ISSUE 161 - MAY 18, 2006

APOGEE PEAK OF FLIGHT NEWSLETTER

How A Group Of High School Students Financed Their Own Rocketry Club

INSIDE:

- Innovative High School Club
- The PerfectFlite Altimeter
- Web Site of the Week
- Fin Setting Tip

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Hillsborough County Rocketry Club

by **Mitchell Kirby, edited by John Manfredo**

The Beginnings...

Myself and two friends had started rocketry at an early age of around eight, but had lost interest during our middle school years. One day in Physics class we were talking about how we all used to do model rocketry, and we decided to build some and launch them together. So we filmed it and afterwards, it made us realize how much fun it is. So after showing the video to many classes in school we decided to start a club.

The Club is Formed

We drew up flyers and started telling everyone in school about it. We scheduled our first launch back in January, and about fifteen to twenty people came out. Since they were so impressed, word spread around school fast and soon everyone wanted to be involved.

Our one problem was funds, because we wanted to start doing bigger and better stuff past the kiddie Estes rockets. We started designing experimental rockets, and began using E-G engines. To gather funds we first started by charging ten dollars for membership which we got 300 dollars from. However, this was only a temporary supply of money, so we went to Sam's Club and bought a whole bunch of candy. We now sell the candy, and have made a good amount of money from that.

Hillsborough County Rocketry Club

Nike smoke on an F22

Round Two

Our second launch was in February, and about twenty-five to thirty people came, including a professional photographer. We used the Apogee Aspire as advertising claiming we would break the sound barrier and fly over a mile high. This advertising campaign worked very well by impressing many people. Our second launch went very well since we recovered fifteen out

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About this Newsletter

You can subscribe "FREE" to receive this e-zine at the Apogee Components web site (www.ApogeeRockets.com), or by sending an e-mail to: ezine@apogeerockets.com with "SUBSCRIBE" as the subject line of the message.

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of sixteen of the rockets. Word spread even more and pretty soon we had gathered seventy-five members. So we knew we would have to make the next launch good in order to keep our fan base. So we made some ex-

3 Cs in booster and 1 C in sustainer

tremely experimental designs (some unsafe). Since we had lost the Aspire last time since it went so high we weren't able to break the sound barrier with it. Then I rebuilt it and strapped a G80 to it.

Third Time's a Charm

At the third launch in March we had about fifty to

3 Ds in booster and 1 D in sustainer

sixty people and launched about twenty rockets. We built our own model Delta II rocket complete with a 5 engine cluster (4 Ds and a core E). We constructed a slide mechanism in which the boosters on the side would fall off once the Ds stopped burning. However, upon launch the rocket turned sideways and flew perfectly, but hit a tall fence and blew up into many pieces. Although it didn't work as we wanted, it still impressed the crowd. Overall, the third launch was a launch of disaster as

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most of our rockets were destroyed. However, it was still a lot of fun and it gained us an even larger following.

Future Plans

In the future we would like to try our own engines. Of course, any engines we buy will be from Apogee Components!. We greatly appreciate the services Apogee offers as well as the speedy delivery. Keep up the good work, its nice to buy from someone you trust. Also, I find it a very admirable that you keep up with all of your customers on a personal basis. I will definitely recommend Apogee, you are inexpensive, easy to deal with, and speedy in getting orders out to your customers!

As a side note, I will be attending either Princeton or MIT in a year majoring in Aerospace Engineering and Minoring in Business. Our club is like a mini-business because we have to come up with money to fund our launches. We have had a launch since the events in these pictures, and with each launch we make bigger and better rockets.

Good job guys! Keep up the great work and thank you for sharing your experiences with our readers; I'm sure they will enjoy it! - ed.

Apogee Aspire taking off on a G80

Setting up the Delta II Cluster

Delta II Launch

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TIP OF THE FIN

Recently, I was making a scratch-built rocket when I ran into a problem. I built the body tube with slots for the fins. When I got ready to glue the fins in, I couldn't get one of the fins to stay upright (see figure 1).

Figure 1

There are many things you can do in a situation like this, but what if you don't have time for a fin jig, etc.? I've found that there is a quick fix in a situation such as this. The first thing you will want to do is to pull the fin off that is giving you trouble. Using wood glue or an equivalent, apply a thin layer to the root edge of the fin as well as the tab, if you are using this type of fin (see figure 2). The reason I used tabs in this rocket was not only for the added strength, but also the ease of assembly. This actually came in handy for the problem I was having because the tab helped to hold the fin while I was trying to get it to stay in the correct position while gluing it in place.

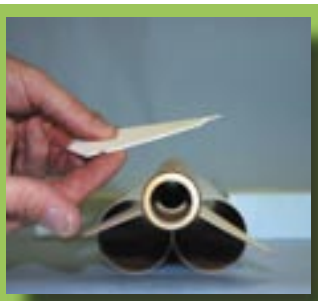

Figure 2

After applying the glue, go ahead and insert the fin into the body tube slot or hold it up on the outside of the tube.

Next, before the glue has a chance to dry, take some thin CA (superglue) with a Teflon applicator and run a bead along the fin-body tube joint. Hold the fin in the correct position until the CA takes hold or you can use a "zip-kicker" for CA to instantly set the glue. If you do use a "kicker", just be sure that the fin is in the position you want due to the fact that the second you apply the kicker, it will set the fin in that position!

If you have a tip you would like to share with our readers, send it to johnm@apogeerockets.com. If we use it in the newsletter, I will send you one of our Dynastar 58" nylon parachutes!

Figure 3

QUESTION AND ANSWER CORNER

This issue's question is regarding altimeters. This person asks, "I am simply looking to purchase a pre-made retail, simple altimeter for my rocket enthusiast nephew. I suppose one that would fit in the most standard payload diameters and lengths would be best. Any advice?"

This rocketeer is in luck! Apogee Components carries the Perfectflite Alt15K/WD logging altimeter with optional data transfer kit. This micro-sized electronic altimeter is simple to use, and it accurately measures the height of the rocket without any fussing around. Just drop it into the payload bay of your rocket and launch it. After you get the rocket back, it makes a series of audible chirps to let you know how high it flew. It is really simple to use, because you don't have to do anything except count the number of beeps! And it works to altitudes up to 15,000 feet above sea level (accurate to ±4 feet). After you get the rocket back, it makes a series of audible chirps to let you know how high it flew. It is really simple to use, because you don't have to do anything except count the number of beeps! And it works to altitudes up to 15,000 feet above sea level (accurate to ±4 feet). There is an optional data connection/transfer unit which allows you to retrieve all the flight data from the unit. Not only do you get the peak altitude for the rocket (data connection unit not required for this feature), but you get all the data from lift-off to landing. The neat part about this is that you can also export the data to a spreadsheet program and figure out the speed and acceleration of the rocket during the flight. Remember, speed is simply the change in altitude of the rocket and acceleration is the change in speed. So with a simple spreadsheet program, you really have access to a lot of information about the rocket. The latest feature that the data download comes with is the standard USB port connection to make transferring your rocket's data as simple as possible! To order this unit go to http://www.apogeerockets.com/Altimeter.asp

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Perfectflite Altimeter
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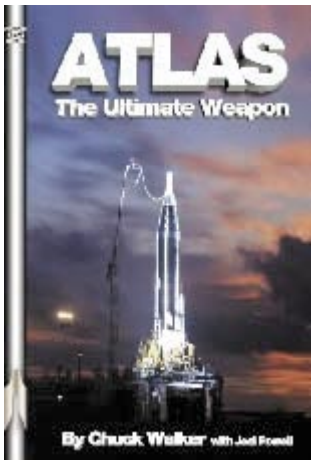

If you want to build *REALLY* big rockets try these two great books from Apogee Space Books

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"Apogee Books" is not affiliated with Apogee Components. But they do sell some nifty space books, and we do recommend them.

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WEB SITES WORTH VISITING

The website worth visiting that I've come across this week is actually a two for one special, you might say! The Nike Hercules site at http://www.nikemissile.org/nike_hercules.htm offers some cool information about this unique missile. They say, "Development of the Nike Hercules took place in the early 1950s and deployment commenced in 1958. A total of 145 missile batteries were deployed. Most of which were converted Nike Ajax units. Deactivation of Nike Hercules batteries, in the United States, commenced in the early 1970s and was completed by 1975, with the exception of batteries remaining in Alaska and Florida.

If you head on over to the other site at http://www.redstone.army.mil/history/nikesite/nike-herc.html, you'll find more information about the Nike. In particular is " ***The Nike Hercules Story*** - produced in 1958/59 by Herbert Kerkow, Inc of New York, New York for the U.S. Army Ordnance Missile Command (a direct predecessor of AMCOM), this 30-minute public affairs presentation demonstrated for the public the Nike Hercules system. This terrific cold war

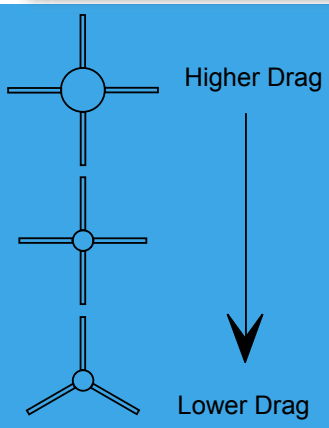
era film contains footage of a launch complex, and firing sequences". This is a video that has to buffer constantly and is easier to watch if you simply download it.

If you'd like to try building this great missile, visit our website at http://www.apogeerockets.com/rocket_plans.asp. These plans for a 1/30 semi-scale Nike-Hercules surface-to-air model rocket include: an informal instruction sheet with photos of real Nike-Hercules rockets that you can use for detailing information; a fin pattern sheet ready to be pasted onto a balsa sheet for cutting out; a fin gluing guide sheet; and a cardboard pattern sheet that includes the paper shrouds and wraps, plus that difficult square-to-circle transition section.

The completed model stands 15.78 inches tall, and is based on 13mm diameter tubes for the booster section, and a 24mm diameter tube for the upper stage. It can be launched as a single stage cluster vehicle of 13mm mini-motors, or you can go for broke and stage the model for very realistic flights.

DEFINING MOMENTS

Aerodynamic Drag is the resistance or friction force experienced by any object moving through the air. Although this can't bee eliminated completely, it can be reduced. Factors that affect drag are velocity, air density, the frontal area exposed to the oncoming air, and a unitless number called the Coefficient-of-Drag (Cd). We'll touch on that in the next issue. One of the easiest factors to control is the frontal area as seen in the illustration at the right. This view is as you would see the rocket if you were looking straight down on it as it sits on the pad. Making the rocket body and nose cone no larger than the motor intended to use for launch is one way to reduce drag, Another is to decrease the number of fins used to the minimum needed to keep the model stable. A third way is to eliminate any protruberances such as pods, scoops, and pylons. The launch lug would be another thing you could eliminate and go to a tower launcher instead. If you would like more information, purchase *Model Rocket Design and Construction* at http://www.apogeerockets.com/design_book.asp



From Model Rocket Design and Construction
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Frontal Views