ISSUE 83 - JUNE 14, 2002

APOGEE
PEAK OF FLIGHT
NEWSLETTER

The Saturn V
It Launched Man's Greatest Space Adventure

Helicopter Duration Rockets
What's Happing in Other Countries?

Helicopter Plan
The Spin Doctor

Reader Mail:
Tips & Photo's See What Others HaveDone

Shrox Plan
Protect Our Nations Capital With DC-SAM

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

ISSUE 83 - JUNE 14, 2002

APOGEE

PEAK OF FLIGHT

YOU CAN OWN AN AUTHENTIC REPLICA FROM THE APOLLO PROGRAM

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. When those five massive 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 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 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.

I've talked to many engineers and technicians that worked on the rocket. To a man, 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 have seen it, the blast off has been described 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.

Only a few rocketeers alive today 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.

The Apogee 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. It demands your attention, like a Marine Drill Sargent barking in your face.

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 a integral part of the launch team.

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 largest kit version in the world. It stands well over 62 inches tall and 5.6 inches 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. It's big, and you gotta look up at it.

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 build 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

cont. on pg. 3

ISSUE 83 - JUNE 14, 2002 APOGEE
PEAK OF FLIGHT

YOU CAN OWN AN AUTHENTIC REPLICA FROM THE APOLLO PROGRAM

cont. from pg. 5

been an engineer working on it, or an astronaut to ride it into space.

While being a Skill Level 5 kit, this rocket will not be difficult for you to build. The instructions are detailed, and easy to follow. Instead of a printed manual with complicated text and fuzzy illustrations, these instructions are video clips that you watch. You just slip the instruction CD-ROM into your computer and turn the electronic pages with your mouse. Each page has a short movie that explains what is done in each assembly step, as well as how to perform the technique. Everyone that has watched the videos has commented that these are the best kit instructions ever made for a model rocket.

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!

By following the techniques in the video instructions, your completed model will be a flawless work of art. People will marvel at the way you have the tube so smooth, and the paint applied with such crisp edges.

And besides building a museum-quality display model, your rocket can be launched in the sky! Yes, it was really designed to be blasted off into space.

actual customer comments:

I was a bit skeptical about the video instructions at first but after viewing a couple of segments, I am a convert. They do remove any doubt on how to properly build the kit as you have stated. I love the attention to detail the kit has." -- *Vic Duniec*

"I want to state publicly how pleased -- no, *thrilled* -- I am with the Saturn V kit The level of detail is outstanding, the fit of parts is beautiful, and (my opinion) it isn't really as hard to build as some might think, thanks to a highly detailed and very clear set of video instructions." -- *Terry "P'rfesser" McCreary*

Here is what is going to happen when you are ready to launch it...

First, the anticipation of the launch will be so thick, you will almost be able to cut it with a knife. You will feel a bit of anxiety along with the thud-thud-thud of your heart pounding hard inside your chest. This is the big moment. Everything has led up to this. The weather is perfect. Not too hot, and only a whiff of a breeze.

You erect the vehicle on the launch pad. The sunlight gleams off it, and it is almost too bright to look at. While you hook up the igniter, from behind you hear the clicking of cameras taking numerous photos of the rocket. When your preparations are complete, you are asked to stand next to the rocket to have your photograph taken too. A big smile cracks across your face, because deep inside you know that people are envious of your masterpiece.

A calm silence falls over the crowd as the countdown begins. As it proceeds to 5, 4, 3, 2, 1, the spectators start shouting along with the countdown. At zero, you hear the thunderous grumbling of the motor as it comes up to full power.

Click, click, click go the cameras once again.

As the mighty rocket inches upward off the pad in clouds of billowing smoke, the brilliantly colored flame will make you squint your eyes. The smoke begins to blow toward you, and you smell the pungent aroma of the exhaust. By now the motor is making an ear-shattering roar, and the rocket is gaining immense speed as it rises perfectly straight into the crisp blue sky.

The wide column of smoke makes the rocket easy to track, and when the motor cuts off, you can hear the crowd whooping and howling. You should have charged them money to see this, you think to yourself.

The rocket begins to slow down about now, and is coasting effortlessly into the stratosphere. Just when it hits apogee, you see it split into two sections. A half-second later, as it starts to descend, the two big parachutes fully blossom open. One on the main part of the rocket, and the second on the forward section.

You feel a sense of unrestrained joyful emotion. You try hard to look calm, but deep inside you are brimming with pride.

cont. on pg. 4

ISSUE 83 - JUNE 14, 2002 APOGEE
PEAK OF FLIGHT

YOU CAN OWN AN AUTHENTIC REPLICA FROM THE APOLLO PROGRAM

cont. from pg. 3

"Yipee!" yells the crowd. They gradually make their way toward you as the rocket slowly descends. As you watch it drift down, you feel the hands slapping on your back and you hear the attaboys from your friends.

As the rocket sections finally touch down on the soft green grass, you feel a calm sense of awe. It was a great flight, and something you'll be proud of for a long, long time. You say to yourself, "that has got to be the next best thing to having watched a real moon-rocket lift off into space." But this was "YOUR" accomplishment.

If you've never experienced something like this, then you have to buy this rocket kit right now. Why wait? Go to the Apogee web site at the link below, and click the order button this very second. We'll have a Saturn V on the road to you, and soon you'll be the most popular modeler in your town.

Here's some more information why you should buy this kit right now.

This kit is totally new from the tip of the escape tower down to the base of the plastic display nozzles. It includes:

- 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.
- 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.
- Urethane resin details for the booster interstage section.
- Eye-poppingly detailed embossed wrap 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.
- Injection molded Reaction Control System (RCS) nozzles on the Service Module.
- Four hours of video instruction. These not onlyshow where to place the parts, but how-to put them together correctly. This gives a high quality fit and light-weight rocket.
- 12 pages of painting instructions and drawings show the colors on the rocket.
- *Kevlar® shock cords.
- 1/4 inch launch lugs.
- RockSim design file so you can pick which motors you'd like to fly, and to determine how well the rocket will perform with those motors.

HERE'S OUR MONEY BACK SATISFACTION PLEDGE:

Take home the Saturn V rocket, and inspect its contents. View the assembly instruction videos. If you're not fully satisfied for any reason, or if it isn't the finest rocket kit you've ever seen, simply return it to use and you'll get a full refund, no questions asked. On top of that, keep the instruction CD-ROM (a $39.95 value by itself) as our free gift.

This is a rocket kit that was truly engineered -- not simply whipped together and tossed into a box. Like all the Apogee

cont. on pg. 5

*Kevlar® is a registered trademark of E.I. duPoint do Nemours and company

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

ISSUE 83 - JUNE 14, 2002

APOGEE

PEAK OF FLIGHT

YOU CAN OWN AN AUTHENTIC REPLICA FROM THE APOLLO PROGRAM

cont. from pg. 4

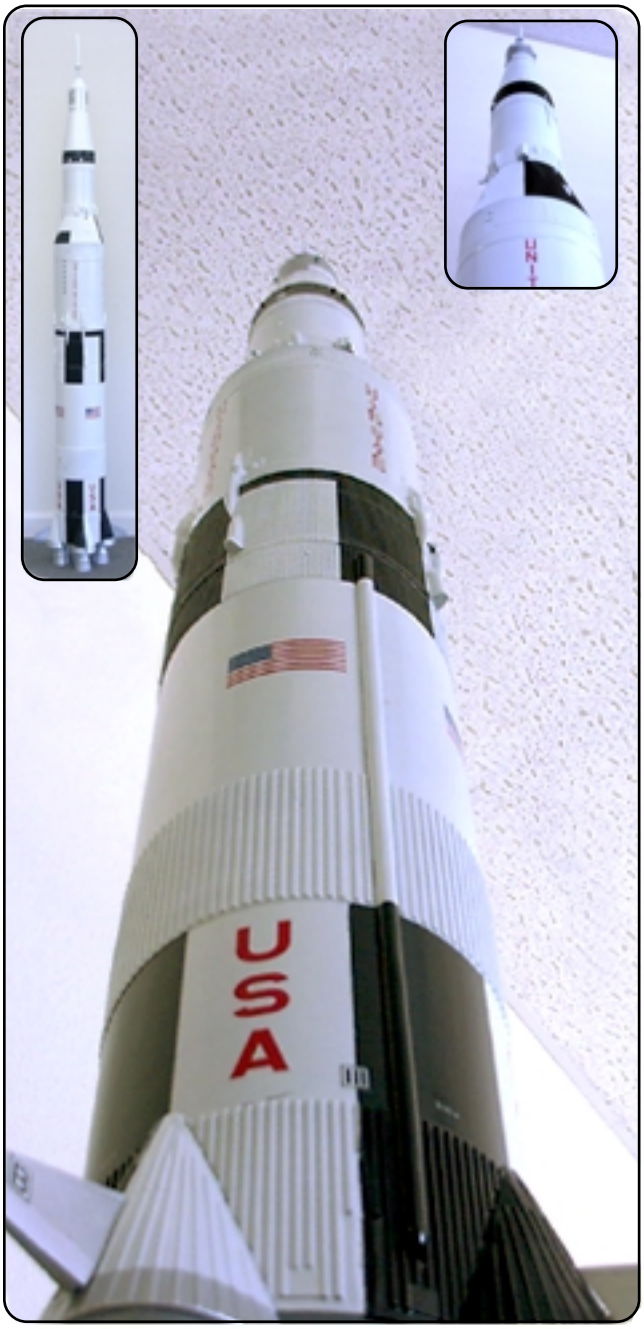
rocket kits, it was designed by a real engineer using true aeronautical principles. It is strong enough to fly on big high-power rocket motors, but is still light weight. In fact, when prepped for flight, this rocket is only 2-1/2 lbs, so you do not need a FAA waiver to launch it! It flies great on an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

I want you to experience the pride and the thrill that owning this rocket kit will give to you. It will be the flagship of your fleet, and the envy of your friends. Go to the Apogee web site right now and place your order for this magnificant rocket kit.

P.S. As a busy modeler, you know that sometimes (Okay, a lot of time) it is difficult to find the time to build rocket kits. That is why I want you to order right now. When you view the instructional videos, you'll learn a lot of new ways to build rockets quicker. You'll somehow find yourself with more time. And building this rocket will go fast, and it will be the biggest pleasure you've had all month.

P.P.S. In my opinion, you can't possibly know the exhilaration that owning your own Apogee Saturn V kit can bring to your life unless you experience it. Go to the Apogee web site http://www.ApogeeRockets.com/Saturn5.asp and click the order button right now. And if you don't think this is the finest rocket kit ever made, send it back for a full refund, but keep the $39.95 instructional CD-ROM as my free gift to you.

For more information on the new Saturn V, including a history of the kit development, see the Apogee Components web site: www.ApogeeRockets.com/Saturn5.asp



F.Y.I.

Postal Rates going up again: Save money by placing your order before June 30!

The United States Postal Service is raising their package delivery rates again. I didn't raise shipping prices the last time the Postal Service had an increase. Unfortunately, I'll have to raise my shipping rates to cover higher costs.

The new rates will go in effect July 1, so if you want to save a little extra you should place your order for your rocketry parts right now. I want to give you as much lead time as possible so you can save a little money by ordering soon.

APOGEE COMPONENTS

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

READER LETTERS:

Stefan Jones wrote us about the need to put an address on the Apogee Aspire kit. He writes:

"I regularly get mail from charitable organizations. Many of these include free address labels as an "advance thank-you gift." These are often on high-quality glossy paper with good adhesive. I usually have more of these labels than I'll ever need.

I've taken to putting a label (or two) on the base of my rockets' nose cones (or bulkhead coupler, for payload models). Besides IDing the rocket, the label is superior to masking tape when it comes to shimming up loose cones. They do not crumble or age like masking tape. They don't curl up along the edge as readily as tape.

Since the label is only visible after deployment, it doesn't mar the design of the rocket."

Thanks for the tip Stefan!

I got some photographs of a couple more Saturn models. These were sent to us by Tom Beach. You may recognize his name, as he's the editor of the NAR's *Sport Rocketry Magazine*. Besides putting together the periodical, it turns out that Tom is actually a pretty good rocket builder -- and quick too. Of all the Saturn 1B kits we've sold, it appears that Tom is the first one to actually finish and fly the bird. He flew the rocket at the NAR's National Sport Launch held over Memorial Day Weekend in Phoenix, Arizona.

Congratulations Tom!

"I flew my Apogee Saturn 1B at NSL over the weekend. I flew the model on an Aerotech F25-4. Boost was straight with a roll (aimed to arc slightly downrange) with ejection near apogee. The moderate wind carried the model sideways, so it landed at an angle and broke one fin. The Apollo capsule broke three of its legs loose from the CM. Wind was low enough that there was no "dragging damage" after landing." --Tom

ISSUE 83 - JUNE 14, 2002 APOGEE
PEAK OF FLIGHT

IN A SPIN WITH HELIROCS AND S9

Editor's Note: *The following article comes to us from the United Kingdom. They sometimes don't speak the same English language that we speak over here on this side of the Atlantic Ocean, so I've modified the text slightly to make it understandible to us Americans.*

Here's a short Glossary of terms that might be unfamiliar to you:

"S9" - The name given to a the competition event using Internats Rules. The event is called "Gyrocopter," but most of us American competitors call it "B-Engine" Helicopter Duration.

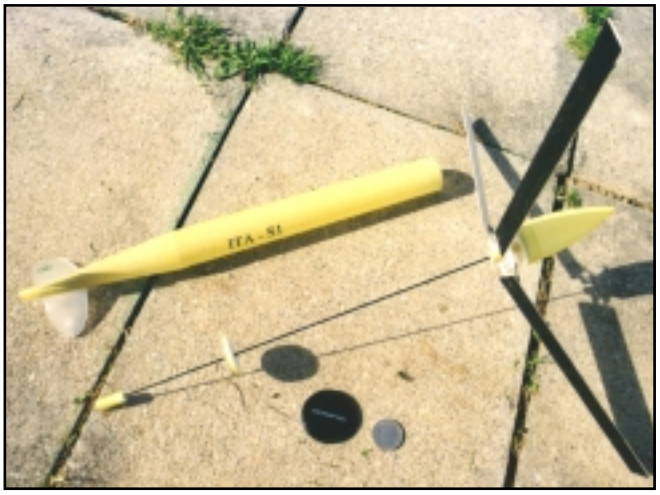
Centres - British spelling of "Center"

Fibre - British spelling of "Fiber," like in fiber glass

Lamina - British term for helicopter rotor blade.

Rampa - Launch Rod or Launch Pad

click here to see an animation of spin doctor in action or go to: http://www.apogeerockets.com/shrox/spindoc.asp



By Stuart Lodge

The ST. LEONHARD MODELLRAKETEN FESTIVALS were special... 1988-89-90 marked the end of the Communist era in Europe and the 'Festivals, held in South Eastern Bavaria formed the perfect backdrop for West and East to mingle. And they were unique in that they contained the first Helicopter Duration events flown outside the USA..

Helicopter Duration...wot's that ?!? At St. Leonhard, National Association of Rocketry (NAR) heliroc duration was flown. Essentially, these are lightweight rockets employing autorotation of deployed rotors as the recovery system and NAR rules do not dictate models' dimensions or minimum launch mass, merely flight duration over three rounds. 'Stateside modellers - such as George Gassaway & Art Rose - evolved the iconoclastic ROTAROC & ROSE-A-ROC respectively and these formed the basis for all further developments.

St. Leonhard in 1988 saw your scribe choose ROSE-A-ROC, a model which featured innovative longitudinal folding of the rotor lamina to slim the rocket for the boost segment of the flight. But before this, some basic theory needed understanding and applying to the models - Autorotation does not occur by accident, it needs to be induced... Tim Barklage's

cont. on pg. 8

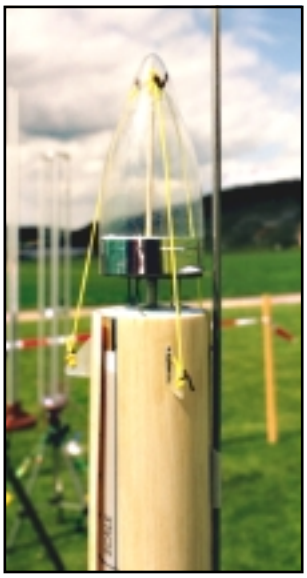
ISSUE 83 - JUNE 14, 2002 APOGEE
PEAK OF FLIGHT

IN A SPIN WITH HELIROCS AND S9

cont. from pg. 7

"Helicopter Duration Research", *American Spacemodeling*, March 1988, provided the answers; summed up:-

* At rotor deployment, the blades open past the horizontal, to provide "pendulum stability", enabling a steady air flow over the lamina.
* The rotors are set up with 5-8 degrees negative incidence to the intended direction of spin to induce autorotation.
* Each rotor has three discrete sections along its length; the third nearest the hub is the Stalled Region - and does nothing; the mid-section is the Driving Region, crucially where the airflow acts to provide autorotation; the tip-section is the Driven Region, which cuts through the air more rapidly and provides LIFT to support the projectile in recovery.



From these it can be surmised that the negative incidence is of no consequence nearest to the rotor hub - this section is too slow to be flying; VITAL in the mid-section Driving Region, to induce autorotation and not quite what's required in the region nearest the tip. WOT ?!? The Driven Region really needs to be at 0 degrees incidence and not negative incidence, because we need it to produce LIFT for a long, time-consuming recovery.

My experiences with ROSE-A-ROC and subsequent STU-ART developments of Art Rose's concept were exemplary, winning Gold at St. Leonhard Modellraketen Festivals in 1988, 89 & 90, normally by large margins. But then the party stalled when the 'Festivals were discontinued and I stopped flying helicopter...

FAI category S9-Gyrocopter ...so why are these different? A fundamental watershed between NAR and Federation Aeronautique Internationale space modelling is one of dimensional constraint - virtually all Space Model contest classes in the FAI Sporting Code section 4d (like the NAR Pink Book) are defined by minimum sizes

S1B-Altitude, S3B-Parachute Duration, S6B-Streamer Duration and S9B-Gyrocopter Duration must be at least 500mm long and 40mm diameter for at least 50% of the length. S9 came about in the mid-90s, in the form of S9A...2.5Ns motors and 350mm x 30mm bodies : 2001 Sporting Code amendments bumped everything (for Seniors) up to 5Ns motors - with commensurate dimensional increases; Juniors still fly S9A. In addition, S9B has a maximum time (max) per round of 240s, S9A, a 180s max. But that's enough of the rationale.

So the rocket - in launch configuration - is bigger than is wanted and there is no legal way of slimming the beast down to get higher boosts and longer durations. Good design and subtlety are the only way to get good results in FAI competitions and with S9-Gyrocopter there is a fundamental decision

cont. on pg. 9

IN A SPIN WITH HELIROCS AND S9

cont. from pg. 8

at the outset: are the lamina to be stored within the body during the boost, or laid down the outside of the 40mm diameter tube ?

Obviously, the highest boosts will be achieved with the rotors stowed internally and the rocket kept as near to 500mm long as possible but...ejection of the recovery system may be less than sure and the rotor lamina will be fairly small.

Editor's Note: *See an internal rotor design on the Apogee Web site at:* http://www.apogeerockets.com/education/newsletter37.asp

The other approach is to have external rotors - moulding these to nestle intimately against the body - typically increasing the diameter of the vehicle to 42mm.

The former is favoured by Italian Antonio Mazzaracchio, S9B World Cup winner in 2001. The latter is practiced by many, including the Yugoslav Katanic clan, who fly S9B very successfully and hold the current World Record. You pays your money and you takes your choice!

Model Masses: S9B models are heavier at launch than the ~20g with motor & recovery system of either S3B-Parachute Duration or S6B-Streamer Duration rockets; 25-40g is much more common and are frequently much longer than the 500mm minimum length.

Propellants: Typical motors seen on the World Cup circuit include the Czech DELTA, Yugoslav ULTRA and the Slovakian VYMOPO - all have Thrust-Delays tailored to FAI contest space modelling across the event spectrum.

Mazzaracchio - internal rotors: minimalist model - boosts on Delta B2-4...firm enough off the rampa, just enough coast for rotor ejection/deployment at apogee. At the 19th Swiss RAK Cup 2002, your scribe flew a model 650mm long with lamina 400mm each at ~35g launch mass...and employed ESTES B4-4, the spent 18mm case providing good pendulum stability in the windy weather.

S9B is still evolving, with no single approach or concept prevailing for long. My own "next step" will be to convert my Estes powered birds to take Slovak VYMOPO B2.5-4 motors - these originally for S4B-Boost Glider. B2.5-4s have a harder ignition spike than the DELTA B2-4 and boost altitude will be much greater than Estes - and heavier than DELTA when empty for better "spin stability" .

Performance tuning: S9B models are sophisticated pieces of sporting equipment, often fabricated from contemporary composite materials, like glass fibre & Kevlar - very strong and very light.

Helirocs generally are unique space models in that their Centres of Pressure (CP) migrate three dimensionally in flight - ~1 calibre behind the launch Centre of Gravity when boosting and then becoming related to the rotating lamina in the recovery phase.

We touched on the need for negative incidence in the rotor blades for autorotation to occur...but this can be approached in a different way. Ibid's SPIN DOCTOR.. design, featuring external lamina, has the blades set up at Zero degrees incidence and yet still spins like a top. How come ?!? ...the lamina trailing edges in the middle - Driving - region are scalloped away, meaning the leading edges are lower than the trailing edges and suckering the beast into thinking that we've built in negative incidence, whilst leaving the tip section - Driven - region at 0 degrees for better lift production.

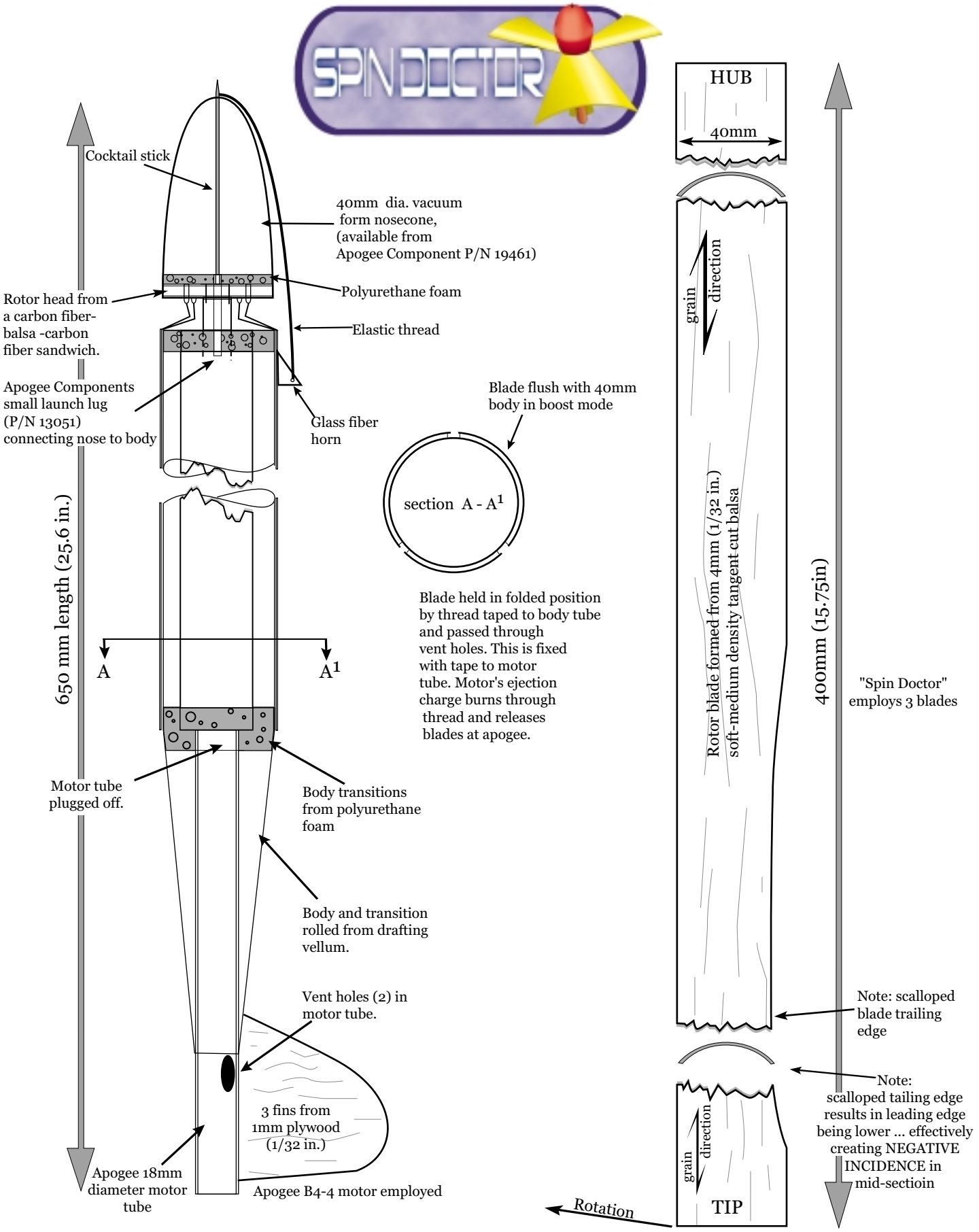
Maybe a facility to flatten the Driven region for the recovery phase, to generate more lift, is the next step. And there will be a lot more tricks to come as this fascinating category evolves!

Wind up... And that's about the global state of play just now. FAI's S9-Gyrocopter Duration discipline has disseminated these fascinating helicopter recovery rockets worldwide, with everything still to play for in the World Cup arena. 2002's 14th World Space Modelling Championships in the Czech Republic features this category...how will the metal be smelted?

About the Author: Stuart Lodge is a famous name in rocketry in the United Kingdom and also among competition modelers in Europe. He's written several rocketry books, including "*Model Rocketry*," "*The Model Rocket Handbook*" and "*Stu's Space... The Gospel According to Stuart Lodge. A Cornucopia of Space Modelling & Model Rocketry*: The World Game." He can be contacted at: stuart.lodge1@ntlworld.com

Archives of this Newsletter

All the articles that have appeared in this newsletter are archived at http://www.apogeerockets.com/education/newsletter_archive.asp



Plan by:
Stuart Lodge, May 2002
FA1 Category S9B,
Gyrocopter Duration

Apogee drawing by:
michael glockson

ISSUE 83 - JUNE 14, 2002 APOGEE
PEAK OF FLIGHT

DC/SAM BY SHROX

The DC/SAM has defended the United States Capital Complex since it's installation in 2004. A two-stage short to medium range interceptor missile, it makes an effective picket in the " electronic fence of defense."

DOWNLOAD THE ROCK SIM PLANS AND DECALS

The data file you will need for protection is at: http://www.ApogeeRockets.com/shrox/DC-SAM.asp

(1) - 19400 - Apogee Nose Cone
(1) - 10099 - Apogee Body Tube
(2) - 10085 - Apogee Body Tube
(1) - 13023 - Apogee Ring
(1) - Apogee 1/8" X 1" Launch Lug
(4) - 13031 - Apogee Ring
(1) - 29005 - Streamer
(1) - 10099 - Apogee Body Tube
(1) - 13007 - Apogee Coupler
(1) - 29505 - #300 Kevlar 36" line
(1) - Shock cord mount
3/32 in. Fin stock (balsa or basswood)

GET WHAT YOU NEED. CALL APOGEE AT 719-535-9335

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