DESIGN PECULIARITIES OF THE AERIAL PHOTOGRAPHY FROM AN UNMANNED AIRCRAFT

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The existing publicly available programs for the design of unmanned aerial vehicle (UAV) flights assume an initial level of personnel training and do not provide for a detailed study of the aerial photography project (APP) in terms of photogrammetric and visual (photographic) quality of photographic materials, requirements of regulatory documents for the accuracy of the final product. In order to achieve the topographic quality of the APP with UAV, it is necessary to take into account a number of its features. The paper considers the issues of determining the optimal duration of the aerial photography day and the effective image format when using interchangeable lenses. It also provides the recommended procedure for calculating the parameters of the topographic APP, taking into account the data of the exposure triangle "shutter speed - aperture - photosensitivity (ISO)", requirements for the maximum quality and theoretical resolution of the "lens - digital image" system. The technique of determining the position of high-rise objects relative to the boundaries of the depth of field (DOF) at given exposure parameters of the camera and the possibility of their correction is described. Based on the theoretical provisions, the author has developed a program that allows it possible to carry out the comprehensive design of aerial photography works with UAVs, including consumer cameras to obtain results of topographic quality. According to the results of the carried out research, it was concluded that an iterative approach to the design of APP parameters is necessary based on the data on shoot location, the customer's requirements for accuracy, the characteristics of the UAV, and the used photographic equipment.

Keywords: aerial photography day, hyperfocal distance, diffraction limit of sharpness, Airy disk, permissible shadow ratio, Rayleigh criterion, Fresnel rings, aerial photography design, theoretical resolution, exposure triangle, effective image format

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