Student Space Systems

at the University of Illinois at Urbana-Champaign

July 2015

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

Outlook

- Meet our new Administrative President*, Jimmy Hall!

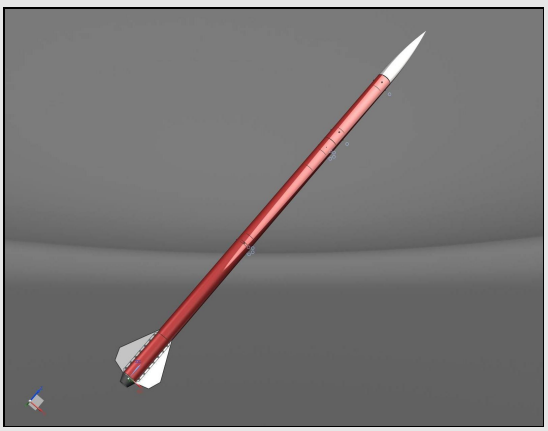
  *To improve the function of the executive board, the offices of President and Vice President have been refined in terms of responsibilities and renamed to Technical President and Administrative President respectively.

- Space Grant rocket suffers parachute failure in Minneapolis.
- Sierra motor manufacturing flaw leads to an explosion; will not fly again. Will serve as display once airframe is repaired.

"The test launch back in December...proved Sierra itself to be a major success." Read the full report for more.

Structures

The Structures Department is busy building the Phase III rocket. Made of aluminium and fiberglass, it will fly to 30,000 feet at a maximum speed of 1,800 ft/s (1,227 mph). Phase III will broadcast live telemetry and also feature an integrated camera to record video. Like all our rockets, it will be named after a mountain range; this hasn't been decided yet, so send us any ideas you have at uiuc.sss@gmail.com!



Phase III CAD render by Sam Wagner.

Propulsion

The Propulsion Department is testing out the experimental G.O.R.E. hybrid motor, which was designed last year and machined earlier this summer. So far, the team has conducted a cold flow injector test. A cold test of a hybrid engine setup is comprised of running gas or liquid into the combustion chamber under the correct pressure. This simulation offers many diagnostic-friendly assessments; in this case, it demonstrated two small leaks that the team later fixed by tightening the pipes. A hot fire will be carried out before the summer ends, and all our members are invited to come watch!

The nitrous tank is kept at approximately 800 psi, and the oxidizer itself flows at 1.6 kg/s.

Avionics

This summer, the hub of Avionics technical work is the San Francisco/Bay Area. Director Matt Halm is working alongside Ben Wexler, Howard Yang, and Sean Nach to produce a nose cone avionics bay for Phase III capable of live telemetry over several miles. Logistically, Matt and division heads Howard Yang, Adam Barbato, and Mohammad Saad are developing strategies to make 2015-2016 the most engaging school year yet by considering exciting technical projects such as tracking antennas and computer vision!

ISM band radio modems fulfill the long range communication requirements of Phase III.

Special Projects

The Department of Special Projects has continued to develop interesting technology this summer, adopting Project Hummingbird from the department of Avionics. Hummingbird is a project to build a fully autonomous quadcopter. Special Projects's other group, Stage Separation, is researching explosive separators as opposed to mechanical separators, as well as the fundamental risks involved with stage separation. As always, Special Projects is pushing SSS's knowledge and experience by devoting many engineer-hours to R&D.

Pictured: Sam Wagner works on controls for Hummingbird.

Outreach

Stay tuned for updates on Quad Day, AIAA Freshman Conference, and E-night!

The corporate outreach team is in the process of reaching out to companies this summer. If you would like to help out and have an internship or have close ties to someone who works in the industry, contact Jake Goldrich at jjgoldr2@illinois.edu.

In The News...

- SpaceX Falcon 9 explodes minutes after CRS-7 launch due to an overpressure event in its upper stage oxygen tank. Its cause was likely a helium container strut that broke off in the oxygen tank. For further reading.
- Russian Progress 60 rocket resupplies the ISS after three consecutive launch failures among separate entities. For further reading.
- The Planetary Society delivers to orbit a test article solar sail, which makes use of solar radiation for propulsion. Its plan is to launch a travelling sail in late 2016. For further reading.

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- Learn more through our website. It is currently in development.
- Send us any comments, concerns, or questions at uiuc.sss@gmail.com!