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Vladimír Mařík · Arnd Schirrmann
Damien Trentesaux · Pavel Vrba (Eds.)

Industrial Applications of Holonic and Multi-Agent Systems

7th International Conference, HoloMAS 2015
Valencia, Spain, September 2–3, 2015
Proceedings

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Preface

It is real pleasure to state that the research activities around holonic and multi-agent systems for industrial applications have continued and even increased their importance during the last decade. The number of both the scientific topics and the achievements in the subject field is growing steadily, especially because of their direct relevance to the Industry 4.0 initiative. The influence of the multi-agent and holonic system philosophy on the Industry 4.0 visions is more than clear.

Besides HoloMAS, which has been the pioneering event in the subject field, there are other conferences such as the IEEE SMC annual conference, INDIN, ETFA, or INCOM that focus their attention on advanced industrial solutions, some of which are based on intelligent agents. But the HoloMAS conference keeps its orientation, character, and flavor and it remains strongly industry oriented.

This year's conference was the tenth 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 society. Starting with 2003 HoloMAS achieved the status of an independent conference organized biyearly on odd years, still under the DEXA patronage (HoloMAS 2003 in Prague, HoloMAS 2005 in Copenhagen, HoloMAS 2007 in Regensburg, HoloMAS 2009 in Linz, HoloMAS 2011 in Toulouse, and HoloMAS 2013 in Prague). The HoloMAS line of scientific events has created a solid community of researchers and practitioners who are active in the subject field. They have started to cooperate in large EU projects, for example, in the EU Integrated Project ARUM (2012–2015), and have jointly elaborated on several new project proposals since the last HoloMAS event.

The research of holonic and agent-based systems has attracted the interest of industry and receives increasing support from both the public sector and private institutions. We witnessed the increased interest from the IEEE System, Man, and Cybernetics Society (<http://ieeesmc.org/>), namely, from its Technical Committees on Distributed Intelligent Systems and on Cybernetics for Intelligent Industrial Systems, which was established early this year. Another IEEE body – 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 for sharing 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 management. There are a number of impacted journals that provide space for articles dealing with industrial agents such as *IEEE Transactions on SMC: Systems*, *IEEE Transactions on Industrial Informatics*, *Journal of Production Research*, *Journal of Intelligent Manufacturing*, or *JAAMAS*.

We are proud to announce that the HoloMAS 2015 conference was held again under the technical co-sponsorship of the IEEE SMC Society.

For HoloMAS 2015 there were 27 papers submitted, from which the Program Committee selected 17 regular papers and two surveys to be included in this volume.

The surveys are aimed at software engineering methods for intelligent manufacturing and at standards and ontologies for process automation. The regular papers are organized into four sections. Conceptual and design issues are the focus of the first section (three papers). The next section is aimed at intelligent manufacturing systems exploring holonic and multi-agent principles (five papers). There is also one specific section summarizing the intermediate results of the EU Integrated Project ARUM aimed at adaptive production management, planning, and scheduling, which explores the latest principles in the domain (four papers). The last section is dedicated to the very hot field of smart grids, networks, and big data (five papers). This application area seems to have grown in importance in the last few years, because some of the results could be easily applied to industrial practice.

There were two invited talks specifically targeted toward HoloMAS 2015:

- Stamatis Karnouskos (SAP): Industrial Cyber-Physical Systems and Their Implications for Modern Enterprises
- Amro M. Farid (Masdar Institute of Science and Technology & MIT): Designing Multi-Agent Systems for Resilient Engineering Systems (the extended abstract is included in this volume)

In general, we are very pleased that the papers accepted for publication as well as the keynotes and surveys follow the main innovation trends in the field of holonic and multi-agent systems and display the current state of the art keeping the industrial orientation of the research in mind. Thus, HoloMAS 2015 reflected the progress in the field, but kept its original character and focus.

The HoloMAS 2015 conference represented another successful scientific event in the HoloMAS history and created highly motivating environment, challenging future research and fostering the integration of efforts in the field. This conference offered – as usual — information about the state of the art in the MAS industrial application field to specialists in neighboring research fields covered by the DEXA multi-conference event.

We are very grateful to the DEXA Association for providing us with this excellent opportunity to organize the HoloMAS 2015 conference within the DEXA event. We would like to express many thanks to Gabriela Wagner and Jitka Seguin for all their organizational efforts, which were of key importance for the success of our conference.

We would like to thank to IEEE SMC Society, and especially the Technical Committees on Distributed Intelligent Systems and on Cybernetics for Intelligent Industrial Systems of this Society, for their technical contributions.

June 2015

Vladimír Mařík
Arnd Schirrmann
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HoloMAS 2015

7th International Conference on

Industrial Applications of Holonic and Multi-Agent Systems

Valencia, Spain, September 2–3, 2015

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