Reconstruction Report*

Automatically generated

April 13, 2012

Pix4D

www.pix4d.com

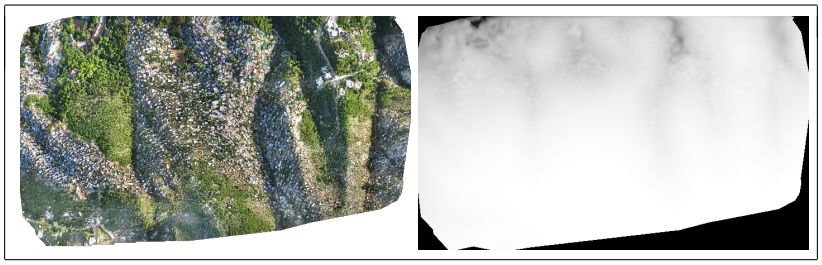

Figure 1: Ortho mosaic (left) and (right) the corresponding digital elevation model (DEM).

*powered by Pix4D (Pix4UAV version v1.11703)

1 Overall Quality

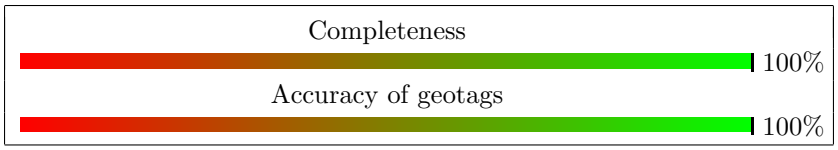

Figure 2: **Quality of the processing**. Completeness refers to the percentage of original images that are included in the final ortho image. A low value might indicate insufficient overlap between the original images. The accuracy of the geotags relates to the quality of the geotags that are associated with each original image (see Figure 7).

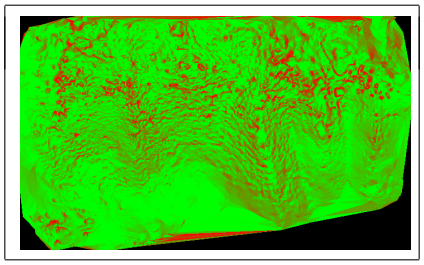

Figure 3: **Quality of the ortho mosaic**. Red indicates areas where the ortho mosaic and the digital elevation model could contain artefacts, e.g. non-linear building edges.

2 Original Image Dataset

The dataset contains 152 original images.

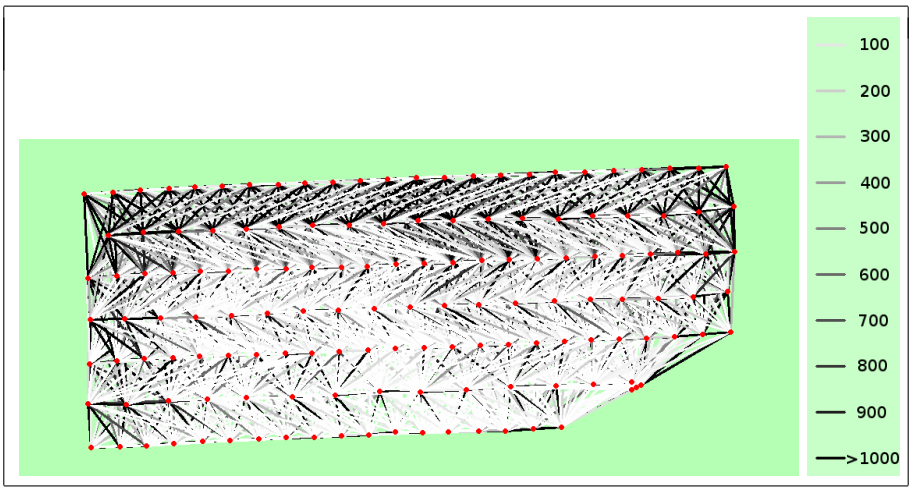

Figure 4: This connectivity graph displays the number of potential keypoint matches (color coded in gray values) between the original images. A high quality result can be obtained if each orginal image is connected with sufficient matches to the neighbouring images along all directions. The large red dot corresponds to the starting original image. The green line follows the original image geotags over time. Keypoint matches consist of distinct images keypoints that are visible in two images and for which a correspondence could be established.

3 Result

The ortho mosaic is composed from 152 out of 152 original images.
The ortho mosaic covers an area of 0.68 km^2 / 68.11 ha / 0.26 mi^2.

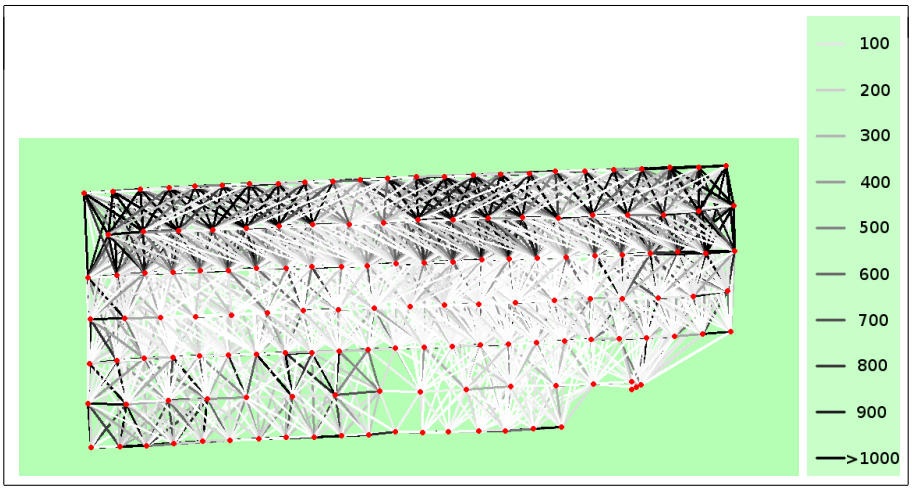

Figure 5: The final connectivity graph displays verified keypoint matches between the original images after bundle block adjustment, which is a global optimisation of the position and orientation of the original images and the digital elevation model.

Figure 6: 2 3D point(s) that have been observed in 18 images (last row of Table 1). Each patch is cropped around the projection of these 3-D point(s) in different images.

	number of keypoint observartions per original image
median	3217
min	395
max	20672
mean	6943.69
	number of 3D points observed
in 2 - 3 images	390336
in 4 - 5 images	31501
in 6 - 7 images	5615
in 8 - 9 images	1614
in 10 - 11 images	791
in 12 - 13 images	375
in 14 - 15 images	165
in 16 - 17 images	22
in 18 - 18 images	2

Table 1: Matching statistics for the bundle block adjustment.

number total keypoint observations for bundle block adjustment	1055441
number total 3D points for bundle block adjustment	430421
mean reprojection error	0.993637 [pixels]

Table 2: Characteristics of bundle block adjustment.

4 Georeference

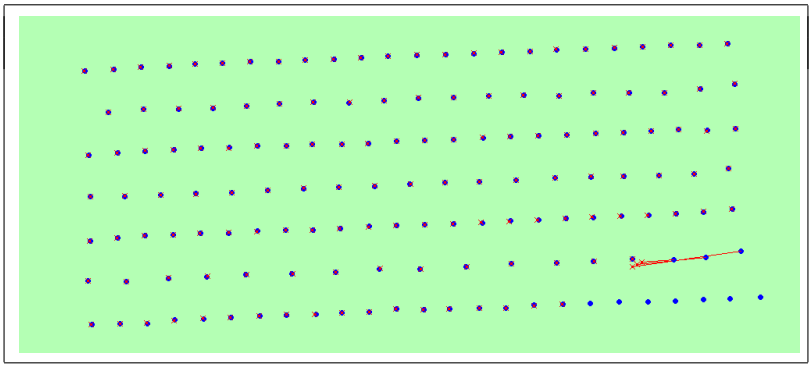

Figure 7: Offset between image GPS tags (red crosses) and estimated positions of the original images (large blue dots) in the horizontal plane.

	geo localisation variance σ [m]
longitude direction (x)	0.577846
latitude direction (y)	0.274257
altitude direction (z)	0.630111

Table 3: Localisation accuracy in metres. 5 out of 145 original image geotags have been labeled as inaccurate (see Figure 7).