Towards Novel Concepts for Collaboration in International Disaster Response

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Introduction

Today's modern disaster response and security systems have to cope with plentiful challenges. On one side the democratic western states have the pressure to reduce costs and to increase the efficiency of their organizations. On the other side people expect higher levels of service for example in medical response. To increase the complicatedness of the situation, the whole security architecture in Europe has changed over the last 20 years. Terroristic and locally limited attacks, biological threads as epidemics, demographic changes and increasing migration problems, proliferation, the ongoing rareness of resources and the increasing influence of organized crime are our days the main threats in Europe and much more probable than large scale war scenarios. Thus the security organizations within Europe's states have to increase their efforts in working together and in building viable security networks. Interoperability is a major issue as well as the design of inter-organizational Command & Control (C2) structure respectively management processes and governance structures and inter-organizational collaboration models. Today a solid security network architecture within a modern state where police, armed forces, fire brigades and Non-Governmental Organizations (NGOs) just to mention some organizations work together in cases of disaster, is paramount today. In this abstract we review approaches of the German Armed Forces (Bundeswehr), the novel doctrine of Network Centric Operations (NCO), a model of a NATO-RTO-SAS working group to explore the design of future solid security network architectures.

Concept Development & Experimentation – A Method for Answers

The Bundeswehr is– as most of the modern western armed forces – in a continuous, adaptive process of innovation with the goal to increase sustainably the mission's fitness. This process is called Transformation (BMVg 2004). One fundamental method to find, test and implement innovations for Transformation is Concept Development & Experimentation (CD&E) (BMVg 2004).

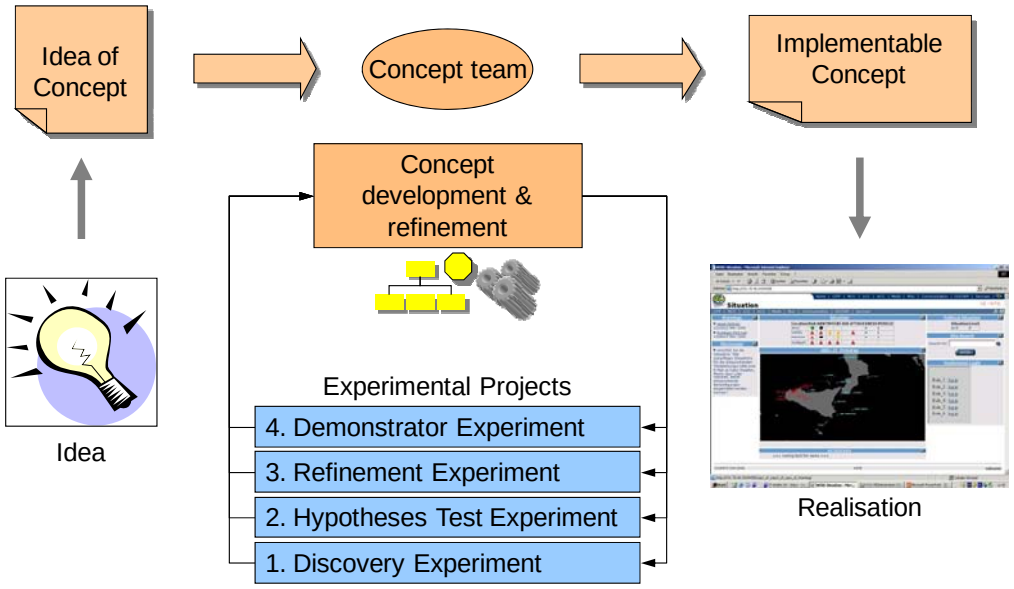

Figure 1: The process of CD&E

CD&E is a well defined method with the underlying process depicted by Figure 1. The idea is that every person (not only military personnel) can submit an idea. This can be a change request or a new idea for material or a new idea for concepts of leadership – all innovations imaginable. These ideas are collected in a department in the German Ministry of Defense (BMVg). If the idea is worthwhile, then military and civil experts in a concept team, established for this particular idea, create a first idea of concept. To test and refine the concept, different forms of experimental efforts can be conducted. In early stages of the CD&E process when it is not quite clear how the concept might look, a discovery experiment can help to explore new ideas for the concept by observing the first concept ideas in experiment – a very qualitative, exploratory approach. After refinements and the involvement of new ideas in the concept it might be possible to formulate clear and verifiable hypotheses and to plan and conduct hypotheses test experiments – a quantitative, confirmatory approach. When the concept is mature enough then a demonstrator experiment can prototypically show the usefulness and appropriateness of the new concept. When the demonstration of the concept was successful then it can be implemented into the organization. The implementation might be a long process again, when it is necessary to change the mindset or cultural aspects of the organization. It might also be the case that the implementation is very cost intensive and it might take for long again. Thus the CD&E method focuses on disruptive rather than incremental innovations.
Beneath national CD&E projects the Bundeswehr does participate in international CD&E projects as well. The Multinational Experiment 5 (MNE 5) series develops a concept for a comprehensive planning approach for future stabilization missions. This approach combines the planners of the military, other governmental organizations and NGOs – the collaboration between governmental organizations and NGOs is one of the core concepts to be designed or reviewed within this experiment series and crucial for future disaster response operations as well.

Network Centric Operations – The Challenge for the 21st Century

The concept of NCO takes into account the revolutionary new possibilities for information networking and its impact on decision making and effectiveness on the military theater. The concept builds on the idea of an interoperable information and communication network connecting all relevant sensors, effectors and decision making personnel in a new organizational form to integrate reconnaissance, decision making and effect (Figure 2). The capability for NCO is one key element of Transformation (BMVg 2004).

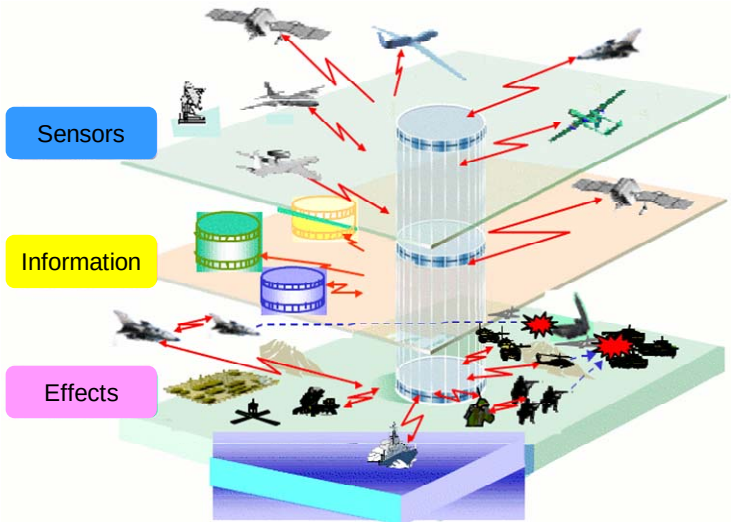

Figure 2: A network of sensors and effectors combined by information-flows

NCO has more than a technical perspective. Figure 3 shows the hypothetical value chain behind the concept of NCO. Especially the cognitive and social domain is a challenge to describe and to change. NCO calls for a mutual operational picture on the on-demand-basis. The awareness of the situation and what is going on in the operation is crucial to assess the options of action within a common plan to respond efficiently especially in a disaster. Thus all organizations involved have to be part in a

networked disaster response system. The C2 processes are of special interest in a system of networked disaster response organizations. The NATO-RTO-SAS 065 working group develops a model to assess C2 maturity and to support the transition towards higher inter-organizational collaboration capabilities.

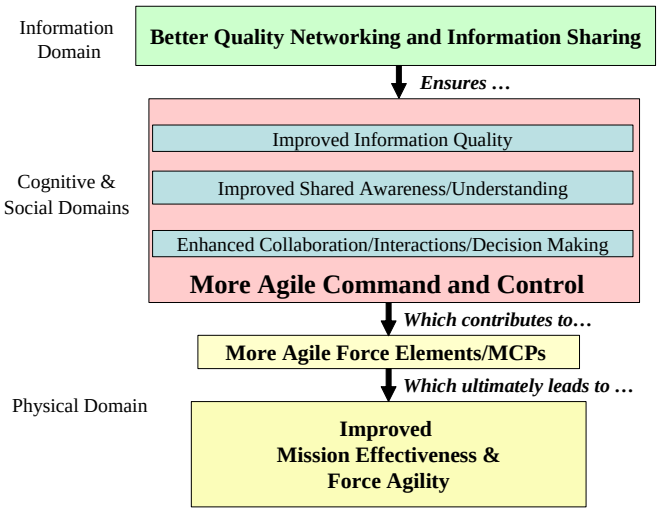

Figure 3: The Value Chain of NCO (Garstka and Alberts, 2004)

NATO Network Enabled Capabilities Command & Control Maturity Model (N2C2M2)

Figure 4 depicts the C2 approach space and the C2 maturity-levels as defined by NATO-RTO-SAS-065 working group in which the authors are active members. The inherent hypothesis behind that model is that different operational environments with different levels of complexity and dynamics require different C2 approaches. These C2 approaches are defined by three complex variables:

- distribution of information among participants,
- patterns of interaction among entities and
- allocation of decision rights in the collective.

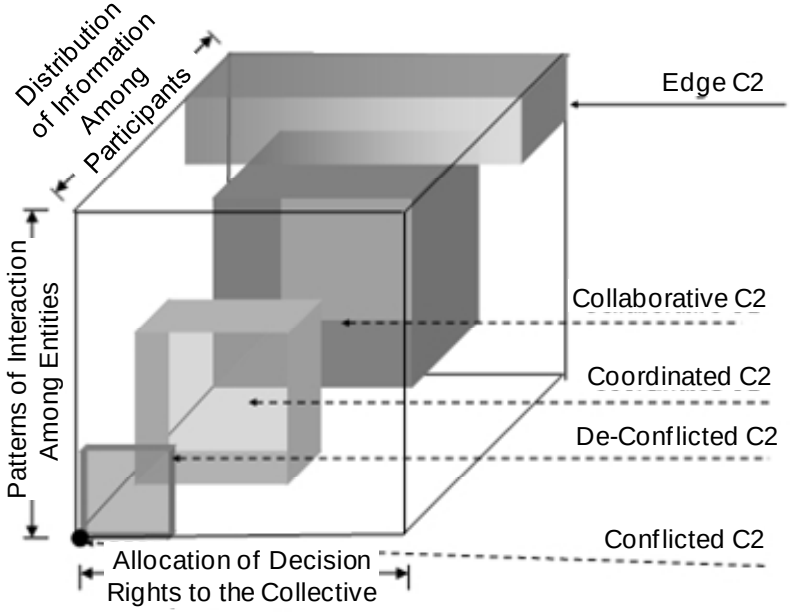

Figure 4: The C2 approach space (according to Alberts and Hayes, 2007, pp 169 and Alberts, Huber, Moffat et al. 2008)

The model helps to assess the cooperation efforts between different organizations in a complex endeavor (Alberts and Hayes, 2007). Beneath the support of C2 assessment of organizations involved in an operation the N2C2M2 will help to find capability gaps and to define the process of force development. During the analytical development of the model, its hypotheses, its transition requirements necessary to transform from one level to the other and a collection of variables defining the three above mentioned complex variables the model was validated with numerous case studies of complex endeavors. Among other endeavors also disasters like the Indian Ocean Tsunami, the hurricane Katrina and the Pakistan Earthquake were analyzed to find support for the model. The author conducted a case study about the Elbe flood in Germany in 2002.

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