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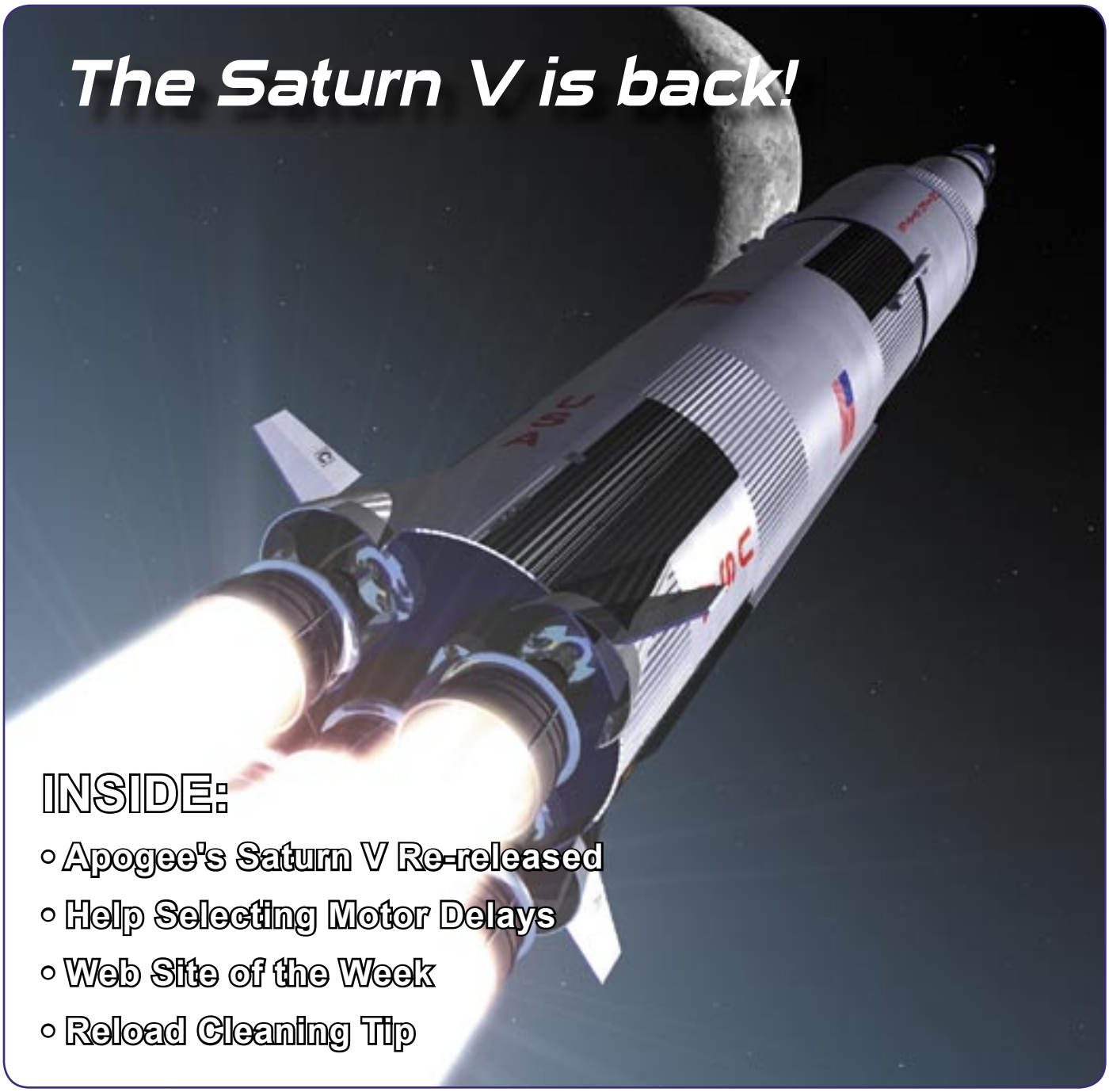
APOGEE PEAK OF FLIGHT NEWSLETTER



The Saturn V is back!

INSIDE:

- Apogee's Saturn V Re-released
- Help Selecting Motor Delays
- Web Site of the Week
- Reload Cleaning Tip

APOGEE COMPONENTS

1130 Elkton Drive, Suite A
Colorado Springs, Colorado 80907 USA
www.ApogeeRockets.com e-mail: orders@ApogeeRockets.com
phone: 719-535-9335 fax: 719-534-9050

1/70th - Scale Saturn V Back in Production!

by **John Manfredo**

(Note: Actual Saturn V photos from NASA archives at http://grin.hq.nasa.gov/subject.html and the Saturn V Reference Page at http://apollosaturn.com/frame-sv.htm)

Own Your Own Share Of Space Exploration History!

Tim Van Milligan, President of Apogee Components, is ecstatic to announce the re-release of Apogee Components' 1/70th-scale model of the mighty Saturn V! He provides us with some great insight into this massive rocket. Tim says, "The Saturn V rocket may be gone — but it will never be forgotten. After all, it was the only rocket used to put men on the surface of the moon."

When talking about the Saturn V, the term "mighty" is an understatement. Taking 6 years to build, it was 28 stories tall, weighed 6.5 million tons, and had the explosive power of an atomic bomb. When those powerful F1 engines ignited and inched the huge rocket off the launch pad, it shook the ground with the full fury of an earthquake. At best, you might say it was a controlled explosion.

The complexity of a launch for this vehicle was quite astounding. There were 5 service arms that would remain connected to the rocket until the Saturn V began to move. It would have to travel 2 inches before these arms began to swing away. There were also 4 hold-down arms at the base of the Saturn that would hold it down until the correct thrust was achieved. Once the rocket started to move and the arms started to release, they needed to all release withing 50 milliseconds of one another or the Saturn would tip over. Ninety percent of its weight was fuel, which was 1 million gallons. The 5 engines of the Saturn's first stage burned 15 metric tons every second. In less than a minute the Saturn V would be literally tearing through the atmosphere, faster than the speed of sound. In less than 10 minutes it was going ten times faster than a .30-06 rifle!

Apollo 11

Apollo 11 Launch

The sound waves could easily pulverize a human's skeleton if he was unlucky enough to be within a mile of the launch pad. Even at further distances, the sound waves felt like someone was thumping on your chest with their fists. The flame was so brilliant that it was hard to look at without squinting. and shot out four times the length of the rocket! And at night, it lit up the sky so bright, you could easily read the tiny print on a newspaper — fifty miles away from the launch site.

From the Memory of Those Who Were There

Tim says, "I've talked to many engineers and tech-

continued on page 3

About this Newsletter

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Apollo Capsule and Escape Tower

nicians that worked on the rocket. They all describe the launch of the Saturn V as an “event.” There is nothing like it they say. It was so huge and so powerful that even the launch of the Space Shuttle pales in comparison.

To those that personally witnessed the blast off of the Saturn V, they describe it as a religious experience. It is like the combined sensation of a lightning bolt, thunder clap, earthquake, avalanche, head-on train crash, and total-body convulsion all wrapped up into one two minute time period. But to them, it has been so etched into their memory, it seemed to last a millennium."

Few rocketeers were lucky enough to actually witness the event of a Saturn V lifting off into space. But now, with the new huge scale of the Apogee Saturn V kit, you can own a remnant from man’s greatest space adventure. You can actually feel what it must have been like to be a part of the experience.

But this Saturn V is more than just space memorabilia. When you look at this new rocket, you’ll be awe struck by its size and commanding presence. Your eyes will be glued to it like it has cast some sort of hypnotic trance on you. Upon seeing it, you’ll relive the glory days of the space program, and the pride that swells up due to the achievement of man walking on the moon. You’ll feel like you were an integral part of the launch team.

Tim Doll’s Saturn models on display at the Seattle Museum of Flight.

Model Size

The huge size of the Saturn V will inspire awe, whether on display or roaring forcefully into the sky. The 1/70th scale Apogee Saturn V is the the largest kit versions that doesn't require high-power certification to launch. Fully loaded, it is just a hair over 3 pounds, so it doesn't rquire a waiver to fly it. Our rocket stands over 62 inches tall and is 5.6 inches in diameter. Erect it on your desk and it will nearly touch the ceiling. People coming into the room will have no choice but to look “up.” It is the similar situation when looking at the real moon rocket, which stood 363 feet in the sky.

Apollo Fuel Fairings

There is so much surface detail on the rocket, you can count the number of stringers (on the corrugated sections) and compare it to the real vehicle. You’ll be able to immediately tell that this was a model built for scale enthusiasts like you. It will mesmerize you for hours on end as you slowly inspect every square centimeter of its surface. It will ignite your imagination as you dream about what it must have been like to have been an engineer working on it or an astronaut to ride it into space.

When you are finished building the model, you will have a huge sense of accomplishment and a can-do attitude to tackle other complex rockets. If you can build this one, you can build any rocket kit!

Apogee Fuel Fairings

Model Details

- Highly detailed injection-molded plastic nose cone and escape tower
- Injection molded RCS nozzles for the Service Module
- Injection molded F1 Display nozzles that are removable when you are ready to launch your rocket.
- Embossed paper wraps for the upper transition piece between the third stage and Service Module.
- 6-color water transfer decals (with special decals for 12 Saturn V’s that rocketed into space.
- High quality paper tubes that were sized to exactly 1/70th scale.
- 7 highly detailed plastic corrugated wraps - that include all the small tunnel covers pre-molded. So assembly is quicker.
- Extra sturdy die-cut centering rings along with a 29mm motor mount that fits your favorite high power rocket motors.

continued on page 4

- 2 large nylon parachutes (58" and 36" diameter) so your rocket descends slowly to the ground to be launched again and again!
- Molded plastic fins that are removable when you transport your rocket to and from the launch site.

Apollo F-1 Engines

- Urethane resin details for the booster interstage section
- Embossed wrap that is eye-popping and detailed for the transition of the 2nd stage to the Service Module
- Special "raised ink" wrap for the Service Module portion to bring out the raised panel lines on the rocket, and to aid in masking off the different color patterns.

Apogee F-1 Engines

- Injection molded Reaction Control System (RCS) nozzles on the Service Module.
- Four hours of video instruction. These not only show where to place the parts, but how-to put them together correctly. This gives a high quality fit and lightweight rocket.
- Kevlar® shock cords

This is a rocket kit that was truly engineered -- not simply whipped together and tossed into a box. Like all the Apogee rocket kits, it was designed by a real engineer using true aeronautical principles. It is strong enough to fly on big high-power rocket motors, but is still light weight. In fact, when prepped for flight, this rocket is only 2-1/2 lbs, so you do not need a FAA waiver to launch it! It flies great on an Aerotech G80-4 rocket motor - which you can purchase at your local hobby store. No high power certification or special rocket motors are required.

Joe Mastroianni and Apogee Saturn V

The photo on the left is from a very satisfied customer of ours! He writes, *"I finally got around to getting a pic of me with my Saturn V. I finished it last winter, and it's been displayed in my office at work all this time. It's too precious to launch. I recently moved offices so had the chance to bring it home. Here it is with me in the backyard. Thanks again for the great kit! I'm so glad I got the Saturn V before it went out of production. I feel like I have a collectors item! - Joe Mastroianni".*

We are pleased to be able to be offering this piece of history to the public again! Be sure to get yours ordered today. You see, you have an advantage over the rest of the public because you are a subscriber to the *Peak of Flight* newsletter. You find out about offerings such as these before most people who just happen to see it on our website. It will be a model that you will find satisfying for years to come as well! Visit http://www.apogeerockets.com/Saturn5.asp as they are available for immediate shipping!

Enzi pleased with rocket court case

The U.S. Court of Appeals for the District of Columbia Circuit recently decided that the Bureau of Alcohol, Tobacco, Firearms, and Explosives (BATFE) had not properly justified its decision to classify ammonium perchlorate composite propellant (APCP), a rocket propellant, as an explosive. The Court sent the matter back to the BATFE. The decision was made in response to a case filed by the National Association of Rocketry and Tripoli Rocketry Association. The BATFE is responsible for regulating explosives.

U.S. Senator Mike Enzi, R-Wyo., sponsored legislation in the 108th Congress that exempts users of certain model rocket propellents from explosive permit requirements. The bill was drafted with care to ensure that the exemption would only apply to non-detonable rocket propellant and would legitimize the hobby use of rockets.

"People who build and launch model rockets for fun should not have to give up their hobby due to an unnecessary set of obstacles and an unjustified claim which classifies rocket propellant as an explosive. This safe, mind-expanding activity offers many benefits to today's youth including increased interest in math, science, and space exploration while providing them with a fun recreational activity. While this decision is not the end, it gives rocketeers firmer footing and gets them closer to enjoying their hobby without having to bear the burden of unnecessary regulation. I hope the BATFE will see clear to give those law-abiding citizens the space they deserve and that in the end rocketeers will enjoy the same freedoms with their hobby as rock collectors and scrap-bookers enjoy with theirs," Enzi said upon learning of the court decision.

Senator Mike Enzi

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"...very well and competently done..." "Highly recommended" **CHOICE**

"...a good and absorbing read." **Spaceflight (British Interplanetary Society)**

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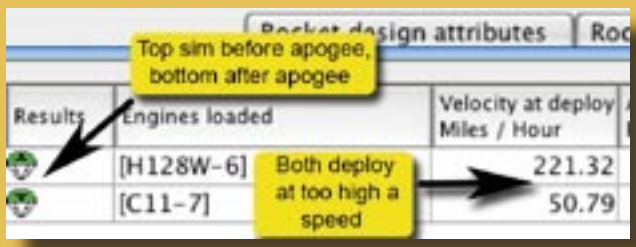
QUESTION AND ANSWER CORNER

How does the delay affect the rocket flight?

If the delay is too long or short, the flight will be cut short and the airframe possibly "zippered" or chute shredded. You want your rocket to be moving as slow as possible during deployment to avoid this and it is usually at apogee.

As you can see in the picture at the right, I have taken a rocket and simulated what happens with both scenarios. Both of these flights I went to the extreme on (i.e. - much too long a delay in one and much too short a delay in the other). What happens is obvious; the short delay in the H128 was going 221 mph at deployment and the C11 used a long delay which caused it to deploy way after apogee at a speed of 50 mph. Both cases would cause major problems in the flight. another result that could happen by too long a delay is one that happened to me. One time I was flying a 26.5 oz. rocket on an E16 with too long of a delay in it. The flight was beautiful until it core-sampled the soil in the field across the street! Believe it or not, the only dam-



age was to the accordian-looking nose cone that hit the ground first! I've definitely had much worse results from a rocket hitting the ground at warp speed!

Just remember to choose your delays wisely, preferably with Rocksim at your side! Transport yourself to http://www.apogeerockets.com/rocksim_demo.asp and try it out today! It will save you many headaches!

WEB SITES WORTH VISITING

The website of the weekis that of North Eastern Pennsylvania Rocketry association; better known as NEPRA. You may find it by linking to http://www.nepra.com/index.html. NEPRA is headed up by Drake "Doc" Damereau who you may recognize as a contributor to the *Peak of Flight* Newsletter. Their website has had a

brand new makeover. If you have been here before, try taking another gander; you'll be pleasantly surprised!

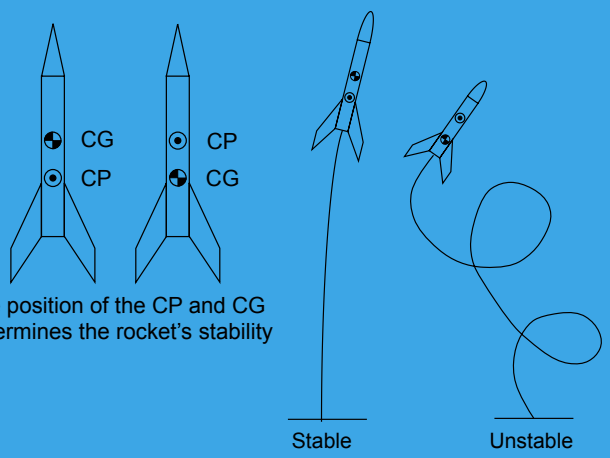
They have a great abundance of launch photos as well as some nice videos, too! For those of you who are "high power-inclined" there is a section that will allow you to experiment with your knowledge for the Level 2 high power test. It is divided into sections dealing with regulation, storage, range and safety, stability, and motors. These will prepare you for the L-2 test that must be passed before attaining your level 2 certification and is set uo very nicely!

The picture at the left really caught my eye because as I have stated in previous issues, it captures the essence of our hobby; passing the hobby from one generation down to another! There is nothing like seeing a rocket flight through the eyes of a young person! In the picture below is a nice example of one of the really cool projects that one of their members constructed. I would have loved to see that model take off into the skies!

They also have a forum area that provides a lot of useful information. It should be noted that although many areas of the website are for registered users only, this is a very easy process which gets you up and running in less than an hour (in my case). Try checking this site out and if you are in their area of the globe, go attend a launch and show support for the hobby!

DEFINING MOMENTS

Stability is the ability of a rocket or airplane to maintain its attitude or resist displacement, and if displaced, to develop forces to restore the original condition. Wow, that's a mouthful! Basically, a stable rocket travels in a relatively straight line, while an unstable rocket constantly turns its nose away from the intended path. Stability is very important because it determines whether or not the rocket will be safe or not. As seen at the right, the basic rule is that the Center of Gravity (CG) should always be in front of the Center of Pressure (CP). If this is not the case, then you will see the rocket flip, whip, roll, and do all kinds of crazy things in the air. You can equate "stability" with "safety."



The position of the CP and CG determines the rocket's stability

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TIP OF THE FIN

One of the things that tend to be a pain for those who use reloads (which happens to be the majority of high power users) is the processs of cleaning the casings. Ammonium perchlorate composite propellant produces undesireable subtances during combustion, such

as hydrochloric acid (HCl). Motors need to be cleaned

Don't dump the brush

after use to remove acids and other "crud" because a dirty case and closures can contribute to motor failure during flight.

There are many methods out there and this is just one of the many good ways to clean a casing. This is one way to do your part to keep the landfill from topping-off so soon, though. First of all, remember that toothbrush that you were getting ready to throw out? Well, don't get rid of it just yet. You'll find it to be very useful in this case! Dip your brush in some white vinegar and shake it off a little. White vinegar will quickly remove burned propellant from the aluminum motor components. It is a safe substance to use in the field and at home, unlike some

White vinegar

Scrub the crud out of it!

commercial solvents, and does not harm aluminum. Start scrubbing the inside of the casing. "Reload" your brush with vinegar as needed. The cleaning can be done on the two closures as well.

After you have removed as much of the "gunk" from the inside of the case and the closures as you can, take a paper towel to remove and dry the vinegar and residue out of the casing. Then you can take a common baby wipe to clean up the rest. As I stated in a previous issue of the newsletter, if you don't work with reloads and don't want to use them, Apogee Components has a stock of single-use motors that will satisfy your rocketry

Baby wipe

urges as well! Please visit http://www.apogeerockets.com/rocket_motors.asp and choose from a variety of motors!