CALIBRATION OF AERIAL SURVEY CAMERA TO THE SPECIFICATION FOR AERIAL SURVEY PHOTOGRAPHY

for

Geographic Air Survey Limited
17 Airport Road
Edmonton Alberta
T5G 0W6

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Manufacturer: Zeiss
Camera Type: RMK A (FMC)
Lens Type: Pleogon A2
Nominal Focal Length: 153 mm
Optical Unit No.: 134638

Lens No.: 134661
Maximum Aperture: F/4
Calibration Aperture: F/4
Date of Calibration: 2 March 1989
Calibrated Focal Length: 153.689 mm
Photographic Emulsion: Panchromatic

FILTER (Section 62):

Number: 139910 Type: A1 AV
Maximum deviation: 1 Second
Maximum Change of Deviation: 1 Second
Maximum Departure from Parallelism: 2 Seconds

IMAGE ILLUMINATION (Section 51 & 52):

Minimum 60 % to 140 mm off axis.

CAMERA SHUTTER (Section 43):

Operation: Satisfactory
Speeds

Mark	100	200	400	600	800	1000
Total Time Seconds	1/90	1/195	1/380	1/560	1/760	1/980
Effective Time Seconds	1/120	1/260	1/510	1/755	1/1040	1/1310

FILM LOCATION SURFACE (Section 54):

Defined by: Fiducial Frame Deviation from flatness: ± .001 mm.

FOCUS (Section 48):

Focus Setting: Satisfactory

FOCAL LENGTH (Section 36):

Calibrated focal length: 153.689 mm.
Equivalent focal length: 153.68 mm.

RADIAL MEASURED DISTORTION (Section 46):

Unit-0.001 mm

Angle	Distortion at Semi-Diagonals				Average	Reference
Degrees	1	2	3	4	Distortion	Distortion
5.62	-2	-1	-1	1	-1	0
11.25	0	0	0	1	0	0
16.88	-1	-3	-1	0	-1	0
22.50	0	-2	-5	2	-1	0
28.13	2	-2	-5	3	-1	0
33.75	-4	-5	-3	1	-3	0
39.38	-5	0	1	4	0	0
42.19	-7	4	7	7	3	0

Maximum departure of average from reference .003 mm to 42.2 Deg.

ASYMMETRY ABOUT PRINCIPAL POINT OF AUTOCOLLIMATION (Section 46):

Maximum asymmetry .009 mm to 42.2 Deg.

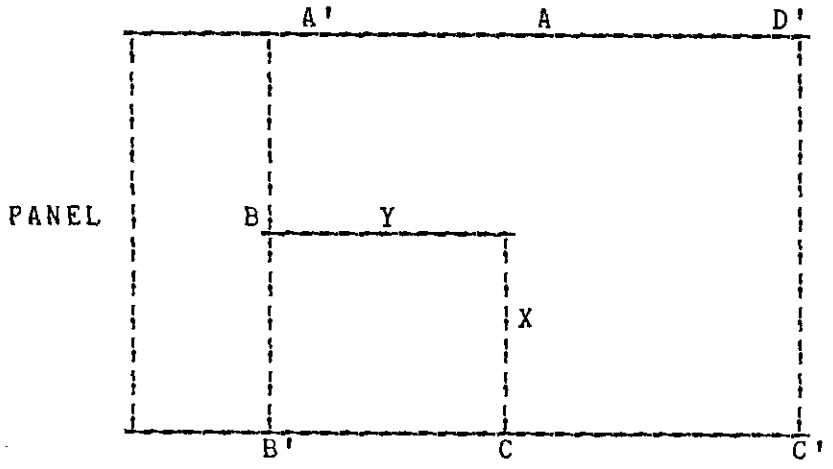
ASYMMETRY ABOUT PRINCIPAL POINT OF BEST SYMMETRY (Section 46)
Maximum asymmetry .005 mm to 42.2 Deg.

TANGENTIAL MEASURED DISTORTION (Section 46):

Maximum tangential distortion .005 mm to 42.2 Deg.

FIDUCIAL MARKS (Sections 40,41 & 42):

Semi-diagonal 2 Semi-diagonal 1



Semi-diagonal 3 Semi-diagonal 4

Angle between A C - B D is 90 deg ± 2 seconds. The fiducial centre is within .004 mm of the point of autocollimation. Distance between the fiducial marks, and also between the marks and the principal point of autocollimation, P, are as follows:

A - C	225.995 mm	A - P	112.997 mm
B - D	226.000 mm	B - P	112.993 mm
		C - P	112.998 mm
		D - P	113.007 mm

The position of the principal point of autocollimation and of the principal point of best symmetry are given in a rectangular coordinate system as shown, with the fiducial centre as origin.

Principal point of autocollimation (X = 0.000, Y = 0.004) mm.
Principal point of best symmetry (X = -0.005, Y = 0.002) mm.

SUMMARY

The measured properties of this optical unit meet the requirements of Category A of the Specification.