Research on the Effect of New Computer Data Processing Technology on the Development of Modern Avionics Equipment

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Abstract. For now, the continuous advancement of computer data processing technology has brought about earth-shaking improvements in the infrastructure and basic technology models of various industries in our society. In the course of the development of modern avionics equipment, the application of data processing skills has firmly grasped the air control authority of aviation electronic equipment. For the future progress of modern avionics, this is an epoch-making breakthrough in computer skills. This article analyzes the development of various aspects of avionics equipment from different perspectives. In addition, this article also conducts a rough analysis and exploration of computer skills related to equipment that can break through modern avionics to help study the practicability of the equipment assisted by it.

Keywords: Computer, Data, Modern Aviation, Electronic Equipment

1. Introduction

In recent years, although our country is still in the stage of socialist development, the progress of our society in various fields has reached an unprecedented stage. Whether it is the computer business we are proud of or other areas of progress, it has become a major project of research and development with in-depth service significance for our lives[1]. On this basis, the scale of my country's aviation industry is also increasing its power. Avionics equipment that can serve the aviation industry has very flexible and powerful maneuverability. Moreover, in some unique aviation fields, the area covered by the radar of these equipment is also very broad. In the process of actual military exercises, we can also find that with the help of equipment in the aviation field, whether it is against enemies on land or in the air, they are very powerful and threatening (see Fig 1).

Looking back from the perspective of the history of the aviation industry, we will find that the internal structure of avionics equipment and breakthroughs in operating technology are closely followed by the update and progress of computer skills. Because modern warfare includes land warfare, sea warfare and air warfare. In this form, the computer data processing technology we use must be able to help aviation equipment have the characteristics of simple functions, wide range, and rapid communication. However, because the changeable weather is the biggest enemy threatening the safety of the aviation industry, in order to ensure the safety and stability of the aviation industry, we have also incorporated the functions of aviation equipment into the application of weather analysis. In
short, with the help of computer skills, the pace of aviation is fast-tracking the pace of the era of followers.

2. Analysis of the application of computer skills in modern avionics equipment

2.1. Computer-based humanized artificial intelligence skills
In life, you may find that people always use the concept of artificial intelligence to create science fiction movies and science fiction books. In fact, my country's research on artificial intelligence is widely used in aviation vehicles. For example, the memory function of the aircraft trajectory, the intelligent control of the aircraft and the protection performance of dangerous critical parameters. From the point of view of data analysis, artificial intelligence can use computers to simulate artificial activities, which can be seen as a relatively practical technique.

![Figure 1. Application of avionics in aircraft in real life.](image)

2.2. Neural network skills based on mesh structure
This technique is also an anthropomorphic technical application. It mainly uses the powerful processing capabilities of computers for data analysis in the form of human-computer interaction. It allows the computer to simulate the operation of the human brain to help aviation equipment to quickly process various data. According to a large number of experimental studies, neural network techniques are very durable in image processing, aviation language understanding and aircraft intelligent control methods.

2.3. The application of computer auxiliary software in aviation
We will gradually find a problem, the application of auxiliary software can run through all aspects of our lives. There will be no exceptions in aviation applications\(^2\). In fact, according to theoretical thinking, the aviation electronics field we are familiar with should be similar to the professionalism in the mechanical electronics field. Then, the graphic display of signal processing and the analysis of the reliability of military systems can all be realized by auxiliary software.

2.4. Application of fine processing technology of parallel parameters
The application of computers in the field of aviation must be a process method that can obtain high-speed data processing. So, the fine processing method with parallel parameters can naturally be widely used. It can be combined with radar at high speed to quickly draw flying routes or maps of aircraft. From the perspective of warfare, it can independently help fighters to identify enemy and own
troops.

3. The main skills of electronic technology combined with computer in modern avionics equipment application

3.1. Integrated circuits capable of achieving super high-speed operation
This kind of integrated circuit capable of ultra-high-speed operation can generally be used in the built-in aviation system of some aviation vehicles. Because the cost of this chip is relatively high, its breakthrough in micron technology also requires a lot of manpower and financial resources. Such chips will become advanced integrated circuits in the continuous development. The use of this overall circuit enables the aircraft to perform high-speed fault self-detection.

3.2. The use of aviation-specific integrated circuits
Compared with the adoption of the first high-speed circuit, the cost of this integrated circuit is much lower. The difference is that it is a circuit form dedicated to aviation systems. It is the circuit composition of the key part of the current cutting-edge aviation technology electronic system. The signals it can handle include unique analog signals and a wide range of digital signals. It may not be as fast as the first circuit. However, its application can also supply aviation equipment.

3.3. The use of integrated circuits based on shortwave
The above two circuits need an external connection to achieve accurate data transmission and analysis. In order not to be restricted by external connections, scholars have developed two integrated circuits, microwave and millimeter wave. Since they do not require an external connection during use, the stability of their functional range will also be greatly improved. Their main principle is similar to the wireless transmission of radar.

3.4. The use of integrated circuit chips instead of chip functions
In terms of product functionality, the chip can be considered a unique form of carrier for the circuit. In electricity, we often say that the form of chip scale integration is to place integrated circuits on the chip for synthesis. This synthesized chip can not only realize the function of the circuit itself, it can also be used as a chip. In other words, this synthesized wafer form can also be called another form of chip.

4. The use of data processing technology in modern avionics weather equipment

4.1. Application of the organization and processing of meteorological data
If we want to allow flying equipment to organize and investigate airborne meteorological data, then we must add some coding skills to the aviation system. Currently, the more popular coding system is the BUFR data system. This form of data organization can not only make certain data surveys on meteorology. In the maritime airspace, it can also conduct low-altitude marine environment surveys. This kind of investigation can help the communication of the marine fleet.

4.2. Analysis of graphic data obtained from satellites
We all know that weather forecasts are relatively reliable information obtained from cloud images sent back to the earth by our satellites. Although it sometimes has certain errors, its application is still more acceptable to the masses. If we put a system capable of weather forecasting in aviation equipment, the Air Force can get relevant weather reports in the aircraft to take precautionary airborne measures.

4.3. Meteorological measures based on radar monitoring
Based on the above description, we know that sometimes the form of weather forecast is inaccurate. Then, on this basis, we must make a backup measure. Radar data monitoring will be a better choice. The basic principle is that electromagnetic waves emitted by radar can react to cloud cover and related rainfall data. Moreover, this form of monitoring is more accurate than the form of weather forecast
(see Table 1).

| Electronic technology                | Main features                      |
|--------------------------------------|------------------------------------|
| High-speed integrated circuit        | High-speed operation of obstacle detection |
| Application Specific Integrated Circuit | Integration of key parts of aviation system |
| Shortwave integrated circuit         | Radar-like wireless transmission   |
| Integrated chip                      | Can form chip-like functions        |

4.4. Electronic sensing technology based on military aviation equipment

This kind of technology tends to be theoretical research. Experts believe that artificial intelligence technology can apply electronic perception to the process of airborne weather monitoring. This perception technology can be used on the outer surface of an aircraft. The basic principle is that changes in weather will inevitably cause changes in air humidity and temperature. Once the electronic sensing technology senses the change in the air, it will provide the operator with corresponding prompts.

5. Analysis of the future application of computer data processing technology in modern avionics equipment

5.1. Acquisition of military intelligence and surveillance of enemy conditions

In the way of information acquisition, the techniques that can be used for data processing are generally the interception of enemy electronic intelligence\[4\]. This ability is generally based on data analysis combined with radar exploration. Since electronic intelligence is generally a process of electromagnetic wave transmission, the use of radar will make data analysis more convenient. The enemy's reconnaissance is generally done by using drones and some aerial stealth aircraft.

5.2. Anti-reinforcement electronic interference technology

Electronic jamming technology is also called radio wave interception technology. This technique is different from the form of intelligence acquisition. If in the course of combat, the enemy's army will inevitably send some information to inform when it needs reinforcements. If we use interference technology similar to electromagnetic waves for corresponding electronic interference, the enemy's information will not reach the reinforcements.

5.3. Electronic guidance based on aviation missiles

In order to ensure the accuracy of the missile launch, we need to install some electronic guidance devices in the missile launcher. According to the high-speed data analysis speed of the computer, the electronic guidance will play the role of the commander of the missile to help the missile attack to the best position of the enemy. According to our country's research, the control range of this method is generally within 500 kilometers.

5.4. Autonomous combat form using hostless robots

Generally speaking, we can only see the appearance of such robots in science fiction movies and science fiction books. However, in reality, foreign scholars are also conducting research on robot control systems. Its basic principle is that data-controlled robots replace humans in combat. Maybe in the future, humans will use robots similar to competitive games to conduct some mixed martial arts or world wars.

6. The practical effect of new electronic computer data processing technology on the
development of modern avionics

6.1. It enhances the advanced nature of aviation equipment at the technical level
In the process of our country's development, the pace of renewal and progress in the aviation field is relatively slow. Perhaps the technologies that other countries have achieved are similar to alien technologies from our perspective\[5\]. However, there is no doubt that computer data processing technology will definitely enhance the advanced nature of avionics in the aviation field. The internal structure of aviation equipment will also achieve advanced exchanges that were impossible before.

6.2. Its application in aviation industry has strengthened our comprehensive national strength
According to the above narrative, we know that our aviation military strength is very weak. Compared with other countries, the development of my country's aviation equipment is very backward. The application of computer data processing technology in electronic equipment will enhance our aviation strength. From the side, it will also enhance our country's comprehensive national strength.

6.3. It can create a precedent in the aviation field of the future
For now, although the skills of the aviation equipment that we study are only possible in theory. However, in the future development of aviation industry, these will certainly become reality. Moreover, the field of computer data is constantly updated. Its application in the aviation field is also very effective. Therefore, the author believes that the first in the aviation field in the future will be the primary development of computer skills.

7. Conclusion
Although the development of my country's avionics equipment cannot be compared to some developed countries outside the United States, we will still do our best and enthusiasm for aviation to apply cutting-edge computer data techniques to the field of avionics\[6\]. This will also be a process for us to prove our comprehensive strength.

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