Aman **Malekar**

MECHANICAL ENGINEERING · THIRD-YEAR UNDERGRADUATE [B.Tech] · CPI 7.78

Indian Institute of Technology, Bombay

■ amanmalekar21@gmail.com | 🌴 aman.malekar-iitb/ | 🛅 aman-malekar



Experience _

DRDO SASE's UAV Fleet Challenge

DEFENCE RESEARCH DEVELOPMENT ORGANISATION, SNOW & AVALANCHE STUDY ESTT

Inter IIT Tech Meet 8.0

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

NOVEMBER 9, 2020 AMAN MALEKAR · RÉSUMÉ

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 & OSC++, Python, Linux, ETEX, html, CSSSimulation & CADSolidWorks, AutoCAD, MATLAB, SimulinkFlight ConfigurationQGroundControl, Betaflight, Mission Planner

Relevant CoursesMicroprocessors 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