ISSUE 167 - SEPTEMBER 12, 2006

APOGEE PEAK OF FLIGHT NEWSLETTER

Project Event Horizon:
Art Hoag's RockSim Success Story

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Event Horizon:

1 Rocket, 3 Really Big Motors

by Art Hoag

It has been just over two years since I sat down and began sketching out what is now known as Project Event Horizon. Since that day, it has achieved the title of the largest rocket to ever leave the ground in Colorado. In the wake of the first launch, Event Horizon stirred up one of the first professional documentary films to be made on a single rocket flight. The second flight took place in Texas at LDRS 25 just 2 months after the first one. It will be flown for the third and last time at the X-Prize Cup in New Mexico in October. This project has presented one great opportunity after another to myself as well as many others. It has allowed me the privilege to do a presentation on the rocket at the Denver Museum of Nature and Science. It has even gotten me into the doors of the University of Colorado where I will be studying Aerospace Engineering. After the final flight, Event Horizon will be retired to the ceiling of Hobbytown USA in Longmont, CO and then move onto the ceiling of the Denver Museum of Nature and Science. This is the story of my journey...

On my eighth birthday I was given an Estes MK-109 Stingray by my neighbor. I built it, bought the engines, and flew it. The flight wasn't completely a success so I went out and bought another kit so I could fly again and get it right. The rest of the story up to my eighteenth birthday is pretty much the same as any other rocketry enthusiast's story. With my successes and failures my rockets continued to progress in power and capability. I flew high power rockets with my mentors for years at PHITS and Tripoli Rocky Mountain launches. Then the two clubs joined to form Northern Colorado Rocketry and that only provoked my interest in the hobby.

I had so much interest in the hobby that I decided to start entering my rockets in 4-H in which I was a member for seven years. During those seven years I took Grand Champion at the Colorado State fair and mentored several 4-H rocket clubs. When people sometimes ask me what I like so much about rocketry, I reply by saying that it keeps me out of trouble and I really enjoy the people that are in the hobby. For me, the best thing about this hobby is that almost everyone I have met has been a genuinely good hearted person.

I believe this to be a major reason why a lot of us are and continue to be so attracted to the hobby. As I began to fly bigger and more powerful rockets with my mentors, I began to think of how cool it would be when I turned eighteen and was of age to legally obtain my high power certifications. At one of the launches someone jokingly said, "Hey Art, you should attempt all three of your certifications in one day". Not a second later someone else replied by saying, "Yeah, and you should do it on the day of your eighteenth birthday". I thought about it for a while and eventually started to make the necessary preparations to not only attempt, but succeed at certifying levels one through three, all in one day on my eighteenth birthday.

It didn't take very long for me to construct the two rockets I would use to accomplish my three certifications. Yes, I said "one day, two rockets, three certifications". After the rockets were pretty much finished, I practiced for the level two written test and once I got good enough at that I started thinking about what I would do to kill time. Sometimes our minds wander, but rarely does it occur that we turn our wandering thoughts into real things.

One day I went through my pile of "someday projects" and pulled out a drawing of one project that I liked the most. It was basically a few layouts of a rocket that was twenty feet tall and used an eleven and a half inch Public Missiles airframe. There was a lot that still needed to be figured out, like how it would be powered and how I planned to fund it. Was it even a realistic possibility or should I just put it back in the pile? Well, coincidentally, Troy Hummel had joined the club and had been flying level one rockets for about a year and seemed to take immediate interest in all of the biggest rockets at the launch.

Troy lived close to me, so geographically we ended up getting together to share knowledge. Although, he admitted that initially it was pretty much I who was doing most of the sharing. Troy seemed like a nice guy, so I asked him if he would be interested in building a really big project. He had only a year in the hobby so the upside was that he would get the chance to learn some of the hobby a bit faster by doing this with me. The downside, I told him, was that he was going to help me fund it. He replied by saying, "What the heck, you've only got one life". So from that point on, I spent the good part

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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.

Apogee Rocketry Grant Program

Apogee Components, Inc. is pleased to announce the first in a yearly grant program geared toward model rocketry education organizations!

The rules are simple:

1. Entrants must submit an essay to Apogee. There is no length requirement for the essay.
2. Any club, organization, school program, etc. is eligible for entry. This would include rocketry clubs or prefectures, 4H, scouts, etc.
3. The content and purpose of the essay is as follows:
   - If we gave you $300, How would you use it to impact the rocketry community?
   - How many people you think it will reach?
   - How many people are involved in the organizing and running of the event?
   - How big of an effect it will have on the rocketry community, and what will that impact be?
4. One of the biggest things to keep in mind when composing your essay is, "How is what I am planning to do unique?"

There will be only one winner and recipient of the grant, which is $300 toward any order with Apogee Components.

The deadline for entry is November 30, 2006.

The grant winner will be announced on January 1,2007.

What a great way to start off the new year!

Remember that "The First Step into Space is an Apogee Model Rocket"!

of two months or so writing sponsorship proposals and completing the designs of the rocket while Troy began construction on the fins.

One of the sponsorship proposals that I wrote was submitted to HobbyTown USA here in Colorado. When I presented the proposal, someone very big walked into my life not a moment too soon. That is not a metaphor; Joe Cowan is probably the tallest and biggest guy I have ever met. I knew that even if he did nothing more than recover the rocket, he needed to be on the team! Not only did Joe jump into the project head first, but because he is the manager of the store in Longmont, he pulled HobbyTown USA in as well. Joe did not waste any time getting everything we needed for the rocket and before long, we begin full scale construction on what was known for a couple of months as the "Colorado Project". One day in school, one of my best friends Steven Gillette was talking about black holes and used the words "Event Horizon" to describe the point of no return in a black hole. I stopped him and said, "Repeat that again". The name stuck, and from then on the rocket that was consuming every bit of my free time and spare cash was known as "Project Event Horizon".

The team, Art, Troy, and Joe (Photo by Rockets Magazine)

After school got out for the summer and I was all done with my junior year in high school, Event Horizon really started to take shape. Every time Troy, Joe and I got together for a build session it seemed like it just continued to get heavier. We were now aiming to fly Event Horizon for the first time at Northern Colorado Rocketry's Oktoberfest, which was just over four months away. In response to the impending launch date, we began to divide up the tasks and each of us were hard at work on the rocket, despite not working together in the same location.

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As the summer came to a close and I started my senior year of high school, my birthday quickly approached. The funny thing about this particular birthday is that I don't ever recall thinking about it as a birthday. It was not only a day to show what I had, but since I only had one shot at it I was very determined to make it work right! Two weeks before my birthday, over the Labor Day weekend I made the trip up to Silverthorne, Colorado in the heart of the mountains to visit a good friend of mine, Scott Harless. Scott opened the doors to Pride Auto Body and two days later both of my certification rockets and the Event Horizon left the paint booth looking like finished rockets!

I spent the remaining two weeks checking over every part of both my rockets and making sure I was in good shape for the big day. Once I was satisfied, I went over the level two written test a few more times, started mounting altimeters and packing parachutes. I made the trip out to the site with my friends the night before and I didn't get much sleep that evening. I stayed awake long into the night and spent every second making sure I had everything covered. Have you ever set up a tower in the dark with minimal help and not much light? Try it some time, it is fun!

When the morning of Sunday, the eighteenth of September came around, it was windy but I didn't waste any time getting my level one attempt out to the pad. About an hour after the waiver opened, the wind died and the game was on! The I284W ignited and took my rocket, called *"Cheaper Than A Girl"* to 1,256 feet above the ground for a successful level one certification! An hour and a half later, I had passed the level two written test and prepped the rocket again. *Cheaper Than A Girl* was powering her way back into the sky under a J415W to 4,486 feet. It was now almost noon and I was legally level two certified!

Just like any rocket enthusiast I was ecstatic but proceeded cautiously because in this hobby if you miss a step, it could mean the difference between success and complete failure. I took a moment to put aside anything that was no longer needed and began to do the final preparation work on my level three rocket, *"The Dream Is Alive."* Once the rocket was ready to go and all the paperwork was completed, I grabbed a few of my friends and we hauled the seventy pound rocket out to the launch pad.

It seemed almost unreal that I had actually gotten to this point as we installed the igniter in the N2000W. Everyone wished me the best of luck. With my wireless remote for backup deployment in hand, I gave the LCO the go ahead to proceed with the count down. Then I really got nervous! The button was pushed and the rocket cleared the tower on its way to 12,335 feet above the Pawnee National Grasslands! It seemed like an eternity as the rocket descended under the drogue. When that main chute deployed and everything was intact, I think I must have jumped twenty feet in the air with my arms over my head!

The Dream is Alive
(Photo by John Marvin)

It was definitely a day to remember and I will be surprised if I ever have another birthday to match it! Birthday or not, I had another big day quickly approaching that I wasted no time preparing for as soon as I got back from the launch. Project Event Horizon was almost ready to go, but there were a few things that still needed to be completed and I knew the schedule was going to be tight. I still had to go to school and continue to do my homework.

Then I started running into problems with Event Horizon a couple of days before the launch. It seemed as if every little thing needed to be adjusted or it needed to be reconfigured. I was losing valuable time and things didn't seem to be working in my favor. On the night before we were supposed to launch, one of my power harnesses to the electronics bay failed and I was not getting the proper power to my backup remote controllers. On top of that, I still had to pack the trailer, travel to the launch site, set up the tower and do final preparations work on the rocket. The Event Horizon was simply not ready to fly safely, so I called off the flight.

Even thought it was disappointing to cancel the flight, I still went out to the site and made the most of the weekend. Almost everyone at Oktoberfest walked up to me and commended my decision. All of them wanted to see Event Horizon fly, as did I, but they would in May and it was going to be worth the wait. Before I knew it, winter was over and Mile High Mayhem was just around the corner.

The Mile High Mayhem launch arrived and with

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it came the rain that the prairie was very much in need of. The rain that we needed for such a long time showed up and then didn't seem to want to leave. Despite the continuing rain, we still ventured out to the launch site on Thursday morning to begin setting up the tower and all of the equipment. When Friday rolled around and there was still no sign that the weather would clear, we started to wonder if we were going to have to call off the launch. We were skeptical, but still pushed on and continued to finish the final prep on the rocket. It was a good time to retreat from the weather into Wildman Rocketry's RV and throw one heck of a motor building party!

Project Event Horizon
(Photo by Rockets Magazine)

When the sun came up Saturday morning there was no longer any rain or wind, but a heavy fog engulfed the prairie. The fog was heavy enough that we could not see the mid power pads much less our tower which was two thousand feet away. It did not take long, however, for the fog to burn off and for cars to start coming over the hill. We loaded the booster in the back of Joe's truck and it was show time once again!

It was like a small festival out at the launch tower and what would be ground zero for Event Horizon. There were friends, family and complete strangers who are now friends. They all watched and eagerly awaited the flight as we assembled the rocket, loaded it onto the tower and raised it. Only after Event Horizon was vertical and towering over twenty two feet in the air did I realize how big it really was!

I spent a few minutes telling the cameras about the impending flight and we posed for a few group photos. Everyone ventured back to the flight line and the few of us that still remained made final preparations on

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CORRECTION: There are a couple of corrections to note on the Tomahawk article in issue 166. In the second paragraph on page 4, 1985 should be 1987. Also, under "About the Author", it should be noted that Richard works for the American Red Cross and has a wife Kathy, and daughter Emily.

Lift off on the N2000W
(Photo by Ray LaPanse)

the rocket. After powering up the cameras, arming the electronics, removing the supports, and installing the igniters we were moving to our fallback point where we would ignite the rocket from and where I would monitor the entire flight.

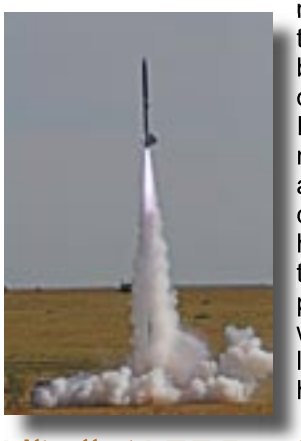
It was now launch time and after everyone was in their positions I gave the go ahead to proceed with the countdown. The ten second countdown reached one and all three of the N2000W's instantly came to pressure. Event Horizon roared from the tower atop a twenty foot flame and as it did the power of the three N2000W's sent vibrations through the ground. It was a sight to see as it pierced a cloud on its way to 10,161 feet. At apogee, the rocket separated as planned and descended for a thousand feet or so until the nosecone shook loose and the main parachutes deployed.

Main deployment
(Photo by Ray LaPanse)

Event Horizon was in the air for a good fifteen minutes or so descending back to the earth. It touched down about two miles from the launch site and took several people and two trucks to recover. After we all tracked through the afternoon rain and hail with a three hundred pound rocket we ended up back under the tents to find that the only damage to the whole rocket was a minor chip in the paint. The first flight of event Horizon was a complete success!

Conclusion

Since then Event Horizon has flown a second time at LDRS 25 and I am now gearing up to fly it a third time in October at the X - Prize Cup. My accomplishments with Event Horizon have allowed me to see and do many things that I normally wouldn't have been able to do. Throughout all of my experience in doing what I have done I have learned for myself that if you really want to accomplish something, then you can do it as long as you work hard at it. Often times I found that the hardest way to accomplish something was the right way to go about doing it. I would like to thank everyone who has helped me do what I have done, it would not have been possible for me to do so without everyone's help. The things I have accomplished in rocketry have been very big ones and have been challenging, but I think that for me rocketry has only been the training that I needed to do what is next.

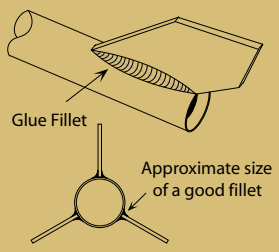


Lift off at LDRS on three N4000BB's
(Photo by Ray LaPanse)

Project Event Horizon was designed in Rocksim 8.0. Simulations were run prior to both the 3 X N2000 flight and the 3 X N4000 flight at LDRS. It's good to know that the designer and flyer of this size of a

DEFINING MOMENTS

A fillet is a fairing of glue or epoxy along the root edge of fins or wings (where they attach to the bodytube) providing additional fin strength. They can also be applied to the inside of a body tube where the motor mount tube is located (see newsletter 149). Fillets on the outside of the body tube serve a couple of purposes. You see, when two parts come together on a rocket they should be faired in so that there are no sharp corners. For example, a fillet of glue applied between the fin and the body tube where they join not only reduces drag, it also increases the strength of the glue joint. A fairing of glue or epoxy along the root edge of fins or wings (where they attach to the bodytube) provides additional fin strength. The Epoxy Clay that we sell makes easy, perfect fillets. See http://www.apogeerockets.com/epoxy-clay.asp to order some for yourself today!



TIP OF THE FIN

How do you get clean, sharp lines between different colors of paint on your model? For example, let's say that you are wanting to paint the fins a different color than the body tube.

The first step and the biggest trick to getting those sharp lines between parts is to use cellophane tape. Cellophane tape will seal against the model much better than plain masking tape. Cellophane tape can stick almost as much as masking tape, unless you perform a simple step before placing the tape on the model. As seen in photo 1, press the tape lightly onto your forehead and then take it right off. The little bit of skin oil is great for keeping the tape pressed-down where you want it, but it will still come off easily.

Photo 1

Now you can press the tape down along the body tube/fin intersection as shown in photo two.

Photo 2

Next, take a piece of plastic and some masking tape to keep the rest of the rocket from getting painted. I usually tape to the plastic first and then line the whole thing up with the cellophane tape that is already in place. This is seen in photo 3 (I don't show taping off the rest of the rocket for time's sake, but you would definitely want to do this so that the only exposed part of the rocket is the part to be painted).

Photo 3

Painting the fin is next, and after it dries completely (if you don't wait, the paint will get pulled up), go ahead and pull the plastic, masking tape, and cellophane tape up all at once. As you can see in photo 4, the line left behind is very sharp, clean, and distinct.

Photo 4

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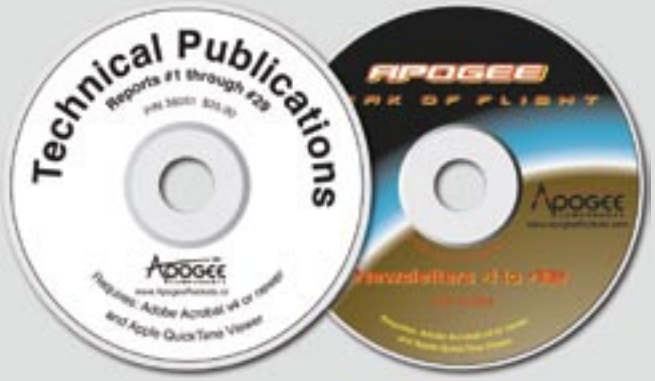
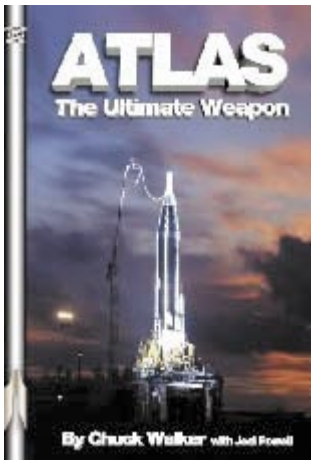
QUESTION AND ANSWER CORNER

A question that seems to be fairly frequent is like this one that comes from customer Tim Carlon who writes, "Archived newsletters 80 through 89 are not retrievable. They are on something called night.net and according to the computer this link doesnot exist. I cannot bring them up either by download or viewing the file. Is there anyway to get a copy of these newsletters? I have read all the newsletters you have put out and have a small library for my rocket club. I would like to add your newsletters to that library".

Well, Tim, you are correct. At this time, those newsletters are not accessible from the web, but the good news is that all the newsletters from 1-159 are available on CD-ROM. This CD comes along free when you purchase the "Technical Publications CD", which has a lot of useful things on it.

Thanks to Tim for asking, and if you would like this great value, please visit http://www.apogeerockets.com/technical_publications.asp to order yours now!





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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.

Web Sites Worth Visiting

I love visiting Rocket Team Vatsaas's website at http://www.vatsaas.org/rtv/. They have some of the most unique designs and large rockets you will find. Take, for instance, the "Dual N motor Giant Bert Rocket" pictured at the left. Actually, it's a spoof that will at least grab your attention. They did do an "Evil Bert" mass launch, which you can see in the group photo of participants in the picture below. You have to chuckle at these rockets! They are also into the retro sci-fi look for a lot of their models. In the picture at the top of the next column you will see this is a big theme they have adopted. Shown in the photo at the bottom of the next column, Brad is shown with the large model made of the sci-fi picture in the inset picture.

Of course, they have the usual cool video section as well as construction and ground support tips, and handy calculators. Along with these are a lessons section which talks about motor asembly, igniting cluster composites, and something on Max Headroom (you'll have to look at that one yourself!). One of the things I find great is that you have the 3 brothers; Rick from Minneapolis, Mark from Denver (yeah, Colorado!), and Brad from Phoenix. Brothers that live far away from each other, yet are brought together by their common love for rocketry.