

ABSTRACT

Master's dissertation: 110 pages, 33 figures, 44 tables, 55 sources, 1 appendix.

Topicality. In today's world, vehicle routing tasks play a key role in logistics and other applications. This is due to the constant increase in production on the market and the need to deliver a large volume of goods in a short time and with minimal costs. If previously ground vehicles were considered as vehicles, now unmanned aerial vehicles are rapidly gaining popularity. They have already begun to be seen not only as a means of delivering goods, but also as a means of transport that can reach hard-to-reach places. Unmanned aerial vehicles significantly reduce the cost and time required to inspect and / or maintain facilities, as they are cheaper to operate than traditional vehicles and can quickly reach the required facilities.

Connection of work with scientific programs, plans, themes. The work was performed at the Department of Automated Information Processing and Control Systems of the National Technical University of Ukraine “Kyiv Polytechnic Institute named after Igor Sikorsky” within the theme of the Institute of Cybernetics named after Victor Glushkov NAS of Ukraine (2017–2021): VF.180.11 “To develop a mathematical apparatus focused on the creation of intelligent information technologies for solving problems of combinatorial optimization and information security” (№ 0117U000323).

The purpose of the work is to minimize the time of inspection or the cost of routes due to the inspection and / or maintenance of a given set of targets in the field by unmanned aerial vehicles that can be located in several depots, subject to certain additional restrictions.

To achieve this purposes you must perform the following **tasks**:

- perform an analysis of the current state of vehicle routing tasks and routing tasks for unmanned aerial vehicles;
- to review the existing methods of solving vehicle routing problems in the presence of several depots;
- to develop algorithms for solving the problem of routing unmanned aerial

vehicles in the presence of several depots (deterministic local search, search with prohibitions, annealing simulation algorithm, algorithm of accelerated probabilistic modeling);

- develop software;
- perform research on the effectiveness of the developed algorithms.

The object of the study is the process of building routes using unmanned aerial vehicles.

The subject of research is methods of construction of routes in the presence of several depots.

Research methods – empirical and theoretical.

Scientific novelty – classification of routing tasks of vehicles, development of new algorithms for routing unmanned aerial vehicles in the presence of several depots.

Applied significance. Methods and software can be used to solve the problems of routing unmanned aerial vehicles in the presence of several depots in areas such as search and rescue, agriculture, environmental monitoring, military affairs, cartography, logistics.

Publications. Materials of the work were published in the professional journal category B “Scientific Bulletin of Uzhgorod University. Mathematics and Informatics Series” [1] and at the VI All-Ukrainian Scientific and Practical Conference of Young Scientists and Students “Information Systems and Management Technologies” (ISTU-2021, Kyiv).

VEHICLE ROUTING PROBLEM, UNMANNED AIRCRAFT, DETERMINED LOCAL SEARCH, SEARCH WITH PROHIBITIONS, TABU SEARCH, IGNITION SIMULATION ALGORITHM, G-ALGORITHM