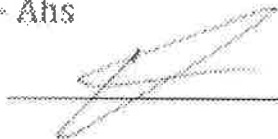


Camera Calibration Certificate

Camera Name	Phase One IXU-RS-1000
Back Serial Number	YC030180
Sensor Resolution	11608 x 8708 (100 MP) (X Axis; Y Axis)
Pixel Size	4.6 μ m
Lens Type & Focal Length	50 MM
Lens Serial Number	12377926
Distance Setting	Infinity [m]
Date Of Calibration	27-Sep-17

Calibration Lab – Phase One.

Signed by – Ahs



Calibration results

(Australis Format)

PARAMETER	VALUE	STD Deviation
FOCAL LENGTH	51.7532 (mm)	0.0017 (mm)
PRINCIPAL POINT OFFSET		
XP	-0.0579 (mm)	0.0052 (mm)
YP	0.0583 (mm)	0.0002 (mm)
RADIAL DISORTION		
K1	1.46676e-005	1.58675e-008
K2	-4.29916e-009	3.04870e-011
K3	3.21819e-013	1.97078e-014
RADIAL-ASYMMETRIC AND TANGENTIAL DISTORTION		
P1	4.08357e-006	5.44602e-007
P2	-1.00868e-006	1.82897e-008
AFFINITY AND NON-ORTHOGONALITY		
B1	-2.75458e-004	1.35377e-005
B2	-5.50187e-005	9.14080e-006

Calibration pictures exported using Capture One version 10

Lens distortion correction parameter used in exporting raw Tiffs – 0% correction.

The coefficients follow the model used by the photogrammetric software Australis where the corrected image coordinates (x_{corr} , y_{corr}) can be calculated from the measured coordinates (x_{meas} , y_{meas}) by using the following formulas:

$$x = x_{meas} - x_p$$

$$y = y_{meas} - y_p$$

$$r^2 = x^2 + y^2 \quad \text{Where } x \text{ and } y \text{ are now with respect to the principal point.}$$

$$dr = K1 * r^3 + K2 * r^5 + K3 * r^7$$

$$x_{corr} = x + x * \frac{dr}{r} + P1 * (r^2 + 2 * x^2) + 2 * P2 * x * y + B1 * x + B2 * y$$

$$y_{corr} = y + y * \frac{dr}{r} + P2 * (r^2 + 2 * y^2) + 2 * P1 * x * y$$

Calibration results
(USGS format)

Camera	iXU1000-RS_(50_mm)
Width	11608
Height	8708
PW	0.0046
PH	0.0046
F	51.7653
XP	-0.0578904
YP	0.0583247
K0	0
K1	1.59934e-005
K2	-9.15744e-009
K3	6.34083e-012
K4	-2.43041e-015
P1	3.95976e-006
P2	-1.00284e-006
P3	5.4099e-005
P4	-1.91583e-008

Calibration results

(INPHO format)

Camera	iXU1000-RS_(50_mm)
CCD_COLUMNS	11608
CCD_ROWS	8708
Pixel Width	0.0046
Pixel Height	0.0046
Focal length	51.7551
PIXEL_REFERENCE	Top Left
PPA X	5791.42
PPA Y	4341.32
K0	0
K1	-1.51461e-005
K2	6.01327e-009
K3	-2.66897e-012
K4	1.07482e-015
P1	-4.08737e-006
P2	1.01185e-006
P3	0
P4	0