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MAY - JUNE 2000

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Left: RATO pack with AeroPack RA98 Motor Retainer and AeroTech™ motor. Right: Prowler UAV in STO launch using RATO pack with AeroTech™ M2500 motor and Aero Pack RA98 Motor Retainer. Acronyms: RATO = Rocket Assist Take Off, UAV = Unmanned Aerial Vehicle, STO = Short Take Off. Photos courtesy of General Atomics Aeronautical Systems Division

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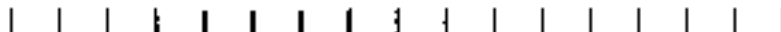
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may/june

5-6.2000

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interview:

rikki rockett: rock star & rocket scientist p.22

Rikki Rockett is best known for playing drums for the rock band Poison. When not on tour he builds massive rockets like the 289 pound Jurassic Kick.

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a simple guide to national launches p.20

Information you need if attending LDRS or NARAM this summer.

launch report:

springfest 2000 p.30

Held just south of Las Vegas, Springfest attracts an international crowd of rocket flyers.

how to:

how to build a camera rocket p.34

Find out the secrets of aerial rocket photography. Part one of a series showing you which cameras work best with which film.

product review:

aerodrag software p.38

New to the software choices out there, AeroDrag offers a nice collection of features at a reasonable price.

product review:

mach buster rocket kit p.40

Want to go super sonic on a G motor? The Mach Buster will do it.

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A comic strip for your entertainment.

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The latest scoop from various clubs.

launch calendar p.44

A huge list of rocket launches.

aft closure: opinion page p.46

One person's opinion, but not necessarily the opinions of this magazine.





About the Cover:

Photo taken by Brent McNeely. The Jurassic Kick Rocket was flown at Delemar Nevada and built by Rikki Rockett and Steve Cello

article submission deadlines

july issue may 21
 september issue july 21
 november issue. september 21

advertiser submission deadlines

july issue june 1
 september issue august 1
 november issue october 1

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Making a lemon into lemonade at Springfest

A Good Thing

I believe we have a good thing going here. We are now on our second issue of the magazine, and it is getting much easier each time to put the publication out. We had a few bumps on the first issue but now that we've gone through it once, we think we've got most everything ironed out. The

biggest snag we ran into was thinking we could print and mail the magazine in a shorter period of time than was really possible. To adjust for the additional time requirements, we have bumped up our production schedule by several weeks in hopes this issue will reach you during the first few days of May. We will continue to adjust our schedule to meet this goal.

A Big Head

Overall the comments regarding the first issue of Extreme Rocketry have been overwhelming. My head is swelling and my wife is having difficulties keeping me down to earth. Letters from our readers have been absolutely glowing with praise. We've had a few letters of constructive criticism and have published almost all of these letters in this publication along with a handful of the more positive letters.

During this last month we received several hundred emails with feedback regarding the magazine. As a result I began redirecting most of the mail to my associate editor Tim Quigg who is handling most of the email now, allowing me to concentrate on getting this issue to press. Thanks Tim!

Expanded Web Site

By the time you read this we hope to have a new section of our web site up and running. This section will be devoted to the rocketry community and feature a launch calendar, club reports, and best of all, a product review section. You as a reader can write your comments and rate any product out there. We will then be incorporating your comments and ratings into our magazine reviews. We hope this tool will be

helpful to all rocketeers when trying to make buying decisions. Manufacturers of rocket products might also find it helpful when trying to determine how to improve their products in relation to competitors. As a whole, the product review section of the web site should foster better buying decisions for hobbyists as well as encourage better quality from manufacturers.

Grand Opening

We had a small booth set up at the Springfest rocket launch held just south of Las Vegas in mid-March. Although we didn't have spot lights, a live band, and dancing girls, we did give out T-shirts to each person who successfully gained a level one, two, or three certification during the three day launch. We believe everyone who participated liked getting the T-shirt and their picture taken for the magazine.

Submitting Articles

We are always looking for new writers to contribute to Extreme Rocketry. If you have writing experience and wish to submit your articles, we welcome them. Currently we are able to pay a small fee for each article which we publish. Although the money is not much, we hope it will allow you to buy a rocket motor or two to help make the effort worth while. Please contact us before you jump in and write your article, many times we will be able to help you with a simple outline of what we are looking for in our magazine.

Hobby Shops

Several hobby shops are now carrying our publication on their stands. You will see the number of shops expand dramatically in the months to come. By the end of the year we should be in all the hobby shops which carry rocketry magazines. However, if you see your local shop does not carry Extreme Rocketry, please encourage them to do so.

Next Year: Monthly Magazine?

In 2001 we hope to publish our magazine on a monthly basis. Before that happens, we feel we need to get the production system down, have a higher circulation, and a wider advertiser base. When these things occur, you will be seeing the magazine in your mailbox at the beginning of each month.

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- More stable than cross-form or conical chutes •
- Professionally designed •

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R9C	6	12	\$60.00
R12C	12.5	20	\$100.00
R14C	20	35	\$135.00
R18C	45	65	\$160.00
R24D	DROGUE CHUTE		\$20.00
STREAMERS			\$20.00

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R12C	\$145.00
R14C	\$189.00
R18C	\$250.00
R24D	DROGUE \$28.00

BALLISTIC

ROCKETMAN CHUTES

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R7C	\$65.25
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R12C	\$145.00
R24D	DROGUE \$29.00



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rants and raves from our readers

by our readers

Hitting it Right!

I had to pick up some friends at the airport last night, and brought [the magazine] with me to read. Their son, he's going on 4, saw it and kept asking me when we could launch rockets again! The mom couldn't believe there even was a mag for rockets at all! (She's seen my house, with mod rocks up thru my L2 bird, filling every empty spot in the family room, but hadn't realized how many other people were into this!) After reading it, I just wonder what will be in the upcoming issues! You hit so many good things in the first one (L1 cert/Range box/FAA, etc.) Can't wait for the next one!

Sparse Magazine

I received your premiere issue of Extreme Rocketry yesterday (Saturday the 25th). For a premiere issue, it was nicely put together. The only negative I could come up with on my first glance through was that the magazine was a little sparse... it looked like there was a lot of empty space, but as soon as more articles and advertisements roll in that should change. It is nice that there is another outlet for model/high power rocketry individuals to share their stories and knowledge with their fellow rocketeers. I hope the best of luck for the magazine and congratulations on a job well done.

Richard Burney

Richard, the magazine will continue to grow as we have more readers and submitted material.

Nice Paper

Just to let you know, I got my first issue of Extreme Rocketry on Saturday, March 25th. And it looks GREAT! The pages seem a little thicker and glossy than most magazines, which I think tends to lend an aura of quality. I've just started going through the articles and so far, they seem to be well thought-out and written. I specifically like the topic of things you need to have in your range kit. For people just starting out in this hobby, this kind of information is invaluable. Again, great job and I'm looking forward to your next issue already!

Lawrence Baker

Extremely Frustrated

I just submitted a subscription online. I must say your online form is *extremely* frustrating to deal with. I had to fill out the complete form 3 times to get everything exactly right for it to be accepted.

Tom McAtee

In time we hope to upgrade to a high quality shopping cart system which should be easier to use. For now, we are stuck with what we have until we have more bucks!

Sexy Centerfold

I got my first issue of ER today. I love the paper quality... and the centerfold, "Oh...You baaad girl!... [Drool]"

Doug

Why a Mars Lander?

I thought this mag was dedicated to high power rocketry. What does the Mars Lander kit have to do with high power rocketry?

Bill Panschar

Our magazine is not dedicated exclusively to high power—we will be address rocketry at all levels with an emphasis on mid and high power. Any rocket that is extremely unique is a candidate for a featured article. We believe the Mars Lander shows excellent craftsmanship and worthy of a feature article.

Fine First Issue

Congratulations on a fine first issue! As a <B.A.R>. "newbie," I especially liked Tim Quigg's "Getting Level 1 Right The First Time" and Brent McNeely's "12 Range Box Essentials." Please keep those "novice" articles in your mix. Also, I enjoyed the interview with Gary Rosenfield. Keep up the good work on Issue #2!

Dick Terpstra

A Bad Start

If you were going to give a sample issue (online or hard copy) you must not have very much confidence in your content to screw up the articles by only offering a few paragraphs of each article. This is akin to blacking out a free issue with black mark out ink. Very unprofessional. So you can count me out on supporting your efforts. And I will continue to tell all my rocketry friends the same.

Ted

More Text per Page

I came home today anticipating a new magazine sitting in my mailbox, and I wasn't disappointed. For the record, I live in Chicago (not the suburbs), if that gives an idea of how long it takes for mail to reach me. It may have been a week or so late, but it sure beats the (lack of) timeliness of other rocketry magazines. I like

the font used in the articles. It seems like there's more text per page than most magazines, but it's still nice and readable. I also like the fact that the centerfold picture doesn't have two pages of articles on the other side; what's the point of a centerfold if you can't remove it without destroying the magazine articles? I only have one suggestion. Mailing envelopes would be nice. I like to store my magazines and having them in envelopes is convenient - keeps them clean. It also avoids having a mailing liable stuck on the cover. All in all, a great effort and I can't wait for the next issue. Congratulations!

Matthew Travis

It Needs to be Said

I'm just throwing this out there because I thought it needed to be said. I know there are a lot of people who probably subscribed to the new magazine just recently and for all I know, many have probably already received it. Me on the other hand, have not. Being that I was perturbed every day this week that I anxiously looked into my mailbox after work and found nothing but bills! I have had correspondence in the past with Brent from Extreme rocketry, I want to make a note and feel free to express your positives, but I have been super impressed with this guy and his determination to make a quality product, such as his magazine. He is having difficulty with the postal people in getting his magazine out, but makes no excuses for it, wants to fix it, and make it right. I admire that in a business person. All the times I have bought rocket related items on line and have called to confirm an order and made to feel as a burden or inconvenience. This gentleman has treated me with respect and answered every question personally and with honest and genuine consideration for my needs and wants. He just recently answered a question and I replied with a simple thank you which most would say "no problem" to themselves and not even bother to write back, but he wrote back a small personal note saying "tell me how I can be better." I wish there were more guys out there in rocketry who are like him and really respect their customers, the ones who pay the bills. I know there are, but many times they are far and few in between. With a commitment to quality and respect, I'm sure this magazine will be a success. Thanks for listening!

Fletcher Partridge

send us your photos! by our readers

Owner: Dennis Watkins
Rocket: LOC Bruiser
Height: 9'4"
Diameter: 7.5"
Unloaded Weight: 34 lbs.
Motor: AeroTech L-1120
Recovery: 2 missile works RRC2s
Location: GARAJ Launch
Altitude: 6581 ft.



Owner: Dan Stuetgen
Rocket: Mercury Redstone
Height: 5 feet
Diameter: 4 inch
Loaded Weight: 3.3 lbs.
Motor: Econojet G motors
Location: unknown
Altitude: aprox. unknown



Owner: Jeff Jacob
Rocket: Un-named
Height: 168 inches
Diameter: 6 inch
Weight: 125 lbs.
Motor: Custom Hybrid
Location: not flown yet
Altitude: not flown yet



Owner: Jeff Jacob
Rocket: Unknown
Height: 156 inches
Diameter: 4 inches
Empty Weight: 35
Motor: Hybrid O motor
Location: unknown
Altitude: unknown



Owner: Barry Forrest
Rocket: NLM
Height: 168 inches
Diameter: 6 inch
Weight: 125 lbs.
Motor: Kosdon K280
Location: El Dorado
Altitude: 13k



Owner: Hyam R. Sosnow
Rocket: "238" scratch built
Height: 6 feet
Diameter: 4 inches
Loaded Weight: 9 pounds
Motors: 2 x I132
Location: Lucerne, CA
Altitude: 6350 feet
Recovery: BSR AltAcc



Submit Your Photo: Do you have a great photo that you'd like to see in the next issue of Extreme Rocketry? Mail your photo to: Photos at Extreme Rocketry, PO Box 28974, Las Vegas, NV 89126. Make sure to include the caption information like you see here along with your photo. Please include contact information in case we have any questions (email addresses are preferable). Photos will not be returned and may or may not be published here.

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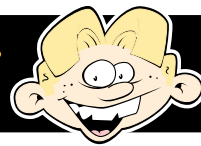
10 inch giant nose cone

Looking for a giant nose cone to fit your 10 inch Sono Tube? Brian Cook stands next to the product. Maximum Thrust Rocketry is now selling these big cones for \$400 each.

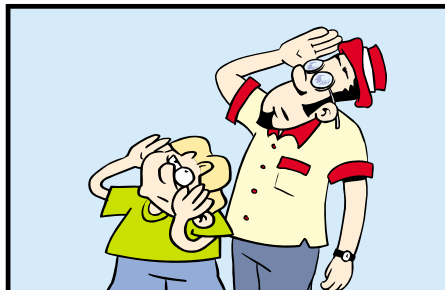
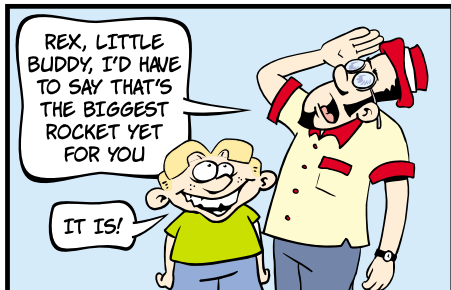
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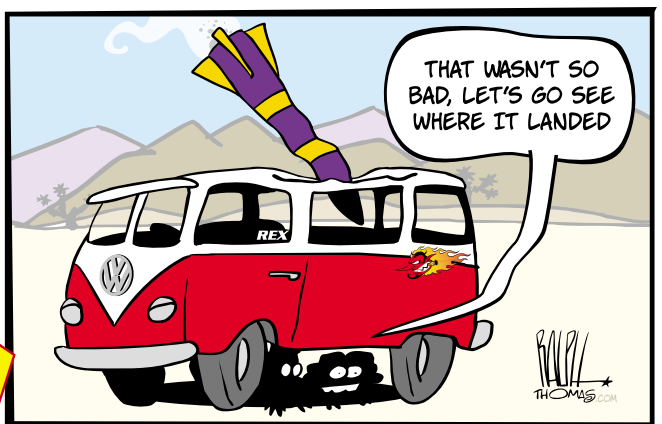
Rocket Rex



BY *Ralph Thomas*



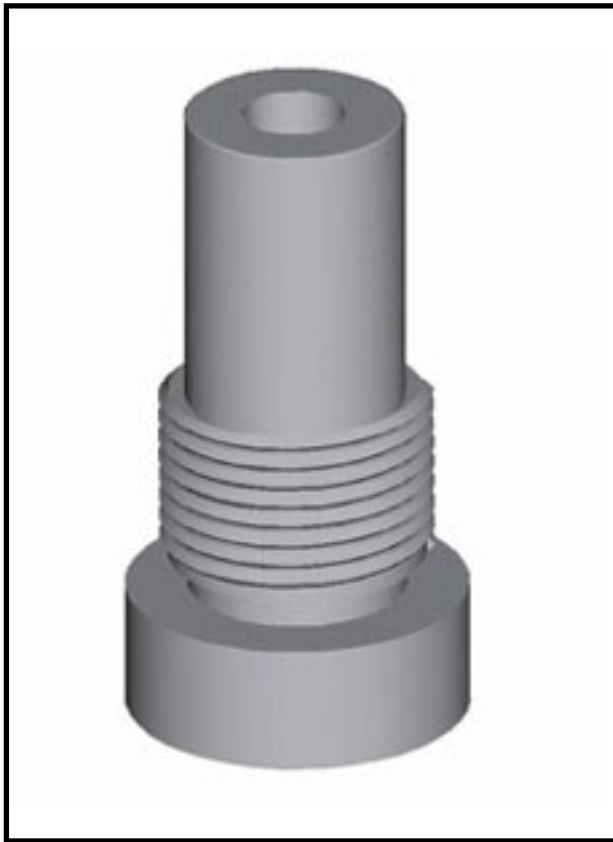
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7.5" ONE/TWO HOLE	\$6/7
11.4" ONE/TWO HOLE	\$8/9
TAP AND DRILL SET.....	\$35
REPLACEMENT O-RINGS.....	\$5

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what rocket companies are up to

ROCKET KITS

new kits from public missiles

New kits from PML include the Hydra, Matrix, Intruder, & Mini Black Brant X. (BBX) The Hydra, Intruder, & Matrix all utilize PML's exclusive 3 inch Quantum Tube. All three can fly on G-80s or larger motors. The Hydra comes with four fins plus two "wings" protruding from the air frame just above the four fins. The Matrix uses three pairs of fins similar to the Small Endeavour. The Matrix resembles a futuristic deep space probe that could be used for mining in space. The Intruder is a futuristic rocket interceptor that comes with five fins. It is aggressive looking. These three kits come standard with 38mm motor mounts.

The mini BBX comes in QT-2.1 with a tail cone to a dedicated 29mm motor tube and detailing information. All kits come with decals or vinyl appls and are the first to receive the totally revised kit instructions. All four new kits received wide acclaim at the East Coast Hobby Show held March 25-27 in Philadelphia. Prices to be announced at introduction.

Slated for late April introduction is the PML CPR-3000 system. The new CPR-3000 system uses a machined aluminum threaded air-frame coupler and threaded sleeve in place of the standard urethane parts. Adding to the strength of the new system is a coupler tube and two additional centering rings. The new system will accommodate the P5, P6, and Adept 25 altimeters at introduction.

The on/off switch used in our P5 altimeter sets will be upgraded to a sealed 5 amp switch. This switch will also be available as a separate item.

ROCKET PRODUCTS

pete's rockets new web site

Petes Rockets, the UK's high power and model rocket specialist, is pleased to announce the arrival of our web site at www.petesrockets.co.uk. They will endeavour to bring the very best of rocketry products to the market place, available through their shop at Heckington in Lincolnshire and mail order for those who find it difficult to visit. They are on hand to offer great products and helpful advice to all rocketeers. Contact: Unit 1 Southview Buildings, Burton Rd, Heckington, Sleaford Lincs, NG34 9QS UK Tel: +44 (0)1529 460279 . Fax. +44 (0)1529 461483 and email:- davy@btinternet.com

ROCKET MOTORS

aerotech introduced RMS-Plus

AeroTech, Inc. is pleased to announce that it has begun shipment of its first major enhancement to the 29 & 38mm lines of Easy Access™ RMS™ high performance rocket motors, the RMS-Plus™ advanced delay sealing system.

RMS-Plus™ is a new delay charge configuration that seals the delay element radially (around the outside) rather than axially as in previous RMS™ reload kits. AeroTech designed RMS-Plus™ to be compatible with existing 29 & 38mm RMS™ forward closures, so that no new hardware purchase is necessary! The major benefits of RMS-Plus™ include:

- More precise delay times
- Greatly reduces the chance of forward closure "blow-by"
- Easier cleanup
- Motors may be left assembled indefinitely prior to use
- No need to remove delay charge assembly if closures are loosened
- No preload necessary for delay o-ring to seal
- One delay propellant formulation used for all delays

For nearly two years, the RMS-Plus™ design has been in the development and testing stages, which included lengthy examination by the Tripoli Motor Testing Committee (TMT) and beta testing by consumers.

Sixteen new RMS-Plus™ reload delay kits ("RDK's") will be available immediately to modify any older 29 & 38mm reload kits to the RMS-Plus™ design, if desired, and to change the delays of RMS-Plus™ reload kits. The older 29 & 38mm RDK's have been discontinued.

RMS-Plus™ reload kits and RDK's come complete with new improved illustrated instructions. The new reload kits can be identified by the prominent RMS-Plus™ logo on the reload kit header cards. The header cards include a handy cross-reference guide on the back side to assist dealers and flyers in selecting the appropriate RMS-Plus™ RDK for any particular reload kit.

In related news, AeroTech is simultaneously releasing short and medium delay versions of its newest 29mm Easy Access™ reload kit, the I200W, in the RMS-Plus™ configuration.

For a preview of the RMS-Plus™ design or to view and download RMS-Plus™ motor reload kit and RDK assembly instructions, please visit the Resource Library on the AeroTech website at www.aerotech-rocketry.com.

ROCKET KITS

rocket dyne name change

Recently RDS was asked to change any and all names, references, likenesses, and mention of the name Rocket Dyne Systems. Apparently the Boeing Company feels that the name Rocket Dyne System is too close to their subsidiary Rocketdyne's trademark. RDS has complied with the demands of the legal staff of Boeing and has since changed our name to Rocket Dynamic Systems, RDS. The company will however, continue to produce the same high quality kits for the rocket enthusiasts.

What's New: RDS has exclusively developed in conjunction with our tubing manufacture the Shock Wave airframe tube. This tube is made for super absorbency of epoxies, resins and all glue types. This tube is great for compositing. There is no glassine cover to peel. RDS body couplers are double the thickness of any currently available. Three new kits will be available by late March. These will be 29, 38, and 54 mm kits. They will be based on our 2.56" & 3.00" Shock Wave Air Frame Tube. Also to make its debut in early spring will be the 5.5" Great Scott. Contact: PO Box 801208 Santa Clarita, Ca. 90380-1208 or call us at 1-800-899-7512. Web: www.rocketdynesys.com, E-mail mike-john@rocketdynesys.com.

ROCKET PRODUCTS

orbital dynamic wide selection

Orbital Dynamics, Inc. (ODI) is pleased to announce the addition of Aero Pack, the Xtreme and Jr. Xtreme line of Model and HPR rocket products. In addition, ODI offers the Largest and Most Diverse Selection of rocketry Products and Services on Earth! ODI is your "One Stop Rocket Shop"™ offering over two-hundred sixteen pages of Products and Services on our Web Catalog! They specialize in helping Beginners, BARs, and those attempting Level I, II, III Certifications, and Beyond! Attention to Service, Discounted Prices, Innovation, and the availability to offer Technical Support across our entire Products Line from 11:00am to 11:00pm

seven days a week display a commitment to serving the Model and HPR rocketry community!

ROCKET CONSTRUCTION

totally tubular tubes

Totally Tubular™ is excited to announce they now stock more sizes of model rocket tubing than anyone on the planet. They have nearly every tube diameter ever made by Estes and Cox, plus some sizes never before created, all in smooth white overwrap, 34" long. Everything from 1/4" od to 5 1/2" od... T-70, T-80, and T-101 as well as T-30 and a special 0.700 od tube for 1/100 Redstone and Saturn 1B fans. Add to this couplers and centering rings for nearly every size, nylon and Mylar film recovery system materials, and specialized tools and adhesives, and they are a scratch builder's paradise. Contact: Totally Tubular, Box 430, Hamburg MI 48139-0430. Web: www.sligar.com/buyrockets/tt.html or email jfackert@cac.net.

ROCKET KITS

new kits from maximum thrust

Maximum Thrust Rocketry's "MAD MAX" rocket, a 3.9" kit with a rounded nose cone is slated for release in April. The kit, standing just over 5' tall, is topped by a unique rounded nose cone. Demo'd at Springfest 2000 with both 3 and 4 fin configurations, the Mad Max will be produced with 3 G-10 fins. The rocket can be configured for drogue-to-main deployment, dual deployment, or single chute deployment. It comes with required hardware (eye bolts and quick links), 1" nylon shock cords (12' and 8') and 36" and 12" chutes, altimeter bay assembly, and a 54mm motor mount. Flown on J's at Springfest, the rocket shows the capability of being flown on extreme J's and possibly even K's. The next two 3.9" kits that will be produced in this order are: Japanese ASM. (rounded n/c) and the "Mach II - the perfect Level II rocket" (ogive n/c). Maximum Thrust is also solidifying a kit merger with Orbital Dynamics, Inc to issue a "Mach III Plus" an elongated version of the ever popular Mach III kit. The stretch version would be 4' longer, have an altimeter bay, along with extra hardware and shock cord for dual deployment. Stay tuned, this will be a hot one! Maximum Thrust is also proud to announce that they will be listing Black Sky's ALTACC on their

site soon along with other fine BSR electronics, and will also be carrying Olson Electronics if all goes well. Contact: phone (619) 596-8318, Web: www.maximumthrust.com.

ROCKET SUPPLIES

shadow composites blowout sale

Due to the success of our Carbon Fiber Blowout Sale, Shadow Composites, Inc. is pleased to announce a NEW blowout sale! The Carbon Fiber has gone back to its regular price, but for a limited time we are offering a once in a lifetime deal on KEVLAR - 7.75 oz/yd. plain weave, 19.75" width, at the amazing price of 8.00 PER YARD! Just the thing for your next truly BULLETPROOF project, at a price which is less than half of anyone selling Kevlar out there!

And, just like the Carbon promotion, Get one yard FREE with every \$20.00 in purchase of any other Shadow Composites products! (This is inclusive of any kevlar yardage you buy - Buy 3 yards of Kevlar at \$8.00 per yard and get one yard added on FREE!)

And, get one yard free with purchase of our Advanced Composite Techniques Video, or TWO YARDS FREE with purchase of our video/Heat Tape combo pack!

If by now you can't tell, we are making a serious effort to get these advanced materials into the hands of our fellow rocketeers to show how effective they can be in YOUR hands. These materials create rockets of superior strength, lighter weight, and by following the techniques shown in our Advanced Composite Techniques Video, you can share in the successes of our past customers.

This is a limited time offer, as long as our supply lasts, so act fast!

Also, our new SPRINT-ABM kit is T-minus one week till launch! We're just waiting for the shroud bodies to come back from the printer, and they'll be ready to ship. You can place your order now for one at \$35.00, and the kit has many slick aspects never seen in small kits before, like a full NOMEX paper inner shroud liner! The SPRINT-ABM will be produced in a numbered edition, so you collectors out there might want to act fast for the first production of this unique new kit.

And lastly, our website at www.shadowaero.com will be updated in the next two weeks with a new, easier on the eyes look and credit card acceptance by PayPal, with final

photos of the TRINITY 4" X 120" all carbon Level 3 technology demonstrator slated to fly at BALLS 10 in September. Thanks for all your support, and we look forward to serving you with the best service in the industry and the most advanced aerospace quality products well into the new millennium!

ASSOCIATION OF EXPERIMENTAL ROCKETRY OF THE PACIFIC PRESENTS

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questions & answers by the rocket guru

Question: NFPA, FAA, DOTSUM... Who are all of these organizations and how do they affect the rocketry hobby?

Answer: As your question alludes to, there are many organizations we must deal with in rocketry. There is more to the hobby than just flying rockets. The DOT (Department of Transportation) regulates shipping of rocket motors and reloads. The CPSC (Consumer Products Safety Commission) regulates what may be and not be sold as a "consumer" item at the retail level. The FAA (Federal Aviation Administration) is responsible for airspace control and regulates flights of rockets that exceed one pound and enter FAA regulated airspace. The NFPA (National Fire Protection Association) makes recommendations for the use of non-professional rocket motors. Although the NFPA only makes recommendations, there are some state and local laws concerning the use of model rockets which are based, at least in part, on NFPA recommendations. This is especially true of NFPA regulation 1122 dealing with model rocketry. The NFPA also has a definition and safety code for high power rockets in the form of NFPA 1127. The BATF (Bureau of Alcohol, Tobacco and Firearms) has responsibility for regulations concerning storage and use of explosives. This agency has taken a recent interest in looking into how high power rocket motors are stored and used. Finally, there is the local ATC (Air Traffic Control). You must notify the nearest FAA ATC center prior to flying large model rockets or high power rockets.

Question: How can I prevent a rocket painted white from yellowing?

Answer: Future Floor Polish (it isn't wax) does not yellow. I've found it to be useful for rocket applications, but it MUST be used over some kind of paint or over acrylic gesso. If it seeps into cardboard or wood, the affected material will become brittle. It will cause dope and even permanent ink marker colors to run. This effect can be used to your advantage, but it can also ruin a model if it is not desired. Future does not seem to cause enamel paint to run, and may certainly be used to cover decals. However, I have not heard nor conducted any testing to verify if the decal will yellow beneath the coating. Also, keep in mind that a glossy finish

is not always desirable, and Future produces only a glossy finish.

Question: How can I prevent balsa fins from breaking off on landing (especially for models with swept fins)?

Answer: What some modelers have done is simply to cover the fins before painting. Silk tissue (like model airplane tissue made from silk fibers) works well. Depending upon the size of your rocket, you could use ordinary Japanese tissue, or Silkspan, or you could even use something like nylon cloth or very light fiberglass (attached with epoxy or CA in this case). With tissue, you need to cover the entire surface of the fin. Simply wrap it over the rounded leading edge, and trim off at the tapered trailing edge, leaving the "bottom" edge and the root uncovered. You can attach Silkspan with almost any glue, but silk tissue "fuzzes" if you get it damp and handle it. In this case, something like Testor's model airplane glue in the orange and white tube, or thick, clear nitrate dope might be a better choice. It won't soften the binder that holds the fibers in the tissue together. Any of these, done after sanding (and filling in the tissue case) will add significantly to the strength of the fin, while adding very little weight.

Question: I realize that there are now three rocketry-related magazines now on the market (counting this one). Are there any more out there you are aware of?

Answer: There are two that I am aware of. "The Rocketeer Collector's Journal" is a publication for serious rocket collectors. It is published four times a year. Subscription is \$16.00 a year. You can subscribe by contacting the Editor, Danney E. Sagstetter at 4432 North Fourth Street, Columbus OH 43224-1035. Phone is (614) 268-6927. The other is "AstroMag," the Canadian Rocketry magazine. It is published three times a year. Subscription is \$14.95. You can send your subscription to 17865 Meloche Street, Pierrefonds, Quebec H9J 3P9 Canada. The e-mail address is 'a3maq@spherenet.com.' Or you can log on to their website at www.game-master.com/yves/.

Question: Estes style shock cord mounts really suck! Is there an alternative?

Answer: There are a number of ways to improve on the old paper and elastic shock cord mount used by Estes for the past 35 years or more. Probably the easiest way I've found to improve on the design is to toss the "way too short" shock cord supplied with the kit, and replace it with a suitable length of good quality braided sewing elastic that is at least twice the length of the model. This will help to avoid tube zippering or ripped out shock cord mounts from too short shock cords. To keep shock cord mounts from ripping out, epoxy the shock cord mount to the inside of the body tube rather than using white or yellow glue. Thirty-minute epoxy works best for this. Be sure to lightly sand the inside of the tube where the shock cord mount is to be placed. Also, be sure to cover the entire mount with a very thin layer of epoxy. This method works best for models with BT-60 or larger body tubes. Another option is to use the "Quest" style Kevlar and elastic shock cord mount. This type of mount uses a length of 50 to 150 pound Kevlar line. You can get this in the form of fishing line from a sporting goods store, or in the form of kite string from a hobby shop. The Kevlar is tied and glued to the motor mount via the motor block, centering ring or around the motor tube itself during initial assembly. It is sized to end just shy of the front end of the body tube where a length of elastic shock cord is tied onto the free end of the Kevlar. This method eliminates any shock cord mount on the inside surface of the body tube. Estes-style shock cord mounts have been known to interfere with parachute deployment. You can use this method on any size rocket. Size the Kevlar appropriately. The final option would be to use a LOC-style shock cord mount for body tubes in the 1.5-inch and up range. With this you take a short length of Kevlar line, fold it in half, and make a 1 to 2-inch loop in the closed end of the folded line. You then epoxy the loop to the inside of the body tube in such a manner as to have the end of the loop extend a little past the open end of the body tube. A shock cord is then tied to the loop. The advantage of this design is that it allows damaged shock cords to be easily replaced. It tends to work better on body tubes greater than 1.5-inches in diameter.

estes educator site: a rare find for model rocketry information

by darrell d. mobley

Of all the websites of valuable information, probably the most rewarding one for those in instructing professions with regard to model rocketry is the Estes Educator websites. The first of the two Web offerings from Estes, the Estes Educator site located at www.esteseducator.com goes a long way to provide hard-to-find information on the science of model rocketry and how it applies to the education process.

Model rocketry is unique in its education qualities in that it teaches science, math, industrial technology and other subjects. For teachers and youth group leaders looking for free publication downloads, special quantity bulk pricing for educators, extensive curriculum support materials and learning software, this Web site is for them.

Once on the site, you'll find a standard left hand navigation approach along with some common navigation along the top header. From the front page, you can visit the "Guide for Teachers," "How Rocketry Benefits Your Class," "Introduction to Our Company," "Estes Educational Program," "Model Rocket Product Line," or the "Safety Code/Laws" sections. Across the top you'll find: Products, Rocketry 101, News, Publications, Curriculums, and Suppliers.

The Publications area is great for immediate gratification with fourteen documents made available in Adobe PDF format. These include:

1. Estes Guide for Teachers & Youth Group Leaders - Introduces you to Estes' rocket technology, safety and launch day operation techniques. Plus, background on Estes Industries and the complete services offered in our educational program. (20 pages)

2. 2000 Estes Educator Catalog - This informative catalog contains the full line of Estes educational products and materials for your classroom or youth group. In addition to Estes model rocket bulk packs and accessories, facts on Estes model rocket engines and igniters are included in the catalog. (18 pages)

3. Estes Model Rocket Launch Systems Guide - Contains a wealth of information. Photographs and clearly drawn schematics make it easily understood. The electrical theory of launch systems is explained and a number of special study problems are included. (18 pages)

4. Estes Camp Leader's Model Rocketry Manual - Expanded guide for introducing model rocketry successfully into camp programs. This publication has been well accepted by camp leaders. The author is an experienced camp leader and professional educator. (18 pages)

5. Estes Model Rocket Contest Guide - Use to plan model rocket contests for school classes or clubs. Contains details on types of competitive events and suggestions on all facets of contests from organization of the planning committee to championship awards. Includes sample score sheets. (16 pages)

6. Estes Guide for Aerospace Clubs - The perfect source book for organizing and operating a successful model rocket club. A comprehensive guide, idea source and reference for club organization and activities. A must for active clubs. (33 pages)

7. Estes Projects in Model Rocketry - Suggestions on how to plan, prepare and present research projects. Ideas for about one hundred projects. Projects range from simple exhibits to true research work. An excellent reference for Science Fair projects. Great ideas for clubs. (14 pages)

8. Estes Teacher's Guide for "Physics of Model Rocketry" Software - This guide explains how to use the "Physics of Model Rocketry" software with your model rocketry studies. Objectives, daily schedules, suggestions and program summaries are included. (8 pages)

9. Estes Teacher's Guide for "In Search of Space: Introduction to Model Rocketry" Software - This teacher's guide shows how to incorporate the "In Search of Space: Introduction to Model Rocketry" software into your model rocketry unit. It includes objectives, daily schedules, the Model Rocket Safety Code and a Model Rocket Safety Code Review. (14 pages)

10. Estes Teacher's Guide for "Flight: Aerodynamics of Model Rockets" Software - This software guide shows how to integrate the "Flight: Aerodynamics of Model Rockets" software into a model rocketry program. Objectives, daily schedules, suggestions and program summaries are included. (6 pages)

11. Estes Elementary Mathematics of Model Rocket Flight - Information on how to make and use your own altitude tracker and how to calculate speeds and accelerations reached by model rockets. Technical Note TN-5. (8 pages)

12. Estes Model Rocketry Study Guide - This book presents a logical program for anyone who wants the most from model rocketry. There is a planned sequence of activities through three skill levels that guides a student on his/her path to becoming an expert model rocketeer. A glossary and self-review are provided for each section. Technical Report TR-8. (45 pages)

13. The Classic Collection - "Classic" Estes Technical Reports and Technical Notes that include rocket stability, multi-staging, altitude tracking, rear and front engine boost gliders, building a wind tunnel, cluster techniques, model rocket engine information, payload launching and recovery techniques. (46 pages)

14. Estes Altitude Prediction Charts - Part 2 - Explains a relatively simple method by which aerodynamic drag and other atmospheric effects can be taken into account in predicting rocket peak altitudes. Includes suggestions for research projects. Technical Report TR-10. Part Two. (23 pages)

You may download these publications at no charge.

Under the Curriculums link, you will find a selection of curriculums and software programs. There is a one time access fee to access the information in this section. The \$19.97 fee gives you unlimited access to 5 curriculums and 4 software programs, much less than you would normally pay for just one software package.

One of the best presentation portions of the site is under the Rocketry 101 section. Detailed graphics depicting model rocketry technology in action are available here to assist you in explaining how model rockets operate. These diagrams and layouts would be an invaluable guide for creation of educational posters such as those used for a science fair or presentation. Model Rocket Flight Profile, Components of a Typical Model Rocket, Launch Site Layout, Recommended Launch Area, Facts About Estes Rocket Engines, Rocket Preflight Preparation, The Estes Igniter and Rocket Reference Chart are all covered here.

The Products area covers in detail the components of the Educators product line. Whitepapers, videos, curriculum guides, entire classroom programs tailored for teaching the science of model rocketry. Combined with bulk educator packs of rocket kits and motors, everything you need is in one easy to navigate place.

The Estes Educator web site has it all for the instructor looking to share the excitement of model rocketry through education based on scientific theory but you don't have to be an educator to benefit from the content you'll find there. You may be a beginner looking for more information, and what better place to get educated than by the company that had been the bellweather for model rocketry for over forty years. Give it a visit, I think you'll enjoy what you'll find there.

getting started with reloadable motors

by the tim quigg

In talking with beginning HPR enthusiasts, one will find the majority of these individuals fall into two distinct categories of indirect and direct introduction. The first group is those who have worked their way up through the rocket alphabet. Beginning with model rocketry, they have gained knowledge in the basic concepts of the hobby flying A through D impulse rocket motors. Graduating to mid-power rocketry, their skill base was expanded with larger rocket vehicles flying on motors in the E through G impulse range. It was at this level that most of these rocketry enthusiasts were introduced to consumer level reloadable rocket motors in the 18mm, 24mm and 29mm sizes. Valuable knowledge and skill in working with reloadable rocket motor technology was gained here before moving on to high power rocketry.

The second group appears to have entered the pursuit of high power rocketry directly; often without the benefit of having worked their way up through the skill and knowledge base the lower levels of rocketry provide. For these people, the world of high power rocketry can sometimes be a challenging, often vexing endeavor. This article is aimed at assisting these people. We'll look at a little bit of history behind the reloadable rocket motor, what it is, and how it is assembled. I will then offer up a few tips on assembling the reloadable rocket motor you won't find in the manufacturer's instructions. For those of you already well versed in HPR, this will be a good refresher for you.

Reloadable rocket motors have been around since about 1985. The primary, unique feature of a reloadable rocket motor is its metal casing designed for repeated use. Surprisingly, this technology is not that new, and has been around for some time. In 1947, the British Jetex reloadable rocket motor was developed for model airplanes. However, its propellant could not produce the thrust necessary for use in rocketry applications.

The reloadable rocket motor technology used by today's HPR enthusiast was born from the development of a composite solid propellant rocket motor used to deploy a parachute from an ultra-light airplane in an emergency. Through continued advances, reloadable rocket motor technology is now as safe to use as the venerable expendable rocket motor. It is true that the reloadable rocket motor system is more complicated, and there is a higher initial cost involved in obtaining the reloadable rocket motor casings. However, if one flies frequently, then the lower cost of the reloads versus the high cost of

the single use high power rocket motors will soon result in greater monetary savings after the initial hardware investment.

In order to participate in the hobby of high power rocketry, one must conform to many rules and regulations. The reloads used in reloadable rocket motors often fall under many of the same rules and regulations as their single use counterparts. Rocket motor manufacturers, the National Fire Protection Association (NFPA) and rocketry organizations such as the National Association of Rocketry (NAR) and the Tripoli Rocketry Association (TRA) recommend that reloadable rocket motors be sold and used only to persons 18 years of age and older. In fact, current federal regulations of the Consumer Product Safety Commission require this.

Local, state and federal regulations play a big role in the individual pursuit of high power rocketry. The Bureau of Alcohol, Tobacco and Firearms (BATF) often requires a Low Explosive Users Permit (LEUP) to purchase, possess and transport reload kits. The BATF may also require a storage magazine which often times must also conform to, be inspected, licensed and approved by local city, county and state fire and regulatory officials. The Department of Transportation (DOT) regulates how rocket motors and reloads are transported. There is also the Federal Aviation Administration (FAA). The FAA requires flight waivers, or (at the very least), notification of any high power rockets you launch wherein the vehicle and propellant weights fall within certain parameters established by this agency.

Faced with these sometimes daunting regulations, it is easy to see why HPR enthusiasts frequently band together to form clubs. These clubs usually have obtained and maintain FAA waived launch sites where a multitude of fellow hobbyists can fly under an all-encompassing compliance envelope established by the club as a group. Many of these clubs have also established, registered and licensed "club magazines" where club members can store their HPR rocket motors and reloads without the difficulties of BATF or DOT compliance. Another aspect of joining a club is that it's always more enjoyable to fly with others.

Keeping all of these local, state and federal regulations in mind, it becomes readily apparent why there are very few teenagers who participate in high power rocketry. Although there are some teenagers who pursue high power under adult guidance and control, it is due to these

regulations that the majority of the HPR enthusiasts are adults.

We've had a cursory overview of the history behind the reloadable rocket motor. We've also had a very brief overview of some of the regulations governing high power rocketry. Now, just what is a reloadable rocket motor? Although there are several very good, well-known and reputable reloadable rocket motor systems on the market today (Ellis Mountain and Kosdon to name a couple) I will restrict my discussions to the Aerotech reloadable rocket motor system. This is arguably the most common and prolific system on the market, and is also the system I have the most personal experience with.

A typical reloadable rocket motor system consists of three parts; a cylindrical casing, which is usually threaded at the ends, an aft closure and a forward closure. As one would expect, these three parts have been machined to very exacting tolerances. These components are made of metal such as an extruded or milled aircraft grade aluminum, and usually sport an anodized finish. Typical sizes for reloadable rocket motors start with the diminutive 18mm casing, and run up through 24mm, 29mm, 38mm, 54mm, and 75mm diameters. The largest are the massive 98mm (4-inch diameter) motor casings that facilitate the M size reloads, and the monster N2000 reload. There are larger rocket motors than these, which run into the O, P and even R impulse range, however these are all typically experimental rocket motors produced by highly skilled individuals for experimental launches. They are generally not for use by the average HPR enthusiast, and can only be flown at a few sites across the United States that have FAA waivers sufficient to support the 20,000+ feet of altitude these rockets can sometimes achieve.

The HPR reloadable rocket motor system shares many basic similarities with the solid rocket boosters of the space shuttle, which are the world's largest reloadable rocket motors. The HPR motor reload kit consists of one or more propellant segments, often referred to as "grains" or "slugs" composed of Ammonium Perchlorate or "AP" as the primary ingredient. This is the same propellant used in the solid rocket boosters of the space shuttle launch system. Each propellant segment is cast in a cardboard tube. Also included in each reload kit is a cardboard or phenolic insulator tube. This insulator tube keeps the burning composite propellant from raising the external temperature of the motor casing above 200 degrees Celsius. This

allows the rocketry enthusiast to use reloadables in the same kind of models that single use motors are used. Again, just like in the space shuttle boosters, HPR reloadable rocket motors utilize a series of o-rings, which when compressed, seal the system.

For the neophyte, assembling a reloadable rocket motor can be an intimidating task. Fortunately, there is usually a complete set of profusely illustrated instructions included with each reload kit. Although there are slight differences from reload to reload based upon size and impulse level, each reloadable rocket motor is assembled in the same basic set of steps.

First, the insulator tube is inserted into the motor casing, and then the propellant segments are inserted into the insulator tube. Once the propellant segments are installed, a disposable motor nozzle is placed on top of the propellant at one end of the casing, and one or more rubber o-rings are inserted around the motor nozzle to seal the aft enclosure. The aft enclosure is then screwed into place over the motor nozzle. Next, the pre-packaged delay segment is inserted into its corresponding cardboard insulator tube. Rubber o-rings are placed into the forward enclosure ahead of the delay segment, and then the delay segment is seated into place in the forward enclosure on top of the o-rings. More o-rings are placed around the rear of the forward enclosure, and then the entire unit is screwed into place on the remaining end of the motor casing. Depending on the size of the motor, usually a pre-metered amount of FFFFG black powder is supplied in each kit to be used as an ejection charge. On larger reload kits, the modeler has to supply his or her own black powder. The black powder is carefully poured into the orifice in the forward enclosure, on top of the delay segment, and then sealed with masking tape or a "sticky dot".

There are various acceptable means used today to ignite reloadable rocket motors. So various are they in fact, this subject could easily be the topic of another article in itself. Aerotech manufactures the Copperhead igniter, one of which is included in each of their high power reload kits. Other forms of ignition include wired camera flash bulbs, igniters used in blasting such as Electric Match, and homemade igniters made from Thermalite fuse. Other high quality igniters are produced by Fire Fox Enterprises in the form of the "Cyclone" igniter and North Coast Rocketry's "Laser Fire" igniter. There are also various kits that one can purchase to mix and dip your own igniters as well.

As one can see, the use of reloadable rocket motor technology can be as much a challenging pursuit as is the hobby of high power rocketry itself. However, as long as one practices the proper precautions; reads and follows all instructions, reloadable rocket motor technology can open a vast horizon of possibilities. It is also recommended to observe and learn from those in the hobby who are well versed with this technology. One can learn many tricks and tips that the manufacturer often doesn't relate in the reload kit instructions. Here are a few tips and tricks I have learned over the years from many helpful rocketry enthusiasts:

- Because the design and construction of a reloadable rocket motor is more complex than the use of an expendable rocket motor, be sure to read all of the instructions supplied with the reload kit and follow them closely. Periodic upgrades are made to reload kits by the manufacturer. These can happen without warning at any time. So it's best not to commit assembly of reloadable rocket motors to memory.
- Before you ever begin motor assembly, make sure the propellant and delay liner tubes are shimmed with masking tape to tighten up the fit within the motor casing.
- Transversely, on 38mm and 54mm reloadable motors with phenolic propellant liner tubes, make sure the liner does not fit too tightly within the reloadable motor casing. Some light sanding with a 360 or finer grit sandpaper may be required in order to get the liner tubes to fit the casing. Always lightly sand the ends of the phenolic liners to remove burrs. The burrs can cut o-rings, generating a blow-by at the propellant washers.
- O-rings must be greased lightly before they are used in the assembly of the rocket motor. The grease aids in the sealing of the system. Use just enough grease to give the o-rings a nice shine. Utilizing the right grease is also important. Permatex High Temperature Super Lube with Teflon is best. In lieu of this, Radio Shack produces a very high quality Teflon impregnated grease that works very well (Archer Lube-Gel with Teflon). Although people use it, I would not recommend using Vaseline petroleum jelly, as it thins when it gets hot.
- Never use too much grease on the forward delay o-rings. Excess grease will seep into the black powder ejection charge and prevent it from firing.
- Avoid contamination of the o-rings. The smallest speck of dirt, sand, or even a human hair can cause an o-ring failure. An o-ring failure can lead to a catastrophic failure (cato) of the rocket motor. Not only will a cato destroy your expensive reloadable motor casing, but it also could severely damage your rocket vehicle. On a much larger scale, an o-ring failure caused a cato which destroyed the space shuttle Challenger.

- You can store an assembled reloadable rocket motor under certain conditions. If the ejection charge has not been installed, loosen one of the enclosures to relieve the loading from the o-rings. Stored in a cool, dry environment, the motor can be stored in this manner for several months. However, remember to tighten the enclosure and install the ejection charge prior to flight!
- After you pour in the black powder and set the cap or sticky dot, never loosen the forward or aft enclosures. Loosening them may cause the ejection charge to shift behind the delay o-rings(s) preventing a complete seal of the delay element causing venting of hot gases through the rocket. A fully loaded motor will keep for several months without ill effect if it's kept out of direct sunlight. Heat makes the grease on the o-rings move around.
- When installing the black powder ejection charge into the ejection charge well of the forward enclosure after assembly of the rocket motor, pour a small amount of the ejection charge into the well of the forward enclosure and gently tap the casing. This will ensure that black powder goes down through the orifice in the forward enclosure and comes into contact with the delay element. This insures that the ejection charge will ignite when the delay element burns through. Once you have ensured the space between the delay element and the orifice is full of black powder, apply the remainder of the ejection charge and seal the ejection charge well.
- The delay element and delay o-ring(s) must be compressed against the forward enclosure in order to seal. Any delay spacers go toward the propellant end of the delay element.
- With 38mm motors, ensure the delay liner chamber in the forward enclosure is sealed with grease. At initial motor pressurization, the grease is forced around the delay liner, sealing it.
- Always lightly grease the outside of the propellant liner tube and the enclosure/casing threads. Greasing the liner aids in cleanup of the motor casing after firing. It's next to impossible to remove the propellant liner from a 38/480 casing when you forget to grease it. Failure to grease the enclosure/casing threads may cause the enclosures to seize, making it impossible to remove the enclosures without damaging them or the motor casing. Do not grease the inside of the delay element liner tube or the delay cavity.

Many of us who enjoy the hobby of high power rocketry find the assembly of the reloadable rocket motor is just as challenging and rewarding as the successful flight of a rocket vehicle. As long as you take your time, read and follow the reload kit instructions, and ask for assistance from experienced rocketry enthusiasts when needed, you should enjoy many years of trouble-free, successful flying.

a simple guide to

compiled by steve moore

LDRS 2000

Official Annual Tripoli Launch

Each year Tripoli Rocketry Association (TRA) holds a national launch at various locations. LDRS stands for Large and Dangerous Rocket Ships. The 19th Annual LDRS Event will take place this year in Orangeburg, South Carolina.

Location: Orangeburg, South Carolina. This is truly a majestic and traditional southern town. Founded in 1704, incorporated in 1883, Orangeburg encompasses approximately 6.38 miles and is home to an estimated population of 13,739 citizens.

Airport: Orangeburg Municipal.

Weather: It is recommended that you check out the local weather as the launch approaches, since the weather can vary depending on weather patterns. Moderate to High humidity levels is possible during summer months.

Date: July 1-4, 2000

Times: Range will be open everyday from 9 a.m. to 1 p.m. (closed for Lunch from 1 to 2 p.m.) and reopens at 2 p.m. and stays open until 8 p.m. The range will close early on Sunday at 6 p.m. The Banquet will be held Sunday night at 8 p.m.

Costs, Fees and Registration: The LDRS 2000 site does have a registration form that you print out and mail in.

Launch fee (advance) . . . \$30.00 (July 1-4)
Advanced registration cut-off is 6/1/00.
Launch fee (on-site) \$40.00
Banquet \$14.00 each

Accommodations: This area is a popular travel destination during the 4th of July Holiday and most area lodgings will be fully booked early, so make your reservations now.

The LDRS 2000 site has several direct links to area hotels/motels, in addition to listing special pricing and amenities. Organizers request that you ask for the Tripoli Rocketry Rate when

inquiring about accommodations. Here are a few of the lodging choices in the Orangeburg area:

- Days Inn 803-534-0500 (official Hotel of LDRS). Booked as of 2/4/00.
 - Quality Inn 803-531-4600 (contact Stephanie Williamson) \$55.00 per night.
 - Ramada Limited 803-534-7630 \$47.00 per night.
 - Hampton Inn 803-531-6400 \$59.00 to \$75.00 per night.
 - Carolina Lodge 803-536-0528 call for availability and rates
 - Comfort Inn 803-531-9200 call for availability and rates
 - Days Inn 803-531-2590 call for availability and rates
 - Southern Lodge 803-531-7333 call for availability and rates
- Nearby Santee State Park is already booked, but we also recommend you contact KOA on availability at nearby locations.

Nightlife: Orangeburg as well as the surrounding communities are abundant with restaurants, lounges and other entertainment venues as well as golf courses, lakes, gardens, a museum, and planetarium.

Special Rules/Contests: LDRS 2000 Contest: AHPRA Bowling Ball Lite Arizona High Power Rocketry Association will be sponsoring this competition. The objective is to loft an eight-pound bowling ball to the highest altitude, using a single Tripoli certified motor. This is open to individuals as well as teams of Tripoli Members. More than one rocket may be entered by a competitor. Prizes: 3 Parachutes (Rocketman Kytec); 6000ns M Motor Hardware (Kosdon East); Videos (Shadow Composites); T-shirt and 6 issue subscription (Extreme Rocketry); and Nosecone (Scotglas Manufacturing).

Other contests include: Best Cato, Best Paint & Finish, Most High Tech, Highest Altitude (under waiver) recorded by an Altimeter, and Closest to the Pad each day.

Only registered flyers will be allowed to fill out flight cards and launch their rockets. Children under the age of 18 are free. If children under 18 want to launch low powered rockets, then that child must sign the waiver with the

parents signature under their own and must be supervised at the launch pad.

Any rocket meeting any of the following conditions, must have the approval of the Special Projects Coordinator before launch will be allowed: any rocket with a total of 6000 newton-seconds; all M impulse and above rockets; or any unconventional design.

All special projects must be submitted no later than May 31st to the Special Projects Coordinator and be pre-approved. Any projects that meet any of the above conditions and are not pre-approved, will not be allowed to launch.

No motor vehicles allowed on sod farm. There will be no camping allowed at the launch site.

All decisions made by an LDRS official are final. This will include anything and everything concerning the LDRS event and the grounds of the launch site itself.

Visit the LDRS 2000 website for the complete and detailed rules and regulations for LDRS 2000.

Vendors:

Blacksky, Kosdon East, Sky-High Rocketry, Photos by Nadine, Starship Enterprises, Robbys Rockets, B2 Rocketry, Giant Leap Rocketry, Aerospace Specialty, Performance Hobbies, Pratt Hobbies, Kool Kones, Aerotech, Rocketman, Star Rocketry, Atlantic Rockets, Lawndart Rocketry, Blackhawk R&D, LOC/Precision, Missile Work Corporation, Magnum Plus Inc., PML, Yank Enterprises and Rocket Vision.

Contact Information:

Web: www.clt.quik.com/skybound/ldrs.htm
Snail Mail: LDRS/Tripoli South Carolina, P.O. Box 550441, Gastonia, NC 28055-0441

national launches

NARAM 2000

Official Annual NAR Launch

National Association of Rocketry's 42nd Annual Meet/National Launch. This is the sixth time NARAM has chosen Colorado for its national launch. The annual event is sanctioned by NAR, the oldest and largest sport rocketry organization in the world. Since 1957, over 80,000 modelers have become NAR members.

Location: Estesland, Colorado (5 miles east of Canon City at the intersections of US Highway 50 and Colorado Highway 67). Elevation 5,500 feet above sea level. Headquarters for the event will be located at the Canon Inn (see Accommodations), located at 3075 E. Highway 50, Canon City, CO. 81212.

Airports: Denver International, Colorado Springs, or Pueblo.

Weather: During July, there is an average high temperature of 93 degrees and a low of 61 degrees. The record high is 106, while the record low is 44. Bring sunscreen, a hat, sunglasses, and closed toe shoes (small cactus in the area). Water consumption will be essential due to the high altitude and the possibility of dehydration.

Date: July 29th-August 4th. The Sport Launch starts the weekend before the contest and runs the entire seven days of the event. The Contest Launches will take place Monday (July 31st) through Friday (August 4th).

Agenda/Schedule:

Sport Launch: Begins Saturday, July 29th and runs through Friday, August 4th.

Contest Launches: Begins Monday, July 31st and runs through Friday, August 4th.

- Research and Development
- Giant Sport Scale
- D Engine Superroc Altitude
- 4xA Engine Cluster Altitude (no airstarts and no boosted darts allowed)
- *C Engine Eggloft Duration
- 1/4a Engine Parachute Duration (Multi-round)

- A Engine Boost Glider Duration
- B Engine Streamer Duration
- 1/2A Engine Helicopter Duration
- D Engine Rocket Glider Duration

Banquet: Friday, August 4th

Other: Catered Picnic and possible tours of area factories where real space launch vehicles are assembled.

Costs, Fees and Registration:

Allows registration online and using snail mail.

Competition Flyers:

Individual Contestant	.....\$40.00
Team	.....\$60.00
Family Contestants	.....\$60.00
(includes first 3 family members)	
Extra Family Contestants	.....\$15.00
(over 3 family members)	
Late Fee	.....\$20.00
(entries postmarked after 6/30/2000)	
Sport Launch Only	.....\$25.00 (All Week)
(18 years old and over, under 18 fly free)	
Extra Family Sport Flyer	.....\$5.00
(18 & over with 1 fully paid family member)	
NAR Championships Banquet	
Adult	.....\$17.00
Child (10 and under)	.....\$8.00
Picnic, Meal and Entertainment	.....\$10.00
Entertainment Only	.....\$3.00
(country western band/guest speaker)	

Accommodations: The Canon City area offers a range of lodging options, everything from hotels to camping. The NARAM 2000 website offers both direct links to lodging sites and a discussion area concerning accommodations for the launch we suggest you check it out for more detailed aspects of visiting the Canon City area. NARAM 2000 is being held in an area of Colorado that sees a lot of tourist activity. It is not unusual for many places to be booked solid during the time the launch will take place. Organizers strongly emphasize get your reservations in early!

As of 10/21/99 the Canon Inn (NARAM 2000 headquarters) is sold out.

Best Western 1925 Fremont Dr., Canon City, CO. 81212 / 800-231-7317

Holy Cross Abby has low cost dorm style rooms. Located about 1 block from the Canon

Inn. 888-588-8631 ext. 239, ask for Paula Sheagley. \$14 per night/per person (maximum 2 people per room), or \$20 per night for singles. No in-room A/C, telephones or televisions. No room service. Each floor has a common area that includes a lounge, microwave and television. The restrooms and showers are located on each floor.

Check out the official website for discussion groups and suggestions on other accommodations, possible campsites and travel motels.

Nightlife: The Canon Inn is a full service hotel with two restaurants; one lounge; six hot tubs; and a full size pool.

Check out the official website for possible discussion groups on entertainment as well as accommodations.

Sponsors, Hosts, and Clubs: COSROCS (Colorado Springs Rocket Society) Operates in Colorado Springs, Co. Excellent safety record no accidents. Friendly club environment and rocketry based educational efforts throughout Colorado. Promotes model rocketry as a safe, fun and exciting family oriented hobby. In addition to sports flying, the club is active in contests and competes strongly in the areas of Boost Gliders, Parachute Duration, Streamer Duration, Helicopter Recovery, Odd-Rocs, and Altitude events.

CRASH (Colorado Rocketry Association of Space Hobbyists) Sport launches 2 times per month throughout the year. Launches are the first Sunday of each month starting at noon and on the third Sunday of the month starting at 10 a.m. The NARAM 2000 website has a direct link to this groups site where you can get the address of monthly launches as well as member and group information.

Tripoli Colorado Local chapter of the national organization.

Vendors to date: Unknown at this time

Contact Information:

Web: <http://www.naram2000.org>

Email: info@naram2000.org

Snail Mail: NARAM 2000, 9678-B East Arapahoe Rd., Box 113, Englewood, Co. 80112

INTERVIEW WITH rikki rockett

by brent mcneely

Rikki Rockett is best known as the drummer for the rock group known as Poison. However, he is also an avid rocket flyer and has built some of the largest rockets seen in the hobby in recent years. The Jurassic Kick is just one such example.

Extreme: Where were you born and raised?

I was born and raised in Mechanicsburg, Pennsylvania. The area is well known for steel, railroads and glass.

Extreme: When did you launch your first rocket?

Rikki: Well, I was probably about 10 or 11 years old. I was the typical kid that bought, built, and flew the little Estes kits with an A motor or half-A motor. After that I went to a B motor, then a C motor, and then a D, which was the biggest at the time. Then I started bundling D motors together, but they would break apart, go haywire and all that kind of stuff. I guess that was sort of typical for me to try to push the envelope. The biggest problems I had were the parachutes getting caught in trees and wires where I lived.

Extreme: Were all of the rockets built from kits?

Rikki: Rockets were too expensive for us as kids, so we started making our own components. I used toilet paper rolls and tried to glue them together. Of course, we didn't have the adhesives back then that we do now. Sometimes we would use duct tape and it would look horrible. We actually got a lot of them to fly, but a lot of stuff didn't.

Extreme: Did you give up rocketry as a kid?

Rikki: I was into rocketry as a kid, but I realized I had taken it about as far as I could go when I got older. Then I discovered girls and rock and roll, but I still stayed interested in space. One of my teachers was really into astronomy. My high school was one of the very few that actually had an observatory. Because of this, I've always been interested in astronomy. I had high grades in the sciences, but not in math, which became a problem for me in astronomy. I kept sticking my head back into rocketry every once in a while though, just to see what was going on. Each time, I realized nothing really was happening for a number of years. A couple of companies came along, but they did pretty much



Rikki with Patriot Rocket

the same thing that Estes was doing. In high school I didn't play around with that stuff as much as I did when I was 11. There was this one guy in school though that I sat down with and we tried to plan out a rocket. He was quite a nerd, and I loved him for that. We drew up all of these diagrams of how the rocket would be built. I wish I could find those diagrams now. The project never got beyond the diagram stage. There was no way we could have built it because it was pretty wild. I really didn't stick my head back into rocketry until the late 1980's.

Extreme: When you finished high school, what were your career aspirations?

Rikki: Well, I started playing drums when I was 12 years old. Since my first drum set I always wanted to be a "rock star." I wanted to be in a band. But, in Pennsylvania it is very difficult to have a successful rock band. You just don't see many examples of successful people in rock bands from Pennsylvania. You see local bands that do okay for a couple of years, but then they go away. It has gotten better now with a few bands. After high school I had a lot of differ-

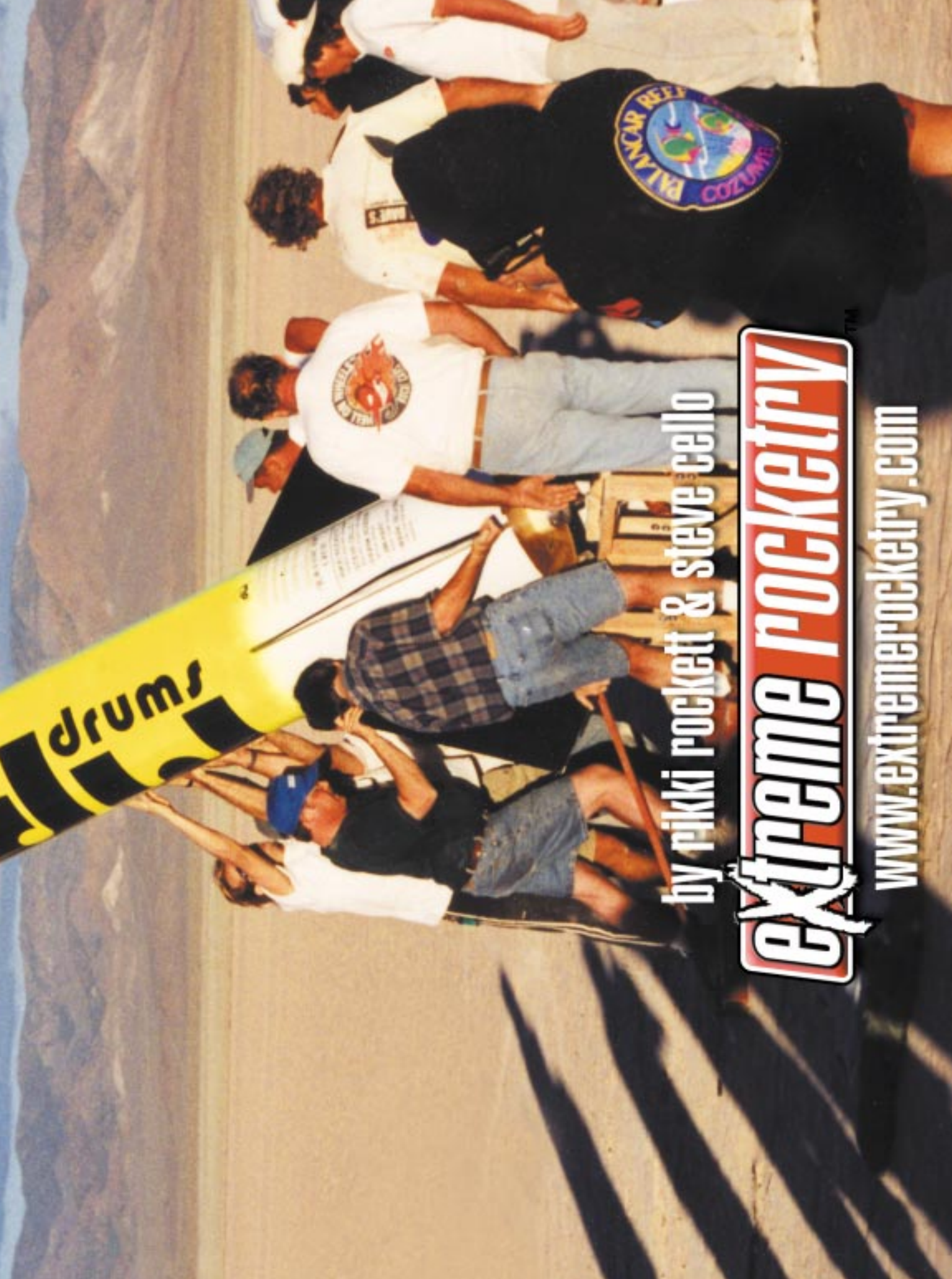
ent jobs. I was a lifeguard in the summer, and in the winter I worked in a clothing store. I also started taking classes to be an Emergency Medical Technician (EMT) because my father was an ambulance driver. I really didn't know what was going to happen. I knew I wanted to play drums, and by the last year of high school I had met Bret Michaels and Bobby Dall and we formed the band which would later be known as Poison. We were playing clubs by then. Right after I got out of high school I went into cosmetology school. There was a Vo-Tech program in high school where they offered cosmetology. The year I went into that program, the teachers went on strike so there was no Vo-Tech school. So, everybody that signed up for the course had half a day they could work in the field they were interested in. So, I went and became an assistant at a hair salon. I fell in love with it because all I had to do was shampoo women all day! There was probably only a 10 percent male clientele. Ninety percent of the business was women and a lot of them were high school or college girls. So, I said, "Hey, this is kind of nice. This sure beats selling suits in the mall!" So that's what I did when I got out of high school. For about two years after high school I had a band, a job as an assistant hair dresser, and I was studying to be an EMT.



Left: Scott Allan, Rikki, and Jim Hart with Jurassic Kick.
Above: Delemar Flight

JURASSIC KICK





by pikki rockett & steve cello

Extreme Rocketry™

www.extimerocketry.com

Jurassic Kick

Owner: Rikki Rockett & Steve Cello

Builder: Rikki Rockett & Steve Cello

Location: California

Rocket Name: Jurassic Kick

Height: 19 feet

Diameter: 22.5 inches

Weight: 289 pounds

Motor: Kosdon 0 motor

Recovery: 8 Rocketman chutes

Electronics:

(2) Cambridge Accelerometers

(1) Adept altimeter

Features: Modular construction, built from kick drum shells from several drum sets.

Colors: Red, yellow & black

Flight Report

Delamar 3,400 Baby 0 motor

Lucerne 5,100 Full 0 motor

Number of flights to date: 2

Description of Rocket

A very large rocket weighing in at almost 300 pounds and over 19 feet tall, constructed primarily from 22.5 inch kick drum shells.



\$100 centerfold poster contest

About the Extreme Centerfold Contest

Each issue, Extreme Rocketry will feature one rocket in our centerfold. If you have a rocket, or have a great photo, please submit it to us at PO Box 28974, Las Vegas, NV 89126 for our Extreme Centerfold contest. If your photo is printed as our centerfold, you will receive \$100.

We expect the photo to be really impressive, and in some way extreme. Please include extensive details about the rocket like those listed on this page. The submission must be an actual photo rather than a digital file (transparencies are also accepted). An accompanying article is not required to win the contest.

Extreme: When did you really start playing for the band full-time?

Rikki: I was about 22 years old when the band started really taking off. Before that we were playing mostly clubs. But we really wanted to play for people of all ages. Back there in Pennsylvania, you had to be 21 years old to get into a bar. So what we would do is rent out halls and skating rinks and put on our own shows. We would make up our own tickets and sell them. It was then that things started taking off and we were doing really, really well.

Extreme: When did you move to California?

Rikki: March of 1984. We heard Motley Crue on the radio at the US Festival, and we said, "What the Hell are we doing here? Let's go to California!" It was cold in Pennsylvania all the way from fall until spring. We wondered what we were doing trucking our equipment out in the snow. When we arrived in California, we lived in a warehouse-like building with one shower. We were dirt poor and built our rooms out of plywood. I didn't want my parents to come out to see me for about a year because it was so bad. Finally, we got a contract with Enigma Records and things took off. Later, Capital picked us up with a couple of other bands. Our first tour was horrible. We were the opening act for Quiet Riot, but the important thing was we still got to play. Later on we got to open for Ratt, and that's when our second single "Talk Dirty to Me" hit the charts and things really started to explode. During those years I was way too busy with the band to even think about rocketry. It was probably the furthest thing from my mind at the time.

Extreme: Where did the name Rikki Rockett come from?

Rikki: Honestly, it came from the hair dresser I worked for. He gave me the nickname "Rocket." When I was working as a hair dresser I was trying so hard to impress everyone. I was so hyper, fast, and energetic they called me "Rocket." Unfortunately, the name doesn't have anything to do with rocketry. But I kind of liked it because I dug rockets and all that kind of stuff, so the nickname stuck. I put my nickname behind my real name which is Richard Ream. I've always gone by Ricky, and Rikki Rockett sounds a whole lot more Rock 'N Roll than Richard Ream.

Extreme: When did you get back into rocketry?

Rikki: It was when C.C. Deville left the band around 1990 and I had the entire summer off. My girlfriend Malina and I were talking one day about rockets. I don't even remember why, but I asked her, "Did you ever launch rockets as a kid?" And she had no idea what I was talking about. She said, "Are you serious?" I then told her how I built these little rockets and used a launcher and the whole thing. She told me she had never seen anything like that. So I told her, "You know what, on my way home, I'll drop by a hobby shop and pick up a kit for both of us and we'll go launch some rockets." Well, I did, and on a second trip to the hobby shop

Left to right: Steve Cello, Rikki, Melina, Rat, and Frank Kosdon



I saw a rocketry magazine with high power rockets on it. I just looked at it and said, "Holy Shit! Just look where the hobby has gone!" I bought the magazine and started calling every manufacturer in it, wanting to get information on how to get into this. I think the Vaughn Brothers were one of the first people I called and I ordered a kit from them. That's pretty much how I got into the high power stuff. I called Scott Bartel for motor reloads and that ended up being a two hour conversation with him. I accepted his invitation to come over, and he helped me with getting ready for my first high power launch and completing my level one certification.

Extreme: What were the first rockets you built when you got back into rocketry?

Rikki: My first rocket was a stretch Blobbo from Vaughn Brothers. I think I flew it on an AeroTech D motor. After that, my first real high power rocket was a Public Missiles Phobos. I painted it purple and put some Poison decals on it. When I flew it for my certification, everything worked perfectly. Scott helped me a lot. At that time, there weren't different levels of certification, only one certification, and that was what I was going for at the time. Malina certified at the next launch we went to with a different rocket.

Extreme: What do you like about rocketry?

Rikki: First of all, I've always been intrigued with space, and I've always been mechanically inclined. I like to tear things apart and figure out how they work. I also like to go the other way and build something from scratch and try to make it work. It's always intrigued me. Today, with all of the electronics stuff we have, it is really becoming an interesting hobby. A lot of people get into the rocket hobby for different reasons. I'm definitely a hobbyist, and I like that aspect more than anything. I like to build something and get it to do something for one reason or another. I don't want to see how high I can go. Many people get into it because they want to be the first amateur rocketeer to get into space or to launch a satellite. While I think that is great, and I'd like to be a part of something like

that, that's not why I got interested in high power rocketry. I don't think I'd become a guy who works at Jet Propulsion Laboratory. I also love the camping out part when attending launches.

Extreme: What is your biggest dislike about rocketry?

Rikki: I don't think this will surprise you. But I think it would have to be the limitations we have on the motors right now and how the politics come into play when the ATF gets involved. I hate that. There should be some control over it, because God knows what would happen right now if we didn't have some controls on rocketry with newbies to the hobby. But it really does hold back a lot of the cutting edge stuff that we are all trying to do. With motors, the limitations we have right now are just over the top. There's just so much legal mumbo-jumbo there and it just keeps getting worse. I'm talking about the government here. The rocket clubs sometimes make it better and sometimes they make it worse. Everyone has their own views on regulation. One person's view is not necessarily right or wrong. It's just we sure look divided to the government agencies out there. I think there does need to be rules, and a lot of people will disagree. But without rules, who would have been hurt by now? That goes without saying though. There are injuries in football and all sorts of other hobbies and sports. I think comparatively speaking, the hobby of rocketry is pretty safe.

Extreme: Are you involved in the leadership of the Lucerne Test Range (LTR) rocket club?

Rikki: Just my web site. At one point I was asked to run for Prefect, but I turned it down just because I knew I wouldn't have the time. I knew that if concert tours came up or recording contracts presented themselves, I would have to back out of my club duties and that would hurt everyone in the club. So I told Jim Hart that if there was anything I could do for the club just to let me know and I'd see what I could do to help out.

Extreme: What were your favorite rocket projects you've been involved in?

Rikki: The one that blew my mind the most was my first big rocket. It was a PML Patriot which flew on the AeroTech K-550 motor. I launched that in Arizona. I worked my butt off on that rocket. I wanted that thing to be perfect. That one was red with flames. A guy had painted my truck and I wanted to match the rocket to the truck. He told me he would paint it for me, but that I would have to do all the labor of prepping it. "I'll spray it and do the flames, but you are sanding it and everything." And I said, "Okay, fine." So I worked my ass off on that thing and I was scared to launch it. "If it crashes—oh man! you know?" That was my first project that I spent real hours on and then have it pass or fail in one fell swoop. That's the excitement of rocketry right there! On that first flight everything worked; it was a gorgeous flight. I have it on video and I will treasure it and the photos forever. That's where I got the desire to do larger projects.



A younger Rikki

Extreme: What was your next project?

Rikki: My next rocket I called the Queen Bertha, which was an upscale version of the Estes Big Bertha. We used 7.5 inch diameter airframe done all with PML components except for the round nose cone, which was done by Jim Cornwell. We made the fins out of Russian Birch plywood. We launched that rocket several times until it finally blew up on an L motor; blew up right on the pad. It was terrible—just heart-wrenching. Steve Cello had become involved in that project half way through. We had been talking on the phone and he was representing Kosdon motors. I told him, “Why don’t you come over. I’m working on this big project which I’m about 70 percent done with, but I’d love to have you get involved.” He did, and after that we knew we had a pretty good match. What he didn’t know, I did and vice-versa. However, if we both were lost, we’d find out!

Extreme: What was your next project?

Rikki: The rocket was called “Go to L.” This was our first L project, and it was also made from PML stuff. I still have that rocket. It’s in my barn right now with a broken fin. I keep threatening to fix that fin and launch it again. After that, our next project was a Hott Rocket kit. (Hott Rockets was the Jim Hart company which has since been sold to Maximum Thrust Rocketry – ed.) The kit was the Phoenix and it came out great, but it was a lot of work. That was the first one where Steve and I worked together from ground zero. The rocket came out really good, but it only made two flights. On the second flight it catoed, and I know exactly why. We had the wrong nozzle so we went into town to have it drilled out, but it didn’t work. It was a beautiful cato though.



Rikki and the Queen Bertha

Extreme: Where did you get the idea for the Jurassic Kick rocket?

Rikki: We came up with the idea at a launch in Vegas. I think it was Springfest. It didn’t take long for us to start building big. We sort of started building rockets exponentially, we just kept building bigger stuff. I remember saying something to Steve at that launch that I’d like to build something really big and over the top. I said, “I’d love to build an O rocket; something to hold an O motor.” We had in our minds an idea for a cardboard O rocket. We wanted to show everyone we could build a cardboard rocket to hold an O motor instead of just strapping the fins and nose cone to the motor. We weren’t sure how we were going to do it, but we didn’t want to make it a metal rocket. We wanted to use model rocket technology to fly an O motor. So we started working on a rocket called, “O My God.” This was a rocket for an O motor, and the components are still here. We just need the fins. We have everything else: the nose cone, the tubes, and all that other stuff. But we abandoned the project when I found out that we could get ahold of several 22 inch diameter kick drum shells. The drum company I was with called Drum Workshop abandoned getting shells from an outside company, and decided to start making their own. So they were starting to toss a lot of these old shells which they couldn’t sell. The 22 by 20 inch kick drum was not a popular size. So these shells were taking up valuable space in the warehouse. So I said, “Please don’t throw those out. How many do you have? I’ll take all of them.” And so I bought them and made the Jurassic Kick out of them, which is essentially just one big kick drum. That’s where we got the name Jurassic Kick! So we had to decide whether to continue with the O My God project or abandon it to do the Jurassic Kick. I thought about it and



Cato of Hott Rocket’s Phoenix

said, “Let’s do the Jurassic Kick now. Let’s put an O in this.”

Extreme: Was the construction difficult for the Jurassic Kick?

Rikki: We weren’t sure how to do it. It took a couple of weeks of planning. We figured the best way to build it was from the inside out, and from the bottom up. So we started thinking in that respect. Essentially, we started with the basic exterior design to figure out how big it was going to be, what kind of nose cone to use, what kind of fins it would have, and what kind of motor it would take to make it happen. After we figured out all of that, we started thinking about materials. At one point we were going to make a smaller version of it with an eight-inch diameter airframe primarily constructed out of wood. But we decided to just jump right into it and skip the smaller version. The final Jurassic Kick took about three months to build, which is actually kind of fast if you think about it. Only towards the end were we working more than once or twice a week. It was tough because Steve had just started a new job. He would come over on some nights and try to do something here or there. The final rocket was about 19 feet tall. The fins were 66 inches from side to side.

Extreme: How did you construct the nose cone?

Rikki: We talked to Jim Cornwell. We looked at several different methods. Eventually we tried to get a six foot cylindrical hunk of foam. We then built this big Barney Rubble lathe. Jim Cornwell told us pretty much how to do it. You need a lathe motor, a self-centering bearing and so on. We built this thing, started it up and it almost flew up and hit us. It was just uncontrollable. So we ended up strapping the lathe into the back of Jim Hart’s



Jim Hart works with lathe to make nose cone

pick-up using hack saws to kind of get the shape of it. It looked like winter time in the back end of the pickup. We cut the foam down right in the drive way, and people were driving by wondering to themselves, "What the Hell are you guys doing?" We finally got that thing trimmed down. We spent about two weeks just laminating it with fiberglass, putting on a couple of coats a day. We would let it dry for four or five hours, then sand it down and put another layer on it. We finally put about eight or ten layers on it. With just the fiberglass itself the nose cone ended up weighing about 40 pounds. Then we turned it over and poured gasoline into it to clean out and dissolve as much Styrofoam as we could. Next, we went in there with a drill with a flapper on it and knocked all the remaining stuff clinging to the inside. We then built some centering rings and put them inside the nose cone. The final nose cone ended up weighing somewhere in the 80 pound range, which is what we wanted.

Extreme: What was the final weight of the Jurassic Kick?

Rikki: With the motor the rocket ended up weighing in at 289 pounds.

Extreme: How tall was the Jurassic Kick?

Rikki: It was about 19 feet tall.

Extreme: Which motor did you fly the rocket on?

Rikki: The rocket made two flights. Both were on Kosdon O motors.

Extreme: How long did the paint job take?

Rikki: I spent a week in a friend's auto body shop painting it. He basically gave me free reign except for the power tools because his employees were using those. The paint job really turned out nice. I asked my friend Mark, "Hey, what paint do you have?" So we just used some left-over paint.

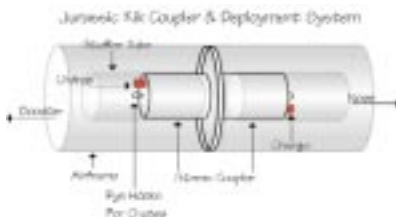
Extreme: What were your concerns before the first flight?

Rikki: We figured the motor would either gut the rocket and just shoot through it, or it would have a nice, slow lift-off. Our biggest fear was trying to figure out a way to construct it strong enough so that the motor would stay in the rocket. We built it more like an airplane, with a stuffer tube and 14

centering rings, which we cut as much out of as possible to reduce weight. The extra holes helped us in being able to reach inside to fiberglass from one to the next. We ended up using the Jim Hart nine inch tubing for our stuffer tube, which was for the inside of our centering rings. We then had outer centering rings which went between the nine inch tube and the 22 inch kick drum tubes. We also made triangular shaped braces that were about a foot in size to go up the inside of the rocket. All of these butted up against the centering rings to support each other. We figured with a succession of those that the concussion of the motor would be absorbed by the honeycomb-like structure.

Extreme: How did you transport the Jurassic Kick?

Rikki: I had a toy hauler trailer I pulled with the Humvee which made transporting it really easy. We made the rocket with a modular design so that it broke up into three parts. Steve will give me credit for this idea. If you can imagine a top hat, actually two of them turned back to back, using a centering ring instead of a piston. One side goes into one end, and the other side goes into the other end. I think the length of it was about three feet, so



we would end up with about a foot-and-a-half of piston. The centering ring would be the blast guard on each side. It doesn't matter which charge goes first; we put charges in the nose cone and in the booster section. No matter what happens, one will throw the other side out. We thought we were onto something here. We figured one chute was not enough. It was too much of a risk, so we used eight parachutes and three of those stripped. I think the cable was actually stronger than the parachute material. We used a ton of black powder and three electronic units. We had a fourth unit, but we couldn't get it working before the launch. But all three of the other units worked perfectly.

Extreme: In your opinion, how did the launch of the rocket go?

Rikki: The day of the launch, I don't know how to say it any different, but I was, "scared shitless." I was thinking, if this thing crashes, I've lost the whole summer. But, if it works, it will be the biggest rocket ever flown 100 percent successfully—meaning I could immediately fly it again. That was our goal, to have a 100 percent successful launch where we could immediately fly it again if we wanted to. The biggest rocket ever flown that I'm aware of was called "Down Right Ignorant." But that rocket wasn't re-launchable after it landed. I have to say hats off to those guys. They were the first to do a rocket of that size and scale and

they set a precedent for all of us. To many of us into large sized rockets, these guys were the pioneers. I'm a bit boastful of the fact that our rocket did work and could fly it again. The only damage we had was the very tip of the nose cone. We made a tiny wood nose cone at the very tip about 3 inches long that cracked on impact. We weren't surprised. It was designed to take the impact on landing and it worked. We figured we would replace the tip each time.

Extreme: What altitude did you get off your first flight?

Rikki: It was only about 5,000 feet. The motor actually chuffed and would have got a little more altitude than that. We blamed Kosdon and he blames us (laughing). So when we looked at the computer data, we later agreed that it did chuff. This happened about 20 feet off the ground, and that was scary.

Extreme: What projects are you planning on doing in the future?

Rikki: Well, I haven't hooked up with Steve for a little while. There's just a lot of stuff going on with Poison, etc. But there are two things we want to do. One, we want to build Godzilla. We want to build this huge, monstrous thing. We want to go 36 inches in diameter and over 30 feet tall. We want to power it with four O motors or a P motor. The second project I'd like to do down the road in about five years. I'd love to launch myself in a rocket. I'd like to build a project that I could put myself in and launch it. I know it would have to be done on an Indian Reservation, and that Tripoli wouldn't have anything to do with it. We would have to figure out a way where I could push the button. I really think it should be done on hybrid motors. I think hybrids would be safer. Whether I ever reach that goal, I don't know. But I'd like to be the first person to launch himself. Believe me, I'd have to be heavily medicated the day of the launch! The biggest trick would be to build a design which would not pull enough G's to make you pass out. That's the trick right there. I think the rocket would need to look a lot like the Mosquito rocket, with those fins and a lot of drag.

Extreme: What advice can you give other rocketeers in the hobby?

Rikki: Launch a lot of smaller rockets. Get out there and experiment with all sorts of different designs. Read some of those rocketry books and get some good information and put it to use. Build stuff based on those designs and get a feel for what works and what doesn't. Also, pay attention to every detail as you build and envision launch day and the steps involved in getting off the ground and down again. Really, really keep safety in mind both in the shop and on the field. Life is good, don't let a safety glitch ruin it. Finally, don't use animals in your rockets. It's cruel and it's all been done before. Besides, it's against Tripoli rules!



springfest 2000

by Carl Delzell and Brent McNeely

Each year the Lucerne Test Range (LTR) rocket club (Tripoli 007) makes its annual trek across state lines from California to the small dry lake bed just southwest of Las Vegas. The El Dorado dry lakebed is known by the locals as a great place to fly RC airplanes, race motorcycles, and for launching hobby rockets. Of the two large invitational launches held at the lake bed, Springfest is the largest, while the Turkey Shoot held over Thanksgiving weekend is the smaller launch. Turkey Shoot is sponsored by the Tripoli Vegas rocket club, which also helps in co-sponsoring Springfest with LTR. Springfest draws a very good crowd of people from across the nation and internationally. One family came all the way from Sweden to attend the event!

Friday

Friday has always been designated as the official setup day for Springfest and this year was no exception but did have one slight difference: an open FAA waiver making launching possible after the launch system was set up. Most of the vendors showed up around noon along with about 60 rocket flyers. Perhaps a dozen motor homes spent Thursday night on the lakebed. Stiff winds made setting up difficult, but not impossible. However, for launching rockets, only the brave ventured to put a rocket on the pad and actually push the button. Mostly people huddled around their campers and cars socializing in anticipation of better weather. Some took advantage of the wind and flew kites. The better weather only came after dark when a handful of rockets were launched for some very nice night flights. Many of the rocketeers made the trek into Boulder City and gathered at a Mexican restaurant.

Saturday

The range was set up and ready for business at 8:00 a.m. After the rocketeers managed to get their bodies moving in the cool air, they began prepping rockets for flight. Unfortunately, the wind kicked up shortly after the waiver opened when many adopted a "wait and see" attitude toward the launch. A few rockets were put on the pads, but overall the number of flights before noon was relatively low.

In the afternoon the wind backed off to a slight breeze and the lakebed warmed up to a comfortable level. It was at this point people rushed to the range head getting in line to put their rockets on the pads. A number of impressive flights took place. The first of these was the Ripley's Believe It or Not! Rocket built by Ron McGough and sponsored by Rocketman Ky Michaelson (who was in attendance and filming the event). The large 19 foot, 100 pound, Big Kahuna rocket was loaded with an AeroTech M-1939 and a full set of Rocketman chutes. Ripley's left the pad without a hitch and climbed into the air for a very nice flight paving the way as if to encourage other rocketeers to get their rockets out there. The whole event was captured by a film crew who was on location.

The worst flight of the day, and the most impressive, was by Rick DuVall, flying his Saturn V scale rocket. Powered by a single use K250, something very strange happened on take-off. The motor lit and smoke just pumped out the back of the rocket while it stayed on the pad. The smoke intensified over a period of about 30 seconds until finally flames started jetting from the bottom of the rocket. Then, after what seemed an eternity the rocket started to slowly move up the launch rod. However, after getting about three feet off the pad, the rocket ceased gaining altitude and tipped sideways and fell to the ground where it con-





tinued to smolder and burn for another five minutes.

AeroTech had a very nice demo flight in Robin Meredith's upscale of an Estes Yellow Jacket. The new motor under development was a Turbo-Hybrid L690. What made this hybrid truly fun to watch was a seven second burn which was impressive to see climb into the air. The rocket hit the ground a bit too hard and reset the altimeter so Robin was unable to determine the actual altitude (which should have been about 8,900 feet).

Barry Forrest scored the highest recorded altitude of the event with a rocket he calls "No Laughing Matter" under Kosdon K-280 motor. Official altitude on the Cambridge was 12,986 ft. and the Missile Works RRC showed 12,997 ft. Rick Magee launched a Quantum Leap two stage for a beautiful boost and stage. The sustainer continued to a very high altitude, but the ground crew lost track of it. Three days later it was recovered, however the batteries had gone dead in the electronics.

A most impressive flight was made with a rocket called Big Purple. Built by Kurt Gugisburg and powered by an L-850 motor, this 36 pounder raced up to 3450 ft. with a video camera on board. Kurt won praise for his spectacular triple chute recovery system by Rocket Rage. Bill Seiders was impressed and said "that is the most stable video platform I have seen to date." Another of the neat rocket flights was the Smok'n Rocket's "Chubby"

which flew on a K550 motor (this rocket was an upscale of an Estes Fat Boy). George Perez launched his Sky Raider on an L-1120 to about 7000 ft. for a perfect flight and a long distance recovery.

Many V-2 rockets in several sizes made a nice showing at the launch. One large V-2 build by Alan Overmoe made an awesome lift off from the far pads. You could see the ground blast away from the pressure of the motor on the lakebed by the pad. The rocket looked more like a football leaping out of a volcanic mushroom cloud. This rocket was powered by AeroTech's biggest motor, the N-2000 and was equipped with two Olsen Altimeters. Each of the electronics recorded only a nine-foot difference in apogee (7,462 and 7,471 feet). Not only



was the lift off impressive, the landing quite literally stopped traffic when the rocket drifted down to earth landing right in the middle of the highway bordering the dry lake bed. A handful of cars stopped until some brave driver moved the rocket and chutes off to the side of the road so that traffic could continue. Not many can claim their rockets have literally stopped traffic!

Hypertek showed off a very nice motor on a gray rocket. The 14 foot rocket was powered by a

Hypertek N2200 motor. Wayne Mrazek showed up with an N hybrid project that was about 6 months in the making. It had a 14 foot airframe was made from 7.5 phenolic tubing, weighing in at 51 pounds without the motor. After a 1 1/2 minute fill, it jumped off the pad on a column of smoke! It deployed its drogue at 7,093 feet, and popped the 15 foot surplus cargo chute at about 1,000 feet. Wayne said "with the certification of an N2200, the era of only long burn low thrust hybrids will be over!"

Saturday's launch ended with Frank Kosdon doing a static motor test of a new O2800. The motor had an impressive short burn of approximately two seconds. Near the end of the burn a loud pop could be heard when apparently the nozzle gave way to the thrust of the motor. After that, everyone pretty much gathered up their gear and either left the lakebed or packed it in for some dinner. Many of the rocket folk gathered in Boulder City for dinner at Toto's Mexican Restaurant before heading to nearby motels.

Sunday

All that can be said about Sunday was it was perfect. The sun warmed up the lakebed into the low 70s and there was just a slight breeze, enough to make the whole day warm and wonderful. People were walking around with big happy grins on their faces just because of the weather.

springfest trivia

Vendors:

High Power Model Rocketry of California
 Maximum Thrust Rocketry
 High Power Rocketry
 Rocketman Enterprises
 Access Rocketry
 Rocket Rage
 Vaughn Brothers
 Extreme Rocketry
 AeroTech, Inc.
 Dr. Rocket
 Olsen Electronics
 Black Sky Research

El Dorado Dry Lake Bed Facts:

Waiver: 7,500 Feet
 Windows: Up to 15,000 Feet
 Average Temp in March: 60-75 degrees
 Ground Type: Dry Lake Bed (see photo)



Contact Information:

LTR: Rick Magee (805) 584-6934
 Tripoli Vegas: Dave Pacheco: 702-432-9293

Lodging:

Railroad Pass Hotel: 800-654-0877
 Super 8 Boulder City: 800-800-8000
 Camping: Free

Facilities:

Four port-a-johns

Fees:

Launch fees: \$10/two days



Participation at the launch pads equaled the perfect day. People were putting rockets on the pads as fast as they could prep them and get the LCO to push the launch buttons.

One of the most interesting rockets seen at the launch was called "Chuff Goes the Weasel" built by Bill Seiders. This very unique motor made a chuffing pulse sound as it climbed into the sky. The exhaust trail had small puffs of smoke where each "chuff" had occurred during its flight.

At about 10:00 a.m. Sunday morning one of the best rocket drag races seen at any launch occurred. On pads six and seven were two Vaughn Brothers' King Blobbo rockets loaded with K-550s. The rockets had an almost simultaneous lift off and both climbed side by side like twin columns of smoke until reaching apogee. Because of the perfect flying conditions it was difficult to tell who won the drag race, but it was great to watch!

Another impressive flight was made by Phil Abshier who launched his M-Devor on an M-1315 to 10,660 ft. for a perfect flight. Larry Freson managed to snag two certifications at Springfest. He did his Level Two certification on a half scale

Patriot Missile powered by a K650 motor and then followed this with his Level Three certification flight to 8,800 ft. on an M1315. It seems as though the big rockets just kept showing up on the far pads. One such rocket was launched by Terry McKiernan on an M1315. Terry's Jupiter C used a dual deployment recover system (two Olsen altimeters). This is Terry's second upscale of the Jupiter C, his first being a four inch diameter version which he used for his level one and two certifications.

Big launches always provide an excellent opportunity to walk the flight line and check out interesting designs and construction techniques. It is like walking in and out of classes at the University of Advanced Rocketry (Hmmm!). And getting to know of few of the people you have read about or seen on video somewhere is always a treat. It seems rocket enthusiasts are always ready to brainstorm and share ideas to make something work. The sense of community is strong in rocketry these days.

certifications

Left to right, top to bottom

Level One:

- Jeff Steele, PML Explorer, AeroTech H242T
- Brian Ronald, PML Io, AeroTech H242T
- Justin Hutter, Kim's Nightmare, AeroTech H242T
- Russel Cooper, AeroTech Aereaux, AeroTech H128
- Bill Wilson, LOC/Precision EZI-65, AeroTech I154J
- Hampden Kuhns, Cirrus Dart, AeroTech H55W

Level Two:

- David Urbanek, Pork Chop Special, Kosden J280
- Larry Freson, Patriot Missile, K650

Level Three:

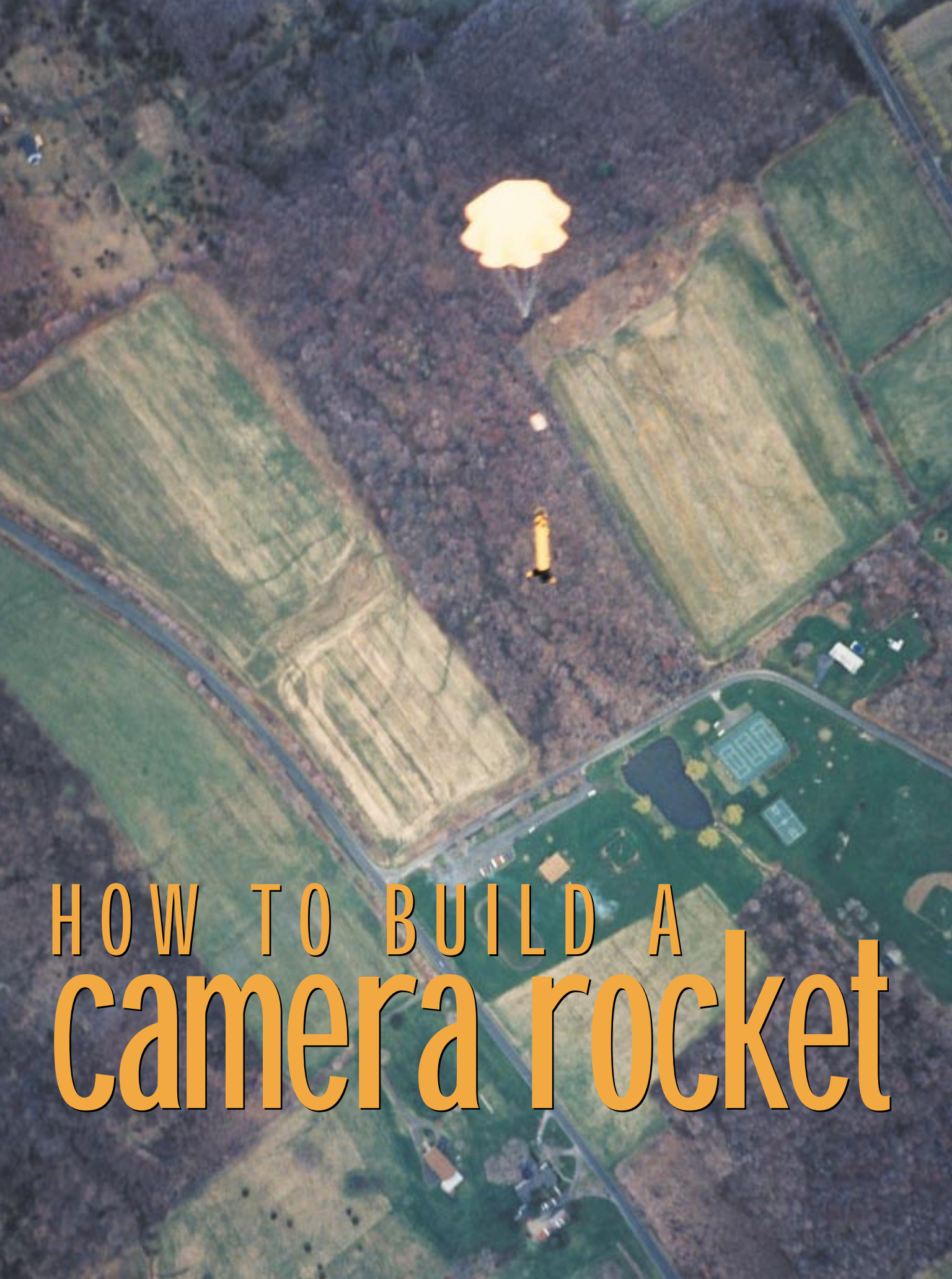
- Philip Abshier, M-Deavour, AeroTech M1315W
- Larry Freson, Patriot Missile, M1315W (shown at launch pad)

Did we mention how good the weather was on Sunday?



motors flown

A motors	.....4
B motors	.....1
C motors	.....22
D motors	.....14
E motors	.....8
F motors	.....18
g motors	.....42
h motors	.....59
i motors	.....58
j motors	.....39
k motors	.....35
l motors	.....8
m motors	.....6
n motors	.....2
o motors	.....(2) static tests



HOW TO BUILD A
camera rocket

part one

by doug gerrard

Adding a camera to your rocket is not only more challenging, but it also gives an additional purpose to flying your rocket. Building and flying a camera rocket can be difficult but the rewards are worth it. There is a certain amount of pride in being able to design, build, and fly a camera rocket and have great photographs to show for your effort. Of course there is a certain amount of risk. It takes something special to take a perfectly good camera, open it up and solder wires to it making it useless for casual use, put this sophisticated piece of equipment into a rocket and launch it up several thousand feet and have it come back on a parachute.

In the next several issues there will be a series of articles that will give you the basics of cameras, and complete directions for building your own camera rocket and pointers for getting more satisfying photographs. Some photographs will be shown and the results that can be achieved from flying Camera Rockets.

Photography Basics

Most standard film is made of plastic with layers of emulsions that are designed to be sensitive to the same light spectrum that we see. Film emulsion is approximately 0.005 inches thick and is made of several different layers. The top layer is a protective coating to reduce the potential damage to the gelatin. The gelatin layer is comprised of approximately 60% gelatin and 40% light sensitive silver-halide crystals. It is these crystals that store the image. These layers are attached to a cellulose-acetate film base with an adhesive. The back of the film base consists of an anti-halation coating which absorbs the remainder of the light that passes through the gelatin so that it is not reflected back to the silver crystals again.

The image is formed by a chemical reaction between the light molecules and the silver-halide crystals. As more light that reaches the film, the silver density of the negative increases. Standard photographic film produces a negative or reversed image of the scene. As bright objects in the scene reflect more light onto the film, they create the

Left: Taken in Connecticut using Kodak Gold 100 speed film. An example of what Point & Shoot cameras are capable of. Right: Also Point & Shoot camera. Taken at Hayburner Launch in 1997 using Royal Gold 100 film



more dense areas of exposure. Darker subjects emit less light, resulting in less density in the negative.

Great photographs start with properly exposing the film to the correct amount of light. Proper exposure of the film is based on three factors that are all interrelated.

- The shutter speed is to amount of time the film is exposed to the light.
- The aperture is essentially the diameter of the hole where the light passes through.
- Film speed is a property of the film that determines how much light is required to properly expose the film.

Film size is also a factor that determines to quality of the photograph, but not with the proper exposure.

SHUTTER SPEED: When it comes to taking clear pictures from a rocket the most important factor is the shutter speed. A rocket flight moves the camera violently from either the rapid acceleration or from dangling from a parachute. Having the fastest possible shutter speed is the only way to freeze the image on the film. Manually setting the shutter speed is the best option. However, with automatic cameras this not available. You can look at the specifications listed in the back of the handbook of a camera before you buy to see its fastest shutter speed available. Keep in mind that there must be the right amount of light to achieve this shutter speed before the camera will set it automatically.

APERTURE: The aperture is essentially a measure of the diameter of the hole with an inverse rela-

tionship. It is actually a ratio of the focal length of the lens to the diameter of the hole. Since the focal length of the lens is fixed, you can think of it as the diameter of the hole this light passes through. The larger the hole, the smaller the aperture number. For a given film, the larger the opening (smaller the aperture number) the faster the shutter speed required for proper exposure.

Another aspect of the aperture is the depth of field of focus. Depth of field is the distance that the camera will see that is in focus. Anything outside the depth of field will be blurry. Since most applications in

high power rocketry deals with focusing on images very far away this usually isn't a problem. If you are trying to capture something close like the booster falling away but want the ground to be in focus too there can be a problem. The larger the aperture diameter (smaller number) the smaller the depth of field. This means that if you are focused on infinity, the closest an object will also be in focus is say 50 feet. The depth of field is also a function of the focal length of the lens and how far the object is away from the camera.

FILM SPEED: Together the shutter speed and the aperture control one thing: the amount of light that reaches the film. Slowing the shutter speed or opening up the aperture allows more light to reach the film. Different film speeds, measured in ASA, require different amounts of light to properly expose them. Slow film speeds (ASA 25 to ASA 100) require more light than fast film speeds (ASA 400 to ASA 1000). The slower the film speed, the smaller the size of the silver-halide crystals on the film. This results in better quality photographs. This is analogous to having finer resolution monitor or printer for your computer.

FILM SIZE: The quality of a photograph depends not only on proper exposure and film speeds but also on film size. Which film speed you use determines the size of the silver-halide crystals on the negative. Slower speed films have smaller crystals therefore finer details can be stored on the negative. The more details that are stored on the negative results in better pictures after enlarging. The size of the film determines how much you have to enlarge the picture. For example, if you want an 8" X 10" you must enlarge a smaller (110) negative



more than a larger (35mm) negative because the 110 negative is much smaller. Therefore the 8" X 10" from a 110 negative will appear grainy even if the film speed are the same.

For cameras on board rockets the best photographs come from a combination of a high shutter speed to freeze the image, slow film speed for more detail, and a large negative for better quality prints. This combination is difficult to achieve. Automatic cameras need faster film speed in order to increase the shutter speed, but the faster the film speed, the grainier the photographs on enlargement. It is a trade off for automatic cameras to use a fast film to increase the shutter speed and the use of grainier films.

Choosing the Right Camera

For on board a rocket, the best combination is to use a camera with a fast shutter speed, use slow film, and preferably have a large negative. This article will discuss a few different types of cameras, the ways they can be mounted in a rocket, and the advantages and disadvantages of each.

CAMERA CHOICES: Cameras on board rockets should have a built in motor drive to advance the

film so you can take the entire roll of film on each flight. There is practically no way to point at a particular object and take the picture so the camera is set to take a photograph at a particular time during the rocket flight. By taking the entire roll of film, chances are that you will see something that you're interested in. This shotgun method may not be efficient but it can result in some spectacular photographs.

Also you should use cameras that have an electronically controlled shutter release switch. This way you can utilize electronic timers to drive relays and accurately control when the camera will take the pictures. The relay is wired in parallel with the camera's own shutter button. Other methods to activate the camera include using a servo or motor driven cam to push down the actual shutter button on the camera. However, this method adds more weight and size to the required payload space. Its only advantage is that you do not have to open up the camera for the connections.

Choices of different types of cameras include the Disc, 110, APS, and even Polaroid® cameras, but by far the most popular for a camera rocket is the 35mm cameras. The Disc and 110 cameras have smaller and fewer negatives than 35mm and

the Polaroid® cameras are very large. The APS film is larger than 110 film but still only about 2/3 the size of standard 35mm film. The two types of 35mm cameras that will be discussed are the point & shoot and the single lens reflex (SLR) cameras.

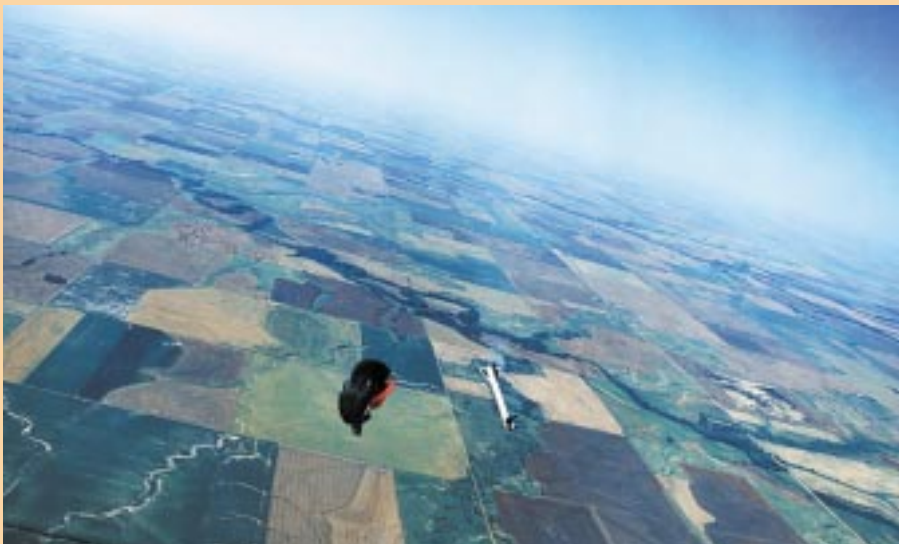
Point & shoot cameras are small, lightweight, inexpensive, and fully automatic which makes them very popular for high power rockets. They do have some disadvantages to SLR cameras. Generally they have a slow shutter speed (their fastest shutter speeds are from 1/200th to 1/500th second), slow film advance speeds (typically one picture every 2 seconds) which limit the number of shots that can be taken during ascent. Since they are completely automatic you cannot manually set them for the highest shutter speed which makes you need to put the grainier faster film in the camera. With point & shoot cameras you are frequently deciding between using the faster film to freeze more shots or using a slower film speed to get the better quality photographs (from the ones that are not blurred).

SLR's have very fast shutter speeds (1/1000th to 1/8000th second) to freeze every picture, very fast film advance rates (2 to 5 pictures per second), and manual exposure allows precise shutter speed and exposure control. Most of the recent SLR cameras have replaced the old plunger cable release with an external cable/switch. This means that there are the external contacts for triggering the camera without having to open the camera up. However SLR's are more expensive, larger, and heavier than point & shoot cameras, which require bigger rockets and motors. However, because of the faster shutter speed and manual control of the aperture, the photographs are clear and properly exposed thereby making SLR cameras by far the best for high power rocketry if you are willing to take the chance and spend the amount of money required to fly these large rockets.

Mounting Styles

The three basic ways that most people mount the camera inside the rocket are looking down the side of the rocket via a mirror, looking straight down after separation, and looking straight out the side of the rocket. Each has its own advantages and disadvantages.

One common design is to have the camera looking straight out the side of the rocket and then reflect the view via a first surface mirror down the



Top: 1996 Hayburner Launch with Royal Gold 100 at 1/2000th second shutter speed. Smoke trail leaves a nice shadow. Bottom: LDRS 18 with Royal Gold 100 at 1/2000th second. Booster is captured adding dimension to photo. Right: Bend, OR launch. Photo using a first surface mirror looking down side of rocket using an SLR camera and Royal Gold 100 film. Dry Lake beds are not usually good for pictures unless you can capture something else in the photo.



side of the rocket. This gives very nice shots down below the rocket during takeoff so there's plenty to photograph. If you design your recovery system for the payload section just right you can also get pictures during decent too. Some disadvantages to this type of design are mounting of the mirror and the greatly increased drag due to the mirror sticking off the side of the rocket. Since altitude attempts are not generally associated with a camera payload this is not a problem other than trying to determine the center of pressure of the rocket. One method for taking this into account for calculating the center of pressure is to treat the cowling as a fin. This is not very good assumption, but better than ignoring it in your calculations. Another concern is that the camera must advance the film rather fast even to get a few shots during the burn of the motor. The flame and smoke are very nice to capture as well as the booster falling away at separation.

This makes SLR cameras the best choice with this method.

Some cameras are mounted so they look straight down on decent with the parachute. These shots are excellent for general aerial surveillance photography if you want to map out your launch site. You can also try to capture your booster as it descends below the payload section. Because this design has no mirror, which itself can be difficult to get the right size and angle, you can get a lot more altitude for a given motor. Its great for point and shoot cameras which have a wider angle lens and the slow film advance rates (since the decent of a rocket doesn't change relatively quickly during decent over a 2 second period).

Having the camera look straight out the side of the rocket gives nice horizon shots like looking out of a plane. It does allow pictures to be taken during boost, coast, and decent phases and you

don't have to mount any mirror. Both SLR and Point & Shoot cameras work with this method.

In summary, if you wish to photograph the flame of your rocket during take-off or the booster falling away at separation, a SLR camera is best. But for your first camera rocket, or to just photograph the launch area, a Point & Shoot camera is your choice.

The next article will provide the necessary steps to open up a Point & Shoot camera and solder wires to the camera to electronically control the camera. Because of the smaller size and lower price, the Point & Shoot camera make the best choice for a first camera rocket.

aerodrag 4.1 software

by tim quigg



I'm really lousy when it comes to mathematical computations of any kind. So it goes without saying that math was not one of my better subjects in high school. Due to this, I had some real doubts about my future in model rocketry when first introduced to the hobby in 1975. Barrowman calculations were horrendous for me, as were Coefficient of Drag computations. Thank the Rocket Gods that the advent of the home computer also brought with it advancements in software that now take care of these tedious computations. Software programs such as WinRoc, Rocksim and wRASP have taken much of the hardship away from the hobby for most of us who are "numerically challenged."

Unfortunately, many of the most commonly used and widely recommended rocketry-related software programs are also rather expensive. And to make matters even worse, some of these computer programs only run in DOS, which can be difficult for those of us who only speak "Windows." My personal criteria are simple; it must be inexpensive but accurate, Windows compatible and it must be user-friendly. Enter John Cipolla of AeroRocket, and his new and exciting product, AeroDRAG 4.1.

I sent a personal check for \$18.00 (\$15.00 for the software plus \$3.00 S&H) along with the order form I downloaded from AeroRockets website. I had the two diskettes in my hand (via Priority Mail) seven days later. Most impressive! At first, I experienced a couple of problems

when I attempted to install the program into my computer. However, these were problems not related to the software, but rather were a direct result of "operator error, headspace and timing." A couple of quick e-mails to John, which were answered almost immediately (the man must live by the computer!) and the problems were resolved.

First off I have to tell you AeroDRAG is one nice little bit of computer work! AeroDRAG can interactively predict rocket drag coefficient for input into WinRoc or wRASP to more accurately predict flight performance. (I use WinRoc extensively, and the "wide open guess method" of calculating Cd always troubled me). In addition, AeroDRAG includes the ability to predict the flight performance of multi-staged rockets using the drag coefficient computed in the main routine. Rockets having up to three stages can be analyzed. AeroDRAG also computes supersonic and hypersonic drag up to Mach 10!

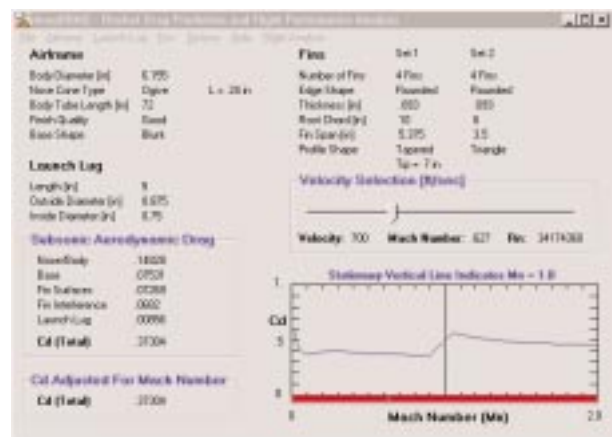
During the course of my 2-week analysis, I received several more e-mails from John inquiring how I liked the software, if I was having any problems, and to also advise me he had created an upgrade to the software. John had initially provided me with AeroDRAG ver-

sion 4.0. He had already upgraded to AeroDRAG 4.1! This guy had been busy! John sent me the upgrade for free via e-mail. Unfortunately, my computer once again experienced problems trying to download the .exe file. (again, NOT a problem of the software). After advising John of my problems via e-mail, I received a second set of discs via Priority Mail in 3 days....AeroDRAG 4.1 at no extra charge! Now, this IS service!

What impressed me the most about AeroDRAG 4.1 (other than the stellar customer service) was its simplicity. Anyone with a basic knowledge of Windows 95 who can operate a mouse and a tape measure can use this software. The program itself is equipped with an extensive help file, which contains copious instructions. There is no question of what is needed, and how to do it with AeroDRAG.

The program consists of a single, large window with individual sub-sections to input the various measurements taken from your rocket vehicle. Across the top of the main window is a toolbar you can click on. Each button opens a sub-window for the insertion of measurements taken from the airframe, launch lugs and fins of your rocket vehicle. All one has to do is start at the left of the toolbar, and work their way across it, filling in the measurements for each window as it pops up. Starting with the airframe, a secondary pop-up window requests you to fill in blanks for body diameter, nose cone type (i.e. ogive, parabola, etc), body tube length, finish quality and base shape. You will also be prompted to add the nose cone length, and boat tail diameter if your rocket is so equipped. As soon as you click on the "close" button, the secondary window disappears, and your measurements have been miraculously inputted into the airframe section within the main window!

For the launch lugs, you insert measurements for the length, inside diameter and out-



side diameter. Again, clicking the "close" button inserts this data into the corresponding section on the main window.

The fin section has a provision for up to 3 sets of fins (no doubt designed for those of you who incorporate canards and strakes into your designs). Required measurements include the number of fin sets, the number of fins in each fin set, fin edge shape, fin thickness, fin root chord, fin span and fin planform shape. If required, you will also be prompted to include the fin tip chord. Again, clicking the "close" button transfers this data to the main window. If anyone has a problem understanding the nomenclature and exactly what is being asked for, a simple click on the "help" file brings up a schematic diagram identifying each rocket part. A very simple yet crucial feature for beginning rocketry enthusiasts.

There is also an options options section within the main window toolbar to input fin sweep angle, calculate average drag coefficient and maximum Mach number. Once all of the

measurements have been input into the system, all one has to do is click the Velocity Selection button on the main window and the software computes your subsonic aerodynamic drag (as well as your Cd adjusted for the specific Mach number you selected). Truly a slick bit of work. And that's not all AeroDRAG does.

AeroDRAG also has a rocket flight performance analysis feature that will help you to compute your ballistic coefficient [lb/ft^2], burnout altitude, burnout velocity [ft/sec] and average acceleration in G's. AeroDRAG will also compute your upper stage coasting results, relaying air density [$\text{lb}\text{-sec}^2/\text{ft}^4$], coasting ballistic coefficient [lb/ft^2], coasting altitude, time delay-coast time in seconds, and total altitude achieved. And if THAT weren't enough, AeroDRAG also computes optimal mass, and conducts both altitude and velocity plots as well. And all of this for only \$18.00!

I was so intrigued by the AeroDRAG 4.1 software, I had to learn more about the man behind the program. I contacted John Cipolla

again, and let the cat out of the bag as to who I was, and what I intended to do. Needless to say, John was taken back by my plans.

Conclusion

In summation, my recommendation is if you use WinRoc or wRASP, you should get AeroDRAG. If you are like many entering hobbyist who can't afford a great deal without cutting into your flying budget, AeroDRAG is a very cost-effective, viable alternative to the higher priced computer programs on the market that perform some of the similar, basic functions. As of this writing, AeroDRAG contains only 108 motors in the master motor list to make flight and altitude predictions.

Pros: Low price, Windows 95 compatible, very user friendly with extensive help file, and great customer service. **Cons:** Limited number of motors in master file. **Company:** AeroRocket (www.aerorocket.com). **List Price:** \$15.00.



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mach buster rocket kit

by jeff brundt

Are you looking for high performance in a small package? Do you want to fly high power for less than \$50 (airframe and motor)? Do you want a rocket guaranteed to break the speed of sound? If you answered yes to any of these questions then Rocket Vision's Mach Buster might just be what you are looking for. This 24mm minimum diameter rocket [is] guaranteed to break the sound barrier. It is definitely high performance in a small package.

For a price less than a tank of gas, gas you get a durable rocket made from cutting edge aerospace components. The kit comes neatly packed in a resealable clear plastic bag. Individual items such as the nose cone, recovery system, fins and nose

weight all come individually packaged in their own resealable baggies. The body tube is made from woven cloth phenolic and is incredibly strong. It has a wall thickness of .090 inch. The nose cone is a single piece made from plastic and has no ugly seam line, which requires sanding or filling. Fins are made from G-10 fiberglass. Their shape is a 30-60 triangle designed for less drag.

Basic Construction

Assembly is straightforward by following the instructions provided. The only criticism I have is that there are no photos provided to aid in the building process. Certain steps performed later would certainly benefit from having an included photo or sketch. Rocket Vision recommends using 5 and 20-minute epoxy in assembly of the kit. I used Bob Smith's brand epoxy in mine. There is a cardboard liner tube for the motor that needs to be epoxied in place. Be

extra careful when you do this so no excess epoxy fills the precut fin slots or piles up at the forward edge of the tube. A long bamboo skewer works well to remove any excess build up when sliding the motor tube in. If you don't remove the excess then installation of a longer motor will be prohibited.

The instructions recommend attaching the fins on one at a time using tape to hold them in alignment. I found this was unnecessary since they were a very tight fit in the precut body tube slots and would hold their position easily. The fins were glued in place using 5-min epoxy first. Then each fin was given a fillet using 20-minute epoxy with some microballoons mixed in. This provides a strong, durable fin to body joint. A little light sanding was all that was needed to clean up the fillets after the epoxy cured. The launch lug provided is a 1/8" lug made from plastic tube. I roughed up one side of this plastic with some sandpaper and epoxied the lug in place, giving it a nice fillet as well.

Rocket Vision includes an addendum to the kit requiring clay be added to the nose cone for additional stabilizing weight. A separate bag with two 1" squares of clay is provided for this. I recommend putting the clay into the nose cone before you install the crossbar for the shock cord attachment. It will certainly be easier than if you do this later. Roll the clay into a strip and tamp it in place with a small diameter dowel and that's it. You can then assemble the nose cone per the instructions. You also may need to sand down the shoulder of the nose cone to get a good fit to the body tube. My kit had a very tight fit between the two, so much that an ejection charge would not have separated them. A little 350-grit sandpaper cured that problem.

Recovery System

The recovery system consists of a 10" dia. rip-stop nylon parachute, several pieces of kevlar cord, six small split rings and a nomex cloth to protect the chute from hot ejection gasses. Use of the nomex protector is highly recommended since there is very little room for wadding of any sort. This portion of the assembly is where a good photo or sketch would help. Fortunately, Rocket Vision has assembly guides with photos on their web site. This

is great for those with Internet access, but not everyone has web access. There is also nothing in the instructions I had that referenced any sort of on-line assembly guides available. The instructions do not note that an online assembly guide is available. However, I was able to find the information I needed to complete this task. The kevlar shock cord is attached to the inside of the body tube by using a small section of liner tube type material. The cord passes behind this section and is knotted on the end then epoxied in place inside the body tube. The cord is then sandwiched between the coupler tube section and the inside wall of the body tube. Do not place this cord holder too far down inside the tube or you will not be able to install a long G55 motor.

Finishing

All that was left to do was paint and finish the rocket. The body tube has no spiral grooves to fill and is nice and smooth. The fins, launch lug and nose cone are smooth as well. The only thing required is to give the rocket a light primer coat then color. I used Krylon white primer on the whole rocket. The body was painted international orange and the nose cone was painted black. The kit comes with laser printed decals that require you to cut and trim. Their only drawback is that they mar easily. I had something laid on top of mine and some of the decal was scratched. Be careful if you use a straightedge and knife to cut the decals. After the decals were applied and let dry, the whole rocket was clear-coated with Top Flite Gloss clear. This product is compatible with Krylon and provides a good durable finish.

Flight Performance

Ready for flight the rocket weighs four ounces, less motor. Rocket Vision suggests several motors. The mildest is an Estes D12-7 and the wildest is their own G55-10. On a G55 this rocket will break the sound barrier and go over a mile high. I have known a few people in our club that have flown this rocket on a G55. Not one has yet to recover their Mach Buster and we fly from an 80-acre farm. For my first flight I used an Estes D12-7. I wanted the rocket back and to get at least a few flights before going 'all the way'. The motor is friction fit using masking tape. The nomex cloth is inserted first followed by the parachute and



shock cord. With the recovery system in place and motor loaded, it was ready for launch. Since this rocket has a 1/8" launch lug it could be launched from a basic Portapad. If you use the G55 it's recommended to follow the safe pad distances in the safety code. The sky was slightly overcast with little wind. At ignition, the rocket quickly disappeared off the pad. This rocket really moves, even on a 'D'. Right at apogee the ejection pop could be heard and the chute deployed perfectly. The rocket descended rather quickly but knowing how tough it was constructed there was no worry. The Mach Buster recovered undamaged ready for another flight.

Final Thoughts

This was a nice, easy fun kit to build. It is easily completed by someone with one or two rockets under their belt. I would say that if you are going to go for performance, be prepared to lose the rocket. Single use motors are the way to go. I have seen and heard plenty of stories of folks flying the Mach Buster on reloads that have never seen the rocket or the reload case ever again. It would certainly help if a locating device could be put in the rocket, however, there is no room for it. A G55 motor takes up most of the body tube with little or no room left for even the parachute. A fellow club member tried suggesting to Rocket Vision to lengthen the body tube by two inches to accommodate a locating beacon but they declined saying it would be unstable. Replacing the parachute with a long, reflective mylar streamer might help. However, remember this thing goes a mile high on a G55 and at 13" long it is not easy to spot. It is definitely an eye test when trying to locate the rocket on descent. Show up with the Mach Buster at a launch and be prepared for everyone to tell you to kiss your rocket good-bye. Even so, you'll have the satisfaction of breaking the sound barrier and a mile in altitude for less than \$50—not bad in my book

Pros: Excellent materials, Ease of construction, Good price and value. **Cons:** Lack of construction photos, decal quality
Company: Rocket Vision (800-568-2785).
List Price: \$19.50.

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Black Rock and Aero-Pac

It's a big place. If the daytime panorama doesn't seem large enough the night sky fills in the details. Open, huge, vast, and endless flat are some of the adjectives that best fit – yet still are lacking. There's not much there except some rocks that appear from nowhere, an occasional bird, a flat disc-like lens of water that is pushed around the playa by the afternoon winds, and people. Mostly crazy people doing odd things like land sailing, Burning Man, land speed record attempts, and impromptu displays of pyrospectacular. The only sane people that visit the region are the rocketeers, everyone else is just plain nuts. But that's what makes it fun!

Since it's such a large place people generally fly rockets that go pretty high, makes sense right? That's why Aero-Pac, the Association of Experimental Rocketry of the Pacific, likes to fly there. And it just so happens that the club will be on the playa in the months of June, July, and September. There will be a 50,000 foot waiver in place for all flying hours everyday at each event. It's reduced for the night launch, of course, to 7,500 feet.

June's launch is called MudRoc given the chance that the playa is sometimes a bit muddy which always makes things interesting. This year Mudroc 7.0 is happening June 24 and 25, a weekend of Fun on the Playa. You might be able to catch a hop in one of the airplanes that fly in for the launch or bum a jaunt in a land sailer. Bring your rockets and come on out.

The July launch is a 4 day West Coast 4 day affair called Aeronaut 2000, a midsummer bash at Black Rock. Friday, Saturday, Sunday, and Monday July 28 through 31 with a night launch on Saturday evening. Sleeping out under the Black Rock stars is not to be missed, the nights are often blessed with meteor showers and an endless show of stars.

Then in September is the grand finale, Black Rock XII and Black Rock EX3, a three day launch starting September 9 culminating with an experimental launch on Monday the 11th. Very, very fun, lots of great people and cool rockets.

Tripoli South Florida

The March launch was to be the day of reckoning for John Taylor and his upscale Quasar newly renamed "2Xtreme". This 6" diameter beast comes equipped with a 3" motor mount, dual deployment, front air bags, and a killer paint/decals scheme. A quick announcement to the eager crowd and the countdown commenced. At zero the Kosdon M1130 quickly came to life and lifted the rocket majestically into the air. At apogee the rocket arched over, and the charge went off to the joy of JT and everyone watching. From 7254' the slight breeze brought the rocket straight towards the pads. At 600 the large main chutes ever so gracefully unfurled. Landing within a hundred feet of the pads, JT was almost there to catch it. This textbook launch and recovery has gained JT entrance into the world of level 3. Jeff Levine flew his Big Banana on a K1100 with a redecorated nose cone, coated in glitter. Guk Kress flew his 1/4 Patriot on an I357 and I300. Matt Young attempted Cert 1 with a Cirrus Dart on an H123. Prefect John Schultz' Thunder'N'Lightning took to the skies with an aggressive two stage.

Derek Deville's Video Miranda was ready to fly on a Kosdon K280 C-slot. With most everyone gathered around the video monitor the announcement was made, and the countdown started. At OE3' someone shouted, "plane," we stopped and all looked. Much to everyone's excitement, it was four F-16's inbound at high speed less than 1000' off the ground. Flying in formation, the jets came in straight over our heads and one by one from the back of the pack began to peel off in high bank turns. The crowd began to cheer wildly but could barely be heard over to roar of the jets. The red orange glow off the jet engines shined and vapor tails formed over the leading edges. It was a magnificent sight. And as quickly as they had come, they were gone. A fantastic treat!

Tripoli Southern Minnesota

Now in our second year with over 20 members, TSM prepares for the flying season.

The last winter meeting for TSM was held on March 25, 2000 at Heritage Halls Museum in Owatonna. Issues discussed at the meeting included; Large project rail launcher for Level 3 and larger projects- Jon Nordmann finalizing design: will incorporate a Black Sky High Power rail. Dan Braam to have lunch available on site at all launches, proceeds go to the club. TSM t-shirts were distributed to those who ordered them- profits went back to the club. Scott Young will do a Level 3 cert attempt at the Maple Island launch site April 22nd. Many large projects in the works for this year, including Ron Freiheit's 3 stage M-M-K (to fly at Black Rock), The Tripoli MN groups Big Honkin' Rocket (BHR) that will be flown at North Branch and possibly our site, plus several others. An aluminum plank will be purchased for access across the drainage ditch- estimated cost \$400. Ron Freiheit will incorporate a wireless mic into the PA system and put in the relay box on the rail launcher. M.a.D. Missiles to sponsor the porta-john for the first launch.

First launch of the season to be April 22, 2000 at Maple Island, MN. Launches to be held fourth Saturday of each month through October. Waiver to 7,300' AGL. Large field, mostly small crops= onions, potatoes and beans. Windows to higher altitudes available with prior arrangements. Experimental launches will also be held the Sunday following a normal launch when interest warrants.

SLRA Launch Report

Overcast skies and a westerly breeze (toward Creve Coeur Lake) were the rule for the February 19 launch. The field was soggy due to heavy rains earlier in the week, and low-lying areas had standing water. Despite the conditions, we had a good turnout, with around 25 flyers, who made a total of 75 flights. The day also marked our first competition of the year.

We had a couple of new flyers join us for (I think) the first time, Dave Aston and Matt Mahoney. Welcome, guys! Troy Manzella also made an appearance and put in several good flights with his Banshee. Lane Douglas was the most frequent flyer, putting up 8 flights during the day. Mitchell Walsh made several good flights with his Snitch UFO. Mike Walsh Jr. flew the day's smallest rocket, his Micro-Maxx Saturn, along with his Barracuda.

Dave and Emily Mulawa also put up several flights, including the old standby Fat Boy. Kevin Souers wins the cluster award for a good flight of his modified Phoenix with a D12-5 plus four C6's – spectacular! Chris, Matt, and John Pennington all put in flights. John added to his fleet of scale models of Orbital Sciences rockets with a good-flying Pegasus XL. RMR regular Dan Schneider brought out a new Tomahawk Cruise Missile for a good flight. Along with their contest flights, the McCoy's (Amanda, Greg, and Jeff) and the Sears family (Peter, Timothy, and Michael) put up several good sport flights.

The contest began with selection of a target time for Random Duration, by drawing a number from a hat. The target time of 65 seconds caused some groans, since it looked like a 65-second flight might go for a swim in Creve Coeur Lake. Paul Graf put up a promising flight, but was disqualified due to ejection of his engine. Newcomer Lane Douglas made a great flight of 73 seconds to take the gold medal.

Krista Brown and Chad Ring, flying as the Two Launch Crue team, joined us from Indiana. They put in a good showing, taking second in Random Duration, as well as first in B Streamer with a fantastic 313-second flight. (That's right, over five

minutes.) This may set a new U.S. record in Team Division. This flight, as well as many of the other good ones, ended up in the lake. John Buckley took second in B SD with two consistent flights, also losing a model to the lake. Jeff McCoy and Timothy Sears followed up in third and fourth place. Ron Hale put up a good qualified flight for contest points.

Paul Graf had a nice looking clone of the old original Flat Cat design, and put up a good flight for A Boost-Glide. Unfortunately, the lake claimed it, so Paul could only get flight points. Tom McAtee lost his foam-wing Delta Sierra to the lake on a 133-second flight, but was able to fly a backup model for a returned flight to take first place. John Buckley again made two consistent flights for second place, with Michael Sears third with his veteran Mini Golden Girl. Jeff McCoy put in a good first flight with his Deltie, but was shot down by the Red Baron on his second flight (i.e. the glider tangled with the pod streamer), resulting in fourth place. Lane Douglas improvised well, flying his ARV Condor with a single glider for a good qualified flight.

Tripoli San Diego

Under warm March skies the Tripoli San Diego Ocotillo Test Range group held a banner event. There were 6 Level 1 attempts and 5 successes, 4 Level II tests passed, and 6 Level II attempts and 5 successes. The motor of choice for the weekend was either the H180 or the J350, we're not quite sure of the exact count, but close to 10 of each of these went up, followed by the incredible new I200 29mm reload. Aerotech, you are great! There was little to no wind, negligible clouds, and plenty of people and motors to make life interesting.

Aerotech & Dr Rockets local dealer John Thompson (Terminal Velocity RMS) kept us all in stock for whatever we needed, and boy on weekends like this the "AP Habit" was roaring! The Most Loud Launch was Andy Woerner's scratch rocket on a K1100, made totally from Home Depot parts, and not only did it hold together, it flew very well. Jon Martin, Chris Grainger, Frank, and company wowed us all with many J350 flights mostly on very small diameter rockets, punching holes in the sky up to nearly 8,000'. Hey, that's OK! Our waiver is 12,500'! Most motors sold goes to John Thompson, most AP burned goes to Andy Woerner, and most hair pulled out goes to the prefect for trying to keep track of everything.

Coming up in April, an M-motor

night flight on a Maximum Thrust Rocketry "Mach III" on an Aerotech M-1315! and possibly Dave Wentworth's LOC Esoteric on a full complement of five 54mm reloads! GAWD!

Tri-City Sky Busters

Mother nature again looked favorably upon us in Northern Ohio. What at first looked like doubtful conditions for our Sunday launch, turned out to be just great. Full sun, no clouds, temps in the 50's but it was a little on the windy side. The field had dried up enough so that we could drive on it to get to our preferred launch location some ways back into the site. 21 flyers made 59 flights from A to J impulse class.

The rocket gods finally granted Barry Lynch what he has been hoping for some time. L-2!! He made a perfect flight of his LOC Magnum on a J-350 with altimeter apogee ejection. Congratulations Barry.

Mark and Josh Hanna made a spectacular flight of a two stage scratch built rocket. The Nike Ajax had a I211-s in the booster, staged to a H123-m in the sustainer. It had an ALTS-2 altimeter in the sustainer with a remote control to stage the H123. The flight started out great. The staging went perfectly. The chute on the booster became tangled upon deployment. The booster received some damage on landing but is repairable. The sustainer went unstable immediately after motor ignition, flying about in a cork screw pattern. The altimeter did its job though and the sustainer was recovered in good shape.

Wolf Von Kiparski flew a Nike Smoke on an Apogee D-10. The motor CATOed on ignition but gave enough thrust to propel the rocket into the air about 100 feet. With no burning motor to ignite the ejection charge, the rocket crashed but is repairable.

Jacob Hahn made the most flights of the day with 7. Next was Eric Jones with 6 flights. It's good to see the young-uns taking an active interest in our hobby!

Three new members joined our ranks on Sunday. They are Dan Ledenican, Robert Faud, and Greg Phillip. Please join me in welcoming them to our rocket family at our next launch!

Pete Pfingsten, our Vice Pres, brought the first finished high power pad to the launch for an examination by all. Pete did an outstanding job fabricating this pad. It has removable legs, VERY wide foot print for those big ones, rod angle is adjustable with a turnbuckle and the whole launch head swivels on the base! The pad will handle up to a one inch rod.

Excellent job Pete!! We will use it a few times and see if we need to make any modifications before he makes the next one.

Blue Mountain Rocketeers

The first Blue Mountain Rocketeers launch of the new millennium occurred on March 25th. 46 people attended, and we logged 106 flights for the day. Broken overcast dominated the day, with temperatures around 48 degrees. We had a slight sprinkle in the morning, but it lasted less than 5 minutes and didn't return. Winds were relatively calm (for Dayton anyway!) from 3 to 7 miles per hour. For the first time in 6 years, our launch control panel broke down, and there was a 1 hour lay-over while the panel was being field repaired (thanks to Ben Sauve for having a push button switch in his pocket!) The cheap launch push-buttons used in both VBR panels are going to be replaced before the next launch, so this won't happen again! The All Hobbies table was well attended, and sales appeared to be brisk. Scott Binder of BSD Rocketry was on hand as well. He sold several Horizon rocket kits, stickers and vinyl for rocket applications. His "name the rocket" contest was also very well supported. But I think he said a person who gave him a name over the Northwest Rocketry web ring won the contest. Congratulations to who ever won! Our October Sky poster raffle made a few more dollars, and we are at about \$50 right now. We still have lots of tickets left folks!

I was pleased to see quite a few kids attend the launch from the school presentation I gave last week at Dayton Elementary. I saw several kids walking around with big smiles on their faces, and Estes Starter sets from the All Hobbies tables. In between stints at LCO and flying rockets (yes, I managed to get 3 in the air!) I was able to help 4 kids take their first steps into model rocketry by helping them prep their first flights.

There were 53 model rocket flights of A through D, 39 mid-power flights of E through G, and 14 HPR flights of H through I. There were lot's of great flights logged. Northwest Rocketry's own Greg Deputy and family attended the launch. Greg wowed the crowd with the flight of his 3xH180 Triad. The rocket experienced a hard landing due to a fowled main chute however, and suffered heavy damage. Greg shrugged it off though, and with a smile assured me it will live to fly again. Chuck Layton treated us to a flight of the new I200 29mm rocket

in a 3" diameter rocket. WOW! What a screamer! Chuck's comment on the flight card read, "What the Hell am I doing?!" Chuck also flew a PML Quasar on an H238 for a killer flight. And if that weren't enough, he flew an odd roc pumpkin on a D12-3. Very cool flight Chuck! Chuck and Ryan Layton also flew a modified Starburst on an H180. John Marbach kicked up his new PML QT Black Brant VB twice on H128's. Tom Ledgerwood flew an IROC on an H123. Scott Binder flew the new BSD Rocketry Diablo on an H128, proving the rocket is ideally suited for its intended purpose of level 1 certification. He also flew the new BSD Rocketry Diablo on an F62-4 Dark Star. He also flew a scratch built 4" Honest John on an I211. I managed to fly my Area 51 on an E18, but a fowled chute resulted in a core sample. I also flew a BSD Excel Plus on an H180. Jim Downey made several flights, but the one that really screamed was his "Hammer Down" on an I211. John Reynolds made several flights for the day. He made a real screaming flight with his Archer on a H242. Dave Emery also made a successful NAR level 1 flight with his PML Patriot on an H128. Welcome to high Power Dave! My thanks to Jim Downey for conducting the Level 1 certification documentation for Dave.

Our next launch is Odd Roc 4 on April 8 at the Smith Hollow site. Weird and wacky rocketry will abound that day. Hmmm, where did I put that rubber chicken...

aerotech launch calendar

May 6

Event: MSRS "Test & Tune" Launch
Location: Shelby Farms, Memphis, TN
Sponsor: MSRS, Nar #550
Contact: Mike Hollihan (hollihan@bellsoutj.net)
Description: MSRS Secondary launch, a new club launch in the evaluation phase. If we get a regular attendance, we will make it a regular event!

May 5, 6 & 7

Range: Culpeper, Va
Event: Tripoli East and Central Virginia
Waiver: 15,000 AGL
Contact: Ed Rowe, 757-566-8012
Email: edrowe@erols.com

May 6 & 7

"SP-2000"
AHPRA, Arizona High Power Rocketry Assoc

Range: Flagstaff, Arizona

Sponsor: Tripoli Paradise Valley #50
Waiver: 40,000 foot waivers (Pending)
Contacts: Mark Clark, 623-877-6814
markclark@starlink.com

May 7

First Sunday every month

Range: Monroe, WA

Sponsor: Tripoli Puget Sound, TRAPS
Waiver: 5,000 ft AGL
Contacts: Christopher Scott, cjs-cott@worldnet.att.net

May 13

Range: North Branch, Minnesota

Sponsor: Tripoli-Minnesota #45
Waiver: 10,000 MSL
Contact: Richard Weyrauch, 651-430-8006
Email: rickw@mail.softcafe.com
Web: www.tripoli-minnesota.org

May 13

Range: Ironwood Apache Junction AZ

Rainbow Valley
Waiver: 7,500 ft – windows to 12,000 ft possible
Contacts: see web page
Web Page:

<http://www.sssrocketry.org/>

Sponsor: NAR Superstition Spacemodeling Society

May 13

Range: Bob Evan's Farms Rio Grande, Ohio

Waiver: 3,000 ft AGL
Contacts: Jerry Myers, cosmo-jwm@worldnet.att.net
Web Page:

www.geocities.com/wvsoar.geo
Sponsor: West Virginia Society of Amateur Rocketry

May 13

Sponsor: ROC – Rocketry Organization of California
Tripoli Anaheim (#48) (CA)
Range: Lucerne Dry Lakebed
Contacts: Rick O'Neil, 909-427-9157 after 6PM M-F
Ron McGough, 562-867-0419
Web: rocstock.org

May 13

Range: Rio Rancho Balloon Park

Sponsors: Tripoli Albuquerque # 87, Albuquerque Rocket Society
Web: www.arsabq.org
Mike Bernard (Club Contact Person), (505) 281 4462
Email: maberna@swcp.com

May 13 & 14

Sponsor: Tripoli Las Vegas #26
Range: Delamar Dry Lake Bed – Near Alamo, NV

Contacts: Mike Alber, (702) 871-7712
malber@msn.com

Web site:

www.mcneely.net/tripoli_vegas

May 13-14

Location: Dallas, TX (Windom)

Event: Mini-Olympics
Sponsor: DARS, NAR 308
Contact: Bob Wilson, 1337 Kesser Dr., Plano, TX 75025 or call (972)517-1434

May 14

Event: B&B Hobbies Classic

Location: Cartersville, GA
Sponsor: Southern Area Rocketry
Contact: comments@soar571.com

May 14

Range: Tuscola Airport (Just west of Tuscola on Rt 36, About half a mile)

Sponsor: Tripoli Central Illinois #059, Rocket R&D
Contacts: Don Reasor, President – Tripoli Central Illinois (217) 253-2586
Paul Adam, (309) 829-5254
Gary Buck, (217) 344-2449 evenings

May 20

Event: MSRS Monthly Launch

Location: Shelby Farms, Memphis, TN
Sponsor: MSRS, Nar #550
Contact: Mike Hollihan (hollihan@bellsoutj.net)
Description: Monthly Club Launch.
Visit <http://msrs.mem.net> for full details.

May 20

Range: Alamogordo, New Mexico

Sponsoring Prefecture(s): Tripoli New Mexico, White Sands #61 and SMRA (NAR 488)
Contacts: Bob Turner (TRA #647), (800) 545-4021
E-mail: space-cur@zianet.com

May 20

Range: Argonia, KS

Sponsors: Tripoli Kansas Kloudbusters
Contacts: John Baumfalk
Email: johnb@southwind.net
Web Page: www.kloudbusters.org
May 20 and 21

"Dairy Aire 2000"
Sponsor: Tripoli Central California
Range: Maddox Farms, Southwest of Fresno, on Kamm Avenue next to the river.

Contacts: Prefect, Jeff Engelman,
Email: jeffsteph@mediaone.net

May 20 & 21

Event: SpudRoc-V
Location: Mountain Home, Idaho
Sponsor: Tripoli Idaho
Contact: Vern Knowles (208) 939-1076
Event status hotline: (208) 376-1704
Visit our web site
www.tripoliidaho.org
E-mail us at
tripoliidaho@hotmail.com

May 20-21

Range: Millican, Oregon

Desert Storm
Sponsor: OREO
Contact: therios.pendragon@gte.net
Web: <http://www.oregonrocketry.com> for more information and maps.

May 20-21

Range: launch 3 miles south of Wayside, Tx in the Texas Panhandle, (approx 40 miles south of Amarillo)

Sponsor: Tripoli Amarillo #92, POTROCSWaiver: 21,500' MSL, approx 18,000' AGL
Contacts: Pat Gordzelik – Prefect, 806-488-2756, 806-353-4618
Email: POTROCS@aol.com
Web: www.potrocs.org

May 20 & 21

Event: Pioneer 2000 Regional & Sport Launch

Location: Pony Express Test Range, Utah

Sponsor: UROC
Contact: David Urbanek: urbanek@surfree.com

May 20 & 21

Range: Ocotillo California

Launch site directions: Take Interstate 8 to Ocotillo exit. Drive south on Hwy 98 for 9.8 miles. Turn west on Coyote #2 proceed 2 miles to site on right fork of Y in road.
Sponsoring Prefecture: Tripoli San Diego #5, DART
Contacts: Kevin Harness, 2717 E. 14th St., National City, CA 91950 (619) 267-5133
Email: Kevroc54321@aol.com

May 21

Event: ROCC Monthly NC Launch

Location: Monroe NC (Charlotte Area)

Contact: Scondy1@aol.com
Description: ROCC Central Carolina Launch.

Website:

<http://hometown.aol.com/scondy1/rocc1.html>

May 21

Event: SARA Monthly Launch

Range: Tucson, AZ

Sponsor: Southern Arizona Rocketry Association
Contact: Stephen Lubliner, (520)296-1689, 103056.621@compuserve.com
Launch Hotline (520)617-2617.
Web: <http://www.primenet.com/~tmorgan/rockets/sara>

May 21

Range: Maddox Farms on Kamm Ave. near Caruthers, Southwest of Fresno

Several thousand acres to launch on with few obstacles
Sponsors: Tripoli Central California
Contacts: Prefect, Brian Liggett
Email: brian@rocketry.com
Web: Tripoli Central California
Phone Line: 559-435-3342 the night before each launch for updates and last minute information

May 21

8:00AM to 1:00PM

Range: Saboba Indian Reservation

In the fields behind Soboba Casino, San Jacinto, CA
Contacts: Lee Rouse, (909) 658-6581
Email: lemi@ivic.net
Web: <http://www.ivic.net/~lemi/>

May 21

(weather permitting)

Range: Indianola Baloon Field, Just East of Indianola Iowa

12:00 noon to 5:00 PM
Sponsor: Tripoli Des Moines
Contacts: ISOAR President Email: Mike Kirkpatrick
Web Page: ISOAR

May 21

NEBRASKA HEAT REGIONAL

Range: LaVista, NE

Breda Iowa – near Carroll, IA
Pickrell NE – So. of Lincoln, NE
Sponsors: Tripoli Nebraska – T.H.O.R., F.O.T.F., Tripoli Nebraska THOR, and Tripoli Des Moines ISOAR
Contacts: Mark Uhlenkamp, 712-663-4521, marku@netins.net
Web Page: tripoli.org/tra_ne/nebraska.htm

Hotline: 402-896-206

May 26-29

Location: Houston, TX

Mars 2000
Sponsor: Challenger, NAR 498
Contact: John Pursley, johnpursley@email.msn.com

May 27

Range: Ardmore (Huntsville), AL

Sponsor: Huntsville Area Rocketry Association (HARA)
Contact: Brian Day, 256/881-9149
Email: bday@hiwaay.net
Web: <http://hiwaay.net/~bday/hara>

May 27

AHPRA

Arizona High Power Rocketry Assoc

Range: Rainbow Valley, AZ

Sponsor: Tripoli Paradise Valley #50
AHPRA
Contacts: Mark Clark, 623-877-6814
markclark@starlink.com
Web: www.ahpra.org

May 27

Sponsors: Tripoli Southern Minnesota #112 Range: Maple Island, MN.

Scott Young (507) 835-1288
Email: yous@waseca.k12.mn.us
Web Page: geocities.com/CapeCanaveral/Station

time to make peace

by ken biba

The opinions expressed in this article are those of the author and do not necessarily reflect the opinions or attitudes of Extreme Rocketry magazine.

It is a hard, cold reality that rocketry is a regulated hobby—regulated by tort and insurance concerns. These regulations supercede even those of local fire marshals, state fireworks, state explosives, interstate commerce, and federal explosives laws. It is also sadly true we are an imperfectly regulated hobby. Rocketry is composed of inconsistent, poorly articulated, often ignorantly administered, and mutually incompatible rules (overseen by multiple agencies with much better things to do). It is constructed by default, a maze of regulations making rocket hobbyists appear to be either outlaws or potential terrorists. All of this makes it extraordinarily hard to reap the benefits of our passion for rocketry.

The eighth grade class at my son's school cancelled their rocket science project because they could not figure out where it was legal to launch rockets in our metropolitan area. As it turns out there were a number of appropriate locations, but finding them and their rules was a daunting task. Is this the fault of the regulators or the fault of a hobby that has inadequately communicated its message?

Some of us respond to regulation by choosing to place responsibility on the regulators, accusing them of some conspiracy to regulate our hobby out of existence. I disagree. This is victim's thinking. Regulators, in my experience, vastly prefer administering easily regulated and self-managing groups, and they amazingly disappear when such groups take charge. Large organizations like the government have enormous bureaucratic inertia in making new decisions, and they emphatically require the guidance from informed, patient, persistent public opinion to nudge them in the right direction. Imperfect regulation is our collective responsibility. It is our job to effectively communicate that the benefits of our hobby far outweigh the risks.

The government listens to those with the loudest and most clearly articulated voices. I believe we need to make ourselves heard above the voices of risk aversion. While the founders of our hobby began the task of making rocketry legitimate (a pioneering relationship with the FAA, deregulation of black powder motors, the beginnings of a uniform fire code), technology and a new generation have changed the rules. Higher power composite motors, new materials, near-space altitude attempts, sophisticated avionics, and the powerful tool of the Internet



science, and inspiration. Any of us who have mentored children in building their first rocket, and watched the pride and success on their faces as a parachute brings their project back safely, know what we have is to be treasured. Any of us who have had the satisfaction of the personal challenge of certifying for high power know what we have.

- Our hobby provides tools to train the next generation of rocket scientists and communications specialists—the ARLISS program from Stanford University is a wonderful example (<http://ssdl.stanford.edu/arliss/> and <http://nasa.asu.edu/CanSat/cansat1/index.html>) These programs help pioneer new, cheaper ways to get to near earth orbit. The CATS prize teams are prime examples of this theme.
- Our hobby provides a nurturing environment to inspire children to strive for the best. Rocketry programs in schools and extracurricular groups have inspired many (including some reading this) to strive for the best.
- Our hobby inspires both children and adults to have fun and to teach themselves the foundations of aerodynamics, electronics, chemistry, and fluid dynamics.

All of these points can be bound together with fun and an incredible safety record.

What can we do to make this message heard over those voices worried over risk? It is irresponsible to simply believe regulators will go away, and it is insufficient (and likely highly inefficient) to simply make litigious war on regulators. Rather we, as citizen hobbyists, must take the responsibility for action—to work proactively, responsibly, and fanatically. It is us, the hobbyists, who must make the change happen. The key to competent regulation is not

have recreated the environment of our hobby. I believe we need to reform the hobby in order to match the times.

We have an incredibly grand message to deliver. We have a hobby that champions learning for adults and children. Rocketry is a hobby of passion, dreams, accomplishment, skill,

simply in the courts or with regulatory agencies, but rather it lies with our own responsibility to do the following:

- Unify in common cause
- Educate others about the real benefits of our hobby
- Act responsibly to make our cause heard

The current joint action of the National Association of Rocketry and the Tripoli Rocketry Association, with respect to anticipated BATF regulations, is necessary, but late, and an ultimately insufficient effort. We must work together not simply in reactive litigation, but more importantly in pro-active education. We must unite vendors, hobbyists, and hobby organizations in a common theme and common purpose. The hobby is small enough that no one group has sufficient resources to work alone. We must work together and find new and better ways to joint concerted powerful action.

The second key is education—informing the general public, regulators, local, state and federal governments, ourselves, and our families about the benefits of rocketry. We have astonishing new tools to accomplish this education. The Internet, television, and other effective public relations give us underutilized tools to foster communication with all our audiences.

The foundation of all this is responsible action. We must create a culture of perpetual improvement, much like amateur radio, who with an extraordinary record of self-regulation, education, and public service have a powerful voice with regulators and legislators. We should emulate their example. We have long depended on our small size as a hobby to be unnoticed. Our success no longer permits this.

So this is my call to make the peace.

- A peace that recognizes the outstanding success and safety of the hobby
- A peace that values and appreciates the learning and fun we provide to children and adults.
- A peace that embeds respect for safety and responsibility in the hobby, rather than as an imagined evil of the regulators.
- A peace that we persistently pursue for the long term – engaging in the hard, but rewarding work of patiently, consistently educating our public.

Join me in stepping up to the responsibility and unabashed fun of making the peace—for ourselves and the fliers to follow us.

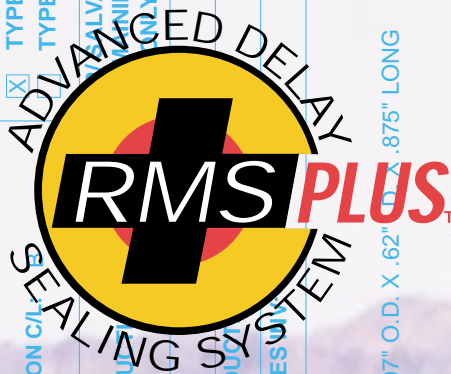
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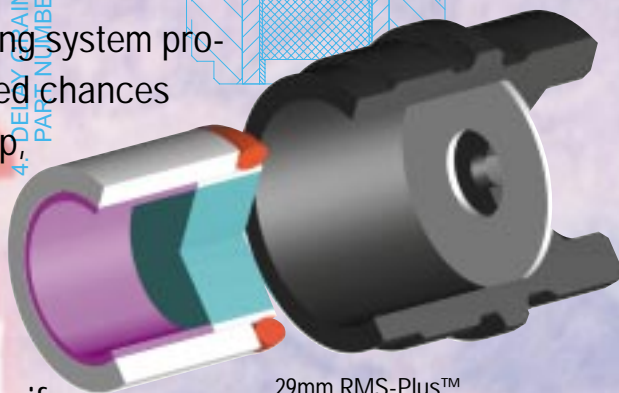
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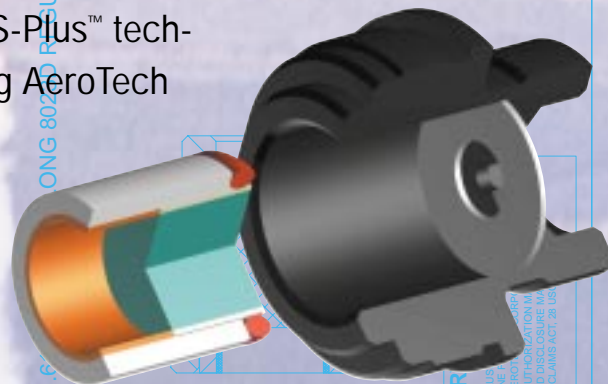
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RMS-Plus™ is now available in all 29 & 38mm Easy Access™ RMS™ reload kits and in new 29 & 38mm RMS™ Reload Delay Kits ("RDK's"). For more information on the RMS-Plus™ design or to view and download RMS-Plus™ motor reload kit and RDK assembly instructions, please visit the Resource Library on the AeroTech website at www.aerotech-rocketry.com.



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