ZOG-43

Zog-43
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March/April 2023
Official NARHAMS Newsletter
Editor: Sarah Jackson

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 bi-monthly and is available to all paid up members of NARHAMS. Club membership is open to all, dues are 10 cent per week.

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

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About NARHAMS

The National Association of Rocketry Headquarters Astro Modeling Section, or NARHAMS, serves Baltimore, the state of Maryland., Washington, DC and the surrounding Metropolitan areas. The club is a section (#139) of the National Association of Rocketry (NAR).
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 seven time winner of the NAR "Section of the Year" award (1997, 1998, 1999, 2001, 2004, 2006, and 2007).

NARHAMS members regularly fly their model rockets at NASA's Goddard Space Flight Center in Greenbelt Md and at public parks in Frederick and Carroll Counties, Md.

NARHAMS welcomes all to our monthly meetings and launches.

For details, dates and directions to our club, meetings and launches, go to: http://narhams.org

From the Editor- March/April 2023
Sarah Jackson, NAR 101372

Hello NARHAMSters!

July is a busy month for NARHAMS. We have our regular launches at Goddard and Krimgold Park. We have the Apollo Contest on July 16th. The FAI World Space Modeling Championships are going on in Austin, Texas. NARAM will be later in the month. We're always looking for volunteers to help out at our events. In this issue, you will see articles on two outreach activities where NARHAMS participates.

We are also looking for field options now that our home field of Old National Pike Park is under construction. We are not sure when or if we will be able to return. Krimgold is serving as a decent backup, but it is not ideal. Send any suggestions to NARHAMS president Alex Mankevich.

As we approach our summer months, be sure to stay hydrated and sunscreened when you are out on the field.

Happy Flying!
Sarah

For questions, answers, opinions, files, photos, and more NARHAMS, join the NARHAMS Groups.io. Also checkout the Facebook group, and of course, the website at narhams.org.

Front: In April, NARHAMS conducted a Rocket Run at the first Sunday Goddard Visitor Center launch. Here are many of the rockets that were collected for this and a future Sport launch Rocket Run event. *Photo: Ed Pearson*

Back: The 3D printed Relativity Space Terran 1 rocket finally launched in March, 2023. Here, NASA materials engineers Dave Ellis and Chris Protz inspect the first additive manufactured GRCop combustion chamber. *Credits: NASA* https://www.nasa.gov/feature/glenn/2023/3d-printed-rocket-launched-using-innovative-nasa-alloy

ZOG ROYAL COURT
(NARHAMS OFFICERS)
ZOG (President) Alex Mankevich

VICE ZOG (Vice-President) Alan Williams

COLLECTOR OF THE ROYAL TAXES (Treasurer) Ed Jackson

KEEPER OF THE HOLY WORDS (Secretary) Brian Beard

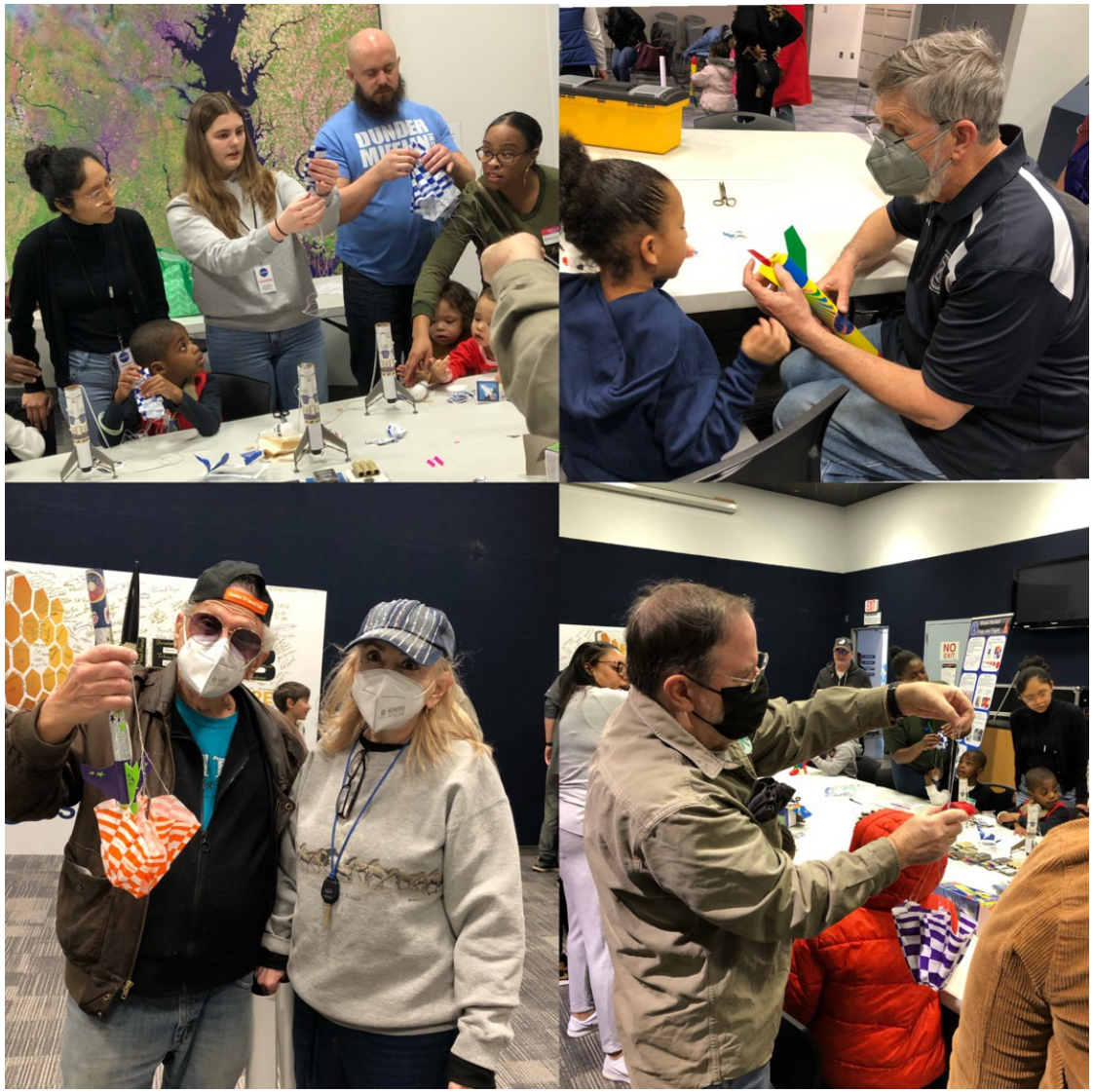
COURT JESTER (Section Advisor) Jim Miers

Upcoming events

Date	Time	Event	Location
July 1st	5:30-9:00 PM	Monthly Meeting Topic: Summer Potluck Picnic Refreshments: everybody	College Park, MD
July 1- July 8		2023 FAI World Championships	Austin, TX
July 2nd	1:00- 3:00 PM	Goddard Launch	Greenbelt, MD
July 2nd	7:00-9:00 PM	Higher Financial Invited Demo Launch- Need volunteers with rockets to launch Contact Alex Mankevich to sign up	14821 Mud College Road Thurmont, MD 21788
July 15th	8:00 AM-12:00 PM	Sport Launch Theme: Wall of Daring (Fixed Altitude) Launch Manager: TBD	Krimgold Park, Woodbine, MD
July 16th	12:00-4:00 PM	Apollo Contest, Goddard Visitor Center Contest Director: Ed Jackson- Need Volunteers	Greenbelt, MD
July 20-Aug 1	9:00 AM-5:00 PM	NARAM 64	Lordsburg, NM
August 5th	5:30-9:00 PM	Monthly Meeting Topic: Rebuild of Goddard Recovered Rockets Refreshments: open	College Park, MD
August 6th	1:00-3:00 PM	Goddard Launch	Greenbelt, MD
August 19th	8:00 AM-12:00 PM	Sport Launch Theme: open Launch Manager: TBD	Krimgold Park, Woodbine, MD

Launch reports

March Goddard Launch



The Prep Room Inside GSFC Visitor Center (VC)—clockwise from upper left: VC volunteers Minerva (left) and Isabel help a group from Jack and Jill get their models prepped; Jim Miers shows how to insert an engine; Mike Cochran helps with a parachute; Ed Light and Kathy Hinkal show off Kathy's Dazzler. *Photos/Captions: Ed Pearson*

Right: Mike Cochran shown shuttling a repaired model to the rack after a misfire. Mike did misfire duty when he wasn't helping others prep their models, loading up models, or helping Ed Jackson with crowd control.

Bottom Right: There were dozens of rocketeers participating. Ed Jackson (Right) was RSO, launch officer and narrator, shown here narrating a flight.

Photos/Captions: Ed Pearson

Top Left: An ascent. The bulk of the models were almost-ready-to-fly rockets assembled in the GSFC prep room minutes before their flights.

Top Right: A descent (rocket to rocket?). Visitor Center staff recorded 55 new rocketeers (first time flyers) and ran out of certificates to award/handout. *Photos/Captions: Ed Pearson*

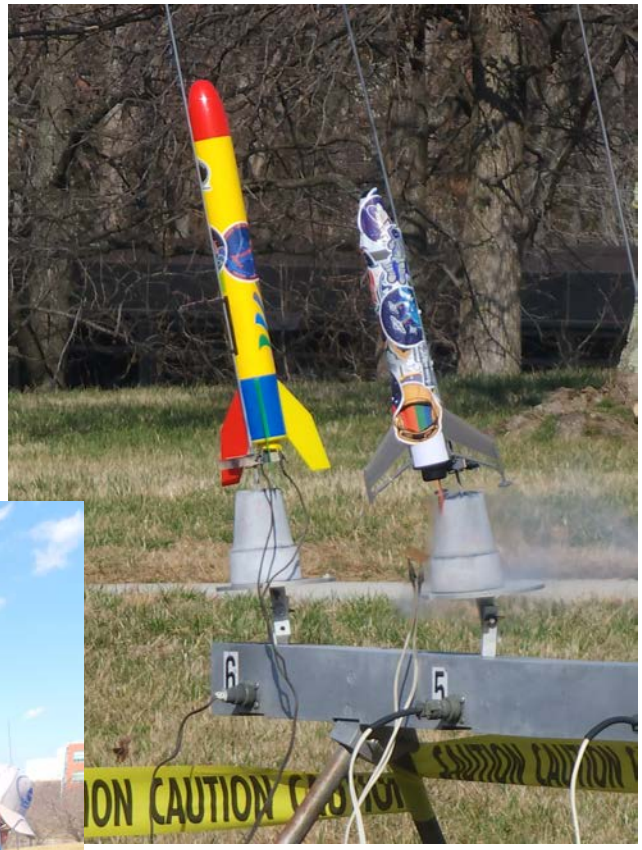
Far Left: Volunteer Minerva (Right) and NARHAMS Sarah Jackson safety checked models, made repairs and performed rail assignments. *Photo: Ed Pearson*

Left: A launch rod is stuck to an Alpha III. *Photo: DJ Emmanuel*

Above Right: Helping with rail hookups were (from left) Mike Cochran and GSFC volunteers Rohaan, Alexis, and Isabel (partially obscured). *Photo: Ed Pearson*

Above: Zog Alex Mankevich (Left) and Adviser Jim Miers helped with setup. At this launch, staff performed many roles. *Photo: Ed Pearson*

Below: Rohaan hooks up the leads to an Estes NASA SLS model. *Photo: DJ Emmanuel*



Above: Two sticker decorated rockets are ready to launch! *Photo: DJ Emmanuel*

April Goddard Rocket Run

Top Left: A young visitor, Harrison, looks over our Estes Mosquitoes fleet. Harrison's grandfather, Rob Thomas, remembers when the GSFC Visitor Center opened and started the launches (47 years back). Harrison *knew* on the other hand who the characters were the Mosquitoes represented.

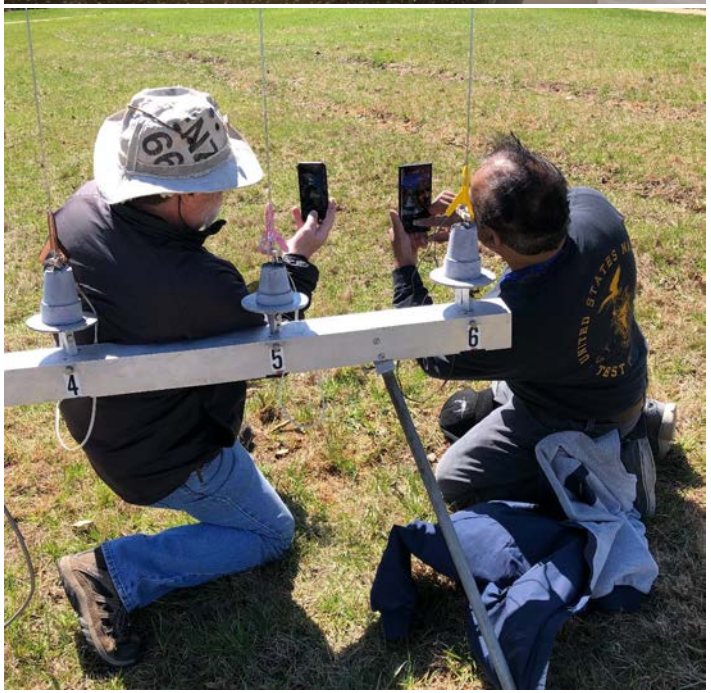
Bottom Left: Mike Cochran (L) and DJ Emmanuel take selfies with the Mosquitoes they built.

Top Right: Ed Jackson's "Luigi" lifts off on the RR's first rack of models.

Bottom Right: Mike Cochran's "Patrick" soars away.

Bottom Middle: Mike (L) and DJ load the second rack of Mosquitoes—we flew a dozen altogether (no misfires, either).

All photos/captions: Ed Pearson



Top Left: Let the fun begin. The Rocket Run starts.

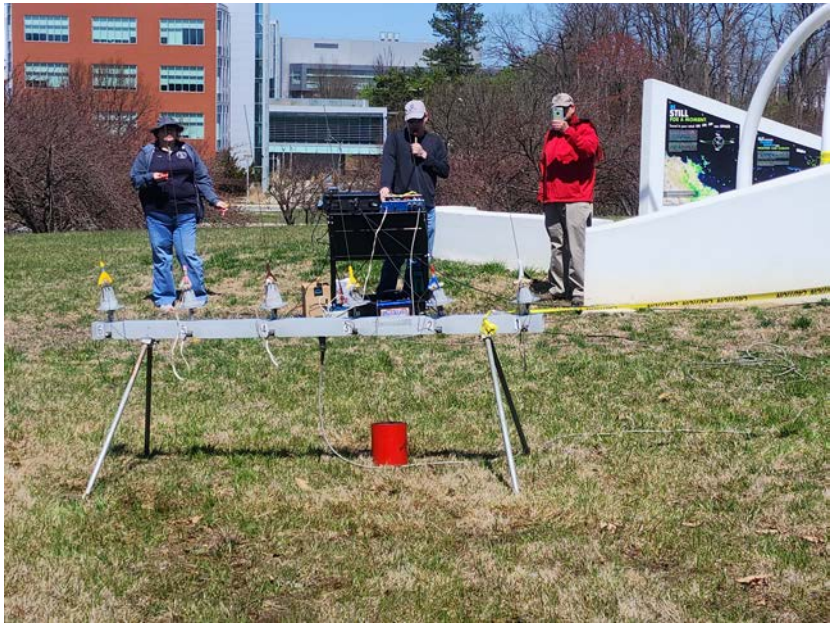
Top Middle: The launch of the first model returned. This model was built by Brian Beard.

Top Right: The first model returned, by a lad wearing a NASA shirt.

Bottom Left: Visitors returned nine models (75% of those flown) or parts of models; many missed a fin or two, and for the second time at a Rocket Run, just a Mosquito nosecone was brought back! Alex Mankevich, NARHAMS Zog, managed the return station. After the metric of returned rockets was determined, visitors got to keep the models and got a bag of space-themed goodies.

Bottom Right: John Bonk made time to watch. John inspired NARHAMS to do Rocket Runs, after we observed John fly a single Mosquito month after month for more than a year, at the Goddard public launches.

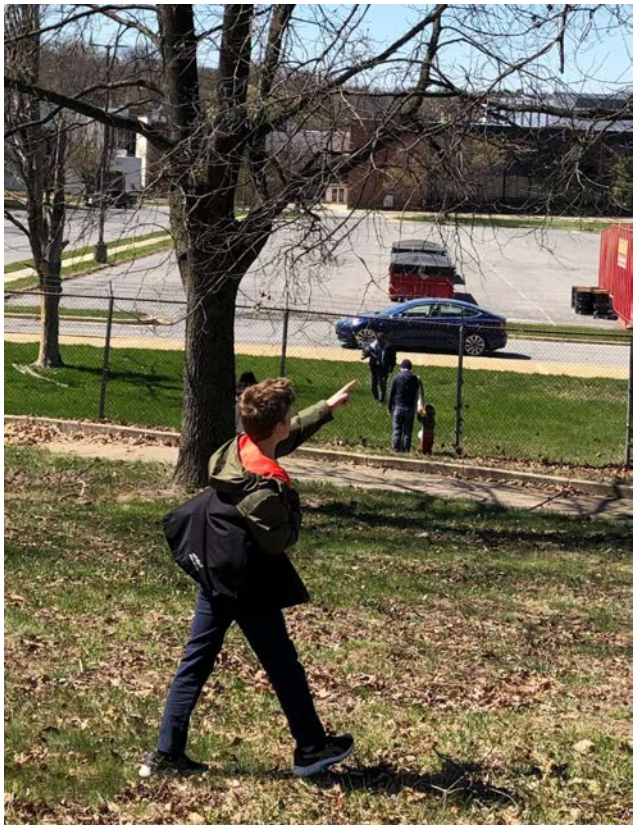
All Photos: Ed Pearson



Above: First four models returned.

Right: DJ Emmanuel (near car) positioned himself over the fence to fetch any errant models. Two were found there. Maybe the missing three went there too?

Photos: Ed Pearson



Top: Ole Ed takes pictures while New Ed launches and narrates. Sarah watches.

Bottom: Michael Cochran explains the rocket run event to a late arriving participant.

Photos: DJ Emmanuel

A few notes from Ole Ed about the Rocket Run:

The club members were outstanding and the kids went away satisfied—except those who were crestfallen that they didn't find models. I was taken aback at how many came back with broken fins (3, 4 or more), how many weren't found (25%), the number of old rocket dreck/dross there were found (it was like it was cleanup day at the visitor center), and that this was second time at a RR, that just a Mosquito nosecone was found!

Below: A panoramic view of the rocket run recovery field. *Photo: Sarah Jackson*

Top left: After the Rocket Run, normal public launches occurred until 3 pm.

Top middle: Sarah Jackson performed safety checks, rail assignments and did repairs when needed.

Top right: Visitor Center student volunteer Alexis (R) helped the club and modelers by assisting at the rack during loading.

Bottom left: Ed Jackson hooks up a model that previously misfired. He was also announcer and RSO.

Bottom right: Visitor Center student volunteer Alexis (R) helped the club and modelers by assisting at the rack during loading.

Photos/Captions: Ed Pearson

April Launch

Launch Manager Jim Baird

Our club held its April launch at Krimgold Park on Saturday, April 15th from 2-7pm, running the full time. The weather started out rather threatening, with lightning off in the distance, but soon turned into a low-wind sunny day, perfect even for G motors. Only a single rack was used, with away pads - plenty for the folks launching that day. There weren't any rockets lost to the trees, no catos, always a good thing. Most folks were club members or regular flyers, but some others joined in as well. There were a few unstable flights, but the only damage done (if any) was to the rocket itself. One flyer was launching NRC competition rockets, and unfortunately lost one during a duration flight - it went up, and no one could see it coming down (is it still up there?).

Here are some statistics for the day:

73 total launches made by 17 flyers. Bill Stec led with an individual total of 15 launches

Motor	Qty
1/4A	1
1/2A	3
A	13
B	10
C	14
D	15
E	9
F	5
G	3

April Krimgold Launch

Above: Jim Miers hooks up the leads to his mid power model. *Photo: Brian Beard*

Above right: Mike M. gets ready to launch his Pringles rocket.

Bottom right: A father and son get ready to launch their first rocket.

Bottom left: Brian Beard gets a good view of the launch site with his Astrocam.

Photos: Brian Beard

Bottom left: Mike Kelley shows off his Solar Vortex.

Top left: Bill Stec, Jim Miers, Alan Williams, and Brian Beard all admire Brian's glider.

Top middle: A rocket lifts off into stormy skies. Luckily the storms stopped before we started launching.

Top right: Chris Greco brought his highly detailed model to show. It did not fly that day, but it was beautiful.

Bottom right: Michael Cochran found pizza somewhere. We were jealous.

Photos: Sarah Jackson

ARC Practice Launch

NARHAMS has several ARC mentors in the club, including Jim Miers, Ted Cochran, and Ed Giugliano. Here are some pictures and words from Ted Cochran about his teams, and the field they found to fly in.

Marriotts Ridge High School in Howard County fielded three TARC teams this year. After a bit of a late start, they were able to complete several launches including one at the regular NARHAMS launch at Krimgold Park in February and several at a private farm in Howard County.

The private farm field was a long but not wide field constrained by power lines across the middle and trees on both sides, but it served well enough while we worked to get permission to launch at the University of Maryland's Maryland Agricultural Experiment Station's Maryland Research & Education Center, also in Howard County. With help from Alex Mankevich to get an insurance certificate completed overnight, this new field became available for TARC launches in mid March. This is a great field--a relatively unobstructed 100+ acres, 1500' x 2500', that we hope will continue to be available for TARC in the future when the crops are out--and maybe even for winter NARHAMS launches.

The three teams from MRHS encountered issues typical for TARC teams, including CATOs and rocket parts landing in trees, but have also learned a lot of rocket science! And, as is often the case, their very best score of 0 was achieved on an unofficial practice launch!

Meeting Notes

Static Judging of Rocket Run's Models

By Ole Ed Pearson

Above: Mike Cochran's model—Sheldon J. Plankton was declared the static best. *Photo: Sally Cook*

At March's meeting, the club discussed and examined models for this year's Rocket Runs. Fifteen Estes Mosquitoes were statically judged prior to the meeting, and at the meeting rankings were announced and prizes awarded. (Members had previously built the rockets and turned them in February for judging).

First place (and $20) went to Michael Cochran. Michael put together two models showing characters from Sponge Bob SquarePants.

Second place (and $10) went to John Larson. John built those cleverly designed Mosquitoes that looked like Minions from the Despicable Me film-franchise.

Left: Jim Filler's Beauty. *Photo: Ed Pearson*

Third place (and $5) went to Jim Filler. Jim built a beautifully finished and gleaming model that a photo cannot adequately show.

Fourth place (and a $2 bill) went to Ed Jackson. Ed (last year's static winner) built four models for the Rocket Run. They shared a common theme—characters from The Super Mario Bros. Movie.

All others were recognized for their model donations with $1 coins (having a space theme) from the US Mint.

Left: John Larson's Minions—Miss Minion (L) bettered the other two. *Photo: Ed Pearson*

A last minute (not assessed/judged) contribution was received from Jim Miers, winner of the first year's Rocket Run static judging. He brought a metallic-finished beauty to the meeting.

Those who built more than one model for the Rocket Run were given a reward. They received a James Webb Space Telescope first

Above: Ed Jackson's Super Mario fleet. Luigi (L) bettered Mario, Princess Peach Toadstool, and Bowser. *Photo: Ed Pearson*

day cover from the USPS.

Because additional models were obtained unsolicited and from the John McCoy legacy collection, the club had enough (24) Mosquitoes for two April Rocket Runs—at Goddard and the club's regular monthly launch. These events are reported separately.

For those unfamiliar, a Rocket Run is like an Easter Egg hunt using model rockets instead of eggs. If youngsters find them, they keep them. The club chose Estes Mosquitoes to fly and used the static judging/ prize-giving as an extra activity and to encourage good craftsmanship. How the judging occurs is shown on the club's Web site—look for "Judging" linked from the "Library" title-bar heading.

Left: The dollar coin given to modelers who placed 5th and greater. *Photo credit: US Mint.*

Above: USPS first day cancelations were given out to recognize modelers who built more than one Mosquito. The cover commemorates a Goddard project that follows on Hubble Telescope discoveries. *Photo: Ed Pearson*

Right: The rest of the models: from Fabrice Derullieux, Brian Beard, and DJ Emmanuel. *Photo: Ed Pearson*

March Meeting

Right: The group discussed safety, launch fields, and static judging results for the Rocket Run entries at the March club meeting. *Photo: Ed Pearson*

Far right: The club meets at the Hap Arnold Center at the College Park (Md) Airport on the first Saturday each month (7 pm start). The ubiquitous topic: business. *Photo: Ed Pearson*

Below: Ed Pearson discusses the judging of the Mosquitos at the March meeting. *Photo: Michael Cochran*

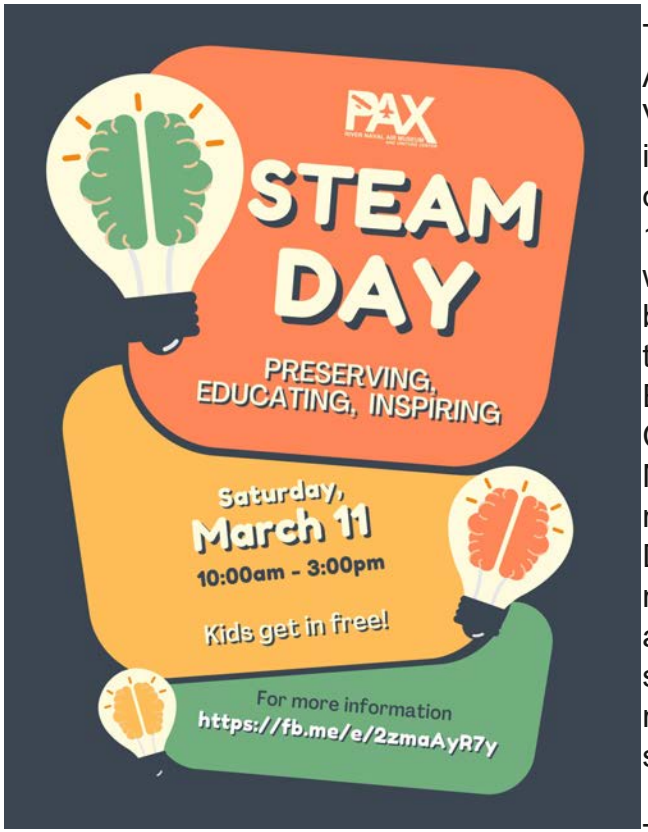
April Meeting

Right: Ole Ed Pearson brings the donuts. All are appreciative! *Photo: Sarah Jackson*

Outreaches

STEAM Day at Pax River Naval Air Museum

By: Alex Mankevich – NARHAMS President



The Pax River Naval Air Museum and Visitor Center hosted its 2023 STEAM Day on Saturday March 11, 2023. NARHAMS was invited to display by Ashley Spalding, the Events and External Communications Manager at the museum. STEAM Day showcases a number of science and arts participants, so it is an exciting mix of arts and science interests.

This was the third time NARHAMS participated in this event. This year we were given a prime location inside the main gallery. We were positioned (appropriately) next to the "U.S. Navy Support to the Space Program" and the "James Lovell Commemorative" displays. This section includes several NASA mission patches, a model of the Discovery Space Shuttle (with astronaut autographs) and a moon

rock. Nearby, there are several actual, and hopefully inert, military missiles on display such as the Tomahawk, AIM-9X-2 and AARCM missiles.

The exhibitors in our immediate area included Boeing which featured its drone program and encouraged the kids to do a Lego build. Across from us was a "reading encouragement" display that featured large models of two of the Star Wars franchise's favorite characters – R2D2 and baby Yoda. On our other side was a Naval Air Station employee who set up a 3-D printing station. He proudly proclaimed that the world's first completely 3-D printed rocket was launching that day, and he had a live feed monitor to show the launch. Relativity Space's Terran 1 rocket was scheduled to lift off from the Cape Canaveral Space Force Station. A crowd (including NARHAMS) inside the museum gathered around his monitor shortly before the scheduled lift-off. However, some glitch happened just at ignition and the rocket stayed on the pad. They recycled the countdown for later that day, however that launch

attempt was scrubbed.

We were given two nice, long eight-feet tables which we proudly festooned with our blue table cloths and club table runner. We placed two banners on either side of the tables. We had a wide variety of model rockets on display from MIcromaxx to the 6.5 feet Miers rocket. Our models included UFOs, gliders, landers, helicopters, tumble recovery and scale models. We allowed the youth to handle our rockets so that they could feel their light-weight nature and to discover for themselves just what recovery device was contained inside the body tubes.

Our usual cast of suspects was on hand to augment our display. Jim Miers talked to visitors about his TARC rocket and about the TARC program. Mike Cochran talked up the First Sunday Goddard Launches. Alan Williams gave demonstrations of his large-sized helicopter model. Ed Jackson roamed about at the front of our display with his five foot U.S. Patriot model, and encouraged the kids to feel its heft and to remove the nose cone to access its cloth parachute. Sarah Jackson and Alex Mankevich encouraged the visitors to take in the variety of model rocket that we had on display so that they could appreciate the variety that model rocketry offers to its enthusiasts.

The day's activity wrapped up at 3:00 p.m. We were advised by the museum staff that they registered 542 visitors for STEAM Day.

First image is the promotional flyer for the event. All other photos credit Sarah Jackson.

NARHAMS in the Newspaper!

Edward Jackson, club treasurer with NARHAMS model rocket club, poses with a variety of rockets from the club at STEAM Day at the Patuxent River Naval Air Museum on March 11.

Staff photo by Darryl Kinsey Jr. Mar 13, 2023. *https://www.somdnews.com/enterprise/news/local/model-rockets-in-flight/image_6f7c7976-d19b-5090-a207-77730f3c1778.html*

Rockville Science Day

by Edward Jackson

April 23th saw the continuation of Rockville Science Day for their 32st year. This year the fair was back in full swing with 3,500 visitors. Like previous years, NARHAMS was asked to conduct a build and launch for the general public to give the participants a fun activity to actively demonstrate STEM principles.

Science Day

In addition to NARHAMS there was a menagerie of other participants that spread across the Rockville campus of Montgomery College. To quote the event flier, there were Rockets, Reptiles and Robots as well as Music, Math games and Maker projects. 3000 people came to the campus with more than 100 different activities and exhibitors to explore. Life Sciences occupied one gymnasium while Technology occupied the other. NARHAMS was in the Campus Center again occupying the Faculty Lounge for the build session and later the upper Athletics Field for the afternoon launch.

The Setup

NARHAMS members started arriving at the campus around 9:30 to room setup and rocket pre-prep. We set up a table inside with display rockets as well as moved one outside the room with banners and additional rockets. With only 45 minutes to build the rockets for each session, we elect to do some steps ahead of time as well as alter the design slightly. We pre-cut the engine clip slot. We also glue the launch lug to the fin can with CA because this step is easy to both forget and get wrong. Again this year we also cut kevlar cord for the shock cord mount because in years past the traditional shock cord mount had not had enough time to dry before the launch. The crew then set about preparing each build station with trays, glue, rags and a rocket kit as they came from pre-prep.

Left: The rocketeers to-be gathered at the class door. We held two class sessions-18 ea. Alan Williams monitored the room's access, handed out tickets to participate, and answered questions on what we were doing/ model rocketry. *Photo: Ed Pearson*

The Build

At 12:00 the event for the day started and our first build session began around 12:45. The first 45 minute session was fully attended with 18 rockets builts by a handful of families with 15 minutes to spare. We cleaned up and re-prepped the room and started the second session promptly at 2:00. The second session really filled the room with the other 18 rockets built bringing the total to 36 possible kits. Even with a loaded room we got through the build with spare time to let the kids decorate their rockets. At this point the race was on, I had moved to the athletic field to set up the launch range while the built rockets were prepped for flight and the Faculty Lounge was put back to the way we found it.

The Launch

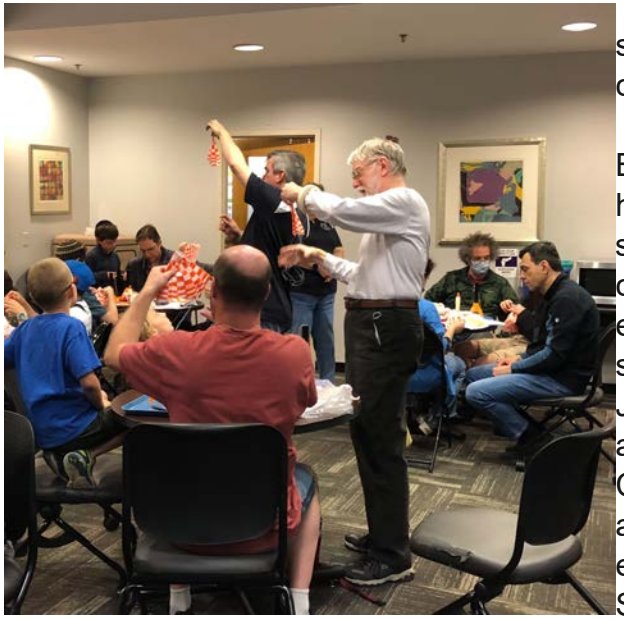
The weather for this day was overcast with a stiff breeze. Around the time we started to call names and the bleachers started to fill up a light sprinkle started. After some introduction announcements

Above: Ed Jackson shows how to make a loop in a shock chord for the parachute's attachment. *Photo: Ed Pearson*

and safety briefing we started calling names of our builders for the first rack. The first rocket left the pad at a moderate angle into the wind then gracefully drifted back into the center of the field. We were able to retrieve all 36 rockets that were built although the additional moisture in the air meant many chutes did not fully deploy. The drizzle also played havoc with our PA system and we had to resort to our small personal amp to finish out the launch.

Above: Jason (L), a TARC finalist from Explorer Post 1010 and a junior from Walter Johnson Senior High, and Richard (R), a sophomore from Wheaton High helped prep models once assemblies were finished. *Photo: Ed Pearson*

Rockville Science day is one of the more involved events that NARHAMS participates in and it would not be possible without the help we get. Thanks to everyone for helping on set-up and clean-up but I also want to take a minute to specifically acknowledge the following contributions:



Right: Ed Jackson (standing, left) led the classes. Brian Beard (standing, right) helped with the builds. Also helping were Mike Cochran, Sarah Jackson, and Alex Mankevich. *Photo: Ed Pearson*

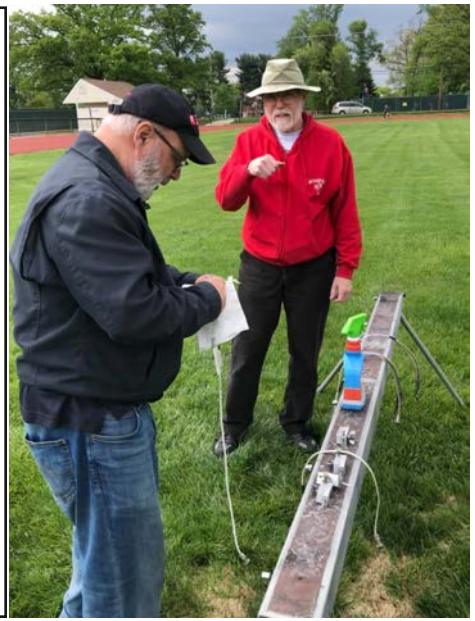
Bob Eckman's Explorer group was on hand to help with both the build session and launch setup. Ed Peason slaved away at safety checking and prepped rockets throughout the entire afternoon. Alan Williams was on hand to serve as greeter and assist in the launch. Sarah Jackson and Brian Beard pre-prepped rockets and aided during the build session. Mike Cocharan helped with rocket pre-prep, builds and pad assistance at launch. Thanks to everyone who made NARHAMS 32nd Rockville Science Day a great success.

Above left: Time to load up. We had two misfires and all models were recovered…but most 'chutes didn't fully open either. Hundreds watched our launch from bleachers. Our club had two Explorer Post 1010 helpers at the field (not shown), Ethan and Alex both high school sophomores who also going to help at TARC.

Above middle: Ed Jackson sends off the last model of the day on the college's athletic field. That's Bob Ekman (L), Science Day Event Director and Explorer Post 1010 advisor, taking pictures.

Above right: Mike Cochran helped after it was all over with cleanup.
Far right: Sarah Jackson cleaning blast deflectors for the next launch. Alex Mankevich WD-40ed everything.

Right: Alex Mankevich at the clips. Brian Beard assisting with cleanup/breakdown and packing.
Photos: Ed Pearson



Building the Boosted Bertha (An Untimely Kit Review)

By James Miers

Introduction:

The original Big Bertha has been in Estes catalogs since nineteensixtyfive. It isa single motor version of the still older Ranger (a cluster payload model), and remains one of Estes' perennial favorites. The Bertha has seen many variations over the years following new technologies and newly introduced motors, and so we have seen the same basic design reincarnated as the Super Big Bertha, Mini-Bertha, Baby Bertha, and Broadsword. At the very least. It took until year 2019before we had a staged version released as well, and having seen several flown at recent launches, I decided to build one of my own, to see how it all went.

Assembly:

This kit follows the Estes standard; all parts, decals, and instruction set included, packagedunder a paper label in the usual plastic bag. A little attention will be needed to ensure the tubing and fins remain undamaged while still in the bag. All parts included are manufactured to size, with no cutting and only a little bit of sanding to shape and to fit isrequired for assembly.Basic tools neededinclude scissors, sandpaper, hobby knife, and ruler, and builders who have already assembled a kit or two should find they have everything required, except possibly spray paint and primer.

Carpenter's glue and plastic cement are the recommended adhesives, however I deviated from the instructions for two applications: one was to use slow-set CA instead of the recommended plastic cement to adhere the motor retainers (CA is the stronger adhesive for this application); the other wasusing epoxy instead of the recommended carpenter's glue to set the coupler into the lower stage,(done to prevent the joint seizing in mid-assembly).

I used multiple coats of automotive filler-primer to seal the balsa grain. It did not work perfectly, but provided an improved surface. Finish paint was from common department store grade rattle-cans, colors selected to conform to the label illustration. Of course, the builder may also choose their own color scheme as desired. Finally, the Boosted Bertha includes water-slide decals for at least eighteen separate application points, some of which are color-coordinated to the orange body and fins, and many of which need to be individually fitted. I added a few of the principal ones and may do more later.

Flying the Boosted Bertha

The Boosted Bertha is simple to assemble for flight; pack the parachute, insert two motors and go. The label suggests many combinations of appropriate motors. I suggest a B6-0 to B6-4 for the first flight. On a B6-0 booster, the Bertha will stage fairly close to ground as it's heavy and somewhat draggy, but the upper stage will attain surprisingly high altitude.

To prevent build-up of fouling between flights, use a little fine-grit sandpaper to clean the inside base surface of the upper stage where it engages the coupler. A bit of wax-paper rubbed around the exposed red coupler surface will further reduce friction and make for a cleaner mating of parts.

Also, avoid using designated upper stage motors (A8-5, B6-6, and C6-7) which are not recommended by Estes. Even flying in two-stage configuration, the Boosted Bertha is too heavy and too slow for the long delays in these motors.

Rating:

The Good:

1. Passport staging – launch preparation is simpler than the traditional tape-everything-together-to-fit method. The Boosted Bertha vents through holes in the booster's centering rings, which leaves a neater appearance than the usual side-venting.
2. Through the wall fin mounts – a stronger assembly for the booster, which needs the extra strength as it will tumble recover.

3. Screw on motor retainers – a fairly new feature for 18mm motors, and this form of retention makes the model easier to assemble and fly.
4. Shock cord – ¼ inch rubber and over a meter long.
5. Parachute – 18” and preassembled. The builder can still cut out the center to stabilize descent if desired.

The Bad:
1. The instructions – these are tri-lingual (English, Spanish, and French),appropriate for anywhere in North America, buttoo abbreviated, with lots of illustration but little written text. There areseveral places where the less experienced builder could be mis-lead, for example selecting the correct motor-mount tube or understanding how deep to set the staging coupler.
2. Assembling the booster fins – These fit throughthe booster wall and the pre-cut slots arejustwide enough for the fin stock, but if your practice is to pre-glue a joint before re-adhering permanently, the balsa stock will swell in the minute or two before the final assemblyand become too thick to fit through the slot. I had to do some quick emergency sanding along the slot edges to enable the fin tabs to fit again without crushing the body of the booster. A minor annoyance, and I expect most builders would not have that problem if they are not taking extra pains with the joint.
3. Fin fillets – the Instructions do not mention adding glue fillets to the fin edges. Most of us donot need to be reminded, but a less experienced builder might not realize. It would have been appropriate to mention.
4. Truncated fin-alignment guides – in the instructions, the printed fin alignment guides to not extend past ¼ inch, and do not allow the builder enough to gauge how accuratelythe fins have been aligned radially to the body. I used an alignment jig, which gives good results especially in conjunction with the through-the-wall design of the booster, but I doubt most builders would go so far. On the whole this will be a minor issue – for most builders, eye-ball accuracy is more than sufficient.

The Ugly:
1. Wind-cocking – the Boosted Bertha is large and fairly slow and with large fin area and accordingly its trajectory is easily impacted by wind. Avoid flying on breezy days and launch as close to vertical as possible. If you aggravateeven moderate winds by pointing the rocket substantially upwind at the pad, especially with longer delay motors in the upper stage, you could wind up with a flight more horizontal than vertical, returning the rocket to ground before the ejection charge can fire, which is a danger to onlookers as well as a fire hazard.
2. Switching motors – with the Boosted Bertha the motors are easy to prep, requiring only to insert and screw down the retainer caps. However,if you are not paying attention, you might inadvertently switch motors, inserting the upper stage motor into the boost section and vice versa. If this happens the rocket will not stage properly, but rather continue to ascend to a low apogee, turn over and begin to return nose-down ballistic, at which time the ejection charge in the booster motor will fire, igniting the upper stageand returningit to ground under power, destroying the rocket and posing a substantial hazard to bystanders and property.
(I have seen both these happen, neither is a pretty sight)

Overall

Estes rates this model as skill level 3 (advanced), which I think is appropriate. It is not a good model for the beginning builder, an issue reflected in the abbreviated instructions, however it should be fun to build and fly once you haveexperience with a few simpler models and are looking for something more challenging. In addition, it makes a good introduction to staging. There are a few quirks in the assembly, just to keep things interesting, and the completed model looks good and provides an impressive flight. This is definitely one to add to the collection.

Above: Final Product. *Photo: Jim Miers*