



Aerial RObotic system integrating multiple ARMS and advanced manipulation for inspection and maintenance

**Workshop on Aerial Robotics Inspection from prototypes to industrial applications.
European Robotics Forum 2017.
March 24, 2017**



Inspection Robotics



Objective 1: Aerial manipulation methods and technologies for industrial inspection and maintenance

O1.1. Evolution of existing aerial manipulation

New aerial robots to perform dexterous accurate manipulation

- Multirotors with fully-actuated aerial platforms
- Helicopters with dexterous arm + simple sensor arm.
- Telemanipulation with haptic devices



O1.2 Development of new methods and technologies

- Multi-rotor platform that can fly and manipulate with the coordinated motion of two arms

Applications better performed with two hands

Fixed contact point with one arm while operating with the second arm

Objective 2: Validation in industrial inspection and maintenance

- Installation and maintenance of permanent Non Destructive Tests (NDT) sensors on remote components
- Deploying and maintaining a mobile robotic system permanently installed on a remote structure



Results of the first perio

- System design and software framework
- Light inspection robot with sensors
- Compliant dual arms autonomous aerial robot
- Fully actuated platforms for contact inspection
- New control methods
- Teleoperation
- Perception
- Planning
- Integration
 - High TRL Prototype
 - Low TRL prototype
- Validation
 - Requirements
 - Industrial plants



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First Period
February, 2017



Future Work

- Control techniques, fully actuated platforms, behavioural coordinated control and hand-eye coordination
- Aerial telemanipulation simulator, force feedback aerial telemanipulation and local planning for human-in-the-loop telemanipulation
- Precise target recognition and tracking, and 3D mapping using aerial robots
- Planning and reactivity methods and technologies
- Multi-rotor and helicopter platforms available
- First industrial experiments