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Digital Modeling of Natural Landscape Complexes According to Data Obtained By with Unmanned Aerial Vehicles

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This article represents a modern approach to mapping and visualization of natural landscape complexes using Petrozavodsk State University arboretum expositions. The main problems considered in the article are the lack of detailed maps with the precise location of plants on the territory and computer models of the structure of natural landscape complexes. The informative value of the existing maps does not give a full picture of the positional application, species diversity and plant biometrics. The article considers the issues of applying detailed aerial photography of the territory using an unmanned aerial vehicle, means of automatic image processing and three-dimensional computer modeling of volumetric and spatial structure. The arboretum species has been identified. Also, it has been found that the collection has been expanding constantly and gradually since the establishment of the garden in 1951 to this day. The precise species locations are shown on the orthophotomap, an arboretum three-dimensional digital surface model has been created and demonstrated. Implementation possibilities on how obtained results could be use to describe species diversity and plant biometrics demonstrate the volumetric and spatial structure and relief of the arboretum territory have been shown. The article will be useful for developing modern cartographic and visualized materials or geoinformation systems, and aerial photography of natural landscape complexes using drone aerial vehicles.