The COS-Rocketeer

The Official Journal of the Colorado Springs Rocket Society (COSROCS)

NAR Section #515

2000 LAC Award Winner!

Volume 12, Issue 3 May/June 2001

Neil Kinney helps Greg Sandras prepare his Patriot
(Photo by Greg Elder)

Inside this issue:

Important Notice: COSROCS membership renewals for 2001 are due now! This will be the last issue of the COS-Rocketeer you will receive, if you have not paid the renewal fee. Please help our club to keep operating in a smooth manner by getting your renewal payment in as soon as possible. Provide your payment to Mark James at one of our launches or meetings, or mail your payment to the address listed on page 2 of this newsletter. Your promptness is appreciated.

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Volume 12, Number 3
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The COS-Rocketeer is the official journal of the Colorado Springs Rocket Society (COSROCS), NAR section #515. This journal, published bi-monthly by members of COSROCS, serves to provide information on all aspects of rocketry. Articles, rocket plans, and photos are always welcome. Items for publication should be submitted to the editor:

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6121 Cranberry Ln.
Colorado Springs, CO 80918

e-mail: gelder@pcisys.net

COSROCS' membership dues are $20.00 per year per family. Junior memberships (under age 18) cost $5.00 per year. Checks should be made payable to COSROCS. Applications and payment should be mailed to the following address:

COSROCS
P.O. Box 15896
Colorado Springs, CO 80935-5896

The COSROCS phone number is (719)575-0060

If you have access to the Internet, COSROCS has a web site and a listserv. The COSROCS web site is:
http://www.cosrocs.org.

The e-mail address for the listserv is cosrocs@egroups.com. To subscribe to the listserv, go to

http://www.egroups.com/subscribe/cosrocs

COSROCS is a family-oriented club. Everyone is always welcome at our launches and meetings. Please join us. You'll have a blast!

COSROCS received the NAR's LAC Award (Rockwell Trophy) in 2000 for having produced the best newsletter.

COSROCS Officers

President:	Neil Kinney, nkinney@arinc.com
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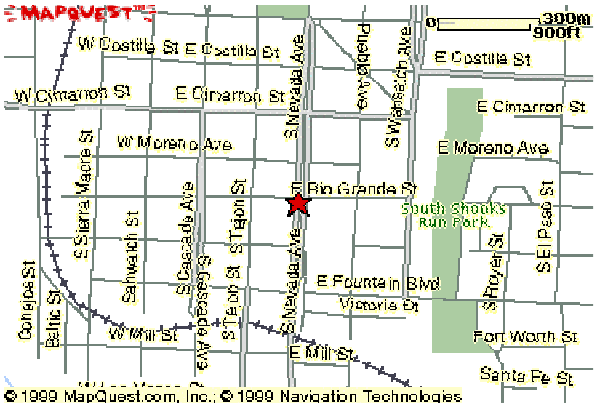
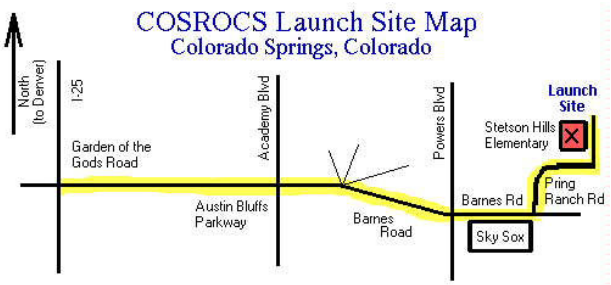
Contests:	Dave Nauer, david.nauer@wcom.com
Web Master:	Mark James, mgjames@concentric.net

Launches and Meetings

COSROCS holds a business meeting on the second Wednesday of every month from 7:00PM until 9:00PM. The meeting location is the Gold Hills Police Station at 705 South Nevada Ave., Colorado Springs.



COSROCS holds a sport launch on the first Saturday of each month, weather permitting. The launch is held at the Stetson Hills Elementary School, located at 4910 Jedediah Smith Rd. in Colorado Springs. The launches begin at 9:00AM and last until approximately 12:00 noon. Our launches are free and open to the public. A one pound weight limit is imposed for rockets launched at Stetson Hills.



The Nagging Editor

By Greg Elder

Spring is finally here. I hope our flying weather will now improve; however, I have seen it snow in Colorado as late as July. This winter has not been very kind to us. Three of our last four launches have been canceled due to snow, wind, or a combination of the two. I've been a COSROCS member since 1993 and this has been the first winter where we have had to cancel so many launches. With the arrival of the warmer weather, you can now (hopefully) start flying those projects you built over the Winter.

Joseph Peklicz, the person who sells the styrofoam UFO's I have been flying at launches (as well as mono-copters), sent me a number of plans for model rockets he has designed. He has given me permission to print his plans in our newsletter. I will be printing some as space allows. We have plans of Joe's Interdimentional Brain Cruiser on page 8. He has other interesting designs too. If you are interested in purchasing either his UFO's or mono-copters, they are $10 each and postage is $4.50. By the way, he informed me that his 3-engine cluster UFO flies fine when all the motors ignite. (As I learned, it doesn't fly so well when only one of the three motors light.) You can order Joseph's kits at the following address:

Joseph Peklicz
635 S. Zane Highway
Martins Ferry, OH 43935-1236

A big thank you once again to everyone who contributed something for this issue. I could not produce the newsletter without everyone's help.

Section News

Peyton Launches. We will be holding Large Model Rocket (LMR) launches the third Saturday of each month at Peyton. We will be launching on property belonging to Tom and Ilene Preble. The Prebles are great folks and we really appreciate their generosity in allowing us to use their land. Thank you very much. We also owe a big thanks to Mike Frazier for introducing us to the Prebles.

Everyone needs to be aware of the following guidelines for the Peyton launches:

1. These launches are for COSROCS members only. You may bring visitors to watch, but only members of COSROCS may fly rockets.
2. We will collect $3 per flyer at these launches. The money will be given to the Prebles to help defray costs associated with the upkeep of their land.
3. Rockets will be strictly limited to LMR, i.e., maximum launch weight of rockets is 3.3 pounds and no motors larger than small H's.
4. We ask that everyone bring a gallon of water with them to the launches. This will help with fire protection and we can use the water to wet down the launch area, if needed.

Here are directions to the Peyton launch site. Head east on Hwy 24 towards Peyton. Turn left onto the Peyton Hwy (after the grocery store). Drive around the curve and bear right (Peyton Hwy). Drive north to Sweet Road, (the third road on your right) and turn right. The ranch will be on your left at 21410 Sweet Rd. (2 miles in from Peyton Hwy).

T-Shirts. If you want a COSROCS t-shirt with the new "In Thrust We Trust" logo, you must contact Nadine ASAP. The order is going in soon.

Patrick Henry School Demo/Launch. Mark James is looking for volunteers to help with a model rocketry talk and demo launch on June 4 at Patrick Henry elementary school. The format consists of a one-hour presentation about rockets to three classes of 20-30 students each. The presentations will be held at 9, 10, and 11 AM. A demonstration launch will then take place at noon. The presentations can be a show and tell type session. Our experience has been that kids normally ask enough questions to fill-up an hour. The school is located on Lehmburg, just off Palmer Park Blvd. If you can help with this, please contact Mark.

Pikes Peak or BLAST XII

By David Nauer

This year's Pikes Peak or BLAST will be held at Stetson Elementary and will happen during our normal launch date on the first Saturday and Sunday in June – the 3rd and 4th to be exact. The contest will be flown with a one-pound launch weight limit for all events. We will fly altitude on Saturday only and have the Plastic Model Conversion entries turned in on Saturday for judging, and returned on Sunday for flying. Also, random duration creates a special problem in that we should be flying this event only on the day the target duration is determined—I have chosen Saturday; so random duration can only be flown on Saturday. The events of this contest make it difficult to accommodate single day fliers, but I will work with any contestant who cannot make it on either Saturday or Sunday as best as I can. For example, if there is a need we can investigate flying altitude on Sunday, but right now I have no plans for setting up the trackers on both days. I will also work with PMC competitors if they can only make Saturday. Otherwise, any event can be flown on either day – and we plan on flying from 9AM to 3PM on Saturday, and from 9AM to 1:30PM on Sunday.

C Eggloft Altitude (Saturday) (18WF)

We will likely allow altitude flying in a narrow 3-hour window, from 10:30 to 1:30, or depending on how the competitors want to work the operation. In C Eggloft altitude the competitor must fly a contest director supplied egg as high as possible under C impulse. If you decide to stage your rocket the egg must be contained in the upper stage of the model. The rocket must be recovered and returned, and the egg must be opened in the presence of the contest director. No materials may be attached to the egg itself (such as glue or tape). Any cracked or damaged egg will result in a disqualification. If the portion of the rocket containing the egg cannot be returned the entry will be disqualified. With a weighting factor of 18 this is a key event, and each competitor can fly twice. Only the best single flight will count.

Plastic Model Conversion (26WF)

This event is open to model rockets that have been assembled from commercially available plastic model kits of guided missiles, rocket vehicles, space vehicles, or jets whose engines are in or spaced apart to the rear of the fuselage. The model must be one that the manufacturer did not produce as a model to be flown; and it must be modified for safe and stable flight by the contestant. The purpose of this competition is to produce a flying model from a kit originally intended as a static model; that shows maximum craftsmanship in construction, finish, and flight performance.

Note that plastic models that do not meet the description above will be disqualified, so check with me if you are unsure or are "pushing the rules envelope". Also remember that we will have a one pound weight limit for this event, so take that into consideration when you pick the model you are going to convert. Note that this

event is not designed to be a "build from scratch" competition – do not take parts from a plastic kit and build your own model from the parts. The intent is for the competitor to convert the rocket to flight keeping as close to the original intended construction. If needed, transparent fins can be used without "modifying" the original kit, but the craftsmanship behind fin attachment and appearance **will** also be judged!

There are 1,100 possible points to be awarded divided into three categories as follows:

1) Craftsmanship (500 possible points)

(a) Neatness and care in construction: 150 points.
(b) Craftsmanship of details: 100 points.
(c) Degree and quality of finish: 100 points.
(d) General appearance: 150 points.

2) Degree of Difficulty (300 possible points)

(a) Asymmetries inherent in the model: 40 points.
(b) Intricacy of paint pattern: 80 points.
(c) Degree of detailing required: 80 points.
(d) Difficulty of stabilizing model: 50 points.
(e) Difficulty of adapting the model for flight: 50 points.

3) Flight (300 possible points)

(a) Mission Points (200 possible) - Mission points are awarded for appropriate and scale-like operation of the model during flight. Examples of such operations are staging, simulated cloud seeding, operation of electronic payload, and smoke ejection. Any such operation must comply fully with the safety standards set forth in this NAR Sporting Code.

(b) Flight (100 possible) - General Flight points are awarded for proper operation of the model during flight, including launch, lack of misfires, stability, recovery, and lack of damage on landing.

Note that a rocket that cannot fly safely (including ignition, flight, and recovery) will be disqualified. After flight, all points are added up and the entry with the highest total will be the winner!

Random Duration (WF10) (Saturday only)

There are three types of Precision Duration and our chosen version (random) has the highest weighting factor. In this flavor of the event the duration is randomly determined at the opening of the contest and announced to all competitors. The modeler has one attempt to fly as close as possible to the target duration, which can range from 30 to 120 seconds in 5-second increments.

Any model that drifts out of sight while still in the air shall only receive flight points, and the model must not have dethermalizers or be radio controlled to affect the duration of the flight. The model must land without being caught or it will be disqualified. The number of seconds above or below the target duration will represent the number of points awarded to a flight. The lowest point total will win.

If you decide to compete in this event, it must be your FIRST timed flight of Saturday – ahead of any other duration events.

A Boost Glider Duration (WF18)

In this event the competitor must boost a glider (only the glider is timed), although all parts must be safely recovered in accordance with the NAR safety code. Although boost glider allows staging, it is difficult to do so with a total impulse of "A", but if you do, the glider must be in the final stage of the model. The glider must not have flexible gliding surfaces (e.g. that would make it a flexi-wing glider!), and must perform a glide at some point after burnout of the motor.

The contestant is allowed two flights, and the total times are added together for a total. One of the two flights must include a return of the glider.

There is a rule modification that has been made since the Pink Book was published as displayed on the NAR web page – a model that glides, even if it has the pod and/or streamer still attached, can now be qualified. If the ruling official determines the main function (e.g. glide) has been achieved, the flight will be qualified. However, it is the contest director or RSO who must rule whether the model actually achieved a glide that was safe.

A Streamer Duration (WF8)

The competitor must fly a streamer recovery model under "A" impulse. The model must be single stage and remain in a single piece throughout the entire flight. A streamer is defined for this event as a piece of cloth, plastic film, or paper, whose shape is approximately rectangular. The streamer must have a length- to-width ratio of five to one (5:1) or greater and have a minimum area of 100 square centimeters. The streamer and model must be connected by only a single line or cord, attached at the narrow end of the streamer. The cord may not be connected to either the streamer or the model at more than one point (e.g., no yokes are permitted). The streamer may not be cut, slit, or otherwise altered in such a manner as to affect its nature as a simple connected plane.

Much like other duration events, two flights are allowed and the results are added together. One of the two flights must be returned.

FUN EVENTS

Fun events are often overlooked by the hard core competitor (although NAR National Champion Bruce Markielewski took COSROCS' last fun event, Micro Max Duration, very seriously and won the event handily)—the fun event is intended to offer a unique twist to the contest, and these events count as much towards the COSROCS championship as the standard NAR events.

4X 1/2 A cluster duration (WF15)

Much like the actual NAR event, cluster altitude, this event requires the competitor to cluster a group of 4 motors, ignite them, and in this case, achieve the longest duration possible. I've decided to modify the duration rules somewhat for this event, allowing the competitor to count only one flight – the longest duration of a single flight wins. The competitor is allowed two flights, but the best will count.

Like Cluster Altitude, the model must be returned and shown to the contest director to prove all motors remained intact in the model. If a flight has less than 4 motors ignite, it will still count, and if it is unstable or unsafe it will be disqualified. For this event, the competitor must use four 1/2A motors.

Any recovery method is acceptable as long as it is safe (but parachute will probably be the most competitive!), and the model must remain in a single piece throughout flight or it will be disqualified.

B Paper airplane duration (WF15)

All contestants must build their paper airplane on site, using the paper provided by the CD. A paper clip or tape may be used to attach the airplane to whatever rocket will be used as the booster. The competitor must build his glider on the day he flies it, but he can try to fly either Saturday or Sunday – and will be allowed up to two flights. Much like our other fun event, only the best single flight will count, and the competitor can opt to fly only one flight. Any rocket

can be used as the booster, but it must fly on a "B" impulse motor, and must weigh less than one pound at lift-off.

Only the glider will be timed, but all pieces must be safely recovered. Ejected motors are a disqualification, and the paper airplane itself must be returned to have a qualified flight.

Peyton Launch Report

By Greg Elder

We first attempted a launch at Peyton on March 10. Mike Frazier had introduced COSROCS to Tom and Ilene Preble, whose property we would be launching from. (Both Mike and the Prebles are members of Colorado Springs Astronomical Society.) This initial launch was to be a demonstration to the Prebles of how COSROCS conducts launches and for them to get to know more about our club. We had a good turn out for this first launch—Neil and Nadine Kinney, Mark James, Stan Huyge, Greg Sandras, Mike Frazier, Warren Layfield, George Shaffier, myself, and a couple other people that I do not recall.

Unfortunately, the weather did not cooperate. When we arrived at 9AM, the skies were very overcast, the temperature cold, and the wind very breezy. Tom and Ilene Preble invited our "merry band of rocketeers" into their home to wait out the weather—in hopes it would eventually improve. While we waited, we discussed the current state of the hobby of model rocketry, and gave the Prebles copies of *Sport Rocketry*, *High Power Rocketry*, and *The COS-Rocketeer*. We also showed them various rockets that we brought with us and explained how we conduct our launches.

The Prebles already had some experience with model rocketry via launching Estes rockets with their children, Tyler and Jessie. In addition, Tom had spent time in the Air Force in the 1980's where he worked with real rockets—Titan missiles in Arizona. The Prebles were very generous hosts to us; Ilene gave us hot chocolate and coffee to warm-up. However, the weather never improved. In fact, it started snowing so we canceled flying that day.

Our next launch attempt in Peyton was on March 24. Again, the weather was very bad that day—too much fog. Another canceled launch. Our third attempt was on March 31 with the same results—launch scrubbed due to the weather. The weather forecast predicted mostly clear skies for the following day, so we scheduled the next launch for Sunday, April 1. As it turned out, the weather was fine and we actually were able to launch that day (no foolin').

"Cape Preble" turned out to be a great site for flying large model rockets. I like it better than the site we used to have in Ellicott—less fences and barb wire to crawl under when retrieving some rockets. We are most appreciative of the Prebles for their generosity in allowing us to launch on their property. We look forward to a long relationship with them. Please be sure to read our guidelines for launching at Peyton under the Section News on page 3.

Below is a list of some of our flights at Peyton.

Name	Rocket	Motor
Mark James	Barracuda	F23-7
Melissa James	Maxi-Alpha 3	D12-3
Eric James	Maxi-Alpha 3	D12-3
Eric James	Maxi-Alpha 3	E15-4
Greg Sandras	1/4-Scale Patriot	H128-4
Greg Sandras	Seahawk	D12-5
Greg Sandras	Phantom 4000	G64-4
Greg Elder	Styro-F.O.	D12-3
Greg Elder	Maxi-Alpha 3	E18-4
Greg Elder	Maxi Goblin	F23-4
Greg Elder	4" Mercury Redstone	G80-4
Greg Elder	Clustered UFO	3XD12-3
T. Maples	Bullpup	B6-3
M. Maples	Strongarm	G40-7
M. Maples	Big Daddy	D12-7
Jon Hodge	Graduator	F62-6
Dave Jolly	LOC IV	H128
Greg Simonsen	NCR Bomarc	H180-4
Greg Simonsen	Broadsword	H97
Greg Simonsen	Broadsword	H180

Why Rockets Go Unstable

By Tim Van Milligan

Every now and then, I get a letter that reads something like this: "I just designed a rocket using your RockSim software. When I flew it this weekend, it went unstable. RockSim told me that my design was stable; so what went wrong?" First off, let me say that "generally speaking" I get this question most often when the modeler is really pushing the performance of the model. That is, they are trying to reduce everything to a bare minimum so that the rocket achieves the highest altitude. Let me say that I can relate to this 100 percent. To me, this is engineering at its best. I like to see modelers doing this type of thing, and asking these types of questions. It tells me that they have a genuine desire to learn and become better modelers.

The answer to the question, however, is that there could have been a zillion things that could have happened. Since I wasn't there and didn't get to see the flight, it is hard for me to give you the reason. But, let me give a list of things that have happened to some of my rockets. Yep, that's right. I've crashed a lot more rockets than you have. Here are some of the things that I now watch out for.

The first thing I always suspect are the fins. They are the cause to at least 80 percent of the rockets that go unstable.

1. Crooked or canted fins. If you have fins on your rocket that are not perfectly straight, they have the potential to cause unexpected lift forces to be generated.

2. Fins where the airfoils are different. If each fin on your rocket has a different airfoil, this would have the same effect as a crooked or canted fins. It generates non-uniform lift forces. The best airfoil on all the fins would be the teardrop shape (symmetrical). But if it isn't uniform on both sides, you have what is called a "cambered" airfoil. This is the same type of airfoil that is on the wing of an airplane; whose purpose is specifically to generate lift.

3. Forward fins. These are any fins placed on the model in front of the Center-of-Gravity (CG). They are always destabilizing if they generate lift. So it is critically important that they be made as small as possible, and that they be "perfectly straight" on the model. If they aren't, the model is probably going to be unstable.

4. Asymmetrical fin arrangements. The word asymmetrical means "not" symmetrical—in other words fins that are not placed or spaced equal distances around the tube. It would also include having some fins on the rocket being bigger than others. In either case, what happens is that the lift force on one side of the rocket can be bigger than on the other side. This can cause the model to do loops if it is hit by a sudden gust of wind (on the wrong side of the model).

5. Fins that pop off during flight. When this happens, the result is that the lift forces around the rocket are not uniform. This makes the rocket do loops. And it is pretty easy to figure out after the flight if you're fortunate to find the parts afterward.

6. Loose fins. Even if the fins don't pop off during flight, the reason we don't tolerate loose fins on the rocket is that they can vibrate back and forth. This disrupts the airflow on one side of the model, and can cause it to go unstable. So never tape a fin onto a rocket, or permit someone else to do so. This is just asking for trouble.

7. Fin flutter. This condition is a lot like loose fins. But the difference is that the root edge of the fin is securely attached. Typically, it is caused by fins that are made from very thin material, or material that can flex. During flight, the fins twist. When this happens, the fin tip is at an angle of attack. That generates lift, and can cause the model to go unstable. If you ever hear of a rocket that buzzes as it goes up into the air; this is fin flutter.

8. Protrusions on the side of the rocket that act like fins. It doesn't have to look like a fin to act like one. Anything on the side of the rocket body tube can generate lift or drag forces when the model is at an angle of attack. It may be a canopy on a model that looks like a jet; or maybe a parasite glider that is there just to be boosted into the air. These forces are very difficult to predict; which is the main reason that RockSim does not allow things to be strapped to the sides of the tube.

9. Parachute that isn't fully inserted into the rocket, and flutters along-side of the rocket. This disrupts the smooth flow of air over the fins. I've seen this happen to a lot of younger modeler's rockets.

10. Loose nose cones that are canted in the tube. This is similar to the number 8 above, because a canted nose cone can generate more lift forces on one side of the rocket than the other.

11. CG shift during flight. This can happen on really light—high performance models. On these models, the parachute sliding rearward in the tube can be enough to move the CG behind the Center-of-Pressure. This has happened to me several times during competition.

12. Air being ducted through the rocket, and out one side. This one isn't common, except for rockets that have jet intake scoops. You just have to watch out for the direction of the air coming out the back.

13. Putting the rocket high on the launch rod, instead of near the bottom. I see this one all the time. Most time it is because the launch rod is bent near the base, and you are trying to avoid that area. Or maybe there is crud on the rod. And it happens a lot on gliders, which have long tails that stand on the launch pad. The result is the same—there isn't enough length of rod for the rocket to travel while it builds up to that critical flight speed. And as we all know, there is a minimum speed the rocket must be traveling at before the fins become effective at keeping it flying straight.

14. Rocket binding on the launch rod. This is similar to the one above. The rocket hangs up for just a moment; decreasing its speed. When it lets go, now it isn't traveling fast enough.

15. Getting entangled in the igniter clips; preventing it from lifting off smoothly. Again, anything that slows the rocket while it is on the rod may be a detriment to the stability of the flight.

16. Piston launchers come with their own problems. When the rocket is traveling upward on the piston and it reaches the stop before popping off is the most common problem. In effect, the rocket comes to rest for a brief instant, and then pops off the piston assembly. Because it is basically starting from rest, the fins of the rocket are not effective at all. So if you are using a piston launcher, just be careful. Better yet, mount the rocket inside a tower launcher too. That way, when it pops off the piston, it has the guidance of the tower while the rocket builds up speed again.

17. Insufficient thrust level. If your rocket is heavy, and you're using a low thrust motor, you need to be extra cautious. Run your RockSim simulations, and see what the lift-off speed is when the rocket clears the rod. If it isn't up to the minimum lift-off speed; try a motor with more initial thrust.

18. A strong gust of wind right when the rocket clears the rod. We blame a lot of unstable flights on this; although it is preventable. Just like number 17 above, run your RockSim simulations; but with a high wind speed. See what happens to the flight.

19. A nose cone that pops off in flight. This one is obvious when it occurs, and usually happens on larger diameter models. And there is a reason nose cones suddenly pop off during high speed flights. It is because the internal pressure inside the rocket is greater than the outside air pressure. So there is a force trying to push the nose cone out of the tube. It is easily solved with a pressure relief hole.

20. Rod whip. We blame this one for a lot of unstable flights too. If there is wind, we can see the rod waving about. This movement adds a velocity component that isn't anticipated. But a lot of times, we use this excuse when there isn't any wind at all. What we think my be occurring is that as the rocket is traveling upward, it is somehow flexing the rod. There needs to be some high-speed movies made to actually determine what is happening, and if this is a legitimate reason for the model to go unstable.

21. Canted thrust line. This may occur when the motor mount is cocked inside the rocket body tube. Because the motor is pushing in a different direction than the rocket wants to move; it causes it to go unstable.

22. Off-axis thrust lines. This is different than a canted thrust line, but the effect can be the same. One kit in particular uses an off-axis thrust line. That is the Estes skill level 5 Space Shuttle. The motor is straight along the length of the model, but is offset from the centerline. This is because the orbiter is creating lift forces that counteract the off axis thrust. But if you tried to fly the External Tank by itself, it will do cartwheels across the sky.

23. CG that is off-axis. This one is rare, unless the CG is way off to one side. It is usually caused by something heavy on one side of the model (maybe a payload inside the rocket that has a heavy battery against one side of the tube*)*.

24. Nozzle Erosion. I have a good friend that thinks this is the cause of a lot of unexplained unstable flights. The theory is that the gases coming out the rocket are eating at the sides of the nozzle. If the erosion of the nozzle isn't uniform, then you'll get a vectored thrust. This would cause the rocket to go unstable. I think there is a lot of legitimacy in this theory, particularly for black powder motors that have clay nozzles. I don't know if it occurs on composite motors that use a phenolic nozzle. The problem can be alleviated by using a longer launch rod. Because if the model is traveling fast enough, the fins can cancel out the effect.

25. Side wall failure. This is actually a motor cato. A tiny pin-hole develops near the base of the motor, which vents hot exhaust gases out one side. It always leaves physical evidence that can be seen after the flight. There isn't anything you can do to prevent it, but it can be used to explain why the flight went unstable.

26. Short Rockets. This is where it gets really tricky. Short rockets are less "dynamically stable." That is, they are more easily disturbed from the flight path, and they take longer to

correct back to straight flight. In my opinion, there is something (one of the other causes listed above), that triggers the model onto its course of instability. Figuring out what that is will be difficult because the design of the model makes it tend to be less stable to begin with.

27. Very long rockets can flex. This means that the nose is flying in one direction, while the tail and motor are going in a different direction. The NAR super-roc competition can really be fun to watch because of this fact. That's my list of causes of rockets going unstable.

As you might guess, most of them are preventable. It takes care and patience during the construction of the model, and setting it up to fly. If you have any others causes, please send them to me, and I'll add them to this list. By knowing the things that can go wrong, we modelers can try to prevent them from happening in the first place. Also, there are some things that you can do to enhance the stability of the rocket. Those things are listed in my book "Model Rocket Design and Construction." Check it out, and see if any of those methods might fit your situation.

About the author: Tim Van Milligan is the owner of Apogee Components (http://www.apogeerockets.com) and the new rocketry education web site: http://www.apogeerockets.com/education. He is also the author of the books: "Model Rocket Design & Construction", "69 Simple Science Fair Projects with Model Rockets: Aeronautics", and publisher of the FREE e-zine newsletter about model rockets. You can subscribe to this e-zine at the Apogee Components web site, or sending any message to: apogeerockets-subscribe@listbot.com.

Pratt Hobbies MicroBeacon

Pratt Hobbies has introduced The MicroBeacon, a tiny device intended to help you find a rocket in tall grass, weeds, or even corn fields. How many times have you watched a model come down, walked to the area where you thought it was, and spent the next hour beating the bushes? The MicroBeacon can help.

Measuring only 15mm in diameter and weighing less than an ounce (without battery), the MicroBeacon is intended to fit in any model powered by conventional 18mm motors or larger. The Kevlar loop at the top of the MicroBeacon allows it to be attached easily to any nose cone eye or a loop in the shock cord. Activate the MicroBeacon by inserting a 12v battery, and insert it on top of your parachute when you prep your model. At ejection, you will be able to hear the distinctive warbling tone produced by the MicroBeacon's piezo transducer.

Our tests show that constant tones, such as those produced by buzzers, tend to blend into ambient noise and be harder to pinpoint. The MicroBeacon uses a blinking LED and some internal circuitry to produce its distinctive warble. Although the LED's primary job is to make the circuit change tone, it is quite bright and can help you spot your model after the sun goes down.

The best part is the price: only $9.95 for each MicroBeacon. The battery is not included, but each unit has a lifetime warranty. Internal circuitry is potted for strength, and the unit is sealed with a thick outer liner. Your MicroBeacon should give you years of service. We're sure you're not going to lose it!

For more information see our web site at www.pratthobbies.com. A secure ordering system is available on the site. We do not keep databases with customer information on any Web-accessible computer.

NAR Offers Scholarships, Educational Grants

The NAR is proud to announce two new educational programs:

The new ***NAR Scholarship Program*** awards college scholarships to NAR members. For the 2001 academic year, $1,000 has been allocated to this program. Dependent on the number of applications received, this amount may be split and awarded to several individuals.

The applicant must be a NAR member in good standing between the ages of 17 and 22 who is planning to attend, or is currently enrolled in a college, university or technical school. Full requirements and application instructions are included on the NAR's online application form.

In addition, to recognize science educators, grants are now being offered as part of the ***Robert L. Cannon Educational Program*** to teachers who use rocketry, in either a structured program during the school day or as an after-school activity. Robert L. Cannon was the educational director for Estes for many years. He promoted the hobby by taking it directly to teachers, schools and youth groups. He realized that a safe program of rocketry in schools would enhance the learning experiences of youth and his efforts resulted in a great number of teachers using model rocketry in the classroom, which continues today.

The NAR board, in its spring 2001 meeting, approved the implementation of this award, which is funded with a part of the proceeds of our annual NARAM auctions. Initially, the Board approved two $500 grants to be awarded annually to educators who currently have a rocketry learning activity. Any educator in an elementary, middle or secondary school may qualify for the grant. One of the primary requirements for receiving this award is to submit an article (preferably with photographs) for inclusion in Sport Rocketry. The grants will be announced at NARAM-43 in Geneseo NY.

If you are a teacher interested in the Cannon award, or know of one who would qualify, obtain an application from:

Stew McNabb, Treasurer
12574 Timberline Drive
Garfield, AR 72732.

PerfectFlite's microAlt Altimeter

A kit version of the tiny microAlt altimeter is now available from PerfectFlite. This data logging dual-event deployment altimeter measures just 2.75" long by 0.8" wide and weighs only 0.7 oz with battery. The microAlt lets lower-powered model rockets employ the advanced electronic recovery and precise altitude determination capabilities of an altimeter—benefits previously reserved for high power rocketry due to the size and expense of the electronics. The kit includes all parts and documentation and sells for just $44.95.

A kit version of the microTimer staging/ejection timer is also available. This single event digital staging/ejection timer is smaller than a quarter, and sells for just $9.95 in kit form.

Because the kits utilize surface mount components, a detailed surface mount assembly tutorial is provided on CD ROM. The newly-released kits can be assembled without the need for exotic tools, but a small-tipped soldering iron and good eyesight are necessary. These are not beginner's kits!

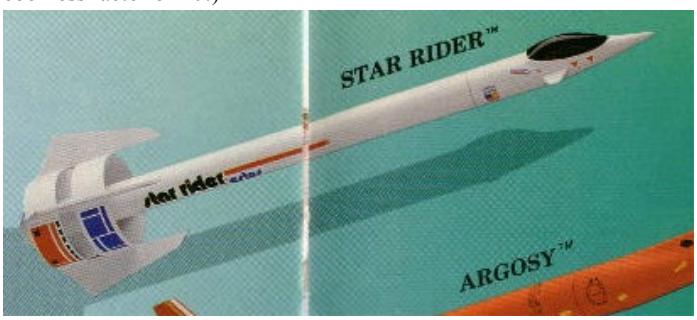
For more information, see their updated web page at www.perfectflite.com. A printed catalog and the documentation CD are also available separately, call (413) 549-3444 for more details.

Project Big Roc Update

(Compiled from notes posted by Greg Sandras)

As mentioned in the last issue of The COS-Rocketeer, Neil suggested the idea of a big rocket project for the club. The idea has caught on and several members of COSROCS have donated $40 each to the project, as well as, volunteered to help with the design, building, and launching of the rocket.

The first Project Big Roc meeting was held March 4th when the launch for that day was canceled due to high winds. We elected Greg Sandras as project manager. Next, we selected the type of rocket to build. Most everyone wanted something with a unique design, rather than a plain 3FNC. Suggestions ranged from the original Estes Sprite, to the Solar Venture, to the Centuri Groove Tube, to the Estes Star Rider. After much discussion a vote was taken and the winning design was the Estes Star Rider. This dual ring-tailed rocket will be a challenge to scale-up to fly on one or more M motors, but we are up to the task. (Besides, as Greg Sandras stated, this rocket will have a coolness factor of 10!)



We discussed the possibility of getting sponsorship for the project to help with the cost. Warren has taken the lead to check into this for us. Lee Simonsen volunteered to make the parachutes for the rocket. Stan Huyge has donated an original Star Rider that we can use for taking measurements. Construction will probably take place at Greg Sandras' house, with Neil Kinney's house as another location if needed.

A second meeting was held March 13 at the Hobby Town in the Citadel Crossing. We determined that our scale-up Star Rider will be approximately 16 feet tall with a body tube diameter of 12". The tail rings will be around 31" in diameter and 12" tall. We discussed various aspects of the project—methods for making the nose cone, how best to attach the fins and rings, materials to use, and so forth. Individuals then volunteered to work on different subcommittees:

1. Schematics of individual rocket parts – Stan Huyge
2. Fin design – Greg Sandras, Mark James, Dave Virga
3. Nosecone – Greg Simonsen
4. Canopy – Stan Huyge
5. Motor mount – Neil Kinney
6. Ring alternatives – Jon Hodge, Greg Elder
7. Body tube alternatives – Mark James
8. Scan Star Rider for brochures – Stan Huyge
9. Brochure/sponsorship – Warren Layfield
10. Parachutes – Lee Simenson

If you are interested in participating, please contact Greg Sandras. Look for meeting notices to be posted on the COSROCS listserv.

COSROCS Calendar

Unless otherwise noted, all launches are at Stetson Hills. Business meetings are at the Gold Hill Police Station.

5 May:	Sports Launch, 9AM
9 May:	Business Meeting, 7PM
19 May:	Sports Launch,Peyton, 9AM
26-28 May:	National Sport Launch, Rush Valley, Utah
2-3 Jun:	Pikes Peak or Blast XII
13 Jun:	Business Meeting, 7PM
16 Jun:	Sports Launch, Peyton, 9AM
7 Jul:	Sports Launch, 9AM
11 Jul:	Business Meeting, 7PM
21 Jul:	Sports Launch, Peyton, 9AM
4 Aug:	Sports Launch, 9AM
4-10 Aug:	NARAM-43, Geneseo, NY
8 Aug:	Business Meeting, 7PM
18 Aug:	Sports Launch, Peyton, 9AM

A Visit to Vern's House

By Greg Elder

On 14 April, some members of COSROCS and CRASH visited the home of Vern and Gleda Estes. The Estes' had extended an invitation to members of the NARAM-2000 committee who did not get a chance to see Vern's personal rocketry museum during NARAM. Kathleen Williams of CRASH assisted with making the arrangements for the visit, which consisted of one group tour at 10:00AM and another at 2:00PM.

Tom Dembowski and I drove to Canon City together for the 10:00AM visit. On the way, we stopped off in Penrose to see the Estes Industries building. We arrived at Vern and Gleda's house shortly before 10:00.

Vern and Gleda spent time talking to each of us and answering our questions. Vern took us into his private model rocketry "museum" for a tour. The museum is a converted bedroom in his house that contains a wealth of model rocketry memorabilia—original kits, photos, catalogs, old motors, paintings, etc. One shelf had Vern's original Big Bertha, as well as other old rockets like a Midget, Astron Cobra, Drifter, Mercury Redstone with balsa nosecone, and a Mars Lander still in the box. Another shelf held the Astron Scout that orbited the earth—carried into space aboard a shuttle flight by astronaut and model rocketeer Jay Apt. On one wall was displayed the first three Estes kits (Scout, Mark, and Space Plane) in their original packaging. Also, displayed on another wall were the patents for the Camaroc and Space Plane.

Vern showed us a chart that tracked the monthly sales of Estes products over the years. He pointed out that the first color catalog he published was in 1966. That year, sales doubled from 50,000 kits per month to 100,000 kits. It was also interesting seeing all the photos Vern had from the early days of his company—you could see how

Estes Industries evolved (even Vern from his crew-cut days to the bearded look and back to the clean shaven appearance).

Vern also has a large screen TV in his museum. He showed us a video from one of the LDRS launches. With the sub-woofers Vern has installed beneath the couches in his museum, we could really "feel" the rockets shown on the video.

Vern mentioned that since selling his company, he has not found any other business that has been as interesting or enjoyable as running his own model rocket company. By the way, one of the folks from Denver who came for the visit was Mel Johnson. As it turns out, he worked with G. Harry Stine to start Model Missiles, Inc. (MMI)—the first model rocket company.

I'd like to thank Vern and Gleda Estes for opening their home to us, and to Kathleen Williams for making the arrangements. This was a visit I'll never forget.

Top photo: Vern Estes' Astron Scout that orbited the earth.
Bottom photo: Vern Estes displays a Cineroc—a rocket payload capable of taking 8mm movies.
(Photos by Frank Bittinger)

Spaceships and Horses

Editor's Note: I've seen the following posted on the Internet a few times over the past couple of years. I don't know if it is really true, but it sure makes for entertaining reading. I'm printing it here for those of you that may not have seen this before.

In a rut? Do you feel like the more things change, the more they don't? Here is a look into the corporate mind that is very interesting, educational, historical, completely true, and hysterical, all at the same time:

The U.S. standard railroad gauge (width between the two rails) is 4 feet, 8.5 inches. That's an exceedingly odd number. Why was that gauge used? Because that's the way they built them in England, and English expatriates designed the U.S. railroads.

Why did the English build them like that? Because the first rail lines were built by the same people who built the pre-railway tramways, and that's the gauge they used.

Why did "they" use that gauge then? Because the people who built the tramways used the same jigs and tools that they used for building wagons which used that wheel spacing.

Okay! Why did the wagons have that particular odd wheelspacing? Well, if they tried to use any other spacing, the wagon wheels would break on some of the old, long distance roads in England, because that's the spacing of the wheel ruts.

So who built those old rutted roads? The first long distance roads in England (and Europe) were built by Imperial Rome for their legions. The roads have been used ever since.

And the ruts in the roads? Roman war chariots first formed the initial ruts, which everyone else had to match for fear of destroying their wagon wheels. Since the chariots were made for (or by) Imperial Rome, they were all alike in the matter of wheel spacing. The United States standard railroad gauge of 4 feet, 8.5 inches derives from the original specification for an Imperial Roman war chariot.

The Imperial Roman war chariots were made just wide enough to accommodate the back ends of two war-horses. Thus, we have the answer to the original question. Now, the twist to the story…

There's an interesting extension to the story about railroad gauges and horses' behinds. When we see a Space Shuttle sitting on its launch pad, there are two big booster rockets attached to the sides of the main fuel tank. These are solid rocket boosters, or SRBs. Thiokol makes the SRBs at their factory in Utah. The engineers who designed the SRBs might have preferred to make them a bit fatter, but the SRBs had to be shipped by train from the factory to the launch site. The railroad line from the factory had to run through a tunnel in the mountains. The SRBs had to fit through that tunnel. The tunnel is slightly wider than the railroad track, and the railroad track is about as wide as two horses' behinds. So, the major design feature of what is arguably the world's most advanced transportation system was determined over two thousand years ago by the width of a horse's behind!

True Modeler's 1/17.5 Scale Jupiter-C

True Modeler's Rocket Kits (TMRK) now offers 1 1/17.5 scale Jupiter-C kit. This exceptionally scaled and detailed rocket is a masterpiece! It stands 47.75" tall and has a diameter of 4". The kit t includes a unique quick-change motor mount system. It can be flown on either a cluster of four 24mm motors or a single 29mm motor (F's, G's and H's). You won't find a mid-power kit as well scaled and detailed as this one. The top assembly is cradled by a 18" parachute

while the bottom half is recovered by a 36" parachute. Laser cut plywood fins, thru-the-wall fin mounting, full color decals, 1/4" launch lugs, and expertly detailed in every way. TMRK's Jupiter-C costs $95.00. For more information, as well as details about ordering, visit TMRK's web site: http://www.truemodeler.com.

Canceled Mercury Flights

By Make Wade
Reprinted from Mark Wade's *Encyclopedia Astronautica,*
http://astronatics.com

24 March 1961 - Cancelled: Mercury MR-3A. Prime Crew: Shepard. Backup Crew: Grissom.

After booster problems on the Mercury MR-2 chimp test flight, Von Braun insisted on a further unmanned booster test flight, against the wishes of Shepard and others at NASA. A Mercury boilerplate capsule was launched on a flawless test on 24 March. If NASA had overruled Von Braun, the manned Freedom 7 capsule would have flown instead. Shepard would have been the first man in space (though not in orbit), beating Gagarin's flight by three weeks.

1961 Late summer - Cancelled: Mercury MR-5. Prime Crew: Glenn.

The original Mercury project plan envisioned all of the astronauts making an initial suborbital hop aboard a Redstone booster before making an orbital flight aboard an Atlas. However delays in the program resulted in the Redstone flights coming much closer to the Atlas flights than planned. By the time of the first suborbital Mercury flight, the Russians had already orbited Yuri Gagarin. After Grissom's capsule sunk, it was still planned to fly Glenn on a suborbital flight to prove the capsule. But Gherman Titov was launched on a full-day orbital flight in August 1961, making NASA's suborbital hops look pathetic. Glenn was moved to the first orbital Atlas flight, and further suborbital Mercury flights were cancelled.

1961 Autumn - Cancelled: Mercury MR-6. Prime Crew: Slayton.

Slayton would probably have flown the fourth manned suborbital Mercury. But after the Russians began orbiting cosmonauts, NASA cancelled further suborbital flights. The MR-6 mission was cancelled by NASA administrator James Webb at the beginning of July, 1961.

1962 May - Cancelled: Mercury 7 Delta 7. Prime Crew: Slayton. Backup Crew: Schirra.

Astronaut Deke Slayton was to have been the second American in orbit. When Slayton was selected as an astronaut in 1959, it was known he had a minor heart fibrillation. This however did not prevent him from being an Air Force test pilot or being selected as an astronaut. But on January 23, 1962 John Glenn's wife refused to do a television appearance with Vice President Lyndon Johnson after a launch scrub of Glenn's mission. Soon thereafter rumors began in McNamara's Pentagon that Glenn had a secret heart condition. It was not Glenn, and his flight went as planned, but in the process Slayton's heart fibrillation came up. After a series of quick developments, Slayton was told he couldn't fly, and was forced to appear at a press conference making that announcement on March 16. The action was seen by many as a warning to the astronauts who was really in charge, although Slayton didn't think there was a direct cause and effect. Slayton's three orbit flight would have been called Delta 7. Instead Carpenter was selected for the mission, and Schirra, Slayton's backup, was moved to the Mercury 8 flight.

1964 October - Cancelled: Mercury 10. Prime Crew: Shepard. Backup Crew: Grissom.

NASA and the Mercury managers had to decide whether to undertake another Mercury after Cooper's planned 22 orbit Mercury 9 flight. Walter Williams, Alan Shepard, and others at MSC pushed for a three-day Mercury 10 endurance mission. A capsule was allocated and Shepard had the name 'Freedom 7 II' painted on the side. But the risk and work pending on Gemini persuaded NASA managers not to undertake another mission unless Mercury 9 failed. By May 11, 1963 Julian Scheer, the new NASA Deputy Assistant Administrator for Public Affairs, announced 'It is absolutely beyond question that if this shot (MA-9) is successful there will be no MA-10.' The massive breakdown of nearly all systems aboard Mercury 9 convinced NASA that this was the right decision. Aerospace writer Martin Caidin used the Mercury 10 scenario as the basis for his novel, Marooned. In the book, the capsule's retrorockets fail, stranding astronaut Pruett in orbit. He is saved by the combined efforts of NASA Gemini and Russian maneuverable Voskhod spacecraft.

Greg Simonsen's Broadsword flies on an H97 at Peyton.
(Photo by Nadine Kinney)

Greg Elder's Maxi Goblin
(Photo by Nadine Kinney)

A view of the Peyton launch site
(Photo by Greg Elder)

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