

Assessing Command and Control System Vulnerabilities in Underdeveloped, Degraded and Denied Operational Environments

Rudolph Oosthuizen

(PhD student, University of Pretoria, CSIR, South Africa; roosthuizen@csir.co.za)

Leon Pretorius

(Professor, University of Pretoria, South Africa; Leon.Pretorius@up.ac.za)

Rudolph Oosthuizen

(CSIR, South Africa; roosthuizen@csir.co.za)

Abstract

Command and Control (C2) is a complex sociotechnical system. Humans, being part of the C2 system, make sense of the situation to support decision making. Communication technology distributes information and orders within a social (organisational) context. In underdeveloped, degraded or denied operational environments, some technical support systems may fail or not be available to a commander to successfully conduct operations. The effect of the degraded or denied technical capabilities on work may not always be clearly understood within the setting of a complex sociotechnical system. Humans may have the ability to develop work-around strategies to accomplish a task in the absence of some technical supports. Cognitive Work Analysis (CWA), and specifically the Work Domain Analysis (WDA) with Abstraction-Decomposition Space (ADS), provides a framework to analyse the effect of loss of technical (physical) means on the success of the total mission. These constructs can be used in System Dynamics modelling and simulation to compare the effect of different approaches. The knowledge gained from this process may serve as input to design and development of C2 systems capable of operating in adverse conditions.