2024 February
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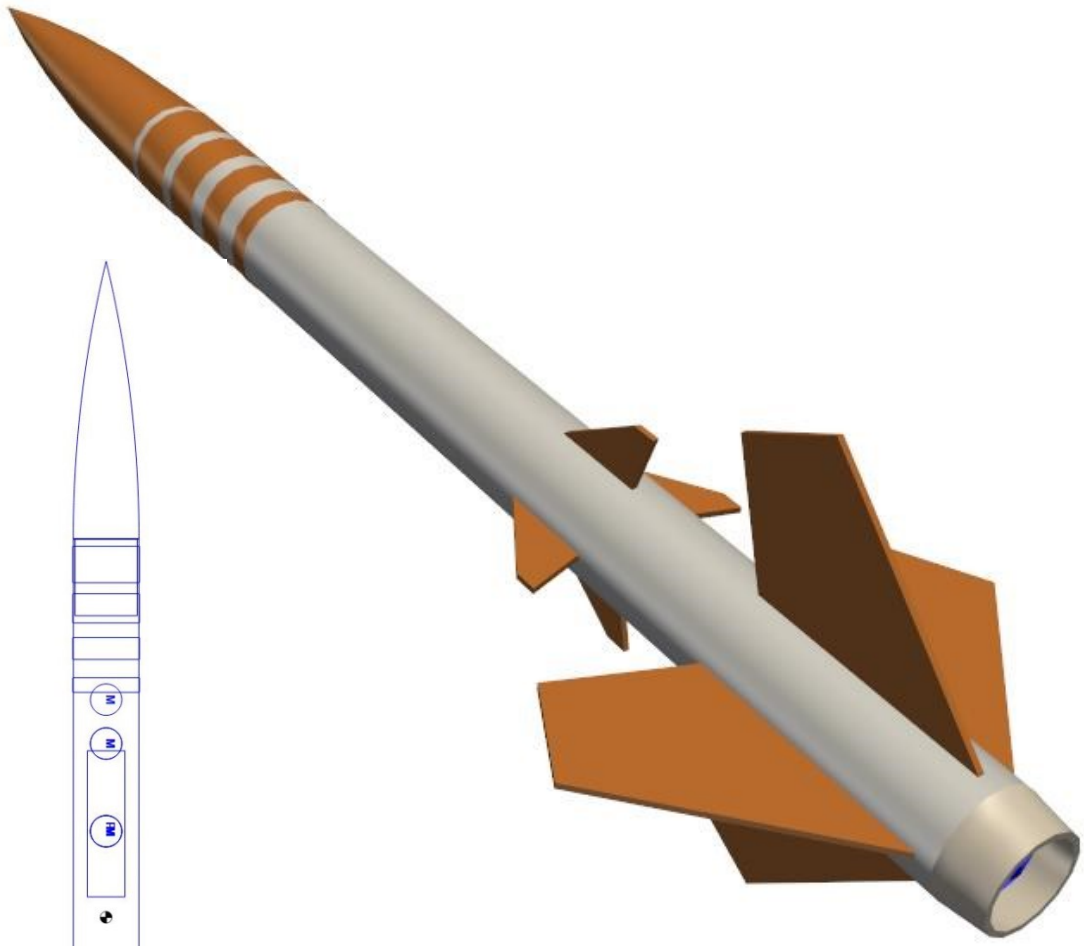
The Potter Rocketeer

Upstate Research Rocketry Group Newsletter

Special Interest Articles:

- Boeing CIM-10 BOMARC
- Starlight BOMARC
- AIRfest '23
- Winter Launch & Holiday Party
- LRDS 42 Update



PR PLANS: THE OCELOT

TRIPOLI OF UPSTATE NY #139 URRG Upstate Research Rocketry Group

On the Cover:
Build the Ocelot! A unique design by *Potter Rocketeer* staff, see page 8

Have a photo that you think would look great on the cover or an idea for a killer cover story? Or perhaps you have a design submission for *PR Plans*? Drop *The Potter Rocketeer* a note at:

PotterRocketeer@urrg.us

Or, better yet, tell the editor all about it at a launch or club meeting! We look forward to hearing from you!

Newsletter Editor:
Rick Barnes

Photos not otherwise credited throughout are editor's imagery

The Editor's Ramblings

Greetings URRGlings!

The new year is upon us, and exciting things are happening. A great deal of behind-the-scenes prep work is being done for LDRS 42 in June.

This includes the rebuilding of our launch control system, and the construction of new launch pads and towers to allow us to expand our launching capacity. The new field layout allows up to 95 total pads for big events. The Syracuse Rocketry Club will again support the event with their hospitality tent, providing rockets to kids and helping them learn to launch them. The banquet will be better than ever, with a pig roast and a real-life astronaut planned as a guest speaker.

There are a lot of volunteer spots still open for workers, so if you're planning to attend, consider signing up for a shift or two to help out.

With all the LDRS activity going on, it's almost easy to forget that we are getting closer to the start of the spring season. The April launch is two months away, so now is the time to finish those winter builds, repair your favorite rockets and set your goals for the year!

Space News

Vulcan Centaur launch
ULA Image

A lot of activity has been happening above the sky. There have been a couple of attempts at moon lander probes recently; the JAXA SLIM lander met was a partial success, in that it made it to the lunar surface, but tipped over on landing after one of its descent engines sort of fell off during the descent. It did land intact, but on its nose, preventing its solar panels from pointing in the right direction to be useful (at least until the moon moves a bit). SLIM came with two small rovers, however, which did deploy and operate successfully.

The first private industry lunar probe from the USA also made a go of attempting a moon landing. The *Peregrine* lander was more of a partial failure. It launched on the new ULA *Vulcan-Centaur* rocket successfully, but unfortunately developed a fuel leak that prevented it from being able to follow through with the landing. Ground crews regained control of the probe but had little choice but to deorbit it back into the Earth's atmosphere.

The launch of the Vulcan rocket, however, was completely successful. This is significant, because this was ULA's first test flight of the machine, which replaces both the Delta and Atlas families of launch

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Sources for BOMARC article:
https://en.wikipedia.org/wiki/CIM-10_Bomarc
https://en.wikipedia.org/wiki/BOMARC_missile_accident_site

Table of Contents:

BOD Corner

The URRG Board of Directors meets monthly to discuss club planning issues. The BOD Secretary keeps minutes of the meetings, which are summarized here.

Jan 7—9:03 AM

- Larry not able to attend
- Past minutes approved
- Treasury
  - Morgan has reviewed sales on LDRS site—doing well so far
  - Club accounts are healthy
  - Several large expenses are planned for LDRS
- BOD is considering a special launch day for LDRS committee members
- Larry & Rick met w/ Torreys
  - Gave rocket kids for grandkids
  - Discussed LDRS & banquet
  - Asked about onions on field, should be OK
  - Asked for a heads up about crops being planted
- Upcoming events
  - Holiday party / launch on 1/13
  - General membership meeting Thursday
  - Low Power committee meeting on Wednesday
- LDRS Planning
  - Banquet subcommittee meets 2/7
  - Need to find out more info about TRAtech talks planned
  - Some folks had issues with the LDRS website, Steve working on compromises
  - RSO discussion—tabled till more people attend
  - Things to think about—contact FD, food vendors, porta-potties
  - Would like to start assigning open tasks so we can account for them
  - Steve G is rebuilding the launch control box in Pelican case. Switch layout will reflect field

Jan 28—9:05 AM

- Minutes from 1/7 approved
- Treasury
  - Buying LDRS stuff already, more expenses soon
  - Renewal reminders will go out from website in Feb
  - Do we want membership cards this year?

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el Presidente'

By Larry Weibert

Hi Team. Spring is around the corner, and we have a busy year to look forward to.

The CRP (Collegiate Rocketry Program) school teams are starting to send plans for review of their projects, and many are lining up dates to have groups certify at various levels and times.

Last year, we saw an increase in both high school participation and the youth flyers. The club is blessed with having James Shatell and SRC (Syracuse Rocket Club) supporting the youth side of activities. The youth side of things will be seeing a busy schedule this year, as the club has invested heavy in the youth rocket kits. Dan Micheal has introduced the club to Aerotech composite A-D motors to support getting them started.

It's good to see the high schools supporting rocketry again. Many of us remember high school rocket clubs which is where a lot of young engineering minds got their start. The high school participation is opening a new set of leadership necessities.

Our present URRG team is already busy with the additional volunteering required to support the club's needs and collage teams. We will be looking for those interested in helping with the high schools as they continue to reach out for direction and support.

Morgan Monroe and Greg Young have been a great help with the high schools' interface and support. We look forward to getting new faces involved to assist. I can see in the future URRG leading a HRP (Highschool Rocketry Program).

The high school members can take advantage of NAR's Junior HPR Participation Program with Level 1 certification and TRA's TMP (Tripoli Mentoring Program) for ages 12-17.

Both programs introduce high school age students to levels of rocketry that further align with the experiences they will be seeing in college engineering endeavors. Supporting the high schools and these programs will need oversight to support—let's see where it all takes us.

So, let's talk about LDRS 42. We're having 4-5 meetings a month to prepare for this event. The club's heavy lifting needs include equipment and volunteers. We have, for many years, enjoyed the sharing and

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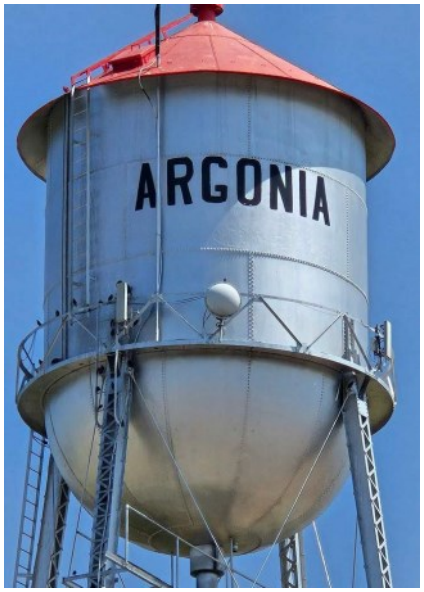
AIRFest 2023

By Steve Gregorski
(Photos are author's)



I hate getting rockets stuck in trees. I really do. If you fly enough at URRG you will eventually get stuck in a tree.

I've had three really bad tree rescues at URRG, plus a few more not-so-bad ones. But I love flying really high. I needed more tree-free altitude than URRG could provide, so……..Kansas here I come!

I attended my first AIRFest this past Labor Day weekend. 50K waiver, and there still are trees. But a lot less of them compared to the east coast.

The drive from my house to Argonia, Kansas was 1350 miles. Ouch. To make the most of it, I packed my SUV with more rocket stuff than ever before (including over 20,000Ns of motors) and headed out.

From what the locals told me, the wind for all four days of AIRFest was quite reasonable. Apparently, on the plains of Kansas, it regularly blows quite hard. No complaints here.

But it was hot. Really hot. 100 degrees hot. And the price you pay for no trees is no shade anywhere. Water, hats and sunscreen were the rule. This was going to be an endurance test.

A pro-flyer tip - the substitute for sunscreen in Kansas is dust. There is dust everywhere. They call it soil. I call it dust. You will get covered in it if you fly, but it does make for great sunscreen. I suppose your vehicle paint will also have great sun protection, because every square inch of your vehicle will get covered in the stuff. I planned on hitting at least one carwash on the way home.

I brought rockets of all sizes to fly, but I had four "big" flights planned. I wanted to achieve new personal altitude records with EX sugar motors for both a single stage flight and a two stage flight.


Half of everything…

I also had two additional two stage flights planned using APCP motors – one using EX and another using commercial motors.

All the two stage flights would use my homemade VOC (Vertical Orientation Control) system to keep the flight as "straight up" as possible. This would allow extended coast times between stage separation and second stage ignition.

When the dust finally settled (pun intended), things when surprising well. The single stage sugar flight went to 11,400 feet on an L-1400. Not quite a personal best, but it did pull 36g's off of the


Used pyro charges

Showtime lights its second stage

Showtime hits 20K' ft apogee

pad, which was quite exciting.

The two stage sugar flight flew on an L-1600 staging to a K-1200 and was perfectly vertical. The flight made it to 17,100 feet, which shattered my previous personal best and got me into the "3 mile high on sugar" club, LOL.

Both APCP two-stage flights were awesome. The first was an EX L-1000 red sunset staging to an EX K-1100 white. The second flight had a Loki L-930 staging to an Aerotech K-700.

Although the flights had completely different motors, the total impulse for both flights was almost exactly the same. And the apogees for both flights were almost exactly the same (20,500 feet and 20,100 feet).

The VOC system did it's job as well, allowing for a maximum coast time of over 15 seconds for both APCP flights. It's really cool when the second stage doesn't light until around 10,000 feet, since it's takes a few seconds between when you see the sustainer smoke trail and when the sound makes it back to the ground. Nice.

The final tally? Over 100,000 feet of apogee when you add up everything I launched into the sky. Ten used motors. And forty six spent ejection charges. (I use redundant systems a lot, so the ejection charges add up quick).

Wicked Sugar High lifts off

It took a few weeks to get everything cleaned up – including myself - after I got home.

So will I go again? Who's to say. But I already bought a few big motor reloads from Ted Chernok, which will match nicely with a 35K two stage VOC guided flight I already have sim'd.

You can never be too prepared!

Showtime launch #1

Showtime launch #2

Featured Rocket: Boeing CIM-10 BOMARC

See page 2 for references

BOMARC on Air Force truck for transport

Wiki Commons image

Normally in this space, we look at rocket subjects that are not commonly modeled and what it would take to build one. The Boeing CIM-10 BOMARC missile is anything but uncommon in the rocketry world; in fact, it has been extremely popular. But that's because it happens to be a very interesting design.

Since we are reviewing a Starlight Bomarc (see next page), it seems like a great time to talk about the original itself. Also known as the IM-99 before the designations were standardized in 1962, the Bomarc could be viewed as one of America's first cruise missiles. Unlike a modern Tomahawk missile, which is ground launched at distant ground targets, the Bomarc was actually a surface-to-air missile. It was not, however, intended to be a defense against nimble fighter planes like modern SAMs might be.

Boeing developed the system in cooperation with the Michigan Aeronautical Research Center (thus the name BO-MARC) in response to an Air Force call for a defensive system, which had both short and long-range components. The Bomarc was focused on the latter.

The design intent was to create a missile which operated more or less like an airplane, which would intercept Soviet bomber formations that were anticipated to come over the pole by flying out to the formation and detonate with a proximity switch in the middle of the enemy formation. As such, it could be equipped with either conventional or nuclear payloads. One could debate, however, the appeal of using a nuke if intercepting Russian bombers while over Canadian airspace. Just one of the many crazy nuclear ideas of the 1950s.

BOMARC being test launched

Wiki Commons image

First put into service in 1959, the Bomarc was of a compound propulsion design. The missile was launched using a rocket motor to get up to target altitude. Then it flopped over horizontal and lit up the main ramjet engines, which were located in nacelles under the fuselage. These would push the missile up to Mach 2.5.

Bomarc launched on a rocket motor and transitioned to ramjets, cruising at Mach 2.5

The missile was stored horizontally in low bunkers. When deployed, doors opened up and the launch guide was raised up vertically. Installations would typically include a dozen or more bunkers.

The first iteration of the Bomarc employed a liquid fueled rocket motor for launch. This led to some complication in deployment; the hypergolic fuels used are extremely caustic, so the missile could not be stored in a fueled state.

When called on, they had to be fueled prior to launch, delaying response time, so actual readiness was impaired. Fueling could be accomplished in about 10 minutes under ideal conditions, but the fuels had to be handled extremely carefully – hypergolic fuels spontaneously ignite when mixed.

This issue reared its head in 1960, when a fueling accident at McGuire Air Force Base led to a bunker fire on a nuclear-tipped missile. Although the explosives didn't detonate, the warhead melted and leaked plutonium. The radioactive material was inadvertently spread around the area while fire crews were trying to control the fire. The location was subsequently closed and remains off limits to this day.

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Kit Review: Starlight BOMARC

While perusing the erock-ets.biz site recently, I came across the fairly recently introduced BOMARC kit from Starlight Model Rockets. Not being previously familiar with this company, and having wanted to build a small model of a BOMARC for a while, I took the opportunity to order one for review.

I should state up front that although the materials and workmanship of the kit is fairly good, there are definitely some issues to be aware of.

The kit appears to be more or less a copy of an old Estes model. Now, to be clear, I don't personally have any issues with cloning or clone kits—they're a great way for modern modelers to build designs that haven't been available for a long time without having to reverse engineer the originals.

With that said, the Starlight kit is a little more than that. There are design changes that impact the finished product that are worth taking note of.

First off, there is a plastic nose cone instead of the Estes kit's original balsa one. That itself is ok, its more robust and easier to add nose weight to.

Also, the included instructions appear to be a direct copy & paste from the Estes kit without updates for the changes made.

But the bigger issue is that the tube lengths included aren't the same as what the original design used. The manufacturer claims that the finished rocket is 23" long, but the actual finished product is about 18-3/4" instead (scale length would be 21"). That means that the body tube included is about 5" too short for the original spec. That is a pretty significant percentage of the overall length.

The consequence of that discrepancy is that it calls into question the indicated center of gravity location. If the rocket is shortened by 20%, then is the CG position correct? It seems doubtful, but there isn't a way to tell. Because of the wings, conduit, and engine nacelles, this model doesn't lend itself to modeling in Open Rocket or Rocksim to try to verify CG. So it will definitely be a heads-up flight.

As a tangent, the tubes for the nacelles were also too long. I was scratching my head trying to figure out how to place them on the body tube while reconciling both the pre-marked locations on the tube, the placement dimension in the instructions (which itself was crossed out by hand with a new number written in), and keeping the proportions shown in the image on the face card and drawings in the instructions. These things just didn't correlate.

I wound up spending some time reading posts on *The Rocketry Forum* and *Ye Old Rocket Forum*, only to learn that I was not alone in my confusion. The first run of kits did, in fact, have too long nacelle tubes included.

But mine wasn't one of them. Rather, it seems that even the shorter, later tubes are still too long, still resulting in awkward proportions.

I elected to further cut my nacelle tubes down by another 1.5". This might not have been exactly correct for scale, but it does look about right, allows them to be located in the right spot—which is where the tube was pre-marked—and actually look like the photo.

Kit Part Set

One other miss in this kit are the decals. The included

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Tech Specs

Manufacturer:	Starlight
Type:	Semi-Scale
Scale:	1/26
Body Diameter:	1.325"
Length:	18.75"
Weight:	2.5 oz (no paint)
Motor Mount:	18 mm
Recovery:	Parachute
Retail Price:	$29.99

PR Plans: *Ocelot*

The *Ocelot* was born out of trying to devise a compact and fairly rugged rocket with unique fins and a boat tail, that would fly on a 29mm motor.

Designed to use LOC Precision 54mm body tube and matching nose cone, the Ocelot pairs these with a 3D printed tail cone.

The fins are forward swept with a set of canards up front. The shapes were settled on by moving the points around in Rocksim until favorable proportions were achieved. An added benefit of the forward sweeping shape is that the rear corners are not exposed to striking the ground first on landing, so they are relatively unlikely to be damaged in that situation.

General construction is typical of mid to high power. The LOC 54mm body tube is heavier than typical in wall thickness compared to most heavy cardboard tubing, so it does require a little more effort to cut the fin slots. But a fresh, sharp razor knife should do fine.

The motor mount uses 3 centering rings. Since LOC ships these rings in packs of two, I elected to laminate two of them together so that the forward ring was effectively a 1/4" thick. This makes it easier to drill into from the side for installing a rail button. If the builder prefers alternate ways to attach buttons, then a standard 1/8" centering ring will suffice.

An Estes 29mm plastic motor retainer was used, since they're light, cheap and reliable. The recovery harness was made from a section of 1/4" Kevlar. The top ring was drilled, and the Kevlar passed through. It was then wrapped around the motor tube and tied off. This is simple and, again, reliable.

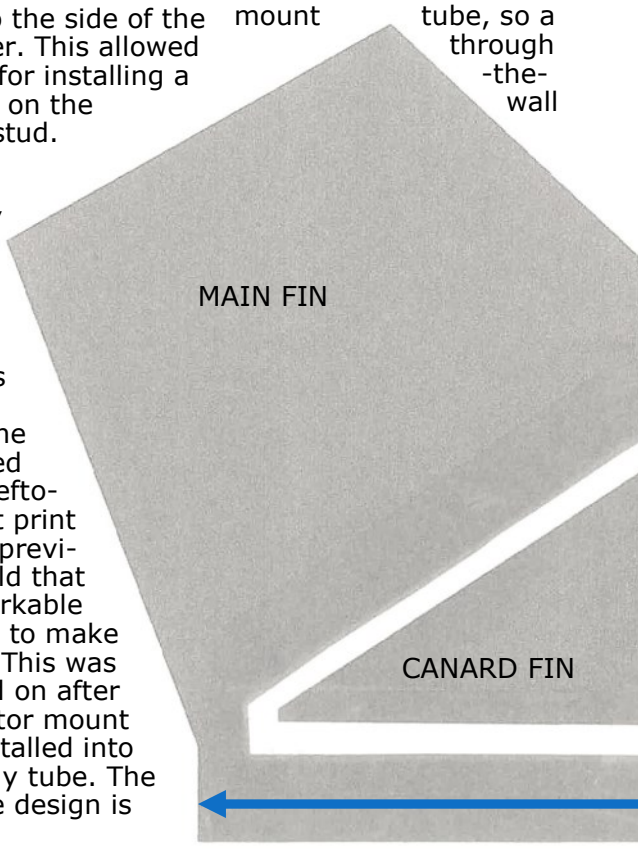
Completed motor mount with recovery harness

Two centering rings are laminated together with wood glue

The LOC nose cone was modified somewhat to allow a 1/4" eyelet to be attached, so as to not have to rely on the molded loop for harness attachment. A hole was cut into the side of the shoulder. This allowed access for installing a locknut on the eyelet stud.

The tail cone is, as mentioned, a 3D printed part. As it happens, the one used was a leftover test print from a previous build that was workable enough to make use of. This was epoxied on after the motor mount was installed into the body tube. The tailcone design is relieved to allow the motor retainer to partially recess into it, which makes for a tidier look.

The other design aspect that is worth mentioning sits underneath the canard fins. These fins sit farther ahead than the motor mount tube, so a through-the-wall



Ocelot
Length: 36.5000 In. , Diameter: 2.2450 In. , Span diameter: 9.7400 In.
Mass 26.4486 Oz. , Selected stage mass 26.4486 Oz.
CG: 22.4495 In., CP: 28.2466 In., Margin: 2.58 Overstable
Shown without engines.

2D & 3D renders were created using Apogee Rocksim 10 software

Fin placement dimensions

.375″

8.75″

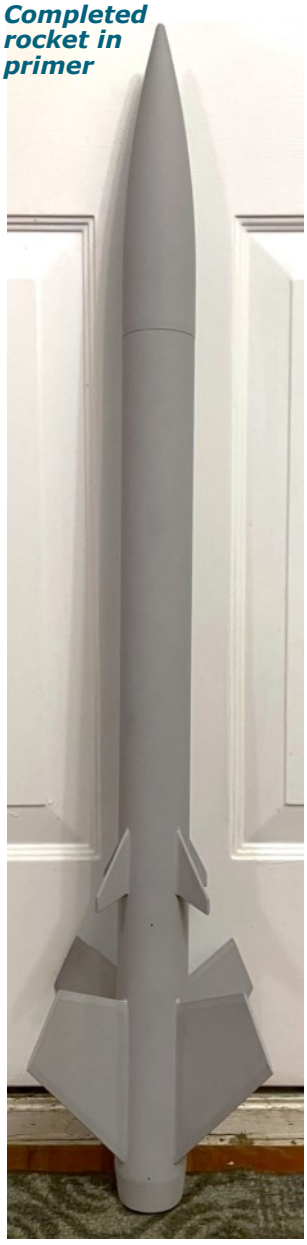
fin tab was not possible. I suppose the motor tube could be stretched, but that's not how this was built due to the tube length on hand. Instead, a section of tube coupler was glued into place just above the front centering ring, fully underlaying the canard fin slots.

Combined with the extra thick body tube wall, this created shallow pockets for the canards to sit in. It may not be quite as robust as a normal TTW tab, but it is better than surface mounting, and these fins shouldn't be terribly exposed to getting banged around.

The fins themselves are made from 1/8″ plywood. For this build, we cheated and had them cut out by *Upscale CNC*. These were beveled before attaching, and installed using a guillotine style fin jig.

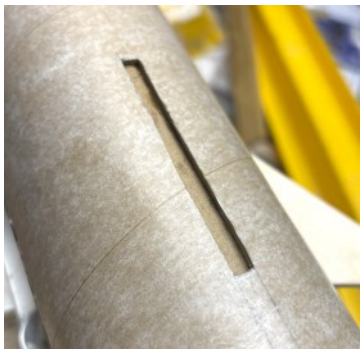
Due to the cold weather this time of year, it was not possible to fully paint the Ocelot prior to the time of this writing. A recent warm spell was enough to allow a coat of primer, but the rest of the paint will have to follow in springtime. We will perhaps follow up with an update later on.

Completed rocket in primer



The .STL print file of the tail cone is available, as is the Rocksim design file. Email potter-rocketeer@urrg.us if you'd like a copy of either file.

Fin slots are marked out and then cut out with a sharp razor knife. This tube is thick, take multiple passes



Canard slots make a pocket by placing the tube coupler behind them, giving more area for glue to bond

Bill of Materials

Body Tube:	LOC BT-2.14 (26″)
Nose Cone:	LOC PNC-2.14
Motor Tube:	LOC MMT-1.14-12 (9″)
Centering Rings:	LOC CR-214-29 (x2)
Motor Retainer:	Estes 9750
Harness:	1/4″ Kevlar (15-20′)
Parachute:	Top Flight PAR30-TM
Fin stock:	1/8″ Ply
Tube Coupler:	LOC TC-2.14 (3″)

Winter Launch & Holiday Party

On January 13, URRG held a winter launch, followed by a post-holiday party.

The event was something of an experiment, as we've never done either before. But Larry had the idea that we should have a Christmas party, and that evolved into adding a launch so that it would be more appealing.

The launch was not on the Torrey farm—the field and farm road was rather muddy due to the winter conditions. Rather, it took place a short distance away on property owned by a member of the club. We used a 5-acre field adjacent to the house to fly low-power rockets.

The weather forecast called for some snow and a bit of wind, but that didn't deter the hard core flyers. About 8 people turned out in total—not huge, but not bad considering it was mid January, up in Rochester the wind was blowing hard, and a snow storm was raging out toward Buffalo.

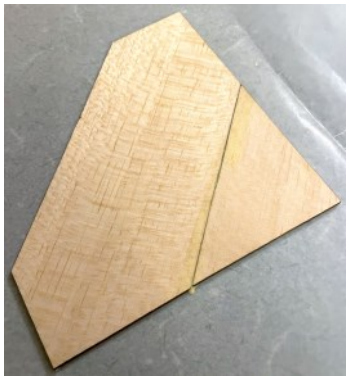
But it turned out to be manageable where we were. We saw some flurries and short spurts of wind gusts, but nothing too severe. We did, however, make good of streamers just the same.

A total of 20 flights were made that afternoon, a large portion of which were by Jackson Pembrooke.

Around 3:30, the flying had basically run its course. We retreated into the house for a social evening. Pizza came from Mark's in Penn Yan, and everyone brought some snacks or dessert.

It turned out to be a pretty nice afternoon and evening all told. Hopefully, if we do this again next year, we'll have a few more people turn out!

Starlight Cont'd



Wing pieces glued together

waterslide decals actually look nice and even include white striping bands (printing white is not something you can do on a laser printer). However, they were printed about 25% too large for the model. As such, they aren't useable at all, unless I scratch build another BOMARC big enough to use them.

However, Starlight is aware of the issue and has posted that anyone that received the too-large decals need only to let them know and they will replace them. I have not done this yet, we will see how good at customer service they are.

Body tube is pre-marked by the mfg

So, after all of this, what did Starlight get right? Well, the kit includes a nice glassine body tube and matching nacelle tubes. They look like they might be Estes products, or at least of similar quality.

The kit includes good quality medium to high density balsa sheet for the laser-cut fins. The ramjet inlet cones for the nacelles are turned balsa, and seem nice enough. Their shoulders needed a little sanding to fit the tubes, but that's not uncommon with balsa nose cones.

The instructions are clear and fairly easy to follow, considering that this is a higher skill level kit. Aside from not being updated. There are also two segments of balsa square stock that are to get shaped into the racetrack conduit on the rocket's back.

Additionally, the kit includes a chrome mylar parachute that the builder must assemble, some modeling clay for nose weight, a motor retainer hook, and piece of elastic cord for a recovery harness.

The build starts with assembling the wing fin. This made from two pieces due the constraints of balsa sheet size. These pieces are butt-joined with wood glue and sanded. However, the fit was good, so once glued up, there was relatively little effort to sand them together with a nice quasi-airfoil on the leading and trailing edges.

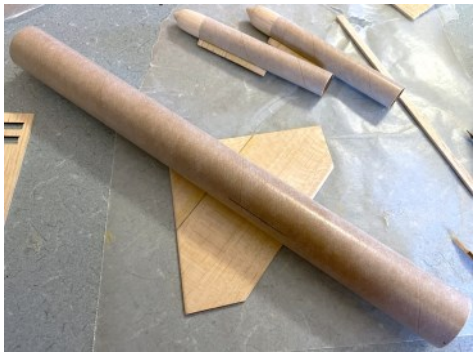
While that was drying, I set about building the motor mount. There wasn't much noteworthy here, save to say that the shock cord attaches through the forward centering ring.

Once the wing is ready, it is glued onto the back of the body tube. Here, its important to make sure that the index location and alignment stay correct when you set it down, but basically, the tube just sits on the wing while the glue dries.

When that's done, attaching the horizontal tail fin is also easy—the orientation is driven by how the wing was attached. So, you also align it and let the tube just sit on it while it dries.

When that part is done, the rudder fin is glued on. This is centered on the horizontal fin and attached at a 90-degree angle. I think the rudder fin's shape was a little off, but its hard to capture in photos. The trailing edge should be vertical, based on photos of the real thing, and it is slightly forward leaning on this model. But I also didn't bother to recut it.

Wing glued to the body tube



With the fins all attached, the motor mount is inserted. The reason for doing it now is that the hook is aligned with the rudder.

One mistake I made here was that I inserted the motor mount too far into the body tube. The instructions said to slide it in until the retainer hook was flush with the end of the body tube. I now realize that the instructions were written for an older-era motor hook, which was only the length of a motor casing. The hook included was a modern Estes-type with the finger tab on the end, which makes the hook longer than the original. Again, it would be nice if the instructions re-

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Visit: https://www.starlightrockets.com/product-page/starlight-bomarc-model-rocket-kit

BOD CONT'D

•We should have cards for ID purposes

•Do we mass print or on-demand? Shouldn't print cards not needed

•Can we batch them throughout the year? Easiest is mass run at Staples

- Should work on developing purchasing policy

•Can authorize certain BOD to certain thresholds of purchase

•Online templates are good starting point, Jason will send out one for review

•Its important to have defined policy incase of future questions

- Ray D has requested a special launch for a youth group
  - Planned for 2/17 or 18
  - Need to get control box back to Steve for upgrade, can't go past that date
  - Need to see is available to support
- Steve S has old generator from Radical Rocketeers, could donate to club. Perhaps Teddy can bring up
- Should we have a tower use fee to help recoup building costs? Future discussion

LDRS Discussion

- Tower trusses—Mickey plans on purchasing ones found by Greg Y, working on plan to retrieve them
- Don & Sherri are not able to participate this year
  - Morgan can run registration in AM, if Steve G can LCO
  - Will see if others can assist during busy times. Need efficient process
  - Need someone to manage parking—Eric is willing handle this
- Steve is working on ironing out raffle prizes on website. Not all prizes are known yet
- No Subcommittee meeting this week
- Food vendor
  - BBQ Shack not attending
  - Keuka Trail food truck will be there. Will provide sample menu
  - Ice cream truck withdrew
- Raffle stuff
  - Teddy has created an announcement script for LCO
  - Teddy will handle field raffle logistics
  - Are we doing banquet raffle? What to put in swag bags?
- Registration packets
  - Have always used Ziploc or Tyvek bags in past, not big enough for new swag
  - Morgan has sourced printed tote bags to use
  - Should put copy of program in bags this year
  - Bags include pre-ordered items, flight cards, invoice sheet, ID, lanyard, pen, trash bag, handwipes
- Flight cards
  - Need cell for pad assignment
  - Safety checklist on back, per past LDRSs
  - Consider making EX cards a different color
- Pad signs
  - Need new signs for extra letters
  - Need to pin down layout
  - Can we put # tag right on pads?
  - What other signs are needed?
- Batteries
  - Need to final field layout to know how many needed

CONTINUES ON PG 14

PRESIDENT CONT'D

supporting of sister clubs. SRC is a great example of this.

We recently reached out to our other sister club, MARS. Todd Smith, the new president of MARS, has been great to work with and his visions for supporting rocketry align with how SCR and URRG feel.

The flyers will see a great future with the three clubs supporting each other. URRG invited MARS to have a MARS tent at LDRS 42 up front with us, and we look forward to supporting their membership. Many of our members like flying at several locations and it gives alternate dates to accommodate flyers' schedules.

LDRS 42 has additional positions due to the size of the event. Road monitors at the entrance, recovery personnel, away cell pad managers, and the away cell Range Boss. Our URRF event requires 56 positions per day to fill. This LDRS has 82 positions per day that need filling. Please, please take a look at the volunteer positions and sign up for a couple of 2-hour shifts.

Not sure where you can help, call me 716-628-1880, I'll find a spot for you to fit your abilities.

BOMARC Cont'd

By the late '50s, solid rocket motors had improved in impulse enough that a revised design was phased in. This –B version did away with the liquid fueled motor in favor of a Thiokol solid rocket motor. The solid fuel model was first launched in 1959.

This improved deployment response vastly, as well as the safety of operations. Another consequence of the motor change was the intercept range of the missile increased substantially. The original model had a functional range of about 200 miles. However, by removing the liquid rocket fuel, Boeing was able to convert that space to fuel storage for the jet engines. That increased the range to 430 miles, a pretty healthy improvement.

Bomarc missiles were deployed in 14 bases across the northern United States. It was also adopted by the RCAF, and installed in a few locations in Canada. The deployment in Canada was a lot more controversial, as the Canadian people were reluctant to get in between a potentially nuclear confrontation between the USA and USSR.

The missiles remained in active service until 1972, but the widespread introduction of ICBMs in the 1960s more or less eliminated the need to defend against Soviet bombers descending on America from over Canada in the first place.

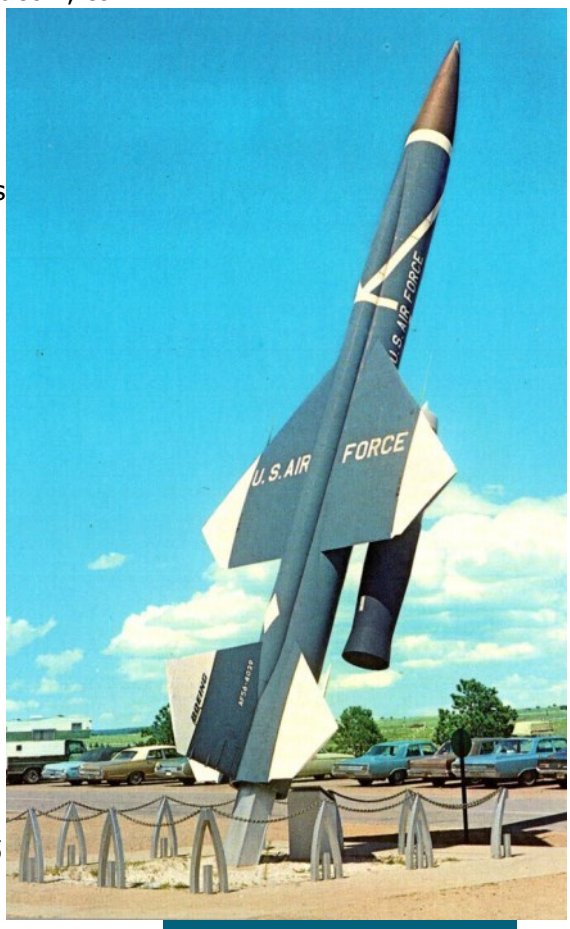
After the Bomarcs were removed from service, the majority were scrapped. However, several of the earlier liquid fueled models were adapted into drone aircraft by NASA. Additionally, there are several on public display in assorted museums around the country.

For the hobby rocketeer, kit versions of the Bomarc are or have been available in multiple sizes by multiple manufacturers over the years, including Estes, Centuri, North Coast and Madcow, to name a few, as well as the Starlight kit reviewed in this issue. So a hobbyist really just has to pick the version that they like.

If one is determined to scratch build a nicely detailed, accurate model, Peter Alway has very nice drawings of the missile and its color schemes in his book *Rockets of the World*.

The Bomarc was 46.6 feet in overall length and 35 inches in diameter. So the Starlight kit in BT-55 tubing is about 1/26 scale. If you built a bigger one in 1/12 scale, you could make use of common 3" airframe tube. This would be fairly large at 49" long. With the weight and drag that likely result from the pods, it would be a good candidate for a 38mm motor mount (or maybe bigger).

Either way, this results in a model that is instantly recognized at the launch pad, and folks will want to take a closer look!



LRDS CONT'D

- Most current batteries probably OK
- Can buy 12 new 12amp/hr batts reasonably priced
- Can we get a load tester to properly test them? Steve G can build one
- Jason committed to building new battery boxes. Will order new batts today

- Last Eurmax tent needed has arrived
- Towers
  - Jason asked local shop to quote fabrication
  - Mickey building one already
  - Need to make sure members fabbing are paying out of pocket
- Need to talk to fire dept.
  - Dept has had trouble finding volunteers
  - Next pancake breakfast is 2/18, should visit and discuss
  - Should at least have an AED on hand for emergency

<u>Low Power Committee</u>

12/13/23

- Need to decide on supplies needed for youth tent. Need James S to chime in
- 40% Estes no longer available, but can get Quest at discount

1/10/24

- Youth tent allows spectators to get involved
- SRC helps prep and fly, instructs kids
- Gave out 66 rockets at URRF9. Might be 50/day at LDRS, hard to say
- Suggest getting 100 simple kits. Dan M to work out discount price
- Looking to get range of LPR motors as well, Dan M to quote 150 ea A & B
- Make end of Jan cutoff for decision, should order early
- Do want to collect flyer info from SRC tent for follow up? Morgan to work on
- SRC willing to bring their LPR pads to augment URRG's

2/7/24

- New pad / control box proposal shared—color code LPR and MPR for simplicity of labeling
- Dan M ordered kits and motors, Can we get status? Can kits be shipped first?

<u>Banquet Committee</u>

2/7/24

- 44 banquet tickets sold so far
- Raffles—have 50/50 and swag/ gift cert raffles
  - Need to decide contents for bags
  - Use "field bucks" for gift certs
- Need to evaluate projector
- Need to have discussion w/ Valley Inn
- Larry to follow up w/ Bob Brown about guest speaker

<u>Equip't Committee</u>

12/20/23

- Discussed control boxes w/ Wilson. Should be OK to build into Pelican case with rotary switch for banks
- Jim S doesn't want to build pads as we want, Larry to retrieve mat'l and come up with Plan B
- Need to build 2nd tower, get trusses for
- Need to audit how many rails we have

1/17/24

- Steve G is rebuilding 128 control box into Pelican case.
- Rich M is making top plate for control panel
- Need to finalize box layout on field
- Need maybe 4 trucks for BFR transport, trailers not preferred
- Mickey making progress on tower
- Jason ordered last tent needed
- Need more battery boxes, should check w/ Rich M for 1515 rails, Eric P can help build stuff, Tim W will make saw horses for parking barriers

<u>BFR Committee</u>

12/27/23

- Need to establish Away Range Boss
- Need to determine away cell layout. Dan M says only have 4 pads at 1500', debate involves setbacks and altitudes flying. Need flexibility of layout
- Do we need staff at away cells?
- Need to make sure that announcements are heard

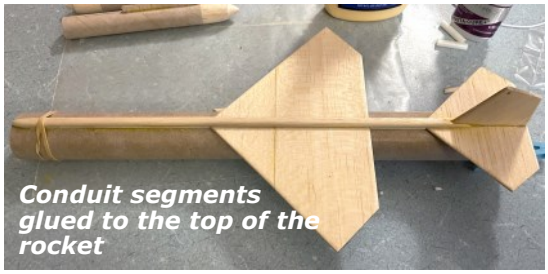
1/24/24

- Larry reviewed layout w/ Sam H, in agreement that more is better
- Tom C asked for tower at C-row
- Need to build 2nd new tower
- Need prep area for air starts at away cell

Starlight Cont'd


Balsa stock shaped for the dorsal conduit

flected this. But, I suppose this means that the rocket's stability margin might now be a little better since the motor is farther forward—assuming it doesn't burn off the back of the rocket as a result.


Conduit segments glued to the top of the rocket

The ramjet nacelles are fairly simple structures. They are just tubes with a nose cone and one pylon each for attaching. After sanding the nose cones to fit and gluing them on, I tried to airfoil the pylons per the instructions. The catch here is that they are very skinny, with the wood grain going directly across them (which is what you want when they're installed). But it makes holding onto them while sanding difficult.

After breaking one and gluing it back together, I decided to glue them onto the nacelles first, then sand them with a small file afterward. A small Emory board worked well for this.

When satisfied, the nacelles are glued to the main body tube. The trick here is holding them normal to the body tube while the glue dried. I put a drop of medium CA glue on the ends of the pylons to tack it while the wood glue dried. This worked well.


Glue fillets are applied to all fin and conduit joints

The last detail is the conduit on the dorsal side of the rocket. This is built up out of the included stock, and has to be stacked for the correct shape and height. There are two sections of lower layer, one that's small between the wing and tail, and a longer one ahead of the wing that extends to the front of the tube. These need to be cut to length and V-notched to sit flush to the wing and tail fins.

The upper layer runs from the front of the body tube to the rudder, and needs to be notched to wrap around the leading edge of the rudder fin. This is not described in the instructions; I had to deduce it by studying the pictures. The upper piece has to be sanded round along the top edges, and the front end is sanded to a bullet shape. I presanded it as much as possible before gluing it on, then final sanded it when the glue was dry.

When its all complete, the Starlight Bomarc makes a nice looking model. It won't win any scale accuracy awards, but it is rewarding to build just the same.


Completed rocket

Due the cold weather, I was not able to paint before going to print. But it actually does look good in its raw form. It just needs a patient builder with a little experience.

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ABOUT URRG

The Upstate Research Rocketry Group, Inc (URRG) is located in Western New York.

We are a NYS incorporated non-profit 501-C3 focusing on educational and research aspects of amateur rocketry.

We are dedicated to promoting model and high power rocketry, and are registered as prefecture #139 with the Tripoli Rocketry Association and NAR Section #765.

URRG has the privilege of flying at Torrey Farms of Potter, NY, one of the finest fields in the Northeast. The former swamp nestled in the heart of the picturesque Finger Lakes wine region, is now a productive farm and has been the home to the July 4th "Muck Fest," LDRS-28, LDRS -31, URRF, and LDRS-34.

URRG at Torrey Farms has been described by Rockets Magazine as the Northeast's summer time rocketry destination.

So whether you're a BAR, an old timer, or just interested in seeing some amazing launches, take some time and visit us during a launch. We're looking forward to seeing you at our next event!

CLUB CALENDAR

2024 Dates

February 15	**Winter Meeting**
March 14	**Winter Meeting**
April 11	**Winter Meeting**
April 20-21	**Launch #1**
May 18-19	**Launch #2**
June 6-9	***LDRS 42***
July 13-14	**Launch #4**
August 10-11	**Launch #5**
September 21-22	**Launch #6**
October 19-20	**Launch #7**
November 2-3	**Launch #8**

For 2024, I resolved to make my offering to the tree gods early...

EDITOR CONT'D

vehicles.

Vulcan-Centaur's second flight should take place this spring, this time carrying Sierra Space's *Dream Chaser* space plane into orbit.

The *Dream Chaser* is a lifting body, reusable space craft that looks like a mini–Space Shuttle. It will fill a similar role to the Shuttle, in that it will be used to carry cargo and supplies to the ISS. It may be possible that a crewed version will come along in the future. Look for more on this in the near future.

In sadder news, it seems that NASA has lost the ability to communicate with *Voyager 1*. Though they are still working the problem, it seems likely that this is effectively the end of probe's service life.

Now in deep space, beyond the bounds of our solar system, Voyager 1 (and its sister Voyager 2) has been conducting science for over four and half decades and has far outlived its expected service life and, presumably, its warrantee…

Nasa has also had to retire the *Ingenuity* helicopter that has been operating on Mars. The probe has suffered damage to its rotor blades, and can no longer fly. At this point, Ingenuity, which arrived with the *Perseverance* rover, has also well outlived it planned service life, and has far more flight time on it than initially imagined.

The other big news is the coming total solar eclipse, will cross right over western NY on April 8th. The eclipse will block out the sun completely, with between 2 and 5 minutes of totality depending on where you are.

Also later in April is the Lyrids meteor shower, which peaks over the same weekend as the first launch of the season. Unfortunately, it will compete with a full moon, which will make it harder to see. But if the weather is good, go outside and look up!

Rick