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RTO MEETING PROCEEDINGS 64

Information Management Challenges in Achieving Coalition Interoperability

(les Défis de la gestion de l'information dans la mise en œuvre de l'interopérabilité au sein d'une coalition)

Papers presented at the RTO Information Systems Technology Panel (IST) Symposium held in Quebec, Canada, 28-30 May 2001.

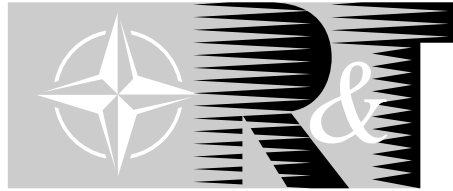


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- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS Studies, Analysis and Simulation Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

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Published December 2001

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ISBN 92-837-1078-9



Printed by St. Joseph Ottawa/Hull
(A St. Joseph Corporation Company)
45 Sacré-Cœur Blvd., Hull (Québec), Canada J8X 1C6

Information Management Challenges in Achieving Coalition Interoperability

(RTO MP-064 / IST-022)

Executive Summary

Coalition interoperability is essential for coalition to have meaning. The information used by any coalition must be understood by all who need it, and the information must be effectively managed. With the expansion of NATO membership, and the peacekeeping roles now being undertaken by NATO it is evident that national defence systems must be capable of effectively inter-operating at many levels, and for a wide variety of purposes. This is not yet the case within NATO.

SYMPOSIUM

The three days of the symposium included 25 papers and an opening keynote presentation. The keynote speaker, Admiral Dyer of the US Navy, presented a challenging review of US approaches being taken to achieving information superiority and interoperability in his paper *Coalition Interoperability in an Information Centric Future*. A further paper from the US examining *Key Concepts for Information Superiority* also set the stage for many of the ideas and issues to be faced.

The symposium sessions were:

- Architectures And Standards: Fundamental Issues
This session examined standards strategies, the use of meta-standards for information management, and codes of practice. It is clear that the status of standards for information management environments are still in need of substantial research.
- Information Management
This is a major problem for coalition interoperability. Papers examined the use of ontologies and natural language for information management. The use of ontologies grounds the IM subject in the wider one of linguistics, and appears to offer much potential for alleviating NATO information interoperability problems.
- Mobile Software Technologies
The use of agents for achieving adaptable coalition systems and the use of mobile interoperation standards such as JINI were described. Again this is a technical area that is likely to be exploited by the military for deployed operations.
- Interoperability Procedures And Practice
The importance of interoperability testing, and the requirements to be imposed on COTS elements and standard were described and reviewed.
- Coalition Common Operating Picture
Common pictures are a prerequisite to effective interoperability and three papers in this session addressed the issues of data fusion and systematic methods for COP construction and dissemination.

The conference provided some important insights into the problems of interoperability. The need for a strong relationship between the ambitions of information superiority and interoperability across similar systems and between communications and information systems was stressed. Some valuable emergent properties of the concepts, architecture and standards approaches for the next generation of systems were evident from the collection of papers presented, and the resultant discussions.

les Défis de la gestion de l'information dans la mise en œuvre de l'interopérabilité au sein d'une coalition

(RTO MP-064 / IST-022)

Synthèse

L'interopérabilité d'une coalition est une qualité essentielle car elle lui donne tout son sens. Les informations utilisées par toute coalition doivent être comprises par tous ceux qui en ont besoin, et doivent être gérées de manière efficace. Compte tenu de l'agrandissement de l'OTAN, et des missions de maintien de la paix qui lui sont actuellement confiées, il apparaît évident que les différents systèmes de défense nationaux doivent être capables d'interopérer efficacement à de nombreux niveaux, et pour une large variété d'objectifs. Or, ceci n'est pas encore le cas au sein de l'OTAN.

SYMPOSIUM

Les trois journées du symposium ont permis de présenter 25 communications et une présentation d'ouverture. Le conférencier principal, l'Amiral Dyer de l'US Navy, a effectué une présentation ambitieuse des méthodes US adoptées pour atteindre une certaine supériorité en matière d'information et d'interopérabilité, dans sa communication intitulée: *L'interopérabilité au sein d'une coalition dans un monde futur axé sur l'information*. Une communication ultérieure des Etats-Unis, sur *Les concepts clés de la supériorité de l'information*, a évoqué aussi de nombreux concepts et problèmes prévisibles.

Les sessions du symposium étaient les suivantes:

- Architectures et Normes: Questions fondamentales
Cette session a examiné les stratégies en matière de normes, l'utilisation des meta-normes pour la gestion de l'information, et les codes de déontologie. Il est apparu clairement que des travaux de recherche importants restent nécessaires dans le domaine des normes pour les environnements de gestion de l'information.
- Gestion de l'information
Ce sujet représente un problème majeur pour l'interopérabilité au sein d'une coalition. Les communications ont porté sur l'utilisation d'ontologies et du langage naturel pour la gestion de l'information. L'utilisation d'ontologies a placé le sujet de la gestion de l'information dans le contexte plus large de la linguistique et semble offrir un potentiel plus important pour résoudre les problèmes d'interopérabilité de l'information de l'OTAN.
- Technologies de logiciels mobiles
L'utilisation d'agents pour la réalisation de systèmes de coalition adaptables et l'utilisation de normes d'interopération mobile comme JINI ont été décrites au cours de cette session. Il s'agit, encore une fois, d'un domaine technique susceptible d'être exploité par les militaires lors d'opérations de déploiement.
- Procédures et techniques d'interopérabilité
L'importance des essais d'interopérabilité et les conditions exigées pour les normes et les éléments COTS ont été décrits et examinés lors de cette session.
- Modèle opérationnel commun pour une coalition
Les modèles opérationnels communs (COP) sont une condition préalable à une interopérabilité efficace et trois communications de cette session ont abordé les questions de fusionnement de données et de méthodes systématiques pour la construction et la diffusion des COP.

La conférence a permis d'apporter des éclairages importants sur les problèmes d'interopérabilité. La nécessité d'une relation forte entre les ambitions d'interopérabilité et celles de supériorité de l'information sur des systèmes identiques et entre les systèmes de communication et d'information a été soulignée. Des approches intéressantes des concepts, des architectures et des normes de la prochaine génération de systèmes ont été mises en évidence dans l'ensemble des communications et des discussions qui en ont résulté.

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Theme

Since the Gulf war, NATO nations have been involved in active coalition operations. In planning future C4I systems, coalition interoperability has always taken second place to national priorities. There is increasing recognition, especially amongst European NATO nations, that the majority of military operations must be conducted in coalition terms. This places new and more important requirements on the interoperability needed for such operations. In particular interoperability is a problem where coalition countries have different levels of technological advancement within their command and control systems. This raises the need to establish as widely as possible the 'lowest common denominator' which represents the interoperability baseline within that coalition.

Interoperability of C4I systems is fundamentally important for the conduct of coalition operations. The recent addition of new European partners within the alliance serves as a reminder of how difficult it is to predict who our partners will be within the next coalition. An overall coalition plan is needed that provides coalition interoperability plans for command, control, and communications systems, i.e. a secure coalition interoperability framework. This framework should cover NATO needs for interoperability plans effective in three broad time periods: present day, short-term, long-term. This symposium will address NATO interests and issues in developing such an information management framework – a crucial step toward achieving coalition C4I interoperability.

TOPICS TO BE COVERED:

- 1) Maintaining secure interoperability
- 2) Command system interfaces:
 - 2a) Information, data and service description languages
 - 2b) Information and service exchange mechanisms
 - 2c) Structures for information and system management
 - 2d) Management interoperability gateways
- 3) Coalition common operating picture
- 4) Communications interoperability
- 5) Command system adaptability/management with low performance communications

Thème

Depuis la guerre du Golfe, les pays de l'OTAN sont régulièrement engagés dans des opérations menées en coalition. L'interopérabilité au sein d'une coalition a toujours été considérée comme un élément secondaire de la planification des futurs systèmes C4I, qui a toujours privilégié les priorités nationales. Or, il est de plus en plus admis, et surtout par les pays européens de l'OTAN, que la plupart des opérations militaires seront désormais conduites au sein d'une coalition. Ceci augmente et crée de nouveaux besoins en matière d'interopérabilité pour ces opérations. L'interopérabilité pose un problème particulier si les systèmes de commandement et contrôle des différents pays d'une coalition accusent des niveaux de développement technologique différents. Il s'ensuit qu'il est nécessaire d'établir d'un commun accord le "plus petit dénominateur commun", qui représentera l'élément de base de l'interopérabilité au sein d'une telle coalition.

L'interopérabilité des systèmes C4I est d'une importance fondamentale pour la conduite d'opérations au sein d'une coalition. L'arrivée récente de nouveaux partenaires européens au sein de l'Alliance nous rappelle à quel point il est difficile de faire des prévisions sur l'identité de nos partenaires dans de futures coalitions. La nécessité se fait donc sentir d'un plan global pour les opérations en coalition comprenant des schémas d'interopérabilité pour les systèmes de commandement, contrôle et communications, c'est-à-dire d'une organisation sécurisée pour l'interopérabilité au sein de la coalition. Ce cadre doit couvrir les besoins de l'OTAN en matière de schémas d'interopérabilité sur trois grandes périodes temporelles, à savoir le présent, le court terme et le long terme. Ce symposium examinera les intérêts et les enjeux pour l'OTAN du développement d'un tel cadre de gestion de l'information, qui représente une étape critique vers l'obtention de l'interopérabilité C4I au sein d'une coalition.

SUJETS À EXAMINER :

- 1) Le maintien d'une interopérabilité sécurisée
- 2) Les interfaces des systèmes de commandement :
 - 2a) L'information, les données, et les langages de description des forces armées
 - 2b) Les mécanismes
 - 2c) Les structures pour la gestion de l'information et des systèmes
 - 2d) Les passerelles de gestion de l'interopérabilité
- 3) La description des opérations communes au sein d'une coalition
- 4) L'interopérabilité des communications
- 5) La gestion/l'adaptabilité des systèmes de commandement dotés de communications de qualité médiocre

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ACKNOWLEDGEMENTS/REMERCIEMENTS

The IST Panel wishes to express its thanks to the RTB members from Canada for the invitation to hold this Symposium in Quebec and for the facilities and personnel which made the Symposium possible.

Les membres de la commission IST remercient les membres du RTB du Canada pour leur invitation à tenir cette réunion à Québec ainsi que pour les installations et le personnel mis à disposition.

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REPORT DOCUMENTATION PAGE

| | | | | | |
|--|---|---|---|---|---|
| 1. Recipient's Reference | 2. Originator's References RTO-MP-064 AC/323(IST-022)TP/11 | 3. Further Reference ISBN 92-837-1078-9 | 4. Security Classification of Document UNCLASSIFIED/ UNLIMITED | | |
| 5. Originator Research and Technology Organisation North Atlantic Treaty Organisation BP 25, 7 rue Ancelle, F-92201 Neuilly-sur-Seine Cedex, France | | | | | |
| 6. Title Information Management Challenges in Achieving Coalition Interoperability | | | | | |
| 7. Presented at/sponsored by the RTO Information Systems Technology Panel (IST) Symposium held in Quebec, Canada, 28-30 May 2001. | | | | | |
| 8. Author(s)/Editor(s) Multiple | | | 9. Date December 2001 | | |
| 10. Author's/Editor's Address Multiple | | | 11. Pages 302 (text) 15 (slides) | | |
| 12. Distribution Statement There are no restrictions on the distribution of this document. Information about the availability of this and other RTO unclassified publications is given on the back cover. | | | | | |
| 13. Keywords/Descriptors | | | | | |
| <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> C4I CCIS (Command and Control Information Systems) Coalition Interoperability Common Operating Picture Communications networks COTS (Commercial Off The Shelf) Criteria development Data fusion Information management </td> <td style="width: 50%; vertical-align: top;"> Information superiority Integrated systems Interoperability Mobile software technologies NATO operations Natural language Ontologies Peacekeeping Secure communication Situational awareness </td> </tr> </table> | | | | C4I CCIS (Command and Control Information Systems) Coalition Interoperability Common Operating Picture Communications networks COTS (Commercial Off The Shelf) Criteria development Data fusion Information management | Information superiority Integrated systems Interoperability Mobile software technologies NATO operations Natural language Ontologies Peacekeeping Secure communication Situational awareness |
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| 14. Abstract | | | | | |
| <p>This volume contains the Technical Evaluation Report and 25 unclassified papers, presented at the Information Systems Technology Panel Symposium held in Quebec, Canada from 28th to 30th May 2001.</p> <p>The papers were presented under the following headings:</p> <ul style="list-style-type: none"> • Architectures and Standards: Fundamental Issues • Information Management • Mobile Software Technologies • Interoperability Procedures and Practices • Information Centric Warfare • Coalition Common Operating Picture | | | | | |

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Springfield
Virginia 2216
Etats-Unis
(accessible également en mode interactif dans la base de
données bibliographiques en ligne du NTIS, et sur CD-ROM)



Imprimé par St-Joseph Ottawa/Hull
(Membre de la Corporation St-Joseph)

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Printed by St. Joseph Ottawa/Hull
(A St. Joseph Corporation Company)
45 Sacré-Cœur Blvd., Hull (Québec), Canada J8X 1C6