

WASHINGTON AEROSPACE

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Points of Interest:

- Redline motors from Aerotech are making their appearance at various launch events around the country. Be sure to check with Ursula at All Hobbies to get yours!
- LDRS is coming up! Have you made plans to attend the launch at Lucerne, CA, on July 19-22?
- Be sure to come to the Washington Aerospace launch at Offutt Lake on July 7th. Two contests will be held: Boost Gliders and Superrocs. See the Washington Aerospace website for directions and contest details @ www.hawkfeather.com/wa-aero.

FROM THE PRESIDENT.....

BY KENT NEWMAN

Lots of Flying.....

Ahhh, what a busy month for rocketeers! Weekend events at Brothers, OR, Lowden and Spokane, WA, and the regular monthly launches at the Monroe and BEMRC's fields. Not only is there a variety of events to attend but there is also a variety of flying that can be done. Brothers offers a 16,000 ft agl waiver and wide open high prairie desert to recover rockets. If you are one of a growing number of rocketeers interested in motor formulation, Monday offers a chance to fly experimental motors under the Tripoli Research Launch guidelines.

Lowden, WA, is the site of a combined Blue Mountain Rocketeers/Scott Binder launch event. Scott and Rose are famous for their hospitality and the BMR bunch is well-known for their family-oriented rocket activities. Combine this with a 5000' waiver and lots of recovery area and the combination can't be beat.

The Spokane Area Rocket Club is a combination of both Brothers and Lowden. An 11,000 ft waiver, open farm land and a casual approach to rockets, kids and family offer a more social setting to a rocketry event.

Volunteers

A very attractive trend is beginning to be noticed in the Northwest. As I travel from one launch event to another, I am duly impressed as I notice the number of fliers continues to increase who volunteer for Launch Control Officer, Pad Manager, equipment lumper, etc. Knowing that all of the work involved in running a launch event is voluntary, such help is indispensable in making rocket activities a success. Thanks to you all who get involved. The more that people participate, the less work and more flying for everyone.



The whole family gets involved in flying rockets at Monroe.

Tripoli Motor Testing

Sue McMurray, chairperson of Tripoli Motor Testing (TMT) since 1997, is stepping down and Mark Clark (Arizona High Power Rocketry Association) is assuming her duties. Sue is a very affable person who has helped the sport tremendously. We wish her well in her hobby rocketry and personal endeavors.

Mark Clark is a long time rocket and propellant enthusiast who actually gets to build rocket motors for a living! We welcome Mark to his responsibilities as chairperson of TMT.

Article Submission

You'll notice a number of authors submitting articles in this month's newsletter. Thanks to each and every one for their submittal. If you have a topic that you think might be of interest, feel free to forward it to me, Kent Newman, at ohiochase@aol.com. Subject matter can vary greatly. Anything from projects, electronics, construction, motors, construction materials, painting, to launch events. The more varied, the better!

BOOST GLIDERS—A PRIMER

BY JIM POMMERT

Boost-gliders present a unique design and construction challenge to the rocketeer. The B/G must ascend vertically at speeds approaching 200 feet per second with the stability and aerodynamics of any rocket. But then it must slow and transition to a glide of 15 to 20 feet per second with the stability and aerodynamics of an airplane. Fortunately, the rules for each turn out to be very similar. Without going into the detail of the June WAC meeting, here are some of our conclusions.



Jim Pommert practices for July's Boost Glider competition.

“Boost-gliders present a unique design and construction challenge to the rocketeer.”

1. First, the axis of the centerline of thrust of the engine should be kept as close to the center of gravity as possible. A normal pop-pod B/G has the axis of the centerline of thrust somewhat above the center of gravity. This creates a nose down (pitch down) force under thrust. The engine pod of a B/G normally has a pylon to keep the hot engine exhaust off the glider. But as we saw in the meeting, the height of this pylon should be kept as low as possible without allowing the exhaust to light the glider on fire. A smooth coat of epoxy over the areas of the glider exposed to engine exhaust will provide some protection to the balsa wood of the glider.
2. Second, boost gliders should be launched from rods or rails of the maximum possible length. As with any rocket where the centerline of thrust is not through the center of gravity, aerodynamic forces are used to balance out the off-center engine thrust. Aerodynamic forces are proportional to speed and angle of attack while en-

gine thrust is independent of speed or angle of attack. With a slower rod departure speed the B/g most rotate to a higher angle of attack before forces on the rocket are balanced. This pitching motion can sometimes be quite dramatic and at best will cost some potential altitude.

3. Third, the pod of a Boost-glider must fit tightly enough that it doesn't separate prematurely from the glider but must fit loosely enough that it will separate at ejection. To judge if your pod and glider are attached tightly enough point your assembled pod and glider nose down holding it by the pod. The glider should not drop off. Now put the tip of the nose cone of the pod about an 1/8 of an inch above a hard surface. Drop the B/G on it's nose and the glider should smoothly detach from the pod (be ready to catch the glider). If you are having trouble with your pod separating properly, try using a heavier nose cone.
4. Fourth, wings, stabilizers and rudders for the glider should be made from no heavier than 8 to 12 lb. C-grain balsa, 4 to 7 lb. is preferred. The body of the glider and the pylon of the pop-pod should be built from heavier 12 to 20 lb. A-grain balsa. Balsa weight is measured per cubic foot. The grain of balsa refers to the angle the wood is cut relative to the rings of the tree. Trees generally grow in concentric rings out from the center of the tree. A-grain balsa is a slice of the tree that is cut within about 30 degrees to being perpendicular to the rings of the tree. C-grain balsa is a slice of the tree that is cut within about 30 degrees of parallel to the rings of the tree. B-grain is of course the wood cut with the grain in between these two. C-grain balsa often appears to have dark flakes in the lighter wood. These flakes are the rings of the Balsa tree cut lengthwise.
5. Finally, the size and proportions of a competition B/G are chosen based on the expected maximum velocity and flight duration. Generally a smaller B/G will boost higher and then glider longer than a larger B/G. But the object of Boost Glider Duration is not to have the longest flight. The object is to have the flight that stays in sight of the timers the longest and then is returned. As wind increases the further a glider will be blown down wind in a given time. A small glider will disappear from view more quickly than a larger glider. For competition, pick a glider that will land just after it has flown out of sight from the timers at the launch pad.

MONROE SPACEPORT—JUNE 3RD

BY KIMBERLY HARMS

Hello Monroe rocket flying comrades!

It was a very good month at the June launch at the Monroe spaceport. The weather was everything from blue sky to dark clouds and light rain. But no wind all day!

Here are the flight breakdowns

| | |
|-------|----|
| 1/4A | 1 |
| 1/2 A | 11 |
| A | 16 |
| B | 18 |
| C | 51 |
| D | 20 |
| E | 15 |
| F | 17 |
| G | 22 |
| H | 18 |
| I | 8 |
| J | 4 |

Total of 201 flights.

There were two certification flights:

William Clugston, BSD Horizon, H242;
Shawn Morrissey, Thoy Phoenix, J350

As far as I know, they both were successful. Good job guys!

Some notable flights:

Chuck Layton launched his "My Big ASP" on a J350.

Ed Mirabella treated us to the launch of his ever popular tube launched "Tow" on a J800. As always, it was quite a crowd pleaser. Thanks Ed!

Randall Credico, one of our Canadian visitors launched his "Crazy Canuch" on a Pro-38 J360 motor. First one of those we have seen at Monroe and it worked very well.

There were so many I motor flights it was hard to remember them all! Rob Clement launched his BSD "Fire on the Horizon" with an I161. Mel Briggs showed us all what a high thrust motor looks like with his PML Endeavor on an I435. Kent Newman launched his "Q-Blue" on an I211. John Smith brought his Shogun back on an I357. Michael Dennis put up his "Expediter - X" with an I211. Tim Heneghan continued the BSD flights with a Horizon 54 with an I161. Dan Mitchell risked the rocket gods with an I200 in a North-Coast Archer. Finally, Ed Mirabella launched a big crayon rocket with an I284. Wow! What a lot of big flights!

This month Washington Aerospace was also running a parachute duration contest. I expect that Jim Pommert will be posting the results for us all to see. Looked like there was a lot of fun being had with the smaller motor flights for this.



Bill Clugston readies his BSD Horizon with an H242 for his L1 certification flight. The flight was successful. Welcome to high power, Bill!

We had lots of volunteer helpers this month. Aside from the usual Monroe staff folks, Robert Geer, David Anstead, Abigail Chang, Rob Clement, Andrew MacMillen and Jim Pommert took a shift at Pad Manager. Lauren Anstead, Don Qualls, Mike Pearson and Steve Thatcher did some very nice work at LCO.

Without these folks volunteering, the launch would not happen. Thank them next time you see them.

We also had a lot of setup and takedown helpers. Thanks guys!

See you all July 1st!

“Without these folks volunteering, the launch would not happen. Thank them next time you see them”.

CONSTRUCTION TIP: EPOXY SYRINGES

BY KENT NEWMAN

The next time that you visit the grocery or drug store, stop by the pharmacy and ask the pharmacist if you can have one or two of the syringes used to dispense medicine to kids. These syringes are typically 10 ml or so and provide

an excellent tool for applying epoxy to rocket projects.

With or without filler, put epoxy into the syringe and apply a uniform bead of adhesive where you want it when you want it. Imagine the great

line that can be had in making fin fillets. Add a straw or plastic tube to the syringe to put epoxy onto hard to reach fin/MMT joints. And the syringes can be reused after the epoxy dries and is removed!

MONROE CONTEST RESULTS

BY JIM POMMERT
CONTEST DIRECTOR

“Next month Washington Aerospace is again sponsoring a contest, but not at Monroe.”

As a kick-off to the 2001 contest season Washington Aerospace sponsored a non-sanctioned parachute duration competition at the launch in Monroe last Sunday. The very light winds provided perfect conditions although participation was light.

In “A” engine parachute duration Rhiannon Doyle took first place in the 13 and under age division with a time of 18 sec-

onds. Reed Charlop was second with a flight of 11 seconds. For those 14 to 18 years of age David Anstead walked away the winner with a nice flight of 37 seconds.

The three adult entrants in “1/2A” parachute duration were all from the SEANAR club. Robert Geer easily captured first place with a nice time of 44 seconds. Second place was a tie between Don Qualls and Abigail Chang with identical 14 second scores.

Next month Washington Aerospace is again sponsoring a contest but not at Monroe. A NAR sanctioned competition open to everyone, NAR member or not, will be held on Saturday, July 7th, at the Offut Lake launch site just south of Olympia. Both A engine Boost Glider and A engine Super Roc Duration events will be held. Ribbons for 1st, 2nd and 3rd place will be awarded in the two younger age divisions.

See you there.

KIT REVIEW—LOC MINIE MAGG

By Bryan M. Chuck

Brief:

LOC's Minie-Magg is a single-staged HP rocket popular with many fliers. Its stubby profile combined with a basic build make it a fun flier for larger motors, as well as smaller H motors for a lesser field.

Construction:

The parts were contained in a durable plastic bag. I felt the components to be a fine quality, and found no warping of the fins. Outside of the Minie Magg's size, it is a basic build. I used 15 minute epoxy for the assembly and 30 minute on fillets. The instructions are simple to follow and are included on the back-side of the info/picture card. I would speculate that a person should have no problems assembling this rocket from the instructions LOC supplies.

All the parts fit together well and required minimal, if any sanding. I decided to deviate slightly from the instructions, though, in order to add a few things to improve the longevity of my Minie-Magg. The supplied shock cord mount is epoxied on the inside side of the airframe, and uses elastic for shock cord material. I did not feel confident using this

arrangement, so I put an eyebolt in the forward centering ring to anchor the shock cord. I also opted to use 20' of tubular nylon in lieu of the elastic. Attaching the cord to the eyebolt was done via quick link. Another minor “CON” to this rocket is the fins do not go all the way to the motor tube. To make amends, I decided to keep the aft centering ring off until after I put the fins on. On the inside of the airframe where the fin tabs came barely through, I put 2 inch wide fiberglass band aids the length of the fin root. Lastly, I added t-nut & brass strip Kaplow-style motor retention before adding the aft centering ring. As for building, here are my thoughts: PROS 1. Quality of airframe, wood components, and nosecone. 2. Exceptional fitting of parts. 3. Simplicity of build/instructions, even if built “stock.” CONS 1. Shock cord attachment and shock cord material. 2. Fins are not to the motor tube. 3. Lack of motor retention, which is fairly common in mid-power and HP rockets.

Finishing:

To finish off my Minie-Magg, I filled the tube spirals with 3M Spot Putty. On the fins, I used a couple coats of SIG sanding sealer from the local R/C

plane store. After sanding things smooth, I employed two light coats of white Krylon primer, sanding between coats. For my color coat, I chose Glossy Krylon Grape. I chose this color in honor of my friends' daughter, whose name is Violet and likes rockets.

Construction Rating: 4 out of 5

Flight:

Flight prep for this rocket is easy. It's wide enough to fit all recovery items with no hassle. Instead of the large amount of wadding the Minie Magg would require, a 18"x18" piece of Top Flight Nomex was used. I also added one of their Nomex sleeves for good measure. The LOC catalog notes that one could fly this rocket with a G80 SU motor.

The maiden flight of my Minie-Magg was at Black Rock XII in Nevada. I chose an I161 medium for the ice breaker. It was a good choice and recovery happened without a hitch. At this point, I've gone as large as an I211. All flights have been arrow straight, and exceptional “rock & roll” motors for this rocket seem to be the I300, I357, and of course, the I211. I've had only one incident when the fin popped loose. In light of that, I would rate the Minie-Magg's flying and prep at a top notch 5.

“DESERT STORM” LAUNCH AT BROTHERS, OR

BY KENT NEWMAN

Traveling to Central Oregon isn't the easiest trip for most Puget Sound fliers but it's certainly worth it. The site is a premier launch event that affords a 16,000' waiver in an area with lots and lots of open recovery space.

Leaving Puyallup at about 1:00 p.m. on Friday, I pulled onto the launch site at 8:00 that night. Now, keep in mind that this trip was in a 31' RV. Your travel time may vary :-)

Camping is allowed at the site and there were already 15-17 campsites established when I arrived. Other fliers stay in Bend which is 40 miles to the West easily traveled on Highway 20. The Oregon Rocketry group arranges for Port-a-Potties to service the needs of some 150 to 175 attendees but that is the extent of the services. All Hobbies provides the opportunity to meet your AP and rocket part needs. And the rest is up to you. But it isn't a problem. Just be sure to bring a lot of water so that the dry and, sometimes windy, site won't pose any problems.



Tom Gonser and John Lyngdal work on Tom's canopy in the high plains desert at Brothers.

When I arrived, the OREO boys pretty much had the flightline and launch pads set up. There was some testing

going on in preparation for Saturday morning's start. Seeing that, I decided to head out to the "away cell" to set up my new launch pad. It's a 2" square aluminum tubing pad that can support 12' of Blacksky rail. Having completed that, I found a spot for the RV, leveled her and got "serious" by building some motors.

Saturday morning was beautiful! After a very chilly night (36 degrees!), the sun was warming up everything quite nicely. The sky was a deep blue and there was only an occasional breeze. I planned on flying the Arcon, a 6" by 11' project, on an M1315. Additionally, there were several people planning on flying Level 3 certification flights so this event was going to include lots of opportunity to see big rockets and motors.

Prep time was only about 50 minutes and I was ready to go. Kimberly Harms was kind enough to transport me and my rocket out to the away cell and we mounted the rocket on the pad. Ensuring that the rocket was targeted straight up, I inserted a Firestar-pyrogen dipped Daveyfire, hooked up the igniter clips and armed the RRC2 and AltAcc. Kimberly and I walked to a safe distance, contacted the LCO desk informing them of our intent to launch and awaited their go-ahead. Kimberly gave a brief description of the rocket and its proposed flight, I started my camcorder, the countdown started and, wham! - the M1315 lit instantly!

The Arcon traveled straight and true to 9369', deployed the R4C drogue and fell at 66 fps to 1000' where the R18C



The author prepares "Composite Trauma for a 9300' flight on a Kosdon K410.

main deployed. A nice soft landing and it was all over. A great flight and no damage. A perfect start to the day!

And then the range opened up. Great flights were taking place all day long with every conceivable motor being used. From 1/2As to M1845s, this was the place to get a rocket "fix". At about 1:30 or so, the wind began to pick up and a layer of cirrus clouds began to cover the blue sky. Flying continued a bit less frequently until about 6:00 p.m. At that time, everyone returned to either their campsites or Bend, ate dinner and prepared for the next day.

Sunday morning was like Saturday. I helped Tom Gonser prep "Pinky" with a Kosdon M1845. Tom was also going to include transmitted video on this flight, a first for this rocket and a new interest for Tom. "Pinky" roared off the pad heading straight up, deploying a drogue and, ultimately, landing under a big 16' surplus military chute.

"Great flights were taking place all day long with every conceivable motor being used. From 1/2As to M1845s, this was the place to get a rocket "fix".

“DESERT STORM—CONT.”

The flight was great but the video was intermittent. Tom has to use a handheld antenna aimed at the accelerating rocket in order to receive video transmissions. Not an easy thing to do with an M1845 spewing hard!

After Pinky was recovered, Tom was kind enough to help me set up the “Doorknob” on the pad. Don’t laugh! The “Doorknob” was an early sixties rocket typically used to sample the air after a atmospheric nuclear blast. The rocket flew in both single and two-staged versions but had a relatively short life of 3 or 4 years. My “Doorknob” was a 5.5” version with a 54mm

motor mount in both stages and a couple of 29mm MMTs in the sustainer for airstarts.

The mission on Sunday was to launch on a Kosdon K700, stage to a J415 after 2 seconds and, then, fire the two H128s after 8 seconds of flight. If everything worked as designed, “DK” should get about 7200’.

The launch was perfect! The Kosdon K700 roared and the “Doorknob” shot toward the sky! AT 2 seconds, the 1/2 gram separation charge split the booster from the sustainer and a second or so later the J415 kicked in. The



The landowner’s pet Emu stops by to check on rocket preparation.

sustainer was still flying straight and true! At the 8+ second mark the H128s fired and the Doorknob went on to hit 7800’! A great flight!

“Desert Storm” was an excellent launch with a large number of rockets of all sizes. If you haven’t been to Brothers, put it on your list!

“CLEAN AS A MOTOR”

BY TRACI SCOTT

How many of us remember the first time we took out that brand new shiny casing and admired its beauty? Then we watched our rocket sore up into the sky, the parachute came out right at apogee, then landed right next to the pad. We get back to the car only to find this dull blackened casing. How are we ever going to get it to look like that beautiful shiny new casing?

There are many methods for cleaning motors, none of which is better than the other but more or less what works for you.

First of all I will share with you a basic kit of supplies that will help with whatever method you decide to use. A long and short wooden skewer, these are great for getting in to the grooves around the closure and for getting those stubborn o rings off. Scotch Bright

for getting off those really tough spots. These two items can be found at any grocery store. Latex, rubber or vinyl gloves to keep the dirt out of the fine lines of your hands. You can find the gloves at any drug store and even some hardware stores are starting to carry them. Alcohol can be used for really moistening the dirt in the grooves and keeping the towelettes moist. A wooden dowel for cleaning those hard to reach areas inside the casing. My newest tool is a toothbrush for getting in the closure grooves. Finally Super Lube, a light coating will keep your closures working smoothly.

In my opinion the best way to clean a motor casing is right away. There are some corrosive properties to the propellant we use and getting them off right away will help keep your casing looking like new. My product of choice is Hercules for Hands. The original use

for this product is to clean your hands after plumbing projects. They can be found in the plumbing section of the hardware store. They come in small packets or big tubs. The one drawback is the price, they can get pretty spendy. The lower cost method, which I also use, is baby wipes. These work just as good but not as fast as the Hercules.

If you have a bad case of AP fever and need to fly as many rockets as you can, just stuff the motors in and worry about the cleaning later. Then I suggest the soaking method. All you need is a bucket of some type and some plain white vinegar. You just soak the casing then rinse it off. This also works well.

The main thing with whatever method you choose to use is to keep the motors as clean as the day you got them. They will not only look great but will perform better.

“My newest tool is a toothbrush for getting in the closure grooves.”

“FIRE IN THE SKY” - LOWDEN, WA

BY CHUCK LAYTON

The 1st Annual "Fire In The Sky" is a Success! Hundreds of acres of soft, green 18" high wheat, warm temperatures, the smell of AP drifting in the breeze, fun flying friends and slurpies! These things are some of what proved to be a successful recipe for a wonderfully organized weekend rocket get together known as "Fire In The Sky."

Scott Binder (owner of BSD High Power Rocketry) and his wonderful wife Rose hosted a two day launch on June 9-10, 2001 at their farm just outside of Lowden, WA (gateway to Walla Walla) as a way of saying thanks to all who have helped make BSD business so good. The event was very organized and Scott went all out in preparing the surrounding fields for a top notch rocket launch. Camping areas were provided as well as a shady flight prep area close to the pads. Ursula Gilkey drove in on Saturday with a large fresh load of AP that she just happened to pick up from Aerotech in Las Vegas (somehow this is "on the way" from Puyallup to Lowden but there are times when it is best to not ask). Why, Scott even had a food vendor (Pacific Northwest Concessions) lined up! High class! Launch support equipment was provided by the BMR club and included their new 24 pad system.

Saturday dawned slightly windy and some of the first flights were model rockets put up by many of the kids. As the adults began to test the waters with mid power rockets Craig Christenson decided to go ahead and put his gor-

geous 5.5" upscale of a BSD Horizon 54 into the air. This 14 pound rocket was crammed with electronics including 2 Black Sky AltAcc 2A units for chute deployments and a Pratt G-Wiz LC 800 for airstarts. Everything worked flawlessly as the central J570 kicked the monster off the pad followed quickly by 2 I2II's coming on-line, adding to the smoke column. The rocket just kissed the top of the 5,000 ft. waiver before the drogue deployed. Main deployment occurred at 500 ft. and a stunningly beautiful flight slowly came to an end. There were quite a few rockets flying with electronics at this event.

The pace of rocket launches picked up significantly in the afternoon as the winds were perceived to be dying. Many H's and I's were flown as well as a handful of J's.

As the heat built up into the lower 80's, many rocketeers discovered the "joys of the slurpie" provided by the food vendor. These were greatly appreciated by ALL.

Also on site was an enterprising teen who would clean your motor casings for \$1 a piece. And he did an outstanding job.

On Sat. afternoon rocket flying ceased briefly in order to start the BMR raffle drawing and present the parents of cute little 3 year old Alexis Nordman with \$715 to help defray medical bills incurred after Alexis was brutally mauled by 2 Rottweilers. The kids of BMR felt that they would like to give back to the community that has helped them in so many ways for 7 years.



Chuck Layton with one of his upscale Estes "Mosquitoes".

Photo courtesy of C. Christiansen

Launching commenced and a total of 93 flights were flown on the 1st day. But the events were far from over. Highlights of the evening were a wonderful Bar-B-Q, an amazing bonfire and a huge amount of rocket talk (lubed with Slurpies, of course). All we needed now was a spectacular night launch.....

Sunday's weather was much the same as Saturday's. 58 flights were launched. Two successful L1 flights were made. 5 locally regional clubs were represented with flyers from 3 states.

I made several new friends at this event and I will most definitely be attending the 2nd annual Fire In The Sky in 2002. Thanks a bunch to Scott and Rose at BSD for sponsoring the event and letting us launch/eat/sleep all over their yard. Thanks also to BMR for letting us launch on their ground support equipment. And thanks to everyone who attended and made this event a huge success.

".....a wonderfully organized weekend rocket get-together known as "Fire In The Sky."

Club Meetings

The first Saturday of every month!

Where: Peace Lutheran Church
214 East Pioneer
Puyallup, WA 98372

Time: 7:00 p.m.

We're on the Web!
www.hawkfeather.com/wa-aero/

NAR Section 578 Super Discounts

All club members get the
following discounts at All
Hobbies store

20%

Special Discount on single
item purchases of over
\$300.

15%

Estes
Dr. Rocket Motors
& Parts

10%

On all of the following:

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AEROTECH KITS
IMPULSE AEROSPACE
DR. ROCKET
AEROTECH MOTORS
AEROTECH RMS
CUSTOM
QUEST
TOP FLIGHT
PARACHUTES
PUBLIC MISSILES, LTD.
THE LAUNCH PAD

NO DISCOUNT

All Red Sticker Items

ALL HOBBIES STORE
1430 E. Main
Puyallup, WA 98372
253-841-0089

<http://allhobbies.net/>

Regional Launch Schedule

Notes:

1. Monroe winter launches are weather permitting (as if the rest of the year isn't)
2. BEMRC launches (Boeing) are model rocket only. C impulse maximum.
3. No EX motors or allowed in regular launches; Kosdon motors not allowed.
4. No certified motors allowed on EX Only launches.

July 1st (Sunday)
July 7th (Saturday)
July 7th (Saturday)
July 7th (Saturday)
July 14th (Saturday)
July 15th (Sunday)
July 21-23 (Sat-Mon)
July 28th (Saturday)

August 4th (Saturday)
August 5th (Sunday)
August 11th
August 11th (Saturday)
August 12th
August 18th (Saturday)
August 24-26th (Fri-Sun)
August 25th (Saturday)

September 2nd (Saturday)
September 3rd (Sunday)
September 9th (Sunday)
September 14th-16th
September 15th, (Saturday)
September 15-16th (Sat-Sun)
September 22nd (Saturday)
September 29th-30th (Sat-Sun)

October 6th (Saturday)
October 5th-7th (Fri-Sun)
October 7th (Sunday)
October 13th (Saturday)
October 14th (Sunday)
October 20th (Saturday)
October 20th-22nd (Sat-Mon)

November 3rd (Saturday)
November 4th (Sunday)

Launch Contacts:

Washington Aerospace
Tripoli Puget Sound
Monroe Launches
Blue Mountain Rocketeers

B.E.M.R.C.
Seattle NAR (SEANAR)
Spokane Area Rocket Club (SPARK)

Tripoli - Oregon
Tripoli - Portland

Monroe, WA (TRAPS-WAC)
Washington Aerospace Mtg @ Offutt Lake
Offutt Lake, WA (Washington Aero)
Kent, WA BEMRC)
BMR Dayton, WA Yvette Smith Mem'l
Spokane, WA (S.P.A.R.C.)
Brothers, OR (OREO) Mon EX Day
Redmond, WA (SEANAR)60 Acres Park

Puyallup, WA (WA Aerospace Meeting)
Monroe, WA (TRAPS-WAC)
Dayton, WA BMR
Kent, WA BEMRC)
Spokane, WA (S.P.A.R.C.)
Offutt Lake, WA (Washington Aero)
Black Rock NV Aeronaut 2001
Redmond, WA (SEANAR)60 Acres Park

Puyallup, WA (WA Aerospace Meeting)
Monroe, WA (TRAPS-WAC)
Spokane, WA (SPARC)
Bonneville, UT UROC Hellfire 7
Offutt Lake, WA (Washington Aero)
Sheridan, OR (OREO) Mon EX Day
Redmond, WA (SEANAR)60 Acres Park
Black Rock NV BALLS 11

Puyallup, WA (WA Aerospace Meeting)
Black Rock, NV Aeropac XIII
Monroe, WA (TRAPS-WAC)
Dayton, WA BMR rolling Thunder 7
Spokane, WA (SPARC)
Offutt Lake, WA (Washington Aero)
Brothers, OR (OREO)

Puyallup, WA (WA Aerospace Meeting)
Monroe, WA (TRAPS-WAC)

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Bruce Johnson 425-228-7292
Christopher Scott 253-858-7256
Tim Quigg 509-382-4176

Lauren Anstead 206-655-3238
Don Qualls 206-784-1667
Bret Conant 509-299-7122

Gary Fillible 503-843-3137
Dennis Winningstad 503-297-3685