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Experience

DRDO SASE's UAV Fleet Challenge
Inter IIT Tech Meet 8.0

Defence Research Development Organisation, Snow & Avalanche Study Estt — *Oct. 2019 - Dec. 2019*

- Objective - to develop UAV quadrotor fleet based on **Swarm Technology** to search for and locate a target object
- Developed a feasible method to use miniature aerial vehicles for coordinated area coverage and surveillance
- Worked in a team of two to build **three** quadrotors for **autonomous waypoint navigation** with Pixhawk flight controller
- Executed **intensive testing** to improve the loiter performance within a budget constraint of **1.5 lakhs**(₹)
- Improved the flight performance by optimising thrust to weight ratio, the electric power used by varying weight and motor-propeller combination to give a hover **flight time of 15 minutes**
- Secured the **second position** in the abstract submission round and qualified for the final competition

Robust Multicopter Control Against Strong Winds
MAVLab IIT Bombay

Supervised learning project under Prof. Hemendra Arya, Aerospace Department — *Aug 2020 - Present*

- Completed more than **60 hours** in the ongoing research work on achieving a robust control on a quadrotor model
- Studied **15+ research papers** covering various aspects of control in a simulated turbulence using the **Dryden wind model**
- Conducting a literature study on various types of controllers including **Model Predictive Control** and **PID Control**
- Learnt about the mathematical model including the kinematics and dynamics of a quadrotor involved in motion

IRIS - Semi Autonomous Drone
Aeromodelling Club, IIT Bombay

Quadcopter with a V-type configuration carrying a high resolution onboard camera — *Aug. 2014 - Apr. 2016*

- Project aimed at developing a quadcopter to generate aerial image datasets using an onboard camera for image processing
- Attained a **higher hover efficiency** and flight time by decreasing the **disk loading** for the quadcopter by **73.99 percent**
- **PID tuned** the drone and minimised electrical interference to the sensors to obtain increased stability
- Analysed the flight data to reduce the noise while maintaining a sufficiently **low latency** during flight

Air Crash Investigation
IIT Bombay

Introduction to Flight, Course Project, Prof R. K. Pant, Aerospace Department — *Sep. 2020 - Oct. 2020*

- Investigated two crashes in aviation history- Trans World Airlines flight 800 and Cathay Pacific Airlines flight 780
- Reviewed the course of events, the **technical failures** and the changes introduced in the future flights

Aerial Robotics
Coursera

Course Project, Prof Vijay Kumar, Coursera — *Aug 2020 - Sep 2020*

- Learnt the basics of linear controllers for unmanned aerial vehicles and **motion planning** in a restricted environment
- Simulated a quadrotor hover and trajectory tracking in a two dimensional model setup, PID tuned the controller

Literature Study on Laser Cutting of Tubes
IIT Bombay

Manufacturing Processes, Course Reading Project under Professor Ramesh K. Singh — *Feb 2020 - Apr. 2020*

- Examined material based experimental studies and different methods employed in laser tube cutting
- Studied the effect of laser beam parameters and material parameters on the quality of cuts obtained
- Learnt about the ongoing research in laser tube cutting and patents related to industrial setups

Technical Activities

Boeing Aeromodelling Competition
Techfest, IIT Bombay

National level competition based on aircraft design, with 100+ competing teams — *Jan 2020*

- Designed and fabricated a **fixed-wing aircraft** from depron with **payload dropping** mission capability
- Attained a **payload fraction** of **0.44** with the constraints of fixed wingspan and thrust to weight ratio
- Identified wingtip stalls as a cause of the crash and hence used stall fencers to prevent mission failures

Amandron - First Person View Racer Drone

Aeromodelling Club, IIT Bombay

First-person view piloted agile miniature aerial vehicle — *Jan 2020*

- Conducted a literature survey on **three flight controllers** to select and configure an optimal controller
- Increased agility of the Omnibus F4 based multirotor by attaining a **thrust to weight ratio of 7.33**
- **Skilled pilot** capable of flying freestyle in **acro mode** with **20+ hours** of learning on the DRL Simulator

Skyrush

Techtatva, Manipal

National level competition based on aircraft design and piloting to tackle an obstacle course — *Sep 2019 -Oct 2019*

- Designed a highly maneuverable aircraft under 1 kg with the constraint of thrust to weight ratio of one
- Achieved a glide time of around 30 seconds while carrying a **payload of 400 grams**
- Finished as the **second runner up** while competing among the top pilots at the national level

Skills & Courses

Languages & OS	C++, Python, Linux, LaTeX, html, CSS
Simulation & CAD	SolidWorks, AutoCAD, MATLAB, Simulink
Flight Configuration	QGroundControl, Betaflight, Mission Planner
Relevant Courses	Microprocessors and Automatic Control*, Strength of Materials, Mechanical Measurement
	Thermodynamics, Fluid Mechanics, Solid Mechanics, Engineering Mechanics
Mathematics	Linear Algebra, Differential Equations, Calculus, Numerical Analysis

Achievements & Awards

2020	Awarded Institute Technical Colour for exemplary contribution to the technical sphere of IIT Bombay (**top 10 out of 10,000 students**)
2016	Recipient of the National Talent Search Examination Scholarship (NTSE) (**top 0.1 % out of 1 million** students)
2014	Awarded the Science Talent Search Scholarship for **three consecutive years** by SCERT
2018	Secured **99.23 percentile** in JEE-Main with **1.26 million** aspirants appearing for the exam
2018	Attained 96.15 percentile in JEE-Advanced amongst 0.16 million candidates

Leadership & Technical Roles

Aeromodelling Club

Institute Technical Council, IITB

As Institute Aeromodelling Secretary — *May 2020 - Present*

- Elected to **represent a community of 200+** and oversee all aeromodelling projects and activities in IIT Bombay
- Envisioned and implemented a blog portal and conducted quizzes to promote student-shared learning in the institute
- Achieved **70% y-o-y increase** in projects while coordinating the Institute Technical Summer Projects
- Conducted an online workshop on **Aerial Robotics** during lockdown, ensured a good learning output for 100+ participants
- **Reached 14,000+** people monthly by developing the online public outreach, sharing informative articles

As Convener — *May 2019 - May 2020*

- Mentored two teams of four members during RC Plane Competition, received the **Best Mentor Award**
- Learnt various aspects of designing miniature aerial vehicles, built and tested **four RC planes** and **five multicopters**
- Managed inventory, **negotiated with sellers** to purchase flight equipment with the annual budget of **2+ lakhs** (₹)
- Delivered a lecture on **"Basics of RC Aircraft Electronics"** to an audience of more than 250 students

Extracurricular

Sports

- Won silver medal in Inter Hostel Hockey Sophie General Championship
- Awarded the **Player of the Month** trophy in National Sports Organisation (NSO) Hockey, for outstanding performance

Cultural & Social

- Completed Kala-Poorna art course from Satya Sheel Kalamandir, learnt about portrait sketching, history of art
- Secured 1st position in Poster Design held during quark'17 Shifting Paradigms at BITS Pilani, K. K. Birla Goa Campus
- Project display for **500+ high school students** under Vidya NGO Techfest, explained the basics of RC planes and drones