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**
2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2024), **currently under review**.
Contributors: Michele Marolla, Salvatore Marcellini, Vincenzo Lippiello

2024 **Chapter 8. Application of Intelligent Aerial Robots to the Inspection and Maintenance of Electrical Power Lines**
Robotics and Automation Solutions for Inspection and Maintenance in Critical Infrastructures 2024 — Book chapter
DOI: 10.1561/9781638282839.ch8
Contributors: Anibal Ollero, Alejandro Suarez, Juan Manuel Marredo, Giovanni Cioffi, Robert Pìnièka, Goran Vasiljevi´c, Viet Duong Hoang, Michele Marolla, Jiaxu Xing, Martin Saska et al.

2023 **Development of a semi-autonomous framework for NDT inspection with a tilting aerial manipulator**
18th International Symposium on Experimental Robotics (ISER 2023)
2023 — Conference paper
Contributors: Michele Marolla, Salvatore Marcellini, Simone D'Angelo, Alessandro De Crescenzo, Vincenzo Lippiello, Bruno Siciliano

2023 **Design and Control of a Novel High Payload Light Arm for Heavy Aerial Manipulation Tasks**
Proceedings of the 20th International Conference on Informatics in Control, Automation and Robotics
2023 — Conference paper
DOI: 10.5220/0012202900003543
Contributors: Michele Marolla, Jonathan Cacace, Vincenzo Lippiello

Skills

Programming C/C++; ROS1/2 and Gazebo; MATLAB/SIMULINK; basic knowledge of Python. Low-level programming, especially MbedOS with STM32 microcontrollers.

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

Other software Linux (Ubuntu); Git and Github; 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.