



Selection of bundle block adjustment parameters in UAV surveys of underground mining-induced displacements

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Measurements for determining terrain surface deformations that are caused by underground mining require high measurement accuracies to be achieved. Uncrewed aerial vehicles (UAVs) have not been widely used for this purpose. The presentation presents the process of selecting optimal bundle block adjustment (BBA) parameters for UAV-acquired data. The analyses were carried out for 25 measurement series on a test field of 2 km². A total of 59 ground control points (GCP) and check points (CP) were used in the study. The analyzed parameters included:

- the GCP accuracy: 15mm or 25mm,
- the GCP number: 9 or 23,
- the tie point accuracy: 1px or 2px,
- the impact of the tie point filtration,
- the impact of the additional corrections of camera calibration (based on the 96-parameter Fourier series) not included in Brown's model,
- the accuracy of the coordinates of the projection centers of the images: the values estimated by the GNSS receiver, or 50mm or 100mm.

The final result of the study is the identification of BBA parameters that allow the highest accuracy of UAV photogrammetry products to be achieved.