# 206-43

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*IN THIS ISSUE:*

Zog-43
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Official NARHAMS Newsletter
Editor: Don Carson

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, at Old National Regional park near Mt. Airy, Md. and at the Carroll County Agriculture Center, near Westminster, 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 -**
**Don Carson, NAR #11069**

In this issue, we have historic news and news of history. Pat McCarthy provided us with an eyewitness account of the launch of the Falcon 9/Orbcom OG-2 and the successful powered landing of the first stage back on dry land! Also, Aviation Week and Space Technology has put all 100 years of publications online and available to all for free - that is 5,200 issues! Ole Ed provided a remembrance of some old friends of the club and of the hobby.

We wrapped up 2015 with a great Holiday Party in Old Greenbelt and, looking forward, Jim Filler has provided some guidance for building and competing at our upcoming ECRM contest. Good stuff to know while we are in Build Season.

We have announced the rules for this year's Kit Bash contest that culminates at the Holiday Party in December. This one is ~~a little~~ a lot different, check it out.

As always, there is lots of launch, competition and outreach coverage.

Lastly, we are holding a Radio Controlled Glider competition a the March 19 Sport Launch - just for fun. You can fly any kind of radio controlled rocket boosted glider with any motor. This event allows us lower power RC flyers to join in.

Fly 'em high, bring 'em back, and be safe.

For questions, answers, opinions, files, photos, and more NARHAMS, join the NARHAMS Yahoo group. You have to get yourself a yahoo e-mail address (but you don't have to use it for anything else), it is free, painless, no ads, and may just be the cure for the common cold. Also: Facebook if you are not parnoid about that sort of thing.

**Front Cover:** Time lapse photograph of the Launch of the Falcon9/Orbcom OG-2 and the successful powered landing of it's first stage back at Cape Canaveral on Dec. 21, 2015. Photo courtesy of SpaceX.

**Back cover:** Dave Fuller's shot from the September Sport Launch at Mt Airy.

**ZOG ROYAL COURT**
(NARHAMS OFFICERS)

**ZOG** (President) Alex Mankevich

**VICE ZOG** (Vice-President) Alan Willaims

**COLLECTOR OF THE ROYAL TAXES** (Treasurer) Maria Ha

**KEEPER OF THE HOLY WORDS** (Secretary) Chris Ha

**COURT JESTER** (Section Advisor) Mark Wise

# Falcon 9 Powered Landing - Eyewitness Account

## By Pat McCarthy

Photos: SpaceX

I was out on SR 528 causeway near the west end of the Port Canaveral locks, I guess about eight miles from Complex 40. I went out to help Jim Banke do his WMMB-AM radio live broadcast accompanied by his son Christopher. This was one of the first Jim covered from nearby, usually he just broadcasts from his home office and watches webcasts for launch timing. There was a big crowd gathered along the causeway.

CCAFS was cleared of all non-essential personnel. There were only about 800 folks total on base, everyone else was chased off about four hours before launch. Of course, it wasn't the launch itself that caused the Safety analysts conservatism, it was the landing attempt (although being the F9 return-to-flight mission, some were probably nervous). In another first, the 45th Space Wing Safety-issued Flight Caution Area map for the operation had TWO Blast Danger Area circles clearly marked, one for SLC-40 & the other for Landing Zone 1, the former CX-13.

We had a great view even with the haze and scattered low clouds. Indeed, the clouds added to the view, giving a really nice glow to all the rocket firings. The TV coverage did not do it justice, which is not unusual for night launches where the video gets washed out by the bright exhaust. The naked eye view was very impressive. I don't think a daytime flight would have been as spectacular.

The first stage of SpaceX's Falcon 9 rocket is seen just before touching down on Landing Site 1 at Florida's Cape Canaveral Air Force Station on Dec. 21, 2015

The launch itself seemed normal, although it appeared to me to fly a very lofted trajectory, not the flatter ones we normally see bending downrange soon after launch. I presume this was because SX had extra performance due to the relatively low payload weight and they wanted to keep the booster relatively close

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**Falcon 9 Landing - continued**

to the coast to make fly-back easier. I suppose one could compare the SX launch commentary callouts of altitude and downrange distance to prior missions to confirm this. Haven't done so yet. The first stage plume exhibited a distinctive greenish tint to me. I have no explanation for this and it was the first time I've seen it. Since it was over three hours after sunset, it was not caused by sunlight on the plume. Staging seemed very high overhead, about 65 degree elevation, not the more common 45 or less degrees. After stage two ignited, we saw it progress downrange.

When the booster re-ignited for its Boostback burn, we saw a nice back-lit glowing plume. Since it was facing away from us, we didn't see the lit engines directly. One could definitely see stage two heading away and stage one heading back toward us. Disconcerting for a long-time launch viewer.

At the ignition of the second booster burn (Reentry burn) things really got bright. This appeared very high overhead. Through binoculars, one could see a distinctive multi-engine flame pattern. It appeared foreshortened compared to the upward flight, no doubt due to the aerodynamic affects of flying down into its own plume and atmospheric shock wave.

Liftoff Falcon 9/Orbcomm OG-2

Between the Reentry burn and the final (Landing) burn, it was easy to track the falling booster by the engine section which sparked and flickered flame all the way to final Landing burn ignition. It was falling very fast between Reentry burn and Landing burn! Again, the impression it was right overhead of us and headed our way was strong. As I mentioned to Jim's son at the time, "Its coming right at us! I picked the wrong day to stop sniffing glue!" Thankfully, Christopher is well versed on his comedy cinema.

After Landing burn ignition, I could see the engine gimballing back and forth searching for the right trajectory. I could not see the ACS jets or grid fins in action. Even after Landing burn ignition, it continued to drop very rapidly until a couple of degrees above my horizon, just before landing. The sonic boom arrived about the same time as the landing, leading many observers (Elon included) to conclude it had exploded after touchdown. Thanks to Jim's warning on his broadcast, we were prepared for the boom and didn't jump to such conclusions. Indeed, my view through the binoculars led me to believe things went as planned. I could see the booster slow at the last second, then the flare from the engine's ground reflection, then a quick shutdown and darkness. Had it blown up, I'm sure I would have seen another, bigger flash. (With associated "earth-shattering kaboom.")

The spectators erupted in cheers, with much hooting and hollering. I think many realized the historic import of this event. I heard many parents tell their kids, "You got to witness history tonight." Indeed. To say I was surprised it all worked would be an understatement. Big kudos to the SpaceX

**Continued on page 5**

team for carrying off this historic feat!

To temper reality, we'll see how they manage to get things certified for re-flight and if they can continue to successfully land future missions regularly. Their ASDS "drone" landing barge is now based out of Port Canaveral. The plan is to send it off shore to capture returning boosters that fly geosynch launch missions, as they won't have the propellant or performance to bring boosters all the way back to CCAFS on some flights. Less performance–dependent flights will land at LZ-1. I wonder who will be the first customer that elects to fly on a "used" rocket?

As an aside, the time-lapse photo SpaceX on the cover came from atop Space Florida's Complex 46 mobile access tower. The launch is the right streak, landing the left streak.

## For More on the Historic Flight:

Great Youtube video of the landing and the reaction at the control center:

https://www.youtube.com/watch?v=1B6oiLNyKKI

Link to the podcast of Jim Banke's WMMB-AM radio coverage of the F9 launch & landing:

http://tunein.com/embed/player/t102521469/

See more press coverage at:

http://www.space.com/31444-spacex-falcon-rocket-landing-epic-photos.html#sthash.rkX1mnLQ.dpuf

For more info on SpaceX and Falcon 9:

http://www.spacex.com/falcon9

Falcon 9 1st stage powered down after successful landing at KSC

# Big Bash in Old Greenbelt - NARHAMS Holiday Party Closes Out 2015

## By Don Carson

This year's year ending holiday party, like in those past, featured lots of great food, a few surprise guests, great raffles, contests, flying, presentations and lots of camaraderie.

This year, instead of a kit bash contest, there was a Best In Show. Contestants brought their best models to display and the best is picked by popular vote. Ellen Fineran won the Best in Show with her Goofy Mag (Level 1 Cert rocket for her). Jef Fineran placed 2nd and Raul Peña grabbed 3rd. Prize money for each place donated by Hobby Works in Laurel, MD and NARHAMS.

Richard Crisco recieves Goddard Plaque
*Photo: D. Carson*

Serious rocket desserts
*Photo: E. Pearson*

Michael Cochran, Richard Crisco, and Ed Pearson all received nice plaques from NASA Goddard for their support of their Open house day launches.

This year, the club awarded it's FROG (For Rocketeers Of Greatness) Awards upon three well deserving recipients - Richard Crisco, Tom and Maria Ha. Truly great folks.

John Hochheimer presented a letter for NAR President Ted Cochran and 50 year NAR Membership Pin to none other than Ole Ed.

Dave Fuller won the big raffle, a quad donated by Hobby Works. Thanks to Hobby Works for all their great support, shop there when you can.

No less than a half dozen Quad copters were being piloted around the room. Stoil Aramov patiently provided lessons to all interested in learning. He did well with all except your reporter who was perhaps suffering from a sugar buzz from all the desserts. Maria was piloting her prize from last year's raffle.

Maria handed out new memberships cards.

It was great to see that we had a number of families present: Has, Shaffers, Finerans, Aramovs, Pearsons, and Panecks.

People lingered long after the party had ended, a sure sign of friends

This stuff needs more sugar, more caffiene
*Photo: A. Mankevich*

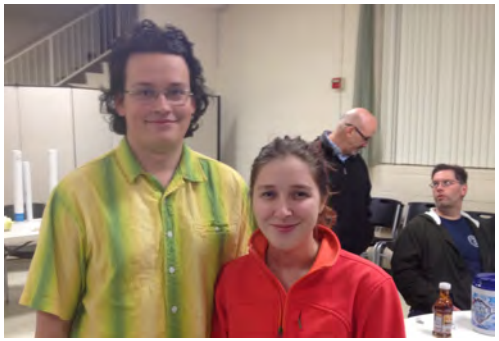
FROG Winners, Tom and Maria
*Photo: D. Carson*

**Continued on page 7**

enjoying the evening and company of friends.

Thanks to Jim Miers for the hospitality of the Greenbelt Community Church.

The rest of the story we will tell with pictures.



Zach and Heather Ha
*Photo: D. Carson*

On the lawn outside, a beacon
*Photo: D. Carson*

Alex and Tom
*Photo: D. Carson*

Rachel and Natelie Shafer
*Photo: E. Pearson*

The hand is quicker than the shutter
*Photo: D. Carson*

Cheers
*Photo: A. Mankevich*

The Best In Show Line Up
*Photo: E. Pearson*

Alex presents a plaque to elf Mike Cochran
*Photo: D. Carson*

**Continued on page 13**

## Party 2015, Continued

Kevin Johnson and John Hochheimer
*Photo: D. Carson*

Ellen and Jef Fineran laughin' it up
*Photo: D. Carson*

*Raffle Goodies*
*Photo: E. Pearson*

Stoil coaches up Maria. The blue blur is her quad
*Photo: E. Pearson*

Ellen Fineran's Best In Show Winner
*Photo: E. Pearson*

John Hochheimer and the 50 Year NAR member
*Photo: D. Carson*

Insiders meeting
*Photo: A. Mankevich*

# 2015 FROG Award Citations

The NARHAMS award
For Rocketeers Of Greatness
is presented to

## RICHARD CRISCO

Richard was the model rocketry coordinator for the “Rock the Ridge” 100th anniversary Camporee of the Baltimore Area Council of the Boy Scouts of America during October 2012.

Since becoming the Scouting Coordinator in September 2013, Richard has guided the model rocketry activities of numerous scouting groups across Maryland. He has unfailingly devoted his time and effort to assure that scouts enjoy their build and launch activities with NARHAMS.

Richard has regularly been serving as the Safety Check-in at the monthly Goddard launches since 2012. His willingness to serve and assist has enhanced NARHAMS’ reputation as a leader in model rocketry outreach activities.

Presented 2015 by a grateful club,
NAR Section #139

The NARHAMS award
For Rocketeers Of Greatness
is presented to

## TOM and MARIA HA

Tom and Maria have initiated the ‘Fly-It, Take-It’ event at many national and local rocket launches since 2009. They have both operated the NARTS program from 2005 to 2010.

Tom and Maria have regularly been serving and mentoring with the most prestigious NAR activities including TARC, NARAM, NSL and especially NARAM-50. Tom and Maria have individually held important offices in multiple NAR sections.

Their many national and international travels as ambassadors to the model rocketry world have helped to promote the “Pay it Forward” mantra of both the NAR and this section.

Presented 2015 by a grateful club,
NAR Section #139

# January 2016 Goddard Visitors Center
## Kicking Off 40 Years of Goddard Launches

By: Alex Mankevich
NARHAMS – President
*Photos: E. Pearson*

NARHAMS kicked off 40 years of public model rocket launches conducted at the NASA Goddard Visitor Center in Greenbelt, Maryland on January 3, 2016. Ole Ed Pearson reminded us of this auspicious milestone. It is thanks to the many people in our section who have dedicated their time and efforts at the Goddard Visitor Center through the decades to make this impressive streak possible.

Interesting model and flew nice. Mike Cochran watches ascent. Landed in Goddard's main area and retrieved by an employee.

We've hit a few bumps along the way though. The occasional federal government closure due to funding gaps closed the Goddard Visitor Center when the shutdown overlaps the first Sunday of the month. The security concerns following September 11, 2001 had also cancelled the first Sunday launches (see ZOG-43 http://narhams.org/zog-43/v24/zog43_v24n03_200203.pdf ). The launches were finally resumed in May 2003 (see ZOG-43 http://narhams.org/zog-43/v25/zog43_v25n05_200305.pdf ). During the summer of 2010, model rocket flights were suspended at the Goddard Visitor Center while NARHAMS worked with the Goddard Public Affairs office to apply for a waiver to allow model rocket flights in the Washington DC Special Flight Rules Area Flight Restricted Zone (see ZOG-43 http://narhams.org/zog-43/v32/zog43_v32n07_201007.pdf ).

Lots of parachutes instead of streamers

The rocket gods were apparently pleased with our 40th year milestone as they provided us a mild January day for the launch. A moderately-sized crowd turned out to give us a total of 76 launches for the day. Some dedicated fliers were able to get in 2 or 3 flights on their rockets. The wind picked up

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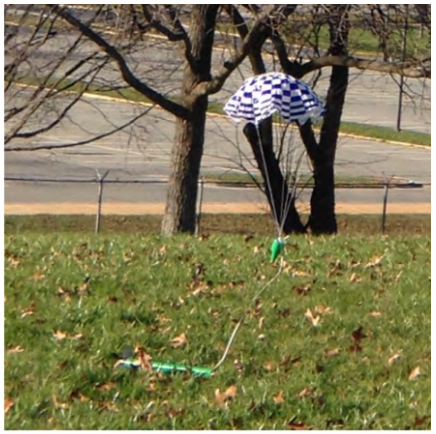
## Nov. Mt Airy Launch, Continued



Launch was same time as Washington/Cowboys game. Touchdown!

slightly towards the end of the launch so that the recovery pole saw some action. Cub Scout pack #101 of Bethesda launched the Estes Hi Flyer and the Estes Baby Bertha on differing motors as a science experiment to understand the effect of force upon mass. Thirteen First-Time Flyer certificates were completed by Julie and Shirley at the information desk.

Our dependable and experienced crew was on hand. Richard Crisco and his brother Mark did the RSO duty. Richard also brought out his family members Kathy, Anna and Aria. Grand niece Aria and niece Anna made flights with their models. Aria is somewhat a rocketry celebrity as she has won prizes in the last two Goddard Apollo contests. Mike Cochran helped out Alex Mankevich at the launch rack with the igniter mis-fires. Ted Avraham came out with wife Frieda and son Joe to fly. Ted made it to the previous night's January business meeting. Ole Ed Pearson did the roving ambassador duties and recorded this launch for prosperity. All in all, it was a good start to yet another year of Goddard First Sunday launches.

Alex came out with his parents from Pax River to check out the action...they learned of the launch from the Web. He was not adverse to flying either. Here he is with mom and a newly acquired Hi Jinks model.

Ted Avraham came out with wife Frieda and son Joe to fly. Ted made it to the previous night's meeting. Here he is with a model, its launch, Frieda and Ted tracking its ascent, and the downed model on the VC sidewalk.

# Finishing Your Model - McCoy Recommendations by Ed Pearson

At a recent NARHAMS meeting, master model builder John McCoy gave a talk on finishing your models. This article covers some highlights, gives you insights, and offers a few of John's recommendations.

First some encouragement to those who feel challenged: The good news is that anyone can make a smooth, finished model. You have to realize, and this is a big caveat, that to produce a nice finish, you are likely to spend three times or more time getting the finish desired than you did in construction!

Second, do your research and homework before finishing your model, i.e., learn from others. John recommends you read and use the information in NARHAMS Tech Tip 002 (filling the seams of a body tube), Tech Tip 003 (making fins), Tech Tip 004 (paint finishing), and Tech Tip 005 (using paint brushes). These tips may be found on the NARHAMS Web site.

If you are going to fill wood grain (e.g., fins), use a filler coat such as Midwest Aero Gloss Balsa Fillercoat or a thin coat of Titebond Molding and Trim Glue that has been cut with water about half, but not a sanding sealer or a clear coat product. The molding and trim glue also makes great fillets if used undiluted--it won't shrink or bubble—on balsa or basswood fins attaching to craft paper or phenolic body tubes.

John McCoy talks about making models look good at the September meeting. In the foreground is a NARHAMS Gold. One can be pardoned for mistaking the kit for a trophy instead.
*Photo: E. Pearson*

John's preferred method of filling balsa or basswood grain and body tube seams is a triple coat of cheap Grey auto primer. Let each coat tack up about 5 minutes before applying the next coat. Allow the triple-coated model sit overnight, then sand with 240 to 360 grit dry sandpaper. If you hit wood or the body seams are still visible add another triple coat of primer and repeat. John has been using this method exclusively over a decade.

If your fillets are going to be made on polypropylene body tubes, space a column of pin holes in the tube alternating along each fin line and along the root edge of the fin about 1 thickness up for the root. Use 5 or 30 minute epoxy for the attachment & fillets. This process is called “The Epoxy Rivet Method”.—the epoxy will fill the pin holes and have a grab that will not separate from the polypropylene. This

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**Finishing, Continued**

method can be used on just about Any Fin & Body Material combination. This method is also featured in depth in NARHAMS Tech-tip 017 “Working with Plastics”.

If you are doing outside painting, work in the shade. Work in non-windy conditions, and move your model inside as soon as possible. Remember when painting in cold weather the model surface and paint need to be at about the same temperature during paint application.

If planning on multiple paint coats, lightly sand between coats while the model is still tacky, that is within ten minutes of the earlier coat. Use 400 grit sandpaper lightly enough to knockoff any dust, dirt or bugs, without applying much pressure. (John uses 360 grit or heavier for primers). Don't wet sand primed paper body tubes, dry sand only. Paint manufactures seem to get it right on drying times, therefore read and obey your can's instructions on when to apply that next coat.

*Photo: Krylon Product Group*

John uses some pretty expensive (Krylon UV clear coats) to top off his models or to make a matte (non-shiny) finish that do not get Pledge with Future protection (see below), but not his primers. He recommends three coats of the cheapest primer you can find.

If doing a silver top coat, prime that part black first. Silver and Gold metallic paints should be the last color coat. Always work from the lightest color to darkest color, then metallic colors.

Before re-priming or repainting, do a sniff test. Smell your model! Put your nose ON the surface of the model, If you can smell the primer/paint, then the model isn't ready for repainting. Before repainting use a tack cloth (available from auto supply stores) to remove dust, hair, sand grit, bugs, etc.

Also consider using a high-quality rubbing compound or polishing compound, such as 3M's Perfect-It-III and Finesse-It-II* (auto stores or online), after all color coats have been applied and are completely dry. Finesse-It-II is the finer polishing compound.

As a top coat over paint, use Pledge Tile & Vinyl Floor Finish with Future for gloss models. For matte models use Krylon UV Clear #1305 Gloss or #1307 Matte. (not Krylon 1301 Crystal Clear or Testors Clear Coat).

John gave a lot of advice and shared his experience at the meeting. This article only cites a few of his recommendations; again he advises to take heed of the NARHAMS Tech Tips.

He closed by saying no model is going to end up perfect. You, the builder, are going to have to decide how much work and time you are going to devote to make that nice finish.

John also reviewed and edited this article for accuracy—Thanks for the talk and sharing of experience.

*Not the Marine brand Finesse-It.

# AVIATION WEEK & SPACE TECHNOLOGY Opens It's Archives To All!

## By Don Carson

*Images and graphics: Aviation Week and Space Techology*

In a blockbuster move, Aviation Week and Space Technology magazine has put all 100 years of it's library online and available to the public for free. In a partnership with Boeing, every article, every photo, even every ad is online. Available is an incredible wealth of material on aviation and space exploration from 1916 up to the present. The website is:

http://archive.aviationweek.com

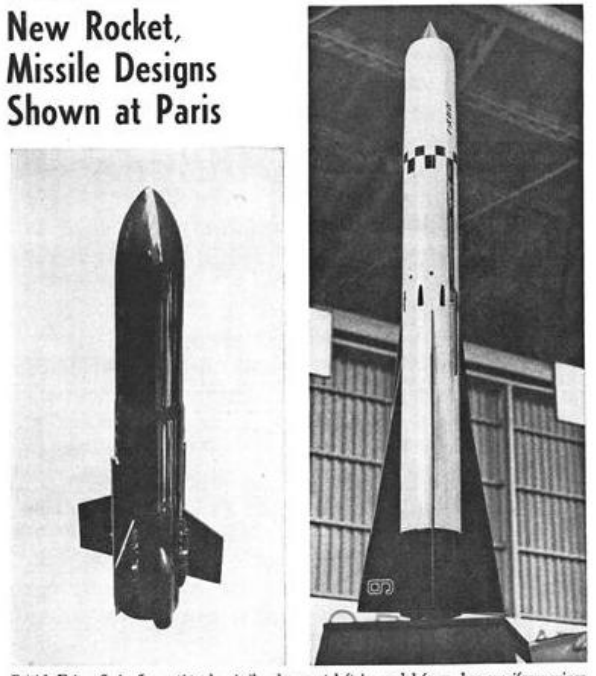
Accessing the website does require you to register a username and password but there is no cost. You do need a valid email address to register. I have not received a single email from them, save the confirmation email that arrived as part of the registration process.

Interested in the Russian Proton launch vehicle? A simple search results in 780 hits! Photos and accounts of early rocket and missile programs were covered on a weekly basis. All manner of early rockets, conceptual and real are buried in there.

Search results are broken down into 4 categories - Covers, Articles, Ads, and Images. The results are presented as images, so one can quickly and easily scan for material of interest. Searches don't bring back all the material you may be looking for. If you are looking for images, you want to look through the articles as well. Images are just pictures found in the issues, it is not clear why some turn up in the image category and some need to be found by looking at the articles.

I searched for Spartan spacecraft, I project I worked on for many years, and got a few hits on images. When I looked at articles, I found many more images. It


ASP sounding rocket (left) was used in ground firings at Holloman AFB as test vehicle for air-launched AN/AMQ-15 rocketsonde. Picture at right shows modified forebody of the ASP and two views of rocketsonde instrument package in which can be seen, from top to bottom, antenna, nose cap, transmitter, timer, index of refraction sensor, dewpoint hygrometer, and transmitter commutator.




British Fairey Swingfire anti-tank missile, shown at left in model form, has cruciform wings to be folded for storage. Wire-guided missile is being developed by British Aircraft Corp. under Ministry of Aviation contract. Swedish Flygmotor experimental missile, right, is designed for testing engines at speeds between Mach 2 and 6. Missile is powered by a ramjet engine. Designated RRX-1, the missile is 6 ft. 10 in. long, 7.5 in. in diameter and has a load capacity of about 33 lb. It can also be used as a sounding rocket.

**Continued on page 15**

**Archive, Continued**

pays to try different search terms and look through the articles. I tried searching on Shuttle missions that Spartans were flown on and found even more.

AvWeek is a weekly publication, a trade journal for the aeronautical and space industries. It contains articles following the development and deployment of new systems as well as failures (at least the unclassified ones). Being a weekly there is a ton of detail information. What you won't find, however are dimensioned drawings of rocket and missiles (or airplanes, either). You might find an occasional outline drawing with perhaps a length on it.

The images in the archives are high quality scans but the original source material is often somewhat blurry, especially as you go back into older issues. The type is clear and crisp, but the photos suffer. Print technology, especially for a weekly publication, was far from today's standards. Unfortunately, the text of the articles is not searchable.

I followed and subscribed to Aviation Week and Space Technology for nearly half of it's 100 years and can tell you that it offers a real education in the fields of aeronautics and aerospace engineering. They often got the scoop on classified programs foreign and domestic, to the point that they earned the nickname Aviation Leak and Space Technology.


Russian Proton Launch Vehicle


More Russian Proton Details

Winston Scott (left) and Takao Doi, the first Japanese to perform an EVA, prepare to grab Spartan as the 1.5-ton satellite and Columbia fly in formation at 17,500 mph.


Lockheed Martin Hybrid Engine Sounding Rocket

# FROM THE ZOG:

## King ZOG is building a Semroc Mars Lander. Yikes!

**By Alex Mankevich, NARHAMS President**
Photos: A. Mankevich

I've read in many places that winter time is historically when model rocketeers dust off their un-built kits and dredge up the motivation take on the more challenging constructions. 2016 is the year in which I've finally relented to begin the construction of the Semroc Mars Lander that has been antagonistically lying on by shelf for years.

The intimidating "Before You Start!" disclaimer advises you to become thoroughly familiar with the instructions, to study the illustrations and to test fit before you glue. The fine print states that this model is a challenge to the even more experienced modelers. The cover page artwork denotes this as being a Skill Level 4 Master Modeler kit.

So, what am I getting myself into? Several catch phrases are going through my mind as I'm blankly staring at the 31 page, 70 step instruction booklet. Phrases like "The only thing to fear is fear itself", "A journey of 1, 0000 miles begins with the first step" and "It's the journey that matters, not the destination" are taunting me as I being to

The Mars Lander

punch out the centering rings. It's already become apparent that I'll need to be thinking 2-3 steps ahead as I glue the pieces together on the current step. I'll also have to pre-paint the landing gear struts before I glue them onto the engine mount tube.

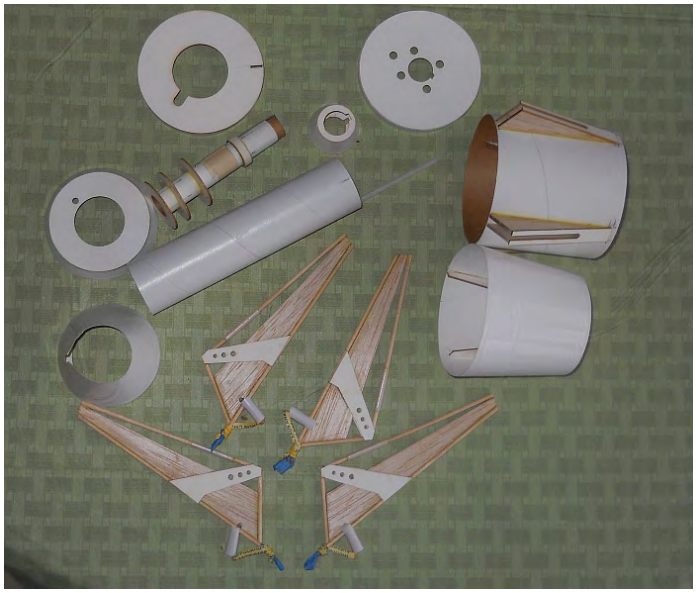
This isn't my usual style of model rocket construction. I consider myself to be an expert in the recycled, renovation and resurrection (i.e.: RRR) style of model rocket construction. I thrive on the "old parts rescued" genre of model rocketry. Here everything is laser cut and brand new. No old body tubes or engine hooks are staring at me with their sad puppy dog eyes begging to be loved.

One of the advantages of the modern age is that I can log onto the internet and get loads of websites which address the complexities of building this model. I've already visited a number of forum sites where modelers have shared their experiences with this build. Some sites have downloaded pictures of the parts in various stages of the model construction. I've come across plenty of warnings about the model's marginal flight stability and the suggestion to add nose weight.

I'll be completed with this build in some future month. I've already begun daydreaming about how I'll pompously strut and swagger up to the check in table with my brand new, completed Mars Lander. I can almost hear the Oooos and Ahhhs of the peanut gallery as I fill out my flight card. I can imagine little kids, puppies, butterflies and hummingbirds hovering around me as I place the model on the launch rack. I'll hear

**Continued on page 17**

**From the Zog, continued**



Parts and pieces

the respect in the launch manager's voice has the launch is counted down. The sound of the motor might just be drowned out by the thundering of multiple cameras clicking as the rocket is launched. Well, that's how I imagine it will be.

Truthfully, I'm undertaking this build so that I can experience more of the totality of what model rocketry has to offer. My other personal goals include attending other sections' launches, building the Saturn V model and winning both an ECRM and Goddard Contest trophy (yeah, I know. Good luck!).

The NAR experience is rich in its reach and scope. From outreach programs to competition flying to serving in some official capacity, there is something for everyone to enjoy or by which to become challenged. I try to emphasize to everyone that involvement is the secret to enjoying your model rocketry activities. There's nothing wrong with enjoying a sport launch now and then. But, getting "hands on" with the various NARHAMS activities and getting to better know your fellow NARHAMSters makes one look forward to the next activity on the NARHAMS calendar.

# The First King Zog

**Mostly from Wikipedia**

**Thanks to James Duffy**

Zog I, born Ahmet Muhtar Zogolliin in Burgajet Castle, in the northern part of the Albanian section of the Ottoman Empire, was the leader of Albania from 1925 to 1939, first as President and then as King (1928–1939).

On 1 September 1928, Albania was transformed into a kingdom, and President Zogu became Zog I, King of the Albanians.

Zog's Albania was a police state. He all but eliminated civil liberties, muzzled the press and murdered political opponents. Not particularly well liked, he was a survivor. There were about 600 blood feuds against Zog, and during his reign he reputedly survived more than 55 assassination attempts. Sounds like he ran the Rules Revision process.

Royal Monogram

During World War II, Italy invaded Albania and King Zog and his family went into exile. The royal family lived in England, Egypt and finally made their home in France, where he died on 9 April 1961, aged 65, of an undisclosed condition. Zog was a heavy smoker, and had been seriously ill for some time. Let that be a lesson for you, kids. His widow, Queen Geraldine, died of natural causes in 2002 at the age of 87 in a military hospital in Tirana, Albania.

For all the details there are on this man, including a rare link to a short audio clip of the King speaking go to:

https://en.m.wikipedia.org/wiki/Zog_I_of_Albania

# Bits and Pieces

## Upcoming Meeting Presentation Topics:

Feb. - Cold Weather Launch Tactics (John McCoy)
Mar. - Plastic Model Conversion - bring models and mentoring
Apr. - Managing Goddard Launches

## Upcoming Launch Themes:

Feb. - Winter Wonderland - bring your white models to lose in the snow
Mar. - Gliders, free-flight and radio-controlled. We will be holding an RC Glider Contest for those interested! Just for fun.
Apr. - SEMROC models

## Announcements:

Jim and Judy Barrowman celbrated their 50th wedding anniversary! Its a good start.

Kevin Johnson asked the beautiful Esther Roura to marry him and she accepted. Congratulations to you both.

## Meeting Hightlights January

At the mtg (Jan 2, College Park) Alex and Mary McCoy (using notes supplied by ailing husband John) talked about being appropriately ready for cold weather launches. Here Alex models some winter garb.

*Photo: E. Pearson*

## Welcome New/Renewing Members

### New Members

Jordon Lane, David Smith and Brent Bourgoin, Geoffery Cosden

### Renewals

John McCoy, Doug Frost, Jim Miers, Raul Pena, Frank Panek, Allan Williams, Jef and Ellen Fineran, Jim Filler, Demitre and Stoil Avramov, Rob Edmonds, Chirs Kidwell, John Donahue

# December 2015 Goddard Visitors Center Launch Report

Clockwise from upper left--Cub Pack 1461 from Bethesda getting ready; preps performed by a family and friends from Greenbelt; Ellicot City Cub Pack 944 inserting motors; and the overall checkin queue waiting their turn.

Michael Ventura from Bethesda Magazine photographed the activity for the mag's Good Life section

Jim was RSO and recorded all flts dutifully.

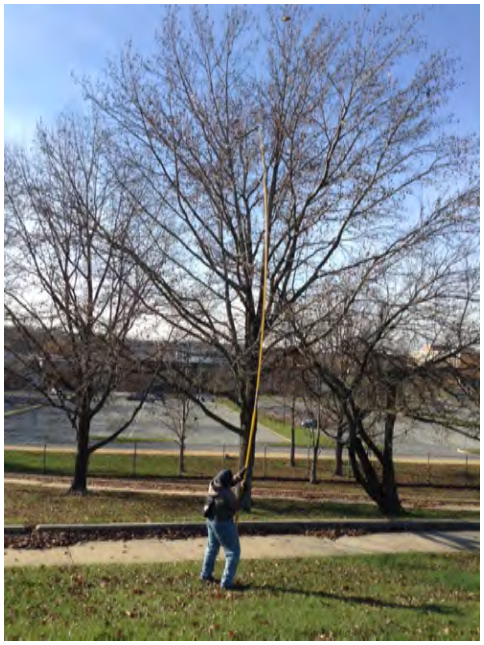
We had several underpowered flts. This is what happens when Crayola-type models fly with A engines.

This is one of more than 100 flts in two hours of launches. The VC staff gave out more than 70 new flyer certificates.

Checkin was done by Richard Crisco and his brother Mark (left).

**Continued on page 18**

## Dec. Goddard Launch, Continued



Tree Recoveries by Ian Cochran

Mike Cochran in Santa Hat w/NARHAMS pin helped at the rack.

Jim suspended the launch to let this Piper Cub pass by.

Also helping were Alex Mankevich (shown) and Jef Fineran/Ole Ed (not shown).

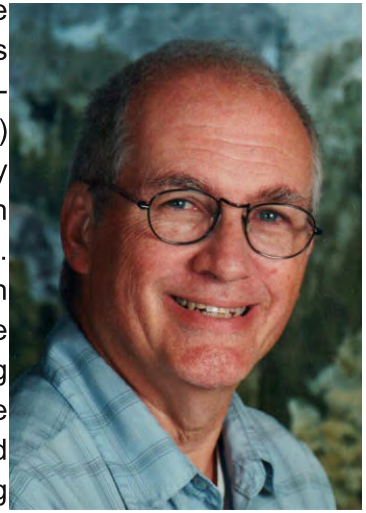
The crew waved goodbye to this model (actually it was descending and Jim caught it soon after).

Young man happily recovers his model.

# Friends
## by Ed Pearson

Recently a trio of memories filled the ole noggin, and I wish to share these, albeit disparate, recollections with you; they are all aprés-contest, social interactions that make model rocketry joyous.

We spent a week in July 1964 at NASA's Wallops Station for NARAM. "We" were Paul Connor, Doug Frost, Rusty Rice and myself. Doug stayed on base as a contestant and the rest of us pre-NARHAMSters (as range crew) shared a room five or so miles away at the Russell Hotel on Main Street in Chincoteague, Virginia. Chincoteague was a quiet town with not much going on at night, so we retired early still keyed up from being at our first NARAM. The town's fire station was adjacent the Russell and weekly (for practice or tradition) rang the fire bell. The schedule was well known to "teaguers" (locals) so it didn't bother them, but was a bit unnerving to the uninitiated staying next door. That, however, didn't keep us up at night. Rather it was residue adrenaline and excitement. So we lay in our beds listening warily for the warning whine of a mosquito we might have missed and waited for exhaustion to win over and carry us off to the land of nod. This was hard, as every few minutes Rusty would drop a Will-Rogers style remark or Paul offer an observation that could be taken benignly or ironically, and the three of us would crack up, giggle inanely from lack of rest and then settle down for the next bout of silence to be punctuated/interrupted. One night, Paul suggested counting hens, ducks, geese, etc., in a most unusual verse. Rusty and I listened transfixed and erupted in laughter. The footnote here cites Paul's count.[43.1] Rusty and I became Paul's students and he dutifully taught us his ditty, quickly correcting us if we went awry. By end of week, we had it down pat. It was something (obviously) I never forgot and daresay did Rusty either. (The Russell, years later, burned down).



Rusty Rice

*Photo: Hampshire Review*

Moving forward a few years, I invite you to the air academy in Vršac, Jugoslavia situated on the border with Romania. The year is 1972; it's the last week in September and I'm there for the first world spacemodelling championships with a passel of folks you know or should have heard of[43.2] and many more great people[43.3] we had never met or known until then. This anecdote is about one evening spent as a translator for two of these people--Peter Freebrey of England and S. Mohamed Orfi of Egypt. I never forgot talking hours and hours with them after everyone retired, and here is why. Mohamed had learned his English from an American pilot; wait I said that wrong: he learned his American from an American pilot, and somehow, because of the quick British cadence or maybe the accent, he couldn't understand Peter. So I translated for Peter in the most unusual conversation I've ever participated. Peter would talk about aeromodelling or spacemodelling and I'd turn from him, face Mohamed, and then parrot Peter, word for word. The Egyptian would then understand and reply in American. I'd get to rest for this part, as Peter could understand English [American]! Wouldn't you too find this surreal and memorable even if it were some 40-plus years later?

This last story is only ten years old, but also seemed surreal because of the setting (exotic to me) and memorable because of the individuals and our time together. It takes place in 2006 in the city of Baikonur, in Kazakhstan and again I'm there to attend a world spacemodelling championships (this time the 16th). During a day off, I find myself walking down a boundary street at the very edge of town with Srdjan Pelagic, chair of FAI's spacemodelling subcommittee and head of the contest's jury, and Stanislav Zhidkov, former Russian team coach and the contest's other FAI judge. To our right, are the city's buildings and to the left, a vast



**Continued on page 22**

ocean of Asian steppe, with Mars-like sand, red tinged from oxidation. The wind gusts in fits and occasionally peppers our faces with grit. Face right: a city of determined people; face left and you forget the city: empty desolation. We pass a building, more like a house than nearby apartments and Srdjan starts laughing. I can't see what's funny, but then again I can't read the Cyrillic-lettered entrance sign. He translates and I get its humor. It reads, "Bar at the End of the World." We go in to meet some expected friends and although perfectly terrestrial, it reminds me of an unworldly setting – sort of like the cantina scene in Star Wars – I guess because of the odd unexpected accouterments, like a mirrored disco ball, or TV sets suspended from the ceiling broadcasting a seven year old Britney Spears' Baby One More Time video. Just unexpected and surreal for the setting. Once seated, Rudi Hodzic, already there, and leader of the Serbian team joins us. Words need to be said about Rudi, a lion of a man. Rudi could see you in a crowded room of strangers, roar in greeting, and unembarrassed, clear a pathway to you. By the time he got there, he could have made five new friends, including those he startled. With him, you feel welcome, no matter who you are or where you're from. If you are fortunate, you meet a Rudi-type person once in a lifetime; the word legendary aptly describes him. (If Shakespeare or Dumas had known him, I daresay a Rudi-esque character would have appeared in their writings). So there we sat, a diverse group of modelers, in a bar at the end of the world, talking about rocketry and enjoyed the moment.

What, you may ask, transpired to conjure up these different memories? The answer is a couple of emails received a short time ago. People say things happen in threes, and Rusty died in January of cancer. He spent 30 plus years teaching at a school for the blind before teaching and coaching (wrestling) for deaf students in Romney, WV. Alice, his wife of 46 years, says he never forgot his model rocket days and indeed his obituary listed model rocketry as the first of his many interests.

Peter died in November, also of cancer. In Vršac, he got second place in the boost glider competition (1st went to Mohamed), went on to become an FAI vice president, and is credited for introducing model rocketry in Great Britain. That's a legacy.

Srdjan says Rudi's heart betrayed him; Rudi and his big heart died in December. Srdjan also credits Rudi for tireless organization and promotion of spacemodelling in Serbia especially with juniors. Rudi was known as a Serbian champion and recognized formally, by his government. I'll be surprised if Serbia's modeling community doesn't implement a Rudi Hodzic award in his recognition.

I endeavored to give you three short personal snippets of sharing pathways with Rusty, Peter and Rudi instead of giving obituaries for these remarkable people. I wanted to offer you a smile in the way I remembered these friends.

__ ____

[43.1]Here is the doggerel (count) that cracked us up: One hen; Two ducks; Three squawking geese; Four limerick oysters; Five corpulent porpoises; Six pairs of Don Alversos tweezers, Seven thousand Macedonians in full battle array; Eight brass monkeys from the ancient, sacred crypts of Egypt; Nine apathetic, sympathetic, diabetic old men on roller skates with a marked propensity towards procrastination and sloth; and Ten lyrical, spherical, diabolical denizens of the deep who hall stall for the call on the quay of the quivy at all hours of the night. Paul says Jerry Lewis popularized this verse.

[43.2]For example, Harry Stine (NAR founder), Vern and Gleda Estes, Jim Kukowski (NAR Executive Director), Jim Barrowman (NAR President) and Judy Barrowman, Howard Kuhn (CMR head, WSMC organizer, and later FAI spacemodelling chair) et al.

[43.3]Here are four: Otakar Saffek (Czech Republic), Ion Radu (Romania), and the Pelagic brothers (Serbia) to cite only a few.

Acknowledgment: Thanks goes to the Museum of Chincoteague, Stuart Lodge, Alexander Mitiuriev, John Newquist, Srdjan Pelagic, et al for their memories, notifications or assistance with facts.

# NARHAMS Gold Kit # 58
# Built by Glenn Feveryear

## Great Job, Glenn!

# NARHAMS Gold

National Association of Rocketry
Headquarters Astro-Modeling Society
(NARHAMS), NAR Section 139 presents:

## Limited Edition
## 50th Anniversary
## Model Rocket Kit

**Only 139 numbered kits available!**

Unique Ducted Booster
2-stage styling
Quality Kit Production
Decal sheet included

Length: 20"
Diameter: 1.34"

Suggested Motors:
B6-4 (first flight)
C6-3
C6-5

Per kit price: $30

Kits available in early March, 2015

Send checks (payable to NARHAMS) to Maria Ha, NARHAMS Treasurer, 512 Chestnut Street, Mount Holly Springs, PA 17065

or
PayPal to rocketha@gmail.com

*Please use the send money to friends or family option when using PayPal!*

# Outreach: Space Night at Wood Acres Elementary School Coming Up

By Alex Mankevich

NARHAMS President

**Space Night** is Wood Acres Elementary School's biennial event that is dedicated to the wonders of space, science and exploration.

**Space Night** is coming! **Join us Friday, March 18, from 6:00 p.m. to 8:30 p.m.** for an evening of fun dedicated to our vibrant Wood Acres Planetarium program. From Aliens to Astronauts, Rockets to Robots, and Planetariums to Planets... these are just a few of the fun things that will be awaiting you and your family at Space Night.

**Space Night** kicks off at 6:00 p.m. with an action-packed fun evening planned for our Wood Acres Community. There will be themed rooms covering our Solar System, Robotics with the Great Adventure Lab, NASA Satellite Servicing, a Mad Science space room, LEGO brick building, KID Museum, an "Are you Smarter than a Wildcat?" game show, star stories, and our **special guest speaker, former NASA Astronaut Daniel Tani**.

**Here is an overview of the event:**

5:30 pm - 7:00 pm: Food Service featuring Potomac Pizza with pizza, salads and drinks.

6:00 pm - **Space Night LAUNCHES!**

6:40 pm and 7:40 pm - Featured Speaker, **former NASA Astronaut Daniel Tani** takes the stage to talk about his journey to become an astronaut - and what it is like in space!

6:00 pm - 8:30 pm - Classrooms are transformed -- to planets in our Solar System; Mad Science; LEGO bricks; STEM Robotics - featuring the Great Adventure Lab; KID Museum; NASA Satellite Servicing; Asteroids, the Sun, the Moon -- and more!

The evening will also feature the bravest of Wood Acres parents going head-to-head with Wildcats in the "Are You Smarter than a Wildcat?" game show, star stories, and more.

# Launch Report  Carroll Co. Ag. Center
# Westminster, Maryland

## Photos and text by Tom Ha

November 28, 2015
Launch Managers: Tom and Maria Ha

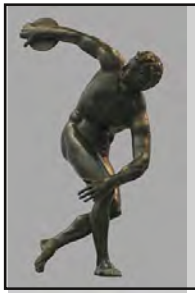
Following a detour to the holiday gift show and sale to have vehicles moved, we were able to get access to the back parking lot and the launch site. We were expecting a drop-off of the range equipment by Fabrice but weren't sure he had received our emails so we set up initially with my Mach8 controller and an Estes Porta-Pad II, along with my rail pad. Fabrice showed up, and we kept my controller out for the away pads and used the club equipment for the rack.

The weather mostly cooperated, though the forecast of occasional showers was quite accurate. Most of it was very fine, but there were some actual rain drops felt while we were there. There were many long periods where it was dry, so we decided to just keep going, and we did hear some surprised people when they drove up and asked whether it was still on. Later we had an offer of help to close up early, but I was just moving some personal stuff into the truck to keep it dry.

We managed to get in 57 flights for the day, which I felt was quite respectable. I flew my USA Fat Boy rocket, decorated for a past July launch theme. I also flew my 29mm saucer on a black powder F15 for a great show, and then flew my Stubby rocket from Andy Jackson, one I built stock so I could beta test the instructions and the rocket for him years ago.

Maria flew some holiday party rockets. Ross Ohmen took the quantity of flights award with 10 flights, Mike Kelley flew the largest motors including a G80 but also parked the first flight of the day quite high up in a tree near the Ag Center building with his Scimitar on two D12's. Mike also had a very successful flight with dual-deploy, with his D-Region Tomahawk deploying the main at 300 feet AGL. Only one rocket was left in the trees, and that was that very first flight of the day, though some flights were hold-your-breath close to the trees!

We had 12 flyers total, including members Ed Jackson, Richard Crisco and Bill Boublitz. The impulses ranged from 1/2A3-4T to G80, with a large number of C6 motors flown. Thanks for Fabrice for the delivery, and to several helpers for the tear-down assistance. It was a great low-key event.



# Competition Corner:
# New Contest Announcements

# ECRM-43 Primer, You can compete!

## By Jim Filler, ECRM-43 Contest Director

What is an ECRM? The Forty Third East Coast Regional Meet is scheduled for June 18th & 19th 2016. NARHAMS has been hosting this NAR sanctioned contest for years. I do not know much of the history before ECRM-17 which was the first one I attended as an adult in 1990. I have been the contest director for this event since ECRM 24 with the exception of ECRM 41. So if you look elsewhere in this copy of ZOG-43 you will find the list of events. PMC, OSL, A HD, 1/2A SRA, SPP, altitude with altimeters. So what exactly does this mess of numbers and letters mean? I am going to offer you some more detail on this and what some options are for you to participate in some or even all of these events. All events must use contest certified motors. The list is located here:

http://www.nar.org/standards-and-testing-committee/nar-certified-motors/

You need to read the specific rules for every event to clarify details. The link to read the sporting code events is here:

http://www.nar.org/contest-flying/us-model-rocket-sporting-code/

PMC The abbreviation stands for Plastic Model Conversion. This event is a craftsmanship event where a kit of a static model is converted to fly as a model rocket. The strategy of using a model of a rocket is generally easier to convert and will usually provide a stable flight more consistently than the strategy of flying a jet-style model that can score a higher static score yet can be more difficult to convert and to get a good flight. Oh did I mention the model has to make a safe flight? Why yes… yes it does. A great online resource is on the NARHAMS website tech-tip library, which you can access here:

http://narhams.org/library_tech.html

**Continued on page 27**

## East Coast Regional Meet - 43

June 18-19, 2016
Old National Park, Mt Airy, MD

**Events**
Plastic Model Conversion
Open Spot Landing
A Helicopter Duration
1/2A Super-Roc Altitude (*)
Standard Precision Payload (*)

(*) Altitude events will be measured with altimeters

## NARAM-58 Competition and Sport Launch

**Plastic Model Conversion**
**E Scale Altitude (altimeter)**
**G Streamer Duration**
**D Rocket Glider Multi-Round (no radio control in this event)**
**C Parachute Duration Multi-Round**
**A Helicopter Duration**
**½ A Super-Roc Altitude (altimeter)**
**Open Spot Landing**
**Research & Development**

**July 23 to Friday July 29, 2016 in Location: Walnut Grove, MO**

**For more info, go to www.naram.org**

**Guide to ECRM-43, Continued**

OSL The abbreviation stands for Open Spot Landing. This event can be flown with your favorite sport model. You only get one flight and your model has to come back in one piece, it cannot separate intentionally or unintentionally. Some flyers will use a saucer style model if the spot is close enough, some like to use a larger model with a minimum engine. Streamer recovery is usually the preferred method for a traditional style rocket. I have been flying an Estes Baby Bertha for years and can usually get a decent flight out of it.

A HD This is Helicopter Duration flown with an "A" engine. Contest kits are available from a few different vendors. Apogee Gyro-Chaser or the Apogee Heli-Roc or the Apogee Mini-copter. Another kit option is here from Flis Kits
http://www.fliskits.com/products/01prod_fs.htm
(note this link does not go to the "Rose-A-Roc kit you will have to click to get to it)
If you want to build from scratch you can get a great plan here:
http://www.nar.org/wp-content/uploads/2014/05/Mini-Rotaroc-A-HD-Gassaway.pdf

1/2A SRA The abbreviation stands for 1/2A engine Super-Roc Altitude (this will be flown using an altimeter). This event will present a new challenge for long time contest flyers. With the altitude events primarily being flown now with altimeters the "Big Time Competitors" strategy for this was to use a 13mm main body that transitioned to a 6mm body tube for the upper half of the model. Now with having to carry an altimeter, this will cause the need for a redesign in order to carry an altimeter. The event requires the model be a minimum of 50cm long and a maximum of 100 cm long. The altitude in meters is multiplied by the models length in cm. In this motor class, my opinion is to use a 100cm length model. I do not know of any kits available for this event. [Editor's note: Like last year, I have a couple of Firefly Altimeters available to loan at ECRM. They fit in a BT-20 tube. The only requirement is if you lose or break it, you owe me the $25 to replace it. See details here:
http://www.perfectflitedirect.com/firefly-altimeter/]

SPP The abbreviation stands for Standard Precision Payload Altitude. This event is open to a single-staged model rocket that carries one fully enclosed Standard Payload to a target altitude of 150 meters and target duration of 40.The purpose of this competition is to accurately predict both the altitude and duration for the flight. This event is fairly new and is similar to a "TARC" type event. I have never flown this event so I am not certain what the best strategy is. If you can practice this at upcoming launches that should give you some do's and don'ts. We will have payloads available for flyers that are going to fly this event at ECRM-43.

The standard NAR model rocket payload is a non-metallic cylinder containing fine sand, with a mass of no less than 28.0 grams. This cylinder shall be 19.1 ± 0.5 millimeters in diameter, and 70.0 ± 10.0 millimeters in length. The payload may be permanently sealed to prevent the loss of the sand. No holes may be drilled into it, no changes made in its shape, and no other material may be affixed to it. So you need to design your model "around" this parameter. Don't forget you also have to carry an altimeter. [Editor's note: same deal for the loan of a Firefly Altimeter. The only problem is I may not be around much to practice before the event.]
Altimeters you can use in an NAR contest can be found here:

NAR Altimeters

All of these events might seem overwhelming, but can be understood by reviewing the rules for each event in the sporting code referenced earlier in this article. I would encourage you to come fly at the contest even if you think it will be tough to win. Anyone coming out to the launch will be able to fly Open Spot Landing only and not pay any contestants fee if you are an NAR member. Come out and join the contest flyers and you might just surprise yourself. If you have questions let me know, I am always happy to answer questions about flying contest events. You can reach me at zog139@yahoo.com

# Calling All Radio Controlled Glider Pilots

The March 19 sport launch will have a glider theme and we will be featuring an RC Glider Contest.

We will follow the NAR Sporting Code rules for the RC Glider event.

*Photo: C. Beyers*

In summary, you pick your target duration and land as close as possible to a predetermined spot. Fly 3 times and the best cumulative best score wins. You can use any certified motor and any size glider.

You FAI folks can practice S8. You beginners can fly any Radio Contolled glider you wish and you can pick the duration that is best for you.

Its all for fun, so come join us.

# 43 Sightings

*AP Photo/Jacquelyn Martin*

On January 11, 2016, Washington Capitals monster hockey legend Alex Ovechkin became the 43rd player in NHL history to score 500 goals. That's a big deal.

Not only that, in January of 2006, Ovechkin got his first NHL hat trick (scoring 3 goals in one game) in his 43rd game, scoring all of Washington's goals in a 3-2 overtime win against the Mighty Ducks of Anaheim.

## 2016 Design/Kit Bash Contest!

Calling all Designers, Craftsmen, Plotters and Schemers.
The gloves are off for 2016's contest.
You can now combine 2 or more model kits of any kind (really any kind - rockets kits, plastic model kits, model airplane kits, you name it) to make a safe and wonderful flying model rocket.

The Rules Are Simple:

1) Use any or all the parts of 2, or more, model kits ***of any kind***, of your choosing, to make a flying model rocket.

2) Additional parts allowed are clear plastic fins for stabilization and internal components; tubes, recovery system, nose weight, etc.

3) You must fly your rocket at a club launch at either:
Old National Pike Park in Mt. Airy, MD
Ag Center in Carroll County
Goddard Visitor Center Launch
(Keep in mind field limitations where they exist)

4) Models need to make one stable and safe flight (as determined by the RSO at the time of the flight; RSO cannot be the modeller). The model does not have to be painted and decaled when it flies, but construction needs to be complete.

5) Bring the finished model and some evidence of the kits used to the December 2016 NARHAMS Holiday Party.

6) Winner determined by popular vote at the Dec. 2016 Holiday Party.

7) Bask in the glory of the adulation you will receive for entering the contest.