INAV

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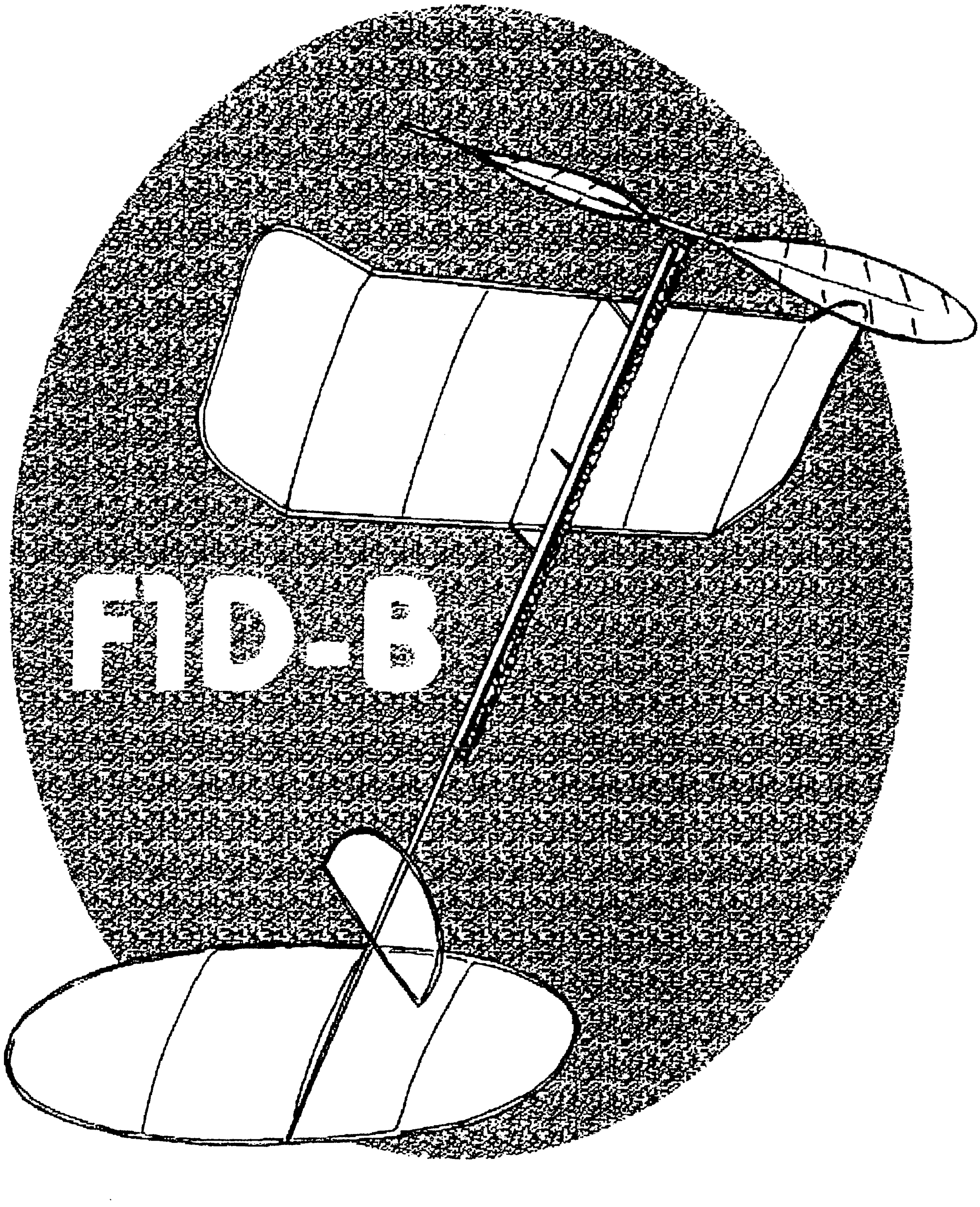

INDOOR NEWS AND VIEWS (INAV) IS PRODUCED IN ST LOUIS BY LARRY COSLICK, GENE JOSHU, HOWARD HENDERSON, BILL MARTIN, STEVE GARDNER, AND ROY WHITE

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THE PRODUCERS ARE LOOKING FOR VOLUNTEERS TO TAKE OVER PUBLICATION OF INAV. ANYONE INTERESTED SHOULD CONTACT HOWARD HENDERSON.

Jim Clem

We at INAV asked Jim to send us some information about his modeling history so we could publish a short biography on him. We consider him to be one of the finest men in our sport and most worthy of our attention. This is to entire text as he sent it to us. We had not intended to go into this level of detail, and Jim asked us to edit it to whatever length we needed to, but after reading it we felt that it was far too interesting to trim in any way. If you have not been fortunate enough to meet this wonderful guy this text will have to do until your luck improves.

S.G.

I was born in Dallas, Texas on September 12, 1923 and am now 74 years old. I studied Mechanical Engineering at SMU, where I met my wife, Fran. We've been married for 38 years and have 2 sons:

Jimmy, age 37 and Mike, age 32. We also have a 2-year old Granddaughter, Alexandra. Both boys have always been modelbuilders but have had to put their hobby aside for a while to make their living. Jimmy was a Junior National Champion one year, and Mike had the walls of his room papered with Junior Indoor Records. I really treasure those years when the boys were young.

I have been a modelbuilder as long as I can remember, and it's certainly been fun. I built my first model in 1932. It was a present for my 9th birthday, a Boeing Fighter kit from Cleveland Model Airplane Company. It was a "Lo-Cal," a beginner's model, and I still have the tube it came in and the plans. There were no contests in Dallas at the time, so I didn't fly my first contest until April 14, 1936. It was held by a local hobby shop, and I won with a 24 ¼ second flight. In town that weekend was Colonel Clarence Chamberlain, the second man to fly the Atlantic, who was barnstorming with his Curtis Condor and taking up passengers. As the prize for first place, I ended up getting a ride with Colonel Chamberlain and had my picture taken with him. I still have that picture. In the summer of 1936, we had the Texas Centennial in Dallas and had a big contest in the middle of the summer. The gang came down from Tulsa - names come back to me like Alvie Dague, Bruce Luckett, Roy Wriston. They were really up to the state-of-the-art in Wakefield and they really wiped us out! After that, we worked hard to become competitive like them, but we were always lagging behind.

I flew nothing but Free Flight Rubber until 1938 when I got my first gas engine for Christmas. It was a Mighty Midget and a kit job. Boy did I have fun! My first gas model was a Flying Quaker, a big 7-foot job powered by the Mighty Midget, which didn't make much power. I guess there were some successful flights, but nothing very extraordinary. I moved on to Bucaneers, Clippers, Zippers and went to a lot of contests in this area. We would all gang up in one car and go to Corpus Christi, San Antonio, Oklahoma City or Fort Worth. It was quite a bit of fun and kept us out of trouble as teenagers. I built some indoor models too at this time, but didn't really know what they were supposed to do, since I had never actually seen one except in the model magazines. I also took the formulas and made and poured my own film.

In the Spring of 1941, Carl Goldberg was working for Comet and was on a tour of the United States, lecturing at various places. He was a friend of Johnny Clemens who had the hobby shop here. (I also worked for Johnny during that period and we became life-long friends.) I met Carl and he helped me get my Baby ROG going. The Nats were held in Chicago that year and that was my first Nats. Carl and Vito Garofalo helped me put the microfilm-covered Baby ROG together, build a box to carry it in, and fly it. It did almost 12 minutes, not enough to be very competitive. It was really fun to be able to know Carl, who was as helpful to me as he was to everybody else. And Vito became a life-long friend until his death recently in an airplane crash when he was returning from Oshkosh. Bob Gibbs has given me the printed results of that first Nats in 1941. It was interesting - there were many people on the results who went on to great accomplishments, like Paul McCready, Bob Champine, Bob Gibbs.

During World War II, I went into Control Line Speed and continued with this thru the post-war era. I flew my first Nats after the war at the Oletha NAS, about 1948. The speed models I was flying then were called Whammies - Quarter, Half and Full. The name came from a character in the 'Lil Abner comic strip. The plans for these models were published in the January, 1949 issue of Air Trails magazine. I was in the Hobby Shop business during this era, but finally sold it and went to work for Carruth Labs, where I got started in the aircraft instrument business. I was in the aircraft instrument business for 37 years, the last 25 of which were in my own shop, Executive Instruments, which employed 40 or more people.

In 1951 at the Dallas Nationals, I flew the first Mono-line speed model and worked with Vic and Joe Stanzel out of Schulenberg, Texas and helped develop Mono-line which became the only competitive way to go in Control Line Speed. I've always liked Control Line Speed because I like racing engines and still work with our sons in their racing engine shop.

We usually flew as a team in Control Line Speed, and our finest hour was with the team of Clem, Beasley & Kirn at the 1955 Nats at Los Alamitos NAS. Out of 6 classes flown, we won 4 1sts, a 2nd, and a 6th place, and set two new records.

I have never completely stopped building models, but there have been some slow periods when I just didn't have time to build, but did officiate at many local and national contests. I was Vice-President of District VIII in the early to mid-50's. Also wrote a Q & A column in Model Aviation and am a leader member, contest director and Life member, #L-55.

I have flown in numerous F1D programs. In 1962, I flew a Bilgri 90 cm. model, complete with "picket fence" bracing. In 1965 I flew in the finals at Lakehurst with a Charlie Sotich "Dram Dip" type model, still 90 cm. I did 31:30, so finally broke the magic 30-minute mark.

In musing over the past, I remember such events as flying in the 1964 Indoor Nats and also running the Control Line Speed events. I flew in the team select finals in West Baden in 1967 and 1983, and in Akron in 1995. Here I did 39:27 with a Bernard Hunt Tandem. Am still reaching for the magic 40. Maybe this year, because the Tandem has tremendous possibilities. I qualified for the finals in Tustin in 1997, but felt my equipment was not good enough, so I didn't go.

Then there's my long love affair with Penny Planes - 1st in NPP in 1987 at Johnson City with a 12:44, 3rd in NPP at J.City in 1988, 2nd in LPP at Moscow in 1995 and a 3rd in LPP at J.City in 1997.

Have had good success with the Frog ROG, with a 1st at J. City in 1990 of 7:51. Also did 9:41 at Lake Hurst in September of that year, with the same model. This is probably the longest Frog flight made. In 1991, had a 1st with 8:48 and in 1994, a 1st with 8:55.

Since 1989, I have enjoyed attending the Kibbie Dome annual meets and have been able to place well well in several of the events.

All my life I have been a competitor. I wish that I could just enjoy flying like my friend Don Lindley learned to do but for me flying in competition is the way to go. I continually work to build "a better mousetrap," to design in the so-called "unfair advantage." To me, just because we have done it "this way" for the last 60 years does not mean we have to continue to do so. Through the years I have done a lot of research on torsion bar hubs and blade shapes on Limited Penny Planes. In 1992, I also built the first V.P. Prop for a Penny Plane. As yet I have not been able to make it perform in high ceilings, but Larry Coslick and Ray Harlan are getting them working very well. Last year I resurrected an old concept where the thrust line is above the Center of Gravity. It works especially well for mini-sticks to help control the high torque. I call the concept the "cobra." Also this last year I have built a torque stand and a thrust stand that will measure props from mini-sticks to F1D. With these I hope to be able to measure prop efficiency and with a strobotac and a video camera, study what the prop does from climb power to cruise. The pictures of these stands were in Bud Tenney's Column on Free Flight Indoor in the March 1998 issue of Model Aviation.

Over the years I have pursued many ventures. When auto racing resumed after World War II, I raced a 1933 3-window Ford coupe "jalopy" (stock car) on the local dirt tracks. Also fooled around some with a Ford V-8 "60" midget. In 1939 I started flying 40 hp Cubs, but it was not until 1953 that I got my Private Pilot's license. Through the years I owned 3 aircraft - a Piper J5A, an Ercoupe and a Cessna 170. Fran and I did all our "courting" in the 170. In 1971 we were almost financially stable and we bought a Formula Vee, a small open-wheel road course race car that looks like a small Indy car. It races in Sport Car Club of America (SCCA) events. Our whole family has raced competition sports cars for the last 25 years, and Mike and Jimmy still build racing engines for a living.

I guess my philosophy is that the impossible takes a little longer and "whatever the mind of man can conceive and believe, it can achieve!"

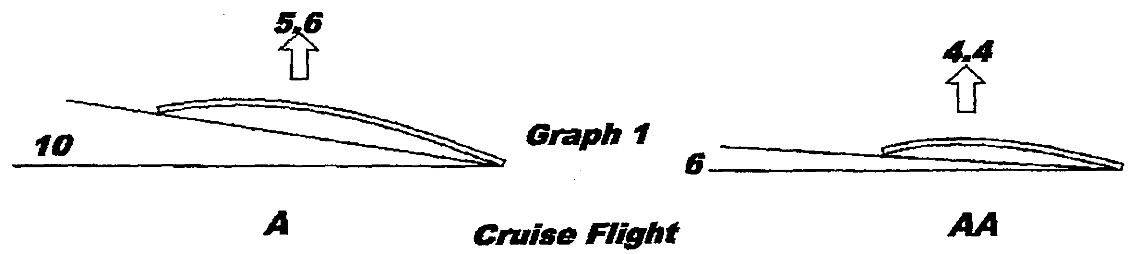
In closing, I would like to thank Larry Coslick, Gene Joshu, Howard Henderson, Bill Martin, Steve Gardner and Roy White for continuing to publish Indoor News & Views. Every issue is a collectable classic!!!!

Pitch Stability in Indoor Models

By Steve Gardner

Your model is up there near the rafters doing great! All you need is another two minutes and it is still all the way up there. You can't miss. You are still watching it very closely thought, because it is not the best model for bouncing around in the clutter up there. You enter the last minute that you need to win, and the model bumps something. It is slowed a bit too much and this lets the nose down ten or fifteen degrees. The model speeds up as it dives and it looses the nice tight turn that has kept it in the center of the building all this time. One of two horrible things happens now. The model flies straight for too long before it starts to circle again and it gets into a wall, or it continues the dive until the wing starts to twist which increases the dive angle and spirals the model to the floor. Fifteen seconds too early. Rats!

What went wrong? It was just a bump. It got away from whatever it hit cleanly with the nose down only a little. You own and have seen other models that would pop right back into their flight pattern without any problem after such a bump, but this model has a real problem with recovering from disturbed flight. Why doesn't it behave like the other ones? Can it be fixed?



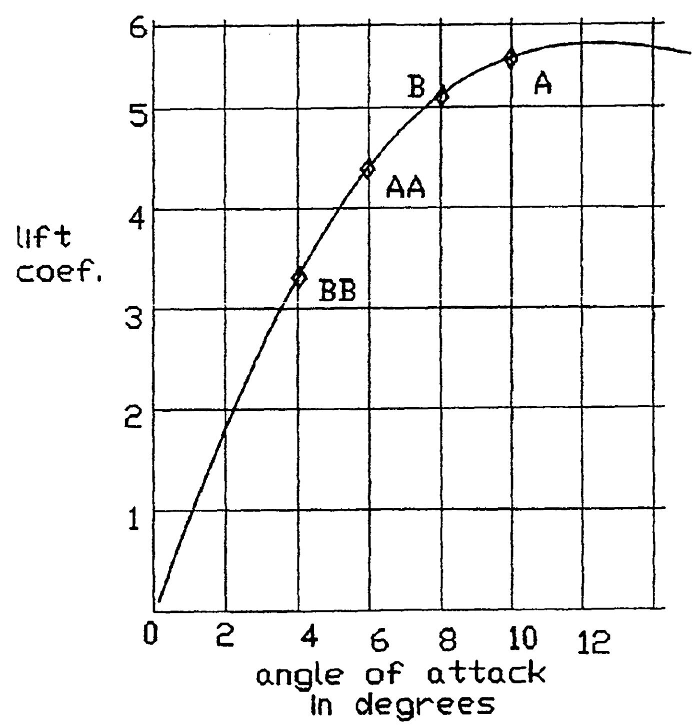
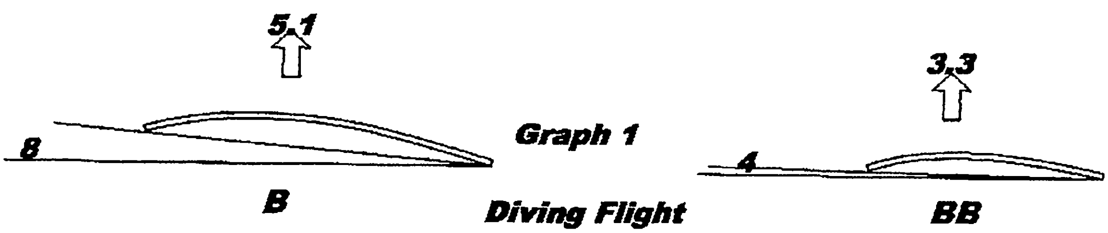


Chart 1

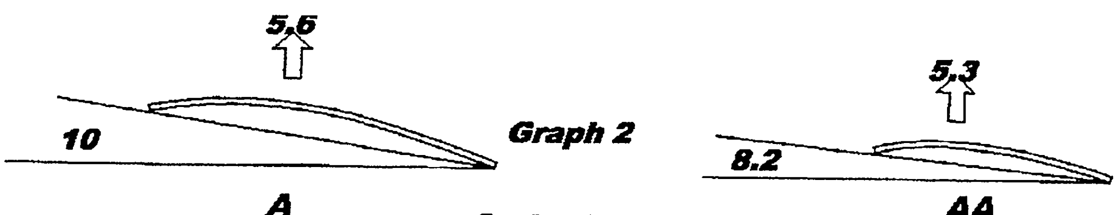
To start with we need to understand what went wrong. Why do some models pop their nose right back up after being disturbed and some do not? What makes a model "stable"? Look at the simple force diagram in figure 1. Imagine the balance point, or center of gravity as simply being the models weight. The wings have to hold this up for the model to fly. From the drawing you can see that the stab also helps hold up the weight, so there is lift from both the wing and the stab. When the model is in steady flight the lift from the wing and from the stab are balanced so that the weight is just supported and there is no tendency to raise of lower the models nose. The numbers indicating the lift of each surface are simply used to compare the proportions of lift from the wing and stab, and are not related to any real lift values. In this example the balanced lift condition happens when the wing 's lift value is 1.27 times the stab's lift value. (the wing carries more of the weight than the stab). If this number goes up, the wing is then lifting more than its share of the weight and so the nose comes up. The larger the number, the faster the model pitches up. Looking at the second set of points on the chart marked B, BB we can see the lift numbers for the same model just after it has been disturbed and is diving as shown here:



Graph 1

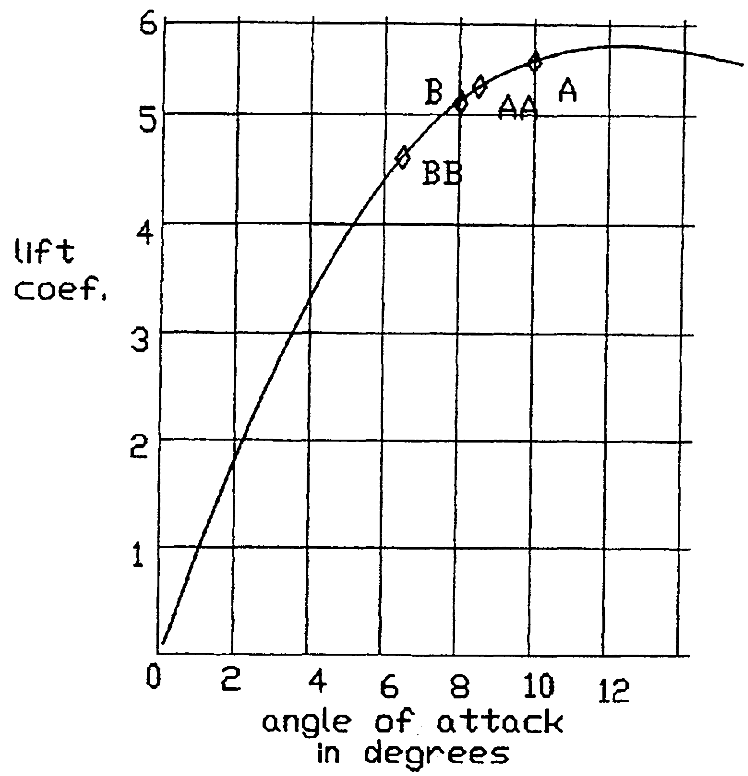
Diving Flight

The wing is now lifting 1.55 times the stab and this will pretty quickly raise the nose of this model. From the lift chart you we can see that the lower the angle the model is flying at, the larger the nose up tendency. This lower angle is not the dive angle itself, but a diving model will have a much lower angle of flight, it can get close to zero in very steep dives. This chart, **Chart 1**, is for a model with 4 degrees of decalage. Decalage is the angular difference between the wing and stab. It has nothing to do with the angle of incidence, which is simply the surface angles compared to the models centerline. When you trim your model out you adjust the wing or stab incidence to get the model flying nice and nose high. Once you have the model trimmed out there will be a certain angle of decalage between the wing and the stab. In the next set of diagrams we show what happens when the decalage angle is too small.

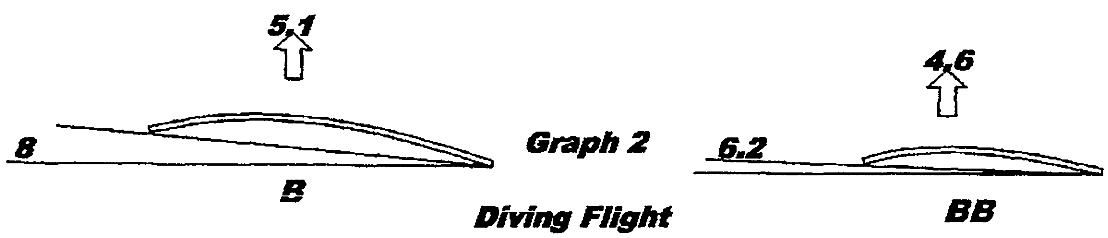


Graph 2

Cruise Flight



The model in these diagrams has a decalage angle of 1.8 degrees, which is very small. This model will fly well as long as it doesn't get too far from its trimmed speed and angle. In steady flight it has a wing to stab lift number ratio of 1.04. Watch what happens when the nose gets down for any reason.



The lift ratio now goes to 1.11, only .07 from the steady flight. The 4-degree decalage model had .28 difference between steady and diving flight, **four times as much.** This model may or may not get its nose up before its wings begin to warp from the speed. In any case it will end up much lower than the model with more decalage.

So, all we have to do is make our models with more decalage. Right? Mostly, but we have to figure out how to do this, and how much more we need, too. There is a drawback to decalage. The more you use, the less work the stab does. A model with none will fly with the wing and the stab at the most efficient angle for the most lift, and this will maximize endurance. This model will also have to be launched perfectly, and must not run into anything at all that might disturb it. It has no margin of stability at all and a gnat's wake will send it crashing. It will just not work at all. On the other hand a model with say, six degrees of decalage will be stable even outdoors in the wind, but it will just be dragging the stab along for the ride. An indoor endurance model can not afford to give this much efficiency way. To make matters a little more complicated yet we must remember that the tail boom of many indoor models is not perfectly ridged and so the decalage can change in flight.

Things to try

Part of the problem with this "solution" is that we can not just make the decalage any amount we like. We test fly our models and move the surfaces so as to make the model fly at what our experience says is the best speed. Once the model is flying the way we feel it should then the decalage has been determined. If we mess with the angles now it will make the model fly too fast or stall the model. Now we just fly the model into the rafters to see if it will behave well or not. Let's say this one does poorly, are we really stuck with a lemon? Not necessarily, here are some things to try.

1. Move the wing back just a bit on the motor stick. This will effectively shift the center of gravity forward and so the model will need a bit more decalage. Make this change in small amounts so that you do not over do it.
2. Add a bit of down thrust to the model's nose bearing. This will also result in the model needing more decalage at a small performance cost. A possible advantage is that the down thrust will help prevent the model stalling during the initial climb phase, yet allow the decalage to be set so as to get the model nice and nose high during the cruise portion of the flight.
3. Use a stiffer tail boom. If the tail boom of your model is a bit too flexible it will actually let some of the decalage bend out of the model. Look at the model in cruise flight and make note of the upward bend of the boom caused by the lift coming from the stab. Now watch the model just after it has bumped something and is starting to dive a bit. If the bend in the boom stays much the same and the model gets its nose up right away, fine. If on the other hand the bend relaxes a great deal and the model dives for an extended period, or even speeds up and spirals in, you need a stiffer boom.
4. Make the tail boom longer. I like this one. The longer tail boom gives any difference in the lift between the wing and stab a greater lever arm to act through. A smaller amount of decalage will work well enough if the tail boom is long enough. Remember number three though when you do this.
5. Make the stab area larger. This lets the stab carry its share of the weight at a lower angle which means less decalage. This fix is not too practical because most flyers are using the largest stab the rules allow anyway. Just another reason to do so.

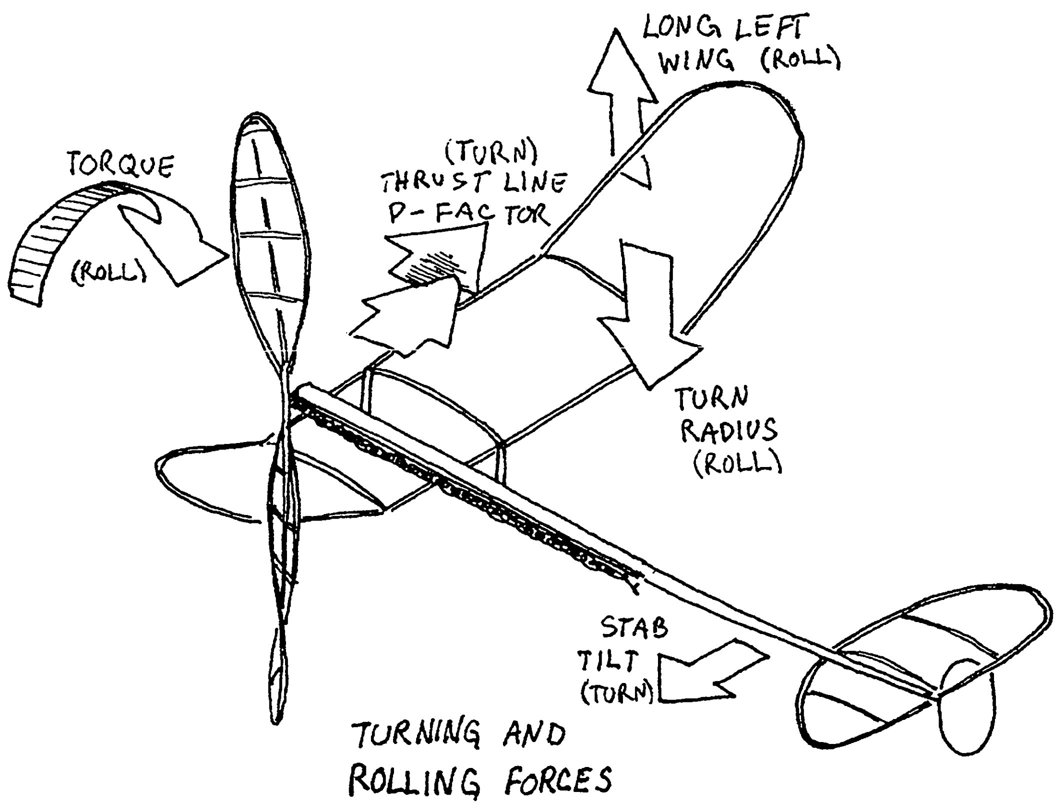
Why the model goes for the wall when it dives from a girder bump

One of the most aggravating things about bumping the ceiling is the model taking off for the wall. It will hit the girder or whatever and the nose will get down a bit and the speed will pick up some, then it will proceed to quit circling and fly straight for an extended time. If you are flying in a small area this will make it necessary to steer the model if you can. If you are way up there in a large site you may just have to watch while your model leaves the sweet spot you launched it into and heads for trouble. What is happening here? Why does a model that flies happily with a circle of 40 or 50 feet decide to open up the turn when the speed gets up a bit? Can you stop it, or at least minimize the effect?

We are kind of in a fix with this one. The reason our models do this is related to how we must trim them to get the best duration while staying within the confines of a building. We need a fairly tight turning circle without a great deal of bank angle while flying very, very slowly. The adjustments we must use to get this work well only when the model is at or very near the trimmed speed. When the speed gets up above this certain level the adjustments we use start to work against us. Imagine a hang glider flying along in level flight. The pilot decides to turn to the right. How does he do this? He pushes his weight to the right to get that wing down. Our models fly with the left wing longer than the right. This is exactly like the hang glider pilot pushing his weight to the right. He gets a right turn for his action. What do we get? If the model is flying fairly slowly we get a nice left turn. What is the difference? We have the added complication of torque, the "P"-factor, thrust line effects, stab tilt effects, and turn radius effects. The torque tends to lower the left wing and if you think it is a small force you do not fly mini-sticks!
The "P"-factor tends to yaw the model to the left and its strength is directly related to the amount the prop disk is tilted up when the model is flying. The thrust line also yaws the model to the left because that is the direction we point it. The same is true of the tilt of the stab. The last factor comes from the fact that a

model with a turn radius of 20 feet and a span of 18" has a right wing flying about 7.5% faster than the left wing. This makes the right wing lift about 15.5% more per unit area than the left, causing a roll effect to the left. Whew! Complicated!

So what is going on with our model? The torque that is applied to the model is fairly constant, causing a left roll tendency. When the model is flying at the proper slow speed the nose is up and so the "P"-factor is helping turn the model left. The slower the flight the harder the prop pulls, so the effect of the thrust line is greatest then giving use more left turn. The effect of stab tilt is related to the lift the stab is giving, and from the previous diagrams that is highest when the model is flying at high angles of attack (slowly), this effect is to turn the model left. The turn radius effect is to roll the model to the left. No wonder we need a longer left wing to hold that wing up! All that left stuff going on! So what happens to the model to make it dive straight or to the right? Imagine the model with the nose down and the speed up. The angle of attack is very low, so that the "P"-factor disappears. The stab tilt is also at its weakest point. The model is now flying faster than the prop is pitched to go, so the thrust is way down and so is the effect of the thrust line. All this begins to open the turn up, and this removes the turn radius effect. What remains is the torque and the long left wing. If the wing were the only factor we would turn right just as the hang glider does, but torque helps us out now and we end up with sort of straight flight, unless the speed gets up any higher. If it does then look out! If we have done what we can to get the model to pop the nose back up then this set of effects will quickly return the model to the nice left turn. If we have a model that takes its time getting the nose up then the model will go wandering whenever it bumps anything. It will almost never wander into a better spot than you started in, so see if any of this stuff helps you get a better flying, more consistent model.



TURNING AND ROLLING FORCES ACTING ON AN INDOOR MODEL

F1D-B
Bernard Hunt

F1D Beginner is the European class roughly equivalent to Pennyplane. The rules specify a maximum span of 46 cm = 18.2", a minimum weight of 3.0 grams, a maximum rubber weight of 1.5 grams and any covering other than microfilm. High tech materials such as boron or carbon fiber and VP props are permitted. Mylar covering is normally used. Biplanes are not allowed (UK rules).

It has proved an excellent class for beginners, perhaps better than EZB or Limited Pennyplane because it is robust yet slow flying. This is due to the big area and low rubber weight. On the other hand, there is plenty of design freedom and challenge for experts because there are few restrictions and VP props are permitted. It points people at F1D proper because the general design and flight characteristics are so similar.

Perhaps some may note that a Limited Pennyplane flying with a 1.5 gram motor would meet the rules for this class. This would still be a good starting point for beginners even though there are F1D Beginner plans with comprehensive instructions and kits available.

It has been suggested that North American modelers might find this class appealing, so I asked Larry Coslick if IN&V could publish a plan and run a demonstration event at USIC 1998 in Johnson City. Peter Keller of Switzerland has kindly provided a plan of his successful "Sunday Silence" design. This is a typical long (32") Swiss design with an abundance of boron and a VP prop. It has a best time of just under 15 min in a 40' ceiling. For high sites like Johnson City, it is doubtful that a VP prop will be much if any advantage because of the restricted rubber weight. The dimensions on the plan are in millimeters. American builders might prefer to use a tungsten-braced stick and a typical Open Pennyplane (no boron) structure with a fixed pitch prop. The wing and tail spars use 7-8lb wood, prop spars and wing posts 8-10lb and the rest 5-6lb. Typical component size weights are 0.9g, wing 0.9g, tailplane + tailboom 0.55g, prop 0.55g. Motors are usually 14-15" long x 0.070" strip.

There are moves afoot to have F1D Beginner recognized as a full FAI class (probably F1M), which opens up the possibility of officially recognized international events and records.

NEWS!

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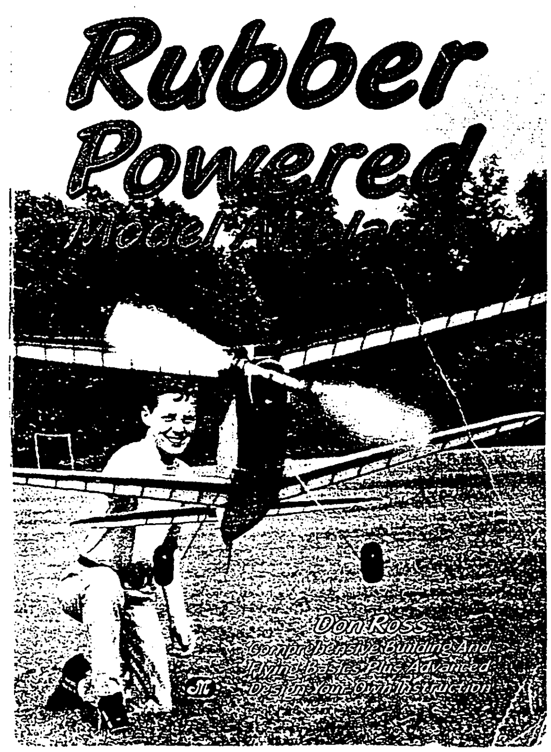


KIDS AND THEIR PLANES

By Larry Coslick

Gene Joshu, Roy White and myself had the privilege of going to Smyrna, Tennessee to help the Kid's Flying Aces Club. This past winter they built eleven limited Penny Planes and the group leader, Tim Lavender, wanted us to come to Smyrna and help trim the models. The group will fly them at the 98 USIC.

You have to see their operation to appreciate what Tim and Wayne Anderson are doing. It would be great if some professional photographer would put together a video of how they run this club and distribute it through the National Free Flight Society and the AMA. There is a lot to be learned here.

Tim is a minister in Smyrna and the club uses a spare room in his church for building their models. The nice part is that they have access to a 22-foot gym a few feet from their building room.

We started at 9AM Saturday morning with the idea to get all the models weighted and trimmed and have a contest in the PM. Tim only wanted three kids in the gym at a time, but that lasted about ten minutes. We were swamped with questions about using the torque meter and winding the motor. After the kids saw how good their models flew, we could not keep them off the floor.

The contest was a great success and there were a lot of flights over six minutes. The winning flight was around 6:56 and second place 6:53. We had to be out of the gym by 5:45 and a few kids were still flying as we were putting up the tables.

Indoor News and Views along with the St. Louis Thermaleers will sponsor four junior events at this years USIC. The events are limited Penny Plane, Bostonian, No-Cal Scale, and Coconut scale.

Tim also wanted us to convey his appreciation to Abram Van Dover and Gary Underwood for their help this past year.

Lew Gitlow, of Indoor Model Supply, sent us his new policies on balsa sales:
The requests for ALL OF ONE SIZE BALSA will be filled with an assortment of sheets close to the size and including the size ordered, in order to allow everyone to obtain first class material. I will try to make the weight, strength, and uniformity meet the demanding requirements of motor stick sheets, prop blades, and spars. EVERYONE WORLD WIDE WILL BE TREATED EQUALLY.
$75.00 minimum on all balsa orders.

F1D-B

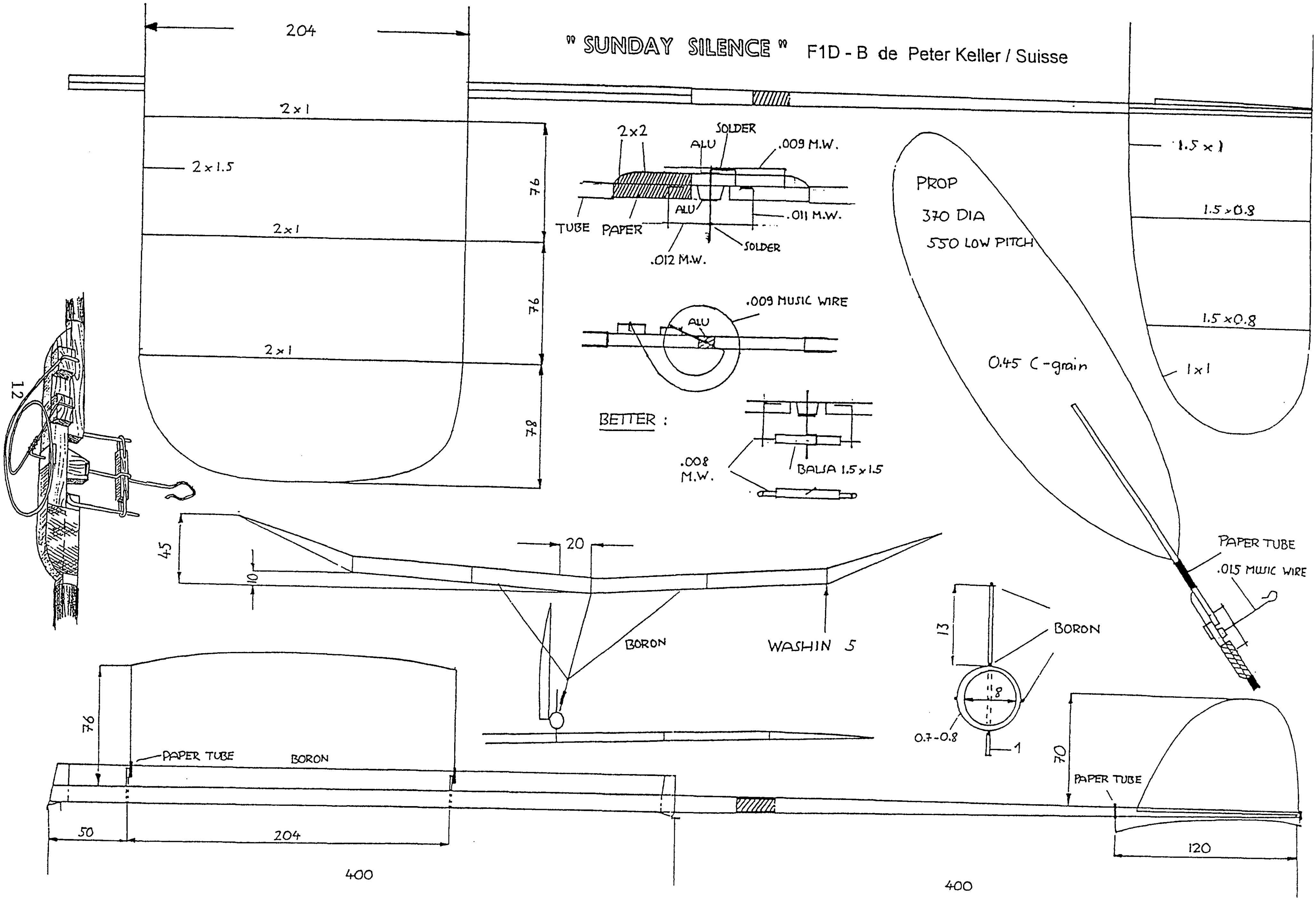
F1D-B will be flown along with Limited Penny Plane at the 1998 USIC. This is not a scheduled event but token awards will be given to third place.

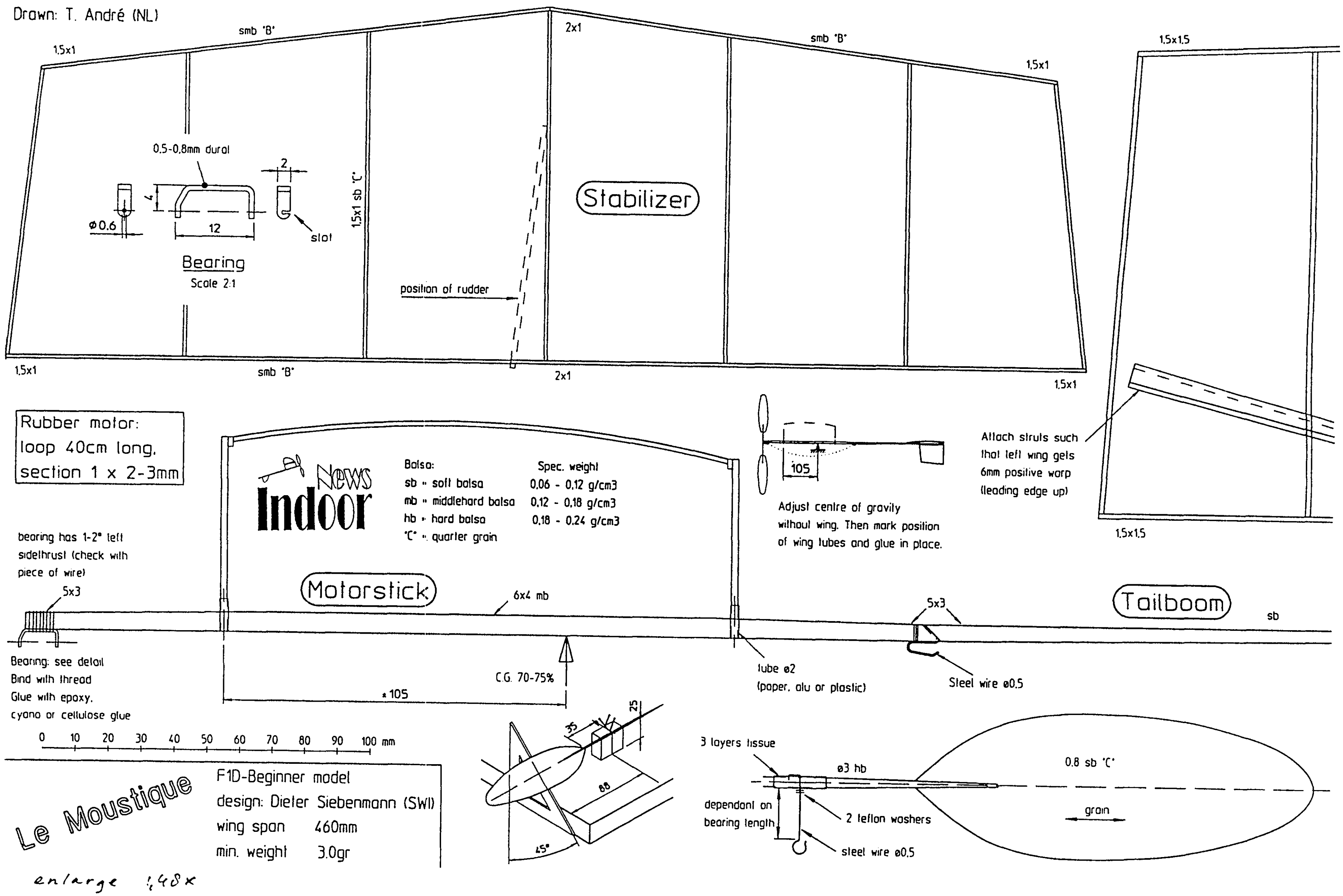
RULES:
- 18.1" span
- 1.5 gram maximum rubber weight
- Monoplanes only
- 3 grams minimum weight without rubber

IMPORTANT NOTICE!
WE GOOFED BIGTIME!

In the last issue, number 92, on page 36 we printed the 1997 USIC entry form instead of the 1998 form. We really hope that you caught the mistake.

" SUNDAY SILENCE " F1D - B de Peter Keller / Suisse

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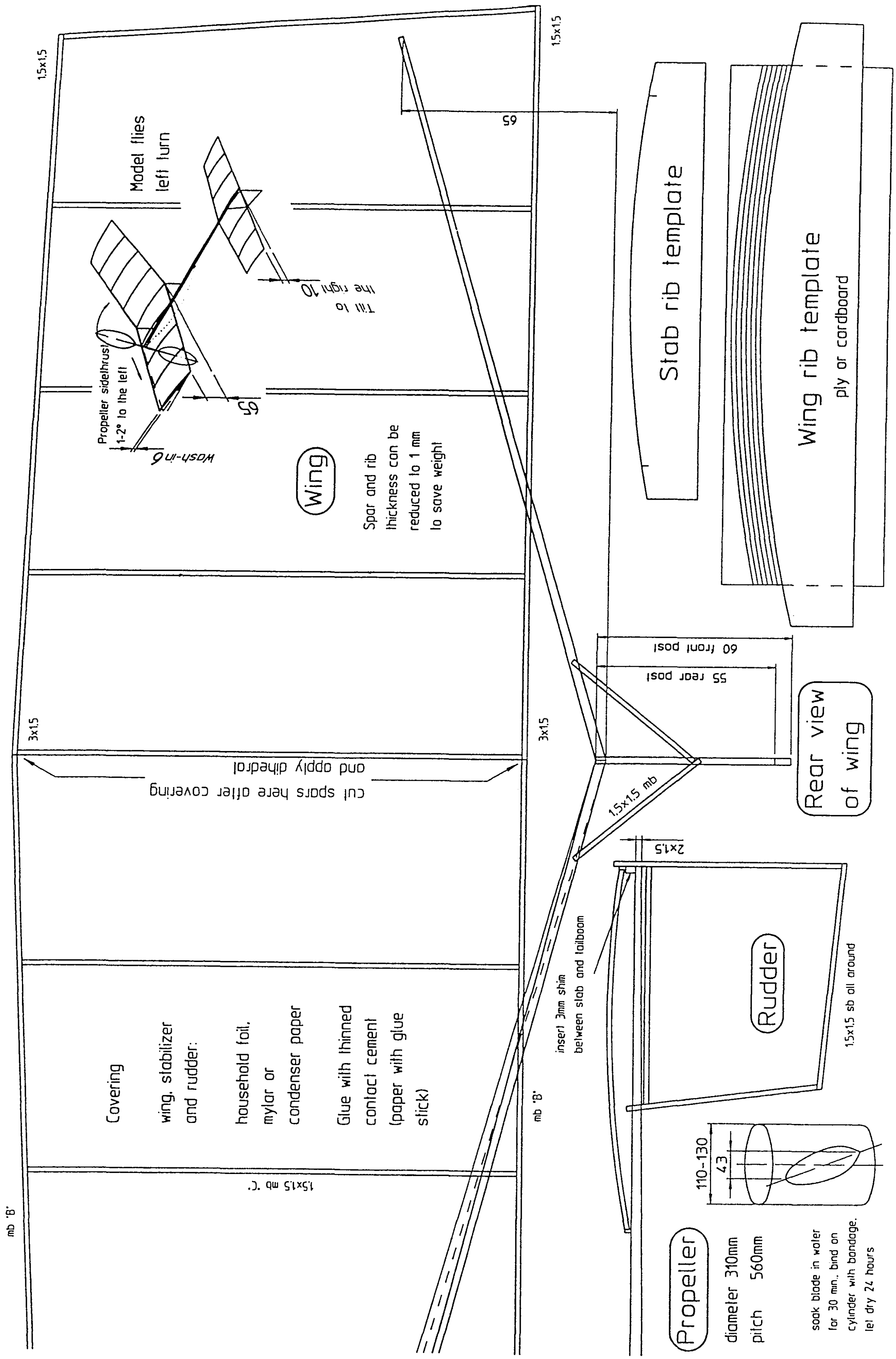
position of rudder
Rubber motor:
loop 40cm long,
section 1 x 2-3mm
News
Indoor
Balsa:
sb = soft balsa
mb = middlehard balsa
hb = hard balsa
'C' = quarter grain
Spec. weight
0,06 - 0,12 g/cm3
0,12 - 0,18 g/cm3
0,18 - 0,24 g/cm3
105
Adjust centre of gravity
without wing. Then mark position
of wing tubes and glue in place.
Attach struts such
that left wing gets
6mm positive warp
(leading edge up)
bearing has 1-2° left
sidethrust (check with
piece of wire)
5x3
Motorstick
6x4 mb
Tailboom
sb
Bearing: see detail
Bind with thread
Glue with epoxy,
cyano or cellulose glue
C.G. 70-75%
≈105
tube ø2
(paper, alu or plastic)
Steel wire ø0,5
0 10 20 30 40 50 60 70 80 90 100 mm
35
25
88
45°
3 layers tissue
ø3 hb
0,8 sb 'C'
dependant on
bearing length
2 teflon washers
steel wire ø0,5
grain
Le Moustique
F1D-Beginner model
design: Dieter Siebenmann (SWI)
wing span 460mm
min. weight 3.0gr
enlarge 1,48x



1.5x1.5
Model flies
left turn
Tilt to
the right 10
Propeller sidethrust
1-2° to the left
65
Wash-in 6
Wing
Spar and rib
thickness can be
reduced to 1 mm
to save weight
Stab rib template
Wing rib template
ply or cardboard
60 front post
55 rear post
Rear view
of wing
3x1.5
cut spars here after covering
and apply dihedral
1.5x1.5 mb
2x1.5
Rudder
1.5x1.5 sb all around
insert 3mm shim
between stab and tailboom
Covering
wing, stabilizer
and rudder:
household foil,
mylar or
condenser paper
Glue with thinned
contact cement
(paper with glue
stick)
mb 'B'
1.5x1.5 mb 'C'
110-130
43
Propeller
diameter 310mm
pitch 560mm
soak blade in water
for 30 min., bind on
cylinder with bandage,
let dry 24 hours

MODEL NAME BLUE MOON BUILDER Mike Thomas, Canada

WING

Leading Edge Spar. Density 6.5# Grain C Length 16" Width .062"

Height .062" Weight .1Gr. **Trailing Edge Spar.** Density 6.5# Grain C

L. 16" H. .062" W. .062" Weight .1Gr. **Tips.** Density 6.5#

Grain C Tip at L/E. Width .062" Height .062" Tip at T/E. Width .062"

Height .062". Weight for 2 Tips. .04G **Ribs Standard.** Density 5.5#

Grain C W. .062" H. .062" Weight Ea. .017G

Wing Posts Density ---- Grain ---- L. ---- W. ----- H. ---

Posts Round, Posts Rectangle. Weight for 2 finished posts. ------ Wing Weight Complete

.6G Special Instructions Center spar 6.5# .062"X.062" Ribs glued to each side of spar. Wing covered with Jap Tissue. No dope, not water shrunk. Wing is glued to top of fuselage.1.49G comp.

FUSELAGE

Longerons. Density# 6.5 Grain C Width .050"

Height .050". Cross-pieces. Density# 6.5 Width .050"

Height .050". Grain C. Detail landing gear and nose block on plan sheet if possible. Total weight of fuselage dry. 1.16G Weight covered. 2G. Type covering used.

Microfilm Plastic . Tissue. Jap

Landing gear .015 Wire 3" long, Wheels, 1/32" Sheet, Wheel hub 4 wraps of tissue around .015" wire. Lead ballast to obtain C.G. and min. weight.

STAB

Outline. Density 6.5# Grain C Leading Edge Center. W. .062"

H. .062" Tip. W. .062" H. .062". Trailing Edge Center. W. .062"

H. .062". Ribs. Density 5.5# Grain C W. .062: H. .062"

Weight Ea. Rib. Varies Weight of Outline Dry. .32G

Weight Covered .65G Special Instructions .062" Basswood peg extends .2", glued behind root L/E, plugs into rolled tissue

MODEL NAME BLUE MOON BUILDER Mike Thomas, Canada

FIN

Fin. Not Floating. Density 5.5# Grain C W All .062"

H. ______ Weight Dry ---- Weight Covered ----

Special Instructions. Glued to top of fuselage.

Prop, Wood Blades - - - Fill in prop spar information

Blades. Density 4.5# Grain C Blades Area. Ea. ?

Blade Thickness .040" Weight for 2 Blades .6G

Give prop pitch at 45 degrees and one inch from tip. Pitch at 45 degree 11P Pitch 1 inch

From tip. 11P . If V / P. Low pitch ______ High pitch ______

If V / D. Diameter when extended ______ Diameter when folded. ______

Speical Instructions on prop construction Blades covered with Jap tissue and 3 coats of dope. Prop Spar, spruce, 1" on each side of 1/8" Aluminum hub. Prop shaft wire. .025"

RUBBER

Loop Length 40" Width .090" Rubber Vintage. Month and Year 8/93 Tan II Weight of Loop. 5G . Turns 4500

Back off Turns. 0 Launch Torque in inch ounces. ______ Turns Left 150

Do you use O rings. Yes. Yes No. ______

TRIM

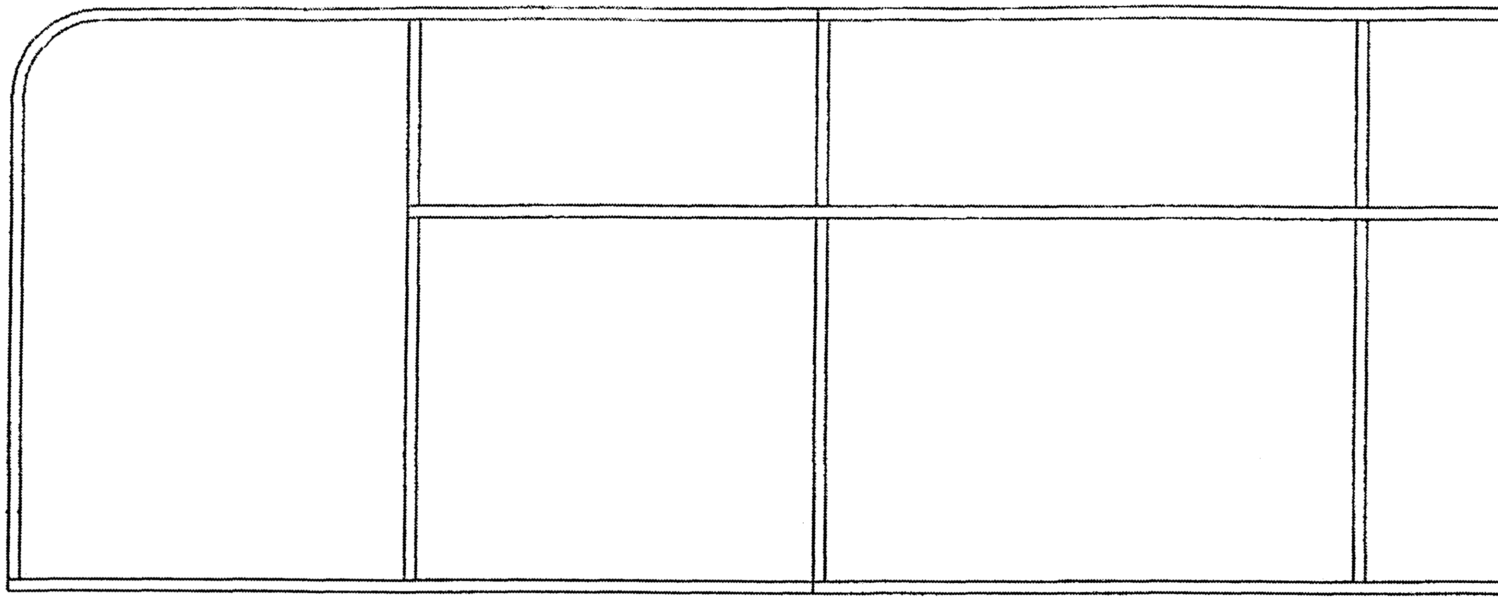
Wash In, Wing Left panel ______ Wash Out Left panel. 1/16"

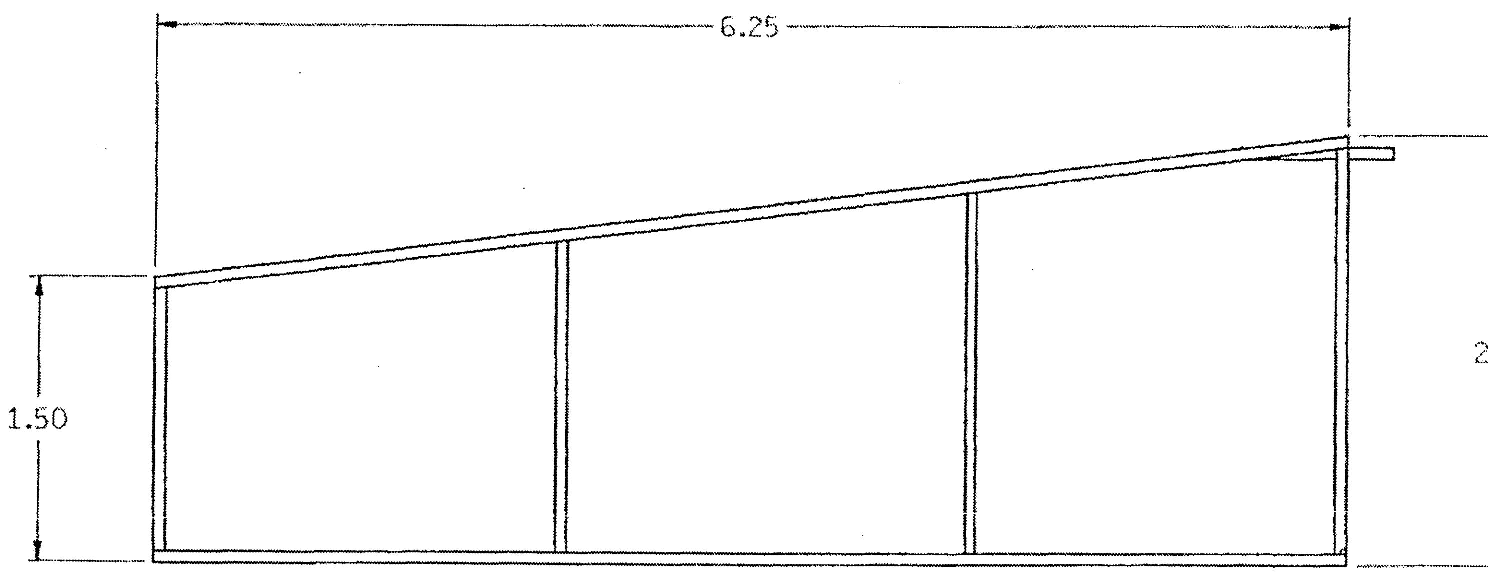
Wash Out. Right panel ______ Wash In. Right panel 1/16"

Wash In Stab. Yes ______ No No How Much ______

Down Thrust. 3 Degree Left Thrust. 2 Degree Special trim instructions.

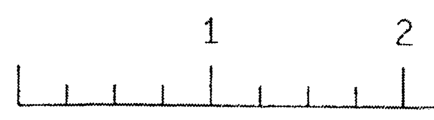
Right circle

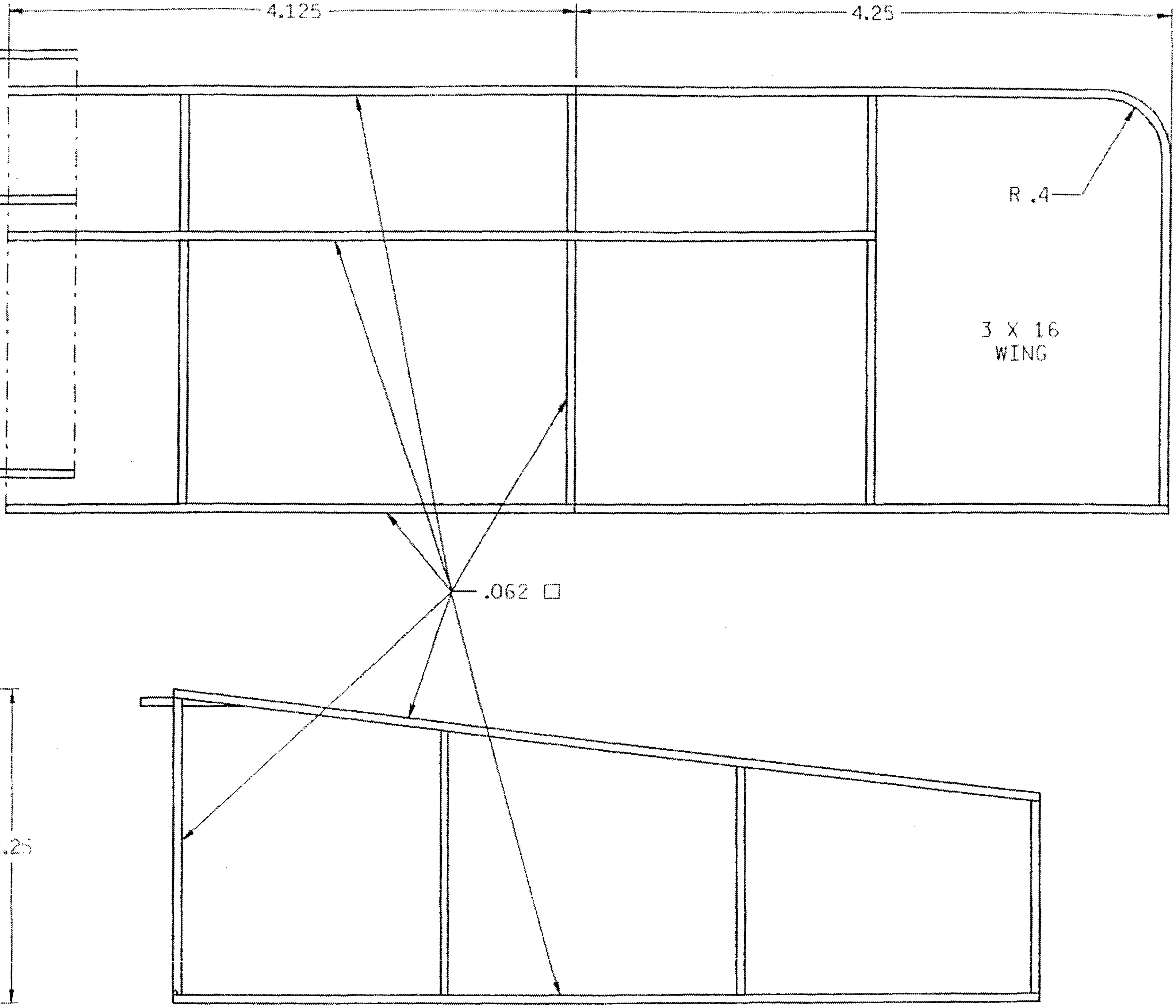




NOTES:

1. WING IS GLUED TO FUSELAGE.
2. WING SPAN = 16.0" MAXIMUM.
   DIHEDRAL APPROX 1.75"
3. NO STAB TILT.

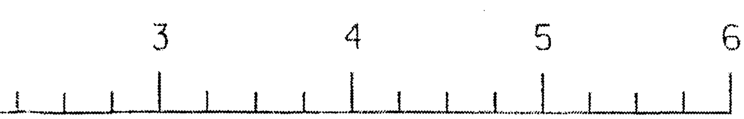


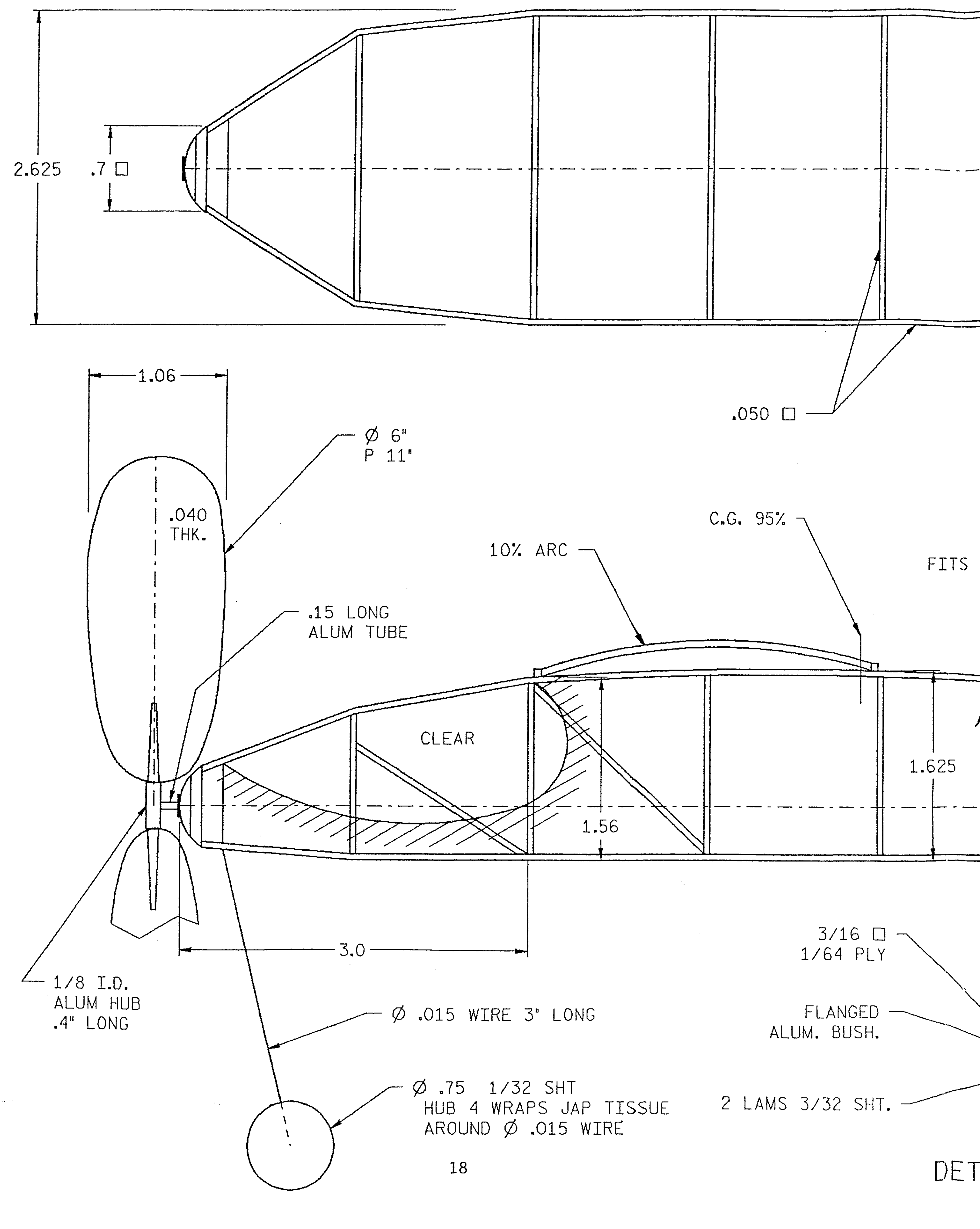


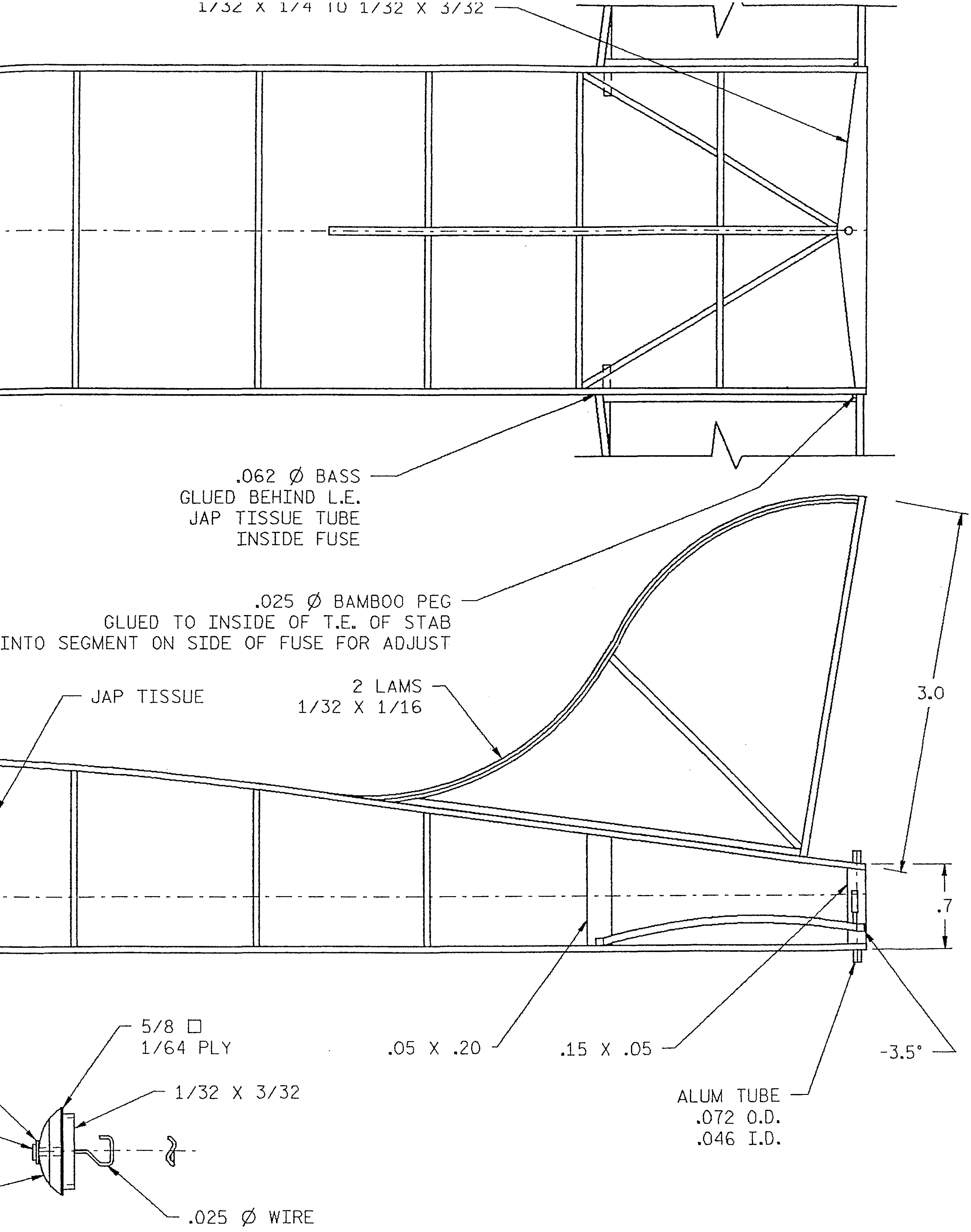
BEST FLIGHT 5:41 @ '97 U.S.I.C.
SECOND PLACE
RUBBER .09 X 40" LOOP TAN II
4500 TURNS

"BLUE MOON"
BOSTONIAN

DESIGNED BY: MIKE THOMAS
-CANADA
CAD: M.PALRANG




2.625
.7 □
.050 □
1.06
Ø 6"
P 11"
.040
THK.
C.G. 95%
10% ARC
FITS
.15 LONG
ALUM TUBE
CLEAR
1.625
1.56
3.0
3/16 □
1/64 PLY
1/8 I.D.
ALUM HUB
.4" LONG
Ø .015 WIRE 3" LONG
FLANGED
ALUM. BUSH.
Ø .75 1/32 SHT
HUB 4 WRAPS JAP TISSUE
AROUND Ø .015 WIRE
2 LAMS 3/32 SHT.
DET



AIL- NOSE BLOCK

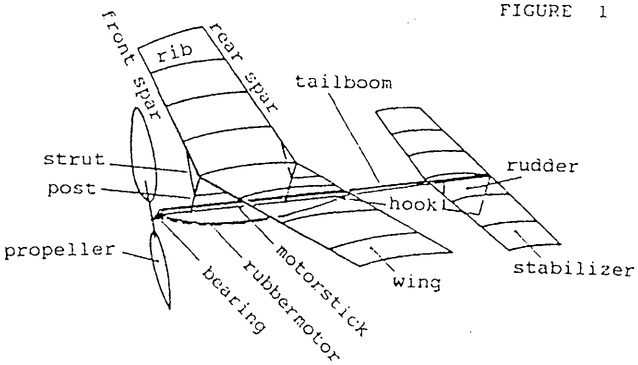
Begin with a Moustique!

Design: Dieter Siebenmann (SWI)
Building instruction:
Ebele Schouwstra and Thedo André (NL)

Choosing a Moustique as your first indoor model is a very good way to start. It is a fairly simple model, it will teach you all the basic techniques an indoor modeler needs and you can already fly it in competitions. It will do two to three minute flights in a gym hall. At competitions flights of more than six minutes are not uncommon. Though we tried to make this building instruction as clear and complete as we could, it will be likely that you will encounter some problems. If something is not clear or when you do not succeed in making something, then do not hesitate to ask an indoor flyer for help. They are very friendly people and will certainly help you. After all, they have been beginners too!

Preparation
When this is your first model airplane you will probably have to learn some new words and terms. Figure 1 shows the main parts of an indoor model. On the

FIGURE 1



drawing there will be more new words. Enlarge the drawing on a copy machine 1,41x.

We need a building board from soft board (in which you can easily stick pins in) of 22x60cm. Tape the plan onto the building board and cover it with clear household foil. This will prevent glue from sticking to the plan. Ensure that everything is flat and wrinkle-free. We need some other accessories. Cut straight strips from a sheet of 2mm balsa of the following dimensions: 10x250mm (4 each), 10x50mm (2 each) and 10x16mm (16 each). Glue four layers of 2mm on top of each other and construct the assembly block of figure 2. Try

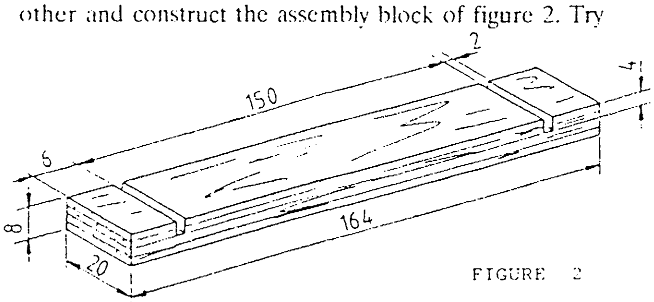
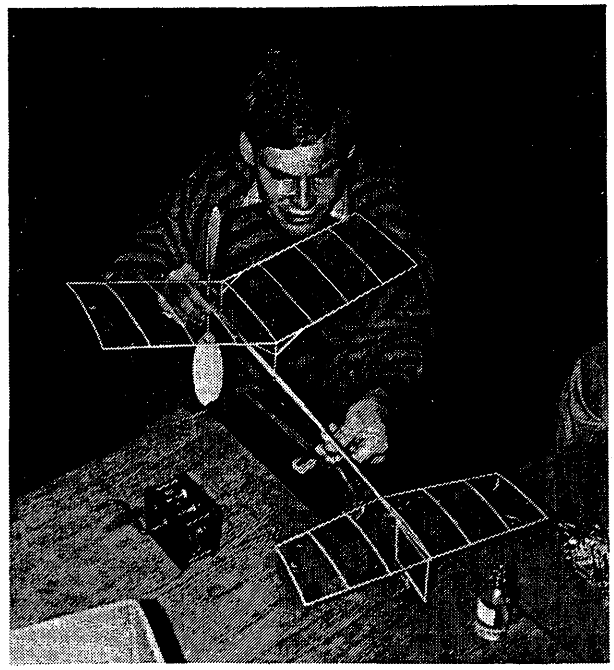
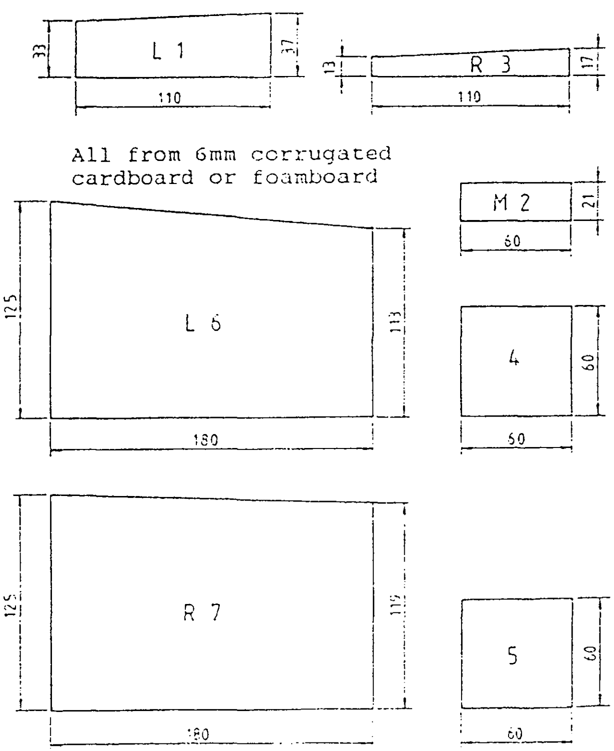


FIGURE 2



to get the sides and grooves as square as possible. Figure 3 shows several jigs which you can make from

FIGURE 3

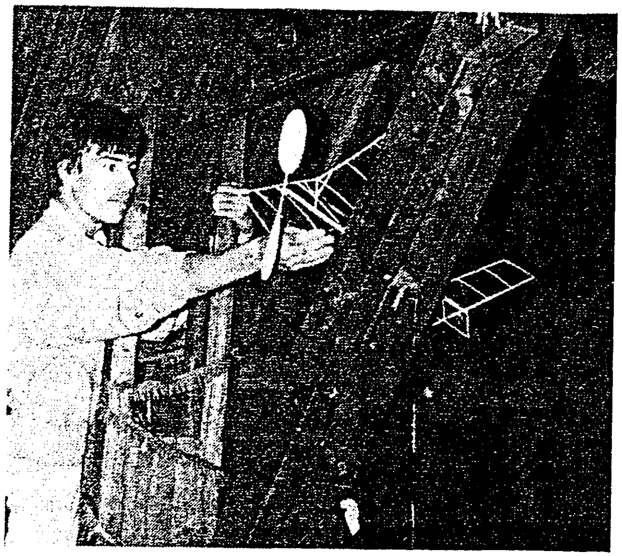


±6mm thick corrugated cardboard or foam board. As before: cut them as square as you can. Next we make the wing and stabilizer rib templates from thin ply or cardboard (see plan). Finish the curved sides as smooth as possible.

Two types of glue

We need two different kinds of glue. For joining wooden parts we use cellulose glue (like UHU-Hart). This glue has to be thinned down about 30% with thinner or acetone. The most handy way to apply the glue is by means of a syringe (needle size ±0,5mm). Stick a piece of wire in the needle to prevent it from clogging up. Indentify the wire with a piece of brightly coloured tape so that you find it quickly in the usual mess on your working table!

The other glue we need is contact cement for adhering the covering to the wing and tail frames. This glue also has to be diluted, ratio glue-thinner 1:2. Usually only thinners of the same brand as the glue will work successfully.



Required materials

For wing spars and wing ribs we need a sheet of 1,5mm middlehard balsa (weight of a 10x100cm sheet 18-27 gram). For tailplane and rudder 1mm is needed, weight of a sheet 10-18 gram. For the fuselage lighter balsa is required: a 4mm sheet of 40-50 gram or a 10x10x1000mm strip of 10-15 gram. In all cases the grain has to straight and regular. For the propellerblades we need a soft sheet of 1mm balsa, preferably quarter grain. This type of grain has more bending stiffness in a direction square to the grain. It is recognizable from its speckled look. We further need a piece of ϕ0,4 or 0,5mm steel wire for the propeller shaft and rear motorhook, a piece of 0,5-0,8mm hard aluminium (f.i. from a beer can) for the propeller bearing (bearings are also commercially available) and a piece of ϕ2mm I.D. aluminium or plastic tubing for the wing sockets. Wing socket tubes can be made yourselves. This is done by rolling a piece of tissue paper over a piece of ϕ2mm O.D. wire, f.i. a drill end, and impregnating this with cement or dope (three windings is sufficient). Pull off the tube before it begins sticking to the wire! For the wing covering we could use lightweight tissue, but only if we cannot obtain one of the many types of lightweight plastic foils that are available. These are called mylar, ultrafilm, microlite, polymicro and the like, and come in weights ranging from 7 to 1,25 grams/m². We further need teflon washers for the propeller bearing and of course rubber to fly on. Addresses of some suppliers are given at the end of the article.

Building wing and tail frames

We start by cutting the ribs and spars. For cutting we preferably use a razor blade. A thicker blade will distort the tiny strips we cut. Cover the other side of the blade that is not used for cutting with a piece of tape or break the blade overlength into two pieces. The ribs are cut in 1,5mm wide strips along the rib template. Make several extra for reserve. The spars are cut along a steel ruler. Cut them 10 to 20mm overlength. Note that the spars of the left wing are longer than of the right one!

We start by building the stabilizer. Rub the edges of the four longest assembly strips with a candle wax. This prevents glue from sticking to it. Pin the strips on the building board along the **outside** of the stabilizer outline (figure 4). Do not cut the strips to length. We need

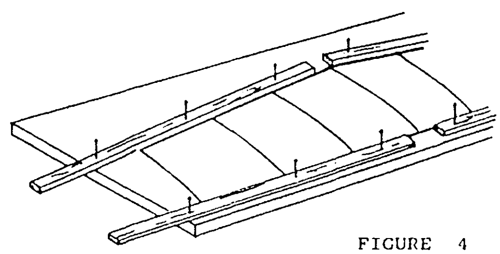


FIGURE 4

them for the wing also. Position the stabilizer spars along the strips and clamp them against it with the small 10x16mm pieces of balsa (figure 5). The spars rest on the building board with their small side, with the thin

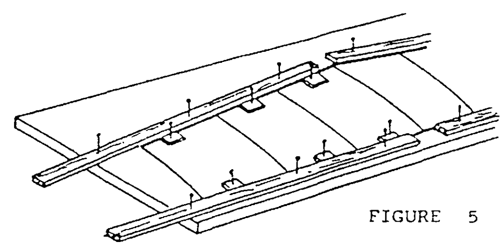


FIGURE 5

tapered ends towards the tip of the stabilizer. Never stick a pin through the spar!

The spars have to be glued together in the middle. Glueing is **always** done in the following manner, called "double glueing". Coat each surface with a thin layer of glue, wait a few seconds, apply glue to one of the surfaces and then join the pieces. This gives the strongest bonds. So for glueing the spars we have to remove them from the building board (setting them up was a useful exercise). Coat the end of one spar and replace it between the clamps, coat the end of the other spar, wait a few seconds, coat again, replace and press the spar against the other and reposition the clamps.

Take one of the ribs and hold it in its position over the plan. Carefully mark both ends to the correct length and cut off. The rib should fit in between the spars such that it is not under any bending stress, but still stays upright in position. Now prepare the next rib. If you cut one too short accidentally, do not worry. It can be used at a position closer towards the tip. When all ribs fit accurately they can be glued. Again: doubly glued. Avoid big blobs of glue.

Leave the stabilizer to dry for half an hour, remove the clamping blocks and carefully lift the frame from the board. If it is stuck to the building board at some place, then loosen it by running a pin underneath. Cut off the extending ends of the spars. Inspect every glue joint closely. Add glue when necessary and remove excess glue with a razor blade. A careful and experienced builder will seldomly have to do this!

The rudder is assembled in the same way as the stabilizer. Position the strips on the board, cut to length, remove, glue and reapply. Note that one end of the sticks is not cut off (figure 6).

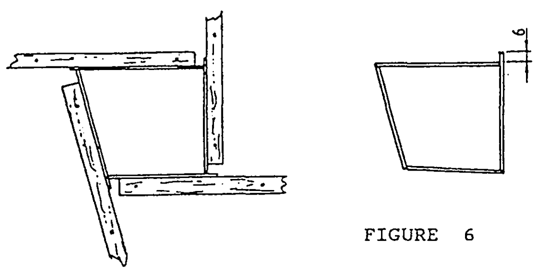


FIGURE 6

The procedure for building the wing is the same as for the stabilizer. Again note the correct position of the spars. The left wing is intentionally longer than the right wing. The middle rib is glued just left of the center line. You may have noted that the wing tips will be raised to a V-shape. We will do this after covering the wing. So the wing halves are joined in the middle temporarily.

Fuselage

The wood for the fuselage has to be of very good quality. Straight grain and no weak, hard or brittle spots. The motorstick can be tapered towards the ends from 6x4 to 5x3 mm to save some weight. Do the sanding in one direction only. A to-and-fro movement may easily break your carefully selected piece of wood.

For joining the motorstick and tailboom we need the large assembly block. Put cellotape over one of the small sides. Do not fold over the unsticked part, it may be cutted off (figure 7). Pin the block on the building

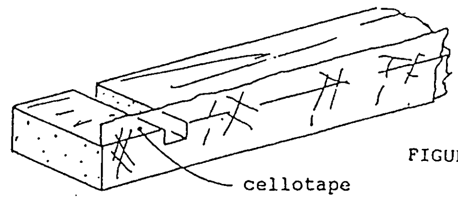


FIGURE 7

board along the top side of the fuselage at the stick-to-boom joint. Position motorstick and tailboom on the plan and check whether the joining faces fit accurately (figure 8). Take time to make this fit as good as you

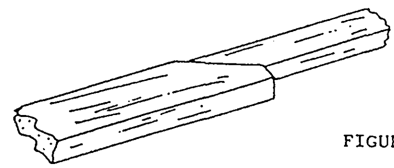


FIGURE 8

can. This joint is a vital one! Glue the pieces together (doubly glued!) and clamp them between the small balsa blocks.

When the glue has dried remove the fuselage from the building board and lay it upside down. Prick a hole with a pin between the motorstick and the tailboom along the glue joint for the rear motor hook. Put glue onto the hook and insert it into the hole. Lay a half knot in a piece of thread, slide the knot over the hook, pull tight and glue each end of the thread downwards along the sides of the motorstick (figure 9). Add a couple of

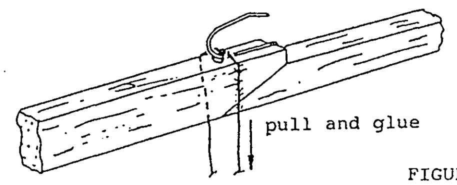


FIGURE 9

winds after drying, put on extra glue and cut the ends off after drying.

The propeller bearing is tack-glued with cellulose glue. With a piece of wire we adjust the bearing such that it is positioned with 1 to 2° of side-thrust to the left. That is to the **right** when viewed from the bottom as in figure 10! Let the glue dry thoroughly. It is then secured with

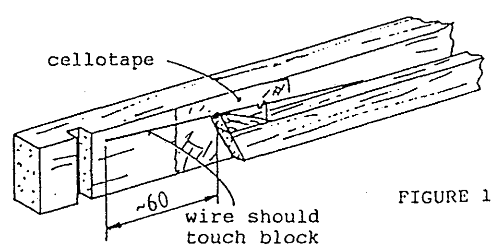


FIGURE 10

thread in the same manner as the rear hook, add several extra winds at the front and the rear of the bearing and glue with a generous amount of glue. You can also use instant glue or epoxy for this purpose. The last thing to add is the little vertical piece of balsa at the end of the tailboom. This piece raises the trailing edge of the stabilizer a little. Practice has shown that the tailboom usually tends to droop downwards instead of upwards. The wing sockets are added later.

Propeller

The propellerspar is sanded from middlehard balsa, 12cm long and tapered from $\phi3$ to $\phi2$mm towards the ends. The center section is reinforced with a few windings of tissue paper glued onto it. Next the propellerhook is bent and glued squarely in the spar. First bend the rounded hook end, prick a hole fore and aft through the tissue with a pin, push the hook through and bend the end squarely twice. Pull the hook backwards so that the rearward bent wire end sticks into the spar. Check alignment carefully and secure the hook with glue on the front and rear side.

The outline of the propellerblades is transfered to the balsa with carbon paper. It is perhaps better to make a cardboard or ply template of the blade shape and cut the blades along this template. This assures that both blades will be of the same shape. The blade can be sanded thinner towards the edges. Forming the blades into the correct pitch and camber is done in a simple way. For this we need a cilindrical shape, f.i. a paint tin, with a diameter of ±12cm. The blades are wetted in warm water for half an hour. They are then strapped to the cilinder with bandage under an angle as indicated on the plan. By putting both blades on top of each other they will get exactly the same twist. Be sure you have got the direction of the angle right, the propeller will turn to the right (when viewed in flying direction). Let dry thoroughly, a day in the open or 15 minutes in an oven (be careful, lowest temperature setting and leave the lid open).

The blades have to be glued to the spar in the correct angle. For this we make a simple jig as in figure 11.

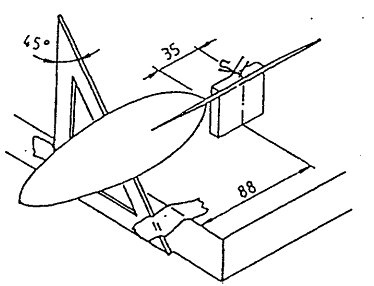


FIGURE 11

There is no need to cut a groove in the blade. You can glue it to the rear of the spar. Use a non-shrinking glue such as PVA or cellulose glue with some drops of castor oil in it. If you decide to make a groove then take care that the blade fits without distortion. On the other hand avoid any gaps. These take up too much glue which can lead to distortion of the blade. The last thing to do is to slide two teflon washers over the hook and finished is your propeller!

Covering

On an indoor model only the top side of the surfaces is covered. We start with the stabilizer and practice the procedure before we use any glue. Clean up your work table and spread out a sheet of newspaper. Onto this we lay the sheet of covering material. It can be spread easily by gently blowing it downwards. Pick up the stabilizer in the middle with one hand, curved side downwards, hold it about 2cm above the foil, check that there is at least 2cm of excess foil all around and drop the frame. It is of great importance that this procedure goes succesfully at the first try. Because we will use contact cement there is no second try! Practice until you feel confident.

Now for the wet run! Lay the stabilizer - curved side upwards - onto **another** sheet of newspaper. A glue drop on the covering newspaper sheet will lead to disaster! We can apply the glue with a little stick with a piece of velvet (figure 12). You can also use fine brush.

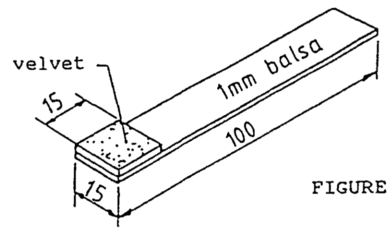
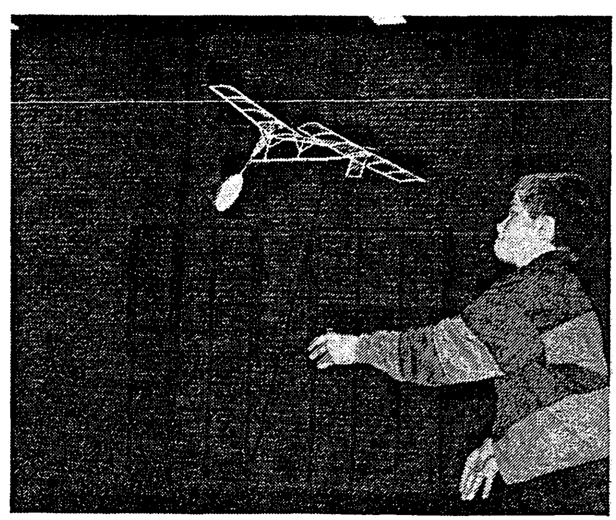


FIGURE 12

It is better to have the glue thinned down a bit too much than too little. You can always apply a second layer of glue. The glue is applied only to the top side of the spars and the end ribs. It is not really necessary to do the ribs as well. The glue may hardly be visible, but it should feel tacky when you touch it. If in doubt add a second run. Pick up the frame, turn it over, hold in position over the foil, check that there is excess foil all around, lower the frame and drop it from ±2cm height. Press the middle of the spar nearest to you down onto the film. Press down the left end of this spar, then the right end. Be sure to make vertical movements only. Tap the spar downwards at some places in between. Now press down the middle of the other spar and its ends. Because of the curvature of the ribs the fixed spar will lift a little from the board and the ribs will bend, but the structure is sufficiently flexible to do this without risk of breakage. Now the frame is fixed and there is no danger anymore of shifting. Next go all around the outline cm by cm and press down firmly.



With a bit of experience this method will result in relatively little wrinkling. Do not bother about wrinkles, they hardly have any effect on performance. When you use paper as a covering material these wrinkles are even beneficial. Changes in humidity will less likely cause warping of the structure. Never dope a paper covered indoor model! Instead of contact cement you can also use thinned white glue or a glue stick (like Pritt). The wing and rudder are covered in the same way as the stabilizer.

Removing the excess foil
Take a new sharp razor blade. Lay the stabilizer on the building board, curved side upwards, with one spar just outside the edge of the board. Take one corner of the foil between thumb and forefinger, insert the razor blade and move it to the right (figure 13). It is as if you

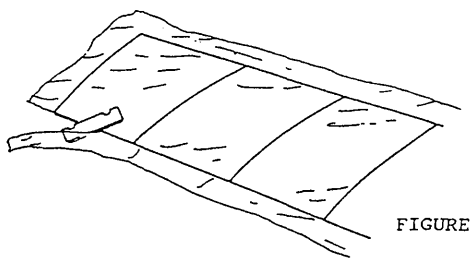


FIGURE 13

try to pull the framework off the table with your left hand and are resisting that with the knife. Go all along the outline of wing, stabilizer and rudder. Take care not to cut into the wood. Do not bother too much when you cannot remove the foil close enough to the spar.

Mounting the stabilizer
Assemble the cardboard jigs L1, M2 and R3 on the working table as in figure 14. The big assembly block is

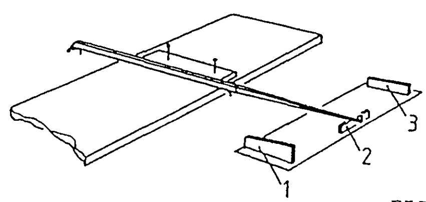


FIGURE 14

pinned to the building board. Place the fuselage against the block and clamp it between the little balsa blocks. Check that the fuselage is aligned squarely with regard to the stabilizer. If the end of the tailboom does not touch jig 2 put something under the jigs to raise them. Place the stabilizer in position (figure 15). When all is

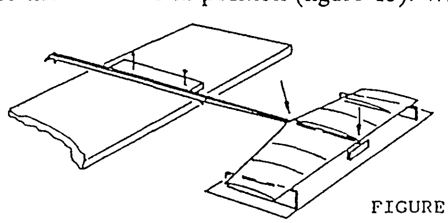


FIGURE 15

properly aligned glue the stabilizer at the indicated spots. Let it dry for at least 15 minutes. From now on you will have to handle your model with extra care: a sudden movement can easily lead to damage. The best way to hold the model is at the nose between thumb and forefinger.

Mounting the rudder
Lay the fuselage with stabilizer upside down. Hold the rudder in its correct position. Note that that the rear is offset to the left 8mm (figure 16). Put glue on the

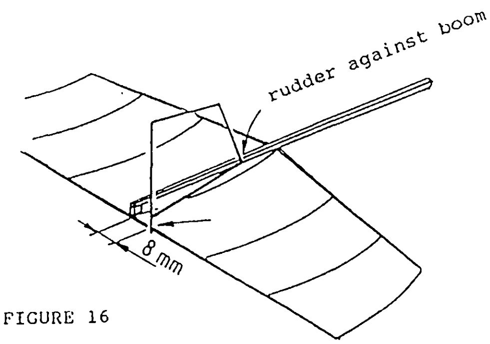
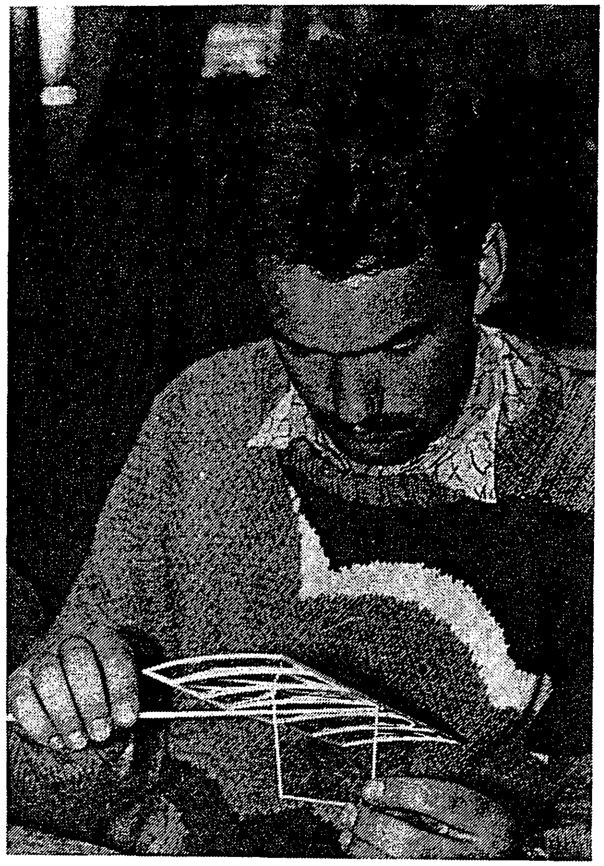


FIGURE 16



rudder as indicated, hold it in position and keep it there for a few seconds. It will stay upright. Leave it to dry further.

Tying the rubbermotor
First we exercise in making a half-knot (figure 17). Take both ends of the rubber (1), cross the ends (2), pass one end underneath the other (3) and pull lightly (4).

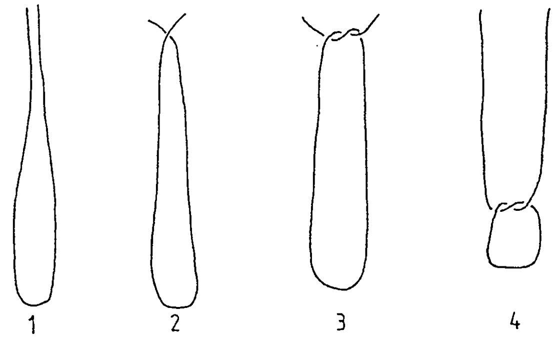


FIGURE 17

Now we make a complete motor (figure 18):

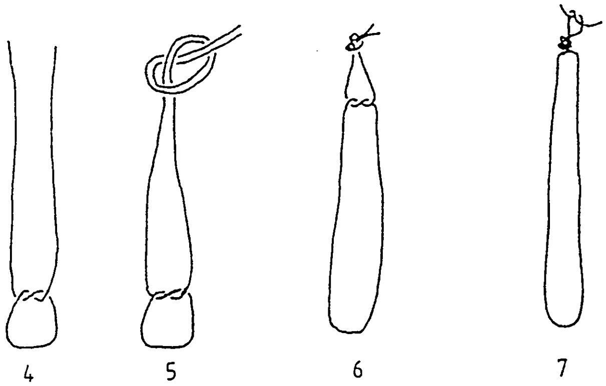
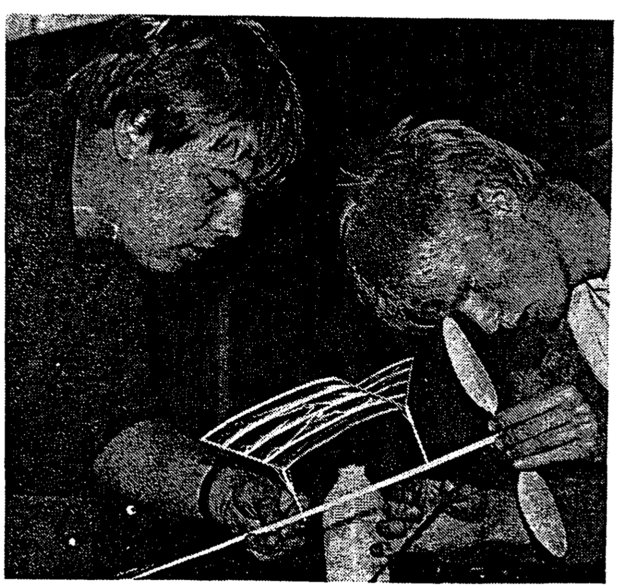


FIGURE 18

- Take a piece of rubber. A suitable size of rubbermotor for this model is a loop of 35cm length and a cross section of 1x2 to 3 mm.
- Slide two small O-rings over the strand and slide them towards the middle. These rings can be cut from ϕ3mm hard plastic tubing.
- Make a half-knot and slide it halfway downwards (4).
- Lay the ends on top of each other and tie a double knot (5). Do not yet pull the knot tight.
- Wet the rubber at the knot (f.i. with saliva). The moisture serves as a lubricant and prevents tearing of the rubber. Pull the knot tight and try to move the knot towards the end to within ±1cm. Pull it really tight!
- Now move the earlier made half-knot towards the double knot and pull tight (6). Remoisture if necessary.
- Slide one of the rings towards the knot and leave the other at the middle of the strand. Cut off the loose ends of rubber to about 5mm of the knot. The rubbermotor is ready.

It is possible that the knot gets loose when you tied it too loosely. When the motor is lubricated (later more about that) then remove the lubricant as far as possible, tie again with the same type knot but now an extra half-knot is put on top of that (7). This knot usually holds. If not then a small drop of instant glue between the loose ends will help.



Balancing

The wing posts are cut from relatively hard balsa. The ends are sanded round such that they fit precisely in the wing sockets. The fit must be such that no real force is required to insert them, but on the other hand they may not slide too easily. The front post is 60mm long, the rear 55mm.

The exact position of the sockets on the fuselage is determined as follows: hook the propeller into the bearing. Slide one of the rings of the rubbermotor over the propellerhook and the other ring over the rear hook. Support the motorstick with a little stick en shift the fuselage till it balances horizontally (figure 19).

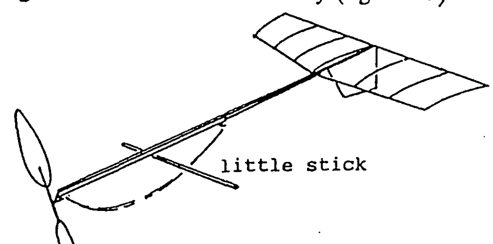


FIGURE 19

Mark this position on the motorstick with a fine pencil. Set other marks at 105mm forward and 45mm aft of this mark. These indicate the positions of the front and rear wing post.

Take the building board with the big assembly block and pin it down as indicated in figure 20. Lay the fuselage

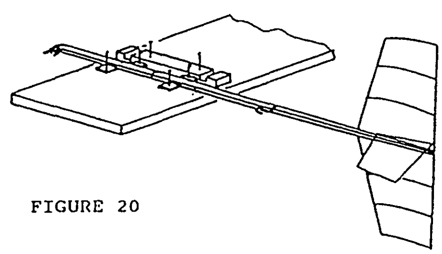


FIGURE 20

parallel to but not against the block. Leave about 1,5cm between so that the fuselage can be clamped with the little blocks. The lengthwise position should be such that the front and rear wing post marks align with the grooves in the assembly block. Slide a socket over each of the wing posts and lay them in the grooves (figure 21).

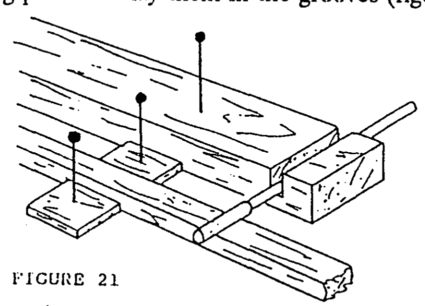


FIGURE 21

Let the sockets stick out over the motorstick equally at both sides. View the posts along the fuselage direction to be sure that they are aligned in the same plane. Glue the sockets to the motorstick sparely. Do not let any glue get onto the posts themselves! Let dry for 15 minutes. Add an extra layer of glue. Only after everything has dried completely you can pull out the posts from the sockets.

Dihedral

The next step is to make dihedral in the wing and mount it to the wing posts. For this we have to set up a

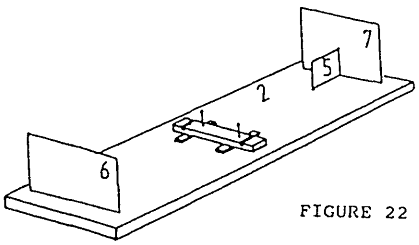


FIGURE 22

jig as in figure 22. Pin the cardboard jigs 4 and 5 vertically on the building board and jigs L6 and R7 against them with the 125mm side forward. Note that L6 and R7 are not exactly equal. The rear side of L6 is shorter than the rear side of R7. This guarantees that the wing halves will be glued together with the right warps built in. The left wing gets a positive warp of 6mm. Pin the large assembly block on the building board with two pieces of balsa underneath to raise it about 2mm.

Insert the longest wing post in the front wing socket and the shortest in the rear socket. Clamp the fuselage against the assembly block as in figure 23. The tail of

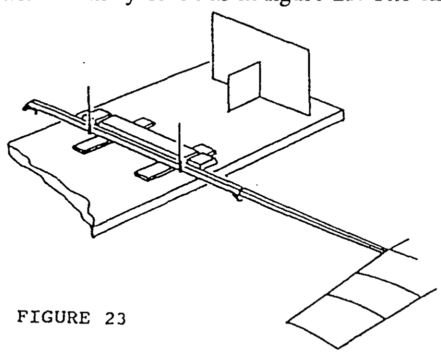


FIGURE 23

the model will stick out beside the table, so be careful not to hit it or the building board accidentally. Take the wing and lay it upside down. Make a half cut where you joined the wing spars. Gently break the joint further till you get the required dihedral amount. Handle the wing with care to prevent tearing of the covering and lay it on the jig (figure 24). Be sure that the leading edge is

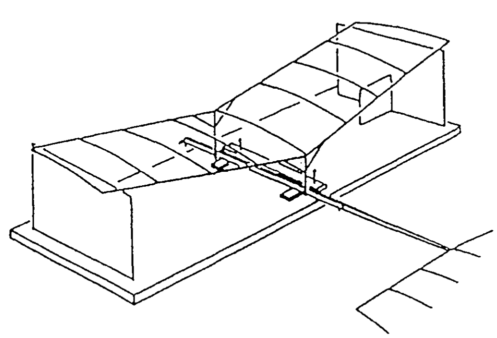


FIGURE 24

forward. The left wing is longer than the right. Position the wing break on top of or just between the wing posts and glue firmly.

You will notice that a big wrinkle has developed in the middle of the wing. It may not look nice but it will not influence the flying capabilities of your model. Add the four struts and let dry for half an hour. Remove the model from the jig and admire your model for a moment. It is finished!

Accessories

Find a box in which you can store and carry your model. The dimensions should be 56x34x14cm minimum. Construct the flaps of the box such that they cannot fall into the box and damage your model (figure 25). The fuselage is fixed with the motorstick slid into two foam rubber

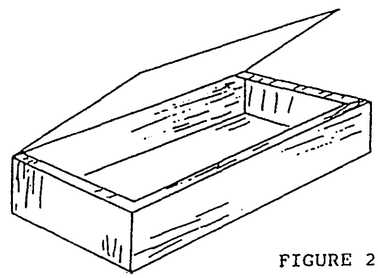


FIGURE 25

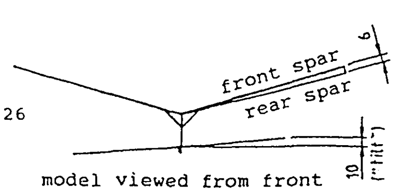
blocks. Cut a slit in each block and glue to the bottom of the box. The wing is mounted in the same way as it is fixed to the fuselage. Glue wing socket tubes to a piece of balsa and glue this in the box. Also in this case the sockets have to be aligned properly to prevent warps from developing in the wing.

For winding the rubber motor we need a winder with a gear ratio of about 1:10. You can make one yourselves from an old hand drill, alarm-clock or Meccano gears. They are also commercially available.

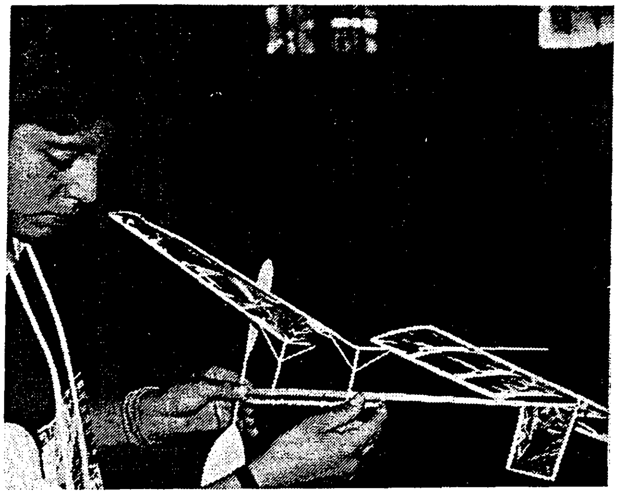
Flying

For our first trim flight we need a draft-free space with a floor space of 10x10m minimum (a gym hall, cantine, hangar, church). Because an indoor model allways flies powered by its propeller and not as a glider we will trim it directly as a powered airplane. Remember that the safest way to hold your model is at the nose between thumb and forefinger. This way you also hold the propeller. Force yourself to slow down, make gentle movements. When you run with the model in your hand all that will be left is the motorstick and remnants of wing and tail will flutter behind you.

Insert the propeller into the bearing and attach the rubber motor (knot at the rear!). Check that:
1. the longest wing post sits in the front socket.
2. the underside of each wing post is exactly equal with the underside of the socket.
3. the left wing has the correct positive warp and the right wing is flat (figure 26).

FIGURE 26


4. the stabilizer is flat.
5. the stabilizer is tilted to the right (figure 26).
6. the rudder is flat.
Small deviations are acceptable.



Take the model at the nose with your left hand and turn the propeller with your right hand 200 turns to the right. Now switch over the model such that you hold it with your left hand from the front at the bearing also keeping the propeller from rotating. Take the model with your right hand at the motorstick under the wing and release the propeller. Let the propeller turn for a few seconds and release the model with a gentle movement. Do not throw it! The model will turn to the left if everything is right. Do not panic when it hits the wall. Just let it happen and pick it up when it has slid down. Also when it risks to collide with a person say to him to stand still, freeze and let the model hit and slide down. The model flies so slowly and is so flexible that hardly any damage will result.

The model should not dive nor climb. When it tries to climb you will notice that it looses velocity, stalls and dives to pick up speed again (figure 27). When it stalls

stalling FIGURE 27

the front wing post has to be lowered in the socket. Do this in small steps of ±1mm. When it dives the rear post has to be lowered. When the model flies a neat and level left turn you can increase the number of turns. From now on we do not do this by hand any more as you can easily damage your model. We use the winder. The motor now always has to be lubricated with castor oil or another type of lubricant. Only then will the motor unwind smoothly and have a longer life. Hold the model between thumb and forefinger at the front so that you also hold the propeller. The rubber is hooked up at the propeller (knot at the rear!). Ask a friend to wind ±500 turns in the motor. Take of the motor from the winder grabbing it firmly just before the O-ring and hook it up to the rear hook. The winding is best done by stretching the rubber about 4 times its original length. In this position wind in about half the number of turns. The other turns are wound while gradually approaching the model till it matches the length of the motorstick. With this procedure, which can be refined a lot, you will get much more turns in the motor and it will last longer!

When the model flies level cut off the end of the wing post that extends below the wing socket. This ensures that you will allways mount the wing onto the fuselage with the correct incidence angle. Allways slide the wing posts into the sockets till they are aligned with the underside of the sockets.

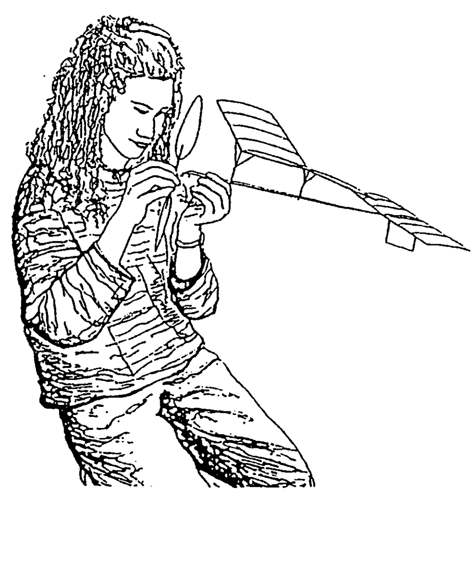
You can now further increase turns till the model approaches the ceiling. When the ceiling is flat and smooth you can even allow it to hit the ceiling. When your winding technique has become optimum you can get up to 1600 turns into the motor. In large halls times of almost 10 minutes can be flown! But in a gym hall flights 5 minutes are very well possible. It is all a matter of clever experimenting with longer, shorter, thicker or thinner rubber, a larger propeller, more pitch, other blade shape or whatever design change you can think of!

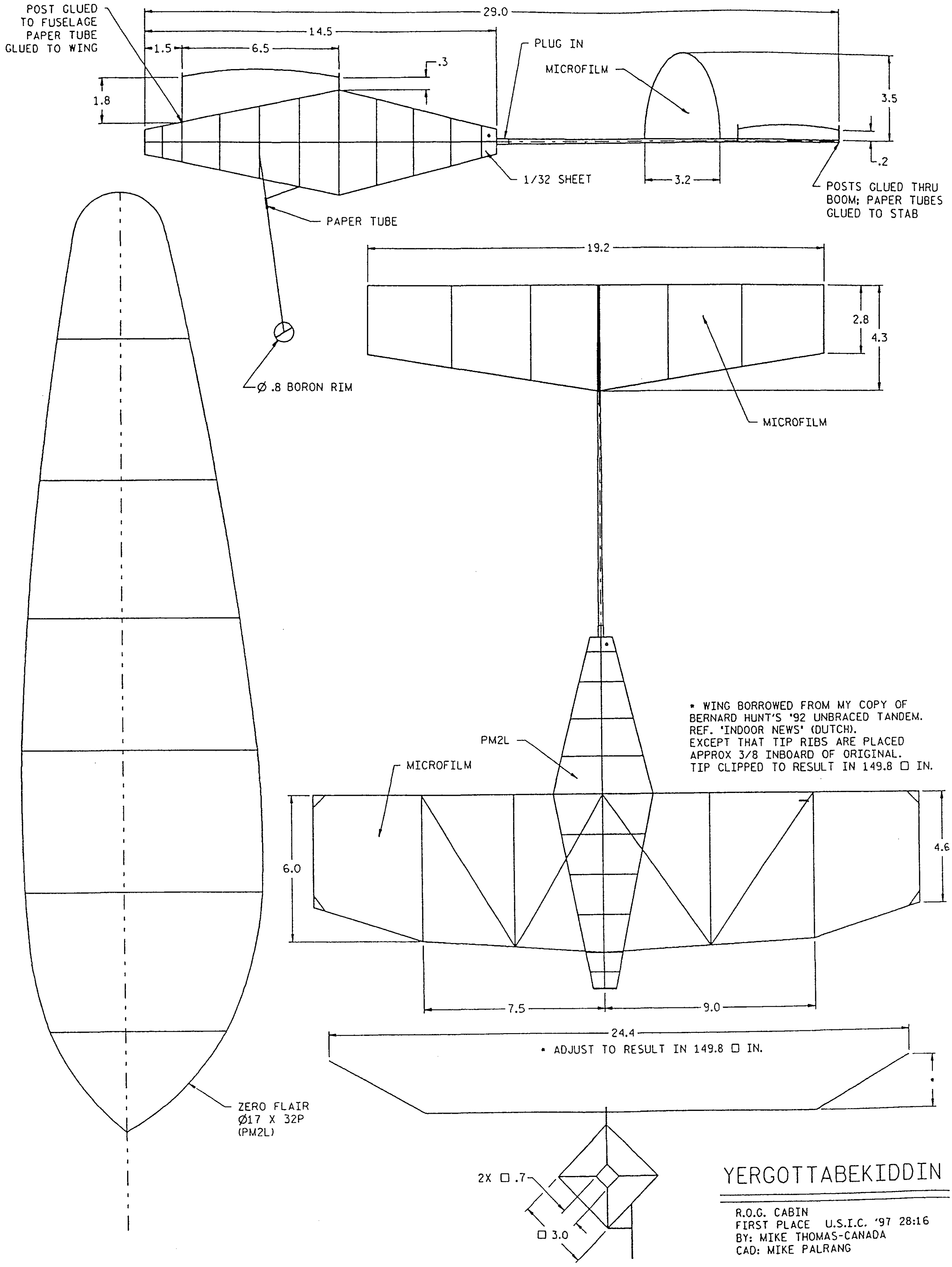
How to continue?

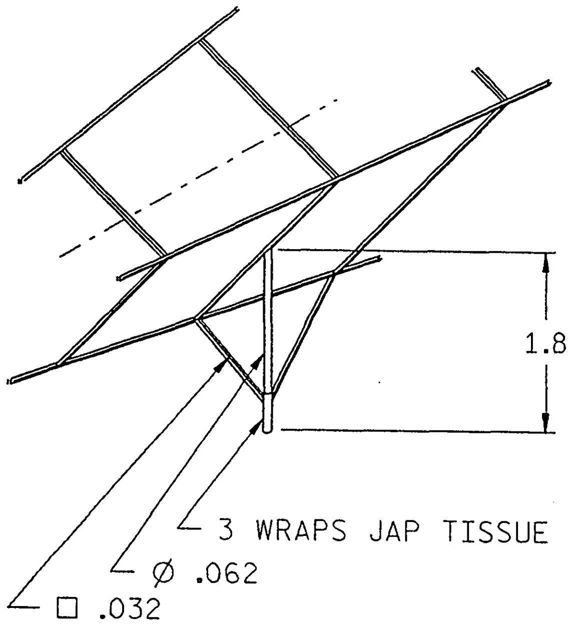
That depends on you. Building or flying this model may not have been as satisfying as you expected or you have had some bad luck. We do not think that that is too bad. You have tried something and gained new experience. But you also may have become curious to what this model really can, and that is quite a bit. It requires further experimenting with rubber sizes. A lot can be told about winding technique. There are many, many other more challenging designs. Remember this: when you fail at something, or have something to ask, call or write one of the other indoor fliers. They will be glad to help you!

List of suppliers

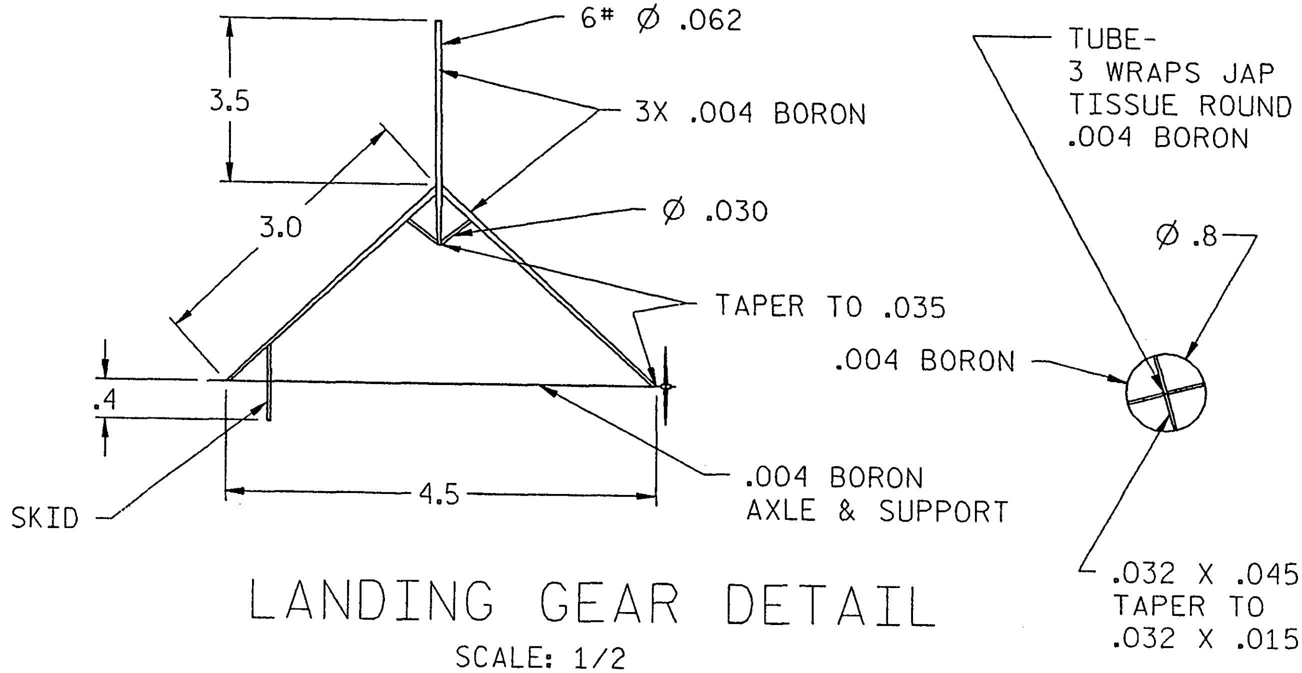
Indoor Model Supply, Box 5311, Salem, OR 97304, U.S.A..
Micro-X, Box 1063, Lorain OH 44055, U.S.A..
SAMS Models, The Chapel, Sandon, Buntingford, Herts SG9 0QJ, England.
F1D Indoor Supplies, John Tipper, 23 Green Lane, Chichester, West Sussex, PO19 4NS, England.




POST GLUED
TO FUSELAGE
PAPER TUBE
GLUED TO WING
29.0
14.5
1.5
6.5
.3
1.8
PLUG IN
MICROFILM
3.5
.2
1/32 SHEET
3.2
POSTS GLUED THRU
BOOM; PAPER TUBES
GLUED TO STAB
PAPER TUBE
19.2
2.8
4.3
Ø .8 BORON RIM
MICROFILM
* WING BORROWED FROM MY COPY OF
BERNARD HUNT'S '92 UNBRACED TANDEM.
REF. 'INDOOR NEWS' (DUTCH).
EXCEPT THAT TIP RIBS ARE PLACED
APPROX 3/8 INBOARD OF ORIGINAL.
TIP CLIPPED TO RESULT IN 149.8 □ IN.
PM2L
MICROFILM
6.0
4.6
7.5
9.0
24.4
* ADJUST TO RESULT IN 149.8 □ IN.
ZERO FLAIR
Ø17 X 32P
(PM2L)
2X □ .7
□ 3.0
YERGOTTABEKIDDIN
R.O.G. CABIN
FIRST PLACE U.S.I.C. '97 28:16
BY: MIKE THOMAS-CANADA
CAD: MIKE PALRANG

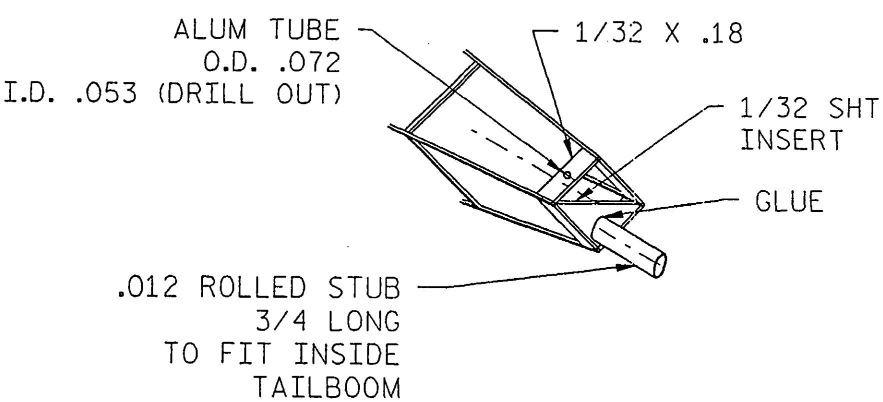


LANDING GEAR TO FUSELAGE DETAIL

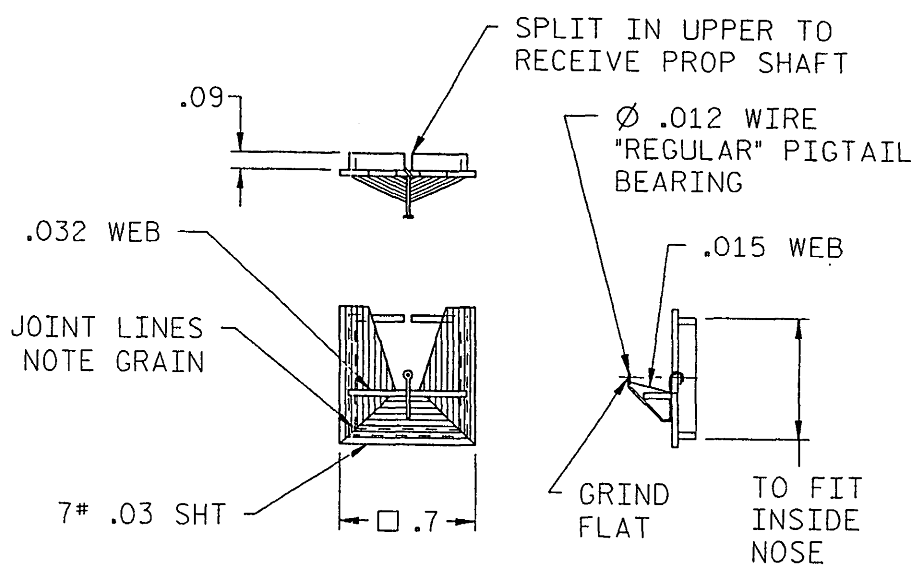


LANDING GEAR DETAIL

SCALE: 1/2



TAILBOOM JOINER DETAIL



NOSE BLOCK DETAIL

SCALE: FULL

SHEET 2 OF 2

Model Name CABIN ROG Builder Mike Thomas, Canada

STAB

Outline. Density 5.8# Grain C **Leading** Edge Center. W. .030"

H. .070" Tip. W. .030" H. .040" . **Trailing** Edge Center. W. .030"

H. .070" Weight Leading Edge Spar ? Weight Trailing Edge Spar

? **Ribs**. Density 5.5# Grain C W. .020" H. .045"

Weight Ea. Rib. ? Weight of Outline Dry. .16G inc. paper tubes.

Weight Covered .17G Special Instructions Paper tubes, 2 turns around .03"X.06" Alm. form

Prop, Covered Blades

Prop Spar. Density 6.5# Grain C Spar Length 17"

Dimensions at prop shaft, W. .080"Dia .H. ______ Dimensions at Tip. W. .030" Dia.

H. ______ Spar Weight. ? Prop Shaft Wire Size. .012"

If prop is V/P or V/D, detail mechanism on separate sheet of paper. Prop Outline, Wood. Density Boron

Grain ______ W. ______ H. ______ If Boron, Boron Size .004"

Ribs, Density 5.5# Grain C W .020H. .030 Prop dry. .14G

Prop

Grain C W. .020" H. .020" Prop weight dry. .14G

Covered .15G

RUBBER

Loop Length 18.5" Width .074" Rubber Vintage, Month and Year 8/93 Tan II . Weight of Loop. 1.84G . Turns 2300

Back off Turns. 10 Launch Torque in inch ounces. .5 Turns Left 40

Do you use O rings. Yes. / No. ______

TRIM

Wash In, Wing Left panel .25" Wash Out Left panel. ----

Wash Out, Right panel --- Wash In. Right panel .05"

Wash In Stab, Yes ______ No / How Much ---

Down Thrust. 1Degree Left Thrust. 2 Deg Special trim instructions.

MODEL NAME CABIN ROG BUILDER Mike Thomas, Canada

WING

Leading Edge Spar. Density 5.5# Grain C Length See Dwg. Width .032" to .03"

Height .125-.05 Weight ? **Trailing Edge Spar.** Density 5.5# Grain C

L. See Dwg .H. .125-.05 W. .032- .03 Weight ? **Tips.** Density 5.5#

Grain C Tip at L/E. Width .03-.025 Height .05-.035 Tip at T/E. Width .03-.023

Height .05-.035 Weight for 2 Tips. ? **Ribs Standard.** Density 5#

Grain C W. .025" H. .065" Weight Ea. ?

Wing Posts Density 7# Grain C L. 1.8 Fwd. .03 Aft. W. .032" H. .1"

Posts Round, Posts Rectangle. Weight for 2 finished posts. ? Wing Weight Complete

.35G Special Instructions Unbraced wing, needs stiff wood

Dihedral ribs. .032x.065" Tip ribs, .032x.036" .020"

Sq. diagonal bracing at tip L/E & T/E.

FUSELAGE

Longerons. Density# 6.3# Grain C Width .045"

Height .045". Cross-pieces. Density# 6 Width .030"

Height .040". Grain C. Detail landing gear and nose block on plan sheet if possible. Total weight of fuselage dry. .83G Weight covered. .95G. Type covering used.

Microfilm ______ Plastic PM 2.

Boom

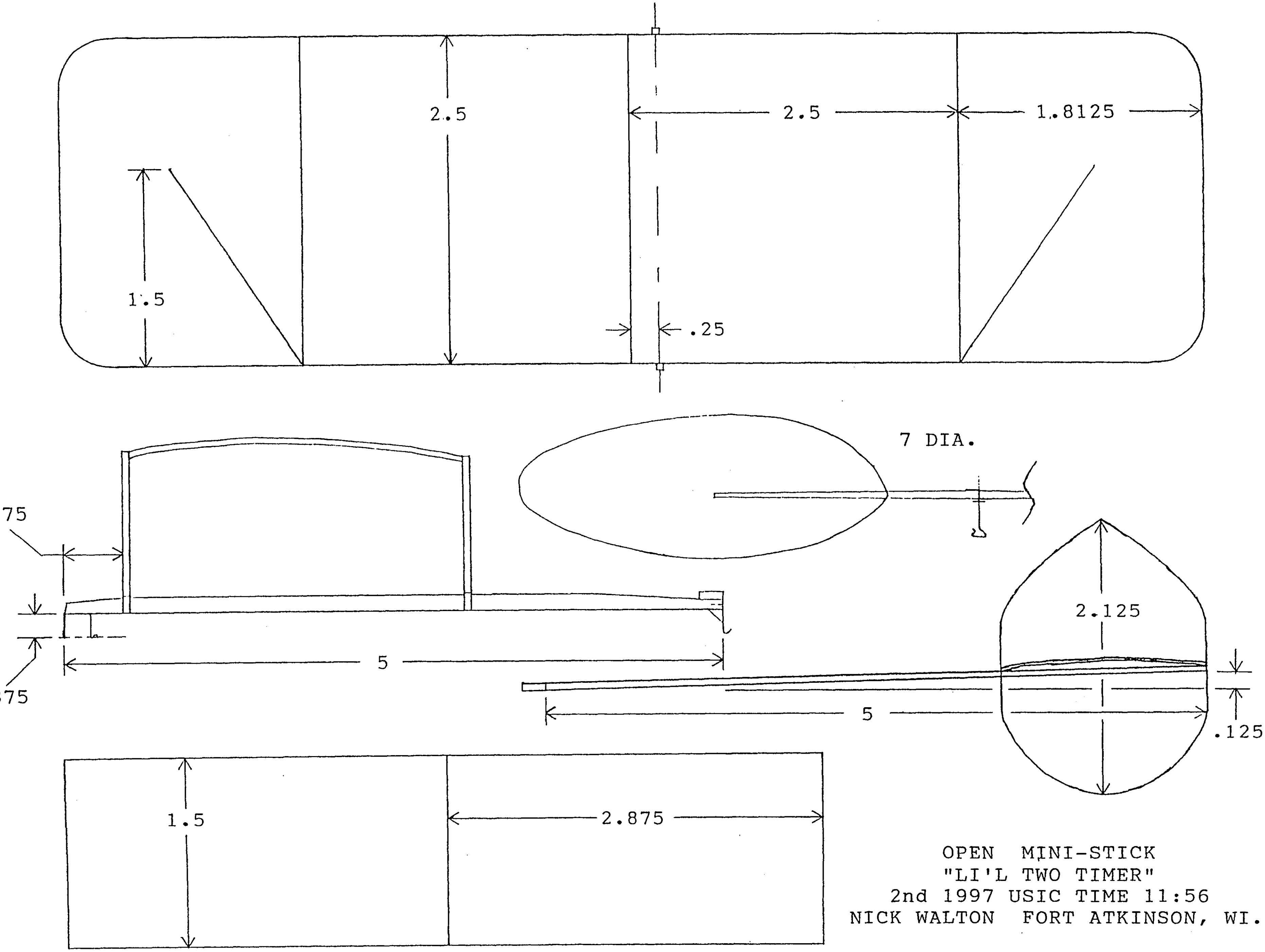
Boom Rolled . Density 5# Grain C Sheet Weight .008 thick

Cut Weight ______ Width Front .2"Diam. Width Rear. .1" Diam.

Glued Weight ______ Boron, Yes, No. Boron Size ______ Boron Position

______ Finished Weight. See spl. inst. Special Instructions

Boom weight includes fin and stab posts. .12G. Boom plugs into tapered sleeve at rear of fuselage.



OPEN MINI-STICK
"LI'L TWO TIMER"
2nd 1997 USIC TIME 11:56
NICK WALTON FORT ATKINSON, WI.

MODEL NAME MINI-STICK BUILDER Nick Walton

STAB

Outline. Density 5 lb. Grain A Leading Edge Center, W. .03 H. .03 Tip. W. .03 H. .03 . Trailing Edge Center, W. .03 H. .03 . Ribs. Density 5 lb. Grain C W. .028 H. .03 Weight Ea. rib. - . Weight of Outline Dry. - Weight Covered. - . Special Instructions. Total Weight Of Stab, Fin And Boom = .003 oz.

WING

Leading Edge Spar. Density 5 lb. Grain A Length 5 Width .03 Height .04 Weight - . Trailing Edge Spar. Density 5 lb. Grain A L. 5 H. .04 W. .03 Weight - Tips. Density 5 lb. Grain A Tip at L/E. Width .03 Height .03 Tip at T/E. Width .03 Height .03 . Weight for 2 Tips. - Ribs Standard. Density 5 lb. Grain A W. .028 H. .04 Weight Ea. - . Ribs Compression. Density ___ Grain ___ Top of Rib. W. ___ H. ___ Bottom of Rib. W. ___ H. ___ Upright ___ Weight Ea. ___. Wing Posts. Density 6 lb. Grain B L. 1.25 W. .053 H. .057 Wing Covered. ___ Wing Weight Complete. .0039 oz Special Instructions Adhesive used for covering - Artists Matte Medium thinned with water

Boom Solid. Density 5 lb. Grain A Length 5.094 Front Width. .055 Front Height. .065 Center W. .053 Center H. .060 Rear W. .051 Rear H. .055 Cut Weight - Finished Weight. - . Special Instructions. Boom plugs in to tissue tube on top of Stick.

FIN

Fin, Not Floating. Density 5 lb. Grain A W. .03 H. .03 Weigt Dry. - Weight Covered. - .

MOTOR STICK SOLID

Density# 5 lb. Grain A Length 4.94 Front, Width .082 Height .095 Center, W. .084 H. .114 Rear, W. .066 H. .068 Cut weight - Finished Weight. - . Special Instructions M/S complete with tubes, post,wire. Weight .003 oz. .

PROP

Grain ____ W. ____ H. ____ Prop weight dry. ____

Covered ____

PROP, WOOD BLADES--- Fill in prop spar information

Blades. Density 5 lb. Grain C Blade Area, Ea. 2.3

Blade Thickness .016 Weight for 2 Blades - Give prop pitch at 45 degrees and one inch from tip. Pitch at 45 degree 16.8 Pitch 1 inch from tip. 11.4 .

Special Instructions on prop construction Finished Weight .0052 Form on 2.125 Diameter Cylinder at 15°

RUBBER

Loop Length 12 Width .026 Rubber Vintage, Month and Year Late '96 . Weight of Loop. ____ . Turns Unknown

Back off Turns. ____ Launch Torque in inch ounces. .2

Turns Left. 20 Do you use O rings. Yes. ____ No. X

TRIM

Wash In, Wing Left panel .0625 Wash Out Left panel. 0

Wash Out, Right panel 0 Wash In, Right panel 0

Wash In Stab, Yes ____ No X How Much ____

Down Thrust. 0° . Left Thrust. 2° Special trim instructions. Add .0625+ Incidence to Wing, .125 in Boom and .125 Stab tilt

FORTY MINUTE CLUB

JANUARY 1998

NAME	COUNTRY	TIME	1*	2*	YEAR	SITE
BROWN, STEVE	USA	63:54	X		1996	SANTA ANA
RICHMOND, JIM	USA	56:35	X		1996	AKRON
RANDOLPH, BOB	USA	55:06	X		1993	SANTA ANA
BROWN, STEVE	USA	53:45		X	1997	SANTA ANA
ASLETT, BERNARD	UK	52:22	X		1983	CARDINGTON
UNDERWOOD, GARY	USA	51:58		X	1996	LAKEHURST
KOWALSKI, DICK	USA	50:41	X		1976	AKRON
DOIG, RICH	USA	50:41		X	1995	AKRON
BANKS, CEZAR	USA	49:50		X	1996	MOSCOW, IDAHO
RICHMOND, JIM	USA	49:44		X	1997	SANTA ANA
ROMAK, BUD	USA	49:35		X	1991	LAKEHURST
RANDOLPH, BOB	USA	49:31		X	1995	AKRON
BARR, LAURIE	UK	49:29		X	1996	CARDINGTON
HUNT, BERNARD	UK	49:07		X	1997	CARDINGTON
COSLICK, LARRY	USA	48:16		X	1997	SANTA ANA
SLUSARCZYK, DON	USA	48:10		X	1995	AKRON
BUTTY, RENE	SWI	48:01		X	1996	MOSCOW, IDAHO
KAGAN, JOHN	USA	47:58		X	1997	SANATA ANA
ROHRBAUGH, AL	USA	47:40	X		1997	AKRON
HARLAN, RAY	USA	47:13		X	1980	AKRON
ROBBINS, HERB	USA	46:41	X		1997	SANTA ANA
DOIG, RICH	USA	46:24	X		1983	AKRON
OTA, KENICHI	JPN	46:16		X	1996	MATUMOTO CITY
LOUCKA, LARRY	USA	46:14		X	1995	AKRON
CHILTON, STAN	USA	46:10		X	1994	AKRON
McGILLIVRAY, JACK	CAN	45:57		X	1996	MOSCOW, IDAHO
RODEMSKY, ERV	USA	45:50	X		1974	SANTA ANA
RIEKE, K. H.	GER	45:40	X		1962	CARDINGTON
MERKT, THOMAS	GER	45:27		X	1996	MOSCOW, IDAHO
GIBBS, BOB	USA	45:23		X	1995	SANTA ANA
REDLIN, CARL	USA	45:17	X		1962	CARDINGTON
ANDREWS, PETE	USA	44:59		X	1979	AKRON
MATHER, CLARENCE	USA	44:44	X		1974	SANTA ANA
ASLETT, BERNARD	UK	44:37		X	1985	CARDINGTON
DE BATTY, BOB	USA	44:35		X	1996	SANTA ANA
NICOARA, VASILE	ROM	44:30		X	1996	MOSCOW, IDAHO
HULBERT, BILL	USA	44:27		X	1994	AKRON
HACKLINGER, MAX	GER	44:20	X		1961	CARDINGTON
NORE, PENTTI	FIN	44:01		X	1986	CARDINGTON
ANDRE, THEDO	NED	44:01		X	1986	CARDINGTON
KOPECKY, ERNIE	USA	43:42	X		1963	SANTA ANA

*CLASS 1 – Over 65 cm   CLASS 2 – FAI 65 cm – 1 gram

Official and unofficial flights included (best effort only, by individual, by class is shown).

NAME	COUNTRY	TIME	1*	2*	YEAR	SITE
ROBBINS, HERB	USA	43:39		X	1995	SANTA ANA
ORSOVAI, DEZSO	HUN	43:37		X	1986	CARDINGTON
KUJAWA, SYLWESTER	POL	43:35		X	1992	WROCLAW
MANGALEA, CORNELIU	ROM	43:30		X	1996	MOSCOW, IDAHO
CUMMINGS, FRANK	USA	43:28	X		1963	SANTA ANA
REE, ANDRAS	HUN	43:27		X	1992	DEBRECEN
ATWOOD, BILL	USA	43:17	X		1963	SANTA ANA
ENOMOTO, HIDEYO	JPN	43:02		X	1997	MATUMOTO CITY
THOMAS, MIKE	CAN	43:01		X	1996	MOSCOW, IDAHO
PLOTZKE, RON	USA	42:53	X		1969	LAKEHURST
FOSTER, JOE	USA	42:44		X	1987	SANTA ANA
SIEBENMANN, DIETER	SWI	42:33		X	1986	CARDINGTON
CAILLIAU, LARRY	USA	42:29		X	1985	AKRON
DOMINA, DAN	USA	42:25		X	1979	AKRON
CANNIZZO, SAL	USA	42:20		X	1983	LAKEHURST
PYMM, DAVE	UK	42:03		X	1986	CARDINGTON
ROMAK, BUD	USA	42:01	X		1965	MOFFETT NAS
OBARSKI, DICK	USA	41:30		X	1981	AKRON
FINCH, TOM	USA	41:27	X		1963	SANTA ANA
CHAMPINE, BOB	USA	41:23	X		1963	SANTA ANA
RODEMSKY, ERV	USA	41:23		X	1979	AKRON
STOLL, ED	USA	41:21	X		1963	SANTA ANA
HOFFMAN, EARL	USA	41:13		X	1987	SANTA ANA
MATHER, CLARENCE	USA	40:54		X	1974	SANTA ANA
GANSER, RON	USA	40:53	X		1996	AKRON
TIPPER, JOHN	UK	40:47		X	1996	MOSCOW, IDAHO
DRAPER, RON	UK	40:44	X		1962	CARDINGTON
POPA, AUREL	ROM	40:42		X	1996	MOSCOW, IDAHO
BILGRI, JOE	USA	40:37	X		1965	SANTA ANA
NONAKA, SIGEYOSI	JPN	40:36		X	1978	CARDINGTON
STEVENS, DARRYL	USA	40:35		X	1986	SANTA ANA
SHEPHERD, JESSE	USA	40:33		X	1995	AKRON
BAILEY, BOB	UK	40:25		X	1987	CARDINGTON
KIHARA, KAZUMASA	JPN	40:21		X	1997	MATUMOTO CITY
LOTZ, RAINER	GER	40:20		X	1996	MOSCOW, IDAHO
GITLOW, LEW	USA	40:15		X	1987	SANTA ANA
MOSKALEV, VASILI	UKR	40:15		X	1996	MOSCOW, IDAHO
KALINA, JIRI	CZE	40:11		X	1975	CARDINGTON
RODENBURG, OTTO	NED	40:11		X	1986	CARDINGTON
TRIOLO, JOHN	USA	40:06	X		1974	LAKEHURST
MZIK, LARRY	USA	40:01		X	1995	AKRON

For additions, corrections, etc. send details to:
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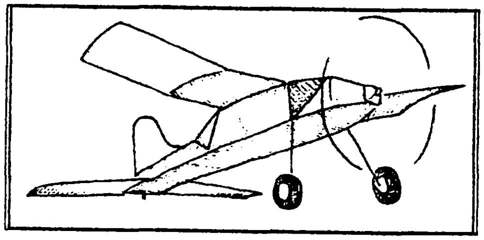

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June, 1998

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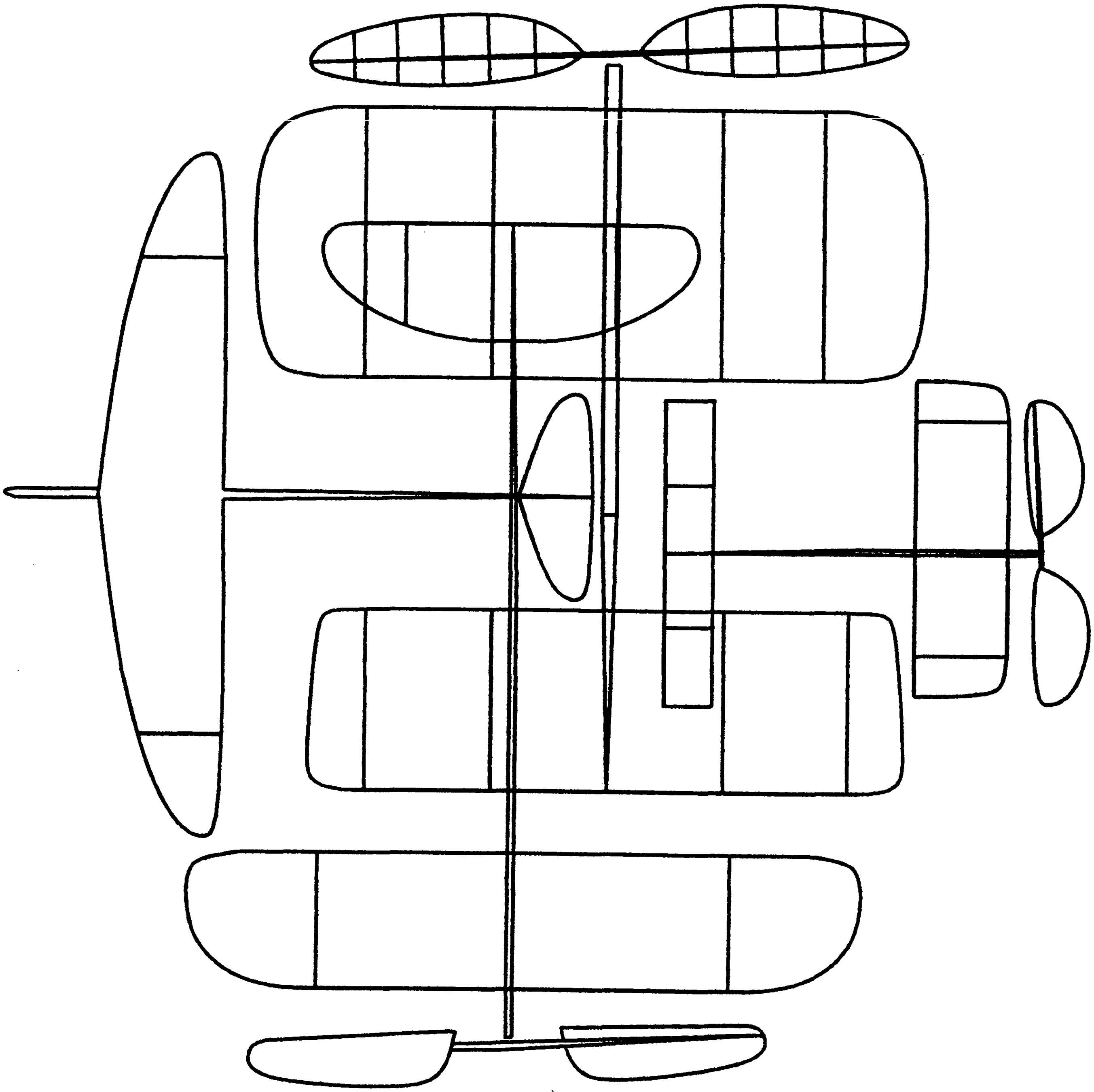
Johnson City, TN
1998



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SOME THOUGHTS ON INDOOR MODEL AIRPLANE PROPELLERS

Jim Grant

This article is written in response to a request which apparently assumes that my experience with full scale propeller blade design fifty plus years ago qualifies me as a model airplane propeller expert. The fundamental geometry and function are the same, but differences in scale effect and construction methods are apparent. Even longer ago I was fortunate to have learned about model propellers of all types from such modelers as John Tyskewicz, Herb Greenberg, Pete Andrews, and others. The request for this article also specified that it include "no math," so with that limitation let us begin.

First, a foreword is in order. I would emphasize that the propeller is the most important part of the model. A model may be accurately built, finished and rigged but if it has a poorly made, inefficient propeller, the flight results will be quite disappointing. Conversely, a good prop can haul an unbelievably ugly crate through the air. Pay attention to accuracy and suitability when making the propeller.

A propeller blade is a rotating airfoil which transforms horse power, through torque and revolutions rate into thrust, which propels the aircraft, just as a wing is an airfoil which provides lift to support the aircraft. They differ in that the wing moves on a flat plane through the air, whereas a propeller blade moves-along a helical path, and is itself a helical surface modified by thickness in the form of airfoil sections and bulk in the hub region. This intriguing shape, the helix, is a surface which is generated by a radius rotating about and translating along an axis at uniform rates of motion, Let us consider the elements of blade geometry: pitch, blade planform or shape, and airfoil section.

PITCH: The pitch of a propeller is the distance it moves forward in one revolution. It determines the pitch angle progression of the blade airfoil sections from hub to tip. These angles are measured with respect to the plane of rotation which is perpendicular to the thrust line. The progression of these airfoil pitch angles is called "basic pitch angle distribution." For some full scale aircraft, custom designed propeller blades will have slight variations from the basic distribution to accommodate changes in air flow caused by the shape of the forward nacelle or fuselage. However, for model airplanes, basic pitch angles without modification in the form Of "wash in" or "wash out" is probably the best choice, Although there is a slight relative increase in inflow velocity where the airstream passes through the tip area of the propeller disc, it may be advantageous not to "wash in" the tip to compensate, but rather to take advantage of the induced "wash out" which this slight inflow velocity increase causes, just as we "wash out" wing tips to minimize vortex drag and to delay stalling. The pitch angle in the shank or inboard area near the hub is also best left unchanged since this part of the blade provides very little thrust. For carved propellers it should be streamlined as best as possible.

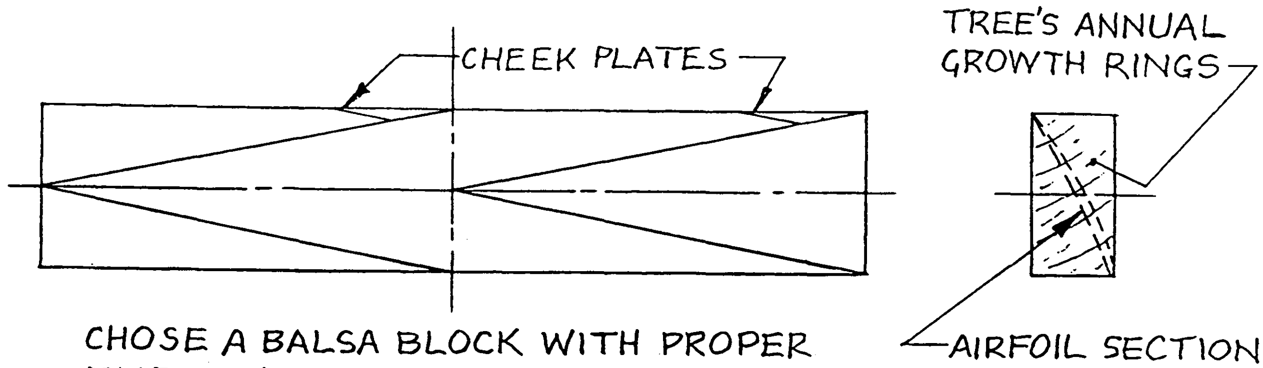
The propeller block shape which will provide perfect helical pitch is shown in figures 1-A, 1-B, and 1-C. A geometric shape such as this may be used either to carve a wooden propeller or as a form on which to construct built up propellers. A jig mounted on a flat board may be constructed having this form, composed of bulkheads located at specific blade radius percentages, each having the proper pitch angle. Next, all of the bulkheads are surfaced with planking.

The pitch we have been discussing is geometric or theoretical pitch. The actual pitch is less because, like any lifting airfoil the blade assumes an angle of attack to create its thrust. This angle will vary from as high as 6-8 degrees in a power climb to as little as 1 degree during the cruise regime. For a graphic idea of the two pitches see figure 2.

BLADE PLAN FORM: Depending upon limiting factors, such a diameter and function, blade shape may vary form a graceful willow-leaf pattern to a rather unattractive, but quite utilitarian rectangular paddle. The built up blades used on ultra-light models have no restrictions against diameter, pitch, or blade width, and may be shaped for high efficiency. For some other models, such as "Limited Penny Plane" or "Bostonian" the diameter is limited and yet these propellers must absorb the power of much heavier motors. The only answer is the use of wide paddle blades and higher pitch ratios (the ratio of the pitch to the diameter). Blade area distribution fore and aft of the spar may be varied to create blades of differing flaring capability. Several blade plan form shapes are shown in figures 3-A, 3-B, and 3-C.

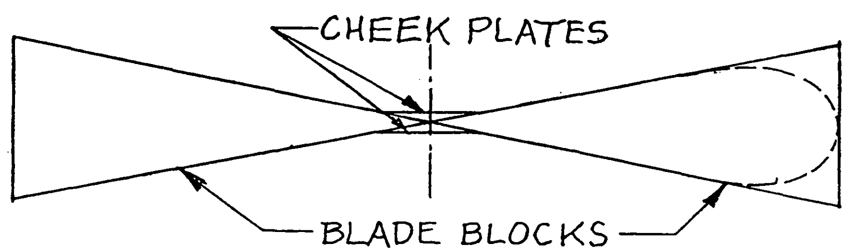
AIRFOIL SECTIONS: The section shape currently in use for ultra-lights, AMA Stick, F1D, ROG, etc. is a truncated ellipse with a camber height which may vary from 3-6 percent. Propellers whose blades are formed from sheet wood have a simple are for an airfoil shape. Carved propellers for flying scale, etc. have airfoil sections similar to the "Clark Y."

I hope that this article will provide some help to young modelers of all ages!!



CHOSE A BALSA BLOCK WITH PROPER END GRAIN TO OBTAIN QUARTER GRAIN BLADE TIPS AND DIVIDE AS SHOWN.

FIG. 1A



ASSEMBLE WITH WHITE GLUE AND LIGHT CLAMPING PRESSURE

FIG. 1B

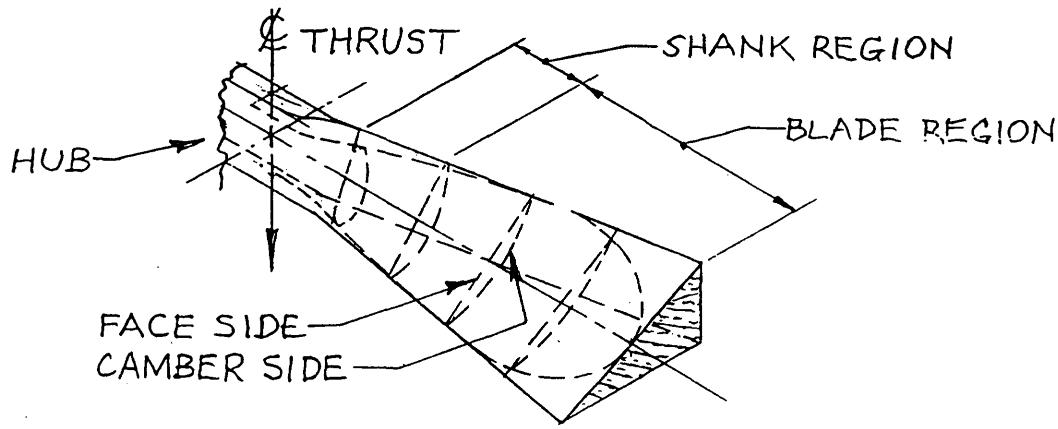
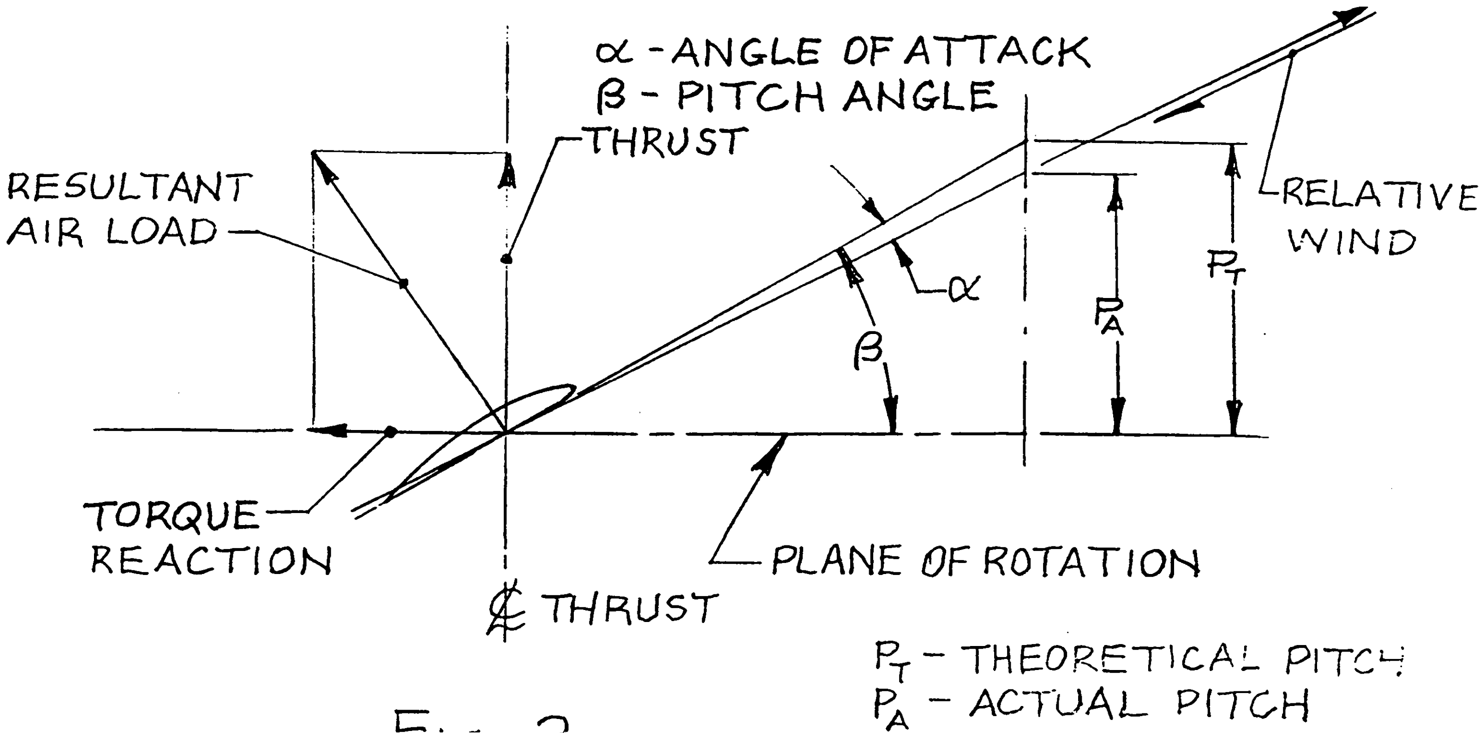
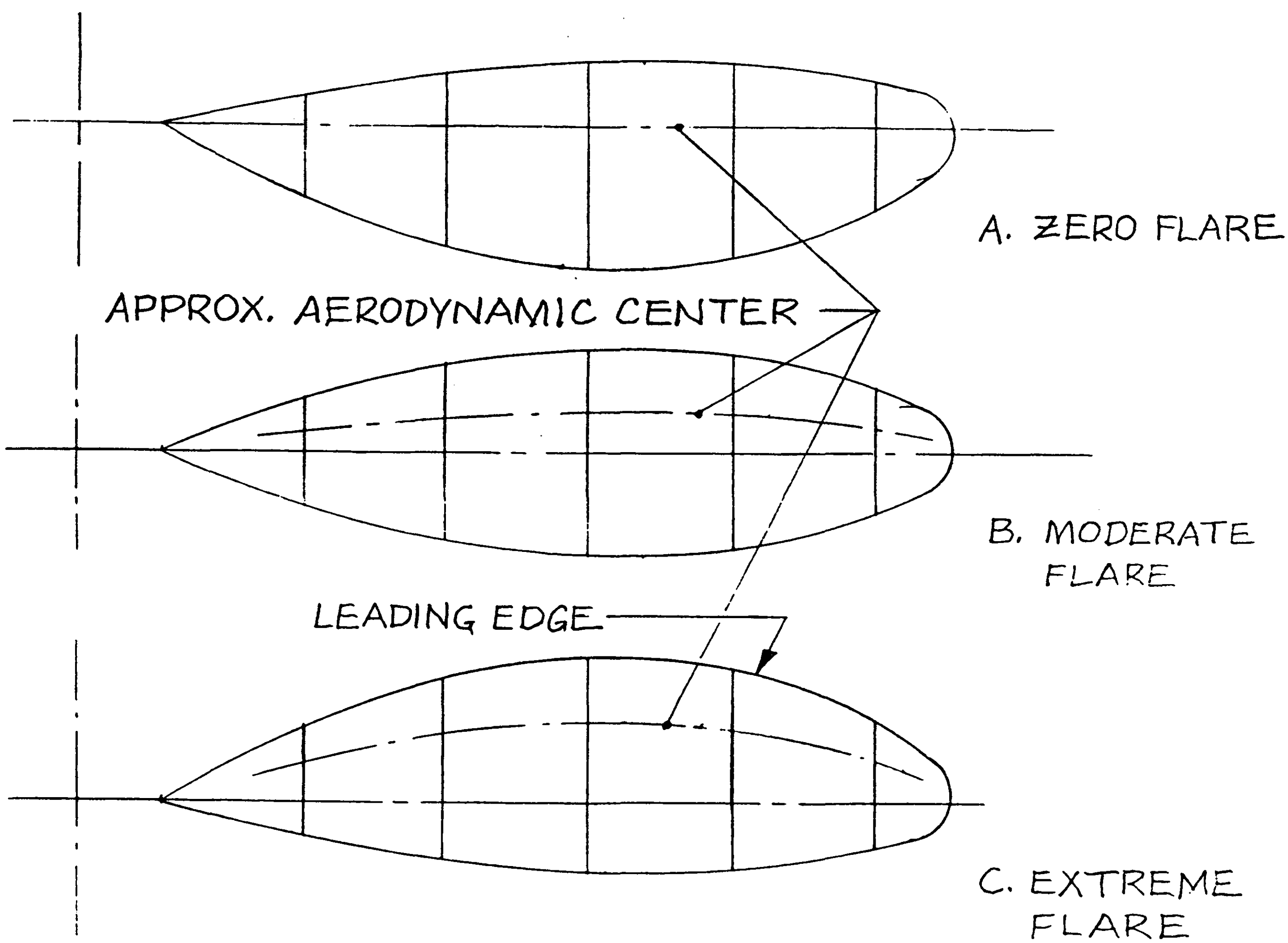


FIG. 1C



α - ANGLE OF ATTACK
β - PITCH ANGLE
THRUST
RESULTANT AIR LOAD
RELATIVE WIND
α
β
P_A
P_T
TORQUE REACTION
PLANE OF ROTATION
℄ THRUST
P_T - THEORETICAL PITCH
P_A - ACTUAL PITCH

FIG. 2



A. ZERO FLARE
APPROX. AERODYNAMIC CENTER
B. MODERATE FLARE
LEADING EDGE
C. EXTREME FLARE

FIG. 3

Use All the Air, But Not the Ceiling

By Larry Coslick

In my opinion, flaring props are the way to fly an EZB at Johnston City. When they are right, the model can get very good no touch times. The idea is to make a long, slow climb to the main beam, go into a long cruse, and then a slow decent. The flaring of the prop slows down the initial RPM and climb. Because early, stronger turns take longer to use, the climb is longer. When the model is torqued properly it will take about 13 minutes to reach the main beam or slightly above it. It will cruse for another 4 minutes and hopefully avoids a mid-air and lands with the winning time.

A flaring prop can use more rubber effectively that a symmetrical prop can. You need the wider cross section to give the cruise torque and let the flaring prevent too high a climb. I use a motor approximately 18% heavier than the weight of the model. My model weighs .53 gram and the rubber weighs .62 gram. Motor stick length compared to rubber motor length is also important. For my style of flying, an 8.5" M/S is just right with a 13" loop of rubber. 7 to 7.5" M/S models max out at about 27 minutes, you simply can't get the long cruse and let down with a short stick and long loop of rubber because the cruise torque is not high enough.

Light EZB's really like flaring props but they are a little harder to trim at full power (.12 to .13 in. oz. of torque.) I rarely launch above .12 in. oz., because these light props are easy to over power. They will usually flutter when launched above .14 in. oz. If your model weights from .5 to .6 grams and you have to launch above this torque, your prop is probable over pitched, its flaring too much, the rubber motor is undersized, or the model is out of trim. Don't think that by using a lighter motor your times will be better. The rubber has to be matched to the prop.

Flaring props are not hard to make, but you might have to make several to get a really good one. The magic is in the prop spar. A 12" spar with a .009" wire shaft should weigh no more than .035 grams. Build a deflection meter such as the one in the INAV issue #90, of the Hobby Shop EZB article. Assign the prop a number and record the deflection of the spar in both planes. Making prop spars is matter of trial and error. Start by making the spar, .040"X.065", tapered to .025" sq. at the tip. The prop blade outlines that I use are shown in INAV issue #85. They are made from .006" C grain 3.8 pound wood. Two blades will weigh about .075 gram. Use thinned aliphatic (yellow) glue when attaching the blades to the spar. Acetate type glues will continue to shrink, distorting the blades or changing the pitch angle. Prop flair is controlled by the position of the blades on the spar. The one that I use at Johnson City and the Kibbie Dome, has the spar mounted ¼" from trailing edge of the prop blade. Try different spar locations to get the amount of flair needed to control the climb.

If you are not satisfied with the way the prop flares, soak the blades off with water. There will be a small white patch on the spar line of the blades, where the glue was applied. Take a soft toothbrush and carefully brush away any remaining white glue, while the blades are still wet. Make a new spar and adjust the wood sizes according to whether you want more or less flair than before. Reform the blades before you put them back onto the new spar. I don't bake the blades when forming them, but air-dry them for several days.

My Akron Light EZB requires a fairly stiff tail boom. I still consider the boom of a good EZB to be part of its magic. The wing of this model must have about 1/16" to 1/18" wash in on the right wing panel. Stab wash is not needed on this model. Launch attitude and forward motion during the launch play a big part in the release of the model. The model needs to be launched slightly nose high. I usually launch my models with the prop and thrust bearing between the fingers of my right hand. I move my hand forward releasing the prop and model at the same instant. I don't believe in wasting turns when launching my models.

For safe, no touch flying you must know the exact launch torque each time the model is released. First of all, use O rings. They keep you from losing turns when transferring the motor from the torque meter to the model. You can make them from plastic Q-Tip sticks or ABS tubing from a model railroad hobby shop. Cut them about .020" with a single edge blade. Don't worry about the sharp edges, they don't cut the rubber motor. If your winder does not have a breaking system put one on it. After the motor is wound, there needs to be a device that holds the winder so that the motor is about ½" shorter than the distance between the prop and the rear hook. By being shorter, this helps eliminate grape vining when loading the rubber motor on the model. This device should be adjusted for each different length motorstick.

Work your way up to the ceiling. It's amazing how much a 2/100 in. oz. increase in launch torque will effect a light EZB when its 25 feet from the ceiling. It will put my model into the steel every time. During the practice session at Johnson City, put a balloon up to 50 feet. This will simulate a flight just under the main beam using a ½ motor. Get your model to climb to the top of the balloon. If there are no other models in the area of your EZB, move the balloon close to the model and have someone looking from the side determine the models height.

Indoor flying is not and probably never will be an exact science, but the closer we pay attention to small details the better are times will be.

For plans for putting a simple breaking system on your Wilder winder and a stooge that holds your winder and torque meter the proper distance apart, send me a self-addressed stamped envelope. Foreign subscribers send $1.00, no stamp. I also have plans for a hand held torque meter for EZB and mini-sticks. If you don't like O rings, you can get right on the prop and tell your launch torque. The plans also show how to calibrate a torque meter using any length wire and size to around .020" in diameter.

Larry Coslick
4202 Valley Crest Hills Dr.
St. Louis, MO 63128

USIC 1998 HAND LAUNCHED STICK # 201

	CONTESTANT	AMA NO.	Flt 1	Flt 2	Flt 3	Flt 4	Best Flight
1	Coslick, Larry	2004652	37:11	36:28	41:25	44:01	44:01
2	Doig, Richard	2005392	38:57	37:47			38:57
3	Kagan, J.		38:30				38:30
4	Slusarczyk, Donald	2005490	5:13	28:06	33:09		33:09
5	Tellier, Fred	2615254	32:56				32:56
6	Hardcastle, Richard	2000847	8:33	29:49			29:49
7	Thomas, Mike	2615041	25:22				25:22
8	Grant, James	2159477	22:35				22:35
9	Burke, Edward J.	2153313	20:12	19:48	8:04		20:12
10	Hacker, Vernon	9000304	14:25	17:09			17:09
11	Barr, Laurie		15:48				15:48
	Clem, Jim	9000055					DNF
	Landrum, Billie	2052674					DNF
	Leonard, Nicholas A., Jr.	2497460					DNF
	Leonard, Nick A.	2497461					DNF
	Loucka, Larry	2001210					DNF
	Nuszer, Joseph	2029036					DNF
	Vallee, Thomas	2001126					DNF
			FINAL SCORES				

USIC 1998 INTERMEDIATE STICK # 202

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	Flt 5	Best Flight
1	Hunt, Bernard		29:32	34:38	36:00	37:19	14:50	37:19
2	Kagan, John		34:14	16:11	35:49	31:06		35:49
3	McGillivray, Jack	2615483	28:49	35:06	34:25	17:14	20:05	35:06
4	Barr, Laurie		27:54	10:41	8:13	14:00	34:20	34:20
5	Slusarczyk, Donald	2005490	26:20	ATT	30:48			30:48
6	Hardcastle, Richard	2000847	28:56	30:38	13:11			30:38
7	Tellier, Fred	2615254	12:22	25:21	27:17	28:51		28:51
8	Barker, John	2002095	13:48	18:32	25:58	4:59	26:51	26:51
9	Sova, Tom	2473169	10:26	12:25	22:20	24:46	26:07	26:07
10	Grant, James	2159477	19:33	26:01	24:17	4:09	26:04	26:04
11	Olshefsky, Peter	2614476	22:03	4:33	24:57	19:13		24:57
12	Thomas, Mike	2615041	21:52	17:56	8:21			21:52
13	Nuszer, Joe		20:21	21:33				21:33
14	Romash, Robert	2130061	19:34	20:46	20:02			20:46
15	Belleff, Daniel		1:44	14:48	20:41			20:41
16	Hacker, Vernon	9000304	10:31	13:06	18:33			18:33
17	Slusarczyk, Charles	2002643	16:24					16:24
18	O'Grady, Dan	2614475	6:08					6:08
	Vallee, Thomas	2001126						DNF
	Raymond-Jones, D.C.	2063358						DNF

USIC 1998 FID # 203

PLACE	CONTESTANT	AMA NO.	FLT. 1	FLT. 2	FLT. 3	FLT. 4	FLT. 5	FLT.6	TOTAL BEST TWO
1	Coslick, Larry	2004652		43:29	42:53				86:22
2	Kagan, J.		40:27	41:28		36:27			81:55
3	Doig, Richard	2005392	36:16	39:03	37:16	37:12	33:58	7:21	76:19
	Thomas, Mike	2615041	35:17	35:42					70:59
	Hunt, Bernard		26:45	10:19	42:11				68:56
	Hulbert, William	2001317	22:15	31:54	27:37	35:39			67:33
	Vallee, Thomas	2001126	26:54	31:54	33:05	31:31			64:59
	Tollier, Fred	2615254	36:40	23:58					60:38
	Joshu, Eugene	2260643	25:51	29:38	30:56	9:03			60:34
	Leonard, Nick	2497461	24:54	11:59	19:20	25:26	27:43		53:09
	Leonard, Nicholas	2497460	23:03	24:20	23:21				47:41
	Clem, Jim	9000055	16:17						16:17
	Hacker, Vernon	9000304	13:03						13:03
	Slusarczyk, Donald	2005490							
	Slusarczyk, Charles	2002643							
	Burke, Edward	2153313							
				FINAL SCORES					

USIC 1998 UNLMTD CLASS CAT GLIDER # 219

PL	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	FLT 6	FLT 7	FLT 8	FLT 9	BEST FLIGHT	SECOND BEST FLT	10
1	Boehm, Bernard	2092567	80.1.	83.2	86.2	85	84.1	82	83.5	76.3	DNF	86.2	85	171.2
2	Von Bueren, Karl	2051477	79.8	80	77.6	77.7	75.6	75.6	82.7	79.2	83.3	83.3	82.7	166
3	Warmann, Robert	2018748	80.2	78.4	74.4	8.2	21.4	73	DNF	DNF	DNF	80.2	78.4	158.6
4	Schlarb, Ralph	2322352	78.5	74.3	78.8	79.5	65.4	74.5	DNF	DNF	DNF	79.5	78.8	158.3
5	Schlarb, W.L.	2014425	78.5	74.2	76.8	78.7	77.2	79.1	DNF	DNF	DNF	79.1	78.7	157.8
6	Fulmer, Keith	2031552	75.5	73.5	56.2	71.5	69.7	75	64.1	71.2	DNF	75.5	75	150.5
7	Romash, Robert	2130061	74.9	75.1	74.5	DNF	DNF	DNF	DNF	DNF	DNF	75.1	74.9	150
8	Person, Lee	2383504	75.2	59.9	74	71.5	73	58	70.6	72.5	73.5	75.2	74	149.2
9	Cawthorne, John	2560561	73.8	73.7	69.8	75	72.4	64.2	70.6	73.4	71.9	75	73.8	148.8
10	Marett, John	2616261	70.4	67.6	69.4	68.2	66.6	62.2	67.8	72	67.6	72	70.4	142.4
11	Belieff, Dan	12816	44.5	52.6	72.6	61	63.4	67.7	67.5	69.4	67.1	72.6	69.4	142
12	Nishanian, Peter	2589485	62	32	61	38.3	10.2	61.6	53.8	56.7	DNF	62	61.6	123.6
13	Johnson, T.E.	2016707	49.7	50	55.2	47	53.6	54.7	DNF	DNF	DNF	55.2	54.7	109.9
14	Vandover, Abram	2000894	12.8	47.5	45	46.6	46.7	48.6	45.8	42.9	40.3	48.6	47.5	96.1
15	Thomas, Mike	2615041	39.1	5.8	19.4	32.9	36.1	30.7	42.3	7	26.8	42.3	39.1	81.4
	Cawthorne, John, Jr.	2560562	(Junior)											DNF
	Doig, Richard	2005392												DNF
	Kimball, Bruce	20559849												DNF
	Kelly, James	2037564												~~DNF~~ DNF
						FINAL SCORES								

USIC 1998 EASY B # 206

PLACE	CONTESTANT	AMA NO.	FLT. 1	FLT. 2	FLT. 3	FLT. 4	FLT. 5	BEST FLT.
1	Coslick, Larry	2004652	26:13	28:16	29:50			29:50
2	Cailliau, Lawrence	2079985	27:42	27:17	27:41	28:07		28:07
3	Hunt, Bernard		19:16	27:27				27:27
4	McGillivray, Jack	2615483	26:17	22:47	10:36	27:24		27:24
5	Slusarczyk, Donald	2005490	23:51	26:21	23:23	23:54	24:25	26:21
6	Kimball, Bruce	2059849	21:33	25:15	25:34			25:34
7	Thomas, Mike	2615041	9:53	22:10	25:19			25:19
	Gardner, Steve		19:30	25:00	24:07			25:00
	Tellier, Fred	2615254	21:10	23:45	19:03			23:45
	Walton, Nick	2397340	6:32	19:02	23:36	21:45		23:36
	Barr, Laurie		23:18	4:02	19:41	10:20	21:57	23:18
	Van Gorder, Walter	2019912	20:32	23:12				23:12
	Hardcastle, Richard	2000847	22:11	19:35	20:56	20:24	22:16	22:16
	Raymond-Jones, D.	2063358	0:08	19:15	20:03	21:59		21:59
	Sova, Tom	2473169	15:51	19:15	21:12	21:06	8:30	21:12
	Obarski, Richard		19:01	16:26	18:29	18:47	20:33	20:33
	Kagan, John		19:46					19:46
	Olshefsky, Peter	2614476	6:33	11:21	10:35	19:42	8:16	19:42
	Kehr, Joe	2549294	18:28	12:26	6:04	13:52	5:35	18:28
	Fellin, John	2095353	13:24	15:11	16:21	15:44	17:45	17:45
	Slusarczyk, Charles	2002643	15:38	17:42	10:15			17:42
	Wisniewski, Gordon	2000716	17:26	11:40	13:09			17:26
	Zufelt, James	2615152	7:21	3:13	9:29	13:49	17:13	17:13
	Singer, Len	2209081	17:10					17:10
	Vallee, Thomas	2001126	16:47					16:47
	Barber, Douglas	2056270	15:49	10:21	15:08	16:31		16:31
	Romash, Robert	2130061	15:26	15:57	16:00	16:28		16:28
	Barker, John	2002095	13:49	15:25	10:13	13:52	0:28	15:25
	Hacker, Vernon	9000304	10:42	13:36	5:11			13:36
	Wrzos, Chester	2020454	12:33	11:26				12:33
	Tellier, Robert		7:09	12:20				12:20
	Rash, Fred	2063458	11:22	12:09	11:44			12:09
	Vandover, Abram	2000894	10:58	12:00				12:00
	Cawthorne, John	2560561	11:52	11:38				11:52
	Von Bueren, Karl	2051477	8:52	6:49	4:40			8:52
	Joshu, Eugene	2260643	0:13					0:13
	Phillips, W.H.	2009088						DNF
	O'Grady, Dan	2614475						DNF
	Martin, William							DNF
	Grant, James	2159477						DNF
	Clem, Jim	9000055						DNF
			FINAL SCORES					

USIC 1998 PENNYPLANE # 207

PLACE	CONTESTANT	AMA NO.	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flight
1	Thomas, Mike	2615041	18:47	16:29	18:17			18:47
2	Hunt, Bernard		17:35	17:58	18:33	18:20		18:33
3	Olshefsky, Peter	2614476	17:16	17:19	16:56	18:08		18:08
4-TIE	Walton, Nick	2397340	16:35	17:42	16:59	17:09	3:44	17:42
4-TIE	Wisniewski, Gordon	2000716	8:00	16:26	9:58	17:18	17:42	17:42
5	Hartman, Phillip	2008667	11:59	15:40	17:12	7:15	6:35	17:12
6-TIE	Coslick, Larry	2004652	12:40	13:52	15:17	16:21	15:48	16:21
6-TIE	Tellier, Fred	2615254	13:02	16:21				16:21
	Kagan, J.		15:58	16:17				16:17
	Clem, Jim	9000055	15:41	15:05	9:29			15:41
	Warmann, Robert	2018748	15:35	13:58	12:19			15:35
	Landrum, Billie	2052674	14:08	10:28	14:31	15:11	6:00	15:11
	Grant, James	2159477	15:09					15:09
	Hardcastle, Richard	2000847	15:08	14:42	10:41			15:08
	Nuszer, Joseph	2029036	14:30	15:08				15:08
	Vallee, Thomas	2001126	8:04	14:19	15:07			15:07
	Obarski, R. W.	2000560	11:05	12:20	11:41	4:24	14:39	14:39
	Kirby, Noel C.	2267885	12:59	14:31				14:31
	Sova, Tom	2473169	9:11	14:17	7:32	14:31		14:31
	Cawthorne, John	2560561	12:53	14:01				14:01
	Phillips, W.H.	2009088	10:58	13:34	11:23	11:38		13:34
	Rash, Fred	2063458	13:12	13:05				13:12
	Kimball, Bruce	2059849	11:52	13:01	13:01			13:01
	Romash, Robert	2130061	11:31	12:20	10:06	9:05	11:32	12:20
	Sullivan, Edward	2069585	8:46	8:56	5:41	12:13		12:13
	Tellier, Robert		9:14	10:35	11:13	7:45		11:13

Place	CONTESTANT	AMA NO.	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flight
	Barber, Douglas	2056270	10:07	11:04	11:04			11:04
	Hacker, Vernon	9000304	7:02	9:19	8:53	10:46		10:46
	Wrzos, Chester	2020454	10:35					10:35
	Kent, Michael	2614477	9:50	10:26	9:25			10:26
	Von Bueren, Karl	2051477	10:10	10:20				10:20
	Zufelt, James	2615152	9:16	8:10	9:45	10:06		10:06
	Italiano, A.J.	2002386	9:28	8:49	2:24	2:28	9:43	9:43
	Raymond-Jones, D.	2063358	7:03	8:43				8:43
	Tenny, Bud		5:24					5:24
	Bakay, Carl	2478659	DNF					
	Fellin, John	2095353	DNF					
	Gagliano, Victor	2110081	DNF					
	Joshu, Eugene	2260643	DNF					
	Loucka, Larry	2001210	DNF					
	O'Grady, Dan	2614475	DNF					
	Plassman, Gerald E.	107613	DNF					
	Slusarczyk, Charles	2002643	DNF					
	Vandover, Abram	2000894	DNF					

USIC 1998 LTD. PENNYPLANE # 208

Place	CONTESTANT	AMA NO.	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flight
1	Cailliau, Lawrence	2079985	15:07	16:04				16:04
2	Kagan, John		13:48	13:38	15:30	15:03		15:38
3	McGillivray, Jack	2615483	11:54	12:05	14:31	15:25	12:53	15:25
4	Thomas, Mike	2615041	14:26	15:03	13:39	15:24	6:55	15:24
5	Marett, John	2616261	4:13	12:58	14:12	12:39	14:56	14:56
6	Hunt, Bernard		13:25	14:55				14:55
7	Wisniewski, Gordon	2000716	13:43	14:11	14:46			14:46
8	Krol, Greg		14:41	3:21	9:46	11:29		14:41
9	Clem, Jim	9000055	12:55	13:08	14:30			14:30
	Miller, Richard	2179518	13:16	14:14	12:42			14:14
	Cawthorne, John	2560561	14:01	7:22	14:07			14:07
	Grant, James	2159477		12:02	13:01	12:14	14:02	14:02
	O'Grady, Dan	2614475	12:15	13:56				13:56
	Romash, Robert	2130061	13:55					13:55
	Sova, Tom	2473169	11:16	13:42	13:17	13:51		13:51
	Tellier, Fred	2615254	13:03	13:50	13:07	13:47	6:55	13:50
	Van Gorder, Walt	2019912	12:59	13:48	3:31			13:48
	Olshefsky, Peter	2614476	11:59	13:43	12:09			13:43
	Von Bueren, Karl	2051477	10:50	13:29	13:42			13:42
	Kehr, Joe D.	2549294		12:28	13:13	12:52	13:33	13:33
	Gardner, Steve			13:13	11:09	13:26	11:27	13:26
	Joshu, Eugene	2260643	13:24	13:00	12:54	12:19		13:24
	Kimball, Bruce	2059849	12:51	13:17				13:17
	Barr. Laurie		12:02	13:06	11:55	2:41		13:06
	Barker, John	2002095	12:04	1:29	4:29	13:04	5:45	13:04
	Warmann, Robert	2018748	13:02	11:47	11:26	3:43	4:11	13:02
	Hardcastle, Richard	2000847	3:35	11:47	12:58	11:04		12:58

Place	CONTESTANT	AMA NO.	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flight
	Hacker, Vernon	9000304	9:50	10:40	12:55	10:20	9:20	12:55
	Walton, Nick	2397340	2:12	12:51	12:18	10:39	3:26	12:51
	Hartman, Phillip	2008667	12:33	3:59	12:41	12:49		12:49
	Rash, Fred	2063458	12:32	12:31	2:30			12:32
	Barber, Douglas	2056270	9:25	11:40	12:10	4:59	12:28	12:28
	Coslick, Larry	2004652	11:47	12:24	5:16	5:46	5:12	12:24
	Martin, Wm.		12:24	10:20	11:33	3:23		12:24
	Raymond-Jones, D.	2063358	12:14	10:12	7:43	7:26	10:49	12:14
	Slusarczyk, Charles	2002643	12:03	3:31				12:03
	Fellin, John	2095353	11:31	6:11	11:32			11:32
	Singer, Len	2209081	4:29	11:28				11:28
	Diebolt, H. J.	2097263	8:47	9:35	6:36	1:38	11:27	11:27
	Slusarczyk, Don		2:52	11:26	9:46			11:26
	Sullivan, Edward	2069585	6:48	11:06	9:24			11:06
	Nuszer, Joseph	2029036	8:04	10:57				10:57
	Tellier, Robert		10:35	10:52	9:25	9:19		10:52
	Vandover, Abram	2000894	7:18	8:09	10:16	10:41	10:16	10:41
	Wrzos, Chester	2020454	10:39	7:16	9:38			10:39
	Cawthorne, John, Jr.	560562	10:39	10:35				10:39
	Campbell, Dann	2346641	8:32	9:59	9:34	10:24		10:24
	Zufelt, James	2615152	10:21	4:22	7:29	7:34	8:38	10:21
	Boone, Jack L.	2107857	8:07	9:34		10:14		10:14
	Kent, Michael	2614477	7:58	7:31	9:20	6:51		9:20
	Italiano, A.J.	2002386	7:31	8:35	6:48	9:18		9:18
	Tenny, R.		8:28					8:28
	Landrum, Billie	2052674			8:24			8:24
	Kirby, Noel C.	2267885	7:00	2:37				2:37
	Bakay, Carl	2478659						DNF

USIC 1998 HELICOPTER # 209

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Thomas, Mike	2615041	8:43	8:12	8:56			8:56
2	Loucka, Larry	2001210	7:10	8:30				8:30
3	Diebolt, H. J.	2097263	4:16	6:33				6:33
4	Vallee, Thomas	2001126	ATT (:50)	5:16	1:28	2:07	5:25	5:25
5	Ripley, Ed	2484619	2:46	4:35				4:35
								0:00
				FINAL SCORES				

USIC ROG CABIN # 204

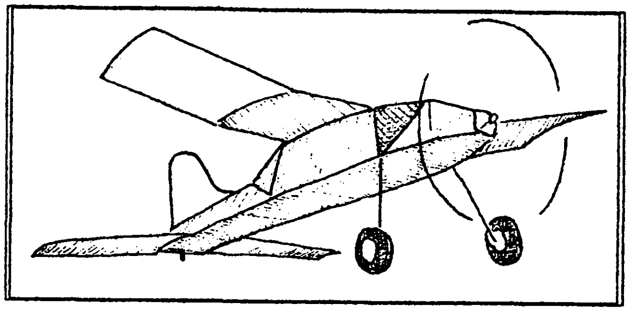
PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	FLT 6	BEST FLIGHT
1	Loucka, Larry	2001210	21:40	30:19					30:19
2	Slusarczyk, Donald	2005490	27:19						27:19
3	Thomas, Mike	2615041	21:24	24:35	26:57				26:57
						FINAL SCORES			

USIC 1998 MANHATTAN # 205

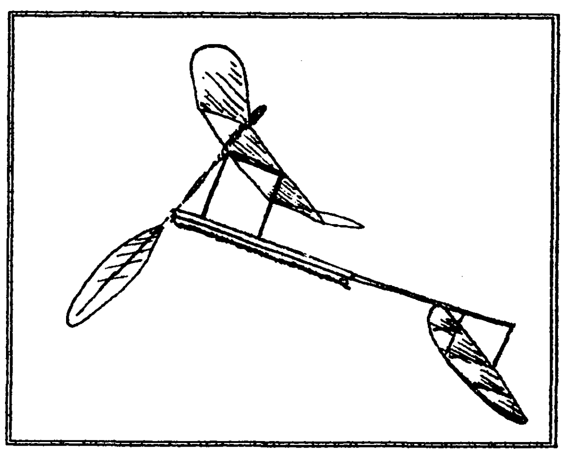
PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	FLT 6
1	Coslick, Larry	2004652	11:44	13:58				13:58
2	Van Gorder, Walter	2019912	13:31	13:41 DROPPED PARTS				13:31
3	Thomas, Mike	26115041	10:39	8:34	12:17	2:59	12:29	12:29
4	Marett, John	2616261	9:05	10:20	11:37	4:02		11:37
5	Loucka, Larry	2001210	9:34	11:23				11:23
6	Grant, James B.	2159477	2:30	8:56	10:24	9:39	10:59	10:59
7	Slusarczyk, Charles	2002643	7:40	9:54	10:14			10:14
8	Diebolt, H. J.	2097263	8:34	8:26	9:29	8:54	9:36	9:36
9	Schutzel, Emil	2508384	6:59	7:32	9:30	7:10	7:57	9:30
10	Tellier, Fred	2615254	8:08	8:53				8:53
11	Raymond-Jones, D.	2063358	2:28	7:34	8:13			8:13
12	Martin, William		6:02	6:32	4:35	6:32		6:32
13	O'Grady, Dan	2614475						DNF
				FINAL SCORES				

USIC/AMA Nats Highlights
By Steve Gardner

A very nice contest. Lots of events to fly and to watch along with lots of nice people to talk to and learn from. Not as many people as last year though, entries are steadily dropping for various reasons and so this contest is becoming a bit more intimate. We sure could use a few more new faces, especially younger ones.

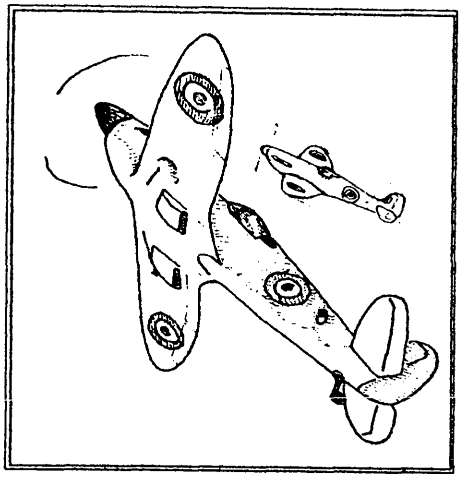


Which batch are you using? Rubber was on the minds of most of the rubber flyers this year. With the last few batches of FAI tan II testing very good to great it looked for a while that 8/93 would loose the crown as the best rubber ever. Not yet. What is probably the next best rubber, 7/97, is turning out to be a fickle material. I used a single motor made from 7/97 and wound as tight as a tick for four LPP flights in a row without any problems, yet Larry Coslick tried it and blew up several motors before turning to 8/93 for the rest of the day. 7/97 can perform as well as 8/93 if you are lucky and get a good piece, but 8/93 is still the best choice for most events. One exception may be events that demand good cruise performance like LPP and Bostonian. For these events 10/97 or 12/97 may be the hot ticket. These batches do not have the initial power that 7/97 or 8/93 have, but they do seem to have a very good cruise phase. Several flyers used 10/97 for Bostonian with great results. This rubber is tough! It will take lots of turns and hang in there during cruise.

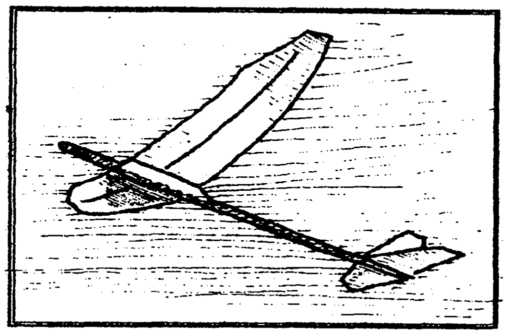


There may have been lots of new rubber flying around, but most people stuck with tried and true model designs. Larry and I were very pleased to see a very large number of well-built Hobby Shop EZBs floating around. All the identical models made for difficult model identification with the prop blade profile being the best way to tell yours from theirs. An exception to the same old thing rule was Bernard Hunt and his fleet of new "Stork" style models. Bernard is trying to eliminate the interference between the wing and the stab on his models by using very long wing posts and mounting the stab on the bottom of the fin. These models are a bit odd looking at first, but when in flight they are graceful, reminding me of tall ships.

Bernard also spearheaded the introduction of the newest FAI event, F1M, to American contests. A demonstration of F1M, also known as F1Db or F1D beginner, was flown along with an informal contest. Like outdoor rubber where there is a weight limit on the rubber carried to lower performance. Plans and details about this new event were included in the previous INAV issue.



In the scale events there was just a fair turnout with the FAC events leading the way like always. The group lead by Tim Lavender from Smyrna made their presents known by fielding several juniors who each had some very good models. Several pretty profile scale models along with a few peanuts, pistachios, bostonians, and even three coconuts were campaigned by this FAC group. Mr. Lavender is to be commended for once again serving as the sparkplug for this wonderful group of young flyers as well as for the very well built scale models he flew himself. A couple hundred of people like him and we would not have a junior problem.



The glider guys filled the air with whistling balsa as usual. It is really amazing how long they can get a bit of balsa to stay up by just shooting or tossing it up into the air. Not all the things whistling around were made of balsa, either. Bruce Kimball was flying an all composite HLG. Just blue foam, carbon, fiberglass, and epoxy. Built like a state of the art R/C sailplane with the wings vacuum bagged to give a perfect finish. He even had a wing built with elliptical dihedral using this method. Innovation did not die when they outlawed the folders! With the precise control this method allows perhaps the search for the magic airfoil will get a good bit further along. I think you will see more of these models in the future.

I do have to sound one discordant note. For some reason the method of choosing the Grand Champion outlined in the AMA rulebook was simply ignored. The rules state that each contestant can choose a certain number of specific events (9 in the this case) to be used to compile his personal score from, and that the scores from each individual event be "normalized" (the winner gets 100 points, 2nd gets a percentage of 100 based on the percentage his best time was of the winners best time. Example: winner, 200 seconds = 100 points, 2nd place, 180 seconds = 90 points). The points are them added up from the events chosen by the contestant. The way this contest was scored appeared to be that all 21 events were counted, and in each event there was no effort to normalize the score. A flyer one second out of first place scored as poorly as one in 2nd place with less than half the time of the winner. It boiled down to who had the time to fly the most events instead of who flew the best. There is a movement afoot to change the way the rule book reads to simplify the scoring and eliminate the exotic, low participation events. Let us know what you think, OK?

Picture Captions

1. Nick Lenard Jr. member of the US F1D world championship team going to Salonic, Romania this October
2. Chuck Slusarczyic and his new design Pennyplane.
3. Mike Thomas prepares his ROG cabin for a test flight.
4. Peter Olshefsky and his 35CM stick.
5. Bill Hulbert putting his F1D together.
6. Bernard Hunt with the EZB version of his unusual "stork" series of models designed to get the stab out of the wing's wake.
7. Larry Coslick preparing to fly his hand launch stick model.
8. Bernard Hunt with his F1D version of his "stork" series.
9. Bernard Hunt's F1D in flight.
10. Larry Coslick adjusts his F1D.
11. Gene Joshu came to the USIC to break 30 minutes with his plastic covered F1D and he did just that.
12. Here shown in flight, Gene's F1D managed a 30:56.
13. Jim Clem with his Pennyplane.
14. Curtiss Robin rubber scale
15. Jack McGillivary's rubber scale Arado.
16. Rich Miller's wonderful Peanut scale Piper Vagabond.
17. P-39 Aircobra rubber scale.
18. Bellanca observation rubber scale model in flight.
19. John Blair with his Pastachio sized Phantom Flash.
20. Joseph Falconberry with his profile scale Cosmic Wind. Joseph is a member of the Smyrna, Tennessee group.
21. Jack Mc Gillivary with his rubber scale Moth Minor.
22. A Focke Wulf observation rubber scale model by Wayne Anderson of the Smyrna FAC club.
23. Wayne Anderson's rubber scale Me 109.
24. Rich Miller and Jack McGillivary with their incredible peanut Spitfires. Rich beat out Jack's spitfire in the WWII mass launch by just a few seconds, winning the event.
25. Rich's beautiful Spitfire.
26. The Smyrna FAC work area. Nice variety!
27. Tom Vallee with his EZB.
28. Larry Coslick winds his Manhattan Cabin model in preparation for his setting a new site record.
29. Joe Nuszer flying his Intermediate stick model.
30. Tom Sova placed second with his Pro-20.
31. Larry Loucka watches Don Slusarezyk launch his autogyro.
32. Bill Martin winds his Cabin model.
33. Bob Romash with his cute little rubber scale foamy.
34. Bruce Kimball and his very modern all composite HLG. Slick!
35. Fred Tollier, do you know where this piece fits?.........
36. It must go with this wing.........
37. Hey! What do ya know, its an F1D!
38. James Zufelt did a personal best time in EZB of 17 minutes.
39. Bernard Hunt's Pennyplane version of his "stork" design series.
40. Jennifer Smith with her Limited Pennyplane.
41. Michelle Boyd with her two-time winning first place coconut scale General Aristocrat.
42. Marcus Conner launches his coconut scale Evans Volksplane.
43. Smyrna FAC with their Coconut scale models.
44. Bobby Jacobs with his Limited Pennyplane.
45. Tim Lavender, the leader of the Smyrna FAC group, with his Bristol Scout rubber scale model.
46. Stephanie Victory with her Profile scale model.
47. Daniel Jones with his semi-scale glider.
48. Robert Stevens launching his Coconut scale Lockheed Vega. This model really flew well. Robert also placed first in the Junior Limited Pennyplane event with an 11:35!
49. Robert's Vega on the wing.
50. Rich Miller assembling his Currie Wott on floats rubber scale model.
51. Steve Gardner's colorful Monarc Bostonian, managed a 1.19 charisma score using tissue colored with an ink jet printer.
52. Mike Thomas, the 1998 Grand Champion, flew in all 21 AMA events! Here he is with his rubber scale Voison.

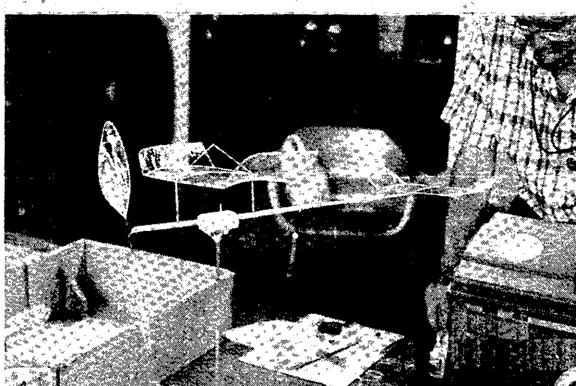
1998

Johnson City, TN


1


2


3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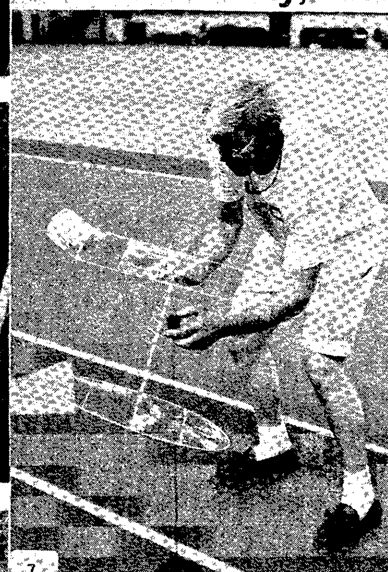
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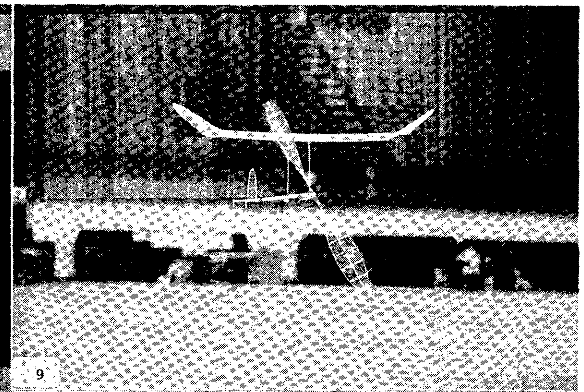
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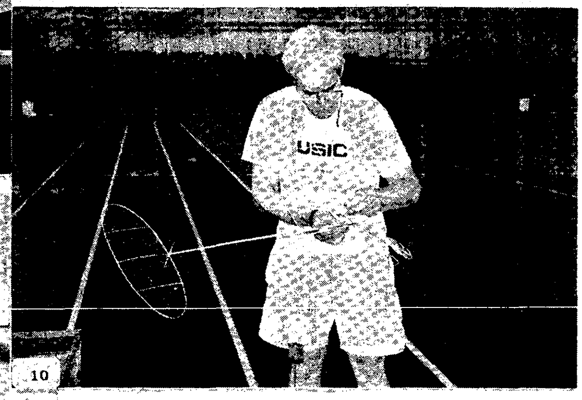

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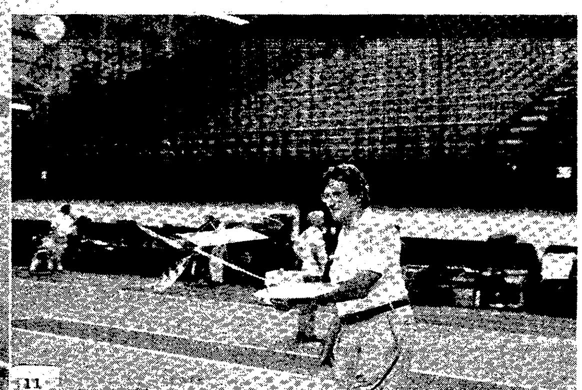
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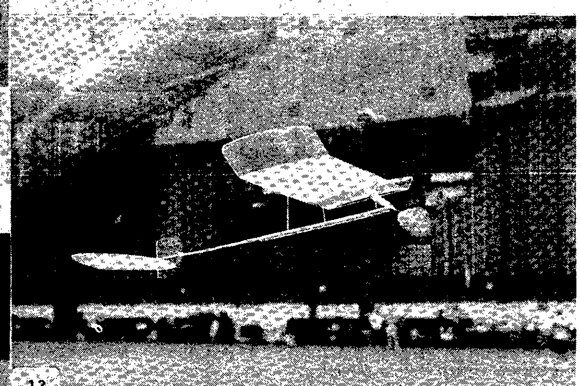
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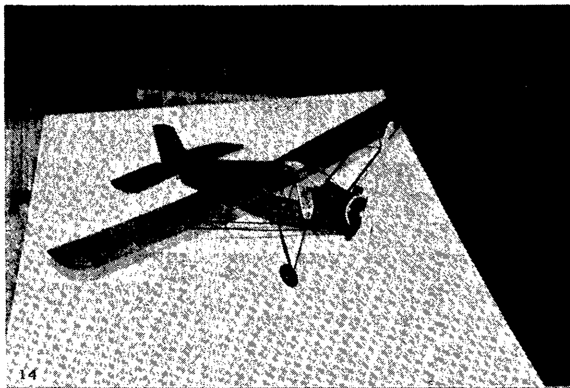
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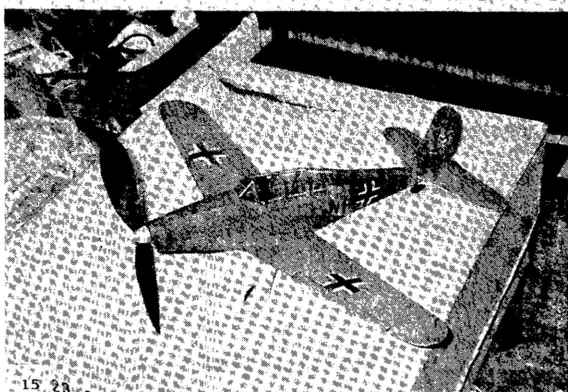
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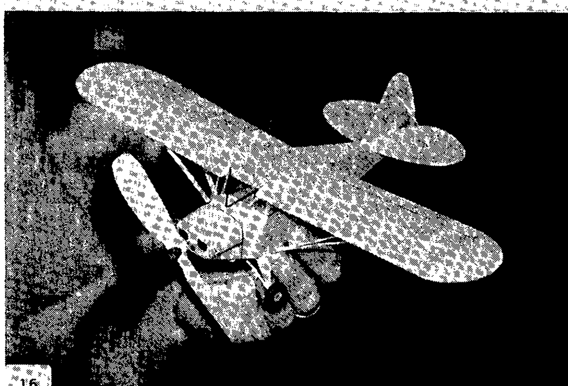
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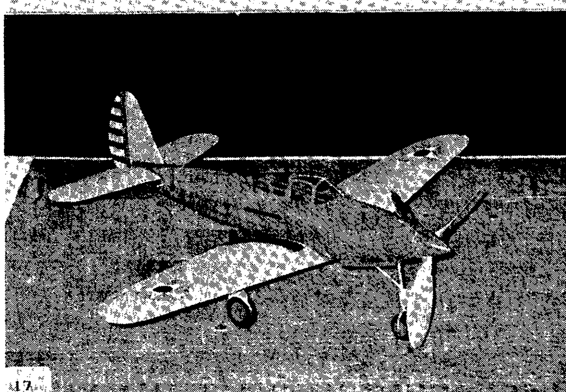
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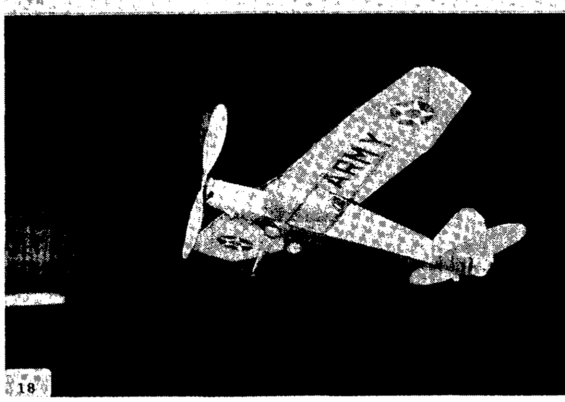

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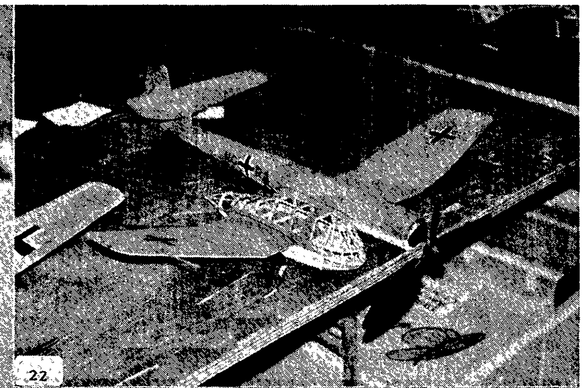
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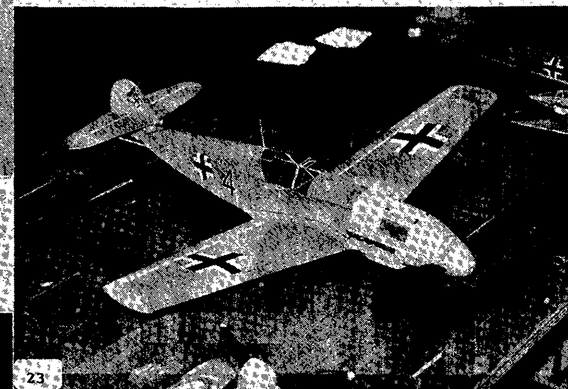
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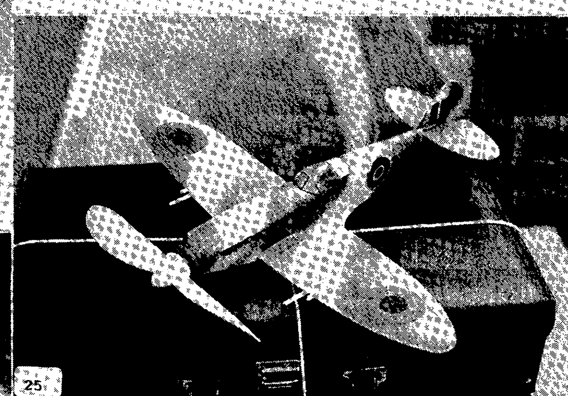
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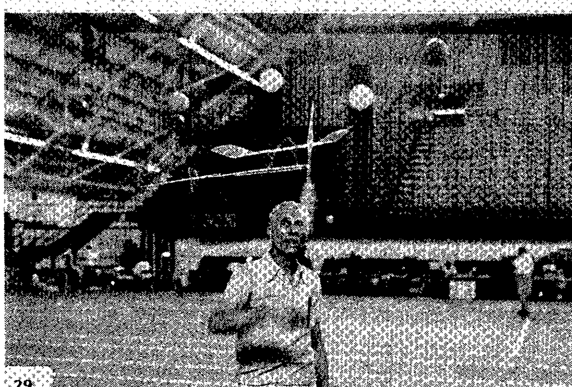
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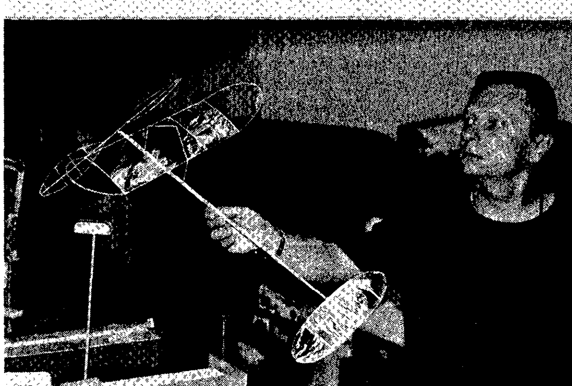
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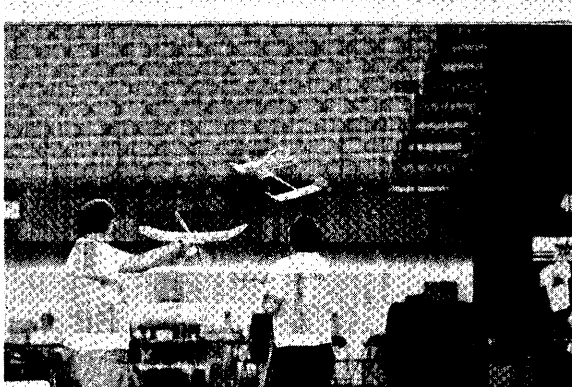
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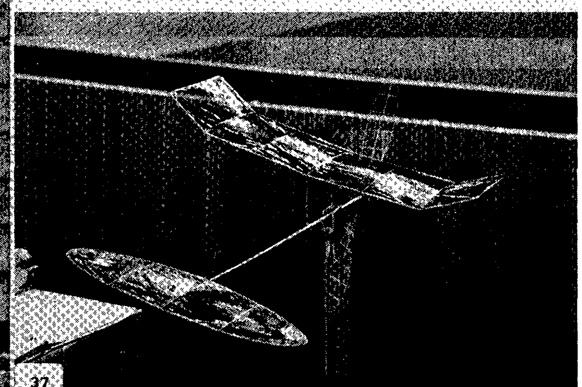
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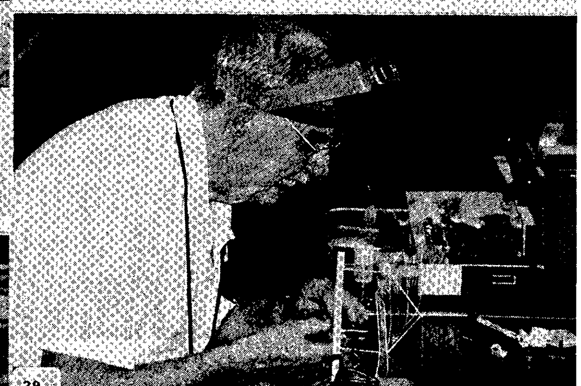
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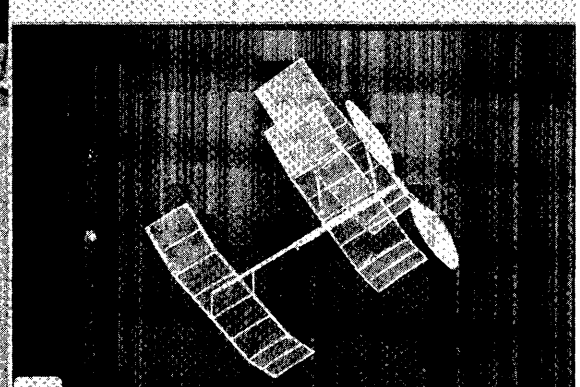
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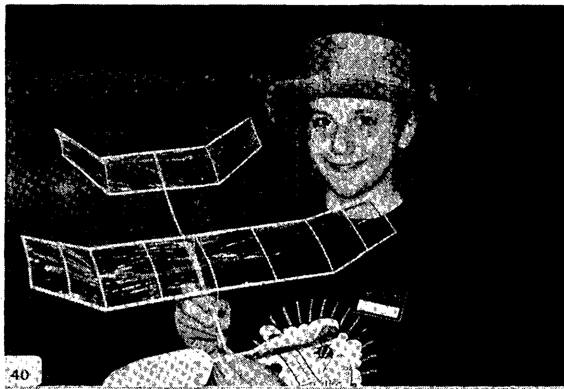
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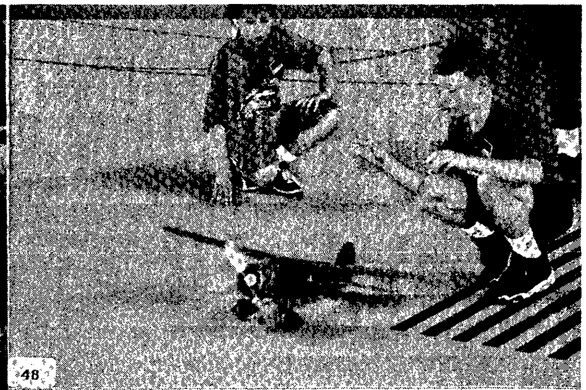
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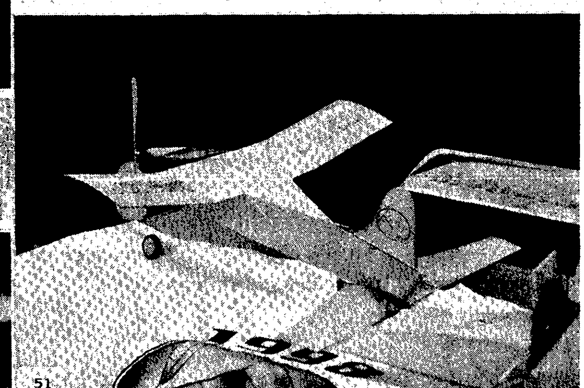
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USIC 1998 AUTOGIRO # 211

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Thomas, Mike	2615041	16:33					16:33
2	Slusarczyk, Donald	2005490	8:40	10:49				10:49
3	Diebolt, H. J.	2097263	7:48	7:48	6:41	7:52	7:41	7:41
4	Ripley, Ed	2484619	6:48	8:22	7:35			7:35
5	Rash, Fred	2063458	4:02	6:55	7:11	7:32		7:32
				FINAL SCORES				

USIC 1998 HAND LAUNCHED GLIDER # 212

PLACE	CONTESTANT	AMA NO.	FL 1	FL 2	FL 3	FL 4	FL 5	FL 5	FL 7	FL 8	FL 9	BEST FLIGHT	2ND BEST FLIGHT	TOTAL BEST 2
1	Boehm, Bernard	2092567	69.1	72.20	74.4	75.5	74.2	75				75.5	75	150.5
2	Romash, Robert	2130061	64	65.40	63.7	65.8	65.5	62.8	69.2	68.9		69.2	68.9	138.1
3	Gagliano, Charles	2110082	51.8	10.10	38.5	39.2	50.1	56.5	57.2	54.7	60.6	60.6	57.2	117.8
4	Kimball, Bruce	2059849	52.5	52.70	53.8	50.2	50.4	55	52.2	53.5	37.4	55	53.8	108.8
5	Von Bueren, Karl F.	2051477	51.6	46.00	50.9	41.7	53.7	43.9	41.9	55	24.6	55	53.7	108.7
6	Gagliano, Victor	2110081	34.4	31.60	35	5.3	26.9	31.5	37.7	14.84	20.8	37.7	35	72.7
7	Johnson, T.E.	2016707	28.6	31.90	29.6							31.9	29.6	61.5
8	Thomas, Mike	2615041	5.9	23.50	4.2	23.4	24.3	3.4				24.3	23.5	47.8
	Eberle, Rob	411592												DNF
	Nishanian, Peter	2589485												DNF
	Surtees, Leonard	2587511												DNF
						FINAL SCORES								

USIC 1998 STD. CLASS CAT GLIDER # 218

	CONTESTANT	AMA NO.	FL 1	FL 2	FL 3	FL 4	FL 5	FL 6	FL 7	FL 8	FL 9	BEST FLIGHT	2ND BEST FLIGHT	TOTAL 2 BEST FLTS
1	Von Bueren, Karl	2051477	83.4	83.6	79.9	72.7	82	80.7	28.7	82.2	81.6	83.9	83.6	167.5
2	Warmann, Robert	2018748	74.6	76.8	81.4	81.2	79.4	16	DNF	DNF	DNF	81.4	81.2	162.6
3	Schlarb , Ralph	2322352	80.1	77.5	78.8	79.1	80.3	32	DNF	DNF	DNF	80.3	80.1	160.4
4	Schlarb, W. L.	2014425	77.5	76.4	78.1	DNF	DNF	DNF	DNF	DNF	DNF	78.1	77.5	155.6
5	Cawthorne, John	2560561	72.4	75.6	76.6	69.7	77	75.6	72.6	74.1	73.5	77	76.6	153.6
	Fulmer, Keith	2031552	74.2	75.1	70.5	73.1	77.4	74.9	DNF	DNF	DNF	74.4	75.1	152.5
	Person, Lee	2363504	71.5	70.9	72.7	71.3	71.4	74.6	69.2	69.3	74.5	74.6	74.5	151.1
	Marett, John	651L	67.2	73.5	68.6	69.2	74.3	66.9	67.3	73.4	74.7	74.7	74.3	149
	Romash, Robert	2130061	73.8	74.6	73.6	DNF	DNF	DNF	DNF	DNF	DNF	74.6	73.8	148.4
	Diebolt, John	97263	53.2	69.8	69.9	65.8	68.1	75	71	69.4	70.7	75	71	146
	Belieff, Dan	12816	60.1	72.3	71.4	64.9	64.2	DNF	DNF	DNF	DNF	72.3	71.4	143.7
	Miller, Richard	2179518	58.3	22.7	1	62	62	51	59.6	39.4	63.3	63.3	62	125.3
	Doig, Richard	2005392	43.1	60.3	61.9	54.2	51.5	11	55.3	52.8	56.3	61.9	60.3	122.2
	Johnson, T.E.	2016707	41.2	53.4	53.8	35.1	51.7	46	DNF	DNF	DNF	53.8	53.4	107.2
	Vandover, Abram	2000894	35.9	5.4	33.4	43.7	47.9	34.5	40.5	36.8	31.9	47.9	43.7	91.6
	Gagliano, Victor	2110081												DNF
	Cawthorne, J. Jr.	2560562												DNF
	Tenny, Bud													DNF
	Kelly, James R.	2037564												DNF
	Kimball, Bruce	2059849												DNF
	Nishanian, Peter	2589485												DNF
	Phillips, W. H.	2009088												DNF
	Rash, Fred	2063458												DNF
							FINAL SCORES							

USIC 1998 ROG STICK # 214

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Loucka, Larry	2001210	19:51	20:19				20:19
2	Coslick, Larry	2004652	18:10	19:57				19:57
3	Sova, Tom	2473169	14:35	16:22	16:56			16:56
4	Thomas, Mike	2615041	15:02	9:50		3:43		15:02
5	Diebolt, H. J.	2097263	10:31					10:31
6	Kehr, Joe	2549294	3:05	7:18	8:31	8:44	9:27	9:27
7	Rash, Fred		6:46	6:39	7:52	7:32	8:49	8:49
8	Raymond-Jones, D.	2063358						DNF
9	Walton, Nick	2397340						DNF
				FINAL SCORES				

USIC 1998 BOSTONIAN # 215

PL	CONTESTANT	AMA NO.	FLT. 1	FLT. 2	FLT. 3	FLT. 4	FLT. 5	BEST 2 FLIGHTS	CHARISMA	TOTAL
1	Coslick, Larry	2004652	5:58	4:37	5:01	5:48		706	1.16	818.96
2	Thomas, Mike	2615041	4:46	5:32	5:11	5:39		671	1.12	751.52
3	Marett, John	2616261	4:41	5:01	5:03			604	1.13	682.52
4	Miller, Richard	2179518	4:41	5:13	4:19			594	1.14	677.16
5	Gardner, Steve		2:21	3:26	5:07	4:12	1:52	559	1.19	665.21
	Schutzel, Emil	2508384	4:13	2:40	4:37	3:58		530	1.15	609.5
	Diebolt, H.	2097261	2:39	4:11	2:37	4:18		509	1.18	600.62
	Barker, John	2002095	4:34	4:12	3:26			526	1.13	594.38
	Cawthorne, John	2560561	3:36	2:57	3:17	3:42	3:31	438	1.18	516.84
	Kent, Michael	2614477	3:34	3:55	3:26	3:37	3:46	461	1.04	479.44
	Krol, Greg		2:58	3:27				385	1.17	450.45
	Rash, Fred	2063458	2:53	3:14	0:47			367	1.1	403.7
	Grant, James B	2159477	3:11	2:31				342	1.15	393.3
	Von Bueren, Karl	2051477	2:13	2:08	2:08	:54		261	1.2	313.2
	Vandover, Abram	2000894	:46	:49				95	1.11	105.45
	Avery, Paul	2158011								DNF
	Bakay, Carl	2478659							1.16	DNF
	Warmann, Robert	2018748								DNF
					FINAL SCORES					

USIC 1998 KIT PLAN SCALE # 213

PLACE	CONTESTANT	AMA NO.	SUBJECT	PTS	MANSHIP	TOTAL	FLT	FLT	FLT	FLT. TOTAL	COLUMNS
1	MCGILLIVRAY, JACK	2615483	ARADO	58	36	94	1:33	1:52	1:55	188	282
2	MAC ENTEE, R.	2102085	DAPHINE	58	34	92	1:38	1:52		184	276
3	BLAIR, JOHN	2029698	FAIRCHILD RANGER	56	35	91	91	91		182	273
4	THOMAS, MIKE	2615041	TAYLORCRAFT	54	38	92	1:38	1:28		178	271
5	MILLER, RICHARD	2179518	HOWARD DG8-9	56	34	90	1:37	1:41		180	270
	GRANT, JAMES	2159477	TAYLORCRAFT D-57	52	35						
	MARTIN, JOHN	2000712									
	RAYMOND-JONES,D.C.	2063358									
			FINAL SCORES								

USIC 1998 FLYING RUBBER SCALE # 507

PL.	CONTESTANT	AMA NO.	SUBJECT	1	2	BEST FLIGHT	2ND FLIGHT	AVERAGEBE ST TWO	TIME POINTS	SCALE POINTS
1	McGillivray, Jack	2615483	SE5 REPLICA	90	90	90	90	90	90	96
2	Blair, John	2029698	PORTERFIELD	52	33	52	33	42.5	42.5	96
							FINAL SCORES			

USIC 1998 PRO 20

	CONTESTANT	AMA NO.	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flight
1	Loucka, Larry	1210	27:39	29:12				29:12
2	Sova, Tom	473169	20:42	24:48				24:48
3	Slusarczyk, Chuck		16:06					16:06
				FINAL SCORES				

USIC 1998 LEGAL EAGLE

PLACE	CONTESTANT	SCORE
1	Schutzel, Emil	21:50
2	Obarski, Richard	15:59
3	MacEntee, Rich	10:02
	FINAL SCORES	

USIC 1998 MINI-STICK # 220

	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Slusarczyk, Donald	2005490	10:40	11:28	11:54			11:54
2	Thomas, Mike	2615041	8:28	9:30	11:36	11:50		11:50
3	Sova, Tom	2473169	10:39	5:00	11:12	11:47		11:47
4	Romash, Robert	2130061	11:21	10:43	11:08	10:09	9:50	11:21
5	Hardcastle, Richard	2000847	11:18	3:47				11:18
6	Barr, Laurie		10:19	10:50	3:12			10:50
7	Walton, Nick	2397340	10:07	5:24	6:27	10:37		10:37
	Olshefsky, Peter	2614476	10:27	8:35	8:51			10:27
	Dlebolt, H.J.	2097263	8:49	8:59	10:17	1:46	9:32	10:17
	Hacker, Vernon	9000304	6:14	10:16	8:57			10:16
	Tellier, Fred	2615254	9:56	10:12				10:12
	Coslick, Larry	2004652	10:00	9:49				10:00
	~~Obarski, R.W.~~	~~2000560~~	~~9:35~~	~~9:59~~	~~8:33~~			~~9:59~~
	Von Bueren, Karl	2051477	8:35	8:22	9:24	9:51	8:06	9:51
	O'Grady, Dan	2614475	5:14	8:04	9:19	9:15		9:19
	Barker, John	2002095	7:59	9:06	8:54	4:21	7:43	9:06
	Van Gorder, Walt	2019912	9:05					9:05
	Singer, Len	2209081	6:32	5:29	7:56	8:26		8:26
	Martin, W.			6:44	7:51			7:51
	Cawthorne, John, Sr.	2560561	7:27	6:20				7:27
	Kehr, Joe	2549294	7:07	4:13	6:09	2:42	5:47	7:07
	Raymond-Jones, D.	2063358	6:50	6:37				6:50
	Tellier, Robert		6:10					6:10
	Miller, Richard	2179518	3:05					3:05
	Sullivan, Edward	2069585	2:47					2:47
	Clem, Jim	9000055		1:03				1:03
	Barber, Douglas	2056270						DNF
	Cailliau, Larry	2079985						DNF
	Cawthorne, John, Jr.	2560562						DNF
	Conner, Matthew	2615256						DNF
	Fellin, John	2095353						DNF
	Kelly, James	2037564						DNF
	Kimball, Bruce	2059849						DNF
	Landrum, Billie	2052674						DNF

	PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5
	Loucka, Larry	2001210						DNF
	Person, Lee	2383504						DNF
	Slusarczyk, Charles	2002643						DNF
	Smith, Philip	2345800						DNF
	Vallee, Thomas	2001126						DNF
	Warmann, Robert	2018748						DNF
					FINAL SCORES			

USIC 1998 UNLIMITED RUBBER SPEED

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Coslick, Larry	4652	6.3	6.3				6.3
2-3	Diebolt, John	97263	9.3	7.7				9.3
2-3	Sova, Tom	473169	9.3	8.9	8.8	9.2		9.3
4	Cawthorne, John, Sr.	560561	11.8	10.6	11.9	10.7	9.8	11.9
5	Blair, John		15.2	9.6	8.1	8		15.2
	Hacker, Vernon							DNF
	Krol, Gregory							DNF
	Slusarczyk, Chuck							DNF
				FINAL SCORES				

FID-B

NAME	1	2	3	4	5	TOTAL	STAND-ING
Bernard Hunt	15:06	16:46	17:32	15:58		17:32	1
Laurie Barr	14:25	15:48	2:12	16:47	17:03	17:03	2
Joe Kehr	4:15	11:38	12:28	6:01	12:16	12:28	3
Billie Landrum	10:24	11:26	10:36			11:26	4
Tom Vallee	5:36	9:12	5:47	8:31	10:40	10:40	5
Chuck Wrzos	5:04					5:04	6

USIC 1998 DIME SCALE

PLACE	CONTESTANT	AIRCRAFT	SCORE
1	McGillivray, Jack	COMET ARADO	7:05
2	Hardcastle, Dick	COMET FOKKER DVII	5:03
3	Miller, Richard	VAGABOND	5:02
4	Martin, "Doc"	MEGOW CURTISS SEAMEN	4:58
5	Blair, John	CHESTER JEEP	4:38
6	Blair, John	CONSOLIDATED BT-7	4:35
7	Thomas, Mike	EZBUILT TAYLORCRAFT	4:23
8	Hiscock, Bill	COMET SPAD	1:39
		FINAL SCORES	

Limited Pennyplane, Junior

Name	1st	2nd	3rd	4th	5th	best	Rank
Stevens, Robert	9:56	11:22	11:35			11:35	1st
Connor, Marcus	10:02	11:03	2:21			11:03	2nd
Victory, Stephanie	5:07	11:01				11:01	3rd
Boyd, Michelle	6:57	8:32	10:25	7:17	9:54	10:25	4th
Smith, Jennifer	9:01	7:53	10:04			10:04	5th
Crow, Adam	8:10	8:40	8:12	9:14		9:14	6th
Anderson, Patrick	7:14	8:29	4:03			8:29	7th
Spaldling, Nikki	7:20	5:34				7:20	8th
Anderson, Karen	6:10	6:42				6:42	9th

No Cal Scale, Junior

Name	1st	2nd	3rd	best	rank
Conner, Matthew	3:30	2:32	1:50	3:30	1st
Anderson, Karen	2:34	2:35	2:45	2:45	2nd
Anderson, Patrick	1:50	1:59	2:14	2:14	3rd
Anderson, Patrick	2:00	2:12	1:51	2:12	4th
Victory, Stephanie	1:48	1:27	2:00	2:00	5th
Crow, Adam	1:23	1:40	1:23	1:40	6th

Bostonian, Junior

Name	Total	Charisma	Time (sec)	Rank
Smith, Jennifer	274	1.09	252	1st
Stevens, Robert	203	1.03	198	2nd
Anderson, Karen	176	1.02	173	3rd
McCord, Adam	174	1.07	163	4th
Lee, Hunter	153	1.06	145	5th
Jones, Daniel	153	1.08	142	6th
Crow, Adam	149	1.05	138	7th
Anderson, Patrick	133	1.01	132	8th

Coconut Scale, Junior

Name	Time	Scale Rank	Time Points	Rank
Boyd, Michelle General Aristocrat	2:51	1	1	1st
Stevens, Robert Lockheed Vega	1:51	2	2	2nd
Conners, Marcus Evans Volksplane	1:27	3	3	3rd

USIC 1998 F.R.O.G.

PLACE	CONTESTANT	AMA NO.	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flight
	Sova, Tom	473169	7:48	7:20	7:38			7:48
	Diebolt, John	97263	6:08	6:27	3:16			6:27
	Rash, Fred	63458	5:46	6:20	1:40	6:02		6:20
	Ripley, Edward	484619	5:51	3:55	1:11	5:58	5:58	5:58
	Clem, Jim	L-55	1:53	2:56				2:56
	Bakey, Carl	478659						DNF
	Henderson, Neal							DNF
	Smith, Phillip	345800						DNF
	Warmann, Robert C.	397340						DNF
				FINAL SCORES				

USIC 1998 PEANUT SCALE # 505

PLACE	CONTESTANT	AMA NO.	AIRCRAFT	FLIGHT 1	FLIGHT 2	FLIGHT 3	FLIGHT POINTS	SCALE POINTS	TOTAL POINTS
1	Thomas, Mike	2615041	VOISIN	1:54	2:04	2:06	113	129.6	248.6
2	McGillivray, Jack	2615483	VOISIN	1:24	1:19		81.5	128.8	210.3
3	Mac Entee, Richard	2102085	LEMBERGER	1:34	1:39		96.5	82.4	178.9
	Romash, Robert	2130061	BERKUT	1:00	0:44	0:50	55	84	139
	Odel, Bill		DAVIS	:21	:22		21	60	81
	Martin, John	2000712	ANSALDO		DNF			71.05	
	Cawthorne, John	2560562			DNF				
				FINAL SCORES					

USIC 1998 NO-CAL SCALE

PL.	CONTESTANT	AMA NO.	Flight 1	Flight 2	Flight 3	Flight 4	Flight 5	Best Flight
1	Thomas, Mike	MAAC1964	6:09	6:55	7:50			7:50
2	Slusarczyk, Chuck		6:29	6:38	6:36	6:40	7:17	7:17
3	Diebolt, John	97263	4:35	2:53	6:58	6:50		6:58
	Slusarczbyk, Don	6420	6:21	6:14	4:43	6:51	6:35	6:51
	Obarski, Richard	560	6:07	6:42	4:41	5:47		6:42
	Van Buren, Karl	61477	3:49	0:35	4:11	5:20	3:06	5:20
	Kehr, Joe	649294	4:20	5:15	5:08	5:04	5:18	5:18
	Rash, Fred	63458	4:36	4:54				4:54
	Nuszer, Joseph	29036	4:25					4:25
	Brownhill, Chris	MAAC 3797-L	3:53	3:52	3:47	3:10	4:04	4:04
	Cawthorne, John, Jr.	560562	1:41	3:11	3:22			3:22
	Cawthorne, John, Sr.	560561	2:49	2:48				2:49
	Warmann, Robert C.	397340						DNF
	Savage, Tom	613003						DNF
	Plassman, Gerald	107613						DNF
	Person, Lee	383504						DNF
	Oleson, Doug	480646						DNF
	MacEntee, Richard	102085						DNF
	Loucka, Larry	1210						DNF
	Landrum, Billie	52674						DNF
	Kelly, Jim	37564						DNF
	Italiano, Tony	2386						DNF
	Boone, Jack	107857						DNF
				FINAL SCORES				

USIC 1998 35 CM

PL.	CONTESTANT	AMA NO.	FLT. 1	FLT.2	FLT. 3	FLT. 4	FLT. 5	BEST FLT.
1	Barr, Laurie		23;32					23:32
2	Sova, Tom	473169	6:24	20:01	19:16	20:55	18:42	20:55
3	O'Grady, Dan	F57	18:30	19:50				19:50
4	Vallee, Thomas	1126	12:13	18:41	13:38	7:18		18:41
5	Raymond-Jones, D.	MAAC13157	11:25	16:05				16:05
6	Romash, Rob	130061	15:59	16:02				16:02
	Nuszer, Joseph	29036	15:50	10:04	10:32			15:50
	Olshefsky, Peter	MAAC864L	13:59	13:24				13:59
	Zufelt, J.		6:51	6:24	10:34	13:46		13:46
	Landrum, Billie	52674	11:30	11:08				11:30
	Warmann, Robert C.	397340						
	Grant, James B.	159477						
	Diebolt, John	97263						
	Fellin, John	95353						
	Slusarczyk, Chuck							
				FINAL SCORES				

USIC 1998 ORNITHOPTER # 210

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	BEST FLIGHT
1	Coslick, Larry	4652	14:35				14:35
2	Ripley, Ed	2484619	3:48	13:06	14:15	4:58	14:15
3	Thomas, Mike	2615041	9:14	13:02	3:08	2:41	13:02
4	Diebolt, H. J.	2097263	5:15				5:15
	Joshu, Eugene	2260643					DNF
				FINAL SCORE			

USIC 1998 PIONEER

PL.	CONTESTANT	PLANE	FLT.					
	MacEntee, Richard		56					
			FINAL SCORE					

Proposed Scheduling Change For the 1999 USIC

Practice Session

Some of you have flown in the International EZB contest held at the Kibbie Dome in Moscow Idaho. It's a very popular event on the West Coast. Wally Miller and Larry Coslick would like to bring it to Johnson City in 1999. With only a few changes in the current schedule, it could be done. Compare the two practice schedules.

Practice Schedule USIC 1998

	7:30	10:00	12:00	2:00	3:00	5:00	7:00 10:00
Practice 1998	IHLG STD CAT GLD UNL CAT GLD UNL RBR SPD	ALL SCALE EVENTS FAC & AMA PLUS NO-CAL	P. PLANE UNL P. PLANE MANHATTAN AUTOGYRO	P-24 MASS LAUNCH	MINI-STICK ORNITHOPTER HELICOPTER	INT STICK ROG STICK EZ-B PRO-20	F1D HL STICK 35 CM CABIN ROG

Revised Practice Schedule, USIC 1999

	7:00	9:00	11:00	1:00	2:30	4:30	6:00 10:00
Proposed Schedule 1999	IHLG STD CAT GLD UNL CAT GLD UNL RBR SPD	ALL SCALE EVENTS PLUS NO-CAL BOSTONIAN P-24 MASS L	P. PLANE UNL P. PLANE MANHATTAN AUTOGYRO	MINI-STICK ORNITHOPTER HELICOPTER	INT. STK ROG STK EZB 35CM	F1D HLS CABIN ROG PRO 20	START COMPETITION FOR F1D HLS CABIN ROG

If F1D fliers need more practice time there is plenty of room at the end of the dome for ¼ and ½ motor flying. This can be done during the midday practice session.

35 CM and autogyro need to be moved to another time slot away from F1D. These modelers are not compatible with the slow flying F1D and HLS. There was a lot of concern about mid-air collisions with these models. With F1D starting Wednesday evening and winding up Thursday evening, this opens up the Saturday evening time slot. This is where the INT. EZB could be flown. This event is flown according to AMA rules but it is flown in rounds. The best two of five flights determines the winner.

Cezar Bank's F1D Box
Construction notes

1. Build four frames out of ½" x ¾" pine, laying one over the other to make sure that they are as identical as possible. It is more important to make them match each other than to get an exact dimension. Outside dimensions of the frames minus 1 ¼" equals the inner dimensions. My frames O.D.s are 36" x 24" ½" 12 ½". The drawings show lap joints; miter joints are O.K. too.

2. Cut two 1/8" think mahogany plysheets to match the frames O.D. Glue these to two of the frames to make the two swinging doors. These sheets will be on the outside of the doors. On the inside of these sheets are the gadgets and fixtures that you will use to hold the models.

3. Cut the floor and end pieces from 1/8" mahogany ply. These are cut to the inside dimensions of the remaining frames by the width of the desired box plus 3/8". This allows the pieces to be glued inside the frames with a 3/16" lip on both sides for the doors to fit onto. This results in a very stiff box when it is closed. It can be made stronger still by the inclusion of ¾" gussets bracing the end pieces to the floor. These help keep the box stiff when it is open.

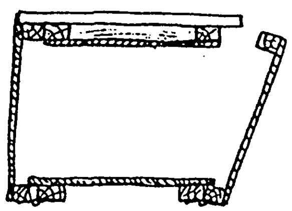
4. Choose a handle, then install two 1 ½" x ½" pine handle braces spaced to fit the chosen handle flush between the top frames of the box. A 1/8" plate is added to the bottom of these handles braces to form a small tray handy for holding items used while flying. Two more 1 ½" x ½" pine pieces are added flush between the top frames at the ends of the box. Cut two top panels from 3/16" Plexiglas to fit the top of the box from each handle brace to the end pieces. Make Plexiglas same width as the box O.D. with doors closed. They also form a lip to match the doors. Attach the Plexiglas using brass screws. Add the handle.

5. Use two brass hinges, 1" – 2" long, on each door on the bottom of the frames. To allow the doors to open within scraping whatever the box is resting on mount four rubber or plastic stand offs on the bottom of the box. These will also keep the bottom of the box from picking up dirt. Add the various meter, scale, and winder mounts to the top along with a "peel and stick" ruler and any winding charts or conversion tables you like. To lock door, use two champfer-head screws (6-32 or 8-32) per door at top to go into captured nuts. Undo the screws to open door.

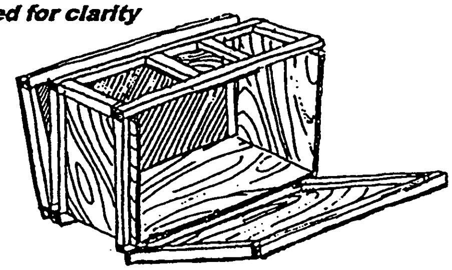
6. **IMPORTANT**; For airline travel, make a "surround box" out of foam/vinyl. Buy the following from your local Upholstery-Fabric store. Buy foam sheeting one inch thick and 2-2 ½ lb. Density. Form the box, glue with contact cement or similar. Cover foam box with .040 - .060 thick upholstery vinyl to outside of foam box. Add "Fragile-Delicate Instrument" lettering. Vent holes should be drilled into the box ends at the top to prevent pressure differences from "popping" the box when the airliner changes altitude.

Cezar Banks' F1D Box

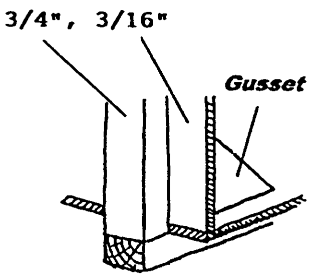
Plexiglas and handle omitted for clarity



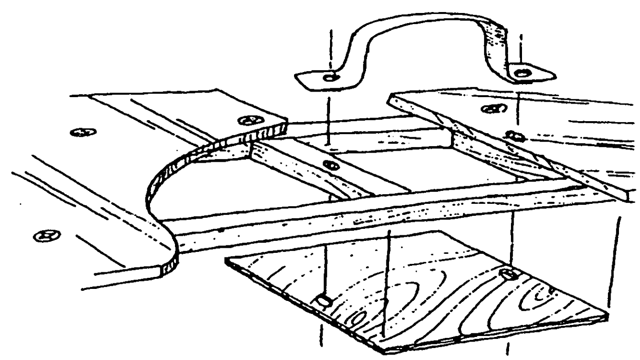
Crossection through box at tray



Box Detail



Box center "lip" detail



Handle detail

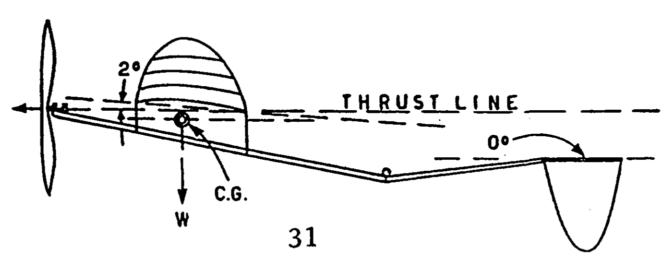
DRAWINGS NOT TO SCALE

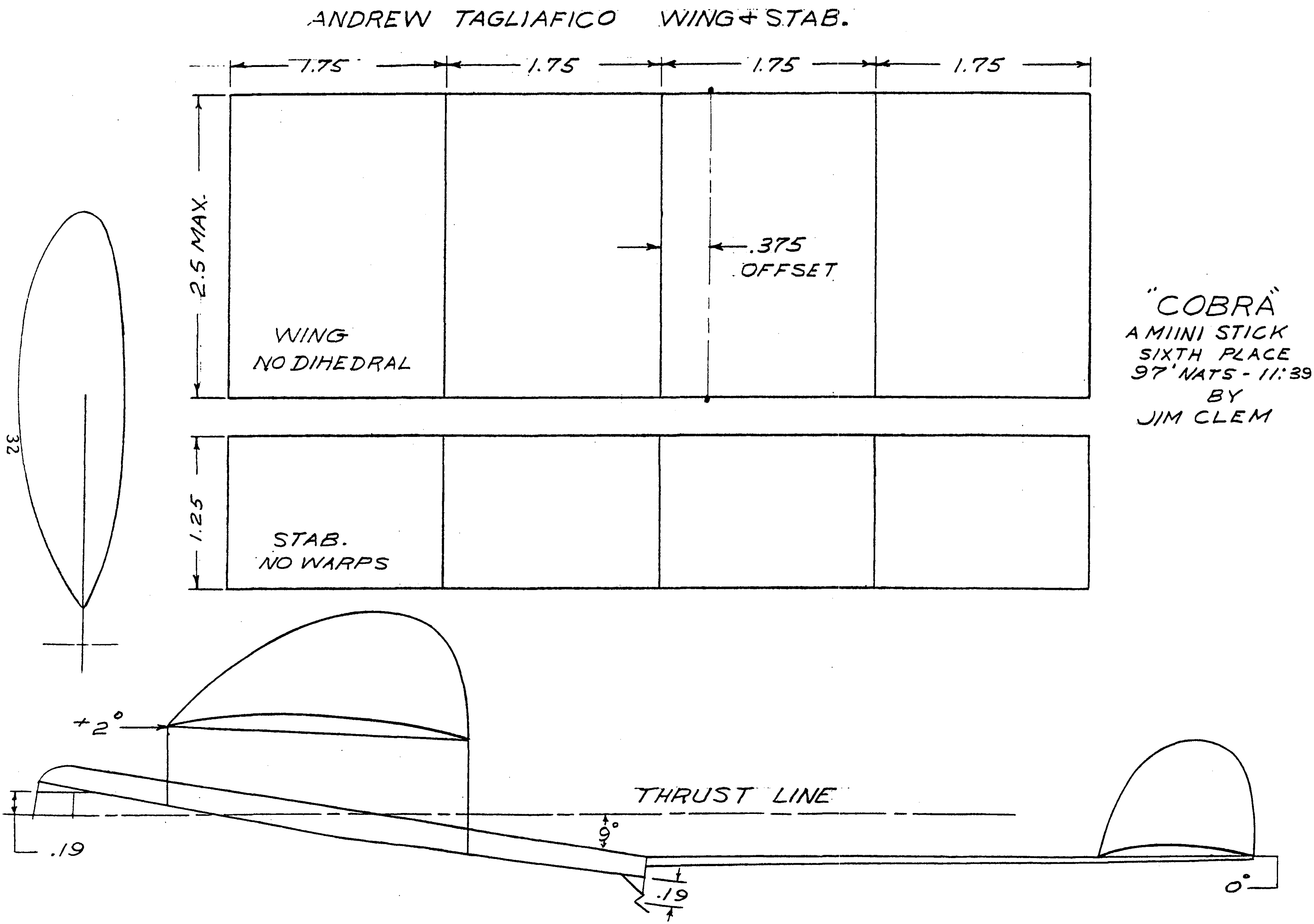
Attention FAC Fliers

This message is for those FAC fliers that attended the 1998 USIC at Johnson City this May. For some unknown reason, we did not get your flight scores. We apologize and will post the scores in our next issue.

The "Cobra" - Why? and How

Because of the tremendous torque problems I have with mini-sticks, I was looking for some design change that might help the problem. I knew that FF Power models also have that problem, so I got out the 1992 NFFS Book on Power Models, by Keith K. Hoover and studied the very high thrust line designs. I could not quite work out a usable configuration for a mini-stick when I remembered a layout in the 1941 book Model Airplane Design and Theory of Flight, by Charles Hampson Grant, in which he said if you put the thrust line above the Center of Gravity it would solve the problem I had been having. Below is a sketch from Charlie's book that shows this force diagram. It does not completely solve the launch torque problem, but does allow you to launch with considerably more torque. In cruise, the model assumes a beautiful "on the step" attitude. Last but not least, when the model is descending you can tell it is your airplane because of its characteristic "banana" shape!




ANDREW TAGLIAFICO WING + STAB.
1.75
1.75
1.75
1.75
2.5 MAX.
.375
OFFSET
WING
NO DIHEDRAL
1.25
STAB.
NO WARPS
"COBRA"
A MIINI STICK
SIXTH PLACE
97' NATS - 11:39
BY
JIM CLEM
+2°
THRUST LINE
9°
.19
.19
0°

MODEL NAME COBRA MINI STICK BUILDER JIM CLEM

MOTOR STICK SOLID

Density # 5 Grain A Length 5" Front, Width .070

Height .115 Center, W. .115 H. .146 Rear, W. .070 H. .115

Cut Weight ______ Finished Weight .14 GM. Special Instructions ______

WT. COMPLETE STICK - .14 GM.

Thrust Bearing, Wire size ______ Other HARLAN BEAR. Web. Density ______

Thickness ______ Rear Hook .010 Web. Density # 5

Thickness .020 Paper Tubes. Material Used JAP TISSUE

Adhesive Used AMBROID--50/50 Special Instructions 6 DROPS TOF PER OZ.

WING

Leading Edge Spar. Density # 5 Grain A Length 7" Width .030

Height .045 Weight ______ Trailing Edge Spar. Density # 5 Grain A

L. 7" H. .045 W. .030 Weight ______ Tips. Density ______

Grain ______ Tip at L/E. Width ______ Height ______ Tip at T/E. Width ______

Height ______ Weight for 2 Tips. ______ Ribs Standard. Density # 5

Grain C W. .025 H. .035 Weight Ea. ______

Wing Posts Density # 5.5 Grain A L. ______ W. .050 ϕ H. ______

Wing Covered ______ Wing Weight Complete. .12 GM Special Instructions

STAB

Outline. Density # 5 Grain A Leading Edge Center, W. .025

H. .030 Tip. W. .025 H. .030 Trailing Edge Center, W. .025

H. .030 Ribs. Density # 4.5 Grain C W. .022 H. .030

FIN

Fin, Not Floating. Density # 4.5 Grain A W. .025

H. .030 Weight Dry ______ Weight Covered .05 GM.

MODEL NAME "COBRA" MINI STICK BUILDER JIM CLEM

Prop Spar. Density BASS WOOD Grain ______ Spar Length 4"

Dimensions at prop shaft, W. .030 H. .030 Dimensions at Tip.

W. .030 H. .030 Spar Weight. ______ Prop Shaft

Wire Size. .010

Prop, Wood Blades

Blades. Density #4.5 Grain C Blades Area, Ea. 2.06 SQ. IN.

Blade Thickness .012 Weight for 2 Blades ______

Give prop pitch at 45 degrees and one inch from tip. Pitch at 45 degree 14" Pitch 1 inch

From tip. 14" If V / P, Low pitch ______ High pitch ______

If V / D, Diameter when extended ______ Diameter when folded ______

Speical Instructions on prop construction MOUNT PROP SHAFT ON .045 X .045 X .500 6#
PROP COMPLETE WEIGHS .11 GM.

RUBBER

Loop Length 13" Width .025 Rubber Vintage, Month and Year
8/93 Weight of Loop. .017 OZ. (.48 GM.) Turns 2790

Back off Turns. ______ Launch Torque in inch ounces. .1 Turns Left 0

Do you use O rings. Yes. YES No. ______

TRIM

Wash In, Wing Left panel .062 Wash Out Left panel. ______

Wash Out, Right panel ______ Wash In, Right panel ______

Wash In Stab, Yes ______ No ______ How Much ______

Down Thrust. ______ Left Thrust. 4° Special trim instructions.

______

______

______

KIBBIE DOME

DOUBLE HEADER / 1998

ANNUAL - AUG.1 THRU 3 • EZB INTERNATIONAL - AUG. 4

UNIVERSITY OF IDAHO, MOSCOW, IDAHO

KIBBIE DOME OPEN FOR FLYING - 8:00 AM TO 8:00 PM

MEET 1. (August 1,2&3) **Kibbie Dome Annual.**

All AMA Official Indoor Events. Six official flights per event (which can be flown any time all three days - 9:30 AM to 8:00 PM)
Hand Launched Glider and Catapult Glider flights 8:00 AM to 9:30 AM only, all three days. Nine (9) official flights allowed.

SPECIAL EVENTS: Pro-20, Novice EZB, P-24, A-6, and NON-RADIO CONTROLLED ELECTRIC F.F. (30 gram max weight for ELECTRIC F.F.)
ENTRY FEE: Open & Senior - $50.00. Junior Flyers - $25.00
Table and 2-chairs rental: $5.00
There are no additional event charges.
CONTEST DIRECTOR: Andrew Tagliafico, Call (503) 452-0546 for additional information. Modest Prizes will be given.
SCALE CONTEST DIRECTOR: (for A.M.A. Scale and Peanut Scale events) Ed Lamb. Call (206)747-7806 for information. The static scale judging will take place prior to flying.

MEET 2. (August 4) **The Wally Miller International EZB Contest.**

Six rounds to be flown from 8:00 AM to 8:00 PM. All AMA rules governing EZB models to be observed. Timer volunteers are welcome.

NEW THIS YEAR: Novice EZB classification added to this event only. A novice is one who has not exceeded an 18-minute EZB flight.
ENTRY FEE: $40.00 for each flyer participating. (Junior, Senior and Open combined).
NOVICE ENTRY FEE: $20.00 (Junior, Senior and Open combined).
CONTEST DIRECTORS: Wally Miller and Larry Coslick.

Modelers with cars must stop at University Visitor Information Center, 645 W. Pullman Road (across from Hardee's Rest.) to obtain a visitor's parking permit. Cost is approximately $2.00

Indoor News and Views

Issue #95

November, 1998

World Championships

INDOOR NEWS AND VIEWS (INAV) IS PRODUCED IN ST LOUIS BY LARRY COSLICK, GENE JOSHU, HOWARD HENDERSON, BILL MARTIN, STEVE GARDNER, AND ROY WHITE

INAV DUES ARE

U.S.	$: 9.00/year
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THE PRODUCERS ARE LOOKING FOR VOLUNTEERS TO TAKE OVER PUBLICATION OF INAV. ANYONE INTERESTED SHOULD CONTACT HOWARD HENDERSON.

INAV subscribers were most generous
In helping finance the USA Junior entry to
The World Championships this year

We at INAV have received a total of $3750.00 (including a matching grant of $850.00) for the funding of the USA Junior Participants in this years World Championships. Nick Leonard received $1102.25 he needed to attend.

The balance of the funds contributed ($2644.75 as of 10-29-98) will be held for future Junior competition support on the national or international level.

We at INAV wish to thank you all for your spectacular support of the USA Junior effort.

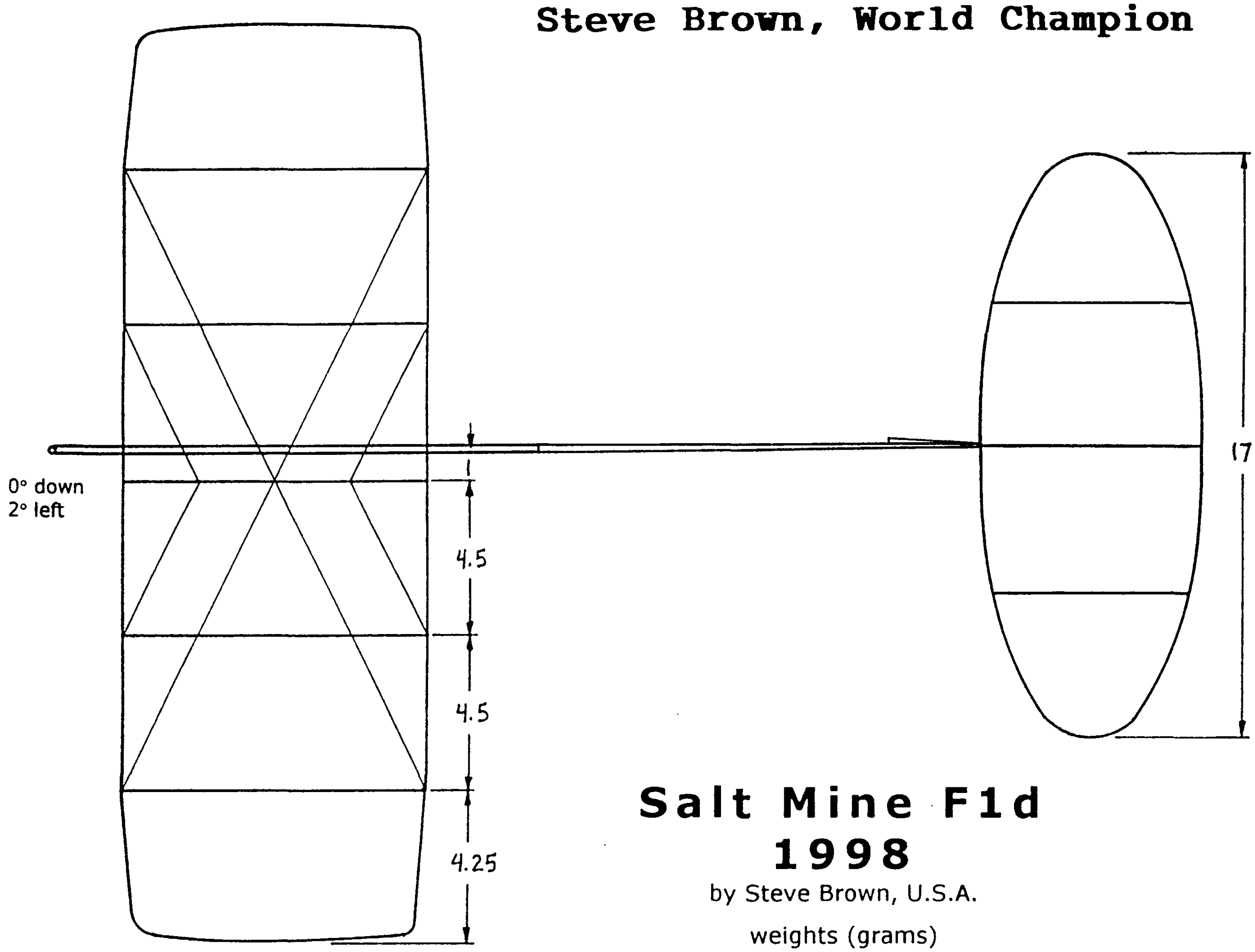
October 26, 1998

I would like to thank those who donated to the F1D Junior Team Fund. It allowed me to go to the World Champs in Romania, which has been a highlight of my life. Although the AMA does not set aside funds for juniors, it is rather touching to see that the modelers take care of each other. I especially want to thank the people behind INAV, Larry Coslick, Howard Henderson, Steve Gardner, and Gene Joshu for the effort that they took upon themselves to help raise money for the fund. Without their help the trip may not have been possible. I also wish to thank Dr. Vernon Hacker for the effort he put into the Junior fund. He sent many letters to AMA and is a prime reason that it was established in the first place. Lastly I would like to thank those at AMA for deciding to create it, and NFFS for deciding to manage it. I am glad that finally there is a program set up for juniors competing in F1D. I hope that in the future it will be unusual when no junior is representing the US at the worlds rather than the other way around. I am very happy to be involved in F1D, but what makes this obsession so special are the people involved. Thank you.

Sincerely,

Nick Leonard, Jr.

Steve Brown, World Champion

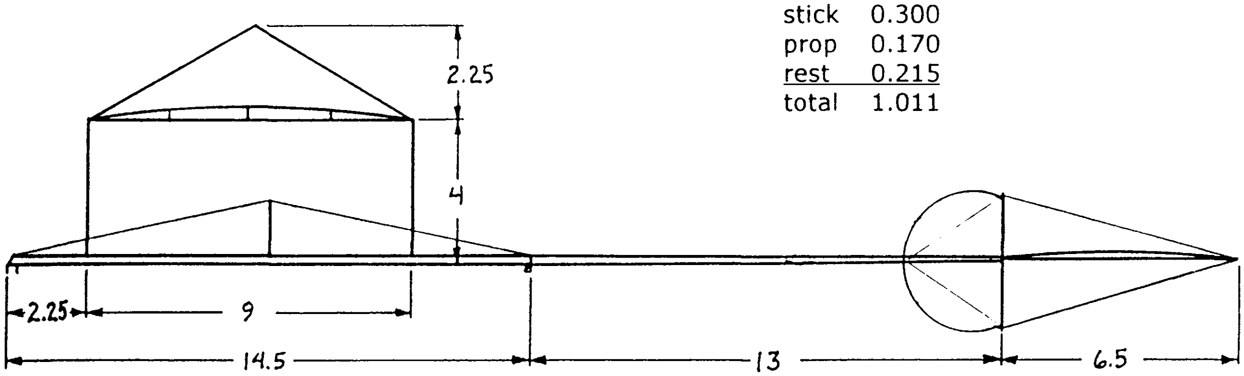


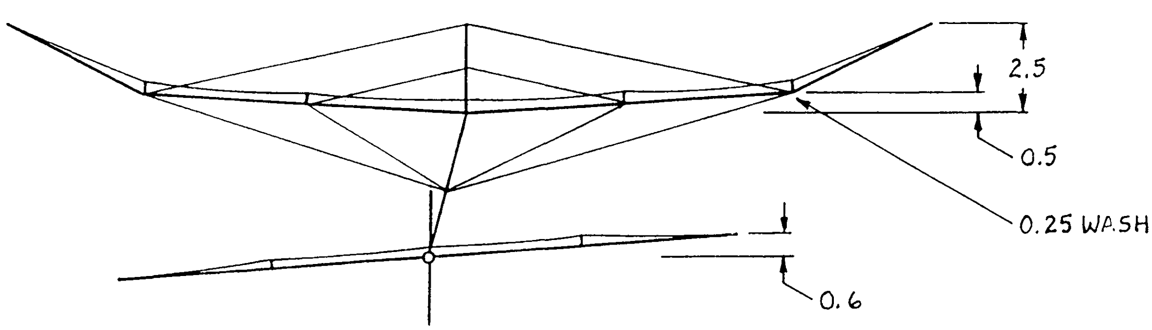
Salt Mine F1d
1998

by Steve Brown, U.S.A.

weights (grams)

wing	0.326
stick	0.300
prop	0.170
rest	0.215
total	1.011

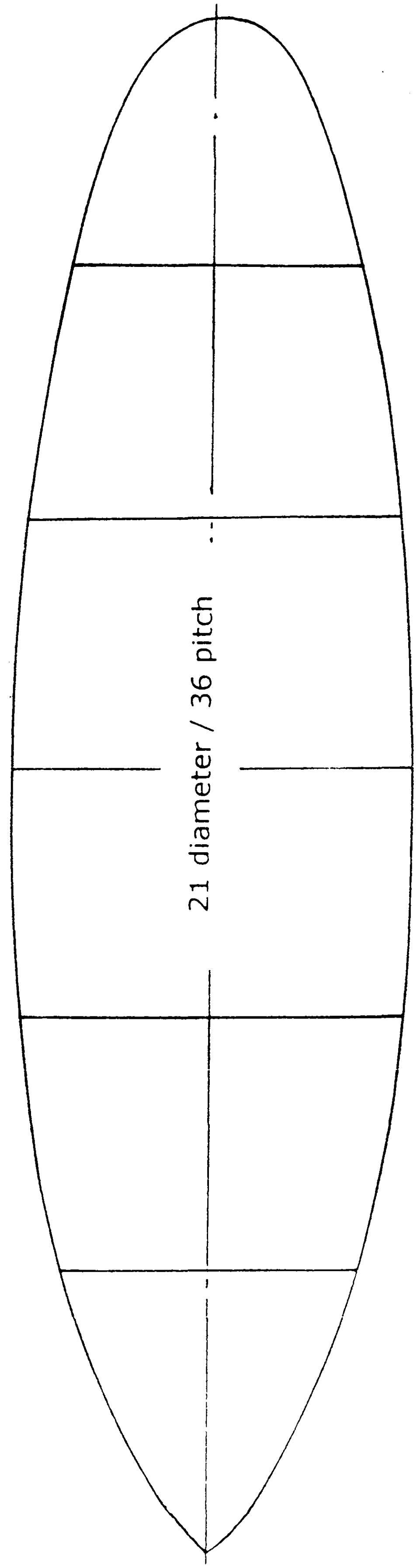




Wing	
spars	.034 X .044 6.0 lb.
tips	.030 X .038 5.1 lb.
middle ribs (3)	.027 X .044 5.3 lb.
compression ribs (2)	
top:	.027 X .030 5.3 lb.
bottom:	.035 X .024 5.0 lb.
uprights:	.004 boron
wingposts	.035 X .055 → .030 X .040 6.0 lb.
	(3) .003 boron
cabane	.030 X .045 → .030 X .035 5.2 lb.
bracing	.0003 tungsten
airfoil	3.5% ellipse
Stabilizer	
spars	.028 X .048 → .022 X .032 5.5 lb.
center rib	.027 X .042 5.3 lb.
outer ribs	.024 X .032 5.2 lb.
bracing	.0003 tungsten to center rib
airfoil	2% arc
Fin	
post	.028 X .050 → .028 X .040 5.5 lb.
outline	.004 boron
Motorstick	
tube	.013 4.0 lb. (4) .004 boron
webs	.018 4.5 lb.
cap	.013 4.0 lb.
bracing post	.045 X .045 → .035 X .035 X 1.75 7.0 lb.
hook	.013 music wire
bearing	Harlan F1d
bracing	(1) .001 tungsten
Boom	
tube	.008 4.0 lb. .230 i.d. → .160 i.d.
Propeller	
spars	.068 X .072 → .028 X .028 5.5 lb.
outline	.025 X .025 4.5 lb.
ribs	.022 X .025 4.5 lb.

Motor

.043 X .078 X 16.5 = 1.70gm, July 1997 Tan II
2010 launch turns - 0 remaining = 2010 used
44.5 RPM average



F1D INDOOR WORLD CHAMPIONSHIP
Slanic-Prahova, Romania, 13 Oct.- 15 Oct. 1998

Final Results - SENIORS

INDIVIDUAL RESULTS FOR ALL COMPETITORS

Place	#	Name	Cntry	Rnd 1	Rnd 2	Rnd 3	Rnd 4	Rnd 5	Rnd 6	Total
1	11	BROWN STEVE	WCH	40:45	43:52	45:11	44: 4	12:18	43: 8	89:15
2	19	REE ANDRAS	HUN	40:37	43:40	45:13	42:37	43: 8	12:43	88:53
3	27	RICHMOND JIM	USA	13:24	41:37	43: 7	12:22	39:33	44:21	87:28
4	40	TIPPER JOHN	GBR	35: 6	24:35	37:35	40:25	43:11	39: 0	83:36
5	41	BAILEY ROBIN	GBR	37:44	36:22	26:10	34:28	40:20	42:28	82:48
6	45	NICOARA VASILE	ROM	40:24	40: 5	41:46	13: 2	26:50	12:19	82:10
7	29	COSLICK LARRY	USA	14:37	30:29	41: 1	40: 0	34: 4	37:48	81: 1
8	7	NORE PENTTI	FIN	37:33	11:50	39:29	39:20	0: 0	1:57	78:49
9	4	ENOMOTO HIDEYO	JPN	38:38	33:39	32:46	34:24	39:57	37:30	78:35
10	15	ORSOVAI DEZSO	HUN	13: 6	37:31	37:58	14:25	39:50	38:30	78:20
11	18	BAKOS FERENC	HUN	7:31	37:11	38:13	39:32	32: 4	38: 9	77:45
12	1	KELLER PETER	SUI	32:28	1:33	37:39	38: 8	38:12	33:36	76:20
13	28	RANDOLPH BOB	USA	32:35	37:17	37:11	17: 3	0:18	28:33	74:28
14	30	CHAMPION ROBERT	FRA	36:19	11:16	38: 0	3:26	24:24	19:58	74:19
15	20	DIHM JAN	POL	16:32	36: 0	37: 2	34:15	36:59	32:18	74: 1
16	42	RICHARDS DEREK	GBR	31:57	31: 7	36:55	37: 6	34:58	33:38	74: 1
17	25	CIAPALA EDWARD	POL	37:41	35:31	35:53	36:13	35:22	24:40	73:54
18	43	POPA AUREL	ROM	36: 3	35:12	30:56	32:23	31:56	6: 9	71:15
19	2	LIEM EDMUND	CAN	17:30	0: 0	34:52	35: 3	29:52	32:39	69:55
20	44	MANGALEA CORNEL	ROM	24:19	34: 5	33:11	25:35	32:37	1:10	67:16
21	33	FRUGOLI FRANCIS	FRA	29:15	28:45	30:56	20:45	33:25	30:01	64:21
22	31	STEPONENAS RIMAS	LAT	22:59	25:48	22:28	28:55	29:41	0: 0	58:36
23	5	ENGLUND LEIF	FIN	11: 9	31:13	0:24	1:53	20:21	26:13	57:26
24	34	COGNET GUY	FRA	21:32	24:42	23:41	20: 9	31:58	25:27	57:25
25	35	SALOGUBOVAS VIT.	LAT	19:50	19:25	23:31	24:21	21: 0	24: 7	48:28
26	36	MOSIN VLADIMIR	LAT	13:41	16: 2	17:50	20:27	20:17	22:52	43:19
27	6	EROFEJEFF HARRO	FIN	21: 1	11:46	19:42	18:38	18: 4	19:46	40:47

FEDERATIA AERONAUTICA INTERNATIONALA
CAMPIONATUL MONDIAL DE AEROMODELE INDOOR
EURO INDOOR OPEN
F1D
1998
SALINA SLANIC
SLANIC PRAHOVA-ROMÂNIA
FEDERATIA ROMANA DE MODELISM

F1D INDOOR WORLD CHAMPIONSHIP
Slanic-Prahova, Romania, 13 Oct.- 15 Oct.1998

Final Results - SENIORS

TEAM STANDINGS

Place	Country	Team		Team Score
1	HUN	Team Manager: Ree Andras		
		BAKOS FERENC	77:45	
		ORSOVAI DEZSO	78:20	
		REE ANDRAS	88:53	
				244:58
2	USA	Team Manager: Bud Romak		
		RANDOLPH BOB	74:28	
		COSLICK LARRY	81: 1	
		RICHMOND JIM	87:28	
				242:57
3	GBR	Team Manager: Colling Michael		
		RICHARDS DEREK	74: 1	
		BAILEY ROBIN	82:48	
		TIPPER JOHN	83:36	
				240:25
4	ROM	Team Manager: Morar Aurel		
		MANGALEA CORNEL	67:16	
		POPA AUREL	71:15	
		NICOARA VASILE	82:10	
				220:41
5	FRA	Team Manager: Champion Robert		
		COGNET GUY	57:25	
		FRUGOLI JEAN FRANCIS	64:21	
		CHAMPION ROBERT	74:19	
				196: 5
6	FIN	Team Manager: Englund Leif		
		EROFEJEFF HARRO	40:47	
		ENGLUND LEIF	57:26	
		NORE PENTTI	78:49	
				177: 2
7	LAT	Team Manager: Steponenas Rimas		
		MOSIN VLADIMIR	43:19	
		SALOGUBOVAS VITALIJU	48:28	
		STEPONENAS RIMAS	58:36	
				150:23
8	POL	Team Manager: Dihm Jan		
		CIAPALA EDWARD	73:54	
		DIHM JAN	74: 1	
				147:55
9	WCH	Team Manager: Bud Romak		
		BROWN STEVE	89:15	
				89:15
10	JPN	Team Manager: Enomoto Hideaki		
		ENOMOTO HIDEYO	78:35	
				78:35
11	SUI	Team Manager:		
		KELLER PETER	76:20	
				76:20
12	CAN	Team Manager:		
		LIEM EDMUND	69:55	
				69:55

Report on F1D Junior World Championships
Slanic, Romania
By: Nick Leonard, Jr.

Dad and I arrived with the other US team members in Bucharest; bleary-eyed and tired. We both had, collectively, seven Stork type F1Ds (Bernard Hunt's new tall post wonders) which had the extreme advantage of unbraced models- we fit all seven in two carry-on sized boxes. The traveling part of this operation could have gone better: the Storks arrived unharmed, but Steve Brown and Bob Randolph both suffered damage despite Lufthansa's special handling. In fact, Larry Coslick's box didn't even arrive with our flight into Bucharest and was said to have been damaged. This was terrible news but could not be helped that day; Lufthansa would send it along with another flight on the following day, which was practice day.

The Elevator. The horror stories were all true about the unguided, unlighted, and single cable box that is the transportation down into the mine. Between that and the mine, the whole thing seemed very intimidating!

Despite all the warnings and conversations, despite the careful preparation, the mine surpassed my expectations of flying difficulty. I had built smaller airplanes that could climb like crazy and props that were low in pitch to really aid quick assent. The RPM was unacceptable for a warm, still site, but Slanic is neither of those. Practice day was a nightmare for me. I think everyone who did not regularly fly the mine had the same experience. The model simply would not climb despite any tweaking. And I thought I was prepared! After the 'Hot Lunch', I took the smallest blade area prop and dropped it's pitch even lower. This improved times, but how long can something fly with an RPM of ~68? My best 1/4 motor time for practice day: 6:15.

Round 1 arrived too soon for me, but I tossed one up and managed a 25:20. It dead-sticked from nearly 50 feet. The 1/4 motor tests were only good to roughly trim a flight pattern, as the same setup on 1/4 implied an eighteen minute flight. Round 2 I lengthened a motor and still dead-sticked from fifty feet, but increased to a 27:35. In Round 3 I was unsure as to the trim of the new model- the previous one had shed it's wing and it's long posts. Time was running out and Steve Brown suggested that I consider this a test flight that doubled as an official. Amazingly, it flew a 29:20. Round 4 came along and during the flight I had to steer the model from the evil walls. It was at about 100 feet and with the aid of the spot light I guided it from certain death. Only because of Gary Underwood's great advice and practice at Lakehurst was I able to pull that off. The prop hung up for about three seconds causing the model to nose dive and lose a minute or so in time. Still, it flew 29:32, just this side of thirty. Rounds 5 and 6 were on the final day. Steve had told me that usually there were not any major changes on the last day. I had noted the night before that I had fallen from 2nd to 4th place and was 3 seconds behind 3rd. How hard can it possibly be to make up three little seconds? In Round 5 I used one attempt when the model misbehaved on climb-out, but lost the round when it's wing twisted way out of proportion, earning a total of 19 seconds. I was extremely mad with the airplane but spent hours fiddling with it on 1/4 motor tests trying to make it at least climb suitably. Unbelievable! It was pulling 29's yesterday, and it was unchanged, but today it refuses to climb. I put in a flight of 21:07. Talk about betrayal!

So, I took 4th place. I vowed that I would never build an unbraced model again. And promised myself to keep the posts below 4 inches. The problem: As torque bends the motor stick, the long wing posts amplified the it, severely warping the wing. This makes a certain limit as to torque not that the motor stick can stand but the wing and it's tremendous drag. Now John Tipper of Great Britain flew a *Stork* and pulled off a 43:11. My hat is off to him, indeed.

Steve Brown very calmly and coolly defended his title as World Champion. He put up two awe inspiring flights of 44 and 45 minutes. What an amazing fellow he is. I sat next to him at 'dinner' several times and was amazed to find that he can indefinitely supply you with cynical but amusing comments about the salt mine, the contest, or the reliability of unbraced F1Ds. He really was very different than what I had seen or guessed.

The next day there was the EuroCup F1D event which the smartest US team members decided to not to attend. The constant 53 degrees and 68% humidity gnaws at you. But some how I managed to take first in the Junior division- mainly because some of the Juniors *were* smart and 700 feet above me. I still ,though, did not reach thirty minutes, but I bettered my times by 11 seconds(wow). Larry Coslick did a tremendous time of 44 minutes, and blew his competition away. The US placed first in team as well- Dad whipped out his two Storks and promptly leapt the thirty minute barrier that I had hit so hard. He placed highly in the rankings and assured a team victory.

The final night, the awards banquet, was a riot, in any way you wish to interpret that. My friends, the Romanian Junior Team who had taken me out on a walk through the town of Slanic, invited me to their table. I was surprised(though I shouldn't have been) that they were all rather 'potted' ,as the English say, and demanded to their team manager that they should have been able to go to the dance hall in town. It was 11 o'clock, and the team manager was no fool. Ha! I exchanged addresses with a number of my competitors- including the long legged Tatianna who took 1st. I hope to correspond with them.

I owe an impossible amount to my Dad. He has supported this entire F1D thing from the start, and has made it possible for me to build and to practice at places like Lakehurst and Johnson City and Moscow. Without him, I wouldn't have probably become interested and then fascinated and then active in indoor models. It has been a special thing that has happened and I am glad I can do something with him that both of us enjoy very much.

I have never actually seen a report on a Slanic World Champs that gives a description of anything but the contest. Most of the competitors stayed at an apartment complex about a mile from the mine. The room that Dad and I shared appeared to be a wedding suite, as it was larger and had more tables than the other rooms. These tables were soon in use- the room became repair central for some of the team. The rooms themselves were fairly rough, but very survivable. We could not drink the water out of the tap, so bottled water was used for every thing. Unfortunately, the only bottled water is a slightly sugary fizzy water which made brushing your teeth miserable. Somehow, Steve Brown found a bottle of still water near the end of our stay and guarded it well, saying that it was more valuable than gold. The dinner in this apartment complex was always a fixed meal starting at 7:30 and continuing on most of the night. The meals ranged widely from trout to chicken to pork chops. Usually they were served with a type of potato and some soup. It was good to have a hearty meal after a chilly day in the mine. Coca Cola usually was the typical drink. Dinner was followed by a nice desert. The kitchen worked extremely hard for the contestants and even catered to the mine every day. The 'Hot Lunch' was usually a warm pork chop with cheese and potatoes. Dad and I brought some MRE's down but found that they would get too cold to eat.

On the way to and from the airport, we would pass horse drawn carts loaded with hay. You could look out into the fields to see horses and plows harvesting the hay or corn. It was truly amazing to open the room window and look out and see a woman herding cattle to a hilly pasture. The entire place, except the mine, had a charm to it. I went out to look at the town of Slanic whose population is around two thousand. The Romanian Junior Team, whom I was with, were very popular in the town and knew many of the locals though they are from Transylvania. We went to a city park of sorts where they enjoyed 'hanging out'. There are many salt formations coming out of the ground and a pond has formed in the center of a collapsed formation. It is a favorite swimming place of those in the town because of the unusual buoyancy.

This has been an incredible trip. It was my first time out of the country and I received a first class dose of culture shock. The contest was great. The site and the people were great. Ha! For all the Gloom and Doom about Slanic, I wouldn't have missed it for the 'world'.

F1D INDOOR WORLD CHAMPIONSHIP
Slanic-Prahova, Romania, 13 Oct.- 15 Oct. 1998
Page 1

Final Results - JUNIORS

INDIVIDUAL RESULTS FOR ALL COMPETITORS

Pos	#	Name	Cntry	Rnd 1	Rnd 2	Rnd 3	Rnd 4	Rnd 5	Rnd 6	Total
1	14	MOSKALIEVA TATIANA	UKR	16: 7	22:58	31: 3	30:20	35:59	38: 9	74: 8
2	32	FILEK JAKUB	POL	34:35	25:50	34:42	34:36	35:32	9:51	70:14
3	49	ROMONTI CRISTIAN	ROM	16:26	25:42	28: 7	30:48	24: 8	17: 7	58:55
4	12	LEONARD NICK JR.	USA	25:20	27:35	29:20	29:32	0:19	21: 7	58:52
5	46	SOMESAN HORATIU	ROM	25:28	26:45	26:46	20: 4	27:49	29:53	57:42
6	47	VAIDA AURELIAN	ROM	25:48	25:24	29: 2	28: 5	28:19	25: 6	57:21
7	38	VALIKONIS IGNAS	LAT	13:25	12: 1	14:20	18: 0	17:31	20:18	38:18
8	39	MULEVICUS AUDRIUS	LAT	13: 0	12: 7	17: 9	15:13	18:43	18:16	36:59
9	37	TYLA GYTIS	LAT	0:19	12:26	1:35	15:16	14:28	16:39	31:55
DSQ	3	KOLIC IVAN	YUG	19:28	24:10	24: 5	10:20	8:30	29:58	54: 8

AIRLINES and MODEL BOXES BY CEZAR BANKS

I think so much lore. most of it negative and horror filled, has been bandied about in the indoor community on this subject that fact and fiction have gotten blurred. The mere idea of giving over your fragile and personal creations to some cretin (supposedly) who will kick, drop, throw, slam or otherwise abuse your precious box without giving it a second thought is just too much. Are you supposed to fly to a contest three to ten time zones away only to discover when you get there so much damage it literally ruins your chances and makes you ill? All for naught? No wonder many would rather face a root canal without anesthesia than suffer the angst that accompanies shipping your model box in baggage.

BUT HOLD ON A MINUTE! Aren't there any successes out there? Hmm. Well, yes, there are. I know of at least two that go back 15 years (mine) or more (Jim Richmond's). And as Jim and I have discussed; between the two of us, we've probably got more airline/model box experience than anybody. Something to think about. You won't find us among those campaigning for smaller F1D's to "solve the airline shipping problem". The interesting thing is that our boxes are very different. Which is another way of saying, "there's not just one way to do it." I would even go so far as to conjecture that "if we spent as much talent on box design and coping with airline travel as we do with model design, the problem would shrink to near nothing." So, for what it's worth, here is the way I did it. Of itself, it won't guarantee success; nothing does, but I think it will improve your chances. Maybe a lot.

My first experience shipping F1D's aboard airliners was in '78 going from San Diego to St. Louis (in connection with my job) and then by rental car on to the then annual indoor champs at West Baden, Indiana. I had a humungous old suitcase into which I packed two F1Ds, two penny planes and one EZB. I arrived with damage (about eight hours to fix, as I recall) and learned my first lesson. Stuff that looks like suitcases will be handled (make that mis-handled) like suitcases. Out went that approach.

Then I made a box out of two WWII surplus 3/8" plywood foot lockers hinged on the long end to open like alligator jaws. It was strong but gosh awful heavy and too wide to carry easily because your carrying arm went out at a 30 degree angle. Aching fatigue set in quickly. More lessons learned: Make it light. Make one dimension narrow for easy carrying. Jim Richmond feels this is important for another reason; the narrowness inhibits air from swirling internally when the baggage handler swings the box. Anyway, this led to my '79 box (see plan in last INAV) which with minor mods is still what I use today. I added the foam/vinyl "surround box" in '82, and for the last 15 years, I've had no model damage aboard airliners! Have had a few film holes to patch but that's all. I believe the foam/vinyl surround box is a critical addition since it provides considerable shock, vibration, and "ding" protection. I also plastered "FRAGILE- DELICATE INSTRUMENTS" on the outside. Of course this could be a mixed blessing if a baggage handler looks upon it as a challenge. But so far, so good. If asked what kind of instruments these are, tell them they are "used to measure air currents in large buildings." You won't be lying.

Before going to the Romania WCh in '82, Team Manager Bud Romak and I drafted a letter to Air France explaining the whole business and asking for special box loading and unloading. We got it. No damage. We have used that same letter (changing only dates, airline, and flight numbers) for all overseas WCh since: '84-JAL, '86-BA, '92-Lufthansa and '94-Lufthansa. All responded positively and we had no damage with any of them. I think these letters are a must for overseas flights.

For attending domestic trials and contests, I've usually shown up at the check-in counter un-announced with my model box. I then ask for the shift supervisor. When he or she shows up, I show them the box, lift the top flap, let them look through the plexiglass at the contents, and ask them to see that the box is hand carried into the baggage compartment. They lift it, see that it's easily manageable and agree. I've never yet been refused. I suppose there's always that first time so this is a good time to practice your social skills. Don't demand anything. Smile a lot. Tell them you've done this before with their (and other) airline(s). That should clinch it. At my destination, my box has sometimes been put on conveyors. Because of its form factor, it has slipped through swinging doors unscathed.

Now, for the other shoe. After reading the above, you'd think I think air travel with my 36" box is no big deal, right? "Not quite." I still feel some anxiety. If I can get someone to drive my models to a meet, I'll do it. Be dumb not to. BUT DO I THINK THE RISK OF TAKING THE BOX BY AIRLINER IS MANAGEABLE? YES, I DO. However, our 15 year success notwithstanding, do I also hedge my bet some? Sure, why not?. Starting with the '84 champs, I made an extra "insurance box" out of 3/8" foam board to carry the components of two F1D's and which I could hand carry into the cabin with me. Wouldn't you just know, my 36" box has always made it thus far and I've never had to depend on the carry-on box? Not a bad record. Agreed?

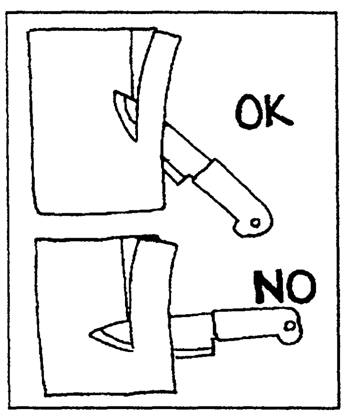
Styrofoam for Indoor Scale Models

Steve Gardner

I hope you all have seen some of the wonderful foam models that have made their way into the various model magazines in the past two years or so. First in England, then all over the place appeared these unusual models. Scale models of subjects that are a bit out of the ordinary, like Lancaster bombers, TU-16 "Bear" bombers, sub-peanut Curtiss seaplane racers, and all sorts of others. They are made from the blue or pink foam that is commonly used for insulating homes. This material is very easy to work with so long as you use very sharp tools. It is extremely inexpensive, a TA-152 fighter with a span of 32 inches cost about a dollar to make. With the proper technique this foam can produce models of exceptional toughness while keeping them reasonably light. There are a large number of subjects that have very complex cross sections that make them difficult to model in stick and tissue. With this new stuff you will be looking for the ones you used to shy away from. You will not need blast tubes and there will be no more trying to match tissue colors to patch things up. Warps are not nearly so likely and are simple to deal with too. The stuff is really nice, but there are some things that are very different about the way you use the foam, so I have gathered together some of the things I have found out while messing around with foam this past year. I hope you find the ideas here helpful.

The foam we are talking about is the stuff called "Styrofoam" by Dupont. It has lots of other names depending on who is selling it. You can most easily find it in the large home improvement stores. The stuff is used to insulate between joists in the vertical walls of houses. We are not talking about the "expanded bead foam" that most people think of when the word "Styrofoam" is mentioned. The foam we are going to use is much finer in texture and also much stronger. It is about 1.5 pounds/ cubic foot, half again heavier than the beaded stuff, but of course much lighter than the finest, hardest to get balsa. I paid $14.00 for a 4'X8'X2" sheet that will make a very large number of models. You can find it in sheets as thin as 1/2" to as thick as 6", with the price going up very fast as the thickness does. Sheets half as thick as the widest fuselage you foresee making are what you want, since we will always be splitting the fuse down the centerline.

I am always asked what I used to cut the foam with. I have yet to need a hot wire setup, although I can see where it would make things simpler. To cut this foam you will need to have very sharp blades. I use a paring knife made by Chicago Cutlery that has a very slight curve to its edge. It is very easy to sharpen using a set of ceramic rods like those you get at good knife stores. When you cut the foam, draw the edge of the knife through the material at an angle, not with the edge at a perpendicular angle to the cut. SEE FIG.1

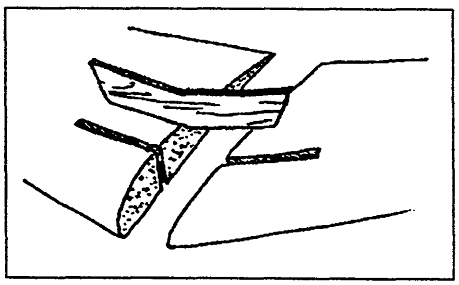


There is a grain to the foam. The foam is less compressible in one direction than the other, so this will determine the orientation of the model parts when they are cut out. Wings especially should be cut out so that the least compressible direction runs span wise. This will allow the wings to be carved and sanded to a very thin, light section without becoming too flimsy. To cut wing and tail blanks out I use a band saw. A peanut might have a wing blank that is around 3/16" thick and this might go all the way up to 1/2" for a 36" model. I do cut the basic taper into the wing blank thickness, but I always leave plenty of material to cut/sand off.

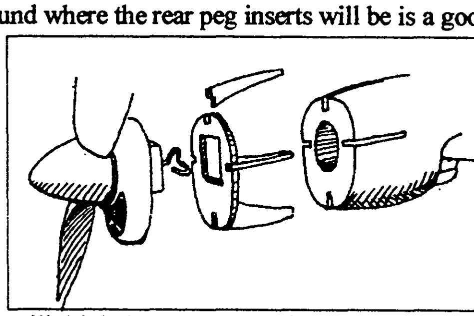
Shaping the foam is very easy with knife or sandpaper. If you have ever built any solid scale models you are going to take to this like a duck to water. Models can be built with this material very quickly. I built a four-gram FW-190 with a nine-inch span with blue foam in a single evening, paint, prop, and all. Once I had this particular model finished I discovered I had left far too much material when I hollowed out the fuse and had left the wings very thick. The model could have easily been a two and a half-gram model and still looked exactly like it does now. Remember, when in doubt, hollow it out. When shaping the model refer to your drawings as often as you need to so that the model comes out with the proper shape and cross section. I use a sharp knife for 90% of the shaping process. This is faster and actually easier than sanding even though the foam sands so very easily. Use a strong side light to make the shape of the piece you are carving stand out. This will make it much easier to see where you need to take material off and where you need to ovoid cutting. If you do happen to cut too deeply into the part you are making, you can simple splice a chunk of foam into the undercut area and reshape it!

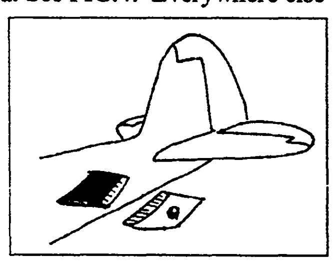
To mark the foam for carving I use a black permanent marker and mark the outline so that when the part is cut out the black outline will remain on the waste material. If you need to mark the foam in an area that will show on the finished model you should use a water based marker. These will tend to bead up on the foam and be a bit harder to see, but will come off of the foam much easier and help prevent you from having to cover black marks with paint.

Once you have the basic shape of the fuse carved out and sanded roughly to shape you can decide how you want to fit the wings. You can cut the wings to fit the fuse sides on the smaller models. This will allow a greater amount of clearance for rubber motors and is plenty strong enough for peanuts and smaller models. For large models you will probably join the wings with a simple joiner as shown in FIG. 2. With the wings



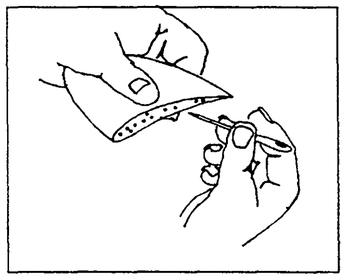
joined you will have to cut and fit the fuse to fit the wing surface. This is done before the fuse is hollowed out so that you will know where the fuse and wing meet and can leave an extra bit of foam around the joint. To hollow the fuse you simply split the fuse down the center where you joined the halves before shaping. I use a motor tool with a very small router bit to cut out foam from the inside of the fuse. I also use a 1/2" dia. sanding drum on a very low speed to cut out the excess foam. Leave most of the foam in the nose area that is not in the rubber motor's way since you will probably need the nose weight anyway. This will also make the front end easier to fasten the front former for the noseplug, see FIG.3. Leaving a very small bit of extra foam around where the rear peg inserts will be is a good idea. See FIG.4. Everywhere else cut lots of





foam out. You will think that you are cutting out far to much material from how flimsy the fuse shell seams to get, but when you join them and fit the wing into the wing opening the fuse will get very stiff and strong. For a peanut the fuselage wall thickness should be about .050" or less. This will result in an incredibly strong model. Even a 36" model should have a .075" or less average thickness from the middle of the wing on back. The more you take out now, the nicer a finish you can use, and the longer the model will fly. Use a nice strong light to see how thin the foam is getting so you do not cut through anyplace. Also, it is often a very good idea to cut the fin/rudder out as part of the fuse instead of separately. Unless the fin is extra thick it is not hollowed out, but left attached to one side or another during the hollowing step.

Gluing this material is easy. I use the odorless CA for all construction and the Foam Primer Pacer sells for using CA on foam. Epoxy can be used as well, but it is very heavy. White glues will work, but since the glue joints are made of a waterproof material, it may take a very long time for the water to leave the glue and so the glue may stay wet for a very long time. If you use water-based glues by all means apply them very thinly so that they can dry quickly. No matter which glue you decide to use is it best if you poke a pattern of pinholes into the foam where you are gluing so that the glue can get into the foam somewhat. I use a sewing needle, the longer taper to the point allows me to poke deeper and get the best glue joints. See FIG. 5.



The foam is finish sanded with 400 grit wet or dry, being very careful not to allow the corners of the paper to mark the foam. Very thin water based spackling may be used to seal the surface, but this can be extremely heavy if not done carefully and well. If use be sure to sand carefully so as not to cut through the sealer while sanding the very maximum amount off to save weight. I do not use any sealer. I just airbrush the appropriate colors onto the model with artist's acrylics. Go for simple coverage and not a super solid look since this paint is not all that light either. A very solid looking model is the result at any rate, especially if you are very much used to stick and tissue. I hand paint the markings on after the basic colors are dry. This is not at all hard, just give it a try. If a mistake is made you can wipe it right off with water. The foam can be found in pink as well as blue, and of course if you are building a model that will be red in the final form then starting with pink will be a good idea. If you must use blue and want the finished model to be red, first spray the whole model with white, then red as needed. The natural color of the foam is good for the underside of camouflaged fighters and the browns and greens cover it really easily too.

You are really going to like the toughness these foam models have. Bouncing off of walls and bleachers is nothing to worry about with these "Nerf" models. I just love the look on the faces of nearby flyers when I blow a motor inside one of my foam models. BLAM! Everybody cringes! No patching, no repairs, no weight build up, no lube soaking, it is just wonderful! These models are also very warp resistant, and you can cut the scale flight surfaces out to trim the model. Give this stuff a try!

NATIONAL FREE FLIGHT SOCIETY

DEDICATED TO THE INTEREST OF FREE FLIGHT AEROMODELING

October 15, 1998

NFFS 1999 TEN MODELS OF THE YEAR NOMINATIONS

Categories for nomination:

1. Models of the Modern era which exhibit unique design and outstanding performance as proven in competition.
2. Unique gadgets, materials or model components which have contributed to the advancement of free flight.

Nominations for models must include:

1. Brief cover letter from individual nominator or officer of sponsoring club.
2. Separate one-page description of model design and competition record.
3. Separate brief resume of modeler/designer.
4. One-page three-view plan with dimensions.
5. Photograph of modeler with model.

Nominations for gadgets, materials or model component items must include:

1. Brief cover letter from individual nominator or officer of sponsoring club.
2. Separate one-page description of item and contribution to free flight.
3. Brief resume of inventor/originator.
4. Photograph and/or three-view drawing of item.

<u>Deadline for completed nominations</u>:

Postmark February 12, 1999

Send completed nominations to:

Larry Kruse, Chair, NFFS Ten MOY Committee
1204 S Mansfield
Stillwater, OK 74074
USA

Telephone: (405) 372-2538

KIBBIE DOME ANNUAL AUGUST 1-3, 1998

There was a record turnout this year--Andrew had all the details worked out, and everything in place when we arrived. The speakers were again dominating the treasured center area. They are suspended by a great many wires, and were covered with black plastic, with the bottom hanging 80 feet from the floor. Fortunately the speakers can be lowered, and the models can be plucked from the top of the speakers while standing on a ladder. The two curtains seemed to snag more models this year, and the net at the far end of the dome captured some models, which landed behind the net on the cross beams. Beginning at mid morning the jet stream above the curtains and near the ceiling was much in evidence, depositing models either on the curtains, the speakers, or the nets. There was only one model that I know of that went above the ceiling tiles, and was lost. That was Anita Taylors' Mini-stick. Those who had flown at Kibbie before had a tendency to adjust their models to top out below the curtains. There was no drift in those areas, and the flights were usually up and down in the same spot. Those who elected to go all out, and climb to the top of the dome had the problem of contending with the curtains, the speaker wires, or the nets. Tn the morning the air was stable and light, but later seemed to get heavy with an inversion layer keeping models at a lower level. We expected Mini-stick times to be at the 12 or 13 minute mark, but only two even topped eleven minutes. There was an amazing total of sixteen entries in Limited Pennynlane. This is not even close to Johnson City totals, but for Kibbie Dome it was outstanding. However, there were six members of the Dona family that flew in this event, including Jacob, age 8, who put up an excellent time of 12:03 on the very first official flight he ever made. He built his own model, and did a good job of flying. Matt Dona, age 10, also had a good time of 11:45. The winning model was a Thrush, flown by the designer, John Lenderman, to a time of 15:05.5. EZB times were good, considering the conditions, with Bruce Kimball getting his personal best time of 28:25, and getting up to just below curtain height. There were some who did not fly, preferring to walt for the International EZB contest, held separately during the fourth day of flying. A report on that competition will be given by Larry Coslick elsewhere in this issue. Many of the competitors noted the absence of Wally Miller, the originator of the EZB event, and were disappointed that he was not present. Wally was involved in his move from Idaho to California, and promised he would be at the next Kibbie Dome fully prepared. Mini-stick was won by our CD, Andrew, flying his Mini-Quark, with a time of 11:27. Gene Joshu knew what to do with his Intermediate stick--he took it out of the box, wound it, and posted two flights of over 28 minutes and the winning time of 30:25. He said the model behaved perfectly, with no problems. Second place was Chuck Dorsett with a flight of 28:00, using the same model that he flew last year. A new event this year was the international class A-6 models. Fresh from doing well in the International E-mail contest, the flyers from the Willamette Modelers group in Oregon won the top places. What is believed to be the first over 7 minute flight was made by John Lenderman with a time of 7:19.4, flying his original design. It was encouraging to see seven entries in ROG stick, with good times posted. Fred Hollingsworth, from Canada, had some new models, and had a very good time of 13:25, which is a new Canadian record. Fred is an enthusiastic builder and flyer--he flew in a good number of events, and really enjoyed himself. The winner of ROG stick was Larry Coslick, flying his model that recently set a record of over 24 minutes in Category IV and also over 20 minutes in Category III. His model featured a VP prop and retracting landing gear. Larry didn't fly too many events as he was testing 3 new models in preparation for the F1D World Champs in Romania. Larry's time in ROG stick was 19:35, followed by John Lenderman flying a light version of his A-6 with the necessary landing gear, to a time of 17:28.5. Third was CD Andrew with 17:03. Open stick was won by Bob DeShields with a time of 34:16, with his flying buddy, Mike Thompson in second with 29:08. There were six entries in Open Stick. Also with six entries was Standard Cataplut glider. The times keep going up in this event. Mike Thompson had a two flight total of 2:50.4, with Bob DeShields second with 2:49.4. Very close! Ed Berray was third with 2:30.1. It was nice to see the Nick Leonards, SR. and Jr., with their F1D

models, also getting ready for flying in Romania, They had some inovative models, with one featuring a variable diameter prop. Edmund Liem, the Canadian F1D team member was in first place with a good time of 70:28 for two flights. In second place was Mike Thompson, using a VP prop for the first time, with a time of 58:14, Pro 20 had 5 entries, and all flew well. The winner was Andrew Tagliafico, one of the originators of this event, with a time of 25:48, followed closely by Mike Thompson with 24:13. Warren Williams flew a creditable 24:13 for third piace. The regular Pennyplane event drew only four entries. We really missed Jim Clem at this contest as he is always a fierce competitor. Bob DeShields flew his biplane to an excellent time Of 18:16. He builds lovely models, and they all fly well. In second place, flying his Thrush plus 10, was John Lenderman with a time of 16:09. Unlimited catapult glider was dominated by those two competitors, Bob DeShields and Mike Thompson. They really get their models up, and they glide so well. Bobs time was 2:56.9 for his two flight total, and Mike had 2:44.0 These guys come prepared! This is shown by the fact that they also took first and second in hand launched glider, with Bob posting an outstanding time of 226.2 seconds, and Mike at 158.2. Bruce Kimball was third flying a glider with a foam wing covered with fiberglass. In the ornithopter event Warren Williams had a large model that flapped slowly for a good time of 8:40. I understand that Warren has built well over 100 ornithopters. He gives away a good number of those interesting models. Gil Coughlin was second with 5:57. Not far behind was Anita Taylor with 5:53.. Anita is a joy to be around, because she is always smiling and cheerful. P-24 had only 3 competitors, but all flew vary well. John Lenderman won with a time of 7:50, and Ed Berray was second with 6:33. Al Lies was third with 6:26, but had some bad luck. His model got stuck in some beams, and would have done real well if the model had made it clear to the floor. Incredibly he was using a motor of .090 at 50 inches long! Watch our for Al next year. Bostonian had only 3 entries. John Lenderman topped Jerry Powell by only 10 seconds. Their times were 3:30 and 3:20. Warren Williams flew his helicopter to a time of 5:45, and Nick Leonard Jr. ended up with 5:09. An event that should be more popular is the 35cm event. Warren Williams had a time of 12:56, showing his versatility.
We again noticed at this years events, a good spirit of fellowship and willingness to help each other. It's just so nice to be among people who are not only competitors, but friends. Our hat is off to Andrew Tagliafico for planning and organizing this fun time together.

Reported by John Lenderman

Big Indoor Contest

St. Petersburg, Florida, January 30 & 31th

January 30, 6:00 am to 12:00 pm

January 31st, 8:00 am to 5:00 pm

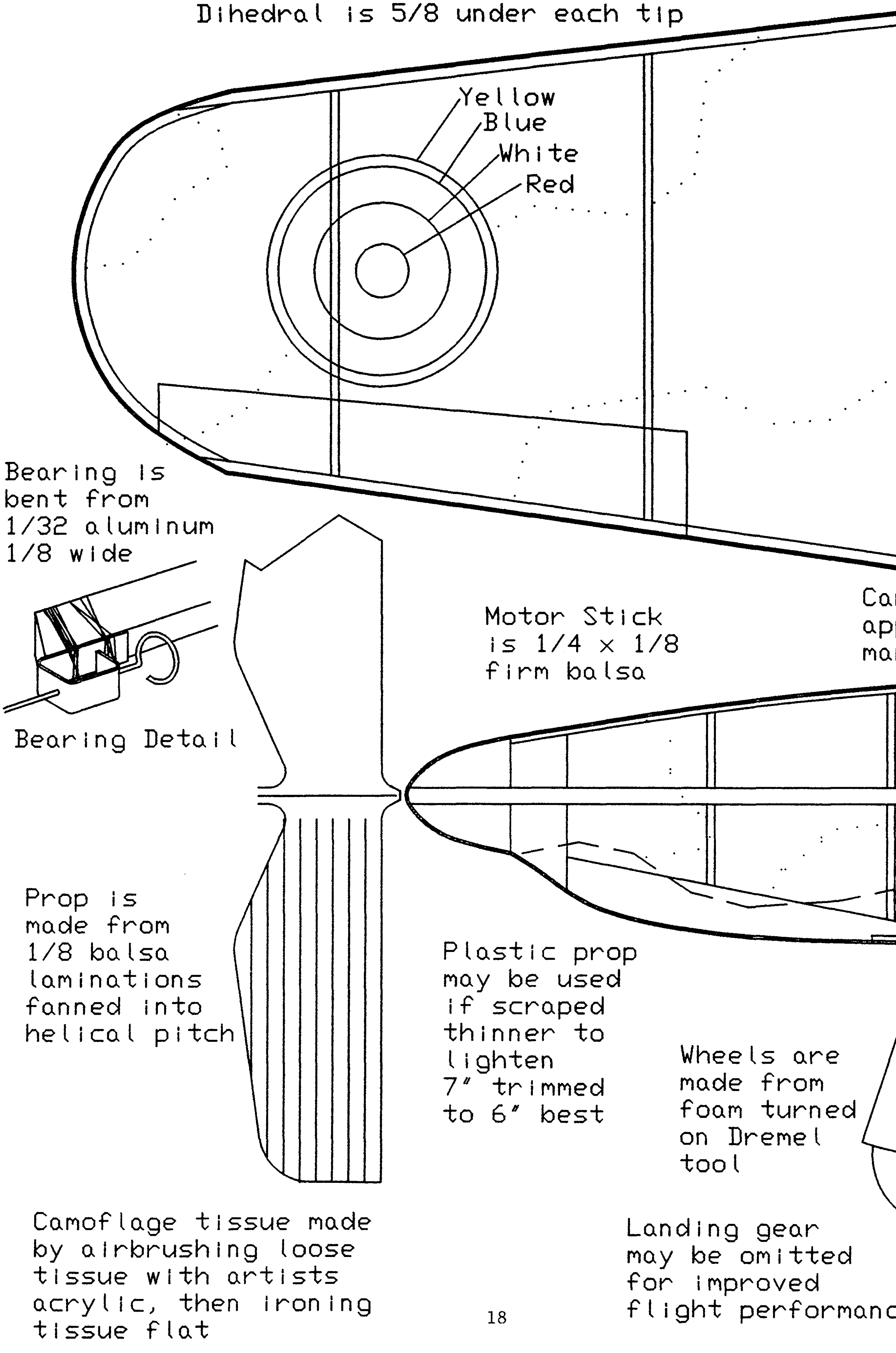
230' Ceiling, AMA Record Trials

For details contact Dr. John Martin Jr.

2180 Tiger Tail Ave.

Miami, Fl. 33133

phone # 305-856-1421


Dihedral is 5/8 under each tip
Yellow
Blue
White
Red
Bearing is
bent from
1/32 aluminum
1/8 wide
Motor Stick
is 1/4 x 1/8
firm balsa
Bearing Detail
Prop is
made from
1/8 balsa
laminations
fanned into
helical pitch
Plastic prop
may be used
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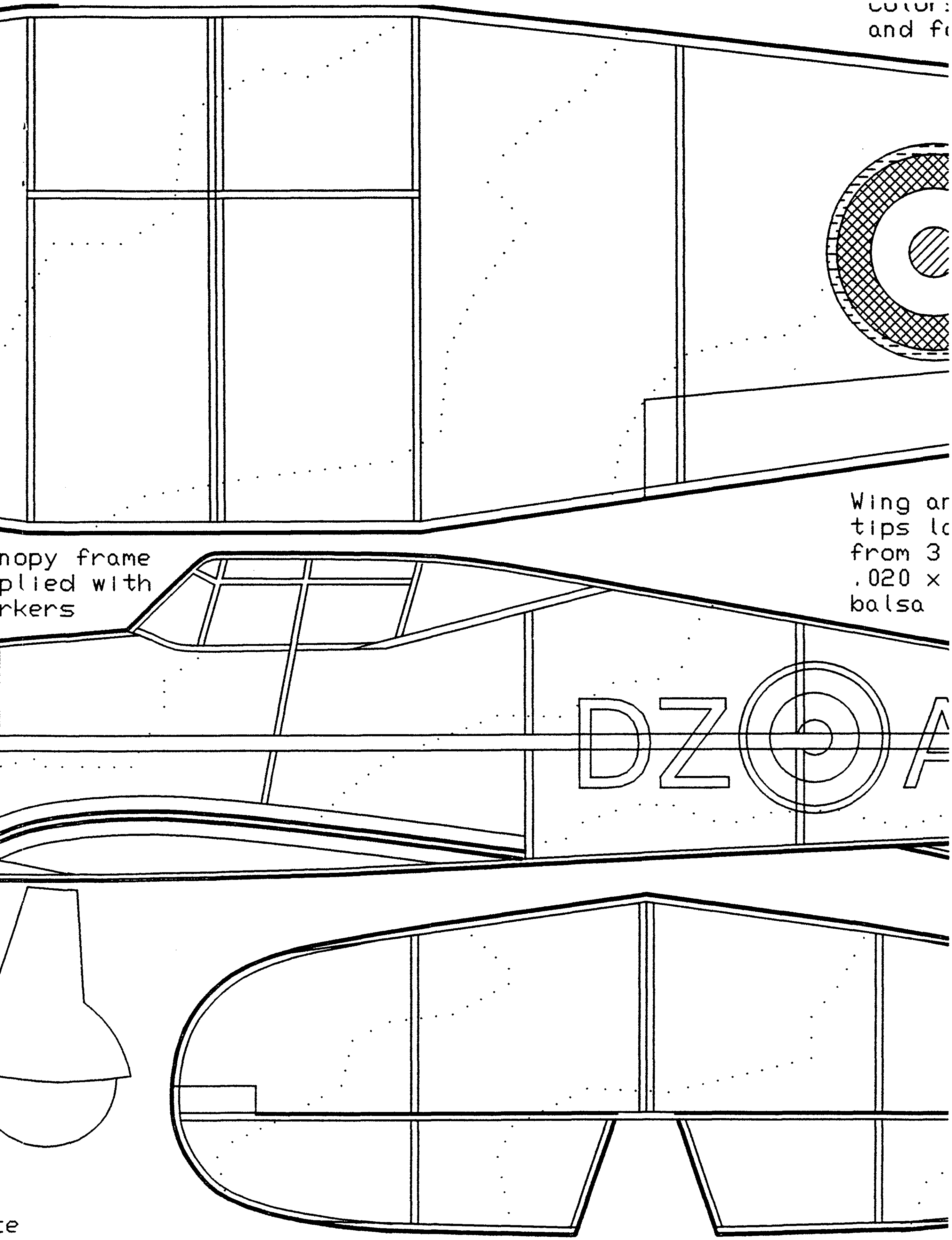
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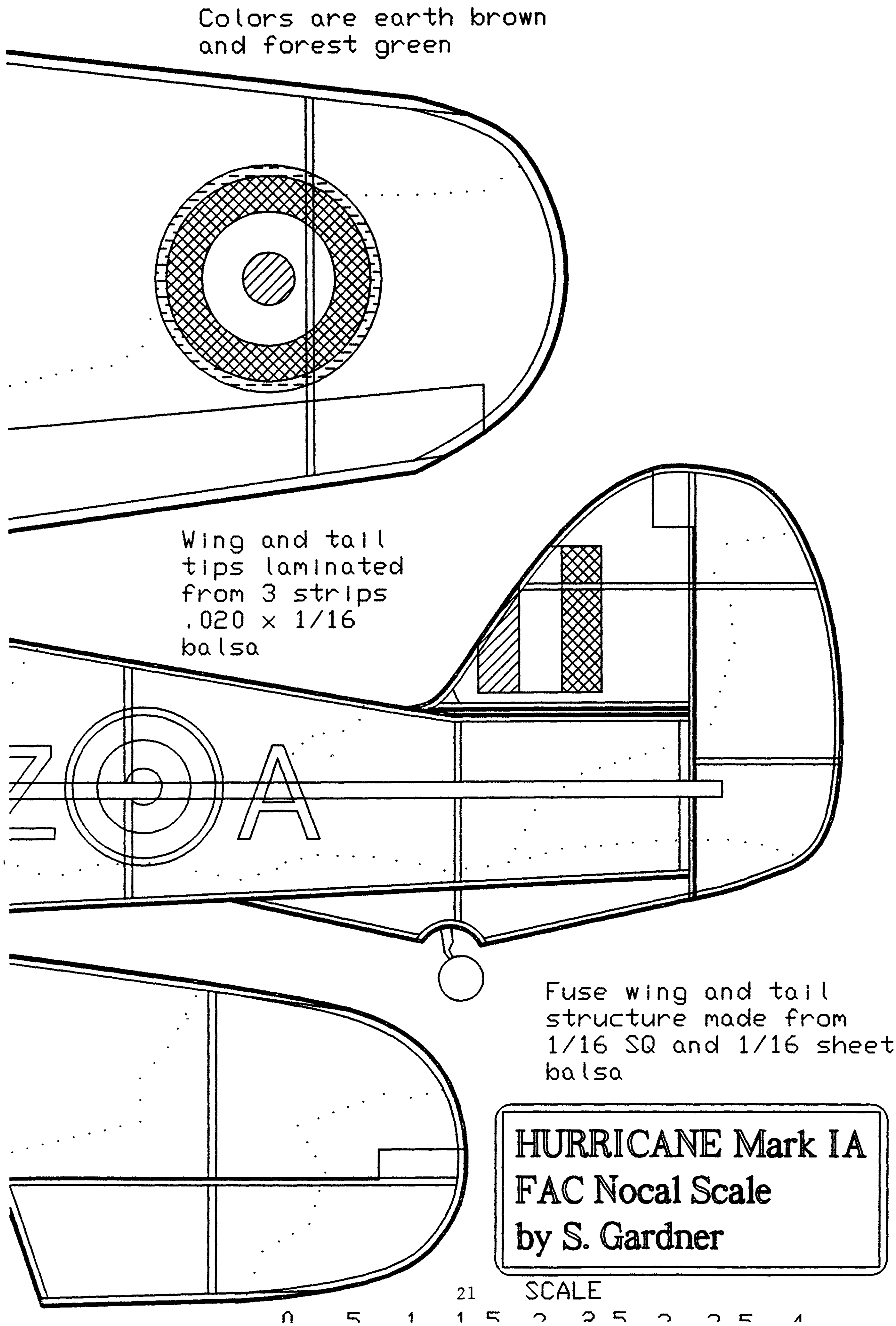
1998 Kibbie Dome Annual Moscow Idaho

Place	Contestant	Time	Place	Contestant	Time
EZB	(Best 1 of 5)		Hand Launched Stick		
1^{st}	Bruce Kimball	28:25	1^{st}	Bob DeShields	34:16
2^{nd}	Darryl Steven	27:20	2^{nd}	Micheal Thompson	29:08
3^{rd}	Lew Gitlow	24:37	3^{rd}	Bruce Kimball	25:17
Intermediate Stick			Standard Catlapult Glider (Best 2 of 9)		
1^{st}	Gene Joshu	30:25	1^{st}	Mike Thompson	2:50.4
2^{nd}	Charles Dorsett	28:00	2^{nd}	Bob DeShields	2:49.4
3^{rd}	Bruce Kimball	26:51	3^{rd}	Ed Berray	2:30.1
F.I.D.			Pro - 20		
1^{st}	Ed Liem	70:28	1^{st}	Andrew Tagliafico	25:48
2^{nd}	Micheal Thompson	58:14	2^{nd}	Micheal Thompson	25:43
3^{rd}	Bob DeShieds	31:37	3^{rd}	Warren Williams	24:13
Limited Penny Plane (Best 1 of 5)			P - 24		
1^{st}	John Lenderman	15:01.5	1^{st}	John Lenderman	7:50
2^{nd}	Darryl Stevens	13:46	2^{nd}	Ed Berray	6:33
3^{rd}	Bruce Kimball	13:39	3^{rd}	Al Lies	6:26
Penny Plane			A - G		
1^{st}	Bob DeShields	18:16	1^{st}	John Lenderman	7:19.4
2^{nd}	John Lenderman	16:09	2^{nd}	Lew Gitlow	6:54
3^{rd}	Bruce Kimball	13:43	3^{rd}	Ken Hark	6:49
Mini – Stick (Best 1 of 5)			R.O. G. Stick		
1^{st}	Andrew Tagliafico	11:27	1^{st}	Larry Coslick	19:35
2^{nd}	John Lenderman	11:15.5	2^{nd}	John Lenderman	17:28.5
3^{rd}	Charles Dorsett	10:52	3^{rd}	Andrew Tagliafico	17:03
Bostonian (Best 2 of 5)			Helicopter		
1^{st}	John Lenderman	3:30	1^{st}	Warren Williams	5:45
2^{nd}	Jerry Powell	3:30	2^{nd}	Nick Leonard Jr.	5:09
3^{rd}	Dave Haught	1:52			
			35 CM		
Ornithopter			1^{st}	Warren Williams	12:56
1^{st}	Warren Williams	8:40			
2^{nd}	Gil Coughlin	5:57	Federation R.O.G.		
3^{rd}	Anita Taylor	5:53	1^{st}	Gil Coughlin	6:48
Hand Launched Glider			Unlimited Catapult Glider		
1^{st}	Bob DeShields	226.2	1^{st}	Bob DeShield	2:56.4
2^{nd}	Mike Thompson	158.2	2^{nd}	Mike Thompson	2:44
3^{rd}	Bruce Kimball	103.5	3^{rd}	Bruce Kimball	2:25.3



HURRICANE Mark IA
FAC Nocal Scale
by S. Gardner

1998 International EZB Contest
by Larry Coslick

Wally Miller, a co-sponsor of this event and the founder of the EZB, was not able to attend this year's contest. He and his wife Mona were in the process of moving from Idaho to southern California. Wally and I have been talking about having the International at Johnson City in 1999. I have submitted a scheduling change to the AMA and the NFFS which would open up a time slot for this event. If this happens we will again have the Novice event. Anyone can enter the Novice event, provided they haven't flown an EZB in competition for over 18 minutes.

I want to thank Anita Taylor for the great job she did in running the contest and her husband Tim for designing a beautiful decal for our model box.

As usual the International follows the Annual, but what a difference a day makes. From the start of round one the strong outside winds had a negative effect on any flight above the curtains which are at 135 feet. There was a length wise drift and it stayed that way all day. Below the curtains the air was very stable. I'll give an account of how my day went, or maybe I should say, didn't go.

Round 1. I used the same prop and model combination that I used at Johnson City with a loop of 8/93 .036"X12.5". During practice the day before, the model climbed to within 25 feet of the curtain and did 28 minutes. In round one, I launched with a torque of .12 in. oz., and the model climbed quickly at first but really slowed down at the 70 foot level. I climbed to the top of the bleachers which are about 75 feet above the floor to time the models climb, and get a more accurate idea of its height. It struggled to reach 110 feet, made one circle and started down. What surprised me the most was that the model had no cruise. It will normally cruise for three or four minutes. It landed at 26:52 with over a row of knots left.

Round 2. I had to get more altitude, so the loop of rubber was shortened ¾ inch and the model was launched at .13 in, oz. It didn't respond to the change, although it did climb slightly higher. This time it landed at 25:54.

Round 3. Somehow the model had to get more altitude and have some sort of a cruse. I put on a new motor, .039"X12" and launched at .13. This time it really liked the change, but I didn't. It was climbing too fast. I grabbed the balloon because it would surely get into the drift if it got above the curtain. It leveled off just above the curtain but started to drift toward the center of the building and the speaker cables. The cables support a large black speaker enclosure which we nick-named the Borg, because it looks like the alien killer space ship for the Star Trek series. My steering was off and I hooked the stab, causing the nose too drop and the prop caught under the wing. End of round 3.

Round 4. The prop was slightly damaged, and instead of repairing it I switched to the prop that I use at Akron Ohio. This prop has a higher RPM, but uses a thinner loop of rubber. After several ¼ motor flights, the model looked as though it was dialed in. Wrong again. I knew the model was in trouble when it reached the curtain at 11 minutes and was still climbing with only 12 feet to the ceiling tiles. At 13 minutes it touched for the first time and was racing for the end of the building and toward a high curtain supported by cables. With the model touching the tiles and the drift, I was not able to get the balloon on it and the model hit one of the cables and slid down behind the curtain. Gene Joshu finally spotted the model on a support beam and we were able to retrieve it with only minor damage. Round 5 & 6. Not worth telling about.

It was a great contest, but a difficult day for me in selecting the right prop and rubber. Days like this are important, because there is the experience to draw on at future contests. If it's too easy, it wouldn't be a challenge.

There were lots of personal high times in EZB during the annual. Bruce Kimball did over 28 minutes with the Hobby shopper. The plans along with building instructions are still available from INAV. Ask for issue #90 U.S. $3.25 per issue (including postage). Overseas $5.50 per issue (including postage) Darryl Stevens did over 27 minutes with a great flying model.

The Novice event was a great addition to this contest. Jerry Powell won the event with a two flight total of 43:39 and Kurt Schuler was second with 38:21.

Wally Miller International EZB Competition

Name	Best	2nd Best	Total	Standing
Larry Coslick	26:52	25:54	52:46	1
Bruce Kimball	26:02	25:35	51:37	2
Darryl Stevens	24:54	24:51	49:45	3
Tim Taylor	24:38	24:06	48:44	4
John Lenderman	24:18	23:49	48:07	5
Bob Deshields	24:16	22:51	47:07	6
Lew Gitlow	23:44	22:08	45:52	7
Mike Thompson	23:39	21:47	45:26	8
Andrew Tagliafico	23:33	20:11	43:44	9
Ed Berray	21:44	21:03	42:47	10
Ken Hark	19:38	19:30	39:08	11
Charles Dorsett	19:43	18:10	37:53	12
Eugene Joshu	8:19		8:19	13

Wally Miller International EZB Competition
Novice

Name	Best	2nd Best	Total	Standing
Jerry Powell	22:17	21:22	43:39	1
Kurt Schuler	19:41	18:40	38:21	2
Jonathan Savre	15:26	14:55	30:21	3
Bob Rovick	15:56	13:59	29:55	4
Chris Borland	12:34	12:23	24:57	5
Charles Higgins	4:00	3:58	7:58	6

THE STORK EXPERIMENT - by B J Hunt

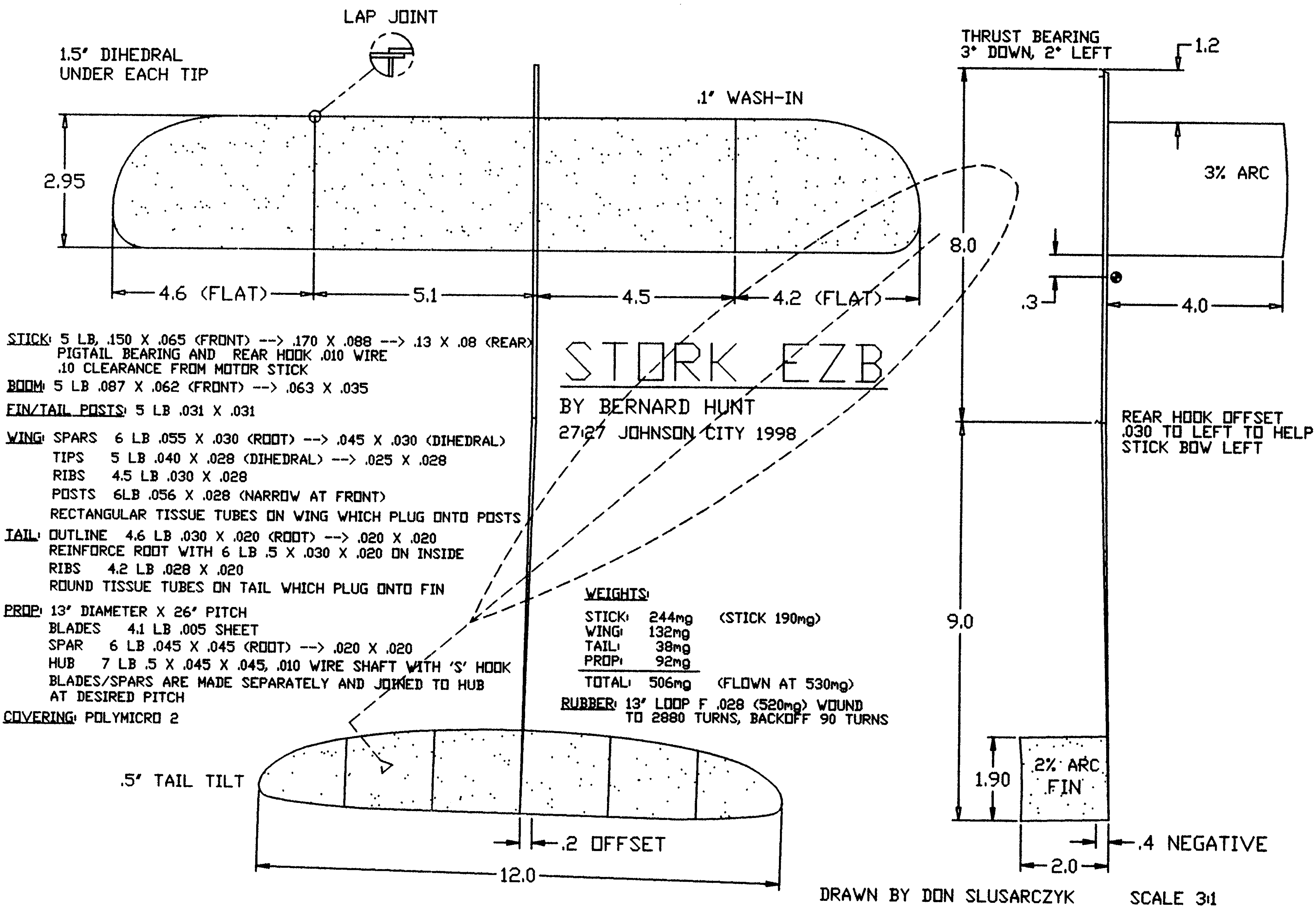
This season I have been experimenting with long wing posts on all my models to see if this gives better times. The aerodynamic idea is that a big vertical distance between the wing and tail reduces the angle of the wing downwash at the tail, which in turn increases the stability of the model and reduces the drag of the tail. The key question is whether the benefits are enough to offset the extra weight and drag of the long wing posts. The following table shows the sizes of posts I have used (all dimensions in inches).

	wing height	tail height	difference	post size (front x side)
US EZB	4	-2	6	0.028 x 0.056
LPP	8	0	8	0.045 x 0.125
OPP	8 (top wing)	-3	11	0.045 x 0.125
Mini Stik	3	-1	5	0.028 x 0.12
F1D	5	-2	7	0.028 x 0.046 + 4 boron
(Int Stik	2	0	2	0.047 x 0.047 = my normal)

When fully trimmed out, all the models flew a beautiful pattern, particularly on the climb, so it does seem that long posts are a good thing for stability. There is a noticeable nose up pitch at launch which needs downthrust and /or stick bow to control. I cannot say for certain that the layout gives better times for all classes, but the Stork versions of my LPP, OPP and Mini Stick are definitely better than my previous efforts. F1D and EZB need more flying experience to decide.

The EZB plan shown is a pretty close copy of Larry Coslick's design in both component sizes and weights. To fit the Stork concept, the nose and tail boom are a little shorter and, of course, it has tall wing posts and an underslung higher aspect ratio tail. I chose to use a non flaring prop, which was a mistake for Johnson City, as the model rocketed up to the roof but it should work better in high sites.

The model was surprisingly easy to trim. As usual for EZBs, it needed the wing warps and the thrust line set by trial and error depending on the stiffness of the stick. My stick was very stiff so I needed lots of down and left thrust and very little washin on the right wing tip. I also sanded the bottom of the stick near the nose as well to get more bow at launch. The wing posts are critical components so use really stiff wood - if in doubt increase the front-to-back size to 0.063" and use 7-8lb density (my pair of 4" posts weighed 25mg). The unusual tail-on-the-fin gave no problems and saved a bit of drag and weight - it looks nice in the air too.


LAP JOINT
1.5" DIHEDRAL
UNDER EACH TIP
.1" WASH-IN
2.95
4.6 (FLAT)
5.1
4.5
4.2 (FLAT)
THRUST BEARING
3° DOWN, 2° LEFT
1.2
3% ARC
8.0
.3
4.0
REAR HOOK OFFSET
.030 TO LEFT TO HELP
STICK BOW LEFT
9.0
1.90
2% ARC
FIN
.4 NEGATIVE
2.0
STORK EZB
BY BERNARD HUNT
27:27 JOHNSON CITY 1998
STICK: 5 LB, .150 X .065 (FRONT) --> .170 X .088 --> .13 X .08 (REAR)
PIGTAIL BEARING AND REAR HOOK .010 WIRE
.10 CLEARANCE FROM MOTOR STICK
BOOM: 5 LB .087 X .062 (FRONT) --> .063 X .035
FIN/TAIL POSTS: 5 LB .031 X .031
WING: SPARS 6 LB .055 X .030 (ROOT) --> .045 X .030 (DIHEDRAL)
TIPS 5 LB .040 X .028 (DIHEDRAL) --> .025 X .028
RIBS 4.5 LB .030 X .028
POSTS 6LB .056 X .028 (NARROW AT FRONT)
RECTANGULAR TISSUE TUBES ON WING WHICH PLUG ONTO POSTS
TAIL: OUTLINE 4.6 LB .030 X .020 (ROOT) --> .020 X .020
REINFORCE ROOT WITH 6 LB .5 X .030 X .020 ON INSIDE
RIBS 4.2 LB .028 X .020
ROUND TISSUE TUBES ON TAIL WHICH PLUG ONTO FIN
PROP: 13" DIAMETER X 26" PITCH
BLADES 4.1 LB .005 SHEET
SPAR 6 LB .045 X .045 (ROOT) --> .020 X .020
HUB 7 LB .5 X .045 X .045, .010 WIRE SHAFT WITH 'S' HOOK
BLADES/SPARS ARE MADE SEPARATELY AND JOINED TO HUB
AT DESIRED PITCH
COVERING: POLYMICRO 2
WEIGHTS:
STICK: 244mg (STICK 190mg)
WING: 132mg
TAIL: 38mg
PROP: 92mg
TOTAL: 506mg (FLOWN AT 530mg)
RUBBER: 13" LOOP F .028 (520mg) WOUND
TO 2880 TURNS, BACKOFF 90 TURNS
.5" TAIL TILT
.2 OFFSET
12.0
DRAWN BY DON SLUSARCZYK
SCALE 3:1

The "Cobra" - Why? and How

Because of the tremendous torque problems I have with mini-sticks, I was looking for some design change that might help the problem. I knew that FF Power models also have that problem, so I got out the 1992 NFFS Book on Power Models, by Keith K. Hoover and studied the very high thrust line designs. I could not quite work out a usable configuration for a mini-stick when I remembered a layout in the 1941 book Model Airplane Design and Theory of Flight, by Charles Hampson Grant, in which he said if you put the thrust line above the Center of Gravity it would solve the problem I had been having. Below is a sketch from Charlie's book that shows this force diagram. It does not completely solve the launch torque problem, but does allow you to launch with considerably more torque. In cruise, the model assumes a beautiful "on the step" attitude. Last but not least, when the model is descending you can tell it is your airplane because of its characteristic "banana" shape!

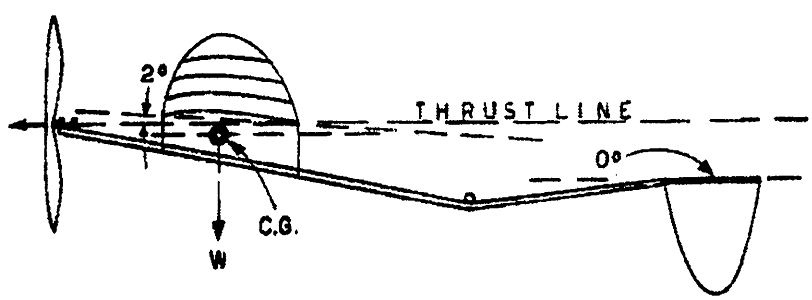
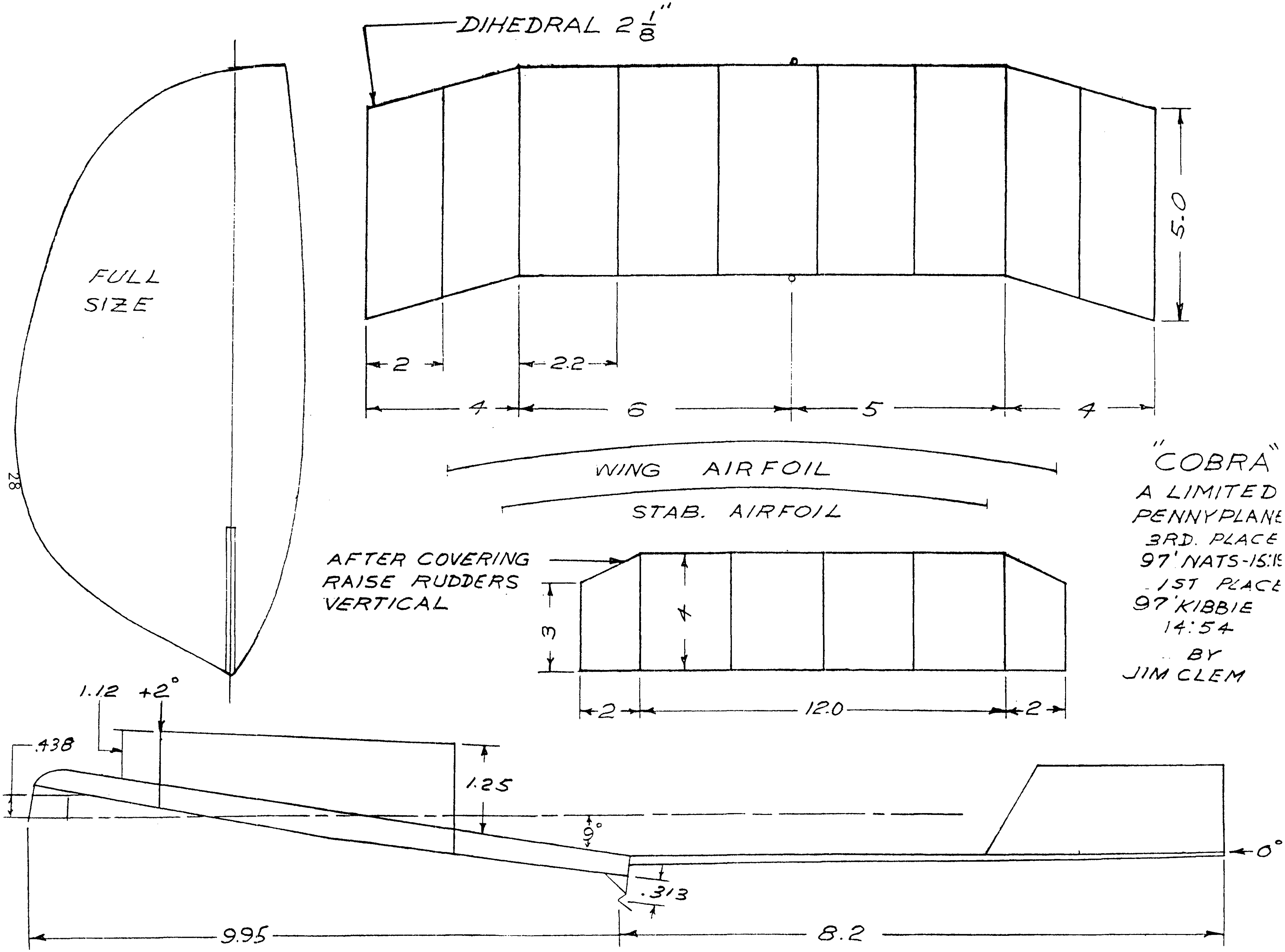


FIG. 66

ABOVE SKETCH FROM -"MODEL AIRPLANE DESIGN + THEORY OF FLIGHT" - P. 85 BY CHARLES HAMPSON GRANT - 1941



"COBRA"
A LIMITED
PENNYPLANE
3RD. PLACE
97' NATS-15:19
1ST PLACE
97' KIBBIE
14:54
BY
JIM CLEM
DIHEDRAL 2 1/8"
FULL SIZE
WING AIRFOIL
STAB. AIRFOIL
AFTER COVERING RAISE RUDDERS VERTICAL
5.0
2
2.2
4
6
5
4
3
4
2
12.0
2
1.12
+2°
.438
1.25
9°
.313
0°
9.95
8.2

MODEL NAME "COBRA" - L.P.P. BUILDER JIM CLEM

MOTOR STICK SOLID

Density # 4.8LB. Grain A Length 10" Front, Width .120

Height .200 Center, W. .220 H. .335 Rear, W. .120 H. .200

Cut Weight ________ Finished Weight 1.15 GM. Special Instructions ________

Thrust Bearing, Wire size ________ Other HARLAN BEAR. Web. Density 7#

Thickness .093 **Rear Hook** .020 Web. Density .032

Thickness ________ **Paper Tubes.** Material Used JAP TISSUE

Adhesive Used AMBROID 50/50 Special Instructions 6 DROPS TOF/OZ.

WING

Leading Edge Spar. Density 7# Grain A Length 19" Width .062

Height .062 Weight ________ **Trailing Edge Spar.** Density 7# Grain A

L. 19" H. .062 W. .062 Weight ________ **Tips.** Density 7#

Grain A Tip at L/E. Width .062 Height .062 Tip at T/E. Width .062

Height .062 Weight for 2 Tips. ________ **Ribs Standard.** Density 5#

Grain A W. .032 H. .062 Weight Ea. ________

Wing Posts Density 7# Grain A L. ________ W .062 H. .062

Wing Covered. ________ Wing Weight Complete. .81 GM. Special Instructions

STAB

Outline. Density 6.4# Grain A Leading Edge Center, W. .045

H. .062 Tip. W. .045 H. .062 Trailing Edge Center, W. .045

H. .062 Ribs. Density 5.5# Grain C W. .032 H. .050

FIN - FORMED BY TURNING TIPS ↑ 90°

Fin, Not Floating. Density ________ Grain ________ W. ________

H. ________ Weight Dry ________ Weight Covered ________

MODEL NAME COBRA-L.P.P. BUILDER JIM CLEM

Prop Spar. Density 12-14 LB. Grain A Spar Length 4.5"

Dimensions at prop shaft, W. .062 H. .062 Dimensions at Tip.

W. .062 H. .062 Spar Weight. ______ Prop Shaft

Wire Size. .018

Prop, Wood Blades

Blades. Density 4.5 LB. Grain A Blades Area. Ea. 9.37 SQ. IN.

Blade Thickness .025 Weight for 2 Blades ______

Give prop pitch at 45 degrees and one inch from tip. Pitch at 45 degree 20.4" Pitch 1 inch

From tip. 20.4" . If V / P, Low pitch ______ High pitch ______

If V / D, Diameter when extended ______ Diameter when folded ______

Speical Instructions on prop construction MAKE 4.5" PROP SPAR ROUND AND INSET 1.25" INTO EACH BLADE. PROP. WT=.75GM

RUBBER

Loop Length 19½ Width .075 Rubber Vintage, Month and Year 8/93 . Weight of Loop. .078 OZ. 2.21 GM. Turns 2762

Back off Turns. ______ Launch Torque in inch ounces. .6 Turns Left 330

Do you use O rings. Yes. YES No. ______

TRIM

Wash In, Wing Left panel .093 Wash Out Left panel. 0

Wash Out, Right panel 0 Wash In, Right panel 0

Wash In Stab, Yes ______ No NO How Much ______

Down Thrust. NO Left Thrust. 4° Special trim instructions.

RANDOM NOTES ON HAND LAUNCHED GLIDERS

Do not use a large stab or rudder. If the model is too stable, it will not make the transition quickly and without altitude loss. In handlaunch, the transition is everything. If the stab is too large, it will tend to let the plane fly even though it is really badly out of longitudinal (fore and aft) trim. You will wonder why adjusting the stab does not bring better flights, when the glider is basically out of balance. Too large a stab will keep the HLG from any snap recovery and the plane will fly through at the top of the launch. If too small, the stab will sink out at gliding speeds because some weight is carried by it. The stab should be tapered from the center outwards to approximately 1/32" at the tips. The stab leading edge may be relatively blunt. You do not want a stab that overlifts. Some people prefer a wing airfoil with a thin section and a high point 40% back from the leading edge. This type of section has less drag than a thicker wing section, but will result in a faster glide and less stability. A thicker section with a high point 25% to 30% from the leading edge may have slightly more drag, but also a better glide and will be more stable, especially in windy weather.

In general, the rudder is too effective at high speeds, and not effective enough at low speeds. The solution is to use stab tilt for the glide turn, keeping just enough rudder for a transition.

Offset the centerline of the wing 116" to the left of the centerline of the fuselage (SWEEPETTE).

Cut out the fuselage slightly over-size to allow for stress relief in the tailboom area, then sand it down to the final shape.

Arrange the wing so that the heavier panel is on the inside of the glide turn. Put built-in washin in the tip of the inside panel. The washin does two things; it makes the panel stall first, dropping the model into the core of the thermal; and it keeps the plane from spiralling too tightly once it is in the thermal.

Resist the urge to make round edges on the fuselage! Rounding saves very little weight but seriously diminishes strength.

Before the last coat of dope on the stab and fin, apply a strip of lightweight Japanese tissue to the rear half of both sides of the fin. Also, apply a 3/4-inch wide strip of tissue to the rear of the stab; top only on the left, and bottom only on the right. Apply the tissue with thinner. These tissued surfaces will be much easier to adjust later for flying trim.

Use white glue for attaching the stab so that it may be easily removed for adjustments.

John Oldenkamp, on his ZWEIBOX, tapers the 1/4" balsa fuselage on the right side only to approximately 3/32" X 1/8" at the extreme aft section. This taper, plus the airfoiled fin (flat on the left side), gives an automatic left turn. John glues the fin onto the side of the fuselage instead of on top.

Bias-cut the finger rest from 1/4" X1" trailing edge stock. The grain ends up in the proper direction and will take very little work to finish.

The POLLY uses built-in rudder offset, 1/8" over 14.5" or 0.5-degrees. The POLLY does not use stab tilt. POLLY does not fly 0-0, but uses some incidence in the stab as a margin of safety of an off-launch. The BLACKJACK design by Larry Sargent also mentions incidence as one of the best kept secrets in HLG flying;it helps in the rollout and helps to avoid the straight up/straight down flight patterns. Use 1/32" to 1/50" of incidence at the wing leading edge.

Tom Peadon (U.S.KID) recommends that the stab be 1/2" below the level of the wing. He can't give a good aerodynamic reason, but it has been proven over and over when he didn't adhere to it.
Kit Bays uses a semi-symmetrical airfoil on heavier, windy weather HLGs. This type does not glide very well in still air, but it gives penetration and stability in the wind.
Control glide turn with the stab tilt.
Control climb pattern with rudder.
The four basic adjustments for HLG: A rearward center of gravity and zero decalage (no incidence in wing or stab) gives a loop free launch. Slight left rudder provides launch turn. Stab tilt for left glide turn. Washin in left wingtip prevents spiral dives.
When a handlaunch goes straight where you point it, and then fails to make a transition, it is only a tweak of up elevator away from perfection.
If the plane turns too tightly in the glide stick some clay on the right wing tip and check the alignment of the rudder.
If the model tends to climb in a wide, flat circle, you can probably counteract this by warping the trailing edge of the stab down, warping a slight part of left rudder, and throwing with more of an overhead motion.
Basic safe trim: Left glide turn in stab tilt, wash-in of the left main wing panel, slight left rudder. May also skew the wing, right wingtip forward, to help the left-turning transition. Similarly, offsetting the wing (about .06") to the left helps save tip weight and bending. Bend wash-in into the left wing progressively from none at the wing root to about 1/16" to 3/32" at the polyhedral break (none in the tip). Bend in equal amounts of "up" on both sides of the stab until the glider has a slightly stalling glide. Put in enough stab tilt to give a hint of left turn when hand gliding. Properly trimmed, the glider will do a 220-degree to 270-degree climbing turn, and then drift gently into a left glide turn. Having the model pointing downwind after the transition will help keep the glider from stalling as its airspeed decreases. You may notice that planes that transition facing the wind tend to stall and lose altitude, especially if it is windy. Having a downwind transition will also allow you to wait longer before throwing into a thermal.
Symptom: instead of spiraling around in a smooth climb, the HLG just slow rolls in a more or less straight line. Problem: the glider is shy on "up". Cure: add more up in the stab (leave center of gravity as on plans). This will make it climb more quickly and roll more quickly. Take out stalling in the glide with stab tilt. An incorrect launch does not usually cause this problem.
Symptom: the model spirals around only about 90-degrees; then the wings level and the model noses up into a stall. Problem: the model was either thrown with too much bank or has too much "top" rudder. Cure: take out left rudder and/or add more wash-in to the wing. Bank the model less or launch more skyward. Sometimes more "up" may be needed. The glide circle may be readjusted with stab tilt if necessary.
Symptom: the model patterns very tightly or loops. Problem: the model has too much "up", or was thrown with too little bank or too much skyward. Cure: take out some up. Open the glide circle by backing off the stab tilt. Throw at a little lower angle or with a bit more bank (go easy). If the model has a tendency to spin-in in the glide, add more wash-in to the wing.

If the model tries to spin in on the glide, add washin on the left wingtip. If the spin persists, reduce the left rudder tab.
If the glider goes way up, does 180-degree vertical reverse, slams straight back to earth, then add more "up" to the right side of the stab.
Problem: the model climbs to the right, but stays in the bank too long and loses altitude, still in a banked attitude before leveling off and turning left. Cure: too much decalage (angular difference between angles of attack of wing and the stab). Warp stab trailing edge down; or, warp right trailing edge of stab down and left trailing edge of stab up. A less-preferred cure is to add more left rudder.
Problem: the model climbs straight or to the left and does a Dutch Roll; and, when you try to correct this by using a sidearm throw, the glider now banks sharply to the right and goes into a shallow banked climb. The glider now banks sharply to the right and goes into a shallow banked climb. The glider seems to alternate between the two extremes. Cure: fin is too small. Possibly, the glider has too much dihedral.
If the glider goes up in a proper spiral, then falls off at the top and stalls: difficult solution, but initially try a tweak more right tab at the bottom of the fin (ZWIEBOX) or a smidge more "down" on the left side of the stab.
If the glider does everything almost perfectly, but spins to earth at the slightest upset: maybe the CG is too far aft, but more likely the left wing panel washin is too shallow.
If the model pulls out of the initial right bank, goes vertical and tends to barrel roll to the left and possibly runs out of oomph upside down, then tweak a little "down" into the right side of the stab.
The following trim scheme is from the CHALLENGER article and could be used as a starting point. It should produce a launch pattern almost vertical in attitude, with a slight turn, maximum altitude, and a flick-out transition on top. Before flying, set up the model as follows: Bend the fin to the left slightly (Just bend the surface by squeezing the wood slightly between your thumb and finger, compressing the wood on the inside of the bend while stretching the wood on the outside. Bend the left side of the stab (rear) slightly down. Bend the right side of the stab up slightly more than the left side was bent down. The ZWEIBOX also uses this stab tweaking up/down. This contributes much to the flick rollout. If the model stalls in the glide, add a little clay to the nose. If the model dives (it shouldn't if you bent the stab up enough), bend the right side of the stab up a little more. If the model sweeps over on its back on the launch, there is too much up on the right side (or not enough down on the left side). Throw again and adjust until the model is going almost straight up. If there is not enough left rudder, the model will go too much to the right and have a very wide glide circle. The model has to go slightly to the right on launch to get a proper transition. Too much washin in the left main panel will lift the wing on launch, making transition difficult and increasing the glide circle. Keep adjusting the stab and rudder to control the launch; add or remove noseweight to control the glide. A full-power launch is almost vertical at 75-degrees to 80-degrees with slight tilt to the right, and almost overhand. If it is launched too near the vertical, it will come over backwards with usually poor transition. If the model, on a proper launch, sweeps back or even loops near the top, this means too much up-bend on the right side and/or increase the down-bend on the left side. if the model comes into the transition a little shaky, makes a fast run, and loses a little altitude before settling into its proper glide, it

can usually be corrected by any or all of these adjustments: bend the right stab up a very small amount, decrease the down-bend on the left stab slightly, remove a small amount from the washin tab, or reduce the left rudder bend slightly.
An alternative trimming scheme is a little bit of washin in the right inner wing panel, stab tilt for a left glide, and a bit of right rudder tab to prevent the model from spinning in when in a thermal. This technique is used by Martyn Cowley (GOLDRUSH). Martyn says that it may sound like a spiral dive waiting to happen, but that it is great for trimming the throw part of the climb-just like a Power model, rolling left while turning right. (from CIA Informer, Jul/Aug 96)

1998 U.S.I.C

These are the results that were not published in issue 94

Coconut Scale

1.	Michelle Boyd	General Aristocrat	2:51
2.	Tim Lavender	Verville Air Coach	1:54
3.	Robert Stevens	Lockheed Vega	1:51

Pistachio

Pl	Name	Model	Scale	Flt.	Total
1.	Tim Lavender	Mess't M-20	2	1	3
2.	Emil Schutzel	14 bis	1	3	4
3.	Doc Martin	Goldwing	4	2	6
4.	Ed Ripley	Wee Bee	3	5	8
5.	Rich Miller	Sperry Jenny	4	4	8
6.	W. Henderson	Longster	3	8	11
7.	Ed Ripley	Sperry Jenny	4	7	11
8.	Bill Hiscock	Stinson SR-7	4	9	13

Golden Age FAC
(Total 3 unlimited flights)

1.	Mike Thomas	J-5	619
2.	Jack McGillivray	Moth Minor	590
3.	Rich MacEntee	Bellanca	400
4.	Chris Brownhill	Robin .	309
5.	Jenny Plassman	Piper	279
6.	John Blair	Waco	211
7.	Wayne Anderson	Focke-Wulfe	124
8.	Robert Stevens	Lockheed Vega	117

FAC Scale

1.	Rich Miller	Curry Wot	160.5
2.	Jack McGillivray	SE-5	159.5
3.	Wayne Anderson	ME-105	149.5
4.	Chris Brownhill	Lacey M-10	142
5.	Rich MacEntee	Waco	140.5
6.	Chris Brownhill	Robin	136.5
7.	Wayne Anderson	BV 14113	121

FAC Peanut

Pl	Name	Model	Sc.	Bst.	Bon.	Total
1.	Rich MacEntee	Lemberger	66	80	15	161
2.	Doc Martin	Ansaldo	70	54.4	15	139.4
3.	Chris Brownhill	Lacey	56	82.5	0	138.5
4.	Doc Martin	Curtiss	51	62.7	10	123.7
5.	Bill O'Dell	Davis DA2A	55	26	10	91

Modern Civil Production
(total of 3 flights)

1.	Jack McGillivray	?	374
2.	Marcus Conner	Volksplane	195
3.	Rich Miller	Vagabond	154
4.	Bill Landrum	Turbo Porter	118

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by Don Ross

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–Frank Fanelli, Editor, *Flying Models Magazine*

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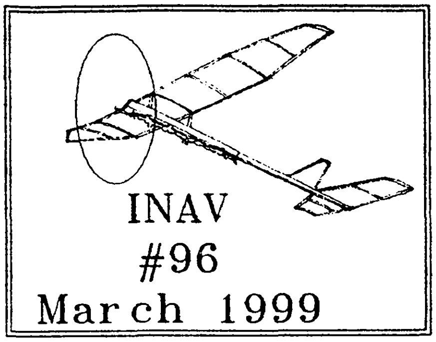

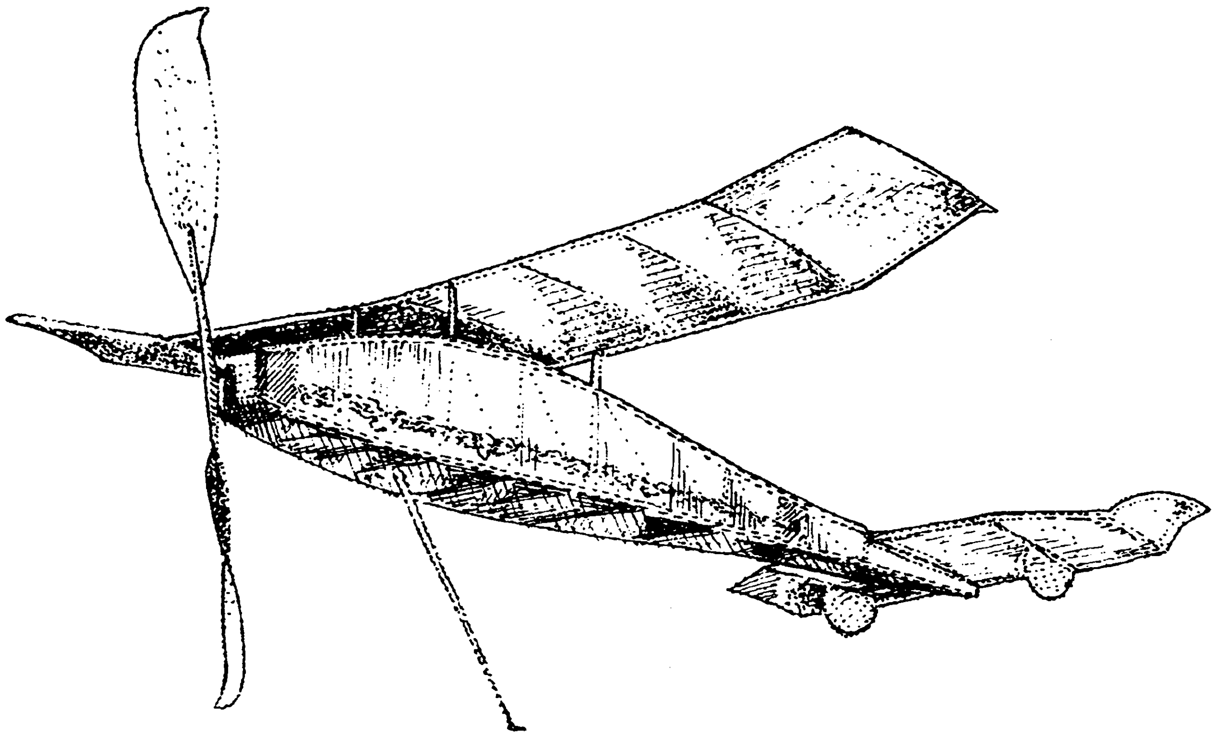

"JOKER"
Manhattan Cabin

Inside:
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Printing Colored Tissue
Covering with Y2K film
Spyderfoam Scale Models

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BOB BAILEY'S REPLY TO NICK LEONARD'S COMMENTS IN ISSUE 95 – NOVEMBER 1998

I would like to comment on Nick Leonards report in Nov. '98. INAV, which I read with great interest having flown at Slanic myself in the World Championship.

We were fortunate in preparations at Cardington when the first two meetings in April gave conditions which were very similar to Slanic in terms of temperature and humidity. Torque levels were not greatly different.

I was also flying an unbraced model but with a bigger wing than the "stork" (8 ¼" chord) and got the impression from the original test that with 4"wing post the model was liable to tuck in due to excess wing wrap. I therefore shortened the wing post to 3 ¼" to ensure a bit of extra safety margin for flying at Slanic.

My models were flown to the maximum torque anticipated for Slanic and no trim problems were encountered there.

From Nick's descriptions of his problems on the last day, it seems very likely that a key joint on the wing spars to wing posts or Wing posts to fuselage was weakened! This could have happened during steering.

To test a joint, hold one component very close to the joint and put a load on the other. No rotation of the second component relation to the first should be visible. Without stiff joints, the unbraced model has no chance of handling high torque.

Incidentally, I ensured that the wing posts have a circular cross section in the motor stick since I had trouble with mounting the slim boron, braced posts. The reason was to ensure a stronger joint, which is also stiffer. The stick wood (rectangles) squashes more easily sideways than from the front to rear.

Regarding the effect a torque on wing warp, the length the post is not revelant, provided they do not bend unequally. It is the angular change (tension) that is the critical parameter, and here, a small diameter motor stick is bad news! With a bigger wing chord the angular change is bigger.

Why do I fly unbraced models? The reason is that I never managed to avoid damage in international travel with braced models; I always was successful in finding a wrong way of setting them up in the box. This experience culminated in my arrival at Johnson City in 1990 with two fuselages and two propellers, having started and with 4 complete aircraft! I didn't touch FID for the best part of 2 years after that, and vowed not to build a braced FID again.

The unbraced models are easy to transport, as Nick Leonard knows well, they are easy to repair (no wire to get in the way) and are, I believe, fully competitive.

Steve Brown's models have one great advantage... Steve Brown flies them!

I hope that Nick has a rethink before ditching the unbraced models; he will exchange one set of problems for a substantially different set! "I've been there and done that"; to use a well warn phrase in Britain.

Bob Bailey

Covering Indoor Models
Using the Thinner Covering Films

This article will cover using Polymicro II or the new Y2K films to cover indoor models. The newer films are more delicate than previous films and so demand new techniques to get good results.

The first step in using the plastic films for covering is to make a covering frame. Basically a covering frame is a pair of rails that the covering is glued to that hold the film while a structure is lowered onto the covering. A method of adjusting the rails in relation to one another is needed to produce the slack that allows the structure to be covered without the film being too tight. Any simple system to allow one rail to be adjusted will work. One method is to use 1/4" X 1 1/2" X 24" hard balsa rails that have two slots cut into each of them 2" from each end and in the middle of the 1 1/2" face. The slots are cut to be a tight fit for 1/4"X 1/2"X 7" spreader pieces that tie the two rails together. Once the rails have the spreader pieces inserted into them the position of the rails can be adjusted by simply pushing the spreaders into or out of the slots until the desired film slack is achieved and any diagonal wrinkles are removed. A better but more elaborate system is to build a pair of rectangular frames from 1/8" X 1/2" X 35" as shown in the diagram. These are joined by 1/8" X 3" X 7" hard balsa crosspieces along the bottom only. This leaves the upper rails of the frames very flexible. A set of five turnbuckles are used to adjust the width and diagonal tension on the upper rails. These upper rails are the ones used to hold the film. Three of the turn buckles go across the frames, one in the center and one at each end. The other two turnbuckles are set up along the diagonals of the frame and are used to adjust the diagonal wrinkles out of the film. This frame is more permanent and more versatile than the frame first described, although both do a good job.

Getting the film off of the card tube is not a trivial job, especially the new Y2K film. Gene Joshu discovered very recently that if you unroll the film out onto a large piece of the foam rubber used in furniture upholstery a very large part of the static that plagues this material is eliminated. Once the film is unrolled to the desired length a piece of cardboard is placed under the film at the desired cut off point. A hot soldering iron of about 15 watts is recommended for film cutting and trimming. Once the film has been cut you can further eliminate static by gently wrinkling the film by rolling it up into very loose ball about 3" in diameter and massaging it gently with the fingertips for a minute or so. Do not roll the ball too tight, this can ruin the film by bursting small air bubbles. Gently and slowly unravel the film onto a smooth matte surface such as a piece of cardboard or Formica. If you are using the new Y2K film you must go very slowly and be very careful not to pull to hard on any one bit of film since this film will tear very easily. Your fingers must be absolutely clean and glue free or the smallest bit of glue on them will start to tear the film. The same is true of all the other items that may touch the film. To help spread the film out evenly and to get the air out from under it you can blow very gently down onto the film, forcing the trapped air out. This job is finished by smoothing the film out with a very soft watercolor brush, or a mascara brush. If a drafting brush is used you must be careful to always draw the brush with the bristles sweeping back. If this type of brush is used with the bristles being pushed the ends of the hairs will tear many small holes into the film. Work with the film until it is well flattened and looks tight with no wrinkles. It is now ready to have the frame glued to it.

The glue that works best for attaching the film to the covering frame is the Prang Glue Pen from Office Depot. This is a very slow drying liquid glue that will allow a small amount of adjustment to the edges of the film to help you remove wrinkles. Glue stick can also be used if the area of the frame is not too large. Once the film is attached to the frame the whole thing is turned over and inspected for diagonal wrinkles or loose spots. Small placement corrections can be made by sliding the film on the still moist adhesive. The object is to get the film tight and wrinkle free on the frame before you use the adjustability of the frame to get the needed slack in the film. An inch of extra film on the outer side of the rails will make these placement corrections easier.

Now that you are ready to cover the model there are some things you can do to make the covering job better. If you are covering a very light structure like an EZB wing you will want to add a handle device to hold the wing spars straight and so that you will have something to hold onto as you place the wing into position on the film. This handle is constructed of a piece of 1/32" X 3/4" X 18" medium balsa with 1" balsa fingers spaced to hold the spar between the ribs. The ends of the fingers are glued with a very small dot of ambroid cement to the trailing edge spar. With six or seven fingers the spar will be very straight. The ribs will hold the front spar straight since the back spar is straight. The handle is glued with a slight droop, like the flaps on a conventional plane. This will allow you to easily place the wing onto the film with precision.

Now you place the wing onto the film without any adhesive to see if there is enough slack to allow the leading and trailing edges to meet the surface of the film. If it is too tight the wing will just rest on the tops of the ribs. If it is too loose the covering will have a great number of wrinkles, especially at the tips. Adjust the frame rails so that the entire wing rests on the film. It is better to error on the side of having the film too loose.

The wing is now turned over so that the glue can be applied to the top surface. Before the spray is sprayed you must cover the handle and fingers with drafting tape so that the spray is not applied to the handle.

The adhesive of choice is 3M #77 Sprayment, buy the larger can since it is much less expensive this way. This stuff is very sticky, do not use it near anything you do not want to stick things to. To apply the spray to the wing you need an area with a dark background and strong sidelighting. This will allow you to see the spray as it floats on the air. Holding the wing by its handle in your left hand, spray a small cloud of sprayment into the air and immediately pass the wing through the cloud so that the top of the wing picks up the spray. Repeat this step several times until the entire wing is thoroughly covered. You can test any questionable area with a small ball of scrap film. Just touch the ball of film onto any parts of the spars you think may not have enough spray on it. If the ball show any tackiness that area is OK. Once the wing has been sprayed take the drafting tape off of the model. Do this by holding the wing vertically by the handle and pull the tape down across itself. This will automatically pull off the drafting tape from the fingers as well.

It is best to get the wing onto the film fairly quickly once you have sprayed it with glue. Since you let only the very finest glue particles settle onto the structure this glue can dry out pretty fast. As long as you can get the wing onto the film in four or five minutes you will be fine. The covering should be done in an area with very good light so that you can tell just how to place the wing. Be very careful to put the wing onto the film right where you test fit it before gluing. Use the handle to get it just so before letting it touch the film. One good method is to rest the fingers of the handle on the rail nearest you with the wing tilted up and clear of the film. The handle is then slowly raise which lowers the wing down onto the film. Remember that you will not be able to easily lift it once it is down so position it carefully before you put it down onto the film. A possible error is to let a tip or one end of a spar touch in the wrong place and then try and force the wing back into place. If this happens you can lift the wing back off of the film by using a small clean brush with clean acetone to unglue the offending area. Placing the wing on the film is not that difficult, it just needs to be done carefully to get superior results. With the wing in place on the film you can gently push any parts that are not attached well down onto the film surface. Simply run your finger around the outline to make sure you are down everywhere. Look carefully and gently poke here and there until you are certain that you are attached everywhere. If there are any areas that you simply did not get any glue on you can take a solution of rubber cement thinned with the proper thinner and fix it. By using a very small, soft paintbrush you can apply a very small amount of glue to fix the offending area. The cement should be extremely thin, perhaps 10 to one or thinner. Any area where you had to use this extra glue you must allow to dry for a good while before the next step. If you do not need to add this glue anywhere you are ready to trim the wing.

A very low power soldering pencil is a good tool to use for trimming the new films. Do not use a medium or large iron as this will have too much heat coming off of the element. This can tightly shrink the film in very localized places and really mess things up. I use a 12-watt iron and often have to unplug it for moment or two to keep it from getting too hot. Also, never trim from under the film as the heat will rise and the film may collect hot air underneath until something goes bad. Trim from above and keep the iron moving. When the film is trimmed from around the wing several small tabs of film are left uncut to hold the wing in place. Once the majority of the film has been trimmed from the wing outline these tabs can be trimmed with the iron while the wing is held by the other hand. This way when the wing comes loose from the film it will not shift and reglue itself to the remaining film on the frame. Clean the tip of the iron frequently during your covering sessions to insure the very best cutting action.

Once you have the wing trimmed all the way around you can give the outline one last very careful inspection. You are looking for anyplace that the film is not attached. If you find any areas that need it you can use the thinned cement to fix them. Use this glue very sparingly. Allow the wing to dry completely so that if the wing touches some other film covered part in your model box it will not stick to it. The above method will work with stabs and other flight surfaces on typical indoor models. Most structures other than the EZB wing do not need the handle to straighten then, but it is a very good way to get any structure down onto the film with good control. I beats the method of "dropping" the structure onto the film and is very much better than trying to use your fingers.

NOTE:

We still have a bunch of the new Y2K film for sale. This film is just over half the weight of Polymicro II and shows some very nice colors. Due to the limited amount of this film we are allowing a maximum of two rolls per person. The film is about 14" wide and 20 feet long on each roll. The price is $33.00 post paid in the US and Canada and $36.00 US post paid to any other countries.

Send Payment to:

Y2K Film
4514 Meadowlane
Red Bud, IL 62278

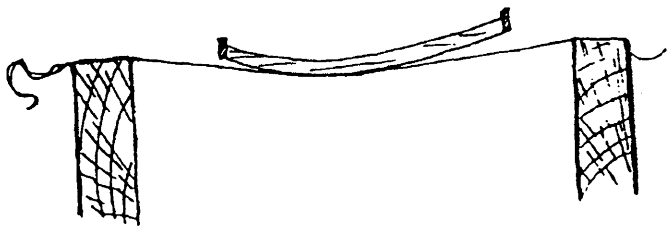
Please remember the two roll limit!

The Y2K Film Fund to Help Support Junior and Senior Contestants at this Years AMA/USIC

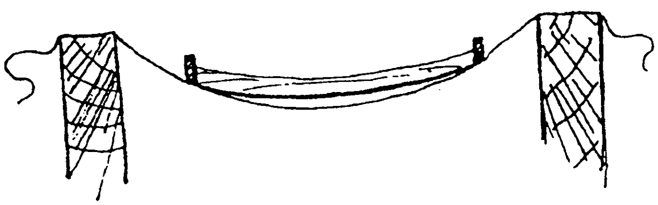
Juniors and seniors who fly at this years AMA Indoor NATS/USIC at Johnson City will have their contest entry fees paid by the Y2K Film fund. To receive the sponsorship the junior or senior contestant should send a copy of their entry forms to:

Y2K Film
4514 Meadow Lane
Red Bud IL, 62278

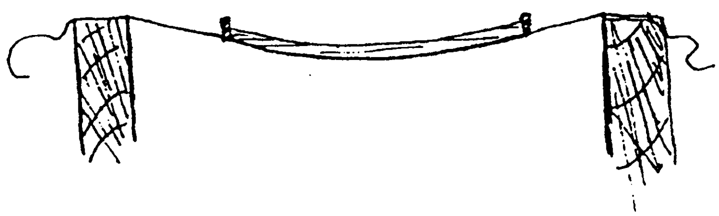
Note: Those wishing to take advantage of this sponsorship should make certain that the copies of their entry forms are sent in time to pay the fees. The sponsorship does not extent to paying any late entry fees what so ever.



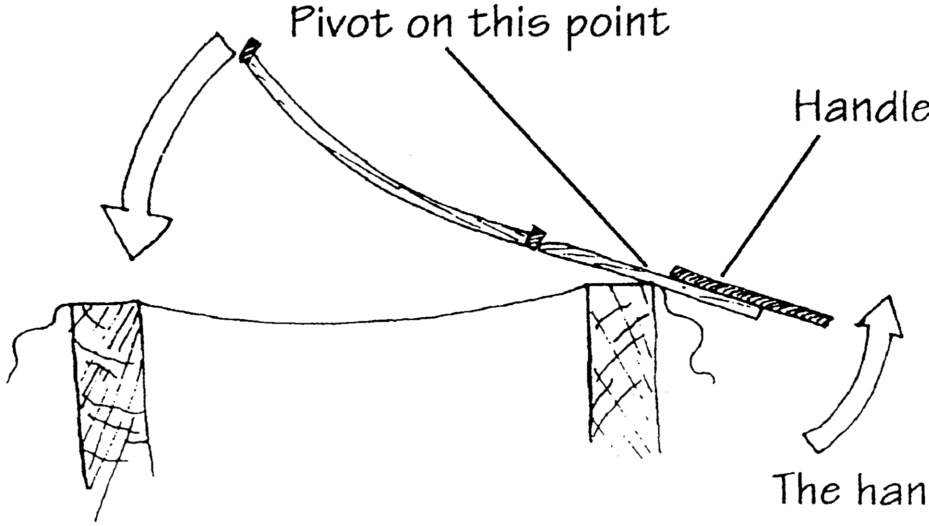
If the wing fails to touch everywhere along the spars the film is too tight on the frame



If the spars touch the film but the ribs do not, the film is too loose on the frame

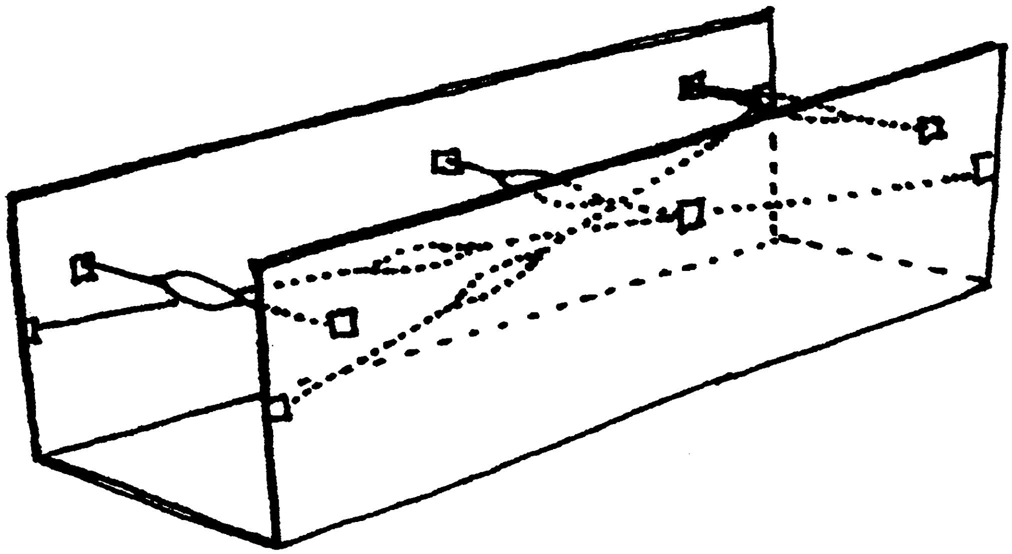


When the spars and the ribs all rest on the film the slack is perfect



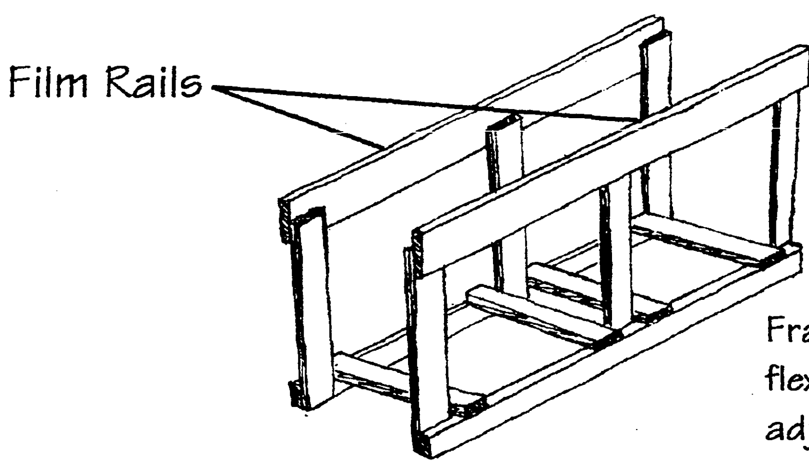
The handle is rocked on the edge of the frame to allow the wing to meet the film very evenly

Larry Coslick's
Adjustable Film Frame



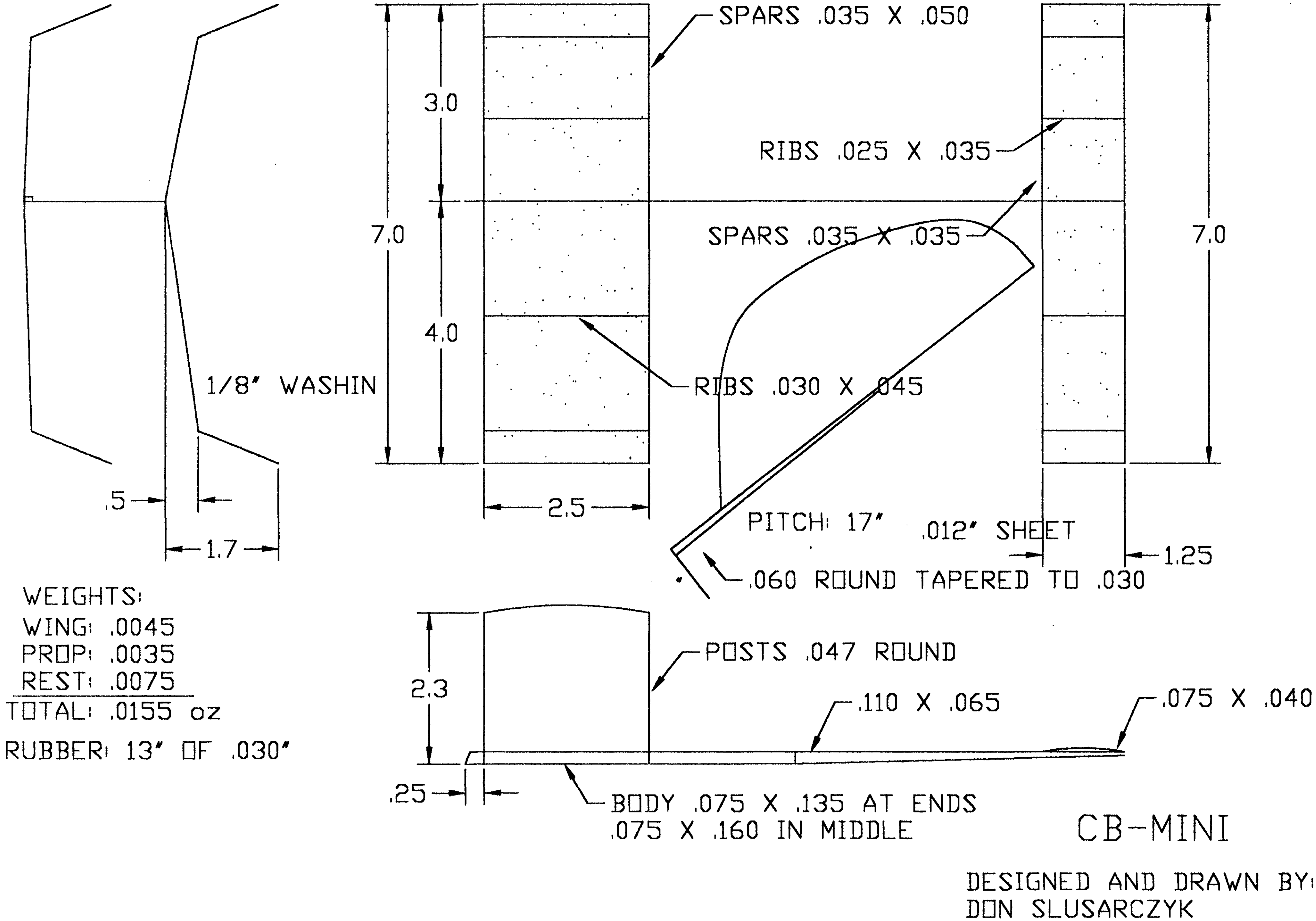
This view shows the arrangment of the turnbuckles that are used to distort the flexable frame and so adjust the film slack and remove any unwanted wrinkles.

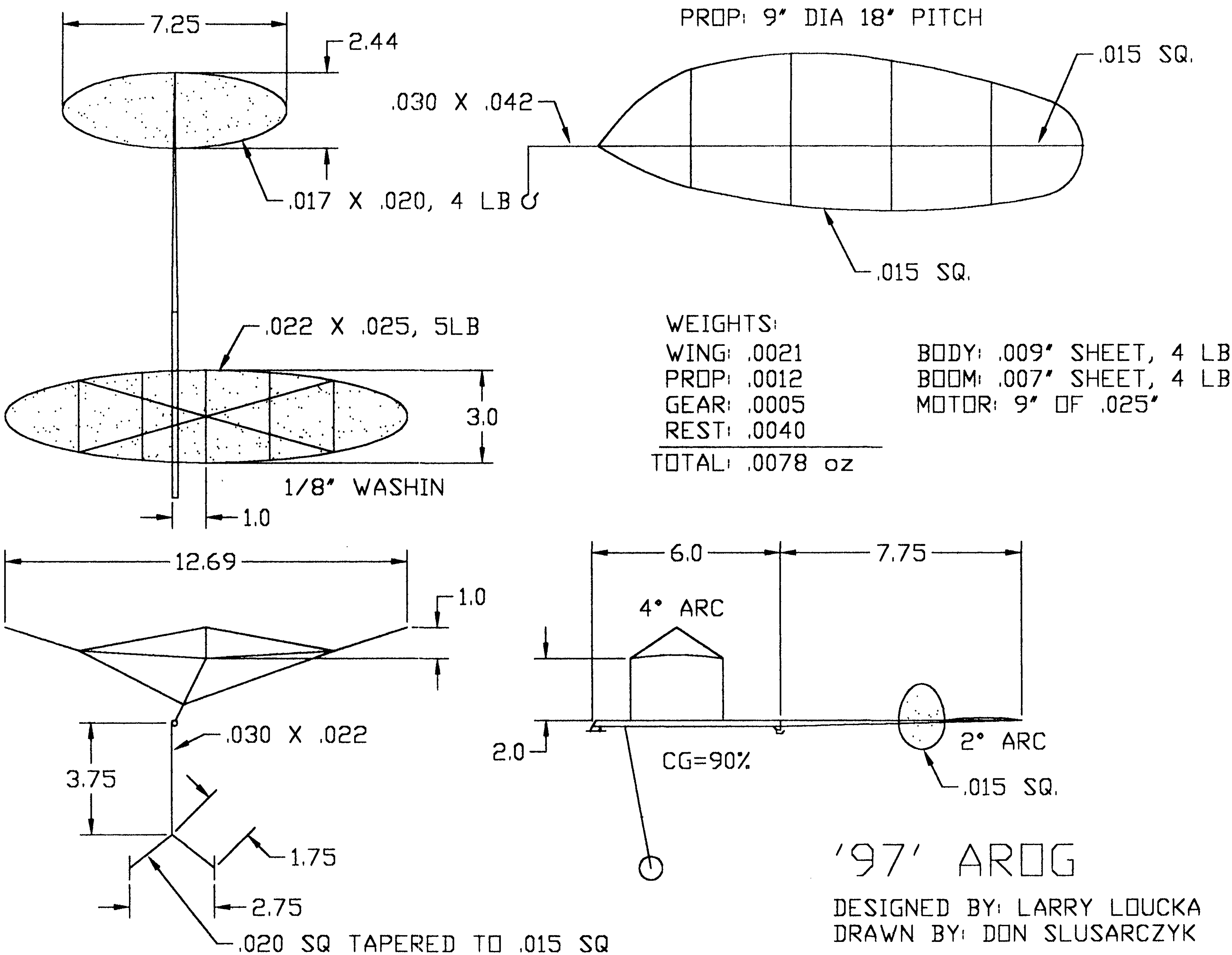
Five turnbuckles are used, three crossing the frame to adjust the film slack and two diagonals to help remove any wrinkles.



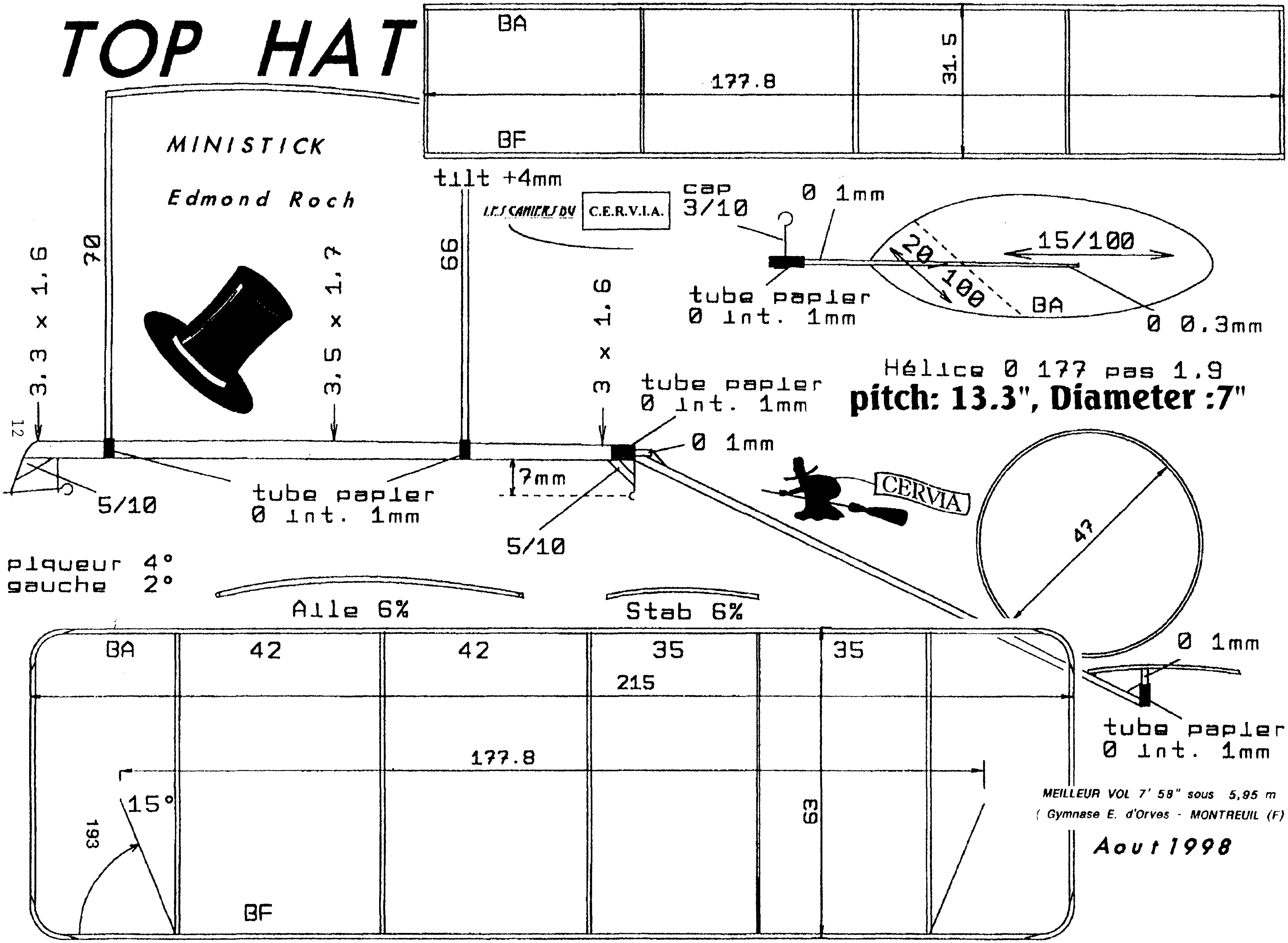
Frame is built with enough flexability to allow easy adjustment

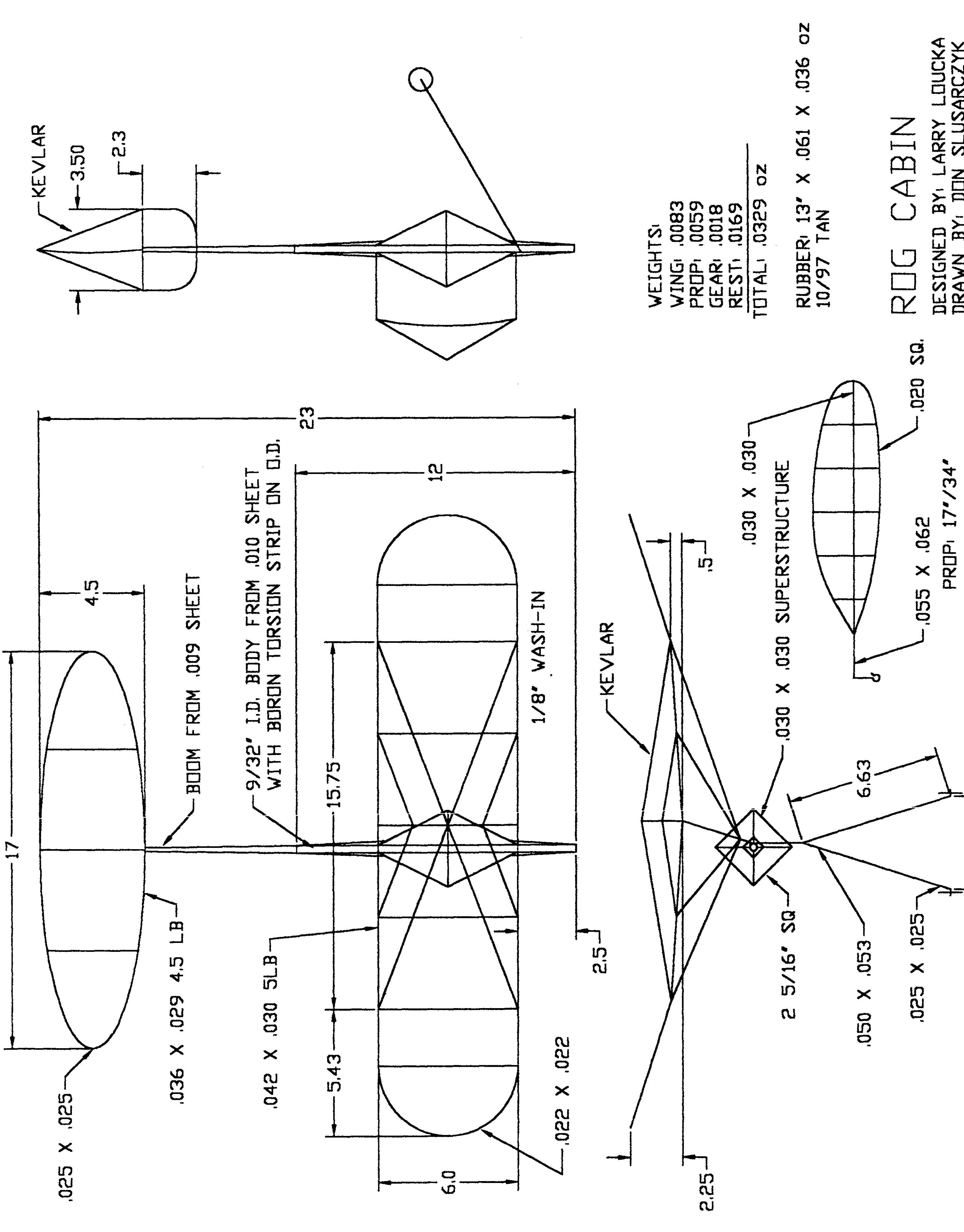
The frame is made up of 1/8"X 1/2" basswood rails and 1/4" X 3/8" basswood uprights and crossbraces. Size the frame to handle the largest model you expect to build. The film is attached across the top of the rails with liquid gluestick.

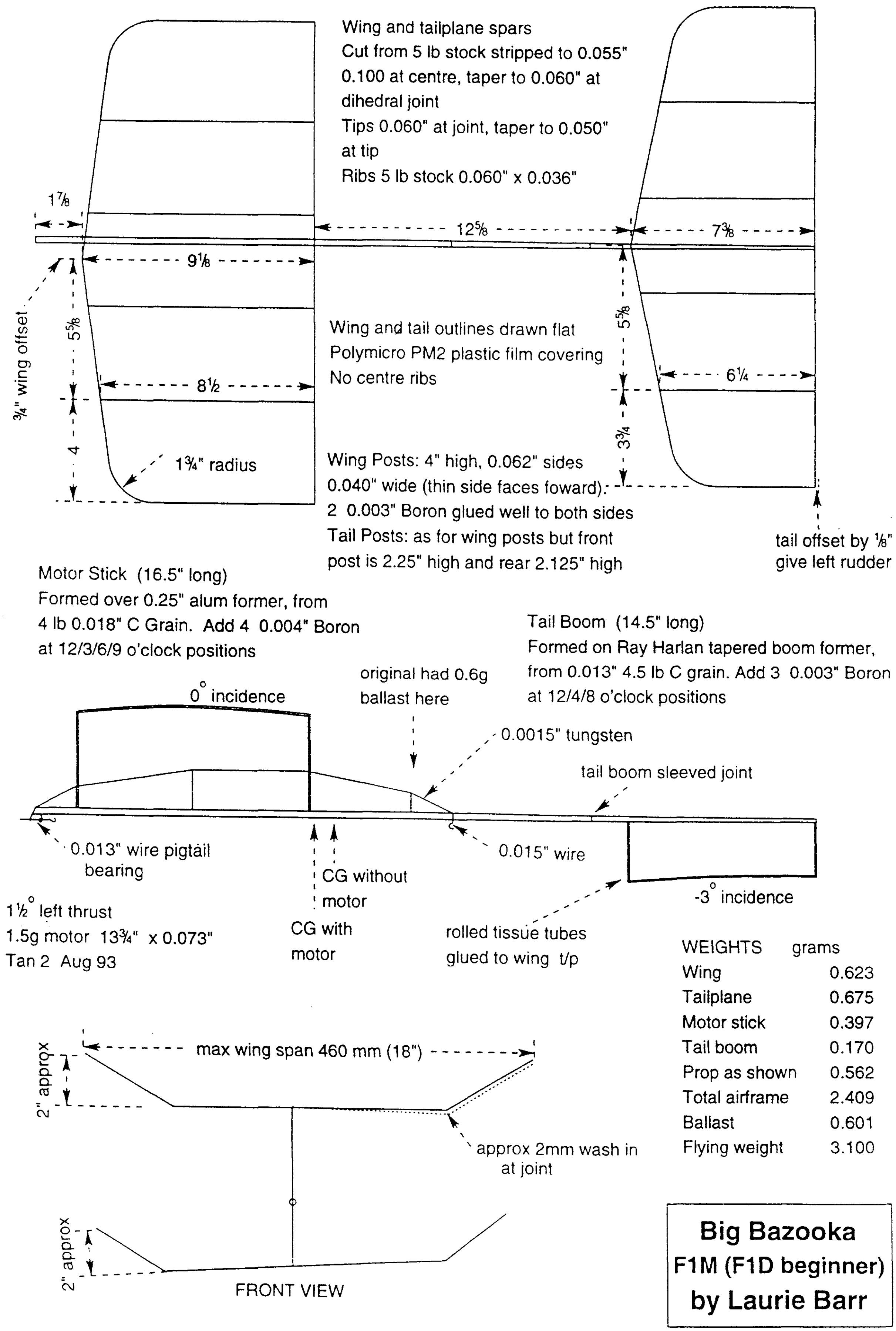

SPARS .035 X .050
RIBS .025 X .035
SPARS .035 X .035
RIBS .030 X .045
3.0
4.0
7.0
7.0
2.5
1/8" WASHIN
.5
1.7
PITCH: 17"
.012" SHEET
1.25
.060 ROUND TAPERED TO .030
WEIGHTS:
WING: .0045
PROP: .0035
REST: .0075
TOTAL: .0155 oz
RUBBER: 13" OF .030"
POSTS .047 ROUND
2.3
.110 X .065
.075 X .040
.25
BODY .075 X .135 AT ENDS
.075 X .160 IN MIDDLE
CB-MINI
DESIGNED AND DRAWN BY:
DON SLUSARCZYK


PROP: 9" DIA 18" PITCH
7.25
2.44
.030 X .042
.015 SQ.
.017 X .020, 4 LB
.015 SQ.
.022 X .025, 5LB
3.0
1/8" WASHIN
1.0
WEIGHTS:
WING: .0021
PROP: .0012
GEAR: .0005
REST: .0040
TOTAL: .0078 oz
BODY: .009" SHEET, 4 LB
BOOM: .007" SHEET, 4 LB
MOTOR: 9" OF .025"
12.69
1.0
6.0
7.75
4° ARC
.030 X .022
3.75
2.0
CG=90%
2° ARC
.015 SQ.
1.75
2.75
.020 SQ TAPERED TO .015 SQ
'97' AROG
DESIGNED BY: LARRY LOUCKA
DRAWN BY: DON SLUSARCZYK

TOP HAT


MINISTICK
Edmond Roch
BA
BF
177.8
31.5
tilt +4mm
LES CAHIERS DU C.E.R.V.I.A.
cap 3/10
Ø 1mm
15/100
20/100
BA
Ø 0.3mm
tube papier Ø int. 1mm
Hélice Ø 177 pas 1.9
pitch: 13.3", Diameter :7"
70
66
3,3 x 1,6
3,5 x 1,7
3 x 1,6
tube papier Ø int. 1mm
Ø 1mm
7mm
5/10
tube papier Ø int. 1mm
5/10
CERVIA
47
piqueur 4°
gauche 2°
Aile 6%
Stab 6%
BA
42
42
35
35
215
177.8
15°
193
63
BF
Ø 1mm
tube papier Ø int. 1mm
MEILLEUR VOL 7' 58" sous 5,95 m
(Gymnase E. d'Orves - MONTREUIL (F)
Aout 1998

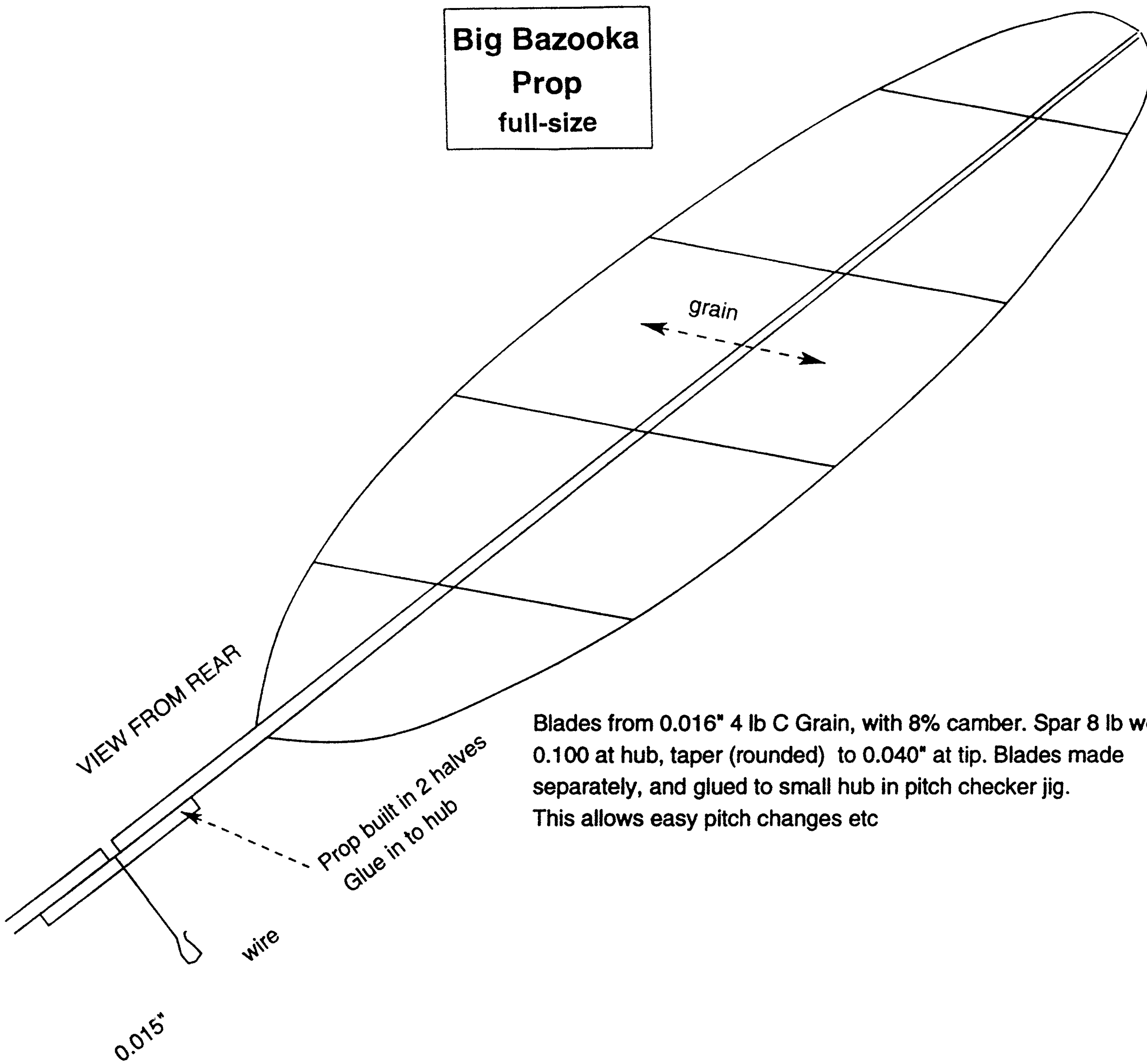

KEVLAR
3.50
2.3
WEIGHTS:
WING: .0083
PROP: .0059
GEAR: .0018
REST: .0169
TOTAL: .0329 oz
RUBBER: 13" X .061 X .036 oz
10/97 TAN
ROG CABIN
DESIGNED BY: LARRY LOUCKA
DRAWN BY: DON SLUSARCZYK
23
12
4.5
17
BOOM FROM .009 SHEET
9/32" I.D. BODY FROM .010 SHEET
WITH BORON TORSION STRIP ON O.D.
15.75
1/8" WASH-IN
KEVLAR
.5
.030 X .030
.030 X .030 SUPERSTRUCTURE
.020 SQ.
.055 X .062
PROP: 17"/34"
.030 X .030
6.63
4
.025 X .025
.036 X .029 4.5 LB
.042 X .030 5LB
5.43
.022 X .022
6.0
2.5
2.25
2 5/16" SQ
.050 X .053
.025 X .025



WEIGHTS	grams
Wing	0.623
Tailplane	0.675
Motor stick	0.397
Tail boom	0.170
Prop as shown	0.562
Total airframe	2.409
Ballast	0.601
Flying weight	3.100

Big Bazooka
F1M (F1D beginner)
by Laurie Barr

FFn Scale 1:5 All dimensions ins



Blades from 0.016" 4 lb C Grain, with 8% camber. Spar 8 lb wood, 0.100 at hub, taper (rounded) to 0.040" at tip. Blades made separately, and glued to small hub in pitch checker jig.
This allows easy pitch changes etc

BIG BAZOOKA F1M (F1D BEGINNER) BY LAURIE BARR

This is my first shot at this class of model, and it has proved to be easy to build and fly. Future developments will include a VP prop to avoid wasting so many back-off turns, possibly making prop 17" dia.

Ribs pre bent inside male/female bandsawed jig, with 3/8" camber. Soak well. Clamp between top/bottom of form with bands, microwave for 1.15 mins at 750 Watts. run sheet through stripper to desired width.

Given a high enough ceiling, and/or a VP prop, I believe this model will fly for 21 minutes. It came 2nd at the USA Indoor Championships, in Johnson City USA, and it won the British Indoor Nationals F1M indoor beginners class, with a flight of 20 min 12 sec.

Easy EZB Props

I used to hate EZB props. I had EZB prop envy. I would follow directions to the letter, using the best wood I could get, and end up with a waffly, wavy prop weighing around 150 mg. My props were the worst part of my EZBs and I did not like any of the first dozen or so I made. My models would kind of bob through the air as the prop shuffled along. There just had to be a great deal of wasted energy in all that wriggling around. After a while I got better at it, but I never actually liked any of my props. I had trouble getting wood I considered adequate, and I always managed to come out with wavy edged blades once the prop was finished. The blades would come off of the form so pretty and nice. Beautiful curves with perfect edges. Glue them to the spar and in a few days they were like all my earlier ones. No fun at all.

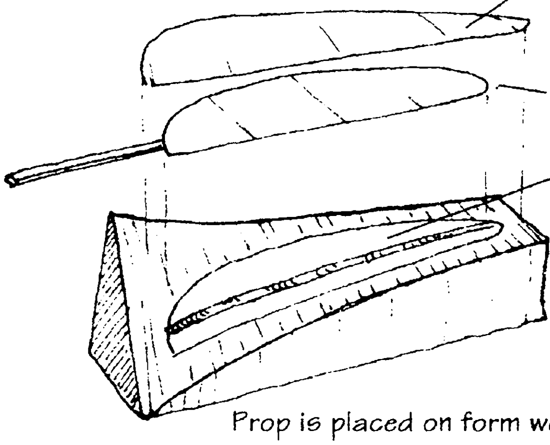
It is kind of funny how things gel all at once. At one of the regular local flying sessions Larry Coslick showed up with an EZB prop dyed red and blue. The color edges were perpendicular to the prop spar, and I gave it a pretty good look to see how he did it. It turns out he dyed the wood before he made up the prop blank so that each piece was a different color. Larry had put the grain straight across the blade from edge to edge instead of the diagonal direction. He had also used very thin A grain balsa. By using a bit more substantial spar he had gotten by with using wood you would never have considered for the prop. I had some of that stuff at home! All I had to do was to sand it to thickness. I made up some blade blanks using my regular ambroid and lacquer thinner. After cutting them out I was worried. Such flimsy things! They just could not make workable blades, no way in the world. Even if they were OK off of the form, my gluing them to the spar was sure to ruin blades this thin. So glue the blades to the spar first! Who said that! Who cares, try it. I quickly slapped the spar onto the blades using ambroid. Normally the blades are glued to the spar with aliphatic so as to eliminate the warping from shrinkage of the glue. I figured that I was going to flatten the blades after any warping the spar gluing was going to do so I went ahead with the ambroid. Besides, I had to use waterproof glue so that the prop blades would not end up glued to the form. I cut a quick groove into the form for the spar and made my balsa sandwich. Twenty minutes in the oven at 220 and TaDa! A very nice, pretty, perfectly formed, and obviously strong and stiff enough prop blade. My best ever blade formed from wood sanded down out of 1/32" A grain balsa. Three different ideas all tried together worked out perfectly. I made four props in the next 12 hours, each better than any I had made up until then. Average weight was 125 mg using 5-pound wood and very strong spars. I like these props. Give this method a try and see if you like it too.

Start with some four pound 1/32" balsa (100-mg props) in any cut of grain you have. If you have some really nice C grain save it for Penny Plane props. One of the secrets to sanding wood down to usable thickness is to use very coarse paper to start with and do not push hard at all. If you start with too fine a paper you will have to press down pretty firmly to get it to cut fast enough. This compresses the wood fibers and drives up the density. What you get is five and a half pound wood that makes a heavy prop. If you use a very coarse paper and very light pressure you will keep the density down and the prop light. You still finish up with very fine paper, but NO pressure. A block with 280 paper using a pair of wraps of masking tape to space the face of the paper above the board makes a nice tool for getting the wood to its final thickness. Once you start sanding the wood you need to be extra careful not to crunch the wood. Sand in one direction, away from the hand holding the sheet against the table. Let the tooth of the paper do all of the cutting, do not press down! Balsa this thin is very much like a bundle of drinking straws. If you push down on the bundle you will collapse the straws and so crease the walls of each tube forming a flattened oval. Not only will the density go up, but also the collapsed tubes will have less stiffness and the wood will be very limp. To help "revive" the wood he sands, Larry Coslick has a trick where he washes the wood after sanding. This removes the imbedded balsa dust from the grain and helps expand the tubes the wood is composed of back to their original shape. He sands down to about .006" and after washing the wood returns to about .008" and is quite a bit stiffer.

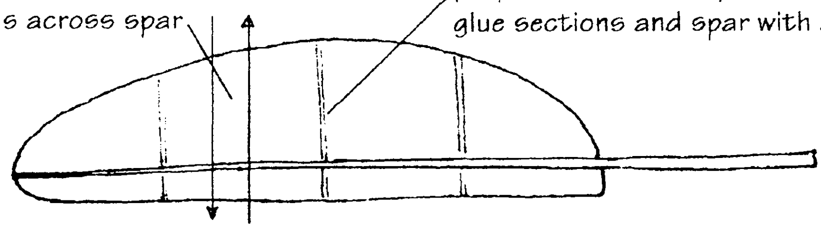
Once you have some nice wood sanded (it will seem far too limp, but do not worry) you can go ahead and use you prop template to make the prop blanks. I use very thin Ambroid to glue the section together, overlapping them about .020" or less. Cut the spars to size and glue them into place with the same thinned glue. Be careful not to use too much glue here, and to not get glue where you do not need it. You will find that gluing the blades to the spars before they are formed is much easier to do than the regular way. Note that the spar runs out to the very tip. This is necessary due to the direction of the grain of the prop blank. Let the prop halves dry before putting them onto the form.

You will need to cut a groove for the spar in the camber form you are going to use on the prop form. Be sure it is deep enough along its entire length. Wet a prop half and place it onto the camber form, then place the camber form and the cap used to prevent damaging the blades onto the prop form and wrap with carpet thread. Bake the whole thing in a 220-degree oven for around 20 minutes. Let the form cool a bit before unwrapping the prop half. You should have a very nice looking prop blade with just a bit of curl (like the prop is under a load) and prefect pitch twist. Make the other blade and join using a wedge as shown in the illustrations.

The resulting propellers will hold the blade twist very well and the blades made this way are very close to identical.

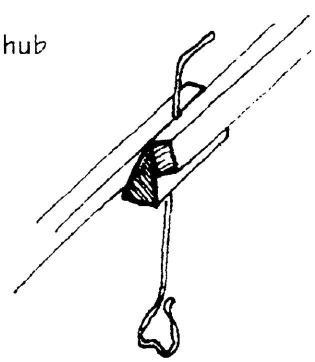


Prop is placed on form wet and the cap is positioned then the whole is wrapped with cotton cord and baked for 20 minutes at 220 degrees



prop spar runs all the way out to the tip .045"X.055" tapering to .025" square at tip

crossection at hub



Because the spars are glued flat to the blades they must attach to the hub at an angle. A wedge of firm balsa serves as the hub as shown.

FORTY MINUTE CLUB

NAME	COUNTRY	TIME	1*	2*	YEAR	SITE
BROWN, STEVE	USA	63:54	X		1996	SANTA ANA
RICHMOND, JIM	USA	56:35	X		1996	AKRON
RANDOLPH, BOB	USA	55:06	X		1993	SANTA ANA
BROWN, STEVE	USA	53:45		X	1997	SANTA ANA
ASLETT, BERNARD	UK	52:22	X		1983	CARDINGTON
UNDERWOOD, GARY	USA	51:58		X	1996	LAKEHURST
ROBBINS, HERB	USA	51:36	X		1998	SANTA ANA
KOWALSKI, DICK	USA	50:41	X		1976	AKRON
DOIG, RICH	USA	50:41		X	1995	AKRON
BANKS, CEZAR	USA	49:50		X	1996	MOSCOW, IDAHO
RICHMOND, JIM	USA	49:44		X	1997	SANTA ANA
ROMAK, BUD	USA	49:35		X	1991	LAKEHURST
RANDOLPH, BOB	USA	49:31		X	1995	AKRON
BARR, LAURIE	UK	49:29		X	1996	CARDINGTON
HUNT, BERNARD	UK	49:07		X	1997	CARDINGTON
COSLICK, LARRY	USA	48:16		X	1997	SANTA ANA
SLUSARCZYK, DON	USA	48:10		X	1995	AKRON
BUTTY, RENE	SWI	48:01		X	1996	MOSCOW, IDAHO
KAGAN, JOHN	USA	47:58		X	1997	SANATA ANA
ROHRBAUGH, AL	USA	47:40	X		1997	AKRON
HARLAN, RAY	USA	47:13		X	1980	AKRON
GIBBS, BOB	USA	47:03		X	1998	SANTA ANA
TIPPER, JOHN	UK	46:45		X	1996	CARDINGTON
DOIG, RICH	USA	46:24	X		1983	AKRON
OTA, KENICHI	JPN	46:16	X		1996	MATUMOTO CITY
LOUCKA, LARRY	USA	46:14		X	1995	AKRON
CHILTON, STAN	USA	46:10		X	1994	AKRON
McGILLIVRAY, JACK	CAN	45:57		X	1996	MOSCOW, IDAHO
RODEMSKY, ERV	USA	45:50	X		1974	SANTA ANA
RIEKE, K. H.	GER	45:40	X		1962	CARDINGTON
MERKT, THOMAS	GER	45:27		X	1996	MOSCOW, IDAHO
REDLIN, CARL	USA	45:17	X		1962	CARDINGTON
REE, ANDRAS	HUN	45:13		X	1998	SLANIC PRAHOVA
ANDREWS, PETE	USA	44:59		X	1979	AKRON
ENOMOTO, HIDEYO	JPN	44:55		X	1998	MATUMOTO CITY
MATHER, CLARENCE	USA	44:44	X		1974	SANTA ANA
ASLETT, BERNARD	UK	44:37		X	1985	CARDINGTON
DE BATTY, BOB	USA	44:35		X	1996	SANTA ANA
NICOARA, VASILE	ROM	44:30		X	1996	MOSCOW, IDAHO
HULBERT, BILL	USA	44:27		X	1994	AKRON
HACKLINGER, MAX	GER	44:20	X		1961	CARDINGTON
NORE, PENTTI	FIN	44:01		X	1986	CARDINGTON
ANDRE, THEDO	NED	44:01		X	1986	CARDINGTON

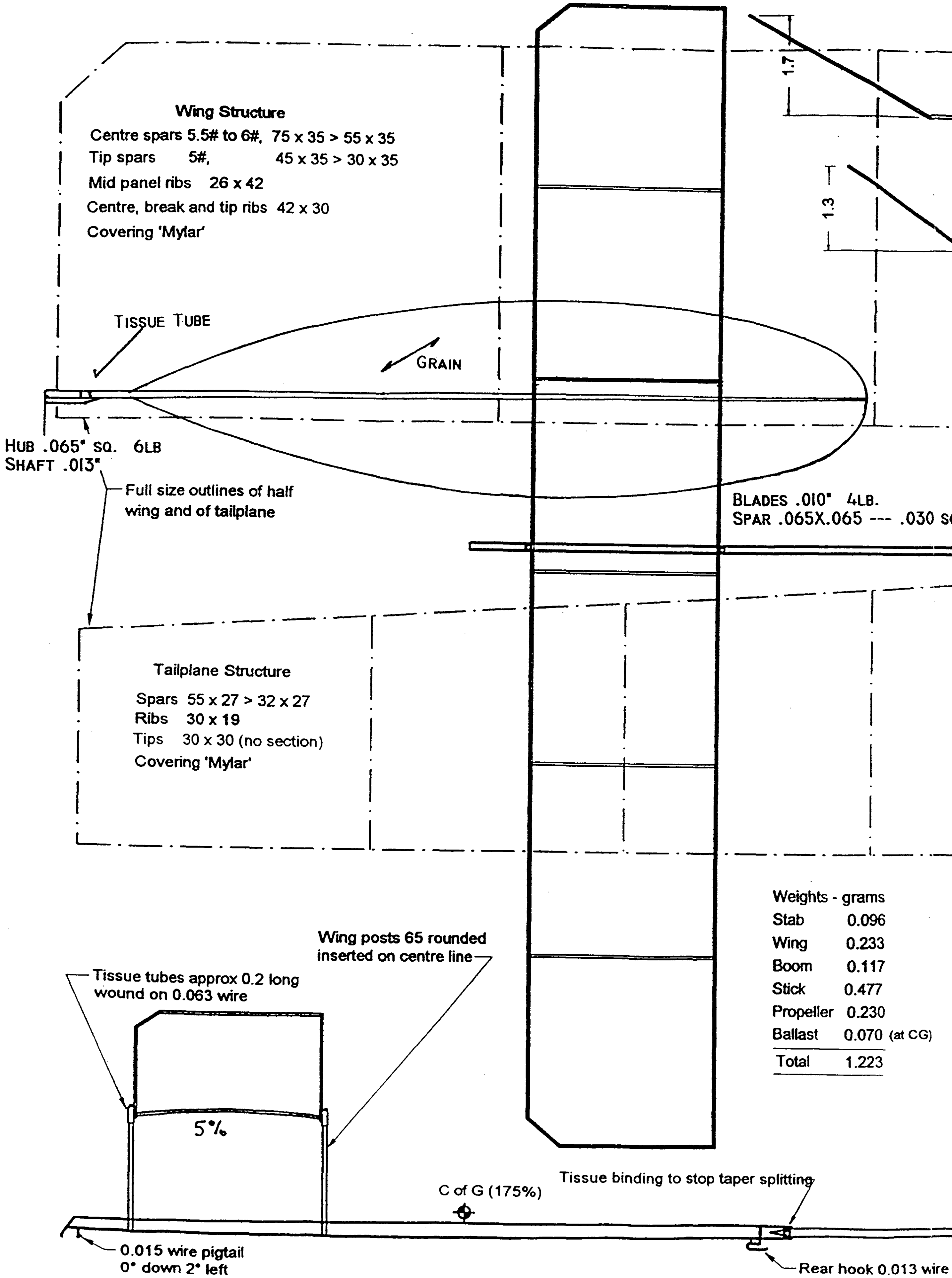
*CLASS 1 - Over 65 cm CLASS 2 - FAI 65 cm - 1 gram

Official and unofficial flights included (best effort only, by individual, by class is shown).

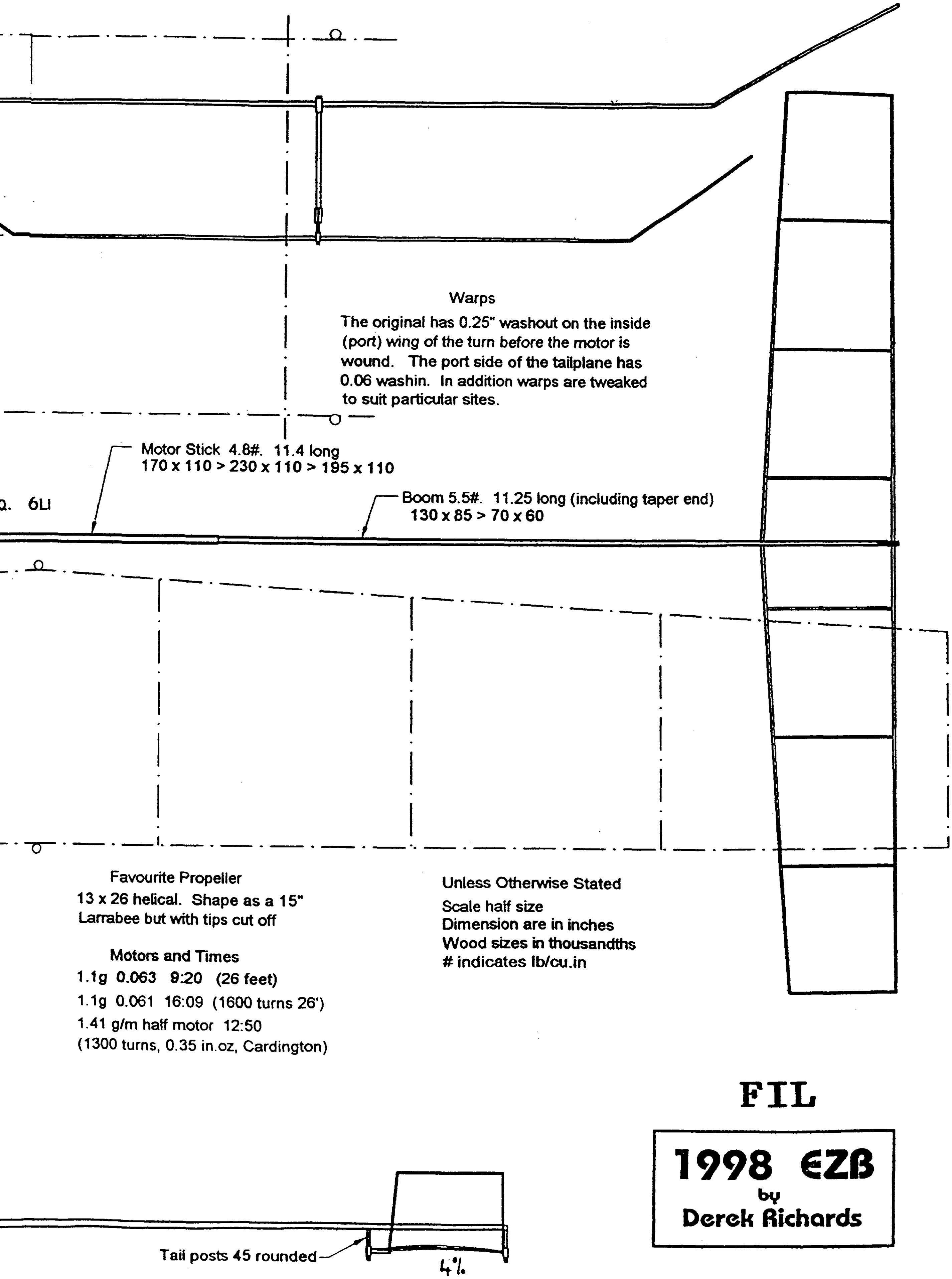
NAME	COUNTRY	TIME	1*	2*	YEAR	SITE
KOPECKY, ERNIE	USA	43:42	X		1963	SANTA ANA
ROBBINS, HERB	USA	43:39		X	1995	SANTA ANA
ORSOVAI, DEZSO	HUN	43:37		X	1986	CARDINGTON
ALLEN, PAUL	USA	43:36	X		1974	SANTA ANA
KUJAWA, SYLWESTER	POL	43:35		X	1992	WROCLAW
MANGALEA, CORNELIU	ROM	43:30		X	1996	MOSCOW, IDAHO
CUMMINGS, FRANK	USA	43:28	X		1963	SANTA ANA
ATWOOD, BILL	USA	43:17	X		1963	SANTA ANA
THOMAS, MIKE	CAN	43:01		X	1996	MOSCOW, IDAHO
PLOTZKE, RON	USA	42:53	X		1969	LAKEHURST
FOSTER, JOE	USA	42:44		X	1987	SANTA ANA
SIEBENMANN, DIETER	SWI	42:33		X	1986	CARDINGTON
CAILLIAU, LARRY	USA	42:29		X	1985	AKRON
BAILEY, BOB	UK	42:28		X	1998	SLANIC PRAHOVA
DOMINA, DAN	USA	42:25		X	1979	AKRON
CANNIZZO, SAL	USA	42:20		X	1983	LAKEHURST
PYMM, DAVE	UK	42:03		X	1986	CARDINGTON
ROMAK, BUD	USA	42:01	X		1965	MOFFETT NAS
OBARSKI, DICK	USA	41:30		X	1981	AKRON
FINCH, TOM	USA	41:27	X		1963	SANTA ANA
KINOSHITA, SATOSHI	JPN	41:24		X	1993	TACHIKAWA CITY
CHAMPINE, BOB	USA	41:23	X		1963	SANTA ANA
RODEMSKY, ERV	USA	41:23		X	1979	AKRON
STOLL, ED	USA	41:21	X		1963	SANTA ANA
HOFFMAN, EARL	USA	41:13		X	1987	SANTA ANA
KIHARA, KAZUMASA	JPN	41:06		X	1998	MATUMOTO CITY
MATHER, CLARENCE	USA	40:54		X	1974	SANTA ANA
GANSER, RON	USA	40:53	X		1996	AKRON
DRAPER, RON	UK	40:44	X		1962	CARDINGTON
POPA, AUREL	ROM	40:42		X	1996	MOSCOW, IDAHO
BILGRI, JOE	USA	40:37	X		1965	SANTA ANA
NONAKA, SIGEYOSI	JPN	40:36		X	1978	CARDINGTON
STEVENS, DARRYL	USA	40:35		X	1986	SANTA ANA
SHEPHERD, JESSE	USA	40:33		X	1995	AKRON
DIHM, JAN	POL	40:21		X	1997	SLANIC PRAHOVA
LOTZ, RAINER	GER	40:20		X	1996	MOSCOW, IDAHO
GITLOW, LEW	USA	40:15		X	1987	SANTA ANA
MOSKALEV, VASILI	UKR	40:15		X	1996	MOSCOW, IDAHO
KALINA, JIRI	CZE	40:11		X	1975	CARDINGTON
RODENBURG, OTTO	NED	40:11		X	1986	CARDINGTON
TRIOLO, JOHN	USA	40:06	X		1974	LAKEHURST
MZIK, LARRY	USA	40:01		X	1995	AKRON

For additions, corrections, etc. send details to:

BOB GIBBS 22870 Springmist Drive, Moreno Valley, CA 92557 USA



Wing Structure
Centre spars 5.5# to 6#, 75 x 35 > 55 x 35
Tip spars 5#, 45 x 35 > 30 x 35
Mid panel ribs 26 x 42
Centre, break and tip ribs 42 x 30
Covering 'Mylar'
1.7
1.3
TISSUE TUBE
GRAIN
HUB .065" SQ. 6LB
SHAFT .013"
Full size outlines of half wing and of tailplane
BLADES .010" 4LB.
SPAR .065X.065 --- .030 SQ
Tailplane Structure
Spars 55 x 27 > 32 x 27
Ribs 30 x 19
Tips 30 x 30 (no section)
Covering 'Mylar'
Weights - grams
Stab 0.096
Wing 0.233
Boom 0.117
Stick 0.477
Propeller 0.230
Ballast 0.070 (at CG)
Total 1.223
Wing posts 65 rounded inserted on centre line
Tissue tubes approx 0.2 long wound on 0.063 wire
5%
C of G (175%)
Tissue binding to stop taper splitting
0.015 wire pigtail
0° down 2° left
Rear hook 0.013 wire



Warps

The original has 0.25" washout on the inside (port) wing of the turn before the motor is wound. The port side of the tailplane has 0.06 washin. In addition warps are tweaked to suit particular sites.

Favourite Propeller

13 x 26 helical. Shape as a 15" Larrabee but with tips cut off

Motors and Times

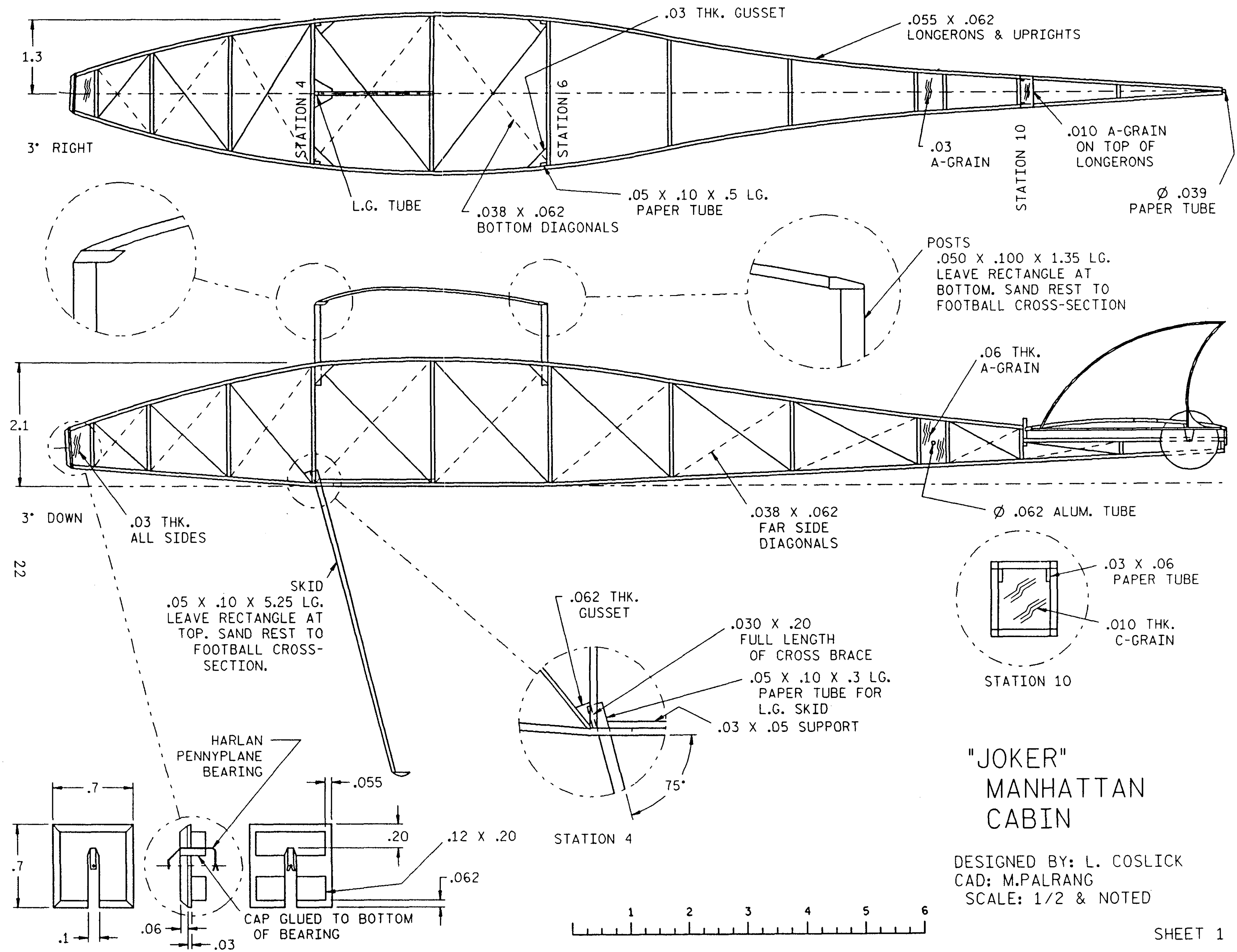
1.1g 0.063 9:20 (26 feet)
1.1g 0.061 16:09 (1600 turns 26')
1.41 g/m half motor 12:50
(1300 turns, 0.35 in.oz, Cardington)

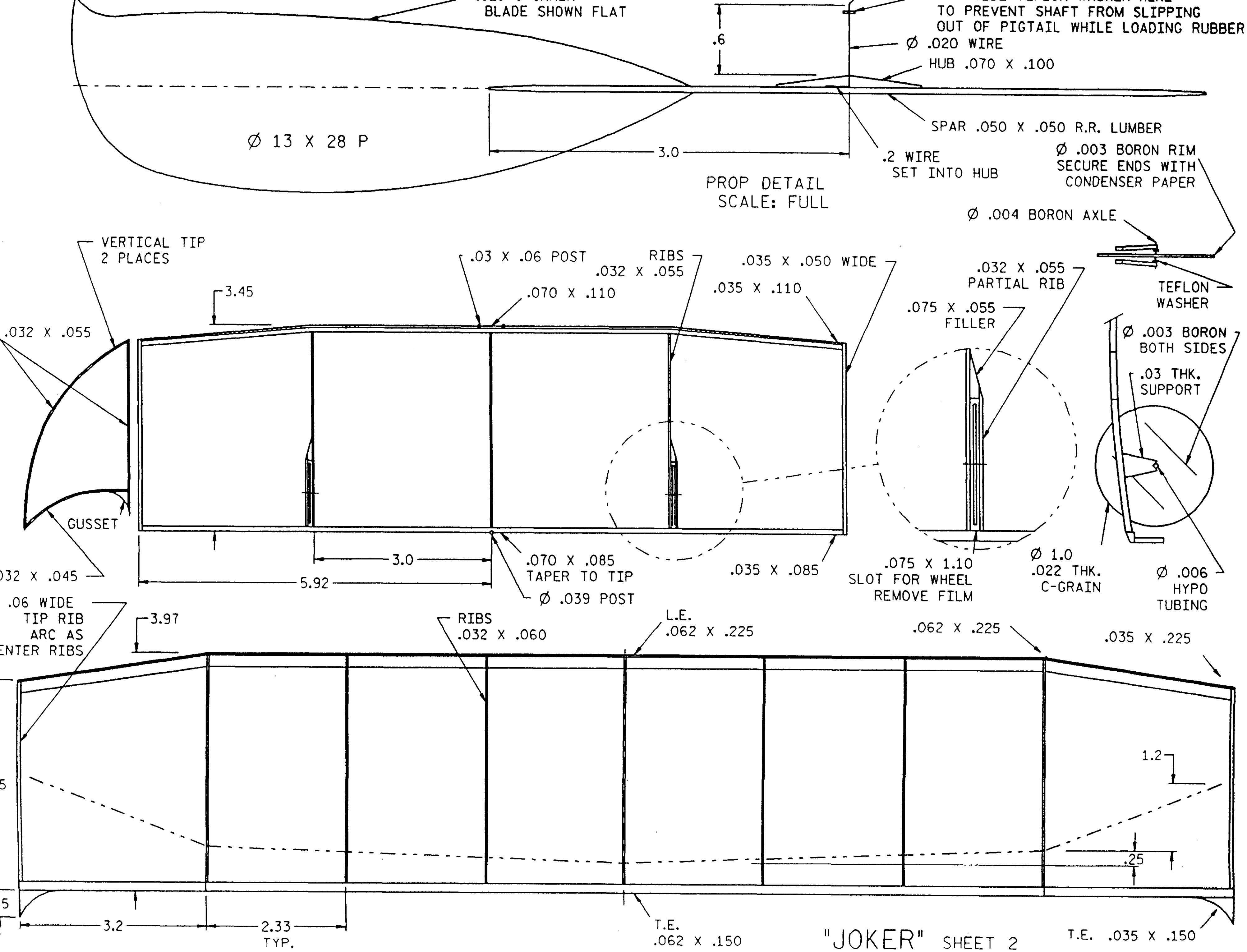
Unless Otherwise Stated

Scale half size
Dimension are in inches
Wood sizes in thousandths
# indicates lb/cu.in

FIL

1998 EZB
by
Derek Richards


.03 THK. GUSSET
.055 X .062
LONGERONS & UPRIGHTS
1.3
3° RIGHT
STATION 4
STATION 6
STATION 10
L.G. TUBE
.038 X .062
BOTTOM DIAGONALS
.05 X .10 X .5 LG.
PAPER TUBE
.03
A-GRAIN
.010 A-GRAIN
ON TOP OF
LONGERONS
Ø .039
PAPER TUBE
POSTS
.050 X .100 X 1.35 LG.
LEAVE RECTANGLE AT
BOTTOM. SAND REST TO
FOOTBALL CROSS-SECTION
.06 THK.
A-GRAIN
2.1
3° DOWN
.03 THK.
ALL SIDES
.038 X .062
FAR SIDE
DIAGONALS
Ø .062 ALUM. TUBE
.03 X .06
PAPER TUBE
.010 THK.
C-GRAIN
STATION 10
SKID
.05 X .10 X 5.25 LG.
LEAVE RECTANGLE AT
TOP. SAND REST TO
FOOTBALL CROSS-
SECTION.
.062 THK.
GUSSET
.030 X .20
FULL LENGTH
OF CROSS BRACE
.05 X .10 X .3 LG.
PAPER TUBE FOR
L.G. SKID
.03 X .05 SUPPORT
75°
STATION 4
HARLAN
PENNYPLANE
BEARING
.7
.7
.1
.06
.03
.055
.20
.12 X .20
.062
CAP GLUED TO BOTTOM
OF BEARING
"JOKER"
MANHATTAN
CABIN
DESIGNED BY: L. COSLICK
CAD: M.PALRANG
SCALE: 1/2 & NOTED
1
2
3
4
5
6
SHEET 1


BLADE SHOWN FLAT
TO PREVENT SHAFT FROM SLIPPING
OUT OF PIGTAIL WHILE LOADING RUBBER
Ø .020 WIRE
HUB .070 X .100
.6
Ø 13 X 28 P
SPAR .050 X .050 R.R. LUMBER
3.0
.2 WIRE
SET INTO HUB
Ø .003 BORON RIM
SECURE ENDS WITH
CONDENSER PAPER
PROP DETAIL
SCALE: FULL
Ø .004 BORON AXLE
TEFLON
WASHER
VERTICAL TIP
2 PLACES
.03 X .06 POST
RIBS
.032 X .055
.035 X .050 WIDE
.032 X .055
PARTIAL RIB
3.45
.070 X .110
.035 X .110
.075 X .055
FILLER
.032 X .055
Ø .003 BORON
BOTH SIDES
.03 THK.
SUPPORT
GUSSET
.032 X .045
3.0
5.92
.070 X .085
TAPER TO TIP
Ø .039 POST
.035 X .085
.075 X 1.10
SLOT FOR WHEEL
REMOVE FILM
Ø 1.0
.022 THK.
C-GRAIN
Ø .006
HYPO
TUBING
.06 WIDE
TIP RIB
ARC AS
CENTER RIBS
3.97
RIBS
.032 X .060
L.E.
.062 X .225
.062 X .225
.035 X .225
1.2
3.5
.25
.45
3.2
2.33
TYP.
T.E.
.062 X .150
"JOKER" SHEET 2
T.E. .035 X .150

MODEL NAME "JOKER" Manhattan Cabin **BUILDER** L. Coslick

WING

Leading Edge Spar. Density 7.5# Grain. A Width .280" Height .062" **Trailing Edge** Spar. Density 7.5# Grain A Width .160" Height .062" **Leading Edge** Tips. .280X.062 at dihedral break, Tapered to .280X.032 at tip. **Trailing Edge** Tips. .160X.062" Tapered to .160X.032 at tip. **Ribs** Density 4.5# Grain C Size .028X.055 **Tip Ribs** .062 wide .032 High **Wing Posts** 7.5# .050X.120" 1.4" Long (4) **Wing Dry** **With 4 Posts** .740G **Wing Covered** With the older Ultrafilm .86G.Model was estimated to be underweight.

STAB

Leading Edge Spar. Density 7# Size. Tapered from center .070" high X .110" wide to .038"X.110 at tips **Trailing Edge** Spar Tapered from center rib .070" high X .085 wide to .038" X .085" at the tips. **Ribs.** Density 4.8# Size .032"X.055" **Wheels** 4# C Grain .022"X1" Diameter (2).**Axle** .004 Boron **Wheel Bearing** .006ID hypo. tubing, .1" long. **Wheel Stiffening** 3/4" .0003 Boron on each side of Wheel bearing, perpendicular to the grain of the wood, and around the diameter of each wheel. **Wheel Weight** .055G (2) **Tips**,Top. 5# .032X.045" End 5# .032X.045" Base .032X.055". Steam top and end pieces around a form. **Tips Dry** .04G (2) **Covered** .045G (2) **Stab Dry** with 3 mounting posts and wheel mounts. .215G. **Stab Covered** with Y2K Film. .234G

Skid

Size .050X.120" Tapered to .040X.085" 8#.Make first 1/2"of skid from 4.5# Balsa. Skid will break at joint and prevent damage to skid support during rough landing. **Skid** Length 5.3" **Skid Weight** .045G

Special Instructions for covering wing. Note that the front of the Leading Edge is tapered at a 60 degree angle. The ribs are mounted on top of the spar, up to that angle. To keep the film from sticking to the wing spar behind the the front of the ribs while applying the 77 spray, drafting tape is placed between each rib right up to the angle break.

MODEL NAME "JOKER" Manhattan Cabin **BUILDER** L. Coslick

FUSELAGE

Longerons. Density# 7.1# Grain A Width .055" Height .062". Cross-pieces. Density# see inst. Width .055" Height .062". Grain A. Detail landing gear and nose block on plan sheet if possible. Total weight of fuselage dry. 1.58G Weight covered. 1.9G. Type covering used. Microfilm ______ Plastic X.

Special Instructions. Cross pieces and uprights are 7.1# to T/E of wing and then 4.8# to rear of fuselage. Diagonals .062"X.032", 4.5#.Wing and Skid paper tubes are .050"X.120" ID. Stab paper tubes are 1/32"X.062"ID. All tubes are rectangular

Prop, Wood Blades

Blades, Density 4.5# Grain C Blade Thickness .025"

Prop, Spar Spruce, .050"X.050"X7" **Hub** .095"X.120"X1" Balsa
Prop, Shaft .020" Prop Complete .055G Prop Pitch 30P
Prop Diameter 13" Special Instructions on Prop and Nose Block.
The prop shaft is inserted into the hub, bent over to 90 degree and cut to .3". Groove the hub so that the wire shaft is flush with the top of the hub. Glue the prop spar to the .095 face of hub. Attach the prop blades with carpenters glue. **Nose Block** The nose block is laminated from 1/32"and1/16"Medium balsa. If you use a Harlan bearing insert a small balsa wedge on the under side of the bearing for extra support. After the prop is threaded through the bearing, I glue a teflon washer behind the pig tail to prevent the prop shaft from slipping out of the pig tail when the motor is placed on the S hook.

MODEL NAME "JOKER" Manhattan Cabin **BUILDER** L. Coslick

RUBBER

Loop Length 22" Width .078" Rubber Vintage, Month and Year 8/93 Weight of Loop. ______. Turns 2300

Back off Turns. 50 Launch Torque in inch ounces. .6 Turns Left 200

Do you use O rings. Yes. X No. ______

TRIM

Wash In, Wing Left panel ______ Wash Out Left panel. ______

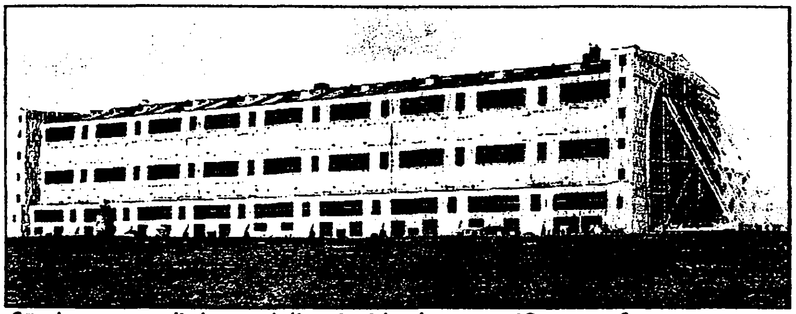
Wash Out, Right panel ______ Wash In, Right panel 1/8"

Wash In Stab, Yes X No ______ How Much 1/16"

Down Thrust. ______ Left Thrust. ______ Special trim instructions.

Model flies right. The rear mounted wheels and forward skid works best under full power. It has a tendency to tip over under low power,especially with a 30P prop.

East Coast Indoor Modelers 1999!



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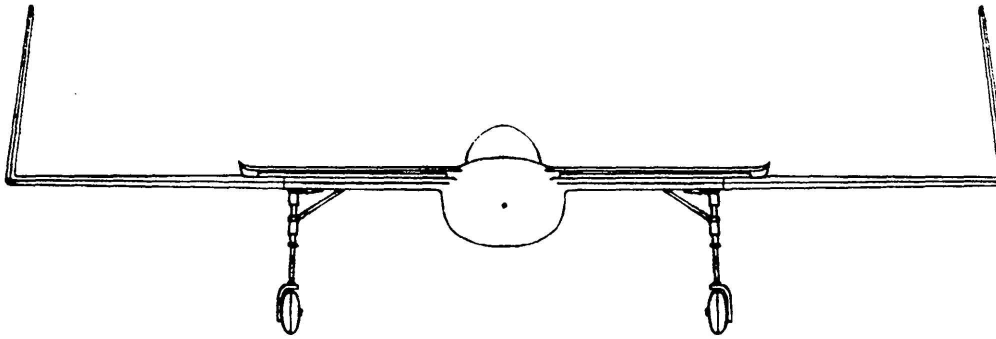
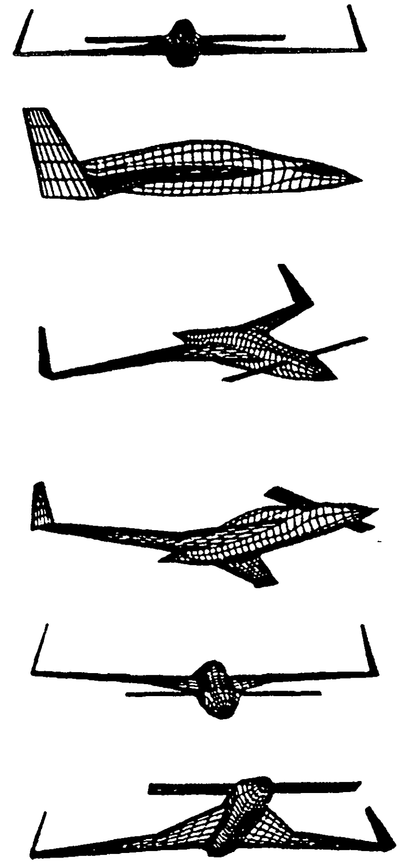
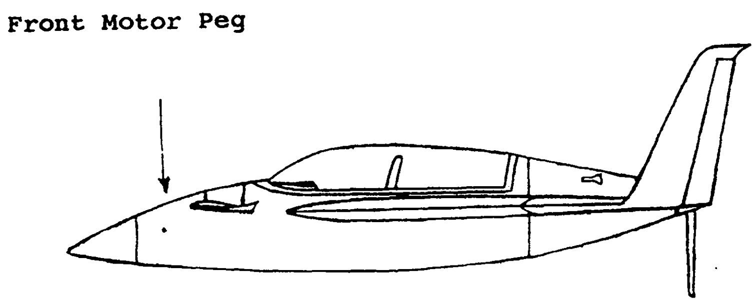
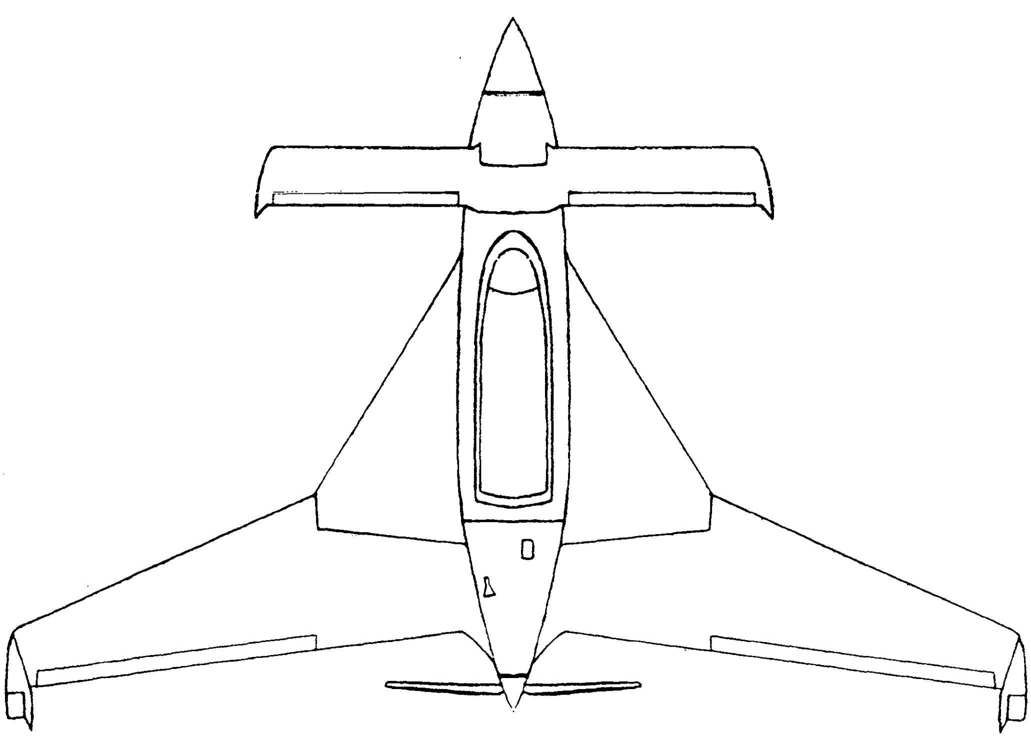
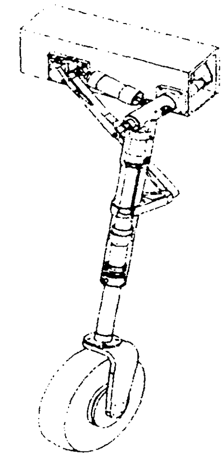


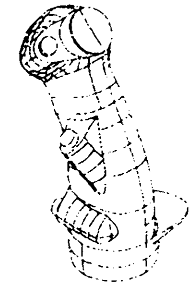




Front Motor Peg







Peanut Infinity 1 Foam construction

Bob Romash

I decided that for last year's USIC competition I wanted to make a new peanut scale. I wanted to utilize a modern, composite aircraft design. The only problem with these new aircraft, when modeling, is that they are very difficult to build using traditional methods, due to their smooth curving shapes. So I decided to use foam. This form of construction seems to be catching on and I have embraced it wholeheartedly. I picked one of the new canard kit aircraft called Infinity 1. It is very similar to Burt Rutan's series of canard aircraft. This particular canard is well suited for modeling due to its front and back seating arrangement. This makes for a slim fuselage and a bit less drag than some of the other side by side seated canards. The foams used in construction are readily available. For the fuselage I used something called "spyder" foam. This is a close cell foam similar to pink or blue insulation foam, but it comes in white. I believe it also sands to a finer finish. This foam is about 1.5 lb. density. It is easily shaped and formed.

The wings are made of foam trays available at your local supermarket. The canards are made from foam I found in a foam plate. This type of foam has a skin on both sides and is a bit stiffer and thusly more suitable for canards and rudders. Construction begins with enlarging the three-view to the appropriate size. For AMA peanut scale you can either have a 13-inch wing or a 9-inch fuselage with the wing being longer than 13 inches if it works out that way. This model is best suited for the 13-inch span application. First, you must make 2 rectangular foam pieces for the fuselage halves big enough so that you can trace the side view and top view of the fuse on them. The two pieces of foam should be held together by thin double sided tape, because after you have shaped the fuselage you will need to take the two halves apart to hollow out the inside. I usually cut out the side profile first and then the top profile. A band saw comes in handy here but a coping saw will suffice. This gives you a rough shape of the fuselage. The seam can either go down the middle or along the side. On this model I chose to have the seam on the side because the wing and canard will cover most of it up when they are attached later.

Once you have the rough fuselage shape, you must now rely on some sculpting skills to bring the rest of the shape out. I shaped my fuse with the canopy in place (which will later be cut off) just to make it easier to see the shape as I was sculpting. The first roughing out can be done with a sharp razor moving to sand paper afterward. I used 220 grit to start the shaping and worked down to 500 grit for final sanding. At this point I cut the canopy off, which will be replaced with a clear canopy. Care should be taken when cutting this off, and you should save it to use as a reference when making your canopy form buck. The buck should be made out of something harder than the foam itself. I used basswood for mine. A vacuum forming machine is not required for this canopy. Just some clear acetate and a heat gun will be sufficient. After heating up the acetate it can be pulled over the form by hand. This is what I did.

Back to the fuselage. Once you have the final shape carefully pull the two halves apart and this is where a Dremel tool comes in. I used a 3/8 inch round carbide cross cut tool bit to hog out the inside. This can be a tricky process. It's good to practice on some scrap foam before starting. Final thickness for the fuselage should be around .080. A good way to see thick spots is to hold up the fuse halves to the light. Thin spots will be lighter than thick spots. If you screw up and punch a hole in the foam with the tool you can cut out this area and insert a plug and start over on that spot. The only adhesives that should be used are two part epoxies (I prefer five-minute) or white glue (Elmers). There are foam compatible hot glues, but I don't have much experience with them. Feel free to try them out yourself. They may also have the advantage of being lighter. After the inside has been hollowed out attention must be paid to strengthening the area around the motor peg and the prop bearing. Gluing a small piece of wood or tiny tabs of light fiberglass on the inside for reinforcement can do this. Having the reinforcement on the inside makes for a better-looking model on the outside. Reinforcing the prop hub area is done by adding a piece of wood between the foam and the prop bearing itself. This wood is glued to the fuse.

The bearing is typical of any rubber type. I also added a spinner made of thin styrene sheet heat formed the same way as the canopy. Remember this is a pusher when making the prop. I made a 3-inch diameter propeller with a rather low pitch for my plane. Feel free to experiment. I put about 4 degrees of down thrust in the prop bearing. The wings are made by simply laying a cut out silhouette of the wing shape on the foam and cutting. Try to find a thicker foam meat tray for the wings. I started with a .250 piece. After the wings are cut out simply sand in an airfoil. I chose a very simple flat-bottomed airfoil. Shaping the wings is the same as the fuse only using sandpaper. Remember the root airfoil is significantly longer than the tip airfoil on this plane. Canards and wing tip rudders are made from the foam plates. This is usually around .080 thickness. Also, simply sand in a basic airfoil here. Once the two wings and canards are shaped they must be attached to the fuse. Due to their long root cord, the wings can be tricky to attach. Remember that the fuse has a slight curve where the wing is being attached and the wing should parallel this curve at the root. You have to make sure that you attach both wings at exactly the same place and angle at either side of the fuse or you will have a schizophrenic flying aircraft. The same care must be taken when attaching the canards. My canards are mounted with slightly more incidence than is shown on the three view. I, also, incorporated movable control surfaces on the canard to facilitate trimming.

The canard works opposite of what a normal stab does. Bending control surfaces down will bring the nose up when flying. Bending the left control surface down more than the right will bring about a right turn and vice-versa. Most trimming will take place by adjusting the canard surfaces. The wing tip rudders are also made from the foam plates and incorporate movable surfaces as well. Making the surfaces move is easy by slicing part way through the foam at the hinge point allowing it to be bent. Care must be taken in mounting the rudder tiplets parallel to the centerline on the fuse. Detailing the model can be done a few different ways. Panel lines can be drawn on by using a fine pen. The only problem with this is that the lines are not very distinct due to the open cell nature of the foam (kind of like drawing on end grained balsa). I have decorated models using pens. But on my peanut I opted to use a slightly more time-consuming, but better-looking process of using black paint tape. This is available at automotive parts shops that have a good car refinishing section. Once I had the paint tape I sliced very thin pieces off (it has self-adhesive back) with a straight edge. These strips were about .010 wide and were placed on the model as the panel lines. Another advantage to using the paint tape is that if you mess up and put a line in the wrong spot it can be peeled off and repositioned.

For other types of models this foam can be airbrushed using acrylic paints. It is best to start off with a white foam when painting so that final colors can be applied to the white foam without using a bottom coat that may be required when using blue or pink foam, but no painting is required on this model. Cockpit detailing on my model included sealing off the hole in the fuse where the canopy goes with a thin piece of balsa and carving out the tops of instrument pods and pilot's heads out of foam. This adds a good deal of realism to the model and is lightweight. Landing gear is optional but will afford more scale points when the judges look at it. My landing gear was made to be removable for flight. This was done by inserting small styrene plastic tubes into the wings and fuse. The tops of the landing gear snug fit into these tubes. The three view doesn't show it but you should put typical landing gear door outlines on the bottom of the wings. The rear landing gear close toward the inside and the front gear closes toward the back. Info on exactly what the front gear looked like wasn't available so I just made it up.

Info on this plane was tricky to get in general because the first real prototype wasn't even flying when I made my model. I found this canard in Kitplanes magazine, which is a great source for info on the latest composite aircraft. Kitplanes mag can be found at any good magazine rack. Borders books and Barnes and Noble always have it as well as other aircraft mags. One problem that I have found with foam models is that they are discriminated against in competition judging and they are not at all legal for FAC peanut, but are only legal for AMA peanut. I lost points in section D (flying surfaces) of the scale judging sheet and section E (type covering). In section D three points are given if all surfaces are double covered and only one point if they are made from solid sheet, which is what I got! In section E I received zero points, because points are only given depending upon what type of covering is used. This is the biggest problem in the judging. This criterion was agreed upon before the proliferation of composite aircraft and widespread use of foam in model making. Hopefully in the future an amendment can be made in this section possibly for overall quality of finish. Realistically, using foam for these aircraft is much closer to the real thing than using stick and tissue construction. I have been experimenting with the use of very thin foam sheets .025 (available from Kenway, the electric motor guy) to make wing surfaces that are double covered, but are still foam. This is done by using an inner structure between sheets, usually just a spar then using the thin foam for top and bottom cover. I am still investigating this process and hope to have a peanut for this year using this construction method to try to get a few more points.

One drawback in using foam construction is that it seems to be a little heavier than stick and tissue. But, hopefully, weights will come down with more experience. My peanut weighed eight grams without landing gear. The best flight was a bit over a minute so far. The construction methods that I have talked about here can be applied to just about any plane. WWII aircraft with their rounded, metal shapes are well suited for foam, as is just about anything else you can think of. I have, also, had a lot of fun making small gliders using foam. I just finished a 6 inch wing span balloon launch XB-70 Valkyrie using spyder foam for the fuse and Kenway's .025 sheet for the wing and canard and it looks pretty fantastic and flies well. I also made a modern composite sailplane complete with full cockpit detail. The cool thing is all these aircraft are white to start out with so you only have to add a few details to make em real bitchin.

Once you have a pile of foam in front of you just use your imagination and you can make some neat stuff. It doesn't have to be a peanut scale. You can maybe go pistachio scale or even coconut scale. It doesn't even have to be a plane. I made some cool little free-float sailboats out of the stuff for my local pond. I hope that this article will help to entice more models to be constructed this way. You will find, with a little practice, that these methods afford rapid construction so that you can spend more time detailing or building other models. Listed below are sources used and if anyone has a more detailed question feel free to call me, Rob Romash at (609) 985-6849 or drop me a line at 16-234 Somerset Ln. Marlton, NJ 08053 or email me at cognisync@aol.com.

Foam sources for free foam -- your local supermarket for meat tray foam. Ask the guys in the back cutting the meat for unused trays. It's great to see the look on their faces when you explain what you're up to-and the paper goods isle for foam plates.

Kenway Microflight – Mail address is PO Box 889 Hackettstown, NJ 07840. Phone (908) 850-0694. One and .5 millimeter white foam sheet 11 inches x 17 inch 10 pack is $18.50. This plane would also be well suited for Kenway's KR1D direct drive electric motor set.

Aerospace composite products—14210 Doolittle Dr.,San Leandro, Ca 94577 Order desk (800) 811-2009 Tech line (510) 352-2022 Fax (510) 352-2021 Web site at http://www.acp-composites.com Spyder foam as well as a multitude of composite materials

Infinity Aerospace – Mail address is PO Box 12275 El Cajon, CA 92022. Phone & Fax: (619) 448-5103. Email: Infaero@flash.net. Home Page: http://www.flash.net/~Infaero Info on Infinity 1 canard

Notice: New Information on the 1999 International EZB Contest at Johnson City TN

Due to a misunderstanding on which set of rules were to be used for this contest in 1999, both F1L (1.2 gram models, FAI style) and AMA (no weight limits) rules will be used in separate contests. These contests will run concurrently on Saturday from 5:30 to 10:00 PM. Processing will be from 5:30 to 6:00 followed by four one-hour rounds ending at 10:00 PM. Best two of four flights wins in both events.

Computer Color Your Model
By
Steve Gardner

Got a favorite airplane you have always wanted to model, but have never had the nerve to start because of its complex color scheme? Maybe an Albatross D-V with its pretty lozenge pattern and colorful personal markings. Maybe one of the super colorful modern aerobatics aircraft like the hot pink Sukhoi 31 or an Eagle bipe with its nine color feather motif. Scale modelers have long lists of models they want to build, but many are never started because of difficult color schemes or complicated lettering. Things like odd colors, light stripes on dark backgrounds, lettering, panel lines, and other details can make a simple model very hard to build. We have a new and powerful tool to help with these neglected models, the computer/ink jet printer combo.

Say you have a plane picked out that is lime green with maroon stripes and powder blue registration numbers on top of everything. The computer can solve all of your problems (except your horrible taste in colors!) with this paint scheme. Getting the maroon stripes onto the light green background without the layers of tissue making the maroon look black is practically impossible. Trying to get very light colors like powder blue to cover darker or contrasting colors is almost a lost cause. If you have an extra year you can always airbrush the model. This is still the most realistic way to finish a scale model, but I really like the watercolorish look of raw tissue and paint is very heavy. For a modern ink-jet style printer this color scheme is absolutely no problem. You can have any part of the tissue any color you like from white to black. The lime green will not have maroon layered over it and the powder blue letters will be the only pigment on the tissue where the letters are. The printer can give you tissue in any color or as many colors as you can imagine. With the right graphics program you can have lettering that will amaze you. You can put photos onto the tissue, or scan in the color three view of your model and simply print it into place. You are gona LOVE this!

You will need a computer and printer, although if you do not have these things you can rent them for a pretty low hourly rate at Kinkos or a similar place. A good graphics program is a must, but you can find one of these practically anywhere. There is the limit of how wide a piece of tissue you can print, but most modern printers will do what is called Banner printing that will allow you to print to almost any length.

I hope that this article will answer all of your questions about this neat new technique and that you will experiment with these new toys yourself. If you discover anything nifty please send it to us here at INAV, we are always after stuff like this.

Tissue

You can print onto any tissue at all from Gampi to heavy Silkspan, but there are differences from one to the next. My personal favorite is Japanese silk tissue bought from a paper specialty store here in St Louis. It is cheap enough at 1.70 a sheet of 18X24 paper and it is very light at around 6 mg per square inch. The Esaka tissue available these days runs around 8-9 mg per square inch. After printing this tissue to a deep green the tissue weights around 6.4 mg per square inch, so weight is no problem. The Silk tissue is very soft compared to Esaka, and it has no shiny side. This tissue takes ink better than any other stuff I have tried. I have also printed Esaka tissue and even tested some domestic tissue. I can see no reason to ever have to deal with domestic tissue again since I can now have any color silk tissue I want. If you use a tissue with a shinny side, print on the dull side to prevent the ink from beading up on the tissue sizing. If you are going to pre shrink the tissue do so before printing and iron it out really well. If there are a lot of wrinkles in the tissue you will have trouble getting it onto the paper it rides through the printer on. I have not tried condenser tissue yet, but I can see it working well except for the base color being beige instead of white.

Printers and inks

I have used several brands of printer to print tissue and they all work very well. Some of the inks are better at resisting bleeding and some are more water resistant than others. There is even a brand of printer that uses a dry film based ink system that will allow metallic and opaque inks. After a fair bit of experimenting I have settled on the HP722C printer. Its main advantage is that it can vary the size of the drops of ink it uses to print. Say you want a nice light and delicate shade of pink on your tissue. If the printer uses a standard size dot of color (red in this case) to get a light shade it must use very few dots of its fixed size. This can make the color grainy. The HP 722c will use more dots of smaller size to get the same color. The beautiful gradation from one delicate pastel color to another with a jillion intermediary colors is really nice. Other printers can get very close, and some have better absolute resolution, but this is the one I like best. Its color ink cartridge also outlasts any color printer I have ever used by at least half.

While I am an obvious HP fan, this method will work with all ink jet style printers and I suspect all laser printers as well. You may have to experiment on the settings concerning quality of printing to prevent bleeding and to get good strong colors. Use the printer you have and do not worry about it.

The Method for Printing Tissue

Some of the first people to use these printers for tissue tried to simply tape the edges or corners of a sheet of tissue to a piece of paper and run this through the printer. Sometimes this will work great and I used the tape all the way around the edges method for a year or so before I figured out a better way. The major problem with this method is that the ink wets the tissue, which swells up and buckles into very fine wrinkles, which stick up and allow the passing print head to rub them. This can ruin a sheet of tissue pretty quick, and it is worse with darker, stronger colors due to greater amounts of ink.

This method is also kind of picky about the paper path through the printer. Printers with paths that bent the paper a great deal gave the tissue a good chance to jam the works since the tissue is loose on the paper. I did some experimenting and the very first way I tried turned out to be the winner. I start with a sheet of ink jet paper. It is a bit stiffer than bond paper and works best. I spray one side of this paper with a very light coat of 3M #77 Spraymant and then I stick it onto a clean scrape of cardboard and rub it down so that it is in good contact everywhere. I then immediately peel it up taking care not to crease it. The cardboard will take off the majority of the glue and the remaining tack is perfect for holding tissue. I have the tissue spread out on a flat surface and ready. I apply the paper to the tissue with a kind of rolling motion, to get it onto the tissue without wrinkles. I rub the paper down onto the tissue and then I trim the tissue to the edge of the paper. I now have a sheet of tissue ready to run through any kind of printer. Paper path is no longer important since the tissue is attached to the paper everywhere. Even if a gross over application of ink results in buckling, the glue will hold the tissue down and the print head will not touch and smear the color. I now make up several sheets of this to have on hand incase I want some colored tissue for a new project.

When you start printing tissue you may find that you have problems getting the colors strong enough, or the opposite problem, bleeding. To adjust his you will have to experiment with the print quality settings of the graphics program you are using. For the HP I recommend starting with the settings on "normal" or " economy" and the paper choice settings on "plain paper". If you are after very strong colors then the "normal" setting will apply a fair amount of ink to the tissue, and even pail colors will come out smoother on this setting. If there are very fine details or lettering on very high contrast backgrounds you might try the "economy" setting. The various printers may call these settings different names, but the idea is the same. A bit of experimentation and you will know what you need to do to get the effect you are after.

Once you have what you want on the tissue all that remains is to get the tissue off of the paper. You may consider leaving it on the paper until you are ready to cover since the paper makes flat storage easier. Once you are ready to cover the model all you need is some Naphtha (lighter fluid) to dissolve the #77 Spraymant glue. Turn the tissue face down on a very clean surface and dampen the paper with naphtha applied with a wadded up paper towel or cotton ball. All you need is to get the paper moist with the solvent and the tissue will come right off. If you were light enough in the glue application you are ready to go. The tissue will be solvent free in about a minute. If you used two or three times the needed amount of glue you will have to take it off of the tissue with the cotton ball. The naphtha will cut the glue like water through sugar. When the tissue is dry it will be just as it was before gluing, no residue at all. The solvent will not effect the ink in any way.

Graphics Programs

There are any number of good programs out there for putting together the different graphics you will want to use on your models. These programs fall into three basic categories: **Raster programs**, often called "paint" programs, which organize color by mapping the color of each pixel on the computer screen. **Vector Programs,** which use lines defined by direction and distance to make up shapes which are then color filled. **CAD programs**, Which are also vector based but which have easier dimensional control, but which are much less useful for color applications. There is a fair amount of overlap these days with the best programs, with the various methods adapting the best features of the others to make them better.

The best choice for our applications are the Vector programs like ***CorelDraw*** and ***Adobe Illustrator***. These programs are incredibly powerful design tools and have spectacular lettering and color capabilities. They can also use **Raster** art from the major paint programs that almost every computer has built into Windows. I use ***CorelDraw 5*** for my art and tissue printing and I can recommend it highly. The newest release of this program is #8, but it is expensive and the power it has is not needed anything but the very most complex professional uses. Any version from 3 on up will do the average modeler just fine.

If you intend to use photographs on your tissue then you will want a **Raster program** like ***Adobe Photoshop5*** or ***Paint Shop Pro 5***. If you have ***CorelDraw*** there is a program built into it called ***CorelPaint*** which is just fine. If you enjoy playing with computers these programs can be very entertaining. The special effects you can use on any given photo are almost infinite in number and appearance. Warning! This can soak up hours and hours.

Misc. Hardware

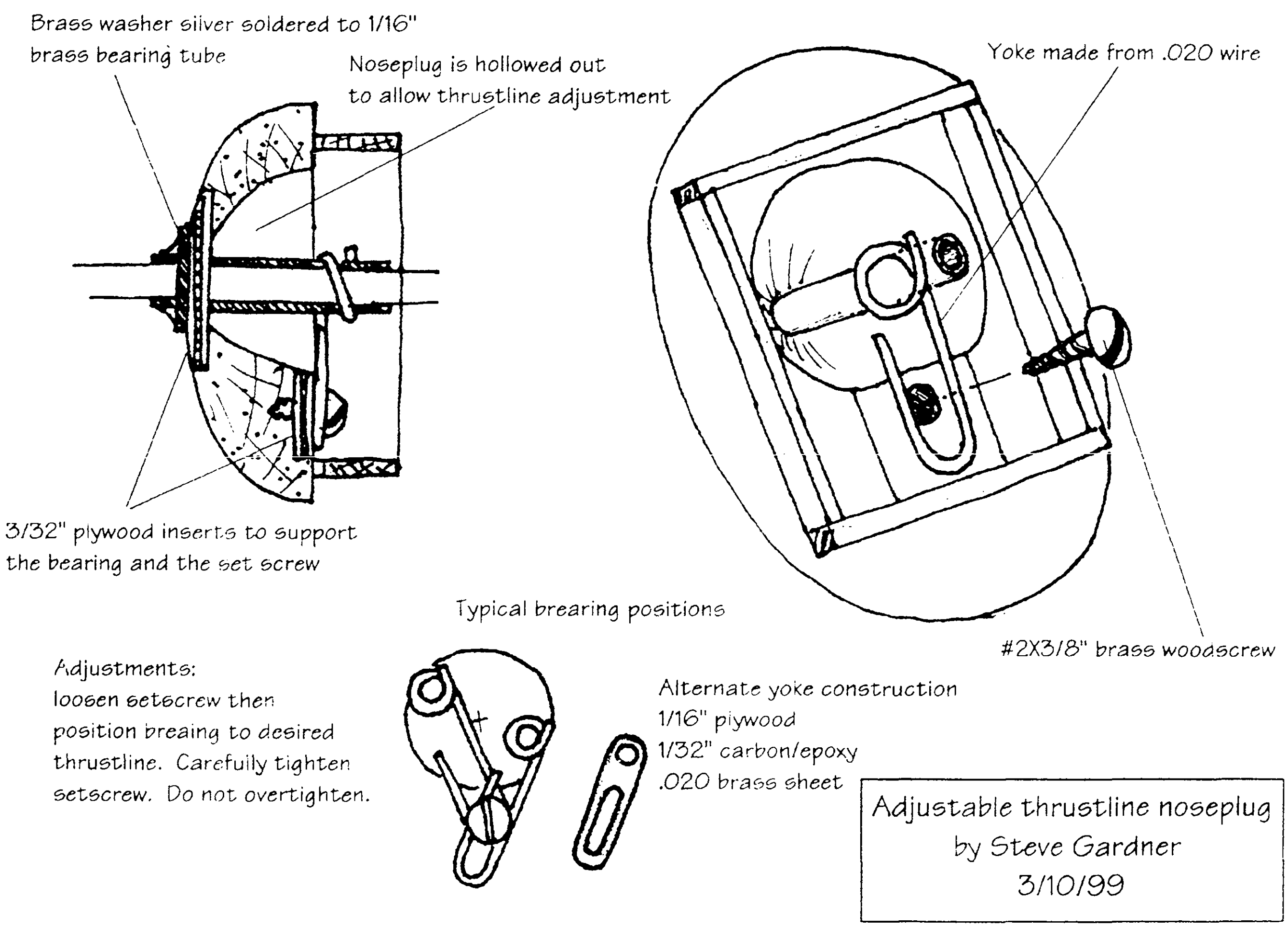
If you are after getting a specific marking or logo onto tissue, or if you want to print a color three view onto the tissue for a scale model, you will want a color flatbed scanner. These things are very cheap these days and the poorest ones perform better than the pro models of five years ago. You will want at least 300 dot per inch resolution (optical) and 24 bit color (16 million colors). You will have trouble finding a scanner for sale these days with specs this poor, so do not worry about it too much. One item that is becoming very popular that you will not need is a digital camera. A 70-dollar scanner and a cheap or even disposable 35-mm film camera will make much better pictures for the net or tissue printing than will a digital camera.

Using the tissue

Even though the ink is not waterproof, I use thinned yellow glue (titebond) to attach the tissue. Since the ink is resistant to the water to a moderate extent this works fine with no smearing at all. The new glue sticks will also do a very good job without any water-related problems. The ink is dope proof so you can also use the traditional methods of attaching tissue with dope. The real difference between this tissue and regular tissue is the way you shrink it. To get this tissue to shrink without ruining the colors you have to get it wet without having fluid water on it. Rubbing alcohol with the usual

25% water sprayed from a Final Net bottle (hairspray) can be used with good effect. To get just the finest mist onto the model without heavy droplets, you spray the alcohol into the air in front of you and then pass the tissue cover whatever through the cloud of mist. You can do this several times at one go, just be sure not to get the surface actually wet. It is easy to underestimate the shrinking power of this method and get warps. Go slow and if you need to you can repeat the spraying. Once you have the tissue shrunk to your satisfaction you can add a coat of very well pastisized dope if you so desire. If the model will be flown strictly indoors you can skip this step. The ink is not so easily disturbed by handling as to need dope just for holding the color down.

A very nice feature of using this method of coloring tissue is that if you damage the model or tear the tissue by blowing a motor you can just print up a perfect matching patch. Even if the damaged area is full of very fine details and multiple colors the patch will match perfectly.



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1994-1999

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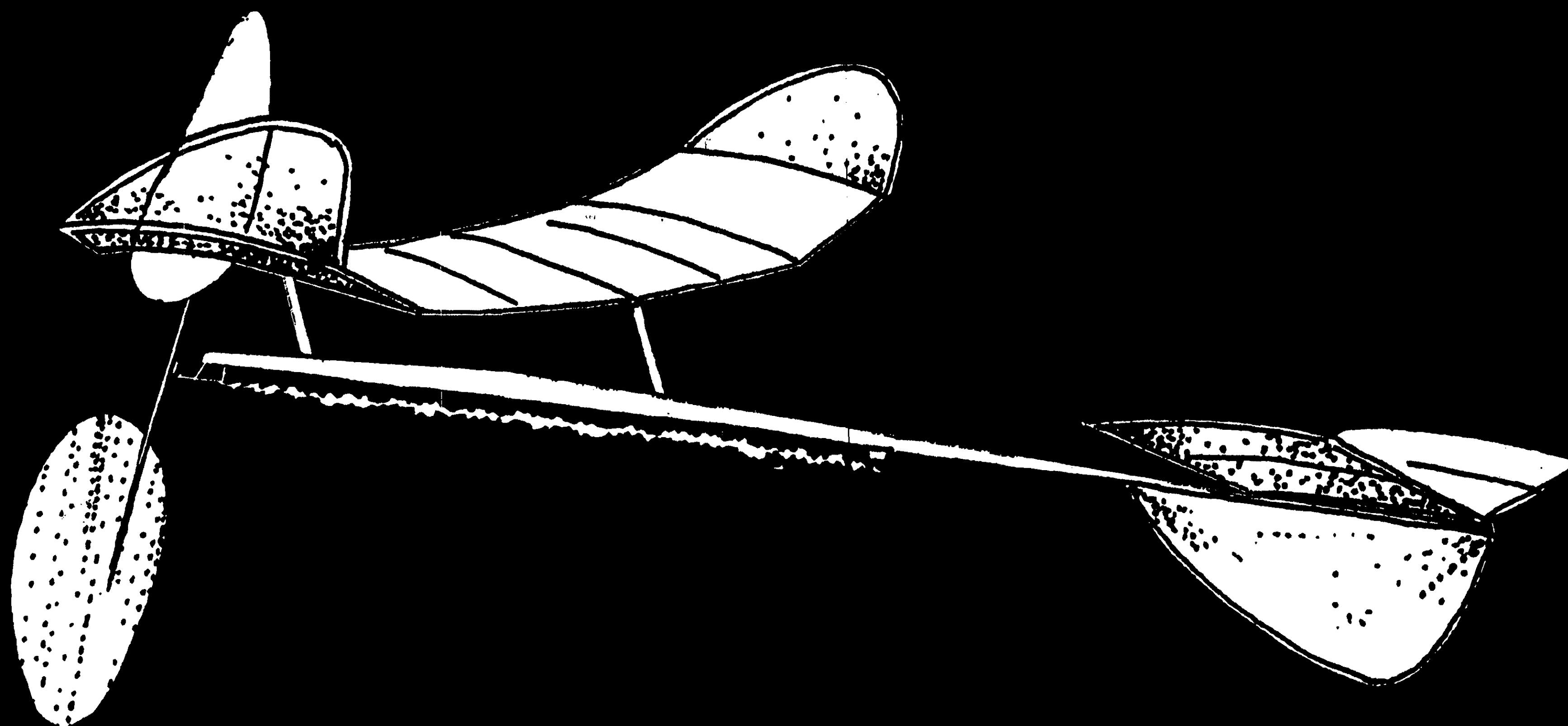
New Rules for FID

Affective January 1, 2001, the rules for FID will read. 55CM minimum wing span, 1.2 gram minimum model weight, and .5 gram maximum rubber weight. We at INAV felt that the 55CM and the 1.2 gram rules proposal had a good chance of passing, but were shocked to hear that the rubber restriction passed. Also, there are no restrictions on model design. With the .5 gram rubber rule, the aerodynamics of the new models will have to be as clean as possible. Multi-flying surfaces probably won't be of any advantage.

It will be interesting to see how many of the current FID fliers will switch over to the new set of rules. We would be interested in your design for the new FID rules. Please send good computer generated drawings to INAV, and we will use them in future issues.

Issue #97
Indoor News and Views
July, 1999

USIC 99



Johnson City, TN

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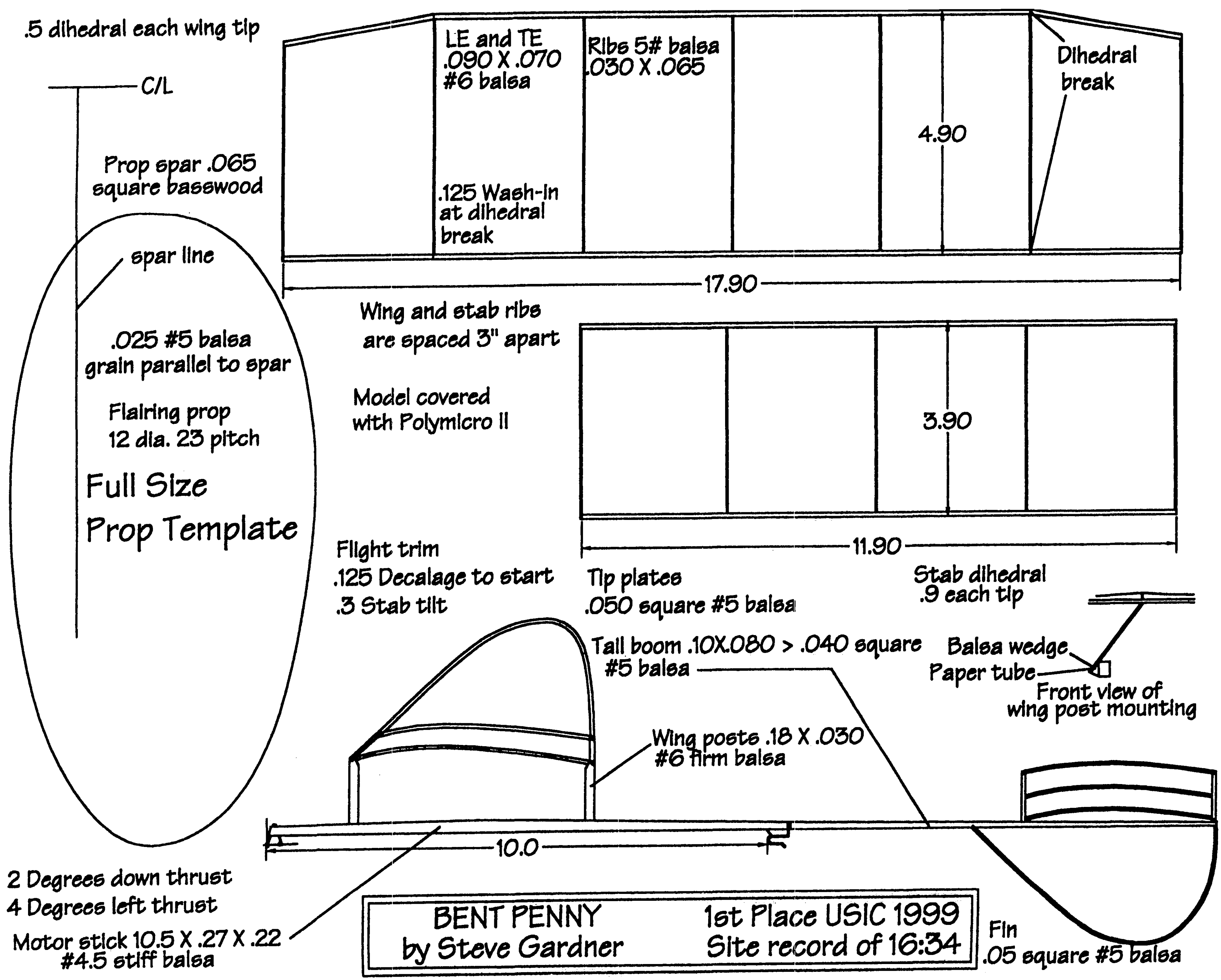
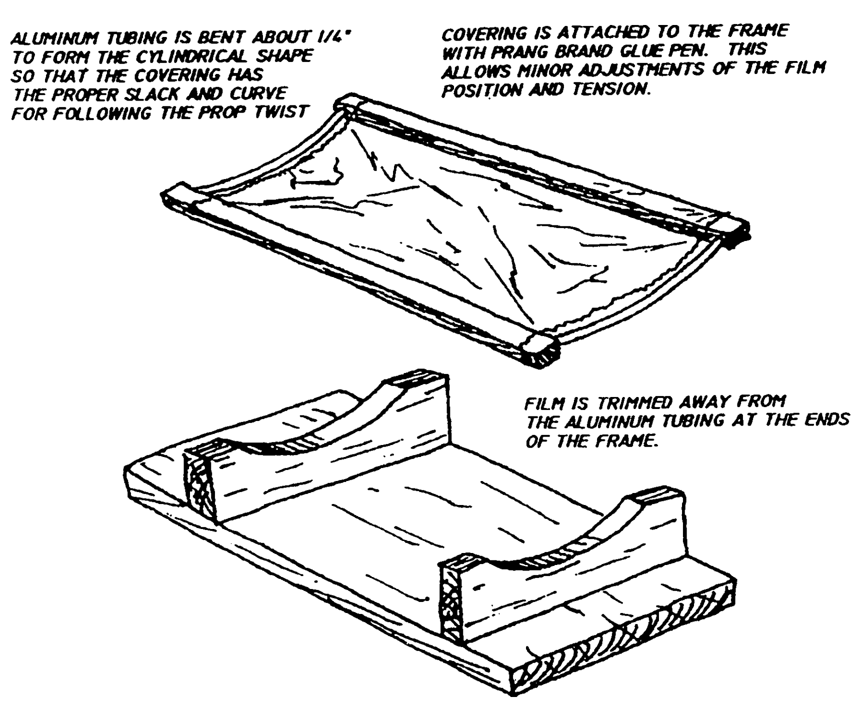


.5 dihedral each wing tip
C/L
Prop spar .065 square basswood
spar line
.025 #5 balsa grain parallel to spar
Flairing prop 12 dia. 23 pitch
Full Size Prop Template
LE and TE .090 X .070 #6 balsa
.125 Wash-in at dihedral break
Ribs 5# balsa .030 X .065
4.90
Dihedral break
17.90
Wing and stab ribs are spaced 3" apart
Model covered with Polymicro II
3.90
11.90
Flight trim
.125 Decalage to start
.3 Stab tilt
Tip plates .050 square #5 balsa
Stab dihedral .9 each tip
Tail boom .10X.080 > .040 square #5 balsa
Balsa wedge
Paper tube
Front view of wing post mounting
Wing posts .18 X .030 #6 firm balsa
10.0
2 Degrees down thrust
4 Degrees left thrust
Motor stick 10.5 X .27 X .22 #4.5 stiff balsa
BENT PENNY by Steve Gardner
1st Place USIC 1999 Site record of 16:34
Fin .05 square #5 balsa

A neat easy way to cover built-up Propellers with plastic or microfilm
By Larry Coslick and Steve Gardner

The following method is based on the one developed by Larry Coslick and myself for covering props with the new Y2K film. It is applicable to any other covering material including microfilm and any sized prop. It has the double advantage of being very easy and working really well.

First build the basic jig base for the size props you are going to cover. Larger jigs may be used for smaller props with a bit of care, but of course smaller jigs are no good for the larger props, so unless you build a bunch of those little ROGs start with a large jig. See the drawings.



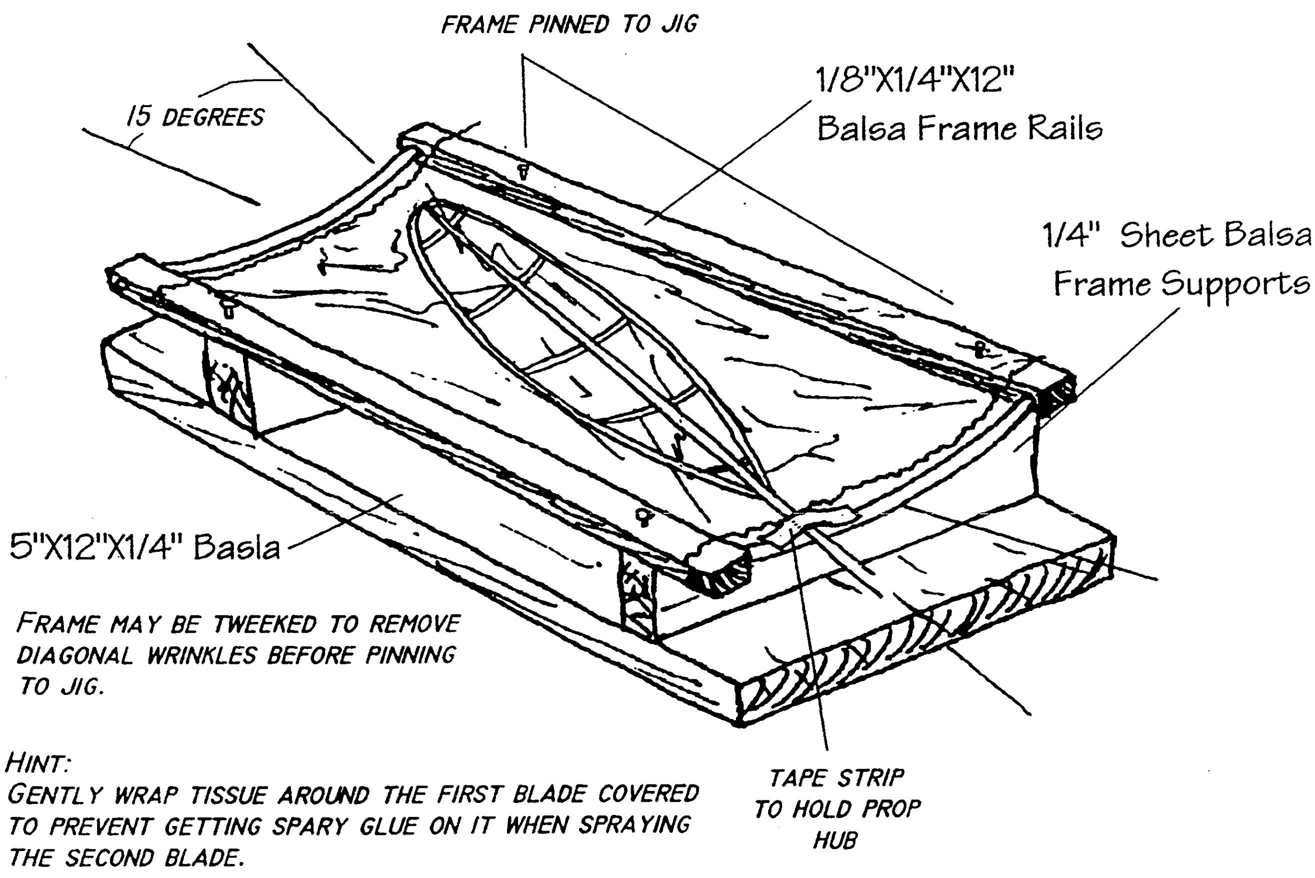
Next, build a pair of covering frames. These are made from 1/8 X 1/4 firm balsa strips of the appropriate length joined by 1/16 dia aluminum tubing at each end. The ends of the aluminum tubes are flattened and glued into holes drilled into the balsa strips. This aluminum tubing allows the frames to be bent to shape after the covering material is applied.

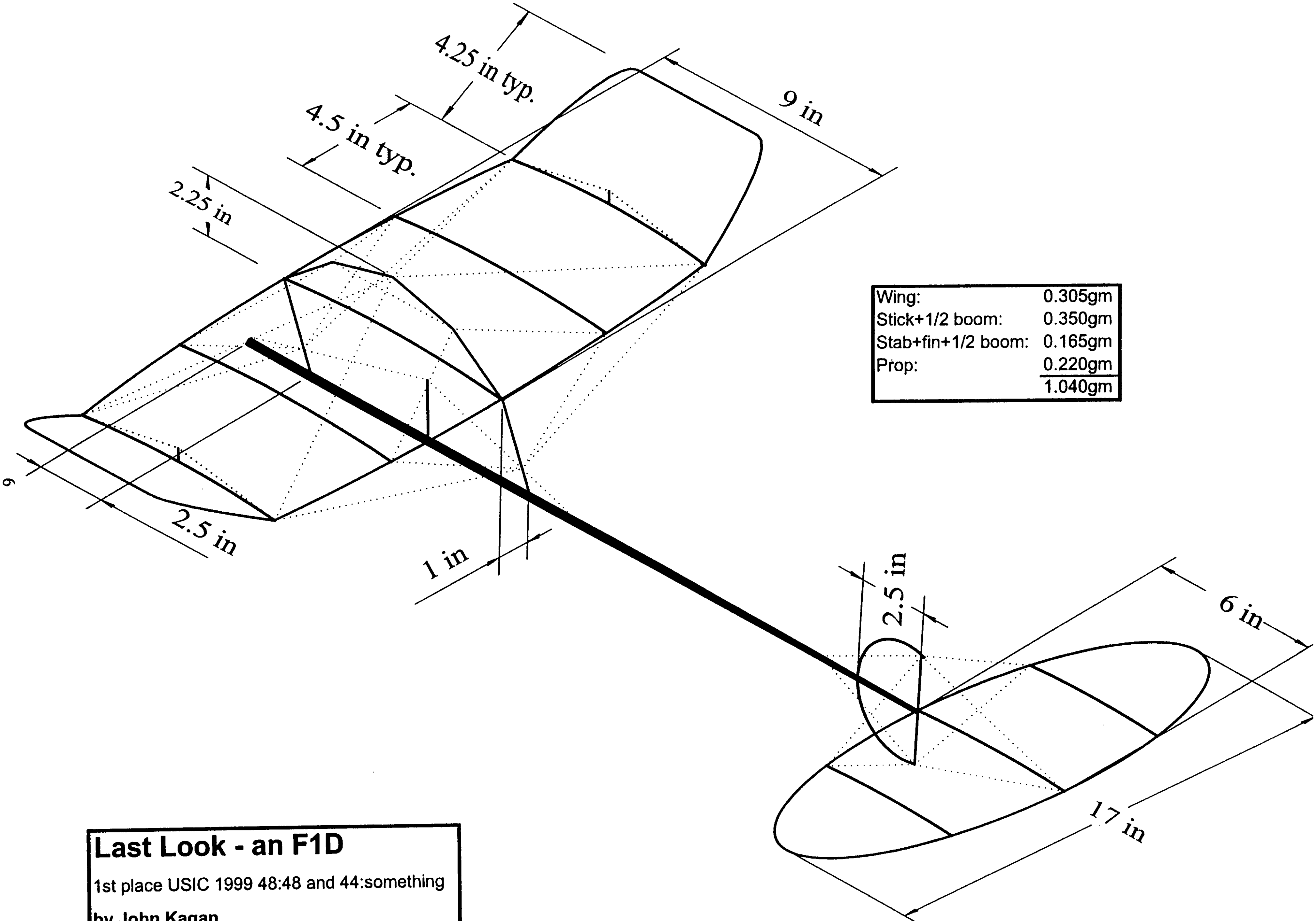
Once the two frames are built and are covered with film the tubes are bent into arcs so as to allow the covering material to take the shape of a section of a cylinder. The covering material is then cut free from the tubing with a hot soldering iron. For microfilm a small length of thread is glued to the tip of the propeller and to the aluminum tube nearest the prop tip. This thread prevents the film from tearing when most of the film has been trimmed around the prop outline.

Before you can spray the prop with the 77 Sprayment glue you must take a length of masking tape 1/8 wide and cover the prop spar so that the covering material will not adhere to it. Drafting tape or other very low tack tape is good here to prevent trouble getting this tape off of the prop without damaging it. Once the prop has the glue sprayed onto it remove the tape and it is ready to place on the film. Have a 1" bit of the same low tack tape ready before you proceed.

Position the prop at the classic 15-degree angle so that the twist of the blade matches the curve of the covering on the frame. The prop is placed by putting the hub at the hook onto the tubing and rocking the prop down onto the film. Carefully position the prop so that the leading and trailing edges meet the film at the same time. Once the prop is in contact with the film take the bit of tape mentioned before and tape the hub to the tubing of the frame. Now the prop and film are held at one end by the tape and the other by the length of thread (for microfilm only). Gently push the prop outline down onto the covering, or reach underneath the frame and lift the covering up to the outline as needed to get the outline attached to the film everywhere.

Once the outline is attached to the film everywhere you can trim the film around the prop. The thread will prevent the prop moving and tearing the microfilm once most of the outline is cut free, and in the case of plastic film, leave the very tip of the prop until last when trimming. Remember to remove the tape at the hub before trying to lift the prop from the frame.





Wing:	0.305gm
Stick+1/2 boom:	0.350gm
Stab+fin+1/2 boom:	0.165gm
Prop:	0.220gm
	1.040gm

Last Look - an F1D

1st place USIC 1999 48:48 and 44:something

by John Kagan

Last Look - Material Dimesions

6/1999 John Kagan

Component	Size	Density	Notes
Motor stick			
Tube	.0125 x .212id x 14.5"	4.6# C	.004 boron at 0, 90, 180, 270
Rear web	.020 x 1/2" x 3/8"	5# C	Web extends above tube
Rear hook	.013 music wire		
Front web	.020 x 1/2" x tube dia.	5# C	
Prop hanger	Harlan		
Front and rear "floor"	.0125 x 1/8" x 3/4"	4.6" C	Glue on outside of tube
Bracing post	.048 sq. -> .040 sq. x 2"	6-7#	Slit to fit over boron
Wing tubes	Tissue .060id x 3/8"		~3-4 wraps
Bracing	.001 tungsten		
Boom			
Tube	.008 x .255" x .135" x 13"	4# C	
Rear cap	.008	4# C	
Joiner tube	.008 x 1/2"	4# C	Cut boom at 6.5"
Wing			
Spar	.034 x .042	5.1# A or B	Planform is 4"x 26.5" ellipse split in half and placed around a 5" x 26.5" rectangle.
Tip	.032 x .036	5# A	
Cabane	.033 x .035 x 2-5/8" (4)	4.5# A	Barn roof shape w/ tungsten bracing
Posts	.034 x .055 x 4"	5# A or B	(2) .003 boron each on sides
Compression ribs			
Rib	.024 x .064	5# C	3% arc
Bracing post	.024 sq. x .5"		Top of rib at halfway point
Wire	.0003 Tungsten		
Middle ribs	.024 x .048	5# C	3% arc
Bracing wire	.0007 nichrome		
Stab			
Outline	.027 x .040	5# A	No taper
Center rib	.024 x .045	5# C	3% arc
Outer ribs	.024 x .038	5# C	3% arc
Fin			
Outline	.024 sq.	4.5# A	
Post	.028 x .050 -> .040	5# A or B	Taper from center to tips
Prop (see Steve Brown's excellent article in previous issue)			
Outline	.024 sq.	5# A	
Ribs	.025 sq.	5# C	6% arc
Center spar yoke	.075 x 1.25 x .1 -> .045	4.5# A	Taper toward tips
Spar	.075 x .080 -> .025 sq. x 10.5		
Shaft	.013 music wire		Loop around yoke
Yoke	.011 music wire		
Screw arm	.033 x .095	Basswood	
Spring	.009 music wire		8 turns
Motor			
Size	.069 x 17"		
Batch	10/97		

CAT IV EZB Record – Larry Cailliau

After the NATS in 1998 I decided to build two new EZB's since my old models were about 3 years old, and not keeping up with the pace set by Larry Coslick. So before I ~~get~~ started I wanted everyone to know that much of my success with EZB is due to the help and research from Larry Coslick, he is the true EZB pioneer. I decided to build during the rainy season that winter, and spent the rest of the summer pondering on how to built a better prop. The old props were set with about ¾ of the blade area in front of a long skinny spar and used mostly spar deflection to flair the prop. This would work fine for higher sites and the lower humidity in Sana Ana. (About 45-50%). I determined that with the higher humidity in Johnson City (Above 50%), these prop spars would take a set in flight and not return to the original lower settings and the model would land with too many turns. I felt that the prop would work better with a slightly smaller diameter and a slightly ticker spar, and about 9/10 of the blade area in front of the spar. With this set up I hoped to get flair more torsionally around the spar and may be it would return better in high humidity. I think it does. I also had a problem with blade grain direction, but couldn't quite figure it out.

Before building I asked Larry Coslick to show me his latest EZBs, which he graciously did, and wouldn't you know he had a prop with the grain 90 degrees to the spar. I didn't think this would work because the outline would waffle too much, but his was perfectly straight. I was enthused and after studying his models went home to build, trying to copy what I saw. The overall dimensions are identical to his hobby shopper. Only difference is wing tip shape and prop shape. Both models were from the same wood and as identical as I could make them. They were set up the same as the old EZB. One flew perfect right out of the box (never ever changed wing incidence – a first) the other took half motor testing and tweeking all day long. Go figure! They both came out to 1/2 gram and used Y2K film for physiological support because not much weight is saved on EZB covering, besides the colors look nicer. The new props came out lighter because the blades could be made thinner with the 90 degree grain.

The second test session at Sana Ana was to be the models 1st full motor flights trying to keep altitude below 100' for Johnson City. My 1st flight calculation from ½ motors were way off, it climbed to 130' with a time of 32 minutes. The motor was 031" x 12.5", 2400 turns. Czar Banks and Steve Brown casually observed the flight saying its flying great and should go for the record. I said no that I had to save the models for USIC, NATS. My friend Bob DeBatty came to me and whispered he would rather have the record than save it for Johnson City. I thought for a minute, there was not much drift that day, and said O.K. I was not gung-ho about this because I had come to test for USIC and had no intentions or thoughts about records. Anyway, the 2nd flight, or 1st record attempt, was wound a little more and it leveled off about 135', stayed centered and landed at 33:30, just short of the record. The 2nd attempt using the same motor was wound tight, 2600 turns, 40 back off turns to a torque of .13. The model grooved and climbed to 140' and was nicely centered. It came down for a nice safe, no-touch, no-steer flight of 35:34. That's the story, some days everything falls into place, others I should have stayed in bed.

New Rules F1d

By Steve Brown

The recent F1d rules change has caused a lot of controversy among U.S. flyers. Effective in 2001, maximum wingspan is reduced from 65cm to 55cm, minimum weight is raised from 1.0gm to 1.2gm and a maximum motor weight is imposed at 0.5gm. The CIAM Free Flight Subcommittee is composed mostly of outdoor flyers and voted 14-5 in favor of the agenda proposed by Hungary. Apparently the Subcommittee referenced the perceived success of performance restrictions in F1b and F1c and applied this philosophy to indoor models. U.S. input was not incorporated in the final specification.

Rules change proponents cited the steady decrease in F1d participation worldwide and the desirability of decreased performance as a means of making the event more accessible to flyers coming to F1d from other classes. A smaller, more robust model was another goal, to improve transportability and to make F1d more suitable for competitions in smaller, low-ceiling sites. I found the "need" to reduce performance puzzling and I know of no U.S. flyers voicing such a need.

Upon hearing of the rules change I began building prototypes to assess the impact of the changes. Larry Coslick asked me to share my experiences with INAV readers. I want to express a caveat about the thoughts that follow and the model design in the plan: my experience with this class evolves with each flying session. This design may or may not prove to be the correct one and is very much a work in progress.

The new rules raise many issues. For example, it can be assumed that the flyer will always want to carry the maximum allowable amount of rubber, 0.5gm. Any change to motor length then requires a corresponding change to motor width. While wingspan has been reduced and the need for long motorsticks has been eliminated, the weight limit has been increased by 0.2gm. Where is one to put the additional weight? Up to 0.13gm of ballast was required on all three of the prototypes I built. Every change made to the model, such as substituting a VP prop for a fixed pitch prop, requires reballasting. It may have been assumed that the extra weight would automatically be used for plastic covering instead of microfilm. Unfortunately for that assumption, a poll taken at the 1998 World Champs in Romania demonstrated that support currently does not exist for the elimination of microfilm.
Reflecting the spirit of the new rules I built each of the prototypes in a very sturdy manner, using wood sizes and densities that would have resulted in a 65cm model being grossly overweight. No special effort was made to save weight in the traditional ways, i.e., glue weight reduction, minimum wood sizes and densities. I found that the "challenge" was to find ways to make the model components heavier. Size-wise, this model could easily be built to less than 1.0gm and have adequate strength. The prototypes reflect my usual design preferences, that is, large chord wings, long fuselages and moderately large diameter, slow turning props.

With the rubber weight restriction it is essential to try to use every available turn. This implies launching the model with little or no backoff. Upon flying the prototypes several things immediately became clear. Large diameter props (19-20") and high torque (around 0.5 in./oz. for the rubber used) with little backoff caused unacceptable launch stability problems. The model would typically emulate a Mini-Stick and torque roll to the left to the point where side thrust became down thrust. The airplane would then race around in a tight circle until the torque diminished. Once a modest torque level was reached the model would slowly climb to about half the desired height. Various combinations of prop diameter (18 – 20" fixed and VP), wing offset (1", 1.25", 1.5"), wing wash (up to 0.3") and wingpost height (3.5 – 5") and wing chord (9", 9.5", 10") were tried.

Since it appeared that motor length would be in the 7.5 – 8.5" range it was logical to reduce the motorstick length to 8.5 – 9". I found that 9" motorsticks rolled on the usual 0.25" diameter forms were so resistant to twisting that little wingpost deflection could be observed at maximum torque. This implies that, unlike 65cm F1d, no extra wing wash was being twisted into the wing under high power. It appears that a smaller stick diameter is needed so that a modest amount of additional wing wash is twisted in at launch. It may be that when stick diameter is optimized the amount of wing offset can be reduced to the usual 1".

I eventually found a combination of configuration, power and adjustments that allowed my prototype to consistently turn times in the 29 minute range. The best time was 29:20 using a 20"/33" fixed pitch prop with moderate blade area. I found it necessary to reduce launch torque to 0.3 in./oz. This required a backoff of about 40 turns in a 7.75" loop of .048" X .041" July 1997 Tan II. This produced a flight using all of 1160 launch turns and a maximum height of about 130 feet. Average prop RPM was 39.5.

We should ask ourselves whether the performance of the prototype reflects the intent of the rules. In terms of reduced performance I think it clearly meets the intent. I am told that the European proponents used 26 minutes as a target. Whether you or I perceive a "need" to reduce performance is another question. Personally, I have never felt a need to reduce performance in any site. With unrestricted rubber this prototype could do 45 minutes. It's sobering to reflect upon the fact that F1d's will now fly lower times than EZB.

I did not attempt to construct my prototype with a detachable tailboom to improve transportability. That is an obvious use for some of the extra weight. The larger wood sizes produce a much more robust model, even when covered with blue microfilm. With the wood sizes I used the wing is very strong and can be steered easily. Ground handling is improved compared to 65cm F1d. The motorstick is easier to build and more resistant to damage.

One area that does not meet the intent of the rules is model size. The prototype is basically the same size as 65cm F1d's, reflecting the high minimum weight. Short of building a Pennyplane-like model of hobby shop balsa covered with plastic there is nowhere to put the weight except in size or gadgets. Biplanes, anyone?

In my opinion the new rules were intended to promote a small wing chord/small prop paradigm. But the 1.2gm weight undercuts that intent. The best way to influence model design toward smaller airplanes would have been to reduce the minimum weight, perhaps to 0.75gm. The prototype may be criticized for its wide wing chord. It has been suggested that an unbraced, narrow chord model that is "more efficient" due to reduced drag will be equal or superior to a wide chord design. I can only defer to experience, which is that the primary determinant of indoor duration is wing loading. If a minimum weight of 1.2gm is mandated the wing loading of a 9" chord model will be much lower than the wing loading of a 6" chord model. History implies that the lower wing loading will prevail. The performance potential of narrow chord airplanes has been touted for many years, but wide chord designs have been the winners.

Another stated goal was to produce a model that was more suited to flying in smaller sites and to construction by less skilled flyers. I took this to mean an airplane that was smaller, more robust in construction, turning in smaller circles and flying faster for better penetration. I found that with a fixed pitch prop the prototype flies about the same speed as a 65cm F1d. With a VP prop it flies a little slower. Due, I think, to the low torque of the small cross-section motor, in the last half of the flight there is less ability to penetrate moving or turbulent air. This model may drift more than 65cm airplanes. The models are easier to construct, but they are not easier to adjust or fly. Obtaining optimum performance from the restricted motors will require significant amounts of skill and patience. The process of repeatably making motors of the correct weight is difficult and the need to constantly reballast the model is a nuisance.

Will the new rules increase participation? In my opinion it is flying site availability and competition for the attention of prospective flyers by computers, sports, etc. that influences participation – not the rules. I predict that a significant number of older flyers will not want to "go backward" to reduced performance and will choose to quit flying F1d. I know of no mass of flyers waiting for a new model specification to begin flying F1d, although we all hope those flyers do exist somewhere.

As in all things Indoor, time will tell.

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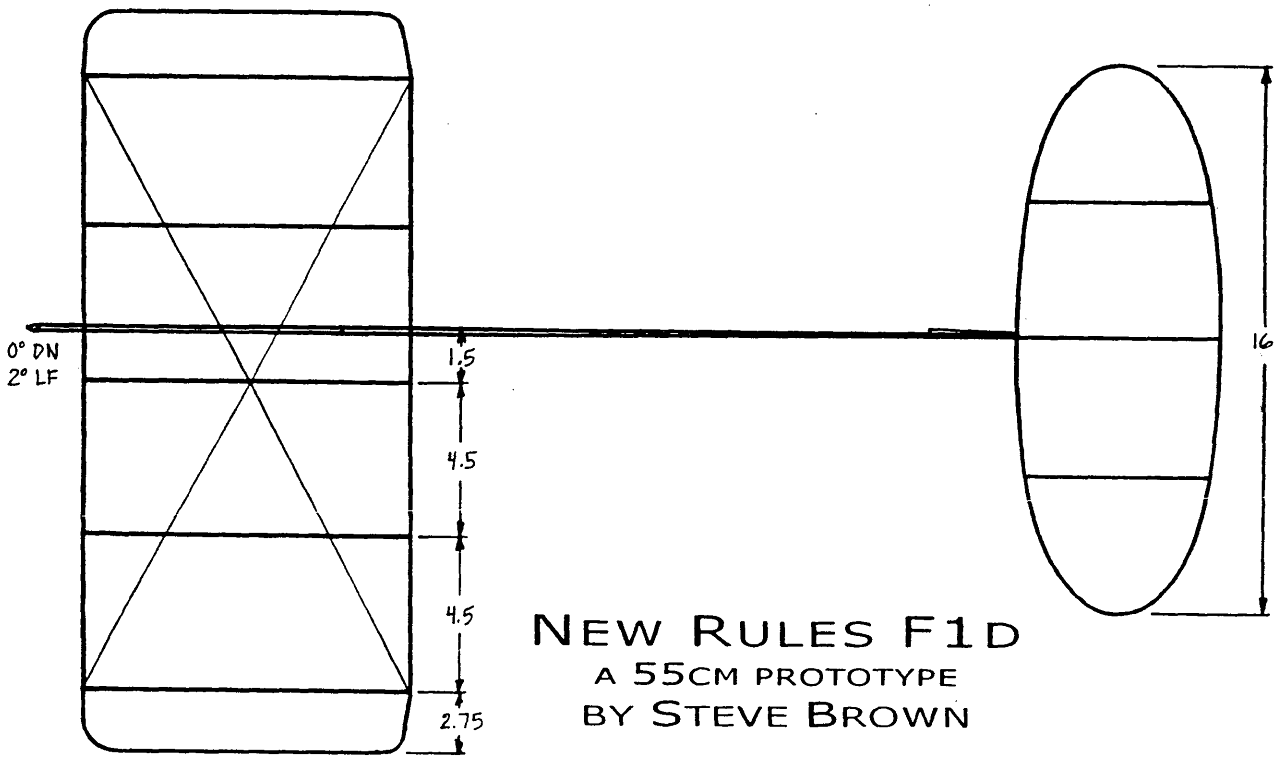


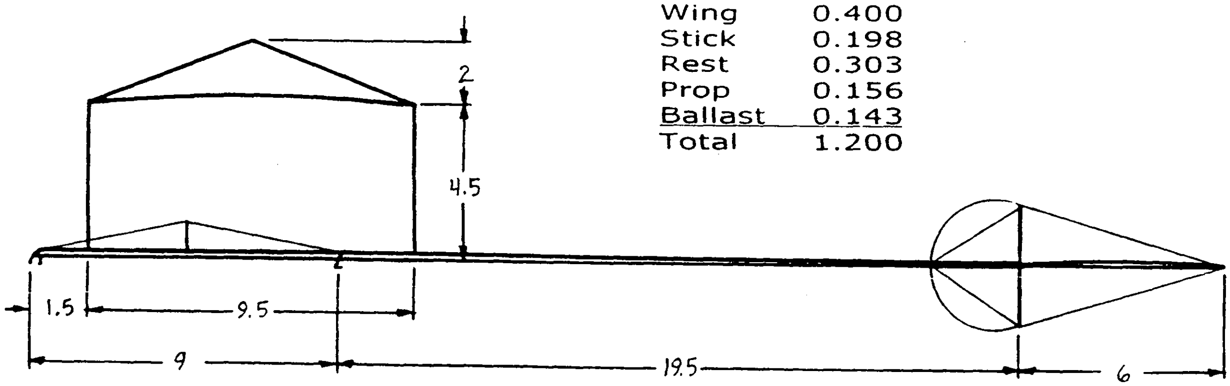
New Rules F1D

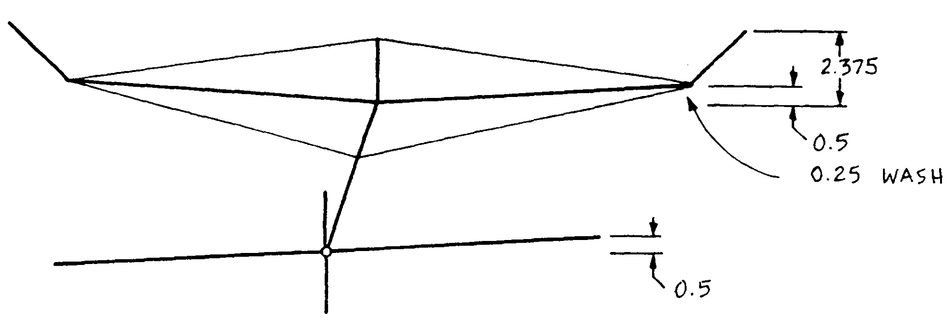
A 55cm prototype

by Steve Brown

Typical Weights (gm)

Wing	0.400
Stick	0.198
Rest	0.303
Prop	0.156
Ballast	0.143
Total	1.200





Wing

SPARS	.033 X .060 6.2 LB.
TIPS	.030 X .047 5.5 LB.
MIDDLE RIBS (3)	.030 X .047 5.2 LB.
COMPRESSION RIBS (2)	.030 X .060 5.2 LB.
WINGPOSTS	.035 X .055 → .035 X .045 6.2 LB. (3) .003 BORON FULL LENGTH, SIDES & BACK
CABANE	.030 X .045 5.5 LB.
BRACING	.0003 TUNGSTEN
AIRFOIL	3.5% ELLIPSE

Stabilizer

SPARS	.028 X .050 → .024 X .032 5.7 LB.
CENTER RIB	.025 X .045 5.5 LB.
OUTER RIBS	.025 X .032 5.5 LB.
BRACING	.0003 TUNGSTEN TO REAR OF CENTER RIB ONLY
AIRFOIL	2% ARC

Fin

POST	.030 X .055 → .030 X .040 5.5 LB.
OUTLINE	.004 BORON

Motorstick

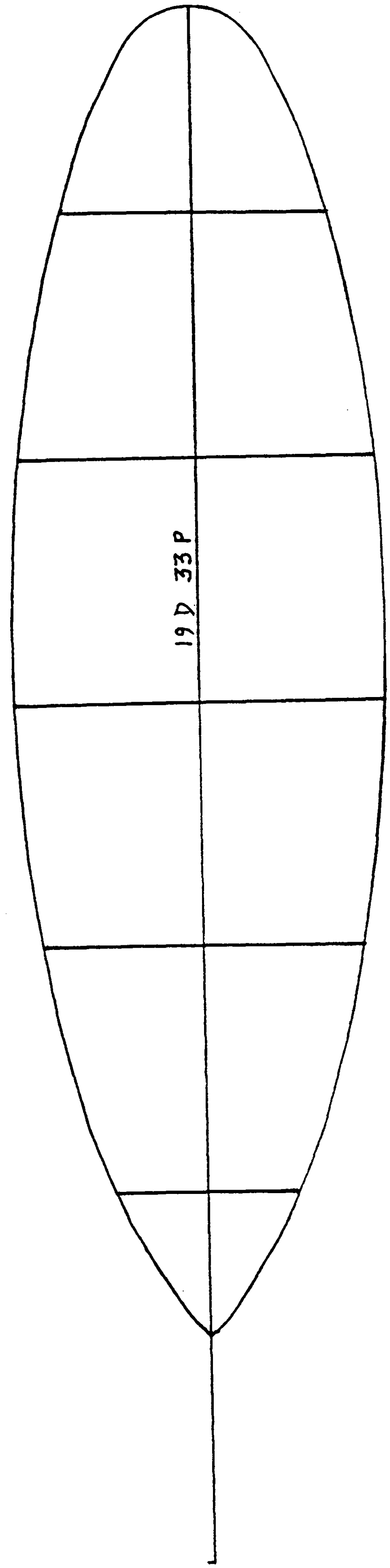
TUBE	.013 4.4 LB. .210 I.D. (3) .004 BORON: 12, 4, 8 O'CLOCK
WEBS	.020 4.5 LB.
CAP	.013 4.4 LB.
BRACING POST	.045 X .045 → .035 X .035 X 1.25 6.8 LB.
HOOK	.012 MUSIC WIRE
BEARING	HARLAN F1D
BRACING	(1) .001 TUNGSTEN

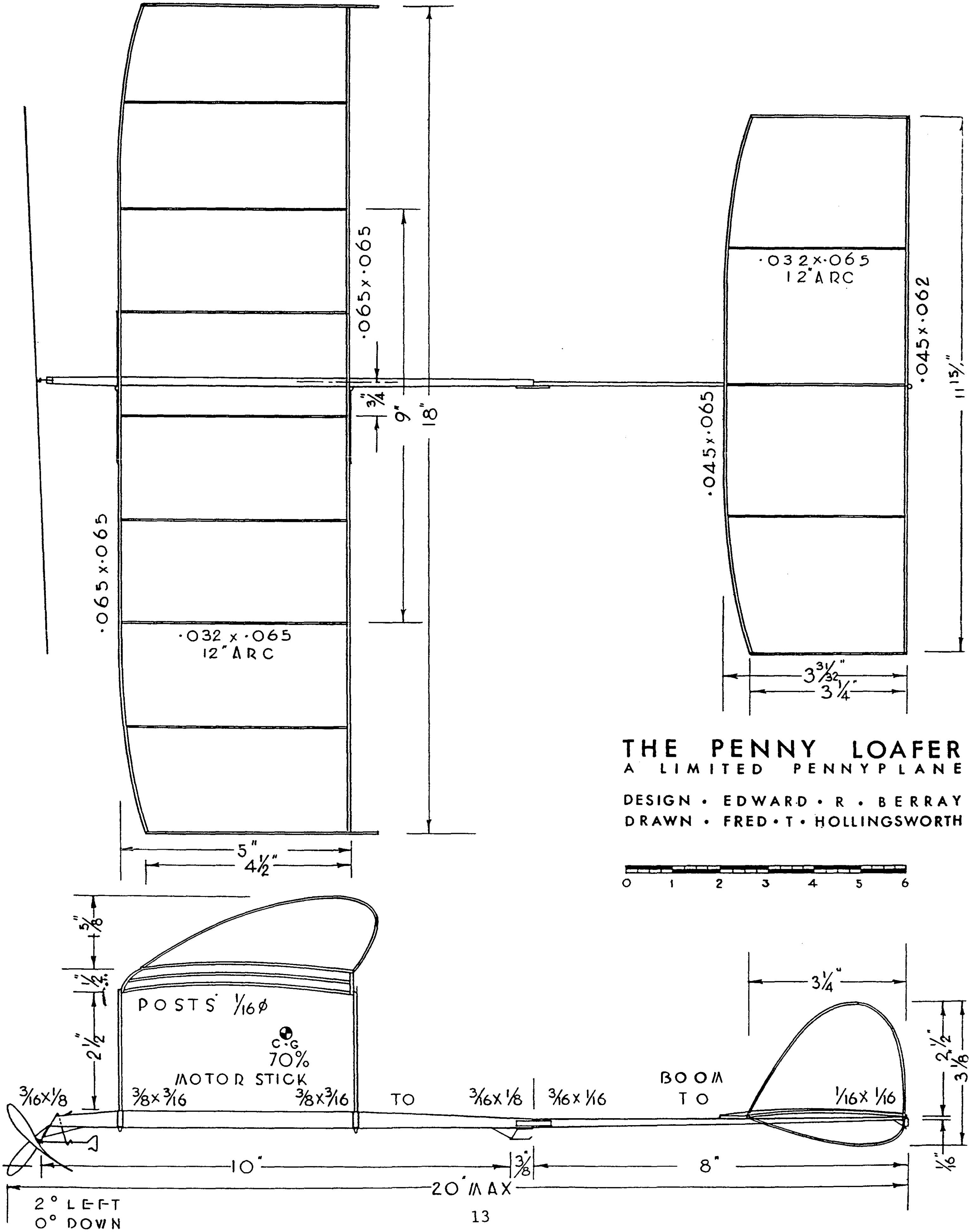
Boom

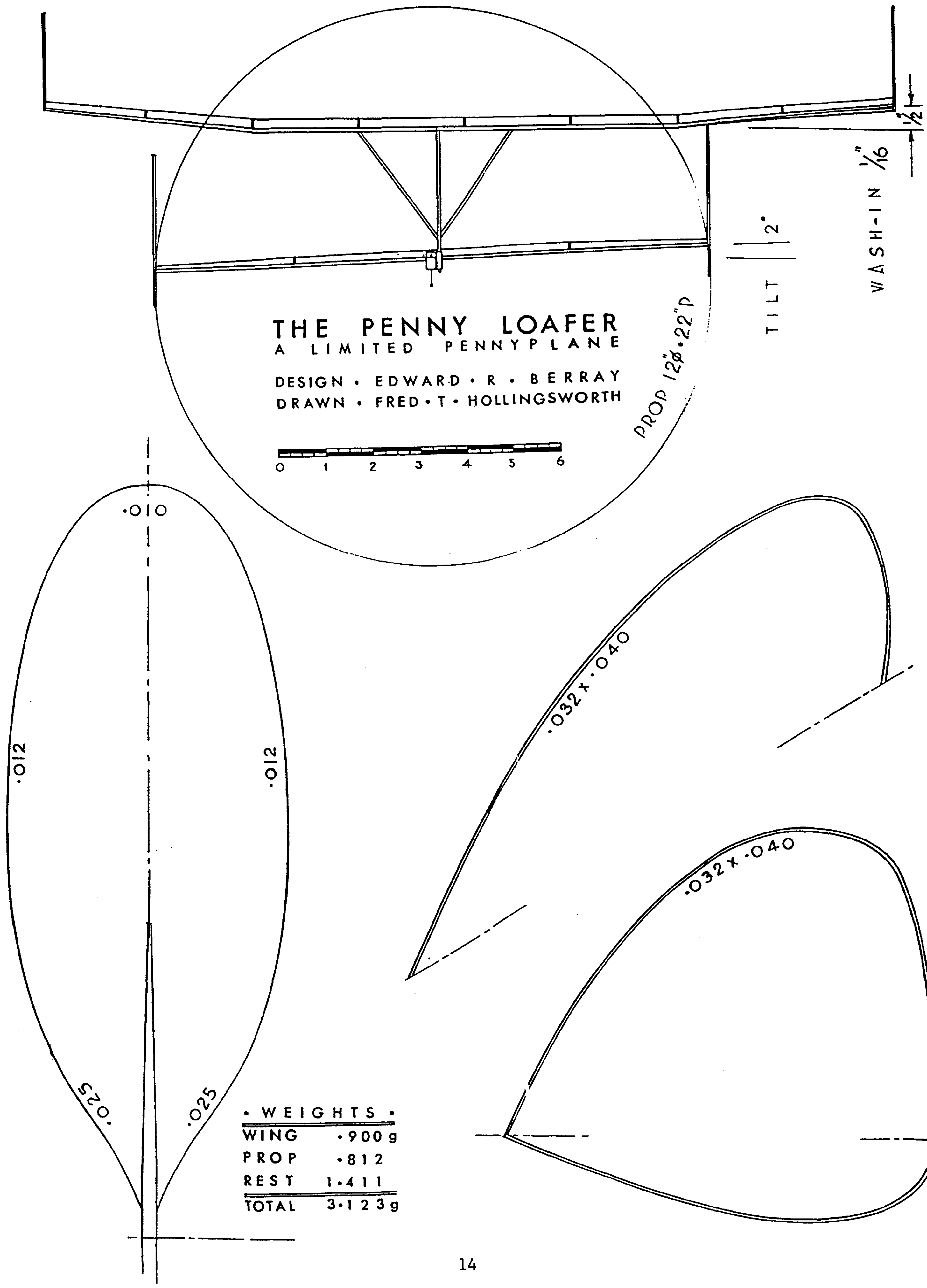
TUBE	.010 4.5 LB. .240 I.D. → .130 I.D. (2) .003 BORON: 12, 6 O'CLOCK

Prop

SPARS	.065 X .075 → .030 X .030 5.5 LB.
OUTLINE	.023 X .025 4.5 LB.
RIBS	.023 X .025 4.5 LB.




THE PENNY LOAFER
A LIMITED PENNYPLANE
DESIGN • EDWARD • R • BERRAY
DRAWN • FRED • T • HOLLINGSWORTH
·065 x ·065
·032 x ·065
12" ARC
·065 x ·065
3/4
9"
18"
5"
4½"
·032 x ·065
12" ARC
·045 x ·062
·045 x ·065
11 15/16"
3 31/32"
3¼"
0 1 2 3 4 5 6
5/8
½"
2½"
POSTS 1/16 ø
C.G
70%
MOTOR STICK
3/16 X 1/8
3/8 x 3/16
3/8 x 3/16
TO
3/16 X 1/8
3/16 x 1/16
BOOM
TO
1/16 X 1/16
3¼"
2½"
3 1/8
1/16
10"
3/8
8"
20" MAX
2° LEFT
0° DOWN

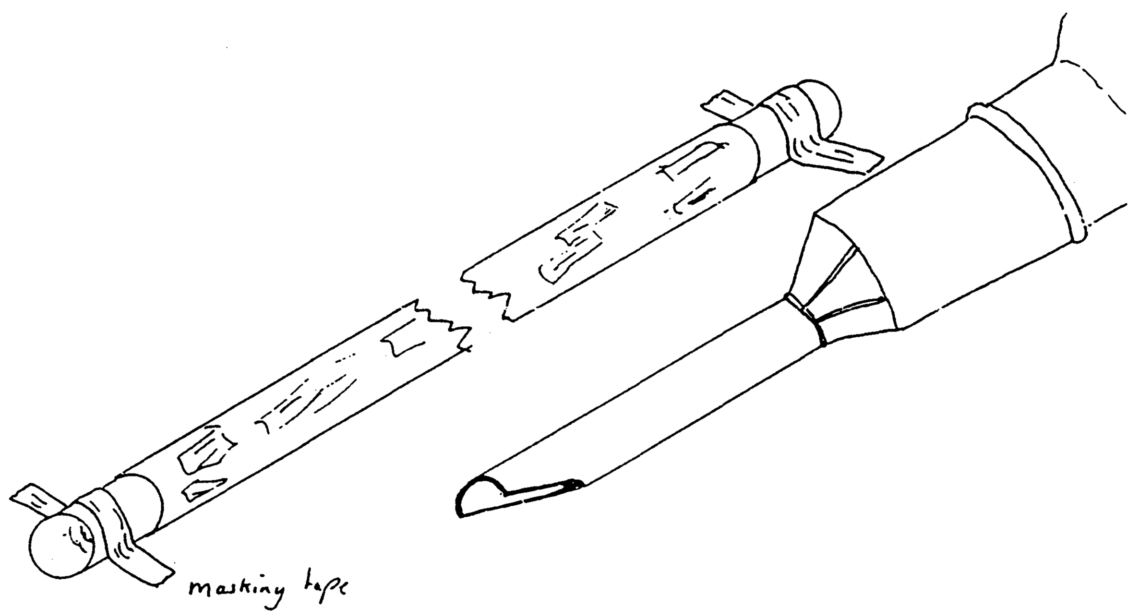

THE PENNY LOAFER
A LIMITED PENNYPLANE
DESIGN • EDWARD • R • BERRAY
DRAWN • FRED • T • HOLLINGSWORTH
PROP 12"ϕ • 22"P
TILT 2°
WASH-IN 1/16"
1/2"
0 1 2 3 4 5 6
•010
•012
•012
•025
•025
•032 x •040
•032 x •040
• WEIGHTS •
WING •900 g
PROP •812
REST 1•411
TOTAL 3•123 g

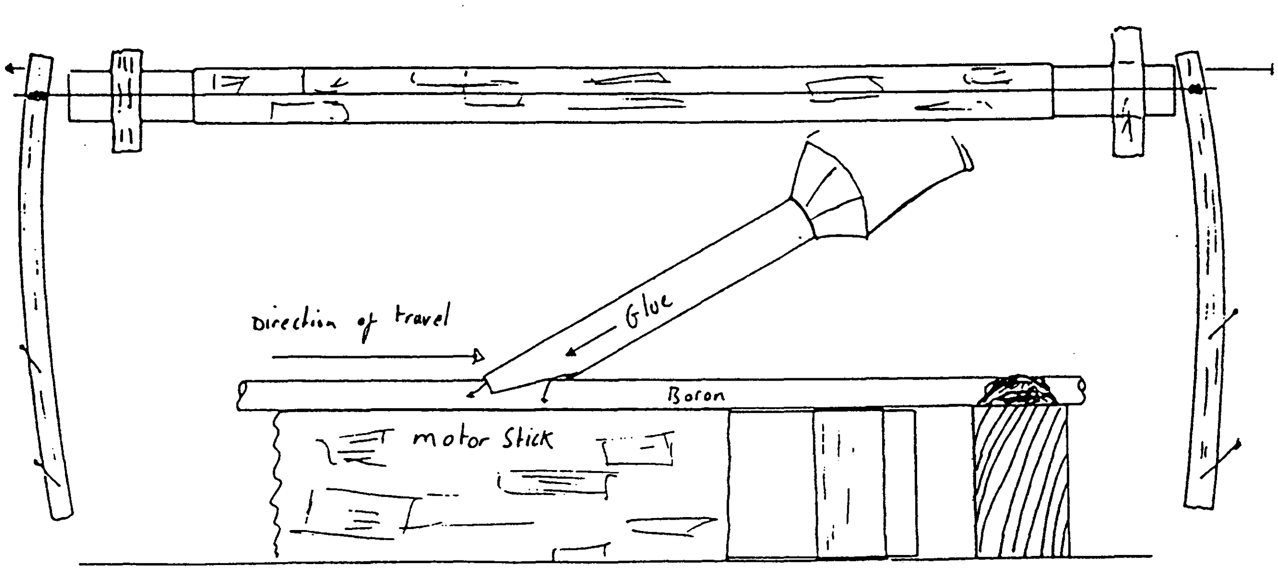
Applying boron to motorsticks

by John Tipper (GBR)

I have tried many different methods to apply boron to motor sticks and have found this one to be the best. The boron stays on straight and has never parted from the motor stick. The weight penalty is only about 2mg for 16ins of boron - a small price to pay for a much stronger motor stick.

1. Tape motor stick down to work bench by the mandrill.
2. Select two pieces of medium balsa 5mm wide x 120mm long, the depth to be the overall diameter of the motor tube.
3. Glue balsa sticks onto each end of boron and allow to dry - this joint needs to be very secure. Carefully file off the point on a 24 gauge hypodermic needle (see drawing). This will leave a half round groove in the end of the needle. I use a small high speed drill and fine cut-off blade for this, so as to leave a clean edge on the needle.
4. Pin balsa sticks to work bench so that boron is under tension and in the correct place on the motor stick.
5. Apply about 8-10 dots of glue along boron to secure in a straight line and allow to dry.
6. Mix up a solution of 20% Duco and 80% Acetone and fill glue gun (glue guns available from F1D Indoor Supplies).
7. Position the half round section of the needle onto the boron and run a bead of glue along the length of the motorstick. The needle will run along the boron like on rails. The glue will coat the boron and form a very small fillet along its length. Allow the glue to dry before cutting end of boron from balsa sticks, then repeat procedure as above for other boron positions.





5/99 Verses 7/97 Tann II

by Larry Coslick

There's such a good variety of rubber, that it's difficult to know which batch to use if you fly as many events as I fly. I wouldn't use 7/97 or 2/99 in my Bostonian or Manhattan, because two motors exploded just after the blast tube was removed. On the other hand, 7/97 works great on most other models provided you don't wind it too hard and the temperature is not too hot. Although my tests are not complete, 5/99 could fill the bill for all my models in the near future. 5/99 has good energy, its tough, and it will take more winds than 7/97.

To make this test I weighed two strips of 1/8th rubber from each batch and found out that 5/99 was 6.7% lighter than 7/97. After correcting for the difference in weight, I had three motors from each batch that were within 2 % of each other in weight. Each motor was pre-wound to 400, 800, and 1100 turns. All six motors stretched approximately one inch during the break in period, and had a maximum stretch of 1.4" after five winds. Each motor was wound to .6 in. oz. of torque and then backed off to its ½ wind torque. All of the 5/99 motors held up through the fourth wind and two broke at around 2300 turns of the fifth wind. One of the 7/97 motors broke at 1600 turns of the 2nd wind and one at 300 turns of the 3rd wind. One loop of each batch held up through five winds and that's where I concluded the test.

(Motors. .072 x 16")

7/97 Wind 1 -- 2140 Turns -- ½ winds -- .135 in. oz.
Wind 5 -- 2300 " -- " " -- .13 " "
Winds 2 through 5 showed ½ winds tq. of .13 for 7/97

5/99 Wind 1 -- 2300 Turns -- ½ winds -- .13 in. oz.
Wind 5 -- 2480 " -- " " -- .13 in. oz.

Note: The rubber was lubed before tying the knot and there was no chafing near the knot.

Basic Rubber Testing Procedures

To get worth while results when testing one batch of rubber against another, it is important to test equivalent weights of rubber as opposed to equivalent sizes. Since the sample test outlined concerns itself with conservative maximum turns, torque at half winds, rubber toughness, and whether the rubber grapevines or not, matching the weight is the best method.

Start by tying three or four loops of each batch and be careful to get the weights as close together as possible. I lightly lube the end of the loop before tying the knot to prevent fraying and this procedure really works. Break the motor in by winding in stages with the final wind at about half the expected maximum winds. Once broken in, wind the motor to 130% of launch torque for medium cross-section motors. (.070"). Thinner motors can go as high as 180%. Once the motor is wound, back off half of the winds and torque. The best rubber will take the most repeated windings while delivering good torque.

The ultimate test for good indoor rubber is to fly one batch of rubber against another. Use a very reliable, repeatable model. The more certain you are that a flight time difference is from the rubber, the better. Make sure that you are using nearly identical motors, launch torque, and O rings to help eliminate any stray factors. Use quarter of half motors to prevent the model from touching, since this will invalidate any test you might make.

1999 USIC
PICTURE CAPTIONS:

1. East Tennessee State University Dome, Site of the USIC in 1999
2. John Koptonak launches his third place Mini-Stick.
3. Rich MacEntee judging scale.
4. Mike Thomas's beautiful Mile Sparrowhawk
5. Tom Sova's Pro 20 about to touch down.
6. Mike Thompson hides behind the many awards he must give out.
7. Michelle Boyd's General Aristocrat just after having its fin damaged in a mid-air collision.
8. John Blair launches one of his many scale models.
9. Bob Romash's cute little Northrop flying wing.
10. Larry Loucka launches his Pennyplane.

11+12. Ron Ganser's wonderful 1911 Cessna, first in AMA scale.

13. Nikki Spradling working on her Mooney designed Monocoupe.
14. Walt Van Gorder and John Kagan ready to catch their models.
15. Jack McGillivary WW1 Junkers scale, first in WWI mass launch.
16. Dave Linstrum's M20b and Bristol Brownie Pistachios.
17. Nice looking Dehaviland Moth Minor.
18. F.R.O.G. headed for the ceiling. John Diebolt won this event with a great flight of 8:02.
19. Rich Miller winding his Coconut scale Zlin agplane.
20. Bernie Hunt retrieving his Intermediate stick.
21. An unusual site, a triple mid-air!
22. Dick Hardcastle prepairing his Intermediate stick for flight.
23. Steve Gardner's colorful Bostonian with computer generated tissue.
24. John Diebolt launching his Pennyplane.
25. Holly Vonasek flying her F1L EZB
26. Just some of the huge Smyrna scale airforce.
27. Tim Lavender's Breuget scale model.
28. Tom Sova launches his F.R.O.G.
29. Rich MacEntee's Cessna Birddog.
30. Larry Coslick puts up a testflight with his F1D.
31. F1M model in flight. This could become a popular event.
32. Jennifer Smith's Coconut scale model up in the rafters. Won 2nd in Coconut scale mass launch.
33. Bob Romash with his fun flying foam airforce.
34. Belanca observation scale model in flight.
35. Voison 1911 Hydroplane scale model. Popular design due to bonus points.
36. Limited Pennyplane in flight. This was the most popular event with 54 entries.

37+38. Larry Coslick's Record setting Bostonian. Best flight 6:18!!

39. Marcus Conners launching his limited Pennyplane. He was 2nd in junior Limited Pennyplane.
40. Dick Hardcastle tests his Limited Pennyplane.
41. Larry Loucka readies his ROG Stick for flight.
42. A nicely built scale model that has the editors of INAV stumped!
43. Tim Lavender's Martynside biplane.
44. Larry Loucka receiving the first place award in Pro 20.
45. Bernie Hunt launches his Mini-Stick. He took 2nd in this event and won the mass launch.
46. Steve Gardner launching his limited Pennyplane. He took first and set a site record of 16:34.

47. Steve Gardner's Limited Pennyplane in flight.
48. Davis DA5 Peanut.
49. Robert Stevens with his P-51 Mustang scale model.
50. Nikki Spradling launches her Limited Pennyplane.
51. Tim Lavender's Coconut cruises along.
52. Jack Boone's very interesting B-17 profile model.
53. Dick Hardcastle with his Pennyplanes.
54. John Blair's pretty Consolidated Dime Scale model.
55. Mike Thomas Receives the award for Pioneer scale from Abram Van Dover.
56. Rich MacEntee and Dave Linstrum judge Pistachio Scale. Emil Schutzel won this event with a pair of two-minute plus flights.
57. Winners waiting for awards. From left to right they are: Tom Sova, Larry Loucka, Fred Tellier, seated is Emil Schutzel, Tim Johnson, and Peter Olshefsky.
58. Rich MacEntee's Turboporter.
59. Bob Romash launches his 6th place limited Pennyplane.
60. Bill Landrum inspects his Pennyplane.

KIBBIE DOME

DOUBLE HEADER / 1999

UNIVERSITY OF IDAHO - MOSCOW, IDAHO

KIBBIE DOME OPEN FOR FLYING – 8:00 am TO 8:00 pm

EVENT 1. (JULY 24,25,26,1999) KIBBIE DOME ANNUAL

All AMA Official Indoor Events. Six official flights per event (which can be flown any time all three days – 9:30 AM to 8:00 PM)

Hand Launched Glider and Catapult Glider flights 8:00AM to 9:30 AM only, all three days. Nine (9) official flights allowed.

SPECIAL EVENTS: Pro-20, Novice EZB, P-24, A-6, and NON-RADIO CONTROLLED ELECTRIC F.F. (30 gram max weight for ELECTRIC F.F.)

ENTRY FEE: Open & Senior – $50.00   Junior Flyers – $25.00

There are no additional event charges.

Table and 2 chairs rental: $5.00

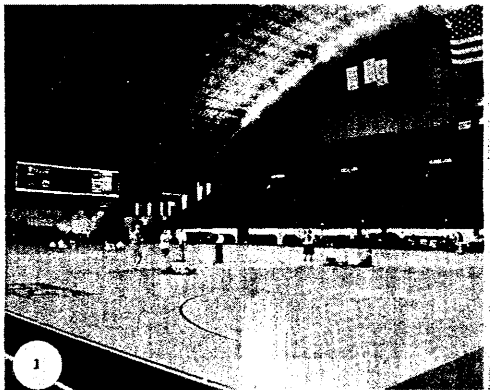
CONTEST DIRECTOR: Andrew Tagliafico – Call (503) 452-0546 for additional information.

EVENT 2 (JULY 24,25,26,1999) FLYING SCALE

Flying Aces Rules

SCALE CONTEST DIRECTOR: Dave Haught. Call (208) 773-5806 for additional information.

Modelers with cars must stop at University Visitor Information Center, 645 W. Pullman Road (across from Hardee's Restaurant) to obtain a visitors parking permit for Monday, July 26, 1999. Cost is approximately $1.00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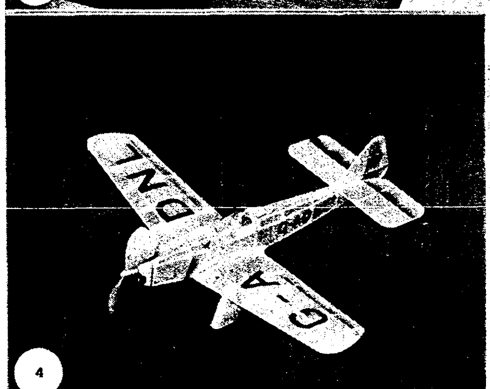

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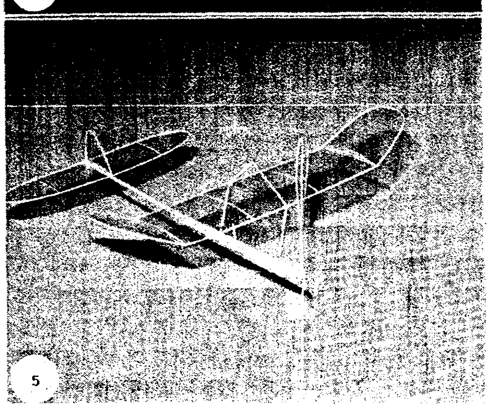
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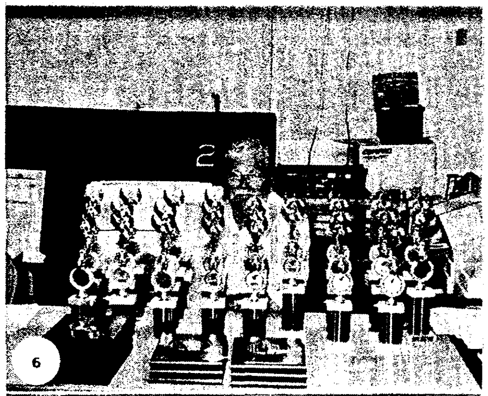
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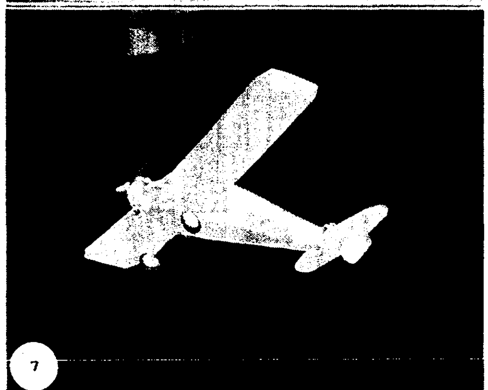
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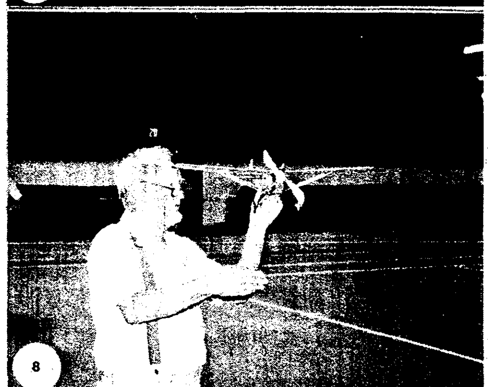
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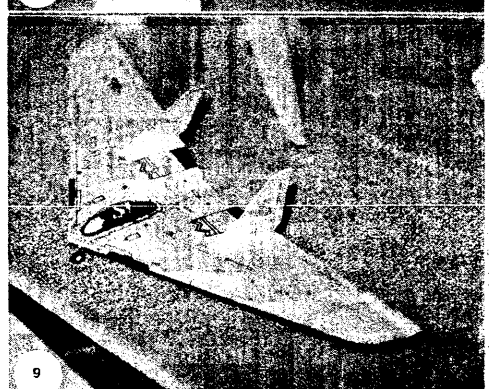
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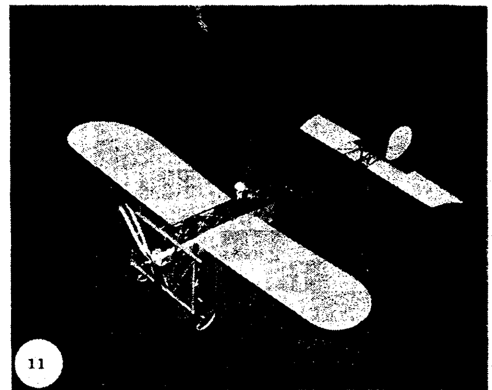
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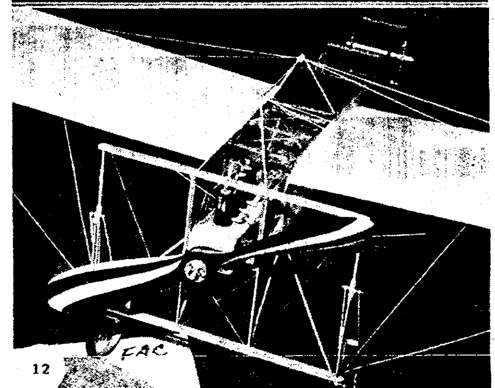

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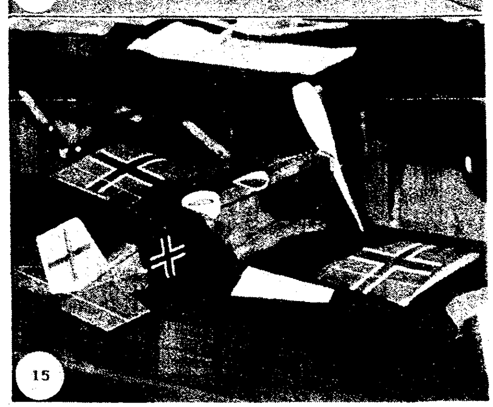
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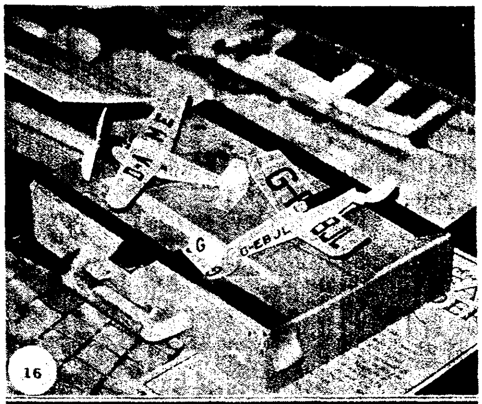
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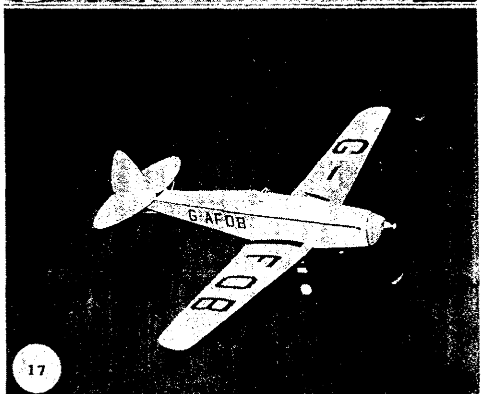

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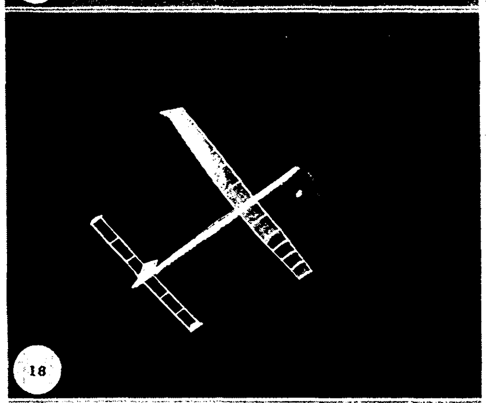
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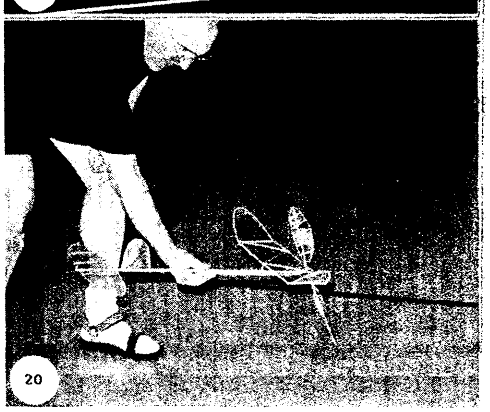
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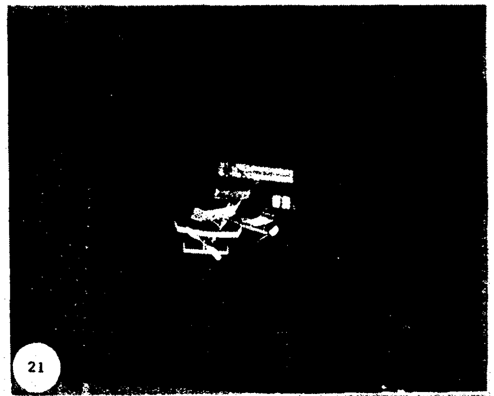
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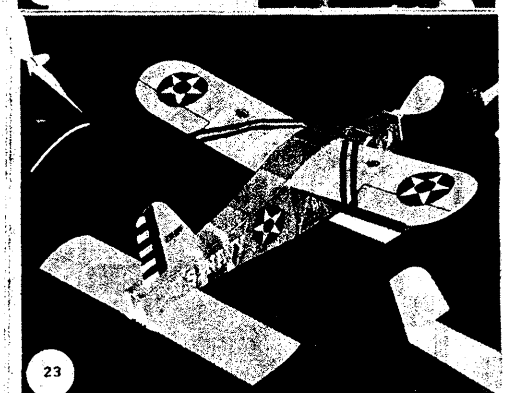
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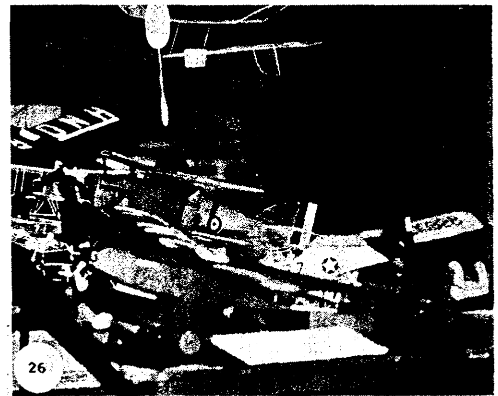
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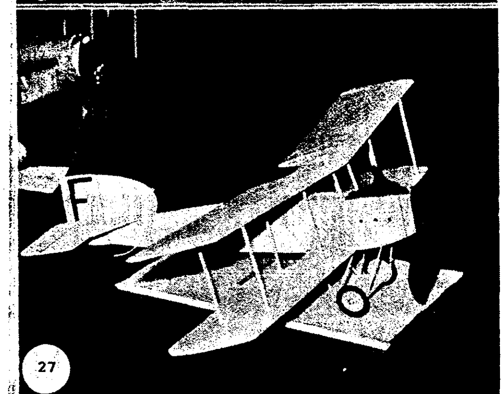
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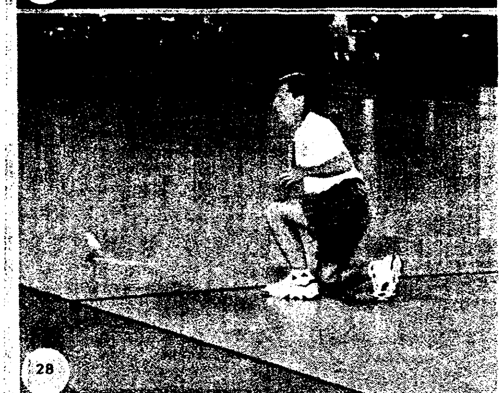
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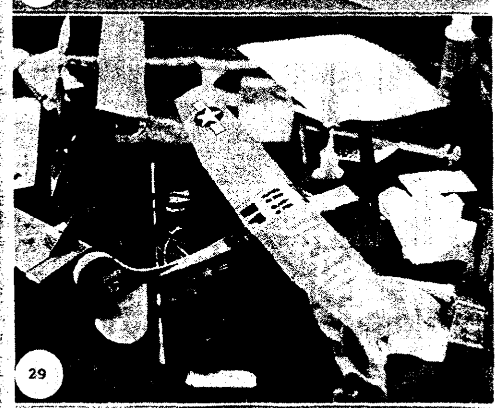
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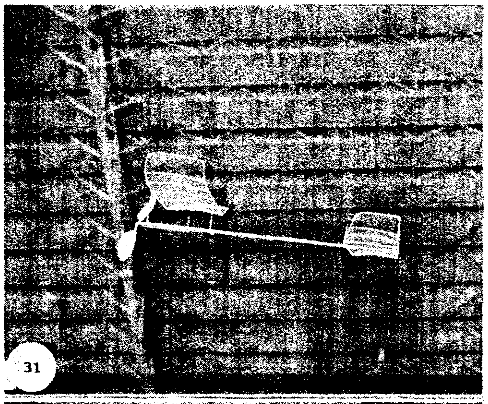
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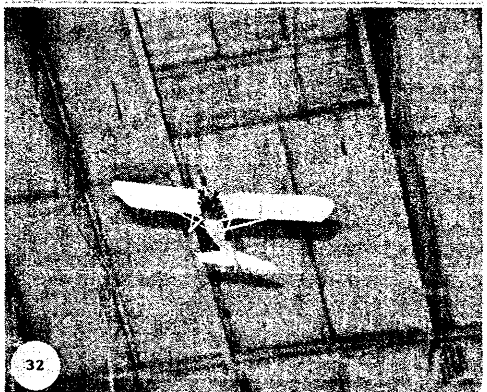
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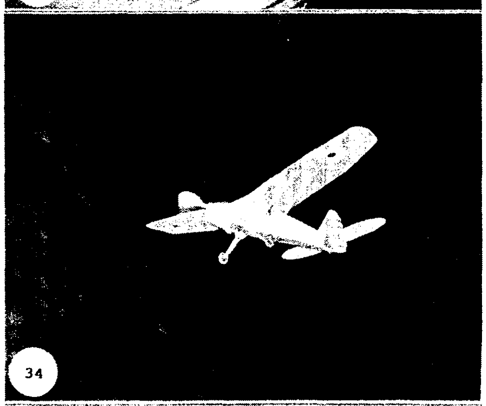
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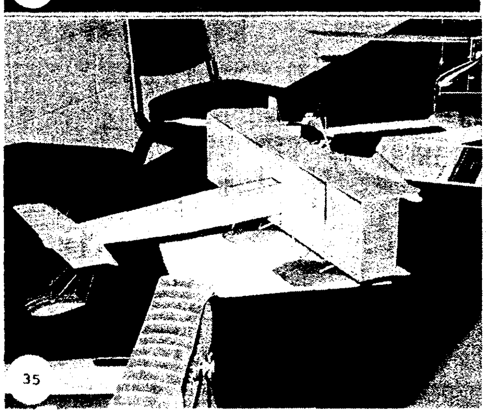
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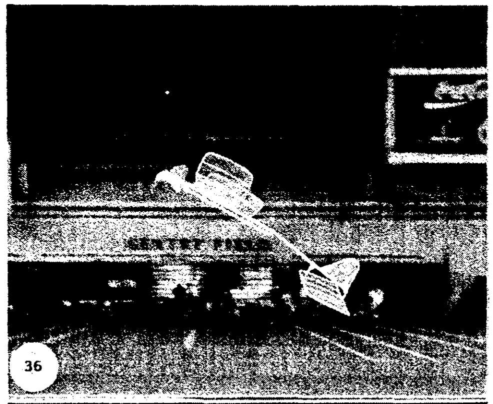
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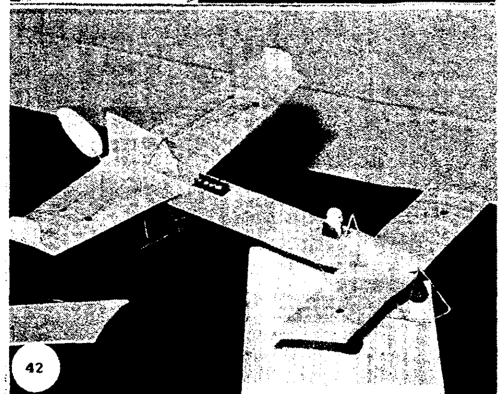
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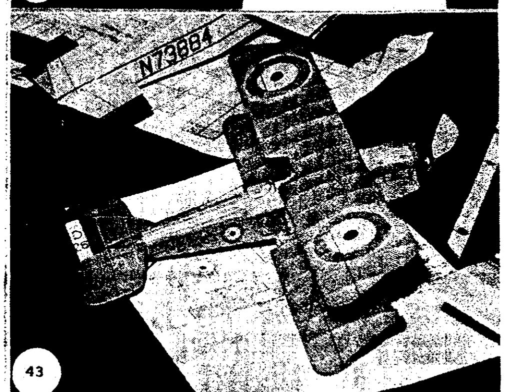

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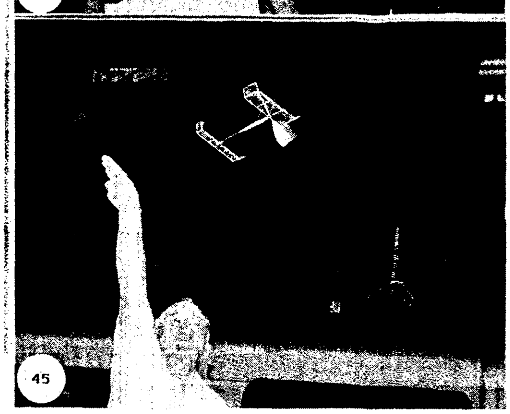
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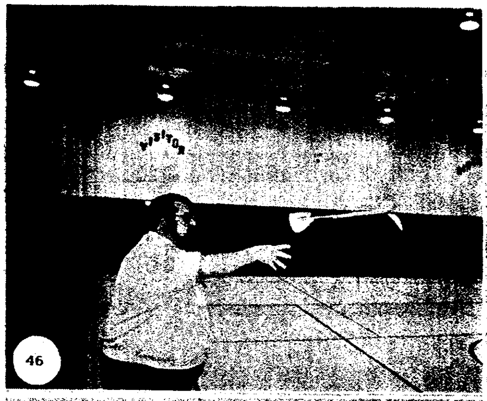

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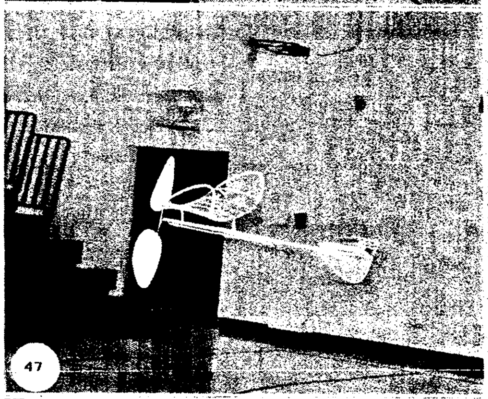
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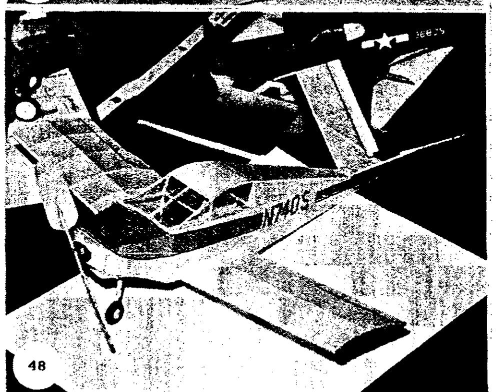

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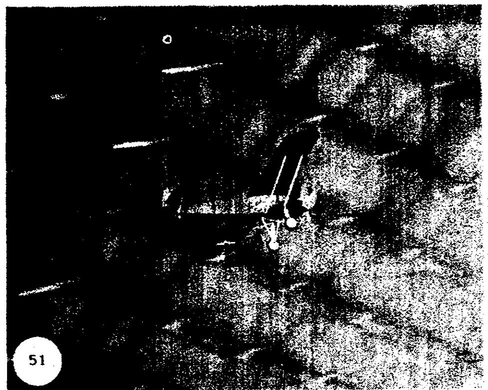
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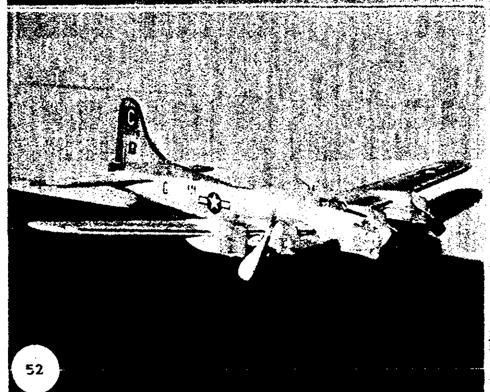
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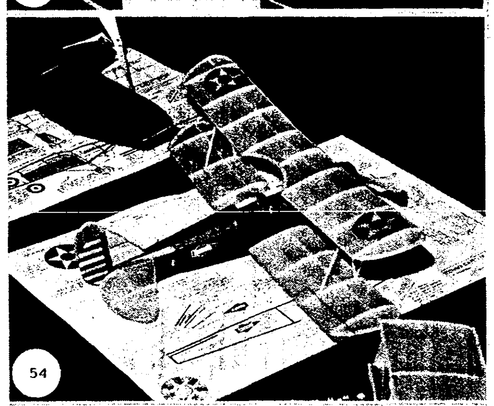
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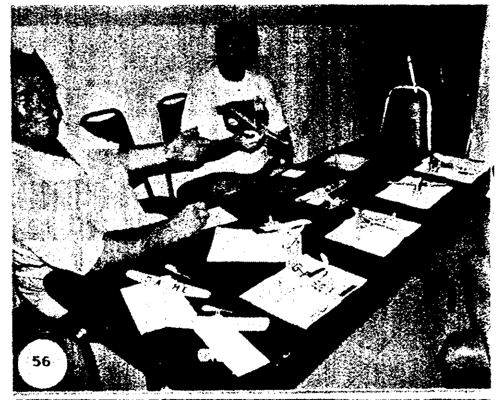
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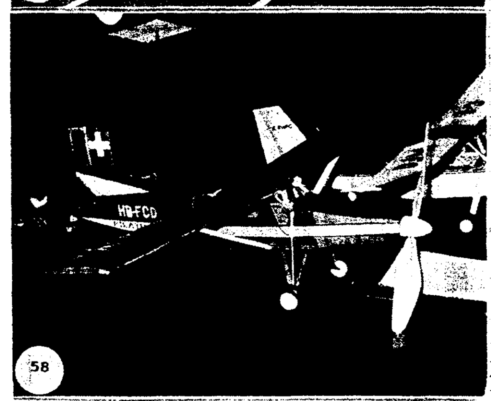

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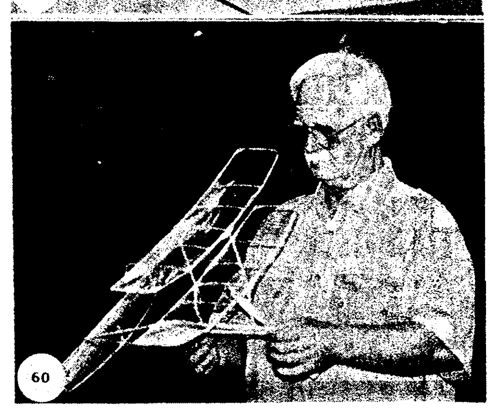
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USIC 1999 NO-CAL Scale Final Scores Jr/Sr

Place	Contestant	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flt	2nd Best	Total
1	Robert Stephens	2:00	2:02	2:05	2:01		2:05	2:02	4:07
2	Patrick Anderson	1:48	1:18	2:05	1:50	1:24	2:05	1:50	3:55
3	Joseph Marriman	1:23	1:42				1:42	1:23	3:05
4	Stephanie Victory	1:12	1:27				1:12	1:27	2:39

USIC 1999 Coconut Scale Final Scores Jr/Sr

Place	Contestant	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Scale Points	Flight Points	Total
1	Michelle Boyd	2:20	2:35				1	1	2
2	Adam McCord	2:14	2:04	2:08	2:32		2	2	4
3	Stephanie Victory	1:26	0:56				3	4	7

USIC 1999 Bostonian Final Scores Jr/Sr

Place	Contestant	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flight
1	Patrick Anderson	1:21	1:48	1:20	1:56	1:47	1:56
2	Joseph Falconberry	1:12	1:16				1:16
3	Nikki Spradling	0:42	0:44				0:44
4	Stephanie Victory	0:15					0:15

USIC 1999 Penny Plane Final Score Jr/Sr

Place	Contestant	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flight
1	Michelle Boyd	6:30	9:25	10:10	11:01	9:34	11:01
2	Marcus Conner	9:27	9:29				9:29
3	Robert Stephens	8:25	8:43	8:59			8:59
4	Nikki Spradling	3:22	5:50	5:23	6:42	7:00	7:00
5	Stephanie Victory	5:46	4:46	3:37			5:46
6	Patrick Anderson	5:30	4:37	4:17			5:30

USIC 1999 PEANUT SCALE #505 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	AIRCRAFT	FLIGHT 1	FLIGHT 2	FLIGHT POINTS	SCALE POINTS	TOTAL POINTS
1	Ganser, Ronald	7532	1911 Voisin Hydroplane	84	80	82	145	227
2	Mac Entee, Richard	102085	Poitier 100TS	94	95	94.5	95	189.5
3	Koptonak, John	58027	Lacey M-10	146	131	92.75	94.5	187.25
4	Romash, Robert	130061	Infinity 1	51.4	46.7	48.5	85	133
5	Thomas, Mike	615041		115	120	117.5	Did not submit for judging	117.5
	MacEntee, Rich	102085	Andreasen Biplane	57	55		105	161
	Crawford, Dohrman	601965						DNF
	Singer, Len	209081						DNF

USIC 1999 INDOOR FLYING RUBBER SCALE #507

PLACE	CONTESTANT	AMA NO.	SUBJECT	BEST FLIGHT	2ND BEST FLIGHT	AVERAGE OF BEST 2 FLIGHTS	FLIGHT POINTS	SCALE POINTS	TOTAL POINTS
1	GANSER, RONALD	7532	1911 Cessna	2:25	2:23	2:24	2:34	100	254
2	THOMAS, MIKE	615041	1935 Miles Sparrowhawk	2:25	2:09	2:14	2:24	91	235
3	BLAIR, JOHN	29698	The Longster	0:41		0;41	0:51	92	143
4	GRANT, JIM	149477	Cranwell CLA 3	1:11		1:11	1:21	54.5	135.5
					FINAL SCORES				

USIC 1999 DIME SCALE SCORING: Total of best 3 flights. Unlimited attempts.

PLACE	CONTESTANT	PLANE	BONUS	FLT 1	FLT 2	FLT 3	TOTAL OF 3 FLTS + BONUS
1	McGillivray, Jack	Arado	10	126	129	131	396
2	Thomas, Mike	Sparrowhawk	10	136	90	129	365
3	Aronstein, David	Heath	3	93	121	113	330
4	Linstrum, David	Heath	3	77	79	80	239
5	Blair, John	Farman	0	59	66	59	184
6	Gardner, Steve	Bristol Brownie	10	43	61	55	169
7	McLellon, Bob		0	46	46	48	140
8	Blair, John	Consolidated	15	58	62		135
9	Linstrum, David	Bristol	10				10

USIC 1999 F1D #203 - FINAL SCORES

PLACE	CONTESTANT	AMA NUMBER	FLIGHT 1	FLIGHT 2	FLIGHT 3	FLIGHT 4	FLIGHT 5	FLIGHT 6	TOTAL OF 2 OF 8 FLIGHTS
1	Kagen, John		44:41	48:48					93:29
2	Coslick, Larry	4652	45:07	38:23	42:05	45:05			90:12
3	Thomas, Mike	615041	32:10	36:41					68:51
4	Hulbert, William	1317	25:00	28:21	30:41	29:27	32:14	7:29	62:55
5	Tellier, Fred	645957	33:43	27:06	28:36	27:19			62:19
6	Vallee, Thomas	1126	22:59	19:35	30:46				53:45
7	Leonard, Nicholas, Jr.	497460	16:31	17:06	19:42	19:45	24:15		44:00
8	Doig, Richard	5392	33:38						33:38
9	Burke, Edward	153313	19:36	13:24					33:00
10	Leonard, Nick A.	497461	10:08						10:08
	Chilton, Stan	L30							DNF
	Clem, Jim	L55							DNF
	Hacker, Vernon	L304							DNF
	Hunt, Bernard	618510							DNF

USIC 1999 HL STICK #201 - FINAL SCORES

	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST.FLIGHT
1	Coslick, Larry	4652	41:44	ATT	43:09	46:48		46:48
2	Kagen, John		18:55	ATT	43:30	42:54	ATT	43:30
3	Doig, Richard	5392	29:07	34:48	32:20	38:31		38:31
4	Thomas, Mike	615041	34:46					34:46
5	Hardcastle, Richard	847	28:46	32:33	29:09	22:29		32:33
6	Tellier, Fred	645957	30:33					30:33
7	Vallee, Thomas	1126	26:48					26:48
8	Sova, Tom	473169	23:31	25:18				25:18
9	Burke, Edward J.	153313	22:31	8:35				22:31
10	Hacker, Vernon	L304	13:02	18:20	22:05			22:05
	Grant, Jim							DNF
	Chilton, Stan	L30						DNF
	Loucka, Larry	1210						DNF

USIC 1999 AUTOGIRO #211. FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Ganser, Ronald	7532	13:44	13:59	15:21	16:23		16:23
2	Thomas, Mike	615041	8:08	10:22	16:16			16:16
3	Slusarczyk, Don		14:10	15:19	15:32	16:11	15:08	16:11
	Diebolt, John		7:21	9:32	10:06	8:36		10:06
	Rash, Fred	63458	8:36	7:25	8:55	7:51	7:08	8:55
	Oleson, Douglas	480646						DNF

USIC 1999 CABIN ROG #204 FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	FLT 6	BEST FLIGHT
1	Loucka, Larry	1210	22:45	28:42					28:42
2	Thomas, Mike	615041	22:50	26:44					26:44
3	Ganser, Ronald	7532	22:42	21:37					22:42

USIC 1999 MANHATTAN #205 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Van Gorder, Walter	19912	11:32	13:36	13:38			13:38
2	Coslick, Larry	4652	13:28	12:47	12:24	13:22		13:28
3	Thomas, Mike	615041	13:00	12:49				13:00
4	Marett, John	616261	8:23	12:39	12:19			12:39
5	Grant, James	159477	9:45	12:14	3:04	6:45		12:14
6	Schutzel, Emil	508384	10:31	9:42	10:41	10:57		10:57
7	Tellier, Fred	9125MAC	4:28	6:29	8:30	8:53	10:29	10:29
8	Ganser, Ronald	7532	8:37	9:15	9:48	9:46		9:48
9	Slusarczyk, Chuck	2643	8:35	9:25				9:25
10	Kehr, Joe	549294	7:53	8:53				8:53
11	Zufelt, James	615152	5:32	5:09	6:19	6:37	7:44	7:44
12	Koptonak, John	58027	4:03	7:04	7:04			7:04
	Loucka, Larry	1210						DNF
	Raymond-Jones, D.	645958						DNF

USIC 1999 HELICOPTER #209 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
	Thomas, Mike	615041	ATT	13:25				13:25
	Vallee, Thomas	1126	5:59	5:57	7:54	8:26	9:42	9:42
	Loucka, Larry	1210	5:08	9:30				9:30
	Diebolt, John		5:02	7:00	6:54	7:24		7:24
	Romash, Robert	130061	5:16	5:36	6:30			6:30
	Tellier, Fred	645957	5:09	4:09				5:09
	Leonard, Jr., Nicholas	497460	1:30	1:01				1:30
	Leifer, Louis	646263						DNF

USIC 1999 #206 EASY B - FINAL SCORES

PLACE	CONTESTANT	AMA NO	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	CAILLIAU, LAWRENCE	79985	29:59	29:53	30:46			30:46
2	COSLICK, LAWRENCE	4652	24:51	30:41	29:52	29:34	26:42	30:41
3	KAGAN, JOHN		24:00	28:19	16:35			28:19
4	SLUSARCZYK, DONALD	5490	7:33	25:18	28:13	12:13	10:17	28:13
5	HUNT, BERNARD	618510	22:32	24:45	25:03	27:09	1:31	27:09
6	THOMAS, MIKE	615041	26:08	5:43				26:08
7	MC GILLIVRAY, JACK	615483	22:22	20:42	24:29			24:29
8	HARDCASTLE, RICHARD	847	21:47	22:46	7:50	23:24		23:24
9	SOVA, TOM	473169	19:50	23:18	22:34	22:28		23:18
10	GARDNER, STEVE	6193	23:06	22:41	23:12	22:34		23:12
11	ROMASH, ROBERT	130061	22:01	23:02	19:53			23:02
12	TELLIER, FRED	645957	22:51	21:22	4:16	17:29	3:58	22:51
13	VAN GORDER,WALTER	19912	20:29	21:10	19:04	22:45	:40	22:45
14	SLUSARCZYK, CHUCK		22:30	10:00				22:30
15	RAYMOND-JONES, D.C.	645958	20:31	18:22	22:02	19:41	21:23	22:02
16	GRANT, JIM		5:13	18:31	17:32	20:41	20:43	20:43
17	OBARSKI, R.W.	560	16:09	6:24	19:29			19:29
18	O'GRADY, DAN	614475	16:53	7:13	19:05	11:12	6:39	19:05
19	SINGER, LEN	209081	16:13	16:35	18:43			18:43
20	WHITTLES, JOHN	4400	14:50	18:09	12:14	3:21		18:09
21	BARBER. DOUG	56270	14:12	16:29	17:29	18:05		18:05
22	HACKER, VERNON	L304	9:11	17:30	16:47	14:37		17:30
23	DOWNS, F.S.	2209	11:52	16:56				16:56
24	WISNIEWSKI, GORDON	716	16:48					16:48
25	CAWTHORNE, JOHN	560561	14:59	2:58	14:26	16:25	8:57	16:25
26	ZUFELT, JAMES	615152	5:37	15:39	16:24			16:24
27	BARKER, JOHN	2095	15:05	15:01	13:01	13:34	15:55	15:55
28	CROSBY, DON		14:20	8:52	8:36	15:02	13:32	15:02
29	ARONSTEIN, DAVID		11:17	14:22				14:22
30	ITALIANO, A.J.	2386	1:04	11:34	8:21			11:34
31	KEHR, JOE	549294	8:09	11:06				11:06
32	CHAMPINE, ROBERT		8:20	8:06	9:41	10:20	10:57	10:57
33	VAN DOVER, ABRAM	894	6:42	10:41	7:05	3:09	9:10	10:41
34	OLSHEFSKY, PETER	614476	8:57	7:22				8:57
PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
35	WRZOS, CHESTER	20454	7:57	3:20				7:57
36	LEIFER, LOUIS	646263	5:38	6:06				6:06
	BAUGHMAN, GARY	4147						
	CHILTON, STAN	L30						
	CLEM, JIM	L55						
	FELLIN, JOHN	95353						
	VALLEE, THOMAS	1126						

USIC 1999 ORNITHOPTER #210 FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Coslick, Lawrence		13:57					13:57
2	Thomas, Mike	615041	11:10	12:40				12:40
3	Diebolt, John		6:59	7:19				7:19

USIC 1999 PENNYPLANE #207 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLT
1	O'Grady, Dan	614475	17:54	9:56	17:51	18:22		18:22
2	Hartman, Phillip	8667	14:25	16:54	18:20	16:18	4:15	18:20
3	Olshefsky, Peter	614476	15:21	17:39	14:08	15:48		17:39
4	Thomas, Mike	615041	15:36	15:48	12:26	15:22	16:57	16:57
5	Tellier, Fred	645957	14:12	14:13	16:29	14:46	14:21	16:29
6	Wisniewski, Gordon	716	16:26	15:23	15:58	14:52	16:15	16:26
7	Clem, Jim	L55	14:52	13:45				14:52
8	Grant, John		6:84	14:50				14:50
9	Whittles, John	4400	12:00	14:18	14:31			14:31
10	Hardcastle, Richard	847	9:46	14:07				14:07
11	Kagan, John	469254	13:32	12:01	12:42			13:32
12	Romash, Robert	130061	13:10	12:46	12:10	12:29	11:25	13:10
13	Kirby, Noel C.	267885	7:27	13:06				13:06
14	Sova, Tom	473169	12:38	5:27	12:04			12:38
15	Raymond-Jones, D.C.	13157	10:12	11:21	12:10	12:22		12:22
16	Cawthorne, John	560561	11:49	12:11	12:08			12:11
17	Johnson, T.E.	16707	8:58	0:06	11:52	11:27		11:52
18	Rash, Fred	63458	8:44	11:00	11:37			11:37
19	Italiano, A.J.	2386	7:19	7:29	9:24	8:58	11:31	11:31
20	Boyd, Michelle	615267	6:30	5:25	10:10	11:01	9:34	11:01
PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLT
21	Sullivan, Edward	69585	10:08	10:48	9:53	10:56		10:56
22	Kent, Michael	614477	2:56	9:44	9:57	10:49	9:39	10:49
23	Vallee, Thomas	1126	7:11	10:26	9:24	4:58	0:34	10:26
24	Slusarczyk, Charles	2643	12:46	10:20				12:46
25	Conner, Marcus	615258	9:27	9:29				9:29
26	Landrum, Billie	52674	8:41	9:03	9:28			9:28
27	Kehr, Joe D.	549294	7:34	9:12				9:12
28	Stevens, Robert	615257	8:25	8:43	8:59			8:59
29	Van Dover, Abram	894	8:11	4:55	2:29			8:11
30	Nuszer, Joseph	29036	8:07					8:07
31	Hacker, Vernon	L304	7:04	7:35	5:16			7:35
32	Barber, Doug	56270	6:05	7:32	5:01			7:32
33	Wrzos, Chester	20454	6:47	7:10				7:10
34	Spradling, Nikki	615265	3:22	5:56	5:23	6:42	7:00	7:00
35	Victory, Stephanie	615264	5:46	4:46	3:33			5:46
36	Anderson, Patrick	61520	5:30	4:57	4:17			5:30
37	Cawthorne, John, Jr.	560562	2:04					2:04

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLT
1	Gardner, Steve		5:06	5:58	14:18	16:34		16:34
2	Cailliau, Lawrence	79985	16:12	15:03				16:12
3	Van Gorder, Walt	19912	14:35	15:30				15:30
4	Thomas, Mike	615041	13:06	13:42	14:02	15:22		15:22
5	McGillivray, Jack	615483	12:21	14:25	14:56	15:06	15:11	15:11
6	Romash, Robert	130061	14:35	12:10	14:03			14:35
7	Cawthorne, John, Sr.	560561	13:17	12;50	13:08	2:06	14:27	14:27
8	Coslick, Larry	4652	10:38	13:51	13:28	11:54	14:21	14:21
9	Olshefsky, Peter	614476	13:12	9:11	10:35	13:55		13:55
10	Wisniewski, Gordon	716	10:35	12:54	13:16	13:16	13:44	13:44
	Marett, John	616261	13:21	11:13	10:46	13:31	12:32	13:31
	Grant, James		8:51	10:46	13:31	10:18	12:20	13:31
	O'Grady, Dan	614475	13:25	13:21	13:17			13:25
	Hartman, Phillip	8667	12:52	13:22	11:46	12:38	4:44	13:22
	Hardcastle, Richard	847	12:16	12:12	12:42	13:20		13:20
	Whittles, John	4400	11:00	13:18	11:09			13:18
	Miller, Richard	179518	6:50	12:36	13:10	3:34		13:10
	Sova, Tom	473169	11:16	12:49				12:49
	Cawthorne, John, Jr.	560562	12:39	11:22	12:18			12:39
	Koptonak, John	58027	12:20	12:35	12:03	12:28	12:37	12:37
	Barker, John	2095	9:18	12:34	11:51	11:21		12:34
	Ganser, Ronald	7532	11:50	12:33	6:08			12:33
	Tellier, Fred	645957	12:30	2:30	10:55	11:24	12:09	12:30
	Clem, Jim	L55	9:23	10:50	7:18	11:05	12:30	12:30
	Kent, Michael	614477	10:07	11:52	11:56	12:29		12:29
	Raymond-Jones, D.	645958	10:50	10:07	12:13			12:13
	Obarski, R W	560	11:15	12:08	11:49	9:22	11:58	12:08
	Johnson, T.E.	16707	10:34	10:02	9:55	11:55		11:55
	Crosby, Don		10:54	10:31	11:19	11:47	11:53	11:53
	Sullivan, Edward	69585	8:24	10:15	11:40	9:58		11:40
	Fellin, John	95353	10:11	11:31	11:22	11:32	5:02	11:32
	Tenny, Bub		11:04	10:39	10:02	11:26		11:26
	Singer, Len	209081	10:23	11:26				11:26
	Champine, Bob		8:25	11:23				11:23
	Italiano, A.J.	2386	2:21	4:02	9:23	10:43	11:22	11:22
	Boone, Jack L.	107857	10:48	8:29	9:52	11:11	10:43	11:11
	Gowen, William		10:53	9:35	:57			10:53
	Vonasek, Holly	529113	9:24	10:32	10:47			10:47
	Kehr, Joe D.	549294	10:40					10:40
	Zufelt, James	615152	9:53	10:00	8:50	8:39	10:16	10:16

USIC 1999 LTD. PENNYPLANE #208 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLT
	Person, Lee	383504	9:13	10:12				10:12
	Landrum, Billie	52674	9:55					9:55
	Gowen, John		9:31	9:04	9:13			9:31
	Barber, Doug		7:48	7:27	6:33	8:52		8:52
	Hacker, Vernon	L304	6:21	7:50	8:09			8:09
	Kelly, James B.	37564	7:38	6:43				7:38
	Kirby, Noel C.	267885	5:50					5:50

USIC 1999 INTERMEDIATE STICK #202

1	Slosarczyk, Don		34:05	10:43	38:12			38:12
2	Kagan, John		35:39					35:39
3	Coslick, Larry	4652	28:47	34:44	31:51			34:44
4	Hunt, Bernard	618510	5:33	32:08	31:59	33:59		33:59
5	Tellier, Fred	645957	27:34	27:40	32:35			32:35
6	Thomas, Mike	615041	23:15	32:29				32:29
7	McGillivray, Jack	615483	30:19	29:03	25:57	26:42		30:19
8	Hardcastle, Richard	847	27:51	29:50	24:30	17:30		29:50
9	Sova, Tom	473169	29:34	23:25				29:34
10	Grant, Jim		7:39	19:03	26:23			26:23
11	Vallee, Thomas	1126	17:33	23:42	3:47			23:42
12	Olshefsky, Peter	614476	12:01	22:18	1:34	7:55	19:40	22:18
13	Downs, F.S.	2209	20:42	15:30				20:42
14	Romash, Robert	130061	16:50	19:46	14:25			19:46
15	Barker, John	2095	7:56	11:46	18:30			18:30
16	Ganser, Ronald	7532	18:22					18:22
17	Whittles, John	4400	17:53	17:51	17:45			17:53
19	Raymond-Jones, D.C.	645958	15:44					15:44
19	Kehr, Joe	549294	7:36	8:15	10:02	2:26		10:02
20	O'Grady, Dan	614475	4:38					4:38
21	Baughman, Gary	4147						DNF

SCORING: BEST SINGLE FLT OF 5 FLTS. 1 DELAYED FLIGHT OF LESS THAN 60 SECONDS ALLOWED FOR EACH OF 5 FLIGHTS.

USIC 1999 HL GLIDER #212 FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FL 1	FL 2	FL 3	FL 4	FL 5	FL 6	FL 7	FL 8	FL 9	BEST FLT	2ND BEST FLT	TOTAL TWO BEST FLTS.
1	Boehm, Bernard	92567	63.8	63.8	60.1	65.3	66.2	66.1	67.3	71.1	67.7	71.1	67.7	138.8
2	Buxton, Jim	75154	66.5	67.3	64.2	59.8	61.4	68.9	63.7	64.8	69.5	69.5	68.9	138.4
3	Romash, Robert	130061	62.3	58.9	63.7	62.8	60.1	60.1	26.8	44.3	42.4	63.7	62.8	126.5
4	Whittles, John	4400	45.0	53.1	52.2	51	51	22.4	57.5	5.2	7.2	57.5	53.1	110.6
5	Jessup, Artie	10269	29.0	35.9	42.5	44.6	35	43.2	45.1	42.5	46	46	45.1	91.1
	Crawford, Dohrman	601965												DNF

USIC 1999 KIT PLAN SCALE #213 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	SUBJECT	FIDEL. PTS.	WORK-MANSHIP	TOTAL
1	Thomas, Mike	615041	Miles Sparrowhawk	58	39	97
2	Grant, Jim	159477	Grasshopper	59	38	97
3	MacEntee, Richard	102085	Daphne	59	38	97
4	Blair, John	29698	Taylor Cub	54.5	39	93.5
5	Miller, Richard	179518	DGA9	56	36	92
	Cawthorne, John	560562				DNF
	#213 Kit Plan Scale Scoring: 2 attempts for each of 5 official flights.					
	Flight time in seconds, cannot exceed total scale points. Score					
	will be sum of best two flights plus static score.					

USIC 1999 ROG STICK #214 FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Coslick, Lawrence	4652	15:49	16:09	18:55	19:09		19:09
2	Sova, Tom	473169	12:54	16:03	18:29			18:29
3	Loucka, Larry	1210	18:26					18:26
4	Thomas, Mike	615041	16:27					16:27
5	Kehr, Joe	549294	10:09	3:08				10:09
6	Tellier, Fred	645957	8:29	9:29	9:28			9:29
7	Chilton, Stan	L30						DNF
8	Raymond-Jones, D.C.	645958						DNF

USIC 1999 BOSTONIAN #215 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST 2 FLTS	CHARISMA	TOTAL
1	Coslick, Larry	4652	5:34	5:56	6:18			12:14	1.2	14:45
2	Thomas, Mike	615041	5:44	5:04	6:09			11:53	1.15	13:40
3	Schutzel, Emil	508384	5:13	4:40	4:45			9:58	1.18	11:46
4	Marett, John	616261	4:18	4:09	4:40	4:32		9:12	1.07	9:56
5	Grant, Jim		4:37	4:22				8:59	1.08	9:42
6	Barker, John	2095	4:27	3:44	2:27	4:07	4:15	8:42	1.08	9:23
7	Miller, Richard	179518	3:20	4:18	0:00			7:38	1.09	8:19
8	Kent, Michael	614477	3:22	2:45	3:16	3:27	3:00	6:49	1.1	7:30
9	Cawthorne, John	560561	2:57	3:06	3:14	2:36	3:26	6:40	1.11	7:24
10	Gardner, Steve		2:29	2:07	2:24	1:44		4:53	1.19	5:49
11	Aronstein, David		4:12		0:00			4:12	1.12	4:42
12	Rash, Fred	63458	1:57	2:20	1:55			4:17	1.08	4:38
13	Wieczorek, Leon.	10105	1:57	2:01	1:56			3:58	1.09	4:19
14	Anderson, Patrick	615260	1:56	1:48				3:44	1.04	3:53
15	MacEntee, Richard	102085							1.06	
	Nuszer, Joseph	29036	0:25					0:25	1.11	0:28

USIC 1999 FAC PEANUT SCALE - SCORING: BEST SINGLE FLIGHT OF 3 FLTS

PLACE	CONTESTANT	PLANE	SCALE POINTS	BONUS	FLT 1	FLT 2	FLT 3
1	Buxton, Jim	P51A	56	10	122		
2	Miller, Richard	Volks Plane	49.5	10	117	113	
3	Lee, Jim	Lacy	56	O	113	112	104
4	MacEntee, Richard	Portier 100 T5	54	O			
5	Munez, George	P51A	53.5	10	40	41	65
6	O'Dell, Bill	Davis	46	10	34	17	39
7	Anderson, Patrick		45	10	31	24	27
	MacEntee, Richard	Linberger	52	15	80	67	

USIC 1999 COCONUT SCALE (MIAMI) - FINAL SCORES

PLACE	CONTESTANT	PLANE	RANK (SCALE)	BEST TIME	RANK (TIME)
1	ARONSTEIN, DAVID	ANT-25	1.75	4:49	2.75
2	BOYD, MICHELLE	Gen Aristocrat	1.5	2:35	3.5
3	ANDERSON, KENNETH	Curtiss CW-15 Air	1.25	2:29	4.25
4	NUNEZ, GEORGE	Potez 63	1.5	2:04	6.5
5	MAC ENTEE, RICHARD	Pilatus Porter	2.5	2:22	6.5
6	LINSTRUM, DAVID	M208 Luftkahsa	2.5	1:45	8.5
7 (TIE)	KOPTONAK, JOHN	Curtiss Robin	2.5	1:36	9.5
7 (TIE)	LAVENDER, TIM	Vervelle Aircoach	2.5	DNF	
DNF	LANDRUM, BILLIE	Not submitted by 12:00			
DNF	CONNER, MARCUS	? Flyabout	5.5		
DNF	CONNER, MATTHEW	Not submitted by 12:00			
DNF	SMITH, JENNIFER	Lincoln	4		
DNF	STEVENS, ROBERT	Farman Moustique	4		
DNF	VICTORY, STEPHANIE	Brista Brownie	6.5		
DNF	MILLER, RICHARD	Zlinz- 317	3		

USIC 1999 STD CLASS CAT GLR. #218 Scoring: Total of best 2 of 9 flts, timed to .1 sec (round down)

PLACE	CONTESTANT	AMA NO.	FL 1	FL 2	FL 3	FL 4	FL 5	FL 6	FL 7	FL 8	FL 9	BEST FLT	2ND BEST FLT	TOTAL TWO BEST FLTS.
1	Schlarb , Ralph	322352	78.8	79.5	61	78.8	20	45	61.3	78.2	66	79.5	78.8	158.3
2	Schlarb, W. L.	14425	65	70.2	68.5	74.2	73.1					74.2	73.1	147.3
3	Romash, Robert	130061	72.5	74.3	68.9	62.8	62.1	65.2	72.1	70.6	70.6	74.3	72.5	146.8
4	Marett, John	616261	2.8	61.1	69.5	59.4	74.9	47.9	68	68.5	69.7	74.9	69.7	144.6
5	Johnson, T.E.	16707	50.1	65.3	65.8	69.8	70.3	53.5	65.7	66.5	64.6	70.3	69.8	140.1
6	Person, Lee	383504	68.4	69	17.1	61.4	69.8	63.7				69.8	69	138.8
7	Jessup, Artie	10269	66	68.4	65.3	65.3	66.9	12.6	64.9	21.6	33.7	68.4	66.9	135.3
8	Koptonak, John	58027	58.9	53.4	56.6	55.8	60.3	61.8	64.9	65.2	64.5	65.2	64.9	130.1
9	Vonasek, Holly	529113	52.9	51.2	13.4	66.8	63.2	54.1	57.6	61.9	61.8	66.8	63.2	130
10	Miller, Richard	179518	54	51	60.5	57.5	51.6	49.9	47.1	39.4		60.5	57.5	118
11	Kelly, James R.	37564	44.2	47.7	65.5	52.4						65.5	52.4	117.9
12	Nishanian, Peter	589485	58	57.1	41.3	57.4	49.7	57.7				58	57.7	115.7
13	Crawford, Dohrm	601965	56.1	52.6	46.2	56.7	51.9	54.9	50.5	51.7	51.1	56.7	56.1	112.8
14	Krempetz, Kurt	69866	55.1	49.5	50.5	55.5	5.3	36.2	18.9	10		55.5	55.1	110.6
15	Krempetz, Kenne	11951	50.2	57.9	50	38.2	37.5	45.1				57.9	50.2	108.1
16	Van Dover, Abra	894	40	45	55.8	45	21.5	25.8	43.7	47.4	50	55.8	50	105.8
17	Whittles, John	4400	53.9	49.9	7.1	43.3	42.1	45	45			53.9	49.9	103.8
18	Champine, Bob	5160	46	45	27	39.9	40.3	25.9	43.8	44.8	40.4	46	45	91
19	Krempetz, Kenny	559200	35.8	38.7	3.6	39.8	27.5	12				39.8	38.7	78.5
20	Vallee, Thomas	1126	29.6	26.9	33.5	34.4	32.6	34.7	37.1	36.8		37.1	38.8	73.9
	Baughman, Gary	4147												DNF

USIC 1999 UNLIMITED CAT GLIDER #219 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	FLT 6	FLT 7	FLT 8	FLT 9	BEST FLT	2ND BEST FLT	TOTAL 2 BEST FLTS.
1	Boehm, Bemard	92567	78.5	79.2	80.2							80.2	79.2	159.4
2	Schlarb, Ralph	322352	77.5	79.2	76.5	73	73	75				79.2	77.5	156.7
3	Schlarb,. W. L.	14425	67.1	66.3	69.5	71.2	75.8	75.2	71.0	75.3		75.8	75.3	151.1
4	Marett, John	616261	72.8	33.5	36.1	66.5	72.8	66.8	56.1	57	75.6	75.6	72.8	148.4
5	Johnson, T.E.	16707	74.3	60.2	62.7	63.4	64.9	72.4	16.5	64.9	65.3	74.3	72.4	146.7
6	Romash, Robert	130061	70.5	72.6	70.1	70.1	65.8	67.5	70.3	67.5	73.3	73.3	72.6	145.9
7	Buxton, Jim	75154	71	69.6	67.6	72.1			70.3			72.1	71	143.1
8	Person, Lee	383504	72.8	62.5	69.2	65.3	57.8	69.6	70.3			72.8	69.6	142.4
9	Nishanian, Peter	589485	67	66	65	58.4	62.3	22.1	68.5	70.2	72	72	70.2	142.2
10	Jessup, Artie	10269	35.5	51.6	66.5	64.3	65.5	67.5	58.2	58.3	53.3	67.5	66.5	134
11	Krempetz, Kenne	11951	49.8	54.3	58.2	60	62.1	62	61.5	58.5	70.1	70.1	62.1	132.2
12	Krempetz, Kurt	69866	5.4	53	51.8	53.1	51	47.5	58.5	57	64.2	64.2	58.5	122.7
13	Van Dover, Abrar	894	44.4	46.6	46	49.5	41.1	3.1	40.4	49.5	52.1	52.1	49.5	101.6
14	Champine, John	5160	45.8	28.3	37.2	27.1	33.8	51.7	45.4	45.8	7.1	51.7	45.8	97.5
15	Crawford, Dohrm	601965	50.1	38.3	42.2	39.9	40.6	37.6				50.1	42.2	92.3
16	Krempetz, Kenny	559200	13.9	37.5	7	44.5	44.3	39.5				44.5	44.3	88.8
	Baughman, Gary	4147												DNF

USIC 1999 MINI STICK #220 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLIGHT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLT
1	Cailliau, Larry	79985	12:32					12:32
2	Hunt, Bernard	618510	10:29	11:43	12:12	11:25		12:12
3	Koptonak, John	58027	11:45	10:28	10:48	11:48	11:57	11:57
4	Van Gorder, Walt	19912	11:17	11:56				11:56
5	Slusarczyk, Don		9:59	11:08	8:24	11:41		11:41
6	Tellier, Robert	645957	8:56	11:02	10:56	11:13		11:13
7	Barker, John	2095	7:57	7:49	7:36	9:35	11:02	11:02
8	Romash, Robert	130061					11:02	11:02
9	Thomas, Mike	615041	10:49	10:47	11;00			11;00
10	Sova, Tom	473169	10:08	10:58	10:11	10:30		10:58
11	Singer, Len	209081	8:53	9:02	10:25			10:25
12	Slusarczyk, C.		9:20	10:18				10:18
13	Diebolt, John		8:14	8:35	10:16	9:13		10:16
14	Schutzel, Emil	508384	8:04	10:11	8:26			10:11
15	Grant, Jim		8:17	9:11	9:57	8:43		9:57
16	Obarski, R.W.	560	9:12	7:10	7:23	4:06	7:02	9:12
17	Kehr, Joe	549294	8:57	8:39	8:51	8:06	8:08	8:57
18	Clem, Jim	L55	4:26	8:56	8:54			8:56
19	Crosby, D.		6:23	8:49	8:47			8:49
20	Olshefsky, Peter	614476	8:38	5:44	7:53	8:36	7:04	8:38
21	Raymond-Jones, D.	645958	7:03	7:22	8:33			8:33
22	O'Grady, Dan	614475	8:12	3:43				8:12
23	Whittles, John	4400	7:39	7:40				7:40

USIC 1999 MINI STICK #220 - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLIGHT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLT
24	Person, Lee	383504	6:55	6:42	6:34		7:23	7:23
25	Kelly, James	37564	6:09	6:14	6:50	4:41		6:50
26	Cawthorne, John, Sr.	560561	4:55	6:24				6:24
27	Hacker, Vernon	L304	5:52					5:52
28	O'Dell, W.		5:09	2:17				5:09
29	Champine, R.		4:10					4:10
30	Downs, Sandy	2209	4:08					4:08

USIC 1999 FIL (INT'L EZ-B 1.2 GM) - FINAL SCORES

PLACE	CONTESTANT	FLIGHT 1	FLIGHT 2	FLIGHT 3	FLIGHT 4	FLIGHT 5	FLIGHT 6	TOTAL OF BEST 2 OF 6 FLIGHTS
1	Hunt, Bernard	19:50	20:03	20:53	19:04			40:56
2	Loucka, Larry	18:30	19:28	19:31	17:20			38:59
3	Grant, Jim	18:13	19:01	19:22	19:12			38:23
4	Tellier, Fred	17:17	18:21	18:23	19:29			37:52
5	Coslick, Larry	18:43	4:32	15:23	18:48			37:31
6	Slusarczyk, Don	16:25	20:05	15:30	7:23			36:30
7	Romash, Robert	16:27	16:15	16:40	15:27			33:07
8	Singer, Len	15:32	17:16					32:48
9	Vonasek, Holly	13:07	14:59	16:57	15:37			32:34
10	Cawthorne, John	15:26	6:51	14:00	14:44			30:10
11	Wrzos, Chester	6:55	14:21	15:01				29:22
12	Raymond-Jones, D.	ATT	7:15	12:51	13:08			25:59
13	Whittles, John	11:31	11:37	9:58	14:07			25:44
14	Hacker, Vernon	8:45	13:06	5:41	12:24			25:30
15	Landrum, Billie	12:17	13:13	5:20				25:30
16	Kagan, John	5:36	15:33					21:09
17	Rash, Fred	8:51	ATT	12:03				20:54
18	Koptonak, John	13:14	7:11					20:25
19	Kehr, Joe	15:18	:42	3:37	3:37			18:55
20	Van Dover, Abram			11:06	6:34			17:40
21	Crosby, D.	ATT	12:22	3:51				16:13
	Cailliau, Larry							DNF

USIC 1999 INTERNATIONAL EZ-B (AMA RULES) FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLIGHT 1	FLIGHT 2	FLIGHT 3	FLIGHT 4	FLIGHT 5	SCORE
1	Cailliau, Larry	79985	31:14	30:09				61:23
2	Sova, Tom		19:10	24:25	20:12	21:59		46:24
3	Hardcastle, Richard	847	22:22	23:55				46:17

USIC 1999 PIONEER SCORING: BEST SINGLE FLIGHT OF 3 FLIGHTS

PLACE	CONTESTANT	PLANE	SC PT.	BONUS	FLT 1	FLT 2	FLT 3	TOTAL OF BEST TIME + SC + BONUS
1	THOMAS, MIKE	1911 Voisin Hydro	x	30	107	127		157
2	GANSER, RON	1511 Cessna	X	5	128.1	143.63		148
3	SCHUTZEL, EMIL	Santos-Dumas	X	25	121	115	114	146
	LAVENDER, TIM	Drzewiecki	x	15	74	87		102
5	MAC ENTEE, RICHARD	Voisin Hydro	x	30	71	45		101
6	ANDERSON, KENNETH	Eastbourne	X	5	21	45		26
	LEE, JIM					45		DNF
	OLESON, DOUG					45		DNF
						45		
			FINAL SCORES			45		

USIC 1999 MODERN CIVIL PRODUCTION (45 PTS. MIN TO FLY) FINAL SCORES

PLACE	CONTESTANT	PLANE	SC PT.	BONUS	FLT 1	FLT 2	FLT 3	TOTAL OF BEST TIME + SC + BONUS
1	McGillivray, Jack	Piper J5B	X	O	264			264
2	Brownhill, Chris	Piper Pacer	X	O	155	168	155	168
3	MacEntee, Richard	Pilatus	X	O	93	94	100	100
4	Nunez, George	Turbo Beaver	X	O	67	87		87
5	Landrum, Billie	Found Cen.	X	O	23	29		29
	Lavendar, Tim	Ord-Hume	X	O				
	Anderson, Kenneth							DNF

USIC 1999 - GOLDEN AGE - FINAL SCORES

PLACE	CONTESTANT	PLANE	SC PT.	BONUS	FLT 1	FLT 2	FLT 3	TOTAL OF BEST TIME + SC + BONUS
1	Thomas, Mike	Piper	X	O	212	231	233	233
2	Miller, Richard	Piper	X	O	156	189	207	207
3	MacEntee, Richard			10	141	140	153	163
4 (tie)	Anderson, Ken		X	O	150			150
4 (tie)	Boyd, Michelle	General Aris.	X	O	150	131	51	150
	Lee, Jim	Taylorcraft	X	O	135	144	137	144
	Smith, Jennifer	Lincoln AP	X	O	133	133	139	139
	Brownhill, Chris	Curtiss Robin	X	O	115	128	121	128
	Blair, John	Beech Staggerw	X	15	73	83	90	105
	Koptonak, John	Fairchild	X	O	86	90	104	104
	Nunez, Geo.	Fairchild	X	O	98	96	100	100
	McLellon, Bob		X	10	39	38	40	50
	Lavender, Tim	Verville	X	O				
	McGillivray, Jack	DeHavilland Moth Minor	X	10				

USIC 1999 F1DB - FINAL SCORES

	CONTESTANT	FLIGHT 1	FLIGHT 2	FLIGHT 3	FLIGHT 4	FLIGHT 5	FLIGHT 6	BEST 2 OF 6
1	Hunt, Bernard	17:40	19:39					19:39
2	Kehr, Joe	13:36	14:13	15:58	14:02	14:19		15:58
3	Rash, Fred	12:17	13:39	14:25	13:23			14:25
4	Tellier, Fred	13:37	:20	13:16	12:25			13:37
5	Landrum, Billie	13:23						13:23
6	Vallee, Thomas	9:54	10:47	1:26	11:34	12:25		12:25
7	Raymond-Jones, D.	4:01	7:29					7:29
	Clem, Jim							DNF
	Diebolt, John							DNF
	Downs, Sandy							DNF
	Kirby, Noel							DNF
	O'Grady, Dan							DNF
	Olshefsky, Peter							DNF
	Van Dover, Abram							DNF
	Wrzos, Chester							DNF
		Scoring: Total of best 2 of 6 flts.						
		1 delayed flt of less than 60 seconds						
		allowed for each of 6 official flights.						

USIC 1999 F.R.O.G. - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	Flt 1	Flt 2	Flt 3	Flt 4	Flt 5	Best Flight
1	Diebolt, John		7:21	6:06	6:24	8:02		8:02
2	Sova, Tom	473169	7:18	7:50				7:50
3	Rash, Fred	63458	6:37	6:29	5:55	7:27		7:27
4	Clem, Jim	L-55	4:59	6:19				6:19
5	Champine, R.		3:32	4:06				4:06
	Smith, Phillip	345800						DNF
	Whittles, John							DNF

USIC 1999 FAC PEANUT SCALE - SCORING: BEST SINGLE FLIGHT OF 3 FLTS

PLACE	CONTESTANT	PLANE	SCALE POINTS	BONUS	FLT 1	FLT 2	FLT 3
1	Buxton, Jim	P51A	56	10	122		
2	Miller, Richard	Volks Plane	49.5	10	117	113	
3	Lee, Jim	Lacy	56	O	113	112	104
4	MacEntee, Richard	Portier 100 T5	54	O			
5	Munez, George	P51A	53.5	10	40	41	65
6	O'Dell, Bill	Davis	46	10	34	17	39
7	Anderson, Patrick		45	10	31	24	27
	MacEntee, Richard	Linberger	52	15	80	67	
	Schutzel, Emil						
	Thomas, Mike						
	Brownhill, Chris						

USIC 1999 PRO 20 FINAL SCORES

PLACE	CONTESTANT	FLIGHT 1	FLIGHT 2	FLIGHT 3	FLIGHT 4	FLIGHT 5	BEST FLIGHT
1	LOUCKA, LARRY	26:00	30:27				30:27
2	SOVA, TOM	22:43	25:15	26:39	23:02	11:04	26:39
3	WHITTLES, JOHN	ATTEMPT	ATTEMPT	14:21	14:33	16:35	16:35
	WRZOS, CHESTER						DNF

USIC 1999 UNLIMITED RUBBER SPEED Scoring: Shortest time for 2 laps. Unlimited attempts.

PLACE	CONTESTANT	AMA NO.	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	COSLICK, LARRY	7:10	9:80	7:33	7:34	6:67	7:49	6:67
2	DIEBOLT, JOHN	10:10	10:60	9:50	9:10			9:10
3	ITALIANO, ANTHONY	16:62	12:94	11:20				11:20
	BIGGE, WILLIAM							DNF
	BLAIR, JOHN							PIERCED BALLOON
	HACKER, VERNON							DNF
	KELLY, JIM							DNF
	RAYMOND-JONES, D.C.							DNF
	ANDERSON, KEN							DNF

USIC 1999 LEGAL EAGLE Scoring: Total of 3 highest flights of 9

	CONTESTANT	FLT.	FLT.	FLT.	SCORE
1	Schutzel, Emil	7:00	7:08	7:11	21:19
2	Obarski, Richard	6:02	6:15	6:05	18:22
3	Aronstein, David	5:28	5:44	5:50	17:02
4	Linstrum, David	2:39	3:10	3:20	9:09
	Bigge, William				DNF
	Diebolt, John				DNF
	MacEntee, Rich				DNF

USIC 1999 35 CM - FINAL SCORES

PLACE	CONTESTANT	AMA NO.	FLIGHT 1	FLIGHT 2	FLIGHT 3	FLIGHT 4	FLIGHT 5	BEST FLIGHT
1	SOVA, TOM	20:54	21:09					21:09
2	ROMASH, ROBERT	20:20	21:00	5:49				21:00
3	VALLEE, THOMAS	15:24	18:30	17:24	19:41	20:58		20:58
	GRANT, JAMES	17:35	19:31					19:31
	O'GRADY, DAN	13:55	14:58	18:22				18:22
	OLSHEFSKY, PETER	17:19						17:19
	WHITTLES, JOHN	11:59	9:35	13:22	16:17			16:17
	RAYMOND-JONES D.C.	9:58	11:45					11:45
	ZUFELT, JAMES	4:04						4:04
	BIGGE, WILLIAM							DNF
	FELLIN, JOHN							DNF
	LANDRUM, BILLIE							DNF
	NUSZER, JOSEPH							DNF
	Van Dover, Abram							DNF

USIC 1999 NO CAL - FINAL SCORES

PLACE	CONTESTANT	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	BEST FLIGHT
1	Thomas, Mike	6:50	7:20	6:40			7:20
2	Slusarczyk, C.	6:52	6:59	6:11	6:37	7:06	7:06
3	Loucka, Larry	6:49	5:59	7:01			7:01
4	Slusarczyk, D.	6:20	6:42	2:17			6:42
5	Obarski, Richard	6:21	6:27	2:26	5:16		6:27
6	Brownhill, Chris	4:46	3:46	4:33	4:51	4:28	4:51
	Rash, Fred	4:03					4:03
	Kehr, Joe	3:35	3:42	4:02			4:02
	Nuszer, Joseph	3:18					3:18
	Fellin, John	2:34	3:01	2:41			3:01
	Van Dover, Abram	2:12	2:28	2:56	ATT	2:45	2:56
	Person, Lee	2:22	1:44	2:24	2:40	2:20	2:40
	Anderson, Patrick	1:07	1:50	1:26	1:24	0:47	1:50
	Boone, Jack	1:40	1:28				1:40
	Diebolt, John	1:25					1:25
	Linstrum, David	0:34					0:34

USIC 1999 FAC SCALE - FINAL SCORES

PLACE	CONTESTANT	PLANE	SC PT.	BONUS	FLT 1	FLT 2	FLT 3	TOTAL OF BEST TIME + SC + BONUS
1	McGillivray, Jack	SE5	59	15	111	91	121	156.5
2	Miller, Richard	Currie WOT	59	20	98			151
3	Lee, Jim	Lacey	60	0	140	129	132	142.5
4	Brownhill, Chris	Lacey	59.5	0	119	114	118	142
5	Anderson, Ken	Blohm & Voss BV141B	52	20	68	75	71	139.5
6	Linstrum, David	Stout 2-AT	55.5	0	96	92	100	133
7	MacEntee, Richard	Farman 352	55.5	10	54			119.5
8	Nunez, George	NakaJimm A5 M2-N	53	15	26	36	37	105
9	O'Dell, Bill	Douglas Skyrader	53.5	10	25			88.5
10	Anderson, Wayne	ME109E	58.5	10				
12	O'Dell, Bill	Cessna Bird Dog	47	0				

USIC 1999 HIGH WING MONOPLANE- SCORING: BEST SINGLE FLT OF 3 FLTS.

PLACE	CONTESTANT	PLANE	SC PT.	BONUS	FLT 1	FLT 2	FLT 3	TOTAL OF BEST TIME + SC + BONUS
1	Koptonak, John	Lacy	x	O	130	136	150	150
2	Brownhill, Chris				149	143	133	149
3	Lee, Jim				107	106	108	108
4	Blair, John	Air Sport	x	O	59	48	0	59
5	MacEntee, Richard	Poitier	x	O		76	55	76
6	Nunez, George	Zippy	x	O	65	61		65

1999 USIC INDOOR MASS LAUNCH WINNERS

* WWI & WWII	JACK MC GILLIVRAY
COCONUT	DAVID ARONSTEIN
MINI STICK	BERNARD HUNT
* P-24	JIM CLEM
BOSTONIAN	JOHN MARETT

(*) Trophy Awarded