

e-Navigation SQA 가이드라인 실무 지침을 위한 요구사항 분석 프로세스 연구

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요약

최근 해양 분야에서는 안전항해에 대해 e-Navigation 전략을 개발하고 있다. e-Navigation 전략이 구현되면 새로운 소프트웨어에 대한 요구가 증가할 것이다. 국제해사기구에서는 소프트웨어 품질의 중요성을 인식하고 소프트웨어 품질 보증 가이드라인을 공식문서로 승인하였다. 이에 따라 해양산업분야에 가이드라인을 적용하기 위해서 실무 지침의 제작이 필요하다. 본 논문은 실무 적용 지침의 명확한 정보 전달을 위해 품질 표준을 기반으로 하여 요구사항 분석단계의 구체적인 활동을 도출하고 개선하는 방안을 제안한다.

키워드 : 국제해사기구, e-Navigation, 소프트웨어 품질, 실무 지침

A Study on Requirement analysis process for the practical guidance of e-Navigation SQA guideline

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Abstract

The maritime industry has been developing e-Navigation strategy for safety navigation. The implementation of e-Navigation strategy will cause many needs for developing new software increasingly. For this reason, IMO referred to importance of software quality and endorsed the e-Navigation SQA/HCD guideline as an official IMO document. Accordingly, it is necessary to develop a practical guidance to apply the guideline. This paper describes the elicitation results about the detailed actions of requirement analysis stage based on quality standards. Also, the improvement measure is proposed in this paper.

Keywords : IMO, e-Navigation, SQA, practical guidance

1. Introduction

For the last 10 years, the marine industry has been discussing safe navigation, referred to as e-Navigation that uses electronic means. Once the e-Navigation strategy begins implementation after 2018, the demand for systems and services on the basis of new software will be increased definitely.

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The International Maritime Organization has established the SQA (Software Quality Assurance) guideline, following the organization’s address on the importance of software quality in 2012, and the guideline was combined with the HCD (Human-centered Design) concept and endorsed on June 2015 as an official IMO document.

With the listing of the e-Navigation SQA/HCD integrated guideline as an official IMO document, there have been many efforts to use the guideline for the marine industry. IMO documents are declarative and they are difficult to comply. To tackle with the problem, it is necessary to create a practical guidance to use guidelines[1]. A practical guidance will include details of the whole development process and step-detailed activities according to steps. Output will be deduced upon completion of each step, and a simple form for this process will be provided.

Specialists and shipbuilding stakeholders

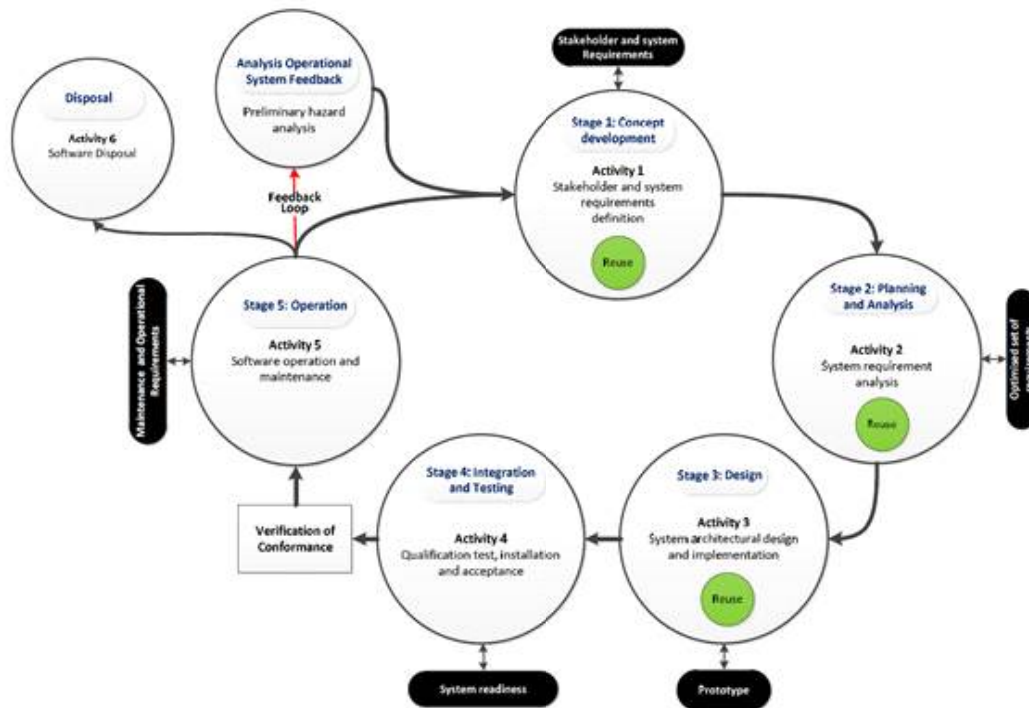
have gathered together in April 2015 for the development of guidelines and introduced guidelines and exchanged various opinions related to future development [2]; and this workshop featured some of the practical guidance. However, the information presented were either difficult to understand or had ambiguities, demanding for more a clear expression and information transmission.

This study suggests a process rebuilding measure of requirement analysis process in the guideline. The process rebuilding makes the practical guidance transmit clear information by eliminating ambiguous requirement items.

Chapter 2 introduces e-Navigation integrated guidelines and explains examples of output including with detailed activities specified in guidelines. Chapter 3 suggests a method to improve requirement process for the conventional guidance.

2. Related Research

(Figure 1) The development process suggested in the guidelines.



2.1 e-Navigation SQA/HCD Guideline

The e-navigation SQA/HCD guideline approved in the 95th MSC in June 2015 is an integrated document for SQA, HCD, and UT (Usability Testing) proposed by three countries - Korea, Australia, and Japan [3]. The guideline includes UT for the development and quality management of the e-navigation and also features SQA and HCD. The purpose of SQA and HCD are to improve data quality and information analysis and development of a system that satisfies customer demand.

The development process of the e-Navigation SQA/HCD guideline compared

and analyzed the software development process of ISO/IEC 12207 standards and the system development process of ISO/IEC 15288 standards and deduced the entire development process[4, 5]. Many areas of the development process of the two standards were duplicates, thus, they were removed and rearranged the development process.

The e-Navigation SQA/HCD guideline divides the development process into six large stages (Figure 1) illustrates the development process suggested in the guidelines.

The first concept development stage defines stakeholders and collects requirements of stakeholders and system requirements. The planning and analysis stage analyzes

(Figure 2) The activities including in each process and development process of guidelines.



This paper proposes a measure to improve the requirement analysis process of the whole process for practical use of the SQA/HCD guideline. The SQA guideline has been a general application in various industries, but limited to the marine industry. For general introduction, the guideline needs to be customized for the marine sector.

Efforts are made to improve process to apply the IMO SQA/HCD guideline based on requirement analysis/application guides of software projects provided by National IT Industry Promotion Agency (NIPA).

The range and role of stakeholders need to be clarified to identify requirements. With this, we attempted to improve the process for identifying requirements.

3.1 Drawing of Stakeholder

Prior to describing activities of each stage, we will analyze and schematize stakeholders participating in the process and stipulate the result in the introduction of each stage. The range and roles of stakeholders have a direct effect on obtaining actions of requirement analysis. (Figure 3) demonstrates stakeholders of requirement analysis stage.

3.2 Process Rebuilding

The process of the IMO SQA/HCD guideline has been drafted based on ISO/IEC 12207 and ISO/IEC 15288 with universal applicability[4, 5]. However, it is difficult to apply international standard documents in specific fields. This study used a model

(Figure 3) The stakeholders of requirement analysis stage



suggested in Korea and customized for the development of practical guidance applicable to Korean marine businesses.

The NIPA provides requirement analysis/application guides of software as a guideline for software development projects [6]. In the case of requirement analysis process, ISO/IEC 12207 and ISO/IEC 15288 processes divide user requirements and system requirements. Also, in that standards, these requirements are classified functional and non-functional requirements[7]. However, because the proposed measure was ambiguous for classifying, improvement was required. This study compared requirement classification items suggested by the NIPA and international standards.

The NIPA guide classifies requirement items as below:

- Equipment Composition Requirement
- System Function Requirement
- Performance Requirement
- System Interface Requirement
- Data Requirement
- Test Requirement

- Security Requirement
- Quality Requirement
- Constraint Requirement
- Project Management Requirement
- Project Support Requirement

They were classified into six requirements as a result of eliminating requirements, such as tests, quality, constrain, project management, and project support. Test requirements were eliminated as they need to be considered when building test stage planning. Quality, constraint, and other project related requirements were eliminated as they are considered as quality management perspective. <Table 3> demonstrates requirement items included in improved analysis process.

4. Conclusion

Interest on software quality is increasing with growing importance of software according to the development of e-Navigation

<Table 3> The requirement items included in improved analysis process.

Requirements Suggested in the NIPA Guide	Improved Requirement	Reason of Exclusion	Countermeasure
Equipment Composition Requirement	Equipment Composition Requirement		
System Function Requirement	System Function Requirement		
Performance Requirement	Performance Requirement		
Data Requirement	Data Requirement		
Security Requirement	Security Requirement		
Test Requirement		To be considered during test planning in the test stage	Move to the test stage
Quality Requirement		To be handled by quality management	Move to quality management
Constraint Requirement		To be handled by quality management	Move to quality management
Project Management Requirement		To be handled by quality management	Move to quality management
Project Management Requirement		To be handled by quality management	Move to quality management

strategy. With this in mind, the IMO listed the e-Navigation SQA/HCD guideline as an official document. IMO is developing practical application guidance for guideline application. The practical guidance is important that deliver the information clearly. Thus, it is necessary to eliminate ambiguous part and describe it easily. For this reason, it was the process rebuilding of requirement analysis process in the e-Navigation SQA/HCD guideline that was progressed. For practical application of the e-Navigation SQA/HCD guidelines, continued efforts to improve processes and case application are necessary.

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