

Banks 1953

**Banks, OR in 1953. Photography shot by plane in 1953-07-01
26 August 2023**



Survey Data

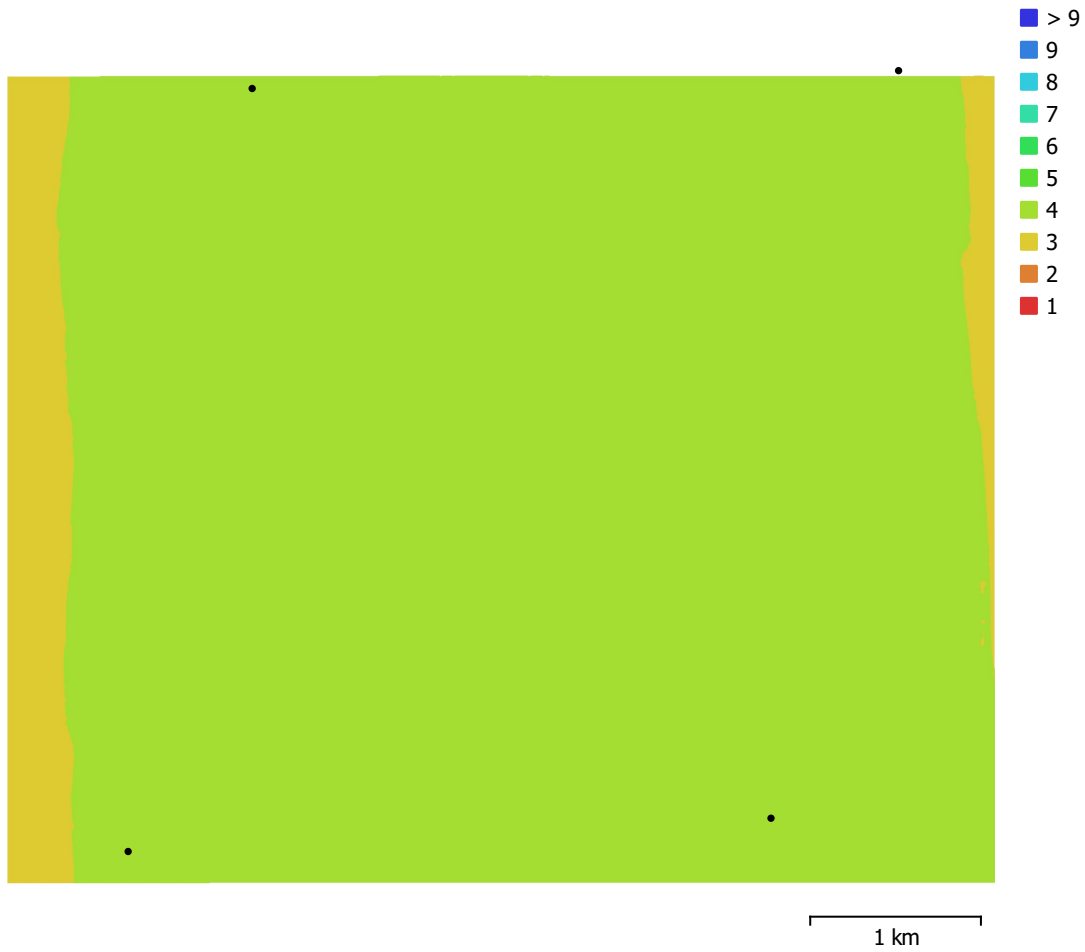


Fig. 1. Camera locations and image overlap.

Number of images:	4	Camera stations:	4
Flying altitude:	5 km	Tie points:	5,126
Ground resolution:	99.3 cm/pix	Projections:	10,786
Coverage area:	27.3 km ²	Reprojection error:	1.37 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
154.4mm	10140 x 9872	154.4 mm	unknown	No
154.4mm	10139 x 9872	154.4 mm	unknown	No
154.4mm	10135 x 9872	154.4 mm	unknown	No

Table 1. Cameras.

Camera Calibration

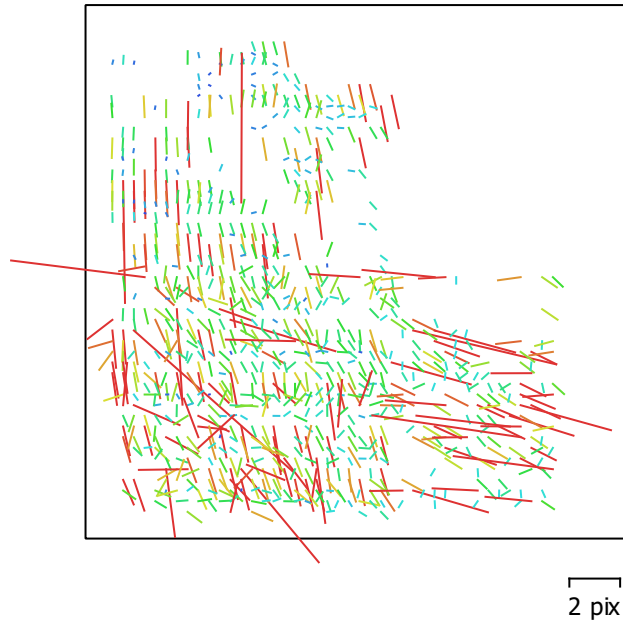


Fig. 2. Image residuals for 154.4mm.

154.4mm

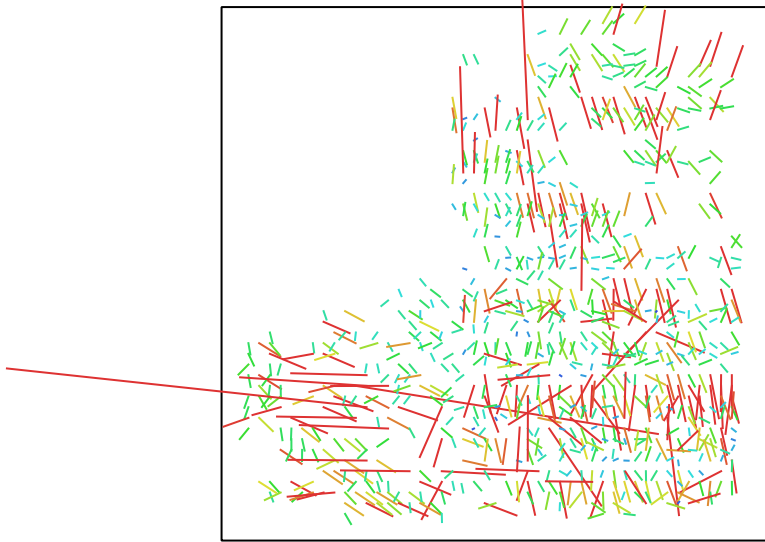
1 images

Type	Resolution	Focal Length	Pixel Size
Frame	10140 x 9872	154.4 mm	unknown

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	4530.87	1.4e+02	1.00	0.07	-0.28	0.09	-0.56	0.48	-0.10	-0.36
Cx	-72.1776	21		1.00	0.01	-0.02	-0.03	0.04	0.30	0.02
Cy	-211.01	26			1.00	-0.29	0.15	-0.13	0.14	0.21
K1	0.000899624	0.0014				1.00	-0.41	0.37	-0.09	-0.17
K2	-0.00375493	0.00077					1.00	-0.98	0.06	0.17
K3	0.000765879	0.00028						1.00	-0.04	-0.15
P1	-0.00318599	0.00038							1.00	0.19
P2	-0.00381111	0.00033								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration



1 pix

Fig. 3. Image residuals for 154.4mm.

154.4mm

1 images

Type	Resolution	Focal Length	Pixel Size
Frame	10139 x 9872	154.4 mm	unknown

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	4566.4	1.4e+02	1.00	-0.16	-0.18	0.11	-0.62	0.54	-0.11	-0.39
Cx	-60.3095	19		1.00	0.26	-0.11	-0.00	0.02	0.19	0.01
Cy	-263.472	24			1.00	-0.33	0.12	-0.08	0.18	0.06
K1	0.000360708	0.0014				1.00	-0.42	0.36	-0.13	-0.17
K2	-0.00314808	0.00069					1.00	-0.98	0.08	0.30
K3	0.000599525	0.00023						1.00	-0.07	-0.27
P1	-0.00303767	0.0004							1.00	0.15
P2	-0.0040567	0.00033								1.00

Table 3. Calibration coefficients and correlation matrix.

Camera Calibration

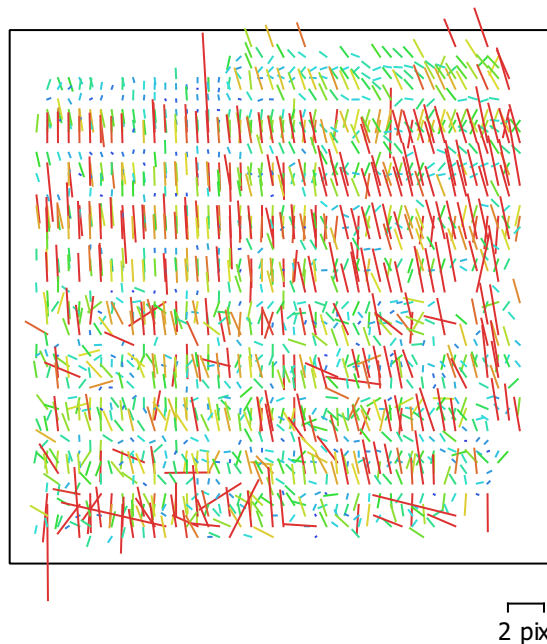


Fig. 4. Image residuals for 154.4mm.

154.4mm

2 images

Type	Resolution	Focal Length	Pixel Size
Frame	10135 x 9872	154.4 mm	unknown

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	4469.38	1.3e+02	1.00	0.12	-0.05	0.07	-0.70	0.59	0.09	0.35
Cx	-13.5829	17		1.00	0.18	0.08	-0.07	0.06	0.30	-0.25
Cy	65.1267	14			1.00	0.26	0.08	-0.08	0.33	0.05
K1	-0.000446139	0.0013				1.00	-0.22	0.14	0.08	0.06
K2	-0.00249243	0.00046					1.00	-0.98	-0.11	-0.26
K3	0.00044884	0.00015						1.00	0.12	0.23
P1	0.00275421	0.00041							1.00	0.15
P2	0.0040578	0.00037								1.00

Table 4. Calibration coefficients and correlation matrix.

Ground Control Points



Fig. 5. GCP locations and error estimates.

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

Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	0.31667	0.593097	0.294454	0.672342	0.733994

Table 5. Control points RMSE.

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

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 1	-0.048213	-0.649818	0.244501	0.695966	1.889 (4)
point 2	0.298613	-0.215444	0.276565	0.460516	1.704 (4)
point 3	0.00186849	0.798501	-0.431048	0.90742	2.281 (4)
point 4	-0.556436	0.548426	-0.157296	0.796954	2.132 (4)
Total	0.31667	0.593097	0.294454	0.733994	2.014

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

Digital Elevation Model

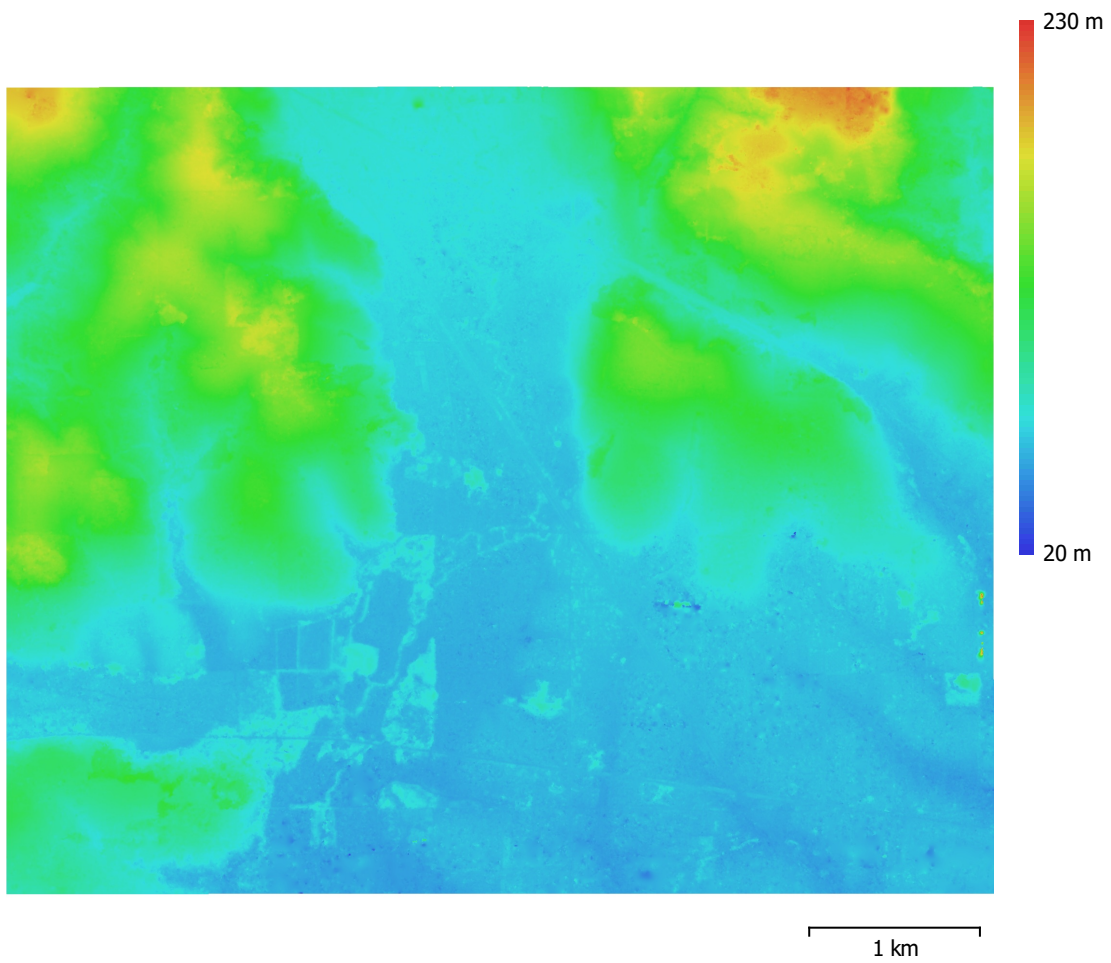


Fig. 6. Reconstructed digital elevation model.

Resolution: 1.99 m/pix
Point density: 0.254 points/m²

Processing Parameters

General

Cameras	4
Aligned cameras	4
Markers	4
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	5,126 of 5,786
RMS reprojection error	0.270063 (1.36971 pix)
Max reprojection error	1.13808 (30.8925 pix)
Mean key point size	7.49625 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.1177

Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Key point limit per Mpx	1,000
Tie point limit	4,000
Exclude stationary tie points	No
Guided image matching	No
Adaptive camera model fitting	No
Matching time	5 seconds
Matching memory usage	518.70 MB
Alignment time	1 seconds
Alignment memory usage	5.58 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	0 seconds
Date created	2023:08:26 21:41:42
Software version	1.8.4.14671
File size	329.08 KB

Depth Maps

Count	4
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Depth maps generation parameters

Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	1 minutes 4 seconds
Memory usage	1.52 GB
Date created	2023:08:26 22:08:39
Software version	1.8.4.14671
File size	68.18 MB

Dense Point Cloud

Points	20,267,095
Point colors	3 bands, uint8

Depth maps generation parameters

Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	1 minutes 4 seconds
Memory usage	1.52 GB
Dense cloud generation parameters	
Processing time	53 seconds
Memory usage	2.08 GB
Date created	2023:08:26 22:09:32
Software version	1.8.4.14671
File size	270.39 MB
Model	
Faces	1,616,365
Vertices	811,353
Vertex colors	3 bands, uint8
Texture	8,192 x 8,192, 4 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	1 minutes 4 seconds
Memory usage	1.52 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	54 seconds
Memory usage	3.71 GB
Texturing parameters	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	8,192
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	38 seconds
UV mapping memory usage	2.76 GB
Blending time	44 seconds
Blending memory usage	8.69 GB
Date created	2023:08:26 22:13:34
Software version	1.8.4.14671
File size	115.85 MB
DEM	
Size	2,913 x 2,386
Coordinate system	WGS 84 (EPSG::4326)
Reconstruction parameters	
Source data	Dense cloud
Interpolation	Enabled
Processing time	2 seconds
Memory usage	191.84 MB
Date created	2023:08:26 22:11:42
Software version	1.8.4.14671
File size	32.93 MB
Orthomosaic	
Size	5,820 x 4,762
Coordinate system	WGS 84 (EPSG::4326)

Colors 3 bands, uint8

Reconstruction parameters

Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	7 seconds
Memory usage	1.57 GB
Date created	2023:08:26 22:12:09
Software version	1.8.4.14671
File size	158.94 MB

System

Software name	Agisoft Metashape Professional
Software version	1.8.4 build 14671
OS	Windows 64 bit
RAM	63.68 GB
CPU	12th Gen Intel(R) Core(TM) i7-12700H
GPU(s)	NVIDIA GeForce RTX 3050 Laptop GPU