

42nd STUDENT CONFERENCE (E2)  
Student Team Competition (3)

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## UNIVERSITY OF COLORADO BOULDER HYSOR PROJECT: 2012 REPORT

**Abstract**

The Hybrid Sounding Rocket, or HySoR, Program at the University of Colorado Boulder was created to develop a safe and inexpensive hybrid sounding rocket platform to carry scientific payloads to high altitudes for various research applications. The ultimate goals of the program are to kick-start an educational rocket program at the university and to develop a hybrid sounding rocket that will deliver payloads to an altitude of 100 km. The program is currently in its initial phase, which is to develop a flight-ready prototype system capable of delivering a 2 kg payload to an altitude of at least 10 km. Construction of this initial phase vehicle is underway, and will be completed in May 2012. The program has been under development since its initiation in 2010, and maintains support from the Department of Aerospace Engineering at the University of Colorado Boulder and several industry affiliates.

This paper will discuss the project goals, the design of the flight-ready prototype, and the processes used to verify and validate each of the rocket subsystems. Specifically, the importance of oxidizer cold flow tests and static motor test firings will be discussed as key milestones in the development phase of the HySoR project. Final testing and integration of the scientific payload with the structure, electronics, and power subsystems of the rocket will be outlined, as well as the remaining design and construction tasks for the vehicle. The legal permit process will be briefly examined in this document, as it pertains to the fall 2012 test launch of this low altitude prototype vehicle in the United States.

Additionally, the educational impact of the Hybrid Sounding Rocket Program at the University of Colorado Boulder will be defined, cataloging various undergraduate and graduate groups that have been involved with the project since its inception. Future goals for this already successful educational rocket program will be outlined with the goal of increasing performance and continuing education and hands-on training for university students.