Mattia Giurato, Ph.D.

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Employment History

06/24 – Present
AOCS & GNC Specialist (Subsystem Leader), D-Orbit s.p.a., Como, Italy
D-Orbit provides space logistics and satellite transportation solutions. As AOCS Subsystem Leader for the ION Satellite Carrier programme:

- Led development of AOCS software: attitude and orbit GNC algorithms and FDIR logic (sensor/actuator fault detection, isolation, and autonomous recovery), compliant with ECSS and Savoir guidelines; maintained the MATLAB/Simulink model-based design environment with code generation for FSW delivery.
- Executed the full V&V pyramid: MIL, SIL, PIL, and HIL campaigns.
- Contributed to the ION-mk3 next-generation satellite: requirements flowdown, subsystem budgets, and system-level analyses.
- Supported ground-segment operations for LEO missions: telemetry monitoring, anomaly investigation, and mission analysis.

02/20 – 06/24
Co-Founder and CTO, ANT-X s.r.l., Milan, Italy
ANT-X is a PoliMi spin-off producing educational UAV platforms and research infrastructure for universities and laboratories worldwide. As CTO, I held full technical ownership across a team of 6:

- Designed and sized multirotor platforms from scratch (COTS components, custom frames) based on Pixhawk/PX4 architecture; customized the PX4 firmware to enable seamless deployment of MATLAB/Simulink code-generated GNC logic, allowing researchers to design, test, and fly control algorithms without writing C++.
- Integrated multi-environment localisation: outdoor GPS and indoor motion-capture and stereo-vision with an onboard companion computer for high-level autonomy.
- Delivered dozens of platforms annually to university research labs across Europe and the USA.

02/20 – 10/20
Post-Doctoral Researcher, Department of Aerospace Science and Technologies, Politecnico di Milano, Italy. *(Concurrent with ANT-X until full-time transition in 10/20.)*
Research topics: Multirotor GNC, attitude and position control, model identification, parameter estimation, attitude and position estimation (EKF, complementary filter).

03/19 – 07/19
Visiting Researcher, LAAS - CNRS Toulouse, France.
Research topics: Control allocation of fully-actuated and over-actuated multirotors.

2018 – 2019
Teaching Assistant, Department of Aerospace Science and Technologies, Politecnico di Milano, Italy.
Assisted the lectures of the course "Estimation in Aerospace" for the M.Sc. tracks in Aeronautics and Space Engineering.

01/16 – 11/16
Research Assistant, Department of Aerospace Science and Technologies, Politecnico di Milano, Italy.
Supported the drone laboratory after M.Sc. graduation; contributed to research activities that led to the first conference publication and the Ph.D. application.

Education

11/16 – 01/20 **Ph.D. in Aerospace Engineering**, Politecnico di Milano, Italy.
Thesis title: *Design, Integration, and Control of Multirotor UAV Platforms*.

10/13 – 12/15 **M.Sc. in Automation and Control Engineering**, Politecnico di Milano, Italy.
Main topics: Robust control, Nonlinear control, Adaptive control, Estimation.
Thesis title: *Design, Integration, and Control of a Multirotor UAV Platform*.

09/10 – 10/13 **B.Sc. in Automation and Control Engineering**, Politecnico di Milano, Italy.

Certifications

02/22 **Professional License in Industrial Engineering (Esame di Stato, Ingegnere Industriale Sez. A)**, FOIM (Fondazione dell'Ordine degli Ingegneri della Provincia di Milano).

03/14 **Simulink for System and Algorithm Modeling**, MathWorks Training Service.

Skills

Languages	Italian, English.
Coding	C/C++, Python, MATLAB and Simulink, PX4, Ardupilot, ROS, ROS2, Gazebo, SITL, HITL, Git, CI/CD, Docker, Bash, Linux, LaTeX.
Embedded	RTOS, UART, SPI, I2C, CAN, Ethernet, MicroPython.
Tools	Jira, Confluence, Jama, Codebeamer.
GNC & Space	Attitude determination and control, orbit GNC, FDIR, ECSS, Savoir, requirements management, MIL/SIL/PIL/HIL.
3D Design and Printing	SolidWorks, Catia, Cura.
Drone Piloting	Over 10 years of experience and licensed with A1/A3, A2, and IT-STS.
Laboratory	Laboratory tools (oscilloscope, spectrum analyzer, ...), iron soldering.

Projects and Collaborations

2021 – 2023 **Drift Car Data Telemetry for the Italian Drift Championship**: Developed and serviced online and offline data processing algorithms, hardware devices, and network infrastructure for evaluating drift car competitions in collaboration with Hydra Data Analysis.

2018 - 2019 **UAV LAB**: Organized and lectured in the "Innovative Teaching Methods" course held at the Drone laboratory of the Department of Aerospace Science and Technologies, Politecnico di Milano, Italy, focusing on the design and integration of a multirotor UAV.

2014 **Aerospace System, Guidance, Navigation, and Control**: Organized and lectured in a theoretical and practical course provided through collaboration between Skyward Experimental Rocketry and The MathWorks.

2013 – 2015 **Skyward Experimental Rocketry**: Served as the leader of the Rocket Control Team.

Research Publications

Journal Articles

1 M. Ryll, D. Bicego, **M. Giurato**, M. Lovera, and A. Franchi, "Fast-hex – a morphing hexarotor: Design, mechanical implementation, control and experimental validation," *IEEE/ASME Transactions on Mechatronics*, vol. 27, no. 3, pp. 1244–1255, 2022. DOI: 10.1109/TMECH.2021.3099197

2 D. Invernizzi, **M. Giurato**, P. Gattazzo, and M. Lovera, "Comparison of control methods for trajectory tracking in fully actuated unmanned aerial vehicles," *IEEE Transactions on Control Systems Technology*, vol. 29, no. 3, pp. 1147–1160, 2021. DOI: 10.1109/TCST.2020.2992389

3. G. Bressan, A. Russo, D. Invernizzi, **M. Giurato**, S. Panza, and M. Lovera, "Adaptive augmentation of the attitude control system for a multirotor unmanned aerial vehicle," *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering*, vol. 234, no. 10, pp. 1587–1596, 2020. DOI: 10.1177/0954410018820193

4. G. Gozzini, D. Invernizzi, S. Panza, **M. Giurato**, and M. Lovera, "Air-to-air automatic landing of unmanned aerial vehicles: A quasi time-optimal hybrid strategy," *Journal of Guidance Control and Dynamics*, vol. 4, no. 3, pp. 692–697, 2020. DOI: 10.1109/LCSYS.2020.2991701

Relevant Conference Proceedings

1. **M. Giurato**, D. Invernizzi, S. Panza, and M. Lovera, "The role of laboratory activities in aerospace control education: Two case studies," in *Proceedings of the 21st IFAC World Congress*, Berlin, Germany, 2020.

2. P. Giuri, A. Marini Cossetti, **M. Giurato**, D. Invernizzi, and M. Lovera, "Air-to-air automatic landing for multirotor uavs," in *Proceedings of the 5th CEAS Conference on Guidance, Navigation and Control*, Milano, Italy, 2019.

3. **M. Giurato**, S. Panza, and M. Lovera, "Robust filtering for very high accuracy attitude determination," in *Proceedings of the 58th Israel Annual Conference on Aerospace Sciences*, Tel Aviv and Haifa, Israel, 2018.

4. D. Invernizzi, **M. Giurato**, P. Gattazzo, and M. Lovera, "Full pose tracking for a tilt-arm quadrotor uav," in *Proceedings of the IEEE Conference on Control Technology and Applications*, Copenhagen, Denmark, 2018.

5. D. Del Cont Bernard, **M. Giurato**, F. Riccardi, and M. Lovera, "Ground effect analysis for a quadrotor platform," in *Proceedings of the 4th CEAS Specialist Conference on Guidance, Navigation & Control*, Warsaw, Poland, 2017.

6. F. Haydar, **M. Giurato**, M. Lovera, and G. Sechi, "Very high accuracy attitude determination for los steering," in *Proceedings of the 10th International ESA Conference on Guidance, Navigation & Control Systems*, Salzburg, Austria, 2017.

7. A. Russo, D. Invernizzi, **M. Giurato**, and M. Lovera, "Adaptive augmentation of the attitude control system for a multirotor uav," in *Proceedings of the 7th European Conference for Aeronautics and Space Sciences*, Milano, Italy, 2017.

8. **M. Giurato** and M. Lovera, "Quadrotor attitude determination: A comparison study," in *Proceedings of the 2016 IEEE Conference on Control Applications (CCA)*, Buenos Aires, Argentina, 2016.

9. A. Rivolta, **M. Giurato**, F. Cuzzocrea, F. Rovere, and S. Farí, "Low cost mems imu calibration for aerospace student activities," in *Proceedings of the 1st Symposium On Space Educational Activities*, 2015.