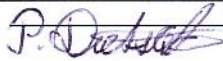


## Camera Calibration Certificate

Object	Aerial Survey Camera Type	Lens Cone Type	Lens Serial-No	Remarks
	RC 20	21/4 NAGA-F	7176	

Acceptance	Characteristics	Acceptance	Remarks
	Radial distortion	yes	
	Photographic resolution	yes	
	Principal point of autocollimation (PPA)	yes	
	Principal point of symmetry (PPS)	yes	
	Fiducial marks	yes	
	Mean radial distortion	yes	
	Radial distortion for semi-diagonals referred to PPS	yes	

Inspection		Signature / Remarks
Date of calibration	20.11.2006	Lens cone operating hours _____
Inspector Name	Dietsche Paul	Signature: 
Position	Supervisor	
Inspection stamp-No	FO 187	
Inspection plan Identification-No	487872	
Version	14.04.1989	
Lens cone calibration No	870105	
process specification Version	19.01.2000	

Maintenance		
The last date, when service/ overhaul of this lens cone was performed.	31.03.2003	Lens cone operating hours ---
Overhaul urgently required:	no	To avoid any malfunctions / damages, it is recommended to perform a complete service / overhaul as soon as possible. See „Lens calibration process specification“ or „RC 20 Technical Referenz

This Camera Calibration Certificate contains four pages. It may not be reproduced other than in full. Camera Calibration Certificates without signature and seal are not valid.

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No.7176

20.11.2006

### Calibrated Focal Length (CFL)

Aperture	4.0
Filter on goniometer	VIS (400 - 700 nm)
Filter on camera	--
Principal distance for focussing distance 900 m : 214.75 mm	

### Radial distortion [micrometers]

Referred to principal point of symmetry (PPS)

Positive values denote image displacement away from center

Radius [mm]	Half - Sides				Mean
	1	3	2	4	
10	1.6	0.6	1.3	0.9	1.1
20	2.5	1.4	2.6	2.0	2.1
30	3.4	2.3	3.7	2.7	3.0
40	4.3	3.5	4.2	3.6	3.9
50	4.4	3.4	4.3	4.0	4.0
60	3.3	3.2	4.1	3.2	3.4
70	2.9	2.0	2.5	2.3	2.4
80	1.0	1.4	1.5	1.3	1.3
90	0.2	0.1	-0.3	-0.2	0.0
100	-1.6	-1.2	-1.1	-1.3	-1.3
110	-2.3	-2.3	-2.2	-2.0	-2.2
120	-2.6	-2.9	-3.6	-3.0	-3.0
130	-3.1	-2.5	-3.3	-2.6	-2.8
140	-1.7	-0.7	-1.6	-1.4	-1.3
148	1.0	0.1	0.7	-0.1	0.4

### Photographic resolution [line pairs per millimeter]

Internal 3-line test-chart contrast log 2.0

Apertur:	4,0
Filter:	VIS(400-700nm)
Film:	KODAK PANATOMIC X 2412
Developer:	KODAK HC110

Angle: [deg]	0	5	10	15	20	25	30	35		
Radial:	84	84	93	91	63	48	46	69		
Tangential:	84	74	73	70	53	55	50	50		

AWAR (Area Weighted Average Resolution) in lp/mm

60



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**Principal point of autocollimation (PPA)****Principal point of symmetry (PPS)**

Referred to central cross (FC), see diagram

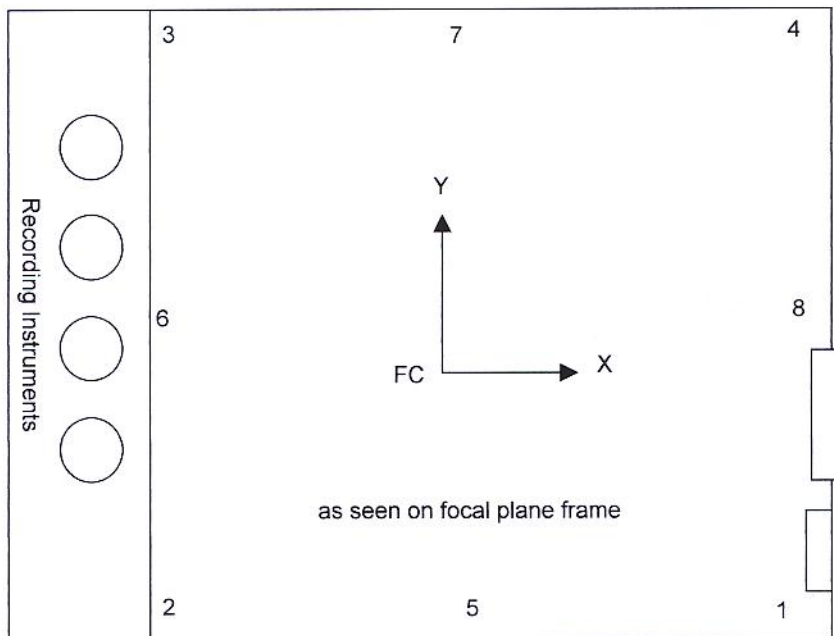
	x[mm]	y[mm]
PPA	-0.010	-0.003
PPS	-0.017	-0.014

**Fiducial marks**

Referred to central cross (FC)

	x[mm]	y[mm]
1	106.001	-106.004
2	-106.003	-106.004
3	-105.998	106.001
4	106.004	106.006

	x[mm]	y[mm]
5	-0.006	-110.006
6	-110.005	-0.005
7	0.000	110.007
8	110.004	0.004



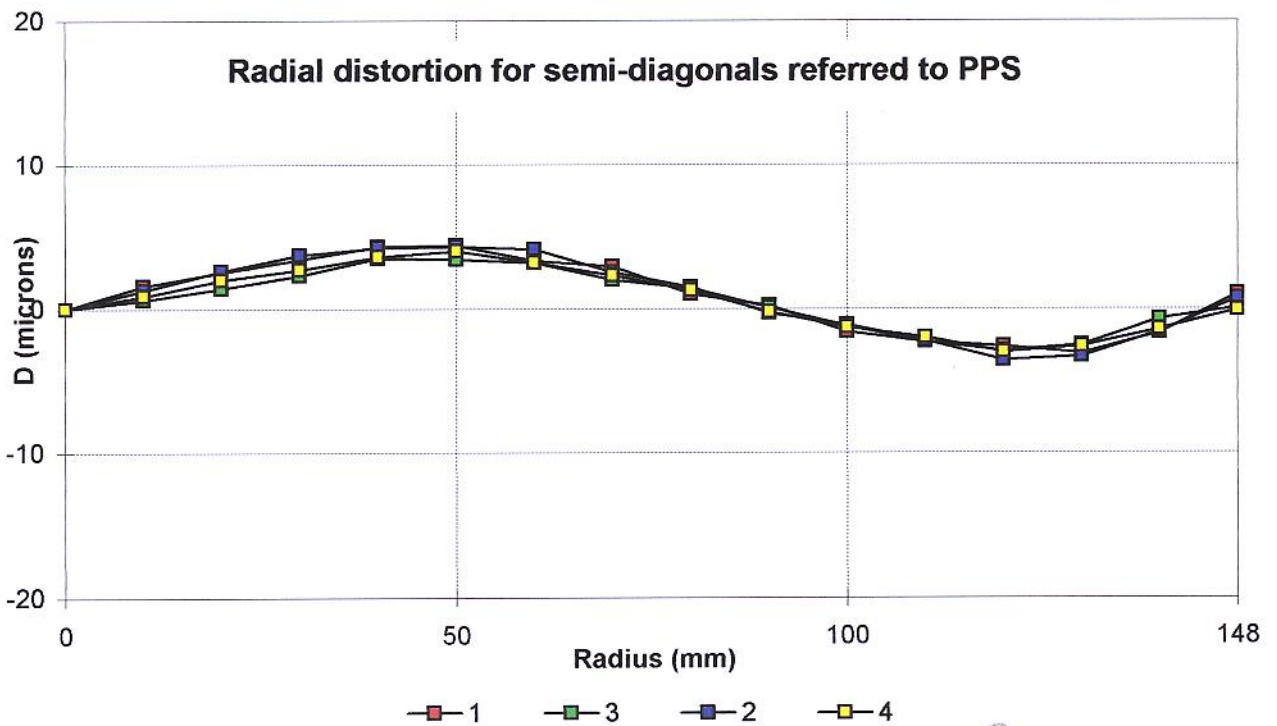
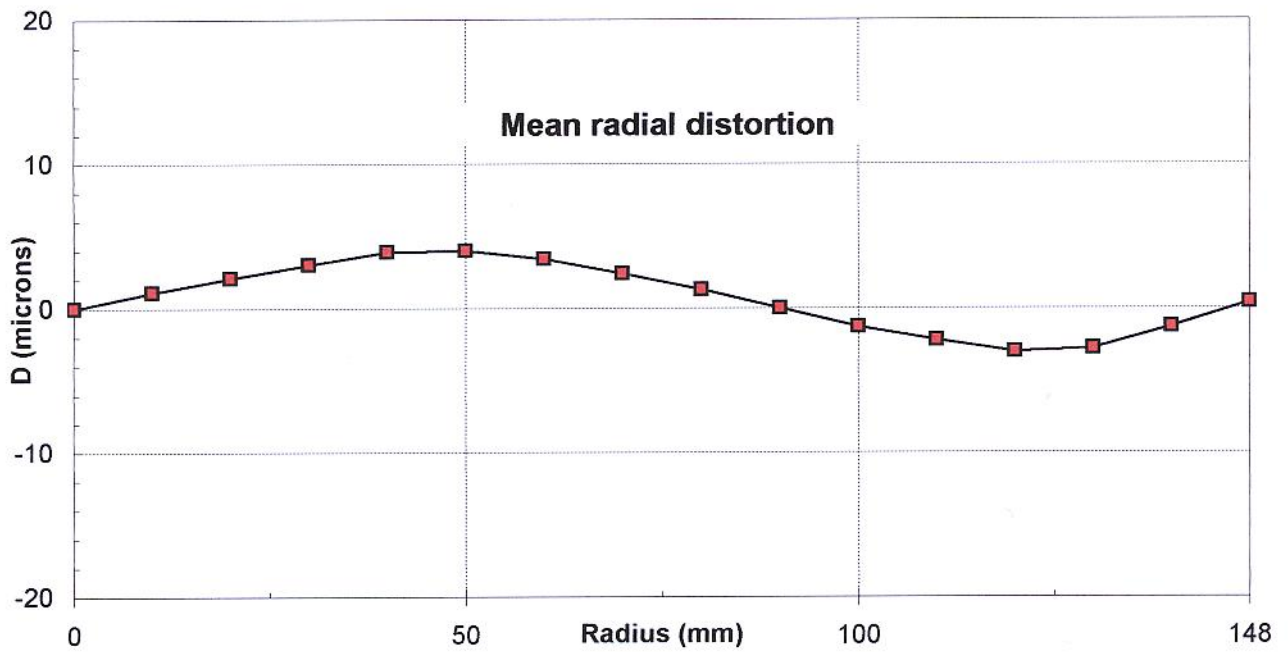
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Aperture:	4.0
Filter on goniometer:	VIS (400 - 700 nm)
Filter on camera:	--
Principal distance for focussing distance 900 m : 214.75 mm	





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Aperture:	4.0
Filter on goniometer:	VIS (400 - 700 nm)
Filter on camera:	--
Principal distance for focussing distance 900 m : 214.75 mm	

