



AEROPAC Fall 2018 Newsletter

Photo: Curt von Delius PHX4

President's Pad

Greetings, fellow AEROPAC members.

The playa dried out nicely for the launches this year although we had the normal windy afternoons. We have been experiencing whiteouts and obscured visibility as a result of the erosion of the playa during Burning Man. Sometimes the lack of visibility due to the dust being raised causes us to stop launching for several hours until it clears.

There were a couple of accidents at the BALLS launch so I would like to emphasize following safe practices.

Make sure that you use a switch of some kind to turn on your staging or deployment electronics. Inserting the battery to power up the electronics is not considered a safe switch.

Twist the bare leads of your igniter together prior
(Con't next page)

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to inserting it into the nozzle to prevent a static charge from setting it off. Position your body away from the motor nozzle when inserting the igniter so that less of you gets burned if it goes off prematurely. Extend your igniter leads so that you are not hooking up the alligator clips with your hands right under the nozzle.

That also keeps from frying the clips.

When turning on your electronics position your body to the side of the rocket so that if the ejection charge goes off you don't get impaled.

If you have to take your rocket off of the launch pad or disassemble it in any way disconnect and remove the igniter and turn off the electronics until it is ready to launch.

Stay safe out there. Murphy is always waiting for something to go wrong.



Charlie Wittman's 2018 ARLISS experience.

All photos courtesy of Charlie Wittman

Jim Green AEROPAC Prefect / President



The Historic Flight of PHX4

Jonathan DuBose



Photo by G. Engelgau

Saturday June 16, 2018 witnessed an epic two stage flight by Curt von Delius. His record setting PHX4 flight was the result of years of hard work, research and the development of an innovative design. What follows is a summary of that flight from my perspective after tagging along with Curt and his team over that weekend.

First, some perspective: After years of breaking and setting new single stage altitude records in the J, K, L and M motors classes, Curt embarked on the Phoenix two stage project. The first flight at MUDROCK 2014, flying with a CTI M3400 booster and CTI N1100, saw the sustainer go unstable at MaxQ after a perfect boost, coast and sustainer burn. The 2nd flight at XPRS 2016, with the same motor configuration but enhanced sustainer fin design to increase stability, reached ~ 96k'. The MUDROCK 2018 PHX4 flight featured a CTI N5800 CSTAR booster motor to a CTI N1100 Moonburner sustainer motor with an 11 second delay between booster burnout and sustainer ignition. This was Curt's 3rd ever two stage attempt.

The PHX4 flew to an estimated 244k' above sea level. Curt's three gps' locked out at 1200 mph and didn't re-lock until the sustainer had fallen from apogee for 72 seconds to below 164k' or 50,000 meters. His flight proved that the current UBlox receiver GPS devices will certainly lock out at 500m/s and will not issue valid packets until below 50,000 meters. Vern Knowles commented that Curt's project is likely the



first flight to ever break the COCOM speed and altitude limits. Here is how Curt accurately calculated Apogee Altitude:

| APOGEE DATA | | Time | |
|--|--------------------------------------|---|----------------------|
| HD Video | 00:05:46:24 00:07:52:13 | 125.63 sec | |
| RDAS | Flight Data Sustainer | 124.75 sec | |
| Raven | Flight Data Sustainer | 125.73 sec | |
| Launch to Apogee | | 125.00 sec | |
| GPS DATA | | Time | Altitude |
| 443 kml | Launch 20:54:49 Re Lock 20:58:06 UTC | 197 sec | 8 sats @ 163556' MSL |
| 442 kml | Launch 20:54:49 Re Lock 20:58:06 UTC | 197 sec | 8 sats @ 163517' MSL |
| Launch to Apogee | | - 125 sec | ≈39' |
| Apogee to Re Lock | | 72 sec | |
| - Fell from apogee for 72 seconds to 163556' MSL when GPS' Re Locked | | | |
| distance = 0.5* gravity* time ² | | Object falling from position of rest for 72 seconds | |
| = 0.5* 9.653534m/s*5184t | 165k MSL | in near vacuum | 82089' |
| = 0.5* 9.598303m/s*5184t | 225k MSL | in near vacuum | 81623' |
| = 0.5* 9.625919m/s*5184t | Average | | 81857' |
| 244k - 163k atmosphere | 1.5% reduction for drag | | - 1227' |
| Distance | | 80630' | |
| Re Lock | | + 163556' MSL | |
| Apogee | | 244186' MSL | |

Clearly, this was the highest two stage flight in amateur rocketry history and the first to ever break the 200,000' barrier. You can experience this amazing supersonic near space flight captured by on board high definition video cameras at: <https://www.youtube.com/watch?v=g0imcpdLdB8>



The PHX4 nose cone is constructed with several different high strength composite materials and protected from the heating of sustained mach 3.5+ speeds with lightweight intumescent ablative.

The fin plate construction includes a 34 layer quasi-isotropic lay-up of unidirectional prepreg carbon fiber. The fin cans and reinforcements are also constructed using prepreg unidirectional carbon fiber. Use of these materials results in ultra strong and relatively lightweight structures. The sustainer fin can was protected from the intense heat with phenolic ablatives and other high temperature materials.

The modular design of the key components and systems allows for very efficient use of space, minimizes weight and makes the final assembly a straightforward process. Utilizing extensive Computer Aided Design (CAD)

Curt with the fully loaded PHX4 sustainer

and Computer Numerical Control (CNC) manufacturing processes insured all systems would mesh seamlessly when assembled.

This was the second flight of this PHX4 sustainer. After the 95,786' flight in 2015 only minor refurbishing of key components was required for a second flight.

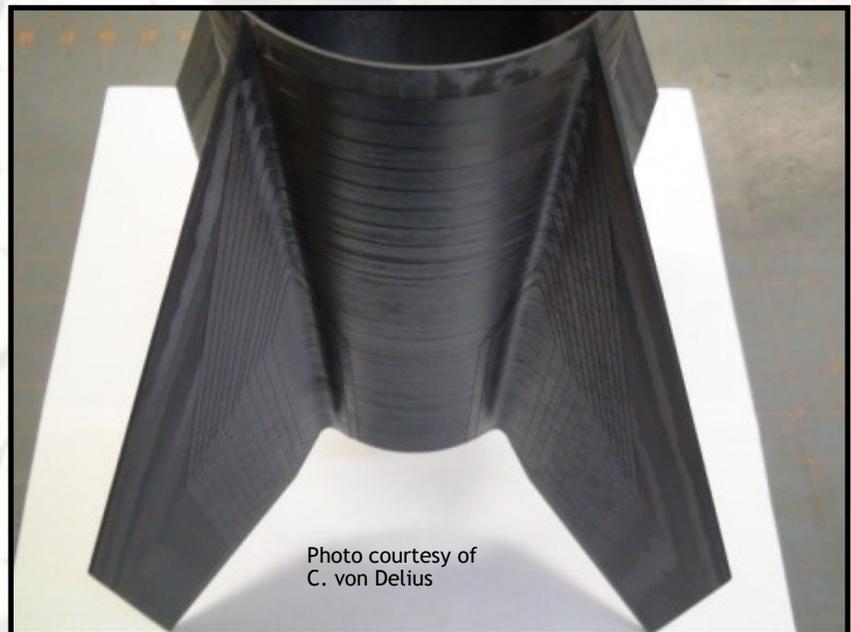
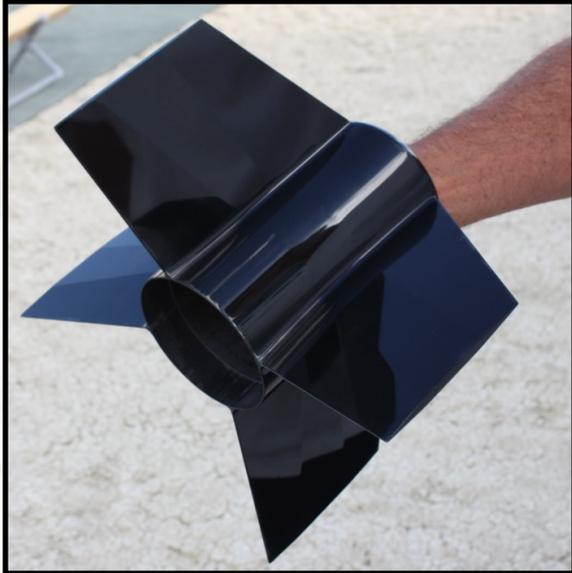


Photo courtesy of C. von Delius

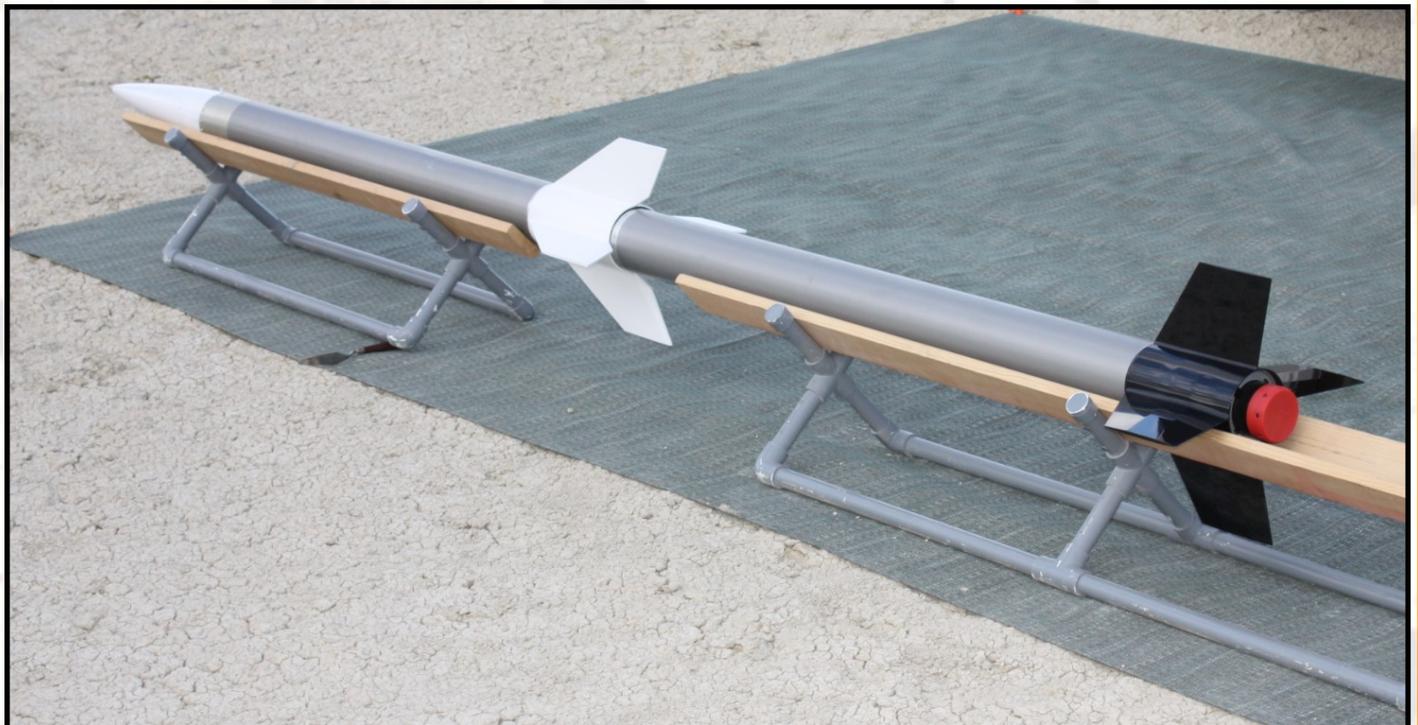
Unfinished sustainer fin can



PHX4 Booster fin can, like the sustainer fins, are constructed of numerous layers of unidirectional pre-preg carbon fiber



The fully expanded bi-axial carbon/phenolic second stage nozzle



The full stack of PHX4 two days before launch. The rocket is basically ready to fly except for the head-end sustainer motor initiator which is installed at the pad immediately prior to loading the rocket in the launch tower.



Curt's custom built 20ft. tower. All 3 of his two stage flights have been launched from this extremely rigid, precision tower.



Checking GPS status while Monica checks off the items on the extensive and detailed checklist



Curt and support crew members Allan Skinner and Darryl Paris help raise the tower loaded with the rocket to vertical position.



Insuring that the launch rail is in a perfectly vertical position. With the upper cables under tension, initial launch tower adjustment is made by moving the base of the tower.



Cables with turnbuckles are then connected at the tower's midpoint. Small diameter high tension cables run the length of the rails and are used as indicators for adjustment to assure the rails are perfectly straight



Curt dons a fire resistant Kevlar flight suit prior to arming the PHX4



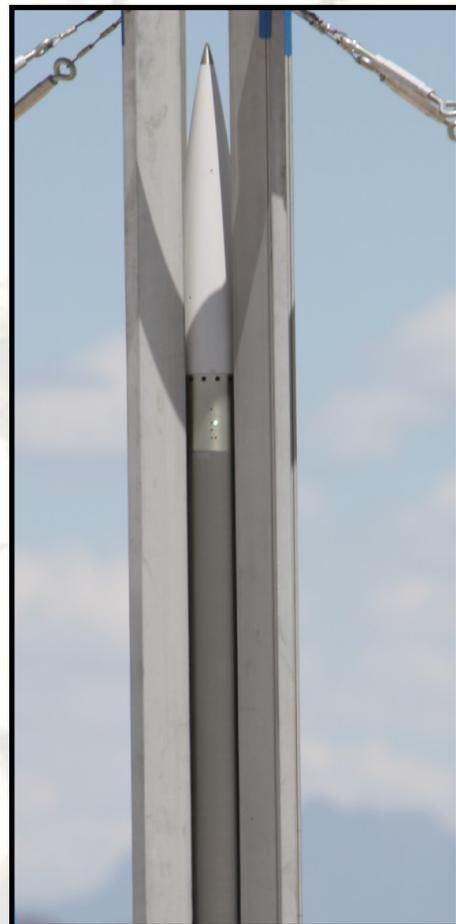
Arming the booster electronics



Arming the sustainer electronics



Installing the booster igniter



The green high intensity LED indicates that the PHX4 is a go for launch!



PHX4 rises straight and true from the playa floor.



Smoke trail from the PHX4 sustainer as it disappears into the heavens.

The sustainer was recovered 6.36 miles from the launch point.



Post retrieval, Curt demonstrates the custom Disc Gap Band Drogue and the X Form Main chutes he designed and fabricated.



The nose module descended on its own Disc Gap Band chute.



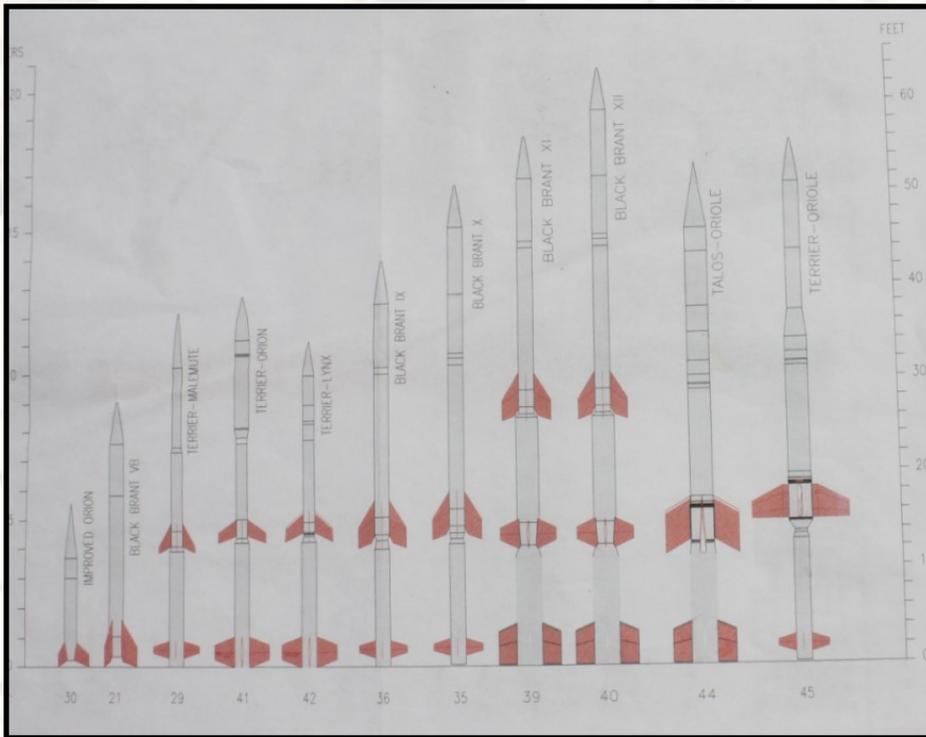
The nose cone and fins suffered significant charring from the sustained mach 3.5+ speeds but the intumescent and cork/phenolic ablatives got the job done.



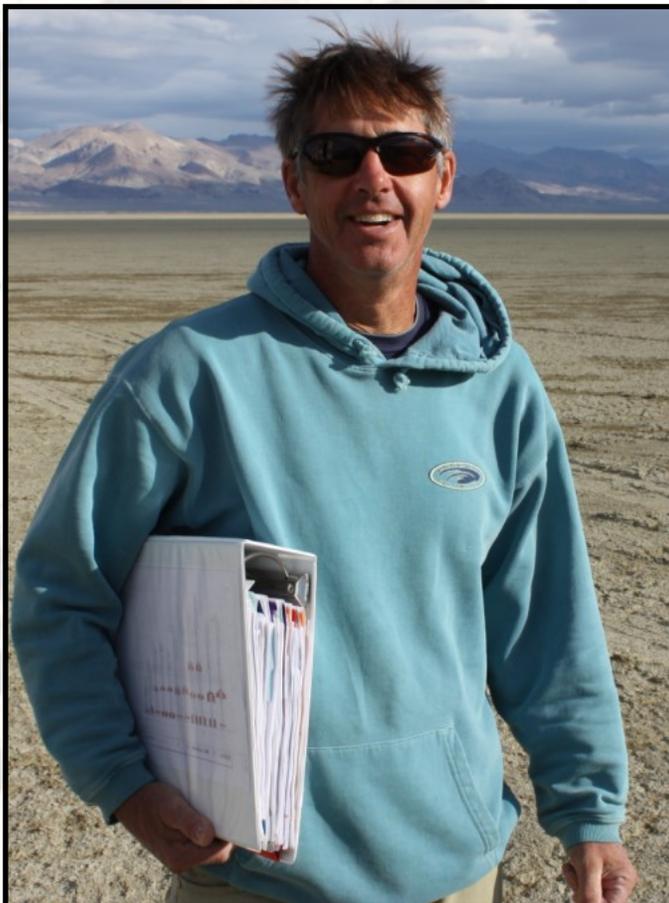
Curt developed innovative designs and deployment strategies to overcome design challenges, including his "Deployment Pistons"

Photo courtesy of C. von Delius





The enduring design of the Black Brant series of sounding rockets are the basis of Curt's design and inspiration.



Curt in a post flight happy mood with his project binder containing his research, documentation and procedures.

Want to fly a rocket to 244k'? Be prepared to make it your full time job for several years and invest significant other resources as well.

All photos by J. DuBose unless otherwise noted



ARLISS 2018—20th Anniversary Launch

Becky Green

ARLISS 20th Annual Launch turned out to be another spectacular event. Since this was our 20th year of ARLISS, there were a few special presentations that I hope you were able to attend. If you didn't attend let me explain and show you, how special it really was, throughout this article.

As usual, ARLISS 2018 began just like normal on Sunday, September 9th at Bruno's, when the students held their meet and greet meeting, which ended around 2:00 pm. By about 2:30 the cars filled with students all started arriving to help set up camp.



Here they all come!

Photo by Jim Wilkerson

Unlike last year's event of the missing trailer...this year the ARLISS trailer was on site when the students all arrived. I would like to say a BIG, thank you to all the students and professors who arrived early and helped set up ARLISS camp. I think camp was set up in record time this year due to all the help and putting away the shade structures with covers on them last year.



Due to lack of haulers this year...Jim took two trips to Empire to not only get the ARLISS trailer....but also get the Uber-Rail. Jonathan and Dick came to the launch...dropped off their trailer and went back to Empire and got the equipment trailer. Lots of driving for everyone...a BIG thank you to you guys for helping.



Everyone getting instructions on how to set up camp Photo by Jim Wilkerson



Let's have a great evening before ARLISS begins Photo by Jim Wilkerson



Monday morning the students were back for our welcome meeting at 8 am. Throughout ARLISS this year, there were a total of (15) teams from Japan, (1) from South Korea, University of Hawaii-Windward Community College, Oregon State University, University of Louisiana @ Lafayette, Peru, University of Oregon, Costa Rica (yes an ARLISS team) and (4) teams from Mexico. There was also the Costa Rican team of 9 students and 1 professor to get their Level 1 and Level 2 certifications.



Monday morning meeting

Photo by UNISEC

Now...as promised...here is one of the special presentations for ARLISS 20th Annual launch. At the end of the welcome meeting, ARLISS presented UNISEC with a special 20 years of ARLISS canvas print (picture on right). We also presented UNISEC with several framed smaller versions of the canvas print.



20 Years of ARLISS Canvas Print

Photo by Jim Wilkerson

UNISEC then presented us with t-shirts. The design of the shirt has pictures of 53 satellites which represents the 53 satellites that have gone into orbit from the Japanese ARLISS Alumni, through UNISEC.



Finally registration began. During the registration, I had to stop and assign flights. That was good since normally we don't have very many projects ready on the first day. However, there were problems with the launching equipment so that caused a delay. Once that was all taken care of we started launching and managed to get 7 rockets launched before the nasty "W" arrived.

At least I was able to continue with the rocket build session for Costa Rica. It actually gave me a lot more time to work with them. By Monday evening, they had the kits built and two of the sections of fiberglass on the kits. They only had to do one more fin section of fiberglass and the last few things to complete the rocket on Tuesday morning. Wow....they are way ahead of schedule.

Tuesday, the Costa Rican students knew what to do while I was assigning ARLISS teams. I assigned and had 4 rockets in the air by about 11 am. However, that was the end of the day due to the Big "W". That means we were going to have a lot of flights on Wednesday and Thursday.



Becky talks things over with Prof. Sinichi Nakasuka
Photo by Jim Wilkerson



Epoxy drying on tip to tip layups

Photo by Jim Wilkerson



10 very happy L2 Costa Ricans

Photo by Jim Wilkerson



Wednesday morning started out great. We had a rush of projects ready but the weather once again didn't hold. However, there were enough breaks in the day that we managed to get 9 flights in the air. As for Costa Rica....they were low flights and had enough time to wait for a break in the weather. They managed to get all 10 L1 flights along with one person from Colombia and 3 from Hawaii. They were 14 for 14. Then came a lot more studying before taking the tests.



4 teams from Mexico with Joe Bevier's rocket

Photo by

Jim Wilkerson

I forgot to mention the issue with porta potties. As we all know....they are a must. Well, for the first time in 20 years Sani Hut didn't have 3 trailers for us. They only had 2. With a bunch of phone calls back and forth....I managed to get Tony Alcocer to come up a day early, bring the 2nd set and then the best part.....on Thursday morning Tony and Seth took the old set back to Sparks, dropped it off for servicing while they shopped at Costco for the ARLISS Banquet food. They are my heroes. I didn't have to leave the launch (good thing because it was very busy). They both split up each taking 1/2 of the shopping list. Then they had to stop in Gerlach to pick up the key and unload all the food at the community center.....and brought back nice fresh porta potties. I know this took your entire day....but THANK YOU SOOOOOOOO MUCH for helping!

Thursday, the last day of ARLISS, began with a bang. We started at 7 am. I think the first launch was at 7:05. Of course, as usual this was the largest day for flights. We managed to get 18 M's and 3 K's off before the weather turned bad again. When there were some lulls in the weather, Costa Rica, Colombia and Hawaii managed to get all their L2 flights off after taking and passing their certification tests.



As promised, here are more of the special presentations for ARLISS 20. The weather calmed down for the Thursday evening event. Prof. Shinichi Nakasuka had a fabulous ARLISS history presentation out on the playa starting at 7:30 pm. We put a white sheet on the ARLISS Trailer and had the projector not only playing his power point presentations...but several messages from teams who were from previous ARLISS years including some from the first year in 1999. Also, another speaker was Nabutada Sako who attended the very first ARLISS in 1999. He is the Director of Satellite Systems Laboratory, Canon Electronics, Inc. He was not only there to present...he was there recruiting the wonderful bright minds of the many students who attended. I also found out that Canon was so impressed with the presentation when Sako returned that they are going to send Sako with a team to ARLISS 2019. As the presentation came to an end, Shinichi presented me with the actual rover that won at ARLISS 2017. After presenting me with this and some very kind words....he expected me to speak. Well...let's just say I didn't get very far before I was overwhelmed with pride knowing how much ARLISS has affected these students. I got a huge lump in my throat and the tears started flowing. I kinda pulled myself together long enough to finish.



Becky receiving award from UNISEC

Photo by Nobutada Sako

Just as I thought ARLISS was over except for the banquet on Friday, I heard there were 2 teams who didn't get to fly. I found two more flyers willing to get up early Friday morning and have their rockets ready for the teams to come back by 7 am to fly so they could make it in time for the ARLISS banquet at the Gerlach Community Center at 9:30 am.

Friday morning Erik Ebert and I went to the Community center to start prepping for the breakfast. It quickly turned into a huge group effort getting everything done super fast. There were so many students from Hawaii, Japan, Louisiana and Oregon who arrived early and started pitching in helping. I was doing a lot of pointing and giving directions while making the 15 dozen hard boiled eggs. With everyone's help we managed to start the breakfast and presentations only 15 minutes late.

It is always wonderful listening to the presentations. Those students have such incredible projects. If you've never attended the presentation, you might want to see it someday. They all share their information which sparks ideas for next year's projects.



After the presentations were completed...it was time for the last of the ARLISS 20th Annual special presentations. Prof. Shinichi Nakasuka once again had a presentation. This one was mainly the messages from all the ARLISS Alumni which he tried presenting Thursday night but we had problems with the audio so it was wonderful hearing them. These messages were from some of the original students and it was great to hear what they went on to do in their careers. Once they were all played, Shinichi asked all the Aero-Pac members to come to the front of the room and for the Japanese teams to come forward with their gifts. First, I was presented with some printed brochures that had many other messages from ARLISS Alumni. The following link has the messages from ARLISS alumni: https://www.dropbox.com/s/mm7uxrrru0wc1p/ARLISS%2020th%20%20%20ANNIVERSARY_digital.pdf?dl=0

Then the student teams presented me with various rovers and flyers that were previously



UNISEC Rover presentation to Becky

Photo by UNISEC



Previously flown Rovers presented to ARLISS by UNISEC

Photo by UNISEC

flown...including this years first and second place rover and flyer. They are all currently getting special custom individual clear displays so they never get damaged.

I just want to say a BIG THANK YOU to everyone who made this a spectacular ARLISS.....from all who helped set up and tear down ARLISS camp and the community center and to UNISEC who helped coordinate each and every project and they stayed until the very end with me and Erik to help clean up and pack the last minute stuff into my van. Good thing they stayed...they were able to take the bag a student left behind to the Reno airport before he got on the plane.



Also, a BIG THANK YOU to the flyers, Jonathan DuBose, Dave Raimondi, Charlie Whitman, James Marino, Dick Jackson, Jake Hudson, John Lyngdal, Joe Bevier, Gary Lech, Jim Green, Seth Wallace and Ted Sobieralski. Of course, we can't forget Tony, Erik, UNISEC, all the students and of course AeroTech. Without all of you ARLISS 2018 wouldn't have been possible.

If I missed your name please don't be mad...I'm probably having another senior moment....LOL.



Outside Gerlach Community Center after the presentations.

Photo by UNISEC



2018 XPRS Contests Winners

Darryl Paris

Weather was not on the competitors side this year and I'm sure it reduced the amount of flights entering the contests. Even with the strong winds and Burning Man dust only two motor classes had no entries, E & O motors, but the rest of the classes were filled. The under 18 Loft Duration crowd saw Will Swenson swooping up most of the loft duration classes with his rivals the Paris kids being sick and not entering. We managed to see two records broken in the Extreme Altitude contest and the competitions heated up once again in the J & K motor class! Kurt Gugisberg managed to knock down his old (but still impressive) record by 3005' higher - to a whopping J motor record of 15,108' high! Great job Kurt! Mike Ostby brought his A game and managed a first place win in three categories, I-M-N motors and set a new record in the I motor to 12,960' way to go Mike!!

I'd like to thank all the competitors for entering and making this a fun event and during XPRS please encourage your fellow rocket enthusiasts to enter the contests. Those wishing to enter next years competitions there's no entry fee and the contests are held on the Friday/Saturday of XPRS and all first place winners receive trophy's! You have 11 months until your next opportunity to set an XPRS record so get building!!

Loft Duration:

A motor Will Swenson

B motor Abby (no last name given)

C motor Emery (sister, no last name)

D motor Will Swenson

E motor no entry

F motor Will Swenson

G motor Will Swenson

Extreme Altitude:

H motor Janet Flenner 5461'

I motor Mike Ostby 12,960' New record!

J motor Kurt Gugisberg 15,108' New record!

K motor Allen Farrington 16,014'

L motor James Flenner 12,556'

M motor Mike Ostby 20,187'

N motor Mike Ostby 14,154' New record, no previous entries.

Contest Record Holders

H motor Joe Bevier 10,538'

I motor Mike Ostby 12,960'

J motor Kurt Gugisberg 15,108'

K motor Juniper Slouber 26,939'

L motor Tim Robinson 19,369'

M motor Chris Aterbery 37,798'

N motor Mike Ostby 14,154'

O motor Mike Ostby 16,377'



Getting that first ARLISS flight Off



Much excitement for the first ARLISS flight of 2018. Dave Raimondi celebrates with his team. Rocket is armed and ready to fly. But notice—no initiator installed.

Photo by Jim Wilkerson

Uh Oh! What is that guy doing during the celebration? Looks like he is holding a short 2 X 4 with a light on it?

Seems AEROPAC's state of the art launch system is down.

Photo by Jim Wilkerson



Jonathan's team from Tokyo Tech sneaks in, loads his rocket with an assist from James Marino. The launch system is back up and Tokyo Tech makes the first flight. Dave had to pull his rocket and do a reset.

Photo by Jim Wilkerson





Joe Bevier and Team ARES Get his ARLISS Rocket Ready to Fly



Team ARES hoists Joe Bevier's rocket at the prep table. It's a long walk to the pad and sometimes an adventure for new ARLISS teams to get the rocket on the rail. Joe supervises the lifting of the rocket into launch position and then it is time for the pre-launch group photo.

Photos by Jim Wilkerson



ARLISS Rookie Ted Sobieralski



Ted made a number of flights—all successful. This was Ted's first year flying ARLISS. Nice rocket! Welcome Ted! All photos by Jim Wilkerson



Tahoma Photography 2018



AEROPAC 2018 Flight Totals

MUDROCK AERONAUT ARLISS / XPRS

| | | |
|--------|-------|--------------------|
| A = 7 | A = 0 | A = 3 |
| B = 6 | B = 3 | B = 5 |
| C = 24 | C = 8 | C = 6 |
| D = 2 | D = 2 | D = 2 |
| E = 2 | E = 4 | E = 7 |
| F = 3 | F = 8 | F = 11 |
| G = 4 | G = 8 | G = 14 |
| H = 6 | H = 6 | H = 50 |
| I = 6 | I = 8 | I = 29 |
| J = 5 | J = 2 | J = 46 |
| K = 3 | K = 4 | K = 27 (3 ARLISS) |
| L = 0 | L = 0 | L = 9 |
| | | |
| M = 6 | M = 3 | M = 60 (40 ARLISS) |
| N = 3 | N = 1 | N = 5 |
| O = 2 | O = 0 | O = 0 |

Total = 79 Total = 57 Total = 274



Photo by J. DuBose

AEROPAC veteran Chet Geyer attended MUDROCK



Photo by J. DuBose

The Sobieralski's O3400 streaks into the sky at XPRS



10 L1 Certs, 10 L2 Certs, ARLISS Rover - U of Costa Rica Rocks the Playa!

Aerospace Engineering Group of the University of Costa Rica

We are a group of students from the Aerospace Engineering Group of the University of Costa Rica. During September 2018, 15 of us had the opportunity to visit the Black Rock desert with the purpose of getting certified in high power rocketry as well as participating in the ARLISS Competition. First of all, we have to say we are very grateful to Tripoli, AeroPAC, Jim and Becky Green, our teachers, parents and all the people that helped and guided us through all of this experience. For us, going to the desert was a great opportunity to learn about rockets, participate at an ARLISS competition and get the Tripoli Certification in High Power Rocketry. The ARLISS competition and the certification means a lot to us because in our country it is impossible to accomplish such a thing and, as rocket lovers, we want to expand the aerospace industry here in Costa Rica. The certification also allows us to consolidate the Aerospace Engineering Group and share what we do and our ideas, as well as learning about other projects. Also, rover competition allows us test and improve our construction, programming, design and soft skills, as well as increase our knowledge about autonomous vehicles.



2018 University of Costa Rica Aerospace Engineering Group

Photos by Jim Wilkerson



We arrived at the desert on Sunday evening and getting to know it was one of the most shocking and amazing experiences we ever had. After taking a moment to appreciate our surroundings, we proceeded to establish our camp before nightfall. Our rover started the work today. On Monday, during the early morning, we got our kits and started to work on our rocket for the certification. The feeling you get when you see and hear the first launch of the day has no comparison. By the end of Monday we had progressed a lot with our rockets but sadly our rover teammates found some troubles, because our motor drivers were damaged by the static in the environment. By Tuesday evening, our rockets were almost done, so our launch date was set to Wednesday. When the launch time came, we were all very nervous, because even the smallest mistake could affect the rocket. We launched 10 rockets equipped with H motors.

After we all launched and recovered our rockets, we had them checked to see if we had really achieved level 1. Thankfully, we all got certified. As we wanted to do level 2 as well, we took a specific theoretical test, that included the safety code and several technical questions about rocketry. When we finished our tests, and the guide checked them to see if we were allowed to do our second launch with higher impulse motors (J motors for this launch). We started preparing our rockets for the level 2 launch. Similarly, we recovered our rockets and had them checked to finally get our level 2 certification. Thankfully everything went well and all of the group accomplished the task.

While we got our level 2 certification, our rover teammates continued working on the project, dealing with more and more issues, parts that got damaged, loose contacts and limited internet access. Nonetheless, they didn't stop. After receiving advice from the Oregon team and some spares from one of the Mexican teams, we started making some progress on CUSUCO, our rover. However, we only had one more day to launch and we still had a lot of work. On Thursday we found another problem. One of our transistors was acting weird, so our motors were not working. But one of the engineers from the Hybrid Project helped us and gave us the one last push that we needed. Thanks to that, and Becky's help we were able to launch at 8am on Friday. We managed to test our mechanical systems, as we had on the last critical failure with our code. Our two onboard computers were not able to talk to each other so we were not able to move after the landing. Still, we learned a lot about ARLISS and we will have a much better version of CUSUCO next year. We are very thankful to all the people that helped us getting there, many of our parts were bought thanks to the money that we raised on our crowdfunding; without them. CUSUCO wouldn't exist.

Finally, we want to say that this experience was very rewarding for each one of us in every way possible. Every day in the desert, we reinforced our team and, as the days went by, we got a lot closer to each other. The experience helped the group to communicate and get along much better. It was also a lot of fun; we laughed all the time and made new friends from different parts of the world



One of our main concerns was that we thought that not speaking English perfectly would affect us, but instead of that, it was a great opportunity for us to practice and learn even more. Being the third generation of the Aerospace Engineering Group that got certified, not only makes the group bigger, but it allows us to launch rockets here in Costa Rica, always following the safety code and the legal restrictions, which is really a huge step for the group. Now that we are back, and as soon as we keep up with all of our college projects and tests, our intention is to teach the other members of the group about all the things we learned and hopefully they will also look forward to the certification, so that our group can get bigger and bigger everyday.



Aerospace Engineering Group of the University of Costa Rica with their 10 Level 1 and 2 rockets certified at ARLISS / XPRS 2018. That's Becky Green in the middle

Photo by Jim Wilkerson



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Tapioca Joe Makes Another Spectacular Flight at XPRS



Photo courtesy of Team Tapioca

Left: Team Tapioca: Gary Lech, Gary Knaust, Chuck Fauser, Ryan Fauser. Not pictured Brian Van't Hul.

R: Tapioca Joe lifts off from Uber rail on an AT N2000.

The flight is in honor of Chuck's father Joe Fauser, "Tapioca Joe"



Photo by M Arlene Fauser



Photo by J. DuBose

The 4 outboard J350s lit at 10 seconds and made an already awesome flight even more spectacular!



DuBose Buries Another One



I was hoping to take home a trophy with my “Little Red Rocket”. I was very happy with the build especially of the fin can layup and I was so confident I threw out a challenge to the club and the defending champ. I even had a great support crew. It was a beautiful straight liftoff out of the APE tower and the AT M685 burned forever. James Marino did his usual awesome LCO and Gary Rosenfield captured some great video. But as everyone knows - “up” is “the easy part”.

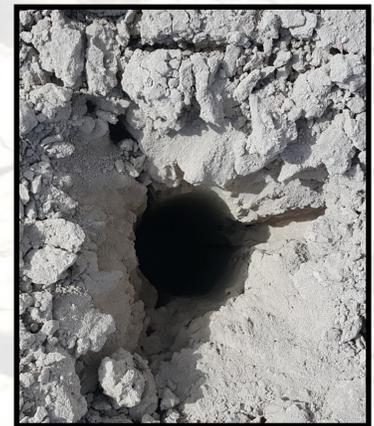


AltOS 2018-09-15-serial-3103-flight-0002-via-2483.telem

| Callsign | Serial | Flight | State | RSSI | Age |
|----------|--------|--------|--------|------|-----|
| KK6DMM | 3103 | 2 | drogue | -90 | 1 |

Launch Pad Ascent Descent Landed Table Site Map Ignitor

| | Current | Maximum |
|------------------------|-----------------------|-----------------------|
| Height | 9058 ft | 35771 ft |
| Speed | -778 fps | 2087 fps |
| Acceleration | -68 ft/s ² | 482 ft/s ² |
| Tilt Angle | -88 ° | 94 ° |
| Latitude | N 40° 52.012002 | |
| Longitude | W 119° 7.380144 | |
| Apogee Igniter Voltage | 3.65 V | |
| Main Igniter Voltage | 0.00 V | |



Telemetry gives me a severe reality check. It is coming is fast, real fast. Amazingly, thanks to Cliff Sojourner, we find the smoking hole - 59” down to the aft end. But hey...the fins stayed on! And we developed some innovative techniques for playa restoration.



Photos by J. DuBose and J. Slouber



2018 ARLISS Adventure

Gary Lech



Photo by Jim Wilkerson

This was the second flight of the rocket. The shakedown flight was perfect but the main chute primary deployment charge (3 grams of BP) may have been insufficient for the airframe with a student payload aboard. The secondary electronics fired the e-match bridge wire but the pyrogen did not ignite the charge. The backup e-match was likely part of a bad batch that was recalled by MJG years earlier. Fortunately the student project deployed successfully but the fin can and airframe, minus the nosecone, came in ballistic impacting at about 240MPH. The airframe was buried over 4 feet into the playa and is intact and will fly again. It took 3 of us about 4 hours to dig it out. The mud pushed thru the airframe and destroyed the e-bay but the StratologgerCF survived and the data was recovered.



Photo by Jim Wilkerson



Photo courtesy of Gary Lech



Photo courtesy of Gary Lech



Photo courtesy of Gary Lech



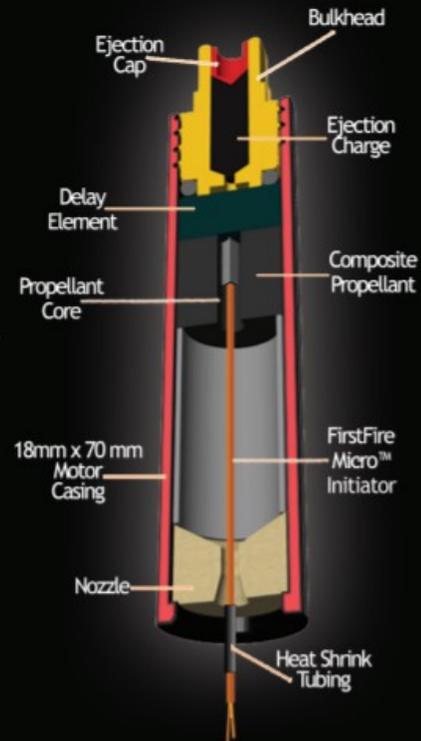
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- Elon Musk

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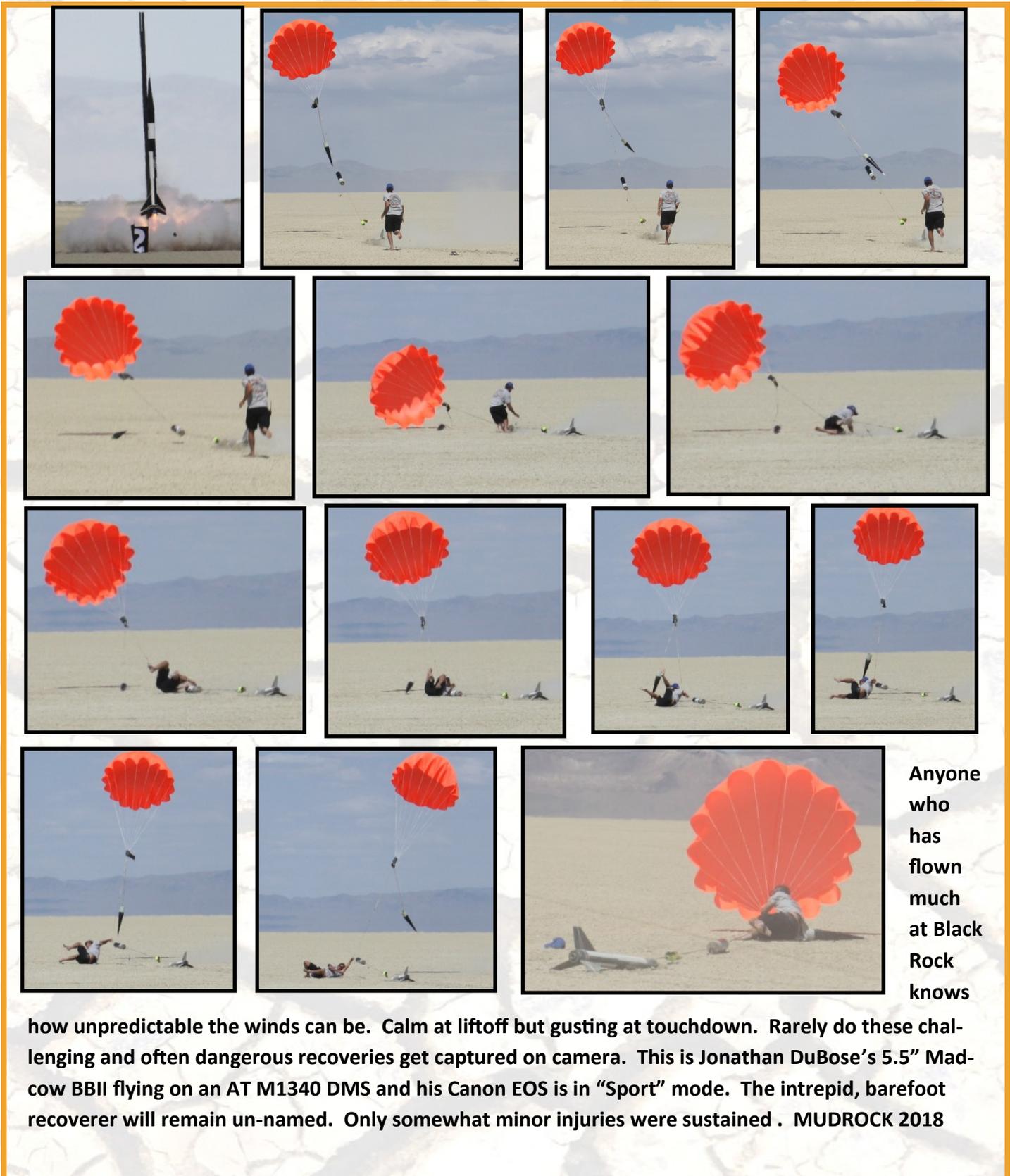


#FutureOfModelRocketry



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Anyone who has flown much at Black Rock knows

how unpredictable the winds can be. Calm at liftoff but gusting at touchdown. Rarely do these challenging and often dangerous recoveries get captured on camera. This is Jonathan DuBose's 5.5" Mad-cow BBII flying on an AT M1340 DMS and his Canon EOS is in "Sport" mode. The intrepid, barefoot recoverer will remain un-named. Only somewhat minor injuries were sustained . MUDROCK 2018



Aeropac Launch Director Report – 2018

Gene Engelau

Mudrock 2018

This year we had Mudrock! – Where last year we missed Mudrock this year we have great Playa conditions. I got out to the site around 4PM Thursday. When I arrive Curt von Delius and some others were already out there and had started to define a flight line. For setup Thursday we mostly dumped off equipment at the proper locations and saved most of the setup for Friday morning when we had more people.



My setup crew Thursday afternoon featuring most of the Parris clan



Flyers Meeting Friday



Photo by J. DuBose

Greg Ruhf heads to the RSO table

Friday – Friday started out beautiful but later in the day we got some wind and even some quick rain. The big event for the day was Curt’s two stage flight to over 200K ft. He was forced to abort due to surface level winds but would try again on Saturday.

Eric Kleinschmidt normally runs registration. But this year he was called up for a year on reserve duty so we had William Walby running registration and the raffle.



Saturday - In general was a nicer day than Friday. As usual we had some wind in the afternoon. But the big news was Curt von Delius's magnificent flight to over 200k' (see article on Curt's flight.)



I was able to launch Full Yellow Jacket on Saturday around 1PM with a M1850 White Lightning motor. It was pretty breezy when I recovered



My camp all lit up Saturday night for the night launch. Sunday it looked like there was some threat of rain so we packed out early to not get caught in the mud.



Aeronaut 2018

Thursday Setup – Marcus K and I and a few others arrived at the launch site around 5pm. Aeronaut this year was much smaller with many folks not coming out due to all the fires and smoke. A few days before Aeronaut the Road 447 up to Gerlach was closed due to a big fire near Nixon. I think that scared a lot of people away.



This photo says it all, lots of smoke Thursday evening. Friday morning it was very hazy and you could really smell the smoke. You could not see the sun. It started clearing some by around 10AM. Like Mudrock we did most of the launch setup Friday morning.



Flyers Meeting Friday – note that you can't see the mountains to the South. I don't have a lot of photos from Aeronaut. Friday I mostly flew some little rockets. Here is my Big Daddy landing with my mascot Piggy's. They have traveled all over the world and sometimes like to come to rocket launches.



Saturday's Flyers Meeting – Note the sky is quite a bit brighter. Saturday the smoke was not as bad, mostly because of the wind. So you need to take the good with the bad.



Photo by J. DuBose

Mike Gentile of Bay Area Rocketry



Flyers Meeting Friday – There were a lot of people at XPRS this year, which was nice to see. The morning was beautiful and dead calm. I flew my Yellow Jacket and fin can landed about 1.5 miles out





ARLISS / XPRS 2018



Amazing sunset Friday evening



Good size Fliers meeting Friday. Again dead calm in the morning.



It was calm in the morning. I flew Das Putz with the Little Piggies riding along



Saturday evening's AEROPAC Board meeting at my camp about 6PM

The End - til 2019 Season!

All photos courtesy of G. Engelgau unless otherwise noted



More Awesome Jim Wilkerson Photos from ARLISS / XPRS



**Curt G's Mercury
Redstone**



**Dick Jackson
listening**



**Jim Wilkerson's Big
Red Vengeance with an
N2000**



**ARLISS Team from
LSU-Lafayette**



Imploring the rocket gods for a good flight



ARLISS team from Hawaii

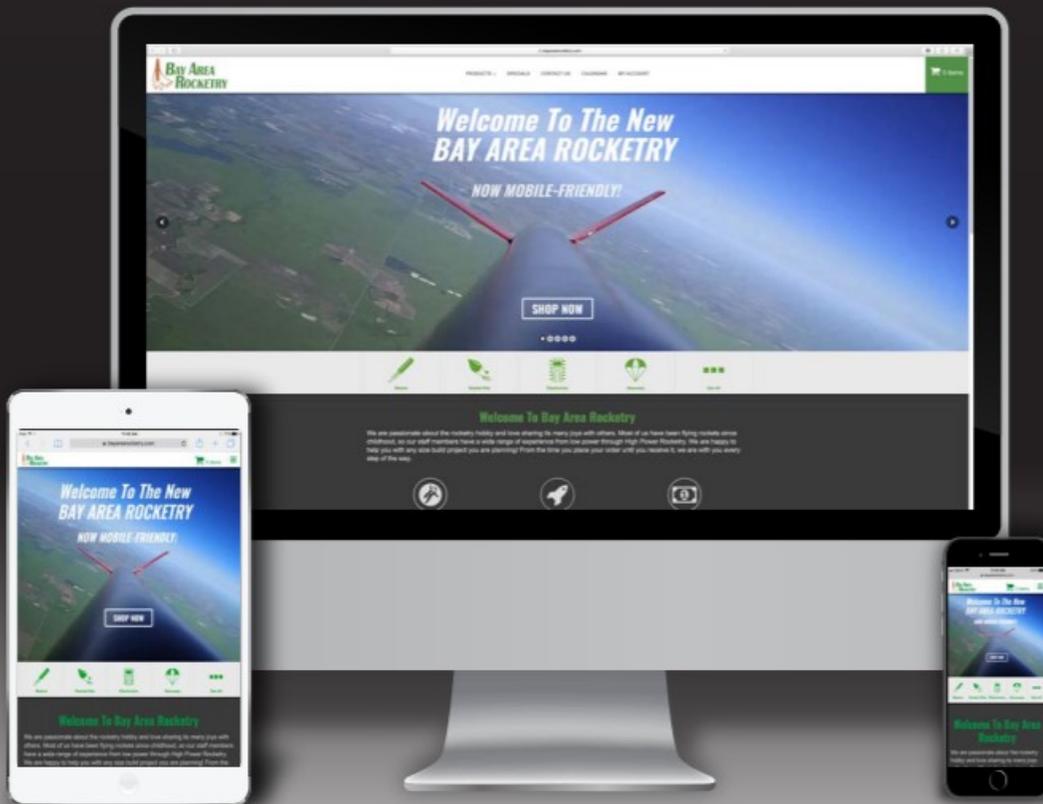
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