

# Key Technics Analysis of Integrated Electronic Information System Development

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**Abstract.** As a system which can realize multifunction, integrated electronic information system, in the current framework of information war, puts up enriching and important neural support against other system. This article studies in detail corresponding key technologies in the development process of integrated electronic information copper to give guidance for efficient and steady development of integrated electronic information system.

## Introduction

Integrated electronic information system application changed traditional weapon equipment system based on mechanization, and developed it into the new battle gear with information as support, and it also became the important determinant of future war victory. In view of the current rapid development of information technology and traditional integrated electronic information system, there is the need to have new research on the main characteristics of the system in the future and the corresponding technical system research at various stages, and in specific operating mode and related technology system, etc., get reasonable interpretation of related development law of our country electric information system to promote the all-round development of integrated electronic information system in our country.

## Mainframe + PSTN network

The most typical one is the "Competition" system built in 1958 by United States, which is the only system in the world that has realized semiautomatic combat command and control system. The system is also shall the first for semiautomatic operation command. Through the use of telephone lines and by means of corresponding "point-to-point", it effectively implements the connection of communications equipment, display, warning radar and electronic computer; with data resources coming from ground observers volunteer, radar station and aircraft units, using transistor and the second generation of computer with high-level language development and application to identify the threats, and command corresponding fighter to effectively intercept enemy bomber; there are two hosts in all its protection zones with 1700 BPS broadband to effectively connect all sectors broadband connection; use large computers with front-end processor for network operation, and through the use of various ways to choose algorithm and routing.

## "Distributed computing" integrated electronic information system

"Distributed computing" integrated electronic information system adopts comprehensive integration means to build the so-called integration which is essentially making use of system interface and corresponding communication network to realize the exchange, interconnection and interoperability between each isolated system, and form a large system model in the integrated framework of multiple systems.

## Minicomputer + ATM/computer local area network (LAN)

The most typical system was world war military command and control system (WWMCCS) constructed when the United States began to form a global military. In concrete application, this system is responsible for the command on America's strategic nuclear weapons. The whole system was composed of four nodes at the beginning, and telephone communications lines were the main contact. When in the 70 s, this system had been extended to the integration of information system including ten several detection warning systems, more than 50 communication systems and more than 20 command centers. The system also first used processing network/computer online, which mainly contained IEEE802 LAN, the network system including third and fourth generation and microcomputer and ATM exchange network. Global military command and control system, as a command system of strategic significance level. In transverse command, it has the phenomenon of

excessive levels, and serious deficiencies of interconnection. There are serious unadaptable situations for relevant demand of low and middle level joint operations, mainly manifested in its weak communication ability and poor concrete and system compatibility. In the aspect of information transmission, the speed is too low and operational condition is bad. The collected information cannot achieve effective sharing, and the worst is that in identification of friend or foe, there is also a serious problem. Because the technology in this stage is on the basis of local area network and minicomputers, so the whole system's key problems is usually calculation.

#### **Global Internet + distributed computing and high performance computer**

At this stage, the integrated electronic information system has become the 2.5 generation, and essentially it has become a kind of transition in the whole system. 2.5 generation system is better in communication and computation evidently compared with the second generation system. The reason is that it adopts distributed computing technology, in addition it also gets larger increase in processor performance, and it also effectively integrated mobile communication network and Internet technology.

One of the most typical system is "warrior C4I" plan. The global command and control system (GCCS) was started to develop in 1992, and its purpose was to replace the previous WWMCCS system. It basically maintained detection system, communication system and command center system of the former system, but in terms of specific performance, it improved greatly. Compared with WWMCCS system, its main advantage is the use of computer technology in the 90 s, but WWMCCS system uses online processing and communication network technology in the 70 s. Compared with GCCS system, it adopts distributed computer network system, which is open three-tier client/server, and the relative software for the implementation of the command and control and distribution of defense department information data for heterogeneous interconnection network and the connected computer display. In actual use process, the system also applies commercial computer technology in the 90 s, including corresponding software, protocols, and hardware devices such as commercial Sun and HPI workstation system, and use the Windows operating system and the corresponding content of TCP/IP protocol; It has the function of communication bandwidth to satisfy related requirements of all kinds of forms, ways and various common operational image. So the use of GCCS system has great promotion effect on the corresponding command and control ability of the U.S. Defense Department. Its computing power, compared with 2.0 g, is 100 times that of the latter.

Although GCCS system made use of all kinds of advanced information technologies in the 90 s, effectively solved the existing problems in 2.0 generation system, in addition, integrately upgraded the "chimney" system, in practice there are three issues, respectively: "bottleneck" of the impact of GCCS system performance turned to network bandwidth; For GCCS system command level, the research did not consider the related extension of low level operation command forces; Related war-fighters need to spend larger time for man and machine interactive operation, and get access to Web service. 2.5 generation integrated electronic information system configuration is shown in Figure 1.

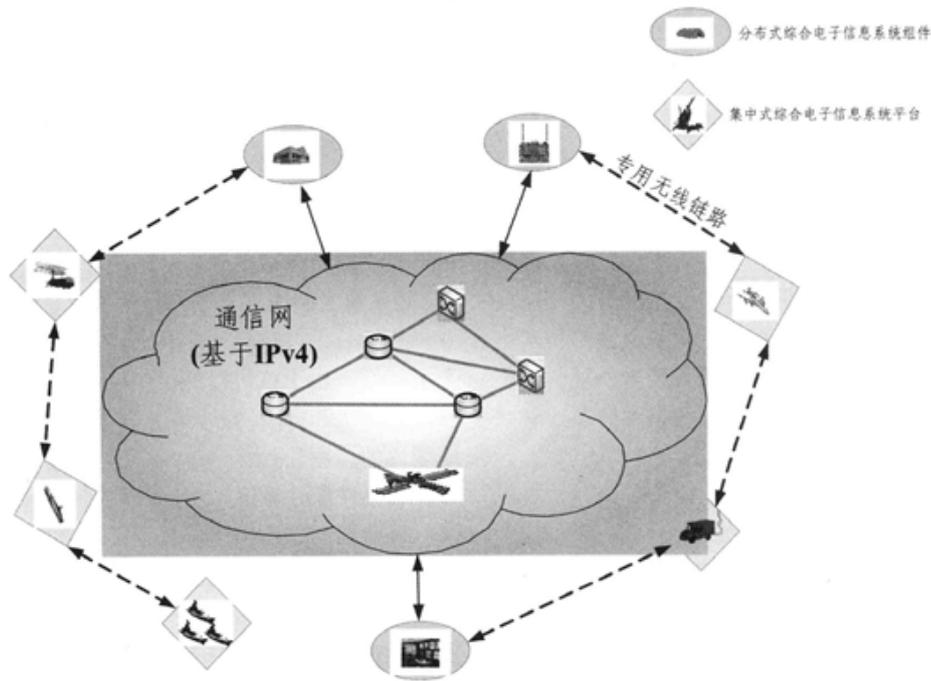


Figure 1 2.5 generation integrated electronic information system

Although 2.5 generation system replaced 2.0 generation system, in specific design and facilities, it does not rely on any information technology of the former. It implemented integrated electronic information system construction with comprehensive integrated method. There is a difference only in terms of the integrated degree extent of specific methods, and in terms of the specific technology system, there is no essential difference.

#### Post-PC devices + next generation Internet + pervasive computing equipment

The most typical system was joint command and control system (JC2) which was implemented in 2006 by the United States. The system changed various existing services management modes in the past stratification, and transformed to the corresponding joint command and control. The ultimate goal was to realize a more diversified and flexible joint operation requirements. In 2006 ~ 2008, JC2 module was developed, and it was upgraded for JC2 module II in 2008 and 2009, and in 2011, it eventually formed the system's operational capability, and alternatively replaced 2.0 generation integrated electronic information system. JC2 adopted pervasive computing, and the main characteristics expression of the calculation is more in-depth embedded computing to connect all that has the ability to calculate things together within the scope of the world. It also uses two modern selection systems, and embedded microcontroller processor and IPv6 Internet. Through the application of pervasive computing, the distributed integrated electronic information system and centralized integrated electronic information system have formed a good connection, and there is an effective connection between specific cooperative engagement and information sharing. "Post-pc devices" in the so-called future battlefield, is the 'skinny' server which has the main function to perfect the stop-intrusion function. Simplify its each sensor and weapon, and the corresponding command and control system and individual system, and can efficiently complete complex tasks only PC can do before, and at the same time, stability and maneuverability are effectively maintained.

From the realization of integrated electronic information system's pervasive computing, embedded server only, with equipment system, can be revealed in the network, and can be realized finally, so, the Internet connection can be achieved on the basis of IPv6 protocol. In addition, most of the equipment's corresponding nodes can be accessed on earth's surface. Only in this way, each command or operational personnel will be corresponding with multiple computer. Users under decentralized state, through collaborative work in a specific environment, eventually realize the user's task. Related users in concrete operation process, have no need to operate the complicated machine instruction. Related users can use speech way, or natural sounds and relatively simple

manual operation to effectively control the tasks of the computer to operate and control some of the model implementation applications only professional and technical personnel can do in the past. The third generation integrated electronic information system form is shown in Figure 2.

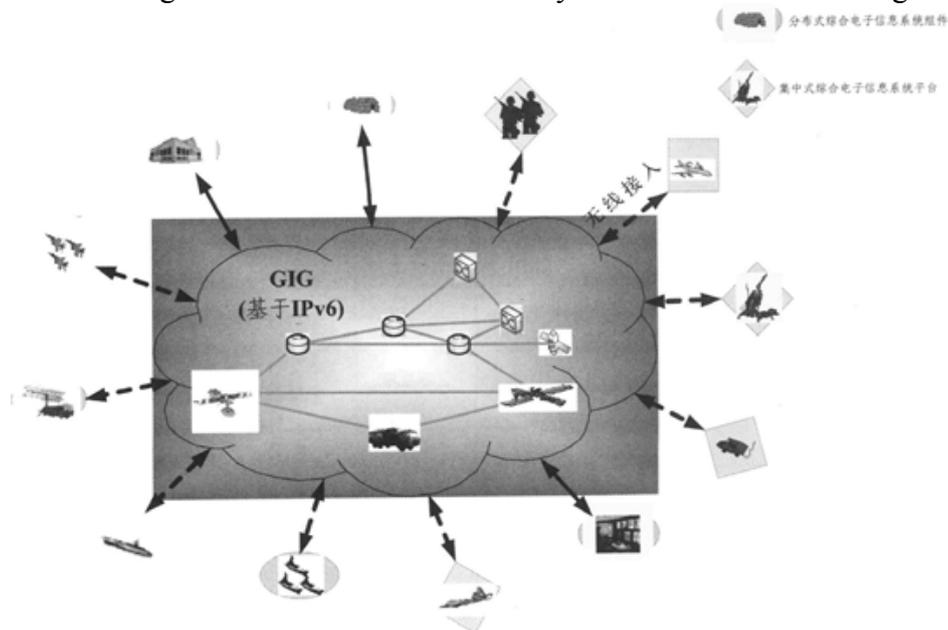


Figure 2 The third generation integrated electronic information system

The third-generation integrated electronic information system, compared with 2.5 generation, is different in that in specific weapon/crosslinking sensor platform aspect. It does not use wireless link, but uses a wireless access way, IPv6. For each field's specific "post-pc", there are many differences in specific intelligence, so there are some technical difficulties for them to implement corresponding integration operations, and needs to be done under intelligent technical conditions, and for GIG, though, it is a typical pervasive computing intelligence system. While the United States defense department was implementing JISR and JC2, GIG implementation, development and research work were in the same stage. It effectively supported the full range of implement services, and give them support of communication network, in addition, also function domain services and core services support, which realized automatic fusion between information and implementation of each machine operation. In addition, there are implementation of on-demand discovery and appropriate contents information access, which cannot be implemented by traditional Internet.

So-called GIG (global information grid), is essentially an information infrastructure to provide the corresponding support of integrated electronic information system. Itself has no division for each functional area, so for GIG, it is essentially different from integrated electronic information system, therefore, in the specific application of integrate electronic information system, we need GIG as the backing to achieve the goal of flexible combination and plug and play. Although GIG provides the corresponding scheduling and found functions, it is only for related computing and communications services, and the services provided by the resources are only in the internal implementation for the whole system shared purpose. For the external personnel, without proper authorization, any resources cannot be obtained.

### Conclusion

For the development of integrated electronic information system, to a certain extent, there is a close relationship with the relevant calculation and the development of communication technology. This paper analyzes the dimensions of integrated electronic information system condition, and divides four generations of integrated electronic information system, highlights the system's information technology era mark, guides the military field in our country, develop complementary advantages, so as to actively promote the continuous development of integrated electronic information system in China.

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