

# THE LEADING EDGE

Newsletter of the Northern Illinois Rocketry Association,  
NAR Section #117, TRA #36

Volume 18, Number 3  
May/June 1995



# 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.

June 2: Regular Monthly Meeting, MRFF Planning.

July 7: Regular Monthly Meeting.

## OTHER ITEMS OF INTEREST

May 27, June 24 - HPR launch, Rantoul Aviation Center, Rantoul, IL, 10am. Contact Greg Smith (217) 352-9655 for more information.

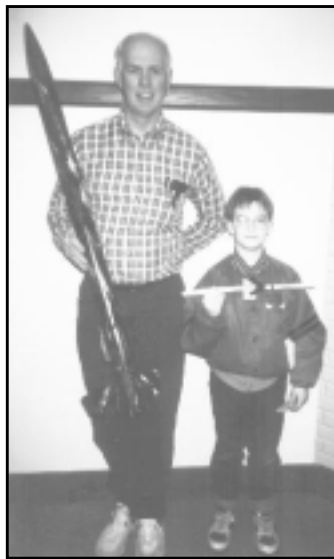
June 3, July 1 - HPR launch, Bong Recreational Area, WI. Waiver to 6000' MSL, \$5 range fee. Noon to 4pm. Contact Dave Sutton at (414) 886-6017 or Paul Olsen at (608) 424-3505 for more information.

Your address label contains an item of vital information, your NIRA membership expiration date! Please check your expiration date and renew your NIRA membership before it expires. You will not receive any more newsletters after your expiration date has passed!

### Model of the Month Winners!

March - Mike Ugorek's HL20 Fall Lifting Body and Ed Thiel's Gray Thang tied in Adult (what?? Ed's an adult now?!). Mark Soppet took youth with his finely done SR71 Blackbird (and this was his very 1st meeting!). Way to go!

April - Bill Thiel's "Rock Rocket" took Adult (really cool marble finish), and Mark Soppet returned to claim Youth with his Mini-Cobra (looks like the paint was still drying!). Congratulations!!



## 1995 CLUB LAUNCH DATES

All launches or other activities start at 2:00 PM. BYOL (bring your own launcher). Location for our 1995 launches is Community Park in Lisle. Get off Route 53 at Short and head west. If you have questions prior to any launch, call either Bob Wiersbe at 708-690-5442, or Mike Jungclas at 708-910-1267.

May 21: Regular Club Launch.

June 17 & 18: Midwest Regional Fun Fly! Two days and one night that you won't want to miss! For more info call Bob at 690-5442. **Register NOW!**

July 16: Regular Club Launch.

### STAFF

Bob Wiersbe - The Fun Stuff  
 Ric Gaff - The Boring Stuff

### CONTRIBUTORS

Lawrence Bercini, Mark Bundick,  
 Adam Elliot, Ric Gaff, Bob Kaplow, Bob Wiersbe

**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. To relieve stress, say this phrase to yourself repeatedly throughout the day: "Send articles to Bob. Send articles to Bob. Send articles to Bob."

### Model of the Year Winners!

Congratulations to Bryan Chesi and Lawrence Bercini, the 1994 Model of the Year winners! Bryan received 10 votes for his Enterprise to win the Youth Division, Lawrence received 11 votes for his Jayhawk to win in Adult.

From the 21 entries received, Jonathan Charbonneau's name was drawn from the hat as the raffle winner!

Prizes will be awarded as soon as we figure out what they are. Thanks to all of you who cast your vote!



## NIRA's Opening Day by Bob Wiersbe

Despite some rather cool temperatures, grey skies, and a cool wind, rocket enthusiasts from all over the Chicagoland area came out of winter hibernation to get in some serious rocket flying at NIRA's April launch.

During a 3 hour launch window, 46 fliers put up 176 flights! This was quite an accomplishment, given that we were operating under our new range rules and without a PA system. Under our new range system only 12 pad positions are allowed, and all flights are flown under the control of the RSO. Fliers hand in their flight card only when their rocket is on the pad and ready to be flown, and can only launch when the RSO announces their rocket and gives the count-down. This put a bit of a strain on the RSO because he had to yell to be heard (as my sore throat will attest), but the system worked very well.

The first cato of the year went to Eric Burmester when a C5-3 took out his Tomcat. Given the way those things fall, I mean fly, this was probably a good thing. Mike Oswald and John Barrett tied for the most launches with 15, but they both had a few problems. John had 3 catos: a B6-4 in a Greyhawk, a D12-5 in a Super Big Bertha, and a D12-3 in an Impulse. John's Impulse flight was quite unusual. One of the motors blew at ignition, taking out a fin, but the rocket kept flying with the other motor and managed to make a good flight. Mike was flying the new Estes Space Shuttle (the foam one that glides); the first flight pulled up just before smacking into the ground, the second one wasn't so fortunate. He also had a bit of trouble getting the new Transwing Glider to transition into a glider, it had a death grip on the pod.

Ed Thiel modified a Broadsword into a cluster model, with a 24mm mount in the center and two 18mm mounts on the outside. He flew it with a D12 in the core and two B6's in the outboards. When the B's kicked in it looked like it was trying to go into warp! Brain Gray got into the clustering act with his Impulse, putting up

two beautiful flights with D12's.

Mike Ugorek had one of the new Quest HL20 Falling, er, Lifting Bodies, and kept trying to get it to lift all day. The flight profile was more boost, nose-dive, dive, dive, eject, thunk! Bob Kaplow turned his Skywriter into a Lawnwriter on an E11-4J reload, power pranging it uprange. An Initiator on an F22-7J ended up in a pond behind the condos after it reverse weatherecocked (flew downwind!), prompting us to stop allowing flights on BlackJack motors for the day. Bob won the award for Predicted Cato Altitude when an Estes E15-8 went kaboom in his ManiaCato.

Tom Pastrick was amusing himself with gliders all day, pranging a swing wing twice and losing his Flat Cat on its third flight. Keith Downs flew a beautifully finished Jayhawk on a D12, it spun quite a bit during the flight and broke off a fin when it landed. Paul Downs had three misfires with his Super Vega before finally getting it in the air. Zach Vicha put up a couple of flights with his Cox Honest John, it flew surprisingly well for a hunk of plastic. (I've heard horror stories about those things being able to penetrate just about anything).

Lawrence Bercini was flying his usual assortment of interesting stuff, including a pyramid, slightly bent Cobra 1500, and an FSI D18-4 in an Engine Elimination Vehicle. Amazingly, the D18 didn't cato. Perhaps Lawrence's most memorable flight was a helicopter model that boosted fairly straight, but then shed two of three rotors and became a mono-copter. It actually did helicopter in, just upside down.

Ron and Mike Swikowski put up 9 flights, all of them with a SuperShot. Nate Anderson had a nice flight of his Mean Machine on a D12. The Adams clan got in 8 flights; Ryan and Kristen Noon put up 9; Daniel Ketterer and Raymi Dionisio both put up 3 flights with their Eagle rockets. Bryan Chesi made yet another flight with an Alpha III that he had flown over 10 times for his science fair experiment. Bill Piva flew one of the new Estes Corkscrews on a B6-4, and it was pretty cool. This will be a good model to use at

demo launches.

Danny Froehlich flew his Army Hawk four times; Fred Lochbihler flew his Racer three times before it disappeared on a C6-7. Ric Gaff wasted a couple of motors in a flying saucer made out of paper plates, and Adam Elliot had his nicely finished D-Region Tomahawk take a core sample after the chute failed to eject.

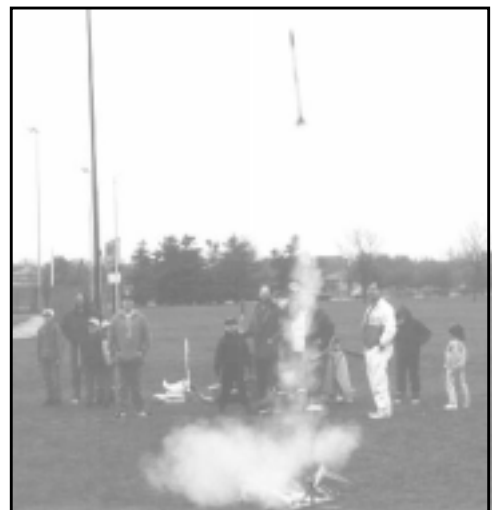
Bill Saindon and his daughter Candace came out to launch a Scout III "with a BMS nose cone". A very nice way to drum up new business! Jonathan Charbonneau put in a ripsnorting flight with a D13-7 in his Mini-Broadsword, prompting newcomers to ask what kind of motor it was. To round out the flying, Mitch Marek launched his Mirage on a G64 reload. It was a perfect flight to end a near perfect day of flying.



Lawrence Bercini gets his Cobra 1500 to ignite using sheer will power.



Bill Piva's Alien Probe gets underway under the watch of Don Vicha (far left) and Kleve Slouber (2nd from left).



A Maniac takes off from Pad 2.

## The Object at Hand

Title: The object at hand. (rocket pioneer Robert Goddard)

Authors: Kernan, Michael

Reference #: A8083131

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It looks so . . . homemade, like tin cans and steel tubes wrapped in asbestos and hung on a rickety lead-pipe frame, the whole affair not quite ten feet high. It stands in the vast lobby of the National Air and Space Museum pointing straight up at the dark belly of the X-15 supersonic plane.

You are looking at a full-scale replica of Robert H. Goddard's first working rocket. On its pioneering flight it rose 41 feet in the air, landing 184 feet from the frame. The flight took 2.5 seconds and launched the human race, for better or worse, into the space age.

We know rather a lot about that momentous day, March 16, 1926. It was a snappy, crisp afternoon with an inch of snow on the ground and the smell of snow in the air. Goddard and his wife, Esther, and a couple of friends had spent the morning setting up the rocket outside his aunt Effie Ward's farmhouse near Auburn, Massachusetts. They kept going inside to get warm but finally, around 2:30 P.M., they had a last cup of hot malted milk and went back out, rubbing their mittened hands.

Goddard, a 44-year-old physics professor at Clark University in Worcester, Massachusetts, opened a small valve to let oxygen into the rocket-shaped fuel tank, situated below the cylindrical motor and attached to it by tubes. The whole apparatus weighed a little more than ten pounds with fuel. Then Henry Sachs, a machinist, lit a blowtorch that he had tied to a pole, and reached up and touches off the igniter filled with black powder on top of the motor.

The thing flashed and roared. Esther Goddard started her home movie camera. The rocket sat there. And sat there.

And after ten seconds it lazily began to move. Clearing the frame--and accelerating with sudden fury--it zoomed straight up, curved, waned, hit the hard ground still roaring, its nozzle half burned away.

Percy Roope, a fellow physicist at Clark and a helper on that day, said the inventor "was calm, he always was cool and quiet, but you could tell he was really excited. He flushed up a bit...."

Esther Goddard recalled much later, "He didn't say much. But you ask any inventor about his invention when it works for the first time, and there's just nothing like it."

The four of them went back to Aunt Effie's



Goddard and his historic rocket.

kitchen for coffee. Later they would cannibalize the parts of that original rocket for future efforts. The movie camera missed the historic flight because the film ran for only seven seconds, and it had taken ten seconds to burn off enough fuel to reduce the rocket's weight to nine pounds, for it had only nine pounds of thrust.

But Esther's photograph of her husband standing possessively beside the device is today the classic illustration no space history can be without.

It's hard to read much in his face. He always was a modest person, his friends said, "plain as blueberry pie," who loved Buster Keaton comedies and smoked his cigars down to his fingernails. Yet always, you felt, there was that other Goddard, that solitary, that visionary who could never tell the wonders of his vision.

One day when he was 17--to be precise, it was October 19, 1899, at Worcester--he climbed a homemade ladder into a cherry tree to do some pruning. He stayed up there for hours, rapt in an ecstatic perception of the world from above, from higher than the treetops, higher than the clouds, higher than the sky, a dream of human beings flying through space, voyaging to the moon and to Mars. Was he the first to envision our planet as a lovely blue-and-white ball in a black vacuum?

We will never know. When he came down at last, dizzy with his dream, he could say only, clumsily, "I was a different boy when I descended the tree from which I ascended. Existence at last seemed very purposive." Every year he celebrated the anniversary of his vision.

Robert Goddard was to have disappointments that would send most of us into the insurance business. "God pity a one-dream man," he once wrote. In the closing weeks of World War I, for instance, he demonstrated to the Army a tube through which soldiers could fire rockets at the

enemy, a technology similar to that of the bazooka, the basic antitank weapon a whole war later. The Army assured Goddard it would be glad to fund his research, but in less than a week the war ended. When his first major paper, "A Method of Reaching Extreme Altitudes," describing a multistage rocket that could take a payload to the moon, was published in 1919, it drew laughter. From the heights of journalism, the New York Times jovially chuckled that Goddard lacked even "the knowledge ladled out daily in high schools."

Forty-nine years later, with Apollo 11 circling the moon for all humankind to see, the Times ran a correction. "It is now definitely established that a rocket can function in a vacuum. The Times regrets the error."

After World War II, U.S. Army scientists debriefed Wernher von Braun and other Germans who had built the terrible V-2 long-range ballistic missiles at Peenemunde. What had given the Nazis the perseverance to get so far ahead of us on this?

The Germans answered: Why ask us? Ask your own rocket pioneer, Dr. Robert Goddard. We learned from him.

The reaction: Robert who? The American public had barely heard of the man. The Germans, inspired by Goddard's passion, had solved their own problems. Von Braun would note, however, that "many design solutions in the V-2 rocket were covered by Goddard patents."

It figures. More than half of his 214 wide-ranging patents were granted to him posthumously, based on his notebooks. Scores had to do with every imaginable phase of rocketry, future as well as present: fuel-feeding devices, gyroscopic stabilizers, a jet-driven propeller, an air-breathing resonance chamber and an idea for solar propulsion. They also included an oscillator that was a forerunner of the radio tube. Not until 1960 was money found to compensate Goddard for possible infringement of his rocket patents, dating from 1914, in building the Jupiter, Redstone, Vanguard, Atlas and Thor rocket engines.

Esther Goddard, by then 15 years a widow, was awarded \$1 million. She gave half of it to the Daniel and Florence Guggenheim Foundation which, along with the Smithsonian Institution, had funded and encouraged the inventor.

Actually, the Smithsonian was his first backer, giving him \$5,000 in 1917 and later helping him attract so many other awards that eventually he became one of the best-funded inventors in the country. Some years ago researchers found several Goddard notebooks dating from before World War I that discussed space probes, solar propulsion, reentry heat shields, electron and ion engines, and gyro-stabilization. They even included a design for crew's quarters on a multi-ton rocket.

In those early days, though, Goddard concealed his actual dream of reaching the moon--for fear of being laughed at. At Princeton, where he had a research fellowship, he was officially working on his oscillator. But at night, though he did not date tell anyone about it, he was working on his theory of rocket propulsion. When--two months before Pearl Harbor--he offered his expertise to the American military, he was put to work on "Jato" takeoff boosters for planes, not exactly what he'd had in mind.

Whatever the rest of the world thought, he kept at his life's work. He had the courage to make a radical change even two weeks after the pioneer flight, putting the fuel tank on top and the engine below it. He built rocket after rocket in steady succession. Every time he began setting up the pipe frame at Effie's farm, small boys would collect in the surrounding woods to watch.

In the National Air and Space Museum you can also see the rocket he flew in May 1926, just two months after the first. This one is the real thing: the oldest liquid-propelled rocket in the world. There are several other Goddard rockets in the museum, notably the 1941 job, 22 feet high, with 985 pounds of thrust.

When his 1929 version, with instruments aboard, crashed in a field, neighbors made such a fuss that he moved his experiments to Camp Devens, Massachusetts, and later to Roswell, New Mexico, a cattle-and-sheep town 3,600 feet above sea level. Here he set up the first rocket-testing center in America. His first successful launch, in 1930, sent a rocket named Nell shooting 2,000 feet skyward at a maximum speed of 500 miles per hour. In 1935 one of his rockets broke the sound barrier. Soon they were shooting two miles high.

All this time, Goddard remained a relatively obscure physics professor. His students adored him. When a lab demonstration was going well, he would whistle to himself. Always the same tune: "It's a Long Way to Tipperary." And the class would cheer.

Forcing himself to become more sociable, he joined the Roswell Rotary Club. He was a man who laughed easily, but you could sense the inner quiet, people said, the concentration of a solitary intent on his one dream. He died five days before V-J Day in 1945, too soon to know that the first man in space would be a Russian. It was just as well.

As you look around at all those space vehicles, from the battered Friendship 7 to the exoskeletal Skylab, big as a house, and as you watch the movies of the takeoffs from Canaveral--those tremendous controlled explosions that rattle your bones even in the NASM theater--remember that all this, or a lot of it anyway, is what Robert Goddard must have been seeing in his mind on that cold afternoon at Aunt Effie's farm as his little brainchild shot up to the treetops.

## Edmonds Aerospace "Deltie"

by Michael Park

A friend of mine gave me a Deltie kit for my birthday and I thought I'd write a brief review of it for r.m.r, especially since it was designed by Rob Edmonds, a regular poster.

The Deltie is an easy-to-build boost glider. Power is from a 13mm motor in a pop-pod. The glider's wings are in an unusual configuration: the wings and elevator form the outline of a delta wing (there is a picture in the March/April 1995 Sport Rocketry).

The kit is very complete; just about everything you'll need is included, including nose weight, a small body tube marking device, and a paper clip for when you're gluing the elevator! The balsa is die-cut, with "lots of notches and tabs on the parts to make them go together just right" (from the directions).

The instructions are generally excellent, consisting of 15 numbered steps on seven photocopied pages. Each step is clearly described and accompanied by numerous diagrams. The writing is directed at the younger rocketeer, but is never condescending. What especially impressed me was that the instructions described not only \*what\* to do, but also \*why\*.

Construction was straightforward, with only two problems. The first was that the fuselage did not quite match the outline printed in the instructions for marking the CG. Very minor. The second was more serious: the angle at which the wings join each other is wrong. Not by much, but the wingtips don't align with the ends of the elevator. If you spread the wings to the proper angle, you end up with a small gap at the joint. I trimmed some of the tabs and notches to improve the fit. (My friend had the same problem with his Deltie.)

The end result was an extremely cute glider which flew very nicely across the room. Now off to the launch pad! I was a bit nervous because would this be not only the Deltie's first flight, but also my own first flight of a boost-glider! However, the flight was entirely successful: the 1/2A3-2T lifted the craft up, and the glider came down circling gently while the pod descended under its streamer. Cool! I was too preoccupied to check my watch, but glide time was on the order of half a minute. For the second flight I loaded an A3-4T (full A power--oooh!). Unfortunately, I got careless and lazy during preparation, and contrary to the instructions, just wound the shock cord around the streamer. This resulted in shock cord separation at ejection. I must emphasize that this was my own fault.

In summary, the Deltie is a great kit and, at \$5, an excellent value. It is a perfect introduction to boost-glidings, especially for young people--although at this point I must mention that the

otherwise outstanding instructions are marred by spelling and typographical errors. (I feel that good spelling and grammar are very important, especially in reading materials aimed at children.)

Highly recommended.

Likes:

- ease of construction
- cute as a bug
- overall excellent instructions
- price

Dislikes:

- problem with wing joint angle
- minor discrepancy between instructions and actual parts
- spelling errors in instructions

The Deltie can be ordered from:

Edmonds Aerospace

13326 Preuit Pl.

Herndon, VA 22070-4341

\$5.00 each, plus \$2.00 shipping.

## Notes from all over

By the time you get this, MRFF will be less than a month away! If you haven't sent in your registration form, do it now! If you've lost it, give Bob Wiersbe a call at (708) 690-5442. You won't want to miss MRFF this year!

We need volunteer RSO/LCO's for our monthly launches. If you are an experienced RSO, please take a 1 hour shift at one of the launches. The work is fun and you'll get to know a lot of new people! If you'd like to learn how to do it, we are training people at each launch.

It's not too soon to be thinking about helping out at the RCHTA show in October. Last year we needed 5 people to run the tables, and 2 to handle the registration/PR stuff. It's a great way to give back some of what you've learned, and you get to see the show for free!

The response to the survey in the last newsletter was underwhelming, to say the least. Only 4 people took the time to fill it out and send it in. That's pretty bad considering we have over 100 NIRA members. So go dig it out and send it in!

We are still certifying launch systems at the monthly meetings to make sure they are Safety Code compliant. Only certified launchers will be allowed on the field.

Got an idea you'd like to share? A cool plan? Pictures? Lots of extra money? Send it in to The Leading Edge! We're always looking for items to fill the pages of this outstanding newsletter! Your article might even make it into the pages of Sport Rocketry!

**Giant Flying Pyramid**  
by Rick Gaff

It's so easy to get use to your basic 3FNC or 4FNC <sup>1</sup> rockets so once in a while its nice to do something different, an ODDROC! One of the classic oddroc on the NIRA range is Bob Kaplow's "Happy Meal UFO" conversion. It's so unrocketlike that people have a hard time believing it can fly, but fly it does! Unfortunately "Happy Meal UFO's" are no longer available (except, perhaps, as expensive collector's items). Fortunately many other oddroc are possible such as the giant flying pyramid!

The Giant Flying Pyramid is actually a double size version of Lawrence Bercini's original 4" pyramid. In fact if you want a really easy to build first oddroc Bercini's model is an excellent choice. The plans for the original pyramid are available in NIRA reprint "Sport Plans of the Model Rocketeer #2".

After building and flying a 4" pyramid I knew I had to build a bigger one. It seemed simple enough just double everything! As it turned out it wasn't quite that simple. The first one I built used tumble recovery just like the 4" model, unfortunately the larger version didn't so much tumble as plummet. Not very fast mind you, but it landed hard enough to squash it's apex each time. I got tired of that pretty fast. The second version used nose blow <sup>2</sup> recovery. The top 3" of the model were cut off to form a small pyramid that was then used like a nose cone. A conventional parachute recovery system was installed in the larger bottom part of the pyramid. This model looked like heck, flew poorly and recovered badly, there simply was not enough room for a large chute. For the 3rd version (I was nothing if not persistent!) I, somewhat desperately, decided to try rear-ejection

recovery<sup>3</sup> sometimes known as the *Kiss of Death* recovery system.<sup>4</sup> This method, I'm happy to say, worked great. We'll get to the details of that in a moment.

To build a pyramid does require some materials and techniques not normally used in building model rockets but nothing too difficult. The airframe is a piece of posterboard that has been cut and folded into a pyramid. The posterboard is pretty cheap, you can buy it at Osco for about 70 cents. It even comes in a variety of colors so you don't even have to finish or paint the model, is that cool or what!

From the posterboard cut a triangle 8 inches wide at the base and 8 inches high as shown in figure 1 this will be used as a template for the actual airframe. To create the airframe draw a set of 4 triangle side by side as shown in figure 1 on the matte side of the posterboard. On the 4th triangle draw a glue tab. That's your airframe! Cut the airframe out as a single piece NOT as 4 separate triangles. After you have it cut out, fold the posterboard, with the glossy side out, along the lines where the triangles meet. A long stiff steel ruler or straight edge is especially nice for this but any long straight edge should work fine, just make sure you use something otherwise you are in for a frustrating time. Once all 4 lines have been folded you should have a pyramid shell. To glue the shell together you should have a work area large enough to lay the pyramid shell on its side and a piece of wax paper or plastic, something glue won't stick to. You can use just about any kind of glue you like, but I prefer Titebond. Spread a little glue along the glue tab, lay the shell on its side and press the tab along the edge of the 1st triangle with the tab inside the shell. Make sure the edges of the triangles are square to each other, then press the tab down good and solid. If

you have a straight edge you can use it to press down on the tab. if you used too much glue the excess will be squeezed out, now is a good time to clean it up. Set the shell aside until the glue dries.

The next assembly to build is the engine mount/recovery system pod. If you check the drawing you will see that this is basically just a piece of BT-70 glued into the middle of a piece of foamcore board, and what is foamcore board I hear you ask? Foamcore is a slab of styrofoam covered on both side with white cardboard and is about 1/4" thick. Foamcore is a lightweight, modestly strong, stiff material suitable for light construction and is available at office supply stores. In the past I had used poster board for the pyramid base but decided it wasn't strong or stiff enough so I switched to the foamcore. If you don't want to use foamcore or can't get it, you could substitute posterboard, cardboard (corrugated or noncorrugated), plywood etc. but the foamcore really works the best. Cut a nice SQUARE piece of foamcore about 7 1/4" on a side. It doesn't have to be exactly 7 1/4" but it does have to be SQUARE, since its going to be the base of the pyramid. Locate the center of the square and draw a circle 2.2" in diameter (BT-70 O.D.). Cut the circle out using a very sharp xacto knife. If you don't have any BT-70 a different size should work as well and preferably a larger rather than a smaller size.

Cut a 5" long piece of BT-70. Glue a piece of 1/16" plywood over one end so that it completely closes that end. Once the glue has dried trim off the excess plywood. Run a small bead of glue along the joint inside the BT-70 to make sure the joint is strong and well sealed. I've found that this is easier then making a custom bulkhead to seal the end of the tube. Glue two 1" long pieces of 1/8" launch lug onto BT-70, one



Above - Lawrence Bercini and his 4" Pyramid.  
Center - Ric Gaff with his Giant Pyramid.  
Far Right - Ric's Giant Pyramid at liftoff.



# Giant Flying Pyramid

By Richard Gaff

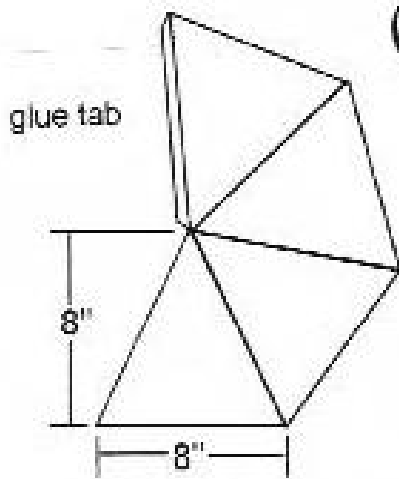
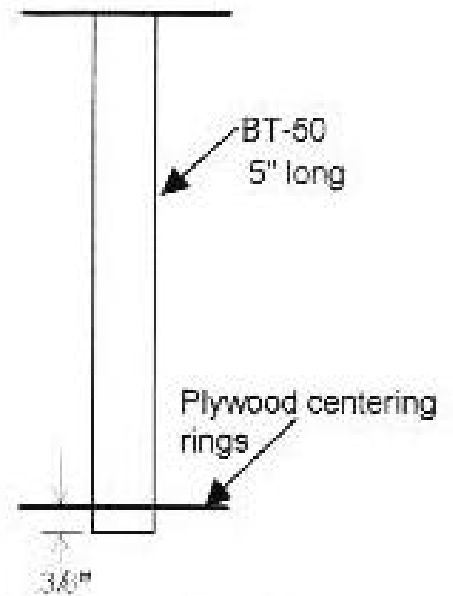
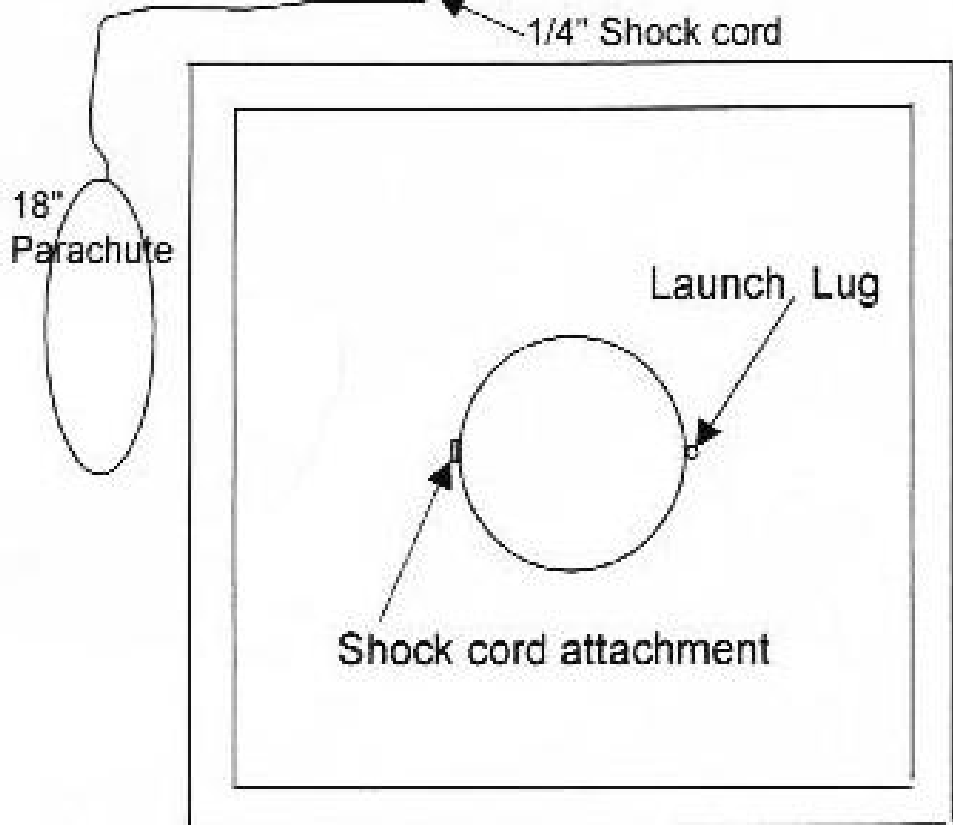
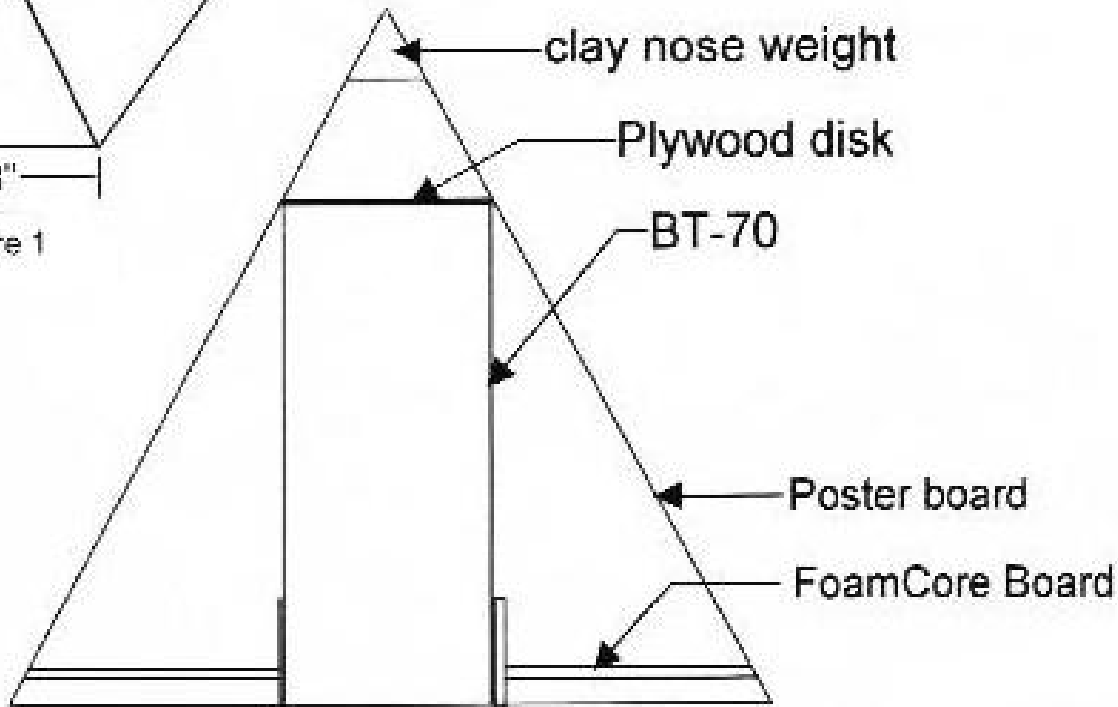


Figure 1



Engine Mounting Tube

at each end, just as if this were a normal rocket (see drawing).

After the glue has dried, slip the BT-70 through the hole you cut in the foamcore so that the foamcore is on the end with the launch lug, you'll need to cut a small notch for the lug. On the side opposite from the lug cut a small 1/4" wide 1/8" deep notch into the foamcore, this is to attach a 1/4" shock cord later. **DO NOT GLUE!** First we need to check the fit of the BT-70 and mounting square in the airframe. The best way to do this is to suspend the pyramid airframe upside down in a small box or short piece of large mailing tube. Suspended like this the airframe will keep its' shape without a lot of fuss. Place the foamcore square with the BT-70 into the bottom of the airframe. Gently press the foamcore in as far as it will go, then slide the BT-70 in as far as it will go, so that the sealed end will press against the inside of the airframe (see drawing). This is where you soon be gluing it together. Now that the BT-70 is located properly you can glue it to the foamcore, do **not** glue the foamcore to the airframe just yet, do not get any glue into the shock cord notch. Leave the pyramid upside down until the glue dries. Now is a good time to build the engine mounting tube. As you can see in the drawing this is a pretty simple device; a short piece of BT-50 and 2 home-made 1/16 inch plywood centering rings.

Once the glue has dried remove the BT-70/mounting square from the airframe. To fly properly the pyramid needs some nose weight. The C.P. of a cone is located 2/3's of the cones length from the top of the cone (.666L). On the pyramid this is about 4.7 inches from the apex and we want the C.G. at least an 1 inch ahead of that, about 3.5 inches. Place a loaded D12 into the engine mounting tube and secure it lightly with a small piece of tape. Place the engine tube into the BT-70 (and hopefully you've been testing the fit of these parts as you built them!). Take about an ounce of clay and wad it into the top of the pyramid, into it's apex. Place the BT-70/engine assembly into the airframe and secure it with a few small pieces of tape. Checking the balance of the pyramid is the tricky part, it's not exactly a normal rocket! What I try to do is balance it on the edge of my right hand while lightly holding it and "rocking" it with my left to get a feel for the balance point, there is no simple way of doing this. You will not be able to locate the precise balance point, the best you can do is get a rough idea and then move it forward by adding more clay. Keep "fiddling" with until you feel the balance point is far enough forward. Once you've reached this Nirvana-like state glue the clay in place. Whew!

While the glued in clay dries we can attach the shock cord. The shock cord is a 2 foot long piece of 1/4" elastic. Slip 1.5 inches through the slot you cut in the foamcore near the BT-70.

Glue this short end along the side of the BT-70, a piece of tape can be used to hold it in place till the glue dries. An 18" parachute is attached to the other end of the shock cord.

The last major step of the construction is gluing in the BT-70/foamcore square assembly. When you place the assembly into the airframe notice that the sides of the airframe do not lay flat against the edge of the square leaving a big gap on each side. It might be possible to build a fixture to hold the sides of the airframe against the square, a small cardboard box for instance. All I did was to tack the airframe to the square in 4 spots on each side of the airframe using thick CA and accelerator. This keeps the model together so you can run a small amount of glue along the joint and I say a small amount, just enough to start sealing the joint, if you put on too much the excess will simply drip inside the model. After the first application of glue has dried you can put on another layer.

The very last step (finally!) is cutting a small hole in the airframe for the launch rod to come thru. After the glue has completely dried slip a launch rod through the launch lugs until it pushes against the inside of the airframe you'll see the end of the rod raising a small dimple. At that point of contact cut a small slit and then carefully push the rod through it. Once you have the basic hole you can enlarge it as necessary for a loose rod fit.

Your giant pyramid is now ready to fly!!!

Well, actually it's ready to be prepped to fly...

Prepping a rear-ejection model is rather different from a front ejection model! The basic idea here is to wrap the parachute around the BT-50 engine assembly. When the ejection charge fires the entire assembly is blasted out of the BT-70 mounting, rear ejection can be very reliable! Take the parachute and pull it into a long narrow spike, we want to fold a very loose parachute, one that opens very quickly. Fold the chute in half length-wise, then open it back up a little. Lay the chute shroud lines along the chute inside the fold, zig-zag the lines along the chute until all but the very end of the lines are laying on the chute. Fold the other half of the chute over the shroud lines. You should now have a chute folded in half with most of the shroud lines inside. If you were to drop the chute while holding on to the end of the shroud lines you would see how quickly and easily this chute will open. Wrap the folded chute around the BT-50 engine assembly in a spiral with the folded end of the chute at the forward end of the tube. Zig-zag the rest of the shock cord on the parachute. Wrap several squares of recovery wadding around the chute and carefully slid it all into the BT-70, you'll probably need to make a small notch in the centering ring for the shock cord to pass through. Put in a D12-0 or D12-3 and it is ready to fly!

Footnotes:

- 1) Three Fins and a Nose Cone, Four Fins and a Nose Cone. Highly abbreviated description of basic model rocket.
- 2) Refers to standard recovery method in which the forward end of a model (i.e. nose cone or payload section) is blown out of the model by the ejection charge.
- 3) Alternate, seldom used recovery method in which the recovery device is ejected out the rear of the model with or near the engine.
- 4) Largely unwarranted nickname for rear ejection recovery. Attempts to use rear ejection in competition models (i.e. altitude models) were generally not very successful do to a lack of understanding of how rear ejection works.





**I spy on the CIA**  
by Adam Elliot

It was a windy Saturday, and the long, long drive down to Rantoul seemed like it would never end.

The reason for going down there was because I had never been to a high power launch before, and wanted to see the big ones. After driving all around the former Air Force Base turned small aircraft playground, I was able to find the launch site with some help. The CIA seemed like ordinary people, typical rocket guys. The wind was really blowing strong with cold air, and the smart guys took Ric Gaff's advice and dressed appropriately. The rest shivered for awhile.

When I arrived at almost 11a.m. they had already gotten off two flights. They had some really cool looking Z-PADS, a typical bench type pad (for small rockets), and another all-metal pad which remains unidentified because I couldn't find the ad for it. Another thing you could notice was that all their rods were bent. Why? I don't know, but I substituted one of my own.

I was anxious to get the D-Region Tomahawk that I had spent all week laboring to finish off the ground. After several attempts it soared high and mighty on a D12-5, safely landing about 100 yards away. As I was recovering it, someone else's malfunctioning bird landed nearby with minimal damage.

Also on the firing line was a Pink Birdie, this was a two-stager. The lower half was "a kit", according to the owner. Where he got it, I don't know. It looked like an oversized pink badminton birdie with a big, rounded nose that was staged to a regular shuttlecock (but pink!). The two stages slipped right together, and it worked beautifully. Both stages used what you might call "impact recovery".



A couple of "typical rocket guys" waiting their turn for a pad.

There were many fine flights, including a few Blackjack and Silverstreak motors. There were some really big and beautiful rockets, included one called "The Twilight Zone". Everyone wanted to know how he got the logo so perfectly on the rocket, and he said that he traced it from his computer screen. The largest rocket there was a Flacon that wasn't launched because of the strong winds. One large rocket used a large core motor and two outboard E's that were ignited by flashpaper and fuse. Only one of the E's ignited, but the flight was still good. I commented that I had read that hand igniting fuse was illegal, I was told "...yeah, but lighting it by other means isn't".

At lunchtime we stuffed ourselves into a small car and went to Hardee's just outside the base. Lo and behold the manager there was a high school classmate of mine! This didn't make their fries taste any better though.

There were plenty of things in the sky to watch as we had air traffic all around us. In fact, we had to coordinate our launches with the flight controller and wait until all planes were on the ground before launching. Someone pointed out to me that they used to have a better launch site, but when a second runway was activated they had to move.

Some younger kids were launching three-stage rockets and getting all the stages back without any problems, just one advantage of launching in an airport! I decided to take advantage of the recovery space and put a C6-7 in my Super Shot. I recovered it nearby without any damage.

At around 6p.m. I helped dismantle the range equipment, being sure to grab my rod before it got mixed in with the crooked ones. The guy with the Pink Birdie was going out to look for the lost upper stage, and I decided to lend him a hand. I found a Mosquito that someone had lost



The obligatory liftoff shot.

earlier in the day, but no sign of the birdie. After the owner gave up and was ready to leave, I spotted the birdie! I stuck it on the end of my launch rod, and walked back triumphantly whistling the tune from the old Space Giants TV show. It took him a moment to notice his birdie on the end of my launch rod, but he was thankful to get it back.

The only name I caught the whole day was that of Gary Buck. Gary is the owner of Rocket R&D, and was telling me about his business, and his plans for expanding into private homes and paying on a piecework basis. He also hopes to be a distributor for the Hypertek and Aerotech Hybrids.

If you have any really big rockets but can't find an acceptable place to launch near the city, then Rantoul seems like a good place to go. They have high power launches once a month, generally on the third Saturday. Ironically, they launch in the middle of an active airport, instead of far away like most people do.



The 2 stage Pink Birdie before flying away.



"Dominus Liftus, Thrustus Maximus, Shredus Notus, Parachutus Ejectus, Recoverus Safus. Amen."

## Estes Electron Beam Launcher by Richard Gaff

Last January I decide to find out how many rockets could be fired using an Estes Electron Beam Launcher. In an effort to keep this article short I'll cut to the chase. On a fresh set of batteries I "fired" 100 igniters and still had life left in the batteries!

You say you haven't gotten 100+ launches on your EB launcher? Then I would like to present a few tips that should help get the most out of a set of AA's.

### Tips for unmodified launchers

- 1) **Use fresh, high quality alkaline batteries.**
- 2) **Avoid short circuits.** 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. Not only will this increase your battery life it will cut down on the aggravation of rocket inertia.
- 3) **Keep the continuity light off as much as possible.** 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 when not using it also helps prevent using your launch controller as a night light inside your range box!
- 4) **Keep your micro clips clean.** This is difficult to do with the micro alligator clips supplied with the launcher but it is important. A small piece of sandpaper or a emery board can make a big difference.

*Modifying the launch controller assuming you want to continue using "AA" batteries.*

The only change to the EBLC 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 buzzer

to use is Radio Shack's part number 273-054, a 6V buzzer. This is a polarized part so you have to make sure you wire it correctly.

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 shorten the life of the battery.

## How I Spent My Spring Vacation by Bob Wiersbe

Well, I finally did it. After years of making plans that fell apart I was able to take a trip down to the Space Center at Huntsville. What started out as a simple trip to Mammoth Cave, Kentucky turned into a 12 state marathon, but with Huntsville in the plans.

The first thing I noticed was the Saturn Block I towering over the buildings. Then the shuttle mock-up, then the SR71 Blackbird, the Redstone, Atlas, Titan II, Saturn V, and the list goes on. The Rocket Park is great, you can almost get inside the rockets, and taking measurements is a snap. The Saturn V, Atlas, and Titan II are on their sides, making it very easy to check them out. And yes, the Atlas the Estes recently put out is fairly accurate, at least as far as the metal panels go.

The museum inside is really cool. Lots and lots of space hardware to be studied and touched. Neat demos that are hard to get to through the crowds. The best thing in the museum: an Apollo command module trainer that you can crawl inside of! I could have spent a day in there, just pushing buttons and studying the guts. My kids liked it too. There's a mock-up of Skylab

that you can walk through, it's amazing how big it really was.

We got there too late in the day to make the tour of the Marshall facilities, so if you go be sure to plan on getting there early. There were tons of Estes kits in the museum shops, and I saw a lot of people buying them. They're a little behind the times though, they have the Saturn 1B and Saturn V on display as being for sale, but neither is available now.

One thing I wish they had available were plastic models identical to the ones on display inside the museum. They had large scale models of all the manned launch vehicles, any one of which would have made an awesome plastic model conversion.

If you're down that way, make plans to stop in. It's worth going to at least once in your life. If you're a kid, start thinking about going to Space Camp. I'd have gone if it was around in my day. Where else could you go and actually mess around with space hardware? Train underwater? Fool around in a shuttle simulator? Build and fly model rockets? Oh, wait, we do that all the time. Be sure to take a camera and tape measure when you go!

[Cover - the Pathfinder shuttle and SR71 Blackbird on display at Huntsville.]



The best part of Huntsville - the Rocket Park!



Me inside the Apollo mock-up. I had a lot of fun getting

## Heard On The Street

Rumors and such, with apologies to the Wall Street Journal

**Swords Into Plowshares** - E Prime, the contractor responsible for the Peacekeeper ICBM, is seeking to resume development of the missile. While the Peacekeeper force itself is being reduced in accordance with START treaty provision, E Prime is looking to convert the vehicle to commercial use. The Defense Department is reviewing the proposal to make sure all treaty provisions are complied with.

**Cracked Casings** - The SRB's used on the STS-63 mission which lifted off February 3 were damaged on descent. A 35 knot wind prevailed in the Atlantic Ocean splashdown area, and produced side loads on the aft skirt and thrust vector control systems. NASA cleared the booster for the STS-67 launch after determining that the damage resulted from the landing and not powered flight loads.

**From Russia with Love** - The first US commercial payload to be launched by a Russian rocket took to orbit January 23. Final Analysis, Inc put its first low orbit communications satellite into a 540 mile polar orbit aboard a Cosmos SL-8 rocket launched from Plesetsk, Russia's northern most launch site. The payload also contained a US Air Force space experiment.

**Faster SSTO?** - NASA officials surprised industry observers by awarding three contracts related to the X-33 reusable launch vehicle demonstrator and the smaller X-34. Lockheed, McDonnell Douglas and Rockwell were chosen to negotiate with the Marshall Space Flight Center. NASA expects to provide each team with about \$8 million in funding for the next phase of the project. Lockheed's efforts will be headed by their Skunks Works team

**Final Flight** - Keith Glennan, NASA's first administrator, died from complications of a stroke April 11 at the age of 89. Glennan brought the German rocket team of Wernher von Braun into the NASA fold from the Army before the Eisenhower administration left office. After NASA, he returned to his post as president of the Case Institute of Technology in Cleveland.

**Crammed Closets** - NASA's MIR visitor, Norm Thagard, is learning a lot about the practical problems of long duration spaceflight. Reportedly, storage and filing are big problems on MIR, and Thagard is taking lots of notes for modifications to spaces onboard the NASA space station. At one point, the MIR crew had to radio earth to the previous MIR inhabitants to ask where a piece of equipment was stored.

**"E" Eulogy** - An US Air Force Atlas E booster, which began service in the ICBM fleet back in 1961 and which was stored for years in the Garber facility, finally got a chance to strut its stuff

March 24 by injecting an Air Force weather satellite into orbit. The Vandenberg shot marked the last Atlas E launch; the Air Force has used all such boosters it had on hand.

**Big Bird Bounces Back** - The March 28 launch of an Ariane 44LP from French Guiana successfully put two large communications satellites into orbit. The launch was especially nerve wracking because it was the first for Arianespace since a December 1 failure, and insurance underwriters had the largest coverage policy ever on the payloads, \$400 million. The satellites reached their transfer orbits without a hitch and will soon be supplying telephone and TV communications to both Europe and South America.

**Conversion Crashes** - Any good competition modeler knows you've got to be careful converting plastic models to fly. The Russian space agency is learning some conversion lessons of its own following the failure of an SS-25 military missile on a commercial launch. A March 28 launch from the Plesetsk Cosmodrome failed to put its three satellites in orbit for reasons still under investigation. The payloads stopped returning data sometime after 4th stage ignition. To turn the SS-25 into a commercial launcher, two additional stages (for a total of five) are added, but the missile retains its mobile silo launcher.

**Mulling MIR Matings** - NASA officials are debating whether to modify the Space Shuttle-MIR docking devise with better instrumentation and explosive bolts of proven reliability to enhance the safety of the proposed docking operations. While such instrumentation has been written into the requirements for the docking adapter for the international space station, NASA engineers had decided the risks of not having such information on the status of latching was an acceptable one for the Shuttle's flights to MIR. An independent review board established by Congress after the 1967 Apollo I fire recommended the reassessment.

**Pegasus Plus** - Orbital Sciences, developers and operators of the Pegasus, were awarded a \$70 million contract to develop the X-34, a reusable vehicle for smaller, low earth orbit payloads. Resembling a Pegasus on steroids, the new vehicle would be launched by an L1011 conversion at 35,000 feet. Final engine selection is due soon with the Rocketdyne Atlas MA-5, modified Delta second stage and Russian Zenit boosters under consideration.

**May the Force be with you** - On May 5th, for the last time in a 40+ year span, "Darth" Riebeschl commuted via train to his job on the near north side of Chicago, as he has done nearly every day since prior to his training completion at DeVry right after WWII. Congrats to Darth on this joyous life-change occasion!

**Welcome to the club** - A hearty welcome to new members Keith J. Downs, Christopher Orris, William Puda, David Ugorek, Christopher Holmes, Bill Saindon, Fred Lochbihler, Jerome Mrozak, Bill Jankowski, Steve Petrek, Kathy Larson, and Keith Gilman!

## NIRA REPRINT SERIES

The NIRA Reprint series, which has been available for months at NIRA meetings, is now available by mail. The reprint series is an effort to get interesting useful information out of the collections of "Old-Timers" and into the hands of people who don't have access to the original material.

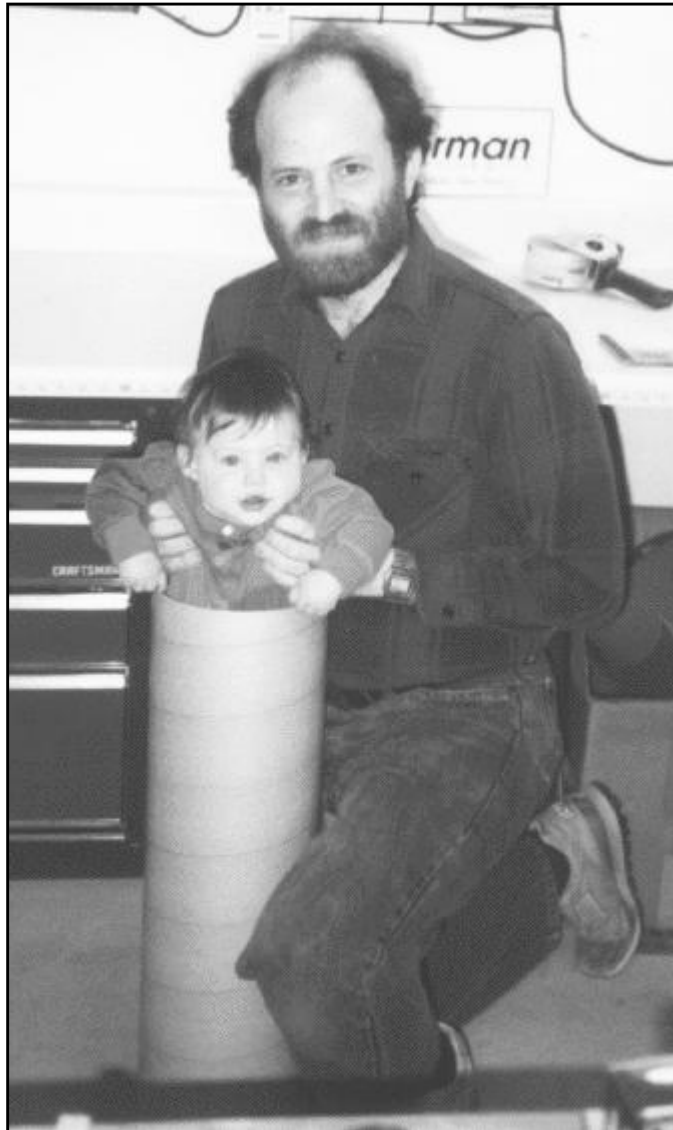
Sources for the reprint series include back issues of Model Rocketeer/American Spacemodeling/Sport Rocketry, Model Rocketry Mag., mainstream magazines, and the Internet's Usenet rocket group Rec.Models.Rockets (R.M.R.) just to name a few.

There are currently 8 booklets available.

- 1) Sport Plans of the Model Rocketeer. A collection of 10 easy to build single page plans. 16 pages
- 2) Sport Plans of the Model Rocketeer #2. A collection of 12 single page plans with the emphasis on ODD. 16 pages
- 3) Glider How-to articles from the Model Rocketeer. How to build, trim, and fly a rocket powered glider. In addition to the how to articles are several more technical articles. 20 pages
- 4) Boost/Glider plans from the Model Rocketeer. Collection of 7 interesting 1 and 2 page plans. 20 pages
- 5) Ideas. A collection of 10 articles about... well...IDEAS! Some things you may not have thought of such as launching from under water! or kitbashing. 16 pages
- 6) Reusable Rocket Ships. Set of 3 articles about the Delta Clipper (DC-X) from Popular Science, Air & Space and Sky & Telescope. 20 pages
- 7) Rec.Model.Rockets Glossary of Rocket Terms.
- 8) NEW! The NIRA Big Book-o-tips! 22 pages of tips, hints, suggestions and ideas that will help you with everything from building to flying!

Reprint booklets are FREE to members at club functions. If you want them by mail simply send 32 cents in stamps or cash for EACH booklet you order. Or (best of all) a large 9x12 Self addressed stamped envelope (the SASE can be used for several at once, be sure to include postage for EACH booklet) to:

Richard Gaff  
3175 Norwood Ct.  
Streamwood, IL 60107



### **Caption the Picture Contest!**

What, another non-flying contest? Yep! Come up with a caption for this picture, and email/call/fax/U.S. mail it to Bob Wiersbe. Whichever one makes me laugh the most will win. All entries will be printed in an upcoming newsletter for all to enjoy.

(Contest open to all members of NIRA, except for anyone with the last name of Wiersbe. Small animals may not enter. All entries will not be returned and will forever remain the property of The Leading Edge. Any similarity between this contest and others run in more reputable magazines is purely intentional. We reserve the right to censor, edit, erase, fold, spindle, and mutilate any entry we deem worthy of such treatment. For complete contest rules and regulations, re-read the paragraph above. Void where prohibited. All taxes must be paid by the winner. By law we must inform the IRS, so include your Social Security number on your entries. Failure to do so will result in severe fines and penalties. You may have already won! We are not liable for anything, and you can't prove it. All rights reserved. Title, taxes, and delivery are extra. See manufacturer rebate coupon for more information. Complete void in the Socialist Republic of California. Does not contain any Red #2. Fat free, sodium free, cholesterol free, content free. Supplies 100% of your daily intake of abuse. We are the knights who say "Ni!"

***THE LEADING EDGE***  
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