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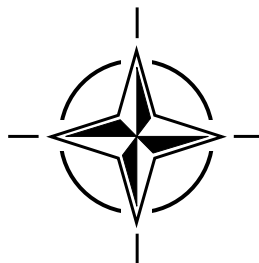
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**RTO LECTURE SERIES 227**

# **Tactical Decision Aids and Situational Awareness**

(Les aides à la prise de décisions tactiques et la connaissance de la situation des forces)

*The material in this publication was assembled to support a Lecture Series under the sponsorship of the Systems Concepts and Integration Panel (SCI) and the Consultant and Exchange Programme of RTA presented on 1-2 November 2001 in Amsterdam, The Netherlands, 8-9 November 2001, Sofia, Bulgaria, 12-13 November 2001 in Madrid, Spain and 19-20 November 2001, Maryland, United States.*



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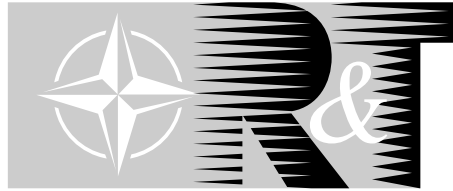
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The total spectrum of R&T activities is covered by the following 7 bodies:

- 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 cooperation 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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# Tactical Decision Aids and Situational Awareness

(RTO EN-019 / SCI-113)

## Executive Summary

This Report documents the results of NATO Research and Technology Organization (RTO) SCI-113 Lecture Series number LS 227, entitled “Tactical Decision Aids and Situational Awareness”.

This Lecture Series has been sponsored by the Systems Concepts and Integration (SCI) Panel and the material contained in this publication was presented on 1-2 November, 2001 in Amsterdam, The Netherlands, on 8-9 November, 2001 in Sofia, Bulgaria, on 12-13 November, 2001 in Madrid, Spain and on 19-20 November, 2001 at the Patuxent River Naval Air Station, Maryland, USA.

The primary purpose of this Lecture Series was to focus the LS audience on the current scientific and technical knowledge within the domain of Decision Aids Systems in relation to certain ongoing development programs.

The authors of the Lecture Series covered in particular the major problems to be addressed in the requirements definition, the state-of-the-art, the emerging technologies, the achievements, the expected benefits to the end-users, the lessons learned and the future trends.

Due to the fact that in the complex and fast-paced Battlespace of the future, humans will rely more and more on Information Technology to deliver knowledge and to assist them in using that knowledge, the *decisions* will be reached by a mix of human and machine reasoning.

The aim of the Decision Aids Systems is to achieve the *decide* and *act* capability.

The key enabling technologies to provide such a capability, as described in the Lecture Series, can be found in the area of the Information Technology and in the automation process of the man-machine integration, together with the accurate modelling of the human cognitive processes.

Special emphasis was given during the Lecture Series to the description of programs covering:

- Interaction of human perception and judgement with automated information processing and presentation
- Mission Management and Crew Assistance for Military Aircraft
- Pilot oriented workload evaluation and redistribution
- Interacting Multiple Model Approach in Dynamic Situation

The material in this publication was assembled to support a Lecture Series under the sponsorship of the Systems Concepts and Integration (SCI) Panel and the Consultant and Exchange Programme of RTO presented on 1-2 November 2001 in Amsterdam, The Netherlands, on 8-9 November 2001 in Sofia, Bulgaria, on 12-13 November 2001 in Madrid, Spain and on 19-20 November 2001 in Maryland, USA.

# **Les aides à la prise de décisions tactiques et la connaissance de la situation des forces**

**(RTO EN-019 / SCI-113)**

## **Synthèse**

Ce rapport présente les résultats du Cycle de conférences LS 227 sur “Les aides à la prise de décisions tactiques et la connaissance de la situation des forces” organisé par la Commission sur les concepts et l’intégration de systèmes (SCI-113) de l’Organisation pour la recherche et la technologie de l’OTAN (RTO).

Dans le cadre de cette activité, les textes contenus dans cette publication ont été présentés du 1 au 2 novembre 2001 à Amsterdam, Pays-Bas, du 8 au 9 novembre 2001 à Sofia, Bulgarie, du 12 au 13 novembre 2001 à Madrid en Espagne et du 19 au 20 novembre 2001 à la base aéronavale de Patuxent River, Maryland aux Etats-Unis.

Ce cycle de conférences a eu pour objectif principal de présenter l’état actuel des connaissances scientifiques et techniques dans le domaine des systèmes d’aides à la prise de décisions, tel que reflété par un certain nombre de programmes de développement actuels.

Les conférenciers ont notamment développé les principaux problèmes à aborder dans le cadre de la définition des spécifications, l’état actuel des connaissances, les technologies naissantes, les réalisations, les bénéfices escomptés pour l’utilisateur final, les enseignements tirés et les tendances futures.

Etant donné que les acteurs du champ de bataille complexe et dynamique du futur feront appel de plus en plus à des technologies de l’information pour transmettre les connaissances et pour être aidé dans leur exploitation, les décisions seront prises par le biais d’un processus décisionnel homme-machine.

Le but des systèmes d’aide à la prise de décisions est de parvenir à une capacité du type “décider et agir”.

Comme il est exposé dans le cycle de conférences, les technologies clés permettant de fournir une telle capacité se trouvent dans le domaine des technologies de l’information, dans le processus d’automatisation de l’intégration homme-machine ainsi que dans la modélisation précise des processus cognitifs humains.

Une attention particulière a été portée à la description de programmes couvrant :

- L’interaction entre le jugement et la perception de l’homme et la présentation et le traitement de l’information automatisée.
- La gestion de la mission et l’aide aux équipages des avions militaires.
- L’évaluation et la redistribution de la charge de travail des pilotes.
- L’approche du modèle interactif multiple en situation dynamique.

Cette publication a été rédigée pour servir de support de cours pour le cycle de conférences organisé par la commission sur les concepts et l’intégration de systèmes (SCI ) du 1 au 2 novembre 2001 à Amsterdam aux Pays Bas, du 8 au 9 novembre 2001 à Sofia en Bulgarie, du 12 au 13 novembre 2001 à Madrid en Espagne et du 19-20 novembre 2001 à Patuxent River aux Etats-Unis.

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<b>14. Abstract</b>					
<p>Today, the use of decision aids systems for commander and operators in the battlefield area is playing an important role due to the new frequent situation of joint coalition and asymmetric warfare in which the defense forces are involved.</p> <p>On these occasions, the capability of own forces to have the evolution of the tactical situation in real time is extremely important.</p> <p>Since combat survival and mission accomplishment depend upon operators performance in the process of decision-making, and the operator performance depends upon the degree of awareness, situation awareness can be seen as a result of a continuous assessment of situation parameters by the operators. This mission critical chain of sub-segment functions is greatly influenced by the nature of the technical systems the operator is leading with.</p>					

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