

14 October 1997

Monthly Program Progress Report

For the period from 1 August 1997 through 30 September 1997

Project: SH-60R Operator Machine Interface Enhancement (SHOMIE)

CHI Systems Project 9704

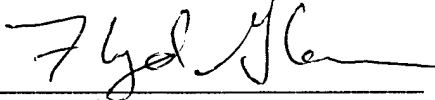
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REPORT FOR THE PERIOD 8/1/97 THROUGH 9/30/97

1. Project Abstract

A systematic approach, designated SH-60R Operator-Machine Interface Enhancement (SHOMIE), is proposed for developing decision aid enhancements to the SENSO and ATO crewstations of the SH-60R aircraft which is currently under development by the Navy. The methodology begins with determination of functional performance requirements via a technique based primarily, but not exclusively, on cognitive task analysis. Cognitive performance limitations are determined both analytically and empirically and then used to derive functional requirements for decision aid concepts to overcome the identified limitations. Relevant software and algorithmic techniques for realizing the desired functionality are then derived from an evaluation of viable candidates obtained from a taxonomic analysis of aiding technologies. Finally, the decision aid concepts are specified as structured architectural designs which are then implemented as software prototypes.

The Phase I effort will focus primarily on the SENSO crewstation because the SENSO's tasks are expected to be changed more radically than the ATO's with the introduction of new sensor information processing software. Also to restrict the scope of the effort to a manageable level and still assure operational relevance, we propose to focus on the domain of acoustic search and localization in littoral ASW missions. CHI Systems has worked extensively in this domain, having developed a variety of ASW decision aids, training tools, cognitive task analyses, and testbeds, all of which will greatly facilitate the development of the decision aids to be formulated by the SHOMIE methodology.

2. Project Status Summary

Project efforts have focused on development of an adaptive, intelligent interface aid for the SENSO based on CHI Systems' COGNET software and development methodology. A demonstration of the interface concept is being developed to illustrate the kinds of aiding that would be provided. Detailed plans and estimates for the development of the requisite cognitive models of SENSO performance are also being constructed. A project final report and Phase II proposal are also being prepared.

3. Progress During the Current Reporting Period

Work during this period consisted primarily of developing a concept of an adaptive, intelligent interface aid for the SENSO and discussing that concept with Government representatives. Meetings attended included a project review meeting with Ms. Becky Morgan and Mr. John Suarez on 28 August 1997 and an M&S HSI meeting on 5 September 1997.

Since a true working version of the proposed aid cannot be produced within the scope of the Phase I project, a demonstration mock-up of the concept is being developed in order to provide examples of the kinds of aiding that can be provided. This demonstration is being constructed using MacroMedia's Director software. It will indicate how the proposed aid will provide three different kinds of aiding (interface navigation, invocation of automated functions, and recommendations for problem solving tactics), all in response to the context of user activity.

It is clear that the proposed adaptive aid will require a substantial effort in cognitive modeling in order to provide the embedded cognitive model which is at the heart of the concept. We plan to develop that model using our COGNET methodology and software toolset. It seems unlikely that a COGNET model covering all SENSO functions could be produced within the scope of a Phase II effort, so we have begun an analysis to estimate the feasible scope of such a model -- probably something on the order of acoustic processing functions or possibly just active acoustics. We intend to develop examples of the principal components of a COGNET model of the SENSO and estimates of the effort required for full model development.

4. Problems

No new problems have arisen in this reporting period and prior problems have been resolved.

5. Plans for the Next Reporting Period

We will complete production of a demonstration mock-up of the proposed aid. A final report will be produced describing the complete project effort and a Phase II proposal will be produced describing plans and costs for implementation of the proposed adaptive, intelligent interface aid.

6. Task and Budget Status

As of 30 September 1997, 59.7% of the Phase I base period budget (\$70,000) had been expended. All planned work has been completed on Task 1 (cognitive model development), Task 2 (identification of decision making limitations), and Task 3 (define enhance OMI functionality). Approximately 50% of planned efforts have been completed on each of Task 4 (identify candidate techniques) and Task 5 (select appropriate techniques). Work has just begun on Task 7 (develop OMI enhancement architecture) and Task 8 (documentation and Phase II plans).