



Aeronaut

The Newsletter for the Association of Experimental Rocketry of the Pacific

Triplou Rocketry Association, Inc. Prefecture no. 23

August 2002: Volume 14, Number 3

First Commissioner's Corner

by John Coker

Welcome to the August issue of Aeronaut. This went to press before the Aeronaut launch, but you won't receive it in the mail until afterwards. Or, you may be reading this on the web...

Newsletter

As mentioned last issue, we need a volunteer for the position of newsletter editor next year. This is my third year as newsletter editor. It's been fun, but it's time for someone else to take over. Not to mention that it's too much to do along with the Prefect duties.

At the recent board meeting, it was decided that next year the newsletter would no longer be mailed out to members. The newsletters will continue to be published (assuming someone takes over as newsletter editor), but we will just publish them on the web.

Aside from massively reducing the job of the newsletter editor, it will also save the club a significant amount of money.

This will be unfortunate for those members who like the printed newsletter. Luckily, 85% of our members have provided their email addresses (and most have web access).

Aeronaut

Our August launch this year will again feature the ARLISS project. We're going to be flying even more this year (up to 20 flights) and we continue to need more help to get all the student projects in the air.

If you would like to participate, we would love to have your help. You must be level 3 certified (before Aeronaut) and able to build a rocket to the ARLISS specifications.

We have received another batch of fin can units from our friendly machinist Rick Forbin. This batch cost us only \$60 and if you would like one or more, please contact me. I will bring a bunch to Aeronaut.

See www.arliss.org for more information.

XPRS

Our last launch of the year is now XPRS (Extreme Performance Rocket Ships), which is a national launch focused on higher and faster flights using certified motors.

AERO-PAC came up with this concept at LDRS last year and it is officially a second TRA national launch.

This year, it will also be called the Tom Cloud Memorial launch in honor of one of our most fun members.

BML Fire Stipulations

For those of you who were at Mudroc, we had an unfortunate situation where a new stipulation was mistakenly added to our permit. This stipulation required us to carry fire suppression equipment (2 shovels, 5 gallons of water and a fire extinguisher) whenever recovering rockets.

Tom Rouse has clarified this with the BML and our new permit will apply this requirement only when retrieving rockets that have gone off the playa. Here is the new wording:

40. The permittee will do everything reasonable, both independently and/or upon request of the Authorized Officer, to prevent or suppress fires caused by the event vehicles, participants, support crews, spectators or related activities. Reimbursement may be required from the permittee for Federal, State, or private costs as a result of suppression and rehabilitation expenses incurred as a result of fire(s) due to event related activities. *If a rocket lands in any vegetation, off the main playa, the rocket retrieval vehicle(s) shall be required to carry the following fire suppression items: A working fire extinguisher, two shovels and five gallons of water. [Italics mine]*

The club will collect supplies to put together at least one set of equipment. This equipment will be available in front of the LOC table for club members to use. Please take the equipment if you might go off the playa. Otherwise, you may get a ticket!

Setup and Cleanup

Very few people are coming early to help with setup or staying until the end and helping with cleanup. All club members should help out. It's not anyone's favorite activity, but it needs to be done.

We all need the equipment to fly.

Given the long drive from the Bay Area to Gerlach, we are starting setup later for Aeronaut. We will leave Bruno's at 2:00pm on Thursday. This should give people time to drive up without having to leave when it's still dark.

Keeping the Playa Clean

One of the major challenges for groups trying to use the Black Rock Desert is keeping it clean. Since it's such a barren place, anything left really stands out.

We are not supposed to leave anything behind. This includes "biodegradable" items like food rinds or seeds and animal droppings. Remember that there is no vegetation to absorb food waste. And clean up after your dog!

Of course, you need to make arrangements to clean up and carry out your own trash. This includes cigarette butts.

Basically, you can't toss *anything* on the ground. That's simple enough, right?

We did a better job than usual at Mudroc. On Sunday afternoon, several groups picked up left over trash in the camp and after we left, several people went back over the site. Good job!

Spectator Fees

The BLM counts spectators as participants for fee purposes. They charge us \$4 per person per day. We are going to start more aggressive collection from spectators at future launches.

We will expect people not registered as flyers (including children) to pay \$5 per day they are out on the playa. If you bring people with you who aren't flyers, please pay for them when you register as a flier.

BOAR: A Flight of Many Firsts

by Dewayne Doud

I flew a rocket at Mudrock last month named BOAR, an acronym for Big Orange ARLISS Rocket. This was my Level 3 certification flight, and there were many "firsts" for me on this one. The first flight of this rocket, first use of a hybrid motor, first time using RDAS and Gwiz MC avionics, and the first use of my homebuilt trailer rail and hybrid GSE. I'd only been into HPR for a year and this rocket was substantially bigger than anything I had flown before. Saturday morning found me launching a 43 pound, 9 foot long rocket on a hybrid M motor! Confident? Yes. Nervous? Hell yes! As I stared at the rocket through binoculars, listening to the LCO count down to zero, time seemed to slow down...I thought to myself, "Have I tested everything? Is the flight tank full? Will it hang on the rail? Melt the fill stem? CATO? Fizzle? Lawn Dart? Cruise Missile? Skywrite? Shred? Drag Separate? Zipper? Strip the Chute? Core Sample a motor home?..."

After the Aeronaut launch last year, I decided to build an ARLISS Rocket and participate in the program. I thought the opportunity to fly interesting payloads for educational purposes was just too cool and Tom Rouse had written in the AERO-PAC newsletter that more fliers were needed for the program. One of the requirements to participate in the ARLISS program is to be certified Level 3 before the ARLISS launch in August. I thought, "No problem - there's a bunch of Fresno launches early in the year and Mudrock in June as a last opportunity to certify before the ARLISS launch in August". I soon found out that just as time appears to slow down during a countdown, it also seems to accelerate during the building of a big rocket project!

First stop was Tom's house to get a look at his ARLISS rocket. I had a copy of the ARLISS AutoCAD drawing and had surfed the ARLISS info on John Coker's excellent website, but I wanted to talk to Tom to get the inside scoop. Tom spent an afternoon



giving me pointers on construction and patiently answered all my questions. I got a fin can from him and was all set to start construction. Next stop was the Hollister airport to meet Bob Fortune of Aerocon. I picked up an RDAS compact and many other rocket goodies from him. Aerocon is the Wal-Mart of rocket stuff!

After buying a Gwiz MC, I began to think that I should build an avionics bay out of 6061 T6 aluminum to protect the avionics in case of a recovery failure. My first attempt turned out great, containing the Gwiz, RDAS, four 9-volt batteries, and an arming switch in a welded aluminum can. Terminal strips for the e-matches and u-bolts for the recovery harness were also built in. Last minute additions included an RDAS Magnetosensor board, external acceleration switch, and RS232 extension cables to enable downloading of flight data without removing the bay from the rocket. My friend and computer wiz Geoff Huber helped me with the configuration and testing of the avionics.

Parts continued to arrive on my doorstep. Blacksky had just finished a production run of fins, and these arrived quickly. I was going to anodize the fins but decided to paint them instead. I used Alodine and Alumiprep to get the paint to adhere nicely to the fins. I painted them black to match the Aeropack 98mm motor retainer. I built the bulkheads using PML components, and reinforced the PML nosecone shoulder with 2 layers of 6 oz. carbon fiber cloth. The Hawk Mountain airframe tubing for the payload section got backordered at the factory, but the airframe tubing for the booster section arrived promptly, and I assembled the booster in just one night. Tom loaned me his 98/7680 casing for a fit check.

Then came the fire at Aerotech and M1419 reloads were suddenly very scarce. With the availability of reloads for the first half of 2002 in question, I decided to use the newly certified Hypertek Mid-M motor (plus I'd been wanting to try a hybrid anyway). This change required some rework to the rocket due to the longer length of the hybrid motor. An aluminum bulkhead was built to fit just forward of the 3500 cc nitrous oxide tank for parachute attachment. The R9 parachute and its Kevlar harness just barely fit into the space between this bulkhead and bottom of the avionics bay. The R7 chute would go forward of the avionics bay where the can sat carrier would normally be installed. The Hypertek motor also required the addition of an external acceleration switch for the RDAS to reliably detect launch.

The decision to go with the Hypertek motor also meant I would need Ground Support Equipment (GSE). This included compressed gas cylinders, solenoids, plumbing, relays, control boxes, and wiring. After some consideration, I decided to build a trailer / launch rail to carry all this stuff. I bought a 12 ft. section of 3-inch square aluminum tube and some McMasterCarr "blacksky compatible" extrusion. I made a mount for the rail out of 3/16th in. aluminum plate and bolted it to a 5x10 ft. utility trailer. The gas cylinders were held in place by Class 100 PVC irrigation pipe secured to the trailer wall. This protected the cylinders during transport and allowed me to surround the nitrous tank with ice to keep it cool. The trailer was just as fun to build as the rocket. Wayne Mzarek of NowHybrids provided a lot of guidance with the Hypertek equipment.

By now, the rest of the parts had arrived and I assembled the rocket. Ground testing of the ejection charges demonstrated 5 grams of 4F black powder would easily separate the rocket and deploy the chutes. I decided to paint the rocket bright fluorescent orange and came up with the name, "Big Orange ARLISS Rocket"(BOAR). Using the final finished weight I ran RocSim calculations taking into account the CG shift as the nitrous was burned. The simulations indicated a stable design, so I prepared the TAP paperwork and mailed it to Karl Baumann and Tom. Due to the motor shortage, the Fresno group had cancelled several of their spring launches so my only opportunity to get my L3 before the ARLISS launch would be at Mudrock in June.



Photo by Nadine Kinney

BOAR: A Flight of Many Firsts (continued)

Before I knew it, it was June and time to head to the Nevada desert to launch. Where did all the time go? Geoff and I towed the trailer out to Black Rock and arrived Friday morning. We set up camp despite the rain and thunderclouds. When static electricity began to discharge on the launch rods, we secured everything and started to head for Bruno's. Just as we were leaving the sun came out, so we set up camp again, and placed the trailer out 500 ft. from the flight line. I tested the GSE and checked the nitrous supply tank quantity (30 lbs) and pressure (700 psi). Friday night in the hotel room, I verified the avionics configuration, reviewed the checklist, and inspected everything one last time.

Saturday morning we arrived at the launch site to find lots of mud (the launch is called Mudrock after all). A storm blew in during the night and soaked everything. After beating my shade tent frame back into shape, I did the final prep on the rocket. With chutes packed and shear pins installed, we went through the RSO table and out to the trailer. A few poses for Nadine

next to the rocket and we moved back to a safe distance and began the nitrous fill. The high humidity left over from the previous night's storm made the nitrous vent vapor easy to see through binoculars. After a few minutes, liquid nitrous was visible at the vent outlet-the signal that the tank was full. I hesitated to be sure the tank was really full and then radioed "Go for launch!" The LCO counted down and Geoff pushed the fire button.

Instantly, a bright orange flame appeared at the bottom of the rocket. It burned through the plastic ties holding the fill stem inside the motor and a 25-pound weight pulled the fill stem free of the injector. With the fill stem out, the pressurized nitrous sprayed through the injector bell and the motor came up to full pressure. The rocket flew up the rail and was airborne with the loud "buzz" that is characteristic of a Hypertek motor. I followed the rocket's flight with the binoculars. Twenty-one seconds after launch it arced over and both chutes deployed at apogee as the Mudrock crowd cheered. The muddy lakebed made for a soft landing

from an altitude of 6900 ft. A successful L3 certification flight clearing the way for ARLISS flights in August! Later that day, we used the trailer to launch Geoff's Hawk Mountain Raptor on a RATTWorks I80 and Larry Lynch-Freshner's PML Tempest on a Hypertek J motor burning an EFX grain.

The flight and construction of the BOAR may sound easy to some, but there were several things that had to work right the first time and many "firsts" for me. There were plenty of opportunities to screw up, but fortunately I avoided "major malfunctions" thanks to the advice of many experienced rocketeers; Tom Rouse, Wayne Mzarek, Geoff Huber, Bob Fortune, John Coker, and Karl Baumann. A special thanks to my wife, Andrea for putting up with my rocketry obsession, er, I mean hobby. One of the best aspects of this hobby is the generosity of rocketeers who willingly share their hard won knowledge to help others succeed. Thanks also to the AERO-PAC BOD and others who made Mudrock possible despite the weather and motor availability.

2002 Launch Schedule

- August 2-4** **Aeronaut 2002**
ARLISS launches on Friday and Saturday
Night launch planned for Saturday
No EX launch
- Sept. 27-29** **XPRS (Extreme Performance Rocket Ships)**
Certified motors only
Events are in the planning phase

BLM Fire Suppression Supplies

by Steve Preston

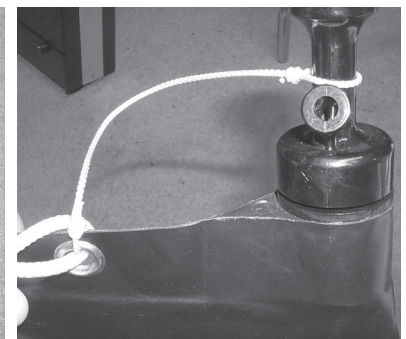
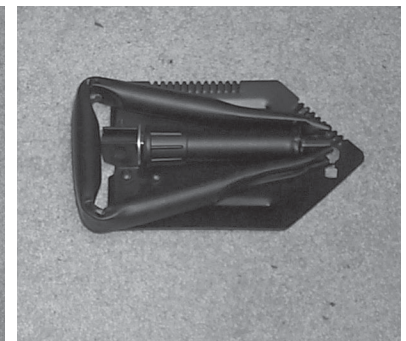
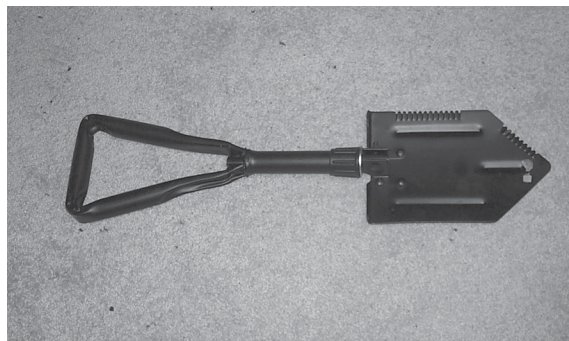
[If you would like to get your own fire suppression supplies, here are some good ideas for a cheap way to fulfil the BLM requirements.]

The surplus store on El Camino in Mountain View has good deals on shovels and water containers. I got 6 of the \$8 shovels for the club.

The shovel is \$8 each (a Chinese copy of U.S. Army shovel). They fold up to 8" x 8" x 3". They also carry real U.S. army shovels \$25 each.

The 5 gallon water container is \$10 (German Army surplus).

The store is on El Camino at Mountain View (the street).



"MudRoc" Was!

by John Coker

MudRoc really lived up to its name this year. It appeared dry when we came out on Thursday, but it rained on and off during the afternoon and evening and pretty steadily in the first part of the night.

By Saturday morning, the entire launch area was covered in muddy footprints and people were walking around with "playa platforms" (mud caked on the bottom of shoes).

Henry Rygoza's truck got stuck in the mud on Friday. He had to wait until the next day to get a crew to help him pull it out.

Seven people and a Jeep!

Photo by Bob Fortune



MudRoc Photos

by Kevin McGrath

Here are those pics of Gary Dwyer's Loc Bruiser from Mudroc 2002.

Also, I encountered a dog on the playa when retrieving a rocket--I thought I'd rescue and take him back to the flight line.

Ugliest mutt I ever saw. Mean as hell, too. Check the picture. I left him to fend for himself.



Photos by Kevin McGrath



Minutes of the Board Meeting

AERO-PAC Board Meeting
July 20, 2002

In attendance: John Coker, Becky Green, Steve Preston, Scott Bowman and Bob Fortune.

1. Equipment status:

- a) Steve reported that most of the equipment now has hand-tightened fittings to facilitate set up and take down. Hand tools stolen from the trailer are being replaced through member donations. The club will also replace the three batteries and the electrical relays that were stolen.
- b) BLM rules - In order to comply with the BLM fire fighting equipment requirements, The club will purchase 3 sets of the required items and have them available when someone needs to drive to retrieve a rocket. Each set includes 2 shovels, 5 gallons of water and a fire extinguisher. Becky will inform Bob Twiggs of the new rules so that the ARLISS participants are informed. All club members are encouraged to bring their own equipment.
- c) Walston receiver - Currently the club does not own a receiver for the AERO-PAC frequency Walston transmitters that are used by several members. A club member owns the only unit currently available. We will look into either acquiring the existing unit for the club, or purchasing a new unit from Walston.
- d) Launch Tower - It was decided that purchasing a launch tower was not practical. The transportation and storage could present a problem. It was suggested that as an alternative, flyaway rail guides could be used. Bob Fortune was asked to check into the availability of such items.

2. Treasurer's report:

Becky reported that the current account balance is \$3,300. The results from Mudrock indicate that we need to make a conscientious effort to collect the \$4 per day BLM fee plus a \$1 per day porta-potty fee from the spectators. The club is paying for these people whether we collect the funds or not. For the remaining launches, we will issue colored cards to be placed in the windshield of all vehicles, indicating that they are either a paid member or a spectator who has paid the daily fees. There will be a different colored card for each day or a card indicating that fees have been paid for the entire launch. Each day board members will check vehicles at the launch and request that those who do not have the necessary card in the windshield, pay the fees. Spectators will also receive an information flyer explaining the BLM fees, porta-potty costs and information about AERO-PAC. The current launch fees are \$30 for non-members, \$20 for non-contributing members and no charge for contributing members.

4. Newsletter:

John will continue to mail the newsletter for the remainder of the year. As a cost cutting measure it was decided that next year the newsletter will be posted to the web site and will not be mailed. John will also provide some helpful hints for members on how to submit articles and pictures.

5. Aeronaut issues:

- a) Tee shirts - There will be 20 tee shirts available for sale at the launch. There will be a link on the AERO-PAC web site so that orders can be placed directly with the manufacturer.
- b) ARLISS - The ARLISS group will be charged \$100 for the hauling cost of one of the "Big Jacks". They have also agreed to pay for the rental of one of the units. The students will also be asked to pay \$4 per day for the BLM fee.

- c) Raffle - Members have been encouraged to donate items for the raffle.

6. Other issues:

- a) Members will be leaving Bruno's at 2:00 PM on Thursday Aug. 1, for set up at the launch site. It is hoped that the later time will allow more people to participate in setting up the equipment.
- b) Launch site rules - We will be reminding those attending the launch that bicycles are not permitted on the launch range or in the area between the flight line and the vendor line.
- c) Other group activities - Members are encouraged to sponsor field trips and alternative sites for members meetings.
- d) XPRS update - Bob and Tony have received raffle contributions from vendors and are proceeding with the planning for contests and contest prizes.

7. BLM Issues:

- a) Tom Rouse has been working to receive clarification of the BLM fire fighting equipment requirements for those retrieving rockets. For Aeronaut we will assume that the requirements are the same as they were at Mudrock.
- b) We have not received any feedback from the BLM regarding their site review after Mudrock. This may be a case where no news is good news.

[We have since clarified these issues. See page 1 for more info.]

Respectfully submitted
Scott Bowman
AERO-PAC Secretary

How to Contact the Board

Acting First Commissioner	John Coker	john@aeropac.org	(650) 685-1890
Second Commissioner	Tony Alcocer	tfish38@aol.com	(707) 526-4631
Treasurer	Becky Green	apfueled@aol.com	(415) 499-8214
Launch Director	Steven Preston	spreston@highpower.com	(408) 729-3401
Secretary	Scott Bowman	scottbow@sonic.net	(707) 894-3823
Newsletter Editor	John Coker	john@aeropac.org	(650) 685-1890
Webmaster	Paul Campbell	paul@aeropac.org	(510)652-9396
Member At Large	Ken Biba	kbiba@forvalue.com	(415)665-1812

Other AERO-PAC email addresses: board@aeropac.org and members@aeropac.org