12th ICCRTS
Adapting C2 to the 21st Century

Paper Title: Engineering Complex Human-Technological Work Systems – A Sensemaking Approach

Topics: (1) Modeling & Simulation, (2) Cognitive & Social Issues, (3) Organizational Issues

Authors: Dennis K. Leedom (Evidence Based Research, Inc)
Robert G. Eggleston (Air Force Research Laboratory, AFRL/HEC)
Celestine A. Ntuen (North Carolina A&T State University)

Contact: Dennis K. Leedom, Ph.D.
Evidence Based Research, Inc.
1595 Spring Hill Road Ste 250
Vienna, Virginia 22182
(512) 869-1658
dkl-texas@suddenlink.net

Abstract

The paper introduces the essential features of an integrated framework for analyzing and designing complex human-technological work systems –one that is more fully developed and illustrated with case studies in a forthcoming book to be published by John Wiley & Sons. Adopting a sensemaking paradigm, the approach draws together current theory regarding the cognitive, social, ecological, and technological functioning of such systems and provides practical ways of analytically investigating the complex interaction of these dimensions in a holistic and rigorous manner. The paper guides the reader on a journey across several dimensions and levels of analysis associated with complex human-technological work systems. Along the way, the authors identify key performance issues inherently associated with the "softer" elements of integrating human expertise and judgment with information systems technology to dynamically construct situation understanding and to provide a framework for organizational decision making. Spanning the gap between the more qualitative theories of the behavioral and social sciences and the more analytic practices of systems engineering, the authors illustrate how these performance issues can be attached and investigated in a systematic and rigorous manner.