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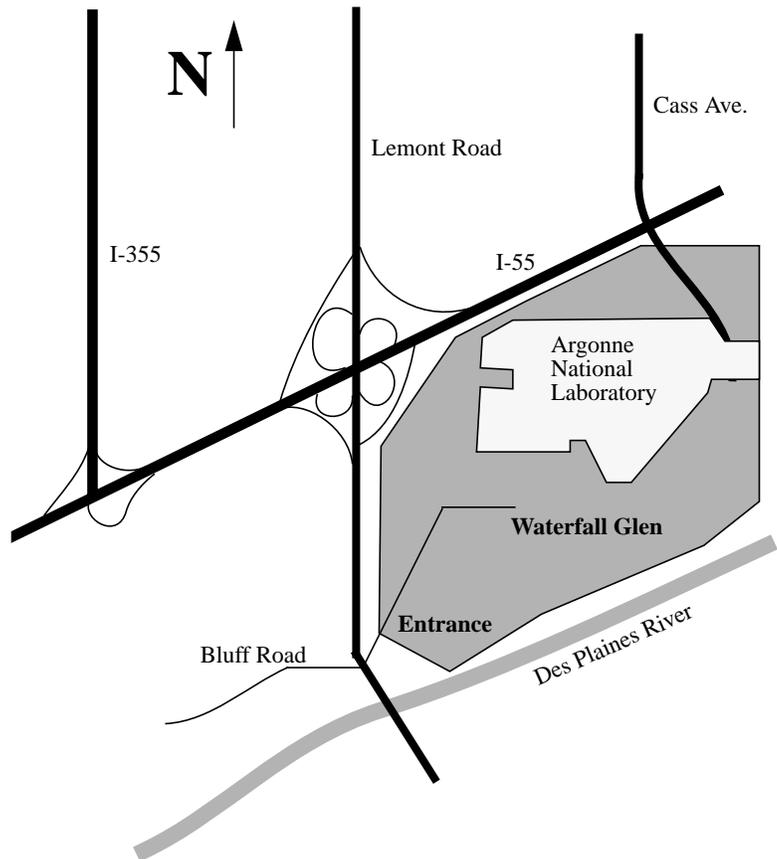
### **NIRA Goes Nomadic!**

Yes folks, once again history repeats itself and NIRA is moving to yet another launch site. Community Park is too crowded from May-August for us to be able to safely hold our launches there, so we have found an alternate site for the May, July, and August launches. Hopefully we will be able to finish off the flying season at Community Park in September, October, and November. Keep watching the newsletter for updates.

Our new site is Waterfall Glen Model Aircraft Field near Lemont, IL, just southwest of Argonne National Laboratory. The field is east of the intersection of Lemont road and Bluff Road, about 2 1/2 miles south of I-55. If you cross the Des Plaines River, you've gone too far south. Access to the site is restricted, and is controlled by a locked gate. We will have someone at the gate between the hours of 10-10:30, 12-12:30, and from 2-5.

Now for the good news! Since we've signed up for the use of the field, the launch will run from 10am to 5pm! We will be sharing the field with an RC club, who will be running an event at some point in the day. This is unavoidable, and probably won't impact our flying time for long. The ceiling will also be increased to 2800 AGL. Don't let the address fool you, it's not that much farther from Community Park, and is only 2 miles or so from a major expressway.

A new NIRA Hotline has been installed at (708) 690-6353! Recorded information about the current launch site is available at this number 24 hours a day, and if you have any questions, leave a message!



### **MRFF is coming!**

You should have received your registration form for the Midwest Regional Fun Fly (if you haven't, contact Bob Wiersbe at (708) 690-6353).

What is MRFF? It's two days of launching rockets, getting to know new people, swapping stories, learning new tricks, and having a lot of fun! MRFF is a little different from our "normal" club launches. Saturday the range opens at 9 in the morning, and stays open until 5 in the evening. Then we have a cookout in the picnic area, prepared by NIRA's own Chef Bundick. The day doesn't end there though! After the cookout we get together in West Chicago for an evening of conversation, a Kitbash Contest, a People's Choice Contest, and a raffle! The range opens again Sunday morning at 9am and finally closes at 5pm.

MRFF is also a little different because you must register to attend, and it costs a little money. But it's money well spent, since you'll have a really good time, and you'll be able to enter fun contests and win some prizes.

If you've never attended MRFF before, you should really make every effort to be there this year! Mark down June 15 & 16 on your calendar, and get send that registration form in!

# T MINUS 1 - NIRA'S CALENDAR OF UPCOMING EVENTS

## 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 (708) 690-5442 if you can help with ideas or can speak yourself.

May 3: Regular Monthly Meeting

June 7: Regular Monthly Meeting. Preparations for MRFF.

July 5: Regular Monthly Meeting.

### STAFF

Bob Wiersbe - Disgruntled Editor

Ric Gaff - Grunting Producer

Mark Bundick - Grunt

### CONTRIBUTORS

Lawrence Bercini, Mark Bundick, Jonathan Charbonneau,

Ric Gaff, Rick Kramer, Bill Larry,

Kevin McKiou, Greg Roman, Bob Wiersbe

### Model of the Month Winners

March - Bill Thiel and his Modified Trident was the Adult winner.

April - Mike Swikowski and his Sentinel was the winner in Youth, and Steve Koszuta was the winner in Adult with his U.S.S. Andromeda. Congratulations!

## 1996 CLUB LAUNCH DATES

Launches are BYOL (bring your own launcher). The location for our 1996 launches is either Community Park in Lisle, or Waterfall Glen in Lemont. If you have questions prior to any launch, call the NIRA hotline at (708) 690-6353 for a recorded message of where the current launch will be.

**May 19** - Club Launch at Waterfall Glen in Lemont. 10am to 5pm.

**June 15 & 16** - Midwest Regional Fun Fly! Pratt's Wayne Woods, Wayne (near Elgin & St. Charles). Range open from 9am to 5pm both days! Don't miss it! Registration forms are already in the mail, send in your form by May 31!

**July 21** - Club Launch at Waterfall Glen in Lemont. 10am to 5pm.

**August 18** - Club Launch at Waterfall Glen in Lemont. 10am to 5pm.

**THE LEADING EDGE**, published bimonthly by and for members of the Northern Illinois Rocketry Association, NIRA, NAR Section #117, is dedicated to the idea that Sport Rocketry is FUN! Articles, plans, photos, other newsletters, and news items of interest should be sent to Bob Wiersbe, 1835 Shetland Drive, Wheaton, IL 60187 (or electronically via Internet to hrbob@ixstar.ih.att.com.) Photos will be returned, other material returned if requested. Send membership applications (dues: \$3/year, including a six issue subscription to the Leading Edge) and nonmember subscriptions (\$5 per six issues) to Ken Hutchinson, 84 Jefferson Lane, Cary, IL 60013. Any item appearing in the Leading Edge may be reprinted by Sport Rocketry with proper credit given; all other uses require written permission of the Northern Illinois Rocketry Association. Publishing the Leading Edge will never be as difficult as designing, building, testing, using, debugging, testing, shipping, using, breaking, shipping, debugging, testing, packing, delivering, and using an NAR launch system.



## **DELTA CLIPPER ROLLS OUT; FLIGHT TESTS TO BEGIN IN MAY**

The four-story-high, newly refurbished NASA Delta Clipper vehicle rolled out of McDonnell Douglas' facility in Huntington Beach, CA, today for transport to New Mexico in preparation for flight tests beginning in May.

Dubbed the DC-XA, for Delta Clipper-Experimental Advanced, the unpiloted, single-stage vehicle is being developed under a cooperative agreement between NASA and its industry partner to demonstrate new technologies needed for a reliable, affordable reusable launch vehicle that could be operated commercially by American industry with NASA as one of its customers.

"This is a radically different vehicle from the DC-X that flew last year in tests conducted for the Air Force," said DC-XA project manager Dan Dumbacher at NASA's Marshall Space Flight Center, Huntsville, AL. "Many technology innovations have been introduced to the vehicle and when we test fly it this spring we'll be writing a new page in the history of space transportation systems."

The DC-XA will be the first rocket ever to fly with a composite hydrogen tank. The tank, built by McDonnell Douglas, is made of graphite-epoxy and is 1,200 pounds lighter than the aluminum tank used in the DC-X. Achieving that kind of weight reduction is essential to the development of a single-stage-to-orbit reusable launch vehicle. The composite tank successfully withstood cryogenic testing under simulated flight conditions at Marshall in December. The series of flight tests planned for the DC-XA at the Army's White Sands Missile Range in New Mexico will demonstrate the hydrogen tank's performance as well as that of other new advanced technology components of the vehicle in a real world operating environment, according to Dumbacher. These components include a Russian-built aluminum-lithium alloy liquid oxygen tank; a composite intertank to connect the hydrogen and oxygen tanks; and an auxiliary propulsion system consisting of a composite liquid hydrogen feedline, a composite liquid hydrogen valve and a liquid-to-gas conversion system in the flight reaction control system. The U.S. Air Force's Phillips Laboratory at Kirtland Air Force Base, New Mexico, will manage flight test operations.

The DC-XA, X-34 and X-33 comprise NASA's Reusable Launch Vehicle Technology Program, a partnership among NASA, the Air Force and private industry to develop a new generation of single-stage-to-orbit launch vehicles. The knowledge and experience acquired in developing and test flying the DC-XA will be used by NASA and an industry partner in development of the X-33, a larger advanced technology demonstrator. NASA will select its industry partner

for that vehicle later this year, with test flights planned for 1999. The X-34, a small technology vehicle to be developed and flight tested by 1998, also will contribute valuable data to the X-33 program, which in turn could lead to a national, industry-led decision to develop a commercial reusable launch vehicle early next century.

NASA's investment in the DC-XA program is \$20 million for hardware and \$30 million for integration. In addition to Marshall, New Mexico's USAF Phillips Lab and U.S. Army White Sands Missile Range, as well as NASA's Langley Research Center, Hampton, VA, and Dryden Flight Research Center, Edwards, CA, are supporting DC-XA.

### **CIA Launch Report by Greg Roman**

Central Illinois Aerospace (CIA) held a high power rocket launch on Saturday March 23. It was scheduled to be at the Rantoul Aviation Center with a 6500' MSL waiver, but got bumped to their monthly launch site at Dodds Park in Champaign, IL. [Hey! We're not the only ones getting bounced around! - Editor]

The site is an enormous rolling field of mowed grass. In giving you an idea of the size of the field, consider that 1/3 of it contains 8 soccer fields. The remaining 2/3 is just grass with very few trees. The waiver is for 4000' at Dodds Park.

The temperature must have been too cold for athletes, because the only people on the field were a lone golfer and us hearty rocketeers. I imagine this will change in the summer.

Five members of the CIA and I showed up to fly rockets. Five Z-pads were set up along with their club launch system. For my first flight of the year I loaded an Estes Patriot with the last C5-3 left from a bulk pack I bought 3 summers ago. Upon liftoff a chunk of flaming propellant was shot 30 feet up. The rocket itself reached apogee at 6 feet and recovered safely under canopy.

Chris Deem flew two Bull Pups, the larger of which was a nicely finished 2.6" diameter model with an F39.

Jonathan Sivier had an Adept altimeter that he put in a BT-55 sized rocket for a risky high flying flight. He then installed the altimeter in an EZI-65 which he flew with a G80. The motor turned out to be a mislabeled G40, which gave a slow, loud liftoff. The heavy rocket lumbered up to a peak altitude of 350 feet.

I flew my "Electric Beavis and Butthead" twice. This rocket is a Cluster R Strato Blaster kit that I modified with a single 24mm motor mount surrounded by 3 18mm mounts. It has an access panel to an electronics bay that I plan on installing an air-start device in. The three outer motors

vent their ejection charge through ports in the side of the rocket. Its first flight was with a single E15 and was slightly unstable. I then prepped it with a D12-3, B6-6, B6-4, and B6-2. Before flying I submitted it to the RSO for inspection. Chris Deem butted in with a sinister grin and said "go for it!" With so few people around RSO Greg Smith gave his approval and called "heads up." The rocket named after the most mischievous of cartoon characters had a flawless flight. The ejection charges fired in sequence for a really cool effect. The greater thrust from this motor combination provided a more stable flight, despite the extra weight and lesser total impulse. It also flew well at ECOF with a single E30.

I asked about the high power launches at Tuscola airport that were advertised in the latest HPR magazine. Apparently a small faction of their club organize those events because no one knew much about them.

I don't remember if Greg Smith flew anything, but I noticed through his car window a collection of superbly finished rockets. There were other flights that I didn't mention, including those of flyers Robert Brunner and Chuck Greenwood.

All in all, it was a good launch. I'm glad I made the 2.5 hour drive. I got to make some mid-power flights that I wouldn't normally get to make on our home field.

### **The 1996 Estes Catalog review by Rick Gaff**

In a hobby that sometimes seems to take an almost perverse pleasure in doing things CHAD [CHear And Dirty] I guess it was inevitable that the largest model rocket manufacturer in the world would do the same. Certainly the latest Estes catalog gives a person a real feeling of Deja vu as it is in fact, a slightly modified copy of the 1995 catalog! Now that's CHAD!

So what, if anything, is new? Five new rocket kits, 8 balsa gliders and 5 wind up gliders. Of the new rockets probably the most interesting is the Venus Probe. A rather odd looking SL 1 kit with a bulbous black nose and numerous spindly silver spider-like legs that make an "Alien Lander". At ejection the Alien Lander separates from the booster and lands on it's legs, kind of an updated Mars Lander! Sounds pretty neat, I'm looking forward to it. The second new rocket is a 1/4 scale semi-scale model of the Air Force AIM-9 Sidewinder air to air missile. This is a SL1 kit built around BT55 and has a plastic nose cone and slotted body tubes for the fins. The slotted tubes are to make fin alignment easier. This is the same thru the wall technique used in high power rockets where it's primary use is to make the fin attachment as strong as possible. This is another really nice looking model, in fact I've already bought one! the

third new kit is a model of the F-22 Air Superiority Fighter. This SL1 kit is in 2 parts; the glider made of TuffLite and is flown as parasite on the booster rocket. I'm not sure what TuffLite (don't give me a hard time, that's how it's spelled) is but apparently it's suppose to be a superior form of Styrofoam, well we'll see.... The fourth new kit is the F-117 Stealth Nighthawk. The Nighthawk is a SL1 model made of TuffLite and requires no painting. I believe the model has an internal engine mount that ejects from the model while the rest of it glides back in. I could be wrong but I think these 2 gliders could be rather fun! They are real easy to build and fly and being made of TuffLite may even be reasonably durable, well we'll see. The last new rocket (2 actually) are the Backyard Redirocs. Calling these kits is not really accurate as there is no real building involved. Molded entirely of TuffLite these little mini-engine powered rockets are easily the simplest rockets ever sold, even the launch lug is molded in! The 2 Redirocs are the Intruder which is flying saucer shaped and the Raider which has a more Air Force sort of look.

The other new kits are not rockets and while I don't want to spend a lot of time on them I do want to at least mention them. Estes is attempting to diversify a little with 2 new lines of non-rocket powered gliders. The first is a line of 8 balsa gliders designed to resemble a variety of aircraft. Included are an F-14 Tomcat, F-18 Hornet, F-4 Phantom, F-16 Falcon, C-130 Hercules, Space Shuttle, F-22 Air Superiority Fighter and the Tornado. The basic look of the aircraft is pre-printed on die cut balsa sheets, after only about 8 to 10 steps you have a glider! While the flat profile will never win you a scale contest, you will have a recognizable aircraft glider and some of them could be boosted on the side of rockets. The last new models are a line of 5 colorful, easy to build rubberband powered gliders. While I'm not a big fan of rubber powered gliders, I must say that these colorful gliders with their molded plastic parts make the balsa models I flew as a youth look pretty stodgy!

Since this is a "new" catalog the question to ask is "what's missing?" Normally you don't have to ask, dropped kits are obvious from their absence, but in this catalog the only way to find out what's gone is to check the price list in the center of the catalog. The kits dropped from this catalog are Solar Warrior, Hercules, Beta-tron, Deep Space Transport, Maxi Force, Patriot, Cato, Scrambler and the Pegasus. Worse than the loss of these kits is the loss of the A8-5 and B8-5 engines. Our hobby is driven by the types of engines that are available, the loss of two engines diminishes what we can do, that's bad news.

**First Impressions: Tips and Traps  
Estes AIM 9 Sidewinder  
by Jonathan Charbonneau**

The Estes Sidewinder is a 1/4 scale model of one of the more advanced heat seeking air-to-air missiles used by the Air Force and Navy. It is one of the new Estes kits for 1996.

I bought two of these at Toys R Us for \$21.33, including tax. For the most part, it is a very nice kit. Instructions are pretty much straight forward and the paint scheme is quite simple (though I haven't painted mine yet).

I do, however, find a couple of faults in this kit, one major and one minor. The minor fault is in step #23. It does not mention anything about the second shock cord that's included in the kit. This shock cord is meant to be tied between the adapter eyelet and the 12" parachute. The major fault is in the skill level rating of the kit. I strongly believe this kit is skill level 3 (Challenge Series), not a skill level 1 (Beta Series).

My reasons; the kit has parts and assembly steps that can easily throw a rocketeer off course if he doesn't read the instructions. In fact, the experienced rocketeer is more likely to be caught unawares with some of the assembly. Why? Experienced builders are used to skill level 1 kits being very basic and therefore can usually assemble them properly without having to look closely at the instructions. This is definitely not the case with the Sidewinder.

First, in the small bag that contains the centering rings there is a piece of BT-20 about the size usually used for making the engine mount. An experienced builder might assume that this is the tube for the engine mount and assemble it, only to find out he was supposed to use the other BT-20 (which was lurking in a piece of BT-55 in my kit). Second, there are detail bands that go around the airframe, which require measurement and marking on the airframe. Skill level 1 kits don't normally have such detail.

Third, the main fins are two piece assemblies which could quite easily get mis-assembled because of where the joint is in relation to the tab. The tip edges, and I repeat, the tip edges must be lined up against the straight edge to assemble the main fins properly. Check this before you glue.

Last, but not least, the Sidewinder has detail pieces that must be nestled in the fin-body joints before the fillets are applied. I saw this in the instructions and still got snagged. Why? Experienced modelers know that glue reinforcement fillets and proper fin alignment are extremely important on flying model rockets. Consequently, they are apt to automatically apply these fillets as soon as the fins are in place so as not to forget. This is what I did. If this rocket were rated skill level 3, experienced rocketeers will read the instructions more closely and assemble the kit properly.

If you're wondering what I plan to do with the other Sidewinder, I'm going to convert it to fly on 24mm engines (D12's and E's).

**"How do you repair a rocket that's had one end stepped on?"  
from an RMR posting by Jim Kerns,  
HUVAARS section, Ann Arbor, MI**

Method 1:

Straighten out the tube as best you can (slit through the "glassine" layer on the body tube if required) and soak with thin CyA glue. Try to get it on both inside and outside of the tube. A dowel or engine casing wrapped in wax paper can be used to hold the tube in shape. This should be more than adequate for a "crunched at the top" body tube repair.

I haven't tried it yet, but it may be possible to inflate one of those long skinny balloons inside the body tube to hold it in shape if you can't find a suitable sized dowel.

My Saturn V has been crunched twice when the 'chutes didn't open. This is the method I've used to repair it both times. It still flies and doesn't look that bad...

Method 2:

Add a layer of fiberglass cloth to above repair using epoxy or CyA. (Usually not necessary for A-E powered stuff)

Method 3:

Cut out the damaged sections and splice in new body tube using some couplers or short lengths of body tube slit lengthwise. The trick, though, is to find the right size tube. I don't think Estes sells the Astrocam size tube (but I could be wrong)

Method 4:

Add a sleeve of body tube (again slit to fit) on the inside or outside of the damaged section. Yellow glue, epoxy, or CyA will work.

Method 5:

Cut out the damaged section (splice the tube if you cut a section out of the middle) and fly a shorter rocket.

**Apogee Announcement  
from Tim Van Milligan**

Effective May 1, 1996, I will be taking over the control of Apogee Components and the company will be run by me here in Canon City, Colorado. Ed LaCroix will still be involved with Apogee Components, but in a diminished capacity. Apogee, under my management, is continuing where Ed left off -- by providing great rocket products with excellent customer service. It is my aim and hope to keep this strong tradition alive, and make it available to even more modelers.

As the new "point-man," any new correspondence with the company should be directed to me. If you have already ordered composite propellant motors, be assured that your motors will be shipped to you in a timely fashion. There may be some unfortunate delays on "future" orders of the composite propellant motors as the transition of the company takes place. But we will get everything straightened out, and you will be able to get motors in time for NARAM.

Here is the big news about the 10.5mm micro motors that you have all been waiting for!! These new motors are "NOW" in stock and available for immediate shipment.

I've put together a new 10 page product brochure that lists these motors (with technical specifications) as well as all the other new rocket literature and accessories Apogee has created. If you would like a brochure, I would be happy to send a copy to you. Since I'm just starting out and things may be hectic, I would hope that you could help out by sending me a "Self-Addressed, Stamped-Envelope." This would allow me to get a copy of it to you in the quickest amount of time.

Here are the specs on the motors:

Type: 1/4A2  
Price per package: \$4.50 (3 motors)  
Delays Available: 2, 4 seconds  
Length: 38.1 mm (1-1/2 inches)  
Diameter: 10.5 mm  
Certified Total Impulse: 0.62 N-Sec  
Peak Thrust: 5.0 Newtons (avg.)  
Burn Time: 0.23 seconds  
Mass: 3.8 grams (avg.)  
Propellant Mass: .75 g

Type: 1/2A2  
Price per package: \$4.90 (3 motors)  
Delays Available: 2, 4 seconds  
Length: 38.1 mm (1-1/2 inches)  
Diameter: 10.5 mm  
Certified Total Impulse: 1.25 N-Sec  
Peak Thrust: 5.0 Newtons (avg.)  
Burn Time: 0.63 seconds  
Mass: 4.5 grams (avg.)  
Propellant Mass: 1.5 g

Type: A2  
Price per package: \$5.15 (2 motors)  
Delays Available: 0, 3, 5, 7 seconds  
Length: 57.1 mm (2-1/4 inches)  
Diameter: 10.5 mm  
Certified Total Impulse: 2.50 N-Sec  
Peak Thrust: 5.0 Newtons (avg.)  
Burn Time: 1.31 seconds  
Mass: 4.7 grams (avg.)  
Propellant Mass: 3.0 g

Projected "B" Motor Data (pending NAR certification)  
Type: B2  
Price per package: \$5.50 (2 motors)  
Delays Available: 0, 3, 5, 7, 9 seconds  
Length: 88.9 mm (3-1/2 inches)  
Diameter: 10.5 mm  
Total Impulse: 5.00 N-Sec  
Peak Thrust: 5.0 Newtons (avg.)  
Burn Time: 2.7 seconds  
Mass: 12.0 grams (avg.)  
Propellant Mass: 6.0 g

**IMPORTANT NOTE #1:** These motors cannot be shipped to, or used in the state of California.

**Note #2:** Undergoing NAR certification are the B2-5, -7, and -9. These will not be sold until certification is received. The B2-0 and B2-3 are certified and are available now!

All the motors come with igniters, wooden igniter holders, and complete instructions for use. Extra igniters are also available: 6 per pack for \$2.69.

Motor mount conversion kits are recommended for those who wish to fly these motors in their existing models. These kits are \$2.50 for the 13mm engine mount adapters, and \$2.55 for the 18mm adapters. These are fully reusable and can be interchanged between rockets in only a few seconds. Tubes and centering rings are also available, and prices on these will be posted later (this message is already too long).

The "medalist" composite motors are also still for sale, but as mentioned previously, there will be a slight delay in their shipment while the transition of Apogee takes place. They should be back on line beginning June 1. These motors are also listed in the product brochure.

In addition to the new motors, Apogee has also developed new literature to support the new 'micro' motors. There are 10 different technical publications covering a wide variety of subjects. Some of the topics covered in these new publications are: breaking old altitude records, creating better streamers, designing better parachutes, new staging techniques, constructing a gliding parachute, trimming gliders for long duration flight, and analyzing a rocket flight for improved launch success. We've also created many new educational publications on how to use rocketry to motivate children to learn more

about rocketry and space exploration. Plus there is a wide variety of other new literature and design aids that are brand new too. All these are fully described in the new product brochure.

In the future, we also hope to bring back most of the Apogee line of rocket kits; as well as continuing to develop new literature. I would like to invite you all to give the new Apogee a try, as it would be our pleasure to serve your needs.

If you would like to order motors based on the above information (without waiting for a product brochure with order form), please determine and add the shipping fees based on the information in the table below:

Order Total -- Shipping Fee  
Under \$25 -- \$3.50  
\$25 to \$35 -- \$5.95  
\$35 to \$70 -- \$7.75  
\$70 to \$100 -- \$9.95  
\$100 and up -- \$11.95

Colorado residents please also add the 3 percent state sales tax. (if motors will be sent to a foreign country, add 63% to total for shipping fees). Motors are shipped parcel post.

Tim Van Milligan  
Apogee Components  
708 Piedra Dr., Suite C  
Canon City, CO 81212-2253  
102374.2533@CompuServe.COM

**NIRA Members Handbook Available!**

The NIRA Members Handbook is 46 pages of useful information about NIRA, where to find rocket supplies, who to talk to in the club about a given topic, maps, and other cool stuff. The Handbook came out last December, when I started handing them out at meetings. My intention was to mail them to everyone in the club, until I found out it would cost over \$125 to do it.

If you are a NIRA member, and would like a copy of the Handbook, you can either pick one up at a meeting or launch, or you can send four 32 cent stamps (\$1.28 in postage) to:

NIRA Handbook  
c/o Bob Wiersbe  
1835 Shetland Drive  
Wheaton, IL 60187

and I'll mail one to you.

The Handbook will probably be update once a year, and updates will be announced in the newsletter. Updates will be available for free at launches and meetings, or by mail if you send in the postage (hey, that \$3 yearly membership fee only goes so far).

**Springfest 1996 High Power Launch  
El Dorado Dry Lake, Henderson, Nevada  
by Rick Kramer**

Friday March 8th was slow and laid back as all the California people lined up their Winnebagos and other assorted RVs behind the white chalk line. It was a day devoted to setting up the tent city and the range, which consisted of three racks approximately fifty yards apart, each containing five high power pads. They were only flying "model rockets" Friday, as the FAA waiver was in effect for Saturday and Sunday only. Several of the vendors were already set up, among them Aerotech, Vaughn Brothers, HPR Magazine, Rocketman, and Public Missiles. I actually got a 10% discount on a LOC Onyx kit with my NIRA membership card. I also saved a few dollars on some G80 Blue Thunder motors that I intend to use at MRFF this June.

Saturday was by far the best of the three days. When you think of Las Vegas, two things come to mind: gambling, and 120 degrees in the shade (if you can find any shade on a dry lake bed). The only gambling going on was whether or not you were going to get your high altitude rocket back; and the weather was just perfect. The temperature was in the low seventies with just a light breeze. I was impressed with the size of the recovery area. It had to be three miles in every direction from the launch pads. I was also impressed by the way the Las Vegas Tripoli club conduct the launch. They had an outstanding sound system and some of the LCOs must have been professional disk jockeys or radio talk show hosts. Their descriptive comments made the launch of each rocket sound like a special event. There were a steady stream of rockets launched from all fifteen pads. One of



**Tent City**

the LCOs seemed to be praying to the rocket gods for a lawn dart, core sample, or an engine cato on every other flight just to keep things interesting. This follows the current mentality displayed in HPR Magazine that only the most spectacular prangs are worth reporting.

Just after the noon high altitude window closed they had the "Best Looking Rocket Contest". (Similar to our "Model of the Month Contest" only on a grand scale.) The high point of the day was when the winner of the contest, a full scale "IRIS", roared off the pad on an M1939. Other notable flights were the Vaughn Brothers "King Viper II" on a cluster of three Aerotech J100 motors. A Dynacom something or other on two K1000's, and a Nimbus on a K1285 that reported back an altitude of 12,000 feet, but unfortunately they never found the rocket again to salvage the radio gear. Jim Hart flew several of his V-2 kits which he is marketing through ads in HPR Magazine. The largest one made a perfect flight and recovery on an Orinso N3200. The tail section floated down on two large parachutes while the nose cone came down separately on one chute. Jim also received

an award from NERO for his contributions to the hobby.

Sunday was a lot slower than Saturday, but there were a number of successful certification flights. The LCO kept saying "Welcome to high power, get your checkbook out!" A lot of the Hybrid powered flights showed up Sunday as well. Around 3:00pm the winds picked up and dust devils started meandering across the dry lake bed. This was a signal

for the tent city to fold up and head back to La-La Land.



The final four of the "Best Looking" contest, the IRIS won. I guess size really does count!

Monday morning I mailed my G80 motors home so they wouldn't be confiscated by airport security. I had a great buffet lunch at one of the local casinos and I hit a slot machine for a minor jackpot. I bought a couple of new shirts at the western wear emporium next door to the casino, and then took the late evening (red-eye) flight back to Midway. I can't think of a better way to spend a long weekend.



**Entries in the "Best Looking" contest.**

## StingRay III S8E RC Rocket Glider (RCRG)

by Kevin McKioui

At one time or another you may have heard some modelers talk about S-something-or-other events or FAI fliers or those Internats guys. Five years ago I saw George Riebesehl fly a rocket-boosted RC glider at a NIRA monthly launch. I think I said something like "Awwwsoommmme..... I'm going to learn to do that". I remember it went almost out of sight on an E6. It just kept going and going and going. Well, with a lot of help from people like George Riebesehl, Ben Roberto and Bob Parks, I not only learned how to fly these wonderful airplanes, but I also learned how to design them. In fact, sometimes, I think designing them is the thing I like best. I started with the KnightStar series which began as a conventional built-up balsa RCRG. There are 6 designs in the KnightStar line.

In 1993 I decided to try and become one of those Internats guys and tryout for the U.S. Team in the S8E event. "What's the U.S. Team and S8E?" you ask. The Academy of Model Aeronautics (AMA) sponsors a team to attend the World SpaceModeling Championships (WSMC) which is held every two years. The team is chosen in odd years and the WSMC is held on even years. The WSMC is sanctioned by the Federation Aeronautique Internationale (FAI), the world organization which sanctions all international aviation contests and world records (full-size and model aviation). The Spacemodeling events begin with the letter S

and S8E is the designation for the RC Rocket Glider event using E impulse motors. Before going on and talking about the glider, maybe I should explain a little about the S8E contest.

The S8E event, like all good rocket duration events, is won by keeping your rocket in the air longer than other contestants. It is flown in rounds. In the first round you must keep your glider in the air 300 seconds to get a maximum score ("max"). Anything less than a max and you get points equal to the number of seconds you keep the glider aloft. In the second round the max is 360 seconds. The third and final "normal" round has a max of 420 seconds. All the contestants receiving a max in the first three rounds go to the first flyoff round which has a max of 480 seconds. If more than one contestant maxes the first flyoff round, they go to the second flyoff round which is flown to completion (or 30 minutes, which ever comes first).

For the U.S. Team tryouts I decided to build something special. I broke with the traditional balsa construction camp and built a rocket glider using composite construction techniques. The first StingRay was very different than previous S8e gliders. The skins were pre-laminated with epoxy and Japanese tissue and then laminated over expanded bead foam. All the radio gear was mounted inside the wing root except for the battery. It was located in a small pod in front of the motor on a carbon fiber boom extending through the wing. It also incorporated the inverted V-tail being used by Ben, George and Bob. I made the '93-94 S8E

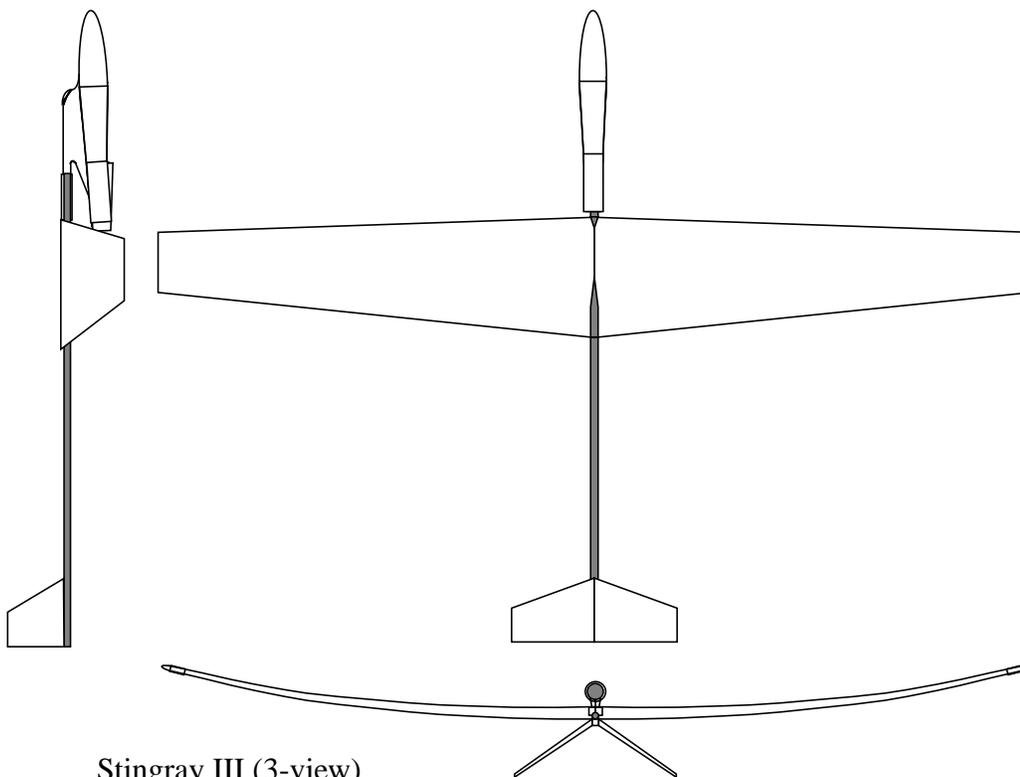
team and designed StingRay II for the 10th World Spacemodeling Championships held in Leszno, Poland.

StingRay II continued the design trend with a pod extending in front of the wing and servos mounted in the wing roots. The pod was improved by making it more aerodynamic and lighter by molding it from kevlar and fiberglass. The pod design was inspired by Bob Parks' Raven 8 and Bob's BP6e airfoil was used for most of the wing. The pod was slightly larger than the original StingRay, but it allowed the receiver to be moved out of the wing. The wings were stretched a bit and the tail made smaller to reduce drag. The '94 WSMC went pretty well with me finishing 8th. But, I was knew the StingRay II could be improved for my bid to be on the '95-'96 U.S. Team.

StingRay III extended the concepts of StingRay II. The pod remained unchanged, but the root airfoil was redesigned for lower drag and the wings stretched further. Rather than have dihedral joints in the wing, I came up with a method to mold wings which are curved. This simplified wing construction, made them more accurate and lighter. The tail size was reduced again to cut drag. The resulting airplane has excellent boost, glide and handling characteristics. This time the U.S. Team flyoffs went very well. I won the S8e event with the StingRay III. I felt like the design had matured to a level it would be worth kitting for other people. So, I spent 6 months developing a 46 page assembly and operation manual and producing 25 kits. The end result looks very much like the 3-view below.

Is there room for improvement in StingRay III? That's top secret. But, there will be some differences when the next generation StingRay makes its appearance at the 11th World Spacemodeling Championships in Ljubljana, Slovenia this September. In the meantime, if you would like to talk about RCRGs, S8E or the StingRay III kits, drop me a line.

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Stingray III (3-view)

### Three Oaks Launch Report by Greg Roman

The best weather conditions in the history of high power rocketry occurred on April 21st at Three Oaks Michigan. If you blinked, you missed it. Considering the 40 tornados that touched down in Illinois the day before, I was tempted to stay at home.

Michigan Team One sponsored the 8000' waived launch. It was held on a cornfield outside of Three Oaks, just over the Indiana border. I arrived at 11am Sunday (oops! I forgot to include the time zone change in my estimated time of arrival). I counted 100 cars parked along the narrow road between my car and the flight line. The wind was so calm that small rockets with big motors were flying straight up and recovering straight down. I spent more time walking between the flight line and my car than I did walking out to recover my rockets.

Eight pads were set up with a club launch system and PA. A crew of hard working, well organized LCOs efficiently kept the line moving. As soon as one parachute opened the countdown began for the next rocket. I never had to wait for more than 3 racks till it was my turn.

I spent so much time prepping rockets and walking back and forth to the flight line that I had very little time to talk to anyone, take pictures, browse at the vendor booths, or just watch the rockets. The few pictures I did take don't do justice to the many really cool rockets and motor combinations. Lesson one: when traveling to rocket heaven, prep rockets in advance

and arrive early, even if the weather forecast is questionable. [This is a good tip to remember for MRFF! - Editor]

One of the coolest flights of the day was by our own Bill Larry. This comes as no surprise, since NIRA has produced many brilliant rocket scientists. Bill's rocket is a Rocket R&D Mighty Falcon. It is 9 feet tall, 5 1/2" diameter, and 17 pounds. It lifted off with a central I284 then airstarted four G80s and two H97s. An altimeter deployed a small drogue chute at apogee and then a larger main chute at 750 feet. I want to say more, this rocket is worthy of its own article. [which just happens to be on the next page - Editor]

Frank Vroda, of Public Missiles LTD., flew one of his own 1/2 scale Patriots. This is a very expensive kit which Frank did a great job of finishing. Unfortunately, he let someone else prep the K550 reloadable motor and the parachute didn't eject. The rocket came whistling down and crashed near the access road just as someone was driving away. The driver got out of his car, wiggled his fingers near his ears, and gave a Bronx Cheer.

I never put a finish on a rocket until it has had a few flights. That way, if it gets lost or crashes, at least the most tedious part of the project won't have been wasted. My latest project is a 2.6" Estes kit that flew well with an F50. I then put it up with a G64. I had just taken the big step into the world of reloadable motors. This time the rocket experience the Lovelace Effect. The nose cone came off and the bungee cord broke while the rocket was still ascending. The rocket came

down and planted itself firmly in the ground. I laminated four layers of fiberglass cloth over the Estes tube, so instead of turning into an accordion the rocket took a 2lb core sample. It can be repaired.

Another rocketeer on the field thought he was doing me a favor by pulling it out and walking it over to me before I could get to it. Lesson Two: Don't mess with someone else's rockets unless it's obvious they need help. Lesson Three: Drill a small hole in the rockets body tube. This will insure that the air pressure inside the rocket will remain the same as the outside pressure, thus preventing the dreaded Lovelace Effect. I also flew my Electronic Beavis and Butthead with a D12 and three B8-5s, and my stretched Graduator with a G33.

Another cool rocket had a cluster of seven Silver Streak motors. I hope the fire damaged Rocketflite motor factory is rebuilt soon. I sure would like to get my hands on some of those motors.

The crowd thinned out in the afternoon, and I advanced my car into vacated spaces several times. Every little bit helped. At 4:30 (Chicago time) the rangehead closed. There was still plenty of daylight left. The wind never picked up all day. I guess a lot of people had a long drive home. What a launch! I can't wait till the next one.



Funny, I don't remember my Interceptor being so big, or taking 2 people to load on a pad. Photo by Greg Roman.

**Rocket R&D Mighty Falcon:  
Kit and Flight Review  
by Bill Larry**

Specs: Length: 110 inches (One 60inch & One 29 inch body tube, 21 inch NC

Diameter: 5.5 Inches

Fins: (3) plywood

Weight: About 11 pounds

Fiberglass Nose cone

84 inch nylon chute

1 54mm & 3 29mm motor mounts (standard)

Price: \$130

This kit has been offered by Rocket R&D since late last fall. It is an upscale version of the infamous Thoy Falcon; Thoy now being owned by Rocket R&D.

**Quality:**

My first impressions were not good when this kit came out of the box. The fin slots cut into the body tube were very roughly cut, and the centering rings and bulkheads are not "aircraft grade" plywood. The body tubes themselves had a few nicks in them, and the body tube ends also seemed roughly cut. The two inch elastic shock cord is woefully inadequate for a rocket of this size/weight (see flight characteristics).

In reality though, the body tubes just needed a little sandpaper. The centering rings and bulkhead are not pretty to look at, but are just as strong as any others.

Making up for any flaw was the gel coated fiber-

glass nose cone, a thing of stunning beauty. (at least to someone as warped as I)

**Construction:**

The instructions are very sparse/generic. All though well spelled out, there are no diagrams to help out. This is not a serious problem since construction is very straightforward, and this kit is not exactly meant for beginners anyway.

I modified the kit in a couple of ways. First of all I cut in three additional 29mm motor mounts for added flight/motor flexibility. I also added some screw/washer/wingnut assemblies for positive motor retention on the 54mm mount; and also act as electrical conductors for airstarting motors. Finally, I cut a couple centering rings and installed a 10 inch section of 4 inch body tube in the base of the payload section, to act as an electronics bay.

**Flight Characteristics:**

My first flight for this rocket was at Bong rec area on March 30<sup>th</sup>. I chose for this flight an I284 38mm reload in the center mount, and 6 G80's, airstarting

I used an Adept high output staging timer hooked up to six daveyfire electric matches (reinforced with thermalite) for airstarting the G motors. I also used an Adept Alts2 altimeter to handle recovery via a 18 inch drogue chute at apogee and the supplied seven foot main chute at 750 feet. I left the ejection charge on the I284(L) to act as a back up to the altimeter. Many people recommend leaving out the motor's ejection charge when using an altimeter for recovery deployment. This, they say, minimizes

the chance for an early ejection or immediate ejection at launch. Personally, I feel that ANY ejection is better than none, so I leave the motor's ejection charge where it belongs.

The rocket jumped off the pad nicely on the I284, and then *really* started moving out when all 6 G80's kicked in. At 2997 feet the rocket arced over into the wind and the altimeter fired the first ejection charge. ARG! SHOCK CORD SEPERATION!!! The payload section and the booster section were now heading their separate ways. The booster went aerodynamic and started picking up speed...WHUMP...a solid core sample taken about 300 yards from the launch area. The payload section/nose cone just tumbled its way down to 750ft. The altimeter then kicked out the main chute, which deployed fine.

Inspection afterwards showed that the 2 inch elastic supplied with the kit had torn in half as if it were paper. There was surprisingly little damage to the booster section, thanks to the soft ground. I had to replace about 20 inches of body tube.

My second flight came on April 21<sup>st</sup> at Three Oaks, Michigan. This flight would again be with a central I284, surrounded this time by 4 G80s and 2 H97 reloads.

Again the rocket jumped off the pad with authority on the I284. The airstarts seemed a little late, with a loud pop signaling that something was wrong. The rocket continued on though, and arced over at 2112 feet.....and headed straight down. WHERE IS THE DROGUE??? Not to worry, the drogue fired slightly late, at a hundred feet or so past apogee. This time everything held together with the strength of 3/8 inch bungee secured by bowline knots. The main chute kicked out at 750 feet, for a nice gentle landing.

Postmortem showed that one of the H97s had blown its nozzle (the pop we heard) and that one of the G80s had not fired. This accounted for the lower than expected altitude. Also, the drogue ejection charge had never fired! My Falcon had been saved by the I284's ejection charge, which I was again using as a back up to the altimeter.

**Conclusions:**

I like my "Mighty Falcon", even with its slight flaws. It went together easily, and it flies great. Next up...Level 2 Tripoli Certification at Bong on May 25<sup>th</sup>. Probable motor selection: J275 surrounded by 4 G80s and 2 H180s. I can't wait.



Left, the business end of Bill Larry's Mighty Falcon. Above, liftoff on an I284. Photos by Greg Roman.

**How to Have Fun at MRFF**  
**By: Lawrence Bercini**

The following are some “Do’s” and “Don’ts” which will help maximize your time at MRFF 1996:

**Do:**  
 Read the MRFF information included in your registration packet. The answers to a lot of your questions are there, such as the schedule of events, rules for contests, and information about where to go for food and evening activities

**Don’t:**  
 Lose your raffle ticket. It literally is your ticket to some cool stuff!

**Do:**  
 Fill out the comments on your flight cards. The more information you provide to the Launch controller about your flight, the more the rest of us can enjoy it.

**Don’t:**  
 Ignore the phrase: “HEADS UP!”

**Do:**  
 Participate in the fun contests. They are not serious competition stuff, they are purely for fun. You don’t need any kind of special model to participate.

**Don’t:**  
 Stand behind me when I photograph a liftoff. In such situations I have been unofficially designated a crash site.

**Do:**  
 Listen for the many quips flowing from the old-timers. It’s one-of-a-kind humor!

**Don’t:**  
 Forget to bring sun screen, a chair, insect repellent and a hat.

**Do:**  
 Meet as many people as you possibly can. The fun of MRFF is composed of two parts: Rockets and People. So if you don’t mix with the people, you get only half of the experience.

**Don’t:**  
 Miss the Saturday cookout finale: the famous Bundick Brownies.

**Do:**  
 Take lots and lots of photos. Bob “I’ll nag you until you give in” Wiersbe likes to publish pictures. Besides, who knows, maybe yours will be among the photos to appear in “Sport Rocketry”!

**Don’t:**  
 Go to lunch alone. Grab somebody else to go with you.

**Do:**  
 Thank the manufacturers who have made contributions to MRFF. The more they are aware they are appreciated, the more they are likely to continue to support us.

**Don’t:**  
 Leave the porta-john door unlocked when in use. A few people have been caught with their pants down...

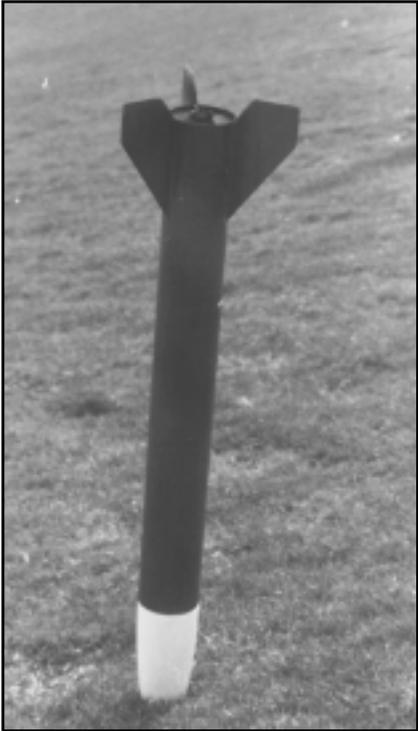
**Do:**  
 Ask questions if you are uncertain about the best way to do something. There are many knowledgeable people there who are glad to help out.

**Don’t:**  
 Go into the swamp. Too many eerie things have been spotted in there (shudder).

**Do:**  
 Lend a hand if you can. Running MRFF is a lot of work and the same people seem to get stuck carrying the load.

**Don’t:**  
 Stand between John Barrett and the check-in line. The man is obsessed with flying, so it’s not safe to get in his way.

**Scenes from a Launch** [a new film directed by Woody Allen and filmed by Jonathan Charbonneau]



Jonathan Charbonneau took these shots at the last club launch. From left to right: A S.W.A.T spills its guts when the motor cato’d, Bob Kaplow had yet another F40 reload spit the nozzle and his rocket pranged, and Ron Husak’s Clusterphobia takes off and takes the clips with it.

**Heard on the Street**

(Rumors and such, with apologies to the Wall Street Journal)

**Back on The Horse** - The Pegasus XL launch vehicle has made its first successful flight. The US Air Force REX-II satellite was launched into orbit aboard the third XL on March 9. The successful launch is good news for Orbital Sciences and for all small satellite missions which are waiting for a ride to orbit, following the failures of the two previous Pegasus XL missions as well as of the sole Conestoga and LLV launches.

**Crossed Wires** - The Skipper satellite, launched last December, reportedly failed one day after deployment because the solar panels were wired to discharge instead of charge. Skipper was to have tested ballistic missile defense technologies in an aerobraking orbit, but remains instead in its original 800 km circular track.

**Body Count** - Chinese sources now report that six people died and 57 were injured during the crash of the Chang Zheng 3B (Long March 3B) launch vehicle at Xichang on Feb 14. Other sources claim that more than a hundred may have died. The rocket's inertial guidance unit failed two seconds after takeoff.

**Final Flight** - Former astronaut Col. Robert Overmyer, 59, was killed on Mar 22 in Duluth, Minnesota, while the prototype Cirrus Design VK30 small airplane he was flying went into an unrecoverable spin. Overmyer was selected as a USAF Manned Orbiting Laboratory astronaut in 1966, and transferred to NASA in 1969. He was pilot of STS-5/Columbia, and commander of mission 51-B/Challenger (Spacelab 3). More recently, Col. Overmyer had begun writing a regular column for Flying magazine.

**Space Age Location/Stone Age Thinking** - In a classic display of leftover Soviet-era male chauvinism, Gagarin Training Center deputy commander Gen. Glazkov reported that they expected improved living conditions on Mir with NASA astronaut Lucid aboard "because we know that women love to clean" (AP report). This from the space agency which hailed Svetlana Savitskaya's 1984 first space-walk by a woman with "now Soviet space technology is advanced enough that [even] a woman can make spacewalks". Excuse me?

**Welcome to the Club** - Bob Heytow, Gerald Keene, Pierre Miller, Bill Carpenter, C. R. Herrig, Chuck Herrig, Christoffer Jacobsen, Tom Jacobsen, Randy Szelinski, and Richard Wartick recently joined NIRA, Welcome!!

**Rockets on Wheels** - Al's Hobby shop of Elmhurst was at the April Three Oaks launch doing great business, selling motors and reload hardware and many PML kits!!! They hope to be able to restock their supplies and be at the Bong launch on May 25<sup>th</sup>.

**Blackjacks Blowing?** - A lot of people have been complaining about black jack reloads lately. I saw a couple, besides my H97, blow their nozzles at Three Oaks. Of the 5 H97s I have flown, 2 have blown their nozzles. [reported by Bill Larry]

**Other Items of Interest**

The Michigan Spacemodeling Championship (10th annual) will be held this year at the Michigan Space Center in Jackson, MI (as usual). The event will be held on June 29 and 30 and the range will be open from 9am to 5pm.

Contact Contest Director Al de la Iglesia (517-546-4874) for more information.

Events:

- C helicopter Duration
- C Payload Altitude
- 1/2 A Parachute Duration (multi-round)
- D Streamer Duration
- Sport Scale



Photos of a disaster: (left to right) The Long March moments before ignition, just clearing the tower (and obviously in trouble), and finally impact.

Rocketry Wordsearch! Find the following words in the puzzle below:

- |          |           |       |          |          |
|----------|-----------|-------|----------|----------|
| Apogee   | Engine    | Lisle | Nosecone | Scale    |
| Blastoff | Fillet    | Lug   | Payload  | Streamer |
| Cato     | Fin       | MRFF  | Prang    | Tube     |
| Chute    | Ignition  | NAR   | Range    |          |
| Ejection | Launchpad | NIRA  | Reload   |          |

F	F	R	M	T	R	D	E	R	E	I
D	I	F	O	T	A	C	E	P	N	N
A	N	L	F	O	O	M	G	N	O	O
P	A	Y	L	O	A	D	O	L	C	I
H	R	E	I	E	T	I	P	S	E	T
C	R	A	R	N	T	S	A	R	S	C
N	H	T	N	I	R	A	A	U	O	E
U	S	U	N	G	C	N	G	L	N	J
A	K	G	T	N	G	S	T	U	B	E
L	I	S	L	E	L	A	C	S	L	S

**Top 10 NASA excuses for breaking the tether from the Shuttle during STS-75.**

10. Forgot to let off the drag when it started to run.
9. Somebody left a Ginsu knife in the cargo bay.
8. Like all cheap yo-yos, the string broke as they tried "around the world."
7. Didn't quite understand "String Theory".
6. Hey, those are the risks you take. Bungee cords are DANGEROUS!
5. Correction, Standby for Scheduled Tether Acquisition Event.
4. No Tom Hanks to save the day.
3. Forgot to tie a knot on the end of it.
2. Calculations for string tension capability done by old Pentium processor.
1. Overwhelming desire to say: "Houston, we have a problem."



Desperate to feed his ever-increasing addiction, Mark "Bunny" Bundick turns to committing grand-theft reload.