

Research on Unmanned Surveillance Equipment System in the Context of Urban Anti-terrorism

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Abstract: This article provides a comprehensive analysis and discussion on the demand, development status, existing problems, research strategies, and recommendations for ground unmanned equipment and unmanned reconnaissance equipment in urban environments. The study found that this equipment plays an important role in improving combat effectiveness, ensuring personnel safety, and reducing costs, but there are still some challenges in technology, safety, and law. The article proposes strategies and recommendations to strengthen technological research and innovation, enhance safety management and supervision, establish a sound legal system, reduce production costs, and strengthen talent cultivation and introduction to promote the healthy development of these equipment. It is hoped that this article can provide reference and inspiration for researchers and decision-makers in related fields and promote equipment modernization and national security development.

Keywords: Ground unmanned equipment; Unmanned reconnaissance equipment in urban environments; Equipment modernization.

1. Introduction

With the continuous development of modern technology, the unmanned reconnaissance equipment system has become an important part of the military field. The unmanned reconnaissance equipment system is a system that integrates various technologies such as unmanned aerial vehicles, sensors, and communication equipment, and can provide important intelligence support and battlefield monitoring for military operations. In modern warfare, the acquisition and transmission of information have become one of the key factors determining the outcome of the war, and the unmanned reconnaissance equipment system is widely used to meet this demand. This article will provide a summary and analysis of the demand, current status, existing problems, research strategies, and other aspects of the unmanned reconnaissance equipment system, in order to provide some reference and inspiration for research in related fields.

2. Development of Ground Unmanned Equipment

Demand: Ground unmanned equipment refers to unmanned robots that can autonomously operate and perform tasks on the ground, including patrol robots, bomb disposal robots, and clearing robots. The development of ground unmanned equipment is mainly driven by the following demands:

Improve combat effectiveness: Ground unmanned equipment can perform tasks in dangerous or hard-to-reach areas, reducing personnel casualties and losses, and improving combat effectiveness.

Meet diverse needs: Ground unmanned equipment can be customized according to task requirements, meeting the needs of different tasks, such as patrol, reconnaissance, search and rescue, and clearance.

Improve operational efficiency: Ground unmanned equipment can autonomously perform tasks without direct human involvement, improving operational efficiency.

Reduce costs: Ground unmanned equipment can reduce manpower, material, and financial inputs, lowering operational costs and improving efficiency.

Ensure personnel safety: Ground unmanned equipment can perform tasks in hazardous areas, ensuring personnel safety, and can also perform high-risk tasks to ensure the safety of combat personnel [1].

Current Status: The technology of ground unmanned equipment is constantly developing, including sensing technology, autonomous navigation technology, control technology, etc., making ground unmanned equipment more accurate and autonomous. The application scenarios of ground unmanned equipment are also expanding, including military, civilian, industrial fields, such as patrol, reconnaissance, search and rescue, clearance, transportation, and other tasks. The types of ground unmanned equipment products are becoming more and more diverse, including wheeled, tracked, and multi-legged forms, which can be selected according to different task requirements. In addition, the industrial chain of ground unmanned equipment is gradually maturing, including hardware, software, control systems, sensors, and other aspects, promoting the development of ground unmanned equipment. As the application scenarios of ground unmanned equipment continue to expand, domestic and foreign market demand is gradually increasing, providing greater space and opportunities for the development of ground unmanned equipment [2].

Existing Problems: Although ground unmanned equipment has achieved certain achievements, there are still some problems, mainly including the following aspects:

Technological bottleneck: The technological bottleneck of ground unmanned equipment still exists, including autonomous navigation, sensors, control systems, etc., which limit its application in complex environments.

Safety issues: Ground unmanned equipment is vulnerable to attack or damage when performing tasks, and there are certain safety risks in handling dangerous items.

Lack of laws and regulations: Currently, there is a lack of

relevant laws and regulations for the management and use of ground unmanned equipment, and there are certain legal gaps that need to be strengthened in supervision and management.

Cost issues: The cost of ground unmanned equipment is relatively high, which is difficult for some small and medium-sized enterprises to bear, limiting their competitiveness in the market.

Talent shortage: Ground unmanned equipment requires professional technical personnel for research and maintenance, but there is currently a shortage of relevant talents, which limits the development of ground unmanned equipment.

The development of ground unmanned equipment still faces various problems, and efforts are needed to strengthen technological innovation, improve management regulations, reduce costs, and cultivate talents to promote the healthy development of ground unmanned equipment.

Research Strategies and Recommendations: To address the above problems, the following research strategies or recommendations can be adopted:

Strengthen the research and innovation of ground unmanned equipment technology, improve its performance in autonomous navigation, sensors, control systems, and other aspects, and enhance its ability to cope with complex environments.

Enhance the security of ground unmanned equipment, including strengthening security protection, improving the ability to handle dangerous items, and ensuring the safety of ground unmanned equipment when performing tasks.

Establish and improve the management regulations of ground unmanned equipment, clarify its position and scope of use in the market, and regulate its production, sales, and use behaviors.

Strengthen cost control of ground unmanned equipment, reduce production costs through technological innovation, and improve its market competitiveness.

Strengthen the cultivation and introduction of talents related to ground unmanned equipment, improve their research and maintenance capabilities, and provide talent support for the sustainable development of ground unmanned equipment [3].

3. Development of Unmanned Reconnaissance Equipment in Urban Environments

Demand: Unmanned reconnaissance equipment in urban environments mainly refers to unmanned reconnaissance equipment applied in urban environments. Its demands mainly include: reconnaissance and monitoring, specific areas or targets in cities need to be investigated and monitored, such as urban security monitoring and traffic regulation; environmental monitoring, environmental monitoring is needed in cities, such as air quality and noise indicators; logistics distribution, unmanned reconnaissance equipment can achieve autonomous distribution for express delivery, catering and other logistics distribution services; emergency rescue, unmanned reconnaissance equipment can perform tasks in dangerous areas when emergencies occur in cities, reducing casualties and losses; urban management, urban management work such as garbage cleaning and road sweeping is needed in cities, and unmanned reconnaissance equipment can improve work efficiency. The emergence of these demands has made unmanned reconnaissance

equipment widely used and constantly developed in urban environments.

Current situation: Unmanned reconnaissance equipment in urban environments is one of the hot research topics in recent years, mainly focused on the following aspects:

Technological innovation: The research of unmanned reconnaissance equipment in urban environments involves multiple technical fields, such as robotics, sensor technology, and artificial intelligence technology. New technological innovations continue to emerge, such as multi-sensor fusion, autonomous navigation, and intelligent control.

Expansion of application scenarios: The application scenarios of unmanned reconnaissance equipment in urban environments continue to expand, covering multiple fields such as urban security monitoring, environmental monitoring, logistics distribution, emergency rescue, and urban management.

Gradual improvement of the industry chain: The industry chain of unmanned reconnaissance equipment in urban environments is gradually improving, including hardware, software, control systems, sensors, and other aspects, which promote the research and development of unmanned reconnaissance equipment.

Strengthened research cooperation between domestic and foreign research institutions: Domestic and foreign research institutions have strengthened research cooperation to jointly promote the research and application of unmanned reconnaissance equipment in urban environments, and improve research levels and achievements [4].

Attention to safety and privacy issues: As the application of unmanned reconnaissance equipment in cities gradually expands, related safety and privacy issues have also attracted attention, and related research is gradually deepening.

Existing problems: Although some achievements have been made in the research of unmanned reconnaissance equipment in urban environments, there are still some problems, mainly including: 1). The technical bottleneck of unmanned reconnaissance equipment in urban environments still exists, such as autonomous navigation, sensors, control systems, etc., which limits its application in complex urban environments. 2). Its application is prone to cause security and privacy issues, such as data leakage and attacks, which require strengthening relevant security management and supervision. 3). Currently, there is a lack of relevant laws and regulations for unmanned reconnaissance equipment in urban environments, and there are certain legal gaps that need to be strengthened in supervision and management. 4). Currently, its cost is high, which restricts its promotion and application in the market. 5). Professional technical personnel are needed for research and maintenance, but there is currently a shortage of relevant talents, which limits its development [5].

Research countermeasures and suggestions: 1). Strengthen technological research and development, improve key technologies such as autonomous navigation, sensors, control systems, etc., and improve the adaptability and application efficiency of unmanned reconnaissance equipment in complex urban environments. 2). Strengthen security management and supervision, establish a sound data security protection mechanism and preventive measures, strengthen supervision and management of unmanned reconnaissance equipment, and prevent security and privacy issues. 3). Strengthen legislation and supervision, establish corresponding laws and regulations and standards, clarify the scope, authority, and responsibility of unmanned

reconnaissance equipment, and strengthen supervision and management of its use. 4). Reduce costs, adopt more mature technologies and materials, improve production efficiency, reduce production costs, and promote market promotion and application. 5). Strengthen talent training and introduction, increase efforts to cultivate and introduce talents in relevant fields, improve the professional skills and comprehensive quality of talents, and promote the research and development of unmanned reconnaissance equipment.

4. Conclusion

Ground unmanned equipment and unmanned reconnaissance equipment in urban environments are hot research directions in the field of military equipment today. This article comprehensively analyzes and discusses the demand, development status, existing problems, research countermeasures, and suggestions of ground unmanned equipment and unmanned reconnaissance equipment in urban environments. Through research, it is found that ground unmanned equipment and unmanned reconnaissance equipment in urban environments play an important role in improving combat effectiveness, ensuring personnel safety, and reducing costs, but there are still some difficulties and challenges in technology, security, and law. Therefore, this article proposes countermeasures and suggestions such as strengthening technological research and innovation, strengthening security management and supervision, establishing a sound legal system, reducing production costs, and strengthening talent training and introduction to promote the development of ground unmanned equipment and unmanned reconnaissance equipment in urban environments.

Acknowledgments

This work is supported by the Natural Science Basic Research Plan in Shanxi Province of China (No.2020JM-361), the Young and middle-aged scientific research backbone projects of Engineering University of PAP (No. KYGG201905) and the basic research foundation project of Engineering University of PAP (No. WJY202019, No. WJY202144, No. WJY202233), the PAP's Military Scientific Research Mandatory Project (No. WJ2020A020048, No. WJ2021A030100).

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