

Camera Geometric Verification Certificate  
No: DMC II 230 - 23522



For

**Geomni, Inc**

467 Aviation Way  
Frederick, Maryland 21701

USA

DMC II 230 – 23522  
Geometric Verification

Camera: DMC II 230-23522  
Manufacturer: Leica Geosystems Technologies, D-73430 Aalen, Germany  
Reference: PAN  
Serial Number: 00123118 (PAN Head)  
Date of Calibration: 20 November 2014  
Date of Report: 12 July 2020  
Number of Pages: 5

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This camera system is certified by Leica Geosystems Technologies and is fully functional within its specifications and tolerances.

Date of Calibration: January 2017

Date of Certification: July 2020



Dipl.Ing. Christian Müller, Product Manager

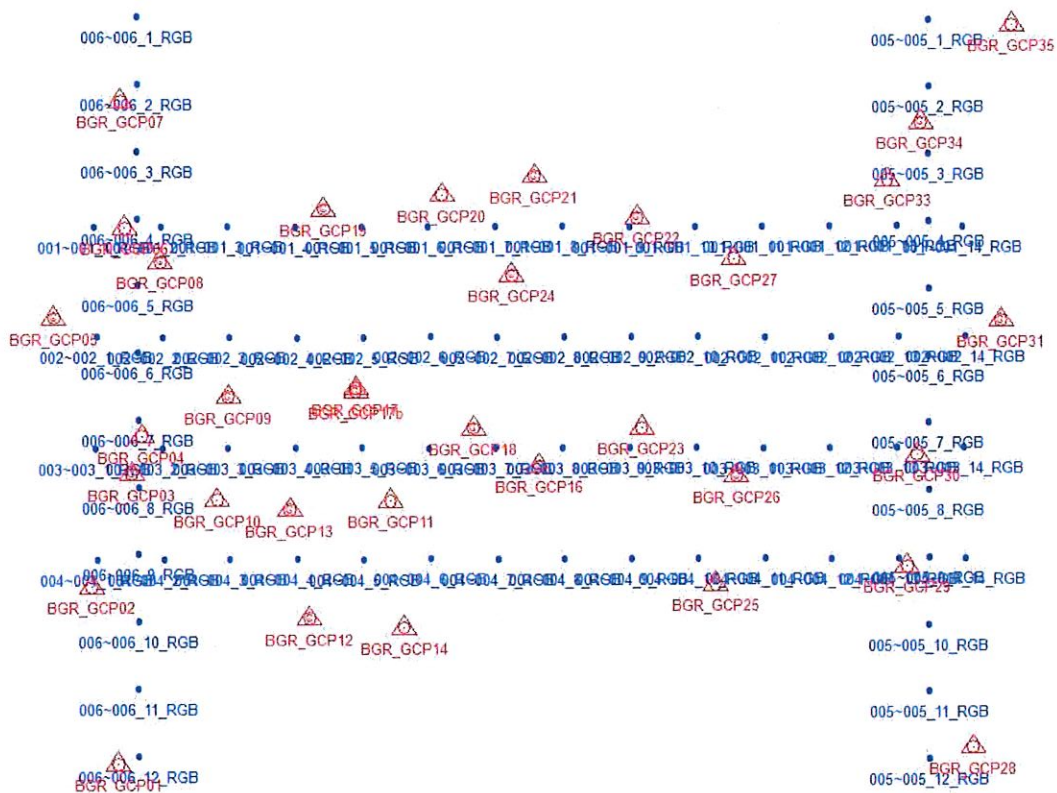
Michael Reading, Customer Support Consultant

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# Camera Serial Numbers and Burn-In flight

Camera Head	Serial Number	Calib. Date
PAN (reference)	00123118	20.11.2014
MS1 (NIR)	00118804	20.11.2014
MS2 (Blue)	00124736	20.11.2014
MS3 (Red)	00124693	20.11.2014
MS4 (Green)	00124739	20.11.2014

Verification flight performed: 9 July 2020



## Flight-Parameter PAN Camera

Parameter	Validation Flight
GSD (cm)	5
End-lap (%)	60
Side-Lap (%)	30
Number of Exposures	80
Number of Flight Lines	4
Number of Cross Flight Lines	2
Number of Control Points	18
Number of Check Points	16
GNSS / INS	Yes

### Application

Parameter	Validation Flight
Weighting for manual measured image points (um)	3.0
Weighting for automatic measured image points (um)	3.0
Weighting for Control Points (m)	.08 / .08 / .08
Weighting for GPS (m)	0.50 / 0.50 / 0.50
Weighting for INS (deg)	0.01 / 0.01 / 0.01
Modeling of GPS systematic residuals	YES
Bore Sight Alignment (YES/NO)	YES
Camera Self Calibration (YES/NO)	NO

### Statistics –Bundle block adjustment

Parameter	Validation Flight
Sigma0 [ $\mu\text{m}$ ]	0.9028
Mean Std Dev Photo Position [m]	0.0260 / 0.0262 / 0.0148
Mean Std Dev Photo Attitude [deg]	0.0015 / 0.0016 / 0.0006
Mean Std Dev Control Points [m]	0.0113 / 0.0113 / 0.0231
Mean Std Dev Check Points [m]	0.0148 / 0.0155 / 0.0237
RMS Photo Position [m]	0.0280 / 0.0264 / 0.0103
RMS Photo Attitude [deg]	0.0023 / 0.0018 / 0.0017



### Statistics – Results from independent reference measurements

Parameter	Validation Flight
RMS of Control Points – horizontal [m]	0.0209 / 0.0193
Max Ground Residual of Control Points – horizontal [m]	0.0484 / 0.0493
RMS of Control Points – vertical [m]	0.0135
Max Ground Residual of Control Points – vertical [m]	0.0237
RMS of Check Points – horizontal [m]	0.0168 / 0.0205
Max Ground Residual of Check Points – horizontal [m]	-0.0320 / -0.0461
RMS of Check Points – vertical [m]	0.0309
Max Ground Residual of Check Points – vertical [m]	-0.0673

The results of the aerial triangulation were generated with ImageStation Automatic Triangulation (ISAT), 2020, from Hexagon Geospatial.

Aerial Triangulation performed by

  
Michael Reading

07-12-2020  
Date