

12TH ICCRTS: “Adapting C2 to the 21st Century”

Paper Title: Design for Submarine Command and Control in the 21st Century

Sam Huf and Thanh Ly, DSTO; and Peter Henley, Curtin University

Point of Contact: Sam Huf

Defence Science and Technology Organisation, Australia

A51, HMAS Stirling, Western Australia, Australia, 6958

Telephone: +61 8 95533571

E-mail : Samuel.huf@dsto.defence.gov.au

Abstract

Researcher / practitioners at Australia’s Defence Science and Technology Organisation (DSTO) are endeavouring to extend the capability of future submarine combat systems. The central pillar of this work is to enable Australia’s future submariners to excel in more complex environments (shallow water and high contact density) and networked operations. Command focused information display and automation will help commanders utilize the increased information. To this end, a multidisciplinary analysis, design and development project has been established. The team’s approach has been to initially step aside from technology push to return to the fundamental principles of submarine command and control, that is, the tactical decision-making of the commander. A Cognitive Systems Engineering method named Control Task Analysis has yielded a detailed set of both information and knowledge processing requirements. From these requirements, several information design prototypes have been proposed that make use of Ecological Interface Design principles from within the Cognitive Work Analysis methodology. The designs are proving useful by consolidating our understanding of undersea command and control in a pragmatic way. Moreover, the prototypes provide a requirements push for science and technology based on advancing the information processing capacity of the decision maker. The paper will summarise work to date, demonstrate prototype designs and discuss progression of the designs toward workable prototype evaluation.

Paper outline:

- Command and control issues in the conventional submarine domain will be described
- Cognitive Work Analysis will be defined
- A work domain analysis will be presented laying out an abstraction hierarchy of C2 priorities and their relation to both to the physical systems and environmental constraints bounding submarine activities
- A Control Task analysis of C2 activities will be presented identifying example information requirements
- Information designs will be posed and explained

- Example working prototype C2 concepts will be demonstrated
- A critical assessment of work to date will be engaged