

University Rocket Launch Competition

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Paul Mueller
Utah State University
Experimental Sounding Rocket Association
Logan, UT



Purpose of Competition

- Engineering design experience for senior-level undergraduates and graduate students
- Near-professional scale, student-designed
- Aerospace workforce development
- Recruiting opportunities for students and employers
- Outreach to K-12 students - generate excitement and motivation to study math, science, and engineering
- Payload launch opportunities to low altitudes (10,000-25,000 feet) with real launch environment
- Technology development and flight test



Technology Development and Flight Test

- Propulsion: fuel formulations, cooled nozzles, aerospike nozzles, throttling, thrust vectoring
- Recovery: limited footprint/guided recovery, flyback boosters
- Operations: closed-loop flight control, rapid turnaround, flight termination
- Cost: low-cost materials and manufacturing
- Instrumentation/data acquisition: performance, altitude, velocity
- Payloads: instrument prototypes, video systems, payload deployment systems



1st Annual Competition Successful

- 1st Annual University Rocket Launch Competition (URLC) held on Jan 5, 2006 near Green River, Utah
- Two participants: University of Alabama-Huntsville and Utah State University
- Competition criteria: launch to 10,000 feet, written report, poster presentation, launch operations and student professionalism
- Videos



Results

- UAH rocket went much higher
- Both rockets had partial recovery system failures
- Flight data not available within 1 hour of ground recovery
- Judges had to rely on written report, poster, and student professionalism in determining winner
- Chose USU as winner, though data was recovered later and showed that UAH's rocket went to 11,200 feet while USU's only went to 5700 feet
- Winner was not really important—objective was to have friendly competition and launch student-designed rockets safely



Future Plans

- Second competition is planned, tentatively with USU and UAH (other schools considering participation)
- Target date: September 2006 (may slip depending on when schools are ready)
- Currently recruiting more schools. Hybrid rocket can be built for about \$1500 (including \$150 in fuel/oxidizer per flight). Rough specifications (more details available):
 - HTPB/nitrous oxide hybrid
 - Diameter: 10 inches
 - Length: 13 feet
 - Launch/burnout weights: 200/150 lbs
 - Initial thrust: 600 lbs
 - Burn duration: 20 seconds



How would this fit with Student Space Propulsion Program (SSPP)?

- Possibilities:
 - SSPP (in SE US) entry-level: smaller-scale, lower altitude, more commercial components; teams “graduate” to URLC in West with larger rockets with more student-built hardware
 - Regional competitions: SSPP in East, URLC in West, both with entry-level and advanced classes
- We are open to suggestions



Questions?

