ABSTRACT

Master's Thesis: 91 pp., 30 figs., 27 tables., 34 sources, 9 supplements.

Topicality. The army is the basis of any country's defense function. The image of the country in the international arena depends on the state of the army, citizens' confidence in their own security, their ability to withstand external threats, and even their ability to prevent wars and conflicts. This is why military spending in the vast majority of countries is the largest cost item. Huge supplies of military resources across the country require high transportation costs. Planning transportation routes that will ensure timely delivery and save on overall shipping costs is a difficult task for the military logistician.

Therefore, there is a need at present for the creation of software for military logistics, which would allow the rapid and efficient planning of deliveries of military resources that would ensure timely delivery and save on transportation costs.

Relationship with working with scientific programs, plans, topics. The work was performed at the Department of Automated Information Processing and Management Systems of the National Technical University of Ukraine «Kyiv Polytechnic Institute. Igor Sikorsky» within the topic "Methods for Visual Programming of Petri-Object Models." 0117U000918.

The purpose of the study is to improve the quality of the delivery of military resources and reduce the cost of their delivery.

To achieve this goal, you must complete the following tasks:

- review existing methods and means of transport tasks;
- to carry out comparative analysis of different methods and models of transport problems;
- formalize the transport task of transportation of material in military units;
- to develop a petri-object model of transportation of material in military units;

- to develop an algorithm for finding the optimal number of vehicles for each military unit and their routes, which reduces the cost of fuel for delivery and the total delay time;
- to develop software implementation of the developed algorithm;
- to analyze the results obtained.

Object of study - information processes for supplying resources to military units..

The subject of the study - methods and information technologies for optimizing the cost of resource delivery.

Scientific novelty of the obtained results

The system of modeling transportation of material transportation in military units allows to operate various resources of military equipment. The system also allows you to adjust the load capacity for each vehicle. The advantage of the system is stochasticity, which in turn brings the modeling of transportation of material to real values. The detailing of the processes allows for a more adequate reflection of the states and actions occurring in the real system. The use of a genetic algorithm makes it possible to determine the required number of vehicles and their load capacity for each warehouse and routes, which reduce order delay and overall fuel costs for delivery. Also, using a genetic algorithm allows you to generate a wide range of solutions and does not allow you to get into local extremes. The system allows modeling of transportation in complex multilevel hierarchical systems.

Publications. The materials of the work are published in the Collection of scientific works of VITI 2019 № 3,4 and at the III All-Ukrainian scientific-practical conference of young scientists and students "Information systems and technologies of management" (ISTU-2019).

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STOCHASTIC PETRI NET, PETRI-OBJECT MODEL, SIMULATION, OPTIMIZATION ALGORITHM