



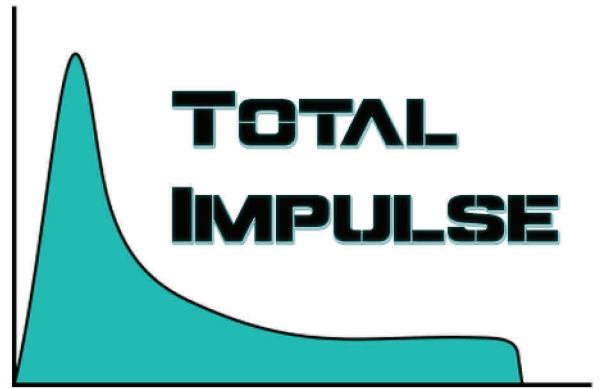
JACKSON MODEL ROCKET CLUB



TOTAL IMPULSE VOLUME 18, No. 4



July-August 2018



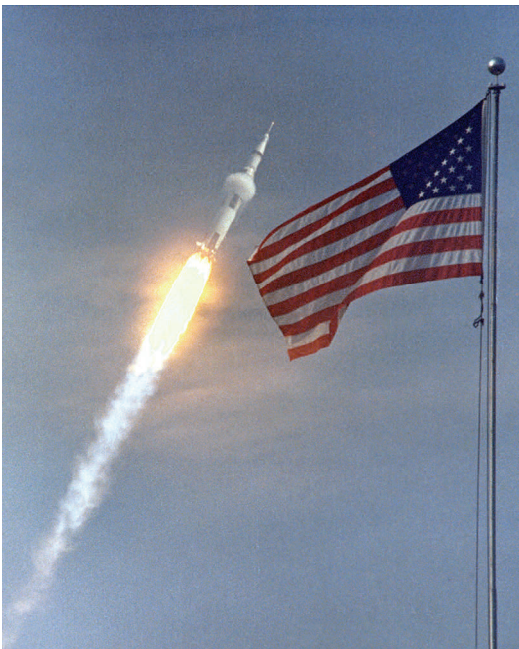
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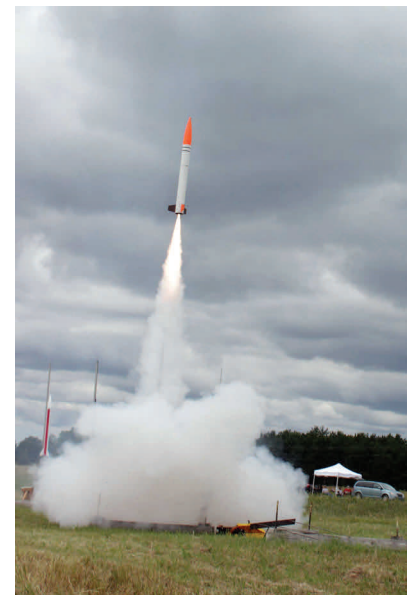
BT-3A(N)/RIM-2D NUCLEAR TERRIER



APOLLO 11 ANNIVERSARY



LAUNCH EVENT COVERAGE



CLUB OFFICERS

President: Scott Miller
Vice President: Roger Sadowsky
Treasurer: Tony Haga
Secretary: Rob Dickinson
NAR Advisor: Buzz Nau
Communications: Dan Harrison
Board of Director: Dale Hodgson
Board of Director: Bob Dickinson



MEMBERSHIP

To become a member of the Jackson Model Rocketry Club 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@sfsindustries.com and mail it along with a check for the annual membership dues (17 and under \$10.00 or 18 and over \$30.00) to our mailing address of: 4788 Moon Lake Rd., Jackson, MI 49201.

Members enjoy reduced launch fees (for engine sizes "F" and higher), participating in club projects, and meeting an incredible group of positive people.

COMM CHANNELS

There are several ways to keep in touch with the JMRC 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

Welcome New Members!

Please welcome our new members and make sure to say Hi and introduce yourself at a future launch.

Larry Dash - March 2018
 Jeremy Sell - May 2018
 Don Nichols - May 2018

Welcome to the July - August 2018 issue of *Total Impulse*. This marks one year and the 9th issue since taking on the editor's hat. Looking back, it's been a great year for JMRC. We took advantage of Rocketry Festival/NAARAM 59 being hosted so close in Muskegon. We participated once again at Make Faire with our highly successful, "build it, fly" fund raiser. We had a much needed maintenance day, held our annual Holiday party, participated in the National Rocket Competition, and held seven sport launches. I can't wait to see what we do in the next 12 months! For starters, we'll be participating at Maker Faire again in late July, at least two members will be travelling to Colorado for NAARAM 60 and the Harrisons will be leaving soon for Trevor to compete in Poland on the US International Competition Team.

As always, *Total Impulse* is looking for submissions. Below is a list of articles we're looking for.

Request for articles,

- Product Reviews
- Build Reports
- Event Reports
- Technical or "How-to" articles
- Photos!
- Space History
- Scale Data
- Sport Plans
- Competition Plans / Techniques
- Support Equipment
- Model Rocket History
- Certification News
- Vendor News

About Total Impulse

Total Impulse is the official newsletter of the Jackson Model Rocket Club (JMRC), Tripoli Prefecture 96, NAR Section 620. Published Monthly, *Total Impulse* is a space-modeling newsletter devoted to representing the diversity of interests in today's hobby of model rocketry. This newsletter is in the public domain except where otherwise marked. Unmarked articles, photographs, and drawings may be re-printed elsewhere, but credit to the author and this newsletter is expected. Material marked as copyrighted may not be re-printed without the consent of the author.

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

Send correspondence to:
 Jackson Model Rocket Club
 Buzz Nau, Editor
 5170 Reno Rd
 Manchester, MI 48158
 E-mail: USSMidway@gmail.com

'Scuse Me, Where Were We?

This July marks the 49th anniversary of the first human to set foot on another celestial body. Sounds impressive when you put it that way and it was. It was an incredible accomplishment to meet this goal in less than 10 years. Growing up in the 60's during the peak of the space race had me believing I'd enjoy flying cars and jet packs in no time. Back then the moon was just the first step and Mars would be next followed by harvesting resources from the moon and asteroids. No such luck. The reasons for the decline in manned space exploration are many, but government funding is by far the greatest. It was obvious the NASA budget couldn't continue receiving Apollo level support. You could also argue, what was more important, manned or unmanned space exploration? NASA couldn't do both aggressively with post-Apollo funding which is where I believe the private sector could have grabbed the baton and kept running, but that didn't happen. Thankfully, we're seeing it now with SpaceX and Blue Origin. They're making fantastic progress and it's been a lot of fun watching, but time is running out for me to get a flying car and jet pack. Just saying.....



Launch/Event Calendar

- Jul 28-29, 2018 Maker Faire (The Henry Ford)
- Aug 4-10 2018 NAARAM 60 (Pueblo, CO)
- Aug 18, 2018 (MIS Graves Campground) Odd-roc Day
- Sept 8, 2018 (MIS Graves Campground)
- Oct 13, 2018 (TBD) Scale Day
- Nov 10, 2018 (TBD)
- Dec 8, 2018 (TBD)

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.

On the Cover:

(top) Two RIM-2D Terrier Static Displays at the museum of Nuclear History - Kelly Michals photo (bottom left) Apollo 11 Launch 7/16/1969 (bottom center) Trevor and Dan Harrison at the CanAm Cup, Muskegon, MI (bottom right) Dale Hodgson's modified LOC I-Roc on a Loki J525 at CrapShoot V



LAUNCH REPORT

JMRC JUNE SPORT & NRC LAUNCH

GRAVES CAMPGROUND JUNE 16, 2018

Once again, the monthly JMRC Sport & NRC launch was threatened with poor weather, but this time the forecast completely skipped over and around the Grave's Campground launch site. Instead, the attendees enjoyed fair skies and winds throughout the day.

Though we were shorthanded on board members as several were unable to attend, there was plenty of help from the members that did attend with set up and tear down.

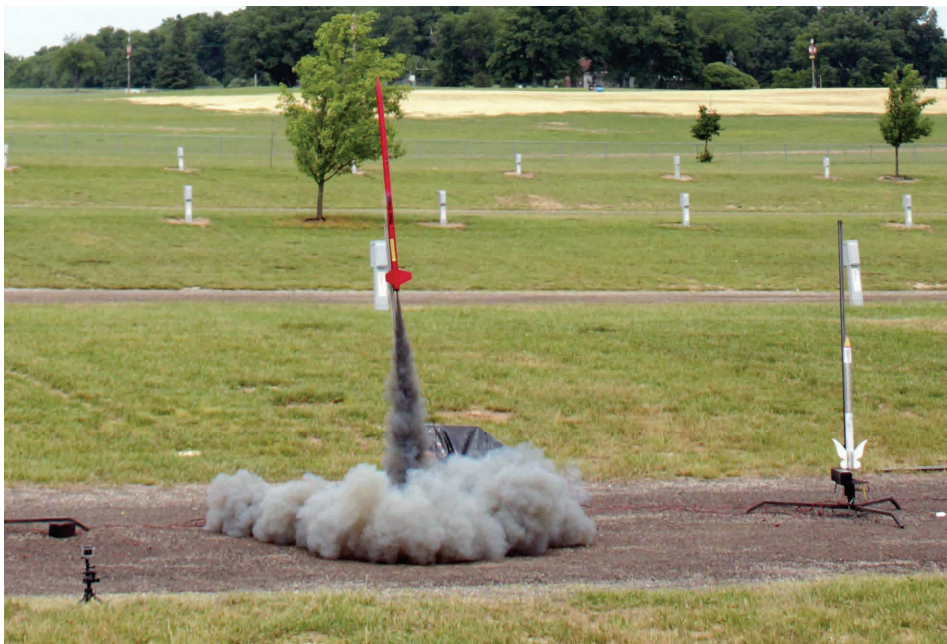
Launch Control Officer (LCO) duties were shared by several, but mainly provided Dale Hodgson. Dale also put up a few glider flights early in the day. For the most part they were successful especially his Semroc Hawk with an elevator modification that greatly improved the glide.

Dan Harrison flew a really nice new rocket glider kit from J&H Aerospace. It's a neat little swing-wing with laser cut parts. His one high power flight for the day was his Lightning Bolt on a home brew J143. It was a beautiful long boost, but unfortunately weather-cocked just enough to land in the woods. It's too high for our current retrieval gear, but hopefully it can be recovered soon.

Some of the most entertaining flights came from Chris Palmer. His aptly named "Saucer of Death" burned for an eternity on a H45, but his best flight was no doubt, his LOC Mini Mag named "Livonia or Bust" on a H550 Super Thunder.

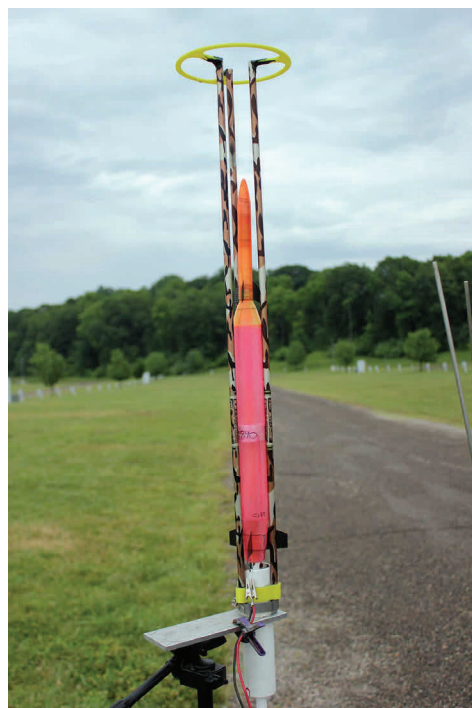


Rick Sharp's Arcas on a H114 Metal Storm



Herb Crites' Mach Schnell SLK

Dave and Sarah Glover were joined by Sarah's longtime friend Christine Scharrer. Christine flew her Fliskits Systic and Estes Venom along with her Estes



Trevor Harrison's S3 FAI Model



Steve Lindeman and his "XF-48 White Knight"

Magician filled with Skittles. At least one Skittle was recovered by Chris Palmer, though it's unknown if he ate it.

Sarah flew her "Fletcher" (Estes Flechette), two stage Mongoose, and an Estes Mosquito that was promptly lost as Mosquito's are prone to do. Dave flew several rockets including his scratch build "Double Trouble" on two F42-8's and Madcow Torrent on a H550-9 as a dress rehearsal for his Level 2 cert flight.

Randy Gilbert put up three flights, his Odyssey 3, new Estes Astron Explorer, and upscale Cobra 1500 he named "Cobra 2160". Herb Crites flew three versions of his venerable "Mach Schnell" series and several flights were with the new Blue Thunder motors which were really impressive.

New member Jeremy Sell put up a successful Level 2 flight with his LOC Warlock on a J293. Unfortunately a later flight with his PML Ariel on a Loki H125 cocktail blew the forward closure and made a mess of the Ariel. Jeremy also flew his Estes PSII Nike Smoke on a G79-9.

Tom Kurecka made his first launch appearance in a while and put in five nice flights including his "Sonic Event" on a F20-4, "Neptune Surveyor" on a D12-5, and upscale SLS Laser-X on a F20-4. Tom produces some of the best rocket videos you'll ever see. Check out his YouTube channel at, <https://www.youtube.com/user/4FlyRockets>

The most flights of the day were put in by Steve Lindeman. Unfortunately, his Scissor Wing Transport did not transition a a good glide and pranged, but his other flights were great including his scratch built XF-48 White Knight on a F15-6.

Mark Chrumka put in seven flights one of which was a boiler plate test of his scale staging system for NARAM. The E15 didn't have enough thrust to trigger the timer. He also lost his Tiny Pterodactyl on a G40 to the woods after a bad rod whip. His other sport flights were more successful



Tom Kurecka's SLS Laser-X



Jeremy Sell preps his Level 2 Warlock

including Estes Firebolt on a D12 and Fliskits Deuces Wild.

Rick Sharp and Art Upton came up from Ohio. Rick had four really nice flights including his AMRAAM on a G79, Madcow Arcas on a H114 Metal Storm, AMW Stinger on a F51, and LOC Viper III on 3 E12's. Art put up three flights all with colorful narrative because, "he planned it that way!"



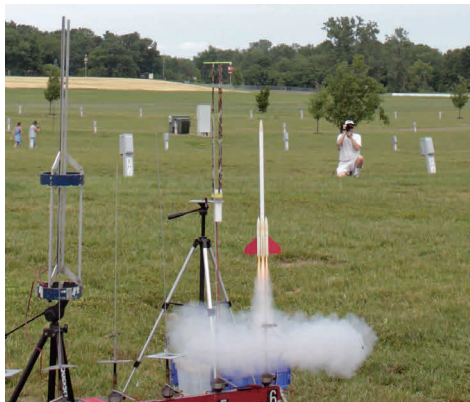
Jeremy's Warlock for a successful L2 flight

NRC Flights:

Competition flying was light. Buzz Nau of the Uncertainty Principle team put up two nice altitude flights. His first was for C Egg Loft with an altitude of 244 meters. Next up was his boiler plate for B Cluster Altitude. This is an event at NARAM, but not one of the NRC events to qualify for during the year. The flight was great, but the altimeter malfunctioned. Regardless, the flight was mainly a structure and stability validation

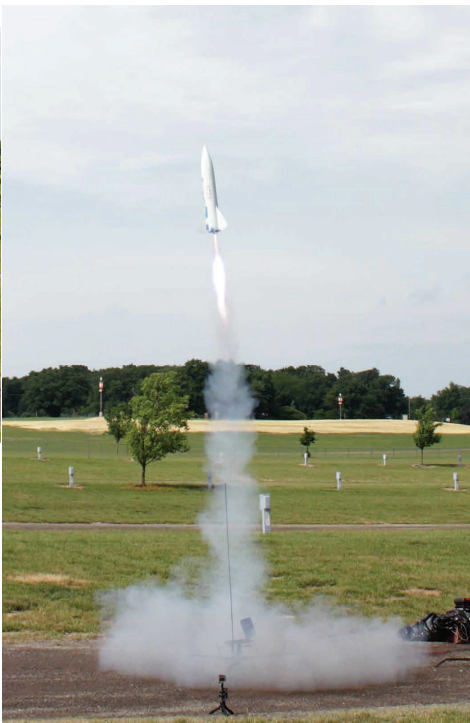
which was successful.

Al de la Iglesia put up two good Streamer Duration flights that bumped the team up a couple notches on the score board. Trevor Harrison also put up 1/2A Parachute Duration flights as he continues to practice for the Internats. He also tested several other FAI models including a successful S3 flight.

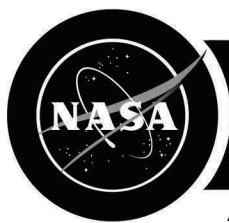


Uncertainty Principle's B Cluster Altitude model

Turnout was solid for the June launch and it was great to see so many members help out with the set-up and tear-down. We had a total of 86 flights which isn't shabby at all. We also want to thank Mike and Natalie Jacobs for bringing donuts and donating a cooler of ice water. It got plenty warm in the afternoon and it was greatly appreciated by all.



Chris Palmer's "Livonia or Bust"



THIS MONTH IN AEROSPACE HISTORY

Apollo 11 Forty-ninth Anniversary

Roger Sadowsky



Houston would perform a check out of the spacecraft. Once everything was checked out, mission control would give the 11 crew the call for TLI (trans lunar injection.) In the command mod-

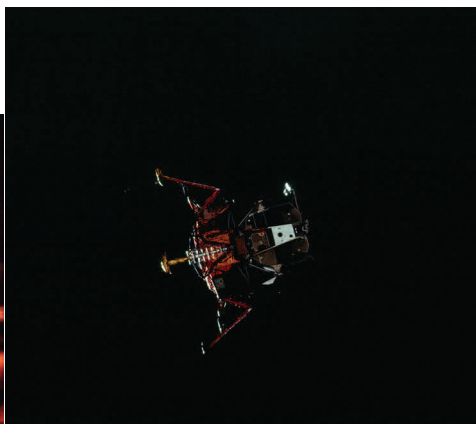


Taking a look back 49 years ago... July, 16, 1969 Kennedy Space Center, Florida Launch Complex 39A at 9:32 a.m. eastern standard time, Apollo 11 lifts off with its crew Neil Armstrong, Michael Collins & Edwin "Buzz" Aldrin into the history books, the first attempt to land a man on the moon.

Once achieving earth orbit the crew, with help from mission control in



ule, the crew would ignite the Saturn's SIVB J-2 engine and off they went. After the burn and reaching escape velocity from the Earth the crew would reconfigure their spacecraft and dock with the stored Lunar Module. Once the LM was extracted from the SIVB the spacecraft would start its journey onward to the moon.



The nearly 4-day trip would give the crew time to perform various daily tasks onboard the spacecraft along with TV time for everyone back



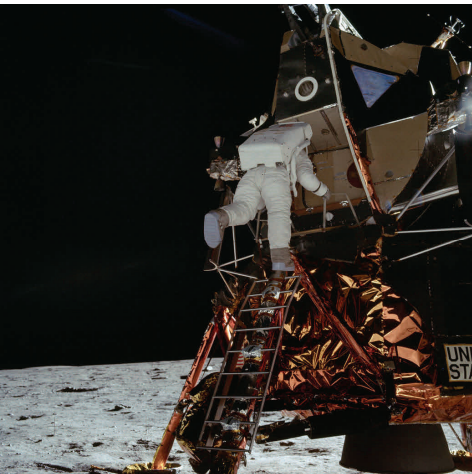
on Earth seeing how the crew was doing. Finally, on July, 20.... The Big Day! Armstrong & Aldrin would take the Lunar Module "Eagle" on down to the lunar surface at The Sea of Tranquility. Armstrong, would announce to Houston... "Tranquility Base... The Eagle has landed". Of course, you can imagine a big sigh of relief at Mission Control. Cap com: Charlie Duke, "Roger Tranquility we copy you on the ground! You got a bunch of guys about ready to turn blue! We're breathing again.. thanks a lot!".



Then the Big moment. Those of us around at that time remember the image on TV and hearing Capcom: Bruce McCandless, "Ok, Neil we can see you coming down the ladder now." Armstrong, "I'm on the LM foot pad it appears to be depressed in the surface about 1 or 2 inches. I'm gonna step off the LM now"... "That's one small step for a man, one giant leap for mankind."



Armstrong would go to work collecting some soil and a few rocks immediately, so that in the event the crew would have to leave they would have some lunar samples in tow.



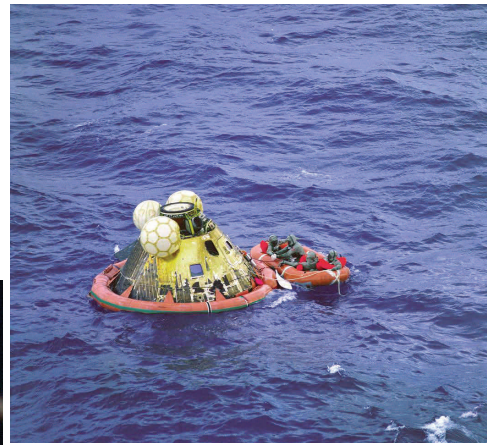
Of course, no issues arose. It was time for Buzz Aldrin to make his trip down the Eagle's ladder and on to the surface. Upon standing at the Sea of Tranquility Aldrin would utter the quote "Magnificent Desolation."

Once the crew was back inside the LM after the over 2-hour EVA. They found part of a broken

switch laying on the floor of the LM. When Aldrin & Armstrong looked at the control panel they discovered it was part of the switch needed to power up the ascent engine which was used to get off the lunar surface and back to dock with Mike Collins in the command module Columbia.



After a discussion with mission control the problem was solved and the crew was able to liftoff and dock with Columbia without a hitch. On July 24, 1969 Apollo 11 would splash down in the Pacific Ocean. The USS Hornet would recover the crew & spacecraft and after the quarantine process was completed the Apollo 11 crew would embark on a worldwide tour celebrating the success of mankind's first landing on the moon.



49 years later we're still learning about the moon from the samples of all of Apollo flights. Hopefully, The United States will return to the moon and continue what the Apollo program started, a permanent base on the moon, also a place to launch a mission on to Mars.

We'll have to see what the future holds in store.

All photos - NASA



HERE MEN FROM THE PLANET EARTH
FIRST SET FOOT UPON THE MOON
JULY 1969, A. D.

WE CAME IN PEACE FOR ALL MANKIND

Neil A. Armstrong
NEIL A. ARMSTRONG
ASTRONAUT

Michael Collins
MICHAEL COLLINS
ASTRONAUT

Edwin E. Aldrin, Jr.
EDWIN E. ALDRIN, JR.
ASTRONAUT

Richard Nixon
RICHARD NIXON
PRESIDENT, UNITED STATES OF AMERICA





LAUNCH REPORT

CRAPSHOOT V

MUSKEGON, MI JUNE 23,24, 2018

Crapshoot is the annual two-day launch held at the Muskegon Michigan Area Rocketry (MMAR) launch site located at the Muskegon Waste Water facility and co-hosted with the Southwest Michigan Association of Spacemodeling Hobbyist (SMASH).

It has been the location for two NARAM's, the National Sport Launch, and other events. The site is incredibly large and yet, still possesses.... Challenges. Chief among them is the large water treatment lake to the south. Rockets that enter "Lake Icky" are not often recovered and when they are, they do not come back unscathed.

The fifth annual Crapshoot launch was held on June 23 and 24. Weather was predicted to be nominal with Sunday being the better day. That ended up being backwards as most flights were flown on Saturday due to an all morning rainout on Sunday. Regardless, there were 132 flights flown over the weekend including successful Level 1, Level 2, and Level 3 flights.

Saturday started cool and gray with a very low ceiling and rain that threatened on and off. While Tony Haga worked on prepping his Madcow Nike Apache for a



Dave's L2 Lift-off on a J270

two-stage flight Dale Hodgson put up his modified I-ROC with a Loki J525 to 2600 feet. Dale had also wanted to put up an M flight, but it didn't work out due to weather.

Randy Gilbert flew his Estes Astron Explorer which went to pieces due to a hot ejection. He also flew a Centuri Stiletto clone, Estes Patriot, NewWay Squaros, and scratch built USN Target Drone.

Dave and Sarah Glover put in quite a few flights with Sarah flying her "Fletcher", Mega Mosquito, Dark Silver and Mongoose. Despite her best effort to lose the Mongoose on a C6-0 to C6-7 it was recovered albeit a bit toasted. Dave flew his Madcow Torrent on a J270 for his successful Level 2 cert flight. Later he tried his upscale Quad Runner on four G80's, two white and two of the new blue thunders. One of the whites blew a nozzle and spit some grains causing a couple of small fires that were quickly put out. It tipped off hard towards the alfalfa and was recovered after a long search.

Buzz Nau put in a few flights launching his new Sky Dart twice and Estes Space Eagle converted to two-stage. The Space Eagle tipped off due to rod whip and resulted in a long walk.

Tom Kurecka started the day with his Estes Little Joe II on an E30. It was a great flight but suffered tower damage on

landing. Next was his Hydra on a I242 and he captured some crazy fin flutter from his onboard video. Tom followed that up with his beefed-up Estes Mercury Atlas that flew on a Cessaroni J330 Classic just shy of 2,000'.

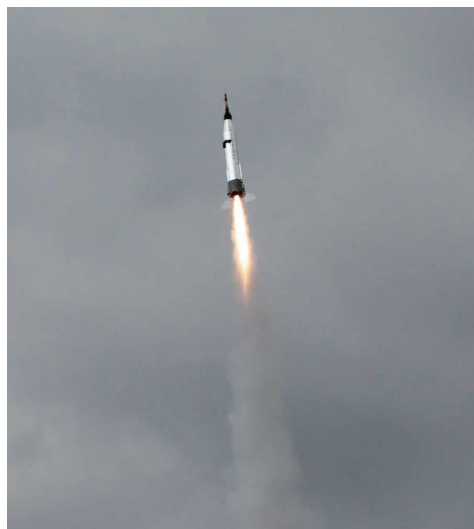
Mike Jacobs brought his old and very colorful LOC IV. The first flight on a G80 failed to push the chute out resulting in a cracked fin. After a quick repair, it was sent up again, this time successfully de-



Mike Jacob's LOC IV on a G80

ploying the chute.

One of the final flights of the day was Dan Harrison's Level 3 attempt. Dan had flown a 6' hybrid earlier in the day that wasn't recovered. It was an impressive flight on the way up, but the minimum diameter rocket was easily lost in the haze. The skies were clear and blue in the late afternoon for his level 3 flight on a Loki M1882. The Rocketry Warehouse Bruno



Tom Kurecka's Estes Mercury Atlas



Dave Glover and his Torrent Level 2



Dan Harrison and his Bruno XL Level 3

XL slightly weather cocked to the south just enough for it to land in the lck despite the wind trying to bring it back. Dan looked from the berm and saw that it was too far out to recover with any gear on hand. We ended day one on a down note thinking Dan had lost his rocket and his certification. To make it worse, Dan saw his 6' hybrid sticking up from the lck as well.



Dan's L3 Lift-off - Randy Gilbert photo

Also on Saturday, Hans McConnell successfully flew his Dub Han on a H238 for his Level 1 certification. There was also the "Crappiest Rocket" contest and the winner was Jay Calvert and his "Sewer Shark aka Sewer Shart".

Sunday was supposed to have

the better weather of the two days but it started out wet and got a lot wetter as morning stretched to afternoon. Several fliers packed it up early since the radar continued to paint a dreary picture, but eventually the rain lifted just after 1:00. The one good note for the morning was Dan's recovery of his Level 3 rocket which had drifted to the edge of the pond overnight. It was airworthy (and apparently, sea-worthy) after a wash down with hot water and dish soap though the altimeters were reduced to slag.

Tom Kurecka on his one Sunday flight, "... I flew my Sonic Event on a Cesaroni H53 Mellow. It surprised me as it attained a altitude of 4,393 feet at 424 mph. I was expecting it to go maybe half that high as all the mellowes I have seen have been slow accents. After looking at the performance graph for that motor I now realize that for the first couple of seconds it had over an 11 to 1 thrust to weight ratio and a 6 to 1 average ratio during the 4.4 second burn time for the flight! No wonder she 'got out of Dodge'."

Buzz had a similar flight with his upscale Maxi Sark on a Cessaroni G54 long burn red motor. It was expected to weathercock some with the size of the fins, but it boosted straight resulting in a long walk for recovery. He also put up a quick 1/2A boost glider flight between rain showers that was lost after two minutes drifting downrange and not losing an inch of altitude. That was the only NRC competition flight for the weekend. Finally, Buzz flew his Centuri Quasar clone on a C6 for a nice flight.

Al dela Iglesia flew his Super Big Bertha a couple of times, but held back his Aerotech Initiator when the wind began blowing rockets a little too close to the lck.

Herb Crites also attended on Sunday, "Despite the slim window between the start of day 2 of Crapshoot V and the rain that ended it early, I managed to put up four model rocket flights to show for the 6 hours of coast-to-coast driving. Each was my with my venerable li'l sport flyer, the 38mm airframe *Mach Schnell* SLK.

I powered two of these four launches with what was formerly the sole AeroTech reload kit for the "one trick pony" AeroTech 24/60 RMS casing—the F35 White Lightning.

(A little history—from the day it was introduced (circa 2008), the F35 White Lightning with a 5-, 8-, or 11-second delay remained the only motor reload kits available for the 24/60. But recently AeroTech certified and released three new 24/60 reload kits: The F51-10NT New Blue Thunder, the F63-10R Redline, and the

F62-10FJ Fast Jack. These new reloads all use a two Bates grains (round bore propellant slug) rather than the F35's single C-slot grain. Because the two-piece grains weigh-in at under 30 grams each, each of the new 24/60 case reload kits can ship without the HAZMAT fee, just like the existing F35, which tips the scale right at the 30-gram limit. It's about time!)

My other two flights were sent skyward on the new Redline motor and the other with Fast Jack. Each flight climbed to about 800 feet and each time the chute deployed properly. Well, except the third launch. On that flight, likely because of the constant drizzle, the damp parachute was a lot less enthusiastic about escaping the rocket and inflating than it did on its earlier flights, when it was a dry and fluffy. Sorta like the difference between a shaking out a bedsheet when it comes out of the washer, compared to one that's hot and fresh outta the dryer. But it did finally open above terra firma—an Arkansas dual deployment. And with that wee bit of drama, another lesson was learned; this one about all-weather rocketry."



Dave Gilmore's Crappiest Rocket entry

Once again weather depressed the number of flights at Crapshoot with 88 flights on Saturday, but only half of that on Sunday. The past couple of years have had a least one bad weather day. One year we'll get two good days in a row. Many thanks to SMASH, MMAR, and especially Pam Gilmore for arranging the lunch and performing LCO duties for most of the weekend.

Link to Tom's YouTube Channel, <https://www.youtube.com/user/4FlyRockets>

VIEW FROM THE FLIGHT LINE

When Too Much Is Just Right

DALE HODGSON

For some of us that's been doing this rocketry thing for a long time it's the same old story. One day we come to the realization that we simply have too much stuff. How did this happen? Ordering spare parts, things that catch our eye but don't really need and always ordering two (or three) when one will do or buying enough parts to serve as a back-up; you know, *just in case*. Most of the time this is a minor annoyance (mostly to spouses who simply don't understand). So, we go on about our rocketry lives; accumulating. Every so often though comes a huge payoff; one that we didn't really expect.

It happened to me fairly recently. I have a 4 fiberglass rocket I call a BR Dart; BR standing for Black Rock. Actually, the design is a nod to Tony Haga's project that he flew on an N1100 at XPRS in 2006. I liked the design so much I thought I would do one of my own; *just in case* I make it back out there some day. In the mean time though I got the bright idea of sticking a Loki M900 red motor in it and flying it to around 17K at MMAR and the Big lcky. I had a

little conversion to do though. I did have one flight with it on a K590 Dual Thrust motor; it was a beautiful thing so I knew the design was solid. What I had to do though was to add another altimeter package. It's always a good idea to have dual altimeters in an M project. Redundancy is a good thing and provides an extra margin of

safety on a big project. The current setup had a 3D printed sled (the model that was made for two altimeters) but I had only installed one...an old PerfectFlite HiAlt 45K. No issues there; the altimeter is very reliable but does not record downloadable flight data. I needed to add another altimeter but wanted one that would record data so we could review it later.

I chose PerfectFlite Stratollogger CF; their newest offering. Small, reliable, programmable and downloadable; everything I could have hoped for. I would use it as the primary and the HiAlt as the backup. Since I already installed two switches on the sled....*just in case*...this would be a simple matter of simply attaching the altimeter to the base of the sled and all would be well. Or so I thought. The Stratollogger CF is a newer version (I believe the CF means "compact footprint") of the previous model, the Stratollogger which is set up on a longer base. When I bought my sled the CF did not yet exist so naturally the thing wouldn't fit on the base as it was designed (or printed) at the time. What to do? I started looking through my stuff, maybe looking for another altimeter that would fit and then it occurred to me...what about all that extra stuff I had acquired over the years? My stash happened to include several LOC style plywood sleds and sets of PerfectFlite mounting screws/hardware. I wondered if I could somehow make an adaptor to let everything mount up correctly?

With a little cutting, drilling and some thought I came up with what I would call an adaptor sled. The concept was really simple. Mount the altimeter to the plywood sled then mount the plywood sled to the 3D printed sled base. It was actually very easy to do as the pictures show. I of course I would have never come up with an adaptor unless I had those extra parts.....*just in case*. So, maybe ordering some extras to have lying around wasn't such a bad idea after all. Now, the rocket itself is all set to go; I can fly it on a bunch of different motors. Hopefully one day I will get to fly an M motor in it. I have the rocket, I have the electronics package, and I have the motor. All I need now is good weather, the right field and a high enough waiver....you know, *just in case*. Happy flying everyone!

Fade To Black Rocket Works

Heavy Duty Launch Pads For Every Need

All pads are powder coated for lasting durability

<https://www.facebook.com/fziegler13/>

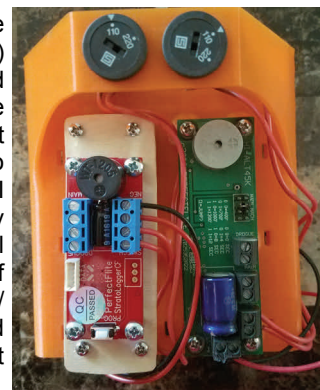
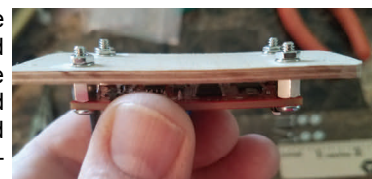
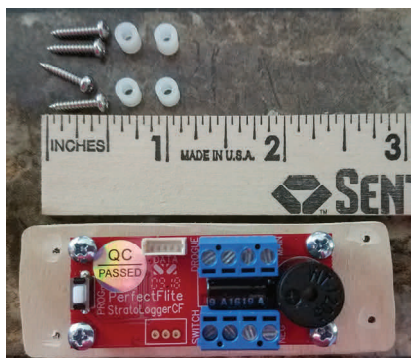
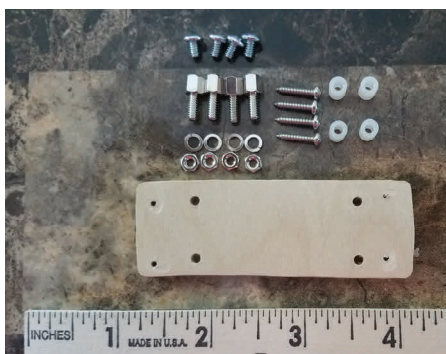
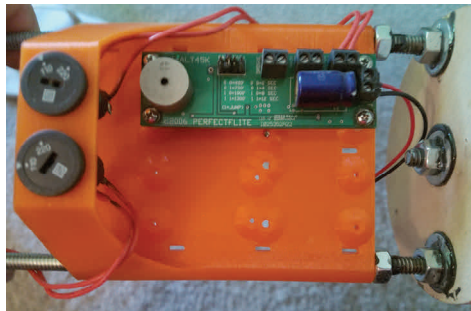
Concept Mini \$119

Concept X-treme \$325

Concept \$285

Ground Pounder \$345

TARC Pad \$285 Ground Pounder Heavy \$425





LAUNCH REPORT

JMRC JULY SPORT LAUNCH

GRAVES CAMPGROUND JULY 14, 2018

The JMRC July sport launch mimicked June in that rain was predicted and threatened, yet failed to disrupt the launch. Flyers did pack up early due to a thunderstorm threat that never came to fruition.

In addition to many regulars, there were several visiting rocketeers. University of Michigan Dearborn students came to test their deployment charges for an upcoming flight. One U of M student successfully flew a Madcow Patriot with an Arduino based deployment altimeter.

Casey Ruckman, a prior student of Sylvania Northview High School came to attempt his Level 2. Thanks to Art Upton for facilitating Casey's attempt. Unfortunately the forward closure blew through and the attempt failed. Luckily the rocket recovered fine and he is repairing it for another attempt soon.

Tony Haga manned the LCO table and Pinky was there to run the always appreciated, JMRC Café. Randy Gilbert and Dave Glover courteously volunteered to cover the launch with photos in Buzz's absence (Thanks Guys!)

Mark Chrumka tried a second go of his boiler plate stag-



U of M Dearborn students with their HPR Project - Randy Gilbert



From the range head - Randy Gilbert

ing system for his NARAM scale model and this time the motor combo worked perfectly much to his relief. Mark also flew his Estes Firebolt.

Randy Gilbert got in several flights including his new Estes Astron Explorer, Pro Series Ventris, and his new scratch built Das Dubl Red Max. The Ventris flew on a F52-5 to 1,022'.

Herb Crites put in 6 successful flights, 4 of the Mach Schnell 38mm SLKs and 2 flights of Mach Schnell SLK 54s. One of the SLK 54s is a new modular system designed to make it easier to interchange parts for repairs or desired flight parameters. Motors flown included the Aerotech F62 Black Max, F51 New Blue Thunder, F63 Redline, H128 White Lightning, and Loki H144 Loki White.

Dave and Sarah Glover put up several flights in addition to capturing some photos. Sarah flew her Estes Dark Silver on a D12 and "Fletcher" with an A3. Dave flew a new Rocketarium Mega Vortico on a C11-0 and E12-0. It has a helicopter/spinner recovery.

He also put up his Stratus Gale on a B4-4 for a nice glider flight now that he has it trimmed. Finally, he put up his Aerotech Arcas to 2580' on a H195 using an Apogee guide chute and Jolly Logic Chute Release for recovery.

Kathy and Bill Kippen were there with a nice flight of a LOC Warlock, but not so nice of a flight of Kathy's Shrox Star Shuttle. (*I've yet to see one of these flight straight.* - Ed)

Other flights included Eldred Pickett's FLEM on a Black Jack and 38 Special flown atop a Sparky. Trevor Harrison was also there practicing for the upcoming Internats competition in Poland.

Our next launch is scheduled for August 18. We hope to see you all there and that our luck with the weather continues to hold.



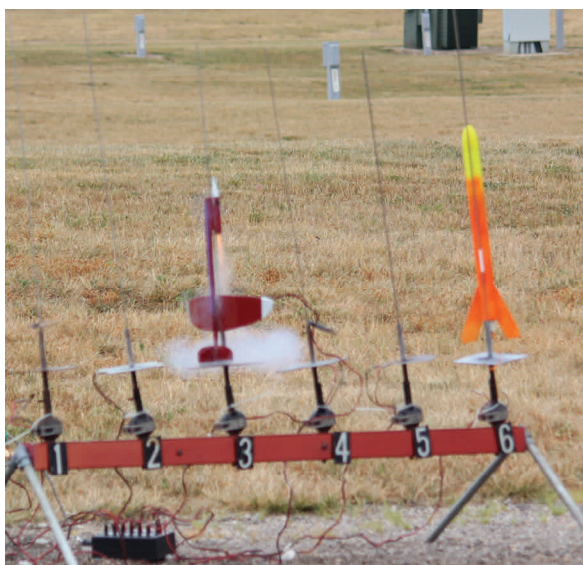
Nice glider flight - Randy Gilbert



Herb preps his Mach Schnell for launch - Randy Gilbert



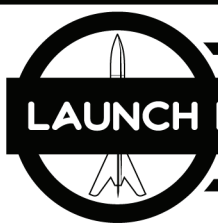
Art's "Not a Bertha" Cato' - Dave Glover



Dave's Stratus Gale lifts off - Dave Glover



Tony's new Dragon-fly class glider - Mark Chrumka

**LAUNCH REPORT****IREC 2018**

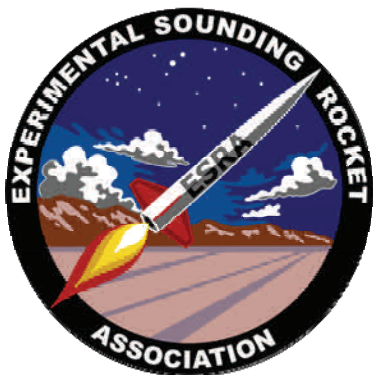
INTERCOLLEGIATE ROCKET ENGINEERING COMPETITION

Rob Dickinson - Spaceport America, NM

The Experimental Sounding Rocket Association (ESRA) has, for the past several years, held an annual college-level rocket contest called the Intercollegiate Rocket Engineering Competition, or IREC. Beginning in 2017, they moved the contest to Spaceport America in New Mexico, and the contest has grown exponentially! For 2018, 124 teams registered, and over 100 attended the week-long event. I worked with a few Michigan- and Ontario- based college teams who have been in the contest for the past few years and decided to attend the event this year. This article will follow my trip driving from Michigan to New Mexico, and assisting with the contest as a flight safety judge and volunteer.

The Contest

IREC has several categories that schools can compete in. Students with commercial solid or hybrid motors can compete in either the 10,000' or 30,000' categories. There are also separate categories for student built solid motors to 10K and 30K. Finally, there are also 10K and 30K divisions for student-built hybrid or liquid-fueled motors.



Teams are carrying a payload of 4 Kg to their target altitude. The payload can be a simple weight, but a scientific payload that does some sampling or testing gets additional points. Greater emphasis on student-designed and -built components also garners more points, as does the quality of their build, and a technical report that each team created that documents their build process. Finally, there is a day long presentation session at the competition where

teams explain the specifics of their rockets.

The Locals

IREC has several teams from our area. U of M-Ann Arbor, U of M-Dearborn, University of Windsor and Michigan State are the teams that you've seen at launches doing test flights the last few years. There are also teams from as far away as Egypt competing.

The Trip Down

It takes 27 hours to drive from Lansing to Las Cruces according to my GPS, and I'd planned 2 days for the trip. On Saturday the 16th, I drove from home to Tulsa Oklahoma – A very long, and very boring drive. I need to shake the hand of the person who invented book tapes! Sunday's drive was better in that getting from mid-Oklahoma to southern New Mexico means driving through Roswell. If you are ever in that part of the country, a stop in Roswell is certainly worthwhile. I stopped at the official Area 51 Museum, which is about 20% museum, and 80% gift shop! Picked up some silly things to bring back to the folks at home, and drove on to Las Cruces.



Monday

One of the attractions of the trip for me was a side trip to White Sands Missile Range, and their rocketry garden and museum. Located just east of Las Cruces, it's a very cool place to visit. I spent some time looking at their V2 (of course), and walked through their rocket garden. Some very interesting drones and rockets!

In the afternoon, I drove the 60 miles north to the flight field on the grounds of Spaceport America, the site where Virgin Galactic is planning on launching their suborbital tourist flights from. In addition to the big hangar, they also have a vertical launch area that we'd be using for the week, and I drove out to meet some of the other volunteers and help setup launch equipment. I got to meet several of the other volunteers I'd be working with that week, as well as some of the local wildlife! The Spaceport security cleared away the rattlesnake, and we got the field set for the students.



Tuesday

Tuesday was spent at the Las Cruces Convention Center, looking over student rockets. One of my jobs was to do flight safety reviews. As these are M- and N- powered flights by teams with little rocketry experience, there were quite a few issues discovered during the review process!

My job was to find those issues, and give the team a list of things to be corrected before they could attempt to fly the rocket. Issues ranged from the simple (stronger rail buttons, thermal protection for shock cords) up to the team who epoxied their motor directly into the rocket with no motor tube or way of installing the forward closure. It was an interesting day!



Wednesday

Wednesday was the first day for the teams to be out at the field. Most teams used this day to make fixes to things brought up during flight safety, and having their projects reviewed by the scoring panel. This is, first and foremost, an engineering contest, so it's a panel of professional engineers who score the projects, and judge the actual contest. The rocketeers, like me, were there to review flight safety, and actually run the launch. I spent the day meeting with teams who had flight safety issues, getting those issues checked off, and their rockets approved and to fly. A few teams were able to get their rockets ready to fly by Wednesday afternoon, but Thursday was seen as the first real launch day.



Thursday

Desert launches are EARLY launches! The leadership of the launch wanted the first salvo to go when the waiver activated, at 6 AM. That meant getting kids to the pads by 5:30, which meant getting to the range by 5, which meant leaving Las Cruces by 4, which meant getting up at 3:30! I tried MANY times to figure another way around this, but that was the reality of the launch. You can fly, or sleep, but not both!!

There were 2 cells for the launch. A solids cell with 8 pads, and a hybrid/liquids cell with 3 pads. Some teams opted to bring their own launch equipment (including tower launchers for rockets going to 30,000', so there was some BIG hardware on the field!) which also had spots on the range. Temperatures would cross WELL over 100 degrees, and with the field in the high desert, at 5,000' ASL, the need for sunscreen and water was ever-present!



Launches ran until 6:30 PM. There were about 50 launches on Thursday, with the mix of successful flights, CATOs and shreds you would expect from such an event. The Spaceport provided a desert fire truck to keep things under control, and while they had a busy day, things progressed smoothly.

I spent most of the day as a traffic cop! With large, heavy rockets, and the launch cells out over 1,500' from the flight line, we had teams driving their projects to the pads. My job was getting

teams organized to drive their projects out when the pads would open for the next salvo, making sure folks knew where they were going, and stopping all traffic for launches. With so many teams, vehicles, and people, I really needed a nightstick and a whistle!



Friday

Another early day at the field. We started pushing teams to get their rockets ready to fly, and not wait until Saturday, so everyone would have a chance to fly and recover their rockets. The teams were scored on the quality of their flights, so getting the rocket back was important. For safety, each team going out for recovery was given water (of course!) and a radio with a built-in GPS transmitter unit that showed the recovery coordinators where everyone was on an electronic map, and

could make sure no one wandered too close to any active launch ranges. It was a great system, that required each team to check in every 15 minutes to make sure no one ran afoul of the heat, local wildlife (snakes, scorpions, or tarantulas) as well as getting injured by the cactus that grew everywhere. However, towards the end of the day, we had more teams wanting to go recover than we had radio sets for, so there were some backups.



I played traffic cop again, and we put another 45 rockets up. One hybrid rocket had problems with over-pressurization that tied up the hybrid pad for most of the afternoon. The pressure relief system failed, and in the heat and sunlight, the tank pressure kept climbing. In the end, they had to resort to a rifle to safely vent the tank. As the location of the tank wasn't obvious, the person 'perforating' the tank had to shoot the rocket in several places to make sure the tank was punctured, as they were too far away to see a gas plume. Word among the

volunteers was that next year, we'll have teams mark the Center of Gravity, Center of Pressure, and a bull-eye on the NO₂ tank!

Saturday

The plan was to finish flying by noon, and for the most part we succeeded. There were a few teams left to fly, but it was more an issue of the launch crew waiting for the rockets to be ready, rather than having prepped rockets waiting for pads. As one of the volunteers, I was worried that not every team would be able to fly, but all the rockets that the teams





could get ready, we got launched! A few teams had to scrub, or just couldn't get the rocket ready in time, but that was an educational experience as well, so it was all good!

Several student teams stayed to help pack up the range (YAY!), and by 3 PM, we were on our way back to Las Cruces for the evening awards ceremony. Once I dragged myself through the shower, and

made it to the ceremony, I found out that the other launch volunteers DIDN'T attend, because they were exhausted! I'm still glad I was able to go, to see the kids who had worked so hard get their awards. It was a fun evening, but when it was over, I was ready for bed!!



The Drive Home

Sunday morning had me packed up, and ready to hit the road east. A quick stop at Pistachioland (home of the world's largest pistachio!) got me snacks for the drive, and I was on the road home!

Or so I thought.

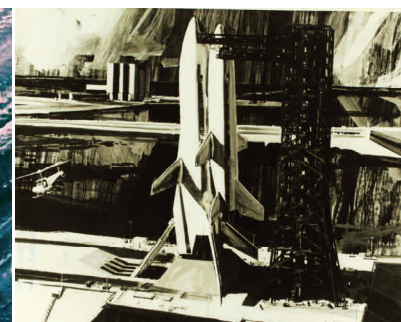
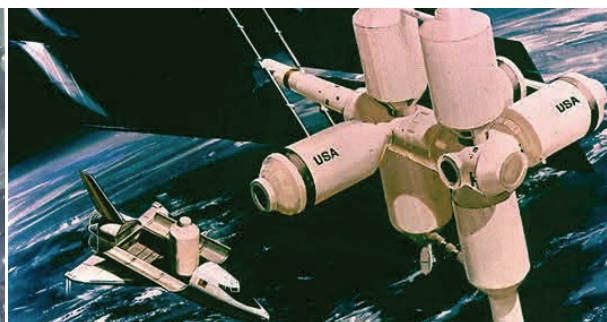
Driving out had been fun and went smoothly, as I was looking forward to seeing new things, and attending the launch. A week later, I was VERY short of sleep, still trying to re-hydrate, and was cooked medium rare! The 14-hour drive each day, that was interesting the first time, was now EXCRUCIATING, and I spent a couple extra hours each day just pulled over, asleep in the car, trying to get awake enough to keep driving. I finally pulled into my driveway about 3 AM on Monday night, due at work Tuesday morning. While I sat in my office chair on Tuesday, I doubt I was conscious for most of it.

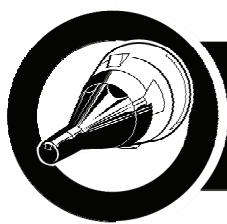


Conclusion

So, how was my week? I got NO sleep, spent most of the day in 100+ degree heat, drank water all day long and STILL had to get an IV for dehydration at one point, battled killer cactus, sunburn, and long drives, and had a FANTASTIC time!

The students were happy and enthusiastic, the other volunteers were either newbies like me, or veterans who helped get us into the routine of the launch and constantly offered assistance and help, the Spaceport staff were professional and friendly, and the event, while more complex and daunting than a NARAM, went smoothly and injury-free! I can't wait for next year to go do it all again! Maybe an extra day for the drive home, but definitely an experience worth repeating!





ROCKET SCALE DATA

BT-3A(N)/RIM-2D “Nuclear” Terrier

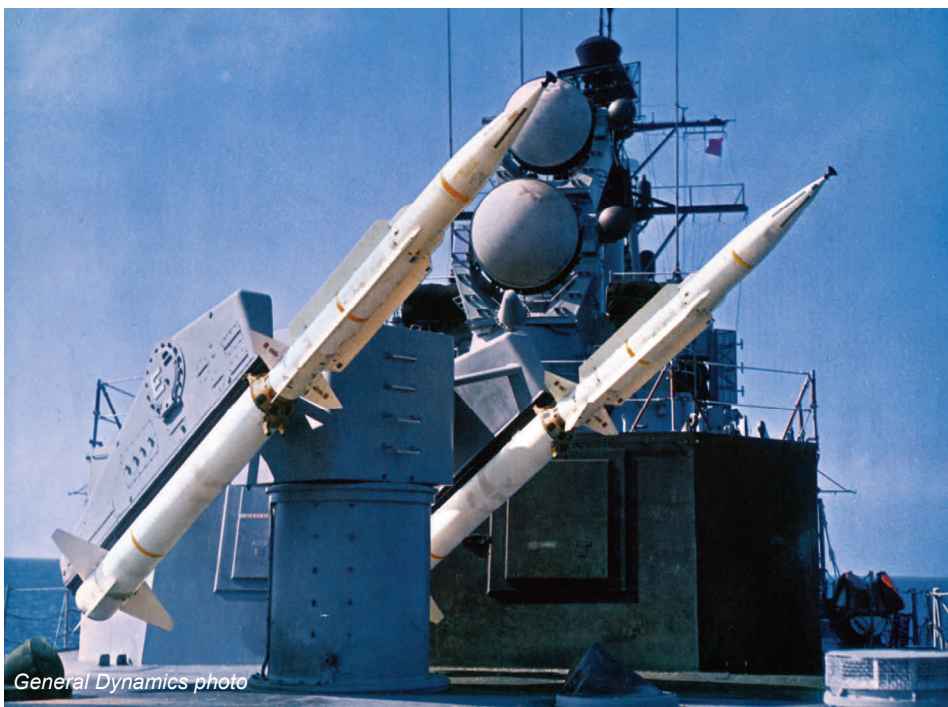
Buzz Nau

The Terrier surface to air missile traces its roots to “Project Bumblebee”, a R&D operation sponsored by the US Navy and managed by the Applied Physics Laboratory of John Hopkins University. This project investigated the major issues with guided missiles; propulsion, guidance, and warhead armament.

The first version of the Terrier missile was the production result of a test vehicle for what would become the ram-jet powered Talos surface to air missile. The first Terrier version used beam riding for guidance and was wing controlled like the Talos.

The BT, (beam riding, tail controlled) was the second version of Terrier and aside from the missile and booster diameters, looked much different from the BW series. The missile was 13.5” in diameter and varied from 164” to just over 174” in length. The Mk 12 booster was 18” in diameter and 155” in length including the inter-stage adapter.

One variant of the BT series was conceived and deployed with a nuclear



RIM-2D Static Display - Kelly Michals photo

warhead and it would be the only version of Terrier to carry a “nuke”. Originally designated BT-3A(N) the Nuke Terrier was redesignated RIM-2D in 1962 when the Department of Defense instituted a major re-vamping of the designation systems for all branches of the US military.

The nuclear Terrier was armed with the 1kt yield w45 warhead. It had a range of 40nm, an operating ceiling of sea level to 100,000 ft and its speed was Mach 3. The RIM-2D was initially brought into service in 1962 to counter and discourage dense formations of attacking Soviet bomber aircraft. When spread-out, aircraft were much easier to engage successfully with the systems in place at the time. It was also considered an anti-missile weapon targeting incoming missiles during their terminal phase of reentry. It is unknown how serious this capability was ever considered.

When mass bomber formations were no longer a concern, the RIM-2D was kept in service to fulfill a Navy requirement for a long range tactical surface to surface anti-ship weapon. Development of a nuclear armed Standard Missile was deferred

which led to the RIM-2D serving in active service well into the 1980's.

The Nuke Terrier was retired in 1988, long after all other versions of Terrier had been replaced by the Standard Missile. There are currently two RIM-2D Terriers on static display at the National Museum of Nuclear Science & History in Albuquerque, New Mexico.

References:

NAVORD Drawings 2556810, 1996251, Vitro Laboratories, Silver Springs, MD

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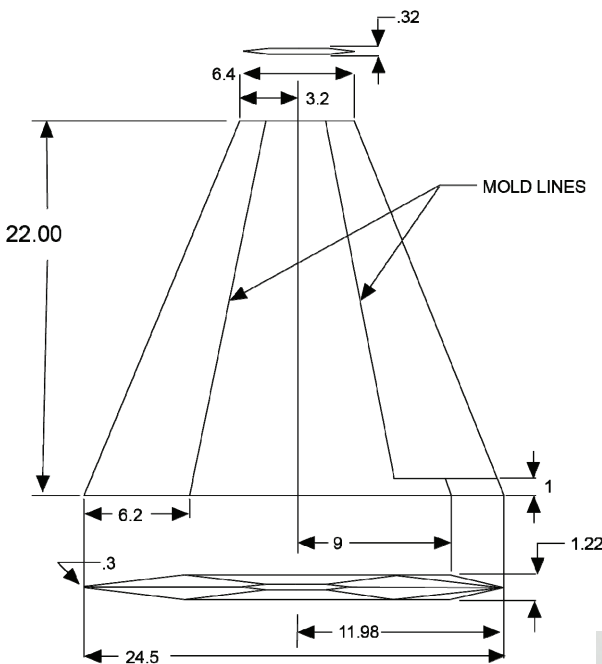
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Gunston, Bill, *The Illustrated Encyclopedia of the World's Rockets and Missiles*, Crown Publishers New York, NY (1979) p199

Kelly Michals' flickr photo album, "RIM-2D Terrier Nuclear Missile", used with permission.

<https://www.flickr.com/photos/rocbolt/sets/72157631535809782/>

Official US Navy photographs

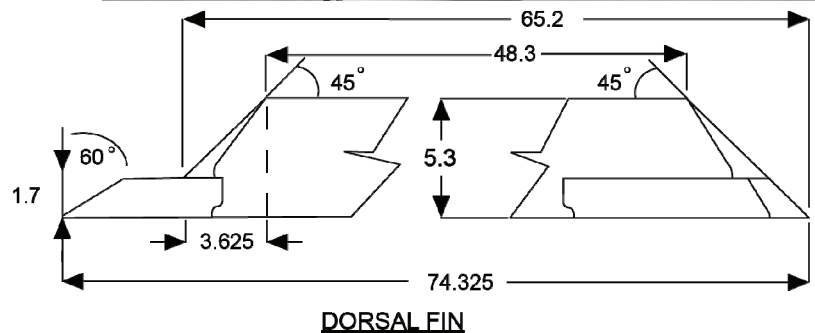


BOOSTER FIN



W45 warhead to the right of the casing - DoD photo

RIM-2D Static Displays - Kelly Michals photo



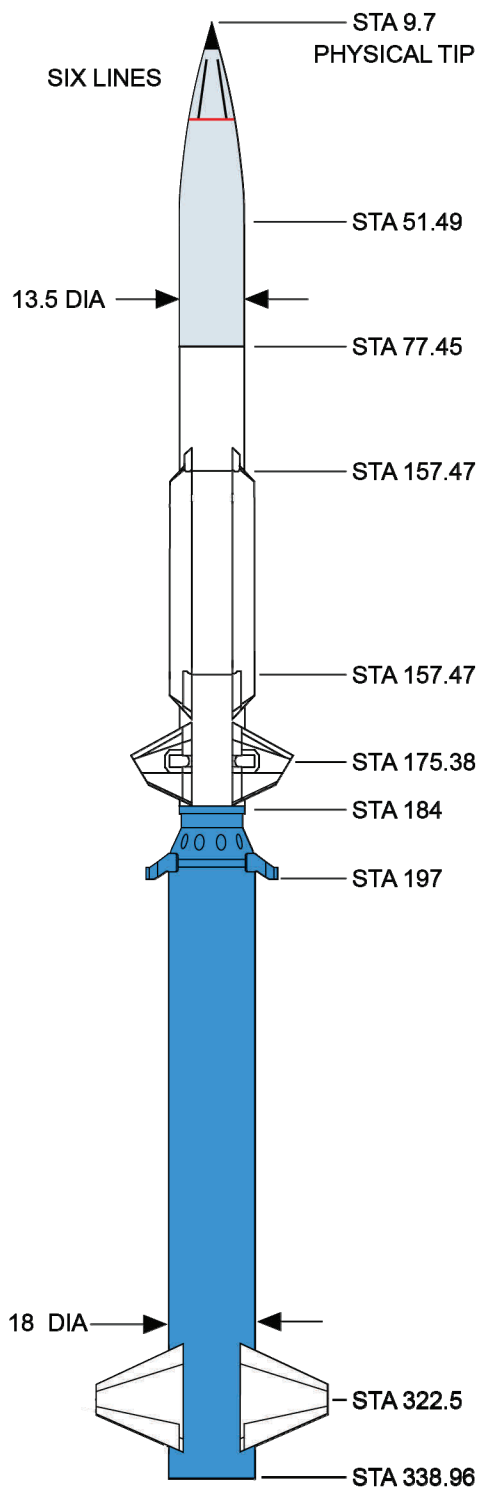
DORSAL FIN



Two pair of RIM-2D Terriers on shore launchers



TERRIER

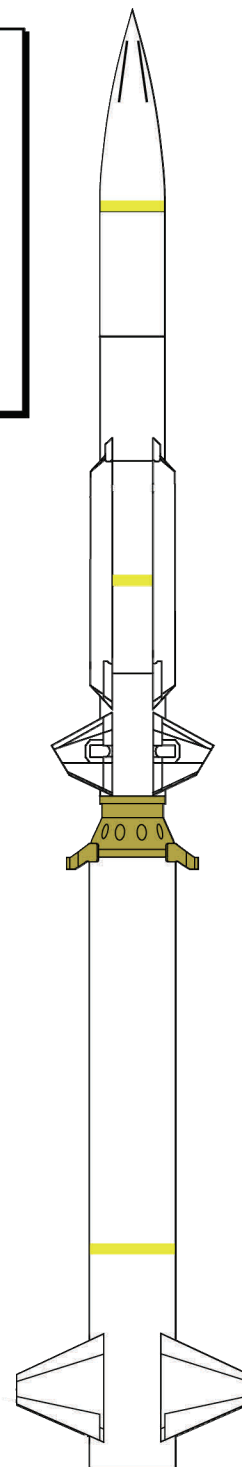
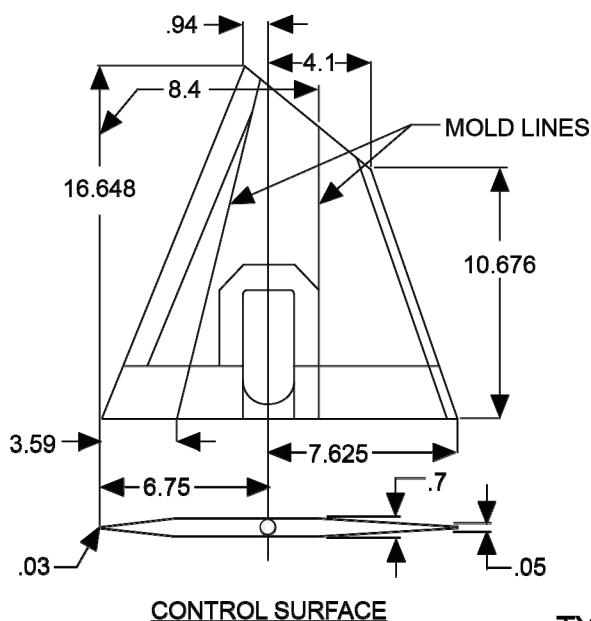


BT-3A(N)/RIM-2D Terrier Dimension & Color Data Drawn by Evan D. Nau

Sources:

NAVORD Drawings 2556810, 1996251
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Institute Press Annapolis, MD (1989) p243
Official US Navy photographs
flickr Album - RIM-2D Terrier Nuclear Missile,
Kelly Michels

	BLUE
	FLAT WHITE
	FLAT BLACK
	BRUSHED ALUMINUM
	RED
	YELLOW
	BRASS



STATIC DISPLAY
NATIONAL MUSEUM OF
NUCLEAR SCIENCE & HISTORY

TYPICAL WAR ROUND

Member Highlight - Roger Sadowsky (Vice-President)

Roger is our other founding member. He's donated more time and effort towards the success of the club than anyone I know. He's often pulling LCO duty, so give him a big thanks the next time you launch something!



When did you first get into model rocketry and what was your first rocket?

I was in 4-H about 10 years old and my first model rocket it was an Estes Alpha. Then I built an Athena & then a Solar Sailor.

How was JMRC formed?

I'm Co. Founder of JMRC along with Scott Miller. The club came into existence in the fall of 1996. David Dunlap from Michigan Tech in Houghton, Mich was in Jackson @ The Michigan Space & Science Center promoting Rockets for Schools. Scott was at the space center at the time & called me to see if I was interested in starting a rocketry club?

Well, that took literally a blink of an eye to sign on to that venture. Here we are now in 2018 going on 22 years of JMRC... Who knew?

What moments in model rocketry stands out as your most memorable?

Memorable moments? There's a Bunch! I would say one of the top moments for me as a club was our First launch that we did at Gumbert's Field in 1999 with Team 1 Rocketry. That launch was the catalyst that set JMRC on course to where we are today! Of course the Black Rock Trip in 2006. Over 2,000 miles from home & JMRC set an example of what a close knit group should be! The feedback many years later that I hear is how this group from Michigan drove 40 hours straight to come and fly on the playa. We "All" flew as a group.. We helped each other out and cheered on our members with their projects they brought all that way to fly. The club has become a multi-generational "Extended" family! Flying rockets has become secondary. We get together once a month just to see our JMRC family members.

What rocketry item that is out of production do you miss the most?

The model rocket I miss the most is the Estes Space Shuttle along with the C5-3 motor that it flew on. It was "Spectacular!" to see in flight.

What do you like flying these days?

Like Scott Miller I find a lot of enjoyment out of seeing our members & guests having "Successful" flights with their projects. Knowing that we played a part in that success.

If high power certified, what level?

High Power Cert L2 in 2004 Hypertek "FX" grain J330-ish flying a Scott Miller SS1 rocket.

What plans do you have in the future or what would you like other flyers to know about you?

My future plans are to finish a long running HPR L3 project. A cross between the Tartar missile & the SA-14 Archer rocket called the Tarcher.

What would you like other flyers to know about you?

If you come to the launches for "Set up" and I might not seem sociable. Please understand that equipment needs to be put in place and made operational for the day. Once that is done we all can have fun flying for the day. Nothing personal, just work to be done.

Are you willing to mentor other club members and if so, in what area?

I'm always willing to help mentor in any way that I can. JMRC has a wonderful talent base that is there for everyone that needs a hand with their projects.

If you could have lunch with anyone in history who would it be and why?

I would like to have lunch with the Apollo 8 crew. Frank Borman, Jim Lovell & Bill Anders. The first to ride the Saturn V rocket. The first to leave the Earth's gravitational pull & head to the Moon for a date with the history books. Would like to experience that story from the source. 2018 is the 50th anniversary of that flight.

Member Highlight - Jeremy Sell

Jeremy is a recently back in the hobby and a new member. He is



quickly getting back in the groove having just earned his level 2 certification.

When did you first get into model rocketry and what was your first rocket?

My first rocket was an Estes Nova Payloader I built in 1988 when I was 11 years old. I don't remember what got me into it, but I suspect it was an ad in a comic book or something. I did what was standard at the time...mailed a money order for the rocket and a starter kit then waited 6-8 weeks for delivery. I grew up on a farm so I had a convenient launch field whenever the crops were gone.

Working on the farm allowed me to make some money for more rockets. I always looked forward to getting the next Estes catalog.

Describe your early activities when you started? (i.e. what kits did you like to build and fly and did you fly with others?)

When I was a kid I built and flew a number of Estes kits with various unique features. First was the Nova Payloader, then the Crusader Swing-Wing, the Comanche 3, the space shuttle glider, and a few others. I flew on my own on my family farm and wasn't aware things like clubs existed. The last rocket I built as a kid was a Maxi-Force that took a cluster of 3 D motors. It came with a long disclaimer about obtaining an FAA waiver and a list of bureaucratic procedures for doing so. By then I was 16 and had discovered cars and girls, quickly lost interest, and never flew it. How did you find out about JMRC and when did you join?

I got back into rocketry just last year after a long 24-year hiatus. I was building a Lego Saturn V rocket and somewhere in the middle of it I had an epiphany..."holy crap why am I not building actual rockets?!" Within a few weeks I had built and flown an Estes Ascender, Mammoth, Space Shuttle, and Nike Smoke. Hungry for more I started looking at HPR and realized it was far less bureaucratic than when I was a kid. I finally flew my Maxi-Force then ordered a PML Ariel. That was about the time I learned about clubs and FAA waivers and got on board with JMRC. The internet has made rocketry far more accessible than in the 1980s.

Continued on the next page

What moment in model rocketry stands out as your most memorable?

For me it was finally flying my Estes Maxi-Force after it sat unlaunched and collecting dust for 24 years. It was the bridge that connected my childhood building to my renewed interest as an adult.

What out of production rocketry item do you miss the most?
I love the old Estes/North Coast Command Control Launch Controller. I bought and used one in the early 90s and after it sat for over 20 years a fresh battery got it going again. I still use it for solo LPR and MPR launches. If it ever dies on me I will be sad.

What do you like flying these days?

Since I joined the JMRC I've been all about the superlatives: Bigger, heavier, faster, etc. My PML Ariel and Endeavor and LOC Precision Warlock have been great for exploring the realm of L1 and L2 HPR within the limits of the club waiver. I'm currently finishing up a MAC Performance 4" Zodiac I hope to push past mach and one mile of altitude (at another field, obviously, but I'll give it a shakedown at MIS). Aside from that though I'm still interested in the novel stuff I was into as a kid...LPR gliders, multi-stage, clusters, etc. I'm starting to get curious about competition rocketry.

If high power certified, what level?

I just got an L2 with my Warlock on a J293 in June. I love that fat tub of lard. Few rockets keep it low and slow on L2 motors like the Warlock.

What rocketry plans do you have in the future?

It's a two-pronged approach. One is higher and faster, the other is modest but unique. I think in the LPR/MPR realm I'm going to pursue gliders.

What is something you would like other members to know about you?

My main passion is backpacking into the middle of nowhere and living like civilization doesn't exist. I love exploring new wilderness regions and escaping into situations where I'm completely on my own. I love staring at a night sky in a remote area. I've been all over every nook and cranny of America so I'm always into talking about domestic adventure travel. I'm really looking forward to getting out to the Black Rock Desert of Nevada for a big launch.

Are you willing to mentor other club members and if so, in what area?

Since I just got back into rocketry last year I'm pretty humble about my expertise, but I'm willing to share what I know with anyone who asks.

Are you looking for help from the membership on a specific area of rocketry?

I will always entertain any tips and tricks from anyone.

If you could have lunch with anyone in history who would it be and why?

Charles Darwin. I would love to pick his brain on how he made the connections he did and all of the reasoning that went into it.

Member Highlight - Ron Watkins

Ron has been a JMRC member since 2000 and also flies with other sections in the area. He always brings beautifully built kits when he flies.

When did you first get into model rocketry, what was your first rocket?

I first got into model rocketry in the early 1960's. My first rocket kit was an MPC Apollo Moon-go kits that I purchased from the Hobby Hub in East Lansing, MI.

Describe your early activities when you started? (i.e. what kits did you like to build and fly and did you fly with others?)

My first rocket kits were Centuri, Estes and MPC kits. Most of my rocket flying was by myself accompanied by my parents.

How did you find out about JMRC and when did you join?

I found out about the JMRC in 2000 when I went to some launch-

es at Jackson Community College and the Jackson Hot Air Jubilee at the Jackson Airport. I joined the club in 2000.

What moment in model rocketry stands out as your most memorable?

Launches with the Jackson Model Rocketry Club. The launch of my Estes Pro Series Patriot rocket with a cluster of four engines. All engines fired successfully and I had a safe recovery.

Video https://www.youtube.com/watch?v=l-k_CeeJeZc

Here is one more highlight I am proud of. My first Estes oracle Flight.

https://www.youtube.com/watch?v=wUMi8-P_Gz8

What out of production rocketry item do you miss the most?

Kits from Centuri and out of production kits from Estes such as the A-20 Demon.

What do you like flying these days?

I fly low and mid power rockets. I enjoy building scale kits.

If high power certified, what level?

I am currently not high power certified.

What rocketry plans do you have in the future?

I would like to become Level 1 certified.

What is something you would like other members to know about you?

I currently have 426 rockets in my current active fleet. I have a website that has information about my rocket fleet and flight data dating back several years. http://www.angelfire.com/space/r_watkins/homepage.html

My webpage: http://www.angelfire.com/space/r_watkins/homepage.html

I have photos of my rockets and rocket launches on Google Photos

https://photos.google.com/share/AF1QipMIM7LMlpSjMu82C67BV-ca1Jgt_xdTAFpH8NcgF4uNwv_RCXW6FHWEP8v68qtywg?key=dIRwUWVCMmM1MW92aFBDalpwZk5XU1FMakViRkJ3

If you could have lunch with anyone in history who would it be and why?

I would like to have lunch of Vern Estes founder of Estes Rockets and thank him for the many hours of enjoyment he has brought to my life.

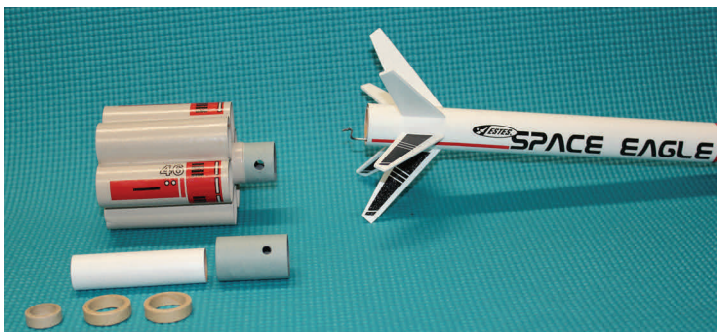


Estes Space Eagle Two-Stage Conversion

Sport Plan
BUZZ NAU

I was actually surprised when I noticed that the Estes Space Eagle kit was NOT two stage. It seemed like a natural conclusion to me, so I set out to convert mine*. Butt-joining (taping) the motors was not possible without doing more modifications than I was willing to do. Since there would be a short gap between the booster and sustainer motors I utilized the Centuri "pass-port" method of venting booster blow through gases. This is done by punching two holes in the staging coupler 180 degrees apart. When the booster motor burns through the top of the grain there a pressure wave that begins to separate the stages. If not vented, you risk the stages separating too far too fast before the heat of the booster motor can ignite the sustainer. These vent holes slow the process down enough for reliable gap-staging.

The conversion itself is extremely easy. As mentioned above you need a JT-50 tube joiner, two CR2050 centering rings, a 2.5" long section of BT-20, and a EB20 engine block.



The first step you want to make is to cut a 3.25" section from the one of the 12" long main body tubes for the booster core tube. Use the remainder for the lower section of the sustainer. Per the instructions, attach the lower tube fins to the booster core tube you just cut. Attach the fins to the sustainer tubes .75" from the aft end of the tube.



Assemble the motor mount that came with the kit per the instructions and glue it in aft end of the sustainer with the motor tube flush with the main airframe tube.

Mark the center of the JT-50 tube joiner. Glue it into the top of the booster tube to the halfway mark with the vent holes visible.

Use the additional BT-20 motor tube, CR2050 centering rings, and EB20 engine block to build the booster motor mount. Glue the centering rings 1" from each end of the tube. Glue the engine block flush into one end of the motor tube. This is now the aft end of the motor mount.

After all the parts are thoroughly dry, insert a spent mo-

tor or dummy case into the booster motor mount. Plug the two stages together. Dry fit the booster motor mount by sliding it into the back of the booster all the way until the dummy casing hits the sustainer's engine hook. Make sure the end with the motor block is at the bottom of the booster. This will hold the motor in place after staging. About 1/8" of motor tube will be sticking out the back of the booster. Sand centering rings if they are too tight. Once you are satisfied with the fit, apply some glue to the inside of the booster body tube and slide the booster motor mount into place. Again, all the way until the dummy motor case hits against the sustainer motor hook.

After glue has had a few minutes to set, disconnect the stages and remove the dummy casing from the booster. Be careful not to move the motor mount from place until the glue is completely set.

To prep for flight, insert a booster motor into the top of the booster with the nozzle down until it rests against the motor block. Insert a sustainer motor of choice in the sustainer. I've found the B6 can be tricky to light when not taped together, so clean out the inside of the nozzle by lightly scraping the throat with a wood dowel. Plug the booster to the sustainer and you're ready to go.

The booster tubes may get a little crimped if they land on a hard surface. Soaking a little fast CA to the inside of the booster fin tubes near the ends may help prevent that or cut down on the severity.



*Standard, "Know what you're doing before you try this" disclaimer applies.



COMPETITION CORNER

Retrospective On The National Rocket Competition Year One

BUZZ NAU

TL;DR - Yes, competition is much easier to host and a lot more relaxed to fly. I miss some of the old events and we'll try to work some in next year as unofficial events.

Long Version -

The first flying season using the new National Rocket Competition (NRC) rules is nearly at an end. In a couple of



short weeks NARAM 60 will be flown at Pueblo, Colorado and champions of one sort and another will be awarded. There will be meet champions, national champions, and event specialists. It's going to be an interesting awards banquet to be sure.

So, what was it like using the new rules as a competitor and contest director? Let's look as CD first. I have a lot of contests under my belt as a CD and this has been the most relaxed and laid season ever. The new rules certainly had a lot to do with it, but the continued lack of entries is probably the main factor. Sure, the sanctioning, documentation, and submission of results in far far easier, but we're still not pulling in new blood which is a big reason for making the rule changes in the first place. Regardless, I'm thankful for the changes especially

considering the involvement, who wants to jump a lot of hurdles and through hoops when you have less than five competitors at any given launch. It's my hope that the exposure of flying competition at every sport launch now will draw some casual competitors in.

As I said, registering a launch is a piece of cake and it would be nice to know how many of the new faces we have seen this summer that sport fly are a result of seeing our launches listed on the NAR launch calendar.

The paper work for the contest couldn't be easier either. At first I tried entering everything into the Contest Director software as flights were flown, but that was cumbersome and the sunlight makes a laptop on a range impossible to read. I went back to printed flight cards and entered everything in later that day. After that I enter the results on-line for instant results and e-mail the Contest Director file to my friendly mid-west contest chairman, Dan Wolf. He validates the results and like that you know your standing nationwide. That part of the new system is pretty darn cool.

What else feels better? Well, no longer needing two timers helps cut down on the disruptions when you're trying to prep your next flight. Also, all altitude events utilize altimeters. Is this a perfect system? No, but using theodolites was far from it too and a much bigger hassle. I for one do not miss using trackers for local contests. I will miss it at NARAM. One, it

was my favorite range duty and two, it was a competition in and of itself working with the other trackers on your team for tight closure rates.

Then there's the flying of the same events all the time. Does that get boring after awhile? I certainly thought it would, but we really didn't "need" to fly



the same events a lot. Many times we qualified high for our division with our first attempt. As long as you're in the top ten there's no reason to re-fly that event unless you want the practice or to try something new. We flew 1/2A Boost Glider, A Payload Alt, A Helicopter, and C Egg Loft Altitude once. I guess we should have spent some time on a R&D project.....

What's missing is the part of an old Regional Contest that was enjoyable, diversity of events. There is no incentive to fly other events when you're concentrating on the NRC events so you can qualify for the National Champion race. In hindsight, that race wasn't all that difficult and we could have easily slipped in a couple of other events that are fun to fly like sport scale and D streamer duration. :)

Stand by for my report on NARAM 61 in the next issue. Meanwhile, consider trying a contest flight or two. It really is fun and remember, you can't improve what you don't measure. <grin>





THIS MONTH IN AEROSPACE HISTORY

Source—NASA Archives

85 Years Ago - 1933

July 8: Karl Jansky creates the science of radio astronomy, publishing his discovery of radio waves emanating from the center of the Milky Way galaxy.



August 17: First Russian liquid fueled rocket successfully fired by The Group for the Investigation of Reactive Engines and Reactive Flight (GIRD), weight: 44 pounds, Russia. The "09" rocket flew for 13 seconds and reached an altitude of approximately 1,200 feet.



65 Years Ago - 1953

August 3: Dr. S. Fred Singer unveiled his proposal for Project MOUSE (Minimum Orbital Unmanned Satellite Experiment) at the Fourth International Congress on Astronautics, Zurich, Switzerland.



August 20: First launch of Army's Redstone missile, Redstone Number 1, launched from Cape Canaveral.



August 2: First full-powered flight of Atlas ICBM using sustainer and booster engine, Cape Canaveral, Fla.



August 7: First launch of Bomarc interceptor missile, Cape Canaveral, Fla.



75 Years Ago - 1943

July 7: Adolph Hitler assigns highest priority to V-2 rocket program.



60 Years Ago - 1958

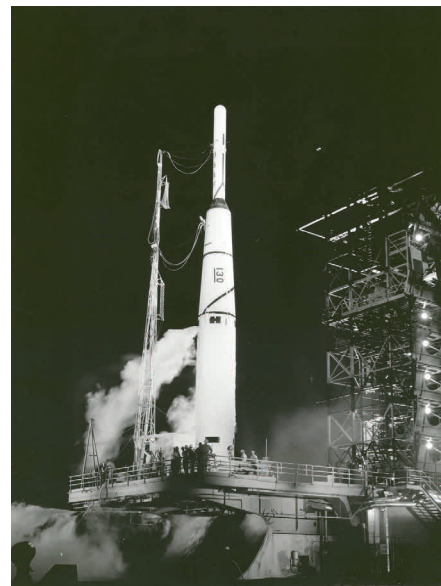
July 2: White House decides a civilian agency will have responsibility for US human spaceflight programs.



July 29: President Eisenhower signed the National Aeronautics and Space Act, creating NASA, Washington, D.C.

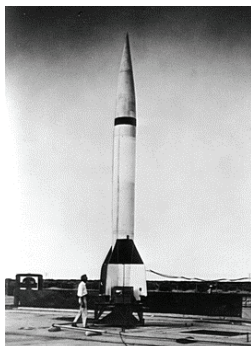
July 26: Explorer 4 launched by Jupiter C from Cape Canaveral, Fla. First satellite to measure the charged particles within the Van Allen Belts.

August 17: Able 1 (Pioneer 0) launched atop a Thor-Able rocket from Cape Canaveral. This spacecraft was the first U.S. attempt at a lunar mission and the first attempted launch beyond Earth orbit by any country. Rocket failed after 77 seconds of flight.



70 Years Ago - 1948

July 13: First test firing of a Convair MX-774 missile. First missile built under the US ballistic missile program.



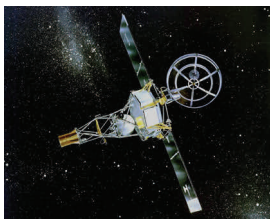
August 19: T. Keith Glennan was sworn in at the White House as NASA's first Administrator. Dr. Hugh Dryden, head of the National Advisory Committee for Aeronautics (NACA), was sworn in as the Deputy Administrator.

August 24: Explorer 5 launched by Jupiter C, Cape Canaveral, Fla. Orbit not achieved because of collision of parts of booster and satellite.

55 Years Ago – 1963

July 26: Syncom 2 launched by Thor Delta, from Cape Canaveral, Fla. First operational geosynchronous communications satellite. Syncom 1 had failed before reaching its final orbit.

August 1: Mariner 2, the first US Venus flyby probe, completed world's first flyby of the Sun.



Facility (DFRF), CA.

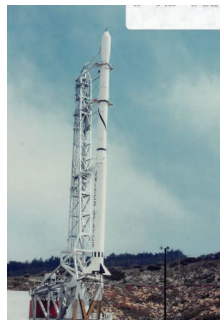
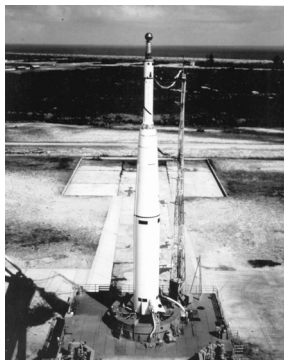


August 22: Highest X-15 flight (unofficial), 354,200 feet (67 + miles), piloted by Joseph A. Walker, DFRF. Also, the flight was the unofficial world altitude record for a winged vehicle, until broken by the Space Shuttle in 1981.



50 Years Ago - 1968

July 4: Explorer 38 launched by Thor Delta from Vandenberg AFB. Also, known as Radio Astronomy Explorer 1 (RAE 1), it was a radio telescope.



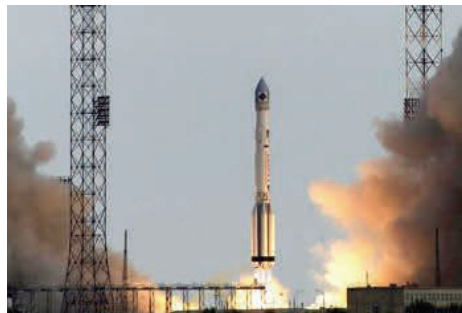
August 8: Explorer 39/40 launched by Scout from Vandenberg AFB. The satellites studied the density of Earth's atmosphere and the characteristics of Earth's magnetic field.

August 10: ATS 4 launched by Atlas Centaur from Cape Canaveral, Fla. Centaur second stage failed to fire. However, some experiments were conducted before the satellite reentered Earth's atmosphere on October 17, 1968.



45 Years Ago – 1973

July 21: Mars 4 launched by Proton K from Baikonur, USSR. Intended as a Martian orbiter it suffered a computer failure and did a flyby. It was the first to detect an ionosphere on Mars.



July 25: Mars 5 launched by Proton K from Baikonur, USSR. Twin to Mars 4, it successfully entered Martian orbit on February 12, 1974.

July 28: Skylab 3 launched by Saturn 1B

from Kennedy Space Center. Second ferry flight to Skylab space station. Crew: Alan L. Bean, Owen K. Garriott, and Jack R. Lousma. Crew landed on Sep 25, 1973.



August 1: First X-24B glide flight, piloted by John A. Manke, DFRF.



August 5: Mars 6 orbiter and lander launched by Proton K from Baikonur, USSR. It arrived at Mars on March 12, 1974, but only transmitted data for a few minutes before slamming into the surface.

August 9: Mars 7 launched by Proton K from Baikonur, USSR. Twin to Mars 6, the spacecraft arrived at Mars on March 9, 1974. Mars 7 suffered a system failure, releasing the lander early and sending it on a flyby path past Mars.

40 Years Ago - 1978

July 14: European Space Agency (ESA) GEOSatellite 2 (GEOS 2) launched by Delta from Cape Canaveral, Fla. GEOS 2 was a geodetic satellite designed to measure changes in Earth's magnetic field.

August 8: Pioneer Venus 1978 launched aboard an Atlas Centaur rocket from Cape Canaveral.



40 Years Ago - 1978 - continued

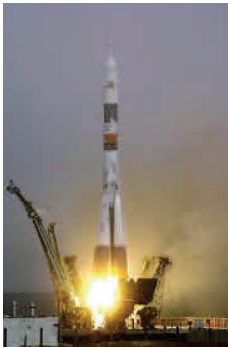
August 12: ISEE 3 launched by Delta from Cape Canaveral, Fla. It was developed through a NASA and European Space Agency (ESA) partnership to study Earth's magnetosphere. After completing its original mission, ISEE-3 was renamed the International Cometary Explorer (ICE) and sent to intercept comet Giacobini-Zinner. ICE remained operational until May 1997; one of the world's the longest-running spacecraft.



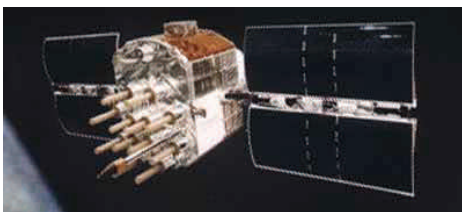
August 14: William Dana flew the first of 27 flights in an F-15 with a 10 degree cone to improve wind tunnel data predictions.



August 26: USSR launches Soyuz 31 aboard a Soyuz rocket from Baikonur. Ferry flight to Salyut-6 space station. Crew: Valery F. Bykovsky (USSR) and Sigmund W.P. Jähn (East Germany).

**35 Years Ago - 1983**

July 14: Navstar 8 launched by Atlas F from Vandenberg AFB. Eighth satellite in the U.S. military's experimental global navigation system, GPS.



July 28: Telstar 3A launched by Delta from Cape Canaveral, Fla. Third generation of the Telstar series of satellites. First Telstar

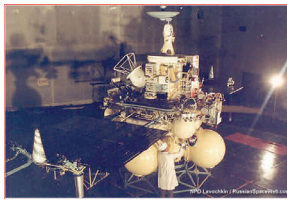
to function as an operational communications satellite rather than as an experimental one.



August 30: STS-8 (Space Shuttle Challenger) launched from Kennedy Space Center. Crew: Richard H. Truly, Daniel C. Brandenstein, Dale A. Gardner, William D. Thornton, and Guion S. Bluford. Insat 1B launched from Shuttle payload bay. Landed September 5 at Edwards AFB. Mission duration: 6 days, 1 hour. First Shuttle night launch and first Shuttle night landing.

**30 Years Ago - 1988**

July 7: Phobos 1 launched aboard Proton-K rocket from Baikonur. Soviet Mars orbiter designed to study the surface composition of the Martian satellite Phobos. Later, radio contact with probe lost and not recovered due to telemetry error.



July 12: Phobos 2, twin probe to Phobos 1, launch by Proton K rocket from Baikonur. Soviet Mars Orbiter to study the surface composition of the Martian satellite Phobos. The satellite gathered data until communication was lost a couple months after it reached Mars.

August 25: Transit-O 25 and Transit-O 31, dual Navy navigation satellites (NNS) launched by NASA Scout from Vandenberg AFB.



August 29: USSR launches Soyuz TM-6 aboard a Soyuz rocket from Baikonur. Ferry flight to Mir space station. Crew: Vladimir A. Lyakhov, Valeriy V. Polyakov, and Abdul Ahad Mohmand (Afghanistan).

**25 Years Ago - 1993**

July 1: Soyuz TM-17 launched aboard a Soyuz rocket from Baikonur. Ferry flight to Mir space station. Crew: Vasili V. Tsibliyev, Aleksandr A. Serebrov, and Jean-Pierre Haigneré (France).



July 1: The Hubble Space Telescope first captured images of fragments of comet P/Shoemaker-Levy 9 with its planetary camera. One year later, the comet fragments collided with Jupiter. The Jupiter collision was the first observed collision of celestial bodies in our solar system.



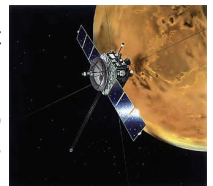
August 31: Meteor 2-21, the last of the Meteor 2 spacecraft, launched by a Tsiklon-3 from Plesetsk, Russia.



The satellite helped gather data on weather and radiation.

20 Years Ago - 1998

July 3: Nozomi (Hope), formerly called Planet B, launched aboard an M-5 rocket from the Japanese Kagoshima Space Center. Japan's first probe to orbit Mars, Nozomi was built to study the atmosphere and ionosphere of Mars using 14 instruments from several nations, including the US.



August 6: NASA's remotely piloted Pathfinder-Plus solar-powered aircraft flew to a record altitude of 80,285 feet above Kaua'i in the Hawaiian Islands.



20 Years Ago – 1998 - continued

August 13: Soyuz TM-28 launched aboard a Soyuz U rocket from Baikonur. Crew: Gennady I. Padalka, Sergei V. Avdeyev, and Yuri M. Baturin. Soyuz TM-28 docked with Mir space station using manual backup because of prior failure of one of two automatic systems.

**15 Years Ago – 2003**

July 7: Mars Explorer Rover-B (MER-B), also known as "Opportunity", launched on a Delta 2 rocket from Cape Canaveral. It is an exact copy of MER-A, and carries the same set of instruments. The landing site for MER-B is known as Meridiani Planum. Opportunity continued to explore for more than a decade after its landing on the Martian surface and, in 2013, set a new driving distance record for interplanetary rovers.



July 29: The 1,000th consecutive day of people living and working aboard the International Space Station (ISS).



August 7: First glide flight of SpaceShipOne at Mojave, CA. SpaceShipOne would go on to win the Ansari X-Prize in 2004 as the first successful commercial suborbital spacecraft.



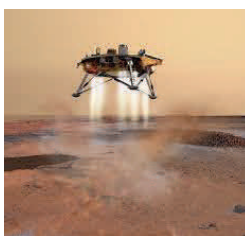
August 25: Space InfraRed Telescope Facility (SIRTF), renamed the Spitzer Space Telescope, was launched by a Delta 2 rocket from Cape Canaveral. It is the fourth of NASA's Great Observatories, the others being the Hubble Telescope, the Compton Gamma Ray Observatory (decommissioned in



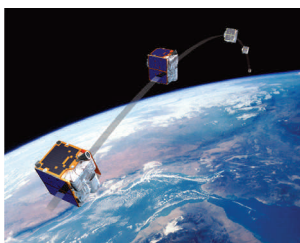
June 2000), and the Chandra X-Ray Observatory. It is also the largest infrared telescope ever launched into space.

10 Years Ago – 2008

July 31: NASA announces that the Mars Phoenix Lander has confirmed the existence of water on Mars by photographing the sublimation of water ice.



August 29: Five identical mini-satellites of the German RapidEye AG corporation launched by a Dnepr rocket from Baikonur. The 6.5 m resolution images will be sold to agricultural, forestry and town-planning enterprises.

**5 Years Ago – 2013**

July 29: Chandra X-Ray Observatory makes the world's first detection of an exoplanet via changes in a star's X-ray radiation levels.



July 31: Mars Phoenix lander confirms its discovery of water on Mars by detecting the presence of water in a soil sample.

August 3: HTV-4 ("Kounotori", meaning White Stork), an unmanned ISS resupply vehicle, launches aboard an H-II rocket from Tanegashima, Japan. Kounotori brought the second humanoid robot, called Kirobo, to the ISS as a technology demonstration experiment.



More Photos From the June Sport Launch



Jeremy Sell's PML Ariel



Herb Crites' Mach Schnell on a Redline



Al dela Iglesia's MRC Standard ARM



Randy Gilbert's Cobra 2160

More Photos From Crapshoot V



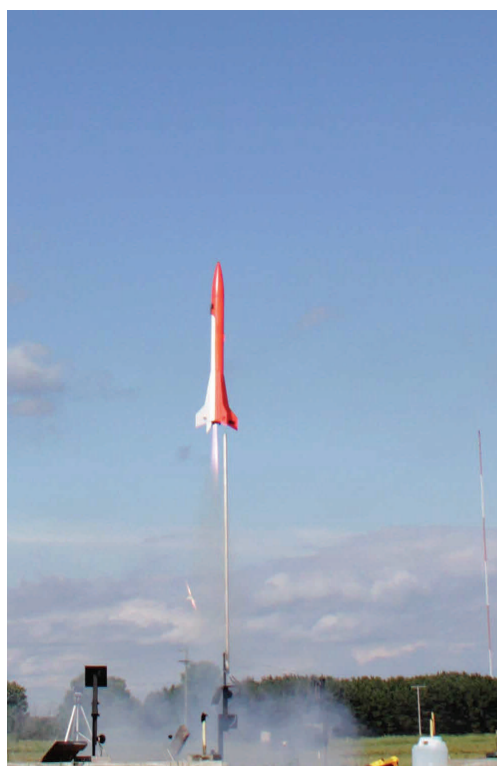
Randy Gilbert's USN Navy Drone 00339A - Randy Gilbert photo



Pam Gilmore - Randy Gilbert photo



Low Ceiling - Randy Gilbert photo



Dave Glover's Quad Runner spitting grains



Randy's Astron Explorer - Randy Gilbert photo



Maxi Alpha 3 cato's Then loses nose cone and chute becoming stable again



Tony and his Madcow Nike Apache

More Photos From the July Sport Launch



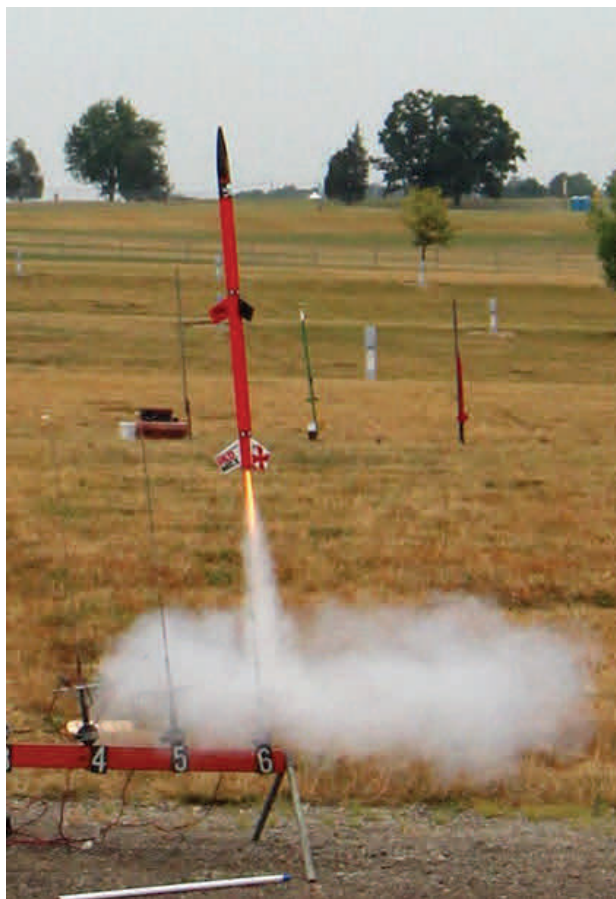
Kathy's Star Shuttle Lift-off - Randy Gilbert



Casey's L2 attempt - Eldred Pickett



Eldred's 38 Special - Randy Gilbert



Randy's Das Dubl Red Max- Randy Gilbert photo

VENDOR NEWS

Estes Industries LLC

Lot of good news out of Penrose as of late. New kit releases have recently been trickling out and then a printed catalog for 2018 was released with even more news. Most of the new kits are classic re-releases including the Black Brant III, Mean Machine, Multi-Roc, Explorer Aquarius, and a 50th Anniversary Saturn V that will include a "bonus". One totally new kit is a scale model of the Mercury Little Joe that looks fantastic! BREAKING NEWS - 7/11/18 - Bill Stine is announced as the VP and General Manager for Estes!



eRockets

Semroc also has a new catalog out you can order from eRockets for a single penny. Also new is a MicroMaxx Orbital Transport and Cherokee. Also announced, eRockets will begin manufacturing Dr Zooch kits for them. Same fantastic instructions, but improvements include more realistic shaped nose cones and laser cut parts.



J&H Aerospace

Dan Harrison of JMRC recently flew the Switchblade S rocket glider from J&H Aerospace. They specialize in model airplane designs and components including some rocket boosted gliders, but also free flight powered and glider aircraft. The Switchblade is a mini engine powered swing wing RG. The model lists for \$25.00 and includes contest grade balsa, formed wire components, and all hardware for the swing wing mechanism. You can check it and their other products out at jhaerospace.com.



Odd'I Rockets

Recently released their new F-104 Starfighter. This is similar to the F-104 released by Centuri in the 70's. They also have an F-16. You can get them at Apogee Components or Jonrocket.



Miller Motor Works

Did you know Scott is a Jolly Logic dealer? Hmmm,....

FlisKits

Jim Flis recently announced that he would be shutting down the company at the end of the year. He cites wanting to spend more time with family and educating. Get in your orders while you still can.

OUR MEMBERS IN THE FIELD...



Eldred Pickett at the July Launch - Eldred photo



Randy Gilbert and his upscale Cobra



Mike Jacobs and his LOC IV



Tom Kurecka and his Little Joe II