

THE LEADING EDGE

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

Volume 17, Number 6
November/December 1994

FAA Makes Rule Change After 9 Year Struggle!

Lawyers and NAR Members Combine
To Wake up Dormant FAA Officials!

Reported by Mark Bundick

The October 3 Federal Register contained the final FAA Part 101 rule.

The Text of the Rule:

"2. Section 101.22 is added to read as follows:

S101.22 Special provisions for large model rockets

Persons operating model rockets that use not more than 125 grams of propellant; that are made of paper, wood, or breakable plastic; that contain no substantial metal parts, and that weigh not more than 1,500 grams, including the propellant, need not comply with S101.23 (b), (c), (g) and (h), provided:

(a) that the person complies with all provisions of S101.25; and

(b) The operation is not conducted within 5 miles of an airport runway or other landing area unless the information required in S101.25 is also provided to the manager of that airport.

3. Section 101.25 is amended by revision the introductory text and paragraphs (a), (b), (c) and (d) to read as follows:

S 101.25 Notice requirements:

No person may operate an unmanned rocket unless that person gives the following information to the FAA ATC facility nearest to the place of intended operation no less than 24 hours prior to and no more than 48 hours prior to beginning the operation:

(a) the names and address of the operators; except when there are multiple participants at a single event, the name and address of the person so designated as the event launch coordinator, whose duties include the coordination of the required launch data estimates and coordinating

the launch event;

(b) the estimated number of rockets to be operated;

(c) the estimated size and estimated weight of each rocket; and

(d) the estimated highest altitude or flight level to which each rocket will be operated."

The rule takes effect November 2, 1994.

Obtaining the Full Text of the Rulemaking

You can read the FAA's full analysis of letters sent in, and the full rationale of the ruling by obtaining a copy of the October 3, 1994 Federal Register. Call the Federal Information Center at 800-366-2998 to see where you might find a copy. Many regional libraries serve as government document repositories, you can ask your local librarian for assistance, or look in your phone book under US Government for the Government Printing Office, can also check Federal Bookstores located in major cities, though the Chicago Loop branch claimed not to carry it.

Summary of the Rule:

Rules for rockets with 113 or less grams of propellant and less than 453 grams liftoff weight remain unchanged.

If you wish to operate 1-3.3 lb models or models with between 113-125 grams of propellant, you must:

(a) notify the Air Traffic Control facility over your airspace with:

- either the names and addresses of the rocket owners

or

- a launch coordinator who can get the required information to the FAA,

and

- the ESTIMATED number, size, weight and expected altitudes of the rockets to be flown.

(b) if your launch site is within 5 miles of an airport, you must provide the same information to the airport manager

(c) requests must be made between 48 and 24 hours prior to the launch; Joe Egan felt that letter, fax or phone constituted acceptable notification to the ATC.

(d) Joe also pointed out that as written, the FAA cannot deny you a 3.3 lb flight operation if you give proper notice. This contrasts with the previous waiver process for such models where waivers could be (and have been) denied.

story continued on page 3



Ric Gaff - NIRA member, sharp dresser, Used Droid Salesman of the Year. (photo by Bob W.)

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.

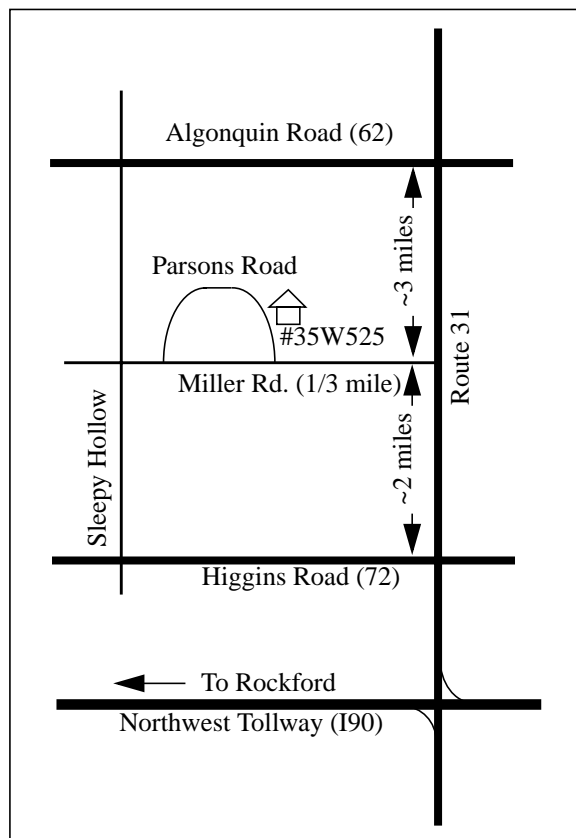
December 2, 1994 - Regular Monthly Meeting.

January 6, 1995 - Regular Monthly Meeting. Officer elections.

February 3, 1995 - Regular Monthly Meeting.

OTHER ITEMS OF INTEREST

December 24 or 26 - Beach Party at Bob Kaplow's. Call Bob at (708) 428-1181 for time and details. Plan to bring a desert or beverage. Date subject to when Tom is in town. See map below for directions to Bob's house. Please RSVP to Bob.



STAFF

Bob Wiersbe - Editor
Ric Gaff - Production

CONTRIBUTORS

Mark Bundick, Adam Elliot, Ric Gaff, John Kallend
Bob Kaplow, Bill Thiel, Bob Wiersbe

1994 CLUB LAUNCH DATES

All launches or other activities start at 2:00 PM. BYOL (bring your own launcher). Casualty insurance required or else RSO must inspect and launch your model. Location for our 1994 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.

December 11: Holiday Party at the Bundick's. Bring a dessert or beverage along. RSVP to Mark or Barb at 708-293-9343.

January 15, 1995: Bowling at Hesterman Bowl, Corner of Main St. Glen Ellyn and Roosevelt Road.

February 19, 1995: Building Session at Bob Kaplow's

March 19, 1995: Field trip to somewhere, stay tuned.

Before you read any further, look at your address label. If it has the message "Membership Expiring! or Membership Expired!" you'd better renew NOW! 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! See the box below for the address to send your renewal to, and remember, you can renew for as many years as you want!

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. Notice - The Leading Edge is known to the State of California to cause headaches, eye strain, nausea, sore ribs, and Carpal Tunnel Syndrome. Read at your own risk.

Model of the Month

Bob Kaplow's nicely done SA-14 Archer XL was the winner in September, congratulations! Now if he can just keep it off the power lines at MRFF this year...



Photo by Ric Gaff

(from page 1)

Joe Egan's Counsel

According to Joe, David did beat Goliath here, folks.

The final rule is only marginally changed from that initially proposed by the FAA, and certainly not the one the NAR petitioned for. While you might first think this is cause for despair, Joe's advice, explanation and perspective were different. He was quite emphatic that this rule is a "BIG WIN" (exact quote) for sport rocket flyers. With Joe's experience and expertise in dealing with administrative law and the Washington environment, I'd not dismiss that opinion lightly, folks.

He pointed out that the FAA has a long standing close relationship with the ATA, the principal airline industry group opposing ANY change in Part 101. In response to the NPRM, ATA petitioned FAA to enact flight controls for ANY ROCKET EXCEEDING 1,500' MAXIMUM ALTITUDE. Remember that the airline industry is one involving thousands of people and billions of dollars. ATA's resources exceeded the NAR's by literally thousands of times. The FAA's comments in the rulemaking document rejected ATA's contention that air safety would be compromised and lauded our excellent safety record.

For the NAR to make any request that incurs ATA's ire in that environment, and get a new, less restrictive rule is a major coup in Joe's eyes.

NAR Services To Be Changed:

I'm working with Harry Stine and Mike Warth of the SSS section in Phoenix to obtain an address and phone list for all regional Air Route Traffic Control Centers (ARTCC) nationwide. I believe these will be the principal ATC offices that you'll have to contact to give the notification, though I'll wait on Harry and Mike's counsel. We'll also prepare a small sample form people can use to have all the information on hand to give ATC when you call, write or fax. We will be distributing this to all sections in a special mailing, and printing the list in Sport Rocketry, and our new Section Soundings newsletter on a regular basis.

We'll also work with the currently unstaffed Membership Committee to get this information into new member packets.

Later this week I'll be contacting Matt Steele in Contest and Records to get the same information into contest materials for CD's to use. Finally, I'll be contacting Mike Platt of the High Power Manufacturers and Dealers Association and other manufacturers to see if the NAR can provide such information in a way that will be useful to suppliers, dealers and manufacturers.

The President's Recommendation and Comments

My recommendation to members now is to UTI-

LIZE the rule. As written, the FAA cannot deny a flight operation under Part 101.25. If you comply with the notification requirements, 3.3 lb rocket flights are yours for the asking. We got it; now let's fly 'em.

I recommend that sections provide notice to the ATC for ALL their sport launches. I'd also suggest that NAR Contest Directors look into utilizing this rule for ALL of your contests as well, to insure modelers on your range can take advantage of the new Part 101.

I also recommend that members continue to be vigilant regarding their flights. The FAA knows we're responsible modelers and have left considerable discretion in our hands. Our safety record is a precious resource and one I know I can count on members to protect.

Thanks and Kudos.

Lots of people have worked long and hard for this day. A billion thanks to:

- J. Patrick Miller, who had the task of shepherding this rule change thru most of its life, a thankless job thru a lonely desert;

- Joe Egan, without whose expertise I don't think we would have gotten a darn thing;

- Trip Barber and his fellow 1985 special commission members, who set up the excellent technical basis for our petition;

- the approximately 110 NAR members who accepted our challenge and wrote timely letter in response to the NPRM; Joe assures me you had the right impact on the process. We'd been a darn sight less effective if you hadn't done the job, folks.

Summary:

We got a better flying environment, even if it's not exactly the one we asked for.

Chicago RCHTA Show Report by Mark Bundick, Bob Kaplow, and Bob Wiersbe

[BK,BW] - The 1994 Chicago RCHTA show offered a few nice surprises for those of us who fly rockets. It was also a bit disappointing, since there were only 2 manufacturers present - Estes Industries, and North Coast Rocketry. There just wasn't anyone else showing rockets this year. Yes, COX had the 20 year old plastic kits on display. MRC didn't have a rocket in their booth, and neither did Great Planes. Rumor has it that Quest and Great Planes have separated. Custom and THOY were both absent (THOY, up for sale, has been bought by Rocket R&D of Urbana IL), and of course AeroTech was nowhere to be seen for the third straight year.

For most of the NIRA folks who attend the show, it usually means spending 3 or 4 hours helping people at the Rocket Make & Take Booth. For the 2nd year in a row we ran out of

the 500 kits provided by Estes Industries! Many thanks to Lawrence Bercini, Harlan Pell, Mike Jungclas, Bob Kaplow, Ric Gaff, Mike Alterio, Dave Price, Steve Koszuta, Cindy Ingram, Mark Bundick, Kevin Smith, Ed Thiel, Bill Thiel, Jim Christensen, John Barrett, Art Peterson, and Greg Roman for their help! Special Kudos to Lawrence for organizing the event, Mike Jungclas for working out the process, and Bob Wiersbe for providing all the paperwork. Thanks also go to RCHTA for the space, Estes for the kits, Great Planes, Jet, and Testors for the building supplies.

At the North Coast Rocketry Booth were the Space Shuttle, Archer, Lance Beta, Patriot, Tigershark, and something new, a BOMARC! According to Matt Steele, it can be converted to glide, but the normal recovery mode is with a chute. The price will be around \$60. Matt also said that the NCR motors should be able to be shipped in a couple of weeks, so stay tuned. [Note - they are still not certified, so don't get the checkbook ready]

[BK] - I did see some other interesting products. Aerospace Composites has glass/nomex and graphite/nomex sheets. These are as strong as steel, while being as light as balsa. I'm going to try using some of this for HPR fins. They also had a flexible Nomex material that will wrap around tubes with ease, to be glassed over for ultimate strength. Another company had iron-on carbon fiber strips. These should be perfect for going over balsa on wings, fuselages, etc. and then CA or epoxied in place.

On the adhesive front, a dental supply company was marketing their nifty CA package, appropriately called ROCKET for its shape. The glue comes packaged in a syringe, and you get a kit that includes a threaded plunger and wheel to precisely control the application thru the teflon tip. Turn the wheel just a bit to dispense large drops, or just squeeze the syringe to get small dots. I got a couple samples of these - they look to be very handy.

I found some interesting non-flying models. Glencoe has a space station to go with all their sci-fi rockets. AMT has some special edition star wars models. I also found paper models of the Ariane, V2 (3 in the kit: V2, A4, and Bumper/WAC), V1, X15, and Nater. The German paper kits were pricy, in the \$30 range, but the Austrian kits were bargains at around \$6. Some of these should be flight convertible. Speaking of paper, Peck tissue has gone up to \$1.35 per sheet, from last years .95. I remember when the stuff was about .20/sheet or less.

Totally out of our price range are laser cutting systems. One was on display at the show, and several manufacturers, including SIG, are using these as a replacement for die cutting parts. There are folks who will custom cut small production runs to your specifications. NIRA-Milwaukee member Mike Guslick has access to one

of these machines. If he can do the kind of work I saw this weekend, custom fins and centering rings will be a snap.

[MB, BW] - There are 9 new kits in the Estes 1995 line up, but don't expect to see any of them until January. Estes has been pretty good at coming out with kits that appeal to both the young and the old the last couple of years, and this year they've come out with a kit I've wanted for decades - a Mercury Atlas! Here's a run-down on the new kits:

E2X Series

- **SPACE SHUTTLE STARTER SET:** This is the Shuttle, without tank or SRBs. It is accurately proportioned and the body is made from Estes' new TuffLite material. This is not the same shuttle that was offered in the early 80's. It features a pop pod (similar to the old Bomarc), has been designed with the right elevon setting for the correct glide, and all you need to do is balance it. Quick to build and flies on C's. 14.75" long. SRP: \$34.99

- **HELICAT STARTER SET:** A long, four-finned BT-55 airframe rocket with helicopter-recovery nose. 33.5" long and uses 18mm motors. SPR: \$31.99.

- **HIJAX:** A kinda neat-looking little payload. 20" long, uses 18mm motors, and features thru-the-wall fin mounting. SRP: \$12.99.

BETA Series

- **CORKSCREW:** A corkscrewing, three-finned design. 21.25" long and uses 18mm motors. The kit package had a nice picture of the model in flight, and indeed, the delay train smoke looked like a corkscrew. One fin has a small spin tab canted about 10 deg. to produce the effect. SRP: \$10.99.

- **FIRESTREAK:** An attractive three-finned rocket that recovers with two metallic streamers. Through-the-wall fins. 14.75" long, uses 18mm motors. SRP: \$10.99

- **TRANSWING SUPER GLIDER:** A flop wing with wings held partially open (!!!) during

boost. The pop pod is just a long piece of BT-50 with two plastic clips. The boom of the glider is held in one, and the wings, partly folded, are held by the other. The model is pretty large, 20" or so span, with neat plastic units that slip onto the ends of the wing panels and have integral molded recesses for the deployment rubber bands. The plastic portion of the boom also is molded to insure a turn in the model; the rear portion of the boom is square spruce stock. I think this will be a pretty successful glider on the "average" football sized rocket field. 22" long, uses B's and C's. SRP: \$16.99

EXPLORER Series - SR-X (Project Aurora): This is a boost glider using an internal pop pod and represents the not-all-that-hypothetical Aurora Sub-Orbital Reconnaissance Plane. This is a nice-looking kit, based on the design featured in Popular Mechanics (if I recall), among other places. The body is TuffLite material. Uses a C6-3 and measures 18" long. SRP: \$24.99.

MASTERS Series

- **MERCURY ATLAS:** Wow! 1/35th scale, injection and vacuform detail parts, chrome body wraps, markings for four missions. Uses D's and E's, and measures 33" high.

LOX Pipe: injection molded, and extremely well done. Vernier Rockets: vacuformed and also well done! Corrugation sections: looked to be vacuformed, but maybe injection; crisp and well done again. Left out the retro-rockets, however. An easy "fix" for us purists. Fairings: again, well done and correct, as best I can tell from the quick look. Capsule: straight steal from the Mercury Redstone, so you total purists will have to convert it to an Atlas variant model.

The separation point is just below the transition from the Atlas to the Mercury, making conversions to Atlas Centaur or Atlas Agena, or even military variants, a snap.

Didn't like the chrome plated strips they used to do some of the finishing; a bit to shiny for me, but it might be technically correct. The display version I picked up looked to be quite light, so

the model ought to be an excellent performer. Also, stability is via the same sort of add on fin units used in the Space Shuttle; substitution using clear sheet will become standard in NAR Sport Scale events, I predict.

All in all a well done kit, and the price, while high for an Estes kit, is fair, IMHO, given the accuracy and ease of construction. SRP: \$47.99.

R/C GLIDERS

- **SWEET VEE:** A V-tailed R/C rocket glider. 34" long, 55" wingspan. Blow molded radio pod, nylon injection molded mechanical mixer, all hardware, obechi covered SD3021 wings and 360 sq. inches. A bit big for rocket power by S8E standards, but probably the best performing RCRG in the Estes line. It would be interesting to fly one alongside a Phoenix at equal altitude and see how they perform together. SRP: \$99.99.

LIGHT GLIDERS Series (a new line of tissue-covered, rubberband-powered gliders - NOT rockets)

- **MIRAGE:** Uses Flex-Coat covering on all aerosurfaces. SRP: \$8.99 - **HI-LITE:** Uses pre-cut foam wings and tail surfaces. SRP: \$5.49. - **PHANTOM:** Uses tow line to launch. 15.75" long. SRP: \$6.49. - **FLIGHT MASTER:** Biggest kit in the line, with a 23.5" wingspan. SRP: \$9.99.

Some addresses for new products:

California Carbon Advanced Materials, PO Box 39, Jamul CA 91935 (619)669-6348: Iron on carbon tape, carbon fibre pushrods, crash cushion foam tape, etc. 20% discount for mentioning RCHTA show.

Paper Models International, 9910 SW Bonnie Brae Dr., Beaverton, OR 97005 (503)646-4289: Paper models of various rockets and jets.

Aerospace Composite Products, 14210 Doolittle Dr., San Leandro CA 94577 (510)352-2022: Nomex honeycomb, all sorts of graphite, kevlar, etc. products.



Photo by Bob Wiersbe



Photo by Bob Kaplow

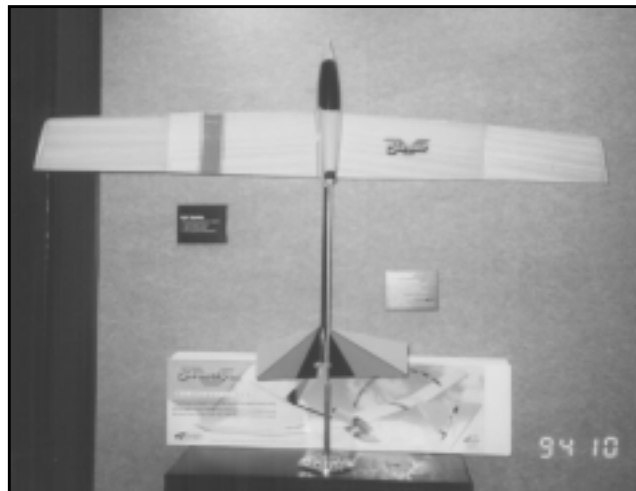


Photo by Bob Kaplow

Three of the new Estes kits, from left to right: Ron McClaren holds the SR-X, the really cool Mercury Atlas, and the Sweet V RCRG.

1994 Club Launch Wrap-up by Bob Wiersbe

If you've missed a NIRA launch the last few months, you've missed a lot! The weather for the September and October launches was perfect, and the turnout for both launches was spectacular.

In September the pads were spread out along the length of a football field and each one was kept busy during the 2 1/2 hour launch. With so many pads spread so far apart, it was difficult to hear people give a countdown, and there was more than a bit of confusion. At a post launch meeting it was decided that the launches had grown too big, and more control (and a PA) was needed.

Once again, we didn't have flight cards, so there's no record of who was there and who flew what. It would be impossible to report the launches anyway - there were too many of them! I'd estimate that there were around 150 flights that day, given the number of people there and the excellent weather.

Greg Roman had the most disastrous flight, his 3 motor clustered Saturday Night Special (with a beeper in the nose cone) failed to eject the chute and pranged. There wasn't much left of the nose cone. Ken Hutchinson narrowly avoided disaster when his Stretched Phantom 1800 landed inside an alcove at the school, surrounded on three sides by roof! He missed the roof by only three feet!

Ric Gaff had fun with his Pyramid and R2D12 (an R2D2 unit converted to fly on D12's). Both made very nice flights, although R2D12 broke one of the clear plastic fins on landing.

The October launch was something else. Imagine the usual 20 pads for NIRA members, plus 4 racks with 5 pads each, all spread out in a line. Then add around 100 spectators, a local hobby shop selling motors and kits, about 40 kids who built a Pegasus rocket at the RCHTA show, and about 10 kids from a local YMCA who built a Bandit rocket. The result was a hectic, fun filled afternoon of flying rockets!

The weather cooperated with us this year for the launch after the RCHTA show, and as a result we had a really good turnout of people who built a kit at the show. Estes donated A8-5 motors for the kids to fly their rocket with again this year, so we knew what to expect. Many of the kids talked mom or dad into buying some bigger motors from Trains Plus Hobbies in Wheaton who had set up a table at the launch site. I saw several kids walking away with new kits or starter sets.

The Pegasus rockets worked every time (well, there were a few misfires), and I remember only 1 separation. That says a lot for the construction process that Mike Jungclas worked out for the show.

Brian Noon and Don Vicha helped a group of boys from the B.R. Ryall YMCA build a Bandit in early October, and Brian brought the group out to the October launch. They had their own rack, complete with a set of drag race countdown lights, and basically ran their own show. So, all afternoon there was either a Pegasus or Bandit (or both) in the air.

The NIRA crew that wasn't helping with the kids from RCHTA were busy putting on a show of their own. John Kallend brought out his Lady Hawk and Phoenix RCRG's and wowed the crowd with three flights. If you haven't seen his Lady Hawk fly, you missed something really cool! It has an airstarted motor, so after he's flown it around for awhile he ignites the second motor for some more altitude and glide time! John had a little trouble with his Phoenix at lift-off, the G12 motor he used took longer to get up thrust, and because he had to launch downwind (the crowd was upwind, and we couldn't turn the range around) it faltered as it left the pad. It started to veer towards the crowd and a light pole, and was tilted at a weird angle, but John got it under control and turned in a really nice flight.

The scariest part of the day came when Bob Kaplow's Der Grey Max blew the nozzle extension and turned into a lawn dart, destroying itself near the check-in table where Mark Bundick had been sitting. I say had, because when he saw the rocket coming down he bolted like a rabbit. It was a really strange failure of an reload, the throat was still in the casing, and the motor continued to burn through to ejection. It just lost thrust when the extension blew. Bob dubbed the prang an "Olympic Torch" because flame was coming out the engine as it was stuck in the ground.

The November launch might have been the best of the year, even though the weather wasn't great. There was another good turnout, with 33 people launching rockets, and probably twice that watching. Pegasus and Bandit rockets were by far the most flown (gee, I wonder why?), and it was great to see many of the people who came out last month again.

There were over 120 flights during the 2 hours we were flying, which is pretty good considering that we ran this launch a little differently. Ric Gaff did the thankless job of being RSO/LCO (thanks Ric!), and spent the day walking the flight line to announce and countdown each flight. This system, while it may have slowed the frequency of flights down, it did make the launch a lot less confused and safer.

Several people flew their first rocket ever; Sandy Walts flew her Warp II that she had finished the night before. Sandy decided to start rocketry the hard way, with a 2 stage flight! She chose a B6-0/A8-5 combination, and the flight was textbook perfect.

Blake Longeway put up at least 4 flights with his Zinger, and it was hard to track that rocket against the grey sky. Robby Adams' Ninja nearly hit Bill Thiel; the streamer got stuck and it pranged right at Bill's feet. Bill seems to be a magnet for pranging rockets, last month he got hit by a Tomcat. Alan and Mike Oswald flew the most rockets, 12 in all. Bryan Chesi put up 6, including 2 flights of his U.S.S. Enterprise and one with his Klingon Cruiser.

Ron Husak had a perfect flight with his Cluster-Phobia on 2 D's and 2 C's, then followed it up with an A in his Wizard. This prompted Ric Gaff to say "You should cluster that one, it's too plain." Ken Hutchinson's Maniac on a D12 drifted all the way across Short Street and ended up in Lake Lawrence.

Kleve Slouber's Centuri Point had a really great flight, it looked like the whole tail was engulfed in flame as it rose in the sky. I guess there's something to be said for grey skies after all! You could see the flame of the motors, even when they were supposed to be putting out tracking smoke (which you couldn't see anyway). C's, D's, and E's showed the engines "pulsing" as they burned, which was an interesting sight.

The highlight of the launch had to be Ken Hutchinson's Phantom 4000HD on an H242 - the first launch of any rocket with an H motor flown in Community Park since the new FAA rules went into effect! Ken was under a lot of pressure to get the flight off, especially after I told Ric to announce it before everyone left. I just didn't want people to miss the launch, since I knew most of them hadn't seen anything bigger than an E flown. They weren't disappointed! After Ken got his remote controlled launcher to arm, the entire crowd did the countdown, and the H242 Blue Thunder roared to life! You could really see the blue flame!! The sound of the motor echoed off the buildings, lending an eerie sound to the launch. The chute ejected perfectly, and Ken watched it until it was down on the ground, well, until splashdown actually. It landed in the lake! Ken was 2 for 2, both of his flights made it to the water. We may have to rename the lake if this keeps up.

A great finale to one of NIRA's best years of rocket launching! Next year should be even better, now that we can fly heavier rockets without getting a waiver. Make your plans NOW to be there next year, and look for the 1995 schedule in the next newsletter. See you in April!

1994 LABOR DAY LAUNCH by Bill Thiel

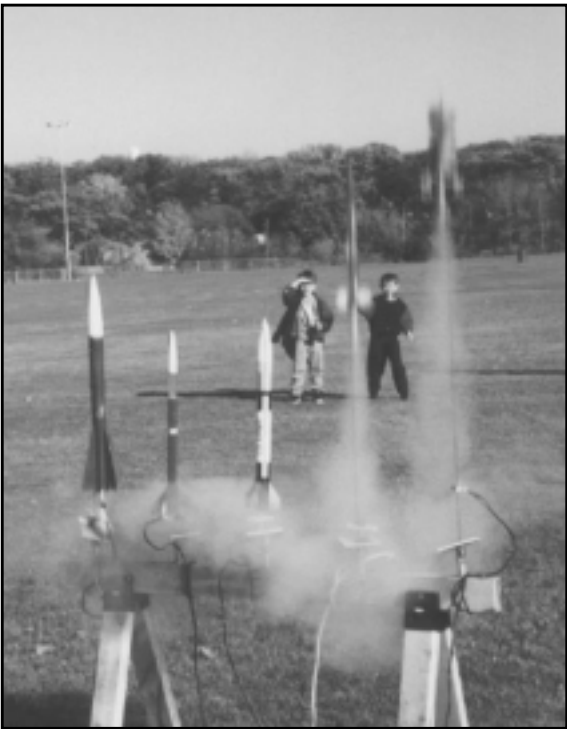
The weather today was just right for the launch. Blue sky, just a light wind, the ground soft from rain earlier in the week, this helped to keep the dust down in the infield.

T minus 1 hour. As per the plan of the day the



Ric Gaff:
 a) has fallen and can't get up.
 b) is taking a quick nap.
 c) is listening for the sound of approaching BATF agents.
 d) has fainted because an Estes E15 didn't blow his rocket up.
 e) is hooking up the clips to a rocket.

Answer: e



And they're off! It's Pumpkin Man in the lead, followed closely by the Silver Thing, with Army Hawk and Patriot just coming out of the gate! And oh no! It looks like the Nova Payloader has misfired! (photo by Kevin Smith)



Look! There in the crowd! It's a bird! It's a plane! NO! It's Superman! Actually, it's Jonathan Charbonneau who celebrated Halloween a week early. (photo by Bob Wiersbe)



Photo by Kevin Smith

People Ponder a Powered Pegasus while Prepping Personal Pegasus with the Professional help of Dave Price.



Photo by Kevin Smith

Mike Jungclas helps rack up some Pegasus rockets.



Business was good at the NIRA run Estes Rocket Make & Take booth.
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Lawrence Bercini tries to take credit for the new NCR Bomarc, but we all know better. (photo by Bob Wiersbe)
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Scenes from the August, September, and October Launches, in no particular order.



Adam Elliot's Astrocam took this fine shot of the shelter and Lake Lawrence in Community Park.



Bob Kaplow and the remains of his Der Gray Max, winner of the October Prang Award. (photo by Bob Wiersbe)



Bill Thiel and the scratch he received from a stray Tomcat. (photo by Kevin Smith)



Kevin Smith is proud of his SR71 Blackbird Trophy Tree. (photo by Cindy Ingram)



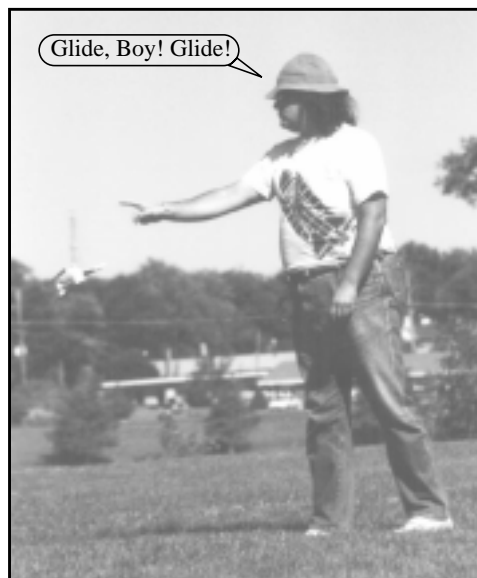
Before and after shots of Greg Roman's Saturday Night Special, winner of the September Prang Award. (photos by Bob Wiersbe)



Steve Koszuta kneels to say a few "Hail Harry's" before launching his LOC ROC IV for his H Certification. (photo by Lee Culver.)



Cindy Ingram practices for her try-out with the Chicago Bears. (photos by Kevin Smith)



Ric Gaff tries to teach an old glider a new trick.



The folks from the B.R. Ryall YMCA loading up some of the kits they built with the help of NIRA members Brian Noon and Don Vicha. (photo by Kevin Smith)

club members who had the equipment for the launch arrived on time to set up the range. The tents were set up with the help from a couple of old scouts (Ed, Bill Thiel) and Bob Kaplow. The tents were filled with the tables and chairs for the sales of pop and distribution of club flyers by Mark Bundick. As the tent/tarp area was taking shape the flying field was being put into shape by Ric Gaff and crew, Ken Hutchinson, Kevin Smith.

T minus 15 minutes. As the time for the first scheduled launch grew close Bill Thiel opened up the registration/check-in table. At the same time Ed Thiel was picking up pointers on how to run the launch controller. It was his first time as the RSO, a job that Ric Gaff and Mark Bunny Bundick gladly relinquished to the new young blood.

T minus 5 min. and counting. Kleve Slouber picks up for Bill Thiel at to check-in, Bill then helps the rack loaders by moving the rockets that have been checked in to the staging area.

T minus 5-4-3-2-1 Launch! The first rocket of the day is an Interceptor I by Marty Frank, the first of his 2 flights for the day.

The count downs continue for the rest of the afternoon. The rest of the modelers that flew only one rocket are as follows. Brian, Jerry, Shelly Smith; Emily Frank; Rosela, Steven Slouber; Bob, Noel Schordje; Sean Trilik; Art Urban; Ryan Brankin; Eric Dunker; Patrick McGuan; Mike Burmester. Also flying only 1 rocket were Paul Rambow with his V-3 on a D12-5, Steve Maxwell with a custom design USAF Condor and Lauren Koszuta with help from dad a model named Bombardment! this model had on board: 3 parasite gliders, 6 re-entry vehicles, 3 paratroopers and radar jamming flak.

The next group flew 2 rockets today. Nate Anderson; Eric Burmester; Chuck, Jan and Marty Frank; Ron Husak; Ken Hutchinson; Terry Kosel with an Honest John on a E15-4 and a Mercury Redstone on a D12-5; Kristen Noon with a first flight of an Athena; Damien Palmer; Lionel Slouber; Kevin Smith with his Paint Sale Special and Skywinder; Jeff Gahris; Reilly Tucker with a Barracuda; Jo Ann Rambow; Alex, Don and Zach Vicha.

The group now expands to the rocketers who flew 3 rockets. Kendall Smith; Michael Ugorek; and Ed Thiel this is an all time low number of flights for Ed at a Labor Day Launch. Ed flew his 12 foot Neon 12 on an E15-6, next was his Patriot 1/5 scale on an E15-7w this time it had a chute fail but it suffered only minor damage. The last flight of the day was Ed's Jayhawk by Estes.

Four flights for the day brings us the next group of modelers. Anna Urban one of her rockets Ping Pong Ball Express had a secret payload (you guessed, it ping pong ball); John Trilik;

Dave Price. All of Dave's rockets were fun to watch. He flew his Nerf Arrow, Pink Hair Curlers, Megaphone and a new rocket to honor NIRA President, Mark "Bunny" Bundick, This Summer he was elected President of the National Association of Rocketry. Since his presidential duties may keep him too busy to fly model rockets, Dave built a Model Bunny. This way, we can still See Bunny Fly.

Adam Elite was the only one to fly 5 rockets Adam's big gun was a scratch built one called Thunder, it was powered by an E15-8 motor and had streamers for recovery.

Matt Price came in next with 6 rockets, his most unusual rocket was one (no name was given) powered by a C6-5 and it had two FX engines for smoke.

Anthony Cekay flew 7 rockets, one of which was the AstroCam.

Dennis Love and Bob Kaplow each flew 8 rockets. Dennis had the only three stage flight of the day with his Mae C. Jemison Special. Bob's flights included 5 that were over the old 1 lb. weight limit but with the new FAA regulations we could fly with just a phone call. His arsenal included Quicksilver on a F50-7 Silver Streak, LOC-4 on a F41-6, Archer X L on a F40-4W this is the rocket that ended our last years Labor Day launch with a Cato, Skywriter-24 on a E28-4T, Go Baby Go! on a F25-4, to round out his flights Bob sent up his ever favorite Happy Meal D and to close out his flights Bob launched his Whiffle Ball and Bat Outta Hell.

We had a tie for the most rockets launched. Ryan Noon and Jonathan Charbonneau each had 9. Ryan sent up his model of the month Serval for it's first flight, he was the only one to send up a EGG in his Omloid and also flew his Maniac on a D12-7. Jonathan had fun with his V-3 as he flew it twice, the second time he had a passenger on it - Superman. He also flew his Mini Broad Sword (a standard Big Bertha, for those of you who are unfamiliar with it).

Last but not least to report about are the two very fine flights by John Kallend of his Lady Hawk RCRG. John's first flight was started with lift off by an E18 then came the surprise as he air started a second motor, a D12. The Lady Hawk came in for a fast landing. Later in the day John flew the Lady Hawk again this time on an F24 with a D11 air start.

For the engine counters this is the break out of engines used. 33 A's, 37 B's, 28 C's, 17 D's, 7 E's, 4 F's, Multistage 1 B/C, 1 C/C/C, 1 D/D, 1 E/D, and 1 F/D.

By the way you will note that at this launch Bill Thiel set a new record for his rockets launched: a big fat ZERO. He did have fun for the second half of the day as he took over from his son at the launch control and launched about sixty of the one hundred thirty one rockets that were

launched this Labor Day 1994.

Thank you all for your help to make the day run so well!

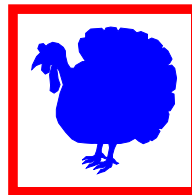
Joy to the World

This "carol" was written a few years ago for the NIRA Christmas party, and now it can finally be sung! Lyrics by Bob Wiersbe.

Joy to the world, the change has come!
Let men their chutes deploy!
The FAA has changed the rules,
And now our case is won,
And now our case is won,
And now, and now our case is won!

We beat the Feds, the time has come,
To launch some larger birds!
We'll take them out, and prep them up,
Let's use a G or H,
Let's use a G or H,
Let's use, let's use a G or H!

Now we will launch my Saturn V,
No waiver we will need!
It weighs 2 pounds, and stages too,
But it meets the current rules,
But it meets the current rules,
But it meets, it meets the current rules!



HAPPY HOLIDAYS!

1995 Officer Nominations

The 1995 NIRA Officer Elections will be held at the January 6th meeting. If you want to vote, but can't be at the meeting, give Bob Wiersbe a call at (708) 690-5442 and he'll mail you a ballot.

The following people are up for re-election:

Vice President - Ed Thiel (Prang Party)

Secretary - Ken Hutchinson (Staging on Impact Party)

Safety Officer - Bob Kaplow (Silly Party)

We're still looking for someone to be President next year, if you are interested, contact Bob Wiersbe.

Write in votes are acceptable, as long as the person is alive, human and a member of the club.

Aerotech Phoenix - Kit Review

by John Kallend

I have been experimenting with rocket powered R/C for three years now, and some NIRA members have seen my Ladyhawk fly. I recently got the opportunity to try another R/C rocket plane; this one is the Aerotech Phoenix. As you might imagine, I jumped at the chance. I would like to thank Bob Parks, the designer of Phoenix, for sending the kit to me.

The Phoenix kit has been available from Aerotech for about three years, but because of the infamous DOT debacle, shipping of its rocket motors was temporarily prohibited shortly after its introduction. Although this situation has now been resolved, the whole marketing strategy for the kit was messed up, which is why you do not see it advertized at present.

Phoenix represents a design philosophy quite different from my Ladyhawk. It is not a 200+mph adrenaline rush like Ladyhawk. Nor is it a lightweight duration contest model. Phoenix is a sport/aerobatic sailplane optimized for fast, efficient gliding flight (although I fully expect to catch thermals with Phoenix)! On casual inspection it looks like a slope-soarer, and only as you get close do you notice the rocket motor housing over the wing. It has 48 inch span, with 336 sq. in of wing area, so it is not large by sailplane standards. It is a low wing design, with simple dihedral. The fuselage is pod & boom, with the motor at the rear of the pod. Controls used are aileron, elevator, and rudder. Low thrust, long burning (nearly 10 seconds for the G12) motors are used to reach altitude without reaching especially high speeds. The motor is a 32mm reloadable with closed front, so it cannot be used for conventional rockets that need a delay and ejection charge. Motors and reloads in this size are only available from Aerotech at present. Although they have announced four reload types (F13, G12, F16J and F23W) only the F13 and G12 are actually available as far as I have been able to ascertain. Bob Parks says that it flies well on 29mm low thrust reloads too (an adapter is needed). He recommends keeping the speed below about 160mph for structural reasons, so don't go putting G64 motors in it.

The instruction booklet is comprehensive, well written in good English and illustrated with photos of every step. I found no errors or inconsistencies in the instructions. Construction starts with the wing. It is foam with 1/16 balsa sheeting, and reinforced with 1/2 inch wide glass tapes running spanwise. I had not sheeted a foam wing for years, but had no difficulty with this task. I used Z-Poxy, and set the wing in its cradles with 100 pounds of concrete on top while the epoxy set up. The instructions recommend vacuum bagging if you have the necessary equipment (which I don't). The tips and roots are cut to the angles needed for the sweep-

back and trendy low-drag block balsa tips, and then cut outs are made for the aileron servos (a micro servo is embedded in each wing). The wing halves are joined with 6" wide glass tape. The final product is incredibly strong. Incidentally, I built three wing halves altogether - one of the original cores was 1/8 inch thinner than it should have been. I was not observant enough to notice until after I had sheeted and sanded it. A call resulted in delivery of another core by return mail, so it was just a minor annoyance.

The tail feathers must be cut from 3/16 balsa, using card templates. The instructions state that the lightweight balsa provided doesn't die-cut well, although my kit's balsa wasn't particularly light. Still, it didn't take long.

The pod and boom fuselage is quick to build. The boom is balsa, and the pod is light ply. The motor tube (spiral wound card, in the model rocket tradition) is aligned using a jig so that the thrust line is correct. The interlocking joint between the pod and boom is cleverly designed for easy alignment combined with high strength. Balsa blocks are used for the "canopy" and to fair the joints with the boom and motor mount. A lot of sanding is needed here, which makes one of those power palm sanders very desirable. The finished fuselage is also very strong - you could almost use it as a golf club. I promised Bob Parks that I would build the model exactly according to the instructions, but if I were to build another Phoenix I think I would lighten the fuselage some, since my landings aren't that bad! (Actually, I deviated on the hatch retainer - I used a Goldberg angled hold down instead of the sticky tape recommended; I hope Bob forgives me).

An unusual feature is the mounting of the vertical fin - it is offset to be flush with the side of the boom. This leads to (a) a stronger joint, (b) the rudder horn is within the boom, reducing drag and lessening the chance of damage, and (c) the pushrod run is dead straight. If there is any effect on the flying characteristics, I haven't noticed. The elevator horn is also recessed within the boom, making access a bit fiddly. Elevator and rudder servos are located at the rear of the pod, and are easily accessible when the "canopy" hatch is removed.

I covered my model in pearl-red and pearl-yellow Monokote. I had all sorts of trouble with the yellow, it bubbled and wrinkled and didn't stick well. I have been using Monokote for years, but this is the last time I'm going to use that color! However, the final result looks pretty good (even my wife said so, 'nuff said?). I stuffed it with 4 S133 micro servos and an RCD Supreme receiver (I like the RCD radios a lot, and RCD replaces them without question whenever I incinerate them). I set up a Futaba Super 7 transmitter so that I could use the ailerons as "spoilerons" too.

I think the heavier wood in the tail feathers led

to a slightly tail heavy condition - I needed a 500mAh battery pack to get the CG to the point shown on the plans, instead of the 150mAh pack recommended- more on this later. Liftoff weight came to about 28 oz.

Parts are provided to build the "business end" of a launcher. I constructed a base from lumber, and attached the launcher head with a coach bolt and wing nut for easy adjustment. I spray painted it black so the sooty exhaust stains wouldn't show.

Bill Ponseigo helped with the first flight, as countdown chief and button pusher. The weather was less than perfect, northeast winds at 15 knots gusting to 20, but nothing was about to stop me now. The re-usable motor was fitted with an F13 reload, which burns for about 5 seconds. First launch of a rocket plane is always an anxious time, but the plane launched perfectly and climbed out almost dead straight, despite the buffeting from the wind. It didn't go very fast, about 60 -70mph, but it kept on going up. Controlling the flight path was easy, Chuck Yeager reactions are not needed. The altitude reached on this motor was about 400 ft - I think the gusts of wind result in higher drag than normal. Levelling off, the rocket transformed into a glider. Penetration into the wind was great, no problem in maintaining position. Controls were just about perfect, and after a few circuits spent feeling it out I tried to set up for landing. I let the airspeed drop too much on downwind, and found that the aileron effectiveness had decreased to the point that I couldn't turn onto final approach without using rudder. I didn't want to risk a stall/spin at low altitude, so I just let it continue downwind and dropped it into the long grass.

Next flight was with a G12 reload - this burns for about 9 seconds, and boosted the model to 700+ feet. I tried a couple of loops and rolls, and a hammerhead turn on the way down. Not repeating my error of the previous flight, I kept the airspeed up, and made a respectable landing this time.

Since the plane exhibited no bad habits, I contacted Bob Parks (by e-mail, it just cost the price of a local call although he lives in California) and asked how it would respond to moving the CG back by substituting a lighter battery. He didn't actually forbid it, so I replaced the 500mAh with a 250mAh pack - the CG is now 1/2 inch behind the marked position, and the plane is at least an ounce lighter.

I've flown it several times like this on both F13 and G12 power; the wind was light and the launches were picture-perfect. I'm sure it reached noticeably higher altitude, due to the lower weight and the smoother flight path. No deterioration in handling was apparent to me, so either I'm insensitive or the plane is very tolerant of the rearward CG. I e-mailed Bob again to tell him that the plane still flew OK, and he

replied that he hadn't tried or analyzed the production version with a rearward CG, but was sure it would work (hindsight is 20/20)!

My overall impressions of this kit.

Positives: this is an excellent design, both aerodynamically and structurally. The instructions are good and building is straightforward, although there is a lot to do. The handling characteristics are great, both on launch and in the glide, and it is fully aerobatic. If anything, I'd say that the rocket launch is easier to fly than a hi-start, and would not present a problem to anyone with some R/C experience.

Negatives: some features of the implementation could be improved - the wing core problem indicates a lapse of quality control (which I understand is now fixed), and the weight of wood for the tail was heavier than the instructions led me to expect.



Photo by Kevin Smith

John's Phoenix had a rather interesting liftoff at the October launch on a G12 reload, nearly hitting a light pole before gaining enough speed and altitude for a great flight.

Lampreys Invade Lisle! by Bob Wiersbe

On October 22, 17 boys from the Wheaton Evangelical Free Church were seen infesting the skies above Community Park with Lamprey rockets. This annual event, number three for me, is always a time of fun, semi-serious competition, and reminiscing about memorable "flights" from year's past.

The first two flights of the day were rather curious, one had the motor shoot into the body tube and melt the rocket so it bent in half, the other just shot the motor through the rocket and into the sky. After two in a row I figured something was up (brilliant, huh?), and asked if anyone else had forgotten to glue the engine block in

place. I was told that the instructions didn't specifically say to glue it in, just to insert it, so that's what most of the kids did. I showed them how to make a thrust ring out of masking tape around the nozzle, and we didn't have any more problems.

The semi-serious competition this year was Le Mans Eat. For those of you who are new to the club, Le Mans Eat is the NIRA version of a Le Mans Heat. The object is simple: place a regular marshmallow on or in your rocket, get someone to time you, run to your pad, load and launch your rocket, recover it, then eat the marshmallow in front of the timer. When the marshmallow is gone, the clock is stopped. Whoever does this in the shortest time wins.

We changed the rules a bit for this launch, and only timed the kids from the moment of liftoff. It was a lot of fun for everyone, and a lot of the kids were fast enough to catch their rocket before it hit the ground (saving the marshmallow from those yummy bits of dirt and grass). One rocket failed to eject the chute and pranged, but the boy ate the dirt covered tidbit anyway. Brandon Hunt turned in a 28.29 second time, good enough for first place. Matt Marquez was next in line with a 37.41 time. Josh Reynolds put up an amazing 1 minute 46.55 second flight, after catching a very nice thermal.

Each year I try to fly something different so the boys see there's more to rocketry than the kit they've built. This year I flew a Quest Aurora, and it worked surprisingly well (I'm not very good at gliders). The memorable "flight" this year was an egglofter turned eggsmasher when the chute jammed. Bits of egg and rocket splattering on the ground brought peals of laughter and cries of Yuck!

The final flight was my BT-60 Patriot missile on an Aerotech E15-10W. I didn't announce what motor I had in it, and it really surprised everyone when it lit, including a family launching rockets at a nearby ball diamond. Like the Ener-



The "Awana Kids" prepped and ready for action!
(photo by Bob Wiersbe)

gizer Bunny, it kept going, and going and going. Most people lost sight of it, but I tracked it all the way to the ground and sent a herd of boys off to find it, which they did. Now to come up with a new contest and rocket for next year!

NAR S&T NEWS

MOTOR CERTIFICATIONS - Release 18

The following motors have been certified by NAR Standards & Testing as of August 28, 1994 for general use as a model rocket motors. They are certified for contest use as of November 10, 1994.

The following are Aerotech reloadable motors, certified only with the indicated size casing and manufacturer supplied nozzle, end closures, and propellant slugs. They are "RC" motors, with no delay or ejection charge.

Aerotech: 24mm x 70mm RC Casing:
E7T-RC (30.0 N-Sec total impulse, 17.1 grams propellant mass)
D7T-RC (20.0 N-Sec total impulse, 10.5 grams propellant mass)

MOTOR CERTIFICATION - Release 20

The following motor has been certified by NAR Standards & Testing as of September 18, 1994 for general use as a model rocket motor. It is certified for contest use as of December 17, 1994.

The following is a single-use disposable motor that may be sold under the Aerotech or Apogee label.

Aerotech/Apogee: 24mm x 70mm:
E6-6 (40.0 N-Sec total impulse, 21.5 grams propellant mass)

Jim Cook, Secretary for NAR Standards & Testing <JimCook@AOL.COM>

Jack Kane, Chairman



A rack of marshmallow lofters are ready to go! (photo by Bob Wiersbe)

RetroRocket - NIRA in the Past

November/December 1984

Bunny and his bride to be, Barbara Frick graced the LE cover with Bunny's cato blasted SPEV. Craig Dudek supplied us with a small BASIC program to calculated altitudes. We featured a full page article from the Suburban Trib covering the club's activities. Ric Gaff featured some materials from the club library, and Bob Kaplow's Parsec 33 egglofter was our featured plan.

November/December 1989

Rich McBroom reported on his trip to central Ohio for an open meet. Lawrence Bercini treated us to ideas about "Kitchen Scale", models of stuff in or made from stuff in your kitchen. Rich also gave us his "A Squared" two staged altitude model.

Semi-Quotable Quotes

"Well, at least you didn't paint it." - Bob Wiersbe after Bob Kaplow's "Der Grey Max" tore itself to pieces in a spectacular prang.

"You're crazy!!!" - entire NIRA crew to Mark Bundick, at his request.

"You're insane!!!" - Lawrence Bercini to Mark Bundick after hearing that he might sell an RCRG to Ed Thiel.

"I'm sorry, I had a blonde moment there..." - Mark Bundick

"This must not be a NIRA launch." - Ken Hutchinson after someone commented on how nice the weather was at the September launch.

Tip-off

A collection of tips from NIRA members. If you have a tip you'd like to see printed, send it to Bob Wiersbe (address on cover).

From Bob Kaplow:

Use a wooden clothespin to clip the Solar igni-

tor right to the launch rod. Space it the proper distance out from the rod. Then you can just set the rocket down on the ignitor. No way this baby can fall out or misfire.

To eliminate burning of parachutes, wrap them in a sheet of recovery wadding. This goes back to very early Estes motors, which included 3 cut and use streamer protectors in each motor instruction sheet. I've eliminated the cutting and just use a sheet of wadding, and cover the chute "diaper" style.

For large models, you can use a large square of crepe paper from party stores. This is flame-proofed by law. For 10x10 sheets, I cut an unopened 20" package in half with my paper cutter, then remove each 10" roll and chop it down to squares. Cutting it in thirds gives sheets good for BT-60 and BT-70 sided models.

From Bob Wiersbe:

PVC tubing makes a great holder for launch rods, protecting them from moisture and keeping them from getting bent. Just cut a length slightly longer than the longest rod, glue a cap on one end, and put a removable cap on the other.

Always clean your launch rod before putting it away. Wiping it down with a little WD40 helps prevent rust and corrosion.

Plastic nose cones make great payload sections!

From Lawrence Bercini:

Ordinary brown paper bag paper works well for shock cord anchors. It becomes soft and malleable when soaked with glue, ensuring a good fit to the tube wall.

Invest in some clear plastic page protectors. You can store your kit instructions within a ring binder, and not have to punch holes in the instructions.

Never use your teeth for any modeling activity.

Heard on the Street - Rumors and Such (with apologies to the Wall Street Journal)

Welcome to the Club - Patrick Cannon, Patrick & Michael McGuane, Aaron & William Gerow, Bryan Chesi, Mike Oswald, Mark Soppet, Martin Strumilowski, Andy Dyckman, Jim Grote-lueschen, Blair Morrison, Bob Venable, Jenny Chaney, Alex Nesenjuk, Fred Becker, and Joe Nowak have joined NIRA in recent months. Welcome!!

It's Better to Burn Out - Magellan will cap its five-year mission radar-mapping Venus on Oct. 11 when flight controllers command the spacecraft to dive into the planet's dense atmosphere. Most of the spacecraft is expected to burn up in the atmosphere within a day, although some pieces will probably reach the planet's surface. Scientists are interested in what the experiment will tell them about Venus' atmosphere, while engineers will benefit from data on the spacecraft's performance as it descends.

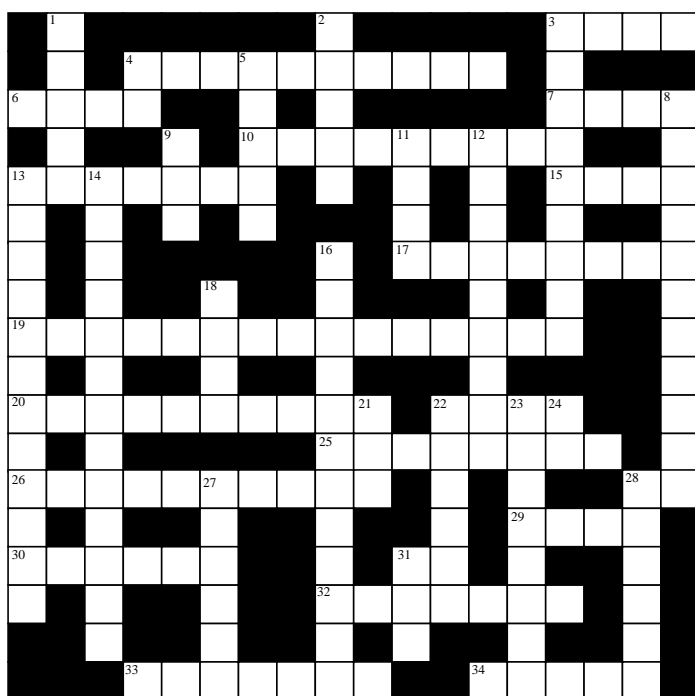
Just Go To Lock-Mart - Lockheed and Martin Marietta have merged to form Lockheed Martin. Lock-Mart (as it's referred to now) will be very strong in the commercial launch market, starting at the low end with LLV, moving up through Atlas and Titan, and finishing at the high end with Proton.

Final Flight - Cosmonaut Dr. Boris Yegorov (sometimes spelled Egorov) died about Sep 12 in his home in Moscow of an apparent heart attack. He was 58. He had been part of the three-man crew of "Voskhod" in October 1964.

Something New Under the Sun - The Ulysses spacecraft, the first probe to explore the sun's environment at high latitudes, is making its first pass over one of the Sun's poles, the south pole in this case. The spacecraft is about 71.2 degrees south of the sun's equator and is leaving an area of high scientific interest in that part of the polar region.



THE LEADING EDGE
C/O Bob Wiersbe
1835 Shetland Drive
Wheaton, IL 60187



Rocketry related crossword puzzle. Answers in next issue. By Bob Wiersbe

Across

- 3 - Section 117
- 4 - Tennis shoe meets church officer
- 6 - Kaboom!
- 7 - Spiral gap
- 10 - Voyager vehicle
- 13 - Sea god
- 15 - Greek letter
- 17 - Eye in the sky
- 19 - Canine meets beach bird
- 20 - Red planet alighter
- 22 - Base of 30 down
- 25 - Long, thin rocket
- 26 - True outhouse
- 28 - Exist
- 29 - Cement
- 30 - FAA permit
- 31 - ___ la la
- 32 - Neptune's staff
- 33 - Atmosphere + o + stinger
- 34 - _____ Centauri

Down

- 1 - Platform
- 2 - Camroc Lofter
- 3 - Clogged Shnoz
- 4 - Negative
- 5 - Model rocketry co-founder
- 8 - Angry contraption
- 9 - Rod runner
- 11 - Jay Apt's employer
- 12 - Person who starts something
- 13 - Gym shoe meets weapon
- 14 - Crashing under thrust
- 16 - Jay Apt's vehicle
- 18 - Starship _____
- 21 - Jog
- 22 - Ready again
- 23 - First of it's kind
- 24 - Went ___ market
- 27 - Seafood sauce
- 28 - Big _____
- 31 - Dorsal _____