

Plenary Discussion Notes – Session 8

Naval Application

Morton Grandt of the Research Institute for Communication, Information Processing and Ergonomics in Germany presented new concepts for the human machine interface to command control systems for anti-air warfare. The goal is to provide cognitive support enabling faster responses required by the fast pace of modern warfare. The most unusual feature of this interface is a graphic polygon summarizing the features that are used in threat assessment. The shape of the polygon enables classification at a single glance.

Annette Kaster of the Research Institute for Communication, Information Processing and Ergonomics in Germany presented a paper about a new approach for supporting ship operators in adjusting the parameters of semi-automated combat direction systems. The total combat system comprises sensor control, sensor data fusion, identification/classification, threat analysis, engagement planning, engagement preparation and engagement execution, and kill assessment. The individual processes can be modified by setting operational parameters. The operator interface presents logical groupings of information, rules and parameters with flow-chart-like graphics revealing which parameters can be modified by the operator at that point. The modifiable parameters are shown by green vs. red symbols that differ in graphic details as well.

Thomas Porathe of Malardalen University in Sweden presented a new system for visualising the decision space for ship manoeuvrability. Based on hydrodynamic models, this system shows which future positions it is possible to reach with steering control at the present moment, as well as predicting where the ship will be if it continues without course corrections. This was illustrated with an explanation of what happened in the Exxon Valdez incident when a turn was not taken at the time planned, and attempted corrections came too late to avoid running aground.

DISCUSSION

In relation to Grandt's presentation, it was pointed out that Prof. Sandra Marshall of San Diego State University, in collaboration with researchers at the U.S. Navy's SPAWARSYSCEN lab, has done hybrid computational modelling of the behaviour of AEGIS anti-air-warfare teams. This research found that experienced teams differed in their use of features to identify possibly threatening tracks. This could have implications for the design of the summary polygon display.

It was pointed out Kaster's display seemed to rely heavily on green and red color coding but that a not insignificant percentage of the male population is red-green colorblind. However, another contributor to the discussion pointed out that this information was also coded in the graphic appearance of the symbols. Another characteristic of the displays also provoked some comment. Sometimes a parameter is shown as modifiable but not modifiable in the particular display. Operators might find this annoying. Kaster responded that this occurs because of the hierarchical structure of the system and the corresponding displays. This informs operators of the interactions among adjustments made at different levels of the system hierarchy. Further discussion established that, although several officers can view the displays, only one is empowered to make changes in parameter values. Another point that came out is that this is a web-based implementation on an intranet, which means that its operation will be familiar to most users.

In relation to Porathe's presentation, it was pointed out that the U.S. Navy has two virtual reality training systems already in use, COVE (conning officer's virtual environment) and VE-SUB, used to rehearse the process of bringing a submarine into harbour, that might be used to evaluate the utility of this visualisation. The visualisation might also be of interest as an enhancement to these training environments.

