Camera Geometric Verification Certificate

No: DMC III 27542

For

Peregrine Aerial Survey

#201 2555 Townline Road
Abbotsford, British Columbia V2T 6E1

Canada

DMC III 27542 Geometric
Verification

Camera:	DMC III 27542
Manufacturer:	Leica Geosystems Technologies, D-73430 Aalen, Germany
Reference:	PAN
Serial Number:	00128301 (PAN Head)
Date of Calibration:	20 June 2017
Date of Report:	03 February 2023
Number of Pages:	5

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

Date of Calibration: 20 June 2017 Date of Certification: 03 February 2023

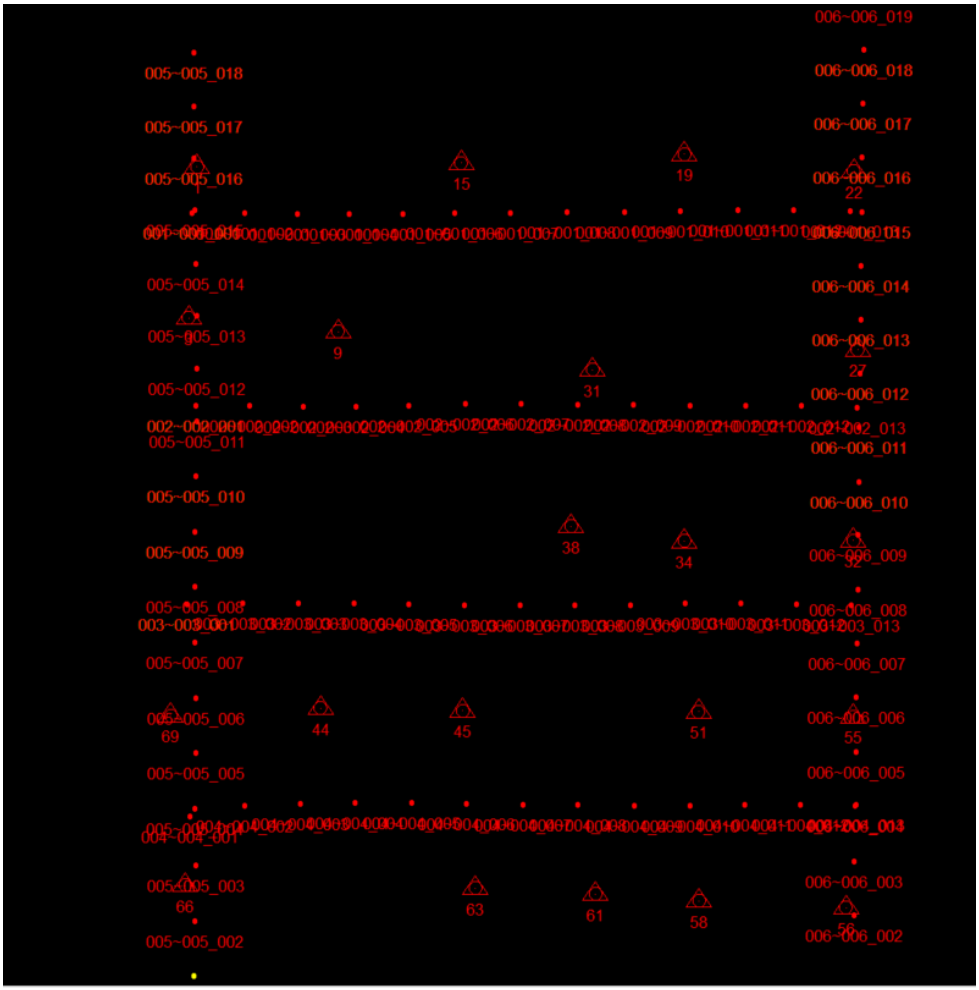
Dipl.Ing. Christian Müller, Product Manager Michael Reading, Customer Support Consultant

Camera Serial Numbers and Burn-In flight

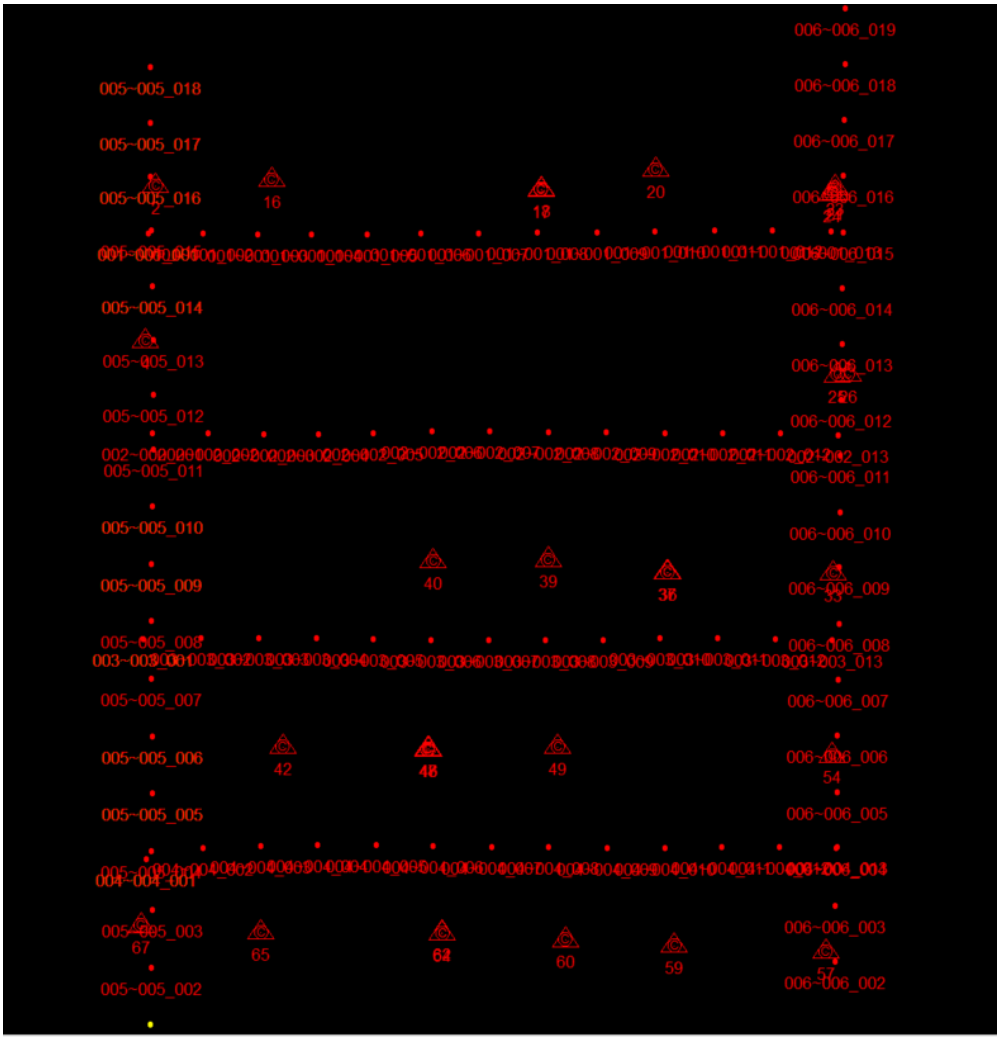
Camera Head	Serial Number	Calib. Date
PAN (reference)	00128301	20.06.2017
MS1 (NIR)	00128770	20.06.2017
MS2 (Blue)	00128798	20.06.2017
MS3 (Red)	00128775	20.06.2017
MS4 (Green)	00128801	20.06.2017

Verification flight performed: 29 January 2023

Flight parameters of 5 cm Verification Flight – Control Points



Flight parameters of 5 cm Verification Flight – Check Points



Parameter	Validation Flight
GSD (cm)	5
End-lap (%)	70
Side-Lap (%)	40
Number of Exposures	88
Number of Flight Lines	4
Number of Cross Flight Lines	2
Number of Control Points	21
Number of Check Points	30
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)	0.100 / 0.100 / 0.100
Weighting for GPS (m)	0.100 / 0.100 / 0.100
Weighting for INS (deg)	0.010 / 0.010 / 0.020
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 [µm]	0.77568
Mean Std Dev Photo Position [m]	0.02161 / 0.02117 / 0.01191
Mean Std Dev Photo Attitude [deg]	0.00093 / 0.00105 / 0.00054
Mean Std Dev Control Points [m]	0.01143 / 0.01121 / 0.03090
Mean Std Dev Check Points [m]	0.02757 / 0.03468 / 0.06393
RMS Photo Position [m]	0.01508 / 0.01415 / 0.01183
RMS Photo Attitude [deg]	0.00139 / 0.00155 / 0.00271

Statistics – Results From Independent Reference Measurements

Parameter	Validation Flight
RMS of Control Points – horizontal [m]	0.02963 / 0.03315
Max Ground Residual of Control Points – horizontal [m]	0.09162 / 0.08136
RMS of Control Points – vertical [m]	0.03095
Max Ground Residual of Control Points – vertical [m]	0.05990
RMS of Check Points – horizontal [m]	0.03280 / 0.03932
Max Ground Residual of Check Points – horizontal [m]	-0.09291 / 0.14253
RMS of Check Points – vertical [m]	0.0.06405
Max Ground Residual of Check Points – vertical [m]	-0.19102

The results of the aerial triangulation were generated with ImageStation Automatic Triangulation (ISAT), 2022, Version 16.7.0, Build 573 from Hexagon Geospatial.

Aerial Triangulation performed by _____ 02.03.2023
Michael Reading Date