



What's Up!

The Official Newsletter of the
Syracuse Rocket Club



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Syracuse, New York

Get Ready for our 2008 Season!

2008 SRC Officers

President: David Harbaugh
Vice President: George Reavis III
Treasurer: Dennis Friend
Tripoli Prefect: Rich Pitzeruse
NAR Section Advisor: Ron Lioto
Secretary: Elaine Reavis

Next Month We Start Launching

May 10th will begin our 11th season. Please take a few minutes to read the **NAR Model Rocket Safety Code** found under the **Launch Site** heading. At our launch site, the following rules also need to be followed:

New Members

The Syracuse Rocket Club proudly welcomes the following “new” member:

Russell Freeman

Table of Contents:

Page 1: SRC Officers and New Members
Pages 2-10: The Extreme Explorer Project
Page 11: Items For Sale and Wanted

No running in the field. There are some large woodchuck holes in the field and someone could get seriously hurt if they fell into one while running.

No free falling spent motors. Rockets that eject their spent motors are not permitted to fly, unless a way is devised to recover the spent motor.

No parking on the field. Parking is only permitted in the designated parking area near the road. The only vehicle permitted on the field is the one that delivers the equipment to the site.

Starting May 1st, we will begin meeting on Mondays!

Walt has informed us that he will be changing his hours of operation. Starting May 1st, we will begin meeting the 1st Monday of each month at 7 PM, unless there is a holiday. (See our SRC Calendar). We'd love to see you at our meetings. Club meetings are an excellent opportunity to exchange ideas and information, plus we meet at Walt's Hobby Shop. **Re-member, SRC members get 10% off their purchases at Walts.**

The Extreme Explorer project
By Rich Pitzeruse

It's not too often an opportunity presents itself for a rocketeer to work on a project that is beyond their means, but something they may have always dreamed about. Just such an opportunity presented itself early in 2007 when the Milton J. Rubenstein Museum Of Science and Technology asked the Syracuse Rocket Club if we'd be interested in helping out with a big rocket.

This was not the first collaboration between the MOST and SRC. For the past few years, SRC has helped the MOST with the High School Rocket Challenge (for more information on that, you can check out this link, (http://www.most.org/2_ee_rocketteams.cfm). However, this was a new project. A meeting between interested SRC members, and Peter Plumley, who is the Exhibits Project Manager for the MOST was held to hammer out the rough idea of the project. Peter's initial idea was to put a 100 lb rocket 8,000' in the air. Not a trivial task...and something none of us in the club had done before. The rocket was to be built by high school and college students, the club would oversee all construction, and perform an advisory role. It would be loaded with scientific experiments, designed and built by the students. The rocket was to fly at Geneseo, NY during the NYPower launch in July. The rocket would go on a tour of schools after its flight, and it would then go on display at the MOST.

At this meeting, we quickly came to an almost unanimous decision on what rocket to build, a Performance Hobbies ¾ scale Nike Smoke. This was a large rocket at 11.5" in diameter and almost 14' tall. It was a pricey kit at \$1,299, but it was a kit that required less assembly than some less expensive kits would. The fin can is one piece and made of carbon fiber. The airframes are filament wound fiberglass tubes. The nosecone is one impressive size fiberglass piece. We chose this kit because assembly time would be much shorter than a more traditional kit with paper tubes, and separate wooden fins.

After the initial meeting, all parties involved were pretty excited about the project. The project needed a team leader, and Elaine Reavis stepped up to the plate. Elaine did a marvelous job managing the team, and she hit the ground running, making sure the items we needed were ordered so work could begin on the rocket. The kit itself was the first stumbling block. Performance Rocketry has a reputation for taking it's time shipping items. Elaine made sure no moss grew on our kit, and it was delivered to the MOST in just a few weeks, as well as recovery system components, and miscellaneous hardware to start building the rocket. Elaine also coordinated the building sessions at the MOST, making sure the students, SRC members, and MOST personnel were all able to make the sessions. I was in charge of ordering the motor, as the resident ATF permit holder. It was decided we would order an Animal Motor Works N2020 White Wolf motor. This is a small N motor (if an N can be considered small!!) at 10,280 ns, just barely in the N range. This is a serious motor, and of course, comes at a serious price. The reusable motor hardware cost \$495, and the reload (propellant and o-rings) cost \$595. I believed this would be a nice motor to push an 80 to 100lb rocket a 5,000 to 6,000 feet in the air.

Not quite to 8000', but I felt Geneseo wasn't a safe place to put 100 lbs that high in the air, with it so close to the village. I was shooting for a mile, and discussed this with Peter and he agreed.

Once the rocket kit arrived, it quickly became apparent that we were dealing with a kit like nothing we ever encountered before. It was much heavier than originally thought. We gathered together to weigh the parts, and the parts alone came to more than 75 lbs. This was unassembled, with no epoxy, no reinforcements, no recovery system parts, no motor, and no scientific experiments. It quickly became apparent that we were dealing with a rocket that would end up tipping the scales at about 150 lbs. It also became apparent that the N2020 would not be up to the task of flying that heavy a rocket. A quick call to Animal Motor Works was made, and they were willing to take back the reload and hardware we bought, so we could order their largest certified motor, an N4000. This is a 16,461 ns motor, quite a bit bigger, and with a faster burning propellant. It would have plenty of initial thrust to get 150lbs moving quickly. However, it wasn't cheap. Hardware was \$795, reload was \$850. Yikes! I called Peter, explained the situation, and he said the funding was available to order the larger motor.

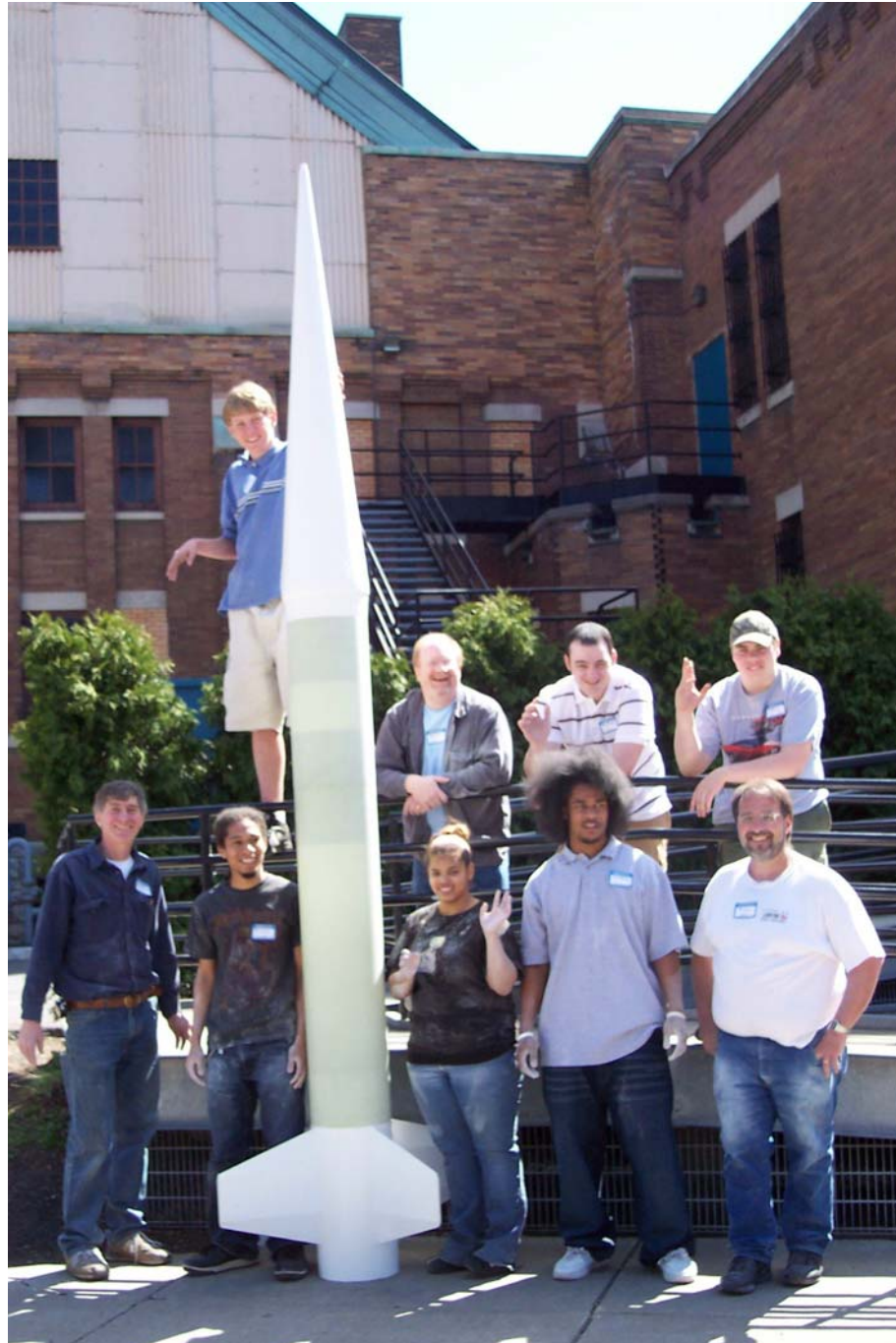
Assembly of the rocket went quite smoothly. A team of high school students, and a Syracuse University student got together to start work on the rocket. First order of business was to get the nosecone and fin can to fit the tubes. The shoulders on both pieces needed some SERIOUS sanding to get to fit. Out came the hand held electric sander. And the sanding started. And it continued. People took turns sanding. We were all covered with white gel coat dust. And we appeared to be getting nowhere. Peter showed us a big lathe that had a grinding disk mounted on it. We gave it a shot. It seemed very aggressive, and took off a lot of material quickly. After a few passes on this grinder, we got the shoulders sanded down enough to fit the tubes. It was time to slide the pieces together, and see just how big a rocket we were dealing with. The parts were brought outside, and stacked together for the first time. It was a BIG rocket, and I think we were all a little overwhelmed at its size, but especially the students.

Photo
George Reavis



They were all new to rocketry, what a way to begin in the hobby! We posed for a quick picture, and ended our first days work on the project.

Photo
George Reavis



More build sessions followed, roughly "1" every week. The students glued the motor tube and centering rings into the fin can. They reinforced the joints with fiberglass. They glued the lower airframe to the fin can. They created an electronics bay inside the tube coupler and glued it to the payload section. All the assembly was done with the supervision of club members.



The launch date was approaching quickly, and there were no student projects yet. Recovery electronics were also nowhere to be seen. Some panic was starting to set in. Since we didn't know what projects were going to be in the rocket, we couldn't design the build around them. What we decided to do instead was take advantage of the huge nosecone, and mount a 4' long 5.5" diameter tube in the cone. This provided quite a bit of space to slide projects in.

SRC member James Shattell took the reigns when it came to painting the rocket. He took the lead, and ordered the paint, and assembled the paint team. They did a marvelous job painting the rocket with automotive paint. A teal nosecone and dark metallic grey was chosen, and was a gorgeous combination.

It was t-minus 1 week and counting...when the recovery electronics arrived. Rob Delles, an SU electrical engineering student was tasked with mounting the electronics and wiring them up. The main recovery device was AED's Rocket Data-Acquisition System with on-board GPS, and live telemetry download. Not only would the R-DAS record altitude, acceleration, and GPS data, but with the telemetry board, it would transmit the data live, in flight. A Perfectflite altimeter was used as a backup recovery device, in case the R-DAS failed for some reason. A few student projects were put together during the last week. Things were so hectic at that time that I was completely removed from them, and didn't know what they were.

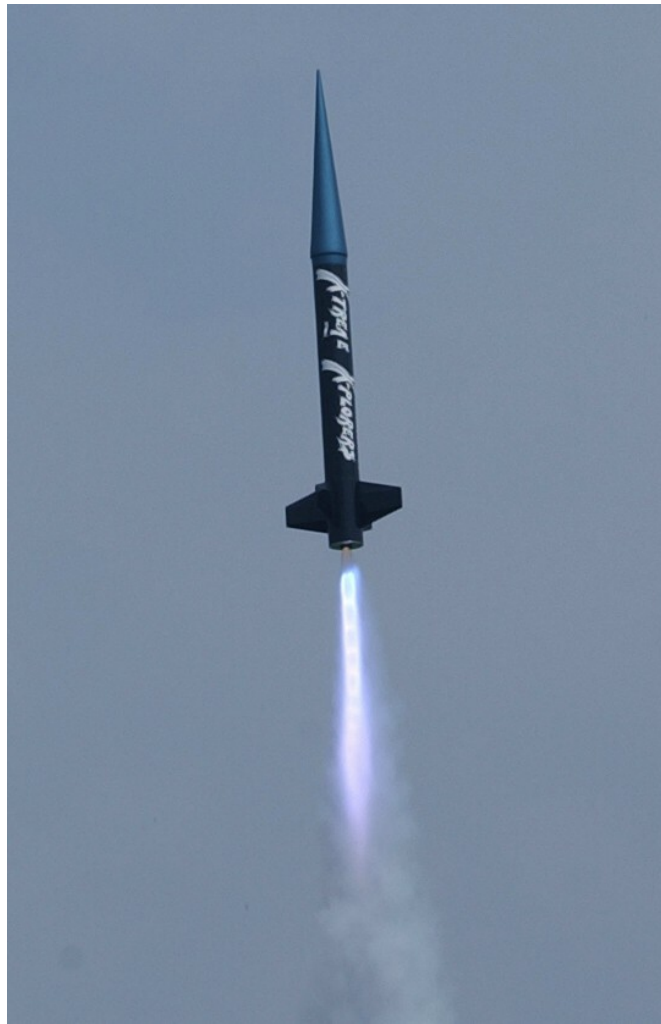
It was finally launch day. On a gorgeous day at Geneseo NY the MOST had set up a HUGE tent at the launch site, and work began very early in the morning prepping the rocket for flight. James helped the students load their projects in the nosecone of the rocket, while David Harbaugh and I worked on loading the motor in the rocket, and rigging and packing the parachutes. I must say, I was very nervous about recovering this rocket. We were using 3 giant parachutes to recover this heavy rocket. We were using a Skyangle XL Cert 3 parachute to recover the nosecone, and 2 Skyangle XXL Cert 3 parachutes to recover the rest of the rocket. I was very worried about the 2 parachutes tangling on the main part of the rocket, as it was something I'd never done before.



(A group of people gathering to get the rocket ready for launch – Photo Tricia Pitzeruse)

Once the rocket was sealed up, and ready to bring to the launch pad, we balanced it on a bathroom scale which showed us the rocket, loaded and ready to fly, weighed in at 143 lbs. This was only 7 lbs off from my original guestimate. The rocket was driven out to the far pad (1,000' away, as per NAR safety code) and loaded on the pad. The recovery electronics were turned on. A big hold up on the pad was an attempt to turn on an onboard video camera. Try as he might, high school student Jamie Plumley just could not turn the camera on. Finally a decision was made to fly it without the camera, and the pad was cleared.

The countdown proceeded, and I am certain I wasn't the only nervous person out there. There was a lot of pressure to recover this rocket intact, including from Larry Leatherman, President of the MOST, who was present for the launch. The Syracuse media was also there. There were a lot of eyes on this rocket. A rocket that all the people involved with building, and flying it, had never had experience with before, not on this scale.

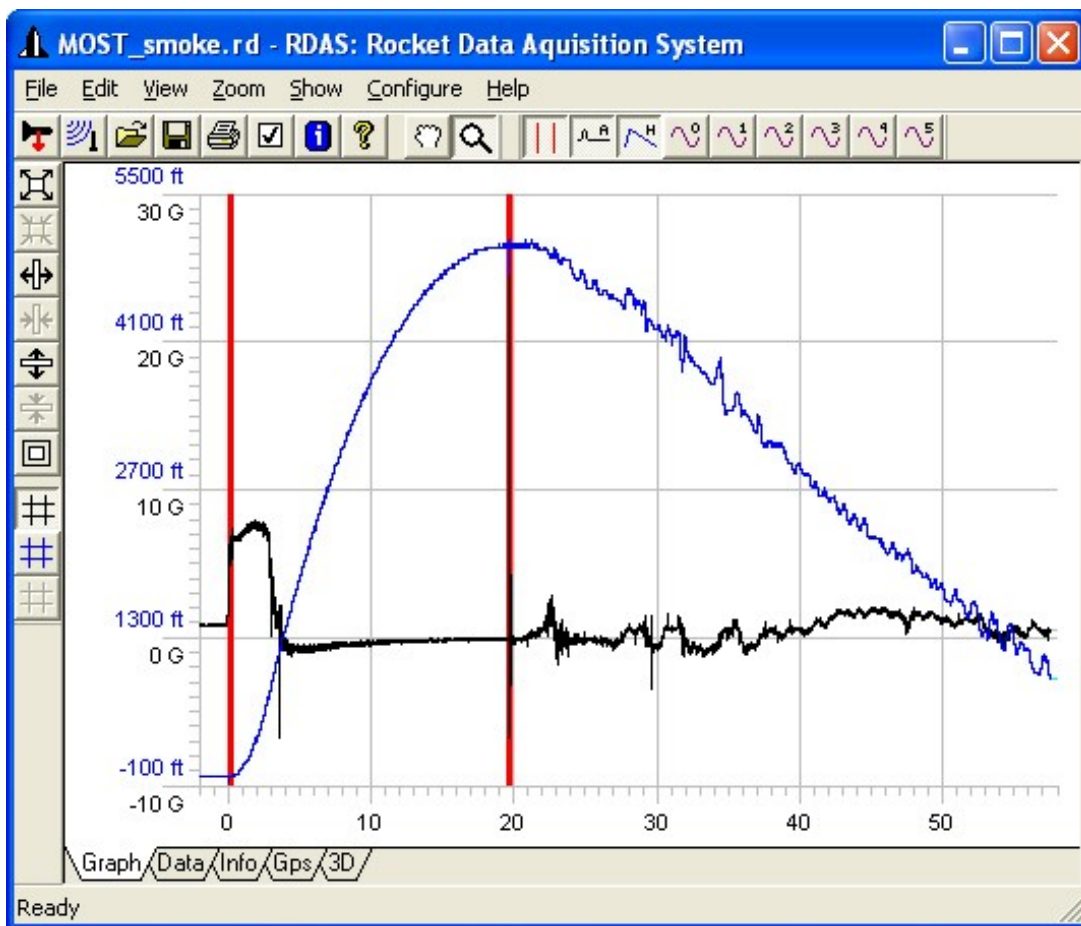


Beautiful liftoff on the Extreme Explorer on an N4000 – Photo Rich Pitzeruse

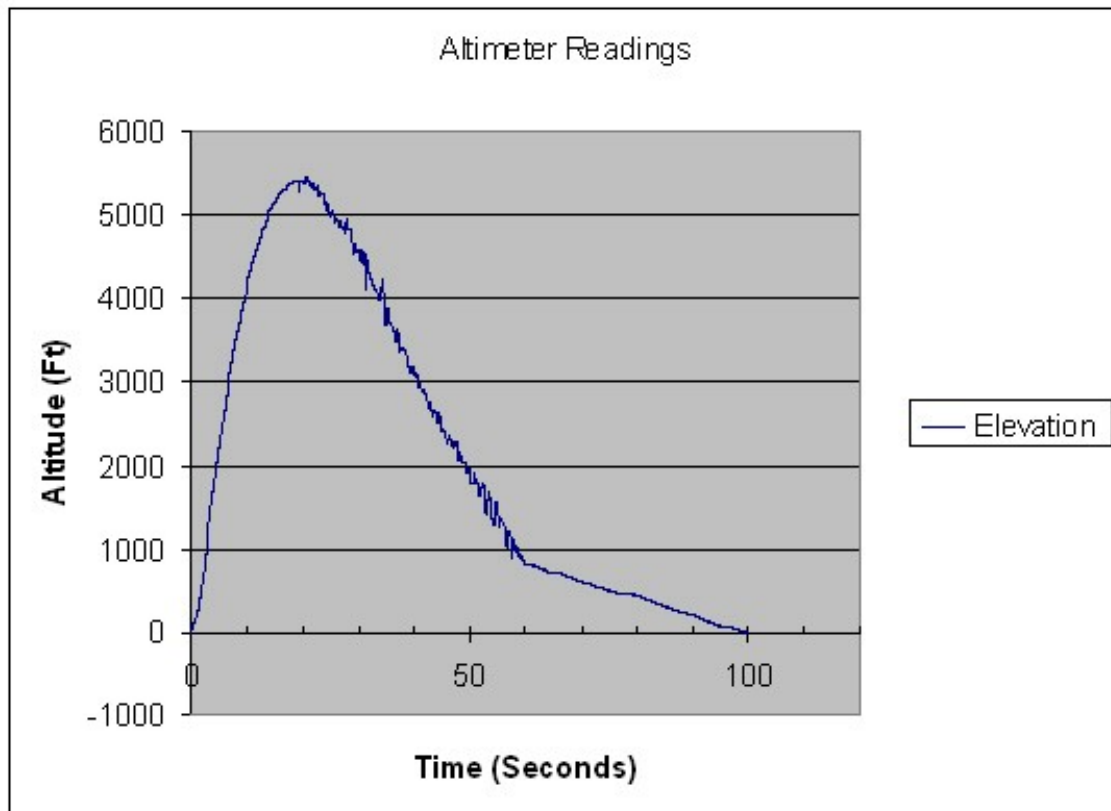
The countdown hit zero, and the \$895 of propellant came to life. It quickly and effortlessly lifted the rocket off the pad. Oh, and what a roar from that motor. The kind you can feel in your chest. Once the motor burned out, the rocket seemed to coast forever. It was hard to believe that 143 lb rocket could be lifted so effortlessly, and so high. Now for the hard part, recovering it intact, so it can be a museum piece and not a pile of garbage. At apogee 14 grams of black powder would pop the payload section from the lower airframe. It happened right on cue. The rocket fell, with a 100' tether between the payload section and lower airframe, enough to make it unstable, but fall reasonably fast. The moment of truth would arrive at 1,200', when the R-DAS was programmed to fire a 14 gram charge to pop the nosecone off, deploying the parachutes. Again, right on cue, the main charge fired, the nosecone popped off, and deployed its 'chute. The 2 parachutes in the rest of the rocket were in deployment bags, and it takes a second or 2 for them to fully deploy. Those 2 seconds seemed like an eternity to me, but both 'chutes opened perfectly, and the entire rocket was descending safely under 3 gorgeous parachutes to the ground.



Rich and David pose with the rocket after it's successful flight – Photo Tricia Pitzeruse



Data from the onboard R-DAS shows altitude (blue line) and acceleration (black line). The vertical red lines show when the R-DAS detected liftoff, and apogee.



Altitude data from the onboard Perfectflight altimeter.

Additionally, this rocket can be seen on page 16 of the February 2008 edition of *Rockets Magazine* (Produced by Liberty Launch Systems L.L.C.). It is one of several rockets featured in the NYPOWER12 article.

A big thanks to Rich for this article.

Rocket Items For Sale

Contact Dennis Friend at: 315-637-3549
for the following items:

- ◆ **The Launch Pad Hellfire Rocket** - finished but not flight worthy. Price: \$30 -

Discreet Componets (prices negotiable):

- ◆ Diodes
- ◆ Resistors
- ◆ Capacitors
- ◆ Transistors
- ◆ IC's, small and large
- ◆ Switches, plugs and sockets
- ◆ LED's, individual and displays
- ◆ Fuse holders
- ◆ Battery holders
- ◆ Potentiometers
- ◆ Solder and flux
- ◆ Panel lights
- ◆ Small fans & small speakers
- ◆ PC boards with components on them
- ◆ Perfboard
- ◆ Electroplate Kits
- ◆ Blank PC board
- ◆ Pen for drawing customer circuit boards
- ◆ Ferric chloride etching solution

This section will be updated quarterly, which means, every quarter you will have to "resubmit" any unsold items from the previous issue. This section will be available to club members. To sell an item, please forward the following: Item(s) for sale, description, new or used, cost, picture(s) if available, contact name and telephone number. Please list items separately, unless they are a bundle sale.

Please send your For Sale or Wanted Ads to:

greavisi@rochester.rr.com

Subject Line: SRC Rocket Items For Sale or Wanted

Just a reminder

Keep your NAR and Tripoli memberships current. Each chapter requires a minimum number of active memberships. Don't forget to include your NAR/Tripoli membership numbers when you renew your yearly SRC memberships. This allows Dennis to monitor our National Memberships.

I encourage all of you to help fill these pages with pictures, helpful hints or general information that would benefit the club.

**Send electronic submissions to:
greavisi@rochester.rr.com
Subject Line: SRC Newsletter**

2008 SRC Launches

2008 launches are posted. All launches are from 10 am to 3 pm at Weigand's Hayfarm.

Dates are subject to change due to the weather and field cuttings. Please check the SRC website <http://www.syracuserocketclub.org> the morning of the launch to confirm that the launch will be held.

We look forward to seeing you there!