

ZOG-43



Zog-43
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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.

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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 Old National Pike Regional park near Mt. Airy, 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- July/August 2022 Sarah Jackson, NAR 101372

Hello NARHAMSters!

Thank you for all the content you've sent in. In the words of our previous editor, Don Carson, this newsletter can't happen without you. I appreciate the time you take to do rocket activities and then write about them. In the next issue I would like to highlight your night rocket builds. Please send in photos (in the light AND in the dark) of your rockets along with a brief description of how you incorporated the lights.

I'm not sure if you've noticed, but I did figure out how to add boxes around some text. Maybe next time I can figure out something else cool and awesome. Thanks for your patience as I learn the fine art of newsletter publishing, everyone!

Keep flying safe, folks!

For questions, answers, opinions, files, photos, and more NARHAMS, join the [NARHAMS Groups.io](http://narhams.org). Also checkout the [Facebook](#) group, and of course, the website at narhams.org.

Front: Ed Pearson receives a 50 year service award from NARHAMS. Ed Pearson is the sixth recipient of the G. Harry Stine Lifetime Achievement Award. *Photo retrieved from NARHAMS Facebook Page.*

Back: Man of Mystery, Ed Pearson, with an Estes Twin Factor. *Photo Sarah Jackson*

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

News

Ed Pearson Receives G. Harry Stine Lifetime Achievement Award

At NARAM-63, it was announced at the NAR Town Hall that NARHAMS' own Ed Pearson was the latest (and only sixth) recipient of the G Harry Stine Lifetime Achievement Award. When Mark Wise presented this news at our August business meeting, for a few moments, Ole Ed was speechless. He gained his voice quickly however, and thanked Mark Wise, NAR, the Board of Trustees, and everyone. He then proceeded to tell us about the two ironies of him receiving the award. After Stine passed, Ole Ed thought that NAR needed an award in his name. Therefore, Ole Ed saved up \$1000 and sent in a check to make an endowment for an award in G. Harry Stine's name. The check was promptly returned to Old Ed with a no thanks. Ole Ed believed it was due to the many requirements he had stipulated for the award. NAR later created the award anyway. The second irony is that about 50 years ago or so, Ole Ed received his first NAR award, best sportsman, from G. Harry Stine, himself. Ole Ed thinks it's fitting that his first and what he believes to be his last award both involve G. Harry Stine.



Above: Ole Ed takes in ECRM 40. *Photo retrieved from NARHAMS Facebook page*

Above right: 50th Anniversary Gala Launch- March 2015. *Photo credit Alex Mankevich*

Bottom far left: Clowning around. *Photo credit Sarah Jackson*

Bottom near left: McAuffle School launch-2012. *Photo credit Alex Mankevich*

Bottom right: At Goddard in August 1995 with Jim Wilkerson. *Photo credit Jim Wilkerson*



Upcoming events

October 15th	12:00 - 4:00 PM	Sport Launch Theme: Diwali Festival (tracking powder) Launch Manager: Ed and Sarah Jackson	Mt. Airy, MD
November 5th	5:00 - 9:00 PM	Monthly Meeting Topic: Planning Meeting and Pizza Party	College Park, MD
November 6th	1:00 - 2:00 PM	Goddard Launch	College Park, MD
November 19th	12:00 - 4:00 PM	Sport Launch Theme: OddRocs Launch Manager: open	Mt. Airy, MD
December 3rd	5:00 - 9:00 PM	Holiday pot luck dinner and raffle Refreshments: everybody	Greenbelt Fire Department (under negotiation), MD

Launch reports

The July 2022 Goddard Launch Report: A Blast From the Past and The Return of the King

By: Alex Mankevich – NARHAMS President

The July launch was only the second launch at the Goddard Visitor Center since the resumption of launches following the COVID shut down. It was also a holiday weekend launch. You can never predict what crowd may show up on a holiday weekend. The weather was sunny and warm without being excessively hot or humid.

The early action inside the Visitor Center auditorium was furious. Several visitors had purchased model rocket kits that needed assembly prior to launch. Ole Ed Pearson, DJ Emmanuel and Michael Cochran provided the build assistance and the flight preparation know-how.

Alex Mankevich filled in for Ed Jackson at the launch control panel. Brian Beard did the safety check-in with Jim Miers assisting with crowd control. A blast from the past arrived in the form of Thomas Henderson. Thomas had been a mainstay at the Goddard launches back when he was a teenager about 10-12 years ago. Thomas eased back into his old role as pad assistant and even took a turn at the recovery pole.

The initial rounds of flights saw only two or three rockets on the launch rack. After about 45 minutes of flying, we finally got around to launching six rockets per rack. After about two hours of non-stop rocket assembly assistance Michael Cochran was able to join the rest of the launch crew. Michael did his usual world's greatest igniter wire replacement duties.

About this time a kindly old gentleman asked if he could take a turn as Firing Officer. Alex consented to step aside from the control panel with the stipulation that petitioner also perform the flight dedications to Herb Desind, Richard Crisco and John McCoy. The veteran rocketeer agreed to those terms; thus the gathered crowd was treated to The Return of the King, who was none other than our very own Ole Ed Pearson. Alex and Michael Cochran stood by in awe of Ole Ed's dulcet tone, impeccable timing, reassuring manner and personal connection to the modelers. The King had indeed returned – if for only one rack of flights.

The surface winds were light, but the upper-level winds were somewhat breezier. We lost about three models to the tall trees. Only a few rockets went over fence and into the lower parking lot. One model had no parachute



Ole Ed Pearson reprised his role of Firing Officer and Color Commentator for one rack of flights. Ole Ed performed the flight dedications during his time at the control panel. *Photo credit Alex Mankevich*

deployment. One rocket provided a brief but loud thrill with a motor CATO.

Everybody wants numbers or else it didn't happen. So, here come the numbers. We totaled 66 flights (slightly up from the previous month) and about seven igniter wire fails. Forty-one persons were awarded First Time Flyer certificates by Shirley Ramos at the Information Desk. We concluded the launch at 2:55 pm.



Clockwise from top far left: Alex Mankevich did honors in launching and announcing (usually performed by Ed Jackson). Thomas Henderson made a guest appearance and helped with loading models and fixing misfires. Mike Cochran (red shirt) and DJ Emmanuel (striped shirt, right) helped newbies put together and prep models in the visitor center. Brian Beard (L) and James Miers performed safety checkins. Shirley Ramos made out certificates for first time flyers. Members of a Ft. Meade adults CAP squadron brought models to fly. *All Photos Ed Pearson*



July 2022 Old National Pike Park Launch



Top left: Alex Mankevich shows off the spiffy stakes that he painted. *Photo Sarah Jackson*

Top left middle: A close up of the spiffy stakes. *Photo Sarah Jackson*

Top right middle: Bill Stec and Ed Jackson contemplate... something. *Photo Faye Stec*

Top right: Faye Stec loads her pink Bertha. *Photo Faye Stec*

Bottom far left: Putting away equipment and trying to stay dry. The launch ended early. *Photo Ed Pearson*

Bottom left: Space Snoopy supervises the launch. *Photo Sarah Jackson*

The August 2022 Goddard Launch Report

By: Alex Mankevich

NARHAMS was in full multi-tasking mode during the August 7th launch at the NASA Goddard Visitor Center. NARHAMS will occasionally conduct two public model rocket launches simultaneously using its multiple launch systems. What made the August Goddard launch stand out was the fact that we ran two additional programs within the overall launch.

Of course, this sort of success does not happen without the participation of NARHAMS members. In addition, it does not happen without the skills that NARHAMS members bring to the party. So, thanks to the range crew that was on hand. Ole Ed Pearson assisted during the build session and performed event

photography, Thomas Henderson assisted at the launch pad as well as at the check-in station, New Ed Jackson was the Firing Officer as well as the provider of launch commentary, Mike Cochran and Bill Handy assisted the modelers at the launch pad and Jim Beard checked in the rockets and assigned launch rails. DJ Emmanuel did the recovery of the rockets that landed over the fence on the spaceflight center property. Alex Mankevich did the liaison work to facilitate the two NASA Goddard projects that were conducted concurrent with the launch.

Amanda Harvey, Visitor Center Program Coordinator, arranged to have high school volunteers assist the range crew at the August Goddard launch. We were assisted by five young volunteers - Alexis Booker, Anaya Alexander, Christian Ward, Aidan Morgan and Noah Ward. We had rotated them through the various stations so that they could get an up close and personal experience across the broad spectrum of conducting a public model rocket launch (on federal property within the Flight Restricted Zone). We had the volunteers assist the visitors with assembling their model rockets and prepping them for flight and we had them assist with the loading of the model rockets on the launch rack. They had an opportunity to observe Brian and Thomas at the Safety Check-In station as well as to observe New Ed at the launch control.



The second program run concurrent with the launch was to attempt to get an aerial photo of the new JPSS/GOES-R Orbits Interweave sculpture in the Rocket Garden. Julie Hoover of the NASA Joint Polar Satellite System program

Left: The range crew helping at NASA Goddard on August 7, 2022. From L-R: Ed Pearson, Thomas Henderson, Bill Handy, Alexis Booker, Ed Jackson, Anaya Alexander, Michael Cochran, Christian Ward, Aidan Morgan (back), Noah Ward (front) and Alex Mankevich. Not shown: Brian Beard and DJ Emmanuel. *Photo Amanda Harvey*

had been exploring multiple options to obtain an aerial image of the sculpture but kept running into difficulties due to the Flight Restricted Zone. Several of the obvious efforts such as drone and helicopter flights were not permissible. Julie felt it was worth attempting to get an aerial image of the sculpture using a model rocket such as the AstroCam. Alex put out the call to the NARHAMS membership for folks to bring their rockets with recording devices to the August Goddard launch.

Andrew and Adlai Perry stepped up with their AstroCam rocket which utilized a video device. Since we knew that the rocket would spin during descent, our initial strategy was to launch right next to the sculpture and hopefully image the sculpture as the rocket ascended under thrust. The flights next to the sculpture were on an A8 motor and on a B4 motor. We launched the third flight from the more distant launch rack using a B4 motor. Well, the third time was the charm. Ms. Hoover announced that she was quite pleased with a couple of “still” images she was able to “freeze” from the video provided by the Perrys. You can view the images and videos that Julie Hoover posted on the internet at <https://photos.app.goo.gl/UZ6e3Eg89XG23vez7>

Lest we forget that there was a typical Goddard launch also on that day. It was a seasonably hot day, so we had set up a pop-up tent over the Check-In Station and DJ Emmanuel passed out much appreciated bottles of cold water. We had at least one scout group in attendance. There was a slight breeze that pushed the descending rockets North towards building #36. Some rockets got caught up high in the trees, but others were recovered by DJ. We totaled eighty-three flights with ten igniter wire misfires. Shirley Ramos and Julie Saba working the Information Desk inside the Visitor Center awarded twenty-four First Time Flyer certificates. The high school volunteers kindly helped with the launch range clean-up and transport into the storage closet.



Top: The four-stage Javelin rocket (upper left) and the two-stage Black Brant rocket (upper right) are imaged in this “still” image from the video recording of the Perry’s AstroCam rocket. The green square is the pop-up tent placed over the sidewalk at the Check-In station. **Bottom:** The Rocket Garden’s Delta rocket is seen in this striking “still” image from the video recording of the Perry’s AstroCam rocket. This image was captured just before the ejection charge kicked in and has been rotated vertically to provide a properly orientated image. The target of the AstroCam flight is the white circular feature seen between the rocket’s fins. Photos Andrew and Adlai Perry



Top left: Aiden helps a family in the auditorium prepare their first rocket.

Photo Ed Pearson

Bottom left: Alex Mankevich (left) and Andrew Perry (center) set up the launch pad next to the sculpture. Adlai Perry (right) supervised this task. *Photo Julie Hoover*

Top right: Safety Check-in performed by Brian Beard—holding an Astro Cam, digital movie rocket. *Photo Ed Pearson*

Photo Ed Pearson

Bottom right: Andrew Perry (standing) and Adlai Perry (kneeling) set up their AstroCam rocket on the launch pad next to the sculpture. *Photo Julie Hoover*

Photo Julie Hoover



August 2022 Sport Launch Report

Alex Mankevich – NARHAMS President

You have to wonder when this summer's heat and humidity will finally relent so that we can enjoy a seasonable and comfortable day of model rocket launches. Plenty of brave souls came out for the launch at Old National Pike Park despite the hot and humid conditions. We were favored by fairly light winds blowing towards the North which kept most of the models out of the tall grass to the East of the launch range head. We did not have to content with any soccer activity.

Scout pack #1967 out of Fairfax, Virginia came out in force. They set up an impressive mission control of their own with a pop-up tent and a folding table. Vice President Alan Williams sashayed over and gave them a

lecture on model rocketry. The scouts brought out a variety of models to fly but their principal model was the Estes Alpha III. Of course, they wanted to fly the Alpha III beyond an altitude of eight hundred feet using their B and C motors. They routinely encountered some thermal activity coming off the field, so

Right: An Estes Interceptor descends before a Cub Scout (Pack 1967 of Fairfax, Va.) pop-up canopy.

Photo Ed Pearson



some of their flights could have done respectfully well during a parachute duration contest.

We had a number of members perform range duty. Launch Control / RSO duties were performed by Jim Miers, Ed Jackson, Alan Williams, Ed Jackson and Alex Mankevich. Check-In duties were handled by Alex Mankevich, Bill Stec, Brett Jurd, Sarah Jackson and Brian Beard. We ran the full launch window until 4:00 PM since we were not hindered by either wind or rain.

Our veteran flyers Steve Lloyd and Brian Beard provided some spectator thrills. Steve had his Vagon Abductor alien rocket which has a clear window showing that the rocket encapsulates a NASA employee who is scared and needing help. Steve launched this rocket on an E20 motor. Steve also flew his Pink Tail rocket which features a rear-mounted video camera. Brian launched his bomb-shaped Tuna rocket which carried two long orange-colored streamers – one of which was about thirty feet long. It made a graceful descent down towards the soccer fields. Brian later wowed the crowd with his Generic Oatmeal rocket. Brian's rocket consists of three stacked containers of oatmeal. Brian had flown this rocket before, so he knew it would fly stable and true.

Jeff Marks made two flights of his Tigres model which was launched stuffed with colored tracking powder. Daniel Solomon

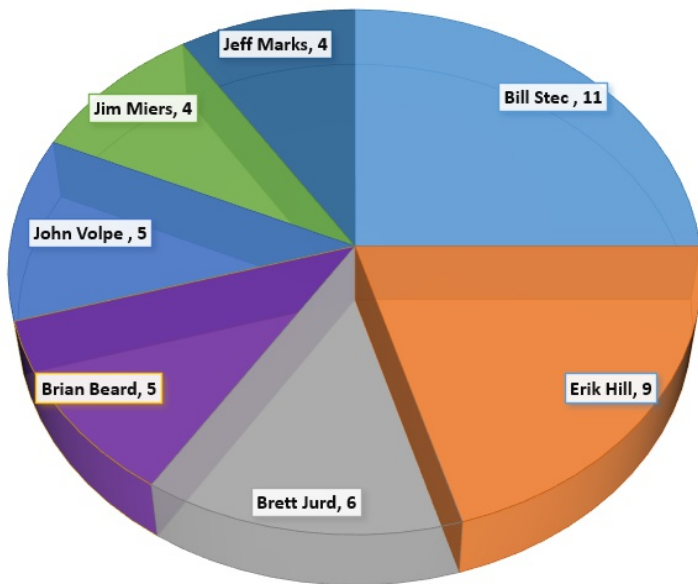


Above: Steve Lloyd points to an alien riding in his Vagon Disruptor (made from a 2-liter Sunkist bottle).
Photo Ed Pearson

turned up later in the day to launch his Red Ranger model as a qualifying flight for September's John McCoy Night Launch.

Our grand total of flights was a whopping 163 launches! Of course, with that impressive number of launches there were bound to be some less-than-nominal flights. An Odyssey rocket and a Saturn V rocket both made loop-de-loop flights, but well away from the crowd so there was no danger. A modified Mean Machine descended ballistically. A Longship rocket suffered a recovery device separation, but otherwise returned safe. The biggest thrill was arguably an Alpha III model on a B6 motor that carried its launch rod and rod holder down range. Jim Miers was conscientious enough to perform an "unofficial" range duty. Jim raced out to any rocket that did its ejection charge while on the dry grass. Jim was pressed into service on at least three occasions. Fortunately, no grass fires were ignited, so NARHAMS' firefighting skills were not called into service.

AUGUST SPORT LAUNCH FREQUENT FLYERS





Far Right: John Volpe's Big Duke lifts off...the chute & cone separated and drifted away. The body brushed against a tree and was returned. The camera must have recorded a spectacular flight. *Photo Ed Pearson*

Right: Wayne Bladen presents his Cherokee E model *Photo Ed Pearson*



Left: Mike McCaleb and his Bottle Rocket 3.0. *Photo Ed Pearson*

Right: Steve Lloyd attaches a camera to his rocket; John Volpe's strap-on look-down camera parasites upon his Big Duke rocket; John Stalnaker's Estes Astro-Cam Rocket (right hand). *Photo Ed Pearson*



Building Techniques

You Might Find These Products Useful

by Steve Lloyd

Balsa Preparation

For most of us who build and launch medium and smaller rockets, the kits from which we build them usually have plastic nosecones. Getting a bright, shiny finish on a plastic nosecone is easy; sand off the rough edges until smooth, paint a layer of primer and then coat with a glossy paint. Done.

On the other hand, some kits still come with balsa nosecones, or you may be designing your own rocket and buy an “aftermarket” balsa nosecone. Certainly, we can smooth the rough balsa with sanding it smooth, but as many of you already know, your results will be notably better if you use a sanding sealer or sanding filler. Several brands are available, but I’ve found one so easy and effective from a world outside of rocketry, that I felt I had to share it with you. The product is “Pine Pro” and it’s actually made for the Cub Scout’s “Pine Derby” racers — small wooden-chassis cars that race with gravity as the power.

Pine Pro is made by AMENCO and their

mailing address is 62 White Street, Red Bank, NJ 07701. Their phone number is 732-842-5215 and website is www.pinepro.com. The product is #10059. So, why use it? First, it fills tiny pores and raises the grain of the wood, making it stiff. Once completely dry, you will be amazed how smooth the surface of the balsa part, presumably a nosecone, will be. It can be reapplied, and with each reapplication and subsequent sanding, the surface becomes smoother and less porous. After wiping down the sanded nosecone removing all the dust, it will accept just about any paint you can think of.

A few additional notes are necessary here. Let me list them:

1. I use wide brush to apply the Pine Pro. You want to apply a generous coating, but not one that drips. Plan ahead: prepare for how and where you will handle the wet nosecone and allow it to dry.
2. Let it dry for several hours. I find that overnight is the best bet. If you attempt to sand it while it’s still wet, you will clog your sanding medium and make a mess of the surface.
3. Once the part is dry and you begin sanding, start with a more aggressive grit sandpaper, like 100 grit. Sand off the roughness. Once the basic surface is

smoother, sand with a gentler grit, like 200. For an even smoother surface continue with a higher grit number.

Each time the surface will get smoother. Once you’re satisfied with the result, be sure to wipe off all dust with either Tack Cloth or a microfiber wiping cloth.

4. If you are using Pine Pro on fins, do only one side at a time. As Pine Pro dries, it WILL warp the fin. Don’t worry about it at this point. Once the Pine Pro side is completely dry, then apply Pine Pro to the other side. Once dry, it may still be warped. If so, simply put it on a flat surface with a heavy, flat weight on top of it, and the next day the fins will be straight and ready for sanding. I almost always use basswood for my fins, as it’s stronger than balsa, but basswood warps with Pine Pro like balsa.
5. This part is optional, but it usually pays dividends with the best results: prime the sanded part before painting. I am fond of Tamiya brand spray Fine Surface Primer. One light coat should be sufficient.
6. If you are going to paint for a polished aluminum and/or chrome paint, be sure to paint the primed surface FIRST with gloss black. Let it dry very thoroughly, at least overnight. THEN spray on your aluminum or chrome and you will see that metallic finish really come through.

Launch Lug Lubricant

Our kind NARHAMS launch leaders regularly wipe off exhaust dirt from the launch rods so your rocket takes off without undue friction. If, for some reason you find your round launch lugs dragging on a launch rod, you may want to try lubricating the launch lugs (not the rod) ahead of time with spray graphite powder. Usually, when we think of the word “lubricate,” we think of oil. This is not an oil, it is a very fine, slippery, dark powder, most often applied by squeezing from a tube.

I have found “Hob-E-Lube” an effective dry graphite lubricant. Like the Pine Pro mentioned earlier, it was developed for the Pine Car Derby race cars. Hob-E-Lube also uses a powdered form of molybdenum, another slippery substance. The product is available from PINECAR P. O. Box 98 Lime Creek, MO 65052 or on their website at www.pinecar.com.

NOTE: The lead in normal wooden pencils is actually graphite. In powdered form it is messy, so before you apply it to the interior of your launch lugs, mask off the surrounding area so you don't get over sprayed graphite all over.

Foil-Covered Rockets

I've spoken about metallic paints a little earlier in this article, but there is another way of getting a truly metallic finish. Some

people like to use aluminum foil, carefully and smoothly glued to their rockets. This is not only difficult, but it adds weight and reduces rocket performance. There is a compromise: a product called BARE METAL FOIL. This comes in sheets and is a very thin aluminum foil, much thinner and much more flexible than regular kitchen aluminum foil. The adhesive is already on the backside of Bare Metal Foil, so no additional glue is necessary.

The surface to be covered with Bare Metal Foil MUST be in some kind of glossy finish. If applied carefully and burnished gently with a smooth cotton cloth and cotton swabs, it will easily fill nooks and crannies and make compound curves. It can also be removed gently, providing you do so not long after covering.

I learned about Bare Metal Foil in building my plastic model cars and airplanes, where it's been a staple in the industry for years. It DOES take a little practice to get the hang of it, but with a little practice it gives you a remarkable metallic finish since, after all, it actually is metal. The products comes in aluminum, chrome, copper, etc.

They can be reached at BARE METAL FOIL P. O. Box 82, Farmington, MOI 48332 or www.Bare-Metal.com or phone 248-476-4366. Each package contains one sheet of the foil and detailed instructions for its use. Full Disclosure: covering an entire rocket

with this product would be expensive, so plan accordingly. The end result, though, can be spectacular.

Help with Estes Fin Alignment Tool

Fin alignment is often an issue when building our rockets. I am a fan of using epoxy adhesives to attach the fins on my rockets. I have one of the fin alignment tools made by Estes, but I have found it to be clumsy in its fit, but nevertheless, usable. Because I use quick-setting epoxies, it's important I don't inadvertently glue one of my fins to the fin guides on that Estes alignment tool. One way to avoid this is to simply cover the fin guides with a layer of kitchen wax paper, like Cut-Rite. This way any errant epoxy that gets on the fin guides is sticking only to the wax paper. I will even tape the wax paper onto the fin guides to be sure it stays put.

A Handy CA Adhesive

Everyone has their favorite adhesives, but an old favorite has been given new life for me in a convenient size. That adhesive is the so-called superglues, or more correctly cyanoacrylate (CA)s. My new favorite, simply because I hate wasting anything when the nozzles clog with adhesive that has set, is the packaging by 3M, or “Scotch.” They now offer “single-use” several cyanoacrylate gels in very small tubes in one inexpensive package.. When I use it on my rockets, I seldom have to use

the quick-set “kicker” sprays to speed up the setting process (although you still can do that if you prefer). If I wipe off the end of a partially-used tube of this “single-use” CA glue, I find it may actually provide more than a single use. There is more than enough CA in each tube to attach a broken fin, for example. The beauty of the product is that you don’t have a large dispensing bottle that often clogs with plenty of product left.

Their contact info is Scotch Brands. 3M, St. Paul, MN 55744-1000 or www.ScotchBrands.com. I’ve found it in hardware stores, hobby shops, etc.

A REAL Chrome Paint

A few years ago, a new product was released that answered the prayers of many a model car builder: the need to replicate the mirror finish of chrome. I’ve addressed some methods earlier, but some may wish to try this product. Be aware, that the liquid product can only be applied to larger areas with an airbrush. For smaller detail, they have marker pens. The brand is MOLOTOW and is from Europe. When painted on a smooth surface and allowed to dry thoroughly, it will look like genuine chrome finish – much more so than any standard hobby/hardware spray or paint. The paint is available in small bottles for airbrushing, but also comes in various sizes of marker pens of 1, 2, and 4mm points.

A few things must be made clear about the product. First off, it takes a LONG time to dry completely. By this I mean more than two days. I base this on two things, my own experience and the comments shared with other hobbyists on Facebook, etc. You will be glad you had the patience.

Standard paint thinners work with the product to clean the airbrush, etc. I prefer lacquer thinner or acetone. These same solvents can be used on the markers with care.

The markers tend to sometimes exude too much of the chrome paint. It’s a good policy to briefly dab the markers on something else before you apply. You will see it glob up but be aware it happens. With the markers, cover only small areas at a time.

Do not reapply unless absolutely necessary. With the markers, try for an even, smooth application the first time. You will get the best results with smooth applications.

Finally, the product has a limited shelf life. The manufacturer hasn’t commented on this, but the rest of the hobby world has. After about six to nine months, it loses some of its chrome gloss. It can still be used, but the finish will be more aluminum than chrome.

MOLOTOW can be reached at CHARTPAK

1 River Road, Leeds MA 01053 or 800-628-1910. Their website is www.molotow.com. I usually purchase mine at www.MegaHobby.com.

Hope all this helps enjoy your rocketry.



Steve Lloyd

Steve Lloyd has contributed a number of articles for the ZOG-43. He usually writes about backyard science and nature or just a philosophical slant on science/nature which you can read in the Frederick News-Post. Steve often gets creative with the themes of his model rocket design such as his "Spirit of Candy Corn" rocket.

Modeling a Black Brant VIII Instrumentation Section

By John Brohm, NAR #78048

In our last article we covered the modeling of the Black Brant VIII Igniter Housing. In this article we'll tackle the Instrumentation Section, the white part one sees in the following photo.



Black Brant VIII Payload Section
Photo by Paul Lubertowicz

The next photo provides a closer view of this section.



Instrumentation Section
Photo by Paul Lubertowicz

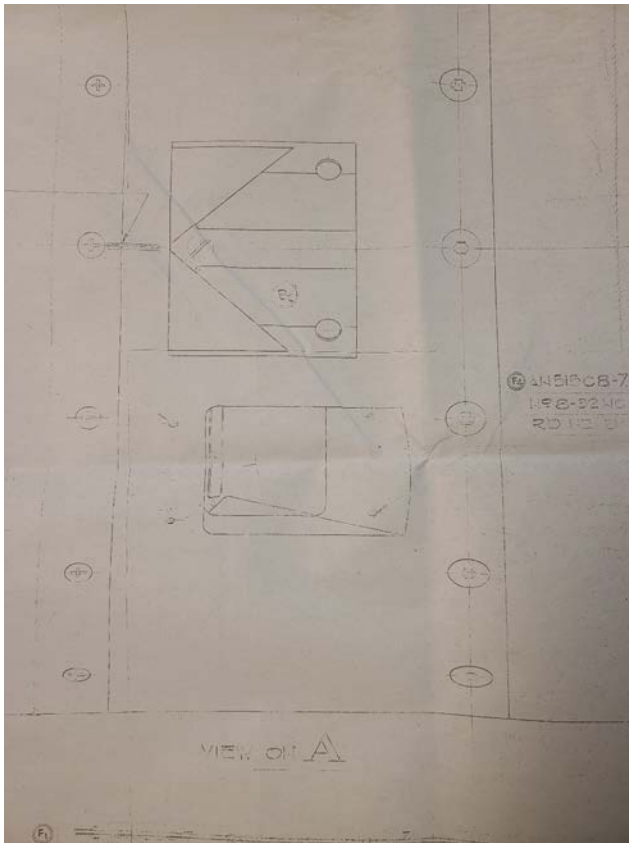
On this section we can see two flush mounted access panels. Then just above is the nose cone, and the very visible inset screws that join the nose to the Instrumentation Section. And as we noted in the last article, the wall mounting clamp obscures the joint between the Igniter

Housing and the Instrumentation section, so we can't be sure what type of fastener was used to secure that joint.

Photos of other BBVC rounds show a variety of joint arrangements for the various modules that can comprise the payload section – some use the milled, angled insets such as we see here between the Instrumentation section and the nose; others use flush-set screws, either of the socket head type or sometimes flat head Phillips screws.

Buried within the data package shared with me by Taras Tataryn is a blueprint of a BBVC payload section that's very similar to the section found on the St. Louis Science Center round. Unfortunately, that blueprint has sustained some water damage somewhere in its past, and so the drawing number is illegible and can't be referenced. Nevertheless, we'll pull in a detail view from that nameless, numberless print, as it highlights the fasteners used at the Igniter Housing/Instrumentation Section joint for that particular Payload version.

In the left of the drawing, we can see the joint between the Igniter Housing and the Instrumentation section, and in this particular payload example the joint is secured by sixteen UNBRAKO 1/4"-28UNF flat head Phillips screws (annotation provided elsewhere on the drawing). Returning to our St. Louis Science Center round, and the fact that the joint and fastener type is obscured by the wall



BBVC Igniter Housing

mounting clamp, we'll stipulate an arbitrary conclusion to our unanticipated confrontation with Schrodinger's Cat and declare these 1/4"-28 flat head Phillips screws as our Instrumentation Section/ Igniter Housing joint fasteners. Reference data established, let's construct our Instrumentation Section.

Instrumentation Section

As seen in our earlier photo, the Instrumentation Section exhibits a pair of access panels and a circumferential row of

joint fasteners. This detail manifests on the outside skin of the section, so we'll reproduce this on a scale length of 0.010" thick sheet Styrene. The Styrene wrap will then be glued to an underlying piece of BT-70 which will nicely slip-fit over the JT-70C coupler we're using to construct the payload section.

Before we do all that, we must first adjust the diameter of the underlying BT-70 tube so that when the Styrene wrap is added, we remain at an overall BT-70 diameter. We accomplish this by first removing the outer paper layer of the BT-70.



Instrumentation Section BT-70 Underlay

All of the white paper layer is removed, and then the stripped tube is saturated with thin CA. Once dry, the stripped tube is carefully sanded to remove any remaining outer white paper remnants, all the while checking wall thickness for uniformity. We want the stripped tube to arrive at a wall thickness of about 0.010".

The Styrene wrap is punched for the row of fasteners, the access panels are scribed into the surface, and then the Styrene wrap is glued to the underlying tube. The representative Phillips head screws (punched, scale diameter Styrene disks, with hand-pressed Phillips impressions made with a 000 Phillips screwdriver) are then added with careful dashes of Tamiya Extra Thin Cement.



Phillips Joint Fasteners

Note that the section is temporarily supported with a spare coupler while being worked on, due to the fragility of the part. Satisfied with the fit, we'll park the part in the Paint Shop, where the native part is primed with Tamiya Light Gray Surface Primer. Once cured, the part is over-sprayed with Tamiya TS-26 Pure White. Once dry, the model's Instrumentation Section is carefully placed on the Payload Section where it's captured between the Igniter Housing and the nose cone.



Payload Section

And there you have it, our finished BBVIII Payload section. Let's take a look at it the on the model.



Payload Section Installed

To give it some context, let's step back a pace or two and offer a photo of the completed model.



Black Brant VIII Complete

In future articles I'd like to present other parts of my Black Brant VIII build; until then, best wishes in your model rocket building endeavors. See you next time!

When That Rocket Really Needs to Say “BANG!”

By Vice-Zog Alan Williams

As in our little modeling universe, NASA Wallops’ Range Safety and Flight Safety Officers are charged with preventing flight hardware from threatening persons or property. Unlike us they have a whole set of action options, from (nothing) to (SOMETHING!!!) depending on what rocket is flying. The 2013 Antares ORB-3 failure gave a memorable example of why vehicle destruct systems exist. (Look up the video on Youtube, then imagine that happening in downtown Chincoteague.)

In late 2017 Alex and I toured the remodeled Wallops main base Range Control Center and noted the ever-important RSO-FSO positions at opposite sides of the Range Surveillance Room front consoles. Either one is independently capable of terminating an errant vehicle. Real-time graphic displays show parameters such as azimuth, flight angle, altitude, velocity, acceleration, predicted impact points, and flight event location call-outs. If any limits are broken, the Range Safety team acts and the Flight Termination System may come into play. No one overrules an RSO/FSO’s safety decisions.

The events are begun by activation of uniquely shaped Arm and Destruct switches at the Safety Officer’s desks. These are sunken into twin hemispherical depressions in the console surface. Two safety covers

must be swung away and both switches deliberately held down to make things happen. An accidental brush with a pencil won’t do it.



Wallops Range Safety Officer Console

This begins lightning-fast interrogations through a secluded command radio transmitter system seven miles south on the “Radar Road” mainland tracking facility. A complex sequence of uniquely coded and formatted recognition messages must agree between the ground and initiator systems. (This prevents interference from outside radio sources.) If the signals confirm as valid a final activation impulse leads to structural dispersion almost instantly. With sustained line-of-sight contact the tight broadcast pattern of its quad-ganged beam antenna systems can reach several thousand miles downrange. By the way, no bellowing sirens or flashing

red lights fire off; those distractions are for Hollywood. The destruct event announces itself adequately, thank you.

What type of safety gear is used depends on rocket type, total liftoff mass, velocity, and intended direction. Since the rocket motors themselves are highly reliable typical problems might come from a rare fin or payload structural fault. It should be noted that the overall vehicle success record at Wallops exceeds 95 percent.

Smaller sounding rockets like the Orion are not FTS equipped. If a failure occurs aerodynamic forces will drop them within the range borders. (Locating ranges in large remote swamps and deserts instead of population centers pays off.) Larger multistage rockets like the Black Brant IX and up sometimes have explosive thrust termination packages. These chop vent holes in the motor forward ends to cancel thrust. (The first Black Brant XII flight in 1988 had them on both the third and fourth stages.) White Sands Missile Range uses them more often because of its narrower flight safety corridor.

The old Aerobee sounding rockets had a safety feature unique to their liquid fueled engine system. Safety “scanners” watched through wire arrays on simple frames scattered around the island. The rockets were to fly right up the wires, showing a good flightpath. If not, the spotter’s radio signals would cut the fuel pressure, killing thrust. Very simple but it worked.

Anything approaching orbital capability

Anything approaching orbital capability will have full multiple stage destruct and propellant dispersal systems. Typically, these are linear charges (those innocent looking thin red pipes running down Saturn I B first stage tanks, for example) and carefully placed bulk explosives to rupture tankage, scatter propellants, and turn big structures into little stuff. And yes, this can cause its own problems. Early Titan I missile test flight C-3 lasted seconds as its destruct package triggered accidentally. When the rocket's hold-down release bolts fired, they jarred the detonation relay in the safety system, recently relocated lower in the missile's aft compartment. KA-Whammo!

On June 19, 1976, my brother Craig and I covered an LTV Scout-D lofting an extremely sensitive hydrogen maser atomic clock 6,200 miles almost straight up from Wallops. The "Gravity Probe-A" experiment tried to detect Einstein's predicted relativistic time and gravity distortion effects during heavy acceleration. At 89 degrees effective launch elevation it was over 35 miles high at 70 seconds into the flight when the first stage separated. At this point its horizontal position was less than two miles offshore. This was a daunting visual experience for those of us watching near the Island security gate since the Scout was still going essentially straight vertical. A thin broken cloud deck about 5 miles up didn't help much. As each upper stage fired its guidance held that close-to-vertical path,

maximizing acceleration. An acute parabola followed motor burnout. Excepting some payload antenna problems everything worked, with ocean impact west of Africa ending the mission. But NASA likes to cover its bets. We were told that a complete second destruct command system was installed to prevent disaster if the rocket leaned the wrong way. (The reciprocal of its intended ground track would have given Washington, D.C. a real thrill.)

Most people didn't know that Wallops' tracking and command destruct system was engaged every time the Shuttle flew up the East Coast while visiting the Space Station. Every effort would have been made to separate the Orbiter from the external tank if it had veered back towards land. Every Space Station mission launch was flawless. But population safety was requirement one.

I think you'll agree that there's a lot of responsibility filling those four curious red teacups in the Safety Officer's desks.

All photos by Alan Williams###



Range Safety Command Antennas



Sensations



Washington