

# 2016 CNY Rocket Team Challenge

## Rocket Launch Details

### Launch Date and Time

- Saturday, June 4: 8:30 AM start time.
- Rain day, if needed: Sunday, June 5, 8:30 a.m. start time.
- Launch Status will be displayed by 6:30 a.m. on the MOST web site at [www.most.org](http://www.most.org)

### Schedule

Rockets will be inspected and launched in order of preparation – first arrivals will be first off the ground. We expect to conclude by 2 PM.

### Launch Site: SU South Campus Skytop field

**Traveling from the North** - Interstate 81 south to exit 17. At the bottom of the ramp, make a hard right onto South State Street and proceed to Colvin Street. Make a right onto Colvin Street and proceed under Interstate 81 and up the hill to Comstock Avenue. Proceed through the intersection to Skytop Road. Make a right onto Skytop Road and proceed up the hill past the Goldstein Student Center, the tennis courts, and the Skytop Office Complex to enter the lot.

**Traveling from the South** - Interstate 81 north to exit 17. At the bottom of the ramp, make a left onto Calthrop Street and proceed to South Salina Street. Make a right onto South Salina Street and proceed to Colvin Street. Make a right onto Colvin Street and proceed under Interstate 81 and up the hill to Comstock Avenue. Proceed through the intersection to Skytop Road. Make a right onto Skytop Road and proceed up the hill past the Goldstein Student Center, the tennis courts, and the Skytop Office Complex to enter the lot.

Launch field on South Campus starts at the right bottom edge of the following South campus map: [Click Here \(http://www.syr.edu/about/pdf/NorthSouthCampus2012.pdf\)](http://www.syr.edu/about/pdf/NorthSouthCampus2012.pdf)

### What we provide on the day of the launch

- Rocket motor and means to secure it to the motor mount
  - For the LOC IV: AeroTech G80-7T (7 second delay for chute deployment)
  - For the Graduator: Aerotech F50-6T (6 second delay for chute deployment)
- Electric igniter
- Protective wadding (~ 50 gms) – placed forward of the motor mount tube
- Recording altimeter (~ 14 gms)
- Recording micro camera with audio (~ 64 gms) – attached to outside of rocket with Velcro and tape
- Ice water coolers will be available, and a cold water fountain is accessible on site

- Lunch will be available for purchase from Syracuse University catering:
  - Hot dog – \$2
  - Hamburger – \$3
  - Water/soda – \$2
  - Jumbo pretzel – \$3
  - Assorted candy – \$2
  - Assorted chips – \$1

### What you should bring

- Your rocket
- Outdoor clothes and footwear appropriate for the weather. In moderate winds (~20 mph) rockets can land far from the launch site and often in trees and thick brush (check for ticks).
- Sunscreen, one water bottle per person, and snacks
- A bag lunch if you're not planning to purchase food from SU catering
- Folding chairs if the ground is damp
- A toolbox containing items you might need to prepare your rocket for flight or repair it

### Expected Rocket Preparedness

- **Computed apogee and rocket weight:** At registration, each team is required to submit their rockets apogee and total weight with payload.  
Apogee calculators you can use:
  - RockSim: Free trial versions of this simulator software are available at [http://www.apogeerockets.com/Rocksim/Rocksim\\_trial](http://www.apogeerockets.com/Rocksim/Rocksim_trial)
  - ThrustCurve: <http://www.thrustcurve.org/>
  - Rocket Equations: [http://www.rocketmime.com/rockets/rckt\\_eqn.html](http://www.rocketmime.com/rockets/rckt_eqn.html)
  - Model Rocket Apogee Predictor: <http://webalt.markworld.com/webalt.html>
- **Painted:** The rocket should have a good primer coat to protect the outer surface and fins. A finish coat with design is best.
- **Nose Cap:** The nose cone of your rocket needs to be secure to the top of your payload bay to prevent it from coming off during the flight and releasing the payload. It is recommended that a small hole be drilled through the payload section's tube (air frame) and into the part of the nose cone that inserts into the airframe (the shoulder). Screw into the hole a ½ inch sheet metal screw.
- **Payload:** Your rocket requires a separate payload section that is isolated from the motor tube section. Payload is a recording altimeter and egg.
  - We will fly with a PerfectFlite Pnut recording altimeter in the payload section. The altimeters will be provided on a sled. These capsules will be

secured with in your payload section with Velcro. To aid in the launch preparation of your rocket, a  $\frac{3}{4}$  inch wide strip 2  $\frac{1}{2}$  inches long of the hook side (rough side) of the Velcro can be placed vertically inside the reserve space of the payload section. Be sure to place the strip far enough down so that it does not interfere with the insertion of the nose cone. The MOST can provide you with the Velcro when you register on site. Please fix this Velcro near an air hole measuring 3 to 5 mm in diameter.

- The “eggstronauts” require a spacesuit to contain their fluids in case the flight doesn’t go well. The eggs (provided on site) will be medium-large in size (58 –62 grams, ~ 2 oz).
- The MOST will install video cameras in the final rocket preparation area. The video camera will be fixed to the outside of the rocket with Velcro and tape. The MOST can provide you with the Velcro when you register. Camera weight: ~ 64 grams or 2.3 oz.

NOTE: Liftoff with camera is optional.

- **Launch Rail Buttons:** Two in perfect vertical alignment (use an angle iron to align) must be fixed securely to the lower tube and offset from the fins. It is best if the button screws are anchored in wood – like the engine mount spacers – and are spaced about one foot apart. Buttons are in the kit but also available at the MOST (call for pick up). Buttons will be also available at the launch. A pair of buttons plus screws weigh 4.2 grams or 0.14 oz.
- **Parachute shock cord anchor:** Epoxy patching the anchor cord to the lower tube must be dry and capable of sustaining a strong tug from the shock cord. If they fail the tug test, the rocket will not fly until a new patch of 5-minute epoxy has been applied and given an hour to reach full strength.
- **Motor Mount:** 29 mm motor mount must be glued securely.

A table will be provided on site with various drills, tools, and epoxy where major repairs and modifications may be attempted.

### **Prepare for your rocket science quiz – which is a component of your score!**

At the launch, the team will be asked five questions to inquire about their knowledge of rocket science. Below is a list of topics from which the judges will draw questions:

- Parts of a rocket
- Center of gravity, center of pressure, and the impact of flight stability
- Newton’s Three Laws of Motion
- Flight phases of a rocket
- Thrust, lift, and drag

- Rocket safety as defined by NAR Safety Code

Rocket science review sites

- <http://www.flyrockets.com/work.asp>
- [http://www.nasa.gov/pdf/153415main\\_Rockets\\_How\\_Rockets\\_Work.pdf](http://www.nasa.gov/pdf/153415main_Rockets_How_Rockets_Work.pdf)

## **Awards**

Individual medallions and team plaques are awarded to the Top 4 teams in both senior and junior divisions

Special Awards:

- Most Technical Team, Senior Division, sponsored by College of Engineering & Computer Science, Syracuse University: College Goodie Bag
- Most Technical Team, Junior Division, sponsored by Technology Alliance of Central New York: College Goodie Bag
- Best Rocket Team Name Award, sponsored by Syracuse Rocket Club: Club membership for a year
- Most Aesthetic Paint Job Award, sponsored by Time Warner Cable: Goodie bag
- Closest Landing to Launch Site Award, sponsored by Lockheed Martin: Goodie bag
- Furthest Landing from the Launch Site Award, sponsored by National Grid: Goodie bag
- Highest Flying LOC IV Rocket Award, sponsored by NASA: NASA baseball caps
- Highest Flying Graduator Rocket Award, sponsored by NASA: NASA baseball caps

## **Have Questions?**

Call Peter Plumley

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