Research on Army and Local Government Integrated Joint Command Information Platform

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Abstract. The current national comprehensive security is facing new challenges. On the basis of the analysis of the current status of the construction of the military and local command systems, the concept of the construction of an integrated military command information platform is proposed. It analyzes the functional requirements of the integrated military-civilian integrated command information platform, designs the system structure and system operation process, and finally discusses the key technologies of the integrated military-civilian integrated command information platform.

1. Introduction

At present, China is in the development from large to strong critical period, international and regional situation in the region increasingly complex, facing the military risks rising, the occurrence of local conflicts are likely to increase. After 20 years of rapid development, the size of domestic cities continues to expand, the population density continues to increase, and the threat of various emergencies and disasters is severe. Every year there are various forms of natural disasters, accidents, public health events, and social security. Events have occurred, and these events have brought incalculable losses to the country. Faced with the increasingly severe threat of military and emergencies the Party Central Committee established the National Security Committee in 2014, which aims to integrate military and land resources and forces and improve national security response capabilities. However, the current command information system for army building and the local government relying on the public security system to build some emergency command and dispatch systems exist when dealing with emergencies. There is a single source of information, relatively independent[1], weak information support capabilities, and resources cannot be shared, reaction time is too long, complex process coordination, poor information transfer, manual transfer links, resource mobilization difficulties and other problems, it is difficult to meet the requirements of national security, and the urgent need to build integrated joint military command believe the information platform to enhance emergency. The efficiency of handling conflicts and incidents improves the rapid response and scientific decision-making ability of integrated military and local command and dispatch.

Therefore, based on the understanding and thinking of the military-civilian integrated joint command information platform and the analysis and analysis of military requirements, this paper studies the military-civilian integrated command information platform. The system architecture, hardware, software structure, and operating process, and then based on the engineering implementation, proposed the key technology for building a military-civilian integrated information command platform, in order to play a role in the research of the military-civilian integrated command information platform.
2. Functional requirements analysis

Military joint command information integration platform is relying on information technology and reasonable working mechanism, the army and local emergency headquarters at different levels of organic linking the different from each other, complement each other, Li and do not belong to, relatively independent of the command element, execution Power and related resources are organically integrated into a whole, achieving cross-departmental information sharing, resource optimization, joint use of processing power, rapid and efficient command process, and timely and accurate risk prediction, which can greatly shorten the response time to respond to emergencies and greatly improve Efficiency in handling conflicts and incidents. Constructing a military-ground integrated joint command information platform is an important guarantee for effectively responding to security threats and completing diverse tasks. From a functional point of view, according to the process and links of handling sudden conflicts, the integrated military and civil command information platform should integrate information resources based on the existing military command information system and the local emergency command system. Event information perception, situation notification, crisis judgment, decision analysis, task assignment, process monitoring, effect evaluation, optimization adjustment, risk prediction and other functions. The specific functional requirements are as follows.

2.1. Army situation monitoring

In weekdays state should be able to complete on the army and the local situation monitoring, access and integration of military forces and government emergency command system trend of various departments of information, can access to at any time in each department position and tasks of combat forces unit which, deployment, configuration, etc. Information can directly display the power maps of defense systems such as army radars and air defense fire units. It can spot check and monitor the situation of subordinate command departments, and provide the visibility and control of the continuous and lasting ability of social resources for the efficient integration of military and ground resources. With the ability to integrate various national emergency information and emergency resources, it can be based on professional monitoring networks such as fire protection, public security, medical treatment, civil air defense, water conservancy, etc., and can dynamically monitor hidden dangers in public emergencies.

2.2. Event awareness release

Mainly should have the ability of rapid perception and release of emergencies and threats, based on the improvement of satellite, reconnaissance, early warning, radar, communications, civil air defense, traffic, emergency and other network systems, can always feel the various threats and emergencies around our country and domestic. In the event, the first time to get relevant information, and through the information sharing mechanism to release the time profile to the military and local units, to achieve “a little perception, the whole network is known”, to provide a basis for rapid response.

2.3. Development of emergency plan

In weekdays, the military-ground integrated joint command information platform should be able to develop and analyze emergency plans. When an emergency incident involving national security occurs, it can unify the command system according to the type of incident, unify the battle plan, organize command and specific actions, and can unite the army and local relevant units and business departments to study incident countermeasures, coordinate task division, and optimize Resource allocation, quickly formulate emergency plans.

2.4. Military mission assignment

By joint military command integrated information platform, can generate the emergency plan decomposition, according to emergency management in each of the division of responsibilities, to the respective military forces and the party authorities to assign the relevant action any tasks, coordination of various departments at all levels. Standardize the emergency start-up process, establish a start-up mechanism, and promptly mobilize emergency command personnel at all levels.
2.5. Disposal process monitoring
With high-definition signal access, seamless switching, and high-definition display capabilities, it provides a high-definition, visual, and accurate display and control platform for auxiliary decision-making. By military joint command information platform integrated monitoring system can integrate all civilian and military video signal access, can the emergency incident site disposal video to dispatch command center, able to clearly and accurately judge the danger, aid to make better Emergency decision. As a control hub, the command center can arbitrarily call all video information, and should have the management and scheduling functions of visualization, intelligence, and one-key management and control.

2.6. Evaluation of disposal effect
It can timely evaluate the effect of emergency incident disposal, and can establish different assessment index systems for various emergencies, conduct real-time assessment during the disposal process, and continuously grasp the disposal effect. In addition, according to the results of the effect evaluation, the emergency response plan can be optimized and adjusted according to the situation, the programs with better response effects can be continuously promoted, and the action programs with poor results can be appropriately optimized and adjusted.

2.7. Domain Risk Forecast
Mainly based on the data accumulated by the integrated military and local integrated command information platform, through big data mining, information correlation analysis, behavior trajectory tracking, public security situation monitoring, police situation prediction analysis and other methods [2], it supports the establishment of a risk prediction model that can be integrated commanding decision-making and forecasting trends in risk research sentence, and to improve decision-making scientific and predictability of the burst time.

3. Architecture design
Integrated military-ground command is the command and management of personnel, the allocation of resources, and the overall control of operations. The integrated command information platform must be based on converged communications, using softswitch technology and information network technology to integrate various military and local communication systems and terminal equipment, and integrate information systems such as location information, geographic information, and related queries related to command and dispatch. To achieve convenient and flexible command relationship reconstruction, comprehensive and visible military situation control, and timely and dynamic task delivery, to meet the requirements of “horizontal integration and vertical flattening” military and civilized integrated command and control.

3.1. Overall architecture design
The purpose of building an integrated military and local command information platform is to solve the problem of how information is effectively acquired, transmitted, shared, and handled when the military and local governments respond to military threats and emergencies, and how to form an efficient, rapid, and accurate response to emergencies Strategy, how to quickly and effectively pass the correct decision plan to the relevant disposal units and personnel in time, and finally realize the effective management and control of the emergency of military and local linkage. Therefore, the design of the integrated military-civilian integrated command information platform must adhere to the problem-oriented and application-oriented traction, base on normalcy and focus on emergency, create a flat command system through system integration and information sharing, and combine military and land resources to exert their respective advantages. , Learn from each other and share resources.

In engineering practice, a communications command cloud based on the military command information network and local government government information network can be used to interconnect the military joint operations command center, government emergency command and dispatch center, as
well as subordinate command centers, linkage units, and disposal units. The interconnected connection relationship forms a net-like command network. The overall architecture is shown in 1. In the event of an emergency, the department that first learned the news will report the situation to the command center through the command network. The command center updates the comprehensive situation and pushes the event situation to other relevant departments through the communication command cloud to achieve "a little perception, the whole network is known". Command center in conjunction with the relevant command structure, joint case study judged by multi-channel integrated confirms the details of the event, the analysis can be disposed of power resources occurrence of an event area around, depending on the type and scale of the event, to determine the disposal process and force used, Optimize resource allocation, improve disposal efficiency, and formulate disposal plans. According to the disposal plan, the task is delivered to the relevant commanding agency through the command chain, and the relevant commanding agency sends a disposal unit to the site for disposal. During the disposal process, the on-site disposal situation can be pushed to the command system in real time through audio, video, etc., and the command staff can make real-time command adjustment according to the on-site disposal situation to achieve the optimal disposal effect.

3.2. Hardware architecture
The construction of the military-ground integrated joint command information platform should adopt advanced design concepts and the latest processing technology, fully consider the actual business applications of the system, and design on the principles of safety, efficiency, rationality, advancement, and practicability. Relying on the military command information network and local government information network, with wired, wireless communication systems, computer network systems as the link, with the command information system as the support and core, with the geographic information system, satellite positioning system, video surveillance system as the auxiliary The hardware structure of the command information platform that integrates various technical means such as network communication, computer-aided decision-making, and centralized comprehensive control. The hardware is mainly composed of integrated display large screen, server cluster, security equipment, dedicated gateway, output device, portable computer, situation monitoring seat, comprehensive disposal seat, data security seat, effect evaluation seat, etc.

(1) Comprehensive display large screen. It is mainly used to display information such as the comprehensive situation of the military and the land, the distribution of forces in various departments, surveillance video in emergency areas, resource usage, and real-time data flow of business systems. Business host and local information resources can be displayed in various display units in real time and in various ways to realize various daily display applications such as splicing, roaming, zooming, superimposing and plan rotation training management.

(2) Dispose of working seats. Mainly include situation monitoring, comprehensive disposal, data assurance, effect evaluation, etc., using the interactive interface provided by each seat, on the basis of outside intelligence information, it can cooperate with other command agencies to comprehensively deal with emergencies and take action on the disposal process Control and comprehensively evaluate the effect.

(3) Server cluster. The server cluster is the core of the military-civilian integrated command information platform, which is mainly used to store and process various basic data and business data, and provides background support for the military-civilian integrated joint command.

(4) Safety and security equipment and dedicated gateway. Mainly provide security and confidentiality protection services to ensure data and information security, as well as the security of the link between the army command information network and the local government government information network.

In practice, all seat hosts and servers can be placed in a confidential machine room to ensure data security, reduce heat dissipation and noise, and simplify the operation console to improve the office environment. In-depth interaction and push services can be realized between the working seats, and at the same time, the seats can achieve in-depth interaction with the large screen, which can be pushed and
displayed by one button. The overall realization of collaborative office and integration and sharing applications provide convenient conditions for the unified command, unified decision-making, scientific deployment and rapid response of the command center.

3.3. Software Design

The software design of the military-ground integrated joint command information platform should adhere to the military-ground emergency response and disposal as the traction, based on the data and model as the core, through the software to establish multi-channel situation monitoring and threat awareness, intelligent and efficient intelligence research sentence and event handling in one of the flat conductor, for efficient joint military conflict made incident to deal with the disposal of management. According to this, the military-ground integrated joint command information platform software can be divided into four layers from bottom to top: support layer, data layer, model layer, and application layer. The software results are shown in Figure 1. The main functions are as follows:

(1) Application layer. Disposal of the application of various emergency situations of the application layer is mainly oriented to the military command structure faces, such as local wars, counter-terrorism stability maintenance, far from the sea convoy, emergency transportation, accident rescue, law enforcement rights, disaster relief, etc., are generally disposed of these emergencies. It includes the following links: situation monitoring, threat perception, situation handling, action control, effect evaluation and risk prediction. Among them, situation monitoring is to access the intelligence information of various departments of the military and the ground during daily duty, to deeply integrate to form a unified comprehensive situation, and to conduct real-time monitoring; threat perception is obtained through situation analysis, radar intelligence departments, The civil department reports, news reports, etc., the first time to learn the basic situation of the emergency; situation handling is to comprehensively consider the time, place, type, scale of the emergency, and the distribution, availability, and coordination of its surrounding disposal power. And other factors, formulate a reasonable configuration and coordinated efficient event disposal plan; action control is to control the process of emergencies in real time, and monitor and control the situation of the disposal site through video, audio, etc. effect evaluation is to deal with Comprehensive evaluation of the effect is used to evaluate the rationality of the disposal process; risk prediction is to predict the risks in common areas through big data analysis and remind relevant institutions to prepare for the response.

(2) Model layer. The model layer provides a core model for emergency handling for the integration of military-ground integrated command applications, including situation generation model, threat awareness model, mission planning model, scheme optimization model, mission allocation model, command and control model, effectiveness evaluation model. The role of risk prediction models, etc., is to establish the connection between basic data and upper-level applications, and to provide a certain amount of auxiliary information for commanders to make decisions under the premise of comprehensive consideration of the multiple factors.

(3) Data layer. Data layer basis for the implementation of integrated joint military command, mainly through the integration of various types of data information to various departments of the Army, to
establish a unified data information, the integration of the joint command for the military to provide various types of data resources [4], the main Including linkage unit data, peripheral threat data, intelligence information data, available resource data, emergency situation data, disposal response data, geographic information data, etc.

(4) Support layer. The support layer is the basic guarantee for the integrated military-ground integrated command information platform. It is mainly composed of supporting software such as GIS components, database engines, user management, message logs, and interactive protocols. By designing a reasonable messaging and interaction protocol, it provides basic software components for the organic connection and information interaction between the military-civilian integrated joint command platform and other command institutions.

4. System operation process
Relying on integrated joint military command information platform for disposal of emergencies is an ordered work process, can be divided into general trend monitoring, integrated research sentence, develop plans, assign tasks, disposal of control, impact assessment and risk prediction link.

(1) Carry out all-round monitoring of the military ground situation during daily duty, and integrate the comprehensive situation into a unified situation map by accessing various information of the military ground to achieve information sharing and real-time monitoring;

(2) After receiving the incident report, the relevant joint command structure, comprehensive information on all aspects of the analysis research sentence;

(3) Comprehensively consider the time, place, surrounding available resources, disposal power and other factors of the incident, formulate a reasonable disposal plan, and clarify the timing and coordination mechanism;

(4) Based on the formulated disposal plan, following the principles of nearby distribution, intelligent matching, and optimal utilization, the disposal task will be assigned to various military and local departments, and the disposal unit will be dispatched to proceed with the disposal;

(5) During the disposal process, video, audio, and files can be used to monitor the disposal situation, control the action process, and conduct real-time command;

(6) After the disposal is completed, conduct a comprehensive effect assessment of the disposal situation, analyze the advantages and disadvantages of the disposal process, and accumulate experience for subsequent disposal;

(7) Store the incident handling situation in a comprehensive database and use it as sample data to conduct risk prediction and analysis. Through data mining technology, establish a risk prediction model to predict and analyze the time and area of possible emergencies in this field to provide situation monitoring Auxiliary information to prepare for active prevention and control;

5. Key technologies
The military-ground integrated joint command information platform involves many technical fields such as command automation, crisis management, and intelligent decision-making. The main key technologies include: multi-dimensional situation fusion technology, integrated command and dispatch technology, intelligent assistant decision-making technology and cognitive risk prediction Judgment technology.

5.1. Multidimensional situation fusion technology
The military-ground integrated joint command information platform can connect multiple departments in the military and the field. The data types sent by each department are different, and the formats are different. How to integrate these massive different data is the key to the platform's situation display and subsequent analysis[5]. With the help of various algorithms related to data processing, analyze, filter, synthesize, correlate and synthesize the data collected and sent by various departments to obtain the most valuable information, remove useless information and irrelevant information to the greatest extent, and provide a basic situation for command and dispatch information.
5.2. **Integrated command and dispatch technology**

The integrated military-ground command is supported by the software system, which integrates the military and local departments that are different, complementary, non-affiliated, relatively independent command elements, execution forces and related resources into a whole to achieve emergency response. The goal of optimal disposal[6]. The integrated command and dispatch technology is to establish a variety of emergency handling processes and models, using the command elements and execution forces of various departments in the military area as constraints, and using optimization methods to optimize the handling process to achieve the integration of multiple departments. Command and Control.

5.3. **Cognitive assisted decision-making technology**

In the practice process of emergency response to emergencies, many links involve decision-making issues, such as how to divide the military and land, how to use the processing power of various departments, the timing of dispatch, and how to coordinate. These factors need to be fully considered when formulating the plan. In practice, it is necessary to make full use of technologies such as big data and cloud computing[7]. With the help of decision cloud and service cloud methods in the cognitive domain, a cognitive assisted decision-making model is established. Optimize and adjust to provide reasonable auxiliary suggestions and preliminary decision-making information for the integrated command of military and ground command.

5.4. **Intelligent risk prediction technology**

Intelligent risk prediction is based on data analysis to predict possible risks in various fields in the future, and prompts the commander to pay attention to prepare for the response. At present, various military and local departments have accumulated a large amount of various types of data in the field, as well as the characteristics and laws of certain emergencies. It is necessary to build and establish the correlation between emergencies and environmental factors to solve the forecast of emergencies. problem. For example, in the autumn and winter, birds migrate frequently, and a lot of unidentified air may appear. When China holds large-scale events, some countries will provoke them.

6. **Conclusion**

Military joint command information integration platform is accompanied by new demands for national safety requirements to enhance the response capacity to produce, and it is a necessary requirement to deal with unexpected events and conflicts, but also to achieve when faced with an emergency situation accurately research sentence. It is an important means for reasonable allocation of resources, optimal use of power, and intelligent prediction of risks. Based on the analysis of the new problems and new challenges facing the national security situation, this paper puts forward the concept of building a military-civilian integrated joint command.

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