

A development of HMI Style Guide for STELLA User Interface

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1. Introduction

The STELLA Interface system is a HMI system that is being driven between Server/Client for control of manufacturing & installation and experimental surveillance of a sodium loop for verifying the performance of equipment's thermal fluid mechanisms.

The Interface system is being designed to make a supervisor and engineer perform functions such as experimental surveillance, control and maintenance, etc., and it is composed of high-rank menus and low-rank menus, shown in Figure 1, features and characteristics of STELLA system by considering the display pages, such as OVERVIEW, MIMICS, TREND, in terms of their functionality. And its functions have a characteristic being driven in real time or by the demand of users between Server/Client. Currently, the STELLA with a display system is a experimental system being developed, so as the style guide on system properties is not being applied, the system understanding and utilization of users is in the difficult situation. Accordingly, this research should progress completion of a system in the aspect of users with the priority of style guide development of the system, rather than development of a function-preferential Interface system.

2. Research Scope and Method

The goal of this research is to suggest a guideline not only on system design that reflects a simple visual design aspect of a general style guide, but also on user interface design increasing utilization and understanding based on the information-structural aspect and user's experience. Accordingly, this paper has analyzed features and subtleties in the composition stage of the style guide in the design aspect, and approached a

function unit and operation content in the information-structural aspect (figure2).

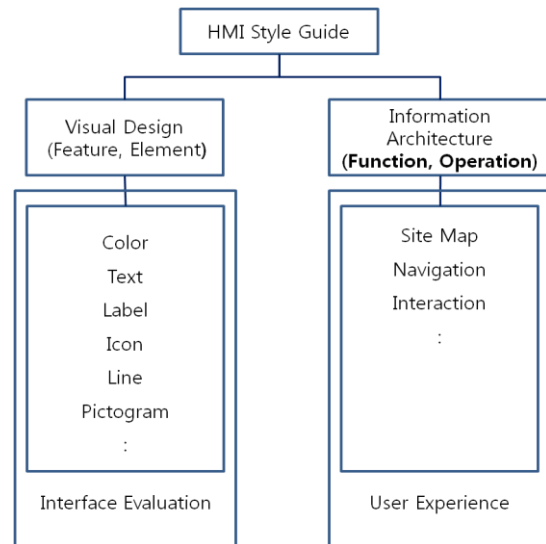


Figure2. Configuration of HMI Style Guide

Firstly, the color, text, label and line, etc. as Interface system's expression elements in the visual design aspect correspond to this. The development method in the visual design aspect was set to be developed on the basis of the assessment result by carrying out expert's assessment on the current system.

Secondly, the information-structural aspect can be divided into structure, navigation, interaction design and function, etc. As the function of a Interface system and characteristics of users are included in the information-structural aspect, this research has targeted that the properties of a system, etc. according to user's type can coincide by reflecting experience of users.

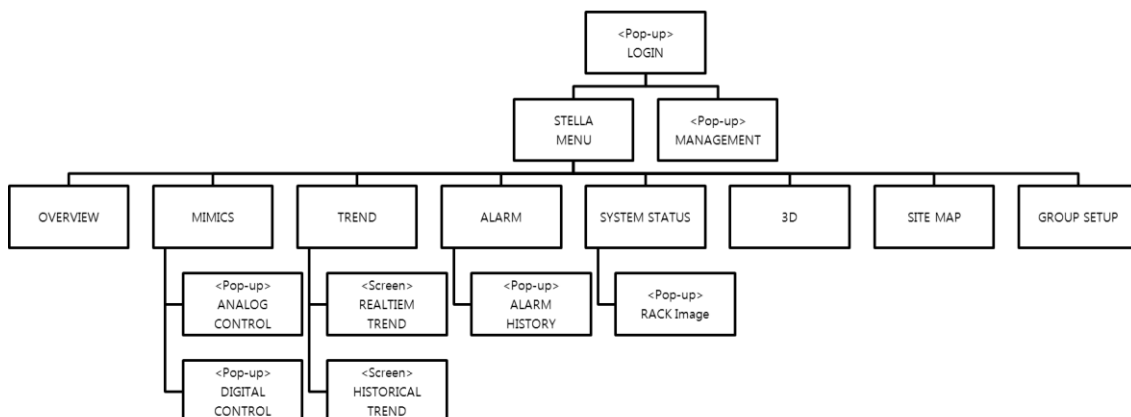


Figure 1. Overall Structure of STELLA Interfaces

However, because it is not a completed program yet, the use experience of experts was reflected instead of the corresponding users.

2.1 Content of Style Guide for Human Factors Review

As to the development method in the visual design aspect, expert's assessment was carried out targeting every screen of STELLA system. As shown in the Table 1, Screen title was classified and Assessment and Comment were drawn in respect of feature and element showing on the screen. The assessment result was reflected to the basic requirement items of the style guide.

Screen in Title	Display Elements	Detailed Attributes	Eval. Criteria and Comments
MIMIC	Pictogram	Size	
		Color	
		Mouse Over	
		representative	
	Diagram	Size	
		Color	
		Mouse Over	
		representative	
	⋮	⋮	

Table1. Items and a Form for Interface Evaluation

Though the goal was to reflect system properties through experience of actual users (Supervisor/Engineer) in the development of the information-structural aspect, there was no supervisor because the current STELLA system is not completed, so it was carried out based on expert's usability assessment on the current system. The usability assessment result reflected the functional requirement items of the style guide.

2.2 Form of Style Guide Writing

The style guide was written as the following form through the assessment method. Every design element (feature, detailed element) shown in the screen are stated in the basic requirements. Guidelines for basic requirement items were stated by referring to the documents such as NUREG-0700, 0711, EPRI. Features and subtleties in the visual design aspect were stated in basic requirements, and the information-structural aspects (function unit, operation) were stated in functional requirements. Guideline for functional requirements was stated based on the result of expert's assessment on the usability by establishing functional requirement for smooth operation of features (experiment and surveillance) of STELLA system. And this research inserted an exemplary screen into an application screen, so that it can be applied to design of programs.

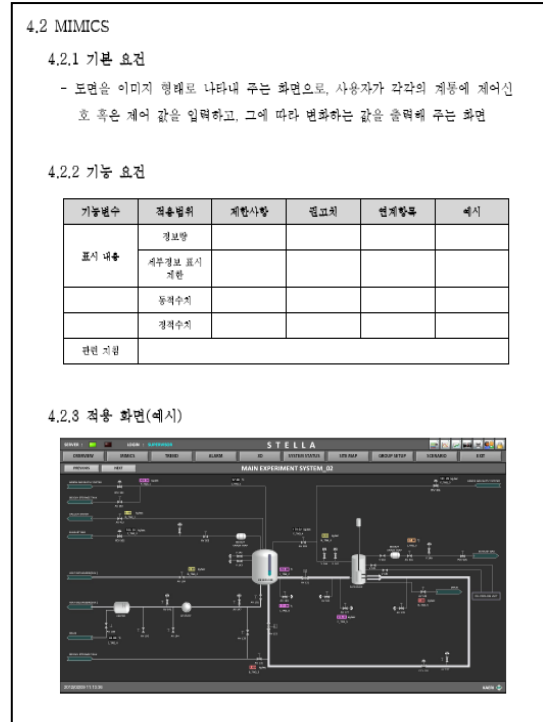


Figure 3. An Example Page of HMI Style Guides

3. Conclusion and Discussion

This research has developed a HMI style guide on the STELLA interface system by focusing on the visual design aspect and information-structural aspect. As the purpose of the STELLA system is mainly experiment and maintenance, it has importance of guideline development in the information-structural aspect, but it couldn't get accurate usability assessment result because of limitation of incomplete programs.

However, if the development research of a style guide on design and information structure like this research is applied to the HMI system to be later developed, it would be helpful to increase the performance of the users in repetitive experiments.

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