NOVAAR FREE PRESS

NORTHERN VIRGINIA ASSOCIATION OF ROCKETRY

JUNE 1986

ECRM

Glider Trimming Part 1

Finishing Rockets Part 2

Making Your Own Chutes and Streamers

...and much more!

HELP!!

I need somebody! HELP! Not just anybody! HELP! You know I need someone. HEELLP!! When I was younger, so much young... huh..oh..uh sorry folks, I got a little carried away there. Uhh.. lets see here... free press right? ...yeah, ok, here we go. Yes we of the NFP do need our reader's help to keep up the swell quality of our newsletter. Currently the Free Press is all done at the editor's (Dan Mulholland) school. Everything is typed in a computer and word processed out onto a printer (you may have noticed this). Photos are all taken care of in the school's dark room. But school is ending!! Please let me know (at 979-4719 after 4 P.M.) if you can lend the use of your computer, darkroom, jacuzzi, printer, auto, bank account, rocket engines, or anything else that may strike you as usefull. Actually, we could probably get by on just the electronics....

DON'T FORGET OUR FUNFLY!!

Sunday, June 22, is the date for our next club launch. Bring out anything you want, this isn't a competition , we're just flying for the fun of it!! It all begins at 10 A.M. at Barron Cameron Park in Reston. The club launch equipment will be there, all you'll need is the rocket, motors, igniters, and a good breakfast!

COME TO THE JUNE 17th MEETING!!

And bring some rockets!! At our next meeting, we will have a streamer, parachute, and wadding packing demonstration by US Team member, Dan Winings! Also we will have discussions to plan out future demonstrations geared at helping the young folks with common problems. If there is a topic you would like discussed, please come in and submit your ideas!

WE NEED SOME HELP OVER HERE TOO!!

Yes, we have just about run out of "cute little titles" for this collumn. This month our new members are Kevin Murphy who joins NOVAAR in the A division department. Also Stan Gimbert, who's son is a member, is joining in C division, finally. Stan has been hanging around NOVAAR since late November and has been the RSO at nearly every launching since! Kevin lives in Fairfax and Stan in Annandale, welcome guys!!

AND FOR THOUGHS OF YOU WHO NEED HELP...

Ken Brown is at it again! Ken has just added a new superroc kit to his line of Sure Fire Kits. The model is three feet long and uses the mini A engines. The kits come complete with instruction and recovery supplies. Mr. Brown has just set a national record in superroc altitude and you can bet these birds will be great performers. You can buy yours ($2) at a meeting or by contacting Ken at 451-2808 after 5 P.M..

ROCKETS ON DISPLAY

In the show window at Cornish & Son's Hobby's, Stan Gimbert has four of his models set up for public viewing. A Black Brant, Space Shuttle, Mercury Redstone, and Pershing Missle are the models on display and when you see thoughs nice paint jobs you'll know why (yeah, but have you seen them fly? -Ed). Next time your there, be sure to remark on the kits. Hey Stan, let us know how well the sales increase!

THE MEET

A new chapter was written on the battle between the North and the South, as 20 contestants, from Upstate New York to the heart of Virginia, fought it out at the East Coast Regional Meet on May 10th & 11th. Manassas Battlefield, site of Civil War clashes and past rocket meets, was used as the battle grounds of ECRM.

The first day, Saturday, was the day for the four duration events. Most modelers decided to start with B International Boost Glider, because the winds were calm and flexies were the favorite of the day. Charlie Sykos used a canard model with a dethermalizer to take first. He came out with 489s, maxing two times, and never lost the model! For a guy who's only been into model rocketry a year, Dan Domina really learns fast! Dan made 441s, for second, and didn't use flexies! Third and fourth places went to the Odd Couple (Jeff Vincent and Chuck Weiss) and Omega Alpha (Terry Lee and George Burall) teams respectively. Both teams used variations on the Wind Drift birds.

B division was swept by a wave of bad luck that would continue through out the meet. In first place was Dan Mulholland, who was able to get one of three attempts at using a flexie to hit the mark and net 158s. After first making attempts with flexies, Adam Nowatarski decided to us a balsa glider to come in second. With the worst of luck was the Boostin Bandits team from Upstate New York who weren't able to get their large sized Wind Drift models to glide properly.

It was sister against brother in A division for the two top places. Jenny Lyon was able to beat little brother Tommy (both from NARHAMS), to take first with 229s. Tommy was right behind with his 142s flight, using the new Estes Hitch-Hiker, as did his sister.

In 1/2A International Parachute Duration, Charley Sykos overcame Dan Domina by 12s to take first with a 352s total time. The Odd Couple caught third with a 306s time, and the Omega Alpha team finished fourth netting 294s.

The kids in B were lead by Mr. Nowatarski achieving 288s. Second in line came Mr. Mulholland with 178s. Robert Edmonds got in ... s.

In A, first and second place were about as close as you can get. Jenny Lyon edged brother Tommy by 1 second!! She took first with 63s and Tom of course made 62s (do they plan it this way?). Third and Fourth place also ran in the family. Sammy Wood came in third with a 52 second flight, and Stephen Wood rounded out fourth with 43s.

The A rocket glide event saw the most diverse types of models used in the meet. The Brown & Brown Team used an old George Gassaway model to take first place in C with a 205s flight. Dan Domina took a strong second with a 181s flight, leaving third to the Odd Couple Team who did it with a 159s glide.

For B division, the story of A rocket glider is a short one. Two very successful prangs were made by both the Boostin Bandits Team and Dan Mulholland. This left first place open to Adam Nowatarski's Seagull glider, which got it with an 87s flight.

In A division the top two spots were shared by Wood brothers. Stephen Wood edged brother Sammy by a half minute with

Wes Gimbert took third with an old Nymth model to get a 36s flight, proving there is still something to be said for sliding-pod gliders.

When it comes to helicopters the Odd Couple Team really knows how to get around. They used a Rose-a-Roc model to bring in 242s of sweet victory, 82s higher than when they were here for MARS! Although 103 behind, Dan Domina used a free wheelin Rotaroc, yes a Rotaroc, to get 139s for second place. The Omega Alpha Team took home third with 94s, also using a Rotaroc.

First in B was Dan Mulholland with a 64s flight using a Rose-a-Xote (a Rose-a-Roc with flexwing gliders attached). A few rotations behind came Adam Nowatarski to take second with a 57s flight. The Boostin Bandits kept up the tradition of bad luck in B division with a pranged flight of a modified Rose-a-Roc.

A International Streamer Duration saw the most fierce competition of the day and the scores tell you why! The Brown & Brown team made their best showing of the day by getting all three maxes for a total of 360s. Almost a minute behind came Charlie Sykos to take second place with 304s. Dan Domina placed in third with 274s. And forth was taken by the Omega Alpha Team with 182s.

The scores in A division were close again! Stephen Wood, who was just 5 seconds ahead of brother Sammy, grabbed first place with a 35s flight. Right behind Sammy was Kevin Murphy with 27 seconds to scoop up third spot.

Dan Mulholland won first in B division with a total of 353s worth of duration. Second place went to Adam Nowatarski getting in 223s. Robert Edmonds, with 128s took third place. Fourth and final was the Boostin Bandits who were disappointed and bewildered with their 62s time.

Day two of ECRM was a windy one, but not windy enough to stop three new national records from being set! The Odd Couple Team took an easy first in A Altitude with 418m, using a rather short model, and set a new national record!! Dan Domina also put in an impressive piston launched flight and reached 367 for second. Third place was tie being shared by Charlie Sykos and the Brown Brown Team, both getting 254s.

A bit more down to Earth in B division was Dan Mulholland with a 340m flight, high enough for first. Adam Nowatarski managed second place with 223m. And the Boostin Bandits, after one nutty flight, won third position with 103m.

The A divisioners reached heights that made many of the older folks glad they weren't in A division! Jenny Lyon reached an impressive 295m and happily marched off as the victor. Brother Tommy was no less impressive with 283m for second place. In a strong third came Sammy Wood with 112m. Believe it or not we have another tie in the same event! Wes Gimbert and Charles Kassel both reached a height of 73m.

The strategy most modelers used in building for B Superroc Altitude, was to put emphasis on the super! In C division a new record was set by the Brown & Brown Team's 12 foot model! The model which used 1/2" launch lugs for it's 10' pole went 57 meters for 1128 points! Not too far behind was the Odd Couple's 10 foot, lower launched bird that reached 52 meters fo 1091 points. Dan Domina came in third with a minimum length model that managed 919 points. And Tim Allen used a 6 foot model to get 781 points.

The Boostin Bandits made the only qualified flight in B division to get 686 points using a 6' 5" piston launched model that soared 49 meters. At nearly the same time, Adam Nowatarski, the Omega Alpha team, and Dan Mulholland pranged their models into the crowd just as the park rangers came out to inspect us. The high winds were to blame.

Once again it was Jenny Lyon ahead of Tommy in A division. Jenny, using a Mini-Mean Machine went 153 meters to get 618 points. Just 18 points behind was Tommy going 145 meters also with a Mini-Mean Machine. Hmmm, maybe they should become a team.

In Eggloft Altitude there was only one flight in A division, and you guessed it, it was Jenny Lyon!! 287m was the height she achieved with her tower launched homemade model.

The Boostin Bandits proved that their luck had definately turned around when the got 518m with a piston launched Aerotech D7 model. Adam reached 251m in an around-and-about way, using a two staged model for a slightly less than stable flight. Dan launched a two staged bird that couldn't decide which way to go, and not suprisingly was lost by the trackers.

In C division a new record was set twice! Charlie Sykos used a D7-8 to go 554m, but was unable to return his model for the record. The Omega Alpha Team also used a D7-8 and claimed first place as well as the new record with their 526m flight. Their first flight was 154m lower and used a D12 engine. The second place spot also went to a D7 user, Dan Domina with 491m. And only 70m behind for third was the Odd Couple Team with 421m.

After the meet, as tradition demands, the award ceremony was held at the God Father's pizza parlor just a few minutes away. For most attendants, this was the best part of the competition. After two days of running around in the sun, we finally got to kick our feet up, relax in the cool airconditioning, eat pizza and reminisce the activities just past, and collect the fruits of our labor too!!

The biggest fruits went to Jenny Lyon, the A division champion. Adam Nowotarski in B division, who gets another piece of fruit for being the meet champion as well. And not to be forgotten, Dan Domina who won in C division.

And to give thanks where thanks is due... Thanks to Charlie Sykos, Terry Lee, and Kevin Brown for their great jobs at tracking. All tracks closed, and about the only ones lost were the models that went unstable. A big hand to Jeff Vincent, Chuck Weiss, and Adam Nowotarski for computing altitudes. Dan Winings, who organized the meet and figured out the points. The biggest acknowledgement must go to "The NOVAAR Sun Worshipers Club", the RSO's and check in officers of the meet. The are: Ken Brown, who also took over as CD at the last minute, Tim Allen, Geronimo Mulholland, Wes Gimbert, and to the man from Mercury, Stan Gimbert who diligently soaked up the ultra violets on both days a lot longer than the rest of us. With the same great help we had in setting up and tearing down the range, and half quality of help we had else-where, MARS 17 would be just as great. See ya there!!

CONTEST CHECK SHEET

By Ken Brown

The most important item for a contest director to have and use before, during, and after a meet is the following check off list. This serves to account for all the possible items required in completing a sanctioned contest.

I CONTEST DIRECTOR:
Range Control Officer.
Range Safety Officer.
Contest Jury, and Judges (if needed).
Trackers, timers, return and safety check.

II FORMS:
Registration: check for signatures.
Flight: white (A), yellow(B), and orange(C).
Insurance
Record

III EQUIPMENT:
Battery (charged).
Stakes, rod holders and 1/8", 3/16" metal launch rods.
Controller and wire clips.
Loud speaker system.
Flags and metal post.
Stop watches.
Hammer (5 lbs).
Folding table and folding chairs.
Fire extinguisher.
Clip boards.
Pen and pencils.
Calculator.
Board for posting results.
Current Pink book.

IV ALTITUDE EVENTS:
Cable reel with phone wire.
Calculator (With altitude software).
Book for altitude calculations.
Phone or CB radios.
Tripod and trackers.
100 foor tape (baseline).

V SPOT LANDING EVENT:
Measuring tape (50 feet or 100 feet).
Stake.

VI AWARDS:
Ribbons
Trophies (metal) or gifts (model kits).

VIII LITERATURE:
Sections and NAR forms for joining organizations.

B International Boost Glider

1. Jenny Lyon	229s
2. Tommy Lyon	142s
1. Dan Mulholland	158s
2. Adam Nowotarski	20s
1. Charlie Sykos	489s
2. Dan Domina	441s
3. Odd Couple Tm	424s
4. Omega Alpha Tm	420s

B Helicopter Duration

1. Dan Mulholland	64s
2. Adam Nowotarski	57s
1. Odd Couple Tm	242s
2. Dan Domina	139s
3. Omega Alpha Tm	94s
4. Jim Nolan	25s

A International Streamer Duration

1. Stephen Wood	35s
2. Sammy Wood	30s
3. Kevin Murphy	27s
4. Jenny Lyon	23s
1. Dan Mulholland	353s
2. Adam Nowotarski	256s
3. Robert Edmonds	128s
4. Boostin Bandits	62s
1. Brown & Brown Tm	360s
2. Charley Sykos	304s
3. Dan Domina	274s
4. Odd Couple Tm	182s

1/2 A International Parachute Duration

1. Jenny Lyon	63s
2. Tommy Lyon Jr.	62s
3. Sammy Wood	52s
4. Stephen Wood	43s
1. Adam Nowotarski	288s
2. Dan Mulholland	178s
3. Robert Edmonds	138s
1. Charley Sykos	352s
2. Dan Domina	340s
3. Odd Couple Tm	306s
4. Omega Alpha Tm	294s

A Altitude

A Division

1. Jenny Lyon	295m
2. Tommy Lyon Jr.	283m
3. Sammy Wood	112m
4. Wes Gimbert	73m
4. Charles Kassel	73m

B Division

1. Dan Mulholland	340m
2. Adam Nowotarski	223m
3. Boostin Bandits	103m

C Division

1. Odd Couple Tm	418m
2. Dan Domina	367m
3. Charley Sykos	256m
3. Brown & Brown Tm	256m
4. Omega Alpha Tm	231m

B Superroc Altitude

1. Jenny Lyon	618pts
2. Tommy Lyon	600pts
1. Boostin Bandits	686pts
1. Brown & Brown Tm	1128pts
2. Odd Couple Tm	1091pts
3. Dan Domina Tm	919pts
4. Tim Allen	781pts

D Eggloft Altitude

1. Jenny Lyon	287m
1. Boostin Bandits	518m
2. Adam Nowotarski	251m
1. Omega Alpha Tm	526m
2. Dan Domina	491m
3. Odd Couple Tm	421m
4. Tim Allen	317m

A Rocket Glider

1. Stephen Wood	76s
2. Sammy Wood	46s
3. Wes Gimbert	36s
1. Adam Nowotarski	87s
1. Brown & Brown Tm	205s
2. Dan Domina	181s
3. Odd Couple Tm	159s
4. Omega Alpha Tm	98s

ROCKET FINISHING FOR BEGINNERS PART II

by Sam Powell

In my first article on finishing rockets, I talked about the various types of paints best suited for use in model rocketry and different techniques to use to achieve a good finish. To get a good paint job though, you must start with a good surface to paint. The three major types of materials used in model rocketry construction (balsa wood, spiral wound paper body tubes, and plastic) all require surface preparation before painting.

Balsa's low weight and strength lends itself very well for use as fins and nose cones. It's major drawback, however, is the prominent grain which must be filled and sanded smooth. The traditional method of filling balsa grain is to brush on coats of balsa fillercoat, sanding the wood smooth with medium or fine sandpaper after each coat. The idea is to sand all of the fillercaot off the surface, leaving only that which remains in the cracks and pores of the balsa wood. This procedure will have to be repeated 3 to 6 times, depending on the final coat of sanding sealer. Let dry completely and sand smooth with fine sandpaper. When using dope based fillers and sealers, be sure to work in a well ventilated area as the fumes can be harmful if inhaled. This method is a little time consuming, but a little patience can produce a smooth surface free of pits and blemishes--ready for painting.

Impatience has inspired me to experiment with different methods of filling balsa. Over time, I have come to use one method which works best for me and is quick and easy to do. Start with vinyl spackling made by DAP Inc., which you can find at almost any building supplies center such as Hechinger's. Scoop a small amount of this thick paste and place it in a small bowl beside another small bowl containing water. Wet the tip of a clean paint brush and work it into the thick paste, thinning it until it is semi-thick liquid about the same consistency as balsa fillercoat. Brush it onto the surface of the balsa, making sure all cracks, crevices and pores are filled. After it has dried completely, sand it smooth with fine sandpaper. You will notice it will san very fast with only fine sandpaper. Al major grain patterns are usually fille at this point. If not, you can us regular balsa fillercoat to finish th job. Lastly, apply a coat of bals sanding sealer, allow to dry and sar smooth. This method will give you smooth surface ready to paint in les than half the time and without all thos noxious fumes.

Plastic surfaces are easily prepared for painting. Seams may be filled with plastic putty and sanded smooth. Otherwise, no sanding is necessary. Care should be taken to ensure surfaces are free of oil, dirt, and fingerprints. Plastic parts should be washed in warm water and a mild detergent to remove oils left by the manufacturing processes and fingerprints from handling.

The above are only a few hints and suggestions in achieving your finishing goals. Someone once said that there are as many different techniques as there are individuals. You will have to experiment with different methods to find the solution that works best for you.

For most people, the spiral woun body tubes furnished with kits ar already smooth enough to paint. If yo are a perfectionist, however, body tub seams and 'spirals' can be filled wi any of a variety of fillers and sand smooth. Thinned 'Squadron Green Putt is just one kind that will work fine.

THE WORD FROM NASA- GREAT THINGS AHEAD

At NOVAAR's May 20th meeting, James Kukowski, a public affairs person from NASA, gave club members a look into the space program's next 50 years. Mr. Kukowski began with the current debates in Congress over future NASA spending, including building 1 or 2 new shuttles. One proposal is to build a trans atmospheric vehicle, or "space plane" in place of a new shuttle. The "Orient Express", as it is also called, would go from New York to Japan in 2 hours, may be built in conjuction with the Department of Defence (DOD).

Also, he pointed out that there has been more change in NASA in the past 6 years than in the first 24. One big change is the creation of a "second space agency" through the DOD which has a budget $2.5 - $4.5 billion greater than NASA's $7.5 billion budget.

There are 150 engineers inside and outside of NASA working on the redisign of the shuttle's solid rocket boosters, as well as new safety features. The shuttles should be truckin' again sometime between next July and December. In the next 2 to 2 1/2 years, the shuttles should be making 15-18 flights a year. NASA intends to get out of launching communication satellites and let the private sector take over. More DOD launches will be made in the future.

In the next ten years there will a total realignment of our rock systems. We will see the developement new launch vehicles to replace t current ones that were developed in t late fifties and early sixties. We m see, as well, the developement of 2 generation shuttles. Our present fle uses late sixties and early seventi technology.

In the next few years expect to s the launching of the space telescope This telescope will be able to see to t edge of the universe, 14 times farth than any today! Also it will be able see objects 50 times more clearly th can be seen from the ground.

And for the most exciting news all... Sometime just after the turn the century we will begin construction a lunar base!! Most structures will made of the lunar soil wich can be us to make cement 15% - 20% stronger than Earth. Around 2020 there should be manned mission to Mars, where anothe base will be set up. In t not-too-distant-future in 1991 there wi begin the first of 18 shuttle figh (over 3 years) to build a multi-nation space station. It will be operationa and fully expandable, by mid 1994-1995. An Alpha Centari visit? Well, we m have to wait another century for that!

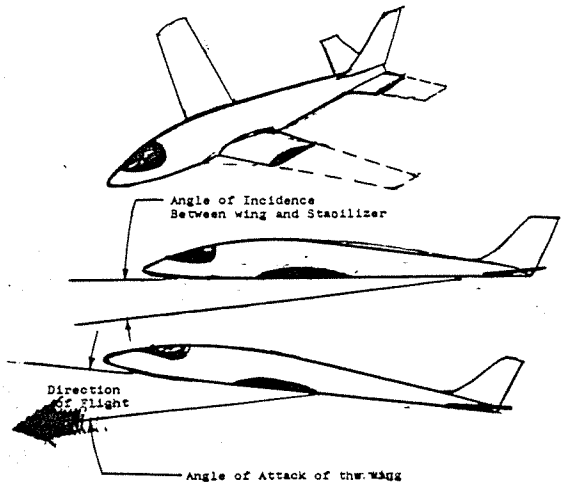
FLY IT!!

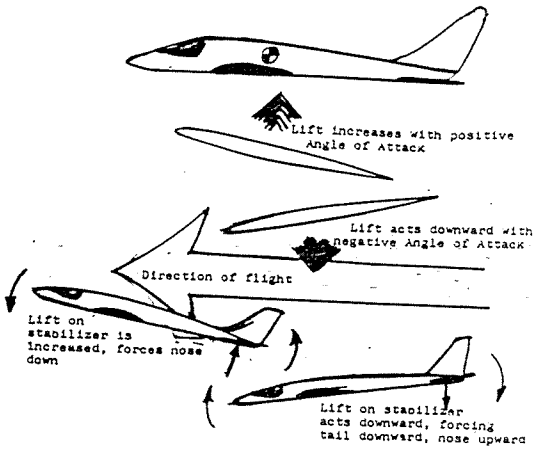
'ART 1 OF A 3 (WELL, MAYBE 4) PART SERIES

BY ROBERT EDMONDS

Almost anything will fly. When one ider circles majesticly over the fields r a max duration while others spiral ickly to the ground, it is not because a special magic element in its design, t merely the result of a bit of time d patience spent in trimming the model r maximum performance. The trimming ocess may seem frustating or overly ticulous at first, but proper justment can yeild contest-winning rformance from almost any design. This the first in a series of articles that ll attempt to make aircraft stability, imming techiques and the effect of both these on performance a bit easier to derstand. We will also treat some of ese inexplicable anomolies which metimes surface during glide testing, t are not normally discussed. First, t's take a look at just what an rplane (whenever I say that I am cluding the gliders) is supposed to do.

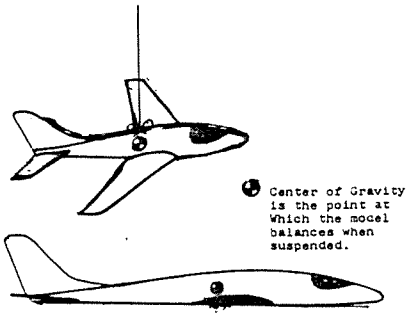
The idea behind an airplane is that ere is a surface, called a wing, that ll produce a lifting force when it ves forward through the air. This part easy, all it requires is some sort of rfoil section (which, as we will see, y actually be a simple flat plate, ough this is not particularly sirable). The tough part is to create device that will keep this wing moving rough the air in a reasonably straight th, and to keep it aligned properly ch the direction of this motion. There e a number of ways to do this (X-29, ace Shuttle, F-16 and others use mputers), but the one we usually use volves a small winglike surface affixed me distance behind the wing. This rface functions by producing small ounts of lifting force, similar to that oduced by the wing, but not always in e upward direction. The angle of cidence of this surface, along with the sition of the center of gravity of the rcraft, governs the angle of attack of





the wing. What did that mean? Let's go to the drawings. As shown here, an angle of incidence is the angle of forward or backward "tilt" of a flying surface relative to some other line on the aircraft. Throughout this article, we will measure these angles relative to the wing, so the wing's angle of incidence will always be zero.

Angle of attack, on the other hand, is not measured with respect to any part of the direction of travel of the surface through the air. The angle of attack of a surface controls its lift and its drag and we may use changes in angle of attack of our small surface behind the wing to keep it aligned properly.



Along with these two important angles, another parameter influences our aircraft's stablility. The center of gravity is the point at which the craft would balance if hung from a string affixed there. If any rotational force (called a moment) is applied to the model, the axis of rotation will always be about this point, as if it were a pivot.

Now let's put together a couple of flying systems such as we have described, with a small surface behind a wing. The first craft will have the small surface, called a stabilizer, mounted at an angle of incidence of zero (relative to the wing). Suppose the center of gravity is positioned at the wing's center of lift (the point at which the lift force is apparently centered). Thus, the wing cannot exert a rotational force about the center of gravity "pivot", and the stabilizer controls the system. The lift of a surface increases with it's angle of attack, and at negative angles (with the leading edge of the surface pointed down) the lift force will act downward. Our aircraft will thus always tend to return to a state of flying directly into the airstream, since, whenever it deviates from this condition, the stabilizer produces a lift force to re-align the system.

This system seems to work reasonably well; the wing is kept facing in the direction of flight, so that it may generate lift. Consider, however, that on some occaision, where the direction of flight is initially straight down. Our stabilizing system will perform flawlessly, and the aircraft will maintain its attitude and direction to the point of earthly encounter. Our aircraft shows no tendancy to return to level flight, merely th ability to remain properly aligned. Now inagine another situation. Any flying surface has critical angle of attack, the "stall" angle beyond which it can no longer

roduce lift. Since our wing and tabilizer have equal incidence angles, hey will always have equal angles of ttack, and they will both reach the tall angle at the same time, if omething (say a gust) causes the angle f attack to increase. After the stall, he lift-free craft begins to drop and ince the direction of travel is now own, the stabilizer re-aligns the craft n a dive and the system destroys itself n the concrete, again with no tendency o return to level flight. Our tabilizer must somehow be made to give ur aircraft the ability to recover to evel flight from any attitude, we must ake the model "know" which way is up. et us then examine a second flying ystem which involves a very special ngle of incidence known as decalage.

The only thing different about this odel is that the stabilizer has been iver a negative angle of incidence. ince this would result in the tabilizer's angle of attack being egative when the wing is aligned with he airstream, and this will have a endancy to bring the craft's nose up ust as it did when the previous design xperienced negative angle of attack. ince we still want to keep the wing roperly aligned, we add a bit additional eight to the nose to counteract this endancy.

We now have a model whose stabilizer s producing a small amount of downward ifting force. Let's see what happens if t enters the same vertical dive to which e subjected our previous model. Lift on ost flying surfaces will increase with he square of the flying speed. Thus, as ravity begins to take its toll on the lummeting craft, and its speed ncreases, the downward force exerted by he stabilizer increases, and this forces he nose upward relative to the irstream, increasing the wing's angle of ttack. This produces extra lift, and eatly pulls the craft out of the dive, aving us some glue. When the craft pproaches the stall angle, the wing, eing always at a higher angle of attack han the stabilizer, stalls while the tabilizer is still generating lift (it s now at a positive angle of attack ecause of the extreme nose up attitude) and now acts to lower the craft's nose quickly so that it may regain its speed, pull out of it's slight dive and continue flying rather than locating new subterrainian alternative energy deposits. We have developed a system which returns our craft to level flight from extreme attitudes naturally. Are there any problems with decalage?

Well, in the flight business, we never get anything for free. Because the stabilizer remains at a negative angle of attack when the wing is flying paralell to the direction of flight, it is generating lift. Whenever a surface generates lift, it produces Induced Drag, and this drag force is normally much higher than the "zero lift drag" (which would be produced by our flat stabilizer at zero angle of attack). Thus, large angles of decalage promote extra drag and reduce performance, but if the decalage angle is too small we lose the beneficial effects we have sought. How do we determine the correct amount of decalage? How can we adjust a design without built-in decalage to fly successfully? Well, all of this can be calculated, but it's much easier to find out in the air through trial and error. Next month, we'll take a bit of time to see just what to look for in a test glide.

THE OUT-HOUSE OF ECRM, BY THE EYE IN THE SKY, HERB DESIND.

...and hold the anchovies!! Stan Gimbert, home on the range.

MAKE YOUR OWN 'CHUTES 'N STREAMERS

by Dan and Dan
(not necessarily in that order)

Sooner or later all rocketeers end wanting to make their own parachutes. eir reason may be to save money, avoid e wait of mail order, because their old e was taken by a UFO, or simply to make better one for competition. Anyway VAAR has members that have been making utes for quite a duration of time and ve gotten it down to a science.

Step one of making a parachute is in e selection of the material to be used, r which there are several choices: dry eaner bags (from dry cleaners), opcloth from hardware stores (.25 mil - mil) for when you get tired of running ck and forth to the cleaners, and nally mylar (from CMR) -a type of astic mirror material. Decide what you e going to use the parachute for before tting the plastic. If the model is not r competition, go with the thicker terial to save on wear and tear.

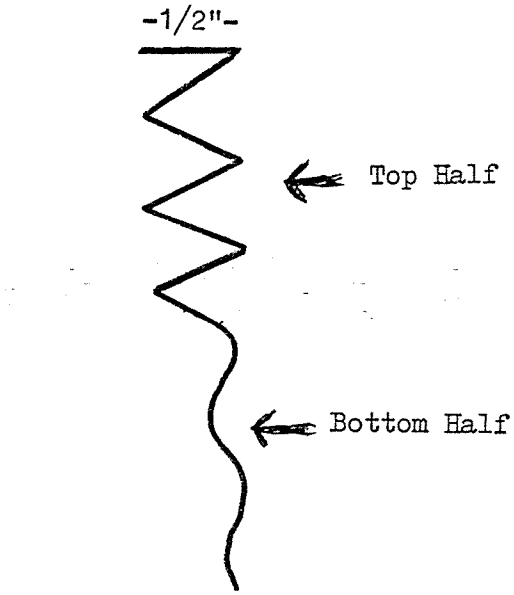
The next step is to cut the plastic. far the easiest way is to first spred e plastic over a large piece of spare od, picnic table, or work bench (not e dinner table kids!!). Then you need get a round object about the size of e parachute you want (usually between " and 24", larger for egglofters and perrocs) -say a pizza pan, frisbie, old cord, pot lid, cookie jar lid, dinner ate, or even a trash can lid. Put this er the plastic (you may want to put a ight on your round object), having rst wiped away any wrinkles on the astic. Cut around the edges with a zor or X-acto blade. Now is the time add a little color to your chutes. th a big Pilot magic marker, color the rachute (red) to your heart's desire.

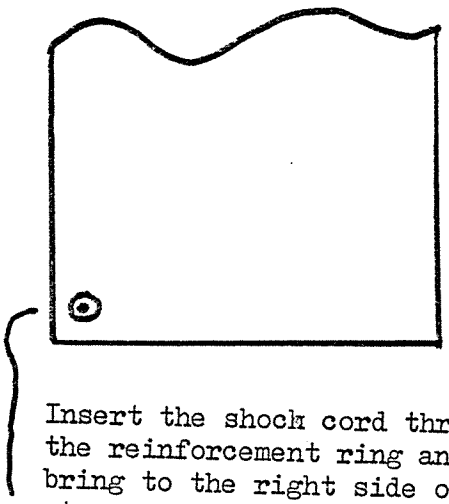
The last step is the shroud lines. tton thread is ok to use but will break d burn easier than polyester (better) nylon thread (best). Most modellers e Gudebrod rod winding thread, size E vailible from CMR), or size EE vialible from tackle shops). Each roud line (12 is the most you'll ever ed) should be one and a half (1 1/2) mes the diameter (the longest line from e side to the other) of the parachute. pe the shroud lines on with adhesive lar (availible from CMR). To save ustration later, buy some barrel swivels (sporting store, fishing department) and tie all those lines into a free hole. Don't use snap swivels!! The snaps too often break.

Most of the numbers and figures above are for optimum (the best) performance. If you don't want a super good parachute use fewer or shorter shroud lines, also thicker material. Other tricks are to use spill holes, a hole cut at the top of the chute for a shorter landing time. You may also want to cut out a spill hole about the size of a quarter in a competition chute for a straighter landing. One last trick for a closer-to-home landing is to use "cross canopy" shroud lines. Make your shroud lines extra long so you can tape them over the top of the chute. Remember, always sprinkle talcum powder on a chute before folding it. This greatly reduces the chance of the chute sticking together and not opening.

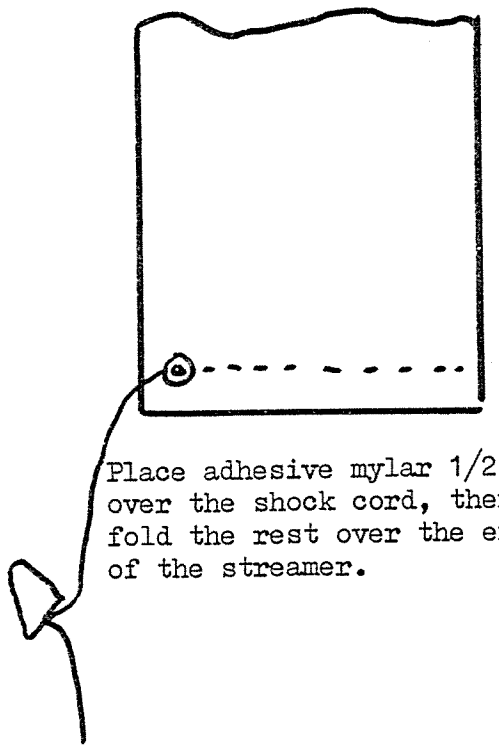
Fortunately making streamers is a bit simpler. Streamers can be made from; crepe paper (same as party streamers), mylar, or tracing paper (purchased at art supply stores). However wide you decide to make your streamer, make the length just ten times as long. When the length gets over ten times the width, you get only very slight improvement in performance. If you use tracing paper (generally regarded as the best material) you will want to make accordian style folds on the top half of the streamer. Attaching the shock cord to the streamer: First, tie the shock cord to the nose, leaving a foot or two left to tie to the streamer. 1/2 inch from the bottom of the streamer, place a paper hole reinforcement disc (drug stores, stationary stores) on both sides of the left edge of the streamer, and make a hole. Now, place the shock cord through the hole and bring it's end to the right edge of the streamer. Fold mylar tape over and around the bottom of the streamer, and go at least 1/2" over the shock line. When packing the streamer, roll it up heading towards the shock cord. Then be sure to wrap the excess shock line around the streamer to help prevent the streamer from ripping off. Always put a drop of Hotstuff on any knots you make with the shock cord.

There is a great sence of pride in making your own "home made" parachute or streamer (not to mention a greater sence of loss if they get torn!). Have fun!!





Insert the shock cord through the reinforcement ring and bring to the right side of the streamer.



Place adhesive mylar 1/2" over the shock cord, then fold the rest over the end of the streamer.

NORTHERN VIRGINIA ASSOCIATION OF ROCKETRY
MEMBERSHIP ROSTER
JUNE 1986

Tim Allen
2031 Maynard Dr.
Falls Church, VA 22043
#28617 C
448-7492

Trip Barber
Tina Barber
Elizabeth & Maria Barber
3432 Archer Ct.
Virginia Beach, VA 23452
#4322 C
#29114 C
#31154 A/ 36592 A
(804) 340-0203

David Bollinger
2727 Duke St., Apt. #810
Alexandria, VA 22314
#29575 C
823-5068

Ken Brown
Kevin Brown
7021 Forest View Dr.
Springfield, VA 22150
#29354 C
#29325 C
451-2808

Kevin Cwalina
5703 Oak Apple Court
Burke, VA 22015
Pending A
250-3856

Tim Eaton
107 Emmet, Station #1
Charlottesville, VA 22904
#36360 C

Robert Edmonds
Embry-Riddle Aero Univ. Box 7790
Prescott, AZ 86301
#37700 C

Bob Fuller
Matt Fuller
5106 Richardson Dr.
Fairfax, VA 22032
Pending C
Pending A
425-6734

Eric Gann
8806 Cromwell Dr.
Springfield, VA 22151
#36583 A
323-6458

Bart Garrett
1802 Sycamore Valley Dr. Apt. 301
Reston, VA 22090
Pending C

Stan Gimbert
Wes Gimbert
9211 Claytonia Lane
Annandale, VA 22003
Pending C
#38288 A
323-9515

Bob Kassell
Andy Kassell
7021 Barnack Dr.
Springfield, VA 22152
Pending C
Pending A
451-0340

John Langford III
2509 St. John Place
Alexandria, VA 22311
#13672 C
379-7898

Young Lee
9804 Pulham Rd.
Burke, VA 22015
Pending B
455-6479

Greg Maguire
391 West Side Dr.
Gaithersburg, MD 20878
#36086 C
(301) 330-2084

Dan Meyer
2605 Cabernet Way
Rancho Cordova, CA 95670
Lifetime Member

Mark Moore
2021 Maynard Dr.
Falls Church, VA 22043
Pending A
893-6927

Dan Mulholland
501 S. Taylor St.
Arlington, VA 22204
#30417 B
979-4719

Adam Nowotarski
689 Brandy Lane
Westminster, MD 21157
#34209 B
(301) 848-2428

Quang Pho
272-5 Collonade Drive
Charlottesville, VA 22903
#29424 C

Samuel Powell
2639-B Gristmill Ct.
Ft. Belvoir, VA 22060
#31127 C
781-0392

Tommy Rinker
2009 Maynard Dr.
Falls Church, VA 22043
Pending A
893-5392

Cassell C. Robinson
20 Chesapeake St. #48 C
Washington, D.C. 20032
#34720 C
562-7124

Gary E. Sanger
11208 Chestnut Grove Sq.
Reston, VA 22090
#36185 C
435-0019

Collin Smith
4905 King Richard Dr.
Annandale, VA 22003
Pending A
425-6063

Chris Tavares
11 Ontario Dr.
Hudson, MA 01749
Lifetime Member
#9772 C
(617) 562-9484

John Thornburg
8709 Greeley Ct.
W. Springfield, VA 22152
Pending A
451-8637

Mike Wiedman
7817 Winona Ct.
Annandale, VA 22003
Pending B
941-4973

David Williams
Jason Williams
c/o Comm Support Activity
APO New York, NY 09378
#35315 C
#35316 A

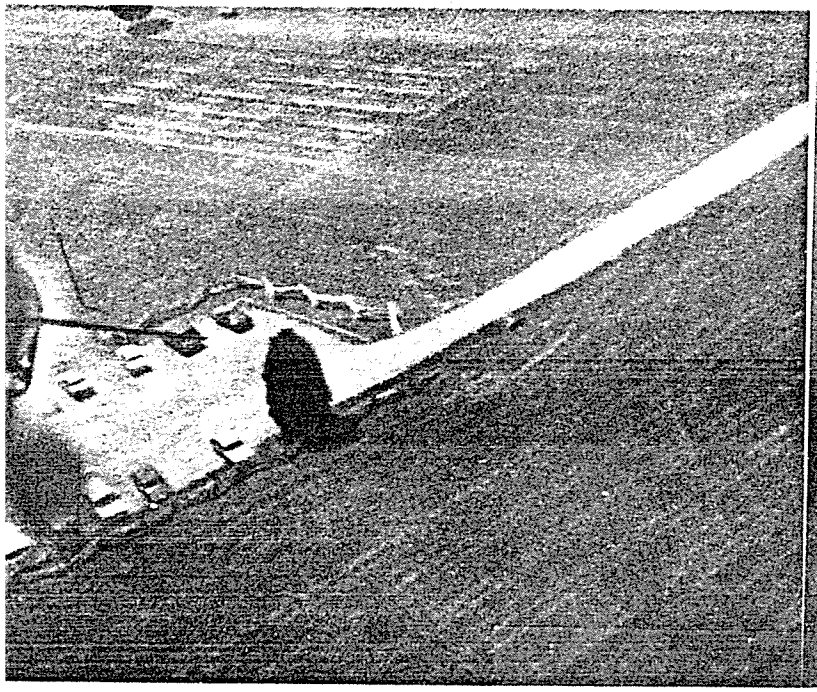
Dan Winings
9620 Leeta Cornus Ln.
Nokesville, VA 22132
#20815 C
(703) 791-5925

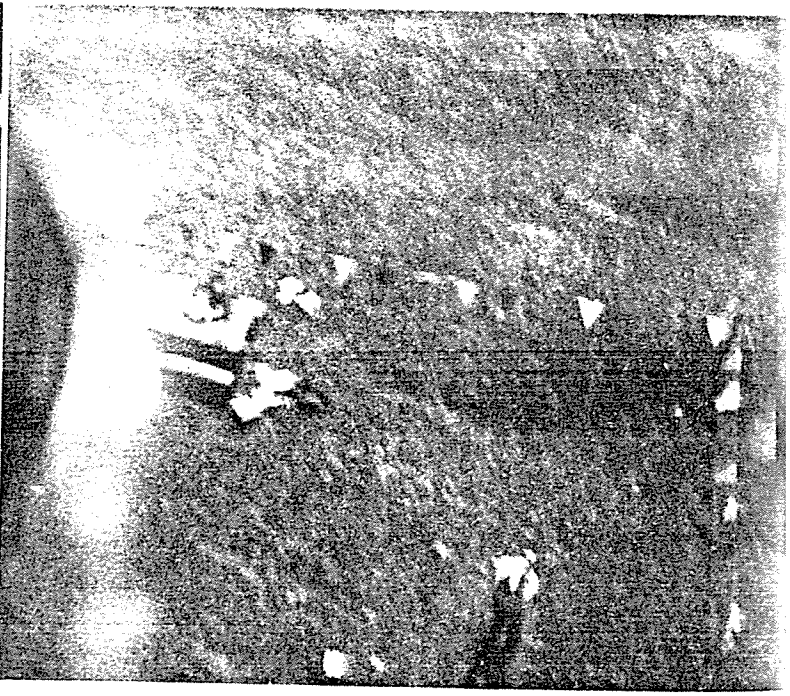
Richard Wood
Sammy & Stephen Wood
5886 Wood Flower Ct.
Burke, VA 22015
#36500 C
#36501 A/ 36502 A
250-1276

COUNTDOWN CALENDAR

NOVAAR meetings are held on the first and third Tuesdays of each month, from 7:00 PM to 8:30 PM, at the Dolley Madison Branch Public Library in McLean. For information call Kenneth Brown (703-451-2808).

TUES June 17	NOVAAR meeting.
SUN, June 22	Barron Cameron Funfly. 10 A.M.
June 28-29	WUBBA Regional Meet. Center Valley PA. 1/2A I P/D, B I S/D, 1/2A H/D, B R/G, B I B/G, B SR Alt., C EL/D
TUES, July 1 & 15	NOVAAR meetings. Cineroc movies on the 15th!!
SAT, July 26	Public demonstration at Fairview Elementary School.
August 3-9	NARAM, Champaign Illionois.
TUES, August 19	NOVAAR meeting. NO MEETING AUGUST 5!!
TUES, Sept. 2 & 16	NOVAAR meetings. Election on the 2nd!!
SAT, Sept. 20	Goddard Contest, 10 A.M., 1/2A Streamer Duration and 1/2A Streamer Spot Landing. NO MINI SIZED ENGINES!!
SAT, Sept 20th	VACUUM Open Meet. 9 A.M. Mannassas Battlefield. 1/2A International Parachute Duration, A International Streamer Duration, C Eggloft Duration, A Rocket Glider, A International Boost Glider, B Superroc Duration, Open Spot Landing





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