



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Reston, Virginia 20192

REPORT OF CALIBRATION of Aerial Mapping Camera

July 21, 2005

Camera type:	Zeiss RMK Top 15*	Camera serial no.:	149993
Lens type:	Zeiss Pleogon A3/4	Lens serial no.:	150008
Nominal focal length:	153 mm	Maximum aperture:	f/4
		Test aperture:	f/4

Submitted by: Midwest Aerial Photography
Galloway, Ohio

Reference: Intergraph purchase order No. P0002955,
dated July 13, 2005.

These measurements were made on Agfa glass plates, 0.19 inch thick, with spectroscopic emulsion type APX Panchromatic, developed in D-19 at 68° F for 3 minutes with continuous agitation. These photographic plates were exposed on a multicollimator camera calibrator using a white light source rated at approximately 5200K.

I. Calibrated Focal Length: 152.712 mm

II. Lens Distortion

Field angle:	7.5°	15°	22.7°	30°	35°	40°
Symmetric radial (um)	0	0	0	1	1	-1
Decentering (um)	0	0	0	1	1	2

Symmetric radial
distortion parameters

Decentering
distortion parameters

Calibrated
principal point

$$\begin{aligned} K_0 &= 0.1434 \times 10^{-4} \\ K_1 &= -0.6854 \times 10^{-8} \\ K_2 &= 0.3999 \times 10^{-12} \\ K_3 &= 0.0000 \\ K_4 &= 0.0000 \end{aligned}$$

$$\begin{aligned} P_1 &= 0.8646 \times 10^{-7} \\ P_2 &= 0.7201 \times 10^{-7} \\ P_3 &= 0.0000 \\ P_4 &= 0.0000 \end{aligned}$$

$$\begin{aligned} x_p &= -0.007 \text{ mm} \\ y_p &= 0.002 \text{ mm} \end{aligned}$$

The values and parameters for Calibrated Focal Length (CFL), Symmetric Radial Distortion (K_0, K_1, K_2, K_3, K_4), Decentering Distortion (P_1, P_2, P_3, P_4), and Calibrated Principal Point [point of symmetry] (x_p, y_p) were determined through a least-squares Simultaneous Multiframe Analytical Calibration (SMAC) adjustment. The x and y-coordinate measurements utilized in the adjustment of the above parameters have a standard deviation (σ) of ± 3 microns.

* Equipped with Forward Motion Compensation

