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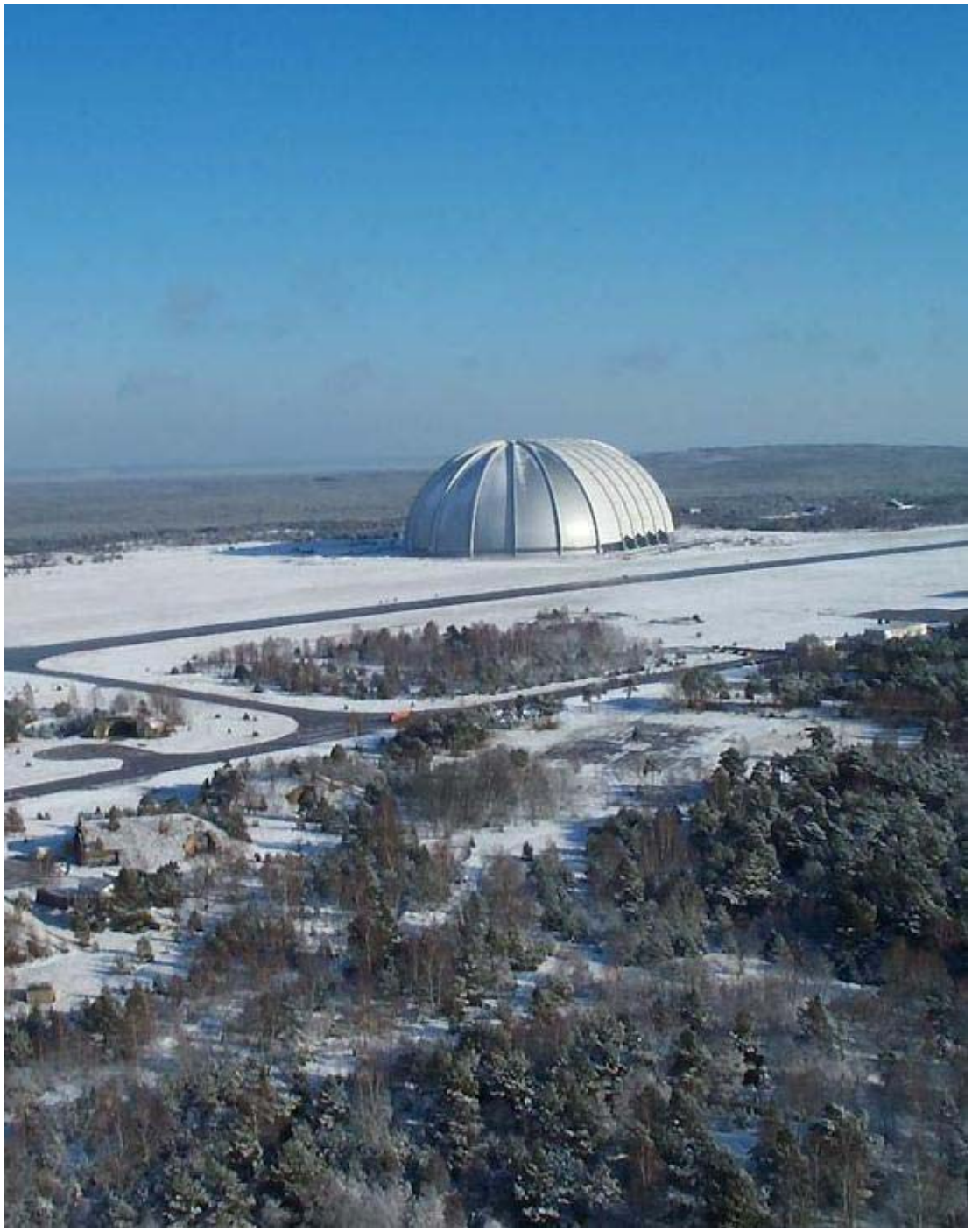

CargoLifter in Winter, Brand, Germany

From The Editor's Desk

Well, the holidays are over for another year, and we would like to thank all of you for your snail cards and e-mail good wishes this holiday season. Many of you used it as a welcome break from building and flying, a time to kick back and enjoy.

My own holidays were hectic, with inlaws and others filling our house down here on the outskirts of New Orleans. Santa brought a new DVD player, and we watched Harry Potter, Lord of the Rings, and of course Bond, James Bond.

The New Year brings many changes and new ideas, and INAV is changing with it, for the better, we hope. Guerilla (or gorilla) flying is introduced this issue with The Scofflaw by Dave Gee, a quick and easy rubber model for flying in church meeting rooms, train stations, movie theaters, and such. Also indoor electric is given a boost by the second annual Uni-Dome Indoor Event at the University of Northern Iowa at Cedar Falls. Contest details follow later in this issue. Both of these areas are sure to be hot items in the coming year, and we welcome your comments.

We made up a belated photo page from the CargoLifter photos of September 14-15, 2002, sent by Mikita Kaplan of Brno, Czech Republic. (I also now own one of those cool, black team shirts). His daughter Gabriela, or Gabi, is also coming up fast in the indoor world. Stay tuned.

Fly safely and have fun. - Carl Bakay

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Sample ad copy should be sent to Tim Goldstein at the above address for publishing details.

From the publishers desk

First off I need to apologize to everybody for this issue of INAV coming out so late. It should have mailed in early January and it is totally my fault that it's fallen behind. The rest of the INAV staff did everything on time and it was me who dropped the ball. The current poor economic times hit me in December when I was told that the company I have been working at will be closing. All employees had to take a pay cut effective of the first to the year. So unfortunately the spare time that I normally devote to INAV quickly became reallocated.

With these changes in my life in mind, INAV need your help. We need to find someone with very strong skills in Microsoft Word that would be interested in helping to produce INAV. The specific help we need is laying out each issue in its final form. The primary requirements are a current version of Microsoft Word, Internet access with the ability to send and receive 4 or 5 MB files, and the time and desire to help INAV. Anyone that is interested should contact me at Tim@IndoorDuration.com or call me at 303-933-9147.

On another front, it has been pointed out to us that we forgot to thank all the contributors to the Jr World Championship team. Sorry for this oversight. The generous support of the indoor community gave the Jr team the needed funds to make the trip. Vern Hacker also deserves to be recognized. He took the initiative to get this started and was the spark plug behind the collection effort. It would not have happened without him.

Tim

We Forgot! The neat balsa density chart in Issue 109 was taken from NFFS "Digest", with the permission of Editor Walt Rozelle. Sorry Walt, and thanks.

UPCOMING CONTESTS FOR 2003

CANADA – ONTARIO - LONDON

Jan2 –Mar 31 2003 HANGAR RAT POSTAL CONTEST Open to ALL indoor flyers, world wide. Classes, same as 2002. (Note change to class "A" rubber selection Both classes must be built to the plan. No alterations!
Class A, change to rubber choice -- May use from 70 thou. to 125 thou.
Class B, No scraping of plastic blades! Must be STOCK. Motor to be 1/8" x 36" max. length.
Entry form available from CD Art Lane at artlane@juno.com, Day Phone : (519) 685-7002 Address : 9-617 Wharncliffe Rd., S., London, Ontario, Canada N6J 2N7

GEORGIA – ATLANTA

TTOMA Indoor Meet – The Thermal Thumbers of Metro Atlanta will be hosting a few more Indoor contests this spring. Check www.thermalthumbers.com for details.

IDAHO – MOSCOW

July 26 – 29 Kibbie Dome Indoor. A 4-day contest with the Wally Miller EZB contest (1.2 gm) flown in the middle of the main event. All AMA and FAI events flown. This is a world class 145' ceiling site. Normally an FAC contest is held at the same time. CD Andy Tagliafico at 503-452-0546

ILLINOIS – CHAMPAIGN

Feb 22,23 Indoor Contest sponsored by the Chicago Aeronuts. To be flown at the University of Illinois Armory, 505 E. Amory, Champaign, IL 61820, a great Cat III site. Entry fee is $20 if done by mail by Feb 12, $30 on site, $1 for Jr and Sr. Fee covers unlimited events. The schedule is:
Sat: 8am-11am HL glider and std. & unlimited cat glider. 11am-8pm A6, FAC NoCal, Science Olympiad, PP, LPP, Bostonian, ministick. 10-11am Bostonian judging. 1:30pm Delta Dart mass launch. 2:30pm double Whammy mass launch.
Sun: 8am-4:30pm intermediate stick, F1d, Cabin ROG, EZB, Helicopter, ROG Stick, F1L.
If you'd like an entry form mailed to you please contact Bob Warmann by mail at 245 N. Oaklawn Ave., Elmhurst, IL, 60126, or Geoff Bower by email at gbower@uiuc.edu

INDIANA – WEST BADEN

Aug 15-17 Indoor Time Trials for Cat III. Fly in this beautiful 97' atrium. See INAV #108 for a history and photos of the resort. More specific details in next issue. Contact: Walt van Gorder, 5669 Victory View Ln, Cincinnati, OH 45233. (513) 922-3351.

IOWA - CEDAR FALLS

March 1-2 UniDome Indoor Rally R/C Contest and Indoor FF
FF Events: #212 HL Glider, #215 Bostonian 7gm., #219 Unlimited Class Catapult Glider, #221 Electric Duration, #505 Peanut Scale, FAC No-Cal Scale, AMA Delta Dart- Jr. and Open classes.
R/C Events: #627 Indoor Electric R/C Duration, Indoor Electric Sport Scale. Contact Mike Gretz at Sig Mfg. for event details. E-mail `mikeg@sigmfg.com`.
Fly hours will be from 6pm to 11pm on Saturday the 1st and from 7am to 4pm on Sunday.
Contact Name : Bob Nelson, 433 Ardmore, Waterloo IA 50701. E-mail : bobsrc@forbin.net
Day Phone : 319-277-0211 Night Phone : 319-233-4771

MASSACHUSETTS – CAMBRIDGE

Evening Indoor at MIT –Flying from 7 pm to 9 pm at MIT's Dupont Gym, the corner of Vassar and Massachusetts Ave. in Cambridge, Mass. Call Ray Harlan at 508-358-4013. Feb 1, May 3.

NEW JERSEY – LAKEHURST

Indoor Flying at Lakehurst – The East Coast Indoor Modelers (ECIM) have the use of Hangar #1 every week from sunup to sundown. The hangar is 800 ft. long by 250 ft., and 180 ft. high. To join, contact Rob Romash at 856-985-6849. E-mail cgrain1@yahoo.com . Dues are $15 a year with a current AMA card.

TENNESSEE – JOHNSON CITY

May 30 – June 3 AMA/NFFS Indoor Nationals, Johnson City, TN. Flying is in the MiniDome fieldhouse of East Tennessee State University. Event schedule in this issue. CD Abram Van Dover is looking for assistant CD's to help out. Write or call him: 112 Tillerson Dr., Newport News, VA 23602, (804) 877-2830.

EXPERIMENTAL STUDIES OF LIFT & DRAG AT VERY LOW AIRSPEED

Vern Neff -- vdneff@aol.com
John Wereb

INTRODUCTION

In a previous article (INAV #106) one of us (V. Neff) speculated about the factors producing lift and drag at very low Reynolds numbers (Re) where little is currently understood about the effects of airflow. As anticipated this article produced some interesting comments from readers and also some controversy.

In order to sort out what is really important at Re < 5000 we have undertaken some experiments with an EZB type wing. The guiding factor in this effort has been simplicity. The experiments are based on a wing moving through air rather than air passing over a static wing. That is, they do not involve the wind tunnel. There are two major reasons for this approach. First of all we point out the well-known fact that the production of a uniform airflow at very low speed is difficult indeed and would require elaborate equipment beyond our means. The second reason is more fundamental and requires some explanation. Engineers use the wind tunnel because it produces (in principle) a uniform flow. This is required in order to simplify the hydrodynamics and to apply the concept of the ideal fluid and the Bernoulli principle. Our interest is more practical and immediate. We propose to measure lift and drag under real indoor flight conditions in order to discover any deviations from ideal fluid behavior. The ideal conditions begin to deteriorate when we get below the so-called critical Reynolds number. In terms of standard aerodynamic theory the critical Re defines a region below which the boundary layer for laminar flow separates completely from the surface of the wing. The importance of the critical Re for model airplanes was emphasized initially by F.W. Schmitz (1). Without going into detail we point out that, at Re < 5000, any airfoil is operating below the critical Re.

The basic procedure we propose involves a wing mounted on a lift (or drag) balance attached to an arm that rotates uniformly at low speed. Under these conditions, in addition to lift and drag, a third centrifugal force acts on the wing. Fortunately the centrifugal acceleration is orthogonal to both lift and drag and does not effect the measurements as long as the wing is in the horizontal plane of rotation.

We plan to do a series of articles on the results of our experiments. For one thing we already have too much information for one issue of INAV. Furthermore the experiments are open ended. We have already done lift and drag measurements on a flat wing. This will probably be followed by measurements on wings of various camber. In addition we can mount a complete model on the existing apparatus. This really opens Pandora's box and we will probably stop when we get tired or, more to the point, when you get tired of hearing from us. In this issue we propose to describe only the apparatus and procedure. Please do not hesitate to contact us concerning questions or objections.

THE ROTATING PLATFORM

In these experiments the wing is mounted on an eight foot rotating shaft. This is shown schematically in Fig (1). Rotating the wing through air presents the problem of a spanwise velocity gradient across the surface. For an 18" wing, the ratio of linear velocities at the outer and inner portions of the wing is 1.04. That is, the outer wing tip travels 4% faster than the inner tip. In terms of lift, this discrepancy can be accounted for by slightly offsetting the wing from center span. In any event we find that the velocity gradient is not experimentally significant as far the lift and drag measurements are concerned. The experimental apparatus does not allow for the measurement of the center of pressure or for wing pitching moments.

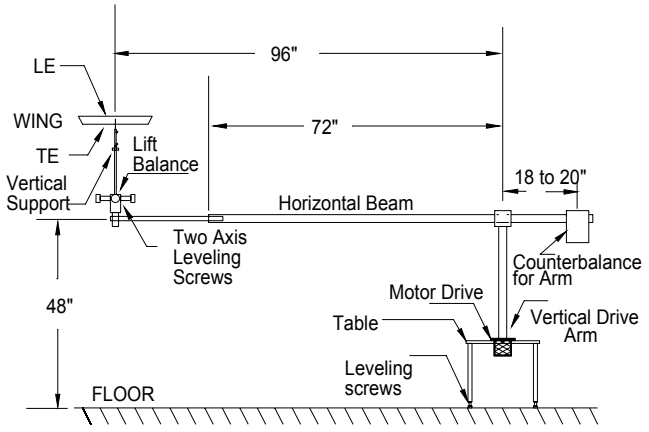


Figure 1 --- Wing Drive Assembly

The central feature of the rotating platform is the heavy-duty precision turntable assembly originally designed for use in a satellite dish positioning device. It is illustrated through a photo rather than a diagram and is shown in Photo # (1).

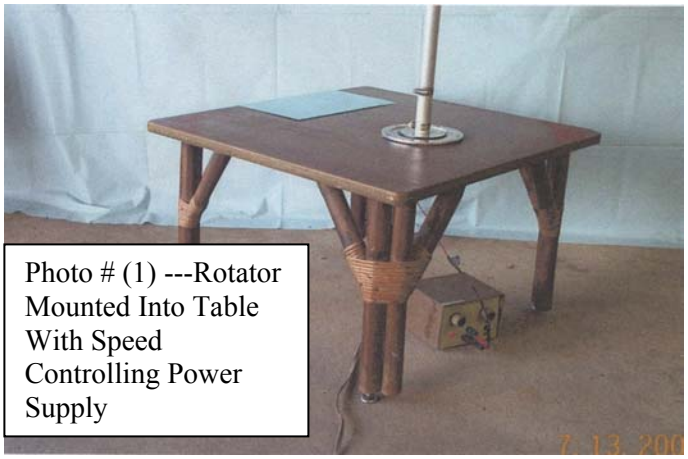


Photo # (1) ---Rotator Mounted Into Table With Speed Controlling Power Supply

The turntable was mounted on a flat platform with legs which are fitted with leveling screws. A 1" diameter aluminum tube 4' in length was rigidly attached to the turntable to serve as the vertical shaft. The horizontal arm also was a 1" diameter aluminum tube into which a ¾ " tube could be fitted at the end in order to adjust the shaft length. This is illustrated in Photo # 2.

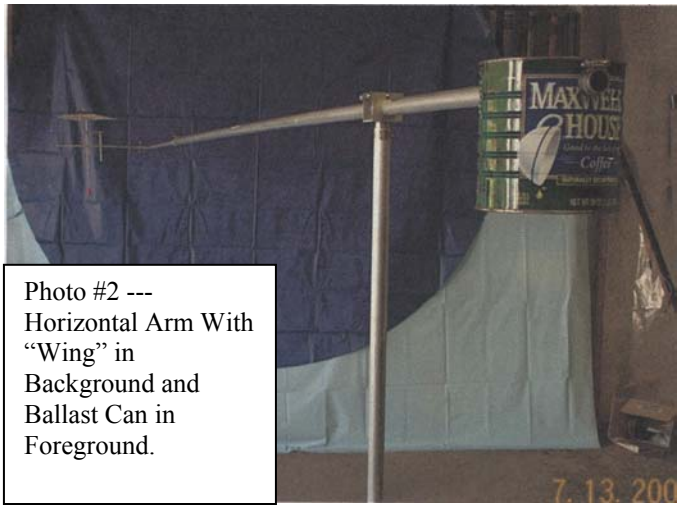


Photo #2 --- Horizontal Arm With "Wing" in Background and Ballast Can in Foreground.

The horizontal arm was mounted with a 2' overhang as shown in the Photo #2 At this end the shaft was equipped with a bucket into which gravel counterweights could be added in order to balance the horizontal arm. The working end of the horizontal shaft was designed to accept either the lift or the drag balance. This receptor is fitted with screws that allow for leveling in both the vertical and the horizontal plane as shown in Photo #3.

The rotator is powered by a 12 volt dc motor with a maximum speed of about 6 rpm. Motor speed can be accurately controlled with a variable voltage dc power supply. We use an ancient Heathkit supply. For the eight foot shaft the maximum rotational velocity gives a maximum linear velocity of 5 ft./s. This is the upper limit of attainable airspeed for the apparatus as described.

THE LIFT BALANCE

Both lift and drag are measured by employing the null principle to balance turning moments or torques. A schematic diagram of the lift balance is shown in Fig. (2).

We call the device a parallel pendulum (PP). The two parallel arms swing about a ¼" diameter solid aluminum rod which fits into the adjustable receptor at the end of the rotating arm. The arms are ¼" rectangular aluminum tubing 52 cm in length. They were drilled and fitted with 1/16" ID brass bearings located at the center. The bearings rotate on 1/16" OD steel shafts fitted into the aluminum rod. The two arms are

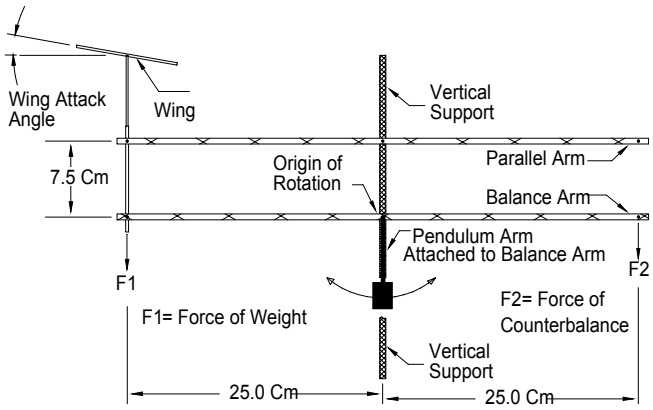


Figure 2 --- Lift Balance Details

separated by a length of 7.5 cm.

The wing mounting arm is located 25.0 cm from the left of center. It consists of 9.0 cm rectangular aluminum into which we attached with epoxy 1/16 " ID aluminum tube which serves to receive the wing mounting wire. All bearings were 1/16 " ID polished brass rotating on 1/16" OD steel shafts. The wing is mounted by attaching (with epoxy) a stiff 1/16" diameter wire to the under surface at the center of the chord. Slightly crimping the wire allows one to force it into the mounting tube with a tight fit. The wire is flexible enough so that it can be bent to any desired angle of attack, but stiff enough to hold this position during a measurement.

Photo #3--- Vertical and Horizontal Adjustment on End of Horizontal Arm.

A 1/16" OD brass pendulum arm is rigidly attached to the lower parallel arm. It serves two fundamental purposes. First of all it serves as a marker for the null measurement. That is, the measurement is made when

at a certain flight speed, the arm is exactly vertical (i.e. parallel to the direction of the gravitational field). This position is determined visually be simply observing the position of the arm as we gradually increase flight speed (remember that flight speeds are very small). Although this method seems absolutely archaic; it actually works quite well and leads to reasonable reproducibility of the

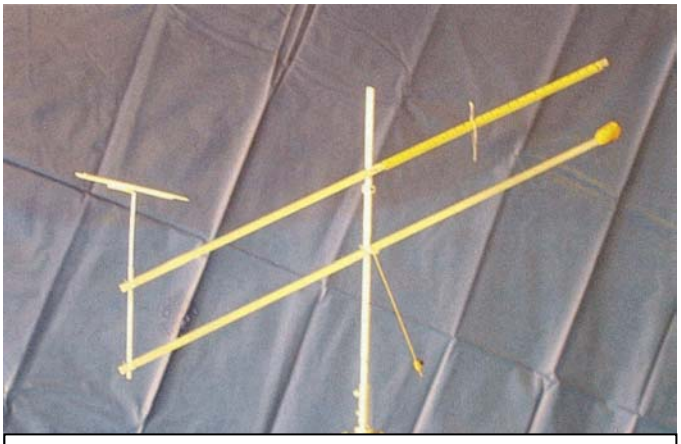


Photo 4 --- Lift Balance in Off-null Position

Photo 5 --- Lift Balance in Null Position

measurements. What this method of measurement lacks in sophistication, it definitely gains in simplicity. The second function of the pendulum arm is to act as a counter weight and to allow for adjustment of the sensitivity of the measurement. The sensitivity varies with the angle of attack. The arm is equipped with a movable cylindrical brass weight that can, if necessary, be adjusted at different angles of attack.

Because the equipment described in the preceding presents a certain relatively small (compared to the wing) cross sectional surface area, it can affect the lift when moving at some given speed. For this reason we have designed the apparatus keeping in mind the idea of compensation. For example, the parallel arms left of center would contribute lift if the rotation is counterclockwise. On the other hand the arm would contribute negative lift in the region to the right of center. This is the main reason why we have chosen both arms to be the same length. This effect will vanish when we are at the null position and that is one of the major advantages of the null measurement. It could, however, cause problems when we are off-null which would lead to an unequal sway in the pendulum. The balance condition
for the torques and forces is indicated on the diagram.

Photos #4 and #5 show the lift balance in the off-null and null position respectively. They illustrate clearly the simplicity of the visual method of null detection.

The actual procedures for the lift measurements are as follows: We first mount the lift balance (including the wing) on a stand for the purpose of standardizing the measurement. The gross weight of the wing is then balanced by adding clay to the lower arm at F2 and a nominal weight, e.g.—1.0 gram, to the upper arm at F2,

(refer to Figure 2). When we achieve perfect balance we transfer the apparatus to the rotating platform. Here we first adjust for the proper angle of attack and then for proper horizontal and vertical alignment. We then remove the 1.00 gram weight and the wing drops to a lower position determined by the mass of the pendulum arm and its counter weight. We then gradually increase rotational speed until the wing rises to the null position. At this speed there is l.00 g of lift operating on the wing. The flight speed in ft./s is recorded at this speed. We then attach a nominal weight, such as 0.100 gram to the right side of the upper parallel arm. Again the flight speed is increased to the null point. At this speed there is now 0.900 g of lift on the wing. This procedure is repeated in increments of typically 0.100 or 0.200gram up to 0.900 gram at which weight there is 0.100 gram of lift on the wing. The wing speed is recorded for each weight. We thus obtain data for lift vs. speed at a given angle of attack. We repeat this series of measurements for the wing set a different angle of attack. This procedure is very useful because we obtain data for lift vs. flight speed at a given angle of attack as well as lift vs. angle of attack at a given flight speed.

THE DRAG BALANCE

In principle the drag balance is essentially a lift balance rotated by 90 degrees. In practice there are important additional considerations about drag measurements. First of all, at relatively low angles of attack, the drag coefficient is only a small fraction of the lift coefficient so we need very good sensitivity to measure it. The problem of compensation, discussed above, also becomes more acute. The reason for this is that the various instrument components contributing to drag are blunt (non-streamlined) objects that produce very large drag effects. In addition the drag torque must balance the gravitational torque. In this case the corresponding forces are at right angles rather than in opposition as in the case of lift.

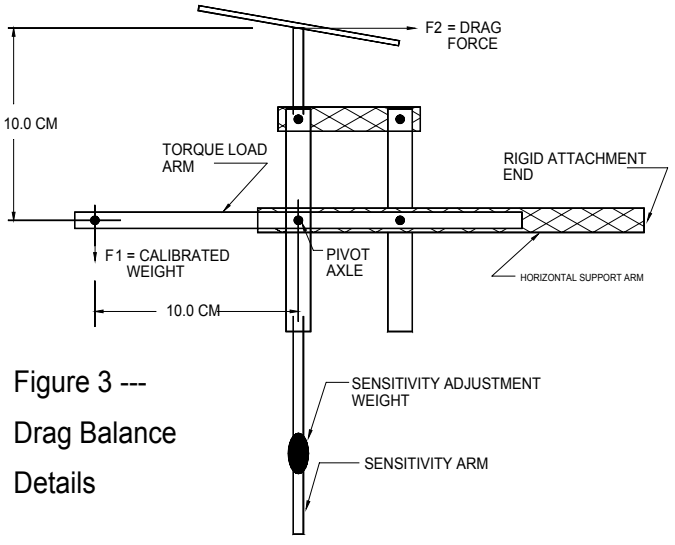


Figure 3 --- Drag Balance Details

A schematic diagram of the drag balance is shown in Fig. (3).

The mounting rod is in the horizontal position. The parallel rotating arms are vertical with respect to the gravitational field. A torque load arm is rigidly attached at its center to the forward (left) parallel arm. A 1/16" hole is drilled in this arm at The position of F1 10.0 cm from the center. The purpose of this hole is to accept wire weights of different magnitude. The pendulum is mounted rigidly to the forward parallel arm as shown. Clay was attached to the pendulum arm as the Sensitivity Adjustment Weight. In this case the weight added serves to standardize the balance and also acts as the counterweight. The vertical wing mounting tube is rigidly attached to the horizontal crossbar separating the pendulum arms. The crossbar remains in the horizontal plane of rotation at any angle of the pendulum arms. The wing mounting tube is designed so that the center of the wing is l0.0 cm from the center of rotation. This was done so that the gravitational torque T1, at F1, and the drag torque T2, at F2, both have the same radial length. The relationships are: T1 = 10 X F1 and T2 = 10 X F2. The dimensions of the various parts and bearing surfaces are the same as those used for the lift balance. For drag measurements the pendulum serves the same purpose as the indicator for the null position which is again determined from visual observation.

The procedures for the drag measurements are as follows: The horizontal support arm is first mounted vertically in a rigid stand. Clay is added to the pendulum arm in order to balance the mass of the wing and its support structure. When the wing is balanced the mechanism is transferred to the end of the horizontal arm such that the support rod is mounted horizontally, not vertically. The balance is then adjusted for horizontal and vertical alignment and the angle of attack is set as described previously for the wing balance. The balance is at null with no extra added weight so, in this trial, we add a small weight , such as 0.100 gram to the hole in the left arm at the position of F1. The wing moves down to a position determined by the torque of the pendulum. Airspeed is gradually increased up to the null position. At this speed the wing is experiencing 0.100 gram of drag. In the case of drag we incrementally increase the weight on the left side of the fulcrum whereas in the lift measurements we incrementally increase weight on the right side. Again we make a series of measurements of drag vs. flight speed at a given angle of attack. We then change the angle of attack and repeat the procedure. Photos #6 and

#7 show the actual drag balance in the off-null and the null positions.

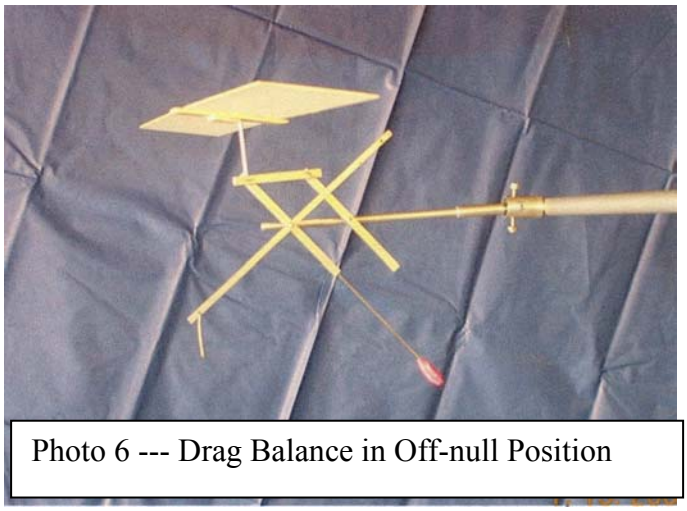


Photo 6 --- Drag Balance in Off-null Position

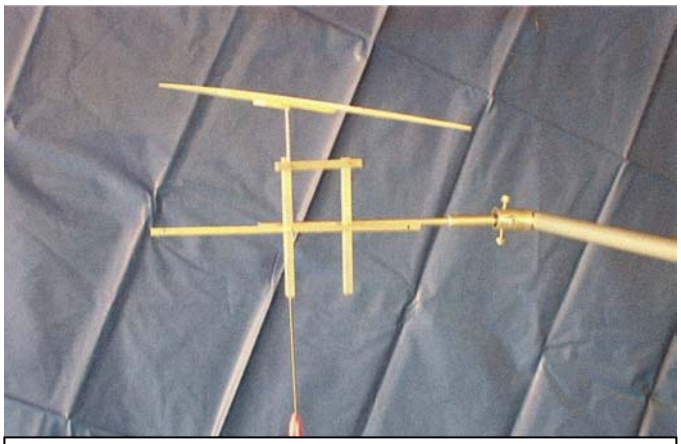


Photo 7 --- Drag Balance in null Position

4. EXPERIMENTAL ACCURACY

Data were obtained for a flat wing with a span of 18" and a chord of 3". The wing has the dimensions of an EZB but not the weight. It was constructed from a flat sheet of 1/20" balsa sanded smooth with #600 emery paper. This gives a stable structure with which we can work without worrying about the flimsiness of a real indoor wing. The actual wing mass is irrelevant because it is balanced out by our null procedure. We made a series of 5 measurements of flight speed required to obtain 1.00 gram of lift for the flat wing set at an angle of attack of 10 degrees. The data are presented in the following along with the relative standard deviation from the mean.

LIFT --- Grams	Flight Speed --- feet/ sec
1.00	2.494
1.00	2.531
1.00	2.539
1.00	2.543
1.00	2.528
Relative Standard Deviation = 0.686 %	

In a following issue of INAV we will submit the results of measurements on the flat wing. They are both interesting and, in some respects, quite surprising. As a teaser we add that they do not support the Newtonian equations for lift and drag at large angles of attack. They also do not support what we would anticipate from standard aerodynamic theory at higher Reynolds numbers. Please stay tuned!

REFERENCE

(1). Schmitz, F. W., Aerodynamic des Flugmodells, l942, Carl O. Lange Verlag.

MAKING ROUND PROPELLER SPARS.

Nick Aikman

The usual way of making round, tapered spars is to twirl the wood between a folded piece of wet and dry paper. Whenever I tried this method, my results appeared to have been chewed by small rodents. The method I now use is hardly rocket science and others have probably discovered it as well. However, it does produce infinitely better results and with the current UK vogue for splitting the prop ribs and gluing them on either side of the main spar instead of on top, I offer this method of spar production for your scrutiny.

First, make 2 large sanding blocks 28.0 cms by 11.5 cms. These blocks MUST be perfectly flat – mine are from ½" MDF. Take 2 sheets of wet and dry paper, 1 of 320 grade and 1 of 400. Cut these sheets in half lengthways and then 'Spraymount' them to the 4 faces of the blocks, giving 2 blocks with a different grade on each face.

Cut a series of oversized, tapered spars, ½" longer than the finished length will be. For my last batch of F1D props, I used straight, even grained, 4.25 lb, A grain sheet. These blanks should be square in cross section and approximately 0.110" wide at the big end, 0.080" at the other. Draw a line across the big end of each spar to show its orientation when finished. In the top drawing, the spars are drawn overlarge in relation to the blocks for clarity.

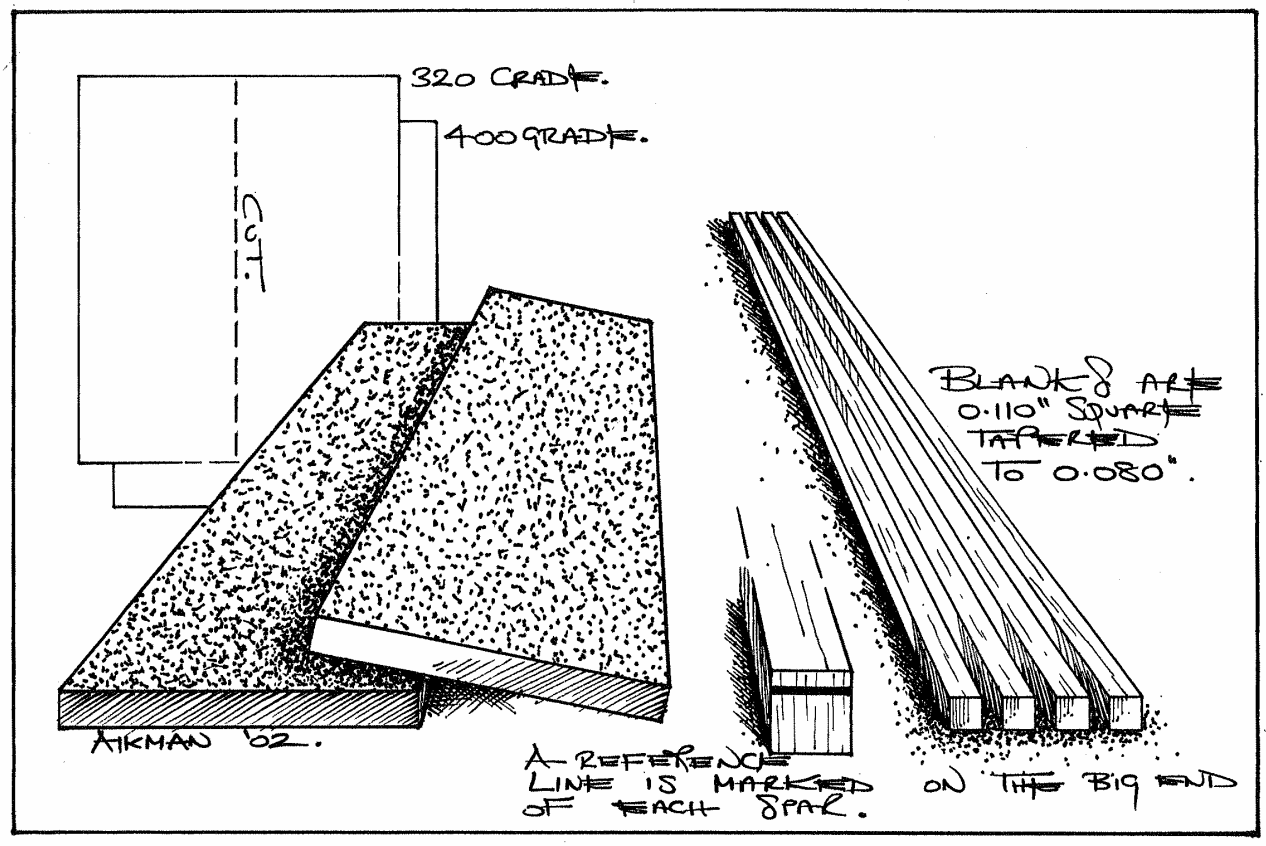
Now to make some balsa dust. Take a block and place it on your workbench with the 320 grade face upwards facing diagonally away from you. Place one of a matched pair of spars lengthways on the block and put the other block on top with the 320 face downwards. The 320 grade faces are for roughing out work, the 400 faces for fine finishing.

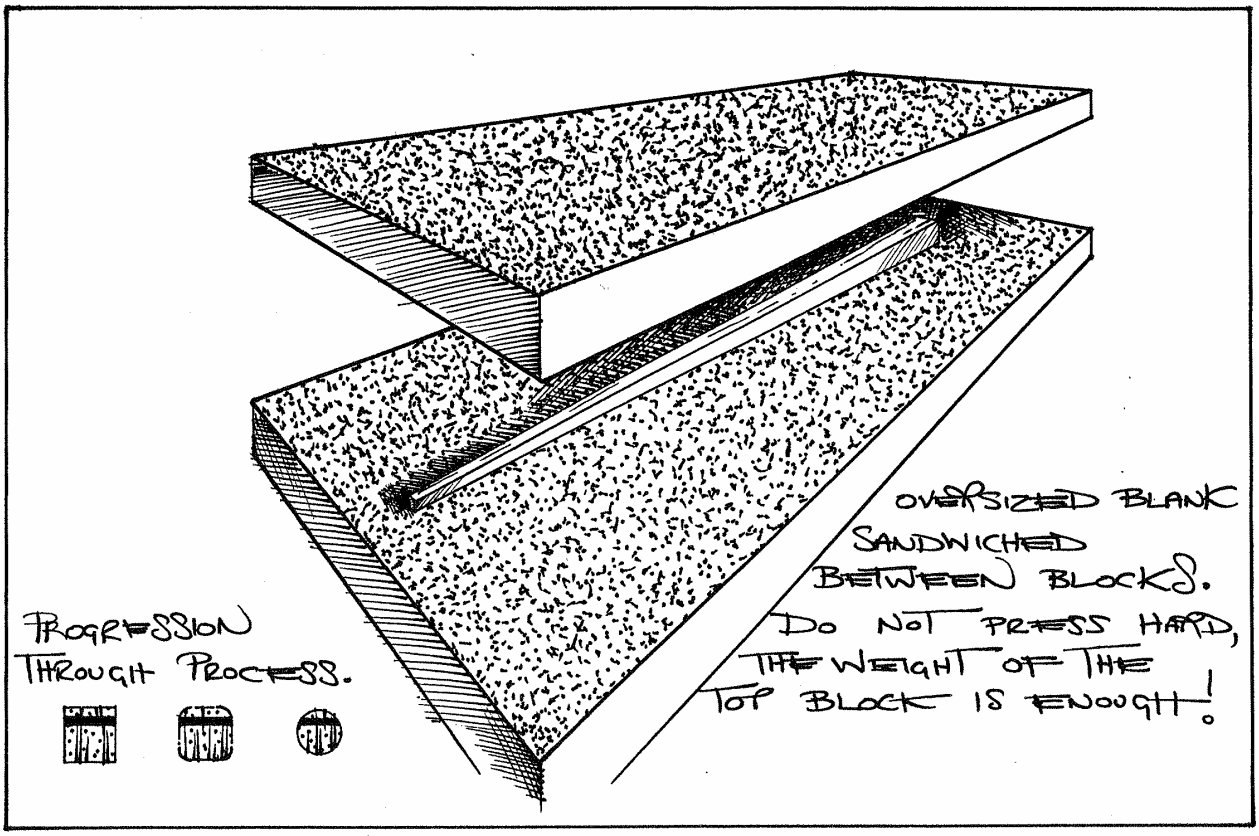
Holding the top block half way down, move it from side to side over the other block – the trapped blank will begin to rotate and a characteristic 'chattering' sound will be produced. It seems to work best with the fat end of the spar away from you. As you continue to move the block from side to side, the edges of the blank will become rounded as material is ground away from the corners. This is not sanding in the normal sense, you do not need to press down hard with the top block. The constant rotation as you move your hand takes away more and more balsa and the motion becomes easier as the blank cross section becomes more circular.

Working to produce a matched pair of spars you need to alternate between the two, comparing weights and diameters as you go. After the roughing out, when the spars become round, you can speed up the process by moving the top block backwards and forwards lengthways, as you continue with the sideways motion. Your arm becomes a machine. The lengthways motion comes from the shoulder joint and the sideways motion from the elbow. Touch and feel are important as you can't see what is happening. By pressing down lightly more on one end of the block, you will take more material away from that end than the other and can change the taper.

The 400 grade faces are used for the final stages as the diameters get smaller. Care is needed at this stage although the process is easier as the top block is gliding over the rotating spar which has in effect become a roller. Balsa is still being removed as you work. Using 2 or 3 full length pieces of boron on each spar (see next INAV) the final spar dimension can be modest – 0.060" dia' down to 0.030". Finished weight for a pair of spars without boron will be around 0.050 gms. Trim the spars to length.

Using this method, I can produce a matched pair of spars in about half an hour. I have also made 35 centimetre prop spars this way tapering from 0.045" dia' down to 0.018". Oval sections can also be made using rectangular blanks, as long as the rectangle is not too extreme.


320 GRADE.
400 GRADE.
CUT.
AIKMAN '02.
BLANKS ARE 0.110" SQUARE TAPERED TO 0.080".
A REFERENCE LINE IS MARKED ON THE BIG END OF EACH SPAR.


OVERSIZED BLANK SANDWICHED BETWEEN BLOCKS.
DO NOT PRESS HARD, THE WEIGHT OF THE TOP BLOCK IS ENOUGH!
PROGRESSION THROUGH PROCESS.

Scale Matters!

By Dave Haught
DHaught042@aol.com

At left: The famed Pistachio that really flew! The prop,made from a water cup at the motel during the Kibbie Dome meet, made the model a success.

Ahh back again I see, well here we go!

Aluminum is the future!?

Last episode I mentioned using paper for landing gears and struts in an attempt to keep things light-especially at the tail. One other trick I stole from someone out there is to replace all the steel music wire on my model where possible with aluminum wire. Aluminum weighs exactly half of steel for the same volume, so the savings is significant. The landing gear on my 36" Turbo Porter is fashioned from 1/16" aluminum welding rod. It is easy to work, sands and cleans up nicely and is more than sufficient for indoor models. I have also acquired a selection of very small gauge aluminum wire of many sizes from craft shops-its used to string beads and such. Hardware stores sell rolls of aluminum wire in larger sizes, and the aluminum welding rod-available by the 36" stick can be bought at most welding shops for less than a dime each -sizes are 1/16", 3/32" and 1/8." This stuff is super for all kinds of applications from spark plug wires to exhaust stacks. I have used an aluminum core slipped into a thin heat shrink tube for curved exhaust stacks-works great! Try it and loose some weight!

Spun Aluminum Too?

While putting the final touches on a Dime Scale Spirit of St. Louis I found myself getting carried away. The model has very little to offer in details after you put on the compass and skylight, so the focus becomes the nose. The first hurdle was the classic turned aluminum cowling. I tried several brilliant schemes but they all seemed too heavy. I searched through the grocery store for the thinnest aluminum foil, then over to the craft store for what they might have, I even bought a few candy bars hoping to rob them of their foil, tasty, but foil is foil, and foil is all too easily snagged and torn when its thin enough to meet our weight requirements.

The only steel wire in the entire model is the prop shaft and the wheel axles. The landing gear is all sheet balsa.

As I was sifting through my covering drawer I found a small piece of 1/4 mill mylar I had left from my old AMA outdoor days. Hmmmm. It was definitely light enough, tough too, but how to put the cool spinny things on it? I tried a pencil eraser stuck in my Dremel-way too fast! Then on my drill press-way to awkward. In desperation I chomped down my corn dog dinner and as I was chewing the thoughts over in my mind I caught myself chewing the corn dog stick too, hmm its round. . . I dug out a small paper hole punch-one that cuts a hole 3/32" dia, punched a few disks out of 600 sandpaper, stuck one to my corn dog stick and simply twisted it between my fingers on top of the mylar.

Excellent, circular scratches! (Isn't amazing what makes our days?) It worked! I discovered it worked best if I taped the mylar down to the bench. Then to attach it to the Spirit. Next hurdle, the mylar was too flimsy, so I glued it to a thin sheet of typing paper to stiffen it up, cut it into neat panels just like on the real ship, added a row of embossed screws on the joint lines and glued the panels to the model-wow it looked great. Next the engine, even though you may need nose weight, that is no excuse for going off your diet! Whilst shopping at the produce section I found that tomatoes and such are often shrink wrapped on foam trays-nothing new? These were black foam! Even though I hate to eat things that are good for me, I bought the tomatoes, gave them to my wife and proceeded to carve the foam into 1/8" square strips, then sand off the corners with an emery board, then run them through a steel nut, like you would a screw. That put a neat set of rings on the cylinder. Then rocker box covers, aluminum

wire pushrods and spark plug wires, exhaust stacks and onto the cowl they went! This hobby is way too cool! Even though my wife did not share my sudden enthusiasm, she did recognize the model, there is still hope!

Too strong you say?

Most of us have hard habits to break. One I see a lot is we over-build our models. Huge gussets, excessive sheeting, and even when we do our best to keep the model as light as possible during the construction and covering phase, we often get in a hurry and stick on a set of plastic wheels that weighs much as the model! I have been rethinking strength a lot lately. When your model only weighs a few grams, you really don't need a flexible shock absorbing landing gear like you may outdoors. The floors in our flying sites are often hard, smooth varnished surfaces, I suspect that before the spring effect of our wire landing gears get to function, the model has already bounced back into the air. For several months I have been eliminating all the wire in the landing gear of my models, just use good balsa wood for the struts and make sure your joints are accurate. Most real aircraft have strong landing gear designs, knee struts, braces, etc. that worked on the real ships. Since we try to duplicate them on our models, why not make them functional? I use a lot of paper and even stiffened thread to simulate back up struts and even bungee cords, which works well with one other item. The anchor point. I used to use an aluminum tube securely glued into the wing or fuselage to plug my landing gear into. Now I use a gusset of light, soft balsa with an undersized hole drilled into it. The landing gear strut is a balsa dowel with a small strip of aluminum wire imbedded into the strut and glued there with CA. It slips snugly into the gusset on the wing or fuselage with a 1/32" gap to allow the wire to bend, flex, or even completely collapse if necessary. I have found this attachment has saved me many a wing and ripped up fuselage with little damage after an impressive crash.

Its 1903 again!

Air minded addicts will no doubt pay some homage to the Wright Brothers this next year, why not do it wright? (Man I love puns!) After seeing the new kit for the Wright Flyer by Dare Design in the magazine ads I had to have one. As I picked through this fine kit I realized I had been here before. Indeed on my shelf of kits I have accumulated over the years, I found not one but three other Wright Flyer kits! Hmmm. What does this mean? Glancing over to my desk my eyes land on my Wright Brother collection, three different sizes of plastic display models from the Hallmark collection-way to valuable to put on the Christmas Tree! And the Monogram plastic model I built in a fit of insanity. None of them will be lifting off into the gym sky, so what to do? BUILD ONE OF THE KITS!? Yikes! I haven't built a kit for . . . So instead what do I do? Take all the neat ideas of all the kits and scratch build a pistachio, a peanut, and a 24" model! Now I know what you are thinking, but its only a boarder line obsession, I can still stop when ever I want to! If you have the Wright bug you may want to join us in this year's celebration. Several clubs around the globe will be holding "Wright Flyer" events, we will have one at the Kibbie Dome in July (shameless plug) for any and all sizes that show up, duration and distance are the categories so far. Besides the new Dare Design kit there are a few Nowlen Aero Peanut kits out there, a great peanut plan in December 1994 Model Builder, and I think the old Easy-Built kit could be made flyable. Now once you get into the race you will soon notice there were three to five different "Flyers." The Kittyhawk first Flyer has no curve in the landing skids-the later versions did. You might check into the rules at your intended contest site to see how they will rule on this. The later Flyers had extended nose and tail moments which make for a smoother easier to trim model.

Flight Logs.

No I am not talking about heavy models. I'm talking about keeping detailed flight records on each model to help in understanding its performance and give you insight into why it does that weird thing when you wind it too far. Most of us start this hobby just for fun. Then it gets to be a challenge as we try to get more duration, more altitude, more rafters, more glory, more minions, more, more, more . . . hmm. Maybe we shouldn't go there. Back to the records. I started seeing the need for records when I flew so many different models in so many different sites. One room had a 22 foot smooth ceiling, the next 28 foot with open girders! Too many winds put my Tiger Moth into danger. As it swooped through the open girders my blood pressure got as high as the model did. I soon learned that two things were essential, a torque meter and a record book. I now know that 1400 turns will give me a good 70 second flight and keep my Moth from suffering rafter rash.

Here as always you can go to extremes. At first I just kept track of winds and times on a 3 x 5 index card. Then I added motor size, length, (ok, motor weight too for you duration guys), how fresh the motor was, duration, flight patterns, and trim adjustments. These will all vary depending on your model and how close you want to keep tabs on it. I have recently begun to chart the time the model levels out under high ceilings and take note of any flight path changes that seem consistent. I have a No-Cal B-25 that has a wonderful climb to 50 feet in 30 seconds,

then it slows suddenly and goes into a cruise mode for 15 seconds, still turning left. Then at 45 seconds it has a slight wobble in the wings, stalls, then makes a 90 degree left turn and flies straight for 5 seconds, another wobble and 90 degree turn and then a final wobble and a tight spin in to the right. Way cool. I don't even want to know why it does this, I like it! Try charting your beasties and you will be able to wow the crowds with just how close you can get the rafters without hitting them as well as use the information to extend your flights, more on this later, meanwhile where is my winder?

Till next time, keep it light! Dave

'DREAM EXTREME'

A 'Droop boom' F1D by Ron Green.

'Dream Extreme' is a direct development from last years' 'Dreamduster', shown in INAV 105.

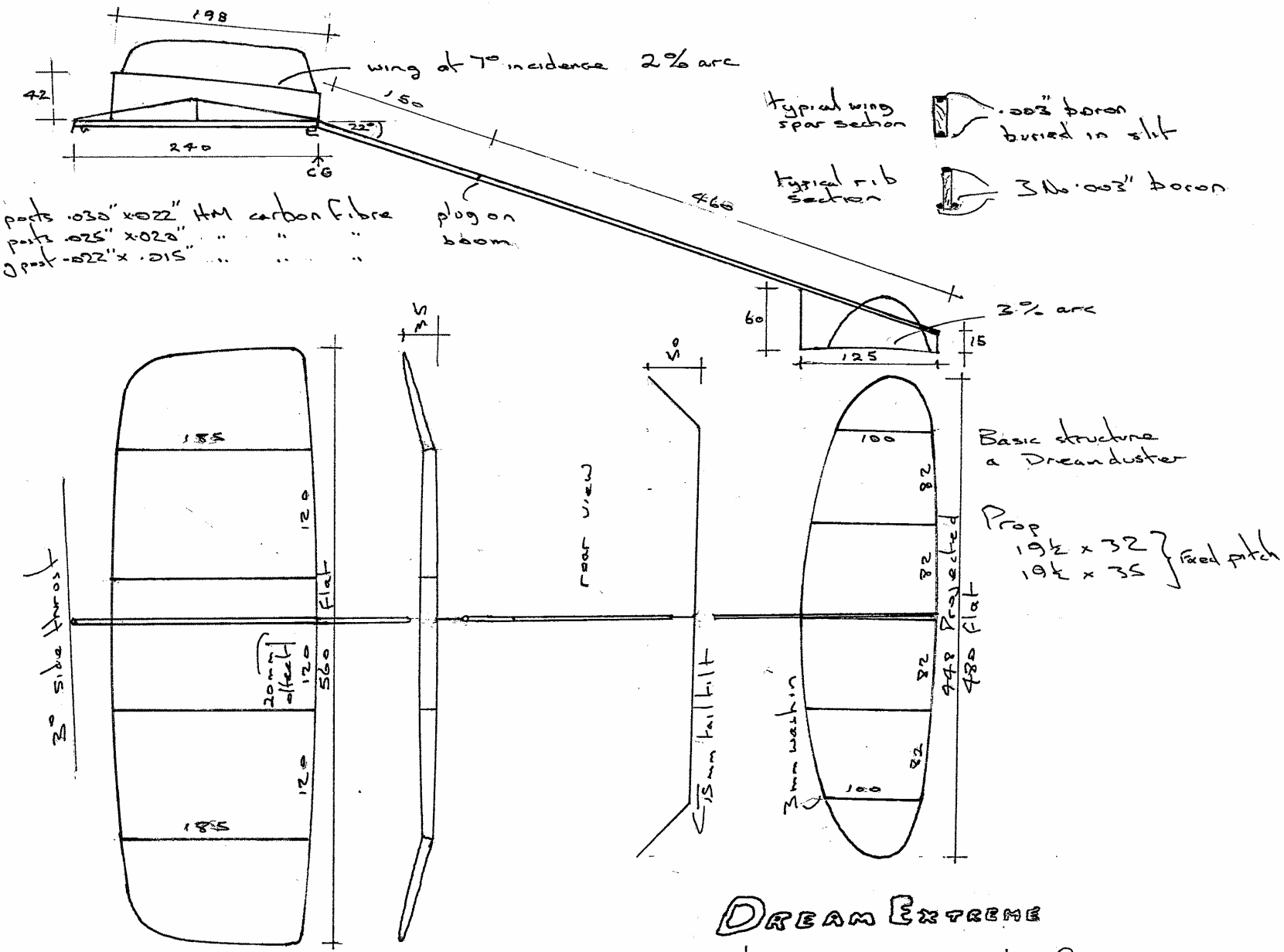
The developmental sequence began with Bernie Hunt's prediction programme suggesting that a 10-inch vertical gap between the wing and tailplane might be an optimal figure. So, with this in mind, 5-inch wing and tail posts were tried. Post drag was kept minimal by the use of high modulus carbon fibre in very small sections. The problem with this was the weight penalty from the carbon. Bernie's input solved this problem by the use of the drooped boom, which had been seen on Dieter Siebenmann's model at the first 'CargoLifter' meeting in 2001. Using a drooped boom is structurally superior and also much lighter due to the reduction in post lengths.

Dieter's theory was also put to the test with the wing incidence set-up. He believes that the prop is more efficient when operating at 90 degrees to the flight path. This was confirmed by tests conducted on Bernie's whirling arm rig. The wing incidence was set at 7 degrees and the model was trimmed to fly with the motor-stick as close to horizontal as possible. An attempt was made to reduce drag from the wing by using thin (0.060" deep at the root) boron/balsa composite spars, also by using a 2 percent airfoil section and by reducing the tip dihedral to 35 mm. This reduction reduces the area of the covering film by a small but significant amount.As with all experimental changes, test flying to assess the layout is paramount and this proved to be difficult at times as the design was changing, sometimes almost daily with new input from Bernie.

Overall, I am convinced that this model has very good potential. It flew an unofficial 37.00 minutes at this year's 'CargoLifter' meeting with less than a fully wound motor. I had a hard time at the World Champs with a hang-up on the catwalk in the first round and then twice having motors blow up just after launch. Lady Luck was not with me!

I shall persevere with these models next year, with minor changes. Hopefully, I can realize the potential that I believe exists.

Good fun isn't it!! -Ron Green.



DREAM EXTREME

designed & drawn by Ron Green
Best time Unofficial 37.03
Cargolifter Germany

Jim Richmond's World Champs winning “SALTY DOG" F1D

This rather simple looking plane with the less than complementary name is the result of the most extensive developmental effort I have made in a long history of model plane design.

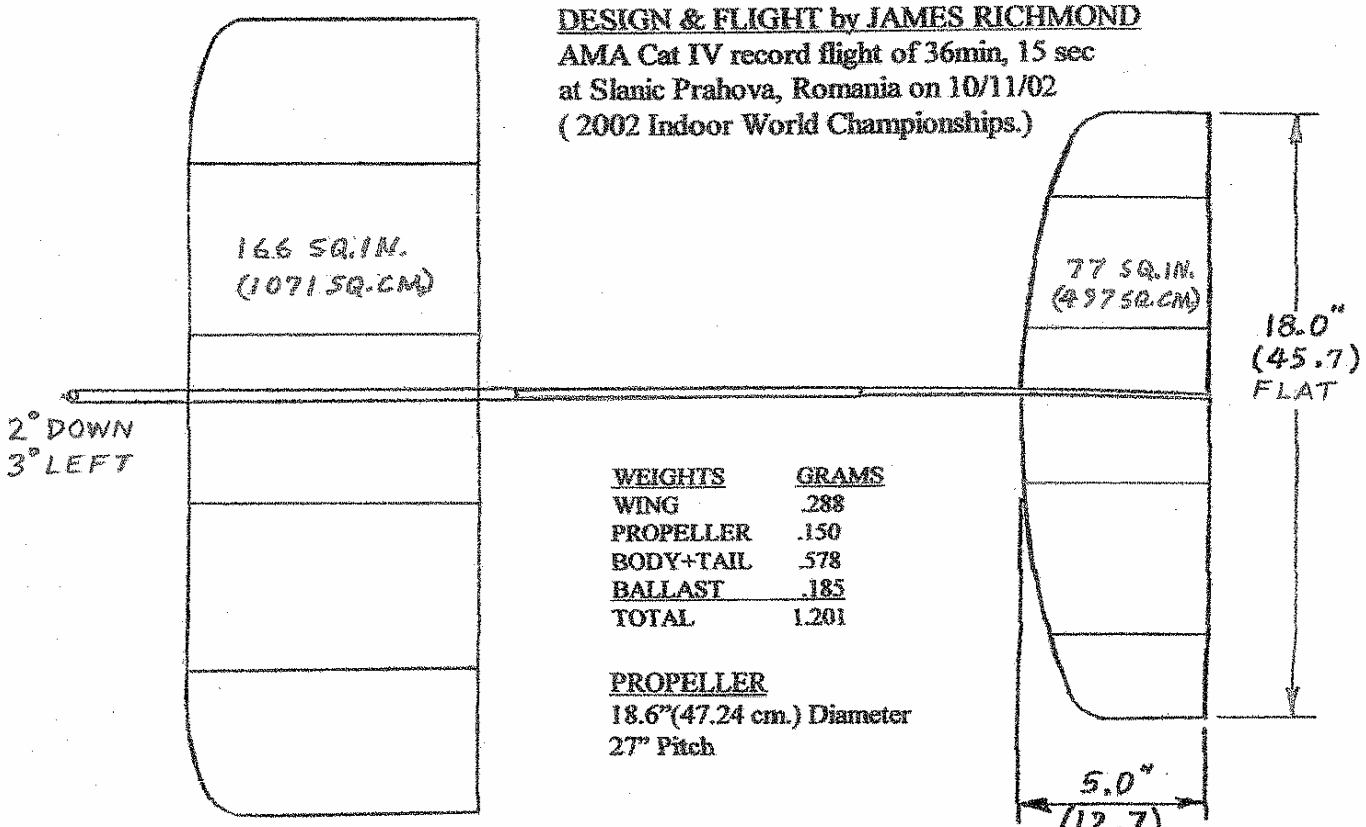
This program was begun after the 2000 world championship with an effort to apply the old F1D technology to these smaller planes. It became apparent right away that the high torque climb-out had to be handled differently- something like the way the Easy B's do itand so the wing bracing was eliminated. The following are the design changes that were made, and the reasons for them:

1. No wing bracing. Permits wing twist for good climbing turn.
2 Boron stiffened wing spar. Needed due to lack of bracing.
3. Stab lowered 1" below boom. Reduces the center of drag and lowers the C. G. to improve the late stage climb-out (less likely to stall during a steep climb).
4. Shortened wing posts from 4" to 3 1/2". Same reason as #3 above.
5.The use of stab tip dihedral (and no rudder) for easier construction, less drag, and less weight.
6. The use of a wire spacer on each end of the motor. They are removable to avoid adding to motor weight and they permit moving the wing away from the prop. They also permit the use of a motor stick long enough to accommodate the wing posts.
7. Stronger wing posts with boron on 3 sides. The twisting wing was found to be tough on prior wing posts (broke 3).
8. Straight instead of angled wing posts. This provides a longer inboard wing and gives more wash-in than wash-out during the wing twist phase for a better climb-out.
9. 75% C.G. instead of 70% for a better cruise.
10. Y2K2 instead of microfilm. Hey, I like this stuff ! It's strong and dimensionally stable and it doesn't die of old age

Now that we have a plane that flies, all we need is a prop/motor combination that works in the Slanic salt mine. Not having had the opportunity to fly a plane of this type in the mine before, we were all scratching our heads trying to figure it out. In my case, I had brought an assortment of 11 props, hoping at least one of them would do the trick. As it turned out, the oldest and least likely one of the bunch gave the best performance.

When I go to a competition, it is my usual practice to take a less desirable plane out of the box first, especially if it needs testing anyway. Then I can develop my "indoor touch" once again without risking the "good stuff". In this case I took out plane #2 which I regarded as the worst in the box (the "dog") and began the series of 1/6 motor test flights. After the last day of testing of several planes, guess what ? The "dog" of the bunch was doing the best time! Not being one to argue with the facts, I made my first few official flights with plane #2 and it made my second longest flight of 35:29. The full motor flights however, were turning up some problems- like power stall and a huge first circle. At this point, the competition was already won, but I switched off to the #5 plane for the remainder of the officials and it behaved perfectly.
O.K., so we tested and adjusted the planes and managed to win the world championship. Now for the rest of the story:
The prop I had selected as being best had been modified from an old F1D 17-1/2" prop made in the 1960's. Props made during this era were very light and delicate and this one was no exception. when I arrived home from Romania, I found I needed a drawing of this prop to go with the drawing of the plane. So when I started measuring it, guess what? One blade was broken in 4 places ! The three inboard ribs were cracked just behind the spar and the outline was broken at the rear spar junction. All were being held in position only by the sturdy green microfilm covering. I knew immediately that this was steering damage and that it must have occurred during my 1 Lt round attempt when the prop caught on the line. So all of my official flights were made using a prop that was broken in 4 places. How about that ?

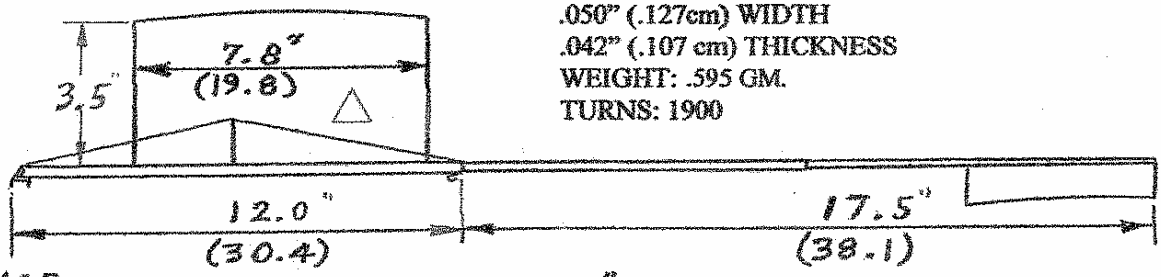
DESIGN & FLIGHT by JAMES RICHMOND
AMA Cat IV record flight of 36min, 15 sec
at Slanic Prahova, Romania on 10/11/02
(2002 Indoor World Championships.)

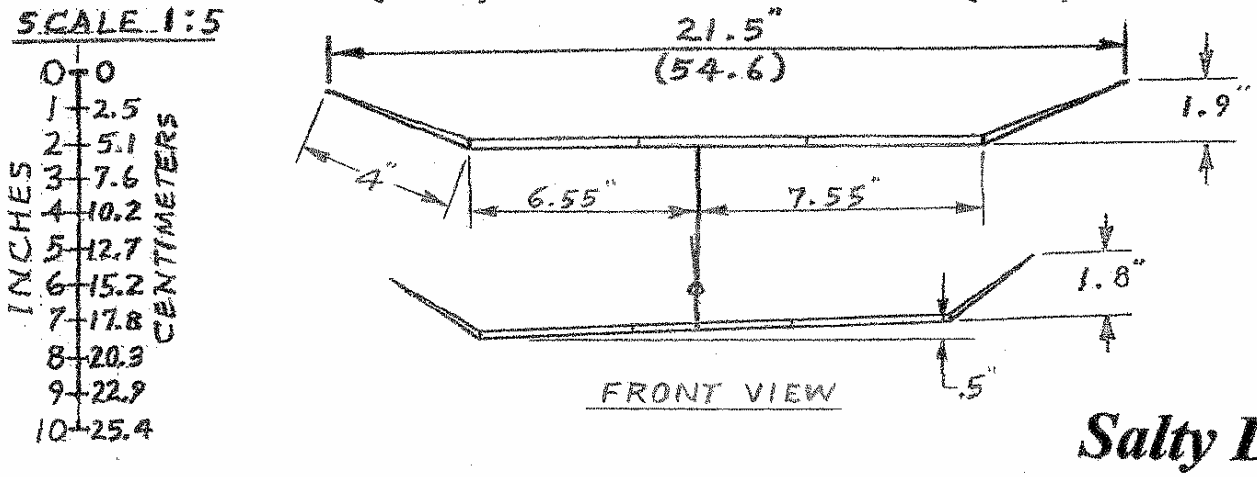


WEIGHTS	GRAMS
WING	.288
PROPELLER	.150
BODY+TAIL	.578
BALLAST	.185
TOTAL	1.201

PROPELLER
18.6"(47.24 cm.) Diameter
27" Pitch

RUBBER MOTOR
9.5" (24.13 cm)
.050" (.127cm) WIDTH
.042" (.107 cm) THICKNESS
WEIGHT: .595 GM.
TURNS: 1900

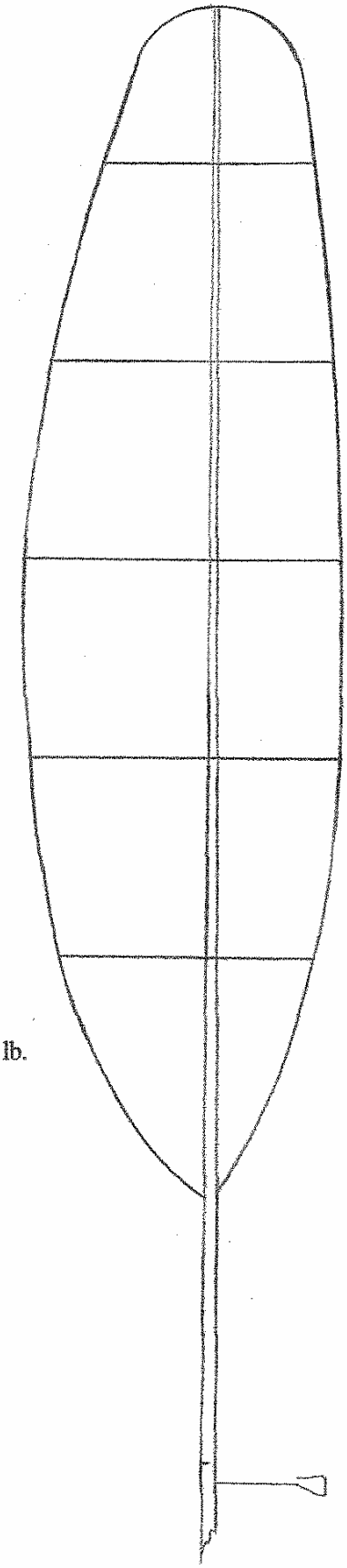




Salty Dog

Materials & Dimensions

Wing	
spars	.035 x .046 - 5 lb.
	.003 boron top & bottom
middle ribs	.030 x .037 - 4.5 lb.
compression ribs	.032 x .040 - 4.5 lb.
tips	.032 x .043 - 6 lb.
tissue tubes (2)	1/16 I.D. x 3/8 long
airfoil	3 % arc
Stabilizer	
spars	.042 x .032 - 5 lb.
ribs	.030 x .040 - 4.6 lb
tissue tubes (2)	.050 I.D. x .300 long
airfoil	2.5 % arc
Motor Stick	
tube	.0135 wall- .250 I.D. x 12"- 3.9 lb.
	(3) .003 boron ; (each side& bottom)
webs	.020- 4.5 lb.
rear hook	.013
bracing post	.045 x .045→.034 x .934- 5.5 lb.
thrust bearing	.012 aluminum
wing posts (2)	.037 x .045 x 3.5"- 5.5 lb.- ends
	fattened to mate with 1/16 I.D.
	wing tubes. .003 boron 3 sides
Extension	.010 wall - .250 O.D. x 9"- 3.9lb.
Tail boom	
tube	.009 wall- .235 O.D.→.100 O.D. x 9"- 3.9 lb.
stab post (front)	.054 x .035 x 1. 200 "- 5.0lb.
stab post (rear)	.054 x .035 x .950"- 5.0lb
Propeller	
spar	.055 x .090→.030 x .030 x 18.6- 4.5 lb.
ribs	.020 x .020- 4.5 lb
outline	.020 x .020- 4.5 lb
shaft	.013 dia.
airfoil	3.5% arc



UNI DOME INDOOR R/C SCALE EVENTS
March 1,2, 2003, Cedar Falls, IA
Sponsored by Sig Mfg. Co.
Events:: Indoor R/C Fun Scale and Indoor R/C Sport Scale plus the following free flight events.

NON RULE BOOK FF EVENTS
NO-CAL PROFILE SCALE (similar to FAC guidelines)

1. A simple event for recognizable profile with a wingspan limit of 16 inches and single surface covered with Jap tissue or the equivalent.
2. Total of three flights to determine score. Highest score wins. Flyoff to break ties.
3. Ant flight of 20 seconds or more is official. All flights hand launched. No maximum flight time.
4. Model must have control outlines, registration or letters, windows, or windshield and open fuselage. Wheel wells for retractable gear must be shown where applicable.
5. Models must be in color scheme of any of the ones used on original aircraft.
6. Models must have full landing gear. No profile landing gear allowed. Retractable gear may be in the up position.
7. All wing struts must be on the model. Judges decisions are final.

ONE DESIGN DURATION - based on the AMA Cub as kitted by Sig. Mfg. Co.
Jr. class - 15 and under.

1. Must use the AMA Cub (delta dart) kit by Sig. Mfg. Co. The stock plan/covering, prop assembly, and wood sizes must be used. No tissue, undersized wood, or changed outlines or dimensions allowed.
2. Rubber motors may be altered to suit conditions.
3. The highest total time of two flights will be added to make the final score. Highest time wins. Five attempts are allowed. Any flight over 10 seconds counts as an attempt.

OPEN CLASS (Let's see what the old guys can dream up)

1. Must use the AMA Cub (Delta Dart) kit by Sig mfg. Co. The stock plan/covering and prop assembly must be used.
2. Scoring to be the same as Jr. class.

ELECTRIC DURATION RULES
Indoor Electric Duration (RC) For event 627
Plane shall not exceed 21 ounces flying weight. Maximum wing loading shall not exceed 3 ½ ounces per square foot.
Battery size is limited to six (6) 50 mAh cells. The plane shall fly a circular or oval or figure 8 course as specified by the judges. Either ROG or hand launch is permitted. Total points will be duration time in seconds. Contest Director will determine number of events allowed.

FREE FLIGHT ELECTRIC POWER
For event 221
1. Model Specifications. The models shall be powered by no more than two (2) Nickel Cadmium 50 mAh cells and may weigh no more than one ounce. There shall be no other restriction on model size or configuration.
2. Scoring. Scoring shall be based on the duration of the best single flight of three (3) attempts.
3. Timing. Time shall be recorded in minutes and seconds, with fraction of seconds dropped. Timing shall begin when the model is hand launched, and ends when the model touches the floor or contacts any part of the building and ceases traditional movement for longer than ten (10) seconds.

Publishers note:
This event is primarily RC. The free flight events are scheduled to fit into the RC flying. The HVAC system will NOT be turned off.

Fly hours will be from 6pm to 11pm on Saturday the 1st and from 7am to 4pm on Sunday.
Contact Name : Bob Nelson, 433 Ardmore, Waterloo IA 50701. E-mail : bobsrc@forbin.net
Day Phone : 319-277-0211 Night Phone : 319-233-4771

CargoLifter Loafer by Laurie Barr

This EZB/F1 L is number 4 in the series built over the last 5 years. Its forerunner's had by now become heavy with age and repairs, and knowing I was going to the Cargolifter hanger, and the immense height available, I went to a lot of trouble to ensure great stiffness, while keeping the airframe to 1.2 grams.

Most EZB's only fly in low ceilings, are much too floppy, and cannot cope with the huge launch torque required to make the most of very high ceilings, like Cardington etc. As the great American Sal Taibi once remarked "Altitood is everything"!

This year in Hanger 1, we have enjoyed relaxed flying, and more people have turned up to fly. Many of their models are built with ordinary balsa, with sagging wings and tailbooms, and the contortions they make when fully wound, wastes all the first burst of rubber power, and they never reach the roof!

Having now defined the detailed structure, I went to great lengths to test all the wood used, to find the highest S.C (Stiffness Coefficient *) rating I could.. I was fortunate, in that some of the wood used, was donated ("Extracted under duress"!) from Bernie Hunt, some of which had a S.C rating of 130!

I was determined not to exceed 1.2 grams, so I built and covered the whole model except the motorstick, and weighed the structure to find the amount of weight I could use in the motorstick, which would have to cope with almost every turn I could apply to it, without too much twist that would warp the wings too far on launch, or bow the motorstick to give too much downthrust.

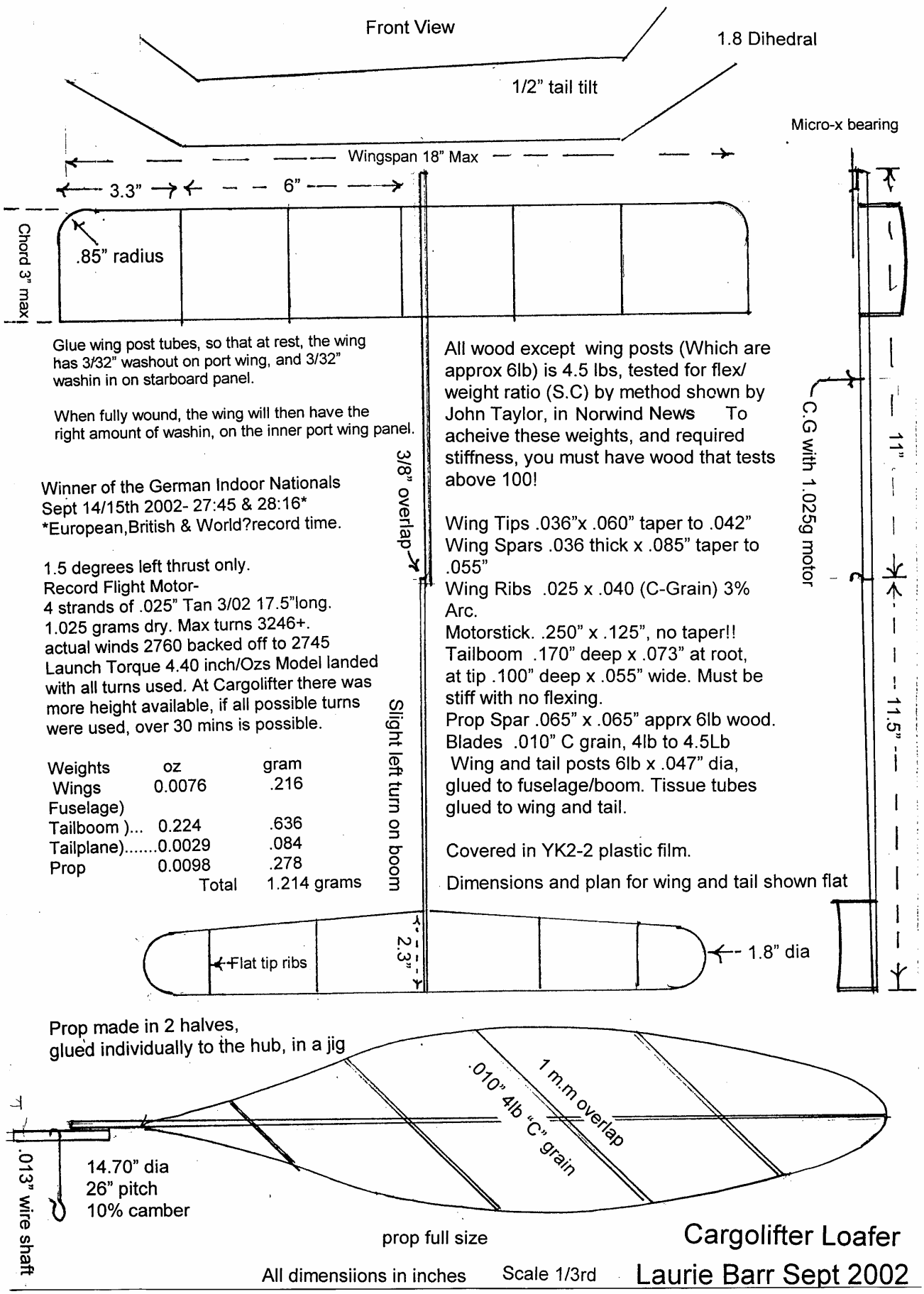
In amongst my rag-bag of "treasures", I found a piece of 1/4" x 1/8", that was exactly what I was looking for, and did not require, any shaping to bring it down to weight. It had Red "spidery" writing on it, just like Bernie Hunts hand produces! ! The end result of all this, is a model that seems to be able to take any amount of launch torque, and is launched vertically like a Javelin, and climbs without hesitation to great heights.

I hope to return next year, and give it all the motor can take, and just see if I can reach the roof at Cargolifter, 320 ft above!

-Laurie Barr. Oct 2002

* I enclose a copy of the original article By Bernard Hunt and John Taylor. Maybe the Editor will publish this not to hard to follow measurement of strength and weight testing.For those not willing to do this, make several motor sticks, tailbooms, Wing Spars, and do a simple deflection test with a small weight, which will at least tell you, which of each, is the best you have! It will not tell you that it is good enough, as compared to S.C testing, until you test fly the whole model, but it is still better than guess work.

(Editors note: We published the balsa testing process in the previous issue of INAV)


Front View
1.8 Dihedral
1/2" tail tilt
Micro-x bearing
Wingspan 18" Max
3.3"
6"
Chord 3" max
.85" radius
Glue wing post tubes, so that at rest, the wing has 3/32" washout on port wing, and 3/32" washin in on starboard panel.
When fully wound, the wing will then have the right amount of washin, on the inner port wing panel.
3/8" overlap
Slight left turn on boom
All wood except wing posts (Which are approx 6lb) is 4.5 lbs, tested for flex/ weight ratio (S.C) by method shown by John Taylor, in Norwind News To acheive these weights, and required stiffness, you must have wood that tests above 100!
Wing Tips .036"x .060" taper to .042"
Wing Spars .036 thick x .085" taper to .055"
Wing Ribs .025 x .040 (C-Grain) 3% Arc.
Motorstick. .250" x .125", no taper!!
Tailboom .170" deep x .073" at root, at tip .100" deep x .055" wide. Must be stiff with no flexing.
Prop Spar .065" x .065" apprx 6lb wood.
Blades .010" C grain, 4lb to 4.5Lb
Wing and tail posts 6lb x .047" dia, glued to fuselage/boom. Tissue tubes glued to wing and tail.
Covered in YK2-2 plastic film.
Dimensions and plan for wing and tail shown flat
C.G with 1.025g motor
11"
11.5"
Winner of the German Indoor Nationals
Sept 14/15th 2002- 27:45 & 28:16*
*European,British & World?record time.
1.5 degrees left thrust only.
Record Flight Motor-
4 strands of .025" Tan 3/02 17.5"long.
1.025 grams dry. Max turns 3246+.
actual winds 2760 backed off to 2745
Launch Torque 4.40 inch/Ozs Model landed with all turns used. At Cargolifter there was more height available, if all possible turns were used, over 30 mins is possible.
Weights oz gram
Wings 0.0076 .216
Fuselage)
Tailboom)... 0.224 .636
Tailplane).....0.0029 .084
Prop 0.0098 .278
Total 1.214 grams
Flat tip ribs
2.3"
1.8" dia
Prop made in 2 halves,
glued individually to the hub, in a jig
.010" 4lb "C" grain
1 m.m overlap
.013" wire shaft
14.70" dia
26" pitch
10% camber
prop full size
All dimensiions in inches
Scale 1/3rd
Cargolifter Loafer
Laurie Barr Sept 2002

US Indoor Championships 2003 Johnson City, Tennessee

May 30 – June 3, 2003

See the Contest Calendar for contact information. Forms and details are available online in the Contest Listings section of www.IndoorDuration.com

UNITED STATES INDOOR CHAMPIONSHIPS 2003 SCHEDULE

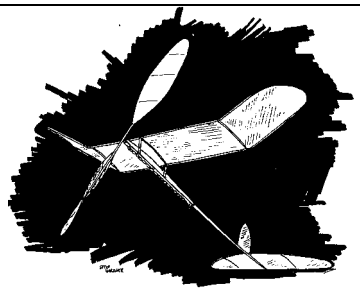
WEDNESDAY 28 MAY 2002	7:30 – 2:00 IHLG STD. CATAPULT UNLIM. CATAPULT RTP SPEED * STRAIGHT LINE SPEED * RACE TO THE ROOF *	2:01 – 3:00 P-24 LAUNCH* AT 2:30	3:01 – 6:00 INTERMEDIATE STICK 35 CM *	6:01/6:30 NO LAUNCH RETRIEVAL	6:31 – 10:00 INTERMEDIATE STICK 35 CM *
THURSDAY 29 MAY 2003	7:30 – 1:00 FAC PEANUT * BOSTONIAN HI WING MONOPLANE * PIONEER * MODERN CIVIL PRODUCTION * WW 1 MASS LAUNCH * 1130 BOSTONIAN MASS LAUNCH 12:30 * UNLIMITED RUBBER SPEED *	1:01 – 4:00 F1D HAND LAUNCH STICK CABIN ROG	4:01/4:30 NO LAUNCH RETRIEVAL	4:31 – 10:00 F1D HAND LAUNCH STICK CABIN ROG	
FRIDAY 30 MAY 2003	7:30 – 12:00 AMA SCALE KIT PLAN SCALE DIME SCALE * PISTACHIO * SCIENCE OLYMPIAD.*	12:01 – 3:30 MINISTICK EZ-B F1L * A ROG *	3:31/4:00 NO LAUNCH RETRIEVAL	4:01 – 10:00 MINISTICK EZ-B F1L * A ROG *	
SATURDAY 31 2003	7:30 – 1:00 FAC SCALE * GOLDEN AGE * COCONUT SCALE * NO CAL SCALE * AMA PEANUT SCIENCE OLYMPIAD * WW II MASS LAUNCH 10:30 * COCONUT MASS LAUNCH 11:30 *	1:01 – 3:00 PENNY PLANE MANHATTAN ELECTRIC DURATION	3:01/3:30 NO LAUNCH RETRIEVAL	3:31 – 7:00 PENNY PLANE MANHATTAN ELECTRIC DURATION	7:01 – 10:00 AUTOGIRO HELICOPTER ORNITHOPTER A-6 *
SUNDAY 1 JUNE 2003	7:30 – 11:30 LIMITED PENNYPLANE F1M*	11:31/12:00 NO LAUNCH RETRIEVAL	12:31 – 3:00 LIMITED PENNYPLANE F1M *	3:01 – 6:00 PREPARATION TO DEPART THE BUILDING MUST BE CLEARED PRIOR TO 6 PM *= NON AMA EVENTS HAVE A GREAT WEEK !!!!	

GOLD NUGGETS

MERRY CHRISTMAS and THOUGHTS FOR THE NEW YEAR

by Alan Cohen

gleened from the Indoor List



It was this time last year that I purchased a few gliders as stocking stuffers as well as my first Guillows stick and tissue 'toy' for the kids. My only model airplane experience before that was the proverbial paper dart. I used to think I was pretty well rounded and knew at least a little about a whole lot of things, but I never knew this world of indoor free flight existed at all. It still amazes me.

Well it has been a year and the indoor bug has bit me hard. I've gone from my first EZB kit that weighed over 2g to the magic of 400mg EZBs that seem to float in air and mesmerize all who see them fly. I look forward to another year of wonderment and all the challenges and frustration that go with it all.

I would just like to say that the best part of this hobby has been all the interesting people I've met along the way. While there are many that enjoy this bizarre activity when exposed to it, there aren't many who pursue it. I am proud to consider myself one among you. The reasons we do this would make for a very interesting thread, but I've been through more than enough in this lifetime to consider life far too important to take seriously. I am sure I'm not alone.

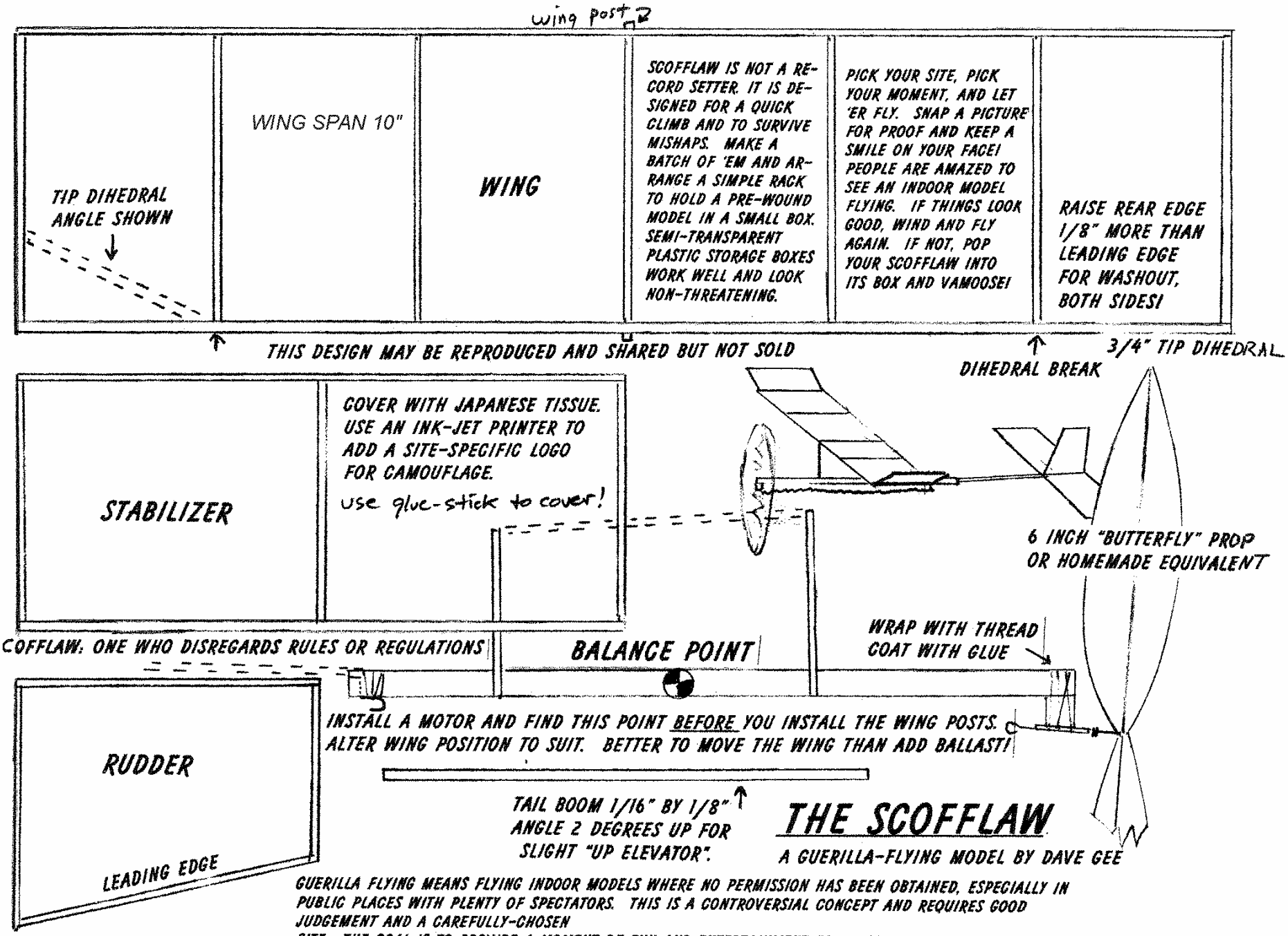
There are some that would consider what we do an utter waste of time. I would argue, isn't everything ultimately an utter waste of time! We might as well enjoy the time we're wasting.

As I look around I see so many people rushing here and rushing there...spending so much time doing things FOR their kids they forget to do things WITH their kids. This time of year reminds us once again, it is all about the children. It is not the presents they really want, it is OUR TIME to enjoy them together. Someone once asked me if I could do one thing over again what would it be. My answer was...to have a catch with my dad in our old backyard one more time.

The unusual thing about model airplanes is that is bridges all age barriers. Pass it on....it means more than you can imagine.

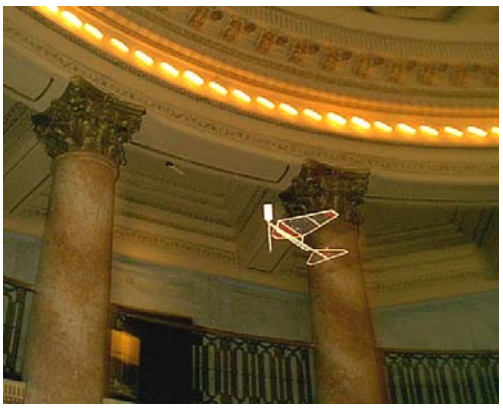
Merry Christmas to all.

Alan Cohen



GUERILLA FLYING MEANS FLYING INDOOR MODELS WHERE NO PERMISSION HAS BEEN OBTAINED, ESPECIALLY IN PUBLIC PLACES WITH PLENTY OF SPECTATORS. THIS IS A CONTROVERSIAL CONCEPT AND REQUIRES GOOD JUDGEMENT AND A CAREFULLY-CHOSEN SITE. THE GOAL IS TO PROVIDE A MOMENT OF FUN AND ENTERTAINMENT FOR PASSERS-BY AND POSITIVE EXPOSURE FOR INDOOR FLYING.

Guerilla Indoor Flying
by Dave Gee stukadave@cs.com



Right: Parlormite in Los Angeles County Museum of Natural History

"Guerilla Indoor Flying" is the practice of flying an indoor model without permission, especially in a public place, with the goal of delighting passers-by who might never otherwise see an indoor plane in action. Proponents have established an etiquette of accepted techniques to help discourage ventures that could cast a negative light on our sport. The concept involves very lightweight rubber-powered models, generally smuggled into the site fully-wound. A well-chosen venue has fairly still air, plenty of space overhead, and steady pedestrian traffic. The plane must be utterly harmless to all objects it may strike, human or structural. Photography is encouraged, to help in sharing one's exploits over the internet.

The basic concept is nothing new. Individuals have launched planes in interesting but unauthorized sites ever since indoor model flying began. I myself once set an unofficial record for indoor helicopters of 500mph at 34,000 feet in a Pan Am airliner cabin. This record might never be broken because Pan Am went out of business shortly thereafter, hopefully for reasons unrelated to my activities.

With the rise of internet communication, word of such isolated adventures could be spread worldwide accompanied by color snapshots. If conventional indoor modeling was a bit sedate, a Man Of Action could achieve fame overnight (if he avoided arrest).

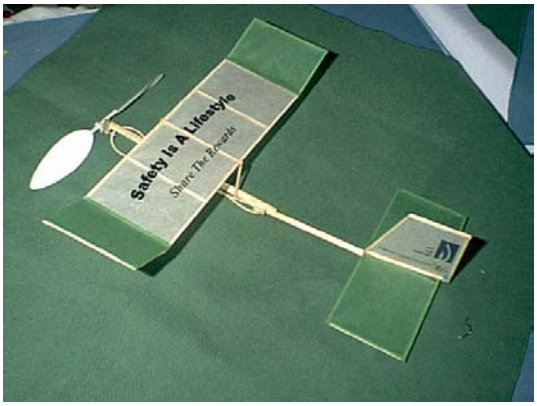
At the turn of the century Guerilla Flying was becoming not just popular but controversial, as opponents argued that such antics risked our already precarious access to legitimate sites. Websites hosted stimulating discussions on whether Guerillas should be encouraged or suppressed. Suddenly, the 9/11 attacks settled the question. Such shenanigans were, at least for the moment, clearly inappropriate.

Now the guerilla flyers are timidly re-emerging. As an ardent proponent, I decided to test a specialized design called Scofflaw. Like a cheesy superhero with a secret identity, the prototype has performed at many classroom demonstration sessions, trimmed for level flight. However, when retrimmed for a fast climb it has occasionally ventured into forbidden airspace. Simple, sturdy construction helps Scofflaw survive being smuggled and flown in unusual places.

In today's security-conscious society a guerilla flyer must carefully choose his site and never appear furtive or suspicious. Use a semi-transparent plastic box to hold a pre-wound Scofflaw and a winder. No tools, nothing harmful. If possible bring some kids along to help. You will be busy so have someone else do the photography. Wear a smile and keep a friendly attitude. Choose an open area slightly off the beaten path, so as not to create a traffic-jam hazard. Launch at an opportune moment and the fun begins. Interested spectators will immediately pepper you with questions. Usually, 1 or 2 nice flights and a departure can be made before being noticed. If an authority figure does object, politely apologize and quickly pack up. The crowd will generally take your side and provide verbal cover for your escape.

Do these techniques work? Anonymous Los Angeles guerillas have made flights in Union Station, the Natural History Museum rotunda, and a helicopter ascent in the Downtown Main Library atrium. The Ontario and San Diego convention centers have been similarly defiled. Coincidentally I have the pictures to prove it.

Scofflaw in flight. Major hotel, lobby atrium, 5:00 am



Scofflaw prototype, wearing computer printed tissue with Guerilla-Flying camouflage corporate logo

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The First Gorilla E-Postal Contest
By Mark “Gorilla” Bennett

Having flown my Limited Pennyplane in about 600 classrooms over the past 5 years, I still get a lift from watching students' reactions. I'll never forget overhearing a certain comment. A 5th grade boy whispers to a friend, "Gee...his toys are BETTER than our toys." While such classroom flying would not qualify as guerilla flying, experienced indoor fanatics should seek opportunities to expose the beauty of slow flying indoor models to the public. Guerilla flying, as described on Dave Gee's Scofflaw plan, means "flying indoor models where no permission has been obtained, especially in public places with plenty of spectators. This is a controversial concept and requires good judgment and carefully chosen site." A newcomer to indoor, Alan Cohen, described his first experience flying his Ministick in a shopping mall and mistakenly called it "Gorilla" flying. A few participants on the indoor mailing list http://groups.yahoo.com/group/indoor thought his misnomer was more appropriate in a post-9/11 world--a bit more humorous, less threatening than "guerilla."

Why not use the postal contest format to combine some elements of contest flying with 'rilla flying? The First Gorilla E-Contest will attempt to fuse serious flying--AMA Ministick--together with flying in public places, possibly unwelcome by authorities, but probably enjoyed by public. The number of people who stop to gawk at flight are multiplied by flight time. For measuring purposes, it's important that spectators STOP to watch. Hopefully, out of those spectators who stop, some will want to chat with the flyer, who can perhaps offer whatever follow-up appropriate, such as phone number, or a prepared handout sheet. Some situations, such as captive audiences, do not count in this contest, even though the situation may be laudably gorillian. For example, a football stadium has a mostly seated, captive audience, so those seated would not count, nor would a classroom, nor a bored board meeting. Shopping malls are ideal. 2003 winner will receive the "Plastic Gorilla" trophy. Also, Top Gorilla for 2003 gets privilege of adjusting the rules if desired, for 2004, after discussing such with the Yahoo indoor list. Entries should be posted online to http://groups.yahoo.com/group/indoor through April 30, 2003. Snail mail entries can be sent to Gorilla Bennett, 1315 F St. #5, Sacramento, CA 95814. Feel free to share accompanying story about your Gorilla experience. Keep in mind the goal for the First Gorilla E-Contest is to generate positive reaction to indoor free flight. But be prepared to leave quickly when asked, or preferably before asked! Be safe, be friendly, be a Gorilla.

Rules for First Gorilla E-Contest, 2003.

1. Eligible flights are flown with Ministick design per AMA rules.
2. Score shall be time in minutes and fraction of minute multiplied by the number of spectators who stop to watch flight. Example: flight time, 1 minute, 30 seconds, 7 spectators. Score-10.5 spectator minutes.
3. A spectator is someone, previously unknown to flyer, who comes to complete stop for at least 10 seconds, as judged by the flyer.
4. Flyer may time his/her own flights.
5. If flyer is arrested, jailed, shot, or forcibly removed by law enforcement, all flights made by flyer are disqualified for purpose of Gorilla E-Contest. However, to be otherwise "kicked out" of site does not render flights invalid.
6. Scores are eligible on flights made from Jan.1, 2003 to April 30, 2003.

Entries to: Gorilla Bennett, 1315 F St. #5, Sacramento, CA 95814
e-mail: KBT45231@AOL.com

Originally published in INAV January 1971

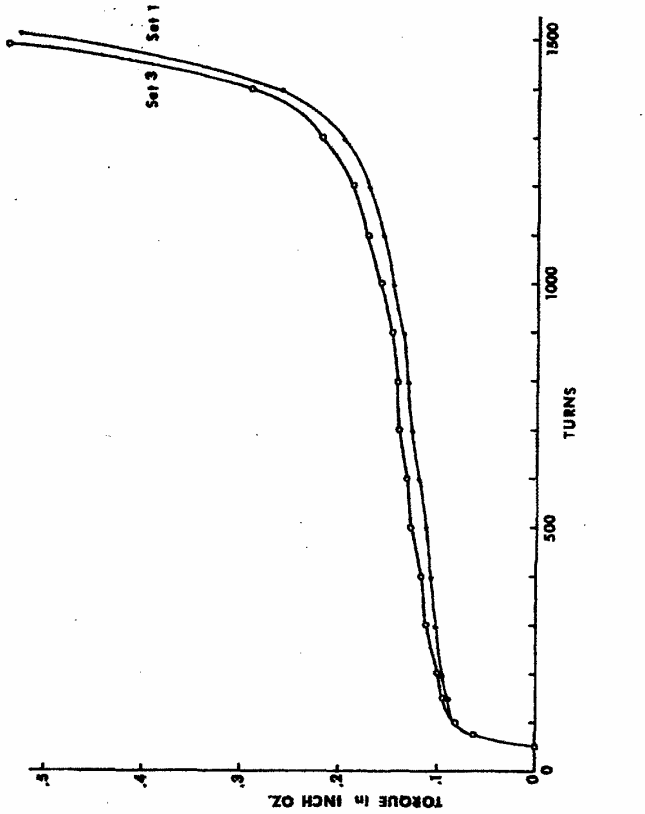
THE LAB

Artificial Aging of Rubber

Quite some time ago (early in 1969) an ambitious program of rubber testing was initiated with the help of other fliers around the country. Some of the rubber samples broke under testing, a few of the tests never got started, and some of them were finished properly. To the dismay of the testing personnel, the laboriously generated data vanished into the NIMAS archives while waiting for more to come in. Out of sight-out of mind! Upon proper prodding, the missing data have been exhumed and part of it has presently been computer analyzed by Bob Meuser, and the plots below have been traced from computer generated plots. Each plot is the average of identical tests performed on each of three motors from the same batch, with identical handling and break-in procedures. In this case, the test was to examine change in characteristics of pirelli after storage at elevated temperatures.

Four complete sets of motors were prepared, and coded in groups of three. Set #1 was held as a control, while sets #2, 3 and 4 were subjected to storage at 120° F. for 48 hours, 96 hours and 144 hours respectively. Comparison of 12 graphs (for the third windup on each motor) showed the most interesting change to have occurred with set #3 (96 hours exposure), and this graph is compared to the graph of set #1 (control) below.

Bob Meuser analyzed the results thus: "It appears that aging and prewinding both increase the energy storage for the same maximum torque. But if aging and prewinding decrease the torque that the motor can stand without breaking then the energy may not be increased. It would have been very interesting to continue the testing for several more wind-ups, ultimately winding to deliberate destruction as a measure of ultimate energy storage."



Pigtail Bearings 101

By Alan Cohen

I have always liked building things, especially from wood. From furniture to acoustic guitars to golf clubs, I love starting the day with nothing but an idea and some wood, and ending up with something that works. Like myself, anyone who 'builds things', whatever it might be, has inevitably come across the need for a third, or better yet, fourth hand. You can have all the vises and clamps in the world, but sometimes nothing will work as well as some extra appendages.

Nowhere have I found this to be truer than in the world of indoor duration model airplanes. Granted, I have only been involved in this little obsession for a year, but I still haven't found a clamp or vise yet that will help me hold that broken, Y2K2 covered, .035" x .025" wing spar together while I get out the glue bottle and apply just the right amount in just the right place and hold it all together in perfect alignment for the obligatory 15 minute cure time.

This brings me to my dilemma with pigtail bearings and the reason for this article.

Not being fortunate enough to have a local mentor, I have had to resort to learning almost everything from reading and trial and error. I am one of the lucky ones who has been able to obtain a copy of Ron Williams' book, "Building and Flying Indoor Model Airplanes", and between that, the INAV archive and the inspiration of a few friends, I have been able to get a few models off the ground.

At first I didn't know pre-made aluminum thrust bearings existed so my first couple of models had bearings made from music wire per Ron's instructions. I wasn't concerned about weight and my first attempts were a 2+-gram EZB and a 4.5-gram Limited Pennyplane with bearings made out of .020 wire. After lots of tweaking they came out okay…heavy, but okay.

My next 'enlightened' versions were made with aluminum bearings and how I relished the ability of being able to skip that awkward step. The honeymoon was short-lived, however. After several more models, I discovered a few serious drawbacks to the aluminum bearing. First, was getting it to stay glued to the motorstick. I lost the majority of two planes due to the untimely disassembly of the bearing while fully loaded with rubber. Second, was the clearance limitation under the motorstick. I found myself adding shims to get the right amount of clearance and subsequently another unnecessary glue joint to the mix. The third was inconvenient down thrust adjustments. Aluminum just doesn't lend itself to bending back and forth. Fourth was weight. Sure I could shave down the aluminum to lighten it up, but by the time I did that I could have made a pigtail. Plus, with pigtails, I can use whatever size wire fits the weight of the model. I am not bound to a 'one size fits all' bearing. And last as well as least was cost. I could make 20 pigtails for the price of an aluminum bearing.

So I had come full circle, back to making pigtails again. But now I had another problem. During the construction of the previous few models, with the help of the Hobby Shopper article and the investment in a scale, I had learned to build lighter and lighter. Then I came across Larry Coslick's Micro-B article in INAV 107. My mind expanded more in the next few weeks than it had throughout the entire '70s. Along with getting my brain around 20mg prop spars, 30mg prop blades, 32mg tail booms and 13mg stabs, I had to make pigtail bearings from .008 wire on a .009 mandrel. It's a good thing there isn't a videotape of me trying to make one of those little beasties, because I surely would be institutionalized with good cause. There was just no way I could keep the mandrel straight while bending the bearing around it.

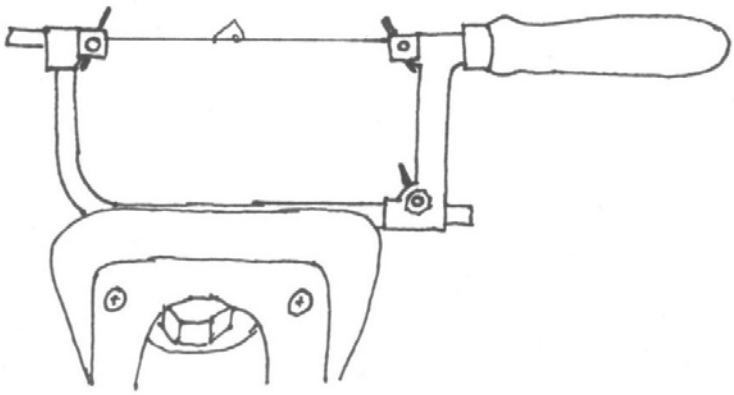
After several nights waking up in a cold sweat, pondering just how I could accomplish this Herculean task, it came to me. I needed four hands…two to keep the mandrel straight and two to bend the bearing. Now, where could I get two more hands? I needed something that would not only hold each end of the mandrel, but could pull it taught. I thought of stringing a full-length piece of .009 wire in a guitar and tuning it tight. That would work, but a bit of a pain. I could make a jig with a guitar tuner. That would work too.

Then I saw it…hanging innocently from my pegboard…my jewelers saw! With two thumbscrew clamps to hold the wire instead of the blade and another to pull it tight and the whole thing clamped upside down in my vise, I couldn't

believe how simple the solutions was. Since I've never been accused of being the sharpest razor in the box and I'm sure others have discovered this shortcut, I couldn't believe I had never read about this method anywhere before. I was now making 10 bearings in the time it took to make one and making them far more accurately. By having the mandrel pulled taught, it became very easy to make adjustments while maintaining prop shaft alignment. After each tweak it was easy to just give the bearing a spin to see if it was still true. By dry fitting the sliced motorstick, I could now make thrust adjustments before permanently mounting the bearing on the motorstick. I was in modeling heaven.

The exact step-by-step process of making a pigtail bearing has been well documented and is beyond the scope of this article, as well as my artistic ability, but if anyone is interested there is a very detailed picture demonstration at http://www.indoorfreeflight.com/wirenose.htm. Just insert a $10 jewelers saw into the process and you are in business.

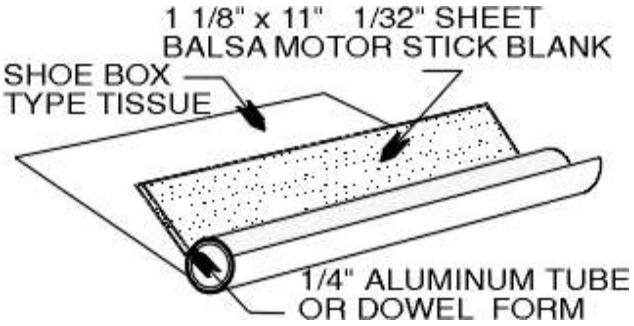
In my opinion, there is nothing more elegant than a well made pigtail bearing. It's easy to notice a well-covered wing, or a poker straight boom, but not much attention is ever paid to the bearing when ogling a model. The elegance is not so much in what it looks like, but in what it does to a stopwatch. Models these days are pushed to the very limits of balsa and rubber and when you consider how much of a models efficiency and flight profile is wound up in that little piece of wire, it is impossible to pay too much attention to it. I have heard flyers say the magic happens when you get the right prop/rubber combination. Well, the only thing holding them together is the thrust bearing. Make it a good one.



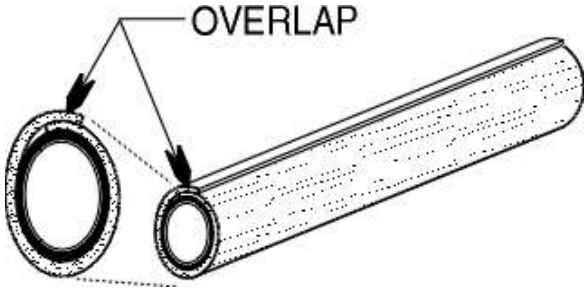
NO-CAL ROLLED BALSA TUBE

MOTOR STICK CONSTRUCTION

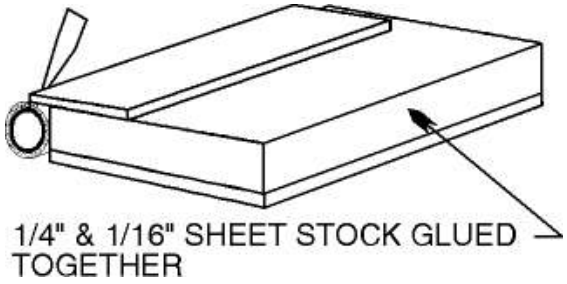
By Paul Bradley



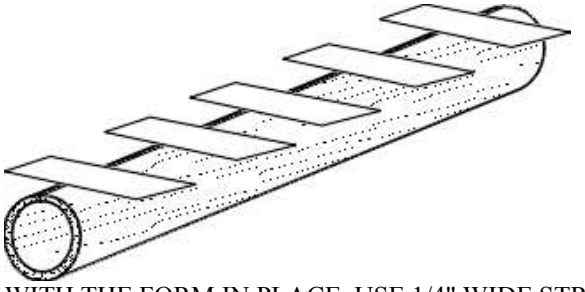
1. HOLD THE MOTOR STICK BLANK UNDER HOT RUNNING WATER FOR SEVERAL MINUTES.
2. MAKE ONE WRAP AROUND THE FORM WITH THE TISSUE.
3. PLACE THE WET BLANK BETWEEN THE TISSUE AND THE FORM AS SHOWN.
4. ROLL THE FORM ON TO THE TISSUE CAPTURING THE BALSA BLANK AS YOU GO. ROLL THE ASSEMBLY UNTIL 5 OR 6 WRAPS OF TISSUE HAVE OCCURRED.
5. HOLD THE ASSEMBLY TOGETHER WITH BANDS OF MASKING TAPE PLACED ABOUT 2" APART.



6. LET THE ASSEMBLY DRY OVER NIGHT, OR BAKE FOR 15 MIN IN AN OVEN ON LOW HEAT.
7. AFTER THE ASSEMBLY IS DRY, REMOVE THE MASKING TAPE AND THE TISSUE PAPER. YOU MAY NEED TO SLIDE THE FORM OUT OF PLACE TO BE SURE ALL TISSUE PAPER IS REMOVED.
8. THERE SHOULD BE AN OVERLAP WHERE THE EDGES OF THE BALSA BLANK COME TOGETHER.
9. SLIDE THE FORM BACK IN TO THE ASSEMBLY.



10. MAKE UP A TRIM SUPPORT BASE FROM PIECES OF 1/4" AND 1/16" STOCK AS SHOWN.
11. USING MASKING TAPE, ATTACH THE MOTOR STICK AND FORM UNIT TO THE SUPPORT BASE. THE OVERLAP SHOULD BE FACING UP.
12. LAY A STRAIGHT EDGE ON THE MOTOR STICK AND SUPPORT BASE AS SHOWN. MAKE SURE THE CUTTING GUIDE EDGE IS PARALLEL WITH THE UNIT, AND CENTERED IN THE OVERLAP AREA.
13. CUT THROUGH BOTH LAYERS OF THE OVERLAP ALONG THE STRAIGHT EDGE.
14. AFTER THE CUT IS MADE, REMOVE THE MASK- - ING TAPE AND THE TWO STRIPS OF SCRAP MATERIAL.



15. WITH THE FORM IN PLACE, USE 1/4" WIDE STRIPS OF MASKING TAPE TO "CLAMP" THE JOINT TOGETHER. MAKE SURE THE JOINT IS STRAIGHT.
16. SLIDE THE FORM OUT OF THE BALSA TUBE.
17. WICK CA ADHESIVE INTO THE JOINT BETWEEN THE TAPE STRIPS. A SMALL AMOUNT WILL COVER A LOT OF AREA.
18. WHEN THE CA HAS FULLY SET UP, REMOVE THE TAPE STRIPS. LIGHTLY SAND.

CARGOLIFTER PHOTO ALBUM
SEPTEMBER, 2002

Cargolifter in Autumn

The Czech Team

The Lineup of Tables

Paula & John Tipper, Ron Green, Andras Ree, Laurie & Betty Barr

Well Prepared Bob Bailey of Britian's F1D Team

A lot to See in the Area

EUROPEAN F1D CHAMPIONSHIPSFOR SENIORS AND JUNIORS.
OPEN INTERNATIONAL FOR F1D, F1L AND F1M.
'CARGOLIFTER 'HANGER, BREISEN-BRAND, GERMANY.

The schedule of events is:

THURSDAY	**OCTOBER 2ND.**	**Arrival, registration and team Managers meeting.**
FRIDAY	**OCTOBER 3RD.**	**08.00-13.00 registration & practice.**
		13.30 opening.
		14.00-18.00 round 1 flights.
		16.00-20.00round 2 flights.
SATURDAY	**OCTOBER 4th.**	**08.00-14.00 registration & practice.**
		14.00-18.00 round 3 flights.
		16.00-20.00 round 4 flights.
SUNDAY	**OCTOBER 5th.**	**08.00-14.00 registration and practice.**
		14.00-16.30 round 5 flights.
		15.30-18.00 round 6 flights.
		20.00-24.00 banquet & prizegiving.

Entry fees will be CHF (Swiss Francs) 300 for senior competitors and CHF 255 for juniors. CHF 45 for senior supporters, CHF 30 for junior supporters. The banquet fee is 20 EURO'S for adults and 10 EURO'S for children under 14.

The accommodation and food is to be arranged by competitors. Hotel information will be available.

There will also be an OPEN INTERNATIONAL competition for F1D, F1L and F1M. This will be flown at the same time as the Euro' Champs in a different part of the hanger.

Given the financial state of the 'CargoLifter' company, the fate of the hall will now be decided by the local authorities and this may be the only time that the hanger can be used for such a championships.

This from the SCAT on-line newsletter
Posted by Rick Pangell TheMaxOut@aol.com

Telescoping Poles- A New Source

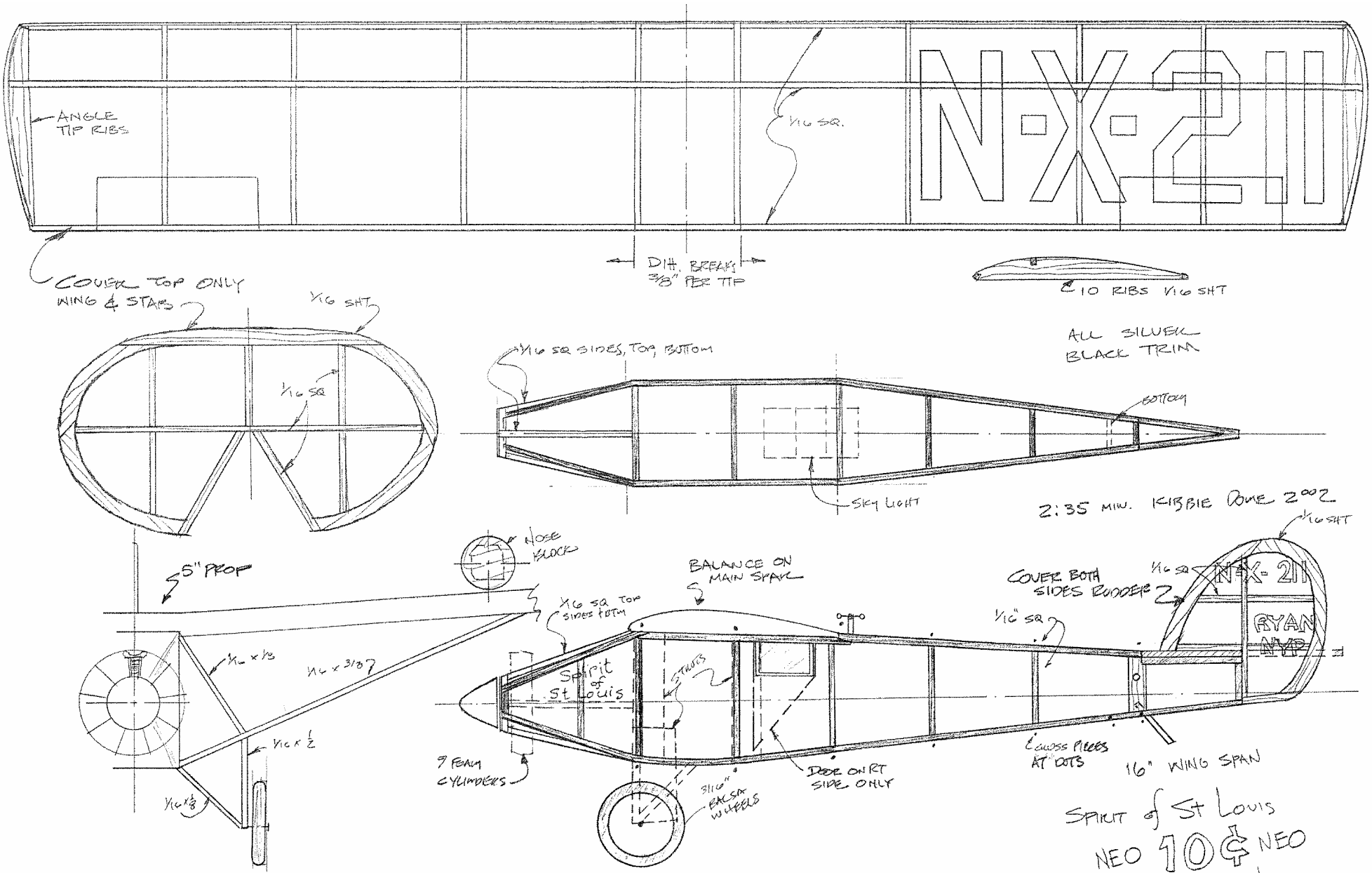
There's a line of fishing poles called "Wonderpole." They are billed as 20 feet long, six-section, telescoping. These are fiberglass base tubes and carbon fiber at tip and list for $19.95 at the Shakespeare website:

www.shakespeare-fishing.com

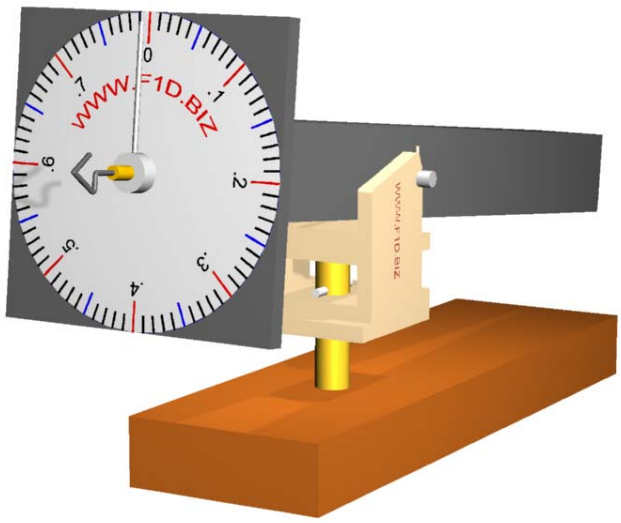
Click on the link "products" to "rods" to "Wonderpole" and the listing comes up. There is a description of the poles offered. The TSP-20 is the 20-footer.

They can also be obtained at:

www.eAngler.com


ANGLE TIP RIBS
1/16 SQ.
N-X-211
DIH. BREAK 3/8" PER TIP
COVER TOP ONLY WING & STABS
1/16 SHT
1/16 SQ
10 RIBS 1/16 SHT
ALL SILVER BLACK TRIM
1/16 SQ SIDES, TOP, BOTTOM
BOTTOM
SKY LIGHT
2:35 MIN. KIBBIE DOME 2002
1/16 SHT
NOSE BLOCK
5" PROP
BALANCE ON MAIN SPAR
COVER BOTH SIDES RUDDER
1/16 SQ
N-X-211
RYAN NYP
1/16 SQ TOP SIDES BOTM
1/16" SQ
1/16 x 1/8
1/16 x 3/16
Spirit of St Louis
STAYS
1/16 x 1/2
1/16 1/8
9 FOAM CYLINDERS
3/16" BALSA WHEELS
DOOR ON RT SIDE ONLY
CROSS PIECES AT DOTS
16" WING SPAN
SPIRIT of ST LOUIS
NEO 10¢ NEO
by DAVE HAUGHT

Torque Meter Review
By Jake Palmer



I recently had the opportunity to purchase a new torque meter from Tim Goldstein of Tru-Weight Indoor Balsa and he asked me to share some of my thoughts on this new item so here they are.

The meter arrived in a small box heavily packed with foam peanuts. My first impressions as I unpacked the box were very good as the unit is quite attractive. The base consists of some laser cut plywood pieces that are preassembled. This plywood assembly rotates on a brass rod that is firmly mounted in a nice piece of oak. The meter itself is made of a charcoal colored plastic with a large wire pin in the middle of the body. This wire easily snaps into and out of the laser cut assembly on the base and acts as a pivot allowing the meter's face to move up and down. The face is a round piece of white paper attached to a square piece of plastic. This paper is printed with a nice scale that has large black numbers and ten clear lines dividing the space between each number. The face also has a clear plastic coating which protects the paper from rubber lube.

After playing with the meter for a while I went ahead and mounted the meter to a nice piece of oak that I set up as a winding stooge. I then went to work winding several motors to test the sensitivity of the meter. The action of the meter was very smooth as the pointer slowly moved around the scale while I was winding. When I was done winding I found it very easy to take readings off of the clearly marked face plate. I can't speak for the accuracy of the meter because I don't have a calibrated meter for a comparison, but based on past experience I would say the readings were right on.

The only feature I didn't like was the tendency for the face plate to drop after the rubber is taken off of the hook. I discussed this with Tim and discovered that he actually designed this into the meter. The idea is that when you unhook a fully wound motor, the face plate will drop out of the way as you attach the motor to the rear hook of your model. It's actually a good idea, but I prefer a neutral balance so I added some clay to the rear of the meter to balance it.

Overall this torque meter is a great tool and a very good value. The snap in feature of the base allows it to be used for all three of the torque ranges that Tim currently offers and saves money in the long run. Rather than buying an entirely new torque meter, you only need to buy the body and snap it into the base you already have. I have the 0.8 in/oz meter which is ideal for F1D. He also offers a 0.3 in/oz meter for lighter models like Mini-Stick and Easy B as well a 1.5 in/oz meter for heavier models like Pennyplane. If you don't have a torque meter and are looking to get one, I recommend you give www.F1D.biz a visit.

National Free Flight Society Symposium Archive CD set
By Jerry Combs

Well Tim Goldstein has done it again. First he collected and made available to all the Indoor News and Views archives, now he has done it for the National Free Flight Society Symposiums. He has gathered all of the symposiums from the first thru 2000 together in a very nicely done set of 4 cd's that can be accessed on your home computer. He has also included the World Championship and plans books and the Winning Indoor Designs book, all printable on your printer. Printing can be a very good way to fill in those moments when you are waiting for the glue to dry on your newest creation. It is wonderful to be able to find the article that you need without having to dig through piles of pages in the garage when the temperature is 20 or 115 degrees Fahrenheit, instead you can find the article or plans in the comfort of your home. I highly recommend that all who are interested in Free Flight purchase this set, it is well worth the price.

New Products from www.F1D.biz

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Adjustable frame to fit all jewelers saw blades. Rugged construction and easy adjustment Brass bushings on the blade retainers for tight clamping. Perfect for making wire nose bearings.
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Orders may be placed online at:
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Tim Goldstein
13096 W Cross Dr
Littleton CO 80127
USA

Fax 303 972-0479

Prices and payment in USA$
MasterCard and Visa accepted. Include card number, expiration date, card holder name.

Excerpts from a conversation on the Indoor list at Yahoogroups

Other than the motor stick breaking, what are other likely failures in F1D competition?

My guesses would be:

Mid-airs
getting hung up on parts of the building
wrecking the model when trying to steer with a balloon
air frame failure after a collision

Bill Kuhl

I don't fly F1D but here are some other possibilities:

1. Sneezing
2. A nervous tic.
3. A spectator (or a competitor) asks you a question during motor hook-up.
4. Someone walks by your table too fast and folds up your wing.
5. Someone's steering balloon bursts while you're walking to the launch area.

Bill Gowen

A comedy of errors: or how I have ruined F1D's and yes each of these has actually happened to me and no I am not particularly graceful. <grin> I am willing to bet that some of these have happened to all of you at one time or another even if you don't want to admit it except for maybe number 6.

1. bashing the stab off against my torque meter or holding stand while installing the motor.

2. bashing the stab into a spectator who was standing closer than I thought.

3. poking my steering pole through the wing while steering at a low ceiling site.

4. tripping and falling while walking out to launch.

5. tripping and falling on the model while retrieving it.

6. I tried using my wheelchair to fly at a local fun fly, my hat is off to Akihiro Danjo for being able to do this. You guessed it, I ran over the model when retrieving it with the wheelchair.

7. This is the one that has cost me the most models of all, spectators who have never been around indoor models reaching out to touch the model and crushing it. This has never been a problem at a major contest but it does happen at local contests.

Jerry Combs

Oh, and let's add to the list: a few months back, I had my Poonker ministick in its box with the winder taped in there beside it. On the way to the flying site, the box experienced a few bumps, (I blame one of my friends for the worst ones) and when I opened the box to fly it-you guessed it- the wing had been transformed into a little ball which was stuck to some tape, the tailboom and prop were broken, and the winder was on the other side of the box. RATS!!

Joshua Finn

En route to flying site for maiden flight of my first F1D. Model parts in cardboard box next to me. Put down car window. Incoming air blows open box. 4 F1D parts swirling around my head. Before I could brake, wing quickly plasters itself against my ear. Think "Y2K-hat." Wing totaled, Other parts reparable. Became instantly fluent in "Sailor."

Mark Bennett

I bet nobody had this happen to you. My hair got stuck on thye microfilm of the wing. I touched accidentally with the back of my head the underside of the wing and my hair and thus my head was stuck. My microfilm was in those days very sticky. And it happen on the first day on the 1978 World championships in Cardington. I got rescued by somebody who really did not know how to do this. My hair survived, my wing did not. And in 1976 at my first world championships my propellor box blew open in a freak wind storm outside. I had lots of building that week to get anything going.

Edmund Liem

I tend to like the rubber band breaking or coming off one of the hooks in flight. Guaranteed to damage a stab and/or prop with some damage to the motorstick. It gets even better when you attempt to patch the film and your wire gets too hot... Additional fun can be had when the motor breaks as you're loading it onto the motorstick, shredding the motorstick and breaking the front off of the stick at the web... oh well!

Jeff Daulton

Another embarrassing way to break an airplane: I launched my model, then decided I wanted to terminate the flight because something was out of adjustment (I can't remember what), but the plane was just out of reach & climbing, so using quick thinking I jumped up & grabbed the motorstick, unfortunately the wings did not come down as fast as the motor stick & I did.

Gary Hodson

How about tearing a wing in half with a steering pole while steering in a high ceiling? That is what happened to me on the first day of practice in the mine, and the only thing we had to steer with was a pole.

Matt Chalker

The torque meter hook grabs the trailing edge of the stab and rips the stab off as you walk away.

Stupid steering accidents. With the model about 1" above the top of the pole, and you miss the wing but you hit the middle of the stab and slice a hole in the film from the top of the pole's tip.

I have bent over to pick up a model and have my glasses slide off and go through the wing.

My other model demise came from my balloon exploding while I was winding the motor. It was slow motion as the balloon debris fell gracefully on the cabane, collapsing it and the model as it continued tot he table. Never flew that model , that was to be the maiden flight of my first 9" chord F1D model. I had built all night to get the wing done and got to Akron early only to destroy the model 30 minutes later. (I was like 16 years old).

Then there is the broken motor which flies up in the air and onto the wing grabbing the bracing and wrapping the wire in a fast ball of fury.

Ahh, the love of model airplanes, and as my dad use to say (and still says). "Well, that is all part of airplane building."

Don Slusarczyk

I am sure glad that this thread came up, now I don't feel like a complete idiot for the ways that I have destroyed some of my models.

Jerry Combs

If you have a computer and are connected to the Internet you should join us on this list. It is dedicated to indoor free flight only. It does not cost anything and you can either view the messages in your web browser or have them sent to you via e-mail. Stop by and visit at:
http://groups.yahoo.com/group/indoor/

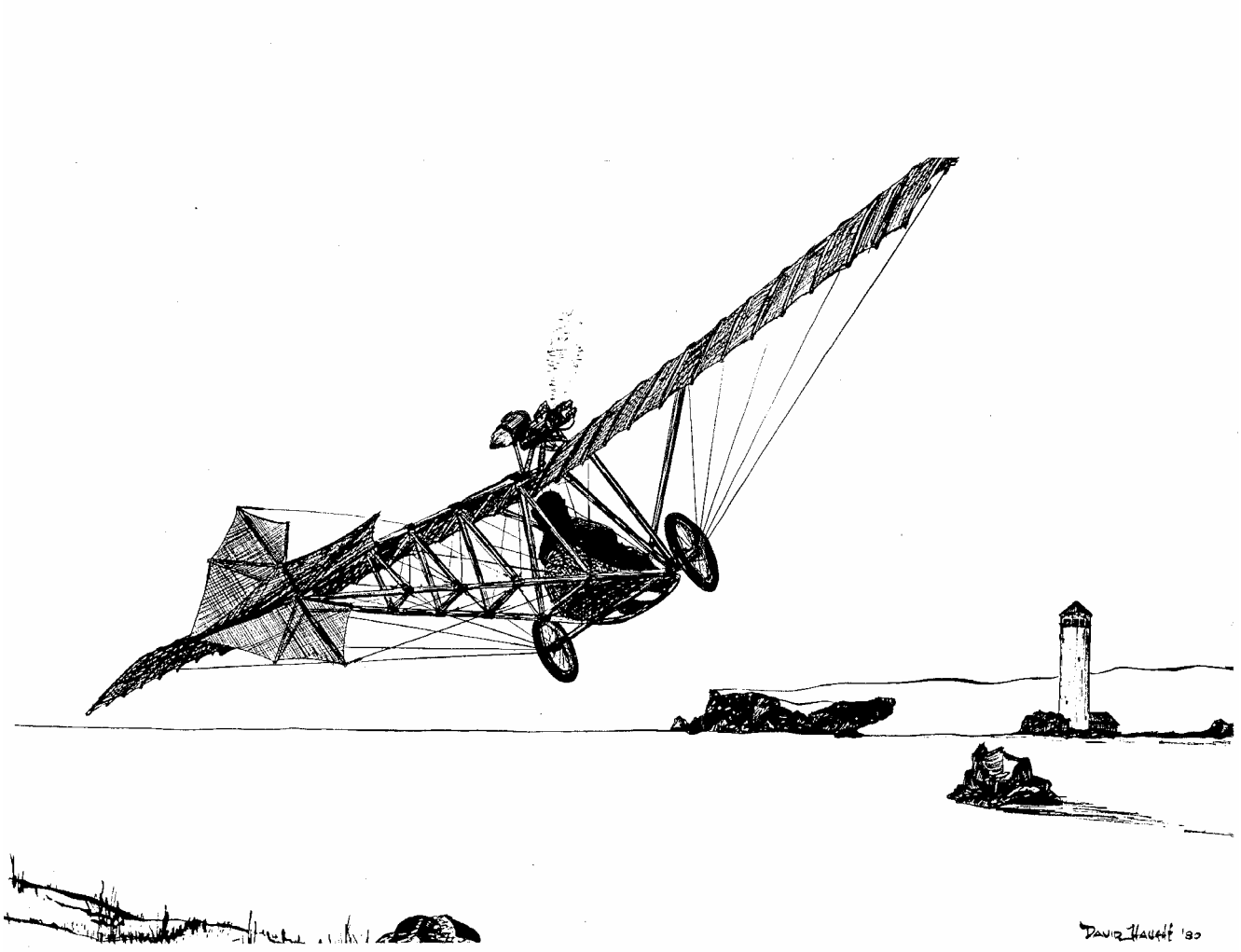
Thanks to Don Slusarczyk for starting this group. It has been a great source of help and amusement to me.

Tim Goldstein

INDOOR
NEWS and VIEWS
ISSUE # 111

$4.50 in the U.S.

May, 2003



Demoiselle, by Dave Haught

FROM THE EDITOR'S DESK

I must confess that in the last few months I have done very little rubber winding, but a lot of rubber burning. Tires, that is. I drove the 650 miles to Bob Wilder's house in Colleyville, Texas, on the western side of Dallas, flew with his indoor group on Thursday, then shared expenses on the four-day round trip to the UniDome meet in Cedar Falls, Iowa March 1 and 2. In the time we spent together in the front seat, we talked for hours about all sorts of indoor topics, rubber and electric. A huge concern for both of us is the current explosion of indoor electric flying, more RC than FF. Both the sport and the subject are explosive, and we here at INAV are very aware that our readers hold strong opinions on the question of electric and rubber flight sharing the same airspace.

One of our main reasons for going to Cedar Falls, Bob representing NIRAC and myself representing INAV, was to see how Bob Nelson would handle this mix. Bob was the CD and owner of Bob's R/C Hobbies, and has put this event on several times before. When we walked in out of the freezing cold on Saturday night, I was very impressed. As you can see by the picture on the album page, they set up four rows of tables right down the 50 yard line, dividing the floor into two halves, with freeflight on one side and RC on the other. I saw no collisions and heard no complaints. Of course, only 'heavies' flew there, with nothing lighter than a NoCal, but it did work well. Just my $0.02 worth.

Fly safely and have fun. - Carl Bakay

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Indoor News and Views is an open forum presenting ideas, opinions, model designs and techniques for the indoor community. Unless specifically stated, INAV does not offer any opinion as to the merit of published work, nor does it endorse any products or services advertised herein.

Sample ad copy should be sent to Tim Goldstein at the above address for publishing details.

Cover drawing by Dave Haught

PUBLISHERS DESK

This is the 12th INAV issue since I have become involved and the 10th since Carl joined as Editor. Nick Aikman has become regular with coverage on the European & UK scene and his great articles and drawings. Dave Haught joined us 4 issues back and brings us wonderful information from the scale side of the sport. Now we have another addition to the volunteer staff that makes INAV possible. Chris Doughty from BC, Canada has answered my plea for help and agreed to take on the formidable task of final layout and formatting of each issue. With Chris's help INAV will continue delivering the high quality publication that Carl works so hard to create. If you meet Carl, Nick, Dave, or Chris please take the time to let them know how much you appreciate the time and effort they invest to make INAV a reality.

Thanks to all of you that have offered your support in my time of career turmoil. The company I worked for the last 5 years has folded. My wife and I have opened a retail jewelry tool & supply store (www.A2ZMetalsmithSupply.com) which includes a fully equipped workshop we rent by the hour or the month. As a new startup it is consuming time and money so my opportunity to pursue this great hobby is limited at the moment. But, we are feeling good about it as we have a plan for the future. Now that we have the store open and running I will be able to start investing more time in providing a good stock of Tru-Weight balsa and hope to start having some time to enjoy the hobby in the next few months.

Tim

UPCOMING CONTESTS FOR 2003

GEORGIA – ATLANTA

May 17 Peach State Indoor Meet – North Springs High School, Sandy Springs, GA. Regis. 8:30 am, flying 9 – 4:30 pm. Hosted by The Thermal Thumbers of Metro Atlanta (TTOMA) Lightweight and heavyweight flown separate. AMA and FAC events, Hangar Rat, George Perryman Back Porch Pusher Challenge. CD David Mills – 404-509-4209. Check www.thermalthumbers.com for club info and details.

GERMANY – BREISEN-BRAND

European F1D Championships for Seniors and Juniors. Open International contest for F1D, FIL and F1M. Location: CargoLifter Hanger, Breisen –Brand, Germany. Contact Nick Aikman for details.

IDAHO – MOSCOW

July 26 – 29 Kibbie Dome Indoor. A 4-day contest with the Wally Miller EZB contest (1.2 gm) flown in the middle of the main event. All AMA and FAI events flown. This is a world class 145' ceiling site. Normally an FAC contest is held at the same time. CD Andy Tagliafico at 503-452-0546
UNIVERSITY VISITOR INFORMATION CENTER 645 W Pullman Road Moscow, Idaho PLEASE NOTE: Special rates are available at the University Inn, Moscow, Idaho, for participants, family and friends. For reservations call: 1-800-325-8765

INDIANA – WEST BADEN

Aug 15-17 Indoor Time Trials for Cat III. Fly in this beautiful 97' atrium. See INAV #108 for a history and photos of the resort. More specific details in next issue. Contact: Walt van Gorder, 5669 Victory View Ln., Cincinnati, OH 45233. (513) 922-3351.

MASSACHUSETTS – CAMBRIDGE

Evening Indoor at MIT –Flying from 7 pm to 9 pm at MIT's Dupont Gym, the corner of Vassar and Massachusetts Ave. in Cambridge, Mass. Call Ray Harlan at 508-358-4013. May 3.

MICHIGAN – FLINT

May 4 Cloudbuster Spring Indoor Fling. Flying 8 am - 8pm at the Indoor Swing golf dome which is a category III site. Classes include catapult glider, Bostonian, LPP, EZB, Mini Stick, No-Cal, Science Olympiad, FAC scale, F1D, Intermediate Stick. Contest Directors: Geroger Lewis 810 329-6833
Fred Gregg Jr 586 264-1018, Don Lang 586 751-3281

NEW JERSEY – LAKEHURST

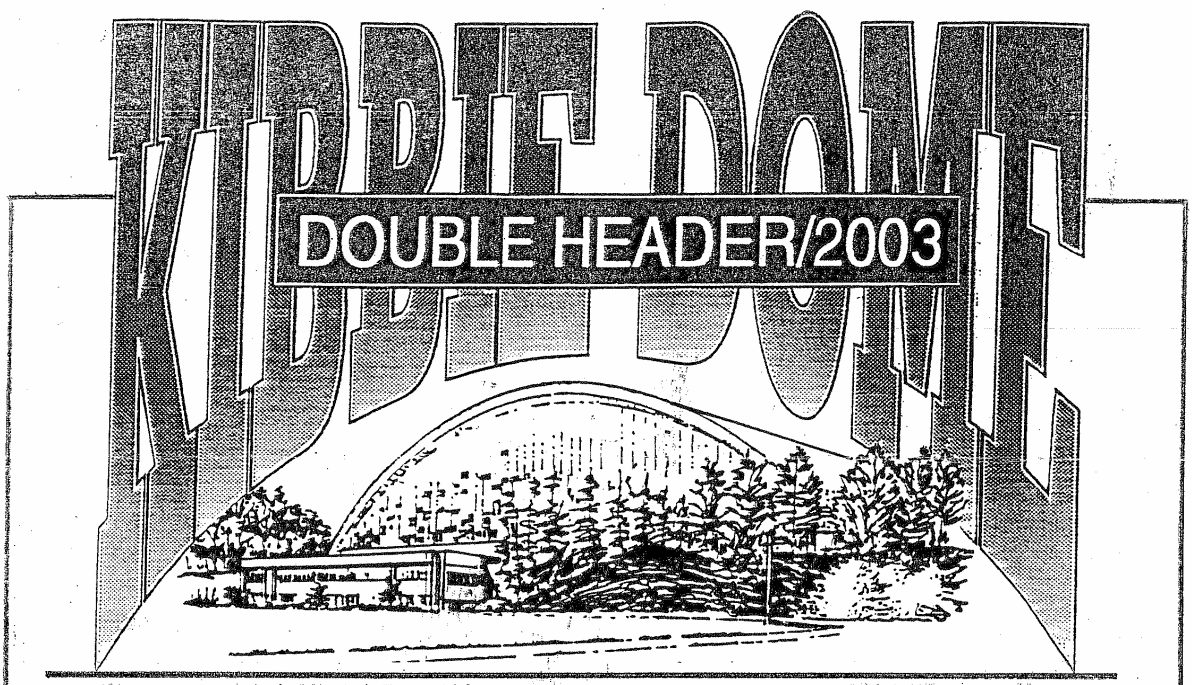
July 3-6 The East Coast Indoor Modelers (ECIM) have the use of Hangar #1. The hangar is 800 ft. long by 250 ft., and 180 ft. high. They are hosting a super spectacular indoor blowout for all indoor classes. Also featured will be an F1D regional. Wives and dates welcome, but for base entry you will need ECIM club ID, Drivers Lic and AMA card. To join or for info., contact Rob Romash days at 856-840-1175, evenings at 856-985-6849. E-mail cgrain1@yahoo.com . Dues are $15 a year with a current AMA card.

SPAIN – ALICANTE

Sept 6 – 7 F1D, F1L, F1M, F4D and F4F. Saturday afternoon, scale competition, Sunday morning all other categories. Height 9,60 metres. Entry fee 15 EURO all categories.
Alicante is 60 Km south of Benidorm on the Mediterranean Spanish coast.
This is the first time that an open international contest is to be held in Spain

TENNESSEE – JOHNSON CITY

May 28 – June 1 AMA/NFFS Indoor Nationals, Johnson City, TN. Flying is in the MiniDome fieldhouse of East Tennessee State University. Event schedule in last issue. CD Abram Van Dover is looking for assistant CD's to help out. Write or call him: 112 Tillerson Dr., Newport News, VA 23602, (804) 877-2830.



ANNUAL JULY 26 THRU JULY 29, 2003
UNIVERSITY OF IDAHO, MOSCOW, IDAHO
KIBBIE DOME OPEN FOR FLYING – 8:00 AM TO 8:00 PM

MEET 1. (July 26 thru July 29) Kibbie Dome Annual
All AMA Indoor Events. 6 official flights per event (Can be flown all 4 days, 9:30 am, to 8:00 pm)
Hand Launched Gliders and Catapult Gliders flights 8:00am to 9:30 am only, all four days. 9 official flights allowed.

SPECIAL EVENTS: A-6 and Non Radio-Controlled Electric F.F.(30 gram max weight for Electric F.F.)

ENTRY FEE: Open & Senior - $70.00, Junior flyers - $25.00. Table & 2 chairs rental $5.00. There are no additional event charges.

CONTEST DIRECTOR: Andrew Tagliafico, Phone 503-452-0546 for additional information. Modest prizes will be awarded.

FLYING SCALE CONTEST DIRECTOR: Dave Haught, Phone 208-744-9026 for additional info. Flying Aces Rules will be used. Static Scale Judging will take place prior to flying.

DISTRICT XI F1D REGIONAL will be held during the Kibbie Dome Annual. 55 cm Wing Span, 1.2 gram min. weight with 0.6 gram rubber rules will be in effect. Models will be processed.

MEET 2. (July 27 & 28) International Easy B, 1.2 gram. Six official flights allowed. Official flights to be flown: Three on Sunday, July 27 & three on Monday, July 28, between 9:30 am & 8:00 pm each day. Models will be processed per AMA-EZB rules plus minimum weight of 1.2 grams. Junior, Senior, and Open combined. No additional fee required if entered in the Kibbie Dome Annual. This event only entry fee: $20.00 plus table & 2 chairs if required. **Special awards to third place.**

Modelers please note that due to construction on campus, and particularly at the Kibbie Center, parking will be limited. All Indoor Modelers must stop at the University Visitor Information Center to obtain a visitor's parking permit and obtain information on what lots are available for parking. This will ensure that individuals know where they are entitled to park and prevent unnecessary parking tickets.

EVENT HORIZON: AN F1M

By Mike Green, UK

A few notes. With hindsight I recommend using thicker wood for the motor stick - say 25 thou and 12 or 15 on the boom. The wood density used was around 5.5 lb/cu. ft. I confess I did not take notes or I have mislaid them! At any rate the model came out light and I had to use ballast which was advantageous. The original was covered in polymicro, but if things look like coming overweight you could use Y2K!

The model takes as much torque as you can wind on - the motor will break first and although the ship is big the climb is impressive. Use rubber of about 73-74 thou for starters, that is to say Tan 2 before 2000. I cannot comment on what comes after that i.e.Tan sport.

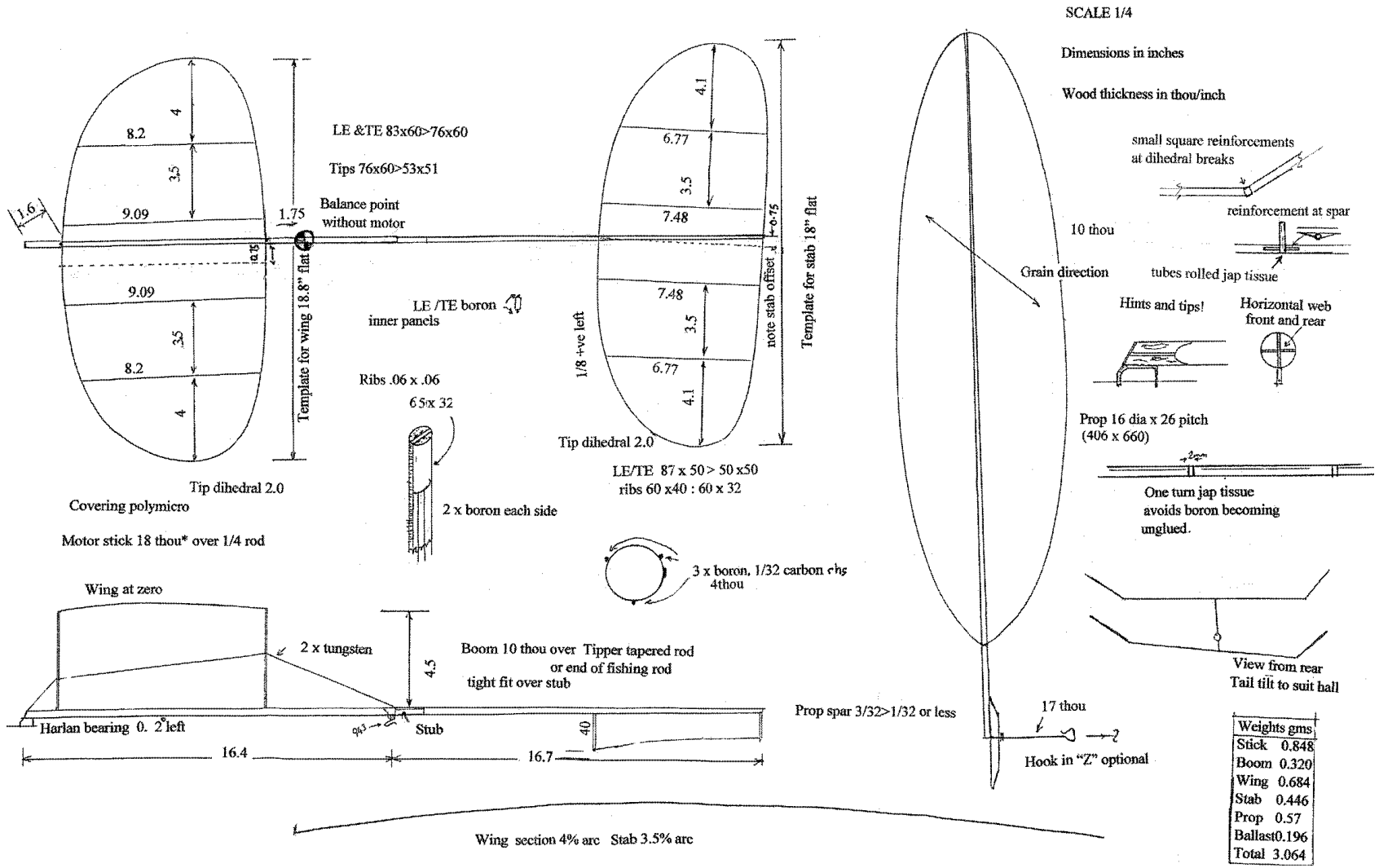
The F1M class - max projected span 46cm, min weight 3g, max rubber weight 1.5g does not suffer from an `over tight' specification which bedevils some indoor classes and therefore does not lead to a situation where all the models look the same. At any rate that is my opinion although inevitably contest models seem to trend toward a sort of `convergent evolution'.

It is a great class for beginners and experts alike and for a novice it is easier than EZB.

"En passant" just an afterthought - the Limited Pennyplane specification fits the rules regarding the airframe.

EVENT HORIZON AN F1M BY MIKE GREEN

BORDEAUX INTERNATIONAL 2nd 16:10 + 16:26 = 32:16



FORTY MINUTE CLUB

January 2003

NAME	COUNTRY	TIME	OPEN*	65CM	55CM	YEAR	SITE
BROWN, STEVE	USA	63:54	X			1996	SANTA ANA
RICHMOND, JIM	USA	59:01	X			2002	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
COSLICK, LARRY	USA	52:04		X		1999	AKRON
UNDERWOOD, GARY	USA	51:58		X		1996	LAKEHURST
GIBBS, BOB	USA	51:53	X			1999	SANTA ANA
ROBBINS, HERB	USA	51:36	X			1998	SANTA ANA
KAGAN, JOHN	USA	51:11		X		1999	AKRON
DOIG, RICK	USA	50:41		X		1995	AKRON
KOWALSKI, DICK	USA	50:41	X			1976	AKRON
RICHMOND, JIM	USA	50:12		X		1999	AKRON
BANKS, CEZAR	USA	49:50		X		1996	MOSCOW, ID
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
SLUSARCZYK, DON	USA	48:10		X		1995	AKRON
BUTTY, RENE	SUI	48:01		X		1996	MOSCOW, ID
ROHRBAUGH, AL	USA	47:40	X			1997	AKRON
TIPPER, JOHN	UK	47:21		X		2000	SLANIC PRAHOVA
HARLAN, RAY	USA	47:13		X		1980	AKRON
GIBBS, BOB	USA	47:03		X		1998	SANTA ANA
DOIG, RICK	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, ID
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, ID
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, HIDEO	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, ID
HULBERT, BILL	USA	44:27		X		1994	AKRON
HACKLINGER, MAX	GER	44:20	X			1961	CARDINGTON
ANDRE, THEDO	NED	44:01		X		1986	CARDINGTON
NORE, PENTTI	FIN	44:01		X		1986	CARDINGTON
ORSOVAI, DEZSO	HUN	44:01		X		2000	SLANIC PRAHOVA
KOPECKY, ERNIE	USA	43:42	X			1963	SANTA ANA
ROBBINS, HERB	USA	43:39		X		1995	SANTA ANA

NAME	COUNTRY	TIME	OPEN*	65CM	55CM	YEAR	SITE
ALLEN, PAUL	USA	43:36	X			1974	SANTA ANA
KUJAWA, SYLWESTER	POL	43:35		X		1992	WROCLAW
AMORARITEI, DAN	ROM	43:31		X		2000	SLANIC PRAHOVA
MANGALEA, CORNELIU	ROM	43:30		X		1996	MOSCOW, ID
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, ID
PLOTZKE, RON	USA	42:53	X			1969	LAKEHURST
FOSTER, JOE	USA	42:44		X		1987	SANTA ANA
SIEBENMANN, DIETER	SUI	42:33		X		1986	CARDINGTON
KELLER, PETER	SUI	42:30		X		1999	BORDEAUX
CALLIAU, 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
LEONARD, NICK SR	USA	41:50		X		1999	AKRON
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
BAKOS, FERENC	HUN	41:10		X		1999	DEBRECEN
KIHARA, KAZUMASA	JPN	41:06		X		1998	MATUMOTO CITY
SCHRAMM, LUTZ	GER	41:02			X	2002	CARGOLIFTER
RICHARDS, DEREK	UK	41:02		X		2000	SLANIC PRAHOVA
ROMBLAD, JONAS	SWE	41:02		X		1999	LAKEHURST
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, ID
MANGALEA, CORNELIU	ROM	40:38			X	2002	CARGOLIFTER
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, ID
GITLOW, LEW	USA	40:15		X		1987	SANTA ANA
MOSKALEV, VASILI	UKR	40:15		X		1996	MOSCOW, ID
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

* OPEN = OVER 65CM WINGSPAN

Official and unofficial flights included. Best effort only, by individual, by class.

Send additions or corrections to:

Steve Brown, 297 Hartman Ct., San Dimas, CA 91773 USA stevebrown@lycosmail.com

ELECTRONIC WEIGHING SCALES

By Gert Brendel (NL)

Introduction

Accurate and precise scales are an essential device for the (competition minded) indoor (duration) flyer. Building a model to minimum weight can only be done with adequate equipment. Now I do know that it is easy to build a scale yourself (that might be good reading stuff for a future issue), but being the lazy kind of person I've bought an electronic balance myself some time ago. Before deciding to buy a particular scale, I've been surfing on the internet for more information. This article is a summary of the electronic balances that I've found, and that I've considered buying myself. In price, they range from US$ 100.- to US$ 240.- as offered on several web pages (prices with-out shipping and handling costs; some companies ask quite an amount for that). And don't forget that, as a European citizen, you sometimes have to pay a large import duty when you buy in the USA...

The Scales

My Weigh MX 50
This is a reasonable cheap pocket scale (around US$ 100.-), which reads 50 grams by 0.01 grams. It comes with a 50 gram ASTM Class M1 calibration weight and recalibrating your scale can be done with the provided EASY-CAL program. The MX-50C reads in grams, grains, carats, and ounces; the auto-off time can also be programmed.

A&D HL-100
This is a compact portable 0.01 gram resolution scale with 100 gram capacity; it has a hard cover hinged carrying case included. The HL-100 case is designed so you can weigh with the scale in the case. The HL-100 is available with either 6 AA batteries as a power source (not included) or AC powered (not included). It has a power saving auto power-off function, which can be disabled.

Tanita 1210 – 100 (or – 50)
The Tanita 1210 50-carat version is a high accuracy mini scale of compact design. This scale has four selectable weighing functions: carats, grams, troy ounces, and grains. It's the only one in this price class that offers a readability of 0.002 gram. The 1210 50 carat version comes standard with 6 AAA batteries, a 10 g (50 carat) calibration mass (located on the scale itself), a weighing tray, a gem cup and a soft carrying case at no additional cost.

Acculab VI-200
This balance can be operated from an AC adapter or from a 9V alkaline battery. All VI-Series balances are available with an optional DB-9, bi-directional RS-232 serial computer/printer interface. At start up, the unit will default to the last weighing mode used. Membrane keypads are raised for tactile feel and include an audio tone to signal function. Large LCD with low battery, overload, underload, stability and mode indicators.

Ohaus Scout SC2020
Scout's durable construction and simple, two-button operation make it a favorite of classrooms and laboratories alike. The balance can be operated by a 9 Volt battery or with the AC Adapter supplied. This scale features a large, high contrast LCD display for great visibility; auto shutoff (user enabled/disabled); an error indicator for over/under loads; span and linear calibration; a tare feature and a low battery indicator.

More information

There's more to read on the Internet about the balances introduced here; at the following websites you can find information from the manufacturers:

- http://www.ohaus.com
- http://www.acculab.com
- http://www.tanita.com
- http://www.andweighing.com
- http://www.myweigh.com

It might be a good idea to compare prices before you buy such expensive equipment. A brief search on the Internet gave the following internet sites (off course, there are more!) were these scales could be bought:

- **AmberDepot.com** http://www.amberdepot.com/scales.htm
- **Precision Weighing Balances** http://www.balances.com, http://www.scaleman.com/ or http://balance.balances.com

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-Ed

MY WEIGH MX 50

Ohaus Scout SC2020

Tanita 1210

A&D HL-100

Acculab VI-200

DIGITAL SCALE OVERVIEW

Model	MY WEIGH MX-50	My-weigh ibalance 201	A&D HL-100	Tanita 1210-100	Acculab VI-200	Ohaus Scout SC2020
Price (without shipping & handling costs)	Ca. US$ 100.-	Ca. US$ 140.-	Ca. US$ 200.-	Ca. US$ 215.-	Ca. US$ 220.-	Ca. US$ 240.-
Weighing modes	g, dwt & ozt	g, oz, oz t, dwt, grains & parts counting	g, ozt & ct	g, ct, ozt & grains	g, oz, dwt, ozt & parts counting	g, oz, oz t, dwt & parts counting
Capacity (grams) (pennyweight) (troy ounces)	 50 g 32.00 dwt 1.5910 ozt	 200 g 128.60 dwt 6.430 ozt	 100 g - 3.5280 oz	 20 g - -	 200g - -	 200 g - -
Readability (grams) (pennyweight) (troy ounces)	 0.01 g 0.01 dwt 0.0005 ozt	 0.01 g 0.01 dwt 0.001 ozt	 0.01 g - 0.0005 oz	 0.002 g - -	 0.01g - -	 0.01 g - -
Linearity		±0.01g	± 0.03 g		±0.01g	± 0.01 g
Repeatability/Std. Dev.		±0.01g	± 0.02 g			0.01 g
Stabilization time	3 seconds	3 seconds	3 seconds (typically)		3 seconds	3 Seconds
Calibration	Auto calibration from keypad (50 gram mass included with the scale)		Full Digital Calibration with front key (calibration mass not included!)	Auto Calibration with 10 gram (50 carat) mass included	Auto calibration from keypad with included weight	Auto Calibration from keypad using 200 gram cal. mass (included with scale)
Maximum overload	150% of capacity	150% of capacity		3% of capacity	150% of capacity	103%
Auto shut-off	2 minutes no activity	Selectable: Off, 60, 120, 180 seconds no activity	Auto Power Off (5 minutes)	automatically 5 minutes after calibration	4 minutes no activity	Selectable: Off, 3 minutes no activity
Optimum temperature range	64 °- 77 ° f / 18 °- 25 ° c	32°- 104° F / 0°- 40° C	-10°C~40°C / 14°F~104°F		50-86 F (10-30 C)	50° to 104° F / 10°to 40° C
Operating humidity range			RH less than 85%		Less than 80% RH	10% to 85% RH
Display	5 segment LCD 1/2" high	6 segment LCD 1/2" high	8 mm, 7 segment LCD	5 digits LCD	5 digits LCD	LCD (0.7" high)
Power requirements	4 AAA batteries (included)	AC adapter (included) or 6 "AA" batteries (not included)	6 AA size batteries (not included) or optional 120V AC adapter	6 AAA batteries (included)	AC adapter (included) or 9V Alkaline battery (not included)	120v/60Hz AC Adapter supplied with balance or a 9 V battery (not included)
Low battery indicator	Yes	Yes	Yes	Yes	Yes	
Platform material	Plastic	Plastic			Stainless steel	Stainless steel
Platform dimensions, inches	2 7/8" x 2 5/8"	5¼" x 5¼"	70 mm / 2.75 inch diameter	1 3/4" diameter	4.5" diameter	4.0 in /10.2 cm diameter
Scale dimensions (L x W x H), inches	5 1/4" x 3 1/4" x 3/4"	7½" x 5¼ x 1¾"	5.9" x 5.5" x 2.1"	5 7/8" x 4 1/4" x 1 1/16"	10.25" x 5.75" x 3.5"	8.25" x 6.75" x 2.4"
Standard accessories	50 gram cal mass, batteries, & manual	200g Calibration Mass, AC Adapter, Manual	Manual, carrying case	6 AAA batteries, a 10g (50 carat) cal. mass, a weighing tray, a gem cup and a carrying case	AC adapter, Cal. weight	AC adapter, Cal. weight
Warranty	12 months from date of purchase	60 months from date of purchase	24 month manufacturer's warranty	180 days from date of purchase	2-year renewable warranty	5 year manufacturer's warranty
Net weight (approx.)	5.6 oz / 160 g	17.6 oz / 500 g	460 g / 1 lb (without batteries installed)	Approx. 260 grams (9.25 oz.)	4 / 1.8 (lb/kg)	1.5/0.7 (lb/kg)
Optional Accessories			External Calibration mass, 120 VAC adapter		Hard-Shell Carrying Case -$35	Security device, carrying case, cables, printer, calibration masses, scoops

DeutscherAeroclub e.V.

Mitglied der Fédération Aeronautiqué International

Sportfachgruppe Modelliflug Fachausschuss Freiflug

(Vorsitzender Gerhard Wöbbeking, Holstenstraße 108, 22767 Hamburg, Tel. 040-3898310, woebbeking@t-online.de)

EUROPEAN CHAMPIONSHIPS F1D OCTOBER 2ND – 5TH, 2003 CARGOLIFTER WERFT, BERLIN-BRAND /GERMANY BULLETIN 1, MARCH 11TH, 2003

The Organiser of the European Championships for F1D in 2003 is the Deutsche Aero Club e.V. with its subsidiary body, the Model Flying Commission and its department, the Free Flight Organization. The Regional Air Sports Organisation of the county of Brandenburg will support the organiser.

The Flying Site will be the CargoLifter hangar at Brand, south of Berlin. The site and hangar will be open from October 2nd at 3.00 PM until October 5th at 10.00 PM. During this time, the European F1D Championships for seniors and juniors will take place as well as an Open International Indoor Competition for F1D, F1L and F1M classes. Because of ongoing negotiations with a new owner uncertainty about the date and the competitions is still remaining. There may be some production activity, despite the long weekend (October 3rd is a national holiday in Germany).

The Contest Director will be Gerhard Wöbbeking, assisted by Thomas Weimer, who will be heading the timekeepers' pool.

The FAI-Jury (and the Jury for the Open International) will consist of Pierre Chaussebourg (CIAM Vice President, FRA), Michael Ramel (Alternate CIAM Delegate GER) and Mike Colling (GBR). Reserve Luca Gialanella (ITA).

Eligibility for the European Championships. This is open to teams from the National Aero Clubs of Europe, including Turkey and Israel. All participants in the Open International must have a current FAI licence.

The Juniors Competition will take place at the same time as the senior event.

Entries for teams and timekeepers for the European Championships may be made until July 31st 2003. Entries should be sent to Michael Thoma, Deutscher Aero Club e.V. Hermann-Blenk-Str. 28, 38108 Braunschweig, Germany. Tel. 0049-531-2354056, Fax 0049-531-2354011, e-mail m.thoma@daec.de. **Entry fees** shall be paid on spot. Only cash in Euros will be accepted. **Entries for the Open International F1D, F1 L, and F1M** may be made until September 20th.

The Official Languages for these contests are English and German.

Entry fees for European Championships.

For competitors (seniors) and Team Managers - 200 Euros (300 Swiss Francs).
For juniors up to 18 years - 170 Euros (255 Swiss Francs).
For supporters (seniors) - 30 Euros (45 Swiss Francs).
For junior supporters up to 18 years - 20 Euros (30 Swiss Francs)
For competitors in Open Internationals (seniors) - 40 Euros for the first class, each other class 20 Euros.
For juniors up to 18 years – 30 Euros for the first class, each other class 15 Euros extra.

Banquet. 20 Euros for adults, 10 Euros for children under 14.

Timekeepers will get 144 Euros to cover board & lodging. Every National Team is free to nominate one timekeeper. The organisers will not provide any timekeepers for the Open International.

Processing of flying. European Championships competitors will collect two timekeepers from the pool. After each flight, if the timed duration is longer than one of that competitors previous best two flights, the model and rubber motor must be checked. Participants of the Open International will also follow this scheme. Their launching area will be separated.

Timetable. October 2nd.
15-20 h Registration of National Teams and individual participants of the Open International. Practice flying.
21.30 h Team Managers Meeting at the Landhotel, Krausnick.

October 3rd. 8-13 h Registration, Practice flying.
13.30 h Opening and briefing.
14-18 h Round 1.
16-20 h Round 2, (Models must be launched before the end of the round).

October 4th. 8-14 h Practice flying.
14-18 h Round 3.
16-20 h Round 4, (Models must be launched before the end of the round).

October 5th. 8-14 h Practice flying.
14-16.30 h Round 5.
15.30-18.00 h Round 6, (Models must be launched before the end of the round).
20-24 h Banquet with prize-giving ceremony at the Landhotel, Krausnick.

Parking. In front of the northern entrance to the hangar. **Tables and chairs** will be provided. **Beverages and Snacks,** (soft drinks, coffee, sandwiches, small sausages and cakes) will be available inside the hangar.

CONTROLLING DRIFT IN LOW CEILING SITES

By Jerry Combs

There you are, all set up at your local site to fly your latest lightweight model. All of the flyers tables are lined up in a neat row. You walk out on the floor and launch your labor of love, all looks good and you move off of the floor with the best of indoor etiquette. Your model climbs nicely and everything is just the way it should be when you notice that your model is beginning to drift towards the far wall. Each circle moves the model closer and closer to the wall. Time for a steer before the model hits the wall. You walk out with your steering pole and just as you attempt the steer you move just that little bit too fast and you end up with your pole right through the middle of your wing. Is there anyway that this disaster could have been prevented?

The answer is yes and it is very simple to use. Some of you may already know of this method while many will not. Back in the early 60's Phil Haner and Hu Entrop taught me a method of low ceiling steering that does not use a pole or a balloon. It is the method of using body heat to move the model back to the center of the room. It does take several people working in unison but it sure beats a ruined model and will work in ceilings up to around 50 feet if used early enough in the flight. As soon as you notice your model beginning to drift ask several of your fellow fliers to help. Each of you needs to walk around the edges of the floor to the other side of the room and just stand there in a line facing the model or maybe in a horseshoe pattern, the heat from your bodies will create enough air movement to move your model back towards the center of the room. This is best accomplished if the fliers form two groups and walk around to the far side from different directions. Do take care to not stay there in a group for too long or the model will then head for the other wall unless there is a persistent drift. If it is a cool day and several of you have cups of coffee or tea the process takes fewer people and less time. Try it next time you are flying and see just how well it works. More than once I have seen records set using this method where if a pole or balloon were used the record may not have been broken.

A REVIEW OF BALSA

With some trepidation I placed an order with Tim Goldstein on the internet . The order was a tentative trip into the unknown. Eventually a package arrived and I eagerly opened the box to reveal the timber that was ordered. I had ordered a selection of 'c' and 'a' grain.

The 'c' grain looked superb and was stamped with a serial no, the weight, stiffness rating, and density. The weight was pretty good and within reasonable limits. I have since used the .013" for a new rules F1d and achieved .3 g motorsticks, ready to go. The thinner wood (.009") is rolled and awaiting tail posts. Both of these components are more than stiff enough. They are indeed impressive. The 'a' grain was .097" 5.2Lb marked as VG . I stripped off 3/16" and cut some F1d spars, they were exactly what I was looking for. They were the correct weight and very stiff without resorting to boron.

On the strength of this I have since purchased more timber from Tim and I am impressed with the standard of the finished product. While people mutter about the cost of the wood, I just remember the pile of 3/16" hobby shop sheet (3Ft x 2Ft) that I rejected , or that I got half a dozen strips from. Yes I buy full sheets to find a particular piece of wood. I can buy from Tim without all that wastage. (I can use my own rejects for Control line Models).

In conclusion, I found Tim's wood to be accurately cut and I agree with his weights, and more importantly I am very happy with the grain and cut quality. The thickness stated on the sheets was within .0005" so I can't fault it.

I would like to thank Tim for providing this supply of indoor wood.

Derek Richards. UK.

Dear Carl,

Recently I had a good experience with a 4H Project. I had heard of their activities in farm-related and home-making skills but they go far beyond those. There is even a model building for airplanes!

Last year I was invited to demonstrate indoor model flying at a meeting. The meeting was the flying contest for a half dozen or so boys who had built Delta Darts. There is an excellent RC club in Bishop and several of their members served as mentors. I have found that the Delta Dart is handy because AMA sells kits so all of the materials are included. They also have some ingenious construction ideas. But they are too heavy for most indoor sites and so the models were zipping around crashing into walls and ceilings.

This year I was asked to lead the project and was given freedom to select the model design. I drew up a 13" version of a Twiggy model that was published years ago. It was aimed for beginners and is only slightly more complicated than the Darts. It looks and flies much better. Nineteen youths signed up and there is no model shop in Bishop. I was able to purchase prop-nose-gear assemblies that solved most of the problem. But I did strip a lot of 1/16 X 1/8 balsa, cut a lot of tissue, and strip rubber, etc. A number of the RC members served as mentors during two Saturday mornings. I wrote concise step-by-step instructions for building and flying the model but most of the modelers and their mentors barged ahead and had to do some things over. But all told it went well. Fifteen models were flying at the finale. The modelers were very enthusiastic and spent over two hours having the joy of seeing their creations hop off the floor and cruise around for thirty seconds or more. There was very little breakage or wall banging. The 4H people can use the local fairgrounds building that is large enough for fair flights. Yes, we had a little contest that was warmly received.

The 4H affixation has advantages. One can reach a large number of youths who are interested in doing things themselves. I attended a general meeting and there were over 100 youths there! Bishop's population is about 4000 but there are several smaller towns nearby. Also the 4H has access to most public owned buildings such as our fairgrounds. I urge modelers everywhere to contact 4H people.

Good Flying!

Clarence Mather

SCALE MATTERS! PART 1

By Dave Haught (DHaught042@aol.com)

The Demoiselle Redux?

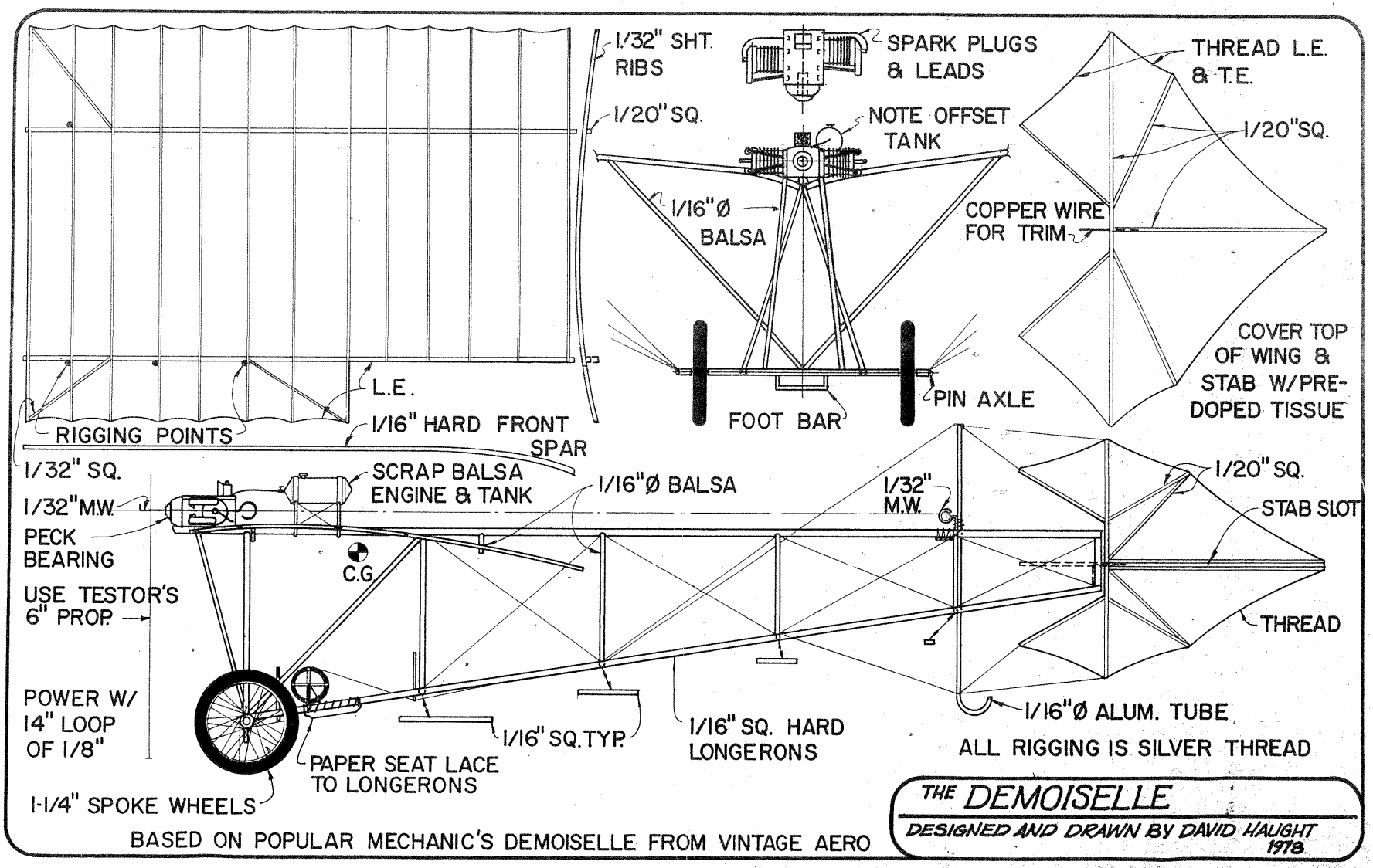
Yes indeed it is that time again! Hope you have had a great building/flying season too! I have yet to get over my old building cycle habits. When I flew outdoors I spent the winter building, now I build all year round and fly all year round, how good can it get? Well back to the topics at hand . . .

Just about everyone has attempted the little Santos-Dumont gem at one time or another. It was one of my first ventures into peanut scale back in the ancient days. The original flew fantastic, logging in consistent flights of over 30 minutes! Well, maybe 30 seconds. As I got a bit more acquainted with the pioneer aircraft I was moved to come up with a more scale version. I found the plans to the original in the old Popular Mechanics article in the library archives and blew them up to the following plan enclosed in this issue. It was a fun model to build. The fuselage was made from oversize sticks sanded round with knobs every 3/4" or so to simulate the bamboo joints on the original. This created the need for coped joints which was easy to do with a small round file. The rigging was added next with the seat sewed out of cotton fabric. I spared no details remembering how much nose weight I had added to the first one. Then the wheels, engine and fuel tank were built and attached. The flying surfaces were kept to last mainly because I was not sure how I wanted to make them.

At this time I was just beginning to realize how little airfoil you really wanted on these vintage types. They have so much inherent drag, a high lift wing is normally an added disaster. I elected to use only six sliced ribs, carrying the thin airfoil shown on the plan-one at the root, tip, and where the leading edge notches in. The remaining ribs are what I call eye fodder. To make them I start by covering the plan with fresh plastic, then pinning a sheet of pre-shrunk, pre-doped tissue down over the wing plan. I then slice an impossibly thin strip off of a light sheet of 1/32" balsa, as paper thin as you can slice it, around .005 or so. This is then located on the tissue where a rib would want to be, held down gently with a light weight, a penny or such, then a thin bead of acetone is applied to the "rib," which soaks right through the wood, activates the dope, and sticks the "rib" to the tissue instantly.

Once all the remaining "ribs" are secure, lift the wing panel off the plan, use a 1" diameter dowel like a rolling pin and roll a curve into the paper thin ribs. The real ribs and spar structure is then overlain onto the tissue with "ribs" and more acetone is applied, covering the wing. This has worked very well, the original is well over 10 years old and still looks great. The tail assembly is done in a similar way with the pre-finished tissue.

A note on finishing pioneer aircraft. I have found many of the natural finishes can be done neatly with the wide variety of tissues out there. Some I have even dyed with ice tea to give a bit darker hue. I had one near disaster that turned out to be a stroke of luck. I had built an indoor 36" rubber 1911 Cessna a few years ago which had come out very light and promising. I covered it with my usual pre-shrunk pre-finished tissue, but this time I had used Krylon satin finished acrylic spray instead of nitrate dope. Not thinking anything about it, I began attaching the tissue with 3M 77 adhesive. The covering slacked on me and it looked horrible, so I thought on it over night and the dream demons kept me up all night. In a fit of dazed ingenuity, I thought I might rejuvenate the light dope on the covering by giving it a coat of thinner. I proceeded to brush on a coat of acetone onto the fuselage first, it looked ok while it was wet, started to shrink ever so slightly as it dried, I did the same to the tail feathers, then as I started on the wing I noticed that the fuselage covering was turning a ghastly white with streaks! It was too late to turn back, so I finished the wings, pinned them to a board to keep them flat and started to look at a different model for the meet. When I came back to the Cessna it had a streaked blushed look to it that had a lot of charm and looks like it was done intentionally! The effect is scale on many of the period aircraft, so I pass this highly engineered secret on to you for your experimentation.


1/32" SHT. RIBS
1/20" SQ.
SPARK PLUGS & LEADS
NOTE OFFSET TANK
1/16"Ø BALSA
THREAD L.E. & T.E.
1/20"SQ.
COPPER WIRE FOR TRIM
COVER TOP OF WING & STAB W/PRE-DOPED TISSUE
L.E.
RIGGING POINTS
1/16" HARD FRONT SPAR
FOOT BAR
PIN AXLE
1/32" SQ.
1/32"M.W.
PECK BEARING
USE TESTOR'S 6" PROP.
SCRAP BALSA ENGINE & TANK
1/16"Ø BALSA
C.G.
1/32" M.W.
1/20" SQ.
STAB SLOT
THREAD
POWER W/ 14" LOOP OF 1/8"
1-1/4" SPOKE WHEELS
PAPER SEAT LACE TO LONGERONS
1/16" SQ. TYP.
1/16" SQ. HARD LONGERONS
1/16"Ø ALUM. TUBE
ALL RIGGING IS SILVER THREAD
THE DEMOISELLE
DESIGNED AND DRAWN BY DAVID HAUGHT 1978
BASED ON POPULAR MECHANIC'S DEMOISELLE FROM VINTAGE AERO

SCALE MATTERS! PART 2

By Dave Haught (DHaught042@aol.com)

Concorde to a land at Moscow Kibbie Dome!? Well, that is if I get it finished. Ever had one of those afternoon horizontal therapy times (naps), where you dream of the ultimate scale model? I was drifting off on the couch to a TV special on the high tech aircraft of the last 20 years, I vaguely remember the Concord being mentioned, then woke up with the obscure obsession to build one. I had a set of plans somewhere, ah yes, toss them into the local large document copier and viola! The ultimate no-cal? At a 16" wing span its motor length comes out at what? 35.5"! Yikes! It looks real cool, love that wing plan form, but that motor length - hmmm.

Then comes the engineering nightmare. Whether it is noble to run a single motor 36+" pusher or tractor? Or maybe do a 36" push-pull thing, or half of each? Too many ideas too little time! I settled on a single pusher for the first iteration.

Now onto the real poser, I have never rolled a 3/16" diameter tube 36" long! The thought caused me to devour a whole box of ice cream sandwiches. Hmmm, still no clear direction. So what to do? Try it! Last IN&V had a great bit on rolled tubes, seemed worth trying, the thought of the Concorde up amongst the ceiling tiles inspired me throw all caution to the wind.

I started by selecting the balsa, giving it a good sanding on both sides to bring it a bit under 1/32", then into the bath tub to soak over night. (Too long for my usual microwave technique, although now that I think on it I could have rolled it into a coil then micro waved it-ah the wonder of hindsight!). Then the search began for the form. I had a 36" length of 1/4" aluminum tube, a brass rod that was 5/16" but nothing 3/16" diameter - except for a few dowels and they were far from straight. But then I remembered some where I had used the door jam as a biplanar squaring jig. I rolled the balsa, taped the cover paper to the door jam and waited 12 hours. Sure enough it was straight and round! Then on to the rest of the beastie! As of press time its still to be covered, but looks promising!

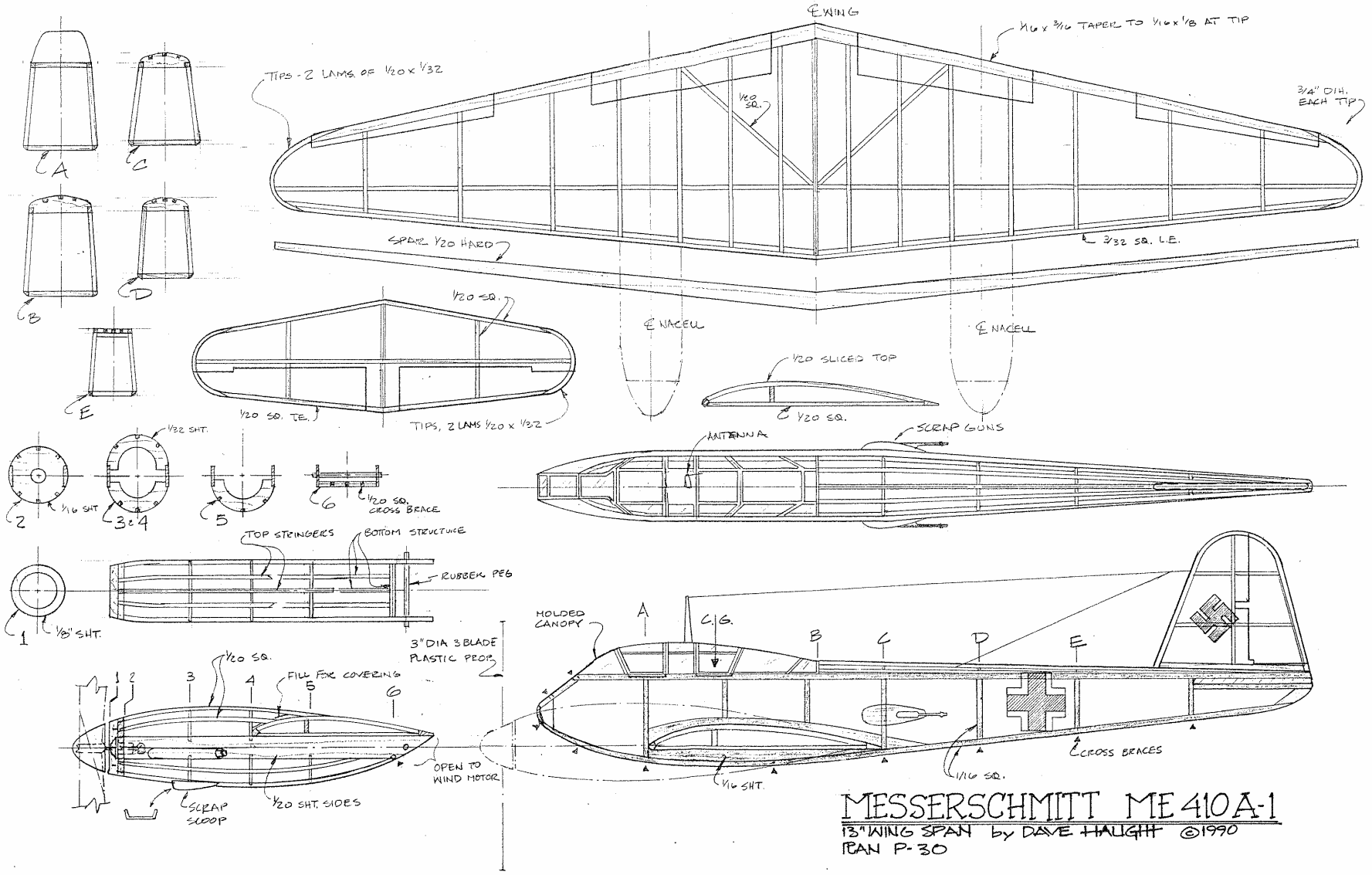
Now for something completely different! The Messerschmitt 410 plan is only for the hopelessly insane out there. Who else would be tempted? Over the years I had my plan service I sold over 100 sets of this one! A few hearty souls wrote me from their institutions to tell me of their successes or lack there of.

The original was built one weekend as I worked at a secret underground nuclear plant out in some desert somewhere. We had strict security limitations that kept us indoors and on site for the summer. That was ok with us since it was well over 120 degrees outside! I introduced the captives to stick and tissue models. One of the engineers was a German aircraft nut who just happened to have a book with him on the 410. I sketched it up and built it on the spot without a lot of wood to choose from. The ship came out at 9 grams, a bit heavy but there is a lot of fuselage and nacelle in this one. This was the first of my open bottom nacelle designs and I still use this concept today. Here again as I mentioned in a previous article in IN&V, you need to keep the motor size down. Most would be successful twins are destroyed on the first few flights by being way over powered, remember you have TWO motors and TWO props generating thrust here! Go easy. Use 2-3 degrees down thrust on the right motor, with the left set at 0 for starters. If torque seems to be a problem, adjust with thrust only. Induce a flight turn with a bit of right rudder, keep the wings as flat as possible, and as always, if the stab warps, toss it! Better to go into the air with a flat stab than to enter the dark deep of the earth with a warped one. What am I saying? Warped stabs can cause disasters of Biblical proportions! The classic potato chip shaped stab is no friend, ever! Twins have the wonderful blessing of high airflow over the tail, which makes them very sensitive to warps and tabs.

DNA and modeling, is it in our genes? Man I love puns! My son just came home on spring break from college with a neat box of Pistachios. He has found them as addictive as the real nuts! So far his new fleet consists of a Roe Biplane, Caudron A, and Wright military flier III! They are soooo cute! He has yet to begin flying sessions but they look like they should perform well. Pistachios are a bit tricky in some plan forms, I have had mixed success with WWII military types since they are low on wing area. The pioneer through thirties birds look pretty good, any successes out there? I have a Sopwith Triplane on the drawing table, we'll see. . .

Shameless plug! Don't miss the annual Kibbie Dome event at Moscow, Idaho this July 26-29! That's four full days of great indoor flying in a fantastic site! F.A.C. events plus some new fun events like twin nocal! Email me for more info! Now back to our sponsors . . .

Yikes! Two pages and still not a word on the B-24's or the jumbo trimotor yet! Well there are more issues of IN&V coming, stay tuned! Back to the bench, or is it time to fly? Dave Haught, enjoying his insanity!



MESSERSCHMITT ME 410 A-1

13" WING SPAN by DAVE ~~HAUGHT~~ ©1990

PAN P-30

BAT OUT OF HELL! – F1D

By Nick Aikman 12.03.03

The model shown on the plan is actually a combination of the second and third F1D's that I built in 2000, after a gap of 14 years.

At the 'CargoLifter' meeting last year, I spent the first day flying a droop boom model but climb pattern problems made me switch to this older, straight aeroplane. When I assembled the wing onto the posts, it was obvious that something had moved somewhere, so I quickly took off the wing and substituted wing three, which had not been flown at high torque before. With time running out on the second afternoon of the contest, there was only a chance for 1 half motor test flight before a full competition attempt. Everything seemed OK.

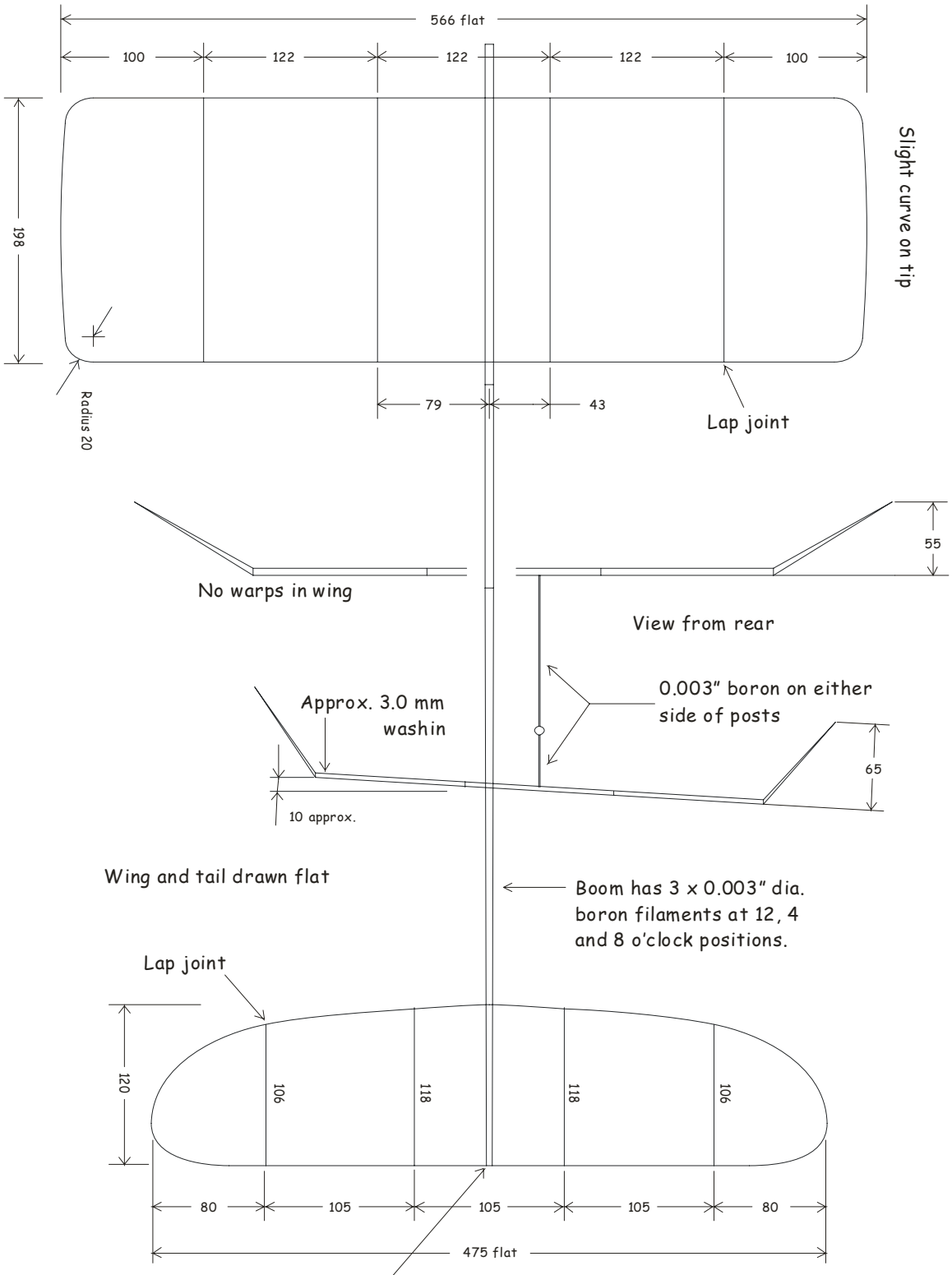
After a reasonable wind, I hooked up the motor and launched – the model took off like its namesake, with the wing distorting in a most alarming manner. This time however there were none of the 'staggers' that had plagued me on the previous day and as the torque dropped off, the climb evened out and the model kept on going, eventually setting the official record.

The model is conventional in design and detail and similar to aeroplanes flown in the UK by Ron Green, Geoffrey Lefever and Bob Bailey. The motorstick wood was probably too soft, needing 4 pieces of boron to provide adequate longitudinal stiffness. This did nothing to control the torsional stiffness, which, together with a floppy wing, gave such spectacular wash-in at launch. Newer straight and drooped models use stiffer stick wood, less stick boron and boron composite wing spars and ribs.

Component	Subcomponent	Details
Wing	Spars	55 x 35 → 100 x 35 → 55 x 35 –5.5 lb, B Grain
	Tips	55 x 32 → 30 x 30 → 55 x 32 – 5.0 lb, B Grain
	Ribs	Andrews 23 x 45 → 23 x 62 → 23 x 45 – 4.3 lb, C Grain
Tailplane	Spars	40 x 31 → 55 x 31 → 40 x 31 – 5.2 lb, A Grain
	Tips	40 x 31 → 40 x 27 → 40 x 31 – 4.4 lb, A grain
	Ribs	Andrews 22 x 28 → 22 x 48 → 22 x 28 – 4.2 lb, C Grain
Motorstick		0.25" dia. Blank 0.845" wide 0.013" - 4.2 lb – C Grain
Extension		0.25" dia. Blank 0.845" wide 0.010" - 3.9 lb – C Grain
Plug-in for boom		Trim to fit boom taper. 1.75" long 0.009" –4.2 lb, C Grain
Tailboom		Blank 0.845" wide → 0.50" wide 0.009" – 4.0 lb, C Grain
Wingposts		55 x 45 oval section – 5.2 lb, A Grain
Tailposts		45 x 38 oval section –5.2 lb, A Grain
Propeller	Spars	60 dia. → 30 dia. – 4.4 lb, A Grain
	Ribs	Andrews 2 are 22 x 24 → 22 x 50 → 22 x 24 – 4.5 lb, C Grain
		Constant 3 are 22 x 24 – 4.5 lb, C Grain
Covering		Y2K2 Applied with 3M "Spraymount"
Rubber		March '02 Tan2

Weights	
Wing	0.304
Tailplane	0.146
Motorstick + Extension + Posts	0.371
Boom + Posts	0.156
Propeller	0.190
Ballast	0.036
Total	1.202

BAT OUT OF HELL!	
U.K. CAT. IV F1D Official Record Holder 36:32 at the CargoLifter Hanger, Germany 15th September 2002	
Scale 1:1 and 1:4	Plan measurements in mm, wood etc. in inches



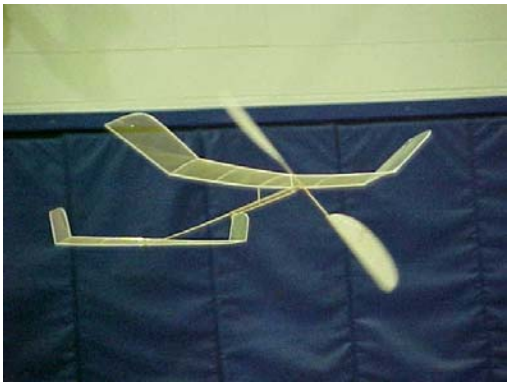
BAT OUT OF HELL!

Page 1 of 2

A F1D model designed and drawn by Nick Aikman (UK)	Scale 1:4, details 1:1
	All measurements in mm

U.K. CAT. IV F1D Official Record Holder 36:32 at the CargoLifter Hanger, Germany 15th September 2002

READER'S PHOTO ALBUM



EZB by Jerry Combs, Photo by Spencer

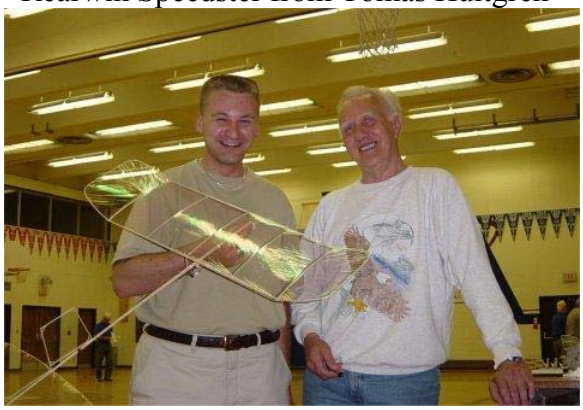
John Pakiz Winding at Beatrice NE Indoor

Carl's Version of a Paul Bradley Hellcat

Jerry Combs Electric FF Does 13+ So Far

Rearwin Speedster from Tomas Hultgren

Scale Judging at Cedar Falls



Vlad Linardic (L) with new Electric FF

Future Aviators at Cedar Falls

APPLYING BORON TO ROUND PROPELLER SPARS

By Nick Aikman. 30.12.02

In the last INAV, I described the way I use for producing perfect, round prop spars. Here's my method of attaching boron to them.

First, cut enough pieces of 0.003 thou' boron for a pair of spars, trim them to the exact length needed – some flyers use 2 per spar, while others prefer 3, while some think this whole procedure is a complete waste of time! However, it certainly makes stiff, light spars. Pre-glue each piece of boron by pulling it through your pinched thumb and forefinger with a small puddle of thinned glue in between. For this, I use an Ambroid/butanone mixture that is the same as the glue I prefer for everything else. I pass each boron strand through 3 or 4 times to form a thin coating over the entire length. Don't add too much – glue is heavy!

Next, take two lengths of cotton thread and glue one to each end of the boron pieces – there should be an overlap of around 4.0 millimetres. Use the same glue. One piece of cotton should have a loop tied into it. The drawing shows the general set up for assembly. With a fine pen, on the fat end of each spar mark the stations where each boron filament will lie. Trap a spar between two steel rulers with tapered packing pieces underneath. The packing is to accommodate the spar taper and ensure that the sides of each ruler rest at the right height against the round balsa. Hold this assembly in place with pins pushed into the building board. Take a piece of boron/cotton and position it in the right place at one end with a pin through the loop. Attach a weight to the end of the other piece of thread and allow this to hang over the edge of the building board – use modeling clay, a bulldog clip or anything else to hand that is easily re-usable. The boron is now in tension and can easily be positioned to lie perfectly over the spar by adjusting the orientation of the thread with more, carefully positioned pins.

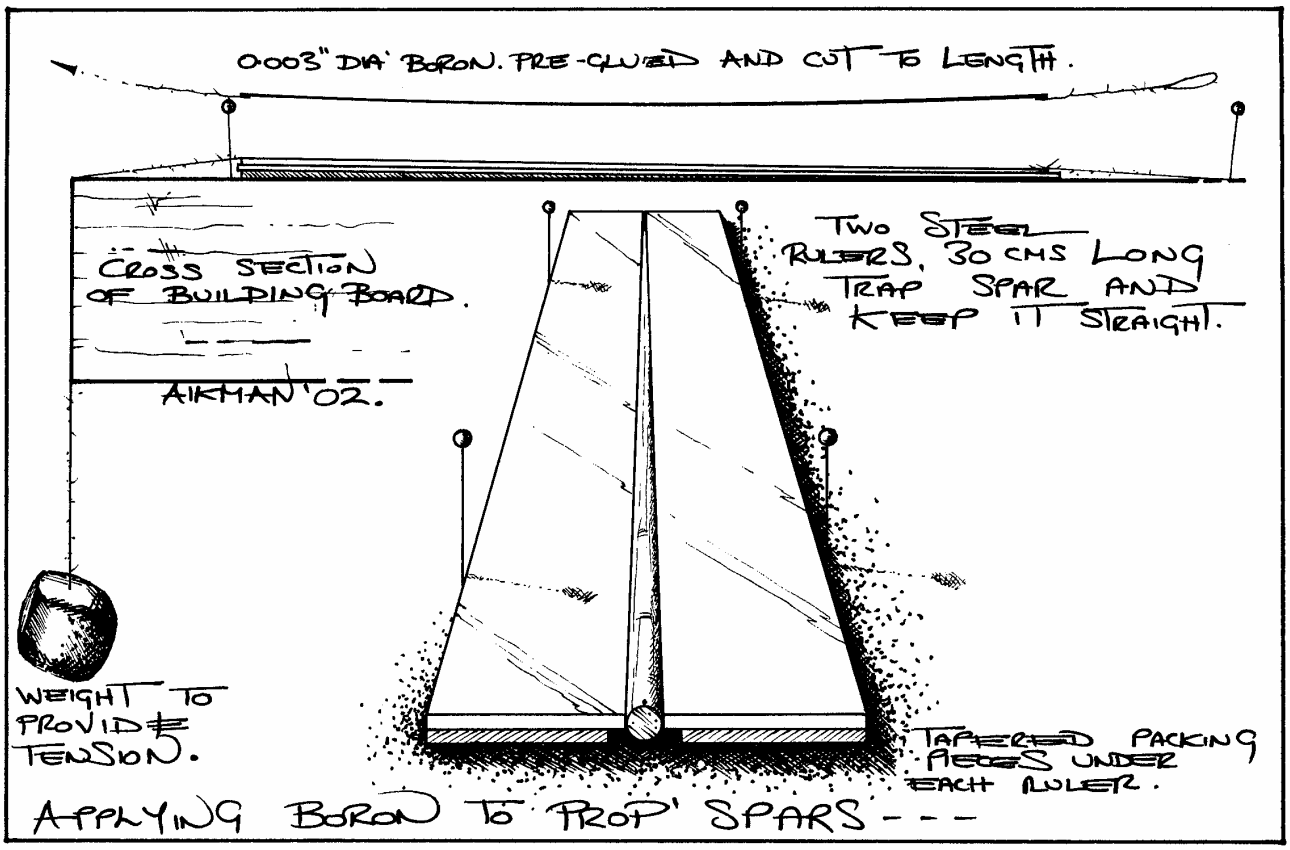
When you are happy that the boron is in the right place, use tiny dots of glue to tack the boron to the balsa at intervals of around 2.0 centimetres – this ensures that the boron stays straight. Finally, reactivate the glue using a very small brush loaded with pure butanone. Leaving the thread ends until last, start 2.00 centimetres from the fat end and apply solvent. This will run along the boron a short distance and melt the glue, which can then be gently rubbed into the wood, trapping the boron in place. Carry on this procedure, working your way up the spar and use the divisions on the ruler to mark how far you get to.

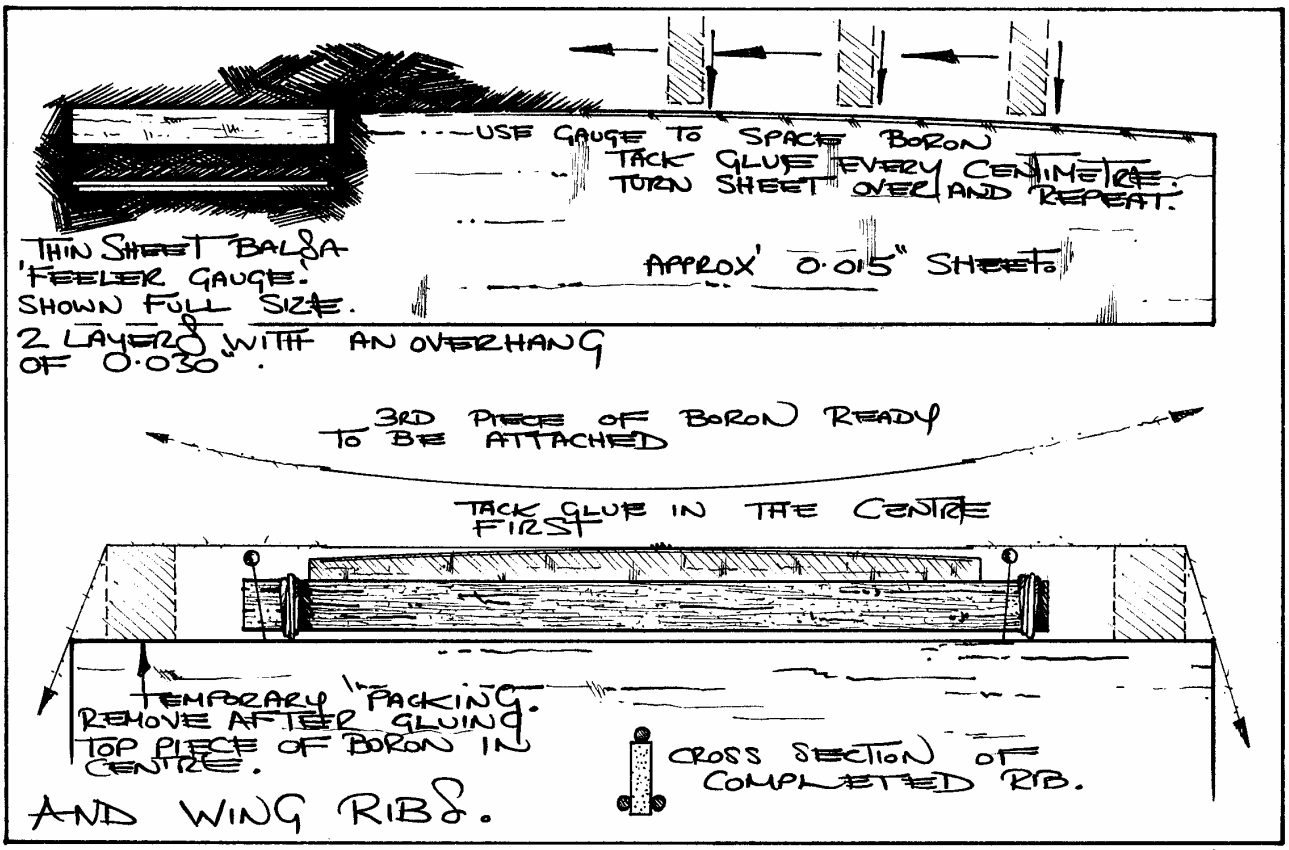
To release the thread ends from the boron once the rest is secured, dissolve the glue connections while pulling gently on the cotton to lift them and hold them away from the spar. Then apply solvent to each end and rub down to attach. The big ends are easy but more care is needed when moving down to the smaller ends – too much solvent can flood the work and undo other joints already made. I usually allow each completed filament to dry for around an hour before moving on to the next. If the spar seems to be glued to a ruler, gently roll the spar from side to side to break the connection. Alternatively, insert a razor blade between the two elements to cut them loose.

Although this set up seems a bit of a 'Heath Robinson', it does work. A complete pair of 9.5 inch F1D spars should weigh around 80 milligrams. I use the same method of cut lengths of boron tensioned between cotton for ribs, wing spars, sticks and booms.

The lower drawing shows my method for making ribs. A feeler gauge is used with a 0.030" overhang and after tacking one end of the pre-glued boron in place, the gauge is worked along the profiled sheet of wood to space the boron the correct distance from the edge – tack glue at regular intervals, turn over and repeat, being careful to match the place where the boron starts on both sides. In practice, once you've made a few ribs, your eye will know what to do and you might dispense with the gauge. After tacking, reactivate the glue with solvent and gently rub down the boron as you go. The top piece of boron is applied using weighted cotton at each end, the wood being held upright on the board by lightly trapping it between two strips of wood, which are held together with rubber bands. This assembly is kept upright with modelling pins. Use temporary packing pieces at each end of the wood strips to raise the boron to the right height and then tack in place in the center of the rib. Remove the packing and tack along the rib profile on either side, working your way out to each end. Again, the glue is then reactivated with solvent and the cotton removed. Finally, the complete rib is cut out below the boron strips with the correct template and you are ready for the next one. For the latest batch of ribs, I used 15 thou' 4.5 LB, C grain sheet and a set of 4 ribs weighed 62/64 milligrams.

It is arguable that if you don't fly regularly in high ceilings, the extra work involved is not worthwhile. However, using these boron/balsa composites does produce extremely stiff components that make models more rugged and durable and less likely to need repair at critical moments.


0·003" DIA' BORON. PRE-GLUED AND CUT TO LENGTH.
CROSS SECTION OF BUILDING BOARD.
AIRMAN '02.
TWO STEEL RULERS, 30 CMS LONG TRAP SPAR AND KEEP IT STRAIGHT.
WEIGHT TO PROVIDE TENSION.
TAPERED PACKING PIECES UNDER EACH RULER.
APPLYING BORON TO PROP' SPARS - - -


USE GAUGE TO SPACE BORON
TACK GLUE EVERY CENTIMETRE.
TURN SHEET OVER AND REPEAT.
THIN SHEET BALSA
FEELER GAUGE.
SHOWN FULL SIZE.
APPROX' 0·015" SHEET.
2 LAYERS WITH AN OVERHANG OF 0·030".
3RD PIECE OF BORON READY TO BE ATTACHED
TACK GLUE IN THE CENTRE FIRST
TEMPORARY PACKING. REMOVE AFTER GLUING TOP PIECE OF BORON IN CENTRE.
CROSS SECTION OF COMPLETED RIB.
AND WING RIBS.

MEET MR. MICRO-DYNE.

From American Modeler Annual 1966

The "wild blue yonder" for an ever increasing band of balsa benders has a 30-foot ceiling. A.M.A. low-ceiling categories are bringing inside many a "blue sky" free flight type, Durations are still quite low since this restricted ceiling event is fairly new, but enthusiasm for this fly-anywhere indoor competition is growing. One of the leaders in this movement is a 33-year-old science teacher, Lew Gitlow. He is president of Micro-Dyne Precision Products, a mail-order retail group formed in 1960 to provide indoor kits, plans and the select balsa so essential to successful indoor construction.

Gitlow has also authored a 52-page book on "Indoor Model Building and Flying" ($1.50 postpaid). He points out many unique advantages of indoor modeling. (Currently available as Indoor Flying Models, for $22. – ed)

Naturally, with these models you can fly year-round regardless of the weather outside, but that is only part of the whole picture. The indoor modeler can spend 15 to 45 minutes as time permits, working on a model. Then he can put the completed part in a drawer or hang it on a pin. “These models go together in what seems like no time at all” says Gitlow. The indoor modelers' accumulation of sawdust and scrap for an entire year wouldn't fill a shoe-box since left-overs from one model are always useful on the next. Imagine storing a year's supply of balsa in a tie-box and all the needed tools, forms and other supplies in a single desk drawer!

Gitlow built his first solid-stick original indoor model at the age of 12 and clocked 45 seconds in the Long Beach Grade School auditorium on Long Island, New York. His next indoor model, built 19 years later, recorded a 3-1/2 minute flight during a meeting of the Ontario, California, Model Airplane Club in a grade school auditorium, During this gap in time, Gitlow had obtained an M.A. degree from Albany State Teachers College in New York and studied three years of advanced Physics.

Lew is the type who designs and builds what he likes to fly and thoroughly enjoys flying his aircraft when they're completed. One of the unique things about indoor modeling, he points out, is the ability to walk alongside a model in flight at perhaps 3 feet per second. "It's almost hypnotic," he admits. "Indoor models last much longer than is commonly realized,” explained Gitlow, “If you were to take an outdoor job and drop it nose-first, have it collide with a wall or fly it out of adjustment on a first flight, chances are that it would need repair. However, the indoor model, due to lightness and slow speed, would recover and float down undamaged
There's more flying time per hour of building time with Indoor models than anything else in the air. In addition, the Indoor modeler has the opportunity to learn how to handle super thin materials, I believe that this is more of an art than a science; You don't need any extensive background in modeling to produce good indoor performance.”

The number one secret of success for indoor modeling, according to Gitlow, is wood. It should be lighter and stronger than most balsa and the cutting technique is different. Micro-Dyne ships sheet balsa of 1/100th" in thickness. This extra-thin sheet is cut, not sanded, by a Gitlow process which remains a trade secret. He purchases his balsa directly from Ecuador in shipments of 2,000 board feet at a time. Gitlow doesn't use much of the balsa that he received for his customers. "There are many types of imperfections characteristic to very light balsa,” he explains. These include irregular grain, wind breakers (small cracks in the balsa), mush wood with no snap or return after bending, weak spots, deposits of pith or cell sap and infestations of mildew if the wood has been allowed to remain in the water after it has been floated downstream in Equation. The ideal indoor balsa has a density range of 4 to 6 pounds per cubic foot and is found in the center of the tree. “A high percentage of the raw-stock that I receive from South America is used to package premium balsa or discarded."
Lew’s telephone rings constantly with inquires from other builders. His wife Anne, who works for the California Dept. of Employment, didn't know a thing about model building until the couple were married three years ago. But she built an FAI type model that clocked 23 minutes in Santa Ana, and is looking forward to making indoor scale in models.

Gitlow is not a power plane pilot and has no desire to become one. "I might he interested in learning to fly a glider, but only if it were one that I had built myself," he commented. He is interested in aerodynamics only as it applies to modeling. As a teen-ager in New York, he built model gliders and sent them aloft on kites and shaking them loose. Aside from model building, his interests in chemistry and physics carried through high school and college, He later taught these subjects in high school and is now teaching in a junior high In Southern Cal where classes are so large (38 to 42) that he must teach from the middle of the room so that all his students can see and hear his demonstrations.

Gitlow's background in chemistry helped him develop a new microfilm covering solution in 1962 that has since been used by many present record holders. The new film was the 74th solution that he tested. During the development of '74;' Tom Pinch, present Class B, Category III record holder and Dave Copple of the Wilmington (Calif.) Indoor Model Airplane Club stopped to visit Gitlow. As the Science Teacher explains it, "Tom took a piece of the new film off the balsa hoop, rolled it into a ball and than pulled it apart. After handling it themselves, Tom and Dave exclaimed, 'That's it!' and took the remaining portion of the batch with them." After slight modification, this film was marketed and has been quite successful because of its strength, lightness and stability," The combination of the new film and good balsa enabled Gitlow to design and produce what he feels is a true beginner's indoor model kit the "Easy B." This solid-stick job with a 1/64th sheet balsa prop and the simplest construction, makes it possible for the novice to finish a good-flying model in a few evenings.
"When you really look at one closely, there isn't very much to an indoor model except ingenuity," explained Gitlow. The completed plane will weigh only a fraction of an ounce. Competition models have propellers that revolve about once each second. 1/1000th of an inch Nichrome wire is used to provide rigidity to the wing. The thin wood outlines of the wing and stabilizer are constructed quickly using cardboard templates. All the microfilm used to cover a 33-inch wing could be rolled into a tiny ball weighing as much as a postage stamp. Condenser paper may also he used in covering and it's only 0002" thick-5,000 sheets to the inch! A hollow tube of 1/64" balsa usually supports the wing, prop, tail and rubber motor, It is made by placing a wet sheet of balsa on a sheet of tissue paper and then rolling the balsa and tissue around a glass rod. After the tube dries for 5 minutes it is removed from the glass rod and the seam is glued. A 14-inch tube weighs about as much as five postage stamps. The tail-boom is made from 1/100" sheet balsa in a similar manner, using weight-selected indoor wood.

Gitlow contends that indoor model building growth was hindered for many years by the mistaken belief that construction was difficult. The Indoor modeler was thought of as a patient guy with; nerves of steel, twelve delicate fingers and no thumbs, thick glasses, a pocketful of tranquilizers, grey hair, no children, years of experience, advanced techniques in adjustment, lots, of spare time and for some fool reason-a dedication to build just super-light models that are ready to fall apart at a sneeze. Today Gitlow finds that indoor modelers fly all types of equipment and turn to indoor modeling for part of the year. Here they find a new fascination and enjoyment not found in other phases of modeling. He estimates that the average indoor modeler is in his 30's. However, a number of Gitlow's kits have been demonstrated by Warren Williams of Upland, Calif to inmates at the Chino Penal Institution whose inmates are encouraged to develop hobbies.

Gitlow estimates that there are five times as many Indoor enthusiasts now compared with only one year age. He bases this figure on the steady increase in the purchase of both kits and specialized indoor model supplies with orders split roughly 50/50 between kits and bulk materials. Additional developments that have aided the growth of Indoor modeling include the new F.A.I. and other classes of international competition that has challenged newcomers and old-timers as well. National Indoor Model Airplane Society (NIMAS) with activities and Indoor News and Views ($2 per year from Bud Tenny, Box 545, Richardson, Texas) does a real job.

Gitlow feels that the next step forward for indoor modelers is the development of super-light-weight flying scale. "Here the main consideration will be to use materials that will turn out a model weighing one-tenth (or less) than that of the usual scale model. The structural design, condenser paper covering, choice of light balsa and propeller selection will make this possible. The designs will have the largest possible stabilizer area, the largest nose moment arm, least wing area, longest tail moment arm, longest fuselage, maximum propeller

clearance and as much square fuselage area as possible for simple light-weight construction. These considerations will give the modeler a scale model capable of unusually long flights."

To keep weight to a minimum Lew uses 1/100" sheet for dummy engines, cylinders and cockpit fairings, areas where 1/32" sheet would normally be used. This thin wood can be bent around curves by brushing water on one side. He uses 1/16" material for fuselage stringers and has been able to develop 24" flying-scale models that weigh less than 1/3 of an ounce including the propeller. As, the model weight goes down the rubber required also diminishes. Color can be added to the tissue before covering by going over the sheet with a felt pen. The solvent does not shrink the tissue or add weight. Gitlow uses waster-soluble food coloring dyes on wood parts and India ink for marking. "The most important single design problem with an indoor scale model is to put the wood just where it will do the most good," advises Lew. "Use very thin wood for the stabilizer and rudder to keep the center of gravity up forward"

Gitlow is now in the process of developing a series of Indoor scale kits. He's also building a new 1,500 square foot factory in Montrose. If the popularity of Indoor models continues, It's a good bet that the teaching profession Is going to lose one fine science teacher who-like most everyone else-would prefer to be his own full-time boss.

That was 37 years ago. Today, Lew is still doing what he does best, with Indoor Model Supply. He has a full line of kits, supplies for indoor, and his own new designs for the A-6 and Science Olympiad events. I myself still fly my Slow Poke and Novice Penny Plane, which I heartily recommend to all beginners. I called Lew on the phone the other day, and he said that if you say anything at all about me, be sure to mention not only the Sci-Oly-1 kit, but also his new 22 page book, The Propeller Propulsion Science Olympiad. He has been working with and helping youngsters and mentors all over the country with this event, and many of his charges went on to advance in the indoor hobby. You can write him at PO Box 2020, Florence Oregon, or call him at 541-902-8508. IMS also has a website at www.indoormodelsupply.com

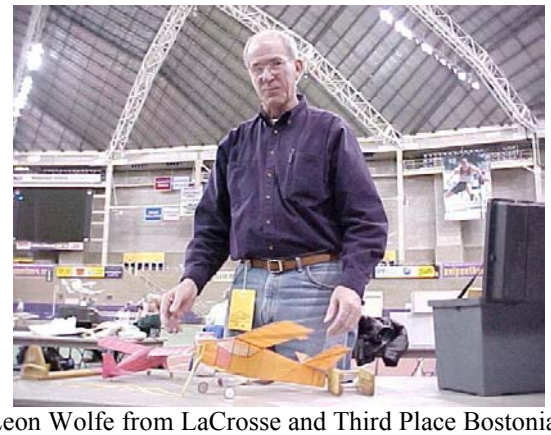
Carl Bakay

CEDAR FALLS, IOWA UNIDOME R/C INDOOR FUN FLY AND CONTEST

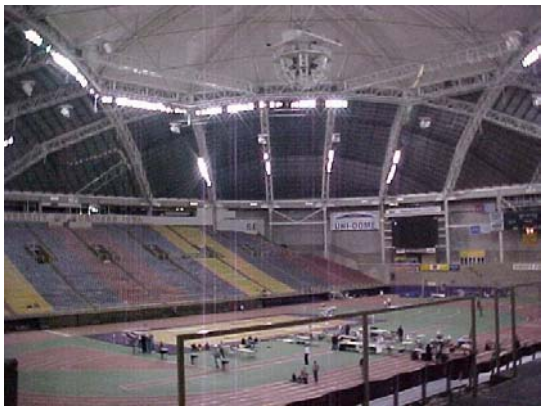
March 1-2, 2003

By Carl Bakay, Harvey, LA

As you can tell by my address, I live way down in the bayous of south Louisiana, across the Mississippi river from New Orleans. It is a real stretch for me to go anywhere farther northwest than Little Rock or northeast than Atlanta. Iowa was out of the question. That is until I had several long phone conversations with Bob Wilder, and he suggested I drive to Dallas first, stay a few days, then carpool up to Iowa and back, splitting expenses. Now this was do-able.



Leon Wolfe from LaCrosse and Third Place Bostonian



Cedar Falls, Iowa UniDome

While staying in Colleyville, Bob was in touch with Bob Selman in Joplin, MO, and Ken Spencer, in nearby Webb City. Bob Selman Designs makes the two gram actuators, converters, and LiPoly chargers which have transformed indoor micro flight. He suggested we drive up by way of Joplin, stay the night, and caravan up to Cedar Falls together. There we would join up with Gary Jones from New Mexico, in the third car. Not only was the caravan successful, but Gary Jones, Carthage, MO provided us with walkie talkies so all three vehicles could stay in constant communication. We drove for a little over seven hours, munching survival goodies provided by Bob's wife, Janell, and we were there.

The UniDome is on the campus of the University of Northern Iowa at Cedar Falls, on the western side of the town of Waterloo, and about 100 miles Northeast of Des Moines. The meet has been held for several years now in a joint effort of the Blackhawk RC Pilots and Indoor Aces Free Flight Club. The first flying session was Saturday evening from 6 pm until 11 pm. Walking in, I was immediately impressed with the layout, which consisted of a no-fly zone of tables across the 50 yard line, neatly dividing the dome into two halves, one side for free flight, the other side for electric R/C. The setup worked beautifully, and these two very dissimilar modeling types coexisted under one roof with no complaints that we could hear. The CD was Bob Nelson, of Bobs RC Hobbies in Cedar Falls, and he ran a very relaxed mixture of duration, fun fly and scale contestants of both rubber and electric, again with few or no problems.

On the free flight side, things were busy but organized. Paul McIlrath, the Krempetz family, Kurt and Kenny, Tem Johnson and others kept the air filled with hand launched and catapult gliders. Kurt got a first in catapult and second in hand launch glider, while Paul won hand launch with a combined two-flight score of 99 seconds. NoCal profile scale featured a Helio Courier by John Pakiz of Omaha, who netted a fourth place in this event, and Gordon Dona grabbed second with a very light Heinkel.

Bob Wilder of our group and Steve Leitgen from LaCrosse made attempts at a new RC endurance record, but Bob suffered from turbulent air and Steve from radio glitches. As of Saturday night, Steve still held the current RC record of 18:30. As for electric free flight, our CD did manage a nice flight of 5:50, good enough for first, and edging out Bob Wilder with just two seconds less at 5:48 in second place. It should be mentioned that Bob's model landed in the top row of seats, against the wall. With fewer air currents, it might have won.

Sunday dawned clear and cold, and we were all glad to be heading indoors, because the temperature outside was 9 degrees with gusty winds. That puts the chill factor in the minus numbers.

Your Editor had a Paul Bradley Hellcat profile scale model, at only 4.5 grams, and a John Pakiz version of the same. But somewhere between Dallas and Joplin they lost their Louisiana humidity and turned into pretzels when I took them out of the box on Sunday. Flight times for these three to four gram models are in the five to six minute range in good air. But Jack O'Leary gambled that an entry built to the 6-gram rule would do better at this site, and was rewarded when his Heinkel 119 netted first place. Peanut Scale was judged by Jon "Wrong Way" McVay, who makes his home in Iowa, and flies with the Blackhawk club. One of the more impressive entries was the first place Ford Stout 2AT peanut of Gary Hodson.

Future Aviators in the Delta Dart Competition

Gary Hodson's Ford Stout Peanut Scale

The air was decidedly calmer on Sunday, and Bob Wilder set his fears aside, and put up his RC duration ship for another try. This time he climbed quickly above the air handlers at 50 or so feet, and made it look easy as he circled in calm, warm air for a new indoor duration record of 20:56. Pretty impressive for six 50 mAh cells and rudder-only.

The flying continued until 4 pm, and everyone left satisfied. In all there were 28 contestants and 43 sport flyers, for an entry total of 71 people. Results are provided by Bob Nelson, Contest Director, and are listed below.

HAND LAUNCH GLIDER

CONTESTANT	*SCORE*	*PLACE*
Paul McIlrath	99.0	1
Kurt Krempetz	91.4	2
Kenny Krempetz, Jr.	54.6	3
Rick Knight	31.0	4

CATAPULT GLIDER

Kurt Krempetz	117.7	1
Kenny Krempetz, Jr.	113.4	2
Tem Johnson	92.7	3
Kenny Krempetz, Sr.	82.8	4
Paul McIlrath	71.0	5
Joe Konefes	62.8	6

FF ELECTRIC DURATION

Bob Nelson	350	1
Bob Wilder	348	2
Rick Knight	128	3

BOSTONIAN

Gordon Dona	280	1
Ed Konefes	228	2
Leon Wolfe	214	3
Floyd Richards	202	4
Jon McVay	194	5

ONE DESIGN DELTA DART – OPEN

CONTESTANT	*SCORE*	*PLACE*
Floyd Richards	208.0	1
Kenny Krempetz, Jr.	179.9	2
Kenny Krempetz, Sr.	162.4	3
Kurt Krempetz	123.2	4
Bob Nelson	106.5	5

PEANUT SCALE

Gary Hodson	174	1
Ed Konefes	109	2
H.G. Frautschy	76	3

RC ELECTRIC DURATION

Bob Wilder	20:56	New Record
Steve Leitgen	N/A	
Denny Paup	N/A	

NO-CAL SCALE

John O'Leary	527	1
Gordon Dona	512	2
Floyd Richard	426	3
John Pakiz	358	4
Jon McVay	299	5

E-FLOWER: AN ELECTRIC DURATION MODEL

by Jerry Combs, Wyandotte, OK
farmerjerry@datalinkok.com

Indoor Electric Free Flight Duration, what yet another event, I hear you scream. I know that many of you have seen some form of electric powered free flight that has shown up where you fly and probably it has been a fast flying noisy little thing that has torn up the air and made it difficult for anyone to fly a serious duration type ship afterwards. When this event was first introduced I was intrigued by it. What would be a good size of model and what motor would work without investing a ton of money.

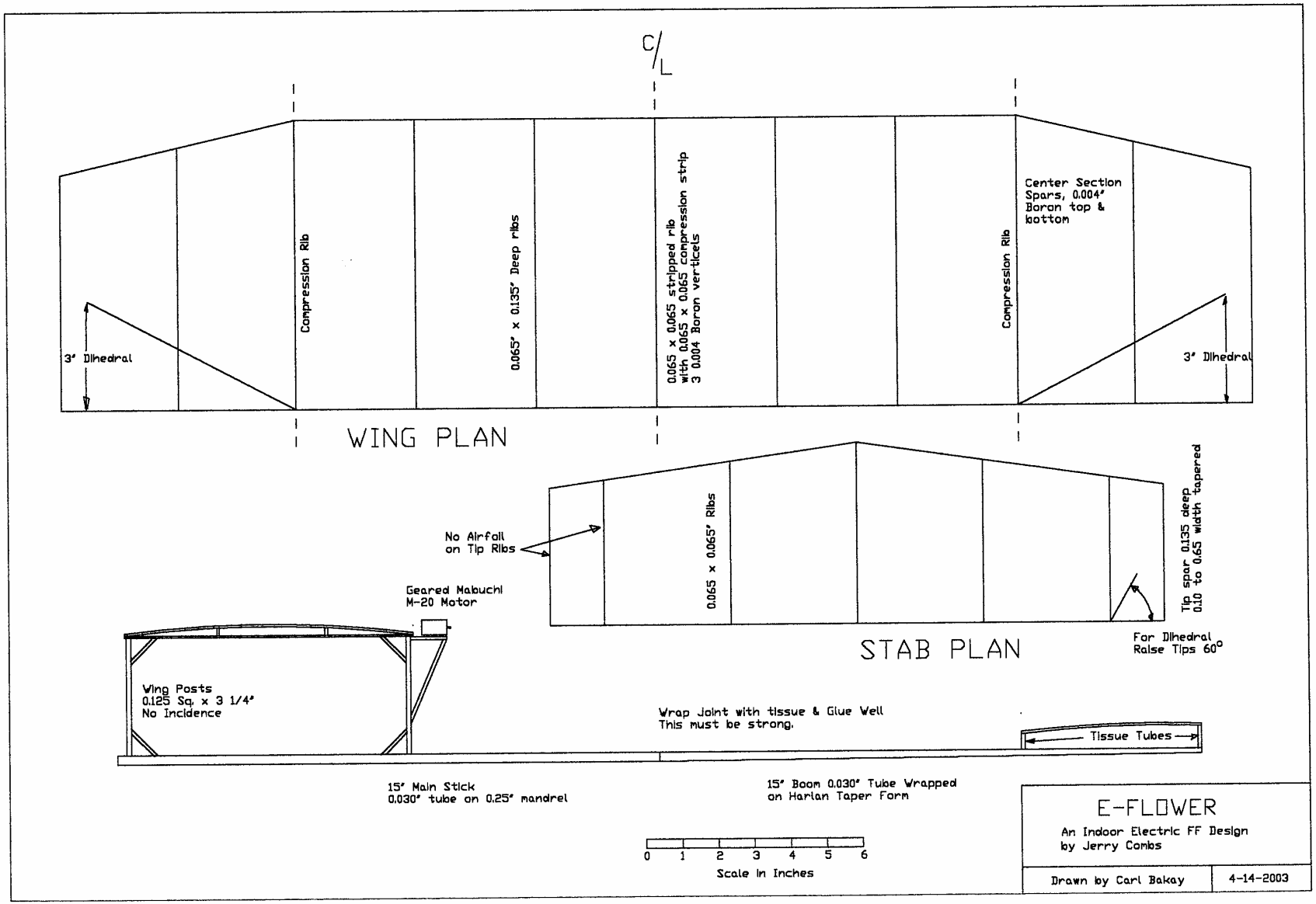
I designed the E-Flower to be easy to construct, inexpensive to build, and yet hopefully have decent duration and not tear the air up for other flyers. Being large the E-Flower flies slowly and is easy to build since all of the parts are big and easy for shaky old fingers to get hold of. I chose the M20 motor because it is relatively inexpensive and easily obtained. Simply go to your local Wal-Mart etc and purchase an E-Charger airplane. They are usually in the $10 range or less depending if you can find them on sale at the time.

The wing spars are 0.135" deep by 0.10" tapered to 0.065" at the tips and there is boron on all four faces of the spars. Don't leave the boron off unless you use much larger spars, the battery's and motor weigh quite a bit so the wing has to be strong. I covered mine with Y2K PPP film but any film in this weight range could be used. The wing is braced in the conventionally manner with "Spider Wire" fishing line. My first wing was built using Nichrome wire and without the boron. The first time it touched the roof it folded so I added the boron and "Spider Wire" on the next one. The motor stick is rolled using 0.030" balsa and the tail boom is rolled using 0.025". The stab and rudders are built of 0.065" square firm balsa. Build the motor mount and Battery mount of firm 0.135" balsa, this is one place that you want things to be really strong as there is a lot of stress on these parts. I recommend using straight "Duco" on these joints, thinned cements don't seem to have enough strength. The model will come out at around 3.5 to 4 grams without the motor and batteries and around 15 to 19 all up weight if you watch your wood selection and don't over use the glue.

I am using the Mabuchi M20 motor with 4.6 to 1 gearing which may or may not be the best choice but it was cheap. I found that Futaba servo gears mesh well with the pinion that comes with the E-chargers. I used a 0.063" carbon rod for the output shaft with a portion of a Q-Tip for a bearing. Add a touch of powdered graphite as a lubricant. Originally I used a blue plastic 12 cm prop available from Bob Selman Designs http://users.joplin.com/~bselman/, this gave me a duration of around 13 to 15 minutes. I am wiring my batteries in parallel to get more capacity. Now I am using a homemade laminated balsa prop. I tried building a double reduction gear train such as used by Ray Harlan but my skills at building gear boxes are not up to his level and I found that I was losing almost ½ of my motor run time. I am using left thrust to turn the model but have still had to add paper tabs on the rudders to keep the turn tight enough for flying in a small gym.

The batteries are one of the biggest keys to getting good duration from a electric free flight duration ship I my opinion. I do a lot of testing of my batteries using a 100ma charge rate and peak charging them. I test for the longest motor run that I can get using a known motor prop combination, I test the cells individually as if they are in pairs you can get erroneous results. I know that there are others testing batteries and some have gotten different results than I have. Some have claimed that all 50ma ni-cads are within 10% or each other, my tests have shown a much broader variance than this so I am sticking to my method of testing for now.

Why not give it a try and build an E-Flower and see what Indoor Electric Free Flight Duration is all about?


C/L
Compression Rib
0.065" x 0.135" Deep ribs
0.065 x 0.065 stripped rib
with 0.065 x 0.065 compression strip
3 0.004 Boron verticals
Compression Rib
Center Section
Spars, 0.004"
Boron top &
bottom
3° Dihedral
3° Dihedral
WING PLAN
No Airfoil
on Tip Ribs
0.065 x 0.065" Ribs
Tip spar 0.135 deep
0.10 to 0.65 width tapered
STAB PLAN
For Dihedral
Raise Tips 60°
Geared Mabuchi
M-20 Motor
Wing Posts
0.125 Sq. x 3 1/4"
No Incidence
Wrap Joint with tissue & Glue Well
This must be strong.
Tissue Tubes
15" Main Stick
0.030" tube on 0.25" mandrel
15" Boom 0.030" Tube Wrapped
on Harlan Taper Form
0 1 2 3 4 5 6
Scale In Inches
E-FLOWER
An Indoor Electric FF Design
by Jerry Combs
Drawn by Carl Bakay
4-14-2003

GORILLA 2003 CONTEST RESULTS

As posted on the Indoor list on Yahoogroups

If you remember, last issue we publicized an international contest with the unique rules of flying in places without permission and scored based upon the number of people that stopped and gawked times the flight time. Well, the contest closed and we have a winner.

Top Gorilla for 2003 is Alan Cohen, with an official 51.96. (4.33 minutes X 12 gawkers.) Good flying and more importantly, good publicity, Alan!

To my knowledge, none of the posted flights encountered any unwelcomeness from security or management. Maybe an on-trim indoor model speaks for itself.

In case there is enough interest to try this again, Alan gets the booby prize of adjusting rules, and promotion. Just discuss changes here on this list, and go for it, Alan. Beware--out of the 6 flyers who said they had a ministicks and would fly gorilla, only three did.

Suggest that in future (but not to presume a future) no model class be specified, but again just "time X spectators." Light models would have their risk rewarded, and heavier models would survive to try for more spectators.

Alan, apparently I will see you at the Super Spectacular Indoor Blowout at Lakehurst, July 4,5. If you don't have Gorilla Trophy in hand by then, I will carry it to NJ.

thanks,
Mark B
Sacramento

I don't know what to say. I would just like to thank the academy and everyone who made this honor possible (Hi Mom!).

Seriously, I think this was a fun idea and something worth continuing. Maybe on a yearly basis rather than for a few months. Flyers could post Gorilla scores, stories and pictures as the spirit moves and at the end of the year we could award the trophy. I really had a lot of fun flying at the mall. The reaction from everyone was sheer amazement.

I think it's the stories and pictures that will motivate other flyers more than anything. Unfortunately, ministicks are not very photogenic at 20' high! Maybe bonus points can be awarded for a good story, and a video of the mall security guard jumping up and down to try an snag a plane would certainly merit top honors.

As far as the model type, I still think a ministick is the best choice for several reasons. It is an AMA sanctioned model which gives it credibility. It can't possibly hurt anything or anybody. It can be set up with a small 5" prop and fairly low pitch which would bring the rpm's up so high that it could fly under almost any 'air'conditions. I adjust my circle radius at about 8' as to keep it out of trouble from indoor trees etc. It can also be made way over 430mg if desired and still be legal, stable and safe.

Regards,
Alan 

LEESON, Charles Henry, age 70 years of Sandy Point passed away April 25, 2003. Dearly beloved husband of Val and devoted father to Janet and Susan and father-in-law to Darryl and Susan's friend Josh.

It is sad to hear this news. He was a perfectionist. His rubber stripper is a testimonial to that dedication. He encouraged me to not grind a flat spot in mine. I'll curse him if it rolls off a table.

-Bruce in Seattle

The passing of Mr. Leeson is a loss. I am glad to have his stripper as well as a few of his perfect spoked wheels not to mention his wood ,where else could you get pre tapered prop spars, his death also reminds me of how very few of us there are in this sport and how crucial it is to get out there and promote this hobby
and get young and old alike into it...

-Rob Romash

I only met Charlie a few times when he came from Sydney to our competitions here in Albury/Wodonga. You are spot-on about Charlie's wheels. He took the time to show anybody his craftsmanship and explain how he did it. His balsa thickness gauge intrigued me greatly. It was a dial device with large flat anvils that triggered on the lightest touch to the wood and recorded the thickness.

Anzac Day has just passed here in Australia and the Anzac Day "Ode Of Remembrance" seems very appropriate for a mate:

They shall grow not old, as we that are left grow old;
Age shall not weary them, nor the years condemn.
At the going down of the sun and in the morning
We will remember them.

Lest We Forget.

-Cu Later Charlie * Danny M *

INDOOR
NEWS and VIEWS
ISSUE # 112

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August, 2003

Kibbie Dome Moscow, Idaho

FROM THE EDITOR'S DESK

In this issue we cover the USIC 2003 at Johnson City, and will squeeze in Kibbie Dome results if we get them before the issue deadline. Attendance at the Championships was down about 25% from previous years, but it was an excellent event, ably run by Abram Van Dover, and everyone had a good time. Photos are provided by Fred Rash and Gary Hodson. West Baden Trials are coming up for August 15, 16 and 17, and I urge everyone to try and make it. It looks like it will be a good turnout. I was unable to make Johnson City due to short term job pressures, but I will sure try to make West Baden.

We also include the second page of plans for Nick Aikman's Bat Out of Hell F1D, which were left out of the last issue, with out sincere apologies to Nick. Also try out a very nice F1D by Aurel Popel.

A sincere Thank You to all who have sent for my Best of SLIM compendium. I have sent out about 150 copies, and it seems well received. Those of you familiar with my other newsletter efforts will know that we have been searching for the Holy Grail for some years now, that is, an alternate supply of sport rubber. Well, some quests have a happy ending and we expect our first shipment from China sometime in August. If possible, I will bring have some 500 g bags at West Baden, and we will see….

- Carl Bakay

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Sample ad copy should be sent to Tim Goldstein at the above address for publishing details.

PUBLISHERS DESK

I have been meaning to mention this for quite a while, but seem to remember after the issue is printed. Your subscription expiration date is printed on the mailing label after your name. If you have a yellow highlight on the date than this is the last issue you will receive unless you renew. Besides the traditional mail in a check or cash method, you can now renew on the Internet using PayPal or MasterCard/Visa credit card. We have to charge slightly more to cover the processing costs, but for those of you not in the USA it is probably less of a surcharge than the postage to renew by mail much less the costs of getting US$ cash or money order. You can renew at www.F1D.biz on the Order Other Items section.

For those of you following my employment saga here is the latest update. I am now working part time for a new company that is forming from the ashes of my former employer. The jewelry tool & supply store that my wife and I started is also ramping up and will hopefully start paying it's own way by Christmas. For now though I am working in the store 5 days a week and not drawing any pay. I haven't mentioned it previously, but I also have an online business in addition to www.F1D.biz that sells Sherline and Taig table top machine tools along with the software and hardware to make them computer controlled. For anyone interested this business is at www.KTMarketing.com. All combined we are now doing OK except that model related activities have been pretty well pushed off until life slows down.

One change that may affect INAV is that the printer I used to have access to for publishing has been sold. We now will have to print the newsletter at a commercial printers. Not quite sure the affect this will have on costs. We will tally up the expenses and see if we can keep the current subscription rates or if an increase is needed.

Tim

Testimonial:

Got a chance to try the samples of rubber that you sent to me. I used it on my P-24 and am impressed with how well it worked. We ended up having a small P-24 contest between 3 of us that have P-24's. The other 2 flyers were flying 4/01 Tan II, and I was flying with the sample rubber. Times were within 5 seconds of each other. One of the guys broke a motor on about the 5th winding, but the sample motor was still going strong the whole time. It isn't 5/99 but it sure is flyable.
Jerry Combs, Wyandotte, OK

Test Results: Carl Bakay, New Orleans, LA

I tested a sample air express shipped from the production batch. It will pass for good sport rubber right now.

Property	Production Batch
Tensile, psi	2275
Thickness	.040"
Width	. 0.124"
Elongation	9.5 x
Permanent Set	5.7%
E, ft lbs/lb @70° F	3847

EXPERIMENTAL STUDIES OF LIFT & DRAG AT VERY LOW AIRSPEED
PART II – THE FLAT WING

By Vern Neff (vdneff@aol.com) and John Wereb

Introduction

In a previous article (INAV # 110) we described the experimental apparatus and procedure for determining lift and drag on a wing moving in air at very low Reynolds numbers (Re ≤ 5000). The experiments are intended to provide information for the indoor modeler who flies in a medium (air) which does not always behave as anticipated based on extrapolation of experiments or aerodynamic theories designed for conventional flight of real airplanes.

At the outset we apologize for the somewhat long-winded nature of the ensuing discussion. At the risk of boring you we shall carefully define terms in order to avoid controversy. Controversy can be interesting and healthy and it certainly abounds in this hobby/science. What we hope to avoid is controversy based on misunderstanding or misinterpretation. We are also aware of the fact that most of you have carried out many more indoor flight experiments than we have. You do so every time you launch your airplane. As you all know there are a large number of factors that contribute to flight duration other than the lift and drag on the wing. Aerodynamics is a well established science and we certainly will not be saying anything that is not already well known or well understood. Our modest intention is to report on some reasonably well controlled experiments at very low flight speed. We begin with a brief discussion intended to convince you why such studies may be useful.

Alice in Indoorland

It is well known that the lift and drag on a fixed object over which a fluid is flowing is often not what common intuition might predict. That is, in fluid dynamics, things are not always what they seem. Consider a simple example of this paradoxical situation based on the measurement of drag as shown schematically in panel (l) The cylindrical wire, and the symmetrical airfoil, are mounted in a wind tunnel in which they span the tunnel so that edge effects are minimized . Their cross sections are shown in proper scale in the figure. If the wind tunnel airspeed is 210 mph, both objects experience the same drag force [l]. We can compound this paradox by trying to explain it with a theory which is simplified to the point where we can solve equations without to much difficulty. We define the concept of ideal flow in air. In ideal flow the air is incompressible, and inviscid (i.e. no shearing forces) and the flow is assumed to be uniform. By uniform we mean that, at any fixed point in the flowstream, the flow velocity is constant in time. Without going into the mathematics we simply point out that ideal uniform flow allows one to define a velocity potential at every point in the stream. The velocity potential can be expressed in terms of a partial differential equation (the Laplace equation) which can be solved when we specify suitable conditions at the boundary of the fluid and the solid object. If we solve this equation for the cylinder and the airfoil depicted in the figure we get the surprising result that the drag force on both objects should be exactly zero. Clearly our theory of ideal flow must be modified in order to explain the observed facts which, in themselves, are somewhat mystifying. The history of the development of aerodynamics is one of modifying flow conditions (i.e. the boundary layer, circulation, the bound vortex, separation, turbulence, etc.) in such a way as to obtain meaningful results with equations which can be solved. What is the point of this discussion which merely describes well known paradoxes? The point is that we must be very careful about the flow conditions if we want to explain drag (or lift). This is particularly true when we consider the conditions of very slow flight where the assumptions of both negligible viscosity, and uniform flow, may break down. For example we can ask how the drag on the two objects in panel (l) would compare if we reduce the airflow from 210 mph to 2 mph. We are aware of no existing data which give an answer to this question. It is not proper to merely extrapolate well known data, or well known concepts, when we enter the largely uncharted land of flight at very low Reynolds numbers because things are not always what they seem.

The Flat Wing

We have chosen the EZB as the standard of measurement for indoor endurance flight. The average well trimmed EZB appears (in level flight) to fly in the range of about 3 ft/s. For our purposes we define the average Reynolds number as Re = 68459(v)(L) where v is the velocity of level flight in meters/s and L is the wing chord (i.e. 3") in meters. The numerical constant is determined from the usual standard values of air viscosity and air density. At 3 ft/s the standard EZB is flying at Re = 4,770. .

You may ask why we chose the flat wing for the first experiments since it is readily acknowledged that a cambered wing gives more lift. The reason is based on the fact that the relative performance of the flat wing appears to improve dramatically at very low flight speed. Rather than indulge in the controversial issue about the correct profile and amount of camber for the indoor endurance model we propose to turn the question around and ask; why does the flat wing do so well in slow air? We now have A-6's which fly for eight minutes. One of us has either won or placed in several significant indoor events with a flat wing ministick (best time 11:20). In fact it is the good performance of the flat wing that lead to our interest in slow flight aerodynamics. After all, no one would ever dream of winning an outdoor contest with a flat wing Wakefield flying at Re = 70,000.

In the following discussion we will compare our data with the results of wind tunnel measurements for the Gottingen flat plate (GFP). In doing so it is necessary to point out at the outset that we are, in a sense, comparing apples with oranges. First of all the minimum Re for the GFP data is 42,000 whereas our measurements are carried out in the range of Re ≤ 5,000. More importantly the wing tip effects are eliminated in the tunnel measurements (i.e. so-called infinite aspect ratio) whereas they are not with our finite wing moving through air with an aspect ratio of 6. Finally we mention the important assumption about uniform flow. We can interchange results about air flowing over a wing with those for a wing moving uniformly through air as long the flow velocity at any fixed point in space is well defined and not changing in time for both types of experiment. If this condition is not met in very slow flight all bets are off and comparisons of the two types of measurement are less meaningful.

Lift Measurements

Our lift and drag measurements are carried out in such a way that we measure lift (or drag) as a function of airspeed at a given angle of attack (α). The equipment was designed to give reasonably accurate measurements in the velocity range of 1.0 – 3.0 ft./s. The equipment is not sensitive enough to give reliable data below a speed of about 1.0 ft./s. This corresponds to a range of Re from about 1600 to 5000 for the EZ-B wing. In standard Aerodynamics (SA) we define the lift coefficient on the basis of the assumption that the lifting force is proportional to the square of the flight speed v. The first thing to establish is whether this assumption of SA still holds in the range of speeds defined above.

The wing was fabricated from a flat sheet of 0.05 " balsa sanded smooth with 600 grit emery paper. The dimensions were 18.0" by 3.0". The actual mass of the wing was 6.23 g. The wing mass effects the sensitivity of the measurement but is irrelevant with respect to the actual lift due to the null type of measurement described in our previous paper.

The lift (in grams) as a function of airspeed (ft./s) at $\alpha = 5^o$ is shown in the table on the left in panel (2). The experimental points are plotted as open circles on the right. The solid curve corresponds to a parabola of the simple form $m(g) = Kv^2$. We use the symbol m for lift because the balance determines mass not force. The lift force is determined by multiplying by the gravitational constant G in appropriate units. The constant K which has units of $g(s/ft.)^2$ is given in the table. It is clear that in the range of velocity from 1.0-3.0 ft./s we get a very good fit of the data to a simple parabola. It is quite remarkable that we get essentially the same results at all measured angles of attack up to $\alpha = 45^o$. We show the fitted curve for $\alpha = 15^o$ in panel (3). The parabolic constant K is shown for all measured angles of attack in panel (4).

The experimental fact that the lift is proportional to the square of the velocity at very slow flight speed is not trivial. The reason for this has to do with the effect of viscosity at low Reynolds number. For very low Re ≤ 10 lift and drag are no longer expected to increase as the square of the velocity. In fact drag increases linearly with v. This region of higher effective viscosity is called the Stokes region. The data described above establishes the fact that, in the range of Re from about 2000 to 5000, the increase in lift with velocity is what we would predict from standard aerodynamic results (SA). This does not mean that we can use SA to predict the behavior of the lift coefficient as we shall now see.

We define the lift coefficient C_l as:

$$C_l = 2mG/\rho v^2 A \qquad (1)$$

Where m is the lift (in grams) and G is the gravitational constant, ρ is the density of air, v is the flight speed and A is the total wing area all in consistent units. C_l itself is, of course, a dimensionless number. The data presented above have established that, over the range of Re from about 2000 – 5000, we have:

$$m(\text{grams}) = Kv^2 \ . \qquad (2)$$

Substituting equation (2) in (1) we obtain:

$$C_l = KU \quad \text{where } U = 2G/\rho A \qquad (3)$$

The constant K(α) corresponds to the values tabulated in panel (4) and depends on the angle of attack α. The constant U contains the density of air ρ. In the course of our experiments we monitored temperature and relative humidity. These varied somewhat but we have chosen the value $\rho = 1.20 \times 10^{-3}$ g/(cm)^3 as a standard. This corresponds to the density of moist air at 70 °F. The area A is, of course, the area of the EZ-B wing.

The tabulated values of K have units of grams(s/ft.)^2. Using these units the constant U is calculated to be $U = 5.046$ (ft./s)^2 /gram. The calculated lift coefficient is tabulated in panel (4) and is plotted as closed circles on the right. The dashed curve represents the wind tunnel data for the Gottingen flat plate (GFP) at Re = 42000 [2]. Due to the parabolic relation between lift and flight speed established by our results, we can say that the C_l curve is valid over the entire range of Re from 2000-5000. That is, we get the same curve for any value of Re in this range. This is an interesting result indicating that, at slow speed, the complex factors producing lift do not change much over this range of Re.

We shall now attempt to compare the apples with the oranges. Note first of all that the GFP has a sharp change in slope at $\alpha = 6^o$ and a maximum at about 15°. Our data also show a steep linear rise at small α but the maximum C_l occurs at the unusually large angle $\alpha = 30^o$. If we define the C_l maximum as the stall angle we see that very slow flight dramatically increases this angle. The most remarkable feature of these curves is related to the relative magnitude of the lift coefficients. Beyond the angle of attack of about 8° we see that the C_l at Re = 5000 is actually larger than that at 42000. This result would definitely not be predicted in SA. In SA the lift coefficient invariably decreases as we go to lower Reynolds numbers. This is universally observed for any type of wing profile not just for the flat wing. According to the C_l curve we would predict that a 1.0 g EZ-B would attain level flight at a speed of 3ft./s if it attains an angle of attack α of about 7° This is based on the assumption that the wing produces all of the lift. It would be of considerable interest to compare the lift of the wing with that obtained for a complete model and this type of experiment is planned for the near future.

We do not attempt to offer any theories for why the lift in very slow flight is quite different from what we would anticipate from SA. We do hope to have demonstrated that it is dangerous to extrapolate standard ideas, or entrenched ways of looking at things, when we fly airplanes at very low speeds. That is; things are not always what they seem.

Drag Measurements

At low angles of attack the drag measurements are more difficult due to the small values of the drag force as compared to the lift force. We found that the drag balance described in the previous article is not sensitive enough to obtain reliable data below
$\alpha < 5^o$. We are in the process of modifying the balance in order to gain better sensitivity.
For $\alpha \geq 5^o$ we obtain the same rather surprising result that the drag increases approximately as the square of the velocity at all angles of attack up $\alpha = 45^o$. Remember that our flat wing is finite and the drag includes the effects of the wingtips. In SA it is presumed that this tip drag is induced by vortices which result from the fact that the wing is producing lift and contributes to what is called induced drag . Also in SA it is found that the induced drag actually increases with decreasing flight speed starting at some value of v which is determined by the Re and the airfoil profile [3] That is, the effect of induced drag becomes more pronounced at low Reynolds numbers. This type of behavior is not indicated by our data on the flat wing which suggests that induced drag is less important in very slow flight.

The actual data are shown in the same format as used for the lift measurements. The parabolic drag curves are shown for $\alpha = 20^o$ in panel (5) and for $\alpha = 30^o$ in panel (6). The parabolic drag constant for all measured angles of attack is shown in the table in panel (7). The value reported for $\alpha = 5^o$ is probably accurate to within about 5 %. We define the drag constant C_d as

$$C_d = 2mG/\rho v^2 A \quad . \qquad (4)$$

Where all terms have been previously defined. Again we substitute $m = Kv^2$ to obtain:

$$C_d = K(\alpha)U \qquad (5)$$

with $U = 5.046$ (ft./s)^2/gram for the EZ-B wing.

The drag coefficient as a function of α is shown as the closed circles in the figure on the right in panel (7). The solid curve represents the data for the GFP at Re = 42000 [2]. In this case comparison is even more difficult because the data for the GFP are reported for α only up to about 10^o. The GFP data indicate a parabolic increase in C_d up to the region of the stall angle. This is the anticipated behavior in SA. Again this anticipated behavior is not observed at Re = 5000. Beyond $\alpha = 10^o$ up to $\alpha = 45^o$ we see that the C_d increases almost linearly with the angle of attack. We currently have no good theoretical reason to explain this behavior but we point out that it is certainly not what would be expected in SA. The drag increases much less rapidly with α than it should at higher Reynolds numbers. Finally we observe that the C_d at Re 5000 is less than that at 42000 for all values of α. Again this type of behavior is unanticipated. At higher Reynolds numbers it is always observed that the C_d increases as we go from higher to lower values of Re.

It is also illuminating to compare the lift/drag (L/D) ratio as a function of α for the two types of data as shown in panel (8). Our data are shown as the closed circles and that for the GFP as the solid curve. Again we note that the GFP data are available only up to $\alpha = 10^o$ whereas our data extend to 45^o. The L/D ratio can be interpreted as a measure of the wing efficiency at a given angle of attack. We can compare these values only for $\alpha \geq 5^o$ because of our lack of reliable data below this value. The L/D for our EZ-B is significantly larger than that for the GFP at all angles of attack above $\alpha = 5^o$. These results may be an indication of why the flat wing does so well in slow air. They do not, however, tell us what changes in the nature of the airflow give rise to this increase in performance. That is still an unsolved problem. In a future issue of INAV we will report lift and drag measurements for a cambered wing and compare with the results for the flat wing.

Summary of Results

1. In the range of Re from 2000 to 5000, both lift and drag forces are directly proportional to the square of the flight speed.
2. To a good degree of approximation the curve of the lift coefficient vs. angle of attack is the same for all Re in the range from 2000 to 5000. This is also true for the drag coefficient.

3. Comparison of our measurements with the wind tunnel results for the Gottingen flat plate at Re 42,000 indicates that the coefficient of lift is actually larger (for $\alpha \geq 5^o$) at the much lower flight speed.
4. The flat wing at Re 5000 stalls at a much larger angle of attack than at Re 42000.
5. The coefficient of drag at Re 5000 is less than that at Re 42000 for all angles $\alpha \geq 5^o$ even though the test wing includes the wingtip drag.
6. The L/D at Re 5000 is significantly larger than that at Re 42000 for all angles of attack.

References

1. Shape and Flow, The Fluid Dynamics of Drag, A. H. Shapiro, Doubleday & Co. Inc. (1961), page 136.
2. Model Aircraft Aerodynamics 4th Ed., Martin Simons, Nexus Special Interests Ltd., (1999), page 231.
3. Ibid. page 17.

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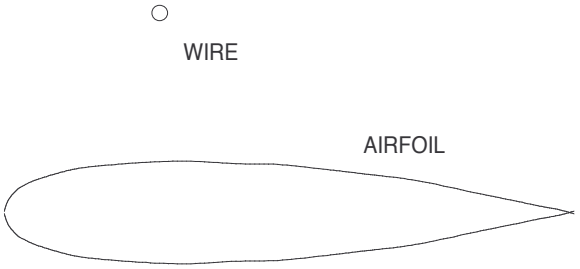
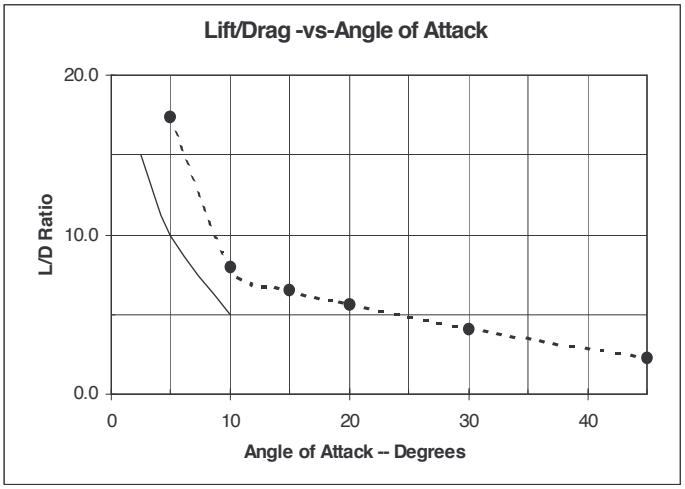
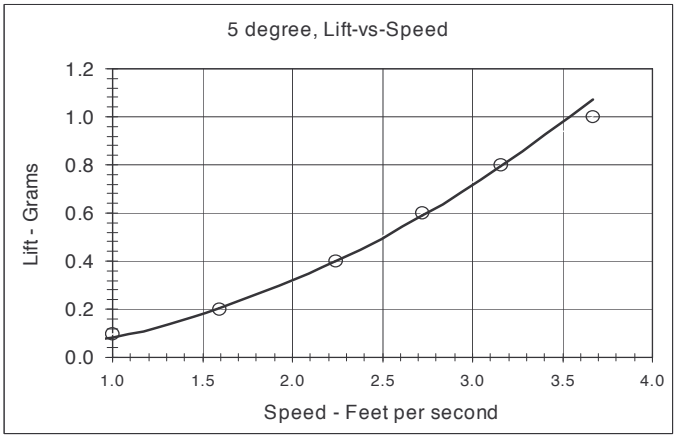


PANEL 1 --- Airfoil and Wire in Wind Tunnel



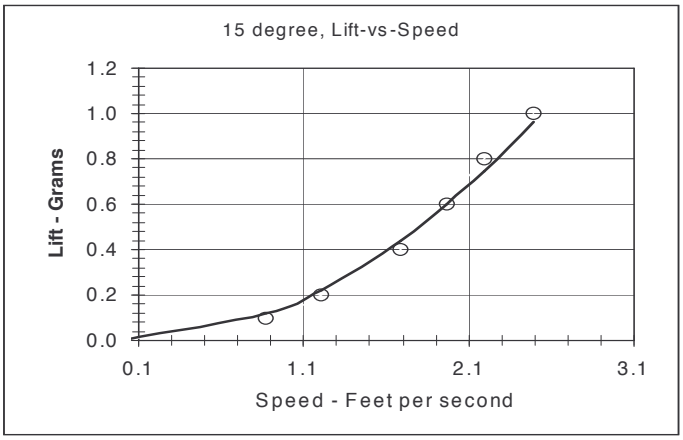
PANEL 8 --- Lift/Drag –vs— Angle of Attack

Curve II	5 deg	K	L-0.0796 x S^2
AIRSPEED Ft/sec	LIFT Grams		
3.670	1.000		1.072
3.157	0.800		0.793
2.720	0.600		0.589
2.242	0.400	0.0796	0.400
1.597	0.200		0.203
1.002	0.100		0.080



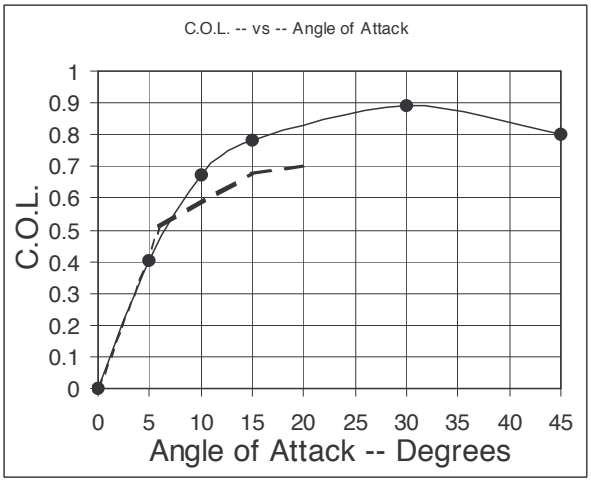
PANEL 2 --- Lift—vs—Airspeed at 5 Degrees

Curve IV	15 deg	K	L=0.1831 x S^2
AIRSPEED Ft/sec	LIFT Grams		
2.490	1.000		0.962
2.190	0.800		0.745
1.966	0.600	0.155	0.600
1.682	0.400		0.439
1.202	0.200		0.224
0.870	0.100		0.117



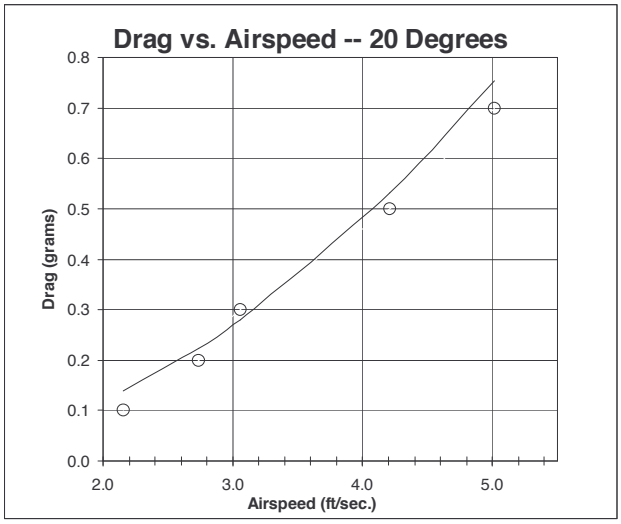
PANEL 3 --- Lift --- vs --- Airspeed at 15 Degrees

Angle of Attack	Lift Constant, K	Coefficient of Lift
Degrees	g(sec/ft)^2	C.O.L.
0	0	0
5	0.096	0.402
10	0.133	0.673
15	0.155	0.783
30	0.177	0.893
45	0.159	0.802



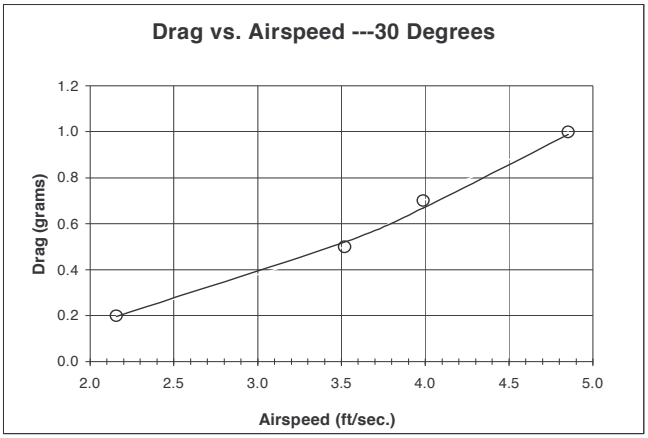
PANEL 4 --- C.O.L.-- vs -- Angle of Attack

AOA	SPEED	LIFT
DEG	FT/SEC	GRAMS
20.0	2.157	0.10
20.0	2.736	0.20
20.0	3.058	0.30
20.0	4.211	0.50
20.0	5.012	0.70



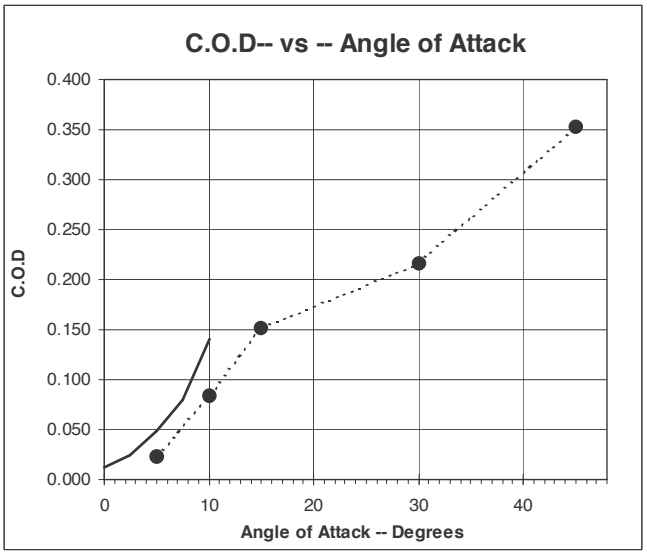
PANEL 5 --- Drag – vs – Airspeed At 20 Degrees

AOA	SPEED	LIFT
DEG	FT/SEC	GRAMS
30.0	4.853	1.00
30.0	3.989	0.70
30.0	3.520	0.50
30.0	2.158	0.20



PANEL 6 --- Drag –vs— Airspeed At 30 degrees

Angle of Attack	Drag Constant K	Coefficient of Drag,
Degrees	g(sec/ft)^2	C.O.D.
5	0.00459	0.0231
10	0.0167	0.0842
15	0.0300	0.151
30	0.0430	0.216
45	0.0700	0.353



PANEL 7 --- Coefficient Of Drag --- vs ---Angle of Attack

UPCOMING CONTESTS FOR 2003

LONDON ENGLAND

European F1D Championships for Seniors and Juniors. Open International contest for F1D, FIL and F1M. Location: Millennium Dome London, England .
Contact Nick Aikman for details.

CANADA, OAKVILLE ONTARIO

Aug 9-10 Canadian Freeflight Indoor Nationals, Sheridan College,1430 Trafalgar Road Oakville Ontario
Saturday August 9 2003 8am to 10am: Standard and unlimited Catapult Glider
10am to 3pm: Limited Penny Plane, Penny Plane, Manhattan Cabin, Mini Stick, FI I:, F1 M
3pm to 6pm: Scale events - Bostonian, No-Cal (6.2 grits), FAC Peanut, FAC High Wing Peanut, FAC Scale, FAC Golden Age Scale, Dime Scale. Blatter 40 (Cloudhuster rules
Sunday August 10 2002 9am to 11am: Continue Scale classes, 11am to 2 pm: F1D,
2pm to 5pm Intermediate stick. Rt_1Cr Stick, F:as1-13 5pm ('losing and Awards
Cost Basic Entry $25.00 including one event plus $5.00 per event Or $60.00 for unlimited event entry
Juniors $10.00 for all events. A $10.00 late fee will be added l'or entries received after July 1 2002
Entries or inquiries to Fred Tellier, 3160 Sussex Crt. Windsor On N8T2C6, fred-tellier@cogeco.com

MASSACHUSETTS – CAMBRIDGE

Evening Indoor at MIT –Flying from 7 pm to 9 pm at MIT's Dupont Gym, the corner of Vassar and Massachusetts Ave. in Cambridge, Mass. Call Ray Harlan at 508-358-4013.

NEW JERSEY – LAKEHURST

Sept 1 The East Coast Indoor Modelers (ECIM) have the use of Hangar #1. The hangar is 800 ft. long by 250 ft., and 180 ft. high. They are hosting a super spectacular indoor blowout for all indoor classes. Also featured will be an F1D regional. Wives and dates welcome, but for base entry you will need ECIM club ID, Drivers Lic and AMA card. To join or for info., contact Rob Romash days at 856-840-1175, evenings at 856-985-6849. E-mail cgrain1@yahoo.com . Dues are $15 a year with a current AMA card.

SPAIN – ALICANTE

Sept 6 – 7 F1D, F1L, F1M, F4D and F4F. Saturday afternoon, scale competition, sunday morning all other categories.
Height 9,60 metres. Entry fee 15 EURO all categories.
Alicante is 60 Km south of Benidorm on the Mediterranean Spanish coast.
This is the first time that an open international contest is to be held in Spain

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TIPS & TRICKS

The High School kids that I work with could not build travel boxes, so we bought plastic boxes at Wall Mart ,of a proper size, and hot glued some blocks of open cell foam (free). To hold the fuselage, I split a block part way on the band saw. For the wings, use an undersized drill and the foam grabs the posts very well. I tried a piece of hot piano wire and ended up with a huge hole. bad idea. Put in a tiny split block to hold the propeller. Make a boo-boo? just rip it out and re glue. This is functional, quick and cheap.

James Watts

A retrieving setup that works well
- An arm taped to the balloon, protruding horizontally, with a hook or tape at the end
- A second line attached to the other end of the arm for steering a positioning.

I got an F1D back from atop the crane platform at the top of Akron with this setup.
Another cool trick is a "V" of razor blades at the end of an arm to cut dangling balloon strings from which a model is hanging.

John Kagan

THE INDOOR DURATION NATIONAL CHAMPIONSHIPS AT THE MILLENNIUM DOME, GREENWICH, LONDON.

By Laurie Barr

Back in late winter, I got a call from Mark Benns, to say he had a good contact at the Dome, and would I like to come with him to test fly our "flimsys". It was a cold "Grey Day", but the EZB I flew, found that it was smooth air, and that the fresh wind outside, did not effect the air on the inside. Afterwards, we sat round a table with Brian Roberts, who is Head of Site Operations, for English Partnerships, who currently look after the property. We suggested some dates during various Bank Holidays, to hold our National Champs, but the kind of costs this would attract, made it impossible. I got to think that many of our indoor fliers are retired anyway, so rather than pass up this unique site and opportunity, we accepted July 1st, 2nd and 3rd.

I contacted the indoor scale committee to see if they wanted to join in, but they were already committed to another site for their Nationals, but several scale flyers did come, as well as the Hand Launched Glider flyers, and some interested spectators as well. Collating all our members BMFA numbers and car registrations for the Dome security requirements, proved to be quite a task, as well as organising all the entries for the comps, but Betty & I burnt the midnight oil, to get the job done in advance. As there were 80 on the list, we did not want to have to do it all on the contest days!

Previous experience proved that the air does not stabilise until the Sun has warmed up the shed (Just like Cardington), and you could clearly hear all the cables that support the roof creaking, telling us it was time to fly!

On the first couple of days of contests, there was a lot of rain in the morning, so much so, that the sound of torrential rain stopped the filming, by a crew, who were covering indoor duration, as part of a film about all aspects of Aeromodelling. It will be shown on Television, sometime in November, on a Cable & Satellite Channel. Luckily the afternoons were much better, and some good flying took place.
Everyone who was there greatly enjoyed it, and we have been promised some date(s) in August & September, again I suspect mid week. I will keep you all informed!

Without the great encouragement and enthusiasm of Brian Roberts from the Dome Executive, none of this would be possible, and we gave him our most grateful thanks. I would also like to take this opportunity, to say a big thank you, to my Wife Betty, who as usual, ran the contests books, and without whom, much of my indoor/outdoor flying would not be possible. Apart from the individual comps, the Dave Yates Trophy took place, to find the overall champion, based on the first 6 places. The scoring is- 6 points for 1st, 5 points for 2nd etc, until 6th place gets 1 point. Also, we made use of this super site, to run a 2 day trial, to select the team for the F1D world champs, to be held in 2004 (Possibly in the Cargolifter hanger near Berlin).

Tuesday 1st of July.
No Cal profile scale.

1.	Clive King	3.43 & 3.30= 7.13.	Dave	Yates	points	6
2.	Laurie Barr	3.24 & 3.46= 7.10	"	"	"	5
3.	Ken Bates	1.29 & 1.28= 2.57	"	"	"	4

Bob Bailey & Nigel Bathe did not fly.

Limited Penny Plane.

1.	John Tipper	14.30 & 13.56 = 28.26	"	"	"	6
2.	Tom Chambers	14.44 & 13.36 = 28.20	"	"	"	5
3.	Laurie Barr	14.11 & 13.06 = 27.17	"	"	"	4
4.	Roy Wilson	12.44 & 13.23 = 26.07	"	"	"	3
5.	Peter Watt	11.34 & 11.32 = 23.06	"	"	"	2
6.	Steve Harvey	9.20 & 9.51 = 19.15	"	"	"	1

Wednesday 2nd of July

EZB/F1L (Houlberg Silver Trophy)

1.	Laurie Barr	24.11 & 23.59 = 48.10	"	"	"	6
2.	John Tipper	23.33 & 22.42 = 46.15	"	"	"	5
3.	Bob Bailey	22.24 & 23.38 = 46.12	"	"	"	4
4.	Geof Lefever	22.23 & 22.01 = 44.24	"	"	"	3
5.	John Billam	20.38 & 19.37 = 40.15	"	"	"	2
6.	Dave Greaves	19.04 & 19.52 = 38.56	"	"	"	1

F.1.M

1.	Laurie Barr	18.22 & 17.20 = 35.42	"	"	"	6
2.	Daniel Billam (Jn'r)	15.45 & 16.58 = 32.23	"	"	"	5
3.	John Billam (Grampa)	15.02 & 16.30 = 31.32	"	"	"	4
4.	Geof Kent	15.01 & 14.33 = 29.34	"	"	"	3
5.	Graham Walker	12.57 & 12.54 = 25.51	"	"	"	2
6.	Tom Chambers	10.53 & 10.45 = 21.57	"	"	"	1

Thursday 3rd of July

Mini Stick/Living room Stick

1.	John Tipper	12.27 & 11.48 = 24.15	"	"	"	6
2.	Laurie Barr	11.39 & 12.02 = 23.41	"	"	"	5
3.	Clive King	9.06 & 10.05 = 19.11	"	"	"	4
4.	Roy Wilson	6.49 & 9.53 = 16.42	"	"	"	3
5.	Nigel Bathe	7.30 & 8.54 = 16.24	"	"	"	2
6.	Urlan Wannop	7.05 & 5.01 = 12.06	"	"	"	1

F.1.D Houlberg Silver Medal Trophy.

1.	John Tipper	30.10 & 29.43 = 59.53	"	"	"	6
2.	Laurie Barr	27.46 & 28.35 = 56.21	"	"	"	5
3.	Geof Lefever	22.15 & 29.01 = 51.16	"	"	"	4
4.	Nick Aikman	27.12 & 00.00 = 27.12	"	"	"	3

Bob Bailey/Ron Green/Derek Richards, Did Not Fly

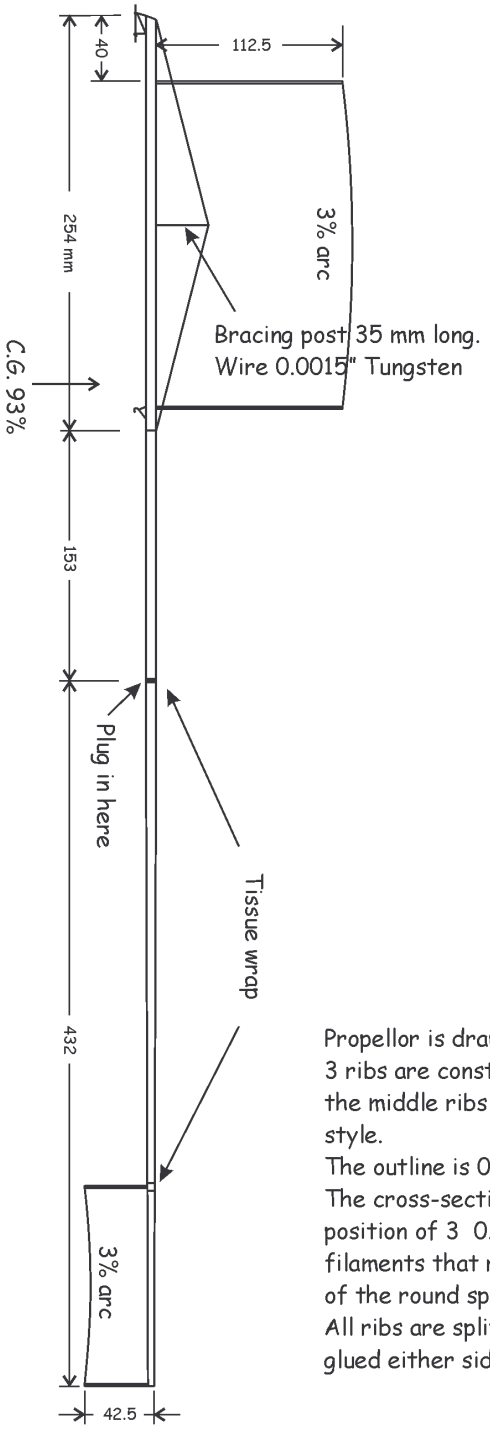
Aeromodeller Trophy, for Team Trials,
flown over Tuesday/Wednesday.

1.	Bob Bailey	32.23 & 34.05 = 66.27	"	"	"	6
2.	Ron Green	31.08 & 32.15 = 63.23	"	"	"	5
3.	John Tipper	28.08 & 30.22 = 60.32	"	"	"	4
4.	Derek Richards	29.30 & 30.22 = 59.52	"	"	"	3
5.	Geof Lefever	30.16 & 29.01 = 59.17	"	"	"	2
6.	Laurie Barr	27.46 & 28.35 = 56.21	"	"	"	1

National Champion, Dave Yates Trophy.

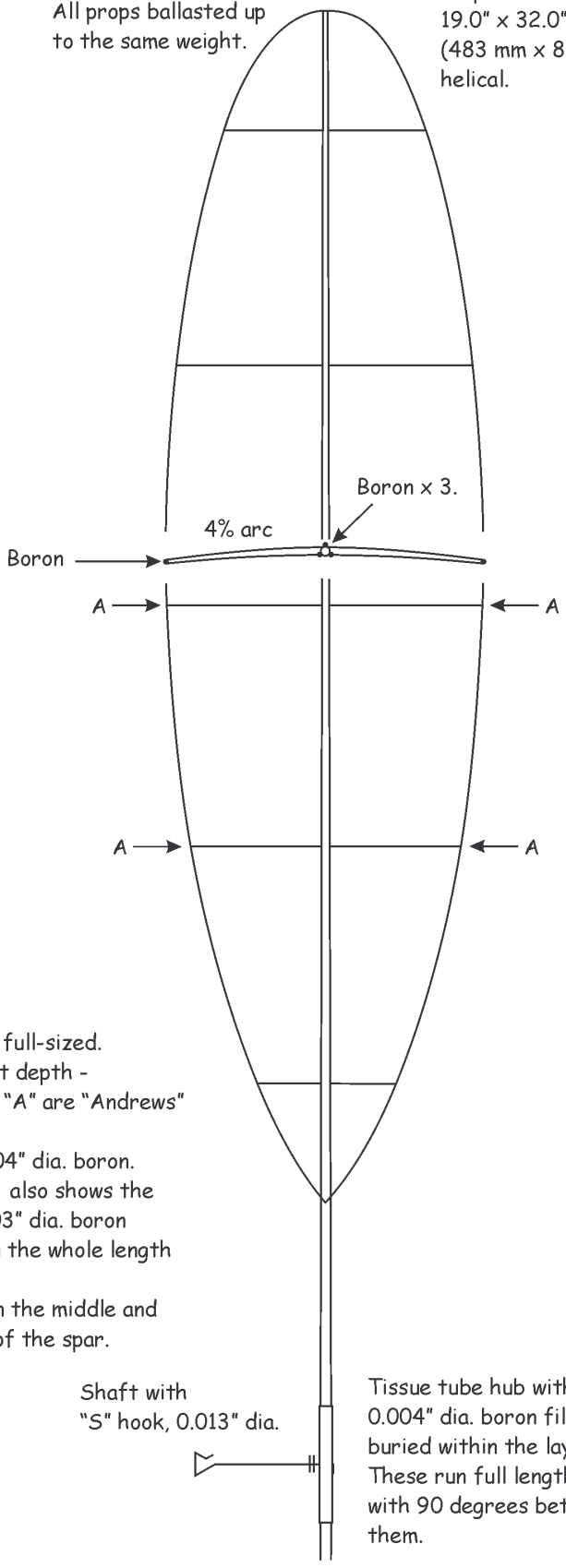
1.	Laurie Barr	32 Points
2.	John Tipper	25 "
3.	Bob Bailey	10 "

Front & rear bearing / hook
are 0.013" dia. wire.
Approx. 2.5 degrees left thrust,
0 degrees down.



All props ballasted up
to the same weight.

Propeller
19.0" x 32.0"
(483 mm x 814 mm)
helical.



Propellor is drawn full-sized.
3 ribs are constant depth -
the middle ribs at "A" are "Andrews"
style.
The outline is 0.004" dia. boron.
The cross-section also shows the
position of 3 0.003" dia. boron
filaments that run the whole length
of the round spar.
All ribs are split in the middle and
glued either side of the spar.

Shaft with
"S" hook, 0.013" dia.

Tissue tube hub with 4
0.004" dia. boron filaments
buried within the layers.
These run full length,
with 90 degrees between
them.

BAT OUT OF HELL!

Page 2 of 2

A F1D model designed and drawn by Nick Aikman (UK)	Scale 1:4, details 1:1
	All measurements in mm

U.K. CAT. IV F1D Official Record Holder 36:32 at the CargoLifter Hanger, Germany 15th September 2002

A PIGTAIL BEARING BUILDING JIG

By Steve Smith
Castle Rock, CO
email: ssmith9831@aol.com

Like most newcomers to indoor modeling, I found that mastering the techniques of making a pigtail bearing can be frustrating. After a few attempts using a couple of pairs of pliers with less than satisfactory results I came up with the following fixture which for me greatly facilitates the fabrication and finishing of these pesky things.

A glance at the sketches below will give you most of the information you need to fabricate a jig for producing bearings to your particular specifications and they take only a few minutes to make.

Start off with a small piece of basswood or other hard wood (hard plastic or lexan should also work) about 1/8 or more thick. Shape the block to fit the inside dimensions of the finished bearing (this can be very small), but make the height taller than required.

Next, you have two choices for setting the shaft (mandrel) retainer:

A) Epoxy a small piece of 1/16" diameter or smaller aluminum, brass, or syringe tubing to the bottom of the block as shown in Figure 1.

B) Or, using a pin vise and small drill bit, drill a small hole near the bottom of the block as shown in Figure 2.

The next step is really the only tricky part of making the jig. Place the block in a vise and with a Zona or fine bladed jewelers saw, make a cut into the top and/or front face of the block to make a channel which will be used to position and restrain the top of the bearing in the Jig. The depth of the cut will set the position of the mandrel (prop shaft) relative to the height of the bearing.

If the jig is for a rectangular bearing make sure that the depth of the cut is the same at both ends of the block. If you make the cut too deep and/or uneven you can CA a small piece of music wire in the bottom of the slot to level or raise the bottom to the proper depth. Note that no cuts are required on the front or back faces as the mandrel will provide a bearing surface to bend against.

Once you have the shape and saw cuts to your satisfaction spread some CA on the faces and along the channel to harden the wood and then run the saw blade back through the channel to make sure it is clear of glue and debris. Make a small hardwood handle of a size and shape to handle easily and CA it on the back side of the block As a final step cut a piece of wire for your mandrel and slide it into the tubing or hole (Do Not Glue!). The mandrel should be slightly larger in diameter than the prop shaft you are going to use. The jig is now complete! The small size of the jig, makes it is easy to handle and work with under a magnifying lens or lamp and securely holds the wire during bending and finishing operations.

To make a bearing you simply take a suitably long piece of wire (~4") and by alternately placing the wire in the jig and then removing to make the bends with a pair of needle nose pliers, shape the body of the bearing to snugly fit against the sides and in the channel of the jig leaving sufficient wire (1 1/2" or more) extending below the level of the mandrel. I won't get into the details of wire sizes, number of turns, turn spacing of the pigtails etc, since they have been dealt with in previous articles

Next, form the pigtail end of the bearing by wrapping the wire around the mandrel two or three times (turns should not touch each other). These pigtail wraps now securely hold the wire in the jig and make wrapping the "bearing" end very easy. Note that this will produce a pigtail on the outside of the bearing. If an inside pigtail is desired it can be twisted to an inside position once the bearing is complete and the jig is no longer required. Make sure you wind the pigtail the opposite direction so it will spiral the correct way when you twist it around in place. Finally, wrap the "bearing" end with a couple of tightly spaced turns and trim the excess.

The real utility of this jig is when it comes time to grind, sand, or polish the face of the bearing. Leaving the bearing on the jig and the mandrel in place, simply push the mandrel flush with the face of the bearing and sand/or polish the face on a piece of sandpaper mounted on your building board or sanding block. The jig and mandrel will keep the bearing in alignment and the face of the bearing square to the shaft axis.

The wrapping process may induce some slight warping in the body of the bearing. By alternately sliding the mandrel back and releasing one end and then the other you can see which way the "bearing" or "pigtail" ends spring, and you can gently twist them back into alignment with the pliers. The finished bearing can now be removed from the jig and the pigtail twisted to the inside using the mandrel and pliers if desired.

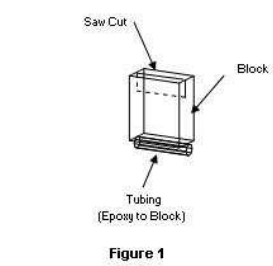
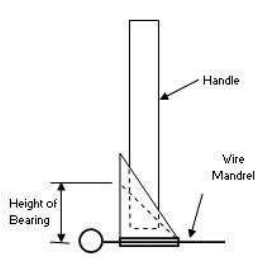
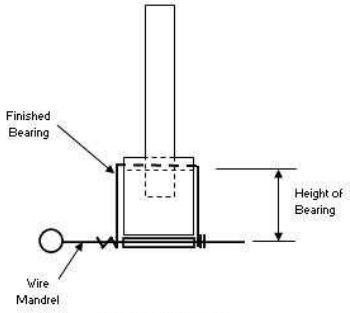


Figure 1

Figure 2



Jig For "V" Shaped Bearing



Jig For "U" Shaped Bearing

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*WILLAMETTE MODELERS TWO DAY INDOOR MEET ALBANY, OREGON * APRIL 26, 27, 2003*

Reported by John Lenderman, Contest Director

Saturday was a chilly, windy, and somewhat wet day, but despite those conditions, we had a record turnout of modelers who carne to enjoy the excellent flying site, and the warm fellowship which prevails at this competition. Sunday was a much nicer day, outside, but the good flying and companionship continued as usual in the building. When we first arrived, the volleyball team was practicing, and we were cautious about bringing our models and boxes inside, but they soon were finished, and had the net removed to clear the floor for our activities. We had scheduled the first two hours for set up and test flying, then from •.12 o'clock until two thirty, the time was for "heavy" models. At two thirty the floor was turned over to the "light", or duration models. This worked out for everyone concerned, and all were happy with that plan. At five o'clock we broke for supper, and returned at six for the symposium.

I must mention something very important--we had thirteen sign up for the Science Olympiad event, and of the thirteen, six were young modelers who had been mentored at their schools by some of our regular flyers. The nice thing was that these young flyers were accompanied by their parents, some of whom were also flying indoor models, and had been coached by the mentors of their children. I firmly believe that we are develop ing a new generation of modelers through the Science Olympiad program, and we must see to it that the administrators and rule makers continue to offer this program through the schools. We are fortunate that there are mentors who are modelers that volunteer their time and efforts to work with these young people, but unfortunately, many schools assign this responsibility to the science teachers who have very little knowledge of model airplanes, and even less knowledge of how to make them fly. Bruce Hannah, a Wakefield modeler from Redmond, Oregon, has been building indoor

models lately, brought two young students with him on this trip, and they flew their very first indoor models in the Science Olympiad event. They both flew very well, and made competitive times in the flights. We trust they will continue building and flying under the mentoring program by Bruce, and return for our winter events later this year. During the heavy model flying, both Chris Borland and Andrew Tagliafico had their Science Olympiad models flying very well, it just so happened that they were about to launch at the same time. They looked over at each other, and you could see there was a challenge coming up. They agreed to launch at the same time, and the models began their climbs. When they reached the ceiling, both models got some bad bounces, but recovered well, and continued flying. During the cruise portion of the flight, each model took turns flying higher, and barely touching the beams in the ceiling. As they descended, it became a question of who had the best cruise, and which model would use the remaining turns most efficiently. Everyone in the building stopped to watch this duel, and made guesses as to which one would stay up the longest. Andrew touched down first at 4:56.5, and Chris followed with the first over five minute flight in that event. His time was 5:04, setting a site record in that event. The official building height is measured at 35 feet. The strange thing is that in the noon mass launch for Science Olympiad, Chris also won that, beating Andrew by just 4 seconds. More on that later.

After breaking for dinner and returning, we began the Symposium. First on the program was Bob Stalick, demonstrating his technique for covering tissue models using the glue stick. Bob prefers the glue stick that is purple colored, as you can see which part of the airframe the glue has been applied to. For curved parts of dihedral joints, Bob thins out the glue by cutting a small piece into a small jar, and adding either warm water, or rubbing alcohol, then mashing it all together to make a thin glue that can be applied with a small brush. The purple color will fade away after it has dried. Bob recommends letting it dry overnight. However, he showed us a monocoat trim iron, which he applies to tissue where the glue is underneath, and et dries et instantly. A very convincing demonstration, and well worth trying. Next, we had asked Chris Borland to show us how he thins out and lightens up the plastic props used en the Science Olympiad event. These props usually weigh between 6.7 to 7.2 grams as they come from the factory, and Chris lightens them to about 2.6 grams. To accomplish this, he purchases from Home Depot a small plastic device that holds one single edge razor blade, and a one foot section of a bannister rail, which has a curved top. Chris then takes the complete 9 inch prop, and makes a mark on each blade where they well be cut off to make the legal size of 20 CM. He then places the blade to be thinned on the bannister part, matching to curve of the bannister to the curve of the blade, and begins stroking with the plastic device holding the single edge blade. This removes small portions of the plastic with each stroke. Chris explained that he thins the front part of the blade, testing the flex now and then. He leaves a slightly thicker portion at the trailing edge of the blade for stiffness en that area. We have observed that the front part of the blade is almost translucent, thereby allowing the blades to flex to a higher pitch under power. The then blade apparently lowers the drag of the blades as Chris is able to use a smaller size motor to power the model. Chris advises to take et slow and easy towards the last scraping of the blade, as pieces can chip off due to the thinness. Next, Ed Berray told us how to adjust the catapult gliders. He stressed that there should be a slight difference en decalage, and not a 0-0 adjustment as has been recommended. Models should weigh' between 2.3 and 2.4 grams. Slight washout of the wing tips are helpful, and a straight up launch and good pullout are essential for long flights. Ed does this very well. Next, a small tip from Wally Miller, via John Lenderman. Wally says those translucent '"0!' rings are hard to see. He uses Rit dye to color them for easy viewing and installation. Someone suggested using a marking pen to color them. Try et. Andrew Tagliagico then show us his new method for making were peg tails. It is rather complicated, so he well publish the article soon with all the details. However, the bases for this project is a piece of dowel split about 2 1/2 inches, from one end, with a bolt and nut through et to tighten et up on the were parts. This split portion holds the pigtail were and mandrel tightly, to enable the front bearing and rear pigtail to be made all during the operation without taking et apart. Watch for the article soon After the symposium, the flying resumed again, continuing until about eleven o'clock.

Thought I might mention a new flyer, Mark Bennett, from Sacramento, came to Albany to practice with his F1D model. He did a lot of practice flying en the upstairs gym and also flew some en the regular flying area. He had some good flights, all the way to the rafters, and was working on getting his variable pitch prop operating correctly. At this time I well give some information about both days of flying, and beginning with the event that had the most entrees. Science Olympiad had 13 entrees, and I have already given the highlight of the duel between Chris and Andrew. David Bufford has improved quite a bet, and at this competition he posted a 4'10.8 to take third place. David has only been flying a few years, and has made great progress en his building and flying. Ed Berray also did a 4:03.5, while David's daughter, Jessica barely messed the four minute mark with a 3:59. At the noon mass launch of Science Olympiad, we had seven entrees---three of whom were our young people. This mass launch was not marred

by any midair collisions, but all models flew very well.. et was quite a sight to see all the models slowly come down to land, with the suspense of watching Chris and Andrew battle et out to the very end. Catapult glider event had 10 entrees, and some very good times.

The A-6 event had nine entries, with some good flying models, but somehow the times were not outstanding as expected. The winning time, by the CD, was not even over the seven minute mark, but the model had been damaged getting it down from a hangup on the basketball girders. Tom Kopriva, flying steadily as usual, posted a 6:16 for second place, while Andrew Tagliafico was third with 5:45. An observation--a good many modelers were flying old models from last year, and the times were about the same as last year. Also, there seemed to be more models hung up this time, but Andrew Tagliafico, with a 40 foot pole tipped with a long feather, was able to get them down easier than with his usual balloon. The 1.2 EZB event had one real good time, a 6:21 by Andrew Tsgliafico, with a 1/4 motor flight. The next best time was a 5:45 by the CD, with Chris Borland posting a nice 5:29 with his model. The A-ROG event was a usual battle between Andrew Tagliafico and Ed Berray, with Andrew topping Ed with his 12:56 to Ed's 12:40. They also ended up in the Mini-stick event the same way--Andrew 8:46 to 7:23. David Bufford was third, flying his new model for a 4:28 flight. Limited Pennyplane saw the CD, flying his Thrush, post a 4:03 to Chris Borlands best ever flight of 3:57.1.2. Chris has made good strides forward in this event, using a new wing design by Cezar Banks. Bostonian had 4 entries, with a 2:27 flight winning the event--not a great showing. Jerry Powell just couldn't get his Yrekan going well. AMA scale was won by Tom Koprive flying his Bristor M1-B, and Jerry Powell was the winner in Peanut Scale with his Cougar.

Our thanks to the Willamette Modelers for presenting this enjoyable contest!

RESULTS

Science Olympiad (13)*

1.	Chris Borland	5:04+
2.	Andrew Tagliafico	4:56.5
3.	David Bufford	4:10.8

Catapult Glider (10)

1.	Ed Berray	75.9
2.	Bruce Mcrory	71.6
3.	Bruce Hannah	69.51

A-6 (9)

1.	John Lenderman	6:44
2.	Tom Kopriva	6:16
3.	Andrew Tagliafico	5:45

H. Launch Glider (6)

1.	Ed Berray	74.5
2.	Tom Kopriva	74.4
3.	Jon Sayre	69.1

AMA 1.2 Gram EZB (5)

1.	Andrew Tagiafico	6:21+
2.	John Lenderman	5:45
3.	Chris Borland	5:29

A-ROG (4)

1.	Andrew Tagliafico	12:56
2.	Ed Berray	12:40
3.	John Lenderman	5:46

Limited Pennyplane

1.	John Lenderman	4:03
2.	Chris Borland	3:57
3.	Jerry Powell	3:42

Mini-stick (4)

1.	Andrew Tagliafico	8:46
2.	Ed Berray	7:32
3.	David Bufford	4:28

Bostonian (4)

1.	John Lenderman	2:27
2.	Jerry Powell	2:23
3.	Tom Kopriva	2:08

AMA Scale (3)

1.	Jerry Powell -Cougar	137.5
2.	Tom Kopriva -Bristol M - 1B	90.4

Peanut Scale (3)

1.	Tom Kopriva -Fike	161
2.	Jerry Powell -Cougar	129

EZB 1/4 Motor (1)

1.	John Lenderman	5:31

Ornithopter

1.	Jon Sayre	4:48

Science Olympiad Mass Launch (7)

1.	Chris Borland	4:41
2.	Andrew Tagliafico	4:37
3.	David Bufford	4:04

* Number of contestants

\+ New site record

\+ Chris Borland-new site record
Science Olympiad 5:04

\+ Andrew Tagliafico-new site record
AMA 1.2 Gram EZB 6:21

USIC 2003 - JOHNSON CITY, TN

The 2003 USIC (United States Indoor Championship) was held May 28 through June 1 in the Mini Dome at East Tennessee State University in Johnson City, TN. The weather outside, as in much of the nation, was cooler than normal. The gathering inside was smaller than we have been accustomed to.

The festivities began with the glider and rubber speed events. The highlight of the glider competition was Jim Buxton's successful attempt at the FAI Category IV Hand Launched Glider (F1N) record. His 83.2 seconds will be hard to beat. It is particularly notable because the site ceiling height, though high, is a bit limiting for Jim. He also won AMA Hand Launched Glider and Standard Catapult Glider. Kurt Krempetz won Unlimited Catapult Glider again. This year Kurt was within a tenth of a second of the site record.

In Straight Line Speed, Jim Lewis dropped .75 seconds from last years winning time of 1.78 seconds to again win. Will he arrive before he leaves next year?

The P-24 Mass Launch Event has been designated the Jim Clem Memorial Trophy and this year's proud winner is John Diebolt.

A full schedule of AMA and FAC scale events were contested. Jim Miller and his team of scale judges (Jack McGillivary, Phil Hartman, John Blair & Steve Bard) put in long hours scrutinizing each model entered in a scale event. Jim works with the individual judges to assure consistency & fairness in the judging process. After a contestant turns in his first official flight, he can receive a copy of his scale score for reference. Often the score sheet will include the judge's comments that will help you to improve the model in the future.

The Dime Scale Event ended in a tie between Richard Miller & Gary Hodson requiring a fly-off. Richard (the perennial winner) withdrew from the fly-off giving Gary the win.
The always popular World War I Mass launch was won by Larry Loucka's DH-6 "Clutching Hand" & the equally popular World War II Mass Launch was won by Jack McGillivary's P-51.

Doug Schaeffer set a new Senior Intermediate Stick record with a flight of 36 minutes, 31 seconds.

The cooler indoor temperatures made for comfortable flying but were also blamed for producing less power from the rubber motors and generally lower times. That is the best excuse we could come up with & we are sticking to it.

We want to thank Abram Van Dover & the Brainbusters for once again running the contest and the AMA & NFFS for their sponsorship.

You owe it to yourself to attend and participate in this well run meet in a great site. The competition is friendly & flying in the Mini Dome is fantastic. Join in the FUN next year!

Tem Johnson
Photos: Gary Hodson

USIC 2003 RESULTS

Event 201 HL Stick 2003 Nationals Johnson City, TN.

Place	Contstant Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	Flt #5	Score
1	Richmond, Jim	4936	34:10					34:10
2	Schaefer, Doug	680152	29:43					29:23
3	Loucka, Larry	1210	24:23	12:06				24:23
4	Grant, Jim	159477	0:17	0:07				0:17

Event 202 Intermediate Stick 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Flt #1	Flt #2	Flt #3	Flt #4	Flt #5	Score
1	Kagan, John	469254	39:00	38:29	38:21			39:00
2	Schaefer, Doug **	6801152	30:12	35:05	36:31	36:08		36:31
3	Leppard, William	93740	19:38	31:12	29:31	35:36	10:50	35:36
4	Richmond, Jim	4936	33:11	10:02	33:36	14:32		33:36
5	Harlan, Ray	131	31:36	31:08				31:36
6	Tellier, Fred	645957	29:36	8:53	30:37	21:20		30:37
7	Cohen, Alan	738608	29:39	28:14				29:39
8	Olshefsky, Peter	614476	23:56	25:16	7:40			25:16
9	Barker, John	2095	17:05	18:52	19:51	16:36	22:53	22:53
10	Grant, James	159477	0:17	16:53	19:50	:07	17:38	19:50
11	Le Blanc, John	271521	6:29	4:44	2:31	11:21		11:21
12	Carney, Bill	83252	0:49					0:49

Event 203 F1D 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	FLT #5	SCORE
1	Kagan, John		30:48	33:04				63:50
2	Sova, Tom	473169	27:43	28:24	30:20	30:43	30:25	61:08
3	Cailliau, Larry	79985	29:21	30:07	30:46	12:35		60:53
4	Schaefer, Doug	680152	29:35	28:59	29:47			59:22
5	Richmond, James	4936	23:52	28:39	28:27			57:06
6	Tellier, Fred	645957	28:35	28:10	27:45	11:53	28:00	56:45
7	Cohen, Alan	738608	21:15	23:59	22:16	27:50	27:24	55:14
8	Momot, Tomasz	675398	23:44	22:56	22:57	11:37		46:41
9	Richman, Steven	763879	4:42	22:28	23:38	4:54		46:06
10	Leppard, Bill	93740	19:00	22:51				41:51
11	Raymond-Jones DC	63358	18:39	20:44	20:06			40:50
12	Olshefsky, Peter	614476	16:52	18:44	17:48	14:41		36:32
13	Carney, Bill	83252	16:20	1:36	14:36			30:56

Event 204 Cabin ROG 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	FLT #5	Score
1	Grant. Jim	159477	12:53					12:53
2	Loucka, Larry	1210	5:30	10:35				10:35

Event 205 Manhattan 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Flt #1	Flt #2	FLT #3	FLT #4	FLT #5	Score
1	Grant, James B.	159477	3:52	9:29	11:04	10:53	12:08	12:08
2	Van Gorder, Walter P.	19912	11:56	11:41	9:45			11:56
3	Loucka, Larry	1210	10:48	11:35				11:35
4	Schutzel, Emil J.	508384	10:55	9:36	8:40	9:56		10:55
5	Tellier, Fred	645957	5:41	6:19	8:19			8:19

Event 206 Easy B 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	FLT #5	SCORE
1	Cailliau, Larry	79985	28:28	12:27				28:28
2	Cohen, Alan	738608	15:39	17:10	19:56	27:07	1:09	27:07

3	Schaefer, Doug ***	680152	26:29					26:29
4	Richmond, James	4936	25:48	25:58				25:58
5	Tellier, Fred	645957	:05	25:11	22:58	22:50	10:26	25:11
6	Momot, Tomasz	675398	19:33	24:28	22:43	23:29	21:48	24:28
7	Sova Tom	473169	23:31	23:34	23:48			23:48
8	Van Gorder, Walt	19912	23:00	16:49	23:17			23:17
9	Harlan, Ray	131	23:03					23:03
10	Leppard, William	93740	20:00					20:00
11	Olshefsky, Peter	614476	11:06	18:59				18:59
12	Grant, James	159477	10:40	17:34	15:24	18:25	18:03	18:25
13	Singer, Len	209081	13:30	18:01				18:01
14	Carney, Bill	83252	13:37	8:36	12:01	16:10		16:10
15	Lemel, A.L.	5028	12:56	10:30	12:24	9:41		12:34
16	Morrow, Chris	546510	12:34	9:32	7:14	10:36	11:41	12:34
18	Barber, Doug	56270	12:25	11:36				12:25
19	LeBlanc, John	271521	10:56	10:30	0:35	6:34		10:56
20	Wrzos, Chet	20454	10:53					10:53
21	Italiano, Tony	2368	3;40	5:23	6:51			6:51
22	LeBlanc, Benjamin**	778969	0:31	4:57	4:46	5:22	5:05	5:22

Event 207 Pennyplane 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	FLT #5	SCORE
1	Olshefsky, Peter	614476	16:50	16:08				16:50
2	Kagan, John	469254	15:51	16:40	15:00	15:00		16:40
3	Diebolt, John	5286	5:08	15:48	12:34	15:04	2:06	15:48
4	Sova, Tom	473169	14:36	15:02	13:02	12:40	15:20	15:20
5	Wisniewski, Gordon	716	13:06	13:19	14:51	14:51		14:51
6	Tellier, Fred	645957	9:31	14:36	11:18	14:37		14:37
7	Richmond, James	4936	6:09	10:59	14:09			14:09
8	Leppard, William	93740	11:40	10:34	13:51	14:01		14:01
9	Raymond-Jones DC	63358	13:01	9:50	9:03			13:01
10	Hartman, Phil	8667	11:26	12:27	9:06	7:07	10:09	12:27
11	Warmann, Bob	187	12:22	12:09	10:01			12:22
12	Richman, Steven	763879	9:38	11:32	12:12	11:27		12:12
13	Carney, Bill	83252	9:45	10:47	10:23	11:51	8:15	11:51
14	Johnson, Tem	16707	9:31	10:19	10:48	11:48		11:48
15	Nuszer, Joe	29036	11:30	8:30	8:21	11:23		11:30
16	Rash, Fred	63458	11:16	11:15				11:16
17	Singer, Len	209081	9:39	10:18	11:02			11:02
18	Bard, Steven	110773	10:00					10:00
19	Italiano, Tony	112385	6:15	5:55	5:58	7:50	8:21	8:21
20	Wrzos, Chet	20454	8:10					8:10
21	Buxton, Jim	75154	6:50					6:50

Event 208 Limited Pennyplane 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Flt #1	Flt #2	Flt #3	Flt #4	Flt #5	Score
1	Van Gorder, Walt	19912	11:41	13:10	14:46	14:50	15:18	15:18
2	Richmond, James	4936	14:47	14:47	15:16			15:16
3	Sova, Tom	473169	13:36	6:09	14:42	15:07		15:07
4	Olshefsky, Peter	614476	13:33	3:28	11:30	13:20	14:45	14:45
5	Kagan, James	469254	13:16	14:38	14:22			14:38
6	Hartman, Phil	8667	13:41	10:55	14:34	13:31	2:30	14:34
7	Richman, Steven	763879	12:52	13:57	12:21	12:16	13:52	13:57
8	Leppard, William	93740	12:27	11:57	13:25	:03	13:55	13:55
9	Buxton, Jim	75154	11:16	11:39	13:27	13:20		13:27
10	Tellier, Fred	645957	12:49	13:10	13:08	3:58		13:10
11	Landrum, Billie	52674	9:00	11:05	13:10			13:10
12	Wisniewski, Gordy	716	8:05	3:47	11:56	9:10	12:54	12:54

13	Collins, Walt	249365	12:13	3:48	11:36	12:08	12:42	12:42
14	Diebolt, John	5268	2:59	3:51	3:22	8:59	12:42	12:42
15	Carney, Bill	83252	12:27	11:09	3:15	2:53	10:50	12:27
16	Barker, John	2095	10:20	9:54	12:06			12:06
17	Bard, Steven	110773	10:17	10:12	10:37	11:01	12:03	12:03
18	Grant, Jim	159477	10:01	8:35	11:45	11:49		11:49
19	Raymond-Jones DC	63358	7:14	7:38	10:08	11:40	10:52	11:40
20	Warmann, Bob	187	10:55	11:23	6:56			11:23
21	Johnson, Tem	16707	11:20	10:24	9:44	7:47		11:20
22	Nuszer, Joe	29036	11:12	7:02	4:12			11:12
23	Campbell, Dann	346641	7:53	10:27	11:03			11:03
24	Masterman, Paul	182816	9:37	6:58	10:56			10:56
25	Rash, Fred	63458	10:54	0:02				10:54
26	McAllister, Patrick ***	695181	8:48	8:19	10:14	9:53	7:00	10:14
27	Boone, Jack	107857	8:06	9:22	9:16	4:23		9:22
28	Miller, Richard	179158	8:50	9:14				9:14
29	Italiano, Tony,	2386	6:05	6:17	7:47	8:13	5:26	8:13
30	Le Blanc, Christopher ***	778968	6:32	5:51	5:06	5:26	7:57	7:57
31	Sullivan, Ed	69585	7:05	6:48				7:05
32	Gowan, Bill	615737	4:49					4:49

Event 209 Helicopter 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	FLT #5	SCORE
1	Richmond, James	4936	8:49	8:55	9:52	8:44		9:52
2	Schaefer, Doug	680152	5:51	7:23	7:22			7:23
3	Diebolt, John	5268	5:05	6:07	4:00			6:07
4	Loucka, Larry	1210	5:18					5:18
5	LeBlanc , Chris	778968	1:26	1:53	1:51			1:53
6	Romash, Rob	130061	1:29					1:29

Event 210 Ornithopter 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	FLT #5	SCORE
1	Harlan, Ray	131	13:24	14:53	15:01			15:01
2	Diebolt, John	5286	5:12					5:12

Event 211 Autogiro 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	FLT #5	SCORE
1	Rash, Fred	63458	7:40	8:19	8:55			8:55
2	Diebolt, John	5286	ATT	2:56	3:35			3:35
	Schaefer, Doug	680152						DNF

Event 212 H L Glider 2003 Nationals Johnson City, TN.

PLACE	Name	AMA NO	Flt #1	Flt #2	Flt #3	Flt #4	Flt #5	Flt #6	Flt #7	Flt #8	Flt #9	Score
1	Buxton, James	75154	76.10	45.30	78.30	77.90	82.40					160.7
2	Lewis, James	119	63.10	73.40	73.00	72.50	65.50	70.90	65.40	70.70	7.70	146.4
3	Boehm, Bernard	92567	63.80	65.60	61.20	65.10	59.20	64.50				130.7
4	Romash, Rob	130061	62.5	62.7	58.6							125.2
5	Krempetz, Kurt	69866	47.90	55.20	50.70	45.70	9.20	47.00				105.9

Event 213 Kit Plan Scale 2003 Nationals Johnson City, TN

Place	Name	AMA NO.	Aircraft Name	Score
1	Lee, Jim	54365	Daphine	186.00
2	Nunez, George	324372	GB-D	171.00

Event 215 Bostonian 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	FLT #5	CHARIS.	SCORE
1	Miller, Richard	179158	4:35	5:31	5:14			1.17	754.65
2	Schutzel, Emil	508384	4:21	3:12	4:02	4:25	4:44	1.12	658.80

3	Barker, John	2095	3:16	4:07	3:52	3:00	3:56	1.10	531.30
4	Kagan, John	469254	3:27	3:29				1.13	470.08
5	Diebolt, John	5286	0:48	3:08	3:19			1.19	460.53
6	Bard, Steven	110773	1:55	3.23	3.00	3:08		1.15	449.65
7	Wieczorek, Leonard	10105	2:07	1:50	1:01	2:17	2:34	1.16	337.56

Event 218 Standard Cat. Glider 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	Flt 1	Flt #2	Flt #3	Flt #4	Flt #5	Flt #6	Flt #7	Flt #8	Flt #9	Score
1	Buxton, James	75154	81.4	81.8	79.7	75.1	81.7	58.9	81.9			163.70
2	Johnson, Tem	16707	79.50	81.00	77.90	71.70	70.50	71.40				160.50
3	Romash, Rob	130061	73.90	72.30	77.60	80.70	77.80	79.70				160.40
4	Warmann, Bob	187	13.10	72.70	80.00	75.10	70.30	5.80	70.00	80.40	76.50	160.40
5	Schlarb, Ralph	322352	75.2	78.8	78.6	79.9	71	80.2				160.10
6	Krempetz, Kurt	69866	59.90	58.70	67.00	65.80	73.80	76.10	55.30	83.30	75.20	159.40
7	Schlarb, W.L.	14425	76.50	75.90	70.10	78.50	79.20	55.00				157.70
8	Miller, Richard	179518	71.70	70.40	71.10	74.50	76.10	73.60				150.60
9	Jessup, Artie	10269	68.50	55.30	60.30	72.70	75.60	69.10	63.20	67.80	72.30	147.90
10	Lewis, James	119	43.50	66.20	56.10							122.30
11	Batte, Thomas	17842	42.00	40.00	42.50	42.70	50.00	51.30	59.30	46.40	47.00	110.60
12	Olshefsky	864L MAAC	51.90	48.20	50.10	46.90	51.90					103.80
12	Krempetz, Ken	11951	53.40	38.50	25.00							91.90
13	Le Blanc, Ben ***	778869	3.70	2.70	6.70	9.00	6.80	9.50	8.80	9.50	11.40	20.90

Event 219 Unlimited Cat. Glider 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	Flt #1	Flt #2	Flt #3	Flt #4	Flt #5	Flt #6	Flt #7	Flt #8	Flt #9	Score
1	Kremptez, Kurt	69866	86.70	91.80	87.20	90.60	94.20	94.30				188.5
2	Lewis, James	119	84.90	84.70	88.80	92.9	85.80	89.50	72.40	89.80	83.00	182.7
3	Buxton, James	75154	83.80	83.30	85.60	76.30	79.10	81.50	79.80	82.30		169.4
4	Boehm, Bernard	92567	79.00	83.20	81.80							165
5	Romash, Rob	130061	74.90	75.30	79.80	78.10						157.9
6	Schlarb, W.L.	14425	79.10	78.70	70.00							157.8
7	Schlarb, Ralph	322352	78.20	77.50	68.40							157.7
8	Johnson, Tem	16707	62.80	76.10	68.30	77.90						154
9	Warmann, Bob	187	77.50	73.90	74.70	16.30	71.60	70.00	54.60	74.70	62.70	152.2
10	Jessup, Artie	10269	67.20	71.80	69.50	74.10	68.80	68.70	69.50	63.80	75.50	149.6
11	Kremptez, Ken	11951	50.10	60.70	58.90	63.10	10.00	63.80	67.20	60.60	59.40	131
12	Batte, Thomas	17842	51.60	53.00	52.40	58.20	60.20	63.20	62.60	59.70	57.90	125.8
13	Hartman, Phillip	8667	33.60	34.30	44.00							87.6

Event 220 Ministick 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Flt #1	Flt #2	Flt #3	Flt #4	Flt #5	Score
1	Romash, Rob	130061	11:53	13:09	10:34	12:42	11:16	13:09
2	Van Gorder	19912	12:46	11:34	12:01			12:46
3	Loucka, Larry	1210	10:43	11:25	11:04	11:33	12:19	12:19
4	Leppard, William	93740	8:12	10:21	12:16			12:16
5	Sova, Tom	473169	8:37	11:13	11:56	12:14	9:56	12:14
6	Harlan, Ray	131	10:51	11:13	10:58	11:54		11:54
7	Schutzel, Emil	508384	9:10	11:53	9:26	10:12	11:30	11:53
8	Collins, Walt	249365	9:49	10:59	11:36	11:20		11:36
9	Schaefer,Doug	680152	11:08					11:08
10	Diebolt, John	5286	10:54	9:02	2:58	8:52		10:54
11	Richmond, James	4936	8:30	8:28	9:40	10:44	4:49	10:44
12	Rash, Fred	63458	10:40	9:03	4:24	10:39	10:40	10:41
13	Tellier, Fred	645957	7:04	10:30	9:00	10:19	9:21	10:30
14	Cohen, Alan	738608	4:10	9;46	10:19	9:36	5:33	10:19
15	Hodson, Gary	669378	4:53	2:01	9:05	10:13		10:13
16	Warmann, Bob	187	9:12	3:46				9:12
17	Singer, Len	209081	8:16	8:55				8:55

18	Grant,James	159477	7:40	5:37				7:40
19	Le Blanc, John	271152	1:19	5:48	6:55	6:43	7:24	7:24
20	Ray, Nicholas	770974	6:33	7:17	7:15	6:36		7:17
21	Lemel, AL	5028	6:55	5:57	5:56	3:49		6:55
22	LeBlanc, Chris	778968	6:14	5:25	6:41	6:29	6:33	6:41

Event 505 Peanut Scale 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Aircraft Name	Score
1	Hodson, Gary	669378	Unknown	200.00
2	Miller, Jim	89382		198.00
3	Buxton, Jim	75154		162.00
4	Lee, Jim	54365		152.00
5	Nunez, Jonathan	726193		147.20
6	Nunez, Paul	Pending		146.40
7	Bard, Steven	110773		145.50
8	Blevins, Doyle	523646		95.50

Event 507 AMA Rubber Scale 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Aircraft Name	Score
1	Blair, John	29698	Russell	298.00
2	Miller, Jim	89382	Vagabond	291.00
3	Lee, Jim	54365	Lacey	287.00
4	Nunez, George	324372	Fairchild 24	236.00
5	Grant, Jim	159477	Cessna	81.00

Event 627 INDOOR ELECTRIC DURATION 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	SCORE
1	Harlan, Ray	131	:58	1:12	3:42	7:09	7:09
	Romash, Robert	130061					DNF

Event USIC A 6 2003 Nationals Johnson City, TN.

Place	NAME	AMA NO.	FLT #1	FLT #2	FLT #3	FLT #4	FLT #5	SCORE
1	Hodson, Gary	6673778	8:31	3:12	8:51	9:10	3:15	9:10
2	Schutzel, Emil	508384	8:38	8:55	2:36	3:47	5:50	8:55
3	Tellier, Fred	9125 MAAC	7:28	6:47	8:08	8:06	8:30	8:30
4	Collins, Walt	249365	7:45	8:03	6:54	8:10		8:10
5	Leppard, Bill	93740	7:16	8:10	7:36	7:29	6:29	8:10
6	Johnson, Tem	16707	7:37	6:01	6:42			7:37
7	Sova, Tom	473169	6:30	7:12	7:27	6:48	6:27	7:27
8	Singer, Len	209081	7:09	7:19				7:19
9	Raymond-Jones, DC	63358 MAAC	4:01	4:48				4:48
10	Bard, Steven	110773	3:40	3:51	4:15	3:48	4:16	4:16
11	Olshefsky, Peter	864L MAAC	3:59	3:22				3:59
12	LeBlanc, John	271521	2:56	2:40	1:53	3:06	3:58	3:58
13	LeBlanc, Ben ***	Pending	2:25	1:50	1:47	2:12	2:33	2:33

Event A-ROG 2003 Nationals Johnson City TN

Place	NAME	AMA NO.	Flt # 1	Flt # 2	Flt # 3	Flt # 4	Flt # 5	Score
1	Loucka, Larry	1210	18:48					18:48
2	Sova Tom	473169	9:50					9:50
3	Diebolt, John	5286	4:32	7:24	6:23			7:24

Event USIC 35 CM 2003 Nationals Johnson City, TN.

Place	NAME	AMA NO.	Flt #1	Flt #2	Flt #3	Flt #4	Flt #5	Best Flt
1	Cohen, Alan	738608	24:10	25:42	12:29	20:28	26:35	26:35
2	Sova, Tom	473169	26:17	14:14				26:17
3	Loucka, Larry	1210	23:26	24:09	25:53	24:51	25:49	25:53
4	Romash, Rob	130061	19:11	20:44	21:28			21:28
5	Raymond-Jones, DC	63358 MAAC	13:05	20:23	16:50	18:45		20:23

Event USIC Dime Scale 2003 Nationals Johnson City, TN.

Place	NAME	AMA NO.	Aircraft Name	Score
1	Hodson, Gary	667378	Fleet Bipe	375
2	Miller, Richard	719518	B.A.T. Monoplane	375
3	Diebolt, John	5286	Leopard Moth	325
4	Dunham, Tim ***	773464	MO-1	237
5	Blair, John	29698	Leopard Moth	205
6	Miller, Jim	89382	M0-1	179
7	Blair, John	29698	P-26	170
8	Barker, John	2095	Curtiss Robin	166
9	Joseph, Joe	301192	Fokker VII	162
10	Joseph, Joe	301192	Farman Strat	152

Event USIC F1L 2003 Nationals Johnson City, TN.

Place	NAME	AMA#	FLT # 1	FLT# 2	FLT # 3	FLT # 4	FLT # 5	FLT # 6	FINAL
1	Kagan, John	469254	20:05	18:57	14:02	19:00	21:29	20:41	42:10
2	Romash, Rob	130061	20:12	20:21	20:05	21:45	13:11		42:06
3	Shaefer, Doug	680152	15:41	19:55	19:11	18:49	20:35		40:30
4	Loucka, Larry	1210	15:33	18:27	20:06	18:20			38:33
5	Lepperd, Bill	93740	7:05	18:12	18:00	8:04	15:01	17:45	36:22
6	Collins, Walt	129365	12:24	16:57	17:12	18:11	5:51		35:23
7	Sova, Tom	473169	16:54	17:52					34:46
8	Grant, Jim	159477	6:13	13:44	18:10	15:46	14:43	14:43	33:56
9	Olshefsky, Peter	864L MAAC	15:57	11:50	17:41	8:59	8:54		33:38
10	Richman, Steven	763879	7:07	14:55	17:08	7:03	13:36	15:40	32:48
11	Tellier, Fred	9125 MAAC	15:45	14:18	16:01	16:26	16:19		32:45
12	Masterman, Paul	182810	16:49	14:01	13:45	14:46			31;35
13	Singer, Len	209081	10:48	13:20	15:45	16:05			31:50
14	Wisniewski, Gordon	716	12:25	14:11	15:10	15:40			30:50
15	Raymond-Jones, D.C.	63358	8:04	10:02	10:33	14:10	9:06	15:41	29:51
16	Cohen, Alan	738608	11:55	17:33					29:28
17	Landrum, Billie	52674	13:08	11:40	12:40	12:10	13:16		26:29
18	Barker, John	738608	8:45	10:07	9:31	11:36	9:01	11:58	23:34
19	Wrzos, Chet	20454	10:38	12:20	11:10				23:30
20	Italiano, Tony	2386	11:54	10:58	1:29	8:59	10:07		22:52

Event USIC F1M 2003 Nationals Johnson City, TN.

Place	NAME	AMA NO.	Flt #1	Flt #2	Flt #3	Flt #4	Flt #5	Flt #6	Score
1	Diebolt, John	5286	4:44	13:31	15:40	15:59	15:32	15:53	31:52
2	Tellier, Fred	9125 MAAC	14:51	13:37	14:30	13:37	8:10		29:21
3	Gowen, Bill	615737	7:36	0:16	14:01	13:22	14:10	14:46	28:56
4	Rash, Fred	63458	11:32	12:04	12:13	12:03	12:55		25:08
5	Barker, John	2095	7:45	10:39	7:21	10:26			21:05
6	Masterman, Paul	182810	10:02	9:41	10:11	8:56			20:13
7	Hartman, Phil	8667	5:46	5:16	10:15	8:11	5:42		18:26
8	Raymond-Jones DC	63358 MAAC	8:20	8:09	7:01	6:30			16:27

Event USIC FAC Peanut 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	Aircraft Name	Score
1	Buxton, Jim	75154	Miss Ashley	144.50
2	Miller, Jim	89382	Fokker DVII	143.75
3	Miller, Richard	719518	Volks Plane	137.00
4	Hodson, Gary	667378	Moustique	122.50
5	Blair, John	29698	Spad VII	108.50
6	Grant, Jim	159477	SE5-A	102.00
7	Joseph, Joe	301192	Curtis S-3	76.50

Event USIC FAC Scale 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	Aircraft Name	Score
1	McGillivary, Jack	1025L MAAC	SE-5 Replica	156.5
2	Hodson, Gary	667378	Avro 560	142.5
3	Lee, Jim	54365 MAAC	Lacey M-10	141.0
4	Nunez, Jonathan	726193	Avenger	136.0
5	Nunez, George	324372	Rumpler	133.5
6	Blair, John	29698	Spad	130.5

Event USIC Golden Age Scale 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	MODEL	SCORE
1	McGillivary, Jack	1025L MAAC	Piper J5B	360
2	Lee, Jim	54365 MAAC	Taylorcraft	360
3	Miller, Jim	89382	MO-1	290
4	Grant, Jim	159477	Rearwin Speedster	254
5	Blair, John	29698	Waco CUC 1	208

Event USIC High Wing Monoplane 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	Aircraft Name	Score
1	McGillivary, Jack	1025L MAAC	Found 100	143.00
2	Lee Jim	54365	Lacey	137.00
3	Blair, John	29698	Cougar	124.00
4	Miller, Jim	89382	Fike E	103.50
5	Blevins, Doyle	523646	Pilatus Porter	86.00

Event USIC Modern Civil Production 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	Aircraft Name	Score
1	McGillivary, Jack	1025L MAAC	Found 100	360 **
2	Lee, Jim	54365	Taylorcraft	360 **
3	Miller, Jim	89382	Found	184
4	Blevins, Doyle	523646	Pilatus Porter	183
5	Anderson, Wayne	587497	Southern Cross	139

Event USIC No Cal 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	Flight1	Flight2	Flight3	Flght4	Flight5	Score
1	Diebolt, John	5286	1:35	7:06	7:20	5:39		7:20
2	Loucka,Larry	1210	7:16	4:30	7:14			7:16
3	Warmann, Bob	187	3:41	4:31	6:17	6:54	6:17	6:54
4	Rash, Fred	63458	3:46	4:33	5:27			5:27
5	Buxton, Jim	75154	3:41	4:08	4:34			4:34
6	Nuszer, Joe	29036	3:47	:04	3:53	3:01		3:53

Event USIC P24 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	
1	Diebolt, John	5286	1
	Bard. Steven	110773	2
	Johnson, Tem	16707	3
	Kagan, John	469254	4
	Stoddart, Chris	773234	5
	Warmann, Bob	187	6

Event USIC Pioneer 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	Aircraft Name	Score
1	Miller, Jim	89382	Voisin 14bis	130.00
2	Tim Lavender	269765	Drzewiecki	124.00

Event USIC Pistachio 2003 Nationals Johnson City, TN.

Place	Name	AMA NO.	Aircraft Name	SCORE
1	Schutzel, Emil	508384	14 bis	5
2	Nunez, George	324372	Sopworth Tri plane	5
3	Momot, Stanislaw	POL 5861	Micro-Veloz	2

Event USIC Race to the Roof 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Flight1	Flight2	Flight3	Flight4	Flight5	Flight6	Flight7	Score
1	Diebolt, John	5286	ATT	:14	ATT	ATT				:14
2	Romash, Rob	130061	ATT	:17	ATT	ATT	ATT	ATT	ATT	:17
3	Bard, Steven	110773	:27	ATT						:27

Event USIC Round the Pole 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Flight1	Flight2	Flight3	Flight4	Flight5	Flight6	Flight7	Score
1	Boone, Jack	107857	3.2	3.2	3.0					3.0
2	Italiano, Tony	2386	3.6	3.8	3.4	3.4	3.2	3.4	3.2	3.0
3	Sova, Tom	473169	3.4	3.6						3.4
4	Diebolt, John	5286	4.6	3.4						3.4
5	Bard, Steven	110773	7.6	7.2	7.0					7.0

Event USIC Straight line Speed 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Flight1	Flight2	Flight3	Flight4	Flight5	Score
1	Lewis, Jim	119	1.7	1.4	1.2	1.0	1.0	1.0
2	Sova, Tom	473169	2.4	1.4	1.6	1.4		1.4
3	Diebolt, John	5286	2.6	2.0				2.0
4	Bard, Steven	110773	4.8					4.8

Event USIC Unlimited Rubber Speed 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Score
1	Diebolt, John	5286	8.6
2	Boone, Jack	107857	8.8
3	Italiano, Tony	2386	15.7

Event USIC WWII Mass Launch 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Aircraft Name
1	McGillivary, Jack	1025L MAAC	P-51

Event USIC WWI Mass Launch 2003 Nationals Johnson City, TN.

Place	Contestant Name	AMA NO.	Aircraft Name
1	Loucka, Larry	1210	DH-6

WEIGHT CALIBRATION OFFER

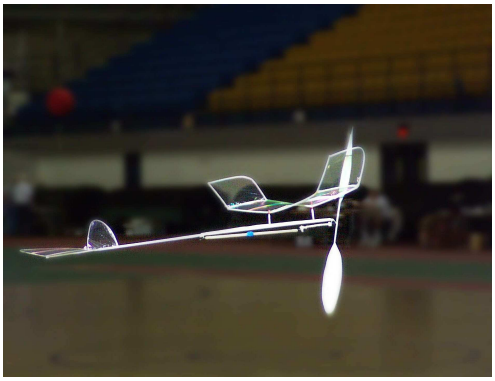
I am a new guy, so I can not pass on any great ideas, but I will offer some help. I will calibrate anybody's weights on a balance that is calibrated and goes to 0.0001 grams. The only cost is you must include enough stamps so that I can return them in the same container or similar. US postal service please as the UPS drop is several miles away. Please provide an E mail address so I can contact the sender with any problems or options.

James Watts
6741 Avenida De Galvez
Navarre, FL 32566

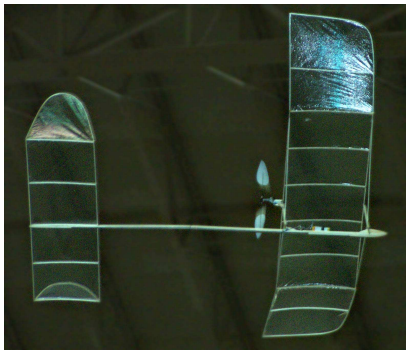
jwicons@earthlink.net

U.S.I.C. 2003 PHOTO ALBUM

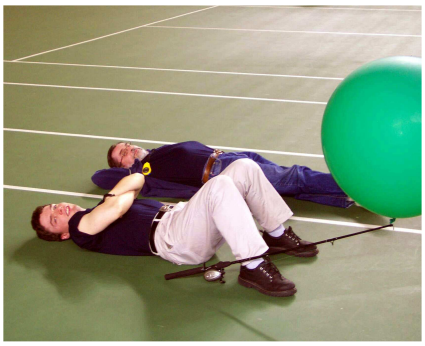
Russian Transport from Smyrna, TN



EZB Landing



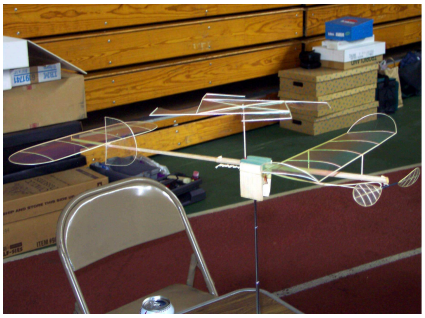
Rob Romash Electric FF



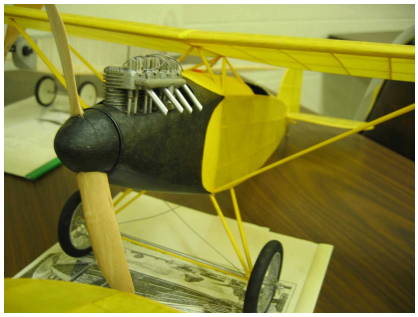
Hey, Thirty Minutes is a Long Time!

Harlan and Electric RC, Tony in Back

Jim Grant & Water Erbach Sr.



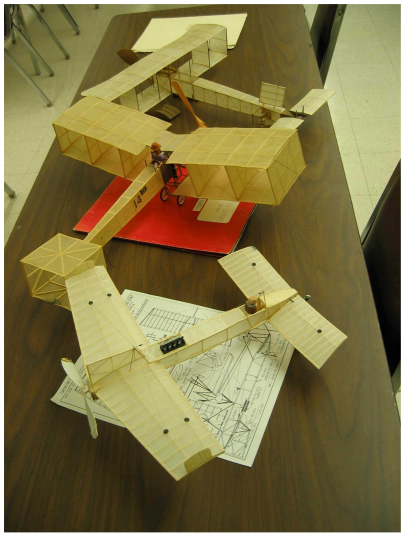
Diebolt Autogyro



The Scale Models were Incredible

John Kagan Prepares to Launch

Richmond and Sova



Pioneer Scale Entries

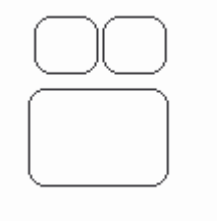
GOLD NUGGETS- INSPIRED BY NATURE

By: H. Bruce McCrory, 7-03

A while ago INAV, Gold Nuggets featured a bird feather. I've been looking for alternative construction methods to feed my appetite for experimentation. The feather image caught my attention, kick-started an imagination that was spiraling into lethargy, and here are the results, so far: Alternates for spars and rolled motor tubes. I collected the products of annual molt, which is a whole story by itself. Just remember to toss feathers into a box with a dash of your favorite toxic thinner, to avoid commercial eradicators.

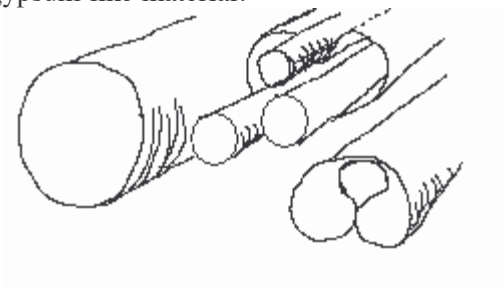
These examples of aerodynamics similar to aeromodeling needs included flight feathers, called remiges, of geese (lazy Canadian), ocean (gull) and domestic bullies (crows). The latter two are sedentary species, and the Canadian geese should be long-haul migratory birds. Enough background.

All samples included the characteristic shaft (rachis), tapering from round tube calamus (quill) at the body to flattened reverse u-channel to the tip of the feather. Each readily flexed under pressure. Though gross shape varied, the leading edge vanes were about one-third the width of the trailing edge. The goose feathers were much narrower and had worn, narrow, tips characteristic of the outer primaries we see as fingers.



Internally, the sedentary species were identical. I chopped into the shafts to see sectional structure. The quill was thick, plastic exoskeleton structure having membranous tissue filling the interior. This tissue reminded me of air bladders. It could be removed from the outer shell like bicycle inner-tubes. The quill and membrane transitioned to hollow-core, double tube-like section where the vanes consisting of barbs and barbules started. The interior "flange" of the double tube was almost twice the thickness of the encircling u-shape shell. It was attached to the top of the shell by more thin membrane. To achieve the same perimeter wall structure with a single cell would double the cross-sectional area and cost of tensile strength. The detached center flange allowed the shaft to twist and bend horizontally, and downward with stresses. But vertically, essentially four I-beam-type flanges resisted upward pressure. You see structural examples of this in floors and deck-beam supported bridges; extremely efficient, and aerodynamic – reduced profile, less drag.

Cutting into the goose quill was difficult. The exoskeleton was thick and hard compared to the others. The core, through the entire length of the rachis was a dense, gypsum-like material.



Using one of my balsa practice tubes, I slipped two rods of equal diameter into the tube. A third rod pushed the tube shell into the void, between the other two rods. Using an edged form cracked and damaged even a wetted tube. The two equal rods were rolled together, over the center third one and the contacted walls of the balsa tube tack glued. The experiment worked. Even to the twist and flexure of the smaller, multi-wall tube, characteristics matched those of the feathers. I've made multi-wall tubes using rod diameters to .032 and .063 inches. This configuration seems to have merit in larger models and situations requiring equal or greater volume of balsa timber.

I'm still fussing with motor tube sections and introducing other materials, but the potential for alternative structural members is too attractive for me to ignore.

Good flying. hb

BUILDING THE HELIO COURIER NO CAL SCALE MODEL

By John Pakiz, Omaha, Nebraska
May, 2003

This Helio Courier is a fine flyer if it's light. Shoot for a target weight of 4 grams or less. The original weighs 4.1 grams, less rubber, and flys an average of 2 minutes under a 26' ceiling. Use light but stiff wood throughout, especially aft of the wing.

Tail and Stabilizer: Make from 1/32" (depth) X 1/20" (width) strips and 1/32" sheet balsa. On the tail notice the notch for the stabilizer. The stab has functional trim tabs and don't leave this out. There are no gussets to keep the structures light.

The Wing: The wing leading and trailing edges are 1/16" square balsa. The 1/32" diagonal ribs keep the wing from warping. The tips are 1/32" X 1/16" laminated strips, two of them. The wing doesn't have much camber for two reasons - you don't need much with a model this light and a thinner section keeps the weight down. To put in the dihedral, lay the wing flat, then block up one tip 30 mm's. On the original model, the L.E. and T.E. were radius sanded to reduce weight and drag.

The Fuselage: The outline is 1/16" square balsa. The diagonals and one upright aft of the cabin are 1/32" X 1/16" for lightness. The rest of the uprights are 1/16" square. The nose piece, the landing gear anchor sheeting and the gussets are 1/16" sheet. The lower nose longeron was curved by soaking the wood in water, then taping it to a template. This formed the curve without stressing the rest of the structure.
The gussets on the lower fuselage below the wing T.E. serve as a grip area for holding and launching the model. Put some small gussets under the wing T.E. where the three stringers come together. This isn't shown on the plan. The landing gear fairings are 1/32" sheet, as are the wheels. The wheels don't rotate so there's no need for wire. Cover the fairings with white tissue to strengthen them. Bevel the fairings for a good fit to the fuselage.

The Power Train: If you wish, by all means use Paul Bradley's rolled motor stick and aluminum prop bearing holder. The plans show the system I use which is simply a 3/32" square stick 8}" long and a .025 wire collar that holds the Peck Polymer bearing. Peck bearings come in various sizes. Use the smallest one. The rear rubber anchor wire is .020. Lash the wires to the motor stick with thread, then give the thread an over coat of cyano glue. Glue the motor stick to the fuselage at every point where the stick intersects with the fuselage structure. The propeller blade shape works well. The blades are 1/32" sheet C-grain balsa. They can be sanded a little thinner. Weigh the blades on a good gram scale to make sure they're the, same weight. The prop spar is 3/32" square that's slightly springy. Sand to a round shape and taper the ends to 1/16". As per the usual procedure, wet the blades and tape them to a 3" diameter can 15 degrees off vertical. I use a 10 ounce baking powder can. It's mandatory to use a propeller pitch guage when assembling the prop. To balance the prop, don't sand the heavy blade. The friction heat from the sanding will change the helical twist in the blade. Instead add tiny tabs of Scotch Magic Tape to the light blade until the prop balances perfectly. Once the tape is pressed down, it disappears. Add a small brass washer to the back of the spar and then the prop is ready to receive the spinner. Don't leave out the three dimensional spinner. It makes the model. This is easily made with a Dremel Moto Tool or it can be fashioned by hand. Sand a circular channel in the spinner's base for the prop spar.

Covering and Decoration: Use the lightest white Japanese tissue such as Old World or Esaki. On the original model the tissue was doped with 50-50 clear but this isn't necessary. Not doping will keep the tissue lighter. Do not dope the tail and stab tissue. The covering can be shrunk on a frame and decorated before being put on the model. Make shrinking frames from 3/8" square balsa or hardwood. The frame needs to be 1/2" larger all the way around than the partbeing covered. Cut a corrugated cardboard insert that fits slightly snugly in the frame. Remove the insert and glue a copy of the part on top of the insert. Shrink the tissue flat side up. I shrink my tissue 4-5 times with water (misted) and a hair dryer. Make sure the tissue grain goes the long way on the frame. Then slide the insert in to the frame and under the tissue. The details on the copy can be seen through the tissue so it's easy to add the tissue trim and draw on the panel lines, etc. On this model the color scheme is a basic white with red and black trim stripes. If the white tissue is left undecorated, the model will look like a ghost. On the wing plan, going from right to left, the 1/8" stripe on the right is black, 1/8" white space, broader red stripe, 1/8" white space and then 1/8" black. The tail and stab have the same scheme - 1/16" black, 1/16" white-•space, red stripe, 1/16" white space and then the 1/16" black. The tail

isn't as complicated as it appears at the top. The fuselage has a red area behind the cabin accented with a white space and a black stripe. White tissue is lighter than colored so that's why this model is mostly white. The color scheme isn't difficult to apply with a little patience. Put the tissue trim on the covering first, then add the lines. A good adhesive for trim tissue is rubber cement very much thinned with lighter fluid (naptha). This won't wrinkle the tissue like thinned Elmer's. You can draw the lines right over the tissue trim. I use felt tip pens made by Millenium. They're permanent, won't smear and the ink is impervious to even dope. Use a 5 point tip for the flap, slot, the fuselage door, the stab trim tab and the fuselage panel lines. Use an 8 point pen for the ailerons and rudder lines. Remember the tissue trim and the lines are being done over the cardboard insert. The insert gives plenty of support to the tissue. It's difficult to draw lines on tissue that start and end exactly where you want them. Post It notes to the rescue. Places Post It note where you want the line to begin and another where you want the line to end. Begin drawing with a straight edge over the Post It note at the starting point and end a little over on the other one. Peel off the notes and Presto - the line is exactly where you want it to be. To draw the ailerons, for example, just run the lines going perpendicular. On the original model many folks have commented on how clean and crisp the wing lines are. It's a difficult task made easy. The fuselage windows are black Japanese tissue. Adhere the circular rear window over the tissue trim. The covering can be attached to the balsa model frames with the thinned rubber cement. Give each part three coats of rubber cement. Now here's where those shrinking frames really rise and shine. Carefully remove the cardboard insertfrom underneath the tissue, then place the appropriate model frame work behind the tissue. Carefully position the frame so the tissue is exactly where it's supposed to be. Small tabs of masking tape will hold the frames in position. Use the lighter fluid through the tissue to activate the adhesive. The lighter fluid drys almost instantly and it won't hurt the Japanese tissue. Cut the tissue out of the shrinking frame, then trim the part. You can do this for all the flat model balsa frames but not the wing.

Final Details: Give the prop spinner several coats of clear dope, then sand lightly. Paint with silver enamel. The 1/32" wheels are painted with black acrylic and the centers are white stick-on disks. The tail wheel fork is cut from 1/32" wood then painted silver. The tail wheel is again 1/32" wood. Put some Magic Tape on both sides of the wood, then use a paper punch to punch out the wheel. The white center is made with a smaller diameter paper punch. The wheel is painted black with the acrylic.

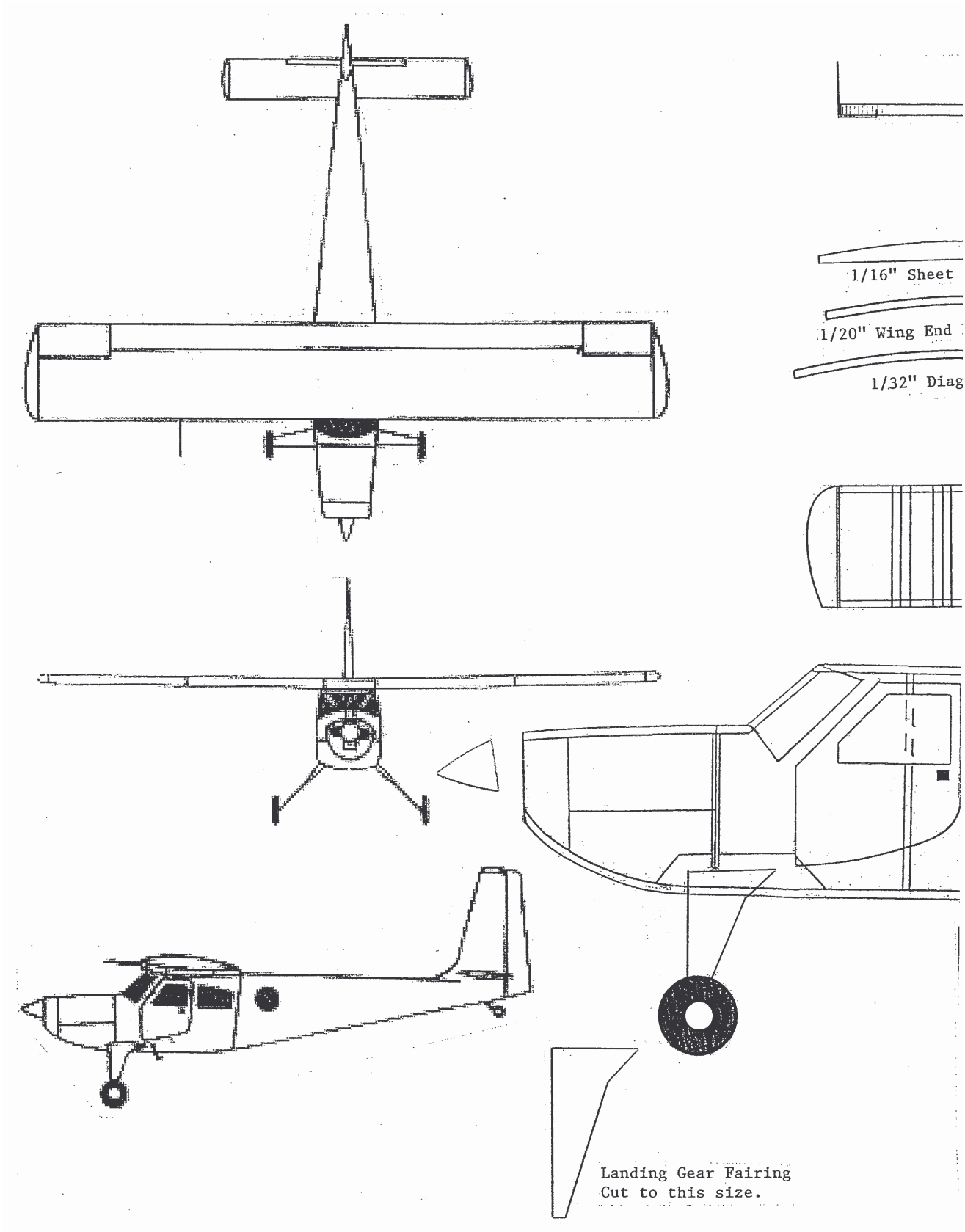
Assembly Notes: When the motor stick is glued to the fuselage, make sure the back of the prop blades have enough clearance so they don't scrape the nose. Also, when gluing the stab to the tail., make allowances for the tail being glued to the fuselage with one degree of left turn. The tail has a high aspect ratio so you shouldn't need much left turn to coordinate the flight pattern.

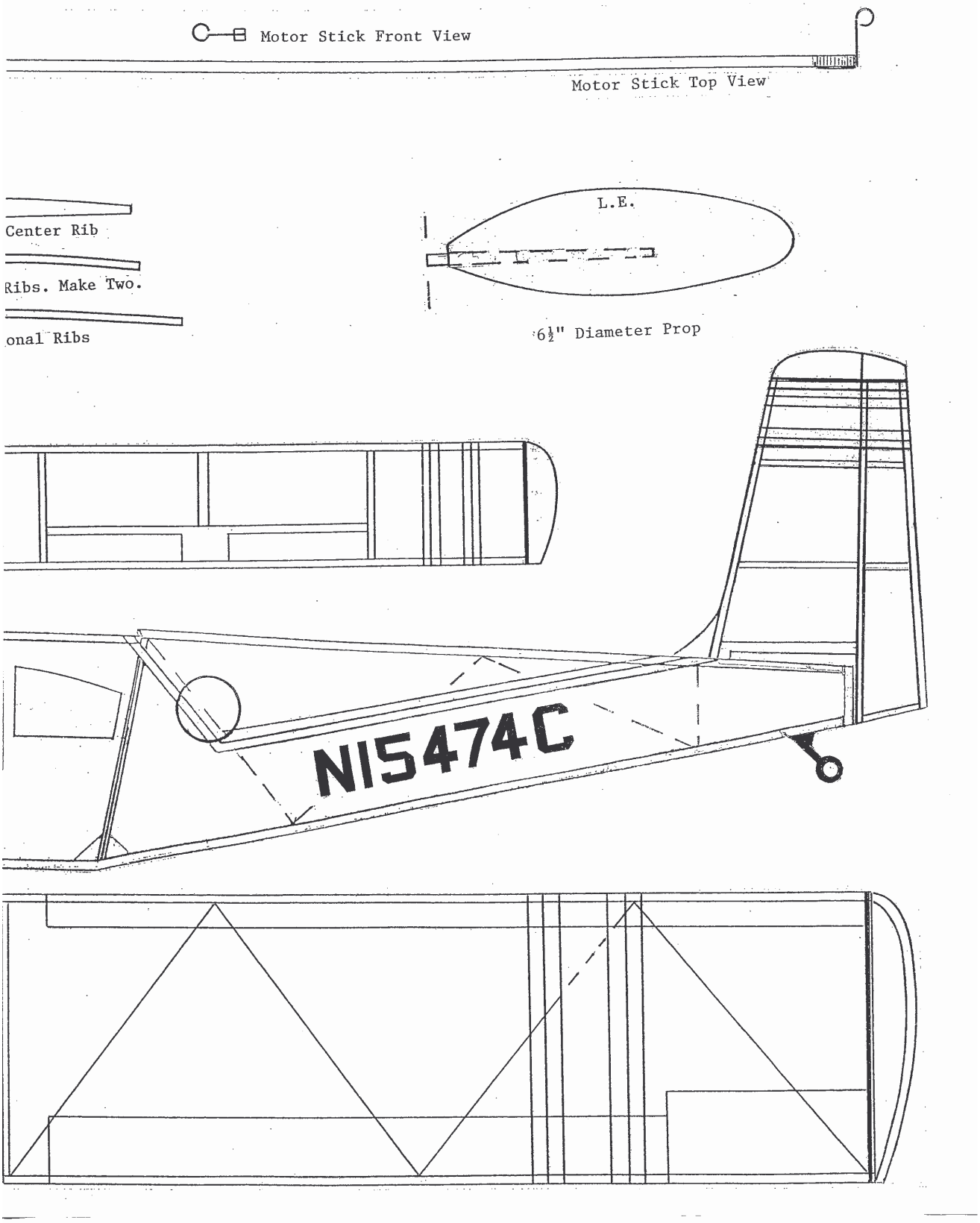
Flight Trimming: This thing has a short nose and long tail moment arm. Here are the adjustments: Four degrees down and two degrees left thrust, 1/10th of a gram of nose weight, one degree of washout on the left wing tip to keep the wing up in the left turn and one degree of left turn in the tail. Under load. the .025 prop bearing wire will bend to about three and a half degrees. The stab has one degree of down trim built in. On the original model I still had to bend in a little down trim on the stab trim tabs. If your model doesn't climb, keep the thrust adjustments and bend in some up trim. For maximum duration, trim the model to fly just at the edge of a stall. For each model the exact trim required is different. Use the trim tabs to achieve this flight pattern. Don't worry about the small stabilizer. It's plenty effective. Don't make a larger one - you don't need the area and for sure you don't need the weight back there.

Here are a few guidelines for the rubber motors. Many of you are much more experienced than I when it comes to model, prop and rubber combinations. This is what I've found. Assume a 4 gram model.

Ceiling Height	**Rubber Diameter**	**Motor Length**	**Number of Turns**
Under 30'	.061 - .062	16"	1450
30 - 40'	.065	16"	1350
50+'	.069	15"	1300-1320

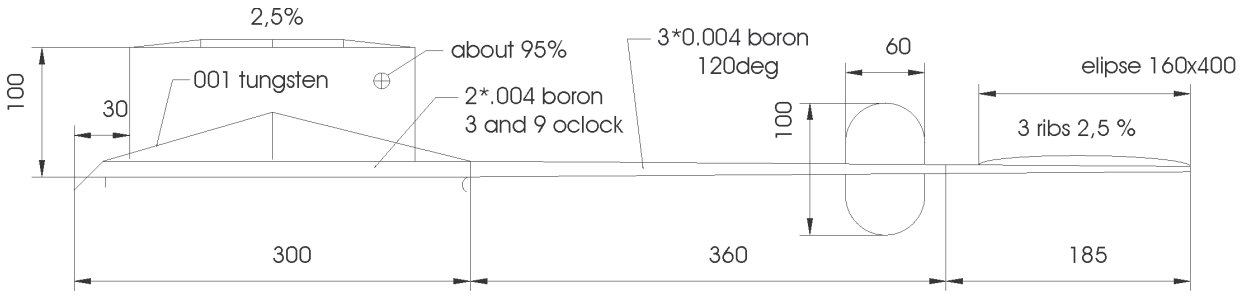
Well, that's about it. I truly hope you enjoy your Helio as much as I've enjoyed mine. It's a fun airplane and an unusual subject.

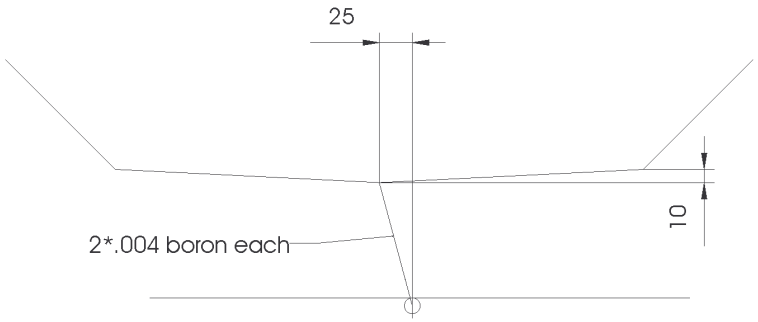

1/16" Sheet
1/20" Wing End
1/32" Diag
Landing Gear Fairing
Cut to this size.

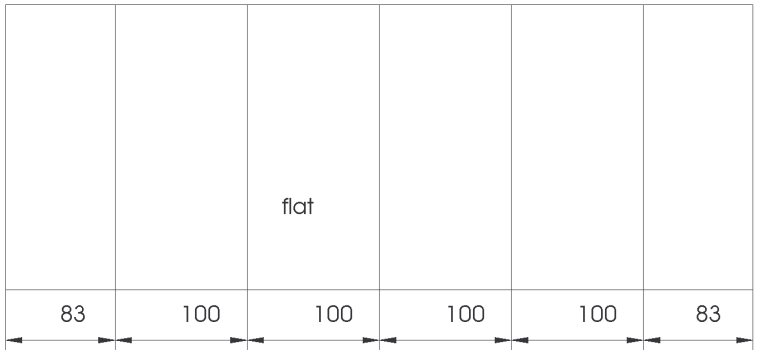

Motor Stick Front View
Motor Stick Top View
Center Rib
Ribs. Make Two.
onal Ribs
L.E.
6½" Diameter Prop
N15474C

***F1D* BY AUREL POPA**

tpopa@fx.ro







Weights

stick	270 mg
1/2boom	180 mg
1/2 boom+stab	180 mg
wing	350mg
prop.	180mg
wing posts	55 mg
rubber	1,12 g/m May '99 2250 turns
covers	Y2K2
Prop.	466 dia 710 pitch
Best time	41'42" Cargo Lifter June 2003

Aurel Popa F 1 D
2003

This is my model as I flew it at Cargo Lifter. I did 6 flights over 40 minutes, 5 flights over 41 minutes, it was a very nice weekend. It is a simple design. I've started covering with microfilm, and bracing the wing as in last year drawing. I used to have some ballast, then changed to Y2K2,and to unbraced wing and, the model increased just to 1.2 grams. If you have any question do not hesitate to ask.
Best regards,
Aurel

As posted to the Free Flight Mailing List.

Date: Mon, 1 Sep 2003
From: Alan Mkitarian
Subject: Results of F1D Team Selection Finals at Lakehurst, N.J.

Hi All:
Just spent three days watching the best indoor fliers in this country. Jim Richmond ran a good contest. The weather was good on Sat early and then the storm of the summer hit with rain drops thru the roof and the outside temp dropping into the 70's made for some very tricky conditions. Sunday and Monday conditions were cloudy and cool with some rain. Here are the results:

Junior Team Selection Finals:

Doug Schaefer	35:30 and 34:11= 69:41
Brett Saanborn	26.27 and 25:08= 53:33
David Rigotti	26:08 and 24:31= 50:39
Patric Wilcox	24:43 and 21:57= 46:40

Senior Team Selection Finals:

John Kagan	37:59 and 36:47= 74:46
Larry Cailliau	36:46 and 35:18= 72:04
Steve Brown	36:40 and 35:01= 71:41
Tom Sova	35:24 and 35:12= 70:36
Brian Johnson	35:10 and 26:08= 61:18
Jeff Dalton	27:33 and 25:54= 53:27
Cezar Banks	28:19 and 21:00= 49:19
Mark Bennett	29:07 and 09:57= 39:04
Alan Cohen	01:25 and 00:00= 01:25
Bill Leppard	00:00 and 00:00= 00:00

KIBBIE DOME 2003

At the awards ceremony, Emil Shutzel, one of three flyers who drove from Kansas, (and first in Bostonian and Manhattan) stood up to laud the Kibbie Dome, especially in comparison to USIC. His main point was that the although both are great sites, the format of Kibbie Dome is modeler friendly, whereas USIC is high pressure. With time slots of a few hours enforced for each event at USIC, you are either close to trimmed and ready, or may face much disaster for lack of work-it- out time. At Kibbie, you can spend four days on one event, or four days on 17 events. At KD, you can *learn* at yout own pace. I suppose you can more easily get help from others also, since no one else is against any event deadlines. The site is taller and wider than at USIC, and fewer mid-airs. I'm told by Steve Brown that altitude density keeps times about 9% lower than a comparable sea level site. But so what. I'm coming back next year, if I'm alive, and living anywhere west of Long Island.
Mark Bennett

* * *

As usual, flying conditions of the Kibbie dome were very good and despite record temperatures (without the nasty humidity you easterners enjoy) the building was quite stable with little temperature variation. Remodel work has really tightened the environment control. Planes tended to land where they were launched.

Most long-distance fliers feel that the relaxed flying atmosphere and site condition is well worth the time and expense of the travel to fly at the Kibbie Dome.

Several firsts and site records were broken. The most notable first was Chris Borland losing his balloon to the ceiling tiles when he was packing up. Everyone thought Steve Brown knocked a plane loose from the tiles with his habitual balloon bounce to get altitude, but it turned out to be our university hosts fishing for lost planes from the rafters, above the tiles. Last minute scores that upset flier standings in classes are common, so prizes that go to early departing contestants often need to be substituted, and the modeler often doesn't realize the lost position until the next issue of INAV. These are things that will likely not be included in the INAV report, so I feel safe in recounting them.

Speaking of lost planes, one F1D sat on the floor for over a day that we think belongs to Darryl Stevens. Should he see this, I'd like him to call me asap, since I have it in a big box and my wife is really hot about all the cleanup I need to do as a result of model interests.
Good flying,
Bruce McCrory, in Seattle

* * *

I thought turnout was good, and thought I heard CD Mr. Tagliafico say the same. Maybe the place is just so dang big, we can't fill it up no matter what. Here's all events to three places.
Mark Bennett

```
Limited PP
John Lenderman     14:27
Jerry Powell       14:17
Ed Berray          13:46

A 6
Gary Hodson        10:18
Tem Johnson         9:31
J. Lenderman        9:22

Ministick
Wally Miller       12:03
Bruce McCrory      11:58
Andy Tagliafico    11:56

1.2 EZB (2 flights)
A Tagliafico       39:49
J. Lenderman       38:50
Wally Miller       35:37

U.S. EZB
Jim Richmond       28:34
J. Lenderman       24:44
Bruce Kimball      21:33

Wright Stuff
Chris Borland       6:23
J. Lenderman        5:34
David Bufford       4:53

UNL CLG  (2 flights)
Tem Johnson         177.4
Ed Berray           138.0
Bob Warmann         124.3

STAND CLG  (2 flights)
Tem Johnson         179.0
Ed Berray           156.8
Bob Warmann         142.7
```

HLG (2 flights)
Bruce Kimball 114.3
Ed Berray 70.5

AROG
Wally Miller 17:17
Bruce McCrory 16:51
Ed Berray 15:47

Bostonian
Emil Shutzel 5:25
Jerry Powell 4:37
Earl Hoffman 2:57

Manhattan Cabin
Emil Shutzel 12:31
Fred Hollinsworth 6:36
J. Lenderman 6:01

Open PP (2 entries)
J. Lenderman 14:36
Tem Johnson 12:49

Intermediate Stick (one entry)
Earl Hoffman 25:39

Helicopter (one entry)
Jim Richmond 7:20

Ornithopter (one entry)
7:41

Sorry, missed the name on ornithopter entry. I saw Herb Robbins with one, and Jon Sayre has one too.

Kibbie Annual F1D (best two flights)
Mark Bennett 31:25, 31:26
Jim Richmond 29:31, 31:35
Steve Brown 28:36, 30:45
Bruce Kimball 29:30, 29:50
Ed Liem 26:48, 27:04
Chris Borland 13:56, 14:20

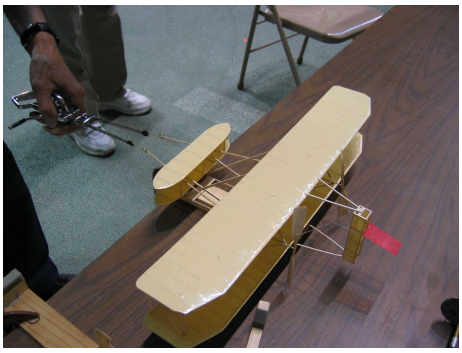
Flew nicely a bunch but did not enter times: Darryl Stevens, Kurt Schuler.

District XI F1D Regional (Team Trials Qualifier)
Mark Bennett 31:10, 31:25
Steve Brown 29:12, 30:45
Herb Robbins 22:24, 24:34

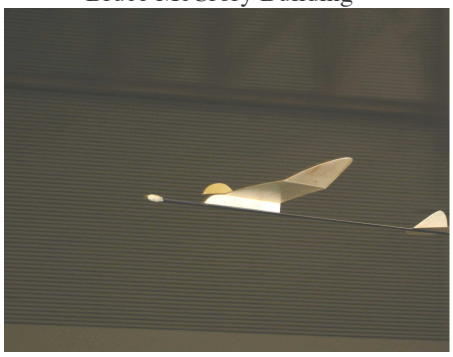
KIBBIE DOME ANNUAL, JULY 26-29, 2003, MOSCOW, IDAHO

Bruce McCrory Building

Dave Haught's B-24 Did Almost 40 sec.



Al Yuhasz"s Wright Flyer



Ed Beray's Glider

Fred Hollingsworth & A-ROG

Awards Ceremony

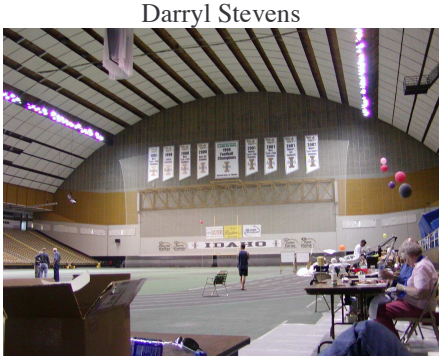
Michael Haught

Science Olympiad Mass Launch Entries

Darryl Stevens

Stev Brown with F1D

Earl Hoffman



Inside the Dome

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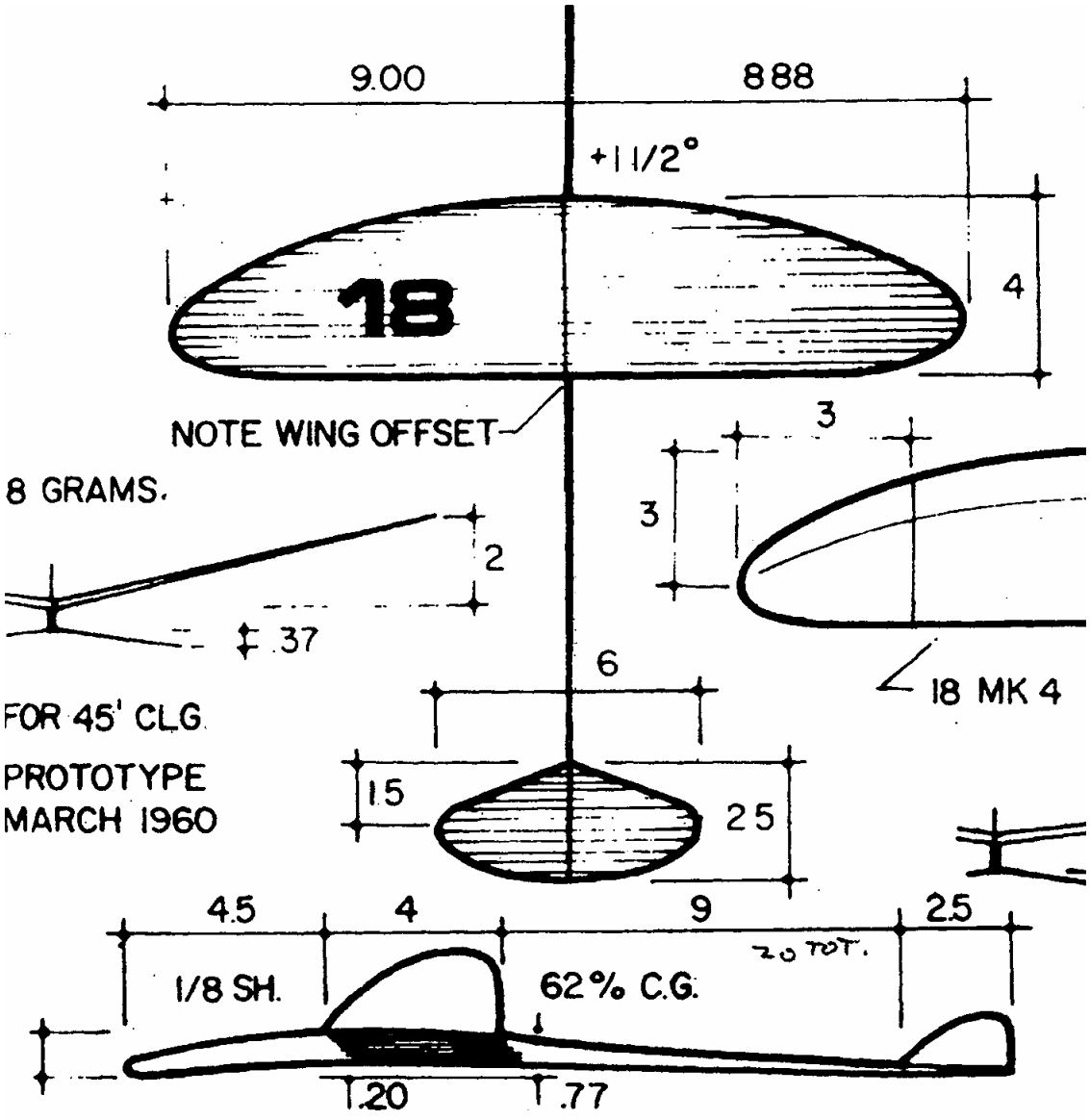
ISSUE # 113

~~October~~, 2003
~~November~~
December



The Sweepette, by Lee Hines

FROM THE EDITOR'S DESK

This issue is more or less devoted to gliders. It is a part of the hobby that Tim and I don't do, simply because I am no good at it, and he doesn't have the time. Mine always go straight up, and come straight down. But watching Hines and Buxton, Surtees and Krempetz, it looks so easy. So this issue features the Sweepette on the cover, as classic as they come. Bud Tenny used it as an INAV masthead for so long, and you can find the plans in his February, '71 issue. We also feature plans of the original 1973 SuperSweep and modern NXT 3, with an article by USIC champion Jim Buxton, who did an amazing minute and twenty-three seconds in the MiniDome this year with this hand launch design.

But by "more or less", I mean that I couldn't resist including yet another killer design by Stan Chilton, who is to ministicks what Larry Coslick is to the EZB. Stan flew it to a Cat I record of 11:13 in the Wichita Central Community Church, and did 12:19 at West Baden this year for a second place. The design is innovative (in our opinion) because it has 2-axis tunable, side mounted motor stick. You build it slightly over stiff, and sand the top for wing warp and the outside for right-hand thrust at launch. The model has yet to see its full potential.

As an added bonus, we have the first of a two-part series on the history of indoor tractor planes. This was sent to me out of the blue by Paul Grabski of the Pensacola Free Flight Team, or PFFT. Added to it is another gem in our mailbox from Dave Linstrum – a good quality plan of the 1933 Comet Shoebox ROG, mentioned in the article. Thanks, guys. Mail like this is the reason I get up in the afternoon.

Fly safely and have fun. - Carl Bakay

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***PUBLISHERS DESK*:**

A few housekeeping items. First, a change in the frequency of INAV. Due to the changes in my employment situation, INAV is now having to pay the full commercial rate for printing. This has increased the costs to produce this publication by about $2000/year. The choice is either to raise the rates or to switch to a 4 times per year schedule. Because I am sure you are all tired of the rate going up, we will be switching to 4 issues/year.

Next up is subscription expirations. To keep costs and workload for the volunteer staff low, we do not mail out reminders. If you look at the mailing label next to your name you will see the month and year your subscription expires. When you are mailed your final issue before your expiration, we highlight this date in yellow. This is your only notice. If you are not sure when your subscription is up, just look at your label and be sure to renew before the date printed there so you don't miss any issues. An interesting trend in subscriptions I am noticing. Our USA subscriber base is shrinking and our non-USA subscriber list is growing. Many subscribers particularly over seas are finding the ability to subscribe or renew on the web with PayPal or a credit card to be very convenient. This seems to be driving the increase in non-USA subscribers. Now, we need to do something to start increasing our USA subscriber base. Our best idea so far is to turn to our current subscribers and ask you to please recommend INAV to anyone you know that is interested in indoor FF.

There is very interesting new web forum at www.SmallFlyingArts.com Due to the efforts of Bill Carney we now have an indoor FF section on the group. While I am a happy subscriber of the Indoor list on Yahoogroups, this new site offers a great format that lets you post pictures with the text. An even bigger benefit is that there are many people using this forum that are not currently indoor fliers, but are stopping by to check us out and see what this sport is all about. I would suggest stopping by and checking it out.

Tim

RESULTS OF F1D TEAM SELECTION FINALS AT LAKEHURST, N.J.

Alan Mkitarian

Hi All:

Just spent three days watching the best indoor fliers in this country. Jim Richmond ran a good contest. The weather was good on Sat early and then the storm of the summer hit with rain drops thru the roof and the outside temp dropping into the 70's made for some very tricky conditions. Sunday and Monday conditions were cloudy and cool with some rain. Here are the results:

Junior Team Selection Finals:

Doug Schaefer	35:30 and 34:11= 69:41
Brett Saanborn	26.27 and 25:08= 53:33
David Rigotti	26:08 and 24:31= 50:39
Patric Wilcox	24:43 and 21:57= 46:40

Senior Team Selection Finals:

John Kagan	37:59 and 36:47= 74:46
Larry Cailliau	36:46 and 35:18= 72:04
Steve Brown	36:40 and 35:01= 71:41
Tom Sova	35:24 and 35:12= 70:36
Brian Johnson	35:10 and 26:08= 61:18
Jeff Dalton	27:33 and 25:54= 53:27
Cezar Banks	28:19 and 21:00= 49:19
Mark Bennett	29:07 and 09:57= 39:04
Alan Cohen	01:25 and 00:00= 01:25

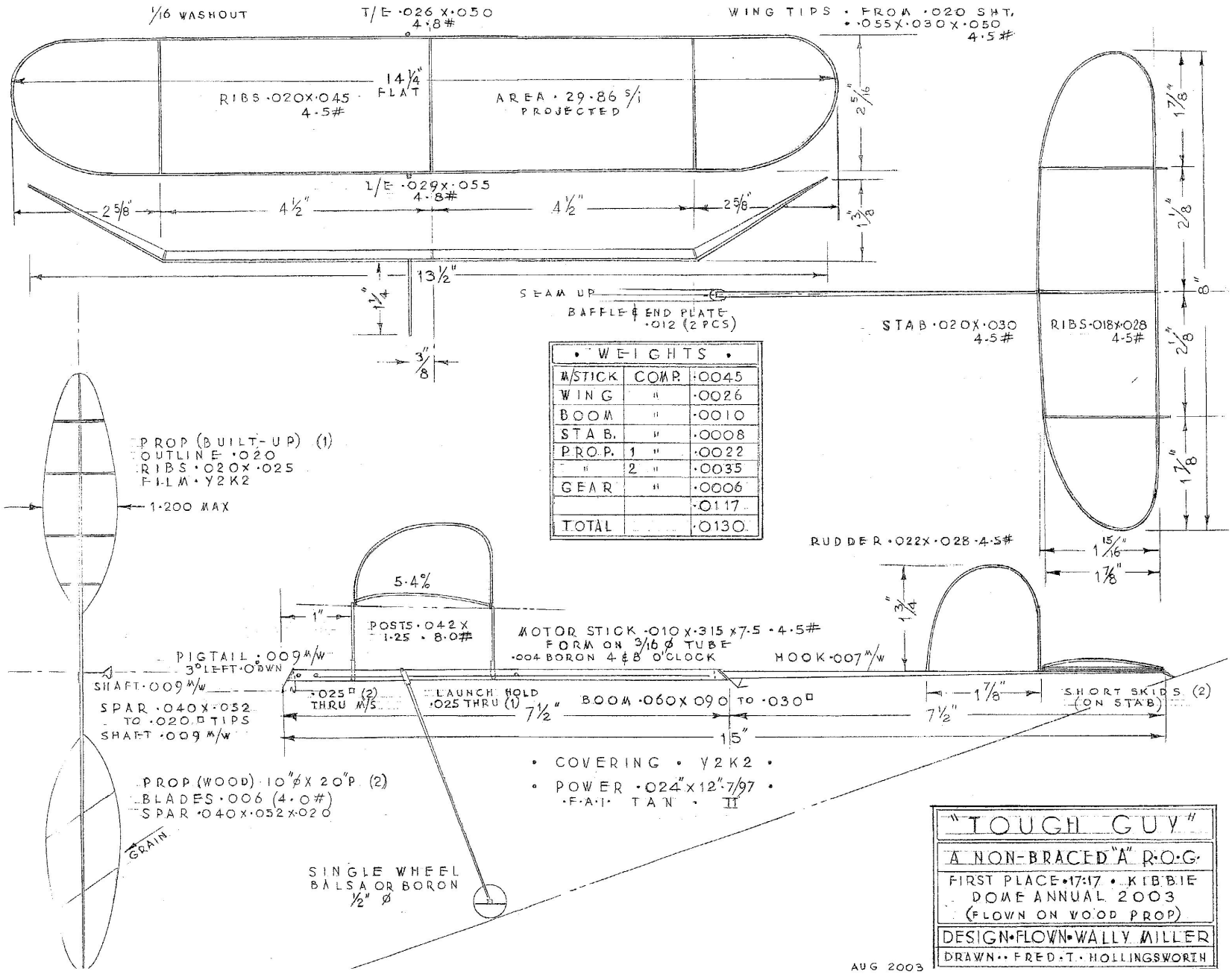
TOUGH GUY AROG

The R.O.G. Stick has long been perceived as a fragile difficult model to build & fly. The main reason being, microfilm covering was almost mandatory. Now with the advent of lightweight plastic film this as no longer a problem, and the not so little R.O.G. is gaining in popularity. Also, a major plus as that the rules for this class are practically non-existent, simply stay within the projected area limits & have a take off gear strong enough to support the model at rest. As for the actual take off: With the normal high angle of attack & at least one point touching the take off area you can expect your model to literally jump into the air.

My design goal was a beefy, plastic covered, non-braced model that could achieve reasonable performance & still take a little abuse.

As for the flying: I was fortunate to end up with high time & feel their is still a lot of potential remaining. I damaged my built up prop & had to revert to a back up solid one. The winning flight was made with this and a slightly underwound .025 x 11" motor. For the next official a .025 x 12"" resulted in the model going over the top. End of model & story. I will start next year with a new model & less aggression.

Good times to all, Wally Miller 



• WEIGHTS •		
M/STICK	COMP.	.0045
WING	"	.0026
BOOM	"	.0010
STAB.	"	.0008
PROP.	1 "	.0022
"	2 "	.0035
GEAR	"	.0006
		.0117
TOTAL		.0130

"TOUGH GUY"

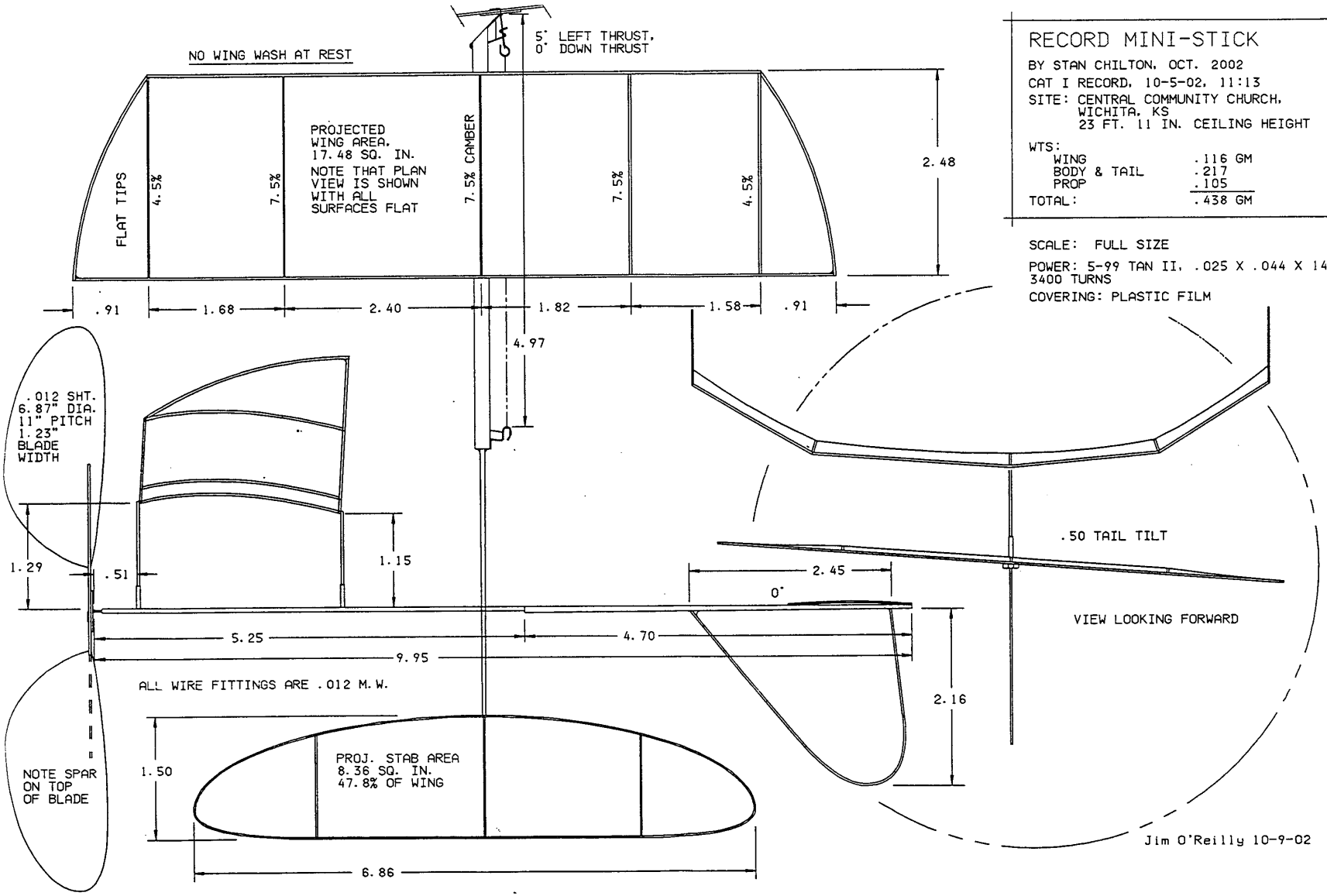
A NON-BRACED "A" R.O.G.

FIRST PLACE • 17:17 • KIBBIE DOME ANNUAL 2003
(FLOWN ON WOOD PROP)

DESIGN • FLOWN • WALLY MILLER

DRAWN • FRED T. HOLLINGSWORTH

AUG 2003



RECORD MINI-STICK

BY STAN CHILTON, OCT. 2002

CAT I RECORD, 10-5-02, 11:13

SITE: CENTRAL COMMUNITY CHURCH,
WICHITA, KS
23 FT. 11 IN. CEILING HEIGHT

WTS:

WING	.116 GM
BODY & TAIL	.217
PROP	.105
TOTAL:	.438 GM

SCALE: FULL SIZE

POWER: 5-99 TAN II, .025 X .044 X 14.0
3400 TURNS

COVERING: PLASTIC FILM

JOHN DIEBOLT WINS MEMORIAL AT JOHNSON CITY

John Diebolt won the P-24 Mass Launch again this year, and in recognition of his achievement was awarded the Jim Clem Memorial Award by Abram Van Dover at the United States Indoor Championships in Johnson City, TN this year.

As you may know, our friend, the late Jim Clem, was a perennial winner of this event. The memorial commemorates not only this, but also his many other contributions to our indoor hobby over the years.

Indoor News and Views congratulates John on his win, with hopes of many more to come.

CATEGORY I RECORD MINI STICK

By Stan Chilton, 10-5-02

This plane did 12:19 at West Baden this year, which was good enough for a second place, but was damaged and could not show its full potential. Stan was kind enough to let me have the plan and the specs below.

I consider the design a major innovation because of the tune-able, side mounted motor stick. Although the concept is common with NoCals, and sanding motorsticks common with EZB's, it's application to this class is unique. Stan recommends building the motorstick slightly over-stiff, then sanding the top for wing warp, and the side for increased right thrust at launch. Wind to full torque with no back off.

MOTOR STICK:	.050 x .195 - 6#
TAIL BOOM:	.055 x .075 TAPERED TO .040 SQ. - 4.0#
STAB:	OUTLINE is one piece .020 x .030 – 5.8#, spliced at LE center
RIBS:	BANANA STYLE,.-018 x .030 - 4.6#
RUDDER:	OUTLINE - .025 SQ
WING:	SPARS - .030 x .038, -5.5 TO 6.0#
	RIBS - .020 x .028, -5.5#
	POSTS - .036 x .042, - 6.5# SOCKETS -.046 ID
PROP:	BLADES - .011, - 3.9#
	SPAR -.023 x .025, BASSWOOD

LAURIE BARR
'THE ARCHBISHOP'

Looking back through old copies of the 'Aeromodeller', I see that in June of 1970, an indoor meeting was held at RAE Cardington, after a gap of several years. The officer in charge of the base welcomed us, wearing his full dress uniform, lunch was laid on in the officer's mess and the ladies present were given a guided tour of the base!

I was there as a young teenager, anxious to find out more about the flimsy contraptions that I had tried to make, and also to see them fly. Also present was Laurie Barr, a well-known and successful UK outdoor, free flight flier. Laurie had spent much of the previous months, building many indoor models in order to learn about them. At that first meeting his 65 cm model made a flight of over 20 minutes. Without Laurie and Cardington, UK indoor duration would probably not exist. Every opportunity requires someone willing to make things happen. During the golden age of indoor, 4 World Championships were held in the twin hangers, organized and backed by Laurie. Over the last 33 years, dozens of national and international records have been recorded there and many technical and aerodynamic innovations that we now take for granted were first introduced by Laurie and others, and developed in the twin 'tin sheds'.

I asked Laurie to tell INAV more of the story –

My modelling life came about after seeing my elder brother make a nice cabin rubber job during the war, while home on leave from the RAF. I was always a sickly child, with severe bouts of chronic asthma; pneumonia etc and I spent most of my life up to the age of 13 in and out of hospitals and convalescent homes. I didn't go to school much!

During another bout of asthma, I needed something to take my mind off my condition and I was given a Keil Kraft Ajax kit (another cabin rubber model), built it and found it easy to do – flying it was something else and after I built 2 or 3 more! I got one to fly rather well and I was hooked.

I soon began to draw up my own designs and had some contest success with them. My designs of that period prior to 1950, found their way into magazines, and the 'Pinocchio and 'Scram', both 28" wingspan, lightweight rubber models are now contest winning models in the SAM vintage movement today.

Free flight models of all kinds soon flew off my workbench, but eventually life caught up with me in the shape (ly) form of my now wife Betty. She could hold a 'mean' rubber job while I wound it and she had many other talents that I don't have space for!

We 'built' 3 children in record time; so then I had to go back to aeromodelling again.

Although open rubber was my first love, I also had success with Wakefield models, and was in the British team at Wiener Neustadt in 1969 and Gothenburg in 1971.

At around this time, I felt that flying outdoor in British weather began to be not such a good idea. I liked the idea of long flights, but the retrievals on foot began to pall. I had done some indoor modelling in the early days, including 'round the pole' flying – using microfilm to cover the wings. It was fascinating stuff. So, in the

winter of 1970 I began to build proper indoor models and after a few false starts, I had a half reasonable 65 cm F1D. As Nick remembers, at the first meeting, it flew over 20 minutes.

Meetings at Cardington were infrequent and so I took over from Stan Wade (a good indoor flyer at that time) organizing meetings at Cardington and I became Chairman of the Indoor Duration Technical Committee.

The giant twin airship hangers stand in splendid isolation, surrounded by grass, like 2 English cathedrals. In later years, I became known as the 'Archbishop of Cardington' – (two hangers, no waiting!) and in those days, this superb facility was free of charge and the buildings were fastidiously maintained by the UK government and were largely used to fly weather balloons.

As Nick has described, we flew until mid-day and then (in our best suits), we would stroll across the road to the RAF officer's mess, for cocktails and Sunday lunch with all the trimmings.

After reading about the trauma and hardships of the 1970 World Indoor Champs in the mine at Slanic, (which nearly killed Joe Bilgri and damaged Pete Andrews), I began to think about just how good we had life at Cardington! I offered to host and underwrite the 1972 World Championships – the BMFA has a rule stating that no-one can offer to hold a World or Open championships unless someone picks up the bill in the event of a loss. Pete Andrews won the contest and many new friendships were formed and team visits to other Championships began on a regular basis.

In 1976, I got a phone call from Ian Kaynes, the Chairman of the CIAM Free-Flight Committee, to tell me that the World Championships were in danger of collapse after the official host nation had pulled out – 'could I, at short notice, run a World Championships at Cardington'? Immediately, I said 'Yes please!' and the contest went ahead – it was a great success, my good friend Bud Romak won and we even had a cocktail bar in the hanger. White-coated waiters with black bow ties served lunch on solid silver plates! The UK team did well; we were Team Silver Medal winners and I managed third place individually.

I first met the great Bud Romak at these Cardington Championships and we became good friends. Bud kept telling me about the USA free flight Champs and the barbecues held afterwards and so in 1985, Betty and I went over to compete at Taft. In open rubber, after the rounds my 'Mulvihill' sized 'Liquorice Stick' got through to the fly-offs. After increasing maxes of 5 to 7 minutes, only Joe Bilgri and I were left. Going on to the 8 minute max', my ancient model climbed well, the prop folded at a great height and then the model chose that moment to have a major structural failure – the fuselage spacers on which the wing pylon was seated, gave out after years of being soaked in rubber lube and this caused the model to lose all of its tail tilt and fly straight downwind, out of sight of the timekeepers. The model still did 8 minutes, but I was relegated to second.
The next day we had a single flight, dawn shoot-out, which I won with a flight of over 13 minutes.

After the successful indoor event in 1976, I offered to sponsor the 1978 World Championships, again at Cardington. Jim Richmond won the individual title and the UK team became Gold Medal winners. I organized the event at Cardington again, in 1986, where Jim Richmond won again.

The years between 1970 and the mid 1990's were a golden age for UK *(and world)* indoor duration, but being responsible for organizing flying in the sheds has become increasingly fraught. Hanger 2 is now full of tall, full sized buildings used for fire research and we no longer fly there. Hanger 1 is in an advanced state of decay with hundreds of pieces of the roof either missing, or hanging in space, waiting to be caught by the netting underneath. In 2002, I organized repairs to 65 of the windows to keep the wind out, and that has kept us flying for another year.

I have traveled the world flying indoor, making friends and hall records, promoting indoor in other countries and helping them to run other World F1D Championships and I hope I have made 'indoor' a better and more interesting place to be, everywhere.

As I finish writing, Laurie has been at it again. After the sad collapse of the 2003 European f1D championships, scheduled for Germany, Laurie managed to reschedule, organize and run the contest, in only nine weeks, with great support from members of the BMFA, FAI/CIAM and many UK indoor flyers. The event was a huge success, held in London's Millenium Dome and thus, Laurie becomes 'Archbishop of Cardington and Greenwich'.

Nick Aikman 15.09.03.

MIXING FF WITH RC

Below is a post that was made on the indoor list at http://groups.yahoo.com/group/indoor/ regarding R/C at USIC as well as some postings

I received a phone call from Walt Van Gorder about next years USIC. The current plan is to fly indoor RC duration during the next USIC. Walt wants me to inform you all that if you think that this RC event should not be flown during normal competition with rubber free flight models, then you need to contact your local VP in your district and voice your opinion to not fly the RC event at the USIC/NATS. Some of you may not be aware, but this past year the first NIRAC Indoor RC Championships were held in Waterford, MI. Next year June 4,5,and 6th, they will be held again. I personally believe that this is the appropriate venue for an indoor RC duration event to be held (and is going to be held per the NIRAC website), not at the USIC. I am sure if I showed up and flew F1D in the middle of their contest they would be upset. I think the reverse is true as well. If you feel the same way, please call your local VP or the AMA and make your voice heard now before the schedule is finalized.

Indoor RC rules allow a maximum flying weight 21 ounces!

Don Slusarczyk

Posts against mixing FF with R/C

I think we would all have to agree that somewhere between a 300mg 35cm and a 21oz, 40" wingspan 'indoor' RC model a line has to be drawn. The logical place for me is FF vs. RC.

I also agree with LC that RC should not be allowed to piggyback on current indoor venue accessibility. If RC guys want to fly at a particular venue, let them secure the rights through the proper channels themselves. If the powers that be who own the facility don't mind, then I can't argue (well I can, but I won't). But other than Lakehurst, I don't know of anyplace where they both can fly successfully at the same time. Even at Lakehurst the RC guys wrap up at noon to allow the FF time.

As far as USIC, I wouldn't want to see it changed. There is a history there. If allowed, RC will certainly grow and make it uncomfortable for FF. I wouldn't want to see this happen (and it will). Anyone who can't see that is selfishly kidding themselves. RC has the monetary backing and marketing of the venders to push their wares. Indoor has only the enjoyment of graceful flight in its purest form. We are not a big market for anyone.
It would be like putting big fish in the same aquarium as little fish. It wouldn't take long for the little fish to get devoured. Little fish need to swim in their own bowl.

Turning it around, I don't see indoor duration guys moving in on an RC venue and asking for their understanding for our needs. We wouldn't get very far. I think RC should respect our turf and take their toys and play on their own playgrounds, not ours.

Alan Cohen

To the specialist, who has chosen a branch of FF *because* of the distinctions and characteristics of that style, any benefit of merging with different interests in the name of *getting along/getting stronger* seems contradicted by history. From the 40s to present, RC has proven that it can well compete by its own merits, using its own resources. What gall to expect hardcore FF'ers to contribute the paltry (or otherwise) site resources they have to further the cause and convenience of RC.

The essence of any politics is "competition for scarce resources." At Lakehurst, we all get along nicely, because the resource is so vast. But given a *half-vast* resource, things aren't so friendly. Sure, flight time and quality-of-experience of a Limited Pennyplane flyer is not likely to be degraded from sharing the same airspace with RC duration. But not so with the lightweights. Ezbs, ministicks, F1Ds, IMS, and HLS should not have to fly through or even think about the wake of RC craft. No matter how slow the RCs are, they are still pretty big, and move some air. Fine, there were only one or two RCs present at last USIC--at its initial opportunity. What about after it catches on? Which becomes more important? Numbers of fee payers, or the character of traditional indoor? Those of us who care about the character and quality of traditional indoor should not be chided or chastised by those of you who think "It's-all-cool-now-why-can't-we-just-get-along..."

<<Banning indoor RC electric from the USIC will serve no beneficial purpose. Don't let emotions rule reason.>>

This all depends of what you mean by "beneficial" and what you mean by "purpose." To the generalist who equally enjoys anything that flies, then sure, let's everyone jump in, the water is fine. Hey, why not let Indoor Rocket Flyers have a slice of the space and time at USIC--after all, rockets are pretty skinny, and only go straight up and straight down. And we will all eventually benefit from such an influx of interest, and Indoor Rocket Guys will then invite us over to all those great sites that *they* will procure someday.

And why not give our Frequent Flyer Miles to some friendly Muslim militants, along with complimentary boxcutters? I hear that many of them are pretty friendly, and have even learned to speak English.

If traditional indoor events cannot support their own weight, then let them perish. But to co-opt RC (into the same space at the same time) as a supposed crutch to support FF rubber indoor? I would rather fight and die.

Mark Bennett

To have a Romash or Harlan fly electric RC at the same contest is one thing. If these electric RC planes weighted as much as a 1.2 gram F1D. What happens when others show up with the equivalent of a 2.0 gram F1d? How much would the RC electric weight then? What worries me more than the weight is those that do not have the world class flying skill of these two gentlemen.

Having watched two of Doug's S.O. planes completely destroyed at USIC on the table by a scale plane practicing out of their time slot. A few used the excuse that the plane was simple and could be built again. True, but those from that segment of the sport did not realize how long it takes to trim out a model. Too keep the model together long enough to find and correct problems. By USIC he is usually tiring of S.O. planes. The burn to it all was he could not compete for a third pound of May 99 rubber prize to the top three in class.

At present other contests we attend (other than Akron, Lakehurst) are divided into three periods; a short time for Gliders, half day for heavy and half for duration. It is hard to justify driving a long distance for half a day flying unless the contest is a couple days. Where are these RC's going to fit in?

Mark Schaefer

The fear is that the other types of Indoor RC will soon invade the USIC like it has at flying sites around the country and push out the Indoor purists. If our entry levels at USIC continue to decline it could easily become an all encompassing Indoor meet with all RC and Freeflight together. I will admit that what Ray Harlan and other true Indoor people are flying in the RC duration event is little or no threat to our models but what is to stop someone showing up with a plane many times heavier and faster and demanding to fly.

Fred Tellier

I dunno. The Glastonbury Aeromodellers have the use of the gym for a whole day for just two contests, and the FAC folk are grounded for part of the time so the transparent air plane crowd can fly. Now we're going to be sharing this with the RC people.?? The fact that Ray Harlan can make a super light airplane doesn't mean that everyone can. I hear talk of racing and combat and it doesn't inspire confidence that they will even try. Neither does the history of outdoors RC. Remember all those articles in Model Builder about how the Quarter Scale planes were going to be light and slow and fly around at scale speeds.

I am an officer in a club that flies in a large one basketball court gym and the whole sticky conundrum is loose among us.

The "transparent" airplane folk require a separate time slot. The scale folk look askance at the kids with delta darts. The P-24 kids are in a limbo. And the RC mob is pushing to get in. Not only are these planes of vastly differing weights and kinetic energies, the flight patterns are different. The FAC planes mostly fly in well controlled circles. Once launched the "transparent" aircraft are airborne for a long time. The juniors are a menace but, I think, a necessary one. The RC planes I have seen don't mix well with even the heaviest rubber in this small space. They zorch around in wide circles that require the whole gym. The control part of radio control is a bit of a euphemism.

Any controversy that could spill out of the model airplane world and involve the already nervous PTB who control the gym could result in the time being given over to basketball kids and soccer players doing jumping jacks.

Danny Soar

I think some are getting a little mixed up in here. I do not hear that we are against RC flying in general , we are against RC being flown at USIC. That is what the issue is at hand here, at least for me it is.
Is USIC the appropriate place to fly indoor RC duration when the event can be flown a week later at the Indoor RC Championships?

I personally have lots of RC park flyers, and indoor RC models, but I would not fly them during an indoor rubber meet. Should football games and baseball games be played at the same time? Some cities use one stadium for both sports so why not then do both at the same time? If indoor becomes extinct then it becomes extinct, but forcing us to share what little flying time we have with RC is not right. This sounds like the Borg saying you will be assimilated (for you Star Trek fans). If they have the numbers then let them rent out the site and run their own contest. What is so hard about that? The last I knew the rent for USIC was $1000/day. So for 5 days that is $5000, and 60 contestants at $100 each is $6000 so how is the AMA loosing money? Perhaps we should have the USIC the way it was when Tony Italiano was running it. Perhaps we need a 3 day USIC like the old days as well and less events to get more flyers. I personally have troubles getting 1 week off work to go fly models and a 3 day meet (like the old days, Fri, Sat, Sun) may bring some back to the USIC as we can schedule it into our lives better. Some food for thought.

Don Slusarczyk

Posts in support of mixing R/C and FF

I have no problem with indoor RC duration being flown at USIC, these models are just big indoor planes and I think they are cool, since they do have steering there is no chance of collision, I dont know what all the fuss is about this...

Rob Romash

Hello guys,

This stuff about the incompatibility of FF with RC is pretty much true but we have been flying this way for at least five years now maybe more in a much smaller venue than anything you are talking about. The Blacksheep fly in a std. school gymnasium not much larger than the basketball court it contains and we separate the flying times for each group the three hours we are there is broken into half hour intervals and each is flown in turn. Yes there are a few tyros that have little skill in flying anything and we allow them to learn here and we try to keep all of the spectators aware of the situation at that time. Our club maintains AMA membership and allows only AMA insured flyers to participate, this eliminates the need for excess insurance and assures the site owner that we are responsible enough to make sure repairs to any damage are accomplished. We have no restrictions on the weight of the model, the size or the power system used, that is left to the flyer and we have yet to have any problems of any kind. These fellows that fly RC sure do fill up a gym with many spectators and out of them we have garnered a few converts to the indoor FF community as they have garnered a few converts to their side.

Life is a series of compromises, best to see what can be done and try it before condemning any group or type of flying for being incompatible. We all have little time on this earth and the few moments of enjoyment we have should be cherished and not taken up in condemnation of other forms of enjoyment. Consider this, Golfers hate us because we take up so much land that could be used for golfing well pooh if they can't allow us our enjoyment that is their loss not ours..

Carlo Godel Past Pres of the Blacksheep Exhibition Squadron
C.D U.S.F.F. Championships 1986, 87, 88
A.M.A. C.D. 95012 Open, Administrator, Leader member

I believe that it comes down to this:

One side believes that if you open the door to RC that a flood of indoor RC enthusiasts will come in and ruin the flying for FF. This may happen because RC enthusiasts are all clods who won't honor the spirit of indoor flyers. This may also be possible because it is impossible for the average builder to make a lightweight RC model. RC enthusiasts also have to own the entire site, ie, they don't play well with others.

The other side believes that indoor RC duration is unique enough that anyone who attempts it will respect the whole indoor thing. They point to the fact that the folks who flew it at USIC were hard core indoor flyers and that others who are talking about flying are also hard core indoor types. These folks believe that if someone shows up with an inappropriate model that it can be dealt with.

One question that I think needs answering is what kind of flyer is drawn to indoor RC duration? Is this an RC person or a FF person? My suspicion is that the dilettante RC person isn't interested in this event, it is certainly too hard for the person only interested in park flyers.

I personally find indoor RC duration a fascinating event. I've talked to Ray Harlan about it and he has approached it with the same dedication and hard work that he has used for the other things indoor he has done.

Marty Sasaki

Keep badmouthing the RC'ers they may eventually be our only salvation in this realistic world. The indoor soccer kids are coming to your town and would like nothing better than to throw the three of you flying indoor out on your ears, yes and the only thing that keeps us flying are numbers of people involved. Very soon we will be asking the RC'ers for a little bit of their time to fly, do not become so involved in your own importance to not see the light of day and what is happening all over. Yes there are lots of a----les in the RC bunch, plenty of them to go around, but we have bunches of them too. We are a very small group nowhere near the numbers of flyers that the RC community has and the AMA caters to the numbers as does the owners of the venues. Wake up see the light of day and put your elitist attitudes to rest or in a very short time you will not have any place to fly at all.

Carlo Godel

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90 SECONDS 30 YEARS LATER
UPDATES AND INSIGHT TO THE LEGENDARY SUPERSWEEP ARTICLE
BY JIM BUXTON

It is hard to believe that thirty years have passed since the 90-second barrier was broken with an indoor hand launched glider. 90 seconds, 'The 90' The Holy Grail of indoor hand-launch. I suppose you could call it the 'Forty Minute Club' of glider, but since it only includes two people, maybe it is better compared to the exclusive ranks of the 'Sixty Minute Club'. Ron Wittman and Stan Stoy have both broken the barrier, but Ron is the only to do it with a fixed wing glider, as is now mandated by the rules. Stan Stoy broke into the mid 90's using a very ingenious and temperamental folding wing glider, see Model Aviation August 1979 for more information.

At any rate let's assume you want to chase the Holy Grail, or perhaps you are just tired of waiting by the mailbox for your Y2K2 and 8/93 Tan II to arrive. No problem, the local hobby shop, and the Internet, and that treadmill in the basement are all you need, and readily available to make a run for the top spot at USIC, or the Kibbie Dome depending upon your location.

First step is to download Ron Wittman's two part article from September and October 1974 American Aircraft Modeler. If the Internet is not your bag drop me a buck in an envelope and I will mail you a copy with the plans.

Read the article start to finish, and then read it again. It is the best one ever done on the subject. Build a copy as close as you can. This is the starting point.

Now I will give you my personal opinions of the model and the techniques. Now, I admit I have never done 90 seconds. I have come as close as 84.7 seconds at the Buffalo Bills practice facility two years ago. So why am I making changes to a design I have never beaten? I have built about thirty gliders for category IV flying. The first several were stock SuperSweeps. The gliders have gradually changed since then, and what I am passing along is what has worked **for Me** to improve my times from 60 seconds to 84. Your results may vary, that's why you built a stock one first as a baseline.

Things I Changed From The SuperSweep

1) Add dihedral

Adding an extra dihedral break to the inside wing panel only improved my time from 60 seconds in 1989, to 73 seconds in 1990. The SuperSweep needs more dihedral to achieve good rollouts. This will allow you to throw a more vertical (and efficient) launch trajectory than you can with a stock wing.

2) Less finish is more

Probably the only thing I do not agree with is Ron's fanatical finish. I have done it, but in my opinion it is overkill. I do not agree that filling the grain to a mirror finish is advantageous. I would never take polishing compound to a glider wing either. Here is my approach, which is no innovation of mine.

Finish sand the wing with 400-grit paper. Mix Sig Nitrate 50-50 with a good lacquer thinner. Add 4 drops to the ounce of TCP for plasticizer. Throw in a little talcum powder for fun. Rub some talcum powder into the wood before the first coat. Brush on a nice heavy coat. Sand with 600 grit 'wet/dry' paper attached to a 2" x 2" x ½" balsa block. Apply a second coat. Sand with 600. Apply a third and final coat of dope with no talcum to keep the wing from turning white when you sand it. Sand with 600, then 1000, then 1500.

For tradition sake I sand my gliders the night before the contest with the green sheet of paper from K&S 'Flex-I-Grit Micro Fine Assorted' which can be found in many local hobby shops. This whole process will add less than a gram to the weight of a 23" glider wing. This is important, as I prefer a lighter glider than the SuperSweep for Johnson City, and because of number 3…

3) Wing wood does not need to be 4lb density

Thanks to the reduced finishing weight you can utilize wood up to 5.5lb density in the wing. This helps in many areas. First off you can find it in a local hobby shop more often. This is where I buy all my glider wood. I like to see it, touch it, check for wind-checks etc. I have wing wood in stock for about ten gliders right now. I can usually find it quicker than I can build. Keep track of when your local shop buys wood, and go check as often as they re-stock. Another benefit of stiffer wood is that I have been able to eliminate adding carbon reinforcement to prevent wing failures. This happened to several of my early gliders.

4) Wood has no place in the fuselage of a glider built after 2000

Other than the pylon that is... Tapered carbon tubes are a real advantage for many reasons. They eliminate about 2 grams (more weight for the wing!) and eliminate many potential problems. All of my wood fuselages ended up needing carbon reinforcement to prevent breakage during any impact that exceeded glide speed. Breaking a fuselage can prove disastrous, as the incidence will surely change when repaired, and that is ultra-critical on these models. The carbon fuselage also eliminates altitude robbing 'tail wagging' at launch. The correct carbon tube will start out 32.5" long and weigh about 5.5 grams. Once cut to size (cut off the larger diameter end) you should have a three-gram tube. Curt Stevens carries them at www.modelresearchlabs.com. Although I have not personally seen any from his stock his specs match the obsolete 'SkyShark Response Zero' tubes that are very good.

5) Decrease the stab size

Not much to say here, but I think the SuperSweep's large stab makes it a little to stable for a snappy rollout.

OK, so that's it. Other than that the SuperSweep is perfect in my eyes. I would say that I only disagree with Ron's dihedral and finish. The rest are merely personal preference. So what about stuff that is not in the article that is worth mentioning?

~Incidence is the most important aspect of building a good glider. It has to be zero-zero to start. If you have any incidence the glider will tend to loop. You want the glider to go straight where you throw it. Place the fuselage pylon against a straight edge and make sure that the top of the boom is parallel to the wing mount. Sand as needed to correct. I place the fuselage on a glass surface against an aluminum yardstick and shine light form the bottom. I then take gauge blocks and check the parallelism of the boom, watching for light shining up through.

~I use Sig-Bond for all wing dihedral joints. A dihedral fixture as seen in figure one is a great tool to have. I saw this gadget in a newsletter somewhere and threw this on together from some stuff I had laying around. Set it to half the total dihedral angle desired, sand both panels, and you have a perfect dihedral joint with no skill required.

~Use a good two-part epoxy to attach the wing pylon to the carbon tube.

~I use Stan Buddenbohm's suggestion of tacking tail surfaces on with glue-stick. Once I have the stab tilt where I want it I run thin CA in the joint.

~I use a razor plane as seen in figure two for wing shaping. Not sure who made them but they work great and seem to be plentiful. I have picked up several at model airplane swap meets over the years. The re-sharpenable blade is adjustable and produces very consistent cuts.

~1/16 basswood for the leading edge, and 1/16" ply for the finger rest.

Weights for NXT 3 components

Fuselage: pylon epoxied onto carbon tube, 3.7 grams
Wing: 5.3 lb balsa, with dihedral joints, 11.7 grams
Finger rest: .6 grams
Stab: 5.8 lb balsa, .75 grams (do not go below .7 grams or failure can result)
Rudder: 5.8 lb balsa, .1 gram
Nose weight: 2 grams
Finish: 1.5 grams
TOTAL=20.35 grams
(Flying weight of this glider is about 21 grams with glue etc.)

Hitting the Roll Out

This is what separates the glider field. You need to get from the top of the launch apex into a glide with minimal loss in altitude. Nailing a roll out right on is still the greatest thrill in modeling for me. Unfortunately it is the hardest thing to learn, and even harder to explain how to do. You're best bet is to get out there and throw…a lot. These general guidelines may help.

These gliders are plenty heavy enough to throw outdoors in the evening. This is the best place to test them, as the ground is softer outside than it is inside. This is probably the greatest advantage to category IV hand launch glider; your practice facility is just a local park away.

Final rollout adjustments will be made using a method known as 'stab twisting'. Bending one side up will make the glider bank more to that side during the launch trajectory. Bending one side down will make the glider bank to the opposite side. By mixing the bends you can control bank, and total incidence.

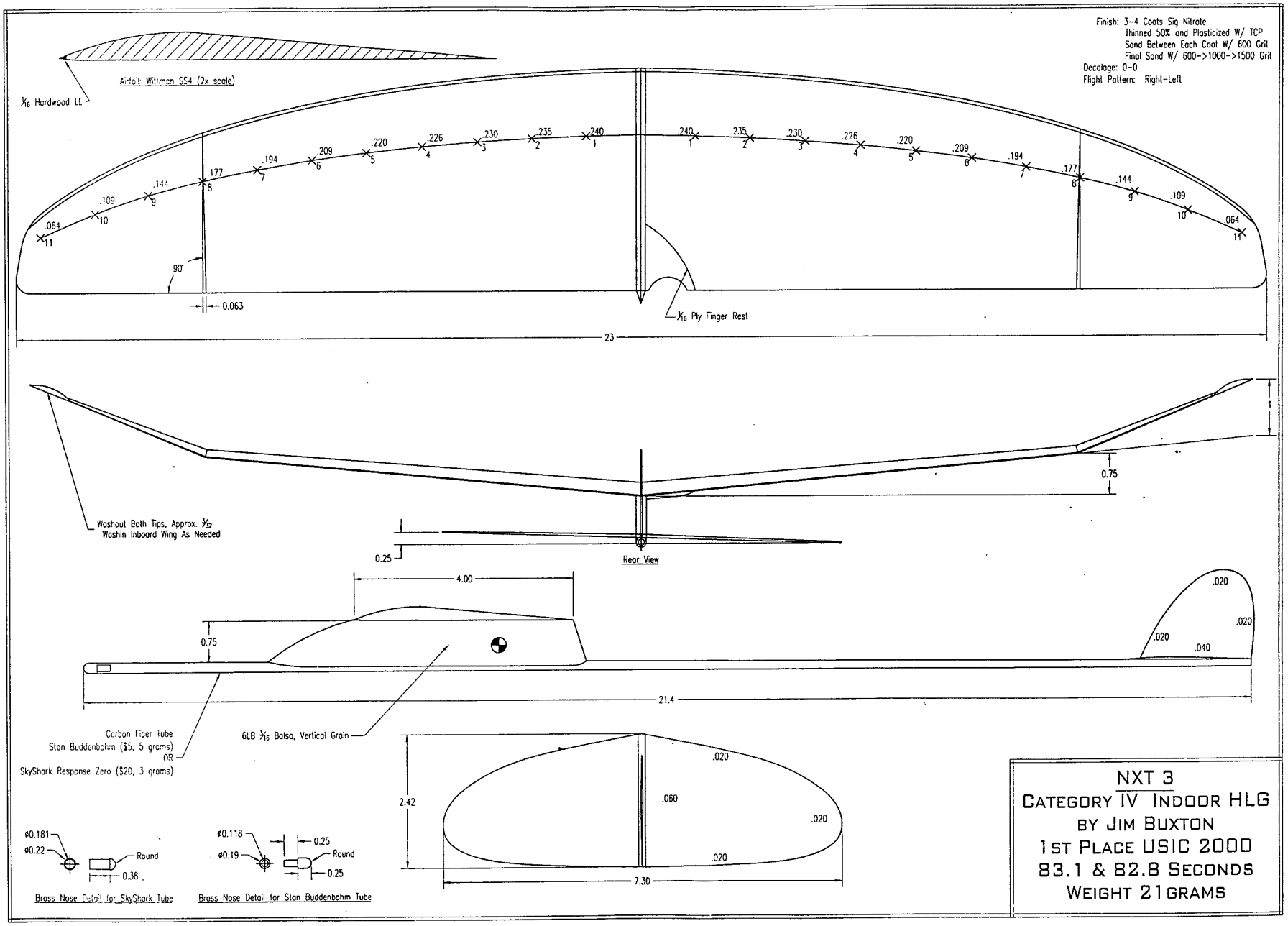
Often people will ask how I get the glider to go 'straight' up form where I throw it rather than bank right and rolling out behind me. The key is to bend the inside of the stab down (right side for a right-left pattern. This will keep the inside wing up, and keep the glider from ending looping' behind you. If the glider goes straight up, stalls and nose dives in without attempting to pull out, you are a slight tweak of up (one side or both) away from perfect trim. You did take the advice to fly all new gliders outdoors first right?

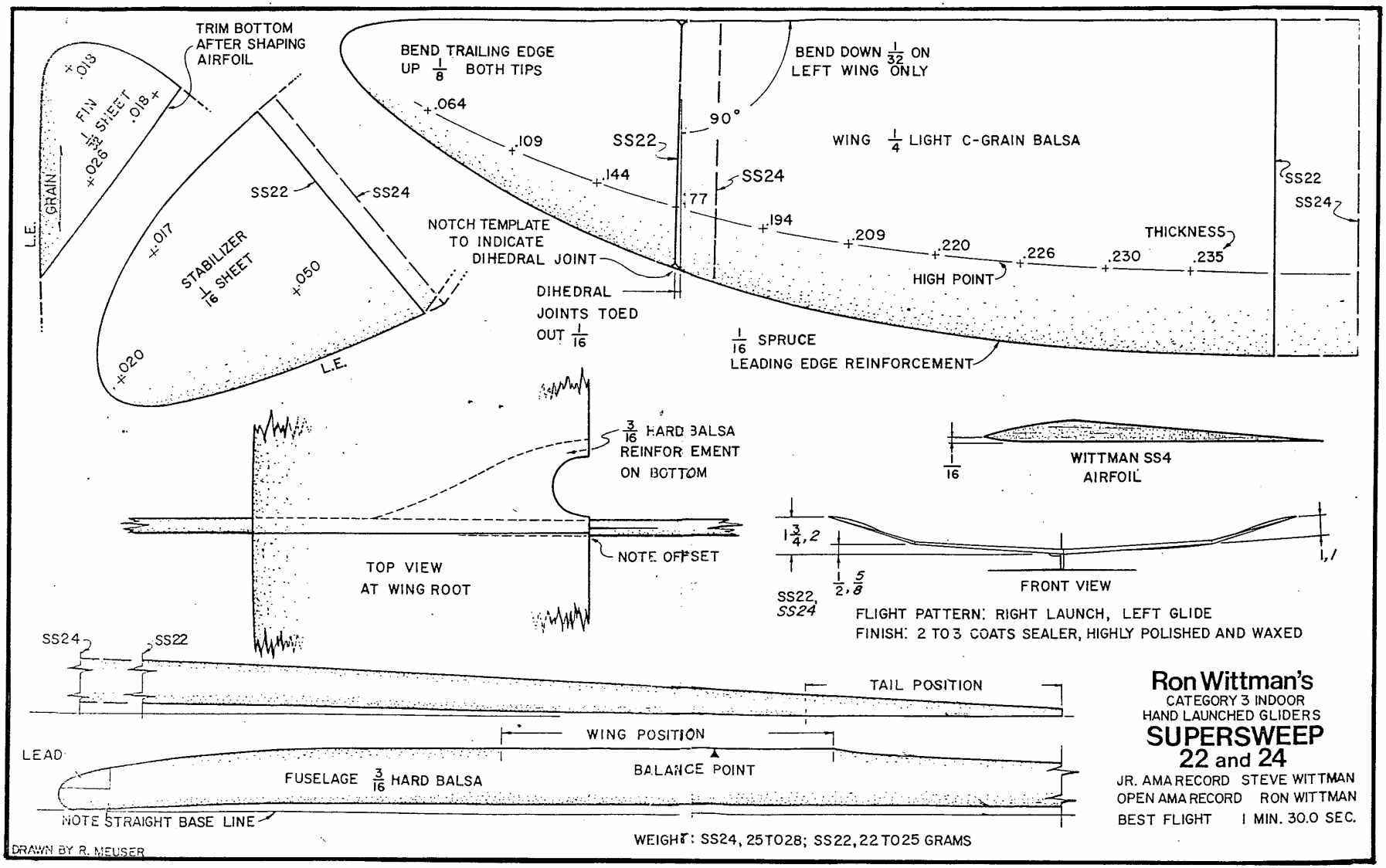
You thought you were going to get through this whole article without the treadmill coming back up I bet. Wrong. It is essential to be in decent shape to fly glider well. As you tire you lose consistency. As you lose consistency you break gliders. Do whatever you can to improve your fitness. The best thing to do is to get out and throw some gliders in the evening calm a few nights a week. This improves your gliders, your trimming skills, and your fitness. You cannot buy a good batch of rubber to get a jump on the competition, but pushups are free, and readily available.

So there you have it all you need to know to go after the Holy Grail of the indoor glider world. No purer event exists. Give it a shot. I am sure you will be surprised at the high degree of challenge and reward you reap from the minimal investment of a few nights at the building board. If you do have any further questions I may be reached at:

Jim Buxton
4956 Wallington Dr.
Hilliard, OH 43026

Glider902003@yahoo.com


Finish: 3-4 Coats Sig Nitrate
Thinned 50% and Plasticized W/ TCP
Sand Between Each Coat W/ 600 Grit
Final Sand W/ 600->1000->1500 Grit
Decolage: 0-0
Flight Pattern: Right-Left
Airfoil: Wittman SS4 (2x scale)
1/16 Hardwood LE
.064 11
.109 10
.144 9
.177 8
.194 7
.209 6
.220 5
.226 4
.230 3
.235 2
.240 1
90°
0.063
1/16 Ply Finger Rest
23
Washout Both Tips, Approx. 1/32
Washin Inboard Wing As Needed
0.25
Rear View
0.75
4.00
.020
.020
.020
.040
21.4
Carbon Fiber Tube
Stan Buddenbohm ($5, 5 grams)
OR
SkyShark Response Zero ($20, 3 grams)
6LB 1/16 Balsa, Vertical Grain
2.42
.060
.020
.020
.020
7.30
ø0.181
ø0.22
Round
0.38
Brass Nose Detail for SkyShark Tube
ø0.118
ø0.19
0.25
Round
0.25
Brass Nose Detail for Stan Buddenbohm Tube
NXT 3
CATEGORY IV INDOOR HLG
BY JIM BUXTON
1ST PLACE USIC 2000
83.1 & 82.8 SECONDS
WEIGHT 21 GRAMS


TRIM BOTTOM AFTER SHAPING AIRFOIL
BEND TRAILING EDGE UP 1/8 BOTH TIPS
BEND DOWN 1/32 ON LEFT WING ONLY
WING 1/4 LIGHT C-GRAIN BALSA
FIN 1/32 SHEET
STABILIZER 1/16 SHEET
GRAIN
L.E.
SS22
SS24
NOTCH TEMPLATE TO INDICATE DIHEDRAL JOINT
DIHEDRAL JOINTS TOED OUT 1/16
1/16 SPRUCE LEADING EDGE REINFORCEMENT
THICKNESS
HIGH POINT
90°
+.064
+.109
+.144
+.177
+.194
+.209
+.220
+.226
+.230
+.235
+.013
+.026
+.018
+.017
+.050
+.020
3/16 HARD BALSA REINFOR EMENT ON BOTTOM
TOP VIEW AT WING ROOT
NOTE OFFSET
WITTMAN SS4 AIRFOIL
1 3/4, 2
1/2, 5/8
1, 1
SS22, SS24
FRONT VIEW
FLIGHT PATTERN: RIGHT LAUNCH, LEFT GLIDE
FINISH: 2 TO 3 COATS SEALER, HIGHLY POLISHED AND WAXED
TAIL POSITION
WING POSITION
BALANCE POINT
LEAD
FUSELAGE 3/16 HARD BALSA
NOTE STRAIGHT BASE LINE
WEIGHT: SS24, 25 TO 28; SS22, 22 TO 25 GRAMS
DRAWN BY R. MEUSER
Ron Wittman's
CATEGORY 3 INDOOR HAND LAUNCHED GLIDERS
SUPERSWEEP
22 and 24
JR. AMA RECORD STEVE WITTMAN
OPEN AMA RECORD RON WITTMAN
BEST FLIGHT 1 MIN. 30.0 SEC.

THE INDOOR MODEL

By Bill Tyler

Time: September 22nd, 1946. Place: Inside the 180 foot high Air Dock at the Naval Air Station, Lakehurst, New Jersey. Pete Andrews, probably the hottest of indoor builders, is sweating out the tail end of his stick-tractor flight , which is now cruising around about 25 feet up. The time now is 24 minutes and there is a possibility that Pete might break the existing record of 26 minutes. Here's 25 minutes and she only lost ten feet of altitude. Pete's praying that the six-year old prewar rubber that he's using will give out with just a little more energy. The timer calls out 26 minutes and it's a new world's record with the ship still about ten feet up. Andrew's final time was over 27 minutes and there was no doubt in the minds of all contestants that if Pete had been able to use better rubber on his ship he would have easily broken 30 minutes, that long sought after goal of the indoor flying fiends.

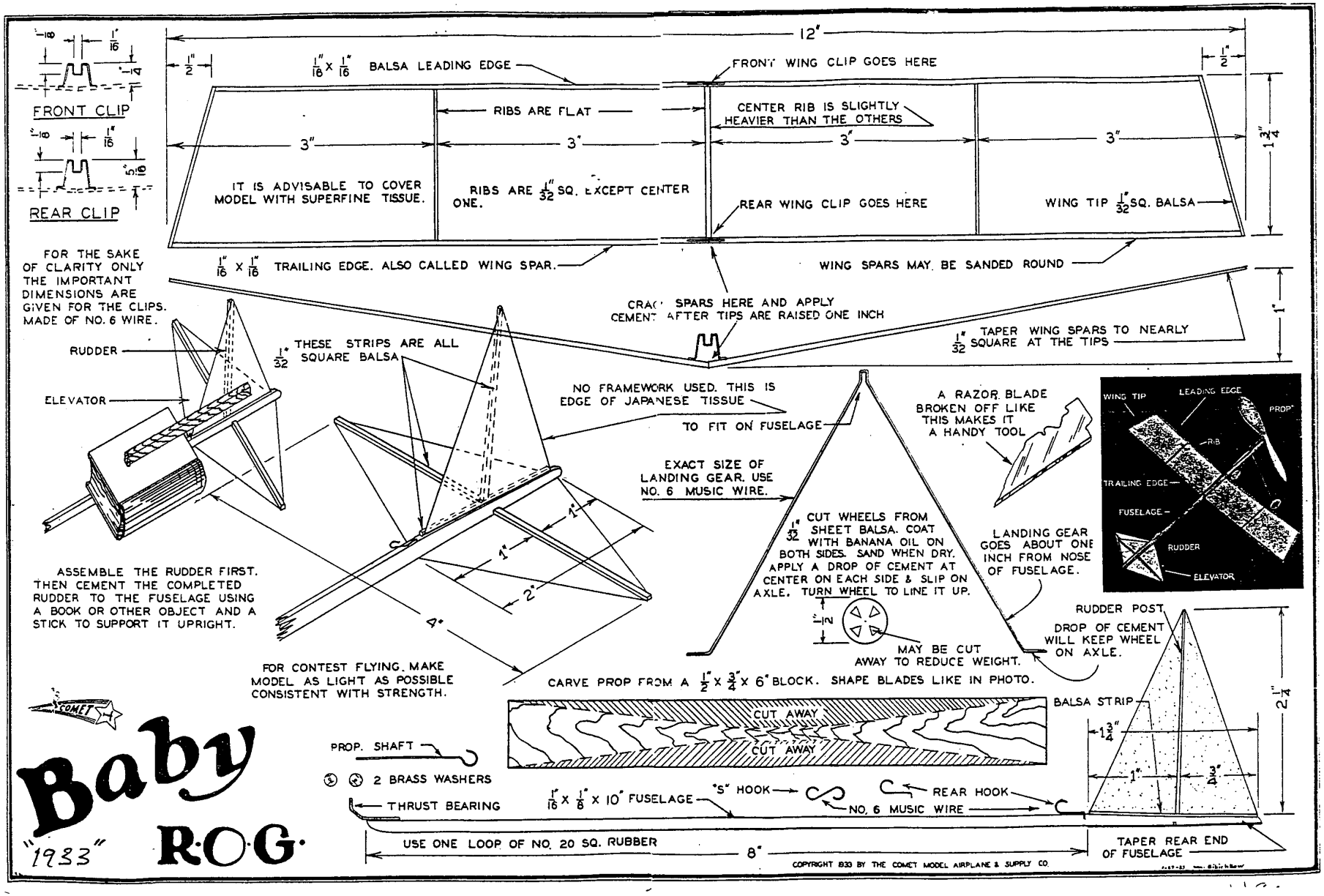
But 27 minutes today is a vast increase in duration compared to the solid three minutes that the indoor "experts" were batting out around 1927 in the days of the now forgotten AMLA (Airplane Model League of America). The author recalls seeing the plans of indoor models in the erstwhile *American Boy* magazine featuring names of legendary giants such as Aram Abgarian, Ernest McCoy, Fay Stroud, and others. (About 1930 a young fellow named Carl Goldberg was mentioned as having won third place at the Nationals.) Believe it or not, the model builders of those days took their indoor flying seriously. Indoor flying was much more popular than outdoors and received more publicity even up to the early thirties when Basset introduced the gas engine and made outdoor flying popular with the masses.

Indoor National winners were given trips to Europe, scholarships, and were looked up to by the youngsters like today's kid asking Shulman to tell him what airfoil he used on his Super Zoomer. (Imagine today's indoor winner receiving an Ercoupe for first prize!) And if you think that getting information out of a hot control-line flyer about how he souped up his engine is tough, back in the days when indoors was king, when an expert's model landed, he quickly scooped it under a hat box less some design secret be revealed !

So you can blame indoor flying on the AMLA when rules were set up that limited an indoor stick model to a size of fifteen inches between thrust bearing and rear hook. No restrictions were placed on wing area, and all parts had to be made by the builder with the exception of metal fittings. (Nope, you couldn't buy a finished model and fly it in a contest. The rules were tough; you had to build it yourself.) The first indoor models, of around 1927, looked much like the baby ROG design used as a beginner's model today. We've illustrated one here to give you the idea. As simple and easy-to-build as they looked, these models were nevertheless constructed with infinite care and weight was watched cautiously to increase their duration. Somebody, we think it was that old sharpie, Aram Abgarian, pulled a fast one on the boys and introduced the first hollow motorstick, with the result that he cleaned up an early national meet because of the lighter wing loading. Another expert came out with a regular airfoil section on his wing and again duration jumped.

At this point in design development stability became a bugaboo. As these tractors were so short coupled (small tail-moment arms) they tended to stall easily and were extremely difficult to adjust. Ernest McCoy, an expert of his day, practically overcame this longitudinal instability problem by putting a reverse-cambered airfoil section on his stabilizer (how about the Pacer gas model?) but the real solution came when a now-forgotten builder noticed a loophole in the rules (15" motorstick between thrust bearing and rear hook) and cemented a tail boom between his motor stick and tail assembly to lengthen the tail-moment arm. Wing areas increased, as part of the trend to decrease wing loadings, and designs lost the so-called r.o.g. look and basically became the same as the indoor tractor of today (see illustration of typical model of 1930).

It remained for the discovery of microfilm to really make possible the high durations of today's indoor models. Paper-covered jobs reached their highest possible duration of between twelve and fourteen minutes despite all the tricks the boys could think up to reduce weight. The hollow teardrop motorstick used today became popular during 1932 and even beautifully built, hollow wing spars, such as used by Pete Andrews on his record-breaking ship, had been used in premicrofilm days. Paper-covered props, similar to the microfilm


FRONT CLIP
REAR CLIP
12"
1/16 X 1/16 BALSA LEADING EDGE
FRONT WING CLIP GOES HERE
RIBS ARE FLAT
CENTER RIB IS SLIGHTLY HEAVIER THAN THE OTHERS
3"
3"
3"
3"
1 3/4"
IT IS ADVISABLE TO COVER MODEL WITH SUPERFINE TISSUE.
RIBS ARE 1/32 SQ. EXCEPT CENTER ONE.
REAR WING CLIP GOES HERE
WING TIP 1/32 SQ. BALSA
1/16 X 1/16 TRAILING EDGE. ALSO CALLED WING SPAR.
WING SPARS MAY BE SANDED ROUND
FOR THE SAKE OF CLARITY ONLY THE IMPORTANT DIMENSIONS ARE GIVEN FOR THE CLIPS. MADE OF NO. 6 WIRE.
CRACK SPARS HERE AND APPLY CEMENT AFTER TIPS ARE RAISED ONE INCH
1"
TAPER WING SPARS TO NEARLY 1/32 SQUARE AT THE TIPS
RUDDER
ELEVATOR
1/32 SQUARE BALSA
THESE STRIPS ARE ALL
NO FRAMEWORK USED. THIS IS EDGE OF JAPANESE TISSUE
TO FIT ON FUSELAGE
A RAZOR BLADE BROKEN OFF LIKE THIS MAKES IT A HANDY TOOL
WING TIP
LEADING EDGE
PROP
RIB
TRAILING EDGE
FUSELAGE
RUDDER
ELEVATOR
EXACT SIZE OF LANDING GEAR. USE NO. 6 MUSIC WIRE.
1"
1"
2"
4"
1/32 CUT WHEELS FROM SHEET BALSA. COAT WITH BANANA OIL ON BOTH SIDES. SAND WHEN DRY. APPLY A DROP OF CEMENT AT CENTER ON EACH SIDE & SLIP ON AXLE. TURN WHEEL TO LINE IT UP.
1/2
MAY BE CUT AWAY TO REDUCE WEIGHT.
LANDING GEAR GOES ABOUT ONE INCH FROM NOSE OF FUSELAGE.
RUDDER POST
DROP OF CEMENT WILL KEEP WHEEL ON AXLE.
ASSEMBLE THE RUDDER FIRST. THEN CEMENT THE COMPLETED RUDDER TO THE FUSELAGE USING A BOOK OR OTHER OBJECT AND A STICK TO SUPPORT IT UPRIGHT.
FOR CONTEST FLYING, MAKE MODEL AS LIGHT AS POSSIBLE CONSISTENT WITH STRENGTH.
CARVE PROP FROM A 1/2" X 3/4" X 6" BLOCK. SHAPE BLADES LIKE IN PHOTO.
CUT AWAY
CUT AWAY
BALSA STRIP
1 3/4"
1"
3/4"
2 1/4"
COMET
Baby
"1933" R·O·G·
PROP. SHAFT
2 BRASS WASHERS
THRUST BEARING
1/16 X 1/8 X 10" FUSELAGE
"S" HOOK
REAR HOOK
NO. 6 MUSIC WIRE
USE ONE LOOP OF NO. 20 SQ. RUBBER
8"
TAPER REAR END OF FUSELAGE
COPYRIGHT 1933 BY THE COMET MODEL AIRPLANE & SUPPLY CO.

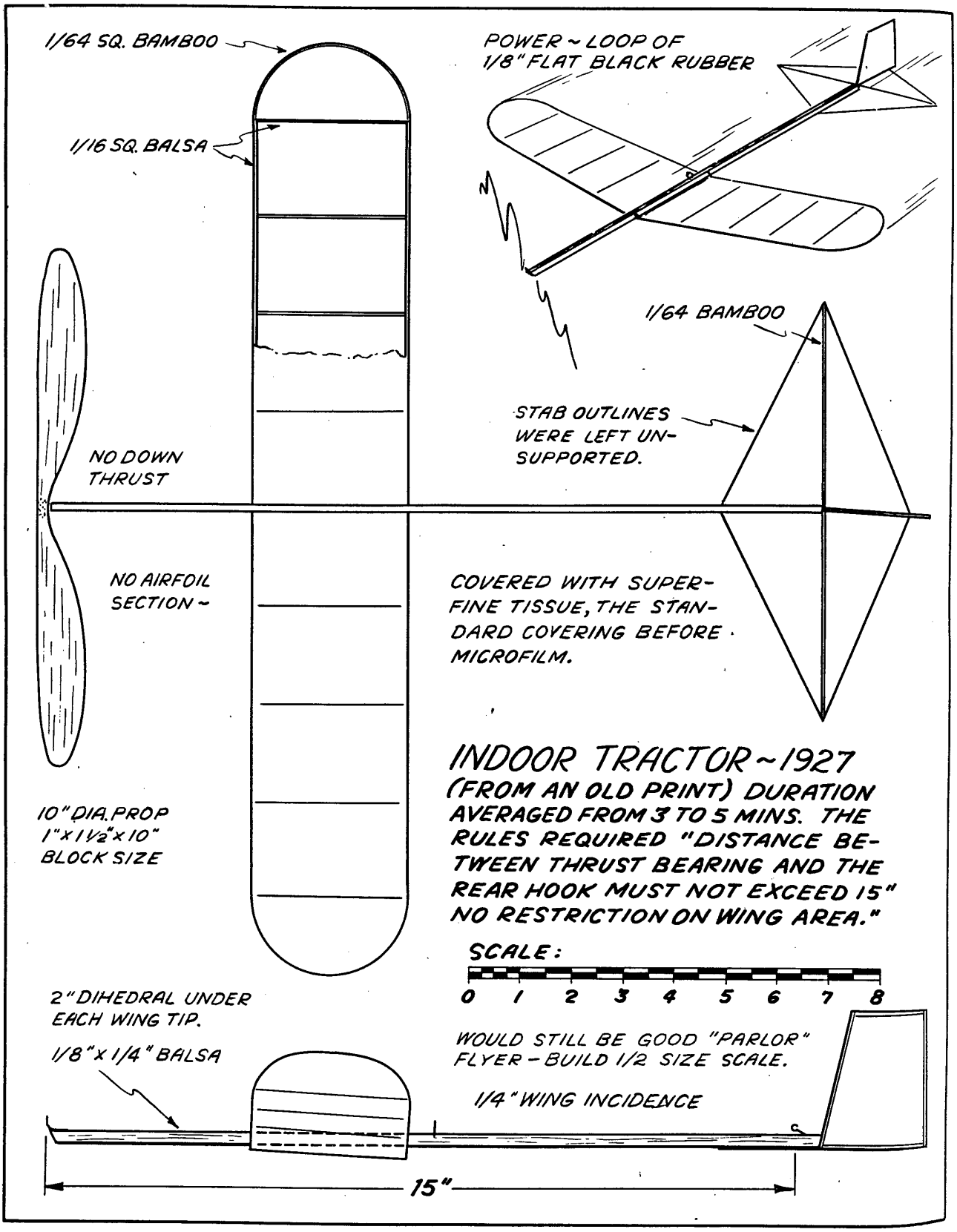
props, had been experimented with but were abandoned because of a lack of efficiency. Aluminum-leaf covering was used by a few of the old timers as it was lighter than paper but never proved practical, because the material was extremely fragile and would shatter almost by being looked at. Microfilm made indoor models what they are today.

To set the record straight microfilm was developed by John P. Glass and Bob Cleary, two old time builders, while attending Massachusetts Institute of Technology. Glass, truly an indoor "fiend," would cut school half the time just to build models and experiment. We recall making many trips to "J. P.'s" room in Cambridge, Massachusetts, opening the door and fairly brushing our way through piles of bottles of experimental microfilm solution, balsa wood, and other assorted junk, to consult the old master on our design problems. What always added zest to the visit was the fact that John had several cans of guncotton (used as a base for dopes, cements, and microfilm) stacked in his room and remarked casually one time that if the stuff ever exploded (it's extremely unstable) half the city of Cambridge would be missing. Glass acted for years as father advisor to the local gang and was mainly responsible for the school of indoor theory that developed into the Boston style.

Getting back to microfilm, it just didn't get discovered; it was evolved. The first samples were extremely brittle and, because of a static electricity charge, were almost impossible to handle. More experimenting produced a plasticizer (castor oil) which, when added to the solution in very small proportions, made the film flexible. Now that film could be taken off water on a hoop, the problem was how to apply it to wing and tail surfaces. Some of the first attempts included diluted rubber-cement solution, wetting the frame with acetone, and then placing it on the film (invariably the acetone ate half the covering away). Some uncredited genius hit upon the simple idea of just running one's tongue over the framework amply wetting it with saliva and then placing the frame on the film. This was the answer.

About the same time as microfilm was introduced, Jerry Kittel, a member of the New York Aeronuts, collaborated with the research staff of a well-known rubber company to develop a more powerful rubber. The resulting stuff was brown in color and, compared to the black rubber then used, was so much more powerful that we recall when Kittel first mailed up a couple of loops in Boston to try out, the models acted like they had been rejuvenated and promptly tried to fly through the roof of the local armory. Known to the trade at T-56 this new rubber was so far superior to the old black variety that new records in all classes were established. (Good news to model builders who have been putting up with wartime synthetics is the fact that the original brown rubber is once again available. Credit should be given to the efforts of the Model Industry Association who convinced the Civilian Production Administration to allow pure rubber strand to be made available for model building because of its educational value.) With lighter models and a more powerful rubber, durations really zoomed. At the 1933 Nationals in New York 99% of all models were microfilm covered and used brown rubber, the results being that durations went up from twelve minutes to seventeen minutes. Carl Goldberg made an unofficial flight of 19'44" in Kingsbridge Armory with a ceiling of 100 feet. With the exception of several refinements in design today's indoor model is basically the same as the models of 1933. Microfilm propellers have been developed that appear to be just as efficient as the best hand-carved types and have the added advantage of being considerably lighter. Credit should be given to Pete Andrews for the development work he a did in working out a better construction method for making "mic" props which we have illustrated here. Another weight-saving contribution was the introduction of braced motorsticks and wings using very thin tungsten wire. Despite the weight-saving advantages of bracing, there have developed two schools of thought-to brace or not to brace. Some builders claim that adding bracing increases drag and therefore destroys whatever advantage was gained by making the model lighter. The pro-bracing boys point out that tungsten wire has almost no resistance and have challenged the rest of the field to make the following test. Place a sheet of white paper on the floor and drop a length of tungsten wire from a six-foot height. So far nobody is fast enough with the stopwatch to be able to time the descent. The other advantage of bracing is that a braced model can be adjusted more positively than the unbraced type and, because of the extra rigidity added to the wing framework and motor stick, can take the stresses of a full power windup without making launching a juggler's act.

To be continued in the next issue. – Ed.


1/64 SQ. BAMBOO
1/16 SQ. BALSA
POWER ~ LOOP OF 1/8" FLAT BLACK RUBBER
1/64 BAMBOO
STAB OUTLINES WERE LEFT UN-SUPPORTED.
NO DOWN THRUST
NO AIRFOIL SECTION ~
COVERED WITH SUPER-FINE TISSUE, THE STAN-DARD COVERING BEFORE MICROFILM.
10" DIA. PROP 1" x 1 1/2" x 10" BLOCK SIZE
INDOOR TRACTOR ~ 1927
(FROM AN OLD PRINT) DURATION AVERAGED FROM 3 TO 5 MINS. THE RULES REQUIRED "DISTANCE BE-TWEEN THRUST BEARING AND THE REAR HOOK MUST NOT EXCEED 15" NO RESTRICTION ON WING AREA."
SCALE:
0 1 2 3 4 5 6 7 8
2" DIHEDRAL UNDER EACH WING TIP.
1/8" x 1/4" BALSA
WOULD STILL BE GOOD "PARLOR" FLYER - BUILD 1/2 SIZE SCALE.
1/4" WING INCIDENCE
15"

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Y2K2 FILM COVERING

By Geoffrey Lefever. 10.09.03

This is intended to bring comfort and relief to anyone who is intimidated by Y2K2 or is not totally happy with his/her covering results. Everyone has a different way of covering and has little tricks when it comes to film. These methods work for me.

It seems to be common sense that covering free from wrinkles must be more efficient i.e. less parasitic drag and a more accurate profile. Anyway I like the look of it that way!

The following may be a little tedious but stay with it. First of all we need some frames. For wing and tail plane I use 1/16 x 1/2 and 1/32 x 1/4". When a sheet of film is laid out it will provide one wing panel or one tail plane panel plus 2 propeller blade panels. This is principally directed to F1D construction, but is equally relevant for other lightweight classes.

Secondly we need a new sheet of mounting card, free from marks, blade cuts or dust. The film is laid out onto the board and cut off with a new double-sided razorblade at a shallow angle using a steel straight edge. Great care must be taken to protect the free end of the film. If the end is lost it may not be recoverable. Low tack paper tape is great stuff and a strip across the free end will make it much easier next time.

For me paper tape is the most important building aid. I use it in 1/4" strips to hold spars and tips to the plan and also to fix 4 thou' boron propeller outlines and spars onto the block.

Back to covering and the tricky bit. Y2K2 is quite fragile and great care is required. Pick up one corner of the film and carefully lift toward the centre. Proceed until you are holding the film in one hand or rather until the film is sticking to your hand and fingers with static. Very, very carefully disengage the film and roll into a loose ball. Air will be trapped in the ball so do not apply any pressure; gently roll for approximately one minute. It goes without saying that hands must be free from sharp nails, bits of cement etc. Cotton gloves do not work as they are not sensitive enough and seem to enhance the static.

Now comes the interesting bit. What to do with the ball of film. Find an end or corner, by now much of the static will have disappeared. Hold by the corner or end and lightly blow on the film. Be patient, the film will slowly unravel and eventually hang vertically. Loosely drape the crumpled film back onto the mounting card. The film now has to be brushed out until completely smooth and free from wrinkles. I use a wide, Chinese fine art brush, the sort with a split bamboo handle. The brush must be the softest imaginable. It is quite possible to lift a corner or a side and gently realign the film to get rid of the worst creases or wrinkles. It is also best to start brushing from the centre outwards. Be reassured that it gets easier with practice.

I use 3M spray adhesive for the film frame and also wing/tailplane outlines; I use the type in a blue can which permits lifting and repositioning, but not of course when dealing with Y2K2. Spray the frame outline and place onto the film. Cut around the edges with a new blade and lift in much the same way as you would lift microfilm. Air pressure will have made the film adhere to the card; one corner should be lifted very slowly until the frame of film is free. You should have a perfect sheet of film with no wrinkles and a slightly crazed surface, which is rather attractive.

The frame of film is put aside until needed. I tend to stick it to the wall of my workshop with a piece of adhesive paper tape - That useful stuff again.

Now to the wing or tailplane. Place the uncovered framework across two pieces of 1/4"square balsa onto newspaper on the floor. The strips of balsa between the outline and the newspaper are necessary to prevent the

outline sticking to the newspaper. If this does happen, a brush loaded with cellulose thinners will release the outline instantly. A single pass of spay adhesive to both leading and trailing edges should be sufficient for the covering; from a height of approximately 2´ above the wing. We don't want the adhesive to weigh more than the balsa! Dip thumb and finger into thinners and lift the frame, this will prevent the frame from sticking to the fingers. Carefully drop over the original plan and nudge to the exact shape of the outline. My plans are drawn onto mounting card. Spot glue the uncovered wing to the exact plan outline at perhaps 6 or 8 locations and mark these points around the outside on the plan, so that you know where to cut the covered wing free. I put small coins onto the outline to ensure that the cement is in contact with the plan on the mounting card.

It is important to spot glue the frame to the plan to keep a perfect outline and also, if the frame is not glued in place, the residual static within the film will cause the outline to leap up and meet the frame, **not good**! Take the frame from the wall and place a long edge approximately 2" outside the outline. Form 2 hinges between the frame and the mounting card with 2 strips of paper tape; that magic stuff again. Let the hinged frame slowly rotate down to the outline. Blow around the edges to make contact between the outline and the film and then very carefully run a fingertip around the outline.

With a new double-edged blade at a very shallow angle, cut the film around the outline at about 1/16"outside of the wood. Lift the frame and put to one side. Any minor wrinkles to the outline can be eased out by softening the adhesive with a small brush of thinners. Slide the blade under the outline where it is tacked to the board. The covered wing should look pretty good. Crack/cut at dihedral joints, cement and place the covered wing over strips of 1/16" thick balsa so that the cemented joints are not in contact with the surface of the building board. Support the tips at the correct dihedral and hold down the wing with coins. Tighten the film at the dihedral break with a small brush and saliva. Dihedral compression ribs should be stiff; otherwise the camber may increase as a result of the tightened film. I use 3 thou' boron on each side of the rib at the base and a third boron over the top of the rib. Ribs are from 22 thou' 4 pound sheet and only 60 thou' deep. 4 ribs should weigh approximately 0.06 grams.

The edges of the wing with the 1/16" surplus film may be sealed with a small brush and saliva or as in Nick Aikman's case, Evostick solvent, which improves the 3M adhesion.

Covering propeller blades is another matter. My propeller blades comprise 4 thou' boron outlines with 3 pieces of 3 thou' boron along the spar and with ribs from 13 thou' C grade timber. This is the off cut from a motor stick blank. The timber is soaked and baked to a camber. The 3 thou' boron is applied to top and bottom. Ribs are then sliced off the curved sheet on a curved former with a flexible steel rule to approximately 40 thou' width. This is Ron Green's method. When covered, the film adheres to the outline, ribs and spar, and there is no air gap between the spar and the film.

Put paper tape onto the spar stub and spray with adhesive. Remove the paper tape and wash your sticky thumbnail with thinners. I place a length of round balsa dowel of approximately 60 thou' diameter across the underside of the frame with film at about half-length of the frame and hold it in place with 2 pins from the underside. The film frame is from 1/32 by ¼ sheet. This prevents the whole of the uncovered blade from contacting the film at one time. Place the outside half of the blade onto the film and gently run a finger around the boron outline to ensure a good bond. Cut around the outline in a similar way to the wing, but leave a small section at the tip to allow rotation. Carefully remove the balsa spacer and press the inboard half onto the film. A little thinners will enable you to ease out any wrinkles. Cut around the rest of the outline and run saliva around the boron outline. The result should be the most uniformly covered propeller blade you have ever seen. It might not be more efficient but it will certainly look good.

Good luck!! 

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FORMING WIRE THRUST BEARINGS

by Andrew Tagliafico

1. Form a V with legs at least twice as long as the required bearing finished length.
2. Bend both legs 90° 90 degrees at required thrust bearing leg length.
3. Cut a mandrel from piano wire .001" to .002" thicker than the prop shaft about 1" long.
4. Insert mandrel and thrust bearing blank with 90 degree bent legs into the slot of the Clamp/Jig as shown in Figure A.
5. Bend front leg of thrust bearing tightly around the mandrel at least 270 degrees additional in the direction of propeller rotation.
   It is important to wind the front bearing and pigtail in the direction of propeller rotation. Front bearing burr will not snag thrust washer after it is honed.
   Pigtail thusly wound will not allow prop shaft to rotate out of the pigtail.
6. The properly honed and finished front bearing will have about 1 1/2 turns forming a secure bearing. The pigtail only needs 1 1/2 turns to hold prop shaft steady.
7. It is important that the pigtail and front bearing have a straight-line alignment. When the thrust bearing is properly formed and aligned it will swing freely on the prop shaft diameter wire.
8. Fabricate a smaller Clamp/Jig from a 1/4" round hardwood dowel and a 4-40 screw with nut for smaller thrust bearings.

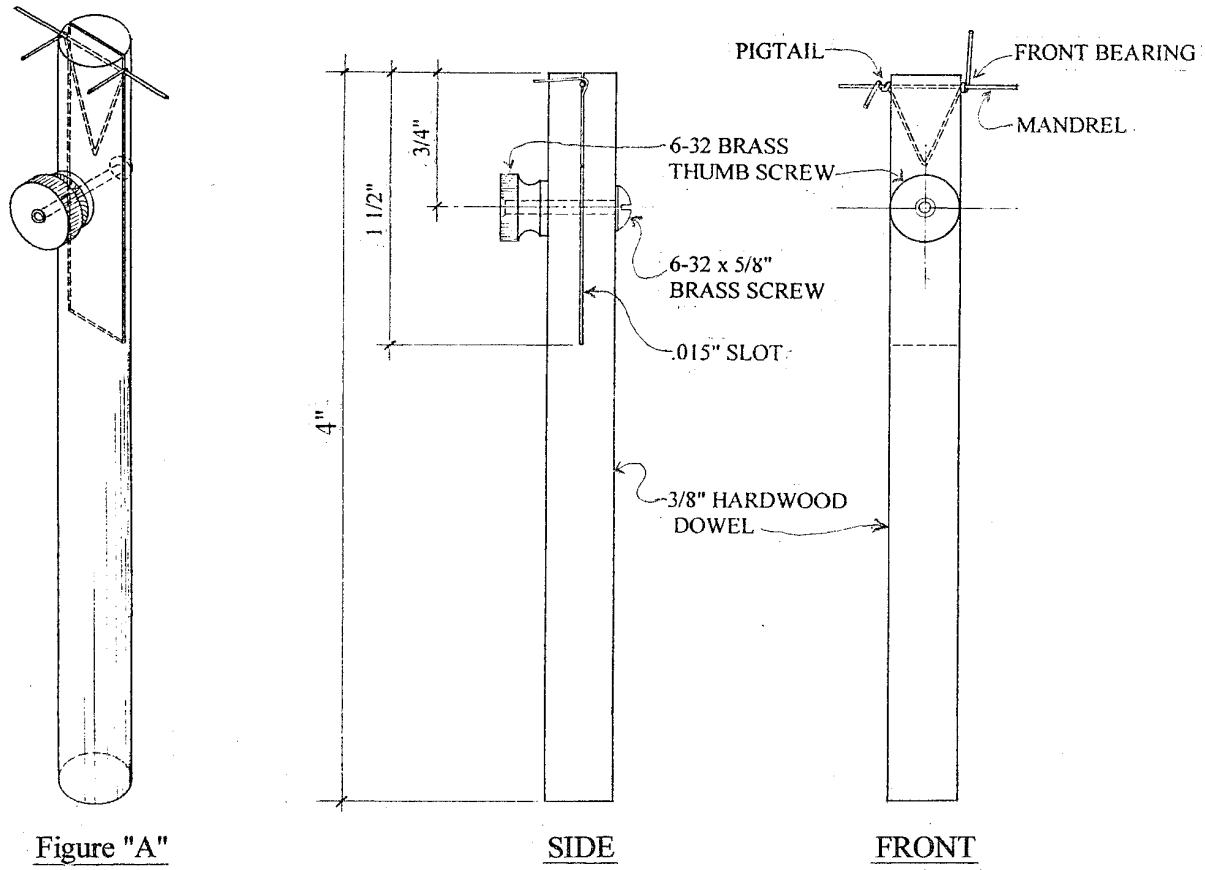


Figure "A"

CLAMP/JIG for FORMING WIRE THRUST BEARINGS

THE INDOOR FF, INDOOR RC DILEMA

By Larry Coslick

It is time to unite and take a stand against allowing any RC events to be flown in conjunction with Indoor FF at National competitions. AMA event #627, RC Indoor Electric Duration is scheduled to be flown at the 2004 USIC. This event is outside of our Indoor FF category and the AMA Indoor Contest Board did not get the opportunity to have an input as to whether this event should be flown at the 2004 USIC. This cross assignment of category events will open the door to any future AMA event that is labeled Indoor RC to be flown at our National Championship and the Indoor Free flight community will eventually be shoved out the back door. Indoor FF membership is small in comparison to the RC group and with the miniaturization of RC electronics there will be greater numbers of RC fliers looking to use our indoor sites that has taken us years to secure. Our models fly slow, are light and won't cause personal or property damage, but RC models can. If future events such as AMA indoor Combat or Pylon racing should injure someone I would bet that the flying site would be closed down to all indoor flying. Indoor FF and Indoor Electric RC are two separate categories and should have their contests at sites that are separate from each other. I understand that indoor contests are a very small part of what most indoor fliers value in this sport. It doesn't matter if you are a competition flier or not, we as indoor fliers will suffer if a stand is not taken right now; and this includes the local level flying sites.

At our last Indoor free flight flying session a modeler brought in a small 3-D aerobatics electric RC model that weighed about six ounces and asked if he could fly it. I told him that it was our policy not to fly Electric RC in our site but since I was doing this letter, I thought that this would be a good chance to see how this model would fly in our forty three foot site. After our flying session was over he flew the model and could do all of the fancy maneuvers including hovering, My main concern was that the model was fast and there was no safe zone on the sidelines to protect us if the pilot should make a mistake. The site has an average size floor space and there was just enough room for one RC model to be in the air at a time, Indoor FF modelers set up their tables around the parameter of the flying site and we do not have a problem if one of our models should fly over our tables, The model can be safely steered away from the area with a balloon steering pole or by catching the model- You can't steer an electric RC model.

Another concern about sharing sites is, how do you allocate the flying times for each group. The more RC fliers there are the less time for Indoor FF. I'm repeating myself but if we adopt the policy of cross assigning events at the local level the AMA will think that this is what we want. What happens at the local level will affect the direction the AMA will take at National competitions unless Indoor Free Flight and Indoor Electric RC are kept in their own categories and National competitions are held at separate sites.

I have submitted a proposal to the AMA to stop their procedure of cross assigning events. I am making a plea to all free flight modelers to please contact your AMA District Indoor Contest Board member, which are listed below and let your AMA District Vice President know your feelings on this matter. Their address and telephone numbers are in the AMA Model Aviation magazine, Contest Board member addresses are listed in the AMA competition directory.

Dist I	Raymond Harlan, 508-358-4013
Dist II	Douglas Barber, 856-235-5318
Dist III	Walter Van Gorder, 513-922-3351
Dist IV	Don Srull, 703-893-5071
Dist V	Richard MacEntec, 941-729-1524
Dist VI	Larry Coslick, 314-892-3803
Dist VII	Gordon Wisniewski, 414-421-3696
Dist VIII	Bud Tenny, 972-235-4035
Dist IX	Stan Chilton, 316-686-9634
Dist X	Clarence Mather, 760-872-1127
Dist XI	Andrew Tagliafico, 503-452-0546

THE F1D CRISIS

I would like to draw your attention to the impending situation regarding World & European class venues, for F1D.

At the highest level, Indoor Flying requires a large/high airspace, draught free, with stable air. It must be available with certainty 2 years ahead of an event. It must be accessible and cheap to get to, and it should preferably have a zero charge for its use.

These sites have been (Are ?), the twin hangers at Cardington, The Salt Mine in Romania, and in the USA - West Baden Johnson City, Moscow Idaho, the multiple hangers at Lakehurst. There was also a World Champs in Poland at Wroclaw, but this site does not quite measure up, compared to all of the above.

As you can see, the USA has far more sites that anywhere else, and the list does not include Santa Anna, and Akron.

The Twin hangers at Cardington are no longer possible venues, because: Hanger No 1 is peeling its cladding and not suitable, and Hanger No 2 is full of tall buildings being burnt! As the prime motivator for W/Champs and European from the U.K, I am no longer a young man, and without more funding from either the FAI or BMFA, and encouragement, I am unlikely to do it any more.

The USA has held many fine Championships in the past, but I believe they lost money on most (?) of them, and are reluctant to do it again. It can make money, but it needs to be organized differently.

This leaves the Salt Mine in Romania. The mine has many of the virtues required, but it is very cold, damp, and not user friendly, to the point, where many of our own Senior/Experienced F1D flyers, will not go there. I believe many of the Worlds best, also share the same view.

Indoor flying/building, is the last refuge for "real" Aeromodellers, as we have not sold our souls to the "devils" of the commercial manufacturers, who dominate with unbeatable, ready to fly models.

If we are really serious about the future of our sport, all national & international bodies must do more than just change the "rules".

The performing and finance bit of this sport is driven at grass roots level by volunteers, and accustomed to using a facility that belongs to someone else.

The high cost of having to fund all the expenses for 3 Jury members (Apart from Judges?), adds costs, indoor budgets cannot afford, from low customer base numbers. Most Contest Directors can read the "Rule Book" anyway!

We are global "Gypsy's", and we all need outdoor and indoor space to perform in, but are used to "borrowing" someone else's field or Hanger.

If we do not start to look ahead, plan and take action, then I am very pessimistic we will survive as the Aeromodellers, we all once were.

Laurie Barr. FSMA

2004 SYMPO "CALL FOR PAPERS / ARTICLES"

Each year the National Free Flight Society publishes a Symposium report. Technical papers and articles are required to make up each edition. If you have a possible technical paper about Free Flight models or design / construction / flying article in mind and would like to have it published in the 2004 SYMPO please contact the editor, Walt Ghio.

Walt's e-mail address is: f1bwalt@comcast.net Mailing address : 1380 Elkhorn Drive, Stockton, CA, 95209

Aram Schlosberg will chair the 2004 Ten Models of the Year committee. Nomination packages for model of the year should include:

1. One page description of the model's innovations as well as its recent contest record.
2. One-page plan (a half wing, side and to view of the fuselage, the stab) with structural details and full size rib sections.
3. Details photographs of nominated model.
4. Resume of modeler / designer (optional).

Aram's e-mail address is: aram.schlosberg@verizon.net Mailing address : 79-02 212th St., Bayside, NY, 11364-3506

Bob Beecroft is the chairman for the 2004 Hall of Fame members. Please send any nominations to Bob. The nomination will require a write up on the individual and photographs.

Bob's e-mail address is: nffsflyer@adelphia.net Mailing address : 3488 Linda Vista Terrace, Fallbrook, CA, 92028-9127

All papers / articles and nominations must be submitted electronically, preferably in Microsoft Word format, via e-mail or CD / Zip disk. Only high quality photographs and a minimum of 4 Megapixel resolution files for photos.

After the proposals are reviewed and selections made completed nominations will be required February 1, 2004.

Thank you for your nominations, Walt Ghio. 

THE 2003 EUROPEAN F1D CHAMPIONSHIPS/OPEN INTERNATIONAL
THE MILLENIUM DOME, GREENWICH, LONDON. 2ND TO 5TH OCTOBER. 2003.

The European F1D Championships have a chequered history, being held sporadically, first in 1987 - in Wroclaw, Poland; 1991-Slanic, in Romania; 1993 – Brno, in the Czech republic and again in 1997, back in the saltmine.

This contest was rescued in heroic fashion with 9 weeks to go by Laurie Barr and an exceptional group of officials and helpers from the British Model Flying Association. In particular, Laurie and Betty Barr, together with BMFA Competition Secretary Jo Halman, her husband Peter, Ian Kaynes and model processor Ian Dowsett, worked tirelessly to save the event after Gerhard Woebbeking encountered insurmountable insurance problems at the original 'CargoLifter' venue in Germany. Gerhard Woebbeking graciously agreed to continue as Contest Director and the FAI jury was also retained.

Like the 'CargoLifter' hanger, the Dome is a modern structure, built to house an exhibition celebrating the millennium and situated right next to the Thames, near London's docklands. The covering is a double layer tensile membrane and the inside is mostly free from obstructions, except for a central steel ring that peaks at over 150 feet, with hanging loudspeakers, rods, cables, and various nooks and crannies that can trap models.

The chance to compete at European level, previous anticipation for the original venue, plus the chance to use another very high site produced a record provisional entry – from 19 countries! - More than at any World Championships. For the most obsessive and dedicated, the venue change also meant a complete re-think in flying tactics/model design as VP props became necessary for top performance.

The UK team had previous site experience earlier in the year and found the main problem to be the wildly variable conditions. No two days were alike and the air often changed from hour to hour, sometimes buoyant and sometimes literally unflyable, with fiendish ground level turbulence and equally unstable air and layers of drift at other altitudes. Practice sessions showed that although the space is big, models often needed repeated steering at altitude to avoid collision with the membrane or hanging speakers in the centre. The most dramatic example of these internal gales came at the July trials for the next World F1D Championships, when one of Geoffrey Lefever's fully wound contest flights was battered back to earth in 4 minutes -while still on the initial climb.

The UK autumnal weather added to the possibilities for poor conditions because the contest was locked into the original October 'CargoLifter' schedule. As the event approached, the UK team and organizers watched the weather forecast with trepidation.

On practice day, flyers from fifteen European nations arrived, less than projected but still very impressive and it was also good to see Ed Liem from Canada adding to the international flavor. The junior entry was disappointingly small, perhaps because of the extra costs involved in getting younger flyers over to the UK. The Romanians and Hungarians had sneaked in early on setting up day and Aurel Popa suggested half motor flights of 17/18 minutes had been achieved. On this and the actual practice day, the air was benign, allowing fine-tuning and tweaking of models in anticipation of the first two contest rounds on Friday.

There was relatively little to see In the way of constructional innovation. Dieter Siebenmann brought a curved dihedral wing, not truly elliptical in the old Max Hacklinger fashion, but a gentle arc across the span. The Ukrainian team had some models with miniscule screw adjusters on wing and tail posts that allow changes in washin/washout without resorting to the fiddly business of ungluing and resetting tissue tubes or wing posts. VP props came in a wide variety of configurations, and prop diameter and pitch also varied enormously.

Generally, the weather held on for the first three rounds and most flyers unknowingly posted what would be their longest flights. As an example of what was to come, my first effort took off from near the center, got blown

half way out to the side of the dome, hit the membrane and scrubbed for 5 minutes, got blown back in again, hit a thermal and rose 20 feet, drifted into the middle again where I steered it away from the hanging speakers and then pottered around quite happily with a very slow let-down. The second round that day was better and many fliers improved their times in the afternoon. By now, many were hoping to make progress later but alas, in many cases this was not to be. My second round flight proved to be my best effort – 30:21 and in round three on the next day, after a good climb I hung in the roof on an invisible wire. Then the conditions deteriorated in the afternoon to such an extent that despite exhortations from one or two others in the GB camp, I decided not to risk the model in the gales of round 4.

On the first round of the final day, I was given the choice of when to fly and elected to go last. Despite this, I was left stranded without enough time to wind without rushing and the motor broke as I was hooking up with two minutes to go, and with no time left to wind again. Winding an F1D motor takes at least ten minutes and the luxury of this timescale was not given. Luckily the 'blast plate' saved the model without damage. The conditions defeated most attempts to improve individual and team scores and there was a general feeling of inevitability as the contest continued to a close.

In the last round, the individual winner Lutz Schramm somehow managed to find some good air and improve his already formidable total, after some prolonged steering. Generally speaking, there were none of the final heroics associated with big contests. Second placed Jonas Romblad made his two best flights in rounds 1 and 5, and in third place, Fabio Manieri's total came from rounds 2 and 3. Only Derek Richards of the British flyers managed to improve slightly after day one and at the end of the last round, many nervous minutes followed before we confirmed that none of the other teams had managed to leapfrog over us to pinch the Team Silver Medal. The Gold Team Medal went to the young team from the Ukraine and I certainly do not begrudge them as they drove all the way across Europe to get to London and took three days to do it. I'm personally delighted for the success of my good friend Fabio Manieri from Rome and also for Gert Brendel the Editor of IFI. Gert finished his first ever F1D on the boat over from Holland, collapsed the motor stick on the first day, spent all night completing a second model and then flew it 'straight out the box' to record 30:47 in round three.

The Open International contests for F1L, F1M and F1D were flown at the same time, but because of the conditions and the fact that there was a shortage of timekeepers, there were few entries. The expected F1D duel between Ron Green and Bob Bailey was literally blown off course after one flight each when both flyers decided to put the models away to prevent damage – for a laugh, Clive King took third flying an F1L which legally fits f1D rules, and using a half motor of 0.60 grams.

So, the end of the biggest ever European Championships and, despite the conditions, a spectacular success. The tradition has been re-started and the next event may be in the French Velodrome, in Bordeaux. For me, it was certainly a 'baptism by fire' in international competition and at the final prize giving; Laurie Barr was presented with an official T-shirt, signed by every single flyer – a fitting memento indeed!

Nick Aikman 21.10.03.

RUBBER COMPARISON TEST USING 1/4 MOTORS
09/03 - HANCOCK GYM 43' - 1.2 GRAM EZB

RUBBER	WINDS	TORQUE IN. OZ.	LAUNCH TORQUE	TIME	CLIMB FEET
5/99 1/4“ .054x4"	640	25	2	6:14	38
3/02 1/8” .053 x 4	620	25	.2	6:00	30
6/01 1/4" .050x4	640	.25	.2	5:33	27
2/99 1/8” .054 x 4	650	.25	.2	5:32	30
7/02 1/4" .053 X 4	600	25	.2	4:55	22
8/01 1/8” .052 x 4	640	.25	.2	4:46	22

Model - F1L - EZB, 12" motor stick, 14X28 pitch, symmetrical blades

Tim Goldstein sent me six samples of rubber an asked me to evaluate them. I've found that the best way to determine the quality of a batch of rubber is to fly it against a known good piece of rubber. Pick a model that will perform well through the whole power pattern and fly at a torque that will keep it out of the ceiling. The rubber was stripped so that each four inch loop was as close to .285 grams as possible. All of the flights were made the same evening to take advantage of the good air and there was just enough time to make one flight on each sample of rubber. I used one 0 ring on each loop to insure a positive hook up without loosing any turns and launched the prop and model at the same time. It's best to make several flights on each sample of rubber, but I was limited to air time because of the other fliers.

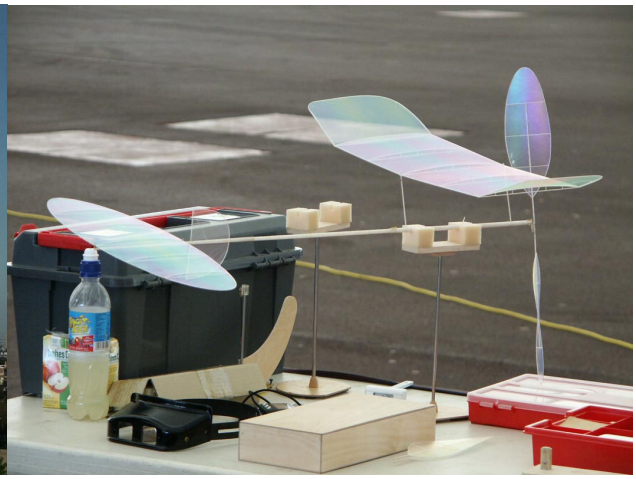
Larry Coslick

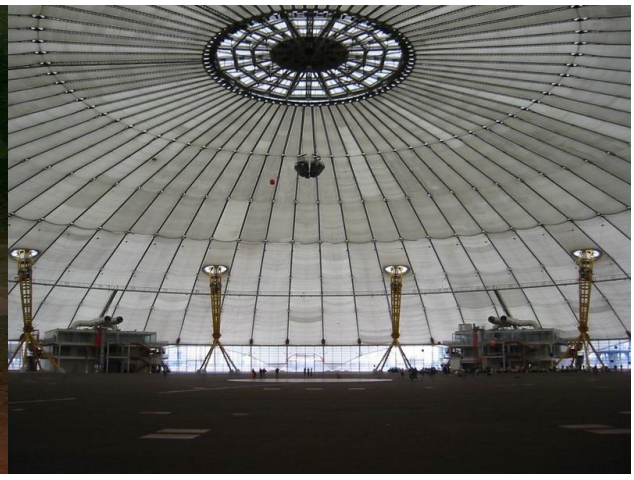
NEW 35 CM RECORD

At a meeting in the Millenium Dome in London, on the 17th of September, British flyer Bob bailey flew a new 35 centimeter world record. The time of 36 minutes and 50 seconds beats the old record set by John Tipper last year in the 'CargoLifter' hanger, by 20 seconds.

Bob used a brand new model weighing 0.38 of a gram, complete with VP prop. The flight reached a height of 120/125 feet on 0.36 grams of rubber. The air was buoyant without being exceptional and 40 minutes is perfectly possible in this 150 foot site. The model was very similar to that in the plan published in INAV 106, with a slightly bigger tailplane area.

F1D EUROPEAN CHAMPIONSHIPS 2003 – PHOTO ALBUM





F1D EUROPEAN CHAMPIONSHIPS 2003												INDIVIDUAL RESULTS		
Place	Family Name	First Name	Junior	Team	No.	1	2	3	4	5	6	Best	2nd	Total
1	Schramm	Lutz		GER	015	32:14	33:54	29:37	00:00	30:22	33:13	33:54	33:13	07:07
2	Romblad	Jonas		SWE	045	30:04	11:57	28:57	29:37	31:35	18:16	31:35	30:04	01:39
3	Manieri	Fabio		ITA	022	24:40	30:02	31:35	14:04	10:23	27:05	31:35	30:02	01:37
4	Popa	Aurel		ROM	038	07:36	29:08	32:03	26:04	25:20	15:56	32:03	29:08	01:11
5	Korniychuk	Oleh		UKR	048	30:08	30:44	00:00	30:26	27:19	16:30	30:44	30:26	01:10
6	Lefever	Geoffrey		GBR	012	29:54	31:10	16:59	15:12	28:32	26:36	31:10	29:54	01:04
7	Keller	Peter		SUI	044	26:38	34:07	00:00	21:12	00:15	10:37	34:07	26:38	00:45
8	Mangalea	Corneliu		ROM	040	10:21	30:20	25:30	00:15	29:49	28:06	30:20	29:49	00:09
9	Kovalyov	Oleksandr		UKR	049	29:12	30:55	29:13	23:08	26:11	28:20	30:55	29:13	00:08
10	Ree	Andras		HUN	018	28:01	31:08	00:00	00:17	28:28	19:36	31:08	28:28	59:36
11	Richards	Derek		GBR	011	28:35	29:37	26:05	25:01	23:29	28:41	29:37	28:41	58:18
12	Aikman	Nick		GBR	013	27:43	30:21	05:43	00:00	00:00	26:26	30:21	27:43	58:04
13	Mosolov	Sergiy		UKR	047	24:21	33:27	00:00	17:59	23:47	00:00	33:27	24:21	57:48
14	Brendel	Gert		NED	030	00:00	00:00	30:47	00:32	26:48	24:19	30:47	26:48	57:35
15	Ciapala	Edward		POL	032	18:17	24:19	26:24	28:24	28:39	26:30	28:39	28:24	57:03
16	Orsovai	Dezso		HUN	019	17:30	00:09	27:37	05:45	25:41	29:00	29:00	27:37	56:37
17	Pontan	Sven		SWE	046	19:37	26:03	18:55	29:49	00:00	18:27	29:49	26:03	55:52
18	Frugoli	Jean-Francois		FRA	009	25:18	28:48	05:35	22:43	26:30	24:02	28:48	26:30	55:18
19	Lotz	Rainer		GER	014	00:06	00:00	28:37	09:17	25:59	19:05	28:37	25:59	54:36
20	Midic	Slobodan		SCG	041	14:48	28:13	25:54	22:32	26:21	23:52	28:13	26:21	54:34
21	Amoraritei	Dan		ROM	039	01:07	23:46	26:08	22:51	27:59	22:10	27:59	26:08	54:07
22	Dihm	Jan		POL	033	23:36	25:14	17:30	27:01	26:47	00:00	27:01	26:47	53:48
23	Nimptsch	Werner		GER	016	19:31	26:14	20:29	26:46	19:02	00:13	26:46	26:14	53:00
24	Siebenmann	Dieter		SUI	043	22:41	29:18	00:00	06:17	01:21	23:24	29:18	23:24	52:42
25	Barberis	Didier		FRA	010	23:45	24:38	20:13	18:34	06:54	27:17	27:17	24:38	51:55
26	Medina-Mangas	Daniel		ESP	004	21:11	27:40	24:15	12:59	00:00	05:51	27:40	24:15	51:55
27	Lotz	Philip	J	GER	017	08:39	26:47	19:30	24:20	22:20	24:53	26:47	24:53	51:40
28	Rogowski	Mariusz	J	POL	036	22:57	24:54	23:40	26:12	00:00	24:27	26:12	24:54	51:06
29	Markiewicz	Jerzy		POL	034	21:39	25:31	19:45	18:04	24:55	22:43	25:31	24:55	50:26
30	Kaplan	Mikita		CZE	001	25:08	25:01	04:30	22:04	00:00	13:33	25:08	25:01	50:09
31	Sukosd	Zoltan		HUN	020	06:50	21:24	19:06	00:15	20:24	26:48	26:48	21:24	48:12
32	Champion	Robert		FRA	008	23:17	22:19	21:13	24:16	14:21	20:15	24:16	23:17	47:33
33	Kaplanova	Klara		CZE	003	23:05	19:53	10:12	22:32	00:17	20:56	23:05	22:32	45:37
34	Nore	Pentti		FIN	007	17:45	19:10	24:48	15:39	00:00	00:00	24:48	19:10	43:58
35	Jarczyk	Krystian	J	POL	037	19:48	20:33	19:59	23:00	19:06	19:54	23:00	20:33	43:33
36	Pianigiani	Franco		ITA	023	10:39	17:22	12:57	11:01	18:56	23:03	23:03	18:56	41:59
37	Pukowiec	Michal	J	POL	035	18:56	19:33	03:00	11:55	21:26	18:33	21:26	19:33	40:59
38	De Angelini	Giacomo		ITA	021	15:10	17:12	13:42	10:05	18:58	21:50	21:50	18:58	40:48
39	Englund	Leif		FIN	005	20:02	05:47	16:59	18:30	18:59	19:39	20:02	19:39	39:41
40	Cinert	Zdenek		CZE	002	16:09	15:05	16:40	13:51	12:40	19:07	19:07	16:40	35:47
41	Kaplanova	Gabriela	J	CZE	050	14:47	00:02	12:45	05:40	11:46	20:53	20:53	14:47	35:40
42	Erofejeff	Harro		FIN	006	00:00	07:04	02:50	01:16	13:11	13:04	13:11	13:04	26:15

F1D EUROPEAN CHAMPIONSHIPS 2003

	SENIOR Team Results		
1	Ukraine	UKR	179.06
2	Great Britain	GBR	177.26
3	Romania	ROM	175.27
4	Germany	GER	174.43
5	Hungary	HUN	164.25
6	Poland	POL	161.17
7	France	FRA	154.46
8	Italy	ITA	144.24
9	Czech Republic	CZE	131.33
10	Sweden	SWE	117.31
11	Switzerland	SUI	113.27
12	Finland	FIN	109.54
13	Netherlands	NED	57.35
14	Serbia & Montenegro	SCG	54.34
15	Spain	ESP	51.55

	JUNIOR Team Results		
1	Poland	POL	135.38
2	Germany	GER	51.40
3	Czech Republic	CZE	35.40

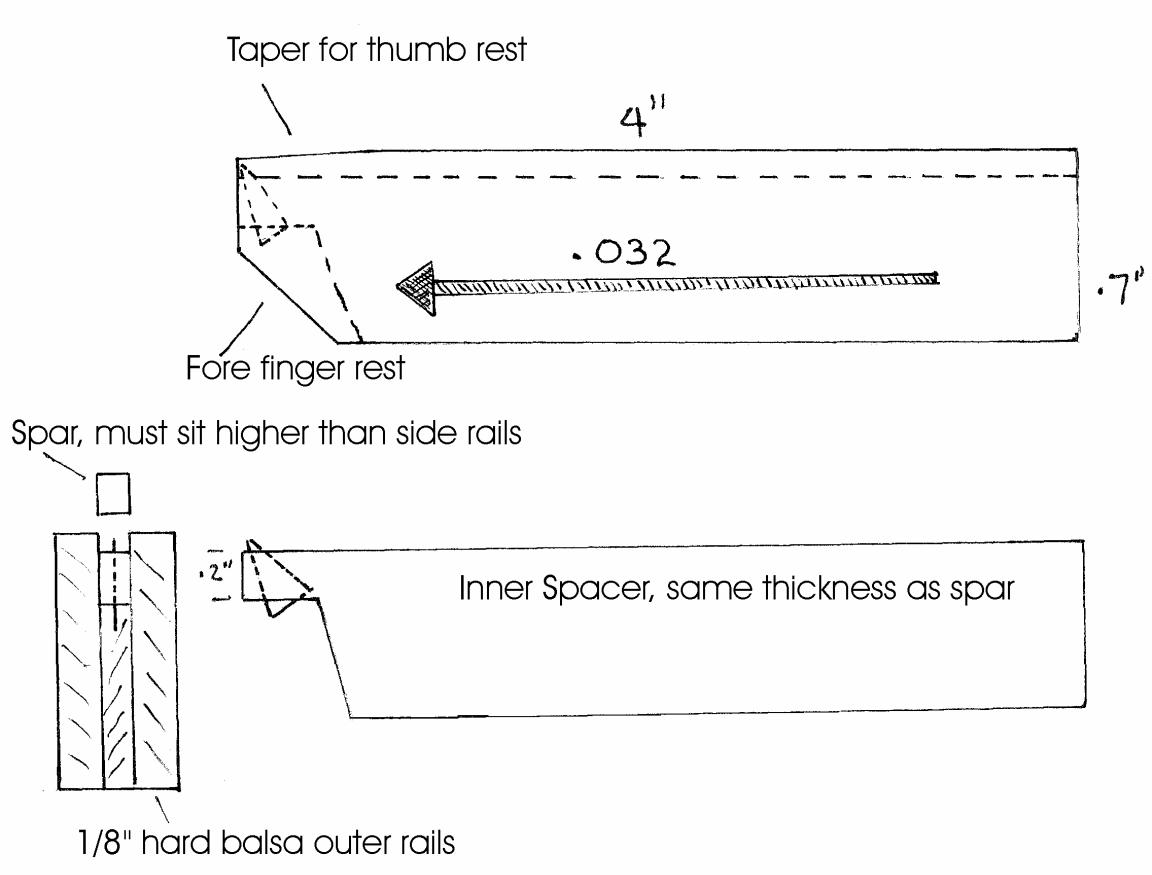
SPAR GROOVING JIG

by Larry Coslick

This simple jig makes it easy to inlay boron on spars and wing posts. Running the spar or wingpost through the jig will make a straight groove along its entire length The base that holds be blade is made from the same thickness balsa as the spar and this insures that the spar will stay centered on the blade.

Take a carbon steel razor blade, snap off one edge to a point and then snap off the tip to about .3 inches long. Cut a vertical slot at the relieved end of the base to accept the blade Depending on the grain of the wood it may take several tries to center the blade. Angle the blade and extend it about .007" above the base. Do not place the blade in a vertical plane because it will cause a small sliver of balsa from the spar to be trapped in front of the blade. The side rails are made from hard .125" balsa to keep them from flexing. Place the side rails slightly below the height of the spar and taper it down toward the blade, See drawing, The whole jig is glued together with thin CA and takes about ten minutes to make one after a few of them are made.

Place the spar in front of the blade and place four fingers under the jig with the thumb on top of the spar over the blade. Press down lightly on the spar and push the spar forward until one inch extends past the blade and then pull the spar through the rest of the way. Use a perfectly flat surface such as glass to mount the spar. Take a strip of **low tack** masking tape longer than the spar and secure it to the glass with a piece of tape at each end. Lay thin straight edge on the front edge of the tape and then the spar along the straight edge. Glue is applied to the boron by running it up through a #25 hypodermic needle and syringe filled with thinned Ambroid or Duco. Place the boron at one end of the spar over the groove and wet one-inch of the boron with acetone. Immediately push the boron into the spar with the backside of a single razor blade. Don't use a lot of pressure and don't flood the boron with acetone. Use this procedure the rest of the way along be spar. Wait about two minutes; remove the straight edge and lift one end of the masking tape from the glass. Place your finger under the spar at the loose end and by moving your finger forward and pulling down on the tape the spar will easily release from the tape, Groove the other side of the spar at this time and lay in the second piece of boron. Sometimes there are dark grain lines that cut across the groove that can cause the cutter to skip. Take a razor blade and go over those spots.



BALSA FOR INDOOR MODELS

From Joe Maxwell's book

1 . Sheets

Indoor balsa, that is balsa sold specifically for building Indoor models, has a number of characteristics which distinguish it from the run-of-mill stock found in the average model shop. It is supplied in relatively short narrow sheets which have been sawn from the lightest, best quality planks obtainable. In its production, particular attention is paid to surface finish and the grain. Each sheet is marked with its thickness, density and grain.

The standard size of an Indoor balsa sheet is 18" long by 1-1/8" wide combined with a range of thicknesses from 0.008" to 0.125". Indoor models use only small amounts of balsa, so these sizes are adequate, but it is interesting to trace their origin. As with many innovations in Indoor supplies, they were first introduced by JASCO.
When received, the rough balsa planks from which the sheets will be sawn are typically just over 36" long, so the length of 18" is obviously half a plank. The source of the 1-1/8" dimension is a little more obscure.
In the 1933 JASCO catalogue the sheet width was 1", but by 1935 it had gone up to 1-1/8" . The reason for this was that 1" proved to be just too narrow for making tubular motor sticks, Thus 1-1/8" became the standard, and has remained ever since.

Narrow sheets have some useful attributes. They are less difficult to saw to the precise limits and finish required. The variation in density and grain across the sheet is likely to be smaller than in wider sheets, Not least, they allow the scarce fight balsa to be shared out to a greater number of users.

No indoor modeller would think of using a sheet with any obvious flaws in it, but there are some less conspicuous defects to look out for. Principal amongst these is the existence of shakes. When a young tree is bent by a severe wind, it will crack without actually breaking. As the tree continues to grow, these cracks, called shakes, become embedded within the trunk, and do not show up until the log has been sawn into small pieces; sometimes not until the sheet stage. In a sheet, the shakes appear as hair-line, almost invisible, cracks running across. On an A grain sheet the shakes will run right across, but in C grain they may run only part way. Such sheets should be avoided at all cost, as any strips cut from them will be drastically weakened.

Shakes can be detected by holding the sheet in front of a bright light, as can another defect - uneven density across the sheet. A certain amount of variation across a sheet is inevitable, especially with C grain, but definite dark and light streaks indicate a sheet which should be rejected, or at least treated with caution.

The best overall colour of a sheet is a moot point. Modellers enthuse about "white" balsa, which is certainly most attractive in appearance, but I have never seen any evidence to prove that it is technically superior to the more usual beige shades. Distinctly brown balsa, which used to be quite common, now seems to be a thing of the past. 

The USA Indoor Teams & Team Selection Program needs your support!

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2004 INTERNATIONAL INDOOR POSTAL CONTEST

For Ministick and A-6 Events

Andrew Tagliafico and Bob Stalick are pleased to announce that we are sponsoring the 2004 International Indoor Postal Contest. We have made a couple of changes in the events and dates for 2004. This year we are sponsoring only two events: Ministick and A-6. The competition will begin on January 1, 2004 and conclude no later than April 30, 2004. As in the past, contestants may fly as many times as they wish in as many sites as they wish during this 4 month period. Only the highest score will be counted in each event. All scores are to be mailed to Andrew Tagliafico at the address below, and all scores must be received no later than May 15, 2004.

Scores will be published twice during the competition and sent to all who have registered scores. The first publication is expected to be around February 15, 2004. The second will be around April 1, 2004. A final publication of scores will accompany the giving of prizes after all flights have been registered, sometime after May 15, 2004. All participants will receive a final report. Trophies will be awarded to third place in each event.

All scores must be posted on the official score sheet, which is attached. Please make additional copies as needed. Please use only this score sheet and send only to Andrew Tagliafico.

Ministick

The contest is open to indoor models that comply with the AMA Ministick rules. All contest flights are to be timed by someone other than the flier. The best single flight time wins., after the flight time has been corrected for different ceiling heights. Ceiling height to be measured as per FAI rules, but with a five meter diameter circle. The corrections factor is 627 divided by (167+46x the square root of the ceiling height in feet). The time in seconds will be multiplied by this number to give the corrected time.

Mini-Stick Model Rules

1. The Ministick model shall be a monoplane covered with any commercially available material sold in sheet from. Microfilm is not allowed.
2. The maximum projected wingspan shall be seven (7") inches.
3. The maximum wing chord shall be two and one-half (2 1/2") inches.
4. The maximum length from front of nose bearing to front of rear motor hook shall be five (5") inches.
5. The maximum length from front of nose bearing to rearmost part of model shall b e ten (10") inches.
6. The projected area of the stabilizer shall not exceed 50 percent of the projected area of the wing.
7. The maximum diameter of the propeller shall be seven (7") inches. The propeller shall be constructed of wood. Wire shafts are permitted. Hubs that allow blade replacement and/or manual pitch adjustment are allowed. Mechanisms that cause variable pitch and/or variable diameter of propellers while in flight shall not be allowed (Natural flexing and flaring of wooden blades is allowed).
8. The minimum overall weight of the model (without motor) shall be 0.015 ounce.
9. Construction is to be primarily wood, with adhesives used only for joining. Tissue and/or thread is permitted for wrapping bearings, hooks and for making sockets, if desired. Boron, carbon fiber, Kevlar and fine wire bracing are not permitted.
10. Mechanisms that restrict the torque available to the propeller are not allowed.

Send Results to:
Andrew Tagliafico
10039 SW Quail Post Road
Portland, OR 97219
USA

A-6

The contest is open to indoor models that comply with the A-6 rules. All contest flights to be timed by someone other than the flier.
Best single flight time wins after the flight time has been corrected for the 70 foot factor. Ceiling height will be determined by the AMA/FAI measurement method. Flight times will be normalized against times from the highest site entered according to the following formula:

- The normalized flight time = 2/3 (highest ceiling height) - (local ceiling height) + (local time).
- Highest ceiling height will be established at 70 feet until an entry from a higher site is received.
- The official normalized times will not be available until the competition is completed.

A-6 Model Rules

1. 30 sq. in. max wing area.
2. 1/32" max prop shaft diameter.
3. 6" max prop diameter. The blades are to be flat, no camber. Blades may b e made of 1/32" thick (1mm)balsa or unlightened plastic, but not foam.
4. 6" max motor stick length as measured from the prop thrust bearing to the rear hook. Tail boom length is unlimited.
5. All strip wood construction is to be a minimum of 1/16x1/16" (1.5x1.5mm where only metric sizes are available). Strip wood may not be modified to any shape other than a square.
6. All sheet wood construction, prop blades, wing and stab ribs are to be a minimum of 1/32" (1mm) thick. Prop blade edges may not be rounded.
7. All wing and stab ribs will be 1/32" x 1/16" (1.5mmx1mm) minimum cross section.
8. Cover materials are limited to: Japanese tissue, Gampi paper or condenser paper.
9. Only wood, wire, adhesives and allowed covering materials can be used f or construction with the exception of the prop shaft support and bearing which may be wire, aluminum or plastic. No special indoor material may be used.
10. Rubber power only.
11. The use of metric size wood is restricted to those that normally cannot get other size wood.
12. The model must weigh a minimum of 1.2 grams.