Applied Cognitive Task Analysis as a tool for analyzing work demands in a C4I environment: a case study using a mid-fidelity simulation

Anders Brödje[1], Johannes Prison[1], Johan Jenvald[2], & Joakim Dahlman[1]
[1]Chalmers University of Technology, Gothenburg
[2]VSL Systems AB, Linköping
Sweden

Abstract

The majority of worldwide goods transportation is carried out by ships at sea. In order to promote safety in narrow waters and around major ports, several countries have installed Vessel Traffic Services (VTS). VTS operators monitor a specific geographical area and support and direct ships that sail through the area, primarily making the navigating officer of each ship aware of the current traffic situation, local weather and geographical conditions. In this, the VTS domain represents a civilian Command, Control, Communications, Computer and Intelligence (C4I) environment. Identifying user needs and analysing user behaviour in these environments require appropriate methods that are comprehensive and valid. This paper presents an adapted use of the Applied Cognitive Task Analysis (ACTA) in a case study where an interactive mid-fidelity scenario for the phase of the Simulation Interview has been used. The use of the interactive simulation as a knowledge eliciting tool within the context of ACTA is discussed and assessed using Hoffman's method evaluation criteria.

Introduction

Within the maritime domain, Vessel Traffic Service (VTS) is one of the measures taken, primarily from authorities, in order to mitigate risks of maritime accidents within a set geographic area, normally in confined waters (IALA, 2008). In designing the next generation decision support systems for this domain, it is of essence to understand cognitive demands on operators rendering the service of VTS. Using available sensors, decision support tools, means of communication and database functions, Vessel Traffic Service Operators (VTSOs) are responsible for monitoring and interacting with vessels, the main objective being to aid the navigating officers on-board vessels within a VTS-area to navigate as safely and efficiently as possible (Brodje et al., 2010). In this respect, VTS represents a complex dynamic environment and is a civilian example of a C4I setting (Command, Control, Communications, Computer and Intelligence, Walker et al., 2005; Salmon et al., 2006; Walker et al., 2006).