Special Session
Distributed Cyber-Physical Robotics

Description/Scope

Using teams of mobile robots has been considered advantageous in numerous application domains, from search and rescue to surveillance and security, environment exploration, precision agriculture, flexible production lines, to name just a few. In all these cases, there is a global coordination layer and the individual robot control layer. In between, a data network allows the robots to exchange information to achieve the desired global coordination. Be it for formation control, relative localization, *rendez-vous*, distributed SLAM or even tele-operation, the behavior of the robotic team depends on team level data communications. In turn, these communications significantly impact the global performance because of the associated latencies and losses, and different communication protocols may have different impacts. Therefore, proper coordination approaches must be designed in a Cyber-Physical manner, joining the Cyber part of communication protocols with the Physical part of mobile Robotics. This Special Session aims at bringing together researchers and practitioners that work on the coordination of robotic teams with either a communications, control or joint communications-control perspective. We are particularly interested in the following topics of interest.

Topics (but are not limited to)

- Communications-aware robotic coordination
- Networked robotics control
- Robotic communications with ROS2
- Distributed coordination based on ROS2
- Distribution middlewares for teams of mobile robots
- Communication-based synchronization of robotic teams
- Real-time ad-hoc wireless communications
- Topology control in ad-hoc dynamic networks
- Communication-based relative localization
- Resilient robotic mesh control

Organizers

- Luis Almeida, CISTER / LASI, Faculty of Engineering, University of Porto, Portugal.
- António Pedro Aguiar, SYSTEC/ARISE, Faculty of Engineering, University of Porto.
- Danilo Tardioli, Centro Universitario de la Defensa, Zaragoza, Spain.