



Pix4Dmapper **Getting Started**



Sign-up	2
Redeem	3
Hardware - Computer	3
Software Download and Installation	4
Download	4
Installation	4
Language settings	7
Update	8
License deactivation	8
Inputs	9
Outputs	9
Image Acquisition Plan	10
General Case	10
Building reconstruction	11
City reconstruction - visible facades	12
Processing Options Templates	13
How to create a project	15
Creating a New Project	15
Importing the Images	17
Configuring the Image Properties	17
Selecting the Output / GCP Coordinate System	18
Selecting the Processing Options Template	20
Processing Steps	21
1. Initial Processing	21
2. Point Cloud and Mesh	21
3. DSM, Orthomosaic and Index	21
Ground Control Points (GCPs)	22
Instructions	22

Sign-up

Please follow these steps to create a Pix4D user account:

1. Click the link or copy paste it into your favorite browser: <https://cloud.pix4d.com/signup/>
2. Complete the sign-up page with your information:

Store Support Settings Licenses Log in

Start with a free account

First name

Last name

Email

Password 
At least 6 characters

Software usage ▼

Country
Switzerland ▼

The following conditions apply:

- [Pix4D Cloud Terms Of Service](#)
- [Pix4D Privacy Policy](#)

Yes, I agree with the above conditions

CREATE ACCOUNT

Sign up in a minute and get a 15-day trial including full access to:

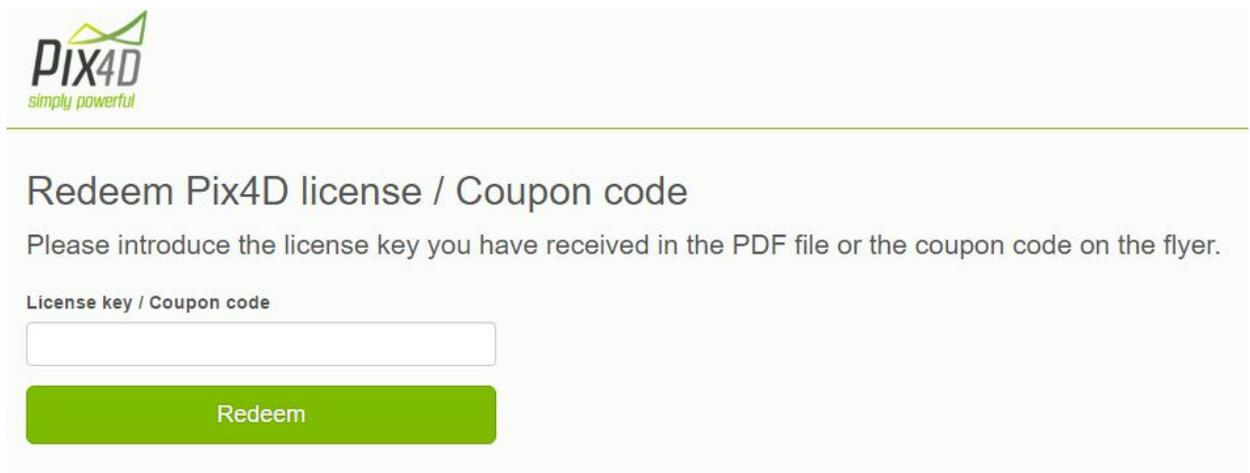
- ✓ Pix4Dmapper desktop
- ✓ Pix4D cloud
- ✓ Personal technical support

3. Click **CREATE ACCOUNT**.
4. A verification email will be sent to activate the account. Open the email and click **Confirm my email**.
5. The Pix4D user account is created and confirmed.

Redeem

If the license is not already assigned to your account via an e-commerce purchase. The license redeem makes sure that you are the owner of your license. First, make sure that you have a Pix4D account. If not, create a Pix4D account as described in section [Sign-up](#). The steps to redeem the license are:

1. Click the link under **Activation Instructions** in the **License Certificate** you have received when purchasing the Pix4D license. Or go to:
<https://cloud.pix4d.com/license-redeem/>
2. Enter the license key in the box below:



PIX4D
simply powerful

Redeem Pix4D license / Coupon code

Please introduce the license key you have received in the PDF file or the coupon code on the flyer.

License key / Coupon code

Redeem

3. Click **Redeem** and the license is under your account.

Hardware - Computer

The following description shows the minimum and recommended Hardware and Software requirements:

Minimum:

- Windows 7, 8, 10, Server 2008, Server 2012, 64 bits (PC or Mac computers using Boot Camp).
- Any CPU (Intel i5/ i7/ Xeon recommended).
- Any GPU that is compatible with OpenGL 3.2. (integrated graphic cards Intel HD 4000 or above).
- Small projects (under 100 images at 14 MP): 4 GB RAM, 10 GB HDD Free Space.
- Medium projects (between 100 and 500 images at 14 MP): 8 GB RAM, 20 GB HDD Free Space.

- Large projects (between 500 and 2000 images at 14 MP): 16 GB RAM, 40 GB HDD Free Space.
- Very Large projects (over 2000 images at 14 MP): 16 GB RAM, 80 GB HDD Free Space.

Recommended:

- Windows 7, 8, 10 64 bits.
- CPU quad-core or hexa-core Intel i7/Xeon.
- GeForce GPU compatible with OpenGL 3.2 and 2 GB RAM.
- Hard disk: SSD.
- Small projects (under 100 images at 14 MP): 8 GB RAM, 15 GB SSD Free Space.
- Medium projects (between 100 and 500 images at 14 MP): 16GB RAM, 30 GB SSD Free Space.
- Large projects (over 500 images at 14 MP): 32 GB RAM, 60 GB SSD Free Space.
- Very Large projects (over 2000 images at 14 MP): 64 GB RAM, 120 GB SSD Free Space.

Software Download and Installation

At any given time there are two versions available to download:

- Pix4D Desktop: This version is meant for production work.
- Pix4D Desktop Preview: This version contains the newest features, but is not meant for production work.

Download

To download the software:

1. Go to: <https://cloud.pix4d.com/download/>.
2. Download Pix4D Desktop or Pix4D Desktop Preview.

Installation

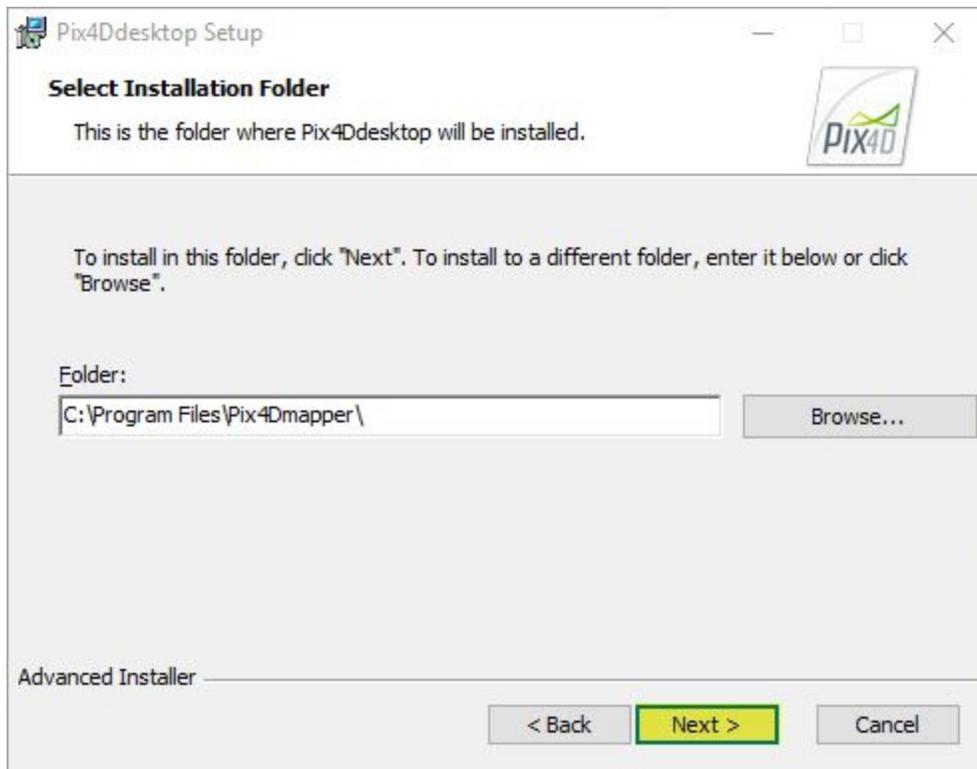
Once the software has been downloaded, install it using the following steps:

1. Double click the downloaded file. The *Pix4Dmapper Setup* wizard starts.

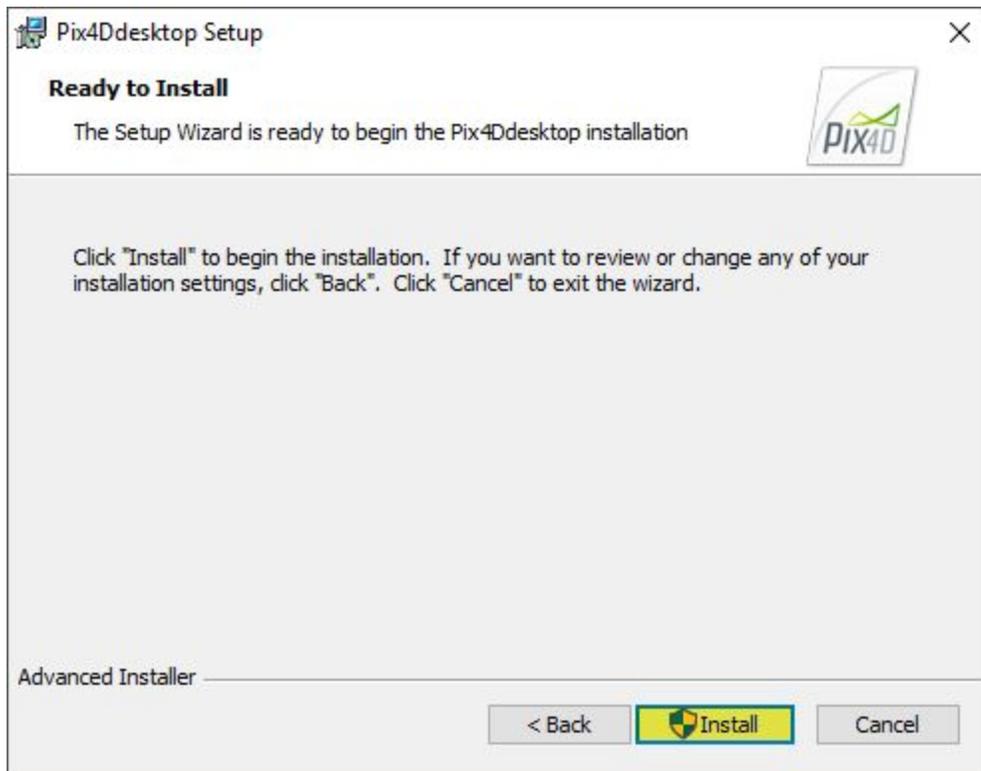
- (optional): If the *Open file - Security Warning* pop-up appears, click **Run**.



- In the *Pix4Dmapper Setup* pop-up, in the *Welcome to the Pix4Dmapper Setup Wizard* screen, click **Next >**.
- (optional) Click **Browse...** to change the destination path for the installation and click **Next >**.



5. Click **Install**.



6. (optional) In the software information window: "*Do you want to allow the following program to install software on this computer?*", click **Yes**.
7. Click **Finish**.
8. A shortcut is created on your desktop and the software opens automatically once the installation is completed.
9. The first time the software opens, the *Pix4Ddesktop Login* window appears:



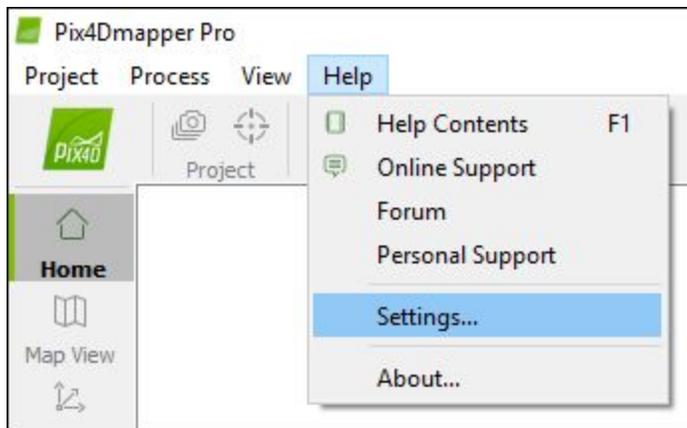
10. Type the *Email* and *Password* of the account and click **Login**.
11. Read the *End-User License Agreement*, select ***I accept the terms in the License Agreement*** and click **Next**.
12. Select one of these options:
 - a. **Request Pix4Dmapper now (Free Trial)** to activate a 15-day trial.
 - b. **Use Pix4Ddiscovery** to activate the limited version.
 - c. **Choose a license** to select among existing licenses on the account.
13. Click **OK**.

Pix4D Desktop is now ready for processing.

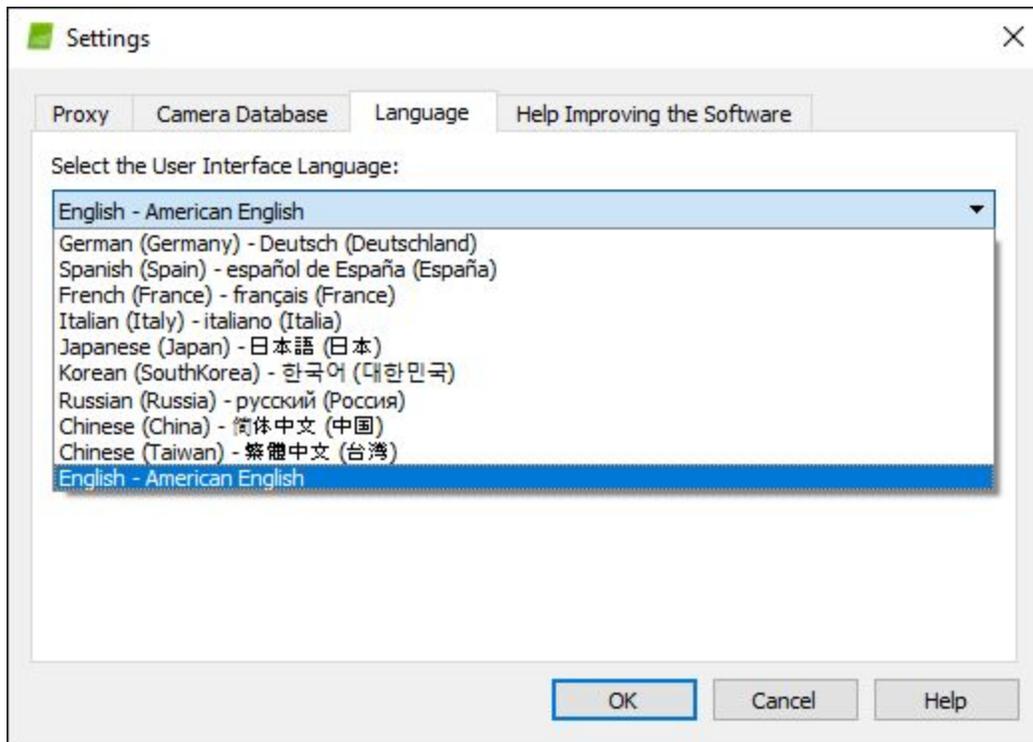
Language settings

You can change the language settings on Pix4D Desktop anytime:

1. Start Pix4Dmapper.
2. On the Menu bar, click **Help > Settings...**



3. The *Settings* windows open:



4. Click on the *Language* tab.
5. Under section *Select the User Interface Language*, select the language.
6. Click **OK**.

The changes will take effect when the software is restarted.

Update

The newest Pix4D Desktop and Pix4D Desktop Preview versions are always available for download as described in section [Download](#).

Additionally, if a new version of Pix4D Desktop is available a *Software Update* pop-up with three options is displayed when the software is opened:

1. **Download and Install Now** to download and install the latest version available.
2. **Remind Me Later** to not download or install the latest version. The pop-up will appear again in 10 days.
3. **Cancel** to not download or install the latest version. No reminder will appear.

License deactivation

Starting from version 4.0 a new license management has been implemented, enabling to remotely deactivate a device:

1. Download the latest version of Pix4D Desktop from the download [page](#).
2. Log out Pix4D Desktop.

3. Go to your license management [panel](#).
4. Under your Pix4Dmapper license, next to the *30 days license check*, click **Enable now**:



5. Log in Pix4D Desktop, this will automatically register the device on the license management panel.
6. To deactivate the device, go to your license management [panel](#) and next to the device name to deactivate, click **Deactivate**  .

Inputs

The main input to Pix4Dmapper are images that can be either JPEG or TIFF files.

Warning: Do not modify the images, i.e. do not rotate or edit the images. Modifying images alters the geometrical properties of the camera and may deteriorate the quality of the results.

Extension	Description
.jpg, .jpeg	JPEG images
.tif, .tiff	Monochromatic TIFF Multi-band TIFF (RGB / Infrared / thermal) 1 layer (no pyramid, no multi-page) 8, 10, 12, 14, 16 bit integer, floating point

Outputs

Pix4Dmapper can generate these outputs:

- **Camera parameters** ([Internal parameters](#), [External parameters](#), [Bingo](#), [SSK](#)): These files describe the internal (focal length,...) or external parameters (position and orientation) of the camera and images.
- **Undistorted images**
- **Densified Point Cloud** (.las, .laz, .xyz, .ply): This is a set of 3D points that reconstruct the model. The X,Y,Z position and the color information is stored for each point of the Densified Point Cloud.

- **Digital Surface Model (Grid DSM, Raster DSM)**: This is a 2.5 D model of the mapped area that contains (X,Y,Z) information, but no color information.
- **Digital Terrain Model (DTM: Raster DTM)**: This is a 2.5 D model of the mapped area after filtering out objects such as buildings, that contains (X,Y,Z) information but no color information.
- **Orthomosaic (GeoTIFF, KML file, Google Maps HTML file)**: 2D model (map) made by blending several orthophotos. Color balanced to be visually pleasing.
- **Index Map (GeoTIFF, Colored KML file, Grid Shapefile)**: To each index is associated an index map. For each pixel on this map, the value of the pixel is derived from the associated reflectance maps.
- **3D Textured Mesh (.obj, .fbx, .dxf, .ply, .pdf, .osgb, .slpk)**: This is a representation of the shape of the model that consists of vertices, edges, faces and the texture from the images that is projected on it. It is useful to present and visualize the model, share it and upload it to online platforms such as Sketchfab.
- **Contour lines (.shp, .pdf, .dxf)**: These are lines connecting points of equal elevation. They are useful because they allow to better understand the shape of the land surface (the topography) on a map.
- **Video animation (.mp4, .mkv, .avi)**
- **3D Digitized objects: Polyline, Surface, Volume base surface (.shp, .dxf,.kml, .dgn)**

Image Acquisition Plan

The image acquisition plan depends on the:

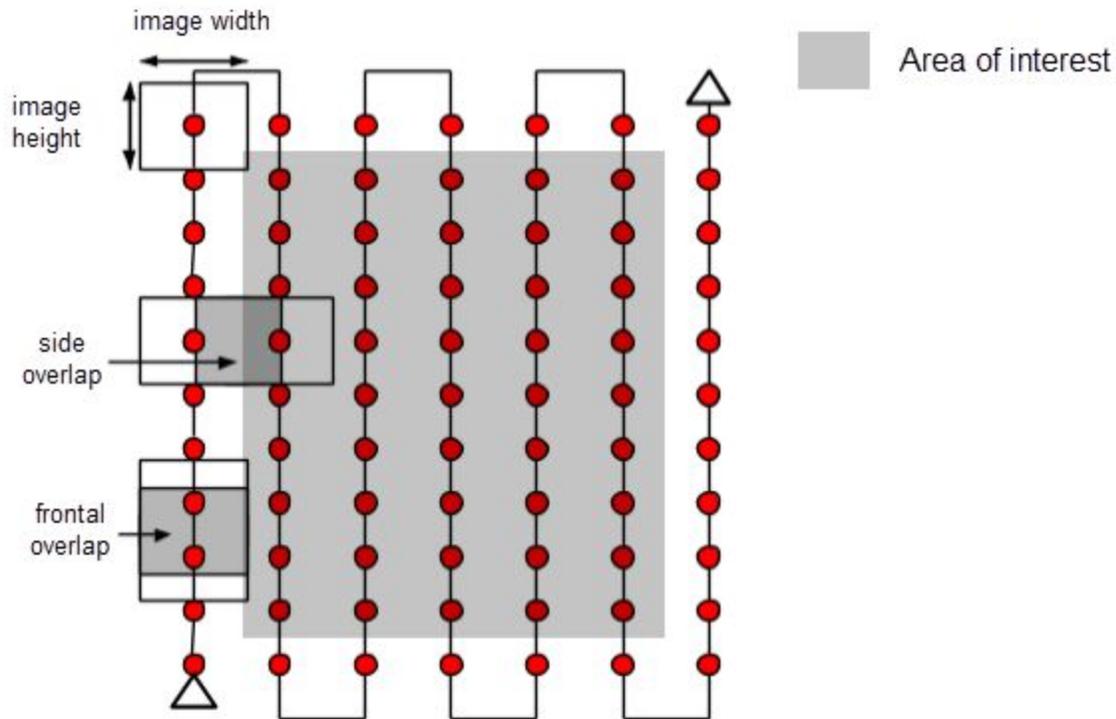
- Type of **terrain / object** to be reconstructed.
- **Ground Sampling Distance (GSD)**: The GSD required by the project specifications will define the distance (flight height) at which the images have to be taken. For example a GSD of 5 cm means that one pixel in the image represents linearly 5 cm on the ground ($5*5 = 25$ square centimeters).
- **Overlap**: The overlap depends on the type of terrain that is mapped and will determine the rate at which the images have to be taken.

A bad image acquisition plan will lead to inaccurate results or processing failure and will require to acquire images again.

All flight plans described below can be flown automatically with the flight planning app **Pix4Dcapture** available on Android and iOS.

General Case

For most cases it is recommended to acquire the images with a regular **grid pattern**. The recommended overlap is at least **75% frontal overlap** (with respect to the flight direction) and at least **60% side overlap** (between flying tracks). The camera should be maintained as much possible at a **constant height** over the terrain / object to ensure the desired GSD.



The overlap and flight height have to be **adapted depending on the terrain**.

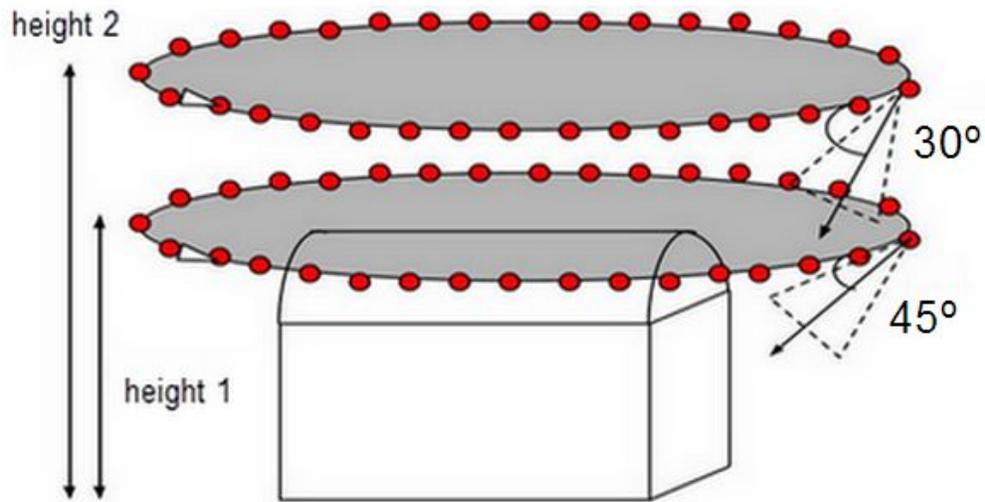
For forest, dense vegetation areas and flat terrains with agricultural fields it is recommended to increase the overlap to at least 85% frontal overlap and at least 70% side overlap and fly higher so that it is easier to detect similarities between overlapping images. Projects with thermal images require at least 90% frontal and side overlap.

For projects with **multiple flights** there should be overlap between the different flights and the conditions (sun direction, weather conditions, no new buildings, etc.) should be similar.

Building reconstruction

For the reconstruction of a building a **circular** flight plan is recommended.

- Fly around the building a first time with a 45° camera angle.
- Fly a second and third time around the building increasing the flight height and decreasing the camera angle with each round.
- It is recommended to take one image every 5 to 10 degrees to ensure enough overlap, depending on the size of the object and distance to it. More images should be taken for shorter distances and larger objects.

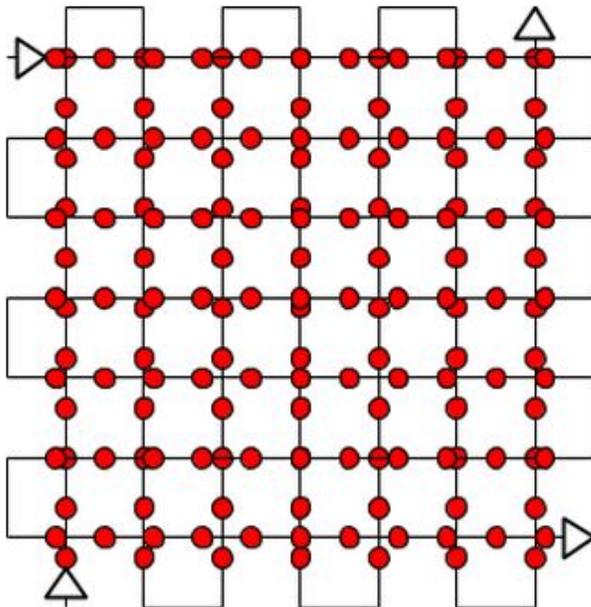


Note: The flight height should not be increased more than twice between all flights, as different heights lead to different GSD.

City reconstruction - visible facades

The 3D reconstruction of urban areas requires a **double grid image** acquisition plan, so that all the facades of buildings (north, west, south, east) are visible on the images. The overlap should be the same as in section [General Case](#).

For the facades to be visible, the images should be taken with an angle between 10° and 35° .



Processing Options Templates

These are the default *Processing Options Templates* available in Pix4Dmapper. We strongly recommend using these to process your projects.

Processing Options Template	Description
3D Maps	<p>Outputs: 3D map (point cloud, 3D textured mesh) as well as a DSM and an Orthomosaic.</p> <p>Typical input: aerial images acquired using a grid flight plan.</p> <p>Outputs quality/reliability: high.</p> <p>Processing speed: slow.</p> <p>Applications: quarries, cadaster, etc.</p>
3D Models	<p>Outputs: 3D model (point cloud, 3D texture mesh).</p> <p>Typical input: aerial oblique or terrestrial images with high overlap.</p> <p>Outputs quality/reliability: high.</p> <p>Processing speed: slow.</p> <p>Application: 3D models of buildings, objects, ground imagery, indoor imagery, inspection, etc.</p>
Ag Multispectral	<p>Outputs: reflectance, index (such as NDVI), classification and application maps.</p> <p>Typical input: aerial nadir images from multispectral cameras (Sequoia, Micasense RedEdge, Multispec 4C, etc).</p> <p>Outputs quality/reliability: high.</p> <p>Processing speed: slow.</p> <p>Application: precision agriculture.</p>
Ag Modified Camera	<p>Outputs: reflectance, index (such as NDVI), classification and application maps.</p> <p>Typical input: aerial nadir images from modified RGB cameras.</p> <p>Outputs quality/reliability: high.</p> <p>Processing speed: slow.</p> <p>Application: precision agriculture.</p>

<p>Ag RGB</p>	<p>Output: orthomosaic. Typical input: images from RGB cameras for agriculture (Sequoia RGB). Outputs quality/reliability: high. Processing speed: average. Application: digital scouting, report claiming for precision agriculture.</p>
<p>3D Maps - Rapid/Low Res</p>	<p>Faster processing of the <i>3D Maps</i> template for assessing the quality of the acquired dataset. Outputs quality/reliability: low. Processing speed: fast.</p>
<p>3D Models - Rapid/Low Res</p>	<p>Faster processing of the <i>3D Models</i> template for assessing the quality of the acquired dataset. Outputs quality/reliability: low. Processing speed: fast.</p>
<p>Ag Modified Camera - Rapid/Low Res</p>	<p>Faster processing of the <i>Ag Modified Camera</i> template for assessing the quality of the acquired dataset. Outputs quality/reliability: low. Processing speed: fast.</p>
<p>Ag RGB - Rapid/Low Res</p>	<p>Faster processing of the <i>Ag RGB</i> template for assessing the quality of the acquired dataset. Outputs quality/reliability: low. Processing speed: fast.</p>
<p>Thermal Camera</p>	<p>Output: thermal reflectance map. Typical input: thermal cameras (Tau 2 based: FLIR Vue Pro, FLIR XT). Outputs quality/reliability: high. Processing speed: slow. Application: irrigation control, solar panels, building inspection, etc.</p>
<p>ThermoMAP Camera</p>	<p>Output: thermal reflectance map. Typical input: nadir images taken with thermoMAP camera.</p>

	Output quality/reliability: high. Processing speed: slow.
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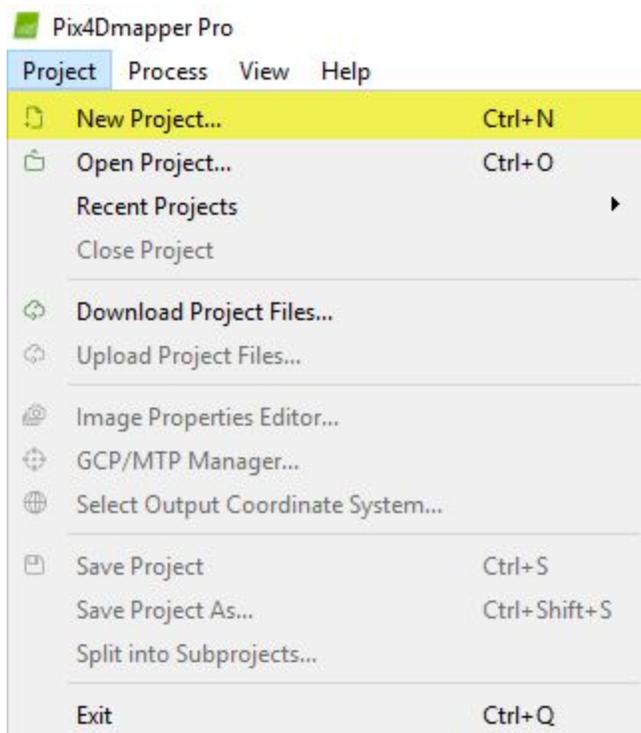
How to create a project

This section goes step by step through the process of creating a new project. Example image datasets can be downloaded from the [Pix4D Knowledge Base](#).

Creating a New Project

To create a new project:

1. Start Pix4Dmapper.
2. On the Menu bar, click **Project > New Project...**



3. The New Project wizard opens:

New Project

This wizard creates a new project.
Choose a name, a directory location and a type for your new project.

Name:

Create In:

Use As Default Project Location

Project Type

New Project

Project Merged from Existing Projects

4. In *Name*: type a name for the project.
5. (optional) In *Create in*: click **Browse...** In the *Select Project Location* pop-up, navigate to select the folder where the project and results will be stored and click **Select Folder**.

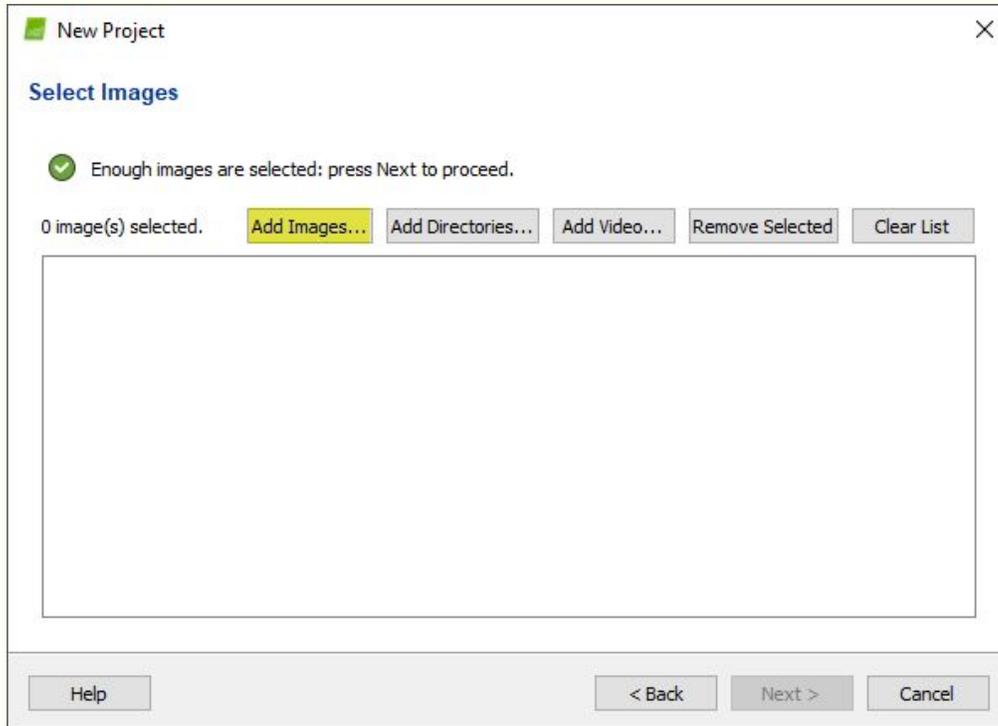
Warning: Ensure that:

- The project name DOES NOT use special character(s).
 - The path where the project will be created DOES NOT use special character(s).
 - The project name and the path together contain less than 128 characters.
6. (optional) Select the checkbox **Use As Default Project Location** to save all new projects in the selected folder.
 7. In *Project Type*, keep the default option *New Project* selected.
 8. Click **Next**.

Importing the Images

On the *Select Images* window:

1. Click **Add Images...** to add the images.



2. On the *Select Images* pop-up, navigate to select the folder where the images are stored, select the images to be imported (it is possible to select multiple images), and click **Open**.
3. Click **Next**.

Configuring the Image Properties

There are three optional steps to follow before clicking **Next**:

a. (optional) [Select Image Coordinate System](#)

If the image geolocation is given in a coordinate system other than WGS84 (default), click **Edit...** under *Coordinate System*, and select the coordinate system of your images.

b. (optional, recommended) [Import Image Geolocation and Orientation](#)

If the image geolocation (position) information is stored in the EXIF of the images, it will be loaded automatically. Note: the geolocation information can also be imported from a file, by clicking **From File....**

Note:

- The software considers the Date Taken field of the EXIF to set up the order in which the images are taken.
- Step 1. Initial Processing is faster for projects with image geolocation. In the case of not sufficient overlap, image geolocation helps to calibrate the images.

c. (optional) Edit Selected Camera Model

A camera model needs to be defined in order to run a project in Pix4Dmapper. The parameters of this model depend on the camera that was used to capture the image. Most cameras save their name in the metadata of the image in EXIF format. This field is used to associate a given camera model to all the images captured with this camera.

The *Selected Camera Model* section, on the *Image Properties* window, displays the selected camera model. The camera model can be:

-  **Valid:** A green check is displayed if the camera model is valid. A camera model is valid if it already exists in the camera model database of Pix4Dmapper or if there is sufficient information in the EXIF data of the images to create a new camera model that will be saved into the user camera model database. If the camera model is retrieved from the EXIF data, it is recommended to check the camera model parameters and, if needed, to edit them.
-  **Invalid:** A red cross is displayed if the camera model is not valid. A camera model is invalid if it is not in the camera model database of Pix4Dmapper and if there is not enough information in the EXIF data of the images. In this case, the camera model needs to be defined manually.

Selecting the Output / GCP Coordinate System

In the Select Output Coordinate System window:

1. (optional) Change the *Output / GCP Coordinate System*.

Note:

- By default, the output and GCP coordinates system will be the same. Thereby, outputs can be shown in the coordinate system of the GCPs.
- By default, the Unit is m (meters).
- If the images have geolocation, by default, Auto detected is selected, displaying the corresponding UTM or NAD83 zone of the images.
- If the images do not have geolocation, by default, Arbitrary Coordinate System is selected.

2. Click **Next**.

The image shows a software dialog box titled "New Project" with a close button (X) in the top right corner. The main heading is "Select Output Coordinate System".

Under "Selected Coordinate System", there is a grid icon and the text: "Datum: World Geodetic System 1984" and "Coordinate System: WGS 84 / UTM zone 32N (egm96)".

Under "Output/GCP Coordinate System", there is a "Unit:" dropdown menu set to "m". Below it are three radio button options:

- Arbitrary Coordinate System [m]
- Auto Detected: WGS84 / UTM zone 32N
- Known Coordinate System [m]

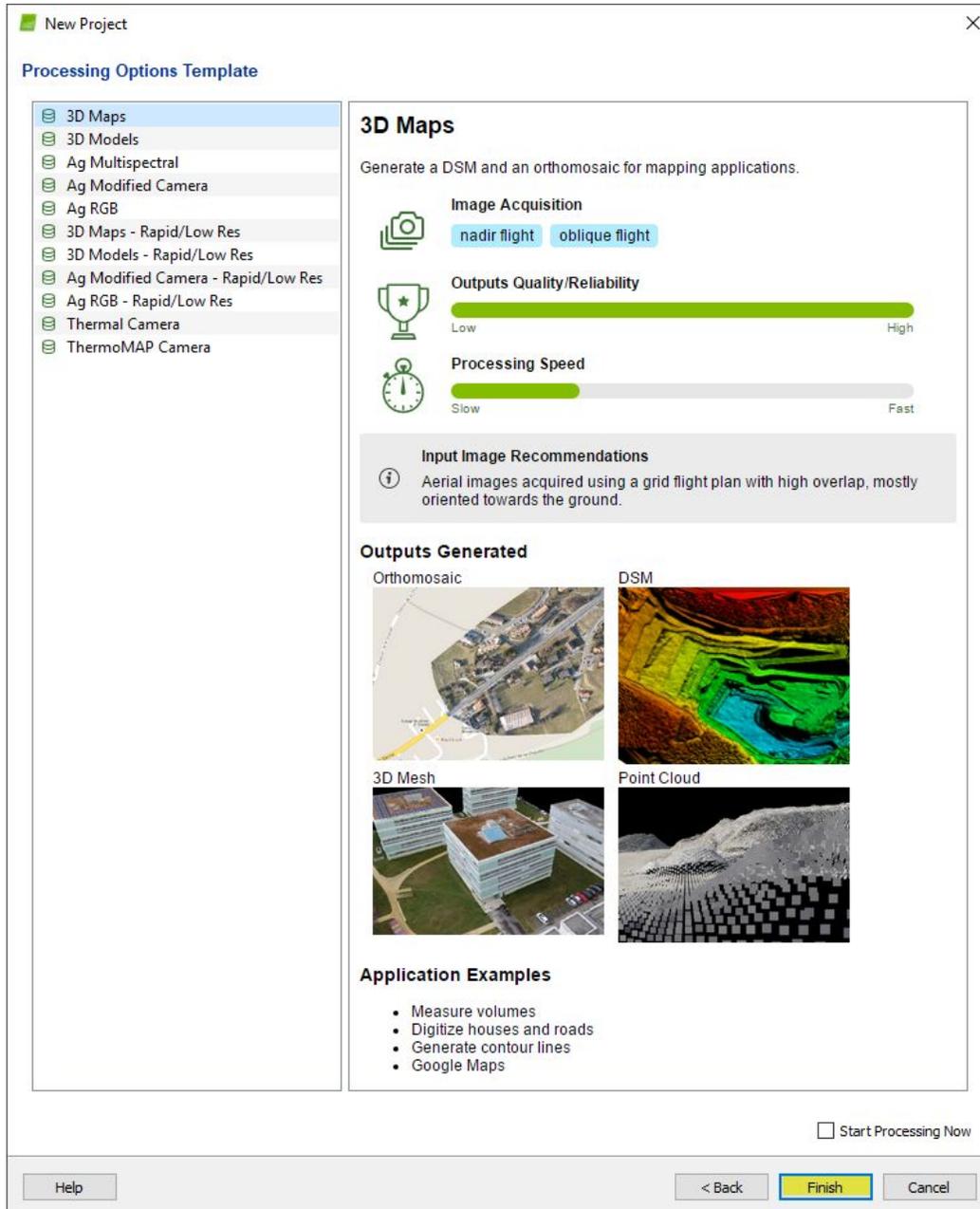
Below the radio buttons is a search field with a magnifying glass icon and the placeholder text "Search Coordinate System". At the bottom left of this section is a checkbox labeled "Advanced Coordinate Options", which is currently unchecked.

At the bottom of the dialog box, there are four buttons: "Help", "< Back", "Next >" (highlighted in yellow), and "Cancel".

Selecting the Processing Options Template

In the *Processing Options Template* window:

1. Select the desired template based on the application and the desired outputs described in section [Processing Options Templates](#).



2. (optional) Select the **Start Processing Now** box to automatically start the processing.
3. Click **Finish** to finish the wizard and start the project.

Processing Steps

This section describes the three steps for processing with Pix4Dmapper.

1. Initial Processing

In this step the images and additional inputs such as GCPs described in section [Inputs](#) will be used to do the following tasks:

- **Keypoints extraction:** Identify specific features as keypoints in the images.
- **Keypoints matching:** Find which images have the same keypoints and match them.
- **Camera model optimization:** Calibrate the internal (focal length,...) and external parameters (orientation,...) of the camera.
- **Geolocation GPS/GCP:** Locate the model if geolocation information is provided.

Automatic Tie Points are created during this step. These are the basis for the next steps of processing.

For more information about outputs, see section [Outputs](#).

2. Point Cloud and Mesh

This step will build on the Automatic Tie Points with:

- **Point Densification:** Additional Tie Points are created based on the *Automatic Tie Points* that results in a *Densified Point Cloud*.
- **3D Textured Mesh:** Based on the Densified Point Cloud a 3D Textured Mesh can be created.

3. DSM, Orthomosaic and Index

This step enables the creation of:

- **Digital Surface Model (DSM):** The creation of the DSM will enable the computation of Volumes, Orthomosaics and Reflectance Maps.
- **Orthomosaic:** The creation of the Orthomosaic is based on orthorectification. This method removes the perspective distortions from the images.
- **Reflectance Map:** The goal is to produce a map where the value of each pixel faithfully indicates the reflectance of the object.
- **Index Map:** Generate an Index Map where the color of each pixel is computed using a formula that combines different bands of the Reflectance Map(s).

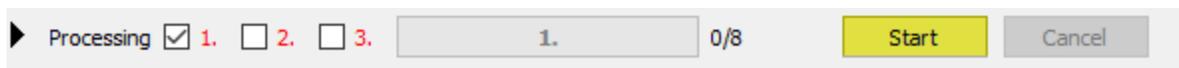
Ground Control Points (GCPs)

This method is used when **the image geolocation and the GCPs are in a known coordinate system** that can be selected from Pix4Dmapper's coordinate system database. The two systems do not need to be the same as. Pix4Dmapper is able to do the conversion between two known coordinate systems.

This is the **MOST COMMON CASE** and makes it possible to mark the GCPs on the images with little manual intervention. However, this method is not suited for "overnight" processing during which the different processing steps start automatically in a row and do not require any supervision by the user.

Instructions

1. Obtain GCPs measurements in the field or through other sources.
2. Add / Import the GCPs with the *GCP / MTP Manager* **WITHOUT** marking them.
3. On the Menu bar, click **View > Processing**. The *Processing* bar appears at the bottom of the Main Window.
4. Select *1. Initial Processing* and deselect *2. Point Cloud and Mesh* and *3. DSM, Orthomosaic and Index*.
5. Click **Start**.



6. Once *Initial Processing* is completed, mark the GCPs in the rayCloud. On the left sidebar, in the section Layers, click **Tie Points**, then click **GCPs / MTPs**. The list of GCPs is displayed. Select a GCP in the layer *GCPs / MTPs*: the right sidebar displays its properties and the list of images in which it is visible. Mark the exact position of the GCP on at least 2 images using the left mouse click. When the green cross is at the correct position in most images, click **Apply**.
7. Click **Process > Reoptimize**.
8. (optional) Regenerate the Quality Report by clicking **Process > Generate Quality Report**.



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