THE LAUNCH RACK

Published by the Garden State Spacemodeling Society
National Association of Rocketry Section No. 439
New Jersey's Oldest Model Rocket Club

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*** 2014 LAC NEWSLETTER AWARD HONORABLE MENTION ***
*** 2015 LAC NEWSLETTER AWARD HONORABLE MENTION ***
*** 2016 LAC NEWSLETTER AWARD RECIPIENT ***

50 Years Ago
~~ July 20th 1968 ~~
The World Watched in Amazement
and Heard Triumphantly:

"THE EAGLE HAS LANDED"

[Ctrl - Click for Video]

President's Message

Arnie Klein

Presidents Report

I don't know of any problems getting into the park (for the May Launch). The reason I was not there is I had an Eagle ceremony to go too for one of my troops scouts. This is very important to me because I am the troops Eagle advisor. The May launch was handled by Jim Zindle he wrote the following:

The launch went well. We had perfect weather and packed up around 2pm. Surprisingly though there were only 2 families which showed up to fly. One had recently joined the club and came from Brooklyn. They flew a couple of Estes Pro Series rockets on Estes F15 29mm motors and some other lower power stuff. They all went well. One drifted down into a tree by the playground near the entrance, but we got it down with the pole.

-Arnie

Lackey's The Editor's Pad

Dr. "It's the Trooth" Bob Kreutz

IF it'll FIT – I'll Print IT!
If not, I'll probably print it anyway...

In an effort to make-up for the lack of NRC related technical articles in the last issue, this edition of the Launch Rack contains 2 papers related to the 2019 NRC events. They are relevant and applicable to B Payload Altimeter Altitude and A Boost-Glider Duration.

If you haven't already, please note that we have been able to insert hyperlinks into some of our PDF formated periodical photos. Ok, well, we inserted 1 (one) link in the cover picture (at the bottom) of a video of the original 1st step upon the moon by Neil Armstrong. We just want to check if it works for you – so give us some feedback. We can include more active links in future issues if you wish. While I've been known to Rickroll a few of my close friends (some of you may have to Google that one...), I promise readers and subscribers I will NOT insert links to questionable or offensive material in any future issue. (That doesn't mean I won't Rickroll You! <G>) Should you deem any content of this publication as inappropriate, please contact me or the Editor Most High directly. Our contact information is stated throughout each issue, we're hard to miss. And just in case the Grand PooBah finds the "Monthly Morph" offensive: No way, no how, I made you famous! An Honor, I would *only* bestow upon our Great Leader!

Lastly, If you have photos or a write up on one of your projects, or a recent launch, please send them (or a link) to us here and we will share them with our readers!

Countdown! 2019

Please **Note**: All Launch Dates are **SATURDAY** *Except* where noted.

President Klein has breached the gate and secured our LAUNCH DATES!. We believe the problems causing our delayed reserved launch dates at North Branch Park have been rectified. Here are the upcoming launches. 2019 Launch Dates are usually the Last Saturday of the Month.

ALL launches*Saturdays*unless otherwise noted in COUNTDOWN

Jun 29 – Sport Launch (Aestival Solstice Launch)
July 27 – Sport Launch (Delta Aquarian Meteoric Launch)
Aug 31 – Sport Launch (Thanks for the Eclipse! Launch)
Sept 28 – Sport Launch (Launch of the Autumnal Equinox)
Oct 26 – Sport Launch (Orion's Annual Meteoric Launch)
Nov 23 – Sport Launch (Launch THIS You Turkeys! Launch)
Dec 28 – Sport Launch (Grand Hibernal Solstice Launch)

Our WebMaster Rob Nee says: Check the GSSS Website! If you go to the launch dates page on the new website there is more info. You can add calendar subscriptions to most phones and Google Calendar. If the launch dates change they show up on your phone or in Outlook automatically!

NEW URL --> http://www.gsss.club/launches.php

Its The Monthly Morph!!

GENERAL KLEING

"To be or not to be?" That is the question which preoccupies our people. We need breathing room...

RE:ENLISTMENTS

>>WELCOME<< ((BACK))
ONE & ALL FOR 2019!!!

Please say *HELLO* to our newest Member: KIRILL BAKUMENKO
WELCOME ABOARD!!!

THE SOAPBOX

STAND UP AND SHOUT!

Shout, shout, let it all out
These are the things I can do without
Come on, I'm talking to You, come on…

Here you can say what you want: So SOUND OFF GSSS – right here - on anything you would like! May similar minds come together - or secret plans be revealed…

The "Where are all the A & B Divisioners?" Dilemma Continues!...

I take it most readers have noticed the somewhat critical opinions being expressed in The Soap Box column? Well, here's another one. The NAR as well as other major aeromodeling organizations are desperate to attract new and youthful membership. Where have they all gone? Kids LOVE things that fly independently - and controlled. It starts with their first balloon on a string. But now, it seems, as if today's youth have been stolen away – They have disappeared from traditional pursuits and kidnapped to...? Pleasure Island! [Pleasure Island **i**s the cursed island with an amusement park from Disney's Pinocchio where mischievous young boys were turned into donkeys. (political innuendo intentional) That's right – remember the hawker:

"Right here, boys! Right here! Get your cake, pie, dill pickles, and ice cream! Eat all you can! Be a glutton! Stuff yourselves! It's all free, boys! It's all free! Hurry, hurry, hurry, hurry!"]

Where is Pleasure Island **Today**??

Its in your family room or the child's bedroom. Where ever his or her computer or tablet is! These days, kids want to be sent to their room!!! If for no other reason than to "get connected" Ask them: get connected to what? "The Internet" is a normal reply, "Facebook" another. What is it they offer that could possibly be better than exploring and being "outside?" I don't think its the outside portion of the idea that is paramount – its "exploring."

Kids haven't changed at all – they still enjoy doing the same things they always have. Exploring! What they have found is a different way of doing it: "On-Line." And who showed them how to do that? Who, by their own actions – that the child is emulating – showed them how to explore their world? Mom and Dad – that's who.

That's right – I'm saying PARENTS are the fault, not their peers. And where is it that the kids that *DO* get involved with rocketry come from? Its not home, its ***school*** (TARC) or to a much lesser degree, Scouts/4H.

Organizations outside the house dedicated to the personal growth of the child. The problem here is the lack of commited, enthusiastic individuals with a working knowledge of model rocketry. Most times the kids have greater understanding of the subject of rocketry, than their adult Mentors. Probably, from the internet!

Its the same in Europe – and one of the reasons you will read articles about rocketry from all over the world, here, in the pages of the Launch Rack. Eastern European kids get their introduction to model rocketry at the local "club." Their clubs are not like those in the US: a loose organization of folks with the common interest of sport rocketry. Theirs are organized much like a school or a team. Even the European Soccer sport is organized into "clubs" which function like professional or semi-professional organizations. Here we might call that AAA ball. One major difference in many locales is: In Eastern Europe, you have to apply to be accepted in some clubs – just like applying to private schools here in the US. Not everyone gets accepted - and there are limited spaces available to those who would like to get in. You have to be good enough and have a technical mind. Eastern European companies sometimes source these clubs for potential future engineers.

So where does rocketry and aeromodeling's dilemma of where to find fresh, youth membership and competitors fit into all this? Well, if you hadn't noticed, robots don't fly rockets, real kids do. Robots show up to the game and take home a trophy for finding their way to the field, Real kids go to NARAM and fly rockets by day and then empty all the ice from the hotel second floor ice machine by night, just because they can. Some times they win, most times they lose, that's life. But they sure have a good time trying. Some stick to it and get better, others get depressed and anxious being bullied on Facepage.

To be serious about this will take a concerted effort, and possibly a radical proposal. Don't wait for the kids to come to NAR, go out and get them. And there is one place they all have to go and are not allowed to surf all day on the internet: School! Elementary School or up to 8th Grade at least to be exact (Form II for our British readers).

In School, it is rewarding when Kids are allowed to join "clubs" to dabble and explore outside interests. But what if we call them "Teams" instead of a club? Teams have a more serious intent than "club". Teams are composed of a group of individuals who work towards a common goal. Kids know that. Teams also compete. Kids know that too. What if these Teams could compete locally like the school Chess or Debate "Teams?" School vs School? The old "Local" NAR meet? The ultimate goal here is the next challenge or competition – the interest is not dropped once that first and only rocket flight is accomplished. There's a "next part" that doesn't seem available today. As a Team, this competition would be outside of NAR organized competition, allowing 'team members' to also join NAR Clubs or Sections and compete through the NRC without having all their points go towards the School Team when they register (under the new NRC Section Champ rules.) Unless... the School wants to establish themselves as an NAR Section... And you know that is exactly what will happen. 3 or 4 schools with Teams will combine over a summer to continue their activity and have some continuity into their next academic year. NAR will have their hands full then – possibly hundreds more showing up at NARAM or the "Festival" through just a few new sections – A/B Sections!!! Try getting ice out of the ice machine then!!!

School Teams would need to have a Teacher as Advisor but – Just like TARC, NAR Adult members would be enlisted as Mentors. Where is the problem with that? Well, there are only 5000 adult NAR members across the nation and I believe quite a few more Elementary Schools, maybe 89,000 (Dept of Education 2016). Simple math tells you every adult NAR member would have their choice of approximately 18 Elementary Schools to chose from! Oh, Whoopee!

Seriously, how many times has your "club" or Section been contacted for assistance in launching models for the local Tarc, CAP, High School or School based "Club?" They are out there – but their Advisors usually have little knowledge or experiance with model rockets. They announce they are going to fly rockets and get enormous smiles and enthusiasm on the faces of the kids. They build some rockets, then the day comes when they can fly them and everyone they contact, including their school administrators say: "Rockets? Noooo – It must be DANGEROUS! Do You know what you're doing? What if someone gets hurt? School Insurance doesn't cover that – best contact the local NAR Section..." And you know what? That is what hey do, and it is when the Advisor writes to the local NAR Section because they realize they really don't have all the information they need – or a plan for afterward. So you invite them to your field. They launch their

rockets. They have lots of fun. But with the limited knowledge of the Advisor Teacher, the "lesson" is concluded and they move on to the next scheduled lesson in baking soda volcanos.

There is a disunion here where we lose kids. We can't rely on a "hook" to interest them, *IF* it is a one-time-shot like this. Could the classic "Make It-Take It" be the wrong thing to do, too? Possibly, if the child only takes their rocket home as trophy and all it does is sit on top of their desk as some award in accomplishing "rocketry." Um, ok, now what can I do...?

We must continue to challenge them with a "program" and long before they get to TARC. Something like NARTrek but without the math and with someone to guide them. If they had a Team and a Mentor – maybe they would continue the activity. And maybe they would join the NAR – or the AMA.

What if it were an Aeronautics Team? It could benefit both Organizations. NAR and AMA could combine their programs already in place through the organizations' Membership, Education and Marketing Boards. Yes, its a huge task, a lot of people, time, money and: huge rewards for everyone. But it will **take** a grand effort, commitment, volunteers and most likely would become the main focus of our organizations for years, in the years to come.

Or, we can sit on our hands and wait for the kids to come to us through the internet, where there is the lure of 150 ever challenging levels to play, not including home made maps. Right?

That's just one opinion from: The Devil's Advocate

ROCKET EMAIL

Send your Rocket eMail to me here:
orbitboybob@comcast.net and I'll do the rest!
...and Remember! The Postage(?) is - FREE!

Bob,
As usual, enjoyed the latest edition and even found it educational.
As for people complaining about Jeannie or the, rockettes, I wouldn't worry about them, they're just afraid of both.
The day I prefer seeing a rocket over a rocket babe, please shoot me.
The, Rocket Babe, says to thank you for the invitation. As much as I would love to, she hasn't been able to get to a club launch for a while now and the last time she did the guys who were married spent the day getting smacked by their wives, so it may not be a good idea for her to at/tend; the book covers are actually toned down a bit.
Patiently waiting for the next edition,
Randy

Randy -
Awwwww, NUTS!
DrB & many, MANY others.....
(did you tell her all she has to do is stand up every once it a while? Maybe a few autographs? On your books...? <G>
Or, might you know Jeri Ryan perhaps?
DrB

Dear Dr Bob,
ANOTHER DAY...Another The Launch Rack! I'm always impressed with this publication and this issue, no exception. When I've read it all, I'll be back in touch, for now, Thank You once more for all your efforts and commitment, best wishes for now.
sincerely...stuart

Most Welcome!
DrB

Messages Channeled through the Oui-GSSS Board

The GSSS BOARD will discuss matters that relate to the Club and affect the membership. A synopsis and the results of any votes will be presented here.

...Or "Stuff We've Heard That's Been Floating Around In Empty Space

The GSSS Board believes the "snafu" that President Klein experienced with getting into North Branch Park in the beginning of 2019, has been rectified. All proper paperwork had been filed and the Permit Commissioner is aware of our insurance renewal dates. Permits will be issued in the future for the beginning of the new year under the previous year's insurance policy – up through March. When the current year's Insurance is issued and received in mid-March, a supplemental Park Permit will be issued for the remainder of the current year.

There had been some confusion due to the Permit being issued January through December, while our insurance is issued March to March. Any other interference with our Park access, if it should occur, can only be deemed as a breakdown in communication between the Park Commission and the Park Rangers. President Klein is now the designated Contact for GSSS and will have direct communications with the Authorities in Charge.

Board of Trustee Voting

The NAR is holding an election for the three seats that are open on the NAR Board of Trustees. There are seven candidates running for the three seats, so your vote counts.

If you will be at NARAM-61, you can instead vote in person at the annual Association meeting on Tuesday, July 30. While you can vote either of three ways, online, mail-in, or in person, you can only vote once! Under the NAR Bylaws only NAR Senior and Leader members (age 16 and older) who have been members since July 30, 2018, or prior (NAR number 105690 or lower) may vote in this election.

BUTLER, NJ -

In celebration of the 50th anniversary of the Moon landing, the Butler Museum will be holding "Space Day". The celebration will be held on Sat July 20th, from 10am - 4pm at the museum which is located at 221 Main Street, in Butler NJ.

There will be a exhibit of Reaction Motors, Inc. hardware, a XLR-11 thrust chamber, a controller for the X-15 among other historic items. All are invited to this FREE exhibit.

B.A.R.C.

Monthly Launch

For Detail MAP: BARC - Click here

Date(s) - 08/17/19; 08/31/19; 09/21/19; 10/19/19; 11/16/19; 11/30/19; 12/21/19

Time: *9:30 am - 3:00 pm* **Location** Rabbit Hill Farm
Latitude / Longitude: 39.4 6595, -75.291475
Category: Sport Launch

Low, Mid, & High Power Rocket Launches. Monthly launches are typically the third Saturday of each month but are subject to change; please check our website for possible date changes.

Website » http://www.barc775.org/
Sponsor Type: NAR Section
Sponsor: BARC #775
Event Director: Mike Zapolski Sr. | BARC2014@comcast.net | 856-455-7855

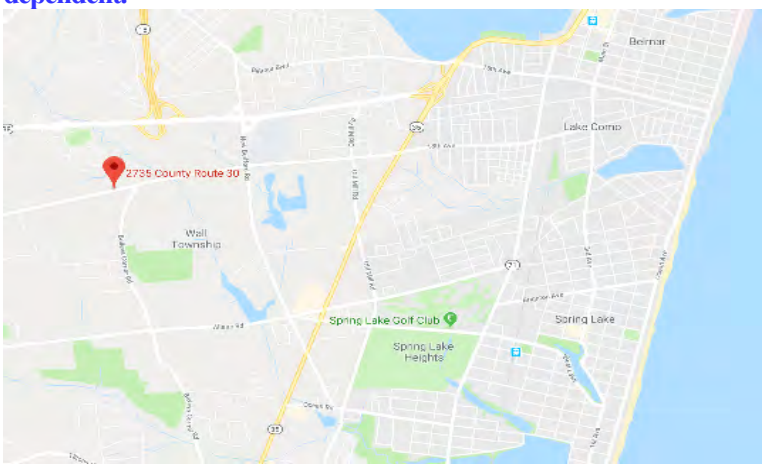
CENJARS Monthly Launch

Belmar, NJ

Proposed Launch Dates:
July 7 - Aug 4 - Sept 1
Oct 6 - Nov 3 - Dec 1

12:30pm to 3:30pm

I don't have a place on our website (cenjars.org) for launch dates. I will look into doing that. We normally launch on the first Sunday of the month from 12:30 to 3:30 or so. I do post announcements early in the week and also post on our Facebook page. The next few planned dates are 8/5, 9/2, 10/7. Of course, these are all weather dependent.



For Detail MAP: CENJARS - Click here

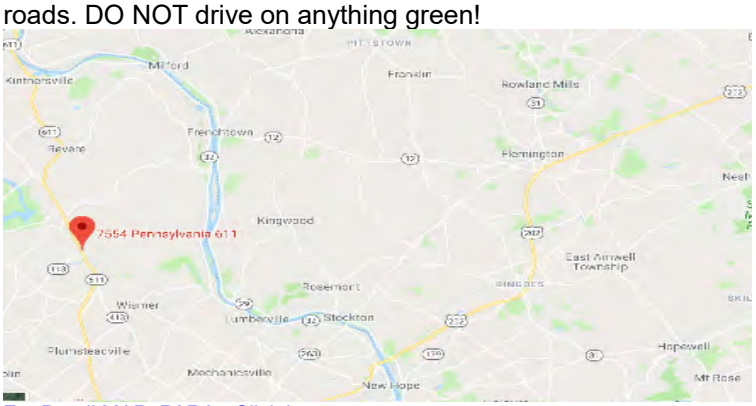
Philadelphia Area Rocketry Association

WE LAUNCH ON THE FIRST SUNDAY OF EACH MONTH AT THE HALLOWELL FARM IN BEDMINSTER, PA 11AM till 3PM
Setup starts at 10:30. Please lend a hand.

July 7 - Aug 4 - Sept 8
Oct 6 - Nov 3 - Dec 1

WE PERMIT ROCKETS WITH UP TO A **G80** MOTOR!
ROCKETS MAY WEIGH UP TO **53 OUNCES (3.3 POUNDS)** WITH INSTALLED MOTORS.15 LAUNCHER CAPABILITY.

The PARA flight field is located at Hallowell farm, approximately 9 miles north of Doylestown PA on Route 611. The entrance to the farm is just north of the intersection of Route 611 and Route 113. Enter here and follow the road to the right, around the barn. Once around the barn, follow the road and you will be able to see where we are set up. The address of the property is 7554 Easton Road, Ottsville, PA 18942. Please drive only on the farm roads. DO NOT drive on anything green!



For Detail MAP: PARA - Click here

To keep down the dust, speed limit at the farm is 5MPH.

We will be launching in a corn field. As it gets later in the growing season you may want to put a beeper on your rockets to help find them in the higher crops. It's a good idea to wear rugged shoes or boots and long pants. There are no rest room facilities on the property but there are plenty of trees, so... Anything you may need - bring with you, including water.

SAFETY IS OF UTMOST IMPORTANCE !!

You will be provided with flight cards which must be filled out before each flight. We record the days launches. You can download the flight cards as a PDF file. This will help us with preflight inspections, maintaining as high a level of safety as possible for you. All rockets must undergo a safety inspection prior to being loaded on the launch pad. If your launch card is not signed off by the RSO, the LCO will not launch it.

SoJARS (NRC) Sojourn

Website: http://www.sojars.org/

The NEW NRC Events for 2018-19 will be:

1/4A-Parachute Duration
1/4A-Helicopter Duration
A-Boost Glider
B Eggloft Duration
B-Payload Altitude-Altimeter
C Egg Altitude-Altimeter

For Detail MAP: SoJARs - Click here
For Detail MAP: S Jersey Tech - Click here

We will have entry forms and results cards along with a thermometer and stop watches. Altitude events fliers -you need to supply your own egg or payload along and an NAR approved Altimeter.

SoJARs plans on having the same contest events every month at all our upcoming club launches.

July 21st	**August 18th**
September 15th	**October 20th**
November 17th	**December 15th**

If you have any questions, please contact info@sojars.org

RADICAL ROCKETEERS

MONTHLY CLUB LAUNCHES

The club launches from Godlewsky Farms, located on Alphano Rd in Great Meadows, NJ. This location is just minutes from I-80 Exit 19. Launches are typically held the second Saturday of the month. Stay tuned to the website and forums for updates.

The large recovery area and FAA waiver allow for everything from low power model rockets to high power flights up to 5000ft AGL.

Launch Dates: None Posted

(Generally 2nd Saturday of the month)

For Detail MAP: RADROC - Click here

S.P.A.A.R.

Monthly Launches

We are based in Lancaster County, PA, and have active members in South-Central Pennsylvania and Northeastern Maryland. SPAAR holds monthly sport launches and meetings in and around the Lancaster Area. We sponsor the Regional Aerospace Meet to Encourage Competition, RAMTEC, as well as NAR sanctioned record trials in the spring and late summer at our Penn Manor launch facility.

SPAAR conducts regular monthly sport launch activities at our Penn Manor Launch Facility on the grounds of Penn Manor Middle School in Lancaster, Pennsylvania.

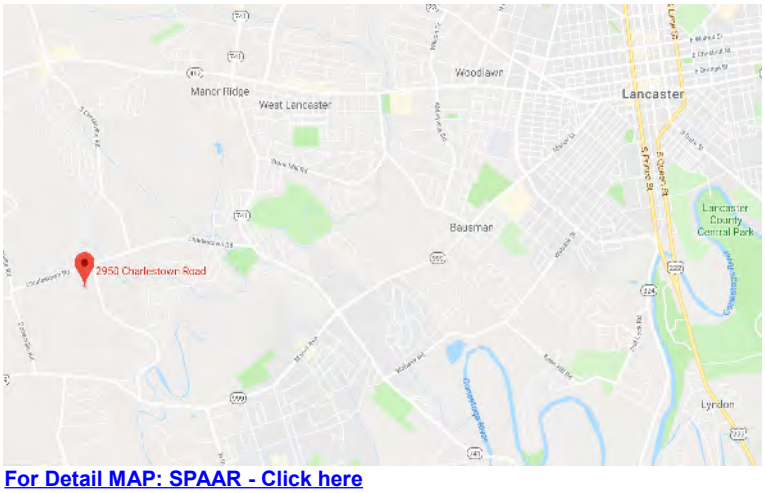
Our launch equipment consists of an 8 pad launch controller for model rockets and a four pad relay system for high power rockets. Up to eight pads can be available for 1/8" to 3/16" rods with four additional pads available for 1/4" rods and up.

Our Penn Manor facility is limited to 160nt-sec of total impulse and the models can weigh up the NAR safety code limit of 3.3 lbs.

Some launches are held at one of two other facilities (see below for directions). Please check the SPAAR calendar for launch locations.

Unless otherwise noted all launches are from 1 PM to 5 PM, weather permitting. (Launches will not be rescheduled if canceled)

July 6 9:00 AM - 5:00 PM	October 6 1:00 PM - 5:00 PM
Launch at Fort Indiantown Gap	SPAARSPAM
August 3 9:00 AM - 4:00 PM	Launch at Manor Middle School
Launch at Halifax	November 3 1:00 PM - 5:00 PM
August 31 9:00 AM - 5:00 PM	Launch at Manor Middle School
Launch and /meeting at Fort Indiantown Gap	
September 21 9:00 AM - 3:00 PM	December 1 1:00 PM - 5:00 PM
Launch at Halifax	Launch at Manor Middle School



For Detail MAP: SPAAR - Click here

GSSS Launch Site

North Branch Park

Important note on how launches are run

1. If no one shows up to fly by 10:30am the range will be shut down early.
2. The range will not be opened until other fliers show up to help setup the range.
3. When those present say they are finished launching the range will close.
4. All launching is canceled if President Trump is at his golf course in Bedminster, We are not always notified until we get to the park so a launch cancellation notice can not always be sent.

Directions to North Branch Park Launch Site

North Branch Park is very near the traffic circle junction of NJ Routes 22, 28, 202, and 206, near Somerville. Follow 202 South from the circle for 2 miles, past Bridgewater Towne Centre Shopping Mall (Wegmans), under railroad trestle marked "4H is Tops", to right turn onto Milltown Road. Make first left after firehouse and 4H Center on right; follow path to open field. Monthly launches from 10-4.

FROM NORTH
NJ Turnpike South to Exit 10, 287 North to Exit 14B (left-hand exit), 202/206 South to Circle

FROM SOUTH
202 North to Milltown Rd.; or 206 North to Circle

FROM EAST
287 North to Exit 13, 202/206 South to Circle

FROM WEST
Rt.78/ Rt.80 East to 287-S, Exit 17, 202/206 South to Circle

Local Facilities

AMENITIES Public Restrooms on site. Fast food locations (Dunkin' Donuts & McDonald's) on Rt. 202.

EQUIPMENT Launching your rocket with GSSS is free. GSSS provides launching facilities and operates under the mis-fire alley protocols. You must supply your own rockets, wadding, rocket motors and ignitors.

MODEL ROCKET SUPPLIES If you wish to purchase motors and other hobby items on-site, Heavenly Hobbies is usually present at the field. We highly recommend you contact them first with your needs and to confirm their attendance and let them know if you need something particular so they can bring it. Toys R Us, Michael's, and Walmart are in the area too and carry some model rocket items.

Map of Launch Site

GSSS Launch Regulations

1. All models/launches to be in compliance with the NAR Model Rocket.Safety Code.
2. All models ready to launch must be presented to the RSO for a safety check.
3. When using the ALLEY SYSTEM, permission to launch must be given by the RSO. A **loud** 5 second countdown must be used before launch.
4. An attempt **MUST** be made to insure that all models are recovered within the boundaries of the park. Using engine/recovery systems compatible with wind conditions etc. (This does not apply at contests).
5. High power (Over 30 Newton-seconds) flights, when allowed by the RSO will be ignited from a minimum distance of 30 feet. (Recovery as in rule #4).
6. Models using more than 30 Newton-seconds of power must use at least a 3/16" or 1/4" launch rod. If smaller, model may not be allowed to fly. (RSO to decide)
7. MOD-ROC flights will be allowed at the discretion of the RSO. (Recovery as in rule #4).
8. Entry and exit from the launch area will be from one end only, at the R S O table.
9. Static testing of engines will not be allowed.
10. Long thrusting engines should only be used in very calm wind conditions (No more than 4.5 seconds of thrust time can be flown. Recovery as in rule #4)
11. All prepping of models will be done outside of launch area.
12. Alcohol is not allowed at any GSSS model rocket launch.

A Note About North Branch Park

Please keep in mind that the park and weather conditions dictate what we allow to fly. If the Range Safety Officer (RSO) does not feel the model can be safely flown or recovered within the park's boundaries, it will not be flown regardless of the weight or impulse. If some other activity shows up and starts using the adjoining fields, the RSO will reduce impulse for all flights. So, bring some small stuff just in case. Remember, we share the park. We do not pay a fee and most of us are not a resident of that county. Rocket flying fields in New Jersey are n short supply, and we are protective of the fields we have. If you are unhappy with this limitation, then we invite you to help us in gaining legal access to privately owned, large, open fields.

Also see the GSSS Launch Regulations

National Events

The 2019 national events have been announced!
More details will follow shortly.

Rocketry Festival 2019

NARAM-61

US Team Selection Flyoffs

FAI Open - NorthCoast Cup

Muncie Indiana

July 27 – August 3, 2019

"The Eagle Has Landed"

50th Anniversary of the Apollo 11 Moon Landing

NARAM Includes the 2018-2019 NRC Events and Special Meet Events

1/4A-Parachute Duration
1/4A-Helicopter Duration
A-Boost Glider
B Eggloft Duration
B-Payload Altitude-Altimeter
C Egg Altitude-Altimeter
C-Rocket Glider (Multi-Round)
E-Altitude
Scale
Research and Development
(Deadline for Papers: July 12th)

Awards for Meet & National Champions

In accordance with Rule 6.3.1 of the Sporting Code. Members may begin flying these events the first day after NARAM ends, August 11, 2018. The NRC ends on June 30 of 2019. Rules can be found at:

https://tinyurl.com/yd6nx73v

All fliers are required to have a current and active **AMA Membership**. For those that do not have an AMA membership, a three-month membership will be provided for you as part of your registration. Those that do have an AMA membership, please record your AMA number and membership type (Full/Park Flier) during registration.

The INTERNATIONAL AEROMODELING CENTER

The International Aeromodeling Center is located about 4 miles east-southeast of Muncie, Indiana. Muncie is about 75 miles northeast of Indianapolis International Airport. IAC address is 5161 E Memorial Dr., Muncie, IN 47302. The NARAM launch site will be at what is known as Flying Site 3 on the grounds of the IAC.

Site Description-Fly rockets large and small at the sport range. The contest and sport range are situated on a LARGE grass area known as Flying Site 3 which is part of the even larger, 1,000 acre grass covered grounds that make up the IAC! Sport and high power flying will commence on 27 July and run though the entire event. The IAC supports all sizes of model rockets and high power rockets through K-impulse with an 6,000' waiver.

Online registration ends: Sunday, July 14, 2019.

https://www.nar.org/site/naram-61-rocketry-festival/registration/

NARAM Hotel: Courtyard Muncie at Horizon Convention Center

Detailed map to the NARAM 61 Host Hotel.

601 South High Street
Muncie, Indiana 47305
1-765-287-8550

Book your group rate at Courtyard Muncie.
Reservations by NAR members must be received by the Marriott on or before Thursday, July 4, 2019.

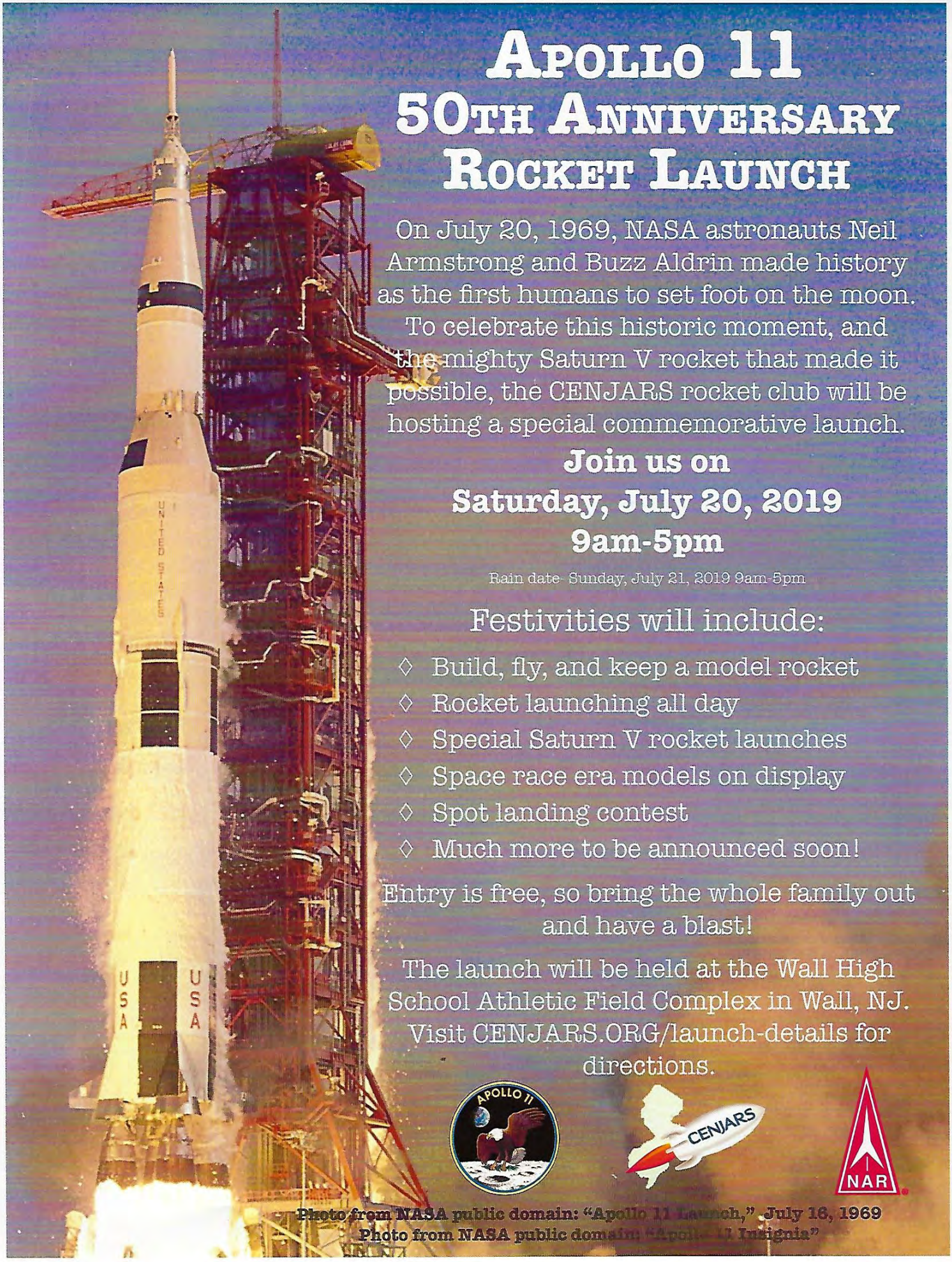
The NARAM-61 block of rooms BEGINS on 7/21/19 and ENDS on 8/5/19. The group code is "NAR." If you are in need of accommodations before 7/21/19 or after 8/5/19, please call Courtyard and book those dates directly.

https://www.nar.org/site/naram-61-rocketry-festival/accomodations/

At NARAM 61, will be a **FREE "Make and Take" event** where you will get to build and fly an AMA Alpha glider and an Estes Alpha rocket*. Entries will get a chance to have a flight of each model timed for duration. The times will be added, and the three entries with the greatest total time will be declared 1, 2, and 3 place winners at an on-field awards presentation complete with a podium. Winners will also receive trophies and some great prizes! There will be one free Estes rocket motor provided for the flight of the Estes Alpha. The event will be held on Saturday and Sunday, July 27-28, 2019.

The **Fly-It/Take-It event** is an activity aimed at people of any age who would like to fly a model rocket for the first time. The NAR gives them the opportunity to fly a rocket for free, and then keep the rocket! It's the NAR's hope that if you fly a rocket, you will find it a fun and exciting activity, and that you will want to fly more rockets! The Fly-It/Take-It table will be operating Monday, July 29 through Saturday, August 3, 2019.

We will be holding exciting **High Power Contest Events** for NARAM, these events have yet to be announced.



Apollo 11 50th Anniversary Rocket Launch

On July 20, 1969, NASA astronauts Neil Armstrong and Buzz Aldrin made history as the first humans to set foot on the moon. To celebrate this historic moment, and the mighty Saturn V rocket that made it possible, the CENJARS rocket club will be hosting a special commemorative launch.

Join us on
Saturday, July 20, 2019
9am-5pm

Rain date- Sunday, July 21, 2019 9am-5pm

Festivities will include:

- ◊ Build, fly, and keep a model rocket
- ◊ Rocket launching all day
- ◊ Special Saturn V rocket launches
- ◊ Space race era models on display
- ◊ Spot landing contest
- ◊ Much more to be announced soon!

Entry is free, so bring the whole family out and have a blast!

The launch will be held at the Wall High School Athletic Field Complex in Wall, NJ. Visit CENJARS.ORG/launch-details for directions.

Photo from NASA public domain: "Apollo 11 Launch," July 16, 1969
Photo from NASA public domain: "Apollo 11 Insignia"

SPORT ROCKETRY'S:
50TH ANNIVERSARY OF APOLLO 11
PHOTO CONTEST

On Saturday, July 20th of 2019, Model Rocketeers from around the globe will be celebrating the Apollo 11 Lunar Landing's 50th Anniversary with rocket launches, picnics, and parties! Will you be a part of this world wide rocket launch event? The National Association of Rocketry is hosting a photo contest to help celebrate the event.

Saturn Photo Contest

Commemorate the launch of Apollo 11 by building and flying a Saturn rocket. On October 1, 2019, we will be giving away three (3) 1-year NAR memberships for the three best modeler/launch/flight photos. We will be hosting a photo gallery on the NAR Website and NAR Facebook page.

CRITERIA:

- The photo contest is open to all NAR members.
- The photos can be any class of the Saturn rocket.
- Simply build it, fly it, and take photos along the way.
- We are looking for a single, best photo, not a photo essay.
- Multiple photo submissions are allowed.
- The photos can be of the builder and model, the build process, the model liftoff, or the model in flight.
- These photos should not have been previously published or posted on social media.
- The image must be at least 8" wide x 10" tall, with a minimum of 200 pixels/inch. All photos should be saved as .jpg files.
- Please, no photo retouching.

PROCESS:

- Include your complete name in the photo name.
- Be sure that your complete contact information is included in your submission e-mail.
- Send photos and submissions via email to: SportRocketry@me.com.
- *Sport Rocketry* has the right to use all submitted photos for publication in the magazine. You retain the copyright to your material.
- After review, we will upload the photos to the NAR Website and NAR Facebook page.

JUDGING:

- On October 1, 2019, a three person panel of judges will select the winning entries based equally upon the criteria of skill, originality, and relevance.
- Three (3) 1-year NAR memberships will be awarded at that time.
- By entering, you agree to be bound by these rules, and that the decisions of the judges are final.

Playlist for Apollo Lunar Landing Day

Also Sprach Zarathustra	2001 A Space Odyssey
Bad moon Rising	Creedence Clearwater Revival
Calling Occupants of Interplanetary Craft	Carpenters
Children of the Sun	Tilly Thorpe
Cold Hearted Orb Rules the Night	The Doors
Cool The Engines	Boston
Countdown	Rush
Dark Side of the Moon	Pink Floyd
Final Frontier	(Star Trek Theme)
Fire on High	ELO
Fly Me to the Moon	Dean Martin
Geronimo	Sheppard
I'm the Urban Spaceman	Paul McCartney
Into the Void	Black Sabbath
Joy	Apollo 100
Major Tom	Peter Schilling
Marooned	Pink Floyd
Moonwalk	Michael Jackson
Radar Rider	Riggs
Rocket	Def Leppart
Rocket Ride	Kiss
Rocketman	Elton John
Space Oddity	David Bowie
Space Oddity	Chris Hadfield
Spaceman	Harry Nilsson
Take Me Away	Blue Oyster Cult
Telstar	The Tornados
The Eagle has landed	Saxon
The Joker	Steve Miller Band
The Moon's a Harsh Mistress	Jimmy Webb
The Planets	Gustav Hoiust
The Race for Space	Public Service Broadcasting
The Right Stuff	Bill Conti
The Vigil	Blue Oyster Cult
Third Stage - Album	Boston
To Tame a Land Maiden	Black Sabbath
Walking on the Moon	The Police
Why Me	Planet P
Mr. Spaceman	The Byrds
Eight Miles High	The Byrds

Talk about a few "Flashback Favorites" - I remember all of these
So I must be getting reeeeally old.... DrB

UNDERSTANDING FAA REGULATIONS

In the latest rules, the FAA has defined three classes of amateur rockets in regards to our hobby. The Class 1 and Class 2 categories are the most relevant to NAR members and will be the focus of this article. You can read the complete regulations for additional information, including details on the Class 3 rocket category.

Class 1 Model Rockets

Class 1 rockets include what used to be known as model and large model rockets. They are defined at 14 CFR 101.22 (a) of the regulations and are listed as:

Class 1- Model Rocket means an amateur rocket that:

(1) Uses no more than 125 grams (4.4 ounces) of propellant;
(2) Uses a slow-burning propellant;
(3) Is made of paper, wood, or breakable plastic;
(4) Contains no substantial metal parts; and
(5) Weighs no more than 1,500 gms (53ozs), incl. the propellant.
(a) You must operate an amateur rocket in such a manner that it:
(1) Is launched on a suborbital trajectory;
(2) When launched, must not cross into the territory of a foreign country unless an agreement is in place between the United States and the country of concern;
(3) Is unmanned; and
(4) Does not create a hazard to persons, property, or aircraft.
(b) The FAA may specify additional operating limitations necessary to ensure that air traffic is not adversely affected, and public safety is not jeopardized.

Launching large model rockets used to require providing prior notification to the FAA. Now, no such notification is required. So long as the general operating limitations at 14 CFR 101.23 as listed below are followed, they can be launched freely.

Class 2 High Power Rockets

The Class 2 rocket category covers high power rockets and is defined at 14 CFR 101.22 (b) and is listed as:

Class 2 – High-Power Rocket means an amateur rocket other than a model rocket that is propelled by a motor(s) having a combined total impulse of 40,960 Newton-seconds (9,208 pound-seconds) or less.

While the older rules prohibited flying unmanned rockets into controlled airspace, the latest rules do not. The newer rules do however, require prior authorization before launching. This is part of the operating limitations for Class 2 High Power Rockets found at 14 CFR 101.25 and stating:

When operating Class 2-High Power Rockets or Class 3-Advanced High Power Rockets, you must comply with the General Operating Limitations of §101.23. In addition, you must not operate Class 2-High Power Rockets or Class 3-Advanced High Power Rockets:

(a) At any altitude where clouds or obscuring phenomena of more than five tenths coverage prevails;
(b) At any altitude where the horizontal visibility is less than 5 mile;
(c) Into any cloud;
(d) Between sunset and sunrise w/o prior FAA authorization;
(e) Within 9.26 kilometers (5 nautical miles) of any airport boundary without prior authorization from the FAA;
(f) In controlled airspace without prior authorization from the FAA;
(g) Unless you observe the greater of the following separation distances from any person or property that is not associated with the operations applies:
(1) Not less than one quarter the maximum expected altitude;
(2) 457 meters (1,500 ft.);
(h) Unless a person at least eighteen years old is present, is charged with ensuring the safety of the operation, and has final approval authority for initiating high-power rocket flight; and
(i) Unless reasonable precautions are provided to report and control a fire caused by rocket activities.

Prior authorization from the FAA, as mentioned in 14 CFR 101.25, items (d), (e), and (f), pertain to having an approved Certificate of Waiver or Authorization (COA) issued by the FAA. To get approval to make Class 2 rocket flights at a certain location, you must first apply for the COA using FAA Form 7711-2. You can find help with filling out this form at the link located at the end of this article. Once the application and other required information has been received, the FAA will conduct an airspace review to determine the compatibility of launching Class 2 rockets with other uses within the designated airspace.

Airspace Review For Class 2 Rockets

The FAA is charged with ensuring the safe use of a public resource: the airspace above all our heads. The primary way they do their job is by making sure that airplanes work as they were designed and have adequate operational limits, ensuring that pilots and other airspace professionals (like controllers) have been adequately trained and receive recurrent training, and by separating airspace users in operation by adequate distances. It is the latter which will have the most bearing on your rocketry activities.

To get an idea of what the FAA looks at during this review, it's helpful to view an aviation map for the next steps. The easiest method is to view VFR Sectional Charts online via a website such as SkyVector or iFlightPlanner. Both of these will allow you to enter GPS coordinates to locate your potential site on the map. You can also download digital versions from the FAA website, just keep in mind that these are fairly large files and can be difficult to work with. They also do not provide the ability to plot locations automatically so if you go this route, you will have to locate your site manually.

Once you're looking at the Sectional Chart, locate your launch site and then consider the following:

1. Are there any airports within 5 nautical miles? If so, you will also need to request authorization in accordance with 14 CFR 101.25(e).
2. You may see a variety of wide straight blue lines on the map with arrows on them and letters like "V321" on the lines. These are airways, connections between radio navigation aids for airplanes under positive airspace control. Having any of these near your launch site makes the FAA nervous and may affect the ability for them to provide authorization.
3. Around larger airports, particularly larger cities, you may see airports marked with a variety of dark blue circles surrounding them. These larger airports frequently have high volumes of jet traffic and these circles represent a class of airspace strictly controlled by the FAA. Obtaining authorization under these terminal control areas (TCA's) is not impossible, however, be prepared to accept lower altitude ceilings in this case.
4. Other things to look out for include large blue hashed areas marked with something like "P-405" (representing Prohibited Airspace, e.g. the White House, portions of the Grand Canyon, etc.) and "MOA" or Military Operations Areas (practice areas for armed forces pilot training). The military operates MOA's independent of the FAA, only telling the FAA when they're using the area. The FAA cannot control access to these areas, and while the military doesn't always allow other uses of "their" airspace, they don't always deny it either.

The presence of any of these things should not discourage you from applying for authorization. Most current NAR certificate holders report that the FAA personnel with whom they interacted with were courteous, helpful, and professional. Don't go into the process thinking of it as an adversarial proceeding; it shouldn't be. You will have a better chance of having your request approved if you make your application in a professional manner, and conduct your activities likewise. Don't hesitate to ask questions but keep in mind that those working on your application are people, and as such they respond to being treated courteously and professionally. Working with the FAA personnel you contact in a cooperative spirit will often bring fruit and establish long term working relationships.

For help with filling out the **FAA Form 7711-2, Application for Certificate of Waiver or Authorization** as well as other required information, visit the Filing for FAA Launch Authorization page.

ARK Komarov...

Golden Jubilee of Europe's most famous Rocket Club

by Stuart Lodge

HISTORY is all about the *PEOPLE*, the few who have a vision and create change for the greater good. Based in Ljubljana, Slovenia, Jože Čuden and Vojko Kogej, who catalysed the genesis of the *Astronavsko Raketarski Klub Vladimir M Komarov* (ARK Komarov), just two stunning examples.

15th Ljubljana Cup ~ *25-26th September 1993* : your scribe's first trip to Slovenia and the (already..) famous Space Models' international competition. I was introduced to the Club's flying facilities at the Ljubljana Barje (muddy marsh..) in heavy rain and wind and also to prominent club members. Accommodated at the Gostilna Jelen (Deer/Stag Guesthouse), sharing a room with Oliver Missbach (GER), Mikulas Szabo (SVK), Alexei Koriapin and friend Juri Draichuk (RUS), under the care of Jelen's friendly and convivial host. Plenty about to happen through the weekend. Also, was given a brief tour of the 'clubhouse' in an apartment block nearby, Rimska ceska 13, in the old part of Ljubljana, where I helped teenager Tomzi Kogej with his English homework! But how did all this begin?

Meeting around the table during the early days of ARK Komarov. Joze cuden and Vojko Kogej present and contributing.

5-4-3-2-1-Kickstart.. ~ *19th November 1969* : young teenagers, Jože Čuden and Vojko Kogej gathered together 13-14 year old school friends and set up a Model Rocket club, actually incorporating full-size astronautical studies, called *Astronavstko Raketarski Klub Vladimir Komarov*. The school in question was the Toneta Tomšič Elementary school (today's OŠ Poljane). The club was named after the Soviet Union kosmonaut, Vladimir M. Komarov, who rode *Soyuz 1;* the space capsule's recovery system failing following re-entry to Earth's atmosphere, crashing fatally in Orenberg Oblast, during 1967. Komarov had already flown one space mission on *Voshkhod 1* and in a tragic quirk of fate,had taken Juri Gagarin's intended second space boost slot. Gagarin was himself to die, in 1968, following a return to his 'day job', as a military test pilot. Sergei Korolev – Soviet Space Programme's Chief Designer – had died of natural causes in 1966. USSR had lost their three major players – Korolev, Gagarin and Vladimir Komarov, in two years.The setting up of ARK Komarov illustrated an evolving Technical Culture, in the former Yugoslavia. A year following the start, ARK Komarov acquired use of workspaces in the Roška Towers, in Ljubljana, where wide experimentation into all kinds of model rockets was encouraged. Eventually, this evolved into the sporting

Fly for fun has always been an element of ARK Komarov's membership. Here we see some night launches on the Ljubljane barje, in the company of Joze Cuden.

pursuit of competition Space Modelling – which had only begun some three years earlier, at the novel Dubnicky

Slovenia's National Space Chmapionships in the 1970s. Plenty of nice scale models on show, with Joze Cuden the 'guy in the blue.

Maj inaugural event, in the former Czechoslovakia. The more 'academic' side of the new club was demonstrated when a newsletter focusing on kosmonautics and rocket modelling, called *Kozmoplov* was produced and published for members. Unhappily, this facility at

What ARK Komarov is best known for…the Ljubljana Cup end of season bash and those Gold, Silver & Bronze Ljubljana Dragons.

Roška was denied ARK Komarov a couple of years later and the club was – so to speak – 'on the road', as a result of national economic cuts and a reduction of the Technical Culture philosophy. In 1974, the first Championships of the Republic of Slovenia took place under the guidance of the novel *Commission for Rocket Modelling of Slovenia*, which had been set up under the stimulus of ARK Komarov. Model Rocket propellants became available from local Chemical Industries, based in nearby Kamnik, based largely on 'Stateside Estes' products. The design and production of model rocket kits soon followed, which led to public demonstration launches of 'show rockets' and rocket competitions, based on flight duration. This catalysed the setting up of more rocket clubs around the nation and things got bigger. Naturally too, in the mid-1960s, Federation Aeronautique Internationale's (FAI) Aeromodelling Commission (CIAM) had introduced contest rocketry - Space Modelling. The climax of these developments – local and global – resulted in the setting up of the inaugural *Ljubljana Cup* for space models, in 1978. In the popular cliché, the rest is history! Some years later, in 1981, in common with the rest of the world and the other republics of Yugoslavia, Rocket Modelling became recognised as a Sport by the national aeroclub – Federation of the Air Organisations of Slovenia (now called LZS). This very year a club member – the first Slovenian – visited Moscow, to the place where kosmo-nauts and internation-al space travellers are trained. Shortly following, in 1984, on 8th February 1984 – Prešeren Day, *Soyuz T-10* flew into Space, mimicking the emblem of the ARK Komarov club. Much was happening in the 'Real World', especially in the land of the southern

Anton Sijanec has been the Contest Director at the end of season Ljubljana World Cups for longer than anyone can remember. Passionate ARK Komarov member and (very..) assertive when laying down the law!

ARK Komarov members are experts at launching and recovering….PORTALOOS! This is always the very last flight at every Ljubljana World Cup.

Slavs..**Independent Slovenia** ~ 1991 saw the 'Ten Day War', when Slovenia declared independence from a failing Yugoslavia…basically Serbia. More positively,

Slovenia declares independence in 1991, triggering the 10 Day War with Serbia. Bogo Stempihar's Renault tells it like it was.

1992 saw the assembly of an official Slovenian Space Modelling Team – based on ARK Komarov members – which participated successfully at the FAI World Space Modelling Championships (WSMC), in Florida, USA. Space Shuttle *Endeavour* – STS 47 - was launched from Cape Canaveral, one member of Endeavour's crew was NAR rocketeer, Jay Apt.

First Book published.. ~ the 1990s Club members contributed features to many journals, domestic and international. In addition, Slovenian involvement in symposiums and conferences was very strong. Co-founder of ARK Komarov, Vojko Kogej, penned two widely published features focusing on the deadly risks of sending humans out of their planet's orbit and into the Universe.

Raketno Modelarstvo, by Joze Cuden and Rasto Snoj,, was the very 1st book published in an independent Slovenia in 1993. The TIM journal is put together by Editor, Joze Cuden, as his 'day job' and published around the southern Slavic states.

1993 saw the publication of the very first book in an independent Slovenia, *Raketno Modelarstvo*, by Jože Čuden & Rasto Snoj…a stellar publication. Slovenian NASA astronaut, Dr Ronald Sega, revisited his homeland and called on ARK Komarov, presenting the members with a NASA memorial plaque. Now, a lifetime Club member.

World Champs Hosts ~ Slovenia was awarded 1996's *11th World Space Modelling Championships*, amazing for so young a country. The Champs attracted some 24 nations, 400 participants, judges & officials…just fantastic. This event was hosted on Kamniško-mengeškem polju, a flood plain between the Julijana Alps, near Kamnik and Mengeš. A super site that has hosted the Ljubljana Cup ever since, with accommodation shifted to dom v Kamniska Bistrica, in the mountains nearby. Club members have liaised individually, or collectively, with full-size Space experts from Russia, USA, Poland, Germany et al. 1997 saw the first Slovenian visit the *RKK Energy Museum*, at Koroljov near Moscow – named after the great man, where original spacecraft of the early kosmonauts are exhibited. November 1999 saw ARK Komarov members participate in the International Students' Conference; called *Promise Baikonur*, at the Baikonur Kosmodrom. 2006 saw the World Championships for Space Models hosted there, with Slovenia and ARK Komarov featuring strongly.

Interkosmos-the world famous motif of ARK Komarov's rocket club.

Moving on.. ~ The achievements of ARK Komarov members at World & European Championships, over many years have been fantastic – 11 medals total – plus innumerable World Cup awards. But the Club has never been just about contest FAI Space Modelling, fly-for-fun rockets and High Power Rocketry (HPR) have featured throughout, not least at the end of season Ljubljana Cups. The Club has always encouraged the genesis and development of similar organisations, in other regions of Slovenia, which explains why the interest is so strong in this nation of ~2 million inhabitants. In 2008, members came up with a high flying rocket, with a home designed motor,

Cool collection of scale models at the Technical Museum of Slovenia, in 2009. Note the paintings by Soviet kosmonaut, Alexei Leonov and artist Andreja Sokolova, some real talent on show.

Super Ariane L-01 atop the souvenirs accumulated by ARK Komarov members over several decades.

which boosted to 4,500 metres, with an electronic payload.

2009…to the Now ~ Club members put together a display for the Technical Museum of Slovenia, in Bistri. A comprehensive array of scale models, space artefacts complemented the amazing artistic works of Soviet kosmonaut, Alexei Leonov and artist, Andreja Sokolova. Your scribe attended and contributed to this exposition, in the company of a large number of visitors. The Club was

Super artwork by Alexei Leonov and Andreja Sokolova in the Technical Museum of Slovenia, back in 2009. Creative imagination plays a big part in Space travels.

moved out from the flat at Tržaška ulica few years ago and once more temporarily without a base. These days, ARK Komarov runs model courses for youngsters at a location in Mencingerjeva ulica, hired weekly during the schoolyear.

Flashback ~ 2019's 41st Ljubljana Cup will be your scribe's Silver Jubilee 25th visit! Things have just continued to get bigger and better…especially the World Cup Finale, every October…novel accommodation at the Terme Snovik health spa has been introduced, in a different league to the 1990's Gostilna Jelen. Oh yes, Gostilna Jelen's friendly and convivial host has recently undergone a long prison sentence for the brutal murder of an associate! Awards continue to come in, including the *Ljubljana Centre Award* – 1990; *Soviet Diploma of Juri Gagarin* - 1996; plaque of the *Space Agency NASA; FAI Honorary Diploma* – 2008; *Diploma for the development and dissemination of Rocket Modelling Sport in Russia* – 2008.

Congratulations are to be offered to Jože Čuden and Vojko Kogej – two young teenagers, who in their wildest dreams could not have imagined what their passion was

Technical Museum of Slovenia, at Bistri, featuring rocket models by ARK Komarov members. Co-founders of the Club, Joze Cuden and Vojko Kogej check out the exhibits, in 2009.

going to achieve. All the other ARK Komarov members too, including Tomislav Kogej, Miha Čuden, Anton Sijanec, Ivan Turk, Drago Perc, Ales Musec, Aljosa Znidarsic, Bogo Stempihar, plus many others. Viva Vladimir Mikhailovich Komarov.

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RADU Ioan N : *Half a Century of World Space Modelling,* 2012

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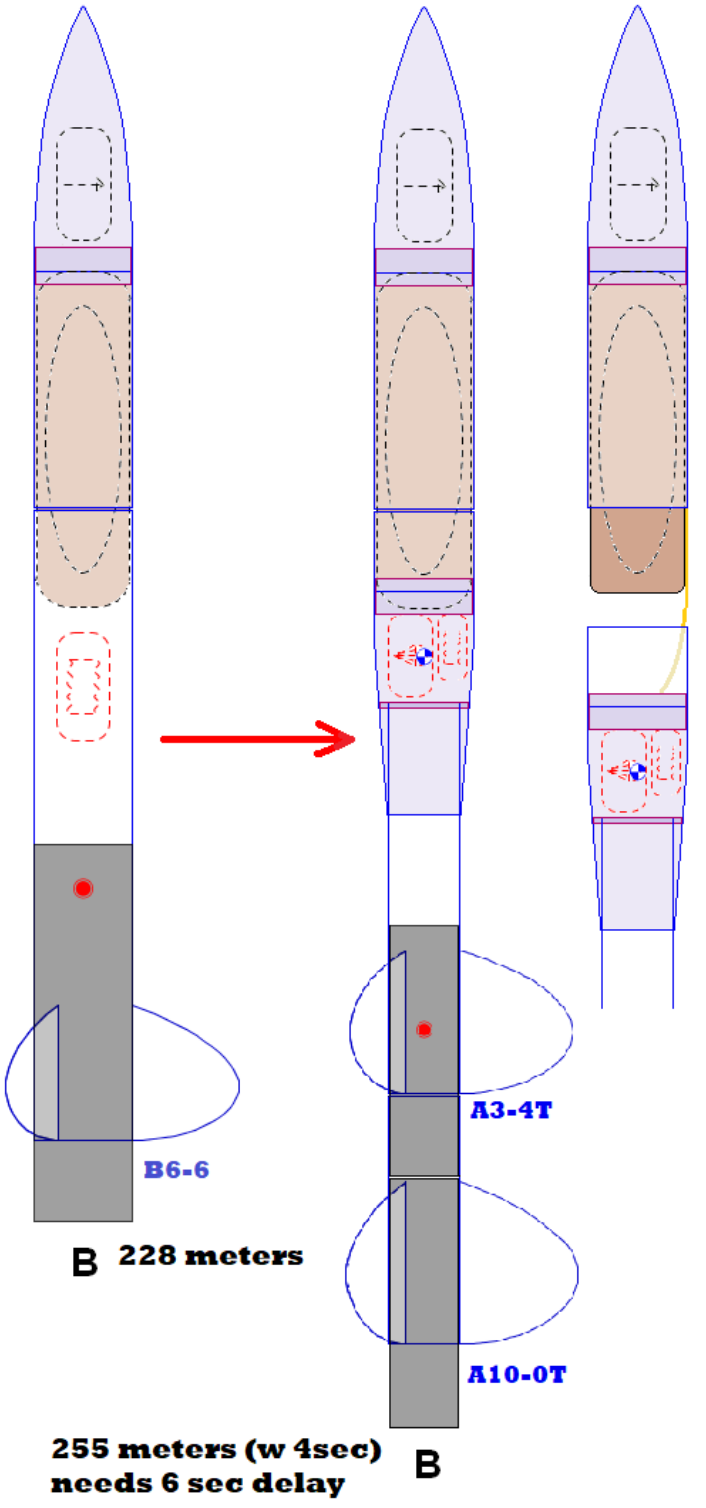
Stuart Lodge

B-Payload Model with Apogee Parts

By Dr. Bob Kreutz

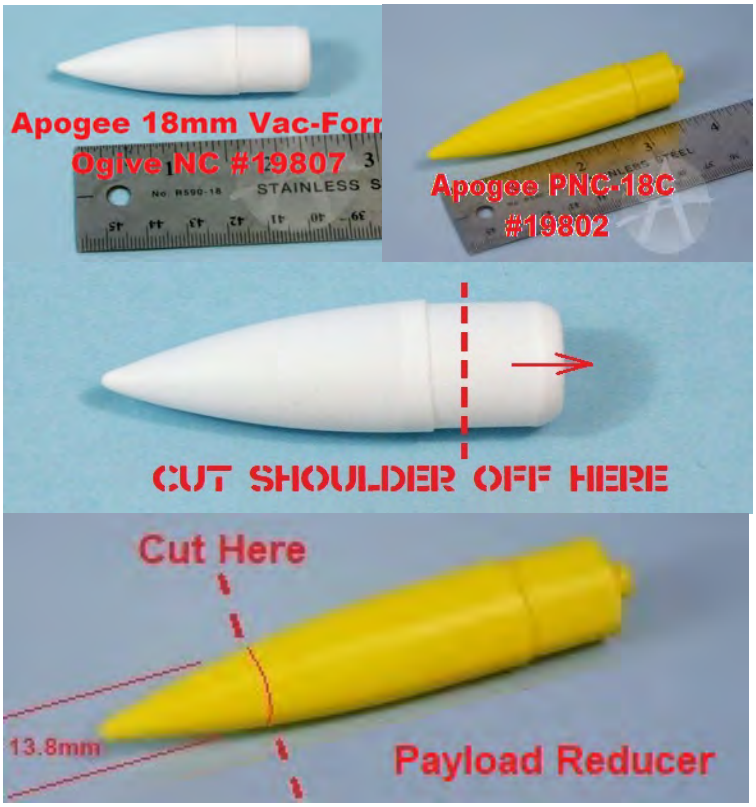
B-Payload Altimeter Altitude is one of this years NRC events. Presented in the May-June 2018, #209 issue of the Launch Rack was the article “Winning Altitude ...or How I Do It” which described strategies for flying NRC Altitude events as a primer. Lets look at designing a model to fly this event (short of using fiberglass molding), competition strategy and expected results. The option is flying a single stage 18mm model with a B6-6 vs a two stage 13mm model with an A10-0T/A3-4T combination.



Simulation software gives a small advantage to the two-staged B impulse Payloader. But any advantage is good in this event. I say a “small” advantage because NRC is limited to currently available motors and we are also limited to the Estes A3-4T as our sustainer motor. The optimum delay on this configuration is 6 seconds, but the A3-6T which is no longer contest certified and limited availability.

The key to building this payload model is to keep things absolutely aligned and finish all interfaces between parts glass-smooth. This will reduce drag and let you optimize performance with the shorter delay time.

Unique to this design is the fact that there is no tube coupler or bulkhead between the payload section and the aft motor/recovery section. The aft end of the payload itself, serves to mate the two parts. The payload is held in the model using the **Reverse Tape Technique** described in its own article. Apogee carries the 2 nosecones required in the design. Both are modified.



The “build” on this model will require fabricating a few “alignment jigs” (basically, some longer tubes or dowels to help insure arrow-straight concentricity of adjoining parts) but is otherwise straight forward and self intuitive.

Note: length of the payload tube is variable – it all depends on the length of <u>your</u> standard NAR Sand Payload that you prefer to use. Once you select your payload – design the payload bay around it!

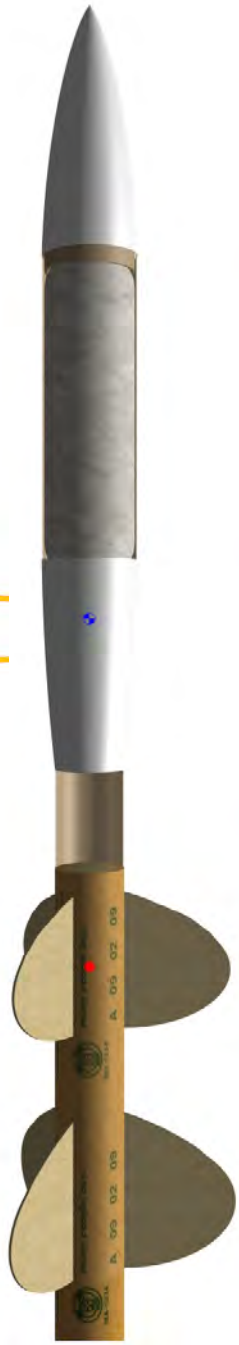
As I've always said, start with the nose. We are using an 18mm Vac-Form Ogive NC nosecone from Apogee #19807. The hollow styrene cone has room for a small altimeter, just pad it with cotton (cotton ball). It is also light weight and anything we do to reduce weight helps. But, if you leave the shoulder the length it comes, you have to increase the length of the payload tube so it will fully insert, then carry that

additional mass aloft. So, cut it off so it protrudes approximately 1/8". If you want to save the shoulder, simply make an inside ring out of index card stock to serve as your shoulder. You need only a short length here because we are gluing it permanently to the top of the payload tube and finishing the outside surface joint smooth with scratch filling primer paint. DON'T FORGET – you need to anchor a shock line to the payload section and there isn't much room. How? Simply loop the end of some 50lb Kevlar cord around the shoulder before you glue it in. The doubled loop will not give you 100lb test line but the doubling will make your payload lanyard stronger, without

having to use real thick 100lb Kevlar. Be sure the lanyard loop extends at least an inch, or two, below the bottom of the payload. You will connect your recovery system to the bottom of this loop.

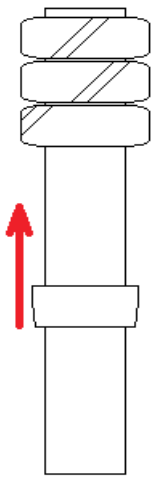
Assemble the nose and payload tube, then test fit the payload holding the lanyard taught. You want the payload to protrude from the bottom of the payload tube 3/4". Be sure your payload tube is cut off true and even. Use a tube cutter like the Estes Tube Marking Guide #002227. Save the section you just cut off, it will be used to mate with the payload section as part (the very top) of the lower sustainer half. Mating two tubes cut apart from each other will align better than trying to even the ends of two random tubes. Trim this payload bottom tube to 1". Remember this will be the top of the sustainer bottom and where the payload will rest. The payload actually becomes the shoulder of the upper (payload) compartment.

The "transition" from 18mm down to the 13mm motor section is streamlined by cutting down an Apogee PNC-18C #19802. Before gluing - cut the shoulder off with a razor saw so that 1/4" remains protruding. Thin the inner wall with a Dremel tool or files so that there is no inside lip of shoulder plastic at the bottom border. Excess plastic here will cut down on available space for recovery and the lip could hang up any recovery device upon ejection. Tie the end of a 3 to 4 foot length of 50lb Kevlar around the shoulder section. Glue the shoulder into the cone. Run the Kevlar shock line through the inside of the 1" top section of your "transition" then glue it onto the cut down shoulder.



Now comes a tricky part. The tip of the PNC-18C is cut off at exactly its 13.8mm diameter. Determine this by wrapping a 13mm tube with a piece of printer paper. Tape it so it doesn't unravel but can slide along the length of the tube. The inside diameter of the (outer) rolled printer paper tube IS the outer diameter of the 13mm tube – this is what you want!!! Slip the end of the combined tubes over the cone tip so the printer paper tube touches the wall of the cone. Scribe a line around the circumference at the edge of the printer paper tube. This is your cut line. Then again, with a Dremel tool or file, bevel the inside of the cone so the 13mm motor tube will slide inside.

Next, we must align the motor tube in the transition cone. It will be glued only at the top centering ring and cone bottom with 5 minute epoxy. Peel the outer wrap of an 18mm engine block so it will fit inside the wide, upper end of the transition to make a smaller sized ring. Sand the bottom edge so it will conform and fit tightly inside the transition cone about half way down. Next, slide the modified ring on to your 13mm motor tube, and 3 regular sized engine blocks on top of it – do not glue. This will serve to center and align the motor tube. Spread epoxy inside the cone where the small ring will rest. Insert the ring alignment jig until it is seated, even with the top of the payload tube. The ring will slide along the jig once it hits the side of the cone and embeds in the epoxy. Remove the jig once set. It is then possible to glue in the motor tube and it should be properly centric and aligned. Finish by assembling all tubes and smoothing all joints. Add thin fins to the model (fiberglass sheet, carbon fiber or 1/64" plywood) and fillet. Secure the motors and payload with the reverse tape technique and - post your NRC score!



TECHNO-FILES

HAND TRIMMING OF COMPETITION BOOST/GLIDERS

by David B. Newill

This article originally appeared in the May 1973 issue of “Model Rocketry Magazine."

DAVID NEWILL, NAR 6739, is an Air Force lieutenant. He was stationed in Lubbock, Texas in 1973, where he flew a T·38, known as the "white rocket". Dave had been the "Model Rocket Tips" Editor for the MODEL ROCKETEER since December, 1972, and he was especially interested in gliders.

(The following article was written to assist both beginning and "expert" rocketeers who find trimming of Renger or Pop-Pod gliders of standard airplane configuration difficult.]

Due to the challenge of skilfully constructing a glider that can both fly well at low gliding speeds and stay together at high launch speeds, the BIG event is one of the most exciting areas of model rocket competition.

This article is the result of seeing numerous B/Gs death dive, graveyard spiral, stall, and spin, even though the owner followed the directions carefully. The steps that follow are similar to those used in trimming hand-launched gliders (Fig. 1)-an initial trimming in good conditions, a side arm throw to observe the glider for a longer period of time, and 'day-of-contest' trimming.

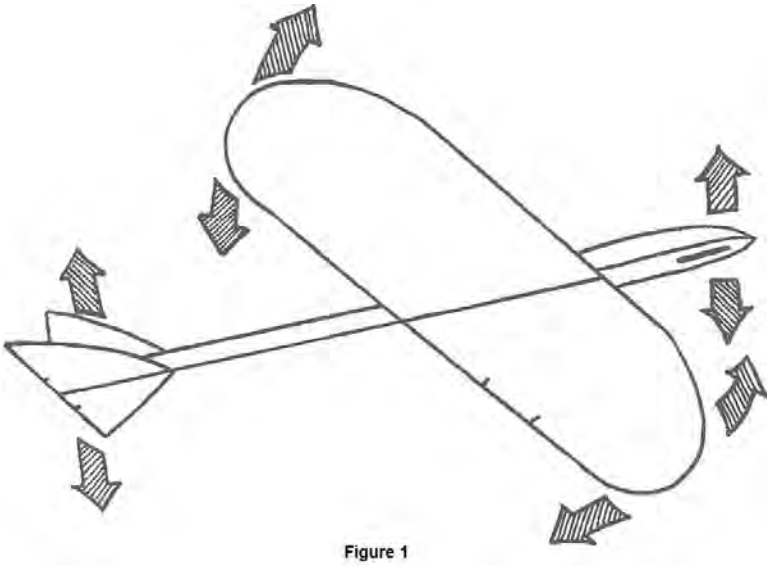


Figure 1

For the initial trimming session, locate a large flat grassy area during a calm day with no thermals. A football field will satisfy the first requirement and flying during the early morning or late evening should satisfy the second in most cases. The field should have as few obstructions as possible to prevent damaging the glider. The weather is important, as even a small breeze or thermal can easily take a glider out of sight-something that should only happen in a contest.

With the site and weather taken care of, begin to trim the glider in pitch by holding the wing tips by the tips of two fingers (Fig. 2). Add clay to the light (high) end or trim wood from the heavy (low) end until the flat bottom of the wing is horizontal. Now balance the glider in roll holding the nose and tail between your fingertips (Fig. 3). The glider will usually be upside-down now. Add clay to the higher wingtip until the wings are horizontal. The glider is now ready for a test flight.

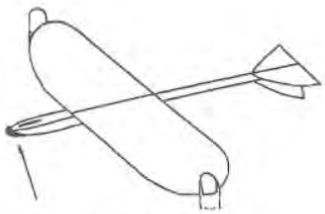


Figure 2

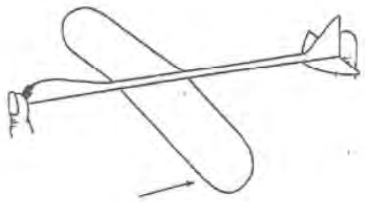


Figure 3

Holding the glider below the trailing edge of the wing, give it a slow straight push toward the horizon. The glider should fly in a straight line and land about twenty feet in front of you. If it falls short of this, use the following list for corrections (Fig. 4):

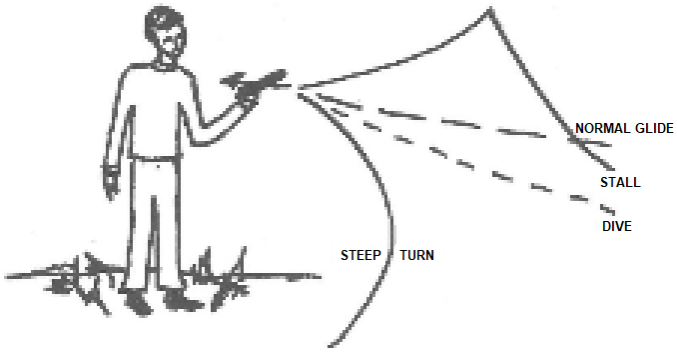


Figure 4

Stall- The glider climbs sharply then dives sharply. Add a small amount of clay to the nose and continue test gliding until all traces of the sharp climb are eliminated.

Dive-The glider noses down rapidly. Carefully using a sharp knife, cut two 3/8" slits where the elevator is glued to the body forming two trim tabs (Fig. 5). Moisten the tabs and warp them up 5°. I f this does not stop the dive, begin to trim some weight from the nose until a stall appears. Add a small amount of weight to the nose, and the glider is trimmed.

Steep turns-The glider turns rapidly and spirals quickly to the ground. Add a slight amount of clay to the outside wing.

Rolls- The glider spins about its long axis. Cut a trim tab into the wing that begins to go down at the start of the roll (clockwise roll-right wing). Moisten, then bend this tab down until the roll is gone (Fig. 6).

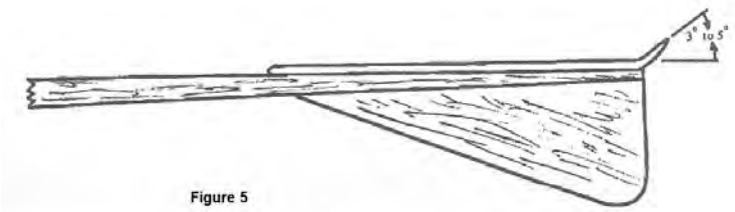


Figure 5

Once the glider achieves a flat slow glide in either a straight line or a very slight turn you are ready for the second step.


Figure 6

(NOTE: If you are left handed please reverse all of the following instructions describing the side-arm throw.)

Place the index finger of your right hand against the point where the trailing edge of the right wing joins the fuselage. Grasp the glider body under the wing with the thumb and middle finger. Now using a hard side-arm throw fling the glider with a lifting motion so that it turns away from you in a tight clockwise turn (Fig. 7). If the glider rolls rapidly to the ground try the throw again by placing the finger on the left wing-body corner. The glider will now climb in a tight turn away from you. As it reaches the peak of the climb, the glider should begin a slow glide similar to that of the initial trim glide. If it does not then make the necessary corrections as listed before. At least twelve test glides are necessary to fully trim the glider for maximum performance.

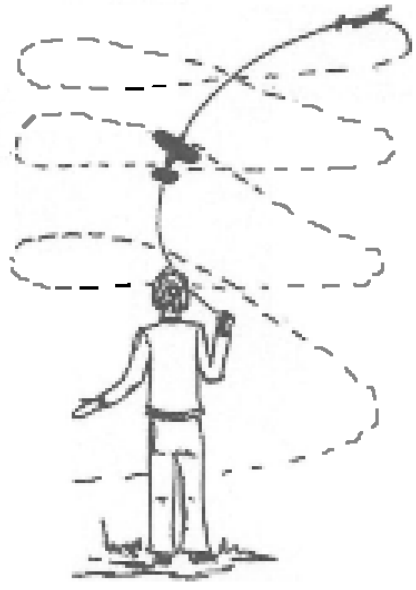


Figure 7

On the day of the competition make a quick side-arm throw just before launch to adjust the glider for the weather conditions. In general, for winds or light rain you will need nose weight. On days with thermals, use some wingtip weight so that the glider will ride the thermals in a large circle.

Although a good deal of luck seems to be included in BIG competition, the author has proven the validity of these basic trimming steps at meets throughout the country with consistently good results.

KEVIN MCKIOU'S GLIDER TRIMMING TIPS

Trim the elevator so the glider *just* will not fly in a straight line without stalling, no matter how slow you throw it. Remember to always toss it at a point on the ground about 20 feet in front of you.

Now you want to induce a turn. Add about 10 degrees of horizontal stab tilt to the right to induce a left turn. Add about a half gram of clay to the left wing tip to get the turn started. Give it another slow toss slightly down. If it glides into a left turn that is pretty flat, you are very close to perfect. If it turns too fast, remove to tip weight. If it won't break into the turn, add a touch of left rudder.

Time to throw it. Throw it up at about a 60 degree angle and tilted slightly to the right. It should arch up, go briefly inverted at the top and roll out in the opposite direction from which you threw it. Give it a real firm throw.

If it kind of slid up and did not arch back, you have the CG too far back. Add half a gram of clay to the nose and go back to step 6.

If it definitely looped back on you, try again with a throw that is a little more horizontal. If you just can't get much height because it wants to loop back (usually into the ground), the CG is too far forward. Remove a bit of nose weight and go back to 6.

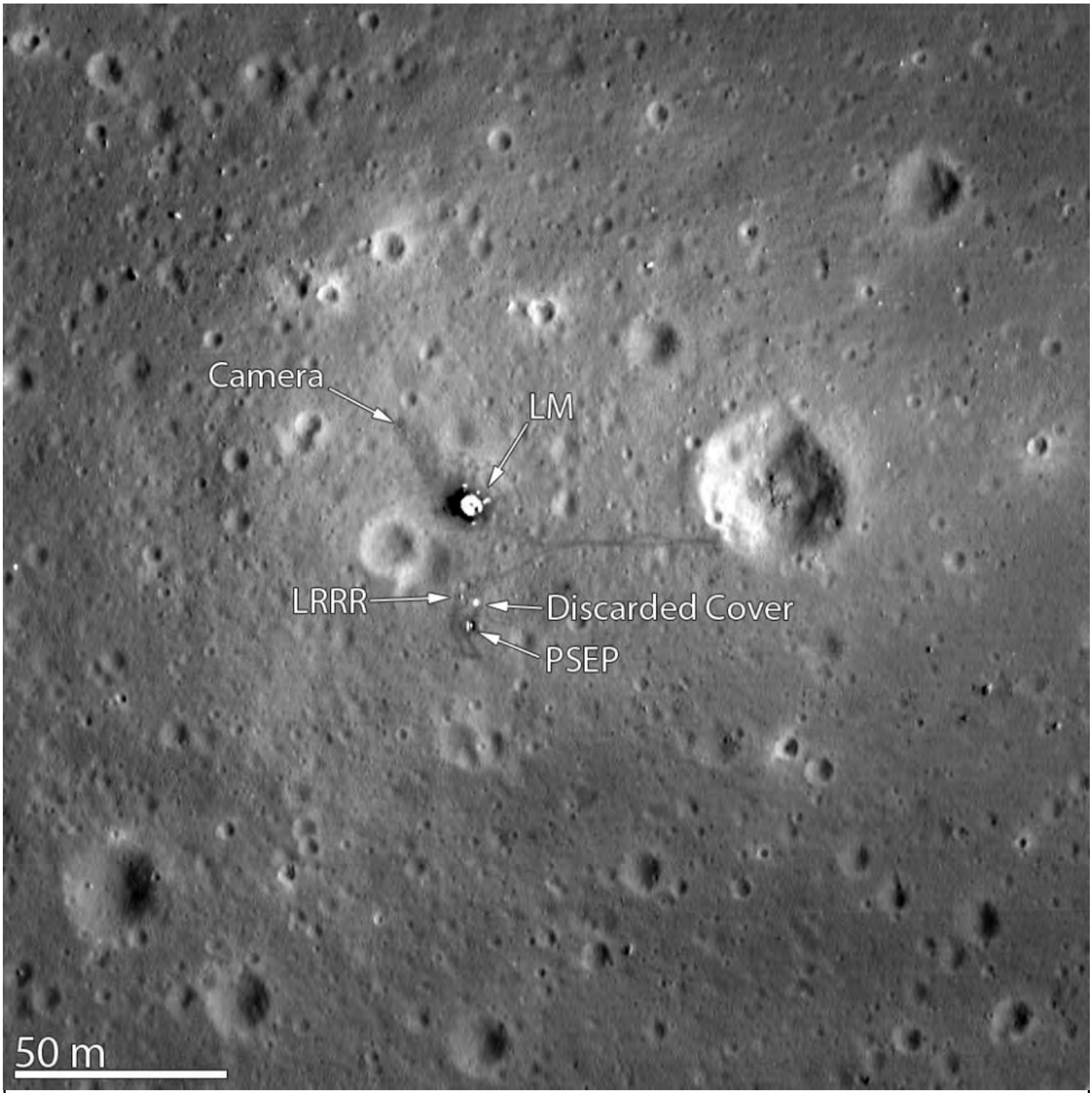
If it seemed to launch OK and pretty much stalled at the top with a really slow roll out, add just a bit more weight to the left wing tip and/or a touch more left rudder.

The glide after HL should be a big gentle circle to the left. If you are not getting a turn, but the launch looks good, give it a bit more left rudder. That should help it into the turn. If the model tends to glide too fast in the turn, add a bit more up elevator. If it seems you just can't get everything working quite right between the launch and the turn (e.g., glides fine, but wants to loop on HL) add wash-in to the left wing tip. That is, bend the trailing edge down on the outer 1/4 of the left wing. Now, as the speed builds, the lift of the outer portion of the left wing increases more than the rest of the wing and forces it to straighten out the glide a bit, slowing it down. As the model slows, the wing tip weight and rudder will tend to turn the model back into the turn. Now you can back off a bit on the elevator. Use this sparingly. You can over do it and cause the model to tip stall. If the glider builds speed as it glides, with no real recovery in a second or two, the CG is very likely too far back. Add a half gram of clay to the nose and go back to the beginning.

That's about it. From this point, you will just have to try it, varying each of the parameters to get a feel for what works well. If you work this well, you should get very good hand launches and transitions to glide.

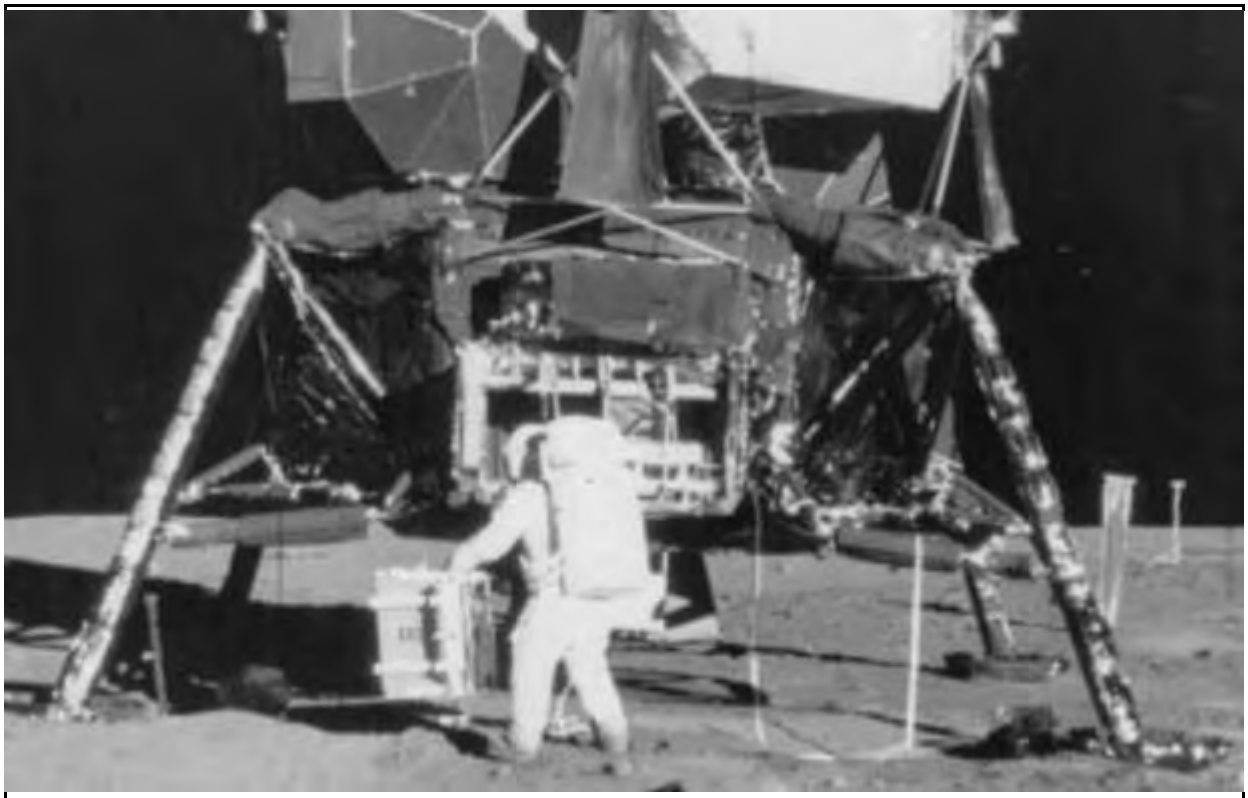
[Lackey's Note: These articles were in the Public Domain and downloadable from the NAR website. Small portions may have been edited to update availability of products and to correct links that may have changed since 1973. Pictures and diagrams were updated and we thank all those who have participated in keeping this article intact. Most all serious spacemodeling competitors have, or will use the info contained in these papers to strengthen their abilities and competitive edge.]

1st Footsteps Upon the Moon



The Lunar Reconnaissance Orbiter Camera snapped its best look yet of the Apollo 11 landing site on the moon. The image, which was released on March 7, 2012, even shows the remnants of Neil Armstrong and Buzz Aldrin's historic first steps on the surface around the Lunar Module

...Still a Tranquil Sea



Buzz Aldrin on the Moon with the landing vehicle Eagle. Photo / Herald archives/Universal Picture Press

The Eagle lunar lander leaving the Moon. Photo / Herald archives

Parting Shots - (or) - "Whasuup" in Space?

NASA names nine 'American hero' astronauts for SpaceX, Boeing missions

From left: Suni Williams, Josh Cassada, Eric Boe, Nicole Mann, Chris Ferguson, Doug Hurley, Bob Behnken, Mike Hopkins, Victor Glover (NASA)

In a move that NASA said marks the beginning of "a new era in American spaceflight," the space agency Friday named nine astronauts who will fly to the ISS aboard capsules developed and made by Boeing and SpaceX. The astronauts will be the first to launch from U.S. soil since NASA retired its space shuttle program in 2011. Some of the astronauts chosen, seven men and two women, are veteran spaceflyers, and some will be making their first trips to space. The astronauts were selected for test flight in 2019, and for formal missions to follow.

For the first test flight of Boeing's CST-100 Starliner capsule, NASA picked Eric Boe, a veteran of two space shuttle missions; Nicole Aunapu Mann, who became an astronaut in 2013 and will be making her first trip to space; and Christopher Ferguson, who flew on three space shuttle missions before retiring from NASA in 2011 and joining Boeing's commercial space operations division. For the first test flight of SpaceX's Crew Dragon capsule, NASA selected Robert Behnken and Douglas Hurley, each of whom made two shuttle flights. "The first flight is something you dream about," Hurley said.

For the first formal mission involving Boeing's CST-100 Starliner, NASA picked Sunita Williams, a former commander of the ISS who has spent 322 days in space, and Josh Cassada, who became an astronaut in 2013 and will be making his first trip to space. The first formal mission of SpaceX's Dragon capsule will be crewed by Michael Hopkins, who has spent 166 days aboard the space station, and Victor Glover, who was selected as an astronaut in 2013 and will be making his first spaceflight. Once the Starliner and Dragon capsules are operational, NASA will no longer need to rely on Russia's Soyuz rocket and spacecraft to launch astronauts into low-Earth orbit.

The Launch Rack

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This Box is NOT Checked…

You're Good!

So this is Not your last Issue