

ASPRS GUIDELINES FOR GEOMETRIC CALIBRATION OF OPTICAL AERIAL CAMERA SYSTEMS

for

JACIE Meeting, Louisville : March 2014

by

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BRIEF BIO. – DEAN MERCHANT



**“I yam what I yam an’ tha’s all
I yam!”**

**What the hell kind of a resume
is that?!**

BRIEF RESUME for DEAN C. MERCHANT: [October 2013]

- + Naval Aviation; “Flying Midshipman USN”, March 1946 – April 1949**
- + Univ. of Illinois, BS Civil Engineering, June 1951**
- + USAFR, Systems Command, [active duty], June 1951-April 1953**
- + The Ohio State University, MS Photogrammetry, March 1955**
- + Aero Service Corp., Field Engineer, March 1955-April 1956**
- + Fairchild Camera Corp., Photogrammetric Engineer, April 1956-1959**
- + Syracuse University, Assistant Professor, Civil Engineering, 1960 – 1967**
- + The Ohio State University, PhD, Geodetic Science**
- + The Ohio State University, Associate Professor – Professor, Geodetic Science, 1967 – 1988; Professor Emeritus, 1988 to present**
- + USAFR, Air War College, Student, June 1976 – June 1977**
- + USAFR, Colonel, [Systems Command], 1977- 1981**
- + Topo Photo Corp., President, 1988 - present**

Licenses [expired]: PE, New York; PE, PLS Ohio; Cert. Photogrammetrist, ASPRS

Honors:

- ASP, Talbert Abrams Award, 1973**
- ASCE, Surveyor of the Year, 1981**
- ASPRS, Honorary Member, 2007**
- ASPRS, Fairchild Award, 2012**

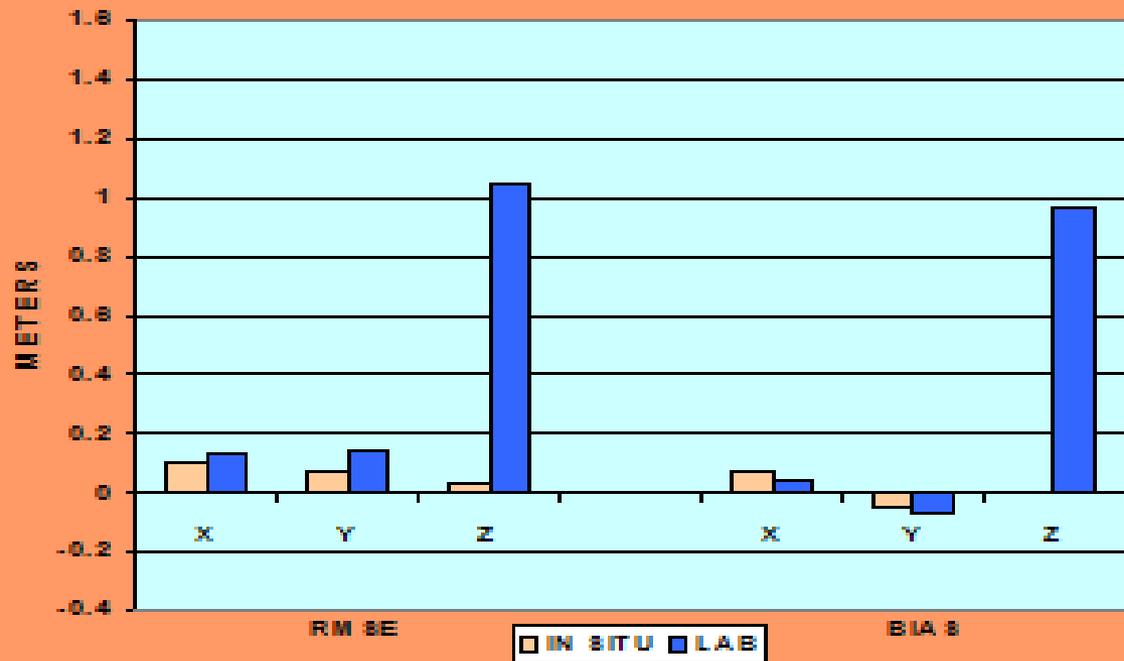


OBJECTIVE:

- ❖ **TO PROVIDE BACKGROUND NECESSARY TO UNDERSTAND AND APPRECIATE THE ROLE THE NEW ASPRS CAMERA CALIBRATION GUIDELINES MAY PLAY IN ADDRESSING JACIE'S OBJECTIVES**

SPRO/OPEN 1260 METERS AGL

Single Photo Resection
Comparisons for an Open-Port, Twin
Engine Aircraft [LMK 15/23 Camera
at 1260 Meters AGL for Seven
Photos



10/2/2011



**Aero Commander Photo Aircraft
Equipped with DMC II 140 Digital Camera
[Aircraft operated by Midwestern Aerial Photography]**



PROJECT CAMERA A ZIESS DMC II 140
TOTAL COMPUTATIONAL CYCLES 4
APRIORI IMAGE STANDARD ERROR ESTIMATE 0.250 (pixel)

FOR IMAGES ONLY:

NUMBER OF IMAGES OBSERVED: 138
RMSE OF IMAGE RESIDUALS: 0.30 (pixel)
[pixel = 0.0072 mm]
TOTAL NUMBER OF OBSERVATIONS; IMAGE AND PAR: 399
TOTAL NUMBER OF UNKNOWN PARAMETERS: 135
DEGREES OF FREEDOM: 264

*** STANDARD ERROR OF UNIT WEIGHT *** 1.280

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INTERIOR ORIENTATION RESULTS AFTER 4 CYCLES

PARAMETER	ADJUSTED VALUE	APOSTRIORI STD.ERROR
Cx	-0.127787E+05	0.788E+00
xo	-0.273747E+01	0.892E+00
yo	0.104737E+01	0.975E+00

XFRAME = 12096. YFRAME = 11200. MAX. RADIAL = 8242.
XOFF = 6048. YOFF = 5600.

CONCLUSION

The primary differences between the ASPRS Guidelines for a system calibration and camera only calibration approaches are:

- **More accurate geospatial solutions** due to an *in situ* approach and high density of targeted control.
- **Less restrictive specifications** in calibration field design
- **Less expensive for data providers** (operators) without need to disassemble the camera system from the aircraft as required for laboratory approaches

Recognition is given to the members of the ASPRS Calibration Committee for their contributions to the formulation and acceptance of the Guidelines. Their meaningful and constructive responses, on two week cycle intervals, allowed significant progress be made toward a near final draft within a six month period.