



Aeronaut

The Newsletter for the Association of Experimental Rocketry of the Pacific

Triplou Rocketry Association, Inc. Prefecture no. 23

February 2000: Volume 12, Number 1

First Commissioner's Corner

First I'd like to wish you all a Happy New Year and then let you know about the upcoming years' activities and some changes.

In this issue you will find the Year 2000 AERO-PAC calendar of launches, meetings, and work parties. We're having 3 Sport launches and one Experimental launch this year. The July launch is a 4-day event to celebrate the beginning of the new century and I hope every one of you can join us. Also we're having only one night launch this year and that's on Saturday night during the July launch. So plan on attending, it should be an excellent launch. The first member's meeting and equipment work party is scheduled for April 8th (location to be announced) with a rain date of April 22nd.

BOD Election Results: There were a total of 49 ballots (48% of the members) returned this year. The BOD was unanimously elected for another year. Thanks to everyone who took the time to return their ballot.

New Membership options: Due to an unforeseen hike in BLM use fees (they doubled!) we are forced to increase dues. This increase in BLM fees will cost us an additional \$18/member/year if you attend all the launches. Of course not everyone attends all the launches. So we are now offering two levels of membership to allow you more flexibility.

REGULAR Member, this costs \$20/year. Includes newsletter, membership card, electronic bulletin board, discounts on T-shirts and electric matches (etc.) and voting privileges, plus a \$10 discount on launch fees.

CONTRIBUTING Member, Includes all of the Regular member benefits PLUS admission to all of this years launches. Nonmember launch fees will increase to \$30/launch. If you go to all 4 launches (EX3 is a separate launch) you save \$40 over the Regular membership and \$60 over the nonmember costs. But the choice is up to you, prepay

or pay-as-you-go. A membership application form is included with this newsletter.

FAA waivers: Based on much discussion we have decided to apply for an altitude waiver of 50,000ft. MSL for all launches. Additionally we are going to ask for extended time and have our waiver run from 0800 to 1800 hours. This gives us an extra 2 hours over what we have had in the past.

Launch Duty and Gold Cards: The last few years have seen shorter or nonexistent lines while waiting for launch pads so the advantage of a Gold Card is moot. We've decided that launch duty volunteers will receive one raffle ticket for each shift they work and those staying for clean up will receive an additional 2 tickets, instead of Gold Cards. These tickets will be held until the end of the season and we will have a special raffle just for the volunteers. We are planning on having some really nice prizes for this special raffle (no \$5 gift certificates!). However, if the July launch has a large attendance we will issue Gold Cards in addition to the raffle tickets.

Porta-Potty Hauling: As per last year, potty transporters will receive \$50 each way. Pickup is in Sparks so you only haul it from there to the launch site. Many thanks to those who did this service last year! Contact Tom Rouse if interested.

BLM Volunteer Work Party: We have scheduled the AERO-PAC Volunteer work party for the morning of the 8th of September. This is Friday morning preceding range setup for the September launch. Last year there were 8 of us who spent 4 hours filling in craters and picking up trash. It was great fun and we visited parts of the playa that are not normally visited by rocketeers. Come and join us and show your support of the BLM and the Black Rock Dessert.

Life Membership Awards: For their years of service and support, Jerry, Mike and Gene Vaughn have been awarded Lifetime memberships to AERO-PAC. We cannot thank them enough for all they have done and this is but a token of our gratitude. Thank you all!

Hypertek Launch Support: AERO-PAC has in its possession 2 complete sets of Hypertek ground support equipment. Due to lack of interest in this motor system the BOD has decided to divest itself of one set and keep the other system in storage instead of the equipment trailer. We will not bring the equipment to the launches unless notified ahead of time. The equipment is heavy (in an already overloaded trailer), gets banged up, and the gases cost us money since they leak out over time. If you want to use the Hypertek launch system you must notify Tom Rouse no later than 30 days prior to a launch. This will give us enough time to fill the tanks with nitrous and O₂. If anyone wants to purchase a set of ground support equipment please contact me or one of the other BOD members.

Well that's all I have to say right now. We'll keep you informed on FAA and other issues as they are finalized. Please contact any of the BOD if you have any suggestions for making the club and launches better. I hope to see many of you at the first meeting in April!

2000 Schedule

April 8, Saturday - Member's meeting and work party, at Tom's house in San Jose.

April 15-16 - Hayburner launch.

April 22 - Rain date for work party.

June 3, Saturday - Board and Member's meeting at Portal's new HQ in San Jose.

June 24-25 - Mudroc 7.0

July 28-31 - Aeronaut 2000

August 19, Saturday - Board and Member's meeting at Portal.

September 9-10 - Black Rock XII
September 11 - Black Rock EX3 (experimental launch)

October 14-15 - Hayburner launch.

December 2, Saturday - Board meeting and end of season meeting and feast at Portal.

Meet the New Board Members

Bob Fortune,

Second Commissioner:

My name is Bob Fortune. My rocket career has been short, 2 years plus now, but passionate. I am amazed daily by the devilish complexity of our mutual pursuit, simple on the exterior and in theory but difficult to master. And that's what makes it fun! Being on the AERO-PAC board allows me to pursue my avocation, mingle with all you wacky rocketeers, attempt to fly rockets at BR launches, and have a wonderful time.

Richard Amstadter, Treasurer:

I've been a member of AERO-PAC for about six years and I finally decided it was time to get off my butt and help out. Rocketry has been my hobby since I was a kid and I stay with it because it still lets me feel like a kid. I've flown many rockets from simple to complex to what some people call dangerous. I don't know why they say that about me. Even with all these rockets flown, I still get nervous carrying my project to the pad and my hands still shake when I put the igniter in. I always hold my breath during the count down and I always pray for the chute to deploy. What could be more fun than that?

William has been doing a great job as prefect and last year he pulled double duty as treasurer too. He needs the help and it's high time I offer it besides, I get to play with the money. I promise I'll do my best to help the club any way I can and not to let anybody down. I'll see you at all the launches.

John Coker, Newsletter Editor:

I have only been involved in Rocketry for two years, but have been involved very actively for that short time. I like hobbies involving building things, especially when they have to prove themselves by doing more than just sitting on a shelf. Rocketry is particularly interesting for me because it is young enough that someone just coming in can make real contributions. I joined the board to become more active in my favorite rocket club. This year I will make it to every day of every launch. After all, it's my duty!

If you would like to see information on my many projects, check out my web site: www.jrocket.com.

Hercules 2-stage M (or, what I learned about Moch)

By Richard Amstadter

Like many of us I started in rocketry when I was a kid flying Estes birds and thinking that the mighty D motor was the end all to fire and glory. I did on one occasion see somebody fly an F but I thought that was almost illegal and anyway, I had no idea where to get a motor that BIG!

I kept in rocketry through my adolescence and into my adult years always searching for that elusive F motor but just never finding anything bigger than THE D. Even in college I can remember sitting around with some buddies who were also into rockets, sharing one of those funny hand rolled cigarettes, discussing the possibility of clustering several D's together to lift something really heavy, maybe a couple of pounds.

Nothing ever came of those discussions other than some smelly fingers and some late homework assignments.

After collage, I went to dental school and rocketry was no longer part of my life. Four years later, my garage once again started to fill with Estes's parts. Lots of parts. I continued staging and clustering always looking for something bigger but never finding it. Five years went by and one day I got a letter from another dentist friend of mine that had a copy of a PML add that he saw in popular science. I couldn't believe it. Here was a guy standing next to a rocket that was bigger than he. The add stated that the rocket could fly on I and J motors. J motors! I never imagined such a thing. I was on the phone to PML immediately, I mean within 30 seconds, my patient would just have to wait, and I ordered my first kit. I was on the road to High Power and I have never looked back.

Living in Northern California, the local prefecture I joined was AERO PAC and my first launch was at the Black Rock desert. I showed up with my 4in. diameter, 5.5ft. rocket thinking I was going to impress the heck out of everyone with my giant rocket. I was immediately humbled. There were people there with rockets so big I thought NASA had built them. I was so naive. Luckily, I met a really nice guy named Rod who took me under his wing and showed me the ropes. He helped me get my first rocket motor, an I 65. He told me it was a long burn motor that should have no problem lifting my rocket. I prepped the rocket and carried it to the pad. Finally when it was my turn they called the count down, pushed the button, and nothing happened. In unison the crowd called out "COPPER HEAD". After two more attempts, some soul took pity on me and gave me a real igniter. He called it an electric match and he said that there was some thermalite

taped to the end. It all looked pretty high Tec to me. I carried my pride and joy to the pad one more time and set it up. This time after the count down there was a puff of smoke and then a long column of smoke as the rocket climbed into the sky. It seemed like that motor burned forever and I never thought that a rocket built in my garage could fly that high. Eventually the rocket reached apogee (I knew what that word meant) and the parachute deployed just like it was supposed to. The LCO called out the customary "welcome to high power, now open up your wallet". You know, he was right. I saw many other flights that weekend. I even saw someone fly a ten-foot rocket with an M motor. I thought to myself, that guy must be crazy to spend all that money on just one motor. I knew I would never do it and my wife would never let me.

That was six years and many rockets ago. Now I'm that guy flying M motors and you know what, my wife does let me, although she always gets a nice piece of jewelry after the launch. During those years I have built and flown several two stage and clustered rockets with various degrees of success. Two years ago I started putting 8mm camcorders in my rockets and have acquired footage from several flights. I've also destroyed a few camcorders in the process. I got my level 3 certification in 1998 on an M 1939 and of course there was a camcorder in the payload. Then I knew it was time to really get my camcorder in the air and I sat down and designed my two stage M.

What really put the two stage M idea in my mind was seeing certification of the Ellis Mountain 3in. M1000 motor with a burn time of about 8 seconds. I thought, what a perfect motor for a sustainer. Then there was the certification of the Aerotec blue thunder M's, and I knew I had the motor I would need to get a big project off the ground. I sat down at the magic box and fired up the Roc Sim program and designed away. What I came up with was HERCULES. A 6in. diameter booster staging to a 4in. diameter sustainer with my camera payload sitting on top. Total length was just less than 15 feet with an estimated launch wait of 60 lbs. The booster used an Aerotec M2400 and the sustainer flew on the Ellis M1000. Estimated altitude was slightly over 20,000 feet with a maximum velocity of 1.3 mach. Wow, this was going to be great! My main concern was keeping the sustainer together as it went through mach. I've been unsuccessful with that in the past. I had run into a problem with fin flutter on a 4in. Minimum diameter L1500. Even though the phenolic airframe had three layers of fiberglass on it and the fins had another three

layers on each side, the poor thing still turned into confetti when it tried to go through mach. It was spectacular. It turned out my fin design was bad. The fins were Black Brant style 0.062 G10 phenolic. The problem was they were too swept back and not stiff enough. This led to a high oscillation of flutter as the speed approached mach and that caused the rocket to literally disintegrate in flight. All that survived was the nosecone because it came down under chute. There wasn't a piece of airframe left bigger than a quarter. Even the L motor casing ended up getting bent although, that probably happened when it hit the ground. I did find the three fins; they had all ripped from the airframe and had sheared at exactly the same place. It was very obvious where the stress point from the oscillation was.

*MACH LESSON 1- fins need to be **very** stiff and **not** swept back at all.*

This seems so obvious to me now.

This time I used 0.125 G10 phenolic material for the fins. They were squared off at the bottom, shaped more like the patriot missile. Because the sustainer wasn't minimum diameter, close but not minimum, I was able to fiberglass the fins onto the 3in. motor mount. They were also mounted between two centering rings that I had slotted. The fins slid into the slots and the root edge butted up against the motor tube. I'm sure that most of you mount your fins in a similar manner. Booster and sustainer fins were all attached this way.

All airframe segments were non-brittle Kraft phenolic tubes from Giant Leap Rocketry. I applied three layers of heavy fiberglass cloth to the entire airframe. The airframes were slotted, slid over the fin-motor mount assemblies, and epoxied into place. Then four more layers of fiberglass cloth were applied to both sides of all the fins. This created a fin canister that had a total of seven layers of fiberglass. The fins didn't have any flex to them at all, or at least I couldn't get them to flex. I have to admit that I'm kind of a wimp, somebody else may have been able to get them to flex but I couldn't.

Now that I had the airframe strong and the fin attachment strong, I was pretty confident that the rocket would stay together in flight. Next, was to make sure that the camcorder payload would hold together. This was of some concern being that the current payload section I was using was very funky looking and not the most aerodynamic thing in the world. I had the camcorder set horizontally looking out the side of the payload section and into a mirror set at 45degrees. The payload section started as a conical nosecone with a 4in. base. That flared down to a box that had

an outside diameter of 10in. by 5in. and was 7in. tall. The bottom of this tapered down to a 4in. airframe. Then it also had the mirror housing sticking out the side of the box. Even though all corners and edges were rounded, it still had a frontal area equivalent to a 9in. diameter airframe. It also looked a lot like Woody Woodpecker. In fact, everybody called it Pecker Head. This payload has served me very well for my other slowly moving rockets, 0.6 mach or less, but I just didn't think it was going to take the stress of this flight. I was in a dilemma, the camcorder had to be placed horizontally with the mirror housing in order to be viewing down the side of the rocket but if I could place it vertically, it would fit inside a 5.38in. airframe and be shaped much more aerodynamically. The stress of mach was definitely going to ruffle Pecker Head's feathers. Pecker Head had to go.

The answer came to me while I was on a family vacation in Florida. Five fun filled days of 100-degree heat, 90% humidity, and hour-long waits in line with two young children. The best experience I ever had. I did

MACH LESSON 1: fins need to be **very** stiff and **not** swept back at all.

however get to go to the Kennedy Space Center and that was awesome. While looking through the visitors guide for more fun things to do with the kids, I came across an add for a store called Spy USA specializing in miniature cameras. There I found the perfect solution, handcuffs and gags in child sizes. My wife vetoed that idea. I also found a color video camera with sound that was only 1.25-in. square and 0.5 in. deep. It was powered by a 9-volt battery that lasted about an hour and the picture was great. This solved my problem, well one of them anyway; I still had my two sweaty kids to deal with. Actually, I love my kids very much and they were really great. The mini camera allowed me to place the camcorder vertically in the 5.38-in. airframe. The mini camera plugged into the input jacks of the camcorder and was mounted in a housing that blended into the 5.38 in. to 4-in. transition of the lower part of the payload section. Now I had a payload that looked more like a rocket than a bird and would not shred when it went through the sound barrier. It also added a couple of thousand feet to the predicted altitude.

I finished construction of the rocket and had it painted two weeks before the launch. This was actually a first for me. Usually the paint on my rockets is still wet as I am driving to the launch site. I was planning on flying this project at 8a.m. Sunday morning at AERO PAC's Black Rock XI launch. As I recently had taken on the responsibility of being treasurer for AERO PAC I spent all day Saturday registering launch participants and selling T-shirts. All I could do was look at my rocket and dream of prepping it. As it was I was still chastised by the past treasurer and current prefect for having the audacity to think that I had the right to fly any rockets at all. I promised that I would fly it first thing Sunday morning and have myself chained back to the registration desk by 10 a.m. I spent Saturday evening putting together the two M motors. Both motors assembled fairly easily. This is a complement to both Aerotech and Ellis Mountain for their designs. One note on Ellis Mountain motors that I heard from both the distributor and other users. They are very hard to light. This worried me because the Ellis Motor was in the sustainer. I tackled this problem with the help and advice of Chet Geyer. He has had considerable experience with these products and suggested that I coat the throat of the forward grain with a pyrogen. Since all of my igniters are Davey Fire electric matches coated with Fire Star pyrogen, I had plenty of pyrogen available. I used a toothbrush, (what else?), to liberally coat the inside of the forward grain and then put the motor together.

I arrived at the launch site around 6:30 a.m. the next morning thinking this would be plenty of time to finish prepping Hercules by 8 a.m. WRONG. You would think by now I would know better. I am always overly optimistic about prep time and am therefore always behind schedule. Luckily for me, Chris McDougall had volunteered to be the assistant treasurer and graciously manned the registration desk. If you can call constant sarcastic comments gracious. At 10:30 I was ready to carry the rocket out to the away cell, 1500 feet out. They always make me fly from there and they always call a heads up. What's up with that? My good friend John Fruge and his buddy Mark were there to help me. John always helps me with my projects and it's a good thing because I won't get on the ladder. We placed the booster on the rail, mated the sustainer to the booster, and then John activated all the electronics. I'm going to tell you which electronics I used because they all worked very well and I think that the manufacturers deserve some recognition. The booster carried a G Wiz Deluxe for deployment. The sustainer used an Adept high current timer for ignition of the M1000. For recovery I

used another G Wiz Deluxe and an Altacc both for dual deployment. Each had their own separate ejection charges. This gave me back up for chute deployment. At 10 minutes to 11:00 I was ready for my 8 o'clock launch.

The LCO made his customary five minute speech about what the rocket was, what it carried, and that everyone needed to get out from under their awnings and pay close attention because as usual this was a Heads Up launch. Five, four, three, two, one, ignition... and nothing happened. John and I scurried around trying to figure out what was wrong. The camcorder was running. I was just about to drive out to the pad when John noticed that the armed light on the separate launch controller for the away cell was not lighted. As my son would say, "Duh dad, did you hook it up?" He would be right. I ran to the 500-foot pads and hooked up the cable to the distribution box. What do you know, the armed light came on. Another countdown and this time when the button was pushed, there was a puff of smoke and the Aerotec M2400 came to life. Hercules left the rail without a moment of hesitation. She climbed straight as an arrow as she tried to rule the sky. At four seconds into flight the Adept timer finished its countdown and the Ellis Mountain M1000 blossomed with flame, no hesitation at all. Chet, you were right, pyrogen on the forward grain worked perfectly. At about two seconds into the M1000 burn, the rocket started to arch over slightly and started a more ballistic trajectory. At about 17,500 feet, as determined by the altimeters, Hercules reached apogee and the drogue chute deployed. It shredded instantly due to the high velocity deployment. It also put such a jerk on the rocket that the shear pins holding the payload section gave and the main chute tried to deploy. It shredded instantly too. Meanwhile, I'm standing on the ground clueless to all of this. I can't see the rocket at all but, eagle eye John says he has it in sight and it appears to be under drogue. I can't see anything, so I'm starring into the sky wondering why Hercules arched over when it was going so straight. John is watching her fall and wondering when the main chute is going to deploy. After about three minutes, John says it's down. It should have taken a lot longer to gently reach the lakebed. All during this the booster was under chute and slowly settled to the ground about a quarter mile away. Now it was time to get into the Jeep

MACH LESSON 2: Payload sections should be no larger in diameter than the main airframe.

and drive over to pick up the sustainer, or what was left of it. When we got to the landing site, (crash site), I was surprised to see how good a condition the rocket was in. It had a two inch zip at the forward end of the airframe, some cracks in the aft end of the airframe, and some slight damage to one fin. Hercules would definitely fly again. The parachutes and camcorder were another story. The chutes looked more like streamers than chutes and the camcorder was never going to film again. We had to completely disassemble it just to retrieve the tape, which we did.

When we got back to the flight line, I talked to a couple of other people who understand what goes on at mach better than I do. They explained to me why the rocket started to arch over during the burn of the sustainer. Both the video tape evidence and the Roc Sim simulation confirms their theory. Apparently, when the rocket goes through mach, a high-pressure cone forms around the rocket. The apex of this cone is located at the tip of the nosecone and the high-pressure area spreads out from there. Inside the mach cone is a low-pressure area. Hercules has a payload section that is bigger in cross section than the main airframe. It also has a large length to diameter ratio. This caused the fins to be within the mach cone and therefore in a very low-pressure area. The fins had no air to bite and could not keep the rocket stable. This allowed the small mini camera housing to stir the rocket. It is clear on the videotape that is what happened. The camera ended up on

MACH LESSON 3: High performance rockets need high performance recovery.

the inside of the arc. Also, when reviewing the Roc Sim flight profile, the sustainer reached mach at about two seconds into flight. This is at about the same time that we observed Hercules going into a ballistic trajectory, confirming the loss of stability when the rocket went through mach.

MACH LESSON 2 – Payload sections should be no larger in diameter than the main airframe.

I spoke with several rocketeers that have more experience than me. They all agreed on the same thing. A high altitude, high performance mach breaking rocket will end up in a ballistic flight to some degree and therefore deploy it's chute at high velocities. You know, I believe them.

MACH LESSON 3 – High performance rockets need high performance recovery.

There are manufacturers out there who help us with these problems. I know Rocketman makes an ultra strong drogue chute for ballistic deployment. I also saw a really great deployment device, (of course after I flew my rocket), made by Black Sky. It's called a PRM (pyrotechnic release mechanism). Instead of having a second ejection charge deploy the main chute from a second compartment, the main chute is retained by the PRM. The drogue is attached to either the top of the main canopy or to the top of a deployment bag via an appropriately long shockcord. When the altimeter deploys the main chute, it fires a small charge within the PRM and that releases the main chute. The drogue now acts like a pilot chute and pulls the main chute out of the airframe. This whole system is elegant. It eliminates the need for shear pins and a separate parachute compartment. It also eliminates the chance of your main chute deploying early. Boy, I wish I had this in Hercules.

All in all I thought the flight went very well. I learned something new and to me that's the whole point of this hobby. Every project I make is little bigger and more complex than the last. Once I fly a rocket successfully, I rarely fly that rocket again. To all those out there in rocket land who are planning a big project, I hope this article gives you some insight and that you can learn from my mistakes. Keep pushing your projects to the limit, it's the only way we can improve and advance ourselves both technically and intellectually. We are fortunate to be in a hobby that gives us the opportunity to challenge both our manual skills and our brains. Lets all fly high, fly safe, and learn.

Minutes of the board meeting

Minutes of the regular meeting of the AERO-PAC board, January 22, 2000

Present: William Walby, Bob Fortune,
RichAmstader, Tom Rouse,
Randolph Mitchell, John Coker

Absent: none.

Attending: Pius Morozumi

Agenda Items:

1.) FAA Waivers: Bob will apply for waivers to 50,000 MSL for all launches, commencing at 8:00 a.m. through 6:00 p.m. Waivers to 50,000 MSL will also be requested for the setup day of each launch, noon through 6:00. An 8,000 MSL waiver will be requested for a single night launch on Saturday, July 29, 8:00 - 11:00 p.m.

Launch windows will be specified in both local and Zulu time for the convenience of the various agencies handling our application.

2.) Trailer Insurance: If our equipment trailer is stolen or trashed the club is effectively out of business. Tom and Bob will research an affordable policy covering vehicle and contents.

3.) Equipment Party and Equipment Needs: The club needs new high power pads; William will contact Jerry Vaughn regarding a commitment made by Jerry last year. Replacement igniter leads are being made. The trailer needs gaskets at doors and vent, plus the usual cleaning and equipment check; Tom may develop a new method of boxing equipment. A combination work party and member's meeting is scheduled for Saturday, April 8th, with a rain date of Saturday, April 22nd.

The club presently owns two complete HyperTech launch systems, which take up space and add weight (250lb each set) to the equipment trailer and were never used

last season. The club will sell one set and keep the other.

Note: No HyperTech support equipment will be brought to any launch unless Tom Rouse receives a specific request for the equipment a minimum of 30 days prior to that launch.

4.) Launch Fees: The new BLM fee schedule for the coming flying season translates to an additional cost to the club of \$18 per member. Put another way, the new BLM fee schedule is expected to add about \$1,000 to our operating costs this year.

Discussion: For many years, Aeropac dues were \$20 per year, and members paid an additional \$20 per launch, for a total of \$80 if attending all three launches. Aeropac also generated a substantial cash reserve from the proceeds of LDRS XIV.

Two years ago the board set a flat fee schedule of \$20 per year; this proved not to be sustainable.

Last year's dues were \$40, including fees for all launches, and the treasurer reported a net income of \$696.97 (including t-shirt sales and the like). Note the club made no major capital improvements last year.

Recognizing that our members have different levels of attendance at launches, the board adopted three dues options:

- a.) \$60 per year all-inclusive of membership, newsletter, and all launches including EX3.
- b.) \$20 for membership & newsletter, plus \$20 per launch plus \$20 for EX3
- c.) Non-members pay \$30 per launch and \$30 for EX3; no member discounts on shirts, electric matches, etc.

5.) Newsletter Schedule: First mailing scheduled for the weekend of February 12th (with membership form and schedule of launches) then two weeks before the equipment party, MudRock and Black Rock XII.

IOW, publication dates are approximately February 12th, March 25th, June 9th and August 26th, for a total of four newsletters. John also offered to redraft the membership application form.

6.) Member Meeting Schedule: Details to follow in Newsletter.

April 8, Saturday, Member's meeting and work party, at Tom's house in San Jose.

April 22 - rain date for above.

June 3, Saturday, Board and Member's meeting at Portal's new HQ in San Jose.

August 19, Saturday, Board and Member's meeting at Portal.

December 2, Saturday, Board meeting and end of season meeting and feast at Portal.

7.) BLM Volunteer Work Party Schedule: The morning of Friday, September 8th. We need much broader member participation in this once-a-year gesture of support for the good folks at the BLM.

8.) How do we get more help at launches?: Discussion, we particularly need more help with the BLM work party and cleanup/packing at the end of each launch. No conclusions reached.

Respectfully submitted,
Randolph Mitchell

Contribute to the Newsletter

We need contributions to make this newsletter better and share useful information. If you have an article, a launch report or pictures to share, please send them to John Coker. My email address is john@jcs.com. If you have a digital camera or a scanner, please send the pictures in as high a resolution as possible. If you have prints or slides and no scanner, I can scan them and even return the originals (please include SASE). Send pictures to:

John Coker
723 Chateau Drive
Hillsborough, CA 94010

Thanks!

1999-2000 Financial Summary

Beginning Balance (Feb 2, 1999)	\$3326.27
Total Expenses	\$5745.88
Total Income	\$6442.85
Ending Balance (Jan 26, 2000)	\$4023.24

How to Contact the Board

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