

## Distributed Autonomous Robotic System 3

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Rüdiger Dillmann  
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# Distributed Autonomous Robotic Systems 3

With 220 Figures and 21 Tables



Springer

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# Preface

The International Conference Committee would like to extend a cordial welcome to all participants of the DARS-4 Conference. This event was made possible through the joint endeavor of the organizer, the authors, and the sponsors: the „Deutsche Forschungsgemeinschaft (DFG)“ and the state Baden-Württemberg. The conference is a real international event. Contributions came from almost any corner of the world. Of course, most of them from the host country Germany, followed by Japan, Italy, USA and many others. All papers have the common goal to contribute solutions to the very demanding task of designing distributed systems to realize robust and intelligent robotic systems. Distributed autonomous robotic systems (DARS) are systems composed of multiple autonomous units such as modules, cells, processors, agents, and robots. Combination or cooperative operation of multiple autonomous units is expected to lead to desirable features such as flexibility, fault tolerance, and efficiency.

The concept of DARS was strongly inspired by biological systems, which have characteristics of autonomous and decentralized systems, self-organizing systems, multi-agent systems, and emergent systems. DARS requires a broad area of interdisciplinary technologies related not only to robotics and computer engineering (especially distributed intelligence and artificial life), but also biology and psychology.

The DARS is the leading established conference on distributed autonomous systems. Reflecting the trends of DARS accelerated by rapid progress in computer and network technologies, the First, the Second and the Third International Symposium on Distributed Autonomous Robotic Systems (DARS '92, DARS '94 and DARS '96) took place 1992, 1994 and 1996 at the Institute of Physical and Chemical Research (RIKEN), Saitama, Japan. In 1998, the first time the event is held in Europe at the Institute for Process Control and Robotics, University of Karlsruhe.

Numerous people have helped to prepare and organize this conference. The layout of the conference program and the reviewing of the papers was done by the members of the program committee, all of them deserve sincere thanks. Dr. Thomas Längle, Mr. Derk Rembold and Mr. Oliver Rogalla had the job of organizing the local arrangements and doing the correspondence; we are very grateful to them. We also would like to thank the Deutsche Forschungsgemeinschaft and the state Baden-Württemberg for the financial help and the University of Karlsruhe for providing the lecturing halls and exhibition facilities.

General Co-Chairs:

*Prof. Dr. Rüdiger Dillmann*

*Prof. Dr. Paolo Dario*

*Prof. Dr. Heinz Wörn*

Program Chair:

*Prof. Dr. Tim Lueth*

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