

Research on Military Emergency Logistics Application Based on Internet of Things Technology

Jiagang Du*, Chen Zhu, and Ye Zhang

Department of Aviation Four Stations, Air Force Logistics College, Zhongshan North Road, Xuzhou, China

*corresponding author

Keywords: Internet of Things, smart card, military emergency logistics

Abstract: This paper first analyses the current situation of military emergency logistics management in our army, and then puts forward the basic concept of applying Internet of Things technology to military emergency logistics. On this basis, it focuses on the application of Internet of Things technology in military emergency logistics, and finally carried out summary and outlook.

1. Introduction

In the new stage of the new century, with the increase of security threats and the continuous expansion of military missions, the scope and content of military practice have undergone great changes. Military emergency logistics, as a bridge between market materials and the "battlefield", has become an important part of our military's logistics support for diversified military missions. In the face of new situations such as major natural disasters, terrorist threats, serious epidemics, and sudden military operations, it is of great theoretical and practical significance to strengthen the rapid, sensitive, and intelligent support capabilities of military emergency logistics. With the rapid development of information technology, Internet of Things technology, as an emerging information technology, has been widely used in the fields of warehousing and distribution, security, remote intelligent control, and system management. According to the current situation of military emergency logistics management, research on the application of Internet of Things technology in military emergency logistics will determine the success or failure of military emergency logistics support capacity building.

2. Current Status of Military Emergency Logistics Management in Our Army

Military emergency logistics refers to a special military logistics activity that the military urgently guarantees the demand for materials, personnel, information and funds in response to emergencies such as major epidemics, serious natural disasters and military conflicts. There are still many problems in the military emergency logistics management of our army. The overall summary has the following three aspects:

2.1 Military Emergency Logistics Information Collection Is Difficult

In the event of an emergency, due to sudden incidents, it is often difficult for military emergency logistics units to accurately collect logistics demand information in a short period of time. In addition, in the emergency support operation, the nature of the tasks is diverse and the direction of action is different. Some of the incidents have a large destructive power and wide-ranging scope, which may destroy all local terrestrial communication network facilities as well as roads and bridge systems. For example, Nepal earthquake, Tibet's Tibet area was destroyed due to communication facilities and transportation difficulties. Tibet the region has been disconnected from the outside world for a long time, and all information including material needs cannot be transmitted. Under this circumstance, how to collect and transmit the local damage degree and demand information accurately and timely to the military emergency logistics unit is the first problem that the rescue department must solve.

2.2 The Unified Command of Military Emergency Logistics Is Difficult

First of all, our military is currently not enough research on military emergency logistics, and the military emergency logistics support force and ability are not strong enough, and it is still in an "empiricalism" state. Secondly, although many military emergency logistics units have formed corresponding emergency logistics support modes, they all start from partial situations and lack unified command. The coordination and coordination of various departments is not enough. Thirdly, although some military emergency logistics units have developed corresponding emergency plans, most of these plans are relatively abstract and practical. For the above reasons, in the face of emergencies, the military emergency logistics unit often cannot accurately obtain the information on the material needs of the rescue area and the geographical, road conditions, weather, etc., resulting in poor communication channels for emergency military logistics and the unclear responsibility, which seriously restricts the efficiency and effectiveness of military emergency logistics.

2.3 Military Emergency Logistics Decision-Making Control Is Difficult

At present, our military emergency logistics management information system is not perfect. The information generated during the military emergency logistics process is numerous and huge. Without the establishment of emergency logistics information release and sharing platform, it is impossible to accurately grasp the details of the emergency situation. As well as the demand and distribution of materials, the quantity and status of the transportation capacity are unclear, and the analysis and judgment are not accurate, so it is impossible to formulate correct emergency logistics decisions^[1]. Therefore, military emergency logistics urgently requires the establishment of an integrated logistics information processing platform. At present, most information transmission is basically based on telephone and fax communication. The amount of information processed is limited, and the information fusion efficiency is low. In complex situations, logistics information is difficult to integrate and screen to form decisions.

Our military emergency logistics has problems of difficult information acquisition, unified command, and difficult decision-making, relevant departments cannot quickly obtain information on emergencies, and cannot make effective and accurate judgments on military emergency logistics. The rapidly developing Internet of Things technology in recent years is a network system that realizes intelligent identification, location, tracking, monitoring and management. Its application in military emergency logistics will greatly improve the ability of information acquisition and processing to command leadership.

3. The Application of Internet of Things Technology in Military Emergency Logistics

Internet of Things technology refers to real-time acquisition of any monitoring device through various information sensing devices, such as sensors, radio frequency identification (RFID) technology, satellite positioning systems, infrared sensors, laser scanners, gas sensors, interactive objects or processes, collecting a variety of information required by sound, light, heat, electricity, mechanics, chemistry, biology, location, etc., combined with the Internet to form a huge network. Its purpose is to realize the connection between objects and objects, objects and people, all items and networks, and to facilitate identification, management and control. Combined with the application status of military emergency logistics, the application of Internet of Things technology in military emergency logistics mainly has the following three aspects:

3.1 The Smart Card Application of Military Emergency Logistics and Emergency Vehicle

In the application of emergency materials transportation and distribution, the vehicle smart card can not only monitor the information of vehicle transportation, material conditions and personnel status in real time, but also promote the overall benefit of the entire military emergency logistics system, and arrange the optimal transportation route. According to the nature of the cargo, the optimal loading and accurate transportation will improve the efficiency of military emergency

logistics, thus achieving the purpose of military transportation emergency. The emergency vehicle smart card mainly realizes the following main functions in the military emergency materials transfer:

Military emergency vehicle navigation: Navigation is the main function of the emergency vehicle smart card. The emergency vehicle smart card is embedded with the Beidou satellite navigation module, which can access the Beidou positioning system in real time. Due to the uncertainty of natural disasters and preparations for military struggles, the pilots of military emergency vehicles are unfamiliar with the sections to the disaster areas or battlefields. In order to achieve military emergency materials in the shortest time and arrive at the designated location in time, Beidou Satellite The navigation system plays a pivotal role^[2].

Military emergency vehicle monitoring and dispatching: In the process of military emergency logistics, the characteristics of military emergency logistics, smart cards receive and transmit vehicle positioning data, dispatch orders and emergency warnings should be combined. For different military emergency logistics situations, different Beidou satellite monitoring systems need to be developed.

Military emergency materials distribution tracking and inquiry: combined with Beidou satellite navigation and positioning function and modern communication technology, tracking the flow and destination of emergency materials, and providing emergency materials data to the military emergency command center to ensure that emergency materials will not be short.

Customized military emergency transportation route: Combine the GIS system embedded in the smart card to analyze and process the emergency vehicle driving data, and design the optimal driving route according to the direction of emergency materials and emergency events, so as to improve the efficiency of military emergency logistics and save military emergency logistics costs.

3.2 Application of Military Emergency Logistics Internet of Things Platform

To build a military emergency logistics Internet of Things platform is to establish a multi-information acquisition, multi-channel transmission, and flexible perception of the Internet of Things information processing platform. And through the combination of coding technology, grid technology, radio frequency technology, sensor network technology, satellite communication and positioning technology, military mobile network technology and mobile wireless networking technology, automatic, fast, parallel, real-time, military emergency materials information Non-contact processing can be achieved^[3].

The military emergency logistics Internet of Things platform mainly consists of three levels (as shown):

Perceptual layer. The sensor network is based on two-dimensional code, RFID and sensors, utilizes the binding of smart cards and emergency transport vehicles to realize in-transit identification and satellite positioning of emergency materials.

Transport network layer. Through the existing wireless network, broadband network, dial-up network, etc., the collection and transmission of military emergency materials data is realized.

Application layer. The input and output control terminal can remotely control the military emergency materials.

3.3 Visual Application of Military Emergency Logistics Assets

Visualization of military emergency logistics assets is to provide timely, accurate information on the location, status categories and transportation of personnel, equipment and supplies to the headquarters or frontline. Through the military emergency logistics Internet of Things system, both frontline operations or disaster relief personnel, logistics support personnel or command personnel can dynamically grasp the information elements such as the location, quantity and status of emergency materials and equipment in real time. By assembling RF cards for important military emergency materials, or assembling the RF cards according to the standard after assembling individual materials, the RFID technology can quickly identify and synchronize the information to the military emergency logistics through Beidou satellite wireless network or dynamic wireless networking^[4]. After statistical analysis and graphical processing, command and control leadership

desktop of the headquarters displays the emergency materials information in real time, and at the same time, the front-line warfighter client displays the location, status, quantity and other information of the emergency materials needed^[5]. The military emergency logistics Internet of Things system is of great significance for ensuring frontline operations at any time during non-military operations, ensuring front-line operations, shortening transportation emergency time, improving military emergency logistics efficiency, and reducing military emergency logistics costs. Basic structure of military emergency logistics internet of things platform is shown in Figure 1.

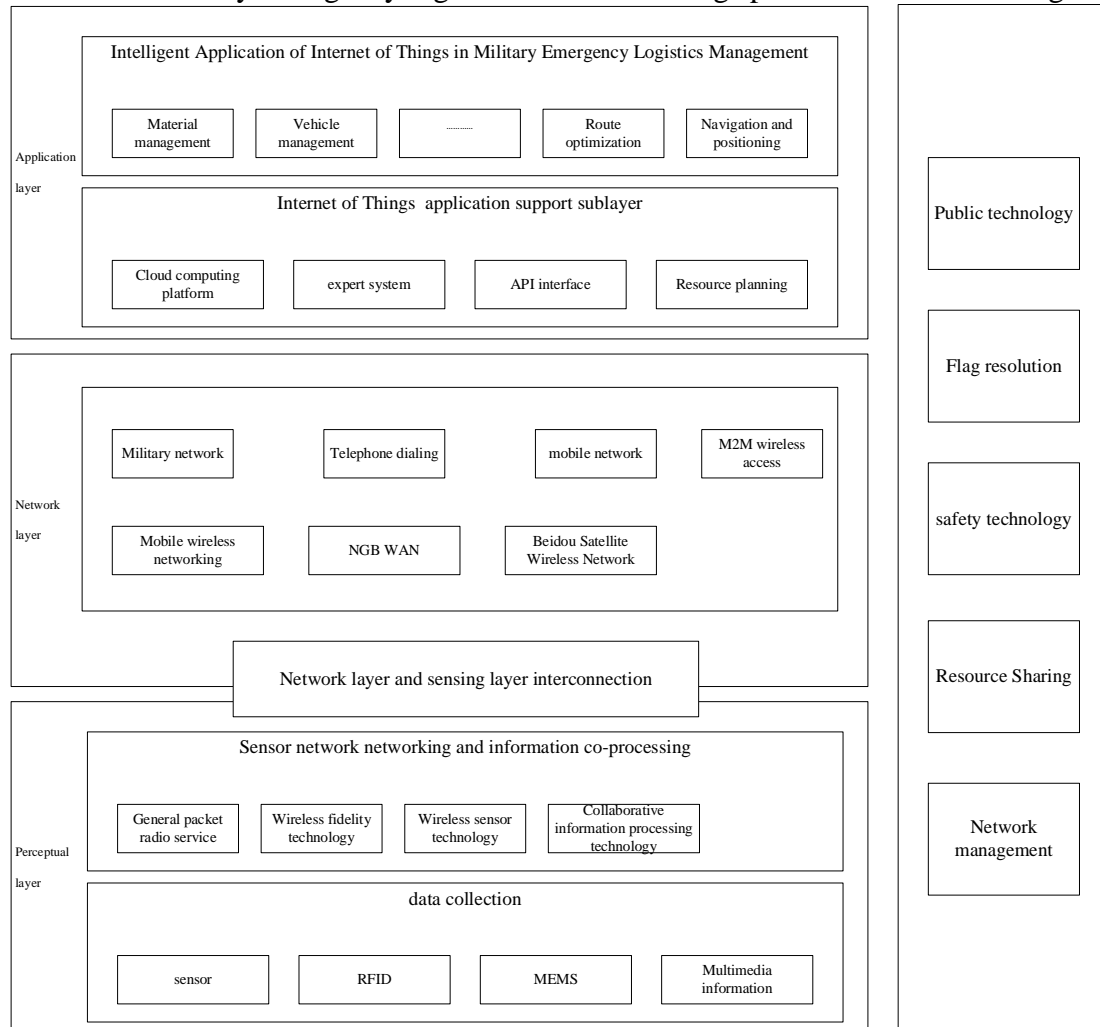


Figure 1 Basic structure of military emergency logistics internet of things platform

4. Summary

This paper discusses the application of Internet of Things technology in military emergency logistics management, and better solves the problems of intelligent management of military materials and vehicle operation status, military emergency materials reserve management, etc., laying a solid foundation for military emergency logistics to realize informationization. In the near future, the Internet of Things technology will further promote the development of military emergency logistics towards automation, intelligence and multi-dimensionality.

References

- [1] Military Internet of Things Perception Modern Military Logistics, Gong Weifeng, Army Procurement and Logistics, 2009.
- [2] Design and Implementation of Logistics Vehicle Monitoring System Based on Internet of Things, Su Yonghong, Computer and Digital Engineering, 2011.

[3] Application of Internet of Things Based on RFID Technology in Modern Logistics, Ding Tianming, China Logistics and Purchasing, 2011.

[4] Planning and design of logistics information platform based on Internet of Things, Li Hongwei, Information Technology, 2011.

[5] Research on Military Emergency Logistics Support Capability Construction, Yan Shuailong, Army Procurement and Logistics, 2011.