Study on the Demand for Unmanned Equipment Support of PAP in the New Era

Jiawei Niu*, Dayong Jiang

College of Equipment Management and Support, Engineering University of PAP, Weiyang District, Xi'an, China

*Corresponding author.

Keywords: PAP, Unmanned equipment, Equipment support

Abstract: Research on the application requirements of unmanned equipment was the basis for the construction and development of PAP equipment support system. First, based on the task types of PAPs, three unmanned equipment support mission scenarios were divided into regular missions, wartime, and non-war military operations; Secondly, combined with specific mission scenarios, unmanned equipment participates in equipment transportation in special areas and conducts limited battlefields. Put forward application ideas for emergency repairs and assistance in the security management of weapons and equipment warehouses. Finally, based on the above analysis, deepen theoretical research in the field of unmanned equipment support, build an unmanned equipment support command and application platform, and strengthen military-civilian integration in the field of unmanned equipment support Put forward countermeasures and suggestions from three aspects, in order to promote the development of unmanned equipment in the field of PAP equipment support.

1. Introduction

Combat traction support, support service combat, the two complement each other. Equipment support plays a vital role in modern warfare. Traditional equipment support was mainly designed based on the establishment of the military system and the combat area, scale, direction and combat plan. The problems were that the support objects were relatively fixed, the support levels were relatively large, the random adjustment was difficult and the support flexibility was insufficient. Under strong confrontation conditions, the anti-strike ability was weak and the large-scale, long-lasting guarantee ability was not strong. In recent years, with the continuous advancement of science and technology, the time and space of future warfare operations will expand to the full-time and the whole domain. The form of warfare will change from "discharging energy with material and gathering energy with the network" to "controlling energy with intelligence" and intelligent elements will penetrate All aspects of equipment support were deployed in a distributed manner throughout the depth of the battlefield, and the traditional support model will also change accordingly [1]. At this stage, unmanned equipment support had begun to expand in some fields, such as unmanned, unmanned transportation, etc.[2]. Therefore, in the context of the world's military revolution and PAP's "multi-faceted and wide-ranging" combat characteristics, how to accurately analyse PAP's equipment support mission requirements and efficiently use unmanned and intelligent equipment to achieve support work was critical to the smooth implementation of the "six positions". The task of "One Body" had important practical significance.

2. Analysis of application scenarios of unmanned equipment in the field of armed police equipment support

From the perspective of PAP equipment support, the target users involved in unmanned equipment support include support subjects and support objects. The support subjects were equipment support departments and support teams at all levels. They were mainly composed of the support team of the corps, the service support team of the detachment, and the support unit in the

  DOI: 10.25236/ssehr.2021.060

brigade and squadron was composed. The support object refers to the task force, that is, the duty and manoeuvre unit (department) team that performs the "six in one" task. They were the direct beneficiaries of the application of unmanned equipment support.

PAP equipment support can be divided into three use scenarios: conventional tasks, wartime, and non-war military operations according to task types. Among them, conventional mission scenarios include daily equipment support and on-duty operations. Wartime mission scenarios were mainly defence operations. Non-war military operations include emergency rescue, emergency response, and anti-terrorism. As the marine equipment support mode of the Coast Guard was quite different from that on land, this article will not discuss it for the time being.

2.1 Conventional mission equipment support scene

The first was the daily equipment support, that is, application for replenishment, replacement and adjustment, retirement and scrapping. Although the daily equipment supports tasks of PAP had a certain degree of planning and regularity, the task volume was still very large due to the "multi-point and wide-ranging" feature of the unit distribution. Especially since the adjustment of the military establishment system, the problem of "exceeding the other" had prevailed at all levels of equipment. Due to the intensity and scale of the equipment adjustment, the intervention of unmanned equipment was urgently needed. The second was the equipment support on duty, which includes equipment guarantee for daily duty and equipment guarantee for large-scale duty security tasks, such as international events such as the G20 Summit and Boao Forum[3]

2.2 Wartime equipment support scene

PAP had great uncertainties in the guarantee of equipment during wartime, the environment was harsh and complex, and they face enemy attacks at any time. Facing the characteristics of full-dimensional confrontation, system confrontation, and information confrontation in future wars, based on intelligent frontier support technology, PAP must actively integrate into the joint combat system in accordance with the requirements of the entire military's informationization, and build a full-dimensional visibility, full-domain coverage, and full-process availability. Controlled and intelligent support system, independently completes various support tasks, realizes a high degree of integration between the support system and the combat system, and fully meets the requirements for weapon equipment support under the conditions of intelligent warfare.

2.3 Non-war military operations equipment support scene

The non-war military operations that PAP was responsible for mainly include prevention and handling of terrorist activities, handling of sudden social security incidents, and emergency rescue. In these mission scenarios, equipment support must be adjusted in time according to changes in the task form to achieve timely, appropriate place, and appropriate amount support. Since the natural and enemy conditions in such operations were generally harsh, various types of unmanned systems must be used to achieve rapid loading, unloading and precise transportation and delivery of various equipment. For example, the use of retransmission automatic machinery to realize the automatic grabbing and reloading of equipment and combat preparations, the use of unmanned systems such as drones to achieve long-distance and accurate delivery of equipment, and the use of battlefield support robots to achieve equipment positioning, acquisition, and distribution [4].

3. Conception on the Application of Unmanned Equipment in PAP Equipment Support Field

3.1 Equipment delivery and accompanying guarantee in special scenarios

By equipping small unmanned vehicles or drones used by squads or individual soldiers, it can help the equipment support squad to carry out equipment delivery and accompanying support in special scenarios. Robots and unmanned vehicles with additional functions such as explosions will enhance the ability of the equipment support team to detect and respond to potential threats. For example, in areas with harsh natural conditions such as Xinjiang and Tibet, missions often require special forces units to maintain high mobility, and traditional transportation tools were difficult to

perform. In terms of equipment development and equipment, it can imitate the function of the "crusher" unmanned transport vehicle equipped by the US Army, and carry the necessary equipment to implement accompanying support, which can effectively reduce the burden on special forces [5]. In future operations and drills, a “guide-follow” approach will be used to complete the equipment and material transportation tasks in a mixed formation of manned and unmanned vehicles to ensure the uninterrupted supply of frontline troops [6].

3.2 Participate in limited battlefield repairs

In the future, the means of weapon equipment destruction will become more complicated and diversified. Compared with the past, the equipment system battle damage mechanism, mode and law will had new changes. It was necessary to accurately predict and evaluate the equipment battle damage situation, formulate battlefield support plans, and make real-time decisions based on the actual battle damage situation, and mobilize battlefield repair guarantees. Resources to complete emergency support guarantee [7]. During wartime, PAP can make full use of massive information and data to conduct intelligent deductions, propose optimal solutions, automatically coordinate and dispatch support resources, and coordinate support activities in accordance with changes in the battlefield situation and combat support purposes.

3.3 Security Management of Weapons and Equipment Depot

In the future, PAP can use autonomous ground-based unmanned vehicles to patrol equipment warehouses at all levels, and collect video, audio, and environmental data to provide safe and efficient deterrence capabilities to protect personnel, assets, and infrastructure. UAVs with long-term endurance can also be developed, which can cooperate with the surveillance system to continuously monitor and reconnaissance an area. In addition, ground unmanned vehicles can also be used to guard and defend the field equipment warehouse during drills and wartimes, and cover with optical electronics and radio reconnaissance locators, so that they can perform patrols and routes without being exposed. Guarantee tasks such as inspection and transportation safety.

4. Analysis on the Application Path of Unmanned Equipment in PAP Equipment Support Field

4.1 Deepen theoretical research in the field of unmanned equipment support

To develop unmanned equipment support, a set of effective support theories and methods must be constructed. PAP must formulate the basic principles of unmanned equipment support theory based on the characteristics of equipment support and the needs of the mission. First of all, unmanned equipment support should focus on the rapid on-site regeneration of equipment combat effectiveness, with on-site support as the mainstay and follow-up support as a supplement. Using mobile support for emergency repair forces and the accompanying emergency repair forces, strive to implement equipment support and emergency repairs in the combat or nearby areas, implement pre-repairs for heavily damaged equipment, prevent them from completely losing combat effectiveness, and implement follow-up support after returning to the rear positions and repair. Secondly, the main battle equipment was the main equipment, and other equipment was supplemented by [8]. PAP's unmanned equipment support had just started with limited technical strength and resources, it needs to focus on the main battle equipment. From the perspective of equipment support itself, only by highlighting key support objects can we ensure the stability and effectiveness of the overall support object structure.

4.2 Build an unmanned equipment support command and application platform

The purpose of equipment support was not only the rapid regeneration and effective release of the combat effectiveness of a single weapon and equipment, but more importantly, the realization of the overall aggregation and maximum release of the combat effectiveness of weapons and equipment. The unmanned equipment support platform should emphasize the interaction between the information network space and the physical space, involving multi-dimensional and massive

data from equipment, performance, use environment, etc. under a complex equipment system, and real-time and reliable information processing and communication under different situations. The organic coordination of resources was an equipment support system that had autonomous perception, intelligent decision-making and self-adaptation capabilities, and can realize the interconnection and coordination of the virtual world and the real physical world. The platform can adopt a distributed storage and computing model based on a heterogeneous network. The computing resources were virtual, dynamic, and scalable. Through the perception of various combat equipment, support equipment and environmental conditions, massive data can be transmitted to brain-like intelligent decision-making. Efficiently complete comprehensive support tasks [9-10].

4.3 Strengthen military-civilian integration in the field of unmanned equipment support

It was necessary to strengthen the awareness of joint support, take the road of integrated support, and promote the military-civilian integration of unmanned equipment support. Persist in giving play to the leading role of PAP's mission requirements, support the defence and military industry enterprises, fully absorb social security resources, build a diversified equipment support force system that integrates military and civilians and integrates military with civilians, and promotes intelligence by leveraging on the advantages of cutting-edge technology R&D and application of local factories. The integration of technology in the field of equipment support will promote the complementary and coordinated development of the military and civilian sides, improve the level of equipment support technology, and give play to the role of technological innovation in building equipment support capabilities. At the same time, by actively exploring the innovation path and model mechanism of military-civilian integration policies and regulations, strive to eliminate the technical barriers between military and civilian institutions, further deepen the level of military-civilian integration, and enhance the participation of local plants in all life stages of equipment to form the greatest integrated equipment guarantees the overall strength.

5. Concluding remarks

At present, in the face of complicated social conditions, fears and enemy conditions, PAP faces greater pressure on duty security, counter-terrorism assaults, and defensive operations, and they need to develop unmanned equipment with armed police characteristics to support them. Studying the needs of unmanned equipment in the field of armed police equipment support, building an unmanned equipment support system, improving the overall combat effectiveness of weapons and equipment, and achieving a leap-forward improvement in the level of equipment support were not only the actual needs of accelerating the construction of a modern armed police, but also the effective fulfilment of PAP. The responsibilities and missions of the troops and the high standards to achieve the practical requirements of the "four guarantees" were of great significance both in theory and in practice.

References

[1] Shigang, S., Hang, Y., Li, L. (2021) Research on the Development Trend of Intelligent Equipment Support Technology. Flying Missile, 4, 90-94.

[2] Zhaoyang, Z., Jiancheng, M., Zhiyu, J. (2020) Research on Distributed and Flexible Support Model for Future Warfare. Aviation Standardization and Quality, 6, 46-51.

[3] Kejie, W., Jing, Z. (2020) Unmanned operations will change the shape of future warfare. Military Abstracts, 19, 23-26.

[4] Hongxing, W., Pengfei, W. (2020) Analysis of the basic motivations for the transformation of army equipment support in the new era. Journal of the Academy of Military Transportation, 5, 28-31.

[5] Xishan, Z., Guangyao, L., Huijie, L. (2020) Yuan Xiangbo. Development and Application of

Intelligent Unmanned Support Equipment. National Defence Science and Technology, 2, 14-18.

[6] Xiaoan, L., Bin, J., Guo, Y. (2020) Tang Jing. Research on the development trend of equipment support under the conditions of intelligent warfare in the future. Flying Missile, 4, 22-25.

[7] Ruizhou, F., Kai, G. (2019) Thoughts on the basic issues of unmanned intelligent equipment support. Journal of the Military Transportation Institute, 7, 37-40.

[8] Haijiang, L., Xiangang, L. (2020) Thoughts on accelerating the development of unmanned equipment technology. National Defense Science and Technology, 6, 28-32.

[9] Jiao, S., Chenning, L., Dexin, L. (2019) Research on the Intelligent Support Mode of Equipment for Future Combat.Journal of Ordnance Equipment Engineering, 1, 10-15.

[10] Ronghui, W., Liya,W., Yi ,Y. (2010)Thoughts on the support of informatized combat equipment. Journal of Armored Forces Engineering Academy, 8, 20-24.