

## Technical Committee on Distributed Intelligent Systems IEEE Systems, Man, and Cybernetics Society

A new TC was formed during 2003 in recognition of the fact that distributed and collaborative agent based networks and systems is an emerging area of research and applications. Over the past decade a number of international projects, some under the auspices of the Intelligent Manufacturing Systems (IMS) Program, were successfully completed around the globe. These projects are now ending leaving a potential opportunity for the SMC Society to fill this void.

The primary objective of the *Distributed Intelligent Systems (DIS)* technical committee is to bring together specialists to develop systems and applications that exploit the technologies of distributed intelligent systems. During the past decade, international groups have been formed to develop holonic and multi-agent systems. Within the Intelligent Manufacturing Systems Program several such consortia have been organized. Many of these projects and initiatives, however, have either concluded or will soon be concluding. Hence, another objective of this technical committee is to promote the continuation of research, development, and applications of agent technologies, building on the foundations created by past consortia and research programs.

The mission of the *DIS* technical committee is to provide a forum for the development and application of collaborative agents system technologies in the manufacturing and supply chain, service automation, and infrastructure sectors. The committee will provide a continuing base to researchers who have been participating in national and international projects under the auspices of other organizations building on the knowledge created by these earlier efforts. The key drivers for this effort are the benefits of distributed systems: robustness, scalability, re-configurability, and productivity, all of which translate to a greater competitive advantage. One project conducted within the Holonic Manufacturing Systems Consortium showed that collaborative agents can enable a physical assembly line to be scalable in production by 70% and have a 40% greater productivity. Similar opportunities exist in supply chains, service sectors and infrastructure systems. Increased robustness in the presence of perturbations provide an added measure of security in today's uncertain world.

The members of the *DIS* technical committee will develop strategies for supporting research and development in collaborative agent and distributed automation technologies, assist in developing an integrated understanding of future systems needs for the key application sectors, and provide opportunities for members to exchange ideas, knowledge, experience, learning and results. Applications of manufacturing and supply chains, service automation, and infrastructures are moving through a rapid and continual process of redefinition driven by demanding markets, globally competition, and rapid technological change. These drivers manifest themselves in terms of more frequent product and service changes, greater customization, relentless improvements in cost, quality, reliability, and infrastructure that must be flexible and readily reconfigurable both physically and in terms of their information systems.

The role of the IEEE Systems, Man, and Cybernetics Society in these developments is both critical and timely. Isolated and successful developments have occurred over the last decades and will continue to occur. The *Distributed Intelligent Systems* technical committee provides a forum for researchers, systems developers and users to meet and deal with the following key issues:

- Integrated systems are needed to ensure that the current available physical capabilities can be best exploited by management and decision-makers;
- Under many circumstances, people are the best decision-makers under rapidly changing conditions, provided they receive timely and appropriate computing support;
- Biological and cybernetic based methods, e.g., neural networks, genetic algorithms, intelligent agents, holonic systems, and bionic manufacturing, are being examined as more flexible approaches for dealing with production environments where team-based empowerment has replaced hierarchical command control. These new approaches have made traditional IT architectures of Computer Integrated Manufacturing obsolete and given way to flatter, bus-based information networks with powerful and distributed computing elements.

### **Activities for 2003-04**

- Organized a track entitled "Collaborative Solutions for Distributed Manufacturing" at the *2003 International Conference on Systems, Man, and Cybernetics (SMC 2003)* consisting of 3 sessions (13 technical papers) and a panel session.

- Develop a track consisting of invited sessions and a panel discussion at the 2004 International Conference on Systems, Man, and Cybernetics (*SMC 2004*) in The Hague, Netherlands, with technical presentations from the core technology areas and key application sectors.
- Present a one day tutorial entitled *The Java Application Development Framework (JADE) for Distributed System Applications* to be held during SMC 2004 in the Hague, Netherlands.
- Publish a special issue of the *IEEE Transactions on Systems, Man, and Cybernetics, Part A*, consisting of peer reviewed papers from the core technology areas and key application sectors, and selected papers from *SMC 2003*, *SMC 2004*, and the JADE tutorial at *SMC 2004*.
- Organize a two day workshop, *Implementation of Distributed Systems in Manufacturing, Service, and Infrastructure*, to be held during 2005.

#### Co-Chairs

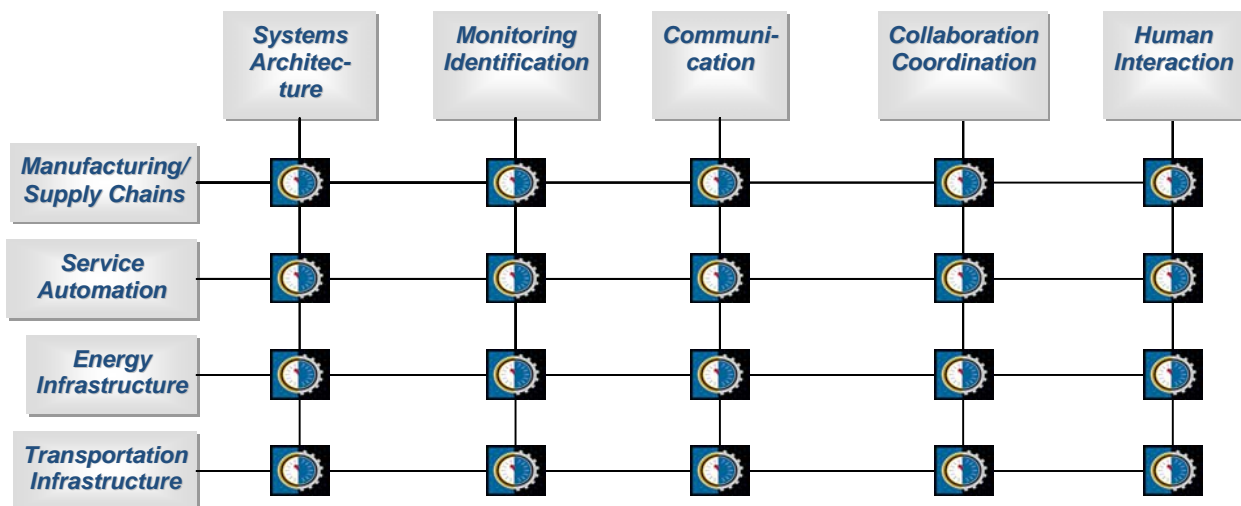
- Dilip Kotak <dilip.kotak@nrc-cnrc.gc.ca> *National Research Council, Canada*
- William Gruver <gruver@cs.sfu.ca> *Simon Fraser University, Canada*

#### Core Technologies and Chairs

- Systems Architecture *Fabio Bellifemine, Telecom Italia, Italy*
- Monitoring and Active Identification *Duncan McFarlane, Cambridge University, UK*
- Communication *Ljiljana Trajkovic, Simon Fraser University, Canada*
- Collaboration/Coordination *Vladimir Marik, Czech Technical University, Czech Republic*
- Human Interaction *Zhi-Qiang Liu, City University of Hong Kong, PR China*

#### Key Application Sectors and Chairs

- Manufacturing and Supply Chains *Paul Valckenaers, Catholic University Leuven, Belgium*
- Service Automation *Vince Thomson, McGill University, Canada*
- Energy Infrastructure *Burhan Turksen, Univ. of Toronto, Canada*
- Transportation Infrastructure *Fumio Mizoguchi, Science University of Tokyo, Japan*
- *Yoga Yogendran, BC Hydro, Canada*
- *Peter Luh, University of Connecticut, USA*
- *Tsu-Tien Lee, National Chiao Tung University, Taiwan*
- *C. C. White, Georgia Tech, USA*



The co-chairs welcome your active contribution in this technical committee, through papers at the annual SMC conference, special workshops and tutorials, articles in the Transactions, and proposals for research/application projects. We also urge the members to note the following opportunities at SMC 2004 in the Hague:

- Invited paper sessions on Distributed Intelligent Systems
- A hands-on tutorial on FIPA (Foundation for Intelligent Physical Agents) and JADE (Java Agent Development Environment)
- A panel session on DIS Agent Architecture.