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LUNAR'clips is also available on-line at

<http://www.starship.org/LUNAR/LUNARclips>



LUNAR Meeting POSTPONED to October 15

7:00 p.m. - 9:00 p.m.

Warren Massey is the featured speaker at LUNAR's October 15 meeting (rescheduled from September); the subject is igniters.

As many club members know, Warren has repeatedly demonstrated his considerable mechanical and electrical engineering skills in the design and construction of virtually all of our launch equipment. His careful consideration of all aspects of an issue is evident in the details and robustness of his creations. Unsatisfied with the results that he was getting from mass manufactured igniters, Warren has researched the design and manufacture of igniters and he'll share his insights with us at the next meeting. Warren's presentation will follow a regular club business meeting.

The September meeting has been moved to October 15 due to scheduling conflicts. The meeting will start a 7:00 p.m. in the community meeting room at the Livermore Police Station, 1110 South Livermore Avenue.



The Range Head

by Jack Hagerty, LUNAR #002

I had a great time at NARAM that I'll tell you about it an accompanying article. But first these important messages.

SEPTEMBER MEETING

Mark Weiss has let me know that the public meeting room at the police station has been booked for the entire second half of September for a community focus group program. We looked into either holding the meeting at another location, or just picking a different date. We used to hold our meetings at the Carnegie building downtown, but that's

no longer available to us and Hobby Haven is long gone. Since we'd have to push the meeting into October, we just decided to move it to it's "normal" place the Thursday before the launch. The "September" meeting, therefore, will be on Thursday, October 15th. This doesn't affect the November meeting at all which will go on as scheduled.

SPEAKING OF SEPTEMBER

Earlier our calendar showed this month's launch as a reprise of our first F/F Scale contest. After announcing that in the July 'Clips, I didn't get a single response from anyone so I never pursued it. I have, however, been pursuing it at the national level. I have an article coming up in either the Nov/Dec or Jan/Feb issue of Sport Rocketry (depending on whether I made the deadline for the earlier one) on the event.

If you've built a model for September, I'm sorry that there



Photo 1. Even the prez gets to fly some times! Jack Hagerty at NARAM 40. (Photo by George Rachor)



Photo 2. The "Lunar Express" in PML's demo rack at NARAM 40. (Photo by Jack Hagerty)

We've been invited to put on a 20-minute demo of hobby rocketry doing anything we want. Normally, our setup time would have to come out of that 20 minutes, but he's willing to make us the first event after the 40 minute lunch break which would give us that much time to set up out on the flight line.

The only down side, for me, is that October 4 happens to be my anniversary and the day has long been spoken for (especially when it falls on a weekend!). This means that I can't participate, but I am willing to help coordinate things

won't be a contest for you, but be sure to bring it in and show it to me. I'm deep into a project along those lines (discussed below) and would love to see any models built to the new rules.

IN OCTOBER

Just a reminder that October is our second (and last) night launch for the year. This was a huge hit last year with a big turnout. Remember that our guidelines require that any rocket flown after dusk have a lighting system visible during the entire flight, not just after recovery deployment. Check Lynn's newsletter archive ([Vol 4, No 4](#) – also see the "TLL" in this issue and Orvis' talk on lights and flashers at <http://www.starship.org/LUNAR/talks/Orvis9803/>) for articles detailing the rules and lighting suggestions. I'm telling you this now because despite the meeting change, there will NOT be another newsletter next month. They won't get back into sync until November.

ALSO IN OCTOBER...

I got a call from George Gissendaner from the East Bay Radio Control club. This is an R/C airplane group that flies from the BART land at the foot of the Altamont on the north side of 580. They're going to be holding an air show on Sunday, October 4 and they'd like us to participate.

beforehand. What I need is a list of people who are willing to fly in front of a crowd, and which of you are willing to be the field boss for the day.

Remember our presentations at the Livermore Air Show? I'm envisioning something similar only smaller: a couple of tables of static displays (with club info handouts) and a live demo that starts with some small black powder models (maybe with an Astrocam), graduates into some multistage flights and ends up with composites. We may get permission to fly an "T" like we did at the last Livermore show.

Let me know if you're interested.

SHAMELESS SELF PROMOTION

Many of you are aware that I'm writing a book on scale data for modelers in the style of Peter Alway's Rockets of the World and Retro Rockets. The difference in my book is that all of the subjects never existed! They're vehicles from the great theoreticians (Oberth, von Braun, etc.), books, movies, TV and even vehicles that were seriously proposed, but never built (Dynasoar, Titan IIIM, Shuttle C).

The book won't be out until next summer at the earliest, but I've had some really cool cover art done. It turned out so



Photo 3. NAR Scale guru Peter Alway (left) with Andrew Waddell and the 80% scale ARS #2. (Photo by Jack Hagerty)

well that I had some posters made up to help finance the book. (You think sticker shock is bad when buying a car? Try getting an estimate to print a 200-page book with color photos!) Right now you can see what it looks like on the NARTS web page in the "poster" section of their "On-Line Catalog" but Lynn offered to set me up with a corner of his *starship.org* site. The posters are 12" x 18" on heavy art stock. We kept it on the small side to make it easy to frame. They retail for \$15 but I'll give LUNAR members 20% off with a valid membership card. I also have a limited number signed by the artist for \$25. (I can give you 20% off the base price of those, too, but I still have to pay the artist \$10 for her signature!) I'll be bringing them to the meeting and the launch (and probably all the meetings and launches for the next year!).

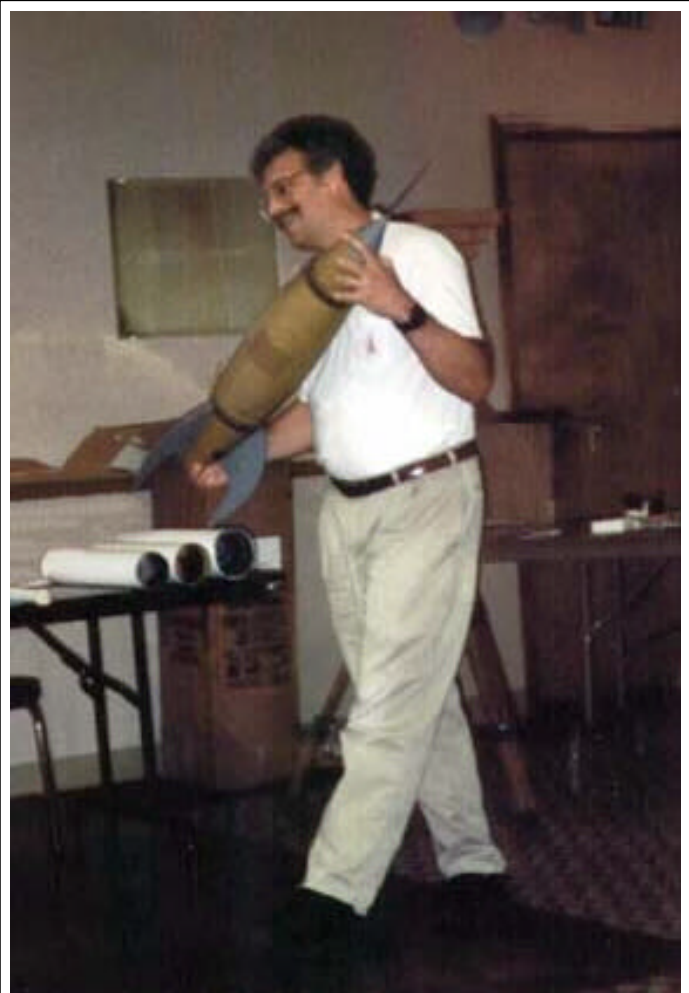


Photo 4. Selling the crowd on "Fiction/Future Scale" at the Manufacturers' Forum. (Photo by Vern Estes)

E-MAIL IDEAS

Our cohorts over at AeroPAC have an interesting feature on their web site (<http://www.aeropac.org/>). It's a list server which allows any member to reach the entire group by simply sending a message to *members@aeropac.org*. With this they can not only get critical last minute announcements (like the one above) to the membership, but they can hold discussions on all aspects of the hobby. As an example, they are currently getting ready for their last Blackrock launch of the season, and lots of people are trying to coordinate rides and equipment.

I've held some discussions with our webmasters Dave Redell (who runs our *lunar.org* site) and Lynn Kissel (who runs *starship.org*, his own site that has the electronic version of our newsletter on it). They say such a thing is possible for us, but I want to poll the membership first to see: 1) if you're interested and 2) do you have any problems with your address being included on the list? Let me know.



You've got my addresses. (See "Who you gonna call?" at the end of the newsletter.)

ABOVE AND BEYOND

I got a note from member Randall Thieme last month which read in part:

"Through a mistake of my own I wound up with two copies of Tim Van Milligan's book Model Rocket Design and Construction. I would like to donate it to the club to either put in the club library (if we have one) or to auction off at the next Lost and Found auction."

What a great idea, Randall! Thanks for thinking of the club. While we don't, unfortunately, have a library, auctioning it off at the next Lost and Found event (which is the November meeting) would be wonderful.

AND FINALLY...

We have several short notices from the membership with items of interest.

Warren Massey forwarded this announcement about a web site called APOLLO 18 (<http://www.apolloeighteen.com/>):

Attention teachers, parents, and space buffs. Now orbiting in a browser near you is a Web site you should call up the moment young Junior expresses any interest in becoming an astronaut or learning about the space program. Amazingly put together by one person, this exhaustive and cleanly designed launch pad contains information on the Apollo, Gemini, and Mercury space programs and many more. Learn about the crew, the mission objectives, and the mission's significance.

You'll also find the latest space-related news, and if you're so inclined, blast off into the discussion rooms to chat about space-related items. Teachers, this site just made your tough job a little easier: Included here are actual lesson plans complete with downloadable slide shows for the space missions.

From Bill Orvis:

For anyone who is interested, in the latest edition (Sept. 1998) of the Circuit Cellar Ink magazine, the lead article is called "Smart Rockets." It shows how to build a data acquisition system and an accelerometer that fits in an Estes Nova payload section. The whole payload is 4.5" long, 1" in diameter, and weighs 32 grams. It includes a PIC microcontroller, 16K of flash memory, a voltage regulator, battery, and accelerometer. The PIC microcontroller has several available analog and digital inputs that could be easily be used for other sensors or

triggers, a nice article with more than enough information on how to build it yourself.

It uses some paint on wires for carrying signals around the rocket that I have got to try.

And from Anthony Cooper:

I have just returned from LDRS XVII and have put together a photo page at

<http://www.2xtreme.net/AMCooper/rockets/ldrs-xvii/ldrs-xvii.htm>

I'll be glad to add text to the pictures if anyone can identify who, rocket, motor, etc.



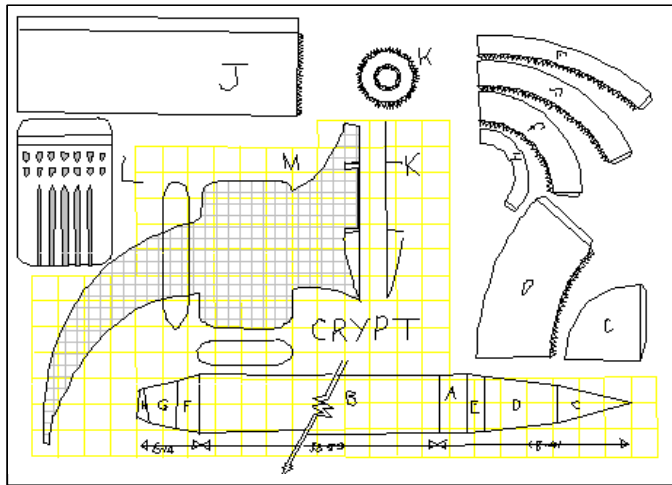
Golden Crypt

by Geoff Canham, LUNAR #493

The Gold level of NARTREK (NAR Training Rocketeers for Experience and Knowledge) involved designing a rocket, calculating its stability and performance, and then flying it six times to compare actual performance with predicted. Also, the rocket had to be a payload model, or a competition rocket. "Competition" could mean anything from a rocket powered by an A motor with a streamer recovery, on upwards. But when I saw the notice of the new Future/Fiction Scale Competition (Vol. 5, No. 2), it opened the door for me to build a rocket that I already intended to build sometime, and complete the Gold level at the same time.

The Eagle comic was first published in Britain in 1950, and continued through to 1969, and the cover story was titled "Dan Dare - Pilot of the Future." He was an astronaut in Spacefleet, obviously the forerunner of Star Fleet. One of the storylines (called "The Man from Nowhere") featured a very stylish interstellar ship from the planet Cryptos, and it was the Crypt Ship that was to become the rocket I would design and build for the NARTREK Gold qualification.

I work in the building industry, and frequently receive sets of construction drawings that come rolled around cardboard tubes. These tubes make ideal body tubes, and the one I used for this rocket had an outside diameter of 2.25" and an inside diameter of 2.125". It resulted in a fairly heavy rocket, but it also gives a fairly stately flight. The nosecone and boattail were constructed from thin card (similar to the cardboard on your breakfast cereal packet). On the accompanying drawing, the body tube is labeled "B" and is 38.58 cm long. The nosecone is 18.41 cm long and consists of parts A (also cut from the same 2.25" diameter tube) and E, D and C which are formed from the thin cardboard.



The outline of the components is shown on the attached drawing, and I apologize for the poor quality, but the software used is more for measuring than drawing. The grid shown over part of the drawing is at 25mm spacing. Along the bottom is an elevation of the main body, including nosecone and boattail, immediately above that, on the right side, are the outlines of parts C and D, and above those are parts E, F, G and H.

The boattail was constructed from parts F, G and H, all glued together, then glued to the base of the body tube, part B. The nosecone and boattail then had spackling applied to it, to make them more like a curved shape than a segmented one.

Actually, before the boattail was attached to the body tube, the engine mount had to be constructed and glued inside the boattail. The engine mount consisted of a cardboard tube, constructed from part J, to take 24mm diameter motors (the rocket was designed to fly on Aerotech E15-4 and E30-4 motors), and part of an old Estes D12-3 motor casing was glued inside it as a stop. Two rings, as shown as part K, were cut out and glued to the outside of the engine mount tube to support the mount inside the body tube. The serrated end to part J is actually triangular shaped glue-tabs, used to fix the lower end of the engine mount inside the base of the boattail.

The three fins were constructed primarily out of 1/8" balsa, and are of through-the-wall construction. The outline is shown hatched as part M, and you can see that the part extending into the body tube is notched around one of the engine mount supports. The mock-engines on the fins are made from 1/2" thick balsa glued to either side of the 1/8" thick fins. The drawing shows a vertical and a horizontal section through the completed mock-engine, and L shows the template used to add the detail. The hatched areas are triangular grooves cut in the face and painted black. The horizontal line immediately above the cut-outs is also a

groove cut in the face, and the line above that is a break line in the painting. Above the line it is painted red, below it silver/chrome.

The section of fin on the body tube side of the mock-engine is faced on either side with an additional layer of 1/16" thick balsa, so the total thickness of fin adjacent to, and extending into, the body tube is 1/4". The leading and trailing edges of the fins were then sanded off to an aerofoil type shape.

The nosecone had another cardboard tube glued inside it, the other end of the tube fitting easily into the top of the body tube to hold the two parts together. Spackle was added inside the nosecone to ensure stability in flight by adding weight, and elastic cord was glued inside the nosecone and body tube to act as a shockcord. The launch lug was cut from a drinking straw (do I believe in recycling, or what?).

The parachute was made out of plastic sheeting provided by a local nursery to protect the carpet in my car when I bought some plants for the garden. The parachute itself was cut out as a 20" square with the corners removed. The parachute cords were made from dental floss that the dentist insists on giving me each time he drills a few holes in my head. The plastic sheet was reinforced at attachment points by squares cut from a self adhesive label, and after three cords pulled loose on the first flight, the attachments were further reinforced with mailing tape.

However, that first flight was not typical (happily). The wind was very strong down at the Berkeley Marina on that Saturday morning, and the rocket weathercocked badly, rising not much more than 100' and most of its flight was almost horizontal. It was down to about 20' when the parachute deployed, and I didn't really notice much reduction in speed before it was down. My mind didn't want to see the remains, but my feet broke out into a jog. But the only damage from landing was a minor dent in the nosecone! There was damage to the fins, but that had occurred before take-off. After ignition, the motor had sent out tongues of flame for a second or two, which had licked a lot of the paint off the base of the rocket, before the motor suddenly developed the thrust to lift off. It seems likely that the igniter was not fully inserted into the motor.

The second flight of the Crypt Ship was two weeks later, after a touch-up of the paintwork. This was the LUNAR meet in May, 1998 (Vol. 5, No. 4), that was also the first try-out of the rules for the Future/Fiction Scale Contest. It was also a similarly windy day, like on the first flight. To overcome the potential for weathercocking, I had decided to use an E30-4 motor this time, to try and get it moving up and away faster, so the wind would have less opportunity to change the flight path. And it worked. The flight was straight up, the parachute deployed just after apogee, and I



and the contest judge, Jack Hagerty, started walking over to where it was landing. A younger recovery team beat us to the landing site, and one of them came rushing back saying "The rocket exploded!" That at least was consistent with the story the rocket comes from, where it either explodes or gets shot down at the end of the two flights. It seems that what had happened was that the rocket had landed on one fin, and 1/8" balsa is not that good at supporting just over a pound in weight, even when assisted somewhat by a parachute. The fin must have buckled until it (the part beyond the mock-motor) shattered into about six parts. Otherwise the rocket was fine, and the parts of the fin were reassembled a few days later, and repainted within a week. It's third flight was at the June LUNAR launch, where it flew well on an E15-4 and everything was intact after touching down alongside the low-power safety-check line.

That got me half way through the number of flights needed to meet the NARTREK Gold requirements. It has to fly three times on each of the two motors it is designed for, and the results of the flight compared with the predicted flight characteristics.



TLL – a 'Trivial Launch Light'

by Roger L. Deran, LUNAR #534

I just love those night launches, and maybe by writing an article about a simple night launch light, I can encourage another one soon. How about having a night contest? How about trying something like C-altitude/night?

The basic problem I found when trying to lash together the simplest possible light was the mounting system. Having the light just rattling around in the payload section just won't cut it. The reversal of acceleration at burnout or, of course, the shock of ejection would throw the light around and could take off the nose cone or do other damage. The solution I found was to cut a short piece of 3/8" dowel to use as a "chassis". The length is such that it fits exactly in the payload section.

The batteries are just taped onto this chassis. I used two AA cells, but AAA would probably work even better, being lighter. I just wanted plenty of current to keep the light bright. A simple flashlight bulb is then taped onto the dowel above the batteries. Black electricians tape is good, duct tape probably would work. I would worry about the strength of masking or clear tape.

The whole circuit is then soldered together with a fine wire. I used Kynar, which is a very high quality, very tough,

single-strand wire used in the electronics industry for prototyping digital circuits by wrapping on posts using special tools. You can get some free from your local wire-wrap fiend. Any good electronics shop has it too. Use a good soldering Iron to get the ends of the batteries hot quickly and to avoid "cooking" the entire battery. I use lead-free solder.

The reason for the fine wire is simply that it makes the easiest switch you can possibly build: none at all! Just run two of the wires together out of the top of the payload section and place the nose cone on. They will hang out where you can twist their stripped ends together to turn on the light.

If the wires are fine, there will be negligible wind resistance, and we are not trying for altitude anyway. You might be concerned that the added drag will cause the rocket to veer to one side, however. To reduce the possibility of that, you can tape them onto the side of the payload section after twisting them together. Also, put them on the opposite side of the launch lug. Don't forget a launch lug represents a significant drag, but never seems to deflect the ship.

My payload section is clear plastic, since it is a Nova, and I recommend the use of a clear section because the light radiates in all directions, unlike lights that are mounted on the side and unlike holes in the body tube. You can put in a clear, colored plastic liner, too. If you use a variety of different colors, each visible from a different direction, the color of the light will appear to vary as the rocket rotates on the way down. Check office/art stores for clear colored plastic.

My first and only flight with this contraption was on a B6-4. There was only slight wind, from the usual direction, so the risk of extreme weathercocking was low, even though the bird was loaded down and the CG was well forward of the CP. (I believe a large CG to CP distance increases both the stability and the tendency to weathercock. This would be an interesting thing to experiment with. Does anyone know whether this is true?) The flight was a gentle curve to the right of the crowd to about 300' so that on recovery, the rocket drifted slowly to the left and landed on the left end of the field. The light was one of the brightest I saw and would have been easy to see up to 1000' or more.

I hope you have fun with this TLL ('Trivial Launch Light'). See you at the next night launch.





Photo 5. Jack Hagerty prepping Brutus at NARAM 40. (Photo by George Rachor)

NARAM 40

by Jack Hagerty, LUNAR #002

NARAM 40 (that's the NAR's Annual Meet, hence the name) was held the second week of August in Muncie, Indiana. I had to jump through a few hoops to get there, as those who have talked to me personally know, but it was well worth the trip.

The main reason I went was to push my still-in-progress book (see "The Range Head") and attend a few administrative meetings, but mostly I went to have fun. It was held at the Aircraft Modeler's Association's National Flying Field in Muncie. This field has about 10,000 acres of mowed grass. Note that "mowed" means like a farmer mows a field, not like you mow the lawn in front of your house. It was an ankle deep mixture of every type of narrow and broad leaf grass you can think of. This made for a wonderful surface to land on, even with fouled recovery systems.

The weather was more humid than around here, but not as bad as I was lead to expect. The temperature was in the high 70's/low 80's the whole week. Actually a great way to spend time flying with a couple of hundred other rocket crazies!



Photo 6. Textbook liftoff for Brutus. (Photo by Jack Hagerty)

I didn't fly in competition and only flew a few things off of the sport range. First was my Binder Design *Brutus* which I flew on an H112 *Blackjack* reload. This was a Level 1 re-certification flight since the NAR HQ had lost my certification a year ago due to a computer glitch. The flight itself was textbook, but the pre-flight made it memorable. As I was walking out to the pad, I passed Bunny (NAR prez Mark Bundick) who had helped me try and get my old certification reinstated, but we both decided it was easier to just re-certify. He waived as I was walking out and I responded with "I'm correcting a bureaucratic oversight!"

Other than that, I just flew my AAA *Pennsylvania Crude* a couple of times on some Aerotech Econojet F20's. Those things are loud! The first flight startled a guy in the range tent who asked "What was that? An H? An I?" He wouldn't believe that it was a low thrust F. Maximum bang for the buck!

Outside of my own flights, the neatest flights to me were the PML (Public Missiles, Ltd.) manufacturers' demos which were, interestingly, almost all scale models. The big (1/53 scale) Saturn V flight drew a huge crowd. The *Lunar*



Photo 7. Andrew Waddell of PML preps the big Saturn V (note checklist). (Photo by Jack Hagerty)

Express semiscale model of the *Luna* from “Destination Moon” and their 80% scale model of the American Rocket Society’s *ARS #2* from the 1930’s were built from Peter Alway’s data in “Retro Rockets.”

The Saturn flight was very impressive, mostly for its size (seven feet tall), although there were some rumors that the four outboard motors never lit. The Lunar Express took off like a scalded cat on a J350 but the next day it re-kitted itself on a J570 when it hit “the speed of G10” and three of the fins popped out. Andrew Waddell later said that he’d been told to “test to destruction” by PML management. Gee, why can’t I come up with excuses like that when my models self destruct? Speaking of destruct, the *ARS* model flight was a real heartbreaker. Nice boost with the tractor engine spouting flame from the nose but no ejection. Pranged big time in front of everyone. Trying to put the best spin on it, Andrew said “Well that was the original flight profile” (the original had no recovery device).

Here are a few shots from the meet. I’m sending Lynn far more than he has space to print in the paper version of the ‘Clips, so maybe he can put the rest in the cyber edition. I can bring my whole slide show to the November meeting if anyone’s interested



Golden Spreadsheet

by Geoff Canham, LUNAR #493

My stepson, Matt Kennedy, and I have been working our way through the NARTREK (NAR Training Rocketeers in Experience & Knowledge) levels. The Bronze level ([Vol. 5, No. 2](#)) worked through standard kits to challenge us to reach specified goals, and the Silver level ([Vol. 5, No. 3](#)) introduced us to a greater variety of rocket types, including rocket gliders

and clustered rockets, and involved more intricate construction. Now we are working on the Gold Level, and this involves designing a rocket, calculating its performance, building the rocket, flying it and comparing actual performance to calculated performance.

The NARTREK documentation gives sources of information, including a Web site where you can download software to calculate the performance of a rocket (see Lynn Kissel’s article in [Vol. 5, No. 3](#)), but we decided to develop a spreadsheet to do the work. There are actually two stages to calculating the performance, firstly to estimate the Center of Gravity and the Center of Pressure for the rocket, and establish whether it will be stable or not in flight, and secondly to calculate the altitude that it will fly to on specified motors. The software that we have seen does one or other of these stages, but not both (although Lynn’s article mentions at least one that does both). The spreadsheet is written to do both stages in one go.

There are almost always approximations that need to be made in the calculations, and the main approximations in this spreadsheet are:

1. The thrust is assumed to occur at the same level throughout the thrust phase, rather than rapidly reaching a peak, then leveling off at a lower level;
2. The total fuel is assumed to be expended during the thrust phase, whereas some is also used to provide smoke during the coast phase and to eject the recovery system (parachute or streamer).

To compensate for these approximations, an adjustment factor has been included in the formula, which is currently set at 1.30. This value was arrived at by using the values for the various Estes rockets from their catalog and checking the calculated altitudes against the stated values. Since then, we have compared results from the spreadsheet against results from a program downloaded from the Internet, and they come close (sometimes higher, sometimes lower).

A major factor contributing to drag during the flight is the frontal area of the rocket, and the spreadsheet calculates this as being the cross-sectional area of the body tube, based on the body tube diameter. The rocket I am designing has large protuberances on the fins that add substantially to the frontal area, so I calculated and inserted the area directly (overwriting the formula).

All the formulas, and the instructions for using the spreadsheet contained in the Excel spreadsheet stored at

<http://www.starship.org/LUNAR/LUNARclips/v5/v5n5/GOLDSPSH.xls>





Who you gonna call?

LUNAR HOTLINE	(925) 443-8705
PRESIDENT	
Jack Hagerty, jhagerty@juno.com	(925) 455-1746
VICE PRESIDENT/EDUCATION	
Ron Baskett, rbaskett@hotcoco.infi.net	(925) 462-2197
SECRETARY/TREASURER	
Mark Weiss, bjweiss@earthlink.com	(925) 447-9025
MEMBERS AT LARGE	
Robert Taylor, 74551.1701@compuserve.com	(925) 447-2291
Warren Massey, masseys@pacbell.net	(925) 443-4933
EDUCATION	
Andrew Pohlman, apoh@sinewave.com	
MEMBERSHIP/EQUIPMENT	
Warren Massey, masseys@pacbell.net	(925) 443-4933
NEWSLETTER	
Lynn Kissel, lkissel@starship.org	(925) 294-8047

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 1950's 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, 4H, Indian Guides, the GATE program, and LARPD Science Camp.

Launches

Section launches are usually held from 8:30 a.m. to 12:30 p.m. on the **third Saturday of the month**, unless preempted by other civic events. Our launch site is in Livermore at the soccer practice field of Robertson Park, adjacent to the rodeo grounds, in the southeast corner of town. 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*.

LUNAR's launch site has been certified by the Fire Marshall up through "H" power, and is the only place in northern California where this level of power can be legally flown.

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 a.m. 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

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.

Other section meetings are currently held on a bi-monthly bases. 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.

WWW site!

LUNAR maintains a World-Wide-Web site on the Internet. It is accessible via the URL (uniform resource locator)

<http://www.lunar.org>

There's a lot of stuff to see there, 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!

The on-line version of the LUNAR'clips is in some ways better than the hard copy version that we mail to the membership. For example, the on-line version often has color images or additional visual material that doesn't appear in the hard copy version.



LUNAR Calendar

Launches at LARPD Soccer Fields, Robertson Park (N 37° 40.10', W 121° 45.36')

Meetings at community meeting room, Livermore Police Station, 1110 S. Livermore Ave.

WARNING! Times and dates are subject to change with little or no notice. For launch confirmation call the LUNAR Hotline (925)443-8705 after 7 am on launch day. Otherwise, visit the LUNAR web site at www.lunar.org for the latest information.

September, 1998, MEETING ◆

POSTPONED until October 15

September 26, 1998, LAUNCH ↗

Saturday, 8:30 a.m. - 12:30 p.m.

October 4, 1998, AIR SHOW

Sunday

Demo launch?

East Bay Radio Control Club

October 15, 1998, MEETING ◆

Thursday, 7:00 p.m. - 9:00 p.m.

Warren Massey, igniters

October 17, 1998, LAUNCH ↗

Saturday, 4:00 - 9:00 p.m.

night launch! ✱

November 2, 1998, DEADLINE

LUNAR'clips submissions for

Nov/Dec due to editor

November 19, 1998, MEETING ◆

Thursday, 7:00 p.m. - 9:00 p.m.

Andrew Pohlman, Level 1 Cert.

November 21, 1998, LAUNCH ↗

Saturday, 8:30 a.m. - 12:30 p.m.

December 19, 1998, LAUNCH ↗

Saturday, 8:30 a.m. - 12:30 p.m.



LUNAR

912 Loyola Way

Livermore, CA 94550-7286