

AIROBOTS - Innovative aerial service robots for remote inspections by contact
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The goal of the AIRobots project is to develop a new generation of aerial service robots capable to support human beings in all those activities which require the ability to interact actively and safely with environments not constrained on ground but, indeed, freely in air. The step forward with respect to the classical field of aerial robotics is to realize aerial vehicles able to accomplish a large variety of applications, such as inspection of buildings and large infrastructures, sample picking, aerial remote manipulation, etc.

The starting point is an aerial platform whose aeromechanical configuration allows the vehicle to interact with the environment in a non-destructive way and to hover close to operating points. Rotary-wing aerial vehicles with shrouded propellers represent the basic airframes which will be then equipped with appropriate robotic end-effectors and sensors in order to transform the aerial platform into an aerial service robot, a system able to fly and to achieve robotic tasks. Advanced automatic control algorithms will be conceived to govern the aerial platform which will be remotely supervised by the operator with the use of haptic devices. Particular emphasis will be given to develop advanced human-in-the-loop and autonomous navigation control strategies relying upon a cooperative and adaptive interaction between the on-board automatic control and the remote operator. Force and visual feedback strategies will be investigated in order to transform the aerial platform in a flying hand suitable for aerial manipulation.

The consortium is composed of four academic groups and an SME with the role of end-user and evaluator of the project outcomes. Prototypes of aerial service robots will be developed and tested on experimental setups which will be constructed in order to reproduce typical industrial scenarios for which aerial inspection robotics can be beneficial (docking, cleaning, inspection and repairing of infrastructures, payload lifting, etc.).

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