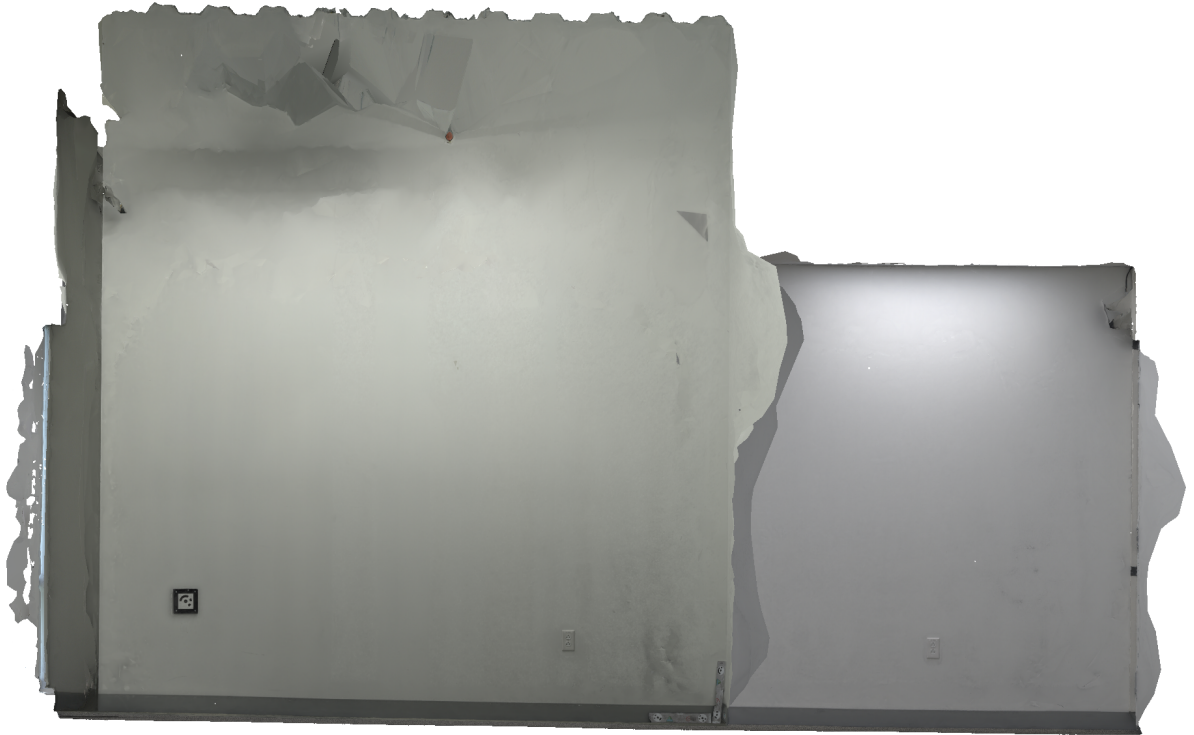


Agisoft Metashape

Processing Report

17 October 2023



Survey Data

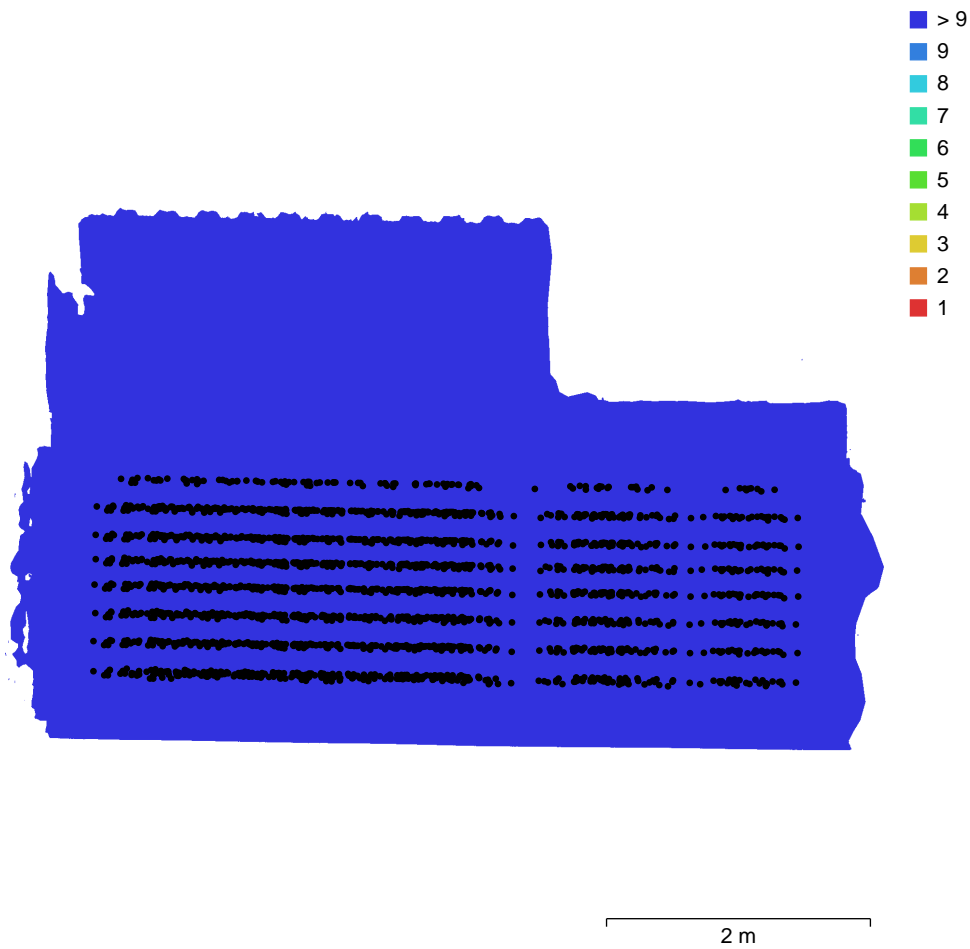


Fig. 1. Camera locations and image overlap.

Number of images:	2,420	Camera stations:	2,420
Flying altitude:	78 cm	Tie points:	933,180
Ground resolution:	0.387 mm/pix	Projections:	2,153,288
Coverage area:	21.6 m ²	Reprojection error:	1.24 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Camera 0	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 1	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 2	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 3	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 4	5784 x 8660	12 mm	4.17 x 4.17 um	No

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Camera 5	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 6	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 7	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 8	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 9	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 10	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 11	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 12	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 13	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 14	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 15	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 16	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 17	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 18	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 19	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 20	5784 x 8660	12 mm	4.17 x 4.17 um	No
Camera 21	5784 x 8660	12 mm	4.17 x 4.17 um	No

Table 1. Cameras.

Camera Calibration

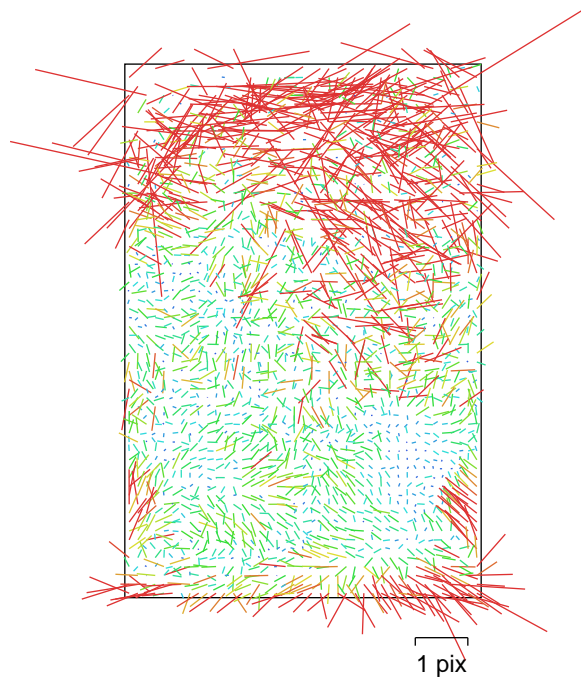


Fig. 2. Image residuals for Camera 0.

Camera 0

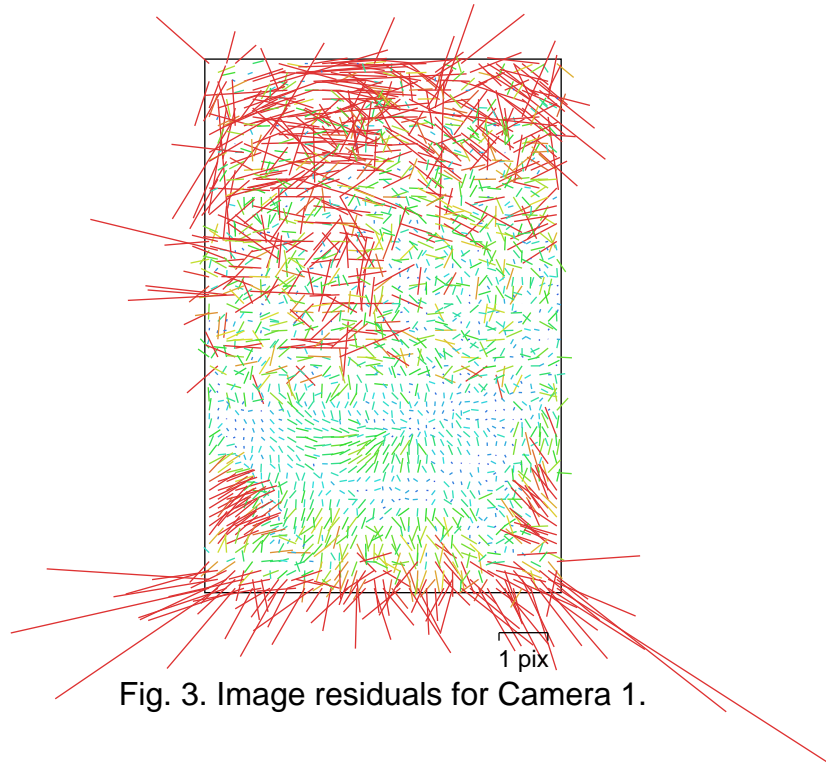
110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2966.06	0.03	1.00	0.02	-0.11	-0.83	0.75	-0.66	-0.02	0.15
Cx	-17.4567	0.036		1.00	-0.14	0.03	-0.01	0.00	0.85	-0.06
Cy	-18.7516	0.037			1.00	-0.00	-0.02	0.03	-0.15	0.73
K1	-0.032523	2.3e-05				1.00	-0.96	0.89	0.06	-0.14
K2	0.00743572	1.8e-05					1.00	-0.98	-0.04	0.05
K3	-0.000415832	4.2e-06						1.00	0.03	-0.01
P1	0.000319149	3.6e-06							1.00	-0.07
P2	-0.000622782	3.6e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration



Camera 1

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2967.14	0.031	1.00	0.03	-0.10	-0.81	0.75	-0.66	-0.00	0.15
Cx	9.20475	0.037		1.00	0.09	-0.04	0.03	-0.02	0.84	0.07
Cy	27.3052	0.044			1.00	-0.06	-0.02	0.03	0.09	0.76
K1	-0.0298986	2.7e-05				1.00	-0.95	0.88	-0.03	-0.13
K2	0.00479465	2.2e-05					1.00	-0.98	0.02	0.04
K3	0.000216749	5.7e-06						1.00	-0.01	-0.01
P1	-0.000632859	3.9e-06							1.00	0.06
P2	-0.000221003	4.1e-06								1.00

Table 3. Calibration coefficients and correlation matrix.

Camera Calibration

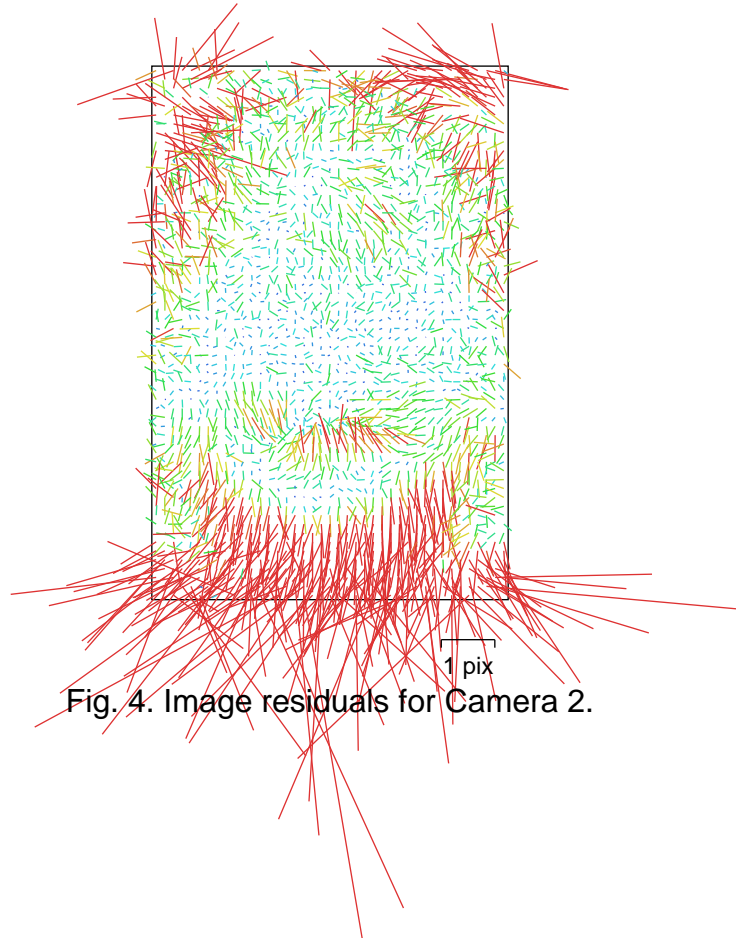


Fig. 4. Image residuals for Camera 2.

Camera 2

110 images

Type

Resolution

Focal Length

Pixel Size

Frame

5784 x 8660

12 mm

4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2967.2	0.024	1.00	-0.01	-0.20	-0.70	0.66	-0.59	-0.00	0.10
Cx	-11.0957	0.026		1.00	0.00	0.01	-0.00	-0.00	0.76	0.02
Cy	41.1862	0.029			1.00	-0.02	-0.02	0.01	0.02	0.76
K1	-0.031712	1.8e-05				1.00	-0.96	0.89	-0.01	-0.10
K2	0.00528217	1.4e-05					1.00	-0.98	0.01	0.08
K3	0.000299908	3.5e-06						1.00	-0.01	-0.06
P1	-0.000775369	2.6e-06							1.00	0.02
P2	-0.000247647	2.6e-06								1.00

Table 4. Calibration coefficients and correlation matrix.

Camera Calibration

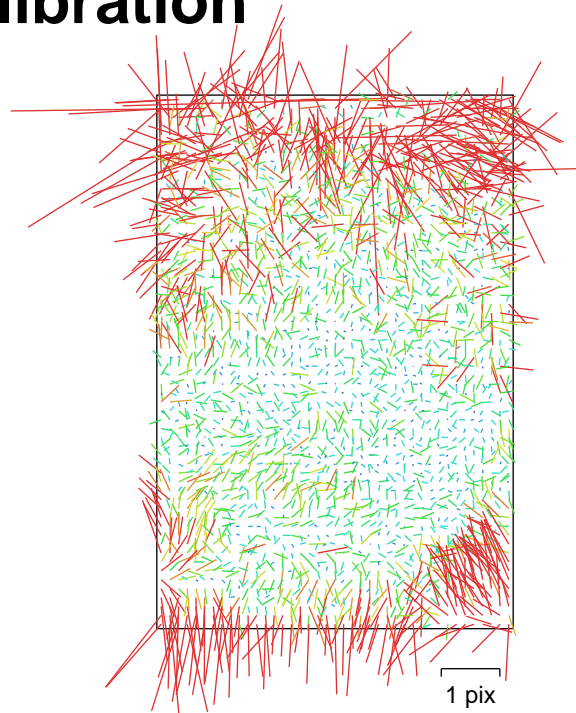


Fig. 5. Image residuals for Camera 3.

Camera 3

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2981.24	0.024	1.00	-0.03	-0.16	-0.76	0.71	-0.64	-0.01	0.07
Cx	24.5425	0.024		1.00	0.01	0.00	-0.00	0.00	0.76	-0.01
Cy	-17.1608	0.026			1.00	0.03	-0.03	0.02	0.02	0.77
K1	-0.0345051	1.6e-05				1.00	-0.96	0.90	-0.01	-0.05
K2	0.00857666	1.2e-05					1.00	-0.98	0.00	0.03
K3	-0.000521703	2.7e-06						1.00	-0.00	-0.02
P1	0.000407305	2.3e-06							1.00	-0.01
P2	-6.32861e-05	2.5e-06								1.00

Table 5. Calibration coefficients and correlation matrix.

Camera Calibration

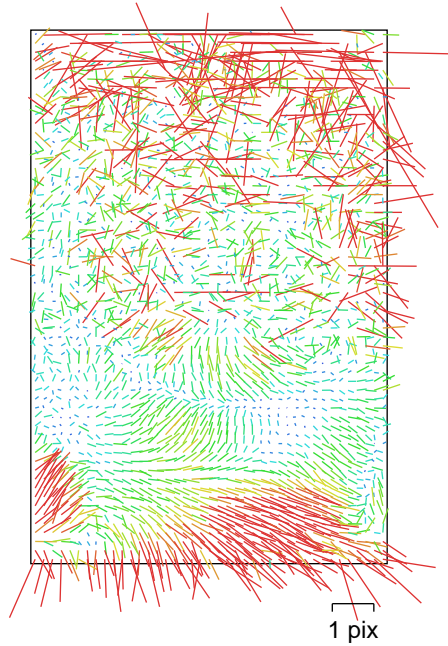


Fig. 6. Image residuals for Camera 4.

Camera 4

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2977.92	0.025	1.00	0.01	-0.15	-0.77	0.74	-0.67	0.01	0.09
Cx	-8.99919	0.029		1.00	-0.03	0.02	-0.01	0.01	0.83	-0.02
Cy	-4.22782	0.035			1.00	-0.07	-0.01	0.02	-0.03	0.83
K1	-0.0319319	1.7e-05				1.00	-0.96	0.90	0.02	-0.16
K2	0.00755747	1.2e-05					1.00	-0.98	-0.01	0.07
K3	-0.000377275	2.7e-06						1.00	0.01	-0.04
P1	0.000702253	2.9e-06							1.00	-0.01
P2	-0.000343534	3.4e-06								1.00

Table 6. Calibration coefficients and correlation matrix.

Camera Calibration

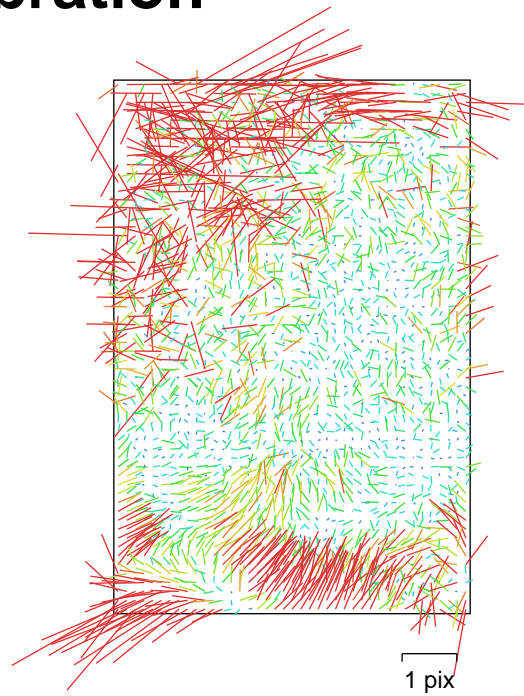


Fig. 7. Image residuals for Camera 5.

Camera 5

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2967.25	0.026	1.00	-0.00	-0.16	-0.80	0.75	-0.67	0.02	0.07
Cx	27.9656	0.027		1.00	0.04	-0.04	0.02	-0.01	0.78	0.01
Cy	49.7273	0.031			1.00	-0.02	-0.01	0.01	0.04	0.81
K1	-0.0328264	1.8e-05				1.00	-0.96	0.91	-0.05	-0.12
K2	0.00785619	1.3e-05					1.00	-0.98	0.03	0.05
K3	-0.000423665	3e-06						1.00	-0.02	-0.02
P1	-0.000877693	2.6e-06							1.00	0.03
P2	0.000112294	3.1e-06								1.00

Table 7. Calibration coefficients and correlation matrix.

Camera Calibration

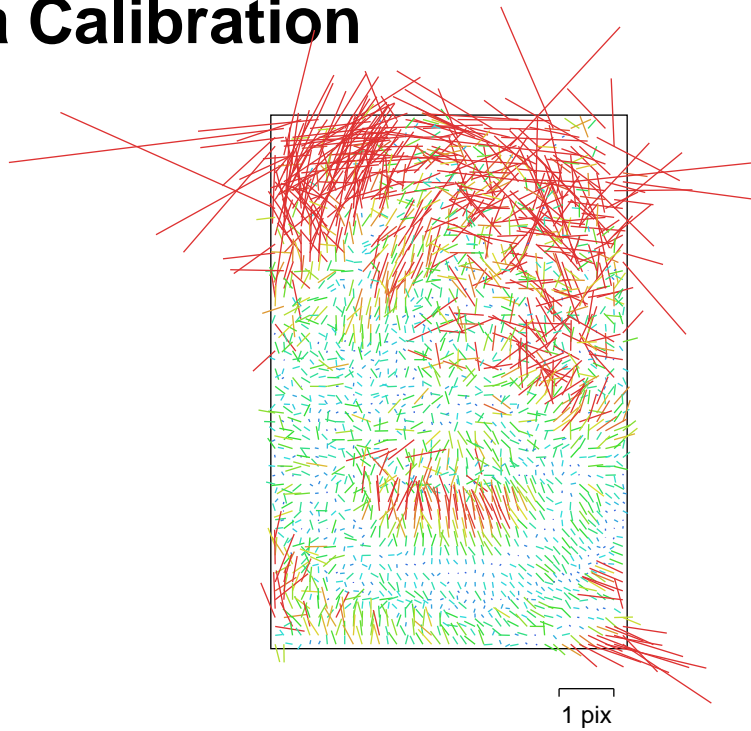


Fig. 8. Image residuals for Camera 6.

Camera 6

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2966.96	0.027	1.00	0.05	-0.18	-0.78	0.73	-0.65	0.02	0.05
Cx	-26.7138	0.028		1.00	-0.09	0.03	-0.02	0.01	0.77	-0.02
Cy	-15.2122	0.029			1.00	0.02	-0.03	0.04	-0.10	0.77
K1	-0.0359665	1.7e-05				1.00	-0.96	0.91	0.04	-0.10
K2	0.00953264	1.2e-05					1.00	-0.98	-0.03	0.02
K3	-0.000733376	2.5e-06						1.00	0.02	0.00
P1	0.000223694	2.7e-06							1.00	-0.05
P2	0.000383225	2.8e-06								1.00

Table 8. Calibration coefficients and correlation matrix.

Camera Calibration

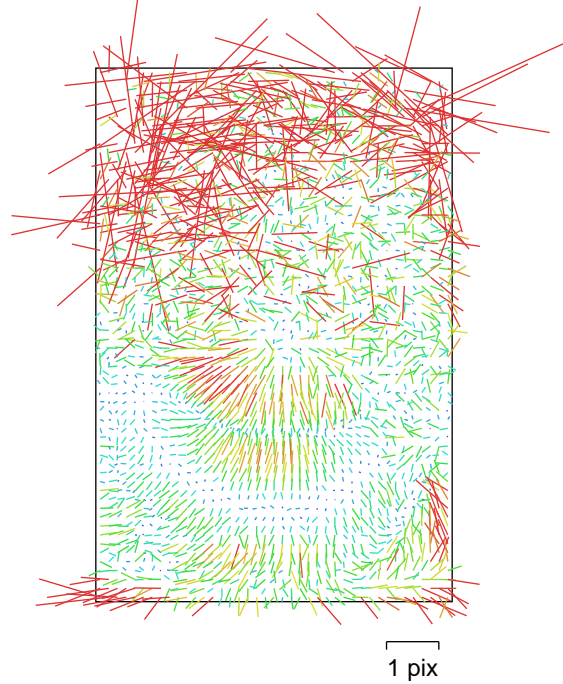


Fig. 9. Image residuals for Camera 7.

Camera 7

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2973.26	0.025	1.00	0.02	-0.20	-0.68	0.67	-0.60	-0.00	0.05
Cx	19.6989	0.029		1.00	0.02	-0.03	0.03	-0.02	0.81	0.03
Cy	20.0466	0.033			1.00	-0.11	0.02	-0.00	0.01	0.80
K1	-0.0326975	1.7e-05				1.00	-0.95	0.89	-0.02	-0.19
K2	0.00746506	1.3e-05					1.00	-0.98	0.02	0.08
K3	-0.00025	3e-06						1.00	-0.02	-0.04
P1	-0.000261475	2.5e-06							1.00	0.01
P2	0.000241109	3e-06								1.00

Table 9. Calibration coefficients and correlation matrix.

Camera Calibration

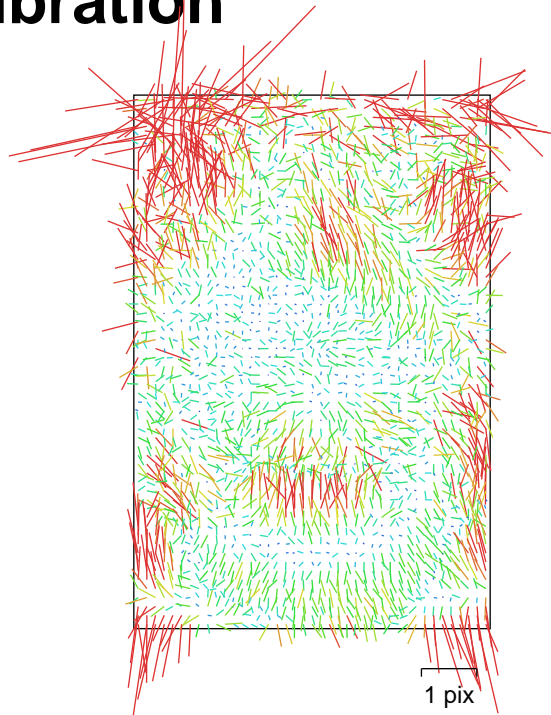


Fig. 10. Image residuals for Camera 8.

Camera 8

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2967.31	0.022	1.00	-0.00	-0.17	-0.69	0.66	-0.60	-0.01	-0.00
Cx	22.0284	0.022		1.00	0.00	0.01	-0.01	0.00	0.70	0.01
Cy	18.1261	0.022			1.00	0.05	-0.04	0.03	-0.00	0.72
K1	-0.0355867	1.3e-05				1.00	-0.96	0.90	0.01	-0.01
K2	0.00932322	9.5e-06					1.00	-0.98	-0.00	-0.04
K3	-0.000628482	2e-06						1.00	0.00	0.04
P1	-0.000636749	1.9e-06							1.00	0.00
P2	-0.000116405	2.1e-06								1.00

Table 10. Calibration coefficients and correlation matrix.

Camera Calibration

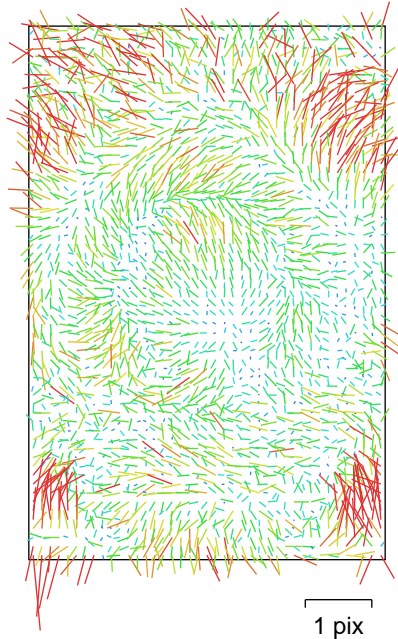


Fig. 11. Image residuals for Camera 9.

Camera 9

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2963.6	0.023	1.00	-0.03	-0.10	-0.74	0.69	-0.62	-0.00	-0.02
Cx	-22.2404	0.019		1.00	0.01	0.02	-0.02	0.02	0.57	-0.00
Cy	-13.7084	0.022			1.00	0.00	0.04	-0.05	0.02	0.66
K1	-0.0396929	1.3e-05				1.00	-0.96	0.91	-0.00	0.03
K2	0.0117439	8.5e-06					1.00	-0.98	0.00	-0.03
K3	-0.00110391	1.7e-06						1.00	-0.00	0.02
P1	0.000352358	1.5e-06							1.00	0.02
P2	4.26288e-05	1.9e-06								1.00

Table 11. Calibration coefficients and correlation matrix.

Camera Calibration

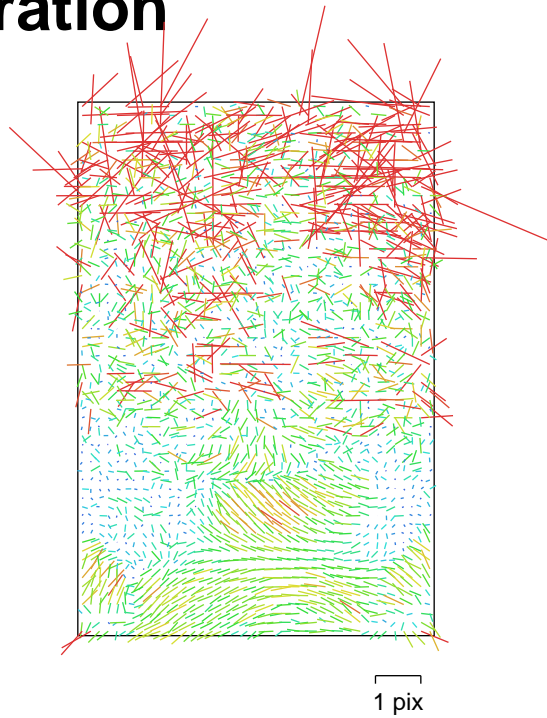


Fig. 12. Image residuals for Camera 10.

Camera 10

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2970.07	0.029	1.00	-0.02	-0.14	-0.81	0.78	-0.71	-0.02	0.04
Cx	-13.3682	0.029		1.00	-0.02	0.02	-0.02	0.02	0.81	-0.02
Cy	-15.8937	0.03			1.00	-0.02	0.02	-0.01	-0.03	0.76
K1	-0.0354617	1.7e-05				1.00	-0.96	0.91	0.03	-0.13
K2	0.0101248	1.1e-05					1.00	-0.99	-0.02	0.05
K3	-0.000842254	2.2e-06						1.00	0.02	-0.02
P1	-0.000164155	2.6e-06							1.00	-0.02
P2	-0.000378957	3.1e-06								1.00

Table 12. Calibration coefficients and correlation matrix.

Camera Calibration

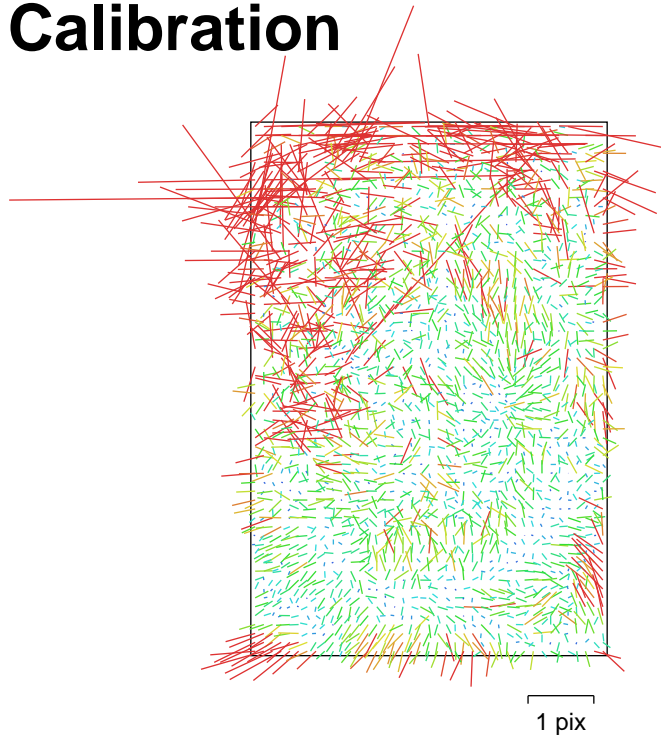


Fig. 13. Image residuals for Camera 11.

Camera 11

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2969.76	0.027	1.00	-0.03	-0.13	-0.81	0.76	-0.69	0.03	-0.01
Cx	19.4865	0.026		1.00	0.01	-0.02	0.01	-0.01	0.75	-0.05
Cy	24.4156	0.026			1.00	0.03	-0.01	0.01	0.00	0.71
K1	-0.0366561	1.6e-05				1.00	-0.96	0.91	-0.07	-0.03
K2	0.0104962	1.1e-05					1.00	-0.99	0.05	-0.03
K3	-0.000913288	2.2e-06						1.00	-0.04	0.05
P1	-0.000536443	2.2e-06							1.00	-0.03
P2	-0.000185621	2.4e-06								1.00

Table 13. Calibration coefficients and correlation matrix.

Camera Calibration

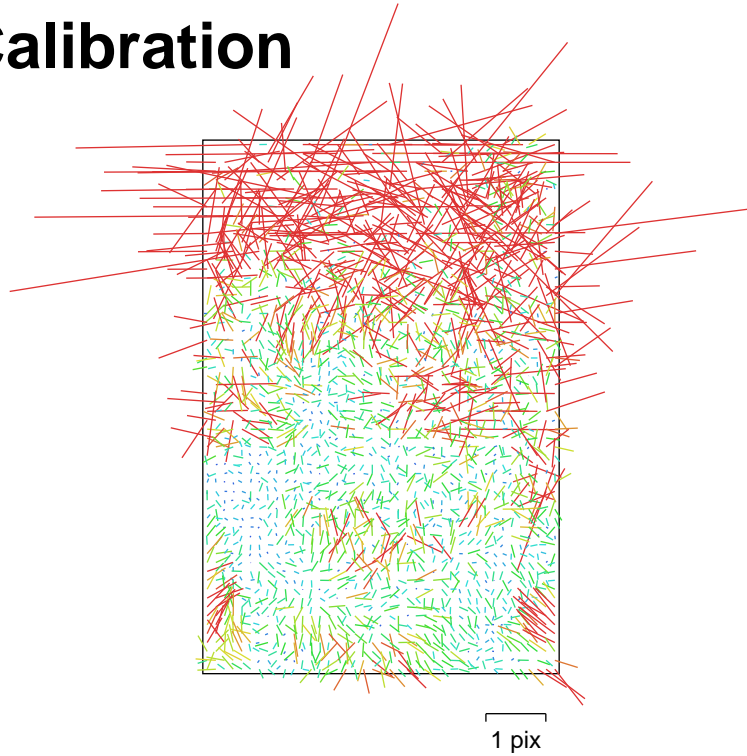


Fig. 14. Image residuals for Camera 12.

Camera 12

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2985.5	0.03	1.00	0.03	-0.13	-0.80	0.74	-0.66	-0.01	0.04
Cx	-19.0109	0.031		1.00	-0.06	0.03	-0.02	0.01	0.80	-0.02
Cy	-11.2381	0.029			1.00	0.04	0.00	-0.00	-0.06	0.63
K1	-0.0352573	1.8e-05				1.00	-0.96	0.91	0.05	-0.07
K2	0.0105957	1.2e-05					1.00	-0.98	-0.03	-0.01
K3	-0.000935271	2.5e-06						1.00	0.02	0.04
P1	0.000204184	2.8e-06							1.00	-0.06
P2	-0.000147055	2.7e-06								1.00

Table 14. Calibration coefficients and correlation matrix.

Camera Calibration

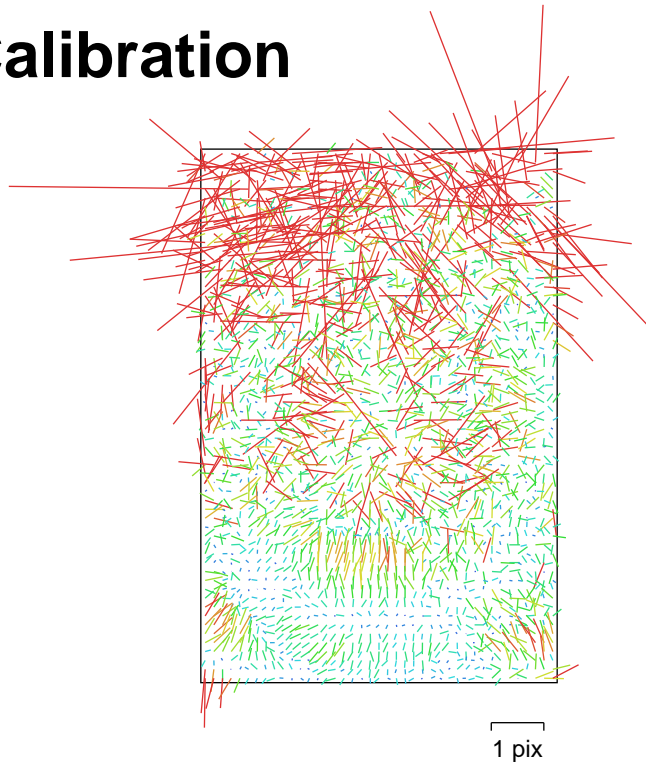


Fig. 15. Image residuals for Camera 13.

Camera 13

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2953.46	0.031	1.00	0.00	-0.13	-0.79	0.76	-0.69	0.00	-0.00
Cx	9.15052	0.029		1.00	0.02	-0.03	0.01	-0.00	0.79	-0.00
Cy	21.9435	0.029			1.00	-0.01	0.04	-0.04	0.01	0.70
K1	-0.0377295	1.9e-05				1.00	-0.96	0.91	-0.04	-0.08
K2	0.0109262	1.2e-05					1.00	-0.99	0.03	0.01
K3	-0.000967793	2.4e-06						1.00	-0.02	0.01
P1	-0.000224924	2.5e-06							1.00	-0.02
P2	0.000159576	2.8e-06								1.00

Table 15. Calibration coefficients and correlation matrix.

Camera Calibration

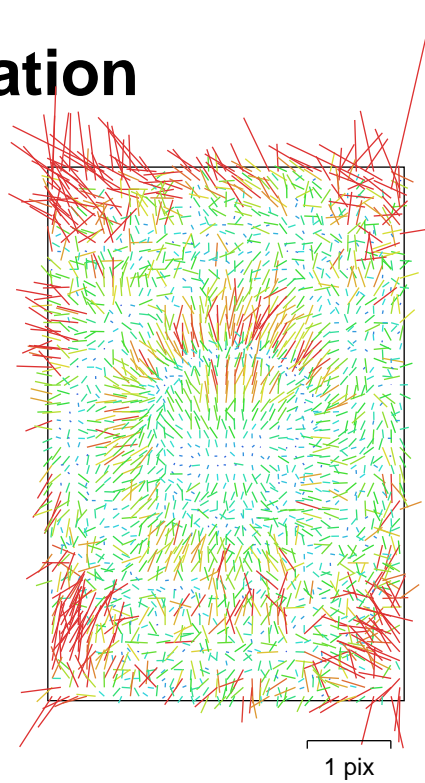


Fig. 16. Image residuals for Camera 14.

Camera 14

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2970.79	0.022	1.00	0.01	-0.04	-0.70	0.64	-0.57	-0.01	-0.02
Cx	8.31459	0.019		1.00	0.01	-0.00	0.00	-0.00	0.57	0.02
Cy	34.9314	0.022			1.00	-0.01	0.05	-0.05	0.01	0.66
K1	-0.0388174	1.2e-05				1.00	-0.96	0.91	0.01	0.03
K2	0.011435	8.8e-06					1.00	-0.98	-0.01	-0.04
K3	-0.00100255	1.8e-06						1.00	0.01	0.04
P1	-0.000334225	1.5e-06							1.00	0.01
P2	0.000261545	1.9e-06								1.00

Table 16. Calibration coefficients and correlation matrix.

Camera Calibration

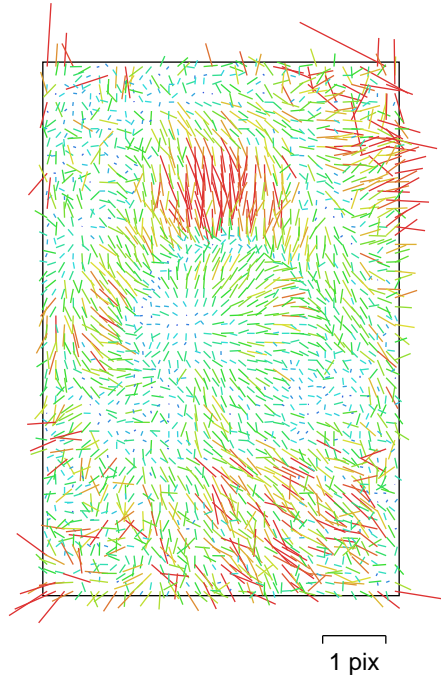


Fig. 17. Image residuals for Camera 15.

Camera 15

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2970.46	0.024	1.00	-0.02	-0.01	-0.71	0.64	-0.57	0.01	-0.01
Cx	-7.03984	0.02		1.00	0.01	0.01	-0.01	0.01	0.57	0.02
Cy	-25.0348	0.023			1.00	-0.02	0.07	-0.06	0.02	0.62
K1	-0.039215	1.3e-05				1.00	-0.96	0.91	-0.00	0.04
K2	0.0117353	9.2e-06					1.00	-0.98	0.00	-0.05
K3	-0.00108673	1.9e-06						1.00	-0.00	0.06
P1	0.000586603	1.7e-06							1.00	0.04
P2	-0.00010886	2e-06								1.00

Table 17. Calibration coefficients and correlation matrix.

Camera Calibration

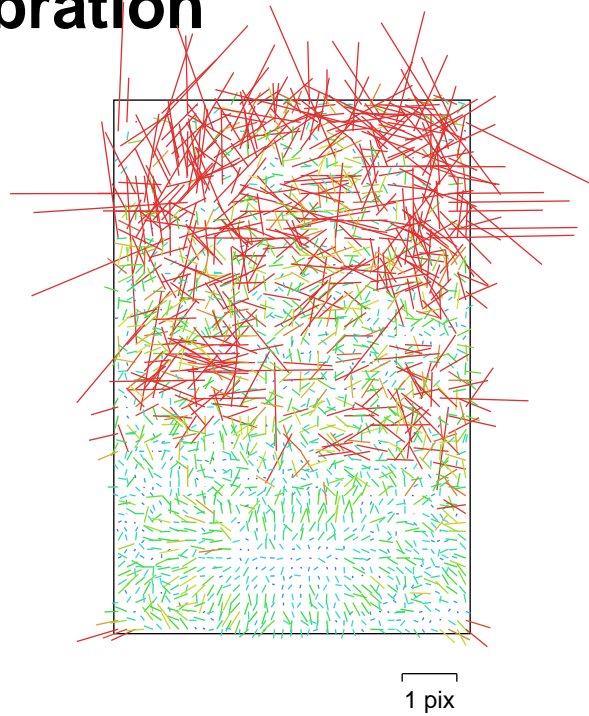


Fig. 18. Image residuals for Camera 16.

Camera 16

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2955.62	0.037	1.00	-0.03	-0.07	-0.83	0.79	-0.73	-0.02	-0.00
Cx	-9.29704	0.034		1.00	-0.02	0.03	-0.02	0.02	0.81	-0.05
Cy	-14.4247	0.032			1.00	0.05	0.01	-0.02	-0.03	0.62
K1	-0.0379973	2.2e-05				1.00	-0.96	0.91	0.03	-0.01
K2	0.0109852	1.3e-05					1.00	-0.99	-0.02	-0.06
K3	-0.00101587	2.4e-06						1.00	0.02	0.08
P1	0.000236418	2.9e-06							1.00	-0.04
P2	-0.000223465	3.1e-06								1.00

Table 18. Calibration coefficients and correlation matrix.

Camera Calibration

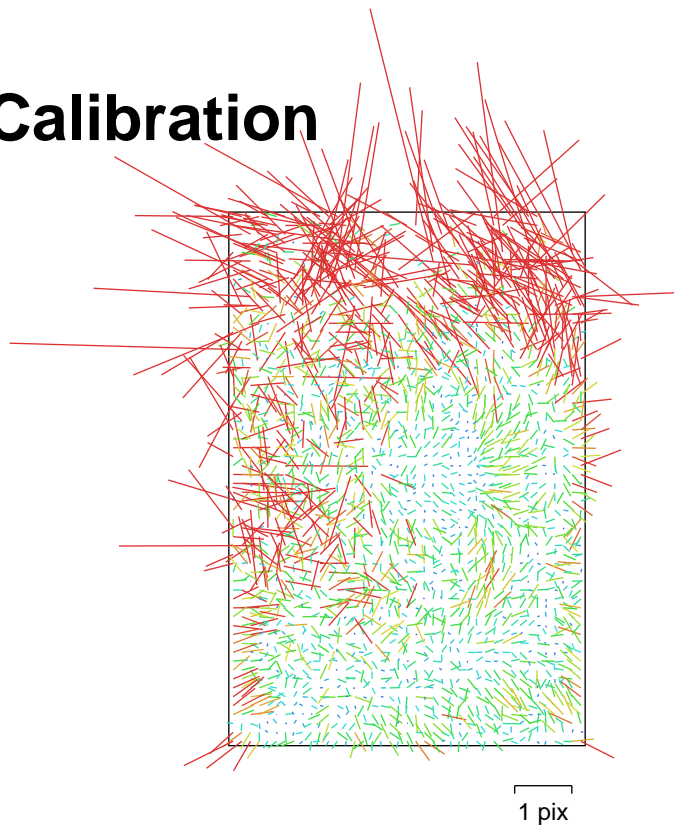


Fig. 19. Image residuals for Camera 17.

Camera 17

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2965.02	0.032	1.00	-0.06	-0.02	-0.81	0.74	-0.66	0.00	-0.02
Cx	17.7525	0.03		1.00	-0.03	-0.02	0.01	-0.01	0.74	-0.08
Cy	39.1155	0.029			1.00	0.04	0.05	-0.06	-0.01	0.60
K1	-0.0381724	1.9e-05				1.00	-0.96	0.90	-0.06	0.03
K2	0.0116725	1.3e-05					1.00	-0.99	0.04	-0.08
K3	-0.00110359	2.5e-06						1.00	-0.03	0.10
P1	-0.000222073	2.6e-06							1.00	-0.04
P2	0.00020406	2.6e-06								1.00

Table 19. Calibration coefficients and correlation matrix.

Camera Calibration

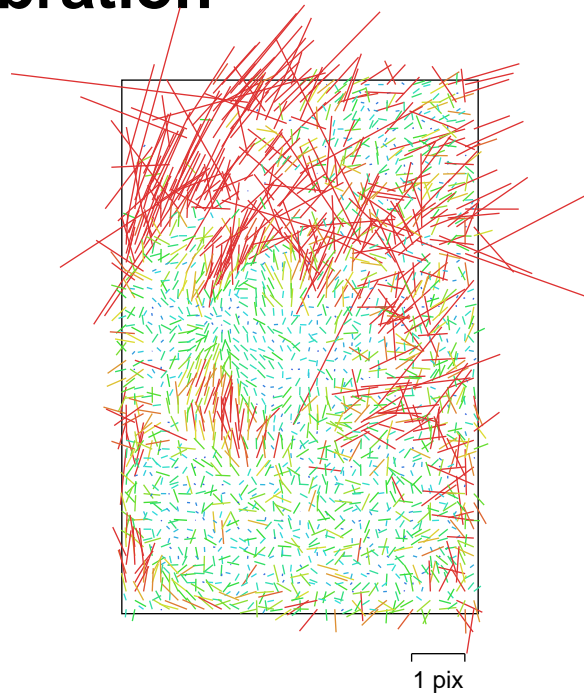


Fig. 20. Image residuals for Camera 18.

Camera 18

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2964.05	0.038	1.00	0.08	0.05	-0.79	0.72	-0.63	-0.01	0.07
Cx	-19.269	0.036		1.00	0.01	0.02	-0.01	0.01	0.70	0.09
Cy	-29.7191	0.037			1.00	0.04	0.05	-0.06	0.01	0.61
K1	-0.0389684	2.2e-05				1.00	-0.95	0.89	0.07	-0.03
K2	0.012153	1.4e-05					1.00	-0.98	-0.06	-0.03
K3	-0.00120413	2.8e-06						1.00	0.05	0.04
P1	9.99683e-05	3.2e-06							1.00	0.07
P2	-0.00029157	3.4e-06								1.00

Table 20. Calibration coefficients and correlation matrix.

Camera Calibration

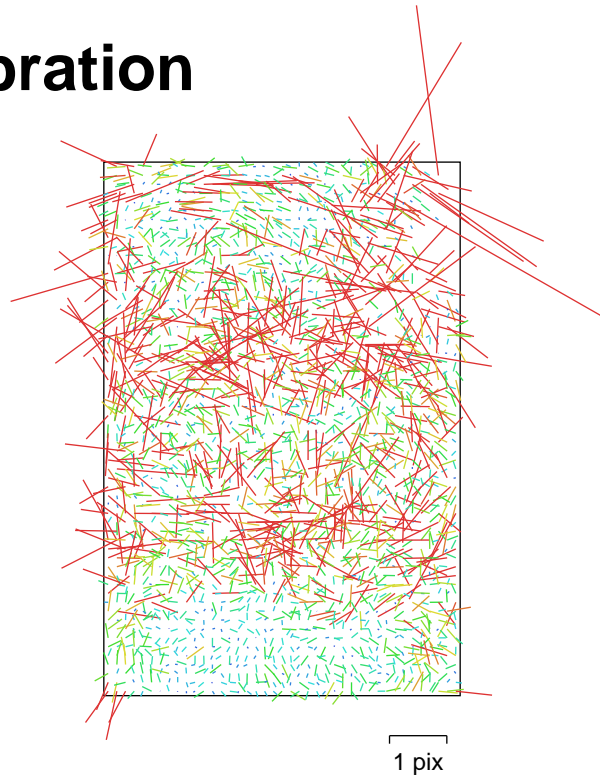


Fig. 21. Image residuals for Camera 19.

Camera 19

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2962.4	0.045	1.00	0.04	0.01	-0.83	0.78	-0.70	-0.00	0.05
Cx	21.7972	0.036		1.00	0.00	-0.02	0.02	-0.02	0.75	-0.04
Cy	25.1104	0.036			1.00	0.05	0.04	-0.05	-0.01	0.57
K1	-0.0389645	2.7e-05				1.00	-0.96	0.90	0.01	-0.02
K2	0.0123232	1.7e-05					1.00	-0.99	0.01	-0.04
K3	-0.00121609	3.3e-06						1.00	-0.02	0.05
P1	-0.000230944	3.3e-06							1.00	-0.06
P2	4.01787e-05	3.6e-06								1.00

Table 21. Calibration coefficients and correlation matrix.

Camera Calibration

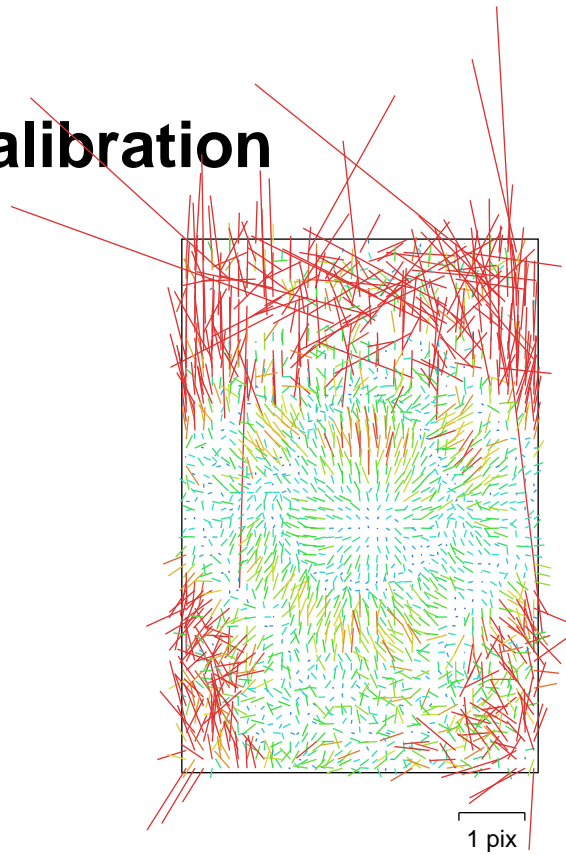


Fig. 22. Image residuals for Camera 20.

Camera 20

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2966.29	0.029	1.00	0.02	0.04	-0.68	0.60	-0.53	0.01	0.10
Cx	18.6289	0.026		1.00	0.01	-0.00	0.01	-0.01	0.66	0.02
Cy	22.8208	0.031			1.00	0.01	0.09	-0.10	0.01	0.56
K1	-0.0394983	1.6e-05				1.00	-0.94	0.88	-0.01	-0.05
K2	0.0121052	1.2e-05					1.00	-0.98	0.00	-0.01
K3	-0.0011183	2.4e-06						1.00	-0.00	0.02
P1	0.000104732	2.5e-06							1.00	0.02
P2	0.000396861	2.6e-06								1.00

Table 22. Calibration coefficients and correlation matrix.

Camera Calibration

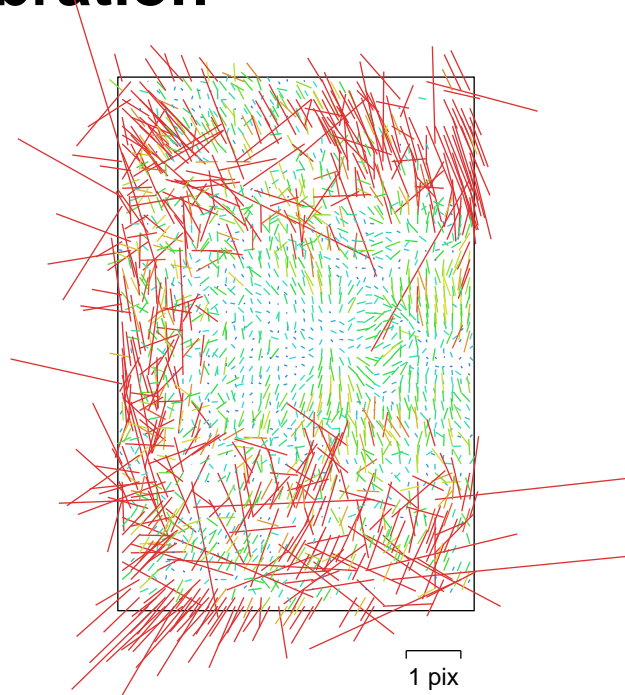


Fig. 23. Image residuals for Camera 21.

Camera 21

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	5784 x 8660	12 mm	4.17 x 4.17 um

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2979.81	0.085	1.00	-0.62	0.04	-0.43	0.36	-0.30	0.05	0.03
Cx	-11.7665	0.095		1.00	-0.03	-0.08	0.08	-0.07	0.45	-0.01
Cy	-27.4279	0.063			1.00	-0.03	0.02	-0.03	0.01	0.93
K1	-0.0323214	4.6e-05				1.00	-0.95	0.88	-0.19	-0.03
K2	0.00706143	3.9e-05					1.00	-0.98	0.17	0.03
K3	-0.000137504	9.4e-06						1.00	-0.14	-0.03
P1	7.60434e-05	7.5e-06							1.00	0.01
P2	-6.52429e-05	7.1e-06								1.00

Table 23. Calibration coefficients and correlation matrix.

Ground Control Points

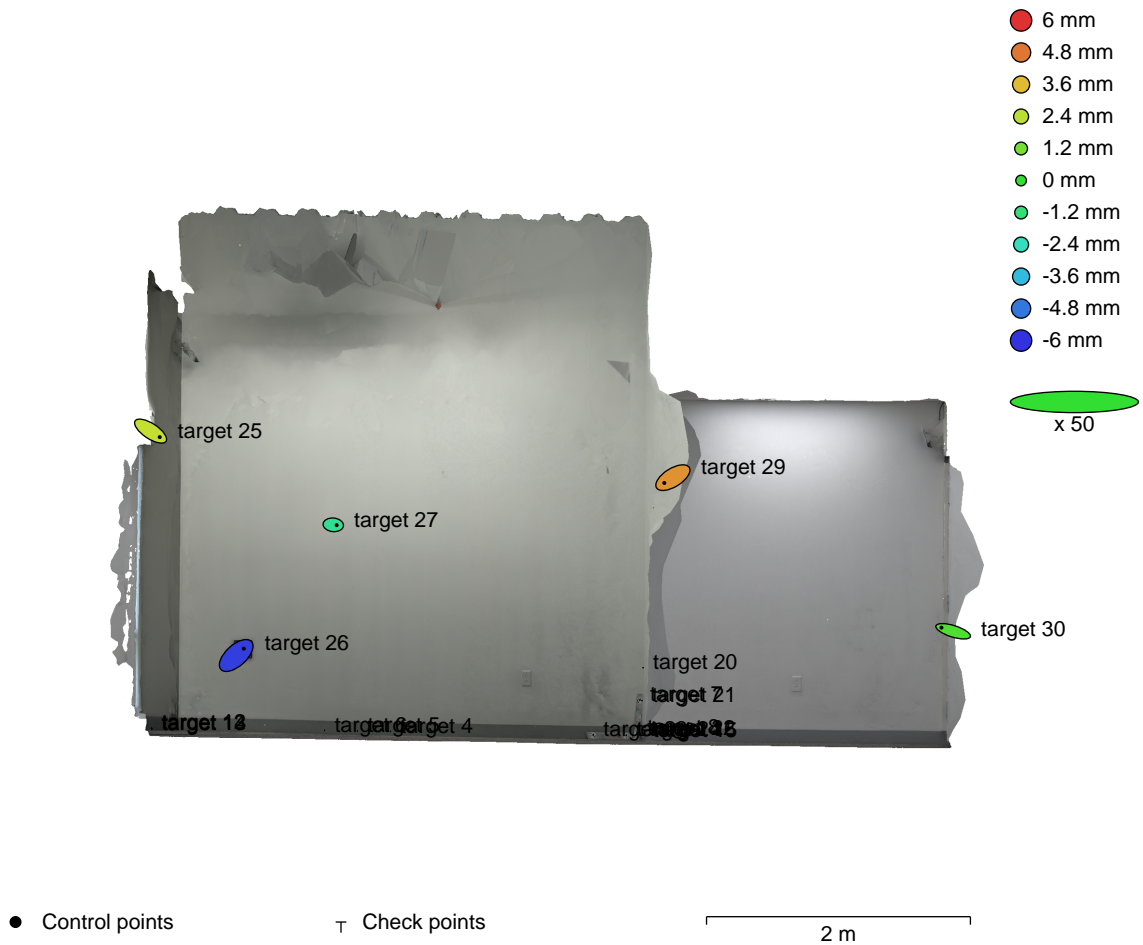


Fig. 24. GCP locations and error estimates.

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 (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
5	2.57932	1.51917	3.51526	2.99346	4.61713

Table 24. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 25	2.76151	-1.82462	2.54606	4.17584	3.871 (199)
target 26	2.28145	2.08497	-5.80361	6.57526	3.207 (111)
target 27	1.02589	-0.0994555	-1.65407	1.94892	3.343 (189)
target 29	-2.59972	-1.62081	4.31694	5.29354	3.665 (270)
target 30	-3.55283	1.10732	0.499037	3.7547	3.450 (195)
Total	2.57932	1.51917	3.51526	4.61713	3.555

Table 25. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 4					3.040 (170)
target 5					3.036 (156)
target 6					2.982 (166)
target 7					1.302 (83)
target 8					1.258 (81)
target 12					3.071 (159)
target 13					3.558 (168)
target 14					3.414 (186)
target 15					1.130 (61)
target 16					1.171 (76)
target 20					3.211 (161)
target 21					3.023 (143)
target 22					2.657 (75)
target 23					3.089 (54)
target 24					1.359 (51)
Total					

Table 26. Check points.

Scale Bars

Label	Distance (m)	Error (m)
003. 7-8	0.250022	-3.84325e-05
006. 15-16	0.250151	0.00012134
009. 23-24	0.251345	0.00122453
002a. 4-5	0.250014	1.37463e-05
002b. 5-6	0.249878	-2.23322e-05
005a. 12-13	0.249967	-1.30261e-05
005b. 13-14	0.249659	-0.000230617
008a. 20-21	0.249716	-0.000313994
008b. 21-22	0.249818	-6.18339e-05
Total		0.000431036

Table 27. Control scale bars.

Digital Elevation Model

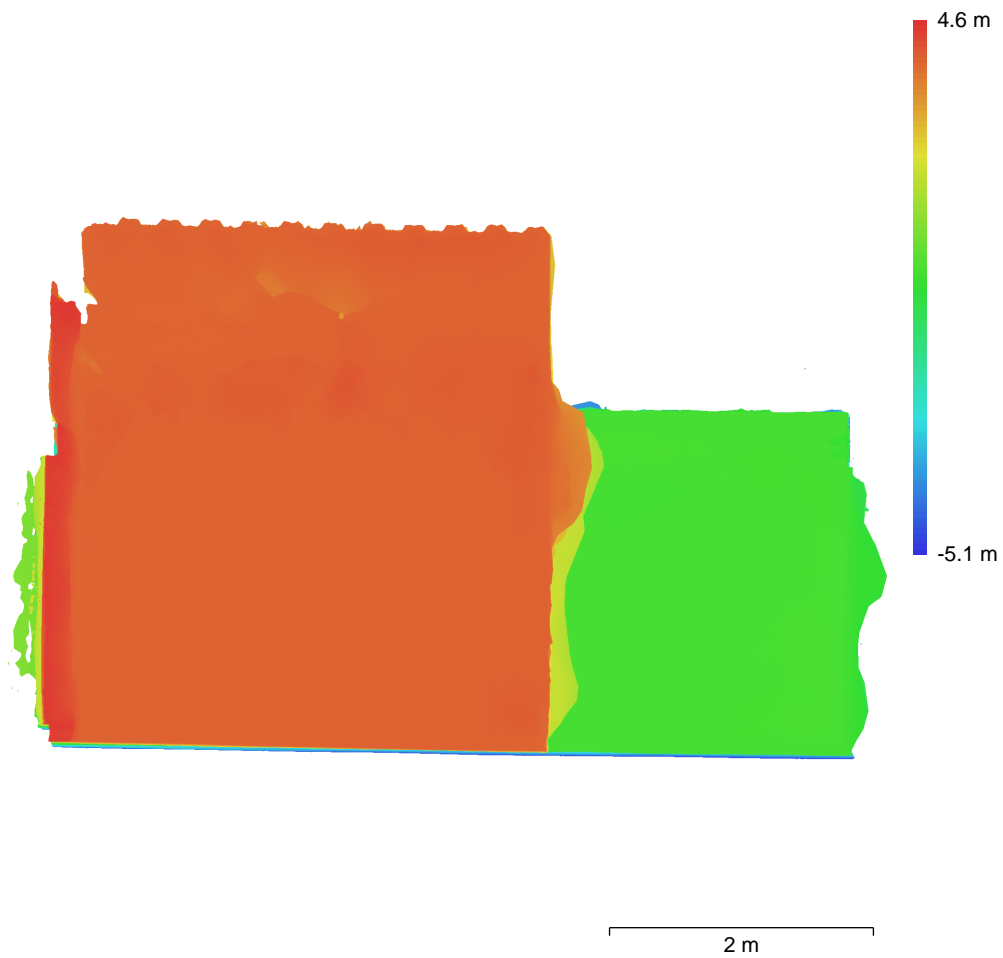


Fig. 25. Reconstructed digital elevation model.

Resolution: 6.25 mm/pix
Point density: 2.56 points/cm²

Processing Parameters

General

Cameras	2420
Aligned cameras	2420
Markers	20
Scale bars	9
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	933,180 of 3,315,390
RMS reprojection error	0.43548 (1.23944 pix)
Max reprojection error	1.98938 (12.6346 pix)
Mean key point size	2.5799 pix
Point colors	3 bands, uint8
Key points	38.05 GB
Average tie point multiplicity	4.74402

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Estimated
Key point limit	60,000
Key point limit per Mpx	1,000
Tie point limit	0
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	5 hours 21 minutes
Matching memory usage	6.20 GB
Alignment time	1 hours 9 minutes
Alignment memory usage	50.11 GB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	42 seconds
Date created	2023:10:11 22:43:18
Software version	2.0.2.16404
File size	331.20 MB

Depth Maps

Count	2109
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Depth maps generation parameters

Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	28 minutes 55 seconds
Memory usage	4.58 GB
Date created	2023:10:16 18:56:39
Software version	2.0.2.16404
File size	4.91 GB

Point Cloud

Points	144,563,647
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Point attributes

Color	3 bands, uint8
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Normal

Point classes

Created (never classified) 144,563,647

Depth maps generation parameters

Quality Medium
Filtering mode Mild
Max neighbors 16
Processing time 28 minutes 55 seconds
Memory usage 4.58 GB

Point cloud generation parameters

Processing time 1 hours 52 minutes
Memory usage 40.17 GB
Date created 2023:10:16 20:51:27
Software version 2.0.2.16404
File size 1.88 GB

Model

Faces 1,797,729
Vertices 900,888
Vertex colors 3 bands, uint8
Texture 16,384 x 16,384, 4 bands, uint8

Depth maps generation parameters

Quality Medium
Filtering mode Mild
Max neighbors 16
Processing time 28 minutes 55 seconds
Memory usage 4.58 GB

Reconstruction parameters

Surface type Arbitrary
Source data Depth maps
Interpolation Enabled
Strict volumetric masks No
Processing time 20 minutes 38 seconds
Memory usage 10.61 GB

Texturing parameters

Mapping mode Generic
Blending mode Mosaic
Texture size 16,384
Enable hole filling Yes
Enable ghosting filter Yes
UV mapping time 4 minutes 4 seconds
UV mapping memory usage 1.99 GB
Blending time 21 minutes 33 seconds
Blending memory usage 11.28 GB
Blending GPU memory usage 7.55 GB
Date created 2023:10:16 21:14:15
Software version 2.0.2.16404
File size 278.26 MB

System

Software name Agisoft Metashape Professional
Software version 2.0.2 build 16404
OS Windows 64 bit
RAM 255.87 GB
CPU AMD Ryzen Threadripper 3970X 32-Core Processor
GPU(s) NVIDIA GeForce RTX 3090
NVIDIA GeForce RTX 3090
NVIDIA GeForce RTX 3090