

## RESEARCH INTERESTS

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🦋 Optimal control theory with numerical implications 🦋 On-board guidance 🦋 Low-thrust mission analysis

## EDUCATION

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### ESA OSIP Ph.D. in Aerospace Engineering

Co-funded research between [DART Laboratory](#) and the European Space Agency.

Supervisor: Prof. Francesco Topputo.

Politecnico di Milano, Italy

Nov. 2021 – current

### M.Sc. in Space Engineering

Full marks with honours, 110/110 cum laude

**Thesis:** “A Homotopic Direct Collocation Approach for Operational-Compliant Trajectories Design”.

Supervisor: Prof. Francesco Topputo.

Politecnico di Milano, Italy

Sep. 2018 – Dec. 2020

### M.Sc. in Aerospace Engineering

Full marks with honours, 110/110 cum laude

Team controller of the [KUOLEVA JAATIKKO](#) project under the [Alta Scuola Politecnica](#) program.

Supervisors: Prof. Livio Pinto, Prof. Carlo De Michele.

Politecnico di Torino, Italy

Sep. 2018 – Dec. 2020

### B.Sc. in Aerospace Engineering

Full marks with honours, 110/110 cum laude

Politecnico di Milano, Italy

Sep. 2015 – Sep. 2018

## PUBLICATIONS

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1. A. C. Morelli, **A. Mannocchi**, C. Giordano, F. Ferrari, and F. Topputo, “Initial Trajectory Assessment of a Low-thrust Option for the RAMSES Mission to (99942) Apophis”, in *Advances in Space Research*, Elsevier, article in press, 2024. [DOI](#)
2. **A. Mannocchi**, C. Giordano, and F. Topputo, “An indirect formulation of operational compliant low-thrust trajectories”, in *2024 AIAA SciTech Forum and Exposition*, Orlando, Florida, January 2024. [DOI](#)
3. **A. Mannocchi**, C. Giordano, and F. Topputo, “Closed-loop guidance for interplanetary CubeSats with indirect methods”, in *74<sup>th</sup> International Astronautical Congress*, Baku, Azerbaijan, October 2023.
4. **A. Mannocchi**, C. Giordano, and F. Topputo, “Design of operational compliant trajectories through a homotopic direct collocation algorithm”, in *33<sup>rd</sup> AAS/AIAA Space Flight Mechanics Meeting*, Austin, Texas, January 2023.
5. F. Ioli, E. Bruno, D. Calzolari, M. Galbiati, **A. Mannocchi**, P. Manzoni, M. Martini, A. Bianchi, A. Cina, C. De Michele, and L. Pinto, “A replicable open-source multi-Camera system for low-cost 4D glacier monitoring”, in *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, Copernicus GmbH, vol. 48, pp: 137–144, 2023. [DOI](#).
6. **A. Mannocchi**, C. Giordano, and F. Topputo, “A homotopic direct collocation approach for operational compliant trajectory design”, in *The Journal of the Astronautical Sciences*, Springer, vol. 69, pp: 1649 – 1665, 2022. [DOI](#).

## EXPERIENCE & TRAINING

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### Visiting Researcher at ESA ESTEC

CubeSat Systems Unit, TEC-SPC

Supervisor: Mr. Roger Walker.

Noordwijk, Netherlands

Feb. 2024 – current

**Visiting Researcher at ESA ESTEC**  
Guidance, Navigation & Control section, TEC-SAG  
Supervisor: Mr. Massimo Casasco.

Noordwijk, Netherlands  
Feb. 2023 – Jul. 2023

**Temporary Research Fellowship (Assegno di Ricerca)**  
DART Laboratory

Milan, Italy  
Apr. 2021 – Oct. 2021

Research for satellites compliance and for algorithms to process and exploit satellites' optical and radar images within the IMPRESA project.

**ESA Standardization Training Course**  
ESEC-Galaxia

Online  
Sep. 2020 – Oct. 2020

Course on the European Cooperation for Space Standardization Standards (ECSS) for project management, quality assessment, product assurance, mechanisms, system engineering, control engineering, and more.

**ESA Concurrent Engineering Challenge**  
ASTRA Team

Milan, Italy  
Nov. 2019

Feasibility study challenge for a mission to the moon of Saturn Enceladus, with Prof. Michèle Lavagna.

**ESA Rosetta Science Operations Scheduling Legacy Workshop**  
ESEC-Galaxia

Transinne, Belgium  
Apr. 2019

Workshop on space missions operations schedule, with the Rosetta mission as a case study.

## TEACHING EXPERIENCE

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**Teaching assistant & Tutor** at Politecnico di Milano, Italy

Sep. 2023 – Dec. 2023

*“Spacecraft Attitude Dynamics”, Space Engineering M.Sc. course, supervisor Prof. Franco Bernelli Zazzera.*

**Teaching assistant** at Politecnico di Milano, Italy

Jun. 2020 – Jul. 2020

*“Alla scoperta dei satelliti”, PoliCollege 2020 Summer session course, supervisor Prof. Franco Bernelli Zazzera.*

**Tutor** at Politecnico di Milano, Italy

Mar. 2020 – Jul. 2020

*Personal tutor within the Multichance service for the exam “Fondamenti di Sperimentazione Aerospaziale”.*

## PROJECTS

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**ESA | RAMSES**

Jul. 2023 – current

Performing the mission analysis for the pre-phase A & phase A of the Rapid Apophis Mission for Security and Safety (RAMSES) mission under ESA contract.

**ERC | GUIDO**

Jun. 2023 – current

The project **GUIDO**, funded by the European Research Council (**ERC**), aims at developing an integrated computing unit for autonomous spacecraft guidance in deep space.

**ERC | EXTREMA**

Jun. 2022 – current

The ERC funded Engineering Extremely Rare Events in Astrodynamics for Deep-Space Missions in Autonomy, **EXTREMA**, project aims to enable CubeSats with autonomous guidance, navigation and control capabilities, ultimately triggering the democratization of the space.

**ESA | AUTONOMOUS GUIDANCE FOR DEEP-SPACE CUBESATS**

Nov. 2021 – current

Working on the **OSIP**-funded project for the design and application of an autonomous guidance algorithm to be demonstrated on-board M-ARGO CubeSat.

## IMPRESA

Apr. 2021 – Oct. 2021

IMage Pattern Recognition for Enhanced Situation Awareness (IMPRESA) project, in collaboration with Italian Navy and BV Tech S.p.A, aimed to the realization of a technological demonstrator for a dual-use system for advanced elaboration of satellite imageries with a focus on maritime situational awareness.

## SCHOLARSHIPS & AWARDS

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- Alta Scuola Politecnica diploma and scholarship, Politecnico di Milano and Politecnico di Torino, Italy. 2018–2020
- Scholarship for high academic performance, Politecnico di Milano, Italy. 2017–2018
- Scholarship for high academic performance, Politecnico di Milano, Italy. 2016–2017
- Best freshmen award for the a.y. 2015/2016, Politecnico di Milano, Italy. 2015–2016

## LANGUAGES

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- **Italian:** Mother tongue
- **English:** C1 level **EXAMS:** TOEFL: Nov. 2020, 105/120 - FCE: Oct. 2017, 180/190.
- **Spanish:** A2 level

## MEMBERSHIPS

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- **Space Generation Advisory Council (SGAC)** member Oct. 2023 – current
- **Women in Aerospace Europe (WIA Europe)** member Jul. 2023 – current
- **American Institute of Aeronautics and Astronautics (AIAA)** member May 2023 – current
- **American Astronomical Society (AAS)** member Jan. 2023 – current

## OTHER ACADEMIC ACTIVITIES

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- **Active reviewer** for two of the major journals in the aerospace sector, the Journal of Guidance, Control, and Dynamics, and the IEEE Transactions on Aerospace and Electronic Systems.
- **Co-advisor** of 10 students for their M.Sc. theses at Politecnico di Milano.
- **Volunteer technical judge** for the 2023 Region VII AIAA Student Paper Conference, 27–28 November 2023 at the University of New South Wales Canberra, Australia.
- **Volunteer tour guide** for showing Politecnico di Milano to new students for the fall semester of the a.y. 2023-24.

## OTHER INTERESTS

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- Passionate reader from when I was young, I write also, mainly poetry at the moment.
- I usually spend my early mornings in the gym and I love mountains and hiking in nature.
- I am an enthusiastic traveler, I love to explore in solo and group trips.

Noordwijk, February 1, 2024