

## **ENSURING THE SAFETY OF A GROUP OF UNMANNED AERIAL VEHICLES IN URBAN AREAS THROUGH THE IMPLEMENTATION OF MACHINE LEARNING ALGORITHMS**

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The operating conditions of a group of unmanned aerial vehicles (UAVs) include both air and ground space covering densely populated areas such as urban and suburban areas of a city (metropolis). During the flights of a group of UAVs in urban areas, the main task is to ensure their comprehensive safety. Thanks to the development of information technology, a number of algorithmic and software tools have been developed to coordinate the joint actions of a group of UAVs.

Thus, ensuring the safety of UAVs in urban areas through the implementation of machine learning algorithms is an urgent scientific task.

The report presents the results of the analysis:

- approaches to risk assessment and safety of UAV flights;
- technological solutions to improve the safety of UAV flights;
- regulatory and legal regulation and air traffic control of UAVs;
- public perception and ethical aspects of UAV use;
- main directions of scientific research in the field of UAV flight safety in the national science, etc.

The introduction of the D2-C2 method allows for the implementation of new approaches to strategic and tactical separation. However, the further development of this approach requires the introduction of machine learning algorithms that will increase the efficiency and flexibility of the UAV group control system in real-world operating conditions. In general, among the prospects for improving the D2-C2 method, the following may be considered:

1. Using machine learning methods to predict traffic anomalies and automatically optimize UAV routes;
2. Application of neural network models for fast processing of large amounts of data and real-time decision-making;
3. Development of adaptive algorithms to reduce delays in case of high airspace congestion.

The features of the implementation of existing machine learning algorithms and those proposed for UAV group management are revealed.

### **References:**

1. Колومیїцев О.В., Комаров В.О., Катунін А.М., Рудаков І.С., Любченко О.В., Слободенюк Ю.В., Костащук М.М., Хома В.В., Богдан С.І., Шендрік В.І. Особливості керування польотами безпілотних літальних апаратів в умовах міської забудови на основі технологій машинного та глибокого навчання. *ГРААЛЬ НАУКИ: міжнар. наук. журнал.* – Вінниця: ГО «Європейська наукова платформа»; НУ «Інститут науково-технічної інтеграції та співпраці», 2024. – No 46. – С. 677-686. DOI 10.36074/grail-of-science.29.11.2024.