12th ICCRTS
"Adapting C2 to the 21st Century"

Red Force Interaction in Situated Cognition

Suggested tracks:
Modeling and Simulation
Cognitive and Social Issues
C2 Metrics and Assessment

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Abstract

Efforts to maximize the impact of network centric warfare (NCW) rely upon the effective integration of human and technological agents. Combat and command and control models must represent the entirety of a network-centric organization, including both humans and non-human components which comprise any complex system. The Dynamic Model of Situated Cognition (DMSC) was introduced by Miller and Shattuck in 2003 as a tool to help analyze this kind of complex system. The model has been applied in a variety of contexts to analyze military command and control and extended and applied to areas broader than its original use. This paper proposes to extend the model by explicitly adding red force cognitive processes. With the addition of red forces, aspects of information warfare can be modeled. This includes actions against an enemy's sensors and communications networks intended to reduce the quality of his information position and to disrupt the interaction between human and non-human elements of his command structure. Potential applications for the extension are proposed, including analyzing the effectiveness of 21st Century information operations against an enemy in both traditional and non-traditional conflicts.

Outline

1. Introduction
   a. Background
   b. Motivation and purpose

2. Review of current model
   a. Basic model – ovals of data & perception and lenses that affect perception
   b. Feedback loops show commander's direction on management of physical assets, sensors, communication systems, etc
   c. Team interaction – some lenses are shared while others are not

3. Proposed extension
   a. Explicitly show red force C2 processes as "mirroring" those of blue force
   b. Some ovals are shared and some are not - why
   c. Discussion of what red's ovals represent
   d. Include the same basic extensions – feedback loops and team interaction

4. Implications of including red forces
   a. Discussion of the quality of information and the quality of interaction in the C2 process (as background)
   b. Blue's goal is to reduce the quality of red's information and the quality of red forces interaction – show this with arrows from blue's side to red's ovals and lenses
   c. Implication or "mapping" of traditional electronic warfare and information operations
   d. Team interaction and preventing that interaction
   e. Human actors within red's lenses

5. Potential applications
   a. Model how degradations in red's information flow and decision-making affect the outcome of conflicts
   b. Explore the nature of "self-synchronized" information operations
   c. Discuss metrics for information-based EBO. That is, how much is a pound of EW or IO worth?

6. Conclusion
   a. Summary
   b. Potential shortfalls and weaknesses
   c. Next steps