Michele Marolla

R&D Robotics Engineer

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Experience

2022–2024 **R&D Robotics Engineer**, *PRISMA Lab, University of Naples Federico II*

- I co-authored a custom version of the PX4 autopilot firmware, implementing autonomous execution of NDT measurement tasks through direct force control using a custom tilting quadcopter. I also implemented the low-level firmware of the whole robotic system, integrating several actuators and sensors through different communication protocols with STM32 microcontrollers and a real-time operating system, along with a custom driver to enable communication between the microcontroller and the autopilot. A paper describing the system has been submitted to IROS 2024, currently under review.
  You can find a video here: youtu.be/IvWUB-oo5Dg

- I developed and maintained the firmware for a 5-DoF robotic arm designed for aerial manipulation, implementing both admittance control and force control for NDT measurements. A paper describing the system has been presented at ISER 2023.
  You can find a video here: youtu.be/BuaigozJK-M

- In the context of the AERIAL-CORE (https://aerial-core.eu/) H2020 project, I developed the onboard firmware for a robotic arm designed for aerial manipulation, as well as high-level control, trajectory planner and teleoperation running on the drone on-board PC. I spent a total of six weeks in Spain for integrating our robotic arm with the rest of the system and perform live demo. A paper describing the system has been presented at ICINCO 2023.
  You can find a video here: youtu.be/HeAgBkeZ3D8

I also realized divulgative and technical videos for PRISMA Lab and Neabotics's projects.

Publications

2024 **A semi-autonomous UAV with human supervisory control for non-destructive inspections in interaction with concrete structures**, *with S. Marcellini and V. Lippiello*
IROS 2024, currently under review.

2023 **Development of a semi-autonomous framework for NDT inspection with a tilting aerial platform**, *with S. Marcellini, S. D'Angelo, A. De Crescenzo, V. Lippiello and B. Siciliano*
ISER 2023.

2023 **Application of Intelligent Aerial Robots to the Inspection and Maintenance of Electrical Power Lines**
Contribution for a chapter in *Robotics and Automation Solutions for Inspection and Maintenance in Critical Infrastructures*

2023 **Design and Control of a Novel High Payload Light Arm for Heavy Aerial Manipulation Task**, *with J. Cacace and V. Lippiello*
ICINCO 2023.

Skills

Programming Good knowledge of C++, ROS1/2 and Gazebo. Good knowledge of MATLAB/SIMULINK. Basic knowledge of Python. Good knowledge of low-level microcontroller programming, especially using MbedOS with STM32 microcontrollers. Good capability to integrate sensors and actuators through several communication protocols.

Autopilots Good knowledge of **PX4** autopilot firmware and capability to customize it for advanced applications (e.g. interaction with the environment). Good knowledge of **QGroundControl**, capability to modify it for custom applications.

Other software Good knowledge of Linux (Ubuntu); good knowledge of Git and Github; good knowledge of Docker.

Electronics Basic knowledge of electronics, capability to use laboratory equipment (soldering iron, oscilloscope, and so on).

Education

2018–2022 **Automation Engineering, Master Degree**, *University Federico II*, Naples, Italy
Final mark: 110/110 cum laude.
Thesis: Design and prototyping of a small-size quadruped robot.

2014–2018 **Automation Engineering, Bachelor Degree**, *University Federico II*, Naples, Italy
Final mark: 110/110 cum laude.
Thesis: Data acquisition and motion planning for a commercial vacuum robot.

Languages

Italian Native speaker

English B2 level, certified by ESOL Cambridge Institute.