

SANTHOSH SANKAR

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Education

University of Michigan, Ann Arbor

Bachelor of Engineering - Aerospace Engineering Major

Relevant courses: Aerodynamics, Spacecraft Dynamics, Model-based Systems Engineering, Propulsion, Controls of Systems

August 2021- August 2024

Experience

CubeSat Flight Lab – University of Michigan

August 2023 - August 2024

Systems Engineer

- Spearheaded the design and successful High Altitude Balloon (HAB) launch of prototypes of Michigan's research CubeSat, defining requirements, developing the concept of operations, and authoring testing and integration procedures. Set up and utilized thermal chambers, multimeters, DC power supplies, and oscilloscopes to execute precise testing protocols.
- Developed 6 iterations of FlatSat and StratoSat prototypes to validate and refine spacecraft functionality. Progressed from a 3U, 7 kg to a 1U, 1.2 kg model by transitioning to a LoRa radio system, enhancing power efficiency and reducing system mass and complexity.
- Led integration of a Raspberry Pi-based flight computer, iterating through designs to reduce mass from 7 kg to 1.2 kg, enabling a 1U configuration for optimized space efficiency and power savings on the 3D-printed StratoSat structure.
- Conducted rigorous environmental testing on the StratoSat, validating system performance at altitudes of 35 km and identifying electromagnetic noise sources to establish a consistent GPS lock.
- Integrated a GPS Ground Plane, reducing system noise and improving GPS signal strength, enhancing data precision and allowing the system to operate reliably in adverse conditions.
- Developed and maintained project timelines, risk management, and interface control documentation, accelerating integration and testing schedules by two weeks and enhancing team coordination and overall project efficiency.
- Designed and prototyped a lightweight, microcontroller-based Flight Termination Unit, reducing previous system mass from 2 kg to 170 g, facilitating remote health monitoring and termination commands for increased mission safety and recovery capabilities of HAB.
- Engineered a Flight Termination Unit featuring an RP2040 microcontroller, LoRa SX1276, and u-blox NEO-M9N GPS module, allowing tracking and significantly reducing system mass while enabling reliable command and tracking functionality.

Human Powered Submarine – University of Michigan

August 2023 – July 2024

- Engineered, tested, and optimized a human-powered submarine to compete at the European International Submarine Race (June 2024), leading design efforts to ensure performance, structural integrity, and compliance with race specifications.
- Collaborated with the Propulsion team to design a high-efficiency propeller using CAD software and designed, manufactured, and tested a tensioner for the timing belt, allowing diver access for adjustments through precise component sourcing and customization.
- Wrote detailed standard operating procedures for fiberglass lay up of the hull which reduced manufacturing time from 2 weeks to 5 days. Along with writing proper design for manufacturing documents for machined components following standard GD&T principles

Michigan Aeronautical Science Association (MASA) – University of Michigan

- Developed MASA's largest collegiate liquid bi-propellant rocket, Clementine, and solid rocket project, Lonely Mission.

Aerodynamics and Recovery Sub-Team Lead

November 2022 – April 2023

- Led aerodynamic analysis and recovery systems development for MASA's "Clementine" project, implementing advanced design strategies to optimize flight stability and recovery.
- Developed and implemented a Model-Based Systems Engineering (MBSE) approach for the "Lonely Mission" solid rocket technology demonstrator, pioneering the use of Rolleron to mitigate roll coupling. This R&D effort improved structural integrity and informed design standards for future liquid rockets in the Tangerine Space Machine series.

Project lead for Fins, Separation Deployment, Composites

April 2022 – November 2022

- Led the transition from a pyrotechnic to a pneumatic Separation Deployment system, minimizing risks of airframe fractures in the fiberglass composite and enhancing safety reliability. Conducted thorough calculations and system tests to ensure successful deployment with lower stress impacts.
 - Conducted extensive simulations with MATLAB-based software (Mastran), FEA, Open Rocket, and CFD, optimizing fin and fin can designs for enhanced aerodynamic stability and precise launch radius control.
 - Produced and assembled fins and fin cans using laser cutting, milling, and lathe techniques, while managing over 10 fiberglass composite layups, enhancing structural integrity and ensuring precision in component production.
 - Performed detailed leak-checks on fluid systems during assembly, testing, and launch operations, ensuring safe and efficient fuel distribution and preventing potential system leaks.
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Skills

- **Software & Programming Languages:** Siemens Star CCM, Siemens Team Center, Siemens NX, SolidWorks, MATLAB, Simulink, MS Office Suite, Python (MicroPython, CircuitPython), C/C++, Data Acquisition, Redmine (open source counterpart of JIRA)
- **Composites & Prototyping:** Skilled in composite layups, including fiberglass, and prototyping for aerospace applications.
- **Testing & Instrumentation:** Experience with thermal chambers, multimeters, DC power supplies, and oscilloscopes for environmental testing and validation.
- **Project Documentation & Management:** Proficient in creating and managing project timelines, Gantt charts, and risk management documents to ensure timely completion of engineering milestones.
- **Collaboration & Leadership:** Strong communication, team collaboration, and leadership skills, demonstrated by leading interdisciplinary teams and guiding complex technical projects.