



Project Title: Advanced Plasma and Geomagnetic Modeling

Project Reference Code: Russ-AspectAerospace

Name of Project Leader: Drew Russ

Host Facility: Aspect Aerospace

Internship Location: In person

Host Facility Location: 358 St. Louis St., Mobile, AL 36602

Project Description (roughly 300 words):

This project involves developing and refining models of plasma in low-earth orbit during solar events and modeling the interaction between the plasma and Earth’s magnetic field near the surface. The model will be used to simulate the connection between an arriving coronal mass ejection and geomagnetic induced current (GIC). One important aspect of the model will be to conduct a sensitivity analysis to determine if additional ground-based magnetometers could improve the fidelity of GIC simulation in real time. A candidate with a strong programming background, especially in physics-based simulation, is preferred. Knowledge of GIC and plasma physics is not expected – the intern will be instructed on the job. If a candidate has a background in AI / machine learning, that may also be incorporated into the analysis and modeling.

Importance:

The world’s power grids are vulnerable to GIC caused by coronal mass ejections, and improved simulation can help power companies prepare for these events.

Requirements:

- **Preferred Major**
 - Computer Engineering, Computer Science, Physics, or equivalent degree
- **Class work**
 - Calculus through differential equations, calculus-based physics 1 and 2
- **Programming knowledge**
 - Scientific programming, especially Python / C++ / MATLAB
- **Software knowledge**
 - Programming tools such as development environments and compilers

Biography (roughly 100-150 words):

Drew Russ graduated in Mechanical Engineering in 2022. He was the lead GN&C Engineer for Xplore in Redmond, WA and help oversee development of satellites for Xplore. He is now the CEO of Aspect Aerospace in Mobile, AL.

Is U.S. citizenship required to participate in this project? Yes

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