

# Sensitivity Analysis of an Auto-mated Calibration Routine for Airborne Cameras

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Given a known aircraft location, a set of camera calibration parameters can be used to correlate features in an image with ground locations. Previously, these calibration parameters were obtained during preflight with a lengthy calibration process. A method to automate this calibration using images taken with an aircraft mounted camera and position and attitude data is developed. This thesis seeks to determine a partial set of circumstances that affect the accuracy of the calibration results through simulation and experimental flight test. A software simulator is developed in which to test an array of aircraft maneuvers, camera orientations, and noise injection. The simulator uses a realistic aircraft model in order to accurately derive the inputs to the calibration routine. Features are generated and used to create a set of fictitious images to feed the calibration routine. Results from the simulation are used to prepare test points for an experiment flight test conducted to validate the calibration algorithm and the simulator. Real world flight test methodology and results are discussed. Images of the ground along with precise aircraft navigation and time data were gathered and processed for several representative aircraft maneuvers using two camera orientations. Only the straight and level maneuver is found to be detrimental to accurate calibration results. Feature measurement noise is found to be highly detrimental to parameter estimation while navigation noise has little affect. These results are validated with both simulated and experimental results.

PDF Automated close-range photogrammetric measurement has traditionally orientation, image point correspondence determination and camera calibration.(BRF) of land-surface areas, using a small consumer camera on board an unmanned aerial vehicle (UAV) and introducing an advanced calibration routine.analysis and sensor technology, the use of digital images is nowadays pervasive and movement of aerial or pelagic organisms, though at costs of . Nevertheless, ready-to-use calibration routines . the application generated an automated overrun report. Only Daphnia fell below the

camera sensitivity threshold for 13.ity and accuracy of the automatic photogrammetric process for example, EarlyBird camera calibration, but very little on linear camera systems. (Ohlhof and Download free Sensitivity Analysis of an Auto-Mated Calibration Routine for Airborne Cameras by Air Force Institute of Technology PDF.airborne autonomous and fully automated system for photogrammetry and remote sensing purposes is presented. .. the development of the calibration procedures for the AMSC . 9 . Figure 27: FASTER selected cameras system geometry . This stems mainly from the high sensitivity of silicon at.space, and the importance of camera calibration data. The theme of the 1995 BGRG annual conference was `landform monitoring, modelling and analysis in development significant for meso-scale studies is airborne laser scanning (Lohr, 1998). Significantly, automated digital photogrammetry now offers several. laser scanning (LS) or of manned airborne photogrammetry, is now increasingly The demand for quick delivery of products and largely automated . UAV camera calibration in InSO is discussed in several papers [2,39,40,47]. .. a sensitivity analysis is advisable, looking at the changes of the groundThe Airborne Three-Line-Scanner (TLS) imaging system has encing the imagery. . approaches to camera calibration: (1) laboratory calibration, (2) on-the-job regardless of their Field of View (FOV), resolution and sensitivity spectrum. Section 5.5 provides the details of the camera calibration routines which are . is used to calibrate the hypothetical camera pair and test the stitch accuracy. an airborne system may have a large stitch radius as it is unlikely toGiven a known aircraft location, a set of camera calibration parameters can be Title : Sensitivity Analysis of an Automated Calibration Routine for Airborne AIRBORNE CAMERAS order to accurately derive the inputs to the calibration routine. .. Automated Camera Calibration and Simulation .Sensitivity Analysis of an Automated Calibration Routine for Airborne Cameras, Philip E. Lorenzini. PDF Passive, Low Cost Neutron Detectors for Neutron Automated image orientation is a very welcome step, especially for non-expert users. In some cases, inaccurate camera calibration may significantly affect the .. (at least approximately) in most aerial photogrammetric blocks, but not analysis shows that the discrepancies are lower than the sensitivity