107 Days Till Launch

The University of Connecticut kicked off its its 6 week fundraising initiative **Ignite**, which seeks to support various student groups across UConn. AIAA had a strong showing in the first two weeks, raising almost $600 over that span. This money is incredibly valuable to the branch, providing us with the capital to: design activities for our outreach with John Wallace Middle School, furnish our Distinguished Lecturer presentation every spring, and of course purchase materials for construction of our sounding rocket. The generous donations from our thoughtful supporters are what make this club possible, and we appreciate every dollar.

If you haven't done so yet, please consider going to http://c-fund.us/qbh to donate to the UCONN AIAA Student Branch and the rocketry team. This week's goal is graduates of the last decade. Donations from eligible parties earn points towards additional funding prizes. Feel free to check out the other exciting groups on campus at https://raise.uconn.edu/.

Thank You!

Distinguished Lecturer

This year's AIAA Distinguished Lecturer is Mr. Thomas A. Morgenfeld, renown test pilot for the US Navy and Lockheed Martin. He graduated the United States Naval Academy in 1965 and was designated a Naval Aviator in 1967. Between active duty, he attended the United States Naval Postgraduate School and earned his MS in aeronautical engineering. In 1976 he began his career as a test pilot, joining the infamous Lockheed Martin Skunk Works. In that time he flew some of the most advanced and secret aircraft every produced, including the F-117, YF-22A, and X-35. Described as an "excellent, enthusiastic, and enjoyable speaker," we are very lucky to have a chance to have him on campus. He is currently scheduled to present on **April 9th** here at UCONN. The exact time and location is currently TBD, however when we have a more concrete time we will send out an update.

Avionics

This year we are using a pair of Altus Metrum Telemega flight computers, one as a primary and a second as a fully redundant backup. These computers measure acceleration and atmospheric pressure to record the flight, and are ultimately used to judge our flight performance for the competition. These computers also provide a live feed of telemetry back to the ground, allowing us to monitor the rocket during the flight. With this we can confirm deployment of the drogue and main parachutes, as well as track the GPS location of the rocket on the descent. Because of the power of the transmitters, to legally operate the flight computers requires a Level 1 Technician license with the FCC. Freshman Liam Mohan volunteered to take up the task of developing a plan to get as many team members as possible certified before the trip to New Mexico. When asked about why he wanted to lead the project, he said,

> "I had no previous knowledge of radio communications and the functionality of HAM but I was quite curious into the subject. I found this to be the perfect opportunity to expand my horizons on the versatility and uses of radio, and not to mention help UConn AIAA achieve success in the 2020 Space America Cup. The goal of our sub-team is to pass certification and get Level 1 Technician Class authority for HAM Radio use. The entire process is going to be self-taught which will be challenging, but with the participation of members and training sessions, I believe our goals can easily be achieved."

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Propulsion

February 22nd we performed a static fire test of the full scale flight motor. This O-class motor is identical to the one that will propel our rocket during the Spaceport America Cup this June. This test provides a wealth of data that we can apply to the design of the rocket going forward. First, it allows us to confirm the performance of our propellant in large, long burning motors. With an 8 second burn, the flight motor has nearly twice the burn time of the previous M-class test fire. During that time, the heat transfer from the flame inside the motor preheats the propellant. This can have a dramatic effect on the performance of the motor, and is challenging to capture with small scale tests. Additionally, the increased length of the motor can allow for more complete combustion, liberating more heat, and improving the efficiency of the motor. While we do our best to simulate the full scale motor as accurately as possible, it is generally viewed as best practice to static fire a full scale flight motor before launching a rocket, to give your flight the best chance for success.

There is an additional benefit to having the full scale static fire, accurate thrust data for the duration of the burn. As the goal of the competition is to be the closest to 30,000', we can use the thrust measured for the duration of the burn in our simulation. This allows us to correct our predictions not only for the delivered total impulse of the motor, but also for the shape of the thrust profile. When comparing two motors of equal impulse, the short duration motor will result in a higher mach number, and accordingly higher drag. At the same time, the rocket will be traveling faster, and will escape the high density atmosphere before the longer burning rocket. Our simulation uses the provided thrust data with standard atmosphere models to consider the combined effects of both drag and air density to provide a more accurate estimate for the flight than just using simulated motor data. With this, we can tune the total mass of the rocket accordingly, to get as close as possible to 30,000'.

Special thanks to the MIT Rocket Team and the kind folks at Crow Island Airpark for providing the facility for the test.
Check out the full static fire video here:
https://youtu.be/xQDgtc9zGco

Want to stay updated with what's happening?
Check our progress at https://aiaa.engr.rso.uconn.edu/.

Interested in joining?
Stop by the next AIAA meeting on March 12th at 6:00pm in UTEB 175, or email branch president Cody Corey (cody.corey@uconn.edu) or rocketry team lead Patrick Meagher (patrick.meagher@uconn.edu) to get involved today!

Thank you to everyone involved for your continued support. Without your help, none of this would be possible.

AIAA
SHAPING THE FUTURE OF AEROSPACE

UCONN
SCHOOL OF ENGINEERING

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