



Newsletter of the Northern Illinois Rocketry Association,
NAR Section #117, Proud Winner of the 1996 Rockwell Newsletter Trophy!

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**Let There Be Light -
The Launch of STS-79**
by Bunny

My personal STS-79 stage was set nearly two years earlier at the STS-59 launch. While waiting out the countdown, a local photographer let me take a peek thru his monster lens, and we struck up further conversation about our launch attendance. When asked about his previous experience, he replied "Well, my last launch was at night. Very impressive." I knew then and there I had to return if NAR member Jay Apt ever occasioned to launch at night. NASA's fourth mission to the Russian MIR space station would afford me that opportunity.

After a decent flight down on Southwest, I hustled off to a pre-launch reception in Cocoa Beach. There, I met up with Bob Parks, of the old MIT Rocket Society and Deadalus fame. His 3.5 year old son Billy munched on cake and seemed far more interested in trucks than planes and rockets. Also attending were John Langford, and his son Ellis. John and I chatted about the possibility of his company, Aurora Flight Sciences, using space and facilities at Wallops, while Ellis outlined his plans for an upcoming NAR contest.

Fellow astronaut Ric Clifford, one of Jay's fellow STS-59 crewmembers, brought out a scrapbook photo album of the mission's training. It was a terrific way to get an overview of the detailed planning and preparation each launch entails. I confess to have been envious of Jay's pre-launch trip to Russia until I noticed that he went in February. Must have been quite a shock coming from Houston. I'm sure there's a story or two to tell about their training facilities; one picture of their WETF showed it to be a bit ratty looking. Note: Having seen the picture of Protons lined up in an assembly building, I think there's a US scale modeler or two that would be more than willing to pay big bucks for good photos of same.

When I got ready to leave, Jay's wife Ebe looked at me kinda funny and asked, "You've been to all of Jay's launches, haven't you?" Sez the Wabbit "Yep, I'm pretty crazy about these things....". I



also pointed out to Ebe that 4,100 NAR members were there, if not all in body, certainly in spirit.

After three hours fitful sleep, it's off to the causeway at 1:30 AM. NARAM-38's capable RSO, Lila Schemler, drove down and met me there for the launch. After we parked, I found myself three cars in back of Charlie Mims, a newly minted private pilot friend of Jay's from MIT days. It was terribly great fun to see the launch surrounded by these folks, and it's never failed that I haven't run into someone I knew while waiting among the thousands. Chance? I think not.

I had found an abbreviated version of the count on the Web, and brought it along to follow during the wait. A smoother shuttle countdown I've never seen before, and by tracking the progress against my document, it was almost as if they were a simulation. A higher percentage of local folks seemed to be in attendance for this launch, probably due to the timing. I suspect they were not disappointed.

The final minutes of the count wind down, and a T minus 31 seconds, the computers take over while the rest of us watch and wait. The main engines fire off, and begin the light show. Seven seconds later, the SRB's ignite, a couple of seconds later, Atlantis clears the smoke around Pad 39A, and the entire Florida coast goes from night to day in the snap of a finger. That photographer's "very impressive", was a gross understatement.

I don't what the change in scenery was for those farther away, but anyone on the causeway who had a newspaper could have read it quite easily. While I was prepared somewhat for that, I was caught off guard by the duration of the light. It lasted all the way thru throttle up, 55 seconds into the flight. SRB sep at T +2 minutes was quite clear, and a good show. I continued to follow Jay's progress downrange until Atlantis disappeared into the low haze on the horizon, about 450 miles from the Cape. By then, the bird looked like a very bright, fast moving star, easily trackable without binoculars, and was more than half way

to a safe orbit.

After the launch, I caught a replay on CNN, and it's very clear the TV cameras have two limitations that prevent a good "capture" of a night launch. (a) they can't adjust the aperture size fast enough to compensate for the light changes like the human eye can, and (b) they don't have enough field of view to take it all in, again, like the human eye does.

A quick breakfast, a fast tour of the visitor's center, and it's back to Chicago. By using some satellite tracking software, several NIRA members were able to track both MIR and Atlantis before, during and after their link up. Even Barb got up with me to catch the joined spacecraft, and pronounced it "neat", an expression she reserves for truly impressive rocket events. Wonder if Jay saw us waving??? The mission also saluted Chicago on return by booming much of the south suburbs.

If you're planning to visit Florida, check out your plans versus the projected Shuttle launch schedules. While there are obviously delays in the process (STS-79 was rescheduled 4 different times), if you plan to arrive a day or so before the launch, odds are you can see the bird go. I would be more than happy to outline how one can obtain causeway passes for any NIRA folks interested. If you're a true rocket nut, you aren't going to be disappointed watching NASA's biggest show.

T MINUS 1 - NIRA'S CALENDAR OF UPCOMING EVENTS

1997 CLUB LAUNCH DATES

Launches are BYOL (bring your own launcher). The location for our 1997 launches is unknown at this time. If you have questions prior to any launch, call the NIRA hotline at (630) 690-6353 and leave a message, I will call you back.

January 19 - Building Session at Bob Kaplow's (map below).

February 16 - Building Session at Bill Thiel's (map below).

March 16 - Building Session at Bob Kaplow's.

April 20, May 18 - Regular Club Launches.

June 14 & 15 - Possibly the Midwest Regional Fun Fly (to be determined).

July 20, August 17, September 21, October 19, November 16 - Regular Club Launches.

STAFF

Bob Wiersbe and Ric Gaff, unquestionably the Best Newsletter Duo in the NAR, at least until next year.

CONTRIBUTORS

Mark Bundick, Cheri Chaney,
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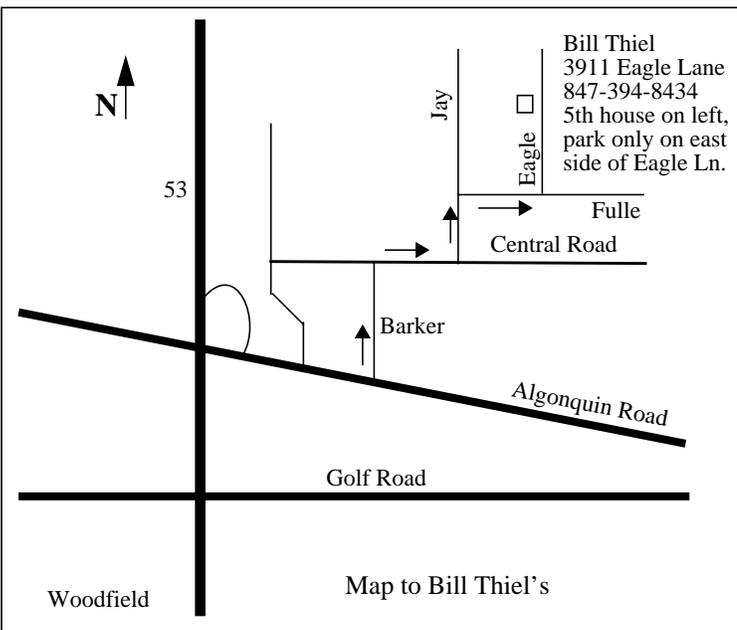
Model of the Month Winners

Well, we've had a bit of trouble the last few months getting pictures and names of the winners (Ric's film is somewhere in Indiana and I missed a few meetings). Here's what I do know:

October - Pierre Miller won in Youth with his Saturn 1B, and Joe Nowak won in Adult with his Tomcat.

January - Pierre Miller won in Youth with his Alarm (a Launch Pad kit), and Ric Gaff won in Adult with his Nike-Hercules (another Launch Pad Kit).

Congratulations! We'll try to find the November and December winners and photos.



MONTHLY MEETINGS

All meetings start at 7:30 PM, and include refreshments, entertainment and a brief business meeting. Don't forget a model for "Model of the Month" voting. We need volunteer speakers to entertain the troops after the business meeting, so call Bob Wiersbe at (630) 690-5442 if you can help with ideas or can speak yourself.

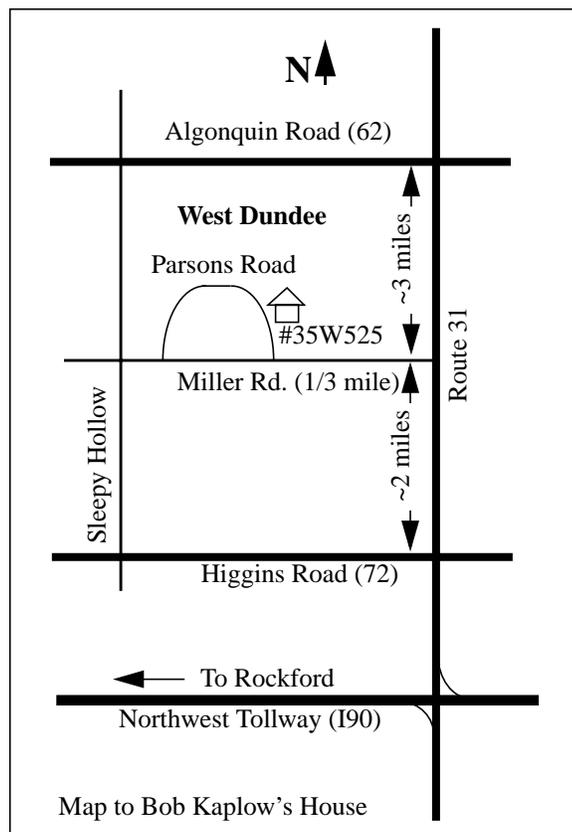
Currently schedule meeting dates are: February 7, March 7, April 4, May 2, June 6, July ??, August 1, September 5, October 3, November 7, December 5.

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Other Items of Interest

SCAM will have TWO launches at the AMA National Aero-modeling Site in Muncie, IN in 1997!! The dates will be May 17 and 18 and September 13 and 14. Details will follow.

The ride is about 5 hours from the Bundick residence, and the field is worth the trip. You might want to put this on your calendars for next year, folks.



The Presidents Podium from Cheri Chaney

Hello once again to all NIRA members.

Lost - Rocket Flying Fields

As of right now, NIRA has **NO FLYING FIELD** for 1997. In the process of trying to reserve Pratts Wayne Woods, we discovered that it is against Dupage County Forest Preserve regulations to issue a permit for flying model rockets. The new supervisor of operations, Mr. Mike Palazzetti, has offered to work with us to try to get the regulations changed, but we can not get a permit to fly anywhere in the Dupage County Forest Preserves until this has been accomplished. It is expected to take at least half a year to get this change, and could very well take longer.

We also will not be allowed to fly in Community Park in Lisle. This means that NIRA will NOT FLY in 1997 unless we can find a temporary field which will accommodate us. Our field requirements are as follows. We need an open area of about 40 acres with no power lines, minimal trees and no large bodies of water. We need to be able to set up our launch pads at different places on the field depending on the prevailing winds. We also need parking for 30 to 40 cars. Anyone having any suggestions for sites to consider should call me at (630) 462-0260, or send e-mail to me at d.h.chaney@lucent.com. Since my e-mail access is incoming only (that's my husband Dave's work address), please include a phone number if you would like a response.

Now for the good news (finally - some good news). We are hopeful that our interaction with the Dupage County Forest Preserves will result in the designation of a model rocket flying field. The site at Greene Valley, which we tried to move to when we left Community Park last year, has been suggested as a place where a model rocket flying field could be established. While still not suitable for high power rockets, this is a much better rocket field than Community Park was. It is located at Greene Road (just west of Route 53) and is between Hobson and 75th Street. This is within a few minutes drive of Community Park and would be a great site for club launches.

No MRFF Site

Pratts Wayne Woods is undergoing construction this year to return it to its original state before human intervention. The model airplane field that we launch from will remain, but once construction is completed, it will be surrounded by swamp. Therefore, Pratts Wayne is no longer a suitable rocket launching site. This means that we are also in need of a new place to hold MRFF (the Midwest Regional Fun Fly). We are also looking for a volunteer to run MRFF, since I will probably be busy with the regulations issue. Anyone willing to be in charge of MRFF, or with ideas for places large enough to hold MRFF that would let us fly please contact me at the phone number or e-mail address listed above.

Time To Get To Work!!!

NIRA is one of the largest and most active NAR

sections. We have a great membership with lots of varied rocket expertise. I also know from talking to members of other rocket clubs, that we are lucky to have so many members who are willing and able to help do the work needed to make NIRA such a fun club to be part of. We have done some amazing things in the past year, including running a MRFF with over 900 flights in just two days (and that was even though we got rained out two hours early). We also helped build an incredible 1200 ESTES model rocket kits at the National Model & Hobby Show, and helped 99 people to fly their new model rockets at our next launch. And, of course, this newsletter won the national newsletter award. If we all work together to find a field, the same way we have worked together to do all those other things, 1997 should be a very good year for NIRA.

October Club Launch by Bob Wiersbe

Well, I finally make it out to a club launch this year, don't fly any rockets, and end up writing the article about it. Sounds about right, doesn't it :)

This had to be the best post-RCHTA (or Chicago Hobby Show for you purists) launch we've ever had. The weather was nearly perfect, the wind was blowing in the exact right direction, lots of NIRA members turned out to fly rockets and helped the folks who came out to fly the Windy City Special they built at the show.

Even with the time change the night before, we had people at the field at 1:30pm eager to launch their rocket. By 2pm the range was up and running and rockets were going up and down the flight line. Ric Gaff took the first shift at LCO, and was busy juggling the flight cards for three racks and fifteen pads.

A steady stream of Windy City Specials worked its way through check-in with Mike Jungclas, over to the prep area staffed by Tom Pastrick, Ray Chesi, Dave Price, Mark Bundick, Leo Ringwald, and Steve Smith, then finally to the racks staffed by Bob Wiersbe, Ken Hutchinson, Joe Nowak, Jeff Pleimling, Rick Kramer, and Mike Ugorek. A times during the afternoon there would be a Windy City just touching down, another one half-way to the ground, and another streaking off into the sky. There were very few failures, and no losses!

By the end of the day 99 people who built a rocket at the show came out and made at least one flight. When you consider that 1200 kits were built, that's about our average turnout from the show. Add in about 50 NIRA members flying rockets, plus the Trailblazers from the YMCA, and you've got a very busy launch.

Even with the large turnout of both NIRA and hobby show people, we were able to launch over 300 rockets during our three hour launch! Kudos go to Ric Gaff and Cheri Chaney for taking on the responsibility of keeping the flight cards straight, announcing each flight, and keeping the flight line moving. Kudos also go to Mike Jungclas for getting 120+ motors ready with igniter

and wadding for each flight.

Chris Nowak put up three beautiful flights with his SR-71 Blackbird on C6-3 motors. Each flight was straight up, with only a slight roll. They were really nice flights to watch. John Koonz launch his 30 year old Estes V-2 on an A8-3, and the 30 year old parachute failed to open. The model didn't suffer any damage, and he'll fly it again.

Steve Smith once again launched Mount St. Marvin, a pyramid design with Marvin the Martian on top. One unique feature of this rocket is the rear ejection recovery, which causes Marvin to land on his head. Steve has been quoted "That's what the helmet is for!"

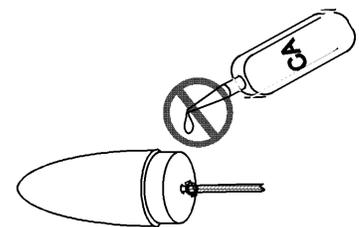
Not to be outdone in the oddroc department, Bob Kaplow brought out his new "Great Pumpkin". This "rocket" is a plastic pumpkin for Halloween candy that he has converted to fly. The pumpkin is launched upside down, but at ejection the parachute pops out the back and the pumpkin returns to earth rightside up and grinning. This year Bob didn't prang anything near Mark Bundick, although a couple of other models did land near where he was standing.

The highest power flight of the day went to Brad Waddell with his Aerotech Initiator on an F22. After a couple of disappointing misfires the rocket made a perfect flight, and really delighted the remaining crowd. We'd asked Brad to wait until after 4pm to fly the rocket for safety reasons.

As darkness was falling and we were taking down the range, Tom Pastrick decided to get in one last flight with his Flat Cat. His model was painted black with orange tips, which made it very easy to spot in the fading light. The glider wasn't trimmed well, and kept stalling on the way down. As it made its final dive it appeared to just pass over the head of Mike Jungclas as he bent down to pick something up.

After the range had been dismantled and the area cleaned up, about 12 of us headed out to Portillo's for something to eat and to talk for a while. We mostly discussed the days events, and what we could do to improve things next year. Two things that came to mind immediately were to put the TIME of the launch on the flyer (my fault), and to have more NIRA members ready to help.

Thanks to all who helped out at the launch in one way or another, even though your name may have been left out of this article. Your efforts are appreciated!



Avoid getting CA on rubber or elastic, it makes them brittle.

Improving the Estes Electron Beam Launch Controller by Richard Gaff

I'm going to make a statement that many people will consider outrageous - the Estes Electron Beam Launcher is one of the cleverest launchers on the market. Think for a moment about the problem Estes Industries has. Every year they have to get launch controllers into the hands of 100's of thousands of new customers, people who have no experience with rockets. They needed a launch controller that works reliably, is easy to use, requires no "exotic" parts and doesn't cost too much. The Electron Beam Launcher fills the bill. At the same time it is not the worlds greatest launcher. It can't fire copperheads or thermalite, clusters of more than 2 engines are dicey, it is not safe to use with sensitive ignitors (i.e. flashbulbs etc.) and it uses batteries like they were free.

It's the EBL's profligate use of batteries that is the biggest complaint people have with the EBL. At most any club launch someone will try many times to launch a rocket only to discover the batteries are dead. It's always been assumed that "AA" are not good for many launches but nobody really knew how many. So in January of 1995 I decided to run a small experiment to try and determine how many launches could be made off a set of "AA" batteries. I was rather surprised to discover that more than 100 launches were possible! So what can we do to get more out of these batteries? Well I'm glad you asked, lets consider some of the ways we can improve the EBL.

Tips for unmodified launchers.

- 1) Use fresh, high quality alkaline batteries. Throw away last years batteries! Start you new flying season with a fresh set. Make sure they are installed properly. That sounds trivial (and it should be) but you'd be surprised....
- 2) Avoid short circuits. Short circuits are death to any battery and especially to primary (non-rechargeable) batteries. When installing the igniter make sure the leads do not touch each other in the nozzle. After hooking the clips to the igniter check to make sure they are not touching each other or the blast deflector or the launch rod. Not only will this increase your battery life it will cut down on the aggravation of rocket inertia. If your model doesn't launch within a few seconds STOP! Check to make sure nothing is shorted. Avoiding shorts is the single most important thing you can do to increase battery life.
- 3) Keep the continuity light off as much as possible. At 120mA the continuity light is a drain on the batteries, 10 secs. of operating the continuity light is approx. one launch. Get into the habit of removing the key before you chase after your rocket. Not only does this conserve battery life it is a lot safer too! Keeping the key

out also helps prevent using your launch controller as a night light inside your range box!

3) Keep your micro clips clean. This is difficult to do with the micro alligator clips supplied with the launcher but it is important.

4) Use rechargeable batteries. Using rechargeable batteries pretty much side steps the whole problem. Of course, this assumes you already use rechargeables or are planning on switching to them in the near future for everyday use. If not, then rechargeables are a pretty expensive "solution". Modifying the launch controller assuming you want to continue using "AA" batteries.

The only change to the EBL possibly worth doing is to remove the light and put in a buzzer. This would cut down on power use and make it is easier to know when you leave it on. It's also a nice safety feature as it lets people around you know that your preparing to fly.

A good, easy to get, inexpensive buzzer to use is a Radio Shack buzzer part number 273-054 (6V) or 273-055 (12V) for about \$2.50. This buzzer is a small white plastic rectangular box with 2 small mounting flanges. Two long wires, 1 red 1 black, to power the device come out one side.

Installing the buzzer is not too difficult but you will need a soldering iron as well as a few other simple tools. First remove the light bulb, you won't be needing this any more. Take out the batteries. Remove the back cover by taking out the 2 screws in back. Do this carefully as the plastic the screws are self-taped into will not take a lot of abuse. Inside you'll find some brass strips and a few screws to hold it all together (figure 1). Compare the drawings to your EBL. Look at where the leads from the buzzer are going to be soldered. Cut the leads at least 1.75 inches long and strip about 1/8th inch off the ends and twist the strands together. Since the buzzer is too large to place inside the EBL we will mount it on the top of the case near the light socket on top of the word "armed" (figure 2). This is where we will glue it but first we should wire it in. Pass the red and black leads through the empty light socket into the case. Solder the red lead to the top strip and the black lead to the bottom one. Glue the buzzer in place using hot melt, epoxy or CA. Put the launcher back together and your done!

Unmodified Estes Electron Beam Launcher

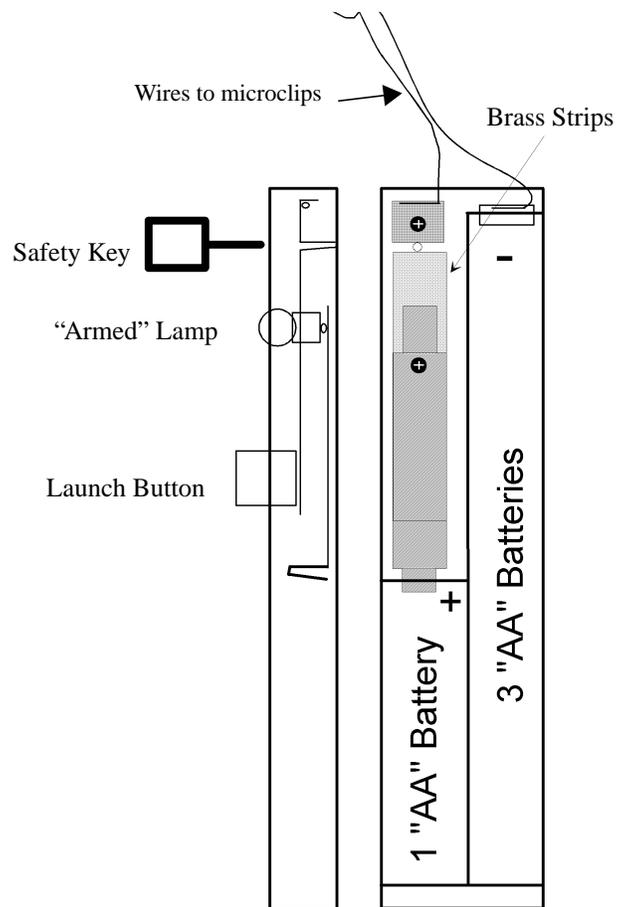


Figure 1.

Back Cover Removed

Some people might suggest using heavier gauge wire. I do not consider this a good idea! The lower resistance would increase the load on the battery causing the load voltage to drop even lower and actually decrease the power going to the ignitor. It would also greatly shorten the life of the battery. However...

Modifying the EBL to use an external battery.

The only time it makes sense to use heavier gauge wire is if you've got a car/motorcycle/gelcell etc. type rechargeable battery and you want to use it instead of the internal batteries. Altering the EBL to use an external battery is only slightly more difficult then installing a buzzer. For this modification you will need three parts:

- 1) 37 Ft. of 18 gauge 2 conductor stranded speaker or lamp cord wire. Radio Shack or hardware store.
- 2) 2 micro clips Radio Shack part # 270-373 or equivalent
- 3) 2 Battery clips 1 red, 1 black Radio Shack Part # 270-374 or equivalent. (see text)

In this design the battery with set on the ground 30 ft from the launch pad (15 ft if only used for motors up to "C") with the EBL at the other end

3-5 ft from the battery. This second length depends on how tall the user is, however a length of five feet makes for a nice general purpose launcher. I also like to add an additional two feet so that there is plenty of slack at the pad while keeping the Safety code mandated 30 ft.

First we will cut a 37 foot length of lamp cord wire (or what even length you decide to use). Look carefully at the wire and you will see that the 2 conductors are not quite the same. One will be smooth with no markings and the other will have either a black stripe printed on it or a rib (or set of ribs) molded into the plastic. This mark is to identify polarity.

At a point 5 feet from one end separate the two wires until you have a gap about 6 inches long. Cut the marked wire. Strip about 1/4 inch of insulation off each end and twist the separate strands together. The black clip (negative pole) should be soldered to the wire going directly to the EBL i.e. the end that is 5 feet long (see fig-

ure 3). The red clip (positive pole) should be soldered to the other cut wire end. With most battery clips (such as RS# 270-374) there are plastic tips on the clip that are used for color coding. Before soldering the clips to the wire these tips must be pulled off the clip and slipped onto the wire. After the clip has been soldered on (and allowed to cool!) the plastic tip is pressed back onto the clip. After all how will you know which is positive and which is negative! The two micro clips are attached to the long end of the lamp cord wire.

The old wire can now be unsoldered from the EBL and thrown away. The opening in the EBL case should be carefully enlarged so that the heavier wire can pass through without being pinched. Check Figures 2 & 3, the marked wire (the one with the black battery clip at the other end) is soldered to the brass clip that is part of the arming switch. The other wire is soldered to the top most brass conductor. You are done! You can now put the back cover on. Make sure

the wire will fit through the hole in the case and it is not being pinched. You now have a launch controller that can handle any ignitor, modest clusters and is flashbulb safe. It should give you many years of service with the only to occasionally replace are the micro clips. Enjoy! The author can be reached by email at rickga@ix.netcom.com.

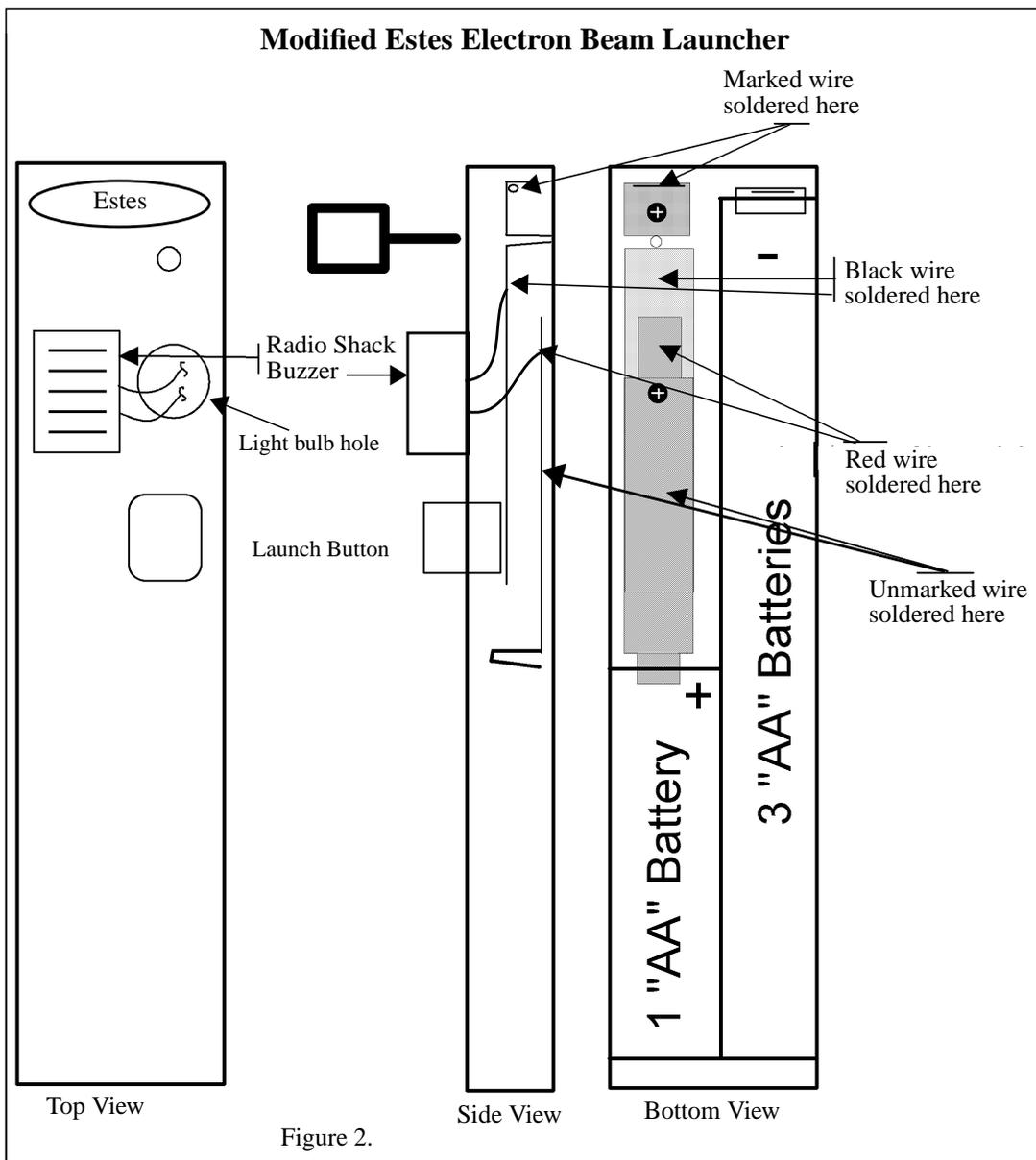


Figure 2.

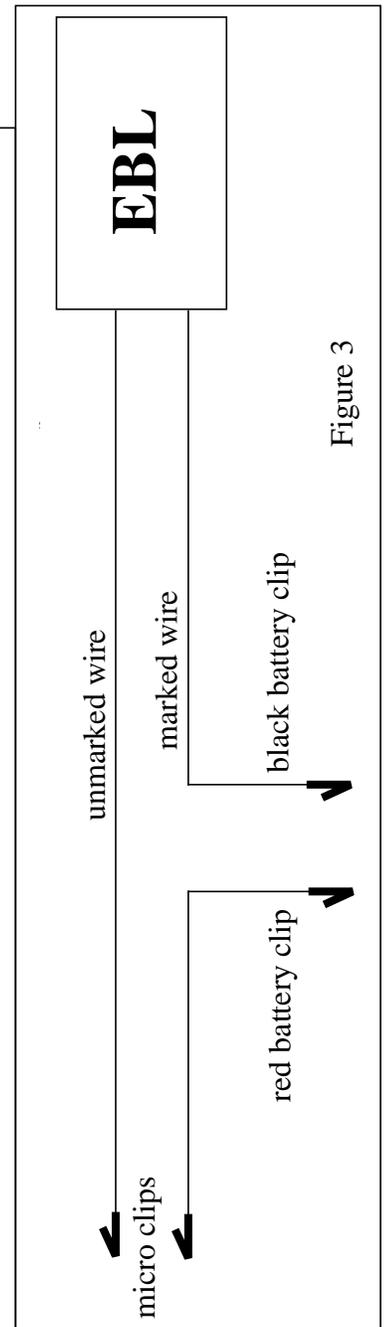


Figure 3

Estes "FAT BOY" A Product Review by Rick Kramer

This is definitely one of the easiest model rocket kits I have ever built. To use an old model rail-roading cliché, "You shake the bag and it falls together." In all its simplicity however, it is designed for strength and durability.

Estes is calling their version of through the wall fin attachment (T3 or "Through The Tube.") The fins project all the way to the motor mount which results in very sturdy construction and simple fin alignment.

I replaced the 1/4 inch X 24 inch shock cord with 3/8 inch X 36 inch sewing elastic. I also replaced the thin plastic 18 inch parachute with a 16 inch Aerotech nylon chute. It has not been flown yet, but I expect it to have similar flight characteristics to the Vaughn Brothers "Blobbo." My engine of choice the C-5-3.

Due to the viscosity of spray paint in a 20 degree F. un-heated garage I opted for brush painting in my 72 degree house with water-based acrylics followed by a coat of acrylic gloss varnish.

FAT BOY EST 2139

Length: 12.9 inches

Diameter: 2.60 inches

Weight: 3.0 ounces

Recommended engines:

B-4-2, B-6-2 (first flight), C-5-3, C-6-3

Price: Around \$12.00 Retail

A Midwestern Rocketeer visits California By Norman Heyen

After escaping the rigors of traveling on company business for almost five years, my number came up a lot this year. But I got to attend a BAYNAR launch in early November in San Jose, CA. After posting a message on the Internet newsgroup, rec.models.rockets, Dan Davis contacted me. Several times, in fact. Dan gave me excellent directions to DeAnzo College, as well as some other 'touristy' travel tips. All in all, Dan was very helpful. Maybe someday he'll find his way to the midwest and I can reciprocate.

The BAYNAR folks fly from a fairly large parking lot at a community college. That's right, a parking lot. And you thought NIRA had a hard time getting a decent launch site. They are hampered by what I would consider an inordinate number of restrictions and government agencies hampering their launches. The college was the best they can come up with. And even that seems to be under constant threat.

But they do launch rockets there! Being pretty safely conscious, they have every rocket checked for a secured engine and no loose fins. There is a pickup truck parked near the launch area, providing both battery power and a place to duck behind. All rocketeers are required to stay behind the truck except when they are called to launch their rocket. The LCO and the rocketeer are the only ones in the open within 25 or so feet. Note the protective helmets, complete with eye

shields worn by those in the open. (Gratefully, this is needed only occasionally) Dan told me that this was the first launch in a couple of months, so the turnout was a bit thin. But those in attendance had a great time, several families were there. The field size pretty much limits engines to 'D' or smaller. No reloads are allowed.

There were a couple of significant flights, including Lou Dick's parachute duration. He brought out a BT-60 sized rocket, stuffed an 'A' engine in it. It got about as high as the light poles, deployed a 48" (or bigger) dry cleaner bag chute and must have got almost 2 minutes of 'hang time'. It was cool and a bit breezy, so no thermals. Pretty impressive. Lou also had a 'Baby Wipe' container odd-roc. No fins, just the container with a bunch of nose weight. Unfortunately, the clay had shifted and the flight was, let's just say, unstable. Yours truly declared that it was 'Midwest Qualified', breaking the tension. (Dan seemed to be concerned that some of these stories would get back to some NAR president, so Mark, you didn't hear it from me...) Lou also had a swing wing glider. I really don't remember if it flew or not. I was too busy talking.

The turnout was about what you would see at a NIRA launch. Ages ranged from a little girl about 4 or 5 with her dad to Lou and Dan, who are, well, older than 4 or 5. Lots of families were there, with everyone busy flying mostly Estes kits. The landings were tough on any mistakes, so there was an incentive to get everything right the first time. Like I said, everyone had a good time, no rockets damaged beyond repair and only one or two written off as lost.

LUNAR was also represented. I've traded e-mails with Dave Redell over the past couple of years, and we met in person. Dave brought his EZI with him. He claims it was painted with Krylon, but Wow!, it looks so much better than mine. Dave has the payload setup for a transmitter, but had modified it for an altimeter. I also got to meet Jim Horner, and saw Jim's MIG glider fly. This is the same design that showed up in Sport Rocketry last month. Jim said that he hadn't had a chance to balance the gliders, but all three glided pretty well. Jim also had a BT-80 based Mosquito flying. His fins were 1/32" balsa skins over a 1/4" balsa framework. It flew well on a 'D'. It was fun to meet these guys in person after reading and trading e-mails from them.

In general I really liked what I saw. Dan is committed to getting as many people involved as possible, especially kids. Like everywhere, he needs more volunteers, but they have a 'core' group to do most of the work. They went out of their way to make everyone (even me!) feel welcome and included. I didn't keep a count, but I'll guess there were about 20 folks there flying and maybe 70 or so flights. The parking lot got a few fins, the trees got a rocket or two, but no one was disappointed. I hope that I can see them again sometime.

And then I was off to a couple of days of excruciatingly boring training classes and a long, late flight home. San Jose traffic made me long for Chicago, and I hate Chicago traffic.

November Numbness by Bob Wiersbe

The November club launch was attended by true die harder rocketeers, those who would brave cold winds and numb toes just for a chance to launch some rockets. And, we actually had a pretty good time! The launch started at 1:30pm so we'd have more daylight to fly, but it was so cold that we stopped flying around 3pm.

About 25 people came out to the launch and 14 individuals flew around 60 rockets. The rest of us stood around talking and trying to stay warm. The skies were gray, with an occasional glimpse at blue sky, but the sun never came our way. Still, it could have been worse.

Rick Kramer put up 9 flights, including his 3FF (3 Fins and a Funnel) and the Awesome Loop (featured in last month's newsletter). Chris Nowak returned after making it out to last month's RCHTA launch and made 9 flights, one of which was his Windy City Special. His SR-71 Blackbird made several nice flights too.

Bob Kaplow experimented with an F100 in his Estes Waci (a slightly modified Estes Manic), it literally warped into the sky then came apart as the nose separated at burnout. It fell like a wounded duck into the ball diamond and lay there smoking for a while. A least Bob didn't have any trouble finding it.

Tony Maro and Mark Soppet were experimenting with Alpha III's on A8-3 motors, seeing what kind of altitude they could get. Mark's dad helped out by working the Estes Alitrack. They each made three flights before heading for a warmer climate.

Tom Pastrick was flying two stage models on A8-0/A8-5 combinations, perhaps to use up his supply of those motors before they become uncertified. On one of his flights the upper stage landed about 3 feet from Ric Gaff as he was walking out to recover one of his models. Tom also flew an R2D2 with a C6-0, which worked much better than a C6-3.

Bill Thiel was right behind the leaders with 8 flights, including one of the now famous Thiel CHAD Staged UFO's. Bill used a D12-0/C6-0 combination for an eyepopping, necksnapping, glad-it's-not-heading-my-way flight.

Erica and Kyle Saginus had some rather bad luck this day. Their Tornado disappeared into the sky on a B4-4 never to be seen again. The Tornado is a pretty cool kit, but don't use anything over an A if you want to get it back. Erica launched her Omloid (loaded with an egg) on a C5-3, but it tipped off the rod and turned into a bazooka round. The egg didn't survive.

Daniel Plotnick made not 1, not 2, not 3, but 4 flights with his new Big Bertha. This has got to be one of the sturdiest designs Estes ever came up with, and Daniel was having fun with it. He used three A8-3 and a B4-2 for his flights (very nice motor selection, by the way!).

Not a bad end to a year of flying! We only got rained out 1 time this year, and had great weather for MRFF and the RCHTA launch. Our launch window opens next April, at a site yet to be determined. See you next year!!

Relay Launcher Design by Ken Hutchinson

Relay launchers have grown in popularity along with mid and high power rocketry. Many low power rocket launch systems use a little hand held box that houses the launch switch and batteries. Light gauge wire runs the required 15 feet to the launch pad and ends in clips that attach to the motor ignitor leads. This simple design does not work well for larger rockets. The ignitors used with larger motors can draw much more current, especially when clustered, and the safe distance grows with motor size. Eventually the wire gauge required to send sufficient current to the pad becomes unmanageable. The solution is to put the launch battery and a control circuit at the pad and run light gauge wire from the pad to the launch switch. This is the classic relay launcher.

A relay launcher circuit does not have to be very complicated. Bob Kaplow published an article some time back that discussed a simple design. In this article I will discuss some additions that you might want to add if you decide build one of your own. In the schematic diagram the only components that are needed for the basic pad side circuit are the six connections

and the relay, K1. The launch battery connects to the positive and negative connections. The arm switch can be replaced with a short circuit. The clip leads for the motor ignitor attach to the points labeled clip1 and clip2. The relay contacts, K2, can be replaced with a short circuit. The output of a traditional launch controller attaches to the points labeled input1 and input2. This controller can be your trusty old Estes launcher but you may have to extend the leads to obtain the required safe distance.

When you press the launch button on your controller, it sends current to the coil of relay K1. The relay contacts close, allowing current from the launch battery to flow through the ignitor. You must use a relay rated to carry the current you want to supply to the ignitor(s). A heavy duty automotive headlamp relay can supply 50Amps or more and is a good candidate. Your little Estes launcher may not supply enough voltage to drive a heavy duty relay so either check this out in advance or stay tuned, in the next issue we will have more to say about this.

The wiring from the battery to the ignitor and then through the relay contacts back to the battery (shown in bold) needs to be reasonably heavy duty but only reasonably so. I like to choose the wire gauge and length so that the

natural resistance of the wire will limit the current to a safe value for the relay even if the ignitor clips are shorted. Some common wire gauges and their electrical resistance in Ohms per foot are: 16 gauge = 0.004; 18 gauge = 0.0064; 20 gauge = 0.010. For short periods of time 16 gauge wire can carry 80Amps without melting, 18 gauge can carry 40A, and 20 gauge can carry 30A. To find the resistance required to allow the desired current, divide the battery voltage by the current. For example to get 30A with a 12V battery, the resistance will be $12/30 = 0.4$ Ohms. If you use 20 gauge wire the total length required would be $0.4/0.010 = 40$ feet. In other words clip leads about 20 feet long, or even longer with heavier gauge wire.

Safety

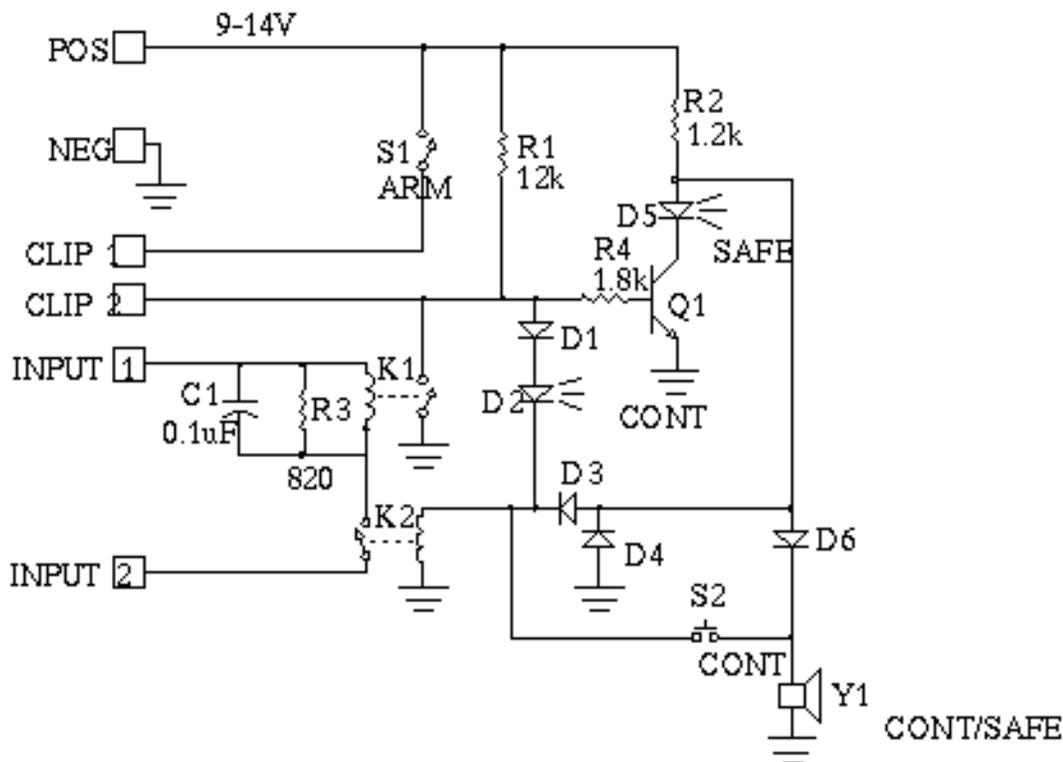
That seems like a long distance, but it is important not to overstress the relay. When overstressed, relay contacts can weld shut, meaning that the firing circuit is always live. If the relay contacts weld because of excessive current flow, the next flyer's rocket will go off as soon as the ignitor leads are connected. There are several ways to minimize the risk from this. The most basic is to prevent it by using the wire resistance to protect the relay as outlined above.

The second method is procedural, provide a way to safe the circuit while the rocket is being loaded on the pad. This can be as simple as disconnecting one of the power leads or the clip leads while working on the rocket. The use of an arming switch, S1, will also accomplish this.

A third method is to use an indicator to warn the flyer that something is wrong. This is the purpose of the light emitting diode, D5, and the sonic alarm, Y1. If you want to build a very simple relay box you could put a sonic alarm where the resistor R1 is shown. When the relay contacts close either because of a firing command or because they are welded shut the sonic alarm will sound.

The fourth method is to use the length of the clip leads to advantage. In our example above the relay and battery could be as much as 20 feet from the pad, so put them there. That way, if all else fails,

Relay Launcher With Continuity Feedback



the flyer will be 20 feet from the pad when the pad is armed. It is better to be 20 feet away than 3 feet if system failures cause a big motor to light unexpectedly.

Which method should you use? That's simple, use all four!

Convenience

It is nice to have a continuity check on the motor ignitor. Many relay launchers provide this at the pad. As we have seen the relay box is used in conjunction with another launch system. The host launcher often has continuity checking of its own and it would be nice if this remained functional when the relay is added. However the host launch system is connected to the relay drive coil, not the ignitor, so it always sees good continuity because of the resistance of the relay coil. It doesn't have to be this way however.

I had a design of my own which allowed the continuity signal to be fed back to the host launch system, but the circuit shown here is a simpler one based on a suggestion made by Rick Gaff. By adding the components labeled R1, R2, R4, D1, D3, D4, Q1, and K2 you can build a relay box that sends continuity back to the host system. The diodes are garden variety 1A diodes, the transistor is almost any small NPN transistor, and the relay K2 is a 12V reed relay such as Radio Shack part number 275-233. For the time being consider LED's D2 and D5 to have been replaced with short circuits.

Ignoring Q1 for the moment, if there is no continuity through the ignitor circuit, then relay K2 will be off. This means that the host launcher will also see an open circuit because the contacts for relay K2 are open and there is no current flow through the coil of relay K1. When an ignitor is attached current can flow through the ignitor and D1 to the coil of K2. This current (10mA) closes the contacts of K2 which allows the host system's continuity check current to flow through the coil of K1. This will generate the correct continuity indication in the host system. I'm running out of space so I will leave the purpose of Q1 as an exercise for the student, it is very important. Hint: consider what happens when relay K1 is turned on to fire the ignitor.

Options

The light emitting diodes D2 and D5 are optional and can be replaced with short circuits. LED D2 provides a visual continuity indication, while D5 is a safety indicator. If D5 is off the relay box is unsafe and should not be used until it is fixed. D5 will also turn off when the fire command is given, this is normal, but it should come back on when the launch button is released. If the LED's are used, high brightness red units such as Radio Shack 276-087 units give the best sunlight visibility.

Many people prefer a sonic indicator for these

functions. You can achieve this by replacing D2 and D5 with shorts and adding S2, D6, and Y1 instead. S1 is a momentary push-button switch, D6 is another 1A diode and Y1 is a 10mA (piezoelectric) sonic beeper. You will also have to use a 330 Ohm, 1W resistor for R2 in place of the 1.2k 1/4W value shown. With these components added you check continuity by pressing S2 and listening for the beep. The beeper will sound automatically when the rocket is fired or if the relay is unsafe. Never use the box if Y2 is sounding continuously.

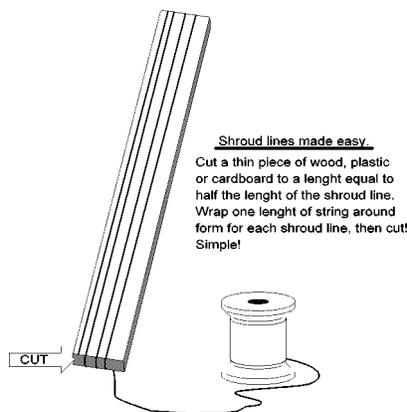
The continuity check current for this design is normally 17mA and increases to 27mA if Y1 is used. This should be safe for most low current ignitors (flashbulbs, electric matches, etc.), but you should always check this with an identical spare ignitor before connecting to one installed in a motor.

Finally R3 and C1 are not strictly necessary, but the inductance of K1 can generate a high enough voltage to cause shocks when it is turned off. The shocks aren't strong enough to be dangerous but these two components should eliminate them altogether if used.

Estes F-22 Lightning II Product Review. by Mark Soppet

This kit is one of Estes' 1996 kits, However, this review had to wait about a year. The construction of the booster is straightforward. The slotted tube for the fins was a nice feature. Some younger rocketeers may think cutting spin tabs in the fins is pretty hard. But it is nothing compared to the glider. It must be epoxied together. I would recommend waiting off on gluing the fuselage halves together until the glider has been trimmed, because there are some nice hollow spots in the nose to put clay in. The foam doesn't lend well to painting.

The decals were pretty good, although the body wrap was too small! My main two complaints were the instructions, which weren't very specific and the skill level, I don't think that beginners know how to cut spin tabs or use epoxy. I think that Explorer Series would be more appropriate. Otherwise this is a good kit. I can't wait to fly it this spring.



Central Illinois Aerospace presents NARCON 97

Join the NAR and the Central Illinois Aerospace (NAR #527) in Champaign-Urbana, Illinois for NARCON '97, the National Convention of Sport Rocketry!

Program

NARCON '97, running from March 21 through 23 at the Springer Cultural Center in Champaign, will feature clinics on such topics as scale modeling, high-power rocketry, radio control, rocket construction and finishing, competition, reloadable and hybrid motor use, club leadership, computers and electronics and recovery systems, with programs suitable for rocketeers of beginning, intermediate and advanced experience levels; manufacturers' displays and demos; seminars on government regulations; and guest speakers from the University of Illinois' Aeronautical and Astronautical Engineering Department.

Events planned include a kitbash, an NAR sanctioned Research and Development competition, an NAR town-meeting, a building session for beginning rocketeers, door prize giveaways, a banquet, a planetarium show, Sunday Brunch and a waived launch (motors through H allowed). If weather conditions prevent the launch we'll substitute a field trip to the Octave Chanute Aviation Museum at the Rantoul Aviation Center.

Included in the registration fee for the entire weekend will be a NARCON notebook including lecture notes for all presentations.

Attractions

Champaign-Urbana is a medium-sized city in east-central Illinois. It is the home of the University of Illinois, a member of the Big Ten. Champaign is also the home of Parkland Community College. Rantoul, IL, 20 miles north of Champaign-Urbana is the home of the Rantoul Aviation Center, formerly the Chanute Air Force Base, which includes the Octave Chanute Aviation Museum.

For more information about NARCON '97, contact Jonathan Sivier at j-sivier@uiuc.edu or by phone at 217/359-8225.

If you are interested in being a presenter at the conference contact Conference Director Greg Smith at gd-smith@uiuc.edu or by phone at 217/352-9655.

If you would like to have a vendor display at the conference contact CIA President John Page at johnrock@uiuc.edu or by phone at 217/356-8981.

A Tale of Two Titans by Bob Wiersbe

The Gemini-Titan is one of my favorite rockets, probably second in line behind the Saturn V. I have three Gemini-Titans in my fleet right now, the old two motor Estes kit (a collectors item!), the more recent single motor Estes kit with the plastic nose cone, and a two motor, 1/24 scale model I built from scratch using the Revell plastic model for the capsule. I also have plans to build a peanut scale model, about 1/144. What I'd like to cover in this article is what I did to the newer Estes kit and how I built the 1/24 scale model.

About six years ago I picked up the newer Estes Gemini-Titan kit, and I thought it was kind of plain, so I thought I'd stage mine to make it more special. I was experimenting with small electronic timers to ignite upper stages, and wanted to build one into the kit.

Not knowing where the real staging point of the vehicle was, I guessed that it was at the base of the roll pattern and cut the tube at that point. It turns out it's above the roll pattern, but the model still looked okay. I added a mini motor mount to the second stage, then cut slots for the four plastic fins to pass through. The fins were glued to the motor tube.

I cut slots in a JC-60 coupler for the fins to slide into. The coupler served as both stage coupler and bulkhead to protect the first stage from the motor exhaust of the second stage. The electronics were placed below the bulkhead out of harms way.

The first time I attempted to fly the model it went unstable and looped all over the sky. Fortunately, it didn't stage. This scared me enough to put the model on the shelf for a long time. When I discovered mercury switch staging I knew I'd found the solution to the Titan problem, so I built the system into the model. I also cut the fin area back on the upper stage to eliminate the instability problem.

Some of you may remember when I brought the model out to Ackerman Park to fly at a club launch, and it blew up on the pad sending a fireball high into the sky (darn C5-3's!!). After letting it sit on the shelf for a while longer, I decided to try again. This time the second stage didn't ignite and it pranged not far enough from a soccer game. It went back on the shelf for several years.

I dug the model out the day before ECOF this year, determined to fly it. I found the problem (a bad capacitor), fixed it, and successfully tested it at home. I prepped the model at the field with a C6-3 in the booster and an A3-6T in the upper stage. Liftoff was nominal, no thrashing about the sky, and this time it staged perfectly! The upper stage chute didn't open, but it landed in some grass and was undamaged. The bulkhead got a little toasted from the exhaust, but did its job. I'll have to bring it out to a club launch sometime and see if my luck holds.

A few years ago Revell re-issued their 1/24 scale plastic model of the Gemini capsule, and I picked one up for nostalgic reasons. As I was

building the model I got to thinking it would be cool to build a Titan booster to put it on and fly it. I dug out my copy of Rockets of the World and did some quick calculations, and found out I'd need a 5" tube. This isn't a standard size, so I figured I'd have to construct my own.

After some futile searching I found out that a club out east had a cache of the exact tube I needed! I made a some phone calls, and two of the tubes showed up a few weeks later (the club no longer has any of the tubes left, so don't ask). The tube is very thin, and needed some stiffening to be able to support the capsule and survive the flight.

To stiffen the tube I used multiple centering rings made from cardboard, and added an inner liner at the top and bottom using oatmeal containers. Since a Titan has 2 main engines I built mine the same way, knowing that I'd probably need two F's to fly the rocket safely. Using Rockets of the World as my guide, I calculated the size the motor tubes needed to be, and the angle they needed to be separated. I used 29mm LOC tubing for the motor and stuffer tubes, and a LOC 2.6" tube (why do they mix metric and US units??) for the parachute container.

The booster is recovered by one parachute, and the capsule by another. The capsule is held on by couplers made from an oatmeal container. To make the model seem more realistic, I made an internal launch lug by drilling holes through the series of centering rings.

The fins were actually the hardest part to do. I wanted them to be clear, so I picked up a sheet of lexan at a home improvement center and some clear plastic rods from American Science and Surplus. My original idea was to epoxy a screw into the end of the plastic rod, and use that as the support for the fins by screwing it into a plywood strip. The fins would then be attached to the rod with screws, and the whole thing could be removed for easy transport and repairs.

I made the fins by cutting two large rectangles from the sheet of lexan, then heating them at the centerline and bending to a 90 degree angle. This gives two fins per set, and they're attached



at the centerline to the rod. When I got it all assembled I discovered that the rod wasn't as secure as I wanted it to be, and the fins were way too loose on the rod. I solved the loose fin problem by gluing the fins to the rod, something I didn't want to do, but had to since I wanted to fly the rocket the next day. The other problem was solved by rotating the fin unit until it was next to a motor tube and taping it in place. Again, not an elegant solution, but one that worked.

I decided to use monokote instead of paint to detail the rocket. One reason for this was that the rocket is **big**, and would take a lot of painting. It just seemed like it would be easier to monokote it. Well, this was the first time I'd ever tried to monokote something, and it was a real learning experience. Bubbles, crinkles, you name it, I did it. When it was finished it looked okay, from a distance. I also found out while doing this that the rocket was actually a couple of inches too long! I'd forgotten to measure the tube to see if it fit the scale I was working with, and it was off.

The final rocket weighed about 40 ounces, and simulations showed that I'd need to use F25-6 motors for a safe flight. The estimated altitude was 750 feet. I flew the rocket at MRFF this year towards the end of the day when the wind was at its calmest. Both motors lit at the same time, and there was only a slow roll as it climbed straight into the sky. Both parachutes deployed and opened just as the rocket was starting to lean over, and both sections were recovered unharmed. It was a perfect flight, and extremely satisfying. It's great when you get a WEAP flight (Went Exactly As Planned)!!



The author charging up the staged Gemini-Titan (left), and the 1/24 scale model all set to go! Both models were flown at ECOF and worked perfectly. (R. Gaff photos)

Heard on the Street
(with apologies to the Wall Street Journal)

Welcome to the Club - Bobby Anderson, Jeff Cowman, Dave Draniczarek, John Economides, Erik Homiak, Jerry Kaye, Jonathan Kubiak, Dan Kutschke, Tom Starshak, Ken & Phil Sterka, John Danchenko, James Dugan, Ken Goodwin, Robert M. Held IV, Charlie Kilby, Christopher Mayer, Christopher Nowak, Brian Roehl, Rob Skiba, Jeff Sostak, Neal Styka, Edward Svaldi, Carl, Alex, Mackenzie & Lisa Van Camp, Mike Lazier, Bruce S. Levison, and Visav Sethi have joined NIRA in recent months, Welcome! NIRA now has over 150 members!!

Inseparable - The SAC-B and HETE satellites were launched on Nov 4, but failed to separate from the launch vehicle final stage because the third stage battery failed. The satellites were launched by an Orbital Sciences Corp. Pegasus XL rocket. The L-1011 carrier plane took off from Wallops Island, Virginia and dropped the Pegasus about 160 km out over the Atlantic Ocean. Since the satellites were tumbling, they were unable to remain in sunlight enough to recharge batteries.

High Diving - The Mars-96 spacecraft was launched on 11/16 by a 8K82K Proton-K rocket, but failed when its ADU propulsion unit failed to inject the spacecraft into its escape trajectory. Instead, the probe reentered the earth's atmosphere over the south Pacific and burned up. Mars-96 was to carry two small landers to descend to the planet's surface, and two penetrator probes designed to bury themselves deep into Martian soil on impact. The landers were powered by Plutonium 238 capsules, which apparently sunk to the bottom of the Pacific Ocean after reentry. Mars-96 was the first new planetary spacecraft from Russia in over a decade, and its failure is a major blow to the Russian space program.

It's A Boy! - Congratulations to the Pleimling's on the birth of their son Brian on November 30th! We hope all is going well.....

Sultan of Swing - Congratulations to Lawrence Bercini for taking First Place in a Dance Contest over the Thanksgiving weekend! Let's hope he's not abandoning oddrocs in favor of the two-step.

Final Flight - For the second time in two months, I find it necessary to bring sad news to the NAR membership and the sport rocketry community as a whole. Mary Roberts returned home from the recent NFPA meeting to find that her 80 year old father had been killed in a home invasion.

Many of you know Mary and her unfailing support of our hobby, and her particular support for the NAR and its sections. In this time of sorrow and tragedy, please take a minute to write her a note. It doesn't bring back a lost loved one, but it does make saying good-bye easier.

Condolences can be sent to:

Mary Roberts
1295 H Street
Penrose, CO 81240

Mark B. Bundick NAR President

1997 NAR Events

Event: NSL-97
Date: May 24-25, 1997
Location: Dallas, TX
Sponsor: DARS, NAR 308
Contact: Scott Hunsicker (972)434-1098
Waiver: 3200 AGL, 5000 on request.
Notes: The NAR National Sport Launch. Details to be announced.

Event: NARCON '97
Date: Mar. 21-23, 1997
Location: Champaign, IL
Sponsor: CIA, NAR 527
Contact: Greg Smith, email gd-smith@uiuc.edu
Notes: The NAR's annual convention. Classes, seminars, presentations, and just plain fun with rockets and rocket folks.

Event: NARAM-39
Date: July 26 - Aug. 1, 1997
Location: Tucson, AZ
Contest Events: 1/4A HD, A SRD, 6xC CA, E DELA, 1/2A SD(MR), D BG(MR), A RG, SpSc, R&D
Sponsor: SARA, NAR 545, and SSS, NAR 506
Contact: Steve Lubliner,
9968 E. Domenic Lane
Tucson, AZ 85730
Telephone (520)296-1689
email 103056.621@compuserve.com.
Waiver: To be applied for.

Event: SMURFF Regional Sport Launches
Date: May 7-8, Sept. 13-14 (1997)
Location: Muncie, IN
Sponsor: Tripoli Central Indiana and AMOREA, NAR 540
Contact: Ned Blumenschein, email 102170.3164@compuserve.com or David Newill, 75562.2774@compuserve.com
Waiver: 7000 AGL (preliminary approval)
Notes: To be held at AMA National Flying Site, over 1000 acres of closely mowed grass.
Official Motel: Muncie AmeriHost, (317)282-0600.

The following are excerpts from the NARAM 39 proposal sent to Trip Barber.

General description

The launch site is located approximately 15 to 18 miles west of Tucson in an area known as Avra Valley. The immediate area to be used by NARAM 39 is being developed by a private group known as TIMPA (Tucson International Modelplex Park Association, Inc.). TIMPA intends to create a facility to service the modeling community. Towards this end they have

installed a paved runway, ramada, and other site improvements to service the radio control modeler community. The use of this site for rocket hobby activities is within their plans; in fact they welcome the opportunity to have a national event conducted at their facility.

TIMPA is leasing the site from the city of Tucson. The overall site, under the TIMPA auspices, is 1 mile square. Currently, the southeast quarter (1/2 mile square) is under development including the R/C site upgrades, road improvements, and normal maintenance. The remaining area is available as a recovery zone.

Maximum rocket size supported by field

As mentioned previously the TIMPA site is one mile square. The launch area is in the southeast quadrant of the TIMPA site closest to the southeast corner. The launch area is approximately 1700 feet from the closest residence not associated with the TIMPA site. Permission will be obtained for foot access to properties to the south and east of the launch areas; these are then considered part of the launch site.

There is a ranch house less than 1500 feet from the launch area. It is inhabited by the TIMPA site caretakers; we consider this house part of the TIMPA field facilities and are not considering it in the restrictions regarding occupied dwellings.

In summary, we are claiming to have a launch site with 3000 by 3000 foot dimensions. Based on the launch site dimensions table in NFPA 1127 (table 2-13.2) we believe our launch site is "I" motor capable. Using the alternate approach of basing the launch site dimensions on 1/2 the maximum altitude expected we believe our site can support "J" or "K" powered models which can stay under the possible 4500 foot agl waiver.

Note that we recently flew a demonstration under FAA notification requirements in moderate winds (from the east). 240 Ns second models were flown and recovered within the TIMPA property.

FAA waiver availability

A FAA waiver for rocket operation has not been previously granted at this field (to the best of our knowledge). Initial research with the Tucson TRACON indicates the possibility for a 4500 foot AGL waiver.



"I don't like the looks of this, Hank."