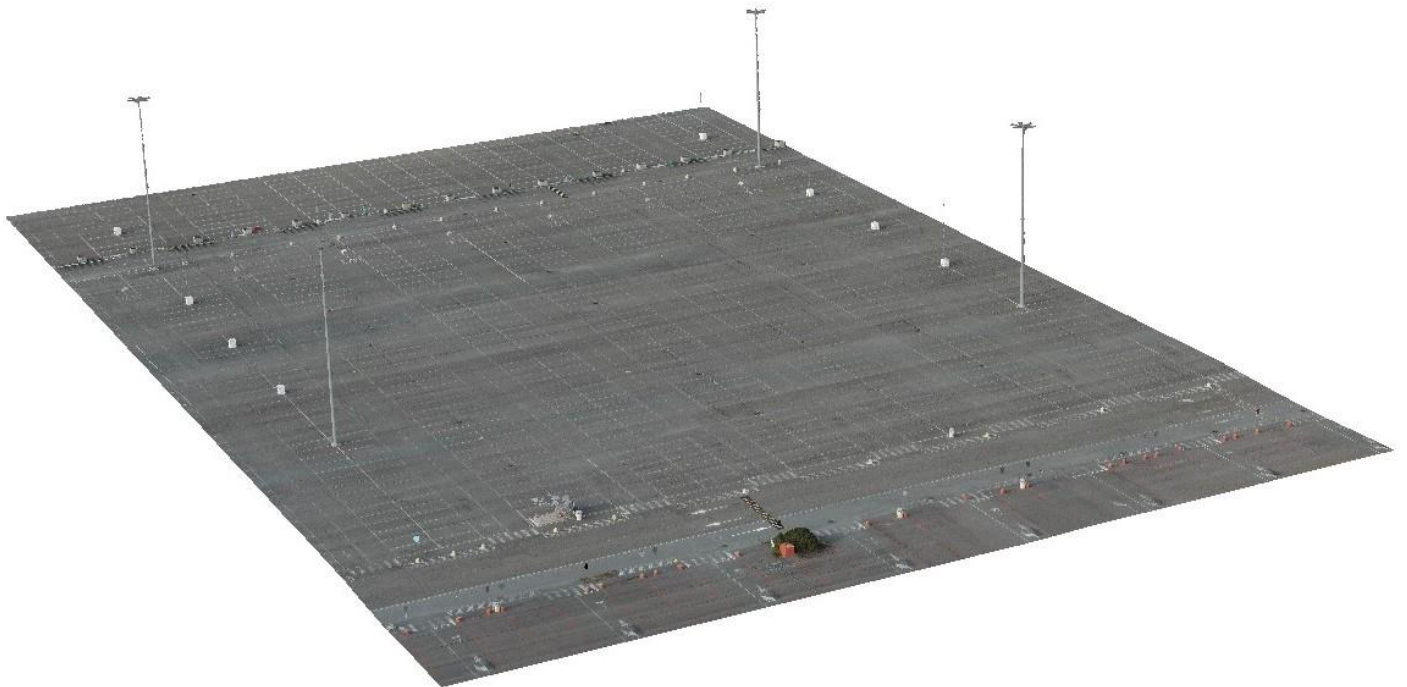




Report Processo di Elaborazione GCP (Ground Control Point) "DJI Zenmuse P1-35mm"





Dati Rilievo sul Campo:

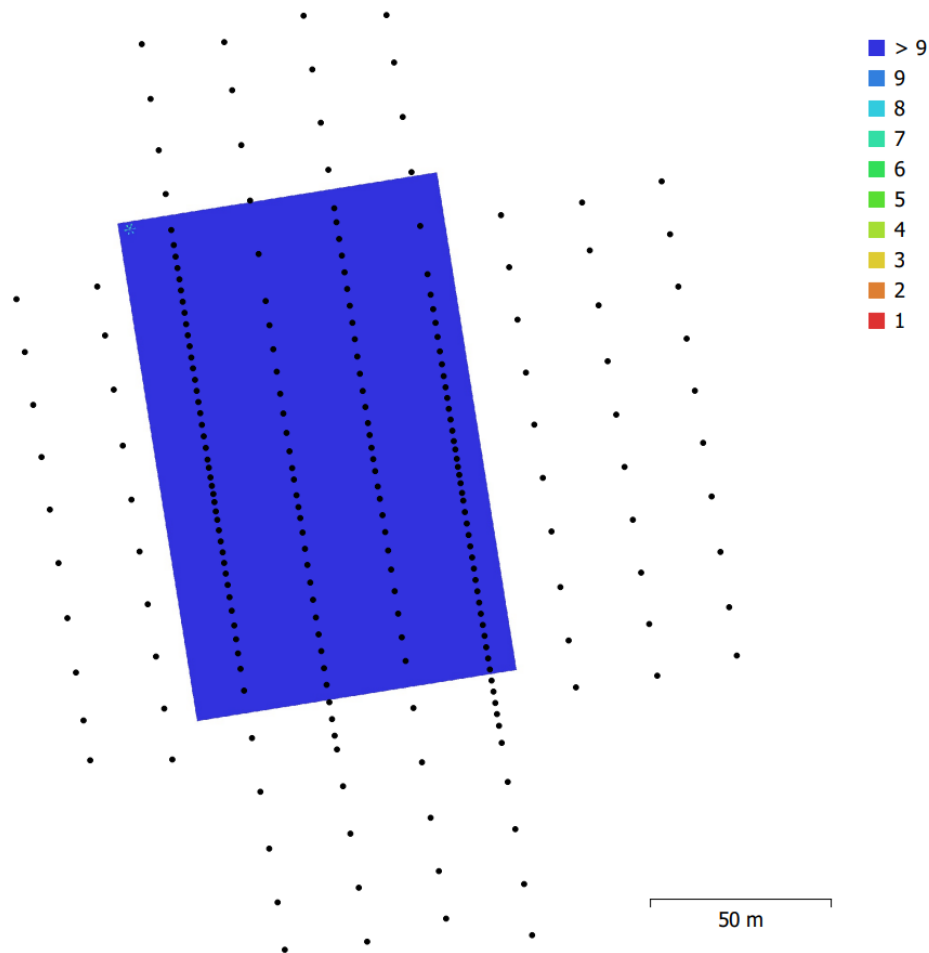


Fig. 1. Camera locations and image overlap.

Number of images:	224	Camera stations:	224
Flying altitude:	103 m	Tie points:	131,611
Ground resolution:	1.21 cm/pix	Projections:	1,130,756
Coverage area:	0.0124 km ²	Reprojection error:	1.07 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ZenmuseP1 (35mm)	8192 x 5460	35 mm	4.39 x 4.39 μm	No

Table 1. Cameras.



Dati di Calibrazione Camera:

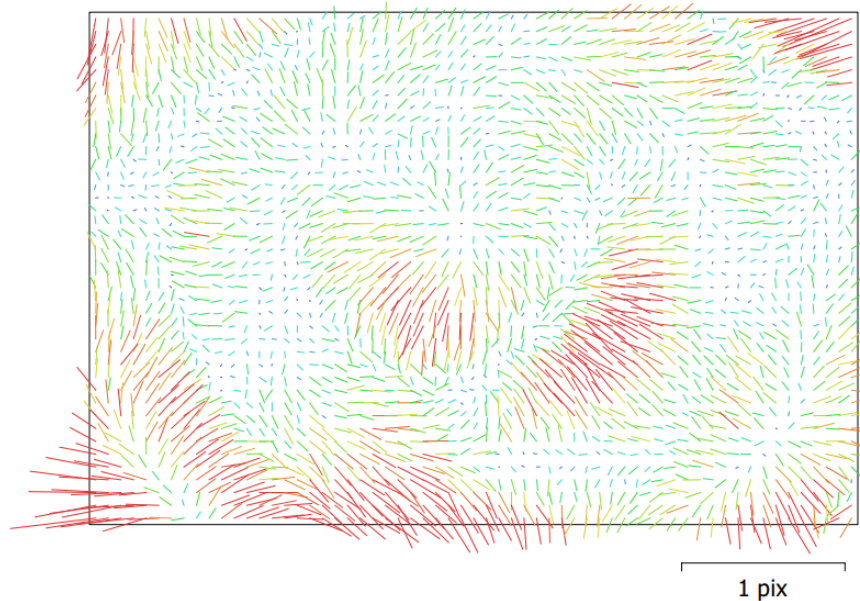


Fig. 2. Image residuals for ZenmuseP1 (35mm).

ZenmuseP1 (35mm)

224 images

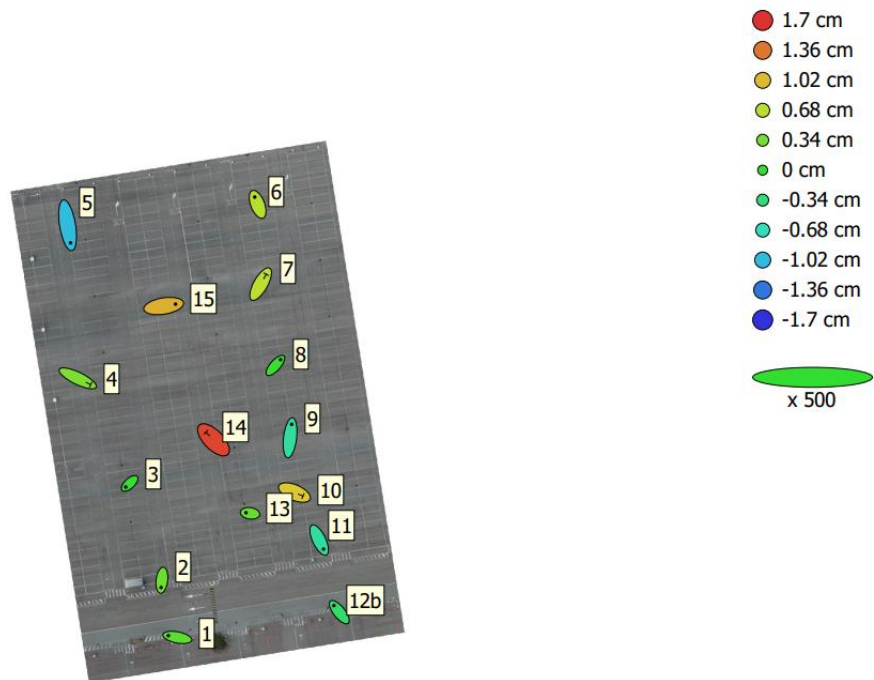
Type	Resolution	Focal Length	Pixel Size
Frame	8192 x 5460	35 mm	4.39 x 4.39 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	8203.67	0.023	1.00	-0.07	0.04	-0.36	0.35	-0.31	-0.07	0.03
Cx	-46.589	0.024		1.00	-0.01	-0.03	0.03	-0.03	0.91	-0.01
Cy	-1.27167	0.019			1.00	0.00	0.00	-0.00	-0.00	0.78
K1	-0.0487023	2.4e-05				1.00	-0.97	0.92	-0.04	-0.00
K2	0.0213126	0.00015					1.00	-0.98	0.04	0.00
K3	-0.103183	0.00027						1.00	-0.05	-0.00
P1	-0.00236054	9.3e-07							1.00	-0.00
P2	0.00077754	7.3e-07								1.00

Table 2. Calibration coefficients and correlation matrix.



Punti di Controllo a terra:



● Control points

⊥ Check points

50 m

Fig. 3. GCP locations and error estimates.

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

Estimated GCP locations are marked with a dot or crossing.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
11	0.629228	0.940491	0.562773	1.13157	1.26379

Table 3. Control points RMSE.

X - Longitude, Y - Latitude, Z - Altitude.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
4	1.01702	0.808117	1.01259	1.29899	1.64703

Table 4. Check points RMSE.

X - Longitude, Y - Latitude, Z - Altitude.



Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
1	-1.00492	0.195932	0.206248	1.04441	0.304 (5)
2	-0.091593	-0.810674	0.288984	0.865502	0.174 (5)
3	-0.439843	-0.402884	0.0110953	0.596574	0.193 (7)
5	0.329072	-1.96539	-1.01745	2.23746	0.272 (7)
6	-0.322918	0.822495	0.663368	1.10491	0.239 (5)
8	0.579889	0.646718	0.0510087	0.870125	0.166 (6)
9	0.180307	1.5152	-0.540443	1.61877	0.335 (7)
11	0.488603	-1.01037	-0.540153	1.24553	0.310 (6)
13	-0.450782	0.064356	0.254309	0.521554	0.369 (5)
15	1.32843	0.216377	1.07686	1.72371	0.265 (5)
12b	-0.596229	0.739412	-0.267706	0.986856	0.260 (6)
Total	0.629228	0.940491	0.562773	1.26379	0.269

Table 5. Control points.
 X - Longitude, Y - Latitude, Z - Altitude.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
4	1.45639	-0.700832	0.392107	1.66313	0.258 (5)
7	0.62339	1.10464	0.687736	1.44285	0.205 (7)
10	0.951421	-0.400934	0.952012	1.40438	0.479 (5)
14	-0.84994	0.860271	1.60259	2.00767	0.293 (5)
Total	1.01702	0.808117	1.01259	1.64703	0.316

Table 6. Check points.
 X - Longitude, Y - Latitude, Z - Altitude.



Modello di Elevazione Digitale:

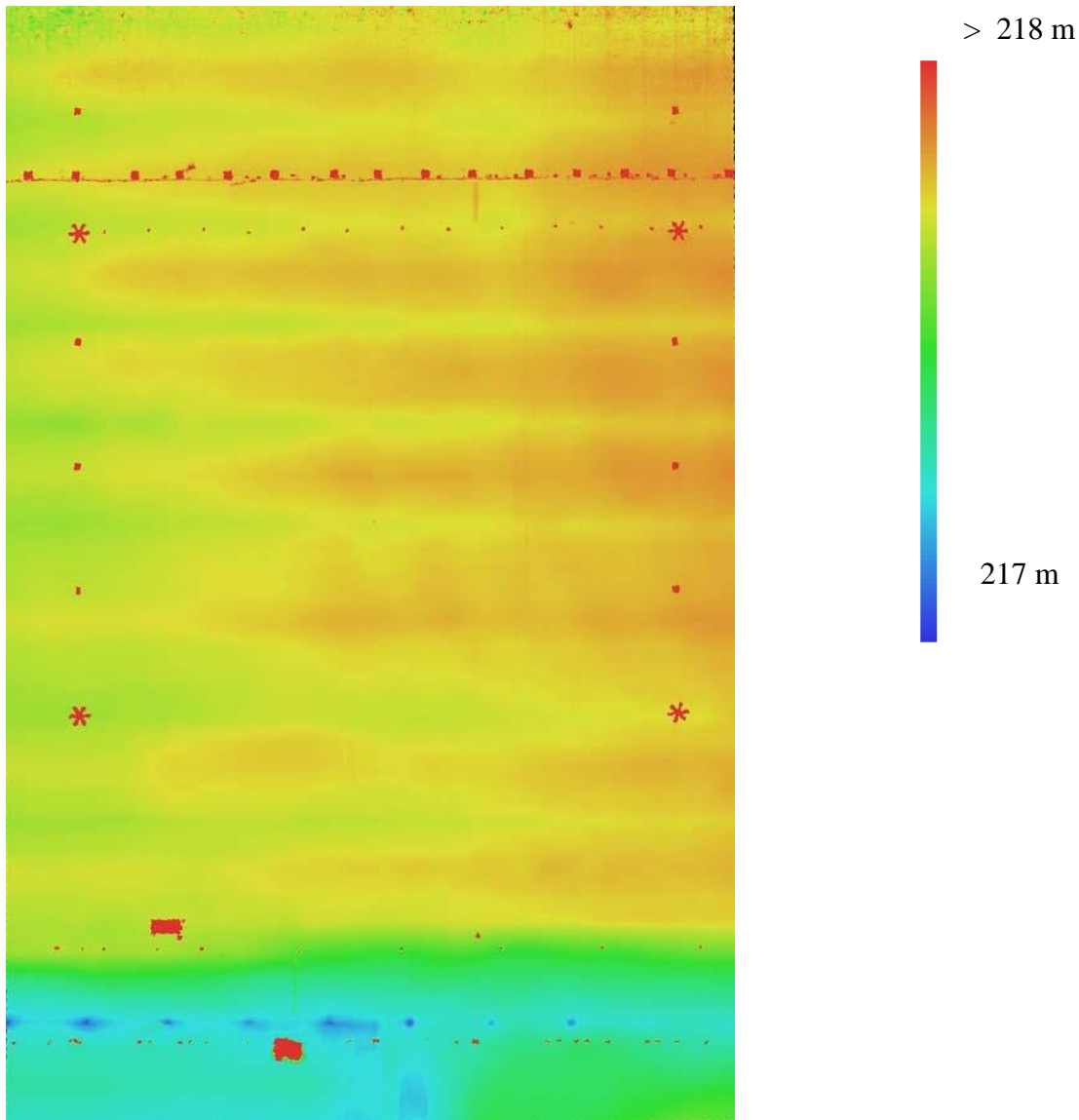


Fig. 4. Reconstructed digital elevation model.

Resolution: 4.89 cm/pix
Point density: 419 points/m²