

Assessment of Different GNSS and IMU Observation Weights on Photogrammetry Aerial Triangulation

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SUMMARY

Nowadays, the Global Navigation Satellite System (GNSS) and Inertial Navigation System (INS) are playing a prominent character in high accuracy navigation applications. Beside camera calibration and tie points which are crucial, GNSS shift and drift errors, which caused by either unknown GNSS antenna-eccentricity, atmospheric effect, GNSS and INS observation qualities, unsolved datum correction between coordinate systems and far away GNSS reference stations from the project area, are important factors in bundle block adjustment ultimate accuracy. In this study, the influence of different a priori observation uncertainties of GNSS and Inertial Measurement Unit (IMU) using block- Aerial Triangulation (AT) method is examined. We investigate the effect of IMU and GNSS uncertainties on the final AT results using Trimble Inpho Match-AT software by evaluating the checkpoints RMS residual and employing a statistical t-test for determining the number of images with the gross error. In our study area, the most trustworthy observation uncertainties was 0.2, 0.2, 0.2 meter for East, North, and Height of the GNSS components respectively, and 0.007, 0.007, 0.009 for Omega, Phi, and Kappa for the IMU orientations, respectively.

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