



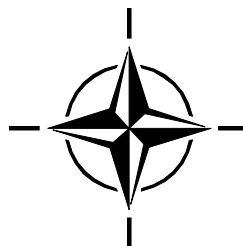
**RTO MEETING PROCEEDINGS MP-117**

**SAS-039**

# **Analysis of the Military Effectiveness of Future C2 Concepts and Systems**

(Analyse de l'efficacité militaire des  
concepts et systèmes C2 du futur)

Papers presented at the RTO Studies, Analysis and Simulation Panel (SAS)  
Symposium held at NC3A, The Hague, The Netherlands, 23-25 April 2002.



Published December 2003

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RTO reports both to the Military Committee of NATO and to the Conference of National Armament Directors. It comprises a Research and Technology Board (RTB) as the highest level of national representation and the Research and Technology Agency (RTA), a dedicated staff with its headquarters in Neuilly, near Paris, France. In order to facilitate contacts with the military users and other NATO activities, a small part of the RTA staff is located in NATO Headquarters in Brussels. The Brussels staff also co-ordinates RTO's co-operation with nations in Middle and Eastern Europe, to which RTO attaches particular importance especially as working together in the field of research is one of the more promising areas of co-operation.

The total spectrum of R&T activities is covered by the following 7 bodies:

- AVT Applied Vehicle Technology Panel
- HFM Human Factors and Medicine Panel
- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS Studies, Analysis and Simulation Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

These bodies are made up of national representatives as well as generally recognised 'world class' scientists. They also provide a communication link to military users and other NATO bodies. RTO's scientific and technological work is carried out by Technical Teams, created for specific activities and with a specific duration. Such Technical Teams can organise workshops, symposia, field trials, lecture series and training courses. An important function of these Technical Teams is to ensure the continuity of the expert networks.

RTO builds upon earlier co-operation in defence research and technology as set-up under the Advisory Group for Aerospace Research and Development (AGARD) and the Defence Research Group (DRG). AGARD and the DRG share common roots in that they were both established at the initiative of Dr Theodore von Kármán, a leading aerospace scientist, who early on recognised the importance of scientific support for the Allied Armed Forces. RTO is capitalising on these common roots in order to provide the Alliance and the NATO nations with a strong scientific and technological basis that will guarantee a solid base for the future.

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# **Analysis of the Military Effectiveness of Future C2 Concepts and Systems**

**(RTO MP-117 / SAS-039)**

## **Executive Summary**

In 1998 The North Atlantic Treaty Organisation (NATO) published a Code of Best Practice (COBP) for Assessing C2, authored by SAS-002, which covered analysis of C2 at the ground forces tactical level in mid to high intensity conflicts. The inherent complexity of C2 (which involves both the information and cognitive domains), has presented the assessment community with challenges that are less well researched and understood and with a tool kit that is clearly lacking. The 1998 COBP, therefore, is being expanded by SAS-026 to help C2 analysts and decision makers deal with these new Information Age assessment challenges so that they can improve their ability to take on analyses of requirements, analyses of alternatives, research on new C2 concepts and capabilities, and support real world operations.

SAS-039 has been commissioned by NATO to conduct a formal review of the revised and extended COBP, and to review current analyses that demonstrate best practices in C2 analyses among member countries. The following materials contain both discussions of the revised and extended COBP, as well as best practices in current C2 analyses. In order to expand the COBP to reflect the full range and complexity of C2, SAS-039 solicited papers on the following topics:

- Operations Other Than War (OOTW)
- Novel Command and Control Arrangements
- Information Superiority Concepts
- Network Centric Concepts
- Distributed/Adaptive C2 Approaches
- Treatment of Cognitive Factors
- The Use of Experimentation

# **Analyse de l'efficacité militaire des concepts et systèmes C2 du futur**

**(RTO MP-117 / SAS-039)**

## **Synthèse**

En 1998, l'Organisation du Traité de l'Atlantique Nord (OTAN) a publié un code des meilleures pratiques (COBP) pour l'évaluation du C2. Etabli par le groupe SAS-002, ce document concernait l'analyse du C2 des forces terrestres au niveau tactique, dans le cadre de conflits de moyenne à forte intensité. La complexité propre au C2 (qui touche à la fois aux domaines de l'information et de la cognition), a mis les évaluateurs devant une tâche qui n'a pas été bien maîtrisée ni sur le plan de la recherche ni sur celui de la compréhension et pour laquelle il y a eu un réel manque d'outils. Par conséquent, le groupe SAS-026 est en cours d'étoffer le COBP pour 1998, afin d'aider les analystes et les décideurs en matière de C2 à faire face aux nouveaux défis de l'ère de l'information liés à l'évaluation, afin de leur permettre d'améliorer leur capacité à analyser les besoins et les options possibles, à mener des recherches sur de nouveaux concepts et capacités C2, et à soutenir des opérations en situation réelle.

L'OTAN a chargé le groupe SAS-039 de procéder à un examen officiel de la nouvelle version élargie du COBP et de passer en revue les études en cours des meilleures pratiques adoptées pour les analyses du C2 dans les pays membres. Les éléments qui suivent rendent compte des discussions sur la nouvelle version élargie du COBP ainsi que des meilleures pratiques en matière d'analyses du C2. Pour que cette nouvelle version reflète l'éventail complet du C2 et toute sa complexité, le groupe SAS-039 a demandé des documents sur les sujets suivants :

- opérations autres que celles de guerre (OAQG)
- nouvelles dispositions de commandement et contrôle
- concepts de supériorité de l'information
- concepts réseaucentriques
- approches C2 réparties/adaptatives
- traitement des facteurs cognitifs
- recours à l'expérimentation

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Evaluation	OOTW (Operation Other Than War)	Risk management	
Force structure planning			
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<p>In 1998 The North Atlantic Treaty Organisation (NATO) published a Code of Best Practice for Assessing C2 (COBP), authored by SAS-002, which covered analysis of C2 at the ground forces tactical level in mid to high intensity conflicts. This 1998 COBP is being expanded by SAS-026 to address the broader spectrum of current C2 issues, including operations other than war, peacekeeping missions, cognitive factors, risk management, network centric concepts, and novel C2 arrangements. The documents contained in this publication discuss the extensions and revisions to the 1998 COBP, and provide best practices examples of current C2 analysis being conducted in member countries.</p>			

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