Open Source Capstone Project to Cultivate Student STEM Innovators

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Background

With the advent of a new class of low-cost Commercial Reusable Suborbital spacecraft, NASA established the Flight Opportunities Program (FOP) to respond to policy guidance and facilitate access to space-relevant environments for researchers, engineers, technologists, and educators. To foster FOP's methodology that every flight is an opportunity for education, FOP has collaborated with NASA's Office of Education, through the AERO Institute, to formulate and implement a concept to help inform, inspire, and cultivate a sustainable, diverse student STEM workforce capable of addressing our Nation's future space exploration and technology needs.

The Concept

This open-source, innovation and partnership model is designed to engage the Science, Technology, Engineering, and Mathematics teaching and learning community to integrate their expertise and creativity into space technology development so that educational assets and the FOP's space technology maturation objectives are mutually beneficial and self-sustaining. This goal may be achieved through strategic collaborations with FOP, the commercial space industry, and our nation's higher learning institutions, to formulate, implement, and evaluate Senior Design Capstone Projects. Potential candidate universities may engage students in an interdisciplinary, multi-departmental, STEM-based initiative that utilizes a NASA Systems Engineering approach to design, create, and operate space technology payloads.

Capstone projects could be proposed to fly on various commercial platforms, including Suborbital Reusable Launch Vehicles (sRLV), parabolic aircraft, and high altitude balloons. These opportunities are profiled on the FOP web site (http://flightopportunities.nasa.gov).

Open Source Implementation

Our presentation will describe a model for how universities can engage students in the design, and build of faculty and student generated space technology payloads aligned with competitive opportunities to test suborbital payloads at no-cost through FOP's Announcement of Flight Opportunity (AFO). Further, the model will promote how universities can share ideas, creativity, and innovation with the Suborbital Research Community and general public, through the utilization of free, open source Internet technologies.

Some student-faculty teams have already begun submission of high-value competitive technology payloads via the FOP's AFO process. The Capstone Project is designed to leverage and expand this significantly. This dynamic Project is evolving steadily and we will present its current status at NSRC 2013. We intend that our FOP exhibit booth will act as a "hub" for all who are interested in this topic.