Динамичное использование автономных летательных аппаратов в сельском хозяйстве и охране окружающей среды Казахстана

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Аннотация. Автономные летательные аппараты являются перспективным инструментом для решения различных задач в сельском хозяйстве и охране окружающей среды в Казахстане. Они обладают рядом преимуществ перед традиционными методами, такими как высокая скорость и эффективность, точность и надежность, безопасность. В настоящее время автономные летательные аппараты в Казахстане используются для мониторинга состояния посевов, внесения удобрений и пестицидов, мониторинга лесов, выявления пожаров и незаконных рубок, мониторинга состояния окружающей среды, выявления загрязнений и чрезвычайных ситуаций. Для повышения эффективности использования автономные летательные аппараты необходимо их динамическое использование, то есть адаптация к конкретным задачам и условиям. В будущем ожидается дальнейшее развитие использования автономные летательные аппараты в сельском хозяйстве и охране окружающей среды в Казахстане. Этому будет способствовать развитие технологий и снижение стоимости автономные летательные аппараты.

Ключевые слова: автономные летательные аппараты, сельское хозяйство, охрана окружающей среды, Казахстан, динамическое использование.

Dynamic use of autonomous aircraft in agriculture and environmental protection of Kazakhstan

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Abstract. Autonomous aircraft (ALA) are a promising tool for solving various tasks in agriculture and environmental protection in Kazakhstan. They have a number of advantages over traditional methods, such as high speed and efficiency, accuracy and reliability, and safety. Currently, ALAS in Kazakhstan are used to monitor the condition of crops, fertilizers and pesticides, forest monitoring, fire detection and illegal logging, environmental monitoring, pollution detection and emergency situations. To increase the efficiency of using ALA, their dynamic use is necessary, that is, adaptation to specific tasks and conditions. Further development of the use of ALA in agriculture and environmental protection in Kazakhstan is expected in the future. This will be facilitated by the development of technologies and the reduction of the cost of ALA.

Keywords: autonomous aircraft, agriculture, environmental protection, Kazakhstan, dynamic use.

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1. Introduction

Autonomous aircraft are a new and rapidly developing technology that has great potential for applications in agriculture and environmental protection. Autonomous aircraft can be used to perform a wide range of tasks, including:

- Agriculture: crop and yield monitoring, fertilizer and pesticide spraying, harvesting, pest and disease control.
- Environmental protection: monitoring forests and water bodies, monitoring air and water pollution, tracking wild animals.

The dynamic use of autonomous aircraft is that these vehicles can be adapted to perform specific tasks depending on current needs. This makes it possible to increase the efficiency and profitability of their use.

Novelty of the article is that it is the first to consider the dynamic use of autonomous aerial vehicles in agriculture and environmental protection in Kazakhstan.

The authors of the article note that autonomous aircraft have a number of advantages over traditional methods, such as high speed and efficiency, accuracy and reliability, and safety. However, to increase the efficiency of using autonomous aircraft, it is necessary to use them dynamically, that is, adapt to specific tasks and conditions.

The article discusses various options for the dynamic use of autonomous aerial vehicles in agriculture and environmental protection in Kazakhstan. The authors of the article note that the dynamic use of autonomous aircraft will improve the efficiency of their use and ensure the achievement of the best results [1].

Thus, the article contributes to the development of research in the field of application of autonomous aerial vehicles in agriculture and environmental protection. It proposes a new approach to the use of autonomous aerial vehicles, which could improve the efficiency of their use in Kazakhstan.

In addition, the article is relevant, since in Kazakhstan there is a trend towards the development of the use of autonomous aircraft in agriculture and environmental protection.

2. Research methods and materials

The development of dynamic use of autonomous aircraft can help Kazakhstan speed up this process and achieve better results in these industries.

Here are some specific examples of the novelty of the article:

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- The article is the first to address the issue of dynamic use of autonomous aircraft in agriculture and environmental protection in Kazakhstan.

- The article proposes a new approach to the use of autonomous aerial vehicles, which can increase the efficiency of their use in Kazakhstan.

- The article is relevant because in Kazakhstan there is a trend towards the development of the use of autonomous aerial vehicles in agriculture and environmental protection [2].

  Application of autonomous aerial vehicles in agriculture

- In agriculture, autonomous aircraft can be used to solve the following tasks:

- Crop and crop monitoring: Autonomous aerial vehicles can be used to obtain images and data about crops and crops using various sensors such as cameras, radars and thermal imaging cameras. This data can be used to assess plant health, identify problems and decide on necessary measures. For example, autonomous aircraft can be used to measure plant height, leaf density and chlorophyll content. This allows you to assess the condition of the plants and identify signs of stress or disease.

- Fertilizer and pesticide spraying: Autonomous aircraft can be used to spray fertilizers and pesticides with high precision. This reduces the amount of chemicals used in agriculture and reduces the environmental impact. For example, autonomous aircraft can be used to spray fertilizer only in areas where it is needed. This allows you to reduce fertilizer consumption and reduce the risk of environmental pollution [2].

Purpose of the article - consider the issue of dynamic use of autonomous aerial vehicles in agriculture and environmental protection in Kazakhstan.

The authors of the article note that autonomous aircraft have a number of advantages over traditional methods, such as high speed and efficiency, accuracy and reliability, and safety. However, to increase the efficiency of using autonomous aircraft, it is necessary to use them dynamically, that is, adapt to specific tasks and conditions [3].

The article discusses various options for the dynamic use of autonomous aerial vehicles in agriculture and environmental protection in Kazakhstan. The authors of the article note that the dynamic use of autonomous aircraft will improve the efficiency of their use and ensure the achievement of the best results.

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Thus, the purpose of the article is to show that the dynamic use of autonomous aerial vehicles is a promising approach to increasing the efficiency of their use in agriculture and environmental protection in Kazakhstan [4].

Specific objectives of the article:

- Analyze the advantages and disadvantages of using autonomous aerial vehicles in agriculture and environmental protection in Kazakhstan.

- An overview of dynamic use cases for autonomous aircraft in these industries.

- Discussion of the prospects for the development of dynamic use of autonomous aircraft in Kazakhstan.

- Harvesting: Autonomous aircraft can be used to harvest crops in hard-to-reach areas. This can be useful for picking fruits and vegetables that cannot be picked by hand. For example, autonomous aircraft can be used to pick apples from trees. This allows crops to be harvested more efficiently and reduces the risk of injury to workers.

- Pest and disease control: Autonomous aircraft can be used to detect pests and diseases in their early stages. This allows you to quickly take measures to eliminate them, which reduces crop losses. For example, autonomous aircraft can be used to detect insect pests on crops. This allows pest control measures to be taken before they cause significant damage to the crop.

Application of autonomous aircraft in environmental protection

- In environmental protection, autonomous aircraft can be used to solve the following tasks:

- Monitoring of forests and water bodies: Autonomous aerial vehicles can be used to obtain images and data about forests and water bodies. This data can be used to assess the state of the environment and identify problems. For example, autonomous aircraft can be used to monitor forests for fires or damage. This allows timely measures to be taken to prevent or eliminate forest fires.

- Monitoring air and water pollution: Autonomous aircraft can be used to monitor air and water pollution. This allows you to track sources of pollution and take action to eliminate them. For example, autonomous aircraft can be used to monitor emissions

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from industrial plants. This allows you to monitor enterprise compliance with environmental standards.

- Wildlife Tracking: Autonomous aircraft can be used to track wild animals. This makes it possible to study animal behavior and identify threats to their populations. For example, autonomous aircraft can be used to track bird migrations. This makes it possible to study bird migration routes and identify factors that may threaten their populations [5].

Benefits of using autonomous aircraft

Autonomous aircraft have a number of advantages over traditional methods:

- High accuracy: Autonomous aircraft can capture images and data with high accuracy, allowing for more informed decisions.

- Large coverage: Autonomous aircraft can cover large areas, allowing monitoring in hard-to-reach areas.

- Cost-effective: Autonomous aircraft can be more cost-effective than traditional methods [6].

Development prospects

As autonomous aerial vehicle technology advances, its use in agriculture and environmental protection will increase. Autonomous aircraft will become more affordable and easier to use, allowing them to be used by a wider range of users.

Additional use cases for autonomous aircraft

Here are some additional examples of the use of autonomous aircraft in agriculture and environmental protection:

Agriculture:

- autonomous aerial vehicles can be used to measure crop yields.

- autonomous aerial vehicles can be used to monitor soil conditions.

- autonomous aerial vehicles can be used to assess the condition of pastures.

- Environmental protection:

- autonomous aerial vehicles can be used to monitor the health of glaciers.

- autonomous aircraft can be used to monitor the health of coral reefs.

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- autonomous aerial vehicles can be used to monitor environmental conditions in disaster areas [7].

3. Conclusion

The dynamic use of autonomous aircraft in agriculture and environmental management opens up new opportunities to improve the efficiency and profitability of these industries. As autonomous aircraft technology advances, its use will only expand.

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