

ANALYSIS OF AGRICULTURE ROBOTICS TASKS SOLVED BY USING UNMANNED AERIAL VEHICLES

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The paper considers the tasks of agricultural lands monitoring with multicopters characterized by high level of video capture speed and resolution, invariance to clouds and other advantages. The aim of the research is to develop a conceptual model and algorithms for group control of heterogeneous robotic complexes, including unmanned aerial vehicles in solving agrarian problems.

The urgency of the introduction of robotic complexes in the agrarian sector, is justified by socio-economic reasons and by a reduction in the freshwater resources of the World. Among the unmanned aerial vehicles, which are actively beginning to be used for monitoring the lands, mapping the yields of land and planning fertilizer zones, there are multicopters, the advantages of which are vertical take-off and high resolution of sensors. In addition to the onboard camera, the multi-copters can also be equipped with other sensory means, such as a thermal imager, thermometer, gas sensors, sonar, wind speed sensors, pressure sensors, infrared and other sensors.

Based on the analysis of existing robotic solutions in the agricultural sector, the classification of the operations performed by them has been developed. A conceptual model and a formal statement of the task of controlling a group of heterogeneous agricultural robots in a certain agricultural space are proposed. The parameters of the set of cultivated lands, the set of processing agricultural objects, the set of objects of basing and storage of robotic means, the set of cultivated crops, a lot of heterogeneous robots, variants of approach of robots from the basing area to the cultivated territory, as well as a set of resource constraints are considered.

Keywords: agricultural robots, precision farming, unmanned aerial vehicles, multicopters, heterogeneous robots.

