Zachary Rhodes

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EDUCATION:

University of Kansas, Lawrence, Kansas

Pursuing Doctor of Philosophy in Aerospace Engineering, Expected Spring 2024-GPA: 3.63

Bachelor of Science in Aerospace Engineering   May 16, 2021

EXPERIENCES:

University of Kansas   Lawrence, Kansas

Graduate Research Assistant   August 2021 – Current

- Researched optimized waypoint selection for the Zero-Effort-Miss and Zero-Effort-Velocity guidance algorithm.
- Developed preliminary mission and spacecraft budgets for a rendezvous mission to the asteroid 2010 TK7.

Undergraduate Research Assistant   December 2020 – July 2021

- Assessed the risk of utilizing UAVs within the vicinity of airport runways.
- Performed a literature review of risk assessments and previous wake vortex research.
- Estimated satellite drag coefficient with the incorporation of atomic oxygen absorption.

Undergraduate Teaching Fellowship   January 2020 - May 2020

- Enhanced student learning by assisting students with Siemens NX and course material issues.
- Created detailed step-by-step procedures for in-class assignments.

SKILLS:

Aircraft/Spacecraft Flight Dynamics and Controls, Astrodynamics and Mission Design, AutoCAD, Autodesk, Global Optimization, MATLAB/Simulink, Microsoft Excel, Microsoft Word, Orbital Determination Tool Kit, Python, Siemens NX, SolidWorks, and Systems Tool Kit

PROJECTS:

Interplanetary Mission Design

- Key member in designing a mission profile to land a payload on Mercury for ecological studies.
- Used MatLab processes to optimize a mission trajectory to Mercury with eight gravity assists.

Aerospace Systems Design 1

- Project Manager- Organized a team of seven engineers to design a 3U CubeSat to measure atmospheric density and spacecraft drag.
- Acquired reference material to ensure a shared team mental model.
- Structures Lead- designed structure of the 3U CubeSat to meet mission and safety requirements.

Introduction to Flight Test Engineering

- Team Lead- Assisted team members in their project tasks.
- Developed a guidance and control algorithm to enable three UAVs to flock.
- Tested control logic with simulations to validate the effectiveness of the swarm flight code.

Orbital Determination

- Estimated the precise location of an observed satellite using a Kalman filter and a Batch filter.

- o Analyzed the performance of both the Kalman filter and the Batch filter

Aircraft Design Laboratory 2
- o Key member in designing the propulsion system for a remotely piloted, unmanned, reusable penetrating hypersonic intelligence, surveillance, and reconnaissance system called the HyperHawk.
- o Placed second in the 2021-2022 AIAA Graduate Team Missile Systems Design Competition.

ACTIVITIES:

Memberships: AIAA, ITC, AAS, and NAR

University of Kansas KUbeSat organization- Project Manager
- o Managed assets in excess of $100,000 and over 60 engineers across multiple disciplines.
- o Generated annual financial budget for acquisition of funding.
- o Developed and validated KUbeSat1's compatibility with Firefly launch requirements in coordination with three external companies.
- o Ensure that ten subteam leads are updated on the timeline and progress.
- o Organized outreach events in coordination with the organization's officers.
- o Ensure the acquisition of hardware each subsystem team requires for success.

University of Kansas KUbeSat organization- Communication Team Co-lead
- o Established team goals and objectives to fulfill mission requirements within a set schedule.
- o Coordinated the efforts of a multi-disciplinary team of engineers to maximize individual strengths.
- o Managed acquisition and distribution of resources to team members.
- o Developed ground station infrastructure for satellite communication in the UHF band.
- o Verified proper functionality of critical ground station components.
- o Coordinated hardware and software tests with various subsystem teams.

Jayhawk High Power Rocketry Organization- Vice President
- o Train members on the proper safety methods to construct and launch high-powered rockets.

ENDORSEMENTS:
- o FCC Amateur Radio Technician Class Operator License.
- o National Association of Rocketry Level 1 certification.

PUBLICATIONS:
- o 2022 AIAA/AAS Astrodynamics Specialist Conference, "*Near-Optimal Waypoint Selection for Enforcing Trajectory Constraints.*"
- o 2022 AIAA/AAS Astrodynamics Specialist Conference, "*Trojan Identification, Exploration, Mapping, and Reconnaissance Mission.*"
- o 2022 International Telemetry Conference, *"KUbeSat Ground Station: Test and Operations."*
- o 2022 AIAA Design Competitions, "*University of Kansas 2021-2022 Hypersonic ISR Platform.*"
- o 2021 International Telemetry Conference, "*Amateur Ground Station for Cube Satellite Program.*"
- o 2021 AIAA/AAS Astrodynamics Specialist Conference, "*Optimization of Multiple-Gravity-Assist Trajectories to Explore Asteroid 2010 TK7.*"