THE LEADING EDGE

Newsletter of the Northern Illinois Rocketry Association, **Volume 21, Number 3**
NAR Section #117, Proud Winner of the 1996 and 1997 Rockwell Newsletter Trophy! **May/June 1998**

New NIRA E-Mail Mailing List!
from Jeff Pleimling

If you have an internet accessible e-mail account, you can join NIRA's new mailing list. A mailing list is a 'group address' that forwards an e-mail to every member of the list.

NIRA's list should be useful in sharing information, requesting help, keeping up on launch schedules, or anything else that is NIRA/rocketry related.

To subscribe to the list, send an e-mail to: nira-subscribe@makelist.com (no subject or message body are needed).

Once you are a subscriber, you can send messages to the list at nira@makelist.com. Only subscribers can send messages (to help stop people from spamming the group).

There is an archive of all list messages accessible through a web-browser at http://www.findmail.com/listsaver/nira/ (you do have to register to see the list, however).

If you have problems with the list, or any questions, please send me an e-mail at jap@interaccess.com. If you are interested in the makelist service, point your web browser to http://www.makelist.com.

Mooseheart Demo

On Saturday, June 6 NIRA will be doing two 45 minute demos at the Mooseheart RC Air and Water Show. This will be the fifth year that NIRA has been present at the show, and our demo is always a big hit.

But, we need your help!! All that's required of you is to bring out some of your rockets to either put on display and/or fly, then help with the loading of the racks during the demo. It's a pretty low-key event, and actually a lot of fun.

The first demo will begin at 10am, the second at 1pm. If you can only make it to one of the demos, that's fine too! Any and all help will be appreciated. Plan to be there at least an hour before the demo so we can get organized. If you have responsible kids that would like to come and help with recovering the rockets, they are very, very welcome!! (Seriously, last year we had a few 8-10 year olds doing recovery for us, and they did a great job. We only lost 1 rocket, and that was only because I didn't feel like wading through tall wet weeds during a rain storm to get it).

If you can help, give Bob Wiersbe a call at (630) 690-5442. Thanks!!!!

COSMOS-1 A SUCCESS!!!

The April launch was the site of COSMOS-1, a three event Section Meet. We won't go into details this issue, but it seems somebody surpassed a U.S. record by a significant margin! Spectacular full coverage next issue. [I'm holding you to that, Adam! - Editor]

NIRA Young Rocketeers

If you missed the May meeting, you missed a really cool presentation by the "NIRA Young Rocketeers", a group of kids in the Rockets for Schools Program. They are:

John McCullum 16, Ken McCullum 14, Dan McCullum 11, Nora Manca 14, and Michael Guzik 13. That's them in the photo below.

They will be launching their "1/4 Scale Patriot with 3 Fins" the weekend of May 8 - 9 in Muskegon, Mi. Be looking for a full report from this crew in a future newsletter!

Dues Increase

Due to recent increases in club spending (specifically, we're paying to have this award winning newsletter printed, instead of having certain induhviduals risk losing their jobs by hanging out at the photocopier at work and make 200 copies), we are seriously considering a dues increase. An increase to $5 per year would just barely cover the costs of printing and postage for a member, leaving little money for other expenses such as the cost of the field we are using, insurance, etc.

President Gaff is working on a proposal, and there will be discussions about it before anything is voted on. Keep watching this space for more information.

T MINUS 1 - NIRA'S CALENDAR OF UPCOMING EVENTS

1998 CLUB LAUNCH DATES

Launches are BYOL (bring your own launcher). The location for our 1998 launches is the Greene Valley Forest Preserve. If you have questions prior to any launch, call the NIRA Infoline at (630) 690-6353 and leave a message, I will call you back.

May 24 - Regular club launch (1 week later than normal due to National Sport Launch on the 15-17).

June 20-21 - Midwest Regional Fun Fly, Yorkville, IL.

July 18 - Eat Cheese or Fly, Bong Recreation Area, Burlington, WI.

July 19 - Regular club launch.

August 16 - Regular club launch.

September 20 - Regular club launch.

October 18 - Regular club launch.

October 31 - Nov 1 - RCHTA Show, Rosemont Expo Center

November 8 - RCHTA Launch.

November 15 - Regular club launch

December 13 - Holiday Party at Bundick's

MONTHLY MEETINGS

All meetings start at 7:30 PM, and include 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 Ric Gaff at (630) 483-2468 if you can help with ideas or can speak yourself. The location is the Glen Ellyn Civic Center, 535 Duane Street (usually on the 3rd floor, but check the board in the lobby).

Currently scheduled meeting dates are: June 5, **July 10** (Note! This is not the first Friday of July!), August 7, September 4, October 2, November 6, December 4.

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 wiersbe@lucent.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. Due to the fact that I'm burned out, stressed out, and bottomed out after doing 31 newsletters, I'm going to sneak out and take a little sabbatical. The next issue will come out, oh, say, whenever I feel like it. - The Management

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Ignatious the Ingenious Insect - Editor

Ric Gaff - Gainfully Employed Production Manager

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IMPORTANT LAUNCH ANNOUNCEMENT!!

NIRA has scheduled a HPR launch at the Beaver Run Sod Farm in Harvard on Sunday, July 5th! The launch will start at 9am and run until 5pm, with a waiver to 5000' AGL. HPR pads will be provided for the big stuff, but bring your own equipment for smaller rockets. As usual, any and all types and sizes of rockets are welcome. Also as usual, only NAR or TRA certified motors may be used. This launch date does not appear on any of the NIRA schedules, so mark your calendar TODAY! See you there!

IMPORTANT LAUNCH ANNOUNCEMENT!!

Model of the Month Winners! (from left to right, all photos by Ric Gaff, well, except the one on the left)

?? - Rick Gaff won Adult with his Mercury-Atlas, and Matthew Duckworth won Youth with his Nike-Apache. Obviously a scale night.

April - Kimber Guzik won the hotly contested Adult voting with her Bullet, Mark Soppet took Youth with his Sizzler.

May - Bob Kaplow was the surprise winner in Adult with his Crayon rocket, and Matthew Duckworth took Youth with his 4A Championship winning S1A Archer.

USE OF NEW INEXPENSIVE TEFLON MATERIALS IN MODEL ROCKETRY

by Bruce S. Levison NAR# 69055

High Tech Polytetrafluoroethylene (PTFE) products have been generally ignored as materials to use in the construction of model rockets. This work explores the utility and benefits of these inexpensive materials that are readily available to model rocketry hobbyists.

Do you have dental floss and pipe sealant in your range box? If you don't you should! Teflon pipe thread seal tape and Glide dental floss are two readily available and inexpensive items have many important applications for use in model rocketry. Teflon Polytetrafluoroethylene is a strong high melting nonflammable plastic polymer developed by chemists at Dupont in the early 1940's. GORE-TEX ePTFE is an expanded sheet or fiber form of PTFE polymer manufactured by W. L. Gore Associates, Inc. GORE-TEX sheet is thin flexible porous material that can be easily stretched to conform to any shape. Currently, Glide dental floss and Teflon pipe joint tape are available at discount stores for only a few dollars a roll or spool.

Glide floss, a strong thin light weight GORE-TEX fiber, is ideal for parachute and recovery shroud lines since it will not burn or melt! The nonflammable aspect of PTFE allows GORE-TEX fiber to withstand exposure to hot exhaust gases from an ejection charge. This also makes Teflon pipe joint tape an ideal recovery wadding since it is bulky and easy to pack into body tubes. For permanent recovery wadding attach four to six, 8 inch long strands of 1/2 inch wide Teflon tape to the base of the rockets shock cord. Typically, a simple overhand knot is simultaneously tied at the middle of all the half inch tape strands, and then the bundle is tied into the shock cord with another overhand knot about an inch away from where the shock cord exits the rockets body tube. The Teflon tape is then lightly bunched and inserted down the body tube ahead of the parachute or recovery streamer. I have launched rocket kits from both Estes and Quest with this configuration, and have yet to melt any of the plastic films in their normal recovery systems (see Figure 1)! Wider body tube models require longer or more numerous strands of Teflon tape. Another option might be to use a wider tape. I used 1/2 inch wide tape for my experiments and I know

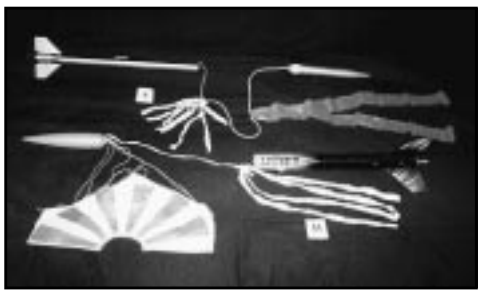


Figure 1.

that 3/4 inch wide Teflon thread sealant tape is available. The Teflon tape readily absorbs the heat and hot particles from the ejection charge. This material is ideal for this application; all that needs to be done after a flight is to gently wipe down the strips with a damp paper towel or cloth and loosely repack it for the next flight! Teflon tape wadding is economical since you can recycle it flight to flight. Teflon tape wadding might be just what model rocketry hobbyists in California are looking for, since no potentially flaming or smoldering sheets of recovery wadding are released from the model during or after flight! This configuration is undoubtedly safer and more economical to use than regular treated paper wadding.

Pipe thread tape can double as a steamer material too! I removed the recovery streamers from my Estes Yankee and Reliant models and flew them with only the four strands of Teflon tape as described above (see Figure 2). Everything worked out great except when I tried lengthening the streamer to 16 inches, with 8 inches of tape on each side of the knot. The longer free strands seemed to tangle too easily about one another and the shock cord. Also loops of this material can be knotted onto the shock cord making for a neater arrangement and offering more aerodynamic drag for a slower gentler recovery. This flame and melt resistant streamer material is both thin and light in weight with four 1/2 inch strands weighing approximately the same as a comparable length of 1 inch wide polyethylene flagging tape (the typical plastic streamer material). However, since Teflon tape requires no wadding to be used, a given model rocket may actually weigh less on the launch pad! The lower pre-flight weight surely translates into a higher ultimate altitude.

Other uses for Teflon pipe thread tape include shimming body tubes and couplers or other friction fit parts that must slide past one another to insure stage separation or nose-cone release. I use this material to reduce friction between any sliding parts. For shimming, I first covered one side of 1/2 inch wide double sided tape with Teflon tape and then applied this to the mating surface on the nose cone of my Estes Reliant rocket. Alternatively, the two sided tape could be applied to a part and then the two sided tape covered with Teflon tape for a slippery yet snug fit. I found that the first option, applying Teflon tape to the two sided tape first, makes for a neater application that is easier to build up in thick layers when required. Teflon tape can also be used to snug any friction fitted rocket joint by manually wrapping the tape around mating parts before assembling. Lose your igniter plugs? Try rolling up a short piece of Teflon pipe tape between your fingers into an oblong ball and inserting the plug with a toothpick or pencil point into the rocket engine nozzle to hold the igniter in place. Layers of Teflon tape could double for use as both heat shielding and cushioning medium (shock absorber) around any part or payload. Wouldn't Teflon pipe thread tape or GORE-TEX sheeting be the ideal non-stick underlayment for fiberglass molds? These materials are very stretchy and flexible and since PTFE is very slippery these films could provide a liner or covering that will conform to any mold yet allow the fiberglass and resin part to be easily separated after it hardens.

My Estes Reliant model is now the ultimate Teflon bird (see Figure 2)! I was given a gift of GORE-TEX sheeting (an 8.5 by 11 inch sheet) and Glide dental floss from W. L. Gore Associates and from these I assembled and 8.5 inch wide parachute. The nonflammable melt proof octagonal canopy was cut from GORE-TEX

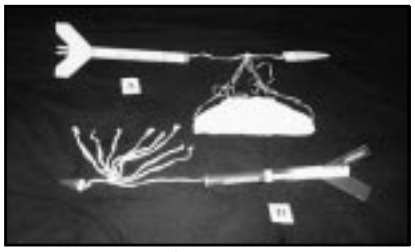


Figure 2.

sheeting with a scissors while it was still contained between its blue backing sheets. With the backing still in place, holes were punched through the canopy with a pencil point 1/4 inch in from the corners. Four 9 inch long sections of Glide dental floss were then attached between adjacent corners of the canopy (as shroud lines) through the punched holes using two half hitches for knots to attach the lines. The parachute was attached to the shock cord with an overhand knot in place of the models normal streamer. The 'chute was gently folded and wrapped with its own shroud lines and placed in the body tube of the rocket without any recovery wadding! I didn't even use any talcum powder on the 'chute since PTFE doesn't melt and stick to itself like other plastics. The flight went perfectly, the parachute opened nearly at apogee; and the rocket was recovered intact from a slow gentle landing! The PTFE parachute was in perfect condition, undamaged with no holes melted in it; all shroud lines still attached and intact. Only a few small cosmetic black scorch marks were noticeable on the canopy! These PTFE products should allow us to get rid of messy recovery wadding and plastic parachutes and streamers that are prone to melting and scorching. It is my hope that one or more of the model rocket manufacturers recognizes the value of the experiments presented in this article and decides to market PTFE parachutes and streamers.

The author wishes to acknowledge Brian Huebner and Ralph D. Zingle of W. L. Gore & Associates, Inc. for their generous gifts of GORE-TEX(r) sheets and Glide(r) Floss. Teflon is a trademark of E. I. du Pont de Nemours & Com-

pany, Inc., Willmington, Delaware. GORE-TEX and Glide Floss are trademarks of W. L. Gore & Associates, Inc.

Captions: Figure 1. Historic photo showing first model rockets to be flown with permanent recovery wadding.

A. Quest Tomahawk scale model modified for streamer recovery with Teflon tape wadding.

B. My son Ben's Estes Bandit, the first rocket ever to fly with attached Teflon recovery wadding.

Figure 2. Historic photo showing first model rockets ever to fly with all Teflon recovery systems.

A. My ultimate Teflon Bird, an Estes Reliant model with an all PTFE parachute and PTFE shimmed nose cone.

B. My son Ian's Estes Yankee rocket has made multiple flights with this Teflon streamer recovery system.

NARCON '98 Reports

The Soviet Manned Lunar Program

Reported by Jeff Pleimling

Peter Alway gave an excellent presentation about the Soviet manned lunar program. The Soviet program, unlike the American, was clouded in so much secrecy that many key elements weren't reveled until after the fall of the Soviet Union.

Although his talk was mainly about the Soviet lunar landing program, he pointed out that they actually had two competing lunar programs, a circumlunar program and a landing program. The circumlunar program was based on the Proton rocket and planned on sending cosmonauts around the Moon while the landing program was based on the N1 rocket.

Sergei Korolev was the chief designer of the N1; the largest of the Soviet launch vehicles. The first stage of the N1 used a cluster of 30 engines – far more then the Saturn V's 5 engines. Rather then gimballing the engines for guidance, the thrust would be varied to guide the rocket.

Peter pointed out that because of the secrecy and the general Soviet political situation the program was starved for funds and priority, and dogged by political and technical struggles between Korolev and Chelomei (the chief designer of the competing program). Korolev's death in 1966 left the program in a weakened state and it wasn't until February of 1969 that the first test flight of the N1 was made, unsuccessfully.

There were three other attempted launches, all were failures and the last two happened well after Apollo 11 put the first person on the moon. The fourth test, in November 1974, was actually for an extended version that would have landed cosmonauts on the moon for a longer duration stay. Not only did a Soviet cosmonaut never land on the moon, but the Soviet Union even denied that the huge project ever existed.

Growing Up Wallops

Reported by Steve Smith

When Mark Bundick told me he was going to do a presentation on his experience of growing up at Wallops Island at NARCON 1998, I knew I did not want to miss it, and boy am glad I didn't. Mark gave a great perspective of growing up at the facility that most, if not all, in the audience would have loved to experience for themselves. Mark's ties to the facility were that his mother was the payroll clerk for the Wallops Island facility up until around the time Mark was born. His father was the #2 man in the Range Control Center. He started out as a radar operator and technician but while at the Range Control Center functioned like a Flight Director at Houston would. Instead of manned missions he was responsible for the sounding rocket launches and airplane tests at the facility.

I warned Mark that if he had exhibited a humdrum attitude about seeing the multitude of rockets launched from the facility he would be in trouble. His attitude was far from it. From the start you could tell he had very fond memories of growing up at Wallops Island. His presentation started out by giving a historical perspective of how the facility came to be. Only if one of the local municipalities gave us a tract of land to launch rockets from like the Navy deeded Wallops Island to NASA, we'd be set. One of the pictures Mark showed us was the ferry used to bring works to and from the facility. The next picture showed the same ferry only this time it had be burned to the waterline by a fire. I found it interesting how Mark tied in "non-rocketry" related aspects of Wallops into his presentation, it completed the whole picture of life at facility.

Mark chronicled some of more popular and odd looking sounding rockets launched from the Island. Let me tell you, boy were there a lot of rockets. Small ones and big ones, skinny ones and fat ones, short ones and long ones. Interestingly he explained that most of the early sounding rockets were experimental and the engineers just didn't know that you shouldn't put really large fins so far forward on a rocket. Wallops Island played host to a total eclipse when Mark was there. He said it was like the Fourth of July when various scientific organizations launched 34 sounding rockets at once to measure various aspects of the eclipse during totality.

You could tell Mark enjoyed giving his presentation and he keep up his enthusiasm throughout the entire talk. I know Mark feels very fortunate to have had the chance to grow up at Wallops Island during some of the most exciting and active times in US sounding rocket history. I videotaped Mark's presentation and will make two copies of it which will be placed in the NIRA library for member to check out if they are interested.

Molding Custom Components

Reported by Adam Elliott

Tim VanMilligan of Apogee Components did a seminar on creating molds and casting parts. Casting, or molding, is never as simple as it looks. He talked about all kinds of materials which can be used to make either the mold or the finished part. Tim usually makes his molds from silicon because it is rubbery and flexible.

The finished part is can be urethane, epoxy, fiberglass, or more silicone, among others. The object's properties can be changed by using additives such as coloring or fiberglass strips.

Tim managed to conjure up some really groovy (no kidding) shapes with his two-part molding process. He passed around many of his molds and described in detail the steps required to make each one, and how best to create a mold.

Then came the real fun, we got to cast some parts! Tim let several participants measure and mix the two part resin and hardener, then pour the mixture into some molds. With a few minutes you could see the part taking shape, and in about 10 minutes the parts could be removed from the mold. It's really not as hard to do as you might think!

No newsletter is complete without a photo of a Saturn V. (R. Gaff photo)

Parachutes for Beginners
Reported by Tom Pastrick

The title of my session was supposed to include "Or Those Who Want To Improve." (Obviously, the title was tooo long).

Well, anyway, those who attended clearly wanted to learn more about making parachutes. Among them were some folks that I recognized as experienced NARAM competitors. It's a challenge to try teaching beginners and experts at the same time, and do it in only one hour. I set my goal. To the beginners, and to the experienced I would show some other possibilities in chute making.

Briefly, I demonstrated how to cut out an Estes parachute so that they could use more shroud lines for a stronger chute. Following that, I made a rough chart comparing types of materials for chute canopies with their good and bad points and did the same with shroud line materials. I went over the pros and cons of the ways to attach the shroud lines. I hurriedly demonstrated several ways to fold them (by then time was running out).

The last item of my session was probably the most exciting and every just had to see. The host section had graciously donated a bowling ball for me to use (and keep for future demos). Well, I suppose that everyone knows that a bowling ball weighs about 16lbs. Out of my Range Box, I randomly selected one of my 24 inch 1/4mil mylar parachutes, unfurled it and placed it on the floor. Placing the bowling ball in the canopy, I then asked the audience if they thought they could lift a bowling ball with one of their parachutes. No takers. I then lifted the bowling ball off the floor by holding only the shroud lines at the snap swivel. You should have seen the expressions of amazement. Word of this feat spread and by the end of NARCON, I had to do it at least 8 more times. The chute was not damaged in any way.

NARCON was a success. Beginners and experts alike are able to learn a thing or two, as well as gab about rockets for about two and a half days. You should attend next year. [Rumor has it that the CIA will be hosting NARCON again next year!]

Kitbash Scale
Reported by Bob Wiersbe

One of the seminars I attended at NARCON '98 was Peter "Buy My Books" Alway's "Kitbash Scale". Peter opened his talk with a brief discussion of the different levels and standards for scale models, such as NAR Scale, FAI Scale, Sport Scale, and Semi-Scale. He stated that people are afraid of scale models because they are under the impression that the models have to be perfect. Peter is a firm believer that an NAR contest model doesn't have to be any better than your regular models, and that the finish is what matters in the end.

The Vendor's area at NARCON, including a very impressive simulated HPR launch! (R. Gaff photo)

The Advanced Rocketry Group display. (R. Gaff photo)

NIRA member Tom Pastrick during his talk about competition at NARCON. (R. Gaff photo)

He then held up an Estes Alpha kit (still in the bag) and said "This is a Doorknob" (a real rocket, not the handle on a door). "It just has the wrong length body tube, the fins are wrong, the decals are wrong, and the instructions are wrong."

It could also be an Aries, D-Region Tomahawk, Pencil, Sandhawk, or even a V-2 (if you have 2 kits). The key is the nose cone in the kit, a 3:1 ogive. For a different scale model, just buy a kit with a 3:1 ogive nose cone but with a bigger body tube. For example, a Prowler or Bailout has the 3:1 ogive nose cone for a BT-60 tube. The same goes for a Phoenix with a BT-80 tube. Any of these kits can be used to create a scale model, you may just need to cut the tube, or get a longer one, and make new fins.

The main emphasis of his talk was around Sport Scale rockets, the kind where you don't have to be exact with the measurements or details. If you have a color picture or drawing, or a black and white line drawing with color markings, then you probably have enough data to build the rocket.

Peter gave us a handout with drawings of rockets that aren't available from Saturn Press, plus fin patterns at different scales. The handout also had this great table of models, the scale factor, and what nose cone you needed to build the kit. He had more complete data of the rockets in the handout that he let people copy, which led to lines at the copy machine. Don't worry, the plans will be in print someday (or you can get them from someone who was at NARCON).

What about decals and markings? Peter solves this problem with the simplest of tools - a marking pen. Need white letters on a black background? Use a black pen and fill in around the letters. He passed around a couple of scale rockets that he had bashed from other kits, and they looked pretty good.

I like Peter's casual approach to Sport Scale, and his talk definitely rekindled my interest in building new scale models and finishing some that I'd already started but gave up on.

Peter "Scale Man" Alway with a kitbashed scale Arcas. (R. Gaff photo)

So you think you are ready for High Power? - Part 3

by Norm Heyen

Final preparations before flight. Since we added a fair amount of weight to the rocket with the extra ring and the baffle system, we better be safe and check the location of the center-of-gravity (CG) and center-of- pressure (CP). Remember the CG should be at least one body diameter ahead of the CP.

Start with the manufacturer's or dealer's motor recommendation. Use WinRASP or a similar program and calculate the delay times needed. Check the altitude as well. Plan for something that will give you about 1000' or so. The delay should be within a second or two of apogee. The speed at deployment should be a low as possible. If the minimum speed occurs between two delays, pick the shorter of the two. The engine data tends to be a bit optimistic. And in normal circumstances, you will need to fly at a bit of an angle, also reducing the predicted altitude.

The CG should be measured as the vehicle is ready for flight. A fully loaded motor, minus the o-rings an ejection charge, needs to be installed, the recovery system installed as far to the back as possible. (Actually, you should do this with the biggest (heaviest) motor you intend on using installed, but for now, use your certification motor.) The CG is the balance point. Mark this point, with a pencil, on the body with a designation like `CG H123'.

The CP is a little more difficult, but there are several programs that make it pretty simple. My preference is VCP. There are articles in Sport Rocketry and in the Handbook of Model Rocketry that describe how to do this with paper and pencil. Measure the dimensions and input these into the program and let the program calculate the CP point. Mark the CP on the rocket and indicate it as `CP'.

OK, where did the marks wind up? Is the CG far enough ahead of the CP? If so, you are about ready. If not, enough weight needs to be added to the nose. The easiest way is to mix some steel (or lead) shot or sinkers with some epoxy and pour the mess into the nose cone. Since epoxy tends to get pretty warm as it cures, the safest bet is to stand the nose in a tub of cold water while it cures. Since we didn't really add that much weight, a couple of ounces should be all that is needed. Re-measure the CG and compare. Still not enough? Add more weight.

RMS motors can be at least partially built before hand. Don't screw everything tight and don't add the black powder ejection charge until ready for the flight. There are a couple of tips here. Use a minimum of grease, meaning very little. Just barely enough to make the rings `shiny'. Any extra will cause problems. To make the clean up easier, apply some on the inside of the casing before sliding the liner in place. A little bit goes on the threads as well. Be especially careful to not get any grease on the delay element. Any extra grease will melt and flow on to the element. The only purpose of the grease is to make the o-rings slide into place without being pinched. When you are ready to use the motor, the final turn or two can be made to get everything tight. Pour the BP into the ejection well. Place the paper adhesive sticker in place. I like to add an `X' of masking tape over the top to help keep it in place and tight. You don't want this to be too loose, or the BP won't produce enough gas to blow the nose and chute out. Best advice? Talk to someone that has built a few engines and have them watch what you are doing.

If necessary, use the supplied Copperhead ignitor. And be sure to cut a small slot (1/16" or so) in the red cap for venting. It really does cut down on the ignition problems. I've assumed you have flown enough mid power rockets to feel comfortable with the composite motor quirks of ignition.

Gather two NAR members at a launch, one who is at least level 1, have them witness your successful flight and sign your forms. Mail them off to NAR HQ and get a new membership card mailed in a month or so. Congratulations! And welcome to high power!

WinRASP is a Windows based program that lets you do pretty good flight simulations. It contains a reasonably accurate motor and rocket database and is pretty simple to use and understand. It will help you pick the right motor and delay for a rocket, as well as predict the launch rod velocity, maximum velocity and maximum acceleration. It is available on the Internet in many places, but the home page is http://ourworld.compuserve.com/homepages/CGibke/wrasp.htm. The author is Chuck Gibke, and this is the best value in rocketry. This fine program is a labor of love and Chuck doesn't charge money for it. Talk about paying forward!

If you've decided on the PML kit, it uses a piston system in place of the baffle or wadding, and you won't need these items or the third centering ring.

THE ONE-PAGE SCALE MODELER SHOTPUT @ 1/42 scale

by Kevin Wickart

The Shotput rocket was designed as the testbed for satellites. From 1959 to 1963 it successfully simulated last-stage conditions for U.S. and, later, Italian satellites. It is the Italian-American version which is modeled here.

For once, the pertinent construction notes will fit on the plan sheet. The important points to remember are:

--Rather than using a conventional shoulder-into-tube matching, the nose section slides over the OUTSIDE of the booster tube. After painting, make sure the fit is not too tight and sand the inside of the T-20 tube as needed.

--The block inside the T-20 tube can be made however you like, so long as it will securely hold a screw eye. One of the easier methods is to glue a BT-20 nose block into a piece of scrap BT-20.

--The nose will have to be hand-milled or fabricated by Balsa Machining Service (no, I do not own stock in the company--it just seems that way sometimes). I suppose you could use the BT-20 sized true-cone nose, glue it into a scrap of BT-20, use wood filler to expand its diameter slightly, then cut it down to length and shape. But I don't know ANYONE who would go to that much trouble. The proper nose starts as a 30-degree cone, 20mm (.787") diameter by 37.3mm (1.469") in length. cut it to 31.3mm and round the tip.

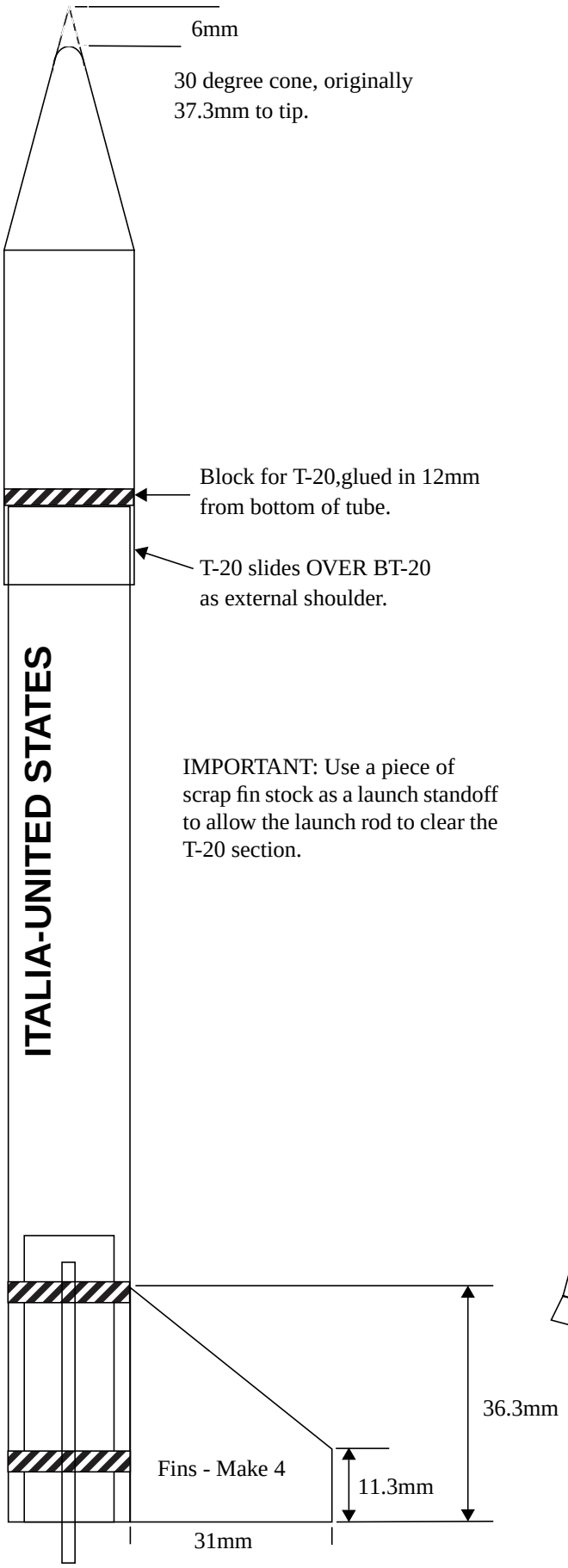
--The launch lug will need a slight standoff in order to allow the launch rod to clear the slightly wider nose section. A scrap of 1/16" balsa or centering ring cardstock would be fine.

--For sheer ease of finishing, paint the Recruit boosters and main body before attaching the Recruits. Don't forget to scrape the paint away at the line of contact.

--The "ITALIA-UNITED STATES" decals can be made easily enough. Either have the plan page photocopied onto "one-up clear label" paper at the local copy shop, or use your word processor. The lettering is 16-point capitals in the "Univers" font. Print the text twice, then take it to the copy shop.

--The Shotput should fly fine on most any 13mm motor EXCEPT the 1/2A3-4T. The delay is too long on this one.

The One-Page Scale Modeler: Shotput @ 1:42 Scale



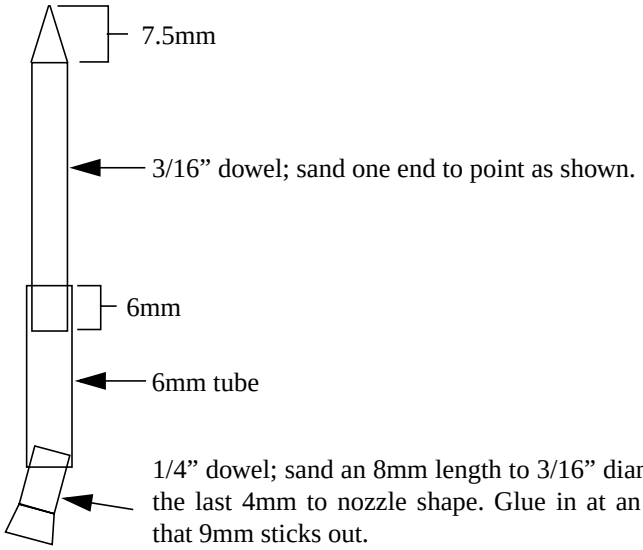
Parts List - Shotput
1 Estes BT-20, 156mm
1 Quest T-20, 51.4mm
1 13mm Engine Mount for BT-20
1 Block for T-20
1 Nose, 30 degree cone cut to 31.3 long and tip rounded
Fin Stock, 1/16" thick
Launch Lug, 1" long
Recovery System: Screw Eye, Shock Cord, Streamer

Parts List - Recruit Booster
2 6mm Tube, 24mm long
2 3/16" Dowel, 43mm long
2 1/4" Dowel, 12mm long

Paint & Decals: Nose and T-20 section black, the rest white. Paint the Recruits BEFORE attaching! The "ITALIA-UNITED STATES" lettering is black, simple block letters 4.2mm (5/32") high [lettering is shown at scale]. One each side as shown, centered above each Recruit.

RECRUIT BOOSTER - MAKE 2

Recruits are to be glued on opposite sides of model, centered between fins, rear of 6mm tube flush with rear of body.



A Day at the Beach with AC-132

by: Tim Johnson (NAR 72478)

It was my great pleasure to view the launch of the final Lockheed-Martin Atlas 2 on Monday, March 16, 1998. After planning to visit an old friend who lives on Florida's "Space Coast", I learned that I might catch the launch by staying an extra day and hoping for a rare on-time mission.

The launch vehicle, identified as AC-132, was to launch the U.S. Navy UHF F8 (Ultra-High Frequency) communications satellite into orbit from Cape Canaveral's Space Launch Complex 36A at 4:22 PM EST on March 16. It would be the tenth and final Atlas 2 launch. Atlas 2 was a stretched and updated version of Atlas-Centaur that began flying in 1991, when General Dynamics still ran the show. Unlike the still-active Atlas 2A and 2AS versions, Atlas 2 was not designed to use strap-on solid motors. AC-132, despite its tail number, would be the 115th flight in the long-running Atlas-Centaur series.

Atlas is one of my favorite rockets. One reason is its history. Atlas boosters have been around for nearly 40 years, flying nearly 550 times altogether. Atlas stood guard as America's first ICBM, boosted Mercury astronauts into orbit, launched Rangers and Surveyors and Lunar Orbiters to the Moon, boosted Mariners to Mars, Venus, and Mercury, and propelled Pioneer 10 and 11 past Jupiter and Saturn and out of the solar system.

Another reason I like Atlas is its quirkiness. It uses a well- known, time-tested "stage-and-a-half" design. It has dime-thin balloon tanks made of stainless steel. But the part of its design that I find most interesting is a pair of big doors on its booster fairing that are open prior to launch to give the launcher hold down arms access to a pair of trunnions on the booster. After the arms release and the Atlas begins to rise, the doors slam shut!

While in Florida, I was easily able to find out if the launch was still "on" by picking up a copy of the "Florida Today" newspaper each morning. The Melbourne, Florida-based paper, which features an orbiting satellite logo, has a "Next Rocket Launch" box on its front page each day with updated launch times and countdown status for anything that flies from the storied Cape Canaveral/Kennedy Space Center launch pads. These days, the pads are pretty busy.

Monday dawned clear and warm, with predicted highs in the 80s. I spent much of the day at the KSC Visitors Center before driving toward Jetty Park just south of Port Canaveral, which itself is just south of the Cape Canaveral Air Force Station entrance gates. This is as close as the non-launch pass, general public crowd can get to a launch.

The park is adjacent to the Port Canaveral channel and fronts an expansive, recently replenished, Atlantic beach. A long fishing pier juts into the ocean beside the park's namesake jetty. From the pier, one can view cruise ships, freighters, scallop boats, and the occasional Trident submarine or space shuttle SRB tug as they enter and depart the port. The pier also happens to be one of the best places on earth from which the general public can view a space launch.

Cape Canaveral itself juts into the Atlantic just north of Port Canaveral, swinging the Delta, Atlas, and Athena launch pads clearly into view. From the Jetty Park pier, one can easily see the towering gantries of Space Launch Complexes (SLCs; recently renamed by the Air Force from the traditional "Launch Complexes") 17A and 17B, about three miles away, used by Boeing Delta vehicles; 36A and 36B, about five and a half miles away, used by Lockheed-Martin Atlas launchers; and 46, about five miles away, a former Trident test pad that hosted the Lockheed-Martin Athena/Lunar Prospector launch in January, 1998. In the distance, one can also see the last pad standing on traditional "Missile Row", mothballed Atlas-Agena Complex 13. Amidst the pads, not far from SLC 36A, is the 140+ year old, black-and-white-striped Cape Canaveral lighthouse.

Active Titan 4 pads SLC 40 and 41 (one of which is to be deactivated soon) and the shuttle pads are not visible from the pier, blocked by a mound of spoil from channel dredging.

I arrived early, at about 3:00 PM. A quick duck into the park bait shop, who's owner was equipped with a radio scanner, confirmed that the launch was still go. After applying several coats of SPF-30 to protect my winterized Midwestern skin, I walked out onto the sunny pier. From there, I had a terrific view of the 156 foot-tall Atlas 2 through 10x50 binoculars. The hulking, green and gray SLC 36A gantry had rolled back 90 minutes earlier, exposing the shiny stainless steel Atlas booster and the rust and white-colored Centaur second stage. The vehicle was topped by a standard bulbous payload fairing, with its enormous conical nose, adorned with a bright red mission emblem.

Gradually, a few dozen other "bird watchers" arrived, some equipped with scanners, radios, and big-lens cameras. By talking with some in the friendly crowd, I was able to learn what was happening. At 2:30 PM, crews began loading liquid oxygen into the Centaur stage. A little after 3:00 PM, they began loading refined kerosene and liquid oxygen into the Atlas booster. Gradually, the upper 2/3rds of the Atlas began to turn white as ice formed on the outside of the LOX tank. At 3:16 PM, liquid hydrogen began to fill the Centaur fuel tank. A steady stream of white LOX and hydrogen boil-off flowed from vent valves on the vehicle and from a tall vent stack atop the launch tower. A layer of rust-colored insulation kept the Centaur stage ice-free. When not peering at the launch pad, I passed the time by watching pelicans, dolphins, and a couple of sea turtles. A steady sea breeze provided a free ride for sea birds hovering in that day's crystal blue sky.

Finally, launch time approached. A pair of fast, quiet military helicopters slipped by after sweeping the downrange area. The planned fly time came and went, and word passed down the pier that there was a hold due to a problem with the launch sequence computer. After a few minutes, word passed down the pier again. This time the word was good: T-3 minutes and counting!

At about 4:30 PM, Atlas LOX venting stopped. Shortly after that, vapor stopped streaming from the launch tower vent stack. Obviously, launch was imminent. Without a radio, I had no way of knowing how much time remained, so I simply kept my binocular- aided eyes on the vehicle. Suddenly, the base of the Atlas turned orange and billowing clouds of steam rose behind, or north of, the pad. After a couple of seconds, the vehicle began to rise, silently and very slowly, atop a welding-torch-bright ball of flame.

I grabbed my 200 mm lens camera and pressed the shutter a few times, then decided to watch the remainder of the event without squinting through a shutter. It turns out that photography is fairly pointless unless you have a 600 mm or bigger lens.

AC-132 cleared the tower, rose straight up, then began to pitch slightly over the ocean. After several seconds, the trombone- throated roar of Atlas's three Rocketdyne engines began to wash over the pier. The sound grew in intensity and dropped in pitch as the rocket rose higher. At its peak, the noise was accompanied by periodic, staccato thunderclaps, and echoes of thunderclaps, that could be felt as well as heard. Then, as the rocket rose higher and pitched more toward the horizon, the din gradually faded.

This booster, devoid of strap-on solid motors in the old- fashioned Atlas style, left a barely discernible brownish trail behind its flickering exhaust flame until it passed through a high altitude layer about one minute after lift-off. There it deposited a short vapor trail. Aided by that trail, I was able to find the vehicle with my binoculars in time to clearly see the booster package shutdown and jettison. After that, AC-132 really began to accelerate on its single core booster engine. After another minute or two, the rocket vanished into a layer of haze near the horizon.

AC-132 successfully lofted UHF F8 into a 12,567 by 120 nautical mile "subsynchronous" orbit from Cape Canaveral's Space Launch Complex 36A at 4:32 PM EST, only 10 minutes later than originally planned. The $190 million,

7,000 pound Hughes-built spacecraft then fired its own thrusters over the course of nine days to maneuver into geosynchronous orbit above the Pacific Ocean.

Since Atlas 2 was only designed to put 6,500 pounds into geosynchronous transfer orbit, UHF F8 had to perform more than the usual number of satellite burns to reach final orbit. That AC-132 did some heavy lifting is evidenced by the fact that its lift-off weight was an estimated 414,439 pounds while its Rocketdyne MA-5A propulsion package only developed 490,0000 pounds of thrust off the pad. Plans call for the satellite to replace FltSatCom 4 at 172 degrees east longitude on June 1, 1998. I'm glad I was able to see the launch of one of my all-time favorite rockets. In coming years, Lockheed-Martin plans to replace the Atlas "stage-and-a-half" Rocketdyne propulsion system with a pair of Russian designed motors built under license by Pratt and Whitney in Florida. While this is understandable, given the fact that competitor Boeing now owns Rocketdyne, Atlas flights won't be the same without that Rocketdyne roar, that funky booster package jettison, and that odd door-slamming just after lift-off.

Shock Cord Attachments for Mid-Power Rockets

by Mark Kotolski

Over the past 25+ years, I have enjoyed many types of rockets. Powered by Estes 'S' motors and D13's to todays Aerotech and Kosdon composites. In all this experience it was easy to see the biggest weak link to most model rocket designs. Getting the rocket off the ground was easy but getting them back in one piece wasn't always the norm, especially those powered by 'D' and above motors.

Shock cord and parachute failures attributed to at least 95% of the failures I've encountered. In the past several years I have been actively involved in mid-power (E-G) and high power (H and above) rockets. The recovery systems on high power rockets are very robust, to withstand a lot of stress and abuse. By using a modified HPR shock cord technique, I have reduced recovery system failures in models powered by D and E motors to about 2%. This technique was incorporated in rockets of my own design as well as in Estes and other manufactured kits. Patterned after the NCR "Gorilla Mount", it uses a light weight wire cable fashioned in the same way. Simple and light.

To use this technique, the first step is to make a trip to a "good" sporting goods store and check out the fishing tackle section. There you will find stranded steel leader wire and crimp sleeves which you will need to fabricate your mounts. I have used the MASON brand in .018" size and the corresponding size crimp sleeves.

The procedure is simple (see Figure 1). Make a large loop in one end of the cable, slide a sleeve in place and crimp the ends of the sleeve tightly with pliers. Place this loop over the motor tube, then slide the forward ring over it. Glue the forward ring in place with the wire trapped between the ring and the motor tube. Place epoxy fillets on both sides of the ring and over the cable loop. Put the motor mount assembly alongside the body tube it will be going into. Cut the wire to length, form and crimp another loop in this end. The cable **SHOULD NOT** be longer than the tube!

The loop should be 1-2" from the top of the tube. This allows easy access to attach the shock cord and will minimize most tube zippers from happening. Now tie your shock cord to the loop by passing it thru the loop several times before knotting it. This will deter the shock cord from being cut by the cable. You can also attach a small metal ring to the loop before crimping it and then tie the shock cord to the ring.

If your rocket design uses a tube coupler, you can use the technique as shown in Figure 2. Here, the wire is attached and crimped around the coupler. The couple is then epoxied in place as usual. The top loop is formed in the same manner as before.

The other component to consider is the parachute. Plastic chutes just don't hold together at ejection. They melt together, tear and strip shroudlines easily. I have converted all my rockets powered by 'D' and above motors, as well as those using 18mm composite motors with nylon chutes. The new thin-mil chutes are close to plastic in weight and it is easy to pack an 18" chute into a 1" tube. The standard nylon chutes weigh more, but if you are using a chute larger than 18", the rocket will be larger and weigh more anyway so a few extra ounces probably won't be a factor. Nylon chutes are worth the price if you want your rocket back in one piece.

I have successfully used plastic chutes on rockets like the Estes SHOADOW and PHOENIX, as well as a 32" upscale of the Estes ASM (old Mini-Brute kit). I made these 36" chutes out of black plastic garbage bags. They use 10 shroud lines with attachment accomplished by using self adhering dots on both sides of the plastic with the lines tied through these in the Estes and Quest manner. Then I use 1" dots of trim Monokote over these to prevent ripping. The reason this works so well is because of two things. The models are very light in weight and at ejection, the rocket is moving very slow. So when the chute opens, there is no great shock.

Go ahead and try these techniques, I'll be the failure rate you have been experiencing declines.

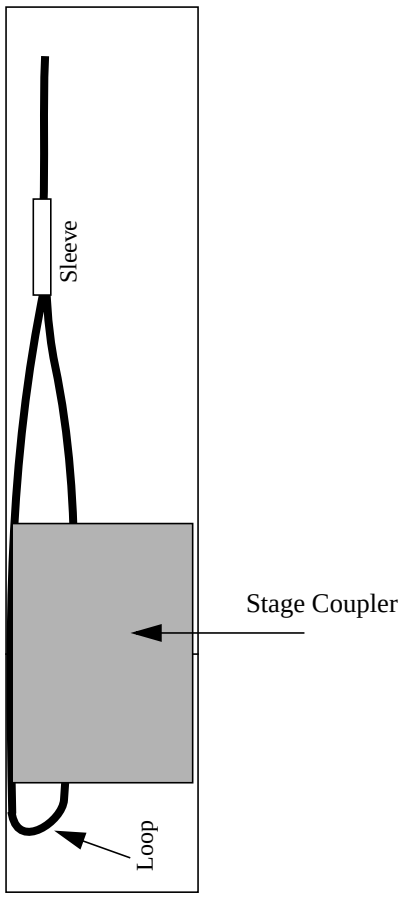


Figure 2.

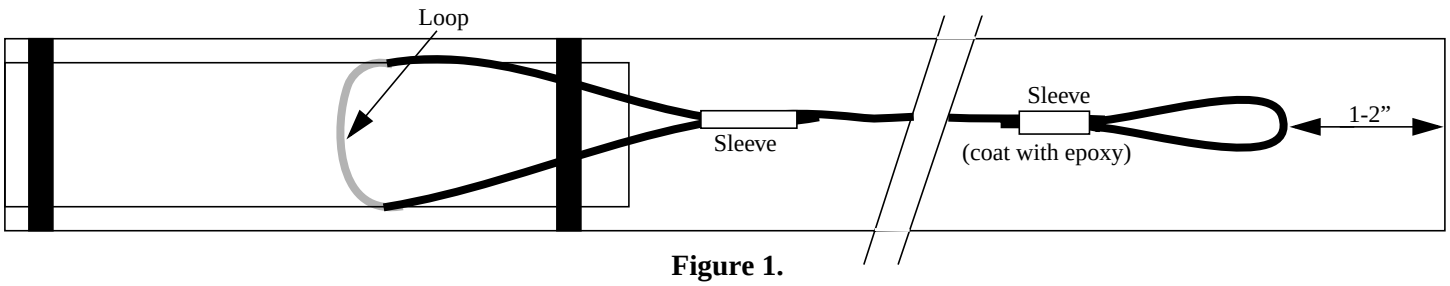


Figure 1.

Disaster at Quest
Date: Fri, 27 Mar 1998

A fire in a toy rocket factory that killed three people and burned two others started accidentally, an investigation has concluded.

Larry Bettendorf, a spokesman for the Bureau of Alcohol, Tobacco and Firearms, said the exact source of ignition wasn't determined by investigators of the ATF and Arizona Department of Public Safety.

He said it could have been started by a spark from a piece of equipment such as a grinder or from static electricity.

The source ignited a box of 900 rockets. The resulting chain reaction destroyed a workshop at the rocket-making complex of Toy Biz, 16750 Avenue C, on March 27. The engines are set off with a low-voltage battery when they are used to launch toy rockets.

Two workers, Cecil Junior (C.J.) Croft, 18, and Alfredo Barrios, 32, were killed instantly by the fire. Another worker, Juan Enriquez, 20, died the next day at Maricopa County Burn Treatment in Phoenix.

One of the injured workers, Damien Barrios, 29, Alfredo's brother, is still being treated at Phoenix burn treatment center. He was reported in critical condition Monday afternoon.

The other worker, Adan Navarro, 20, sustained less serious burns, even though he was standing next to other four workers. He was treated at Yuma Regional Medical Center and released.

Bettendorf said the ATF and DPS have completed their investigation and the actual source of the fire may not ever be determined. However, all intentional causes were eliminated by the investigation.

Toy Biz, the New York company that owns the plant, is just starting its own investigation into the fire and what can be done to prevent a future disaster, according to Tuck Hardie, a Toy Biz spokesman.

"Quite frankly, we're just starting (an investigation)," Hardie said. "We were far more concerned about helping our employees ... and their families. Our focus has been on that."

Hardie said the company has a team of engineers who are working on the problem. He said the engineers collected evidence from the scene, but they are still analyzing it to determine what happened and how to prevent any future problems.

Meanwhile, Hardie said the operation at the Yuma-area plant is still closed.

The local plant is located on Cocopah tribal land about a mile south of Highway 95 and County 16th Street. The building in which the fire broke out is one of nine located in the complex.

The buildings are separated by long distances on the five-acre site, so if one goes up in flames, fire won't spread to the others. The complex also includes several bunkers similar to those used by the military to store explosives.

Fourth Victim in Toy Rocket Plant Fire Dies

A man burned last month in a fire at a toy rocket manufacturing plant has died in Phoenix, according to Cocopah Tribal police.

Police reported Damien Barrios, 29, died Sunday evening at the Maricopa County Burn Treatment Center from injuries sustained March 27 when a fire destroyed a workshop at the rocket-making complex of Toy Biz, 16750 Avenue C.

Barrios was one of five men inside the workshop when an accidental fire swept through the building igniting a box of about 900 small rockets, the type used to launch toy rockets into the air. He was the fourth victim to die.

A joint investigation by the U.S. Bureau of Alcohol, Tobacco and Firearms and the Arizona Department of Public Safety determined the fire started accidentally.

[Editors Note: With the passing of Bill Stine's father, G. Harry Stine, last November, and now the fire and death of four workers, it's been a very rough time for Quest. It would be great if we could all show our support for Quest by buying their products and encouraging hobby shops to carry them too.]

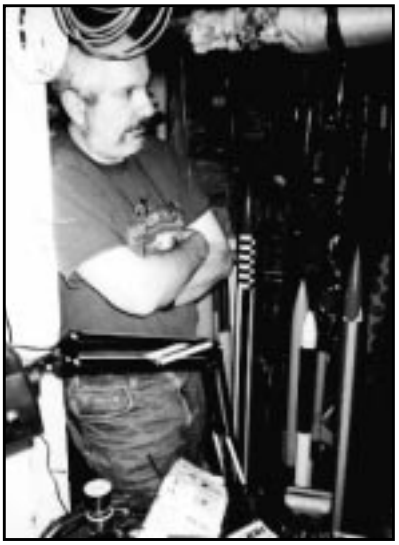
Photos from the February Building Session at Pete Olivola's house:

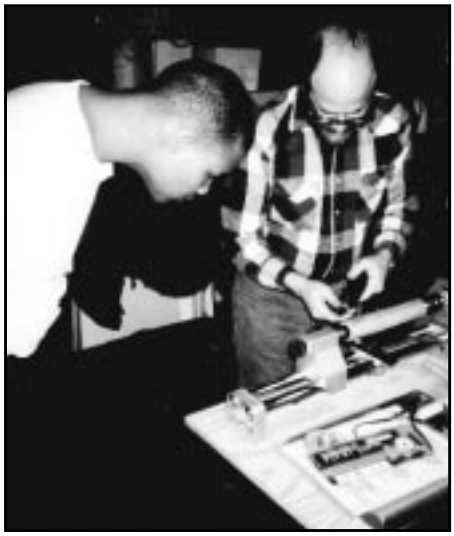
Left: Pete Olivola holds up his house. Note all the cool rockets stacked up behind him.

Center: Bob Kaplow experiments with a Dremel tool and a lathe. Pierre Miller looks on to make sure Bob doesn't mess up his work.

Right: Rick Kramer working on what else - a tube rocket! This one was one of many rockets that were built for Quest for a show they were doing out on the East Coast.

Above Right: Tom Pastrick creates a parachute. (All photos by R. Gaff)





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

Welcome to the Club! - Mike Blackwell, Jeff Beeks, Thom Cashill, Bill Clinton, David Compton, Lupe Esquivel, Jr, James P. Kase, John Kouns, Thomas Lewandowski, Monica Lewinski, Alan Prepelica, Scott A. Schaffner, Kenneth Starr, and Chris Timm have joined NIRA in recent months. Welcome!

Bombs Away, Dream Baby - NASA has begun drop testing of an X-38 test vehicle. The X-38 is a project to develop a lifeboat (crew return vehicle) for the Space Station. X-38 V-131 was dropped from a B-52 on Mar 12, flying 7 km over Edwards AFB, and parachuted to the desert. Vehicle 131 is a subscale test prototype, not a spaceworthy craft. Two other 130-series X-38's will be drop tests prior to the space flight of the full-scale V-201 in the year 2000.

As Went #1, So Goes #2 - Lockheed Martin Astronautics launched the last Atlas II, AC-132, from Cape Canaveral on Mar 16. It placed a Hughes HS-601 satellite in orbit for the US Navy. Future Navy Atlas launches will use the IIA and IIAS models, as well as the forthcoming IIAR variant.

What's In A Name - Since the late 1970s, NASA has made a practice of naming its larger satellites, usually after a famous dead scientist. Other space agencies have named their satellites after flowers, minerals, elementary particles, mythological characters, or astronomical objects. Wanna see a list? Point your browser at:

http://hea-www.harvard.edu/~jcm/space/misc/names.html

Corrections and additions are welcome.

Taking the Long Way Home - The former Asiasat 3 satellite, placed in incorrect orbit last December, is undergoing an unprecedented maneuver. The Hughes HS-601 class satellite is now using its liquid engine at perigee to raise its apogee to lunar distance, and use lunar gravity to maneuver it toward a final orbit. Final translunar injection on May 7 will lead to HGS-1 making a circumlunar pass on May 13 followed by a return to geosynchronous altitudes. The lunar flyby will be made with the satellite in spin-stabilized mode, with the two main antennas deployed to give it extra stability.

Play Name That Telescope - NASA and the AXAF Science Center are sponsoring a contest to name the Advanced X-ray Astrophysics Facility (AXAF), a 4-tonne X-ray telescope to be launched on Space Shuttle Columbia in December 1998. The winner will get a free trip to see the launch, and everyone who enters will get a free AXAF poster. The winning entry can be the name of a place or a thing symbolizing exploration of the universe, or a mythological or fictional character, or a historical person (but not someone alive today). Previous X-ray satellites have been named after physicists Albert Einstein, Wilhelm Roentgen, and Bruno Rossi; the first X-ray satellite, launched from Kenya, was named Uhuru after the Swahili word for freedom. You can get details of the contest at

http://asc.harvard.edu/contest.html

Entries are due by June 30 and the winner will be announced later in the year.

NAR S&T News

R46: NEW NAR SAFETY CODE FOR RADIO CONTROLLED ROCKET BOOSTED GLIDERS

The following new safety code was approved by NAR Board on Jan 31, 1998.

Safety Code for Radio Controlled Rocket Boosted Gliders (R/C RBGs)

The following code is to be used in conjunction with the NAR Model Rocket and High Power Rocket Safety Codes. In areas where the R/C RBG code overlaps these other codes, the R/C RBG code takes precedence.

1 - Definition: A Radio-Controlled (R/C) Rocket Boosted Glider (RBG) is defined as a rocket boosted model capable of gliding flight and equipped with a radio control system capable of controlling the direction of flight during glide and, optionally, boost.

2 - Radio Control: I will use only approved radio equipment operating on frequencies allocated for use in flying models. I will check the radio and reception range of any new model, repaired model, or any new combination of model and radio system. I will only fly if the radio system is operating properly and there is no interference. I will ensure that a frequency control method is being used at the flying site, then check I am transmitting on an unused frequency.

3 - Flightworthiness: I will check that the model is in safe and controllable condition for glide as well as in proper trim for rocket boost before each flight. I will not fly in the presence of spectators until I can safely boost, fly, and land models of the type I am flying.

4 - Motor Thrust: My R/C RBG will weight no more than the motor manufacturer's recommended maximum lift-off weight for the motors when used in R/C RBGs.

5 - Launch Angle: An R/C RBG may be launched at angles of 30 to 45 degrees from vertical provided that it is capable of having its flight path controlled safely during rocket boost and provided that the launcher is pointed away from specified spectator areas. Otherwise the R/C RBG may not be launched at an angle exceeding 30 degrees from vertical.

6 - Air-starts: During stable, gliding flight of the R/C RBG, an attached motor may be air-started to increase the model's altitude or airspeed without diving. This is permitted if:

(a) The onboard R/C ignition system is designed to not to be triggered accidentally, possesses an arm/disarm system, and is not armed until the model is on the pad with the radio system turned on and verified. (b) The proposed airstart was reviewed and approved by the Range Safety Officer (if present) prior to launch. (c) The model heading is not toward spectators. (d) The model is at least 100 feet above the launch site. (e) The pilot gives a loud countdown for the air-start.

If the model descends below the minimum altitude for air-starts or the air-start fails, the model will be landed in a safe area, clear of people, and only the pilot or pilot's appointed helper will be allowed to approach the model until the ignition system has been disarmed.

7 - Launch: The pilot will verify the glider's radio system and transmitter are turned on, in the desired configuration, and working prior to signaling the Launch Control Officer (LCO) the model is ready for launch. The LCO will coordinate with the pilot when to launch the model, remaining alert to possible calls from the pilot for the count to be stopped. Pilots may launch their models with their own launch controller if the LCO agrees. In the event of an apparent misfire, the pilot should remain ready to control the model until the ignition system has been disabled.

R47: MOTOR DECERTIFICATIONS

This announcement contains two types of model rocket motor decertifications.

It supersedes the combined NAR/TRA certified motor list as published in the November/December 1997 issue of "Sport Rocketry" magazine.

NAR Contest Decertifications: The following motors will lose their certification for NAR contest use effective July 1, 1998 but are certified for use at NARAM 40. They remain certified for general sport flying for a period of three years.

FSI (all): A6-3,5 B6-0,3,5 C6-0,3,5 D18-0,4,6 D20-0,3,5,7 E5-0,4,6 E60-0,4,6,8 F7-4,6 F100-0,4,6,8,10

NAR General Use Decertifications: The following motors, having been out of production for more than three years, will lose their NAR certification for general use effective July 1, 1998.

Aerotech/Apogee: E6-2 F10-2
Estes: E15-4,6,8,P

R48: NEW MOTOR CERTIFICATION

The following motors have been certified by NAR Standards & Testing as of March 29, 1998 for general use as model rocket motors. They are certified for contest use effective May 28, 1998.

Apogee: 18mm x 70mm: D10-3, 5, 7 (20 Newton-seconds total impulse, 9.8 grams propellant mass)

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

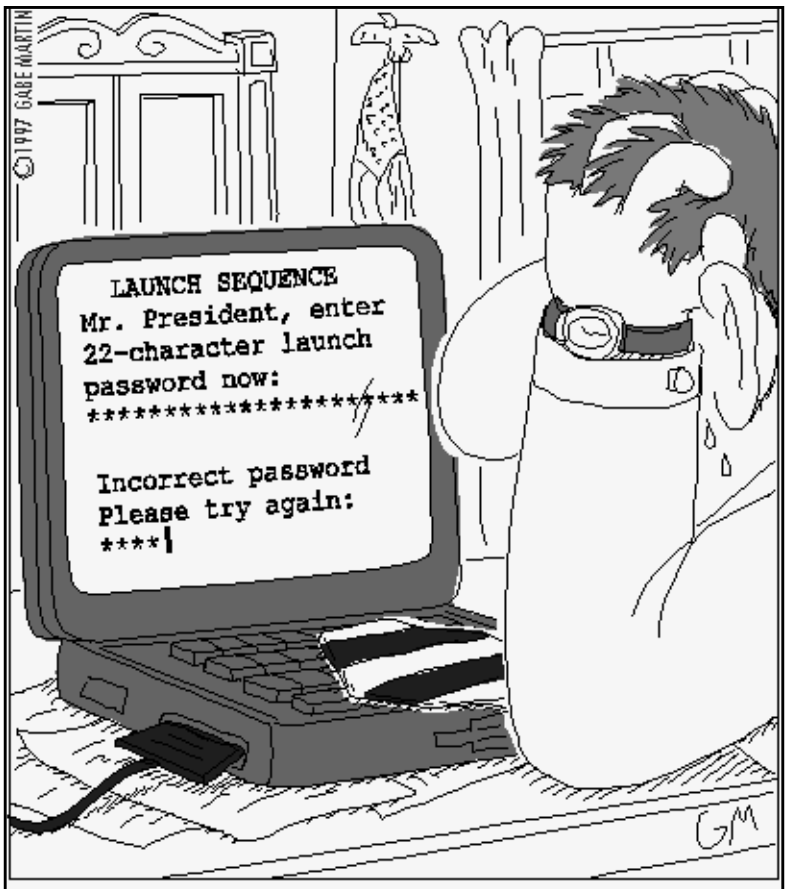
Jack Kane, Chairman

NIRA's Web Page Has Moved!!

The new URL is:

http://www.nira.chicago.il.us

Check it out!!!



For once, the computer saves the world.