



## September 19 LUNAR Meeting: Mike Sunseri on Finishing Rockets

At the September 19<sup>th</sup> meeting, Mike Sunseri will talk about "how to build and decal and paint rockets in the low- to mid-power."

After the Final Robertson Launch, the happiest of us had won auctions on some of Mike's *fabulously* finished rockets. Now you can learn a few tricks from Mike to apply to your next rocket project! (*And you can win everlasting fame and fortune by sending a quick write-up of your rocket build and finish to the editor (newsletter@lunar.org)!)*

The meeting starts at 7:30 PM with a short business agenda. LUNAR meetings are held at the Robert Livermore Community Center, 4444 East Avenue in Livermore. See the LUNAR website for detailed driving directions.

## Next LUNAR Launch

At press time, the details of the next LUNAR launch were undecided. Stay tuned! Check the website (<http://www.lunar.org>) for updates. Subscribe to the Announce email list to get information about launches and other LUNAR club business. More information about email lists at: <http://www.lunar.org/docs/lists/lists.shtml>

LUNAR will launch at Snow Ranch as scheduled, in the wet season, perhaps as early as November. Do a rain dance!

## In This Issue

September 19 <sup>th</sup> Meeting.....	1
Range Head .....	2
Launch Site Report .....	2
July 18 <sup>th</sup> LUNAR Meeting Report .....	3
Note From The Editor .....	3
LUNAR at the Maker Faire.....	3
Robertson Park Final Launch Report .....	6
Thank-Yous.....	8
Summary Statistics .....	9
Auction Report .....	9
Contest Report.....	9
Coffee Can K Motors .....	12
The Old Rocketeer .....	14
Who we are.....	15
LUNAR Calendar.....	16



Robertson Park Final Launch, June 30<sup>th</sup>, 2007



Maker Faire, May 19<sup>th</sup>, 2007



## Range Head

Craig Saunders, President, LUNAR #890, NAR #76743

What a blast the Final Robertson Park launch was. I had a great time hanging with all the folks that showed up! The old-timers, the newbies, and the LARPD folks... It was cool that so much stuff was going on; it was kind of difficult to decide what to do next. My girls came and brought their rockets, so I got a (rare) chance to fly with them. Man, what a way to close out Robertson... Been there, done that, got the t-shirt!

I've seen the rest of the newsletter, so I won't try to heap more praise onto all the volunteers who made the launch so enjoyable. But I do want to highlight Steve Kendall and Dave Cummings, who many months ago made the mistake of making some suggestions while I was in listening range... Although Steve's a veteran LUNAR volunteer, he's the first to figure out the whole t-shirt thing. And while Dave didn't start out with a lot of LUNAR volunteer experience, he certainly had a bunch by the time he was finished organizing the Robertson Park farewell party. The reason that LUNAR is such a great experience is because of all the volunteers such as Dave and Steve and the contributions they make.

## Education Director

Speaking of meetings (which I was before this column was edited,) we need to find a new Education Director. I've been fulfilling that role for a while but LUNAR needs someone dedicated to organizing and promoting our club meetings. And, I need more time to work on other stuff like finding new launch sites.

More specifically, the Education Director will take care of the following things:

- Maintain a list of potential topics and speakers & solicit suggestions for new topics and speakers.
- Schedule topics & speakers for specific meetings.
- Work with the newsletter editor and web master to publicize meetings.
- Co-ordinate meeting arrangements so that speakers have what they need.

It sounds like a lot of work but we're really only talking about 6 meetings per year. And we're not talking about a lot of fancy preparation required. And we already have a decent list of potential topics, so you don't have to start from scratch. And, although everyone will be happy to give you their opinions and suggestions, you will have some influence in having topics that you're interested in. 🤔

So if you're interested, please drop me an email at [president@lunar.org](mailto:president@lunar.org), or call me (925-324-2400). LUNAR could really use the help!

## Search for new launch site

So Cliff, our 'Clips editor, is always after me to turn in the Range Head column. I've figured out that what he really wants is the latest news on the launch site search. Well, that's so important that it deserves it's own column. So look elsewhere in 'Clips for the latest on new launch sites.

Suggestions, comments and offers of assistance are always welcome. ☺ Just email me at [president@lunar.org](mailto:president@lunar.org), or call me 925-324-2400.

## Launch Site Report

Craig Saunders, President, LUNAR #890, NAR #76743

With the final launch at Robertson Park now a pleasant memory, it's time to look forward to the wonderful opportunities awaiting us as we discover new places to fly rockets.

Several LUNAR members attended the Independence Day rocket celebration in Patterson. The Patterson Sports Complex/Park is a nice place to launch rockets on the same scale as Robertson Park. We hope to be able to set up a launch there in the near future. (We are still working on dates and other details.)

As mentioned previously, we still need to investigate using the abandoned Crows Landing NALF (Naval Auxiliary Landing Field.) With 7800+ feet of runway, it would be an excellent launch site. However, it is now controlled by Stanislaus County and they have rebuffed previous efforts to conduct launches there. So we have to consider this a long-shot.

In Livermore, we are looking at 3 different locations north of 580, off N. Livermore and Vasco Roads. We are still at the initial stages with these properties, so I don't want to jinx it. We also are trying to get introductions to a couple of sites east and south of Livermore.

On a less active tract, we haven't given up either on NASA Ames and a couple of locations in Newark...

That's it for now. When there's more concrete news, I'll be sure to post it on the website and the email lists... Suggestions, comments and offers of assistance are always welcome. ☺ Just email me at [president@lunar.org](mailto:president@lunar.org) call me at 925-324-2400.



## LUNAR Meeting Report

Craig Saunders, President, LUNAR #890, NAR #76743

### Minutes From 18 July 2007 LUNAR Members Meeting

At the July 18<sup>th</sup> meeting, the membership agreed to amend the By-Laws in the following ways:

- Change the Membership Year from Jan 1<sup>st</sup> – Dec 31<sup>st</sup> to June 1<sup>st</sup> to May 31<sup>st</sup>.
- Eliminate the pro-rating of dues over the membership year. (ie – Renew at the beginning of the year to get the full value of your dues!)
- Combine the Junior and Senior membership categories into a single Junior membership for Twelve (12) to Seventeen (17) years of age.
- Allow the Board of Directors to change membership dues and flight-card fees at an official LUNAR meeting. (These are no longer called out in the By-Laws.)

Subsequently, the Board voted to affirm the following membership dues:

- Youth (to age 11) and Junior (ages 12-17): \$6/year.
- Adult (age 18 and over): \$25/year.
- Contributing Membership: an additional \$20/year (total is \$26/year for youth and junior, \$45/year for adult)

The membership of all current members as of July 18<sup>th</sup> was extended from 12/31/07 to 5/31/08 to match the new membership calendar.

This is only the second time that LUNAR has raised membership dues. The previous dues increase was approximately nine years ago.

The updated By-Laws will be posted on the LUNAR website.

At the meeting, LUNAR's President, Craig Saunders, reviewed the financial background related to these changes and answered questions. If you have any questions, concerns or suggestions regarding these changes, please feel free to contact Craig directly.

After concluding the club business, everyone brought out their favorite altimeters and shared what they like about them. We got to examine a wide selection of altimeters and learn what works (and doesn't work) for each. There was also a lot of discussion

on how to mount them in payload bays, care and feeding of batteries, and other useful information.

## Note From the Editor

Cliff Sojourner, LUNAR #1212, NAR #82864

Volunteers make the greatest things in the world. As I read and re-read to layout and format the articles in this issue, I have come to deeply understand how LUNAR embodies the volunteer spirit. Look at our huge outreach efforts, which wouldn't happen without the dedicated, passionate efforts of LUNAR members. Maker Faire was just the tip of the iceberg; beneath the waterline much more is happening, all the time. Look at the Robertson Park Final Launch effort: one of our largest launches ever, one of the smoothest, with four separate special events happening at the same time! What a lot of work, and what great rewards! I can't say enough, so I'll say "good people, thanks for the honor of working with you." Come fly with LUNAR soon and find out for yourself the special thing makes the best rocket club around!

## LUNAR at the Maker Faire

Craig Saunders, President, LUNAR #890, NAR #76743  
Cliff Sojourner, LUNAR #1212, NAR #82864

How to describe Maker Faire? Well, the official answer is "A two-day, family-friendly event that celebrates arts, crafts, engineering, science projects and the Do-It-Yourself (DIY) mindset. It's for creative, resourceful folks who like to tinker and love to make things. We call them Makers." Kind of like a G-rated Burning Man for geeks.

45,000 "Makers" attended this year's Maker Faire (May 19-20<sup>th</sup> at the San Mateo Expo Center), with over 400 exhibits to wander through, watch and participate in. A fabulous variety of exhibits showed everything from Power Tool Drag Races, to a Victorian RV (Okay, what you would get if you put a Victorian house on top of a VW microbus...), to a robot that played a full drum kit, to various excuses to use propane and other flammable materials. If it could be built, it was probably at Maker Faire. Rube Goldberg would be very much at home here.

Once again, LUNAR (NAR section #534) and AeroPAC (TRA Prefecture for Northern California and Northern Nevada) were invited to exhibit at the Faire. Last year, we were neighbors in the main exhibit hall. The main hall location generated a lot of traffic for us, as many people walked by, saw our display of rockets, stopped to admire and chat a bit.

This year, LUNAR and AeroPAC shared "The Rocket Room", just off the Robots Hall.





## LUNAR'clips 2007

Livermore Unit of the National Association of Rocketry

Volume 14, Number 4

June-July 2007



Framing the outside entrance doors, we set up Aidan Sojourner's 5.5" and 10" Nike Smokes, and Eric Ebert's large Cherokee-M, to attract folks into the Rocket Room.



Along the hallway, we set up a promenade of large rockets such as Jamie Clay's unique Mercury Joe, Conner Kuhn's 5.5" Mercury Redstone, Eric Ebert's giant 10" Polecat Saturn V, Peter Clay's three sizes of Black Brants, and others.

LUNAR showed three tables of low-power and mid-power rockets, motors, books, and movies. AeroPAC exhibited

additional high power rockets and other parts and components that provided excellent visual aids to explain our hobby to the public. LUNAR and AeroPAC had rocket movies playing continuously.



The LUNAR booth had many, many model rockets on display. All our volunteers showed some of their rockets, but we also had Mike Sunseri's collection of finely-finished donations to the

LUNAR auction on hand. Some of the more commented-on displays included the Estes PortaPotty models (which folks didn't believe would really fly), Aaron Stanley's HPR carbon-fiber wrapped rocket (which prompted questions about the CF & provided a visual aid for HPR topics such as electronics and dual-deployment), John Hogan's FedEx shipping container model (he made at the show), Tom Desmarais' collection of unusual rockets (including the pyramid of Styrofoam cups rocket that has flown many times at Robertson Park.)



Although the "Rocket Room" didn't get quite the same level of pass-through traffic as the main hall last year, we had more than enough room for all our displays and activities. And, after each Robot Combat contest finished, a wave of folks exited through the Rocket Room. Many people were attracted by the displays and stopped to find out about rocketry, watch a launch movie, or build a kit.

LUNAR's Build-It/Fly-It/Take-It is a big attraction at Maker Faire. This year many new Faire visitors participated. Some of last year's visitors came to our booth again to see what was new, some were excited about flying with us again. Last year, over the 2 days, we ended up building about 150 rockets. This year, we brought 300 kits and sold out mid-afternoon on Sunday. We probably could have sold another 50 or more kits if we had them.

This year, as last year, we used Quest kits. Several months prior to the Faire, we spoke with Nettie Hunsicker and the nice folks



## LUNAR'clips 2007

Livermore Unit of the National Association of Rocketry

Volume 14, Number 4

June-July 2007

at Quest about creating a special kit to deal with the requirements of flying at Maker Faire, in San Mateo, California: The rockets would fly & land in a small area of asphalt parking lot, with a large crosswind (typically 10 knots) and some trees. The rockets had to be buildable by novices in just a few minutes. Quest created the "Cyclone", a kit with the following features:



- Large diameter body to reduce altitude
- Plastic fincan to simplify building.
- Would fly well on A through C motors
- Streamers to reduce drifting, and for ease of preparation and reliability of deployment
- Plastic fins to land on the parking lot with less breakage.

The kits were inexpensive, so we could offer the kit with one A6-4 motor for \$5. The parts fit together nicely, so hobby knives and other tools weren't required. The kit's cardboard and plastic parts meant only plastic cement glue was required. Plastic cement sets up in 15 minutes, which is perfect for this kind of mass construction and flying.

Of course, launching the rocket is what makes building fun. This year, we had a fenced-off launch area in the parking lot, so we could leave the pads set up. We had enough room for 16 pads, with enough distance between them, so we could launch one rack while another was being set up.

The morning launch sessions were easy and fun, due to the small number of flyers and large number of available pads. The afternoon sessions were much more of a challenge, due to the large number of flyers, consequent long lines, and everyone (flyers and range crew) being tired and wanting to go home. But, watching rockets fly up in the air is fun for everyone. Hearing the "oooh's" and "aaah's" from the kids and parents made it all worthwhile.

Launching 300 of the same model on the same motor enabled us to dial-in the flight profile. After adjusting the launch rod angles, very few of the rockets landed in the trees or outside the visible local area. The Power Tools Drag Race folks were our neighbors. LUNAR Juniors Susie Cobb and Kevon Cooper recovered many rockets landing amongst all the power tools.

Stu Cobb and Tony Cooper served as LCOs, and gave all the kids a chance to push the button to launch their rockets. It's amazing how many people are needed to make our participation in Maker Faire successful. Between the booth greeters, build assistants, pad mothers and all the others, it really does take an army to make it happen. We were lucky to have the best volunteers, including:

Bryan Bajema  
Stu & Susie Cobb  
Tony, Sheryl, Crystal, & Kevon Cooper  
Tom Desmarais  
Charles Dillon  
Erik Gillig  
Jack Hagerty  
John Hogan  
Stefan Jones  
Erik Kleinschmidt  
Conner Kuhns  
Dave Risher  
Craig Saunders  
Cliff & Maddi Sojourner  
Aaron Stanley  
Charlie Wittman

So, what do we remember about Maker Faire? *CBS Sunday Morning* science & technology correspondent Daniel Sieberg made a 6 minute feature about the Maker Faire.



Two weeks later, the feature aired, and we got to watch LUNAR's own Kevon Cooper show Mr Sieberg how to build a rocket. When asked if he'd "like to go into a rocket science some day", Kevon responded "I already am a rocket scientist!"

With 300 rockets built and flown, 45,000 Faire attendees, and over 6 million viewers of the *CBS Sunday Morning* feature, hobby rocketry got some excellent outreach and exposure!





## Launch Reports

Jack Hagerty, LUNAR #002, 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://lunar.mtrd.com/gallery>. Some of my favorites are printed here, but many more are available online – maybe even a picture of your rocket. Or maybe you could post a picture of someone's rocket?*

### June 30, Robertson Park

Wow, I'd say we know how to go out in style!

Pretty impressive launch yesterday. The efforts of Craig and Tony to publicize this event really paid off. We had lots of early LUNAR numbers there including six of the nine "double-oughts" (members with single digit membership numbers). Specifically, we had Mark Weiss (#001), me (#002), H.W. "Bear" Neff (#005), Joe Mingoia (#006), Warren Massey (#007) and Eric Kleinschmidt (#008). Unfortunately, we weren't all there at the same time so we couldn't get an "old timers" group photos, but it was still cool. For the record, the other double-oughts are Kurt Peters (003), Joe Ciccone (004) and Lynn Kissel (009). I haven't heard from Kurt in over a decade, but last I knew he was living in Clayton (our club membership roster doesn't list an address for him anymore). Joe Ciccone left the state to change jobs about a year after LUNAR was founded. Lynn Kissel still lives in town, and I really though he might show up. Lynn was our first newsletter editor.

I noticed that most of the next ten members (010 to 019) were children of the first ten, the exception being Bruce Shay (017) who also came to fly.

OK, here are the numbers for the day:

Total Flights	380
New Fliers	3
Total Fliers	297
Motors consumed	
Total	391
Total Impulse expended	2,359 (A high range "K")
Average Impulse	
Per motor	6.2 (A low range "C" )
Per flight	6.3 (A low range "C")
Contest Flights	9

Yes, 391 is a huge number of flights, and we knew it was going to be big from the 100-yard-long line that lasted all day. It's not the record though. That's still held by May 2001 with 478. Yes, that's correct, nearly 500 launches at that one, which was an all day special groups and night launch combo. Still, this month was unusual for the number of "A" and "B" motors flown. At

almost every launch, "C" motors dominate, but this time we had more of both "A" and "B" motors than "C".

Safety stats looked pretty good. There were enough prangs that we fell slightly below our nominal 93% threshold:

	Count	Percent
Total Flights	380	100.0
Successful	352	92.6
Motor Failure	2	0.5
Unstable	11	2.9
Recovery Failure	15	3.9



Jack Hagerty with Bear Neff – single digit prime LUNAR numbers, adding up to a single digit prime! Maybe that's not really amazing. What's really amazing is how far Bear drove to attend the Final Robertson Launch.

Thanks, too, to the other party committee members: Dave Cummings, who managed the whole thing. Alan Thym and Rob Tashjian who handled the BBQ (and all the helpers under the tent). Steve Kendall, of course, who caused the commemorative T-shirts to be there, and the always-dependable Coopers who manned more than half of the LCO shifts (Tony) and womanned the registration table all day (Sheryl). I guess I should throw Kevon in there too who helped me nail the raffle bags into the grass.

### Launch Photos

Here are some launch photos, submitted to the LUNAR Gallery.

*In a deep voice, say:  
"Luke, I am your father!"  
Muhuahahaha!!!" just  
before the C6-0 ejects.*





# LUNAR'clips 2007

Livermore Unit of the National Association of Rocketry

Volume 14, Number 4

June-July 2007



People brought some of their nicest rockets to launch and land on the grass.



This CATO looks worse than it was: The glider was undamaged; reloaded, and flew successfully.



Somewhat against his nature, James Marino did a great job finishing Snarky, but the result was worthwhile: Snarky flew great, and was a real crowd-pleaser, in the final 24-launch salute.



Jack Hagerty's Estes Alpha was the first rocket ever launched at Robertson Park, and as the last of the 24-launch salute, was the last ever to be launched at Robertson Park. That's some perfect closure. **Don't tell Jack**, but it appears none of the photographers got the launch picture! It was difficult enough to capture 24 frames in a row, but the smoke obscured the launch for most photographers. The Alpha survived, and the vintage LUNAR launch pad survived. See you in another 14 years.





## Robertson Park Party: Thank-Yous



Dave and Mary Cummings

## From Dave Cummings, LUNAR #450

I hope everyone enjoyed the LUNAR BBQ and the cake and ice cream. We had a big turnout for our last launch at Robertson Park. I tried to have enough food for everyone but fell short on hamburgers. I'm sorry if you missed out on any of the food.



I'd like to thank everyone for helping with the BBQ and serving the treats. That includes: George Thym, Nick Tashjian, James & Laura Marino, Charlie Whitman, Aidan Sojourner and his friend Matthew Reddy, and my wife, Mary Cummings. My biggest thanks goes out to Rob Tashjian and Alan Thym. They were of tremendous help to me and worked very hard at the launch.

This was the first BBQ that LUNAR has ever done. Maybe we can do this again. We enjoyed it and had fun doing it.

## From Rob Tashjian, LUNAR #1253

I want to add my thanks as well: ^)

First, I'd like to extend special thanks to George Thym and Mary Cummings who spent the whole day working at the barbecue booth and who were only incidentally related to LUNAR (way to abuse your relation! : ^). We owe them, guys!

Thanks to James and Laura Marino for voluntarily going to Costco at noon on Saturday for supplies. Talk about taking one for the team!



A nice young lady, Matthew Reddy, and Aidan Sojourner, who voluntarily held off eating cake and ice cream while they handed out spoons and forks to everyone!



Alan Thym, who made the whole thing look easy.





# LUNAR'clips 2007

Livermore Unit of the National Association of Rocketry

Volume 14, Number 4

June-July 2007

Everyone who came through the booth and helped!

And especially thanks to Dave Cummings, who planned the whole thing, made sure it happened, and without whom we never would have had the party!

And just to add a little to Jack Hagerty's statistics above, we served:

- 200 hamburgers
- 16 Boca burgers
- 17 Garden burgers
- 96 beef dogs
- 48 chicken dogs, (I think there was one pack left after we ran out of all the buns)
- 4 out of 5 cakes
- nearly all the ice cream



## Robertson Park Final Statistics

And finally, for those of you who haven't had enough numbers, here's the grand totals for our 14 years at Robertson:

## Robertson Park Final Statistics

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Launches:	5	10	9	11	11	10	10	10	10	9	7	8	11	7	5
Total Flights:		1242		1355	1840	1921	1999	2160	2729	2121	1620	1696	2120	1233	1297
Motors consumed:		1406		1558	1982	2003	2095	2264	2832	2226	1788	1786	2196	1286	1320
Total Impulse:		34082		43512	56527	64082	69607	84035	89130	38133	30801	19200	22475	15187	9535
Average Impulse Per motor:		24		28	29	32	33	37	32	17	17	11	10	12	7
Average Impulse Per flight:		27		32	31	33	35	39	33	18	19	11	11	12	7

## All-Time Summary, Robertson Park

Number of Launches	133
Total Flights	23,333
Motors consumed	24,742
Total Impulse	576,306 Newton-seconds (76% of a full R motor!)
Average Impulse Per motor	22 (just over a D)
Per flight	24 (just over a D)

There are no flight cards for 1993 or 1995, and parts of 1994 and 1996 had to be extrapolated from the existing cards, which were incomplete. You can figure at least 500 flights for 1993 (we only flew from August on) and 1,200 for 1995. That's where we got the "more than 25,000 flights" for the back of the T-shirts. There were also dozens of special launches for TARC, science classes, etc. that aren't counted here.

That's a wrap, everybody!

-- Jack

## Robertson Park Memorial Auction

The silent auction was a success, netting LUNAR several hundred dollars, and many happy auction winners.

Auction donations came from all over, all kinds of things, from boxes of tubing and balsa, to built rockets, to mystery boxes of parts, and non-rocketry related items. Our very special thanks to Mike Sunseri who donated many of the most highly sought built rockets.



## LUNAR'clips 2007

Livermore Unit of the National Association of Rocketry

Volume 14, Number 4

June-July 2007



Around the perimeter of the launch control area, the auction items were laid out for inspection. People put tickets in the drawing bags for the items they hoped to win.



The most tickets for any item in the drawing went to the X-Box system. The hush grew restless as the crowd waited for Sheryl to draw the winning ticket:



The lucky ticket was announced, and an astonished but happy young man took home the spoils of victory:



The auction was a lot of fun for everyone. The smart money, err tickets, were on the mystery boxes and parts assortments. One young man scored a mystery box with 4 mid-power RMS cases, more than a dozen reloads for them, and a bunch of black powder motors!! We're sure he's busy building and we look forward to seeing him and his creations soon.





## Robertson Park Memorial Contest

From Cliff Sojourner, Emergency Substitute Contest Coordinator, LUNAR #1212

Although it was too windy for good contest flights, we had good participation for the Robertson Park Memorial Contest. The nine contest flights kept our Emergency Substitute Contest Coordinators Greg Wong and Cliff Sojourner busy most of the flying day, with their duties of running registration, check-in, measuring, flight timing, and post-flight inspection. Special thanks to Greg Wong for helping run things for long after we expected, and to Carl Reisinger for his expertise and advice, keeping things running smoothly and correctly, and for scoring the contest.

John Hogan's flights were lost in a drag-race mass launch; we are very sorry, John! Tim Jesus' A-streamer rocket flew well and showed good times but spat the motor both launches. Bruce Shay's A-streamer rocket lost the motor, showing good duration but wouldn't have been good enough to beat uber-rocketeer Carl Resinger, who turned in the day's only complete flights in both events.



Emergency Substitute Contest Director Cliff Sojourner presents TWO First Place ribbons to uber-rocketeer Carl Resinger – Congratulations Carl, well done!

Ben Shay's eggloft rocket showed superb duration, over 3 minutes on a massive 30" silver mylar chute, which drew gasps from the crowd as it blew far down range and disappeared on a thermal. We thought all was lost so marked the flight as "not returned", but at 3PM Ben came running back to Robertson Park. He had found the rocket in the vineyard past the church on the other side of the road past the stream over the bridge at the end of the park... Trembling with anticipation, he opened the egg carrier... sadly, a couple drips on the egg finished the story.

Despite the challenging flying conditions, everyone says they had a good time and eagerly anticipate the next contests!!

LUNAR Contest Director Tom Desmarais thinks we could run an informal contest at every launch, and official NAR events every other launch. The regular contest might be something like spot landing, mark your spot with a flag, on the honor system. We could also run SD and PD, perhaps with other contestants doing the timing. What do you think about it?

NAR Western Region Contest Director Carl Reisinger used the NAR contest software on his laptop to make this chart, showing the final results for the contest:

## ROBERTSON PARK MEMORIAL CONTEST STANDINGS

### C Egg Lofting Duration

Place	Contestant	NAR Number	Section	Flight 1	Flight 2	Total	NAR Points
<b>A Division</b>							
--	Shay, Ben	85791	534	EGG		0	0
--	Sojourner, Aidan	84417	534	EGG		0	0
<b>C Division</b>							
1	Reisinger, Carl	20137	IND	36		36	160
--	Inserni, Antonio Angel	PENDING	534	EGG		0	0

### A Streamer Duration

Place	Contestant	NAR Number	Section	Flight 1	Flight 2	Total	NAR Points
<b>C Division</b>							
1	Reisinger, Carl	20137	IND	49		49	80
--	Hogan, John	PENDING	534	LST	LST	0	8
--	Jesus, Tim	PENDING	534	EJ	EJ	0	8
--	Shay, Bruce	12117	534	EJ	EJ	0	0

Thanks again to our participants. We'll do it again soon!



The Coffee Can motors: 2560 NS  
in a single grain

Kevin McGrath, LUNAR# 879, NAR# 77618

The coffee can K is one of those odd motors that you don't see flown very often. It is a single grain, full K motor in the 98/2560 Aerotech case. I first saw one fly at Hayburner 2002. Its unusual, short and stubby appearance and long burn time stuck in my mind.

Last summer I bought the casing and flew 5 flights on the coffee can K – each with a different Aerotech propellant – White Lightning, Blue Thunder, Redline, Green demo motor and Warp 9(!).

The 5 flights were all flown in the same rocket, which makes it interesting to do direct performance comparisons of the different propellants.

Below is a picture of the casing and reload kit components. I didn't have a coffee can available so a soda-can had to suffice for scale!



The 98/2560 casing is approximately 3.85" x 10.8". The grain itself is approx 3.5" x 6" and weighs 3.1 Lbs.

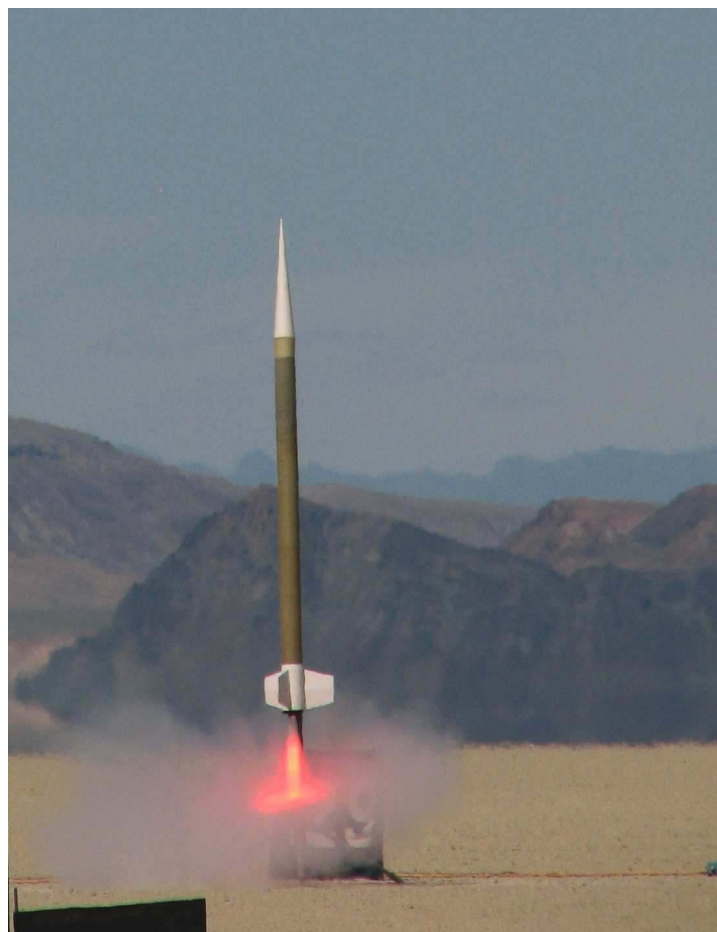
The coffee can K is simple to prep and the assembly is straightforward. It seems to go quicker than a 54mm K. The beefy-single use seal ring is first CA-ed to the equally heavy duty liner. Since the motor is plugged (no motor ejection) there is no chance of delay train blow-by. Because of their large size, the various parts of the reload kit are easy to handle. Four inch

O-rings are harder to lose in when you drop them in the playa dust at Black Rock or the grass at Snow Ranch!

I used dry Teflon spray instead of grease on the liners and they dropped right out after firing. Clean-up was easy. The liners are extra thick and show little sign of wear after firing.

## The Rocket

All five flights were flown in “Thunderbolt”, my scratch built L3 rocket.



*Thunderbolt lifts off on a K680R coffee can*

Thunderbolt is a 4" x 8' minimum diameter rocket capable of Mach-plus flights. The construction is all fiberglass and carbon using Performance Rocketry and Hawk mountain parts. It has flown on J, K, L and M impulse class motors.

For the coffee can K flights, the lift off weight was about 17 lbs. The rocket was prepped and flown in the same configuration for all flights with some minor differences in LOW due solely to the density of the propellant in the 98/2560 motor.. The drogue was a 3' Top Flight X-form and the main





was a Rocketman R12C. The altimeter was a G-wiz MC, which reliably handled the dual deployment and data logging chores.

## The Flights

The flights took place over 4 launches at Black Rock last summer:

Mudrock, June 2006	K695R
Mavericks, July 2006	K650T
Aeronaut, August 2006	K800G
XPRS, September 2006	K1999W9 and K458W

One thing that stands out on all the flights is the long burn time. The web thickness of the 98mm grain gives the coffee can K motor one of the longest burn times for any given propellant

The K458W has 6 second burn time that satisfied this long burn aficionado's need for fire, smoke and noise. My usual K motor is a 54mm K550 with a 2.5 second burn, thus the 6 second burn was impressive.

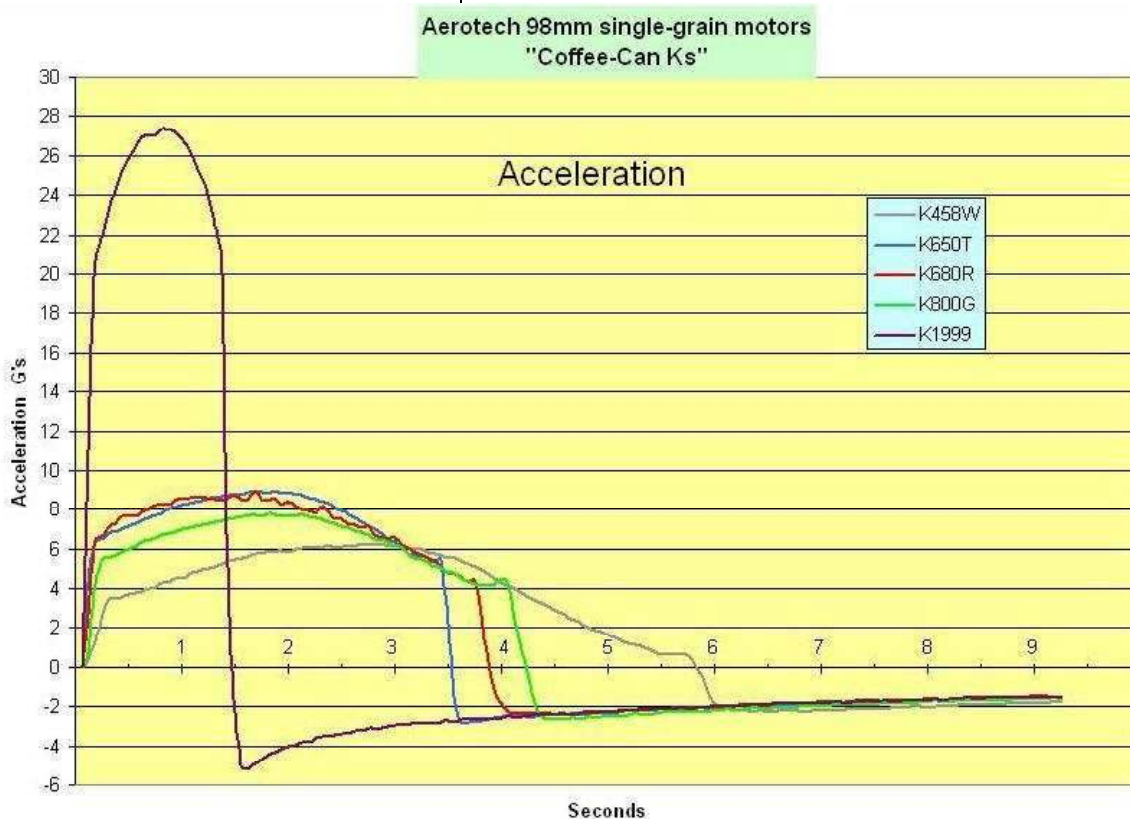
The 3.5 to 4 second burns of the Blue Thunder and Redline are comparatively long also. The Blue and Red flames were nicely visible, even in the bright desert sun.

The K1999 (yes 1999!) has a 1.5 second burn – that *is* a long burn for a Warp 9 motor! It had a low smoke, 4-foot yellow flame. In smaller diameter motors, Warp 9 has such a short burn that one rarely sees the flame (or even the rocket).

The K800G green demo motor was part of an Aerotech development project and is not yet certified. Gary Rosenfield of Aerotech said this particular batch of propellant didn't exhibit the burn characteristics he was looking for. The burn was longer than expected and he thought the color was a bit soft. But I liked the 4+ second burn and thought the green was pretty good.

Back to the K1999 Warp 9 – now that is one awesome motor! The 17-pound T-bolt took off like it was going to leave the fins on the pad! At 27.4 Gs, it pushed 0.93 Mach in 1.5 seconds. Warp 9 is obviously the hottest ( $I_{sp}$ -wise) of the 5 propellants, lofting Thunderbolt 900' higher than the others.

Motor	Burn time (sec)	Max Acceleration (G)	Altitude (ft)
K458W	6.0	6.1	7647
K650T	3.5	8.8	7155
K680R	3.75	9.0	7591
K800G	4.25	7.8	7396
K1999 W9	1.5	27.4	8565



## Impressions and Conclusions

The coffee can Ks have a lot going for them: easy prep and long burn times. Plus they seem to generate lots of interest. I'll be flying more of them and would certainly recommend them. The cost is a little more than the comparable 54mm full K.



## LUNAR'clips 2007

Livermore Unit of the National Association of Rocketry

Volume 14, Number 4

June-July 2007

The K458W, K650T and K680R have plenty of lifting power for rockets up to 25lbs and the K1999W9 is a real sledgehammer for that size of rocket. The K1999 would be great at lofting large 30-50 lb rockets for low-altitude (1000-1500') dramatic flights. A 10 inch Nike Smoke on a K1999 would be quite a sight at Snow Ranch. (Cliff: hint, hint...I've got the casing).

Special thanks go to Larry Frieson of Mohave Desert High Power for his assistance, and sponsoring two of the flights, plus arranging the demo motors from Aerotech. I'd also like to thank Gary Rosenfield and Aerotech for the Warp9 and Green demo motors.

*Now Available!*



LUNAR logo items



<http://www.cafepress.com/lunarorg>

## Motor Cleaning Tips from the Old Rocketeer

Kevin McGrath, LUNAR# 879, NAR# 77618

Tip 1: The dishwasher is NOT a good idea. The detergent and hot water acted as a corrosive and dulled the anodized finish. The cases didn't come clean anyway.

(Plus, my normally very supportive wife was not happy ...but Honey, I didn't put the silverware in with the rocket motors!)

Tip 2: Those new disposable electric toothbrushes work well for loosening the last bits of crud. They are cheap too...\$4.99

Tip 3: Orange hand cleaner works well for cleaning cases. The mild abrasives cut the grease and remove crud. (You should be using spray teflon for everything but O-rings anyway) The abrasive is mild enough to be safe for the anodized finished.



(Send your funny ideas for The Old Rocketeer to [newsletter@lunar.org](mailto:newsletter@lunar.org)!)

Bonk! Ouch.

## Back In Print!

By popular demand, *Spaceship Handbook* is once again available. We have done a limited reprint of this precedent setting volume for those of you that missed the original printing. Don't miss out again!



ARA Press  
785 Jefferson Ave.  
Livermore, CA 94550  
(925) 455-1143  
[www.arapress.com](http://www.arapress.com)



## Spaceship Handbook

by Jack Hagerty and  
Jon C. Rogers

- 75 Fictional, Theoretical and Real Subjects.
- 534 Pages.
- Data Drawings.
- Over 500 photographs and illustrations, most in color.

• **Only \$59.95!**  
(plus shipping)

15% off for LUNAR members!





# LUNAR'clips 2007

Livermore Unit of the National Association of Rocketry

Volume 14, Number 4

June-July 2007

## Who you gonna call?

LUNAR HOTLINE (925) 443-8705

### PRESIDENT

Craig Saunders, [president@lunar.org](mailto:president@lunar.org) (925) 324-2400

### VICE PRESIDENT

Tony Cooper, [vp@lunar.org](mailto:vp@lunar.org) (510) 471-3648

### SECRETARY

David Raimondi, [secretary@lunar.org](mailto:secretary@lunar.org)

### TREASURER

Sheryl Cooper, [treasurer@lunar.org](mailto:treasurer@lunar.org)

### MEMBERS AT LARGE

Lee Teicheira, [bmal1@lunar.org](mailto:bmal1@lunar.org)

Richard Hagen, [bmal2@lunar.org](mailto:bmal2@lunar.org)

### EQUIPMENT

Bill Orvis, [equipment@lunar.org](mailto:equipment@lunar.org)

### MEMBERSHIP

Tony Cooper, [membership@lunar.org](mailto:membership@lunar.org)

### NEWSLETTER

Cliff Sojourner, [newsletter@lunar.org](mailto:newsletter@lunar.org)

### CALPYRO III

Rob Tashjian, [calpyro@lunar.org](mailto:calpyro@lunar.org)

### CONTEST DIRECTOR

Tom Desmarais, [tdesmarais@acm.org](mailto:tdesmarais@acm.org)

*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*.

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 before the launch date.

## 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 currently held on a bi-monthly basis. These meetings cover 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.

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 contains 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: Youth (to age 11) is \$6; Junior (ages 12-17) is \$6; Adult (over 18) is \$25. Become a Contributing Member for an extra \$20 (\$26 Youth & Junior; \$45 Adult), and your flight cards are free.

## 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*

# LUNAR Calendar

Launches at new location or Snow Ranch (see website [www.lunar.org](http://www.lunar.org) for directions)  
Meetings at Robert Livermore Community Center, 4444 East 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](http://www.lunar.org) for the latest information.

<b>January 17, 2007</b> Meeting 7:30 to 9:30 PM Elections Presentation: Bill Orvis: Odd-Rockets	<b>May 16, 2007</b> Meeting 7:30 to 9:30 PM Presentation: Eric Kleinschmidt: Hybrid Rocketry	<b>September 19, 2007</b> Meeting 7:30 to 9:30 PM Presentation: Mike Sunseri: Build, Decal, and Paint Rockets
<b>January 2007 launches</b> Jan 6: 9 AM - 3 PM, Snow Ranch Jan 20: 9 AM - 1 PM, Robertson Park	<b>May 2007 launches</b> May 5: 9 AM - 3 PM, Snow Ranch May 12: <b>4 PM - 10 PM</b> , Robertson Park <b>Night Launch</b>	<b>September 2007 launch</b> Sept 22: 9 AM - 1 PM, location TBD <b>NAR Contest</b>
<b>February 2007 launches</b> Feb 3: 9 AM - 3 PM, Snow Ranch Feb 17: 9 AM - 1 PM, Robertson Park	<b>June 2007 launch</b> June 30: 9 AM - 1 PM, Robertson Park	<b>October 2007 launch</b> Oct 27: <b>4 PM - 10 PM</b> , location TBD <b>Night Launch</b>
<b>March 14, 2007</b> Meeting 7:30 to 9:30 PM Presentation: Jamie Clay: Video Rocketry	<b>July 18, 2007</b> Meeting 7:30 to 9:30 PM Presentation: various: Altimeters	<b>November 14, 2007</b> Meeting 7:30 to 9:30 PM
<b>March 2007 launches</b> March 3: 9 AM - 3 PM, Snow Ranch March 17: 9 AM - 1 PM, Robertson Park	<b>July 2007 launch</b> July 21: <i>Cancelled</i>	<b>November 2007 launches</b> Nov 3: 9 AM - 3 PM, Snow Ranch Nov 17: 9 AM - 1 PM, location TBD
<b>April 2007 launches</b> April 7: 9 AM - 3 PM, Snow Ranch April 22: 9 AM - 1 PM, Robertson Park <b>NAR Contest</b>	<b>August 2007 launch</b> Aug 18: 9 AM - 1 PM, location TBD	<b>December 2007 launches</b> Dec 1: 9 AM - 3 PM, Snow Ranch Dec 15: 9 AM - 1 PM, location TBD



## LUNAR

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