

## ABSTRACT

Master dissertation: 95 pp., 16 fig., 20 tab., 6 app., 24 sources.

**The relevance.** According to the statement of the Deputy Director General of «Kyivvtodor», the intensity of traffic on the roads of Kyiv beyond the expected level of loading. The example of this can be the Southern Bridge, which was calculated at an intensity level up to 10,000 cars per day during a design. However, according to expert estimates, in 2017 a peak load of 100,000 cars per day was set. Also, the number of vehicles traveling on the roads to Kiev has significantly increased due to the rapid construction of settlements around the capital. In particular, the traffic on these roads is more than 40,000 cars per day. In view of such a significant increase in the traffic flow on the road network, it is necessary to use effective approaches to traffic management, both in expanding the existing network and in constructing its new sections.

Management on the road network and its visual demonstration the traffic planning modeling software are used for quality planning of traffic flow. However, such simulation using existing software products is not realistic enough and it also does not meet modern practical needs. In this regard, it is important to develop a software tool for modeling the traffic in a three-dimensional view, which will be aimed to combine several approaches to modeling the traffic flow and the necessary function of evaluation of the main significant traffic parameters.

**Relationship of work with scientific programs, plans, themes.** The work was done at the department of computer-aided management and data processing systems of the National technical university of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute» within the theme «Three-Dimensional Road Traffic Simulation» (№ DR 0117U0009100).

**Purpose and objects of the research.** The goal of the research is to improve the quality and efficiency of the processes of building a new transport system, its new parts and to develop the already existing in the real life a road network, as well as to reduce losses by identifying inefficient solutions and bottlenecks in the transport system at the modeling stage.

To achieve this goal it is necessary to solve the following tasks:

- to analyze the existing systems for traffic flow modeling;

- to identify the necessary functional for a full modeling;
- to study modeling problems and methods of their solution;
- to analyze existing algorithms that simulate the behavior of the vehicle on the road;
- to develop software;
- to analyze and to draw conclusions about the realized product.

**The object of study** – traffic processes and pedestrians of the road network.

**The subject of the research** – methods and models of modeling of three-dimensional traffic.

**Methods of the research**, used in the paper, are based on the methods of the imitation modeling.

**Scientific novelty of the results** is detailing the model of the traffic movement, developing an algorithm for simulating vehicle management, which provides an opportunity to present the traffic of the vehicle like real conditions, use of the modern cross-platform game engine Unity3D, which offers many opportunities for the implementation of such tools, as well as the implementation of multi-threading to reduce the cost of resources.

**Publications.** The results of the research were published at the scientific and technical conference «The actual problems of informatization of management decisions» and will be published in the scientific and technical journal "Mathematical Machines and Systems".

SIMULATION MODELING, TRANSPORT MOVEMENT, UNITY3D, THREE-DIMENSIONAL VISUALIZATION, TRAFFIC JAMS, ROAD VEHICLES, PEDESTRIANS MOVEMENT, SPARMANN MODEL, WIEDEMANN MODEL, WEATHER CONDITIONS