



MAX-Q

HARA

Newsletter of the Huntsville Area Rocketry Association

Volume 11, Number 3, July 1997

HARA Launches NASA Open House



Brian Day's HV-ARCAS takes to the air on an AeroTech G64 before a crowd at the NASA MSFC Open House

HARA members were invited to present a model rocket demonstration for an Open House event at the NASA Marshall Space Flight Center on Saturday, May 3. Hundreds of spectators witnessed the launching of model rockets (through "G" power) during two different flight sessions. The weather was breezy but otherwise clear on the morning after a cluster of violent thunderstorms and tornadoes swept through the area, encouraging HARA rocketeers to keep altitudes to a minimum. About a dozen models were flown for each session, ranging in size and altitude with the full countdown ritual. All systems worked as designed, and the crowds applauded the larger models and enjoyed asking questions.

Greg Warren brought a beautiful static display of scale models, including a newly finished Sidewinder missile, and flew the PA system for the rest of the day. Mark Tygielski pleased the crowd by unveiling last year's Christmas present (from himself) - a Crimson and White (surprise!) LOC Bruiser EXP. And no, the 8-foot Bruiser didn't fly. Mark made some interesting flights, though, with his F-powered Ace Shark and a Quest DCX-B.

Kevin Cornelius made his one and only flight of his Vaughn Brothers VB Extreme 54, a gorgeous flight powered by a G40,

which unfortunately caught a stiff breeze aloft and drifted into the trees. It's such a helpless feeling to look 60 feet straight up and see your beautiful rocket dangling there... Dave Gannett also managed to hit the tree area with his LOC Onyx, but finally found the wayward rocket on his way home.

Vince Huegele manned the launch controller and also managed to fly his D-powered Big Bertha, Black Brant, DC-X, Hercules and a custom C-powered crayon. Brian Day flew an Estes Phoenix on an F24 and an AeroTech HV Arcas on a G64, both of which caught some pretty high winds aloft and drifted well over the rocket-eating trees and into the cow pasture.

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Editor: Brian Day

Contributors: Vince Huegele, Kevin Cornelius, Mark Tygielski, Greg Warren

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

Send all submissions or payments to:

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

HARA Officers

President	Brian Day
Vice President	Kevin Cornelius
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Adviser	Vince Huegele

Have you forgotten to pay your 1997 dues?

Reminder. HARA membership dues are \$10.00 per year (\$5.00 for additional family members, up to \$20.00 maximum), and may be paid to any HARA officer.

Adviser's Ascent

by Vince Huegele

It wouldn't be possible for me to be quiet even by leaving the offices of president and newsletter editor. So I am inventing a column here to retain a soapbox. The advisor has been an invisible position in HARA all these years, but is still an artifact in the NAR section officers structure. It's really intended for an adult when sponsoring a kids' club, but now we can pretend it's an honorary post of an esteemed consultant.

I didn't want to fade into the haze without some parting comments, mainly about why I chose now to bow out. (Actually I didn't want to be taken to the Village to be interrogated about why I resigned). I'm certainly not tired of rockets, particularly with the big birds proliferating, and there are no political problems. So, a la Letterman, I have a list:

The Top Five Reasons for Vince stepping down...

5. Ten years is long enough - murderers get paroled quicker.
4. Out of administrative ideas.
3. Day job is sucking the life out of me.
2. Plenty of good people around to keep the program going.
1. Gonna' be a daddy!

There's something about having a stork attack that pushes the hobby stuff back a bit, at least until the kid can come out to the launches himself. So I'm going to have to put the parachute powder on the changing table for a while.

I would like to commend Brian, Kevin and Mark for taking the helm and holding HARA on course. The newsletter looks great, the web page is sharp, new people are coming in, and all of the aspects of a good club are on track.

And we have hats!

- Vince

Huegeles Launch New Project

- Project: BENJAMIN RAY HUEGELE
- Initialized: 9:47 am 6/30/97
- Specs: 6 lb. 15oz. 19.5"
- Status: Nominal, Operational
- Investigators: Vince and Sharal Huegele
- Status: red line

HARA extends a hearty welcome to its newest member, Benjamin Ray Huegele, and eagerly awaits his innovative contributions to the rocketry community! (Vince, how old does a member need to be to assume the HARA presidency? - bd)

HARA also welcomes the following new HARA members:

- **Chuck & Nick Andruss**
- **Shawn Askew**
- **John & James Beasley**
- **Phillip Burroughs**
- **Micah Butler**
- **Bill Eubanks**
- **Mike & Stephan Redfearn**
- **Mike Toelley**

Rocket R&D Aerobee Hi Kit Review

by Vince Huegele

The 4" diameter Aerobee Hi was my first 38mm motor rocket. It would also be the tallest bird I've ever done. I've built and flown 54mm motor powered rockets as part of the project SOAR team, but this kit was all mine.

The instruction sheet, like what comes with most advanced rocket kits, was overly simplified and poor. I suppose they can't all be as explicit as Estes or AeroTech, but if you're going to bag a kit, try to have assembly directions more than a generic "use lots of epoxy," and, "there are as many building techniques as there are builders." I had to draw out several dimensions to check how far the motor centering pieces went in the tube.

The materials were of very good quality and cleanly cut to the correct tolerance. Plywood centering rings and fins were smooth and without warp. The pieces dry fit together well without forcing, and that's impressive. Everything needed was in the bag.

Glass Action

This was my first attempt at fiberglassing an airframe. I had noticed large rockets live longer if they are reinforced, so this was the time to do it.

First, I rolled both paper body tubes, booster and nose sections, with medium weight cloth. Then they got a second layer of the same. I put one layer of light cloth over the fins and left a lip to go into the fillet. My adventures with the orbital sander were great. Power tools are the way to go! But get that dust mask!

The instructions didn't say where the middle centering ring for the engine tube went, but I found a place for it. I built a piston to connect to the fore ring. I left the aft ring off the motor tube assembly as I have learned to do to allow easier fin attachment. The motor tube goes in the body tube well centered and glued there. Then the fins can be amply filleted from the inside for sufficient structural integrity. After that the aft ring goes on. The outside fin fillets were finished more for cosmetics than strength. I patched, primed and sanded the final surface a lot to learn how the fibers fill.

The kit comes with nice balsa strips for the conduits that add a scale flair to the bird. The directions for installing the motor retainer clip weren't clear, so I made my own tabs with the screws provided.

The painting scheme was hard to follow exactly on the kit drawing. I referred to Peter Alway's book for detailing.

There are few kinds of orange paint on the market to choose from, but I used the Krylon Popsicle Orange for the body. It was a good color and gave the rocket a 'University of Tennessee' feel to it. The nose got aluminum enamel.

When it was all over, the body surface had kind of an acne cellulite texture to it that all my sanding and spot filling still didn't heal. But the process was educational. My first fiberglassing job wasn't as smooth as I wanted, but I know the rocket was now strong enough to take anything a 38mm motor can do. The tube edges and fin joints should handle normal, and maybe even rough landings.

Shoot it

I didn't get the Aerobee Hi ready for LDRS, but the chance to fly came at the Birmingham sod farm. I loaded up a Vulcan H300-7 to inaugurate the bird. The motor ignited well and the rocket took off nicely. I must say, as you are proportionally far away from these birds for safety when they go up, you consequently can't tell they're big honking rockets, so you almost lose the effect. Still, it was a cool flight. Right at apogee the upper section separated to bring out the four foot diameter chute. It was a walk to the landing spot, but all was well. A conduit strip had been slightly cracked by the ejection recoil, so I made a note to ease back on the charge amount next time.

Back at the prep table, I assembled an AeroTech H123 into the 38mm casing. On the pad, this motor lit off well, but the delay element burned too quickly causing the rocket to eject early, still going up at a good clip. The chute didn't shred, but tangled into only a half deploy. It was this bad opening that showed me that the shroud lines were not all the same length. I'll have to take off points for the kit's parachute quality.

The Aerobee Hi landed a little hard, even in the fresh mud, but it only cracked a fin. Without the fiberglass work, this flight would have had the fin popped off and a zipper cut in the tube front edge from the shock cord. The lesson here: for high power, build it strong for the worst case - you'll eventually need it.

Built a Rocket Kit Lately?

Why not write a review and publish it in **MAX-Q**?

E-mail is convenient, but if you don't have a computer or Internet access, just mail your submissions to:

HARA/Max-Q

1120 Pratt Avenue, Huntsville, AL 35801.

Plan O' The Issue

This issue's plan again comes from the rec.models.rockets archive on the Internet. This is one of those rocket projects that I've been meaning to build for years now and have never quite gotten around to it. Mark Tygielski, however, has come pretty close with his "Bama Booster". The Black Powder Express is a high-power clustered rocket, and is intended for those with previous HPR and clustering experience. As the model's weight and propellant may exceed model rocket limits (depending on flight configuration), flying it may require an FAA waiver. - bd

Black Powder Express

by Steve Lubecki

Every one likes lots of smoke & fire. The Black Powder Express has plenty of it. With a Rocketflite G100-7 and 9 plugged Estes D12-0's, this rocket leaves as easy trail to follow. You will need the following parts to build the Black Powder Express:

Quantity	Part	Source
(5)	34" MMT-0.95	LOC
(1)	12" x 12" x 1/8" aircraft plywood	Sig, Midwest
(4)	4" x 1/4" diameter dowels	Sig, Midwest
(1)	34" BT-3.90	LOC
(1)	10" BT-3.90	LOC
(1)	BA-3.90	LOC
(1)	PNC-3.90	LOC
(1)	SCM-2	LOC
(1)	LL-50	LOC
(1)	CR-3.90-1.14	LOC
(1)	1.9" OD x 1.5" ID motor tube	Z-Welding

First take the 5 34" MMT-0.95 (29mm) and cut them exactly in half. Then, get the 1.9" OD motor tube [Editor's note: You can also use a LOC MMT-1.52 (38mm) and shim it up to 1.9" OD using packing tape.] and test fit it and nine of the MMT-0.95 pieces into one end of the 34" BT-3.90. Make sure that all tube ends are even and that all tubes are pushed in about 5" into the BT-3.90. Wrap rubber bands around the exposed tubes and then, using thick CA and zip kicker, glue the outer tubes to themselves, being careful not to bond them to the BT-3.90. When the CA has hardened, remove the assembly and slip the center motor tube out of the other nine. Mix up some epoxy and fillet two valleys at a time on the

inside of the motor tube assembly only. Once all the valleys are filled, epoxy the main motor tube into the center. The voids between the MMT-0.95's and the main motor tube should be full of epoxy at this point.

Next, apply a liberal amount of epoxy into the 34" BT-3.90 about 3"-4" into one end and spread it evenly around the inside of the tube. Slide the CR-3.90-1.14 into the tube and, using the motor tube assembly, push the centering ring in 5". Hold the tube upright and rotate it to allow the epoxy to form a fillet around the top of the centering ring. When the epoxy has set, turn the assembly upside down and pour epoxy into the voids between the BT-3.90 and the MMT-0.95 to a depth of about 1/4". When the epoxy has set, pack tissue into the voids until about 1/2" is left at the top of each void. Fill the remainder of the voids with epoxy. Cut the fins from the plywood sheet. I used a LOC Ultimate fin pattern and made three fins. Epoxy the fins into place 1/2" up from the bottom of the motor tubes. When the epoxy has set, fillet each fin liberally with epoxy, one at a time.

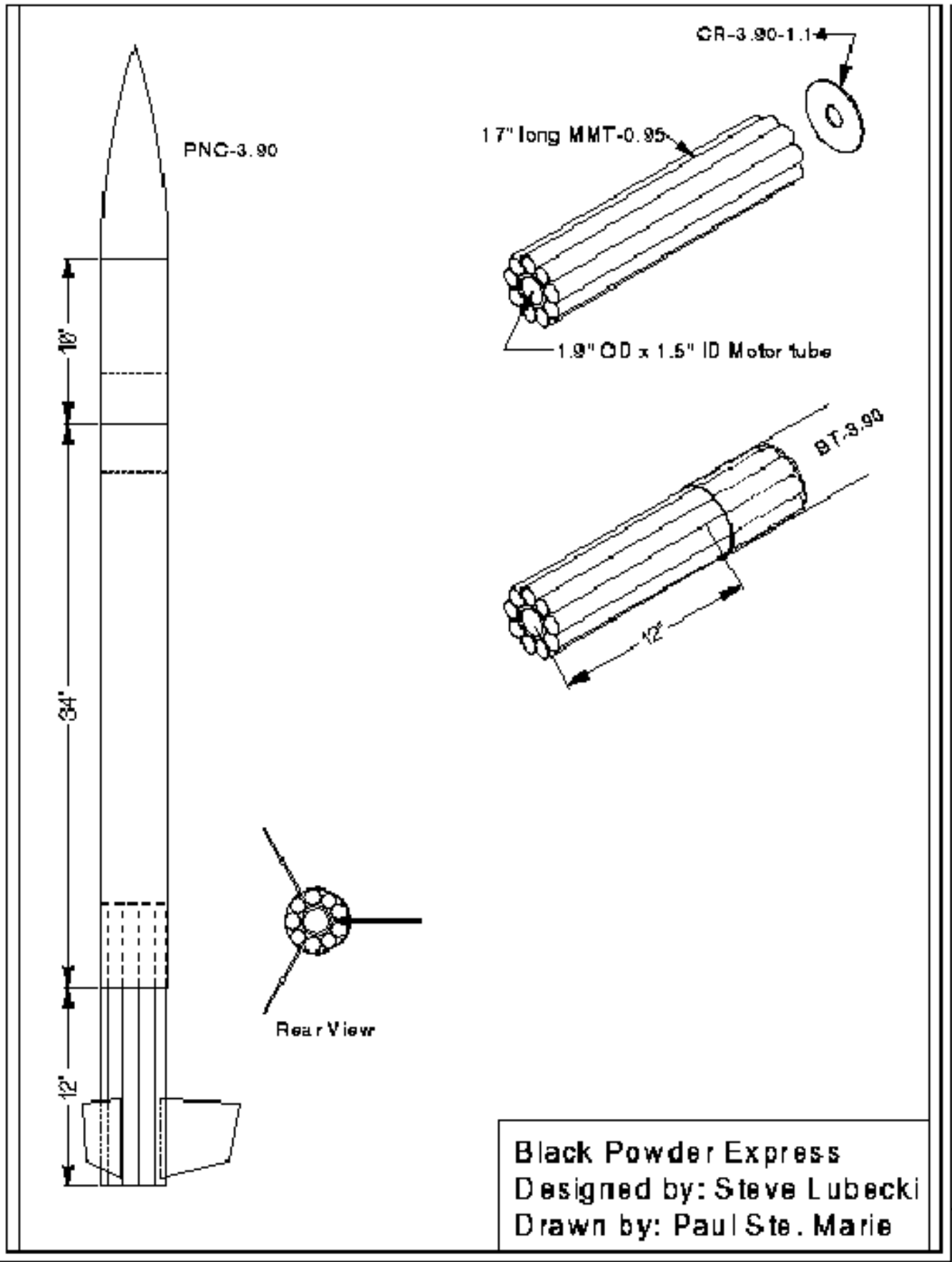
Next, drill 4 1/4" diameter holes about 15" down from the top of the tube (2 holes opposite each other and two at 90 degrees and 1/4" up). Install 4" x 1/4" dowels into these holes and CA into place. These are to keep the parachute and wadding from falling too far into the tube on launch. (A stuffer tube will also work but I've seen too many collapse or burn through and cause ejection problems.)

Assemble the bulkhead assembly per LOC instructions and then epoxy it 3" into the 10" BT-3.90. Install the shock cord mount per the LOC instructions. Cut the launch lug in half and epoxy it on the main tube.

Prepping this rocket for flight is fun. First take 9 D12-0's and fill the ends with epoxy. Wrap tape blocks around the nozzle ends of the D12-0's and the Rocketflite G100-7 and friction fit them into the motor tubes. Next, cut slow Thermalite into 10 equal pieces about 3" long. Then, using nine of the pieces, fold one end of each piece over about 1/4" and take the folded end of each piece and insert it into a D12-0 nozzle. Pack tissue into the nozzle to keep it from falling out. With the tenth piece of Thermalite, fold one end over about three times and put it into the nozzle of the G100-7 exactly the same length as the Rocketflite electric ignitor. Tie the free ends of the nine pieces of Thermalite installed in the D motors together in a bundle using another piece of Thermalite. The main motor Thermalite should be resting above the wrapped bundle.

To launch the rocket, use a flashbulb or a Thermalite ignitor to electrically ignite the main bundle. As it burns up it will ignite the G100-7 Thermalite. The rocket lifts off the pad on the 9 D12-0's and about 100'-200' up the G100-7 ignites. The D's move the rocket up real slow and the G kicks it up in a hurry. A seven second delay is perfect if everything goes right. Use a 48" parachute in this rocket. 9 D's and a G are great for average-sized flying fields.

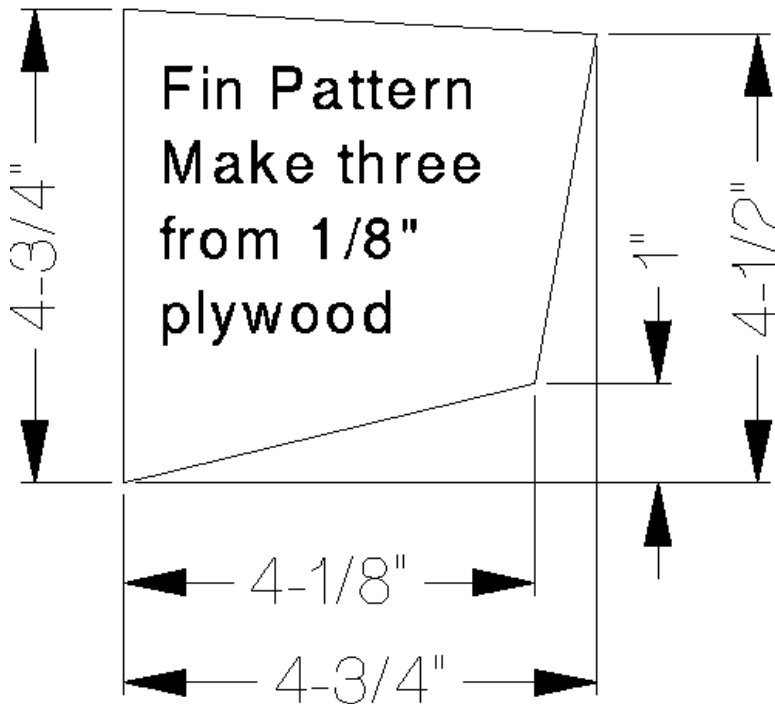
How about 9 G42's and 1 H115 Smoky Sam? Look out, Danville! [But gee, Steve, then it would have to be a Composite Express! - ed.]



Black Powder Express
 Designed by: Steve Lubecki
 Drawn by: Paul Ste. Marie

Black Powder Express Fin Pattern

(WARNING - not to scale)



Kevin Cornelius readies his Vaughn Brothers' VB Extreme 54 at the MSFC Open House

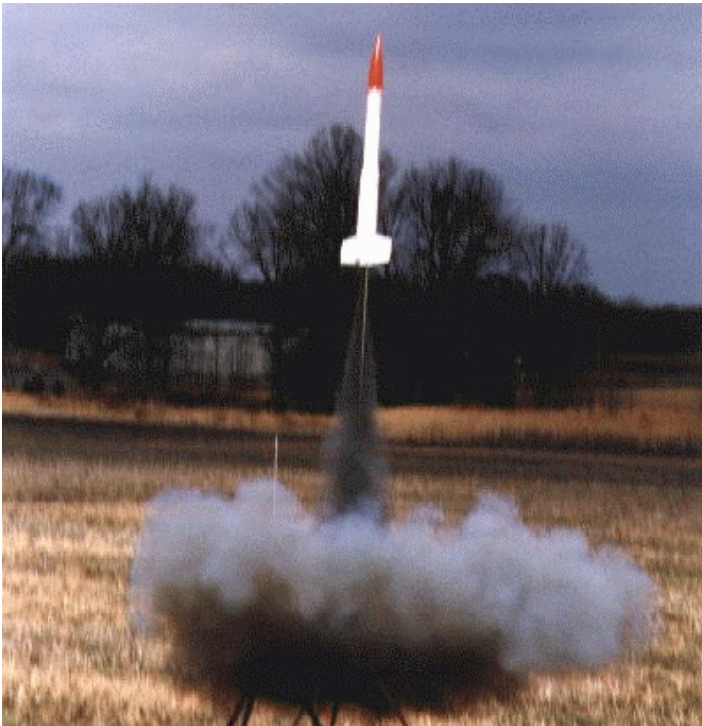
MSFC Open House (continued from page 1)

Brian's 4" crayon provided some excitement for the crowd when the four second delay he chose for the G80 turned out to be closer to ten or twelve seconds, ejecting just in time to avoid any damage. Neal Redmond sent up his Super Big Bertha and Maxi-Force on F and G motors for some superb flights. Other attractions at MSFC's first public open house in 30 years included tours of the Payload Crew Training Complex, meeting astronaut Mark Lee, watching NASA rocket engine firings, and touring various MSFC labs and facilities. "I had a lot of people asking when the firings were scheduled because they didn't want to miss one and everyone seemed to be impressed with what you all did", said Phyllis Olinger, a paralegal specialist from the Office of Chief Counsel at MSFC. "I really appreciate the time you gave to be a part of the open house". Phyllis said that Marshall is considering another open house in the year 2000. Brian's Arcas flight (pictured on page 1) was featured on the cover of the May 7 edition of the Marshall Star, MSFC's employee newsletter.



Mark Tygielski, Kevin Cornelius, Brian Day, Greg Warren and Vince Huegele pose with an impressive array of projects at the MSFC Open House.





Dave Gannett's LOC Norad on a G33 before...



...and after a test of his "ballistic recovery" system.



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“Where a calculator on the ENIAC is equipped with 18,000 vacuum tubes and weighs 30 tons, computers in the future may have only 1,000 vacuum tubes and weigh only 1 1/2 tons.”

- Popular Mechanics, March 1949

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Greg Warren displays his new scratch-built AIM-9 Sidewinder at the MSFC Open House.

**Huntsville Area Rocketry Association
1120 Pratt Avenue
Huntsville, AL 35801**

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Remaining Launches & Meetings

07/26	Fun Fly (G motor limit) Athens, AL
08/14	HARA meeting 7:30PM HATS, 4900 Univ. Square, HSV
08/23	High Power and Open Range waiver to 10K AGL
09/11	HARA meeting Time & Place TBD
09/27	High Power and Open Range waiver to 10K AGL
10/09	HARA meeting 7:30PM HATS, 4900 Univ. Square, HSV
10/25	High Power and Open Range waiver to 10K AGL
11/13	HARA meeting Time & Place TBD

* All launches subject to weather and field availability.