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Holonic and Multi-Agent Systems for Manufacturing

5th International Conference on Industrial Applications of Holonic and Multi-Agent Systems, HoloMAS 2011
Toulouse, France, August 29-31, 2011
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Preface

Another two years have passed from the last HoloMAS conference held in Linz in 2009. It is a pleasure to say that the R&D activities around holonic and multi-agent systems for industrial applications have not faded during this period. On the contrary, the number of scientific events aimed at the subject field is growing steadily. Besides HoloMAS, which has been the pioneering event in this field, there are multiple conferences such as the IEEE Conference on Industrial Informatics (INDIN), the IEEE Conference on Emergent Technologies and Factory Automation (ETFA) or the IFAC Symposium on Information Control Problems in Manufacturing (INCOM) that aim their attention at advanced industrial automation systems based on intelligent agents.

This year's conference was the eighth in the sequence of HoloMAS events. The first three (HoloMAS 2000 in Greenwich, HoloMAS 2001 in Munich and HoloMAS 2002 in Aix-en-Provence) were organized as workshops under the umbrella of DEXA association. Starting with 2003, HoloMAS became an independent conference organized biyearly on the odd years, still under the DEXA patronage (HoloMAS 2003 in Prague, HoloMAS 2005 in Copenhagen, HoloMAS 2007 in Regensburg and HoloMAS 2009 in Linz). On the even years the attention is focused on specific events: the IEEE Workshop on Distributed Intelligent Systems (DIS 2006) with a special track covering the "obvious" HoloMAS topics was organized in Prague in June 2006. Similarly, the IEEE Conference on Distributed Human–Machine Systems (DHMS 2008), which has absorbed the HoloMAS field, was held in Athens, Greece, in March 2008, and the IFAC Workshop on Intelligent Manufacturing Systems (IMS 2010) in Lisbon, Portugal, in 2010. This approach allows the HoloMAS community to be better integrated with both the information society-oriented DEXA community as well as the IEEE Society aimed at human–machine systems, cybernetics, and industrial informatics.

The research of holonic and agent-based systems receives constant support from both the public sector and private institutions. There is an increased interest from the IEEE System, Man, and Cybernetics (SMC) Society, namely, from its Technical Committee on Distributed Intelligent Systems, which leverages the experience gained in the former Holonic Manufacturing Systems consortium. Another IEEE body - the Industrial Electronics Society - supports the related R&D field through its Technical Committee on Industrial Agents (http://tcia.ieee-ies.org/). Its mission is to provide a base for researchers and application practitioners, to share their experiences with applications of holonic and agent technologies in the industrial sector, especially in assembly and process control, planning and scheduling, and supply chain managements. There are number of impacted journals that provide space for articles dealing with industrial agents such as the *IEEE Transactions on SMC, Part C: Applications*

and Reviews, Journal of Engineering of Artificial Intelligence Applications (EAAI), IEEE Transactions on Industrial Informatics, Computers in Industry or *the Journal of Autonomous Agents and Multi-Agent Systems (JAAMAS).* Let us recall that the extended versions of selected best HoloMAS 2009 papers were published in the special issue of the *International Journal of Production Research.*

It is our pleasure to inform you that for HoloMAS 2011 there were 36 papers submitted, from which the Program Committee selected 25 papers to be included in this volume, by authors from 13 countries all over the world. Among the key trends that the accepted papers report on is the effort to shift the holonic/agent-based control system from the personal computer (the prevalent hosting platform in the past) closer to the "hardware." The obvious reason is to increase even more the distributiveness and thus the robustness and flexibility of the control system. In this model the control application is designed as embedded software running on a dedicated microcontroller. This brings new challenges related to limited resources in terms of memory, processing power, battery life, etc. Related topics discussed in this volume are the employment of simulation techniques for modeling, designing and validating the control system prior to its deployment on the real hardware. The boom in Web applications and smart mobile devices like smart phones and tablets have recently drawn the attention of the industrial sector as it brings new challenges and possibilities for building next–generation user interfaces for SCADA and operator panels. Looking at the applications of holonic and agent systems we collected quite an interesting portfolio this year, including smart grids, supply chain and logistics, healthcare, mobile robots and unmanned aerial vehicles.

There were two invited talks specifically targeted toward HoloMAS 2011:

- Peter Skobelev (Magenta Solutions): "Multi-agent Systems for Real-Time Resource Allocation, Scheduling, Optimization and Controlling"
- Alois Zoitl (Vienna University of Technology): "A Control Architecture for Self-Reconfigurable Production Systems"

Also, for the first time in the HoloMAS history, there was a special session organized covering the topic of smart industrial systems.

The HoloMAS 2011 conference was a highly motivating environment, challenging the future research and fostering integration in the subject field. It has always served as a showcase of the holonic and agent-based manufacturing research offering information on the state of the art to specialists in neighboring, knowledge-processing research fields covered by the DEXA multi-conference event. We are very grateful to the DEXA Association for providing us with this excellent opportunity. We would like to express our many thanks to Gabriela Wagner for all her organizational efforts which were of key importance for the success of this event.

We would like to thank the IEEE SMC Society, and especially the Technical Committee on Distributed Intelligent Systems of this Society, for its technical co-sponsorship.

June 2011

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HoloMAS 2011

5th International Conference on Industrial Applications of Holonic and Multi-agent Systems, HoloMAS 2011

Applications of Holonic and Multi-agent Systems

Toulouse, France, August 29–31, 2011

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