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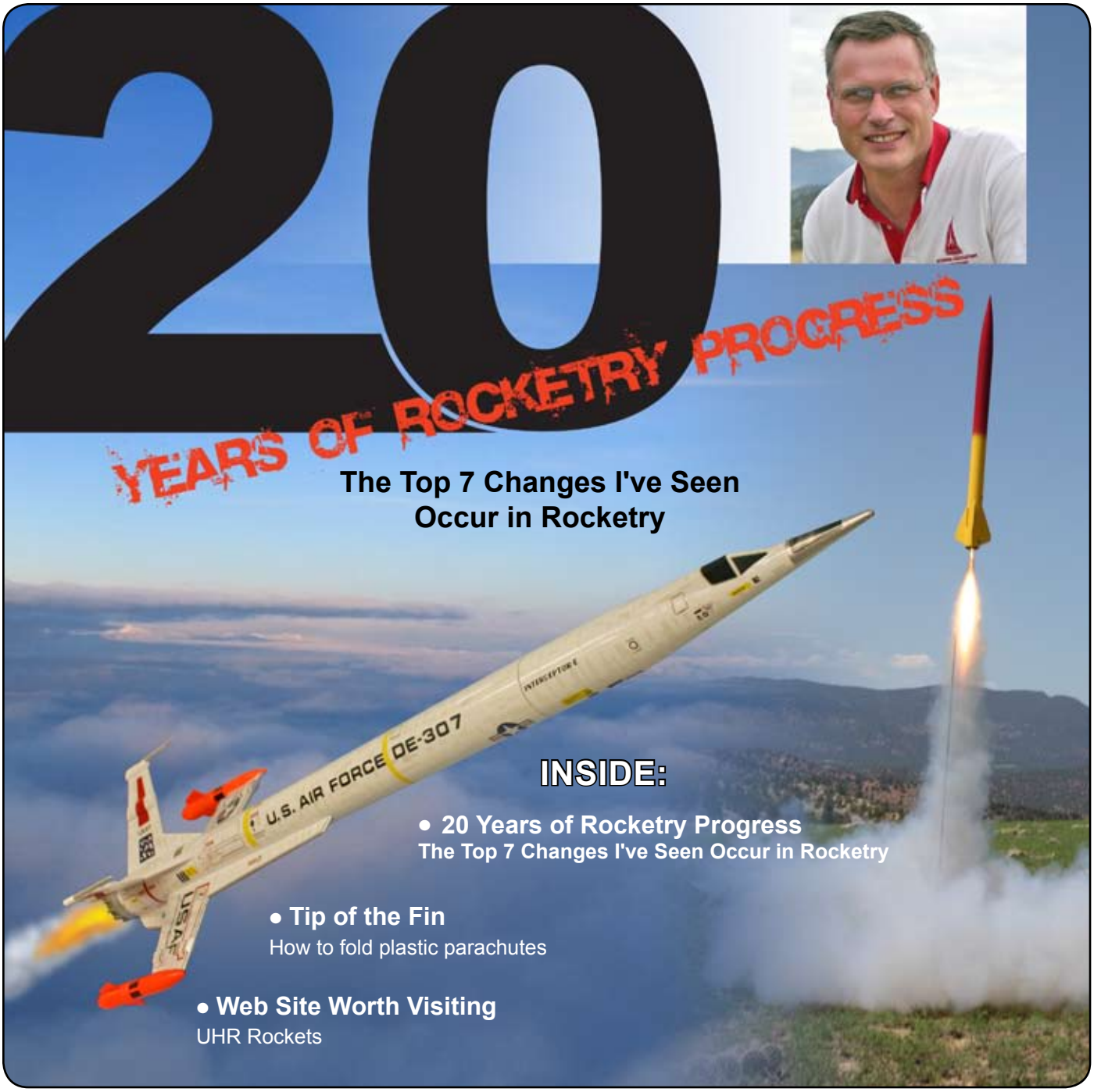
APOGEE PEAK OF FLIGHT NEWSLETTER



The Top 7 Changes I've Seen Occur in Rocketry

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  UHR Rockets

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20 Years of Rockry Progress

The Top 7 Changes I've Seen Occur in Rocketry

By Tim Van Milligan

Since Apogee Components is one of the leaders in model rocketry, we are on the front lines of communication with rocketry hobbyists. We love talking "rockets" with them, as we share your passion for rocketry. The B.A.R.'s are really fun to talk to. "B.A.R." stands for Born-Again-Rocketeer. They are usually adults that did rocketry when they were kids, and are returning to the hobby after being away for a long period of time (usually more than 10 years).

They all seem to tell me the same thing: "Boy, rocketry sure has changed a lot since I did it as a kid."

As they say that to me, I start thinking of that great philosopher from the Star Trek series: Chief Engineer Scotty. His famous saying was: "Captain, Ya cannot change the laws of physics."

In other words, the way rockets work is the same now as it was 20 years ago. So why are the B.A.R.'s saying that rocketry has undergone a phenomenal change?

My first thought is of Estes' rockets, since they have been around in rocketry the longest. Basically, my perception of Estes hasn't changed much in 20 years. They still make the same motors: A8-3, B6-4, C6-5 as well as some fine kits, such as the new "Interceptor E" rocket (which you'll now find on our web site at: http://www.apogeerockets.com/Interceptor-E.asp). But they haven't done anything to change the laws of physics.

But once I get past thoughts of Estes' rockets, and look at the rest of the rocket industry, there really have been some big changes in the last 20 years. If you have been in the hobby all during that time, the changes have been slow and methodical. But if you leap back to what was available 20 years ago and compare it to what we have now, it is pretty phenomenal.

Before I get into my top 7 big changes in rocketry, I have to say up front that "NOW -- yes… TODAY, is the Golden Age of rocketry. You are living the in the best time to be in rocketry."

There is a lot of nostalgia for the days of our youth, and we long for those feelings we had for rocketry from when we first started. It was so new and exciting to us. We wish we could bring it back. That is why there are so many clone kits available today.

But if you look at what is available now, the variety is simply awesome. You can do so much more today than you could 20 years ago.

Here is my list of the top 7 things that have changed rocketry significantly during the last 20 years.

1. The number of rocket manufacturers that have been birthed

There are probably over 100 manufacturers today, and the number keeps growing every month. Each manufacturer brings something new and unique to rocketry. For example, 18 years ago, Ed LaCroix started a little company called Apogee Components. We're still around

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today trying our best to make an impact on the hobby through the products we've brought to hobbyists.

But on the other side of that coin, the shear number of companies that have gone out of business is equally staggering. Pick up an old magazine and see which vendors were in business back then. With the growth in the number of companies comes increased competition for the consumer's money. The margins are slim, and it is tough to make a profit. As my friend Doug Pratt of Pratt Hobbies once told me: "Do you know how to make a small fortune in the model rocket industry? *Start with a LARGE fortune."*

2. The Internet

In 1988, the personal computer was just becoming affordable to the average American household, and the first rocketry discussion groups were just being formed on AOL (which was still a Mac-only chat group), and then Compuserve. There weren't online vendors back then, just a group of folks that would join the daily discussion of rocketry. But by the mid 1990's there were several online vendors. I feel lucky that Apogee Components was one of the first ones to set up a storefront. It gave us an initial advantage over a lot of other start-up companies.

The way the Internet changed things is that it became easier for modelers to share information with each other over long distances. More importantly, new companies finally had an affordable marketing vehicle to reach consumers. This is probably the main reason that there has been an explosion in the number of new rocketry companies in the last 20 years.

3. Reloadable rocket engines

High power rocketry was around 20 years ago, but it was expensive because the manufacturing costs to make the big motors put it out of reach of most hobbyists.

When reloads first became available in the early 1990's there was a major shift in the hobby because now a modeler could afford to build bigger rockets. Prior to reloadables, when a modeler had built all the fun Estes kits, they would exit the hobby because there was no room for advancement. After reloads, they would stick around in the hobby well into their adult years. It can be said that the average age of a typical rocketeer is more mature now than 20 years ago, because the adults have stuck around instead of leaving the hobby.

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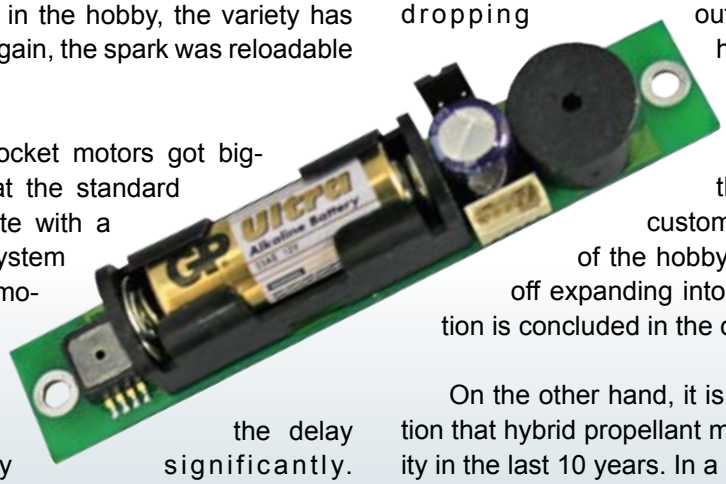
The more I think about it, I'd say that "reloadable motors" was the spark that started most of the other changes in rocketry. That spark caused the average age of the rocketeer to increase. The increased age and maturity of rocketeers spawned the other changes. In my mind, one of the most significant changes is the difference between today's rocketry clubs and those of 20 years ago. It is impressive how organized they are, the stability they have in their membership, and how much ground support equipment they own. Compare that to rocketry clubs prior to 20 years ago. They were mostly school groups and associations of modelers that liked to do rocketry competitions.

4. Electronics

Twenty years ago, flight computers and small gadgets for rockets were around. But because the number of adults was increasing in the hobby, the variety has increased dramatically. Again, the spark was reloadable rocket motors.



As the reloadable rocket motors got bigger, it was apparent that the standard way of ejecting the chute with a delay/ejection charge system (that was built-into the motor) was not foolproof. There were some quality issues of assembling the motors that caused the delay times of the motor to vary significantly. So the rocketeers turned to electronic gizmos that were dead-on accurate. The first were timers that fired off the ejection at a predetermined time after liftoff. From there electronic altimeters with deployment features were found useful. This of course let to modern dual-deployment systems.

The variety of electronics continues to grow, and it has become an industry of its own. If you have a cool new electronic gizmo for rocketry, please contact me. I'm constantly looking for new gadgets to put into rockets as payloads.

This is one growth area that I anticipate will continue to provide changes in rocketry. The GPS based systems are less than a few years old, and the prices are coming down. This is good news for the rocketry community, and because of it, it will be interesting to see what will result as it relates to rocketry.

5. Regulations by the BATFE

Unfortunately, this change in the hobby has been a bad one for rocketeers. As rocket engines got bigger, the heavy hand of the BATFE stepped in to regulate it. While this issue hasn't been concluded yet (due to rocketeers taking the government to court for overstepping their legal authority), it has changed the hobby.

For starters, many of the modelers that got into high power rocketry because it became affordable started dropping out again because of the hassle of regulation enforcement by the BATFE. I can say that this has affected our business here, as there are a lot of our former customers that have dropped out of the hobby for this reason. We've put off expanding into high power until the situation is concluded in the courts.

On the other hand, it is because of the legal situation that hybrid propellant motors have gained popularity in the last 10 years. In a hybrid motor, the propellant is usually paper, with the oxidizer being nitrous oxide (laughing gas). While hybrid motors don't have the same regulatory hassles as composite propellant motors, they do have the drawback of requiring extra (expensive) ground support equipment needed to launch these rockets.

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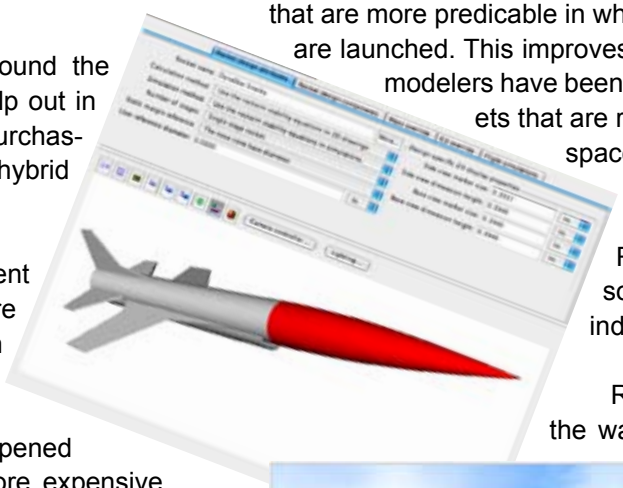
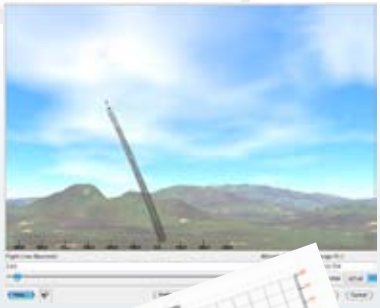
Again, it is the local clubs around the country that have stepped up to help out in this area. They have made group purchases to buy the equipment to launch hybrid motors.

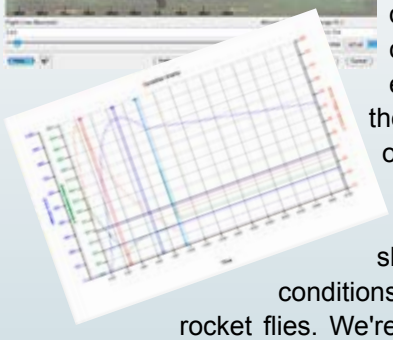
The other thing that government regulation has done is to create more modelers that are mixing their own propellants. I don't think the bureaucrats at the BATFE want this, but that is the Pandora's Box that has opened when they made bigger motors more expensive because the their additional regulations.



6. RockSim

The RockSim software that we sell here at Apogee Components has definitely changed a lot of aspects of rocketry. It is now possible to design rockets that are more predicable in what they will do when they are launched. This improves safety. Because of that, modelers have been able to build bigger rockets that are reaching the very edge of space. I can't think of a single high-altitude project that didn't involve the RockSim software in some way. It has become indispensable design tool.





RockSim is also changing the way rocketeers are teaching others about the principles of rocketry and aeronautics. It is no longer necessary to do a bunch of arm waving when explaining rocketry to students. Now teachers can actually show the effects of changing the shape of the rocket or the type of rocket engine used in the model. Plus, they can show how atmospheric conditions will affect the way the rocket flies. We're seeing an explosive growth in the use of the RockSim software by schools throughout the world. It is exciting to know that students that are using RockSim today are going to be walking on the moon in the future!

Finally, RockSim is saving its users a lot of money. Because modelers are designing more stable rockets, they are losing and crashing fewer of them. That saves them money. I suppose this is one reason why RockSim is catching on in schools these days. They don't have money to waste, so they want to get the most value for their money.

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December Special

What a Great Christmas Gift!

You get the Skill Level 2 Cd plus a Saturn 1B poster for only $23.15

Get model rocket skills that will impress your friends and a 20"x27.5" poster!
Plus Free Shipping!
Regular price: $7.40

SAVE $15.96

To take advantage of this deal go to:

http://www.ApogeeRockets.com/December_Special.asp

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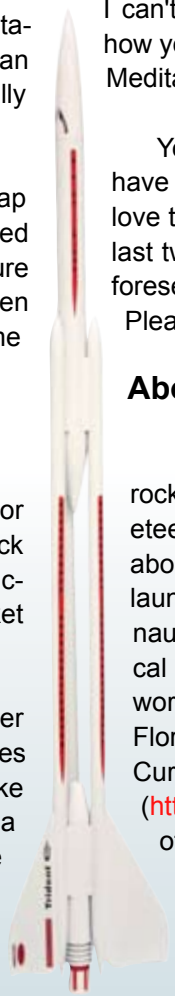
Thinking about things, I conclude that RockSim was made possible by two things; The first is affordable high-speed computers, and the second is because of the availability of reloadable motors. Prior to affordable computers, modelers had to compute the stability of their rockets by hand using the Barrowman equations. That is hard work, and few people actually ran the numbers.

When the rockets got bigger because of cheap reloadable rocket motors, rocketeers discovered that they needed to get serious about making sure their rockets were going to operate properly when launched. RockSim came along at just the right time to meet this need.



7. Reproduction Rocketry

Twenty years ago, there wasn't a lot of clamor for old rocket kits. But as B.A.R.'s are coming back into the hobby, there is a huge demand for reproductions and upscales of old Estes and Centuri rocket kits.

A whole new industry has been created to cater to this desire. In fact, there isn't a week that goes by when someone doesn't ask me if we could make one of their old favorite kits from when they were a youth. But when I see all the competition for the repro kits, I think I'll stick to what we do best: being a resource for rocket designers.

Repo-Rocketry sure makes you think that life is cyclical. What was old is now new again…

Conclusion

As the year comes to a close, it seems only natural to reflect on what was accomplished over the last year and where we might go in the future. So I thought that I'd write about these seven things because it provides a bit of perspective on where we've been and how we got to where we are right now.

There is an eighth change that has occurred in the last twenty years too. That change is that you've decided to be a part of rocketry at this point in your life. I'm excited that I could share the experience with you, and I can't wait to write about your accomplishments and how you've changed rocketry for the next twenty years. Meditate on that…

You now have my list of the top eight changes that have occurred in rocketry in the last twenty years. I'd love to hear about what changes you've noticed in the last twenty years too. Don't forget to tell me what you foresee for the next twenty, as that is cool stuff too. Please feel to email me with your thoughts.

About The Author:

Tim Van Milligan (a.k.a. “Mr. Rocket”) is a real rocket scientist who likes helping out other rocketeers. Before he started writing articles and books about rocketry, he worked on the Delta II rocket that launched satellites into orbit. He has a B.S. in Aeronautical Engineering from Embry-Riddle Aeronautical University in Daytona Beach, Florida, and has worked toward a M.S. in Space Technology from the Florida Institute of Technology in Melbourne, Florida. Currently, he is the owner of Apogee Components (http://www.apogeerockets.com) and the curator of the rocketry education web site: http://www.apogeerockets.com/education/. He is also the author of the books: “Model Rocket Design and Construction,” “69 Simple Science Fair Projects with Model Rockets: Aeronautics” and publisher of a FREE e-zine newsletter about model rockets. You can subscribe to the e-zine at the Apogee Components web site or by sending an e-mail to: ezine@apogeerockets.com with “SUBSCRIBE” as the subject line of the message.

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TIP OF THE FIN

How to Fold Plastic Parachutes

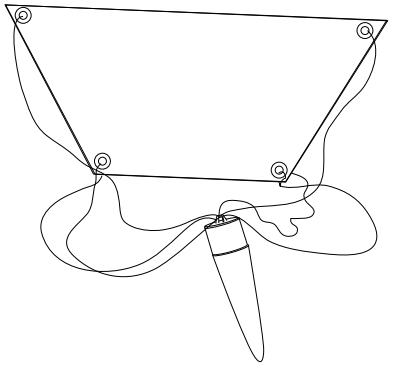
Whenever I attend a launch with younger children, I see a lot of parachute failures. In 90% of those failures, the parachute fails to fully open. In other words, the chute that comes out looks like a wadded up piece of plastic. Hence the name: "Plastic-Wad Recovery." This is not good, since the rocket is going to fall faster and hit the ground at a speed where a fin is sure to be busted off.

The cause of plastic-wad recovery is that the parachute was not packed correctly. In the traditional packing method, the suspension lines are wrapped around the folded plastic canopy. This is OK if the lines are loose around the canopy, and if the canopy is folded properly. And there are many people that recommend this method because it slows down the opening time of canopy, which reduces the chances of it shredding.

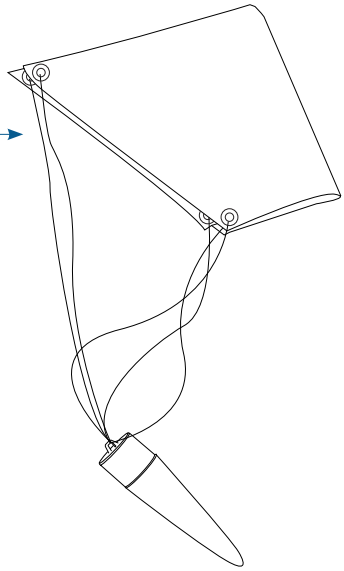
But I think that for younger modelers the lines should NOT be wrapped around the canopy. First of all, they don't usually fold the parachute properly. The telling sign is that the parachute is big and bulky and doesn't slide easily into the rocket tube. So to fix that problem, the children will wrap the lines around really tight to cinch down on the plastic and make it fit into the tube. These two things almost guarantee plastic wad recovery.

I now recommend the folding method where the shroud lines are laid on top of the canopy while it is being folded. It is easier to see if the chute is incorrectly packed if it doesn't fit into the tube.

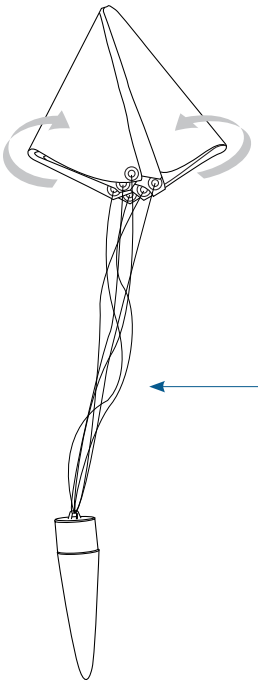
1. Start by laying the canopy on a flat surface. This is a good time to put a little baby powder on the plastic to remove some of the static electricity charge on the chute so the plastic doesn't stick to itself as easily. Then fold the canopy in half, so that all the corners line up.



2. Fold the canopy in half again. You'll now have the corners in two spots.



3. Fold the corner with the fewest shroud lines towards the corner where the other shroud lines are. The purpose is to get all the corners in on spot so all the shroud lines are together. You should also fold the other edge (without any shroud lines) inward to match the first fold. You should end up with a shape that resembles a pointed diamond.



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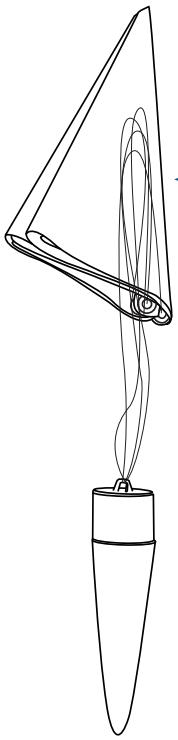
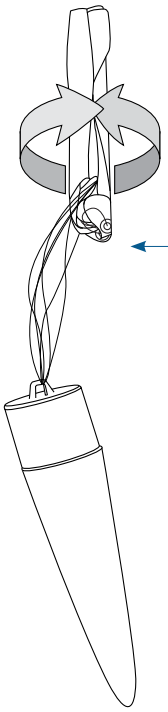
4. Fold the diamond shape in half, and you should end up with a triangular shape. All the shroud lines should still be together.

5. Carefully pick up the shroud lines, and lay them on top of the canopy. Do not let the lines hang over the edge of the plastic canopy. If the lines are extremely long, you should loop them a second time. You want to leave a little length of shroud line that attaches to the nose cone out of the canopy. The length should be approximately equal to the diameter of the tube.



6. Fold the canopy in half lengthwise with the canopy lines inside like a taco. If you have a big canopy, you may need to fold the canopy lengthwise a second time to reduce the width.

7. Now fold the length in half, so the peak is even with the edge where the shroud lines come out. DO NOT fold the long way more than one time to make the length shorter. If you have a really large diameter chute, you will need a "long-tubed" rocket to put it in. Otherwise you will have full-inflation issues with the chute.



8. To complete the folding process, we'll now roll the parachute up so it looks like a cigar. You can roll it tight if needed. When you are done, if you've folded carefully and neatly, the diameter of the cigar-shaped parachute should easily fit into the tube.

9. When installing the parachute into the rocket, you should insert the wadding first, the shock cord second, and finally the parachute. Keep it tightly rolled until it is fully inserted into the tube. It will unroll to fill the diameter of the tube, but that is OK. Finally install the nose cone on the tube.

Using this method of folding, the plastic parachute will snap open very quickly as it exits the tube. While this will put a lot of stress on the plastic, it is worth the minimal risk. I'd rather it pop open with a quick snap than to unroll slowly. A parachute with one or two missing shroud lines is still going to fall a lot slower than a plastic wad.

A fully blossomed parachute right after ejection is a sight worth seeing.

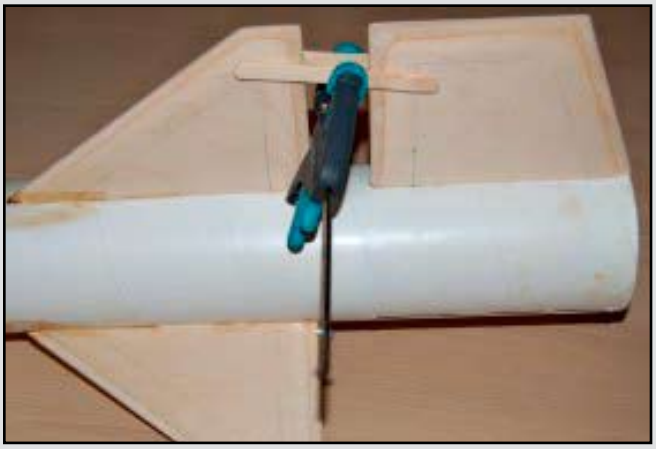
Additional Information: Newsletter 184 - Learn how to fold Nylon-Cloth Parachutes

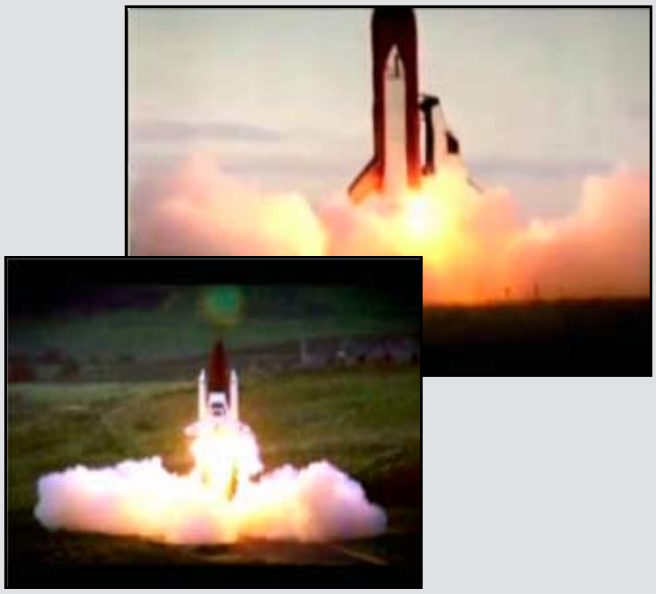
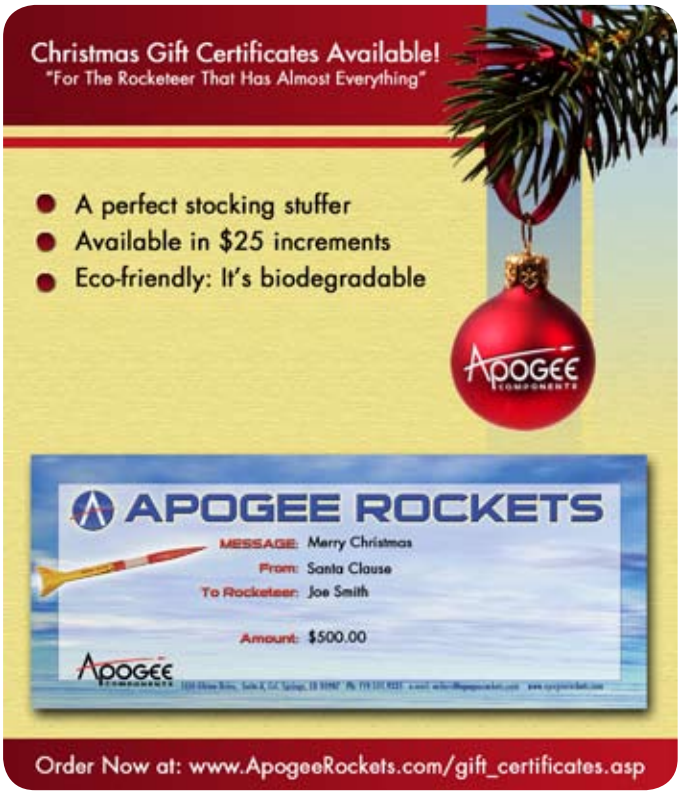
Web Site Worth Visiting

http://www.rockets.herts.ac.uk/index.htm

The University of Hertfordshire Rocketry web site is a great resource for rocketeers looking for information on building big high-powered rockets. The web site is well constructed and easy to navigate. The navigation buttons list categories like: Products, Airframes, Rockets in Build, Launch Reports, Rocket Motors, Technical Data, Useful Tools, News Archive, and Links.

The "Rocket Airframes" and "Rockets In Build" contain great how-to manuals on building and flying larger rockets. You'll find lots of pictures and great construction tips on how to put together large rockets. This comes in really handy if you are building a rocket from scratch instead of from a kit that contains everything.



Under the Technical Data section, I found a really interesting article on Parachute Shock Loads. The apparatus on how to measure the loads was extremely intriguing. They had to build a fixture that mounted in a wind tunnel so that they could measure the forces as the parachute opened.

Finally, there is some good British humor on the web site too. The video of the launch of the Space Shuttle Reliant Robin had me in stitches. It is a must-see video.