TOTAL IMPULSE

JACKSON MODEL ROCKET CLUB
JMRC HUVARS
HURON VALLEY ROCKET SOCIETY
TRIPOLI ROCKETRY ASSOCIATION, INC.
TOTAL IMPULSE VOLUME 23, NO. 5
FALL 2023

NATIONAL SPORT LAUNCH - EAST

OCTOBER/NOVEMBER SPORT LAUNCHES

EGGTIMER QUARK ALTIMETER

AIM-68 "BIG Q" SCALE DATA

THOY AIM-54C PHOENIX PLAN

CLUB OFFICERS

President: Scott Miller
Vice President: Roger Sadowsky
Treasurer: Tony Haga
Secretary: Buzz Nau
Editor / NAR Advisor: Buzz Nau
Board of Director: Al de la Iglesia
Board of Director: Dale Hodgson
Board of Director: Herb Crites
Board of Director: Fred Ziegler
Board of Director: Mark Chrumka

MEMBERSHIP

To become a member of the Jackson Model Rocketry Club and Huron Valley Rocket Society means becoming a part of our family. We have monthly launches and participate in many educational events. We encourage our members to actively participate in our club projects, running for office in our annual elections, contributing to our monthly newsletter with articles or tips, and offering services to the club in their area of expertise. We have many members comprised of children, men, women, professionals, lay people, educators and people from many other walks of life.

You may fill out an application at a launch or request an application from one of our board members at scott@sfsmindustries.com and mail it along with a check for the annual membership dues ($30.00 individual or $40.00 family) to our mailing address:

JMRC/HUVARS
C/O Tony Haga
711 Wilwood Rd
Rochester Hills, MI 48309

Members enjoy participating in club projects, meeting an incredible group of positive people, and no launch fees!

COMM CHANNELS

There are several ways to keep in touch with the JMRC/HUVARS and it's members.

Website: http://www.jmrconline.org. Information includes directions to launch sites & schedule, range procedures, and instructions on how to join the club.

Groups.io: The JMRC groups.io site is a place to share files and also serves as our primary e-mail list serv. Follow this link to join, https://groups.io/g/jmrc

Facebook: If you have a FaceBook account search for "Jackson Model Rocket Club JMRC" and request to be added.

GroupMe: Our new chat channel for broadcasting notifications instantly using a free download client for IOS and Droid as well as by SMS text messaging. You can join the notification chat after creating a free account and following this link,
https://groupme.com/join_group/28013422/zc5IC1

EDITOR'S RANGE BOX

Welcome to the final issue of Total Impulse for 2023 as we close out the year. You may have noticed that this is labeled the Fall issue and that there wasn't an issue for September/October. It was a case of very little news and content at the time. A Fall issue was able to include the last two sport launches of the year as well as coverage of the National Sport Launch.

The hoped for December launch was not possible, but your BOD spent that day meeting to discuss club business. In addition to finalizing the club bylaws we also conferred on the winter party, a YouTube channel dedicated to club activity, and strategies to get back to Grave's Campground at the Michigan International Speedway. That last item isn't in the Club News because there isn't anything really to report yet, but we're hoping to have some news early next year.

vNARCON 2024 is almost here and three club members are presenting. President Scott Miller will give a presentation on his "Screw it, Fly-it" series of 3D printed rockets. Al de la Iglesia, the National Contest Chair, will host an open discussion on competition rocketry, and your editor will present how to publish a digital newsletter. If you haven't attended vNARCON it is well worth the price of admission. For $25 you get to choose between dozens of rocketry topics to attend virtually and will have access to all session recordings.

Finally, we are always looking for newsletter material. Product reviews, kit builds, any kind of plan, event coverage, projects… anything rocketry and aerospace related has a home here. You can always send material to the editor at pics@jmrconline.org or my address, ussmidway@gmail.com. You are welcome to reach out to me if you have an idea to discuss. I'd love to hear from you!

Table of Contents:

Launch/Event Calendar - 2023

- We are done for 2023. Stay tuned for the 2024 flight schedule!

NOTE: Launch dates are subject to change without notice. Be sure to call the "launch hotline" at 517.262.0510 for the latest weather and field information or sign up for the JMRC Notification GroupMe chat.

PRESIDENT'S CORNER

Let's assess our situation on my perspective of the club's financial health. With our new reference point of pre/during/post COVID lockdown I'll stick with those labels. Pre-COVID we were doing well in terms of launch turnout and financial stability. During covid we were essentially sitting duck's and minimized our spending since we had virtually zero income. However, thanks to the healthy status of the club we were able to weather the storm.

On to Post-COVID; our ramp up met some struggles but the club banded together and persevered. While our bank account is not what it used to be I can honestly say I'm not concerned at all. 2023 held a pretty full launch calendar, that is when mother nature treated us well. Anytime we can gather as a rocket family is a success regardless if any rockets ever fly... not to say there were some impressive flights!

As for my lack of concern on financials is because we have a three part strategy in play. Step one, have a strong Treasurer with a verboten stamp to slap our wrist anytime we want to overspend. Step two, host launches as often as possible and I'm confident 2024 will have just as many if not more than this flying year. Step three is to start back up our annual party and club elections. Historically our parties were an excellent time had by all and with the raffle and auction it turned into our best fund raiser of the year. Mark February 3rd on your calendar, our party is a pot luck and open to anyone that wants to come. More details will follow shortly.

I want to thank the BOD for all of their time and effort to keep this club trucking along as we close in on three decades. I also appreciate everyone that comes out to our launches... flyers, spectators, and all types of support is what makes the hobby unique and great. I hope everyone has a great holiday season and comes back in the new year with lots of new projects to fly!

About Total Impulse

Total Impulse is the official newsletter of the Jackson Model Rocket Club (JMRC), Tripoli Prefecture 96, NAR Section 620. Published Bi-Monthly, *Total Impulse* is a space-modeling newsletter devoted to representing the diversity of interests in today's hobby of model rocketry.

The editor of *Total Impulse* accepts material for inclusion from anyone.

Send correspondence to:
Jackson Model Rocket Club
Buzz Nau, Editor
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On the Cover:

(Main Photo) Tony Haga's Flame-On! lifts off at the National Sport Launch in Pence, Indiana on a CTI K600. (Inset) Tony Haga with his Stoichiometric at the National Sport Launch. It flew on a Loki N3800, the largest motor flown at the event.

LAUNCH REPORT

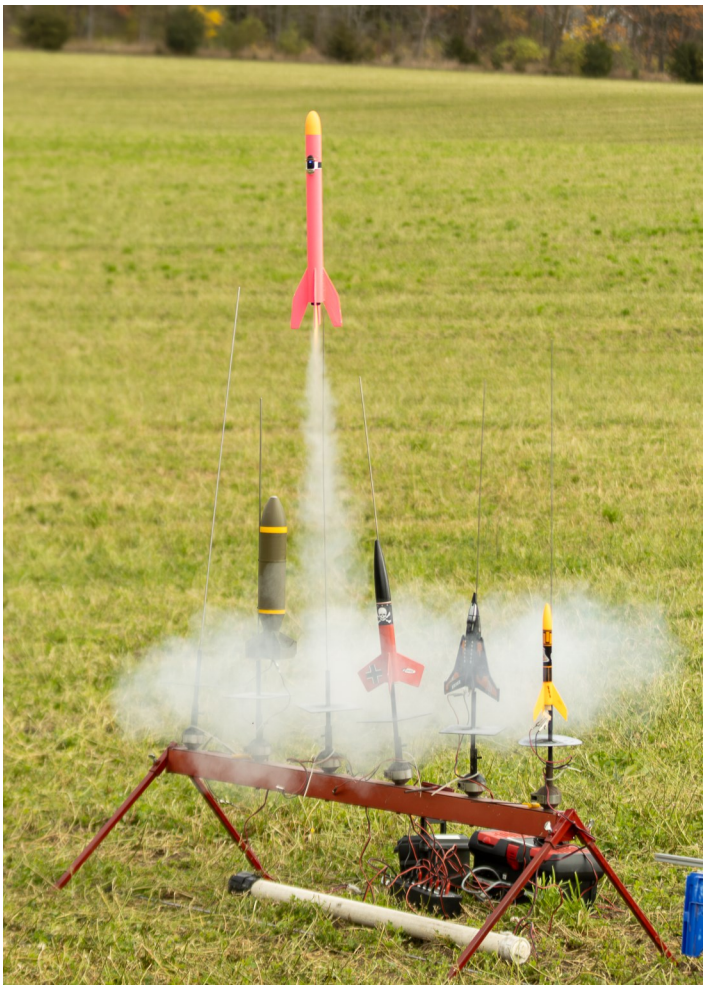
OCTOBER SPORT LAUNCH

28 October 2023 - Horning 1 Field Buzz Nau

Autumn weather in the Midwest is anything but predictable and nice days are few and far between. The forecast for October 28 was not promising, but it ended up being a decent day. It wasn't ideal as it was a little chilly and breezy, but flyable. The bleak forecast probably had a lot to do with the launch turnout. There were only 36 flights by 9 fliers, but we did see several new people and anytime there are new faces, it's a good launch.

The top flier of the day was Mark Chrumka with eight total. His upscale Nebauer Rockets Orion II flew great on a CTI E31, as well as his Dual Deploy Test Rocket, Hawks Hobbies Super Sprite on an Estes E9, and QModeling Nike-X. Mark encountered bad luck though, mainly with some 3D printed models. His 3D-printed Gemini Lunar Lander went unstable on a D15, the 3D-printed Ram Jet had a deployment failure, but the 3D-printed Bomb Rocket, modeled after a WWII 500lb bomb flew great.

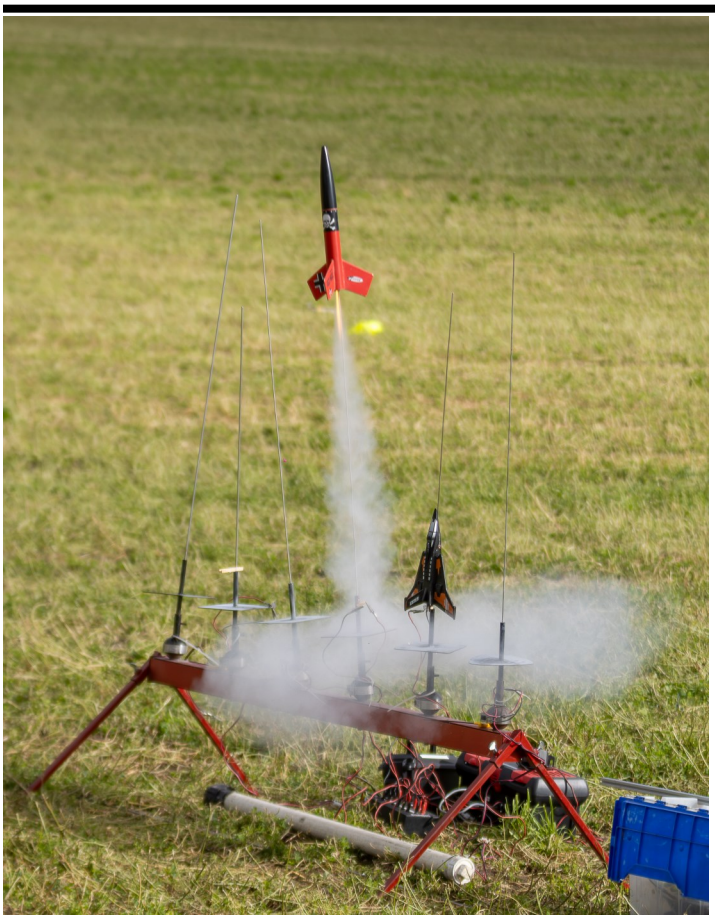
Buzz followed Mark with five flights. His notable flights included a Big Bertha on a C6-5, upscale Centuri Vector-V on a C11-5, and Estes Astron Farside 3-stager flying on an A8-0 to A8-0, to A8-5 combo.



Ryan and Alexa Woodz' Big Bertha

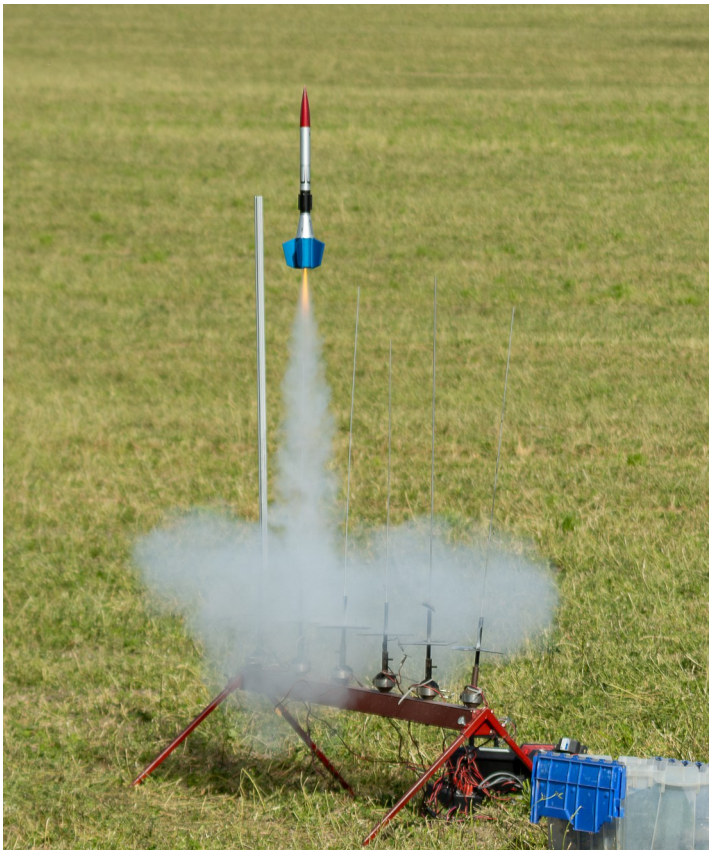
Mark Chrumka's Orion II

Alexa Woodz and Mark Chrumka at the LCO table



Al de la Iglesia's Der Red Max

Yitah Wu's Two-Stage Maxi Alpha



Buzz Nau's Upscale Vector-V

Several fliers had four launches. Herb Crites had two flights of his Mach Schnell SLK 54, once on a Loki H160 and again on a Loki H125. He also flew the SLK 75m twice, on an AT I1299 Warp Nine and a Loki I430 Blue. Yitah Wu flew a scratch-built staged Maxi Alpha on a D12-0 to D12-7 and a large scratch-built MX774 on an E9-6. He also put up a V-2 on an E9-6 and chad-staged Screaming Eagle.

Corey Luedemann and his friend Ryan Rosenau flew with us for the first time and put up four flights. Corey flew his Star A several times on an A8-3 and C6-7's. Also making it out for the first time, Garret Ernst flew his ESAM-58 several times and Hi-Flyer once on an E12-6. Ryan Woodz and daughter Alexa had three flights including their Alpha III on an A8-3 and Boosted Bertha upper stage only, so a Big Bertha.

Al de la Iglesia flew three classics, an Estes Scout Ship Nova on an A8-3, original Der Red Max on a B6-4, and old school Big Bertha on a B6-4. Elsewhere in this issue is Tony Haga's article on building and flying the Eggtimer Quark altimeter. He tested it out in his Patriot on a G79 for the apogee deployment and a Jolly Logic Chute Release for the main deployment. Tony also CHAD staged a Snitch with a D12-0 to a B4.

Thanks to everyone who came out to fly and help with the setup and teardown. The end of the flying season is approaching fast and it was good to see fliers taking advantage of one of the last opportunities to fly in 2023.

Al prepares his Der Red Max and Nova Scout Ship

Mark Chrumka's Super Sprite

Mark Chrumka's Gemini Lunar Lander

Ryan and Alexa Woodz

Buzz Nau's Astron Farside

VIEW FROM THE FLIGHT LINE

The Best Laid Plans……

DALE HODGSON

Well, I've been back from the NSL in Pence, IN for a couple of weeks now. The field is outstanding; lots of room to fly and recover. Our hosts were very nice and ran what I would call a smooth launch. There was little wait getting a project cleared for flight and it always seemed that there was a rack of pads open. Plenty of vendors were on hand as well; I felt a bit like a kid in a candy store. Lots of stuff to look at and browse through…you know; just in case I saw something I really, really needed (aka wanted, whether needed or not).

Getting ready for this launch seemed to be a little different for me; I likened it to a football team getting ready for an away game. No homefield advantage and things were managed just a bit differently. Not badly mind you; just different.

Besides, after hearing about the weather forecasts beforehand I was prepping to fly big. At first, I thought maybe an L or an M to start things but when I fly stuff that big and complicated that's all I usually do. I wanted to do a little more so I dropped down a notch. I had some Loki and J and K moonburners available as well as a couple of CTI J Mellow reloads and those who know me well know how much I love flying long-burn motors. Once I decided on motors, I prepped the appropriate rockets to fly them. I had thought initially I would just take the stuff that I do not get the chance to fly much (except at Muskegon) but just in case I would take something a bit smaller so I would at least be able to get something in the air. Altimeters were prepped, igniters were dipped and rockets with all the necessary tools were loaded. The thing was; once I left my house on Tuesday (the launch wasn't until that Friday) there was no going back. I had meetings in Michigan on Tuesday through Thursday morning so I decided just to make it one big, long trip. After the meetings were over, I decided to swing by Scott's house to pick up some supplies….meaning big igniters for big motors (he also supplied some smaller igniters to try out a new dip he's been working on) as well as a couple of motor cases.

By the time we got to the field on Friday morning the weather forecast changed a bit. Temps and visibility were good but the wind was out of the west and fairly strong…stronger than we were comfortable flying in. The only downside was that when the winds come from the west there are wind turbines under a mile from the range. Anything going very high had a good chance of making it that far. A couple of folks decided to chance it and fly some high-altitude stuff. I don't know if any made it to the turbines but one of the RSO's told me it has happened in the past and that any rocket making it to them was basically hamburger. So, we spent the day volunteering to help set up the range and serve as spotters and pad managers. The help was appreciated by our hosts, which was a good PR move for us as a club. We set our sights on Saturday, which was a great call because it was a much better, and busier day. I won't go into the flights themselves; I'm sure those will be described in detail in the event article, but I will say there were some good ones. I had planned on flying a K350 but when I tried getting the case into the motor tube it wouldn't get past the rear thrust ring on the case. Normally I test fit everything beforehand, but I didn't have the case at home during prep. So, I had to improvise and pretty quickly. Thank God for the vendors; I was able to get a smaller motor that fit and flew the rocket. The only issue is I now have a big K to fly later on. I later found out that there was either a small size difference in the rear centering ring (it was a Kosdon case rather than a Loki) or a slight mis-fit with the motor retainer because of some built-up JB Weld at the retainer/motor tube joint. I didn't assemble that part of the rocket; I obtained it from Chris Palmer a few years ago. I believe the retainer he used was an older style that has since been changed to better accommodate Loki/Kosdon cases. No matter, I'll have everything corrected by the time we either go back to Pence or fly at Muskegon. I was disappointed to say the least and when I have an issue like that I must step back and regroup. I served as ground support for Tony, Herb, and Buzz who burned some major amounts of AP (N, M, and M respectively) and I was content with that.

Sunday was a nice day as well and a little breezy, but at least the winds were carrying everything from the south(ish) so the wind turbines weren't an issue. I got two flights in, one on a G and another on a J Mellow. Two good flights; everything nominal. Not exactly what I had planned on for the weekend but I was able to adjust enough to be able to get projects airborne.

Continued on page 13

LAUNCH REPORT

NOVEMBER SPORT LAUNCH

4 November 2023 - Horning 1 Field Buzz Nau

What a difference a week makes! Due to scheduling conflicts, deer firearm season, and the date for the National Sport Launch, we had to hold our November launch a week after the October launch. It worked out well because the weather on November 4th was excellent! Winds were light and variable and the temperature wasn't bad either. Turnout reflected the weather as 16 fliers put up 72 launches for the day. It was also good to see many of the new faces showing up again.

Sport Flying

Tallying the most launches again was Mark Chrumka with 13. His Aerotech HV Arcas flew nicely on an F25-5 and he flew several multistage rockets including the Epic II and boosted Chiller. His Fliskits Deuces Wild lived up to the name with a wild tipoff due to motor ignition with one of the two C6-5s igniting late. Unfortunately, Mark continued his streak of bad luck with 3D-printed models. His Gemini Lunar Lander went unstable again despite adding even more nose weight. Likewise, Mark's 3D-printed Pershing 1-A went unstable. The most painful mishap was his QModeling Nike X suffering a CATO with an AT F44-4.

Next up with 12 launches, Yitah Wu flew a large assortment of his cool scratch-builds like the two-stage clustered "Pixel" on a total of 4 D12s. He also put in another successful Snitch Saucer with a small upper-stage rocket. Yitah also flew a D12-5 cluster in the "Broadsword IV" and a 2.6-inch diameter Der Red Max on an E9-6.

Mark Chrumka's AT Arcas HV

Ryan Woodz' clustered Boosted Bertha

Herb Crites got in 6 flights total, 4 with his Mach Schnell SLK 54m and a couple with the SLK 75m. Herb loves heavy-hitting motors and flew a couple of AT H250 Green Mojaves, an H999 Warp 9, and Loki H144 White in the SLK 54m. The SLK 75m flew on a Loki I430 Blue and AT I599 Warp 9.

With 5 flights, Buzz Nau gave Scott's latest 3D printed, Screw It, Fly It a successful test on a Loki G80. He also tested the altimeter bay nose cone using a Perfectflite Alt45K for apogee ejection. Buzz also flew his two-stage Super Stiletto on a B6-0 to B6-4, MRC Iron Man on a C11-3, and Estes Interceptor E on an AT F24-4. The Interceptor E suffered a fouled chute and slight damage from the hard landing. Ryan Rosenau and Corey Luedemann were back again. Ryan flew a rocket called "Saturn 13" with an E12-6 and his Phantom three times. Corey flew his Spite on an E12-6.

Jay Calvert also had 5 flights. These included his WAC Pencil on a B6-4 and Goblin on a D12-7. His big flight for the day was his North Coast Rocketry SA-14 Archer on a CTI H123 Skidmark.

Yitah Wu's Pixel two-stager. The booster has a cluster of 3xD12's

This was Jay's old Level 1 cert rocket which ejected flying pumpkins!

Several fliers had 4 flights. Dale Hodgson flew a LOC Scout a couple of times on E26-4s, "Samantha's Revenge" on an F52-5, and Tbolt38 on a G79-6. One of Garret Ernst's four flights was a successful Level 1 cert attempt. Garret flew an Apogee Rockets Zephyr on a Loki H144 White. The delay was a touch long, but the model landed safely nearby for a successful attempt. Garret also flew an ESAM-58 on a C6-5 and a Hi-Flyer on an E12-6.

Ryan and Alexa Woodz put up 4 flights between them. Ryan has designed a 3D-printed swappable motor mount for the Boosted Bertha. He flew it twice on a cluster of A8s and it performed well! Alexa also flew it once without a cluster as well as her Alpha III on an A8-3.

Fred Zeigler also tested one of Scott's "Screw It, Fly It" 3D rockets on a G70. The boost looked fine, but it ejected right after the motor burnout. The model was undamaged. Fred also had a nice flight with his Black Betty on an H125-7.

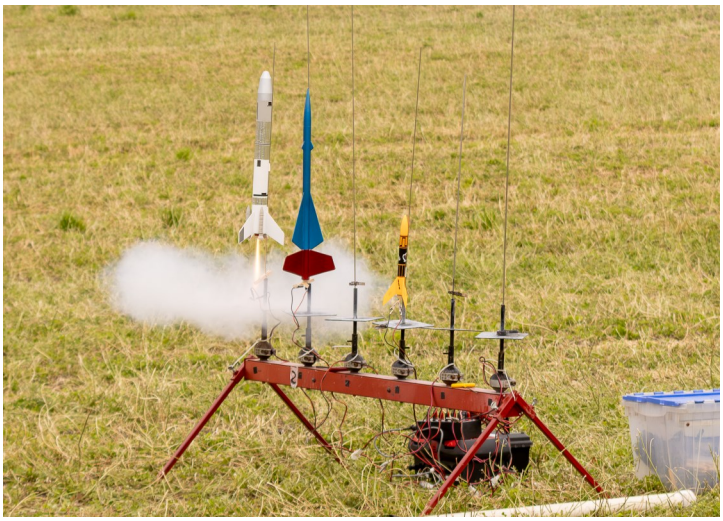
The Jenisons, James, Jeff, and Julianna had 6 flights between them. Julianna Flew her Alpha twice and Star Blazer once. James also flew an Alpha and a Tigress. The Tigress was found at the end of the day and is in the club trailer. Jeff flew a Hiflyer XL on a D12-5 which snagged on the power lines. It came off later in the day after the Jenisons had left and it is also in the club trailer.

Competition

Andy Tomasch flew 1/2A parachute duration and B streamer duration events. His two-flight total for 1/2A PD was 93 seconds and B SD was 121 seconds. Al de la Iglesia and Buzz Nau of the Total Impulse team flew 1/2A PD and B SD as well as A rocket glider. Buzz's A RG boosted nicely but did not deploy the wings for a DQ. Al got 110 seconds on a single B SD flight. His first 1/2A PD flight hit almost 2 minutes at 119 seconds. His second flight was timed to ten minutes when the timers stopped tracking it. That was more than good enough to max out on the event.

Jeff Jenison's HiFlyer on a D12-5

Again, it was a great turnout for what may be the last launch of the year. We will attempt to hold a launch in December or even January if the weather looks favorable. Many thanks to everyone who helped with setup and teardown. It's now officially build season until next year, so get going on those projects!



Garret Ernst and his Level 1 Zephyr

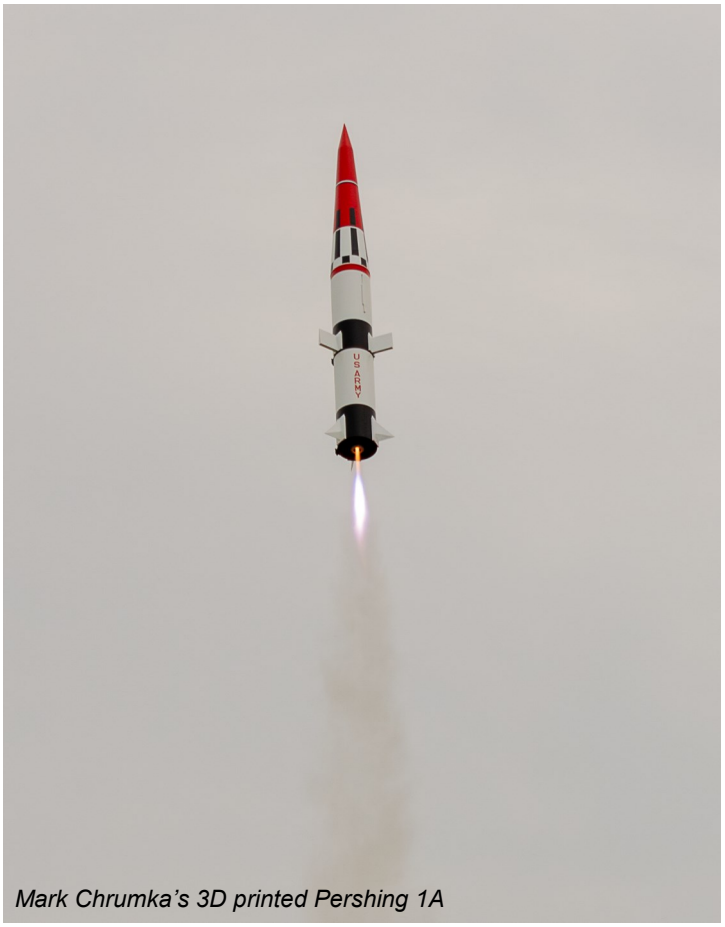
Garret Ernst's Zephyr liftoff

Mark Chrumka's QModeling Nike X has a F44 CATO

Dale Hodgson's 38 Thunderbolt

Yitah Wu's staged Snitch

Mark Chrumka with a 3D printed Pershing 1A



Mark Chrumka's 3D printed Pershing 1A

PRODUCT REVIEW:
BUILDING AND FLYING THE EGGTIMER QUARK ALTIMETER

Tony Haga

After a few years of attrition with age, new technology, and some bad luck with the Big Icky out at Muskegon, I found my supply of altimeters dwindling to a disturbingly low level. I usually fly Perfectflites but those seem to be hard to come by now so I was looking for a new, and hopefully cheaper, alternative so I wouldn't be out so much cash the next time I dunk it. After some searching, I came across a suite of electronics by Eggtimer Rocketry. Eggtimer provides a wide range of electronics from GPS transmitters to apogee deployment-only altimeters to Wi-Fi switches. Prices are very reasonable but here's the deal, you have to put them together yourself. Eggtimer sells all its products in kit form. They provide the circuit board, components, and solder. You provide everything else.

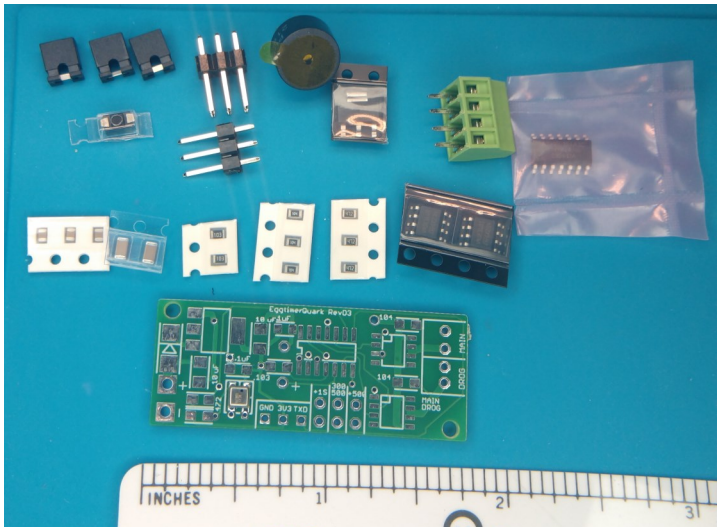
I decided to try my hand at building their Quark altimeter. These units seem to be getting quite popular. The Quark is a simple dual-deployment altimeter with no data logging but will beep out the apogee altitude at the end of the flight. This seemed like a good place to start and for only $20 the price can't be beat. I ordered four of the units to make sure I had enough, figuring I would probably screw up at least one of them (which I did, more on that later). You will need a good quality soldering iron with a fine tip (I used a Hakko with a 0.2mm tip), a solder-resistant surface (like a silicone mat or steal a ceramic trivet from the kitchen), a small wire cutter and a set of tweezers. You will also need some kind of optical aid. It would be impossible to do without one. I used one of those big lighted hoop magnifiers for soldering and a jeweler's loop to inspect the solder joints. I have done a fair amount of component soldering over the years putting together and updating old HealthKit and Dynaco stereo and ham radio gear so I already had the equipment needed. Just needed to clear off some space on the workbench (again) and find an hour of uninterrupted time.

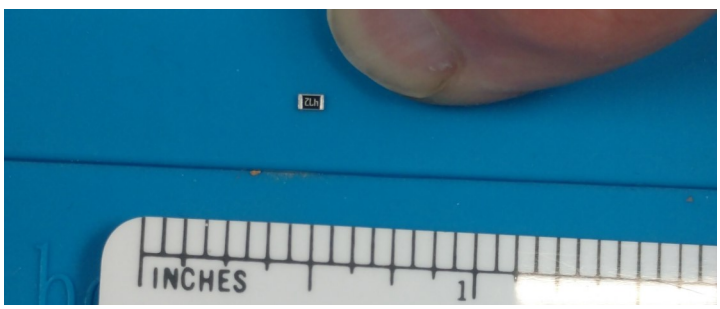
Eggtimer Quark Packaging

Eggtimer sends their altimeters out in a padded envelope with the parts neatly separated in plastic. They provide a couple extras of the smallest components in case you drop one. If you drop one of those small resistors on the carpet you will never see it again.

Eggtimer Quark Components

The first thing to notice is that some of these components are **really** small. The resistors are barely 2mm. It will take a steady hand to put this thing together.

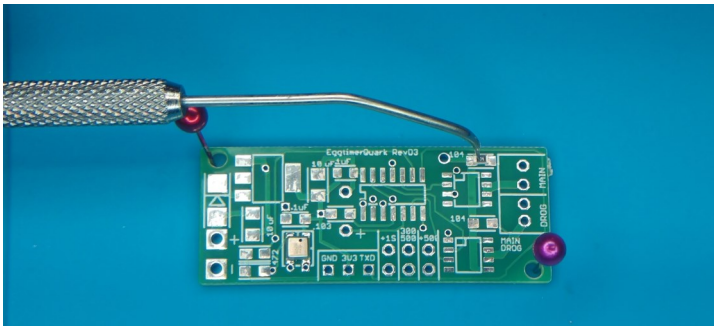




Components Closeup

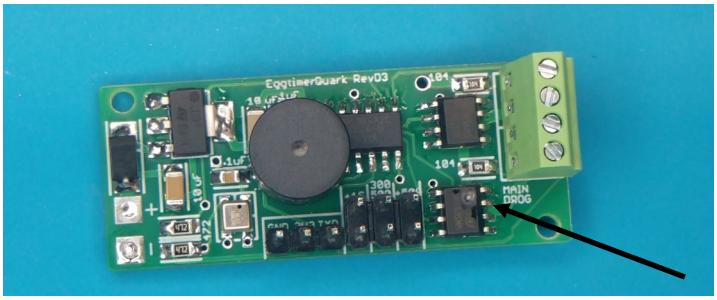
There are a couple of good YouTube videos showing step-by-step instructions. Click on this link to watch a good one, https://www.youtube.com/watch?v=S0Ge5Eb51yU.

I would recommend watching these and follow along while working on yours. Eggtimer also provides a very good set of instructions. Follow them to the letter and check off the boxes as the steps are completed. I found it best to get the components organized and separated before starting. I also found it a bit easier to place the components on the board with the tweezers and then holding them down on the board with a dental pick. This helped me keep the component from moving while soldering in place.



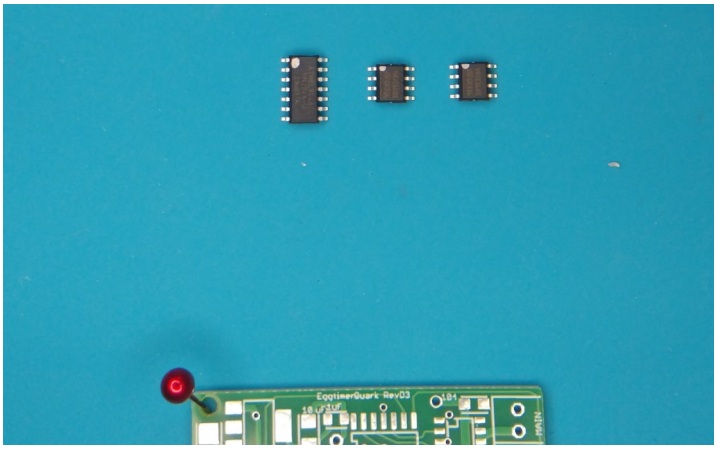
Using a dental pick to hold down a component

And make sure you have the components in the correct orientation before soldering. I found the printing on the parts to be very difficult to see and getting them in correctly to be a challenge. I wrecked a unit when I soldered one of the drivers in wrong. I must have fumbled it while setting it on the board and managed to get it turned around. Then I let the magic smoke out when I powered it on. If you look close on the bottom right you can see the cooked component.



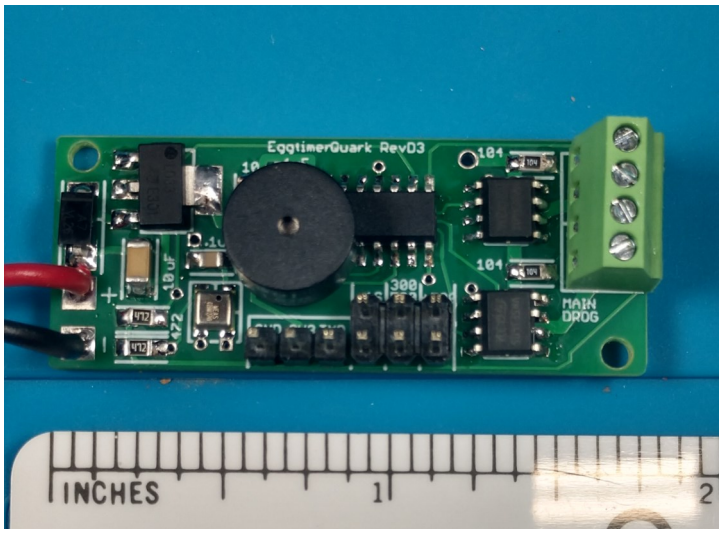
Arrow highlights cooked driver

After that I painted a dot on the parts with a silver magic marker to make sure I got them on the board correctly.



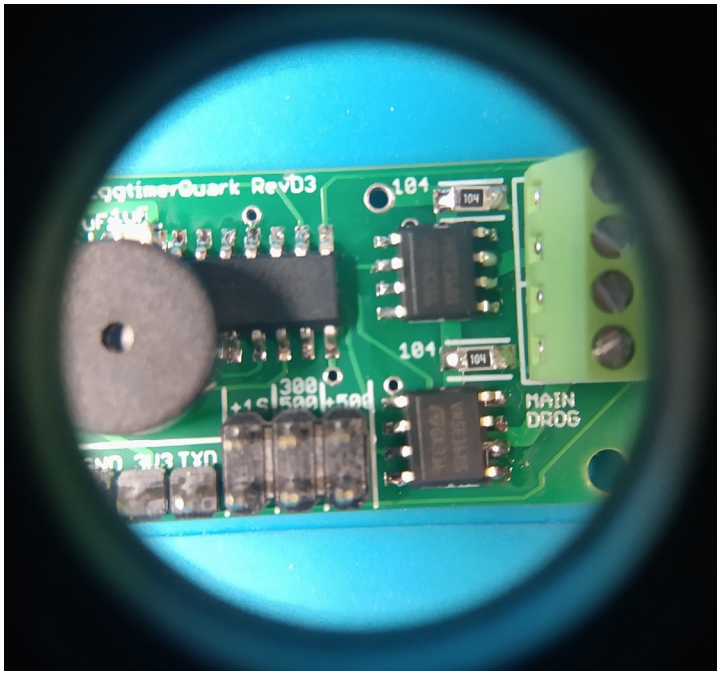
Silver dots indicate pin 1

After about an hour of taking my time, I had a completed unit.



Finished Eggtimer Quark

The main deployment altitude is set via jumpers on the board, selectable for 300', 500', 800', or 1000'. You can also add a jumper to add 1 second to the apogee deployment. You can test your completed Eggtimer via software but I decided to build a small vacuum chamber out of an applesauce jar and a handheld vacuum pump.

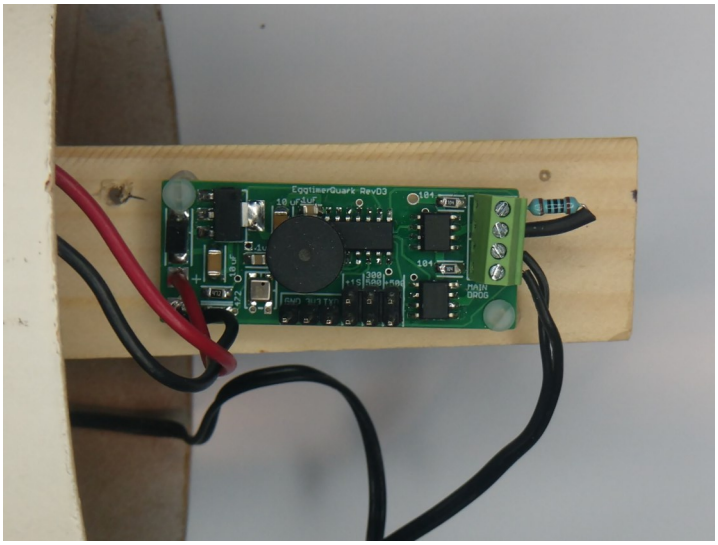


Close-up of solder joints as seen using a jeweler's loop

I just stuffed the unit in the jar and used a couple of old-style Christmas tree bulbs (the ones with a filament) to simulate ejection charges. I then drew a vacuum with the hand pump and watched for the lights to flash as I let the air back in. The three units that I put together correctly all worked fine.

CHAD vacuum bottle altimeter tester

There is a quirk in setting up the Quark that you need to be aware of. It needs to see resistance on both deployment channels or it won't start up properly. So, if you are only going to use one of the deployment channels (like using the altimeter just for apogee deployment) You need to install a resistor across the unused channel. Eggtimer recommends a 100 Ohm resistor and you can see that here.



100 ohm resistor in place on the main deployment channel

So, it is very important that you get the deployment charges wired correctly. The unit will beep out a code if one of the channels is not connected to anything and you must fix that before flight. But if you have the connections incorrect at the altimeter (resistor connected to the wrong channel) you can't tell by the beep code.

Also, be aware that there are no terminals for a switch like on some other altimeters. You will need to add a switch in line with the battery. Speaking of batteries, although a standard 9v battery can be used, Eggtimer recommends using a 2S (7.4v) Lipo battery.

I have only flown once using one of the Eggtimers. I made an altimeter sled from a wood paint stirring stick and flew it in my LOC Patriot on a Loki G96 out at the Horning 1 field. I used it just for apogee deployment and used the Jolly Logic Chute Release for the main deployment. All worked fine. Next, I might try a couple of their Wi-Fi switches. These can be used to turn the altimeters on and off using an app on your cellphone or tablet. In that case, you wouldn't have to worry about trying to climb a ladder to reach the switches mounted high up on the rocket.

Building the Quark was fun and not really that hard if you take your time and follow the instructions and videos. Anyone that can put together a dual deployment rocket should be able to put the Eggtimer kits together without too much trouble. And 20 bucks for a dual deployment altimeter is a deal that is hard to beat. If you feel you need some soldering practice there are lots of kits available (just look on Amazon for SMD practice kits) but for the cost you might as well just start off with a kit from Eggtimer. You might even end up with an altimeter when you're done. As a matter of fact, I just ordered a few more items from Eggtimer to keep me busy over the winter.

Continued from page 6

The lesson learned here was that the further out the prep is done the greater the chance something happens not planned on, either with the weather or equipment. My recommendations are; to over-prep beforehand, and make sure everything fits because there may not be the proper equipment available on the field for corrections. The weather is the weather; we're in the Great Lakes. If it is predicted calm, plan for winds meaning have "plan B" motors on hand just in case the need arises to fly lower. If it's predicted to be clear; plan on clouds and adjust accordingly to fly safely and not punch through ceilings. I think what happened to me personally was I looked at the weather, trusted the forecast, and got "big motor fever". Plus, always remember to test fit motors into projects well beforehand; I would recommend this during the build if possible. If by chance, a preassembled project is to be flown that was not assembled by the current owner be sure and do that test fit beforehand. It will save a lot of stress……and no one likes to see a grown man cry. But that sometimes is the nature of our hobby.

Overall, the weekend was a lot of fun spent with great friends doing that thing we like to do so much. I'm planning on a trip back so it won't seem like such an away game next time. And we all know how important home-field advantage can be.
Happy flying !!

LAUNCH REPORT

NATIONAL SPORT LAUNCH - EAST

10-12 November 2023 - Pence, Indiana Buzz Nau

This year marks the first time that the NAR hosted two National Sport Launches. NSL West was held on May 27-29 at Alamosa, Colorado. NSL East was held on November 10-12 at Pence, Indiana. Six members of our club; Jay Calvert, Herb Crites, Tony Haga, Dale Hodgson, Al de la Iglesia, Buzz Nau, and Michael O'Neal, attended the three-day event hosted by the Indiana Rockey Society (Section 711).

The host field consisted of six square miles of recovery area and a waiver to 17,999 feet. Most of us stayed about half an hour west in Danville, Illinois. In addition to sport and high-power flying, Mark "Bunny" Bundick ran a separate contest range for those wanting to throw up some NRC flights. The event was also supported by a good number of vendors including Chris's Rocket Supplies, Wildman, Impulse Buys, and Country Line.

Friday

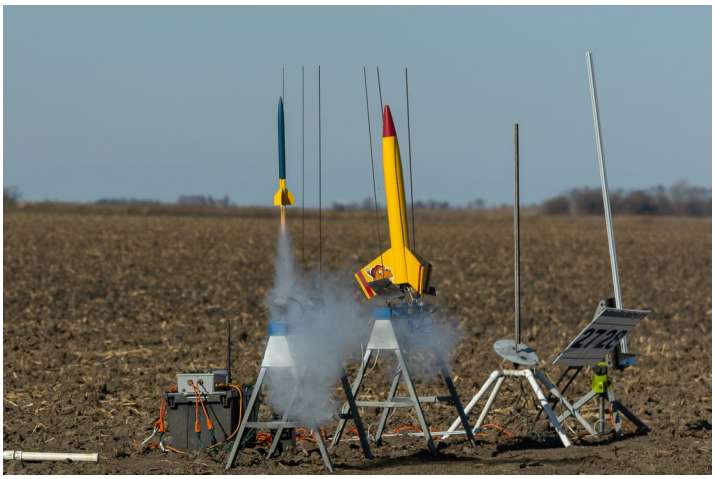
Prior to the event, most of us signed up for the first range duty shift on Friday. This turned out to be a fortuitous decision. The host section needed help to finish setting up the range, so we didn't really lose any flying opportunities. Those were few anyway on Friday as a strong westerly wind kept most large projects grounded.

Al put in four flights on Friday, five if you include me flying his Big Bertha on a C6-3. His Super Big Bertha flew on an E12-6 and suffered a little tube damage from a fouled chute. Al also put up two NRC flights. He pistoned two B Streamer Duration flights using a 5x50 inch, 1 mil mylar streamer. One stayed up for two minutes and the second was a DQ for nose cone separation.

Herb put up two nice flights with his Mach Schnell SLK 54m. His first was on a Loki J474 Cocktail and the second flew on an Aerotech I1299 Warp 9.

Also, with only one flight on Friday, Michael O'Neal flew his Estes Blue Sapphire on a C6-5 to 742 feet per his Jolly Logic 1.

Jay flew his Turbo Vortico (small spinning rocket) several times on Quest Q-Jet D's and E's. Just for fun, one flight used an older D Q-Jet with a visibly cracked clay nozzle (from before Aerotech's reinforced nozzle update). The flight was…unique. After a burst of normal thrust that got the rocket 50 feet up and spinning at high rpm, the nozzle (part of it) blew out. The sudden loss of pressure stopped the APCP propellant burn for about 1 second, but the burning delay grain reignited it for about a second before it went out again. Then it happened again, then once more. Four separate pulses of thrust, all while gaining altitude, spinning like crazy, and arcing down range. The "Flying Chuff". The RSO is still scratching his head. Don't see that everyday…



Al de la Iglesia's Mini King Viper III

Tony Haga and his Flame-On!

Saturday

As predicted, the weather on Saturday was near perfect. Low surface winds as well as winds aloft and a little warmer. The crowd was also much larger. The after-launch report indicated that there were nearly 150 in attendance at the event and they were all there on Saturday.

Al flew the bulk of his 18 flights on Saturday. These included his 4" diameter scratch-built Mega Mosquito on an AT F67-4, Estes Mega Der Red Max on an AT G76-4 Mojave Green, scratch-built Maxi Alpha on a D12-3, and scratch-built Mini King Viper III on a cluster of three A3-6's. All flew well and landed within 100' of the pads.

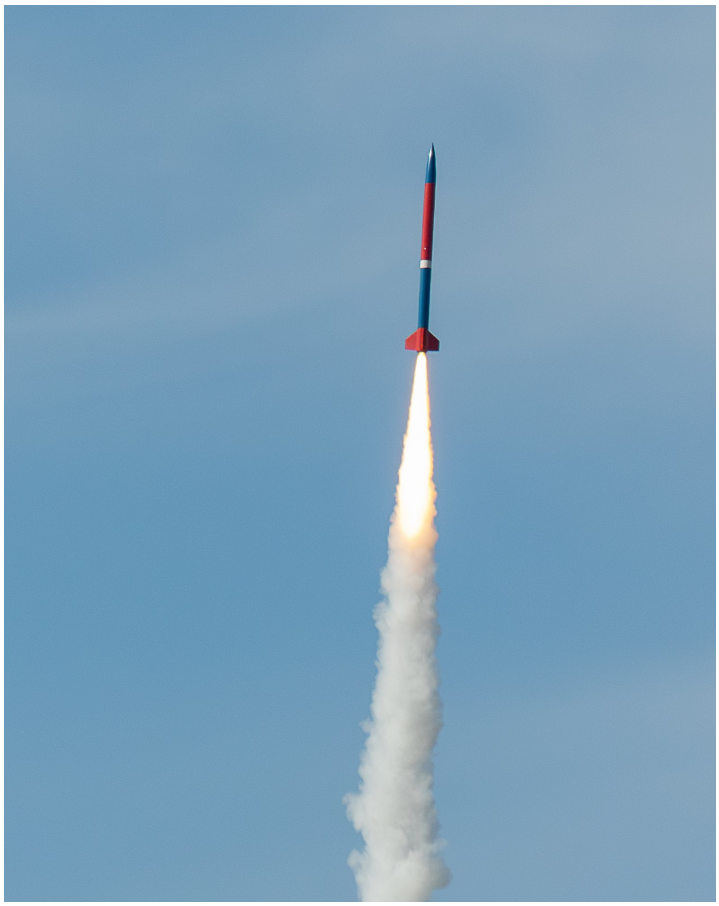
Herb flew the first big motor of our group on Saturday. His Mach Schnell SLK 75m (A) lifted off on a Loki M1378 Red. The boost started out fine, but the upper airframe failed at ~2900 feet shredding it. It was likely over Mach 1 when it failed.

The big flight of the day as well as for the event was Tony Haga's *Stoichiometric* on a Loki N3800 to 13,800 feet. I gave him an extra set of hands as he prepped everything. The launch went perfectly, though neither of us saw the main come out. We eventually caught it when it was near the ground already. Tony had a Big Red Bee tracker onboard and it helped us narrow it down in an adjacent field.

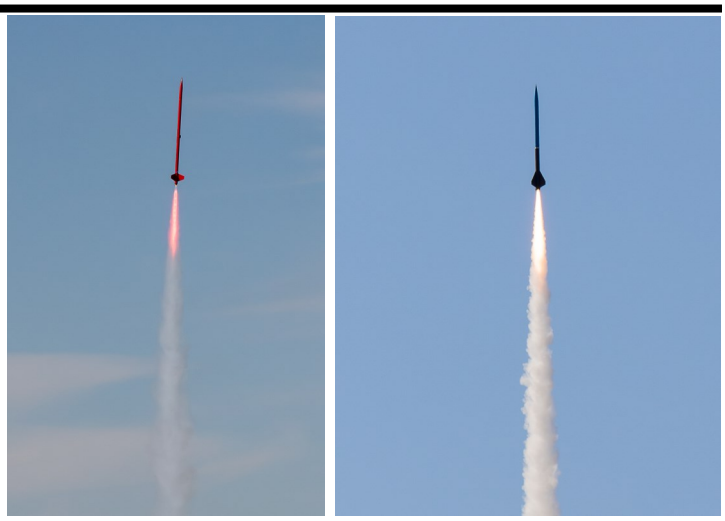
Dale had motor fit issues which prevented him from launching his K350, but he did manage to fly his Madd Dog, "Go Blue 2" on a CTI J210. The only problem was it landed across the powerlines along the road. The local power company was notified and they got it down with the loss of a foot of shock cord.

My big project for the event was my Performance Hobbies Intimidator 5 on a Loki M1882. In addition to dual altimeters, I also had an onboard 808 camera. The liftoff and accent were great, but I never saw it after apogee. Al caught it right after the main charge went off but saw that the chute had fouled. Tony and I retrieved it from the same field his *Stoichiometric* landed in. The shock cords were severely twisted due to the booster spinning during descent. The onboard video showed that the booster had tangled with the main chute preventing it from opening. The damage is minimal and I already have most of it repaired. My other flight for the day was my Madcow AGM-33 Pike on a Loki H90 Red. A nice flight that recovered nearby using a Jolly Logic Chute Release.

Jay flew a 4" rocket with three 29 mm motor mounts and three



Tony's Stoichiometric on a Loki N3800

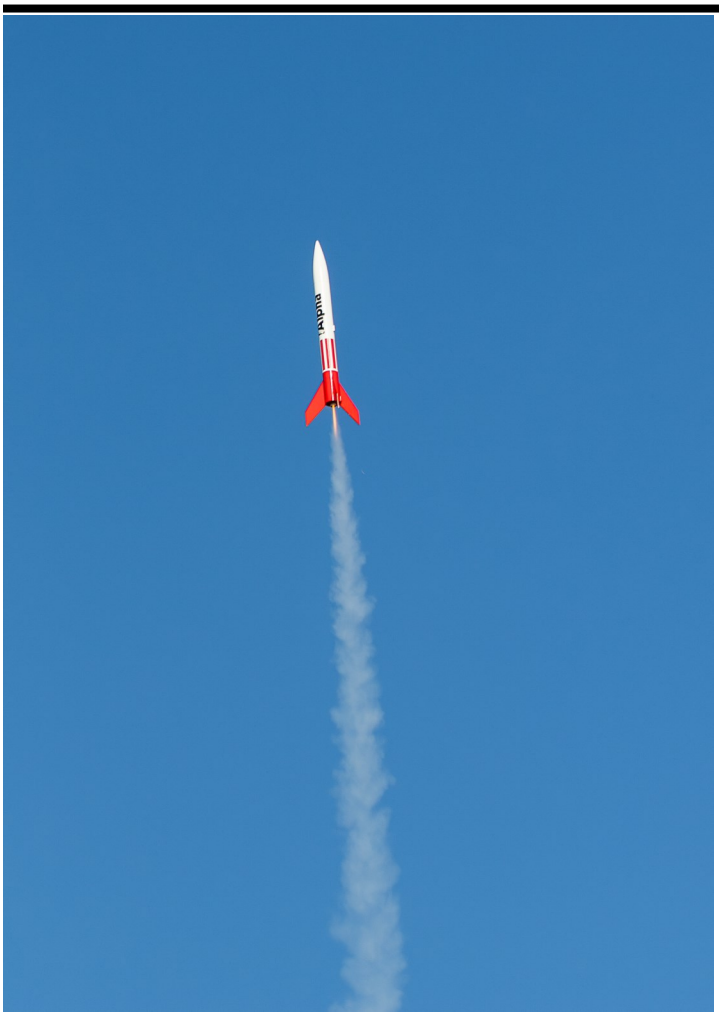


Herb's Mach Schnell SLK 75 (L) Buzz's Intimidator 5 (R)

sets of fins. It was designed by former Michiana Rocketry Prefect Jerry Vida and turned into a limited production kit by LOC Precision in 2020. It had no official name, except for the "Michiana Mayhem 2020 Rocket". Jay calls his "Nine Fins, Three Motors, and the Truth". All three Aerotech I205W DMS motors fired for a rousing flight. The rocket went out of sight and nobody saw it land. It landed a full mile away on the far side of two rises in the field, but Jay relied on the on board Tracki and his iPhone to walk straight to it.

Michael put up five flights on Saturday including his first dual deployment. He flew a BMS 3" School Rocket, "School Deploy" on a G64 to 1043 feet per his Eggtimer Quantum. His main was successfully deployed at 500 feet. Other flights included an Odd'l Rockets Cyclone on an A3-4T and Estes Star Orbiter on a F22-7J to 1803 feet.

Saturday night included a buffet dinner at the Beef House and two keynotes. The first was Gary Rosefield who presented a slideshow of photos showing the construction of Aerotech's new facility. The second speaker was astronaut Woody Hoburg. Woody grew up a model rocketeer who flew many large projects before going on to become an astronaut and engineer for NASA's SpaceX Crew 6 mission to the International Space Station. It was an informative session that included a video of the mission followed by a Q&A.



Al's Maxi Alpha

Sunday
The weather on Sunday was somewhere between Friday's and Saturday's. A little breezy and cold, with the wind coming from the south. The crowd was also a lot smaller. It appears many fliers only attended on Saturday.

Tony went big again flying his *Flame-On!* with a CTI K600 to 6,000 feet. It was almost a replay of his flight on Saturday, but I saw it when it deployed this time, landing within 100 yards of where his *Stoichiometric* landed. At least *Flame-On* was lighter and easier to carry back.

When Al was done flying on Sunday, he managed to fly the 1/2A to G cycle, well done! Flights included his Mini King Viper III lighting all three A3-6's this time and his Maxi Alpha again on a D12-3. He had a time explaining to the RSO that it would indeed fly fine on the Mighty D. There was no NRC flying on Sunday as no one was interested in losing models in the wind.

Dale got in two flights, his first was a modified Giant Leap Thunderbolt on a Loki G79 Ice Blue. A great boost to about 1100 feet and a good recovery. His last flight was a 54mm Minimum Diameter on a CTI J150 Mellow. A nice 6-second burn to 6,600 feet which resulted in a long, but good recovery.

Michael also had a long recovery for his Estes SA-2061 Sasha, two-stage. It flew on an E12-0 to an E12-6 to 1961 feet. He also flew his dual-deployment rocket again, but the recovery shock lines fouled one another. It still landed fine. Michael had two goals for NSL, hit 2000 feet, and perform a successful electronic deployment. He barely missed the first one but nailed the second one. He also flew his first F and G motors.

Herb had another airframe failure on Sunday, but this time on landing. His Mach Schnell SLK 75m (B) flew great on a Loki J820 White Star Grain, but the upper airframe broke on landing, possibly due to the side motion from the wind. Herb also flew his SLK 54m twice, once on an AT I600 Redline and again with an AT I500 Blue Thunder. Both flights were successful.

Michael preps his dual deploy test flight

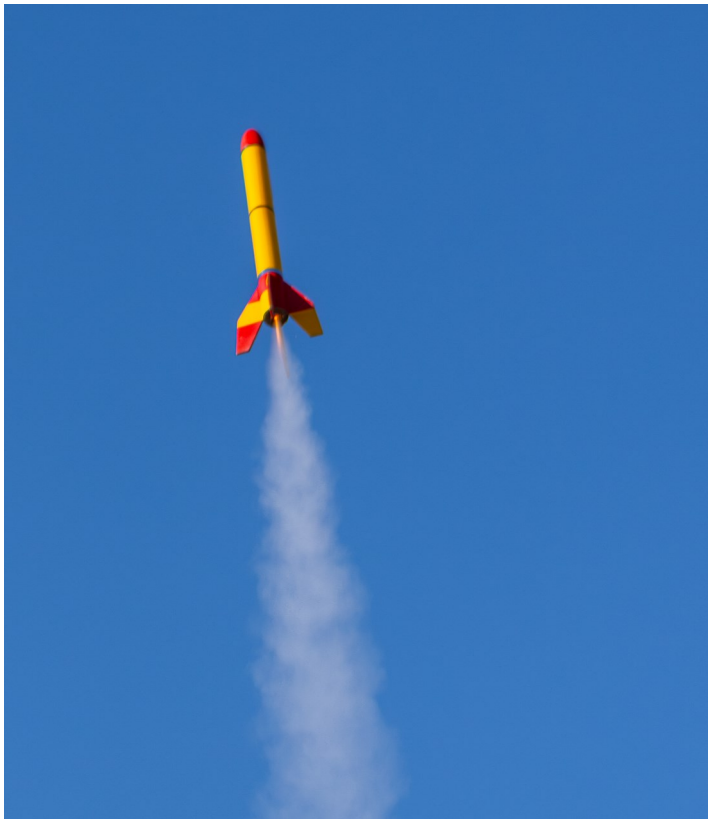
I flew three G motors to complete my NSL flights. The first was my THOY Peacock on a CTI G68. It was a long recovery walk even with using a Jolly Logic Chute Release. I dialed the deployment altitude down to 300 feet and the next two flights landed much closer. The second flight was my Madcow Honest John on a CTI G131 Smokey Sam. Nice flight, but it almost caught the power lines. Lastly, I flew my scratch-built Cherokee G on a CTI G57.

Tony had told us after he attended Thunderstruck earlier this year that the field was nice and it certainly is. The Indiana Rocket Society did a great job hosting the event. There were no real issues with the ground support equipment and the LCO's were awesome. The weather in November in the Midwest can be a real crapshoot but for the most part, the long weekend worked out well. Those of us that went are already looking forward to Thunderstruck 2024.

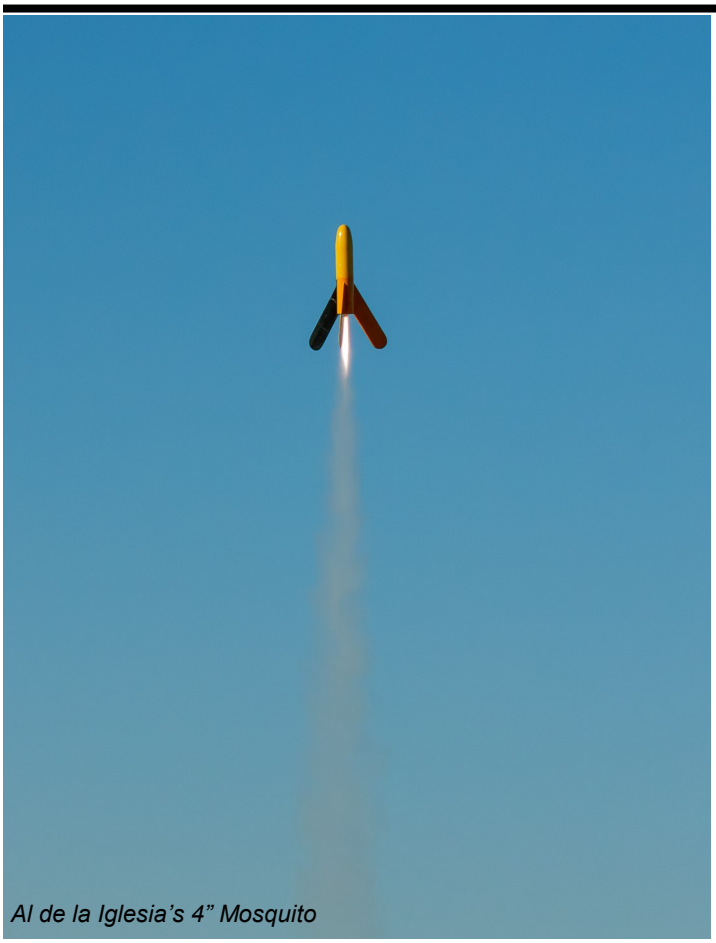
A student group M project

Chad Ring's G. Gassaway Pumpkin Rocket

Buzz Nau's Madcow AGM-33 Pike



Al de la Iglesia's Big Bertha



Al de la Iglesia's 4" Mosquito

Buzz Nau's Madcow Honest John

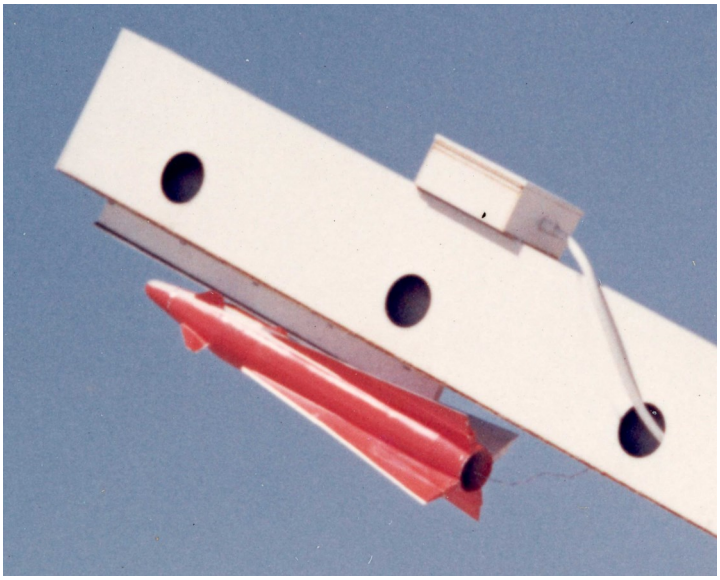
AIM-68 QUETZALCOATI "BIG Q"

ROCKET SCALE DATA

Chris Timm & Buzz Nau

After the end of World War II, the United States atomic scientists embarked on a weapons test and development program never seen before. In addition to reliability and efficiency, other major goals were higher yields and smaller warheads. By 1952 technology had been developed to consider a warhead small enough for air defense missiles. This led to the development of the W25, 1.7 kiloton warhead by the US Air Force and Los Alamos Scientific Laboratory. At the same time, the USAF was looking for a high-speed, nuclear armed, air-to-air missile to counter large formations of bombers. Missile development was also in its infancy and to simplify the weapon and improve reliability an unguided rocket was chosen as the delivery vehicle. The warhead yield was such that it just needed to be in the ballpark to be effective. Thus, the AIR-2 Genie was born and entered service in 1957.

Production of the Genie ended in 1962 and shortly afterwards a replacement was sought after by the USAF. This time the vehicle would be a guided missile with a lower, half-kiloton warhead. The design would come from the Air Force Weapons Laboratory by 1st Lt John McMasters and as the designer, he got to choose the name. Officially called the AIM-68 Quetzalcoatl after an Aztec Serpent God, it was soon shortened to "Big Q" due to constant spelling and pronunciation errors.



ZAIM-68 Little Q test round at WSRM

'Big-Q' Missile Design Flight-Tested by Air Force

First photo of the Air Force's "Big-Q" air-to-air missile shape which has been undergoing flight tests at the Air Force Weapons Laboratory, Kirtland AFB, N.M. Air Force officers have thus far described the vehicle as one of a number of shapes which are being developed to test new missile aircraft mating characteristics. It is not an active weapons development program, according to the Air Force.

The AIM-68 Big Q was nearly the same length as the AIR-2 Genie at 9 feet 7 inches, but smaller in diameter at 14 inches versus the Genie's 17.5 inches. Also like the Genie, Big Q had cruciform delta fins that would pop out to full size after launch to fit internal weapons bays used by some USAF fighters. Big Q also mounted cruciform canards located on the blunted conical radome. The canards at 90 and 270 degrees could be pitched between 0 and 15 degrees for guidance. The missile was considered for use on the F-4C Phantom II, F-101B Voodoo, F-102A Delta Dagger, and F-106A Delta Dart.

Big Q was to utilize some off-the-shelf components already in production. The guidance system would be borrowed from the AIM-2C/D Falcon and propulsion would be the dual-thrust solid fuel motor used by the AGM-12 Bullpup. The W30 0.5 kiloton warhead was also used by the RIM-8 Talos.

Dynamic stability wind tunnel tests from 1.5 to 4 Mach were performed using a 1/5 scale model supplied by the Air Force Weapons Laboratory in 1965. These tests were performed by the Von Karman Gas Dynamics Facility at Arnold Air Force Station, Tennessee.

In May 1965 a ZAIM-68 motor test vehicle called "Little Q", was flown from the White Sand Missile Range. Afterward, a contract for 20 prototype body sections was awarded to the National Tapered Wing Engineering Company in June 1965. The Big-Q was cancelled a year later like many other

AIM-68 QUETZALCOATI "BIG Q"

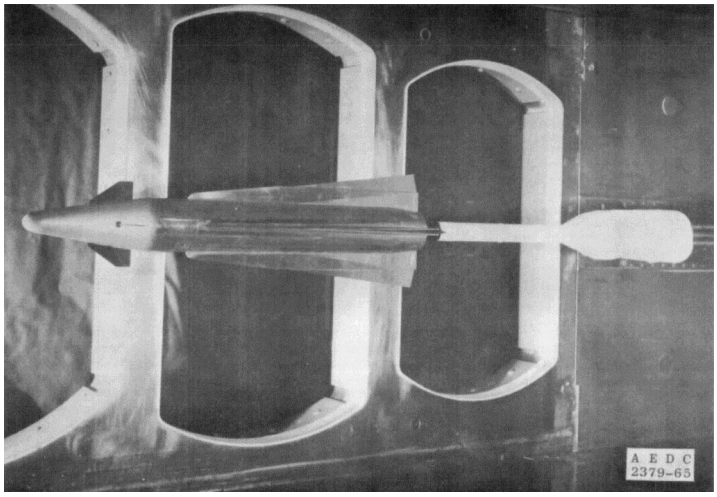
ROCKET SCALE DATA

Chris Timm & Buzz Nau

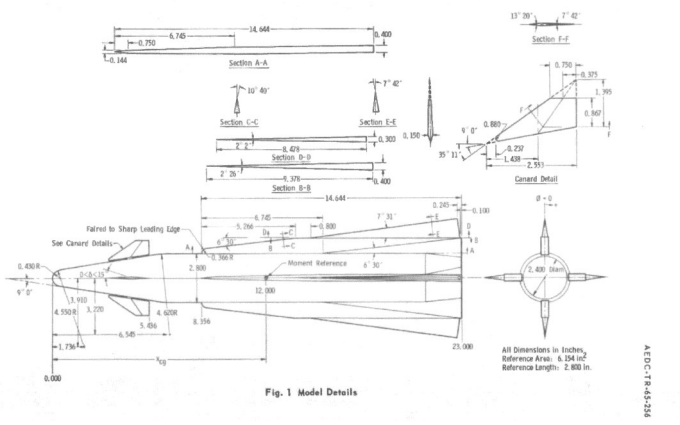
new weapons programs around the same time. The Air Force instead opted to upgrade the AIR-2 Genie's propulsion system.

The US Navy made a couple of requests in 1995 to acquire the RIM-68A designation for the Standard Missile Block IV to keep the sequence linear with the RIM-66 Standard Medium Range and RIM-67 Standard Extended Range but was denied both times. The SM Blk IV subsequently received the RIM-156 designation.

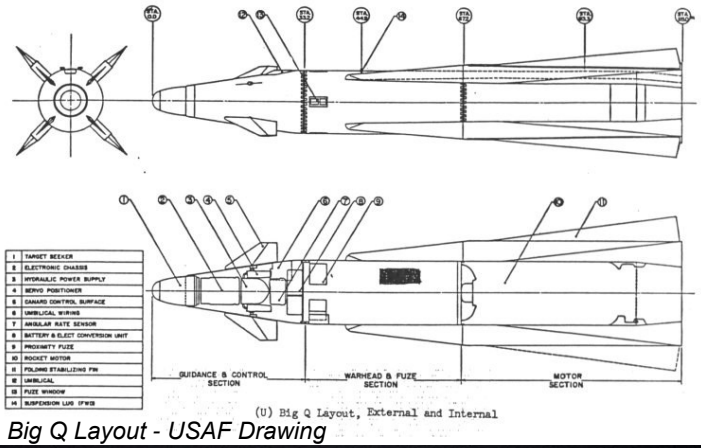
References:
Burt, G. E., Aro, Inc. (December 1965), *Dynamic Stability Tests on a 1/5 Scale Model of the Big Q Air-to-Air Missile at Mach Numbers From 1.5 to 4,* Von Karman Gas Dynamics Facility, Arnold Engineering Development Center, Arnold Air Force Station, Tennessee
Air Force Weapons Lab AIM-68 Big Q - Designation Systems



AIM-68 Wind Tunnel Model - USAF Photo

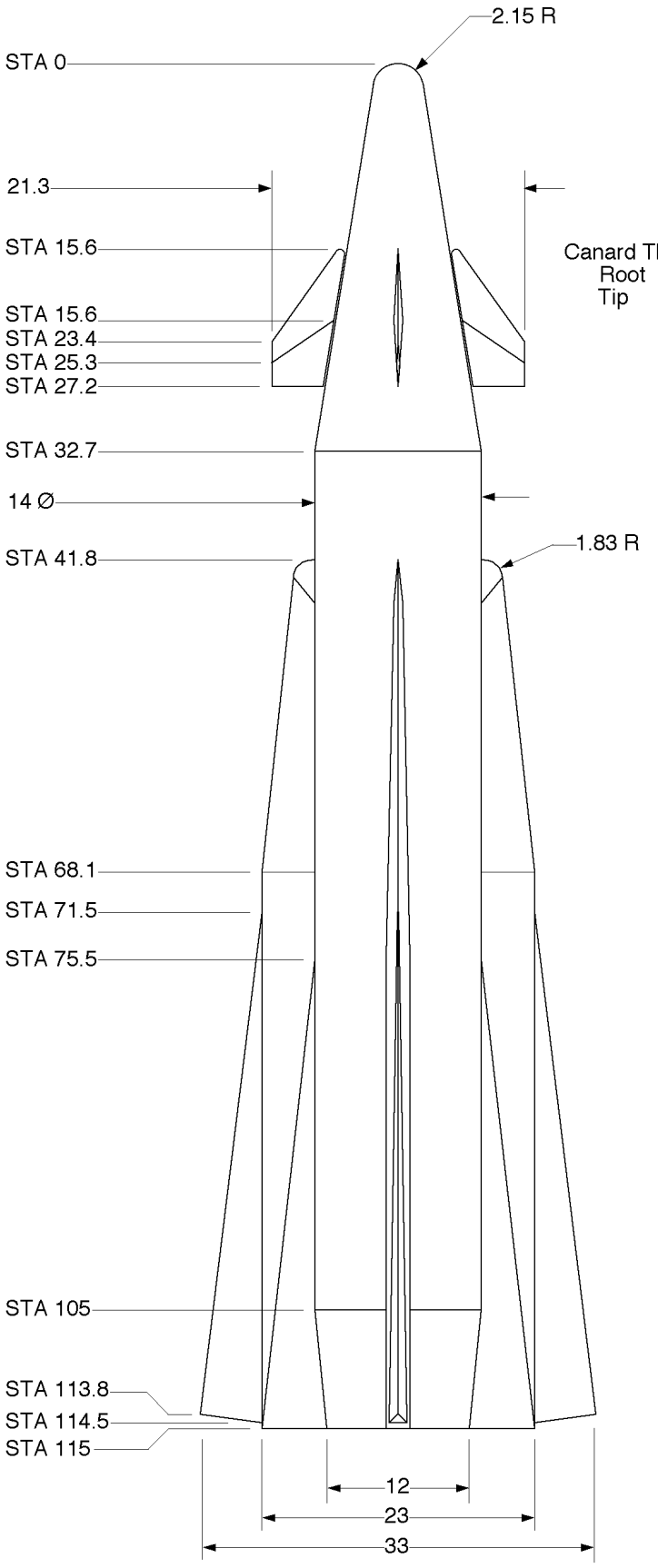


Wind Tunnel Model Details - USAF Drawing



Big Q Layout - USAF Drawing

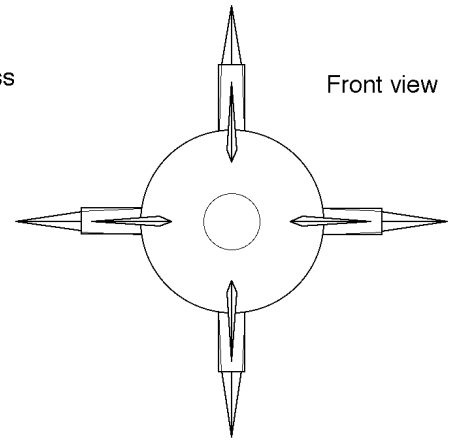
F-106A Delta Dart fires an inert AIR-2 Genie - USAF photo

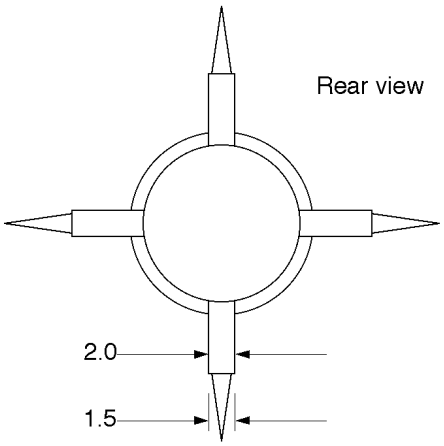


Color patterns:

Fullsize Mock-up	Overall white
WSMR Little Q	Overall fluorescent red

Canard Thickness
Root .75
Tip .25





Quetzalcoatl

"Big Q"
ZAIM-68A
1/15 scale
Dimensions in inches

Sources:

Dynamic Stability Tests on a 1/5-Scale Model of the Big Q Air-to-Air Missile at Mach Numbers From 1.5 to 4, by G.E. Burt, AEDC-TR-65-256.

Photo of Little Q pre-launch, WSMR, May 6, 1965.

Photo of inert full size mock-up.

JMRC HUVARS Club News

Holiday Party

The annual club Holiday Party and Meeting is a GO. The date will be February 3, 2024 at the Freedom Township Hall near Manchester, MI from 1:00 pm to 5:00 pm. As in the past, It will be a potluck dinner. President Scott Miller will post a link for a signup sheet to the forum shortly. Bringing a dish to share is not mandatory, but please consider donating $5 to the club per person instead. There will be a kitchen available at the hall if you need to prepare anything onsite.

We will also elect club officers for the next year. The current officers and board members have indicated that they are willing to serve another year in their current positions. Please send an email to bod@jmrc.org if you would like to nominate yourself or someone else (with their permission). Voting will take place at the meeting, but an electronic survey ballot can be sent upon request if you are unable to attend the party and wish to vote.

Other party activities include a raffle, auction, and white elephant gift exchange. Raffle and auction donations are always welcome. This is historically a great moneymaker for the club allowing us to keep the launch equipment in good shape and provide enhancements and upgrades. White elephant rules will be explained at the party.

Club Field Trip to the US Air Force Museum

We thought that a fun winter activity would be a field trip to the Wright Patterson Air Force Base in Dayton, Ohio to visit the Air Force Museum. It is an incredible museum and well worth the trip. It is a 3 1/2 hour drive from Ann Arbor which would be a good meetup location for car pooling. If you have never been there before then this would be a good opportunity for a visit. Stay tuned to the forum where we will be opening a chat for trip planning.

JMRCtv

We have a YouTube channel. Actually, we've had it for 13 years, but in a recent board meeting we talked about getting more proactive with it. You can access it HERE and look for new content and changes to the channel soon. If you have videos you would like to share, contact Buzz at ussmidway@gmail.com.

Submit Launch Photos Email

Do you have photos or a writeup from any of our launches that you would like to submit for the newsletter? We have an email address for you! Use the email address pics@jmrconline.org and send in your material. Make sure to include the date of the launch, flyer's name, model name, and motor used.

Launch Field Update

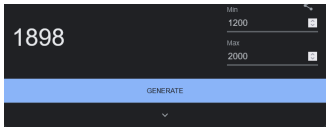
Our launch field options remain the same for 2024. Crops will be identical at Horning 1 and 2, but Horning 1 will be improved somewhat.. The adjacent fields to the west and north will turn to alfalfa opening up a lot more recovery room. Crops may change at Horning 1 in 2025 or 26. If another launch site has not been identified by then we will need to move to a third Horning field. The Hornings own several other large fields so other opportunities should be available at that time. If you see any of the Hornings at a future launch be sure to thank them for their generosity and support over the years.

Free Alpha III Kit for Kids

Al de la Iglesia's continues his offer for a free rocket kit (Estes Alpha III) to any flier who is 18 years old or younger, but he is down to only a few left. The flier (or parent/guardian) must be a club member or join at the launch. Limit one free rocket kit per youth.
Please send an email to Al at aiglesia@gmail.com to let him know that you are interested and how many youth are attending so that he can bring enough rocket kits.

Fun Contest Lineup for 2024

Precision Altitude - We only had a couple of flights for this event over 2023. The two participant agreed to let us continue the event through 2024 with the hope that more members will participate.



The target for precision altitude contest is **1,898 feet.** The goal is to fly the closest to the target altitude without going over. The contest will run all season long until our last launch in 2024. The entry fee will be $5 per attempt and you can try as often as you like. The winner will receive 50% of the pot, second place will earn 25%, and the remaining 25% will go the to the club general fund. Work on your simulations over the winter and take your shot next year!

Our Big Bertha Contest top place winners with their prizes (port-a-john not included). Thanks to Chris Timm, Steve Kristal, and Buzz Nau for the prize donations.

Iron-man III - launch date 2024

We originally scheduled this event for the September launch, but for unforeseen reasons we're postponing it for now. A new date will be announced to the club email list.
Just like the past Ironman contests. Build a single model to be flown in three events. Cost will be $10 which will get you motors needed to fly the events. The motors for Iron-man III will be 18mm 1/2A6-0's and 1/2A6-4's. The models need to accommodate 18mm motors and be two-stage. Prizes will be awarded to the top three overall performers

Events

· **Double Spot Landing** (booster and sustainer!)
· **Streamer Duration**
· **Altitude** (with an altimeter)

BYLAWS OF THE JACKSON MODEL ROCKET CLUB AND HURON VALLEY ROCKET SOCIETY

ARTICLE 1, NAME: The names of this dual organization shall be the JACKSON MODEL ROCKET CLUB (JMRC) and HURON VALLEY ROCKET SOCIETY (HUVARS). They will operate as co-non-profit organizations.

ARTICLE 2, PURPOSE: It shall be the purpose of this cooperative club arrangement to (a) aid and abet the aims and purposes of the National Association of Rocketry (NAR) and Tripoli Rocketry Association (TRA) in Jackson, Ann Arbor, and the environs of SouthEastern Michigan; (b) operate and maintain a model rocket range following NAR/TRA standards and regulations; (c) promote and support all aspects of the hobby of model rocketry; (d) to engage in other scientific, educational, or related activities about rocketry, the space program, or astronomy as the club may from time to time deem necessary or desirable in connection with the above purposes.

ARTICLE 3, MEMBERSHIP: Membership in JMRC/HUVARS is open to anyone from age 10 to adult. It is desirable that club members also be NAR and/or TRA members in good standing so that a Section Charter may be granted, enabling members to participate in NAR and TRA-sponsored activities. Members under twelve years of age must have parental consent to join JMRC/HUVARS.

ARTICLE 4, DUES: Club dues shall be collected annually. All monies shall be kept in a general fund in the form of a checking account in the JMRC name by the Treasurer. Special assessments may be levied by a majority vote of the members present and voting at any JMRC/HUVARS meeting, providing notice of such intent is given to each member through the club's newsletter or email list server.

ARTICLE 5, MEETINGS: Meetings of JMRC/HUVARS Board of Directors shall be held at least quarterly each year at times and places designated by the club officers. Operation of a rocket range shall not be considered a meeting. A quorum shall consist of at least four Board members, and meetings shall be conducted and governed by Roberts Rules of Order, Revised.

ARTICLE 6, BOARD OF DIRECTORS: The Board of Directors of JMRC/HUVARS shall consist of four officers, and five members-at-large which will include one senior member of the NAR, who shall be designated by the NAR as Section Advisor. If JMRC/HUVARS is at any time supported by a sponsor, then the sponsor may also be granted a position on the board. A high-power certification is not required to be a Board member or Officer.

The Board of Directors makes key decisions such as;

- Launch dates and locations
- Purchasing approvals
- Provide direction for the section
- Advocate ideas, suggestions, and requests submitted from the membership

ARTICLE 7, OFFICERS: The officers of JMRC/HUVARS shall consist of a President, Vice-President, Treasurer, and Secretary, all of whom should be members of the NAR or TRA. The officers will receive no compensation for their duties from the club monies, except reimbursement for agreed-upon expenses such as xeroxing, mailing, or other items up to $100 without a BOD quorum approval. The Treasurer can suspend this privilege if the general fund's amount is within 20% of our insurance deductible.

President – Manages section paperwork with the NAR and TRA. Governs meetings and is the chief administrative officer of the club.

- Vice-President – Assists the President and serves in their place when they cannot function for any reason.
- Treasurer – Collects dues and other fees and pays bills. Manages any financials linked to the section account. Maintains the membership list.
- Secretary – Keeps meeting minutes, logs launch statistics, and non-regulatory documentation.

ARTICLE 8, ELECTIONS: Elections of the officers shall take place in person at the annual party. Members who are unable to attend will have the option to vote through an electronic survey. All electees shall serve a term of one year. Vacancies in office shall be filled by nomination of a member in good standing to fill the unexpired term of office and shall take place within a month of when the vacancy is announced. Nominations for all elections shall be made from the membership to the Board of Directors, and the candidates having the largest number of votes shall be elected. Electronic ballots will be in the form of an anonymous survey emailed to requesting members with two weeks allowed to fill out the survey ballot. The results will be announced after the vote tally at the annual party to the club email list server and in the newsletter.

ARTICLE 9, COMMITTEES: Provided there is sufficient membership, there shall be three Standing Committees of JMRC/HUVARS, plus such additional committees as, from time to time deemed necessary or desirable. The Standing Committees are as follows:

(A) THE HIGH-POWER CERTIFICATION COMMITTEE shall oversee all arrangements for certification attempts by JMRC/HUVARS and guest members. The committee shall contain at least one TRA TAP or NAR L3CC member. Any member that is a recognized TAP or L3CC can fill this role. The committee will serve as a knowledge resource to those club members interested in obtaining a High-Power Certification

(B) THE CONTEST AND RECORDS COMMITTEE shall oversee all arrangements for contests and shall monitor all national-record attempts by JMRC/HUVARS members. The committee shall contain at least one Leader member of the NAR. The committee will also witness applicable fulfillment of NARTREK objectives if requested by the NARTREK participants.

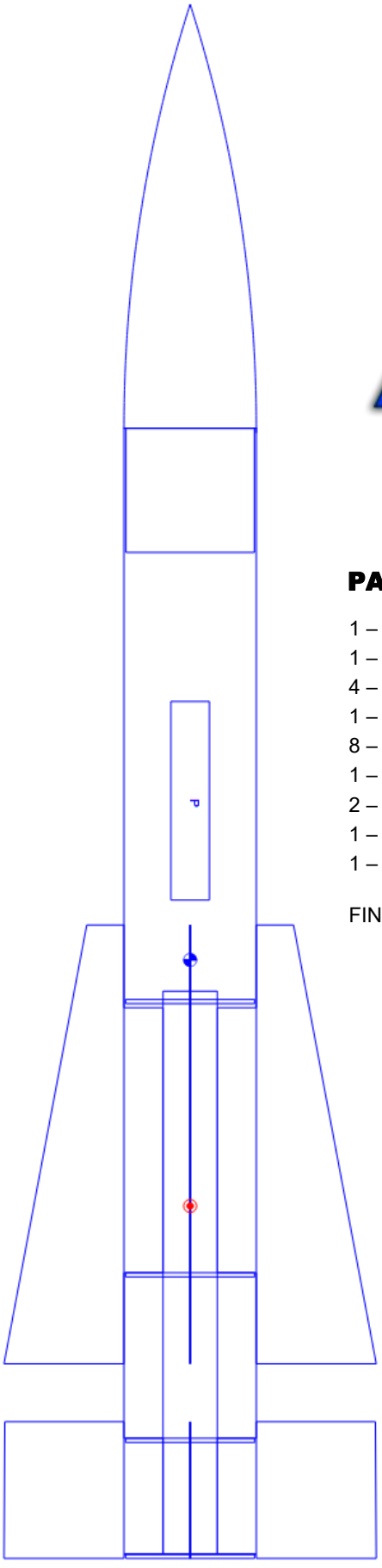
(C) THE ACTIVITIES COMMITTEE shall oversee making all arrangements for all club meetings, for conducting membership campaigns, and for carrying on public relations. This committee shall also be responsible for planning joint ventures with other NAR/TRA sections.

The club President shall be an ex-officio member of all committees.

ARTICLE 10, TERMINATION OF ACTIVITIES: If, due to declining interest and membership or for other unforeseen reasons, JMRC/HUVARS can no longer maintain its integrity and carry on the usual activities, then the club officers may ask the remaining members to vote on disbanding the organization. If such a vote is passed by a supermajority, then any JMRC/HUVARS assets, including monies in the club treasury are to be divided fairly and equitably amongst the membership. If this cannot be done without major conflict, then any assets may be given to the NAR and or TRA as a gift to their general fund.

ARTICLE 11, AMENDMENTS: These bylaws may be amended by a two-thirds vote of the club members present and voting at any meeting of the club or online survey, providing written notice of the impending amendment has been sent to the membership at least 7 days before such a meeting or survey. Amendments passed shall take effect 14 days after being voted on, and club members will be notified of such changes in writing.

I have read and comprehend the above bylaws of the JACKSON MODEL ROCKET CLUB and HURON VALLEY ROCKET SOCIETY and agree to aid and abide by them.



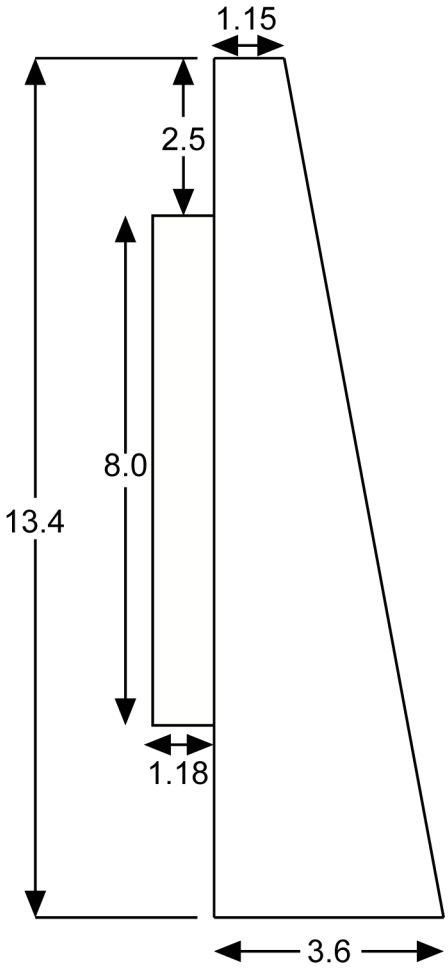
AIM-54 PHOENIX

PARTS LIST

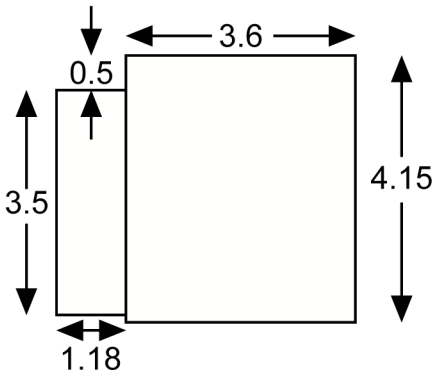
1 – LOC 3.90” Nose Cone
1 – LOC 3.90 Body Tube (34”)
4 – LOC 3.90-1.52 Centering Rings
1 – LOC 1.52 Motor Tube (17”)
8 – Fins from 1/8” plywood
1 – 36” Parachute
2 – Rail Buttons
1 – Recovery Harness
1 – Nose Cone Weight (2 oz)

FIN TEMPLATES NOT TO SCALE

FORWARD FINS



AFT FINS



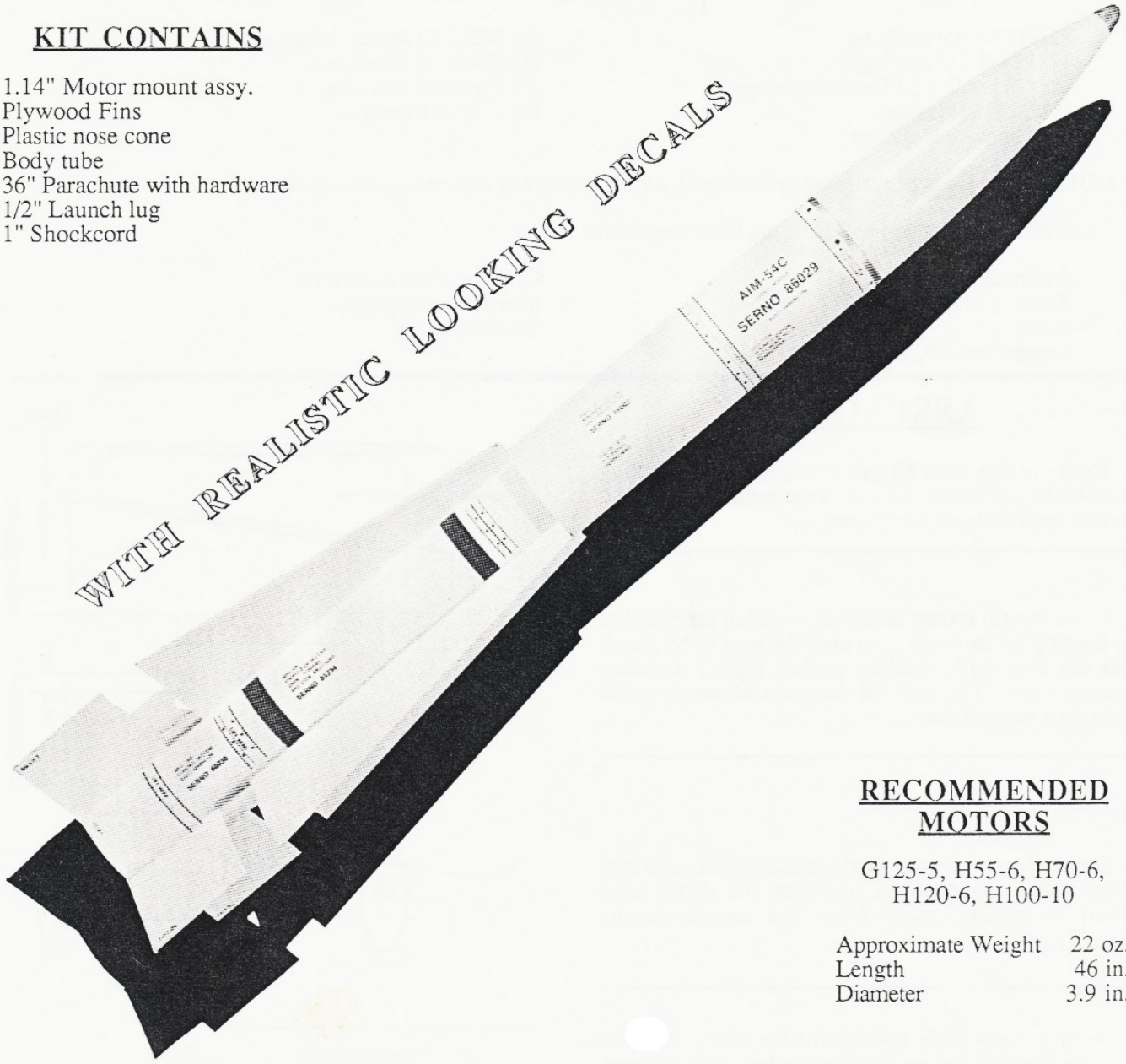
NOTE: There is a 1.45” gap between fins

T.H.O.Y. Tiffany Hobbies of Ypsilanti SK-101

PHOENIX

KIT CONTAINS

1.14" Motor mount assy.
Plywood Fins
Plastic nose cone
Body tube
36" Parachute with hardware
1/2" Launch lug
1" Shockcord



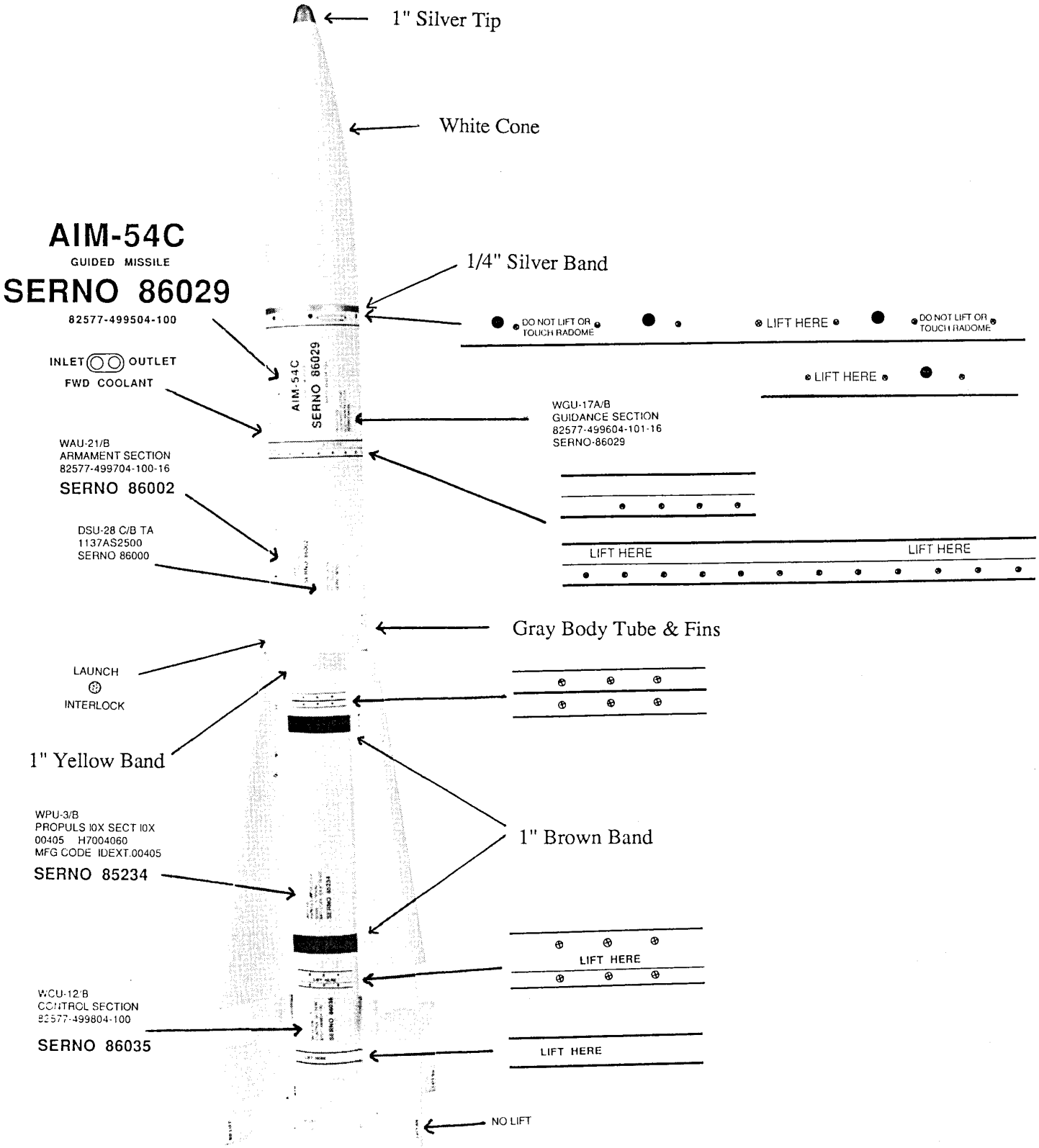
RECOMMENDED MOTORS

G125-5, H55-6, H70-6,
H120-6, H100-10

Approximate Weight	22 oz.
Length	46 in.
Diameter	3.9 in.

The Phoenix is a semi-scale model of a Navy air-to-air supersonic missile. Features 38 mm motor mount with a 29mm adapter, 36" Parachute, and through-the-wall fin mounting.

PAINT AND DECAL INSTRUCTIONS



TIFFANY HOBBIES OF YPSILANTI
P.O. BOX 467, YPSILANTI, MI 48197

WGU-17A/B
GUIDANCE SECTION
82577-499604-101-16
SERNO-86029

WCU-12/B
CONTROL SECTION
82577-499804-100

SERNO 86035

WGU-17A/B
GUIDANCE SECTION
82577-499604-101-16
SERNO-86029

WCU-12/B
CONTROL SECTION
82577-499804-100

SERNO 86035

WPU-3/B
PROPULS I0X SECT I0X
00405 H7004060
MFG CODE IDEXT.00405

SERNO 85234

WAU-21/B
ARMAMENT SECTION
82577-499704-100-16

SERNO 86002

WPU-3/B
PROPULS I0X SECT I0X
00405 H7004060
MFG CODE IDEXT.00405

SERNO 85234

WAU-21/B
ARMAMENT SECTION
82577-499704-100-16

SERNO 86002

AIM-54C

GUIDED MISSILE

SERNO 86029

82577-499504-100

AIM-54C

GUIDED MISSILE

SERNO 86029

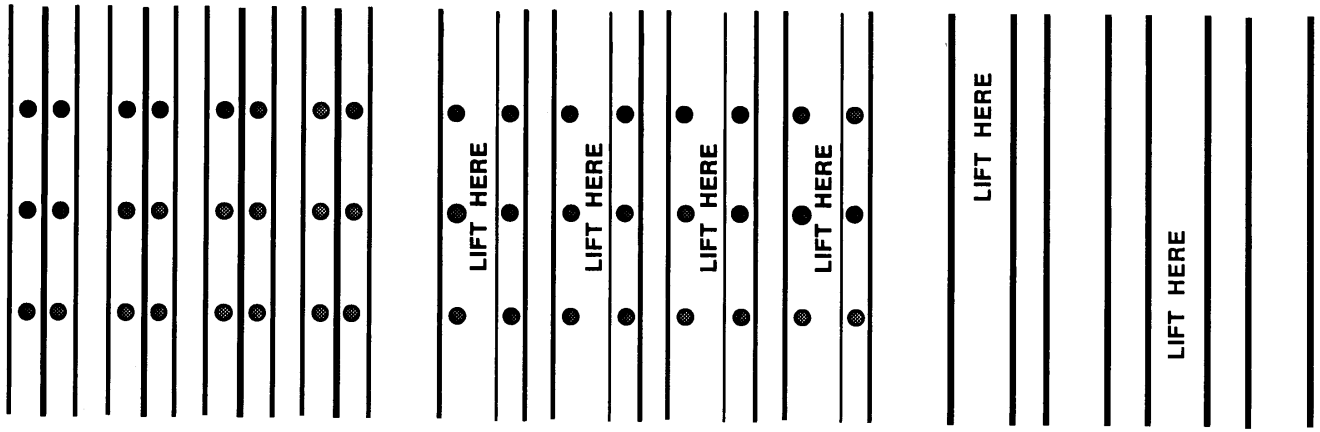
82577-499504-100

DSU-28 C/B TA
1137AS2500
SERNO 86000

DSU-28 C/B TA
1137AS2500
SERNO 86000

INLET OUTLET

FWD COOLANT

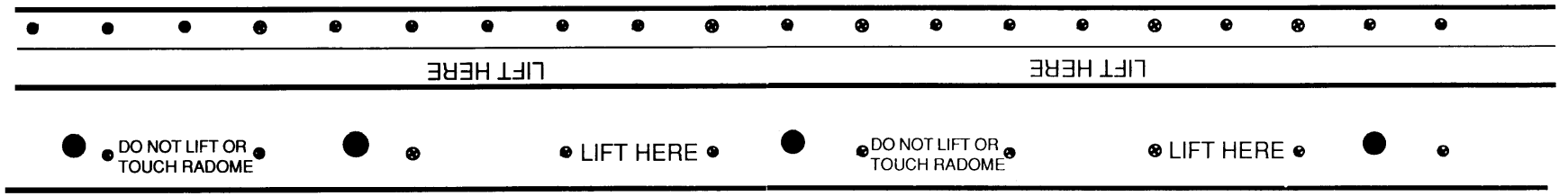


LAUNCH

INTERLOCK

NO LIFT NO LIFT
NO LIFT NO LIFT

NO LIFT NO LIFT NO LIFT
NO LIFT NO LIFT NO LIFT



LAUNCH WINDOWS

Launch dates from SpaceFlight.com

December 1, 2923
Soyuz - Progress MS-25 / 86P
Launch Site: Baikonur Cosmodrome
A Russian government Soyuz rocket will launch the 86th Progress cargo delivery ship to the International Space Station. This mission will use a rocket in the Soyuz-2.1a configuration.

December 2023
Falcon Heavy - USSF 52
Launch Site: LC-39A, KSC
A SpaceX Falcon Heavy rocket will launch the USSF 52 mission for the U.S. Space Force. The Falcon Heavy will launch an unspecified military payload on this mission.

December 13, 2023
Electron - 'The Moon God Awakens'
Launch Site: Launch Complex 1, Mahia Peninsula
A Rocket Lab Electron rocket will launch the QPS-SAR-5, also known as 'TSUKUYOMI-I', for the Japan-based Earth-imaging company the Institute for Q-shu Pioneers of Space, Inc. (iQPS). This will be the 42nd flight of the Electron rocket and the first since a launch failure in September.

December 2023
Falcon 9 - Ovzon3
Launch Site: Cape Canaveral
A Falcon 9 will launch a much-delayed small geostationary satellite for the Swedish broadband internet provider Ovzon. Originally scheduled to launch on an Ariane 5, the satellite was moved to Falcon 9 due to delayed in manufacturing.

December 24, 2023
Vulcan Centaur - Peregrine
Launch Site: SLC-41, CCSFS
A United Launch Alliance Vulcan Centaur rocket will launch on its inaugural flight with the Peregrine commercial lunar lander for Astrobotic. The Peregrine robotic lander will carry multiple experiments, scientific instruments, and tech demo payloads for NASA and other customers. The mission will also launch two prototype satellites for Amazon's Kuiper broadband constellation. The Vulcan Centaur rocket will fly in the VC2S configuration with two GEM-63XL solid rocket boosters, a short-length payload fairing, and two RL10 engines on the Centaur upper stage.

TBD. 2023
Falcon 9 - WorldView Legion 1 & 2
Launch Site: SLC-4E, Vandenberg SFB
A SpaceX Falcon 9 rocket will launch the first pair of WorldView Legion Earth observation satellites for Maxar Technologies. Maxar plans to deploy six commercial WorldView Legion high-resolution remote sensing satellites into a mix of sun-synchronous and mid-inclination orbits on three SpaceX Falcon 9 rockets. The first stage of the Falcon 9 will return to Landing Zone 4 at Vandenberg Space Force Base for landing.

4th Quarter, 2023
Falcon 9 - ASBM
Launch Site: SLC-4E, Vandenberg SFB
A SpaceX Falcon 9 rocket will launch the Arctic Satellite Broadband Mission, consisting of two satellites owned by Space Norway. The Falcon 9 will launch the two Northrop Grumman-built satellites into a highly elliptical orbit that lingers over the Arctic region. The satellites carry communications payloads for the Norwegian Ministry of Defense, the U.S. Space Force, and Inmarsat.

TBD, 2023
Falcon 9 - USSF-124
Launch Site: SLC-40, CCSFB
A SpaceX Falcon 9 will launch a mission for the U.S. Space Force and Missile Defense Agency.

TBD, 2023
Falcon 9 - WorldView Legion 3 & 4
Launch Site: Vandenberg SFB, or CCSFB
A SpaceX Falcon 9 rocket will launch the second pair of WorldView Legion Earth observation satellites for Maxar Technologies. Maxar plans to deploy six commercial WorldView Legion high-resolution remote sensing satellites into a mix of sun-synchronous and mid-inclination orbits on three SpaceX Falcon 9 rockets.

TBD, 2023
Atlas 5 - USSF 51
Launch Site: SLC-41, CCSFB
A United Launch Alliance Atlas 5 rocket, designated AV-101, will launch the USSF 51 mission for the U.S. Space Force. This mission will launch an undisclosed payload for the military.

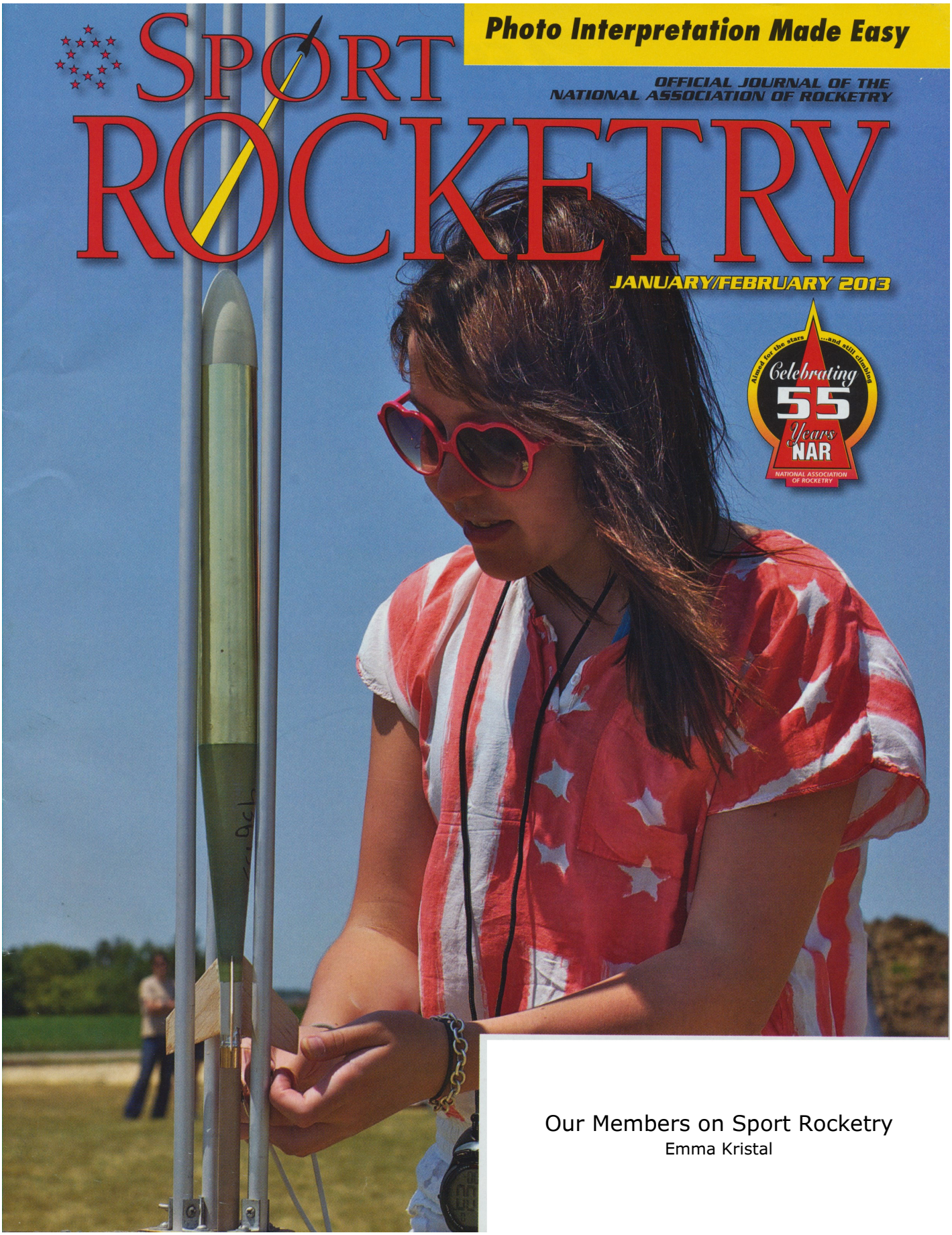
January 10, 2024
Falcon 9 - Axiom Mission 3
Launch Site: TBD
A SpaceX Falcon 9 rocket launched a Crew Dragon spacecraft on the program's 13th flight with astronauts. The commercial mission, managed by Axiom Space, is commanded by a former NASA astronaut. Three passengers, including a representative of the Turkish Space Agency, are expected to also fly on this two-week commercial mission to the International Space Station.

January 12, 2024
Falcon 9 - IM-1
Launch Site: LC-39A, KSC
A SpaceX Falcon 9 rocket will launch the IM-1 mission with the Nova-C lander built and owned by Intuitive Machines. The IM-1 mission will attempt to deliver a suite of science payloads to the surface of the moon for NASA's Commercial Lunar Payload Services program.

Early 2024
Vulcan Centaur - Dream Chaser 1
Launch Site: SLC-41, CCSFB
A United Launch Alliance Vulcan Centaur rocket will launch on its second demonstration flight with Sierra Space's Dream Chaser cargo vehicle for the International Space Station. The Dream Chaser is a lifting body resupply spacecraft that will launch on top of a rocket and land on a runway. This will be the Dream Chaser's first flight to space. The Vulcan Centaur rocket will fly in the VC4L configuration with four GEM-63XL solid rocket boosters, a long-length payload fairing, and two RL10 engines on the Centaur upper stage.

Late-January 2024
Falcon 9 - NG-20
Launch Site: Cape Canaveral
A SpaceX Falcon 9 rocket will launch Northrop Grumman's 21st Cygnus cargo freighter on the 20th operational cargo delivery flight to the International Space Station. The mission is known as NG-20. The launch vehicle for this mission was changed from Northrop Grumman's own Antares 230+ rocket to SpaceX's Falcon 9 rocket after Russia's invasion of Ukraine ended engine and booster production for the Antares program.

Starship Integrated Test Flight 2 - SpaceX photo



Our Members on Sport Rocketry

Emma Kristal