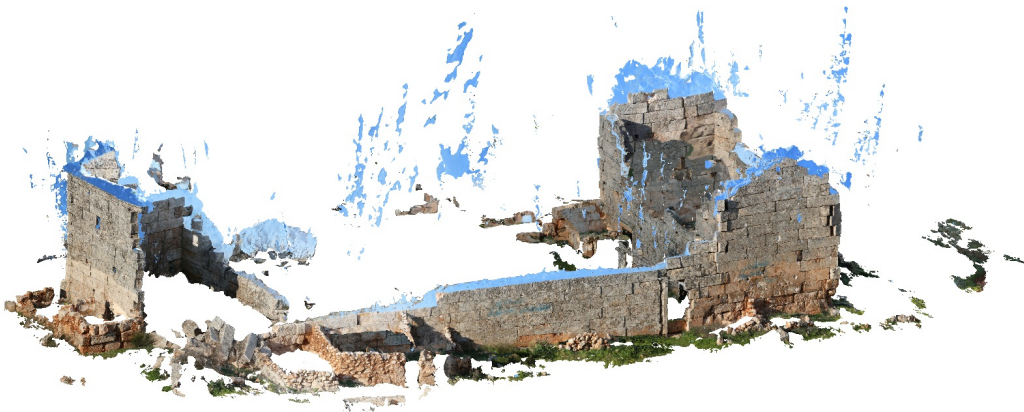


# House in Shenshrah, Syria

Institute for Digital Archaeology  
Khaled Hiatlih

03 March 2019



# Survey Data

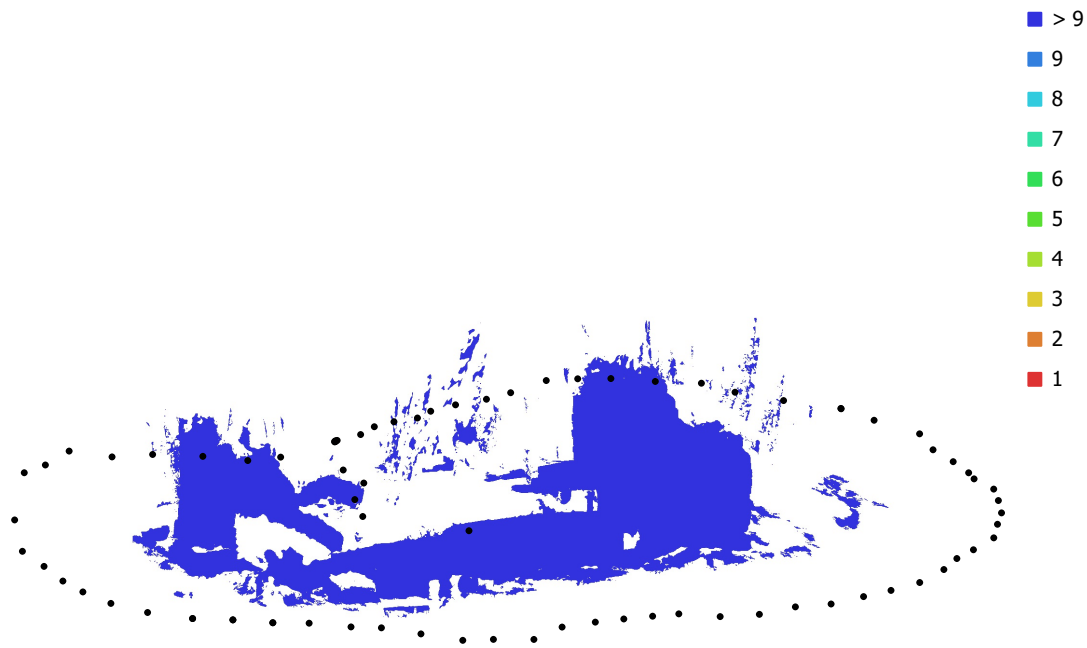


Fig. 1. Camera locations and image overlap.

Number of images: 81

Camera stations: 81

Tie points: 63,852

Projections: 245,461

Reprojection error: 0.522 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Canon EOS 70D (24mm)	5472 x 3648	24 mm	4.17 x 4.17 $\mu\text{m}$	No
Canon EOS 70D (29mm)	5472 x 3648	29 mm	4.17 x 4.17 $\mu\text{m}$	No
Canon EOS 70D (22mm)	5472 x 3648	22 mm	4.17 x 4.17 $\mu\text{m}$	No
Canon EOS 70D (27mm)	5472 x 3648	27 mm	4.17 x 4.17 $\mu\text{m}$	No

Table 1. Cameras.

# Camera Calibration

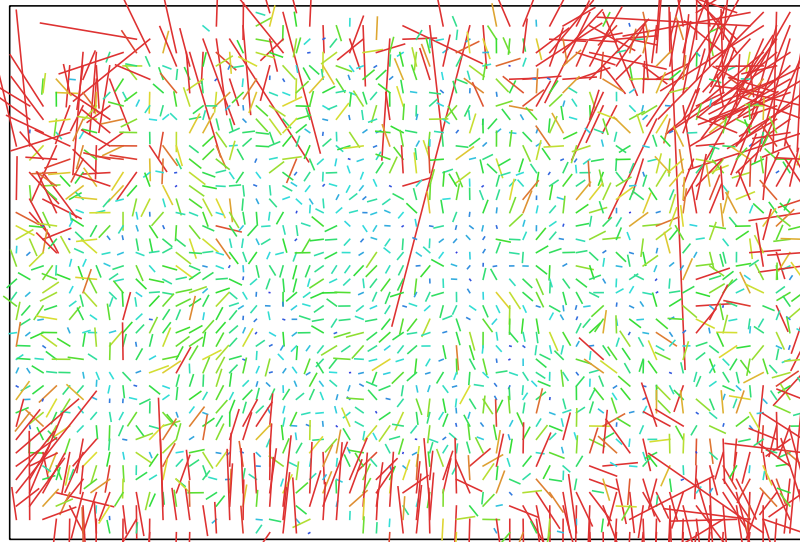


Fig. 2. Image residuals for Canon EOS 70D (24mm).

## Canon EOS 70D (24mm)

55 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>5472 x 3648</b>	<b>24 mm</b>	<b>4.17 x 4.17 <math>\mu</math>m</b>

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	P1	P2
<b>F</b>	<b>5948.6</b>	0.18	1.00	-0.10	-0.09	-0.56	0.05	-0.12	0.18	-0.08	-0.01
<b>Cx</b>	<b>34.5193</b>	0.23		1.00	0.08	0.08	0.05	0.11	-0.13	0.86	0.02
<b>Cy</b>	<b>-49.3051</b>	0.21			1.00	0.00	0.00	-0.08	0.10	0.05	0.58
<b>B1</b>	<b>8.37589</b>	0.13				1.00	-0.05	-0.08	0.05	0.06	-0.02
<b>B2</b>	<b>-4.63313</b>	0.12					1.00	-0.06	0.05	0.06	-0.09
<b>K1</b>	<b>-0.0927748</b>	6.5e-005						1.00	-0.93	0.14	-0.14
<b>K2</b>	<b>0.298687</b>	0.00025							1.00	-0.15	0.09
<b>P1</b>	<b>0.00137845</b>	1.2e-005								1.00	-0.01
<b>P2</b>	<b>-0.00145035</b>	7e-006									1.00

Table 2. Calibration coefficients and correlation matrix.

# Camera Calibration

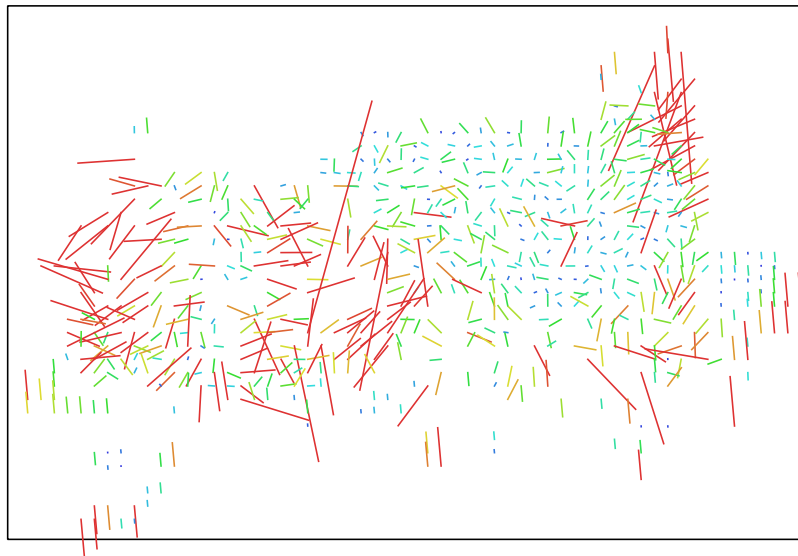


Fig. 3. Image residuals for Canon EOS 70D (29mm). 1 pix

## Canon EOS 70D (29mm)

1 images

Type  
**Frame**

Resolution  
**5472 x 3648**

Focal Length  
**29 mm**

Pixel Size  
**4.17 x 4.17  $\mu\text{m}$**

	Value	Error	F	B1	B2	K1	P1	P2
<b>F</b>	<b>6613.26</b>	0.91	1.00	-0.14	-0.04	0.09	0.16	0.40
<b>B1</b>	<b>7.91092</b>	0.22		1.00	-0.07	-0.14	0.16	-0.02
<b>B2</b>	<b>-2.0239</b>	0.25			1.00	0.14	-0.44	-0.12
<b>K1</b>	<b>0.0026431</b>	0.00029				1.00	-0.14	0.01
<b>P1</b>	<b>-0.00100769</b>	4.2e-005					1.00	0.09
<b>P2</b>	<b>-0.000432662</b>	3.9e-005						1.00

Table 3. Calibration coefficients and correlation matrix.

# Camera Calibration

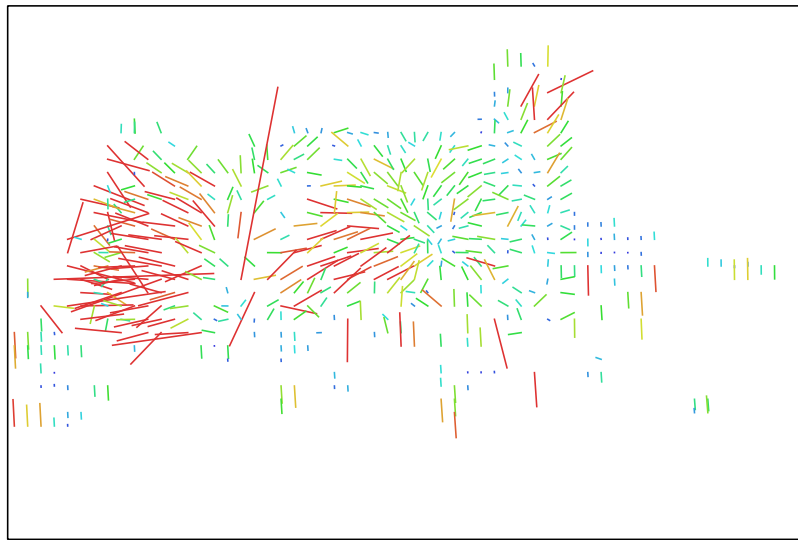


Fig. 4. Image residuals for Canon EOS 70D (22mm). ┌  
1 pix

## Canon EOS 70D (22mm)

1 images

Type  
Frame

Resolution  
**5472 x 3648**

Focal Length  
**22 mm**

Pixel Size  
**4.17 x 4.17  $\mu\text{m}$**

	Value	Error	F	Cx	Cy	B1	B2	K1	P1	P2
<b>F</b>	<b>5251.14</b>	0.73	1.00	-0.34	-0.10	-0.25	0.10	0.17	-0.17	0.56
<b>Cx</b>	<b>-5.58289</b>	1.7		1.00	-0.28	0.12	0.23	-0.01	0.89	-0.44
<b>Cy</b>	<b>-28.6198</b>	0.93			1.00	0.13	-0.10	-0.12	-0.34	0.29
<b>B1</b>	<b>6.49597</b>	0.19				1.00	-0.07	-0.03	0.24	-0.12
<b>B2</b>	<b>-0.868619</b>	0.21					1.00	0.20	0.20	0.17
<b>K1</b>	<b>-0.0751644</b>	0.00026						1.00	0.23	0.15
<b>P1</b>	<b>0.000507536</b>	9.1e-005							1.00	-0.32
<b>P2</b>	<b>-0.000412002</b>	4.3e-005								1.00

Table 4. Calibration coefficients and correlation matrix.

# Camera Calibration

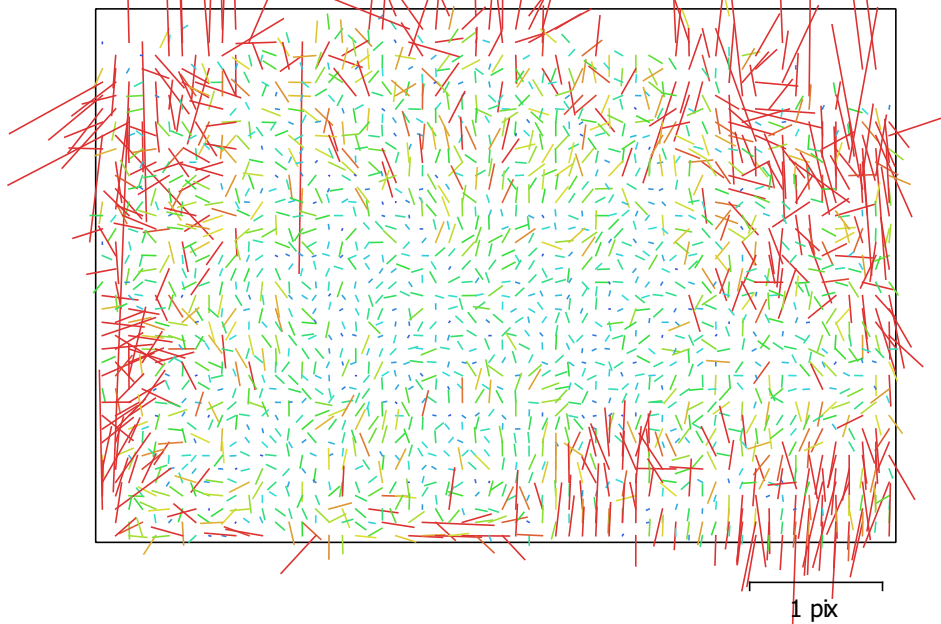


Fig. 5. Image residuals for Canon EOS 70D (27mm).

## Canon EOS 70D (27mm)

24 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>5472 x 3648</b>	<b>27 mm</b>	<b>4.17 x 4.17 <math>\mu\text{m}</math></b>

	Value	Error	F	B2	K1	K2	P1	P2
<b>F</b>	<b>6448.58</b>	0.25	1.00	0.08	-0.31	0.38	-0.06	0.04
<b>B2</b>	<b>-6.64166</b>	0.14		1.00	0.00	0.01	0.02	-0.14
<b>K1</b>	<b>-0.0578537</b>	0.00015			1.00	-0.93	0.13	-0.13
<b>K2</b>	<b>0.350387</b>	0.00069				1.00	-0.09	0.07
<b>P1</b>	<b>-3.13229e-005</b>	9.2e-006					1.00	-0.11
<b>P2</b>	<b>-0.000464638</b>	1.1e-005						1.00

Table 5. Calibration coefficients and correlation matrix.

# Digital Elevation Model

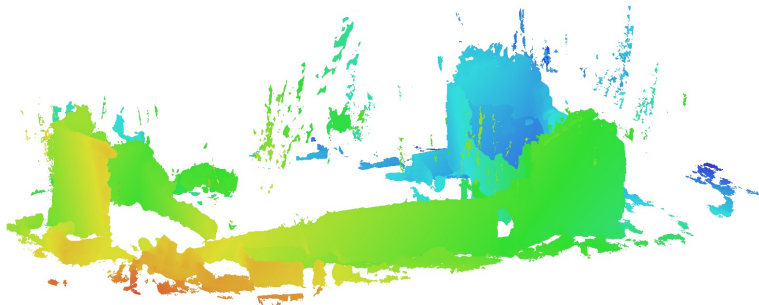


Fig. 6. Reconstructed digital elevation model.

# Processing Parameters

## General

Cameras	81
Aligned cameras	81

## Point Cloud

Points	63,852 of 81,590
RMS reprojection error	0.115764 (0.521787 pix)
Max reprojection error	0.358324 (14.1954 pix)
Mean key point size	3.99921 pix
Point colors	3 bands, uint8
Key points	Yes
Average tie point multiplicity	4.07036

## Alignment parameters

Accuracy	High
Generic preselection	No
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	40 minutes 55 seconds
Alignment time	2 minutes 25 seconds

## Depth Maps

Count	80
-------	----

## Reconstruction parameters

Quality	High
Filtering mode	Aggressive
Processing time	2 hours 6 minutes

## Dense Point Cloud

Points	27,099,547
Point colors	3 bands, uint8

## Reconstruction parameters

Quality	High
Depth filtering	Aggressive
Depth maps generation time	2 hours 6 minutes
Dense cloud generation time	41 minutes 52 seconds

## Model

Faces	5,419,908
Vertices	2,726,843
Vertex colors	3 bands, uint8
Texture	4,096 x 4,096, 4 bands, uint8

## Reconstruction parameters

Surface type	Arbitrary
Source data	Dense
Interpolation	Enabled
Quality	High
Depth filtering	Aggressive
Face count	5,419,909
Processing time	3 hours 46 minutes

## Texturing parameters

Mapping mode	Generic
Blending mode	Mosaic
Texture size	4,096 x 4,096



**General**

Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	2 minutes 27 seconds
Blending time	18 minutes 9 seconds

**Software**

Version	1.5.0 build 7492
Platform	Windows 64