

## Geometric Performance of Digital Airborne Camera Systems - A User's Perspective

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### ABSTRACT

It is near impossible to get from the camera manufactures a clear answer concerning the geometrical accuracy of their digital cameras. Not being satisfied by non-committing statement, such as 'investigations have shown that the data produced by their camera satisfies a particular map accuracy standard', we decided to make our own investigation

This paper evaluates the deployment accuracy of large format digital frame cameras. The findings are based on an ongoing evaluation of a project comprising 19,376 frames in 66 Blocks ranging from 40 to 600 models each, that have been taken over a period of 8 months

The purpose of the investigation is the following:

#### Part A

- determine the geometric accuracy of a multi lens digital camera system as a whole as well as their individual modules and this under operational conditions
- determine the geometric stability of the camera and their components over a period of extensive usage.
- determine how accurate the inner orientation and the image distortion can be determined by Block Adjustment with self calibration capabilities.
- to evaluate to what extent the results are influenced by the block size and availability and distribution of ground control points.

These investigations are based on automated Aerial Triangulation and Bundle Adjustments with extended self calibration capabilities. All control measurements were made by automatic image correlation.

#### Part B

Taking into account that the camera self calibration affects only the aerial triangulation result, but does - a priori - not correct the images used in stereo restitution, we investigate the extent of the model deformation resulting from the uncompensated image distortion.

#### Part C

Concluding that for high precision photogrammetric data capture with presently available software, digital images produce unacceptable large errors. The paper discusses several procedures that can be deployed to reprocess the imagery using algorithms derived from the block adjustment, or correct the photogrammetric output by post-processing the results of the data capture.,

In conclusion the paper presents our findings with respect of the

- Geometric accuracy that can be reached with digital cameras
- The feasibility of Post calibration of digital camera
- The operational infrastructure that must be in place to achieve to used digital cameras for high precision photogrammetric work.