

The NOVAAR Free Press

November and December 2004

At January's launch, Ben Title's camera equipped R/C airplane snapped this shot of the Great Meadow field as a rocket took flight from the one of the High Power pads.



Inside this Issue

<u>Calendar</u>	<u>2</u>
<u>November Events and Activities</u>	<u>3</u>
<u>December Events and Activities</u>	<u>6</u>

Competition Rocketry	10
<u>February Build Session, RAMTEC-12,</u>	
<u>NOVAAR Section Meet, TARC-2005</u>	
<u>The 2004 Flight Year</u>	<u>16</u>

Sport Rocketry

<u>The Flight of the Moon Shot</u>	<u>11</u>
<u>Doug Hillson's 3-D Glider, part two</u>	<u>13</u>

Advanced Rocketry

<u>Dual Deployment Recovery using</u>	
<u>the Defy Gravity Tether</u>	<u>14</u>
<u>From the Editor</u>	<u>15</u>



Section 205

NOVAAR Free Press

November – December 2004

This is the official newsletter of the *Northern Virginia Association of Rocketry* (NOVAAR), Section 205 of the *National Association of Rocketry* (NAR). This newsletter is a benefit of being a member – *You are a member, aren't you?*

Section Officers

President:..... John Hochheimer
john.hochheimer@verizon.net
Secretary:..... Trip Barber
ahbarber@alum.mit.edu
Treasurer:..... Keith Wancowicz
keith@thaicustomcrafts.com
Senior Advisor:..... Ken Brown
brown007@bellatlantic.net

Membership and Dues

To maintain the clubs launch equipment, pay for our website, and produce this newsletter we collect dues. Dues are collected annually and are: \$5 for members age 13 and younger, \$8 for members age 14 to 18 and \$10 for everyone else. A membership application can be found at many local hobby shops and on our website.

Meetings

NOVAAR holds meetings on the first and third Tuesday of the month, from 7:00 pm to 8:30 pm, at the King's Park Community Center in Springfield, VA. The most current topics to be discussed and directions to our meeting room can be found on our website.

Build Sessions

Once a month, on the third Sunday of the month from 1:00 pm to 5:00 pm, at the King's Park Community Center, the club gets together to build rockets and share construction techniques. The most current schedule and directions to our meeting room can be found on our website.

Launches

NOVAAR conducts monthly launches at [Great Meadow](#) which is located in The Plains, VA – approximately 50 minutes south of Washington DC on Route 66. Launches start at 9 am and run until 5 pm (10 am to 4 pm during the winter). The most current schedule and directions to *Great Meadow* can be found on our website.

There is no charge to fly at club launches (motor sizes A to G). However, there is a \$5 charge to launch high-powered rockets (motor sizes H to I -- the field is not large enough for bigger motors). **AND**, you don't have to be a member to fly with us. Though, after you meet us and, realize that we don't bite – *as long as we take our medication – we know you will want to join.*

If weather threatens the launch day, our website will report the status of the launch by 8:00 pm the day before.

Website

The club's website (www.novaar.org) is where the most current information about future club activities can be found. The site is maintained by...

Webmaster:..... Dan Winings
dwinings@adelphia.net

Newsletter

The club's newsletter is published 6 times a year or, as close to that schedule that is humanly possible for the editor to achieve. The newsletter reports on the club's activities and features articles written by club members about their endeavors within the Model Rocketry Hobby. The articles include, *but are not limited to*, topics on sport rocketry, competitive rocketry and high-powered rocketry. Send submissions to ...

Editor:..... Frank Prekel
fjprekel@aol.com

Calendar

January 2005

SUN	MON	TUE	WED	THU	FRI	SAT
						1 New Years Day
2	3	4 NOVAAR Meeting	5	6	7	8 NOVAAR Launch
9 Launch Back-up	10	11	12	13	14	15
16 NOVAAR Build	17 ML King Holiday	18 NOVAAR Meeting	19	20 Inauguration Day	21	22
23	24	25	26	27	28	29
30	31					

February 2005

SUN	MON	TUE	WED	THU	FRI	SAT
Also, National Freedom Day		1 NOVAAR Meeting	2 Groundhog Day	3	4	5
6	7	8 Mardi Gras Day	9 Chinese New Year	10	11	12 NOVAAR Launch
13 Launch Back-up	14 Valentine Day	15 NOVAAR Meeting	16	17	18	19
20 NOVAAR Build	21 Presidents Holiday	22 Washington Birthday	23	24	25	26
27	28					

March 2005

SUN	MON	TUE	WED	THU	FRI	SAT
		1 NOVAAR Meeting	2	3	4	5
6	7	8	9	10	11	12 NOVAAR Launch
13 Launch Back-up	14	15 NOVAAR Meeting	16	17 St Patrick Day	18	19
20 NOVAAR Build	21	22	23	24	25	26
27	28	29	30	31	1	2

November Events and Activities

November 2nd Meeting The U.S. World Spacemodeling Championships Junior Team visits

The business portion of the first meeting of November focused on the second half of the competition year. It was announced that NOVAAR would fly ECROM and RAMTEC as a club. Events and schedule will be announced.



Also discussed, was the club's new trailer. The trailer is a donation from the folks at the Aviation Industries Association and the Team America Rocketry Challenge. The new rolling shed will be aluminum, have a rear and side door and have a wood lined interior.

The need for shelves and their possible configuration was discussed. The desire to paint the whole thing orange was discussed and un-ceremonially dismissed.



The featured speakers were several members of the United States' World Spacemodeling Championships Junior Team fresh from their trip to Warsaw, Poland. The 7-person team includes 4 NOVAAR members and is managed by a 5th – John Langford. The team competed against 19 other countries in 8 different events.



Additional photos, taken by John Langford and Tony Reynolds, can be seen in the "Photo Galleries" section of the US Space Modeling website -- www.spacemodeling.org/.

☆☆☆

November Events and Activities

November 6th Launch

The first weekend of November dawned cool and sunny. The club was joined on the field by several groups and families. The turnout resulted in our busiest launch day of the year – 260 launches. That edged the daily average of 250 sport launches per day during NARAM-46.

November 2004 Launch Day Totals – 260 flights

? A	¼A	½A	A	B	C	D	E	F	G	H	I	J	CLU	STA
0	2	28	48	53	46	17	4	16	6	5	3	2	10	20

CLU
STA

cluster, motors used not reported.
staged, motors used not reported.



☆☆☆

November 16th Meeting Aurora's MarsFlyer and NASA's ARES Mars Scout Project

The last meeting of the November featured continued discussion of the competition year to come. The desire to conduct a section and a regional meet we discussed. Both were tentatively scheduled for spring 2005.

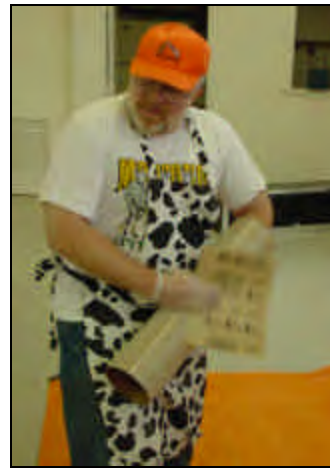
Planning for the new trailer continues, with Trip Barber doing some shopping. He has his eye on a 5-foot by 8 or 10-foot trailer with a single axel. Vehicles towing the trailer will need a larger hitch. Once acquired, the trailer will be marked with signage advertising the Team America Rocketry Challenge and NOVAAR markings. The idea to paint it orange was once again dismissed.

The speaker for the evening was Bob Parks, of NOVAAR's "California Division". Bob spoke about the project he is working on for Aurora Flight Sciences – the MarsFlyer



The project plans to launch the flyer to Mars inside of an aero shell. The shell will enter Mars' atmosphere where rockets and parachutes will slow its decent. Once in the martian atmosphere, the shell will separate and the glider will be released and unfold. Once unfolded, the rocket motor will fire and the controllers on Earth will fly the aircraft over the surface of Mars.

November Events and Activities



Aurora, teamed with Orbital Sciences Corp., Draper Laboratory and SAIC, responded to the NASA Mars Airplane Package RFP in 1999. During the 45 day proposal effort, Aurora led the airplane design team and was responsible in particular for the configuration selection, aerodynamic design, structural and mechanical design, and controls aspects. In this short period, the Aurora team studied the complex airplane folding to a very high level of detail. The analyses included complete aerodynamic and structural FEM, 6 DOF simulations, solid modeling, flutter analysis, and Montecarlo simulation of the entry. Fabrication of a rocket powered, in-flight deployable demonstrator, and a folding display model, along with it's aeroshell was also included in this effort – taken the from Aurora Flight Sciences website.



Additional information can be found on Aurora's website – www.aurora.aero/gallery/gallery_mars.html.

☆☆☆

November 21st Building Session

The build session for November continued the work on the club's demonstration rockets. The fins and motor mounts for the I-ROC were completed and installed. The Wocket's shell was attached and its motor mount was finished.



It was decided that at the next launch, the saucer will fly!

☆☆☆

December Events and Activities

December 7th Meeting

The first meeting of December saw the continuation of the discussion and planning for regional and club competitions.

Also discussed, was the possibility of teaming with the Challenger Center in Alexandria and facilitating a launch session in conjunction with their summer "Mission programs". The Center is looking for assistance with 5 1-week programs during July and August. It was thought that the club may be able use the Challenger Center's connection to help accelerate access to the Laurel Hill (Lorton) flying field. John Hochheimer will talk with the center and determine how we could best help.

For more information about the Challenger Center visit their website – www.challenger.org/.

The presentation for the evening was given by the students of the Oakton High School Rocketry Club. This charter TARC participant has taken on a new challenge – NASA's Student Launch Initiative.

The initiative is an educational partnership between the NASA's Marshall Space Flight Center and selected high schools across the country. The mission of the initiative is to involve students in a hands-on engineering and planning project designed to parallel the designing, building, and testing aspects of the aerospace industry. Oakton High School is one of ten high schools participating in the Student Launch Initiative.



The Oakton High School Rocketry Club's web page is at www.fcps.k12.va.us/OaktonHS/rocket%20site/rocket%20site/home.htm and copy of their proposal is at www.fcps.k12.va.us/OaktonHS/rocket%20site/rocket%20site/PROPOSAL.pdf.

For more information about NASA's Student Launch Initiative visit education.msfc.nasa.gov/docs/127.htm.

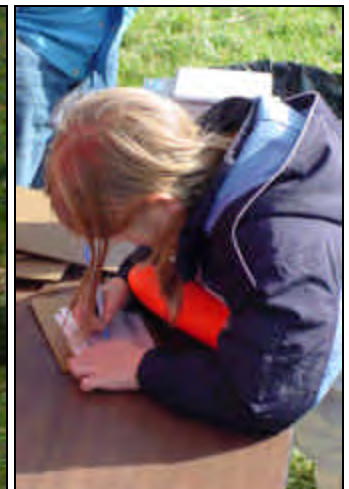
☆☆☆

December 11th Launch

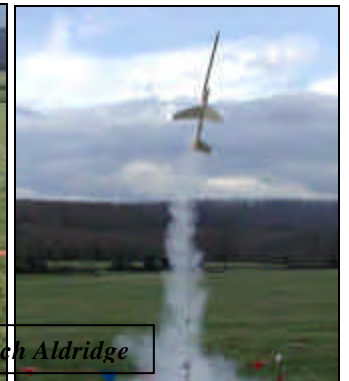
The December launch was cold and overcast. It brought with it TARC test flights, the first flight of the club's saucer and the arrival of our new trailer.

December 2004 Launch Day Totals – 66 flights

? A	¼A	½A	A	B	C	D	E	F	G	H	I	J	CLU	STA
0	0	0	5	10	12	8	5	7	4	3	1	2	3	6
CLU				cluster, motors used not reported.										
STA				staged, motors used not reported.										



December Events and Activities



photos: Rich Aldridge



December Events and Activities

The Saucer Flies

With the assistance of Bart Markley, the club's demonstration saucer took flight for the first time. At apogee, the motor mount was to eject and deploy the parachute. However, it got hung-up in the body tube and it landed with a "thud". One of the legs separated from the centering rings and the saucer's shell. In all the damage is minor and will be repaired at the next build session.



photo: Trip Barber



photo: Rich Aldridge



The New Trailer

The club's new trailer made its first appearance on the launch field attached to the back of Trip Barber truck. Regrettably, a trailer with a side door was not available. At the end of the lunch, everything in the old trailer was moved to the new.

Everything fit! And, there is room for more!!



After January's launch, Trip Barber took the trailer to the sign shop to have it decked-out with its new markings.



photo: Trip Barber

OK, some people seem to be against painting the entire trailer orange. So, maybe, we can paint the fenders orange?

☆☆☆

December Events and Activities

December 19th -- Holiday Party

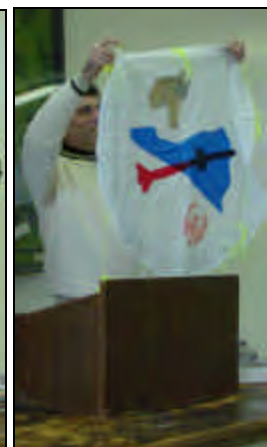
The December build session was cancelled in favor of the Annual Holiday Party. The club joined together to enjoy each other's company and eat.



photos: Craig Beyers



Jonathan Rains reported that NARAM-46 had \$1,369.11 left after paying all the bills. And, for his efforts serving as the CD, the club presented Jonathan with a NARAM-46 logo'd parachute. In addition, he and John Hochheimer served as auctioneers for the club's annual auction and earned the club another \$171.



☆☆☆

December 21st Meeting Cancelled in favor of pending holidays

Hey, it was the holidays!

☆☆☆

Competition Rocketry

February's Build Session to focus on Competition Rocketry

The next build session, February 20th, will be dedicated to the construction of competition rockets for up-coming events. Ken Brown, NOVAAR's Senior Advisor and the proprietor of QCR – Qualified Competitive Rocketry (www.cybertravelog.com/qcr), will school attendees on the finer points of B Rocket Gliders and D Dual Egg Lofting rockets. Kits and Parts will be available for sale or bring your own.

☆☆☆

RAMTEC-12 Planned for Our Field

On April 2nd and 3rd 2005, on our field at Great Meadow, SPAAR will be conduct RAMTEC-12. After learning, the SPAAR had lost access to their field; NOVAAR suggested that they could use ours. And, they accepted. So, SPAAR is "bringing the RAMTEC road show" to Great Meadow.

Events to be flown are:

- D Dual Egg Lofting Altitude
- D Helicopter Duration
- B Rocket Glider Duration
- 1/4A Parachute Duration

All of the information you should need is available at www.spaar.org/ramtec, including directions and a registration form.

Registration fee for the competition is:

- \$10.00 for A and B Division,
- \$15.00 for C Division and
- \$18.00 for Team Division.

Advanced Registration is preferred, however on-site registration and check-in will be Saturday morning at the range.

The Contest Range will be open Saturday from 9am to 5pm and Sunday from 9am to 2pm. Events may be flown either day with the exception of D Dual Egg Lofting Altitude, which must be flown on Saturday.

The range is open for sport flying both days, during operation of the contest range. And will be managed by NOVAAR. All flights are subject to clearance of the Range Safety Officer.

☆☆☆

NOVAAR Section Meet Planned

On June 5th (a Sunday), on our field at Great Meadow, NOVAAR will hold its annual section meet.

Events to be flown are:

- B Superroc Altitude
- A Streamer Duration, and
- 1/2A Boost Glider

The Contest Range will be open Sunday from 9am to 5pm. Joe Woodford will serve as the Contest Director.

☆☆☆

NARAM-47 is just around the corner

From July 30th to August 5th, 2005, NARAM-47 will be conducted at the Voice of America Park in West Chester, OH. NARAM-47 will be hosted by the Queen City Area Rocket Klub (QUARK, NAR section 624 – www.quarkers.org).

Events to be flown are:

- 1/4A Helicopter Duration
- 1/2A Boost Glider Duration
- A Cluster Altitude
- B Super Roc Altitude
- C Streamer Duration (Multi-round)
- Set Duration
- D Dual Eggloft Duration
- Open Spot Landing
- Giant Sport Scale
- Plastic Model Conversion, and
- Research and Development

The Contest Director is Mark Fisher

(<mailto:micronzen@hotmail.com>).

☆☆☆

Ever wanted to launch eggs into space?

We'll pay you...

And we'll pay your friends too. Your school can compete against other schools and organizations from across the country for its share of \$60,000 in prizes! Thousands of students each year compete in the Team America Rocketry Challenge, a nationwide model rocket contest and the largest competition of its kind.

To win, each team must design, build, and fly a model rocket carrying a raw egg and return it safely to the ground while staying aloft for a predetermined amount of time. Whoever is the closest win!

Join us this year as we Celebrate the World Year in Physics, which marks the 100th year anniversary of Einstein publishing his papers on relativity.

Qualification Deadline – April 11, 2005

For more information, please visit our website at www.rocketcontest.org.



Sport Rocketry

The Flight of the Moon Shot

Steve Schwartz

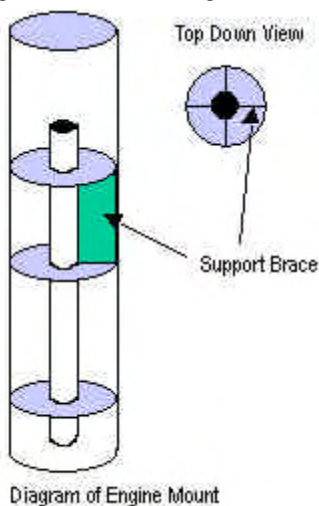
A couple of summers ago, I was looking for fireworks at the local fireworks stand. I noticed a large canister of assorted items. It consisted of a large tube stuffed with 4th of July goodies. It looked kind of like a large crayon and was called the Moon Shot.



I bought it and used the contents for celebrating the 4th of July. Then I started thinking. Could you make a rocket out of this? I anticipated using a "G" engine and did some quick rocket simulations. I learned that it should work, if I could keep the weight down to about 32 ounces. I had several other projects I was working on, so I wound up taking a year and a half to complete the rocket. Here is how I built it and how it flew.

My biggest challenge was keeping the weight down. For this reason, I choose to use a corrugated cardboard engine mount and traditional balsa fins. I also choose to use white glue, which should be lighter than epoxy. Since I was using these "less than sturdy" materials, I had to be very careful to ensure the rocket could handle the power of a "G".

I started with building the engine mount. I used a standard 29mm, 2ft long tube for the engine tube. I fitted an old Aerotech "G" engine casing into the tube and glued an engine block into the correct position. For



an engine hook, I used an old Estes "E" sized hook. I simply broke off the top retainer, so it would glue flat against the tube. I included an ejection baffle by using a whole punch to cut four holes at the top of the engine tube. I inserted a small piece of copper scouring pad and sealed off the top of the tube.

For attaching this engine mount to the body tube, I used old scrap corrugated cardboard for centering rings and support braces. I used a compass to draw the circles for the insides and outsides of the ring. I used scissors to cut the outside ring and a razor hobby knife to cut out the inside. In both cases, I cut conservatively and left extra cardboard. This required a final go over with sandpaper to get a snug fit.

My engine mount design consisted of 3 centering rings with 8 rectangular braces placed perpendicular between the centering rings (4 between each ring). The braces provided support to the centering rings, which helped prevent the rings from flexing during launch, and they also provided a lot of additional surface area for gluing the engine mount inside the body tube. This design was sort of honeycomb pattern, and it provided a very strong and lightweight mount. Figure 1 provides a diagram of the engine mount as installed in the body tube.



After making the centering ring and brace pieces, but before assembling them, I worked on the fins. I cut the fins from 1/8 in balsa and left a 1/2 inside strip for mounting thru the wall. The fin strip would fit thru the body tube, be glued to the support braces, and fit snug below and against the middle-centering ring. After completing the fins, I carefully measured and cut fin slots in the body tube with a Dremel tool. I was now ready to install both the engine mount and fins in a combined process.

I first glued the top centering ring and top 4 braces to the engine tube using white glue. I made sure I had ample glue

Sport Rocketry

files. I then inserted and glued this assembled engine section into the body tube. I temporarily used the bottom centering ring to ensure a straight alignment while the glue dried. When dry, I removed the bottom ring. This allowed me to reach into the tube and glue each of the support braces to the body tube. When everything was dry, I glued in the 2nd centering ring. When this was dry, I sequentially installed the bottom braces and fins, one at a time. This process allowed me to thoroughly glue and align each brace/fin and let it dry, before I installed the next one. When done, I examined the mount and decided the last centering ring was not needed. This left the back of the tube open, with the fin inserts and support braces visible. The finished engine mount was very strong and very light. Note: Keep in mind; you need to be patient during this process. I could basically do one step per night and wait a day for the glue to dry. It took a full week or better to complete this engine mount/fin assembly.

I was able to work on the nose cone, while the glue was drying on the engine mount assembly. I started with sealing the small slot in the top with wood putty. This slot could be used to convert the fireworks tube into a child's coin bank. I then measured and cut a 6 in. corrugated cardboard disc to fit on the inside of the nosecone. The nosecone fit on the outside of the body tube, so this disc provided a firm platform for resting on top of the body tube. Before installing the disc, I glued several small pieces of scrap balsa to the top middle of the disc, kind of like a small pyramid. This served an anchor for my screw eye. When the glue was dry, I drilled a small hole from below, through the disc and into the balsa. I secured a large screw eye into this hole. When gluing the disc to the nose cone, I used liquid nails. This was my one exception to using white glue. The cardboard didn't seem to hold well to the plastic nose cone using white glue.

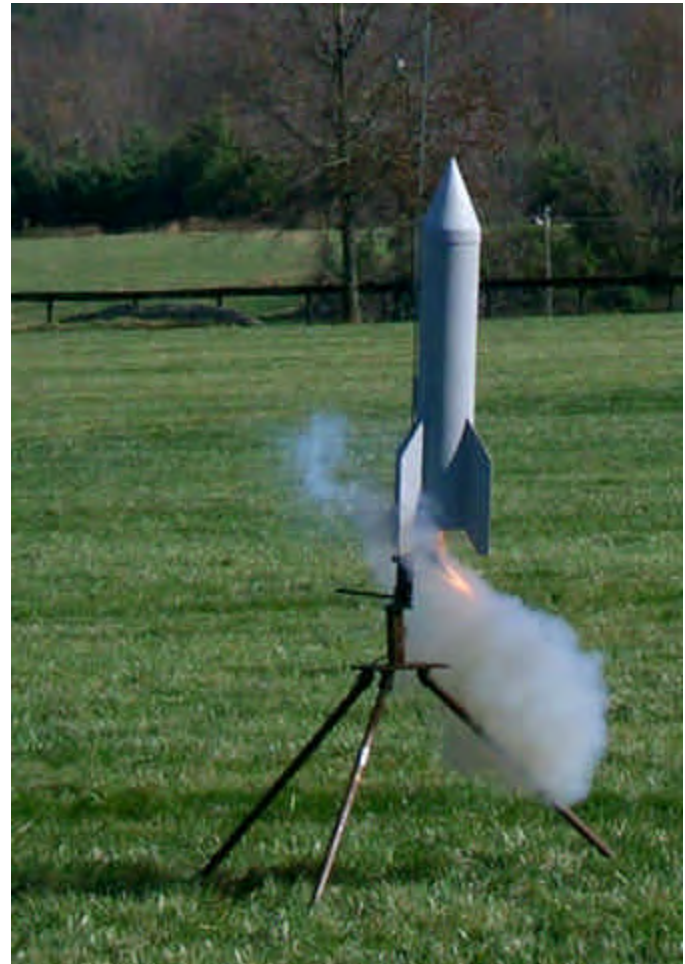
For launch lugs, I used a soda straw from McDonalds. The straws are a perfect size to fit over a 1/4 inch launch rod. To get the straw to glue to rocket, I first coated the straw with white glue and wrapped a piece of paper around the straw. The glue held the paper wrap securely and I could then glue the wrapped straw to the rocket. I used a balsa spacer to offset the lug about 1/4 in from the body tube. I had to space the lug away from the tube to allow the launch rod to miss the nose cone, which fit on the outside of the body tube. I attached the spacer and launch lug near the rocket's center of gravity. Although I used a 4 in. long lug, I tested and determined this was not sufficient. I then attached another 1 in lug and spacer at the base of the body tube. The two lugs provided a long and stable guide.

For the shock cord, I used a 3/8 in wide 6 foot long piece of elastic. I attached it to the inside of the body tube using the traditional method of folding it in a strip of paper and gluing it to tube. After examining this attachment, I didn't feel comfortable. I was concerned the parachute deployment might rip this attachment. I decided to install a 2nd similar shock card, right next to the first one. These two cords provided double support and a bit of redundancy in case one ripped out. I attached both shock cords to the nose cone screw eye. I added another 12 in section of 3/8 in elastic between the screw eye and a 36 in nylon parachute.

I was now ready for final preparation and finishing. To the seal the fins, I used three coats of white glue. I'd apply a coat, let it dry, sand it, and apply another coat. When applying the 2nd and 3rd coats, I used water to slightly thin the white glue. I'd apply a bit of glue, dip my finger in water, and spread the glue out over a small area. The glue not only provided a smooth finish, but it also added strength to the 1/8 in fins.

The body tube also needed preparation. The body tube spiral had a deep indentation.. I filled this with wood putty and sanded it smooth when dry. I also knew from experience, that the tube would not take paint. The paint would simply soak into the unfinished cardboard tube. I solved this by also applying three coats of white glue to the body tube. As with the fins, I used water to slightly thin the later coats and sanded the surface after each application. The final product was a smooth non-porous finish that could be painted.

I didn't want to spend a lot of time painting the model, since I wasn't sure it would work. Why spend hours on an elaborate paint job if it fly's once and crashes? So, I only gave the Moon Shot a coat of gray primer. When done, I weighed the model. It was 34 ounces with a parachute, but w/o engine. This was very near my target weight. I was now ready to fly the Moon Shot.



I was all set to fly the Moon Shot at the club's Nov 6, Great Meadow launch. On launch day, It was a bit windy, with 15-20 mph winds. At first I didn't want to fly, but several club members assured me the winds were Ok for a rocket of this

Sport Rocketry

size, so I went ahead. I used an Aerotech G-35-4W engine. As I prepped the rocket and waited out the countdown, I experienced a sense of anticipation, which I hadn't felt in years. Would the engine mount hold? Would the fins stay on? Would the ejection baffle protect the chute? Doing this scratch built experiment was making me very tense and nervous!

When the countdown reached zero, the engine ignited and the Moon Shot lifted off, slow and straight. It arced over and the parachute ejected safely, just past peak altitude. It landing downrange about 200 yards away. When I reached the rocket to inspect it, I found the engine mount was solid with no damage, the baffle worked with no damage to the chute, and the fins held up during the flight. The only damage was one broken fin, which was caused by a hard landing.

I considered this whole experiment a HUGE success. I can't wait to paint the Moon Shot and fly it next season. The only design change I'd make is with the fins. The current design uses swept back fins which extend beyond the back of the body tube. When landing, the fins make first contact with the ground and are easily broken. I should not have used fins that extend beyond the body tube. For future launches, I'll use a larger parachute and hope for the best.

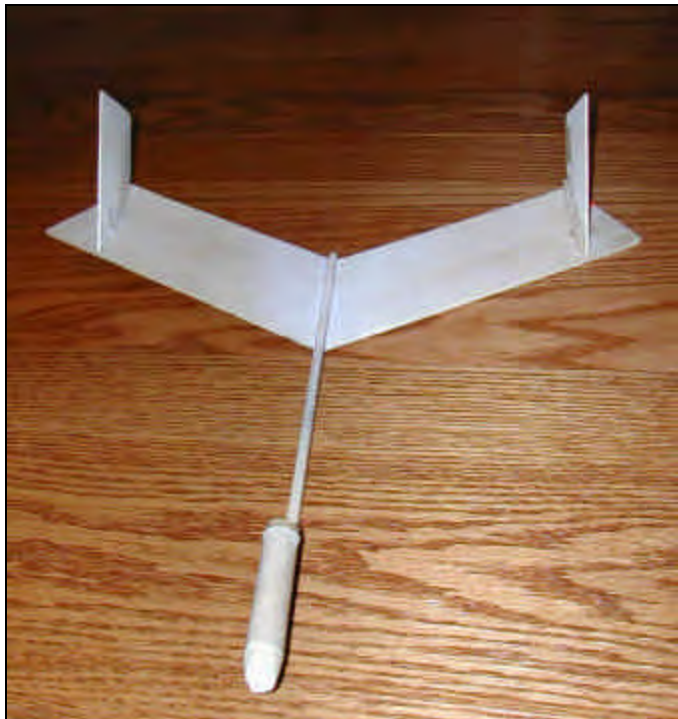
☆☆☆

Doug Hillson's 3-D Glider – part two

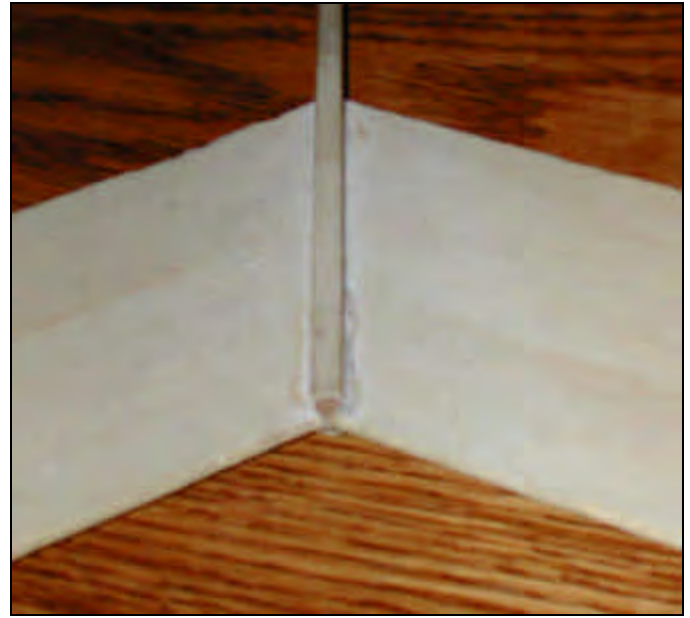
In the last issue of the Free Press, Doug Hillson wrote about and present the plans for his "3-D Glider" – boost glider that would cost less than \$3.

The article included drawings and the considerations Doug took into account when designing and building the rocket. However, there weren't and photographs included. After asking, Doug sent these shots of the completed rocket. However they arrived after the last issue was released.

So, without further adieu, here are the images.



forward view



detail of the wing and boom



Left wing with trimming applied.

☆☆☆



Qualified Competition Rockets

Complete Line of NAR Competition Kits (43) and Parts
Sport Model Rocket Kits and Micro Maxx Kits

QCR kits have placed in NARAM's 31 – 46

For catalog, send Self-Addresses Envelope to ...

Kenneth Brown

7021 View Drive

Springfield, VA 22150 Phone: 703-451-2808

www.cybertravelog.com/qcr

Advanced Rocketry

Dual-deployment recovery using the Defy Gravity Tether

Will Marchant, NAR 13356

I had built a BSD Horizon 4" kit (www.bsdrocketry.com/4Horizon.htm) to use for my level 2 high power certification. The "stock" Horizon uses a motor initiated ejection charge for recovery. After seeking council, I decided that deploying a 36" parachute at 4000' on a 4-pound rocket was likely to result in a very long walk! I'd already built the kit, so what was I to do?

The obvious answer was to use some form of dual-deployment recovery. The typical system uses an altimeter to first deploy a small drogue parachute at apogee with the main parachute deployed at a much lower altitude. That system requires compartments for the drogue, and main parachutes, as well as an avionics bay compartment for the altimeter. The stock Horizon has a compartment for the main recovery system and a payload bay.

I thought about replacing or rebuilding the payload compartment to contain both the altimeter and main parachute. But an easier option presented itself in the form of the Defy Gravity Tether (www.macson.com/_pass5/dg/tether.html).

The Tether has lots of possible uses, but in my case, I've got it holding the main parachute furled until the low deployment altitude is reached. At apogee an ejection charge separates the payload bay from the engine portion of the airframe. The rocket then "tumbles" at a low speed until the main parachute is unfurled by the altimeter.

The Tether is a small device (see figure 1) consisting of a locking body that retains two metal tabs until the e-match initiated pyrotechnic charge is activated. The Tether can use Black Powder or Pyrodex.



Figure 1 – These are the basic pieces of the Tether. The grid squares are one inch on a side. The rubber stopper seals the charge compartment in one half of the locking mechanism. The wire harness for the e-match exits the charge compartment alongside the rubber stopper. The steel cable is run through one of the tabs and keeps both halves of the locking mechanism from being lost.

For my application the tabs are connected by a small length of parachute cord (see figure 2) which wraps around, and confines, the main parachute. A piece of Nomex cloth from Pratt Hobbies wrapped around the parachute, shroud lines, and

shock cord gives the Tether a good grip (see figure 3.) Note that the Nomex is securely attached to the Tether tabs. The steel cable connecting the lock halves goes through one of the tabs to keep them from being lost. Finally, one of the tabs is clipped into the carabineer at the base of the payload bay (see figure 4.)



Figure 2 – The user supplies a piece of cloth (a Pratt Hobbies Nomex parachute protector in this case) to wrap the parachute and shock cord. The red parachute cord and the two metal tabs hold the parachute inside the cloth until the locking mechanism releases.

I've flown the Horizon twice in this configuration. Both times the main parachute fully deployed and the rocket was recovered successfully.



Figure 3 – The parachute is securely wrapped inside the cloth and held in place by the parachute cord and tabs. The green locking mechanism is then held together with a small piece of masking tape. The tape will yield when the pyrotechnic charge is initiated and the locking mechanism will fly apart.

Advanced Rocketry

I like the Tether and plan to continue using it. You'll need to be very careful to keep the e-match wire for your apogee ejection charge from tangling the Tethered main parachute. Trim all e-match wires to the appropriate length and minimize excess that might tangle.



Figure 4 – The completed assembly is then securely attached to the payload bay eyebolt with a carabineer through one of the large holes in the metal tab. The e-match wires are not shown in this photo. They would be attached to the two red screw-terminals. Note that only a short length of ematch cable is required.

☆☆☆

From the Editor

The Free Press wants your Pictures and Articles, too

There have been lots of cameras on the field lately. However, the total number of pictures people have shared with the *Free Press* can be counted on just two hands. A lot of promises have been made yet no pictures. Submit what ever you got, and if selected, your by-line will appear on the picture. Shooting on film? No Problem, lend us the picture, it will be scanned, and your photo returned with a copy of the scanned image – a good deal!

We're always looking for articles too. It doesn't have to be the Great American Novel just on a rocketry topic that interests you.

Have you gotten your NOVAAR Hat Pin Yet?



Don't be the only person on your block not to get one!!

Frank Prekel -- fjprekel@aol.com

Catch me at the meetings or on the field.

The NAR pin is \$4.50 (plus shipping) and is available from NARTS (www.nar.org/narts).

Sorry, the U.S. Flag Ribbon is out-of-print

From the Editor

Advertising Policy

This issue marks the first appearance of a new advertiser, **Vertical Force Rocketry**! *Vertical Force Rocketry* is owned and operated by fellow NOVAAR member Rich Aldridge. On launch day Rich can be often found on the field flying and his car loaded with all kinds of model rocketry goodness. The *Vertical Force Rocketry* website features rocket related online games and a gallery of pictures taken at Great Meadow.

So that brings me to Free Press' *new* "Advertising Policy".

It is very straightforward – There is \$50,000 charge per issue. There has to be a 6-issue commitment. AND, of course, the total payment is made in advance, and all ads are placed on "space-available" basis.

UNLESS you're a **NOVAAR member**, then the ad is **FREE**. However, we reserve the right to hound the advertiser for an article for the Free Press.

☆☆☆



VERTICAL FORCE ROCKETRY

Vertical Force Rocketry is a model rocket retailer based in Northern Virginia.

We sell model rockets from FlisKits, Semroc, Rockethead Rockets, Estes, Quest, Custom, Loc Precision, Edmonds Aerospace, and Aerotech. We sell model rocket motors (engines) from Estes, Quest, and Aerotech.

A local dealer, means local delivery – you may qualify for free in-person delivery; if you live in or near Woodbridge, Virginia, Attend NOVAAR meetings or, attend the NOVAAR sport launches at Great Meadow.

www.vforcerocketry.com/

Rich Aldridge

sales@vforcerocketry.com

The 2004 Flight Year

Compiled by Joe Woodford



? A	¼A	½A	A	B	C	D	E	F	G	H	I	J	CLU	STA
-----	----	----	---	---	---	---	---	---	---	---	---	---	-----	-----

January 24

57 flights

0	0	0	8	9	8	6	6	3	2	0	1	0	0	14
---	---	---	---	---	---	---	---	---	---	---	---	---	---	----

February 21

71 flights

0	0	6	9	6	25	12	8	1	0	0	0	0	0	10
---	---	---	---	---	----	----	---	---	---	---	---	---	---	----

March 13

77 flights

0	0	0	10	10	3	5	0	5	2	0	0	0	38	0
---	---	---	----	----	---	---	---	---	---	---	---	---	----	---

April 3 and 4

74 flights

0	0	0	3	2	6	4	2	0	2	0	0	1	0	55
---	---	---	---	---	---	---	---	---	---	---	---	---	---	----

May 15

217 flights

0	0	9	39	52	42	20	16	6	6	0	4	3	0	20
---	---	---	----	----	----	----	----	---	---	---	---	---	---	----

June 12

142 flights

0	0	6	17	24	29	26	10	10	13	4	2	1	0	0
---	---	---	----	----	----	----	----	----	----	---	---	---	---	---

July 31 to August 6 – NARAM-46

1038 flights

21	4	25	113	193	236	120	65	60	44	26	14	6	56	47
----	---	----	-----	-----	-----	-----	----	----	----	----	----	---	----	----

August 28

197 flights

3	1	5	18	59	26	26	13	11	5	9	3	4	8	6
---	---	---	----	----	----	----	----	----	---	---	---	---	---	---

September 18 – Hurricane Ivan Visits

0 flights

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

November 6

260 flights

0	2	28	48	53	46	17	4	16	6	5	3	2	10	20
---	---	----	----	----	----	----	---	----	---	---	---	---	----	----

December 11

66 flights

0	0	0	5	10	12	8	5	7	4	3	1	2	3	6
---	---	---	---	----	----	---	---	---	---	---	---	---	---	---

CLU cluster, motors used not reported.
STA staged, motors used not reported.

