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APOGEE PEAK OF FLIGHT NEWSLETTER

NCASE

The National Conference on Aviation and Space Education - Exploring New Worlds

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NCASE Highlights

by John Manfredo

In the last issue of the Peak of Flight newsletter, Apogee Components' President, Tim Van Milligan, gave us a glance of what is new and upcoming in the rocketry hobby from his time at the 2006 I-Hobby Expo in Chicago. In this issue, I would like to give you my perspective on the National Conference for Aviation and Space Education (NCASE) in Arlington, VA.

"The National Conference on Aviation and Space Education will focus on the core subject areas with an emphasis toward hands-on, minds-on sessions applied to National Standards, Standards of Learning, and 'No Child Left Behind."

This is how the 2006 NCASE conference was introduced, and it was a great time for all in attendance. I recently had the privilege of attending this conference back in Arlington, VA and what a wonderful opportunity it was to meet so many people in this field that have a passion for rocketry! These individuals came from many areas including teachers, rocketry clubs and organizations, businesses, and government entities. The conference is put on by the Civil Air Patrol, who did a very nice job putting the whole thing together.

Famous Faces

Each day started with a 'general assembly' which would feature someone of notoriety. Such notable individuals included Thomas Crouch, Curator of the National Air and Space Museum, Dr. James B. Garvin who is the Chief Scientist at NASA, and Robert (Hoot) Gibson, a former Navy pilot and space shuttle astronaut. Also on hand was Ken Hyde of the Wright Flying Experience. Ken discovered that the meticulous Wright brothers put very little of their work on paper or in one research place. These gaps in the historical record have given rise to the Wright Experience, a team of historians, engineers, pilots and mechanics led by Ken, and dedicated to more completely telling the Wright story in order to inspire the next generation of innovators. Ken's work on the 1903 Wright Flyer flown at the commemoration of the Centennial of Flight provided him the opportunity to work closely with Scott Crossfield of X-15 fame. Scott was dear to the CAP/NCASE and passed away last year.

Robert (Hoot) Gibson

NCASE also had the honor of having Buzz Aldrin on hand in the middle of the day for a book signing and as the speaker in the closing general assembly. He entertained the audience with stories from his astronaut days and missions in space. Buzz (who legally changed his name to "Buzz" several years ago) was the second human to walk on the moon. On July 20, 1969, he followed Neil Armstrong onto the lunar surface. He flew on Gemini 12 and then was chosen as lunar module pilot for Apollo 11.

Buzz Aldrin & myself

Since his retirement, Buzz has been a booster for space exploration. In his speeches he encourages people to 'reach for the stars'. The highlight of the conference was getting to meet this space legend. Talk about a treat! In the picture you can see me with this legend, who is one of my personal childhood heroes. I was able to shake his hand and get an autograph in the children's book in which he wrote the

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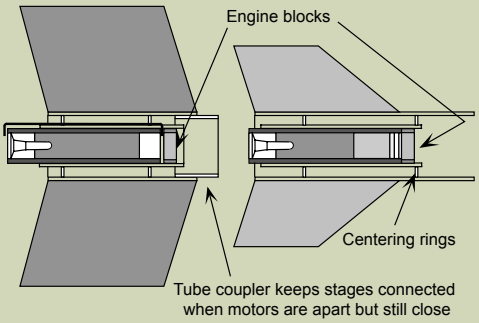
About this Newsletter

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.

Questions and Answers

Edward Horabin writes, "I am currently building a Dynastar Rip-Roar rocket kit and have a question about the staging method used. I have seen your guide to staging on the Apogee Rockets website which suggests that there should be vent holes in the airframe of a gap-staged model. I understand that this is to prevent separation of the stages until the sustainer motor ignites. However, in the instructions for the Rip-Roar, there isn't any mention of putting vents into the booster section. Would it be wise to vent the booster stage to increase staging reliability or is there a reason why vents aren't required on this particular model"?



Mr. Rocket answers, saying, "Great question. I'm glad to see you're doing your homework. In the case of the Rip-Roar, there is enough room internally in the space between the motors for the cool air to be pushed into (called a plenum). It is like a reservoir that can hold a small amound of additional air. Additionally, the upper stage motor is very close to the tube from the lower stage motor. So the transfer of hot gases is pretty direct. To be honest, in this particular design, it was a surprise when we discovered that it didn't need a vent hole. We were doing some test flying and wondered what would happen if the customer didn't have a vent hole between the stages. So we built some test models without the holes and it worked great. Initially, we were going to recommend it. But then after trying it a dozen times without a vent hole, we decided to go with it as is. Adding a vent hole shouldn't hurt the model. It will just give it an extra margin of safety".

Try this unique model today and see for yourself what is an exceptionally reliable two-stage rocket that will provide an exhilirating ride every time! See http://www.apogeerockets.com/Rip-Roar.asp for more details!

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foreword. Winston Scott was available for book signing as well. He was a member of Space Shuttle missions in 1996 and 1997.

Breakout Sessions

When the general assembly was done, participants broke out into short educational sessions that would enlighten them as to what was the latest and greatest in the field. Depending upon what you teach, the subject was all laid out for you, and had in the description what standard(s) the session applied to. For example; science, math, technology, reading/language arts, and social studies were some of the standards that sessions applied to.

Winston Scott

TARC

I attended the "Sponsoring the Team America Rocketry Challenge" (TARC) session. This was very timely as this contest is going on as we speak. It was presented by Trip Barber from NAR, who is in charge of TARC, J. P. Stevens from NAR, and Allison Harvey from Aerospace Industries Association (AIA), the other sponsor of TARC. This was a great session to attend as we here at Apogee receive many inquiries about TARC.

One of the main issues that was cleared up for me was in response to the frequently received question, "If our school is in the middle of nowhere, how do we get our flight witnessed and OK'd since there are no clubs around?" The rules state that the flight must be qualified by an adult NAR member. This individual doesn't necessarily need to be part of a club. Any adult at the school may join NAR for this sole purpose, but they can't be the same individual that is the TARC team's sponsor.

NAR said that the teams that did the best in the contest this past year were brand new, not only to TARC, but to rocketry in general. They think that the reason for this based on what they observed, is that the rookie teams paid more attention to detail than the veteran teams. The veteran teams seemed to be more lax on their preparation for the competition. This tells you that it pays to be prepared!

Trip Barber said that the number one thing that will help you do better in this competition is practice, practice, practice. That means that the more launches you can do with different weather conditions and motor combinations, the better. That way you will be prepared for what motor your model will need on the day of the finals. The more information you can record in a log book will help immensely. The other helpful advice was to keep the design simple. This makes the team's project much easier and less likely that something will fail.

Apogee TARC Special

SLI

As a reminder, I want to let you know that Apogee is offering a 1/2 off Rocksim for TARC teams this year. This can be seen at http://www.apogeerockets.com/teamamerica_challenge.asp. To provide you with some inspirational statistics, 9 out of the top 10 winning teams this past year used Rocksim to design and simulate their flights to get the most accurate information!

The top 25 teams from the finals of TARC are selected by NASA to participate in the Student Launch Initiative (SLI). They get to design and fly larger models with a task laid out by NASA and present their results in a science fair format. You can see one of their boards and models in the pictures.

NAR Boys

Another interesting session was put on by some members of NAR, Stew McNabb and Vince Huegele. Stew is on the right and Vince on the left in the picture. Vince is the Education Chairman for the NAR and is a physicist for NASA in Huntsville, AL.

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Web Sites Worth Visiting

The website worth visiting for this issue is that of "The Sky Pirate" at http://www.skypirate.net/rocketry/index.htm. This is what I would call a no-frills site, and I mean that in a good way! Sometimes you just don't want information overload on these websites; just keep it plain and simple.

First off, from a basic aesthetic point of view, the layout and colors catch the eye as you click through the pages. The meat of the site is broken down into Projects, Launch Reports, FAQs, Construction, and Links. The Projects section has many kits listed, all of which have crisp photos of the finely finished models available. A simple click will give you the large version so that you can inspect the detail of these fine birds.

The Launch Reports section has launch pictures from 2000 through 2004, all of which are only a click away from large versions as well. Based out of Texas, the Sky Pirate has photo locations from McGregor and Windom to Justin and Rockwall. Back in 2002, NARAM 44 was held in McGregor, so their club had a lot of company! The FAQ section has a few links to the some popular rocketry information sites such as Rocketry Online, Essence Rocketry Reviews, and John Coker's website, which I have featured here previously.

The construction page has a lot of links to tips and tricks that you will find very helpful. Seen in the picture is the technique talked about regarding internal fillets on rockets that are very close to minimum diameter. Last but not least, the Links page has many connections for you in terms of organizations and vendors. I appreciate it when I see a rocket enthusiast provide a link for us on his webpage! The one thing that I noticed is that the site has not been updated since 2005. I would love to see more; I'm sure I wouldn't be disappointed. Take a gander and enjoy yourself!

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They had a nice presentation called, “How to Use Model Rocketry in the Classroom Without Being a Rocket Scientist”. Some of the ideas Vince conveyed to the audience were that any teacher can understand how to build and launch a model rocket and make it apply to class subject material. Model rocketry is a progressive educational activity and is an exercise and illustration of STEM (Science, Technology, Engineering, and Math) principles for younger grades while still being a STEM research tool for the older grades. For example, model rocketry teaches physics, trigonometry, chemistry, material properties, and aerodynamics.

Student Inspiration Through High Power

One of the other sessions worth mentioning was put on by Gary Dalke, who is a Systems Engineer at NASA. His talk was titled, “Up Close and Personal with Large Scale Rocketry Components”. They were large indeed! As you can see in the two pictures, Gary was there to show off some high power rockets of his. Basically, the gist behind his talk was to help educators become more familiar with the high power side of the rocketry hobby. Not only this, but also how the small models can lead kids into the larger models and keep their interest in the field of science. He did a very nice job of explaining in simple terms to the participants all the aspects of high power including motors, legal issues, FAA topics and showed some cool videos on the big screen!

Gary Dalke

Gary’s Upscale Quantum Leap

Allison Harvey said about NCASE, “The NCASE conference was a great event, and we were able to engage and talk to many educators who were interested in rocketry. The one-on-one interaction with the attendees who visited our booth allowed us to spread the word to aerospace educators about the abundance of programs and teacher resources available with respect to rocketry. Through our participation, we were able to gain valuable exposure and build awareness of the importance rocketry education. There is an important difference between seeing a name on a piece of paper or email and actually being able to see people involved in organizations and programs like ours, as we are trying to generate enthusiasm for aerospace careers and model rocketry as a lifelong hobby. Through our participation in the conference, we were able to communicate our message in many different forms, from multimedia and educational sessions to model rocket displays and informational sheets. I know we caught different attendees’ eyes in each of those ways, so it was a great opportunity to participate as an exhibitor and sponsor."

What she said really dovetails beautifully on what Dr. Garvin stated. He drove home the point that the individuals that will be going to the Moon and Mars are certainly no one in this generation, but will be the ones who are about 10-15 years old right now. His point was that this emphasizes how important it is to increase the interest of kids in the sciences and science careers since they are the ones that will need to lead the charge.

Conclusion

Overall, I took away the reenforcement that model rocketry increases the interest in STEM and science course enrollment. It also raises the kids’ maturity level in applying scientific knowledge and also leadership, cooperation, and self-esteem. Vince sums it up like this: “Model rocketry is like professional scientific research; it’s never completely finished. You can’t get to a point where you’ve 'done it all'. There’s always a new design to test, another challenge to take to fly higher, faster, or better. Like the adventure in space, model rocketry is only limited by the imagination. Teachers are desperate to instill this creative, inventive thinking process in students because thinking people will be successful.”

John Manfredo is the Education Coordinator and Newsletter Editor at Apogee Components. He is Level 1 High-Power Certified and has been building and flying rockets since the early 1970’s.

John Manfredo

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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 $300.00, 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?
4. One of the biggest things to keep in mind when composing your essay is, "How is what I am planning unique?"

There will be only one winner and recipient of the grant, which is $300.00 toward any order with Apogee Components.

The deadline for entry is November 30, 2006.

Make sure it is post- marked by November 30th!

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

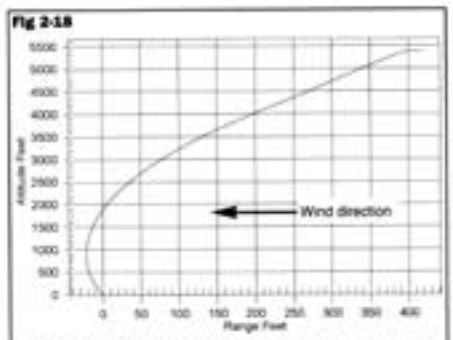
What a great way to start off the new year!

Send essay to
1130 Elkton Drive Suite A
Colorado Springs CO 80907
or
johnm@apogeerockets.com

DEFINING MOMENTS

Dynamic Stability

As a rocket travels into the air, it is affected by different forces - such as a gust of wind or the drag on the model. As you might expect, predicting how the rocket reacts to these disturbances is very complicated. Often, "statically stable" models will weathercock strongly into the wind, while others will oscillate wildly as they travel upward. Both of these cases can be unsafe. The ability to predict how a rocket will fly in windy conditions and what it will do when launched on an angle is what dynamic stability is all about. When you know how the rocket will react to different conditions, you can take precautions and angle the launch rod appropriately so that you get a better and safer flight. Dynamic stability is much harder to determine than static stability. Not only is it affected by the relationship between the CP and CG of the model, but also by the speed of the rocket, wind, launch angle, and even by the shape of the internal components that make up the rocket. The many equations that are needed to predict the flight path of the rocket are so complicated that it has been beyond realistic expectations to solve them for more than the most simplistic conditions. But with sophisticated software like RockSim (http://www.apogeerockets.com/rocksim.asp), modelers can find out how their designs will really fly.



Dynamic stability is about predicting how a rocket will fly. This graph of a rocket's trajectory shows that the rocket will initially travel with the wind, and then turn to travel into it.

Dynamic Stability Graph from Model Rocket Design and Construction www.apogeerockets.com

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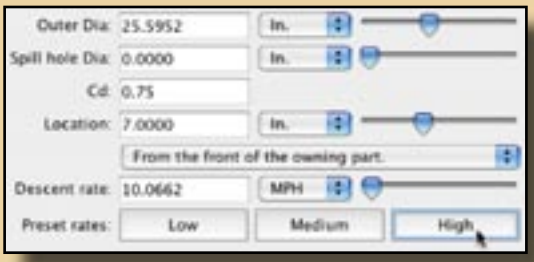
TIP OF THE FIN

Here's how to find the correct size parachute using RockSim (www.ApogeeRockets.com/rocksim.asp). You don't want a chute that is too small and will allow your rocket to fall too quickly and snap off a fin. Nor do you want one that is too big. Otherwise, your beautiful design will float away and be lost forever.

To start, it is typical to wait until everything else is installed in the rocket before adding the parachute. That way you know the true weight of the rocket as it comes down. Also, be sure to install the biggest motor into the design that you think you'll fly with the rocket. When you go to the parachute component screen, you'll see that RockSim has calculated the descent weight of the design. This DOES include the weight of the rocket engine, but minus the propellant weight. Since the propellant is consumed during the ascent, it is gone by the time the parachute is deployed. What this means is that when you install a motor later, the rocket will fall a bit faster than predicted. Assuming you don't know what size parachute to use, the first thing you would do when coming to the parachute component screen is to click on one of the "Preset Rate" buttons. This will set the outer diameter of the parachute for you. These rates are 3.5 m/s for low (slow), 4.0 m/s for medium, and 4.5 m/s for high (fast).



From this point, you can tweak the outer diameter to the sizes of chutes that are available. For example, if RockSim says that the medium descent rate of 4.0 m/s should have a chute that is 29.34 inches, you would probably select a chute that is closest to this. That could be a 24 inch diameter, or a 36 inch diameter. Both would probably work. It really is going to depend on other factors and RockSim can help you with those too. If the field where you're planning on launching the rocket is small, run a simulation with the larger 36 inch parachute. Why? To find out how far downrange the rocket will drift. RockSim will calculate this for you.