

# Aastha Bhatt

## Space Systems & Satellite Communications Engineer

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## EDUCATION

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### Master in Space Studies Specialization- Space Engineering and Applications 2025 – Present

#### International Space University, France

- **Key Subjects:** Advanced Semiconductor Technology, Advanced Optical Sensing, Space and satellite technology, Advanced Optoelectronics, Advanced Engineering Mathematics, System Engineering, Propulsion Systems, Ground station technologies, Remote sensing and Applications.

### Bachelor of Engineering in Electronics and Communication 2020 – 2024

#### V.V.P. Engineering College, India

- **Key Subjects:** Power Electronics, Analog & Digital Electronics, Microprocessors and Microcontrollers, Control System Theory, Industrial Automation, Satellite communication, Digital Signal Processing, Radar and Radio Navigation.
- **Final CGPA:** 9.66/10

## WORK EXPERIENCE

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### Project Trainee | Physical Research Laboratory (PRL) | India 01.2024 – 04.2024

- Synthesized multi-source atmospheric datasets from ECMWF, MOSDAC, and NASA EarthData using MATLAB to model vertical profiles.
- Performed trend analysis on Lidar, Radiosonde, and Ceilometer data to support space-based atmospheric science studies.
- Automated data processing scripts for high-volume satellite telemetry, reducing manual analysis time for atmospheric trend detection

### Research Trainee | Space Application Centre, ISRO | India 08.2023 – 11.2023

- Architected a Pointing, Acquisition, and Tracking (PAT) electronics driver for satellite-based quantum communication using STM32 microcontrollers.
- Integrated high-precision DAC/ADC components and DC-DC converters to optimize pointing accuracy for inter-satellite optical links.
- Developed firmware for real-time control loops, ensuring stable feedback for satellite quantum key distribution (QKD) payloads

### Intern | Aartronix Innovations Pvt. Ltd | India 02.2023 – 05.2023

- Simulated Power Factor Correction (PFC) circuit topologies using MATLAB and Simulink to improve power efficiency in electronic subsystems.

## PROJECTS

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### Pointing, Acquisition, and Tracking (PAT) System

- Designed and implemented an electronics driver using STM32 microcontrollers for satellite-based quantum communication. This project involved integrating DAC/ADC and DC-DC converters to enhance pointing precision for optical links.

### Martian Rover and Drone

- A team project focused on designing a system for 3D lava tube mapping. The project included seismic sensing and spectroscopy for the detection of minerals and bio signatures.

### 1U CubeSat

- Designed a 1U CubeSat specifically for environmental monitoring.

### Ground Station Software Development

- Developed software for a ground station to manage the transmission and reception of data.

### Atmospheric Data Analysis

- Analyzed multi-source atmospheric data from ECMWF, MOSDAC, and EarthData using MATLAB. This involved deriving vertical profiles and trend analyses for space and atmospheric science studies.

### **Fingerprint Door Locking System**

- Developed a security system using R305 modules.

### **Robotic Cars**

- Designed a Bluetooth-based car controlled via gestures and voice commands.

### **Power Factor Correction (PFC)**

- Developed simulations and models for PFC circuits using MATLAB and Simulink.

## **LITERATURE REVIEWS & RESEARCH**

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### **Satellite Ground Station Architecture**

- Conducted a comprehensive technical review of high-frequency radio wave propagation and ground station software-defined radio (SDR) frameworks. Analyzed the integration of automated tracking algorithms for improved signal-to-noise ratios during LEO satellite passes.

### **Hydrogen Fuel Cell Technology for Sustainable Transport**

- Authored a technical review on the chemical kinetics and power density of hydrogen fuel cells. Evaluated the feasibility of Polymer Electrolyte Membrane (PEM) fuel cells for heavy-duty vehicle applications and their potential integration into future lunar/planetary surface mobility power systems.

### **Power Factor Correction (PFC) Topologies**

- Developed a comparative analysis of Boost and Interleaved PFC converter topologies using MATLAB/Simulink. Validated efficiency gains and Harmonic Distortion (THD) reduction for high-power electronics used in satellite power conditioning units.

### **Earth Observation & Atmospheric Trend Analysis**

- Published research on multi-instrument data fusion (Lidar, Radiosonde, and Ceilometer) to derive vertical atmospheric profiles. Investigated aerosol-cloud interactions and their impact on long-term climate modeling using data from ISRO and NASA repositories.

## **KNOWLEDGE & SKILLS**

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### **TECHNICAL SKILLS**

- **Core Systems:** MBSE (Cameo Systems Modeller), Satellite Link Budgeting, PAT Systems, RF Engineering, Sensors and Actuators.
- **Hardware/Embedded:** STM32, Arduino, Raspberry Pi, Altium, KiCAD, DAC/ADC Integration, Power Electronics.
- **Software/Tools:** MATLAB, Simulink, GNU Radio, TINA-TI, Keil uVision, CubeMX, STK (Satellite tool kit), Cameo Systems Modeller (CSM)
- **Data Analysis:** Satellite Telemetry, Radiosonde, Lidar, Ceilometer, TopCAT, ArcGIS, QGIS

### **LANGUAGES**

- English (Fluent) | French (Good) | Gujarati (Native) | Hindi (Fluent)