Student Space Systems

at the University of Illinois at Urbana-Champaign

2.9.2015

Mission Statement: To engage students in modern high power rocketry and to promote the advancement of rocket research. In addition, to allow our members to gain experience working with propulsion, avionics, launch systems, structures, safety, and outreach while maintaining a professional setting.

Outlook

- SSS booth at E-night draws large crowd! Many students were recruited to our growing order.
- A new website is under construction. Stay tuned.
- Sierra's first test flight is a **SUCCESS!** It reached a maximum altitude of 6,241ft, flew at a top speed of 750ft/s, and returned in one piece!

Phase II 'Sierra' moments before launch. From left: *Florin Ghinet, David Degenhardt, Matt Halm, Ben Wexler.*

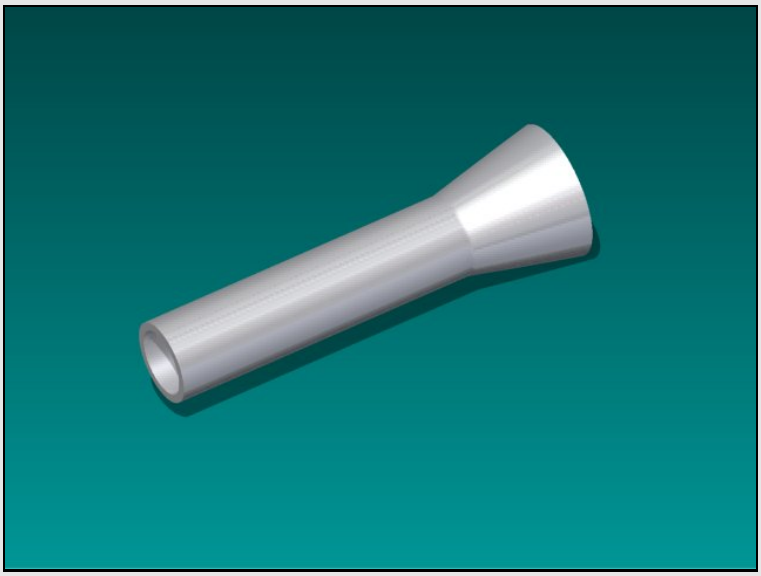
Structures

The Department of Structures is currently designing the Phase III rocket, intended to fly to 50,000 feet. In addition to the design work, it is currently looking into opportunities with the Composites Lab to construct its own carbon fiber fins. Last but not least, the Department of Structures is refitting the Phase II Sierra rocket for a flight to 16,000 feet later this semester.

Employing carbon fiber fins offers strength while reducing weight.

Propulsion

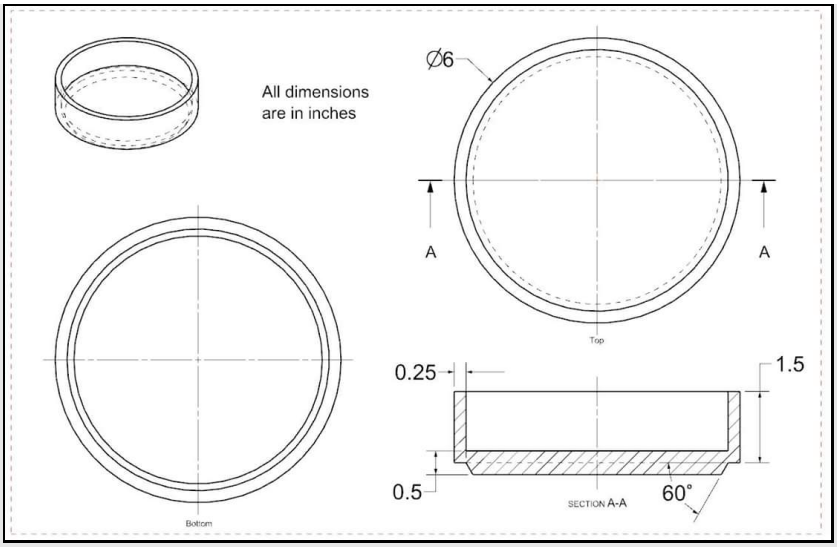
Last semester, each subdivision within the department took charge of designing a key aspect of the hybrid motor. It is expected to put out 5,000N*s of impulse, making it a L-class motor. Now, these subsystems are integrated in order to complete the hybrid motor design review, which is nearing completion. After the board approves it for funding, the department will order parts and begin testing at its Willard Airport test facility.



Hybrid motor nozzle CAD model by Dalton Moffit.

Avionics

The Department of Avionics' Phase III team has made great progress on SSS's next generation systems for payload structure and telemetry. The Phase III payload will incorporate a modular design called the Layered Access Networked Avionics system (L.A.N.A.) which consists of several shallow cylinders that will communicate with each other through the I2C protocol. The Phase II and Phase III teams are also collaborating on increasing the range of or telemetry to around 10 miles. After consulting with Electrical and Computer Engineering Dean Jennifer Bernhard, the teams are testing new radio modules with custom high-gain antennas in the near future.



L.A.N.A prototype CAD model by Howard Yang.

Special Projects

This semester, the Special Projects Department is building and testing a reaction control system (RCS). This system is responsible for stabilizing the rocket's flight path in reduced-atmosphere environments. Funding for RCS has been approved recently by the executive board of SSS, and parts will be ordered soon.

An RCS design meeting. Pictured: *David Degenhardt.*

Launch Systems

The Launch Systems department deals with the preparations and processes needed to launch rockets like storage, transportation, and final configuration. After last semester's design phase, a prototype of the launch tower is now under development; the tower will offer guidance and safety for increasingly powerful rockets.

The launch tower needs to offer low friction and be scalable to larger rockets.

Outreach

This year, SSS plans to organize a great educational outreach event for Engineering Open House (EOH) on March 13-14. A committee is forming to prepare the displays for this year, mainly the sharpie rocket and ejection test charges.

A corporate outreach committee is quickly forming here at SSS. As liaison between our club and outside industry, it will interact directly with recruiters and representatives from companies. Its aim is to develop relationships with companies that can assist us in achieving our goals. This is a great opportunity to hone one's soft skills like speaking, writing, and networking. For more information, contact Jake Goldrich, External Director.

In the news...

- SpaceX launches DSCOVR satellite for NOAA to monitor solar winds, but does not attempt barge landing of Falcon 9 first stage as secondary objective like in CRS-5 due to adverse weather conditions. For further reading
- NASA plans to send Clipper spacecraft to Jupiter's icy moon, Europa, to search for underwater life in $18.5 billion budget proposed by White House. For further reading
- SLS booster engine RS-25 test fire is under way. The entire booster utilizes four such engines and will operate at 3.6 million lb thrust! For further reading

Departments have new meeting times this semester:

- Launch Systems - Director: Nick Campbell, nickcampbell94@gmail.com
  - Tuesday 6pm, Talbot 302E
- Structures - Director: David Degenhardt, degenha2@illinois.edu
  - Tuesday 7pm, Talbot 302E
- Avionics - Director: Mathew Halm, mhalm2@illinois.edu
  - Wednesday 8pm, Talbot 302E
- Special Projects - Director: Max Archer, m4rch3r@gmail.com
  - Thursday 6pm, Talbot 206N
- Propulsion - Director: Florin Ghinet, ghinet2@illinois.edu
  - Thursday 6pm, Talbot 302E
- Educational/Corporate Outreach - Director: Jake Goldrich, jjgoldr2@illinois.edu

Contact Us

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- Send us any comments, concerns, or questions at uiuc.sss@gmail.com!