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Thinking and Countermeasures of Systematic Construction of Weapon Equipment Based on Industrial Internet

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Abstract

Modern war is a confrontation between systems. The scale of our military's equipment is too large, the integration and compatibility are not high, and the proportion of main battle equipment, information system equipment and support equipment is not reasonable. The systematization of weapons and equipment is an important topic to be urgently solved at present. From the understanding and understanding of the development of industrial Internet, and drawing on the development mode and technology of industrial Internet, this paper gives enlightening thoughts on the systematic construction of military weapons and equipment, and puts forward preliminary ideas and Countermeasures for the construction of "Internet" of weapons and equipment, so as to provide reference for the systematic construction of weapons and equipment to realize standardization, serialization, generalization and meet the needs of integrated joint operations.

Keywords

Industrial Internet weapon equipment systematization.

1. Introduction

The white paper "China's national defense in the new era" points out that "the Chinese army should improve and optimize the weapon and equipment system structure, comprehensively promote the development of weapons and equipment in all services, coordinate the development of main combat equipment, information systems and support equipment, and comprehensively improve the level of standardization, serialization and generalization". Modern war is a confrontation between systems. A complete weapon system is an important part of adapting to the integrated joint operation mode and winning modern information war. Since the 18th CPC National Congress, the construction of weapons and equipment has been put in a strategic position of priority development. The development of weapons and equipment has been greatly improved, but there is still a certain gap from winning the information war. The lack of the concept of "great power defense" leads to fighting on their own, setting up barriers to each other, and non integration. The incomplete standardization system leads to a wide range of types of weapons and equipment that are not common to each other. The shortage of talents leads to serious restrictions on the key core technologies of high-end weapons and equipment. All these seriously restrict the systematic development of weapons and equipment, and it is impossible to realize the innovative and integrated development of all-round, all-round, multi-level and multi technology. With the advent of the information age and the continuous improvement and maturity of China's industrial Internet construction, its construction and application mode provides favorable conditions and construction ideas for building the "Internet" of weapons and equipment and breaking through the "blocking point" of the systematic construction of traditional weapons and equipment.

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2. The Concept of Industrial Internet

Industrial Internet is a new type of infrastructure, application mode and industrial ecology that is deeply integrated with the new generation of information and communication technology and industrial economy. Through the comprehensive connection of people, machines, things, systems, etc., a new manufacturing and service system covering the whole industrial chain and the whole value chain is built, which provides a way to realize the digitalization, networking and intelligent development of industry and even industry, It is an important cornerstone of the fourth industrial revolution. It includes three systems: network, platform and security. Based on network, platform and security, it is not only the infrastructure for industrial digitalization, networking and intelligent transformation, but also the application mode of the deep integration of Internet, big data, artificial intelligence and the real economy.

2.1. Network System

It includes three parts: network interconnection, data interworking and identification analysis. Network interconnection is to realize the data transmission between local institutions, upstream and downstream enterprises, users, products and personnel, machines, materials, environment, systems and other elements in the enterprise. Data interoperability is to realize mutual understanding of information transmission between elements through standardized description and unified modeling of data. The identification resolution system is composed of identification code, identification resolution system and identification data services. By allocating identification codes to physical resources such as materials, machines and products and virtual resources such as processes, software, models and data, it realizes the logical positioning and information query of physical entities and virtual objects, and supports the sharing of data across enterprises, regions and industries.

2.2. Platform System

It includes four levels: edge layer, IAAs, PAAS and SaaS, which is equivalent to the "operating system" of industrial Internet. The multi-source, heterogeneous and massive data collected at the network level are transmitted to the industrial Internet platform. Using the algorithm model of big data and artificial intelligence analysis and various simulation tools such as physics and chemistry, combined with digital twins, industrial intelligence and other technologies, massive data mining and analysis are carried out to realize data-driven scientific decision-making and intelligent application.

2.3. Safety System

The industrial Internet security system involves many network security issues such as equipment, control, network, platform, industrial app, data and so on. Its core task is to ensure the healthy and orderly development of the industrial Internet through monitoring and early warning, emergency response, detection and evaluation, functional testing and other means.

3. Basic Concept of "Internet" of Weapons and Equipment

3.1. General Concept.

The "Internet" of weapons and equipment is to make full use of the existing and gradually mature 5g network infrastructure and communication technology, rely on the powerful Internet of things technology, deeply integrate the Internet, big data, artificial intelligence, cloud computing and other advanced technologies, realize the comprehensive connection of people, machines, equipment, systems, etc., and build a new systematic construction and management mode of weapons and equipment covering the industrial chain of military enterprises and the value chain of troops, It provides a way to realize the digitalization, networking and intelligent

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development of weapon equipment system construction. It can also be regarded as the industrial "Internet" of specific objects, which also includes three systems based on network, platform as the center and security as the guarantee.

3.2. Basic Assumptions

Based on the comprehensive construction deployment and coverage of 5g network base stations, the military production-oriented enterprises, material and parts suppliers and other industrial chains that produce various weapons and equipment can open up the information island through the transformation and upgrading of the enterprise's intranet and the construction of the external network, so as to realize the ubiquitous interconnection and smooth flow of data in all links of the industrial chain; Adopt the Internet of things technology of identification analysis to give "ID card" to every machine and product of the "Internet" of weapons and equipment, realize the accurate docking of supply chain system, enterprise production system and army use chain, and the comprehensive interconnection of people, machines and things, so as to realize the full life cycle management of products across enterprises, regions and industries, and promote the integration and sharing of information resources. At the same time, a strong technical research team will build a service system based on massive data collection, aggregation and analysis to meet the digital, networked and intelligent needs of military enterprises and troops, support the carrier of ubiquitous connection, flexible supply and efficient allocation of enterprise and military resources, and develop and build an "Internet" integrated platform for six level weapons and equipment from the Military Commission to individual soldiers. With advanced computing architecture and high-performance cloud computing infrastructure, it can realize the integration, storage and computing of massive heterogeneous data, solve the problem that the explosive growth of weapons and equipment data processing does not match the computing capacity of existing military enterprises and weapons and equipment systems, and accelerate the data-driven networking and intelligent process. Establish a multi-level security assurance system for the "Internet" of weapons and equipment that covers equipment security, control security, network security, platform security and data security, especially related core technologies such as identification and analysis system security, weapons and equipment "Internet" platform security, user control system security, enterprise and weapons and equipment big data security, so as to realize the all-round protection of the "Internet" of weapons and equipment and ensure the absolute security of the whole system.

4. The Role and Significance of "Internet" Construction of Weapons and Equipment

With the continuous development and improvement of China's manufacturing industry system and industrial Internet, coupled with the continuous breakthrough and maturity of the bottlenecks of new technologies such as artificial intelligence, big data, Internet of things, 5g, cloud computing, and the continuous independent innovation in key and core technology fields, the construction concept of "interconnection" of weapons and equipment may become a reality, which is the systematization, intellectualization Digital construction provides a solid platform and foundation, and provides a vast expansion space for better accurate docking with the future informatization, intelligence and unmanned combat needs.

4.1. It Is Conducive to the Scientific Design of Weapon Equipment Requirements and Technical Indicators

After the "Internet" platform of weapons and equipment is built, the data of the equipment can be controlled in the whole process from production to delivery, to distribution of troops and then to individual use. Through big data statistical analysis, we can know in real time which

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equipment has a high utilization rate, which equipment plays an obvious role in the task, and which equipment has a low utilization rate in practical application, so as to provide accurate reference for the next step of equipment demand design and technical index improvement.

4.2. Greatly Improve the Efficiency of Military Weapons and Equipment Management

Relying on various sensors, inquirers, recognizers, diagnostics and other information collection equipment, collect various real-time information such as the quantity, quality, variety, status and location of relevant personnel, equipment and materials, and transmit it to a large database through the information network, so that the resources in the whole management system can be fully visible and data analysis and statistics through the platform system, so as to solve the manual and fuzzy current equipment statistics, The problem of estimating and generalizing the retirement status of equipment, so as to realize the life-cycle management of weapons and equipment, so as to greatly improve the management and support efficiency and deployment accuracy in peacetime and wartime.

4.3. It Is Conducive to Further Improve Command and Combat Effectiveness

The "Internet" platform of weapons and equipment, combined with modern communication technology and big data analysis, enables individuals and commanders to "visualize" the combat performance of personnel and weapons and equipment throughout the whole process, so as to better assist commanders in accurately and reasonably deploying combat tasks, flexibly allocating weapons and equipment and commanding the combat process, so as to maximize combat effectiveness; It is conducive to individual soldiers or combat units to understand their own weapon and equipment performance in advance, and reduce casualties caused by weapon and equipment failure during operation.

5. Some Countermeasures and Suggestions

The "Internet" construction mode of weapons and equipment is based on the development of industrial Internet. At present, although the development of industrial Internet in China has made preliminary progress, it is still supported by platform key technologies, edge intelligence technology, wireless sensor network technology, industrial big data analysis, industrial mechanism modeling, short board of standardization system, industrial data collection ability, massive data processing ability, industrial big data modeling and analysis ability, industrial app cultivation ability The shortage of key technologies and core capabilities such as digital integration capability in the whole product life cycle is seriously restricted, and systematic and scenario scale applications have not been formed.

5.1. It Is Necessary to Establish A Unified Leading Organization to Coordinate The Pilot Promotion

The construction of "Internet" of weapons and equipment involves many departments and fields such as government, military, enterprises, colleges and universities, scientific research institutions, etc. it is a huge and complex systematic, exploratory and innovative project. Therefore, it is necessary to establish a unified leading organization with the overall planning of the government, the coordination and cooperation of the army, the talent and technology support of colleges and research institutions, and the strong support and guarantee of military and local enterprises, firmly establish the idea of "big country defense" of "large system, large opening, large integration, and large coordination", take pilot attempts to explore light weapons and general-purpose equipment first, and gradually promote the overall planning of weapons and equipment that covers the highest level of precision and sophistication.

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5.2. Strengthen the Top-level Design and Standardization Construction

We should focus on the long-term overall planning, clarify the relationship between all levels and types, rely on the construction of industrial Internet, and build an "Internet" technology ecosystem of weapons and equipment through the deep integration of production, University and research resources, so as to promote the standardization, serialization and generalization of the whole life cycle of weapons and equipment from the scientific research and technology demonstration, research and development end to the equipment and material supply end, military enterprise production end to the military application end. Give full play to the leading role of industrial Internet in advanced and sophisticated fields such as aerospace and major equipment, and promote the upgrading of high-end manufacturing industry from production automation to intelligence. Establish a standard system and institutional mechanism for the development of all equipment, and formulate a standard system for the classification of each link, unit and element of equipment, so as to realize the interconnection of weapons and equipment of the whole army and truly integrate them into a whole.

5.3. We Should Consolidate the Source Innovation and Talent Base

The "Internet" of weapons and equipment is an interdisciplinary and integrated field, which requires in-depth basic research and strengthening the original and leading scientific and technological research, especially the top secret data content related to military enterprises, weapons and equipment R & D and manufacturing, and compilation strength. Once it is broken by foreign or hostile forces, it will be a devastating blow. Therefore, we should cultivate innovative fertile soil with innovative research and talent cultivation, support the construction and application of "Internet" of weapons and equipment in a wider field, a wider industry and a deeper level, strive to tackle the core and key technologies, build its security assurance system, strengthen the security assurance ability of equipment, network, control, application and data, and achieve the goal of absolute security assurance.

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