



Informant

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Some members of one of the teams with their rocket at the launch site. Photo by Jonathan Sivier.

Future Rocket Scientists

By Jonathan Sivier

For many years the CIA has been assisting the U of I Aeronautical and Astronautical Engineering department with their Illinois Aerospace Institute. This is their summer camp for high school kids. We help the kids design and build boost gliders and egg lofters and then assist them with flying their rockets.

In February 2004 we were contacted by Professors Philippe Geubelle and Vicky Coverstone about assisting them with a freshman introductory course, AAE 199. They wanted the students to be able to build electronic payloads and then fly them to a

respectable altitude. Initially they were talking about the neighborhood of 10000 feet. After much discussion and deliberation it was decided that a much more reasonable altitude of 2000 feet fit better with their budget and with what we felt we could achieve in the time allotted.

The payloads were to be CanSats. These had to fit into the same volume as a 12 ounce pop can and couldn't weigh more than 12 ounces. The students were given an assortment of electronic instruments to choose from to design their CanSats. They could potentially include barometric pressure sensors, magnetic field sensors, accelerometers and cameras. The data from these instruments were recorded in a unit called a HOBO.



A CanSat payload being weighed prior to the launch day. Photo by Jonathan Sivier.

We spent a lot of time coming up with a design that we felt was easy enough to build for largely inexperienced rocketeers, large enough to hold the required payloads and rugged enough to take the punishment we were sure these rockets were going to endure. Mark Joseph ran many simulations on RockSim to find a combination of rocket, motor, delay and parachute that would do what we wanted.

We decided on a stretched version of the BSD 38 Special powered by an Aerotech I161 motor. These are 3 inch diameter rockets with 38 mm motor mount tubes. The standard payload sections were replaced with longer ones large enough to hold two CanSats. With sixty students in ten teams this meant five rockets.

In September we made a presentation to the class on what the process with the rockets would be. Then at a later meeting we oversaw the first building session and got them started on the construction of their rockets.

Another question we had to answer was where to hold the launch. When we first started this club in 1992 we were able to fly on the Chanute Air Force base in Rantoul. However the redevelopment of the base over the past decade has made it more and more difficult to find a suitable location on the base and get permission to fly there. We hope to be able to fly there again, but in the meantime we needed to find an alternate location. Luckily our president, Alan Carroll, had an idea for a possible launch location. His wife's family owns some farmland south and east of Rantoul, near the town of Flatville. Through his efforts we have been able to get permission to hold high power launches on this land.

Flatville is an appropriate name for this launch site. It is amazingly flat and after the crops were harvested we had a huge open field in which to fly.

We planned on two potential launch dates. The primary date was to be Saturday, November 6 with the 13th as a rain date. This gave

sufficient time for the students to build their CanSats and rockets, but left enough time before the end of the semester so they could analyze their data and write their reports. Our biggest concern was that the weather tends to be unfavorable more often than not this late in the year.

After that our only worry was, would we get our FAA waiver in time for the launch date. There was some nail-biting waiting for it to arrive, but it came in time and we were "go" for launch.

We decided to assemble the motors prior to the day of the launch to reduce the amount of prep time needed on the field. So on the day before the launch Mark Joseph, Greg Smith and Jonathan Sivier met in Talbot Lab and loaded six I161 motors. Five for the rockets built by the students to fly their payloads and one to fly in the demo model Mark Joseph had put together as the first flight of the day to test the winds aloft.



The same team's rocket taking off at the Flatville launch site. Photo by Alan Carroll.

On the date of the launch the weather turned out to be very acceptable. It was a bit cool at 8:00 in the morning as we were setting up, but it became a clear and sunny day with temperatures in the 60's. The wind was moderate and from the southwest which is perfect for this field.

It turned out that it was Dad's Day at the University of Illinois so many of the kids in the class came with their fathers and families.

All-in-all we felt the launch at the Flatville site was a great success. The AAE student's rockets all flew very well. We flew six 38 Specials on I161 motors. There were no misfires or igniter failures. All of them successfully opened their parachutes and landed in the field. Some ended up having some trouble with their data collection, but our part of the event, dealing with flying the rockets, went as well as we could possibly have hoped.

After the students flew their rockets in the morning most of us stayed and flew our own rockets in the afternoon. We had a wide range of rockets flown, though given that we had this great, big field available there were more large rockets than there were smaller ones. Quite a few H and I motors were flown during the afternoon and 2 rockets were flown with K motors. There were a couple of crashes, but overall it was a great day of flying. The weather was warmer than we had any right to expect in November and while it was a bit windier than we might have liked it was acceptable.

Greg Smith flew his video rockets a couple of times and a bunch of ham radio folks showed up to watch. Also some of the students from the morning hung around and watched for part of the afternoon.

Plans are in the works to hold this class again in the fall of 2005. If the budget allows we hope to use the things we have learned this year and build upon last year's success. They are talking about higher altitudes, with possibly a GPS unit and/or radio tracker in each rocket.

Highlights of 2005

Here are some highlights of upcoming Central Illinois Aerospace activities we can look forward to in 2005.

Meeting Topics

We have scheduled topics for all of the monthly meetings this year. However we are always looking for ideas for topics at future meetings. So let us know if there are any topics you would like to see covered.

- March 1: Show and tell.
- April 5: Radio controlled gliders.
- May 3: Competition events and strategy.
- June 7: Rocket books.
- July 5: GARLO follow-up.
- August 2: Introduction to model rocketry.
- September 6: Introduction to mid-power rocketry
- October 4: Annual Swap Meet.
- November 1: Rocket electronics and payloads.
- December 6: Rocketry nostalgia and tall tales.

Special Events

- July 2: GARLO 2005:
- August 13: Annual Nostalgia Launch: prizes for oldest rocket and/or motor flown.
- September 10: Annual Night Launch.

GARLO 2005

"Winged Spaceships"

The Great Annual Rocket Launch Of 2005 will be held on Saturday, July 2, 2005. This is our big annual event, a purely-for-fun rocket launch. We will be awarding ribbons and prizes for winners of 7 fun events. The first event will be Winged Spaceships. This is in honor of the space shuttle's return to flight which is scheduled for later this year. This includes the shuttle and spaceplanes of many different kinds. Real world possibilities would be the shuttle, the X15, DynaSoar, Space Ship 1, etc. The classic

Estes kit The Orbital Transport and others like it would also be great subjects. We hope this will give plenty of opportunity for creativity and imagination. Recovery of these models can be whatever method works best for you. However if your model (or a portion thereof) recovers by gliding you can potentially win in the other special contest, Spaceplane Glider Duration. Then there will of course be the events we hold every year, Best of Show (Static), Best of Show (Flying) and Spot Landing (uncontrolled rocket and controlled and uncontrolled glider). We also have a large number of "Prang" ribbons as consolation prizes. Due to the rain at GARLO 2004 we were unable to fly the Moon Rockets competition. So we will also be judging these rockets at GARLO 2005. It should be a great day of flying and I hope everyone will plan on being there.



Jonathan Sivier's E Egg Loft entry, an Estes Eliminator, takes off on August 28, 2004. Photo by Jonathan Sivier.

We held our Insurrection VII contest during our August 28, 2004 launch. Since the Weather Channel had been predicting rain and high winds, we had a low turnout for both the regular launch and the contest. We only had four members competing, William Carney, Jonathan Sivier, Lon Westfall, and me. We didn't have as many events as we could have, which turned out for the best as it started to rain later in the day.

Our first event was E Egg Lofting Duration, and we had three competitors, Jonathan Sivier, Lon Westfall, and me. Lon had a very nice model he built with the new Apogee Rockets BT-70 sized 5:1 ogive plastic nose cone. I didn't see his first flight, because I was outside of the park (see below). But everyone said he had a nice flight, and a time of 63 seconds. For his second flight, Lon tried using a 42 inch nylon parachute. That's a pretty big parachute for a rocket that is not all that big. In fact, it's not a heavy enough rocket for the parachute to easily open. It deployed very nicely then proceeded to fall, sort of billowing, but not quite opening. The chute finally opened when the rocket was only 75 to 100 feet off the ground, to much applause I might add. Lon's time for this flight was only 40 seconds.

Jonathan was flying what is fast becoming his standard E powered contest rocket, his Estes Eliminator. This time he added an egg capsule to it, which prevented it from going all the way down the launch rod. However this worked just fine and Jonathan got a 96 second duration on a flight that landed near the brush by the north-south stream. For his second attempt, Jonathan adjusted the launch angle, and got a duration of 109 seconds on a flight that landed much closer than the first one.

I was flying a purpose built rocket with an E9-6 that went a lot higher than I thought it would. It also drifted further than I thought it would. In fact, it drifted out of the park, over Bradley Avenue, and then over Country Fair Drive. Fortunately, it didn't land in the very busy intersection, but on the grass just past the

Insurrection VII Results

By Christopher Brian Deem. Contest director

sidewalk. The front end of the body tube was dented, and the egg capsule seemed a little ... soft. I guess I should have used an E9-8. When I got back (Lon said I was gone 19 minutes and 45 seconds) we checked the egg, and it was unbroken, just shoved forward. I had a duration of 214 seconds, which gave me first place. I didn't make a second flight, because it seemed pointless. I didn't think I would be able to recover the rocket if it made a longer flight and everyone else had already made their two allotted flights.

Our next event was 1/2A Parachute Duration. For this event we had four competitors, the three from the first event, plus Will Carney. Will was flying a Custom Rockets Razor, which is a tube-finned rocket. His first flight was disqualified due to the shock cord breaking. His second flight got a duration of 10 seconds, which wasn't too bad considering that the Razor is much bigger than the standard 1/2 A duration model.

Speaking of bigger than optimal models, Jonathan flew his "El Bandito" which flies very well on a B6, but not so well on a 1/2A3. His first flight only stayed up for 8 seconds. Showing great consistency on his second flight he once again got a duration of 8 seconds, for a total of 16 seconds. This beats our previous record of 19 seconds for two flights in 1/2A Parachute Duration held by Chuck Greenwood. I'm sure with a little luck we can get it down to single digits.

Lon Westfall was using a very small rocket with a Mylar parachute. His first attempt was 70 seconds, which was the longest single flight in this event. Unfortunately the motor for his second flight CATO'ed. This burnt the body tube and ripped his parachute. Under the rules, Lon was allowed to make a third flight, since the CATO didn't count as a flight. Lon wasn't sure his rocket was up to it, so I offered a high tech solution to the burnt body tube (wrap tape around it). As for the torn chute, well just stuff it back in and hope for the best. Unfortunately, the best was not to be, as Lon's rocket

disappeared into the darkening sky. Adam Joseph spotted it some time later sticking out of the ground about 50 yards away. It had ejected its engine, and so was disqualified. That gave Lon second place with his 70 second flight.

I was flying my all-purpose 13 mm to 18 mm duration rocket. The first flight was on a 1/2A3-2T. It ejected on the way up for a 48 second flight. Figuring that I could get a little more altitude, my second flight used a 1/2A3-4T and a slightly larger parachute. Good in theory, not so good in practice. The second flight arced more than the first, so it actually ejected at a lower altitude. The duration was one second less than the first flight, 47 seconds, giving me a total of 95 seconds.

Our last event was Streamer Spot Landing. The same four people flew as in 1/2A PD. When we fly any of the spot landing events, I determine the spot by flying a rocket first thing, and marking the spot where it lands with a flag. Because of the variable wind, the spot ended up being about 80 feet due north of the launch pads. Since for most of the day the wind was blowing west to northwest, this made launch angle adjustment crucial. Will Carney made his attempt (you are only allowed one flight) while I was chasing after my Egg Lofting rocket. He flew a scratch built rocket that we have seen fly several times before. It always turns in a good flight. Unfortunately, this time it landed so far from the flag that he didn't bother to measure the distance. Some of the non-contestants seemed confused later when we were talking and said "at least it landed in the park". So we had to explain that we have, on occasion, missed the park completely in spot landing. I mean, hey, it's only 110 acres.

Lon got third place with a distance of 29.4 meters. Jonathan was flying his Apogee Micro V-2, which is BT-20 sized and flies on 13 mm motors. In order to help him, Adam Joseph put a small sign on the flag identifying it as "London". The V-2 landed 20.94 meters from the flag, in the general direction of London, so I don't know if that helped or not.

My rocket came in first with a distance of 18.3 meters. Not the best distance I've ever gotten, but better than a lot of my attempts. I once missed the park with the rocket I was using to determine the spot for spot landing.

Our final results are: 598 points total for our section. William Carney was fourth with 18 points. Lon Westfall was third with 130 points. Jonathan was second with 160 points. This means I was club champion with 290 points. That's right! I'm club champ again! Not only that, but I won all three events! And you know why? Well, mainly because some of the people that usually beat me didn't compete this time, and Lon picked the only 1/2A that has ever CATO'ed for his second parachute duration flight. Plus of course, my secret ace-in-the-hole, dumb luck. Remember, you too can be a big time competitor. Just come out to one of our contests. We're not that hard to beat.

First Delta IV Heavy Launches

By Chuck Greenwood

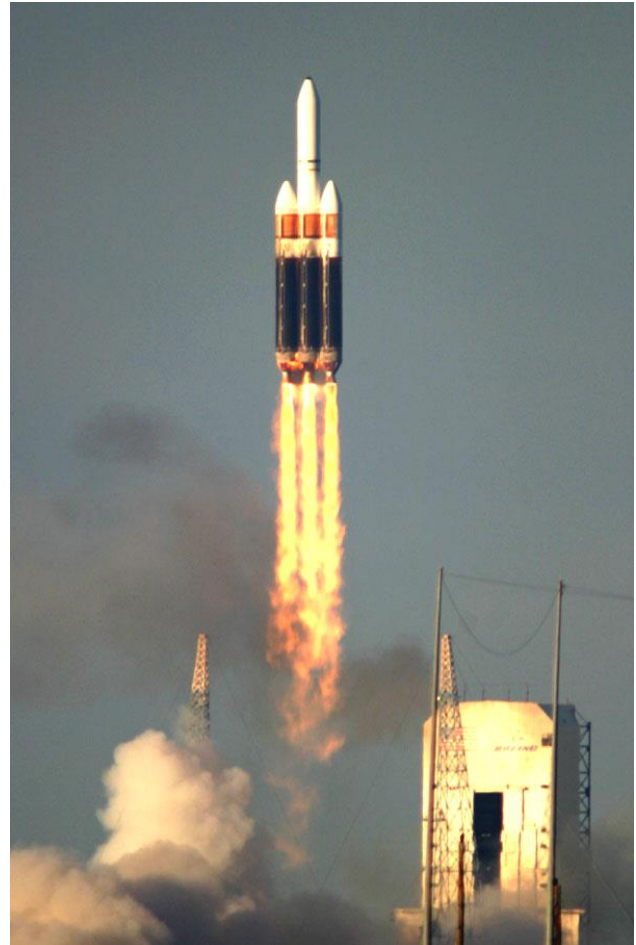
Your CIA Southeastern representative has been hard at work following the latest in spacecraft news. The recent overwhelming successes of the Cassini-Huygens mission have taken center stage, but let us not forget to congratulate the folks at Boeing for the inaugural flight of the Delta IV Heavy on December 21, 2004.

In case you haven't heard, the D-IV H is the heaviest liquid-fuel system since the days of Apollo.

I stood in cool but sunny conditions at the end of a concrete fishing pier at Jetty Park with a couple hundred other rocket gazers. The launch had been delayed many times, in fact for over a year, due to glitches, fixes, weather, and what not. Today would be the day, we all knew. There was yet another hold for yet another concern, but finally the moment was upon us.

Several folks knew somebody who knew somebody, and each one pointed at a different

launch pad, or tangle of towers, as THE launch platform. I could not see a rocket at any of them, and so I tried to watch them all.



Delta IV Heavy takes off from Cape Canaveral Air Force Station in Florida. Picture from Spaceflight Now.

Suddenly the cry went up, "There it is!" I still couldn't see anything. Then, way off to one side, I saw it. All the guessers were wrong; the launch pad was farther west, and farther away, than we had thought. It was also hidden behind a berm surrounding the submarine pens. No matter, the sight of the rocket in flight was stunning. Next time I will prepare a better watching spot.

For a moment it looked a bit like something "John Page's Brother" had put together, and then I thought, why not? Doesn't he still work for Boeing? How odd that one CIA member would be on one coast, at the constructing end of things, while another member lives at the other coast, at the watching end of things!

(Editors note: Mark Page did work for McDonnell-Douglas in Long Beach, but he left prior to the take-over by Boeing. He now designs racecars.)

We stood in stunned silence as the huge triple rocket flew. The sound came in later, as a crackling thundering presence strong enough to feel in your chest, and shake your trouser leg. This flying machine was louder than most shuttle flights, with much more "crump" and crackle, and a much deeper rumble. The sound continued long after the rocket dwindled to a dot. Odd echoes bounced at us from unlikely directions. How can empty ocean make an echo? Perhaps big density differences in air masses? Sounds from the furious conflagration followed us all as we trooped off the pier.



Delta IV Heavy heads downrange. Picture from Spaceflight Now.

The separation of the two side boosters happened at such a distance that I could not see it. Note to self - get binoculars for next time. Another note to self - get busy building a large scale model of this puppy! Work done now will get you a step ahead when - maybe - they start using this configuration carrying a mini-shuttle for manned launches.

Later news of the launch pooh-poohed the mission as a failure because the target altitude had not been reached. Hey news media! Give them a break! Nobody has flown three rockets bolted together before. Nobody has lofted this much stuff on an untried rocket in decades. Now that the cause has been determined (bubbles in fuel lines tricked the sensors into believing that the tanks had gone dry) a fix can be put in, and the next flight will "Go, baby, GO!"

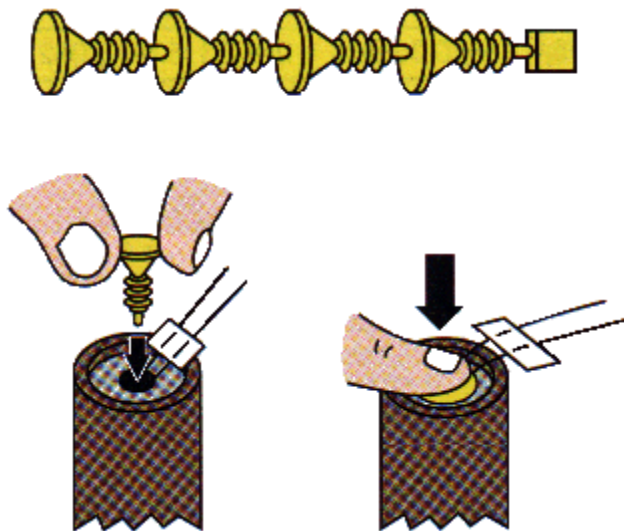
If you are ever down this way for a launch you can contact me at GreenwoodC@brevardcc.edu or <http://www.brevardcc.edu/planet> for viewing locations and local perspective.

Ask the Experts

Igniters: Part 1

With the flying season just around the corner I thought it might be a good time to cover one of the basics of model rocketry that sometimes causes trouble for beginners. Using the igniters that come with Estes motors may seem like a simple process and it is once you get the hang of it. However we do see many people having trouble with igniters when they are just starting out. So here are some tips that may help you have successful flights with your rockets.

Estes igniters come with a tape strip on them. Leave this in place. It helps hold the igniter leads together. If it comes off it is easy for the igniter to be damaged by having the leads spread too far apart, breaking the wire under the pyrogen at the tip of the igniter.



Insert the igniter straight into the nozzle of the rocket motor until it touches the propellant. Then bend the igniter leads so they project out at 90° to the side of the motor. Bend them towards the side of the rocket between two fins and opposite the launch lug. This way you will be able to more easily access the igniter in order to attach the clips when the rocket is on the pad without interference from the fins or the launch rod. Then press the plug into the nozzle to hold the igniter firmly in place.

Here is a chart showing the correct plugs to use with the different Estes motors. Make a copy of it and tape it inside your range box.

Estes Rocket Motor Nozzle Plug Colors	
A3	Orange
A10	Green
A6, A8, B4	Yellow
B6, C6	Magenta
B8, C5	Blue
D11, D12	White
C11, E9	Black

After you have placed the rocket on the pad attach the clips to the igniter leads. Make sure the clips are clean where they will contact the igniter and also make sure they hold the igniter firmly. I like to bend the excess igniter lead around the clip for a better connection and to

keep the clip from falling off. Make sure the clips aren't touching each other or any metal since this could short out the ignition current and keep your rocket from launching.

Goddard and Stumpy

By Mark Page

Episode five is probably the most popular single panel (based on my 2 fans). I introduce Stumpaw and Rokket-Henge. Also Stumpy's feet make their debut appearance. Don't laugh, I wasn't sure what kind of pants, legs, and shoes would best fit the character. In the end I chose classical "Desert Rat."

Other Clubs

Tripoli Central Illinois

The Tripoli Central Illinois folks launch from November to April at the Tuscola Airport on various Sundays. They have a 10,000' waiver. Newcomers are always welcome. They do require that people who fly motors larger than G be NAR or Tripoli members with insurance.

Contact: Don Reasor

Phone: 217-253-2586

Email: Don.Reasor@netcare-il.com

http://www.tripoli.org/launchad/TRA_Central_IL.html

Northern Illinois Rocketry Association

NIRA holds regular launches in the Chicago area

<http://www.NIRA-rocketry.org/>

Fermilab Association of Rocketry

FAR holds meetings and launches near Batavia, IL.

<http://www.fnal.gov/orgs/far/>

Peoria Area Rocket Society

PARS is a model rocket club serving Peoria, IL and surrounding communities.

<http://www.piars.us/>

Tripoli Quad Cities

Model and High Power rocketry for Eastern Iowa and North Western Illinois.

<http://www.tripoliquadcities39.com/>

Tri-State Rocketry

Serving Quincy, Illinois and surrounding communities.

http://www.geocities.com/tri_state_rocketry

Indiana

There are various clubs in Indiana who hold regular launches.

<http://www.indyrocks.org/>

St. Louis

The St. Louis Rocketry Association holds model and high power launches approximately monthly.

<http://www.stlouisrocketry.org/>

Local Vendors

Here are local places to get rocketry supplies.

Hobby Lobby: next to County Market near the corner of Mattis and I-72.

Leisure Time Pet & Hobby: 807 N. Mattis.

Rocket R&D: Gary Buck at 217-841-4777.

Slot and Wing Hobbies: Just north of I-74 on the east side of Prospect.

Call for Submissions

If you have something to share with the other members we would love to hear from you. Possibilities for submissions include: reports on launches or other events, technical articles, rocket plans, contest and flying tips and hints, reviews of models or motors, books, software or other items of interest to rocketeers and photos taken at launches. If you have something in mind to submit for the next issue, hopefully in August of 2005, contact the editor.

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