Abstract submitted to the organization of the

12th ICCRTS – June 2007 – Newport, RI, USA
"ADAPTING C2 TO THE 21ST CENTURY"

Awareness and problem solving: knowledge computation between codification and abstraction

Dr David W. VERSAILLES
Research Center of the French Air Force

&

Pr Catherine THOMAS
University of Metz, France & GREDEG/RODIGE (UMR 6227 CNRS)

Contact and corresponding author:

Lt-Col Dr David W Versailles
CReA – Centre de recherche de l'Armée de l'air
Research Center of the French Air Force
French Air Force base 701
13661 Salon Air
France
tel (office): +33 (0)4 90 17 83 30
cell phone: +33 (0)6 09 52 54 56
fax (office): +33 (0)4 90 17 81 89 (new!!)
eMail: dversailles@cr-ea.net

Topics:
Track 4 – Cognitive and social issues
Track 8 – C2 technologies and systems
Track 2 – Networks and networking

In this contribution we will elaborate on the interpretation of awareness on the basis of the asymmetry between information and knowledge. We will sketch the main elements associated to the implementation of knowledge computation in the C2 cycle on the basis of the aspects associated to knowledge assets codification and contextualization.

The networking and computational capabilities available at all levels of the military systems on a battlefield and in the C2 chain have come to a turning point where the creation, formalization, and distribution of information may be integrated into problem solving features. Our purpose clearly demarcates information sharing from knowledge sharing. Knowledge results from the interpretation of a proposition regarding a subject in a given context; knowledge truth-status is related to trial and errors processes confronting hypotheses to reality. Opportunities associated to the new computational capabilities associated to the various nodes of the Command and control network do not only refer to information sharing and to the corresponding information transfer mechanisms (such as the OODA loop). Our purpose in this contribution relates to the knowledge-based mechanisms.

Efficiency in command intent transmission refers to the mobilization of information databases, understood here as a set of common references pushed into the system or picked up at specific times by the various actors. Awareness accommodates a wide range of activities and handles different timescales and different command levels. Various people committed to the same situational problem will react according to their own perspectives on the situation, which spans the perception of elements in the environment, the comprehension of their meaning and the projection of their status in the next future.
Current research on the knowledge management has brought specific tools useful for grasping at the same time the nuances of interaction as regard knowledge codification and abstraction from a specific context. We want to apply these tools to C2 interaction. Both codification and abstraction associate the problem situation to ‘sticky’ purposes. The analysis of codification goes deeper into the relevance of the code for the final purpose of the decision program. The abstraction level refers to the structure of the phenomenon to be considered. Our analysis of shared awareness will consequently both refer to code(s) and context sharing. The preparation of action will then depend on generic references and problem solving generators worth because they are connected both to the reality of the missions and to the subtle details of command intent. This contribution will focus on the main aspects of awareness (whatever shared, situational, local, global, transitory, etc). It will inquire the articulation of the basic characteristics of knowledge assets production with real-time processing (or computation) and simulate the benefits of such an evolution onto the description of recent operations.