Metric Exploitation of a Single Low Oblique Aerial Image

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SUMMARY

In recent years, oblique aerial images are involved in various photogrammetric processes and are used not only for interpretation or visualization purposes but also in metric applications. This paper describes an approach for the computation of vertical and horizontal distances from a single low oblique aerial image. The proposed methodology can be applied in the case that the camera exterior orientation is unknown. It relies on the automatic determination of the nadir point using edges detection and lines extraction algorithms, combined with robust model fitting and least-squares techniques, taking into account the underlying geometry of oblique imagery. The workflow and the mathematical model used are presented in detail and the effect of different variables (flying height, camera constant, tilt of the camera axis, length of the line segment, error in the determination of the flying height and error due to lack of ground elevation information) on the errors of both measured vertical and horizontal distances are evaluated. Finally, the desktop application that was developed based on the proposed methodology and tested using a data set of low oblique imagery is presented and ideas for future research are discussed.