

THE ZOG-43

The Newsletter of NARHAMS, NAR Section #139.
NAR National Champions 2001, 2004



Food and Fun with the NARHAMS Family

By Kevin Johnson, NAR 77083

At the December meeting, club business is set aside for a month and NARHAMS members come together to celebrate another year and enjoy the holiday spirit by stuffing ourselves on good food and adding to the treasury through buying lots of raffle tickets.

This year was no different with many old and new faces making an appearance at the College Park Airport for the annual potluck party. Jim Berg took pictures of the night, which included tables overflowing with food and prizes. This year Zog Bubbles decreed the dinner would be a true potluck, with no sign up sheet for dishes. Club members brought a variety of dishes, and even our resident vegetarian was seen with a full plate. The raffle was another great success, bringing in over \$200 as everyone tried to win a selection of kits, posters, supplies and surprise packages. Don Brown even won one something, so you know it was a good raffle. I hope that everyone had a great holiday, and wish you the best in the new year! 🌟



**JANUARY 2005
VOL 27 ISSUE 1**

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ZOG-43

Volume 27 Number 1 January 2005

ZOG-43 is the official newsletter of NARHAMS the National Association of Rocketry Headquarters Astro Modeling Section # 139

NARHAMS is the oldest model rocket club in the United States!

ZOG-43 is dedicated to model rocketeers of all ages, abilities, and interest. We are committed to providing the most current, up-to-date information on model and real world rocketry, and to provide educational material as well as entertaining information. ZOG-43 is published monthly and is available to anyone on a subscription basis. Current rates are \$10 for meeting pickup or email or \$15 for postal mail U.S. Funds for 12 issues a year, payable to NARHAMS. Material in ZOG-43 is not copyrighted. Free and unlimited reproduction is granted with the proper credit to the author and/or ZOG-43.

For more information.....

If you have any questions about ZOG-43 or NARHAMS, or if you have any comment(s), correspondence, free merchandise or if you'd like to submit an article, send them to :

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ZOG-43 is edited by Kevin Johnson, and is an eight-time winner of the NAR/LAC "Rockwell" Trophy, recognized as the best NAR section newsletter.

Years won: 1969, 1973, 1975, 1990, 1991, 1992, 2003, & 2004

Zog-43 staff typist is none other than Jennifer Ash-Poole a.k.a. Secretary to the Stars !

Photographs: by Kevin Johnson, except where noted.

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NARHAMS ON THE WEB

<http://www.narhams.org>

Send and receive E-mail with other NARHAMS members through NARHAMS Web page grouplist via yahoo-groups.



NARHAMS serves Baltimore, the state of Md., Washington DC and the surrounding Metropolitan areas. The club is a section of the National Association of Model Rocketry (NAR) and we are the oldest continuously active model rocket club in the United States, first established as a high school club in 1963, changing our name to NARHAMS when chartered as a NAR section in 1965. NARHAMS is the only five time winner of the NAR "Section of the Year" award.

Years won: 1997,1998,1999, 2001, 2004

NARHAMS members regularly fly their model rockets at NASA's Goddard Space Flight Center on Soil Conservation Rd. in Greenbelt Md. The launches are open to the public and are held the first Sunday of every month (weather permitting), starting at 1 PM.

Sport Launches are usually held the second Saturday of every month at Middletown Recreation Park in Middletown Md. Check the web page for updates.

NARHAMS welcomes all prospective new members to our monthly meetings. They are held on the first Saturday of the month from 5:30 to 9:30 PM at the College Park Airport Annex Building. Dues are 10 cents a week, with an initial 50 cents up front (good for 5 weeks) as a sign of good faith.

NEW: Monthly meetings available on-line via chat-room , simply go to the NARHAMS homepage and click on the link.

ZOG ROYAL COURT

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Directions to College Park Airport:

Follow I-495 to Kenilworth Ave. South. Make a right onto Paint Branch Parkway, then make a right on Cpl. Frank S. Scott Dr. At the airport entrance go straight to the Operations Building, the annex building is adjacent to the "Ops" building.



From the Zog ...

Ahh, a new year and some new changes. January is usually about resolutions. You are trying to start a good habit, stop a bad habit, or start something you have been putting off for a while.

So, let's think of some fun resolutions you know you can keep. You can resolve to build a new kit and fly it sometime this year. You can resolve to try to talk to a new person at one of the sport launches. You can resolve to try to make it to one of the meetings, if you have never gotten to one that didn't involve food.

You can resolve to be kinder to a fellow club member whose rocket philosophy may be different than yours. You can resolve to TRY competition if you never have, or BUILD a sport model if all you build is competition (That last one is aimed at you, Kidwell.)

Here are the Zog Bubbles rocket related resolutions for the year:

I resolve to finish Kevin Johnson's parachute. (I had started it 1 and a half years ago. I find it every now and then in my sewing room.)

I resolve to finish my Silver NARTREK and my Gold NARTREK this year.

(I got 12 months! I am half way finished with the Silver!)

I resolve to try out for the World Spacemodeling Team.

I resolve to finish painting the last 1/3 of my rocket room, so it is all one color. (It's still rocket related!)

I resolve to have FUN flying rockets this year.

Got any resolutions I have missed? E-mail any ideas to me and we can come up with the club resolutions for the year.

Zog Bubbles 

Oops!

Sharp-eyed readers of last month's issue noticed that in the year in review parade of Zog-43 covers, I had inadvertently put the January issue in twice. The issue that was missing was October. So here is the 10/04 cover featuring photos from the annual night launch. 



January is National Hobby Month

Don't forget to try and promote our hobby to someone new this month! Invite someone to the sport launch and help them fly a rocket for the first time. 

New Meeting Times

Don't forget that meetings this year have moved to Saturdays. There were a lot of club members that found that Friday night traffic around the beltway was getting in the way of them making it to club meetings. At the planning meeting in October it was decided to try a shift to Saturdays to help more club members attend.

Keep a lookout on the calendar for when the meetings will be held. 



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December Sport Launch- Middletown Park

We didn't have the biggest crowd out to launch with us in December, but we had a busy day nonetheless.

The TARC team from Middletown High School was out for their first flight of the year. Kevin Johnson took the pictures of the prep, launch and recovery above. A staging failure lead to the nose first recovery.

Dr. Kidwell brought out a boilerplate model of his team's SF/F scale rocket, Thunderbird 3. The model had a couple of nice flights, but ended up smaking the park sign on landing.

Not to be outdone by her teammate, Jennifer Ash-Poole flew a B powered rocket glider to complete another level of her NARTREK quest.

David Jarkey decided that since the TARC team wasn't going to fly again, he would give his converted birdhouse a flight. The rocket featured clear plastic fins for stability and came complete with s jaunty cardinal prrking out of the hole. The flight on a G motor was fast and loud, with a safe recovery under a parachute.

Come out and join the fun at the next sport launch! 🦋



David loads his birdhouse rocket on the pad. Photo by Jennifer Ash-Poole



Yeap, it's got fins. David ponders his model before approaching safety check-in. Photo by Kevin Johnson

Top- Jennifer and her NARTREK RG
Bottom- Dr. K displays a diminutive Thunderbird 3.
Photos by Kevin Johnson

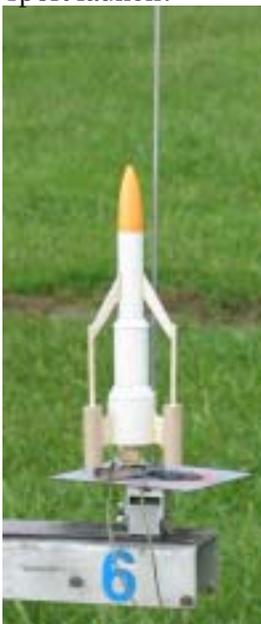


Photo by Jennifer Ash-Poole



The newer, larger TARC team from Middletown preps, flies, and prangs their 1st flight.
Photos by Kevin Johnson

NARHAMS Year End Outreach Reports

Boy Scouts at Goddard

By Jennifer Ash-Poole, NAR 61415

The Goddard Sunday in December hosted the Kensington boy scouts for lots of flying. Kevin Johnson and I had helped these boys build the Pratt Polaris kit. They were now ready to fly them at Goddard.

The interesting thing about the date is that the previous 2 years, Maryland had its first snow on December 5. This year, the weather was 60s and sunny.

Kevin claimed he had to go out of state that day, so it was up to me to help these boys prep and fly. Several of the dads helped me prep the ignitors, and Ole Ed helped the boys tape their engines in. We were using the Quest B6-4 engines. Good thing the kits had streamers.

Out of the 25 kids, 24 showed up, and most of the kids got in two flights. A few lucky ones flew three times. Some kids had to find their models, and some needed repairs between flights. Luckily, I brought my trusty CA, kicker, exacto knife and tape to the launch. A few models had to be shortened by an inch or two, and one had to be shortened almost by half. I did end up putting CA all over my right hand while fixing one kid's model. I had to wait until I got home to use the debonder. Ouch!

At 2:45pm, evil RSO Alan Williams froze the line so the last flights were around 3 pm. The scout leader still had lots of motors left, and said they would make another trip out in the spring. ✨



Rocket Launch with Ellicott Mills Middle School

By Kevin Johnson, NAR 77083

On December 18th I helped out Bob Hodge, a teacher at Ellicott Mills Middle School, with a launch for a class project. The class had built Super Sixes to fly and I pointed Mr. Hodge to the low cost launch systems on the NAR website so the kids could each build and take home their own launch pads. I provided all the parents the club web address and talked about our launches at Goddard and Middletown. I also gave a brief safety talk before we went out to launch the rockets.

I had help from the members of the Long Reach High School TARC team. Their teacher thought it would be a good idea for them to share their expertise with the kids. They helped the students tape the motors in place, and I helped get all the igniters and clips hooked up. After the class launched all their rockets, the TARC guys demonstrated their large rocket carrying models.

Here is part of a letter from Mr. Hodge after the launch:

Well, 26 to 28 kids put up their rockets, every kid's rocket went up, a few came down a bit strange, and a few were damaged on landing but

they ALL were successful. Each time a rocket went up the crowd went "wow," and "ooh!"

We had between 60 to 75 people there, and almost everyone stayed until they all went up. The parents were very grateful and what blew me away was having these little kids come up and thank me. I should have thanked them, it made my day to see everyone of them smiling and running after their rockets when they were coming down.

Your guys were a great help and please tell them I and the kids and the parents really appreciate them helping out today. I asked Mike [*one of the TARC guys--kj*] to get everyone's name to me so I can make up a certificate for them.

They launched their rockets; one only went to the end of the launch rod and the parachute popped out, everyone had a good laugh, but the others went up and came down with the eggs undamaged. The attached picture (below) shows you where our eyes were all morning! ✨



Gliders: Construction, Trimming Tips for Better Flying

By Bob Johannes

Editor's Note-- This article was originally written with catapult launched gliders in mind. Since cat gliders have very similar flight characteristics to boost gliders, I think that most of the building and trimming tips in this article will apply. I have changed the section on power trimming to reflect the rocket boost of our gliders. Hope this helps when you are building your gliders this year! -- kj

Construction tips

Wing leading edge: Use a thin strip of bass wood or spruce to keep the leading edge free from nicks. Plane and sand the wing blank to the airfoil shape, leaving the leading edge quite sharp. When you have finished sanding, hold the wing blank up to a light and you should see a dark center with lighter areas around the edges. Sand all parts quite smooth. Then, carefully cut the dihedral separations. Sand the dihedral angles accurately so you get good joints.

Alignment: Leave the fuselage sides flat as an aid in aligning the wing-fuselage joint. Make sure that the tip dihedral is the same on both wing halves.

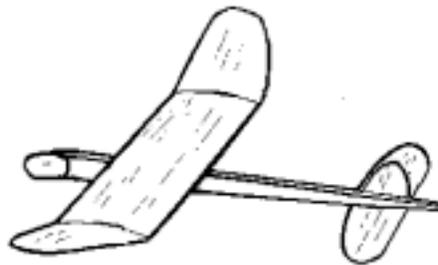
Pin the wing to the fuselage with the center dihedral joint exactly aligned with the fuselage. Turn the wing/fuselage upside down on a flat surface. Using two squares against the flat fuselage sides, making sure that the fuselage is vertical. Tack glue the wing with thin CyA on both sides of the fuselage, then put a bead of thick CyA on each side.

Glue on the horizontal tail exactly

aligned with the wing. Use slow-drying glue to attach the fin. Make sure the fin is straight on the fuselage. Turn the glider upside down and using a square, make sure the fin is perpendicular to the wing.

Finish: Dope provides a smooth surface that is fairly waterproof. Apply three coats of unthinned dope (I use Aerogloss) and sand all surfaces smooth after the first and second coats. Leave the last half inch of the fin and stabilizer undoped.

Copper wires: Glue 3/8-inch lengths of thin copper wire to the rear of the fin and stabilizer. This enables you to bend the wood for adjustments, and the wires will hold the adjustments indefinitely.



Trimming tips

Wing flap: Cut a small flap on the left, main wing panel. The chord of the flap should be approximately 5/16 inches. Bend it down 1/32 inches and glue it in that position. The flap will prevent spiral dives.

Basic trim philosophy is to use decalage (stabilizer adjustments) to adjust the power (launch) pattern. Use the center of gravity (CG) and glide circle diameter to control the glide.

Hand glide: Balance the glider at approximately 50% CG. Hand glide and adjust the CG until you get a slight stall. Then, adjust the rudder to get a hint of a left turn.

First launch: The stall that you put in during hand gliding should assure that the glider will not spiral in and crash on the first launch.

Observe the boost and glide circle diameter. If the transition is reasonable and the glider is stalling and turning, continue flying and adjusting rudder until you get the diameter of glide circle as you want it. It should be about 100 feet in diameter.

Don't try to adjust the transition at this point. Just get the circle the way you want it. The rudder setting will affect the boost and transition.

Boost trim: The boost should be straight up with a hint of barrel roll. The glider should flop into the glide at the top with no stall. If the glider tends to nose over on the way up, add up elevator to get the hint of barrel roll. If the glider is loopy, add down to get a more straight up pattern. If the glider stalls at the top, add a little more up elevator to get more barrel roll. The barrel roll is what controls the flop out recovery.

Glide trim: During the boost trimming, the glider should still be stalling in the glide. Once you are satisfied with the boost and transition, adjust the glide trim by adding clay to the nose. Never put clay on a wing tip to adjust turn. You need the rudder offset for the boost pattern.

The glide should be slow and buoyant with a very slight hint of stall. Since all the adjustments are interrelated, you may have to go back and fine tune some of the previous adjustments. Once trimmed, the dope and the copper wires should keep your glider in trim indefinitely.

Adapted from *The Lone Eagle*
SAM NX-211

Frank Gruswitz, editor

St. Louis MO 

NARCON 2005

Announcement

WOOSH will once again be hosting NARCON. This years event will be hosted at University Wisconsin Parkside in Kenosha, WI, March 11-13.

We have some great keynote speakers this year. To start the weekend off Ky Michaelson will give the keynote address on Friday night. On Saturday night we will have Vern Estes speaking. We have a lot of great content this year and more is on the way. The vendors have been great in helping support the event too.

Registration is open and more information can be found at www.narcon2005.org. If you have any questions please contact me directly at director@narcon2005.org. A lot more information will be coming soon. Hope to see you all there in March.

Gabe Kolesari NAR 82009 L2
Vice President
WOOSH Rocketry
Event Director NARCON 2005
www.wooshrocketry.org
www.narcon2005.org ✨



Calendar of Events for 2005

Jan 8- 5-10 pm Monthly meeting, SF/F scale discussion (Mike Howie)
Jan 16- 12 - 4 pm Club building session at Goddard
Jan 22- 12 - 4 pm Sport launch, fly what you got for Christmas theme
Feb 5- 10 am - noon Cadet building session College Park Aviation Museum
Feb 5- 5 - 10 pm Monthly meeting, A Cluster Altitude (John McCoy)
Feb 6- 1 - 2 pm Goddard Public Launch
Feb 12- 12 - 4 pm Sport launch, Red Rocket Day
Feb 26- 1 - 5 pm Udvar-Hazy Tour Dulles, VA
Mar 5- 10 am - noon Cadet building session College Park Aviation Museum
Mar 5- 5 - 10 pm Monthly meeting, 40th anniversary party
Mar 6- 1 - 2 pm Goddard Public Launch
Mar 12- 10 am - 4 pm KATE-3 section meet
Apr 2- 10 am - noon Cadet building session College Park Aviation Museum
Apr 2- 5 - 10 pm Monthly meeting, 1/8A techniques (John McCoy)
Apr 3- 1 - 2 pm Goddard Public Launch
Apr 16-17- 9 am - 4 pm ECRM-32 regional meet
Apr 24- 12 - 4 pm Rockville Consortium of Sciences Rockville, MD
May 1- 1 - 2 pm Goddard Public Launch
May 7- 5 - 10 pm Monthly meeting, NARAM models (Chris Kidwell)
May 14- 10 am - 10 pm OPOSSUM-9 open meet/ night launch
May 21- 8 am - 5 pm TARC Flyoffs Great Meadow, VA
May 28-30- Balticon-39 Baltimore, MD

Jun 4- 5 - 10 pm Monthly meeting, fiberglass tubing (Mark Petrovich)
Jun 5- 1 - 2 pm Goddard Public Launch
Jun 11- 10 am - 4 pm Sport launch, cluster/staging theme
Jul 2- 5 - 10 pm Monthly meeting, open building session, focus on staging
Jul 3- 1 - 2 pm Goddard Public Launch
Jul 9- 10 am - 4 pm Sport launch, airborne trooper spot landing, special prize for 40 troopers deployed
Jul 10- 12 - 4 pm Goddard building session, open to public, tie in to Goddard Contest
Jul 17- 10 am - 4 pm Goddard contest
Jul 30 - Aug 5 24/7 NARAM-47 OH
Aug 6- 5 - 10 pm Monthly meeting, pirates discussion (Alan Williams)
Aug 7- 1 - 2 pm Goddard Public Launch
Aug 13- 10 am - 4 pm Sport launch, pirate theme
Sep 3- 5 - 10 pm Monthly meeting, elections, night launch discussion (John McCoy)
Sep 4- 1 - 2 pm Goddard Public Launch
Sep 10- 10 am - 10 pm Record trial, FAI S6A (A SD), night launch
Sep 25- 12 - 4 pm AIAA Picnic Launch
Oct 1- 5 - 10 pm Monthly meeting, leftover parts scratch building (Jim Miers)
Oct 2- 1 - 2 pm Goddard Public Launch
Oct 8- 10 am - 4 pm Sport launch, Oktoberfest theme, microbrew launch
Nov 5- 5 - 10 pm Monthly meeting, glider building session (Robert Edmonds)
Nov 6- 1 - 2 pm Goddard Public Launch
Nov 12- 10 am - 4 pm OPOSSUM-10
Dec 3- 5 - 10 pm Monthly meeting, holiday party
Dec 4- 1 - 2 pm Goddard Public Launch
Dec 10- 10 am - 4 pm Sport launch

Sport launches are held at Middletown Park from 10am-4pm, waiver up to 3.3 lbs and "G" motors not exceeding 62.5 grams of propellant. All flights "E" power and above are restricted to 5 degrees from vertical and between the hours of noon and four PM. Call ahead to confirm launch and waiver availability.

Business meetings are held at the College Park Airport Annex Building. Meetings begin at 5pm with building sessions or presentations and last until 10:00pm or so.

Questions? Call Club President Jennifer Ash-Poole at 410-674-6262 or visit NARHAMS online at <http://www.narhams.org>

Kids Control ISS Cameras

NASA's ISS EarthKAM Program Seeks Participants for February and April 2005 Missions

ISS EarthKAM is recruiting middle school educators who would like to involve their students in an innovative and exciting NASA education program that gives students the opportunity to take images of Earth from the International Space Station. ISS EarthKAM picture taking missions



are scheduled for February 1-4, 2005 and late April 2005.

ISS EarthKAM (Earth Knowledge Acquired by Middle schools) is NASA's unique educational initiative that gives students direct access to, and control of, a digital camera mounted in an Earth viewing window of the International Space Station (ISS). Students participating in ISS EarthKAM identify places on Earth they want to photograph from space; use the ISS EarthKAM Web-based interface to calculate exactly when the ISS EarthKAM digital camera should take its pictures; submit their image requests to the ISS; track their image requests; and then analyze their images. The

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students' images of Earth can be downloaded for analysis and exploration within hours of being taken.

Students use their images of Earth to study topics such as changes on Earth's surface, human land use patterns, and geologic processes. ISS EarthKAM is designed to enhance students' science, math, technology, and geography knowledge. All of the ISS EarthKAM images, as well as various activities and educator guides keyed to national standards, are publicly available on the ISS EarthKAM Web site.

Teachers interested in involving their students in ISS EarthKAM can register through the ISS EarthKAM online registration system at <http://datasystem.earthkam.ucsd.edu/ekReg/ekRegistration.shtml>. The next ISS EarthKAM missions are scheduled for February 1-4, 2005 and late April 2005. Participation is free.

All of the existing (16,000 +) ISS EarthKAM images can be accessed through the Datasystem: <http://datasystem.earthkam.ucsd.edu/> 



Middle school students control a digital camera on the ISS using the Internet. They then view and work with the images online.

ISS EarthKAM Web site: <http://www.earthkam.ucsd.edu>

For additional information contact:
Martos Hoffman
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Space Science Education
Martos_Hoffman@terc.edu



An EarthKAM image of Cape Cod is superimposed on a map showing how the photos are located and aligned.



This EarthKAM image of islanding in the Red Sea near Egypt was taken under the direction of middle school students.



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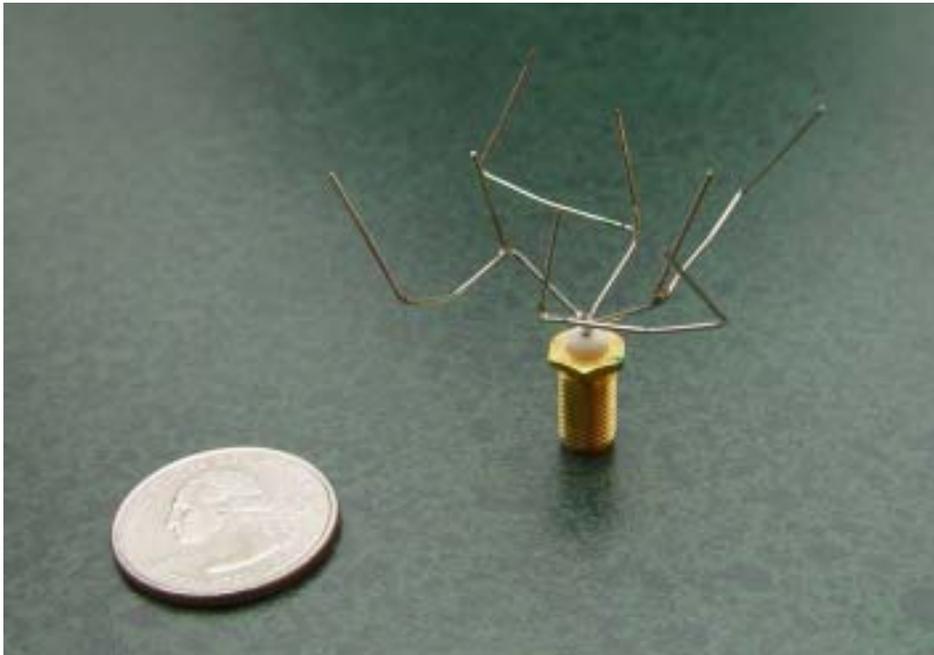
ASP MicroMaxx kits now in stock!

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Antennas, Designed by Darwin

by Patrick L. Barry



Who in their right mind would design this bizarre-looking antenna? Actually, nobody did. It *evolved*.

Taking a cue from nature, NASA engineers used a kind of “artificial evolution” to find this design. The result may look odd, but it works very well.

“The evolutionary process improves the design of antennas, just as evolution in nature leads to fitter plants and animals,” says Jason Lohn, leader of the Evolvable Systems Group at NASA’s Ames Research Center.

The improvement comes from Darwin’s idea of natural selection: only the fittest members of a generation survive to produce offspring. Over many generations, traits that hinder survival are weeded out, while beneficial traits become more common. “In the end,” he says, “you have the design equivalent of a shark, honed over countless generations to be well adapted to its environment and tasks.”

Evolutionary computation, as it’s called, applies this principle to hardware design. It’s particularly useful for tackling problems that are difficult to solve by hand—like the design of new antennas.

Designing a new antenna for NASA’s Space Technology 5 (ST-5) mission was the challenge facing Lohn’s group. ST-5 will explore how TV-sized “nano-satellites” can perform the tasks of much larger, conventional satellites at a cheaper cost. Antennas on these satellites must be smaller than usual, yet capable of doing everything that a bigger antenna can do.

The evolution of this bizarre-looking antenna happened inside a computer. Many random designs were tested in a computer simulation. The computer

judged their performance against certain goals for the design: efficiency, a narrow or wide broadcast angle, frequency range, and so on.

As in nature, only the best performers were kept, and these served as parents of a new generation. To make the new generation, the traits of the best designs were randomly mixed by the computer to produce fresh, new designs—just as a father and mother’s genes are mixed to make unique children. This new generation was again tested in the computer simulation, and the best designs became the parents of yet another generation.

This process was repeated thousands, millions of times, until it settled onto an optimal, shark-like design that wouldn’t improve any further. With today’s fast computers, millions of generations can be simulated in only a day or so.

The result: an excellent antenna with an odd shape no human would, or could, design.

For more about artificial evolution, see arc.arc.nasa.gov/story.php?sid=86&sec. For more about Space Technology 5, see nmp.nasa.gov/st5. For an animation that helps explain to kids how ST5’s antenna sends pictures through space, go to spaceplace.nasa.gov/en/kids/st5xband/st5xband.shtml. 

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

AstroBulletin

By Jennifer Ash-Poole, NAR 61415

February may be the shortest month of the year, but it has quite a few anniversaries and a comet and planets to view in the night sky.

As for big things that happened this month, the Galileo space craft did a flyby of Venus in 1990, and a flyby of Io 10 years later. 75 years ago on February 18, 1930, Clyde Tombaugh discovered Pluto. He was looking at plates taken with the 13 inch telescope in Flagstaff, Arizona, with a blink comparator, when he found a speck had moved between two of the plates. Thus, Pluto was discovered. February 14 boasts the 15th anniversary of the Voyager 1 Family Portrait images to be released, the 25th anniversary of the Solar Maximum Launch, the 5th anniversary of the NEAR spacecraft orbiting an asteroid, and of course, Valentine's Day.

We also celebrate the Chinese New Year on February 9. It will begin the year of the Rooster. Be sure to wear red for good luck.

During the first week of February, we are treated to Punxsutawney Phil coming out of his den to predict the weather. While you are up early in the morning waiting for the groundhog, you can see Jupiter overhead and Mars rising in the east. On the morning February 27, The Moon will occult Jupiter. This will happen in the constellation Virgo. Jupiter and the Moon will be in one of Virgo's arms.

If you have your binoculars, you may be able to see Comet Machholz near the constellation Cassiopeia. Cassiopeia looks like an M or W, depending on its place in the sky. Comet Machholz was the 5th naked eye comet to be seen in 2004. The comet is now going away from us,

but it brightened enough to be seen very well the first week of January. (Urban astronomers still need binoculars to view this gem.) This comet is in the night sky for most of the evening, You may be able to view it at night, then get up the next morning and see it again!

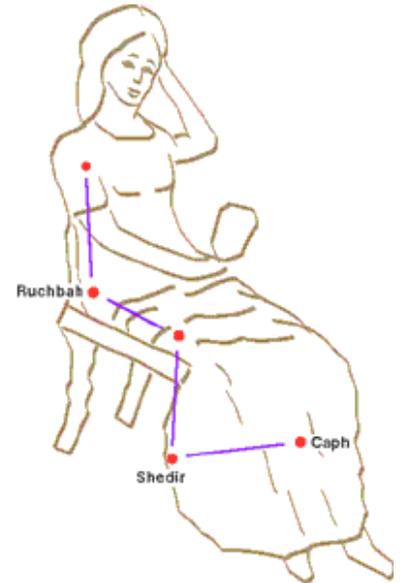
During the evening, Saturn is overhead around 9pm, and is in the constellation Gemini. Saturn is closest to the star Pollux, one of the twins. ✨

Last Quarter - Feb 2

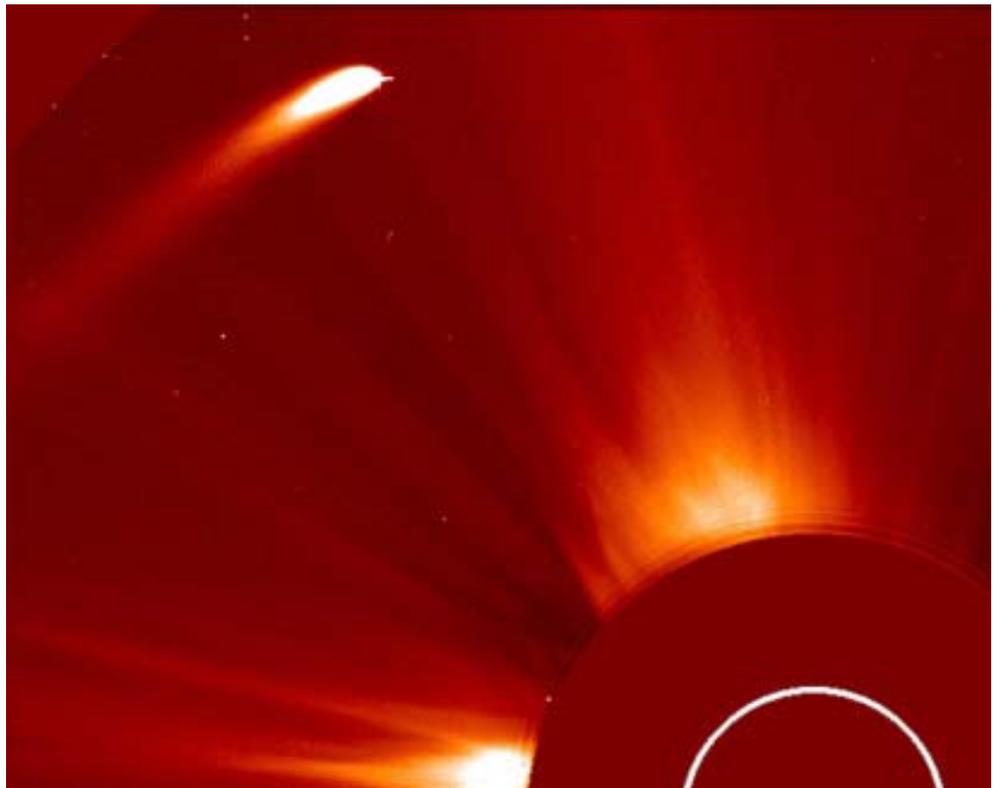
New Moon - Feb 8

First Quarter Feb 16

Full Moon - Feb 24



The mythological queen Cassiopeia floats overhead in fall and winter.



The mask in the LASCO coronagraph hides the bright Sun, the size of which is shown by the inner ring. This image of Comet Machholz was captured on 8 January 2002 by the LASCO C2 instrument on SOHO.

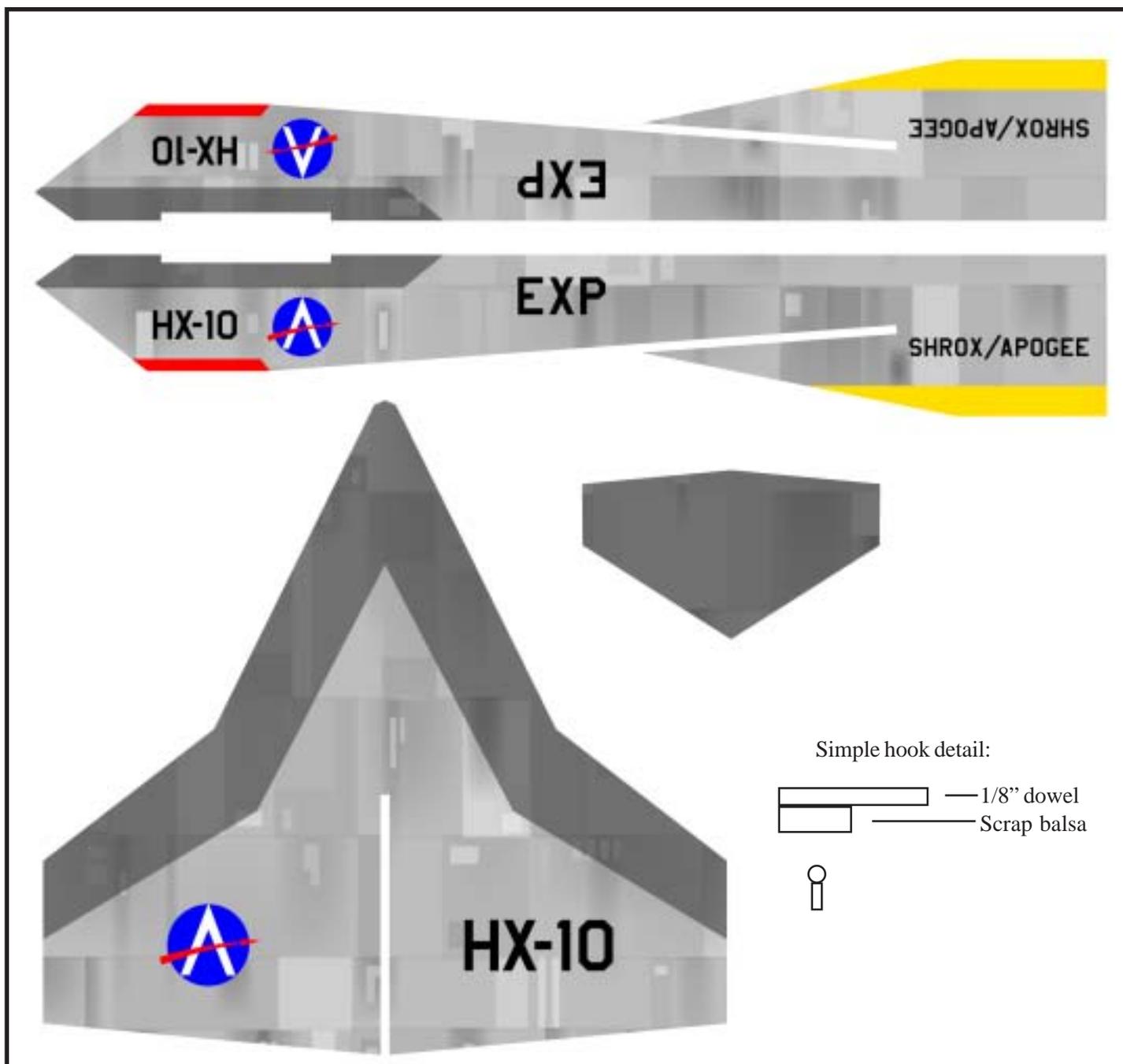
NARHAMS

Build the HX-10 Boost Glider

A free plan by Apogee Components

Glue these patterns on stiff cardboard or balsa, then cut them out and assemble. Make a hook as shown from scrap balsa and a section of 1/8" dowel and glue on top of the canard.

To attach glider to a rocket, add an extra 1/8" launch lug between the fins at the rocket's CG. 



NEXT ISSUE'S SUBMISSION DEADLINE IS JANUARY 31!

Feb 12th

10:00AM-4:00PM
Red rocket theme
Middletown Park
SPORT LAUNCH

Feb 6th

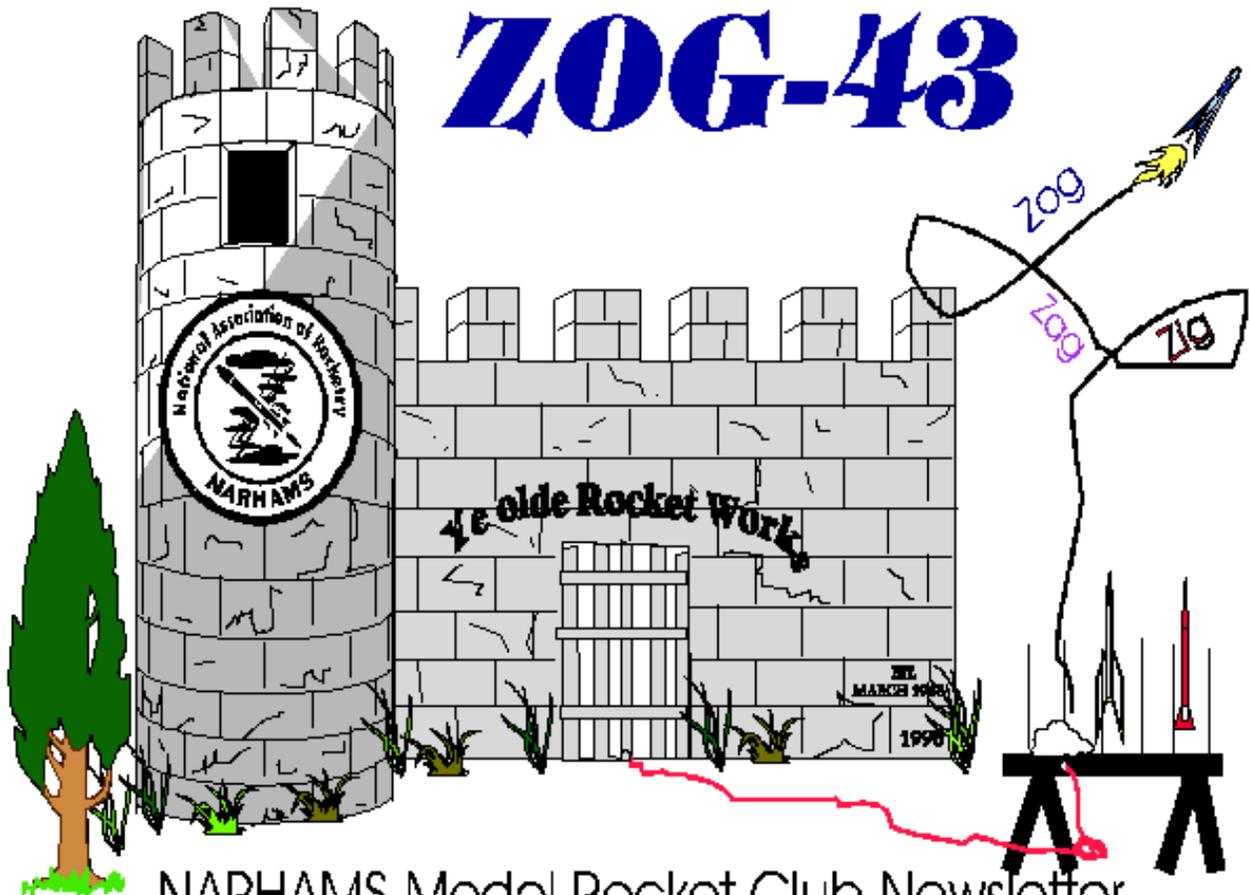
Visitor's Center
Goddard Space Flight Center
PUBLIC LAUNCH

Jan 22nd

10:00AM-4:00PM
Fly what you got for Christmas
Middletown Park
SPORT LAUNCH

Launch Schedule

5269 RIVENDELL LANE, APT 5
COLUMBIA, MARYLAND 21049
ZOG - FORTY THREE



NARHAMS Model Rocket Club Newsletter