

## CREATING A THREE-DIMENSIONAL DIGITAL SURFACE MODEL OF THE CENTRAL PLANNING DISTRICT OF PERM BASED ON AERIAL SURVEY DATA

Artem S. Zaripov

Perm State University, 15, Bukireva St., Perm, 614990, Russia, Master Student, phone: (952)31-75-022, e-mail: artemiy790@yandex.ru

The aim of the work was to create a detailed digital model of the Central Planning District (DPC) of Perm. Aerial photography from an unmanned aerial vehicle was used as the main method. The uniqueness of the work lies in the combination of two types of UAVs in one project. The relevance of the research is substantiated by combined use of two UAVs types, which made it possible to shoot vast territory with complex boundaries in high resolution. The subject was a vast urban area with a complex structure. To improve the quality of geo-referencing of the final data, the survey was carried out using reference signs placed over the entire area covered by flights. The result of the work was an orthomosaic with a spatial resolution of 2 cm per pixel, as well as a digital terrain model and a three-dimensional model with a resolution of 11 and 3 cm, respectively. Thanks to the use of reference signs, the reference accuracy, both planned and high, is in average less than 3 cm and does not exceed 5 cm in any sign. On the geoportal, the orthophotomap is used as an accessible, connected, large-scale detailed substrate, and the three-dimensional model is optimized for viewing in a browser and viewable from any angle.

**Key words:** unmanned aerial vehicle, aerial photography, photogrammetry, digital surface model, orthophotomap, urban planning.

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Received 15.04.2020

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