

# Safety Early Warning for Air Traffic Management

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**Abstract:** In recent years, with the rapid development of China's transportation industry, air traffic management has attracted more and more attention, and its safety problems have become increasingly prominent. In civil aviation transport, it mainly involves various types of transportation tools, such as high-altitude and long-span channels. Therefore, it is one of the most important contents to strengthen the safety management in the civil aviation transportation. Air traffic safety early warning management is not only related to the safety of the aircraft flight, but also can very good reflect the aviation technology level in our country, said from the book, the main content of air traffic safety management is to keep the normal order of air traffic, at the same time avoid mutual collision between all kinds of aircraft and obstacles, in the current situation, to strengthen the management of air safety early warning research is very important.

**Keywords:** Air Traffic Management; Aviation; Safety Early Warning

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## 1. Foreword

At present, China's air traffic management is mainly people-oriented, and people, as the main body of aircraft transportation, its safety consciousness and quality directly affect the development of civil aviation. Therefore, on the basis of the existing legal system in China for different types of problems for civil aviation development and service nature needs and set up and stipulate the corresponding content, form and means and a series of general terms to introduce and explain, also at the same time of the actual situation of the airports and airlines to a certain extent, reasonable analysis, to provide theoretical basis for air traffic management in our country, also provides the theoretical guidance for our aviation safety management.

## 2. Background study on safety early warning in air traffic management

There is no doubt that the safety role of air control in civil aviation is important. The occurrence of civil aviation disasters and accidents has a certain contingency, but the accident also contains many inevitable factors that can be controlled, such as the illegal operation of flight personnel, the error of control personnel, the error of maintenance personnel and management personnel. If these seemingly small errors are not corrected and controlled in time, they will gather and magnify little by little, and eventually it will be difficult to control and lead to the occurrence of disaster. However, in recent years, air traffic control under the current system exposed the poor management, low utilization rate of airspace resources, route congestion caused by flight delays and other problems?, The service guarantee capability of the air traffic control system is in a relatively lagging state. If the control capacity is increased in a short term, it is bound to affect the aviation safety. Therefore, in this case, it is especially necessary to introduce advanced ideas of early warning management and further improve the safe operation level of air traffic control. Because the principle of early warning management reflects a thought of paying attention to pre-event management, compared with the traditional post-event management mode, it is more conducive to the pre-control and prevention of accidents.

## 3. Functional study and analysis of the Air Management Organization Center

Air management center of organizational structure is the optimization of organizational structure, can better reasonable allocation and utilization of resources, is advantageous to the division of professional advantage, can well security work, in the work, can guarantee various departments, below is an air management center organization structure, depicts the composition of the air management organization center. As can be seen from Figure 1, it can be seen that the management of ATC center is mainly divided into two parts. One is the aviation administration department, and the other is the technical

support department. The aviation administration department is responsible for the development of information management, including the development of management and control work and the normal operation of flight reports. Second, the main work of the technical support department is to be responsible for the development of various communication work and the use of testing equipment. The division of labor is relatively detailed and detailed, and it is conducive to the efficient development of air control work. Below, we interpret the organizational structure of the air management organization center separately.

### **3.1 Navigation administration department**

Navigation administration department of the main work is responsible for the jurisdiction of the traffic control work and completes the airport tower control and navigation intelligence work, but also to help relevant departments of related air management, in the navigation administration of some events within the navigation administration department has the responsibility to assist with investigation. In addition, the aviation administration department is also responsible for the weather forecast work, the main work content is to timely report the weather at the airport, release important relevant information, provide some meteorological services for air traffic, and answer relevant consultation questions, etc. In addition, the aviation administration department is also responsible for the management of the regional control room. The main work content is to provide air traffic control services to the controlled aviation servers in the region, implement the management in the acceptance area, and report the relevant flight forecast and flight dynamics to the control department. Finally, in the navigation administration department, there are still a lot of management contents, such as tower control and flight report room, which are one of the important contents of management, and it is essential in the management. Among them, the main work content of the flight report room is to review the flight forecast and flight plan of the aircraft, so as to better provide the flight dynamics for the control room and the flight support unit.

### **3.2 Technical support department**

The main work content of the technical support department is to ensure the safety technology of air traffic management, to be responsible for the daily management, maintenance and operation of communication and navigation radar, the management of equipment and the construction of other businesses, so as to provide better communication radar services for flight. The department under the jurisdiction of the technical support department has aviation tube radar station, whose main work content is responsible for the daily maintenance and operation maintenance of primary / secondary radar system and display equipment, terminal display equipment, multi-radar processing system and internal communication system, and the daily management of maintenance personnel training, etc. Second power station is also one of the management content of technical support department, the main job is responsible for the equipment of low voltage power supply security work, completes the daily maintenance of power supply system, and technical department of the station of oil machine maintenance and repair, etc., to ensure that the navigation tube building equipment power supply is normal.

## **4. Study on the status quo and function of air traffic management safety early warning**

### **4.1 The status quo**

From the above we of air traffic management safety early warning management system work analysis, although the current air traffic safety management system has a complete set of system, but the air management comprehensive guarantee performance still have certain lack, at the same time the air traffic management safety management activities there are some optimization space, remains to be further optimization. Especially for the information management technology, the data feedback control mode in the process of air traffic safety management needs to be further optimized and improved. At present, the main defect of the current situation of the air traffic management safety early warning system is that it can not timely warn of accidents, which is easy to lead to direct problems.

### **4.2 Function**

From the current situation of air traffic safety management early warning, the system function of air traffic safety early warning is mainly reflected in the following points. (1) Alarm is to analyze and identify various disasters in air traffic management and papaverine that cause disasters, to directly evaluate the safety situation, to ensure the safety and effectiveness of the system, and to better deal with some problems in air traffic. (2) Correction is to comprehensively and

proactively predict and control the development trend of air traffic management accidents and disasters, so as to better ensure the balance in management practice and improve the quality of safety management. (3) Immunization is to make a comprehensive prediction of the same type or the same nature of air traffic disaster omen and the inducement of accidents, identify a series of coping strategies more quickly, determine the measures and means to deal with the problem, and strengthen the prevention and solution of the problem.

## **5. Problems that need to be paid attention to in the management of air traffic safety early warning**

In the air traffic safety early warning management, there are many problems that need to be paid attention to. First of all, attention should be paid to the accuracy of air traffic early warning, scientific and reasonable prediction of dangers. In the process of air early warning management, the most important thing is to control the risk, control the risk management in a reasonable state, further reduce the safety risks of air traffic, and reduce the processing cost of risks. In addition, we should also pay attention to the scientific nature and rationality of early warning and alarm, and set the risk in the negligible area to avoid the occurrence of false alarm and leakage alarm phenomenon. Second, we should pay attention to the qualitative and quantitative evaluation of air traffic safety together, the qualitative evaluation of air traffic safety is mainly based on the evaluation of management experience and lessons, the risk status of the system of the comprehensive judgment, at the same time, on the basis of this, summarizes the discrete phenomenon, form a macro concept. In essence, it is to conduct in-depth interviews through the inspection of compliance and object investigation, and make accurate records, and then deduce the framework through theoretical derivation, and integrate information resources to ensure the scientific and profound nature of information. Finally, in the safety risk evaluation, we can not always pursue the two aspects, but also pay attention to the quantitative evaluation, so as to better improve the scientific nature and accuracy.

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