

The Countdown

August, 2018

August 31, 2018

Dear Friends of Rice Eclipse,

Welcome back to campus! I hope everyone had a wonderful summer. As we commence another academic year, I am excited to hear the stories from many of our members who applied their Eclipse skillsets in internships.

I would firstly like to congratulate our new officer team. The group includes Andre Sushchenko as Vice President/Design Lead, Alex Acosta as Aerodynamics/Structures Lead, Tommy Yuan as Avionics Lead, Jeremy Palmer as Propulsion Lead, Katie DeSpain as Chief Safety Officer, and Ryan Udell as Secretary/Treasurer. Another change we will be implementing is an enhanced social media presence. In addition to more frequent Facebook posts, those interested in keeping better updated on the team's activities can find us on Twitter, and this monthly Countdown report can be subscribed to below.

What will not change is the team's unwavering commitment to reaching our project goals. With the long-term vision of flying our own hybrid rocket engine, we are concurrently pushing forward development of our hybrid propulsion systems as well as building institutional knowledge in the design of airframes and flight avionics through solid motor launch vehicles. Beyond our short-term technical objectives, the number one priority of our team for August and September is the integration of new student members. We will maintain our ambitious drive forward in a way that emphasizes the inclusion of the new members who will one day run this team after all of the current members graduate.

For any new freshmen, transfer students, or returning Rice students, we will be hosting a mini-rockets launch day in early September. This opportunity will allow new members to build and fly their own small rockets on the Rice sports fields, so they can experience the excitement of a launch.

Let's start the year with a (controlled) bang!

Ad astra,



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A Dive into the Projects for Fall 2018

Aerodynamics

The Spaceport America Cup, 2019

- After Eclipse's first successful launch in the 2018 competition, Eclipse will design an all new rocket for the 2019 competition.
- Current teams include composites, airframe, recovery, and structures.
- The payload for this project will be built by Eclipse's own avionics team.
- These rockets are currently Eclipse's most powerful rockets reaching heights of 10,000 ft and beyond.
- Last year's Noctua rocket was made with carbon body tubes and an innovative motor mount system.



A Minimum Diameter Rocket

- The minimum diameter rocket will be designed to fly as high as possible with a reduced body tube diameter.
- The body will be made with improved carbon fiber wrapping techniques developed by the composites team.
- The body will house several advanced payloads developed by the avionics team.
- Eclipse will use a custom fly away rail guide on the launch pad.

Propulsion

Luna Hybrid Rocket Engine

- Building off the four successful tests earlier in 2018, Luna will be tested several more times with gas injected thrust vector control.
- The engine serves as a testing ground to scale up to a larger engine for launch purposes.
- Many variations of the engine will be tested to examine different variables.
- Luna is a 50 lb thrust engine.



August, 2018

Titan Hybrid Rocket Engine

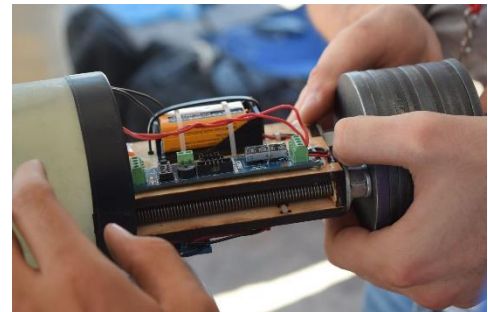
- The larger of Eclipses two hybrid engines, Titan is built to fly.
- The proposed next test for this 800 lb thrust engine is near the end of 2018.
- Titan is built in flight configuration and will utilize our new mobile launch bed, which was built last year, for its second test.



Avionics

The Spaceport America Cup Competition Payload

- Possibly the most important aspect on any rocket is the payload and Eclipse's Avionics Team will create the 8.8 lb payload for the annual Spaceport America Cup.
- The payload for next year is still in the brainstorming phase.



New Member Payloads Project

- This project is an avionics project that is designed to be simple for all new members interested in electronics.
- A Programmable LED matrix, a portable speaker, and a simple piano are the three payloads avionics will use to teach new members.

Titan Load Cell Project

- Eclipse will develop a new load for Titan with a longer range.
- Avionics will build off of applications learned testing Luna I.I.

Eclipse Member Highlight



Jeremy Palmer

Propulsion Team Lead

Year: Class of 2019

Major: Mechanical Engineering

Last Internship: SpaceX

Why are you passionate and/or inspired by space?

For me, I think I'm most inspired by the projects themselves. Aerospace projects introduce engineering challenges that you won't really see in many other industries, and often push the limits of what is considered possible. There isn't anything special about just improving old technologies, I'd rather work on projects that are on the cutting edge and brand new.

What is one project you worked on with Rice Eclipse and why is it significant to you?

In April of 2016 we attempted the first hot fire of the MkII, or Titan, hybrid engine, but experienced an anomaly during the burn that caused considerable damage to the system. This was just before I became VP of the club, and that summer I worked through all of the documentation of the engine to determine what exactly had gone wrong. I eventually found that there was an error in the bolt strength calculations around the nozzle. This was really significant to me because it meant we could repair the engine and fire it again with confidence that the previous problem had been solved.

How has Rice Eclipse helped you?

Rice Eclipse has given me a fantastic hands-on opportunity to apply knowledge I've gained in the classroom. At the same time, I have also learned new skills and topics that go beyond the regular mechanical engineering curriculum. Most of all, Eclipse has given me projects to speak with potential employers about and experience in the aerospace field that helps me become a more competitive applicant.

What are some of your aspirations and goals in life?

I would love to work in rocket propulsion, specifically in liquid engines or hybrid engines ideally. I don't really have a big desire to be an astronaut or travel to Mars or anywhere, but I think it would be really cool to ride on a vehicle I contributed to in some capacity. I just want an orbit or two.

Lastly, what would you like to say to people thinking about a career in STEM or joining the Space industry?

Be prepared for some disappointment, careers in aerospace can be hard to come by, but be persistent and try to make connections in person when possible. Most other universities have a similar rocketry clubs, and you need to put in a lot of work if you want to stand out from the others. Classes are obviously important, but potential employers will be most interested in your hands-on, often extra-curricular, engineering experience.

August, 2018

Upcoming Events:

September 9th

- General Meeting, OEDK Classroom
- Mini Rocket Launch Day

September 23rd

- Luna Hybrid Engine Test
- General Meeting, OEDK Classroom

For more information about our current projects, visit our website by clicking the button below or go to eclipse.rice.edu.

VISIT OUR WEBSITE

Rice Eclipse is also on Facebook, Twitter, and Youtube! Click the buttons below to check it out!

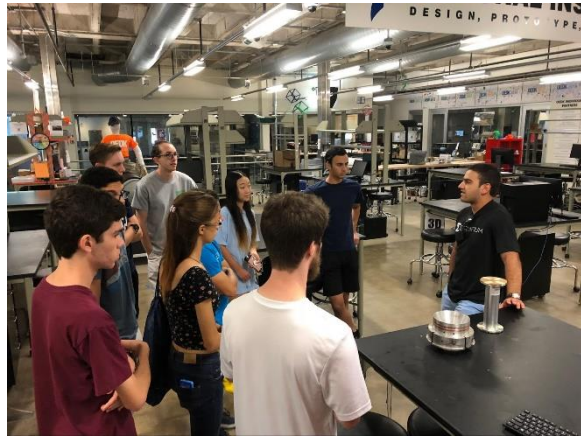
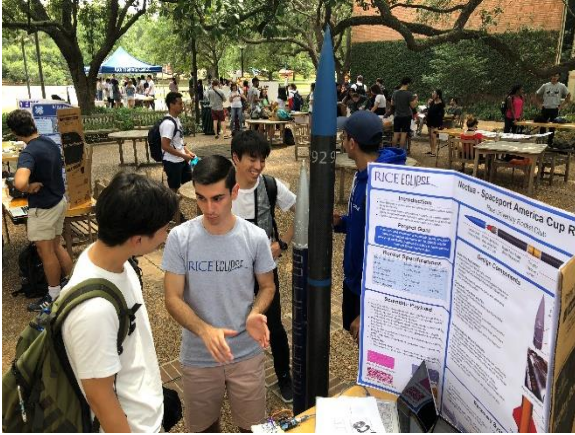


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