Ashwin M R

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LinkedIn | ORCID: 0000-0001-6214-7129 | Portfolio

Education

University of Illinois at Urbana–Champaign (UIUC), USA 2024 – 2025
Master of Engineering in Aerospace Systems Engineering, Grainger College of Engineering
Ongoing study with Prof. Jason Merret on MBSE integration with Generative AI for Aerospace Systems
Activities: Illini Chess Club; Illini Run Club

LPU, Punjab, INDIA 2019 – 2023
Bachelor of Technology in Aerospace Engineering
Capstone Work: Improvisation of Electrothermal Thrusters by increasing no of flow chambers.
Activities: Research Lead - Astrionics, Chess Club

Technical skills

Simulation Softwares: ANSYS (CFX, Fluent, Transient Structural), OpenFOAM, COMSOL Multiphysics, ABAQUS, Solidworks, Creo Parametric, MeshLab, Matlab;
SysML & AI Tools: SysML2, Papyrus, NLP (spaCy), Chaos Engineering;
Programming Languages: C++, Python, HTML, CSS, Javascript;
OS: Windows, Fedora, Arch, Ubuntu;
CFD: AMR, Multiphase Flow, Turbulence Modeling, Discretization Methods, Post-processing, CHT;
Experimental Skills: TPS Characterization, Sensor Calibration and Heat Flux Mapping, IR Thermography, Radiative Property Testing, Heat Flux Gauges and Thermocouples;

Experience

Indian Space Research Organization (ISRO), Thermal Simulation Lab — Trivandrum, India Jan 2024 – Jul 2024
Graduate Apprentice

- Developed MATLAB code to convert 3D ray-tracing coordinates into ANSYS CFX input format.
- Performed design and ray-tracing analysis on a 500 mm filament IR lamp mounted on a High-Performance Radiant Heater (HPRH); simulation targeted uniform heat flux of 130 W/cm^2 over a 200 mm × 200 mm specimen.
- Tested an 80 W CO_2 laser on a 50 mm × 50 mm specimen using a laser power meter and thermopile sensor.
- Conducted and tested improved configurations on a Parabolic Reflector Module with IR lamps to simulate concentrated-surface heating up to 180 W/cm^2.

Activities & leadership

Project Coordinator, Astrionics (Student-led organization) — Jalandhar, India Nov 2021 – Nov 2022

- Led aerospace-related projects focused on system-level integration and analysis.
- Prepared technical documents and project plan sheets for development milestones.
- Coordinated with team members to provide technical guidance and foster a collaborative environment.
- Reported daily status to department heads to communicate workflow progress.

Publications

Journal Paper

- Comparative analytical analysis and component selection of resistojet thruster for satellite propulsion, *Journal of Space Safety Engineering*, 2024.

Conference Papers

- Integration of Natural Language Processing and Large Language Models for Automated SysML Generation with Topological Robustness Benchmarking in MBSE, AIAA SciTech 2026 (Upcoming), FL, USA
- Structural and Thermal Analysis of a CubeSat, in *Lecture Notes in Mechanical Engineering*.
- Material selection based on joule heating simulation for resistojet thruster, *Materials Today: Proceedings*.

Technical projects

- High Performance Radiant Heater Designing: Designed and manufactured HPRH module (500 mm filament length) for simulating uniform heat flux of 130 W/cm^2 over 200 mm x 200 mm specimen.
- Improvisation of Resistojet Thruster: Conducted experimental, numerical and CFD testing of improvised Resistojet thruster of 12 flow chamber configuration which resulted in higher flow stabilization.
- Automated SysML Generation Pipeline: MBSE study on building an AI pipeline that turns aerospace text into Papyrus-ready SysML and benchmarks NLP vs LLM extraction using graph edit distance under controlled noise across nine frontier models.