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Alabama Unmanned Systems Operations Mastery for Educators (AUSOME)

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RCEU 2022 Project Proposal

Project Title

Alabama Unmanned Systems Operations Mastery for Educators (AUSOME)

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RCEU 2022 Project Proposal

I. Project Description

The Alabama Unmanned Systems Operations Mastery for Educators (AUSOME) is a STEM education program managed out of the UAH Unmanned Aircraft Systems Research Program. For the past two years, AUSOME has been providing instruction and hands-on training for educators across the country on how to incorporate unmanned aircraft systems (UAS), or drones, into the classroom. UAS offer a unique perspective as a learning platform for anything and everything falling under Science, Technology, Engineering, and Math (STEM) education but are also excellent tools for creative learning and problem solving. The U.S. Space and Rocket Center, home of Space Camp and Aviation Challenge, have adopted AUSOME as a key element to the Space Camp for Educators summer programs as well as the State Teachers of the Year professional development program. The AUSOME RCEU Project is seeking a student interested in drone technology and inspired to work with educators on how to increase the use of drones in the classroom. The outcome of the AUSOME RCEU Project will consist of a series of educational materials for educators to use as a template for drones in STEM as well as hands-on demonstrations with the 2022 Space Camp for Educators season. The RCEU student will work directly with the UAH mentor on these demos and will also receive training in UAS operations to include exam preparation to earn an FAA Remote Pilot certificate.

II. Student Duties, Contributions, and Outcomes

a. Specific Student Duties

The specific duties of the AUSOME RCEU student will focus on the development and implementation strategy of learning objectives for drones in the classroom to include:

- Understand FAA Part 107 Remote Pilot rules and regulations for operations of UAS in the national airspace system
- Understand National Institute of Standards and Technology (NIST) public safety training requirements for UAS operations
- Create template lesson plan materials and learning outcomes for UAS in the classroom focusing on middle and high school computer literacy requirements from the Alabama State Department of Education
- Develop basic and advanced flight profiles for the Tello educational drone using Python and Java programming languages
- Design and build an indoor and outdoor obstacle course for Tello educational drone
- Support U.S. Space and Rocket Center (USSRC) Space Camp for Educators AUSOME Demonstrations with RCEU Mentor

b. Tangible Contributions by the Student to the Project

(10% of Review)

The AUSOME RCEU student will contribute heavily to the layout and instructional approach to expand the use of drones by educators. Working directly with the UAH mentor and the educational staff at the USSRC, the student will provide insight into the educational material,

RCEU 2022 Project Proposal

lesson plan layout, modify templates in use by the AUSOME team and USSRC, as well as also technical, practical hands-on experiences with educators.

c. Specific Outcomes Provided by the Project to the Student (30% of Review)

This RCEU project is equal parts technical development for STEM education and professional development for students. Students will be exposed to a unique training opportunity with the USSRC and AUSOME where the approach is to “educate-the-educator” and encourage the adoption of UAS for STEM education. The RCEU student will not only receive instruction and teaching experience but will also receive training to feel comfortable operating UAS and exam preparation for the FAA Remote Pilot certificate.

III. Student Selection Criteria

This creative research opportunity is seeking a student to with strong communication skills with a technical background including at minimum introductory computer programming in C++ and/or Python. This project is open to all interested students at any academic rank but students with experience in mentoring or tutoring are encouraged based on the opportunities to for instructing teachers on technical topics. Students of any college and program of study are encouraged to apply.

IV. Project Mentorship (30% of Review)

The AUSOME RCEU Project will have access to the University of Alabama in Huntsville’s (UAH) Unmanned Aircraft Systems Integration Lab located at the Rotorcraft Systems Engineering and Simulation Center (RSESC). Mr. Casey Calamaio, a Research Engineer at RSESC with a background in geospatial applications and unmanned systems is the primary mentor for this project. Calamaio will mentor the student in training material development, practical UAS flight training, and use of the AUSOME educational resources. An additional resource for the AUSOME RCEU student is the UAS Research Programs team which consists of experts in the UAS field with backgrounds in engineering, payload development, remote sensing, modeling and simulations, and aeronautical operations. In the unlikely absence of Calamaio during the period of performance of the RCEU20, Mr. Jerry Hendrix, Director of the UAS Research Programs will be the primary mentor for the student. Additionally, UAH is a core member of the FAA ASSURE Center of Excellence for UAS and a leading university on the national team. The student shall join the mentor at least once a month to report directly to FAA leadership during monthly Technical Interchange Meetings. This will introduce the student to research management and the ability to communicate research progress at multiple levels. For development of a drone obstacle course, the student and mentor will work with the UAH student chapter of the Association of Unmanned Vehicle Systems International (AUVSI). In addition to resources at UAH and the USSRC, the student will also be exposed to the local drone community involved in this program including the Pathfinder chapter of AUVSI once a month at the Board of Directors meeting held monthly at the USSRC Executive Conference Room.