Research on Equipment Logistic Support Information technique

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***Abstract*:**Based on the analysis of equipment logistic support, this paper puts forward equipment integrated support business connotation. And it suggests that all-life-cycle equipment logistic support information starts from management without paper. Then we gradually establish digital platform for equipment logistic support, and construct integrated data environment to realize digitization, automation, networking and integration of all-life-cycle equipment information. This paper proposes an information framework of all-life-cycle equipment logistic support to achieve the equipment logistic support information goal. Then key information techniques are analyzed to realization equipment logistic support information.

Introduction

With the complex equipment system, equipment support has become an important factor affecting the combat effectiveness of the military forces, it has been used as the support to combat performance requirements, and occupies the equally important position, has become an important factor restricting the development of equipment system and life cycle cost. In order to meet the needs of the modern war on the damaged equipment and equipment failure, response and resume fighting requirements quickly, supportability equipment must be from the design phase synchronization is designed, and has been to the continuous improvement of equipments in the usage phase, the whole process throughout the whole life cycle of equipment. In the development process of integrated equipment support equipment system in support issues into consideration, the support design and deployment while equipment, to provide resources and support each other, and equipped with the lowest cost, the establishment of support system, meet the mission requirements usually and readiness for a series of technical and management activities of [1,2].From the beginning of the 20 century 80 years, the introduction of support design in the development of F-18 aircraft in the U.S., then developed a new type of weapon B-2 bombers, SSN-21 nuclear attack submarines and fighter F-22, from the beginning of the design emphasizes the design and analysis of support, will guarantee the design and weapon equipment and production process are integrated to ensure the combat readiness target weapon system [3]. Developed countries, the comprehensive protection technology has gone through a long process of development, has been gradually using information technology and digital integrated support platform to achieve the comprehensive protection of equipment design and planning. China started in 1980s by the military took the lead in introducing integrated logistics support concept, translated a number of comprehensive data protection. In 2000 years, china has gradually introduced the interactive electronic manual, support analysis, integrated support management software, the formation of related GB, GJB, the main focus of the digital integrated equipment support in specific areas of business, has not been carried out the integrated support management. As early as 90s, Europe and the United States optimize the design and implementation of equipment and equipment support product, support scheme design and evaluation, plan maintenance, spare parts, equipment and other support information management through the simulation technology, information technology, data processing technology, IETM technology. Based

on EAGLE, ASENT, MMIS, AIMSS, Arbortext, Relex etc., software support digital integrated support platform has been a lot of applications in the U.S.

Equipment integrated support business connotation

Integrated equipment support oriented to the whole life cycle is around the equipment design and system design of the two main line, the bridge is the support analysis, requirements, equipment manufacturer, use three kinds of roles include life cycle process, as shown in fig 1.

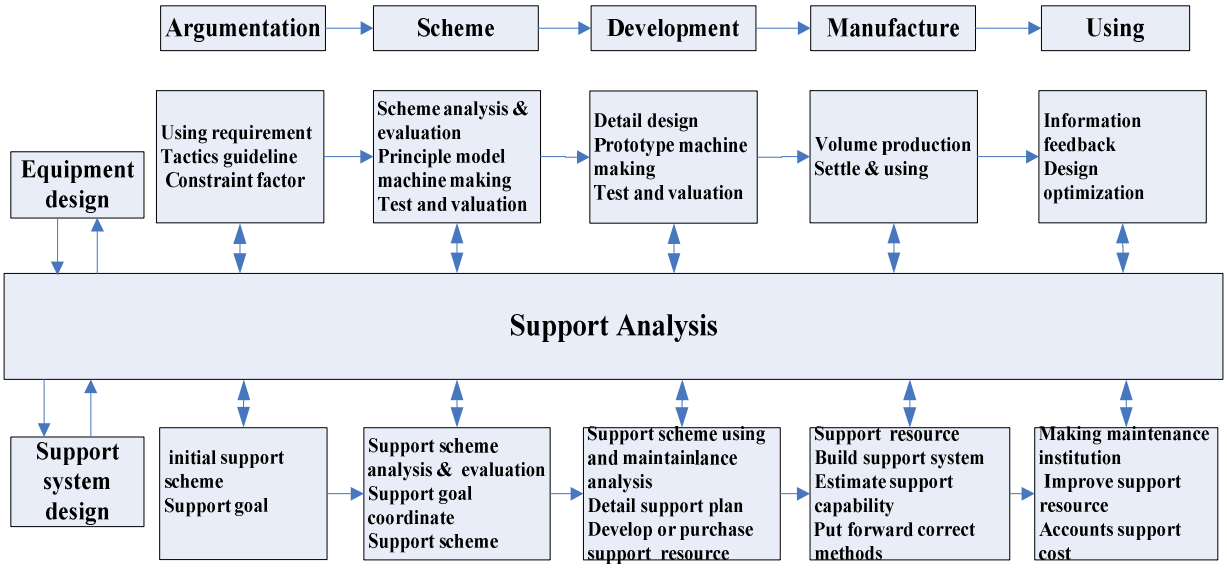

Figure 1. connotation of equipment integrated support service for the whole life cycle

To carry out the design of integrated equipment support services include support equipment, that is to carry out a comprehensive equipment reliability, maintainability, testability, support and safety and other general characteristics of analysis and design; determine the equipment support scheme and support resources, requires close collaboration between reliability and maintainability engineers and support engineers, accomplished by support analysis; provide the required support, including procurement and supply plan, provide spare parts, documents, ground support equipment and training [4]. Equipment integrated support work throughout the demonstration, program, engineering design and development, manufacturing and use of the various stages of the life cycle [5].

Integrated equipment support information goal oriented life cycle is from the life cycle information paperless. Equipment integrated support core data into product definition data and the product data support, data definition products include engineering drawings, design specifications, technical reports, analysis and test data, data support products including product data files, data reliability and maintainability, use and maintenance manual, supply and maintenance of data, support analysis and support records data elements.

Equipment integrated information framework

According to the integrated equipment support for the whole life cycle of the connotation of business connotation, its information system includes integrated support platform, digital design and manufacture platform, integrated support platform, which is like fig 2. Integrated support platform is composed of three layers, which are design analysis and scheme, integrated security management and technical support, and remote application. Digital design platform and digital manufacturing platform provide the

corresponding design and manufacturing data for the integrated support platform. The basic support system of support from the three aspects of the business integration platform, data center and hardware support platform integrated security platform, through the standard system, information security system and operation management system to guarantee the comprehensive support work standardization, safety and efficiency. The detail of equipment integrated information framework is described in another paper.

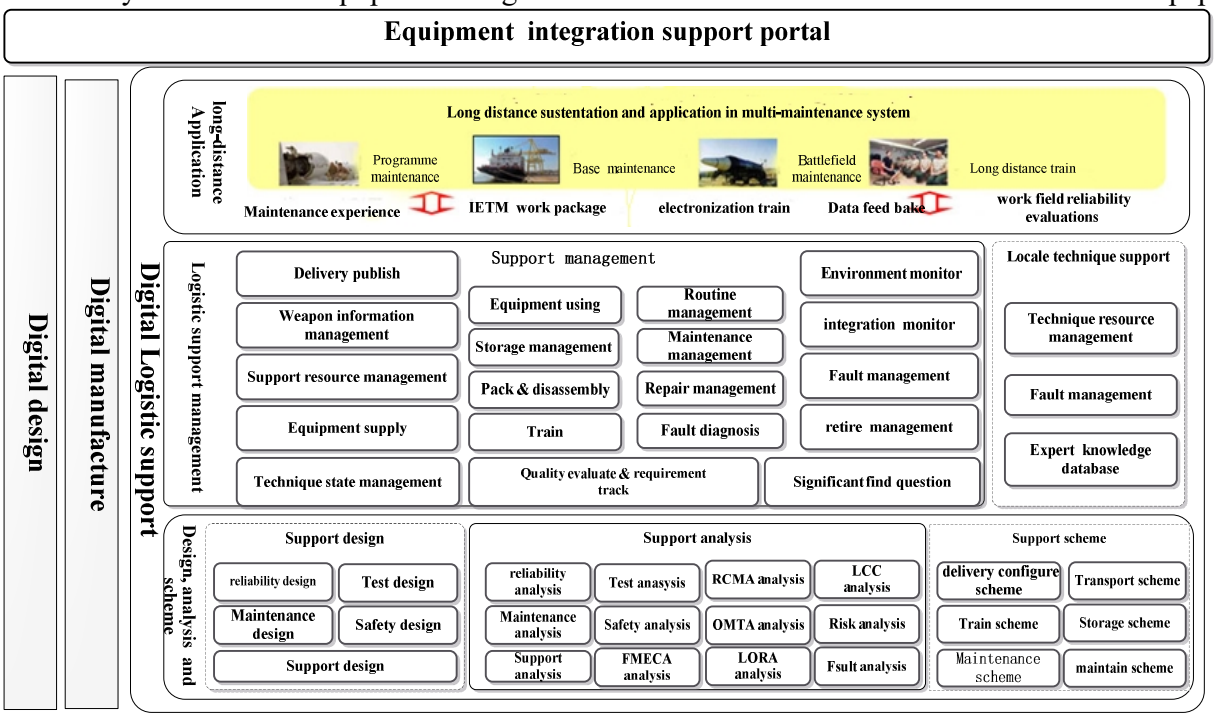

Figure 2. Information framework of equipment integrated support

Digital equipment logistic support realization key technologies

Digital equipment logistic support as a comprehensive project, it is needed to integrate, penetrate and cross the technology of multi-discipline. Digital technology, simulation technology, big data technology and data analysis & processing technology are used to realize digital equipment logistic support. The technologies framework is like fig 3.

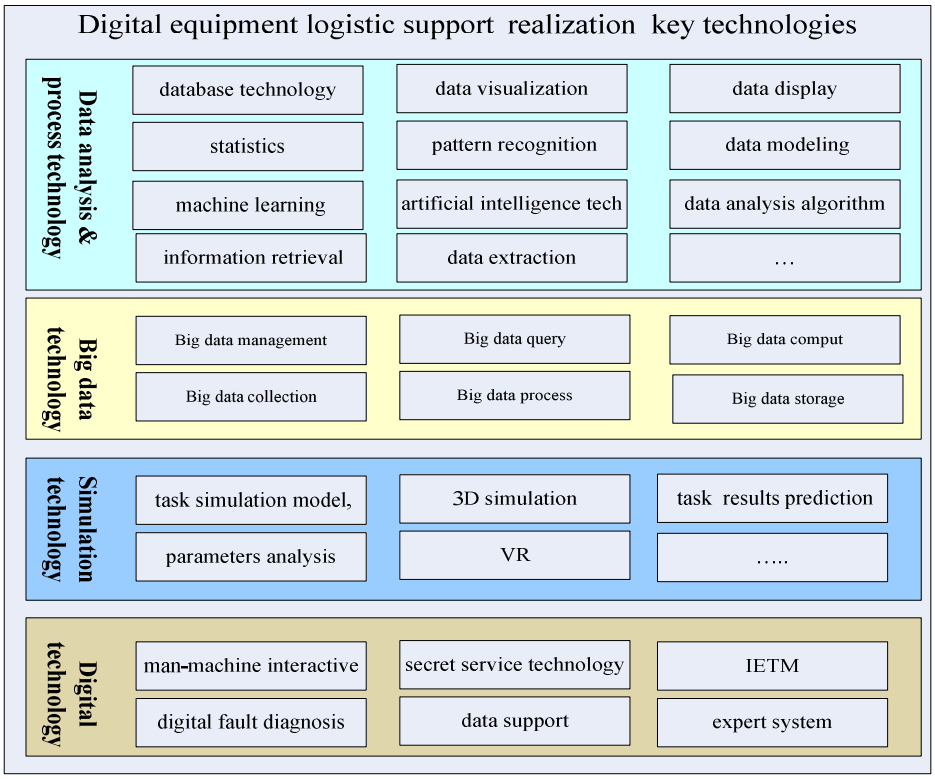

Figure 3. Digital equipment logistic support realization key technologies

A. *Digital Technology*

Digital technology is one of the important technologies of equipment logistic support information technology. Digital integrated support has become an inevitable requirement of the construction of equipment support. Digital technology mainly includes man-machine interactive technology, digital fault diagnosis, expert system of secret service technology, data support technology, IETM technology etc… Through the application of digital technology, build a safe, reliable and easy to use equipment integrated support software platform, support the development of the equipment integrated support work, and improve the efficiency and effectiveness of equipment support. The application of digital technology in the comprehensive protection of life cycle equipment is the innovation of equipment support technology. It is the base of improving the comprehensive efficiency of equipment support and is an important symbol of the modernization of equipment support.

B. *Simulation technology*

Integrated equipment support simulation technology is another key technology in real combat and training requirements for input, establishing the task simulation model, the input parameters for the analysis, the task prediction results is possible and necessary to complete a task of support. Through the simulation technology, the task results and the completion of the task of the support analysis, as an alternative support mechanism, system design parameters, maintenance strategy, inventory policy to provide decision-making basis for the development of. Visual simulation of a variety of forms, in order to realistic 3D simulation environment, to complete the equipment integrated support feasibility, adaptability, risk assessment and evaluation.

C. *Big Data Technology*

Equipment lifecycle process comprehensive support will produce large amounts of complex data, not only the data size is huge, and growing faster than Moore's law, more than 95% of the data is unstructured, and the need for long time storage, non hot data will also be random access, with the traditional core data storage in relational database based on the comparison has significant difference. ILS emphasizes the protection of the joint, universal focus between different devices support equipment, the protection of resources and means of support, requires the establishment of a unified standard, support system structure can be integrated with existing equipment, make it more suitable for the existing equipment support requirements, and can make the development of future support system compatible with the existing system, to the realization of common use different types of old and new equipment. Ultimately need to build a comprehensive database of public infrastructure support based on large data, data from the various stages of the life cycle of equipment, the database can provide technical data support for each stage.

D. *Data Analysis & Processing Technology*

The key of equipment comprehensive support is the guarantee analysis, data analysis and processing technology is the key technology of the support analysis. Data analysis and processing technology, including database technology, statistics, machine learning, data visualization and information retrieval technology, pattern recognition and artificial intelligence technology, data extraction, data analysis algorithm, data modeling technology, data display technology etc.. The data modeling technology is used to model the data of the equipment integrated support field. According to the conventional data analysis algorithm and the product characteristic and the data characteristic, the specific analysis algorithm is set up. The integrated equipment support data model and analysis algorithm was achieved by using digital technology, the data extraction technology will be equipped with comprehensive support in the field of multi-source heterogeneous data effectively selected by correlation algorithm calculation results using the digital display technology to decision makers, manage users, designers, support officers and other visual display, auxiliary equipment integrated support to carry out the work.

Data analysis and processing technology is a practical application technology, it has been widely used in finance, banking, agriculture, manufacturing, retail, telecommunications, health care, education and biological sciences and other fields. The application of data in the whole life cycle of equipment support in analysis processing technology, will help improve the design performance, support products ensure a reasonable program, to enhance the management efficiency of equipment support, and ultimately improve the support performance of the equipment, so as to enhance the operational performance of equipment.

CONCLUSION

Based on the analysis of the whole life cycle of the equipment support business connotation, this paper puts forward the integrated equipment support information goal and equipment integrated support the information framework. Based on the framework of information construction, to promote the equipment life cycle cost effective reduction, promote the integration of equipment development and protection work, and promote the quality of equipment support, efficiency and capacity to improve.

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