



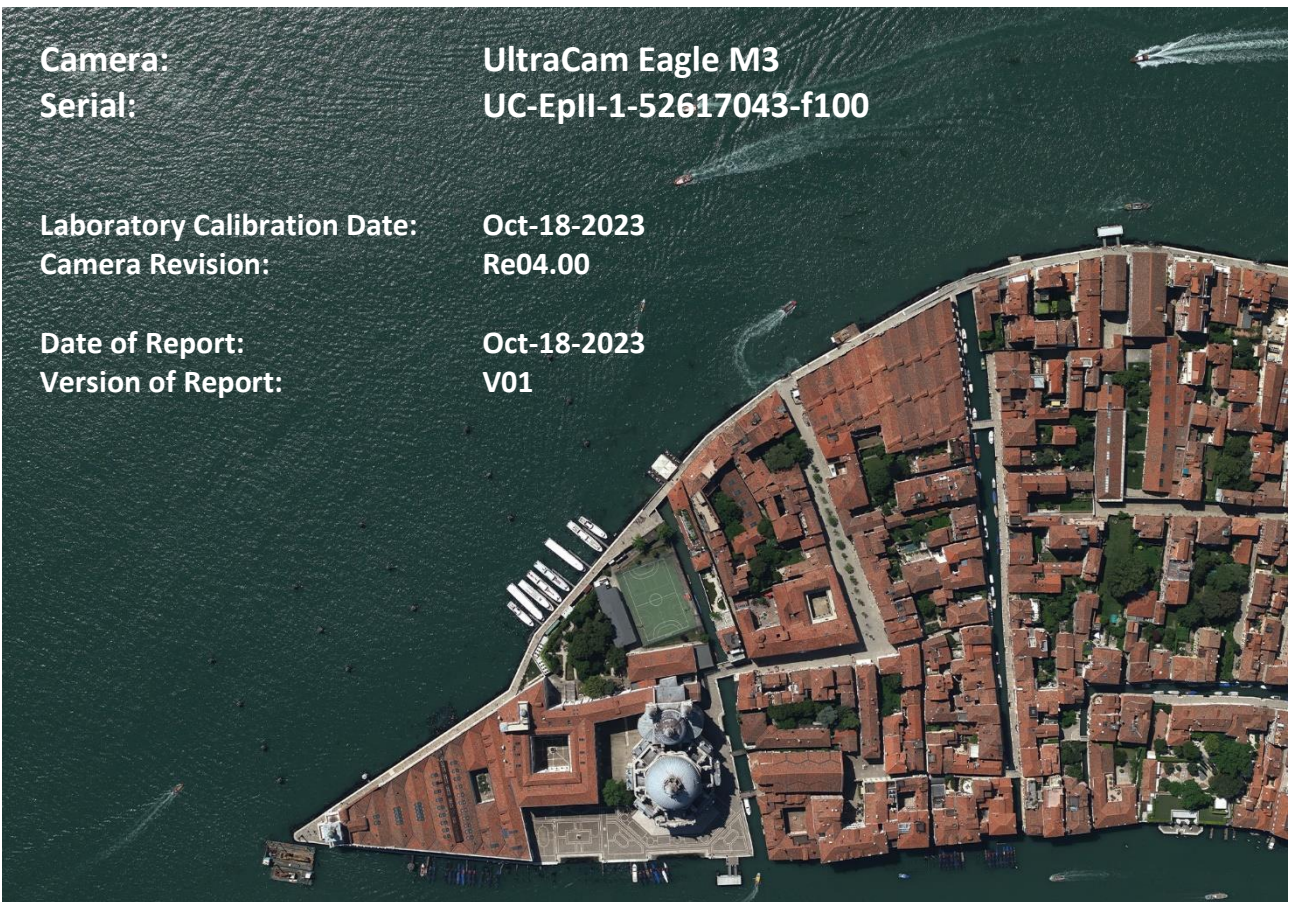
ULTRACAM

Calibration Report

Camera: UltraCam Eagle M3
Serial: UC-EpII-1-52617043-f100

Laboratory Calibration Date: Oct-18-2023
Camera Revision: Re04.00

Date of Report: Oct-18-2023
Version of Report: V01



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Venice, Italy

Photo on page 1 courtesy of Vexcel Imaging GmbH



ULTRACAM

Geometric Calibration

Camera: UltraCam Eagle M3
Serial: UC-EpII-1-52617043-f100

Panchromatic Camera: ck = 100.500 mm
Multispectral Camera: ck = 100.500 mm

PPA Information: X: 0.000mm
Y: 0.000mm



Panchromatic Camera

Large Format Panchromatic Output Image

Image Format	long track cross track	68.016mm 105.840mm	17004pixel 26460pixel
Image Extent		(-34.008, -52.920)mm	(34.008, 52.920)mm
Pixel Size		4.000µm*4.000µm	
Focal Length	ck	100.500mm	± 0.002mm
Principal Point (Level 2)	X_ppa	0.000mm	± 0.002mm
	Y_ppa	0.000mm	± 0.002mm
Lens Distortion	Remaining Distortion less than 0.002mm		

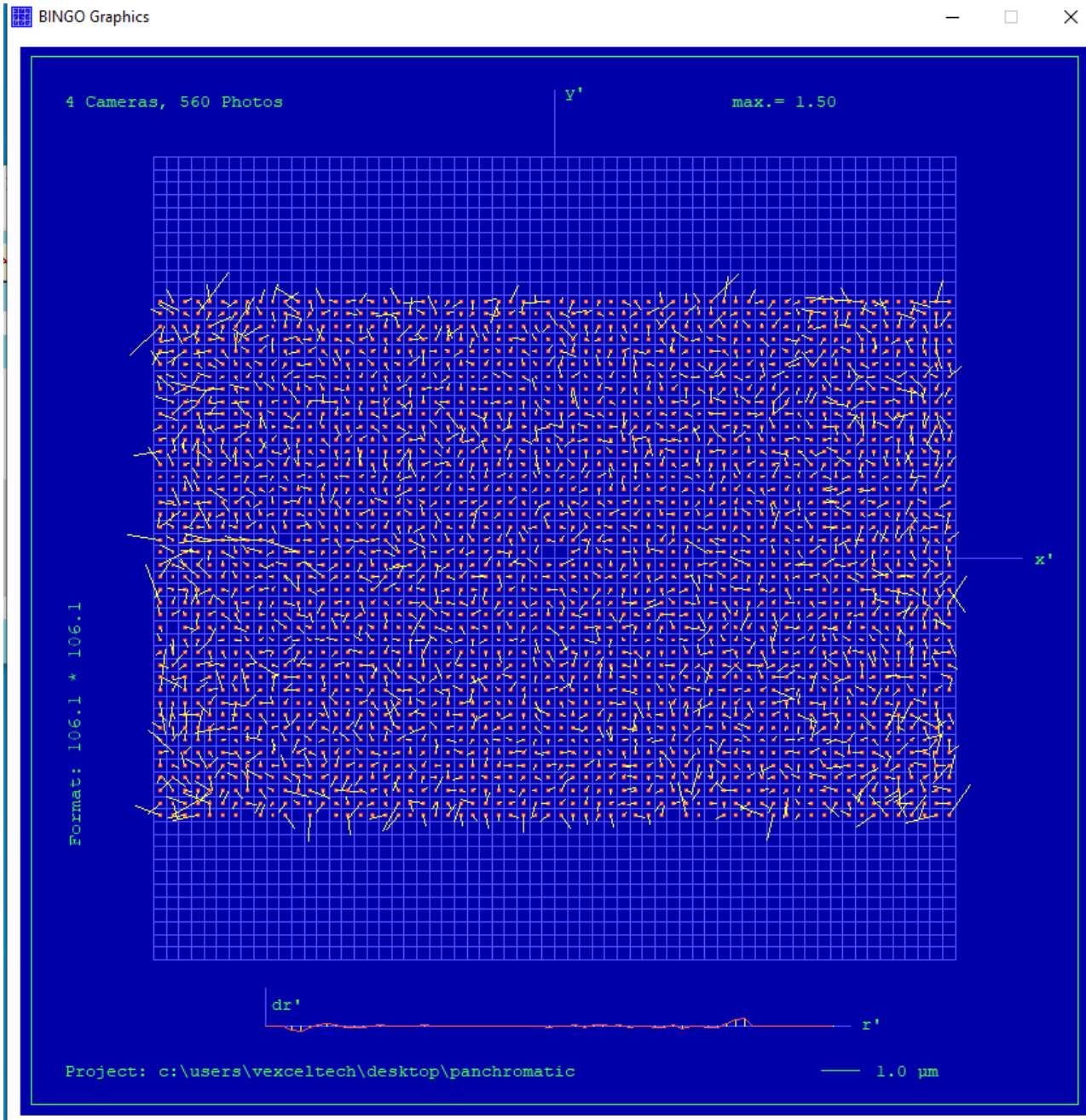
Multispectral Camera

Medium Format Multispectral Output Image (Upscaled to panchromatic image format)

Image Format	long track cross track	68.016mm 105.840mm	5668pixel 8820pixel
Image Extent		(-34.008, -52.920)mm	(34.008, 52.920)mm
Pixel Size		12.000µm*12.000µm	
Focal Length	ck	100.500mm	± 0.002mm
Principal Point (Level 2)	X_ppa	0.000mm	± 0.002mm
	Y_ppa	0.000mm	± 0.002mm
Lens Distortion	Remaining Distortion less than 0.002mm		



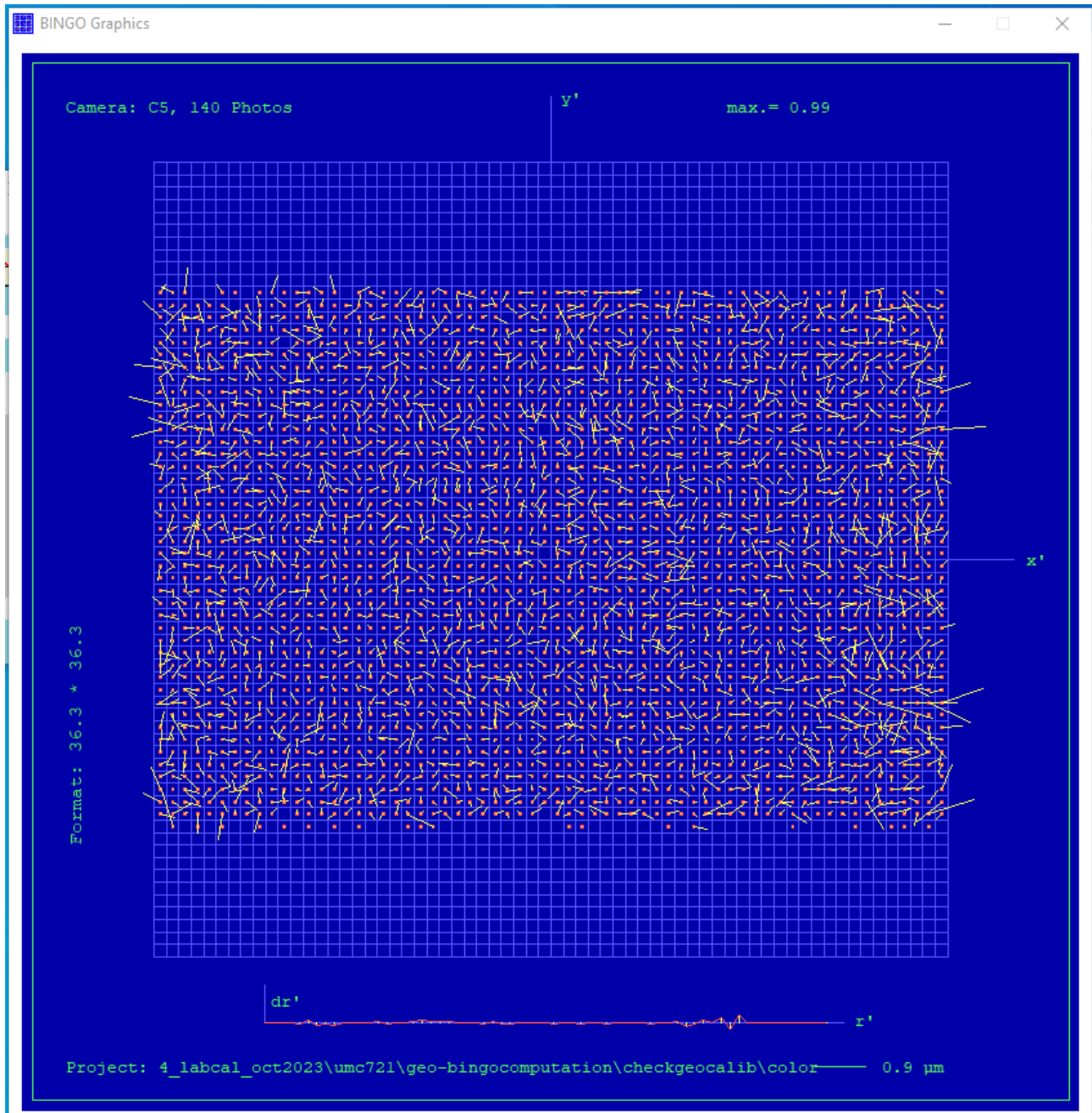
Full Panchromatic Image, Residual Error Diagram



Residual Error (RMS): **0.67 μm**



Green Cone (Cone 5), Residual Error Diagram



Residual Error (RMS): **0.58 μm**



Explanations

Calibration Method:

The geometric calibration is based on a set of 140 images of a defined geometry target with 394 GCPs.

Number of point measurements for the panchromatic camera : >16000

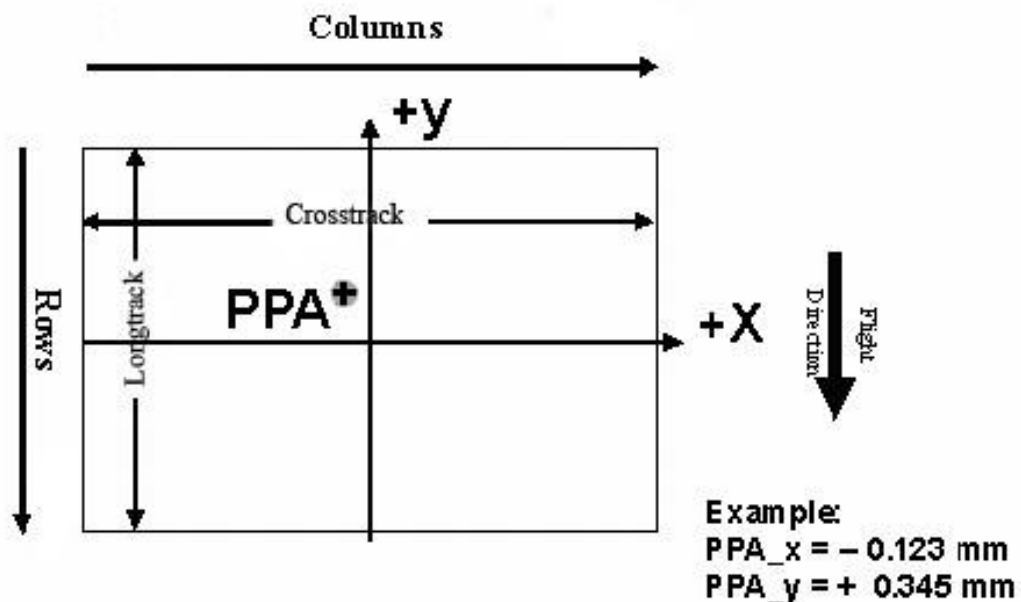
Number of point measurements for the multispectral camera : >60000

Determination of the image parameters by Least Squares Adjustment.

Software used for the adjustment: BINGO (GIP Eng. Aalen, Germany)

Level 2 Image Coordinate System:

Lvl2, Camera prop. Orientation

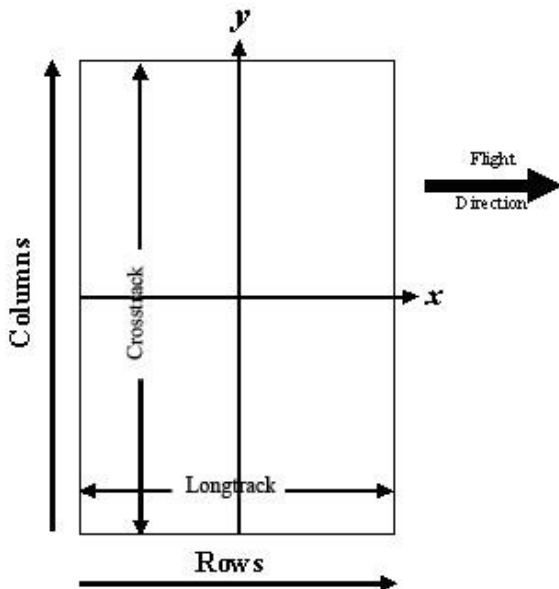




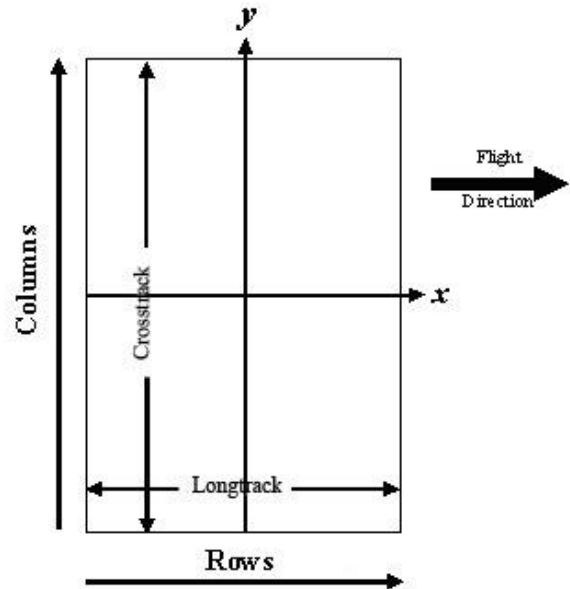
The image coordinate system of the Level 2 images is shown in the above figure. The basic image format and coordinate of the principal point in the level 2 image is given on page 4 of this report. The above figure shows the position of an example principal point at the coordinate (-0.123 / 0.345).



Level 3 Image Coordinate System:
(after rotation of 270° CW)



Panchromatic Image Format



Multispectral Image Format

Position of Principal Point in Level 3 Image

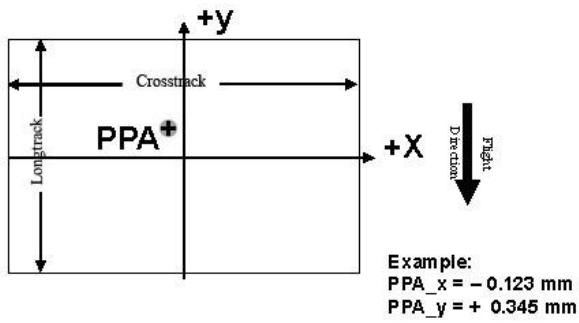
The position of the principal point in the level 3 image depends on the “rotation” setting used in UltraMap during the pan-sharpening step. The exact position relative to the image center is given in the table below as a function of the rotation setting used in UltraMap. The coordinates are specified for clockwise (CW) rotation in steps of 90 degrees, according to the principal point coordinate given on page 4 for high- and low resolution images.

Image Format	Clockwise Rotation (Degree)	PPA	
		X	Y
Level 2	-	0.000	0.120
Level 3	0	0.000	0.120
Level 3	90	0.120	0.000
Level 3	180	0.000	-0.120
Level 3	270	-0.120	0.000

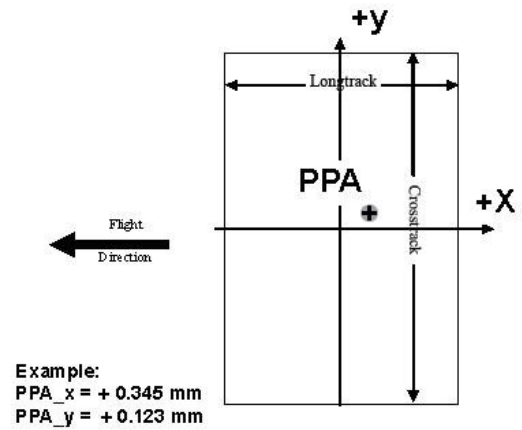


The coordinates in the figure below are only example values to illustrate the effect of image rotation on the principal point position, and do **not** correspond to the camera described in this report.

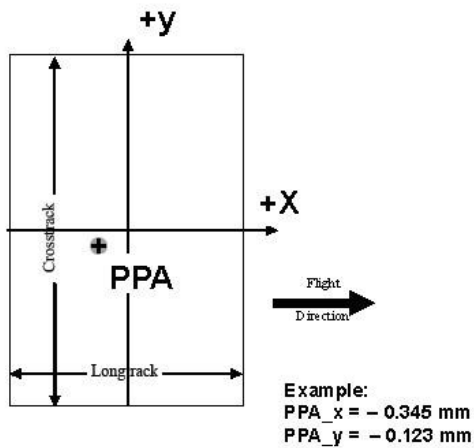
Lvl3, Rotation 0 deg clockwise



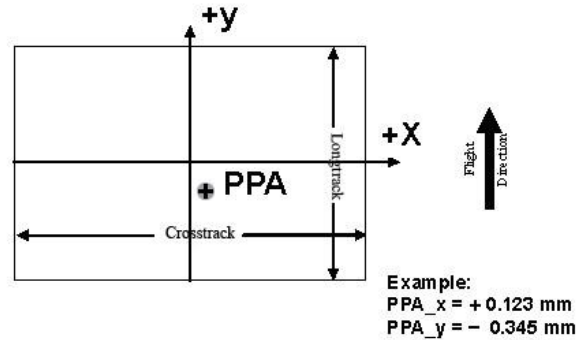
Lvl3, Rotation 90 deg clockwise



Lvl3, Rotation 270 deg clockwise



Lvl3, Rotation 180 deg clockwise





Lens Resolving Power

The following curves show the development of the modulation transfer function across different image heights of the panchromatic cones.

Please note that these values have been calculated and can vary up to 10% with optics from production (especially at high LP's).

The curves are given for the meridional (tangential) and sagital (radial) component of signals at frequencies of 12.5, 25, 50 and 100 line pairs per millimeter.

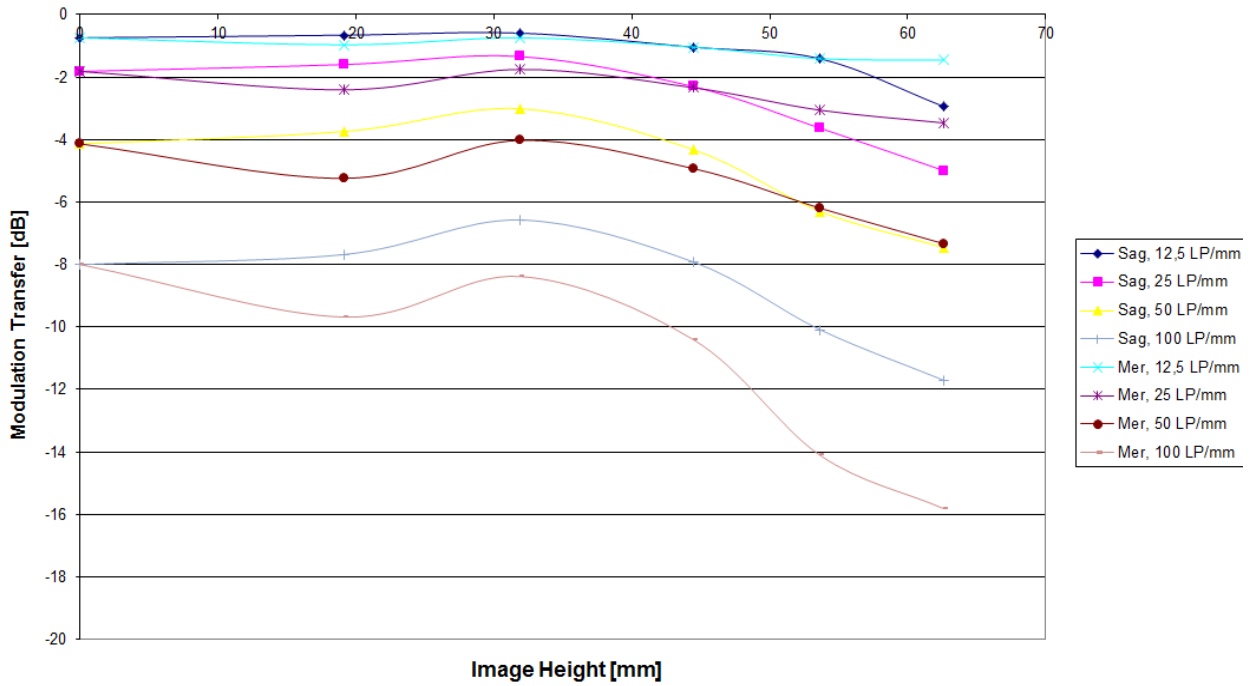
As the MTF is a function of the specific aperture size used, one set of curves is given for each aperture size.

Lens types

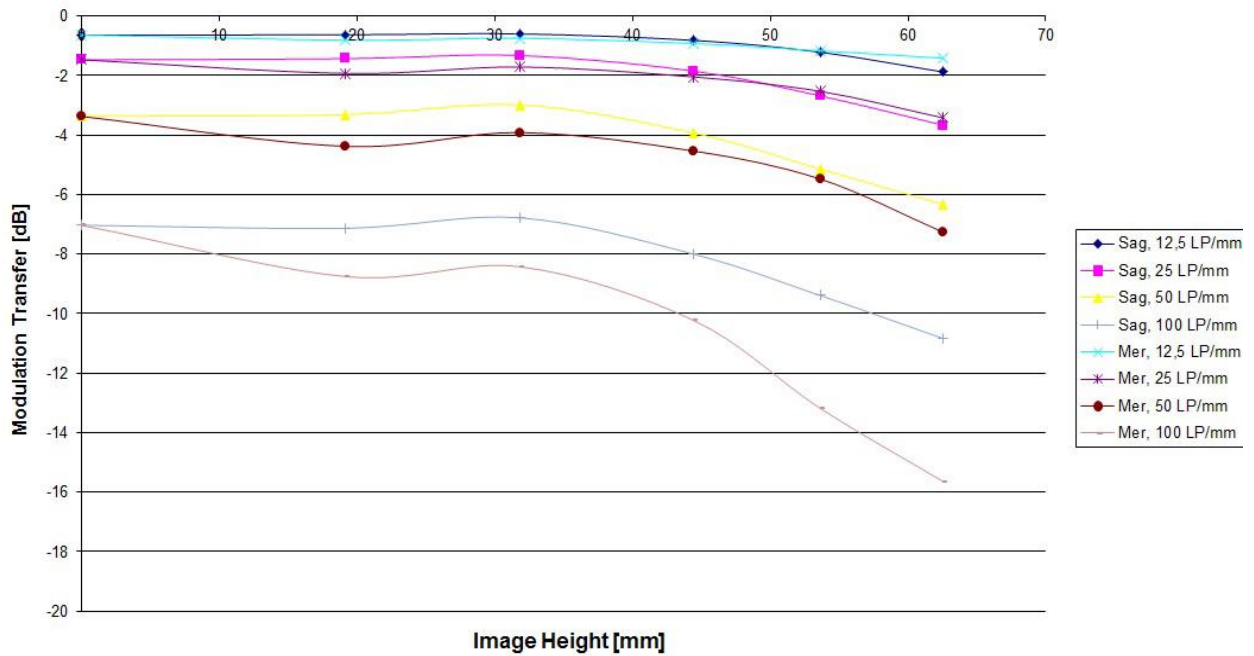
Cone	Lens
C0 (PAN)	Qioptic Vexcel HR Digaron 1:5,6/100mm, Qioptic GmbH, Germany
C1 (PAN)	Qioptic Vexcel HR Digaron 1:5,6/100mm, Qioptic GmbH, Germany
C2 (PAN)	Qioptic Vexcel HR Digaron 1:5,6/100mm, Qioptic GmbH, Germany
C3 (PAN)	Qioptic Vexcel HR Digaron 1:5,6/100mm, Qioptic GmbH, Germany
C4 (RED)	Qioptic Vexcel HR Digaron 1:4/33mm, Qioptic GmbH, Germany
C5 (GREEN)	Qioptic Vexcel HR Digaron 1:4/33mm, Qioptic GmbH, Germany
C6 (BLUE)	Qioptic Vexcel HR Digaron 1:4/33mm, Qioptic GmbH, Germany
C7 (NIR)	Qioptic Vexcel HR Digaron 1:4/33mm, Qioptic GmbH, Germany



Modulation versus Image Height - Aperture f/ 5.6

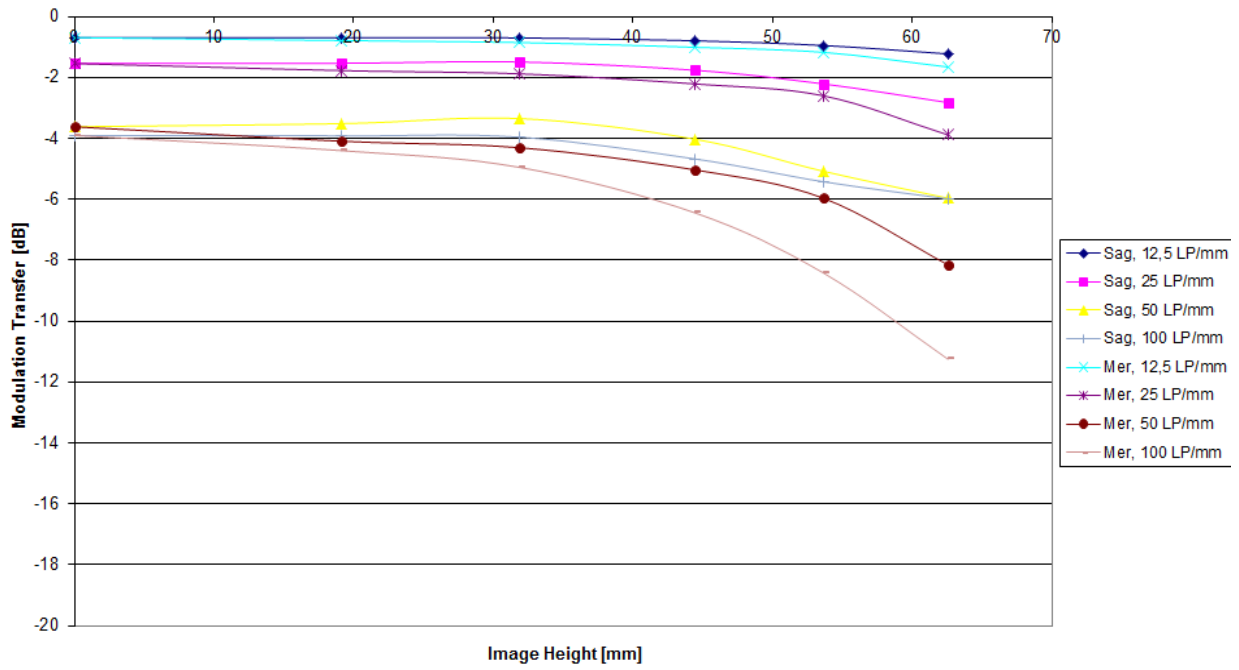


Modulation versus Image Height - Aperture f/ 6.7

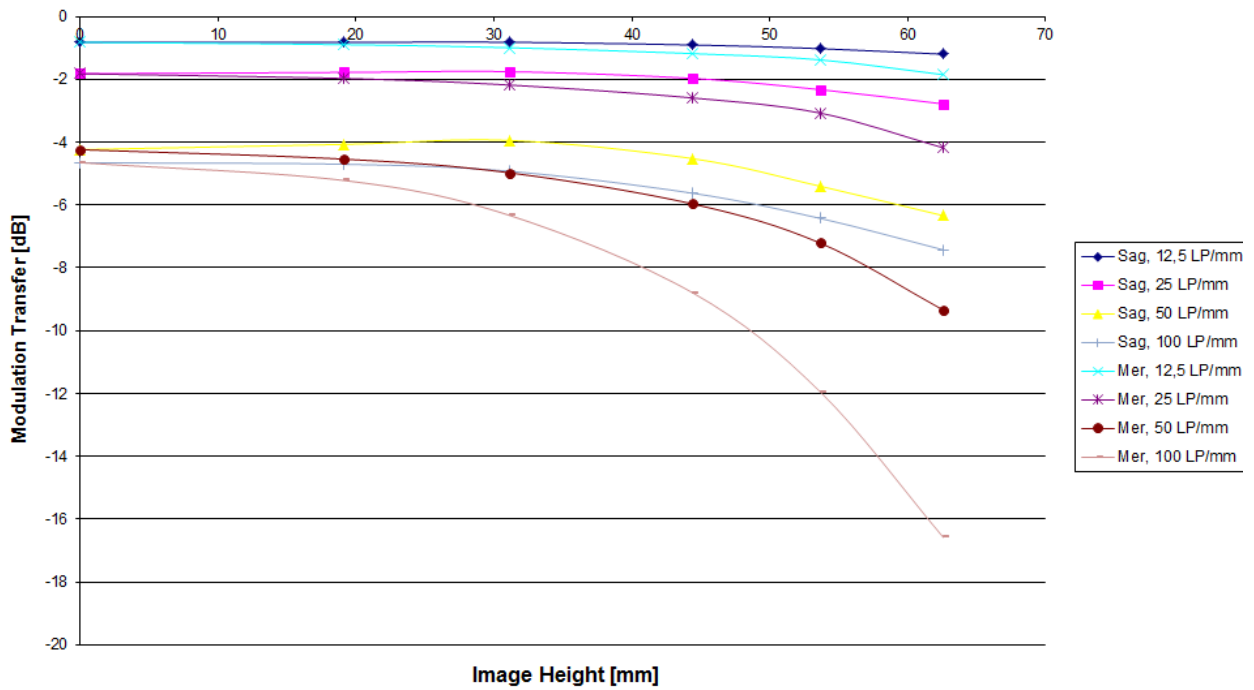




Modulation versus Image Height - Aperture f / 8

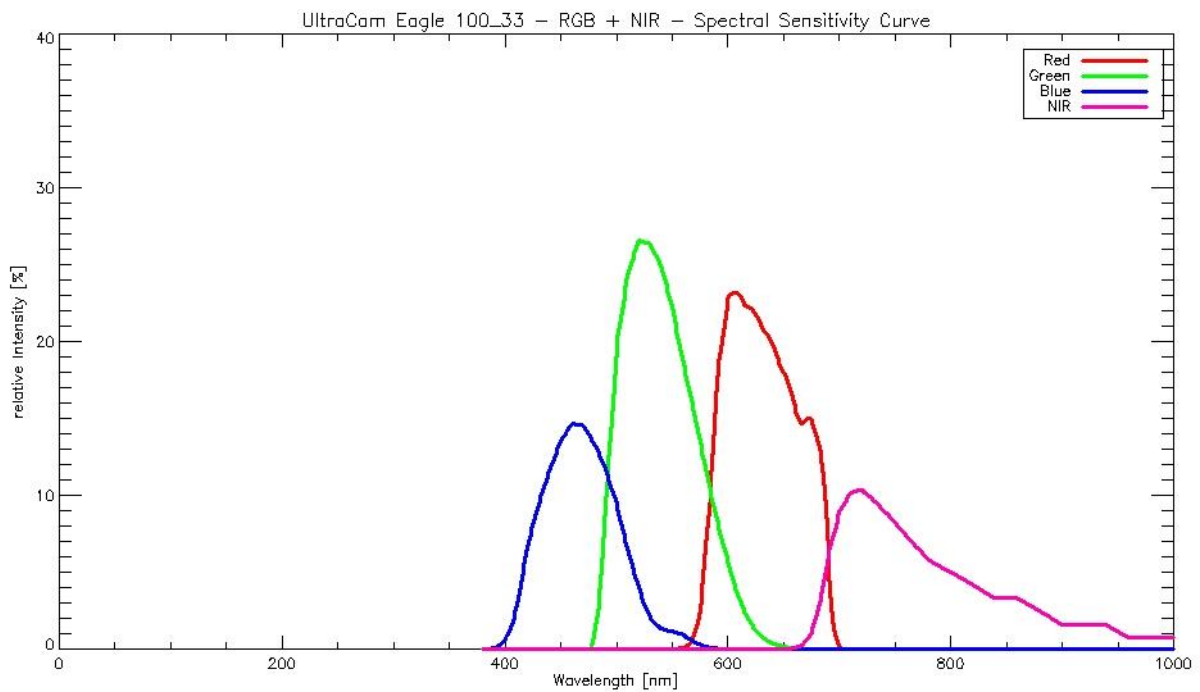
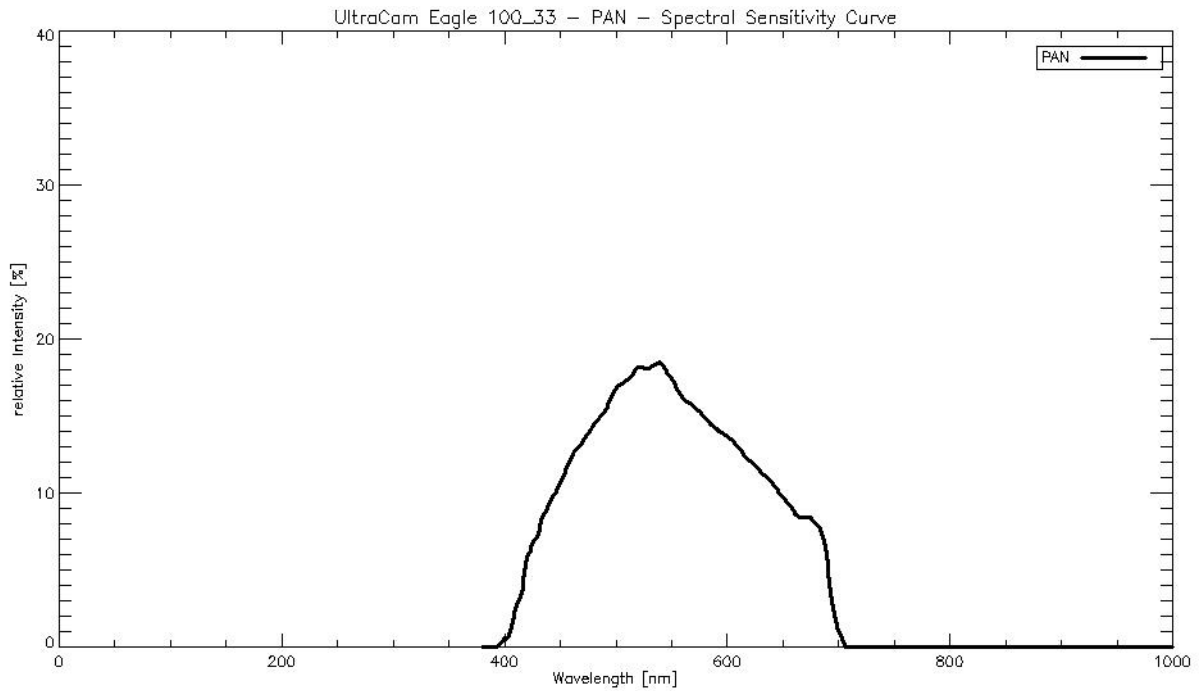


Modulation versus Image Height - Aperture f / 9.5





Spectral Sensitivity





ULTRACAM

Radiometric Calibration

Camera: UltraCam Eagle M3
Serial: UC-EpII-1-52617043-f100

	PAN	R, G, NIR	B
Used Apertures	F5.6	F4.8	F4.8
	F6.7	F5.6	F4.8
	F8	F6.7	F4.8
	F9.5	F8	F5.6
	F11	F9.5	F6.7
	F13	F11	F8
	F16	F13	F9.5
	F22	F19	F13

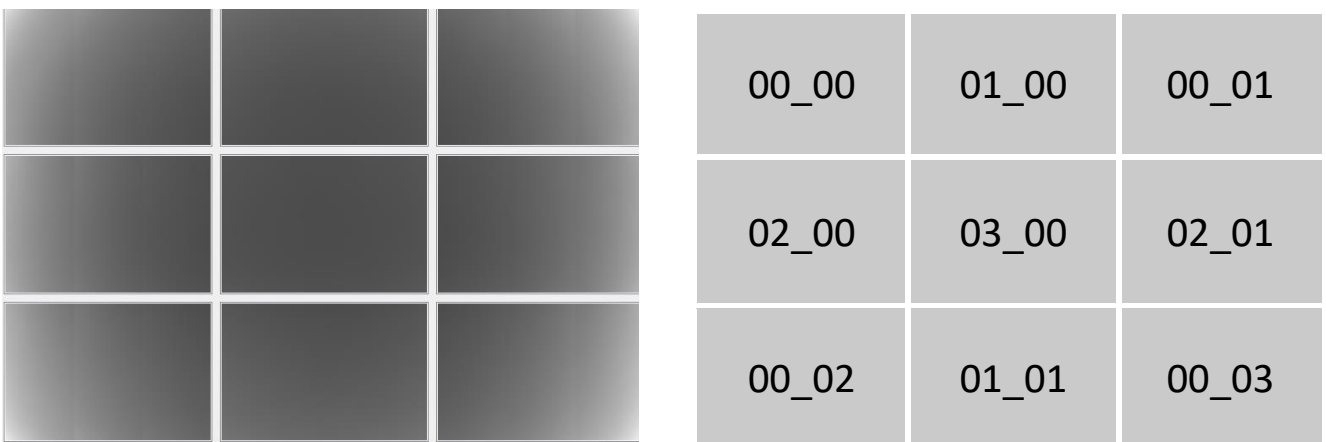
Dead Pixel Report: see Appendix I



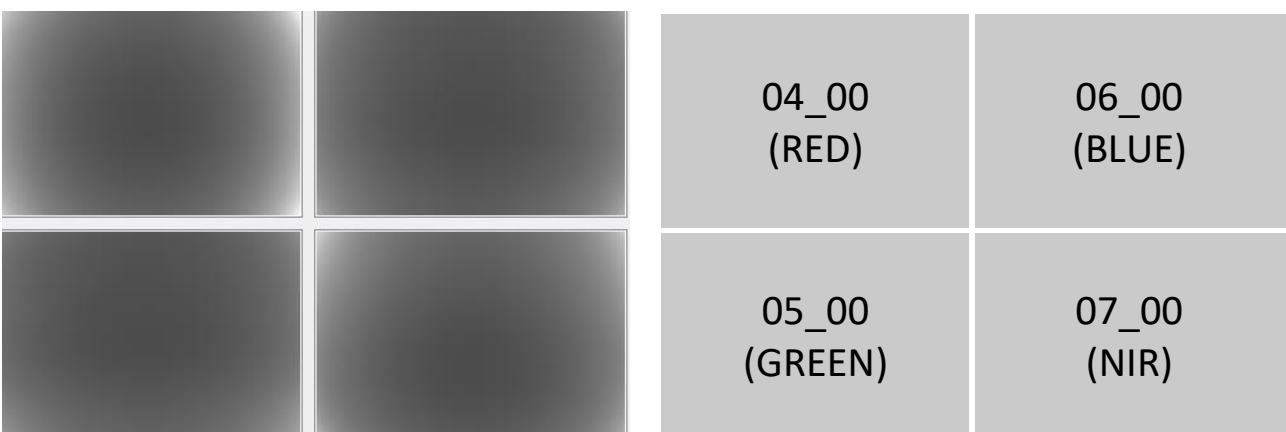
Calibration of Vignetting for working Aperture F6.7

	PAN	R, G, NIR	B
Aperture	F6.7	F5.6	F4.8

Graphical Overview of Pan Sensors:



Graphical Overview of Multispectral Sensors:





Explanations

Calibration Method:

The radiometric calibration is based on a series of 50 flat field images for each aperture size and sensor. The flat field is illuminated by eight normal light lamps with known spectral illumination curves.

These images are used to calculate the specific sensitivity of each pixel to compensate local as well as global variations in sensitivity. Sensitivity tables are calculated for each sensor and aperture setting, and applied during post processing from level 0 to level 1.

Outlier Pixels that do not have a linear behavior as described in the CCD specifications are marked as defective during the calibration procedure. These pixels are not used or only partially used during post processing and the information is restored by interpolation between the neighborhood pixels surrounding the defective pixels.

Certain pixels that are named Qmax pixels due to the fact that they can only store and transfer charge up to a certain maximum amount are detected in an additional calibration step. These pixels are treated differently during post processing, since their behavior can affect not only single pixel values but whole columns.



ULTRACAM

Shutter Calibration

Camera: UltraCam Eagle M3
Serial: UC-EpII-1-52617043-f100

Panchromatic Camera: 4 * Prontor Magnetic 0 HS
Prontor-Werk Alfred Gauthier GmbH, Germany

Multispectral Camera: 4 * Prontor Magnetic 0 HS
Prontor-Werk Alfred Gauthier GmbH, Germany



Calibration of Shutter Release Times:

The shutter release times measured during the calibration describe the time from the moment when the electrical current through the shutter is turned off by the electronics, until the shutter is mechanically closed.

This time is relevant for the exposure control and needs to be known before image recording can take place.

Currently used SRT values (operation values):

Cone Number	Lens Serial Number	SRT F5.6 [ms]	SRT F6.7 [ms]	SRT F8 [ms]	SRT F9.5 [ms]	SRT F11 [ms]	SRT F13 [ms]	SRT F16 [ms]	SRT F22 [ms]	Measurement Tolerance [ms]
C0 (Pan)	12 57 52 45	7.08	7.19	7.50	7.72	7.90	8.09	8.26	8.60	+/- 0.2
C1 (Pan)	12 57 52 52	6.61	6.79	7.11	7.34	7.53	7.64	7.81	8.13	+/- 0.2
C2 (Pan)	12 57 52 51	6.82	6.99	7.29	7.54	7.73	7.86	8.03	8.35	+/- 0.2
C3 (Pan)	12 57 52 38	5.92	6.19	6.47	6.70	6.83	6.92	7.08	7.29	+/- 0.2
C4 (Red)	12 52 68 67	7.53	7.65	7.79	7.94	8.08	8.24	8.32	8.56	+/- 0.2
C5 (Green)	12 52 68 54	7.65	7.78	7.95	8.09	8.19	8.27	8.44	8.54	+/- 0.2
C6 (Blue)	12 52 68 59	7.71	7.71	7.68	7.87	8.11	8.19	8.41	8.69	+/- 0.2
C7 (NIR)	12 52 68 73	7.66	7.82	7.98	8.10	8.29	8.47	8.63	8.99	+/- 0.2



ULTRACAM

Electronics and Sensor Calibration

Camera: UltraCam Eagle M3
Serial: UC-EpII-1-52617043-f100

Panchromatic Camera: 9 * FTF9060-M Area CCD Sensor by DALSA
Multispectral Camera: 4 * FTF9060-M Area CCD Sensor by DALSA



Calibration of Negative Substrate Voltage (VNS):

For optimum performance of the DALSA CCD sensors, the negative substrate voltage is adjusted to a value specified by DALSA.

This voltage value is measured to achieve the best anti-blooming performance possible for each particular sensor.

Currently used VNS and VOG values (operation values):

Cone_Sensor	Sensor Type	Sensor Serial Number	VNS Voltage [V]	VOG Voltage [V]
00_00	FTF9060-M	20 1289/106	22.20	6.68
00_01	FTF9060-M	20 1289/100	21.60	6.41
00_02	FTF9060-M	20 1289/083	21.40	6.62
00_03	FTF9060-M	20 5220/030	21.40	6.30
01_00	FTF9060-M	20 1289/085	21.60	6.23
01_01	FTF9060-M	20 9941/062	21.40	6.13
02_00	FTF9060-M	21 0265/015	21.40	6.11
02_01	FTF9060-M	20 5221/022	22.00	6.14
03_00	FTF9060-M	20 5221/009	20.00	5.88
04_00 (red)	FTF9060-M	20 1289/102	21.60	6.92
05_00 (green)	FTF9060-M	20 9941/066	21.20	6.14
06_00 (blue)	FTF9060-M	20 1289/084	21.60	6.50
07_00 (NIR)	FTF9060-M	20 1289/105	22.20	6.35



Calibration of Intensity Threshold for Exposure Control:

Each CCD sensor and electronics module varies slightly in global sensitivity and intensity scale.

Therefore the maximum possible intensity of each sensor needs to be measured to evaluate the sensitivity behavior of the CCD and electronics.

This value is used as a threshold for the exposure control dialogue shown in the in-flight user interface of the Eagle.

Currently used Threshold values (operation values):

Cone_Sensor	Sensor Type	Sensor Serial Number	Intensity Threshold [DN]	
			Tap 1	Tap2
00_00	FTF9060-M	20 1289/106	13390	12530
00_01	FTF9060-M	20 1289/100	13320	12390
00_02	FTF9060-M	20 1289/083	13360	12400
00_03	FTF9060-M	20 5220/030	13930	12680
01_00	FTF9060-M	20 1289/085	13450	12170
01_01	FTF9060-M	20 9941/062	13500	12260
02_00	FTF9060-M	21 0265/015	13510	12620
02_01	FTF9060-M	20 5221/022	12510	11530
03_00	FTF9060-M	20 5221/009	14150	13110
04_00 (red)	FTF9060-M	20 1289/102	13170	12020
05_00 (green)	FTF9060-M	20 9941/066	14180	13090
06_00 (blue)	FTF9060-M	20 1289/084	13070	12270
07_00 (NIR)	FTF9060-M	20 1289/105	13040	12370



ULTRACAM

Summary

Camera:	UltraCam Eagle M3
Serial:	UC-EpII-1-52617043-f100
Laboratory Calibration Date:	Oct-18-2023
Camera Revision:	Re04.00
Date of Report:	Oct-18-2023
Version of Report:	V01

The following calibrations have been performed for the above mentioned digital aerial mapping camera:

- Geometric Calibration
- Radiometric Calibration
- Shutter Calibration
- Sensor and Electronics Calibration

This equipment is operating fully within specification as defined by Vexcel Imaging GmbH.

Dr. Michael Gruber
Chief Scientist, Photogrammetry
Vexcel Imaging GmbH

Dipl. Ing. (FH) Helmut Jauk
Senior Project Engineer R&D
Vexcel Imaging GmbH



Appendix I

Dead Pixel Report:

Sensor number	Anomaly type	X-Coordinate	Y-Coordinate
C00-00	PIXEL: 1788/1962	PIXEL: 881/ 750	PIXEL: 7770/1427
	PIXEL: 8480/3173	PIXEL: 4583/2574	PIXEL: 6123/2903
	PIXEL: 4715/4479	PIXEL: 6250/3696	PIXEL: 5572/4315
	PIXEL: 7880/5455	PIXEL: 3053/4532	PIXEL: 8975/4815
	PIXEL: 626/ 380	PIXEL: 2717/5659	PIXEL: 2503/5707
	PIXEL: 1456/ 836	PIXEL: 8520/ 722	PIXEL: 8520/ 723
	PIXEL: 651/3841	PIXEL: 6765/2485	PIXEL: 948/3615
	PIXEL: 761/5406	PIXEL: 9029/4233	PIXEL: 1654/4495
		COLUMN: 6032/1425	PIXEL: 3504/1958
			PIXEL: 6921/3099
			PIXEL: 8918/4340
			PIXEL: 4958/4874
			PIXEL: 8097/5928
			PIXEL: 8521/ 723
			PIXEL: 949/3615
			PIXEL: 943/5062
C00-01	PIXEL: 4886/ 137	PIXEL: 4984/ 737	PIXEL: 8953/ 800
	PIXEL: 8013/1719	PIXEL: 2770/1965	PIXEL: 2071/1980
	PIXEL: 4336/2251	PIXEL: 7730/2352	PIXEL: 2286/2504
	PIXEL: 6706/3284	PIXEL: 1259/3340	PIXEL: 7944/4325
	PIXEL: 7150/4737	PIXEL: 6656/4794	PIXEL: 8127/5144
	PIXEL: 7656/5390	PIXEL: 4139/5811	PIXEL: 465/5856
	PIXEL: 6995/5896	PIXEL: 3868/5908	PIXEL: 8262/ 109
	PIXEL: 2394/1996	PIXEL: 6392/6012	PIXEL: 6397/6012
	PIXEL: 6414/6012	PIXEL: 6429/6012	PIXEL: 6430/6012
	PIXEL: 6442/6012	PIXEL: 6444/6012	PIXEL: 6445/6012
	PIXEL: 6452/6012		PIXEL: 6451/6012
C00-02	PIXEL: 1541/1607		
	PIXEL: 703/ 629	PIXEL: 5032/1396	PIXEL: 7782/1768
	PIXEL: 2893/1969	PIXEL: 7548/2373	PIXEL: 4566/2745
	PIXEL: 1083/3136	PIXEL: 7162/3548	PIXEL: 8827/3793
	PIXEL: 3139/3932	PIXEL: 5722/4285	PIXEL: 4649/5303
	PIXEL: 1540/1607	PIXEL: 1540/1608	PIXEL: 1541/1608
	PIXEL: 8960/5974	PIXEL: 8961/5974	PIXEL: 8960/5975
			PIXEL: 7257/1962
			PIXEL: 5618/2779
			PIXEL: 8155/3809
			PIXEL: 2078/5631
			PIXEL: 5560/1946
			PIXEL: 8961/5975
C00-03			



PIXEL: 7937/ 277	PIXEL: 1247/ 307		
PIXEL: 6429/ 377	PIXEL: 6874/ 560	PIXEL: 8496/ 663	PIXEL: 2848/1050
PIXEL: 6054/1166	PIXEL: 7299/1544	PIXEL: 6442/2653	PIXEL: 274/2716
PIXEL: 7068/2724	PIXEL: 1075/2798	PIXEL: 8672/2862	PIXEL: 7637/3149
PIXEL: 7637/3150	PIXEL: 4446/3681	PIXEL: 1216/3784	PIXEL: 8191/4081
PIXEL: 2643/4342	PIXEL: 3568/4630	PIXEL: 2522/4950	PIXEL: 8232/5498
PIXEL: 6191/5670	PIXEL: 6191/5671	PIXEL: 502/ 980	PIXEL: 1260/1709
PIXEL: 150/1966	PIXEL: 1923/3385	PIXEL: 927/3756	PIXEL: 927/3757
PIXEL: 447/5096	PIXEL: 8908/5780	PIXEL: 3322/5831	PIXEL: 3322/5832
PIXEL: 3490/6000	PIXEL: 1525/6013		

C01-00

PIXEL: 3647/ 102	PIXEL: 6224/1339	PIXEL: 3820/1665	PIXEL: 593/2763
PIXEL: 8024/2864	PIXEL: 544/3049	PIXEL: 8036/3431	PIXEL: 946/3623
PIXEL: 6229/3758	PIXEL: 7193/4281	PIXEL: 8127/4368	PIXEL: 3303/4705
PIXEL: 4863/4829	PIXEL: 5105/4952	PIXEL: 6526/5084	PIXEL: 7121/5178
PIXEL: 6229/5307	PIXEL: 324/5586	PIXEL: 2943/5650	PIXEL: 6952/5982
PIXEL: 5377/ 158	PIXEL: 404/ 284	PIXEL: 3265/1147	PIXEL: 5989/1501
PIXEL: 5705/1523	PIXEL: 5687/2585	PIXEL: 4551/3441	PIXEL: 206/3852
PIXEL: 206/3853	PIXEL: 279/4275	PIXEL: 131/5751	PIXEL: 131/5752
PIXEL: 132/5752			

C01-01

PIXEL: 1504/1117			
PIXEL: 3797/1824	PIXEL: 7498/1839	PIXEL: 3792/1858	PIXEL: 7563/1865
PIXEL: 8979/1956	PIXEL: 6644/2605	PIXEL: 6530/3032	PIXEL: 1385/3831
PIXEL: 1838/4229	PIXEL: 6079/4235	PIXEL: 1109/4395	PIXEL: 3433/4493
PIXEL: 5641/5074	PIXEL: 6466/5997	PIXEL: 8655/ 248	PIXEL: 5963/ 378
PIXEL: 2236/1417	PIXEL: 6353/1450	PIXEL: 1924/2516	PIXEL: 1924/2517
PIXEL: 597/3782	PIXEL: 286/5505	COLUMN: 941/ 583	

C02-00

PIXEL: 2114/5193	PIXEL: 2115/5193	PIXEL: 7985/ 75	
PIXEL: 8697/ 157	PIXEL: 3967/ 310	PIXEL: 468/1117	PIXEL: 1612/1228
PIXEL: 6202/1851	PIXEL: 1339/2479	PIXEL: 8906/3617	PIXEL: 4345/3747
PIXEL: 5030/4093	PIXEL: 1348/4134	PIXEL: 7838/4178	PIXEL: 7556/4183
PIXEL: 8070/4539	PIXEL: 7559/5343	PIXEL: 3337/5939	PIXEL: 9006/ 76
PIXEL: 8952/ 92	PIXEL: 8951/ 93	PIXEL: 8952/ 93	PIXEL: 8945/ 147
PIXEL: 8945/ 148	PIXEL: 589/ 293	PIXEL: 6798/1692	PIXEL: 935/3109
PIXEL: 2114/5194	PIXEL: 2115/5194	PIXEL: 6104/5714	PIXEL: 542/5801

C02-01

PIXEL: 8059/ 47	PIXEL: 3860/ 263		
PIXEL: 1958/ 912	PIXEL: 5232/1141	PIXEL: 7315/2936	PIXEL: 8865/3152
PIXEL: 2547/3178	PIXEL: 1740/3675	PIXEL: 2390/3855	PIXEL: 1697/3985
PIXEL: 3028/4105	PIXEL: 1368/4294	PIXEL: 2082/4424	PIXEL: 4614/4871



PIXEL: 5913/5872 PIXEL: 8603/ 363 PIXEL: 784/5139 PIXEL: 8989/5380
PIXEL: 265/5410 PIXEL: 501/5618

C03-00

PIXEL: 3349/1729 PIXEL: 3527/2555 PIXEL: 1274/2592 PIXEL: 1184/2702
PIXEL: 5964/3481 PIXEL: 7593/3584 PIXEL: 4668/3669 PIXEL: 4668/3670
PIXEL: 4669/3670 PIXEL: 4433/3795 PIXEL: 4971/4161 PIXEL: 326/5254
PIXEL: 3260/5851 PIXEL: 6364/5998 PIXEL: 2978/ 327 PIXEL: 1232/1081
PIXEL: 1131/5284 PIXEL: 1131/5285 PIXEL: 423/5412

C04-00

PIXEL: 7237/ 46 PIXEL: 8868/ 303 PIXEL: 3606/ 501 PIXEL: 1041/2229
PIXEL: 2819/ 966 PIXEL: 3250/1738 PIXEL: 7242/1778 PIXEL: 4952/4384
PIXEL: 1687/3256 PIXEL: 1496/3673 PIXEL: 8652/4255 PIXEL: 3287/ 385
PIXEL: 5426/4875 PIXEL: 1554/5126 PIXEL: 273/ 176 PIXEL: 407/1270
PIXEL: 8537/ 458 PIXEL: 8538/ 458 PIXEL: 7805/ 716

C05-00

PIXEL: 6294/2942 PIXEL: 6894/ 337 PIXEL: 2514/ 598 PIXEL: 8874/ 746
PIXEL: 112/ 45 PIXEL: 8457/ 981 PIXEL: 3983/1344 PIXEL: 5657/1887
PIXEL: 3619/ 752 PIXEL: 5252/2319 PIXEL: 1723/3382 PIXEL: 3702/5252
PIXEL: 5024/2296 PIXEL: 5755/1865 PIXEL: 4695/2647 PIXEL: 6295/2942
PIXEL: 8957/ 20 PIXEL: 6295/2943 PIXEL: 5857/3177 PIXEL: 5858/3177
PIXEL: 6294/2943 PIXEL: 657/3976 PIXEL: 658/3976 PIXEL: 659/3976
PIXEL: 658/3975 PIXEL: 658/3977 PIXEL: 659/3977 PIXEL: 1847/4924
PIXEL: 657/3977 PIXEL: 1846/4925 PIXEL: 1847/4925 PIXEL: 1846/4926
PIXEL: 1848/4924 PIXEL: 3468/5362

C06-00

PIXEL: 7674/ 430 PIXEL: 411/1301 PIXEL: 6567/2703 PIXEL: 6787/3340
PIXEL: 5406/3944 PIXEL: 8915/4383 PIXEL: 801/5213 PIXEL: 8407/5456
PIXEL: 5714/5714 PIXEL: 2825/5992 PIXEL: 8882/ 315 PIXEL: 8733/ 363
PIXEL: 5491/1733 PIXEL: 706/3202 PIXEL: 8823/3957 PIXEL: 577/4251
PIXEL: 401/5627 PIXEL: 9023/5909 PIXEL: 432/5920

C07-00

PIXEL: 3738/ 810 PIXEL: 4442/ 916 PIXEL: 2073/1099 PIXEL: 2602/3187
PIXEL: 6704/1705 PIXEL: 618/2245 PIXEL: 5112/2441 PIXEL: 1396/5161
PIXEL: 4827/3522 PIXEL: 4618/3602 PIXEL: 2557/4724 PIXEL: 4889/ 388
PIXEL: 7931/5282 PIXEL: 2517/ 26 PIXEL: 8848/ 56 PIXEL: 4237/1764
PIXEL: 6469/ 873 PIXEL: 8071/ 933 PIXEL: 987/1589 PIXEL: 214/4340
PIXEL: 8162/1794 PIXEL: 4581/2865 PIXEL: 4808/4262 PIXEL: 8174/5947
PIXEL: 2234/4910 PIXEL: 2119/5655 PIXEL: 2119/5656



Notes

COLUMN anomaly: all pixels below the Qmax detector at location (X,Y) may be affected.
PIXEL anomaly: single detector at location (X,Y) is not functioning within normal range

The Level0 coordinates exclude the two leftmost pixels containing the line index: the corresponding pixel can therefore be located at column (X+2,Y).

Appendix II

Calibration and Modification Dates

Type of Calibration	Laboratory Calibration Date	Modification Date	Modification Reason
Geometric Calibration	18.Oct.2023	18.Oct.2023	
Radiometric Calibration	18.Oct.2023	18.Oct.2023	
Shutter Calibration	18.Oct.2023	18.Oct.2023	
Electronics and Sensor Calibration	18.Oct.2023	18.Oct.2023	



Note: The above-mentioned Laboratory Calibration Dates represent the dates the camera was calibrated in one of our calibration labs for a full Laboratory Calibration. The Modification date represents a date on which the calibration has been modified due to a calibration enhancement or part exchange. It is an additional information and does not replace the Laboratory Calibration date in any way. With the Modification Reason, always the last modification to the calibration is highlighted.