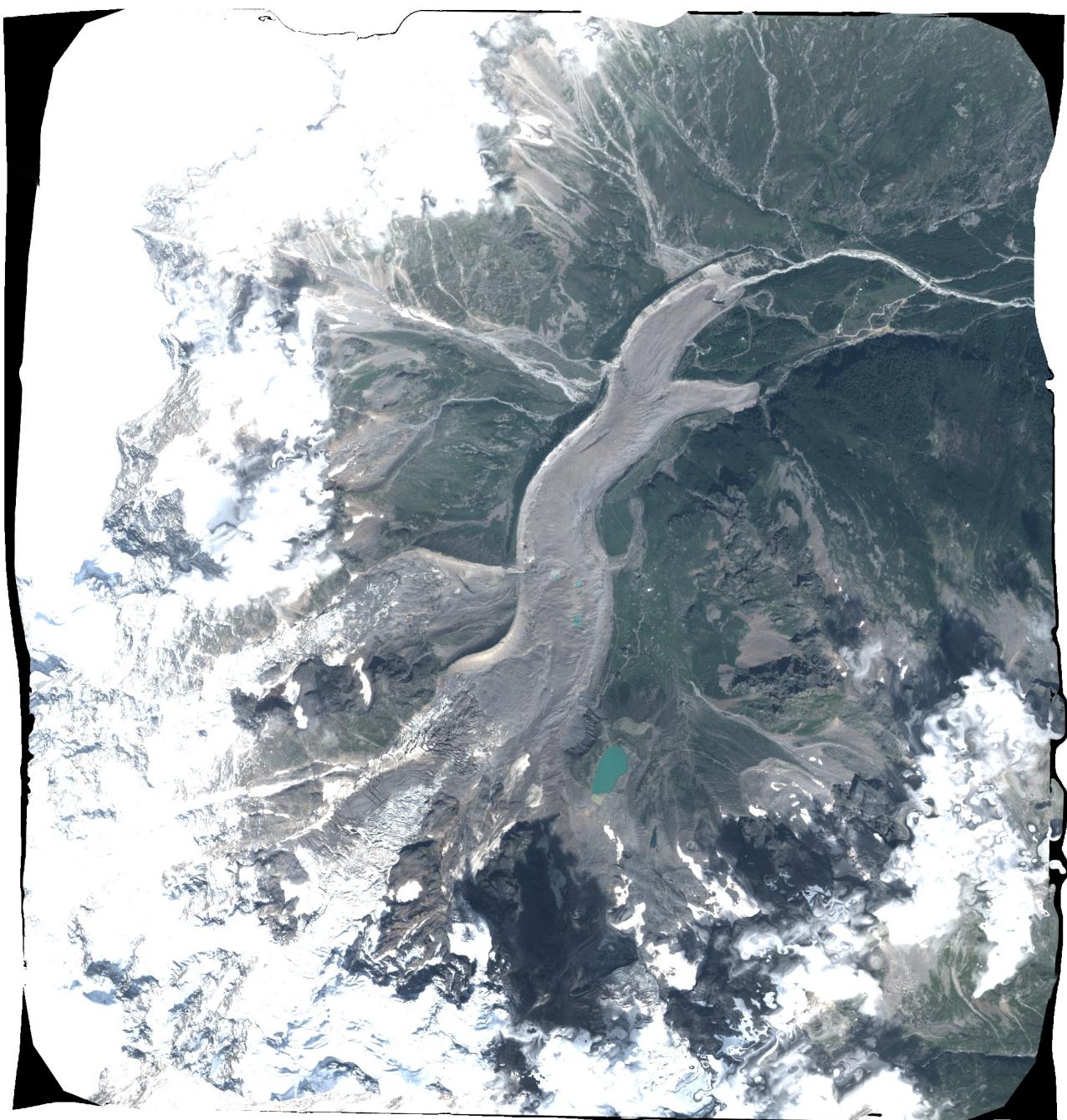


# Vallarino - Lab 05 - Satellite Images

Processing Report  
23 December 2022



# Survey Data



Fig. 1. Camera locations and image overlap.

Number of images:	2	Camera stations:	2
Flying altitude:	1.47 km	Tie points:	2,572
Ground resolution:	52 cm/pix	Projections:	5,144
Coverage area:	39.5 km <sup>2</sup>	Reprojection error:	0.943 pix

<b>Camera Model</b>	<b>Resolution</b>	<b>Focal Length</b>	<b>Pixel Size</b>	<b>Precalibrated</b>
unknown	12130 x 12083	unknown	unknown	RPC
unknown	12346 x 12465	unknown	unknown	RPC

Table 1. Cameras.

# Camera Locations

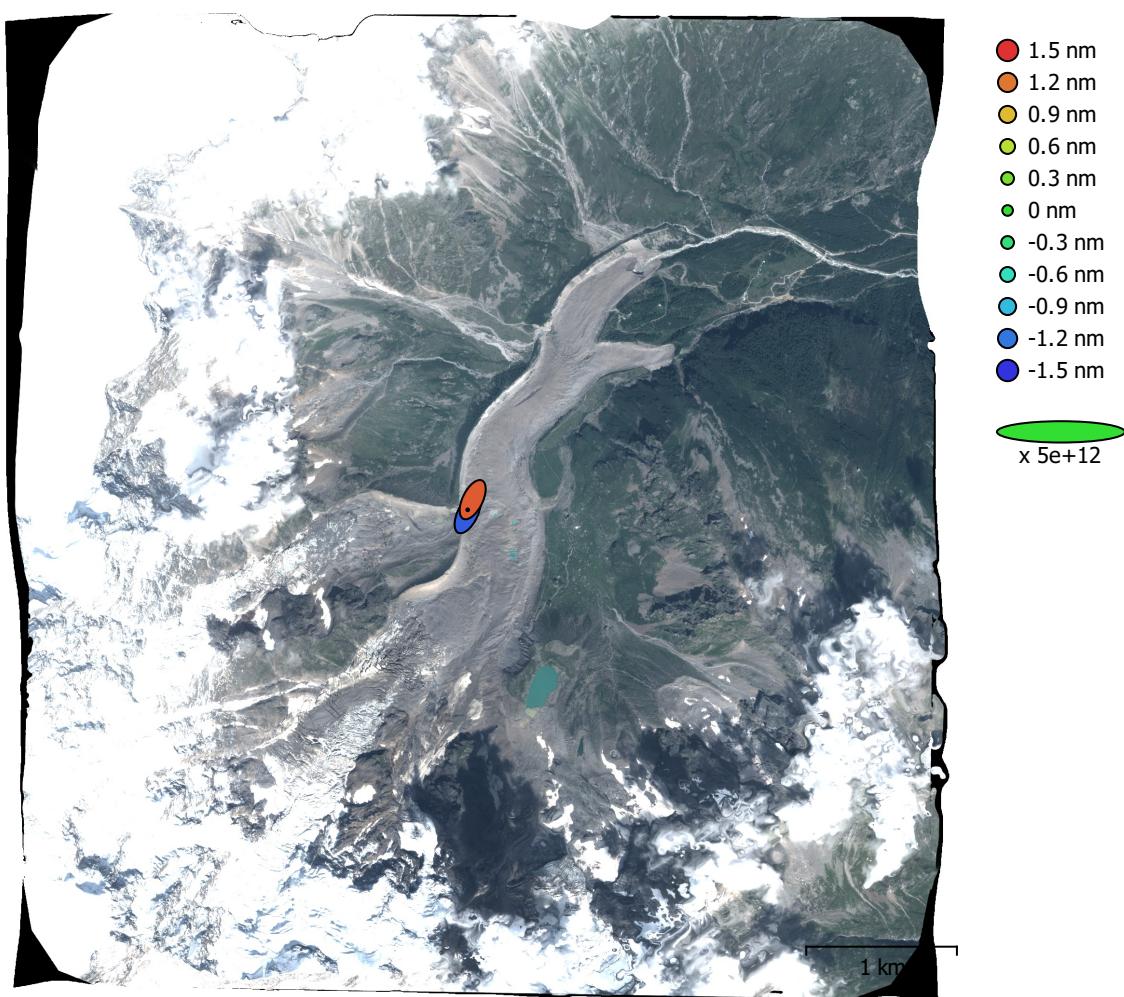


Fig. 2. Camera locations and error estimates.

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

Estimated camera locations are marked with a black dot.

X error (nm)	Y error (nm)	Z error (nm)	XY error (nm)	Total error (nm)
0.0132083	0.0269038	1.32188	0.0299712	1.32222

Table 2. Average camera location error.

X - Easting, Y - Northing, Z - Altitude.

# Camera Orientations

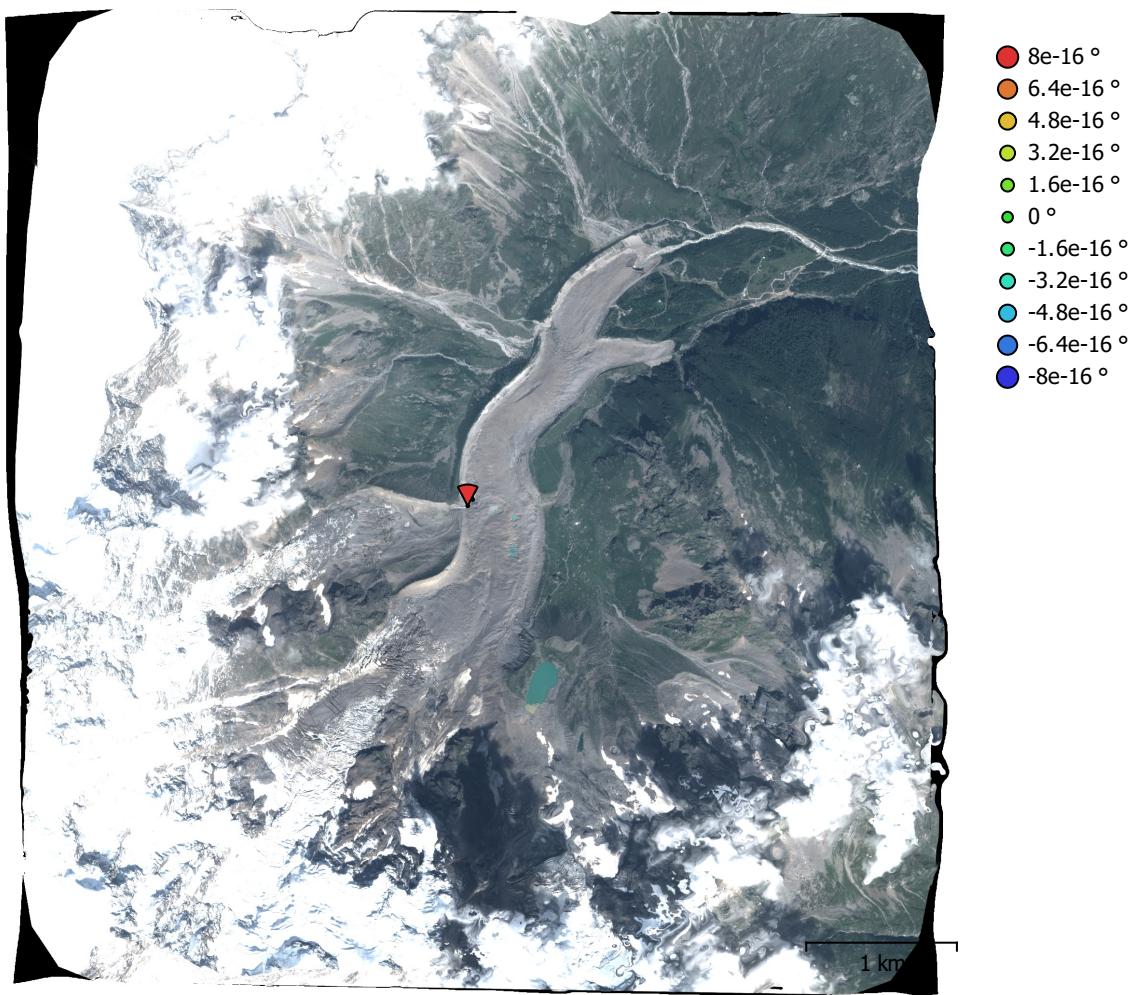


Fig. 3. Camera orientations and error estimates.

Arcs represent yaw error estimates.

Yaw error (°)	Pitch error (°)	Roll error (°)	Total error (°)
5.62248e-16	1.50867e-14	1.08977e-15	1.51364e-14

Table 3. Average camera rotation error.

# Ground Control Points

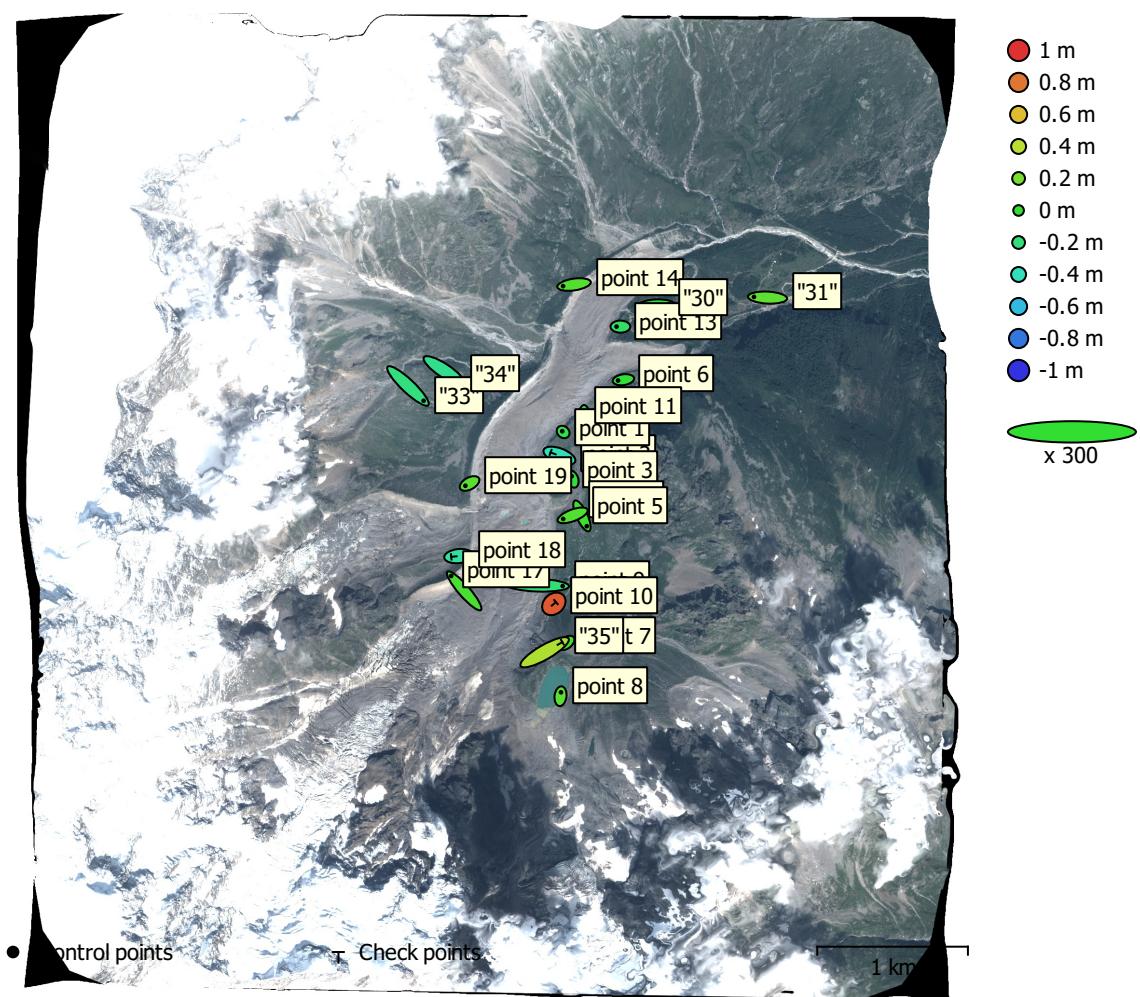


Fig. 4. GCP locations and error estimates.

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

Estimated GCP locations are marked with a dot or crossing.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
17	46.9288	29.8805	12.6158	55.6341	57.0466

Table 4. Control points RMSE.

X - Easting, Y - Northing, Z - Altitude.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
4	46.8553	23.9181	54.1555	52.607	75.5004

Table 5. Check points RMSE.

X - Easting, Y - Northing, Z - Altitude.

<b>Label</b>	<b>X error (cm)</b>	<b>Y error (cm)</b>	<b>Z error (cm)</b>	<b>Total (cm)</b>	<b>Image (pix)</b>
point 14	-48.5548	-7.17051	9.92571	50.0749	0.349 (2)
point 13	-17.1048	0.0969406	-13.5668	21.8321	0.677 (2)
point 6	-23.6673	-3.4627	-1.28257	23.9537	0.227 (2)
point 19	-18.5812	-10.1367	11.8066	24.2365	1.059 (2)
point 1	-3.92576	3.30249	-7.04109	8.71177	0.564 (2)
point 3	-4.17916	13.3759	-3.74264	14.5048	0.226 (2)
point 8	2.06948	17.1843	12.0681	21.1003	0.529 (2)
point 4	21.2491	-45.5911	3.33183	50.4101	0.787 (2)
point 17	-57.5365	65.8214	6.45347	87.6616	0.561 (2)
point 9	112.223	-4.00142	-19.8703	114.039	1.085 (2)
point 5	-41.8767	-15.865	9.38228	45.7535	0.833 (2)
point 7	-12.608	-10.0231	4.04522	16.6069	0.271 (2)
point 11	0.634238	40.432	-12.6428	42.3673	0.774 (2)
"30"	55.2052	1.85712	-1.41393	55.2546	0.387 (2)
"31"	-60.0391	3.05377	12.6704	61.4375	0.557 (2)
"33"	69.1171	-65.4446	-21.9515	97.6834	0.783 (2)
"34"	64.4048	-42.631	-26.7702	81.7436	1.290 (2)
<b>Total</b>	<b>46.9288</b>	<b>29.8805</b>	<b>12.6158</b>	<b>57.0466</b>	<b>0.712</b>

Table 6. Control points.  
X - Easting, Y - Northing, Z - Altitude.

<b>Label</b>	<b>X error (cm)</b>	<b>Y error (cm)</b>	<b>Z error (cm)</b>	<b>Total (cm)</b>	<b>Image (pix)</b>
point 2	-38.9661	14.4857	-38.7467	56.8286	0.007 (2)
point 18	-32.3183	-3.41002	-31.9653	45.5837	0.103 (2)
point 10	9.22166	7.82767	88.9604	89.7789	0.032 (2)
"35"	78.3186	44.7835	35.9755	97.1268	0.024 (2)
<b>Total</b>	<b>46.8553</b>	<b>23.9181</b>	<b>54.1555</b>	<b>75.5004</b>	<b>0.055</b>

Table 7. Check points.  
X - Easting, Y - Northing, Z - Altitude.

# Digital Elevation Model

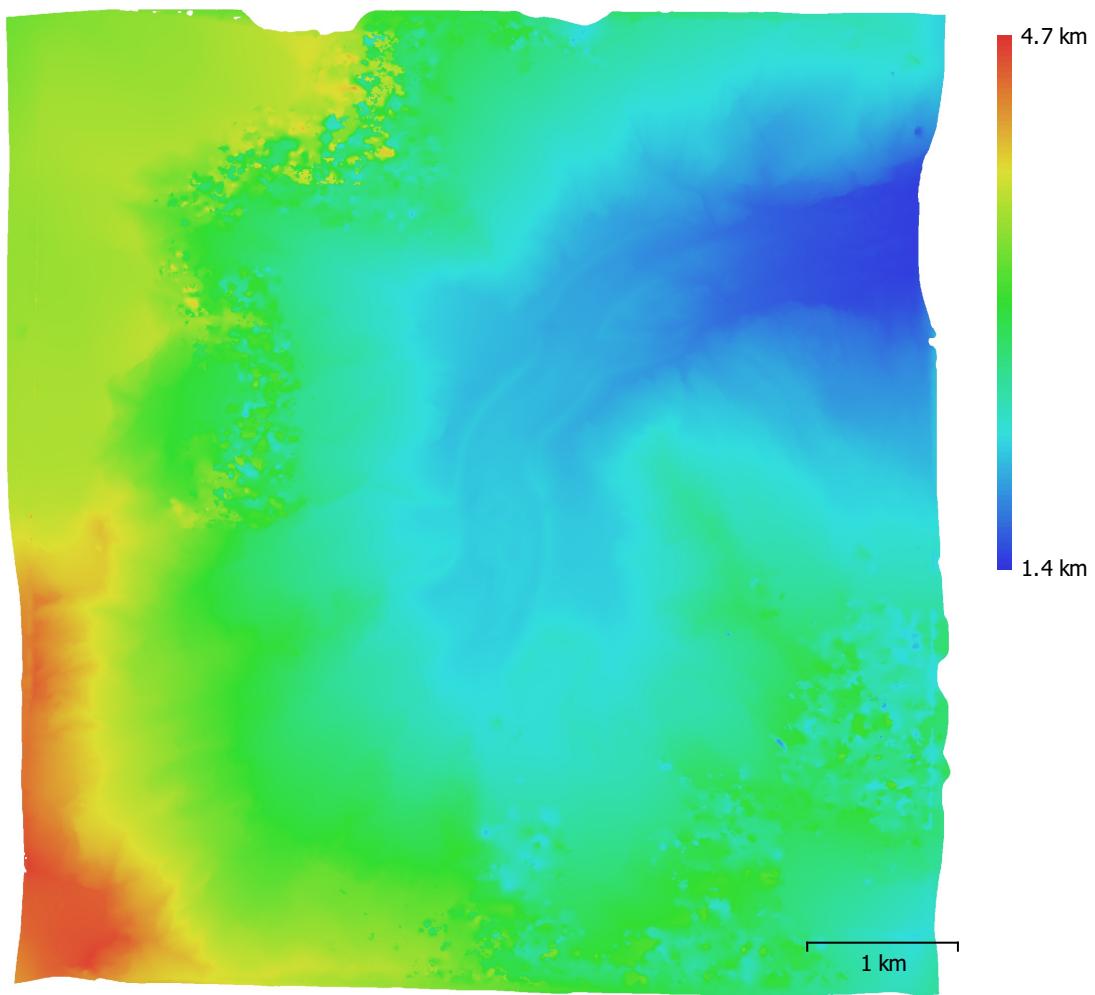


Fig. 5. Reconstructed digital elevation model.

Resolution: 1.04 m/pix

Point density: 0.923 points/m<sup>2</sup>

# Processing Parameters

## General

Cameras	2
Aligned cameras	2
Markers	21
Coordinate system	WGS 84 / UTM zone 32N (EPSG::32632)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	2,572 of 2,667
RMS reprojection error	0.0895335 (0.94306 pix)
Max reprojection error	0.268688 (17.934 pix)
Mean key point size	5.76574 pix
Point colors	4 bands, uint16
Key points	No
Average tie point multiplicity	2

## Alignment parameters

Accuracy	High
Generic preselection	No
Reference preselection	Source
Key point limit	40,000
Key point limit per Mpx	1,000
Tie point limit	4,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	5 seconds
Matching memory usage	1.24 GB
Alignment time	0 seconds
Alignment memory usage	20.00 KB
Date created	2022:12:23 12:30:21
Software version	1.8.4.14856
File size	164.73 KB

## Depth Maps

Count	2
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## Depth maps generation parameters

Quality	High
Filtering mode	Moderate
Max neighbors	16
Processing time	10 minutes 14 seconds
Memory usage	2.71 GB
Date created	2022:12:23 12:53:07
Software version	1.8.4.14856
File size	104.58 MB

## Dense Point Cloud

Points	46,807,975
Point colors	4 bands, uint16

## Depth maps generation parameters

Quality	High
Filtering mode	Moderate
Max neighbors	16
Processing time	10 minutes 14 seconds

Memory usage	2.71 GB
<b>Dense cloud generation parameters</b>	
Processing time	2 minutes 19 seconds
Memory usage	4.74 GB
Date created	2022:12:23 12:55:26
Software version	1.8.4.14856
File size	967.36 MB
<b>DEM</b>	
Size	14,972 x 14,691
Coordinate system	WGS 84 / UTM zone 32N (EPSG::32632)
<b>Reconstruction parameters</b>	
Source data	Dense cloud
Interpolation	Enabled
Processing time	24 seconds
Memory usage	314.34 MB
Date created	2022:12:23 13:25:40
Software version	1.8.4.14856
File size	157.26 MB
<b>Orthomosaic</b>	
Size	12,517 x 13,096
Coordinate system	WGS 84 / UTM zone 32N (EPSG::32632)
Colors	4 bands, uint16
<b>Reconstruction parameters</b>	
Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	1 minutes 35 seconds
Memory usage	9.06 GB
Date created	2022:12:23 13:29:02
Software version	1.8.4.14856
File size	5.66 GB
<b>System</b>	
Software name	Agisoft Metashape Professional
Software version	1.8.4 build 14856
OS	Windows 64 bit
RAM	15.78 GB
CPU	Intel(R) Core(TM) i7-10700 CPU @ 2.90GHz
GPU(s)	Quadro P1000