



## **Autodesk Project Photofly**

### **Getting Started with the Photo Scene Editor 2.1**

**Last Update: July 2011**

#### **Introduction**

Capturing the as-built reality for purposes, e.g. renovation, energy analysis, add-on design, is now possible using your standard digital camera, thanks to advanced computer vision technologies developed by Autodesk made available through “Project Photofly.”

Project Photofly is a technology preview that automatically converts photographs shot around an object or of a scene into “Photo Scenes,” which includes a photorealistic 3D model, utilizing the power of cloud computing. To use the power of Project Photofly, a standalone application for Windows called the “Photo Scene Editor” has been developed. This application lets you submit your photographs to the Project Photofly web service and view the returned Photo Scenes. You can save your Photo Scenes and export the computed 3D points, cameras, and 3D geometry in various CAD formats.

This document is the Photo Scene Editor User Guide, which will guide you through the process of creating Photo Scenes and working with them.

#### **What is new with version 2.1?**

- FBX export: see chapter 5
- On the fly manual stitch: see section 2.5

# **Contents**

## **Terms & Definitions**

## **System Requirements**

## **Installation Instructions**

## **Chapter 1 – Shooting the right images**

## **Chapter 2 – Creation of a Photo Scene**

### **2.1 – Global workflow**

### **2.2 – Creating a Photo Scene – Stage 1 (draft mesh)**

### **2.3 – Creating a Photo Scene – Stage 2 (refined mesh)**

### **2.4 – Checking for wrong cameras**

### **2.5 – Manual Stitch**

### **2.6 – Adding Images**

### **2.7 – Sharing projects**

## **Chapter 3 – Viewing and Navigation in the Photo Scene**

### **3.1 – Selecting the interface layout**

### **3.2 – Viewing the stitching results**

### **3.3 – Navigating in the Photo Scene**

### **3.4 - Free 3D Navigation in the Photo Scene**

### **3.5 – Lock on Camera Mode**

## **Chapter 4 – Edition of the Photo Scene**

### **4.1 – Cleaning the 3D mesh**

### **4.2 – Creating Reference Points**

### **4.3 – Setting a World Coordinate System**

### **4.4 – Setting a Reference Distance**

### **4.5 - Making Measurements**

### **4.6 – Creating Lines and Polylines**

## **Chapter 5 – Export of a Photo Scene**

## **Chapter 6 – Creation of a movie**

## **Annex 1 – Preferences**

## **Annex 2 – Error Messages**

### **1 - Error Messages from the Photo Scene Editor**

### **2 - Error Messages from the Automatic Stitching Engine**

## Terms & Definitions

Term	Definition
<b>Image</b>	The Images are the pictures that you shoot around an object or a scene using your digital camera. They can be in .jpeg or .tif format.
<b>Feature</b>	A feature is a group of pixels in the Image that contains some remarkable information such as some variation in contrast. There will be many features automatically extracted by computer vision algorithms in each single Image. Matching corresponding features in several Images is the basis of the Stitching process.
<b>Stitching</b>	Also called “camera calibration” or “camera registration,” the Stitching process is the process of automatically computing the Photo Scene from Images. It utilizes a series of computer vision algorithms called the “Camera Factory Engine,” that runs in the cloud.
<b>Photo Scene</b>	The result of the Stitching process is called a “Photo Scene.” The Photo Scene includes “Calibrated Cameras,” associated with their undistorted “Background Pictures,” a 3D point cloud called the “Automatic Point Cloud,” and a photo textured 3D mesh. A global scale and coordinate system can be set for the Photo Scene.
<b>Cameras</b>	<p>Project Photofly computes the camera parameters associated with each Image: location &amp; orientation in space, focal length and non-linear distortion (barrel/pincushion). Each computed camera is then called a “Camera.” It is associated with its corresponding Image, which is displayed as a Background Picture corresponding to the undistorted Image as seen through the viewing cone.</p> <p><i>Example below: on the left, the Image, on the right, the corresponding calibrated Camera + its Background Picture</i></p> 
<b>Automatic Point Cloud</b>	The Automatic Point Cloud is computed automatically by Project Photofly. This series of 3D points is randomly located over the entire scene, as the result of the automatic feature extraction during the Stitching process. The user has no control over the location and density of this point cloud.

<b>Photo Scene Editor</b>	The Photo Scene Editor is a Windows-based application that lets you submit your Images to the Project Photofly server, to automatically run the Stitching process, and to view the Photo Scenes returned by the server. Using the Photo Scene Editor, you can edit the scene, assign a scale and a coordinate system, add “Reference Points and Lines” (see below), and export the Photo Scenes to various file formats such as DWG.
<b>Reference Points</b>	The Automatic Point Cloud may not provide 3D points exactly where necessary for further snapping or measurement operations. Additional 3D points can then be manually placed by the user, using the Photo Scene Editor. They are collectively called the “Reference Points.” A semi-automatic process lets you perform this task easily.
<b>Reference Lines</b>	The Photo Scene Editor lets you create lines and polylines that can then be used as references geometry when drawing and designing in 3D using other Autodesk applications, e.g., AutoCAD.
<b>Manual Stitch</b>	Some Images may not be stitched automatically, or may be stitched improperly by the automatic engine. In this case, the user can manually select matching Features between any non-stitched photo and some other stitched ones, before re-launching the Photo Scene computation process. This process is called Manual Stitch.
<b>Splats</b>	Splats are the local texture maps associated with each 3D point of the Automatic Point Cloud. They provide a better, more photo-realistic, visualization of the object or the scene. They cannot be exported in a file for use in another application. You may independently activate the display of splats and/or 3D points using the toggle tools provided in the Photo Scene Editor.
<b>3D Mesh</b>	<p>The result of the computation, starting with Photo Scene Editor 2.0, is a 3D mesh, i.e. a 3D model made of triangular polygons. This 3D mesh can be:</p> <ul style="list-style-type: none"> <li>- Draft, if computed automatically right after the stitching process;</li> <li>- Refined, if computed after the draft one, in a user-selected resolution. The photo-texturing is also optimized with the refined mesh.</li> </ul>

## System Requirements

### Operating Systems:

- Microsoft® Windows® XP Service Pack 3 or higher
- Microsoft® Windows® 7
- 32-bit and 64-bit systems

### Recommended CPU:

- Intel®Core™2Duo.

### Memory:

- 1 GB RAM

### Hard Disk:

- 1 GB free hard drive

### Graphic card:

- OpenGL compatible Video Card (Recommended OpenGL version 1.3)
- Video Size : 256MB or more Video Memory

Important: You will need to update the drivers if you are using one of the following graphic boards, for a proper use of the Photo Scene Editor.

- NVIDIA GeForce 8600 GT (Update from NVIDIA website)
- NVIDIA GeForce 9800 GT (Update from NVIDIA website)
- Intel® Q35 Express Chipset Family (Update by option in right click)
- Integrated - Intel® Q45/Q43 Express Chipset (Update by option in right click)

## Installation Instructions

### First installation:

1. Click the “Download Now” button on following page:  
[http://labs.autodesk.com/utilities/photo\\_scene\\_editor/](http://labs.autodesk.com/utilities/photo_scene_editor/).
2. Download the installer “PhotoSceneEditorInstaller.msi.” Click on this file and follow the instruction to install the Photo Scene Editor.

### Updates:

The latest version of the Photo Scene Editor is required for the compatibility with the Web Service, which is continuously updated with new features. The Photo Scene Editor will automatically check for updates if you create a Photo Scene. If an update is required:

1. Click the “Download” button on the following page:  
[http://labs.autodesk.com/utilities/photo\\_scene\\_editor/](http://labs.autodesk.com/utilities/photo_scene_editor/).
2. Download the installer “PhotoSceneEditorInstaller.msi.” Click on this file and follow the instruction to update your Photo Scene Editor.

## Chapter 1 – Shooting the Right Images

Check the shooting guidelines video on:

<http://www.youtube.com/watch?v=8YNrQA6eofI>

Also available from:

[http://labs.autodesk.com/technologies/photofly/getting\\_started/](http://labs.autodesk.com/technologies/photofly/getting_started/)

Your photos must be located on your disk for further use in the Photo Scene Editor or in an Autodesk application. During the Stitching, they will be uploaded temporarily to the cloud for the computation of the Photo Scene.

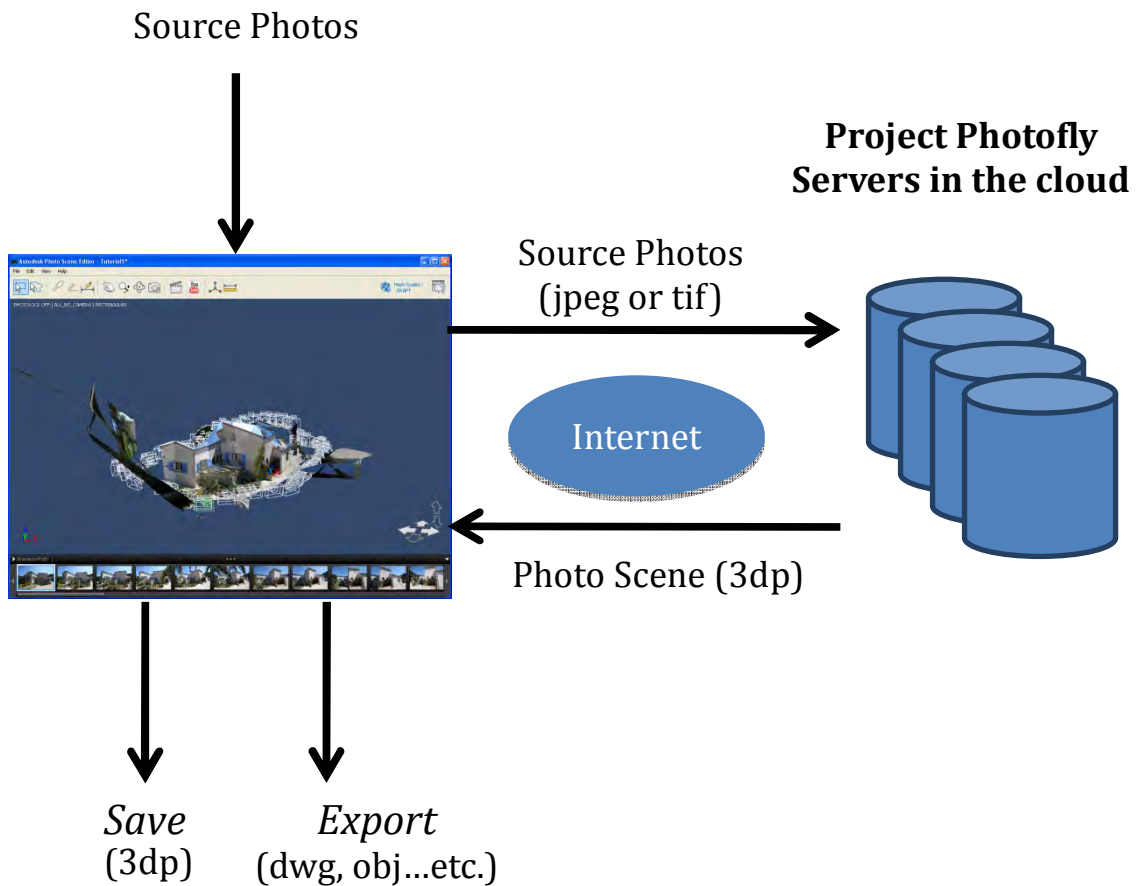
### Important:

- Make sure that you have watched the Photo guide video at least once, before shooting your first set of pictures.
- Your Source Photos on your disk will never be affected or destroyed during any of the Photo Scene creation or edition process.
- Possible formats are JPEG or TIFF.
- The folder where you saved your Source Photos must NOT be in “read only” mode. As a matter of fact, the photo scene computed by the server will be automatically saved in the same folder, so you MUST be given all the access rights for this folder.
- Remove the fuzzy, over-exposed, or under-exposed pictures from your folder.
- Rotate your pictures if they have been shot in portrait mode. This rotation cannot be done once the photos have been selected in the Photo Scene Editor.

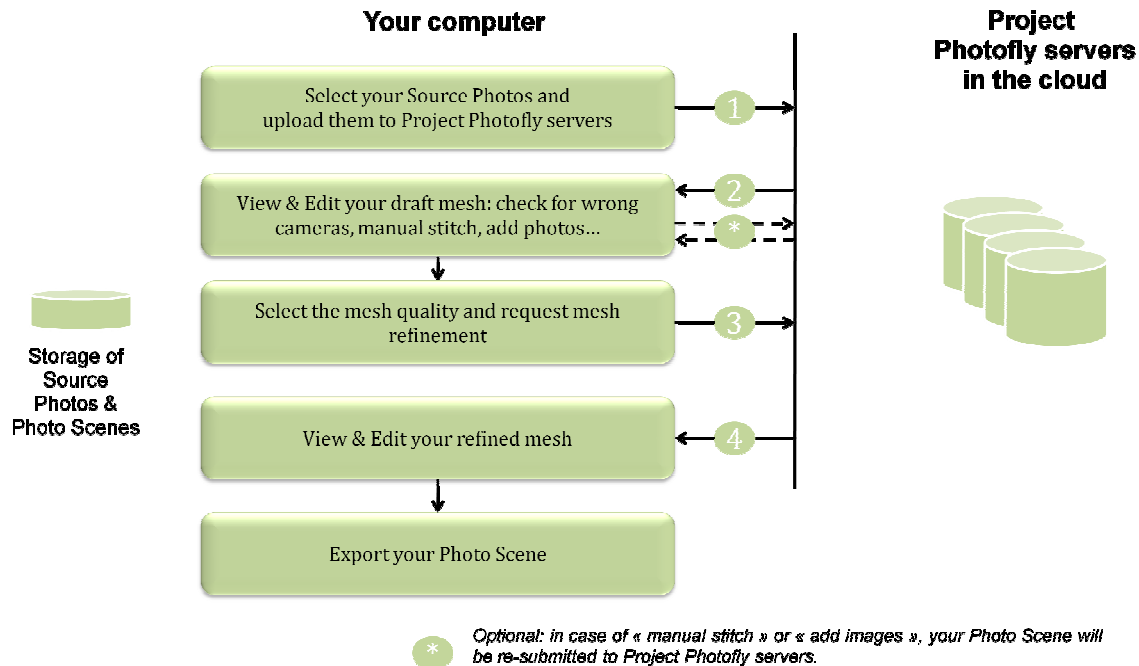
## Chapter 2 – Creation of a Photo Scene

### 2.1 – Global workflow

Photo Scenes are computed in the cloud, which means your Images will be uploaded to a server for processing, and you will get a Photo Scene file back once the computation is over.



Starting with Photo Scene Editor 2.0, the returned Photo Scene includes a photo-textured 3D mesh, automatically computed from the various stitched photos. The Photo Scene creation process is run in 4 steps in a typical workflow as follows:



### Default Photo Scene Name

The Photo Scene file has a “.3dp” extension. A default name is automatically created to include the date and the time when it was computed, as follows: “Scene\_yyyy\_mm\_dd\_hr\_mn\_sc.3dp”. You can change this name and set yours.

### Wait or E-mail

Once your Images are uploaded, or once requested by the user after a manual stitch or for mesh refinement, processing starts in the cloud. You then have the choice to:

- Either wait for the result and stay connected:
  - o Once the computation is over, the Photo Scene will appear in a 3D viewer automatically with no intervention.
  - o The .3dp file will automatically be saved in the same folder as your Images.
- Or quit the application and get the result later, since the processing may take a while depending on the number of Images, the number of projects being processed, and the number of CPUs allocated in the cloud at that time. In this case, you are asked to provide your e-mail address, where a message will be sent once the computation is done. You can get the result by either opening or saving your Photo Scene.
- At any time, you can open a Photo Scene file and view or edit its content as explained in this document.



## 2.2 – Creating a Photo Scene – Stage 1 (draft mesh)

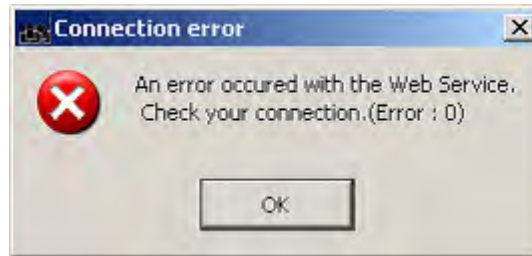
- Run “PhotoSceneEditor.exe” to start the Photo Scene Editor wizard. If you are connected to the Internet, the following window will pop-up:



- If you are not connected to the Internet, or if you are behind a proxy server, when starting your Photo Scene Editor, the following error message will appear before the pop-up window above appears:



- If you click on “Work Offline,” the following message will appear:



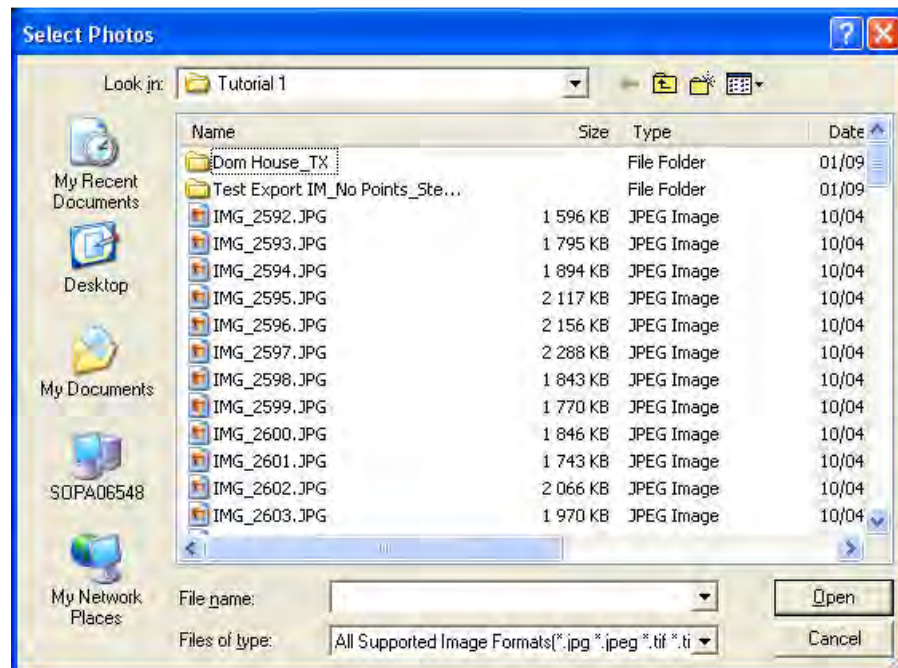
Click on “OK” to continue using your Photo Scene Editor to open, view and edit Photo Scenes in this case. The creation of Photo Scenes will not be possible in this case. See paragraph 2.4 below “Opening a Photo Scene.”

- Clicking on “Edit Proxy Settings” will pop-up the “Connection” setting tab of the Photo Scene Editor Preferences window. Check the instructions in the Annex 1 – Preferences – *Connection*.

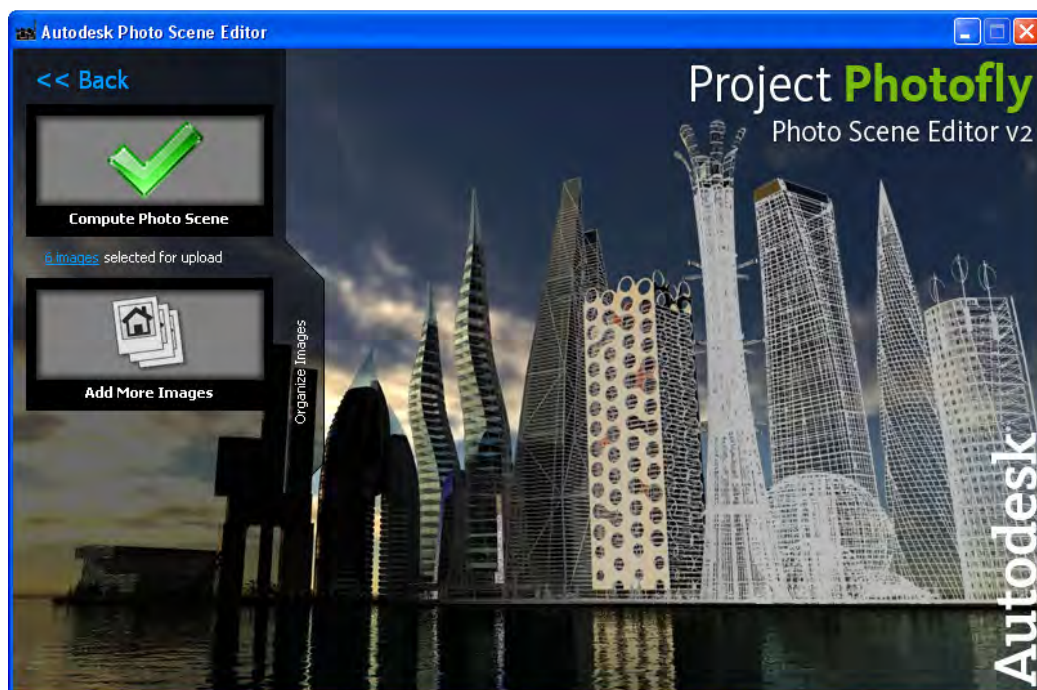
**Important:**

- Your computer MUST be at the right date and time, in your right time zone. Otherwise, the connection with the Project Photofly servers (which may well be in another time zone than yours) will NOT respond correctly.

- Click on “Create Photo Scene From Your Images” to start the process. This will open the following selection window.

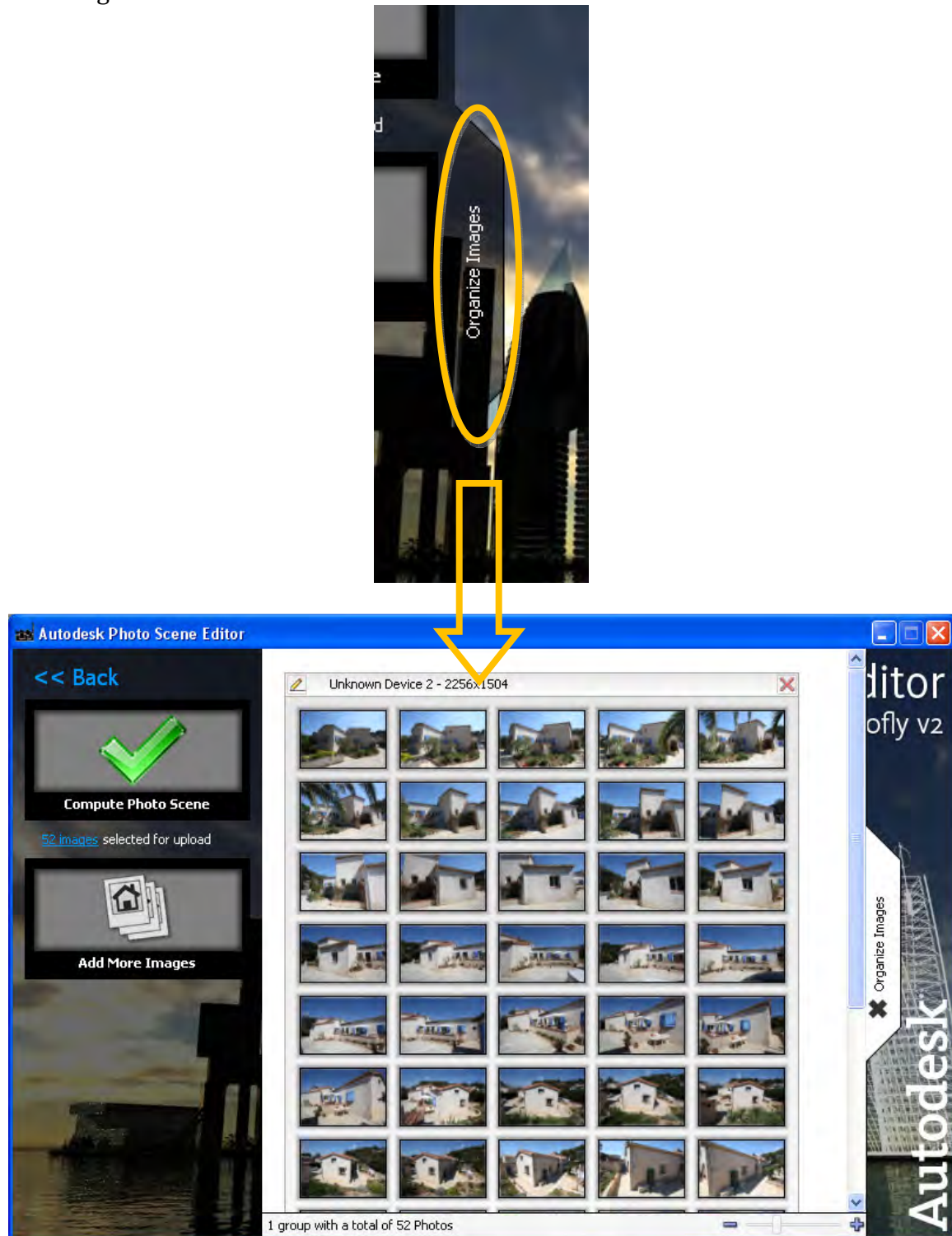


- Browse and select your photos. Click on “Open” when finished. This will open the following window:

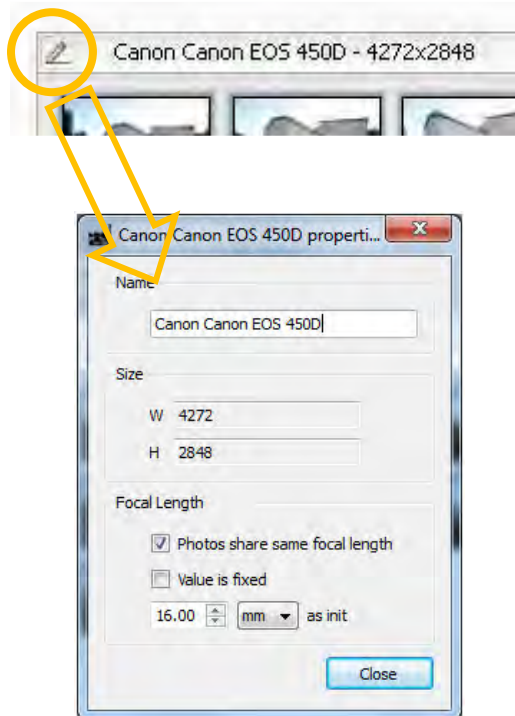




- You can click on “Organize Images” vertical tab to see your selected Images again.



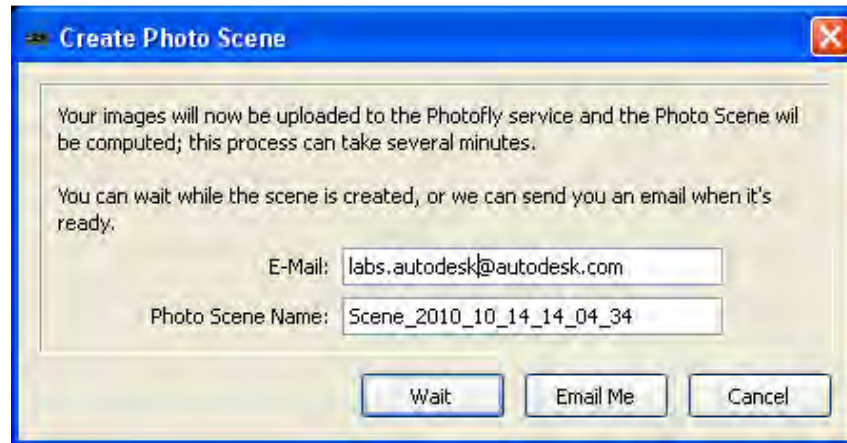
- Images are automatically grouped by same focal length, as read from their Exif files. Clicking on the information icon on the upper left corner, will open the property box for each group of photos.



- Click on “Compute Photo Scene” to start the stitching process.
- The first time that you use the software, the following window appears:

- Enter your name and e-mail address (mandatory), and check the necessary boxes (first one mandatory).

- A second window appears every time you submit photos to Project Photofly servers:



- The "Photo Scene Name" will allow you to enter a name for your project, so that you can easily identify it in the e-mail giving the link to download the result once the computation is completed. This can be useful if you have launched several projects on the cloud.
- Click on one of the options.
- The Images will then start getting uploaded to the server for computation.
- The following window will appear. If you choose to stay connected, wait until the three steps are completed.





- Note that the Photo Scene creation process may start on the first uploaded pictures. So you may see the second progress bar start before the upload is completed.
- At any time during the process, you can click on “Send Me an Email When Complete” if you select not to wait until the upload (step 1) and/or the computation (step 2) is over.
- If an error occurs during the automatic stitching process, you may receive one the error messages listed in Annex 2. You will then need to proceed according to the instructions given in such messages.

### *Receiving an e-mail once the computation is finished*

- Once the computation is over, you will receive the following e-mail from Autodesk Labs:

“Your Photo Scene has been created successfully. Here is the link to download your Photo Scene: .....”

- When clicking on “Photo\_Scene-Name,” you will be prompted the following message:



- Click “Open” or “Save” to start downloading your .3dp file.
- If you select “Open,” the Photo Scene Editor will start automatically and your project will appear in the 3D viewer. Do not forget to save it before quitting the software.
- If you selected to “save” the Photo Scene, you can run “PhotoSceneEditor.exe” at any time, and click on “Open an Existing Photo Scene” to open your .3dp

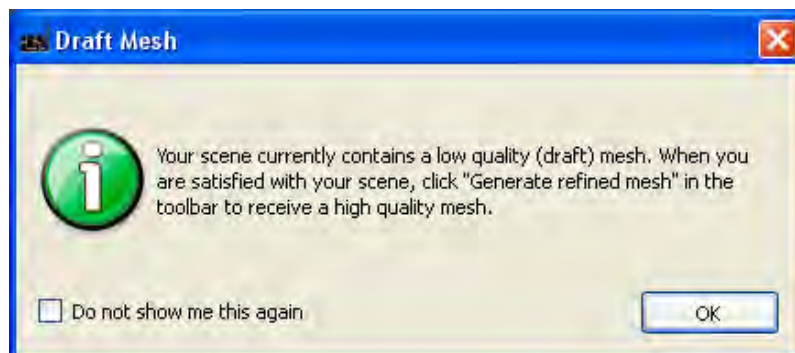
file. You can also directly access your “Recent Files” by clicking on one of the thumbnails on the lower right of the window.



- The Photo Scene will automatically appear in the 3D viewer.

#### *First Photo Scene received*

- Right after the first stitch, a draft mesh has been computed by the servers. The following message appears to warn you that a further refinement step is needed to get a higher quality mesh.



- At this stage, you can use the draft mesh for several purposes:
  - Run a mesh refinement process, optionally selecting the area of the mesh that you want to refine (see section 2.3 below).
  - Complete your Photo Scene (see section 2.4 below):
    - Check for wrong cameras and eventually unstitch or remove them.
    - Manually stitch the unstitched pictures.
    - Add images.
  - Edit the Photo Scene (see section 3 below).

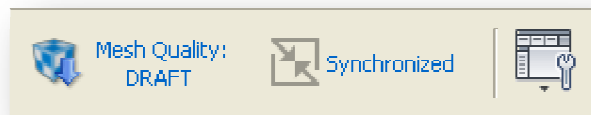


- Export the draft mesh as is, in one the 3D formats (see section 4 below).
- Export the file as a RZI file, for photo-modeling inside AutoCAD.

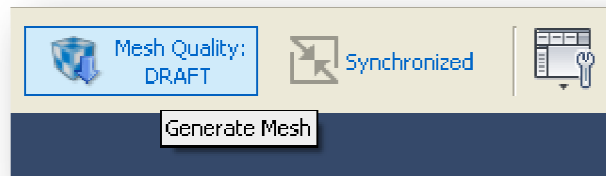
## 2.3 – Creating a Photo Scene – Stage 2 (refined mesh)

### *Request for a mesh refinement*

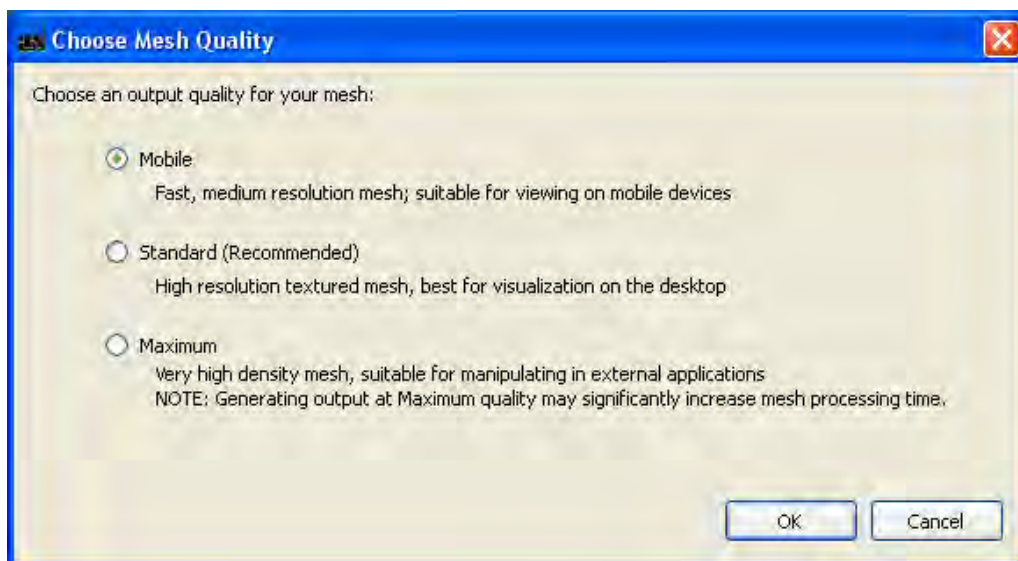
- Before requesting a mesh refinement, you can define the area of the mesh that you want: check “Section 3 – Editing the Photo Scene.”
- The quality of the mesh being displayed is always shown at the right of the ribbon:



- Placing the mouse over, you will be able to activate the Mesh Quality selection, for the mesh refinement stage.



- Click on it to make the following pop-up window appear:

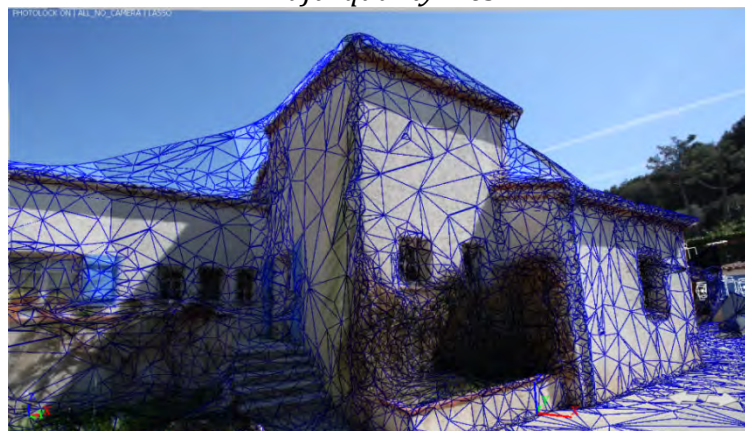


- Click on the desired mesh quality.
- The Photo Scene will then be uploaded on Project Photofly servers for computation. Note that the Source Photos are NOT be uploaded a second time. The automatic mesh creation process may take several minutes depending on the size of your project, the number of projects in the queue of Project Photofly servers, and the quality that you requested. Therefore, you can either wait or request an e-mail to be sent once the computation is over. See section 2.2 above. The e-mail is recommended if you requested a mesh with maximum quality.



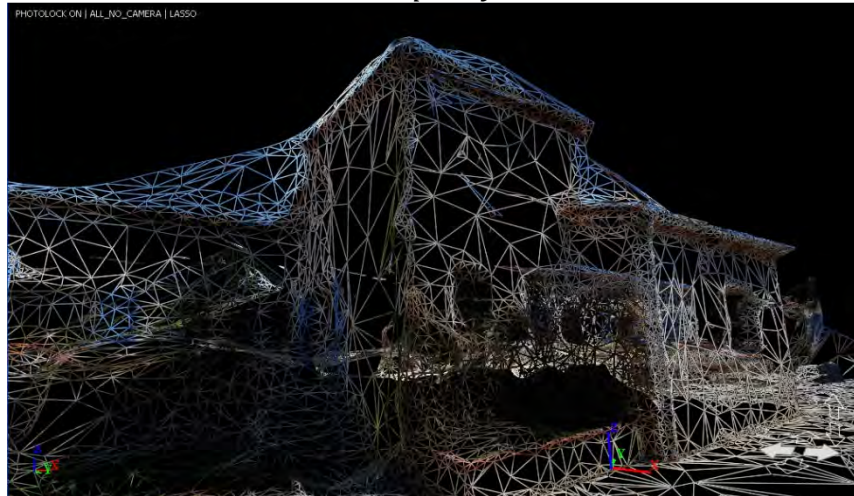
- Once the mesh has been computed, it can be viewed and edited using the Photo Scene Editor as explained in Section 3 below.
- Here below, an example of the same project with the 4 mesh qualities.

*"Draft" quality mesh*

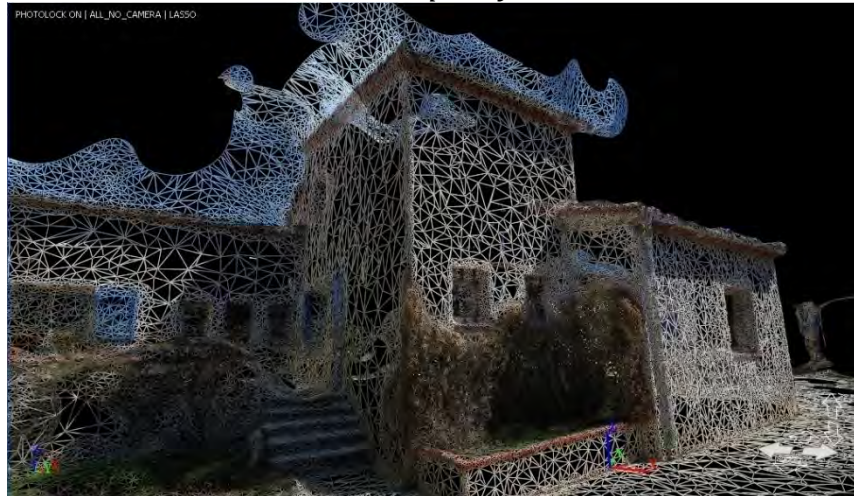




*“Mobile” quality mesh*



*“Standard” quality mesh*

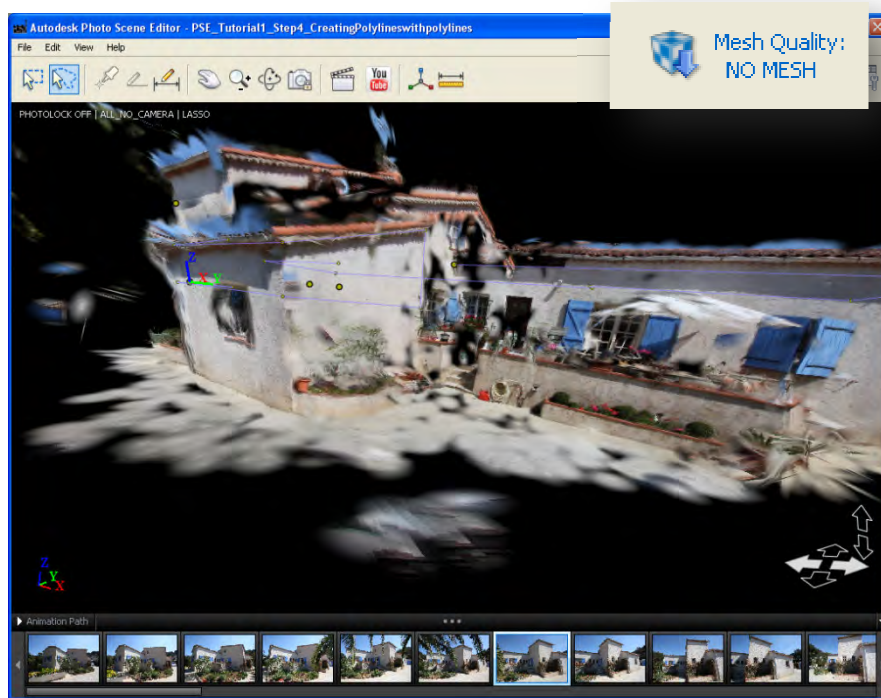


*“Maximum” quality mesh*



### *Opening a .rzi file from previous Photo Scene Editor versions*

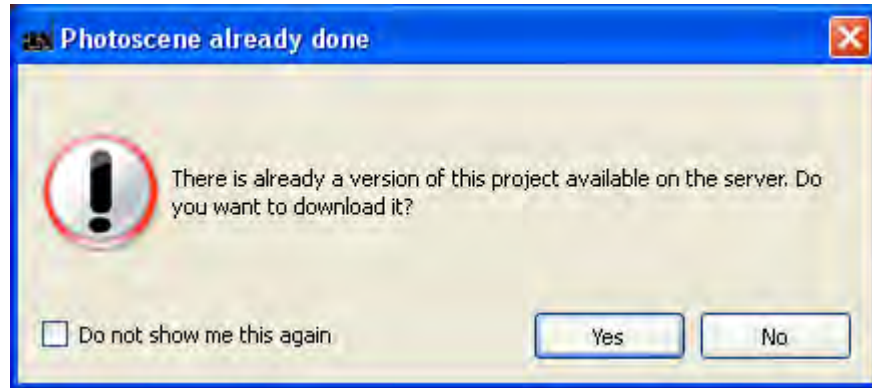
- You can open a .rzi file computed with previous versions of the Photo Scene Editor.
- In this case, the Photo Scene will appear with splats (and all the elements that you added eventually, such as Reference Points or Lines).



- You can then ask for a mesh refinement in one of the proposed 3 mesh qualities (see above). Draft mesh is not possible in this case.

### *Requesting a same mesh refinement several times*

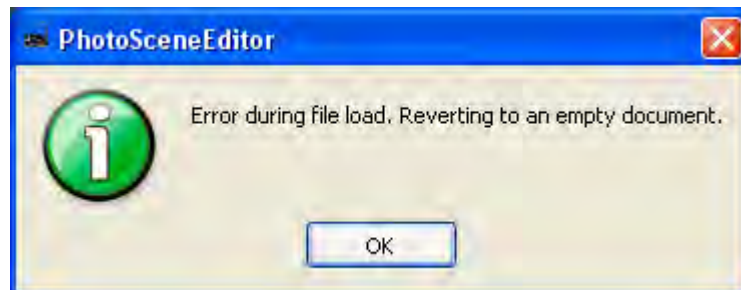
- If you have already requested a mesh refinement for a same project, with the same resolution, it may happen that it is already stored on Project Photofly servers. In this case, the Photo Scene Editor will pop-up the following window:



- If you answer “No,” the Photo Scene will be uploaded to Project Photofly servers and a new computation will start.

### *Error during file load*

- If you have moved your Images from the folder where they were initially stored when creating the corresponding Photo Scene, an image selection window will appear, asking to locate the Image folder by selecting the first image only. If you cannot find your images anymore, the following error message will appear and the 3D viewer will open without any Photo Scene loaded.

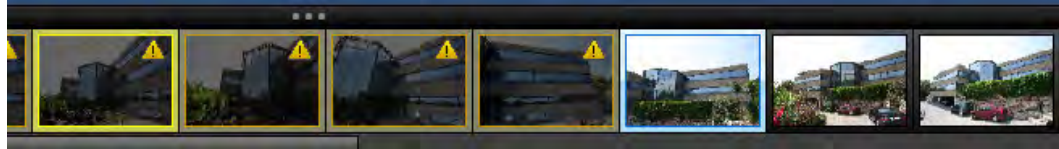




## 2.4 – Checking for wrong cameras

Sometimes, the Project Photofly automatic engine is not 100% successful.

- **Case 1:** The automatic engine did not provide 100% stitching success on all your Images. Photos that were not stitched automatically are viewed in the thumbnail as darker pictures and with a yellow warning as shown below:

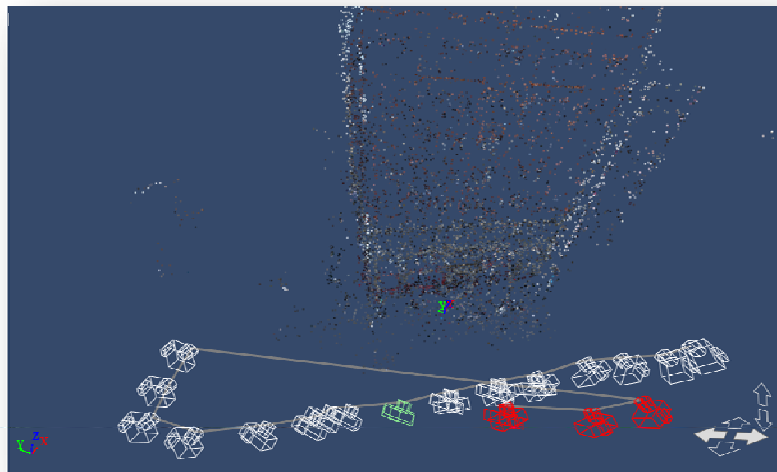


In most cases, this is due to a lack of visual continuity between adjacent pictures. Check the Shooting guidelines in Chapter 1 for more information. You can manually connect these photos with the already stitched ones, through a “Manual Stitch” process (see section 2.5 below).

- **Case 2:** In some cases, the automatic engine will compute wrong camera information. This may occur when your pictures contain so many repetitive patterns that even human eyes can hardly make a difference. For example, the many sides of a building may all look alike, and the engine may well place some of your photos on the wrong side of the building. In this case 2, you will need to unstitch this (these) photo(s) and manually stitch it (them) again.

### Checking for wrong cameras – Method 1

One way to check if this case 2 happened is to look at the computed camera path, that you can compare to your real sequence of shooting (if you took the pictures of course). In the example below, the 4 cameras in red have been stitched improperly, which is visible by the camera path, which should have been continuous in this case.

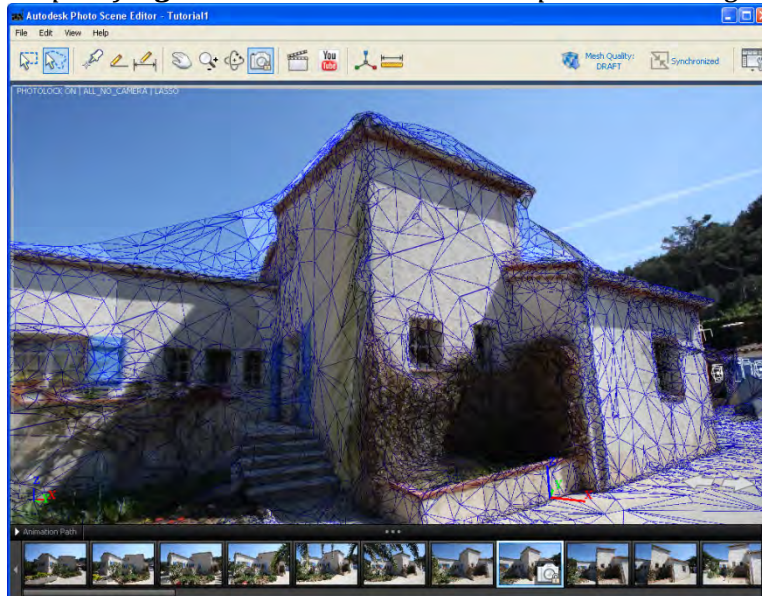


## Checking for wrong cameras – Method 2

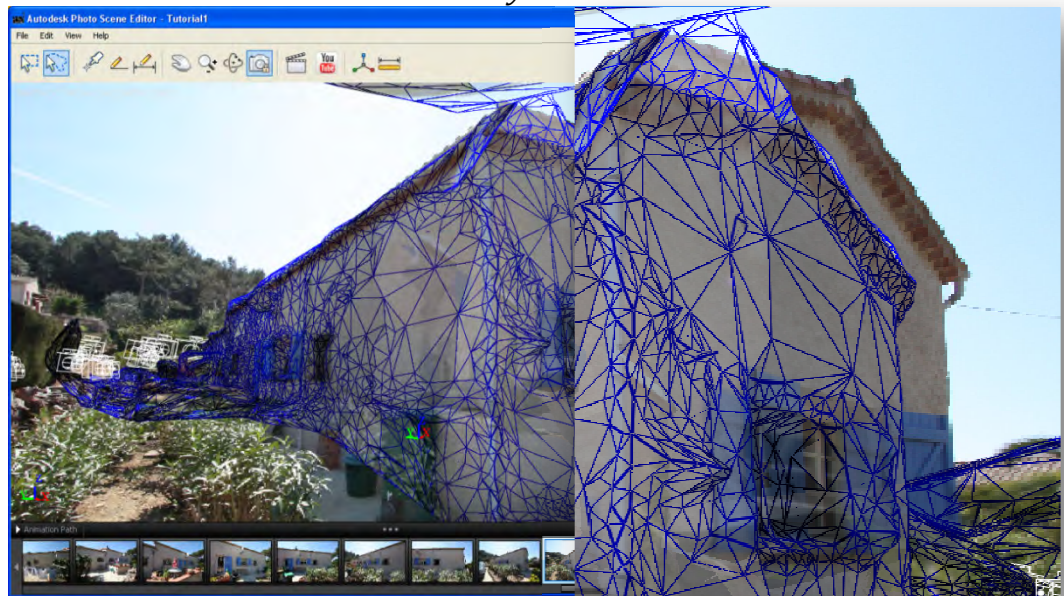
Another way to look for wrong cameras (case 2) is to visually superimpose the draft mesh over each stitched photo, and check for any misalignment.

- Make sure that you use the specific display for the draft mesh (blue wireframe and semi-transparent textures). If not, check *Preferences* -> *Display Settings* (Annex 1), and un-toggle the “Display Draft Mesh as Other Mesh” button.
- Use the “Photolock” mode, and browse through your cameras one by one.

*Example of a **good camera**: 3D mesh and picture are aligned.*



*Example of a **wrong camera**: the 3D mesh and the picture are not aligned.  
This camera should be manually unstitched.*



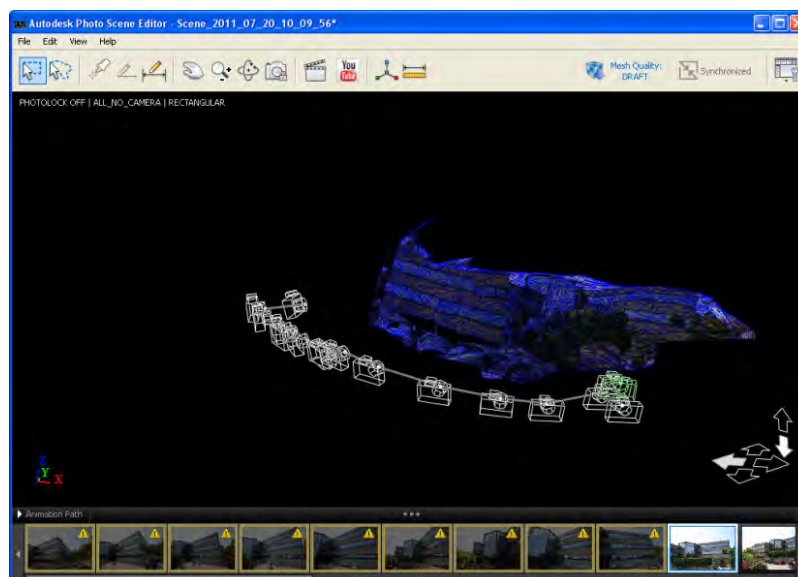
### *Unstitching the wrong cameras*

- The first step is then to unstitch these photos:
  - Identify them in the thumbnail view. Note that you can select several images in the thumbnail view by clicking on them using either “shift” or “ctrl” keys.
  - Select “Unstitch Selected Photo(s)” when right-clicking in one of the selected thumbnail images.
  - The unstitched photos then become dark in the thumbnail view, and they disappear from the 3D window.
  - You should unstitch all the bad ones before going for a manual stitch.
- Once all these improperly stitched photos have been unstitched, you can then manually stitch them again by following the steps listed in Case 1 above.

## **2.5 – Manual Stitch**

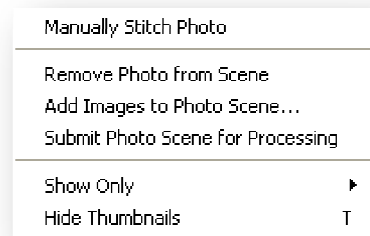
The manual stitching process consists in adding the photos that could not be stitched automatically in your project, by manually connecting such missing photos to the ones already stitched. Starting with version 2.1 of the Photo Scene Editor, you can now manually stitch several unstitched photos in a single pass before re-submitting your Photo Scene to the Project Photofly servers: each photo that you have been manually stitching is pre-computed locally and pre-positioned at its right location. Therefore, each manually stitched photo can be used as any other stitched photo as a reference for connecting other unstitched photos. This is particularly useful when you need to complete the complete tour of a scene (a building, an object...etc.) with several pictures that requires a manual stitch.

Here is an example below. Several pictures could not be stitched automatically, and they appear darker in the thumbnail viewer.

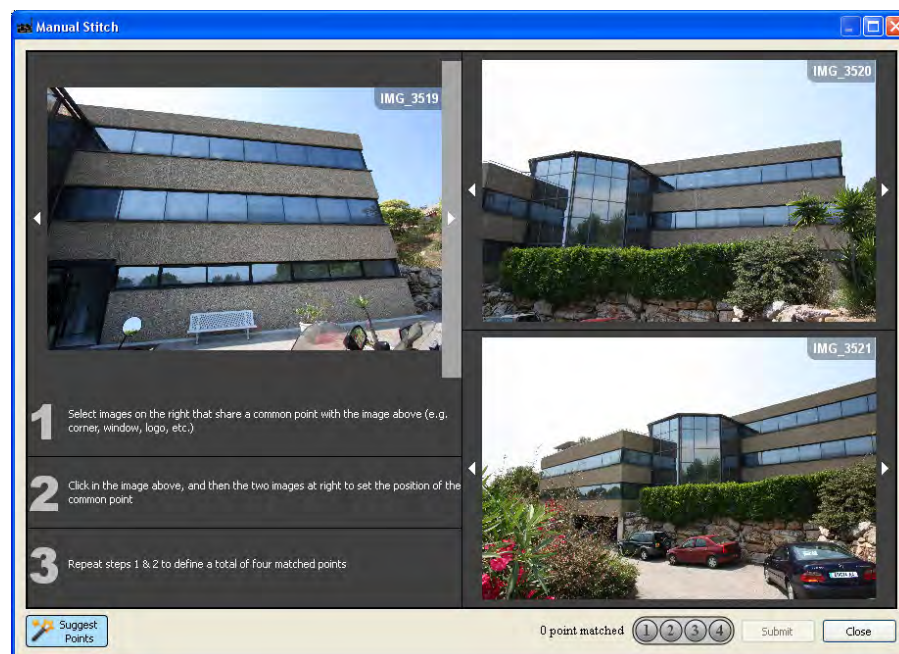




- Double click in the thumbnail picture of the first photo that you want to manually stitch, or right click in it and select “Manual Stitch.”



- This will pop-up the following window:

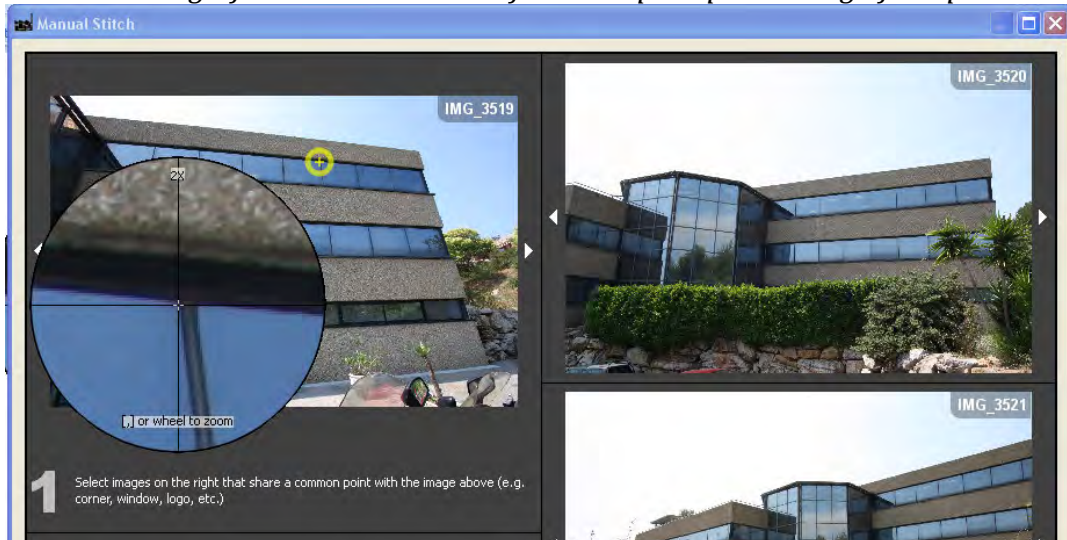


- The process is the following:
  - The picture to be stitched manually is displayed on the left hand side. You can browse the unstitched pictures left or right using the arrows on the sides of the displayed photo.
  - On the right hand-side, you can select and view 2 pictures among all the stitched pictures. You can browse the stitched pictures left or right using the arrows on the sides of the displayed photos.
  - You must create at least 4 connections between the non-stitched picture on the left, and at least 2 stitched ones on the right.
  - Start by selecting a feature in the non-stitched picture by right clicking on top of the image. Make sure to select an area that is visible in at least 2 stitched images.

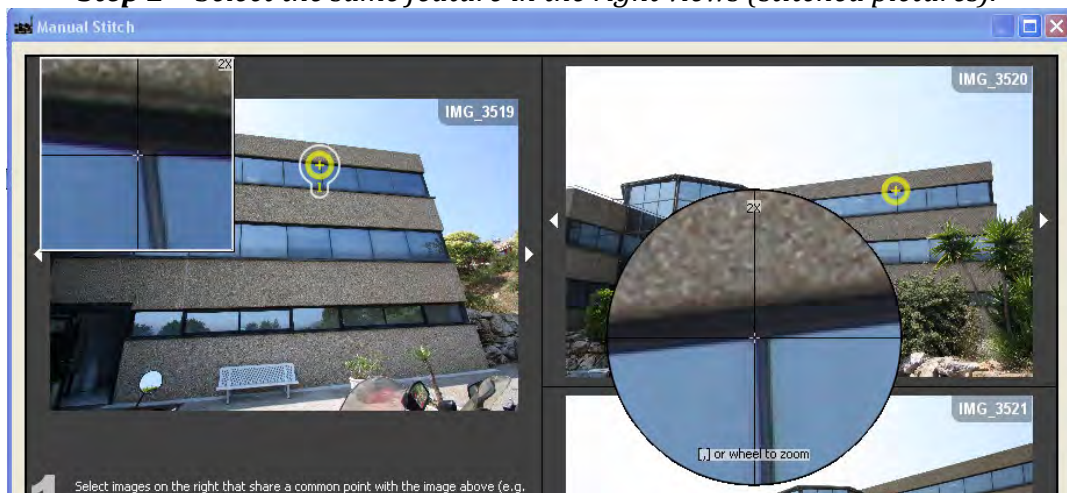
### *Manually stitching one picture*

- Follow steps 1 to 6 below.

**Step 1** – Select a feature (well defined, highly contrasted point) in the left view (non-stitched picture). A left click in the image will pop-up a magnifier window to allow for a sub-pixel positioning of the point.



**Step 2** – Select the same feature in the right views (stitched pictures).

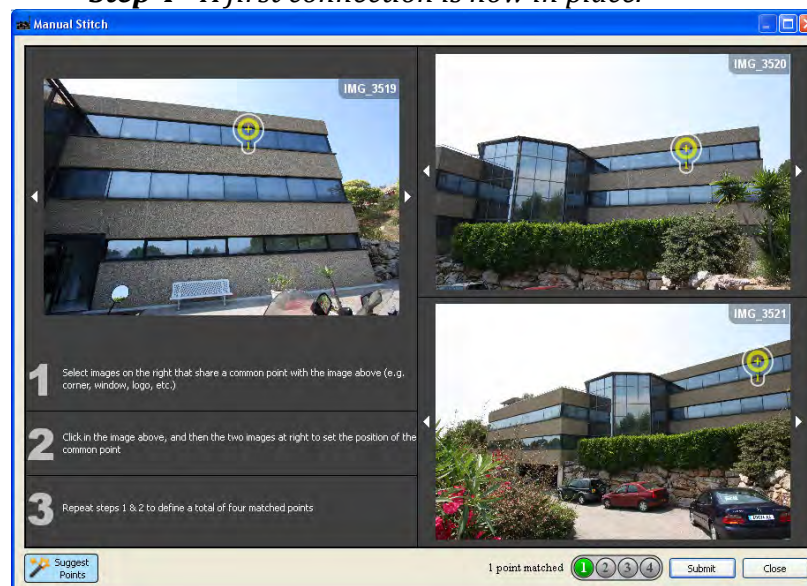


**Step 3** – If the “Suggest Points” button is set at bottom left of the window, the software will automatically propose a matching feature in the third view as below. Proposed features are marked with a yellow square. You need to click in it to validate or readjust the location of the point in this 3<sup>rd</sup> view.



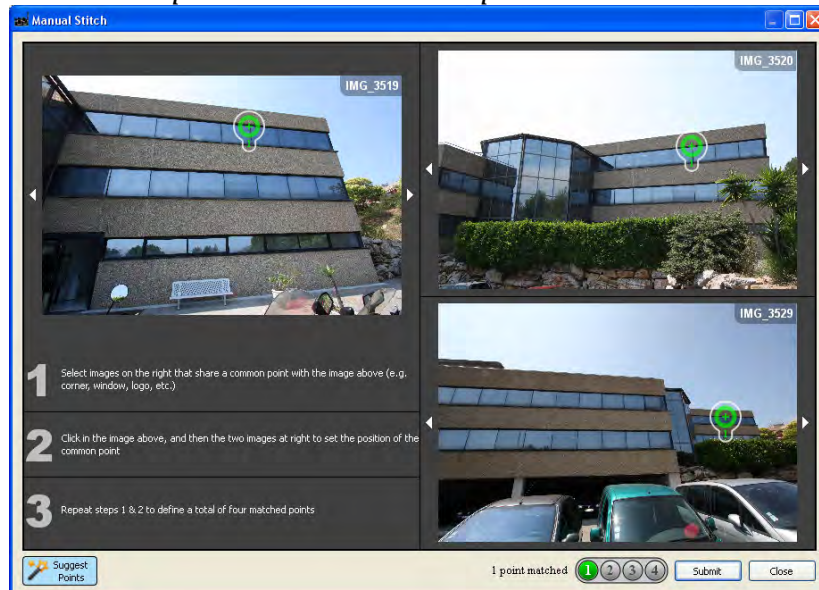
**Step 3.1** – If there is no proposed feature, you must click at the right location to complete the manual matching process on the third view as well.

**Step 4** - A first connection is now in place.

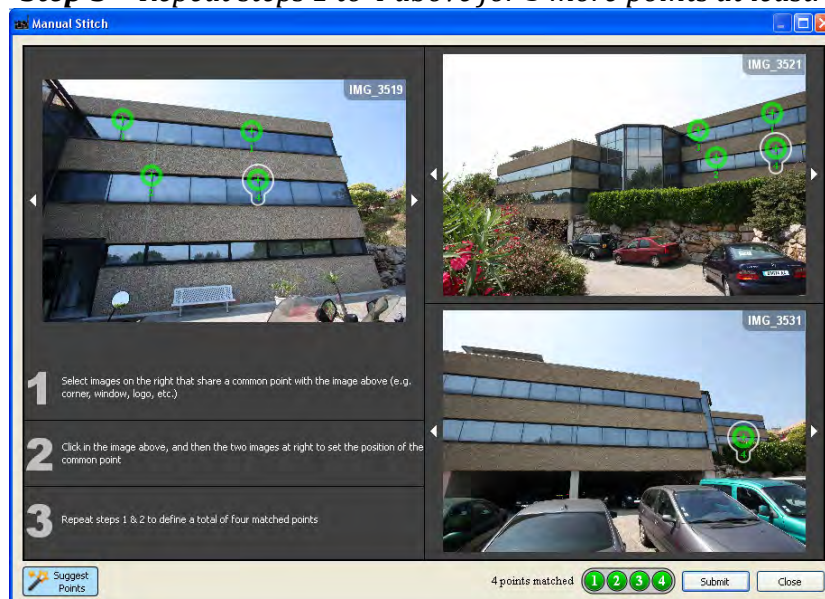




**Step 4.1** - If the connection point remains yellow in all 3 windows as above, it means that there is not enough parallax between the 2 selected stitched photos on the right, so you will need to reinforce this point by selecting it again in a 4<sup>th</sup> view showing more parallax as in the example below.



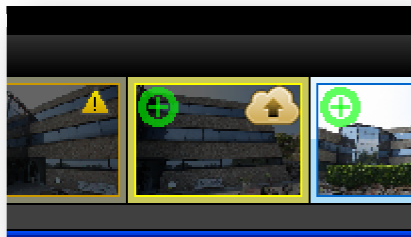
**Step 5** – Repeat steps 1 to 4 above for 3 more points at least.



- Once 4 connections have been made with all manual points in “green”, the picture that you just manually stitched has been pre-processed at its right location. It will be used as a reference for further manual stitch. The following message appears:



This added photo then appears in the thumbnail viewer as follows:

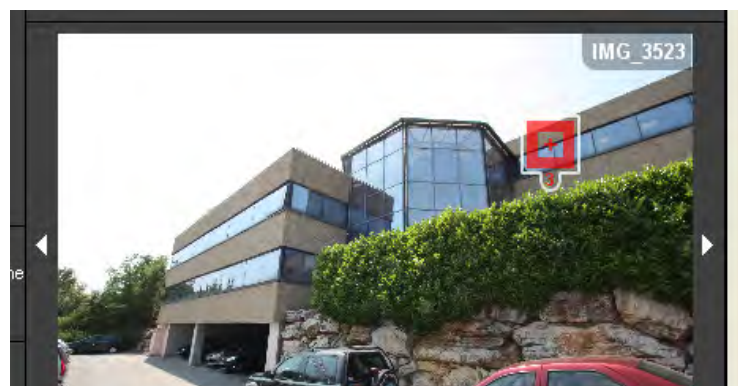


#### *Manually stitching more unstitched photos*

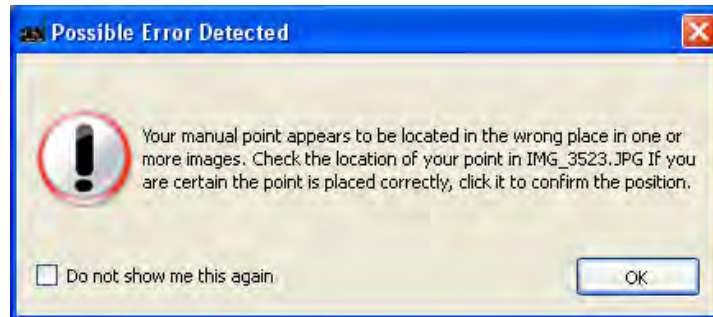
- You can then manually stitch all the other unstitched pictures if necessary, by repeating steps 1 to 6 above, before submitting your project to Project Photofly servers.
- When you are done connecting all the unstitched pictures, click on "Submit". The information is then sent to the server for a new computation of the Photo Scene. As explained in section 2.2, you may wait for the result, or "Quit and Receive the Photo Scene Later."

#### *Managing the manual stitch issues: Case 1 – Wrong point*

- If your manual point is not properly located in one of the 2 stitched photos, it is then marked with a red square as below.



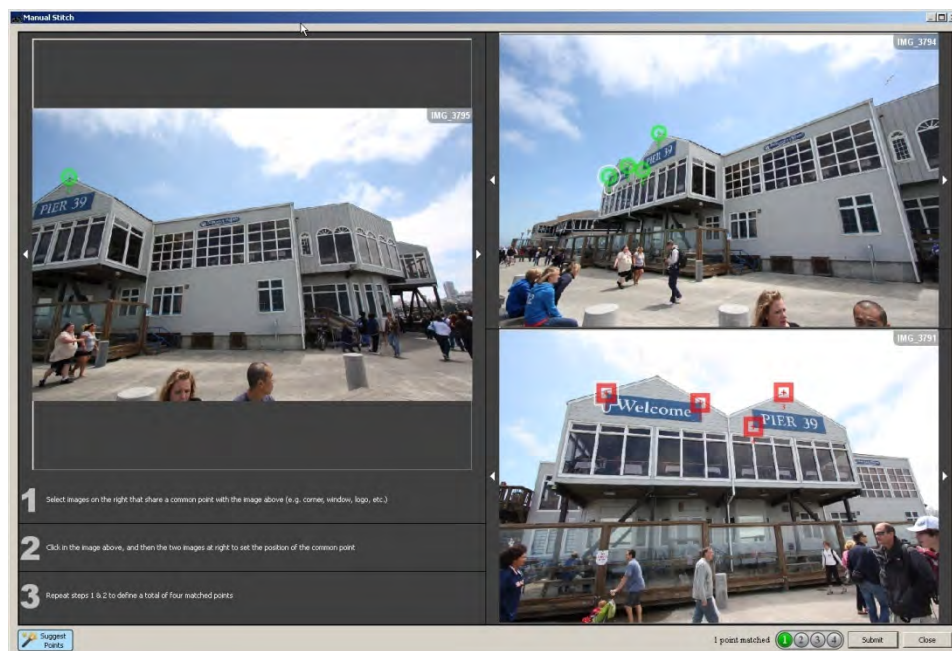
- You will then be prompted the following message as well:



- You will then need to re-position this point at its right location.

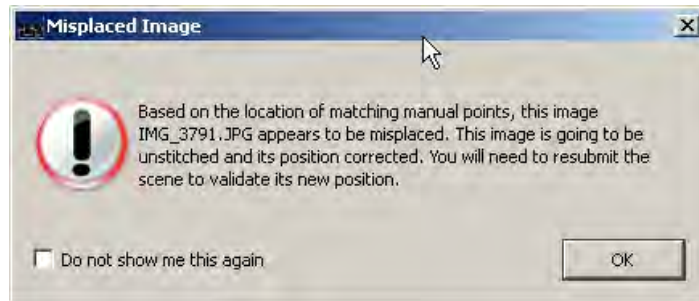
### *Managing the manual stitch issues: Case 2 – Wrong stitched camera*

- It may happen that one stitched camera (appearing in the right windows as a reference one for connecting points) was badly stitched by the automatic engine, and you did not see it when checking for wrong cameras as explained in section 2.4.
- In this case, all the points clicked in this picture will appear red, as in the example below.

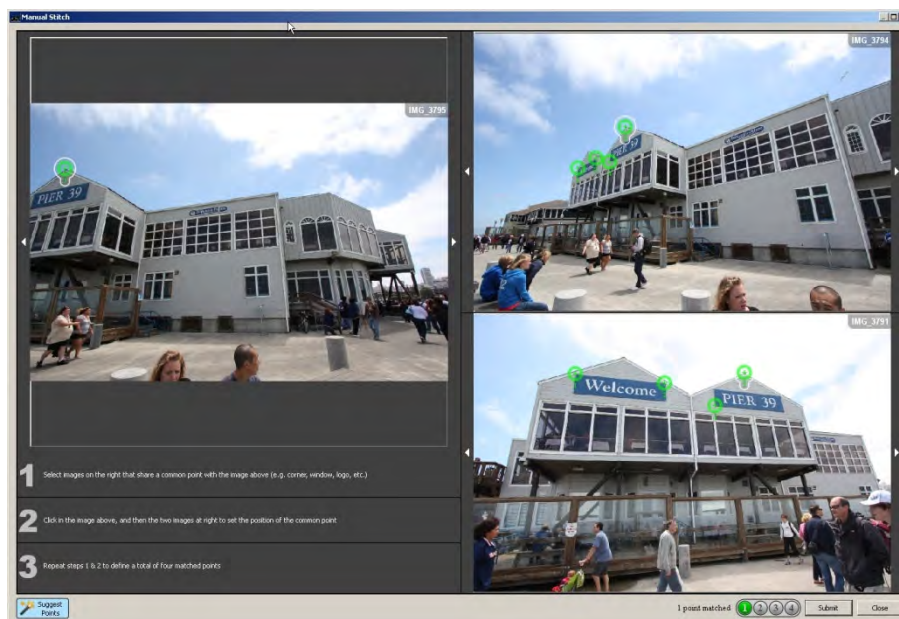


- If you validate each one of these red markers in this picture (by clicking successfully in each red square), the following message appears:



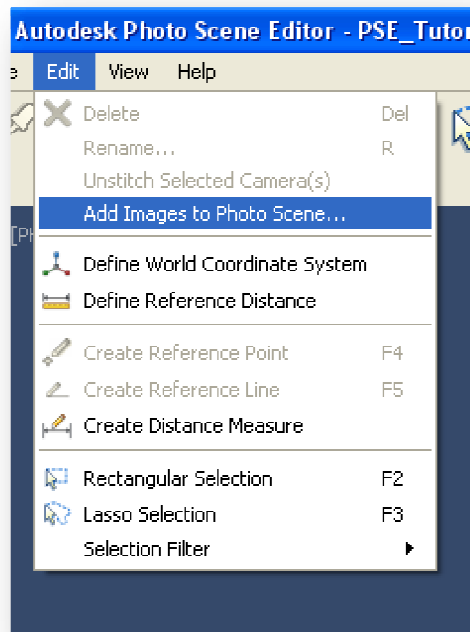


- Clicking on “OK” will then re-position the corresponding camera at its best location. You will then need to re-submit the Photo Scene to Project Photofly servers to fully validate it.

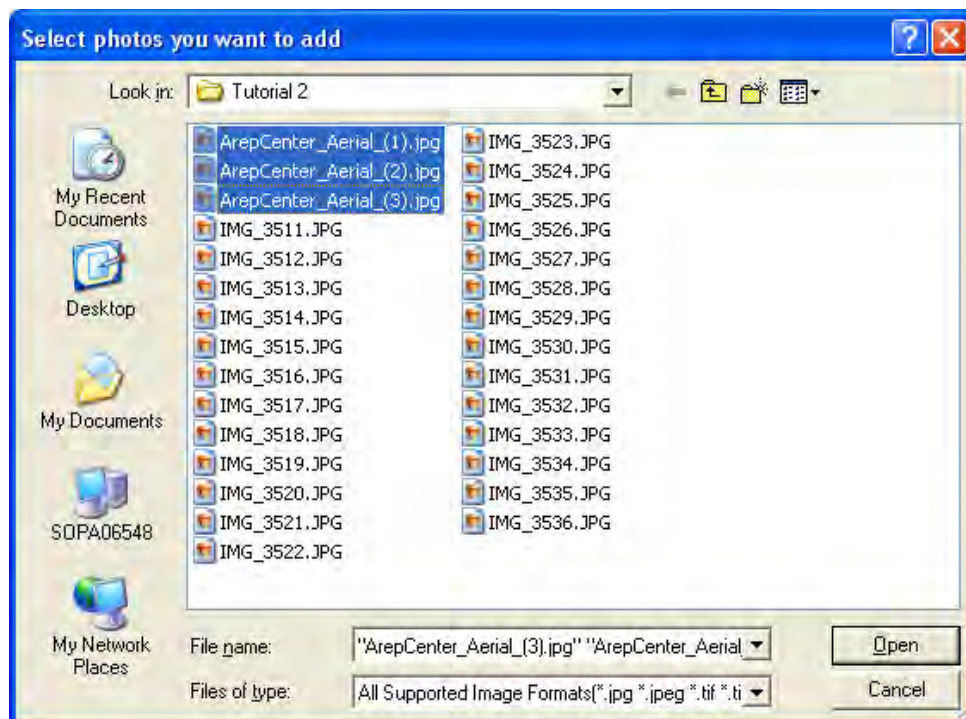


## 2.6 – Adding Images

You can add one or more Images at any time in your Photo Scene. To do this, simply select *Edit > Add Images and Stitch...* from the menu bar.



- This will open the Image selection window.





- Once the photos have been selected, click on “Open”. This opens the following pop-up window:



- Clicking on “Process Scene” will start the automatic stitching process, including the upload of the selected photo(s) to the server.
- Clicking on “Return to Scene” will add the selected images in the thumbnail view as unstitched. You will then need to manually stitch them as explained in section 3.12 – Case 1 here above.

## 2.7 – Sharing projects

You can easily share your projects with others by simply sending your 3dp file as an attachment in an e-mail. The person receiving this 3dp file will need to install the Photo Scene Editor to open it.

The 3dp file includes some Photo Scene data and references others on your disk and/or the Project Photofly servers:

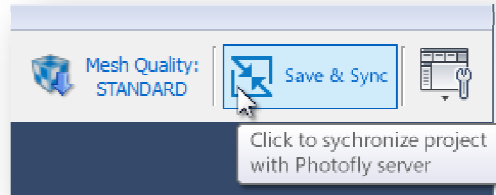
- Data included in the 3dp file:
  - Camera information
  - Reference Points, Lines, measurements, scale, WCS, if added by the user
  - Manual stitch data
- Data NOT included in the 3dp file, but referenced by it:
  - Source Photos
  - 3D mesh (draft or any other density)
  - Points Clouds

When the person will receive your 3dp file, the Photo Scene Editor will look for the corresponding referenced data on Project Photofly servers. Note that this may take some time to download all this data since images and mesh can be heavy.

### *Synchronizing your project*

If you want to share your project in its current state, you must first synchronize it with the one stored on Project Photofly servers. Synchronization occurs when:

- A scene is calculated/processed (transparent for the user).
- You save a file and the corresponding preference is turned on (default: turned off).
- You click on the 'Save & Sync' toolbar button (see below).



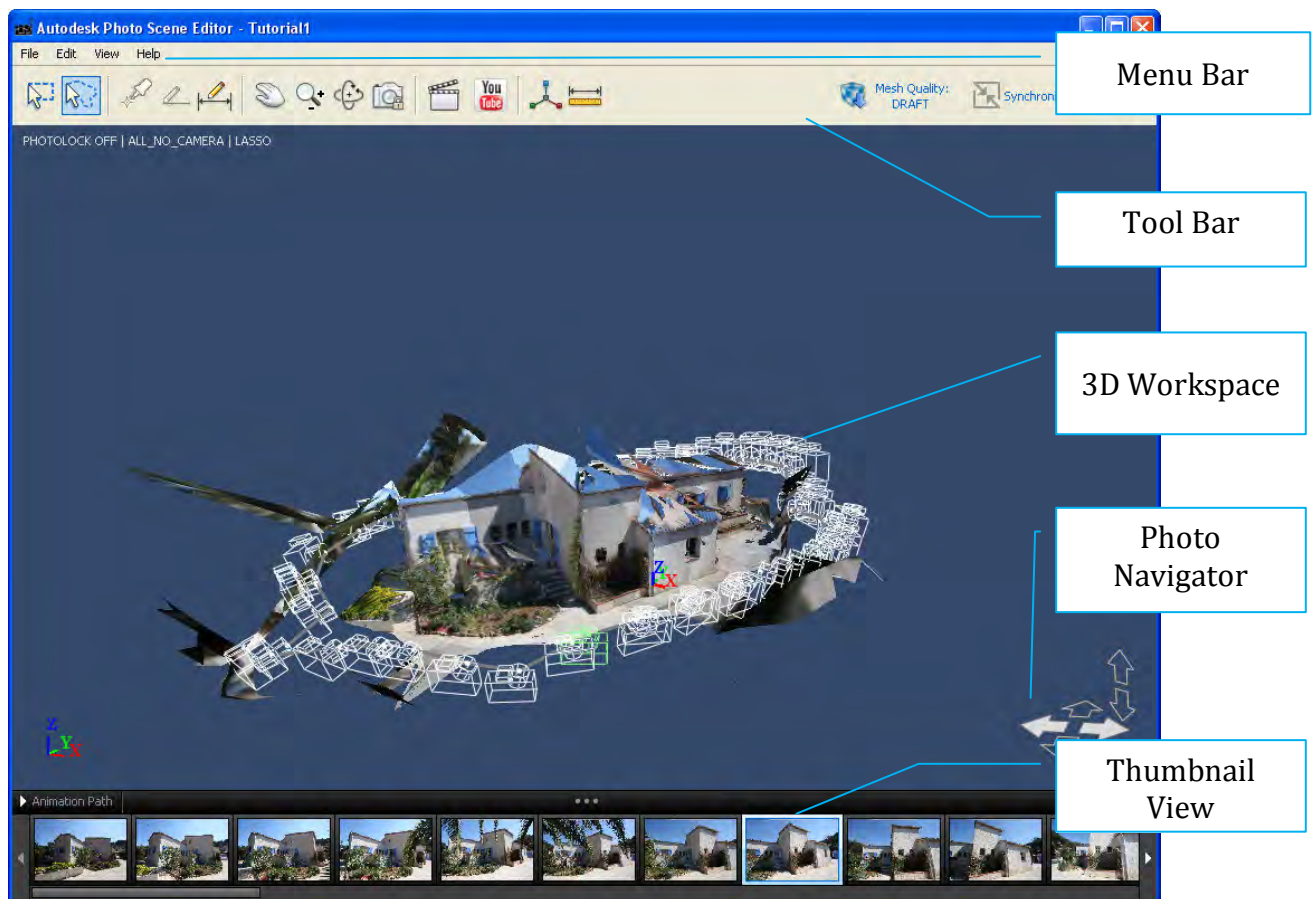
See Annex 1 to turn 'Sync on Save' on or off. This preference is set to OFF by default (= no synchronization on save).

## Chapter 3 – Viewing and Navigation in the Photo Scene

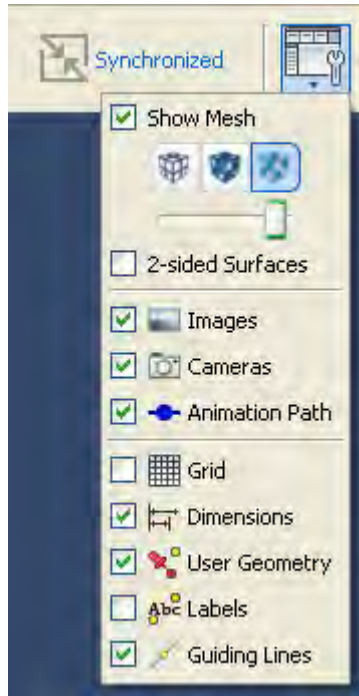
### 3.1 – Selecting the interface layout

The Photo Scene Editor main components are:

- The menu bar
- The ribbon : composed of tool buttons and commands; Includes a sub-ribbon
- The 3d workspace : the 3d view where all objects are drawn
  - 3D Navigation manipulators
  - Photo Navigation Manipulators (Thumbnail View, Photo Space Navigator)



A sub-tool bar is also available for more display options:



The Photo Scene Editor has 2 main possible layouts:

- **Default layout** : menu bar + ribbon + 3D workspace + thumbnail view (see the above screenshot)
- **Full screen layout** : menu bar + 3D workspace

Selecting the full screen layout, or coming back to the default layout, can be set from the menu bar by: *View > Toggle Full Screen*, or by pressing *Alt + Enter*.

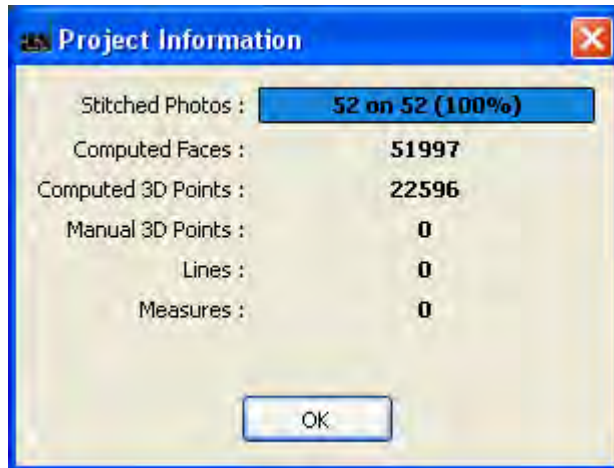
### 3.2 – Viewing the stitching results

The stitching results are:

- the number of stitched photos,
- the number of computed faces in the 3D mesh,
- the number of 3D points in the Automatic Point Cloud,
- the number of 3D Reference Points that you added manually,
- the number of 3D Reference Lines that you added manually,
- the number of 3D Distance Measures that you added manually.

This information is available from the menu bar: *Help > Project Information*, or by pressing the *I* key.

A pop-up window will then appear showing the stitching results:



### 3.3 – Navigating in the Photo Scene

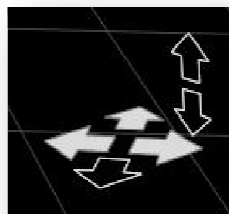
The Photo Scene Editor provides 2 different navigation modes:

- **Free “3D navigation” mode** = Navigating and exploring the 3D space.
- **“Photo Lock” mode** = Looking through a Calibrated Camera in a constrained navigation locked to an image, and navigating from Calibrated Camera to Calibrated Camera.

#### *Switching from the “3D navigation” mode to the “photo lock” mode*

This is performed either by:

- Clicking on a thumbnail.
- Pressing the space bar on the keyboard.
- Right clicking in the 3D workspace and selecting “Photo Lock.”
- Clicking on one of the white arrows in the lower right corner of the 3D workspace:



*The directions to the available adjacent photos are drawn filled, and can be selected.  
The disabled directions (no available adjacent photo) are drawn in wireframe.*

#### *Switching from the “photo lock” mode to the “3D navigation” mode*

This is performed either by:

- Clicking on a thumbnail.
- Pressing the space bar on the keyboard.
- Pressing Alt + Double clicking on a thumbnail.

### *Switching from one photo to the next in the “photo lock” mode*

This is performed either by:

- Clicking on a thumbnail.
- Pressing Alt + Left or Right keyboard arrow.
- Orbiting by pressing Alt + Right click in the 3D workspace: this mode will temporarily use a 3D camera motion to move through the various photos. The lock on the nearest camera will happen when releasing the right click. To get this behavior, make sure that “Lock during Photo Orbit” is set in the *Preferences -> General Settings* (see Annex 1).
- Clicking on one of the white arrows in the lower right corner of the 3D workspace:
















*The directions to the available adjacent photos are drawn filled, and can be selected.  
The disabled directions (no available adjacent photo) are drawn in wireframe.*

### 3.4 - Free 3D Navigation in the Photo Scene

#### Navigation tools

The free 3D navigation tools are the following:

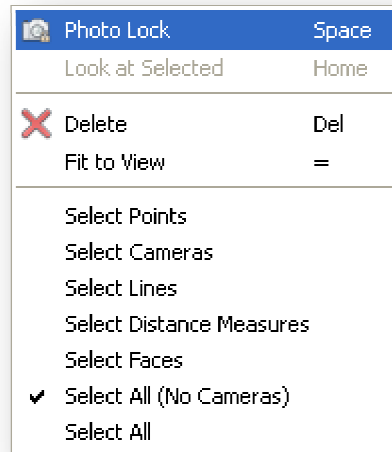
Tool	Ribbon	Shortcut
3D PAN		 : Middle click
ORBIT		 +  : Alt + Left click
ZOOM		 +  : Ctrl + Alt + Left click Or  : Wheel
ROLL (= camera rotation around its viewing axis)	 +  In the 3D window	 +  : Alt + Right click

Free 3D navigation tools are also available from the menu bar: *View > Navigation*.

#### “Bird’s Eye View” mode

The Bird’s Eye View is an automatically created viewing camera position that shows the entire Photo Scene, i.e. the 3D mesh and the Calibrated Cameras displayed with their 3D icons. When switching from a “Photo Lock” mode to the Bird’s Eye View, the viewing camera axis keeps the same direction than the Calibrated Camera on which it was locked just before.


The Bird's Eye View can be toggled through the main contextual menu (right click in the 3D window):



It can also be toggled through the menu bar: *View > Photo Lock* or through the <Space> key.

### Grid display

A grid is displayed on the computed default XOY plane as in the example below.

- The size of the grid will be relative to the scene (bounding box).
- You can add/remove the grid by clicking on  in the sub-ribbon.
- You can always remove the grid in the Preferences (see Annex 1).

### 3D mesh display

Starting with Photo Scene Editor 2.0, the default display is a photo-textured 3D mesh. Display options for the mesh are accessible in the sub-ribbon. You can select either the wireframe or the textured mode. A slider will set the transparency level over the background. This is useful to check the superimposition of the 3D mesh over the cameras in the Photo Lock mode. Wrong or badly stitched cameras appear then clearly.



With the 2-sided Surfaces option toggled, the triangles of the 3D mesh will be seen in all directions, even from the back.



### *Splats versus 3D points display*

Starting with Photo Scene Editor 2.0, the splats are no more the default display setting. They will be displayed ONLY if your Photo Scene does not include a 3D mesh, which can be the case when:

- You open a Photo Scene computed with an earlier version of the Photo Scene Editor (no mesh included);
- Or you open a Photo Scene computed by Photo Scene Editor 2.0 but for which the 3D mesh has not been saved.

The size of the splats can then be adjusted using the corresponding slider in the sub-ribbon:



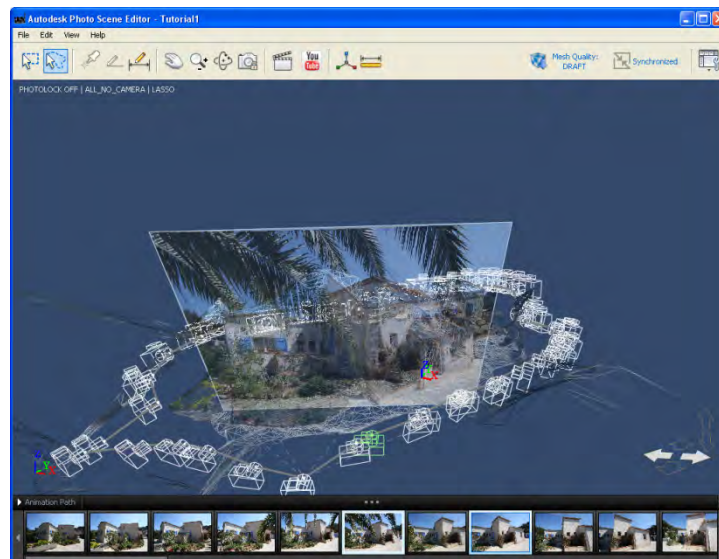
### *Displaying Background Pictures in the 3D space*

The Background Pictures associated with each Calibrated Camera can be displayed in the 3D space. To activate the display of the Background Pictures while in 3D navigation mode, you must first toggle the display of such Background Pictures by clicking on the corresponding toggle in the sub-ribbon.



Then you can display the Background Picture by:











- Either simply moving the mouse over the thumbnails;
- Or pressing Alt and moving the mouse over the camera icons in the 3D workspace.



### 3.5 – Lock on Camera Mode

#### *Navigation Tools in the “photo lock” mode*

The navigation tools available in the “lock on camera” mode allow moving in the 2D photo space. They are the following:

Tool	Ribbon	Shortcut
2D PAN		 +  : Alt + pressing down the wheel
ORBIT (this tool is used to move to another photo in the lock on camera mode – See above) Needs to set “Lock during photo orbit” in Preferences > General Settings		 +  : Alt + Left click
ZOOM		 +  : Ctrl + Alt + Left click Or  : Wheel

## Chapter 4 – Edition of the Photo Scene

### 4.1 – Cleaning the 3D mesh

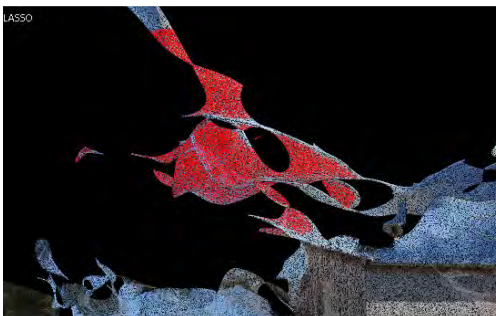
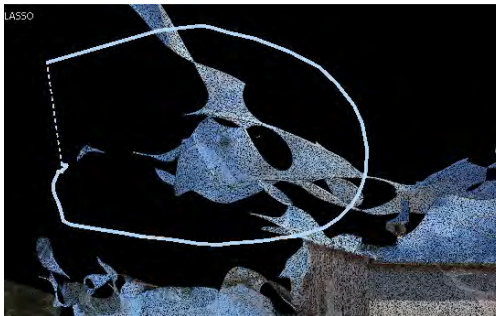
At any stage in the process, it might be useful to clean the 3D mesh, either for a better viewing experience, or to select a specific area of the draft mesh before requesting a mesh refinement.


Cleaning the 3D mesh is performed by:

- First selecting the desired triangles, using the rectangular selection or the lasso selection tools available in the Photo Scene Editor. The display should be set to “3D Navigation” mode with “Select All (No Cameras)” or “Select Faces” to allow for an easier selection.



- Using one of the above tools, you can then select the desired triangles, as in the example below. Once selected, they will appear in red (default viewing option).



- You can then click on the Delete button of the tool bar  to delete these triangles. The delete action can also be performed from the menu bar: *Edit > Delete*, or by right clicking in the 3D workspace and selecting “Delete.”

## 4.2 – Creating Reference Points

### *Why Reference points?*

You may need to create 3D points at locations of interest, for various purposes:

- Setting the World Coordinate System (WCS): the WCS requires a well-located 3D point that will become the origin, and at least 2 pairs of 3D points (the origin may be one of these points) that will define the X, the Y or the Z axis.
- Setting the scale of the Photo Scene: the scale will be set by assigning a known distance between two 3D points where the distance indicates real-world measurements.
- Creating measurements: measurements will be defined between two 3D points, or between one 3D point and along one of the WCS axis.
- Creating lines and polylines representing edges of the scene.
- Image-based modeling: Once in a 3D modeling package such as AutoCAD, you can use the defined points and lines as a basis to create more complex shapes. For instance, by snapping 3D primitives on well-located 3D points such as corners of a building you can create the building envelope.

### *Image-based modeling step 1*

*Snapping the basic shape to 3D points  
at the corner of a building*





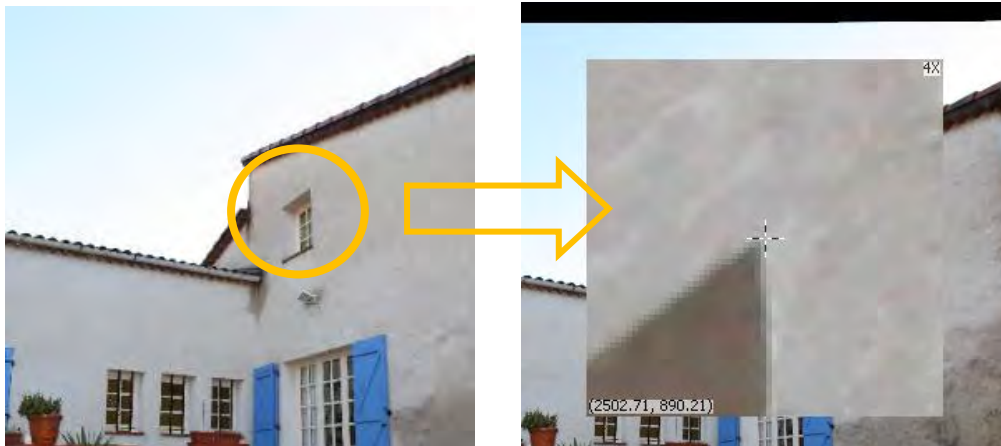
*Image-based modeling step 2  
Adding modeling details by attaching  
more primitives to the basic shape  
and aligning them with the Background Pictures*

### Creating a Reference Point

To create a Reference Point, follow the steps below:

- Select your viewpoint: The preferred viewpoint is the one right in front of the 3D point that you want to create.
- Set your display mode.
  - o The mandatory visualization mode for creating Reference Points is "Photo Lock".
  - o You should then remove the 3D mesh from the display since the 3D points will be created with the pictures as references, not the mesh. Uncheck the "Show Mesh" box in the sub-ribbon.

- Click on  in the tool bar, or *Edit > Create Reference Point* from the menu bar. Your cursor then appears as  in the 3D window.
- Click on the desired feature in the selected image. Features to look for should be highly contrasted and should correspond to an easily identifiable element of your scene (corners for example). When clicking on the feature, a magnifier will pop-up, to allow for an accurate placement.




- Clicking on a feature will automatically run an automatic matching process, and a 3D position will automatically be computed for this feature once the same feature has been found in at least one other Calibrated Image, allowing the triangulation process to occur.
- Once the 3D point has been created, it will appear with a red pin on the image. It has now become a 3D Reference Point.






- The thumbnails will also show:
  - The image in which the feature was initially identified, this thumbnail being highlighted by a green pin.
  - Green dots in the other images that give the visual indication that your 3D point is properly located.



- At this stage, you are done with this 3D Reference Point, and you can create additional ones once the “Create Reference Point” tool is active (cursor =  ).


### **Adjusting a Reference Point**

In some cases, you may find that the 3D Reference Point created from one image is not properly located in other images. You can then fine tune the manual placement of the 3D point, using another image, at least, as a reference.

- First select another camera from which the initially selected feature can be seen as well, but from a substantially different angle: the closer to 90° angle between 2 viewpoints, the better for the triangulation process. As an example, selecting the closest neighbor to the first image is typically not appropriate.
- In this second image, the 3D point will be displayed as a red dot together with a “guiding line.” This guiding line displays the optical axis on which the 3D point should be located, given its location in the first image. Make sure that the “Display Guiding Line”  is toggled in the Tool Bar.

*Example of 3D point & Guiding Line  
in a second image*



- The cursor must appear as , which indicates that you are in the adjustment mode. Clicking on the picture will then pop-up the magnifier again. You can then easily adjust the placement of the point along this guiding line, or close to it. Once you release the click, the triangulation process is run again to create the 3D Reference Point.
- You may repeat this process for a 3<sup>rd</sup> and a 4<sup>th</sup> image to increase the accuracy of your Reference Point.
- Every picture that was used to manually fine tune the placement of your Reference Point will be tagged with a green pin in the Thumbnail View as in the example below:



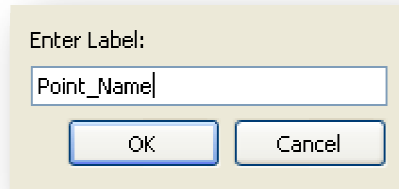
### Labeling a Reference Point

Labeling a Reference Point may be useful in a design process. To create a label, follow the steps below:

- Set your visualization mode as “Lock on Camera.”
- Make sure that “Labels” is toggled in the sub-Tool Bar.



- Select one Reference Point by clicking on it in the 3D workspace.
- Right click to get the contextual menu and select “Rename Point....” You can also select *Edit > Rename...* from the Menu Bar.
- A small pop-up window appears, where you can type the name of this Reference Point, as in the example below:



### ***Deleting a Reference Point***

To delete a Reference Point, follow the steps below:


- Select one Reference Point by clicking on it in the 3D workspace.
- Right click to get the contextual menu and select “Delete Point.” You can also

select *Edit > Delete* from the Menu Bar, or click on  in the Tool Bar.

### 4.3– Setting a World Coordinate System

A default World Coordinate System (WCS) is set by the Stitching engine, with Z up. You may find it useful to re-locate this WCS so that it better meets your design criteria. As explained in the Project Photofly “Photo Guide,” it can be very useful to locate the WCS at the corner of a building as in the example below:




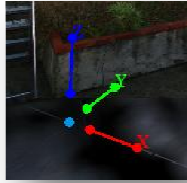
 *Good candidate features for creating the 3D points that will be used to create the coordinate system.*

To create your own WCS, follow the steps below:

- Select your viewpoint: The preferred viewpoint is the one that allows seeing the entire set of Reference Points used for the placement of your WCS.
- Set your display mode.
  - The mandatory visualization mode for creating Reference Points is “Photo Lock”.
  - You should then remove the 3D mesh from the display since the WCS will be created with the pictures as references, not the mesh. Uncheck the “Show Mesh” box in the sub-ribbon.



- Click on  in the Tool Bar to enter the WCS creation mode. You can also click on: *Edit > Define World Space* in the Menu Bar. The following WCS icon appears somewhere in your 3D workspace:



- Place the origin first, by clicking on the corresponding dot in the WCS icon, and attaching it to one Reference Point.
- Place a first axis then, by clicking on one or both dots defining each axis in the WCS icon. The selected dot appears in yellow.
  - When clicking on the dot opposite to the origin, your selected axis will move around the origin. You then virtually attach this dot to another Reference Point that is located along this axis from the origin. In the example below, the Z axis was attached to a Reference Point exactly vertical located vertical from the selected origin:



- When clicking on the dot close to the origin, you may locate your selected axis in a completely different area from the one used previously. The second dot for the same axis must be moved as well accordingly, as in the sequence below:

*Step 1 – Select 1<sup>st</sup> dot of X axis*



*Step 2 – Move it to its right place*



*Step 3 – Attach it to its  
Reference Point*



*Step 4 – Attach 2<sup>nd</sup> dot to 2<sup>nd</sup>  
Reference Point*



- You can use either one of these two techniques for setting two axes. The 3<sup>rd</sup> axis will be deduced automatically.

#### 4.4 - Setting a Reference Distance


You can define a Reference Distance to scale your Photo Scene, by setting a known measurement between 2 Reference Points. Instructions to measure a good Reference Distance when shooting your Photo Scene on a real site are given in the Project Photofly “Photo Guide.” Setting the scale will allow to make measurements relative to this scale.

Note that the Reference Distance is unit less. You may set a Reference Distance in whatever unit and then measure in this same unit. When importing this data in AutoCAD for example, you will need to define your unit.

To define the reference distance, follow the steps below:

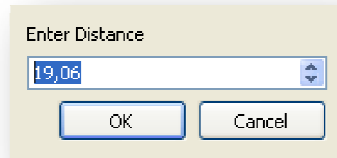
- Select a viewpoint that allows seeing the 2 Reference Points used for the setting of your Reference Distance.
- Set your display mode.
  - The mandatory visualization mode for creating Reference Points is “Photo Lock”.
  - You should then remove the 3D mesh from the display since the Reference Distance will be created with the pictures as references, not the mesh. Uncheck the “Show Mesh” box in the sub-ribbon.



- Click on  in the Tool Bar to enter the reference distance creation mode. You can also click on: *Edit > Define Reference Distance* in the Menu Bar. You are then given the opportunity to attach the reference distance (displayed as a blue arrow) to 2 Reference Points as in the example below:




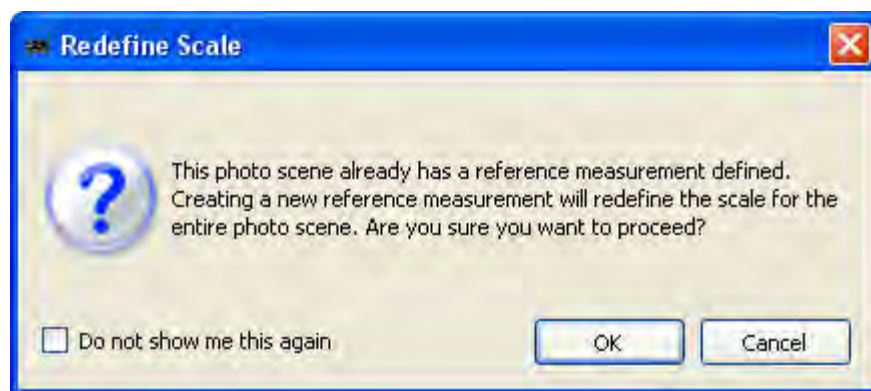
- Once you place the second end of the arrow to the second Reference Point, a pop-up windows appears, in which you can enter the value of the real measurement:



- Clicking on "OK" will scale the entire Photo Scene.
- You can reset this reference distance by right clicking in the 3D workspace and selecting "Reset Reference Distance" in the contextual menu.



- You can also click again on  in the Tool Bar to set a new value. In which case, you will be prompted the following message:



- Click on "OK" to delete the former value, and you can then create your Reference Distance again.

## 4.5 – Making Measurements


You can measure distances between 2 Reference Points, or between one Reference Point and along one axis of the WCS. Distances are relative to the Reference Distance that you previously set up.

To create a measurement, follow the steps below:

- Select a viewpoint that allows seeing the 2 Reference Points used for the measurement.
- Set your display mode.
  - o The mandatory visualization mode for creating Reference Points is "Photo Lock".

- You should then remove the 3D mesh from the display since the 3D measurements will be created with the pictures as references, not the mesh. Uncheck the “Show Mesh” box in the sub-ribbon.



- Click on  in the Tool Bar to enter the measurement creation mode.
- To measure the distance between 2 Reference Points, click the first end of the ruler on the first point, and the second end on the second point. The distance will then appear as shown below:



- To measure the distance between one Reference Point and along one axis of the WCS, click the first end of the ruler on the first point, and extend the ruler as much as needed along the selected axis that will automatically appear in red/white for the X axis, the second end on the second point. The distance will then appear as shown below:



- Note that the measurements are NOT exported in your DWG file (see Step 4).





## 4.6 – Creating Lines and Polygons

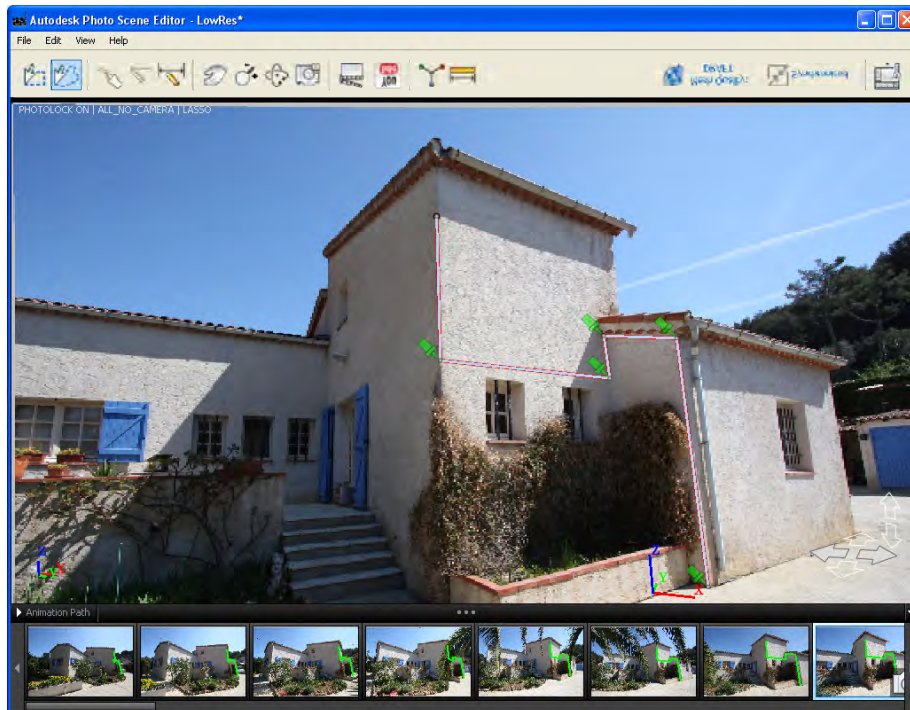
You can create lines and polygons using the Photo Scene Editor, in a way that is very similar to the creation of Reference Points (see paragraph 3.7).

### *Creating a line or polygon in auto-match mode*

To create a Reference Line or Polygon in auto-match mode, follow the steps below:

- Select your viewpoint: The preferred viewpoint is the one right in front of the 3D point that you want to create.
- Set your display mode.
  - o The mandatory visualization mode for creating Reference Points is “Photo Lock”.
  - o You should then remove the 3D mesh from the display since the 3D lines will be created with the pictures as references, not the mesh. Uncheck the “Show Mesh” box in the sub-ribbon.

- Click on  in the tool bar, or *Edit > Create Reference Line* from the menu bar. Your cursor then appears as  in the 3D window.
- Click on the desired feature in the selected image to start your line or polygon.



- The polyline will be completed by pressing “Enter,” “Escape,” or by a double click.

- The vertices of the lines or polylines are automatically computed in 3D using the same “auto-matching” process than the one described for the creation of 3D Reference Point (paragraph 3.7). This process may take some time, depending on the number of vertices and the number of photos in your project. During this process, the polyline is adjusted automatically:
  - o More points will be computed between two vertices by the auto-match engine if the corresponding line follows a high contrast edge, to make it more accurate.
  - o Starting from the 3<sup>rd</sup> line segment, the auto-match engine will check if this line segment should not be in the same planar surface than the one defined by the 2 first lines. If it is close to it, it will automatically adjust this 3<sup>rd</sup> one to be co-planar with the first 2 ones.
- You may adjust these vertices the same way that you can adjust Reference Points (see “Adjusting a Reference Point” in paragraph 3.7).
- The Reference Lines and polylines created with the Photo Scene Editor will be exported in the DWG file (see Step 4).

#### *Creating a line or polyline in constrained mode*

It may be useful to create lines or polylines by following the axis or planes defined by your WCS:

- It will ensure the planarity of your set of lines, should they be planar.
- You can define planar sections.
- You can create 3D points which are not visible in the images, by locating them at the crossing of 2 axes.

*Example of defining a 3D point not visible in the image, but located at the crossing of the X (red) and Z (blue) axis*





- You can get a robust 3D point despite a weak confidence in the matching process. Weak confidence may come from:
  - o The fact that the point is visible in 2 or 3 images only.
  - o The fact that the point is visible in images that offer very little parallax.

The mandatory steps before using constraints when drawing your lines are:

- To set a reliable World Coordinate System,
- To well define your starting 3D point.

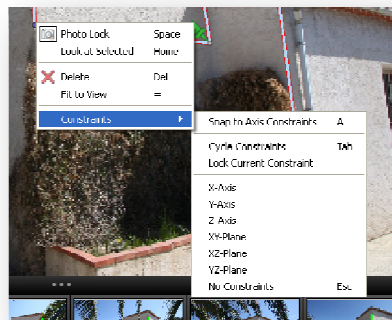
To create a Reference Line or Polyline in constrained mode, follow the steps below:

- Select your viewpoint: The preferred viewpoint is the one right in front of the 3D point that you want to create.
- Set your display mode.
  - The mandatory visualization mode for creating Reference Points is “Photo Lock”.
  - You should then remove the 3D mesh from the display since the 3D lines will be created with the pictures as references, not the mesh. Uncheck the “Show Mesh” box in the sub-ribbon.

- Click on  in the tool bar, or *Edit > Create Reference Line* from the menu bar. Your cursor then appears as  in the 3D window.
- Click on the desired feature in the selected image to start your line or polyline.
- The following shortcuts are available to work in this mode:
  - A: Toggle auto-snapping to axes
  - Shift: Lock/unlock to axis constraint
  - Tab: Cycle constraints
  - Ctrl : To avoid any new snapping
  - ESC: Exit the tool and validate the line created
  - Backspace: Delete the previous segment of the line

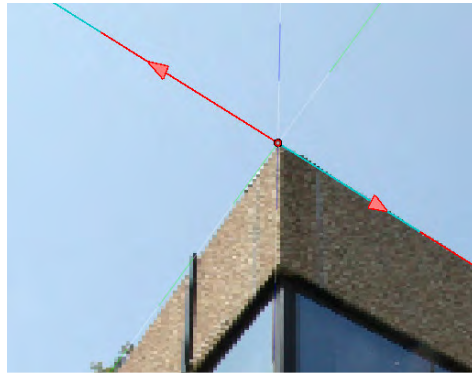


- You can select which constraint to use by either right clicking in the 3D view or pressing “Tab” several times.
  - Right clicking will pop-up the following window:

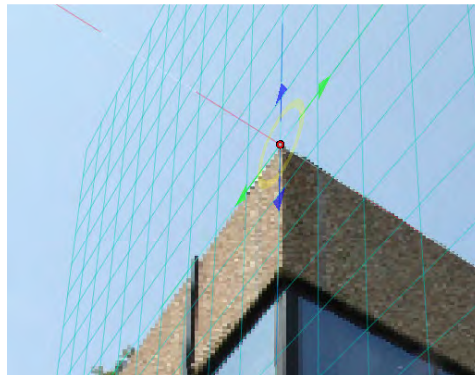


- Pressing Tab will allow you to loop between the constraints.

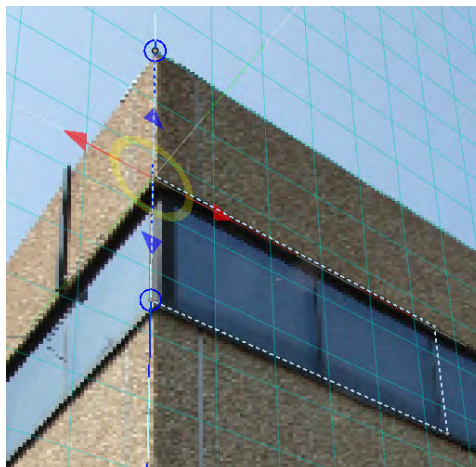
*Example of constraint activated on X axis*



*Example of constraint activated on XOZ axis*



*It then becomes easy to draw lines and polylines along the edges of a building for example, **if your WCS has been properly set of course**. In the following example, drawing the contour of the windows on this façade was made possible using this technique.*





## Chapter 4 – Export of the Photo Scene

You can export the entire Photo Scene or a selection of its components, in DWG, OBJ, LAS, IPM or RZI format.

- **DWG** is the abbreviation for DraWinG, the native drawing file format for Autodesk applications. DWG files created by the Photo Scene Editor can be read in any Autodesk software starting from 2010 version. They contain 2 layers:

- Reference Points and Lines
- Reference Points Labels

*Should you want to export the 3D Point Cloud as well, you will need to export it separately in LAS format. See below.*

- Autodesk® **FBX**® asset exchange technology facilitates higher-fidelity data exchange between several Autodesk content creation packages. For more information on the FBX format, visit the FBX SDK and Plug-ins page at the Autodesk web site: [www.autodesk.com/fbx](http://www.autodesk.com/fbx). The FBX file created by the Photo Scene Editor contains the 3D cameras, the 3D mesh, and all the Reference Points, Lines and Labels created by the user.
- The **OBJ** is a 3D geometry definition file format with *.obj* file extension, which contains the photo textured 3D mesh produced by the Photo Scene Editor.
- The **LAS** file format is a public file format for the interchange of LIDAR data between vendors and customers. This binary file format is an alternative to proprietary systems or a generic ASCII file interchange system used by many companies. More about ASPRS and LAS format on: <http://www.asprs.org>  
The LAS file created by the Photo Scene Editor contains the 3D point cloud that is automatically extracted from the pixels of the Source Photos, during the mesh creation process.
- **IPM** is the Inventor Publisher Mobile format from Autodesk®. The IPM Viewer allows you to interactively view fixed or animated 3D assembly instructions created with Autodesk Inventor Publisher software. You can freely download this viewer for your iPhone, iPad, or iPod Touch (iOS 3.2 or later), on:  
<http://itunes.apple.com/fr/app/inventor-publisher-mobile/id393147903?mt=8>
- **RZI** is the Autodesk® ImageModeler® 2009 native file format to save and load Photo Scenes. RZI files will contain the whole or part of your Photo Scene, depending on your selection. By default, the entire Photo Scene will be exported, which means:
  - Cameras
  - Reference Points
  - 3D mesh
  - Reference lines
  - Distance measures

### *Exporting a Photo Scene*

- To export a Photo Scene, click on *File -> Export Scene As...* in the menu bar. This will pop-up the export window, in which you can select your file name and export format.

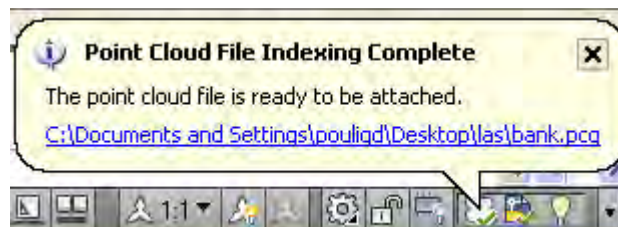
### *Importing the Automatic Point Cloud in AutoCAD using the LAS format*

Please, follow the steps below to import your Automatic Point Cloud in AutoCAD:

- Load the corresponding drawing first (\*.dwg)
- Index the .las file to create a .pcg file:



- Wait for the indexation to be completed, i.e. once you see the following tooltip appear:



- Attach the .pcg file by either:
  - o Clicking the tooltip link
  - o Importing the .pcg file or
  - o Selection "Attach" from ribbon button.

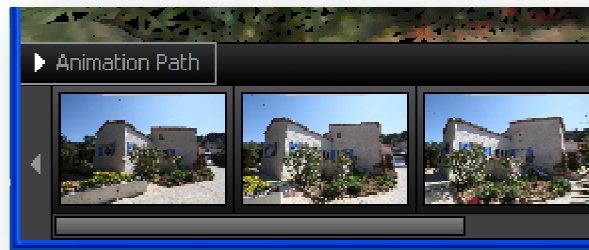
Important: Let the insertion point to (0,0,0) and scale to default.

## Chapter 5 – Creation of a Movie

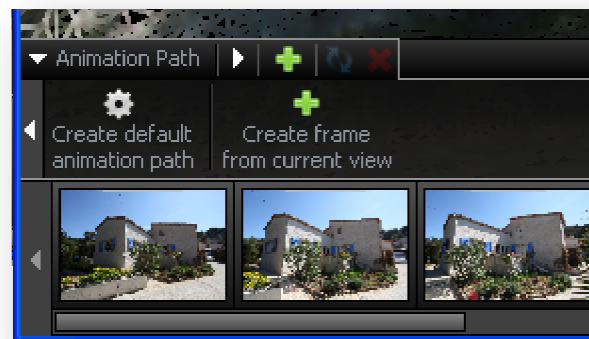
One way to share your 3D model with others is to create a movie from it. This movie will be created from a camera animation made of a series of “keyframes” manually set where you want. In-between frames will be automatically interpolated by the Photo Scene Editor during the rendering phase.

### Stage 1 – Creation of the animation

- Select your display mode:
  - o Background color: See Annex 1 – Preferences – Colors.
  - o “Wireframed” or “textured” mode: the rendering of your movie will later be performed in one of these modes exclusively. Note that you can render a first movie in one mode, and render another movie with the other one, keeping the exact same camera path for both.
- Click on “Animation Path” to start creating your keyframes.



- This will open the Animation Path tool.

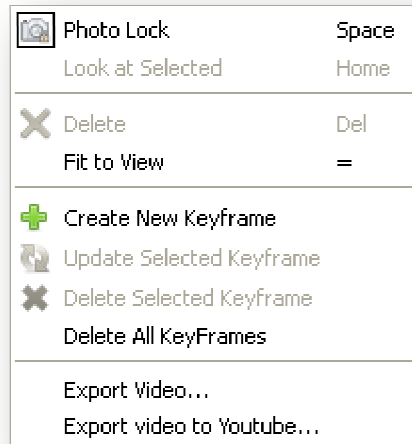


- Selecting “Create default animation path” will automatically create one keyframe for each of the stitched photos. The animation path defined this way will then go through each one of your cameras.
- If you do not want to use this default animation path, you can start defining your own keyframes.

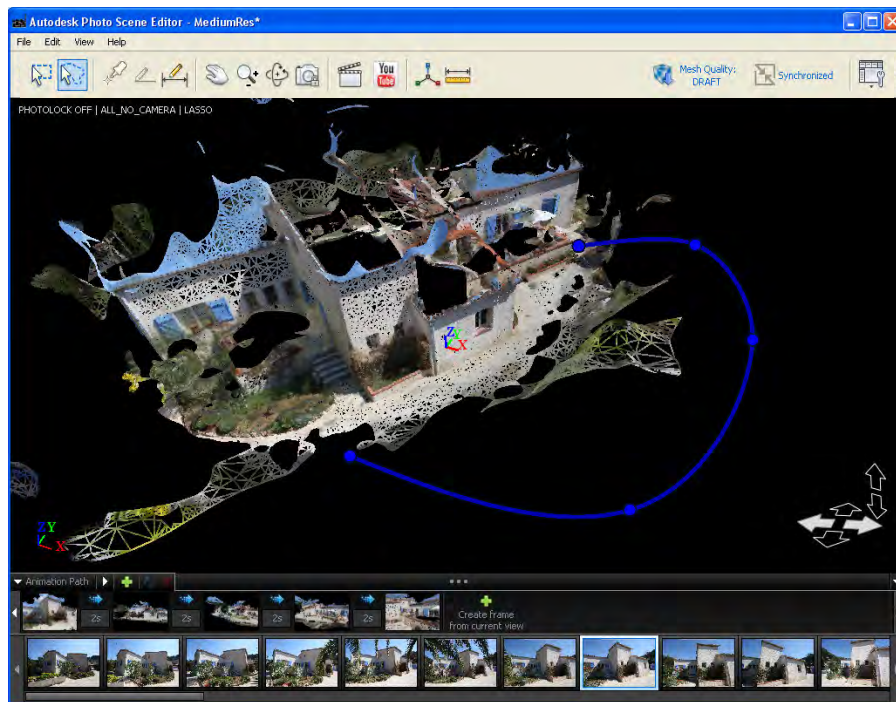
- Select your viewpoint in the 3D window, and then click on “Create frame from current view” in the Animation Path tool.



- You can also right click in the 3D window and select “Create New Keyframe” from the menu.

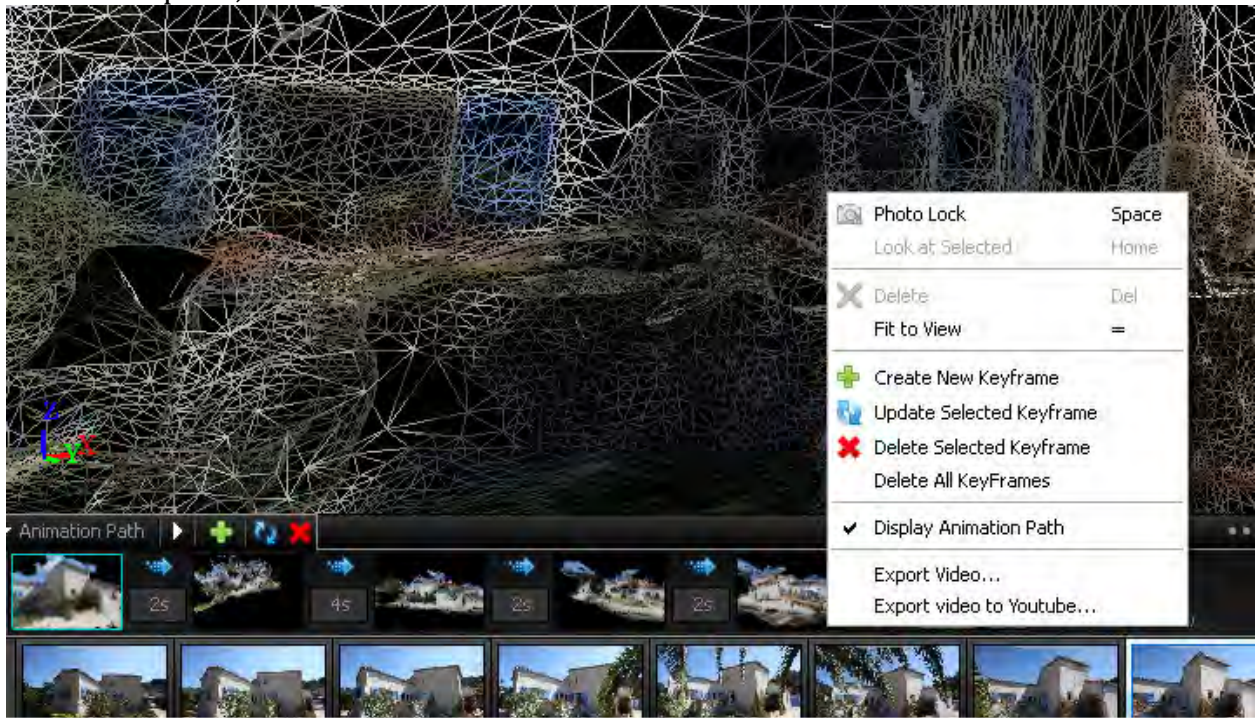


- The camera path that you set is displayed in the 3D window.

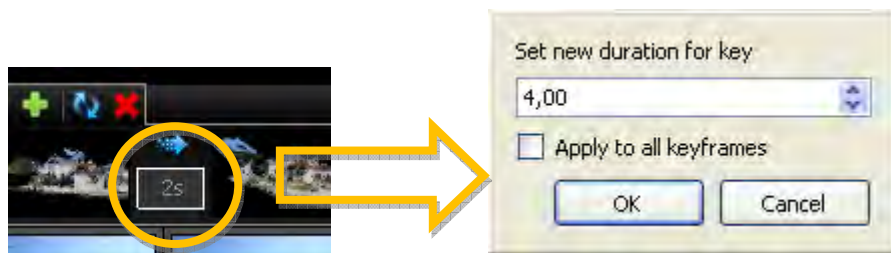




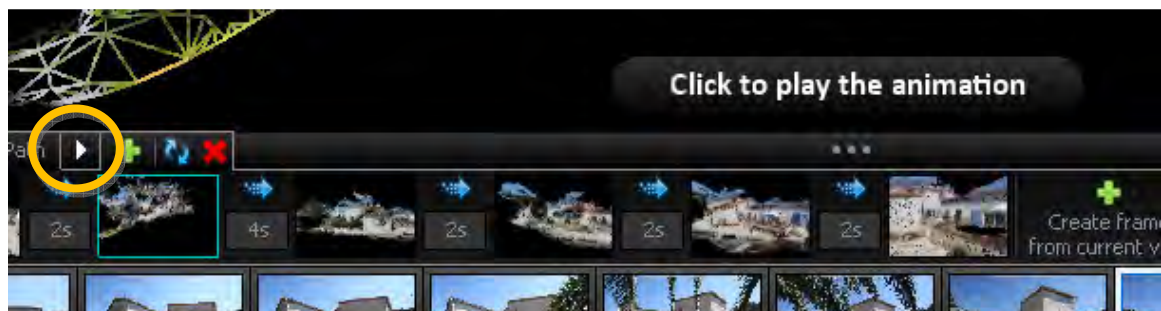
- At any time, you can select one keyframe in the Animation Path tool or in the 3D window, and either update the selected keyframe with the current viewpoint, or delete it.



- A default time of 2 seconds is set between each keyframe. You can change this by clicking on the corresponding box in the Animation Path tool.

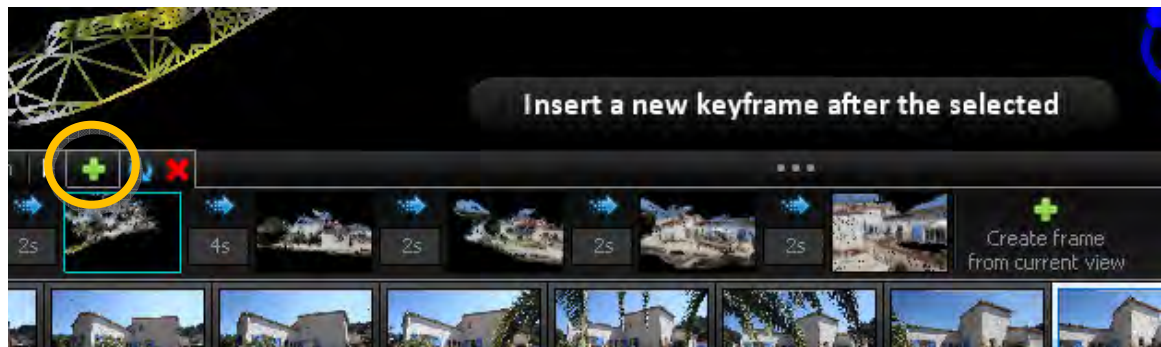


- By clicking on the arrow in the Animation Path tool, you can play your animation in the 3D window.





- By clicking on the “+” in the Animation Path tool, you can insert a new keyframe after the one selected in the animation path.

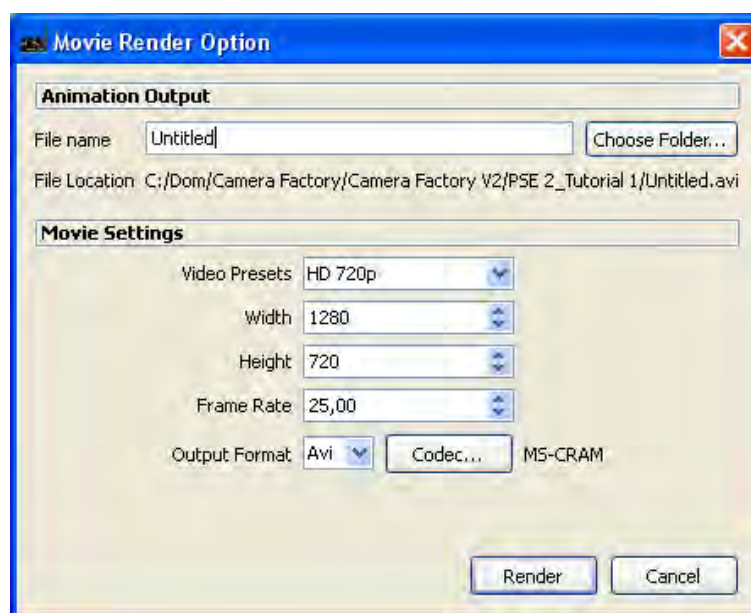


### Stage 2 – Rendering the movie

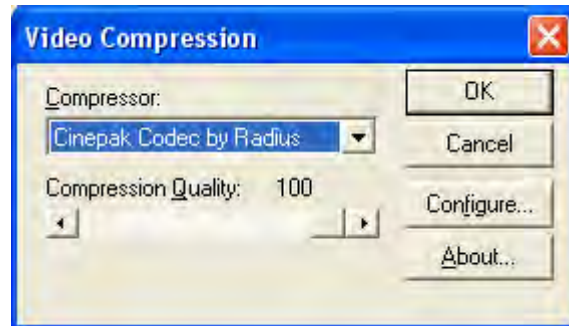
- Once you have created your animation path, you can render the corresponding movie in various formats and store it, either on your computer or directly on your You Tube account.



- Selecting “Export Video” will pop-up the following window:



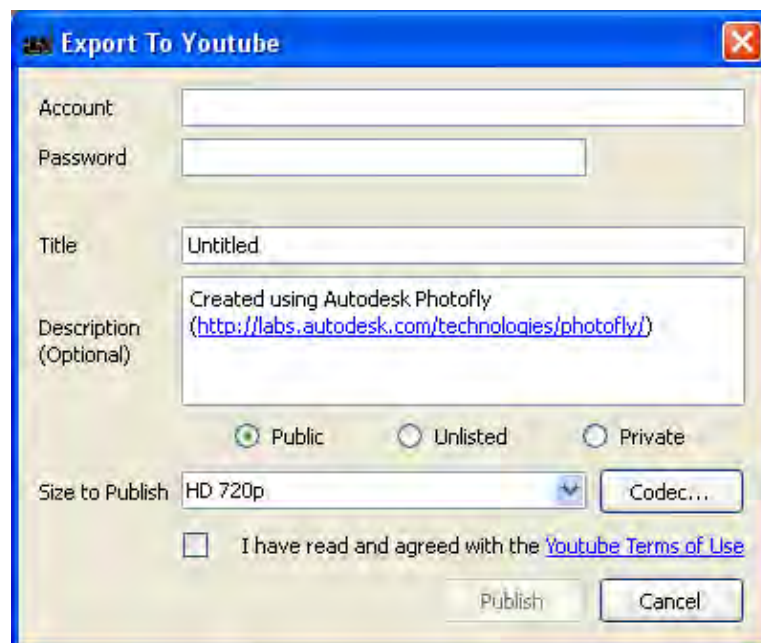
- Select the video parameters that you want, either selecting one of the presets, or defining your own set, including the codecs.



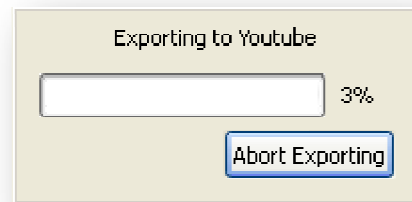
- Click on “Render” to generate your movie.
- You can directly render your video and publish it on your You Tube account.



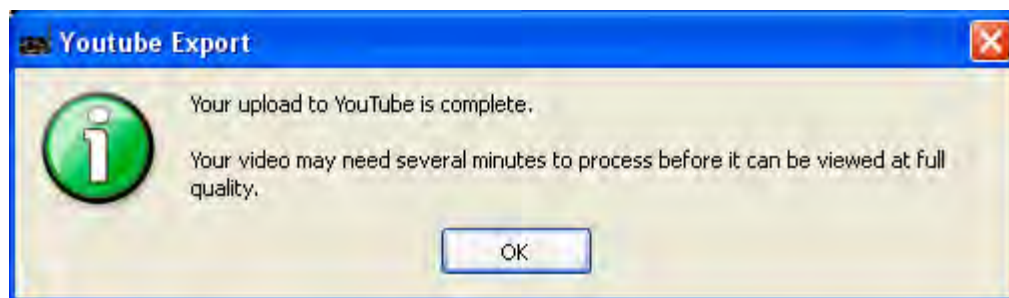
- You must have your own account on You Tube to publish your videos. Creating an account can be done on:  
[http://www.youtube.com/create\\_account?next=%2Findex](http://www.youtube.com/create_account?next=%2Findex)
- Selecting “You Tube” will pop-up the following window:



- Once you have entered your account and password information, Photo Scene Editor will automatically connect to You Tube to check the authentication. A message *"Authentication successful"* will appear after this real time check.
- Set the various requested parameters, and click on "Publish".
- Once the rendering is done, Photo Scene Editor will automatically export the rendered movie to You Tube.



- Once the upload is complete, the following pop-up window appears:

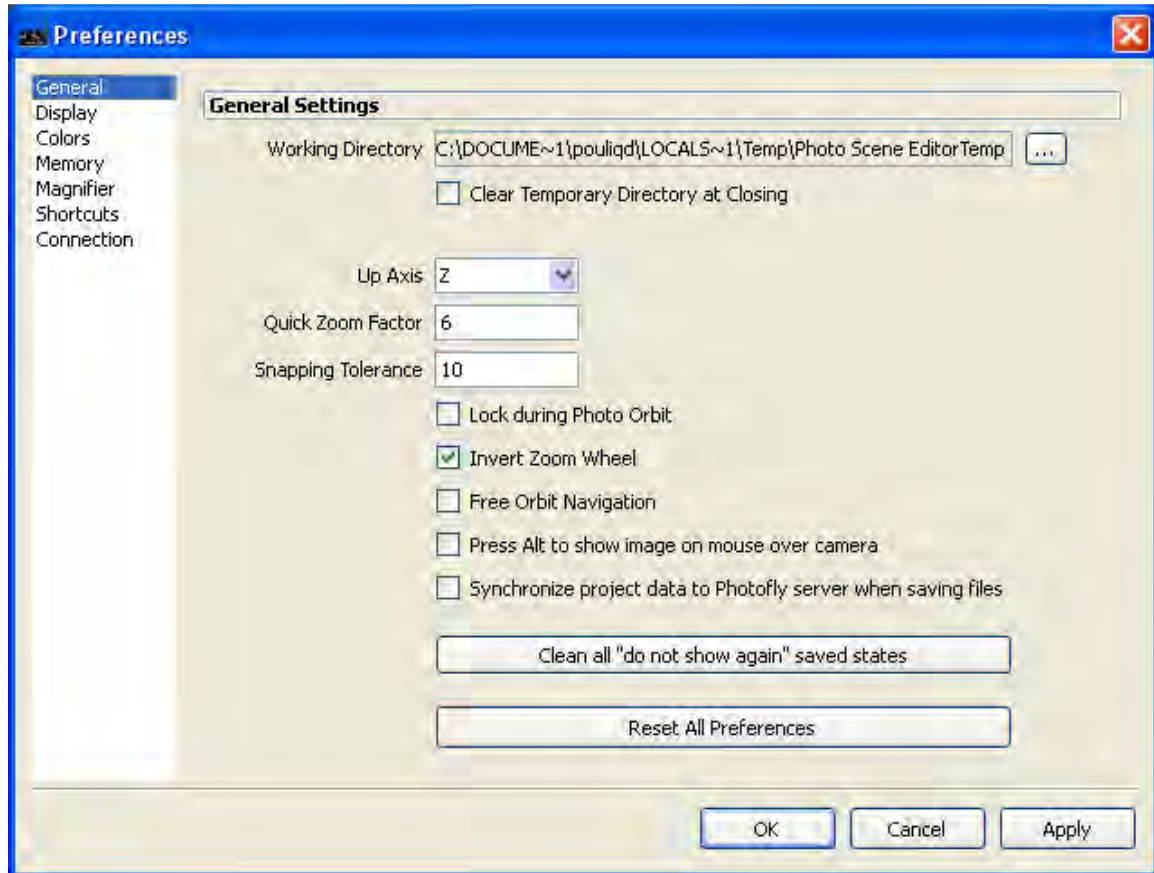


- You will need to connect to your You Tube account to check when the video is ready for viewing on-line.

## Annex 1 – Preferences

The preferences can be accessed from the menu bar by: *File > Preferences*, or by pressing “P” on your keyboard.

### General Settings:



Working directory	: The path to the working directory where temp files are stored
Up Axis	: The up axis of the scene (Z by default).
Quick Zoom Factor	: Zoom factor of the Quick Zoom function
Snapping Tolerance	: The hit/intersection sensitivity in pixels
Lock during Photo Orbit	: When set, the viewer will lock to the nearest camera while orbiting
Invert Zoom Wheel	: Will invert the wheel behavior for your mouse
Synchronize project data	: Will automatically synchronize your .3dp file with the one stored on Project Photofly servers when saving your file.

## Display Settings:

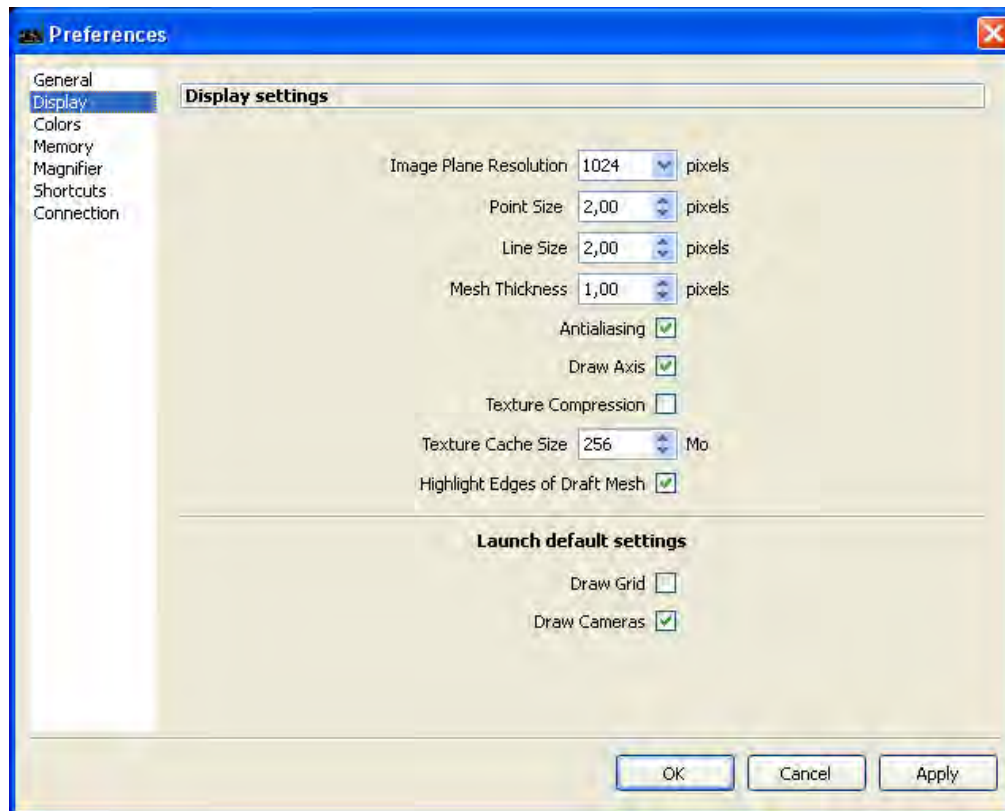
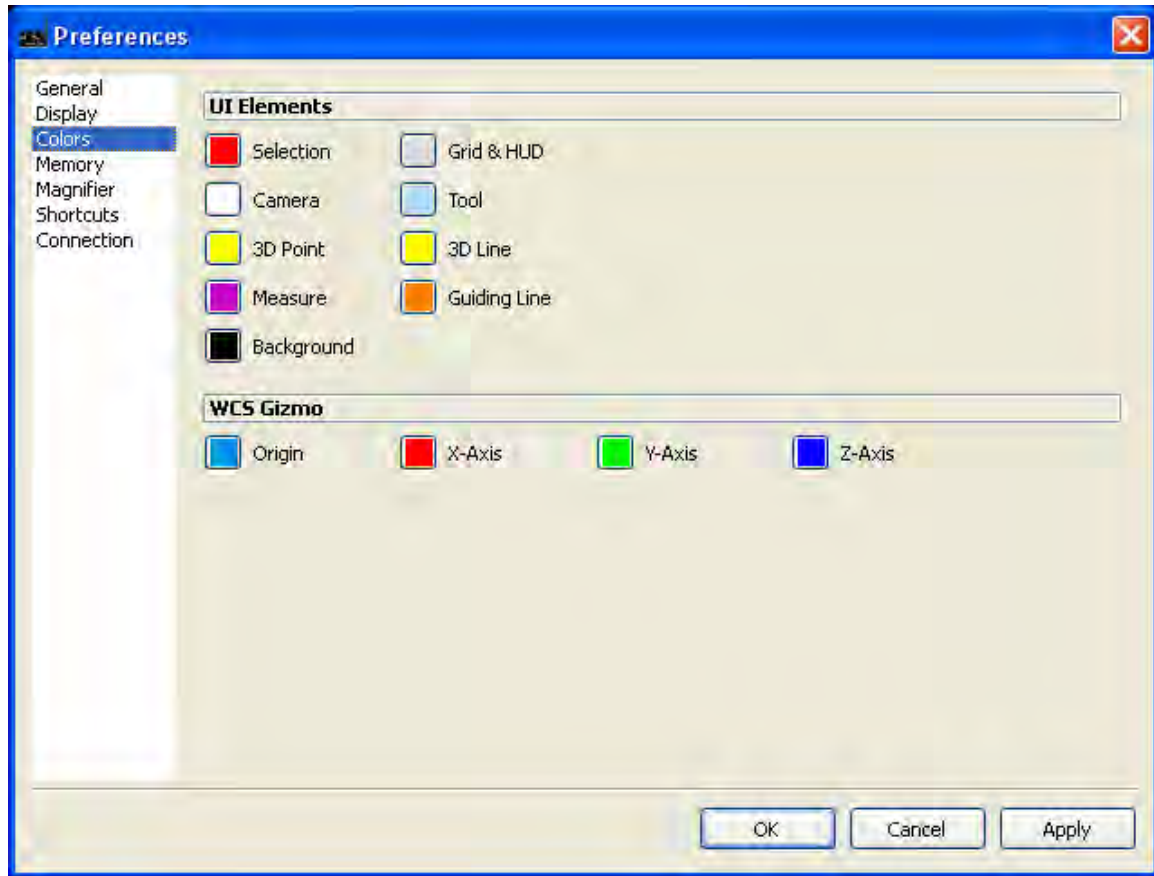


Image Plane Resolution	: The texture proxy size for the Background Pictures
Point Size	: Size of the 3D points in pixels
Line Size	: Size of the 3D lines in pixels
Antialiasing	: Antialiasing (for all types of lines)
Draw Axis	: Display the WCS in the 3D workspace.
Draw grid	: Display the grid in the 3D workspace
Draw Splats "Static"	: Local texture maps will be computed once for all, independently from the viewing angle.
Draw Splats "Dynamic"	: Local texture maps are computed depending upon the viewing angle.
Draw Points	: The display of the 3D points is always active when set.
Draw Cameras	: The display of the cameras is always active when set.
Texture Compression	: Compress textures in Video Memory. Not supported by every graphic board.
Texture Cache Size	: Texture cache size for the Background Pictures.
Highlight Edges of Draft Mesh:	When toggled, the draft mesh will be displayed with a blue wireframe and a semi-transparent texture map, to allow for an easier checking of wrong cameras.



## Colors:



You can define the color for all the objects and components that are displayed in the 3D workspace. Clicking on one of the color icon will pop-up the following window:



### Memory:

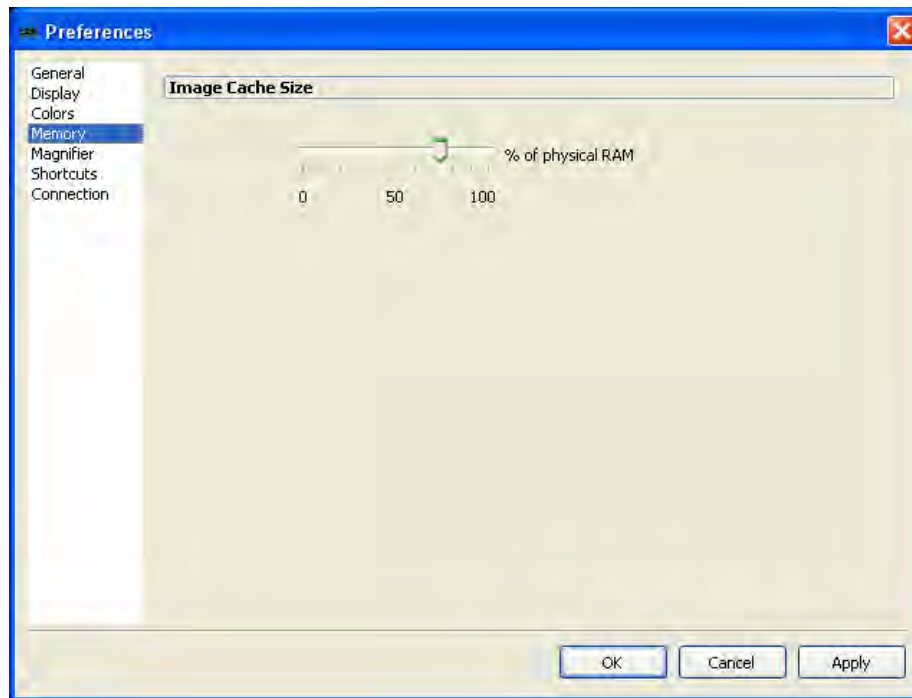
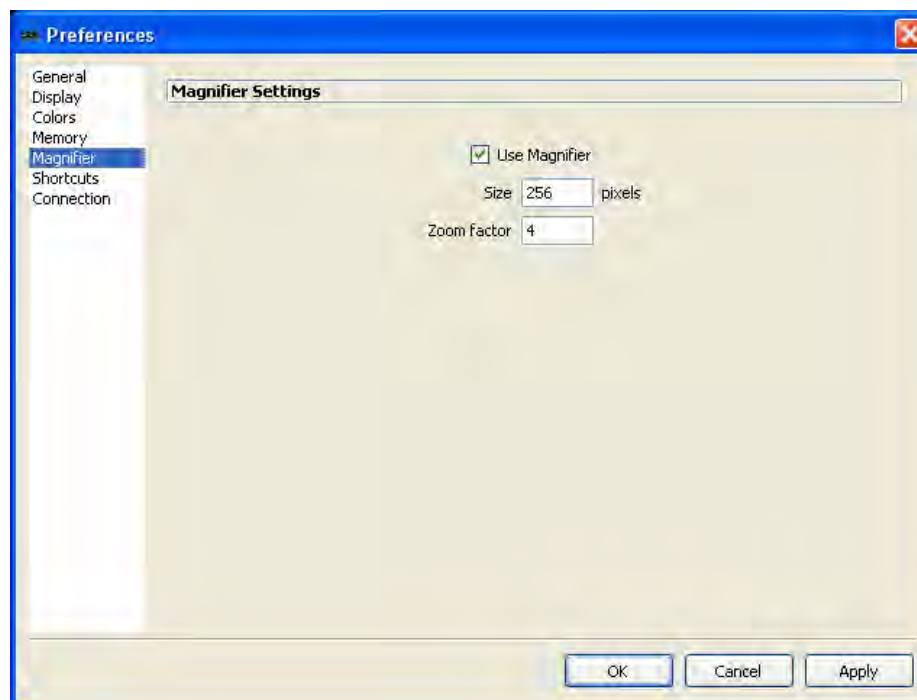


Image Cache Size : Global memory cache management that the application is allowed to use.

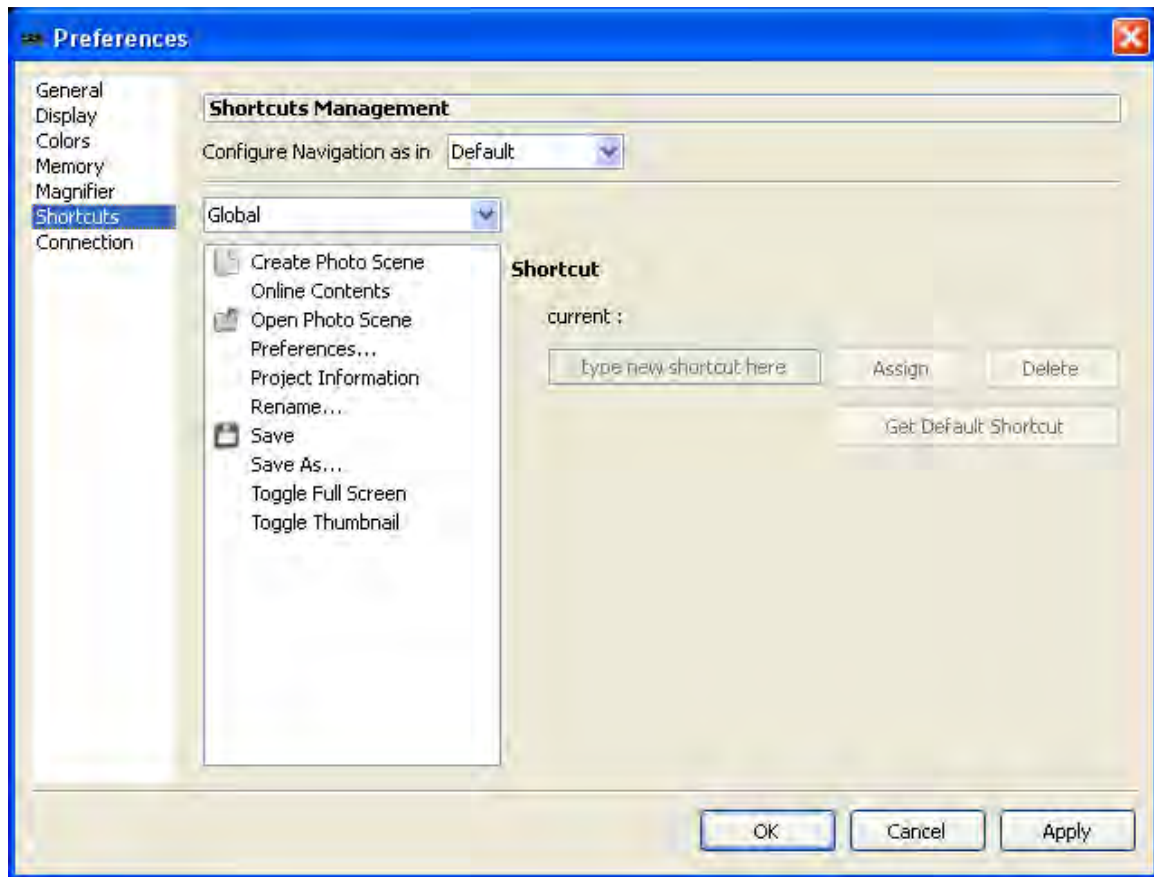
### Magnifier:



The magnifier is the pop-up window used for an accurate placement of the cursor when creating a Reference Point.

Use Magnifier : Defines the use or not of the magnifier when creating Reference Points (set to “on” by default)  
Size : The window size in pixel of the magnifier  
Zoom factor : The zoom factor of the magnifier

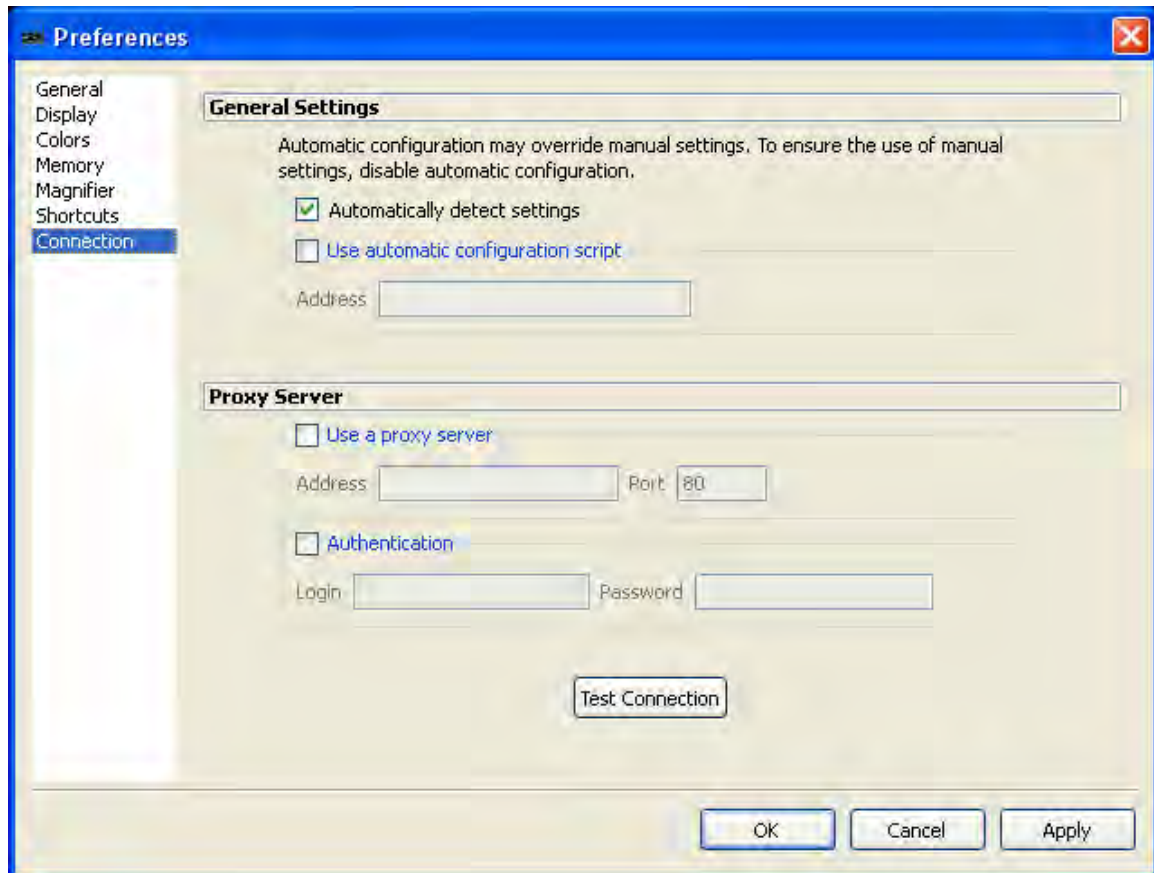
### Shortcuts:



You can create your own settings for the shortcuts, or make them like your most favorite design software (choice of the following Autodesk software: Autodesk® AutoCAD 2010, Autodesk® 3ds Max® or Autodesk® Maya® 2011 at this stage). This applies to every command of the Photo Scene Editor for the display, the global project management, the navigation, the selection or the editing tool set.

To create a new shortcut, select the corresponding command in one of the 5 categories, type the new shortcut on your keyboard, and click on “Assign” to make it active.

**Connection:**



- “Automatically detect settings” is your default configuration. The software will try to automatically detect settings, or use the parameters set by default in your Internet Explorer, should they be set.
- “Use configuration script”: Ask your IT Administrator to provide you with your .pac file, if any, and enter the corresponding address in the given field.
- “Use a proxy server”: Ask your IT administrator to provide you with your IP address and port.
- “Authentication”: Enter the Login and Password if required.

Please note that you must disable the automatic configuration if you manually enter proxy server settings.

## Annex 2 – Error Messages

- **Your Photo Scene has been created successfully, however some of the images are corrupt or failed to upload.**
  - Action: Check your files and try resubmitting the scene with the same photos.
- **Your Photo Scene has been created successfully, however your images appear to be taken from the same physical location. Images in a photo scene cannot be taken from a single spot. If you are not satisfied with your photo scene, try capturing images of your subject from different positions and resubmit the scene. For more information, check out Shooting Guidelines.**
  - Action: Try capturing images of your subject from different positions, and then resubmit the scene. See the Shooting Guidelines for more information.  
[http://labs.autodesk.com/technologies/photofly/getting\\_started/](http://labs.autodesk.com/technologies/photofly/getting_started/)
- **Your Photo Scene has been successfully created, but some of the images could not be stitched. If you are not satisfied with your photo scene, try capturing images of your subject from different positions and resubmit the scene. For more information, check out our Shooting Guidelines.**
  - Action: Check the Shooting Guidelines for more information, and try to resubmit a new set of photos.  
[http://labs.autodesk.com/technologies/photofly/getting\\_started/](http://labs.autodesk.com/technologies/photofly/getting_started/)
- **The application was unable to create your Photo Scene. In most cases, this is caused by a problem on our servers, so please resubmit your photos and try again. If you continue to encounter problems, there may be an issue with the photos you have submitted. Please forward this email to [labs.photofly@autodesk.com](mailto:labs.photofly@autodesk.com) and we can look into the problem further. You may also want to review the Shooting Guidelines video.**
  - Action 1: Check the Shooting Guidelines for more information, and try to resubmit a new set of photos.  
[http://labs.autodesk.com/technologies/photofly/getting\\_started/](http://labs.autodesk.com/technologies/photofly/getting_started/)
  - Action 2: Remove all possible non-supported characters (è%\$!\$&"@%...etc.) in the photo scene name, folder name or image names.
- **The application was unable to create your Photo Scene because there are not enough images to compute the scene. You must provide at least three images.**



- Action: Check the Shooting Guidelines for more information, and try to resubmit a new set of photos.  
[http://labs.autodesk.com/technologies/photofly/getting\\_started/](http://labs.autodesk.com/technologies/photofly/getting_started/)
- **The application was unable to create your Photo Scene because some of the images are corrupt or failed to upload.**
  - Action: Check your files and try resubmitting the scene.
- **The application was unable to create your Photo Scene because no 3D information could be extracted from your images, as they appear to be taken from the same physical location. Images in a photo scene cannot be taken from a single spot. Try capturing images of your subject from different positions, and then resubmit the scene. For more information, check out our Shooting Guidelines.**
  - Action: Try capturing images of your subject from different positions, and then resubmit the scene. See the Shooting Guidelines for more information.  
[http://labs.autodesk.com/technologies/photofly/getting\\_started/](http://labs.autodesk.com/technologies/photofly/getting_started/)
- **The application was unable to create your Photo Scene because no 3D information could be extracted from your images, as they do not appear to overlap. Images in a photo scene must overlap. Try capturing overlapping images of your subject, then resubmit the scene. For more information, check out our Shooting Guidelines.**
  - Action: Try capturing overlapping images of your subject, and then resubmit the scene. See the Shooting Guidelines for more information.  
[http://labs.autodesk.com/technologies/photofly/getting\\_started/](http://labs.autodesk.com/technologies/photofly/getting_started/)
- **The application cannot write on local disk.**
  - Action: Check the sharing and security rights of your folder containing the Source Photos, and the network path to this folder.
- **The application cannot write to the specified location.**
  - Action: Check the sharing and security rights of your folder containing the Source Photos, and the network path to this folder.
- **An unknown error occurred during the upload process. Please check your connection and try again later.**
  - Action 1: check your proxy or firewall issues (see Annex 1 – Preferences > Connection)
  - Action 2: resubmit your photos or photo scene again, since the connection may have been down during the upload process.