Robotic Sailing
Preface

IRSC 2011 is only the fourth in a series of conferences dedicated to robotic sailing, and while still comparatively small, we have seen a substantial increase in the number of groups interested in and working on robotic sailboats recently. Given that sailing is a fairly old way of locomotion and a high-tech sports today, it is somewhat surprising that the first competition for autonomous sailboats was proposed as late as 2004. Yet, the original objective to autonomously sail across the Atlantic ocean proved to be fairly ambitious, and no boat has succeeded so far.

However, this also highlights the complexity of the engineering challenges at hand. Sailing depends as much on the physical properties of boat and rig as on the course and route set in the context of changing winds and currents. Moreover, performance measures do not only include the boat speed, but also seaworthiness and robustness of the whole system. Hence, building a robotic sailboat is a true interdisciplinary project, involving naval architecture and physics, electrical engineering and power management, embedded systems, computer science, and systems engineering.

Establishing a conference held jointly with the World Robotic Sailing Championship (WRSC) has provided a platform for discussions among scientists from all fields involved in robotic sailing. In fact, we believe that the progress made in autonomous sailing so far is to no small extent driven by this combination of competition and knowledge exchange. The interdisciplinary nature of robotics and robotic sailing is reflected in the papers contributed to IRSC and the teams participating in WRSC. Further promoting this multidisciplinary approach will be key to tackling the numerous challenges on the way to truly autonomous sailboats.

These proceedings summarize the state of the art in robotic sailing, and the introduction in Part I contains a review illustrating its history and recent advances. Clearly, having a robust and reliable boat is a key requirement, which is also the focus of papers in Part II. The proposed designs range from small one-design boats for algorithm development to vessels built to cross the Atlantic Ocean. Different aspects of the system design and validation are discussed in Part III. The remaining papers focus on algorithmic matters: Part IV presents approaches for collision avoidance while Part V addresses localization and route planning.
Organizing IRSC 2011 was only possible with the help of many people. We are grateful to all of them, particularly to Petra Roßkopf for her assistance with the conference location, and to our student co-organizers, who have worked tirelessly to get everything arranged. We also thank our sponsors and partners without whom this conference would have been infeasible. Alexander Schlaefer is very appreciative for the patience and tolerance of Achim Schweikard, who supported the idea to organize IRSC/WRSC in Lübeck. Ole Blaurock would like to express his appreciation to the robotic sailing team at the Fachhochschule Lübeck, which started only in the beginning of the year and yet managed to activate numerous colleagues, enabling the participation in WRSC 2011.

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