Calibration Certificate

Object	**Digital Aerial Survey Camera**
Manufacturer	Ingenieur-Gesellschaft für Interfaces mbH D-57223 Kreuztal
Type	Penta DigiCAM 80mm / 50mm
Serial Number	
Customer	Aerowest GmbH Flughafenring 11 44139 Dortmund Germany
Date of calibration flight	19.05.2014
Date of calibration calculation	12.06.2014
Number of pages of the certificate	3

The result of this calibration reflects the situation during the survey flight. External circumstances like errors in the determination of the ground control points can falsify the results of the calculation.

Seal	Date	Person in charge
Ingenieur-Gesellschaft für Interfaces mbH * Germany *	12.06.2014	Dr. J. Kremer

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AEROcontrol CCNS

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Parameter	***Value***				
Mounting Orientation	Front	Right	Back	Left	Nadir
S/N Camera Body	148	145	147	159	163
S/N Lens	7CST21137	7CSU21997	7CSU22144	7CSU22163	7BVS20100
Pixel Size [µm]	6.0				
Image Width [Pixel]	8176				6132
Image Height [Pixel]	6132				8176
Focal Length [mm]	81.938	82.037	82.045	81.860	50.193
Principle Point X [mm]	0.211	0.109	-0.376	-0.180	0.021
Principle Point Y [mm]	0.342	-0.053	-0.193	0.028	0.0515
Roll [deg]	-0.243	-45.198	-0.506	44.926	-0.110
Pitch [deg]	45.134	-0.025	-44.944	0.210	0.119
Yaw [deg]	-0.035	-0.085	0.692	0.009	0.276

Radial symmetric lens distortion of the nadir camera:

Distance [mm]	***Distortion [µm]***
0	0
5	-1.7
10	-3.1
15	-3.9
20	-3.5
25	-1.5
30	2.6
35	9.2

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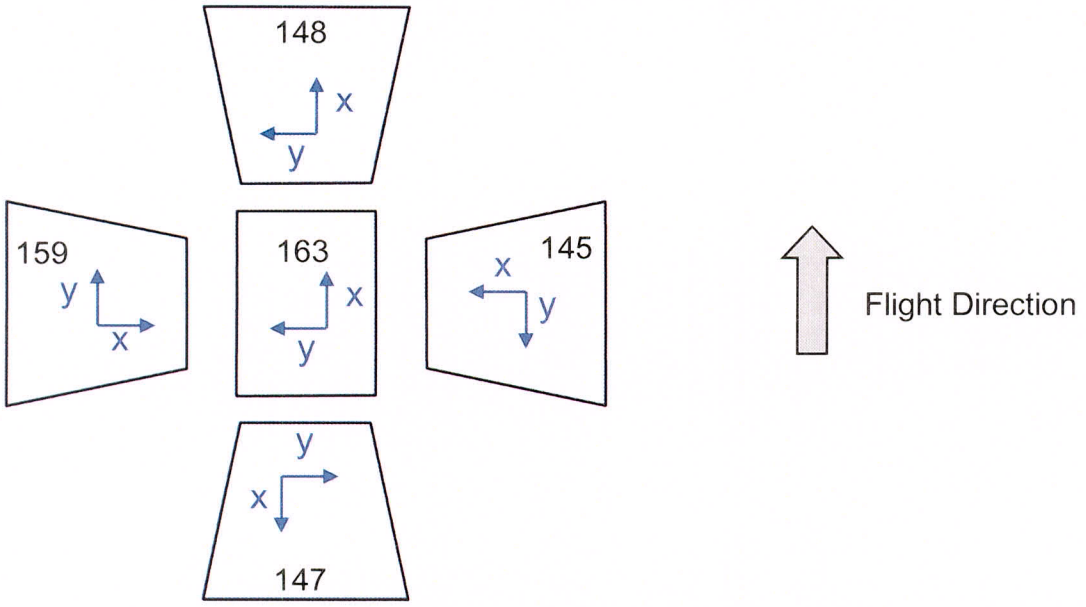

This calibration certificate documents the determination of the focal lengths and the principal points of the camera system by optimization of those parameters during an aerial triangulation of an aerial survey project. For the nadir looking camera the radial distortion is determined as well.

Besides the camera parameters the orientation of the cameras relative to the GPS/IMU system is determined during the calculation.

Note: The result of the calculation reflects the situation during the survey flight. External circumstances like errors in the determination of the ground control points can falsify the results of the calculation.