Multi-Agent Cooperation Over Unreliable MANETs

What?
- Extension of the Darwinian Particle Swarm Optimization (DPSO), denoted as RDPSO (Robotic DPSO), to the multi-robot systems (MRS) domain

Why?
- The DPSO is an evolutionary algorithm that extends the PSO using natural selection
- Contrarily to virtual agents, robots are designed to act in the real world where obstacles and communication constraints need to be taken into account

How?
- The concepts of social exclusion and inclusion are used to enhance the ability to escape from local optima
- A new objective function is created to guide the robot to perform the main mission while avoiding obstacles
- The link matrix is used to “force” each robot to communicate with its nearest neighbor that has not chosen it as its nearest neighbor using attractive or repulsive tensions
- Deployment strategy based on the Spiral of Theodorus

Validated by simulations in **MatLab** and experiments with teams of eSwarBots and TraxBots

Preliminary results show that, with both simulated and physical robots, the global optimum is achieved in approximately 90% of the experiments

Contact Person:
Micael S. Couceiro
micaelcouceiro@isr.uc.pt
http://paloma.isr.uc.pt/~micaelcouceiro/

Supervisors:
Prof. Rui P. Rocha (ISR - University of Coimbra)
rprocha@isr.uc.pt
Prof. Nuno M. F. Ferreira (ISEC - IPC)
nunomig@isec.pt

Mobile Robotics Laboratory
Institute of Systems and Robotics
ISR – Coimbra