This tutorial shows how marker based chunk alignment can be used for referenced and unreferenced models.

Overview

Sometimes it is required to combine models reconstructed in separate chunks to the single model, for example, to show their relative orientation and scale.

Method A – Use the same reference coordinate system

Step 1. Place markers in every chunk.

Markers can be placed in 3D-view mode using Create Marker option by right-clicking on the desired marker position (if mesh is displayed), or using Create Marker option in the Photo view to set up first marker projection – this is so-called “Guided Approach” described in PhotoScan Pro manual.

Alternative method is to create marker on the Workspace pane and then place each projection manually using Place Marker command in the Photo view mode.

Irrespectively to the method used it is very recommended to check marker projections for each chunk and refine them (using Edit Markers tool in the Photo view mode) if required (manually adjusted markers will be marked as green flags, while automatically placed – as blue flags):
Repeat for each marker and each chunk:

**Step 2. Insert marker coordinates using Ground Control pane.**

Open *Ground Control* pane, if it's closed, using *View* menu.

Input coordinates for each marker in the local or geographic coordinate system. Please note that coordinate system should be the same across all the chunks. In case geographic coordinate system is used it should be properly specified in the *Ground Control* pane settings dialog:

After all the coordinates are input press Update button.

Coordinates can be imported from text file using *Import* button on the *Ground Control* pane (it is possible to use four column file – *Marker_name, X-coord, Y-coord, Z-coord*).

Note: Here for the sample project we've used fake coordinates for simplicity.

Repeat this step for each chunk. Note that markers corresponding to the different real-world points in different chunks should have different labels.
**Step 3. Align Chunks.**

When all the chunks have at least three markers that do not lay on a single line and the marker coordinates are input, all of these chunks are already referenced in the coordinate system that corresponds to marker coordinate system (chunks have [R] sign next to their label in the *Workspace* pane).

So now you can press *Show Aligned* button on the toolbar to see how all the chunks look together:

![Image of aligned chunks](image)

Now choose *Merge Chunks* option in the *Workflow* menu – it will result in single chunk with all the photos from both chunks.

![Merge Chunks dialog](image)

*Combine Models* option produces unchanged model merge for the resulting chunk.

*Merge Markers* option will combine markers with the same labels, assuming that they are pointing at the same points.

Press *OK* and new chunk will be created containing single model created by merging models from the original chunks.
Method B – Use chunk overlap

**Step 1. Place markers in every chunk.**

Markers can be placed in 3D-view mode using Create Marker tool (is mesh is displayed) – this is so-called “Guided Approach” described in PhotoScan Pro manual. Alternative method is to create marker on the Workspace pane and then place each projection manually using Place Marker command in the Photo view mode.

It is important to place markers in the area of chunk overlap, but keeping in mind that they should not lay on a single line).

Check marker projection for each chunk and refine them (using Edit Markers tool in the Photo view mode) if required (manually adjusted markers will be marked as green flags, while automatically placed – blue flags).

Repeat the step for every chunk, but following this way you need to name markers using the same label in case they refer to the same real world point even in the different chunks.
Step 2. Align Chunks

Select Align Chunks command in Workflow menu:

Choose Marker based method and double-click on the chunk that is supposed to be used as a reference.
Fix scale should be only checked in the cases when each chunk was already scaled properly.

Here is the result (for visualization purposes we've used different colors for solid view visualization mode):

Merging chunks is the same as in the Option A, but here you'll need to use Merge Markers option.