Vishnuvardhan Shakthibala

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Education

Politecnico Di Milano — *Milano, Italy*

MSc in Space engineering — *Sept 2018 - Jul 2021*

- Average grade : 99/110 | Thesis grade: 6/7
- **Thesis title:** Autonomous motion planning spacecraft guidance for inspection mission
- Adopted the FMT* motion planning algorithm to find guidance law.
- Modeled the Spacecraft Inspection problem to be able to apply FMT* algorithm.
- **Main courses:** Orbital mechanics, Space mission design and analysis, Attitude dynamics and control, System Identification and Estimation, and Modeling and simulation of Aerospace systems

Alliance University, India — *Bengaluru, India*

Bachelor of Technology in Aerospace engineering — *Aug, 2013 - Aug, 2017*

- Cumulative GPA: 3.7/4.0
- Bachelor's thesis: Spacecraft trajectory optimization using Evolutionary Algorithm

CONFERENCES

IAC 2021 — *Dubai*

PHASE-A DESIGN OF ICE CREAM: A COST-EFFECTIVE MARS SAMPLE RETURN MISSION

- Phase A study for Mars sample return mission was presented as a conference paper at IAC 2021, Dubai.

Work Experience

Spacecraft dynamics control and system engineering group — *Italy*

Group leader (Volunteer Part-time) — *Dec, 2023 - Present*

- Co-Founder and group leader of an independent research group focused on Space systems.
- Driving and guiding the development of AOCS open-source simulator.
- Involved in research problems related to Cubesat formation flying, with a goal to develop robust GNC by leverage natural dynamics while respecting the constraints.

Brain technologies — *Pordenone, Italy*

System Validation Engineer at **Electrolux** — *Jun,2023 - Feb, 2024*

- Functional validation (UI Firmware, CCF, Mainboard) of complete integrated prototypes
- Create a test plan which defines the kind of validation and verification that needs to be carried out
- Managing and solving issues with other departments.

Brain technologies — *Trento, Italy*

Software Developer for ADAS systems at **Stellantis - CRF** — *Sep, 2022 -May, 2023*

- Developing software in C++ on RTMaps for Software in loop testing aimed at Rapid prototyping.
- Successfully implemented the interfaces, enabling seamless integration of third-party devices – Radar, Camera from tier 2 providers into prototyping process.
- Automating and analyzing strategies to accelerate the migration of models from Simulink to RTMaps.
- Conducted bench tests to validate algorithms for real-time data processing using CAN data.
- Collaborated with the development team to fine-tune components/interfaces to reduce processing overload and increase the usability.
- Building interactive HMI using python to visualize ADAS/ADX features.
- Interacted with Dspace products – AUTERA AutoBox, Microautobox. CAN Message data logging and reading.
- **Skills:** RTMAPS, C++/C, Python, Matlab, Simulink, CAN protocol.

Polispace, Politecnico di Milano. — *Milan, Italy*

Junior Project Manager (Volunteer) — *Nov, 2020 - May, 2021*

- Supervised a team of 10 undergrads to work on end-to-end spacecraft subsystem design from high-level requirements.
- Conducted regular teaching activities to equip the team with necessary knowledge and skills in Mission design
- **Skills:**System engineering, Project management.

Society for Space education research and education — *Bengaluru, India*

Teaching Mentor (Volunteer) — *Aug, 2020 - Mar, 2021*

- Motivated and mentored interns to work on interesting space technology-related problems.
- Assessed and evaluated the quality of the internship projects.
- **Skills**: Teaching, Performance evalution.

Skills

Programming	Matlab, Python,C++,C, Shell scripting
Software	Simulink, Real-time multisensor application (RTMAPS)
Miscellaneous	Linux-Ubuntu, LaTeX(Overleaf), Microsoft Office, Git, GNU build tools.
Soft Skills	Team work, Time management, problem-solving, leadership, adaptability, communication.

University Projects

Drag Free trajectory control (DFTC) *Milan, Italy*

Politecnico Di Milan *Nov 2020 - Dec 2020*

- Modelled the multi-disciplinary domain of the Uni-directional DFTC system.
- Numerically analyzing the system dynamics and selecting suitable integrator.
- Simulated and analyzed the model for nominal and off-nominal conditions in MATLAB.
- Parametric study is carried out to study the sensitivity of the system performance with variations in parameters.
- Simulated and analyzed the model for nominal and off-nominal conditions in MATLAB.
- **Skills:** Modeling and Simulation of dynamic systems, Classical control theory.

ARGO - Phase A space mission design and analysis *Milan, Italy*

Politecnico Di Milan *Feb, 2020 - Jun, 2020*

- Designed the complex space mission using concurrent system engineering principles.
- Handled collection and dispersion of state-of-the-art data to multi-domain subsystems.
- Responsible for the preliminary design of the OBDH subsystem.
- **Skills:** Skills acquired: System Identification, State estimation, Monte Carlo Simulation, Control theory.

Preliminary orbital trajectory design and perturbation analysis *Milan, Italy*

Politecnico Di Milan *Nov 2018 - Jan 2019*

- **Preliminary Trajectory Design:** Mission was to find the optimal trajectory between Mars and Mercury by leveraging the fly-by maneuver around the earth. Various trajectories are evaluated by pruning the solutions from feasible porkchop plots (built using Ephemeris) combined with the optimal fly-by maneuver.
- **Perturbation Analysis:** Analyzed the evolution of the prescribed orbit with effects of perturbations such as 3-body and J2 perturbation.
- Obtained perturbed orbit was then compared with the real data from the existing orbit of comparable characteristics.
- **Skills:** Orbital/Space mechanics, Evolutionary algorithms (Genetic algorithm).

UAV system Identification and State estimation *Milan, Italy*

Politecnico Di Milan *Jun 2020 - Aug 2020*

- Frequency domain Grey box mod el identification of Linear lateral dynamics of UAV by using Experimental Data (with the aid of the Greyest function of Matlab).
- Data filtering was carried out by eliminating the noises and identifying the major frequency content of the dynamics.
- Prior to parameter estimation, the initial condition required for the Output error method was obtained by using both the Genetic Algorithm and Monte - Carlo Analysis.
- Designed Kalman filter (as a sensor fusion technique) to estimate the lateral velocity (one of the state variable) using intertial measurements.
- **Skills:** Orbital/Space mechanics, Evolutionary algorithms (Genetic algorithm).

Achievements & Scholarship

Handled the team as a project manager for AIAA UG Space mission design competition, AIAA *2021, US*

University Financial Aid - DIRITTO ALLO STUDIO UNIVERSITARIO scholarship recipient, POLIMI *2018-2021, Italy*

Top three finalists out of 76 , Design for additive Challenge (Competition by Additive Industries) *2017, Netherlands*

Best New Entry team award , 33rd American Helicopter Society undergraduate student design competition *2016, US*

Interests

Documentary, Films, Cricket, Snow-Boarding

Languages

English - IELTS - C1, 2017	Professional proficiency
Kannada	Native proficiency
Tamil	Bilingual proficiency
Italian	Beginner