Original Paper

Research on Integration and Improvement of Different Software Quality Management Systems

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Abstract

This paper analyzes the characteristics of GJB 9001c and GJB 5000A military quality management system standards. Taking optimization and improvement as the guiding ideology, some specifications of GJB 9001c and GJB 5000A are integrated, in order to put forward the military software quality management system content to help them integrate and improve.

Keywords

military software quality management systems, fusion, improvement

As the core of information technology, the importance of quality management of software products cannot be ignored. However, software product is a kind of special logic product. Its "manufacturing" process is basically equivalent to the "design" process. Obviously, it is impossible to mechanically apply hardware product quality management methods to manage software product quality. Therefore, it is necessary to establish a quality management method for software products.

1. Theoretical Basis of Integration and Improvement of Military Software Quality Management System

With the rapid development of equipment in the direction of high precision, information and intelligence, the complexity and importance of software have been significantly improved. At the same time, the proportion of software quality problems remains high, which has become the key factor restricting combat effectiveness, so the establishment of quality management system is imperative.

1.1 Unified Theoretical Basis

At present, military software development units generally require the implementation of two quality standards: GJB 9001C quality management system requirements and GJB5000A military software

development capability maturity model. In this way, there are repeated system construction, process overlapping and unclear confusion, which leads to resource waste and confusion. The two standards are different in starting point and emphasis, but they are interlinked in the aspects of theoretical basis and key factors. It is of great significance to study their unified operation and development, give full play to their advantages and avoid weakening each other, so as to effectively improve the quality management level of military software.

1.2 Same Management Approach

GJB9001C can help military software development organizations improve engineering management ability and product quality level, and effectively reduce quality accidents and risks. GJB5000A model is divided into five maturity levels of ladder evolution, and 22 process areas are defined. These process areas are organized according to the maturity level, and are marked as the process activities and requirements to be implemented to meet the corresponding levels. The two standards embody modern scientific management concepts, such as systematic method, full participation, scientific decision-making, cybernetics, statistical analysis and documentation.

1.3 Similar System Framework

The eight principles of GJB9001C of quality management are embodied in GJB5000A. There is a clear mapping relationship between standard terms and process area practice. For example, the seven process areas included in the secondary model have corresponding clauses as the basis.

1.4 Similar Evaluation Criteria

Both of them are evaluation standards, which require the establishment of implementation plans and management rules based on the characteristics of the organization. Section 4.4.1.1 of GJB9001C clearly stipulates that according to the characteristics of undertaking military software development tasks, and in accordance with the requirements of 8000, GJB 5000 and software engineering, the corresponding software working process shall be established and implemented. It can be seen that there is no essential and principled gap between the two quality standards. Instead, they embody the general characteristics of the whole and can complement and support each other. This provides conditions for software organizations to establish and implement a more complete, more reliable, more efficient and lower cost unified quality management system based on the two standards.

2. Specific Measures for Integration and Improvement

2.1 Strengthen the Organization Structure of Software Quality Management

First of all, the participation and leading role of senior managers should be emphasized. It is proposed that the top management of an organization should ensure that the responsibilities, authorities and their relationships within the organization are specified and communicated, that an appropriate communication process is established within the organization, and that the effectiveness of the quality

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management system is communicated. Secondly, the establishment of full-time institutions. As a full-time team, it is responsible for the formulation, maintenance and improvement of software process, which is generally composed of senior experts, project leaders, experienced developers and quality assurance personnel. At the same time, establish the mechanism of all staff participation. Full participation is the foundation of the establishment and implementation of quality management system, because only full participation of all staff can make their talents bring benefits to the organization, and ensure the realization of various commitments made by the top management. Therefore, software organizations should take measures to ensure the establishment of a mechanism of full participation in the whole organization, so that every employee can realize the importance of quality management.

2.2 Optimizing the Software Quality Management Process Mode

Based on the basic model of software quality management based on process improvement, the management behavior is divided into four groups of processes, namely, contract implementation process, software production process, customer feedback process and continuous improvement process. First of all, the process of contract realization. Starting from the requirements of requirements, combined with the enterprise's own software process capability, the contract is reviewed. After passing the contract review, the enterprise organizes the software design and development to form the final product, which is delivered to the customer after internal release. Secondly, the software development process. According to the requirements, the software requirements specification shall be formed, the software development plan and quality assurance plan shall be formulated, the responsibilities and authorities shall be defined, and the resource allocation shall be ensured. Thirdly, user feedback process. Collect and sort out the customer's feedback on software products, and use statistical technology to measure and analyze, as an input to improve the software process capability. At the same time, according to the user's feedback, put forward corrective and preventive measures, and timely inform customers of the processing results.

2.3 Improve Software Quality Management System Framework

The framework of software quality management system mainly describes the basic of software quality management system from management. Requirements, including management responsibilities, resource management, product realization and measurement, analysis and improvement. In the management responsibilities, it is necessary to formulate quality policy, quality work plan and software quality management system documents, propose and take measures, organize design review of software products and software testing and verification at various stages, participate in the acceptance, delivery, installation and maintenance of software products, confirm and record the quality problems of software products, and verify the effect of corrective measures. In resource management, it is necessary to provide necessary resources to ensure the implementation of the quality management system and continuously improve its effectiveness, and ultimately achieve the purpose of improving customer

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satisfaction, In order to ensure that the quality of software developers reaches the corresponding level, in terms of infrastructure and working environment, the office shall identify and manage the working environment and human factors required for the realization of product conformity with the characteristics, and shall be responsible for determining and providing the necessary infrastructure for the operation field according to the needs of production and operation, so as to create a good working environment. In the process of product realization, software requirements management should be considered. Starting from the requirements, the overall system requirements of the software should be established according to the customer requirements specifications, and the global database or data structure should be set up to specify the design constraints. From the perspective of software project planning, project managers estimate the cost and resources of the project and evaluate the project risk, Determine the project development plan according to the project objectives; review and audit the software products and activities in the whole software life cycle from the perspective of software quality assurance to verify the conformity of these software products and activities with corresponding regulations and standards; make some requirements for product configuration management from the perspective of marking and traceability, and require the products to be uniquely identified and traceable when necessary. In the process of measurement, analysis and improvement, it is necessary to organize the monitoring and measurement of satisfaction information; establish a comprehensive internal quality audit system to verify whether the quality activities conform to the plan and the implementation effect of various elements of the quality management system, and verify whether the specified quality objectives have been achieved; monitor and measure the process, and take appropriate corrective and preventive measures, In order to ensure that the quality process is controlled; to monitor and measure the products; to control the unqualified products and take effective analysis methods or statistical techniques to analyze the data from various sources, and be able to use the analysis results as input for continuous improvement.

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