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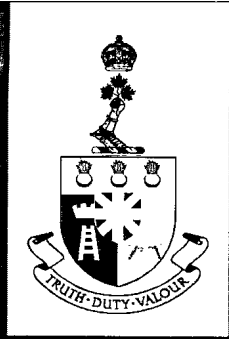
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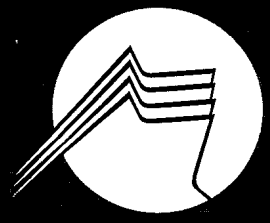
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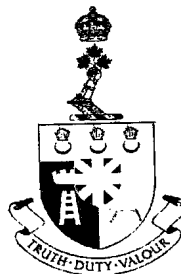


Proceedings of the Knowledge-Based Systems & Robotics Workshop

November 14 - 17, 1993

Edited by:

H. Merklinger
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FOREWORD

Research conducted to date on the international scene has clearly shown the growing presence of new information technologies in all areas of our lives. Advances in informatics and telecommunications have profoundly affected all economic sectors, whether they involve the manufacturing of goods, the provision of services or the acquisition and employment of defence resources. The changes are not limited to these areas; recent advances in Knowledge-Based Systems and Robotics highlight new opportunities for dual applications of these technologies in times of peace or conflict. There are already clear indications that we will alter our internal and external relations among government departments, industry and educational institutes.

With the integration of informatics and communications technologies, knowledge and information have become strategic resources and agents for change as our post-industrial society enters a new stage—the information age. The information society is “information intensive”, which is to say that information will henceforth be the raw material for the development of new defence applications.

It is in this context that we in CRAD, with cooperation from Industry Canada, Fisheries and Oceans Canada and the Royal Military College of Canada, are pleased to bring together so many different agencies interested in developing and supporting our initiatives. Our primary goal is to ensure the availability and integration of advanced technologies to meet the entire spectrum of military needs. To accomplish this goal we are very conscious of the necessity to meet the operational and support requirements of the Canadian Forces economically in the present, while at the same time recognizing our responsibilities to advise our client of the very best and

AVANT-PROPOS

Les recherches effectuées sur la scène internationale ont clairement démontré que les nouvelles technologies de l'information influencent de plus en plus tous les aspects de notre vie. Les progrès de l'informatique et des télécommunications ont profondément transformé tous les secteurs économiques, qu'il s'agisse de la fabrication de biens, de la prestation de services ou de l'acquisition et de l'utilisation des ressources de défense.

Ces domaines ne sont pas les seuls à avoir changé; les progrès récents dans les domaines des systèmes à base de connaissances et de la robotique ont mis en lumière de nouvelles possibilités d'appliquer ces deux technologies de concert, en temps de paix comme en temps de conflit. Il est déjà manifeste que nous allons modifier notre façon de communiquer, tant dans les ministères que dans l'industrie et les établissements d'enseignement.

À la suite de l'intégration de l'informatique et des technologies des communications, la connaissance et l'information sont devenus des ressources stratégiques et des agents de changement, à mesure que notre société post-industrielle entre dans une nouvelle ère, l'âge de l'informatique. Cette nouvelle société repose sur l'information; cette dernière sera donc la matière brute à partir de laquelle seront mises au point les nouvelles applications en matière de défense.

C'est dans ce contexte que le CR Dév, en collaboration avec Industrie, Sciences et Technologie Canada, Pêches et Océans et le Collège militaire royal du Canada, a le plaisir de réunir autant d'organismes intéressés à réaliser et à soutenir ses projets. Notre principal objectif est d'intégrer les technologies avancées et de les mettre à la disposition des Forces canadiennes afin de satisfaire tout l'éventail de leurs besoins militaires. Nous sommes très conscients que

most promising technologies that can be developed to meet these needs in future.

I appreciate all contributions from the private sector, other government departments and universities; we all benefited from your activities over this three-day workshop, and the associated exhibition. I am confident that your efforts helped to develop a synergistic approach to identifying practical applications of advanced technologies in Knowledge-Based Systems, Artificial Intelligence and Robotics.

pour atteindre ce but, nous devons dès à présent satisfaire à un coût raisonnable les besoins des Forces canadiennes en matière d'opérations et de soutien. De plus, nous savons que nous avons d'autres responsabilités; nous devons en effet tenir nos clients au courant des technologies les meilleures et les plus prometteuses qui pourront être mises au point afin de continuer à satisfaire les besoins précités.

J'apprécie toutes les contributions venant du secteur privé, des autres ministères et des universités; vous nous avez beaucoup apporté au cours de cet atelier de trois jours et de l'exposition qui l'accompagnait. Je suis convaincu que vos efforts ont contribué à établir une approche synergique qui permettra de trouver des applications pratiques pour les technologies avancées en matière de systèmes à base de connaissances, d'intelligence artificielle et de robotique.



K. A. Peebles
Chief, Research and Development. Le chef - Recherche et développement.

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The organizers of the Knowledge Based Systems and Robotics Workshop wish to express their gratitude to the Chief of Research and Development, Industry Canada, Fisheries and Oceans, and Foreign Affairs for sponsoring the Workshop.

The organizers are indebted to M. Farooq and P. Roberge of the Royal Military College, J. Grodski of the Defence and Civil Institute of Environmental Medicine and their Technical Committee Members for the organization, and review of responses to the Call For Papers and the subsequent design and conduct of the Academic Programme.

A special thanks to Key Note Speakers, Session Chairs, Panel Members, Authors, and to all who presented papers at the Workshop. We also acknowledge and appreciate the participation of many members of the Knowledge Based Systems and Robotic Communities representing government, industry, university and military researchers and program co-ordinators.

We are also grateful to BGen (Retd.) R. Dobson of B.I.S.I. and to S. Akhtar from Industry Canada for facilitating the display and promotion of dual use advanced technologies and related hardware. Our thanks is extended to Marg Coll of Conference Coll Inc. for processing advanced and on-site registration.

Whitin the CRAD organization we are indebted to many who devoted a lot of time and effort to guarantee a successful Workshop. Sub-committees were supervised by R. Elliot, D. Wakefield, T. Davies and P. Dumouchel. Secretarial support was ably provided by D. Hill.

H. Merklinger
Workshop Chair

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On remercie particulièrement les conférenciers invités, les présidents de session, les membres de jury et tous ceux qui ont présenté des articles durant l'atelier. Nous sommes reconnaissants de la participation de plusieurs membres de la communauté de systèmes des bases de connaissance et robotique représentant le gouvernement, l'industrie, les universités et chercheurs pour la défense militaire.

On est de plus reconnaissant au Bgén (retraité) R. Dobson de B.I.S.I. et à S. Akhtar du Ministère de l'Industrie du Canada d'avoir permis l'exposition et la promotion des technologies avancées à utilité duelle et le matériel qui s'y rapporte. Nos remerciements vont aussi à Marg Coll de Conférence Coll Inc. pour l'inscription anticipée et l'inscription locale.

Parmi l'organisation de CR Dév nous sommes reconnaissants à ceux qui ont donné le temps et les efforts nécessaires à la garantie du succès de l'atelier. Les sous-comités étaient supervisés par R. Elliot, D. Wakefield, T. Davies et P. Dumouchel. Le secrétariat fut supporté par D. Hill.

H. Merklinger
Président de l'Atelier

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