

UPDATES

SRT has been hard at work preparing for the upcoming year. New members have been chosen through our application/interview process and the whole team is already in full gear for this upcoming year.

Goals for the team have been set, along with budgets and sub-team milestones. There are several big changes being implemented this year. Look below for a detailed description.

Competition: *The Experimental Sounding Rocketry Association (ESRA) has moved their competition to Spaceport America near Las Cruces, New Mexico and has renamed the competition the Spaceport America Cup.*

Team Focus: *This year, the team will be focused on doing something we have not been able to do in the past three years; flying our rockets with our hybrid engines. This will mean that we will not be designing and building a new rocket, but rather modifying a couple of previous designs, and flying these modified designs regularly throughout the year to prepare us for competition.*

Technical Sub-team - Flight Operations: *This new sub-team was created to handle deficiencies the team has had in the past three years with respect to the intricacies of flying a hybrid rocket. Additionally, this team will facilitate the new team focus.*

Business Management Sub-team - Business & Manufacturing Systems: *Formally the Business sub-team, Business & Manufacturing Systems is focused on dramatically improving certain purchasing and administrative process. The scope of this sub-team also encompasses specific technical analytics such as combustion chamber life cycle analysis, part degradation mitigation techniques, manufacturing process plans, and much more.*

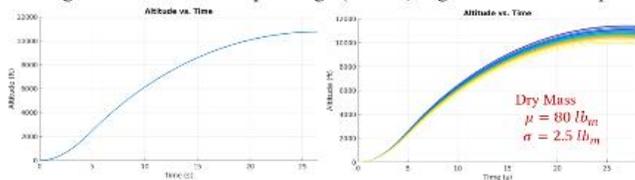
DETAILS

The Dynamics team has been hard at work improving the team's trajectory prediction capability. One project has been the integration of

a Monte Carlo variable input to the current 1 degree-of-freedom (DOF) trajectory analysis code. By injecting distribution-weighted variations to predetermined variables, the team can know, with a greater level on certainty, what the expected rocket altitude will likely be.

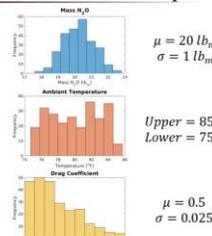
Monte Carlo Simulation

- Significant sources of random error → **Altitude Overestimation**
 - C_D Curve (changing angle-of-attack)
 - Thrust & Mass Loss Curves (real combustion vs. idealized)
 - Atmospheric Model (deviation from Std. Atmos.)
 - Mass Measurement (dry mass, N2O fill mass)
- Assign distributions → Step through ($n = 100$) flights → Establish Spread



(Example) Variable Setup

- Mass N2O
 - Error: Lack of filling precision
 - Bias: Towards fill target
 - Dist: **Normal**
- Temperature
 - Error: Atmospheric fluctuations
 - Bias: None
 - Dist: **Uniform**
- Drag Coefficient
 - Error: Changing AoA
 - Bias: Towards C_D @ AoA = 0°
 - Dist: **Half-Normal**



EVENTS

The Texas A&M Sounding Rocketry supported the regional Boy Scouts of America in welcoming 175 new cub scouts by facilitating a model rocket launch day. In partnership with Tripoli Houston, members set-up the venue as well as acted as launch technicians, launching a total of 125 scout-built rockets. Additionally, members answered questions from the public about current projects, sponsors, and team goals. The hope is that outreach events like this one will spark the interest in a new generation of rocket scientists.

