RASHIKA SUGGANAHALLI NATESH BABU

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PROFILE SUMMARY

Post-graduate Space Engineer, passionate about cutting-edge technologies in **Space Systems engineering**, **Attitude Dynamics and Control of Spacecraft, Satellite Communication** domain**.** Self-motivated professional working with experts in implementing **Model-based system engineering** practices until the delivery of projects/products. Keen to apply technical and analytical skills to solve challenging problems using **MATLAB & Simulink, Python, and C++** and eager to implement System Engineering principles in developing sophisticated space missions and exploration studies.

ACADEMIC QUALIFICATION

Politecnico di Milano, Italy **Sep 2018 – Jul'21**

- Masters of Science in **Space Engineering**; Grades: 3.3/4
- **Courses:** Orbital Mechanics; Space Propulsion; Dynamics and Control of Spacecraft Structures; Attitude Dynamics and Control of Spacecraft; Space Mission Design and Analysis; Telecommunications; Space Physics

Alliance University, India **Aug 2013 – Jul'17**

- Bachelor of Technology **in Aerospace Engineering**; Grades: 3.6/4

Flight Laboratory, Indian Institute of Technology, India **Jan 2016 – Feb'16**

- Flight Testing Exercises at ground level and various phases of flight. Flew Piper Super Cub & Saratoga to record flight data

WORK EXPERIENCE

Junior Consultant – Systems Engineer, *Capgemini Italia, Italy* **Oct 2021 – Present**

- Developed and Managed system requirements leveraging **Model-Based System Engineering** practices for On-Board Charger dedicated to electric vehicles and Infotainment and Adaptive cruise control system for Light Vehicles
- Defined and analyzed the Architecture and algorithm for ECUs and ADAS of Light and Heavy vehicles
- Developed **verification and validation test criteria** along with risk analysis of system requirements in accordance with ISO / IEC 15288: 2015 (SYS.2)
- Assessed for any non-conformances with the developed requirements and test criteria followed at the integration level.
- Automated the task of attributes creation and KPI calculation on **DOORS** by developing a script on **DXL**, saving man-hours by 30%.
- **Keywords:** INCOSE, Model-based System Engineering, Requirements, SysML **Tools:** IBM-DOORS, Polarion, JIRA, Confluence, SVN, MS-Office

Master Thesis Student, *DAER, Politecnico Di Milano, Italy* **Sep 2020 - Jul'21**

Title: Automatic Mass Balancing of 3-DOF Attitude Simulator using System Identification – *Read Abstract here*

- Built parameter estimation based on the gray-box model and adaptive control to make **3DOF Hardware in the Loop** Attitude simulator autonomous.
- Carried out Sensor-fusion efficiently using the Least-Square approach and Kalman Filters and developed an efficient estimation algorithm based on the Extended Kalman filter
- Increased stabilization efficiency with multi-masses by implementing extended Kalman Filter for horizontal axes and adaptive control for transversal axis.
- **Keywords:** HIL, LQR, Adaptive control, Kalman filter, UKF, EKF; Lyapunov function **Tools:** MATLAB/Simulink, LaTeX, GitHub

Space Mission Design team Instructor/Mentor, *Society of Space Education Research and Development,* **Aug 2020 – Jun'21**

- Guided and mentored students to develop Phase 0/A Space Mission studies, Attitude and controls, and Rocket propulsion projects.
- Devised resources and problem sets for students to provide additional practice and improve knowledge on complex subjects
- Successfully developed 7+ projects by **guiding 70+ students** strictly following standard protocols.
- **Keywords: Requirement and Model-based** systems engineering, Controls, Leadership, Team management, ECSS

Logistics Officer, Systems Team, *Space@yourService- Mission Asclepios, Switzerland* **May 2020 – Jul'21**

- **Analog Astronaut mission** by students for the students. Designed Spacesuits + Communication system + Mission control center procedures.
- **Keywords:** System engineering, Database management; **Skills:** Leadership, Team management, Deadline oriented

Graduate Apprentice Trainee, *Hindustan Aeronautics Ltd, India* **Nov 2017 – Jul'18**

- Designed Indian Launch Vehicle GSLV MK III subsystem's in **AutoCAD**. Lead inventory creation and procurements of outsourced products task. **Database management** and version control were done using **ERP-IFS** software from **Phase 0 to the launch** of MK III
- **Verified and validated** outsourced products to integrate with subsystems.
- **Skills:** Teamwork, Result driven, Data management; **Tools:** AutoCAD, ERP-IFS

Project Trainee, ***Indian Space Research Organization, India*** **Feb 2017 – Jun'17**

Title: Modeling of Media Correction and Atmospheric Drag for Orbit Determination, supervised by Padmdeo Mishra

- Performed **statistical method** of **data analysis** to interpret the efficiency of existing GPS media correction algorithms - **Klobuchar model and NeQuick model**
- Developed an algorithm to compensate for GPS communication delay caused by Ionosphere and atmospheric drag, which is 30% more efficient than available Klobuchar coefficients.
- **Keywords:** GPS Satellite, Perturbations, Least Square, Data Analysis; **Tools:** MATLAB, C++, Microsoft office package, Linux

PAPER PUBLICATIONS

- Alessio Bocci, **Rashika Sugganahalli Natesh Babu,** et a, IACl 2021: "ARGO: a planetary defense mission to test gravity traction techniques" - Read paper here
- Francesco Ventre, **Rashika Sugganahalli Natesh Babu,** et al, IAC 2021: "PoliSpace: a student approach for enabling the growth of the Italian Space workforce" - Read paper here

SELECTED ACADEMIC PROJECTS and RESEARCH WORK

Asteroid Redirection with Gravity Tractoring and Observation-ARGO **Feb 2020 – Jul'20**

- SMAD project by an international team of 10; Supervised by Michele Lavagna; *Read Abstract here*
- **Phase A** study of a Gravity Tractoring assessment on Binary Asteroid system- following requirement-based systems engineering approach and **ESA ECSS and CCDSS** standards. Designed each subsystem with budget analysis and **AIV**
- Lead Engineer in designing complete Telecommunication system, RF analysis, and Ground link performed with FreeFlyer software.
- **Keywords:** Requirement and Model-based systems engineering, ECSS standards; **Tools:** MATLAB & Simulink, GMAT, FreeFlyer, LaTeX; **Skills:** Team management, Leadership, Deadline oriented, Punctual

Attitude Determination and Control of 12U CubeSat using reaction wheel and cold-gas thrusters **Sept 2019 – Feb'20**

- Designed control logic for Detumbling, Slew, and tracking phases. ADCS individual project supervised by Biggs James Douglas
- Implemented disturbance rejection control system in the tracking phase.
- **Keywords:** Attitude and Control, Lyapunov stability; **Tools:** MATLAB & Simulink, LaTeX

Conceptual Design and Performance Estimation of Sounding Rocket **Sept 2019 – Feb'20**

- Launch Vehicles course project by a team of 10 supervised by Maggi Filippo.
- Designed a sounding rocket with a launch from the Mediterranean area carrying a payload of 150 kg. Performance, Budget and landing uncertainty analysis was performed considering Microgravity conditions.
- **Keywords:** House of Quality, Pareto Rule, Microgravity, Project Management **Tools:** MATLAB & Simulink, LaTeX, MS Excel

Design of Interplanetary transfer using Gravity assist **Sept 2018 – Feb'19**

- Orbital controls and maneuvering course project by a team of 4, supervised by Camilla Colombo.
- **Keywords:** Lambert problem, DeltaV minimization; **Tools:** MATLAB & Simulink, LaTeX

SKILLS SUMMARY

- **Programming:** C & C++ (*Certified from BALC Institute, India*)**,** Python, HTML/CSS, LaTeX*(Certified from IIT, Bombay)*
- **Tools:** MATLAB & Simulink, AutoCAD, CATIA, ANSYS, SolidWorks, OpenFoam, FreeFlyer, GMAT, STK, GIT, MS Office, IBM DOORS, Jira, Confluence, SVN, Polarian
- **Data and tasks management:** ERP – IFS, Trello, Slack
- **Platforms:** Windows, Linux, Arduino, Raspberry Pi, macOS
- **Languages:** English, German (A2), Italian(A1), Kannada, Hindi, Telugu
- **Hobbies:** Drawing, Painting, Blogging, Volunteer

SELECTED MENTORED PROJECTS

- **Conceptual Design of an Autonomous Asteroid Mining Robot - Read here**
- **Conceptual Design of Two-Stage Rocket to reach Karman Line - Read here**
- **Top-Level Mission Analysis and Feasibility Study of a Near-Earth Asteroid Mining Mission and Resource Return - Read here**
- **STARS-Simplified Tool for Analysis of Rocket Systems - Read here**
- **Space Mission Design - Team ICARUS VI - Read here**