

Camera Calibration Verification
Model: DMC II 140



For
Midwest Aerial Photography
7535 West Broad Street
Galloway, OH, 43119

Date:
October 3, 2018

Calibration Details

Camera:

Manufacturer

Reference

Serial Number

Date of Calibration

Date of Report

Number of Pages

This camera system is certified by PixElement and is fully functional within its published specifications and tolerances.

Signature

Ben Vander Jagt

Ph.D

CEO/CTO

Calibration Overview

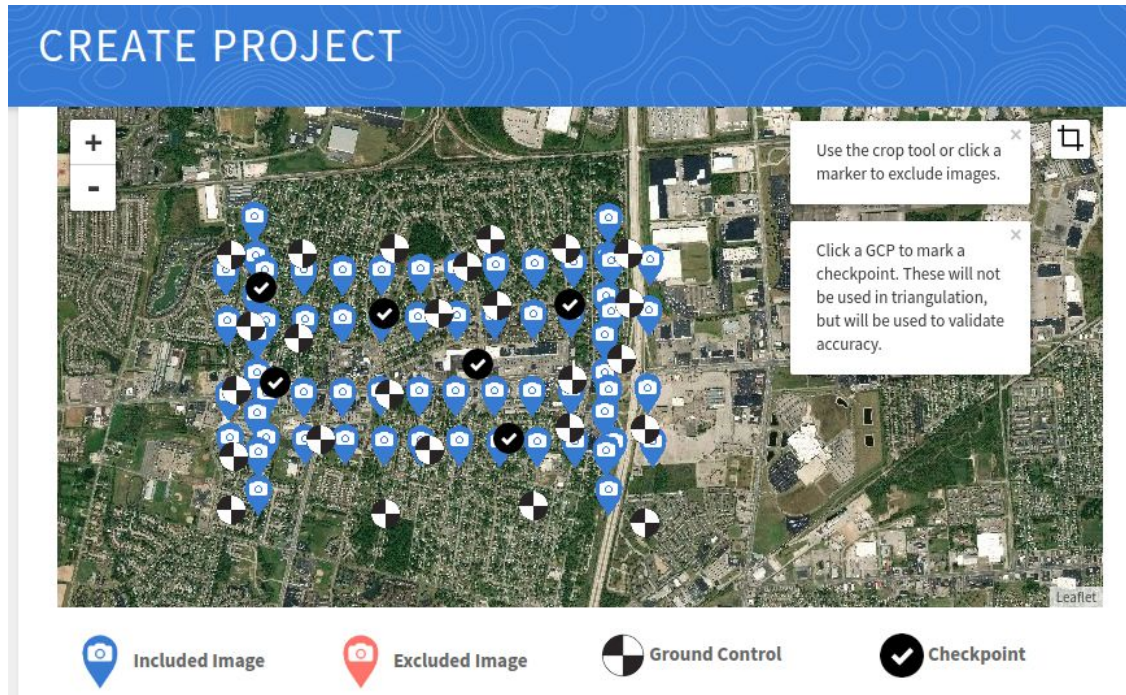
Reference Camera	PAN	
Serial Number	00119664	
Number of rows/columns [pixels]	12096 x 11200	
Pixel Size [μm]	7.200 x 7.200	
Image Size [mm]	87.091 x 80.640	
Focal Length [mm]	91.9985 mm	+ /- 0.002 mm
Principal Point [mm]	X= -0.0064 mm, Y= -0.0102 mm	+ /- 0.002 mm

Date of Calibration Flight:

The calibration flight for the DMC was performed on September 15, 2018.

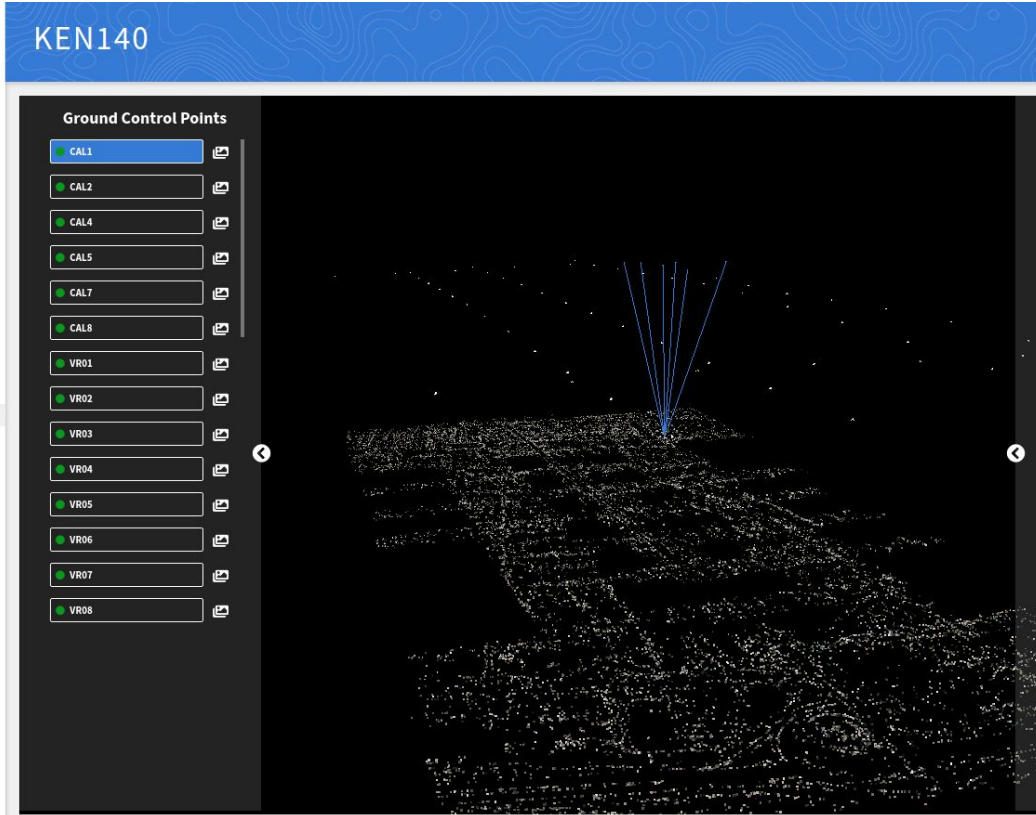
Parameter	Parameter Value
AVG GSD [cm]	4.6
Along-Track Flightlines	4
Number of Cross Track Flight Lines	2
Number of Ground Control Points (GCP) in AT	8
Number of Checkpoints	16
Avg # observations / Control Point	4
Avg Forward-lap [%]	60
Avg Side-lap [%]	30
Average Height Above Ground [m]	581
Average Altitude [m]	863

Calibration Procedure:



Aerial Triangulation Details

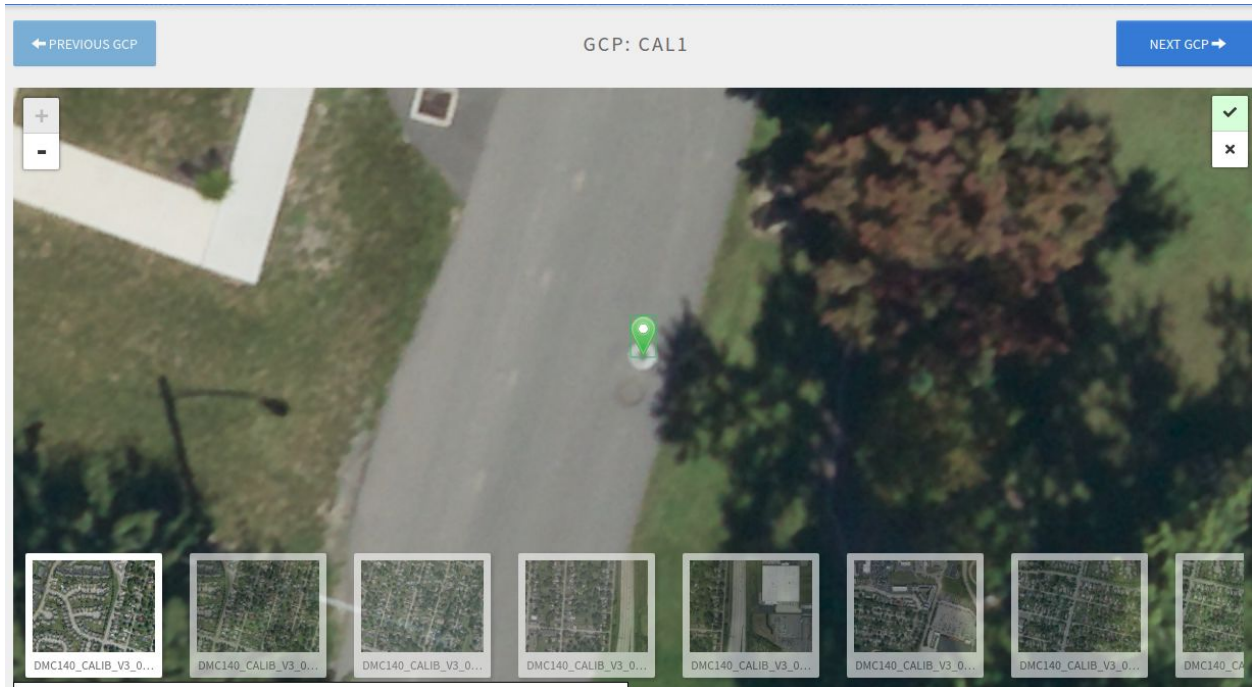
Parameter	Parameter Adjusted
Focal length	No
Principal Point	No
Radial Distortion	Yes
Tangential Distortion	No
Photo Positions (X,Y,Z)	Yes
Photo Orientations (o, p, k)	Yes
Lever Arm Offset	No
Avg Sidelap	30



Aerial Triangulation Statistics

Parameter	Parameter Adjusted
Average Reprojection Error (pixels)	0.4
St.Dev of Photo Position [m]	[0.17, 0.16, 0.04]
St.Dev of Photo Orientation [mdeg]	[10.2, 12.9, 13.1]
St. Dev of GCPS [m]	[0.02, 0.01, 0.04]
St. Dev of Checkpoints [m]	[0.03, 0.03, 0.04]
RMS of Photo Positions vs GPS [m]	[0.17, 0.16, 0.62]
RMS of Photo Orientations [mdeg]	[10.1, 12.9, 14.1]
RMS of GCPs	[0.02, 0.01, 0.04]
RMS of Checkpoints	[0.03, 0.03, 0.04]

GCP/Checkpoint Statistics



Parameter	Parameter Adjusted
GCP Horizontal RMSE	[0.02, 0.01]
GCP Vertical RMSE	[0.04]
Checkpoint Horizontal RMSE	[0.03, 0.03]
Checkpoint Vertical RMSE	[0.04]

This aerial triangulation was produced with PixElement Photogrammetry Software.