



MAX-Q

HARA

Newsletter of the Huntsville Area Rocketry Association

Volume 13, Number 1, August 1999



The site of NSL 99'. This was taken Saturday morning, the best flying day of the weekend.

HARA and SoAR Co-Host National Sport Launch 99

Ardmore, Alabama

By: Chuck Andrus

Staged on Memorial Day weekend, the National Association of Rocketry's National Sport Launch '99 has come and gone. I don't have a lot of range statistics to throw around, nor details of some of the most interesting flight I've ever seen, but I would like to share a few of the highlights of the launch in a pictorial layout. Even though I was flipping burgers at the HARA tent all weekend, I was still able to soak up some of rocketry's best!



George Gassaway's unique rocket-powered glider

Check out some more photo highlights of this exciting three-day weekend starting on page 4

Inside **MAX-Q**

NSL '99 Highlights.....	1,4
Advisor's Ascent.....	2
RMS Tips and Tricks.....	3
Scratch Building.....	6

Product Review: Magnelite Igniters.....	7
Construction Feature: Rocket Rotisserie!.....	8
Space Camp Saturn Launch	13

MAX-Q

Vol. 13, No. 1 August 1999

Editor: Brian Day

Contributors: Chuck Andrus, Phillip Burroughs, Vince Huegele, Ronny Tipps, Mark Tygielski, Greg Warren

MAX-Q is the official newsletter of the Huntsville Area Rocketry Association (HARA), also known as NAR Section 403 and Tripoli Huntsville. Subscriptions are included as part of membership dues, or available to non-members for \$12.00 per year (4 issues). Any material contained in **MAX-Q** may be used freely, so long as proper credit is given. The editor welcomes any suitable material submitted for publication.

Previews of **MAX-Q** can be found on HARA's web page located at:

<http://hiwaay.net/~bday/hara>

Send all submissions or payments to:

HARA
1403 Joshua Drive
Huntsville, AL 35803

Submissions may also be made in electronic form via email to:
bday@hiwaay.net.

HARA Officers

President	Brian Day
Vice President	Chuck Andrus
Secretary	Phillip Burroughs
Treasurer	Mark Tygielski
Adviser	Vince Huegele

1999 Membership Dues

- Individual: \$12 / year
- Family: \$20 / year

(pro-rated quarterly for new members)

Contact any club officer to join

Advisor's Ascent

By Vince Huegele

In many fraternal organizations there is an officer designated as Historian. His role is to document the group's actions for future record. We don't have that office, but as the only original HARA active member and the default corporate memory, I have some observations about the present that I will present in the context of the past.

If you could plot out HARA's activity success (why would I try to graphically depict some intangible aspect? ... because engineers like to graph everything!) you would see two significant peaks. The first major rise would be in 1988 when HARA hosted (and won) NARAM-30. That major accomplishment put the young club on the national rocketry map. After 1990 the curve would subside and flatten a bit until forming another high rise – now. The regional launch last October and the NSL this May asserted HARA again as a well-organized, experienced, major rocketry group. The size and activity of the monthly launches has surpassed the previous HARA 'golden age' of the late 80's. Business is great. So many people from far and near - often far- are flying regularly with us. HARA is clearly in a renaissance.

I would also say the entire hobby is in a renaissance. Not since the late 60's has there been this much intensity in the industry. There is a massive proliferation of rocketry vendors and product accessories. The technology is booming as many rocketeers experiment, discover, and report their progress. Things that didn't exist until recently, but were greatly needed for high power– altimeters, igniters, parachutes, RMS, reinforcement materials, and all manner of useful procedures - are now available. The modeler has capability and opportunity as never before. The other surge is the volume of people involved. HARA's, and other clubs' launch attendance is massive because so many people are flying big rockets now. The larger number of active hobbyists fuels the industry further.

As we just observed the 30th anniversary of having been to the moon (not 30 years of being there), and as we see a continuing entropy in the American space program, I wonder if we're not returning to the pre-Sputnik days, where amateurs did most of the dreaming and flying while the public ignored the sky. Maybe the time is right for the next teenage Goddard or von Braun to meddle with models in their garage and test them out at our field. My catch phrase for our hobby has been, "you get to be your own von Braun." As our rocket passion propagates, another one will surely emerge from our ranks.

I don't see why this year should be a peak in the HARA success plot, but have the curve instead be more of a continuing rising slope as we fly into the next century. There are still a lot of rockets to build, people to certify, and clouds to pierce. Enjoy these good old days; rocketry is doing very well. HARA remains on ascent.

Fly high,

Vince

HARA Section Advisor

RMS Tips and Tricks

Here are some useful tips I've picked up over the years for using and maintaining reloadable rocket motors:

From: Gary Rosenfield (Pres. AeroTech)

- Always use grease sparingly. Apply a thin coat of grease to the o-rings. If grease covers the face of the delay element, ejection charge reliability will suffer. Use enough grease on the threads to allow the closures to tighten smoothly.
- Make sure you shake the completed motor, ejection cap up, before installing in the rocket. This settles some of the ejection charge in the transfer cavity above the delay element, which helps to ignite the charge when the delay burns out.
- Make sure the end closures are tightened completely against the case. This preloads the o-rings to prevent combustion gas leakage.
- The delay element or delay spacer must protrude slightly (about .020"-.030") above the forward closure after being installed. When the closure is tightened, the delay or spacer compresses the delay o-rings.
- Ensure that the motor is cleaned thoroughly after each use. Residues, especially in the forward closure delay o-ring area, can prevent proper sealing and result in the forward closure being turned into a nozzle.
- Inspect the o-rings for nicks, cuts, thin sections or other defects. AeroTech will replace these or any other defective parts you find in your reload kits. Defective o-rings can cause hot gas leaks and motor failure. Don't use a reload kit with defective or missing parts.
- The parts must be assembled in the correct order and location. We've seen o-rings stretched around the end closure threads, for example. Needless to say, the subsequent flight using that motor was less than perfect.
- If you have a misfire and need to remove the aft closure and nozzle insert to install a new igniter, hold the motor nozzle up and avoid moving the liner or other internal parts. If the delay moves after the ejection charge is installed, the charge may leak under the delay o-rings and cause a forward seal failure.
- Don't leave a motor assembled for an extended period. This can cause a compression set of the delay element. If necessary to store the motor before launch, loosen the aft closure slightly (a couple of turns) to reduce the preloading of the delay o-rings.
- A real indication of trouble is if you have parts left over. Check your assembly again, or call AeroTech.

Other Useful RMS Tips

Even though it's a no-tool process, the following tools and supplies are useful for reloadable motors:

- A hobby knife is useful for clearing out the ejection transfer port in the forward closure.
- The edge of a 6" steel ruler can be used to (gently) scrape any carbon build-up from the inside ends of the motor case.
- A bottle brush (from the supermarket) works wonderfully for scrubbing out the inside of the motor casing.
- Kerosene or Hoppe's Powder Solvent (from a gun shop) are good solvents to clean motors with.
- "Wet Ones" or baby wipes are very handy to have around, not only for your motors, but for your hands.
- Super Lube aerosol spray is a convenient substitute for the lube gel that comes with motors. The spray isn't as likely to be over-applied, and also makes it easier to lube inside the motor casing.

Build The Future

Ever see a kid at a launch just watching everyone else prepping and flying their rockets, not quite sure how to get involved? Here's a tip from HARA member Mark Tygielski.

"I saw this kid just sitting back kind of envying everyone else, and I had an old Estes rocket lying in the back of my truck, so I gave it to him, with a B motor and igniter. His eyes lit up, and in just a few minutes, he was flying his very own rocket! It really felt good!"

Why not bring an old rocket to the HARA launches for just this purpose? It not only feels good, but it just might recruit a new rocketeer into the hobby.

We've Moved!!!

Please note HARA's new mailing address and phone:

HARA
1403 Joshua Drive
Huntsville, AL 35803
(256) 881-9149

NSL Photo Highlights



This is a candid shot of Brian Day, HARA president, with one of his frequent flyers.



HARA is fortunate to have George Gassaway regularly attend launches in North Alabama. At NSL he flew many of his radio-controlled models, as well as the actively guided "Sun-Seeker."



What HARA launch would be complete without celebrities? Homer Hickam, Jr., author of "Rocket Boys," stopped by to sign autographs, shake hands and share fond memories. This autographed Saturn V may never fly again!



Another of George's crowd pleasers at liftoff.



Of course, there were scores of beautifully detailed scale models for the Mick Wilkins Memorial Sport Scale Meet.



Those innocent looking power lines didn't look so innocent with rockets draped across them. A storm system moved through the area late Sunday, whipping up the Southern winds, and freeing the casualties from their lofty roost.



Here are a few undoubtedly hot and thirsty individuals passing through the RSO area. Lines rarely formed, regardless of the relentlessly heavy traffic, a testament to the thorough organization of the SoAR operations at the range.



They just came from everywhere for NSL '99!!!

More photos on page 14!

Chuck's Scratches

by Chuck Andrus

I overheard a conversation at a recent launch that kind of piqued my interest. The topic was about scratch building, and the accompanying expense. I haven't given it much thought before, but the guys had a point. Why would I scratch build when I can buy a kit for the same, or even less money? To scratch build or not to scratch build...? that is the question. (c'mon...I'm trying to make this at least a little entertaining!) Let's take a few moments to look at some of the reasons why a newcomer or veteran to rocketry might choose one approach over another.

The Personal Touch

Before I actually started scratch building, I too used to look to economy as the driving factor. My 6" L2 certification project helped me realize the bottom line isn't always the bottom line. For nearly the same cost, I could have probably built a Bruiser (or other similar kit), but I wasn't able to find exactly what I wanted. I prefer a somewhat unconventional fin shape, flexible motor configuration and airframe assembly/hardware. The choice was either buy a kit and toss the motor mount rings, fins, and buy more tube couplers and assembly hardware, or freelance it with my own choice of parts and assembly techniques, resulting in a product built exactly to my specifications. Additionally, the satisfaction and thrill of building a successfully flown original design will be all mine.

Scaley

I don't have much experience as a scale modeler, but herein lies another reason to scratch build. Mark Tygelski, Brian Day and I have examined enough scale Nike Hercules drawings (don't ask why... if we tell you, we'll have to kill you) to note the available models as well as data "scaled" by rocket manufacturers is out in the weeds. Of course, there are many good reasons for a mass producer to massage the scale of a model a little. Most missiles are designed with instability as a feature, so flight controls have maximum efficiency. To build a model to exact scale, for the most part, would be disastrous, without special consideration of stability issues (George Gassaway's models, for example). That's another article all together, but does explain why scale-like kits frequently bend the numbers a little. If you want an exact scale model of a specific airframe, you'll probably have to do a lot of research of the full scale vehicle, and build your model according to the data you gather.

Ouch

After the I357 passes through the upper motor mount ring of your Vulcanite as it cracks the sound barrier, you'll quickly become familiar with another reason to scratch build, or "Kit-Bash", as the case may be. As the fallout gently rains to the ground, mocking you with each fin

dancing in the air like a snow flake on a calm winter day, you might think to yourself..... "What can I do to this thing next time so it will handle More Power?" (insert Tim Allen grunt here). Scratching your head with the fins in your back pocket, you watch a couple curious kids stir an ant hill at the edge of the field with the remnants of the nearly unrecognizable body tube. Ahhh yes. "A more durable whatchamacallit..... or a fiber glassed whatsit..... might have prevented this." We can rebuild it. We can make it better, stronger, faster. We have the technology.....(70's...had to be there I guess).

Soooo. Your first high power capable kit is now also your first kit "bashed" model as well. Sure, it needs a payload section, and maybe a "zipperless" body tube configuration. Have at it. Make it what you want. Kits are nice to build, but when it's time to put it back together after a flight featuring multiple rapid direction changes (shred/zipper/cato....you know what I mean), use your imagination.

Does Size Really Matter?

Mosquitos are bad this year, eh? 6" upscaled Mosquitos that is. Or what about a 12" Fat Boy? Two more reasons to scratchbuild. If you are fond of a rather interesting production kit, how about making it bigger? After all, if it's fun to fly on a B-6, it's got to be somewhere around 256 times more fun on an I-211, right? I heard rumor of a club member considering upscale of an Estes Condor ARV. You know.... the one with two gliders. For the record, I've got R/C gear for at least one of the parasite aircraft. Get the idea?

Oh yeah. One other fairly common factor influencing the decision to scratch build or not. If you are in a hurry... well, don't be. Kits tend to go together faster, since you start out with all the parts in the same place (though help from a pair of three year old hands keeps me busy looking for "misplaced" parts). I tend to change materials and specifications of my scratch built designs based on what is available at the time. No sweat. Just something to keep in mind. Time is not necessarily on your side

There are many more reasons to scratch build or kit bash than can be mentioned here, and as many reasons to built from production kits. When push comes to shove though, and you can't find a kit of a model you would like to build, or would like to come up with something a little out of the ordinary, remember that all the resources and help you could possibly need are only an email or a phone call away. HARA is crawling with members more than happy to help with any project you could dream up. We are fortunate to have the knowledge, resources and experience of an entire club to share in construction and launch of projects of all flavors. Cast your ideas on the table at the next club meeting. Guaranteed you'll get a bite.

Product review:

Magnelite Igniter Kit

by Rich Gramly

Rocketflite

836 Houston Dr.

New Haven IN 46774

<http://www.rocketflite.com>

The Magnelite igniter kit comes from Rocketflite, the people who built the Silverstreak motors. In fact, the advertising implies that if enough Magnelite igniter kits are sold the company may be able to put the Silverstreaks back on the market. The basic kit consists of a two-part pyrogen mix. Pre-soldered leads are available in 16, 32, 48, and 64-inch lengths. The pyrogen costs \$16.95 and is described as enough to make "...over 800..." of the 16-inch igniters. The bare igniter leads cost \$6.95/ML-16; \$8.95/ML-32; \$10.95/ML-48; and \$12.95/ML-64. This equates to right at 58 cents, 74 and 1/2 cents, 91 cents, and \$1.08 each respectively for the bare leads. I bought 24 of the 16-inch leads and 12 of the 32-inch leads. With shipping and handling this brought my total purchase to \$45.45 for a total of 36 igniters and lots of left over pyrogen for additional igniters later.

The package arrived within three weeks of my mailing the personal check (they don't take plastic, company checks, or COD at this time) and signed liability release form and affidavit of age (18). (First time buyers must sign and date the release before Rocketflite will ship). The 6-inch cubic box was sent by USPS and arrived in my mailbox with no apparent signs of wear or tear. Inside I found a stack of paper including a copy of my order, a one-page instruction sheet, a page of descriptive information, and a blank order form. Three zip lock type storage bags contained my three sets of bare leads. Another baggy held the powdered part of the pyrogen in a plastic bottle, a popsicle stick, and a disposable plastic pipette. The final baggy contained the liquid part of the mix in a glass jar with a metal lid. Both containers were double-sealed with tape, and the glass jar was well protected by foam chips in the baggy.

The instructions were adequate, but could stand a good editor. The word "too" was always misspelled as "to" which led to some mental gymnastics during the first reading. The six basic steps necessary to make the igniters again were adequate, but could have been improved through the addition of a couple of simple line drawings. These illustrations would have served the reader much better than the two rather poor inkjet images of an igniter burning and a rocket launch using Silverstreak motors.

Basic mixing instructions have the user stir the liquid portion in the glass bottle and then add the powder and continue stirring until the mix approaches a "ketchup" like consistency with a silver-grey appearance. While the

visual imagery is odd, it turns out to be an accurate description of the texture and consistency. The bare leads are dipped into the paste with a circular motion and then allowed to dry with the dipped part of the lead hanging over the edge of table. The instructions describe a bending back of the leads onto themselves as a means of applying a larger dollop of igniter paste. I dipped all 32 of the smaller 16 inch leads without the bend back and dipped eight of the 32 inch leads straight as well. The other 4 longer leads were doubled back as described. Each time I dipped the leads in and lightly tapped them on the side of the jar, they came out with a good coating of paste that held to the lead with very little running or dripping. Even the doubled leads held their extra heavy coating without dripping off or sagging. The instructions warn against double dipping. When I had finished making the 32 igniters, the bottle of paste was only slightly diminished. While I'm not certain of the claim of 800 ML-16 igniters from a single kit, it does appear that several hundred igniters could be made from that single bottle.

The instructions say that 1 to 3 hours are required for the paste to dry and I found that accurate. Environmental conditions at the time were about 80 degrees F, humidity about 60% and I had several fans going. Within two hours the paste was dry to the touch. I set aside a small pea sized piece of the paste to dry and do a test burn later. I sealed the metal lid to the jar tightly and resealed that with tape. I put that into a plastic bag and then placed that bag back into the original baggy with the foam chips. The instructions say that the leftover paste can be stored at between -20 and 140 degrees F. I chose to store mine in a back corner of the refrigerator. The plastic pipette would be used to add Naphtha (user supplies this) to the paste if it dried out and became too thick in storage.

I lit the small piece of pyrogen with a match for a test burn and was impressed with the result. The advertising claims a burn temperature of around 6,400 degrees Fahrenheit. While I didn't have a pyrometer to test the claim, I did walk around with a bright, blue-white after-image for several minutes! The burn was very hot, fairly long lasting, and produced little residue that might potentially clog nozzles.



"The Thrill of Flight, and the Agony of Digging It Up"

Build a Rocket Rotisserie!

by Phillip Burroughs

Before venturing into my first High Power Rocket project, I asked what club members have done to make fiberglassing easier. I found out that most had performed the fiberglassing by themselves (with no help) and that all recommended a jig to hold the body tube horizontal while applying the fiberglass cloth and resin. Some did mention that the horizontal jig was a plus for applying the fiberglass and resin, but it is also a drawback since the resin tends to gravitate to the lowest point (one side) of the body tube. This would create a high ridge along the body tube length and also be subject to cracking, (if not sanded down to the fiberglass material). A method to correct for the gravitational creep of the resin during curing is to periodically/continuously rotate the body tube. This means that a constant presence is required during the several hour curing process with the possibility of inadvertent cloth adjustments with manual handling. Another recommendation was made to use a hair dryer or heat gun to speed up the curing process. This can be better accomplished with both hands free. Since I too, thought that I might be fiberglassing by myself and as a result of the comments and experiences collected, I designed and built an electric rotisserie to hold a rocket body tube. This design also works great as a holding fixture for painting rockets. Below is a list of parts and procedures I used to build the Rocket Rotisserie. Hopefully, this will help you build your own or spur other ideas.

PARTS LIST:

1 qty	Sunbeam Rotisserie Grill Kit (Model 0989)	\$14.99	(Big Lots)
1 qty	6 ft length x 1-1/4" Diameter Closet Rod (wood)	\$ 7.35	(LOWE's)
1 qty	8 ft length of 2" x 4" (Wood)	\$ 2.85	(LOWE's)
2 qty	4" Door Hinges w/ Screws (6 holes)	\$ 3.36	(LOWE's)
1 qty	5/16" Square Head x 1-1/2" Machine Screw	\$ 0.66	(LOWE's)
1 qty	1/4"-2" Hex Head Lag Screw	\$ 0.16	(LOWE's)
3 qty	1/4" x 1-1/2" Metal Washer	\$ 0.78	(LOWE's)
2 qty	24" x 1" x 4" (Scrap Wood)	\$ 0.00	(Scrap)
2 qty	1/4-20 x 4-1/2" Carriage Bolts	\$ 0.32	(LOWE's)
2 qty	1/4-20 Hex Nuts (7/16" wrench, 12 Pack)	\$ 0.78	(LOWE's)

Total Cost	\$31.25	(May '98)
------------	---------	-----------

To build and prepare components:

- 1) Cut off two 1-ft lengths of the 2x4, with the cuts being perpendicular to the long edge (See Figure 1).
- 2) Place the short lengths (A & B) just cut on the remaining 6 ft piece (C) of 2x4 (See Figure 2).
- 3) Make a pencil mark where the inside edge of the vertical legs (A & B) meet with the top side of the horizontal piece (C, 6 ft piece 2x4) (See Figure 2).
- 4) Measure the diameter of the head of the door hinge pin and write it down for use in STEP 5 and later.
- 5) Use the value recorded in STEP 4 and mark parallel lines on either side of the lines you marked on Part C in STEP 3. This will give you the width of material that you need to cut out in the next step plus a small tolerance. (i.e. material needed to be removed is really the radius of hinge plus the hinge plate thickness)
- 6) Cut slots between pencil marks on Part C (see Figure 3), the minimum depth should be at least half the diameter of the hinge pin head measured in STEP 4.
- 7) On the inside corner of Parts A & B mark a horizontal line the height of the hinge pin head diameter, measured in STEP 4.
- 8) Cut a notch from the pencil mark to the lower edge on Parts A & B. Minimum depth should be at least half the diameter of the hinge pin head diameter measured in STEP 4.
- 9) Align short legs (Parts A & B) vertically with the end of horizontal piece (Part C), place door hinge on interior corner with the pin placed inside the slots.
- 10) Use pencil to mark screw hole placement and top edge of hinge on vertical legs (Parts A & B).
- 11) Place short legs (A & B) on flat surface and drill pilot holes for the two outer hinge screw locations.
- 12) Attach the outside two hinge screws, leaving the center hinge screw out. One side of the each hinge is now attached to Parts A & B.
- 13) Drill the center hinge screw location all the way through Parts A & B. Hole size should be large enough to let 1/4" carriage bolt to slide through freely.
- 14) Place short legs (A & B) vertically and fold free side of hinge down and mark hinge screw hole placement on Part C, both ends.
- 15) Drill pilot holes for the hinge screw locations on Part C.
- 16) Place short legs (Parts A & B) back in vertical position and attach hinge screws in place for both A & B on opposite ends and same side of Part C. Now Parts A & B are attached to Part C as in Figure 4.
- 17) Drill 1.5" - 2" deep hole (diameter needs to be large enough to relieve stress on wooden rod (Part F) so that cracks do not form) in the center of each end of closet rod.
- 18) Screw in 5/16" x 1-1/2" square head machine screw into hole in one end of closet rod (Part F). Note: Square head machine screw is sized to match motor receiver hole.
- 19) Screw in 1/4"-2" lag wood screw with one washer into hole in the other end of closet rod (Part F). Washer hole required enlargement to fit over wood screw.
- 20) Place rotisserie motor on mounting bracket and place machine screw in motor notch. Adjust height of motor bracket next to outer side of the short vertical leg (Part A) so that the closet rod (Part F) clears the top. Mark motor bracket location on Part A.
- 21) Mount motor bracket to outside of short vertical leg (Part A) with hardware provided in rotisserie kit.
- 22) Place motor on motor bracket and insert machine screw end of closet rod (Part F) into motor receiver hole. Take wood screw end of closet rod (Part F) and adjust opposite rotisserie bracket location on outer side of opposite short vertical leg (Part B), and mount. Make sure that closet rod (Part F) is

clear of top edge of short vertical leg (Part A & B) and that there is a slight slope on the closet rod (Part F) so that any liquids that spill onto rod, flow away from the motor end (A) and toward Part B.

- 23) Take scrap pieces of wood (24" x 1" x 4", Parts D & E) and cutting a 45° angle (Optional cuts) off each end on the 4" side (See Figure 5).
- 24) Mark a line at the midpoint of 24" length of scrap wood (D & E) across the 4" width (See Figure 5).
- 25) Place Parts D & E centerlines in center of vertical short legs (Parts A & B, respectively) and clamp in place with the wide base set at the same level as the horizontal (Part C) piece bottom.
- 26) Using the center screw hinge hole in Parts A & B as a guide, drill a hole all the way through the scrap of 24" 1x4" crossbrace (Parts D & E). This hole diameter should be the same as used in STEP 13.
- 27) Mark holes in scrap wood (Parts D & E) as "Operational Hole".
- 28) Fold down short legs (Parts A & B) on to horizontal piece (Part C) and drill a hole (same diameter as STEP 13 center hinge screw location). The location of this hole is not critical, but I placed each in the center width (A & B) and about an inch below the hardware mounted (in STEPS 21-22) on A & B, so that the "Storage Bolt Hole" will be as far away from the hinge pivot point as possible. This hole will eventually go all the way through Parts A, B, C, D & E (see Figure 7). Note: The "Storage Bolt Hole" can go through STEPS 21-22 hardware if you like for a hard surface to tighten against.
- 29) Raise Parts A & B to complete holes through Part C.
- 30) Align D & E (as in Figure 7) so that the ends and sides line up on the opposite side of Part C from Parts A & B and clamp in place.
- 31) With Parts D & E clamped in place, drill holes all the way through both Parts D & E using holes made in STEP 18 in Part C as guides. Marks these holes in Parts D & E as, "Storage Holes". Also, mark on Part C and Parts D & E which piece go together for "Storage", since misalignments between holes may not let Parts D & E be interchangeable for nice storage on Part C.

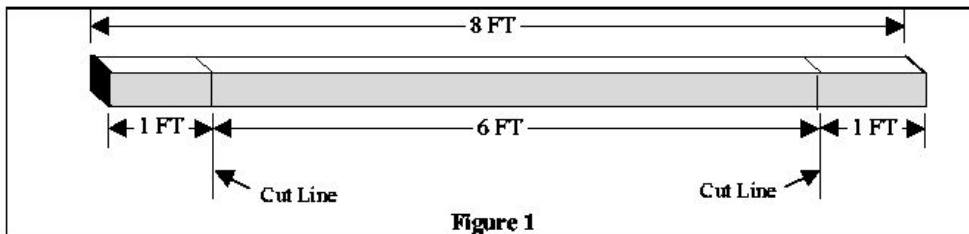


Figure 1

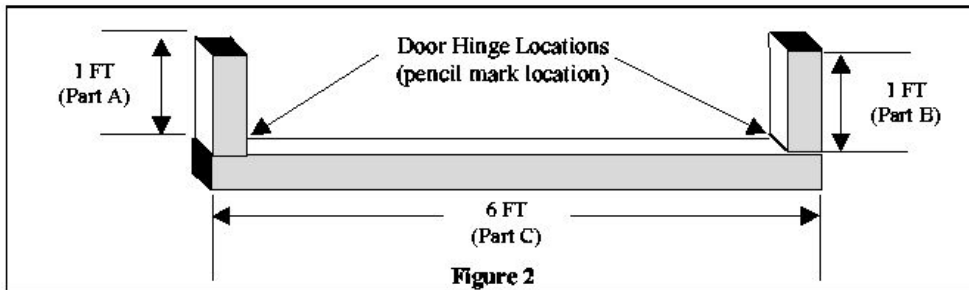


Figure 2

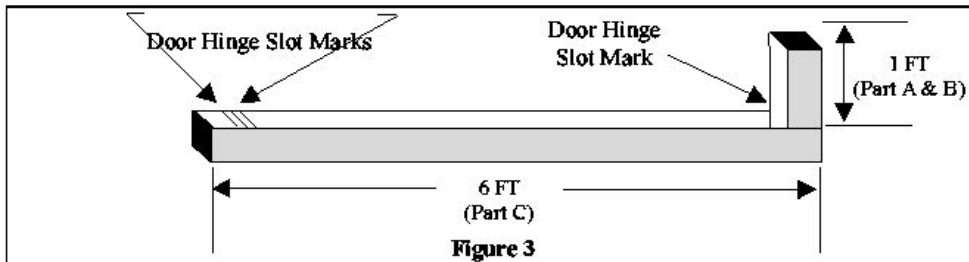


Figure 3

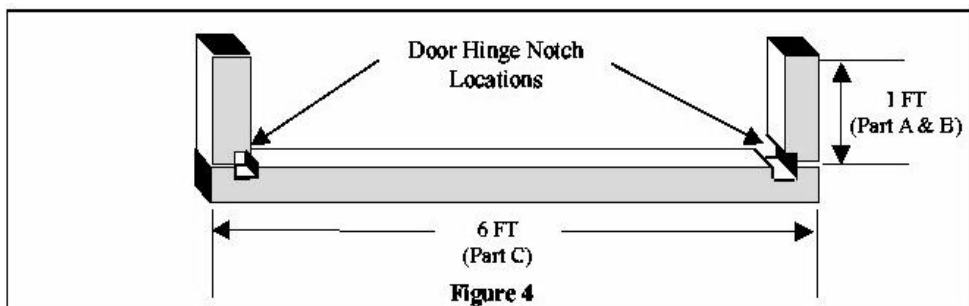
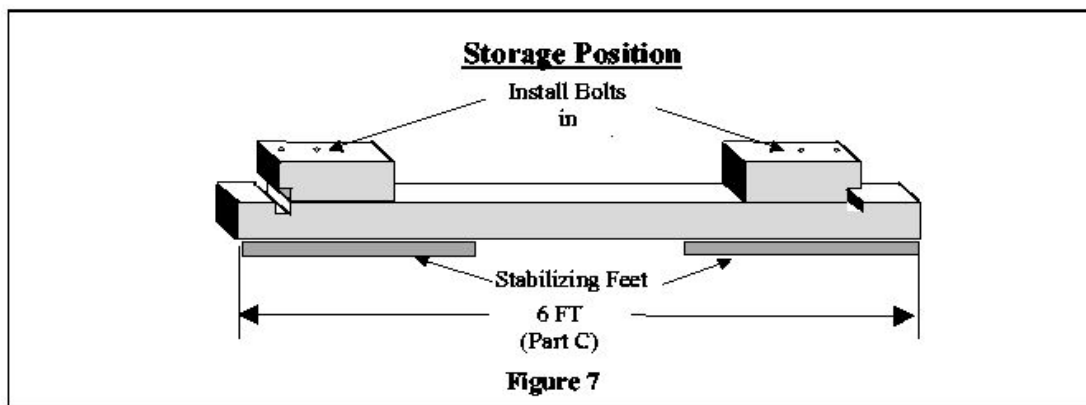
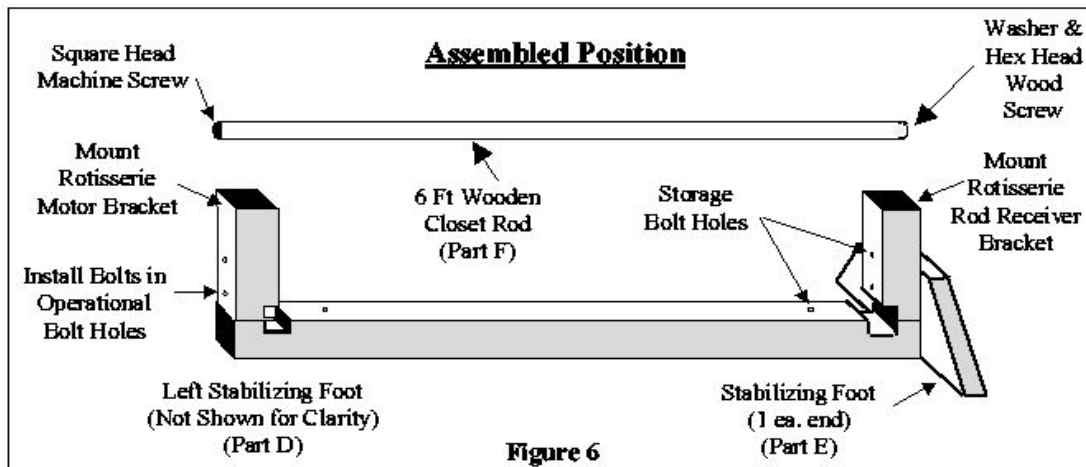
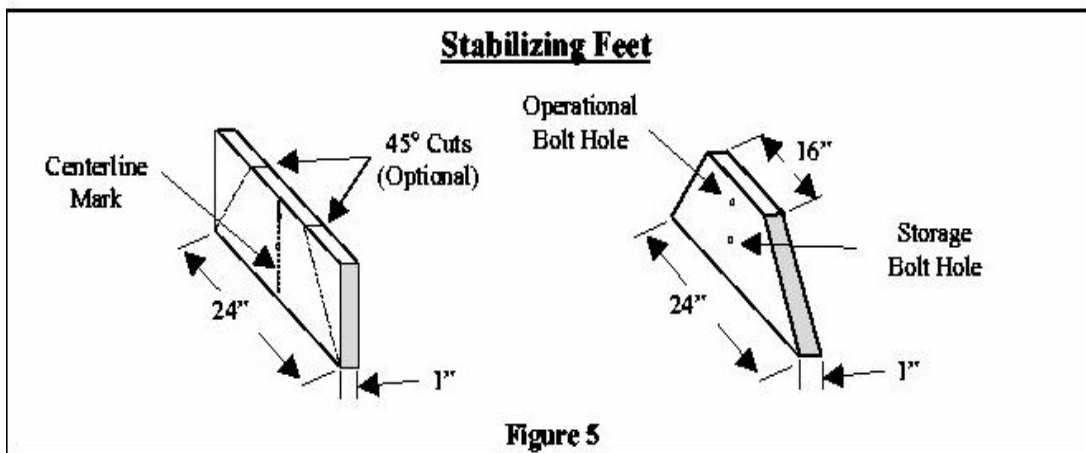


Figure 4



Now that all the hardware, assembly and storage points have been made, it's time to put it to work. Next, install one carriage bolt and washer through the Operational Bolt Hole on the Stabilizing foot then through the vertical short leg Operational Bolt Hole and then tighten up the 1/4-20 hex nut against the hinge plate. Repeat carriage bolt installation for opposite end. Now place motor on mount and install square head machine screw into motor receiver and place the lag wood screw on top of rotisserie receiver on the opposing end. Place the washer on the closet rod wood screw end on the inside lip of the opposing receiver so that wood does not hang up on the metal receiver. The "Head" of hex head lag screw acts as a retaining lip on the outside edge of the metal receiver. The wooden closet rod creates a positive pressure on the inside edge of the two vertical short legs (Parts A & B) to force the legs to stay open. The long carriage bolts also help keep the short vertical legs (Parts A & B) from folding inward on to Part C. Plug in the motor and test the operation to make sure everything works and rotates freely. One thing that was interesting about the motor in this kit was that the direction of rotation changes each time the power is removed and applied.

The Rocket Rotisserie is capable of rotating a 5'8" length by 2 ft diameter body tube. In my case for this first rocket, all I needed was a 3.1" diameter x 34" length. In order to make my body tube fit on the wooden closet rod, 1.25" diameter, I cut out a number of cardboard inserts (centering rings) and placed them on the wooden rod. I used about 8 rings in order to give the body tube some internal support while being fiberglassed, fearing that the cardboard tube may weaken from moisture in the resin and slippage on the closet rod as the rocket body tube rotated. I used some newspaper sheets to help the centering rings stay equally spaced while sliding the body tube onto the centering rings already mounted on the wooden rod. Then I added two more centering rings approximately 1" inside each end of the body tube in order to reduce resin from running on the inside of the tube and making it difficult to install the motor mount or interfere with nose cone fit. Very little

resin wound up on the inside of the body tube. Since the motor gearing will not allow you to overcome the motor torque while power is turned off. The motor was not used while laying up the fiberglass. The wooden rod was just placed on the mounting brackets attached to both vertical feet (Parts A & B). The wooden rod extending out of the body tube served as a very good handle and means to hand rotate the body tube during this process. When the body tube was completely glassed, I put the motor on the mount and attached the wooden rod to the motor to rotate. As the motor rotated the body tube, I was able to work out air bubbles, creases, and dry/wet spots in the fiberglass. Once I got the surface to my liken, I was able to apply a heat gun to the surface and just had to move it longitudinally along the body tube to speed up the drying process. I was also able to leave the Rocket Rotisserie alone and start performing clean up activities while some of the resin puddles were still wet.

I have not used the Rocket Rotisserie personally for priming/painting but know that Chuck Andrus has on some larger rockets. I was not able to because the 29mm motor tube on the rocket would not fit on the wooden rod. I believe that the 38mm motor tube should fit over the wooden closet rod (1.25" = 31.75mm diameter) but I haven't tested it out. Chuck told me that he used the rod primarily to do the painting. I believe this was due to the fin outer diameter may have been larger than the approximately 20" working diameter.

I designed the Rocket Rotisserie so that all the parts used in the "Operational Position" are reused in the "Stored Position", i.e. the long carriage bolts, nuts, and washers. I did this so that I would lose not the parts between use. The bolts, washers and nuts used in the "Operational Position" that go through the Stabilizing Feet (Parts D & E), short vertical legs (Parts A & B), are used to hold the pieces together in the "Storage Position". The vertical short legs (Parts A & B) are folded down onto Part C with the Stabilizing Feet (Parts D & E) placed on the opposite side of Part C. The bolts are then used to hold the parts together by pushing them through the "Stabilizing Feet" "Storage Bolt Holes", then through Part C and the opposite sides short vertical legs. The washer is then placed on the end of the long carriage bolt and the nut tightened down to hold everything in place. This puts all the sharp edges on the same side of Part C with the mounting hardware. The only loose parts left over are: the rotisserie motor and the wooden rod. In this stored position you have a minimum profile tool ready for storage.

Hopefully, others will be able to get as much benefit out of this design as I and other HARA members. If anyone has improvements to this design, please let me know. I'm always looking for improvement ideas.

THE NATIONAL ORGANIZATION OF ADVANCED NON-PROFESSIONAL ROCKETRY

Tripoli Rocketry Association, Inc.

P.O. BOX 970010 OREM, UT 84097-0010
Voice (801) 225-9306 FAX (801) 225-9307

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE (HOME) _____ (WORK) _____
DATE OF BIRTH _____ OCCUPATION _____

MEMBERSHIP CLASS - CHECK ONE:
(Includes a one-year subscription to this magazine.)

	REGULAR	1st CLASS*
Senior (18 and Older)	\$75.00 <input type="checkbox"/>	\$94.50 <input type="checkbox"/>
Junior (17 and Under)	\$60.00 <input type="checkbox"/>	\$79.50 <input type="checkbox"/>
Canadian	1st Class	\$94.50 <input type="checkbox"/>
Foreign	Airmail	\$94.50 <input type="checkbox"/>
*1st class mail arrives up to SIX WEEKS earlier than regular.		
Membership ONLY (No Magazine)		
Senior (18 and Older)	\$45.00 <input type="checkbox"/>	
Junior (17 and Under)	\$30.00 <input type="checkbox"/>	

I, the undersigned, understand that the Tripoli Rocketry Assn. Inc. is not able to assume liability of any kind with regards to my activities or the activities of others. I agree to pursue my advanced rocketry activities in conformance with the Association's Bylaws and Safety Code, and that I will be an active member of the Association to the best of my ability.

DATE _____ SIGNATURE _____

GUARDIAN'S SIGNATURE _____
(If Under 21)

The fees above all include a one-time new member processing fee which will provide you with a Handbook and other materials. After your first year fees to renew will be \$10.00 less.



_____|_____|_____|_____|_____|_____|_____|_____|

Expiration Date (4 digits)

Membership Application

THIS MEMBERSHIP APPLICATION MAY BE COPIED FOR YOUR USE - ALLOW 2 TO 4 WEEKS FOR PROCESSING

Space Camp Saturn launch

by Vince Huegele

It was hot in the Alabama sun on the morning of July 19 when Space Camp dedicated their model flying field to Homer Hickam, author of the best selling book "Rocket Boys" and the movie "October Sky". The simple ceremony had Homer and the director of the Space and Rocket Center say a few words and unveil a plaque and a sign renaming the field after Homer.

HARA was represented by myself and Ronny and Greg Tipps. Ronny had two Saturn V's of a size to fly in the medium size field. Both were scratch built, about 1/250 and 1/144 scale, and had flown at HARA launches before. The larger one had been signed by Homer at the NSL launch in May. Ronny was the only HARA person who had a Saturn V built and 'broken in,' willing to fly when the Center called me last week to request a Saturn launch. (With more notice we could have done something more elaborate, but they just called days before the anniversary.)

After the brief speeches the dignitaries stepped out to the center of the field where Ronny had his own pad and firing system set up. Homer pushed the launch button for the smaller Saturn first, which had a nominal ascent. The orange nylon chute took its time unfolding, but finally blossomed above the crowd. He also fired the larger one, which tipped significantly and came down fast. The chute popped and opened at the proverbial last moment for a 'qualified flight.' Greg noted a fin was cracked on landing in the grass, but we were too happy from the acceptable performance to be bothered by that. Both rockets were authoritatively fired on command in front of a crowd of almost seventy people, mostly camper kids, and many cameras from the press. It was very impressive, seeing the new full size Sat V in the background.

Homer was very proud of the honor. A space camp counselor said over 600 rockets were fired a week off the field. (So it's no surprise that the trees have so many model pieces in them!)



Ronny and Greg Tipps admit their obsession with Saturn V's at the Space Camp Saturn V launch and dedication of the Homer Hickam Model Rocket Field



The Tipps' Saturn V launches in the foreground, before an impressive new backdrop

HARA Acquiring Reloadable Rocket Motor Inventory

In order to simplify the process of high power certification, HARA is in the process of acquiring an inventory of reloadable rocket motors to be made available to club members for their use at club launches. Dues-paying club members will be able to sign out the motor casings free of charge. Non-members will be able to use the casings for a nominal fee (the fee schedule is being worked out; details will be made available soon).

Users of club motor casings should clean them thoroughly and return them promptly to a club officer. If the casing has been damaged or lost, the user will be expected to replace the casing with a new one.

The following AeroTech and/or Dr. Rocket motor systems have either been acquired or are planned:

Motor	Available Reloads	Status
29/180	G75W, H128W, H238T	Acquired
29/240	H97J, H180W, H220T	Acquired
38/240	H73J, H123W, H242T	Acquired
38/360	H112J, I161W, I357T	Acquired
38/480	I154J, I221W, I300T	Acquired
38/720	J350W	Planned
38/1080	J570W	Possible
54/852	J90W, J180T, J275W, J460T	Acquired
54/1280	J135W, J415W, J800T	Acquired

To arrange for motor use, please contact a club officer.

HARA NSL '99 T-Shirts Still Available

HARA still has a limited quantity of the specially run NSL '99 T-shirts available in sizes M through XXL. The shirts are %100 cotton ash colored (light gray) fabric, imprinted with the HARA logo on the back (see right), and "HARA NSL '99" above the front pocket. Price is \$8.00 each (\$9.00 for XXL).

Now you can proudly display your club affiliation with a HARA T-shirt! Contact any club officer.



Although it never got to fly on its intended AeroTech L1120W motor, Dave Bucher's scratch-built Bullpup drew a lot of attention at the NSL launch



Safe recoveries were plentiful at NSL



Jason Yount's futuristic model rides a Blue Thunder reload



Johnnie Paul's Lance Beta on a White Lightning motor

Editor's note:

*In order to reduce mailing expenses, HARA would like to hand out as many issues of **Max-Q** as possible at meetings and launches. **Max-Q** will also be available on the HARA web page in Adobe PDF format. If you would like your name removed from the postal mailing list, please let the editor know.*

Thanks,

- Brian

“Basic research is what I’m doing when I don’t know what I’m doing”

- Wernher von Braun

HARA Membership Application

Date _____

Annual Dues: individual membership \$12.00; family membership \$20.00 (pro-rated quarterly)

Name: _____
 Address _____
 City, ST ZIP _____
 email address? _____

Phone: _____ NAR Member? Y N # _____ Insured? Y N
 Age (if under 18) _____ TRA Member? Y N # _____

Send to: **HARA**
 1403 Joshua Drive
 Huntsville, AL 35803

Ph: (256) 881-9149



Saturn V replica at the U.S. Space and Rocket Center is dedicated with fanfare and fireworks
(photo: R. Tipps)

Huntsville Area Rocketry Association
 1403 Joshua Drive
 Huntsville, AL 35803

Return Requested

COUNTDOWN '99

08/28	HPR and Model Rocket Open Range 10,000 ft (AGL) FAA waiver Ardmore, AL - 10:00 AM
09/25	HPR and Model Rocket Open Range 10,000 ft (AGL) FAA waiver Ardmore, AL - 10:00 AM
10/30 10/31	2 nd Annual Rocket City Blastoff! 2-day Regional Model Rocket and High Power Launch Ardmore, AL
11/20	HPR and Model Rocket Open Range 10,000 ft (AGL) FAA waiver Ardmore, AL - 10:00 AM

*** All launches subject to weather and field availability.**

HARA meetings are held on the 2nd Thursday of each month at 7:30 PM, at the office of the Huntsville Association of Technical Societies, 4900 University Square, Suite 4, HSV

First Class Delivery to: