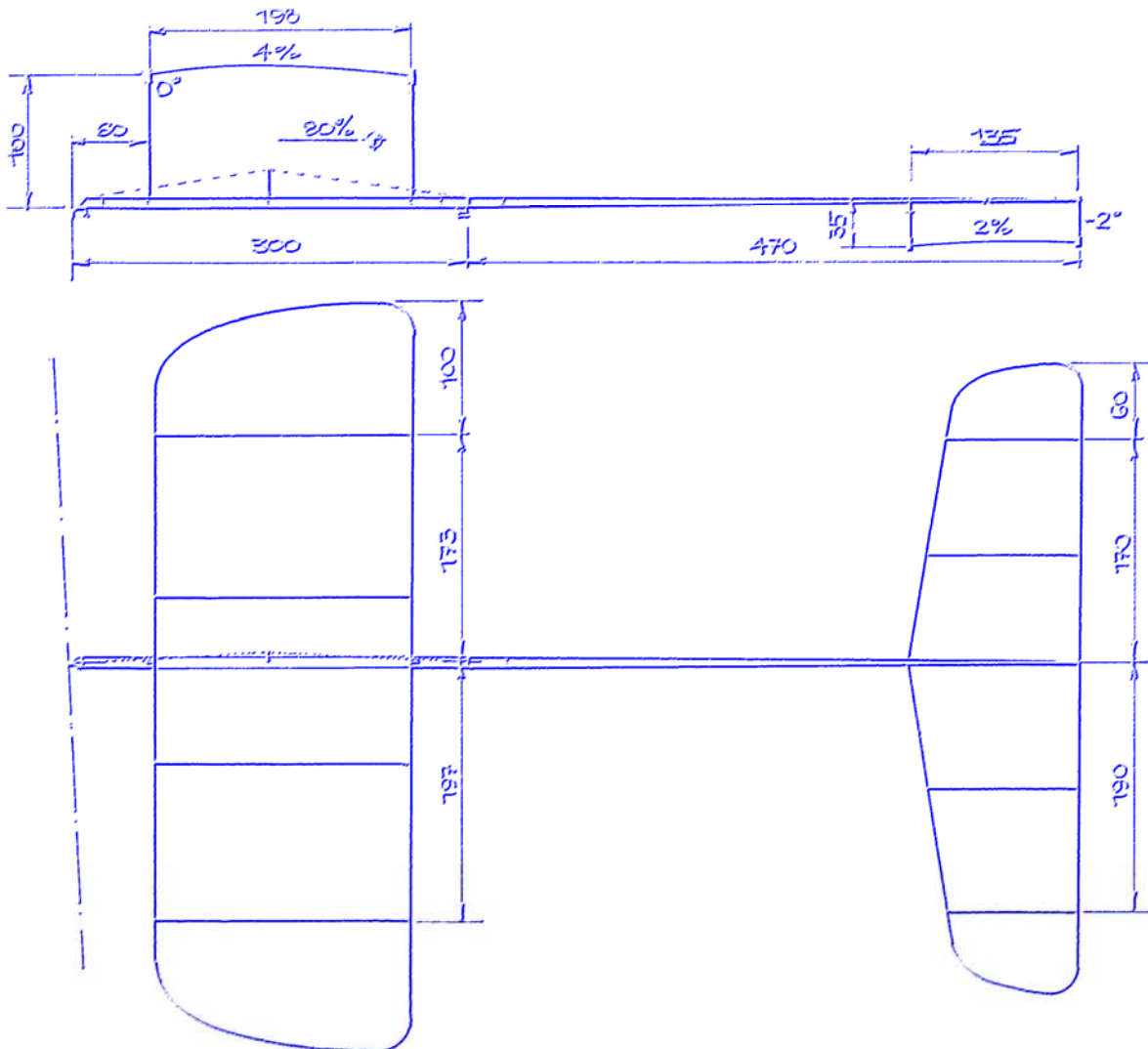


## Fall 2008

## 2008 World Championships



# FROM THE EDITOR'S DESK

Season's Greetings to all our subscribers. After much work, INAV #123 is done and you have hopefully received this issue before the New Year. We think this latest issue of INAV is full of great material and as always, we thank our contributors for their hard work and terrific articles. After many years without a comparable document, Jeff Hood has put together a great indoor resource list which we think will be helpful to all indoor flyers. Slobodan Midich has contributed another excellent article, this time describing his experimentation with variable diameter props, which seem to have garnered a renewed interest with top F1D flyers. In addition, Carl Bakay continues the Beginner's Corner column, which we encourage our subscribers to distribute to young and interested indoor flyers. Great contest coverage has been provided by Glen Simperts, Nick Aikman, and John Lenderman. As a Food, Drug and Medical Device lawyer, I'll refrain from commenting on Mark Bennett's Fliagra plan/article other than to say it looks like a great project with times to back up its potent name.

I would like to renew our request for continued contributions of articles, comments and letters to the editor. It took us a bit longer than usual to get enough material for a full issue, and some of that is probably attributable to my lack of time in recent months to aggressively chase down new material. As you all know, INAV relies on the content contributed by our readers to put together our publication, and the more articles we get, the more great issues we can put out.

With the new year almost upon us, I would also like to get people thinking about the 2009 USIC/Indoor Nationals (particularly in the U.S., but our international readers are encouraged to participate as well; especially those from my birthplace in the Great White North). As many of you know, USIC attendance was down a bit in 2008, which we think to some extent may be attributable to the sky high gas prices this summer and the slowing economy. Well, gas prices have come down but the economy has really run into the Minidome's big blue scoreboard (so to speak). Accordingly, if your finances allow, planning for USIC should start earlier than ever. While I have only been attending the event for three years, it is one of the highlights of my year and it never ceases to amaze me how much I learn, the friends I make, and the good times had by all.

To close, I'll relate an interesting interaction I had at work recently that shows you never know where a potential indoor flyer might be hiding. The other week, one of the Deputy Directors of the Centers for Disease Control was in my offices for a meeting we were having. He is a serious fellow, with a resume longer than this issue, dressed in full Commissioned Corps uniform. We left the conference room to go to my office so he could download some documentation to my computer for printing and distribution. As we walked into my office, he immediately smiled when he noticed the Peanut scale models (a Mr. Mulligan, Dr.I, and a P51) on my shelves as well as the ministick I keep at work to provide some relief during my many weekends in the office. He said "are you a flyer?" To which I responded that it depends on who you ask, but I certainly make attempts at flight. Well, it turns out the Deputy Director is a long time modeler with all sorts of (mostly outdoor, but a bit of indoor) freeflight under his belt. In recent years, he has focused on paper models (Fiddler's Green type stuff). However, I cajoled him throughout the afternoon and have high hopes of getting him back into balsa. Our last conversation concluded with a brief discussion of the logistics of getting from Atlanta to Johnson City. In closing, thanks again to our great contributors and the efforts of our editorial team, and my personal thanks to Jeff Hood without whom I would be up the proverbial creek without a paddle. We hope you all enjoy the issue.

Tony Pavel



**TRADE FAIR HALL 1 - 2008 WORLD CHAMPIONSHIPS**



**TRADE FAIR HALL 1 - INSIDE THE HALL**

INAV subscriptions are for a 1 year period, during which 4 issues are anticipated.

USA subscriptions are mailed bulk rate, all others are air mail.

Adult subscriptions:

USA US \$15.00/year

Canada US \$19.00/year

All Others US \$24.00/year

Make checks payable to "Tony Pavel/INAV"

Junior Subscriptions: Subtract US\$6.00 from the appropriate adult price.

Junior subscriptions are subsidized by the sale of the INAV archive CD and the donations of members. They are only available to those 18 or younger. To get a Junior rate, proof of age must be supplied with the subscription payment. Valid proof would include copies of high school or lower ID card, government issued permit, license, or ID with birth date, Flying organization ID card showing non-adult status, or anything you feel proves your eligibility.

Send all subscriptions to:

Tony Pavel

1921 S St. NW

Washington, DC 20009

paveltony@gmail.com

Co-Editors – Carl Bakay, Jeff Hood

Contributing Editor - Nick Aikman, U.K.

Contributing Editor – Bill Gowen

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.

# FLIAGRA - LOW-CEILING F1D

Mark Bennett

This design, "Fliagra"--is supposed to stay up longer. As an analog to patented designs, it's available over-the-counter, without prescription. Fliagra set a Cat 1 AMA record of 27:50 on 8/27/08. (These statements have not been evaluated by the FDA.) My philosophy for low ceiling F1d flying is that the first task is to use up all rubber turns--not easy to do with typical 9" motors and 19" props. So, I have gravitated to fatter motors (8.4 or 8.5" long, unstretched) and smaller props (17.6"). The problem remains in how to achieve pitch change that avoids bumping a Cat 1 ceiling (where I fly, 22 feet) for entire flight, yet delivers the very highest RPMs during final 6 minutes of descent. The perfect VP spring ought to deliver such a profile, but I haven't found it yet. Rather, after a quick (2 minute) climb almost to ceiling, a slow descent at 38-39 RPMs, and second climb at increasing RPMs, I usually bump the ceiling from about 14 minutes past launch through to about 21 minutes. I assume that's where much energy is being wasted-- with unnecessary climb pitch in that phase. I get a desirable high RPM (59-61) descent for final 6-7 minutes. But if the perfect VP spring were able to keep model off the ceiling completely, I believe it would buy another minute or two of time. Then, goal is to do the same thing with a bigger prop for another 1/2 or 1 minute, maybe. Springs I've tried: 9 wraps of .009" wire, 10 of .009", 8 of .009", 8 of .008", 6 of .008" and 4 of .008". Please email me if you have a suggestion for better VP spring.

The weights described on plan are what my brand new F1d parts weight but by the time they are contest or record trial-ready (meaning repairs) , there's usually not much ballast to add, if any. Also, the wingspan shown on plan was a building error which I recorded as is for the sake of AMA documentation. However, I suggest not shortchanging wingspan, and getting closer to 55 cm, such as 21.5".

Mark Bennett

F1diddler@yahoo.com

## Indoor Model Specialties

### High quality, Low prices

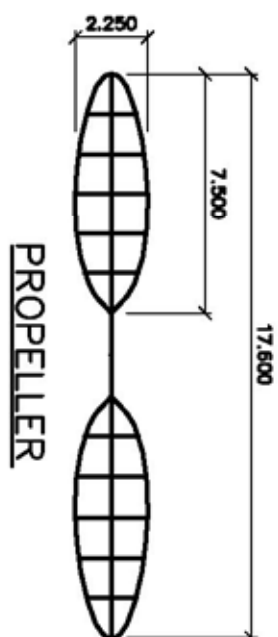
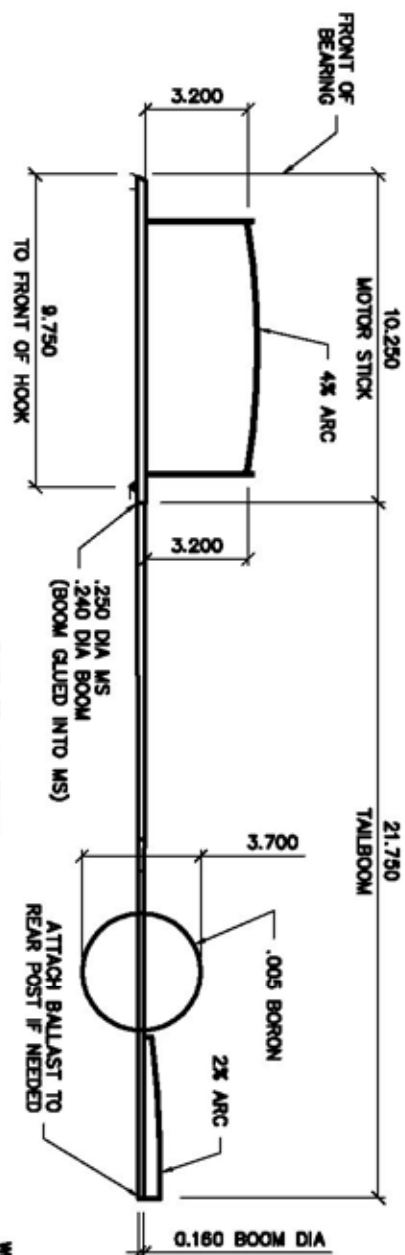
Tools from Scales to Rubber Strippers  
Material from Ultrafilm to Thrust Bearings  
Bambino competitive Science Olympiad model kit

See my brochure under Links at  
<http://www.indoorduration.com>

Ray Harlan  
15 Happy Hollow Road  
Wayland, MA 01778  
508.358.4013

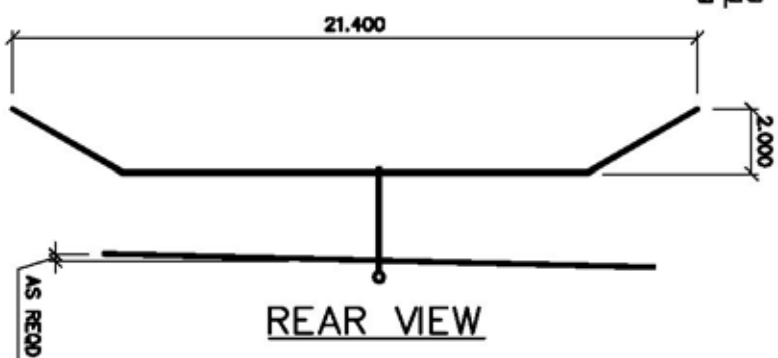
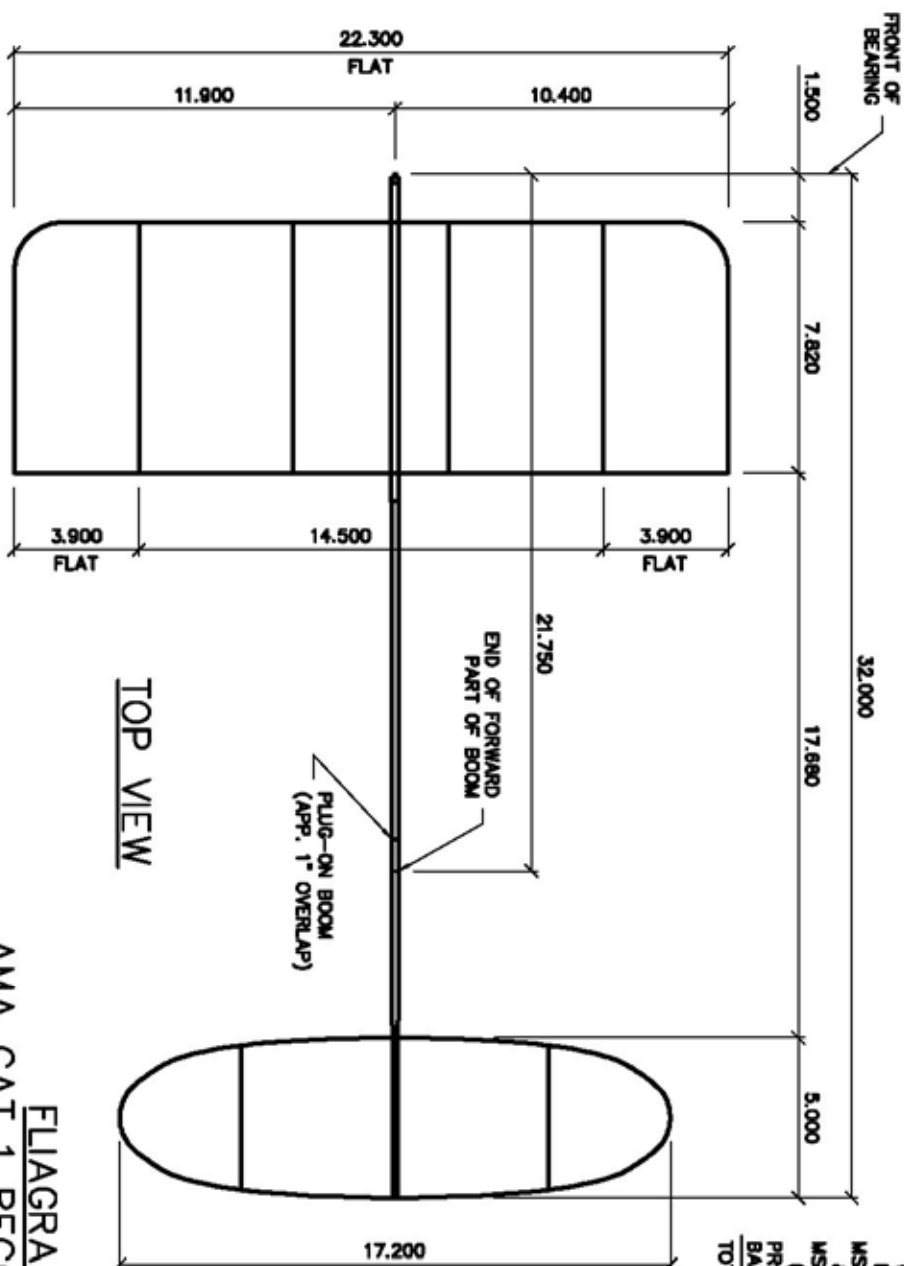
Mastercard and Visa accepted





**WEIGHTS**

WING W/ BORONED SPARS	.323g
STAB INC. TUBES	.132g
RUDDER	.017g
REAR BOOM ASSY	.110g
W/ BORON T & B, RUDDER & POSTS	
MS (BORON OPTIONAL) & POSTS	.273g
MS AND FRONT OF BOOM (BOOM W/ BORON T & B)	.360g
PROP (W/ VP PER INAV 89)	.230g
BALLAST	.028g
<b>TOTAL</b>	<b>1.203g</b>



**FLIAGRA**  
**AMA CAT 1 RECORD F1D**  
 BUILT AND FLOWN BY MARK BENNETT  
 RECORD FLIGHT 27:50  
 AUGUST 27, 2008

## RESULTS FOR THE 2008 INTERNATIONAL POSTAL MINISTICK AND A-6 CONTEST

Here are the 2008 International Postal Contest results for Ministick and A-6. While we did not have the previous number of entries as before, the quality was quite good. We did have the 2007 year with no contest so starting back up, the word may not have gotten around to everybody. The Brainbusters will run the contest again for 2009. Please pass the word on. We do want to recognize one individual, not just for his wining ways, but getting all his countrymen's scores in to us the scorers. That man is Akihiro Danjo. Akihiro was 1<sup>st</sup> in Ministick in the International Class 1<sup>st</sup> again in the A-6 Class. Since we only had one entry from the International group, both International and USA A-6 has been combined. All of us here in the USA want to say, Well done!

All the winners are listed below, we have two classes for Ministick and one for A-6. If you are not aware of the Postal Contest rules, both events have a handicap factor due to the difference in ceiling heights in the various sites.

We want to thank all the contestants that entered and to their timers and any support people. Again we would like you and others to know that the Brainbusters will run this contest for the year 2009.

### MINISTICK INTERNATIONAL CLASS

First Place Akihiro Danjo	Japan	994
Second Place Toru Onishi	Japan	981
Third Place Shigeru Fujita	Japan	791

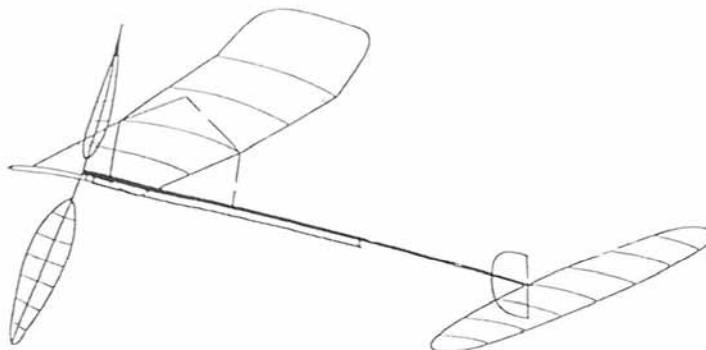
### MINISTICK USA CLASS

Walter Collins	1,034
Andrew Tagliafico	669
Abram Van Dover	583

### COMBINED A-6 CLASS

Akihiro Danjo	Japan	507
Andrew Tagliafico	USA	396
Walter Collins	USA	354

On the reverse page are names, countries, scores and other pertinent data of all contestants.



# INTERNATIONAL POSTAL MINISTICK SCORES AND OTHER DATA.

NAME	COUNTRY	TIME, SEC	CEILING HEIGHT	ADJUSTED TIME	DATE, BEST FLT	LOCATION
Collins, Walter	USA	505	9 Ft 2 In	1,034	29 Jan 08	Church Rec Room
Danjo, Akihiro	Japan	661	29 Ft 6 In	994	14 March 08	Kawasaki Marien Gym
Onishi, Toru	Japan	652	29 Ft 6 In	981	14 March 08	Kawasaki Marien Gym
Fujita Shigeru	Japan	526	29 Ft 6 In	791	14 March 08	Kawasaki Marien Gym
Okayasu, Hiroyuki	Japan	492	29 Ft 6 In	740	14 March 08	Kawasaki Marien Gym
Kaneko, Shoji	Japan	445	29 Ft 6 In	669	14 March 08	Kawasaki Marien Gym
Tagliafico, Andrew	USA	478	36 FT	669	24 Feb 08	S. Albany H.S.
Iida, Minoru	Japan	390	29 Ft 6 In	587	14 March 08	Kawasaki Marien Gym
Van Dover, Abram	USA	285	9 Ft 2 In	583	21 Feb 08	Church Rec Room
Wannop, Urlan	Scotland	347	25 Ft 2 In	547	16 Mar 08	Barony College
Tonetti, Silvano	Italy	350	29 Ft 6 In	526	20 Jan 08	Palafilarets Hall
Lorenzi, Davide	Italy	301	29 Ft 6 In	453	20 Jan 08	Palafilarets Hall
Sagnotti, Maurizio	Italy	269	29 Ft 6 In	405	20 Jan 08	Palafilarets Hall
Berray, Ed	USA	282	36 Ft	394	24 Feb 08	S. Albany H.S.
Lenderman, John	USA	267	36 Ft	373	30 Mar 08	S. Albany H.S.
Altig, Mike	USA	258	36 Ft	365	24 Feb 08	S. Albany H.S.
Funnell, Howard	UK	237	30	355	3 Feb 08	K2 Crawley
Arnotti, Jim	Scotland	196	25 Ft 2 In	309	16 Mar 08	Barony College
Sabey, Ron	Scotland	165	25 Ft 2 In	260	16 Mar 08	Barony College

# INTERNATIONAL POSTAL A-6 SCORES AND OTHER DATA.

Danjo, Akihiro	Japan	488	42 Ft 1 In	507	31 March 08	Yokohama Bunka Gym
Tagliafico, Andrew	USA	373	36 Ft	396	27 Jan 08	S. Albany H.S.
Collins, Walter	USA	354	70 Ft	354	27 Jan 08	Full Scale Tunnel
Berray, Ed	USA	327	36 Ft	350	27 Jan 08	S. Albany H.S.
Lenderman, John	USA	285	36 Ft	307	24 Feb 08	S. Albany H.s.
Von Buren, Karl	USA	265	20 Ft	298	11 Mar 08	Bridesburg Com Ctr
Altig, Michael	USA	216	36 Ft	239	30 Mar 08	S. Albany H.S.
Len Singer	USA	214	70 Ft	214	27 Jan 08	Full Scale Tunnel
Van Dover, Abram	USA	156	70 Ft	156	30 March 08	Full Scale Tunnel



# NATIONAL SCIENCE OLYMPIAD - 2008

**Glen Simpers**

There was drama, there was angst, there was a flight of 3 seconds, and a triumph of 3:29. As students from across the nation competed in the National Science Olympiad it was the calm hand of experienced modelers that allowed a smooth “Wright Stuff” event. On 31 May at George Washington University in Washington, D.C., High School and Middle School teams competed in science and engineering events. The Olympiad promotes an interest in science, engineering, and mathematics throughout our nation’s schools. As a culmination of many state and regional competitions, the National event was the “best of the best”.

The “Wright Stuff” event features rubber-band powered models flown indoors in a large gym. Tom Sanders and Jeff Anderson organized and ran this event. Both serious indoor model flyers, they knew how to efficiently run the event, easing the check-in of each model and reporting the results. Drawing upon local science teachers and at least one ‘D.C. Maxecuter’ modeler to time flights, they ran the event without a hitch. While Mary Sanders barred the door against the many coaches, well wishers, and errant wind gusts, each student team flew two flights.

The students maintained a sense of humor as they competed with good sportsmanship and serious intent. They were full of youthful enthusiasm. I felt honored to have met them.



**TOM SANDERS AND JEFF ANDERSON CHECK IN MODELS**



**JARAD SUTHERLAND, OF GRAND HAVEN H.S., MICHIGAN**

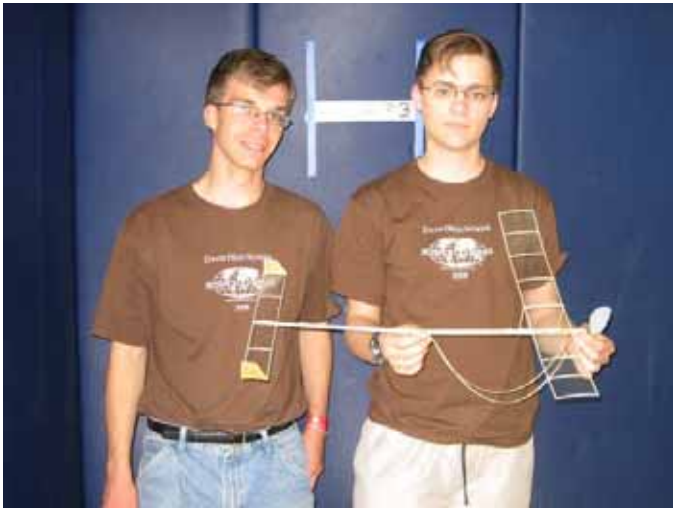


**WINDING FOR A FLIGHT. ANDREW LI UJAS SHAH  
OF SPRACKENKILL H.S, NEW YORK**

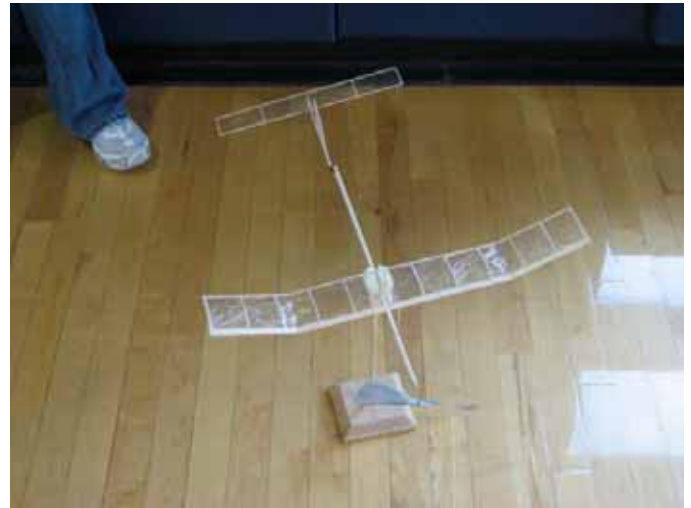


**LIKE ANY EVENT OF THIS KIND, THE TEAM T-SHIRTS  
WERE OFTEN HUMOROUS**





**ANDREW TAYLOR AND MICHAEL MURDOCK,  
DAVIS H.S, UTAH**



**WHILE THE GIRLS WERE CAMERA SHY, THEIR MODEL  
WAS NOT - AFTER A SUCCESSFUL FLIGHT**



**TEAM AT THE CHECK-IN TABLE**



**WINGLETS FOR FLYING EFFICIENCY**



**ONE OF THE MORE UNIQUE MODELS FROM  
PENNCREST H.S., PA**



**JEFF ANDERSON CHECKS IN ANOTHER TEAM**

# SOURCES FOR SUPPLIES (AND OTHER STUFF...)

**Jeff Hood**

Back in 1987, Richard Doig did an article on sources for indoor supplies. I have always thought that it was a great idea, and some of the information in it is still valuable. But thinking that it might be a good idea to update the listing (seeing that twenty plus years have passed...) I thought that I would compile a list of sources that I have used since getting into indoor a few years ago. Along with this are some methods and techniques that I have picked up along the way.

First, I need to note my appreciation for Tim Goldstein (F1D.biz/Peck-Polymers). When I got into indoor again a few years ago, that source was invaluable for finding things necessary for the hobby. I still get quite a bit from Tim, and I still don't know where he finds some of the things he carries. If you are looking for a one-stop place for indoor supplies, his is the place. With his acquisition of Peck-Polymers, along with IMS (Lew Gitlow), I think I could be safe in saying that he has the best single supply for indoor/rubber power modeling ever.

However, part of the hobby that is fun is hunting down other tools and supplies. (at least to me...) I'm probably too much of a tool junkie, spending more time looking for things than flying, but since I have a list, I thought I might as well share it.

Fortunately, many things are actually easier to find now because of the Internet, but unfortunately some things are no longer available, or almost impossible to find. But hopefully, this list will help with some other current sources for indoor materials and equipment. I'm sure that there are numerous suppliers for most of the items, and if anyone has any other sources for these items, or has sources for items not listed, please email them to me, and we can get them into future issues of INAV.

## Wood

Might as well start here, since not much flying is going to happen without balsa. Balsa could take up an entire article by itself (and already has...) and I am probably not the best to talk about buying indoor wood, since I decided over a year ago to go down the road of cutting my own. Needless to say, I spent much more time and money on figuring out the cutting and sourcing process than I would have if I had purchased from the normal sources. (However, I did learn quite a bit about balsa...) But anyway, here is my list...

### Local Craft Shops/Hobby Shops

You can find some great balsa in the racks at the local stores. Now, it takes a *long* time to sort through it, and you get quite a few odd looks standing there with a scale and sheets spread out everywhere, but there is good stock to be found. I found the best sheet I have ever seen for EZB motorsticks in a bin at the local Michael's one day. Around 4.3# for the sheet, and virtually every motorstick cut from it is stiffer than anything else I have found to date. And the price for the sheets is *very* reasonable, considering you are hand picking it.

### Online Balsa Suppliers - National Balsa, Solarbo, Katmar, etc.

Another good source for sheet wood. If you order their Contest Grade wood, you generally get decent wood between 5# - 6# wood, and sometimes some good sub-5# wood. To get some good wood from them, you generally have to order a bunch of sheets (10-20 per size) and sort through them... Good thing is that the stuff that doesn't make the grade is good for jigs and such, and the prices for the sheets is much lower than any hobby shop or other source.

### F1D.biz

If you want good wood, and want it sorted for density and SC, you can't do any better than F1D.biz. Tim's wood is accurately graded, and great quality. Sure it costs quite a bit per sheet, but you know you are getting what you ordered. His stock can be a bit thin at times, but if you know what you need, this is a great source.

### HoodsWood (my stuff...)

I started selling wood about a year ago, and generally have quite a bit on hand. I grade each sheet for thickness and grain, but don't grade *each* sheet for weight, rather taking the weight off the billet that it was cut from. I also don't grade for SC, mostly because it is so time consuming and would raise the price too much, and somewhat because it is only somewhat accurate. I generally will have a bunch on hand at the contests that I go to, since everyone likes to hand pick sheets (and nobody complains about something that they hand picked...)

## Scalpels

There are tons of places on the Internet to get scalpels handles and blades. One that I like is Indigo Instruments. Prices are good, and the quality of the blades is as good as anything that I have seen. You generally want the carbon steel blades, not the stainless steel ones, and you don't need sterile blades. They also have good tweezers, scissors, hemostats, and all kinds of other great tools that we need for the hobby.

## Razor Blades

Many sources for these also. But I really like Electron Microscopy Sciences, as they have the best carbon steel single edge blades I have found, at \$12.50 for a box of 100. They have many different type of razor blades, including the elusive carbon steel double edge blades that you break in half, then to a point. And as many of the online suppliers, they have all kinds of other stuff that can come in very useful.

The other blade that I have been using quite a bit comes from taking the cheap Bic orange and white disposable shavers, and taking the blades out. (have to be careful there, as you have to cut away a few plastic pieces, and you can get cut very easily...) The nice thing about these is that they are *very* sharp, and very flexible. I use them for sliding under wings and prop outlines after they have dried, as the blades are flexible enough to bend to make it easy, but thin enough to slip under outlines very easily. It would be nice to find a source for them without having to extract them, but I haven't been able to find them yet.

## Ambroid / Duco

The mainstays for gluing structures together. I use both, and generally pick up tubes when I see them for sale. Duco is easy to find, (Wal-Mart carries it...) but Ambroid can be a bit harder. Many hobby shops don't carry it anymore, since most of their sales are CyA. I just got one of the pint bottles of Ambroid from Peck, and that should last a long, long time. I have tried Siment, which is widely available, but it didn't seem to be as strong as the others. I use a few mixtures thinned to different ratios for different purposes, (as most do) and most of them have a few drops of plasticizer thrown in. (once again, from Peck...) Mostly I use Ambroid for wings, stabs and prop outlines, and Duco for gluing seams. For some reason, Duco seems to have less shrinkage problems in gluing seams. Once I switched to it, my crooked boom problems seemed to go away.

## CyA

I don't use much CyA in construction, other than for attaching prop shafts and field repairs. But from guys who use it for quite a bit (and even exclusively...) the recommendations are that you have to use fresh CyA, and apply it very sparingly. I keep a bottle of thin and medium in my field box, along with a vial of accelerator, which I apply with a fine dropper. If anyone has any information on brands that are better than others, let me know. But the good thing is that you can find the stuff *everywhere*.

## Glue Application

Going with the above, I use various methods to apply glue. I never did get the hang of using a syringe, although many do. I mostly use 1/2 oz. needle bottles. Peck has them in two sizes, of which I use the 25 ga. needle for most applications, and the larger 20 ga. for thinned aliphatic resin type glues (yellow wood glue). An alternative is to get 1/2 oz. LDPE bottles with luer lock caps, and then top them off with luer taper needles. The only problem is that I have only found a single source for them, and the minimum order is a bag of 50. The price is about \$1.50 (bottle, cap, and needle) and you do get the benefit of many different needle types, sizes and lengths. The source for anyone interested is Ellsworth Adhesives, and a source for the small scabbard caps for the needle (or syringes for that matter...) is Howard Electronic Instruments, who also supply needles.

I also use a tapered teflon stick (from Stan Chilton's article in INAV) where I got the 1/4" teflon sheet from Small Parts. Just cut that into 1/4" square lengths, taper the end, and you have a great non-stick applicator for moving things around, or applying a spot of glue. I also use this sometimes for applying a small bit of CyA to a joint for repairs. The smallest sheet you can get from Small Parts pretty much gives you a lifetime supply, or get some friends to go together and split the cost. Speaking of Small Parts... It is a great source for all kinds of things that are hard to find other places, although the cost is generally fairly steep, and the shipping high. But a great source for something if you just can't find it anywhere else.

Last but not least I use an array of small brushes, from 000 to 2 in size for applying glue, as well as applying Acetone as a solvent on joints. My favorite method for rolled tubes for motorsticks and booms is to use a 000 brush to apply a coat on both sides of the joint, let dry, and then use the brush to apply a minute amount about a half inch at a time. I get my brushes anywhere I find them, but *did* learn to only buy good quality brushes, especially in the very small sizes.

A note to anyone who is interested... I have seen quite a few of the glue applicators that were made a while back from food coloring bottles, with a neck that has a wire running through it to keep it from being clogged. I know that it was written up in INAV, and I also know from talking to quite a few guys out there that if someone felt like making a run of them, you would probably have no trouble selling them. I haven't made one yet, but they sure are nice.

# SOURCES FOR SUPPLIES (CONT.)

## Covering Adhesives

I only use 3M Sprayment to adhere film coverings. I never had much success with saliva or other concoctions, and it is readily available and becoming less expensive per can since the craft boom began a few years back. I try to get the 77 kind, but have used others with the same success. Most of the time I apply it in the standard manner (spray into the air, passing the part under and covering it with a misting of the adhesive...) but lately have been using a method I learned recently. Spray some of the Sprayment into a jar, thin with an appropriate solvent (of which the only thing that I have had success with is TCE - Trichloroethylene) and apply with a brush to the outline. Then after it dries, put the outline on the film, and go around the edges of the outline with a brush loaded with the solvent, which reactivates the adhesive and sticks the covering. This method creates less of a mess than the spray and mist method, and allows minor repositioning if necessary. A source for TCE is Chemical-Supermarket.com, although there are others (just Google TCE...) One problem with TCE is that it evaporates fairly rapidly, and you have to rethin occasionally. I have also used Bestine, which is rubber cement thinner, available in most art supply or craft stores, and I have heard that Naptha also works, but haven't tried it yet.

## Film

The lightest film available in 2008 is .5 micron OS Film. Peck sells OS Film, as well as .9 micron TruLite film. Ray Harlan also sells SuperUltrafilm, which is a .9 micron film, and UltraFilm, which is a 1.4 micron film, on his site IndoorSpecialties.com.

## Microfilm Solution

The *only* commercial microfilm solution available at this time seems to be Violet Dream. From talking to those who have used it, it is very good film, although it takes a while to order it and get it shipped.

## Tissue

Once again, the one stop source for all tissues is Peck. They have Esaki tissue (for rolling tissue tubes), Airspan (makes great hinges on VP props), and Silkspan (I use it for rolling motorstick and boom tubes... better wet strength than standard tissue). They also have condenser paper, although the use for that seems to be small, since the only class that it tends to be used on currently is A6.

## Wire

Peck carries all the sizes of music wire that you would need, in straightened lengths. But in a pinch, I often go to the local music supply stores and just use guitar strings, which come in a packet about 4" square, and when taken out are a bit curved, but generally not that much to matter. The guitar strings are cheaper than the straightened wire, and at least in my area I can get them when I need them. I have tried all kinds of different ways to straighten the wire, with limited success. If anyone knows a good way, let me know and I will gladly put it in INAV. Small Parts also carries music wire, but in a limited number of sizes.

## Pins

The German-made modeling pins that Peck carries are great. Sharp, well made, and have large plastic heads that won't pull off. They also carry insect pins, size 000, that are great for holding things together for repairs. The diameter of the pins is .010 (.25mm) which is much smaller than standard modeling pins, but still would cause structural damage if put through a spar or outline. Years ago, Ray Harlan wrote an article in INAV about using .005 music wire sharpened to a point, which is small enough to go through the fibers of balsa without much (if any) damage. I found a great source of insect pins (called minutens) that are approximately .004 in diameter from GardensAre.com. They don't have heads on them, but I just took some 1/16" square hard balsa, cut pieces 1/2" in length, and pushed the blunt end into the sticks and secured it with a drop of thin CyA. They work great for field repairs, and even holding some things in place during construction. Electrolysis needles are another option. I get mine from ElectricSpa.com, which has them in sizes from .003 to .006, and they have "handles" already in place. They are more expensive than the minutens, but you don't need that many, and a pack should last many, many years. To keep them easily accessible, I just put a block of foam in my toolbox, and stick them in (you do have to be careful on the smallest ones not to bend the pins...).

## Prop Washers

Peck carries die cut Teflon washers, .010 thick with a .018 hole. These are good for almost any size indoor plane, and the best thing about them is that you don't have to make them. However, if you really *want* to make your own, you can get Teflon sheet from Small Parts, and punch out your own (although getting the holes in the center is such a pain I gave up on that idea after the first try...). Peck also carries two sizes of Teflon tube, which you can slice off sections as needed, without the hassle of making the hole. One of the "Chopper" cutters (I got my "Chopper II" from Micro-Mark) is great for cutting the tubes to length, as well as being useful for other things. Another good way is to take a small block of aluminum and drill a hole the size of the tubing (a good tight fit, loose isn't good...) and slice off the washers with a razor blade, keeping the blade flush to the block. This helps keep the blade square, and works very well. I have also used Ruby jewel bearings as thrust washers. Unfortunately, I

have not been able to find a reliable source for them, although you can sometimes find them on EBay in packages of which you might find a dozen that are appropriate sizes for indoor.

## **Thrust Bearings**

The standard for bearings are the Harlan bearings from IndoorSpecialties.com. Three different sizes, EZB/F1D - Pennyplane - SciOly. You can also get them from Peck, and Peck carries bearings from the Indoor Model Supply (IMS) line. The other option (which I use for EZB and occasionally other classes...) is to make your own from music wire. You can't beat the price of making your own, and they are lighter. But getting the hang of making them..... that's another story. There are some great articles in INAV back issues that cover the process, but it still takes a while to get the knack of it.

## **Bracing Wire**

Both Peck and Indoor Specialties carry tungsten wire, in various sizes. Peck carries nichrome, and IS carries Karma. I don't know of any other current sources.

## **Kevlar Thread**

This is fairly easy to find. The fly tying crowd uses it, so you can find it online at most vendors that cater to them (Google "fly tying supplies"...). I found some great Kevlar thread at Cabella's, and the strands of the thread are loose enough that you can separate an individual strand from the thread, long enough for most purposes. I use it to wrap boron inlaid wing spars, as well as on the Aikman-style variable pitch hubs that I use. I also found a 6/0 Kevlar Thread at FlyTyingWorld.com that is the smallest gauge I have found to date, and does not "destrand" like some of the others.

## **Boron**

Where else... Peck and IS. IS carries .003 and .004, and Peck carries .003/.004/.0056. I don't know of any other sources.

## **Balsa Strippers**

The Harlan stripper from IS is worth it's weight in gold. I bought mine in the mid 80's during my first brief introduction to indoor flying, and can't imagine building without it. I did make one change in the last year, and that was to get a cutting mat (you can get them at Walmart, craft stores, etc.) and cut it to cover the base. It works much better than the wood base, and made a big difference. And if you want the Cadillac upgrade, get one of the blade holders from Peck. Machined out of aluminum, and with a design that has the blade at just the right angle to keep it tight to the fence, the combination of the cutting mat base and blade holder just can't be beat. Also I wouldn't give up my Jones-style stripper from Peck. I never was lucky enough (or smart enough in the 80's...) to get one of the original Jones models, but Tim's new version is a great tool. I also made one of the miniature versions of it (like Steve Gardner sold a while back) to keep in my toolbox for onsite needs. Too bad someone doesn't make a version of it for sale... (Hint for Tim... make a 1/5 size version of your current Jones style stripper... It would be *perfect* for a flight box)

## **Motor Stick Forms**

I mostly use the standard K&S brass tubing, found in virtually every hobby shop around. The sizes are generally sufficient, and it is inexpensive. One of the nice things with the telescoping tubing is if you need a length longer than an individual piece, you can cut a small length of the next smaller size, and CyA it inside the ends of two other pieces to connect them seamlessly. Another good option is to use graphite shafts or tubing, which is easily found from the kite flying community. I have some graphite tubes from KiteBuilder.com that work great, and you can get them in more sizes than the K&S tubing.

## **Boom Forms**

Indoor Specialties has an aluminum tapered boom form that works very well. However, the taper is more than I like for some classes, so I looked for other solutions. You can sometimes find inexpensive fishing poles that one or two of the sections serve well for boom forms, generally in fiberglass. I also found some tapered graphite tubes at KiteBuilder.com, which have a gradual taper to a larger section for the rear tip of the boom. The dimensions for the large end and small end are given, along with the length, so you can calculate which one would have the section that fits your needs. I also pirated the tip section of my old steering pole, which is perfect for F1D booms. Or find someone with a large metal lathe, and then you can have a boom form turned to exactly the taper that you want.

## **Micrometer/Thickness Gauge**

One tool that you really can not do without in this hobby. The standard micrometers and calipers are okay, but as they are designed to measure primarily metal, which does not compress as balsa and rubber do, they tend to be a bit harder to get repeatable results with. They are however fairly inexpensive, since you aren't working with tolerances as you would be in machining metal. So I tend to use dial thickness gauges for most of my measuring needs. These are the ones that close by themselves, and you push/pull a lever to *open* the jaws, and then let it close on the material that you are measuring. You can find small dial thickness gauges on EBay all the time for reasonable prices. Expect to pay around \$50 for a good one (Starrett 1010) if you get lucky. You can also get a Mitutoyo 7308 online for around \$130 new. Both of these are very high quality measuring



# SOURCES FOR SUPPLIES (CONT.)

devices, and should last a lifetime. I opted for one like Indoor Specialties sells, which is around \$35. It is an import version of the better ones, but I have found it to be more than sufficient for measuring rubber thickness. You will want to modify the spring in it for measuring rubber, since the default compresses rubber too much. Some guys take out the spring completely, but I found that you sometimes have problems with the jaws closing. So I just stretch the spring a bit at a time, until I get the compression that I want (which on a .100 strip would be between .001 and .002). You can get a large dial gauge from Harbor Freight for less than \$30. I use that size for measuring wood thickness, as it is a bit easier to handle. I have also have a digital gauge with large anvils for measuring wood thickness, as the larger area does not compress the wood as much, and tends to be more accurate.

## Scales

I have a Harlan beam balance which I still use, primarily for weighing large components (assembled wings, stabs, motorsticks, and whole planes...). The long arm of the balance makes it easy to have it hanging over the edge of a bench, and it is as accurate as anyone would need for indoor. I also have an inexpensive .01g resolution DuraScale which I got from SaveOnScales.com. You can get pretty much anything from them, and it is more of a personal preference on the design than anything else. The DuraScale is around \$60, and seems to work well. With digital scales, you pretty much get what you pay for in accuracy and repeatability. I also have an Acculab VIC 123 that I keep in the shop, which reads to .001g. I got it from Precision Weighing Balances - [search.balances.com](http://search.balances.com). The *only* problem with it is that you have to have it powered up for a while for it to stabilize. Depending on the temperature, it can take a few hours until it is fully set. Many guys that I have talked to leave theirs powered on all the time, and although it is fairly expensive, it is extremely accurate and repeatable.

## Torquemeter

Not much of a selection here. Peck carries the IMS torquemeter kit, but I don't think that Tim currently sells his version that he had in years past. I was lucky enough to get back into indoor when Wayne was making his Geauga torquemeters, and have one of the small models, but Wayne is not making them anymore, and currently has no plans to start production. The only other commercial torquemeter that I have seen is the old Jim Jones torquemeter, which has been out of production for a long time. So the situation is not great for commercial versions, although making your own is not that hard, and I have a homemade one that I use for anything over .6 in./oz. (the upper limit for my Geauga...). I actually like the small and compact size of the Jones torquemeter, and it would be nice if someone decided to start producing them.

## Winders

About the same situation as the torquemeters. If you are lucky enough to have a Wilder from many years ago, or a Geauga from a few years back, you can consider yourself lucky. They are about the only winders that were made commercially, and both are now out of production. Wilders have been selling for \$250+ on EBay when they come up, and I'm sure that the Geauga's would be in that ballpark, since they are very similar. If you don't have one of the above, about the only choice is to use one of the KP yellow winders, which you can get at Peck. They are nice and do the job, although they don't have a counter. But you can get them with a 10:1 ratio, which is the preferred ratio for indoor. Making your own winder is much more difficult than making a torquemeter, so unless someone wants to start machining winders, or unless you can buy a used one, that is about all that is available. However, Peck will be producing winders within the next year that will be modeled after the classic Wilder winders, which should help the situation.

## Rubber Strippers

The Harlan stripper from Indoor Specialties is the only one readily available. It is a very nice tool, and does the job extremely well. I think that there is someone else making a rubber stripper in Europe, but I don't have the source. The Leeson and Opegard strippers have been out of production for many years, and the Geauga is also not being made anymore. I was fortunate to get one of the Geauga strippers on one of the last runs that Wayne made, and it is simply an amazing piece of machining. Rubber strippers are even more difficult to engineer and manufacture than winders, so it might be a while until another model surfaces. Peck was looking into producing them, but I don't know what the current status of that project is.

## Stainless steel tubing

Used for miscellaneous VP pieces, you can either cut down hypo needles (easiest with a cut-off wheel in a Dremel-type tool...) or buy exactly the size you want from Small Parts. They have both standard and thin walled hypo tubing available, and you can get exactly the inside diameter that you need.

## Reamers

There are various sources for miniature reamers, which are very handy for creating and enlarging holes in prop shafts and such. Micro-Mark carries them, as well as ToolsGS.com. They come in a set of 6, which work from drill size 42 to 73. Peck also sells dental reamers, which come in much

smaller sizes and have very sharp points. I use them to start holes in prop shafts, and miscellaneous other things that need small holes. You can also get them from most any online dental supply company, usually found by searching for reamers or flex reamer. Or if you have a friendly dentist, they will probably give you a few if you ask.

## **Pliers**

I have learned my lesson here, and now only buy good quality pliers. The cheap ones just don't work for doing fine work with small diameter music wire. I use a set of flat nose pliers which are good for general bending, a set of extra thin long jaw chain nose pliers (needlenose) for where I need to make very tight angled bends, a set of long thin round nose pliers for bending loops, a set with one flat blade and one round blade (I probably use these more than the others...) which allow bending loops and angles without switching pliers. I also have a set of wire shears, which are needed for cutting larger music wire without trashing the jaws on a set of diagonal cutters. And last but not least is a pair of carbide jaw diagonal cutters, which I have had for over a year and the cutting jaw still looks new - no nicks or gouges like standard steel jaw pliers get when cutting .015 music wire. Peck has a good selection of pliers at good prices, and you can also look on virtually any online jewelry supply company (ShorInternational.com is a favorite of mine, where I got my carbide jaw diagonal cutters at the best price that I have seen...) for a large selection of sizes and jaw shapes. I have not tried parallel jaw pliers yet, but those who have used them say that they hold wire for bending much better than the standard design.

## **O Rings**

Indoor Specialties carries O-rings in two sizes, one size for Pennyplane and SO, and the other for everything smaller. I like the rubber O-rings for Pennyplane and larger planes, but where weight is critical (as in EZB and F1D) I cut my own from various types of plastic tubing. In your typical R/C hobby shop, you can find different sized push rods that make great O-ring material. I also stored a lifetime supply of Push-Up Pop sticks (when the kids were younger...) which are good for larger O-ring material. Some of the plastic Q-Tip sticks also make good O-rings for EZB and Ministick. But for any O-ring stock, you really need to test wind to make sure that they will withstand the torque for the given application before planning on using them at a contest. (ask me how I know...)

## **Rubber Lube**

I use Armor-All, set out in a pan for a few weeks to evaporate out all of the water-based stuff. You can speed the process by putting it in a pan and sitting it in an oven on a low temperature setting, but it doesn't smell that great, and wives generally don't like things like that. I just pour a bottle in an old baking pan, sit it in the corner, and in a few weeks it should be down to a clear liquid with some amber at the bottom. I don't know what the amber part is, but I pour off the clear, and put it in a bottle. Others do the same thing with Son-of-a-Gun and similar liquids, but I don't know if there is any appreciable difference. It's the silicone that matters for the lube. There are some commercial lubes available, and some use Dow 33 Silicone grease, which comes in a tube, but this is cheap, easy to work with, and seems to do the job.

## **Rubber**

Well, this one could be an article in itself. FAI Tan and Tan Supersport are about the only things available right now, and although some of the batches are quite good, they don't compare to the older Tan II. The problem is that Tan II was last produced in 7/02, which is now six years ago. If you get lucky, you can sometimes get a box of Tan II off of EBay, but expect to pay quite a bit for it. Recently a one pound box of 10/97, which is a good batch (but not a 5/99 or 2/99...) went for over \$150. A pound of 5/99 would likely go for 3 or 4 times that amount. I use my best Tan SS for testing, and my "good stuff" for contests. Good thing is that for indoor (unlike the poor outdoor rubber guys...) a pound will last quite a while. But this isn't new in the sport, and in the early 80's they had the same problem with Pirelli in the days before Tan II. Maybe someone someday will make a great rubber again. But until then, you just have to search for what you can find.

## **Balloons**

Peck and Indoor Specialties carry 3' balloons for steering. I never bothered to look for any other source, but I'm sure that they are out there somewhere. Mylar balloons that don't break (for retrieval, not steering...) can be picked up at most any party supply store, either locally or online. I like the quick release valves that Peck carries for filling the balloons, and I don't know of any other source for them. Or you can just use a length of dowel and rubber bands as that works fine also.

## **Steering Poles**

There are a few sources out there for fiberglass/carbon fiber steering poles. Jackite.com, which sells kite equipment, carries a nice fiberglass collapsing pole, in lengths from 13' to 31'. They are a bit larger than some of the other options, but a 28' pole cost less than \$50. If you search for "carp pole", you get quite a few UK sources (carp fishing must be much more popular over there than here in the US...) for poles, ranging from \$100 and up. Also, there is one source that has a website that has great poles, the lightest and smallest collapsed size that I have seen. And his prices are far lower than any of the other carp poles. His poles range from \$80 and up, and the website is listed in the list of suppliers at the end.

# SOURCES FOR SUPPLIES (CONT.)

## Steering Equipment

You want to have a good reel, but not too light (you don't want it floating away...) and I have found that Walmart, etc. have a large selection of inexpensive reels. I got one for less than \$20 that works great. It seems that the expensive reels are the lightest ones, and since that isn't really something that you want in a steering reel, the inexpensive ones work very well. I like the open bait casting type of reel, not a spinning reel, but both work. I also picked up a Pocket Fisherman a while back, and it works very well for a reel for Mylar balloons. It would be too light for a large balloon, but the nice thing is it packs very well, and they are fairly cheap.

Backing rod, which is used for the first 30' or so of the steering line and keeps props from hanging up on the line, is available from Peck in two sizes. The 1/4" size is nice, but has to be reinforced by slitting it down the center and inlaying a length of line, and then gluing it back together. The larger size, which I think is 3/8" can be used without reinforcement, and can also be found in most all home center stores.

## Storage Boxes

Foamboard is one of man's great inventions for our hobby. Strong, light, and cheap. And easier to work with than cardboard. I usually get mine when it is on sale at the local craft store (Michael's or AC Moore) for about \$1 a 24x30 sheet. I also make boxes out of Gatorboard, which is much stronger and just as light, but it is fairly expensive compared to the typical foamboard. You can sometimes get it at local art supply stores, and if you are lucky you might find a cutoff that they will sell fairly cheap. I also found a great gadget to cut the rabbets for joining either foamboard or Gatorboard. I got mine from DickBlick.com, and it is just called a Foamboard Rabbet Cutter, and is made for the 3/16" foamboard. It cuts a perfect sized rabbet, and you can make a box in no time. I also use styrene U-channel from Plastruct (the stuff that the model railroad guys use...) to make slides for mounting parts in the boxes. I just glue a piece on both sides of a sheet of balsa, and the channel between them makes a perfect slip fit for another sheet with tubes or posts for mounting wings and stabs.

## SUPPLIER LISTING

Peck-Polymers

[www.peck-polymers.com](http://www.peck-polymers.com)

877.754.7465

Pretty much everything needed for indoor

Indoor Specialties

[www.indoorspecialties.com](http://www.indoorspecialties.com)

508.358.4013

[ray@indoorspecialties.com](mailto:ray@indoorspecialties.com)

Rubber Stripper, Balsa Stripper, and other indoor items

Small Parts, Inc.

[www.smallparts.com](http://www.smallparts.com)

800.220.4242

All kinds of great things that are hard to find elsewhere

National Balsa

[www.nationalbalsa.com](http://www.nationalbalsa.com)

413.277.9500

Good quality wood and great service for "stock" wood

Indigo Instruments

[www.indigo.com](http://www.indigo.com)

877.746.4764

Great source for razor blades and other items

Micro-Mark

[www.micro-mark.com](http://www.micro-mark.com)

800.225.1066

Good source for modeling tools and supplies

Micro-Tools

[www.micro-tools.com](http://www.micro-tools.com)

707.446.1120

High quality tools

Collapsible Graphite Steering Poles

[mysite.verizon.net/igtov1/rodgallery\\_pole.html](http://mysite.verizon.net/igtov1/rodgallery_pole.html)

[igtov1@gmail.com](mailto:igtov1@gmail.com)

Best steering pole I have seen

[www.artsuppliesonline.com](http://www.artsuppliesonline.com)

800.967.7367

Good source for general supplies

[www.plastruct.com](http://www.plastruct.com)

800.666.7015

# BEGINNER'S CORNER

Carl Bakay

## TOOLS AND SUPPLIES

Let's start with the bench tools first. My most useful power tool is a bandsaw. It holds scroll blades for curvy work, and wider blades for straight cuts. If you use a fence on the bandsaw work table, or just a straight piece of wood clamped a fixed distance from the blade, you can cut your own spars from sheet stock. It is a fact that if a hobby or craft shop carries balsa at all, it is more likely to carry sheet than sticks. So rather than order these special, you can use a saw to rip them yourself, and save \$\$\$ in the process. You can also pick sheets for their stiffness and/or density, using the stiffer wood for leading and trailing edges and spars, and softer, lighter wood for crosspieces. I have about 10 mailing tubes glued together in a closet, and sort my strips by size and weight.

The second most useful power tool is a small drill press, with a chuck that will hold down to a 1/32" drill bit securely. A Dremel tool mounted in a drill press jig works best for really small holes, but is very high speed. My \$59.00 drill press from Harbor Freight Tools has a chuck that is well made enough to suit most needs. You don't need to spend a lot of money here.

As for small hand tools, a small set of wire cutters, needle nose pliers, and wire bending pliers are all you need to start. Harbor Freight has these, but quality counts here, so go to Micro Mark listed at the end of this article, and Tim Goldstein's A 2 Z Metalsmith Supply. For other building supplies, venture into Office Depot, Hobby Lobby or Michael's craft stores, they have Titebond, Elmers, and Cyanoacrylate cements, hardwood and balsa, metal rulers, compasses and protractors, and French curves. While you are there, pick up a project backboard (I call them science fair backboards) made from foam board, cut out two 18" x 24" squares, and glue together with Elmer's or Titebond, keeping it flat with some big books. Go to the drugstore and pick up cotton swabs, single and double edge razor blades. (You will find the Xacto hobby knives are thick, and split the small wood sizes used in indoor modeling.) Finally, go to an auto parts store and pick up a spray bottle of Son-of-a-Gun silicone protectant. It is a fine rubber lubricant. So is Curel Hand Lotion.

## TOOLBOXES

The toolbox I use most is not a toolbox at all, but a shoebox. It stays on the floor of the backseat of my car, ready for instant use with one or two of the rubber sport models in the trunk. Put these things in it: spare rubber motors, 1:10 winder, rubber lube, clay, scotch tape, masking tape, stopwatch, scissors, razor blade or hobby knife, pencil and paper to record times, CA, 3-in-1 oil, pins, needle nose pliers. You'll think of more. These items can be stolen from your workbench, but it is easiest to have a separate set.

The second toolbox is used for club contests or real contest competition. You can find many different styles at any sporting goods store in the fishing section. They also have clear parts boxes. Some people have an indoor and an outdoor toolbox, but a few I met at Johnson City picked out one with interchangeable trays, and just switch the trays out.

## THE DENNY DART

Neil Dennis way up in Bliss, New York, has designed a series of models for beginners called the Denny Dart. The Mark II is the basic intro design, followed by a Mark III with more wing area and better performance, and ending up with a Mark IV with curved wing and tail, airfoiled (curved) ribs, and a more efficient propeller. He will send you 3 of the same or one of each for a \$10.00 bill or check, postpaid. We chose this design over others because it is a well thought-out graded series of airplanes, ideal for learning quickly, and because he gave permission to reproduce the plans in INAV.

We will start with the middle one, as it is enough of an improvement on the original design to build it first, but is not any more difficult.. In Neil's own words,

*"The reason for the MKIII was to make the front spar from one piece of 12" wood, Karl Gies thought it would make it easier and I think that was right after making the change as it takes away the need to cut and paste the wing plan which could be a problem getting the spars straight. I think it is easier to build as the plan can be "stuck down" on a building board in total, the sticks can be added and the parts cut out, rather than having individual pieces of tissue to work with. So, I shortened it and made the chord wider to keep the wing area. I had to change the decalage a bit to make the trimming easier also. "*

Let's get started. Figure 1 shows what comes in the MK III kit, and Figure 2 shows everything laid out on our well-used building board. Tools and

## BEG. CORNER (CONT.)

materials needed aren't much – some glue, glue stick, razor blades, pins, and sandpaper. You can make a copy of the plan from this issue, and lay tissue over it, or use the tissue plan from the kit. In either case, the first thing to do is wad the tissue into a tight ball, carefully flatten it out, and iron as in Figure 3 it with a 'cotton' setting. This breaks up the paper fibers and gives the covering some elasticity, so it won't warp your plane over time with humidity changes.

All of the Denny Darts are made from 1/16" x 3/32" sticks, with the ones in the kit being 12" long. They may look the same, but some will be stiffer than others. Bend each one back and forth, and find three that are the stiffest. Use these for the leading and trailing edges of the wing, and the stabilizer. Cut the sticks to size, coat with glue stick, put a "glop" of glue (carpenter's wood glue or model cement) in a plastic bottle cap, dip the end or ends of the stick in the glue and press down over the tissue outline. Be sure to press the sticks together tightly, and don't leave any gaps. I always use straight pins at the ends, never through the wood, but straddling the pieces in an "X", as in Figure 4.

Let things dry at least an hour or two, and carefully cut the pieces free of the tissue with a new razor blade. Even though they are getting harder to find, the old double-edged razor blades my dad used (Wilkenson, Gillette) are thinner and sharper than any single-edged utility blade, and best for a job like this.

Cut the leading edge of the wing at the two x marks, lay it on a 3/4" thick book or two CD cases, and pin the wingtips down so there is 3/4" dihedral on both. The glue the x and y joints. Let dry thoroughly. You can glue a bit of paper or short piece of sewing thread to make them stronger. Also put a drop of glue on the leading edge and trailing edge center locations, and place the 5" piece of 1/8" square hard balsa down so the front and rear stick out equally. This is the wing mount to the motor stick (Figure 5).

The motor stick comes already fashioned in one-piece in the kits I bought. Place the stabilizer sticks-up on the building board, and glue the tapered part of the motor stick to the center stabilizer spar. Now glue the rudder to the top of the motorstick, making sure it is at 90 degrees to the stabilizer (Figure 5). When the tail is dry, bend a long straight pin into a hook, and insert it just in front of the stab. Slide the prop assembly snugly in place.

Tie the ends of the rubber motor together with a square knot or overhand knot, wet the rubber with saliva (nothing else will work here) and pull the knot as tight as you can. Rub in some Son-of-a-Gun or lotion. Hang the motor between the prop hook and tail hook (we don't want the wing on yet) and balance the motor stick/motor/prop on a pencil. Where it balances, mark CG on the motor stick (this stands for center of gravity). Now we can mount the wing on the stick with the CG on the tissue matching up with the CG you wrote on the stick. Figure 6 shows the finished airplane.

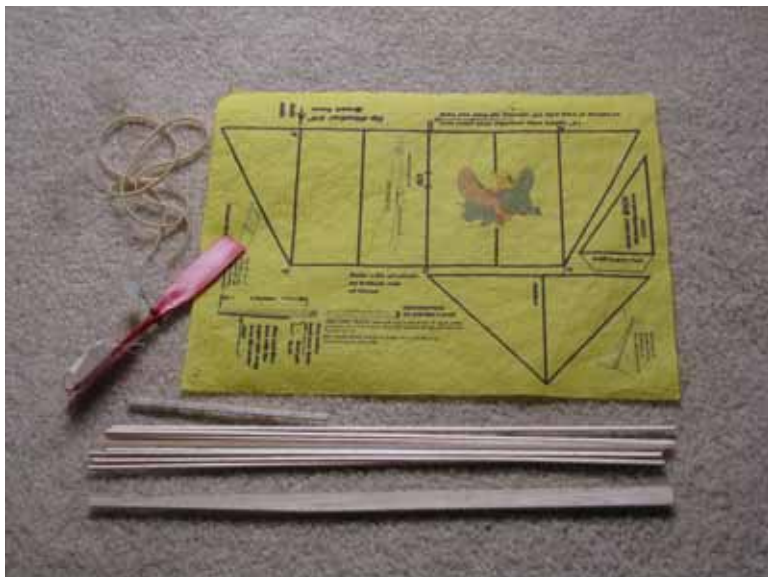


FIGURE 1

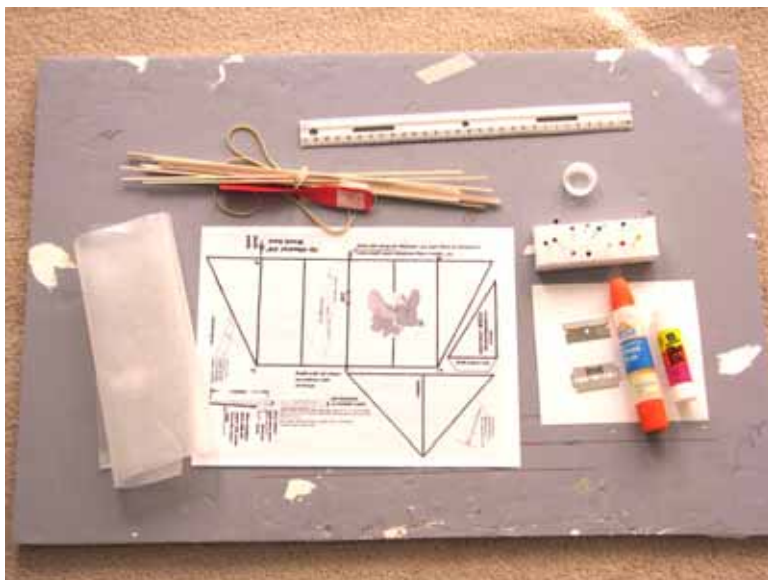


FIGURE 2



FIGURE 3



The best time to test fly is anytime if you are indoors, but early in the morning or late in the evening if you are outside for now. Put 100 turns in the motor to start, and launch the model with a gentle push, and it should hold its own in a gentle, left-hand circle. Use a paper trim tab on the rudder as shown in the plan, to control left or right flight. To control up or down, slide the wing forward or back as needed, until a steady climb and glide are achieved. Work up to 400-500 turns, or use a hand drill and a hook, with a helper (a stooge) to stretch the motor while winding, and get in up to 1000 turns.

Have fun, and see you next month, where we will move on the Mark IV, and see what we can do for some real duration.

A2Z All-In-One site by Tim Goldstein

[www.peck-polymers.com/store/](http://www.peck-polymers.com/store/)

A2Z tools, Peck Polymers kits and supplies, indoor balsa, much more

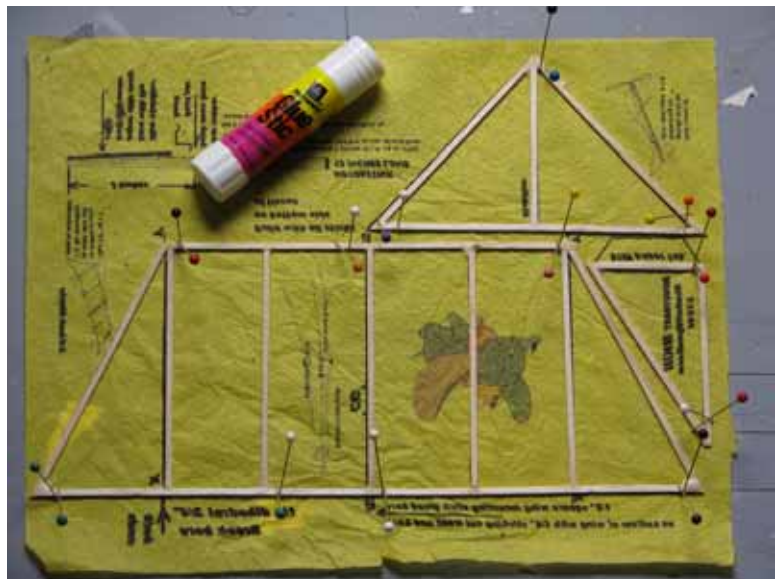
Micro Mark

340 Snyder Avenue

Berkeley Heights, NJ 07922-1538

Order Toll Free 800-225-1066

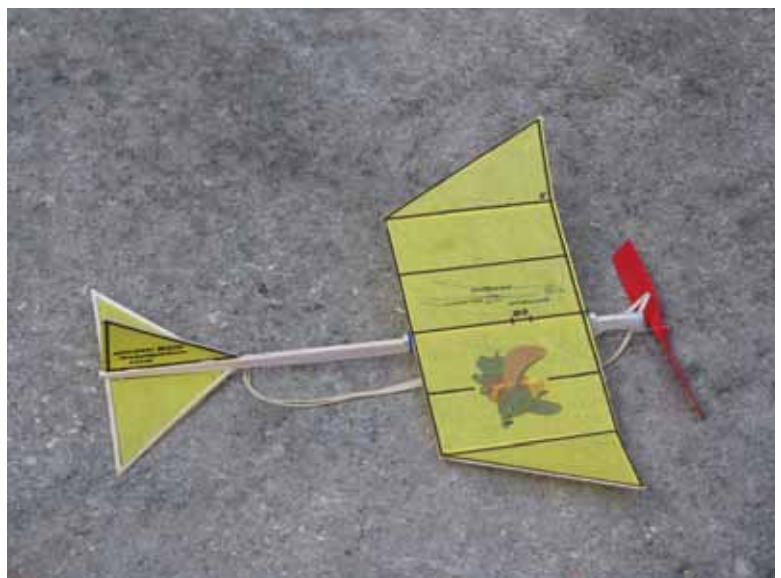
catalog at [www.micromark.com](http://www.micromark.com)



**FIGURE 4**



**FIGURE 5**



**FIGURE 6**

# NEW VD PROP

**Slobodan Midich (article was written in March 2007. but was not published yet )**

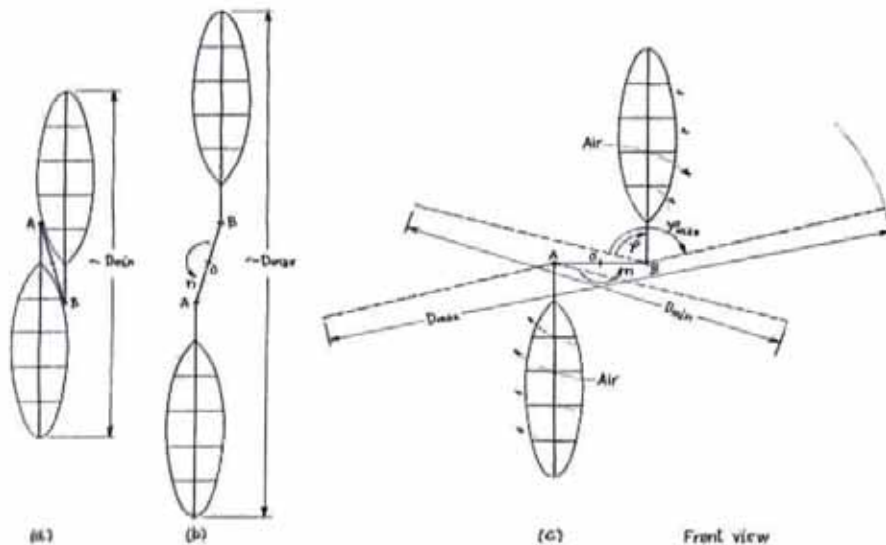
In response to my question on the Yahoo Indoor\_Construction Group regarding F1D models, specifically regarding reducing prop revolutions per minute (RPM) in low ceiling flying sites and what the better method is to regulate the prop speed on indoor models: Variable Pitch (VP), or Variable Diameter (VD), from the point of prop efficiency, Professor Mark Drela replied:

"Theoretically, the VD prop is better than VP prop, by far. The VD prop reduces climb mainly by releasing the rubber's energy more slowly during the power burst, via a greatly reduced rpm. The VP prop reduces climb mainly by throwing away most of the rubber's energy during the power burst, via blade stall." and he deduced the duration potential of VD prop via energy argument: "Since you're taking off with nearly max energy (with VD prop), and not dumping it via blade stall like with VP, theoretically you should be able to get high-ceiling duration with only a fraction of the total climb altitude."

Professor Drela also gave some good general guidelines for sizes of minimum and maximum prop diameter, with significantly wider blades than usual. For F1D Dr. Drela estimated as pretty good  $D_{min}=40$  cm, and  $D_{max}=54$  cm, and a max blade cord 9 cm (!). Dr. Drela emphasized that it's essential that the blade angles must decrease about 7 degrees at the same time while changing the diameter from max to min position, so that the blade  $cl$ 's are still good in all positions. He just briefly calculates thrust, torque, RPM, and efficiency of VD prop for both end positions and middle position of blades, for the given flying speed.

After that I decided to put into practice an idea that I have been thinking about for a long time. The idea was for a VD prop in which both the prop diameter and blade angles change at the same time. That is my invention. It's similar, but not the same implementation as Jim Richmond folding prop. With Richmond's VD design, there exists only two prop diameters: min. and max., as click/clack. Also, when the prop is in the min position it is not possible to get max position in the flight. Here I present an implementation that allows the diameter of the prop to change continually from min to max, and from max to min position, and if the prop is stopped by some obstacle in the flight, the diameter of prop will decrease, and after release from obstacle diameter return to the prior position. At the same time as the diameter prop of the prop changes the pitch changes to the preset dialed-in, so is possible to change the P/D ratio "as you wish". It's possible to make  $P/D=Const$ .

My implementation is presented in Fig. 1. and Fig. 2. That is a folding type VD prop with some new properties.



**FIGURE 1**

Variable diameter prop: (a) Min position, (b) Max position, (c) Mid position

As you can see on Fig.1, (a) and (b), because of angle  $\theta$  (Theta) of the VD mechanic (half-angle of the cone at the tip of legs) in both  $D_{min}$  and  $D_{max}$  positions, prop blades are not in one line, but are very close to that. From Fig.1. (c), it is clear that the maximum folding angle of blade is a little smaller than 180 degrees,  $\phi_{max}=180-2*\theta$ , and minimum folding angle is a little bigger than 0 degrees,  $\phi_{min}=\theta$ . Folding of the blades in the working angle span is reversible in both sense.

If the length of hub AB is "a" and length of blade is "b" (from hinge to tip) than Dmin, Dmax, and  $\Delta D = D_{max} - D_{min}$ , can be easily calculated for small angle  $\theta$  from equations:

$$\begin{aligned} D_{min} &= 2 \cdot b \cdot a \cdot \cos \theta, \\ D_{max} &= 2 \cdot b + a \cdot \cos \theta, \\ \Delta D &= 2 \cdot a \cdot \cos \theta, \end{aligned}$$

or it can be also easy estimated graphically.

From Fig.1(c), you can also see the air stream lines, and that the effective length of blade cord is longer than ribs, with increase of effective RN and compensation for a slower prop rotation in middle position.

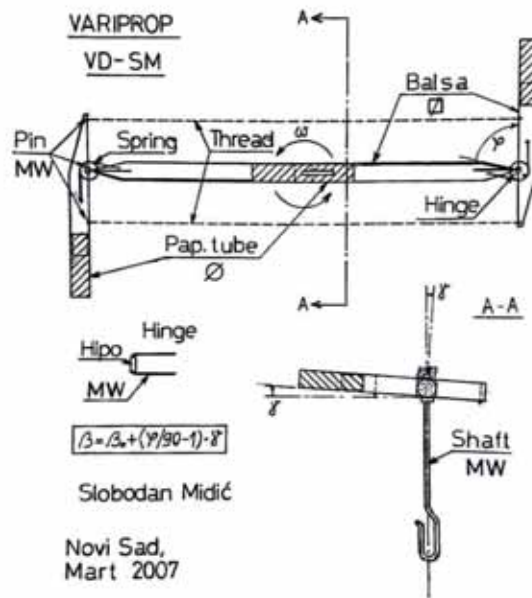


FIGURE 2

Fig.2 diagrams the mechanics of the new VD prop. It utilizes three paper tubes, two to hold the blade spars, and one in the middle of hub, to hold both “legs.” The shaft of prop is fixed to the central tube. Of course the two paper tubes for blade holding can be omitted if the hinges are made directly on the spars, to make full prop easier to construct.

At the tip of both legs are hinges from hypodermic tubes 26G, with music wire 0.009”, and above it are two spiral springs from music wire 0.006” that close the prop, so the closed position of prop is the minimal diameter. Two threads between spar holders provide for the parallel movement of blades in a parallelogram. Each spar holder is adjusted in the prop middle position for a pitching down angle of  $\gamma$  (Gamma) degrees, which provides an increase in blade angle at max position for  $+\gamma$  degree, and a decrease in the blade angle for  $-\gamma$  degree at min position. In this way the total decrease of the blade angle from max to min position is  $2 \cdot \gamma$  degree, and vice versa. That means the attack angle  $\beta$  of prop at some radius changes as follows:



FIGURE 3

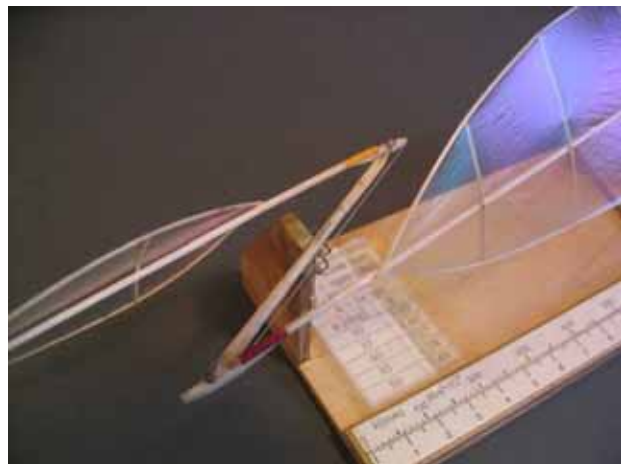


FIGURE 4

$$\beta = \beta_0 + (\varphi/90 - 1) \cdot \gamma$$

where  $\beta_0$  is attack angle for  $\gamma=0$  [deg]. For adjusting the angle  $\gamma$ , rotate each of the hub legs separately in a hub paper tube to the reference axis of the shaft, and when you find the exact angle  $\gamma$  in the middle position, you will need to fix it by one small drop of glue. Then you can adjust the pitch of each blade in the usual way, and fix both with glue.

I first made one prototype of the mechanism to check my construction (Fig.3), and then I made one VD prop (Fig.4) for a F1D model. My test VD prop was:  $D_{min}=400$  mm,  $D_{max}=548$  mm, blades were from one old fix-prop (width 56 mm), weight of blades 160 mg (too much), weight of mechanism 130 mg. So the total weight of prop was 290 mg, which was of course too heavy, but I could fly my model. All wood was balsa 2x2 mm, length of central hub 76 mm, angle  $\theta$  was 14 deg, and the two springs were made from music wire 0.015 mm, 4.75 turns, left, on a mandrel of 1.4 mm. Blade length was 200 mm, length "b" was 240 mm. Angle  $\gamma$  was -3.5 degrees. Pitches measured on the middle of blade were  $P_{min} = 710$  mm,  $P_{max} = 1010$  mm. I have flown with this model only 2 times up to now, and in both successful flights only with a 1/2 motor (weight of rubber 0.3 g). In Novi Sad school hall (8 m high) I flew more than 15 minutes, and in Belgrade fair hall 3, with 22 m high ceiling, I flew nearly 17 minutes. My impressions of the flights were very good; this VD mechanism works excellently, now I must make bigger blades and a simpler mechanism. It's not a big problem to make this VD prop lighter than 260 mg. Especially interesting was to see two events: launching and steering. I have launched the model with prop in closed position. Just I come to the launching place with a fully wound motor, I released the prop, the blades sprung from min to max position and the prop began to rotate very slowly. With the balloon steering, when the rope touched the prop, it went to min position, and after steering is complete, the prop returns to earlier diameter.



**FIGURE 5**

## Appendix

In my opinion, with described VD propeller mechanism and properly dimensioned blades and springs, it would be possible to make F1D flight times of more than 40 minutes also in halls with ceilings under 30 meters, or potentially up to 10% longer flights than with usual VP props. And generally, duration time in different ceiling heights will be less distinguishable in the future.

Because this VD prop results in saving energy, the design may be useful for other rubber powered classes of models (F1B, and other), and why not also for some sort of prop powered airplanes...

## Remarks in August 2008:

- 1) After WCh in Belgrade, I can say, I have rarely flown my indoor models so I have not got enough experience with this VD prop, and at WCh I flew with my VP props.
- 2) There is one error on the drawing Nr. 2. In the A-A projection angle  $\gamma$  which needs to be -3.5 deg, not +3.5 deg as depicted.
- 3) When Ljubomir Radosavljevic, director of WCh F1D Belgrade 2008., and Serb competitor F1D, first saw this prop, he named it as "High Voltage" prop, because it is like warning symbol for high voltage; associative and simpatico...

# BELGRADE WORLD F1D CHAMPIONSHIPS 2008

**Nick Aikman**

This event was a great success with a brand new venue, increased attendance, spectacular times, a new CAT III F1D World Record and a preceding Open International giving early arrivals the chance to spend a whole week doing nothing but F1Dding.

Anyone who did sneak out into the city found it safe and lively with a modern cosmopolitan feel. The Hotel N where many stayed was clean and the food was good too.

The sweltering heat that we had last year returned with internal temps up to 39/102 degrees. By agreement, on the first two days of the World Champs, the round schedule was re-jigged to move things backwards to take advantage of calmer evening air – rounds 2 and 4 ended at midnight.

## The Site

Hall 1 of the Trade Fair is low for a World Champs, only 28 metres/92 feet high. The floor area was good and a huge central array of lights that we'd seen last year had been removed leaving a clean central disc of concrete in the ceiling that was scrubable. One hazard quickly became obvious – 4 small square vents around the disc were just the right size to suck any model near enough out to oblivion and this happened several times during the week. The only solution was to plug the hole with a steering balloon – a practice quickly given several obscene nicknames. Hundreds of short steel reinforcing rods sticking out of the concrete roof beams were another danger and the roof structure snared a few models too – but certainly less than I expected.

Glass walls and thousands of round glass windows in the roof allowed the sun to shine directly on the floor giving rise to bad turbulence that saw more than one contest flight do a 'dying swan' act before piling into the floor. In the roof, a jet stream extending down for about 20 feet saw many models hit the curving roof with only limited chance of balloon rescue before a lot of altitude was lost. Despite these facts, most people I spoke too thought the hall was a good site.

Things inside were well laid out and each country had a secure enclosed preparation area complete with a fridge to store rubber and much needed supplies of cold drinking water.

## Open internationals

Contests for F1D and 35 cm were held over 2 days prior to the Champs and this gave many a chance to size up the hall and do some serious practice. Unknown at the time, the top 4 F1D Open winners ended in exactly the same order as in the actual Champs. So it was Treger, then Schramm followed by Kagan and Richmond.

Only 10 entered 35 cm, a surprise to me. The very light (sub 0.40 g) VP equipped machines flown by Mark Benns and Bob Bailey had an advantage of around 10 minutes over everyone else and Mark Benns won with scores of 30:50 and 31:08 – good times in such a gusty environment.

During late night F1D practice, Lutz Schramm flew an unofficial time well over 37 minutes from an altitude of about 75 feet – the longest flight all week.

## Technicalities

Mylar balloons are now almost universal and much needed in this site. I only heard 3 or 4 explosions from latex balloons all week but saw several Mylar balloons get impaled and slowly deflate near flying models without the usual balsa/plastic carnage that goes with exploding rubber.

All those with stocks of May '99 probably used it – and found it very fragile in the heat. John Kagan quoted winding 6 motors in round 5 before getting one to hold together and I saw Jim Richmond lose a lot winding in that round too. There were also a lot of motors that blew well into a flight in the hotter air near the ceiling. Jim Richmond was using his venerable VD props, the only one to do so. Ivan Treger, the eventual winner used March '02, which is known to be tougher in hot conditions.

Models ranged from the very long (34"+) to some much more truncated specimens and there was a roughly even split between the flat tail fraternity and the tail tip dihedral devotees.

Most recent technical developments have focussed on carbon structures for VP hubs and prop blades and Lutz Schramm's beautifully precise models also had hollow carbon wingposts – one of which had a slight curve and sat in tubes on the wing and stick. By rotating the tube, a different amount of wing washin/washout could be induced.



More flyers are trying elliptical or curved dihedral after Schramm paved the way. Two of the Brits used it, as did Rainer Lotz, who also had the only 'droop-boomed' model on display. Rainer had an ultra high modulus carbon outlined prop with ribs made from only a single piece of boron.

The theory is that under high torque, the ribs balloon to higher camber when needed. Schramm also used carbon prop outlines, fastidiously made on a twisted former and sanded from approx' 0.3 mm square at the root to around 0.18 mm square at the tips! Both Lotz and Schramm used a main prop spar that stopped at the first rib, leaving the rest of the blade reliant on carbon only, presumably to flex more evenly.

Ivan Treger's winning models were conservative in layout but meticulously constructed (see plan) and several of the Czech flyers were also equipped with his VP units and design layout.

## Contest impressions

There were more juniors and seniors than recently and it was good to see full senior teams from Italy and Japan again, plus one or two others who had been away from F1D for a while.

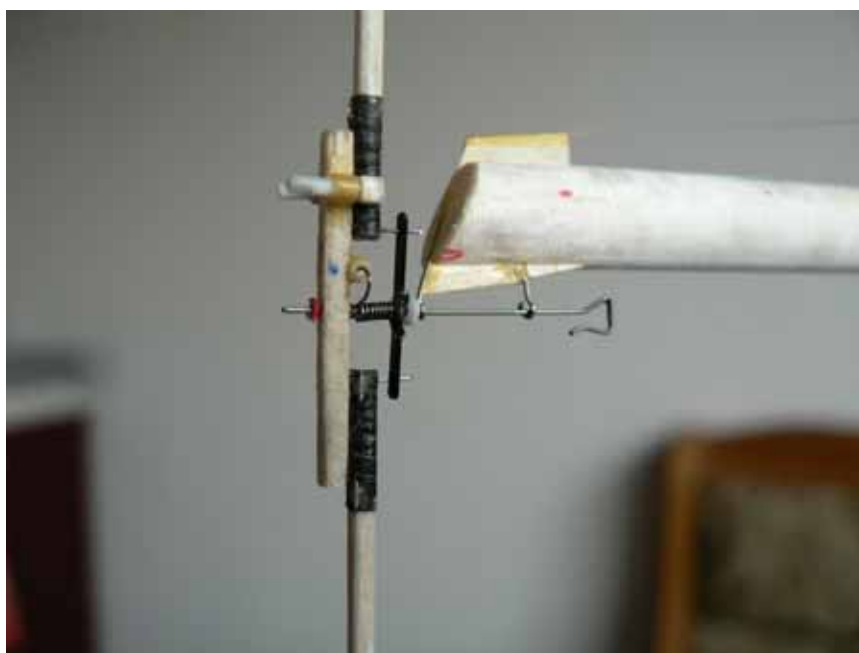
All of Treger's flights were over 30 minutes but many of the long flights came on the afternoon of the second and third days, when the air was a bit more stable or people went all out at the end. Steering skills were vital and played a significant role in the results. Many flyers have little high ceiling experience and use a pole far more often so they struggled with balloon techniques. It was great to see some of the young European Juniors showing no steering inhibitions, pulling off good steers at altitude.

The top few flyers managed to score from well below the ceiling, and this separated them from others who needed to climb all the way into turbulence to have a chance of long flights.

With great experience and strength in depth, the USA were clear winners of the senior Team event with GBR second and Hungary third. Sadly, USA juniors Justin Young and Tim Chang were hamstrung without a third Team member although they made up for it by placing first and second individually. With a lot of experience over several international contests, Gabriela Kaplanova was third. Without a full junior American Team, the top spot here went to the young Czechs, followed by the Poles and then the Romanians.

Ivan Treger may be a surprise winner to some but it's great for F1D to see a European flyer at the top of results. Lutz Schramm was second after placing third in 2006 and second in 2004 – surely his turn must come soon.

So, many thanks to the Serbian Aero Club, to Ljuba, Dragana, Vladimir and all the helpers and timekeepers. Another contest is over and the next European and World Champs are scheduled for the same hall. It will be interesting to see what model/flying developments take place to adapt to this particular site.



**LUTZ SCHRAM VP HUB**

# F1D World Championships Senior Individual Results

1	Ivan Treger	SVK	34.31	36.23*	35.00	32.09	34.16	35.25+	71.48
2	Lutz Schramm	GER	36.18*	34.42	9.36	29.44	33.27	35.01+	71.19
3	John Kagan	USA	34.27	34.15	35.38*	35.15+	18.04	34.01	70.53
4	James Richmond	USA	34.56*	10.17	19.55	14.22	33.10+	32.42	68.06
5	Doug Schaefer	USA	1.13	32.19	31.44	34.24*	32.32	33.30+	67.54
6	Aurel Popa	ROU	31.30	31.55	33.05+	30.27	31.18	34.01*	67.06
7	Lawrence Cailliau	W/C	15.57	34.06*	5.50	29.33	31.31	32.20+	66.26
8	Derek Richards	GBR	24.11	30.30	32.38+	33.27*	30.38	32.12	66.05
9	Dider Barberis	FRA	32.30+	22.27	33.16*	29.11	29.16	28.03	65.46
10	Dezso Orsovai	HUN	33.03*	32.33	0.00	0.00	32.35+	10.54	65.38
11	Mark Benns	GBR	29.43	31.56+	33.17*	31.18	30.50	31.15	65.13
12	Andras Ree	HUN	31.05	31.30	8.06	31.41+	32.49*	15.49	64.30
13	Corneliu Mangalea	ROU	30.34	32.47*	30.56+	7.35	27.14	28.42	63.43
14	Robin Bailey	GBR	13.27	30.57	31.06+	32.28*	27.50	6.11	63.34
15	Tomasz Momot	POL	24.01	27.48	28.44	31.21+	0.49	32.06*	63.27
16	Uwe Bundesen	GER	27.42	0.00	28.49	31.38*	29.47	31.28+	63.06
17	Slobodan Midic	SRB	28.16	18.06	30.51+	31.00*	30.25	30.44	61.51
18	Edvard Ciapala	POL	27.33	30.08+	29.58	29.19	26.34	30.39*	60.47
19	Zoltan Sukosd	HUN	30.16+	30.23*	0.00	0.00	0.00	0.00	60.39
20	Robert Champion	FRA	19.31	29.16	28.46	30.00+	27.20	30.07*	60.07
21	Mikita Kaplan	CZE	14.25	25.44	0.00	27.38	28.22+	31.25*	59.47
22	Fabio Manieri	ITA	30.06*	26.05	22.22	28.24	28.32+	28.31	58.38
23	Slobodan Milic	SRB	29.12+	11.24	25.01	23.59	29.14*	4.32	58.26
24	Karol Vins, Ing.	SVK	14.54	28.50+	29.31*	15.07	27.13	18.48	58.21
25	Rainer Lotz	SUI	24.14	27.27+	26.01	27.25	28.07*	26.58	55.34
26	Hideyo Enomoto	JPN	26.26	25.47	27.10+	28.00*	25.38	9.15	55.10
27	Thierry Marilier	FRA	25.22	17.08	19.23	26.02	27.12+	27.56*	55.08
28	Dan Amoraritei	ROU	24.56	27.43*	27.06+	24.57	10.43	25.00	54.49
29	Klara Kaplanova	CZE	12.34	26.23	27.50*	26.36+	25.21	1.01	54.26
30	Jerzy Markiewicz	POL	25.29	23.30	27.23*	0.00	26.04+	18.57	53.27
31	Ljubomir Radosavljevic	SRB	22.55	25.04	26.50*	22.23	9.40	26.30+	53.20
32	Benito Bertolani	ITA	6.28	18.56	18.05	3.32	26.30*	26.13+	52.43
33	Zdenek Cinert	CZE	24.14	27.28*	24.34	25.01+	20.13	21.30	52.29
34	Rimas Steponenas	LTU	10.22	25.01+	10.54	25.53*	0.00	0.00	50.54
35	Mario Gialanella	ITA	3.41	22.18+	16.12	15.22	26.35*	17.50	48.53
36	Yoshiharu Nakajo	JPN	23.11	19.14	23.07	24.28*	23.15+	19.51	47.43
37	Ernestas Dambrauskas	LTU	20.29+	8.09	18.56	24.10*	0.00	19.54	44.39
38	Okitusugu Sasaki	JPN	21.47	21.34	22.11*	21.07	8.06	22.01+	44.12

No. of best flts in round	4	6	8	9	5	6	
No. of 2nd flts in round	4	6	7	6	7	8	
No. of scoring flts in round	8	12	15	15	12	14	
No. of flights over 25 min	19	26	22	24	28	23	142
No. of flights over 30 min	11	14	10	12	11	15	73
No. of flights over 35 min	1	1	2	1	0	2	7

## F1D World Championships Senior Team Results

	<u>Country</u>	<u>Abbrev</u>	<u>Total</u>	<u>Round-by-round places</u>				
1	USA	USA	206.53	7	5	2	2	1
2	Great Britain	GBR	194.52	8	3	1	1	2
3	Hungary	HUN	190.47	1	1	3	3	3
4	Romania	ROU	185.38	2	2	4	4	4
5	France	FRA	181.01	4	6	6	5	5
6	Poland	POL	177.41	5	4	5	6	6
7	Serbia	SRB	173.37	3	8	7	7	7
8	Czech Republic	CZE	166.42	10	9	8	8	8
9	Italy	ITA	160.14	12	11	10	10	9
10	Japan	JPN	147.05	6	7	9	9	10
11	Germany	GER	134.25	9	12	12	11	11
12	Slovakia	SVK	130.09	11	10	11	12	12
13	Lithuania	LTU	95.33	13	13	13	13	13
14	Switzerland	SUI	55.34	14	14	14	14	14

## F1D World Championships Junior Individual Results

1	Justin Young	USA	33.24*	32.50+	29.03	32.13	17.13	31.02	66.14
2	Timothy Chang	USA	27.17	15.38	30.19+	0.00	30.40*	15.09	60.59
3	Gabriela Kaplanova	CZE	26.44	29.38+	25.32	29.24	27.46	29.45*	59.23
4	Szymon Goralczyk	POL	24.27	25.20	28.28+	29.39*	25.44	27.33	58.07
5	Ciprian Pascu	ROU	25.14	2.33	26.02	27.26+	26.31	27.57*	55.23
6	Petr Klimes	CZE	9.49	22.57+	22.03	21.37	21.01	28.52*	51.49
7	Hugo Marilier	FRA	25.11*	22.54	23.04	15.23	23.39	24.46+	49.57
8	Atila Seprodi	ROU	0.00	22.18	23.21	21.11	23.46+	25.37*	49.23
9	Robert Horak	CZE	23.54	24.48*	23.54	23.52	20.04	24.28+	49.16
10	Krzysztof Muras	POL	20.42	22.54	23.31+	25.20*	22.54	8.48	48.51
11	Tomasz Demidowicz	POL	21.37	23.50+	23.17	23.35	24.33*	23.26	48.23
12	Martynas Salkauskas	LTU	23.27+	23.17	22.26	23.53*	12.59	6.33	47.20
13	Cosmin Dediliuc	ROU	0.00	23.12	23.17+	23.45*	20.43	0.00	47.02
14	Jonas Deveikis	LTU	16.33	9.46	22.32+	24.02*	21.40	8.44	46.34
15	Jean Trautsolt	FRA	6.06	22.41+	14.04	21.29	21.33	23.30*	46.11
16	Lucas Marilier	FRA	21.32	21.31	22.06+	21.48	22.33*	6.09	44.39
17	Simas Laurikenas	LTU	13.19	13.07	5.24	21.13+	0.00	22.34*	43.47

No. of best flts in round	2	1	0	5	3	6	
No. of 2nd flts in round	1	5	6	2	1	2	
No. of scoring flts in round	3	6	6	7	4	8	
No. of flights over 20 min	11	13	15	15	14	11	79
No. of flights over 25 min	5	3	5	5	4	6	28
No. of flights over 30 min	1	1	1	1	1	1	6

## F1D World Championships Junior Team Results

	<u>Country</u>	<u>Abbrev</u>		<u>Total</u>	<u>Round-by-round places</u>				
1	Czech Republic	CZE	160.28	3	2	1	2	2	1
2	Poland	POL	155.21	1	1	2	1	1	2
3	Romania	ROU	151.48	6	6	3	3	3	3
4	France	FRA	140.47	5	3	4	4	4	4
5	Lithuania	LTU	137.41	4	5	6	5	5	5
6	USA	USA	127.13	2	4	5	6	6	6

## Senior Open F1D Results (Best 2 flights. 1st 6 only)

1	Ivan Treger	SVK	33:40	35:00	1:08:40
2	Lutz Schramm	GER	34:20	34:08	1:08:28
3	John Kagan	USA	32:00	34:10	1:06:10
4	James Richmond	USA	33:00	32:30	1:05:30
5	Dezso Orsovai	HUN	33:02	31:56	1:04:58
6	Aurel Popa	ROU	31:34	32:44	1:04:18

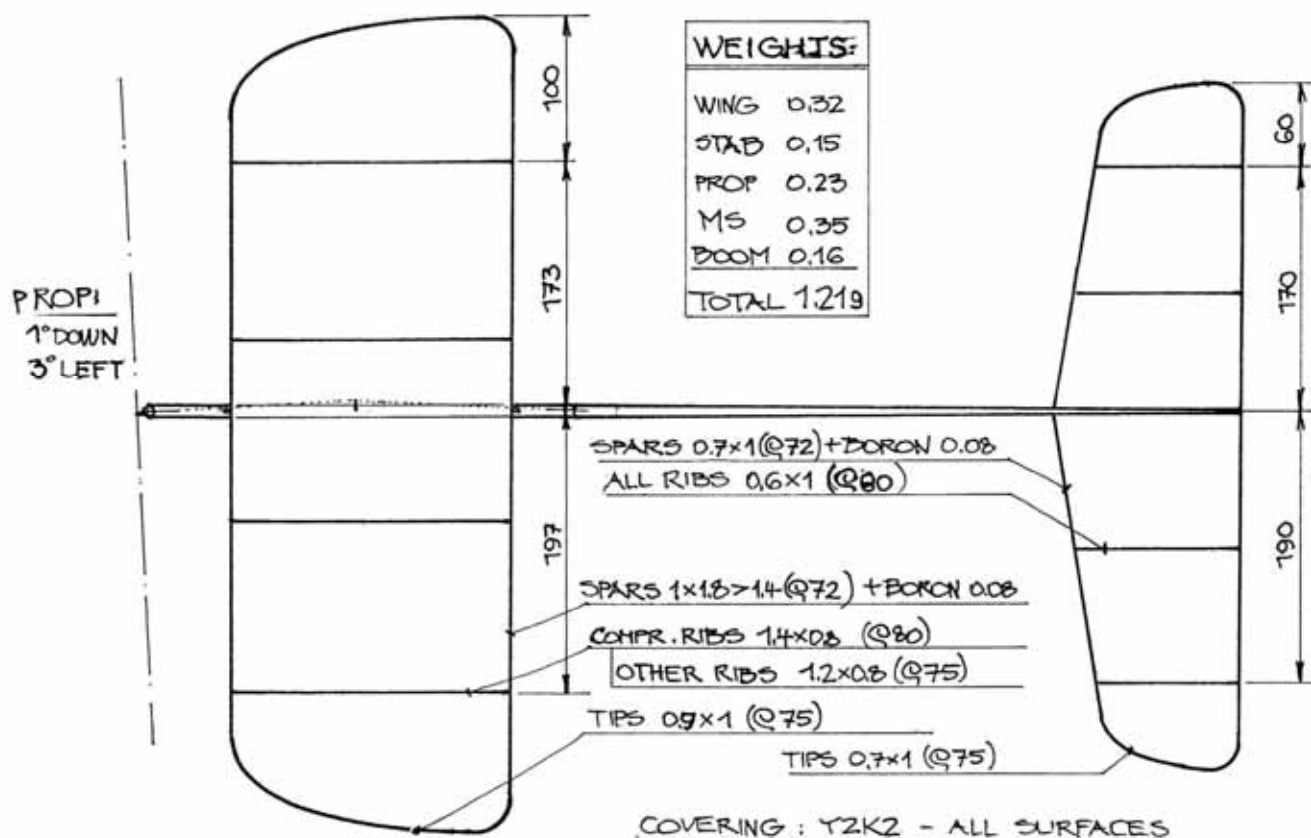
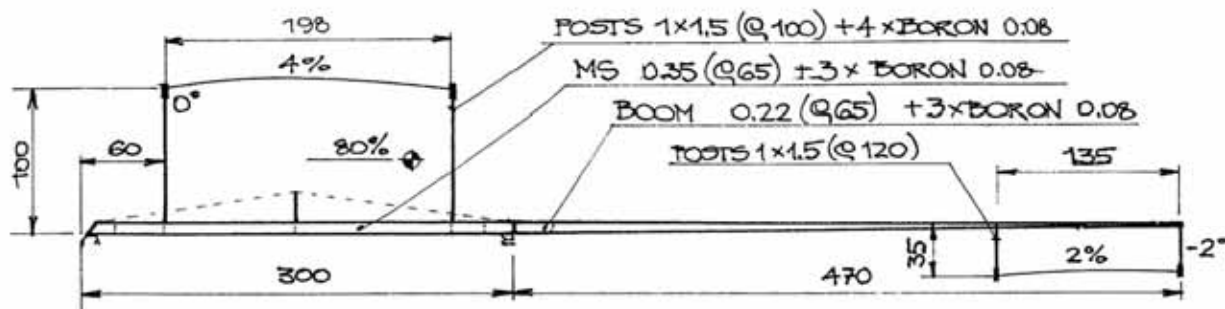
## Junior Open F1D Results (Best 2 flights)

1	Gabriela Kaplanova	CZE	28:58	29:14	0:58:12
2	Robert Horak	CZE	23:30	25:09	0:48:39
3	Jiri Klimes	CZE	22:33	22:31	0:45:04
4	Petr Klimes	CZE	20:25	21:43	0:42:08
5	Justin Young	USA	25:41	00:00	0:25:41

## Open 35 CM Results (Best 2 flights. 1st 5 only)

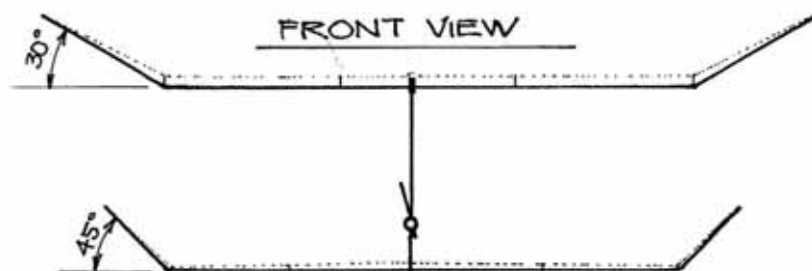
1	Mark Benns	GBR	30:50	31:08	1:01:58
2	Bob Bailey	GBR	29:22	30:55	1:00:17
3	Slobodan Midic	SRB	22:52	20:45	0:43:47
4	Peter Ing	GBR	17:42	16:28	0:34:10
5	John Shaw	GBR	15:53	16:38	0:32:31





#### WEIGHTS:

WING	0.32
STAB	0.15
PROP	0.23
MS	0.35
BOOM	0.16
TOTAL	1.219



RUBBER: TAN 2 3/2 - 1.25g/m<sup>2</sup>

#### VP HUB (SCALE 1:1)

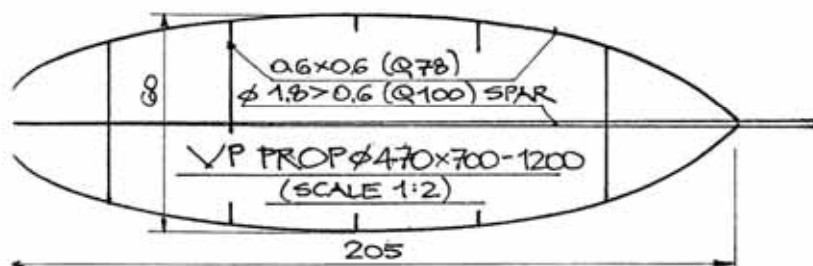
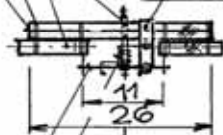
FIBERGLASS TUBE 1.5x1.5 + Balsa (Q65)

KEVLAR HINGE

FIB. TUBE  $\phi$  1.8

HYPERDERMIC TUBE  $\phi$  0.6

SCREWS HOLDER/ROD CELL + CARB



DIMENSIONS IN mm, Q-SPEC. WEIGHT kg/m<sup>3</sup>  
(SCALE 1:5)

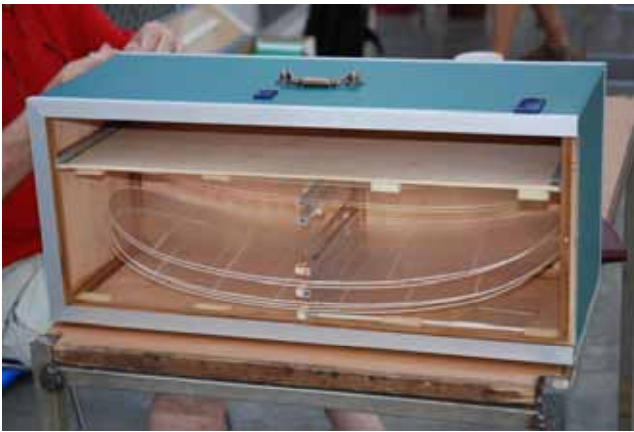
1<sup>st</sup> PLACE IN WCH BELGRAD SERBIA 2008

IVAN TREGER  
SLOVAKIA

WORLD RECORD - CAT 3 - 36.23 min



# **BELGRADE WORLD F1D CHAMPIONSHIPS 2008**



**LUTZ SCHRAM MODEL BOX**



**LUTZ SCHRAM CARBON BLADE**



**MARK BENNS LAUNCHING**



**RANIER LOTZ CARBON BLADE**

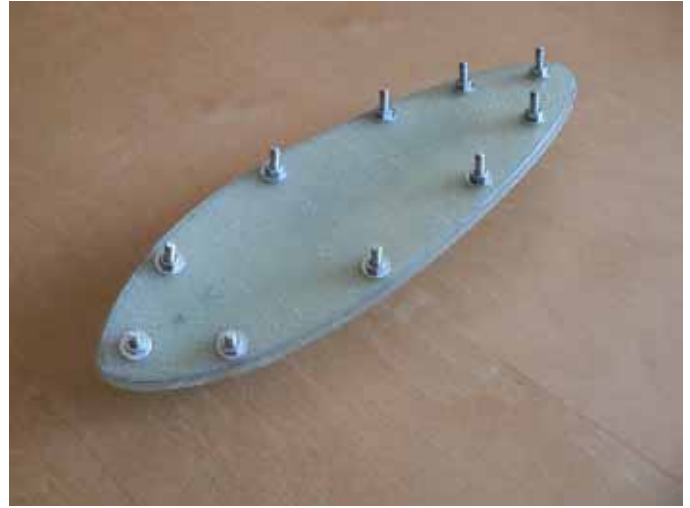


**TIM CHANG**

# LUTZ SCHRAM F1D CARBON PROP OUTLINES



**CARBON FIBERS**



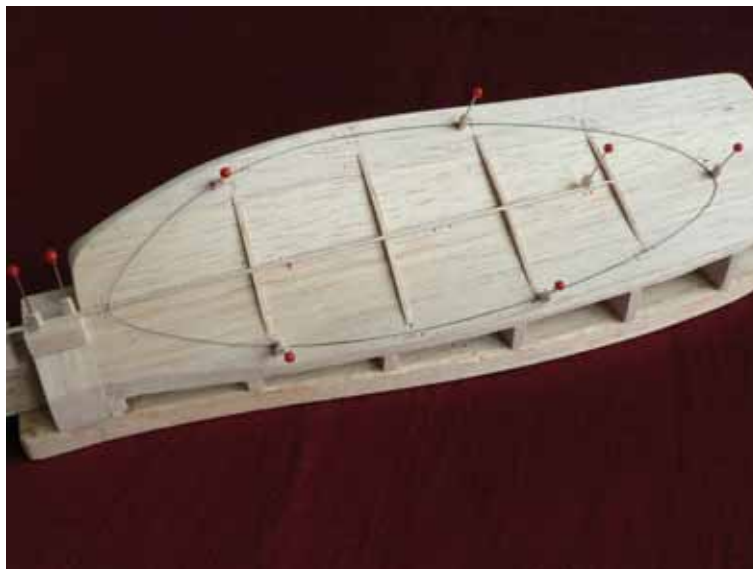
**FORMING JIG**



**FORMING JIG PARTS**



**BLADE OUTLINE**



**OUTLINE ON JIG READY FOR RIBS**

# CARBON PROP OUTLINES

Nick Aikman

(Pictures on previous page)

Here are 3 self-explanatory pictures of a prop development that Lutz Schramm has been working on for some time. In the INAV 121 article, Lutz used Kevlar and resin to mould the outlines but his latest props seen at the Belgrade Champs use carbon fibre instead.

The pictures show a glass fibre 3 piece twisted mould that screws together like earlier versions. At the Champs, Lutz showed me that the outlines taper from about 0.3 mm square near the root to 0.18 mm at the tips. To produce this graduation in one plane, the central core of the jig is also graduated in thickness to these dimensions and when the outline has set, a matching taper is sanded in on the outside vertical face of each outline.

Rainer Lotz had a similar looking prop at the Champs, moulded from ultra-high modulus carbon tow and Rainer said that he coaxes the carbon/resin strand around the core with a fine paintbrush as carbon has little strength when pulled.

I believe that both flyers wet the carbon with resin and use a roller over absorbent paper to take out the excess. The finished VP props weigh around 0.24 g.

Nick Aikman.

**Indoor Model Supply**

Indoor Wood Kits  
Stripped Rubber  
Accessories  
Supplies

Indoor Model Supply  
is now a  
division of A2Z Corp

For our full product line and to place an order visit:  
**www.Peck-Polymers.com**

**Peck-Polymers**

The World's Best Flying  
Peanut Kits Now Laser Cut!



**All the traditional items you depend on!**

Balsa Wood	Plastic props 4"-11"
Ambroid Glue	Thrust Bearings
Tools	Wheels
Rubber Lube	Rubber
Books	Prop Shafts
RC & FF Sport and Scale Kits	
Japanese & Domestic Tissue	

**Over 250 Different  
Kits In Stock!**

 Full line of West Wing  
RC & FF kits  
Fly Better By Design

**Stocking FF kits by:**

• Peck Polymers	• West Wings	• Sting Aero
• Diels Engineering	• Lee's Hobbies	• IMS
• Aerographics	• Ackus	• BMJR
• Nowlen Aero	• Free Plane	• Fly-M
• Herr Engineering	• Campbells Custom Kits	

**Featured Products**

**Jones Balsa Stripper**  
Cut strips from sheet  
Make Custom sized sticks  
For Indoor and Mirco RC  
1/8"x1/8" maximum



**Esaki Tissue**  
Esaki Japanese Tissue  
7 Traditional Colors  
Red/Black Checkered  
Silver Esaki is Back!



**Blade Holder for  
Micrometer Style  
Balsa Stripper**  
CNC Machined Aluminum  
Hard Anodized Finish  
Main Body Teflon Treated  
Turcite Teflon Insert



**Supplies for Indoor FF**  
**Carbon Fiber Pultrusion**  
Micro Tubes starting at 0.7mm OD by DPP  
Rod: Round, Half Round, Trailing Edge, Rectangle  
0.9 micron covering    Jones balsa stripper  
Boron filament    Condenser Paper  
Teflon thrust washers    Small music wire  
Rubber Winders    Specialized tools  
Many more unique & hard to find supplies

**Now stocking OS Film**  
The lightest plastic covering film in the world!

 **The Worlds Finest Balsa**  
Individually Graded Sheets  
For Ultralight RC & Free Flight

For quickest service order online.  
For our full product line and to place an order visit:  
**www.Peck-Polymers.com**  
A2Z Corp Peck Polymers division  
1530 W Tufts Ave Unit B  
Englewood CO 80110  
720 833-9300

**STING AERO  
PRODUCTS**

FF Discus Gliders  
Carbon Booms  
Timers & More

For our full product line and to place an order visit:  
**www.Peck-Polymers.com**  
A2Z Corp Sting Aero division

# F1D WING SPARS

Larry Coslick

## F1D WING SPARS, WITH .003 BORON AND KEVLAR THREAD

Place a piece of Scott drafting, sticky side up on a flat building board and secure both ends to keep the tape tight. Lay a ruler along one edge of the tape and place the spar along the tape side of the ruler and make sure that the spar is tight against the ruler. I use thinned Duco cement and a #25 hypodermic needle and syringe to apply the glue to the Boron. Run the Boron up through the needle ( remove the point ) and syringe until there is one inch remaining, then pull it back through the needle. Turn the Boron around and run about 6" through the needle that didn't get glue the first time.

Center the Boron on the spar and tack glue it every 1/2" using a very small artists brush dipped in a thin mixture of acetone and glue. After both sides are tacked, the spar is removed from the tape and wrapped with three to four strands of Kevlar in a spiral wrap about 1/8" apart. Mark the spar off into 2" sections and apply Acetone to all four sides of a section and work down the spar. Don't rub or apply any pressure to the spar while applying the acetone.

After the first piece of boron is applied I lift the tape, ruler and spar off of the building board as one unit. I hold one end of the ruler and spar vertically and pull the tape straight down very slowly.

Removing strands of Kevlar from the tow can be quite a challenge. I tape the top and bottom of the 5' section of tow that I have to a dark colored door for contrast. I start in the middle and separate five - ten strands from the rest of the tow, then pull them down from the top and up from the bottom. If your lucky three or four strands will come free along its entire length. Remove any short sections and glue the strands together by running them through your fingers loaded with thinned glue. Tack one end of the Kevlar to one end of the spar and cut off 25" of thread. Take some masking tape and clay and hang it on the loose end. The clay has to be heavy enough to wrap the thread tight against all four edges. Hold the spar at about a forty five degree angle to make the spiral wraps.

LC 2008

# THE RICHMOND RIB

Jim Richmond

The subjects of bent and "Andrews" rib types keeps coming up and I would like to set the record straight regarding my involvement. Except for an occasional experiment I have not used bent ribs on models since 1976 when the extreme humidity of Cardington caused my F1D bent ribs to remember their original flat shape.

Although I have no objection to most names people assign to model parts, the term "Andrews rib" is one that gets under my skin. Pete was a good guy and a personal friend and during our long drive across Europe enroute to the 1970 world championship many things were discussed including my use of banana-shaped compression ribs. He wanted to know if they worked satisfactorily and I said I found them to be as good as built-up ribs and a lot easier to make. Then in 1972 he won the world champs using compression ribs of this type. He left his plane with the British who drew it up including a separate sketch of the banana-shaped compression ribs which they thought were very unique. These were published in the Feb 1973 issue of IN&V. In the Sept. 1970 issue of IN&V there is a drawing of my cabin model which had won the past two Nats and it clearly shows the "Andrews" type compression ribs I was using at that time.

I think it is a great idea to honor those who created useful designs by hanging their name on them. It's my understanding that Pete came up with the cabane idea for bracing-if so, that could be the "Andrews cabane".

Jim Richmond



# THE NEW NATIONAL FREE FLIGHT SOCIETY MEMBERSHIP & RENEWAL APPLICATION

## Carl Bakay

As the new Membership Chairman for the NFFS, I hope you are enjoying another great year of flying, whether indoors, outdoors, or both. I took over these duties from the very capable hands of J P Kish in August of last year. At the time, I just thought it would be a lot of work, but since then I have had the opportunity to meet and work with many great modelers, and have a lot of fun.

Phil Sullivan is our new Society President, and along with his district vice presidents, has come up with a new Membership and Renewal Application, reproduced here.

First, we ask you to donate to the NFFS Foundation. Why? We established the foundation to benefit ongoing operations and contribute to the growth of the Society you have come to depend on. Some of the areas it supports are the annual Symposium, website maintenance, and programs to preserve and promote free flight modeling. Just as important to you, you reduce your income tax liability with this charitable contribution. You can add it to the rest of your itemized deductions to lower your tax, and potentially avoid capital gains taxes by giving the capital gains liability, or part of it, to the Foundation.

Finally, there are three categories of membership to US members: \$100 for five years, \$48 for two years, and \$25 for one year. While they last, I am sending out water slide NFFS decals with 2 and 5 year renewals, and a pin with 5 year renewals.

Free flight forever.

Carl Bakay  
NFFS Membership

### IMPORTANT RENEWAL INFORMATION

To continue receiving the NFFS Digest without interruption, your dues should reach the NFFS Membership Office at least two (2) months before your current expiration date. For example, if your Digest mailing label says your month of expiration is August, NFFS should receive your payment by June. Do not wait for a reminder from NFFS. You will be late and miss an issue.

If possible, please renew your membership for at least two years.

**International members only** - If you renew at least two months before your dues expire, you can now use VISA or Mastercard (on two or more year memberships only) by mailing to the address in the application below; by using the shopping cart on our web site [freeflight.org](http://freeflight.org); by e-mail to [carl.bakay@scientificdrilling.com](mailto:carl.bakay@scientificdrilling.com).

### ★ ★ NFFS Foundation Donation ★ ★

NFFS Members are encouraged to support the NFFS Foundation by a voluntary extra tax deductible contribution. Contributions can be made in three different levels: **Silver** for \$75; **Gold** for \$125; **Platinum** for \$250 or more. Sustaining membership contributors will have their names listed by level in the next NFFS Symposium Publication.

Sustaining members can simply add the Foundation amount to their regular membership application check when they send it to NFFS.

*Thanks for your support.*

Bob Stalick, Chairman NFFS Foundation. Federal EIN 38-2231086



### NFFS MEMBERSHIP & RENEWAL APPLICATION

Mail to: NFFS Membership Office  
118 Gentry Circle  
Lafayette, LA 70508-6326  
USA

Make checks payable  
in U.S. dollars to:  
**National Free Flight Society**

Dues include a mandatory \$.50 per year for NFFS membership.

**5 Year Red Membership** includes memb. card, 2 NFFS decal sheets and pin.

**2 Year White Membership** includes memb. card and 2 NFFS decal sheets.

**1 Year NFFS Blue Membership** includes membership card and 1 NFFS decal sheet.

<b>US Residents (Age 19 &amp; over)</b>	<input type="checkbox"/> 5 years	<b>\$100.00</b>
	<input type="checkbox"/> 2 years	<b>\$48.00</b>
	<input type="checkbox"/> 1 year	<b>\$25.00</b>

<b>Junior Membership (U.S. only)</b> Age 18 & under as of July 1 of the current year Copy of birth certificate required for new memberships.	<input type="checkbox"/> 2 years	<b>\$18.00</b>
	<input type="checkbox"/> 1 year	<b>\$10.00</b>

<b>All Non-U.S. Residents</b> (To use VISA or MasterCard, see Important Renewal Information above.)	<input type="checkbox"/> 2 years	<b>\$56.00</b>
	<input type="checkbox"/> 1 year	<b>\$29.00</b>

<b>Life Membership</b>	<b>US Residents</b>	<input type="checkbox"/> \$500.00
	<b>Non-US Residents</b>	<input type="checkbox"/> \$550.00

### ★ NFFS Foundation Donation ★

☐ Silver - \$75   ☐ Gold - \$125   ☐ Platinum - \$250 or more \$ \_\_\_\_\_

To help reduce expenses maintaining NFFS records,  
**PLEASE renew for at least 2 years. Thank you!**

Check boxes to what applies:

New Member ☐   Renewal ☐   Address change ☐   Donation ☐

Amount: \$    Current expiration date: Mo. - Yr. \_\_\_\_\_

PLEASE PRINT

Name: \_\_\_\_\_ AMA member: Yes ☐ No ☐

Address: \_\_\_\_\_ AMA #: \_\_\_\_\_

City, State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_

(IMPORTANT - PLEASE PRINT VERY CLEARLY)

e-mail address \_\_\_\_\_

Send **all** renewals, address changes, applications, and  
membership questions to the Membership Office.

e-mail: [carl.bakay@scientificdrilling.com](mailto:carl.bakay@scientificdrilling.com)

# **“PLASTICIZING” BalsaWood for Making Flexible Propellers for Model Airplanes**

**Matt Payne**

I’ve long wanted to make an all-balsa prop that would bend at the root so as to reduce the chances of breaking upon hitting a tree or landing. I knew that lignin stiffens wood, so I decided to see what would happen if I removed it from balsa. What I found is that it imparts permanent flexibility and hardness by allowing the wood to shrink so that the fibers come into close proximity. You can take advantage of these changes in the wood to make a thin, light, hard propeller that will resist unwinding under torque, and that will flex at the root like a plastic prop, reducing the chance of breaking upon landing.

The trick is to use dense sheet balsa (1/16- to 3/32-inch) with close grain, soak it in ammonia until it no longer floats (usually about a week), then boil it for an hour in water, and then soak it in ammonia again overnight before forming. As it dries, it will shrink and the fibers will come close together. It will look like it is made of laminated strips, and it will be hard and flexible, sort of like bamboo.

The best results for making a “one-piece” prop from wood processed in this manner can be obtained by forming individual blades and overlap-joining them at the root, sandwiching in a piece of untreated balsa the thickness of the desired shaft bushing outside diameter. When cutting the pattern, allow for shrinkage of 25% across the chord, and 10% in overall length. Thickness will be reduced about 30 to 40%. (Balsa with an original thickness of 1/16-inch will have a thickness of a little more than 1/32-inch after.)

When forming on a forming block, to prevent buckling of the wood, particularly at the tip edges, wrap it closely with ¼-inch wide strip rubber or use balsa scrap pinned across the blade. You can also use a 1/64-inch plywood or 1/16-inch balsa “blank” over the blade, and strap it down (to the forming block). Let it dry on the block thoroughly, then remove it and dope it immediately. If there is buckling at the tip or root, wet it with saliva and clamp it flat with scrap balsa and let it dry. Then sand it, and dope it again, twice. For a low-pitch prop like a typical plastic job, use a forming block with a 12-degree terminal angle. Do not place the root-end of the blade at the root-end of the block at first. Doing so may cause the root end of the blade to crack or split. First place the blade about ½-inch to ¾-inch from the root-end of the block, and pin it or strap it down. Keep it wet for an hour or two, then move the blade to the root and strap it down. If it does split, after it dries, close the split and glue it with c-a glue. Overlap-joining will reinforce the split repair, and result in a reduction of the twist of about four to five degrees. After joining the blades, you can increase or decrease the pitch by steaming and twisting over a jet of steam from a teapot.

It might be possible to impregnate the wood during a final water-soaking with an elastomeric polymer of some sort to add flexure strength. Carbon fiber sheet applied to the root area might also protect against cracking. If you try any of these things or have any other ideas, I’d like to hear from you.

Matt Payne May 2008    [propellerman@sbcglobal.net](mailto:propellerman@sbcglobal.net)



# CONTEST RESULTS

## WILLAMETTE MODELERS TWO DAY INDOOR MEET

**ALBANY, OREGON - APRIL 19, 20, 2008**

At this time of the year we usually have nice spring weather, with temperatures on the mild or warmer side. Not so for this contest. When I arose on Saturday morning I found a layer of ice on the car, and the hill out of town was like a winter scene with snow on the road and on the trees. Further on, as I approached the city of Salem, I ran into a blizzard, which lasted for five minutes. The rest of the drive to Albany was interspersed with showers and clear spots. Upon arriving at the flying site, we found the blowers still operating and the building was quite cold. We finally got someone to shut off the blowers, and the contest began. The next morning we arose in Albany to find 1/2 inch of snow on the ground, and reports of heavy hail in the area. Needless to say, it again was cold in the building, and remained that way during the competition. It was winter all over again.

I must relate an interesting incident that began late Friday evening. The phone rang, and when I answered, the gentleman on the line asked about our contest, and wondered if we would allow visitors to attend the meet without models. It seems that Sean O'Connor, from Portland had a visitor from Sweden, who had been on the Swedish International Indoor World Championship team three times, and while searching the Internet, had found our contest on the competition schedule. His name is Sven Pontan. Of course I said it would be an honor to have him visit with our group of flyers. I fortunately had a small Swedish flag, and had it on the table by the door when he came in. He was delighted to see the flag, as was his nephew and brother-in-law, Mr. O'Connor. They visited for several hours, and Sven had the opportunity to fly my Mini-stick, and to observe Andrews 35 Cm model. These folks were very interesting to talk with, but they had to leave for other business. Sven will also be visiting his brother-in-law in Nebraska very shortly. It was a pleasant interlude.

Now for the contest. There were only 12 contestants, but some good flying was done by this small group. It was good to have Bob Carpenter back with his wife and son. Tony Mula got us going with his fleet of models that fly so well. Ed Berray came in late as he had an upset stomach, but he soon was flying steadily with the rest of us. His models all are good flyers, and he is an excellent builder. As I mentioned in my last report, we now have a double row of speakers on the ceiling beams, and they do snag models. Fortunately Andrew Tagliafico has a long pole, and he has turned out to be an expert at retrieving the models from those speakers. I would guess there were at least eight or nine that were hung up, including a Bostonian. Consequently we find ourselves not winding to max turns, even on official flights. The flying continued until five o'clock, when we broke for supper. We came back to get the symposium going at six fifteen, and there were a dozen people attending. The first speaker was James Alderson--I asked him to tell us about his Bostonian props, because they fly so well. James says he used three or four books on making scale models fly to get his information, and he passed three page report that had some really interesting and informative data that described how to get the most potential from your models. He gave an excellent presentation. Next Andrew Tagliafico showed us an easy method for covering with the new films. He makes a rectangular form that is bigger than the framework to be covered. Then on a work board covered with taped down newspaper, he rolls out the film. Using a soft, wide brush, he smoothes the film on the newspaper. Then he applies thinned out rubber cement to the rectangular form, puts it on the film, and activates the rubber cement with rubber cement thinner. He then heats a 3/32 wire and cuts that loose by just winding the wire on the outside of the form. Do Not get the wire too hot--just enough to cut the film. He then brushes the structure to be covered with thinned rubber cement, and after it dries, he places it on the film covered form, and cuts it loose with the heated wire. Andrew deflects the long side of the form to make a bit of slack so the wing ribs touch the film at all points. Nice and easy Next Ed Berray talked about encouraging the younger flyers to try other events. Many of the Science Olympiad flyers fly that event only--Ed wants us to mentor them on other indoor events. Finally, John Lenderman talked about his favorite subject-- "If it will glide, it will fly." He stated that you can get the most potential from your new model by gliding it and making adjustments to incidence and CG until you feel it is doing the best gliding that it possibly can. Then when you fly it, the model should perform well. We resumed flying after that presentation, and finally went home at about ten o'clock. The next morning we began the flying on the regular Sunday schedule.

We found that the cold weather does affect the rubber, and consequently, the times were down somewhat. In the A-6 event, Ed Berray had a brand new model that was designed by Wally Miller. On the first test flight it performed quite well, and did an over five minute flight. Again, many of the flyers did not torque up too high because of the speakers, so the times were mediocre. Catapult glider flyers are getting better, but are still not able to best our top man, Ed Berray. He did well with hand launched also, getting up near the ceiling on his throws. Most everyone did well with their Science Olympiad models with Rebekah Altig doing a great 3:50 in the Jr.-Sr. event. Andrew Tagliafico is hard to beat these days, as he has a good design, and he flies it very well. He also does well in the Mini Stick event, as he takes some chances by putting them up into the beams and speakers. His 7:22 was hard to beat, as his model performed quite well. On the noon mass launch of Science Olympiad, there were only three that entered, and shortly after the launch signal was given, both Andrew and Ed Berray drifted to the wall, and the only other contestant eventually did the same, but he had the winning time. I say winning because he was the only one left flying. In the regular EZB event, there were only two contestants, and John Lenderman was the winner with a 6:10 on a 1/4 motor. Ed Berray, with a smoothly flying model, was second with a nice time

of 5:59. In the 1.2 EZB event, Ed had his model flying quite well, but somehow, his best flight was not recorded. Consequently, he lost that event by one second! John Pratt, with his first 1.2 model, had it going well, and made some very good flights to win third place. We'll have to look out for him when he learns what to do. There were only two flyers entered in both Peanut Scale, and AMA Scale, but both had very nice models and flew them well. George Gilbert won over Bob Carpenter in Peanut Scale, and James Alderson won over Bob Carpenter in "AMA Scale. In the 35 Cm event, Ed Berray made some changes in his prop pitch, and came out the winner over Andrew Tagliafico. Both models flew very nicely, and were a pleasure to watch. In the Bostonian event, the usual winner had some trouble getting the correct torque in his motors, and even though he tried hard, he was not able to solve it on Sunday. James Alderson has won this event for most of the contests this year, but I warn you, look out for him next year. James is so precise in what he does, and is so careful to register all the vital information on his flights. That makes it easier to duplicate your good flights.

Despite the inclement weather, we feel everyone had a good time, and not only enjoyed the fellowship, but perhaps learned something they didn't know before. We encourage you to consider going to the Kibbie Dome in July, and experience of flying in one of the best sites in the world.

## RESULTS

### A-6 (7)

1. Ed Berray	5:34
2. John Lenderman	4:37
3. Andrew Tagliafico	4:07

### LIMITED PENNY PLANE 1/4 MOTOR (3)

1. John Lenderman	3:52
2. Ed Berray	3:12
3. Michael Altig	3:03

### MINI-STICK (4)

1. Andrew Tagliafico	7:22
2. John Lenderman	5:43
3. Ed Berray	5:13

### INDOOR STD CATAPULT (4)

1. Ed Berray	75.6
2. Bob Stalick	66.5
3. Bob Carpenter	62.9

### INDOOR HLG (2)

1. Ed Berray	59.3
2. Bob Stalick	43.3

### OPEN SCIENCE OLYMPIAD (4)

1. Andrew Tagliafico	4:11
2. Ed Berray	4:01
3. Michael Altig	3:07

### JR-SR SCIENCE OLYMPIAD (2)

1. Rebekah Altig	3:50
2. Wesley Altig	3:10
3. Andrew Tagliafico	:23

### SO MASS LAUNCH-NOON

1. John Lenderman	2:34
2. Ed Berray	:54

### 1.2 EZB (4) 1/4 MOTOR

1. John Lenderman	4:56
2. Ed Berray	4:56
3. John Pratt	4:25

### EZB 1/4 MOTOR

1. John Lenderman	6:10
2. Ed Berray	5:59

### 35 Cm. (2)

1. Ed Berray	8:05
2. Andrew Tagliafico	7:13

### PEANUT SCALE (2)

1. George Gilbert	:41
2. Bob Carpenter	DNF

### AMA SCALE (2)

1. JAMES ALDERSON	:45.2
2. Bob Carpenter	DNF

### BOSTONIAN (2)

1. John Lenderman	2:57
2. James Alderson	2:38

Our thanks to the Willamette Modelers Club who sponsors this event.

Reported by John Lenderman CD

# CONTEST RESULTS (CONT.)

**KIBBIE DOME ANNUAL - MOSCOW, IDAHO - JULY 6-10, 2008**

**John Lenderman**

There were some concerns about the number of competitors that would attend this years competition, with the price of gasoline being one of the factors, and the economy the other. Ed Berray and I drove up from Oregon, and arrived late in the afternoon. After checking in to the motel, we drove right to the dome to get our tables ready, and bring in our model boxes and equipment. There were five or six other modelers there already, preparing their flying areas and unpacking the models. Mostly we stood around and talked about modeling and what the latest trends were. The glider boys were showing off their new models that were at first known as discus launch gliders, but the new term is "tip launch gliders", as the models were flown by holding them only by the wingtip. Stan Buddenbohm and Bruce Kimball had some beautifully made gliders, and were explaining the details of the designs and launching techniques. Bruce, of course, had won our Nationals and the British Nationals using this new approach, and we were looking forward to watching them demonstrate their prowess. A few more flyers trickled in, but not to the number we usually expect. The next morning we got a good demonstration of the capabilities of these tip launch gliders. There were several others with these new gliders, and some with the usual javelin type launch, but they were not getting near the height of the tip launchers. Several of us estimated that both Stan and Bruce were reaching 90 feet or more. There are two methods for launching - Thumb under or thumb over. Also a single spin move before launch gave added impetus to the throw. Ed Berray had purchased a kit from Stan shortly before the contest, and after practicing his throw for several days, was getting quite respectable times with his model. Both Stan and Bruce were very generous giving further instructions to the other flyers. We have to mention-that our genial EZB man, Wally Miller, who had been preparing for this contest for a year, was unable to attend because of a respiratory condition that arose shortly before he was to leave for Moscow. In talking to him recently, he was well and healthy again, and looking forward to next years competition. He is quite meticulous in his preparations, and has some innovative changes that he feels sure will give him the victories he strives for. We had a gentleman and his daughter come all the way from Indianapolis to fly Science Olympiad. They are Leo and Catherine Pilachowski. They really showed us how to fly these SO models, and with sport rubber also!! Leo had a high time of 7:16 and Catherine flew her model to a 6:01 time. They were 1st and 2nd in the SO event. Leo said he really liked the format of this contest, and both he and Catherine flew almost constantly during the entire competition. He plans to return again next year. The conditions in the dome changed after the first day, and for a good part of the next four days, there was a struggle to get our models to perform to levels we had experienced before, in previous years. About the third day I wandered down to the area of the F1D models, and one flyer asked how we were doing at the other end of the building. When I told him we couldn't get anything to work, he replied that was the same thing they were experiencing. I noticed that some flyers were breaking motors trying for more turns and more torque. In the A-6 event, I counted ten broken motors for myself in trying to increase my time. Others were experiencing the same problem. One thing that I noticed, however, was the fellowship between the modelers, helping one another, and exchanging ideas. It was good to see that!

I'll cover the events and will give highlights that are pertinent to that event. In the Mini-stick event, Lou Young, who does a great job in mentoring, posted a good flight of 12:21. He is usually so busy working with his young charges, that we don't notice that he is flying for himself, and doing a nice job of that. Emil Schutzel is busy all the time, and constantly testing on short flights, and weighing motors. He put up a nice 11:46 for second place, and quiet Mark Bennett was close behind at 11:38. EZB 1.2 (F1L) was dominated by Steve Brown, and F1D World Champion-, who put up two great flights of 21:32 and 22:01. His model was exquisitely built, a real gem. The competition is the total of the two best flights. In second was John Lenderman, with a 19:54 and 21:07, these flights being posted on the first day of competition. In third was Bill Leppard, who did lots of steady flying the whole contest, with a posting of 37:50. The Limited Pennyplane event was won with the only fifteen minute plus flight by John Lenderman, who did this flight with his original Thrush. The 15:02 was right at the top of the dome, and missed hitting the wires and net for a heart stopping 15:02. Steady flying Mike Palrang came close with a great 14:53, and young Tim Chang was third with an early posting of 14:37. Tim is a really talented young flyer, mentored by Lou Young, and will be representing the USA at the F1D World Championships in Belgrade later this year. He is still only a junior. As mentioned earlier, Science Olympiad was won by Leo Pilachowski and his daughter Catherine. Their times of 7:16 and 6:01 surpassed the times of two of our best SO fliers, Chris Borland and Andrew Tagliafico. And again I stress that they were using FAI sport rubber: Chris did manage a third place with a time of 5:58, with Andrew next at 5:39. Andrew seems to think the success of Leo and Catherine is in their propellers, and the right rubber size, but we didn't have an opportunity to look over those props or study the models qualities. They sure did know how to make them perform. As I am reporting on the winners, I must tell you that I started with the events with the most entries, and will finish with the events that had a lower number of flyers. The next event is Standard Catapult Glider, and I have to tell you these fellows know how to make them fly and fly high. Stan Buddenbohm was the most consistent in his launches and flights--all were in the 1:32 range or better, and he was the eventual winner with a two flight total of 195.4. Not too far behind was Darryl Stevens with a good total of 186.7. Ralph Ray quietly put up good flights and garnered third place with a nice time of 183.7. A very good Wakefield flyer, Norm Furutani was close behind for fourth place with a good time of 179.9. In the regular EZB event, Mike Palrang flew his model for an excellent time of 27:07. Mike just goes about his business with great ability and experience, knowing his model and the capabilities built into it. mark Bennett is known for his F1D flying and also his Mini-stick victories, and he shows he can also fly EZB, posting a very good time of 25:38. Mark seems to be always building or

repairing, but he sure gets results. In third place is our host and a great flyer, with his time of 25:00 in the EZB event. We heard that the rule change to .7 grams had been defeated, so that means we will have to try and build lighter models to compete. In the regular Pennyplane event, that quiet man, Steve Brown posted a nice flight of 17:44, and we didn't even get to see the model or any part of that flight. Bill Leppard flew continually, and got a flight of 16:32 for second place. Another of Lou Young's group, Spencer Hanson, a nice young man, had 16:00 for third place. SO mass launch found Andrew Tagliafico on top with a 5:47, followed by Leo Pilachowski at 5:28, and in third Ed Berray with a good 5:04. Unlimited Catapult Glider showed our glider man, Stan Buddenbohm with a very good two flight total of 191.3. Darryl Stevens again was second with 183.0 and in third was Tem Johnson with a close 175.0. Hand-launched Glider had Stan Buddenbohm on top with some great launches. His 158.2 topped Bruce Kimball who had a total of 145.4 for his two flights. I guess we should be using the new name for this event--tip launched glider. Ed Berray, who just started flying this event with tip launch, learned enough to take third place with his personal best of 84.0. The 35 cm event produced some very pretty models, and Bill Leppard flew his to a good time of 24:21, with Andrew Tagliafico not far behind at 21:43. Ed Berray, with a nice flying model was third at 21:29. Baby ROG produced some very good time and Andrew Tagliafico showed he knows how to fly them. His 19:22 was not too far ahead of Tim Chang who had a well built model that flew for a great 18:42. Again in third place was Ed Berray with 17:07. F1D was flown as an AMA event, and Tim Chang showed why he has made the international team. He did a very good: 33:22, and Mark Bennett was very close for second at 32:35. Steve Brown was third at 30:39. Emil Schutzzel shows he knows how to fly Bostonian with an outstanding flight of 5:17. Intermediate Stick was won by Tim Chang with an outstanding time of 35:28, With Bill Leppard second at 32:04. Mike Palrang was third with 20:00. F1M event, that not too many fly, was showing Bill Leppard in first place with a 17:39.

We deeply appreciate the amount of work Andrew puts into this premier event, and extend our sincerest thanks to him from all of us. He is planning for 2009!!

Here are the complete results.

#### **MINI-STICK (10)**

1. Lou Young	12:21
2. Emil Schutzzel	11:46
3. Mark Bennett	11:38

#### **EASY B 1.2g (F1L) (10)**

1. Steve Brown	43:33
2. John Lenderman	41:01
3. Bill Leppard	37:50

#### **LIMITED PENNYPLANE (10)**

1. John Lenderman	15:02
2. Mike Palrang	14:53
3. Tim Chang	14:37

#### **SCIENCE OLYMPIAD (8)**

1. Leo Pilachowski	7:16
2. Catherine Pilachowski	6:01
3. Chris Borland	5:58

#### **A-6 (8)**

1. Emil Schutzzel	9:48
2. Tem Johnson	9:44
3. A. Tagliafico	9:00

#### **STANDARD CATAPULT GLIDER (8)**

1. Stan Buddenbohm	195.4
2. Darryl Stevens	186.7
3. Ralph Ray	183.7

#### **EASY B (7)**

1. Mike Palrang	27:07
2. Mark Bennett	25:38
3. A. Tagliafico	25:00

#### **PENNYPLANE (7)**

1. Steve Brown	17:44
2. Bill Leppard	16:32
3. Spencer Hanson	16:00

#### **SO MASS LAUNCH (7)**

1. A. Tagliafico	5:47
2. L. Pilachowski	5:28
3. Ed Berray	5:04

#### **UNLIMITED CATAPULT GLIDER (6)**

1. Stan Buddenbohm	191.3
2. Darryl Stevens	183.0
3. Tem Johnson	175.0

#### **TIP LAUNCHED GLIDER (6)**

1. Stan Buddenbohm	158.2
2. Bruce Kimball	145.4
3. Ed Berray	84.9

#### **35 CM (5)**

1. Bill Leppard	24:21
2. A. Tagliafico	21:43
3. Ed Berray	21:29

#### **BABY ROG (4)**

1. A. Tagliafico	19:22
2. Tim Chang	18:42
3. Ed Berray	17:07

#### **F1D AMA (5)**

1. Tim Chang	33:22
2. Mark Bennett	32:35
3. Steve Brown	30:39

#### **BOSTONIAN (3)**

1. Emil Schutzzel	5:17
2. John Lenderman	3:28.5
3. Lou Young	2:51

#### **INTERMEDIATE STICK (3)**

1. Tim Chang	35:28
2. Bill Leppard	32:04
3. Mike Palrang	20:00

#### **F1M (1)**

1. Bill Leppard	17:39
-----------------	-------

# 2008 - 2009 CONTEST SCHEDULE

## **Nijmegen, Netherlands International Indoor Fly**

March 28/29      The classes flown will be F1D, F1M, F1L, F1N (Indoor Glider) Sainte, and the scale classes F4F, F4D, F4E and pistachio. The venue used is a cat. I hall (ceiling at nearly 8 meters) with a fairly smooth and unobstructed ceiling. Area is nearly 2400 sq. metres. More info on [www.iifi.nl](http://www.iifi.nl).

## **Missouri**

HAFFA, the Heart of America FF Association, hosts Sunday flying sessions in the Ozanan Gymnasium (20 ft ceiling), 421 East 137<sup>th</sup> St., Kansas City, MO. Dates are: Dec 21, 2008 and also Jan 18, Feb 15, March 15, 2009.

## **Kansas**

HAFFA also flies in the Kansas City College Gym (30 ft ceiling) on Saturdays, dates to be decided at press time. For info – Emil Schutzel 913-341-7788.

## **Connecticut**

The Glastonbury Modelers are back in force with a full season of winter Indoor Free Flight!  
The site is Glastonbury High School, Glastonbury CT. Dates are Sundays, Dec 21, 2008, and Feb 8, Feb 22, March 22 and April 26, 2009. Contact John Koptonak, [gliderguider@comcast.net](mailto:gliderguider@comcast.net), 860-434-1029, or Tony Lincoln, [tony.lincoln@cox.net](mailto:tony.lincoln@cox.net), 860-659-2457

## **NOTICE:**

Indoor flyers - we have received requests from the editors of the NFFS Symposium for more Indoor FF content. Apparently, NFFS has been asked by a decent number of folks to include more Indoor FF material in the Symposium. However, to date (similar to our recent problems with getting fresh material), NFFS has not received any submissions. Lets try to help NFFS out, and please send some material to:

John Lorbiecki  
[lorbieckie@sbcglobal.net](mailto:lorbieckie@sbcglobal.net)

