

On the intersection of aerial, surface, and underwater vehicles

Abstract

Typical UAVs (Unmanned Aerial Vehicles), ASVs (Autonomous Surface Vehicles) and AUVs (Autonomous Underwater Vehicles) have in common a thrust propulsion actuation complemented by a method for torque generation, whether by differential propeller actuation or the use of rudders and fins. Additionally, all are subject to nonlinear drag dynamics and to persistent disturbances due to wind, currents, and waves. It is then natural to ask whether the control techniques and insights gained from UAVs can be extrapolated to ASVs and AUVs.

For the initial part of the talk I will reflect on motion control of UAVs and provide an overview of my latest research beyond it. Next, I will present a transposition of the control ideas, insights and challenges from UAVs to ASVs and AUVs and provide theoretical and experimental motion control results for two different ASVs: a hovercraft and an electrical boat.

Bio

David Cabecinhas received the Licenciatura and Ph.D. degrees in Electrical and Computer Engineering from the Instituto Superior Técnico (IST), Lisbon, Portugal, in 2006 and 2014, respectively. Since then he is a Post-Doctoral Fellow with the Faculty of Science and Technology, University of Macau, Macao SAR, China.

His current research interests include control theory and dynamic systems with a particular focus on nonlinear motion control, sensor-based control, and estimation, and their application and implementation on aerial, surface and underwater vehicles.



Date and location

March 1st, 5:30 PM, EA3