Preface

Humans sail the oceans for centuries. In our highly technological age, a new interest on ancient forms of navigation is gaining a new attention with the necessity to know more and more about the oceans that undoubtedly regulate the delicate ecosystem where we live. Persistent ocean monitoring is a necessity and is currently being undertaken by a multitude of robotic platforms throughout the globe. Unmanned wind propelled crafts have a great potential for providing ocean data, with superior performance than other robotic technologies in terms of autonomy, speed and maneuverability, and also the ability to provide a continuous remote access for data retrieval and mission control.

Sailing is a challenging task driven by highly complex dynamic interactions between the wind, the water and all the sailboat's components above and below the surface. The design, construction and navigation of a sailing boat is the result of a multifaceted combination of several engineering fields, with continuous progresses towards more efficient ways to use the wind power while withstanding the harsh marine environment. Removing the crew and automating the navigation of a sailing boat raises this level of complexity while transferring to a computer system all the knowledge, experience and intuition that makes a human sailor handling correctly a sailing boat.

In the last few years there have been various developments in this field and some successful autonomous sailing boats have already performed relevant missions in the oceans. About ten years ago, a small community engaged in this domain has been challenged to develop an autonomous sailing boat to cross the Atlantic without assistance, resembling the first defiance in the early 60s for solitaire Atlantic crossing. Although not yet succeeded, the Microtransat challenge has stimulated various researchers from universities and companies, and also enthusiasts of sailing, to start working towards this objective. The World Robotic Sailing Championship and the International Robotic Sailing Conference was born in 2008 to provide an annual scientific and experimental forum to join the world community, share results and demonstrate their last achievements in the field.

The 9th World Robotic Sailing Championship and International Robotic Sailing Conference returns to Portugal after the successful WRSC/IRSC 2009 organized in

Matosinhos by the Faculty of Engineering of the University of Porto. The 2016 edition will be once again organized by the Faculty of Engineering of the University of Porto (FEUP), now in cooperation with the Institute for Systems and Computer Engineering, Technology and Science (INESC TEC), and hosted by the city of Viana do Castelo, north of Portugal. This is a city with a strong tradition in sailing and a recognized engagement in the promotion of water sports in the region.

These proceedings contain the papers selected for presentation in the 9th International Robotic Sailing Conference and are organized in three main topics. The first part addresses the design, construction and validation of new platforms and rigs. The second part is devoted to the development of sensors and algorithms to enhance the performance of critical maneuvers of robotic sailing boats. Finally, the papers in the last part are dedicated to the improvement of behaviors required for autonomous missions.

We would like to acknowledge the effort of those who contributed to the organization of WRSC/IRSC 2016. This includes not only the authors of the papers and the participants in the competition, but also the members of the Program Committee for their valuable and timely reviews that greatly improved the overall quality of the papers. We also would like to thank the support of the organizing entities (Faculty of Engineering of the University of Porto and the Institute for Systems and Computer Engineering, Technology and Science), the Municipality of Viana do Castelo and the Sailing Club of Viana do Castelo for hosting this event in the city, and all the other sponsors, colleagues and friends that also contributed to the success of WRSC/IRSC 2016.

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