

Agisoft Metashape

Processing Report

17 October 2023



Survey Data

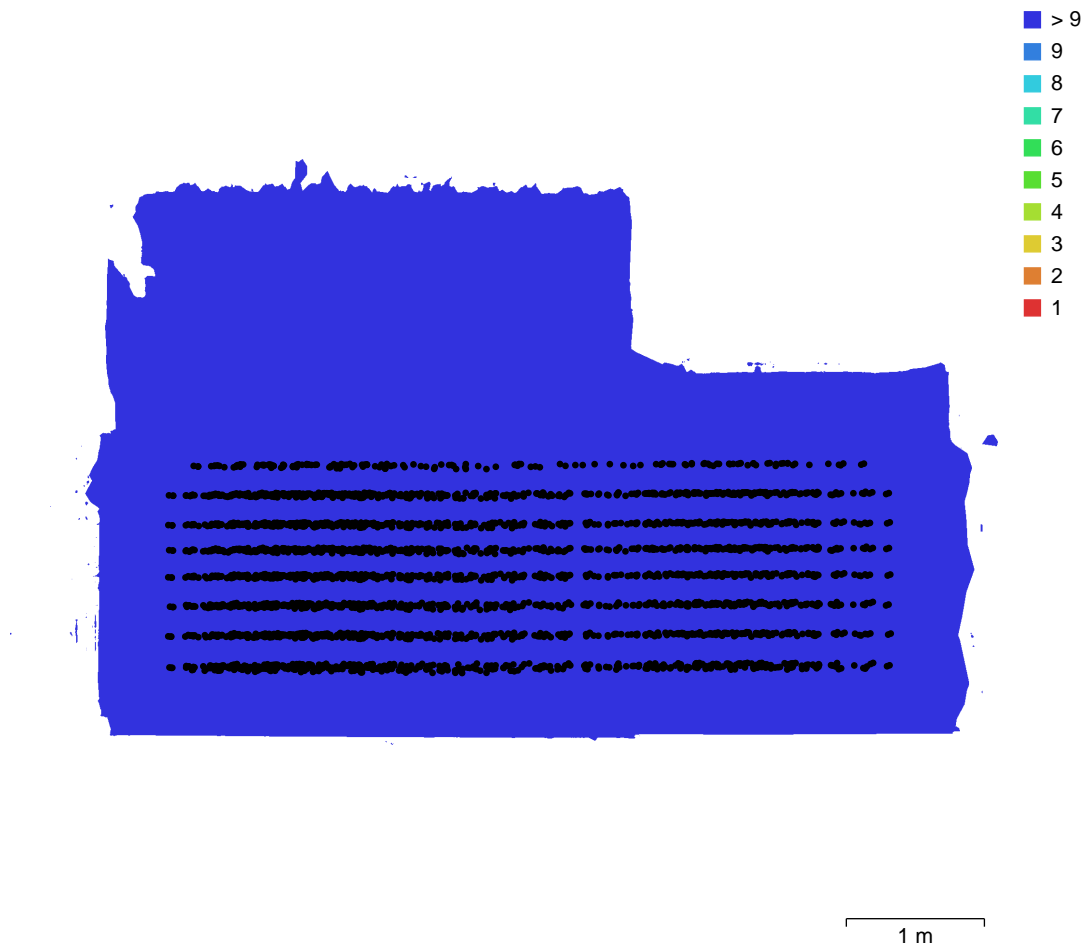


Fig. 1. Camera locations and image overlap.

Number of images:	3,388	Camera stations:	3,388
Flying altitude:	79.5 cm	Tie points:	2,588,113
Ground resolution:	0.386 mm/pix	Projections:	6,045,670
Coverage area:	21.4 m ²	Reprojection error:	1.28 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

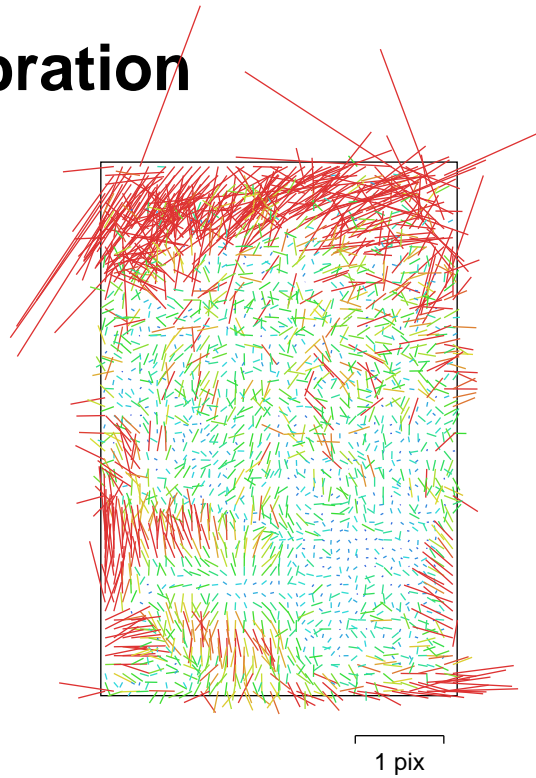


Fig. 2. Image residuals for Camera 0.

Camera 0

154 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	2960	0.049	1.00	-0.01	-0.09	-0.82	0.75	-0.66	-0.06	0.13
Cx	-13.3492	0.059		1.00	-0.11	0.07	-0.05	0.04	0.85	-0.06
Cy	-12.3725	0.06			1.00	-0.01	-0.00	0.02	-0.11	0.77
K1	-0.0345311	3.6e-05				1.00	-0.96	0.89	0.12	-0.13
K2	0.00849173	2.8e-05					1.00	-0.98	-0.10	0.05
K3	-0.000663303	6.5e-06						1.00	0.09	-0.00
P1	0.000488785	5.5e-06							1.00	-0.05
P2	-7.10978e-05	5.8e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

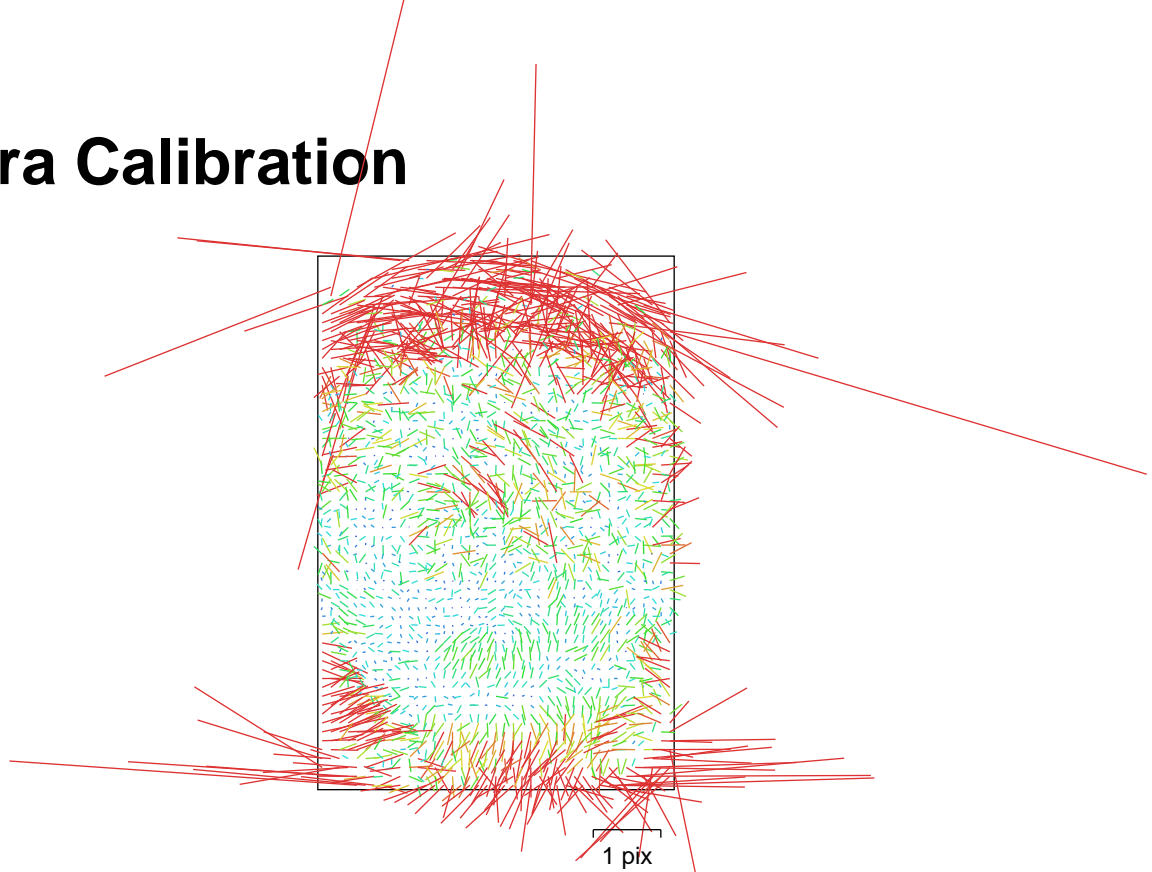


Fig. 3. Image residuals for Camera 1.

Camera 1

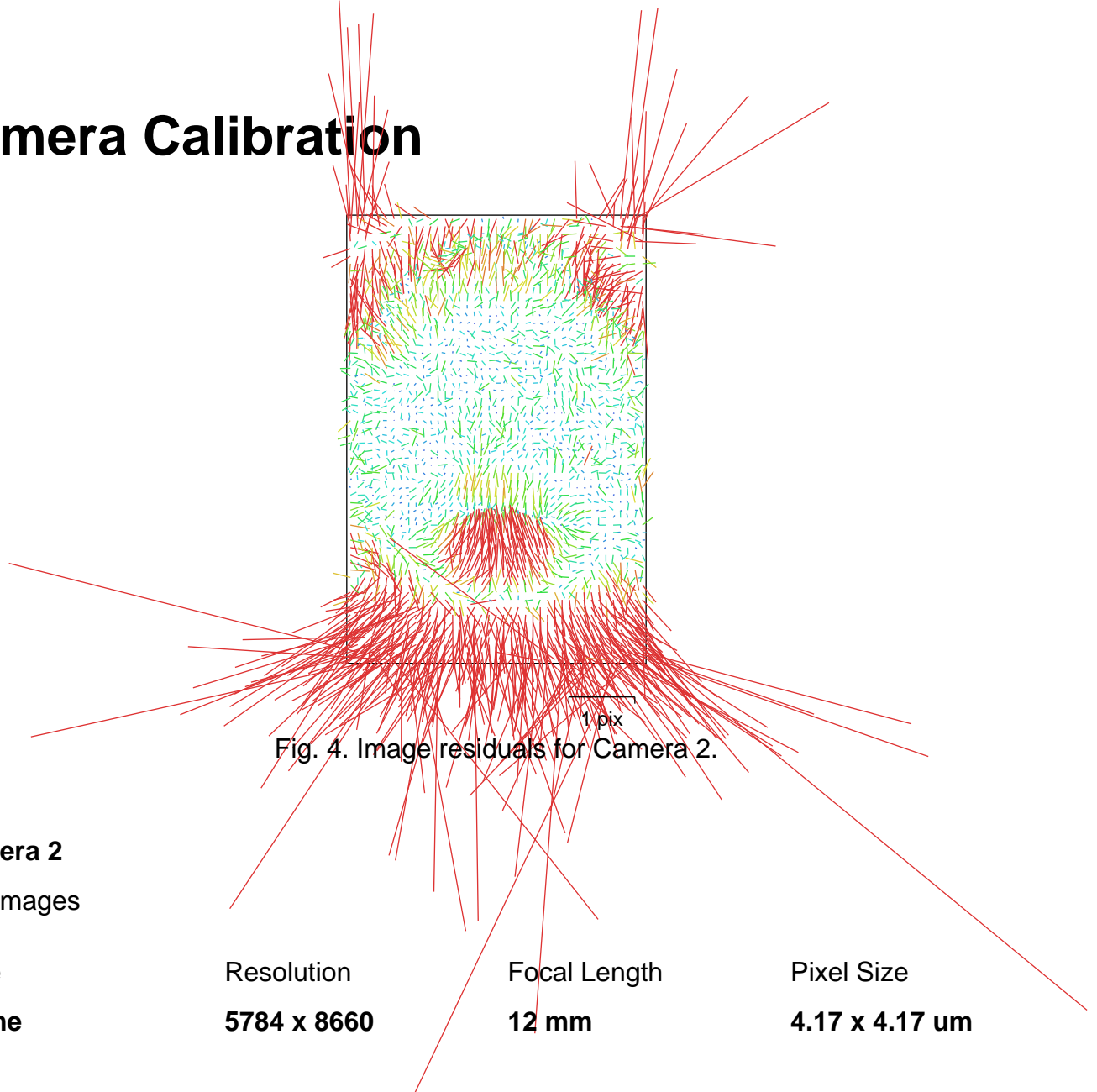
154 images

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	2961.19	0.061	1.00	-0.01	-0.09	-0.83	0.78	-0.71	-0.04	0.14
Cx	1.50348	0.069		1.00	-0.02	0.02	-0.02	0.03	0.86	-0.00
Cy	38.0351	0.075			1.00	-0.07	0.03	-0.02	-0.03	0.79
K1	-0.0371254	5.9e-05				1.00	-0.96	0.91	0.05	-0.12
K2	0.010857	5.4e-05					1.00	-0.98	-0.05	0.08
K3	-0.0013628	1.5e-05						1.00	0.05	-0.07
P1	-0.00127479	7.1e-06							1.00	-0.02
P2	0.000646254	7.5e-06								1.00

Table 3. Calibration coefficients and correlation matrix.

Camera Calibration



Camera 2

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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	2972.54	0.041	1.00	-0.00	-0.18	-0.69	0.66	-0.59	0.02	0.12
Cx	-14.5488	0.044		1.00	0.02	0.01	0.01	-0.01	0.76	0.05
Cy	47.3017	0.049			1.00	-0.01	-0.01	-0.00	0.02	0.78
K1	-0.0345245	3e-05				1.00	-0.96	0.89	-0.02	-0.11
K2	0.00765843	2.5e-05					1.00	-0.98	0.02	0.12
K3	-0.000220281	6.1e-06						1.00	-0.02	-0.10
P1	-0.000934014	4e-06							1.00	0.03
P2	8.8439e-05	4.6e-06								1.00

Table 4. Calibration coefficients and correlation matrix.

Camera Calibration

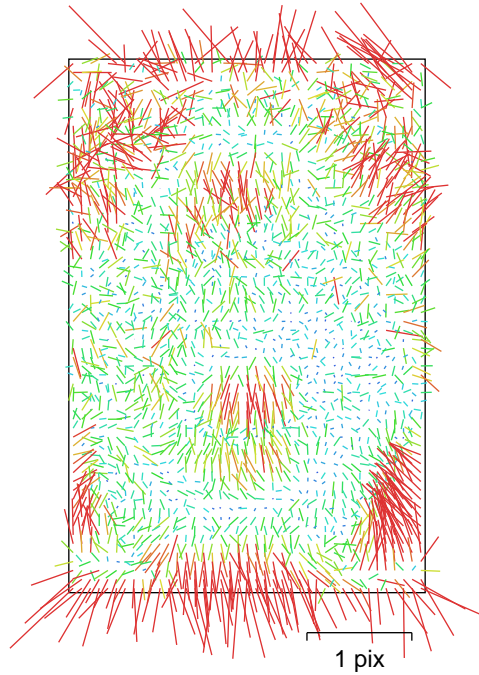


Fig. 5. Image residuals for Camera 3.

Camera 3

154 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	2962.78	0.036	1.00	-0.02	-0.16	-0.72	0.68	-0.60	0.01	0.05
Cx	-24.8629	0.034		1.00	-0.01	0.02	-0.01	0.01	0.71	-0.02
Cy	-19.1167	0.04			1.00	0.04	-0.03	0.03	0.01	0.78
K1	-0.0360821	2.3e-05				1.00	-0.96	0.90	-0.01	-0.03
K2	0.00920736	1.7e-05					1.00	-0.98	0.00	0.01
K3	-0.000665308	3.9e-06						1.00	-0.00	-0.00
P1	0.000352852	2.9e-06							1.00	0.00
P2	0.000403844	3.5e-06								1.00

Table 5. Calibration coefficients and correlation matrix.

Camera Calibration

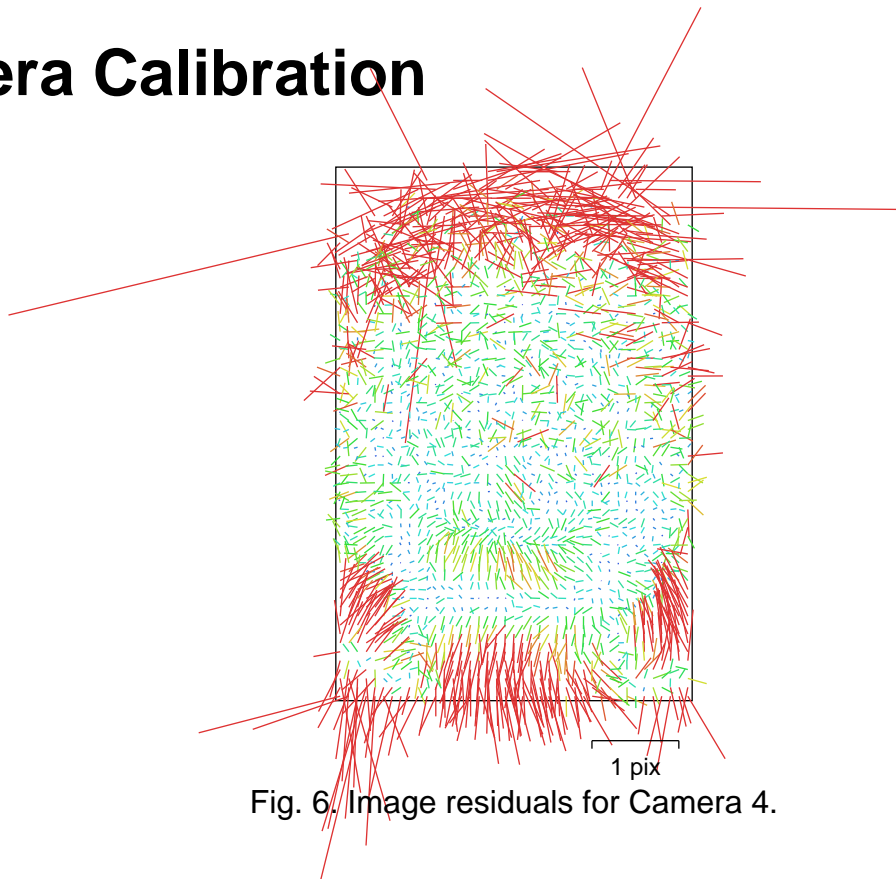


Fig. 6. Image residuals for Camera 4.

Camera 4

154 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	2976.38	0.045	1.00	0.01	-0.16	-0.75	0.72	-0.66	-0.01	0.06
Cx	-0.970441	0.054		1.00	0.04	-0.01	0.01	-0.01	0.85	0.04
Cy	9.02806	0.068			1.00	-0.10	0.03	-0.02	0.06	0.85
K1	-0.0355335	3.5e-05				1.00	-0.96	0.90	0.01	-0.18
K2	0.00969028	2.9e-05					1.00	-0.98	-0.02	0.08
K3	-0.000892784	7.1e-06						1.00	0.01	-0.07
P1	0.00107854	5.2e-06							1.00	0.06
P2	0.000621086	6.5e-06								1.00

Table 6. Calibration coefficients and correlation matrix.

Camera Calibration

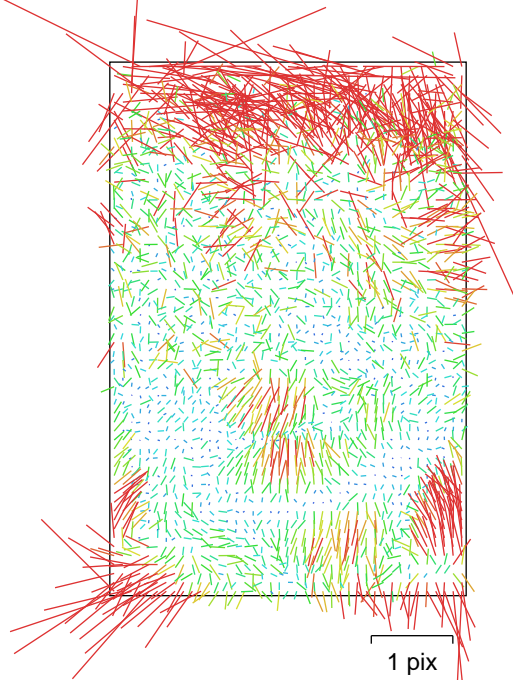


Fig. 7. Image residuals for Camera 5.

Camera 5

154 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	2957.51	0.041	1.00	-0.02	-0.14	-0.78	0.72	-0.65	-0.01	0.09
Cx	24.2452	0.046		1.00	0.05	-0.04	0.02	-0.01	0.80	0.02
Cy	58.3711	0.052			1.00	-0.02	-0.00	0.01	0.05	0.81
K1	-0.033086	2.8e-05				1.00	-0.96	0.90	-0.05	-0.13
K2	0.00742285	2.2e-05					1.00	-0.98	0.02	0.05
K3	-0.000319242	5.1e-06						1.00	-0.01	-0.02
P1	-0.000922754	4.2e-06							1.00	0.04
P2	0.000699963	5.1e-06								1.00

Table 7. Calibration coefficients and correlation matrix.

Camera Calibration

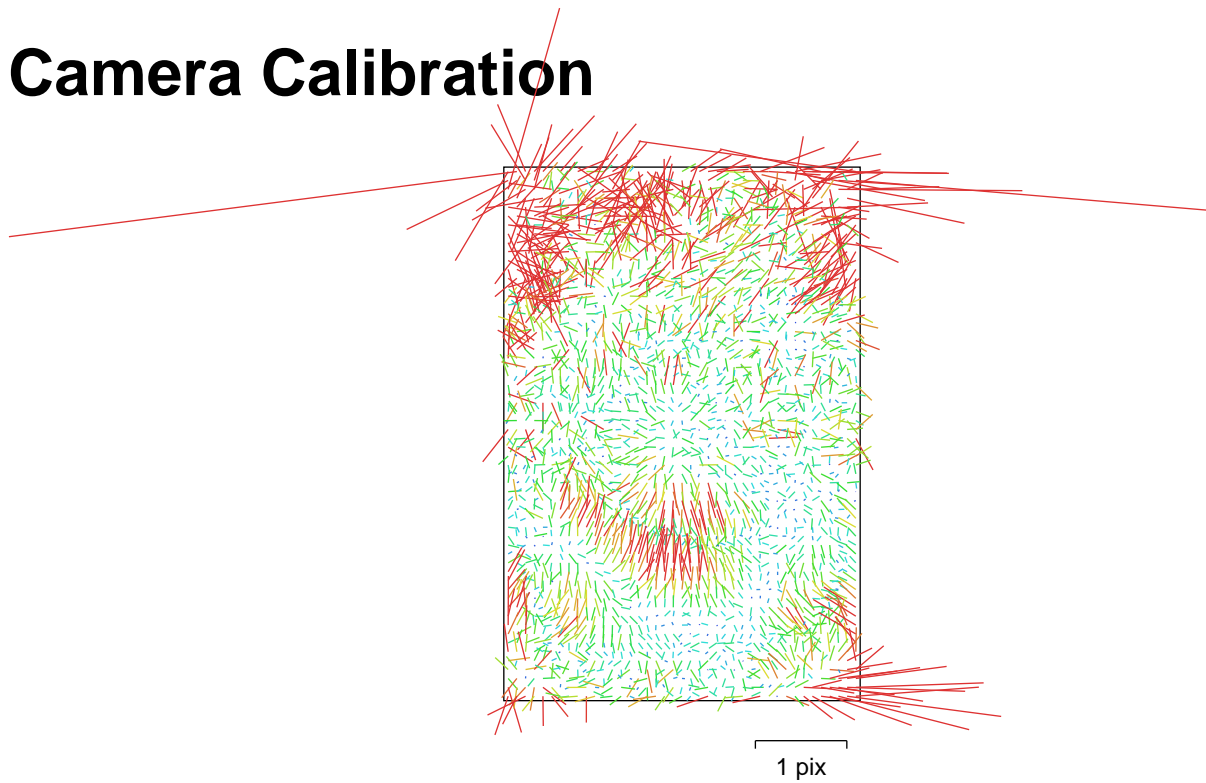


Fig. 8. Image residuals for Camera 6.

Camera 6

154 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	2959.7	0.042	1.00	0.08	-0.13	-0.77	0.71	-0.63	0.01	0.06
Cx	-20.1166	0.044		1.00	-0.01	-0.01	0.02	-0.03	0.73	0.05
Cy	-10.3718	0.048			1.00	0.01	-0.02	0.03	-0.04	0.82
K1	-0.036786	2.8e-05				1.00	-0.96	0.90	0.04	-0.09
K2	0.00968504	2.1e-05					1.00	-0.98	-0.02	0.03
K3	-0.000775701	4.9e-06						1.00	0.02	-0.00
P1	0.000411438	3.9e-06							1.00	0.01
P2	0.000764838	4.6e-06								1.00

Table 8. Calibration coefficients and correlation matrix.

Camera Calibration

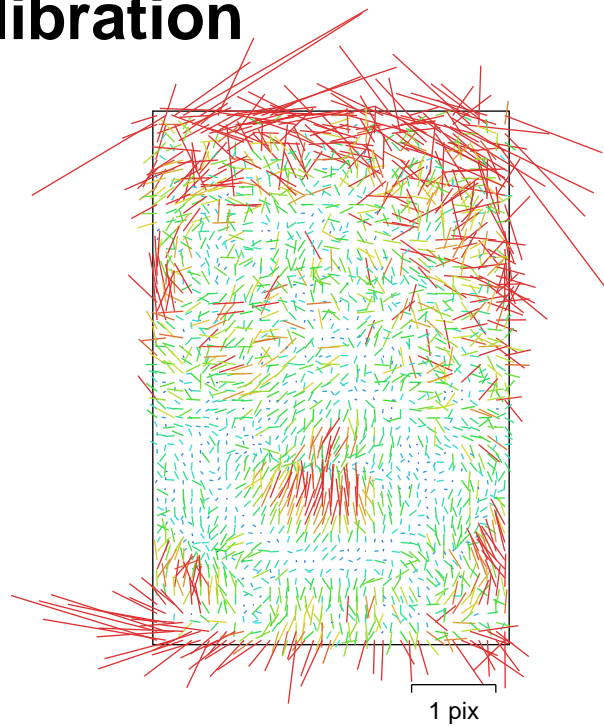


Fig. 9. Image residuals for Camera 7.

Camera 7

154 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	2959.8	0.041	1.00	0.01	-0.19	-0.70	0.67	-0.59	-0.01	0.03
Cx	20.1495	0.047		1.00	0.01	-0.02	0.01	-0.01	0.80	0.02
Cy	28.3825	0.052			1.00	-0.08	0.02	0.00	-0.01	0.81
K1	-0.0326855	2.9e-05				1.00	-0.96	0.89	-0.01	-0.18
K2	0.0067229	2.3e-05					1.00	-0.98	0.01	0.07
K3	-8.15948e-05	5.7e-06						1.00	-0.01	-0.03
P1	-0.000220047	4.2e-06							1.00	0.01
P2	0.000927495	4.9e-06								1.00

Table 9. Calibration coefficients and correlation matrix.

Camera Calibration

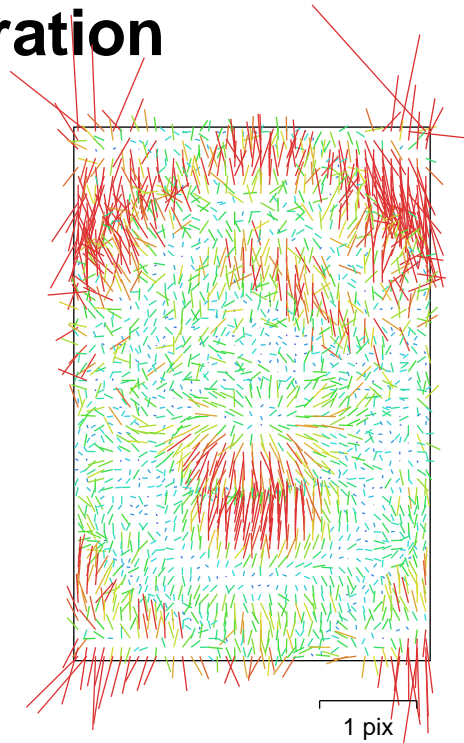


Fig. 10. Image residuals for Camera 8.

Camera 8

154 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	2959.91	0.033	1.00	0.01	-0.13	-0.67	0.64	-0.58	0.01	0.03
Cx	20.415	0.034		1.00	-0.01	0.01	-0.01	0.01	0.72	-0.01
Cy	26.0942	0.036			1.00	0.02	-0.01	0.01	-0.03	0.77
K1	-0.0355642	2e-05				1.00	-0.96	0.90	0.01	-0.08
K2	0.0088985	1.5e-05					1.00	-0.98	-0.01	0.03
K3	-0.000535206	3.3e-06						1.00	0.01	-0.02
P1	-0.000713384	2.9e-06							1.00	-0.02
P2	0.000138318	3.2e-06								1.00

Table 10. Calibration coefficients and correlation matrix.

Camera Calibration

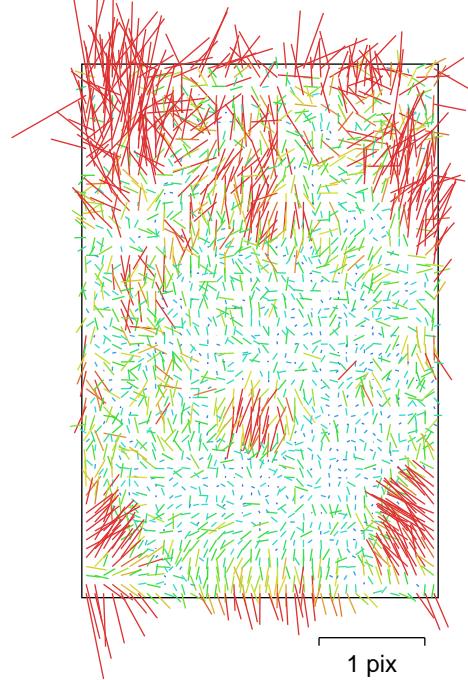


Fig. 11. Image residuals for Camera 9.

Camera 9

154 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	2957.43	0.038	1.00	-0.02	-0.07	-0.74	0.68	-0.60	0.03	0.04
Cx	-20.9188	0.031		1.00	-0.02	0.02	-0.02	0.02	0.59	-0.02
Cy	-7.53464	0.038			1.00	0.01	0.03	-0.04	-0.00	0.70
K1	-0.0399798	2.1e-05				1.00	-0.96	0.91	-0.02	-0.00
K2	0.011807	1.5e-05					1.00	-0.98	0.01	-0.02
K3	-0.00112077	3.1e-06						1.00	-0.01	0.03
P1	0.000365211	2.5e-06							1.00	0.00
P2	0.000208311	3.3e-06								1.00

Table 11. Calibration coefficients and correlation matrix.

Camera Calibration

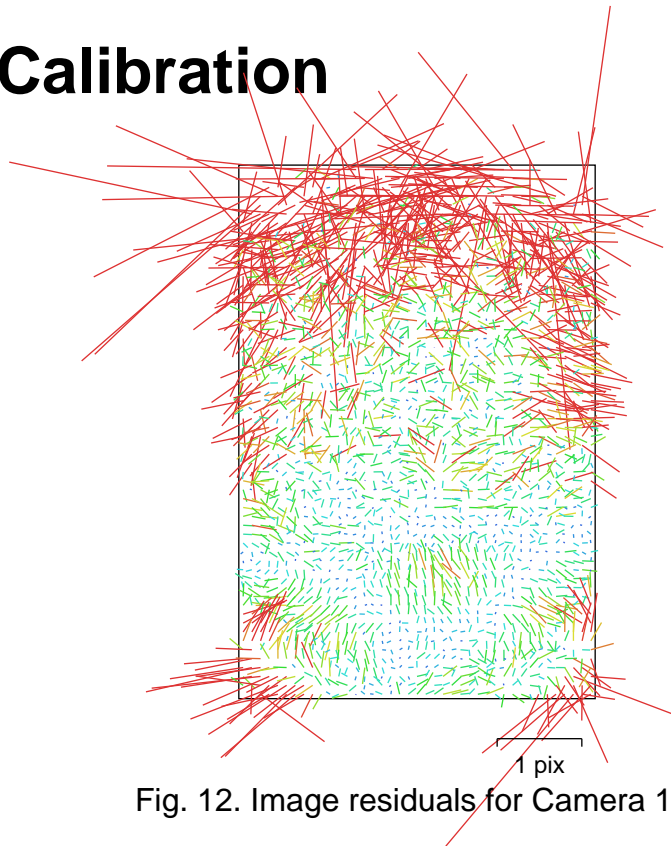


Fig. 12. Image residuals for Camera 10.

Camera 10
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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	2961.4	0.051	1.00	-0.03	-0.16	-0.80	0.75	-0.68	-0.01	0.02
Cx	-3.53303	0.05		1.00	0.03	-0.00	-0.00	-0.00	0.82	0.04
Cy	-7.63667	0.057			1.00	0.01	-0.01	0.01	0.02	0.76
K1	-0.0371388	3.6e-05				1.00	-0.97	0.92	-0.01	-0.07
K2	0.0116121	2.7e-05					1.00	-0.99	0.00	-0.01
K3	-0.00127637	6.4e-06						1.00	-0.00	0.03
P1	0.000258485	4.2e-06							1.00	0.03
P2	2.86112e-05	5.7e-06								1.00

Table 12. Calibration coefficients and correlation matrix.

Camera Calibration

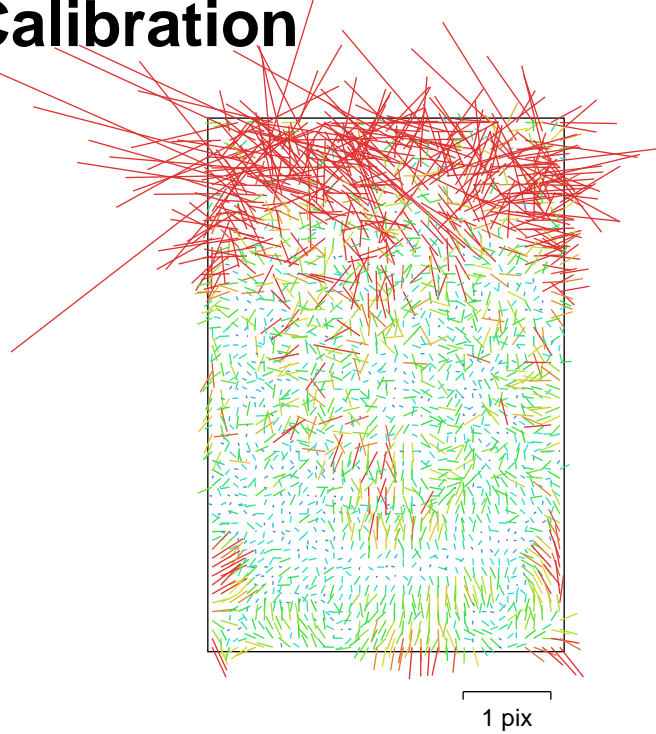


Fig. 13. Image residuals for Camera 11.

Camera 11

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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	2964.53	0.043	1.00	-0.04	-0.12	-0.80	0.74	-0.67	0.01	0.03
Cx	15.4923	0.042		1.00	0.01	-0.04	0.03	-0.03	0.76	-0.04
Cy	32.3311	0.045			1.00	0.01	0.02	-0.02	0.01	0.72
K1	-0.0366681	2.6e-05				1.00	-0.96	0.91	-0.07	-0.08
K2	0.0101901	1.8e-05					1.00	-0.98	0.05	0.00
K3	-0.000837917	3.8e-06						1.00	-0.04	0.02
P1	-0.0006358	3.6e-06							1.00	-0.01
P2	0.000227399	4.1e-06								1.00

Table 13. Calibration coefficients and correlation matrix.

Camera Calibration

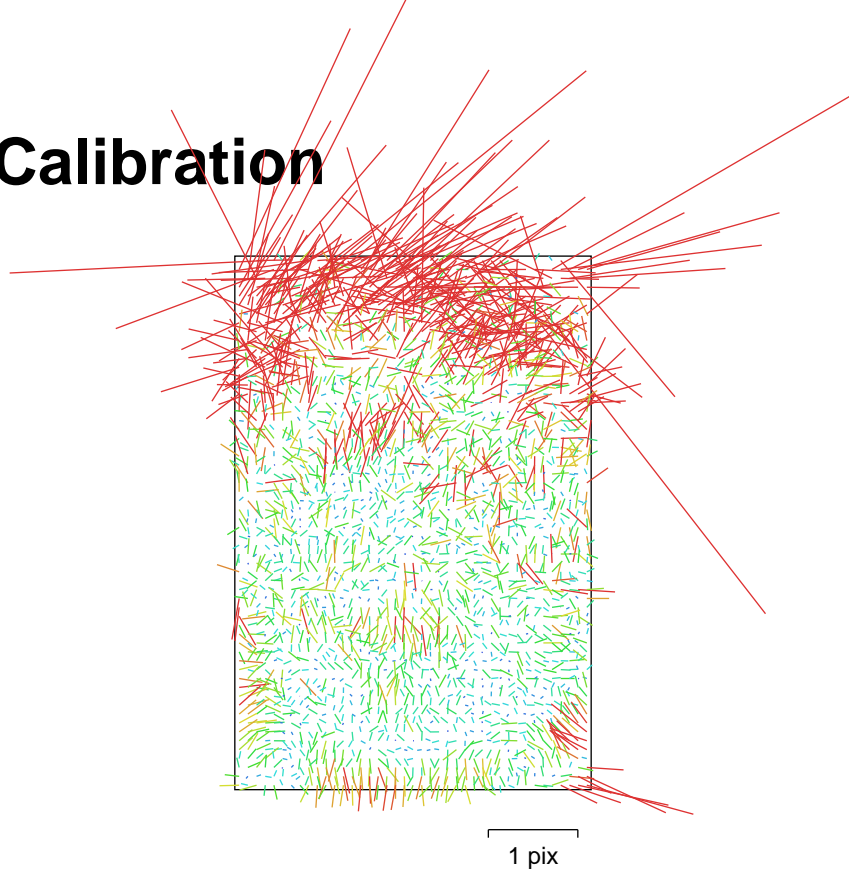


Fig. 14. Image residuals for Camera 12.

Camera 12

154 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	2966.36	0.047	1.00	0.07	-0.03	-0.82	0.75	-0.68	-0.00	0.04
Cx	-14.3124	0.044		1.00	0.01	-0.01	0.01	-0.01	0.73	0.06
Cy	-4.91223	0.046			1.00	0.01	0.04	-0.04	-0.01	0.68
K1	-0.0410476	3e-05				1.00	-0.96	0.91	0.05	-0.03
K2	0.013418	2.1e-05					1.00	-0.99	-0.03	-0.03
K3	-0.00148783	4.4e-06						1.00	0.02	0.05
P1	0.000216599	3.8e-06							1.00	0.02
P2	0.000258784	4.3e-06								1.00

Table 14. Calibration coefficients and correlation matrix.

Camera Calibration

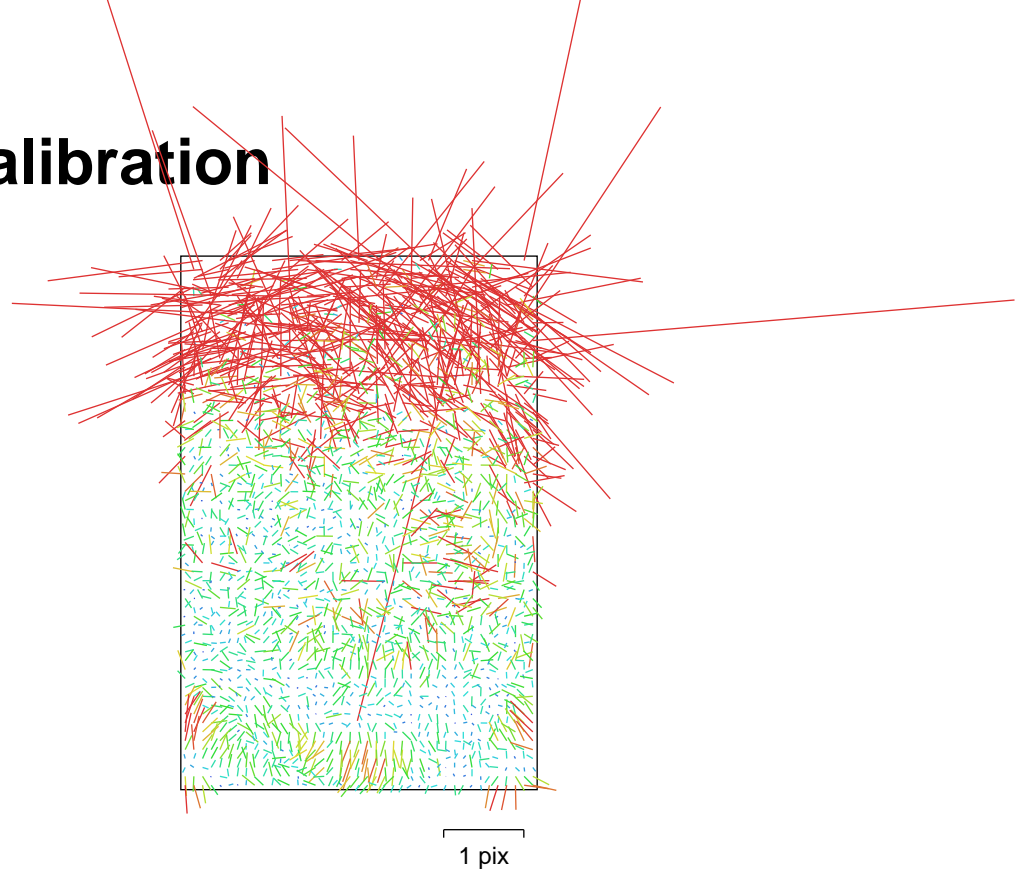


Fig. 15. Image residuals for Camera 13.

Camera 13

154 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	2948.69	0.053	1.00	0.01	-0.14	-0.77	0.73	-0.66	-0.00	-0.00
Cx	8.86968	0.05		1.00	-0.02	-0.01	0.02	-0.02	0.79	-0.04
Cy	25.8809	0.055			1.00	0.03	0.02	-0.03	-0.01	0.67
K1	-0.0391074	3.3e-05				1.00	-0.96	0.90	-0.02	-0.08
K2	0.0116876	2.2e-05					1.00	-0.99	0.03	0.00
K3	-0.00113228	4.7e-06						1.00	-0.04	0.02
P1	-0.000181936	4.2e-06							1.00	-0.04
P2	0.000408156	4.8e-06								1.00

Table 15. Calibration coefficients and correlation matrix.

Camera Calibration

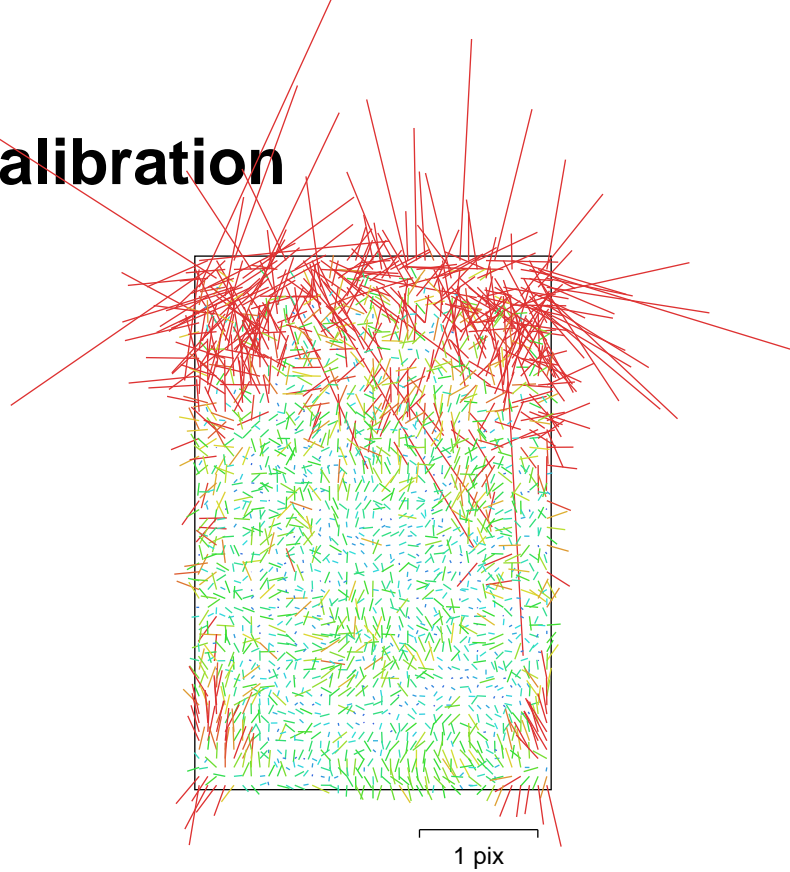


Fig. 16. Image residuals for Camera 14.

Camera 14

154 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	2974.5	0.038	1.00	-0.00	-0.03	-0.74	0.68	-0.61	0.00	0.04
Cx	8.38511	0.033		1.00	0.01	0.00	-0.00	0.00	0.65	0.00
Cy	45.4702	0.041			1.00	0.00	0.06	-0.07	0.00	0.65
K1	-0.0383062	2.2e-05				1.00	-0.96	0.90	-0.00	0.00
K2	0.0116117	1.5e-05					1.00	-0.98	0.00	-0.04
K3	-0.00105133	3.2e-06						1.00	-0.00	0.04
P1	-0.000301406	2.6e-06							1.00	-0.00
P2	0.000391363	3.3e-06								1.00

Table 16. Calibration coefficients and correlation matrix.

Camera Calibration

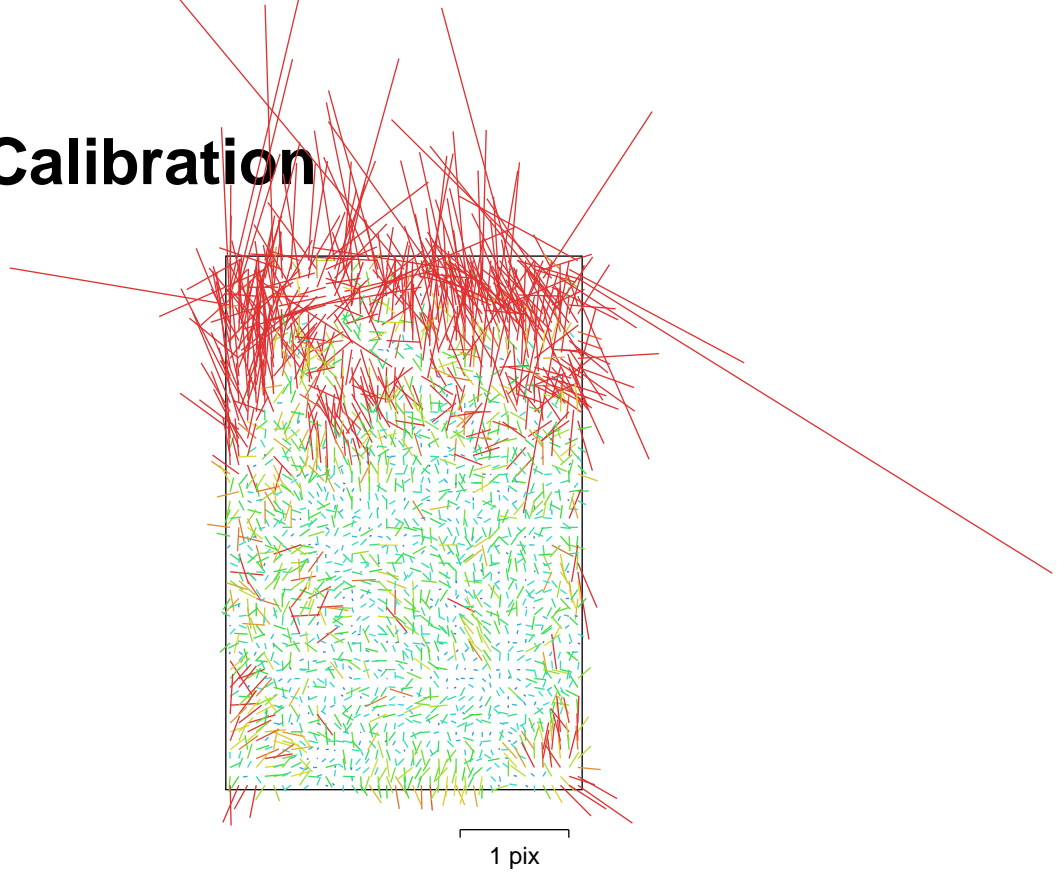


Fig. 17. Image residuals for Camera 15.

Camera 15

154 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	2976.06	0.041	1.00	0.00	0.02	-0.75	0.69	-0.62	0.03	0.05
Cx	-8.88348	0.034		1.00	-0.01	0.00	-0.00	0.00	0.65	0.01
Cy	-16.4435	0.042			1.00	0.00	0.07	-0.08	0.00	0.62
K1	-0.0381466	2.3e-05				1.00	-0.96	0.90	-0.02	-0.01
K2	0.0116276	1.6e-05					1.00	-0.98	0.01	-0.04
K3	-0.00107163	3.2e-06						1.00	-0.01	0.05
P1	0.000498248	2.9e-06							1.00	0.03
P2	-4.79943e-05	3.5e-06								1.00

Table 17. Calibration coefficients and correlation matrix.

Camera Calibration

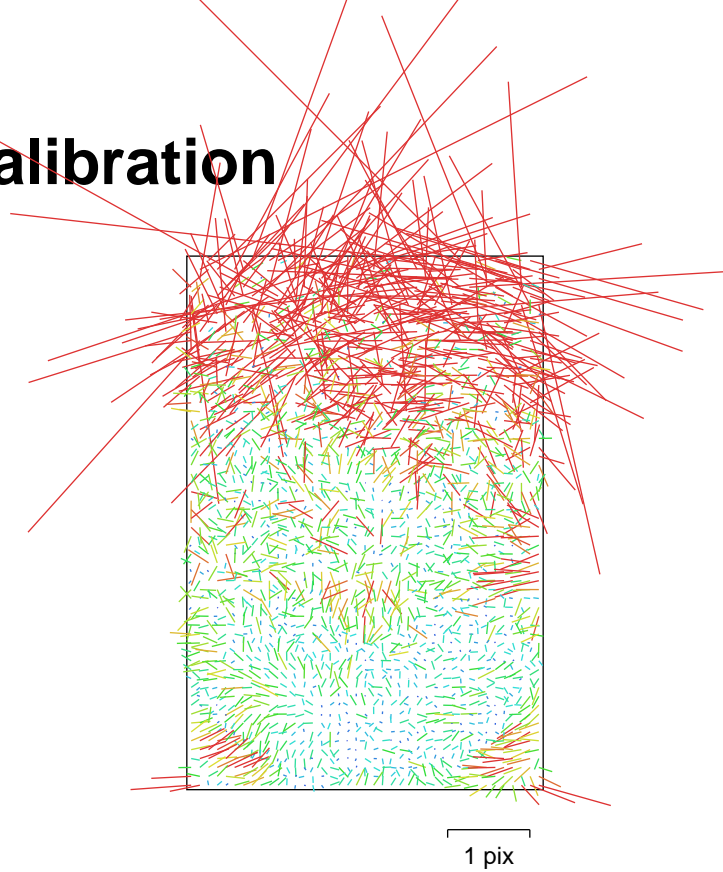


Fig. 18. Image residuals for Camera 16.

Camera 16

154 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	2957.7	0.052	1.00	-0.01	-0.09	-0.78	0.75	-0.67	0.01	-0.00
Cx	-1.99924	0.052		1.00	0.00	-0.01	0.01	-0.01	0.81	0.02
Cy	-7.02503	0.057			1.00	0.06	0.01	-0.01	0.00	0.64
K1	-0.0380553	3.1e-05				1.00	-0.95	0.89	-0.02	-0.05
K2	0.0110967	1.9e-05					1.00	-0.98	0.01	-0.05
K3	-0.00102647	3.8e-06						1.00	0.00	0.09
P1	0.000430707	4.2e-06							1.00	0.03
P2	0.000174328	5.1e-06								1.00

Table 18. Calibration coefficients and correlation matrix.

Camera Calibration

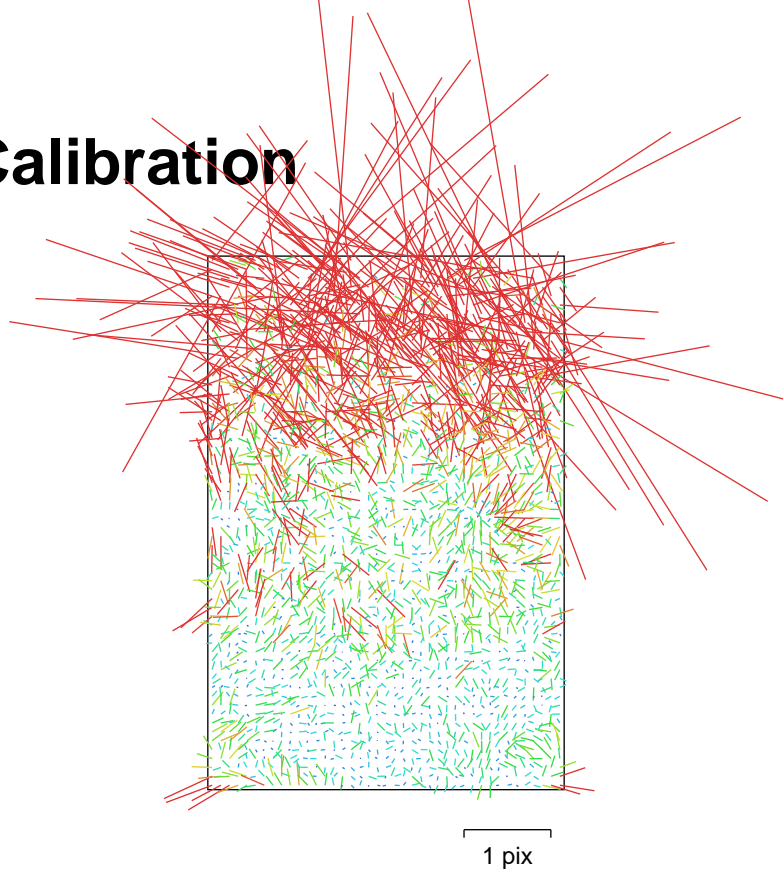


Fig. 19. Image residuals for Camera 17.

Camera 17

154 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	2970.93	0.052	1.00	-0.04	-0.04	-0.82	0.77	-0.69	-0.00	0.04
Cx	16.8695	0.053		1.00	0.04	-0.03	0.03	-0.03	0.80	-0.00
Cy	48.0723	0.051			1.00	0.04	0.04	-0.05	0.06	0.60
K1	-0.0374611	3.2e-05				1.00	-0.96	0.90	-0.05	-0.02
K2	0.0114685	2.1e-05					1.00	-0.99	0.03	-0.04
K3	-0.0010497	4.2e-06						1.00	-0.03	0.07
P1	-1.46425e-05	4.6e-06							1.00	0.05
P2	0.000582489	4.5e-06								1.00

Table 19. Calibration coefficients and correlation matrix.

Camera Calibration

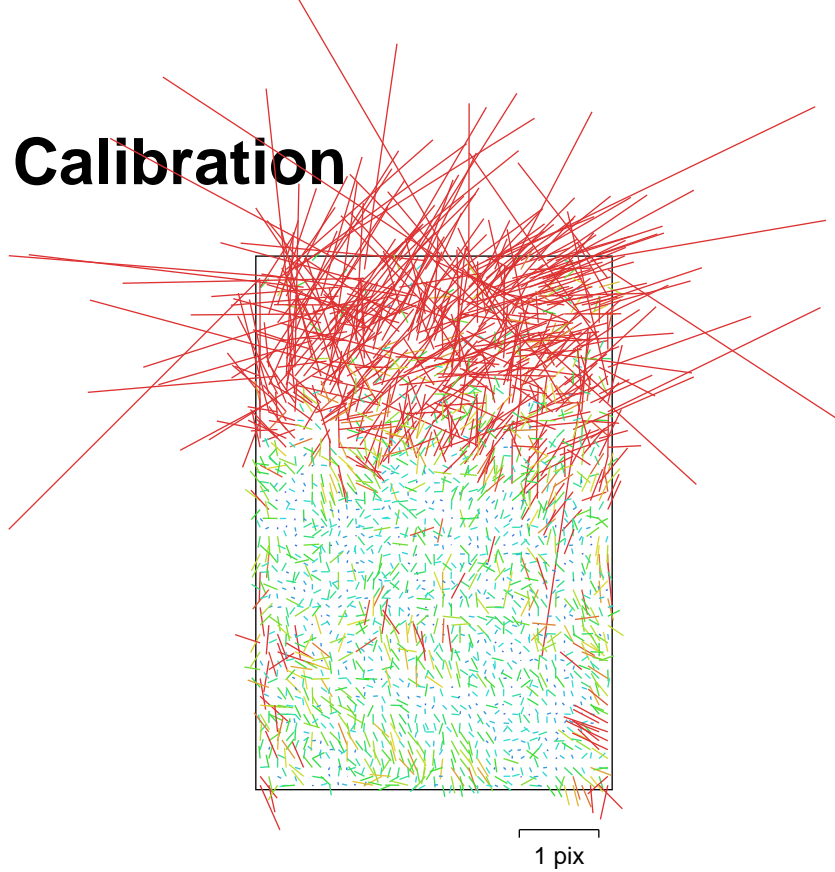


Fig. 20. Image residuals for Camera 18.

Camera 18

154 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	2964.64	0.066	1.00	0.11	0.05	-0.80	0.73	-0.64	0.01	0.08
Cx	-16.7458	0.062		1.00	0.03	-0.03	0.03	-0.03	0.72	0.07
Cy	-23.7418	0.063			1.00	0.08	0.04	-0.05	0.00	0.57
K1	-0.0381523	4e-05				1.00	-0.95	0.89	0.03	-0.02
K2	0.011561	2.6e-05					1.00	-0.98	-0.02	-0.04
K3	-0.0010944	5.2e-06						1.00	0.01	0.06
P1	-0.000189671	5.4e-06							1.00	0.02
P2	7.63696e-06	5.6e-06								1.00

Table 20. Calibration coefficients and correlation matrix.

Camera Calibration

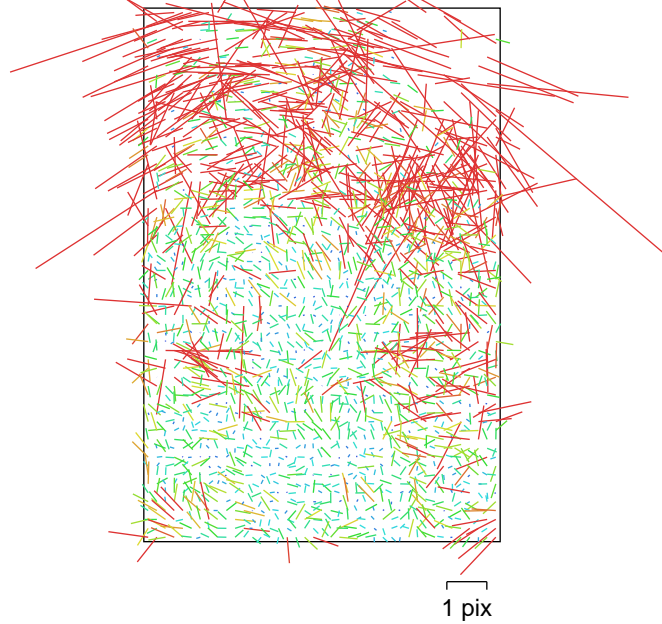


Fig. 21. Image residuals for Camera 19.

Camera 19

154 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	2952.88	0.11	1.00	0.09	0.03	-0.80	0.76	-0.68	0.02	0.01
Cx	21.8741	0.096		1.00	-0.00	-0.06	0.08	-0.09	0.78	-0.03
Cy	34.919	0.1			1.00	0.04	0.03	-0.05	0.01	0.64
K1	-0.0357855	7.6e-05				1.00	-0.95	0.89	-0.03	-0.04
K2	0.0101168	5.4e-05					1.00	-0.98	0.04	-0.03
K3	-0.000766658	1.2e-05						1.00	-0.05	0.03
P1	-0.000413881	8.8e-06							1.00	-0.02
P2	0.000415068	1.1e-05								1.00

Table 21. Calibration coefficients and correlation matrix.

Camera Calibration

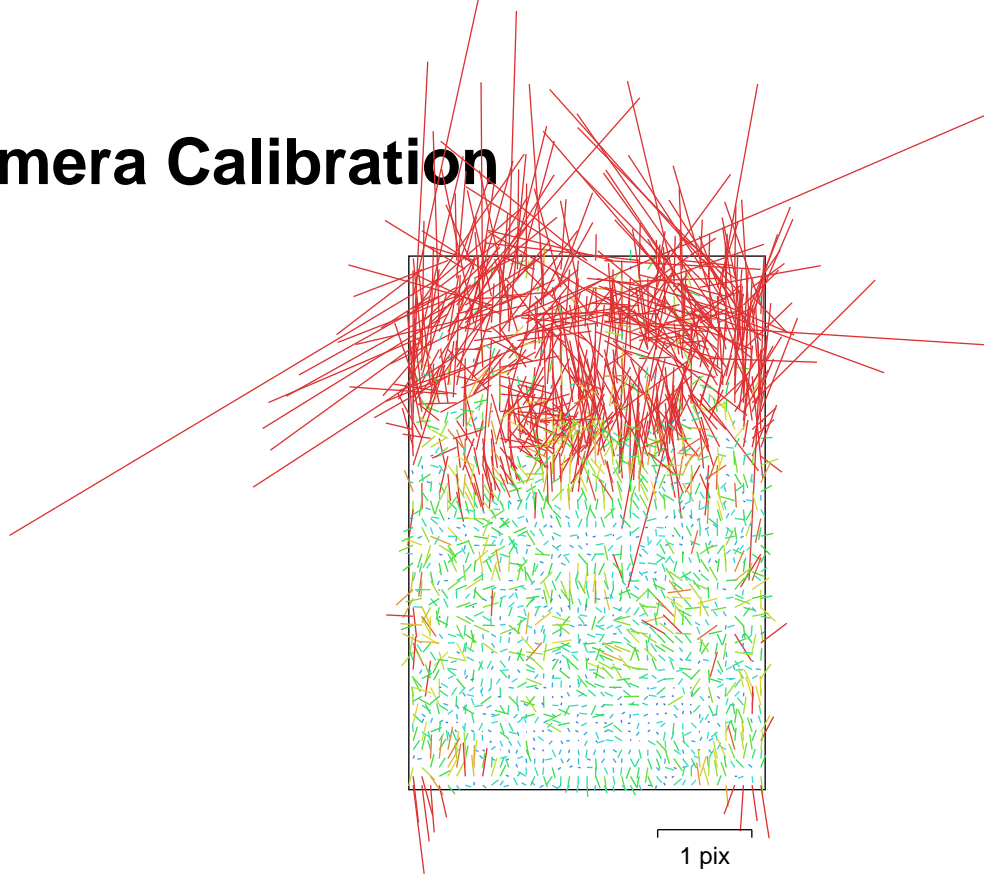


Fig. 22. Image residuals for Camera 20.

Camera 20

154 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	2967.34	0.055	1.00	0.01	0.04	-0.71	0.64	-0.56	0.02	0.06
Cx	16.6674	0.047		1.00	-0.00	0.01	-0.01	0.00	0.68	0.01
Cy	31.7127	0.06			1.00	0.06	0.06	-0.09	0.00	0.55
K1	-0.0407726	3.2e-05				1.00	-0.94	0.87	-0.00	-0.01
K2	0.0129282	2.2e-05					1.00	-0.98	0.00	-0.04
K3	-0.00126778	4.6e-06						1.00	-0.00	0.04
P1	0.000104813	4.6e-06							1.00	-0.00
P2	0.00070154	5e-06								1.00

Table 22. Calibration coefficients and correlation matrix.

Camera Calibration

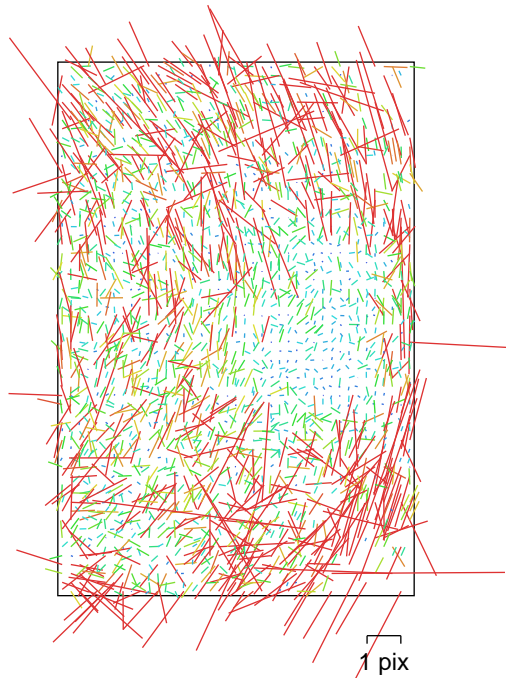


Fig. 23. Image residuals for Camera 21.

Camera 21

154 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	2966.74	0.21	1.00	-0.54	0.01	-0.50	0.48	-0.42	0.14	-0.02
Cx	-22.3354	0.21		1.00	-0.00	-0.08	0.02	-0.00	0.28	-0.03
Cy	-29.6672	0.15			1.00	-0.00	0.01	-0.01	-0.04	0.92
K1	-0.0344767	0.00011				1.00	-0.95	0.88	-0.10	0.03
K2	0.00810333	9.2e-05					1.00	-0.98	0.11	-0.02
K3	-0.000410949	2.1e-05						1.00	-0.09	0.02
P1	3.30018e-06	1.6e-05							1.00	-0.01
P2	-0.000363794	1.7e-05								1.00

Table 23. Calibration coefficients and correlation matrix.

Ground Control Points



● Control points

⊥ Check points

1 m

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 (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
5	1.02709	5.92356	3.70642	6.01194	7.06265

Table 24. Check points RMSE.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
target 4					3.255 (194)
target 5					3.278 (203)
target 6					3.238 (196)
target 7					2.733 (71)
target 8					2.981 (90)
target 12					3.723 (184)
target 13					3.124 (182)
target 14					3.169 (179)
target 15					2.917 (36)
target 16					2.444 (35)
target 20					3.402 (228)
target 21					3.458 (268)
target 22					3.133 (260)
target 23					2.709 (78)
target 24					2.653 (77)
target 25	-1.1049	2.03843	2.78431	3.62331	3.536 (282)
target 26	-1.17652	0.225208	1.81364	2.17352	3.191 (112)
target 27	0.549042	2.49136	2.76147	3.75953	4.132 (311)
target 29	0.981217	11.075	5.09703	12.231	3.565 (290)
target 30	-1.18545	6.50955	4.90312	8.2353	3.897 (346)
Total	1.02709	5.92356	3.70642	7.06265	3.756

Table 25. Check points.

Scale Bars

Label	Distance (m)	Error (m)
003. 7-8	0.250196	0.000136068
006. 15-16	0.2505	0.000470074
009. 23-24	0.249938	-0.000181806
002a. 4-5	0.250098	9.82993e-05
002b. 5-6	0.249748	-0.000152363
005a. 12-13	0.249813	-0.000167493
005b. 13-14	0.249836	-5.38894e-05
008a. 20-21	0.250119	8.91153e-05
008b. 21-22	0.249752	-0.000128206
Total		0.000200209

Table 26. Control scale bars.

Digital Elevation Model

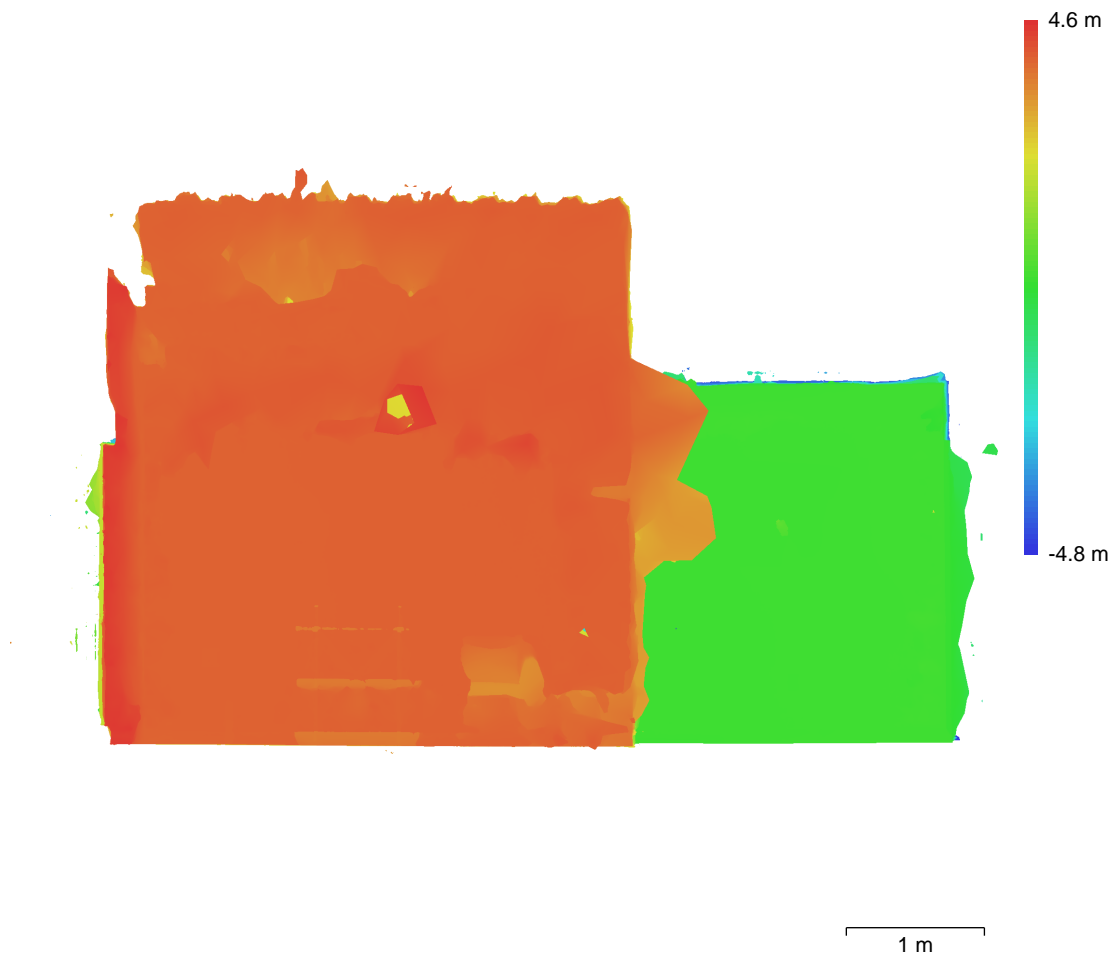


Fig. 25. Reconstructed digital elevation model.

Resolution: 5.38 mm/pix
Point density: 3.45 points/cm²

Processing Parameters

General

Cameras	3388
Aligned cameras	3388
Markers	21
Scale bars	9
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	2,588,113 of 6,376,270
RMS reprojection error	0.429519 (1.28169 pix)
Max reprojection error	12.6917 (16.4701 pix)
Mean key point size	2.88353 pix
Point colors	3 bands, uint8
Key points	16.05 GB
Average tie point multiplicity	3.98969

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	1 hours 13 minutes
Matching memory usage	4.78 GB
Alignment time	14 minutes 26 seconds
Alignment memory usage	39.51 GB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	20 seconds
Date created	2023:10:11 18:32:53
Software version	2.0.2.16404
File size	563.21 MB

Depth Maps

Count	3127
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Depth maps generation parameters

Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	57 minutes 9 seconds
Memory usage	5.15 GB
Date created	2023:10:16 21:11:04
Software version	2.0.2.16404
File size	8.08 GB

Point Cloud

Points	188,710,185
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Point attributes

Color	3 bands, uint8
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Normal

Point classes

Created (never classified) 188,710,185

Depth maps generation parameters

Quality Medium
Filtering mode Mild
Max neighbors 16
Processing time 57 minutes 9 seconds
Memory usage 5.15 GB

Point cloud generation parameters

Processing time 4 hours 32 minutes
Memory usage 92.24 GB
Date created 2023:10:17 01:46:05
Software version 2.0.2.16404
File size 2.48 GB

Model

Faces 1,767,687
Vertices 887,454
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 57 minutes 9 seconds
Memory usage 5.15 GB

Reconstruction parameters

Surface type Arbitrary
Source data Depth maps
Interpolation Enabled
Strict volumetric masks No
Processing time 24 minutes 26 seconds
Memory usage 11.11 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 13 seconds
UV mapping memory usage 1.75 GB
Blending time 24 minutes 12 seconds
Blending memory usage 10.79 GB
Blending GPU memory usage 7.55 GB
Date created 2023:10:17 02:11:53
Software version 2.0.2.16404
File size 259.51 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