Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

President's Pad

Tony Alcocer

It's the start to another year's flying for us at AEROPAC. I don't have much to report. Jim Green was able to obtain our FAA waiver for 2015. For the most part we have a standing 150K waiver with 9 nautical mile radius with some scheduled windows to 200K with 17 nautical mile radius. We will again be using a blanket BLM permit through Tripoli. It worked out well last year and AEROPAC was able to save some money using the Tripoli BLM permit. The only thing I would like to point out is that the **BLM is still requiring that ANYONE using a vehicle to recover a rocket, must have 5 gallons of water and a shovel with them for fire suppression.** Also **looking for, or recovering rockets in Wilderness Area or Wilderness Study Area require special procedures.** These, and the other stipulations are not up for debate. It's BLM's property and that is what they want us to do in order to have permission from the BLM.

Tony leads AEROPAC in post cleaning party ritual

What's Inside

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

President's Pad

As for me personally, I've been busy this winter mentoring at a local high school. I also made 35 more "s4 model rocket" kits. Making these kits takes a lot of work. I want to thank Evan Curtis for his CNC work cutting out all the plywood parts. Barry at LOC Precision for the discount on all the cardboard parts; Bob Fortune at Aerocon for donating all the parachutes; and Randy at Rail buttons.com for all the rail buttons. With all this I've not had much free time or enthusiasm to finish up my builds yet.

I have been able to "pour" a few Research motors over the last few months. I've been asked to start writing a column about Research motors starting this month.

Wimpy Red 54mm, 75mm Swamp Gas Research grains

75mm 2 grain Swamp Gas burn

54mm 3 grain Wimpy Red burn

Research Basics: I've been playing around with Research motors for about 12 years now. Research is just another tangent that you can follow in this hobby. Just like other aspects of this hobby, you can immerse yourself completely or you can go very basic. It's almost like baking Brownies. You can buy a box of Brownie mix, acquire a few simple mixing supplies, and have some decent Brownies. Or you can go all out and learn what each ingredient does and come up with your own recipe. Currently I'm playing with moon burners.

I have been for about 3 years now. I like long burn motors and have been "playing around" (my term for my research activities) with alternate liner insulation materials. I've been playing around with different nozzle materials. If you come out to Aeronaut you may see a rocket fly using a completely wooden nozzle or even a nozzle made from a billiard ball. It's Research, after all. If you want to learn or hear more about Research, let me know.

"Research is what I am doing when I don't know what I am doing" Werner Von Braun

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

Planning on flying high this year? Don't forget to pre-approve your flight!

It seems that more and more folks are planning high altitude flights. Don't get caught out at the last minute! You need to be pre-approved by AEROPAC for flights over 35k' ***30 days prior to your flight.*** If you plan go over 50k' you will need approval by the TRIPOLI Class 3 Committee ***90 days before your flight*** even if your rocket is not Class 3 (40,960 ns or less).

These processes are not meant to throttle your creativity or be a PIA. They are in place to insure everyone's safety and to insure that we prove that we are worthy to continue using the amazing resource that is the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area.

AEROPAC Procedures for flights over 35,000 feet

Aero-Pac approval is required for flights that will go over 35,000 ft. We will review these flights for safety and to insure they will operate within the regulations we follow. Our FAA waiver is for airspace up to 200,000' MSL and defines a cylinder with 8 nautical mile radius. All aspects of each flight, including recovery, must take place within that cylinder. We often move our launch-site to accommodate prevailing wind and help keep flights within allowed space.

If you plan to fly above 35,000', submit the online form 30 days in advance of the launch with information describing your flight. Include your calculations describing how you will recover within waiver airspace under prevailing wind conditions. We will be enforcing these maximum drogue chute sizes. See AEROPAC's Safety rules for more information.

You need to complete and submit the "High Altitude" form accessible from AEROPAC's main webpage.

TRIPOLI Class 3 procedures for flights over 50k' - Submit your application 90 days before your flight!

The forms are available on TRIPOLI's Resource page:

www.tripoli.org/Resources/tabid/344/Default.aspx

A 6DOF analysis ("splash pattern") is also required. RocksimPro has this feature. If you do not have access to this software the Class 3 Committee will complete this analysis.

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

ARLISS-style Opportunities for TARC Finalists

Lynn Cominsky

Due to changes in NASA education funding, NASA's Student Launch Initiative (NSLI) was not offered this past year (2014). This competition has been offered to finalists in NAR's Team America Rocketry Challenge (TARC), with student teams being provided with a small amount of funding to build Level 1 rockets and design payloads. Realizing that this year's finalists would be missing this opportunity to move beyond model rockets, Ken Biba arranged with NAR to fund a prize for students using the S4 payloads, which are being provided through Sonoma State University's NASA funded S4 (Small Satellites for Secondary Students) program.

S4 was modeled on ARLISS, so this new competition is continuing the tradition. We contacted the top 25 TARC teams (through their mentors) to offer them the chance to write proposals to conduct a science experiment that would use the S4 electronics. The intent was for them to send us their payloads, and we would fly them on ARLISS K rockets. We received 8 proposals from 3 different institutions, and selected five for free payloads and launch opportunities at MUDROCK in June. The winning teams are:

Professor Cominsky at Black Rock pointing the way skyward

1) Team 1 from Newark Memorial High School Atmospheric Effects on Descent Rate

2) Team 2 from Newark Memorial High School Precision of S4 Payload Sensors

3) Team 3 from Newark Memorial High School, Establishing a Model for the Variability of Wind Speed

4) Team from Elena L. Christian Junior High School in St. Croix, US

Virgin Islands, Measuring and comparing relative air humidity in Arid and Equatorial Regions

4) Team from Elena L. Christian Junior High School in St. Croix, US Virgin Islands Measuring and comparing relative air humidity in Arid and Equatorial Regions

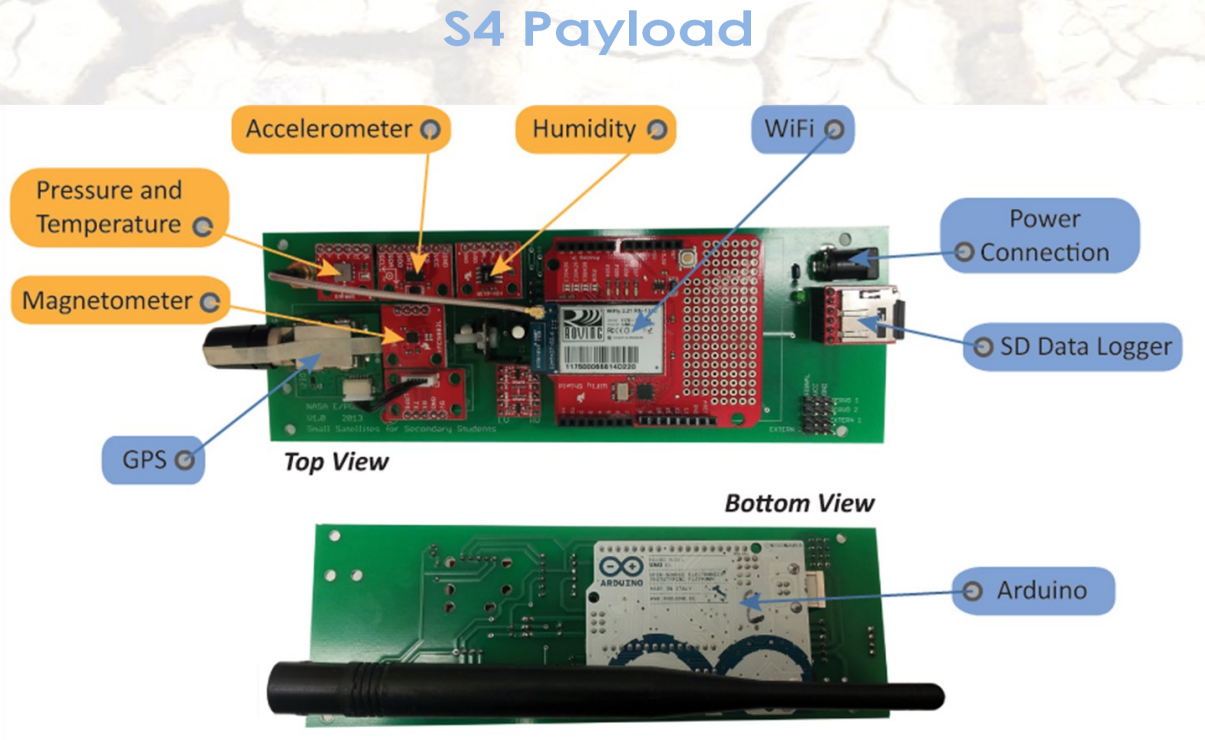
5) Team 2 from Northview High School in Sylvania, Ohio Calculating the Migration Patterns of North American Birds

The Newark (California) teams are mentored by Jerry Liang, who is one of the original S4 educators trained in Summer 2013. Their team placed 12th in TARC last year. They are planning on bringing some, if not all, of their own rockets to MudRock.

The St. Croix team is mentored by Steve Bullock. Their team placed 21st in 2014. They are also planning on building their own rocket and are raising the funds to come to MudRock in person. In fact, they already have reservations at Bruno's for 10 team members and 5 mentors!

The Sylvania Ohio team is mentored by Ryan Reed. Their team placed 3rd in 2014. They are trying to raise the funds to come to MudRock.

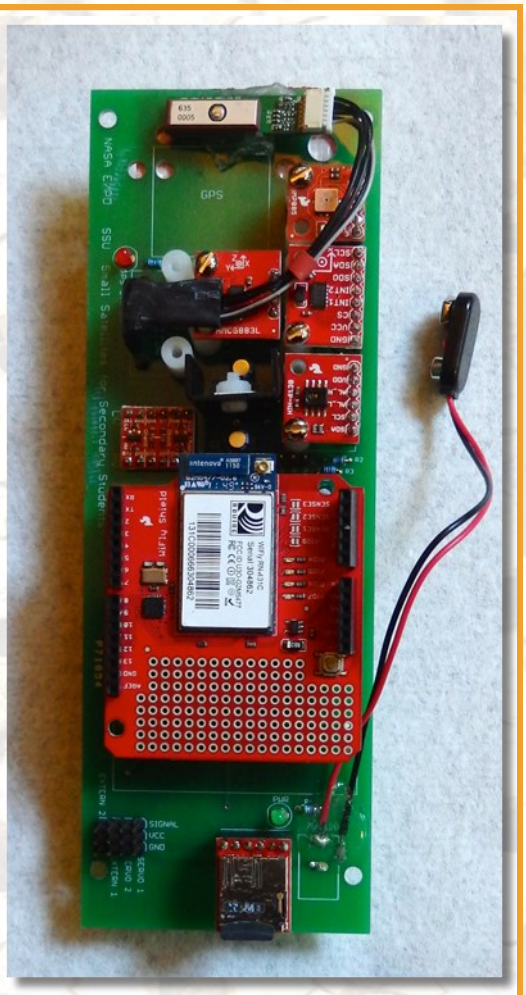
As in ARLISS, the teams will have to analyze their data and then make presentations following their S4 flights. A team of judges will decide which team receives the cash prize(s) donated by NAR.



Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

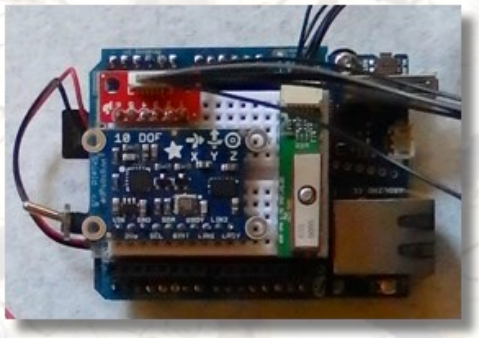
ARLISS S4

- STEM gap filler
  - More challenging than TARC
  - Middle school and high school
  - On the way to ARLISS Classic
- Student focus rockets → payloads
  - Students design and implement an experiment
  - Experiment flown on reliable airframe
  - Data shared with the Internet
- Product of Sonoma State University's Dr. Lynn Cominsky
  - NASA contractor for science satellite outreach
  - NASA funded
  - AeroPac Sonoma State partner
- Not just a widget but a curriculum



S4 STUDENT MISSION

- Students design an experiment
  - Arduino based sensor rich flight package
- Implement data collection and analysis on the S4 payload
- Experiment flown on rocket or balloon
  - Payload team can be remote from launch site
- Experimental data stored on SD card on payload AND transmitted via WiFi/TCP to Internet as telemetry
- Shared on the Internet in real time
  - From anywhere that has Internet access
  - Including Black Rock!



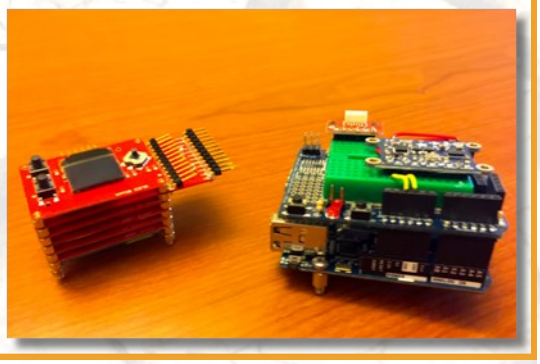


Photo by G. Engelgau

Fruity Chutes Gathering Parachute Deployment Statistical Data

Gene Engelgau

Fruity Chutes has started a program to gather actual parachute deployment reliability data. While parachute reliability is overall very high, we want to quantify the reliability, and when there are recovery problems, identify the causes. To gather the data we have a survey form you fill out for each flight. It gathers key information on the flight and also asks for photos, video, or flight computer information about it. Best of all each submission to Fruity Chutes earns you $10 in Webstore credit! The goal is to have data from at least 100 flights or more, hopefully during the course of this flying season. And of course, this applies to folks using a Fruity Chutes as their primary recovery.

A number of ARLISS flyers are also using Fruity Chutes. This is a good opportunity to both participate and build up credit with Fruity Chutes for a future parachute purchase! Fruity Chuites will have the survey forms available at all the Black Rock launches.

To learn more about the program you can go to http://fruitychutes.com/other_fun_stuff/parachute-safety-survey.htm. Download the form in XLS, or PDF, complete and return. Then get your credit!

You can earn credit when:

You are flying a Fruity Chutes parachute as your primary recovery.

After your flight you complete the Fruity Chutes Parachute Recovery Flight Data form (all required information must be provided).

You provide a photo or video of the recovery site, the parachute as found, and the UAS (rocket, UAV, drone, other).

You sign and return the form to gene@fruitychutes.com plus photos or videos.

Fruity Chutes has sole discretion whether to include, or not include a submission in it's advertising.

Our goal is to collect 100 or more documented flights or more by the end of 2015. In order to have as broad a sampling as possible we will be limiting any one customer to 10 flight submissions. We may change this depending on how it goes. If you are a fan of Fruity Chutes you can submit more than 10 flights and we will include these in the data set. We will be issuing webstore credit quarterly, so be patient.

You can use the XLS version to fill out the data, electronically sign and send back to us. Or download the PDF, print, fill out, sign, scan and return. On return we need the photo documentation. For videos we ask you to upload to YouTube and make it available via share link.

Why Aerodynamic Drag Matters...and How to Calculate It

Ken Biba

I have a fascination with flying rockets high - that (partially) sublimated desire to somehow reach space myself. So I like to build rockets that get as high as they can ... and my physics background compels me to understand the (hopefully!) simple laws of nature that allow them to do so.

For a ground launched, fin guided rocket one of the key factors is energy lost to friction due to drag - every bit of energy lost to drag is energy not available to fight gravity for rocket altitude. Drag is the enemy of flying high and the subtle ally of gravity. And estimating drag has big impact on mission planning—more impact the higher and faster the airframe will go. For the first sing le stage rocket discussed below - the RockSim estimate was about 35k' AGL against actual performance of 46.5k'. For the Carmack Prize flight, the RockSim estimate was about 90k' AGL vs actual performance (assuming launch lug does not prematurely release!) that will be closer to 130k'! For the Carmack Prize - we would not have even made the attempt since the simulation suggested it could never reach 100k'! This difference is drag estimate is essential in mission planning and to ensure that these high flights remain within the FAA waiver. Wikipedia (https://n.wikipedia.org/wiki/Drag_equation) tells us that a good first estimate of this drag can be calculated as follows.

In fluid dynamics, the drag equation is a formula used to calculate the force of drag experienced by an object due to movement through a fully enclosing fluid. The formula is accurate only under certain conditions: the objects must have a blunt form factor and the fluid must have a large enough Reynolds number to produce turbulence behind the object. The equation is:

$$F_D = \tfrac{1}{2}\rho u^2 C_D A$$

F_D is the drag force, which is by definition the force component in the direction of the flow velocity,[1]

ρ is the mass density of the fluid,

u is the flow velocity relative to the object,

A is the reference area, and

C_D is the drag coefficient - a dimensionless coefficient related to the object's geometry and taking into account both skin friction and form drag.

Why Aerodynamic Drag Matters ...and How to Calculate It

Ken Biba

Note that for a rocket going through the atmosphere there are really three critical items: While I won't bore you today with airframe and mission design - *note that drag (and hence energy lost to friction) goes up by the square of velocity and by the square of the radius of the rocket.* Going fast in a large rocket is not helpful for saving energy to combat gravity.

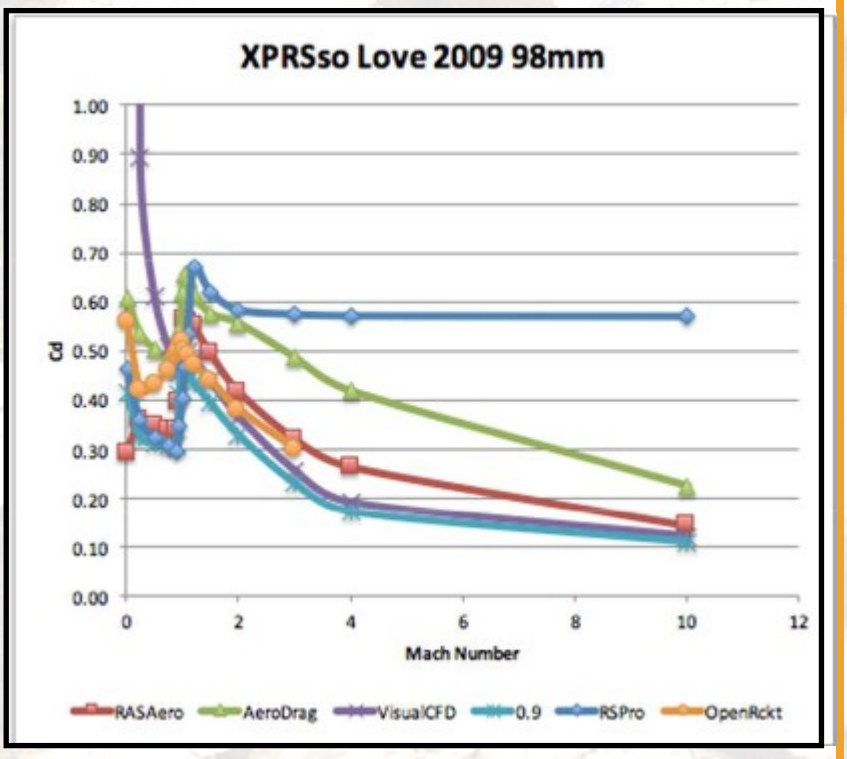
But let's look at this magic number Cd - the overall drag coefficient. It becomes the key component of calculating drag. However, particularly for supersonic rockets - Cd is not a single number - it is rather a function of Mach number - and varies substantially between subsonic (Mach < .8), transonic (.8 < Mach < 1.2) and supersonic domains (1.2 < Mach < 5). Mach number is not the same as velocity, since the Mach number for a given velocity will change with temperature and pressure. As temperature and pressure decrease (i.e. as a rocket ascends higher in the atmosphere) the velocity corresponding to a given Mach number will decrease (the speed of sound is lower higher in the atmosphere).

Professional aerospace engineers with access to professional modeling tools would do a complete computational fluid dynamic (CFD) simulation of the airframe to model the Cd vs Mach number curve, but for modern amateur rocketeers without access to a supersonic wind tunnel or the funds for high end CFD, the only feasible way to estimate Cd (and indeed overall drag) is via some type of computer modeling and simulation tool.

There are a variety of tools available to the amateur rocketeer to calculate Cd and drag - OpenRocket, RASAero, RockSim, RockSim Pro, AERODrag and VisualCFD.

I first investigated this for a series of rockets that held the N altitude record in the 2005-2010 period. I noticed that these rockets were outperforming their RockSim and RockSim Pro simulations and wondered why.

Here are the Cd functions for the 2009 variant of this airframe (which reached 46.5k'AGL on an N1000).

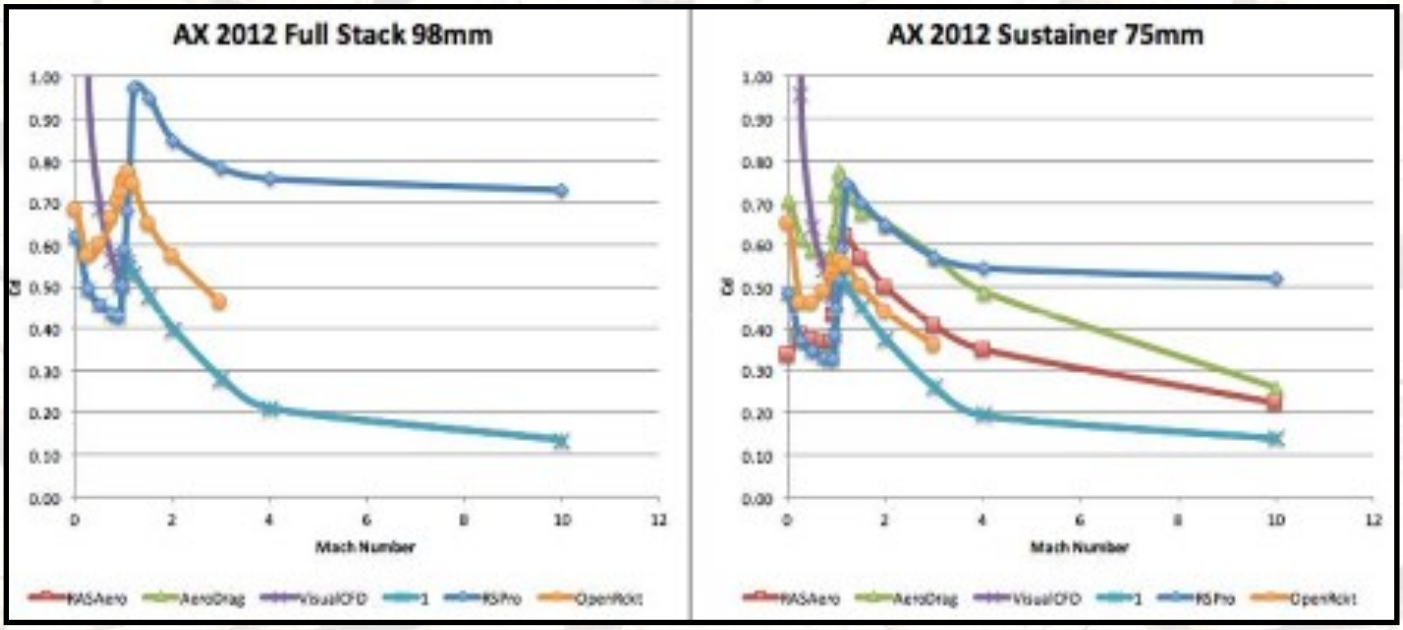


Why Aerodynamic Drag Matters ...and How to Calculate It

Ken Biba

Note the dramatic differences between the modeling tools! As it happens, a composite curve using RASAero for the subsonic regime and VisualCFD's estimate for the supersonic regime - scaled by a pragmatic constant of .9, accurately models the actual performance of the airframe. RockSim and RockSimPro give Cd estimates, particularly for transonic and supersonic regimes, that highly overestimate drag and hence underestimate altitude. Now let's look at the same analysis for the Carmack Prize winning 100k airframe from 2012 that is the foundation of the ARLISS Xtreme airframe.

The first chart above is for the full stack of the two -stage airframe and the second chart is for just the 3" sustainer. The curve that closely models the actual performance is a composite Cd function (labeled



"1" in above graphs) - using RASAero's estimate for the subsonic regime and VisualCFD's estimate for the transonic and supersonic regimes with a constant scale of 1 rather than the .9 from the 2009 XPResso Love airframe.

These two examples illustrate that most amateur rocketry tools do a poor job of modeling drag - particularly transonic and supersonic drag - and hence do a poor job of estimating the altitude and performance of supersonic rockets. My experience with these tools and with estimating amateur rocket performance suggests some guidelines for rocketeers who want to have some idea what their high performance rocket will do before flight.

Why Aerodynamic Drag Matters ...and How to Calculate It **Ken Biba**

Tool	Comments
AERODrag	Drag estimates seem materially too high.
OpenRocket	Drag estimates not bad. Simulation estimates not bad. As one integrated tool for multistage design and simulation may be the best all around choice. A bit awkward to use and inadequate Monte Carlo dispersion analysis for high altitude flight.
RASAero	Limited to single-stage. Single-stage Cd estimates appear quite good. However, the simulation engine seems overly optimistic, materially overestimating altitude. No dispersion analysis. Not really a design tool.
RockSim	Decent design tool. Pessimistic Cd estimates, particularly supersonic.
	No dispersion analysis.
RockSim Pro	Decent design tool. Decent 6-DOF simulation engine. Pessimistic Cd estimates (essentially the same as RockSim). Pretty good dispersion modeling yielding Google Earth dispersion patterns.
VisualCFD	A "desktop" computational fluid dynamics tool. A marginal UI, highly labor intensive, but compared to industrial-grade CFD programs, surprisingly computationally efficient. Its predictions closely match our experience. Not really a design or simulation tool.

• Do a CFD if at all possible. A CFD will give a much better estimate of drag. This Cd function estimate can then be used with a good 6DOF mission simulation tool like RockSim Pro to give a good profile of the entire flight.

• Do a CFD "lite" with a tool like VisualCFD. VisualCFD does not appear to do a good job with subsonic drag, but it DOES do a very good job with transonic and supersonic drag. A composite Cd function can be created using subsonic Cd estimates from other tools. This Cd function estimate can then again be used with RockSim Pro for mission planning.

Why Aerodynamic Drag Matters ...and How to Calculate It

Ken Biba

• For a single stage airframe, RASAero does a very good job of estimating the Cd function and of altitude estimates. Apparently there is a multi-stage version of RASAero available behind the scenes .... but not to us mere mortals.

• For both single stage and multi-stage airframes, OpenRocket does a very good of estimating the Cd function and is a more complete design and mission planning tool than RASAero.

• RockSim and RockSim Pro (which apparently use essentially the same Cd function estimation algorithms) do a relatively poor job of estimating the Cd function for transonic and supersonic airframes. In particular, beware of the high performance indicated for conical nosecones - it just ain't so if your airframe is not hypersonic (Mach > 5).

End

Photo by J. DuBose

The author explains the drag busting features of his 54mm min diameter rocket. Note the Mike Fisher (Binder Design) custom MAX Q fin can. Special fin design by Ken B.

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

Road Trip to Oregon Rocketry Launch

Jonathan DuBose

With a two-stage project coming up this summer and needing a 30k' plus waiver for some test flights it seemed like a good idea to go up to the Oregon Rocketry (OROC) site near Brothers, Oregon. I contacted the club and Wilson Allness, the club secretary gave me a welcome and answered my questions. Dick Jackson decided to come along.

I wanted to give the sustainer for my two stage project another test. That takes about 30k' and this is about the only place around other than Black Rock where you can go that high.

Interestingly, as soon as we left California it started raining and kept it up most of the way to the launch site. We got to the site mid-day Thursday and only 1 other vehicle was there. As it turns out I had met this fellow, Gary Lech, at XPRS 5 or so years ago. We set up camp, the equipment guy arrived and we helped set the range up. Then it started raining again and kept it up all night. Fortunately, this soil isn't like the playa, it's volcanic, absorbs the rain quickly and doesn't get slippery. Little did we know that this was a huge front, that there was kayaking in the streets of Fresno and that Dairyaire would be washed out. Good thing we came up here!

Friday was EX day but the clouds were pretty low so the 20 or so folks who braved the weather we thought were pretty bored. So we static tested a 54mm 3 grain Wimpy Red. Very nice burn but it didn't clear the skies. Maybe a 75mm 2 grain Swamp Gas would do the trick. This burn actually got some cheers and lo and behold there was now some blue up there. I load the 4" Armageddon with a 54mm 5 grain Swamp Gas motor and up she went. Very nice! The main however was feeling kind of shy and doesn't make an appearance. Nice drogue though!

This launch site is set in the Oregon's high desert about 45 miles east of Bend. When the skies are clear you are treated with a spectacular view of "The Three Sisters" and Mt. Bachelor. The terrain is very much like Nevada but no dry lake bed here. Recovery can be a challenge with all the sage brush. There is a network of roads but some hiking is almost a given.

Saturday dawned clear with a wonderful view of the mountains but by 8am the cloud cover reappeared. The low

and mid power range was pretty busy as many more rocketeers have showed up.

One rocket that caught everyone's eye was a beautiful, detailed, scratch-built Titan. The flight started off great and like many of the early Titans, something went wrong. Hopefully, the owner can recover from that CATO.

By 11:30 the sky was looking better and patches of blue appeared. We call in the high waiver (42k') and I final prep "Full Bore Linear Panic—S " ("S" for sustainer) that would fly on an AT M685W. At 12:30 it's a go. Several OROC members helped out and we load the rocket to the rail that was sited to a 270 deg azimuth and tilted 3 deg away from the flight line and Highway 20.

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

Road Trip to Oregon Rocketry Launch

Jonathan DuBose

Loading the igniter to the FBLP sustainer

Full Bore screamed off the pad and then did a little 'hula' although not as bad as the flight at XPRS last year. She straightened up and went to 30k' - give or take, and depending what device you want to believe.

The guys from Altus Metrum (Keith Packard and Bdale Garby) were present and offered to help track the flight. Off we head to recover and after several miles of hiking (of course, there's a road right there as it turns out) and stomping through the sage brush there was no sign of the rocket. We head back to camp and Keith Packard offers to help track it down. According to Keith "rocket hunting is the most fun part of rocketry". Keith has a bag of tricks and draws on a feature of Altus Metrum GPS units. I was not aware of this feature but later found it described in the manual:

"You may also enjoy having a ham radio "HT" that covers the 70cm band... you can use that with your antenna to direction -find the rocket on the ground the same way you can use a Walston or Beeline tracker. This can be handy if the rocket is hiding in sage brush or a tree, or if the last GPS position doesn't get you close enough because the rocket dropped into a canyon, or the wind is blowing it across a dry lake bed, or something like that."

Basically, turn the squelch on your HAM radio OFF (so it makes static) and tune to the radio frequency of the unit in the rocket. The rocket was about 3 miles out and after getting to the top of a hill about 2.5 miles away we got the beeps. When we got within a quarter mile we turn on AltosDroid and found the rocket after a short hike.

The Brothers OROC site is a nice launch site, the folks are very friendly, but don't fly high there unless you have very good tracking and the complete bag of tricks!

Sunset over the OROC launch site looking west to the "Three Sisters

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

AERO-PAC EQUIPMENT 2015

Richard Hagen

We've had something of an equipment maintenance hiatus for the last year or so, but we're finally getting back to normal. My company hired a new, part-time employee this year and we've been leaning on him heavily to get our equipment back in shape.

Historically, we've had more HP pad bases than rails, but not anymore. This year when we head to the desert, HP will have 3 small-button rails and 3 large-button rails. The new large-button rail is 14 ft. long, so it'll provide an extra 2 ft. for any of those big, slow rockets that need a little extra time on the rail.

Since this question comes up periodically, here's a quick tutorial on rail selection. Small-button rails have a 1/4" slot down the rail while large-button rails have a 5/16" slot. Small rail buttons will fit into the larger slot, but will not engage the rail safely. As a general "rule-of-thumb," rockets weighing in at 30 pounds or less can fly safely from the small-button rails, while rockets weighing between 30 and 80 pounds can fly safely from the large-button rails.

Newly reconfigured rail base

Our HP pads got major re-lubrication and a bunch of new, stainless steel hardware over the winter. We added some dedicated wrenches for tightening and leveling which should help you precision flyers who want to go vertical at 90.0 Degrees. We also increased the height of our horizontal rest bar by 2 1/2" so you'll be engaging those rail buttons near waist height instead of down in the dirt. Some of us are getting older and it's easier to stand back up if we don't bend over too far. Just for show, we replaced some of those flags that had become so faded you couldn't see them from the LCO table.

The model rocket 1-10 pad group got new, stainless steel, tripod style launch pads. No more driving stakes into the ground in the hot sun. The new pads fold up nicely for compact storage and set-up quickly.

AERO-PAC EQUIPMENT 2015

Richard Hagen

The mid-power pads 11-20 also got new tripod style pads. They have the same center hub as the model rocket pads with longer legs. They seem to store and set-up easily.


Photo by R. Hagen


Photo by R. Hagen

Really cool new low power base units!

The 21-30 pad group didn't suffer much damage last year, so beyond rethreading a few lock bolts, we didn't change anything there.

Our main 30-pad controller got a Winter overhaul with a bunch of new switches, relays and extensive testing. We discovered two unsoldered connections in our battery harness that have been with us for a very long time. This year if we hear silence after the "5,4,3,2,1 countdown", there's a pretty good chance the problem is on the rocket end of the igniter cable.

We added a base unit to the FRS/GMRS network, so the LCO should be audible on Channel 5 without needing five thumbs to hold down PTT buttons. We also retired a water damaged radio and increased the number of FRS radios and chargers.

Bring your project up to Black Rock this year and test out some of our new stuff.

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

AEROPAC Equipment Cleaning Party / SchmoozeFest / Show and Tell

On Saturday April 18, AEROPAC held its annual equipment cleaning party at the beautiful home of Lynn Cominsky and Garret Jerrigan. We found a spot amidst the chickens and horses , unloaded the trailer and gave everything a good inspection. Richard had already done a lot of work so we really just ended up giving the rails an acid bath and power washing.

About 5 people seemed to be doing most of the work while the rest of us chatted away about things rocketry.

Dick Jackson, Bernard Ormsby and Tom Fetter did the messy part —soaking the rails in a light acid bath and then scrubbing them with wire brushes. Jim Green and Ken Adams then power washed the rails to make them all shiny and new looking.

Gene Engelgau and Ken Biba showed off projects they had done over the winter.

Finally, with Tony holding court we chowed down on pizza with Lynn adding deviled eggs and chocolate cake.

Ken Biba also hosted a training session for operating the Virtual Classroom. Kevin John will lead a team of 4 physics students who will operate the VC during MUDROCK. Hopefully, this will free up Ken so we see him launching more rockets

There was heavy security for the equipment trailer

"You did what!!??"

Nice shiny, clean rails for upcoming season.

Gene Engelgau shows off his new min diameter 75mm rocket which incorporates lot of very interesting features

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

Largest rocketry inventory west of the Mississippi!

Be sure to pre-order your 75 and 98mm motors!

If Rocketry Is So Much Fun, Why Am I So Miserable?

Ross Ohmen

A list of the common rocketry problems, and the cures.

Let's face it – rocketry is seriously cool, but fraught with difficulty, frustration, expense, and disappointment. Try some of these foolproof solutions:

My rockets suffer recovery problems.

1. Remove the tape holding the nosecone on during transport.
2. Remove the trash bag twisty wire/plastic thingy holding the parachute shut during testing or transport.
3. Attach the parachute, instead of just putting it in the body tube "for just a moment".
4. Actually put in wadding, instead of just thinking you did.
5. Actually turn on the electronics for your dual-deploy rocket.
6. Stop installing your parachutes in the airframe with a plunger and hydraulic press.
7. Stop installing your wadding in the airframe with a plunger and hydraulic press.
8. Stop installing your nosecone in the airframe with a plunger and hydraulic press.
9. Start installing your friction-fit motors in the airframe with a plunger and hydraulic press.
10. Actually install black powder (bp) in the ejection well.
11. Make sure the bp actually touches the delay grain, and not the grease, dirt, underwear, or other unburnable stuff in the ejection well.
12. If you put enough baby powder on the parachutes, they will catch fire.
13. Stop expecting that useless sticky-paper disk to stick to the ejection well. It never will.
14. Stop expecting those useless sticky disks to hold the shrouds on the parachute of your 20-year-old Estes rocket. They won't.
15. Stop expecting that molten alien of a burnt 'chute to open, and install one that can open without a team of oxen.
16. Stop using delay grains that are older than you are.
17. No, you will never see that "thermaling" parachute-duration rocket again.
18. And yes, getting a parachute out of anything larger than 12" in diameter, and having it inflate without tearing off, is impossible.

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

If Rocketry Is So Much Fun, Why Am I So Miserable?

Ross Ohmen

My rocket motors blow up.

1. Stop using motors that are older than you are.
2. Actually tighten the case, instead of thinking you did.
3. If your igniter doesn't fit in the hole, it sure won't come out.
4. Stop making them out of match heads.
5. Stop making them out of black powder.
6. Stop making them out of Ammonium Nitrate.
7. Stop making them out of Ammonium Perchlorate.
8. Stop making them out of NO2 and baloney loaf.
9. Two words: Demo Motor.
10. Stop using them when it's 120 degrees outside.
11. Stop using VMax engines in rockets that pull 70 g's.
12. Stop using engines entirely. Kites rarely go "BOOM!!"

My rockets have airframe failures.

1. Stop trying to launch a J570 in a paper airframe.
2. Stop trying to launch an F39 in a BT-50 airframe.
3. Stop trying to launch a K1275 in a 54mm airframe.
4. Stop trying to launch an N5800 in a 98mm airframe. If 10 guys with CNCs and gallons of high-strength epoxy and carbon fiber can't do it, you can't either.
5. Stop trying to launch Warp 9 in anything.
6. If the airframe is bent now, just wait until you hit the button…
7. It was a little weakened after lawn-darting from 3000 ft.

If Rocketry Is So Much Fun, Why Am I So Miserable?

Ross Ohmen

My rockets get stuck in trees/houses/wires/windshields.

1. Stop flying near power lines.
2. Stop flying near trees.
3. Stop flying near cars, boats, houses, cattle or submarines.
4. Stop flying near windmills.
5. Stop flying near sewage treatment centers.
6. Stop flying anywhere on the East Coast.
7. Stop flying near anything.
8. Stop flying in 50 mph winds.

The police want to talk to me.

1. You flew near an airport?!?
2. You flew near a freeway?!?
3. You flew near a power plant?!?
4. You flew near Air Force One?!?
5. Your latest batch of cow-manure – er – home-made propellant is just a little stinky.
6. Maybe you shouldn't dissolve your neighbor's laundry with high concentrations of Tepanol.
7. Maybe you shouldn't blow up your shed so loudly.
8. Maybe you should mix the liquids of your home-made propellant first.
9. Maybe you shouldn't have told that juvenile delinquent that rockets launch fine horizontally, or that you used to have bottle-rocket wars.
10. Maybe you shouldn't have told that RC-enthusiast how easy it is to launch rockets from his plane/tank/submarine.
11. Maybe you shouldn't put your address on your rocket.
12. Maybe you shouldn't try to retrieve that rocket from the prison, even if it IS your favorite.

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

If Rocketry Is So Much Fun, Why Am I So Miserable?

Ross Ohmen

My rockets arrive at the launch site all busted up.

1. Two-year-olds are not compatible with rockets.
2. Running five-year-olds are not compatible with rockets.
3. Bowling balls are not compatible with rockets, when driving a slalom course.
4. Back packs full of books are not compatible with rockets.
5. Full trunks are not compatible with rockets.
6. If you don't know how tight your roof rack is, it isn't tight enough.
7. Yes, the rain through that leaky rear window did ruin your rare Centuri rockets with cardboard fins.
8. Your D-powered boost glider will not arrive at the launch site in one piece. Ever.

The launch director glares at me, nags, and mutters under his breath.

1. Try helping out – set up, tear down, LCO, RSO, and clean up your own site. If you can build a 2-stage high-power rocket, you can figure out how to register fliers at the launch.
2. Stop leaving your broken rockets in the Porta-potties.
3. Stop trying to make your rocket explode at apogee.
4. Stop hiding photographers 20 feet from your complex "M" project.
5. Stop giving the Launch Director advice on re-designing his entire electrical system so your cheap/broken igniter works every time.
6. Take your busted EZ-Up with you, instead of pretending "the wind storm blew it in."

The LCO glares at me, nags, and mutters under his breath.

1. Replace that igniter that won't light, instead of pretending it's just a bad connection.
2. Stop running onto the range to replace your lousy igniter, while the range is closed. Twenty other rockets have to wait for you!
3. Stop telling him long stories when he has a rack of rockets to launch.
4. Stop telling him to launch your rocket first. If your batteries don't last, you're too inept for rocketry.
5. Stop complaining that he launched your rocket without you seeing it. You were talking to the cute gal grilling hamburgers!

If Rocketry Is So Much Fun, Why Am I So Miserable?

Ross Ohmen

6. Stop trying to create videos of exploding and dangerous rockets, to post on YouTube.

7. Stop telling the club prez that SOMEONE should create a detailed report of the last launch, complete with pictures (especially of you). It's a ton of work, and you'd complain that "he didn't get my good side…" (as if you have a good side…)

8. Stop complaining of how "musty" the club meeting at the library/classroom/attic/ unused bedroom is. You have a free meeting site!

9. Stop complaining of how high the dues are. Our hobby is produced by amateurs who spend countless hours volunteering their time, setting up, breaking down, RSO'ing, LCO'ing, repairing, writing newsletters, updating web sites, and dealing with every organization that wants us to just go away. They earned your $70/year.

10. Stop asking the club president to find a site only ¼ mile from your house – "this one is SO far!!!" He probably killed himself to get a site at all, and everyone, from the FAA, to the mayor, to the fire marshal, Homeland Security, and the local R/C club wants him dead.

The club vendor glares at me, nags, and mutters under his breath.

1. Buy stuff. In fact, buy lots of stuff.

2. Keep your broke teenagers from shoplifting everything.

3. Stop assuming every motor failure you have is his fault. Are you SURE you didn't swap those two little o-rings?

4. Stop asking him to drive 700 miles to your 10-person launch that got cancelled after he started driving.

5. Buy MORE stuff.

6. Try helping him set up, instead of asking for the 18th time, "When are you going to be open?"

7. **Buy** that ancient package of motors, and that battered nose-cone in a size no one uses anymore.

8. Stop asking him to stock weird rocket parts that he will never sell at another rocket launch, for as long as he lives.

9. Stop asking him for a discount on anything - he just spent $800 to get his rolling hobby shop to the middle of nowhere.

10. Do not ask him if he can climb back into his trailer to find you a $5 parachute, after he's just packed 100 boxes back in there.

Association of Experimental Rocketry Of the Pacific
TRIPOLI Rocketry Association, Inc. Prefecture No. 23
Volume 21 Issue 1
May 2015

If Rocketry Is So Much Fun, Why Am I So Miserable?

Ross Ohmen

My creditors glare at me, nag, and mutter under their breath.

1. Realize that EX motors DO NOT cost less, and the overhead costs MUCH more.
2. If you can't get into your garage, anymore, you have ENOUGH. Stop buying MORE.
3. Yes, it cost $800 to drive the motor home 600 miles each way to that launch in the next state.
4. Yes, AP is $20 per pound, if you can get it. And you need lots for EX motors…
5. Yes, AP is the cheap ingredient in EX motors.
6. Yes, that set of 6 motor cases you bought is now useless, because the reload manufacturer a) went bankrupt, b) went to jail, or c) died. Reloads are available at auction sites for much more than you can afford.
7. Yes, that rocket you just crashed was worth $500. Was. No longer.
8. No, you'll never use that 16"-diameter nosecone you just bought.
9. Yes, motors for that huge monster project are stupidly expensive. What did you expect?

My boss glares at me, nags, and mutters under his breath.

1. You're going to have to do some real work, some day.
2. Your extensive rocket motor database is not billable to the client.
3. Stop doodling rockets during the boss's staff meeting.
4. Stop using the company's giant ink-jet printer to make decals!
5. Stop taking two-hour lunches to babble rocket stuff with your fellow deviants!
6. Stop taking sick leave to attend "Giant, Scary, Rockets of the Midwest"

My rocket buddies glare at me, laugh at me, and mutter under their breath.

1. A rocket with five fins is no big deal. Now, fifty-five fins…
2. Your booster stage became stable after separating from the sustainer, and it crashed through your buddy's RV.
3. Your mercury switch lit the sustainer stage on the bench and slammed the rocket through the ATF agent's tire.
4. Your "pyrotechnic" rocket started a fire, showing just how safe rocketry is – on the 5 o'clock news.
5. Your complex, 4-"L1500" rocket tore itself to pieces and scattered burning motors everywhere, in-

If Rocketry Is So Much Fun, Why Am I So Miserable?

Ross Ohmen

6. Yes, your 7-foot saucer might fly stably on an N2000 motor, but it's still stupid.

7. It sucks to set up next to you at the launch: Your deployment charge went off while bench-testing that 7.5" rocket, and six of your fellow rocketeers need new underwear.

8. It sucks to set up next to you at the launch: Mix in another 8-track, Elvis! And throw that old tape away! We've heard it 8 times!

9. It sucks to set up next to you at the launch: For the last time, I did NOT bring a set of taps, and you broke the only 1/8" bit I had!!

10. It sucks to set up next to you at the launch: You told every person who walked by, how I forgot to put enough BP in the ejection charge and crashed my complex project.

11. It sucks to set up next to you at the launch: Your drunk friend won't stop saying "I made one of those in junior high school!"

12. It sucks to set up next to you at the launch: Your dog crapped on my parachute when that Sparky K let loose on the nearby pad…

My wife glares at me, nags, and mutters under her breath.

1. Perhaps spending the mortgage money on motors was a bad idea.

2. So was filling the living room with "projects" in various stages of assembly.

3. The smell of curing epoxy is not an aphrodisiac…

4. Mix in a workout, once in a while, Schwarzeneggar!

5. Your new "Pyramid of Death" does not have priority over getting the hot-water heater fixed.

6. Your rocket blog has more pictures than the family albums.

7. Taking your wife on a 4-hour drive to a fly-infested cow pasture is NOT a romantic anniversary present.

8. And forcing her to use a porta-potty does not get you "rustic" points.

9. You're not going to look like genius marriage material when she has to explain to her Bunko club that you CA'ed yourself to a 6" airframe.

10. She's gonna be pissed when she discovers how much you had to bid to get that rare Estes Saturn 1B on E-Bay.

11. And you never built it.

If Rocketry Is So Much Fun, Why Am I So Miserable?

Ross Ohmen

My kids look at me funny.

1. Mix in a family night, Marco Polo!
2. I guess there wasn't much space for the munchkins in the back seat of your car, with your Level 3 project was back there…
3. You didn't know your daughter was dating?
4. You didn't know who your state senators were when your son asked, but you knew who's the president of that rocket club 275 miles away.

How come I can't get a date?

1. Have you looked at yourself in a mirror lately?
2. You will never get in shape fiberglassing airframes.
3. No one else smiles at the smell of burnt BP or AP.
4. No one else smiles at the T-shirt with the arcane rocketry logo…
5. No one else smiles at that battered sun hat that's also a saucer rocket.
6. Perhaps the word got around about the epoxy on your suit jacket.
7. Get current. Mix in a newspaper once in a while, so you know what's going on outside the rocketry world. No one else cares if "they got to 80,000 feet on a single motor!!"

My head feels funny, and I keep falling down.

1. Stop mixing EX Motors in a closed garage.
2. Detonating BP in your face will do that…
3. Perhaps it's a bad idea walking for that rocket that's "just over that hill," when it's 110 degrees in the sun, and you left the water at your camp.
4. Another bad idea - driving all night to fly the next day…
5. Stop breathing acetone.
6. How many people told you not to try to get that rocket off the power line? And did you listen?
7. Even the DOG knows to wear a dust mask when sanding carbon fiber.
8. Perhaps you'll check the next tree for hornets before you climb it to retrieve your rocket.

SO: Follow these guidelines, and you'll continue to enjoy the benefits of our hobby, develop a personality, perhaps even live to a ripe old age… …if the other guy with the research motor doesn't blow you up first…