Agisoft Metashape - Multiespectral

Processing Report - MM-RB

26 May 2024

Survey Data

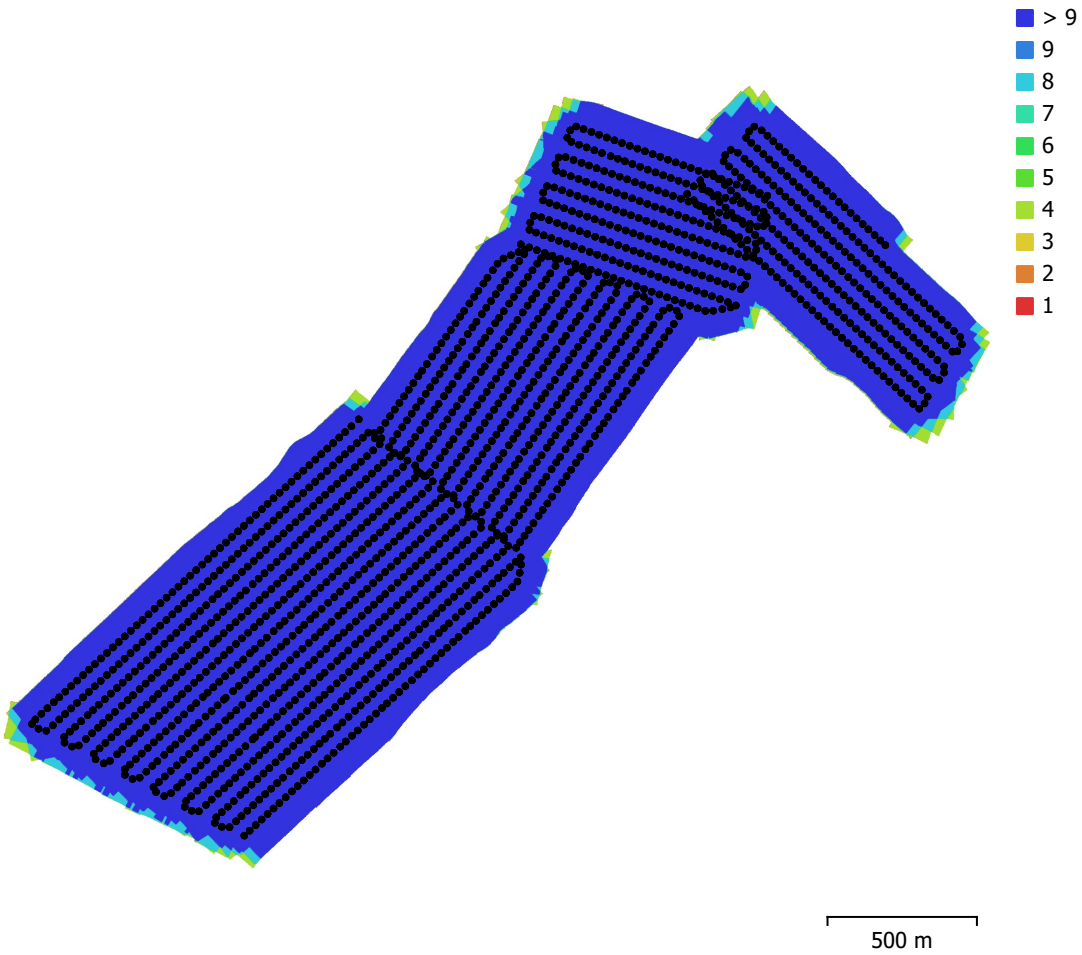

Fig. 1. Camera locations and image overlap.

Number of images:	6,932	Camera stations:	6,932
Flying altitude:	161 m	Tie points:	867,854
Ground resolution:	7.1 cm/pix	Projections:	3,271,949
Coverage area:	3.03 km²	Reprojection error:	0.615 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
M3M, Green (4.34mm)	2592 x 1944	4.34 mm	2 x 2 µm	Yes
M3M, Red (4.34mm)	2592 x 1944	4.34 mm	2 x 2 µm	Yes
M3M, RedEdge (4.34mm)	2592 x 1944	4.34 mm	2 x 2 µm	Yes
M3M, NIR (4.34mm)	2592 x 1944	4.34 mm	2 x 2 µm	Yes

Table 1. Cameras.

Camera Calibration

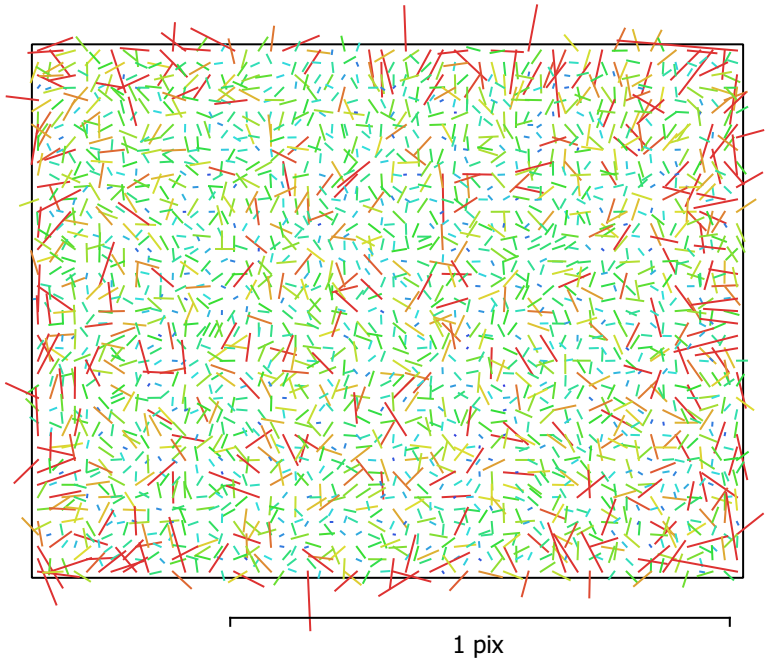

Fig. 2. Image residuals for M3M, Green (4.34mm).

M3M, Green (4.34mm)

1733 images, precalibrated, additional corrections

Type	Resolution	Focal Length	Pixel Size
Frame	**2592 x 1944**	**4.34 mm**	**2 x 2 µm**

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	**2183.22**	0.66	1.00	-0.01	0.07	-0.27	-0.02	-0.98	0.97	-0.96	0.94	-0.01	0.07
Cx	**-2.52653**	0.14		1.00	-0.00	-0.03	0.16	0.01	-0.01	0.01	-0.02	0.99	-0.00
Cy	**28.0741**	0.14			1.00	-0.11	-0.05	-0.07	0.07	-0.08	0.08	-0.00	0.99
B1	**-4.0592**	0.017				1.00	0.00	0.30	-0.31	0.31	-0.31	-0.04	-0.11
B2	**-0.68445**	0.012					1.00	0.02	-0.02	0.02	-0.02	0.16	-0.05
K1	**-0.0221819**	0.0034						1.00	-1.00	0.99	-0.97	0.01	-0.07
K2	**0.0797369**	0.014							1.00	-1.00	0.99	-0.01	0.08
K3	**-0.241975**	0.026								1.00	-1.00	0.01	-0.08
K4	**0.157358**	0.017									1.00	-0.01	0.09
P1	**-0.000461685**	3e-05										1.00	-0.00
P2	**-2.81899e-05**	3.1e-05											1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

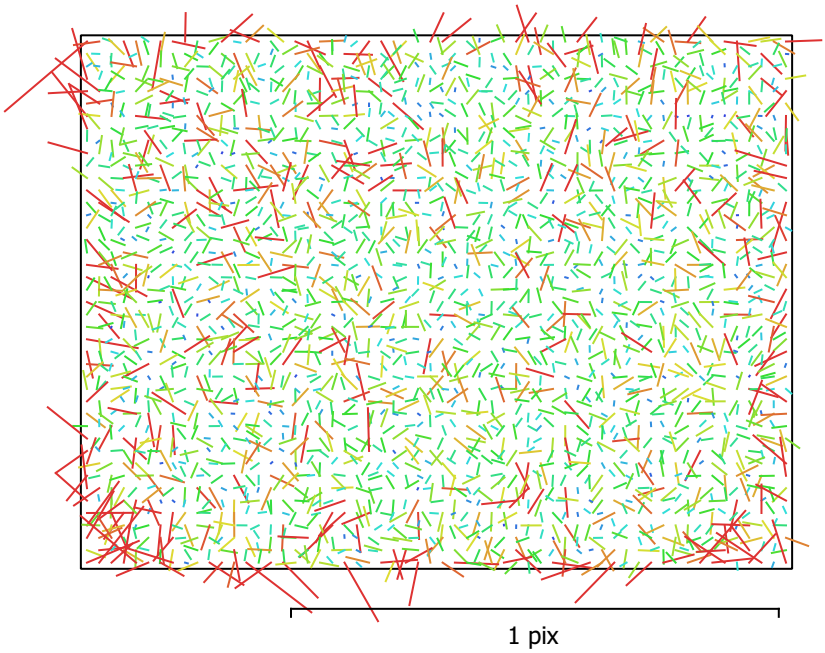

Fig. 3. Image residuals for M3M, Red (4.34mm).

M3M, Red (4.34mm)

1733 images, precalibrated, additional corrections

Type	Resolution	Focal Length	Pixel Size
Frame	**2592 x 1944**	**4.34 mm**	**2 x 2 µm**

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	**2185.94**	0.68	1.00	-0.03	-0.01	-0.26	-0.01	-0.98	0.97	-0.96	0.94	-0.03	-0.02
Cx	**18.6001**	0.14		1.00	-0.00	0.05	0.01	0.03	-0.03	0.03	-0.02	0.99	0.00
Cy	**-8.56447**	0.14			1.00	0.01	0.06	0.01	-0.01	0.01	-0.01	-0.00	0.99
B1	**-3.65545**	0.017				1.00	0.01	0.29	-0.30	0.30	-0.29	0.05	0.01
B2	**-0.354305**	0.011					1.00	0.01	-0.01	0.01	-0.01	0.01	0.06
K1	**-0.0272176**	0.0035						1.00	-1.00	0.99	-0.97	0.03	0.02
K2	**0.106985**	0.015							1.00	-1.00	0.99	-0.02	-0.02
K3	**-0.297001**	0.027								1.00	-1.00	0.02	0.02
K4	**0.191508**	0.018									1.00	-0.02	-0.02
P1	**-0.000387561**	2.9e-05										1.00	0.00
P2	**0.000302806**	3.1e-05											1.00

Table 3. Calibration coefficients and correlation matrix.

Camera Calibration

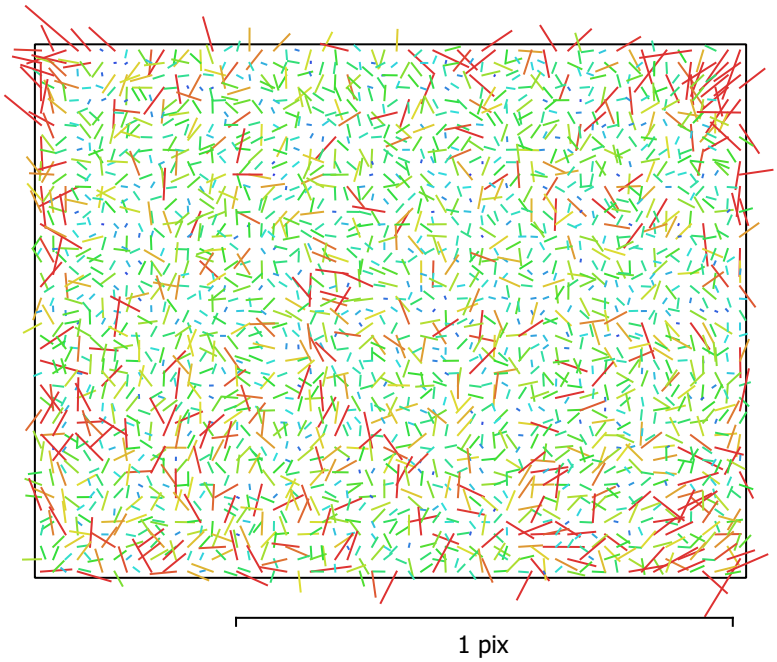

Fig. 4. Image residuals for M3M, RedEdge (4.34mm).

M3M, RedEdge (4.34mm)

1733 images, precalibrated, additional corrections

Type	Resolution	Focal Length	Pixel Size
Frame	**2592 x 1944**	**4.34 mm**	**2 x 2 µm**

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	**2188.45**	0.66	1.00	-0.01	0.02	-0.27	-0.03	-0.98	0.97	-0.96	0.94	-0.01	0.01
Cx	**-2.26942**	0.13		1.00	0.00	-0.01	0.03	0.01	-0.01	0.01	-0.01	0.99	0.00
Cy	**5.65737**	0.14			1.00	-0.01	-0.01	-0.01	0.02	-0.02	0.02	0.00	0.99
B1	**-4.10449**	0.016				1.00	0.01	0.30	-0.31	0.31	-0.30	-0.01	-0.01
B2	**-0.909899**	0.011					1.00	0.02	-0.02	0.02	-0.02	0.04	-0.01
K1	**-0.00801179**	0.0034						1.00	-1.00	0.99	-0.98	0.01	-0.02
K2	**0.0256245**	0.014							1.00	-1.00	0.99	-0.01	0.02
K3	**-0.145645**	0.027								1.00	-1.00	0.01	-0.02
K4	**0.090964**	0.018									1.00	-0.01	0.02
P1	**-0.000106969**	2.9e-05										1.00	0.00
P2	**-0.000226861**	3e-05											1.00

Table 4. Calibration coefficients and correlation matrix.

Camera Calibration

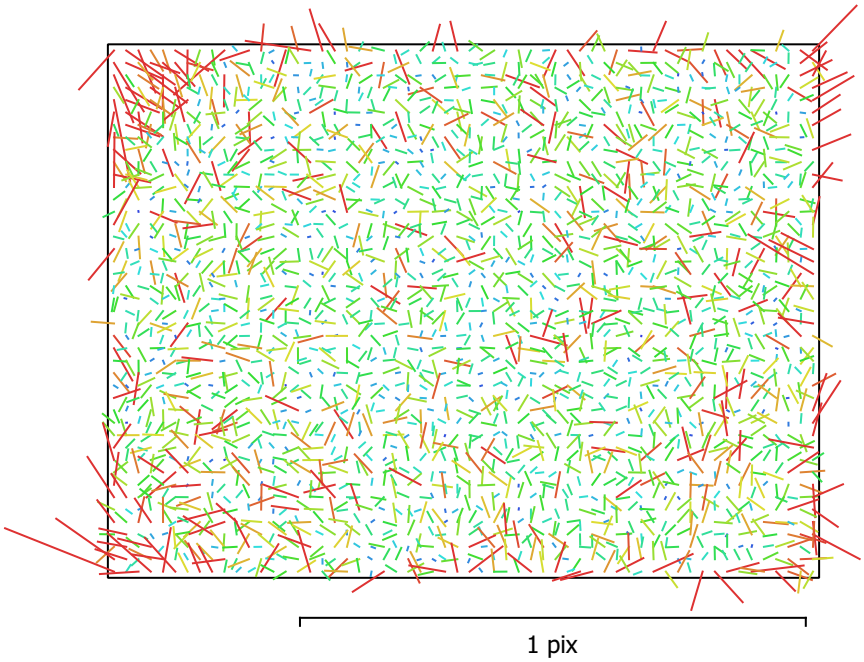

Fig. 5. Image residuals for M3M, NIR (4.34mm).

M3M, NIR (4.34mm)

1733 images, precalibrated, additional corrections

Type	Resolution	Focal Length	Pixel Size
Frame	**2592 x 1944**	**4.34 mm**	**2 x 2 µm**

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	**2196.99**	0.66	1.00	-0.01	0.00	-0.27	-0.01	-0.98	0.97	-0.96	0.94	-0.01	-0.01
Cx	**12.9307**	0.14		1.00	-0.00	0.02	0.01	0.01	-0.01	0.01	-0.00	0.99	0.00
Cy	**-1.64558**	0.14			1.00	0.00	0.04	0.01	-0.01	0.01	-0.01	-0.00	0.99
B1	**-4.08521**	0.016				1.00	0.01	0.30	-0.31	0.31	-0.30	0.02	0.00
B2	**-0.310448**	0.011					1.00	0.01	-0.01	0.01	-0.01	0.02	0.04
K1	**0.00265874**	0.0035						1.00	-1.00	0.99	-0.98	0.00	0.01
K2	**-0.0346422**	0.015							1.00	-1.00	0.99	-0.00	-0.01
K3	**-0.0159681**	0.027								1.00	-1.00	0.00	0.01
K4	**-0.00215132**	0.019									1.00	0.00	-0.01
P1	**-0.000313477**	3.1e-05										1.00	0.00
P2	**6.47156e-05**	3.1e-05											1.00

Table 5. Calibration coefficients and correlation matrix.

Camera Locations

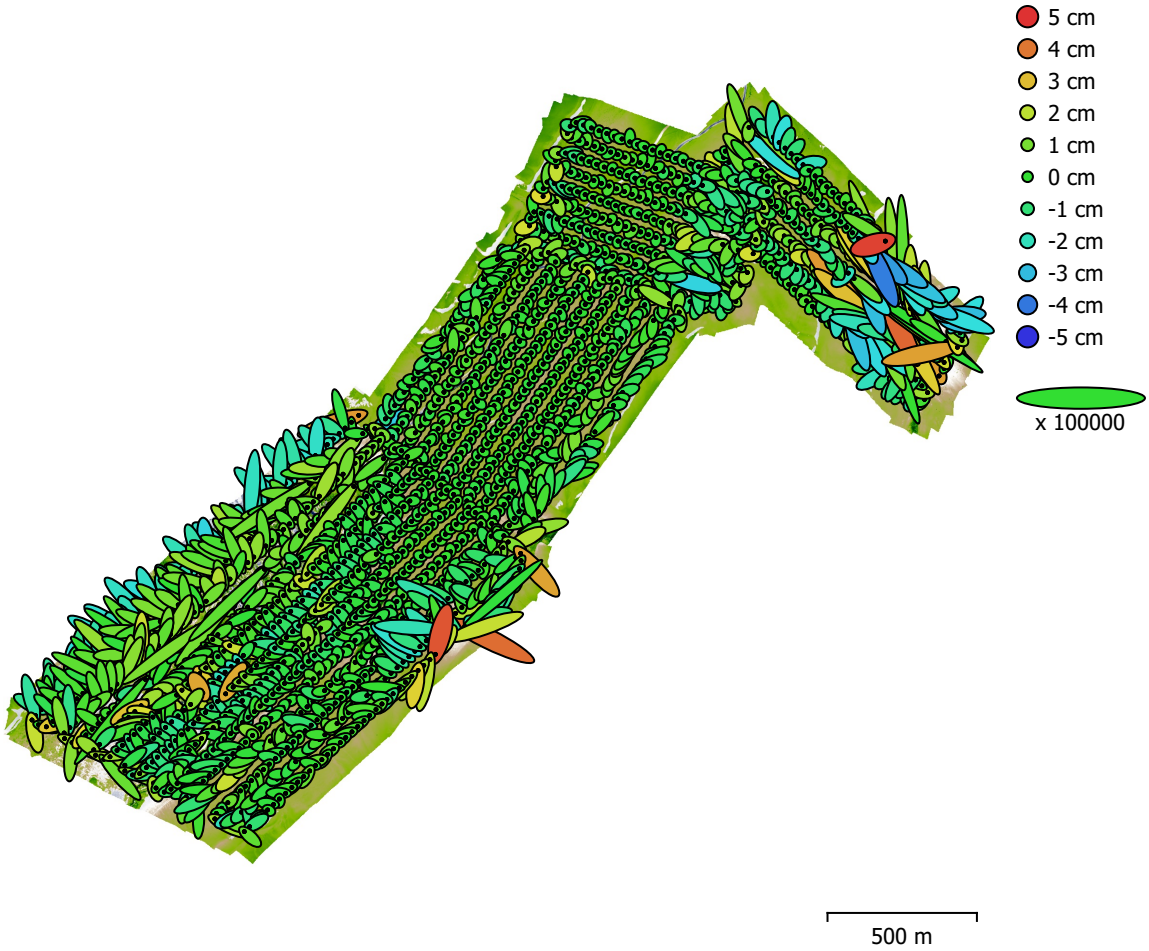

Fig. 6. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total error (mm)
0.479124	0.46329	9.29204	0.666481	9.31592

Table 6. Average camera location error.
X - Longitude, Y - Latitude, Z - Altitude.

Digital Elevation Model

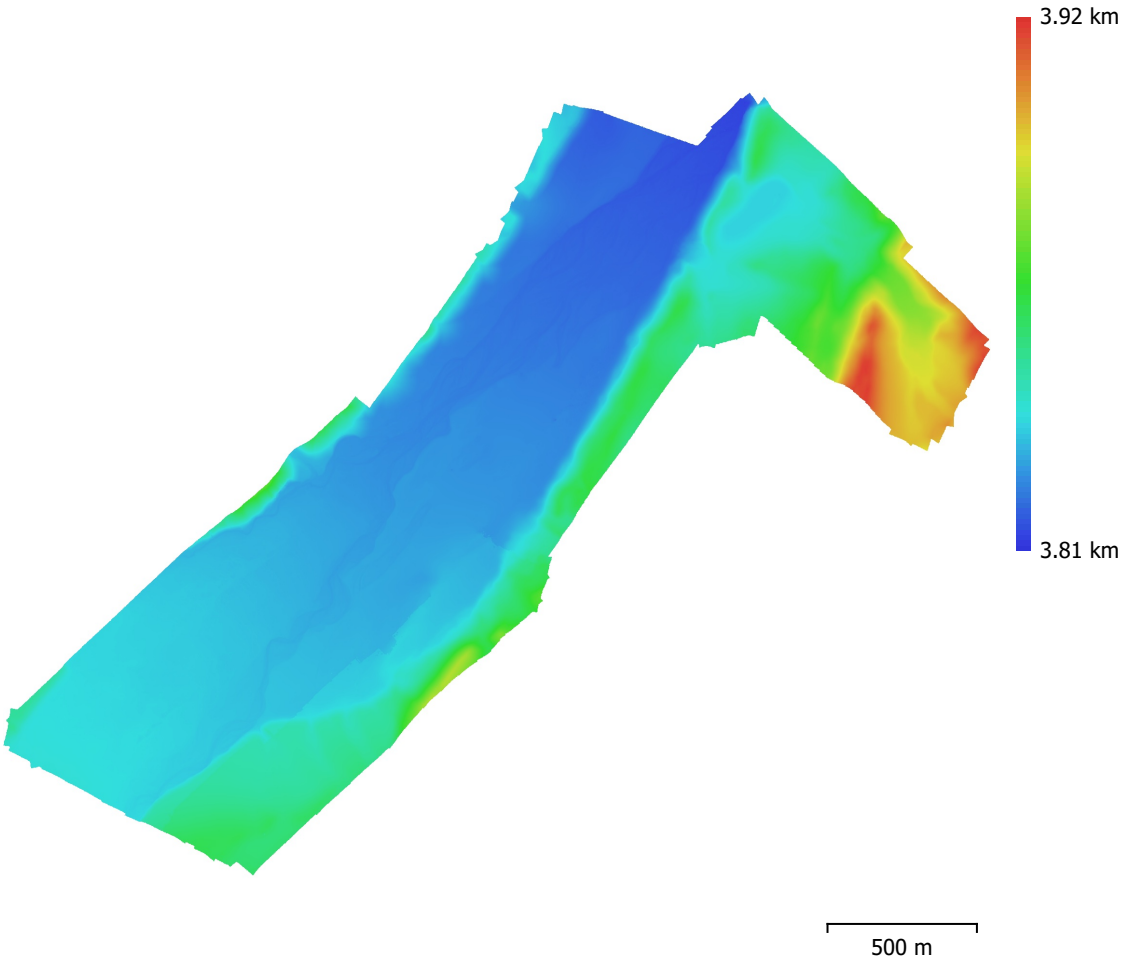

Fig. 7. Reconstructed digital elevation model.

Resolution:	28.4 cm/pix
Point density:	12.4 points/m²

Processing Parameters

General	
Cameras	6932
Aligned cameras	6932
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	867,854 of 2,533,169
RMS reprojection error	0.0954545 (0.614729 pix)
Max reprojection error	0.20718 (4.34375 pix)
Mean key point size	6.11434 pix
Point colors	1 bands, uint16
Key points	3.82 GB
Average tie point multiplicity	7.02472
Alignment parameters	
Accuracy	Medium
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Key point limit per Mpx	1,000
Tie point limit	4,000
Exclude stationary tie points	Yes
Guided image matching	Yes
Adaptive camera model fitting	Yes
Matching time	8 minutes 47 seconds
Matching memory usage	9.45 GB
Alignment time	37 minutes 49 seconds
Alignment memory usage	1.64 GB
Optimization parameters	
Parameters	f, b1, b2, cx, cy, k1-k4, p1, p2
Fit additional corrections	Yes
Adaptive camera model fitting	No
Optimization time	2 minutes 5 seconds
Date created	2024:05:25 21:15:53
Software version	1.8.4.14654
File size	365.16 MB
Depth Maps	
Count	1363
Depth maps generation parameters	
Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	6 minutes 2 seconds
File size	631.59 MB
Dense Point Cloud	
Points	35,315,597
Point colors	4 bands, uint16
Depth maps generation parameters	
Quality	Medium
Filtering mode	Mild
Max neighbors	16

Processing time	6 minutes 2 seconds
Dense cloud generation parameters	
Processing time	9 minutes 43 seconds
Date created	2024:05:25 22:19:33
Software version	1.8.4.14654
File size	740.21 MB
DEM	
Size	18,754 x 17,294
Coordinate system	POSGAR 2007 / Argentina 2 (EPSG::5344)
File size	128.92 MB
Orthomosaic	
Size	47,090 x 37,423
Coordinate system	POSGAR 2007 / Argentina 2 (EPSG::5344)
Colors	4 bands, uint16
Reconstruction parameters	
Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	49 minutes 24 seconds
Memory usage	2.41 GB
Date created	2024:05:26 15:44:41
Software version	1.8.4.14654
File size	125.41 GB
Raster Transform	
Expression	(B4-B2)/(B4+B2)
System	
Software name	Agisoft Metashape Professional
Software version	1.8.4 build 14654
OS	Windows 64 bit
RAM	63.42 GB
CPU	AMD Ryzen 9 5900HX with Radeon Graphics
GPU(s)	NVIDIA GeForce RTX 3080 Laptop GPU