206-43

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ModRoc History from the UK
The Return of Attila of NARHAMS
50th Anniversary of AS-502/Apollo 6
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Club Launches, and more...

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Vol 40 No 2

Zog-43
Volume 40 Number 2
March/April 2018
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 - History Made, History Watched, History Recorded

We have recently witnessed the most important spaceflight event in 50 years - the successful flight of Elon Musk's dream - the Falcon Heavy launch vehicle. It was not only the most powerful rocket since the Saturn V, but it also successfully landed 2 (very nearly all 3) of its first stage cores to be reflown again. Yes the Shuttle was truly amazing. The Shuttle kept the US going to space. Falcon Heavy is the dream of the '50s, the rocket ship that takes you to the moon and Mars and returns to land on Earth vertically, like a proper rocket ship should. Our own Jared Haworth of We Report Space was there to record history and has shared 3 iconic images in this issue of that momentous occasion.

Cool video of the first mission of the Falcon Heavy

We also have Bill Boublitz's account of the second unmanned flight of the Saturn V and Apollo Command and Service Modules, some 50 years ago.

Stuart Lodge, of the British Model Flying Association, takes through more than 100 years of events that helped form model rocketry as we know it today. Stuart's account has a focus on events in Europe that are largely unknown to modelers here in the States.

With this issue, we make history ourselves. It has been more that 43 years (actually it has been 47 1/2 years) since the world has seen a new installment of Attila of NARHAMS. Your wait is over, Attila is back!

I hope you enjoy this issue. As always,

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

For questions, answers, opinions, files, photos, and more NARHAMS, join the NARHAMS Yahoo group. 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: The historic dual landing of the Falcon Heavy launch vehicle's 2 side cores moments before touchdown. The center core narrowly missed its landing on the barge at sea.
Photo: J. Haworth/We Report Space

Back cover: Club member Jared Haworth captured this dramatic image of the initial launch of the Falcon Heavy.
Photo: J. Haworth/We Report Space

ZOG ROYAL COURT
(NARHAMS OFFICERS)

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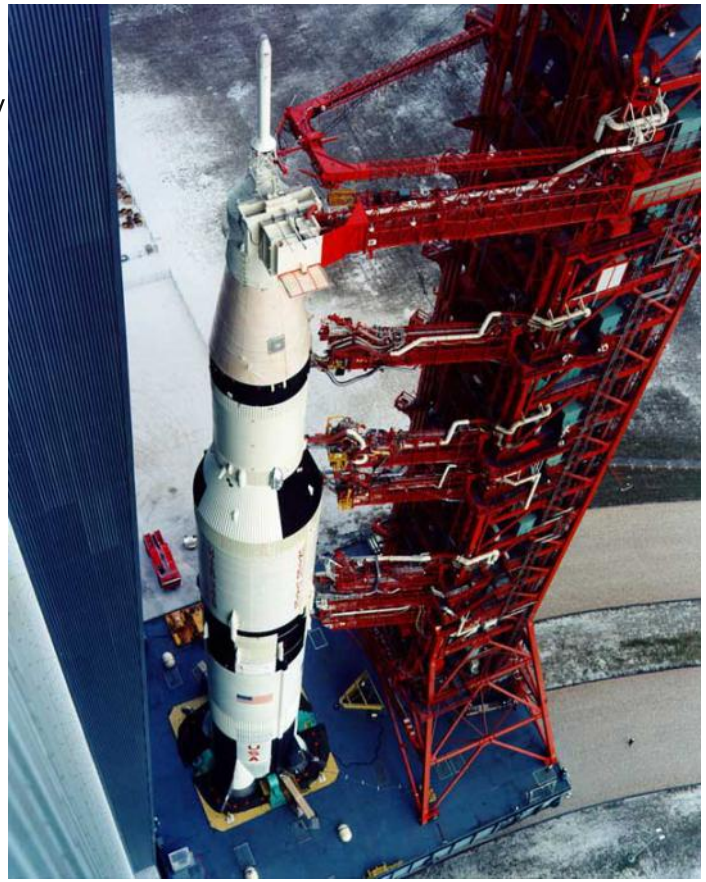
COURT JESTER (Section Advisor) John McCoy

AS-502/Apollo 6

Continuing NARHAMS' 50th Anniversary Commemorative of Apollo-Saturn Milestones

By: Bill Boublitz, NAR 36860

Photos: NASA



On April 4, 1968, AS-502 lifted off from Complex 39A, Kennedy Space Center, FL. at 12:00:01 Universal Time. Thus began the second unmanned flight of a full Saturn V stack and the final qualification flight for manned missions. Payload included Command Module 020, Service Module 014 and a Lunar Module simulator LTA-2R for ballast.

The mission profile included burning all three stages to insert the payload into a 103 nautical mile circular orbit. After one or two orbits, the third stage would be restarted, sending the spacecraft into a trans-lunar trajectory. This would be followed by a Service Module braking burn to create an elliptical orbit with a minimum apogee of 9,120 nautical miles. During the return path a second SM burn would accelerate Apollo 6 to a speed commensurate with a lunar return trajectory, whereupon the spacecraft would separate and be subjected to re-entry conditions.

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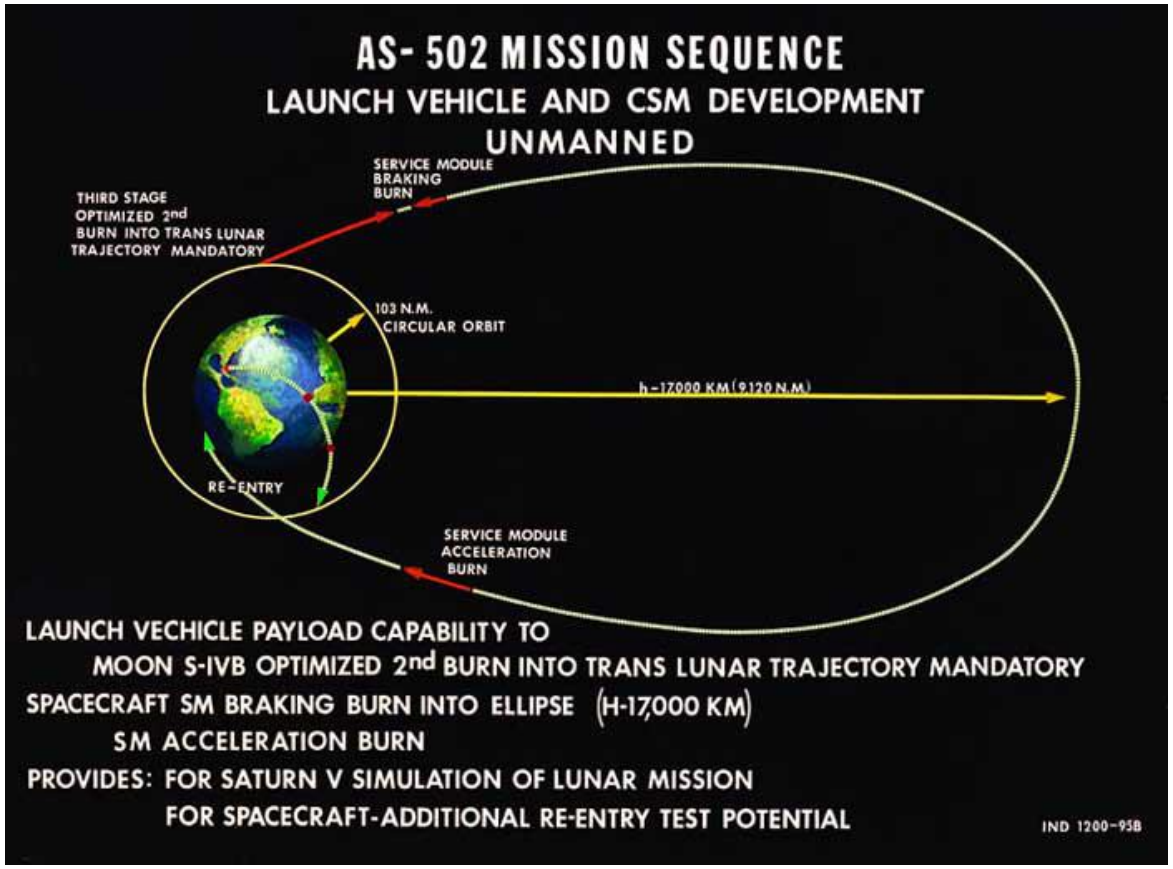
AS-502/Apollo 6, Continued



Mission objectives were to demonstrate structural and thermal integrity, compatibility of the launch vehicle and spacecraft and separation of launch vehicle stages. These objectives were achieved. Additionally, the mission sought to verify operation of the Saturn V propulsion, guidance, control and electrical systems. These objectives were not achieved.

Toward the end of the first stage burn, AS-502 began to shake violently. The entire stack began to "Pogo." This term describes a synchronous coupling of frequencies that resonate throughout the vehicle, causing it to oscillate fore and aft in its flight path. Had humans been on board, they would not have survived.

All five second stage J-2 engines ignited at 2m 30s. One outer J-2 shut down prematurely at 4m 23s, followed 1.3 seconds later by a second J-2 motor shutdown. The three remaining engines were allowed to burn 58 seconds longer than planned to compensate for loss of thrust.

The single S-IVB/J-2 third stage motor was ignited at 9m 36s, burning 39 seconds longer than planned to place the 81,421 lb. payload into a 110 x 225 mile orbit. At 3h 13m 35s, the S-IVB/J-2 was restarted, but shut down 16 seconds later, well short of the planned 5m 26s burn. Trans-lunar trajectory was not achieved.

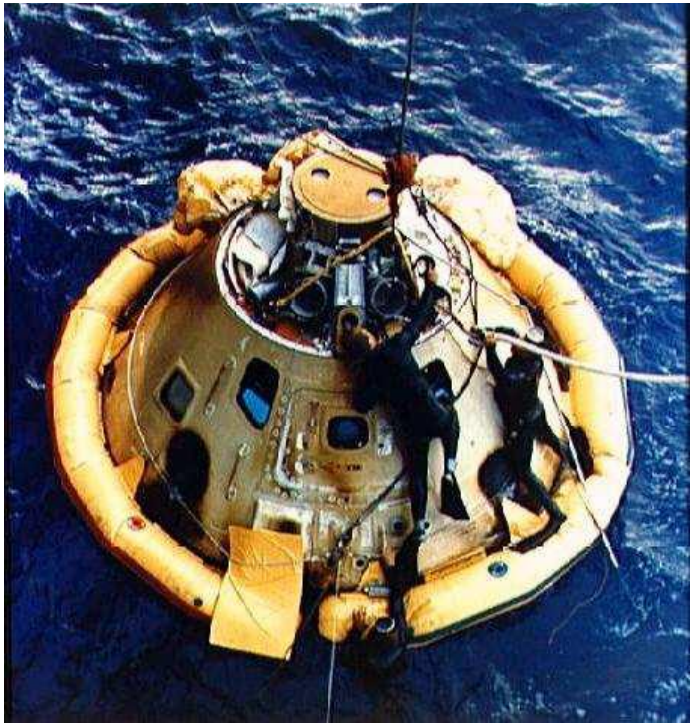
Due to a manufacturing flaw, structural panels were lost from the lunar

Continued next page

AS-502/Apollo 6, Continued

module adapter during ascent. Altogether, these failures were the only blemish on the Saturn V's remarkable flight history.

Spacecraft separation occurred at 3h 14m 28s. The planned Service Module engine burn was extended to 7m 22s to boost Apollo 6 to an apogee of 13,800 miles. As Apollo 6 began the long fall homeward, thrusters oriented the spacecraft nose toward Earth. Two-thirds of the way down, the Service Module engine was again fired to accelerate the spacecraft. The Command Module reentered Earth's atmosphere traveling 32,830 ft. per second, less than the planned 36,453 ft./sec. Apollo 6 landed in the Pacific Ocean at time elapsed 9h 57m 20s, some fifty miles off target. It was recovered by divers from the U.S.S. Okinawa.



The first S-II/J-2 shut down was due to a broken fuel line caused by excessive vibration. The second S-II/J-2 shut down was due to incorrect wiring. The S-IVB/J-2 restart failure was caused by damage from excessive vibration.

Engineers had encountered Pogo during Titan II qualification flights for Project Gemini. They understood the nature of the problem and recommended injecting helium into the fuel lines to damp out the resonant frequencies. Astonishingly, on April 27, 1968, NASA Administrator James Webb boldly approved plans to prepare the very next Saturn V to carry human cargo. This flight took place in December, 1968, when astronauts Borman, Lovell and Anders became the first humans to leave the bonds of Earth's gravity and journey to the vicinity of the Moon.

John Langford, Long Time Model Rocketeer, Recieves Lifetime Achievement Award!

John S. Langford (left) received Aviations Week and Space Technology's prestigious Lifetime Achievement Award for building the highly innovative small aerospace company Aurora Flight Sciences, which was acquired by Boeing in 2017, as well as for his continuing industry leadership and dedication to mentoring students and young engineers. He received the award from Graham Warwick, Aviation Week's managing editor for technology.

In the model rocketry world, John and Aurora have been strong supporters of the hobby and the NAR. John has long been active in international competition - supporting, flying and managing the US team. Recently, it has been reported that he has purchased Estes-Cox (yes, our Estes rocket company), who's parent company had declared bankruptcy.

Video: Learn more about the career of John Langford

Photo: C. Zimmer/Aviation Week and Space Technology

Meeting Highlights

February

With the backdrop of very good food (courtesy of Mary McCoy) and talks on military rockets (props courtesy of John McCoy's Micro Works), business centered on a constitutional amendment to allow non-NAR family members to vote at NARHAMS meetings. The proposed amendment failed to garner the 3/4 membership approval to pass

Photo: E. Pearson

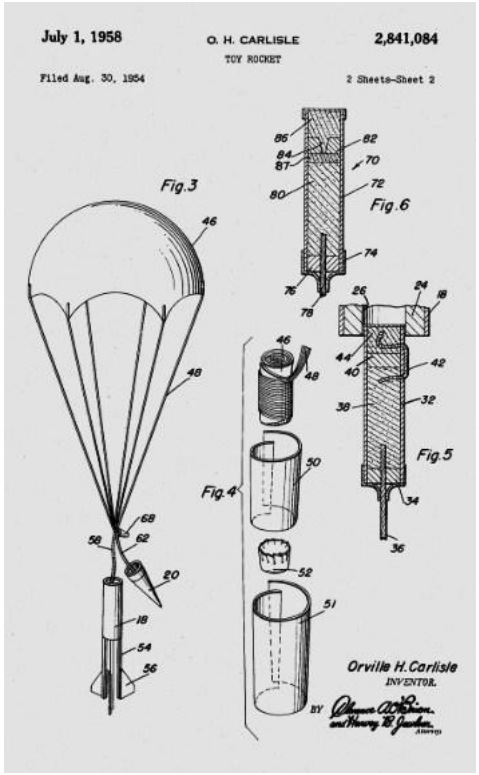
MODEL ROCKETRY ~ all about History...and Mystery

By Stuart Lodge
British Model Flying Association (since 1966!)

G. HARRY STINE made it all happen 'Stateside in the mid-to-late 1950s...simplz. Professional rocket scientist, with a job at White Sands missile range after World War 2, Stine saw the need for a spare time activity, based on what was to become the *Space Race*. Crucially, he recognised the need for a body to control what became known as *Model Rocketry* and with fellow devotee, Orville H. Carlisle, in 1957, set up the *National Association of Rocketry* - the legendary NAR – which was awarded the *Frank Ehling Diploma*, at the April 2016 FAI-CIAM Plenary Meeting.

Building Blocks

But more was needed to get Model Rocketry 'off the ground'...
1958: an entrepreneurial Vernon Estes founded Estes Industries and put the vision of these great men into the hands of enthusiasts across the age and gender spectrum. Vernon Estes contributed more than anyone else, introducing 1000s to his simple kits and starter packs, over many decades.



Orville Carlisle…we owe so much to you! This is the document that changed the world…1950.
Photo: S. Lodge

Internationale

Progress could never have happened, unless corresponding developments had been taking place in other nations. One early 20th century innovation was the 'rocket boosted glider'...
1911 Romania: Ion Stroescu equipped a model aircraft with a fireworks' rocket, which flew well.
1912: Germany: Carl Neubronner did exactly the same, but got most of the credit!
1920's Germany: Wernher von Braun was designing recreational & research rockets. Better known for conceiving Nazi rocket weapons' systems, later becoming head of NASA's Marshall Space Flight Center, during the Space Race, leading the development of the Saturn V.

The first rocket boosted glider. Conceived by Carl Neubronner and flew for the first time in 1912. Ion Stroescu, a Romanian, actually beat him to it, but Neubronner gets the credit!
Photo: S. Lodge

Basically how Estes got started. How to pack Blackpowder, Delay Grain and Ejection Charges into Cardboard Tubes…the genesis of how it's done now.
Photo: S. Lodge

Continued next page

History and Mystery, Continued

1924 Union of Soviet Socialist Republics (USSR): the first competition for rocket models was hosted at Tbilisi, Georgia. Five years later, E.V. Lutsenko wrote the first conceptual words on the subject of Altitude and Duration contests for rockets. Soon after, K.E. Tsiolkovski encouraged enthusiasts to indulge 'toy rockets' and produced drawings of suitable designs.

1930's USSR: Osoaviachim was set up - a forum to investigate rocket models – fronted up by Friderik Zander & Sergei Korolev. The latter went on to head USSR's full-size Space Programme, following a spell in the Ljubljanka prison! All sorts of rockets and rocket gliders began to take to the sky, many being successfully recovered by parachute – a watershed moment.

1930's United Kingdom, specifically...Scotland: John D. Stewart built and launched rockets in his homeland; the genesis of rocket models in the British Isles.

1939-45 Global: World War 2 intervened, with 'real rockets' of all kinds wreaking havoc!

1947 United Kingdom: Jetex, a "reloadable rocket system" (RMS), with replaceable cartridges, was conceived by ICI and went on to become legendary.

1950s Czechoslovakia (ČSSR): The Synjet, a metal RMS motor was developed. Append the word Jetex here, because that's surely what it was.

1956 Yugoslavia: The Taifun – Typhoon – rocket motor was developed, similar to Synjet, setting the scene for Srdjan Pelagić to set up a rocket club in Sombor, going on to win a Radio Belgrade sponsored event. With Aleksander Madzarać and others, he was responsible for setting up more clubs in his homeland. Mr Pelagić recently retired from his post as Chair of the CIAM Space Models sub-Committee, following a stellar contribution.

1958 USA: Along came Vernon Estes with his innovative model rocket kits and motors.

1960's United Kingdom: Paul Clark tried to import

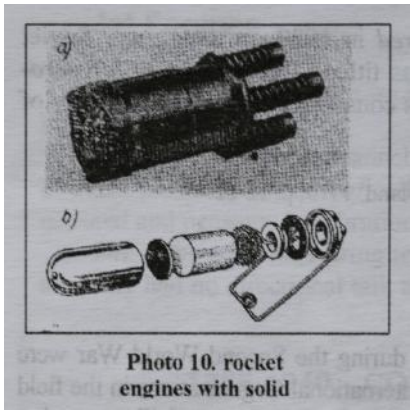


Photo 10. rocket engines with solid

Above: The late-1940s saw the emergence of Jetex. Gentle thrust for boosting small gliders, but this was the first RMS motor, with renewable propellant blocks.

Right: Synjet and Taifun reloadable motors from former Czechoslovakia and Yugoslavia respectively. Conspicuously similar to Jetex.
Photos: I. Radu

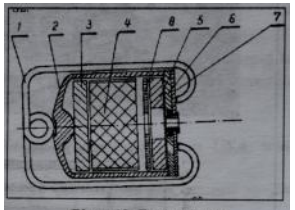


Photo 13. Engine Synjet

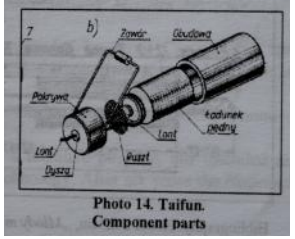
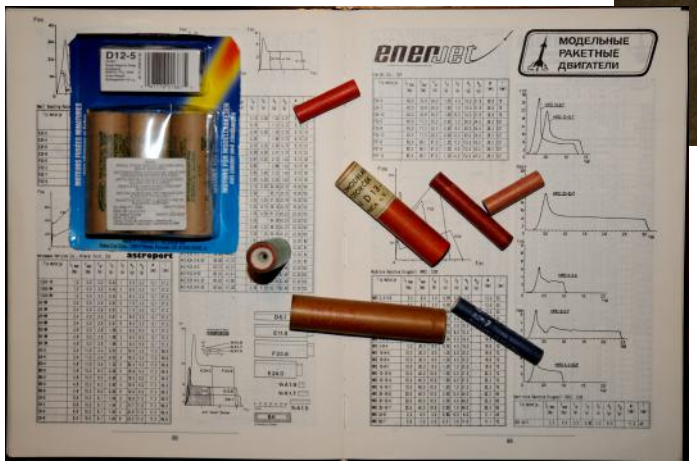


Photo 14. Taifun. Component parts

This appeared in toyshops in the late-1950s and early 1960s. Super, but needed a spring to launch, as the motor – which acted as a Delay Grain – was too weak! Note the parachute for recovery.
Photo: I. Radu

Above: This was where we ended up. Estes Starter Kit…Electric Launcher; Launch Rod & Mount; Rocket; Propellents & Recovery Systems. Well done, Estes, Quest et al.
Photo: S. Lodge

Left: Pack of Estes, plus…MDR, Delta, Dubnica motors from Eastern Europe. Just so much going on all over.
Photo: S. Lodge



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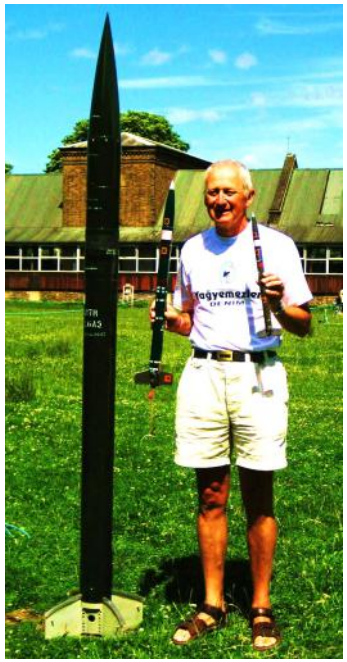
History and Mystery, Continued

Estes' stuff, but sandbagged by the Home Office!
1969 Yugoslavia: Jože Čuden and Vojko Kogej set up ARK Komarov, in Ljubljana. This is the most significant Space Models' club in Europe, hosts the Ljubljana World Cup and now part of Slovenia. The rest is "history"!
1980 United Kingdom: Paul Clark attended the 5th World Champs, at Lakehurst, USA, with a British team. Paul created the British Space Modelling Association and we were on the launch pad.
1980's: Estes' rocketry products became available in the UK, late in this decade.
1988-89-90 West Germany: St Leonhard Modellraketen Festivals, set up by Oliver Missbach and Pavel Miladinović, brought East and Western Europe together. Magic! USSR and ČSSR split into their former entities, although more peacefully than the former-Yugoslavia, in 1991! Lots more nations were available to boost Space Models! Rocket motors started being produced in many more countries.

Astronavstko Raketarski Klub Vladimir M. Komarov (ARK Komarov) was formed in 1969. Check out a flying day, near Ljubljana, in the 1970s. The guy in the blue is Joze Cuden, co-founder of ARK Komarov and current FAI Space Models sub-Committee Chair. Lots of Slovenians, who didn't like being called Yugoslavs!.
Photo: J. Cuden

Globally...more formally

But a lot more was needed to kickstart real international activity.
1962: Stine presented Federation Aeronautique Internationale (FAI) with a conceptual idea of what was globally to become known as Space Modelling and simultaneously, drafted embryonic concepts for rocket competitions.
1964: Commission International d'Aeromodelisme (CIAM) of FAI, ratified these proposals and Space Modelling took its place alongside other model flying activities…becoming a recognised Airsport. Space Modelling began quickly to grow through Europe and beyond.
1965: Stine penned the seminal text on the activity, The Handbook of Model Rocketry, initially published in the '60s. Brilliantly and uniquely, Harry developed a vision of dispersing his obsession throughout the civilised world. Many editions have followed subsequently.
1966: At much the same time the England football team was defeating West Germany in the World Cup, Dubnicky Maj - the first FAI Space Modelling contest - was hosted at Dubnica-nad-Vahom, over the weekend of 28-29 May '66, in the former-Czechoslovakia. This featured some classic disciplines, which are flown to the present day. Similar events developed around the continent of Europe.
1972: 1st World Space Modelling Championships was conceived and flown at Vršac, in the former-Yugoslavia. Model Rocketry-Space Modelling had surely come of age. The late Peter Freebrey FSMAE, was a runner-up at this event, before becoming World Champion two years later.
1979: European Championships introduced to fill the gap between



Above: Ellie Stine (USA) prepares her Scale Altitude model at the 1972 1st World Space Modelling Championships, in Yugoslavia. Dad Harry was on the FAI Jury.
Photo: G. Stine

Left: Stuart Lodge beside a full-size BAJ Skua, holding 1/3 and 1/5 replicas, at a rocket meet in recent times. Oh yes, at the Royal Gunpowder Mills (!?!), near Waltham Abbey, UK.
Photo: S. Lodge

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successive WSMCs.

1992: World Cup was introduced for S8E-RC Rocket Gliders, competitors accumulating points at each event they attended, with totting up at the end of the season.

1994: Segregation of Seniors and Juniors, at Major Champs. Also, the World Cup series added S4-Boost Glider, S6-Streamer Duration, S7-Scale and S9-Gyrocopter Duration to the existing Rocket Gliders. FAI diplomas presented at the close of every season.

2010: Back to the future...the 18th World Space Modelling Championships was held in Irig, now part of Serbia, a brief hike from Vršac…full circle. From that single nation of Yugoslavia in 1972 competing, the schisms of 1991 resulted in the novel states of Serbia, Slovenia, Croatia, Montenegro and Macedonia, embracing national rivalries. Naturally, similar has taken place in the old USSR, releasing Russia, Ukraine, Belarus, Estonia, Latvia, Lithuania, Ukbekistan, Kazakhstan et al, slugging it out for the podiums.

2020: The 23rd World Space Modelling Champs, Juniors & Seniors, will take place in Romania.

Conclusion

We've not even scratched it! Harry Stine departed this life at the turn of the Millennium, but his legacy is timeless. 1000 years ago, Gunpowder was developed in China. Rockets became weapons, signal devices, recreational stuff – 'fireworks' - pretty much as now. But it took the last century to make these things workable devices. Just about every country in Europe had an enthusiast who brought rocket models to life in his homeland. Model Rockets had been flown for ages in the UK, but until Paul Clark's untiring efforts, nothing had been done to make the activity official. Demand for High Power Rocketry brought the need for Ammonium Perchlorate Composite Propellants, which implied another raft of regulations from HSE. Southern England Rocket Flyers (SERFs), with the cooperation of BMFA, did the groundwork and made these products accessible to UK modellers, trading on the safe & sound track record UK model rocketry had achieved. There's just so much more that could be included, but that's enough for now. Wow, that History's much less simple than it seemed at the start...ENJOY!

1980's UK Model Rocketry. John D. Stewart – in the blazer – was boosting ModRocs in Scotland, in the 1930s. Far right is Paul Clark who formalized the process in the 1980s.
Photo: S. Lodge

Lots of badges & medals from all over the world. Never forget, G. Harry Stine was responsible for all of this.
Photo: S. Lodge

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Your scribe on the cover of Obrana – the Slovak Army journal – in the 1990s. Seem to remember that V-5-V Vertikal scale model did rather well!
Photo: S. Lodge

Really must have a launch frame in a Model Rocketry publication! Bedrich Pavka (CZE) boosts his Ariane 44L away, at a Ljubljana Cup, in Slovenia, in the 2000s.
Photo: S. Lodge

Dynasoar Rocketry - RC Rocket Gliders

Daedalus

HABU SR-71

Battlecruiser

Dynasoar Rocketry

Dynasoar Rocketry specializes in limited runs of unique and really cool Radio Controlled Rocket Gliders. They post the plans for these are on their webpage, along with links to the build threads with photos. These photos are just a sampling of the kits they sell.

Website: https://dynasoarrocketry.com

Here are some flight videos.

Deadalus

HABU SR-71

Batttlecruiser

Photos: F. Burke

Falcon Heavy Liftoff

Photo Credit NARHAMSter Jared Haworth/We Report Space

March 2018 Mt. Airy Sport Launch
Tubular, Tumbler and Tipsy Green
By Bill Boublitz, NAR 36860,
Acting Launch Manager



March Mt. Airy took place on the 17th; St. Paddy's Day, which coincided with the 60th anniversary of the first successful Vanguard 1 satellite launch.

Alex Mankevich, Mike Kelley, Sarah and Ed Jackson loaded the gear out of storage at 9:15 am. I joined them for set up. We were open for business at 10:00 am. Working under Alex, Sarah and Ed, I assumed the Launch Officer position for a second consecutive month. We commenced operations under chilly conditions; temps in the low forties, winds from the west at five-to-eight mph, gusting to eleven.

Sarah led with the first flight; Jim Filler's "Greenman" on a C11. Also in the first rack were Mike Kelly's "Hydra-Sandhawk" and "Emerald Streak", followed by Ed Jackson's "Hex 3", a tumbler model. In the second round Ed flew his "Long Overdue"; a tubular stabilized model. Twenty minutes into the day, we'd tallied four theme flights and a two-stage flight.

The CMIT North TARC Team returned to make qualification flights. Alex worked with the team. CMIT made three flights; one successful qualification and two DQ's.

Dave Smith presented a beautifully built "Cosmic Interceptor" for launch on an E9. Upon ignition, the motor blew it's nozzle and didn't lift an inch. We got a close up of another E9 CATO. The vehicle was undamaged. Dave immediately loaded an E12. This time the vehicle enjoyed a good boost but suffered damage upon landing due to late deployment. Undeterred, Dave presented an Estes "Dark Star" beautifully finished and painted by his daughter. A great flight and safe recovery was enjoyed by all.

Scout Troop 1199 from Germantown, MD began to filter in. This was a focused, organized group of thirty-three Scouts. All their birds flew well. Troop members

Above: Veteran Mike Kelly went the other way with his Argent 5'-plus high model.
Photo: E. Pearson

Right: Launch Leprechaun.
Photo: A. Mankevich

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March Mt Airy Launch, Continued

returning for their second year presented more sophisticated builds. Many Scout families hung around and continued to fly throughout the afternoon. As the pace quickened, Alex and Sarah provided assistance with safety check in. At one point we were launching a "Gnome" a minute.

Ed Pearson and Veep-ZOG Alan Williams arrived. Alan sprang into action, assisting with pad prep and range safety. 'Ole Ed assumed back-range safety, roving paparazzi and greeted guest flyers. How Ed manages to be three places at once continues to astonish me. Alan later flew a beautiful ARCAS model.

Sarah Jackson achieved her NARTREK Bronze Parachute Duration, putting up a "Wizard" on a B6-6. A flight time of 1:45 was recorded, easily beating the 60 second requirement. Way to go, Sarah!

Ed Jackson and Alex provided relief for this newbie L.O. to warm up and enjoy a sandwich. Thank you, friends.

Stoil Avramov, with colleague Nathan, stopped by to make a TARC test flight. After a few igniter issues, they were off the pad with a successful flight of their "Long Reach 5" design on an F23.

We welcomed new NAR member Doug Bowman back to model rocketry. Doug flew two well built models; an Estes "Magician" on a D12 and a "Sprint XL" on an E9 which drifted into the adjoining county. Welcome back to rocketry, Doug.

Our final theme flight of the day was made by suitably attired Mike Owen and son Ethan. They flew an "Orange Crush" to insure Southern Ireland was represented on this St. Paddy's Day.

Mike Ratel arrived circa 2:30 hoping to launch his new beefed up Estes "V-2" on mid-power. After visiting with friends on the field, snow began to fall and the range was closed at 3:00 pm. Mike graciously stayed to help Alex, Mike Kelley and myself with the breakdown. Thank you, Mike.

Alan watches Leprechaun Mike Owen and son Ethan.
Photo: A. Mankevich

Ed Jackson put up several tube and flying saucer-type rockets.
Photo: E. Pearson

A couple of teams performed test flights for the Team America competition. Alex Mankevich processed their paperwork.
Photo: E. Pearson

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March Mt Airy Launch, Continued

In all, forty-six rocketeers put up one-hundred and six flights. Two models were lost to the trees. Three others suffered damage upon landing. A total of one-hundred nine motors were burned; one 1/8A Micro-Max, fifty-five 1/2A3, nine A8, two B4, fourteen B6, nine C6, five each: C11, D12 and E motors, and four F motors. No G motors were flown.

While we didn't commemorate the successful Vanguard 1 launch, we were reminded of the painful early days of professional rocketry with Dave Smith's CATO.

'Twas a day to remember; great families, many smiles, lots of action. Thanks to all ye lads and lasses who attended.

Sarah w/Jim Filler's Greenman.
Photo: A. Mankevich

Here Mike Owen is shown retrieving his Black Diamond (right hand) and Orange Crush models.
Photo: E. Pearson

Stoil Avramov(L) with rocket joined colleague Nathan(R) in TARC test flights.
Photo: E. Pearson

William Boublitz, of southern Pennsylvania, was launch manager.
Photo: E. Pearson

Pack 1199.
Photo: A. Mankevich

Bits and Pieces

Upcoming Meeting Presentation Topics:

April 7	Winter Builds Show & Tell
May 5	Laser Cutter - Open Build
June 2	Night Launch Lights

Upcoming Launches/Themes:

April 21	Mt Airy, Open theme
May 6	NASA Goddard public launch
May 19	Mt Airy, Ping Pong Ball, NRC
May 26	National Sport Launch, Genesco, NY
Jun 3	NASA Goddard public launch
Jun 16-17	Mt Airy, ECRM-45, NRC & Sport launch

New Online Store for NARHAMS Merchandise:

https://www.cafepress.com/narhams

Welcome New/Renewing Members

New Members

Stanley Max

Renewals

Alex Mankevich; Sarah Jackson; Jim Miers; John Thompson; Dave Smith

Announcements

Congratulations!

Tom and Ginny Jackson have a new addition to the family, little Nathan Jackson! He's the one in Ginny's arms. Congratulations to the family and welcome little rocketeer.

March 2018 Goddard Launch Report:

By Alex Mankevich
Photos By Ed Pearson

One of 120 flights.

Maybe its just me, but I look upon a March model rocket launch as a ‘spring fling’ type of activity. My mind wraps around mild temperatures with pleasing, warming sunshine. However, this year’s March launch at the Goddard Visitor Center gave us the "March comes in like a lion" kind of outing.

Not that the launch crowd minded! The Visitor Center parking lot became filled, requiring some visitors to park a quarter mile away. This included our own Bill Boublitz. The rocketeers then lined up deep for their safety checks.

The day’s steady wind blew a handful of rockets into the surrounding trees, despite many of the rockets having holes in their ‘chutes. The large crowd kept your friendly neighborhood range crew from assisting with rocket recovery from the trees. We also had a few prangs. A memorable prang safely ejected on the ground, dramatically popping the model back into the air.

Inside the Visitor Center, Shirley Ramos and Julie Saba filled out 60 new flyer certificates, and put in word that additional certificates will be needed for future launches. Poor Ole Ed Pearson spent nearly two hours inside the Visitor Center as he helped a steady stream of rocketeers prepare their models for launch. Mike Cochran assisted with preparation as well before joining the rest of

Dr. Chikako Suzuki of JAXA (center) at the launch rack with her Estes Shuttle Xpress along with her fellow Japanese guests.

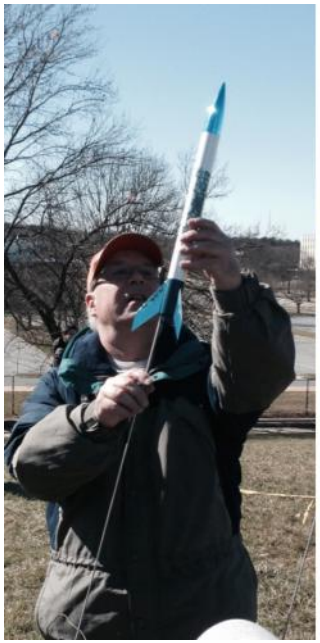
Continued next page

March Goddard Launch, Continued

the launch crew outside.

A bright spot to the day was the participation of Dr. Chikako Suzuki, currently a visiting researcher at GSFC from the Japanese Space Agency (JAXA). Dr. Suzuki emailed NARHAMS prior to the launch to get clarification regarding her plans to launch the Estes Shuttle Xpress. She regarded this flight as a glider model, which she had noted on the Visitor Center's website is not allowed for Goddard launches. Both Ed Jackson and Alex Mankevich responded that the Shuttle Xpress model is considered a parasite glider and is not launched as a powered glider model. Upon the recommendation of Jim Filler, Alex prepared a 'welcome package' for Dr. Suzuki which included NARHAMS' patch and pin, along with a color printout of our latest ZOG-43.

We recorded 120 flights for the afternoon. It was a frantic day with colder than desired temperatures and that constant wind chill making it feel even colder. We had intended to do an Apollo 6 commemoration. The 50th anniversary of that flight took place on April 04, 1968. Unfortunately, the large crowd and frantic launch pace precluded any halt in launch activity to do Bill Boublitz's planned presentation. The constant wind had already cancelled any attempt to launch Bill's Saturn V model on a D12 motor.



Alex Mankevich (L) and Michael Cochran helped load the launch rack. Michael also helped Ole Ed prepare rockets in the Visitor Center before the launch.

Ed Jackson operated the launch panel, did narrations and as shown here worked on misfired rockets while the next rack loaded.

Inside the Visitor Center, Shirley Ramos (L) and Julie Saba filled out 60 new First Time flyer certificates.

Sarah Jackson and Bill Boublitz were kept busy at the safety check station.

Why I Volunteer at the Goddard Launch

By Sarah Jackson

NARHAMS has been running the Goddard launch for longer than I have been alive. As a newbie rocketeer, I never knew about the Goddard launch until my BAR husband, Ed Jackson, decided to revisit his childhood memories of rocket flying. On a hot summer Sunday, Ed and I drove to Goddard Space Flight Center to see how the launches were. When we arrived, he was greeted by a lovely kind man known as Ole Ed. Ole Ed carried a notebook and pen and made sure to write down our names and I am almost certain he took a few pictures as well (I have since learned that he is sneaky like that). Other than Ole Ed, my Ed did not recognize any of the faces from his past. For me, it was all so new and confusing, but watching the rockets fly was amazing. Before we knew, Ed was going to Goddard every month to launch a couple of rockets. Before he knew, Ed was helping with the Goddard launch. Before I knew, *I* was helping with the Goddard launches.

I am not a native rocketeer, and I have less than two years in the hobby. I barely know my nose cone from my engine mount most days. I can follow instructions to put a kit together, but I have no clue what the center of gravity is, nor can I tell you what engine goes best with what rocket. I just like building kits, and trying to make each new rocket better than the last (and generally failing miserably- do not bring up the subject of a Comanche-3, mini or otherwise). I enjoy watching the rockets go up and come down. I enjoy seeing the craftsmanship on other members' rockets. I enjoy being part of the NARHAMS family. I enjoy seeing the excitement of kids launching their first rocket. I enjoy being helpful, which is partly why I volunteer at Goddard.

Ed told me stories of how he and his dad and brother used to go to Goddard every month to launch rockets. At that time, Alan Williams was a fin-breaker extraordinaire in his duties as safety check-in, while Ole Ed Pearson entertained audiences with his commentary as launch manager. Ed told me stories of flying with Jennifer Ash, Jim Filler, Chris Kidwell, and others who have become legendary names to me; I still stand slightly in awe of them even after meeting them. It amazes me that Ed remembers these rocket people from 25-30 years ago. These are the ones who helped Ed become the rocketeer that he is today. I also volunteer at Goddard because I want to be that person for some child that is starting out in the hobby. Twenty years from now, I want a young person to come up to me and say, "I remember you. You broke my fin during safety check-in." I will be very proud of myself when that day comes.

Running Goddard launches is not terribly fun, while it is fairly tiring. The safety check-in line seems to extend into infinity, and although it is nice that the kids are all excited watching rockets fly, they do not always want to stay in orderly lines or follow directions. Moreover, each month is the same; a manic dash to get through the line to make sure everyone has a chance to fly. In between there's gluing fins back on, repacking parachutes, and checking for recovery wadding. It is frantic and chaotic and a lot like a job, but I still like it. As it is, I already know some of the regulars, and a few of them have made it to the Mt Airy launches as well. It's only one day of the month, and maybe someday I will have the reward of being the person who kept a child in rocketry.

This is what rocketry is for me: improving my building skills, being part of a community, and helping others. What is rocketry to you?

February Goddard Launch Report: A Good Soaking!

By Ed Pearson

It rained. A lot. At day's end, a reported 1.1" rain soaked the area--the most for a day since August 2017. NARHAMS knew of the forecast but still showed up at the Goddard Space Flight Center on this February Super Bowl Sunday.

No launch today, but the club shined anyway.

Alex Mankevich brought display rockets and a PowerPoint presentation. Michael Cochran brought space-themed DVDs. Ed and Sarah Jackson brought a variety of sport and competition models.

Photo: E. Pearson

Setting up in a visitor center auditorium, club members did talks and show/tell for passersby. The presentations were particularly well received by a group of approximately 30 parents and their 4-6 year olds (birthday party group).

Photo: E. Pearson

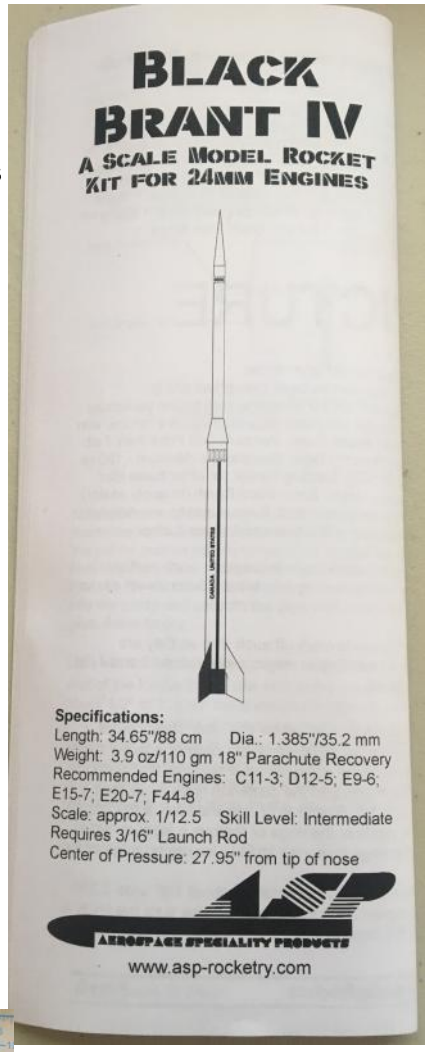
Product Review:
Black Brant IV, Scale Model for 24 mm engines by ASP

Photos and Review by Jennifer Ash

Back in October, Andy Jackson of Aerospace Specialty Products sent me a note asking if I had time to build a kit for him as a beta tester. He wouldn't tell me the kit, so it was like an early Christmas present when the box showed up on my doorstep. Andy makes great introductory scale model kits, and has had a line of 24 mm models. I love Black Brant models, but hadn't had a chance to build a 24 mm one, so this was going to be a fun build.

This kit has A LOT of parts. If you look at picture above, that is everything in the kit. You see 2 small bags of stuff.

Taking everything out, you get the stuff in the picture on the right. I couldn't fit everything into one picture, but you use everything in the kit.



I was obviously working with a not quite finished copy of the directions, since he didn't have a PARTS PICTURE (just the words). He also told me to go to Steps XX if I wanted to skip around for the build. But I am an experienced modeler, I could skip around just fine. Luckily, the figures and pictures for everything else were in the directions, so it was all good.

Andy gives you plenty of Kevlar and elastic for the shock cord (really long!), an easy way to do details on the fins for scale, laser cut fins, and an awesome way to get the weight in the right place with the transition. A few of the parts were loose, but since everything was getting glued together for the weights, the looseness of the coupler assembly tube and the balsa transition were just fine.

Andy tells you to do the details of the fins BEFORE you glue them to the body tube. I followed his directions, and it looked good when I got the fins on the model. It is a nice way to add details, and not have to fight with the fins and tubes. Nice work Andy! He also suggests filling in the body tube seams before gluing anything else together. I didn't do that, since I thought I should fly it before I painted it.

Continued next page

Black Brant IV, Continued

I built the model using wood glue, and to spec on the directions, since my plan was to fly it on the black powder motors. If you plan on using anything above the E9, I would build using epoxy, and swap out the launch lunch for rail guides. The parachute was a standard ASP mylar chute. You might want to swap out the cute for a nylon one, or even a small nylon streamer. The model can handle it, and it might make more than 3 flights. I didn't get a chance to paint it, wanting to fly it first, and not having the good weather to paint. Andy will have the finishing/painting instructions available for download from his site.

I finished building the model in November, but there wasn't a chance to fly it until the January Blue Ridge Rocketeers launch. Since Frank Panek has a High Power site for his club, I thought it was a good place to test the model on a C11-3, D 12-5, and the E9-6. The first flight was on a C11-3. The rocket went straight up, and the chute deployed perfectly. It really should have had a C11-4, the delay was just a bit short. But I think the C11-5 delay would have been too long. The model came down great, no external damage. The chute was a bit ripped and charred, and I know I put in a lot of wadding. I prepped it again, and launched on a D12-5. The delay was perfect, and the chute didn't deploy (wad recovery) but the model landed about 10 feet closer than the C11. I had to untangle the chute before I could launch it on the E9-6. The only damage was a fin ding on the bottom of one of the fins. That could have been done from a landing, but everything else looked like it had not been flown. A very well built rocket.

Considering how high the model went on the C and D, I kinda knew I might not see it again, but hey! I am a scientist, and I had to see the test procedures through. I put in the E9-6 and we launched. Once again, straight up ("to the stratosphere" as Frank said), parachute deployed and came down on a farm about a half mile over in front of the silo. Into my Jeep I went, drove over to the farm, asked if I could look, was told I could drive wherever, and

Launch on a C11.

proceeded to start at the silo and work my way back to the launch area. An unpainted rocket in a corn field is hard to find, and I didn't have any luck. I spent an hour or more looking, found bones, cows, mud, rocks, but no rocket. Hopefully it will show up.

If you have the space to fly it, or want to replace the chute with a streamer, this model is a great "larger" scale model to fly.

Black Brant IV Model Rocket Kit

February 2018 Mt. Airy Sport Launch
Winter Frost-Bitten Rocketeers
By Bill Boublitz, NAR 36860, Acting Launch Manager

Alex Mankevich was the official February Launch Manager. I arrived at the shed at 9:17 am, to find Alex pulling gear. Sarah and Ed Jackson joined us minutes later and made the work go swiftly. We were ready to fly in the New Year at 10:00 am.

The day started with four of us, a soggy field, temps in the upper thirties, winds from the north at 5 mph and snow in the forecast. Ed and Sarah presented the first birds of the day. With a wink and gesture toward the launch console, Alex said, "Go for it." I spent the next hour helping three friends enjoy rocketry. They put up six flights while keeping watch on my performance at the range head.

We were soon joined by Fabrice Derullieux. In addition to ensuring our batteries were charged, Fabrice lingered through the day offering sound advise to new flyers and TARC Teams. He later gave the newbie Launch Officer some respite and stayed to help break down the range.

The Taylor family arrived around noon. They had attended NARHAMS' February Goddard launch but were unable to fly due to the soaking rains. Eugene, (Dad), last launched a rocket in 1986. Son Joseph and daughter Joy became first time fliers and insisted on "pushing the button." They flew a Taser and vintage Estes Astrocam 110, which had languished in the box for thirty years. The Astrocam made four excellent flights, unfortunately sans film.

We were happy to host two returning TARC teams. First, the CMIT North Team test flew their bird on an F32 composite. The design proved flight worthy with a very straight boost and little roll. Absence of a separation event caused the vehicle to return ballistically. Next was the Starry Knights Team from Middletown High School. This team made and submitted a qualification flight, recording an altitude of 885 feet and a duration of 48.36 seconds. Starry Knights made a second, (unrecorded), test flight. Both flights were powered by F30-6FJ motors.

Ed Jackson flew some interesting models; among them a "Deuce's Wild," from

L. to R. Fabrice, the Taylors, Bill Boublitz.
Photo: A. Mankevich

TARC team readies; Starry Knights Team; L: Unidentified team member, C: School paper journalist, R: team leader Lillian Mueller.
Photo: A. Mankevich

Continued next page

February Mt Airy Launch, Continued

FlisKits. This dual, canted 18 mm motor cluster flew very well, a testament to the alignment skills of the builder. Later Ed presented a thirty-two year old Estes Wizard wearing a vintage, brushed on Dope paint job. (It's been awhile since I've seen one of those!) It looked great and flew well.

King ZOG, Alex provided the best Frost Bitten Bird, (theme of the day), flying his "Great White" - an all white original design on a B4-4. Too bad the snow was still an hour away. We would have enjoyed the King fetching his camouflaged bird out of the condensation. Alex also flew a beautiful Tomahawk cruise missile, with more decals than he cares to remember applying.

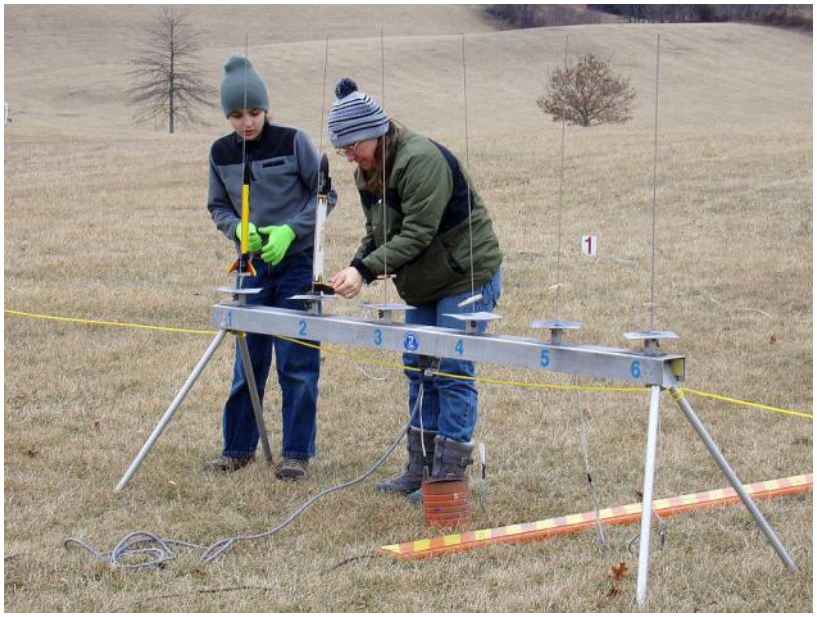
The weather began to turn nasty. Chill was setting in. I decided to liven things up by providing one of those infamous E9 motor CATOS. Amazingly, my Estes Vagabond can be repaired to fly again.

We planned to close down at 2 pm when John Petrie came walking up the slope with a box full of rockets. John made three flights before we had to close the range at 2:30 pm due to snow falling.

Twelve rocketeers made 31 flights; one each A10-3T, 1/2A6-2, two A8-3, two B4-4, ten B6-4, one C6-0, four C6-3, four C6-5, one E9-6, two F30-6FJ and one F32. Interestingly, no D or G motors were flown.

The ranks of experienced Launch Managers have thinned during the past year. I encourage members willing and able to step forward and become part of the sustaining generation.

I look forward to serving you again in the future.



Prepare to launch; Joseph Taylor with his Mom prepping their birds.
Photo: A. Mankevich

Ed doing clean-up; Starry Knights team prepping second flight in background while Ed Jackson gets a head start on break down.
Photo: A. Mankevich

Ed and Fabrice.
Photo: A. Mankevich

From the ZOG: *Ricky Arnold – Astronaut, Spacewalker, Educator and Fan of NARHAMS*

By: Alex Mankevich, NARHAMS President

Astronaut Ricky Arnold lifted off into space on March 21, 2018 aboard a Soyuz MS-08/54S with NASA Astronaut Drew Feustel and Russian Commander Oleg Artemyev. As of the publication of this issue of the ZOG-43, this trio makes up part of the Expedition 55-56 to the International Space Station.

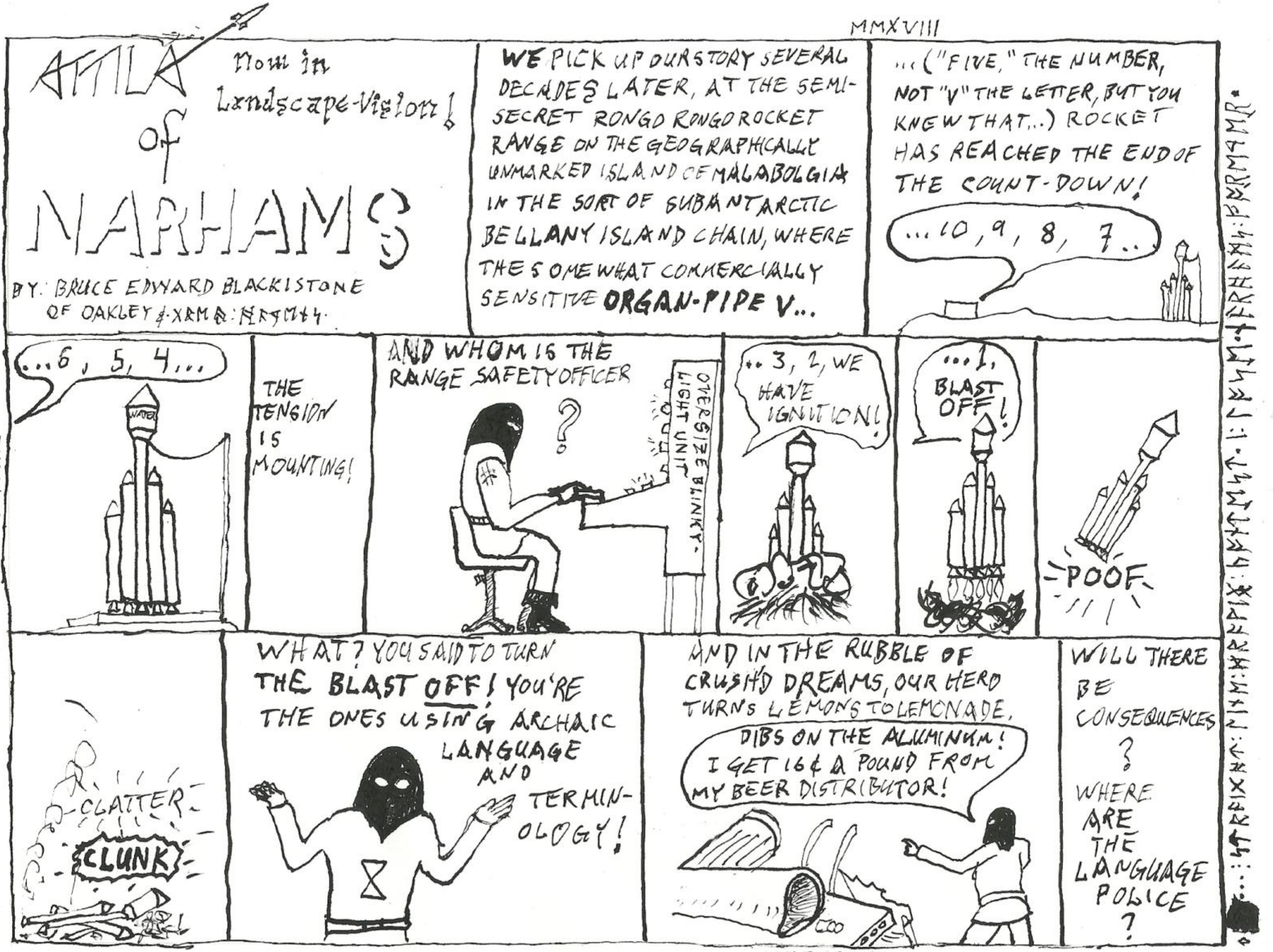
Arnold was born in Cheverly and raised in Bowie, Maryland. He completed Astronaut Candidate Training in February 2006. Ricky currently serves as the Assistant to the Chief for EVA and Robotics in the Astronaut Office. He has flown on one previous shuttle mission, which was mission STS-119 in 2009 during which he logged two spacewalks totaling 12 hours 34 minutes. Arnold's EVA helped to install one of the station's main solar array truss segments.

During their current ISS mission, Arnold and Feustel are set to perform a spacewalk on March 29th to install wireless antennas and replace cameras outside the space station. They are expected to remain in space for 159 days, returning to a landing in Kazakhstan on or about August 28, 2018.

NARHAMSters Alex Mankevich, Richard Crisco and Richard Hickok were lucky enough to meet Ricky Arnold in April 2014 as the astronaut spoke during Space Night at the Wood Acres Elementary School in Bethesda. After his presentation, Ricky patiently signed autographs for children of all ages. Alex explained NARHAMS role during Space Night and insisted that Arnold provide an autograph with a brief profound message for NARHAMS. Attached to this article is Ricky's signed portrait with the encouraging words "Good luck, NARHAMS!"

Richard R. Arnold II

Photo: NASA


MMXVIII
ATTILA of NARHAMS
Now in Landscape-Vision!
BY: BRUCE EDWARD BLACKISTONE OF OAKLEY
WE PICK UP OUR STORY SEVERAL DECADES LATER, AT THE SEMI-SECRET RONGO RONGO ROCKET RANGE ON THE GEOGRAPHICALLY UNMARKED ISLAND OF MALABOLGIA IN THE SORT OF SUBANTARCTIC BELLANY ISLAND CHAIN, WHERE THE SOMEWHAT COMMERCIALLY SENSITIVE ORGAN-PIPE V...
... ("FIVE," THE NUMBER, NOT "V" THE LETTER, BUT YOU KNEW THAT...) ROCKET HAS REACHED THE END OF THE COUNT-DOWN!
...10, 9, 8, 7...
...6, 5, 4...
WATER
THE TENSION IS MOUNTING!
AND WHOM IS THE RANGE SAFETY OFFICER
?
OVERSIZE BLINKY-LIGHT UNIT
...3, 2, WE HAVE IGNITION!
...1, BLAST OFF!
POOF
CLATTER
CLUNK
WHAT? YOU SAID TO TURN THE BLAST OFF! YOU'RE THE ONES USING ARCHAIC LANGUAGE AND TERMINOLOGY!
AND IN THE RUBBLE OF CRUSH'D DREAMS, OUR HERO TURNS LEMONS TO LEMONADE.
DIBS ON THE ALUMINUM! I GET 16¢ A POUND FROM MY BEER DISTRIBUTOR!
WILL THERE BE CONSEQUENCES?
WHERE ARE THE LANGUAGE POLICE?
04042018

Outreach: Full STEAM Ahead Rocket Build Session

By Ed Pearson

NARHAMs club members supported a technology and arts expo at the Patuxant (Pax) River Naval Air Station Visitor Center and Museum, in Lexington Park, Md. on Feb 10.

We had a booth to display our wares and did two build-it workshops for a total of 22 rockets.

The venue at Pax River.
Photo: E. Pearson

The display set up. Sarah and Ed Jackson, and Alan engaging the public.
Photo: E. Pearson

Our Zog (Alex) talks with Dan Bramos (L), the organizer of the technology and arts expo and board member of the Patuxent River Naval Air Museum.
Photo: E. Pearson

Alan explains.
Photo: E. Pearson

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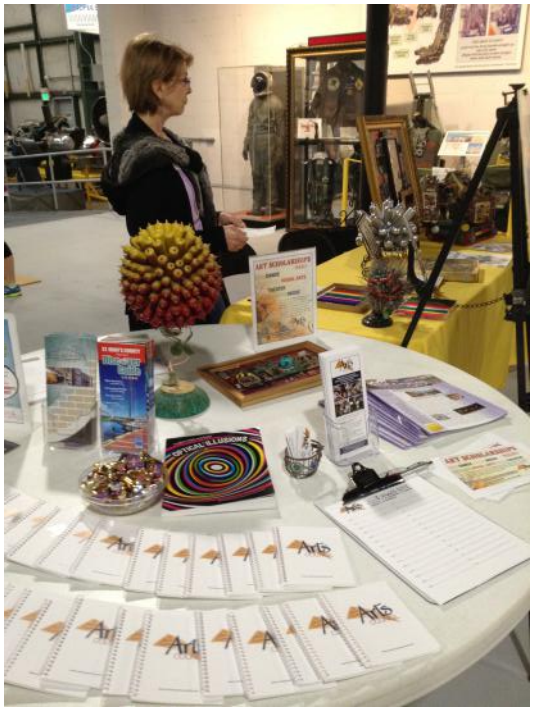
Outreach, continued



Another exhibitor-this one focused on arts instead of technology.
Photo: E. Pearson

Ed helping a youngster.
Photo: E. Pearson

Alex helping/leading the build session.
Photo: E. Pearson

Right: Sarah helping the build session.
Photo: E. Pearson

Left: Model rocket paparazzi.
Photo: E. Pearson

Corrections

From the last issue of the Zog-43:

- The Antares OA-8 flew on Sunday, Nov. 12th 2017 (A photo caption read otherwise.)
- In the John Young obituary, the Apollo 10 flight was in May 1969, but we all knew that.
- In the account of the remodeled Wallops Launch Control Center, the upgrades were improvements on the 1990's technologies not the orginal '50's hardware.

Competition Corner: A Spring and Summer Full of Contests

East Coast Regional Meet (ECRM) - 45
June 16-17, 2018

1/2A Parachute Duration
1/2A Boost Glider
A Payload Altitude
A Helicopter Duration
Open Spot Landing
Sport Scale

This will be both a contest and an NRC sanctioned launch (as well as a Sport Launch). It provides all participants the ability to fly any of the six NRC events. This event will award trophies for first place in all divisions for the specified ECRM events only.

NOTE: if you choose to fly eggloft for NRC, you must provide your own egg(s) as eggloft is not an ECRM event. Payloads will be available to borrow. Firefly altimeters will also be available to borrow.

All contest forms, launch equipment and stopwatches will be provided. If you choose to fly in the "ECRM" contest, there is a $10 fee for A& B division entries, and a $20 fee for C&D division entries.

There will also be a BBQ picnic to follow on Sunday afternoon. $7 per person or $25 per family of four or more.

Steel City Smoke Trail 18 – June 2nd & 3rd, 2018 Cedar Grove, PA

All 6 NRC events
1/2A Boost Glide
A Helicopter Duration
A Payload Alt. (18mm)
C Super- Roc Altitude w/altimeter – NARAM event

Meet champions will be determined from the last four events listed above

Contact: Pittsburgh Space Command (http://www.psc473.org/)

CanAm Cup 2018 Muskegon, MI June 8-10, 2018

World Cup events: S4A, S6A, S8E/P, S9A
Open International Events: S3A, S2/P

Contestants must have an FAI license to fly in the WorldCup.

Contact: Mike Nowak, 2349 Coventry Road, Cleveland Heights, Ohio, (216) 337- 9537

NARAM-60 Competition and Rocketry Festival

Events:
1/2A Parachute Duration*
1/2A Boost Glide Duration*
A Streamer Duration*
A Helicopter Duration*
A Payload Altitude*
C Eggloft Altitude*
B Cluster Altitude
C SuperRoc Altitude
Classic Model
Sport Scale
Research & Development

August 4-10, 2018
Hudson Ranch
Pueblo, CO

Old Rocketeer Reunion on August 4
Keep tabs, new activities to be announced

For current info, go to
www.nar.org

NARHAMS NRC Launches

Held in conjucton with the following
Mt Airy Sport Launches:
May 19
June 16-17
September 15
November 17

NASA Goddard Visitor Center Model Rocket Contest

WHEN: **Sunday July 15, 2018 12 noon – 4pm**
(no rain date)

FOR: All Area Model Rocketeers

WHERE: NASA/Goddard Visitor Center, Greenbelt, Maryland
(I-95 Exit 22A, Baltimore-Washington Parkway Exit for
Route 193 East; then follow signs to Visitor Center on ICE Sat Road)

EVENTS: "Lunar" Spot Landing

COST: Free

REGISTRATION: Register at the launch site on the day of the launch

SPONSORS: This contest hosted by the NASA Goddard Visitor Center and conducted by the National Association of Rocketry Headquarters Astro Modeling Section (NARHAMS). Assistance has been received from the Maryland Space Business Roundtable and model rocket companies.

AWARDS: First through fifth place trophies and model rocket kits for each event have been donated.

WHY: This event is to commemorate the 49th Anniversary of the Apollo 11 Moon Landing, and promote interest in Space Sciences among area students.

Contest Rules

1. The contest is open to all model rocketeers.
2. Contestants must follow the National Association of Rocketry (NAR) Safety Code
3. Modelers must provide their own model rockets, wadding, engines, igniters, and prepping tools. The Space Center will provide the launch equipment suitable for 1/8" and 3/16" diameter straws (launch lugs).
4. In each event, contestants may fly either as an individual or as part of one team. Entry into both team and individual competition is not permitted.
5. Model rockets must use a single (NAR classification and safety certified) engine for each flight. "D" class engines or greater are prohibited.
6. Total weight of the model rocket with engine must be less than four ounces.
7. Model rockets must pass a preflight safety, engine and weight inspection at the launch site prior to launch.
8. Model rockets must land safely and must use either streamers or parachutes or gyrocopter-type devices for their recovery.
9. Model rockets must not separate into two or more unattached parts during flight.

Contest Judging and Other Important Information

1. Modelers may launch their models one time.
2. A launch is a successful ignition of the engine. A flight is when the model rocket starts to move upward on the launch pad and until the model rocket finally stops its descent.
3. The object of the event is to determine whose flight comes closest to reaching the center of a circular 125'-diameter "Moon" marked on the ground.
4. If a model rocket lands on the "Moon," contestants must leave the model rocket undisturbed until the model rocket is measured.
5. Officials will measure all model rockets that land within the "Moon's" boundaries.
6. Measurement will be from the "Moon's" center to the tip of the model rocket's nosecone. The measurement becomes the contestant's score.
7. The person with the smallest measurement (i.e., closest to the "Moon" center) will be declared the winner. The next smallest score will be second place and so on.
8. The contest will be flown in two age divisions: one is for those 15 years and younger; the other is for those 16 years and older. Teams will be classified by the age of the oldest team members.
9. Decisions of the judges are final.
10. These contest Sundays have traditionally been some of the hottest days of the year, so be prepared. Also, please be prepared to have FUN!

Time Schedule

Visitor Center Hours for This Event	12 Noon to 4:00 p.m.
Contest Registration	12:00 p.m. to 2:30 p.m.
Opening Ceremonies	12:30 p.m. to 12:45 p.m.
Contest (Flying Period)	12:45 p.m. to 2:45 p.m.
Awards Ceremonies	3:30 p.m. to 4:00 p.m.

For further information, call the Goddard Visitor Center at (301) 286-8981, Tuesday through Friday, 10:00 a.m. to 4:00 p.m.