

Team composition

The PoliMI team for the Leonardo Drone Contest combines the competences of two research laboratories:

Aerospace Systems and Control Laboratory
Department of Aerospace Science and Technology



Artificial Intelligence and Robotics Laboratory
Department of Electronics, Information and Bioengineering



Team composition

PhD student: Gabriele Roggi



Advisor: Marco Lovera



Co-advisor: Matteo Matteucci



Team members: Simone Mentasti, Mattia Giurato



LDC activities so far

Main activities since kick-off on November 2019:

- Literature review and documentation on autonomous GNC for mobile robotics and UAVs
- Preliminary definition of overall architecture for Y1 competition
- Preliminary selection of algorithms for Y1 competition
- Design and integration of a test rig to support preliminary experimental work within FlyART, including flight control computer, navigation computing platform, representative sensors
- Design and integration of SiL test facility to support algorithm and software development



LDC activities so far

Main activities since kick-off on November 2019:

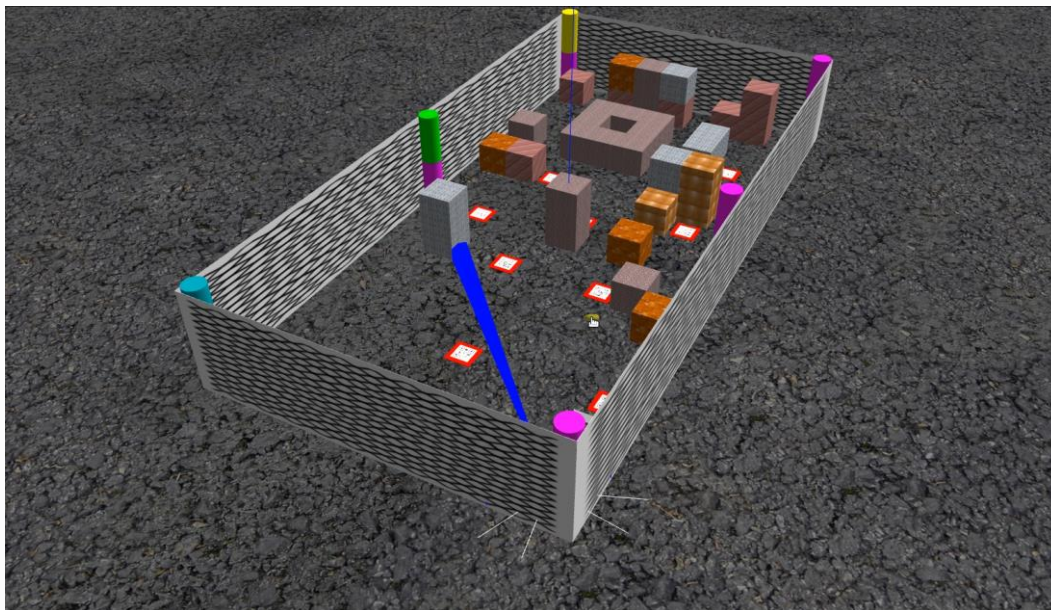
- Definition of overall architecture for Y1 competition
- Final selection of algorithms for Y1 competition
- Drone platform preliminary design and BoM definition

Only software development activities ongoing since lockdown, including refinement of SiL to include info from competition rules (available since March 20 2020)

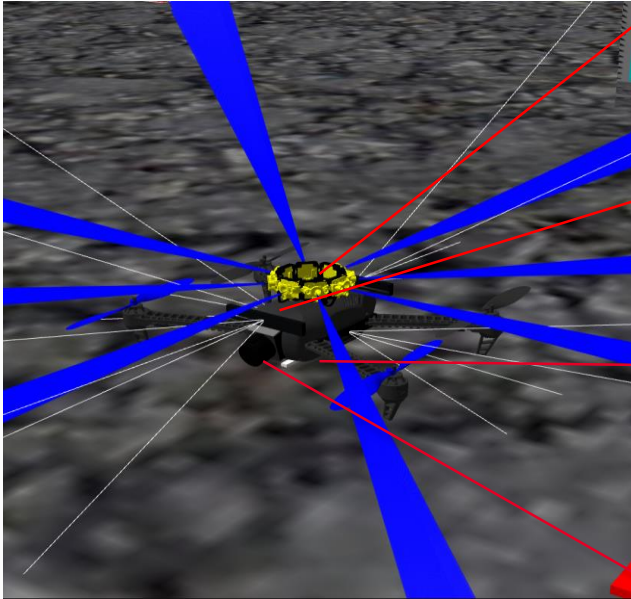


Simulation environment

Software development SiL to replicate the competition rules



Simulation environment - drone



Single point lasers (collision avoidance)

Monocular cameras (poles recognition)

Downward-looking camera
(QR recognition)

Stereo camera (odometry and mapping)



Simulation

Three main aspects will be shown in the simulations:

- Global planning. It plans a trajectory from the home position to a series of waypoints (QR markers) using the available map (obtained in a preliminary phase).
- Trajectory tracking and landing. The drone will follow the defined trajectory and it will land on the QR codes.
- Local planning (collision avoidance). It modifies the trajectory, if not collision-free.

