Pratik Prakash Aher

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Education

Program	Institution/Board	%/CGPA	Year
B.Tech.	IIST *Thiruvanathapuram, Kerala*	**9.04/10**	2020-24
Higher Secondary Examination	Sri Chaitanya Junior College *Pune, Maharashtra*	**87.54%**	2018-20
Secondary School Examination	Strawberry English Medium School *Sangamner, Maharashtra*	**96.0%**	2017-18

Key Projects

Satellite Ground Station, IIST

1. *Handled Satellite Ground Station* **May 2022 - Jan 2023**

(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- I was responsible to take the passes of INSPIRESAT-1 (1st Satellite launched by our Institute) and keep track of the health of the Spacecraft. The satellite is working good until now and has successfully completed its mission objective. As a head of the ground station, I had to look on the operations and the maintenance of the antennas and complete electrical and electronic system following it. Several damages due to lightning strikes were resolved and the whole setup was rebuilt again.

2. *Configured and Automated Ground Station Software* **July 2022 - October 2022**

(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- Configured a Ground Station Software using Ball Aerospace's COSMOS (Now Openc3) which can be use to receive as well as to send commands to Satellite. I have also automated the configuration of the software for the ease of future use and to make it mission independent. For automating the configuration, I have built a python application which takes in an excel file and then generates all the necessary files required for COSMOS to configure. This application is built for systems engineers who can configure COSMOS much easily without going in depth of its documentation.

3. *Tracking POEM-1 Platform* **July 2022 - August 2022**

(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- POEM (PSLV Orbital Experimental Module) platform was developed by ISRO to carry out experiments on the fourth stage of PSLV rocket until it deorbits. On POEM-1, a payload which transmits national anthem and preamble of India was integrated. Our ground station was one among all other ISRO ground stations to receive the signal and decode all the 15 lines of preamble text embedded into it.

4. *Commissioning activities for ARCADE and SCOOB-II* **July 2023 - August 2023**

(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- Our ground station at IIST was chosen to be part of the commissioning activities for the Singaporean CubeSats: ARCADE(27U) and SCOOB-II(3U) which were launched on 30th July. I was head of the commissioning and the post launch operation team. First orbit after launch, beacons were seen and successfully decoded. The satellite health parameters were nominal and it also highlighted the deployments of the solar panels on it. There after all the subsequent ground passes for both the Cubesats were tracked and satellite parameters were monitored.

5. *Contribution to the Success of Dhruva Space's LEAP-TD Mission* **January 2024 - May 2024**

(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- As a head of the satellite ground station, I handled the post launch operations of LEAP-TD mission of Dhruva Space private startup company in India. This mission was launched onboard ISRO's PSLV-C58 POEM-3 platform. I worked with ground station operators team from Dhruva Space to take regular passes of the LEAP-TD payload.

Small-spacecraft Systems and Payload Centre (SSPACE), Nano-sat Lab, IIST

1. *Design and Testing of Flight Software for PiLOT Payload* **December 2022 - April 2023**
(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- I was part of PiLOT (PSLV In Orbital OBC and Thermals) payload mission launched on 22nd April 2023 by PSLV C-55(ISRO) launch vehicle. My role in this mission was to design and test the flight software of the payload. I was also involved in carrying out all the flight readiness testing before launch of our payload. I also got an opportunity to integrate our payload on 4th stage of PSLV. After launch, payload was switch ON and the data was successfully downlinked and decoded. According to the data received, the software worked as expected. Main objective of the mission was to validate the thermal model of a additive manufactured 1U structure placed on POEM module of fourth stage PSLV launch vehicle.

2. *RTOS based Flight Software* **May 2023 - August 2023**
(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- As part of my internship project, I have designed an architecture based on Real Time Operating System for a flight software which will be used in upcoming satellite missions. This type of flight software architecture is an advance version of the earlier developed software for PiLOT mission. It will be used for mission which has more complexity and more than one payload subsystems. The architecture designed above was also been analyzed using appropriate tools used to analyzed the Real Time Operating System based softwares.

3. *In Orbit Reprogramming for CubeSats* **August 2023 - May 2024**
(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- To change the functionality of CubeSats drastically over the course of the mission runtime and to recover from any anomalies faced in the orbit, I was able to implement reprogramming of the Flight Software on a custom made On Board Computer (Processor: Microsemi Smartfusion-2) PCB Card designed at SSPACE lab in IIST.

4. *RS485 POEM Controller Module* **January 2024 - May 2024**
(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- A FPGA based RS485 controller Module was developed to interface payloads on the POEM platform with the packages of POEM platform. Using this interface the payload is able to transfer its telemetry data to the POEM packages and also receive commands from the POEM packages into the payload. This controller module helped in reducing the response time for telemetry transfer and also reduced the overload of operation on the micro-controller.

5. *Design and Testing of Flight Software for GRACE Payload* **January 2024 - May 2024**
(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- I was part of GRACE (GMC, Reprogramming And Communication Experiment) payload mission on POEM-4 platform of PSLV-C61 mission. I was the head of Flight software and systems integration subsystem for the payload. A custom designed communication board based on ADF7030-1 transceiver IC provided by Analog Devices was interfaced with the On Board Computer and was operated as per the mission requirements. A radiation counter based on GM tube was one another scientific instrument placed on the GRACE payload.

6. *Design and Testing of Flight Software for INSPIRESat-3* **January 2024 - May 2024**
(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- INSPIRESat-3 is one another cubesat in the INSPIRE satellite program. I contributed in developing of the flight software for it. Drivers for payloads and other interfacing sensors were developed and tested. INSPIRESat-3 is a multi-payload satellite which adds on to the tasks and processing to be done by the On Board Computer. FPGA and the RAM over the System On Module was efficiently used to optimize the storage and runtime memory for running the software.

7. *Contributed to the Major Update of INSPIRE Decoding Software* **January 2024 - May 2024**
(Guide: Prof. Priyadarshnam Hari) *IIST Kerala*

- INSPIRE decoding software is used to decode the raw bytes of data into its final human readable form. I upgraded the software to make it storage efficient. All the decoded data was also stored in a single file which will make it easy for the researchers to analyze the data.

Complex Networks

1. ***A Complex Network Analysis of the Youtube Video Network on Israel-Hamas War*** **August 2023 - Jan 2024**
(Guide: Prof. B. S. Manoj) *IIST Kerala*

- A course project for an elective course of complex network at IIST was been published as a conference paper in one of the IEEE conferences. A dataset created for the analysis of the network was also published on IEEE Dataport website. I also got an opportunity to participate in the conference.

Technical Skills

- Programming Language: C, C++, Python, Verilog HDL, Assembly, Arduino
- Software/Tools: Libero, Softconsole, Gephi, LTspice, Matlab, Simulink, LabView, PathWave ADS, Latex

Achievements/Awards

- Successfully qualified *JEE Mains* (2020),
- Among Top 1% in *JEE Advance* (2020),
- Class Rank 3rd in *National Mathematics Olympiad* (2018),
- Class Rank 3rd in *Secondary School Examination* (2018),
- Class Rank 1st in *National Science Olympiad* (2016),

Others

- Hobbies: Playing Badminton, Reading Autobiographies
- Languages: Marathi, Hindi, English.

Date: 4th August, 2024 (Pratik Prakash Aher)