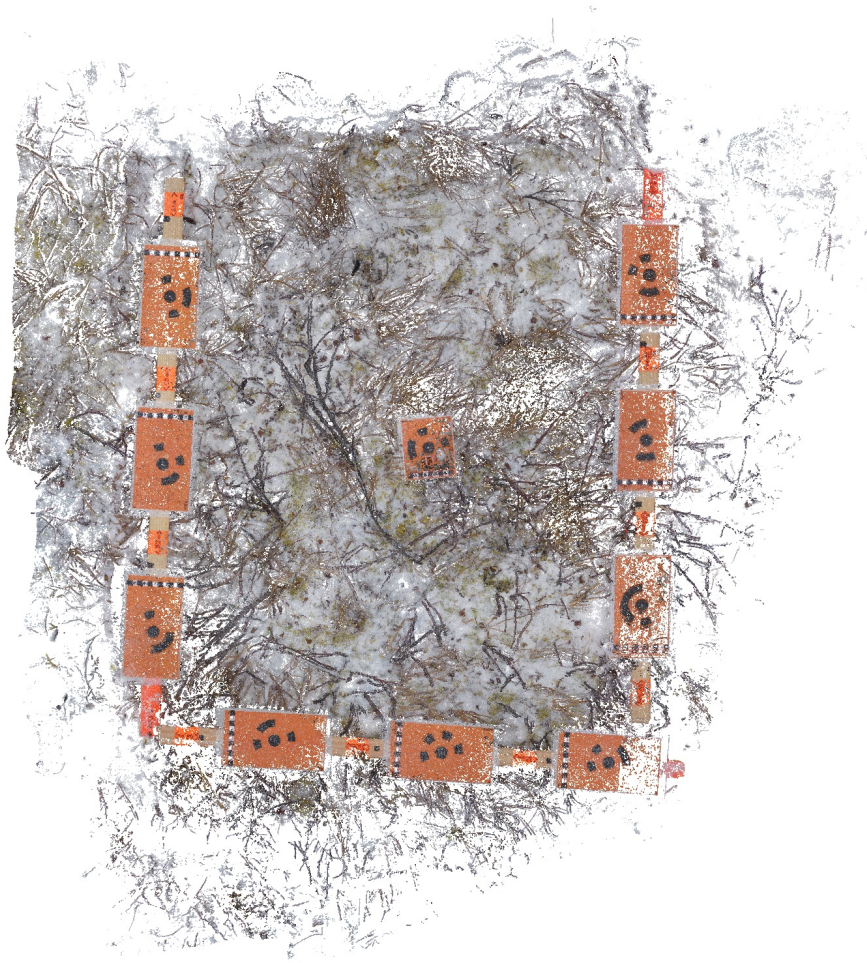


A621-Lumix

Processing Report
28 December 2023



Survey Data

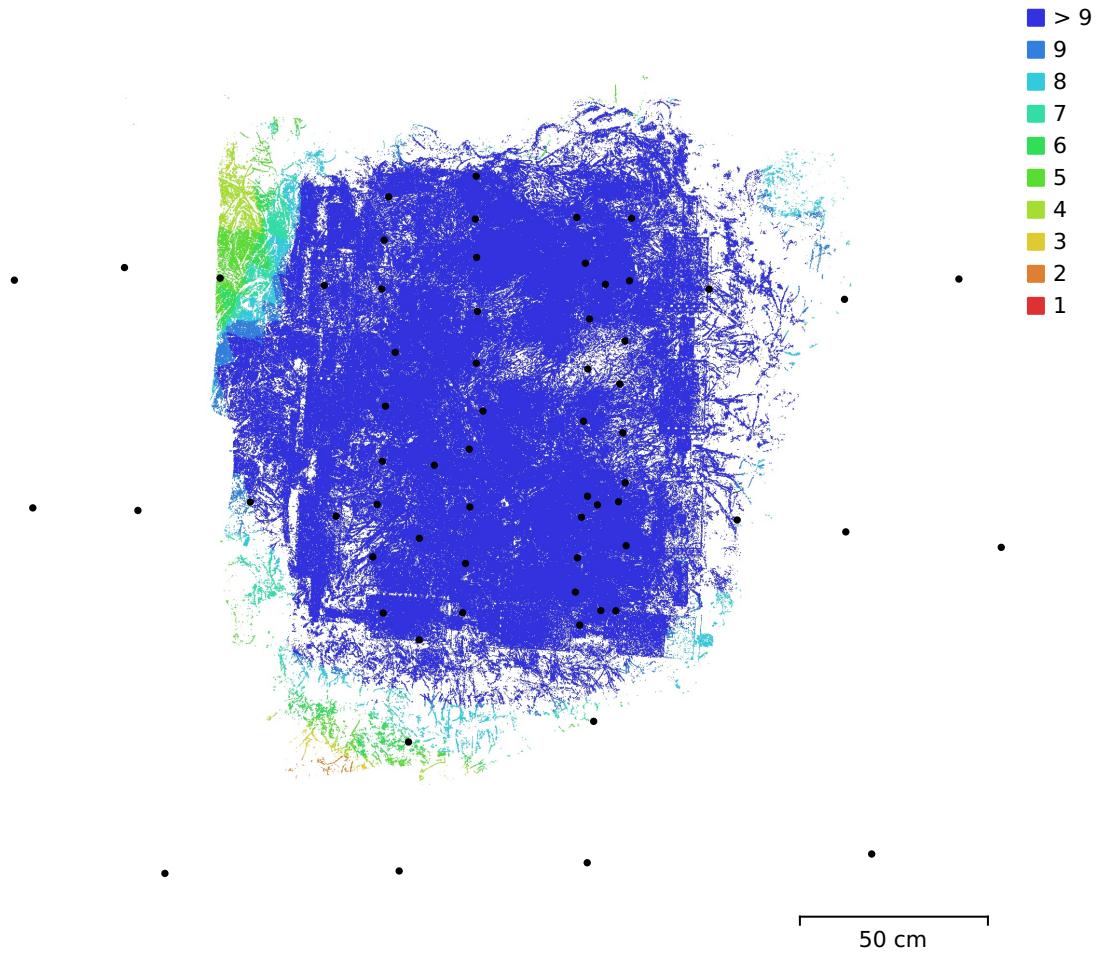


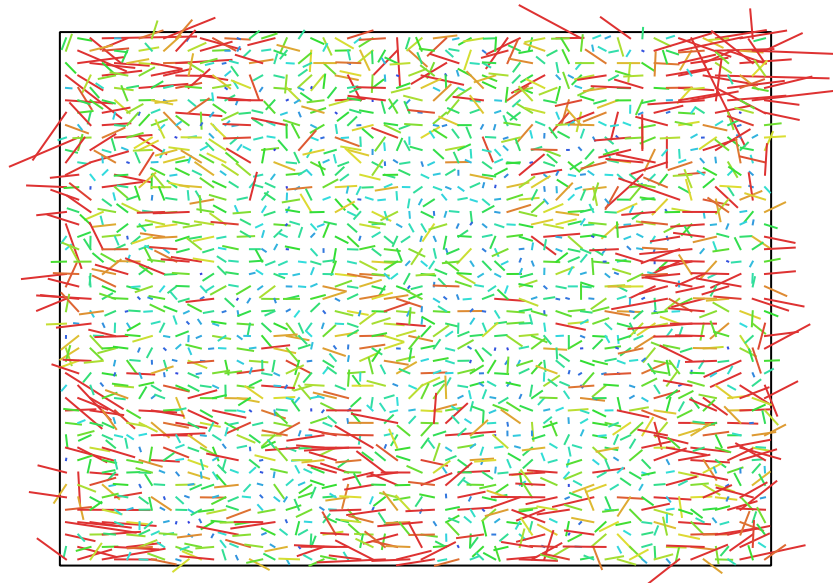
Fig. 1. Camera locations and image overlap.

Number of images:	64	Camera stations:	64
Flying altitude:	51 cm	Tie points:	23,541
Ground resolution:	0.0995 mm/pix	Projections:	51,244
Coverage area:	1.52 m ²	Reprojection error:	0.351 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
DC-TS7 (6mm)	5184 x 3888	6 mm	1.18 x 1.18 μ m	No

Table 1. Cameras.

Camera Calibration



1 pix

Fig. 2. Image residuals for DC-TS7 (6mm).

DC-TS7 (6mm)

64 images

Type	Resolution	Focal Length	Pixel Size
Frame	5184 x 3888	6 mm	1.18 x 1.18 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	5120.47	0.89	1.00	0.15	-0.32	0.08	0.06	-0.07	0.19	-0.09
Cx	-24.1539	0.81		1.00	-0.03	0.04	0.03	-0.04	0.78	-0.07
Cy	-26.8213	1.1			1.00	-0.07	0.00	0.00	-0.03	0.77
K1	-0.015313	0.00025				1.00	-0.90	0.84	0.05	-0.08
K2	0.0144622	0.0014					1.00	-0.98	0.04	0.01
K3	-0.0200593	0.0026						1.00	-0.05	-0.01
P1	-0.000844995	3.7e-05							1.00	-0.04
P2	-0.00148952	4.4e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330658	0.000657773
target 2_target 3	0.330473	0.00047328
target 4_target 5	0.330739	0.000738835
target 5_target 6	0.33003	3.03866e-05
target 7_target 8	0.329279	-0.000721404
target 8_target 9	0.328812	-0.00118843
Total		0.000722985

Table 3. Control scale bars.

Digital Elevation Model

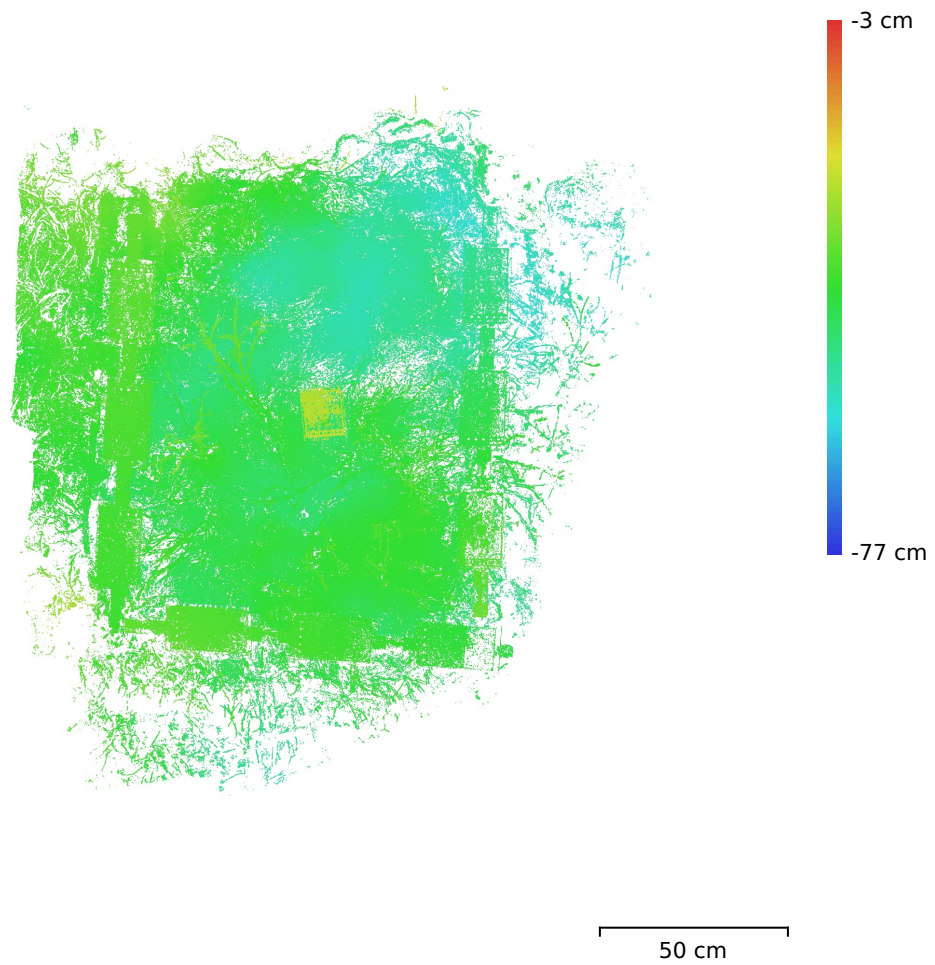


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	64
Aligned cameras	64
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	23,541 of 70,515
RMS reprojection error	0.131644 (0.351261 pix)
Max reprojection error	0.641801 (3.43373 pix)
Mean key point size	2.56879 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.22194

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	30 seconds
Matching memory usage	836.57 MB
Alignment time	7 seconds
Alignment memory usage	148.55 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:28 20:32:27
Software version	2.0.3.16960
File size	4.33 MB

Depth Maps

Count	62
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 21 seconds
Memory usage	11.57 GB
Date created	2023:12:28 20:36:59
Software version	2.0.3.16960
File size	927.85 MB

Point Cloud

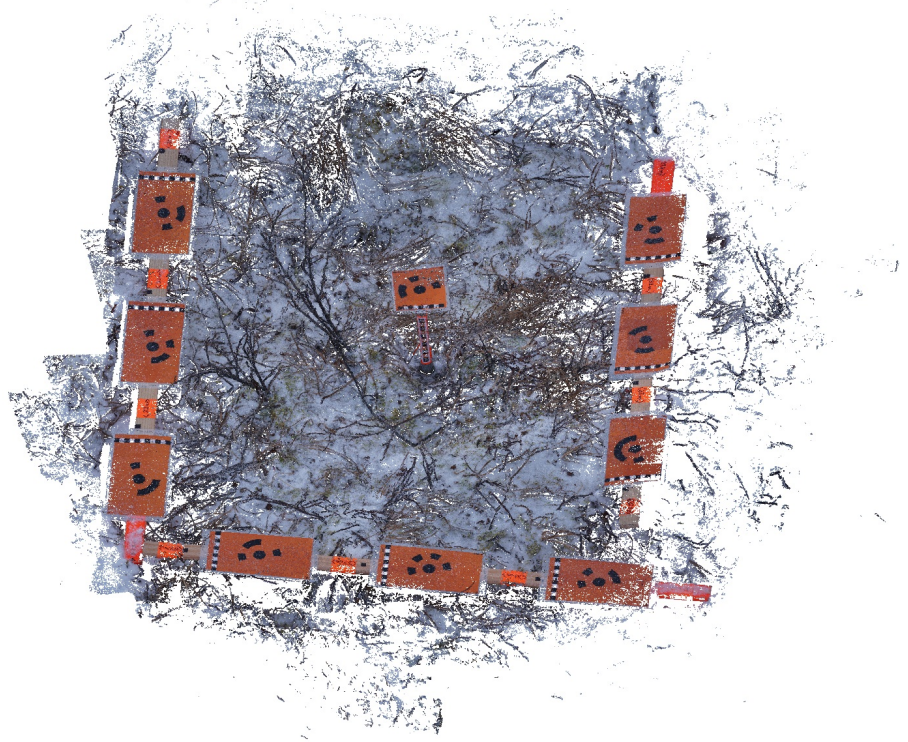
Points	35,929,913
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 15
Point classes	
Created (never classified)	35,929,913
Point cloud generation parameters	
Processing time	7 minutes 52 seconds
Memory usage	16.73 GB
Date created	2023:12:28 20:44:51
Software version	2.0.3.16960
File size	514.69 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

A621-Sony

Processing Report
28 December 2023



Survey Data

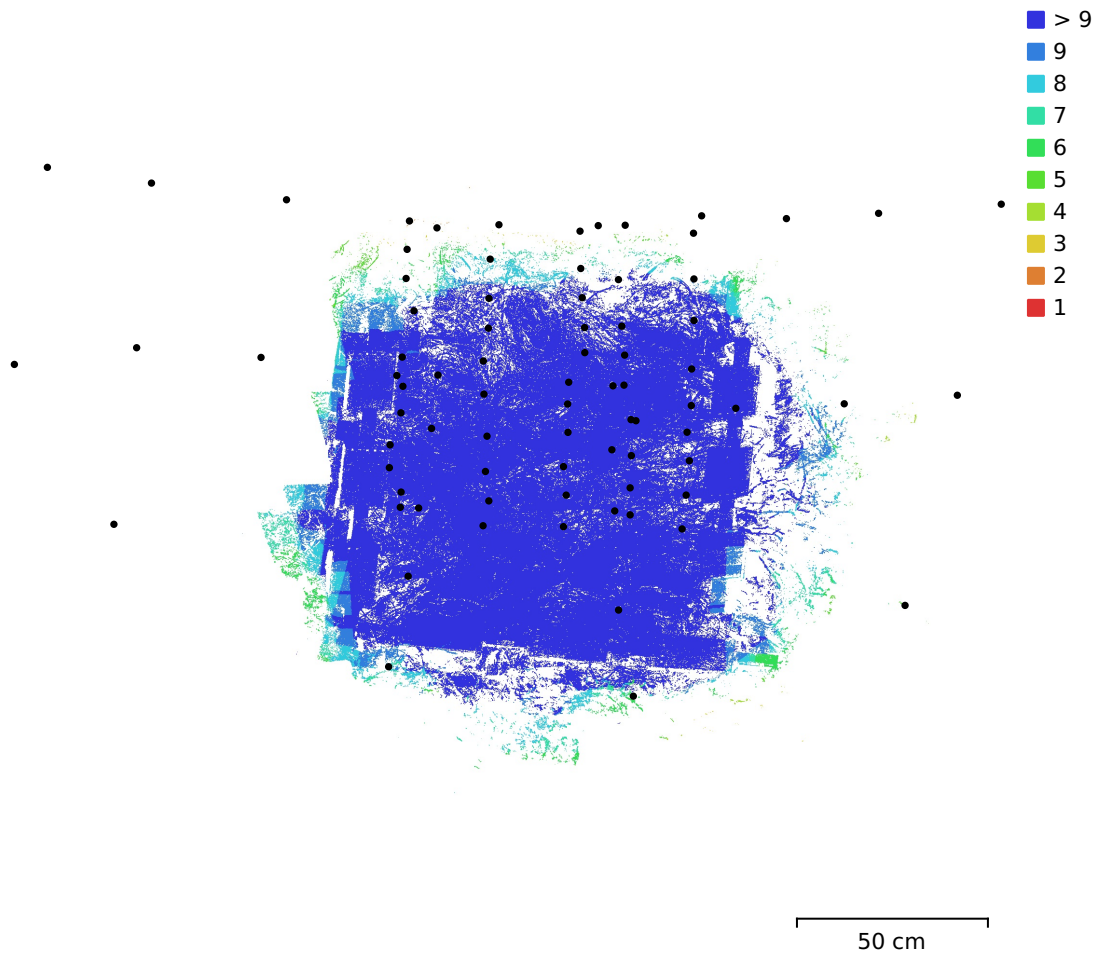


Fig. 1. Camera locations and image overlap.

Number of images:	79	Camera stations:	79
Flying altitude:	48.2 cm	Tie points:	22,175
Ground resolution:	0.0739 mm/pix	Projections:	47,272
Coverage area:	1.06 m ²	Reprojection error:	0.349 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

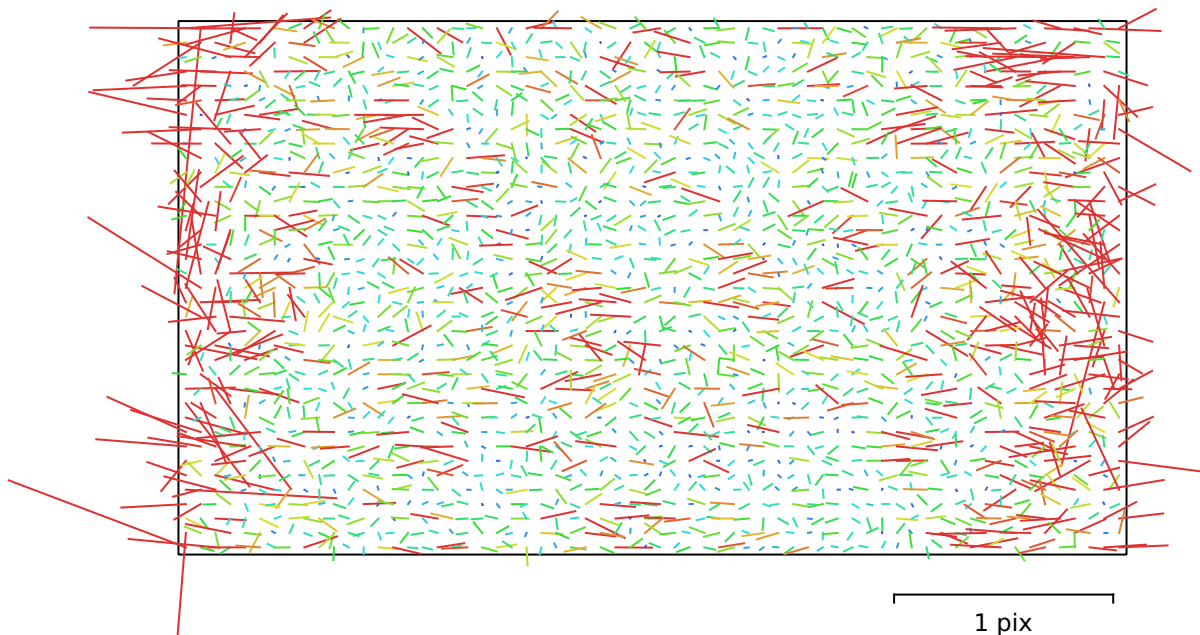


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

79 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm
F:	6524.25		
Cx:	38.545	B1:	0
Cy:	22.9217	B2:	0
K1:	0.0037595	P1:	0.00204273
K2:	-0.0162379	P2:	0.0011552
K3:	0.127327	P3:	0
K4:	0	P4:	0

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.329306	-0.000693701
target 2_target 3	0.329643	-0.000356516
target 4_target 5	0.330708	0.000708057
target 5_target 6	0.330338	0.000338459
Total		0.000553223

Table 2. Control scale bars.

Digital Elevation Model

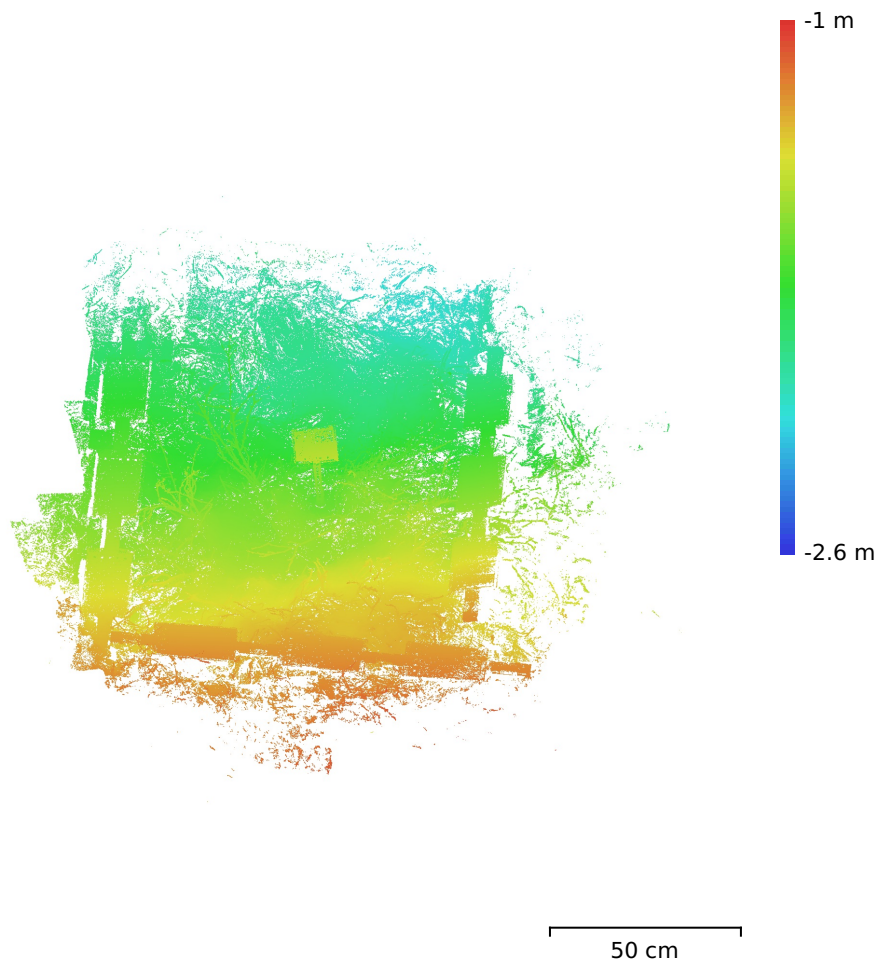


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	79
Aligned cameras	79
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	22,175 of 74,984
RMS reprojection error	0.119267 (0.348531 pix)
Max reprojection error	0.454043 (2.14805 pix)
Mean key point size	2.75652 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.13788

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	35 seconds
Matching memory usage	872.74 MB
Alignment time	14 seconds
Alignment memory usage	361.50 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:28 20:11:51
Software version	2.0.3.16960
File size	4.39 MB

Depth Maps

Count	77
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	5 minutes 11 seconds
Memory usage	12.58 GB
Date created	2023:12:28 20:17:21
Software version	2.0.3.16960
File size	1.18 GB

Point Cloud

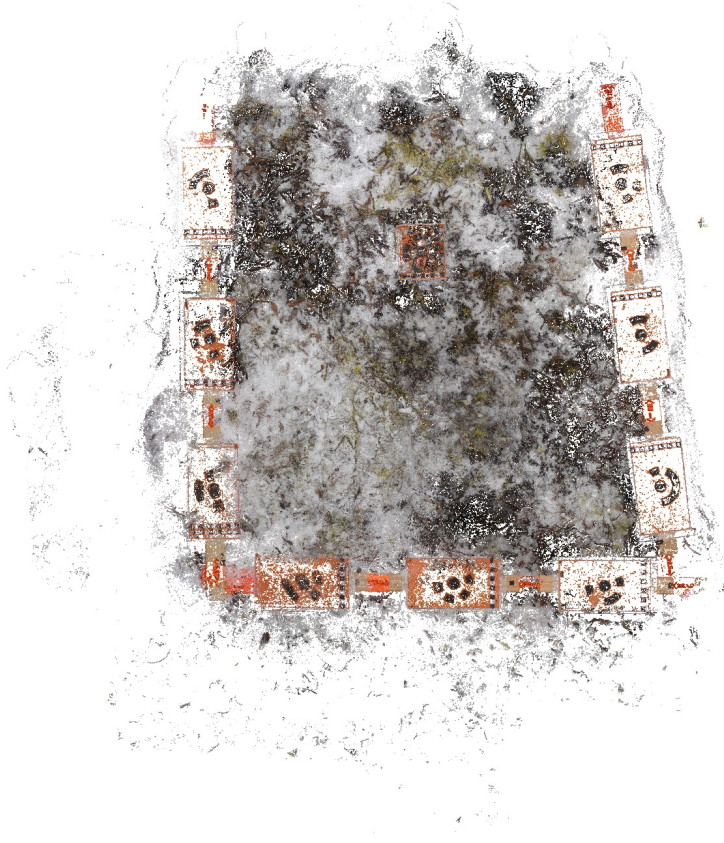
Points	34,038,088
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 10
Point classes	
Created (never classified)	34,038,088
Point cloud generation parameters	
Processing time	11 minutes 26 seconds
Memory usage	21.43 GB
Date created	2023:12:28 20:28:48
Software version	2.0.3.16960
File size	487.63 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

A765-Lumix

Processing Report
29 December 2023



Survey Data

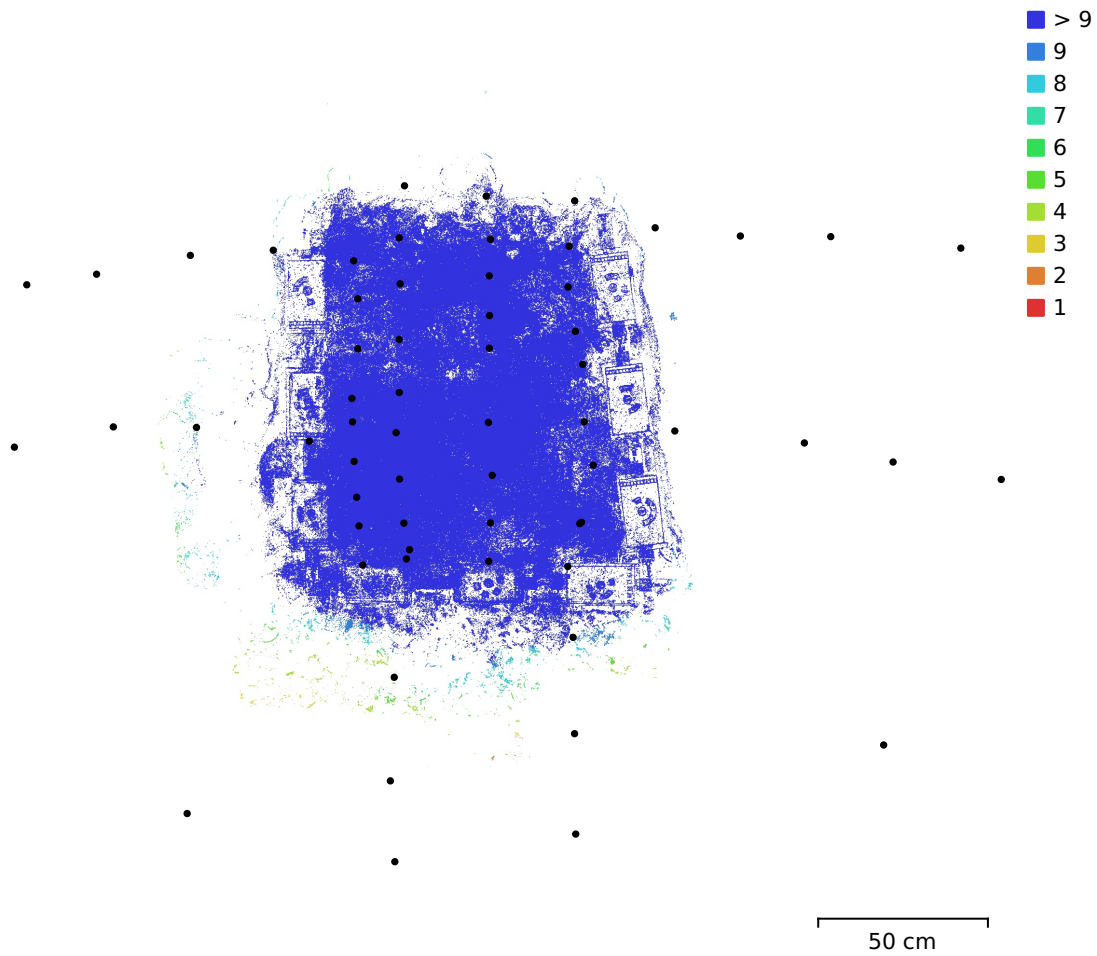


Fig. 1. Camera locations and image overlap.

Number of images:	62	Camera stations:	62
Flying altitude:	61.5 cm	Tie points:	28,308
Ground resolution:	0.12 mm/pix	Projections:	69,010
Coverage area:	1.08 m ²	Reprojection error:	0.581 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
DC-TS7 (6mm)	5184 x 3888	6 mm	1.18 x 1.18 μ m	No

Table 1. Cameras.

Camera Calibration

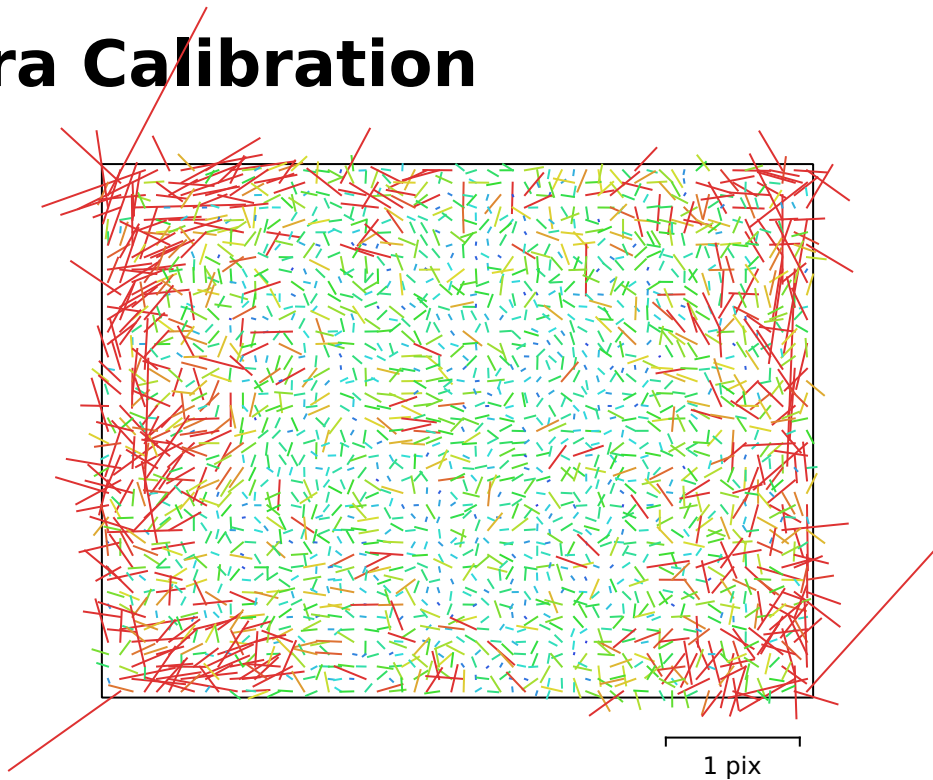


Fig. 2. Image residuals for DC-TS7 (6mm).

DC-TS7 (6mm)

62 images

Type	Resolution	Focal Length	Pixel Size
Frame	5184 x 3888	6 mm	1.18 x 1.18 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	5138.24	1.2	1.00	-0.05	-0.47	0.05	0.04	-0.04	-0.06	-0.21
Cx	-42.5887	1.1		1.00	-0.16	0.01	-0.01	0.00	0.83	-0.04
Cy	-175.102	1.4			1.00	-0.10	0.01	-0.00	-0.14	0.73
K1	-0.0129554	0.00044				1.00	-0.92	0.85	-0.00	-0.16
K2	0.00685452	0.0027					1.00	-0.98	-0.00	0.02
K3	-0.0134961	0.005						1.00	-0.01	-0.01
P1	-0.00141081	5.1e-05							1.00	-0.05
P2	-0.00858473	5.6e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330108	0.000108244
target 2_target 3	0.325966	-0.00403364
target 4_target 5	0.327636	-0.00236405
target 5_target 6	0.33123	0.00122998
target 7_target 8	0.332458	0.00245823
target 8_target 9	0.332493	0.00249333
Total		0.00243732

Table 3. Control scale bars.

Digital Elevation Model

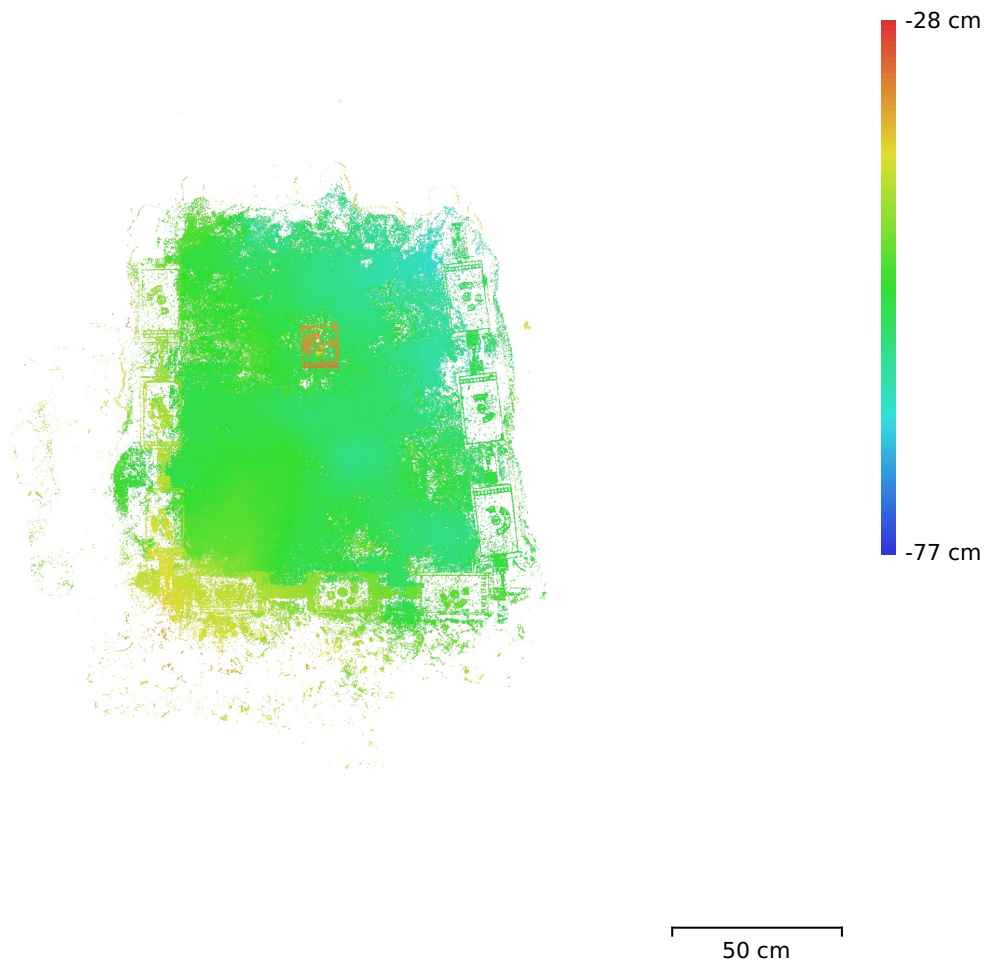


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	62
Aligned cameras	62
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	28,308 of 110,077
RMS reprojection error	0.195273 (0.581377 pix)
Max reprojection error	3.86262 (8.90456 pix)
Mean key point size	2.88779 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.5922

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	31 seconds
Matching memory usage	863.54 MB
Alignment time	13 seconds
Alignment memory usage	227.44 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 16:31:24
Software version	2.0.3.16960
File size	7.49 MB

Depth Maps

Count	60
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 45 seconds
Memory usage	11.11 GB
Date created	2023:12:29 16:36:26
Software version	2.0.3.16960
File size	807.00 MB

Point Cloud

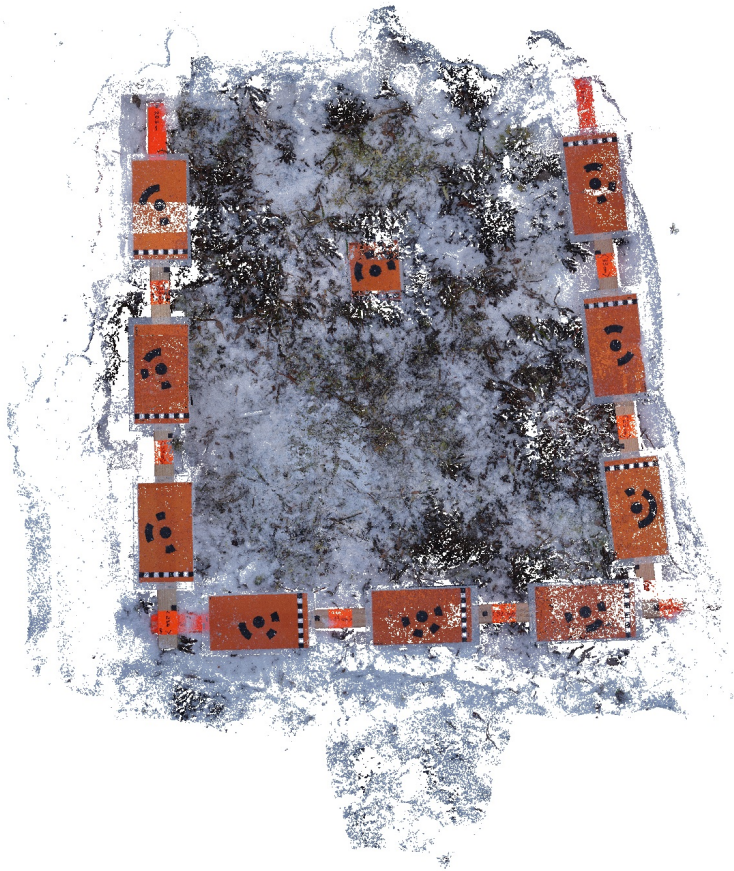
Points	25,102,261
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 15
Point classes	
Created (never classified)	25,102,261
Point cloud generation parameters	
Processing time	6 minutes 57 seconds
Memory usage	17.06 GB
Date created	2023:12:29 16:43:24
Software version	2.0.3.16960
File size	359.55 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

A765-Sony

Processing Report
02 January 2024



Survey Data

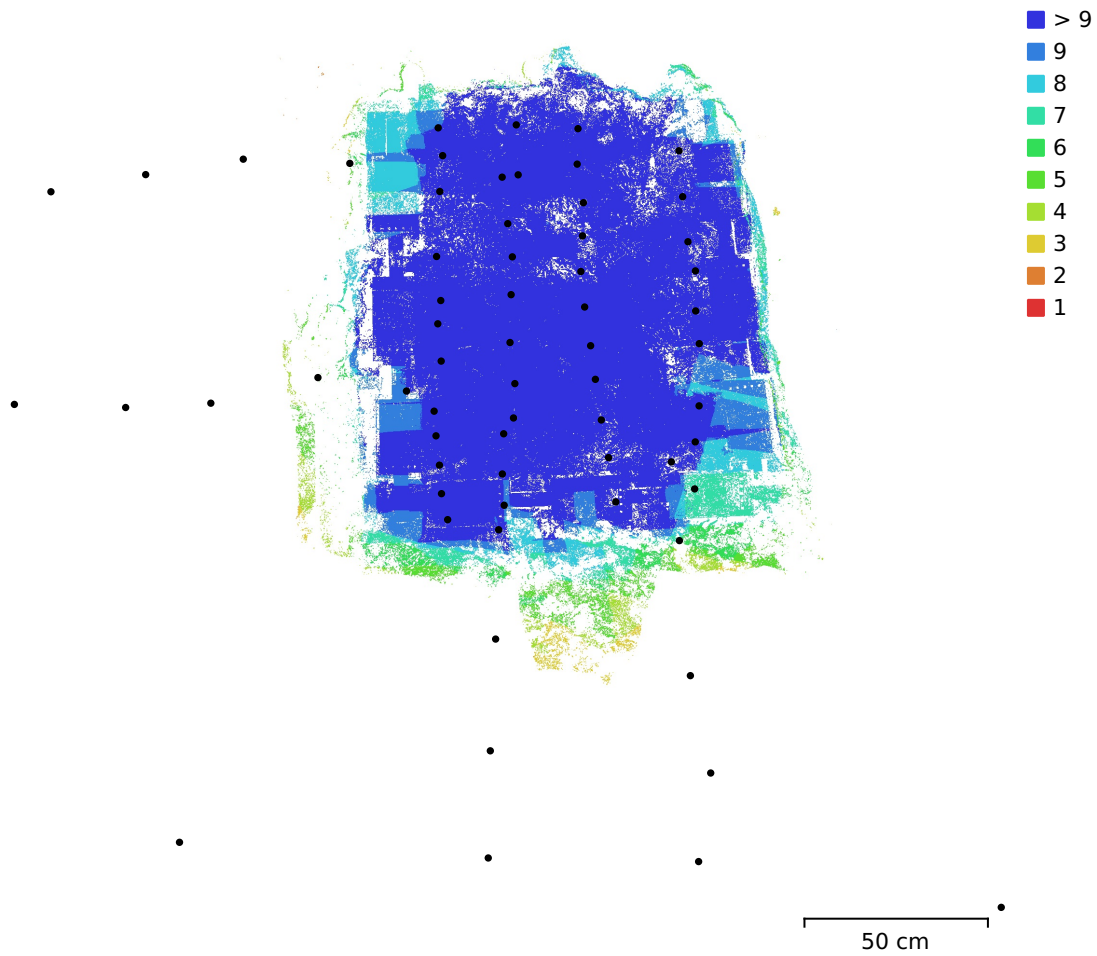


Fig. 1. Camera locations and image overlap.

Number of images:	73	Camera stations:	64
Flying altitude:	48.7 cm	Tie points:	28,381
Ground resolution:	0.0729 mm/pix	Projections:	62,651
Coverage area:	1.27 m ²	Reprojection error:	0.317 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No
ILCE-6000, E PZ...	6000 x 3376	27 mm	4.24 x 4.24 μm	No
ILCE-6000, E PZ...	6000 x 3376	30 mm	4.19 x 4.19 μm	No

Table 1. Cameras.

Camera Calibration

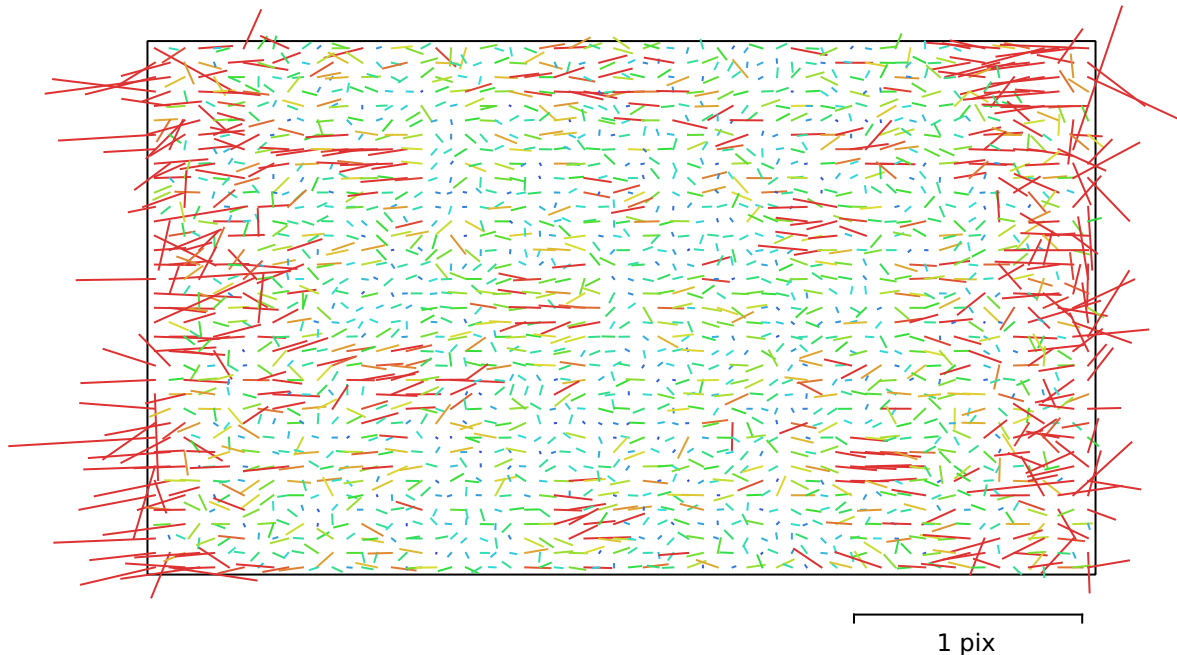


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

45 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm
F:	6681.37		
Cx:	16.1453	B1:	0
Cy:	19.5705	B2:	0
K1:	-0.00488132	P1:	0.00139946
K2:	0.0245913	P2:	-2.18334e-05
K3:	0.0131532	P3:	0
K4:	0	P4:	0

Camera Calibration

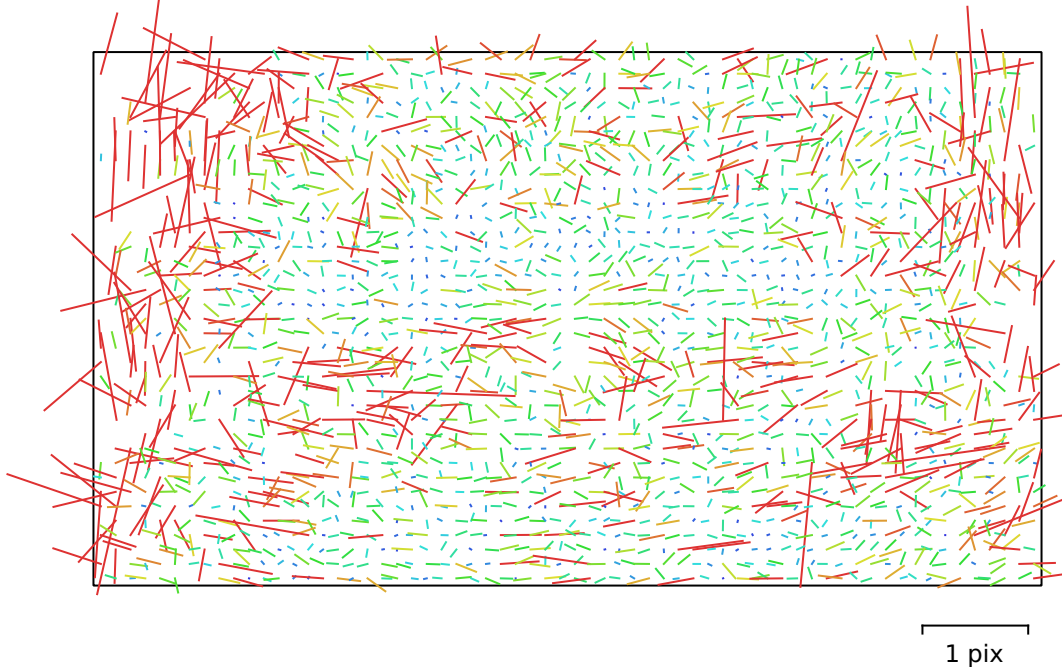


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (27mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (27mm)

27 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	27 mm	4.24 x 4.24 μm
F:	7096.47		
Cx:	32.4036	B1:	0
Cy:	-7.17183	B2:	0
K1:	-0.00121575	P1:	0.00195672
K2:	0.0103395	P2:	-0.00168034
K3:	0.0526864	P3:	0
K4:	0	P4:	0

Camera Calibration

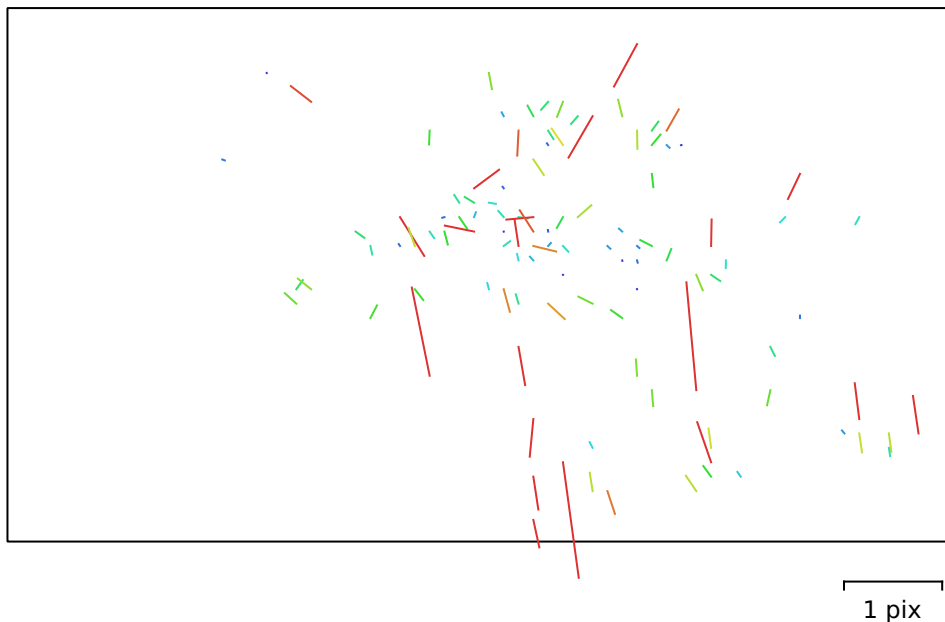


Fig. 4. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (30mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (30mm)

1 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	30 mm	4.19 x 4.19 μm
F:	7706.59		
Cx:	136.21	B1:	0
Cy:	-30.8791	B2:	0
K1:	0.0147054	P1:	0.00673673
K2:	-0.228008	P2:	-0.0035109
K3:	0.980114	P3:	0
K4:	0	P4:	0

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330154	0.00015364
target 2_target 3	0.329857	-0.000143354
target 4_target 5	0.330305	0.000304941
target 5_target 6	0.330143	0.000142725
target 7_target 9	0.659771	-0.000229304
Total		0.000204986

Table 2. Control scale bars.

Digital Elevation Model

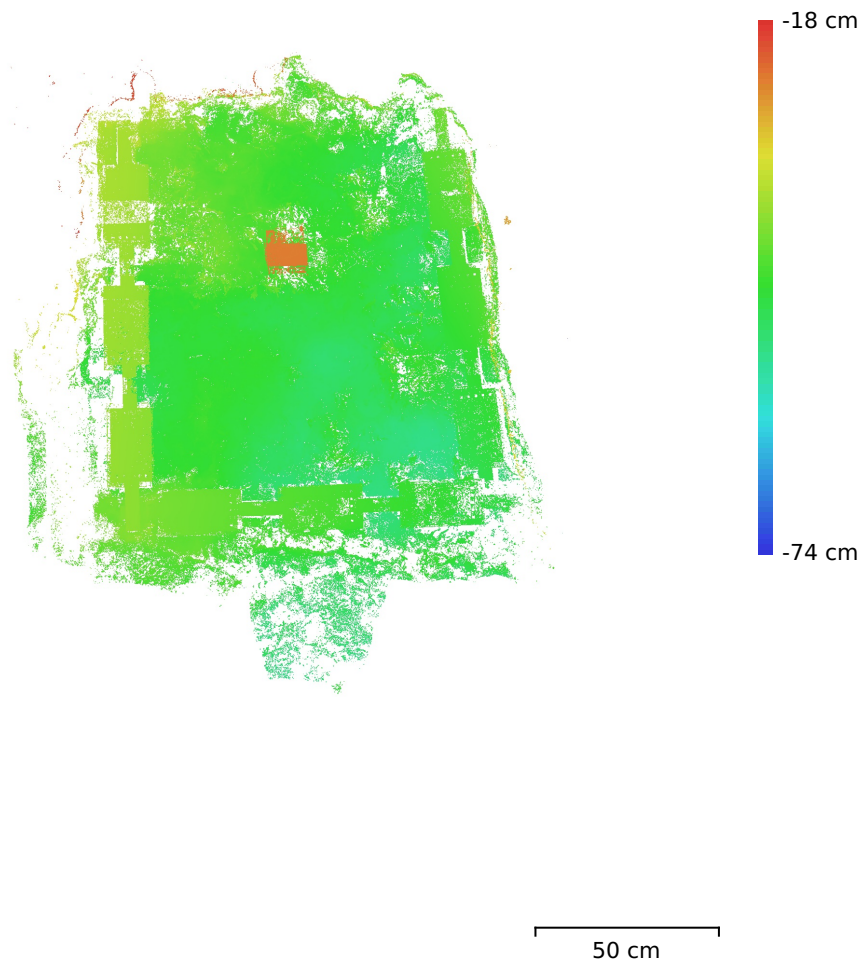


Fig. 5. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	73
Aligned cameras	64
Markers	10
Scale bars	7
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	28,381 of 108,725
RMS reprojection error	0.114719 (0.317143 pix)
Max reprojection error	0.408398 (2.56631 pix)
Mean key point size	2.67512 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.20269

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	31 seconds
Matching memory usage	876.59 MB
Alignment time	18 seconds
Alignment memory usage	197.48 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 16:53:22
Software version	2.0.3.16960
File size	4.62 MB

Depth Maps

Count	63
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 28 seconds
Memory usage	11.39 GB
Date created	2023:12:29 16:58:13
Software version	2.0.3.16960
File size	1.10 GB

Point Cloud

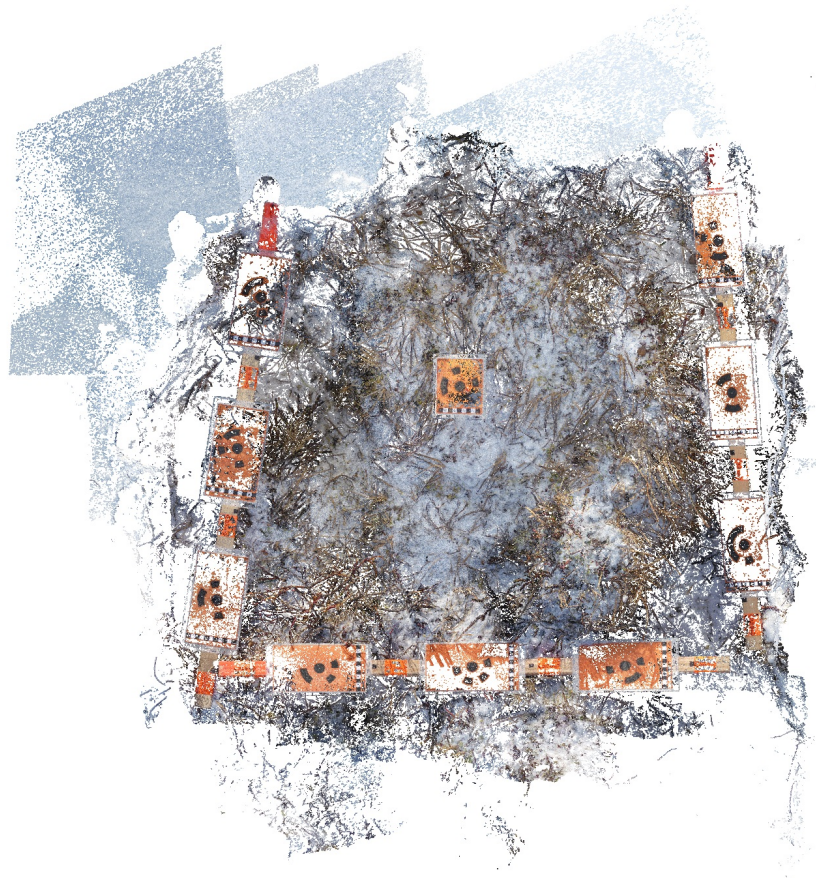
Points	28,826,562
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 12
Point classes	
Created (never classified)	28,826,562
Point cloud generation parameters	
Processing time	9 minutes 40 seconds
Memory usage	17.41 GB
Date created	2023:12:29 17:07:55
Software version	2.0.3.16960
File size	411.55 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

A766-Lumix

Processing Report
29 December 2023



Survey Data

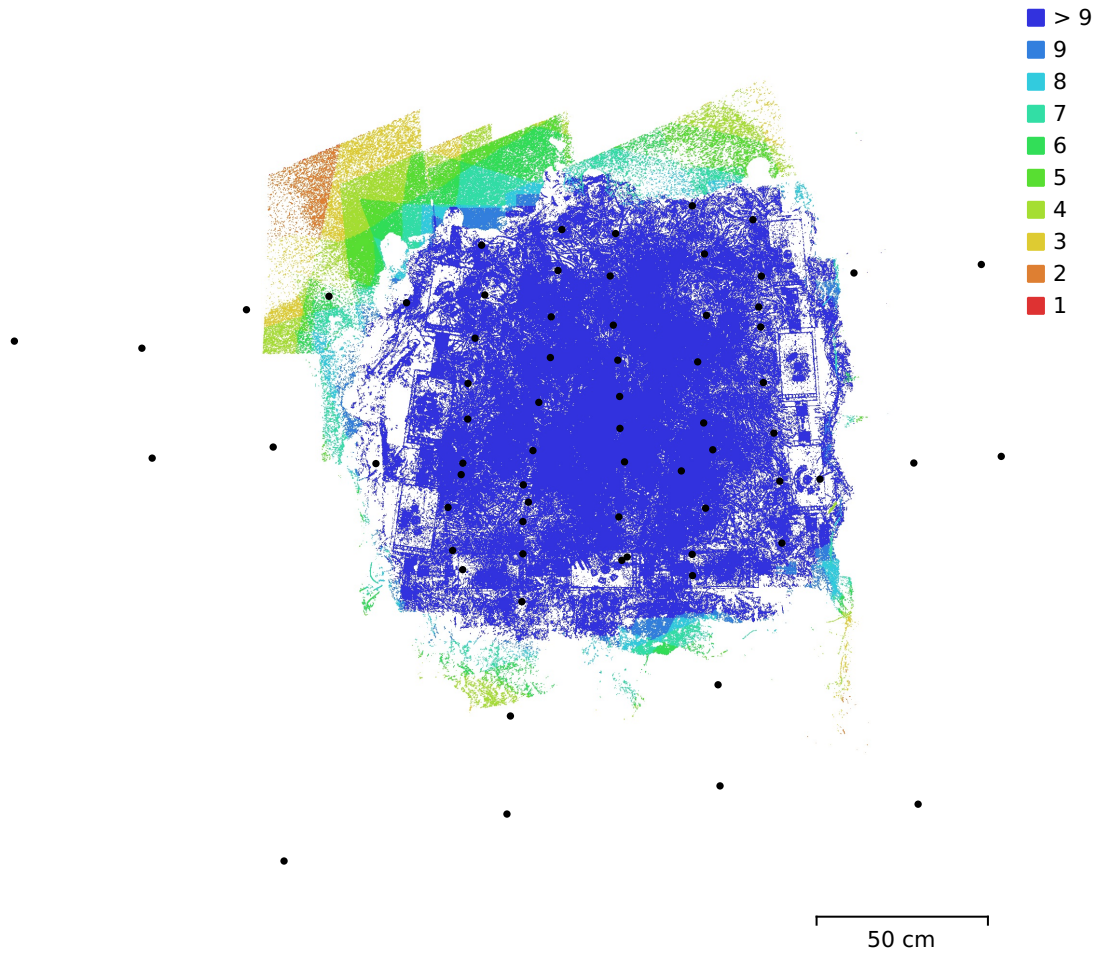


Fig. 1. Camera locations and image overlap.

Number of images:	68	Camera stations:	68
Flying altitude:	52.8 cm	Tie points:	19,459
Ground resolution:	0.103 mm/pix	Projections:	45,715
Coverage area:	1.57 m ²	Reprojection error:	0.404 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
DC-TS7 (6mm)	5184 x 3888	6 mm	1.18 x 1.18 μ m	No

Table 1. Cameras.

Camera Calibration

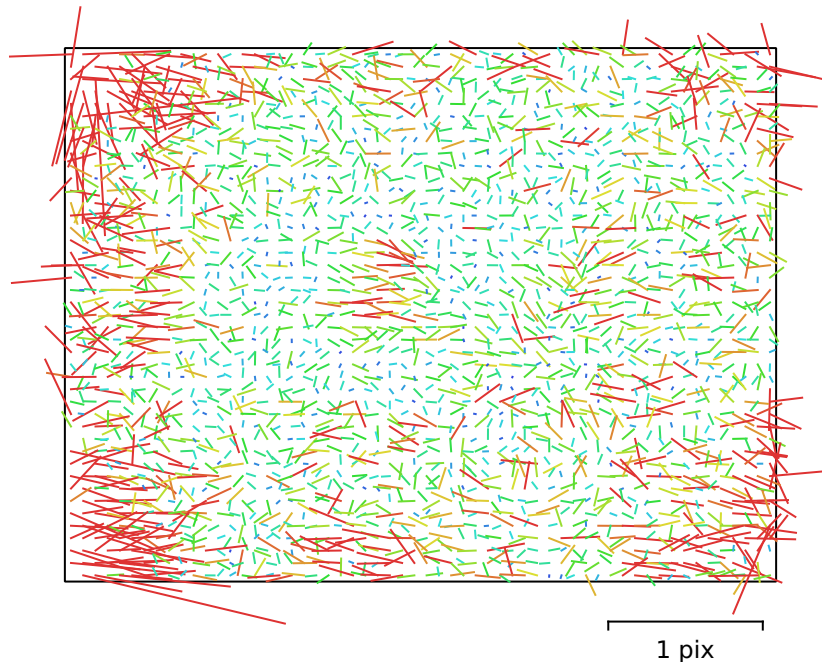


Fig. 2. Image residuals for DC-TS7 (6mm).

DC-TS7 (6mm)

68 images

Type	Resolution	Focal Length	Pixel Size
Frame	5184 x 3888	6 mm	1.18 x 1.18 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	5139.84	0.41	1.00	-0.08	-0.34	-0.07	0.15	-0.14	-0.08	-0.07
Cx	-43.0761	0.4		1.00	0.03	-0.04	0.03	-0.04	0.80	-0.04
Cy	-59.5283	0.45			1.00	-0.05	-0.00	0.01	-0.02	0.73
K1	-0.0150737	0.00025				1.00	-0.95	0.89	-0.04	-0.06
K2	0.0197501	0.0016					1.00	-0.98	0.03	0.01
K3	-0.0464396	0.0029						1.00	-0.04	-0.01
P1	-0.00170191	1.9e-05							1.00	-0.06
P2	-0.0021361	2e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.3302	0.000200062
target 2_target 3	0.330121	0.000121116
target 4_target 5	0.329999	-8.55269e-07
target 5_target 6	0.329842	-0.000157802
target 7_target 8	0.330056	5.60158e-05
target 8_target 9	0.329781	-0.000218979
Total		0.000147584

Table 3. Control scale bars.

Digital Elevation Model

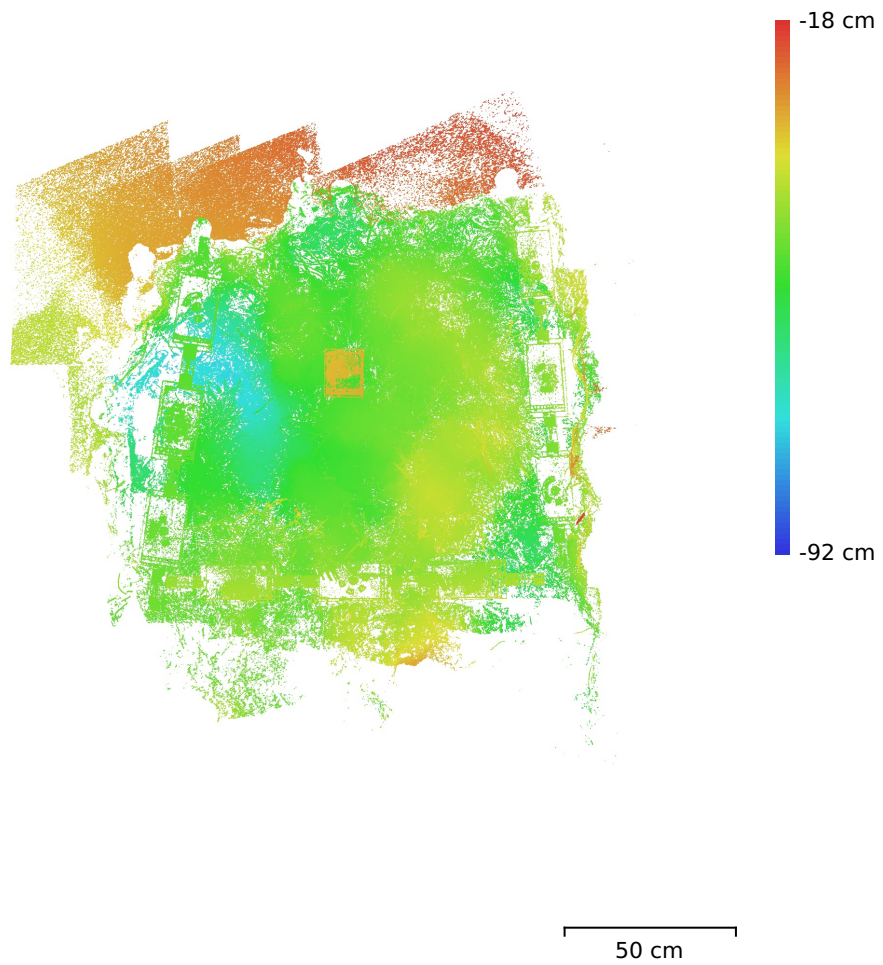


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	68
Aligned cameras	68
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	19,459 of 87,432
RMS reprojection error	0.137084 (0.404365 pix)
Max reprojection error	0.388988 (2.0566 pix)
Mean key point size	2.8468 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.33465

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	30 seconds
Matching memory usage	877.30 MB
Alignment time	10 seconds
Alignment memory usage	176.02 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 15:37:54
Software version	2.0.3.16960
File size	5.37 MB

Depth Maps

Count	65
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	5 minutes 7 seconds
Memory usage	12.08 GB
Date created	2023:12:29 15:43:14
Software version	2.0.3.16960
File size	943.27 MB

Point Cloud

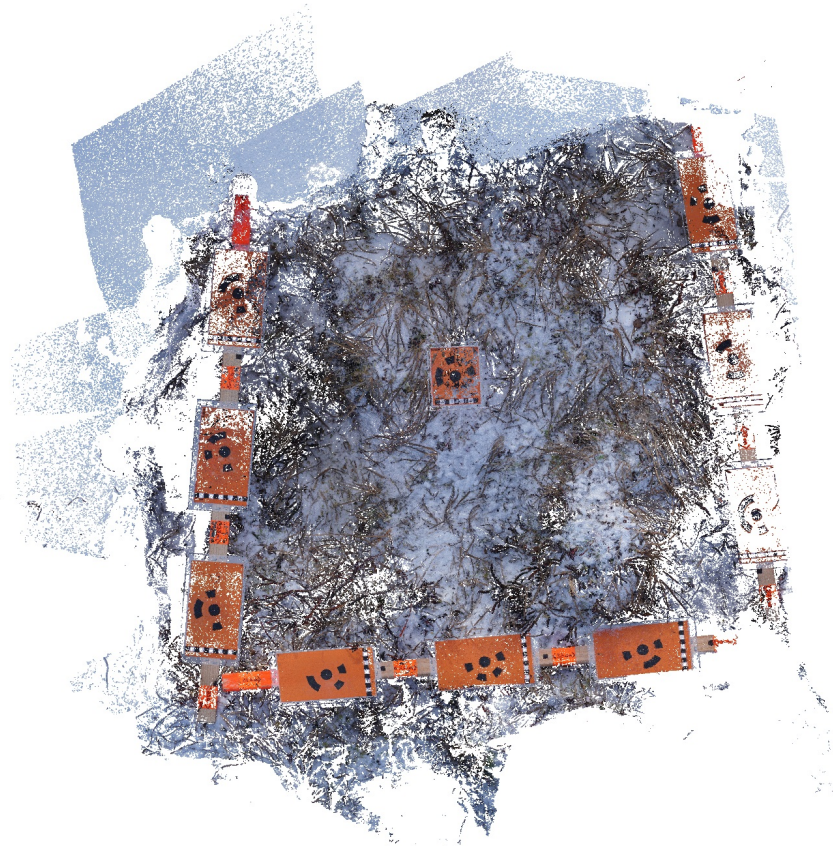
Points	33,532,788
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 17
Point classes	
Created (never classified)	33,532,788
Point cloud generation parameters	
Processing time	8 minutes 34 seconds
Memory usage	18.28 GB
Date created	2023:12:29 15:51:49
Software version	2.0.3.16960
File size	481.58 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

A766-Sony

Processing Report
29 December 2023



Survey Data

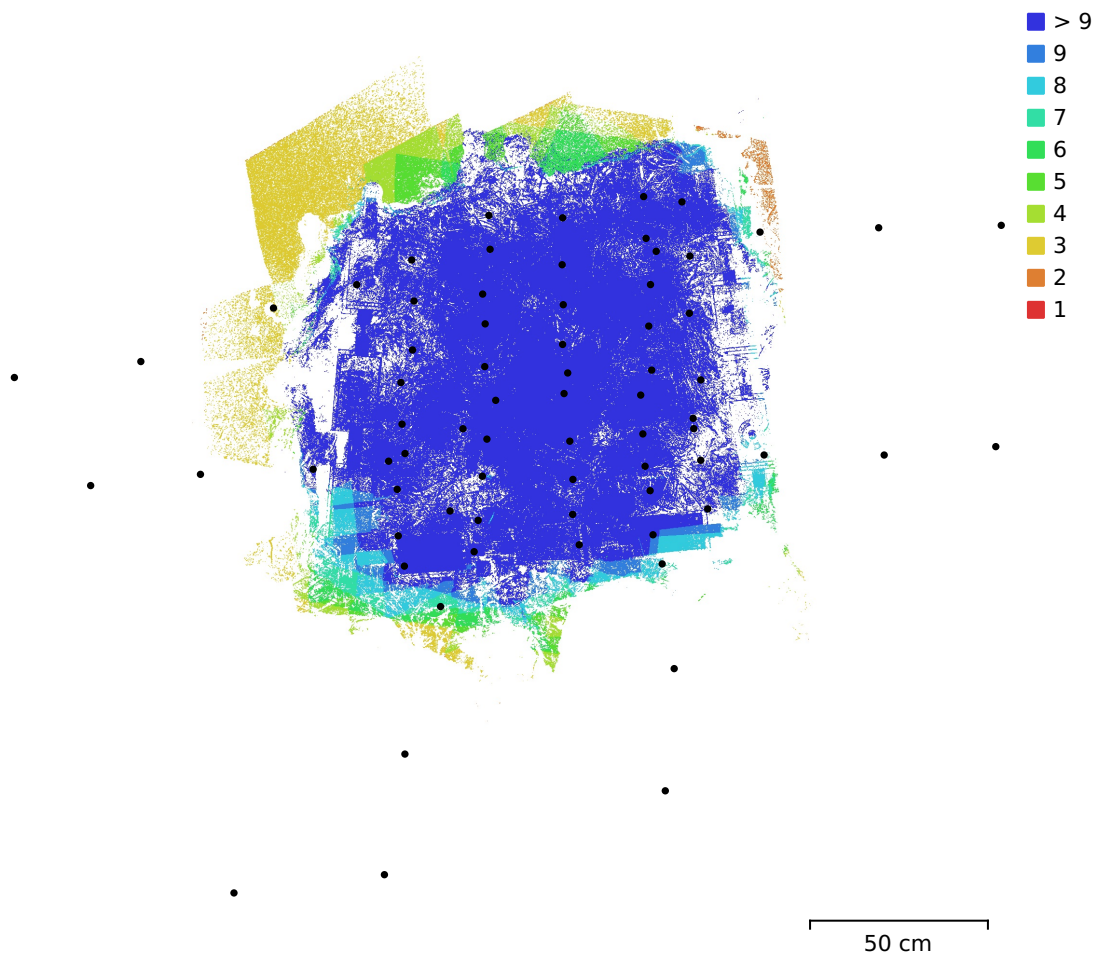


Fig. 1. Camera locations and image overlap.

Number of images:	72	Camera stations:	71
Flying altitude:	50.5 cm	Tie points:	17,196
Ground resolution:	0.0829 mm/pix	Projections:	38,236
Coverage area:	1.42 m ²	Reprojection error:	0.382 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	24 mm	4.19 x 4.19 μm	No

Table 1. Cameras.

Camera Calibration

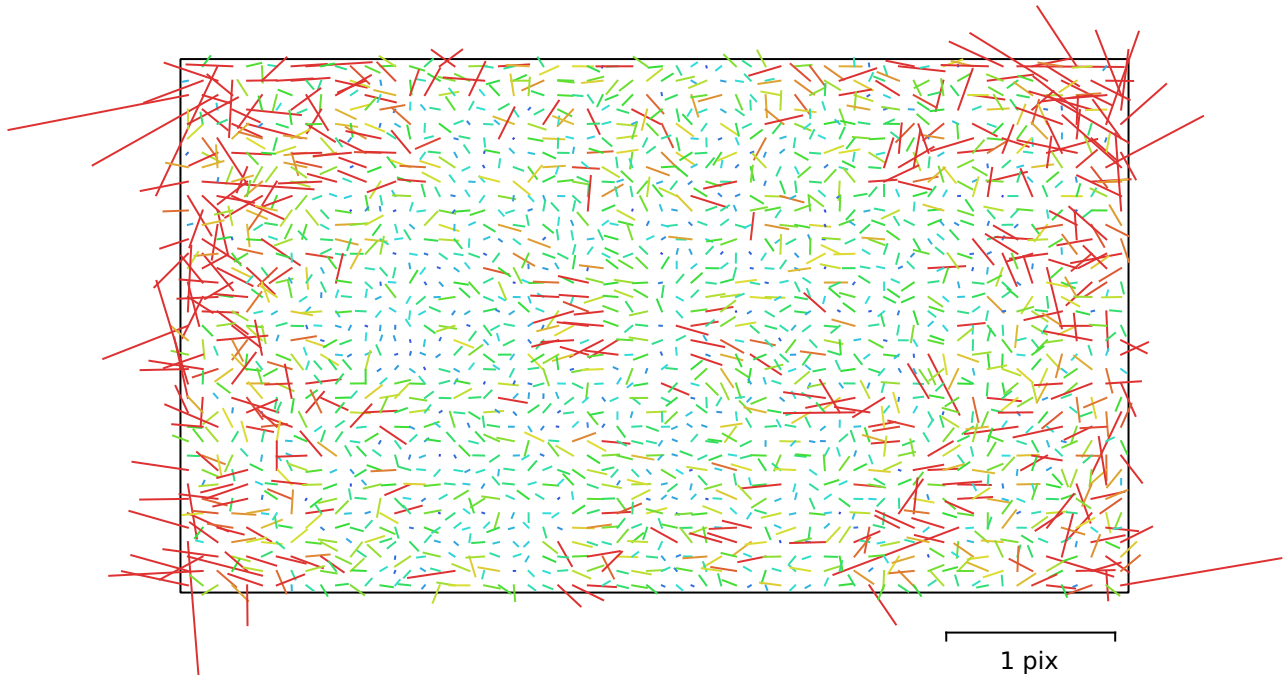


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (24mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (24mm)

72 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	24 mm	4.19 x 4.19 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6094.73	0.7	1.00	-0.07	-0.53	-0.02	0.07	-0.05	-0.07	-0.02
Cx	14.1232	0.59		1.00	0.05	-0.03	0.02	-0.01	0.77	0.04
Cy	14.4064	0.76			1.00	-0.13	0.04	-0.03	0.01	0.56
K1	-0.00904119	0.00037				1.00	-0.94	0.87	-0.03	-0.10
K2	0.028241	0.0028					1.00	-0.98	0.01	0.03
K3	0.0159379	0.0065						1.00	-0.02	-0.02
P1	0.00123491	2.6e-05							1.00	-0.02
P2	0.000545476	2.7e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.329822	-0.000178491
target 2_target 3	0.33	1.3886e-07
target 4_target 5	0.330127	0.000127086
target 5_target 6	0.330051	5.11087e-05
Total		0.000112497

Table 3. Control scale bars.

Digital Elevation Model

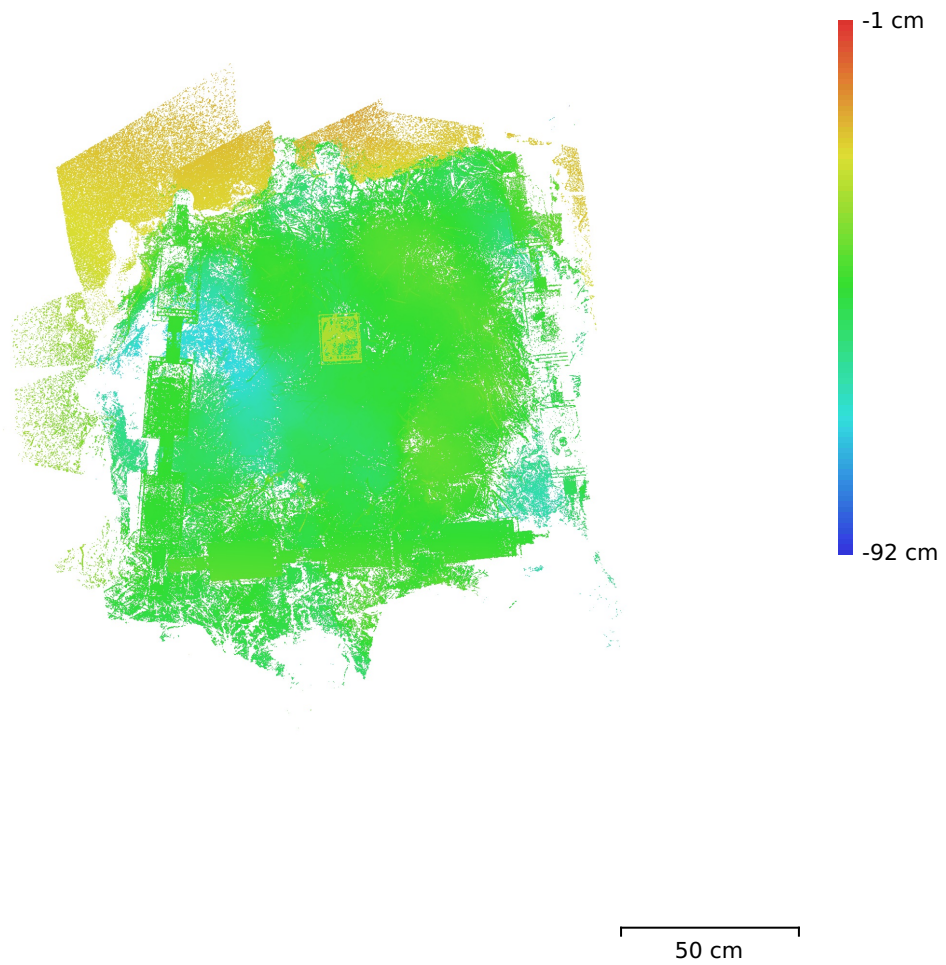


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	72
Aligned cameras	71
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	17,196 of 77,924
RMS reprojection error	0.127665 (0.382381 pix)
Max reprojection error	0.40186 (2.13371 pix)
Mean key point size	2.82865 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.22858

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	31 seconds
Matching memory usage	854.27 MB
Alignment time	9 seconds
Alignment memory usage	157.92 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 15:54:41
Software version	2.0.3.16960
File size	4.59 MB

Depth Maps

Count	69
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 49 seconds
Memory usage	12.12 GB
Date created	2023:12:29 15:59:42
Software version	2.0.3.16960
File size	1.04 GB

Point Cloud

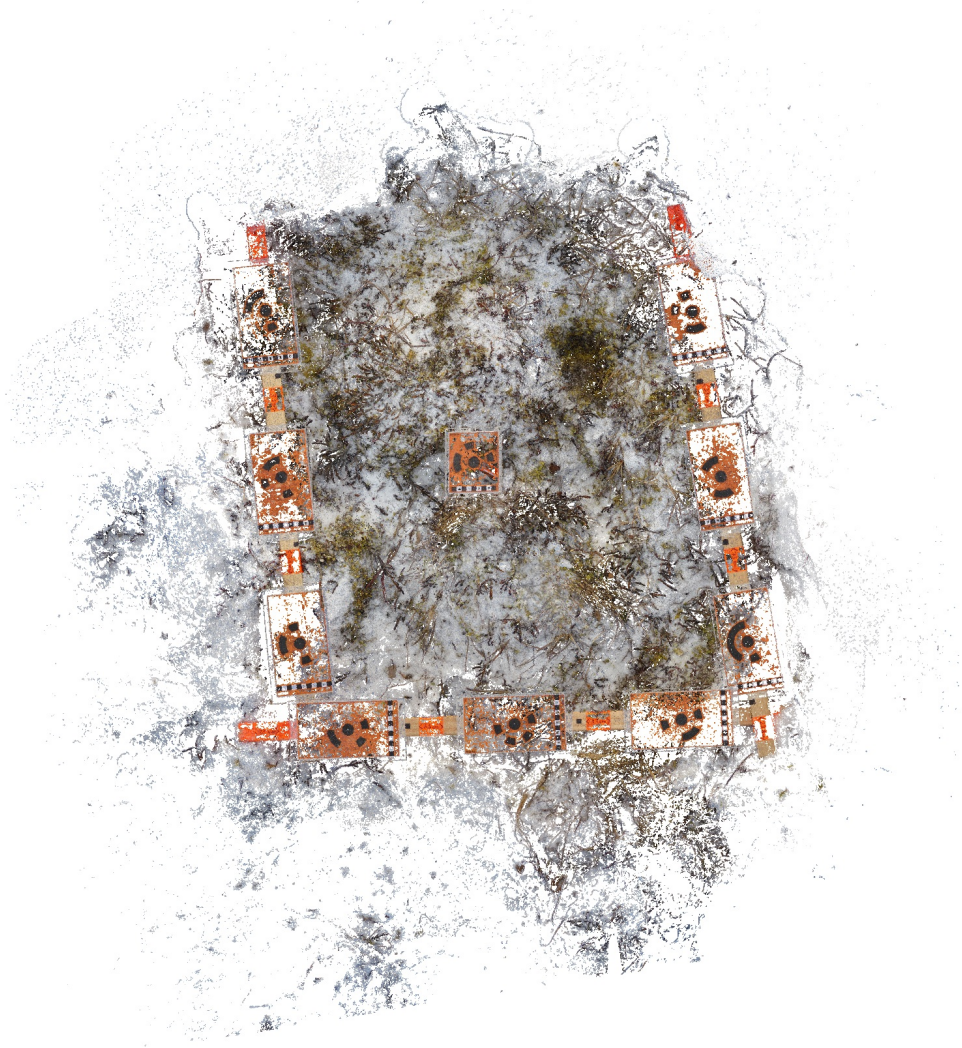
Points	31,753,538
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 12
Point classes	
Created (never classified)	31,753,538
Point cloud generation parameters	
Processing time	10 minutes 33 seconds
Memory usage	19.31 GB
Date created	2023:12:29 16:10:16
Software version	2.0.3.16960
File size	454.89 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

A767-Lumix

Processing Report
28 December 2023



Survey Data

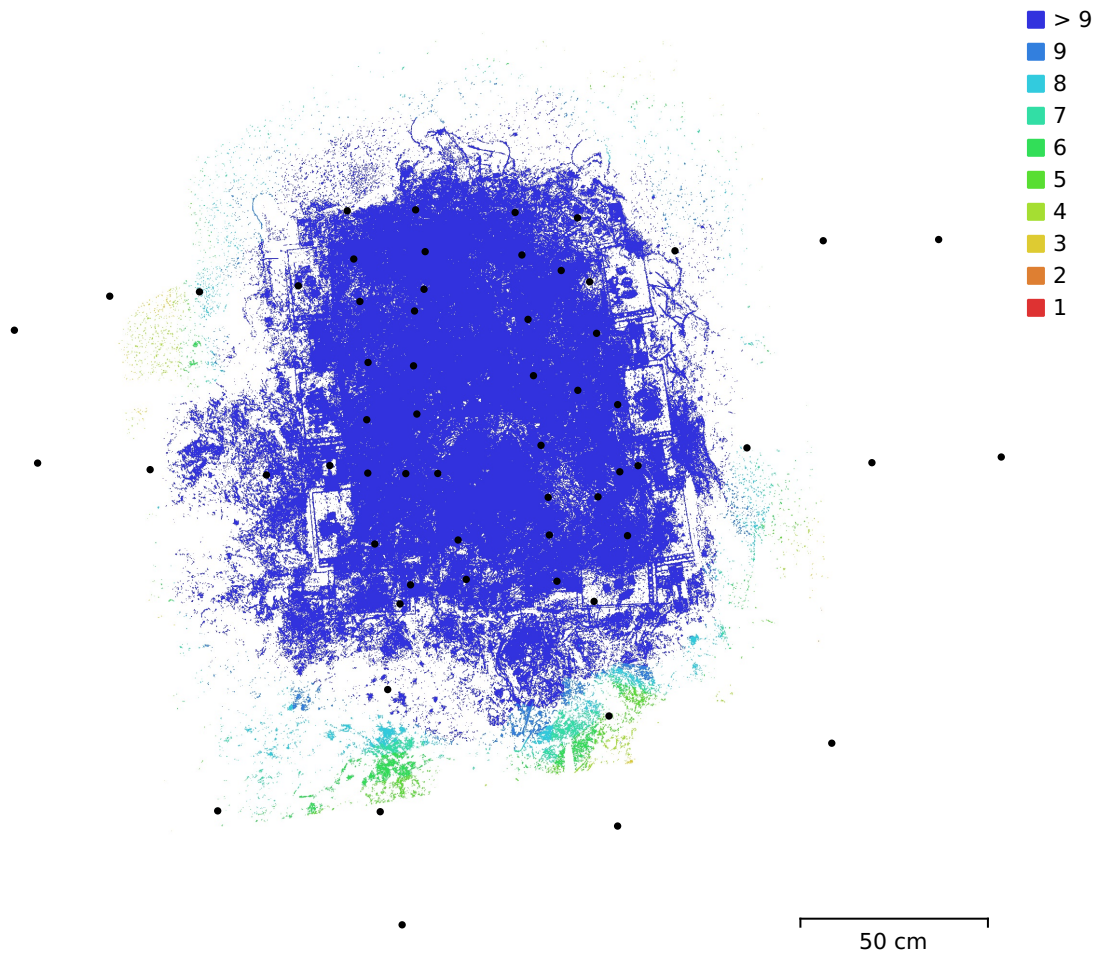


Fig. 1. Camera locations and image overlap.

Number of images:	59	Camera stations:	59
Flying altitude:	49.8 cm	Tie points:	21,090
Ground resolution:	0.116 mm/pix	Projections:	50,174
Coverage area:	1.29 m ²	Reprojection error:	0.387 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
DC-TS7 (4.9mm)	5184 x 3888	4.9 mm	1.17 x 1.17 μ m	No

Table 1. Cameras.

Camera Calibration

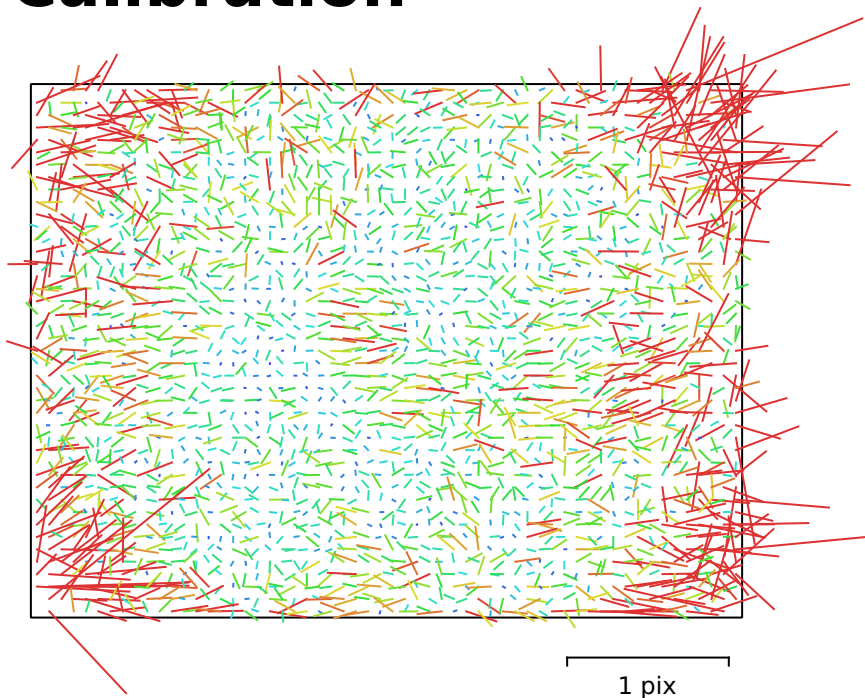


Fig. 2. Image residuals for DC-TS7 (4.9mm).

DC-TS7 (4.9mm)

59 images

Type	Resolution	Focal Length	Pixel Size
Frame	5184 x 3888	4.9 mm	1.17 x 1.17 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	4289.44	0.27	1.00	-0.06	-0.40	-0.03	0.12	-0.12	-0.02	-0.17
Cx	-40.9757	0.25		1.00	-0.02	-0.01	0.02	-0.02	0.85	-0.01
Cy	-60.2212	0.33			1.00	-0.08	0.02	-0.01	-0.03	0.79
K1	-0.0111791	0.00017				1.00	-0.95	0.88	-0.02	-0.07
K2	0.0325001	0.0008					1.00	-0.98	0.03	0.03
K3	-0.0507689	0.0011						1.00	-0.03	-0.02
P1	-0.00193034	1.5e-05							1.00	-0.01
P2	-0.00294087	1.7e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330038	3.83056e-05
target 2_target 3	0.329962	-3.81975e-05
target 4_target 5	0.32997	-3.03124e-05
target 5_target 6	0.330123	0.000123315
target 7_target 8	0.33002	2.03133e-05
target 8_target 9	0.329886	-0.000113525
Total		7.34307e-05

Table 3. Control scale bars.

Digital Elevation Model

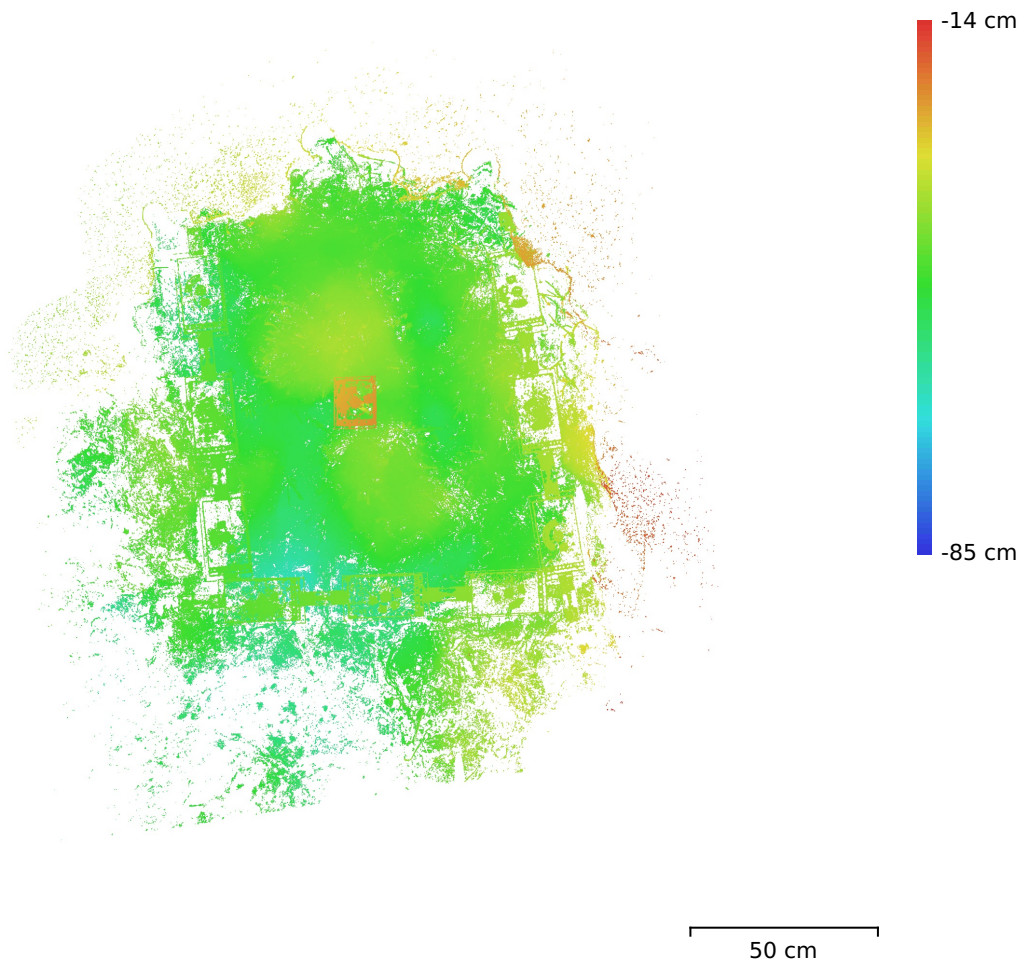


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	59
Aligned cameras	59
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	21,090 of 70,159
RMS reprojection error	0.134735 (0.386691 pix)
Max reprojection error	0.382561 (2.27265 pix)
Mean key point size	2.74306 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.46298

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	27 seconds
Matching memory usage	881.16 MB
Alignment time	6 seconds
Alignment memory usage	122.38 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:28 21:16:32
Software version	2.0.3.16960
File size	4.64 MB

Depth Maps

Count	59
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 54 seconds
Memory usage	12.07 GB
Date created	2023:12:28 21:21:35
Software version	2.0.3.16960
File size	897.71 MB

Point Cloud

Points	30,712,244
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 18
Point classes	
Created (never classified)	30,712,244
Point cloud generation parameters	
Processing time	7 minutes 25 seconds
Memory usage	16.90 GB
Date created	2023:12:28 21:29:02
Software version	2.0.3.16960
File size	440.62 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

A767-Sony

Processing Report
28 December 2023



Survey Data

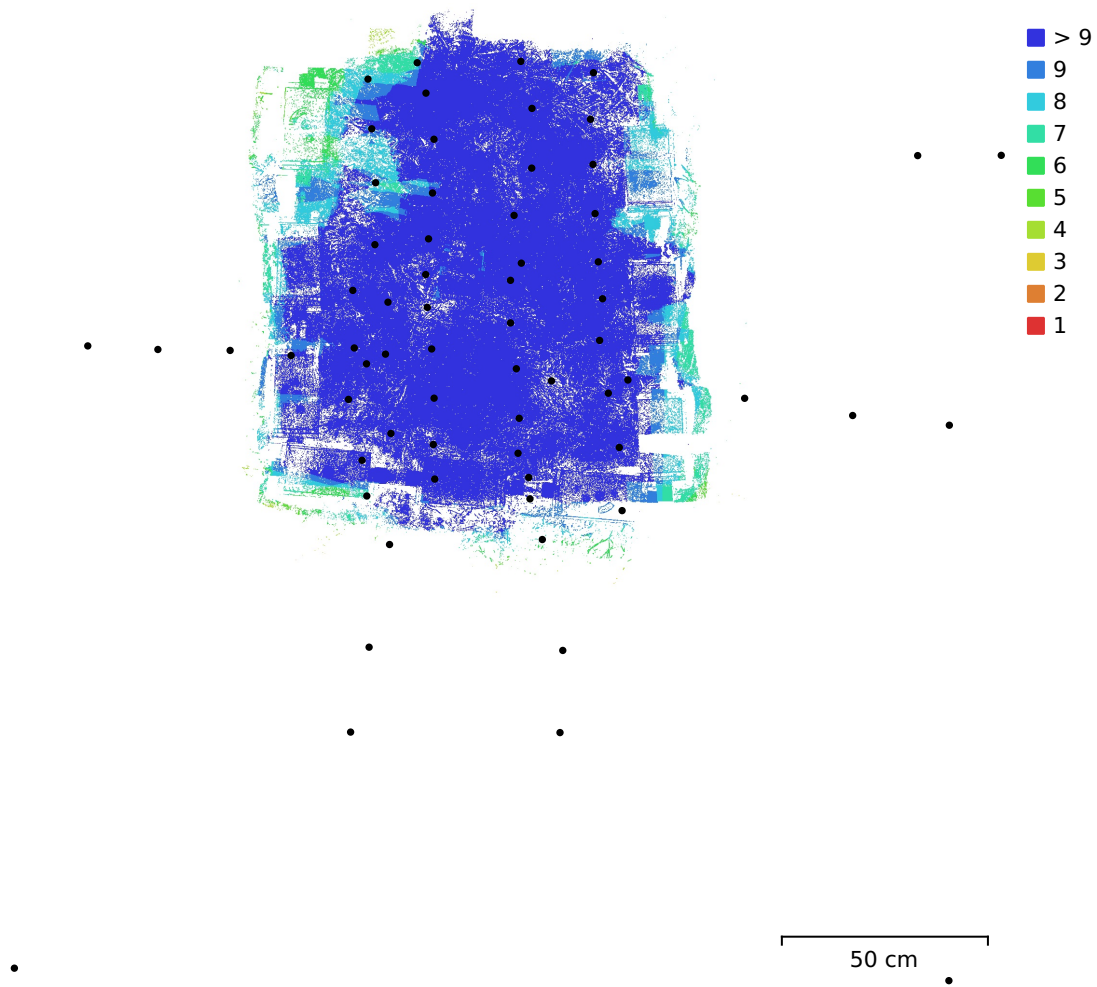


Fig. 1. Camera locations and image overlap.

Number of images:	65	Camera stations:	65
Flying altitude:	45.5 cm	Tie points:	15,698
Ground resolution:	0.0867 mm/pix	Projections:	33,714
Coverage area:	9.08e+03 cm ²	Reprojection error:	0.41 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	32 mm	4.19 x 4.19 μm	No
ILCE-6000, E PZ...	6000 x 3376	35 mm	4.23 x 4.23 μm	No
ILCE-6000, E PZ...	6000 x 3376	20 mm	4.19 x 4.19 μm	No
ILCE-6000, E PZ...	6000 x 3376	31 mm	4.24 x 4.24 μm	No

Table 1. Cameras.

Camera Calibration

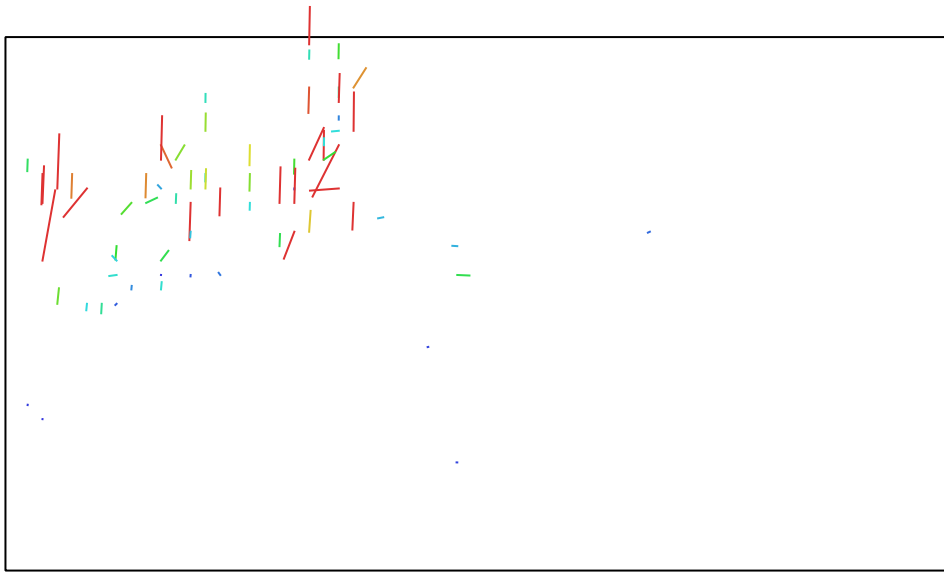


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (32mm). ┌
1 pix

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (32mm)

2 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	32 mm	4.19 x 4.19 μm
F:	9328.39		
Cx:	149.873	B1:	0
Cy:	-1651.85	B2:	0
K1:	0.0109851	P1:	0.0186361
K2:	0.887201	P2:	-0.0422582
K3:	-3.25049	P3:	0
K4:	0	P4:	0

Camera Calibration

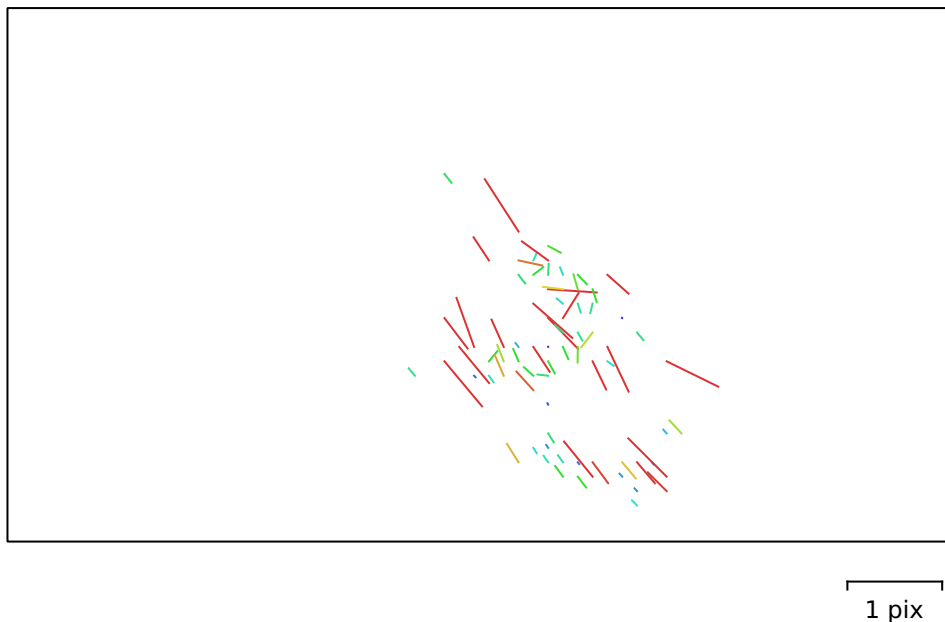


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (35mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (35mm)

2 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	35 mm	4.23 x 4.23 μm
F:	8724.24		
Cx:	-1168.74	B1:	0
Cy:	654.601	B2:	0
K1:	0.269735	P1:	-0.0486581
K2:	-2.39575	P2:	0.00554324
K3:	7.03254	P3:	0
K4:	0	P4:	0

Camera Calibration

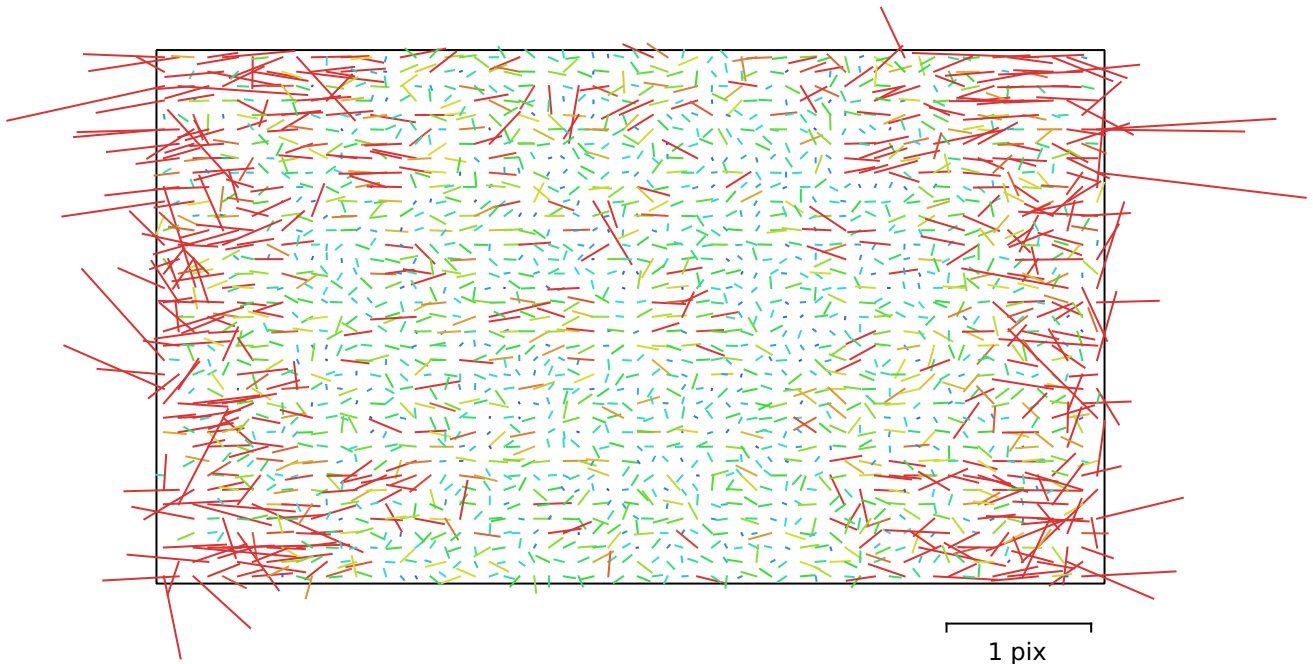


Fig. 4. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (20mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (20mm)

41 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	20 mm	4.19 x 4.19 μm
F:	5230.74		
Cx:	-56.7863	B1:	0
Cy:	143.416	B2:	0
K1:	-0.0146644	P1:	-0.00287189
K2:	0.0403382	P2:	0.0052805
K3:	-0.0156734	P3:	0
K4:	0	P4:	0

Camera Calibration

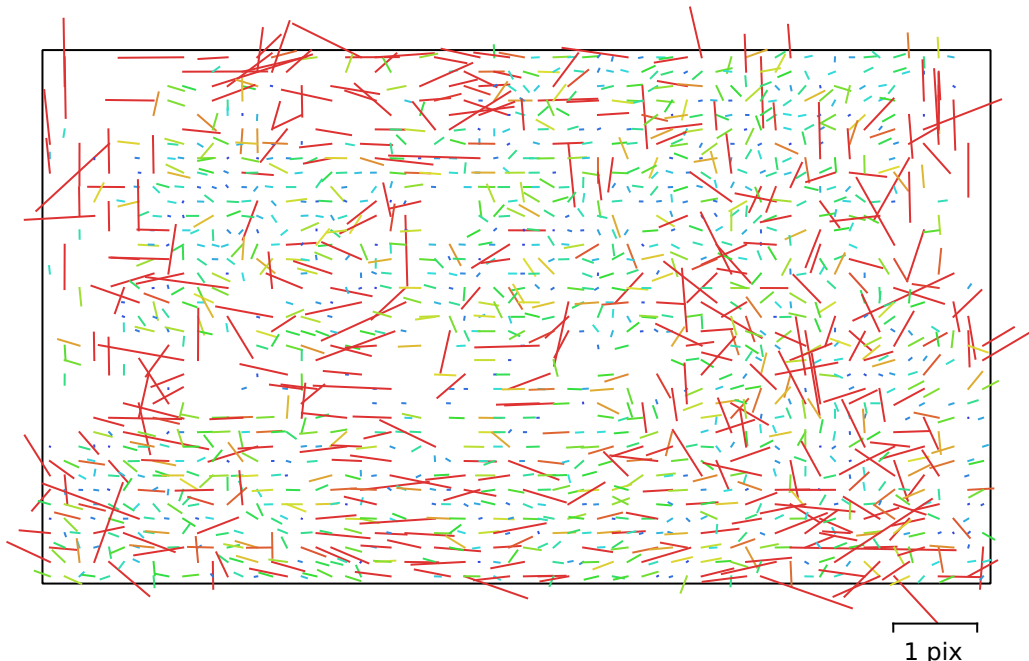


Fig. 5. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (31mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (31mm)

20 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	31 mm	4.24 x 4.24 μm
F:	7965.86		
Cx:	7.99634	B1:	0
Cy:	-87.4633	B2:	0
K1:	0.00631652	P1:	-0.000399668
K2:	0.0505711	P2:	-0.0026838
K3:	-0.133379	P3:	0
K4:	0	P4:	0

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330279	0.00027864
target 2_target 3	0.331494	0.00149415
target 4_target 5	0.332734	0.0027342
target 5_target 6	0.329294	-0.00070627
target 8_target 9	0.326122	-0.00387758
Total		0.00225035

Table 2. Control scale bars.

Digital Elevation Model

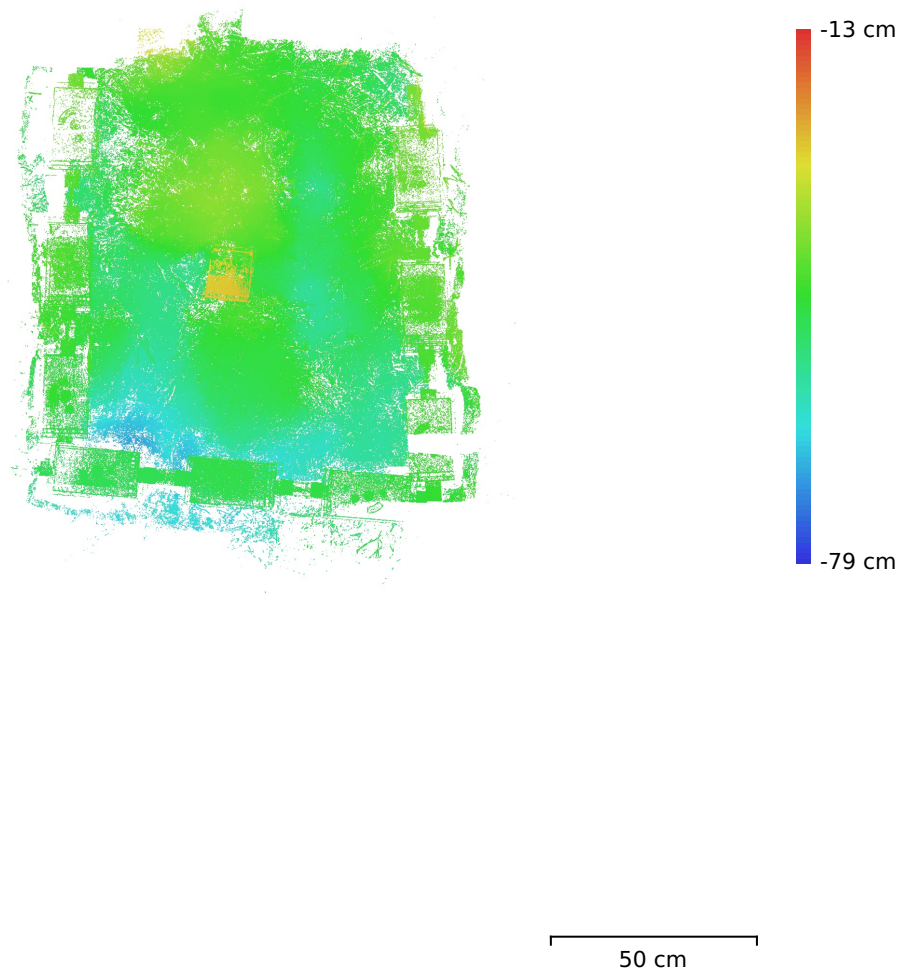


Fig. 6. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	65
Aligned cameras	65
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	15,698 of 75,996
RMS reprojection error	0.132939 (0.409991 pix)
Max reprojection error	0.583303 (2.47435 pix)
Mean key point size	2.89262 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.25047

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	29 seconds
Matching memory usage	880.56 MB
Alignment time	16 seconds
Alignment memory usage	161.39 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:28 21:31:36
Software version	2.0.3.16960
File size	4.49 MB

Depth Maps

Count	57
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	3 minutes 45 seconds
Memory usage	10.28 GB
Date created	2023:12:28 21:35:41
Software version	2.0.3.16960
File size	807.17 MB

Point Cloud

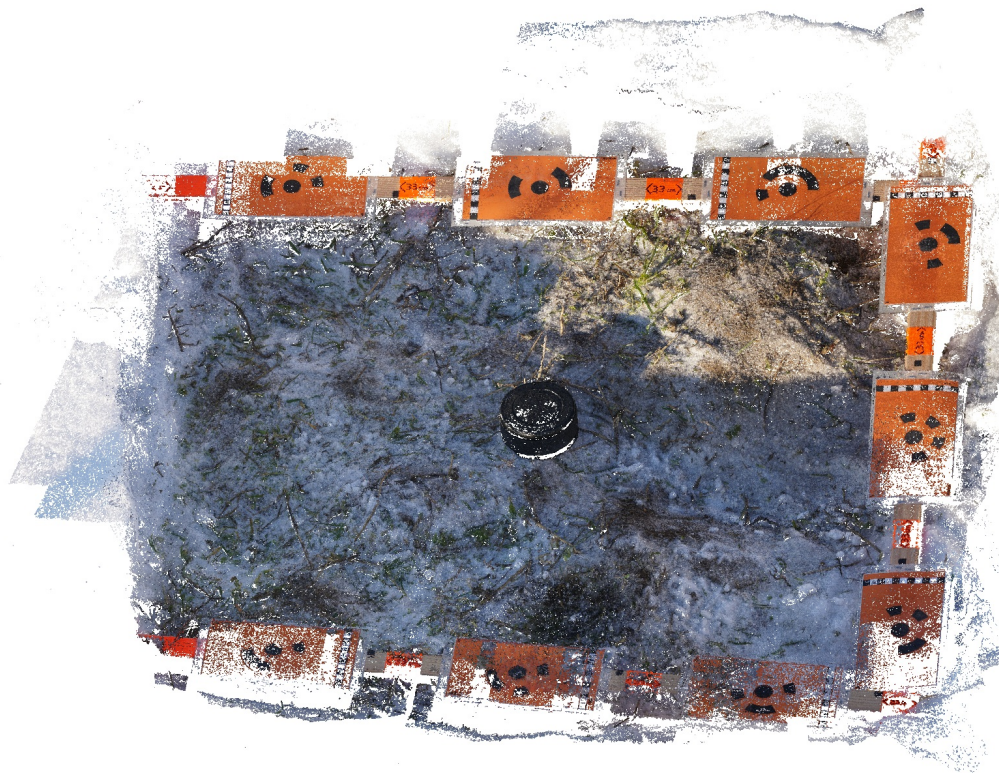
Points	23,732,951
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 8
Point classes	
Created (never classified)	23,732,951
Point cloud generation parameters	
Processing time	7 minutes 13 seconds
Memory usage	15.48 GB
Date created	2023:12:28 21:42:54
Software version	2.0.3.16960
File size	338.23 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

CB068-Sony

Processing Report
02 January 2024



Survey Data

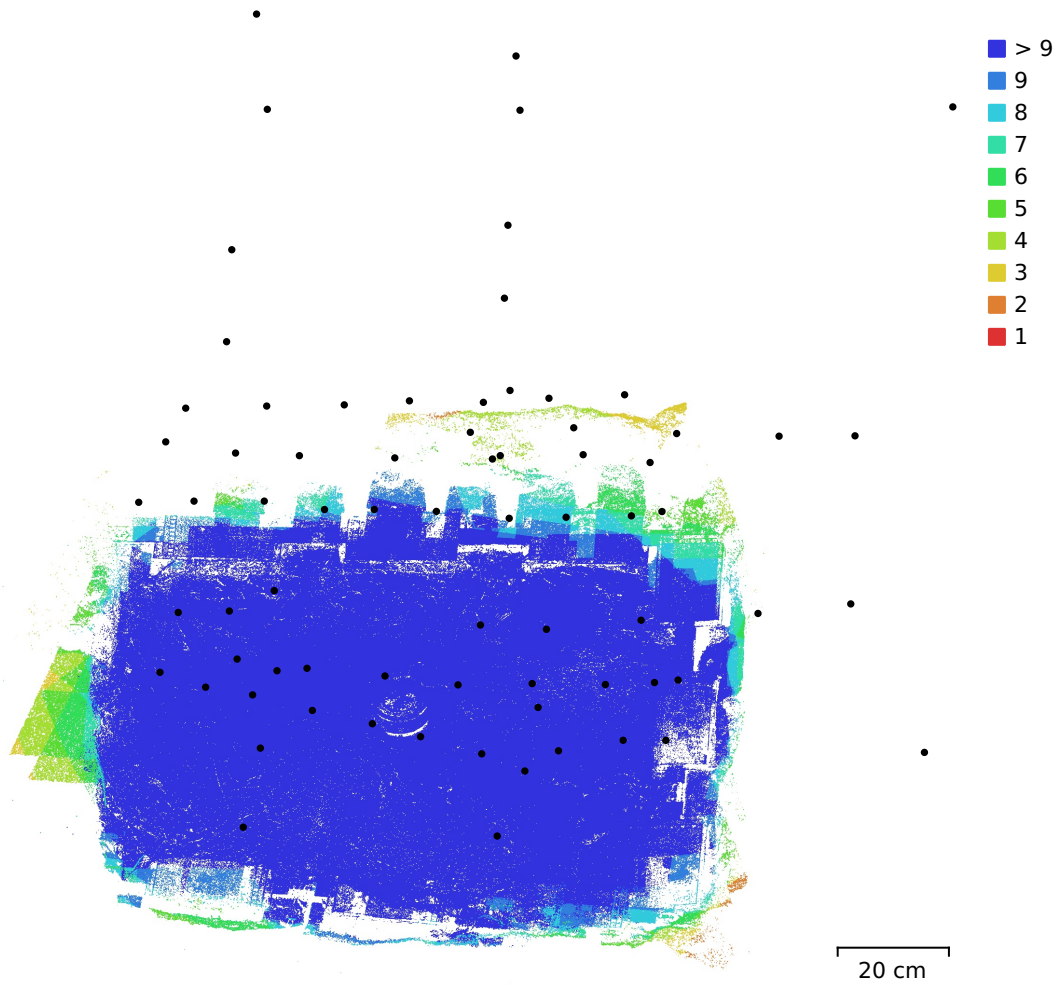


Fig. 1. Camera locations and image overlap.

Number of images:	73	Camera stations:	73
Flying altitude:	48.6 cm	Tie points:	37,166
Ground resolution:	0.0755 mm/pix	Projections:	85,611
Coverage area:	7.97e+03 cm ²	Reprojection error:	0.425 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

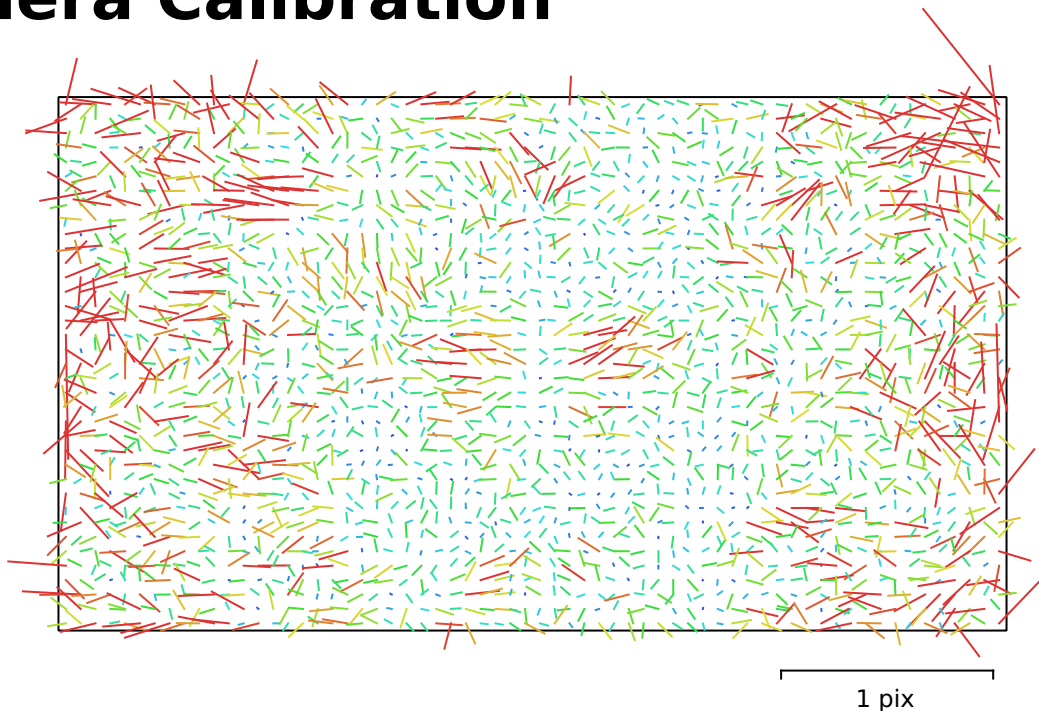


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

73 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6444.4	0.62	1.00	0.12	-0.39	-0.03	0.08	-0.06	0.16	0.11
Cx	33.9508	0.43		1.00	-0.08	-0.03	0.02	-0.01	0.90	-0.10
Cy	22.2857	0.5			1.00	-0.02	-0.04	0.03	-0.02	0.66
K1	-0.0102857	0.00027				1.00	-0.95	0.88	-0.02	-0.03
K2	0.114122	0.0024					1.00	-0.98	0.02	-0.01
K3	-0.174917	0.0062						1.00	-0.01	0.00
P1	0.00269591	2e-05							1.00	0.00
P2	0.000710735	1.8e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.326679	-0.00332086
target 2_target 3	0.329216	-0.000784103
target 4_target 6	0.661019	0.00101863
target 7_target 9	0.661013	0.001013
Total		0.00185113

Table 3. Control scale bars.

Digital Elevation Model

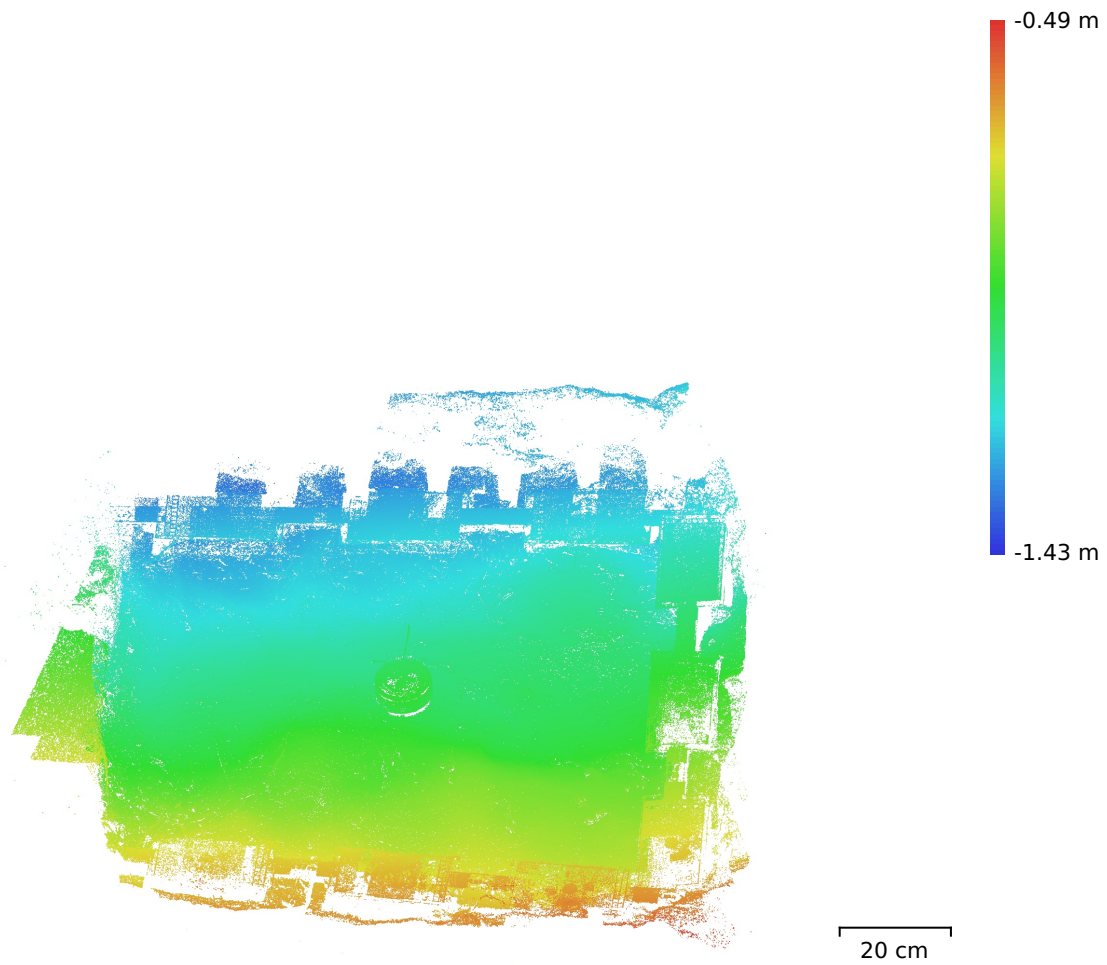


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	73
Aligned cameras	73
Markers	8
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	37,166 of 145,767
RMS reprojection error	0.141675 (0.424743 pix)
Max reprojection error	1.29579 (5.03973 pix)
Mean key point size	2.82564 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.34487

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	42 seconds
Matching memory usage	856.10 MB
Alignment time	16 seconds
Alignment memory usage	241.90 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 19:53:52
Software version	2.0.3.16960
File size	6.49 MB

Depth Maps

Count	73
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	6 minutes 1 seconds
Memory usage	14.70 GB
Date created	2023:12:29 20:00:12
Software version	2.0.3.16960
File size	1.48 GB

Point Cloud

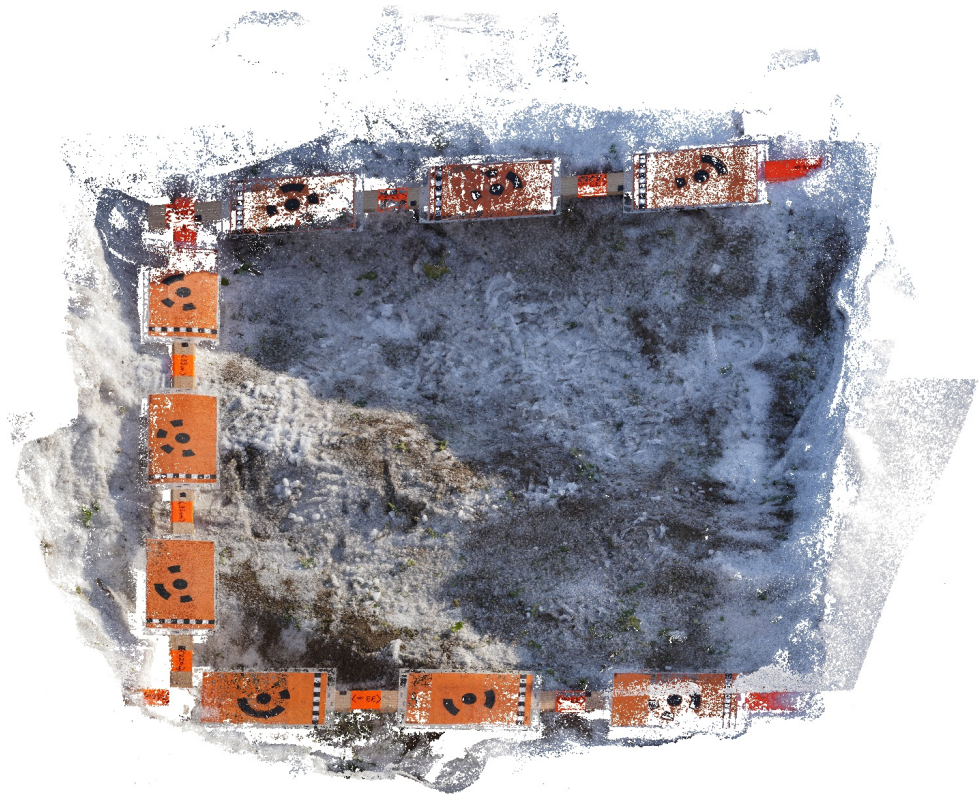
Points	27,485,466
Coordinate precision	0.0621 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 17
Point classes	
Created (never classified)	27,485,466
Point cloud generation parameters	
Processing time	11 minutes 50 seconds
Memory usage	20.45 GB
Date created	2023:12:29 20:12:04
Software version	2.0.3.16960
File size	393.75 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

CN063-Sony

Processing Report
02 January 2024



Survey Data

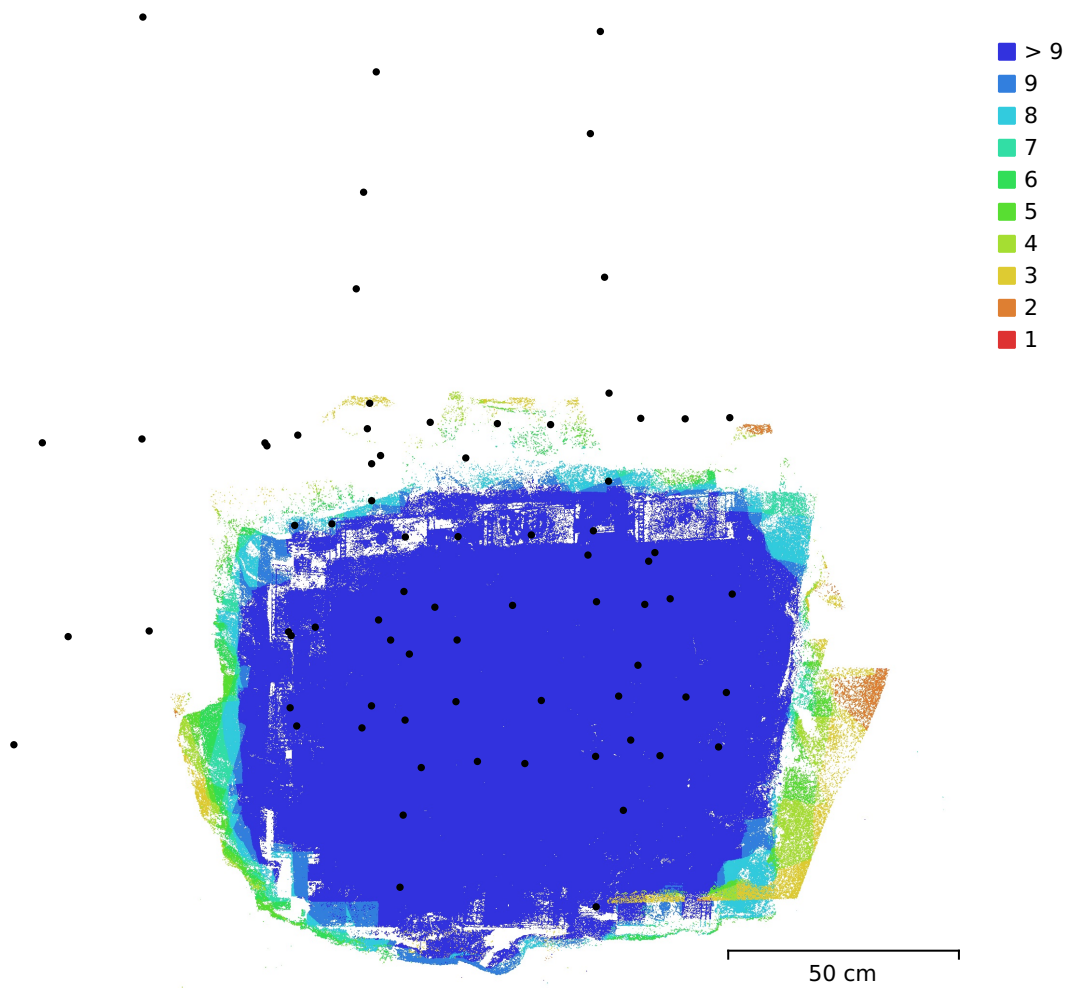


Fig. 1. Camera locations and image overlap.

Number of images:	74	Camera stations:	74
Flying altitude:	53.2 cm	Tie points:	41,375
Ground resolution:	0.0824 mm/pix	Projections:	99,151
Coverage area:	1.15 m ²	Reprojection error:	0.411 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No
ILCE-6000, E PZ...	6000 x 3376	24 mm	4.19 x 4.19 μm	No

Table 1. Cameras.

Camera Calibration

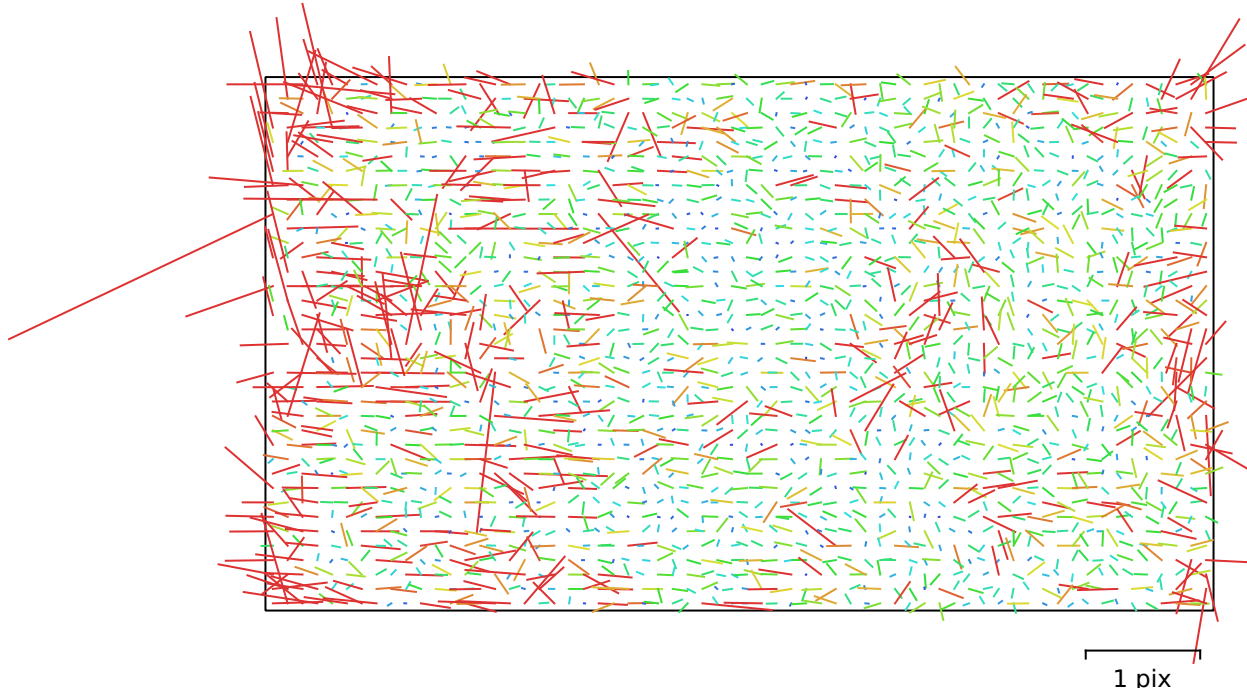


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

17 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6449.65	1.4	1.00	0.03	-0.10	-0.01	0.07	-0.06	-0.01	0.04
Cx	16.2886	0.77		1.00	-0.16	-0.06	0.05	-0.05	0.76	-0.03
Cy	71.5425	0.66			1.00	-0.00	-0.01	0.01	-0.17	0.75
K1	-0.00447282	0.00056				1.00	-0.96	0.89	-0.06	-0.00
K2	0.0448662	0.0046					1.00	-0.98	0.03	0.00
K3	0.0131852	0.011						1.00	-0.02	-0.01
P1	0.00151786	3.1e-05							1.00	-0.12
P2	0.000705413	2.8e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

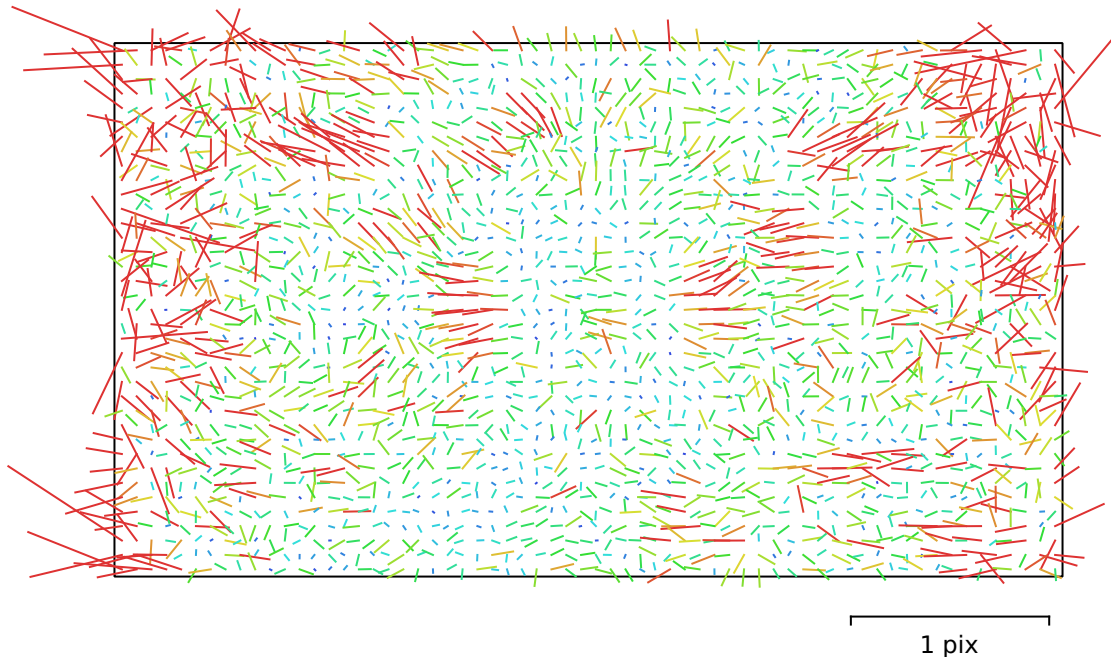


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (24mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (24mm)

57 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	24 mm	4.19 x 4.19 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6275.15	0.42	1.00	-0.02	-0.73	-0.02	0.06	-0.05	0.00	-0.18
Cx	14.5278	0.33		1.00	-0.03	0.02	-0.02	0.02	0.93	-0.08
Cy	38.6221	0.45			1.00	-0.10	0.03	-0.02	-0.04	0.64
K1	-0.00752722	0.00023				1.00	-0.95	0.89	0.03	-0.11
K2	0.0194736	0.002					1.00	-0.98	-0.03	0.03
K3	0.0414657	0.0049						1.00	0.02	-0.01
P1	0.00101263	1.7e-05							1.00	-0.08
P2	0.000269756	1.8e-05								1.00

Table 3. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.33042	0.000419949
target 2_target 3	0.330143	0.000143163
target 5_target 6	0.33001	1.02931e-05
target 7_target 9	0.659713	-0.000287136
Total		0.000264294

Table 4. Control scale bars.

Digital Elevation Model

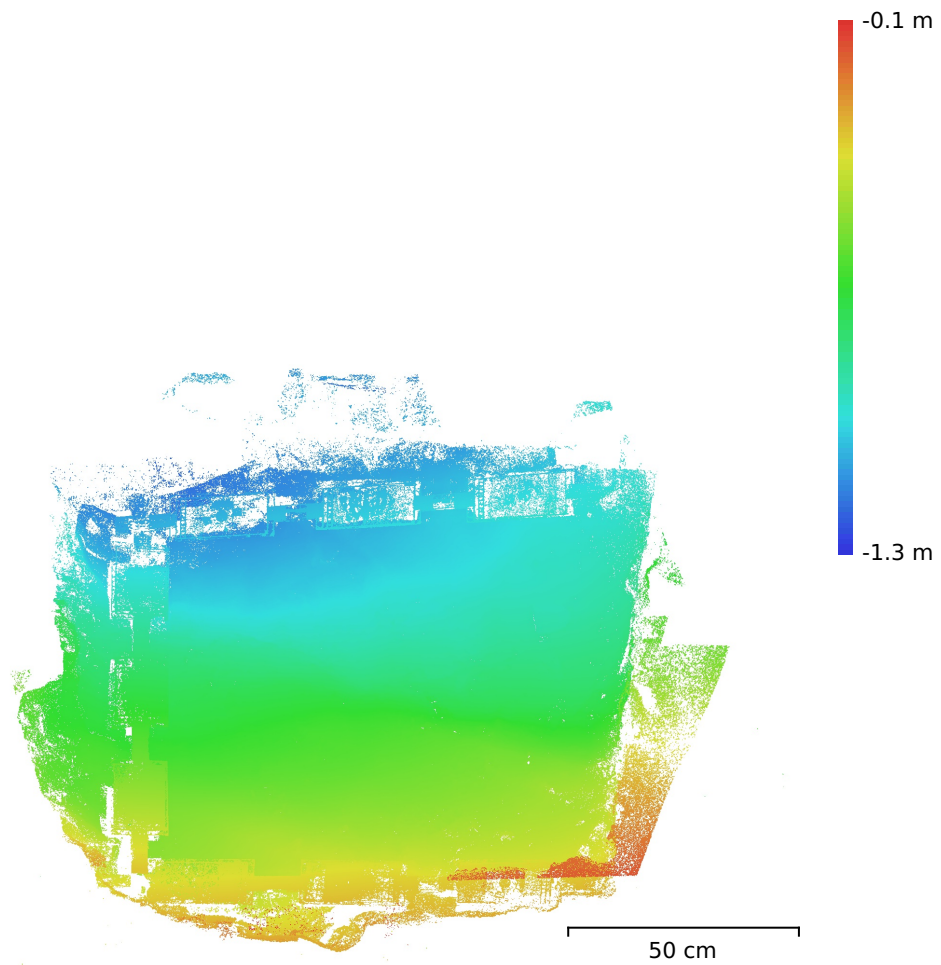


Fig. 4. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	74
Aligned cameras	74
Markers	8
Scale bars	5
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	41,375 of 157,616
RMS reprojection error	0.138739 (0.410788 pix)
Max reprojection error	0.828633 (3.9194 pix)
Mean key point size	2.78832 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.39236

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	39 seconds
Matching memory usage	847.19 MB
Alignment time	23 seconds
Alignment memory usage	264.35 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2024:01:02 15:05:34
Software version	2.0.3.16960
File size	7.16 MB

Depth Maps

Count	74
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	5 minutes 57 seconds
Memory usage	13.62 GB
Date created	2024:01:02 15:11:59
Software version	2.0.3.16960
File size	1.56 GB

Point Cloud

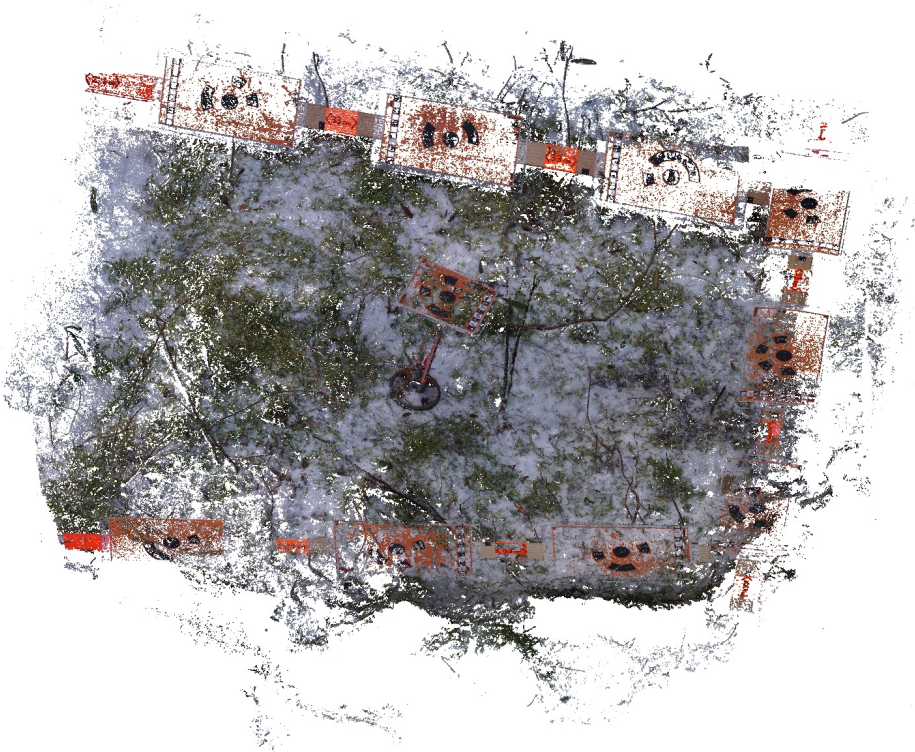
Points	32,360,577
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 22
Point classes	
Created (never classified)	32,360,577
Point cloud generation parameters	
Processing time	13 minutes 14 seconds
Memory usage	20.74 GB
Date created	2024:01:02 15:25:13
Software version	2.0.3.16960
File size	468.60 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

DB107-Sony

Processing Report
01 January 2024



Survey Data

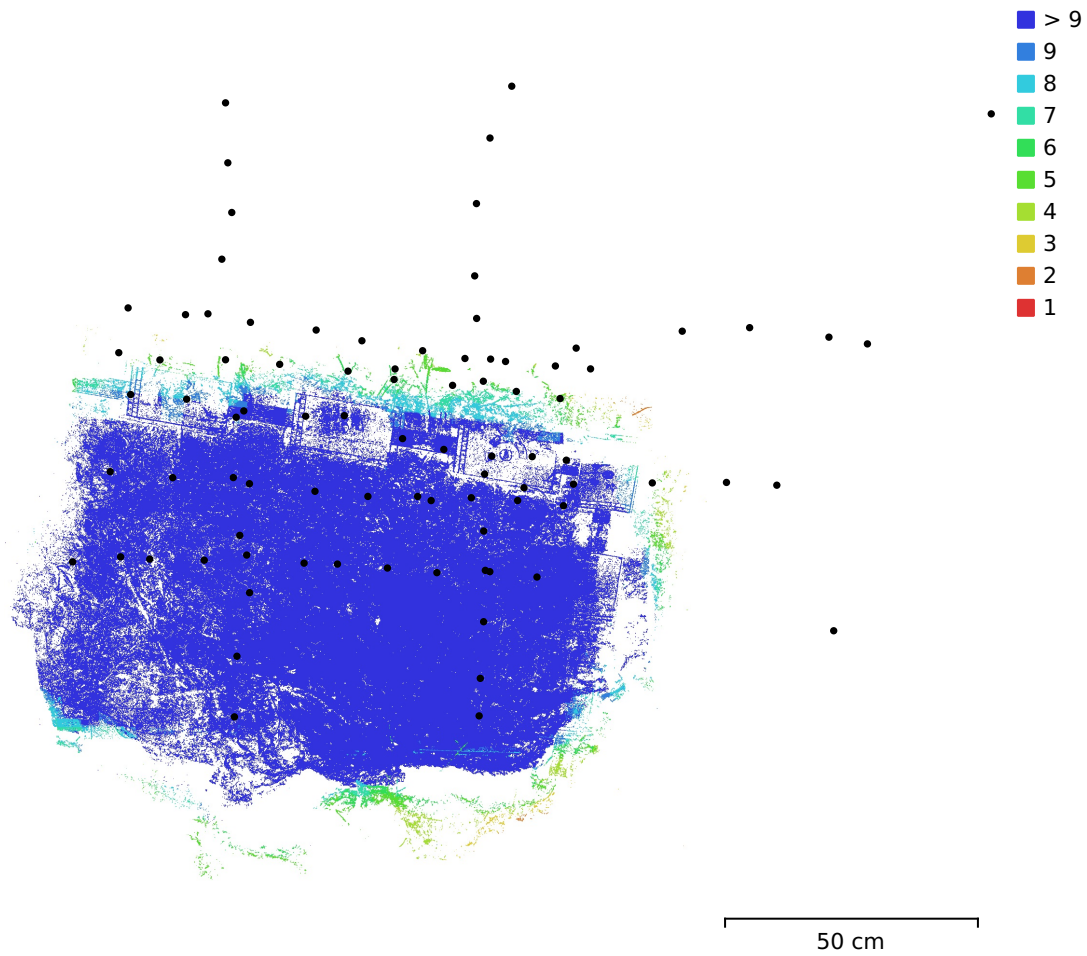


Fig. 1. Camera locations and image overlap.

Number of images:	88	Camera stations:	87
Flying altitude:	53.7 cm	Tie points:	22,202
Ground resolution:	0.0807 mm/pix	Projections:	51,433
Coverage area:	6.75e+03 cm ²	Reprojection error:	0.457 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

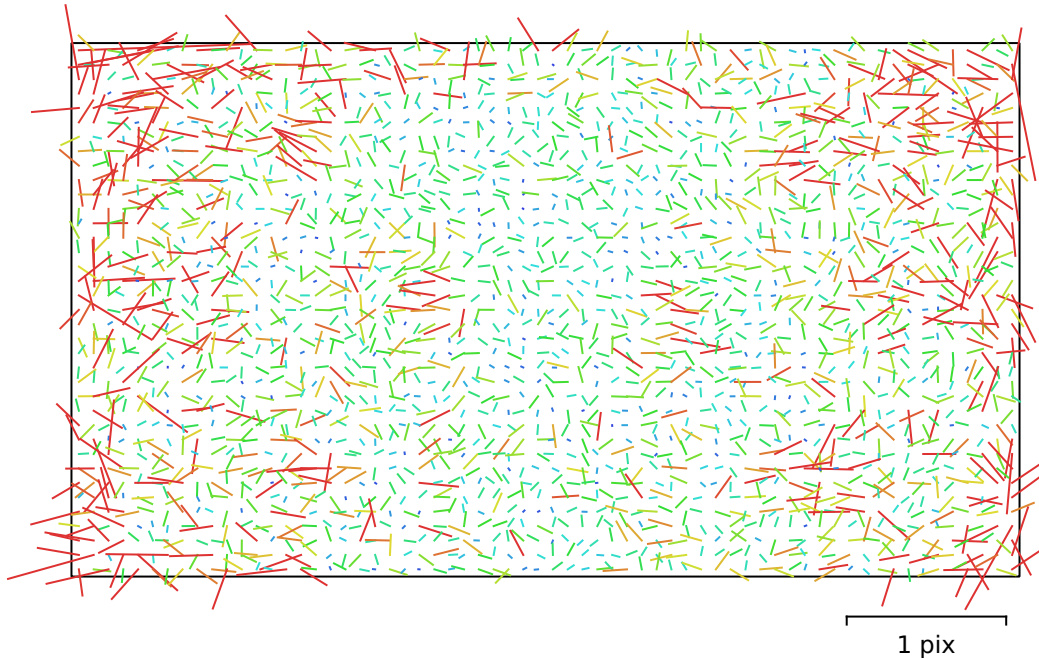


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

88 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6657.2	0.9	1.00	-0.02	-0.41	0.02	0.07	-0.06	-0.05	-0.15
Cx	21.3339	0.9		1.00	-0.03	0.00	-0.03	0.03	0.90	0.00
Cy	9.54015	1			1.00	-0.06	0.03	-0.03	-0.10	0.83
K1	0.00685339	0.00039				1.00	-0.94	0.88	-0.00	-0.03
K2	-0.0253959	0.0037					1.00	-0.98	-0.03	0.03
K3	0.140695	0.01						1.00	0.02	-0.03
P1	0.00170379	3.8e-05							1.00	-0.07
P2	-0.00084172	3.6e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 4_target 5	0.329999	-1.47648e-06
target 5_target 6	0.330132	0.000131822
target 7_target 8	0.329886	-0.000113568
target 8_target 9	0.329983	-1.68673e-05
Total		8.7409e-05

Table 3. Control scale bars.

Digital Elevation Model

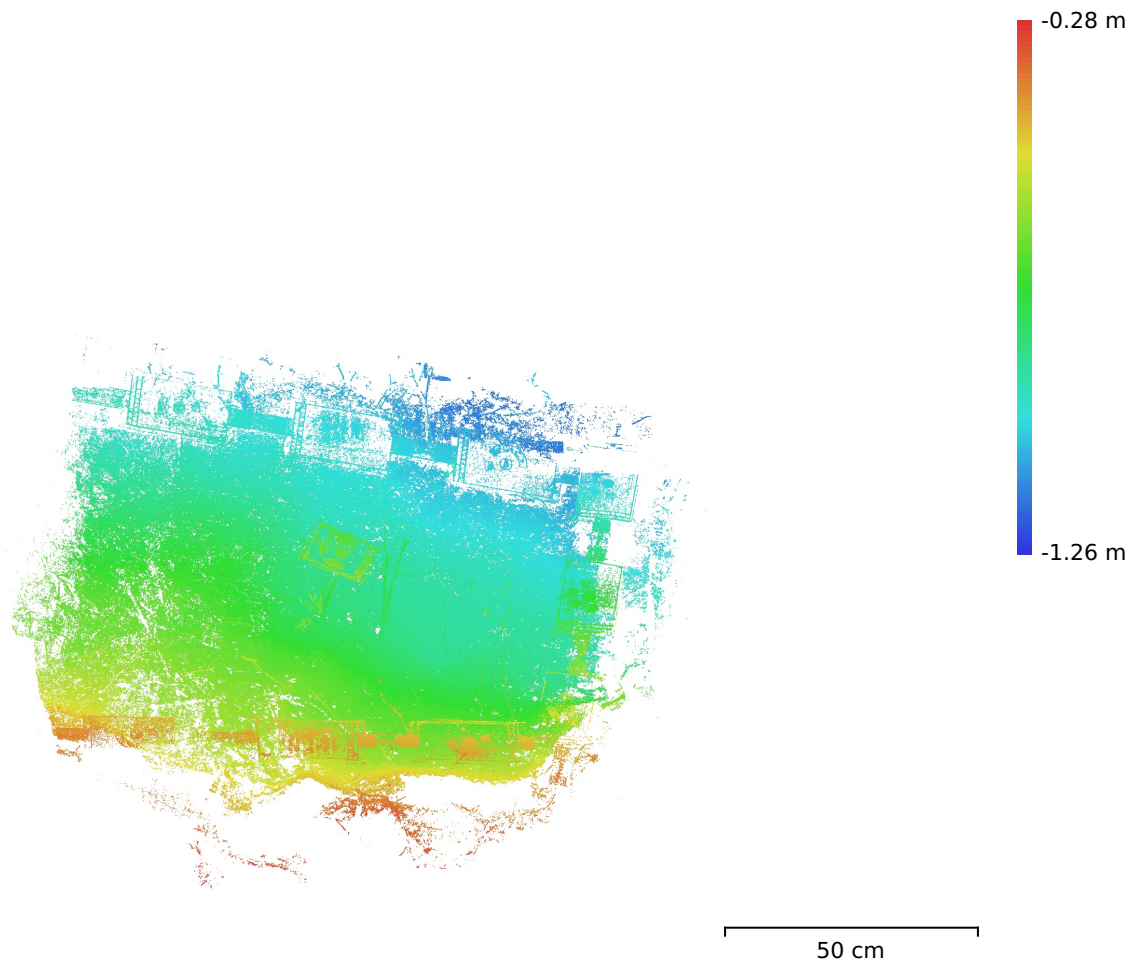


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	88
Aligned cameras	87
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	22,202 of 122,055
RMS reprojection error	0.13227 (0.457313 pix)
Max reprojection error	0.366133 (2.12064 pix)
Mean key point size	3.32235 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.32269

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	53 seconds
Matching memory usage	902.52 MB
Alignment time	15 seconds
Alignment memory usage	215.80 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2024:01:01 23:48:36
Software version	2.0.3.16960
File size	7.35 MB

Depth Maps

Count	76
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	5 minutes 28 seconds
Memory usage	13.11 GB
Date created	2024:01:01 23:54:24
Software version	2.0.3.16960
File size	1.10 GB

Point Cloud

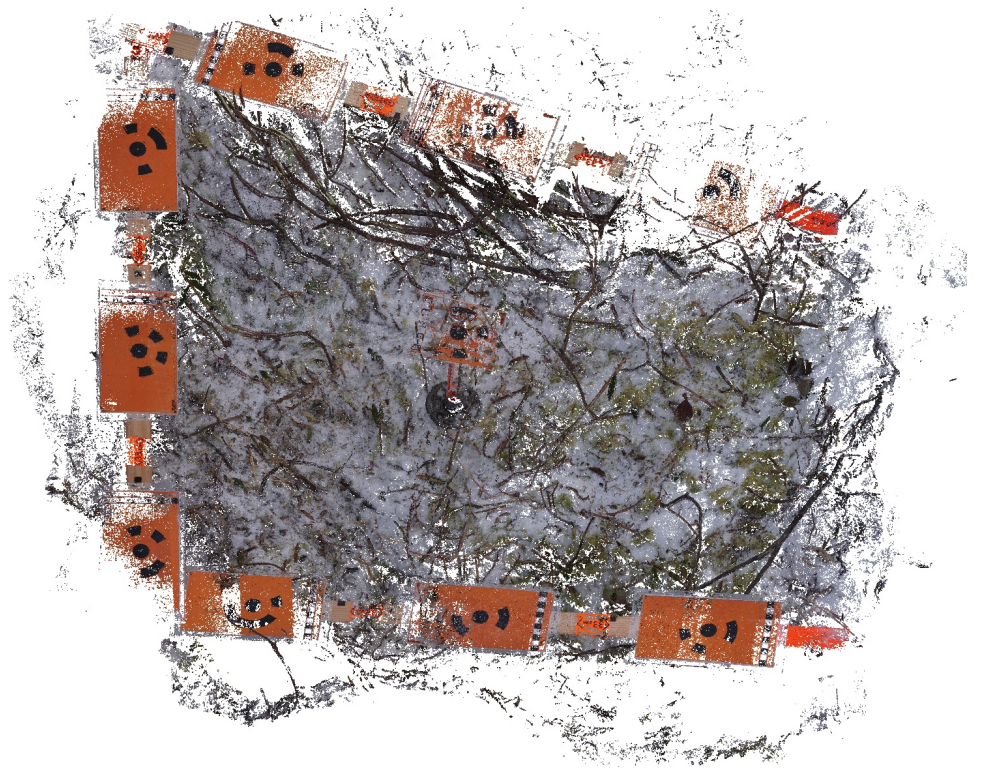
Points	23,079,502
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 15
Point classes	
Created (never classified)	23,079,502
Point cloud generation parameters	
Processing time	9 minutes 32 seconds
Memory usage	20.82 GB
Date created	2024:01:02 00:03:57
Software version	2.0.3.16960
File size	329.46 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

DB247-Sony

Processing Report
29 December 2023



Survey Data

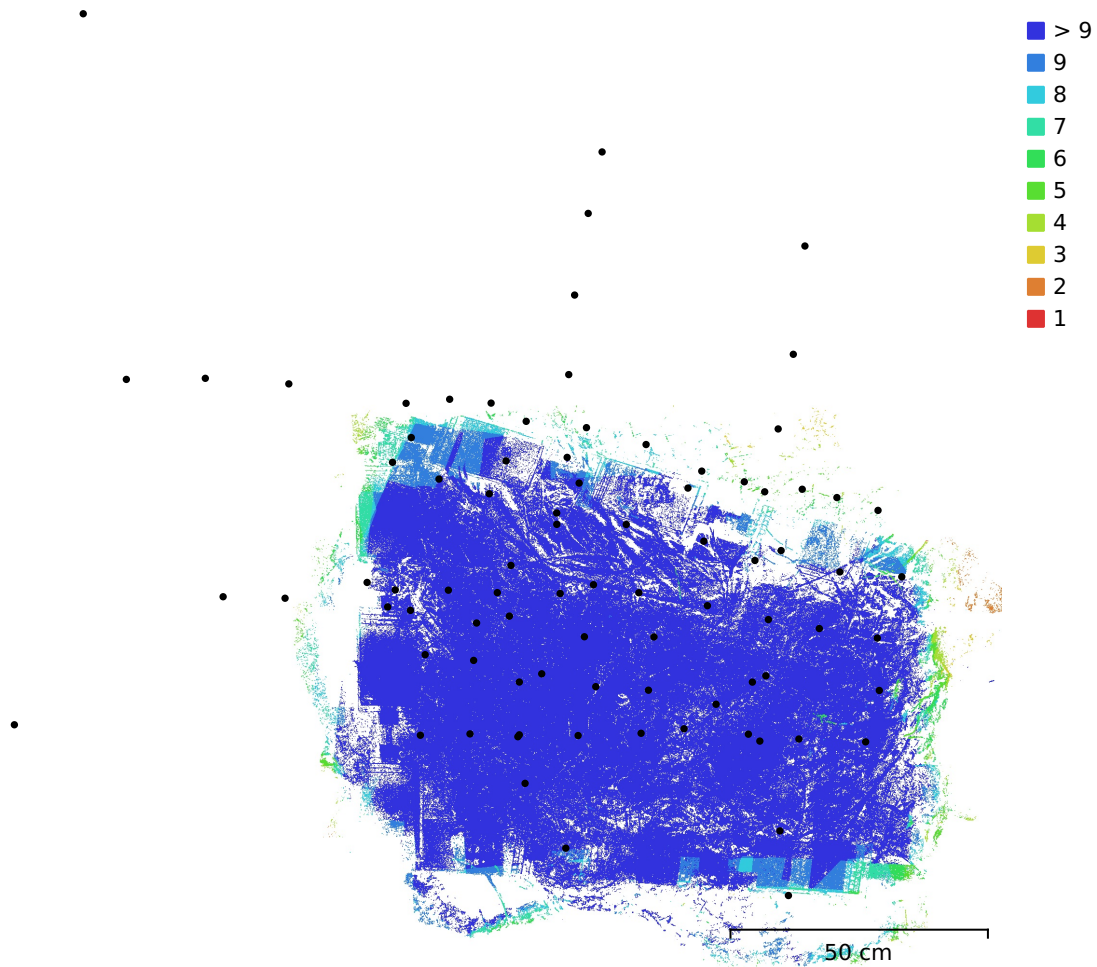


Fig. 1. Camera locations and image overlap.

Number of images:	85	Camera stations:	85
Flying altitude:	45.4 cm	Tie points:	19,911
Ground resolution:	0.0682 mm/pix	Projections:	43,231
Coverage area:	7.39e+03 cm ²	Reprojection error:	0.414 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

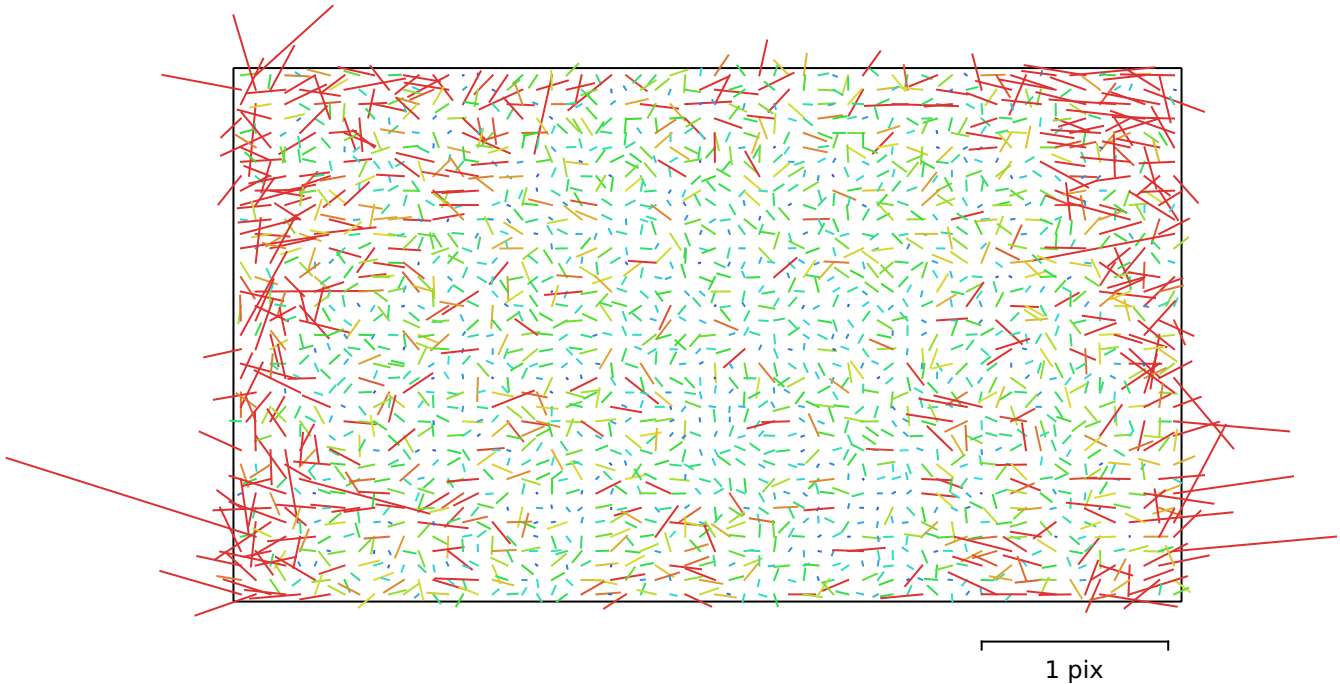


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

85 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm
F:	6655.89		
Cx:	-68.9891	B1:	0
Cy:	-12.5016	B2:	0
K1:	-0.00611405	P1:	-0.00141887
K2:	0.0709372	P2:	-0.00113048
K3:	-0.0780063	P3:	0
K4:	0	P4:	0

Scale Bars

Label	Distance (m)	Error (m)
target 4_target 5	0.328919	-0.00108072
target 5_target 6	0.331535	0.0015349
target 7_target 8	0.329327	-0.000672587
target 8_target 9	0.330206	0.000206229
Total		0.00100235

Table 2. Control scale bars.

Digital Elevation Model

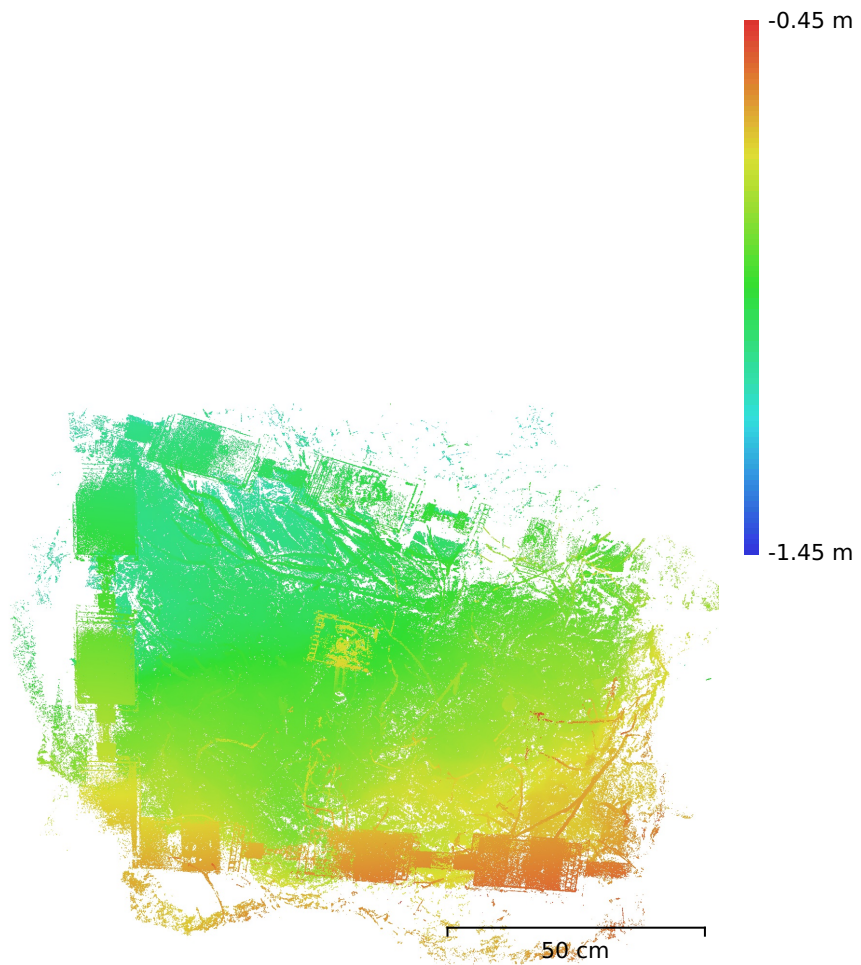


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	85
Aligned cameras	85
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	19,911 of 89,827
RMS reprojection error	0.130251 (0.413624 pix)
Max reprojection error	0.910424 (4.20517 pix)
Mean key point size	3.01933 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.19992

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	38 seconds
Matching memory usage	892.11 MB
Alignment time	20 seconds
Alignment memory usage	164.00 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 17:39:39
Software version	2.0.3.16960
File size	5.24 MB

Depth Maps

Count	78
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	5 minutes 5 seconds
Memory usage	12.86 GB
Date created	2023:12:29 17:45:08
Software version	2.0.3.16960
File size	1.03 GB

Point Cloud

Points	24,435,985
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 10
Point classes	
Created (never classified)	24,435,985
Point cloud generation parameters	
Processing time	9 minutes 52 seconds
Memory usage	21.22 GB
Date created	2023:12:29 17:55:01
Software version	2.0.3.16960
File size	348.36 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

DB248-Sony

Processing Report
02 January 2024



Survey Data

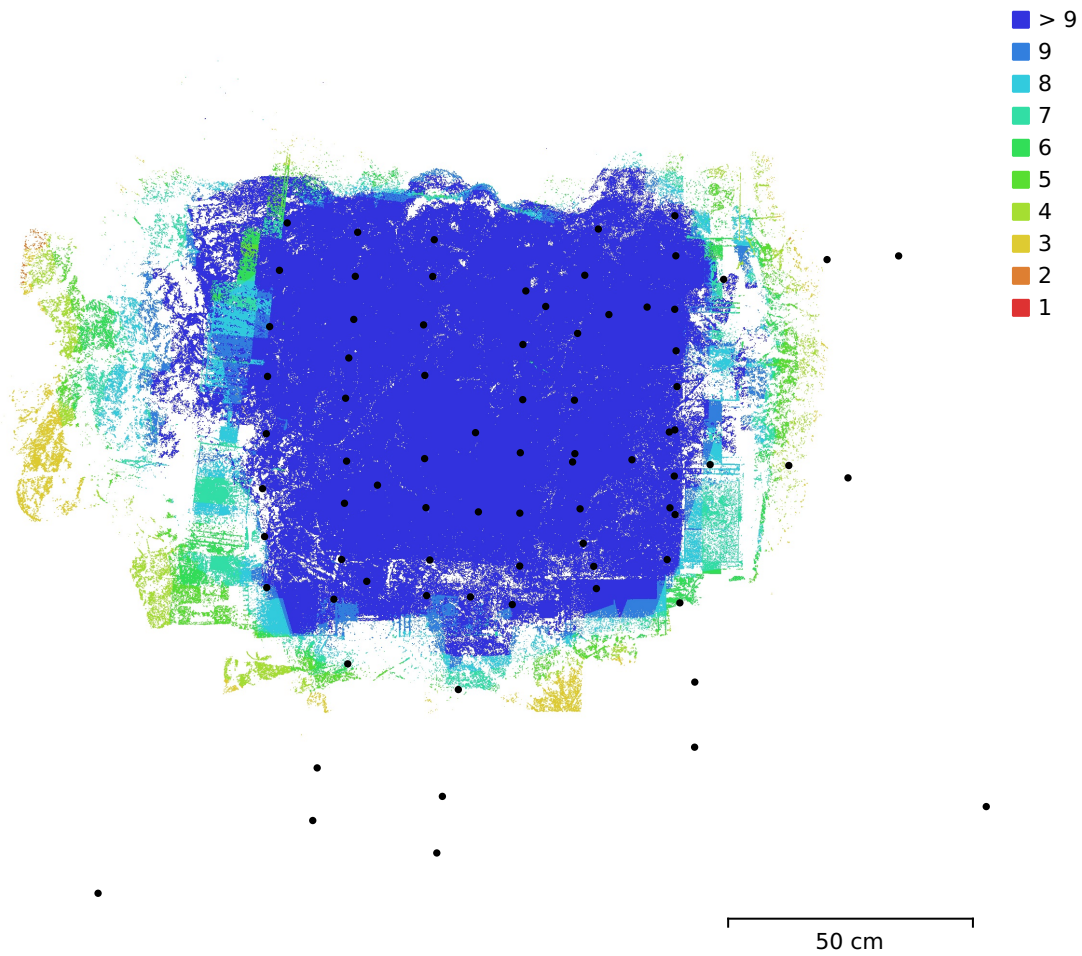


Fig. 1. Camera locations and image overlap.

Number of images:	81	Camera stations:	79
Flying altitude:	48.5 cm	Tie points:	25,766
Ground resolution:	0.0728 mm/pix	Projections:	60,434
Coverage area:	9.87e+03 cm ²	Reprojection error:	0.391 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

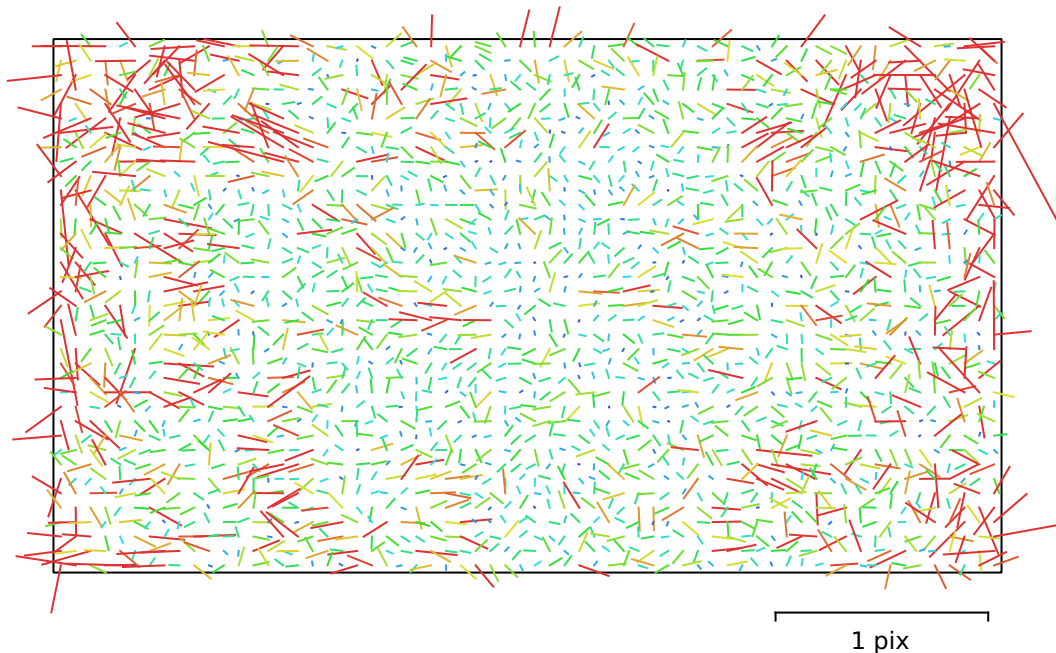


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

81 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm
F:	6656.41		
Cx:	22.6199	B1:	0
Cy:	18.7726	B2:	0
K1:	-0.000659036	P1:	0.00159725
K2:	0.050787	P2:	-0.000677033
K3:	-0.0153611	P3:	0
K4:	0	P4:	0

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 3	0.658753	-0.00124739
target 4_target 6	0.661241	0.00124067
Total		0.00124403

Table 2. Control scale bars.

Digital Elevation Model

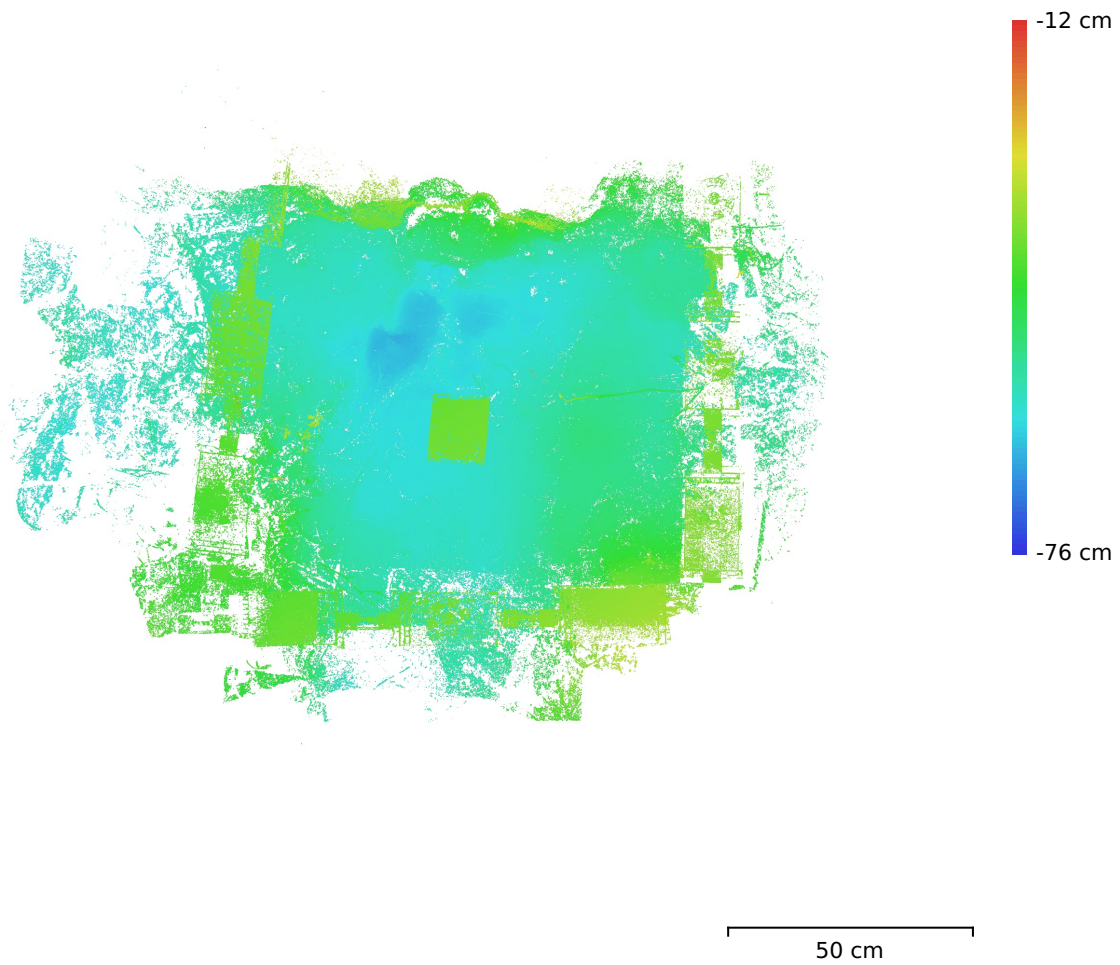


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	81
Aligned cameras	79
Markers	8
Scale bars	5
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	25,766 of 108,237
RMS reprojection error	0.132838 (0.391146 pix)
Max reprojection error	0.420087 (2.0296 pix)
Mean key point size	2.8224 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.32916

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	37 seconds
Matching memory usage	853.99 MB
Alignment time	18 seconds
Alignment memory usage	205.89 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 17:11:17
Software version	2.0.3.16960
File size	4.76 MB

Depth Maps

Count	74
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	5 minutes 24 seconds
Memory usage	13.04 GB
Date created	2023:12:29 17:17:04
Software version	2.0.3.16960
File size	1.23 GB

Point Cloud

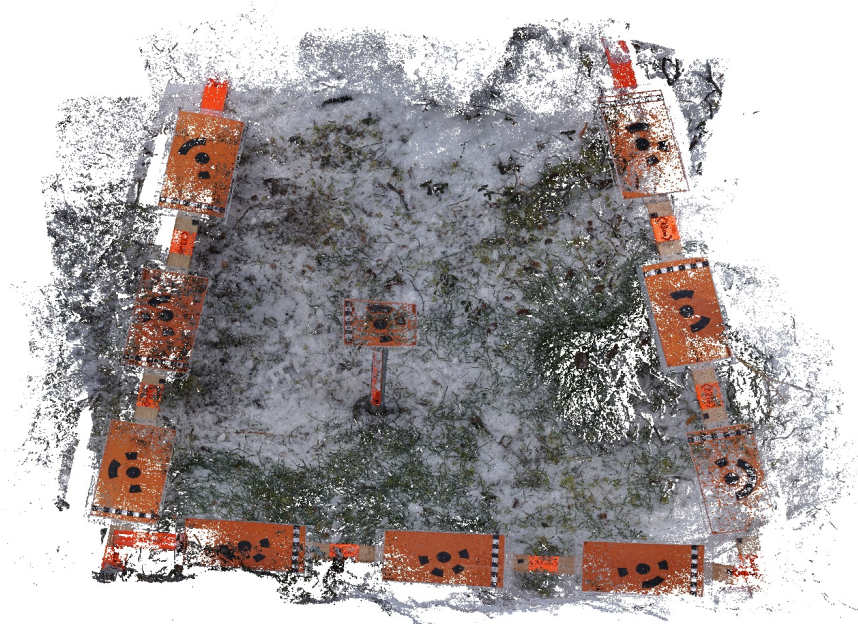
Points	27,484,758
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 17
Point classes	
Created (never classified)	27,484,758
Point cloud generation parameters	
Processing time	10 minutes 19 seconds
Memory usage	20.42 GB
Date created	2023:12:29 17:27:25
Software version	2.0.3.16960
File size	391.26 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

EB099-Sony

Processing Report
29 December 2023



Survey Data

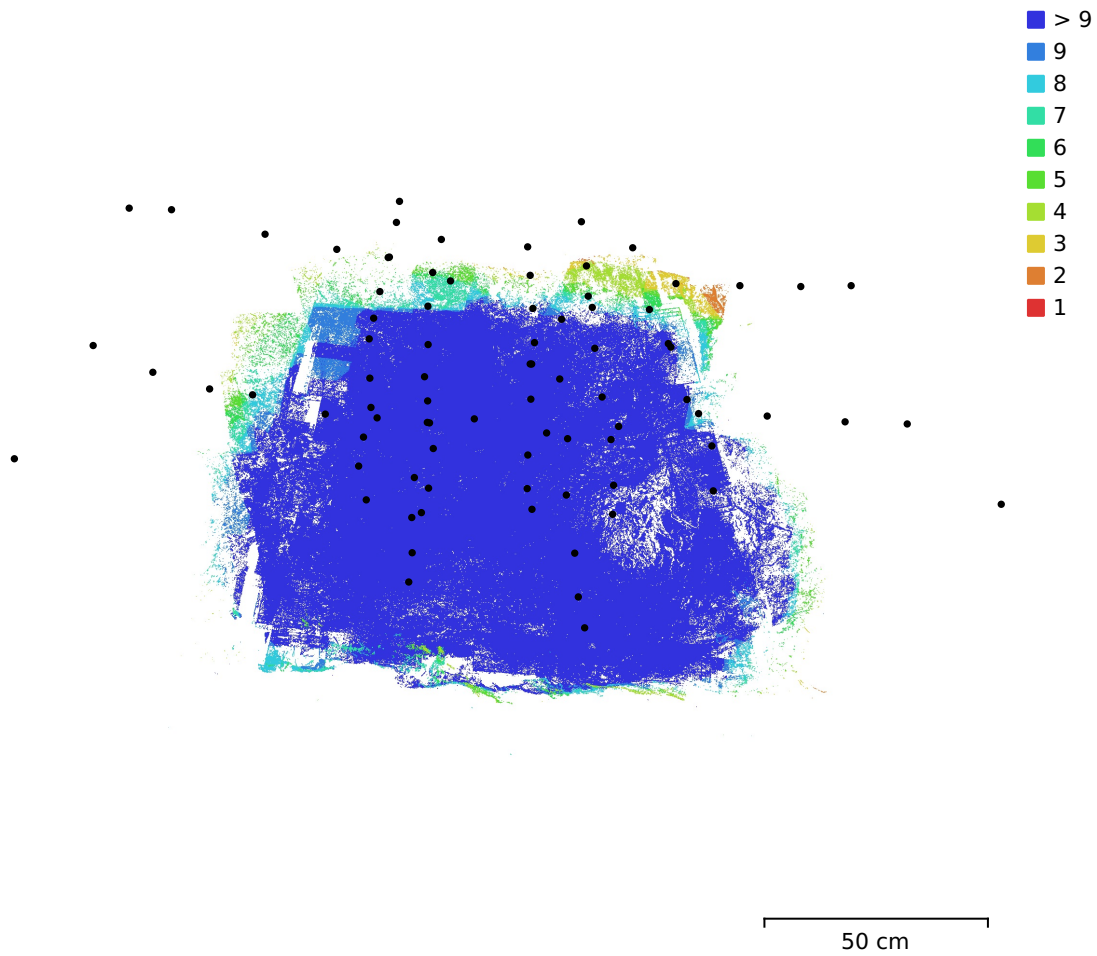


Fig. 1. Camera locations and image overlap.

Number of images:	84	Camera stations:	84
Flying altitude:	57.8 cm	Tie points:	36,584
Ground resolution:	0.0869 mm/pix	Projections:	87,346
Coverage area:	8.62e+03 cm ²	Reprojection error:	0.37 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

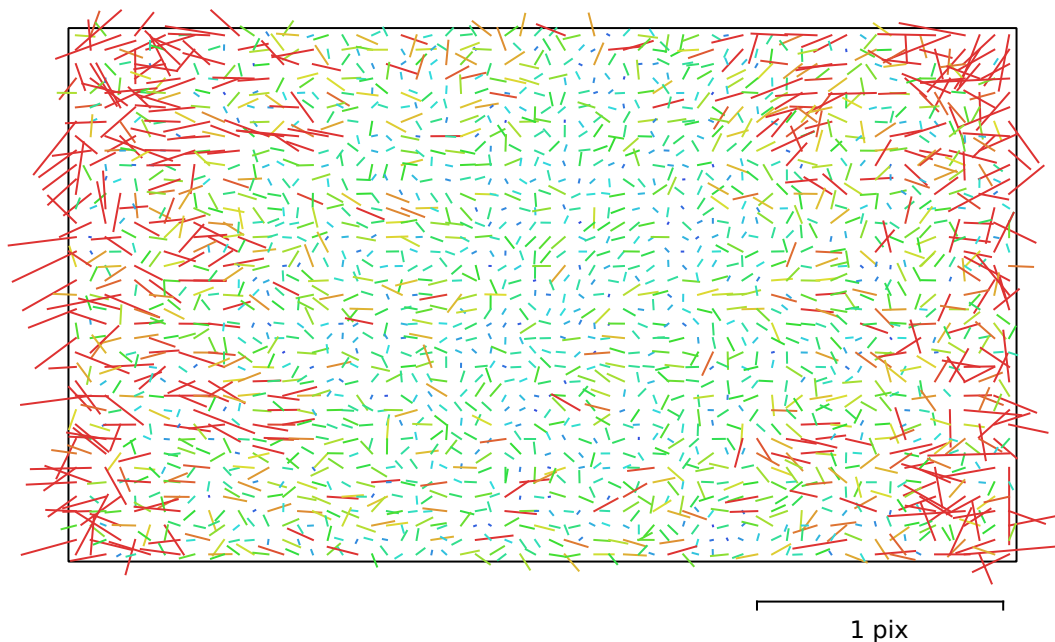


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

84 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6652.57	0.61	1.00	-0.11	-0.57	0.08	0.05	-0.04	-0.14	-0.19
Cx	11.5705	0.49		1.00	0.14	0.01	-0.02	0.02	0.85	0.04
Cy	15.4555	0.62			1.00	-0.10	0.03	-0.03	0.19	0.73
K1	-0.00796468	0.00022				1.00	-0.93	0.86	0.01	-0.06
K2	0.0647292	0.0021					1.00	-0.98	-0.02	0.01
K3	-0.075051	0.006						1.00	0.02	-0.01
P1	0.00116366	2e-05							1.00	0.10
P2	-0.000140406	2e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330006	6.04238e-06
target 2_target 3	0.330046	4.64826e-05
target 4_target 5	0.33	-1.72693e-07
target 5_target 6	0.329841	-0.000159043
target 7_target 8	0.329951	-4.89841e-05
target 8_target 9	0.330155	0.000155474
Total		9.49243e-05

Table 3. Control scale bars.

Digital Elevation Model

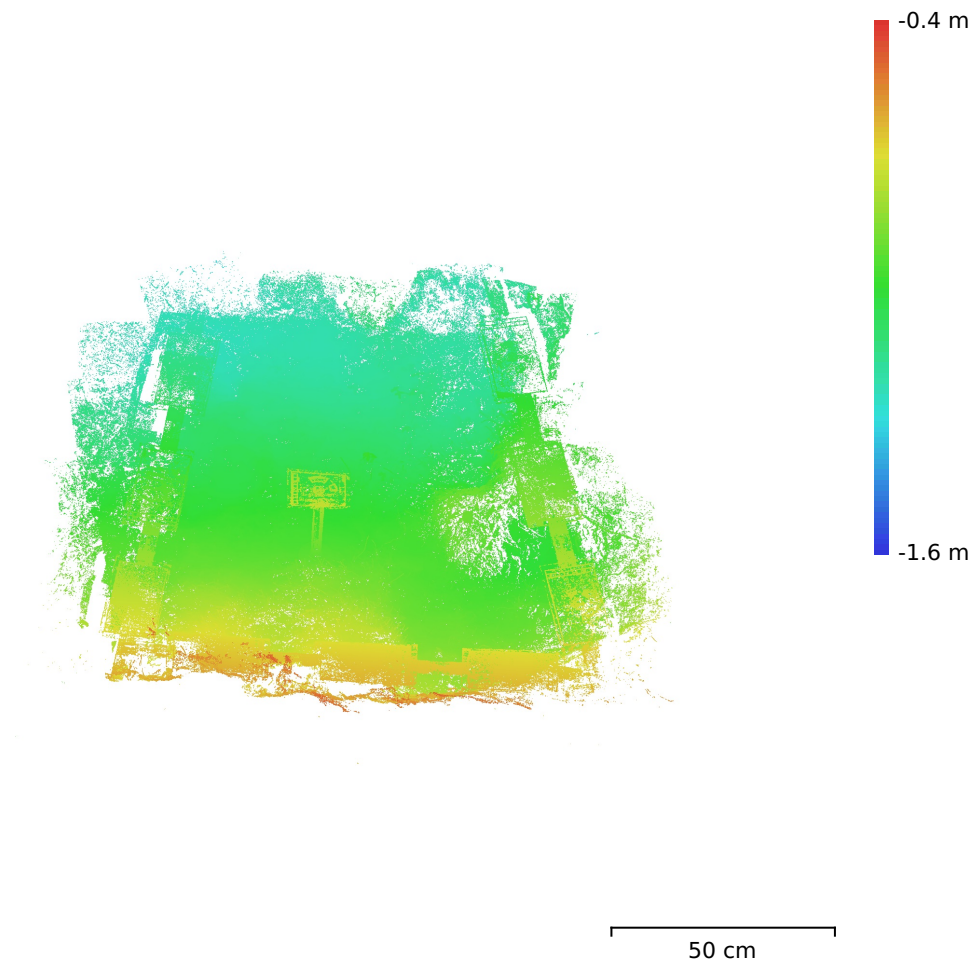


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	84
Aligned cameras	84
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	36,584 of 133,157
RMS reprojection error	0.12999 (0.370174 pix)
Max reprojection error	0.442407 (2.09502 pix)
Mean key point size	2.71138 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.30488

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	42 seconds
Matching memory usage	887.00 MB
Alignment time	18 seconds
Alignment memory usage	235.10 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 18:16:38
Software version	2.0.3.16960
File size	8.24 MB

Depth Maps

Count	84
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	6 minutes 19 seconds
Memory usage	13.56 GB
Date created	2023:12:29 18:23:20
Software version	2.0.3.16960
File size	1.37 GB

Point Cloud

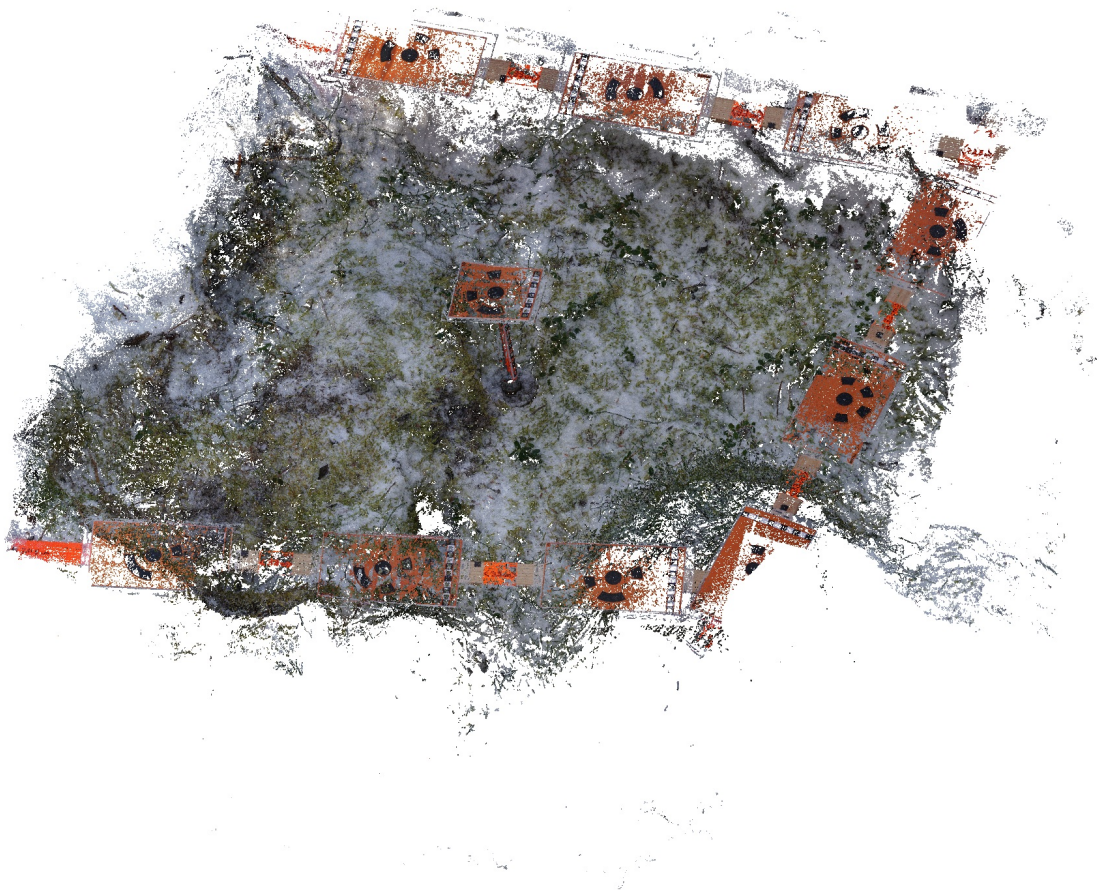
Points	29,062,687
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 15
Point classes	
Created (never classified)	29,062,687
Point cloud generation parameters	
Processing time	13 minutes 10 seconds
Memory usage	23.64 GB
Date created	2023:12:29 18:36:31
Software version	2.0.3.16960
File size	415.41 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

EB100-Sony

Processing Report
29 December 2023



Survey Data

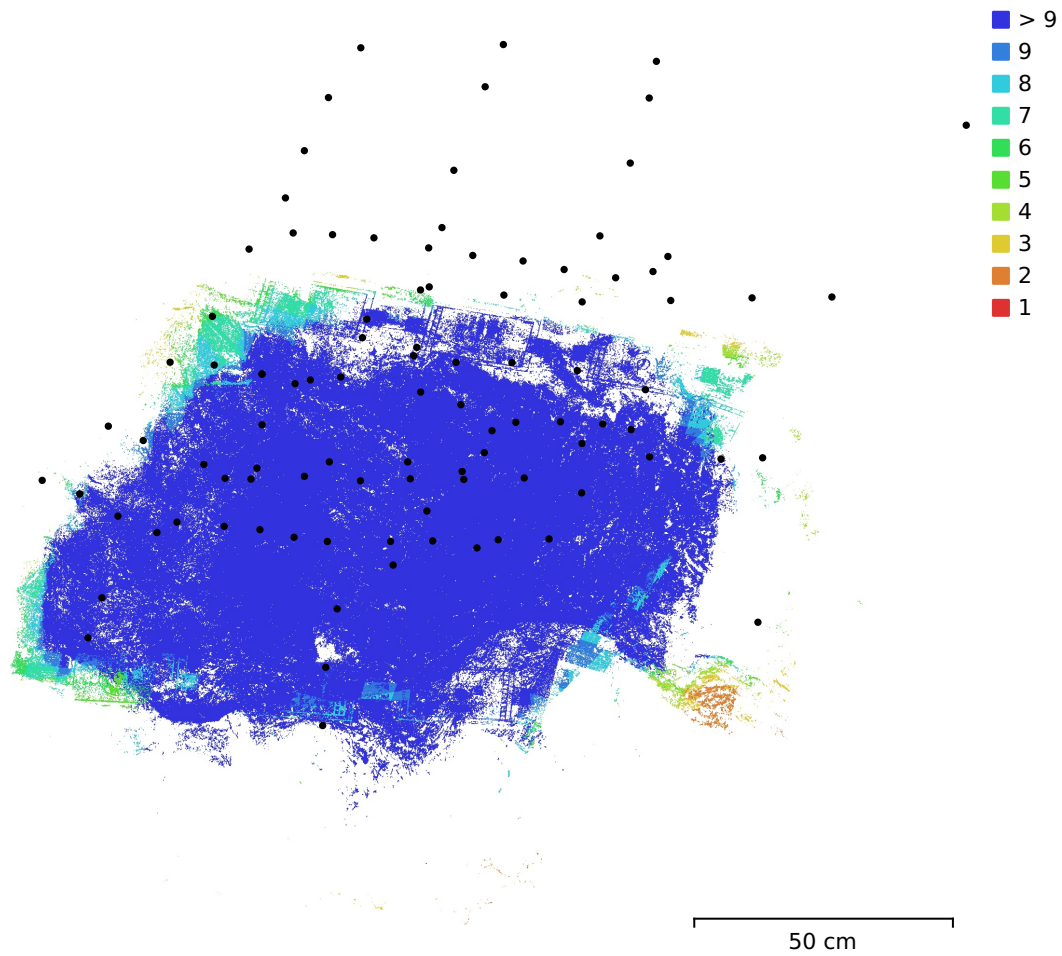


Fig. 1. Camera locations and image overlap.

Number of images:	99	Camera stations:	97
Flying altitude:	55.5 cm	Tie points:	31,841
Ground resolution:	0.0858 mm/pix	Projections:	76,138
Coverage area:	8.07e+03 cm ²	Reprojection error:	0.418 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No
ILCE-6000, E PZ...	6000 x 3376	25 mm	3.03 x 3.03 μm	No

Table 1. Cameras.

Camera Calibration

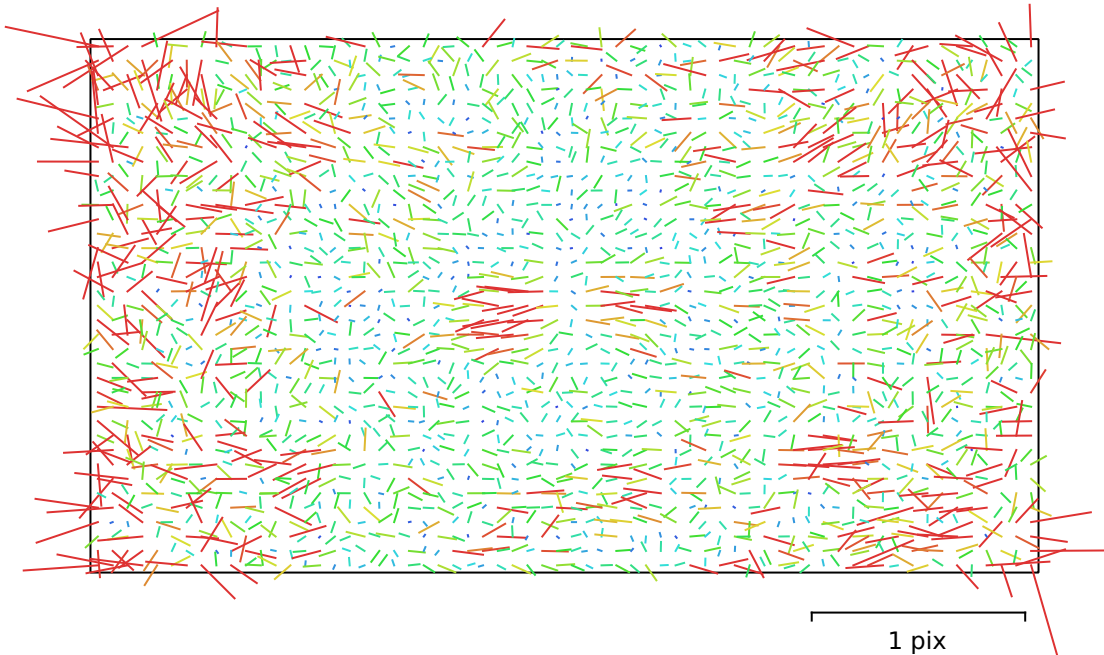


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

97 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6469.54	0.61	1.00	0.06	-0.57	0.03	0.06	-0.04	0.06	-0.43
Cx	4.63273	0.49		1.00	-0.09	0.00	0.01	-0.01	0.90	-0.04
Cy	22.6957	0.67			1.00	-0.08	0.02	-0.03	-0.09	0.84
K1	0.00643019	0.00026				1.00	-0.94	0.87	0.01	-0.06
K2	-0.0622739	0.0023					1.00	-0.98	0.00	0.02
K3	0.237455	0.006						1.00	-0.00	-0.02
P1	0.000546689	2.3e-05							1.00	-0.02
P2	0.000450735	2.6e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

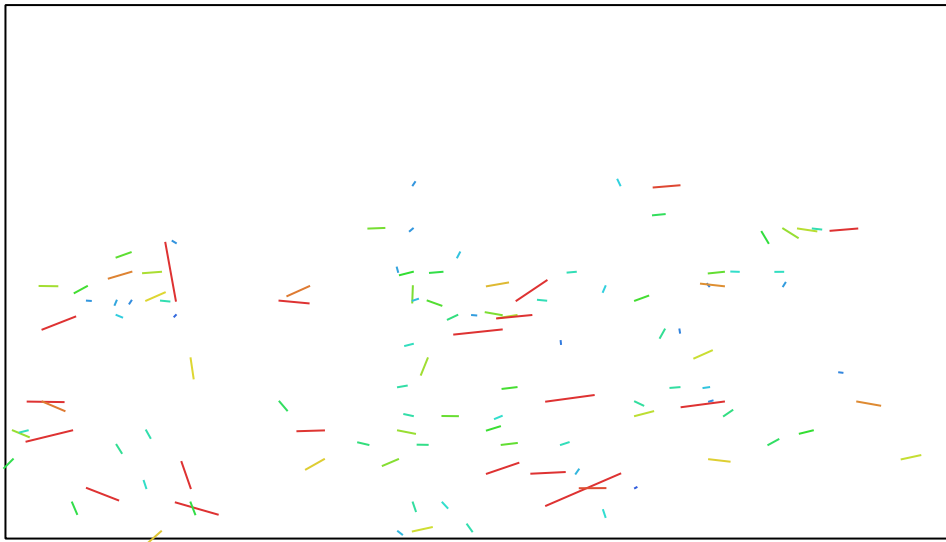


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm). 1 pix

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

2 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	3.03 x 3.03 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	9509.4	50	1.00	0.10	-0.61	-0.11	0.22	-0.27	0.03	-0.10
Cx	1410.58	20		1.00	-0.01	-0.46	0.36	-0.31	0.62	-0.17
Cy	593.342	20			1.00	0.06	-0.08	0.09	0.13	0.45
K1	0.000982276	0.011				1.00	-0.94	0.88	0.18	0.07
K2	0.0222522	0.084					1.00	-0.98	-0.08	-0.02
K3	-0.0164708	0.23						1.00	0.05	0.01
P1	0.00206897	0.00066							1.00	0.08
P2	0.00050755	0.00031								1.00

Table 3. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.329655	-0.000345019
target 2_target 3	0.330435	0.000435161
target 4_target 5	0.330241	0.000241024
target 5_target 6	0.32971	-0.000289732
target 7_target 8	0.329957	-4.28263e-05
Total		0.000300757

Table 4. Control scale bars.

Digital Elevation Model

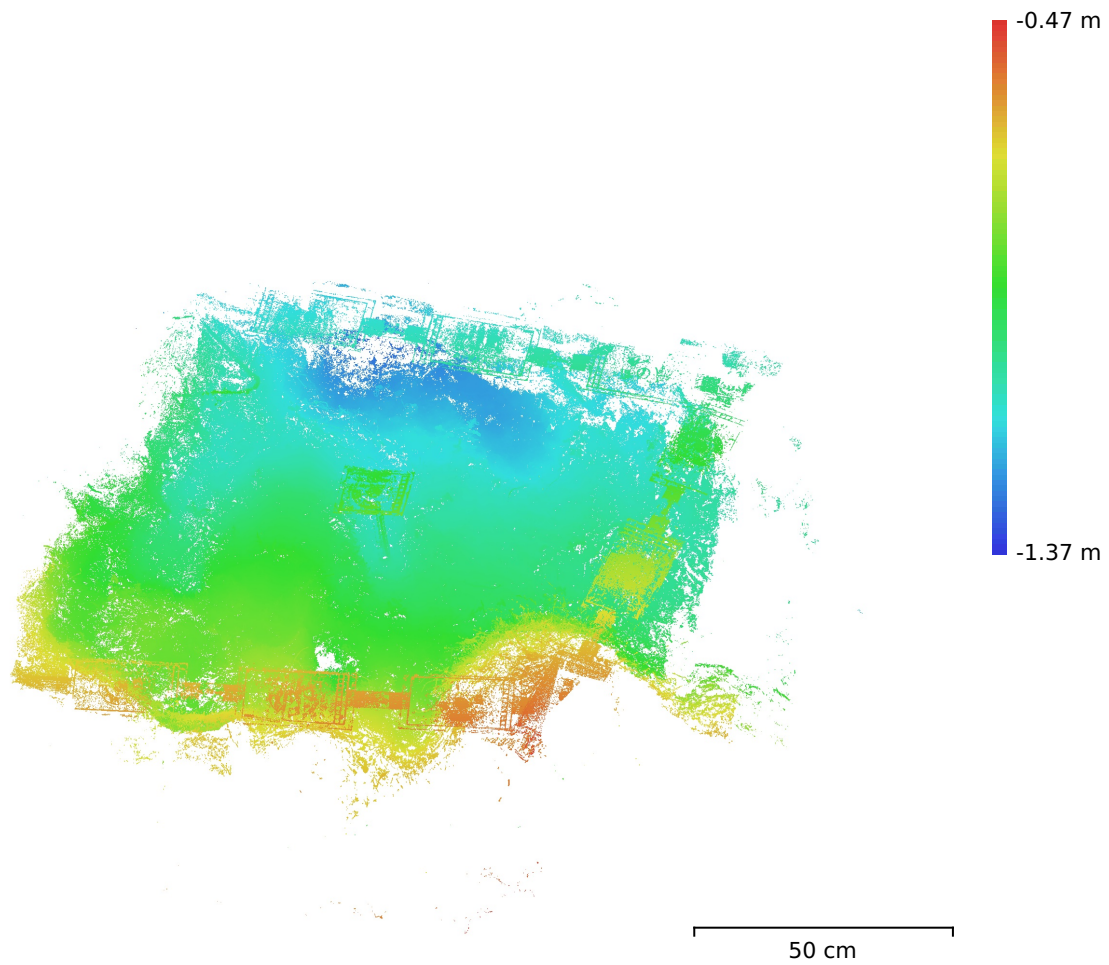


Fig. 4. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	99
Aligned cameras	97
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	31,841 of 157,360
RMS reprojection error	0.131526 (0.418343 pix)
Max reprojection error	0.563146 (2.68375 pix)
Mean key point size	3.03878 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.34512

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	46 seconds
Matching memory usage	891.19 MB
Alignment time	34 seconds
Alignment memory usage	721.88 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 18:40:18
Software version	2.0.3.16960
File size	9.63 MB

Depth Maps

Count	92
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	6 minutes 45 seconds
Memory usage	15.03 GB
Date created	2023:12:29 18:47:44
Software version	2.0.3.16960
File size	1.46 GB

Point Cloud

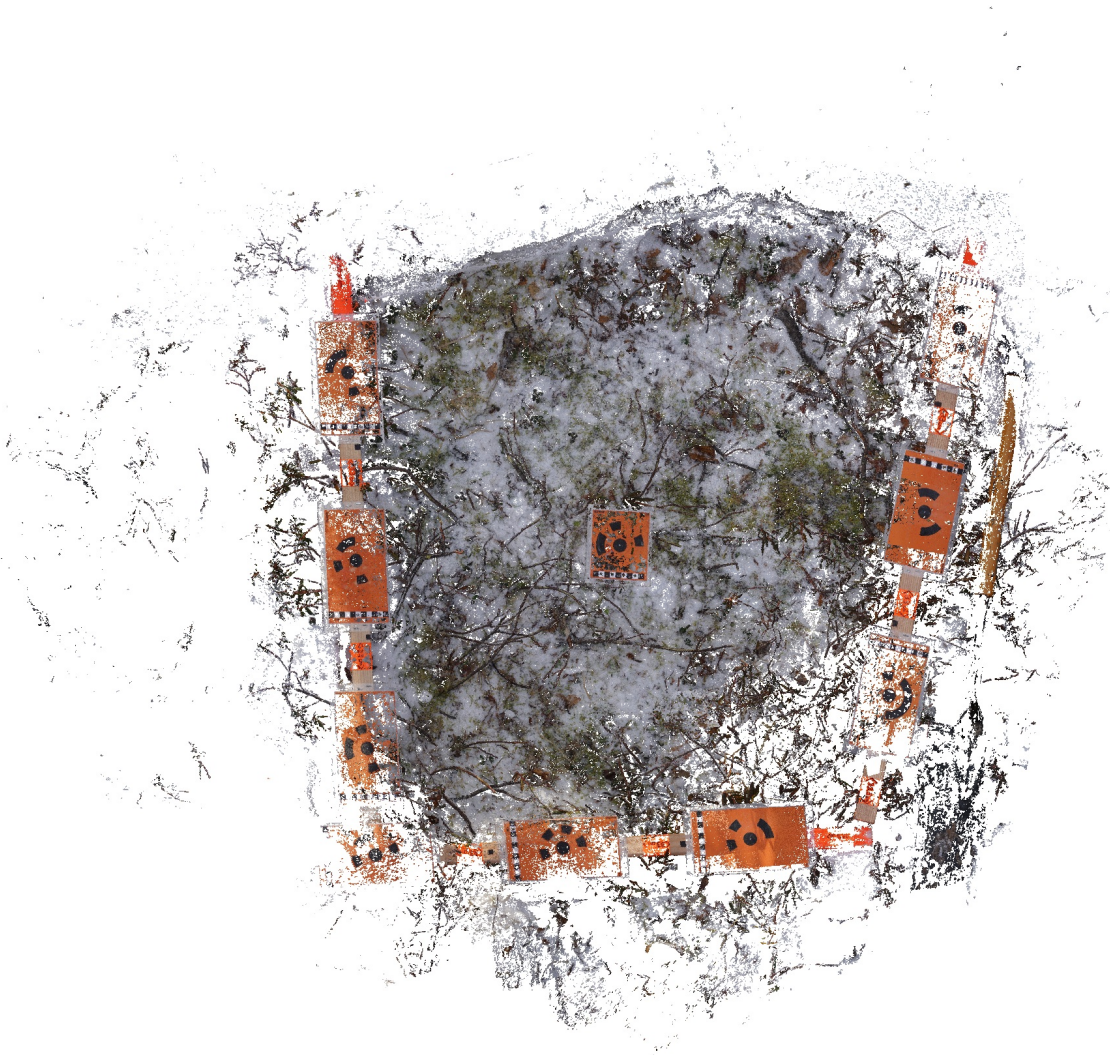
Points	30,357,797
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 17
Point classes	
Created (never classified)	30,357,797
Point cloud generation parameters	
Processing time	14 minutes 18 seconds
Memory usage	25.50 GB
Date created	2023:12:29 19:02:03
Software version	2.0.3.16960
File size	433.44 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

EB252-Sony

Processing Report
29 December 2023



Survey Data

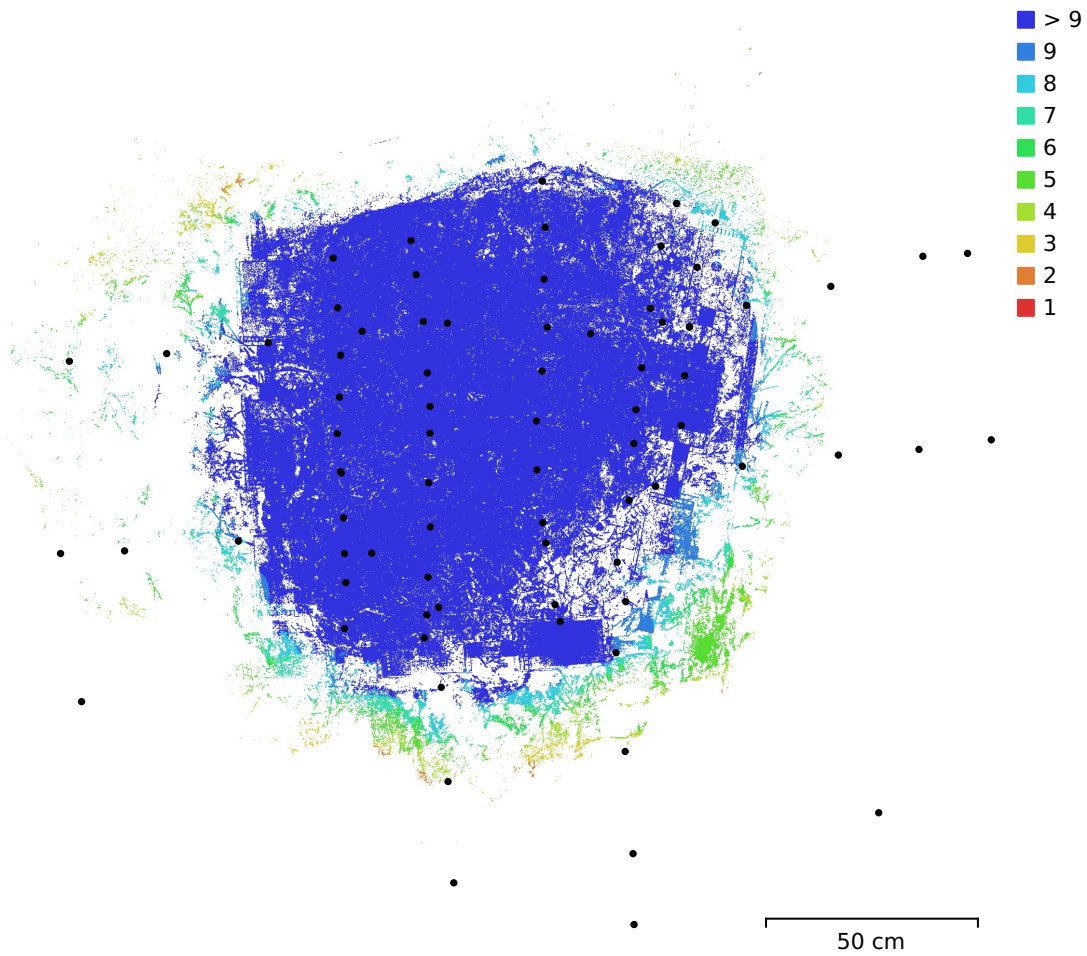


Fig. 1. Camera locations and image overlap.

Number of images:	79	Camera stations:	78
Flying altitude:	56 cm	Tie points:	20,056
Ground resolution:	0.086 mm/pix	Projections:	45,287
Coverage area:	1.16 m ²	Reprojection error:	0.391 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

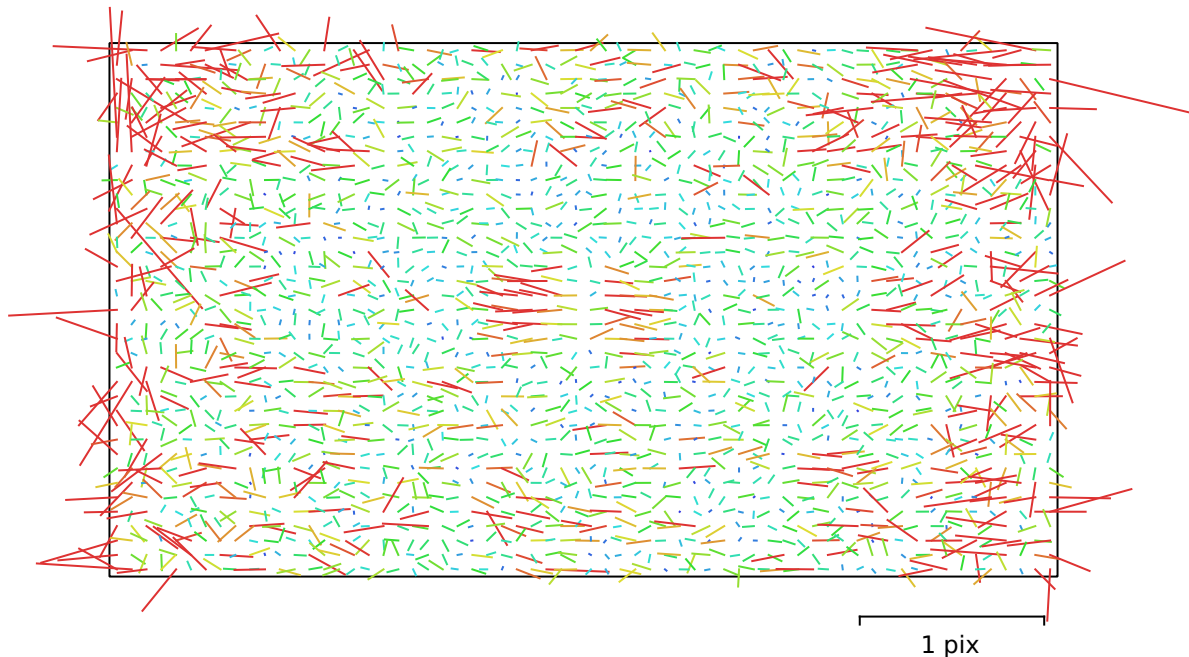


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

79 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6515.15	0.98	1.00	-0.10	-0.56	0.23	0.00	-0.02	-0.12	-0.38
Cx	5.85535	0.86		1.00	-0.02	-0.05	0.01	-0.01	0.97	-0.05
Cy	14.6233	1.2			1.00	-0.19	0.05	-0.03	-0.01	0.87
K1	-5.1878e-05	0.00037				1.00	-0.91	0.84	-0.04	-0.15
K2	0.0162868	0.0031					1.00	-0.98	0.00	0.04
K3	0.0351089	0.0083						1.00	-0.00	-0.02
P1	0.000544918	4.4e-05							1.00	-0.07
P2	-0.000883566	5.3e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330065	6.51877e-05
target 2_target 3	0.330049	4.94534e-05
target 4_target 5	0.330759	0.000759365
target 5_target 6	0.330283	0.00028281
target 7_target 8	0.329424	-0.000576498
target 8_target 9	0.329416	-0.000584374
Total		0.00047208

Table 3. Control scale bars.

Digital Elevation Model

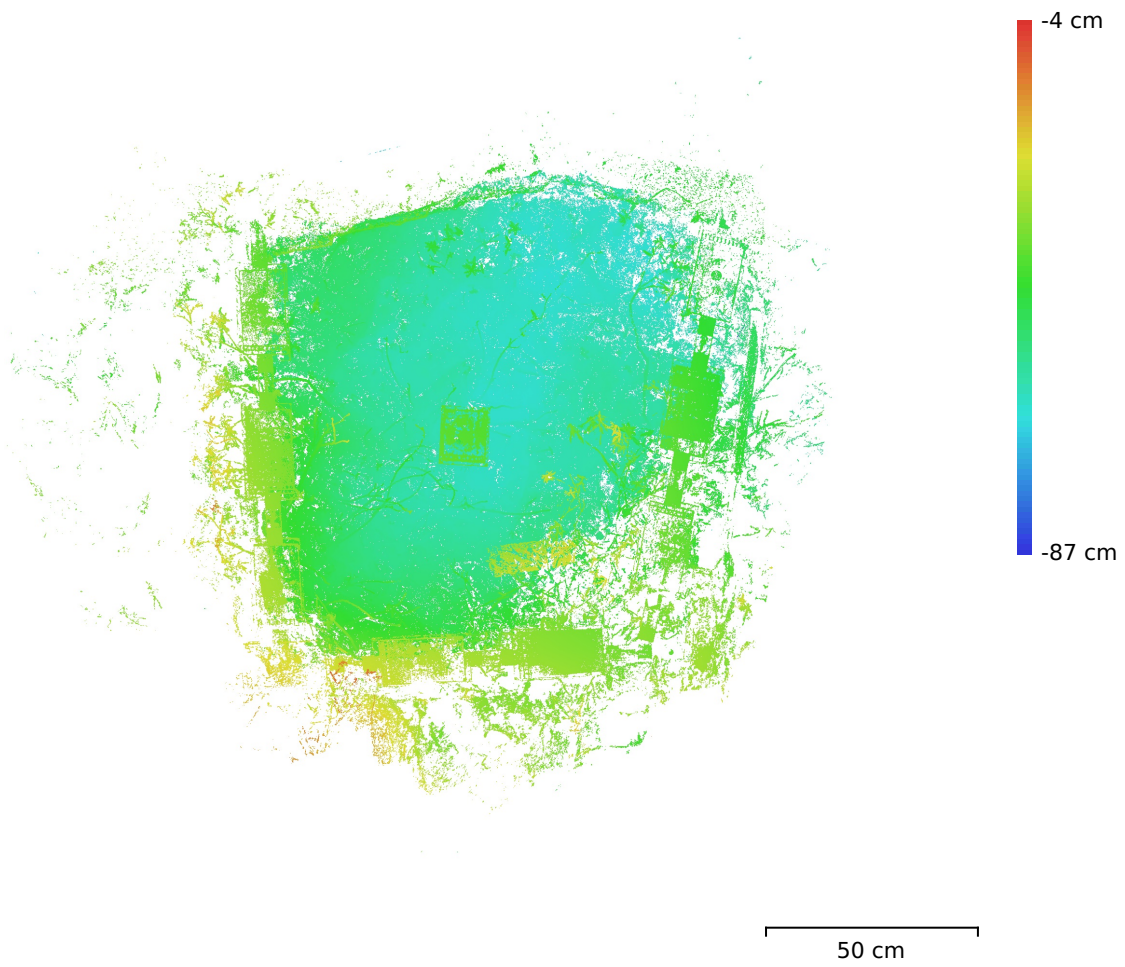


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	79
Aligned cameras	78
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	20,056 of 92,719
RMS reprojection error	0.126545 (0.390761 pix)
Max reprojection error	0.351368 (2.17979 pix)
Mean key point size	2.93586 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.27419

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	31 seconds
Matching memory usage	872.85 MB
Alignment time	13 seconds
Alignment memory usage	186.02 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 17:57:59
Software version	2.0.3.16960
File size	5.55 MB

Depth Maps

Count	77
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	5 minutes 5 seconds
Memory usage	12.45 GB
Date created	2023:12:29 18:03:22
Software version	2.0.3.16960
File size	1015.64 MB

Point Cloud

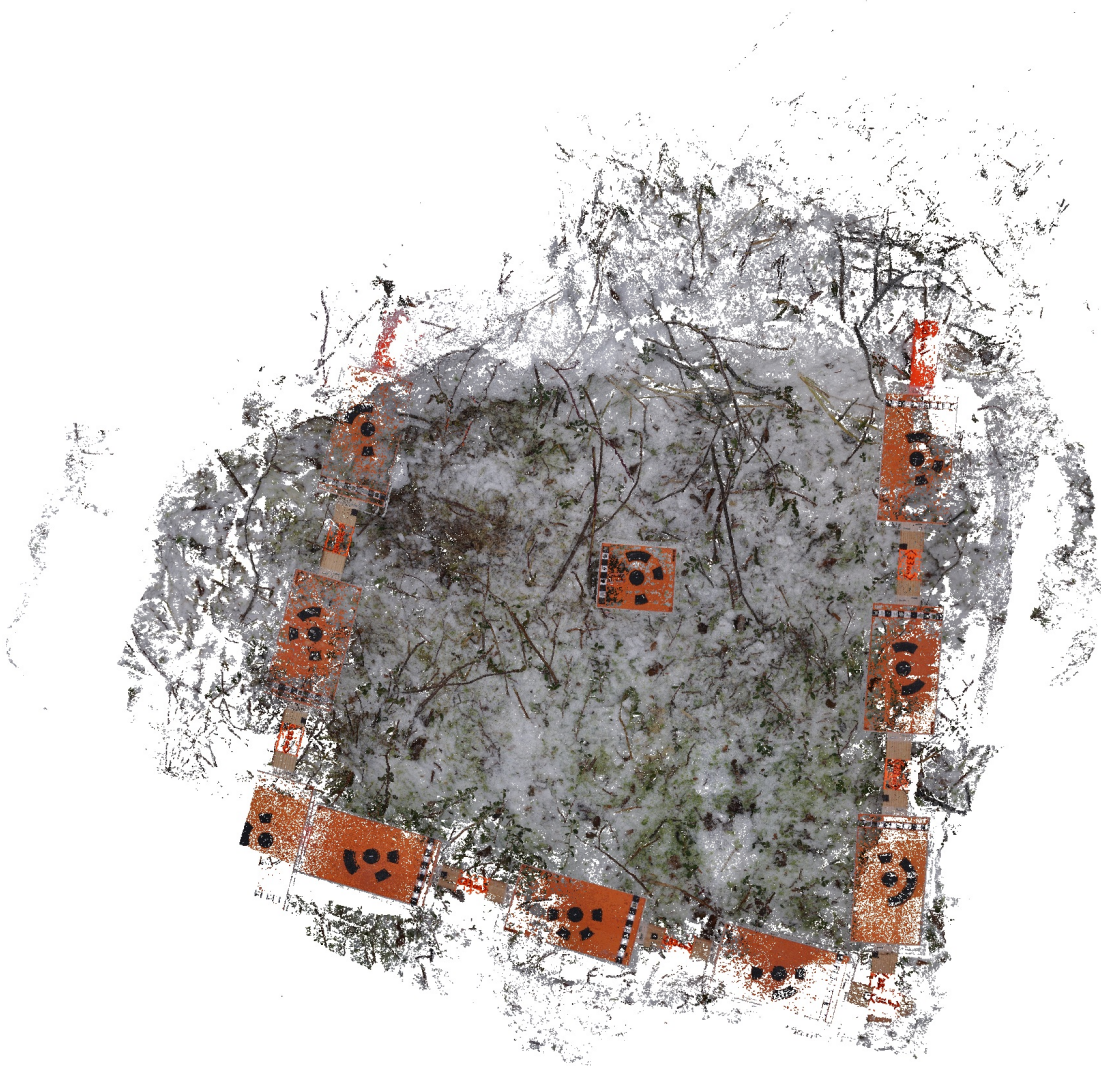
Points	32,461,908
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 18
Point classes	
Created (never classified)	32,461,908
Point cloud generation parameters	
Processing time	9 minutes 59 seconds
Memory usage	21.35 GB
Date created	2023:12:29 18:13:21
Software version	2.0.3.16960
File size	464.91 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

EN097-Sony

Processing Report
29 December 2023



Survey Data

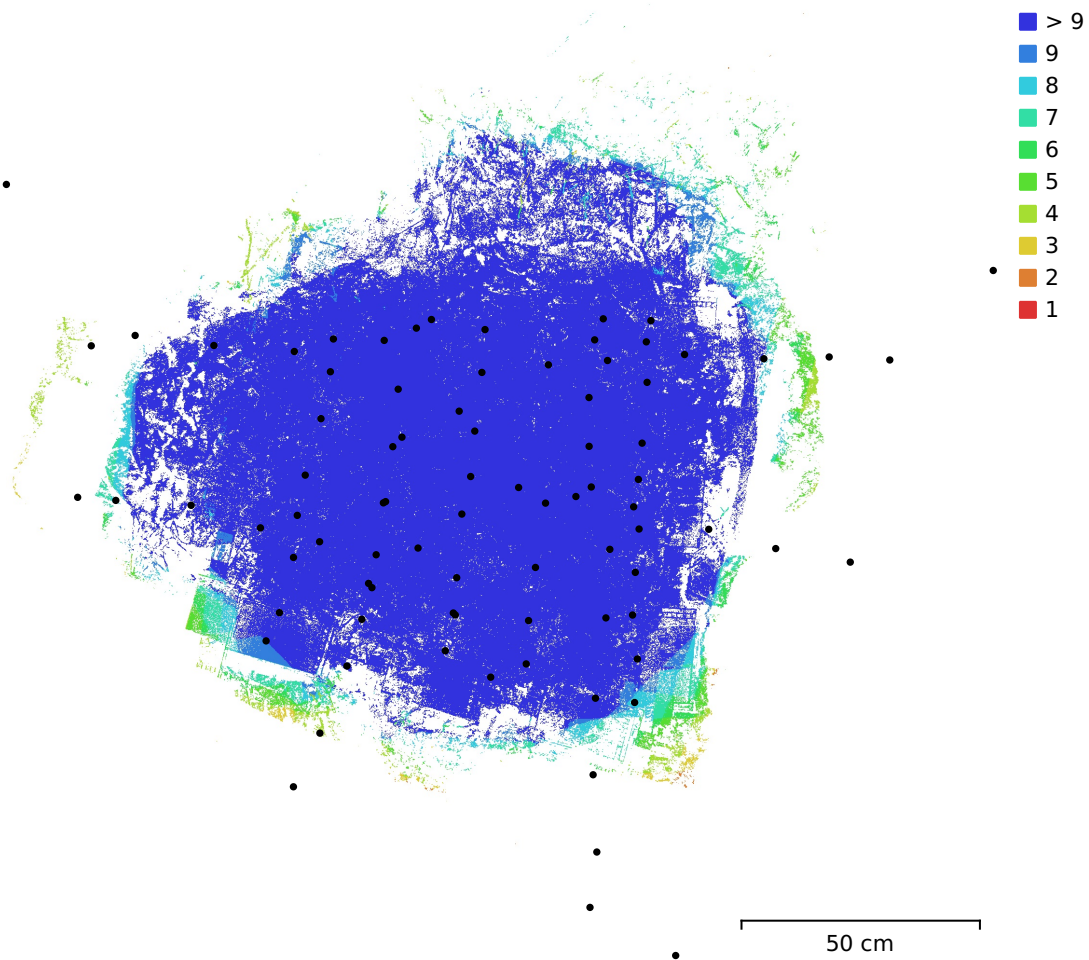


Fig. 1. Camera locations and image overlap.

Number of images:	84	Camera stations:	84
Flying altitude:	55.3 cm	Tie points:	32,079
Ground resolution:	0.0848 mm/pix	Projections:	75,810
Coverage area:	1.1 m ²	Reprojection error:	0.384 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

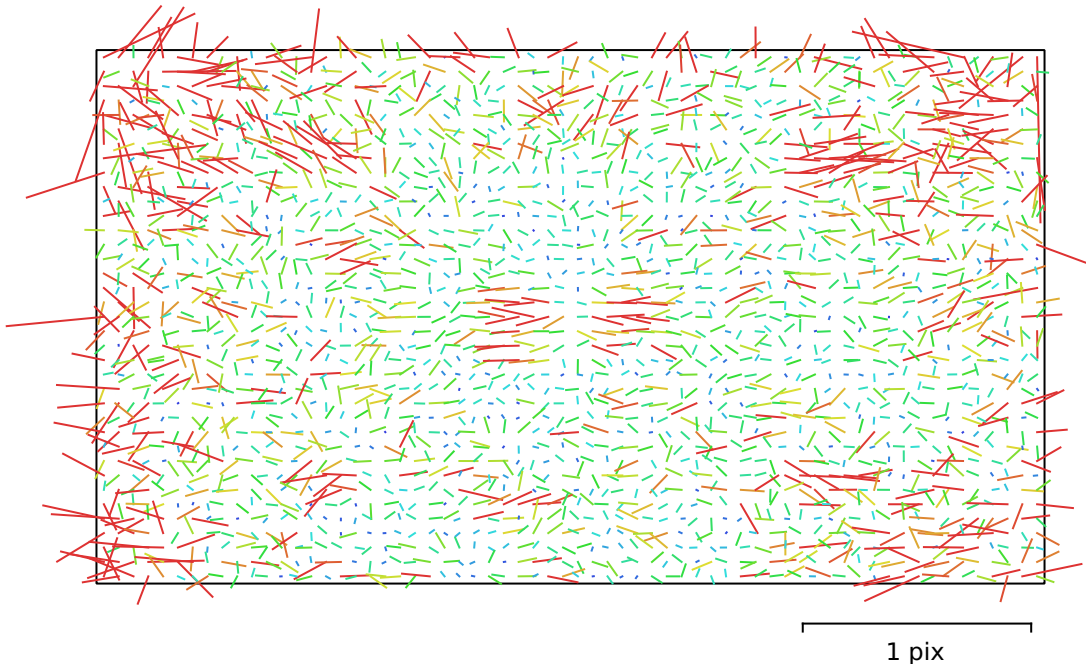


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

84 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6520.14	0.61	1.00	-0.07	-0.55	0.13	0.05	-0.05	0.00	-0.42
Cx	8.90922	0.62		1.00	-0.08	-0.01	-0.02	0.03	0.88	-0.05
Cy	-0.202236	0.76			1.00	-0.11	0.00	0.01	-0.07	0.84
K1	0.00362487	0.00024				1.00	-0.92	0.86	0.01	-0.11
K2	-0.00478607	0.0022					1.00	-0.98	-0.01	0.01
K3	0.102978	0.0059						1.00	0.01	0.00
P1	0.000534676	2.9e-05							1.00	-0.04
P2	-0.000738621	3e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330357	0.000357456
target 2_target 3	0.330384	0.000384416
target 4_target 5	0.329697	-0.00030294
target 5_target 6	0.33003	2.98091e-05
target 7_target 8	0.329698	-0.000301882
target 8_target 9	0.329832	-0.000168307
Total		0.000285094

Table 3. Control scale bars.

Digital Elevation Model

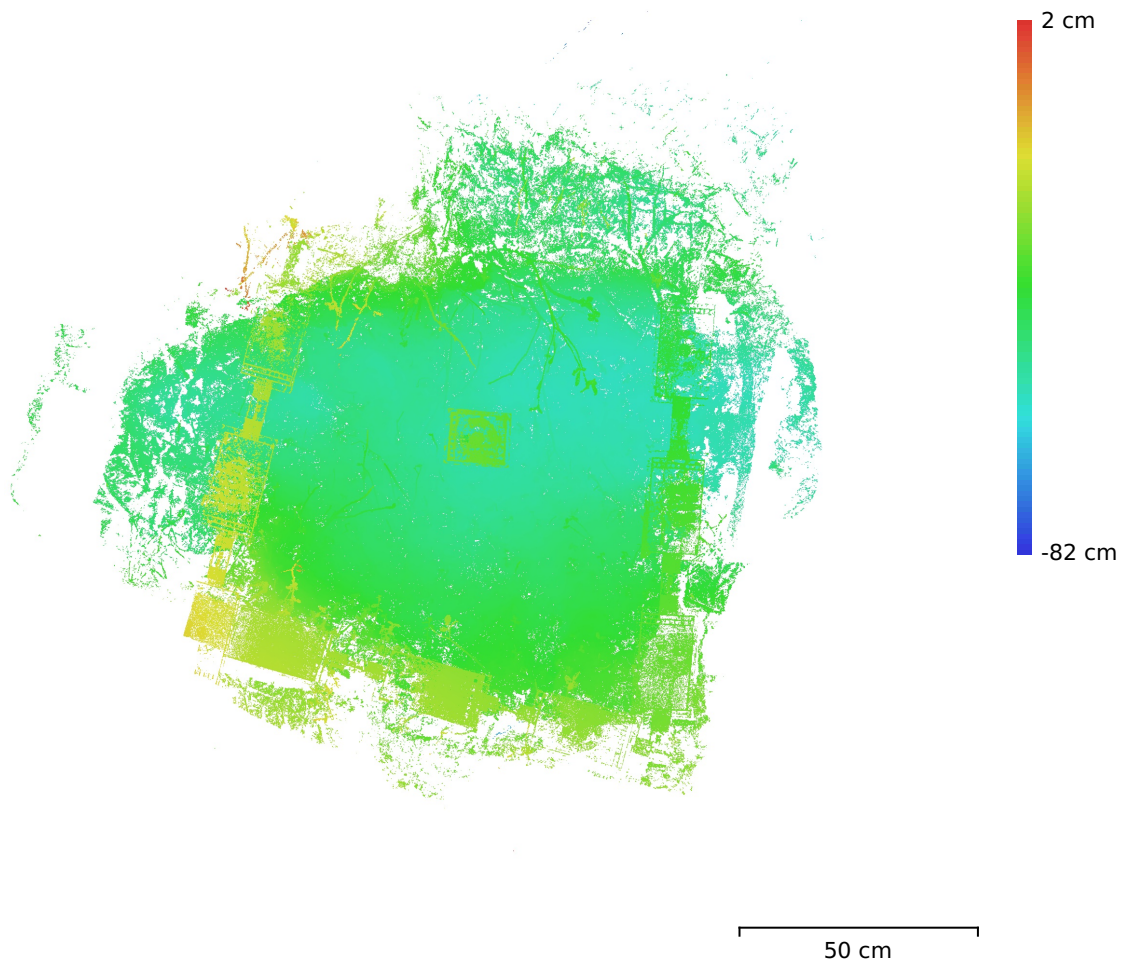


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	84
Aligned cameras	84
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	32,079 of 129,207
RMS reprojection error	0.132622 (0.383792 pix)
Max reprojection error	0.453853 (2.38022 pix)
Mean key point size	2.76048 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.34196

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	1 minutes 3 seconds
Matching memory usage	869.49 MB
Alignment time	19 seconds
Alignment memory usage	233.46 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 19:07:23
Software version	2.0.3.16960
File size	8.03 MB

Depth Maps

Count	81
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	6 minutes 21 seconds
Memory usage	12.98 GB
Date created	2023:12:29 19:14:08
Software version	2.0.3.16960
File size	1.29 GB

Point Cloud

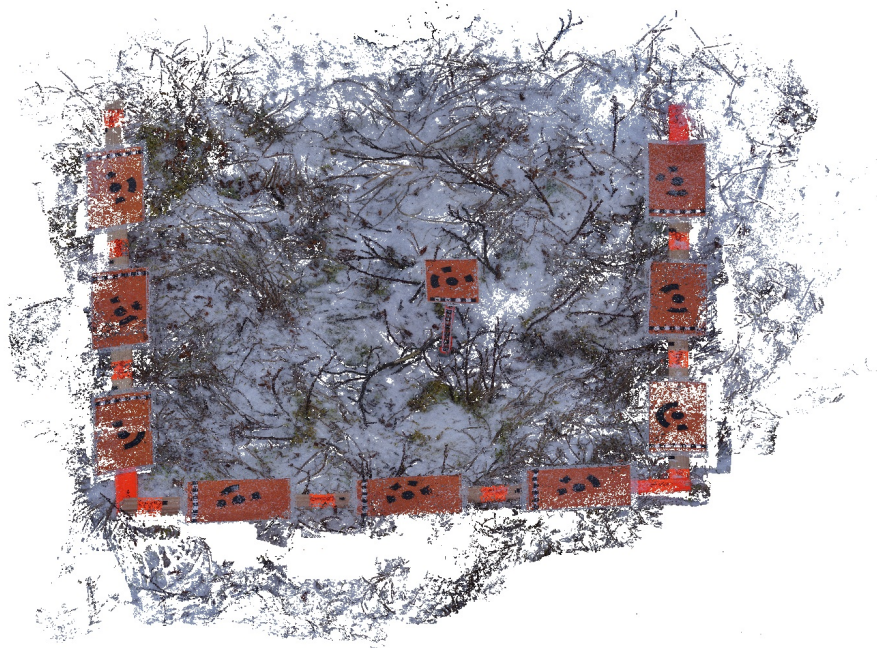
Points	31,996,459
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 18
Point classes	
Created (never classified)	31,996,459
Point cloud generation parameters	
Processing time	12 minutes 15 seconds
Memory usage	22.86 GB
Date created	2023:12:29 19:26:25
Software version	2.0.3.16960
File size	456.74 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

N613-Sony

Processing Report
22 December 2023



Survey Data

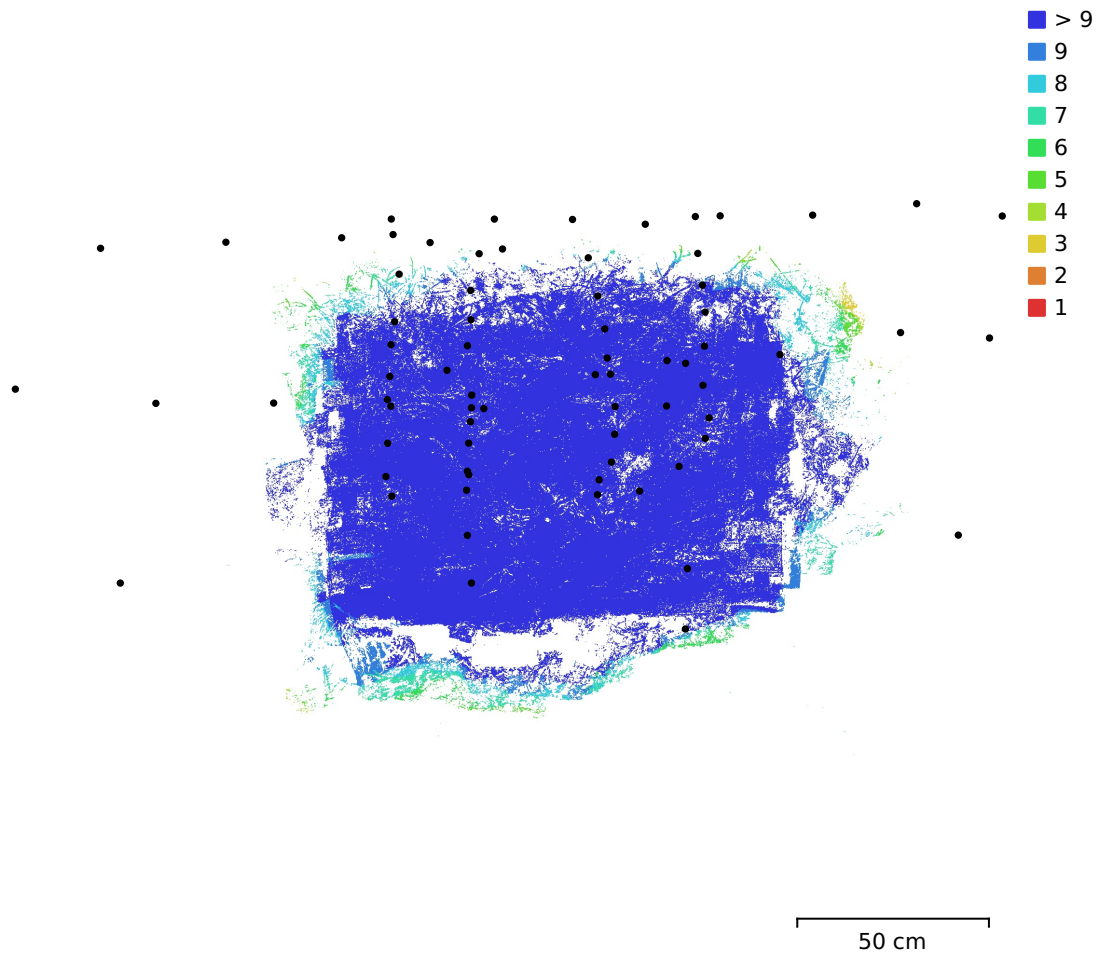


Fig. 1. Camera locations and image overlap.

Number of images:	72	Camera stations:	72
Flying altitude:	52.4 cm	Tie points:	22,641
Ground resolution:	0.0842 mm/pix	Projections:	47,863
Coverage area:	1.08 m ²	Reprojection error:	0.365 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No
ILCE-6000, E PZ...	6000 x 3376	24 mm	4.19 x 4.19 μm	No

Table 1. Cameras.

Camera Calibration

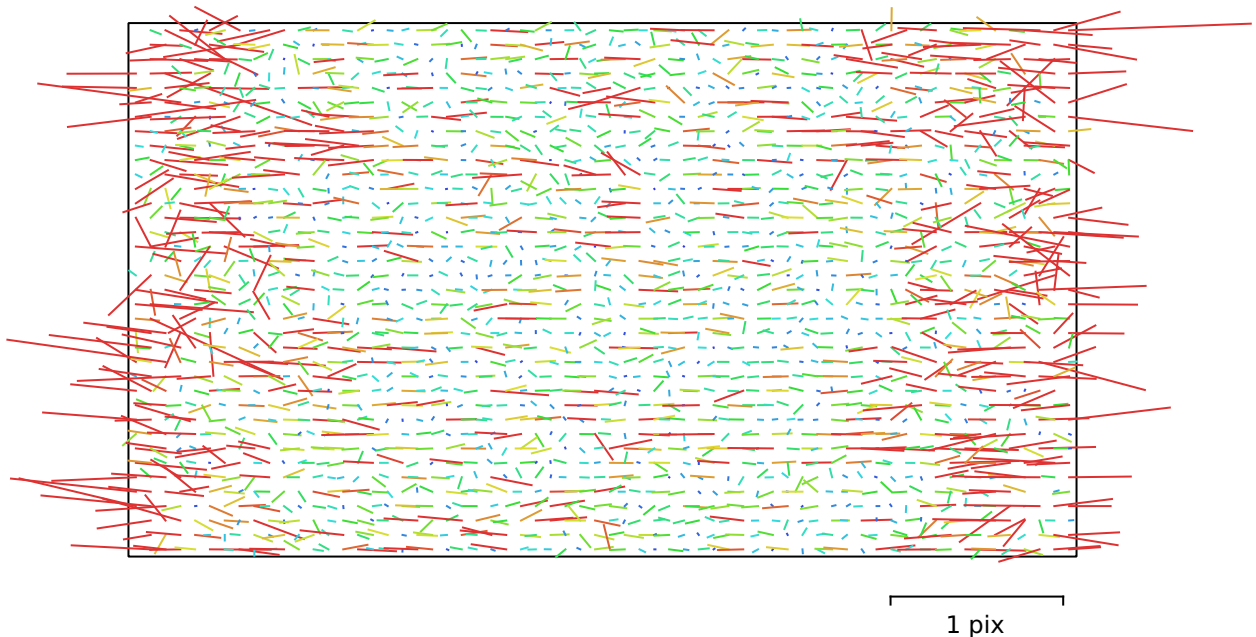


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

38 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6226.14	2.8	1.00	-0.31	-0.07	0.11	0.02	0.00	-0.05	-0.05
Cx	6.42232	1.6		1.00	-0.02	0.05	-0.01	0.00	0.72	-0.02
Cy	11.0269	2			1.00	-0.15	0.02	-0.02	-0.17	0.59
K1	-0.00194915	0.00048				1.00	-0.89	0.82	0.09	-0.11
K2	-0.00207364	0.0036					1.00	-0.98	0.00	0.02
K3	0.085174	0.0088						1.00	-0.01	-0.01
P1	0.00058749	5.6e-05							1.00	-0.09
P2	-0.000593427	8.2e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

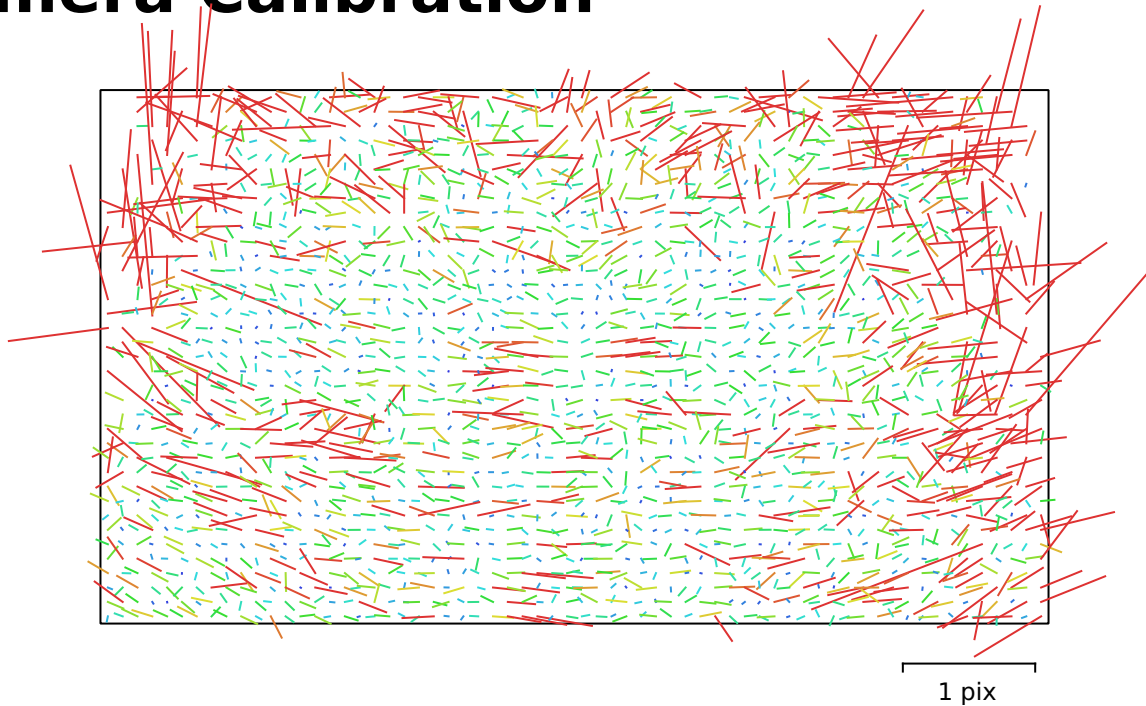


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (24mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (24mm)

34 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	24 mm	4.19 x 4.19 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6152.84	1.9	1.00	-0.03	-0.74	0.25	-0.04	-0.00	-0.01	-0.34
Cx	-22.4613	1.4		1.00	0.14	-0.00	0.00	0.01	0.88	0.13
Cy	50.9965	2.4			1.00	-0.24	0.08	-0.02	0.14	0.70
K1	-0.0118379	0.00048				1.00	-0.90	0.83	0.02	-0.16
K2	0.0302758	0.0036					1.00	-0.98	-0.01	0.05
K3	-0.00194208	0.0086						1.00	0.02	0.00
P1	-0.00010393	6.9e-05							1.00	0.18
P2	0.000255581	9.8e-05								1.00

Table 3. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330311	0.00031107
target 7_target 8	0.329688	-0.000311653
Total		0.000311362

Table 4. Control scale bars.

Digital Elevation Model

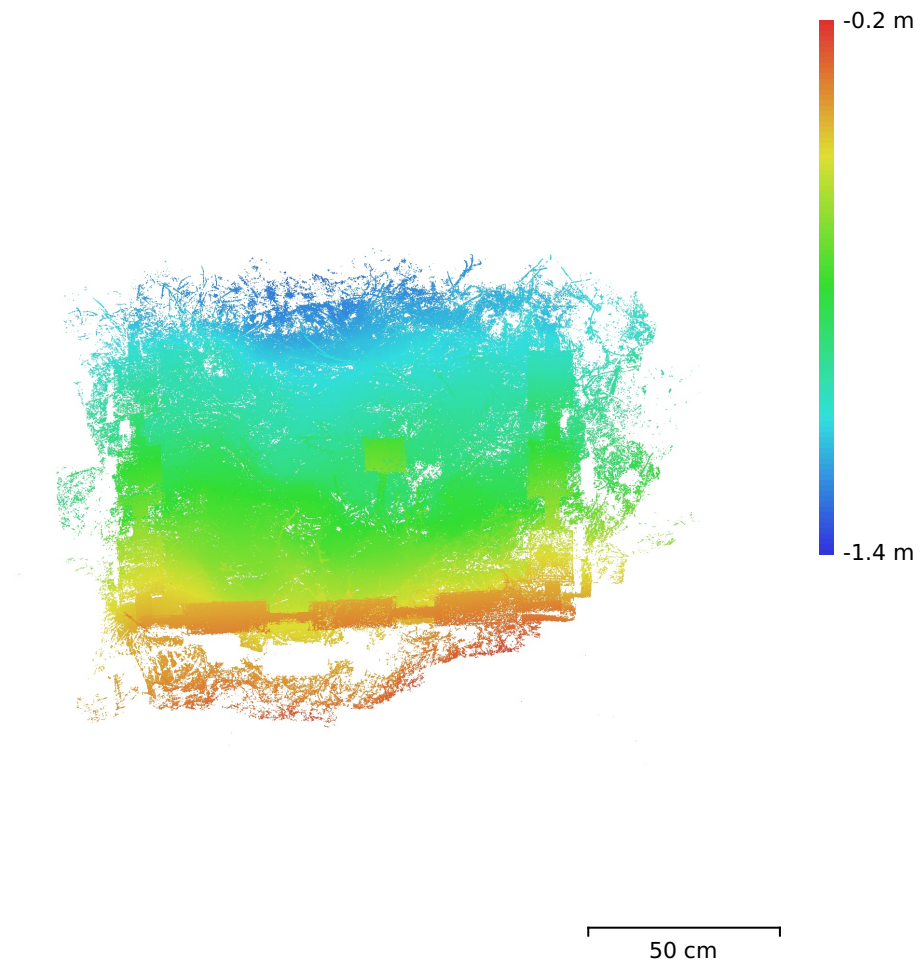


Fig. 4. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	72
Aligned cameras	72
Markers	8
Scale bars	4
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	22,641 of 84,831
RMS reprojection error	0.123564 (0.364778 pix)
Max reprojection error	0.618703 (3.50979 pix)
Mean key point size	2.83745 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.15275

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	34 seconds
Matching memory usage	848.07 MB
Alignment time	14 seconds
Alignment memory usage	166.69 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:22 20:14:30
Software version	2.0.3.16960
File size	4.94 MB

Depth Maps

Count	67
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 22 seconds
Memory usage	10.65 GB
Date created	2023:12:22 20:19:10
Software version	2.0.3.16960
File size	1004.25 MB

Point Cloud

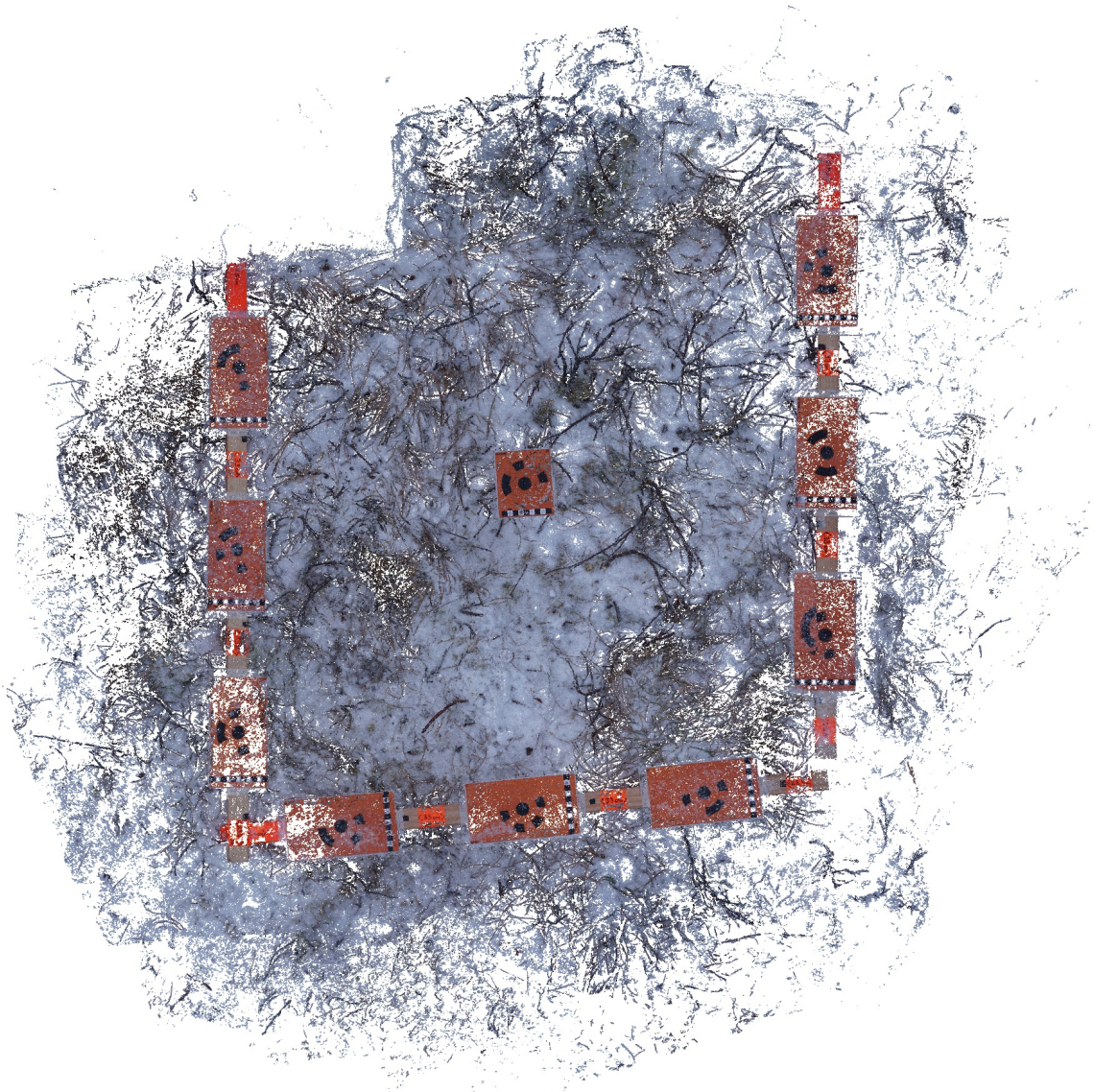
Points	36,124,945
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 12
Point classes	
Created (never classified)	36,124,945
Point cloud generation parameters	
Processing time	8 minutes 46 seconds
Memory usage	19.11 GB
Date created	2023:12:22 20:27:57
Software version	2.0.3.16960
File size	517.24 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

N617-Sony

Processing Report
22 December 2023



Survey Data

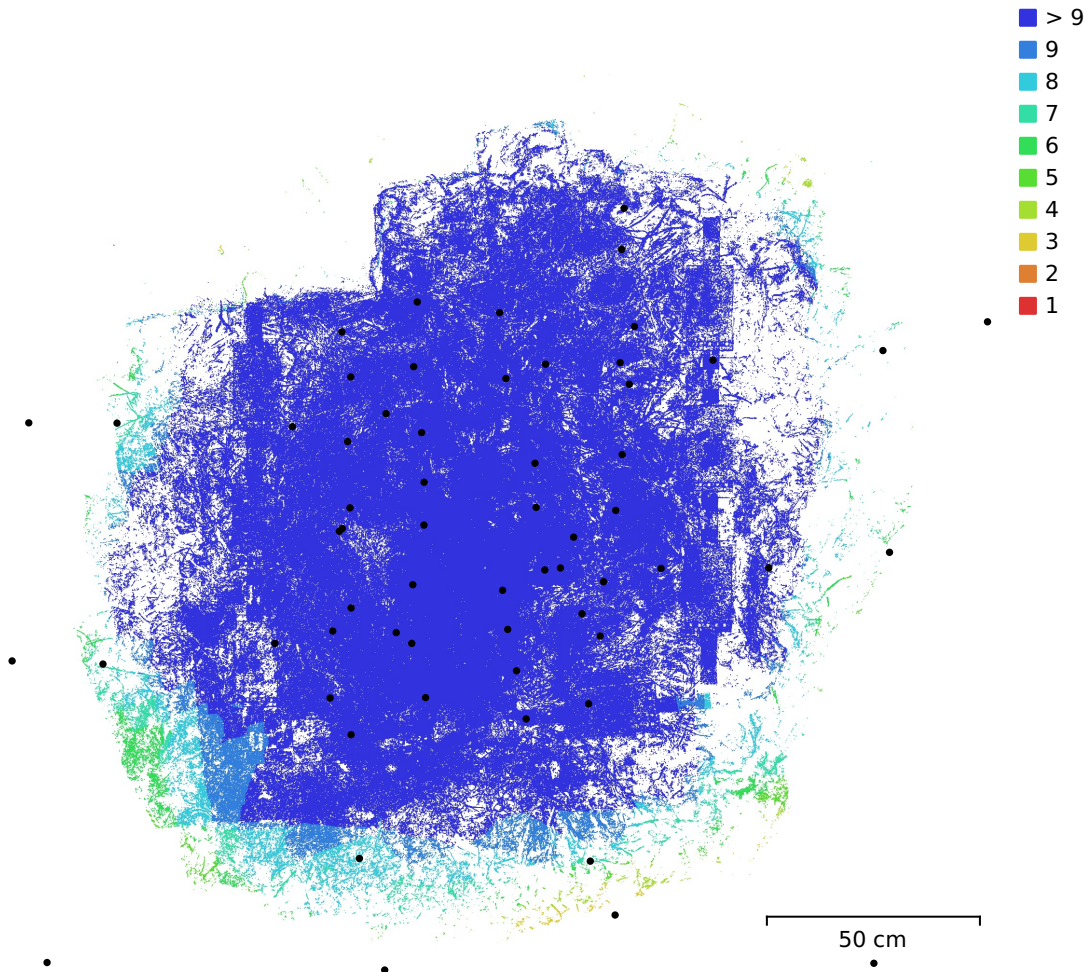


Fig. 1. Camera locations and image overlap.

Number of images:	61	Camera stations:	61
Flying altitude:	54.5 cm	Tie points:	18,309
Ground resolution:	0.136 mm/pix	Projections:	40,179
Coverage area:	1.72 m ²	Reprojection error:	0.41 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	16 mm	4.19 x 4.19 μ m	No

Table 1. Cameras.

Camera Calibration

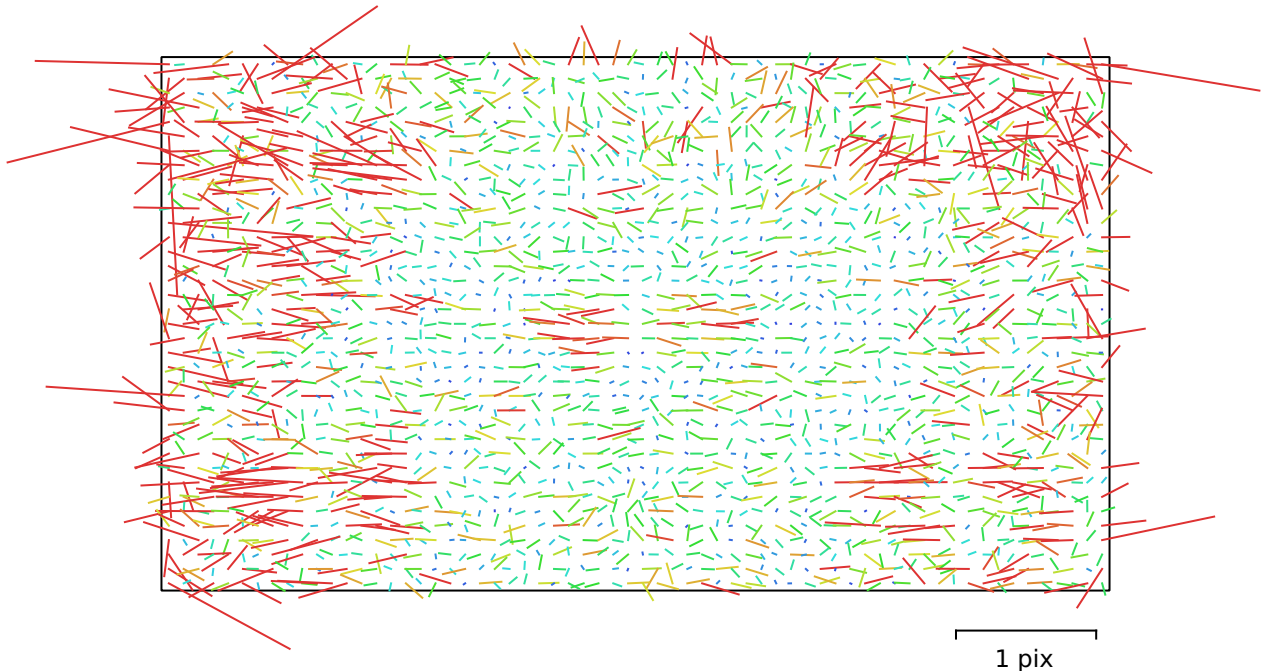


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (16mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (16mm)

61 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	16 mm	4.19 x 4.19 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	4013.9	0.4	1.00	0.10	-0.39	0.02	0.10	-0.09	0.08	-0.08
Cx	23.0467	0.4		1.00	-0.04	0.02	-0.00	0.00	0.88	-0.02
Cy	35.3132	0.43			1.00	-0.11	0.06	-0.04	-0.04	0.66
K1	-0.0548103	0.00016				1.00	-0.90	0.83	0.05	-0.12
K2	0.0587426	0.00052					1.00	-0.98	-0.00	0.06
K3	-0.0225499	0.00052						1.00	0.01	-0.04
P1	0.00224147	2.5e-05							1.00	-0.05
P2	0.00119782	2.5e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330061	6.08262e-05
target 2_target 3	0.330212	0.000212227
target 4_target 5	0.330234	0.000233952
target 8_target 9	0.32949	-0.000509552
Total		0.000301296

Table 3. Control scale bars.

Digital Elevation Model

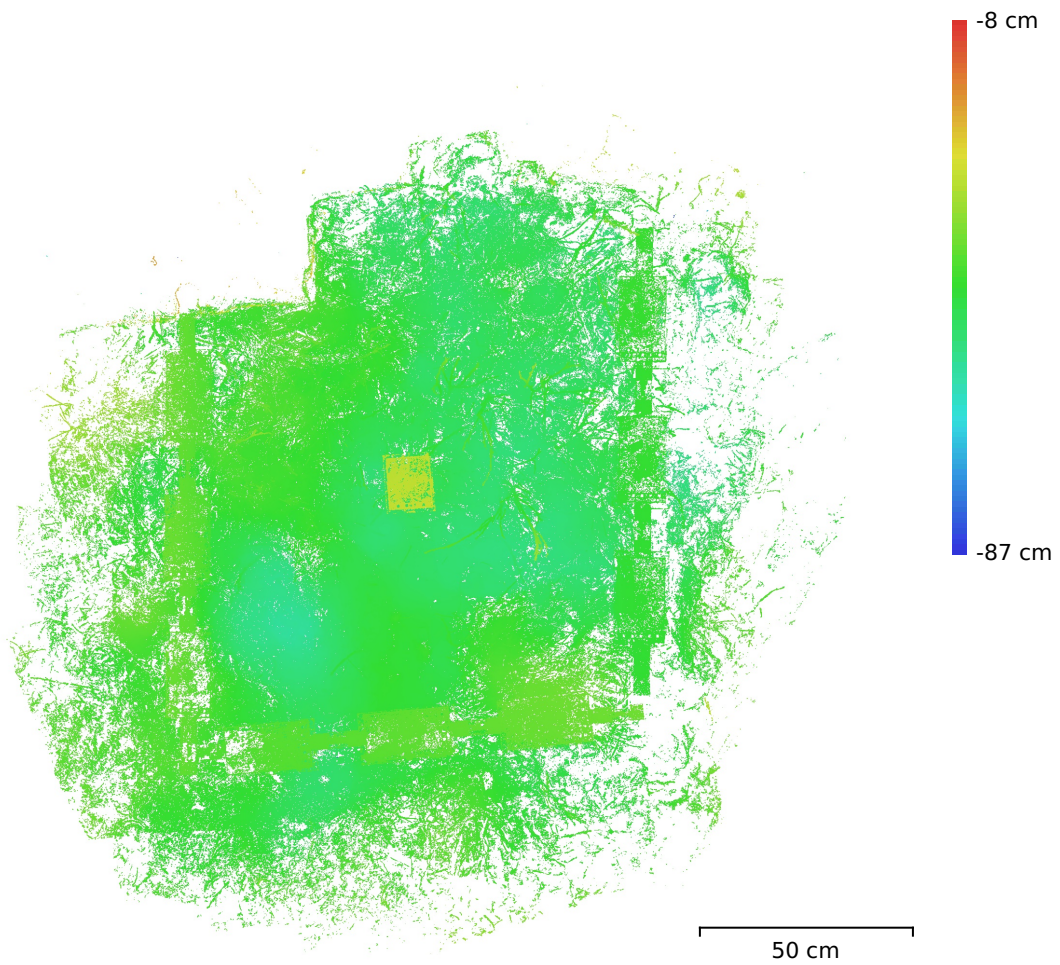


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	61
Aligned cameras	61
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	18,309 of 76,712
RMS reprojection error	0.141167 (0.409561 pix)
Max reprojection error	0.457137 (2.08642 pix)
Mean key point size	2.72416 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.3033

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	32 seconds
Matching memory usage	846.35 MB
Alignment time	8 seconds
Alignment memory usage	177.15 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:22 20:31:19
Software version	2.0.3.16960
File size	4.68 MB

Depth Maps

Count	60
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 23 seconds
Memory usage	11.50 GB
Date created	2023:12:22 20:35:53
Software version	2.0.3.16960
File size	1007.29 MB

Point Cloud

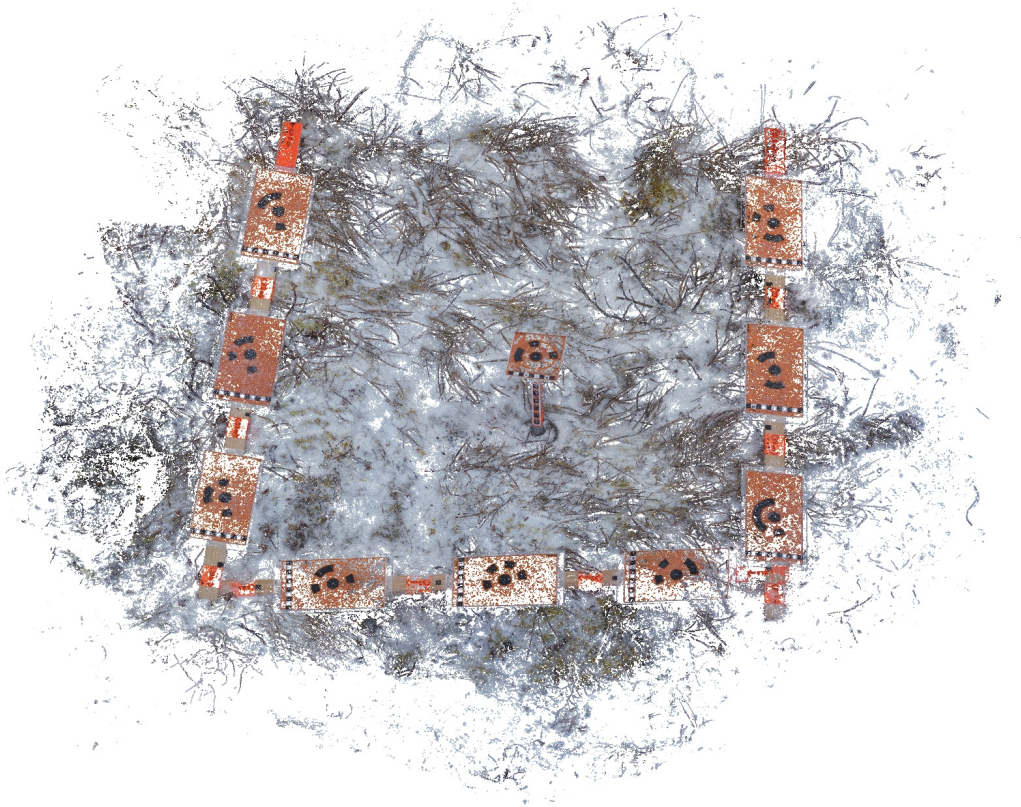
Points	40,665,027
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 17
Point classes	
Created (never classified)	40,665,027
Point cloud generation parameters	
Processing time	8 minutes 35 seconds
Memory usage	17.57 GB
Date created	2023:12:22 20:44:29
Software version	2.0.3.16960
File size	584.31 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

N618-Lumix

Processing Report
22 December 2023



Survey Data

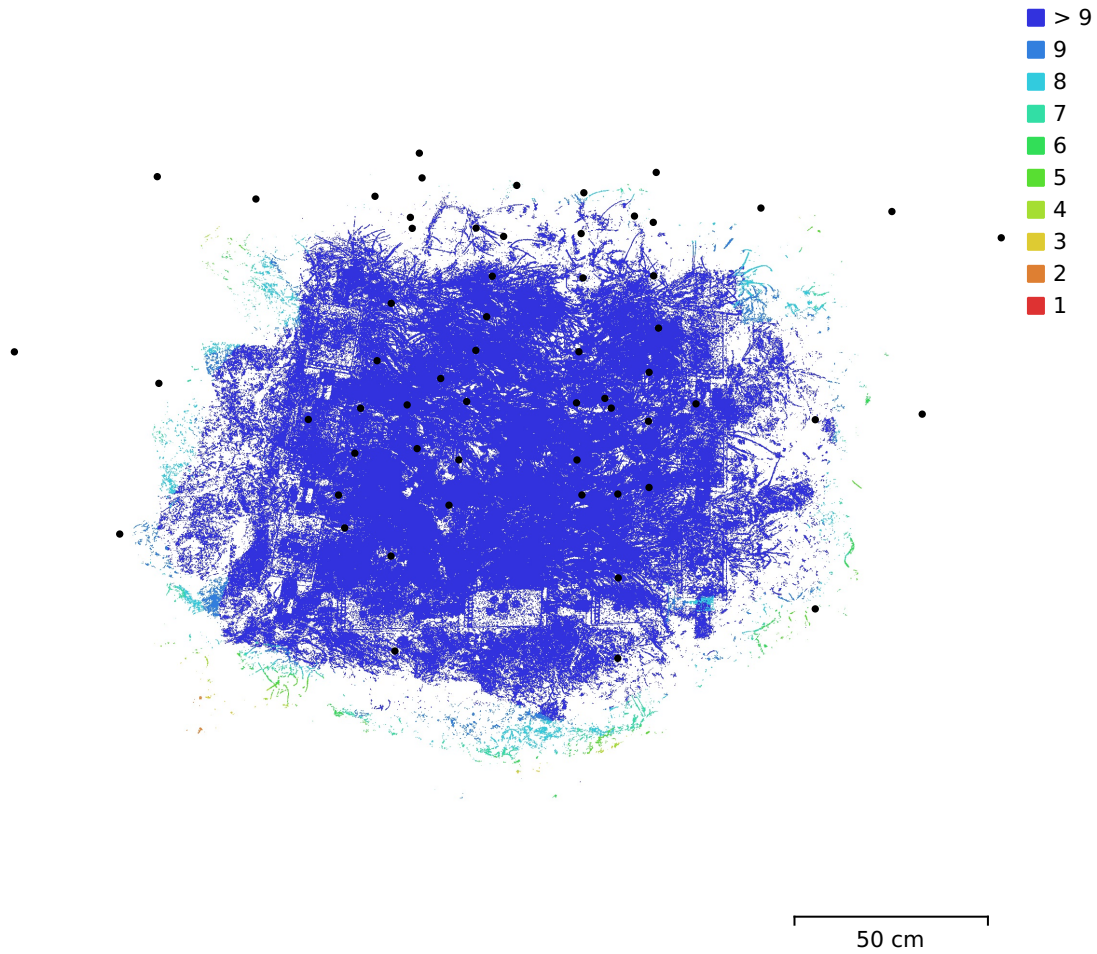


Fig. 1. Camera locations and image overlap.

Number of images:	58	Camera stations:	58
Flying altitude:	57.5 cm	Tie points:	20,535
Ground resolution:	0.134 mm/pix	Projections:	45,812
Coverage area:	1.24 m ²	Reprojection error:	0.372 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
DC-TS7 (4.9mm)	5184 x 3888	4.9 mm	1.17 x 1.17 μ m	No

Table 1. Cameras.

Camera Calibration

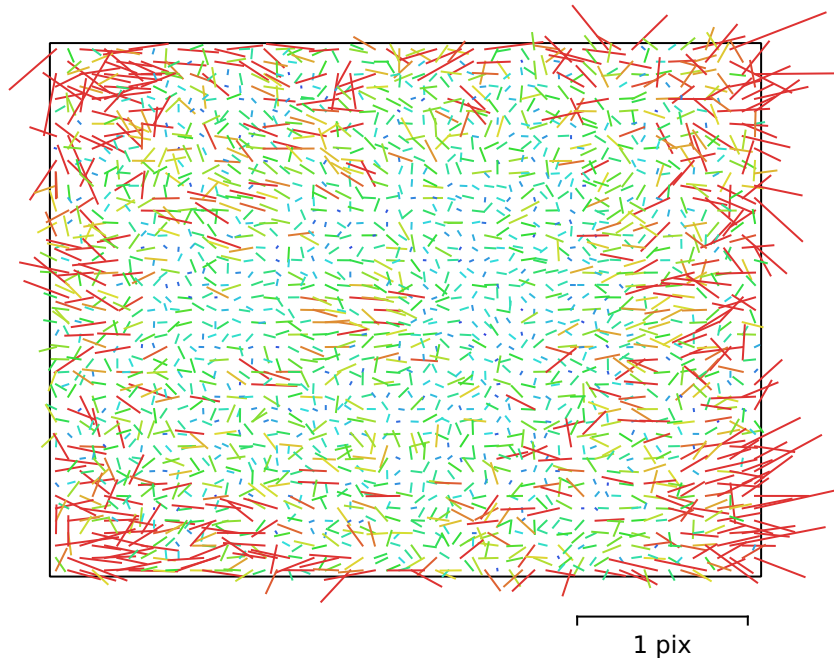


Fig. 2. Image residuals for DC-TS7 (4.9mm).

DC-TS7 (4.9mm)

58 images

Type	Resolution	Focal Length	Pixel Size
Frame	5184 x 3888	4.9 mm	1.17 x 1.17 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	4273.6	0.32	1.00	0.04	-0.49	-0.02	0.10	-0.10	0.04	-0.14
Cx	7.12971	0.27		1.00	-0.10	0.00	0.01	-0.01	0.85	-0.10
Cy	-54.5794	0.38			1.00	-0.08	0.01	-0.00	-0.05	0.71
K1	-0.00867792	0.00018				1.00	-0.94	0.88	0.01	-0.10
K2	0.0143518	0.00075					1.00	-0.98	0.01	0.04
K3	-0.0207699	0.00099						1.00	-0.00	-0.04
P1	0.0012798	1.7e-05							1.00	-0.08
P2	-0.00295152	1.9e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330051	5.09161e-05
target 2_target 3	0.329792	-0.000207989
target 4_target 5	0.329994	-6.43739e-06
target 5_target 6	0.330163	0.000163282
Total		0.00013468

Table 3. Control scale bars.

Digital Elevation Model

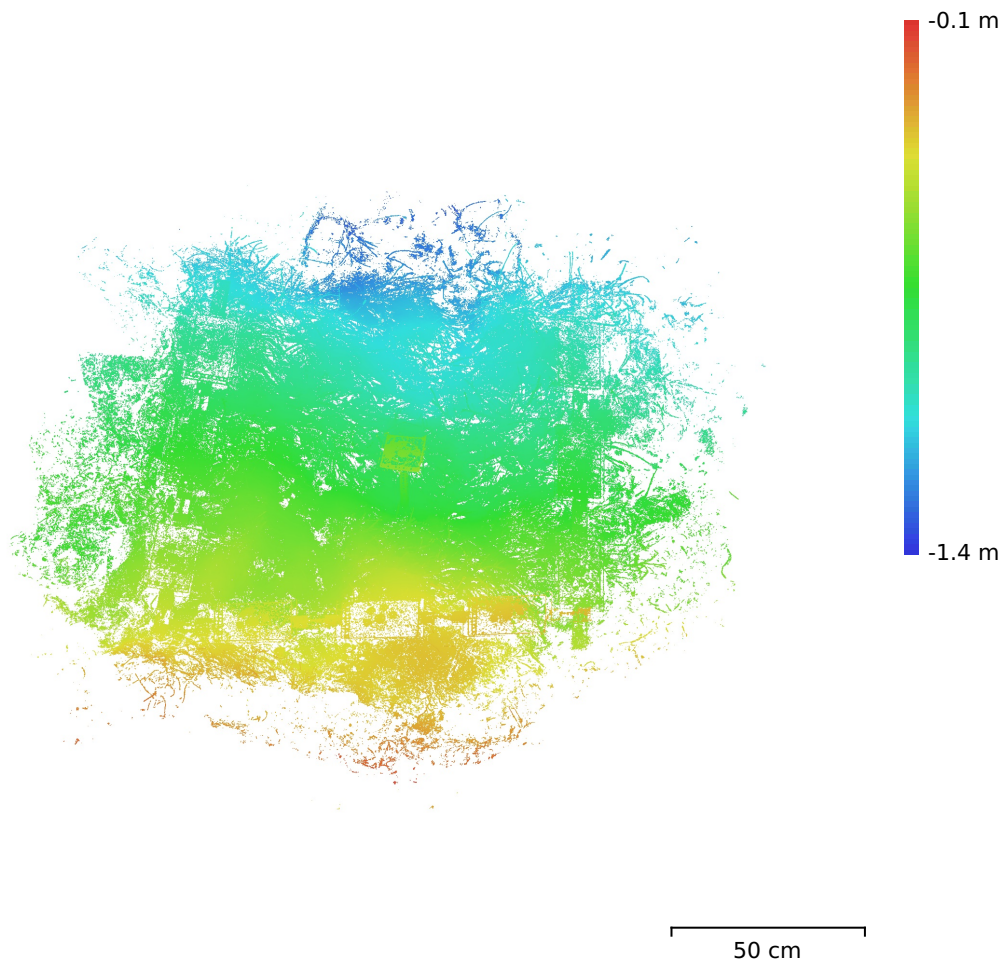


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	58
Aligned cameras	58
Markers	8
Scale bars	4
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	20,535 of 74,399
RMS reprojection error	0.134533 (0.37193 pix)
Max reprojection error	0.420017 (2.00007 pix)
Mean key point size	2.63149 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.34964

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	29 seconds
Matching memory usage	828.30 MB
Alignment time	7 seconds
Alignment memory usage	395.17 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:22 18:45:41
Software version	2.0.3.16960
File size	4.68 MB

Depth Maps

Count	58
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 21 seconds
Memory usage	11.52 GB
Date created	2023:12:22 18:50:13
Software version	2.0.3.16960
File size	856.69 MB

Point Cloud

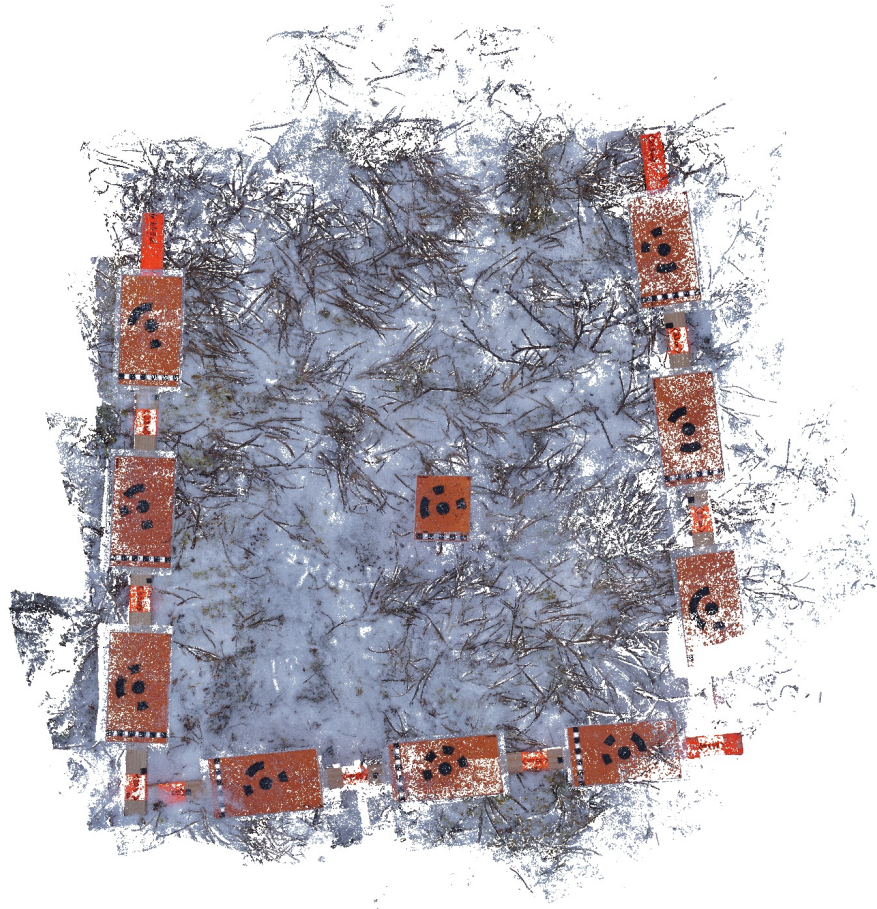
Points	31,279,717
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 18
Point classes	
Created (never classified)	31,279,717
Point cloud generation parameters	
Processing time	6 minutes 56 seconds
Memory usage	16.68 GB
Date created	2023:12:22 18:57:10
Software version	2.0.3.16960
File size	450.18 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

N618-Sony

Processing Report
22 December 2023



Survey Data

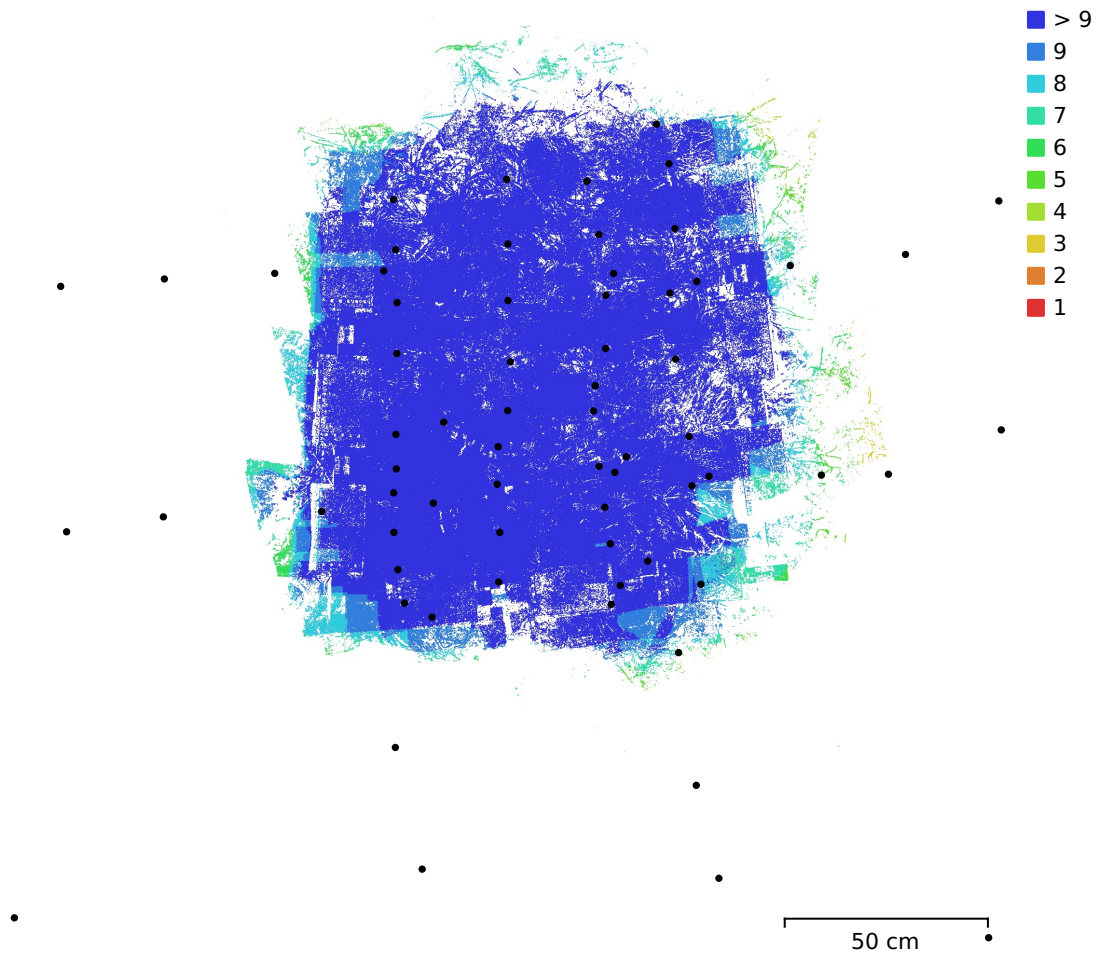


Fig. 1. Camera locations and image overlap.

Number of images:	68	Camera stations:	67
Flying altitude:	53.1 cm	Tie points:	18,706
Ground resolution:	0.0793 mm/pix	Projections:	39,840
Coverage area:	1.3 m ²	Reprojection error:	0.353 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No
ILCE-6000, E PZ...	6000 x 3376	26 mm	4.19 x 4.19 μm	No
ILCE-6000, E PZ...	6000 x 3376	27 mm	4.24 x 4.24 μm	No

Table 1. Cameras.

Camera Calibration

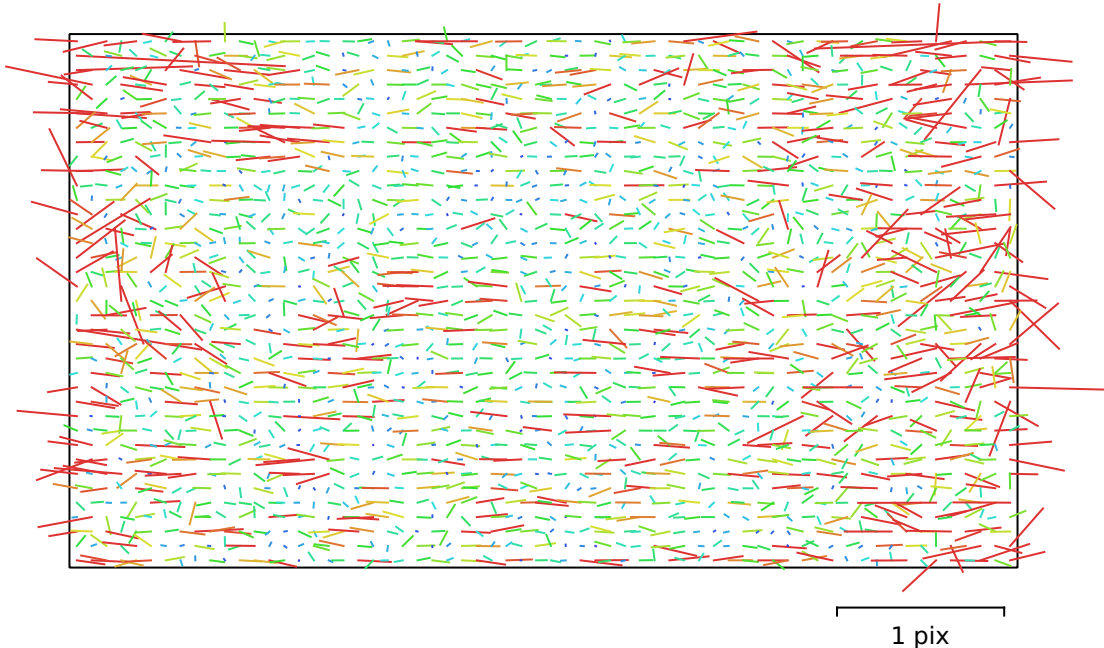


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

42 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6699.11	2.4	1.00	0.42	-0.24	0.05	0.08	-0.06	0.33	-0.08
Cx	30.5816	1.5		1.00	-0.13	0.04	-0.01	0.02	0.70	-0.06
Cy	24.2058	1.7			1.00	-0.00	-0.03	0.03	-0.00	0.64
K1	-0.0165304	0.00048				1.00	-0.92	0.85	0.05	0.01
K2	0.129425	0.0042					1.00	-0.98	-0.02	-0.02
K3	-0.196876	0.012						1.00	0.02	0.02
P1	0.00187363	4.7e-05							1.00	0.02
P2	0.000131064	4.9e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

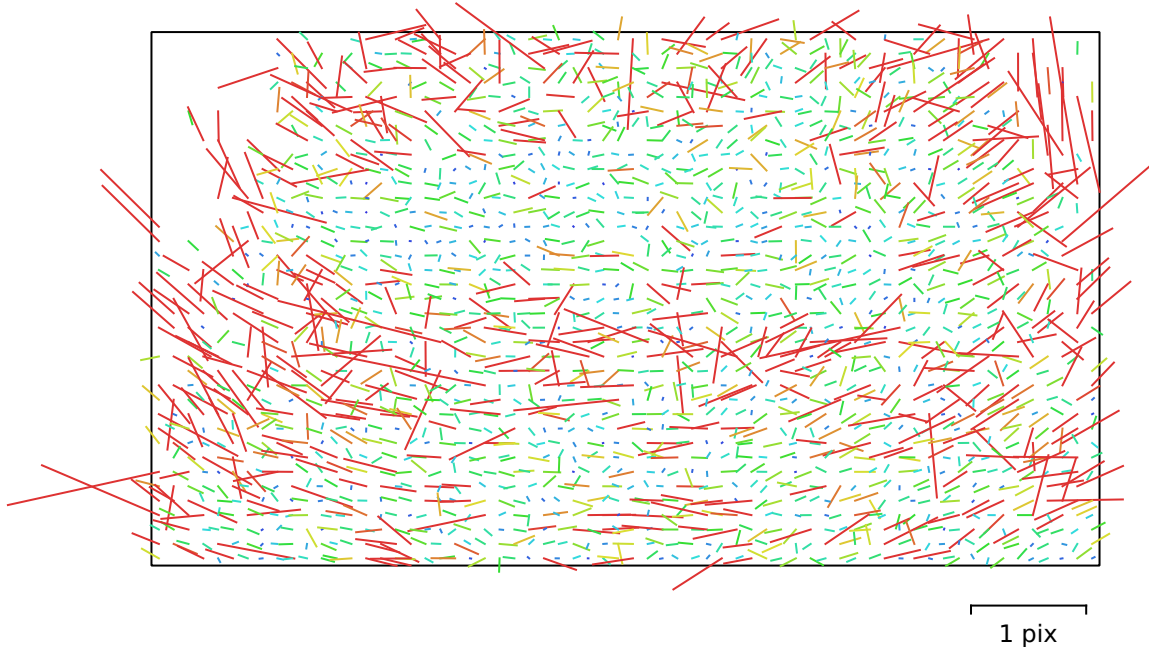


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (26mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (26mm)

24 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	26 mm	4.19 x 4.19 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6872.42	2.3	1.00	0.11	-0.71	0.19	0.00	-0.06	0.09	-0.34
Cx	7.5614	1.9		1.00	-0.13	0.01	0.01	-0.01	0.92	0.00
Cy	-7.89856	3.1			1.00	-0.24	0.09	-0.01	-0.13	0.70
K1	-0.01841	0.00076				1.00	-0.90	0.82	0.00	-0.19
K2	0.123469	0.007					1.00	-0.98	0.00	0.08
K3	-0.176048	0.021						1.00	0.00	-0.01
P1	0.00130581	9.2e-05							1.00	0.01
P2	-0.000874668	0.00011								1.00

Table 3. Calibration coefficients and correlation matrix.

Camera Calibration



Fig. 4. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (27mm). 1 pix

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (27mm)

2 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	27 mm	4.24 x 4.24 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	7004.1	9.1	1.00	0.17	-0.92	-0.19	0.13	-0.11	0.17	-0.25
Cx	34.5315	9.7		1.00	-0.09	0.18	-0.19	0.17	0.97	0.22
Cy	25.4038	12			1.00	0.06	-0.01	-0.02	-0.09	0.49
K1	0.0780072	0.0082				1.00	-0.97	0.92	0.23	-0.10
K2	-0.982938	0.13					1.00	-0.98	-0.25	0.14
K3	3.19787	0.57						1.00	0.22	-0.18
P1	0.00294578	0.00053							1.00	0.21
P2	-0.000960071	0.00028								1.00

Table 4. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330156	0.000156274
target 4_target 5	0.329935	-6.5264e-05
target 5_target 6	0.329909	-9.11165e-05
Total		0.00011103

Table 5. Control scale bars.

Digital Elevation Model

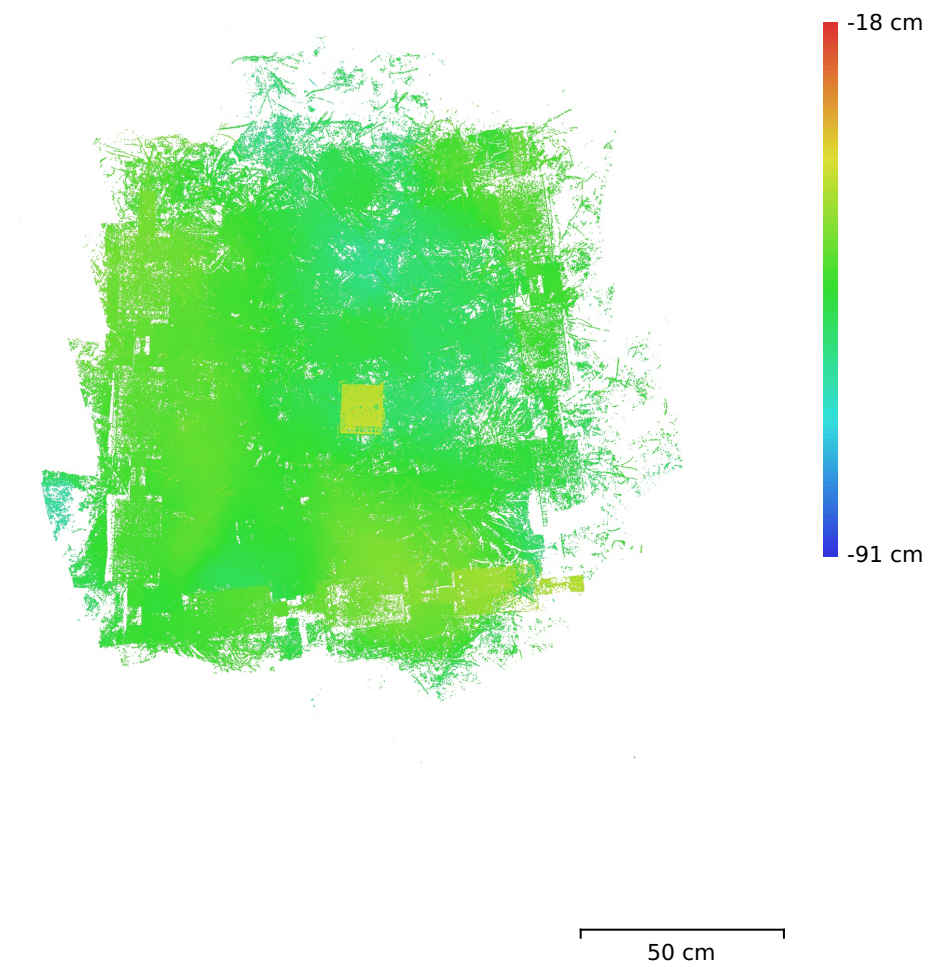


Fig. 5. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	68
Aligned cameras	67
Markers	9
Scale bars	5
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	18,706 of 68,513
RMS reprojection error	0.122535 (0.353327 pix)
Max reprojection error	0.393477 (2.47614 pix)
Mean key point size	2.72928 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.14135

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	33 seconds
Matching memory usage	841.05 MB
Alignment time	17 seconds
Alignment memory usage	146.41 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:22 18:27:53
Software version	2.0.3.16960
File size	3.98 MB

Depth Maps

Count	66
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	3 minutes 50 seconds
Memory usage	11.04 GB
Date created	2023:12:22 18:32:04
Software version	2.0.3.16960
File size	972.63 MB

Point Cloud

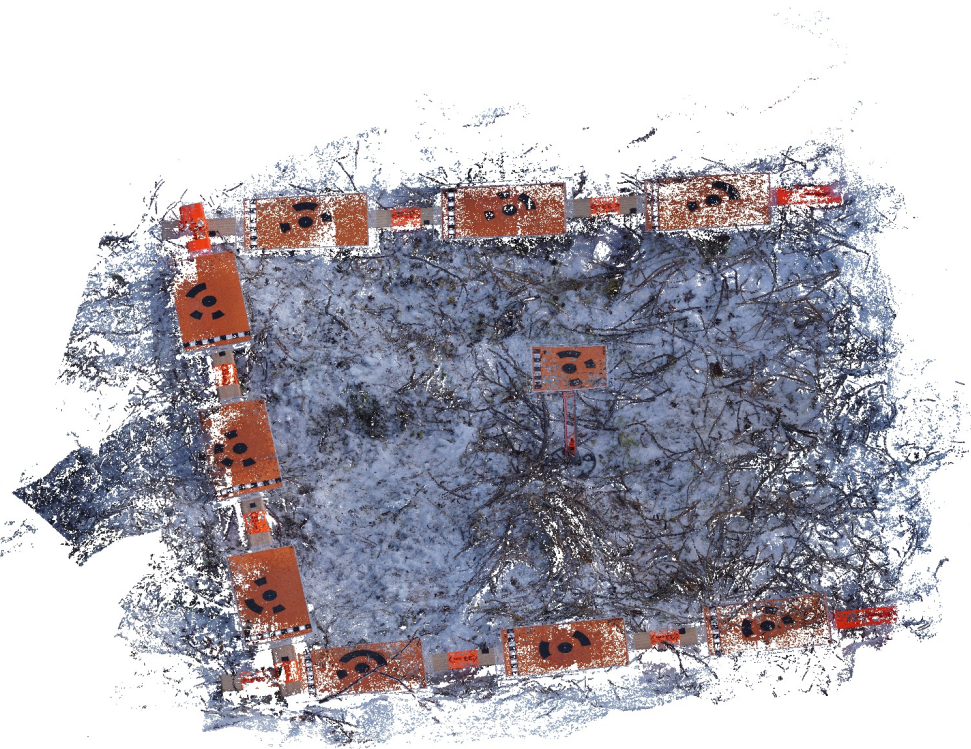
Points	31,761,212
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 11
Point classes	
Created (never classified)	31,761,212
Point cloud generation parameters	
Processing time	9 minutes 13 seconds
Memory usage	18.32 GB
Date created	2023:12:22 18:41:18
Software version	2.0.3.16960
File size	453.18 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

N655-Sony

Processing Report
22 December 2023



Survey Data

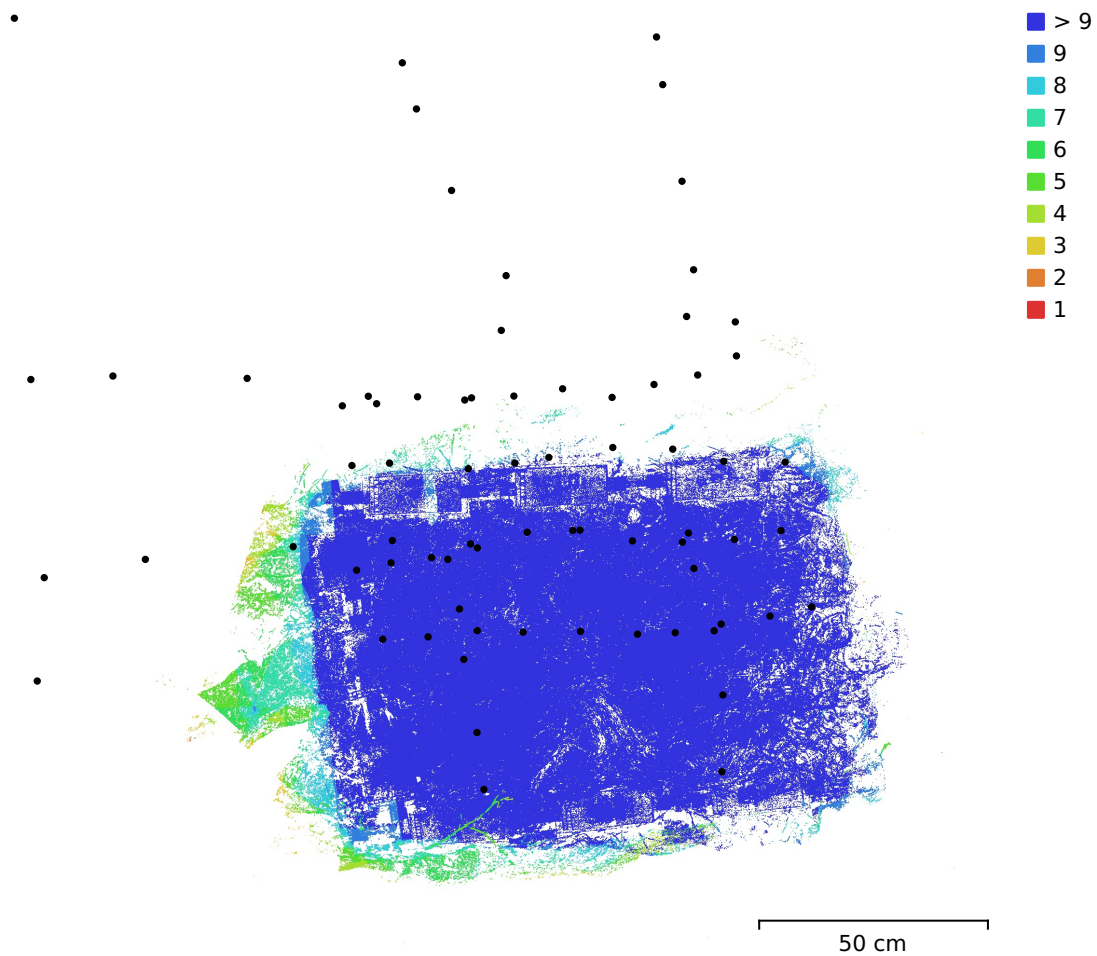


Fig. 1. Camera locations and image overlap.

Number of images:	73	Camera stations:	73
Flying altitude:	50.1 cm	Tie points:	26,234
Ground resolution:	0.0758 mm/pix	Projections:	57,214
Coverage area:	9.12e+03 cm ²	Reprojection error:	0.367 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No
ILCE-6000, E PZ...	6000 x 3376	27 mm	4.24 x 4.24 μm	No

Table 1. Cameras.

Camera Calibration

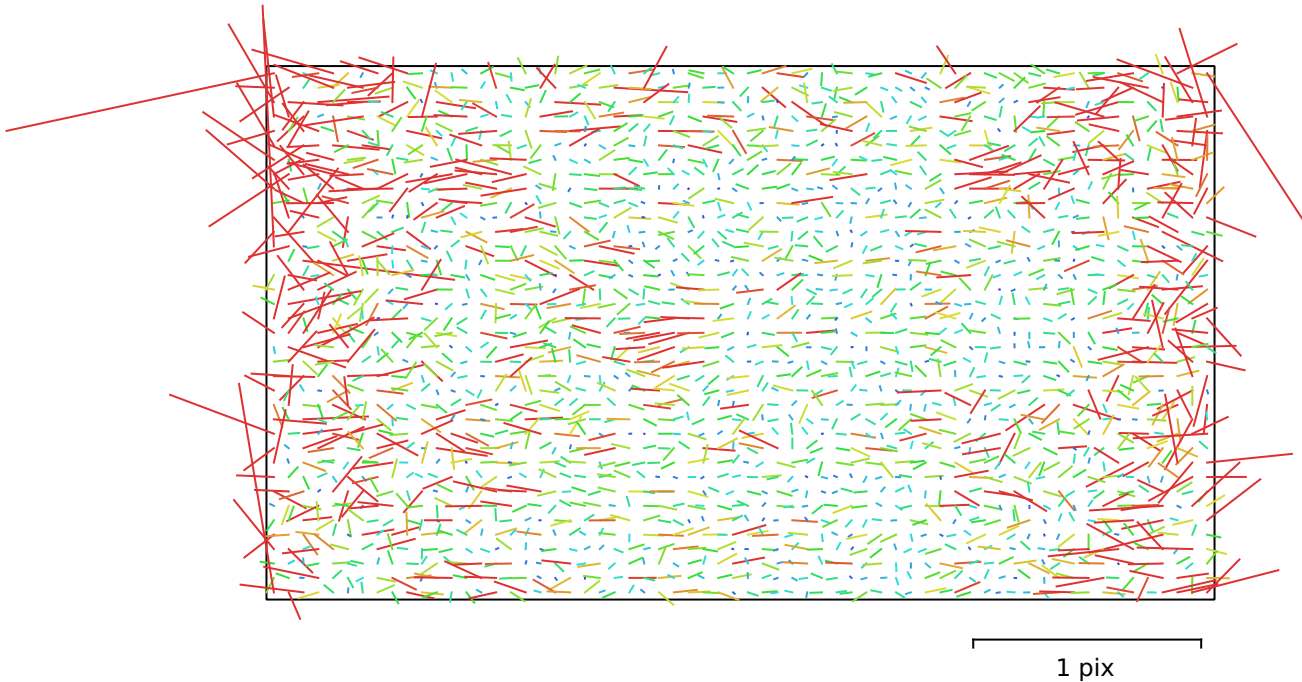


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

71 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6605.28	0.67	1.00	0.20	-0.61	0.04	0.06	-0.06	0.03	-0.28
Cx	-3.60729	0.5		1.00	-0.14	-0.03	0.01	-0.00	0.83	-0.07
Cy	12.5706	0.75			1.00	-0.13	0.01	-0.00	0.01	0.78
K1	0.00281859	0.00031				1.00	-0.93	0.85	-0.04	-0.10
K2	-0.0128874	0.0028					1.00	-0.98	0.02	0.01
K3	0.131929	0.0075						1.00	-0.01	0.00
P1	0.000618246	2.2e-05							1.00	0.00
P2	-0.000590408	2.9e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

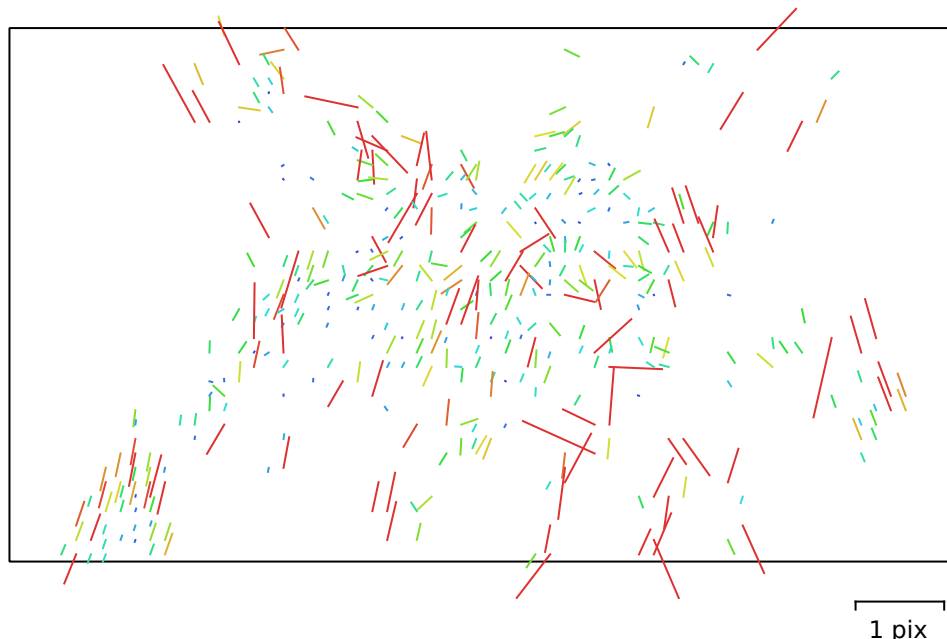


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (27mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (27mm)

2 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	27 mm	4.24 x 4.24 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6877.26	2.9	1.00	-0.13	-0.79	0.15	-0.11	0.05	-0.10	-0.23
Cx	20.1903	4.5		1.00	0.01	0.06	-0.07	0.06	0.98	-0.11
Cy	31.2138	4.6			1.00	-0.22	0.17	-0.11	0.00	0.69
K1	-0.0168699	0.0027				1.00	-0.97	0.90	0.09	-0.04
K2	0.151113	0.032					1.00	-0.98	-0.10	0.02
K3	-0.366553	0.11						1.00	0.09	-0.02
P1	0.00246901	0.00024							1.00	-0.08
P2	-0.000356792	0.00013								1.00

Table 3. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.331028	0.0010279
target 2_target 3	0.330294	0.000293639
target 4_target 5	0.32999	-1.04863e-05
target 5_target 6	0.329845	-0.000154984
target 7_target 8	0.329917	-8.31978e-05
target 8_target 9	0.328919	-0.00108135
Total		0.000624922

Table 4. Control scale bars.

Digital Elevation Model

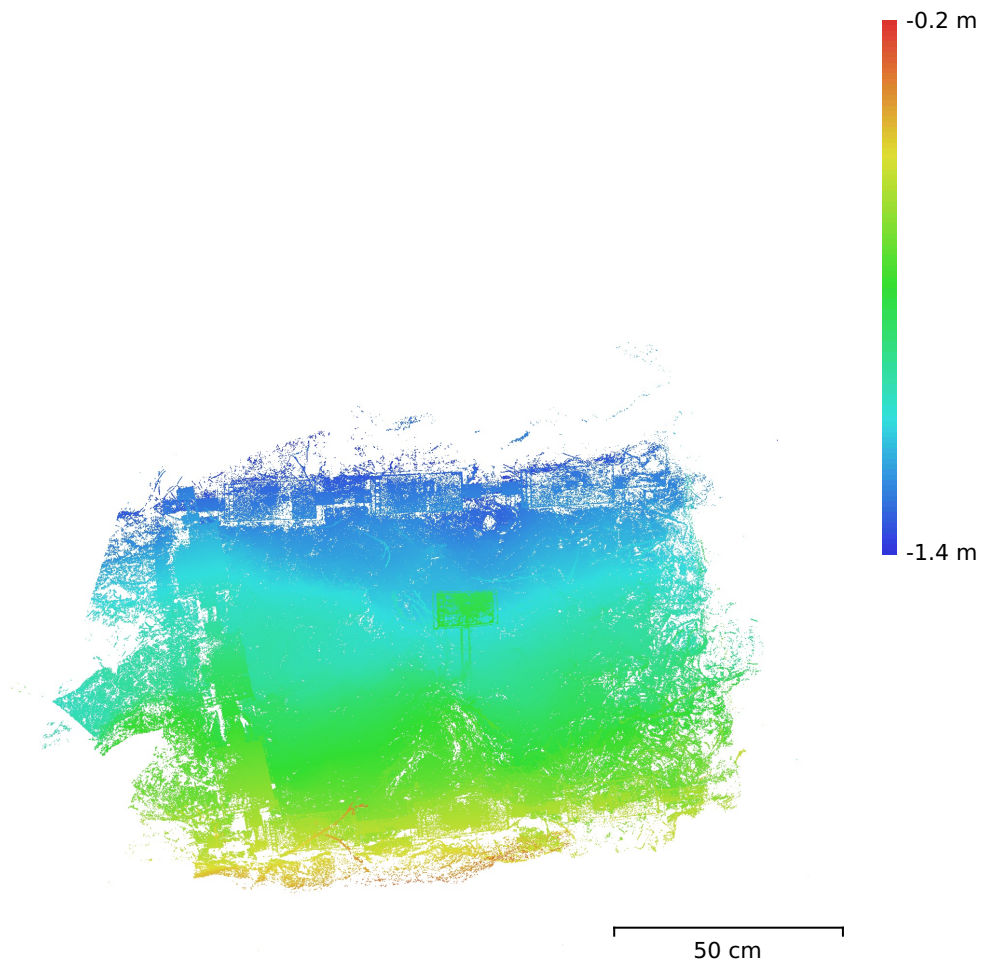


Fig. 4. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	73
Aligned cameras	73
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	26,234 of 104,750
RMS reprojection error	0.127459 (0.366927 pix)
Max reprojection error	0.58188 (2.51693 pix)
Mean key point size	2.72959 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.21903

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	33 seconds
Matching memory usage	839.69 MB
Alignment time	14 seconds
Alignment memory usage	194.35 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:22 19:16:14
Software version	2.0.3.16960
File size	6.22 MB

Depth Maps

Count	72
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 57 seconds
Memory usage	11.97 GB
Date created	2023:12:22 19:21:28
Software version	2.0.3.16960
File size	1.14 GB

Point Cloud

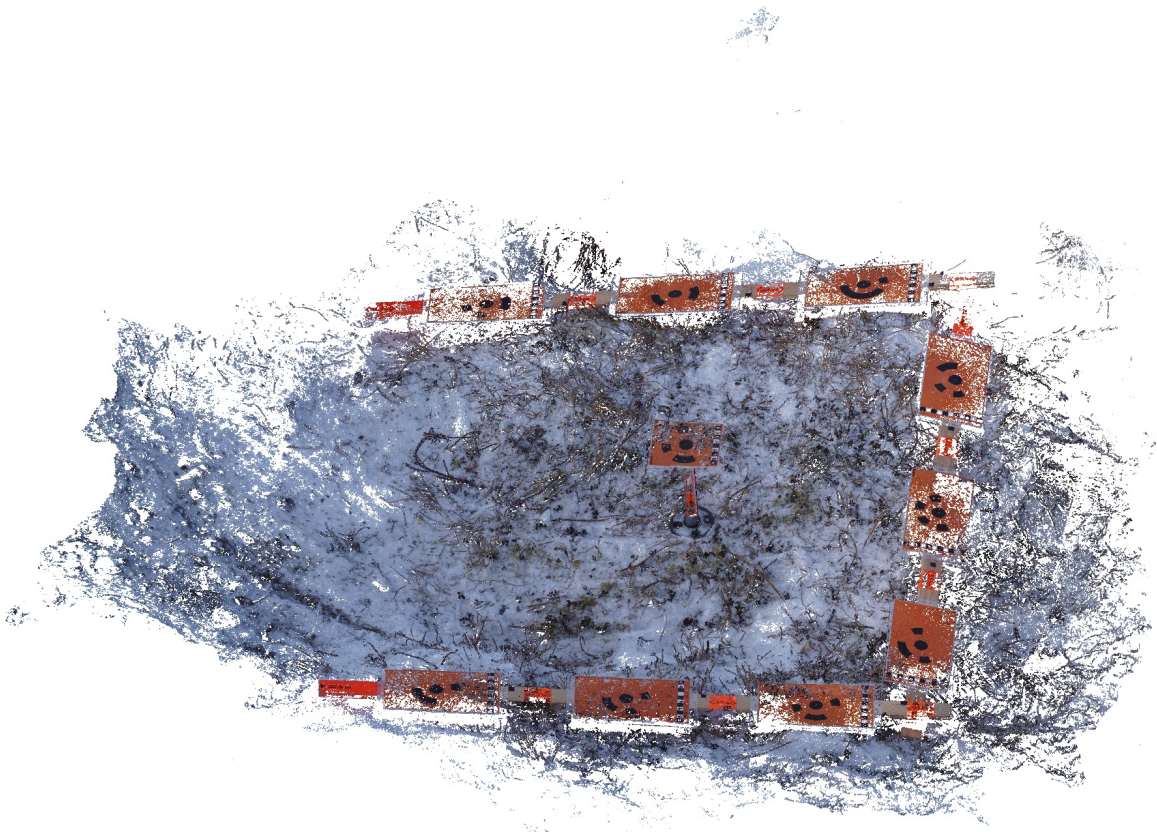
Points	30,387,789
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 14
Point classes	
Created (never classified)	30,387,789
Point cloud generation parameters	
Processing time	10 minutes 18 seconds
Memory usage	19.88 GB
Date created	2023:12:22 19:31:48
Software version	2.0.3.16960
File size	436.31 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

N656-Sony

Processing Report
22 December 2023



Survey Data

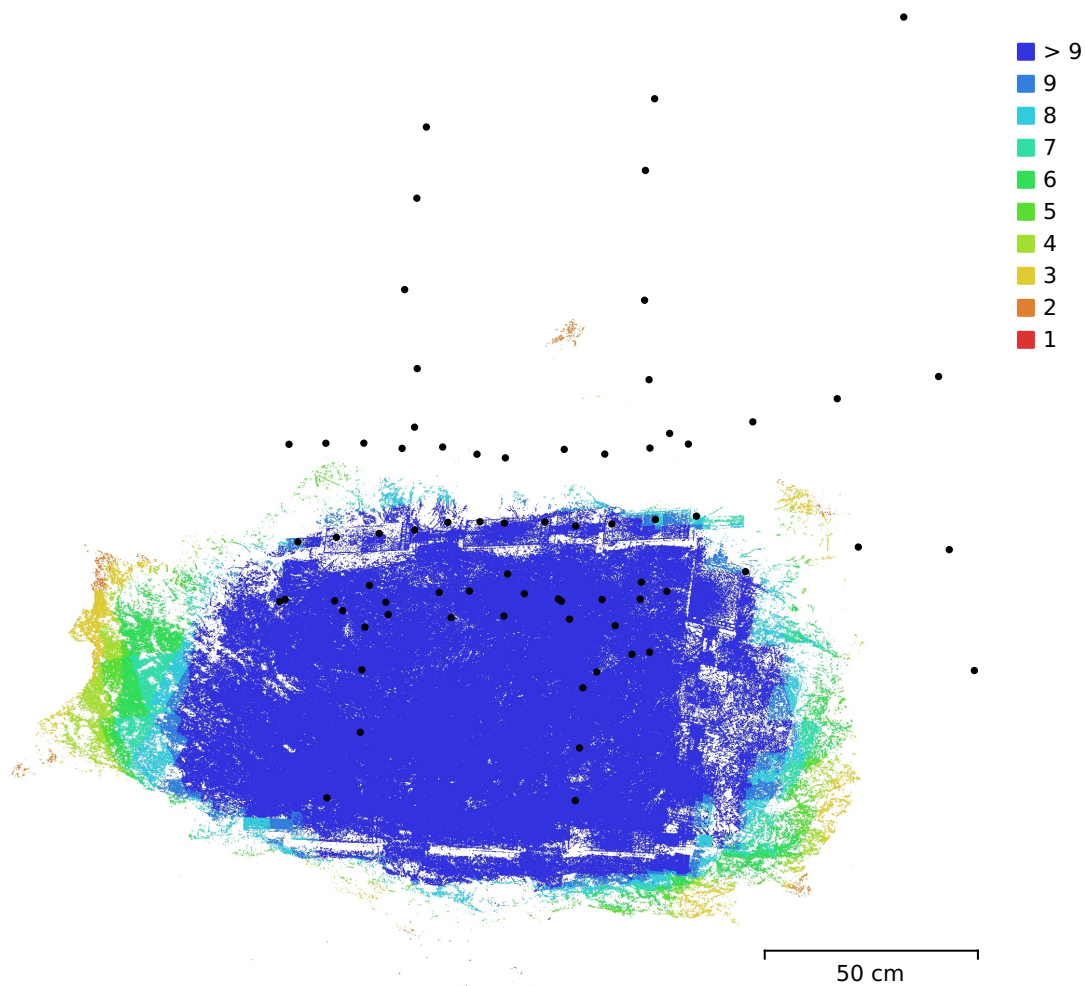


Fig. 1. Camera locations and image overlap.

Number of images:	72	Camera stations:	72
Flying altitude:	66.1 cm	Tie points:	35,190
Ground resolution:	0.101 mm/pix	Projections:	80,146
Coverage area:	1.1 m ²	Reprojection error:	0.382 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No
ILCE-6000, E PZ...	6000 x 3376	24 mm	4.19 x 4.19 μm	No

Table 1. Cameras.

Camera Calibration

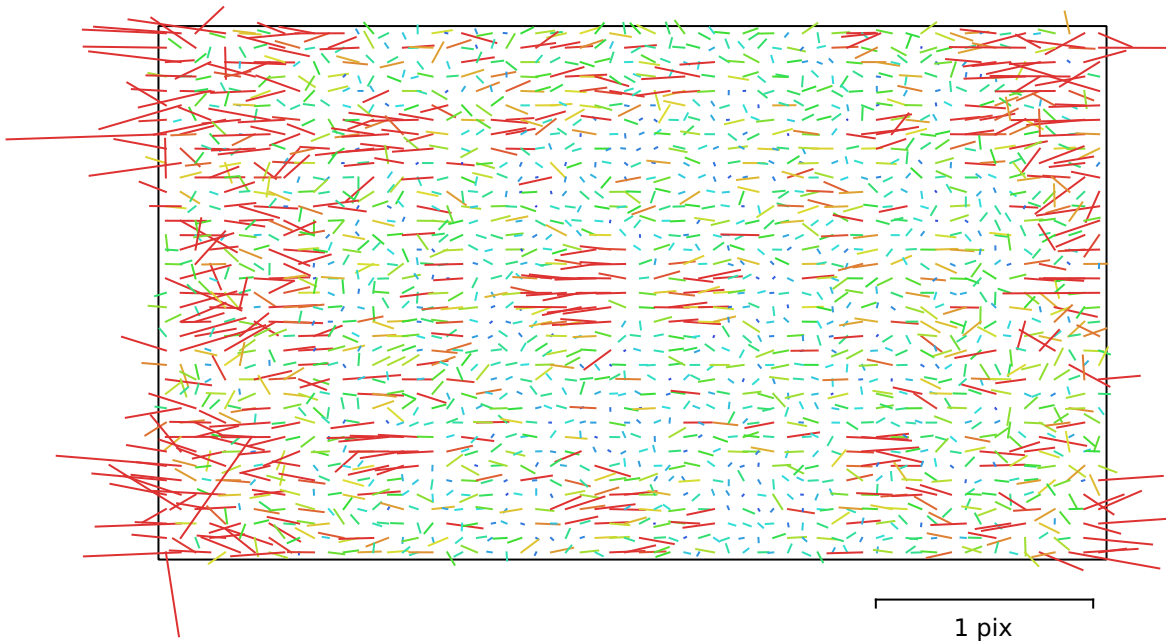


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

42 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6532.09	1.9	1.00	0.49	-0.14	0.07	0.07	-0.03	0.08	-0.09
Cx	17.0495	0.93		1.00	-0.15	0.03	0.06	-0.04	0.42	-0.15
Cy	2.3953	0.89			1.00	-0.04	-0.01	0.01	0.03	0.61
K1	0.00327553	0.0003				1.00	-0.92	0.85	-0.04	-0.05
K2	0.0199412	0.0027					1.00	-0.98	0.02	-0.01
K3	0.0484103	0.0071						1.00	-0.02	0.01
P1	0.00124469	2.5e-05							1.00	0.08
P2	-0.000901128	3.3e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

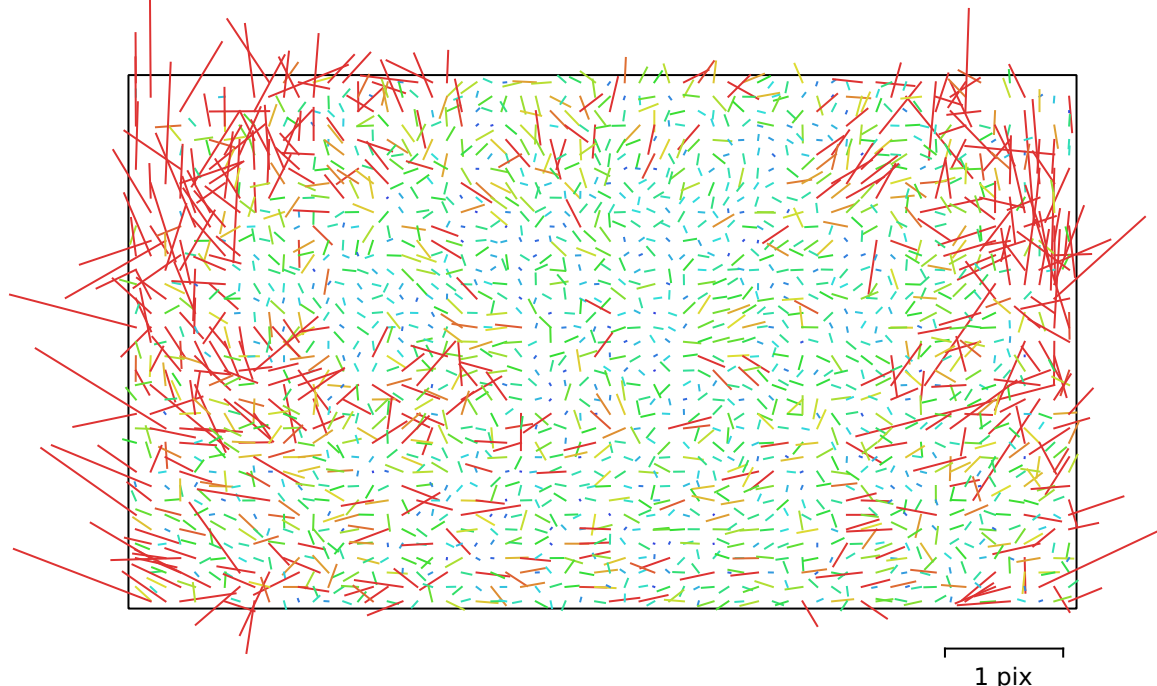


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (24mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (24mm)

30 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	24 mm	4.19 x 4.19 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6320.68	0.74	1.00	-0.01	-0.75	0.17	0.03	-0.06	-0.05	-0.58
Cx	-1.03452	0.83		1.00	-0.04	-0.03	0.03	-0.02	0.95	0.01
Cy	-4.17861	1.2			1.00	-0.25	0.09	-0.04	-0.03	0.85
K1	-0.00790195	0.00043				1.00	-0.93	0.86	-0.06	-0.21
K2	0.0510696	0.0036					1.00	-0.98	0.04	0.07
K3	-0.0292978	0.0094						1.00	-0.04	-0.03
P1	0.000391573	4.5e-05							1.00	0.03
P2	-0.000640482	4.7e-05								1.00

Table 3. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.329922	-7.803e-05
target 2_target 3	0.329851	-0.000149005
target 4_target 5	0.330147	0.000147352
target 5_target 6	0.329864	-0.000135784
target 7_target 8	0.330023	2.32545e-05
target 8_target 9	0.330192	0.00019196
Total		0.00013281

Table 4. Control scale bars.

Digital Elevation Model

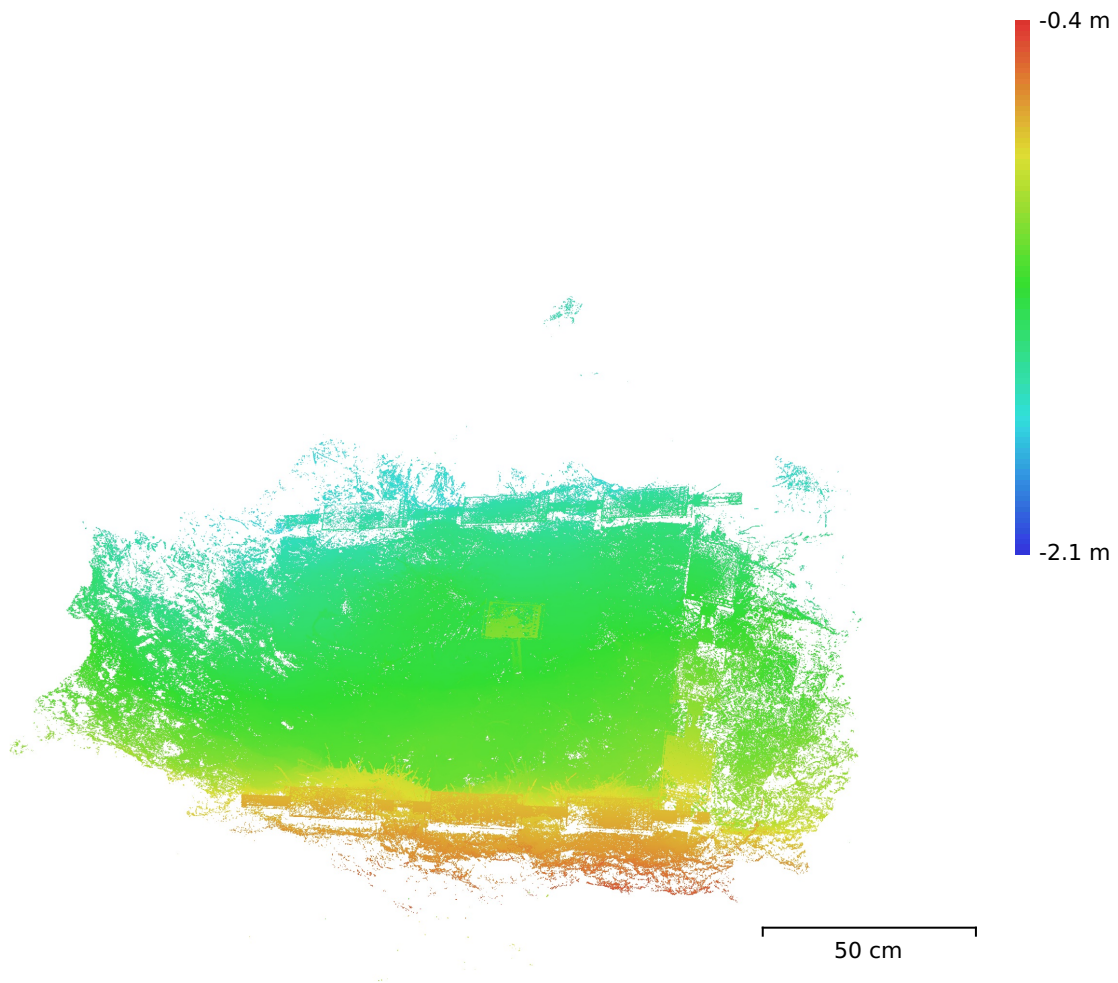


Fig. 4. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	72
Aligned cameras	72
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	35,190 of 142,663
RMS reprojection error	0.12909 (0.381751 pix)
Max reprojection error	0.561711 (2.35619 pix)
Mean key point size	2.85896 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.30208

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	34 seconds
Matching memory usage	863.71 MB
Alignment time	22 seconds
Alignment memory usage	245.37 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:22 19:34:58
Software version	2.0.3.16960
File size	8.73 MB

Depth Maps

Count	72
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	5 minutes 35 seconds
Memory usage	12.40 GB
Date created	2023:12:22 19:41:00
Software version	2.0.3.16960
File size	1.33 GB

Point Cloud

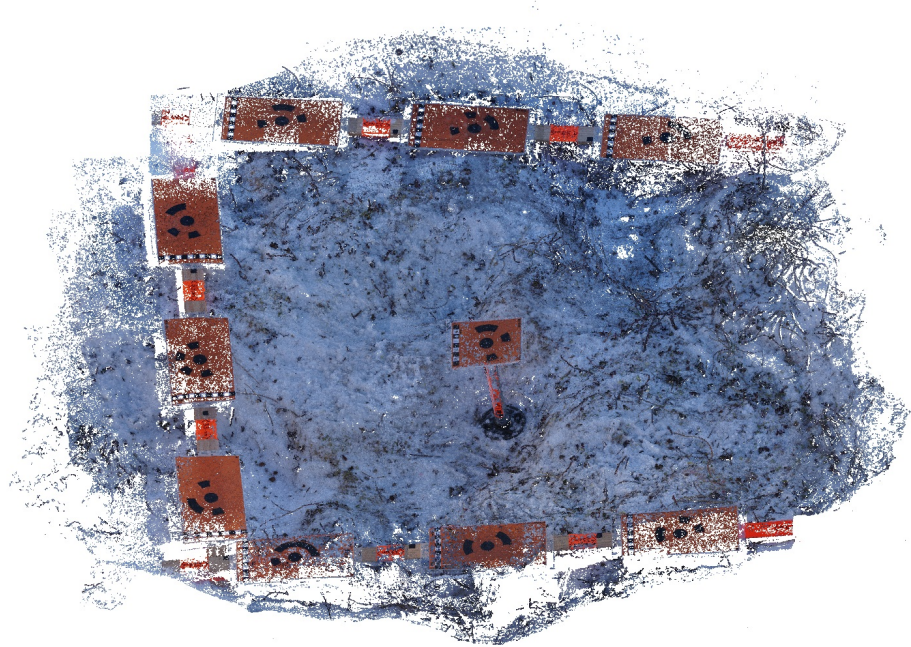
Points	38,113,495
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 14
Point classes	
Created (never classified)	38,113,495
Point cloud generation parameters	
Processing time	11 minutes 58 seconds
Memory usage	20.19 GB
Date created	2023:12:22 19:52:59
Software version	2.0.3.16960
File size	546.19 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

N657-Sony

Processing Report
22 December 2023



Survey Data

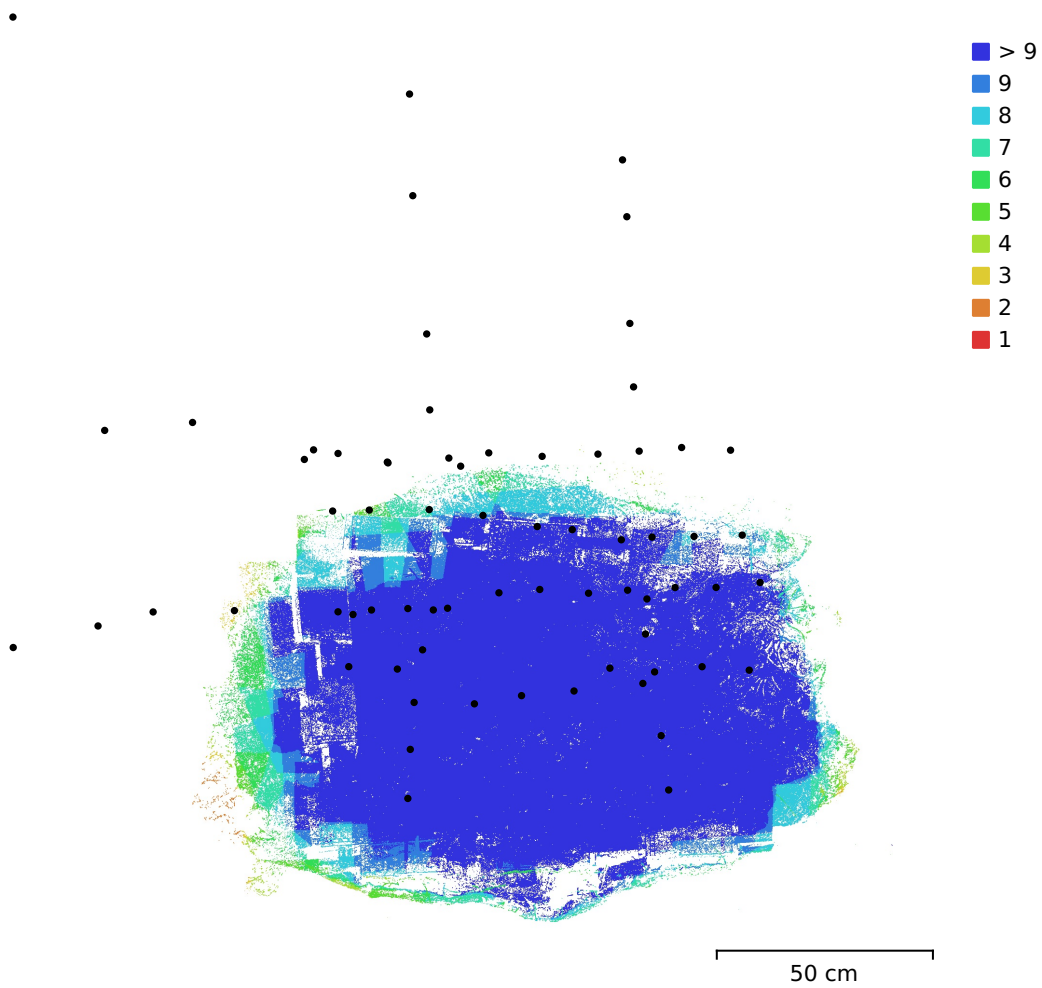


Fig. 1. Camera locations and image overlap.

Number of images:	69	Camera stations:	69
Flying altitude:	49.9 cm	Tie points:	27,153
Ground resolution:	0.0747 mm/pix	Projections:	61,020
Coverage area:	9.59e+03 cm ²	Reprojection error:	0.398 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No
ILCE-6000, E PZ...	6000 x 3376	26 mm	4.19 x 4.19 μm	No

Table 1. Cameras.

Camera Calibration

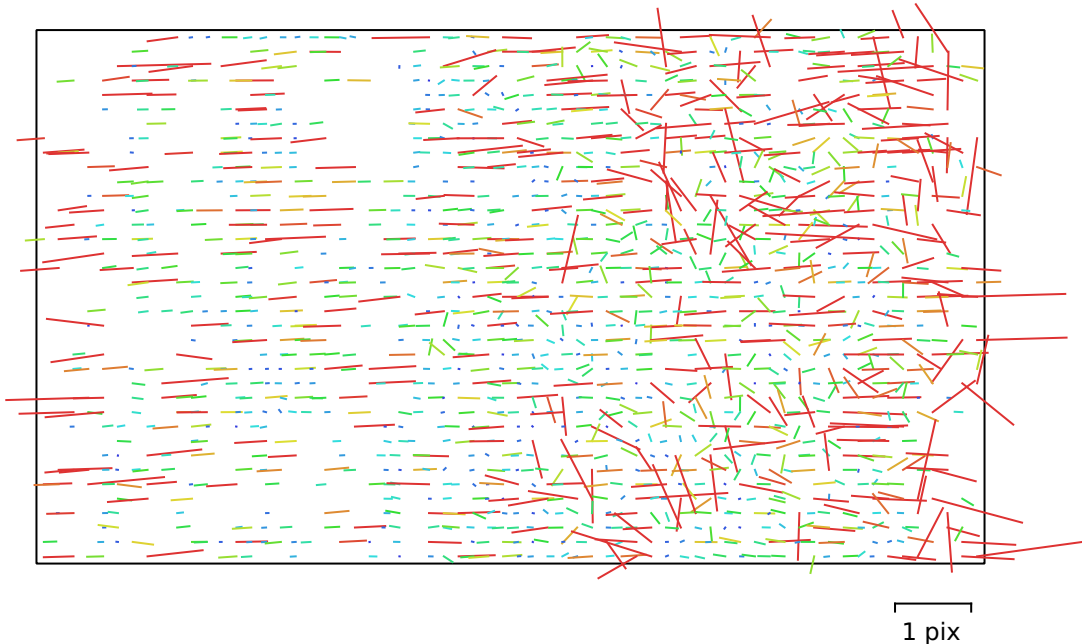


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

5 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6537.43	4.5	1.00	-0.02	-0.02	0.03	-0.05	0.05	0.11	-0.06
Cx	41.0823	3		1.00	-0.17	0.03	-0.03	0.02	0.74	-0.16
Cy	49.4319	2.9			1.00	0.05	-0.02	0.02	-0.24	0.84
K1	-0.00465052	0.0017				1.00	-0.95	0.87	-0.05	0.01
K2	0.047166	0.015					1.00	-0.97	0.03	0.00
K3	-0.0408985	0.04						1.00	-0.02	0.01
P1	0.00291238	0.0001							1.00	-0.29
P2	0.000939256	0.00017								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

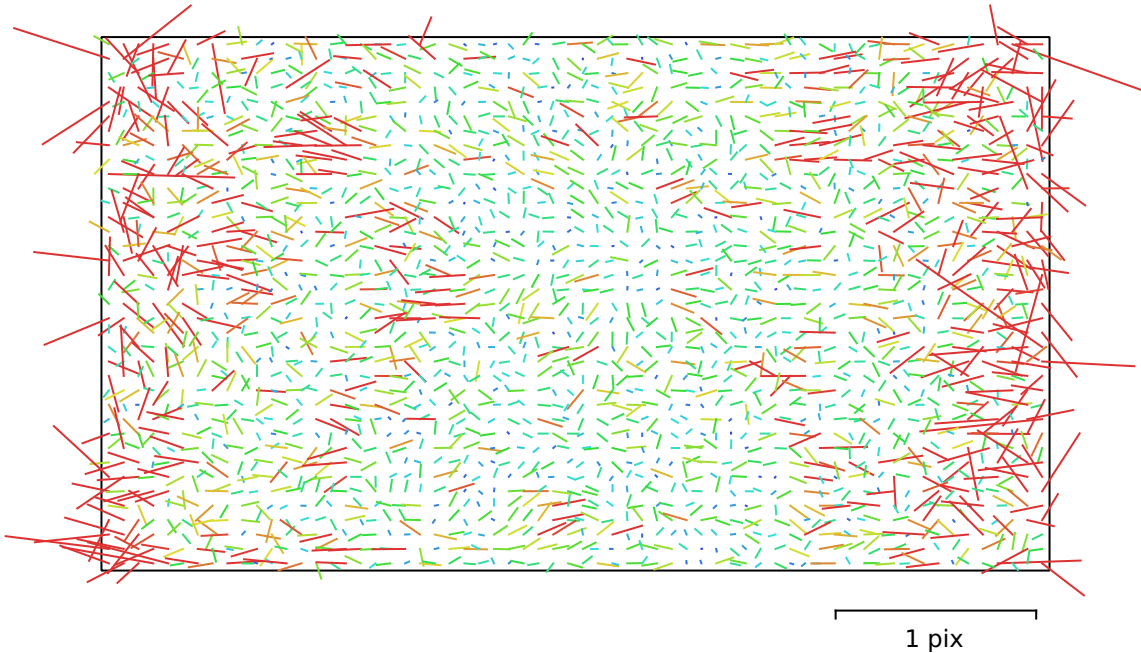


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (26mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (26mm)

64 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	26 mm	4.19 x 4.19 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6717.45	0.66	1.00	0.04	-0.54	0.04	0.03	-0.02	0.02	-0.23
Cx	29.6735	0.57		1.00	-0.03	0.03	-0.01	0.02	0.89	-0.06
Cy	21.0321	0.76			1.00	-0.11	0.05	-0.04	0.01	0.78
K1	0.00106362	0.00032				1.00	-0.94	0.87	0.03	-0.09
K2	0.00707805	0.0031					1.00	-0.98	-0.02	0.04
K3	0.0776549	0.0089						1.00	0.02	-0.04
P1	0.00183637	2.5e-05							1.00	-0.03
P2	-0.00066032	2.8e-05								1.00

Table 3. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.330009	8.75297e-06
target 2_target 3	0.329658	-0.000342416
target 7_target 8	0.330559	0.000558745
target 8_target 9	0.329773	-0.000226563
Total		0.000346718

Table 4. Control scale bars.

Digital Elevation Model

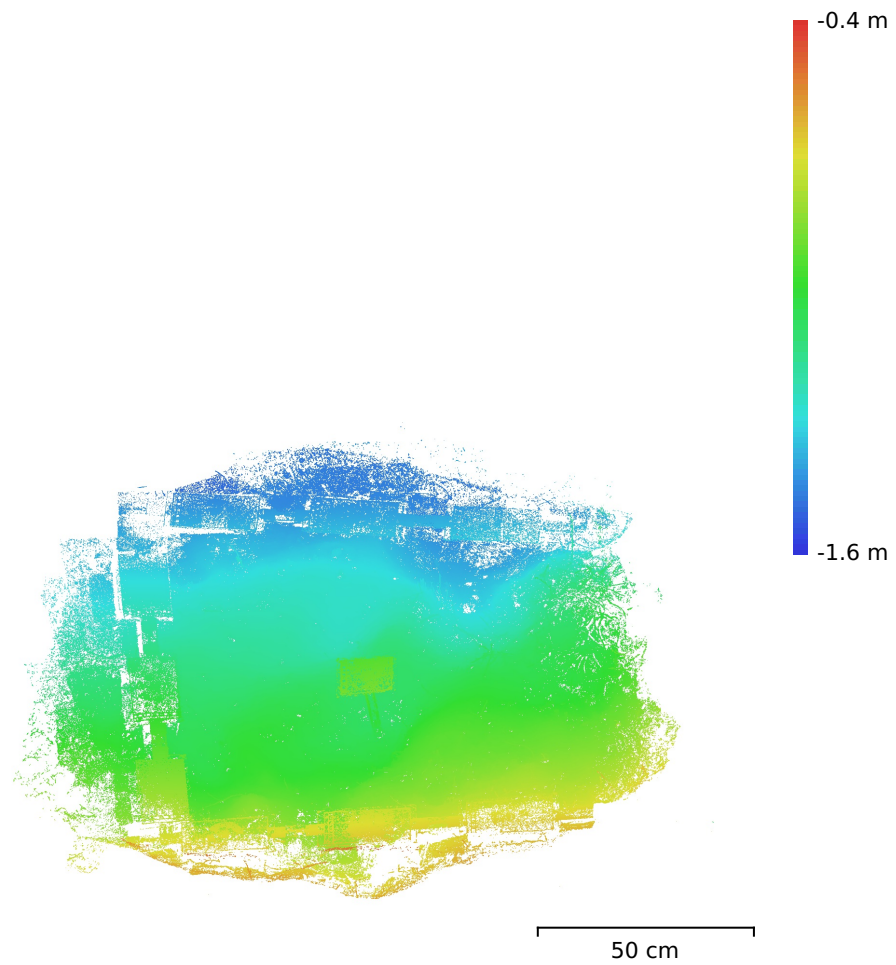


Fig. 4. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	69
Aligned cameras	69
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	27,153 of 122,371
RMS reprojection error	0.127677 (0.398193 pix)
Max reprojection error	0.461486 (2.53322 pix)
Mean key point size	2.9972 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.2721

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	33 seconds
Matching memory usage	876.26 MB
Alignment time	16 seconds
Alignment memory usage	215.68 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:22 19:56:36
Software version	2.0.3.16960
File size	7.34 MB

Depth Maps

Count	67
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	4 minutes 43 seconds
Memory usage	12.21 GB
Date created	2023:12:22 20:01:40
Software version	2.0.3.16960
File size	1.17 GB

Point Cloud

Points	29,780,900
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 14
Point classes	
Created (never classified)	29,780,900
Point cloud generation parameters	
Processing time	9 minutes 31 seconds
Memory usage	18.56 GB
Date created	2023:12:22 20:11:12
Software version	2.0.3.16960
File size	427.96 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

SB027-Sony

Processing Report
02 January 2024



Survey Data

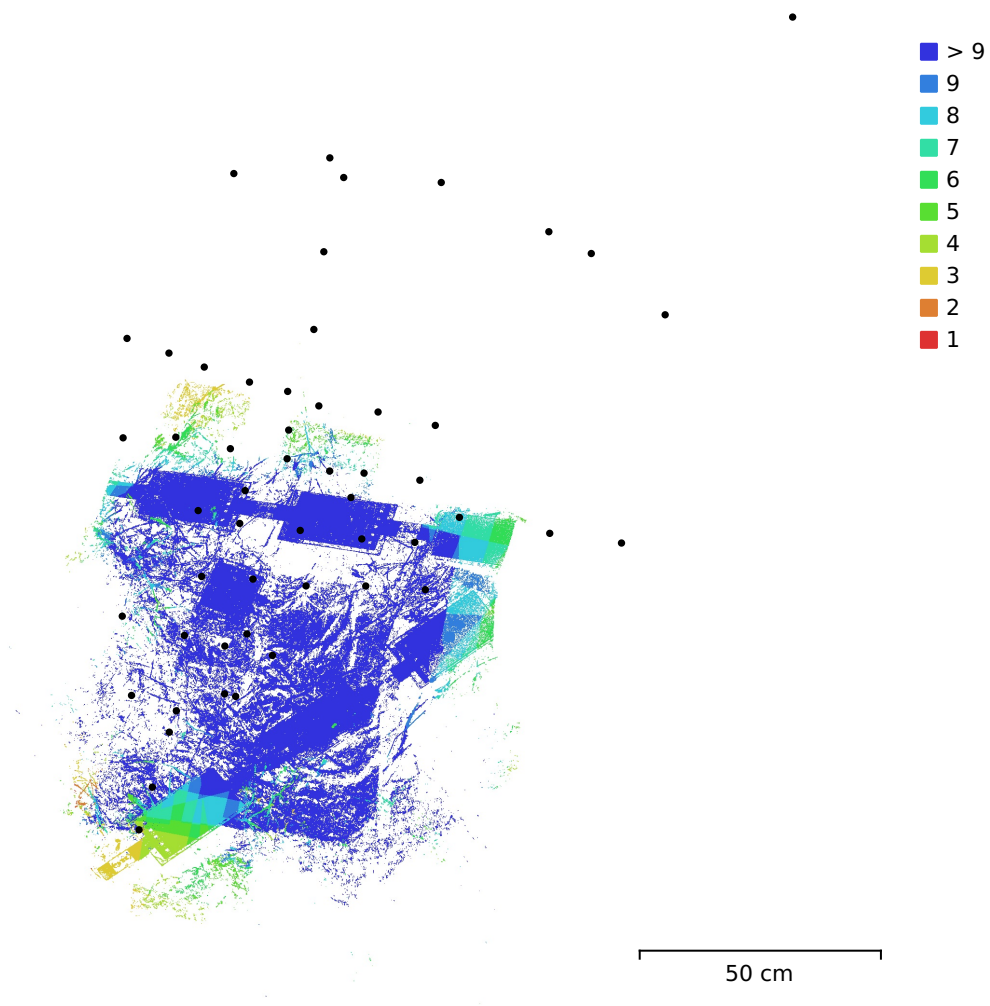


Fig. 1. Camera locations and image overlap.

Number of images:	55	Camera stations:	53
Flying altitude:	45.1 cm	Tie points:	8,864
Ground resolution:	0.0689 mm/pix	Projections:	20,534
Coverage area:	3.51e+03 cm ²	Reprojection error:	0.33 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

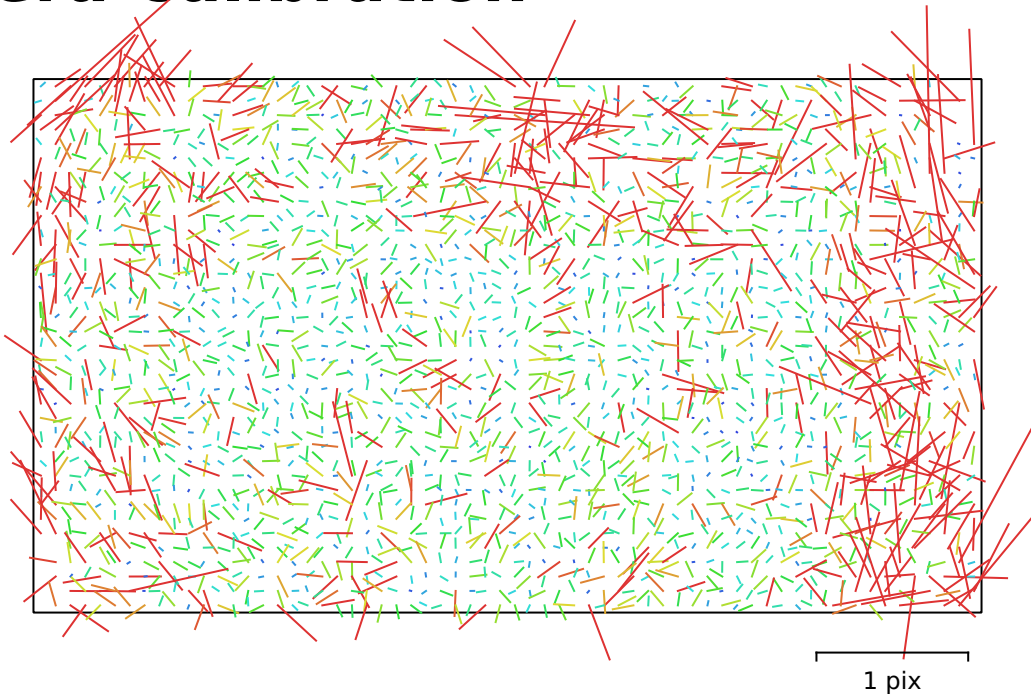


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

55 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6541.85	1.9	1.00	0.03	-0.32	0.05	0.08	-0.06	-0.06	-0.18
Cx	-1.47432	1.4		1.00	-0.06	-0.12	0.08	-0.08	0.88	0.04
Cy	-0.838066	1.6			1.00	-0.02	-0.04	0.03	-0.06	0.78
K1	0.00213802	0.00062				1.00	-0.92	0.85	-0.13	-0.07
K2	0.0196988	0.0057					1.00	-0.98	0.08	-0.01
K3	0.0448429	0.016						1.00	-0.08	0.01
P1	0.000887554	6.2e-05							1.00	0.09
P2	-8.46588e-05	5.8e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.329946	-5.37536e-05
target 2_target 3	0.329408	-0.00059224
target 4_target 5	0.33017	0.000170227
target 5_target 6	0.330474	0.00047393
Total		0.000389623

Table 3. Control scale bars.

Digital Elevation Model

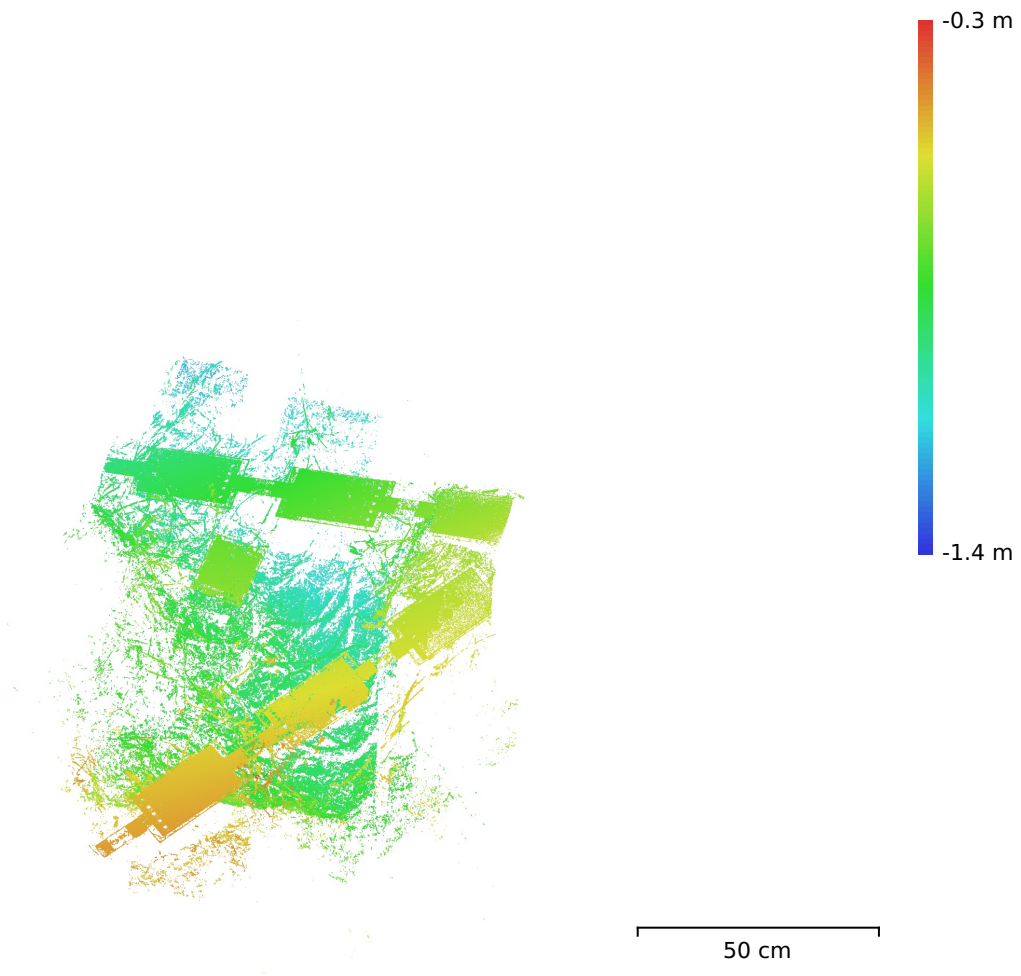


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	55
Aligned cameras	53
Markers	7
Scale bars	4
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	8,864 of 34,631
RMS reprojection error	0.119929 (0.329518 pix)
Max reprojection error	0.692133 (1.94411 pix)
Mean key point size	2.62906 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.32985

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	25 seconds
Matching memory usage	838.84 MB
Alignment time	5 seconds
Alignment memory usage	161.04 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2024:01:02 15:28:42
Software version	2.0.3.16960
File size	2.15 MB

Depth Maps

Count	44
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	3 minutes 10 seconds
Memory usage	9.44 GB
Date created	2024:01:02 15:31:59
Software version	2.0.3.16960
File size	381.28 MB

Point Cloud

Points	9,738,404
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 12
Point classes	
Created (never classified)	9,738,404
Point cloud generation parameters	
Processing time	5 minutes 0 seconds
Memory usage	12.48 GB
Date created	2024:01:02 15:37:00
Software version	2.0.3.16960
File size	141.36 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

WB025-Sony

Processing Report
02 January 2024



Survey Data

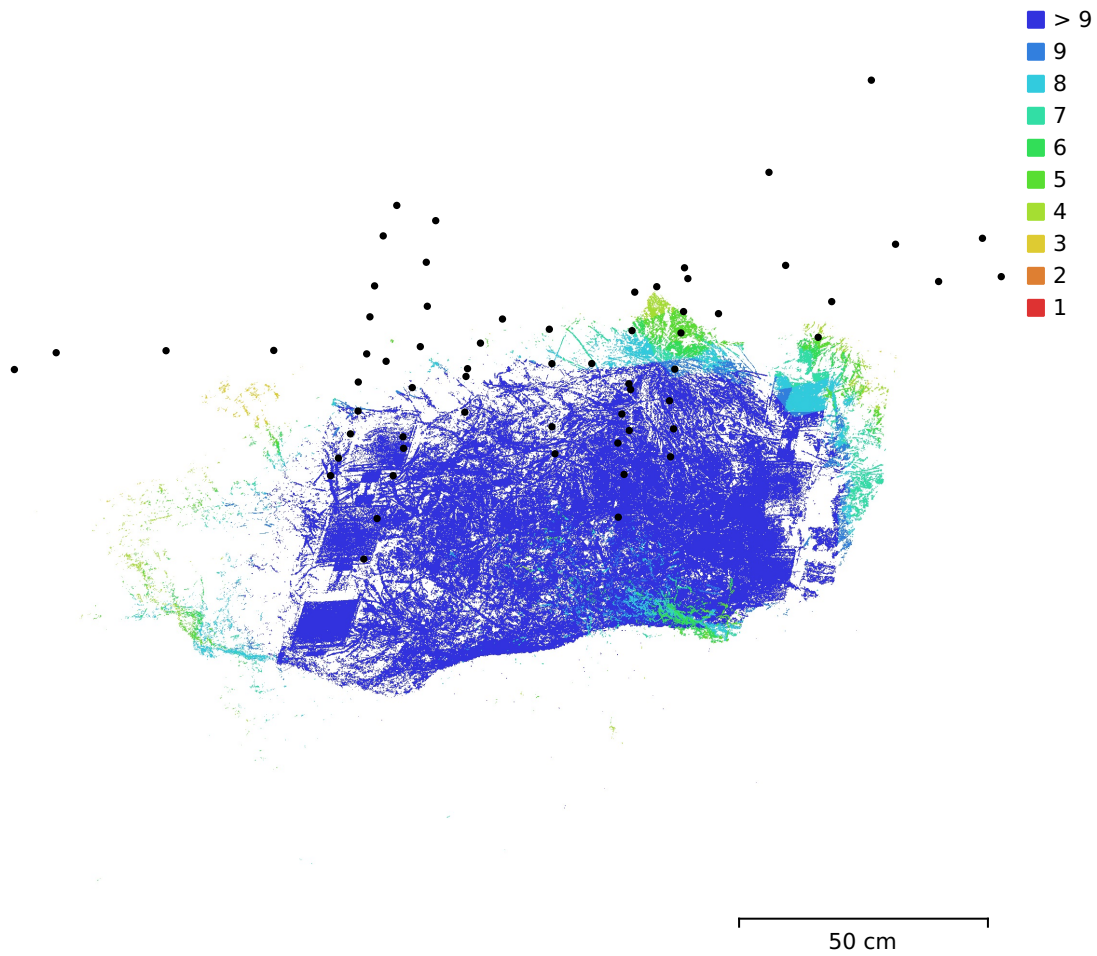


Fig. 1. Camera locations and image overlap.

Number of images:	65	Camera stations:	63
Flying altitude:	52.1 cm	Tie points:	9,404
Ground resolution:	0.0797 mm/pix	Projections:	20,693
Coverage area:	4.56e+03 cm ²	Reprojection error:	0.373 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No
ILCE-6000, E PZ...	6000 x 3376	16 mm	4.19 x 4.19 μm	No

Table 1. Cameras.

Camera Calibration

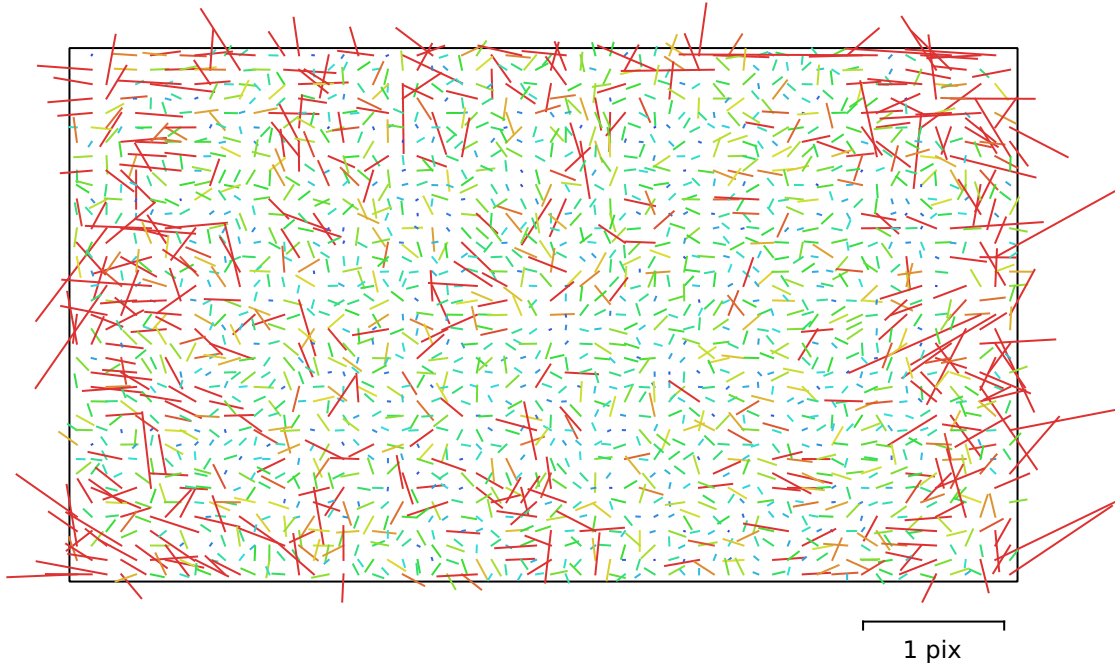


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

60 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6534.84	3.9	1.00	-0.11	-0.32	0.39	-0.12	0.11	-0.27	-0.20
Cx	6.56987	2.5		1.00	0.07	-0.13	0.10	-0.10	0.73	0.05
Cy	-38.3267	4.2			1.00	-0.13	0.08	-0.04	0.01	0.77
K1	0.00221192	0.00065				1.00	-0.82	0.76	-0.26	-0.10
K2	-0.0138274	0.005					1.00	-0.98	0.10	0.08
K3	0.154735	0.014						1.00	-0.09	-0.04
P1	5.59118e-05	0.00011							1.00	0.00
P2	-0.000587886	0.00016								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

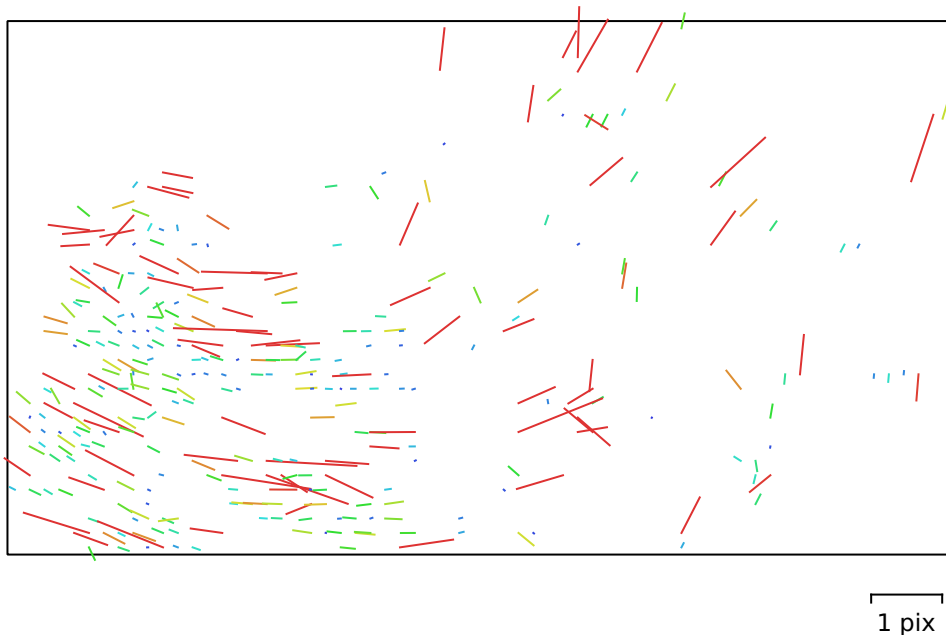


Fig. 3. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (16mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (16mm)

5 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	16 mm	4.19 x 4.19 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	4020.7	4.4	1.00	-0.10	-0.73	-0.02	0.13	-0.15	-0.06	-0.29
Cx	34.5189	4.3		1.00	-0.26	0.40	-0.18	0.10	0.88	-0.36
Cy	37.8483	6.2			1.00	-0.27	0.04	0.04	-0.31	0.68
K1	-0.0583066	0.0014				1.00	-0.83	0.72	0.34	-0.39
K2	0.0629116	0.0039					1.00	-0.98	-0.08	0.09
K3	-0.0238015	0.0036						1.00	0.02	0.02
P1	0.00271286	0.00034							1.00	-0.37
P2	0.0013938	0.00022								1.00

Table 3. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.329963	-3.72449e-05
target 2_target 3	0.329625	-0.000375197
target 4_target 5	0.330412	0.00041156
Total		0.000322253

Table 4. Control scale bars.

Digital Elevation Model

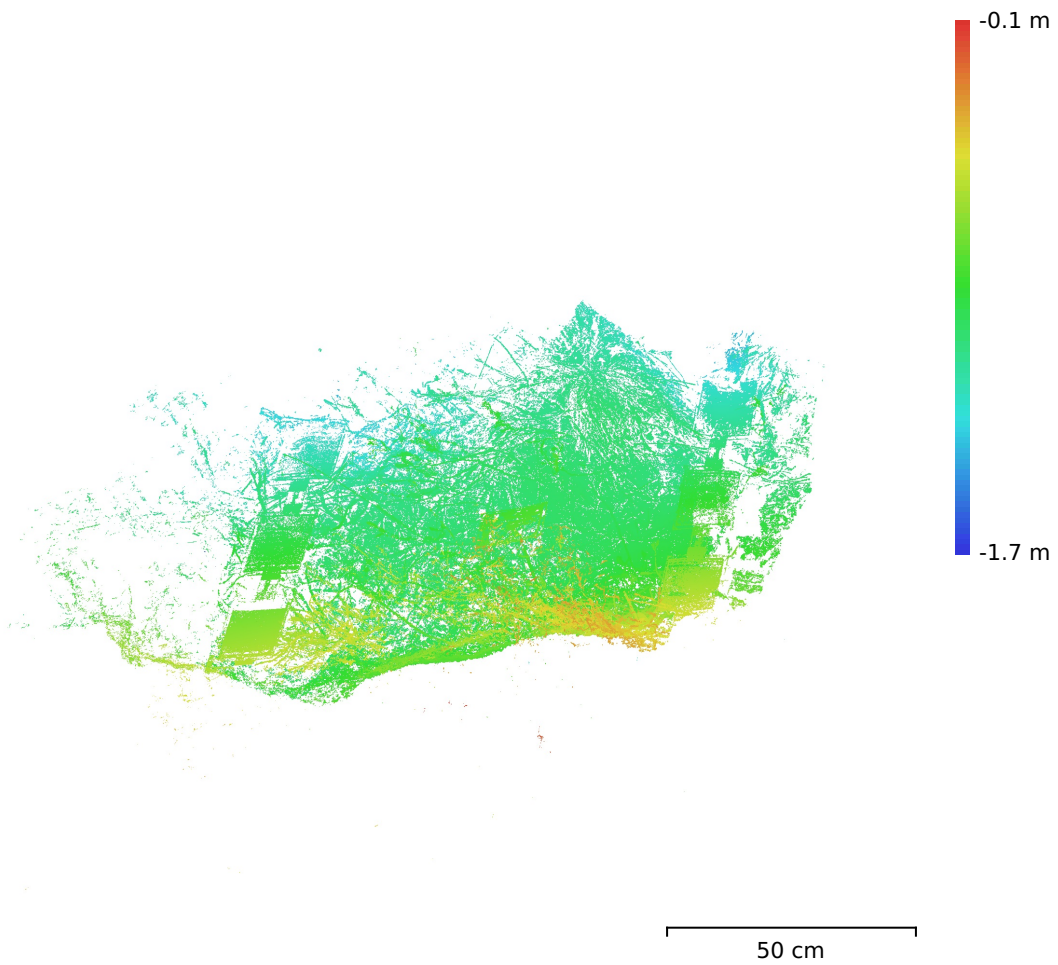


Fig. 4. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	65
Aligned cameras	63
Markers	6
Scale bars	3
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	9,404 of 42,938
RMS reprojection error	0.11942 (0.373259 pix)
Max reprojection error	0.378306 (1.92382 pix)
Mean key point size	2.96886 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.19898

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	25 seconds
Matching memory usage	917.42 MB
Alignment time	10 seconds
Alignment memory usage	112.48 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2024:01:02 15:49:41
Software version	2.0.3.16960
File size	2.50 MB

Depth Maps

Count	47
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	3 minutes 21 seconds
Memory usage	10.38 GB
Date created	2024:01:02 15:53:15
Software version	2.0.3.16960
File size	562.69 MB

Point Cloud

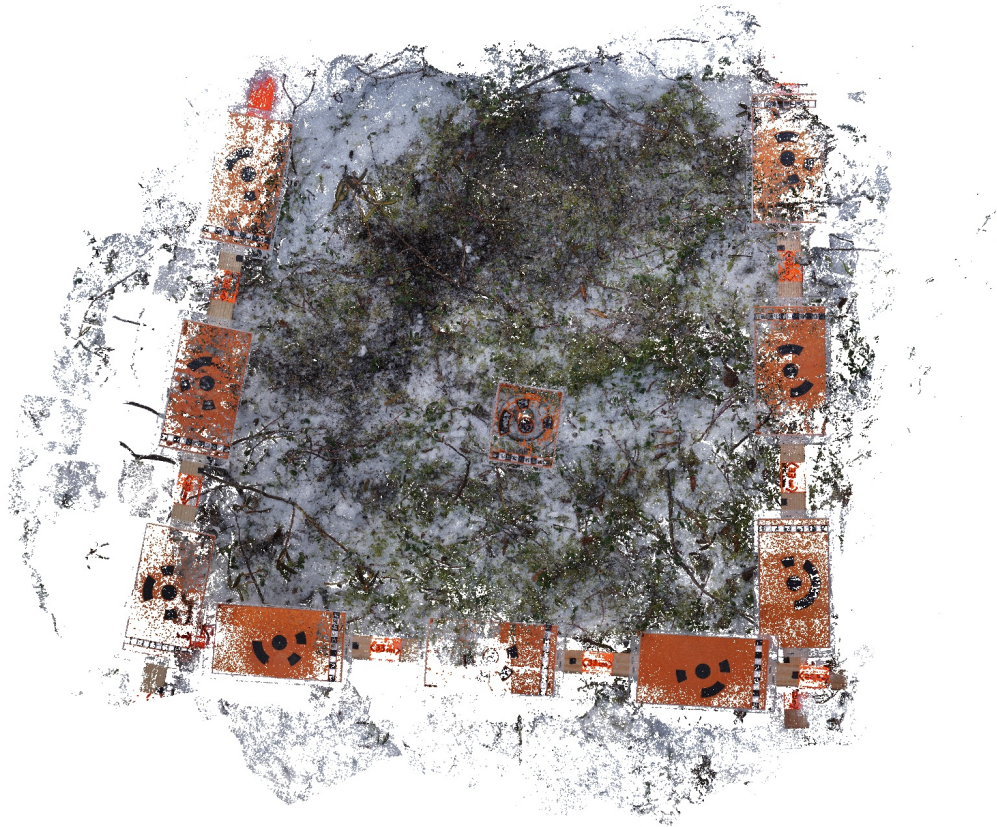
Points	17,955,140
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 11
Point classes	
Created (never classified)	17,955,140
Point cloud generation parameters	
Processing time	5 minutes 22 seconds
Memory usage	13.37 GB
Date created	2024:01:02 15:58:38
Software version	2.0.3.16960
File size	258.65 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB

WN101-Sony

Processing Report
29 December 2023



Survey Data

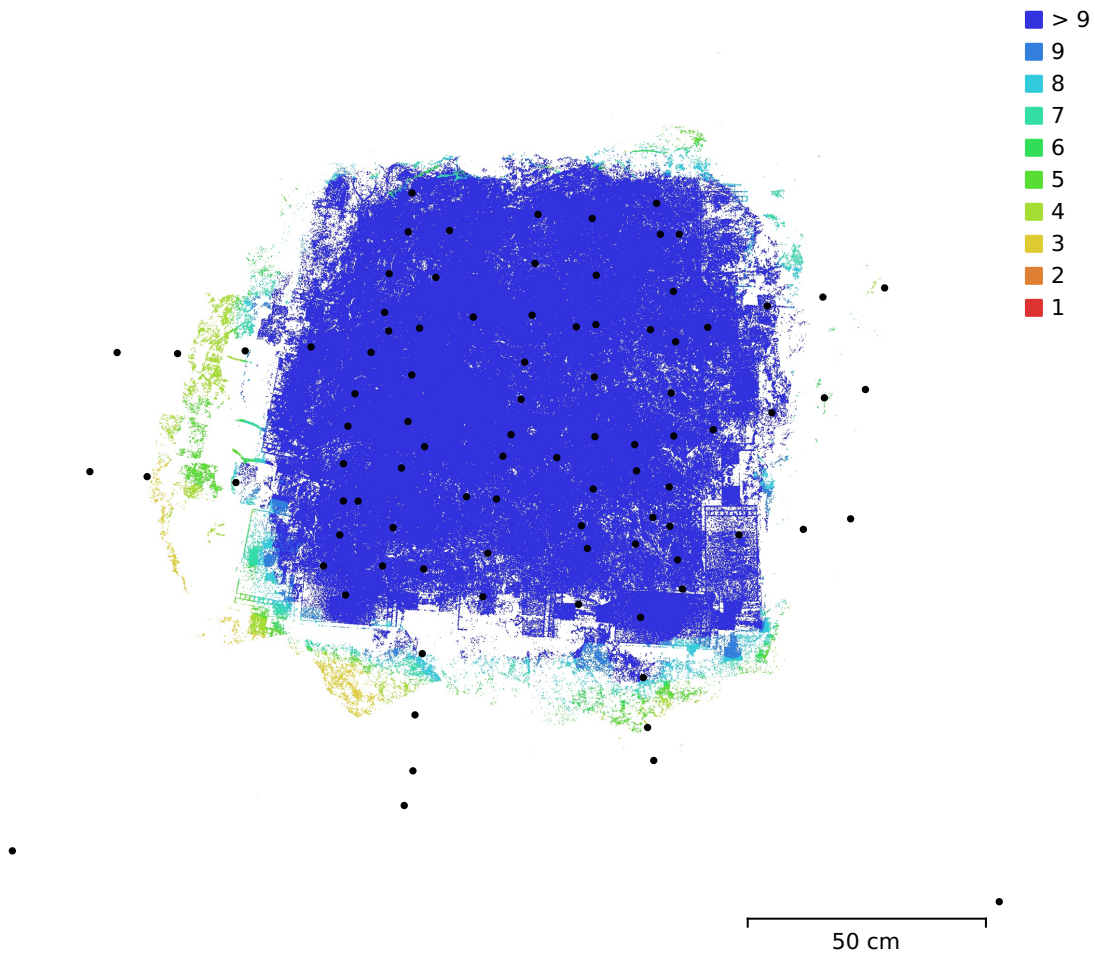


Fig. 1. Camera locations and image overlap.

Number of images:	91	Camera stations:	91
Flying altitude:	54.9 cm	Tie points:	31,801
Ground resolution:	0.0821 mm/pix	Projections:	74,357
Coverage area:	9.38e+03 cm ²	Reprojection error:	0.409 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ILCE-6000, E PZ...	6000 x 3376	25 mm	4.25 x 4.25 μm	No

Table 1. Cameras.

Camera Calibration

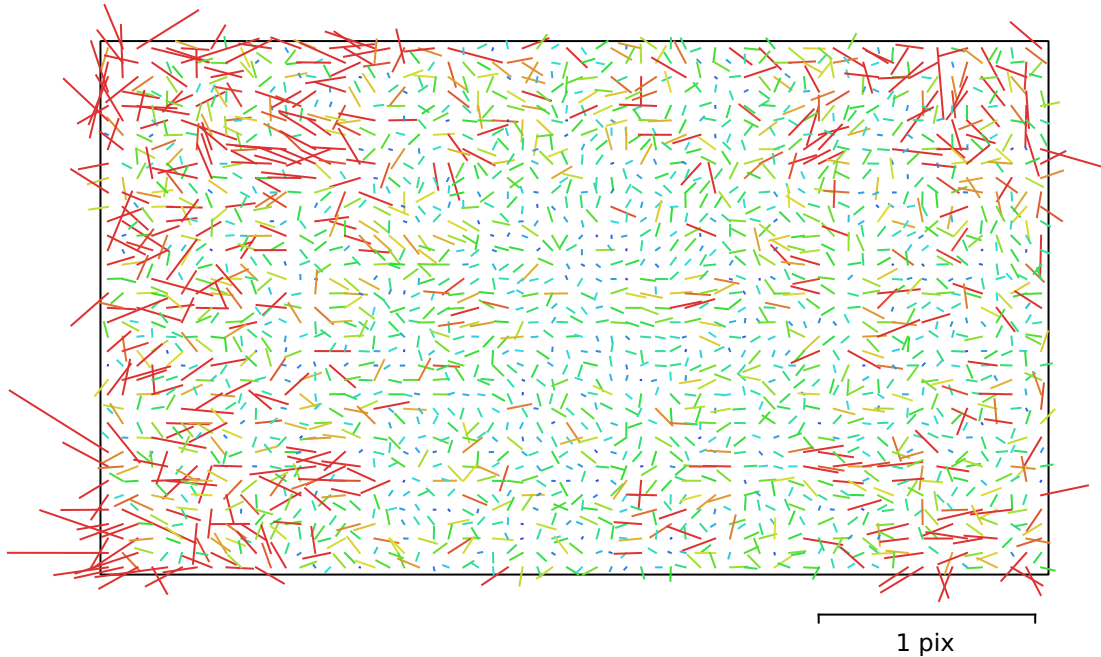


Fig. 2. Image residuals for ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm).

ILCE-6000, E PZ 16-50mm F3.5-5.6 OSS (25mm)

91 images

Type	Resolution	Focal Length	Pixel Size
Frame	6000 x 3376	25 mm	4.25 x 4.25 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	6686.24	0.62	1.00	0.00	-0.59	0.01	0.08	-0.07	-0.07	-0.29
Cx	7.31374	0.48		1.00	-0.10	0.06	-0.01	0.01	0.84	-0.11
Cy	19.163	0.62			1.00	-0.09	0.00	0.00	-0.02	0.76
K1	0.00125093	0.00028				1.00	-0.94	0.88	0.05	-0.08
K2	-0.0225016	0.0026					1.00	-0.98	-0.02	0.00
K3	0.14452	0.0073						1.00	0.02	0.00
P1	0.000925004	2.1e-05							1.00	-0.07
P2	-5.38784e-06	2.1e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Scale Bars

Label	Distance (m)	Error (m)
target 1_target 2	0.329716	-0.000284365
target 2_target 3	0.33028	0.000280196
target 4_target 5	0.330138	0.000138228
target 5_target 6	0.330253	0.000253186
target 7_target 8	0.329833	-0.000167376
target 8_target 9	0.329779	-0.000221119
Total		0.000230756

Table 3. Control scale bars.

Digital Elevation Model

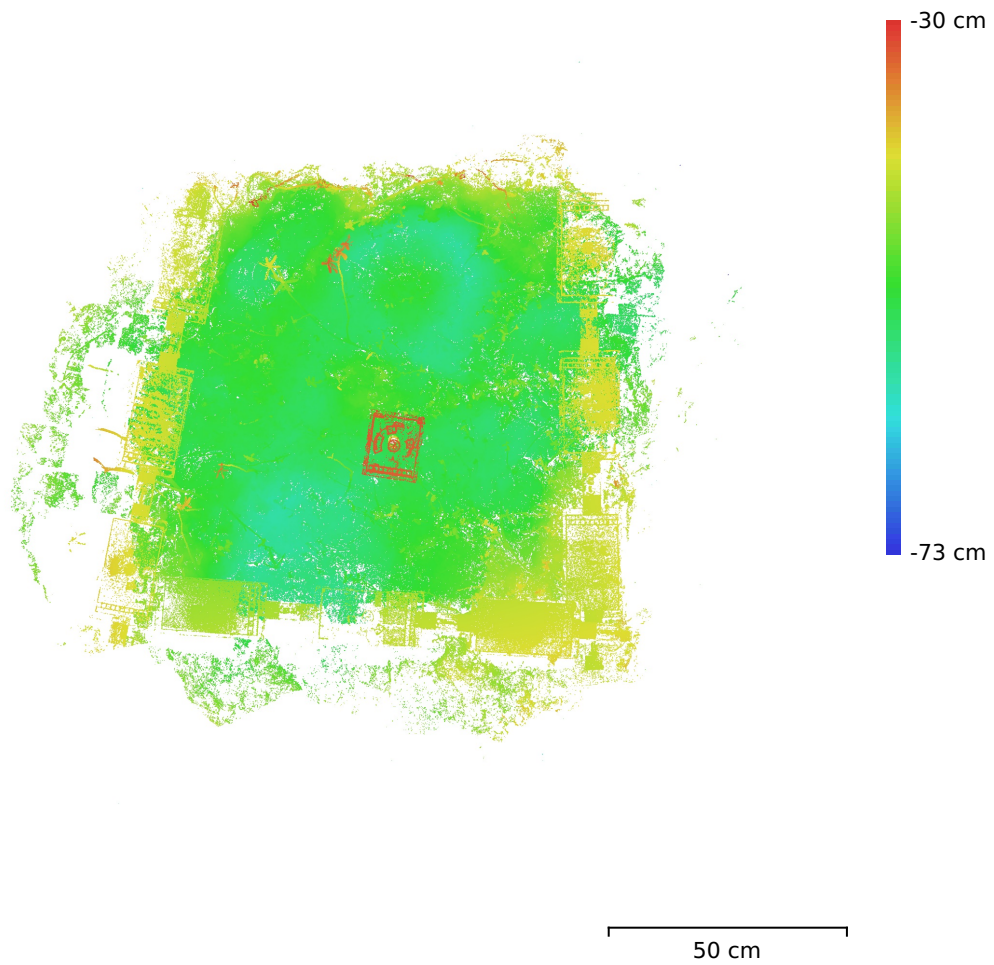


Fig. 3. Reconstructed digital elevation model.

Resolution: unknown
Point density: unknown

Processing Parameters

General

Cameras	91
Aligned cameras	91
Markers	10
Scale bars	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	31,801 of 133,008
RMS reprojection error	0.128777 (0.408806 pix)
Max reprojection error	0.431064 (2.05418 pix)
Mean key point size	3.02404 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.33033

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	Sequential
Key point limit	50,000
Key point limit per Mpx	1,000
Tie point limit	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	43 seconds
Matching memory usage	899.55 MB
Alignment time	17 seconds
Alignment memory usage	219.75 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:12:29 19:30:03
Software version	2.0.3.16960
File size	8.20 MB

Depth Maps

Count	88
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Depth maps generation parameters

Quality	Ultra High
Filtering mode	Mild
Max neighbors	16
Processing time	6 minutes 40 seconds
Memory usage	13.83 GB
Date created	2023:12:29 19:37:04
Software version	2.0.3.16960
File size	1.44 GB

Point Cloud

Points	29,323,875
Coordinate precision	0.0625 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	2 - 17
Point classes	
Created (never classified)	29,323,875
Point cloud generation parameters	
Processing time	13 minutes 3 seconds
Memory usage	24.55 GB
Date created	2023:12:29 19:50:08
Software version	2.0.3.16960
File size	417.65 MB
System	
Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Linux 64 bit
RAM	251.70 GB
CPU	Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
GPU(s)	Tesla P100-PCIE-12GB Tesla P100-PCIE-12GB