

Rilievo Fotogrammetrico

Riqualificazione tratto di Via M. Chizzolini in Campitello di Marcaria.

16 July 2018



Survey Data

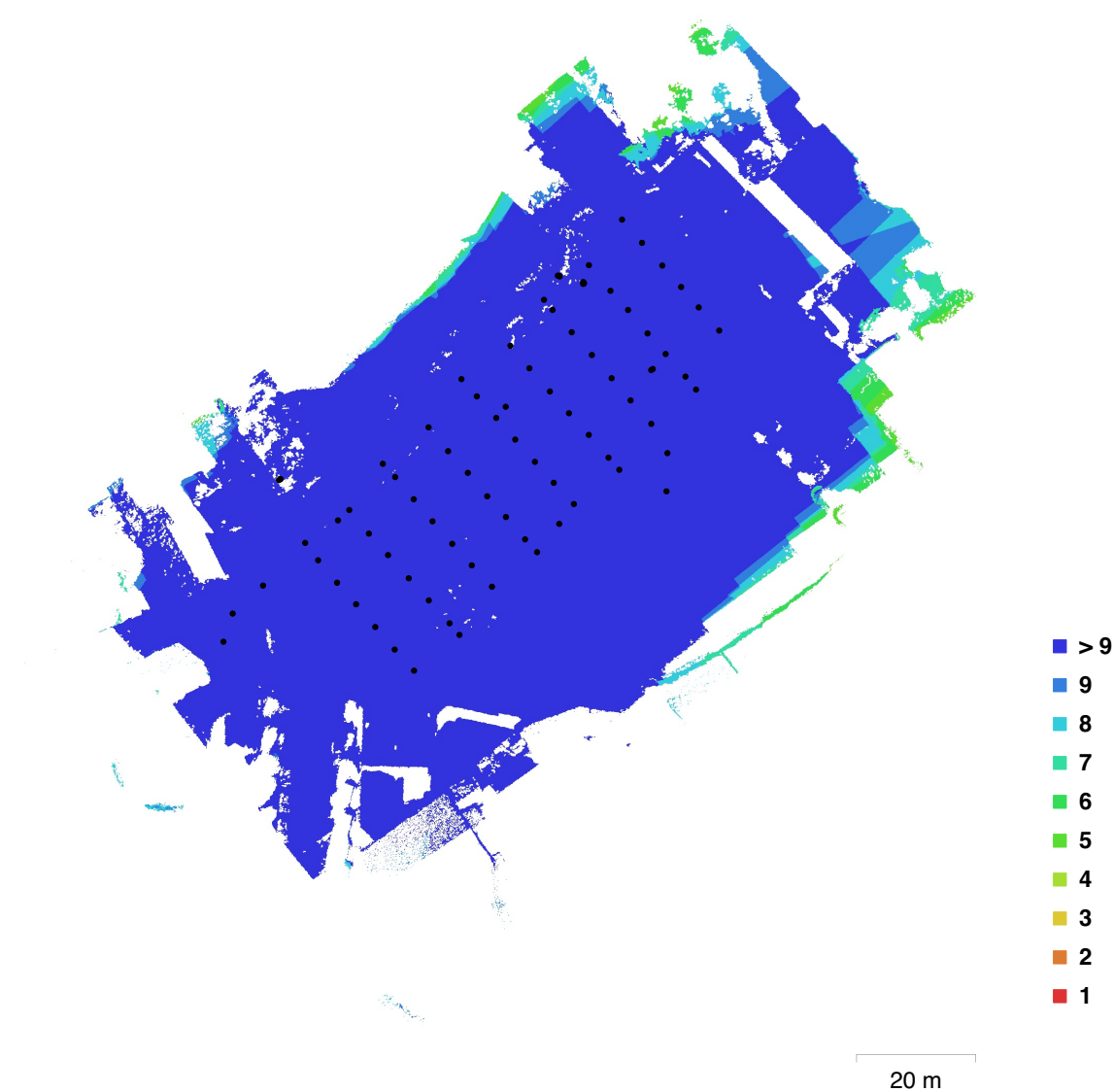


Fig. 1. Camera locations and image overlap.

Number of images:	81	Camera stations:	81
Flying altitude:	42.1 m	Tie points:	329,576
Ground resolution:	1.64 cm/pix	Projections:	1,466,308
Coverage area:	9.38e+03 m²	Reprojection error:	0.937 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
FC300X (3.61 mm)	4000 x 3000	3.61 mm	1.56 x 1.56 µm	No

Table 1. Cameras.

Camera Calibration

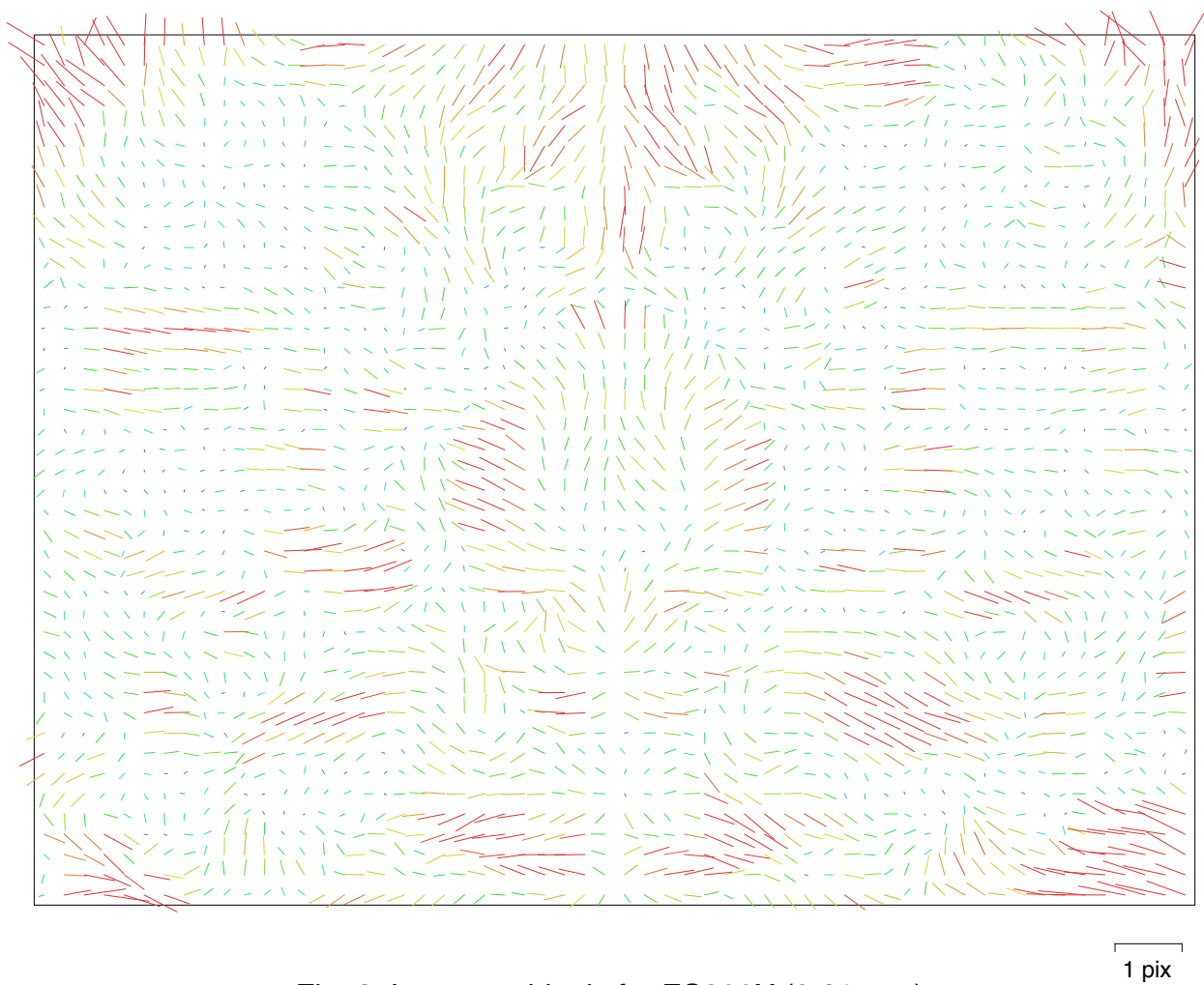


Fig. 2. Image residuals for FC300X (3.61 mm).

FC300X (3.61 mm)
81 images

Resolution	Focal Length	Pixel Size	Precalibrated
4000 x 3000	3.61 mm	1.56 x 1.56 μm	No
Type:	Frame	F:	2326.34
Cx:	-2.94108	B1:	-3.52921
Cy:	-21.9808	B2:	-0.802565
K1:	0.000649062	P1:	0.000294164
K2:	-0.0342152	P2:	-0.00124002
K3:	0.0632975	P3:	0
K4:	-0.0268135	P4:	0

Camera Locations

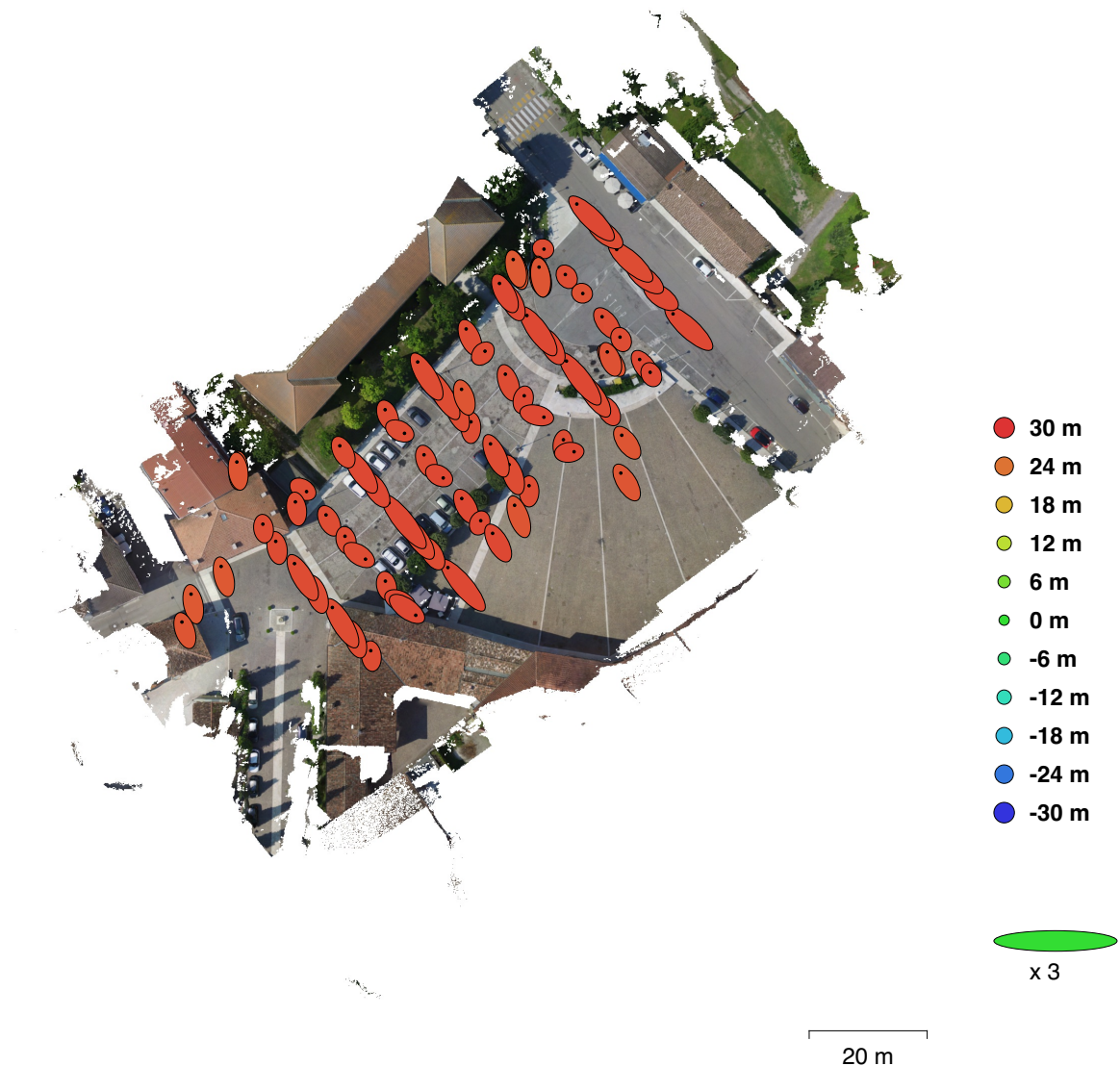


Fig. 3. Camera locations and error estimates.

Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.

Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	XY error (m)	Z error (m)	Total error (m)
0.698969	1.03665	1.25028	27.5031	27.5315

Table 2. Average camera location error.

Ground Control Points



Fig. 4. GCP locations.

Label	XY error (cm)	Z error (cm)	Error (cm)	Projections	Error (pix)
1	1.66208	2.81627	3.27015	3	0.235
10					
11	2.41946	0.0537272	2.42006	7	0.381
12	1.89206	3.6674	4.12671	7	0.394
13					
14					
15	4.18662	7.65908	8.72865	3	0.320
16	1.02203	-2.72726	2.91247	8	0.409
17	4.26649	-6.12028	7.46061	2	0.293

Label	XY error (cm)	Z error (cm)	Error (cm)	Projections	Error (pix)
18	4.12378	-1.92448	4.55073	2	0.418
19					
2	1.75129	1.58303	2.36072	2	0.266
20	2.4314	-0.0373976	2.43168	4	0.218
21	1.65726	-1.86311	2.49353	4	0.173
22	3.71545	-3.89976	5.38635	3	0.473
23	3.47755	1.35451	3.73203	2	0.148
24	1.84677	-1.60736	2.4483	3	0.305
25	0.230531	-0.0471525	0.235304	6	0.311
26					
27					
28					
29					
3	2.44242	2.02933	3.17547	5	0.856
30	1.15587	-3.07708	3.28701	8	0.500
31	1.61327	-2.47261	2.95236	2	0.036
32	1.9692	0.198834	1.97921	2	0.269
33	2.85812	-5.11696	5.86107	3	0.304
34	1.17753	-1.93292	2.26335	2	0.074
4	5.77281	-0.206856	5.77652	4	0.185
5	6.82271	0.987187	6.89376	4	0.402
6					
7	6.38015	-3.25658	7.16321	2	0.437
8	1.25059	1.22744	1.75231	6	0.101
9					
Total	3.24388	3.00722	4.42336		0.383

Table 3. Control points.

Digital Elevation Model

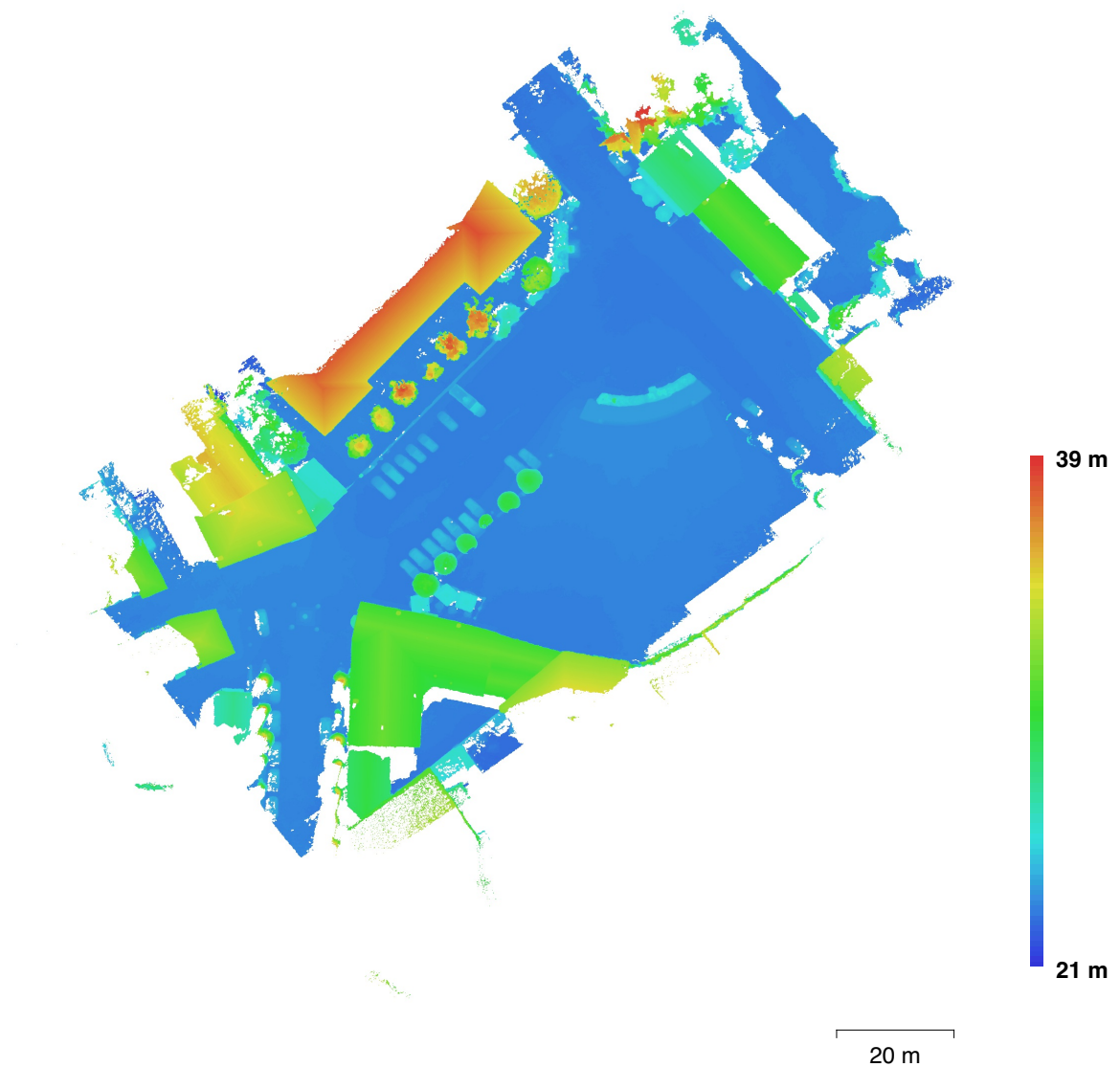


Fig. 5. Reconstructed digital elevation model.

Resolution: 3.27 cm/pix
Point density: 934 points/m²

Processing Parameters

General

Cameras	81
Aligned cameras	81
Markers	34
Coordinate system	WGS 84 / UTM zone 32N (EPSG::32632)

Point Cloud

Points	329,576 of 389,676
RMS reprojection error	0.230837 (0.936657 pix)
Max reprojection error	0.861164 (52.0202 pix)
Mean key point size	3.84501 pix
Effective overlap	4.99921

Alignment parameters

Accuracy	High
Pair preselection	Disabled
Key point limit	0
Tie point limit	0
Constrain features by mask	No
Adaptive camera model fitting	Yes
Matching time	34 minutes 52 seconds
Alignment time	2 minutes 2 seconds

Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k4, p1, p2
Optimization time	6 seconds

Dense Point Cloud

Points	15,254,437
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Reconstruction parameters

Quality	High
Depth filtering	Aggressive
Depth maps generation time	1 hours 8 minutes
Dense cloud generation time	18 minutes 39 seconds

Model

Faces	3,050,880
Vertices	1,532,462
Texture	12,000 x 12,000, uint8

Reconstruction parameters

Surface type	Arbitrary
Source data	Dense
Interpolation	Enabled
Quality	High
Depth filtering	Aggressive
Face count	3,050,881
Processing time	16 minutes 26 seconds

Texturing parameters

Mapping mode	Generic
Blending mode	Average
Texture size	12,000 x 12,000
Enable color correction	Yes
Enable hole filling	Yes
UV mapping time	1 minutes 8 seconds
Blending time	3 minutes 8 seconds

DEM

Size	5,742 x 6,027
Coordinate system	WGS 84 / UTM zone 32N (EPSG::32632)

Reconstruction parameters

Source data	Dense cloud
Interpolation	Disabled

Processing time	18 seconds
Orthomosaic	
Size	9,794 x 10,634
Coordinate system	WGS 84 / UTM zone 32N (EPSG::32632)
Channels	3, uint8
Blending mode	Mosaic
Reconstruction parameters	
Surface	Mesh
Enable color correction	Yes
Processing time	3 minutes 29 seconds
Software	
Version	1.2.5 build 2678
Platform	Mac OS 64 bit