Explorer Post 1010

TARC Team 8296

Chris Fann
Ronnie Foreman
Phil Manougian
Amanda Steckel

Design and Development

- We used RockSim to digitally build and simulate our rocket and its performance before we actually built it.
- From our years of experience, we adapted a basic design.
- We tested streamers over the summer and developed experience packing and deploying them.
- We researched streamer deployment techniques. We found a way to run the streamer connection line outside the rocket up to the nose cone.
- We used our launch rails and rail buttons from last year.

Final Design

Our final design was a 38 inch rocket.

- BT80 Body Tube
- 3 7x70 inch Streamers
- F32-6T Motor
- Nose Cone: PNC-80K
- Altimeter: PerfectFlite Alt15k

Our cargo unit was 22 inches long in order to have a large cross section when descending. Three streamers were attached to the cargo unit at the aft end, on the nose cone, and in the middle.

Flight Testing

We conducted 17 test launches on six launch days to refine our streamer deployment and rocket weight to altitude ratio.

- December 30 - two launches (F32-4T)
- January 16 - two launches (F32-4T)
- February 20 - two launches (F32-4T)
- February 27 - two launches (F32-4T)
- March 20 - four launches (CATO with F32-6T)
- March 27 - five launches (F32-6T and backup booster)

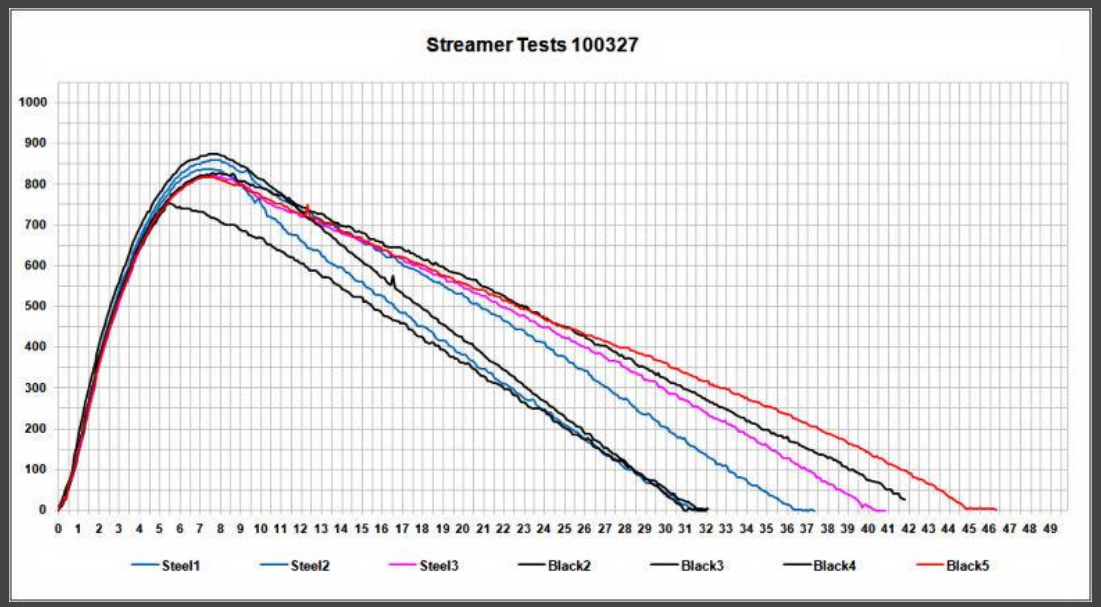
Success/Failure

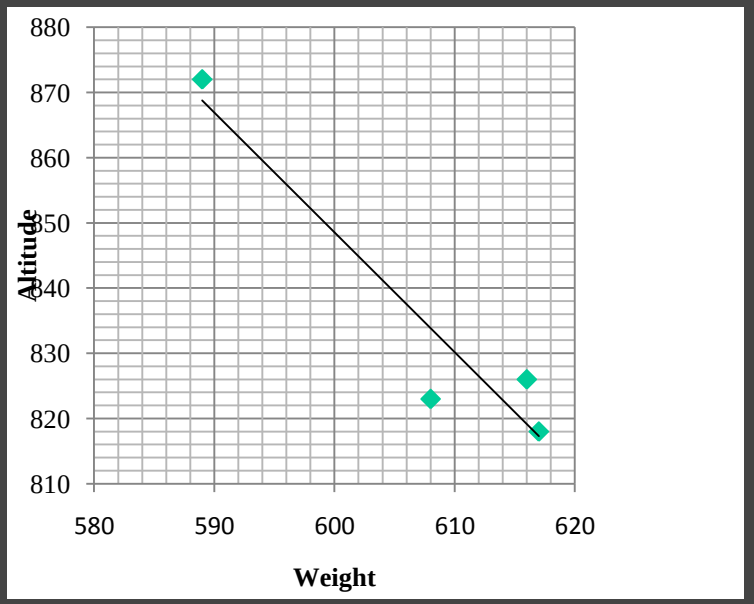
Initially, we had success reaching 825ft but not descending slow enough. We increased the cargo unit size and added streamers to slow the descent.

We used an Aerotech F32-4T for most of our launches. We tried a F32-6T and had a major CATO, which was determined to be a manufacturing problem. For the final qualification launches we used the F32-6T to delay ejection a few seconds.

Problems/Solutions

We used a cyclic process to refine our rocket and streamer solution. We recorded our launches and mapped them using Excel graphs. We video taped our launches so we could review them. After every launch we conducted an analysis session and planned modifications for the next launch.





Lessons Learned

- Test early and often.
- Launch whenever possible.
- A lot of streamer material is required to get a slow descent rate.
- Because we maxed out the streamer size, we used the rocket itself to increase drag and slow the descent.
- Get data from every launch to make meaningful adjustments.

Teamwork

Our team is all high school seniors. This is our fourth year participating in TARC. We have all been to a National Fly-off before. Initially, we worked with our other teams to get them going and share our experience. We decided to form our own team so our senior year would be memorable, and it has been.