LUNAR'clips *2013*

Livermore Unit of the National Association of Rocketry

Volume 20, Number 1
January-February 2013

Upcoming LUNAR Launches:

- Mar 2, Apr 6: 09:00 to 16:00: high power launch at Snow Ranch.
- Mar 16, Apr 20, May 11: 09:00 to 13:00 regular sport launch at NASA Ames, Mountain View.

As always, check the LUNAR website (*http://www.lunar.org*) for updated launch information. Driving directions to Snow Ranch and NASA Ames launch sites are available on the LUNAR website. If you are bringing motors to NASA Ames, you must print and display the orange placard (see the NASA Ames access instructions on the LUNAR website).

Next LUNAR Club Meetings:

The next LUNAR Club Meetings will be held Thursday, Mar 14 and May 16, 2013, 7:30 PM.

These meetings will be held at Greenmeadow Community Association - 303 Parkside Drive, Palo Alto, CA 94306. See the LUNAR website for a map.

In This Issue

NARCON was a BIG SUCCESS!!!

Important Notice:
At the November LUNAR Membership meeting a motion was proposed and passed to stop mailing LUNAR'clips newsletters to the membership. The Nov-Dec issue was the last 'clips to be mailed out. If you want to ensure you are getting the 'clips in the future, be sure to subscribe by visiting:
http://lunar.org/mailman/listinfo/clips

In This Issue:

Contest! Prizes!

Airplane, Airplane, Go Away!

MEGA Newton Seconds!

NARCON!

Crayon Rockets Under the Microscope!

And…

Where's the Range Head??

Just follow our nifty new signs to the range head at Snow Ranch.

LUNAR'clips *2013*
Livermore Unit of the National Association of Rocketry
Volume 20, Number 1
January-February 2013

Range Head

David Raimondi, President, LUNAR #1221, NAR #82676

Spring has finally arrived and so has the less stable weather of the seasonal change. If you attended the last launch you got to wait around for the fog to lift and once it did, the wind started to pick up. We had to stop the launch early because of the wind and all of the rockets that were drifting down the airfield. We already had the launch rods tipped into the wind 30 degrees off vertical, the maximum angle allowed per the NAR Safety code.

So what can you do to help keep the launch going? The answer is simple: use smaller motors; reef your parachute a little; cut a spill hole in the top of the parachute; and consider not flying the bigger rockets. Everyone was told it was time to cut down on the altitude more than once. You should always be prepared with smaller motors to fly. Be prepared for the next time.

Safety starts with you. Next time you are preparing your rockets for flight, take a moment and check the following items: Are the fins about to fall off? Does the motor hook still hold the motor securely in the rocket? Is the shock cord and shock cord anchor still in good condition? Is the launch lug still securely glued to the airframe? Do I have enough flame retardant wadding? (DO NOT USE toilet paper or paper towels, it will burn!) Is it time to replace the melted parachute or streamer? All of these items are usually forgotten on launch day, but they all play an important part in a safe flight.

I saw a lot of parawads (parachutes that don't open) at the last launch. To mitigate this problem, consider storing your parachutes out of the rocket and hanging on a hook. If you are using the plastic parachutes that come with Estes and Quest, lay them flat on a table and put a very light coating of talcum powder on both sides. The talcum powder will make the surface slippery, which helps the parachutes open up. Then fold the parachute when you are ready to fly. Alternately, you can get a nylon parachute from TopFlight. I think the smallest parachute is 8 inches, and the standard sizes are available.

Let's fly smart and safely. Up fast, down slow.

David

Building a BIG Rocket?

If you're working on a REALLY BIG rocket then you might want to check out the special cameras available at www.lomography.com. They make wide-angle cameras that expose your image over several frames of 35mm or 120 film. You won't have to lose any of the detail in your next project!

Three frames of 35mm film to capture this rocket? No problem! But how many frames would you need for a Mean Machine?

LUNAR'clips *2013*
Livermore Unit of the National Association of Rocketry
Volume 20, Number 1
January-February 2013

Ryan Coleman NAR #59361 LUNAR #1672 LUNAR-FUN-4 December 2012 and - January 2013

We had a lot of fun at LUNAR-FUN-4, held in December and January at Snow Ranch! In December, the fog was in for most of the day, so very few flights were made, but some crazy people flew spot landing when they couldn't see the spot from the launch pads! Later the fog lifted and a few duration flights were flown.

Rocket Families: Reese, Kira (hiding!), Cody and dad Michael Tran, with Tracker Andy and dad Tom Desmarais in the background, while Ryan does paperwork.

January was a more beautiful day for flying, so we set up trackers and got all of our tracked flights in. The Set Altitude goal was 160 meters (528 feet), so all of those flights also qualified for the LUNAR 1/10 Mile Wall. Cody Tran was first in A division (and beat his dad!) at 133m with a kit-bashed Estes Gold Strike/Chrome Dome on a C6-3 and Reese Tran was second. Wes Freeman was first in C division at 148m with his LOC Ezi-65 on a G53FJ-5, while Tom Desmarais was second and Michael Tran placed third. However, no one challenged Tim & Eric Robinson's 1/10th mile record of 506 ft set on 6/23/12.

We also flew 1/2A Altitude. This event sounds simple, but is very challenging to put a rocket powered by a single 1/2A motor as high as you can. In A division, Kira beat out her brothers by a few meters, she even tied her dad Michael flying in C Division! In C Division, Jim Bassham won top honors with a rocket made from blackshaft tubing and a nice piston start. Ryan Coleman and Tom Desmarais flew 1/2A Streamer models to okay results. Jack Hagerty attempted to fly a 40 year old Estes Mosquito in the event, but in 1/2A Altitude you can't eject a motor 'bare' without a recovery device of some sort. Jack attempted to tie/tape the motor to a piece of string taped to the model, which unfortunately broke. After finding the 40 year old model, Jack decided not to risk it to fly again.

<*Jack, hiding behind the shades*

Jim Bassham and Tom Desmarais deserve extra honors for tracking every flight, with an almost perfect record of tracks closed!

In Open Spot Landing A Division , Reese Tran edged out his siblings and Aidan Wise. All flew kits and the wind/fog made it challenging. Ryan Coleman won C Division with a distance of just 2 meters, made in the fog when you couldn't see the spot from the launch pads. Jim Bassham scored 8 meters, also in the fog. Many C Division entrants misjudged the wind, the fog, or their own model and scored about 50 meters or "FAR".

In Predicted Duration, the goal is to keep your model in the air exactly as long as you predict, but you must predict 30 seconds or more. Kira again beat out her siblings, with a 20% accuracy guess off 48 seconds. Kevin Wise rounded out the entrants with a 48% accuracy guess off 55 seconds. Things were much more heated in C Division, with Jim Bassham scoring 2.08% error ahead of Ryan Coleman scoring 2.7% error. Michael Tran scored 16%, besting all his children but not quite besting the ridiculously low scores of the other C Division entrants.

1/8A Parachute Duration Multi-Round is a strange event, it requires deploying a parachute out of a model powered by a

single Quest micromaxx motor. These motors are tiny, and the models are also tiny and light! This is a NARAM event so it is important practice for those thinking of going to the national championships. Jim Bassham put in 3 good flights including a MAX of 40 seconds on his first flight. Ryan Coleman and Tom Desmarais also flew but had deployment problems on some flights. Getting the tiny parachutes to open is hard!

A Rocket Glider Duration is a fun event where you must get a glider to go up and down in a single piece on an A motor. Jim Bassham won the event with two solid flights, but Tom Desmarais had the best single flight but DQed his first flight. Ryan Coleman flew a backslider, essentially a rocket made with 1 long tube, a hole punch, a nosecone and 3 fins.

Concept Sport Scale only saw two entrants. Jack Hagerty judged this event, which he in some ways is responsible for starting, as the models must be based on futuristic rockets from fiction or unbuilt plans made by serious rocket scientists. Jim Bassham flew an Argus (a single-stage to orbit concept from Georgia Tech), well finished and took first place. Jonathan Sato flew a Mars Snooper, but couldn't catch Jim's finish and the Estes Mars Snooper doesn't exactly match the source material.

Concept Sport Scale: Jonathan Sato's Mars Snooper (l) and Jim Bassham's Argus ready for launch.

Many contestants were pleased by the kit prizes given out at the end of the day. Some competitors were jumping for joy and showed up at the next launch with their kits built and ready to fly!

We're finishing our last LUNAR contest at the April Snow Ranch launch, then we're flying our last regional of the contest year at TCC's Dairy Aire.

And here are prizes for the contest!

Is this a hot deal or what? These are just some of the kits that you could win by entering a LUNAR contest! And contest entry is FREE!

Upcoming Contest Schedule:

At TCC's Dairy Aire launch we'll hold our last contest of the season, which will be a lot of fun too!

All of these contests will have kit prizes for participants, donated by LUNAR and Tom Desmarais. These are pretty nice prizes, and participating is free. Almost any rocket qualifies in several of the events

Events in the fall are still totally up for scheduling. If there's an event you're curious about, let the Contest Director know and we'll try to squeeze it in.

As always, contest information is on the web:

http://rgc.name/prcb/meets-current.html
www.lunar.org/wiki/tiki-index.php?page=Upcoming+Contests+Summary

LUNAR'clips *2013*
Livermore Unit of the National Association of Rocketry
Volume 20, Number 1
January-February 2013

Launch Reports

Statistics by Jack Hagerty, LUNAR #2, NAR #55105

Editor's note: many folks post photos to the picture gallery. You can find the gallery by clicking "Gallery" on the left side of the LUNAR website main page (http://www.lunar.org), or directly from http://www.lunar.org/gallery2. And don't forget to add your name and comments on your photographs!

January 5th Snow Ranch

Jack Hagerty wrote: For January, the weather was quite nice at the ranch today. The temperature (mid-50's?) was OK when the wind didn't blow, which it didn't most of the time, and the ground was firm enough that we didn't sink much past our knees.

Total Flights:	232	
Motors consumed:	251	
Total Impulse expended:	36,051 - A mid-range "O"	
Total Fliers:	119	
Average Impulse		
Per motor:		143.6 - A mid-range "G"
Per flight:		155.4 - A high-range "G"
Safety Statistics:		
Total Flights:	232	100.0%
Successful:	229	98.7%
Motor Failure:	0	0.0%
Unstable:	2	0.9%
Recovery Failure:	1	0.0%

Ryan wrapped up our LUNAR Fun-4 contest that started last month, which accounted for all of the flights below "A".

It seems that folks were coming out of the woodwork to do their HP certs. Some have been waiting since June (too foggy last month). There were 10 L1 cert flights and 3 L2. There was one TARC team out there that made a few test flights, plus the UC Davis SLI team (being mentored by Steve Kendall) made a "K" flight.

Here are the names of all the Cert fliers along with their models. The cards don't list whether or not they were successful:
L1 Attempts were made by Tim Robinson, LOC Athena on an H151; James Buscue, Madcow Cowabunga on an H120; Jack Waterson, PML Quicksilver on an H73; Charles Hymes, Madcow Sun Dagger on an H128; Tony Slajs, Madcow Rush Job on an H 148; Dennis Yeh, LOC Sobriety on an H128 (I'm sure that his name for the rocket, not the kit name!); Winton Davies, Madcow Piranha on an H238; Robert Belknap, Pem Tech King Kralan on an H143; James Ryan, AeroTech Lightning Bolt on an I200; and Mark Demmers, Madcow Torrent on an I303.

L2 attempts were: Mark Isabell Giant Leap Vertical Assault on a J500; Matthew Bowman, Hester (scratch built) on a J500; and Ross Talarico, PML Nimbus on a J270

January 19th NASA AMES

Cancelled? Air operations? Get that big plane off our field!

It's not fair, but sometimes the powers that be want to use the airfield as an airfield instead of as a training center for bright young scientists. OK, we'll make up for it next month! But before we go back to Moffett, let's talk about….

February 2nd Snow Ranch!!!

Jack Hagerty wrote:

Drum roll please!

As many of you know, we were creeping up on our two-millionth Newton-second of impulse flown at club launches at the end of last year. So, before I display the totals for Saturday, here are the cumulative club totals since March 1993 (our first launch as a chartered NAR section):

Number of Launches	229
Total Flights	44,660
Motors consumed	48,034
Total Impulse	2,037,111
Average Impulse Per motor	42.4
Per flight	45.6

Those are pretty impressive numbers! Thanks to Casey Barker and our other HP fliers, we pushed more than double the average impulse for a Ranch launch. And just for planning purposes, at our current rate of about 3,000 flights/year we should pass 50,000 sometime in late 2014.

Editor's note: So what does two million Newton seconds mean in rocket terms? According to Lynne Kissel, LUNAR #009 and a retired researcher at LLNL, 2 mega Ns is sufficient to land a 134 kg payload on the surface of the MOON!! (That's ignoring the weight of the rocket, fuel, etc, of course!). WOW!

OK, here are the numbers from February 2nd:

Total Flights:	306	
Motors consumed:	330	
Total Impulse expended:	56,117 - A low-range "P"	
Total Fliers:	171	
Average Impulse		
Per motor:		171.1 - A low-range "H"
Per flight:		184.6 - A low-range "H"
Safety Statistics:		
Total Flights:	306	100.0%
Successful:	286	93.5%
Motor Failure:	4	1.3%
Unstable:	3	1.0%
Recovery Failure:	13	4.2%

February 16th NASA AMES

So what do we do for an encore after launching 2,000,000 Ns?

How about hosting swarms of rocketeers at NASA AMES two weeks later??

- **9 TARC teamswith 87 people!**
- **88 Scouts**
- **A bunch of TGIF'ers!**
- And the normal bunch of LUNARtics (if LUNARtics can be called normal)!

For a total of 525 people. (Several groups were assigned specific staggered times to attend so that we could stay under our 350-person limit)

So here are the numbers:

Total Flights:	434	
Motors consumed:	439	
Total Impulse expended:	4,933 - A high-range "L"	
Total Fliers:	525	
Average Impulse		
Per motor:		11.2 - A low-range "D"
Per flight:		11.4 - A low-range "D"
Safety Statistics:		
Total Flights:	434	100.0%
Successful:	424	97.7%
Motor Failure:	2	0.5%
Unstable:	2	0.5%
Recovery Failure:	6	1.4%

That's right:

Four hundred and thirty four flights!!

All the clip boards are full and kids are lined up ready to launch their rockets. Now it's time for Tony to work his magic!

And here are a couple of the TARC teams readying their rockets for launch:

LUNAR hosted NARCON 2013 and everyone seemed to really enjoy themselves. There will be full-blown coverage of the event in an upcoming issue of Sport Rocketry so we'll just list a few highlights.

One of the important parts of NARCON is a series of technical presentations, and LUNAR attracted some great speakers. So many, in fact, that we had to break the talks into two groups. That made it impossible to see all of the talks, so Jeff Dillon of PureVideo.tv created videos of the talks. Here are the links:

John Beans - Trends in Rocket Electronics
http://www.youtube.com/watch?v=1OgUF-Ky-Os

Chuck Piper - Early Bay Area Rocketry
http://www.youtube.com/watch?v=7KI67NTGOos

Will Marchant - Pegasus launch for NASA's NuSTAR
http://www.youtube.com/watch?v=ACCkFI0jwQ0

Gene Engelgau - Rocketry Recovery Technology
http://www.youtube.com/watch?v=idcUGlXo-AM

Casey Barker, Ken Biba, Dave Raimondi - Aeropac 100K/Carmack Prize
http://www.youtube.com/watch?v=2f6yomcfi1g

Bill Colburn - Hybrid Rocketry/Early Bay Area Rocketry
http://www.youtube.com/watch?v=M3m_LwKMrpY

Tony Cooper - Pinata Rocket
http://www.youtube.com/watch?v=44x9cVO5XWs

Patrick McCarthy - Cape Canaveral Spaceport: The Next Ten Years
http://www.youtube.com/watch?v=H0uNwy7mp60

Trip Barber - International Rocketry Competition
http://www.youtube.com/watch?v=ky_N6ndMqjk

Ken Biba, Lynn Cominsky, Dave Raimondi - ARLISS
http://www.youtube.com/watch?v=eAfH1QC7VFQ

NARCON also included a tour of the Nike missile base in Marin, and Jeff recorded it (in 3 parts). Thanks very much, Jeff!
http://www.youtube.com/watch?v=DngSaNPyXCs
http://www.youtube.com/watch?v=f_oLTjOU_Qw
http://www.youtube.com/watch?v=OeaUfdN62Hs


Nike-Hercules comes out of its silo at the missile base in Marin County.

Saturday night there was an excellent turnout for the banquet, highlighted by the keynote speaker: our very own Steve Jurvetson.

Dave Raimondi was eager to clean out his garage, so after Steve's talk we had a big raffle. Here's some of the loot that was given away:

LUNAR'clips *2013*
Livermore Unit of the National Association of Rocketry
Volume 20, Number 1
January-February 2013

So Many People to Thank!

Narcon 2013 was a big success, but it didn't 'just happen." A lot of talented, hard working people contributed their time, effort, and skills to produce our LUNAR extravaganza.

Planning for NARCON 2013 took a long time. As far back at December, 2011, Ryan Coleman, Jack Hagerty and others were looking for venues. Eventually Cliff Sojourner and Charlie Whitman toured several local sites and they put together the proposal which led us to the Biltmore Hotel. By April, 2012, Cliff had negotiated the final proposal which was sent to, and approved by, the NAR BoD. Game On for NARCON 2013!

An event this big needs a director. Sam Fineberg stepped up and did a fabulous job of keeping track of all of the activities, accommodations, meetings, trips, and lots of other things. Helping Sam in the "lots of things" department were VP Tony Cooper and President Dave Raimondi.

The heart of NARCON is an interesting and challenging variety of technical presentations. That means we needed speakers, of course, and several LUNARtics stepped up to volunteer. Not everything rocketry-related happens in our backyard, however, so Jack Hagerty, Ryan Coleman and Charlie Whitman contacted other distinguished candidates and worked on speaker coordination. They did a great job! If you missed any of their talks, links to videos are available on the previous page.

NARCON needed a logo so Jack Hagerty and Ryan Coleman worked together to develop a memorable one. Jack then used the logo to create a flyer which he distributed at NARAM to begin generating interest in NARCON 2013. Later on Sam Fineberg used the logo in a T-shirt design which was available at Zazzle.com, and Jim Flis of FlisKits created a neat NARCON 2013 sticker (and donated enough stickers for everyone!).

Nothing gets done without money. Sheryl Cooper. 'Nuff said!

Side trips are an interesting addition to any conference and NARCON had some great ones. Bruce LaFetra helped with planning, along with Marcus Krause for the CHM tour, Jack Hagerty for the Hiller museum tour, and Alyn Thym for the Nike tour (which was so well attended that they broke us up into two groups!). Some lucky attendees were able to view Steve Jurvetson's amazing collection of rocket memorabilia.

You've seen the big, burly guys ejecting unruly fans at football or baseball games? That's the job of the Event Staff, and NARCON 2013's big, burly guys (and gals) were coordinated by Greg Kurlinski. Other Event Staff members were Steve and Durelle Kurlinski, Larcie Fitzmorris, Merelan Jones, and Myrriah Rivera.

Several people worked on donations. Marcus Krause and Mike Gentile worked with vendors and Casey Barker arranged a donation from Google. The large number of donated rocketry items fueled a huge raffle!

The large number of speakers meant that the attendees could only attend half of the talks. Videographer Jeff Dillon and his assistant. Robert Belknap, solved the problem by recording the sessions. They did a great job!

SWAG!

The goal of the professional conference attendee is to collect some free stuff and NARCON 2013 didn't let us down. Among the goodies in that distinctive green Bay Area Rocketry bag were:

- An ESTES 'Classic Series' Photon Probe kit and an ESTES catalog
- Lots of QUEST info, including a 25% off discount coupon (good until Dec 31st!).
- FlisKits included their nifty NARCON 2013 sticker
- Another nice sticker from Bay Area Rocketry
- and AEROTECH provided a catalog with all of their products

Thanks, everyone, for the SWAG!

Bringing home the SWAG!

LUNAR'clips *2013*
Livermore Unit of the National Association of Rocketry
Volume 20, Number 1
January-February 2013

The Flying Crayons

William Orvis, LUNAR #309

A lot of people I know are flying crayon rockets; clusters of crayons; crayons in a box; you know the ones I mean, where you get a crayon bank, add fins, an engine mount and make it into a rocket. There are even kits available for doing the conversion.

Not to be outdone, I decided I needed to get into the crayon craze. However, no fake crayons for me. I am going to do this with the real thing. Here you see my initial fleet of crayon rockets made from real crayons.

So, what do you need to build real crayon rockets? Well, real crayons, of course, and a ¼ inch drill. Add to that a little balsa wood, a launch lug, some paint and glue and you are there. Get a whole box of crayons as you are going to screw up a few figuring out how to drill a Micro Maxx sized hole in a crayon that is just slightly larger in diameter than the engine.

Building the Crayon

Step 1, wrap some tape around a ¼ inch drill bit, 1 inch back from the tip to mark the depth you need to drill to fit a Micro Maxx engine in the back of a crayon. Wrap a little around your fingers as well to protect them from the drill.

I tried drilling a larger hole that would fit a Micro Maxx engine tube, but there was just not enough crayon left after the drilling so I had to forgo the engine mount and insert the Micro Maxx directly into the wax. I was a little concerned that the heat of the engine might melt the wax and cause problems, but it turned out to not be a problem.

Step 2, Hold the crayon down on a steady platform and carefully drill down the center of the bottom until you reach your depth mark.

Try to not drill your fingers in the process. It gets blood on the crayon and you have to throw it out and try again. This is why you have a whole box of crayons to work with. Actually, if you use a red crayon, you can get away with drilling your fingers and not have to replace the crayon. Unfortunately, there is only one red crayon in a box.

Drill slowly and carefully, as you can see, there is not a lot of crayon between the drill and the paper. Also keep in mind that your fingers are just on the other side of the paper, and the paper is, well, paper-thin. When you are done, test fit a Micro Maxx engine. It should go in and fit snugly but not bind.

Step 3, Make the fins. I started with some 1/16 balsa and cut some ½ x ½ squares. Using sandpaper, I shortened the tip edge by about 1/16 of an inch to make a trapezoidal fin.

Step 4, Glue the fins onto the paper at the bottom of the crayon. You probably figured this out on your own but if you put the fins on the pointy end, it does not fly very well.

Step 5, Glue on a ¼ inch long Micro Maxx launch lug about 1/3 of the way up the side of the crayon.

Step 6, Paint the fins and you are done. You don't need to paint the body as that part is already done for you by the Crayola Company.

Flying the Crayon.

Stick in a Micro Maxx engine and an igniter and you are ready to go. Hold in the igniter with a toothpick.

One of the more useful features of a crayon rocket is that you can use it to fill out your flight card. No more searching for a pen to fill it out, just grab your rocket and write away.

So, how does it fly? The crayon rocket is probably the best flying of all the Micro Maxx rockets I have ever built. Most Micro Maxx rockets tend to be a little unstable and fly a little strange. The crayon rocket flew straight and stable and fast. I originally thought the weight would be a problem as the crayon is a bit heavy, but the increased stabilization brought on by the weight caused a straight, stable flight that easily overcame any altitude losses because of the weight.

It actually flew to about 150 feet, ejected the engine and plunked back down on the ground.

Who says you cannot make a rocket out of a real crayon. I did lose a little of the wax but it will fly again.

Amazing, but Heartbreaking: Martin Hall Captures a CATO

February at Snow Ranch:

The motor is producing thrust, but you can see that the nose cone has already started moving forward (the blue stripe is masking tape)

Now the nose cone is ejected.

And the chute and the remainder of the fuel continue to burn.

A sad end to a beautiful rocket!

LUNAR'clips *2013*
Livermore Unit of the National Association of Rocketry
Volume 20, Number 1
January-February 2013

Who you gonna call?

LUNAR HOTLINE (925) 443-8705
PRESIDENT
David Raimondi, *president@lunar.org*
VICE PRESIDENT
Tony Cooper, *vp@lunar.org* (510) 589-5292
SECRETARY
Sam Fineberg, *secretary@lunar.org*
TREASURER
Sheryl Cooper, *treasurer@lunar.org*
MEMBERS AT LARGE
Alan Thym, *bmal1@lunar.org*
Charlie Wittman, *bmal2@lunar.org*
EQUIPMENT
Bill Orvis, *equipment@lunar.org*
MEMBERSHIP
Tony Cooper, *membership@lunar.org*
NEWSLETTER
Wes Freeman, *newsletter@lunar.org*
CALPYRO III
Rob Tashjian, *calpyro@lunar.org*
CONTEST DIRECTOR
Ryan Coleman, *contest@lunar.org*

Who We Are...

LUNAR is the Livermore Unit of the National Association of Rocketry, Section #534

LUNAR is located in Livermore, California, about fifty miles southeast of San Francisco. We are organized to supply a safe, educational and legal means of furthering the hobby of model and high-powered rocketry in northern California, to aid and encourage the development of all club members' knowledge and expertise in the area of rocketry, to promote youth education and community involvement, and to engage in scientific, educational and related activities. LUNAR is open to rocketry hobbyists of all ages to further the sport and science of hobby rocketry within the NAR (National Association of Rocketry) and Tripoli safety codes. These codes have allowed hundreds of millions of model rocket launches by hobbyists since the late 1950s without serious injuries.

LUNAR also supports assorted rocketry activities of community youth groups. We have hosted launches (and in some case building sessions) for the Boy Scouts, Girl Scouts, 4H, YMCA Adventure Guides, the GATE program, and LARPD Science Camp.

Launches

Section launches are usually held from 9:00 a.m. to 1:00 p.m. on the **third Saturday of the month**. Generally these are *sport launches*, although we occasionally hold sanctioned *contest launches* for points in the NAR national contest standings, *theme launches* where we focus on a particular class of rocket, and *night launches.*

Launches at Moffett field are limited to G engines and a maximum altitude of 1000 feet. No more than 350 people can be on the airfield at one time. Outreach groups (Scouts, schools, etc) please contact the President and Vice President in advance.

LUNAR's Snow Ranch launch site accommodates all rockets from 1/4-A to M motors, with a 15,000 foot maximum altitude. The LUNAR Board requests notification of L and M flights a week before the launch date. Contact the LUNAR Members At Large directly, or post a message on *officers@lunar.org*. or lunar-general@googlegroups.com.

The LUNAR Hotline - (925) 443-8705

The Hotline is available to provide up-to-date event information. It's a good idea to call our Hotline to verify the date of the next launch or meeting.

On launch days, the Hotline recording is updated by 7:00 AM to reflect the Go/No-Go status of the launch. On launch days with questionable weather, it is especially important to call the Hotline to get the latest information. You can also leave messages on the Hotline.

Meetings

Section meetings are held bi-monthly. These meetings cover general section business, and typically include presentations by club members or other experts on some aspect of the hobby, ranging from simple building tips to advanced science and engineering principles. Officers' meetings are held bi-monthly, alternate months from the section meetings, and typically concern administrative details.

The LUNAR annual meeting is held during the first quarter of the calendar year at a time and place announced to the membership. At this meeting, officers are elected and other club business is conducted.

World Wide Web site!

LUNAR maintains a Web site at *http://www.lunar.org*

You will find a lot of stuff to see on the web site, and it always has the latest information about LUNAR and our activities. For example, you'll find our latest launch and meeting calendar, directions to our launch site, a gallery of photos from past launches, the on-line issues of the LUNAR'clips (the section newsletter), our section bylaws, pointers to member rocket pages, pointers to other rocket and space related information on the Internet, … and lots more!

Membership

Your membership fees support the costs of launch operations, equipment maintenance, meetings, newsletter, outreach events, and other public services. Join LUNAR now! Yearly fees for a family are $25.

2013 LUNAR Calendar

Launches at Snow Ranch or NASA/Ames Moffett Field (see website *www.lunar.org* for directions)
Meetings at Livermore Public Library, Community Room B, 1188 South Livermore Avenue, in Livermore.

WARNING! Times and dates are subject to change with little notice. Setup starts an hour before the listed time and teardown and packing up usually takes an hour after the listed time. For launch confirmation call the LUNAR Hotline (925) 443-8705 after 7 AM on launch day. Visit the LUNAR web site at *www.lunar.org* for the latest information.

January	February	March
Jan 5, 9am: Snow Ranch Launch & Contests Jan 17, 7:30pm: Club Meeting: Elections ~~Jan 19: Low Power Launch, Moffett/Ames~~ ~~Jan 26: Low Power Launch, Moffett/Ames~~	Feb 2, 9am: Snow Ranch Launch Feb 14, 7pm: Board of Directors Meeting Feb 16: Low Power Launch, Moffett/Ames Feb 21-24: NARCON	Mar 2, 9am: Snow Ranch Launch and contests Mar 14, 7:30pm: Club Meeting Mar 16: Low Power Launch Moffett/Ames Mar 17 & 24: TARC Qual, Moffett/Ames
April	**May**	**June**
Apr 6, 9am: Snow Ranch Launch ~~Apr 18, 7pm: Board of Directors Meeting~~ Apr 20: Low Power Launch, Moffett/Ames	May 11: Low Power Launch, Moffett/Ames May 16, 7:30pm: Club Meeting	Jun 20, 7pm: Board of Directors Meeting Jun 22, 9am: Low Power Launch, Moffett/Ames
July	**August**	**September**
Jul 18, 7:30pm: Club Meeting Jul 20, 9am: Low Power Launch, Moffett/Ames	Aug 15, 7pm: Board of Directors Meeting Aug 17: Low Power Launch, Moffett/Ames	Sep 19, 7:30pm: Club Meeting Sep 21: Low Power Launch, Moffett/Ames
October	**November**	**December**
Oct 24, 7pm: Board of Directors Meeting Oct 26: Low Power Launch, Moffett/Ames	Nov 2, 9am: Snow Ranch Launch Nov 16: Low Power Launch, Moffett/Ames Nov 21, 7:30pm: Club Meeting	Dec 7, 9am: Snow Ranch Launch Dec 19, 7pm: Board of Directors Meeting Dec 21 Low Power Launch, Moffett/Ames

LUNAR
c/o Membership Chair
31120 Chicoine Ave.
Hayward, CA 94544-7432