Aashutosh Aman Mishra

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Summary

Highly motivated aerospace engineer with a strong background in aircraft sizing, flight dynamics, flight simulation modeling, and aircraft stability and control.

Areas of Specialization

Aircraft design; Flight dynamic model for fixed-wing and rotorcraft; Aerodynamic model development; Flight test data processing and calibration; Aircraft stability and control; Fly-by-wire control law setup; 6-DOF non-linear piloted/auto flight simulation model development.

Education

PhD Candidate, Aerospace Engineering, Auburn University   May 2025
An Integrated Methodology for Vehicle Design Subject to Flying Qualities Constraints.
GPA: 4.00

M.Sc. Aerospace Engineering, Auburn University   May 2023
GPA: 4.00

B.E., Mechanical Engineering, Tribhuvan University, Nepal   November 2017
GPA: 3.30

Project Experience

Ph.D. Candidate and Researcher   2019 – Present
Auburn University, Auburn, AL

- Developed generalized tools for aircraft sizing, rapid prototyping, and real-time flight simulation for conventional as well as novel advanced air mobility configurations, including fuel-burning, all-electric, and hybrid-electric aircraft.

- Integrated mass-properties evaluation within the sizing framework where the vehicle is not considered as a point-mass during design mission evaluation.

- Multi-disciplinary analysis & optimization (MDO/MDAO) of UAM flight vehicle using genetic algorithm (NSGA-II) in MATLAB.

- Developed propeller/rotor design and analysis framework to evaluate the propeller performance at design and off-design flight conditions.

- Incorporated vortex-lattice and panel methods for aerodynamic prediction within the aircraft sizing and flight simulation framework in an optimal way to support real-time flight simulation.

- Implemented a strip-theory based modeling approach to tackle coupled aero-propulsive interactions and validated it with CFD-generated as well as wind tunnel results.

- Integrated aircraft longitudinal and lateral-directional flight dynamic characteristics into aircraft sizing framework to meet the handling qualities guidelines defined by MIL-STD-1797A and MIL-F-8785C.

- Formulated tail sizing approach for fixed-wing (as well as eVTOL vehicles) based on the stability and control (S&C) requirements at different flight conditions as defined by 14CFR Part 23 and Part 25 to ensure desirable flight characteristics after the vehicle has been sized.

- Led the development, integration, and validation of aero-propulsive characteristics for novel eVTOL designs into the research flight simulators driven by a MATLAB/Simulink-based non-linear time domain simulation framework.

- Gained hands-on experience with flight simulator construction, flight control system development, flight control interface, control loading box modeling, visualization setup, and model calibration, to facilitate flight simulator operation.

- Integrated in-house fight dynamic models (developed in MATLAB) and aircraft configuration files into the environment of FlightGear and X-Plane for visual references in the flight simulator.

Teaching Experience

Graduate Teaching Assistant (GTA)   2019 – 2020

- Tutored aircraft design tools like OpenVSP, XFOIL, QMIL/QPROP, and CFD (FlightStream®) to the aircraft design class.

Skills

- **Software**: MATLAB/Simulink, Python, C/C++, FORTRAN, OpenVSP, FlightStream, XFOIL, AVL, XROTOR, SolidWorks, CATIA, Git.

- **Technical**: Flight simulator visual setup using warp and blend, control loading systems, mechanical workshop experience, 3D-printing, data processing, and documentation.

Awards and Achievements

- AIAA Orville and Wilbur Wright Graduate Award (2024)

- AIAA Luis de Florez Graduate Award in Flight Simulation (2022)

- AIAA Electrified Aircraft Technology Best Paper Award (2022)

- AIAA Aircraft Design Best Paper Award (2021)

Select Publications (Google Scholar)

- Mishra, A.A., et al., "Optimization of lift-plus-cruise vertical take-off and landing aircraft with electrified propulsion," Journal of Aircraft, 2024.

- Mishra, A.A., et al., "Sizing and analysis of a lift-plus-cruise aircraft with electrified propulsion," Journal of Aircraft, 2022.

- Mishra, A.A., et al., "Generalized energy-based flight vehicle sizing and performance analysis methodology," Journal of Aircraft, 2021.