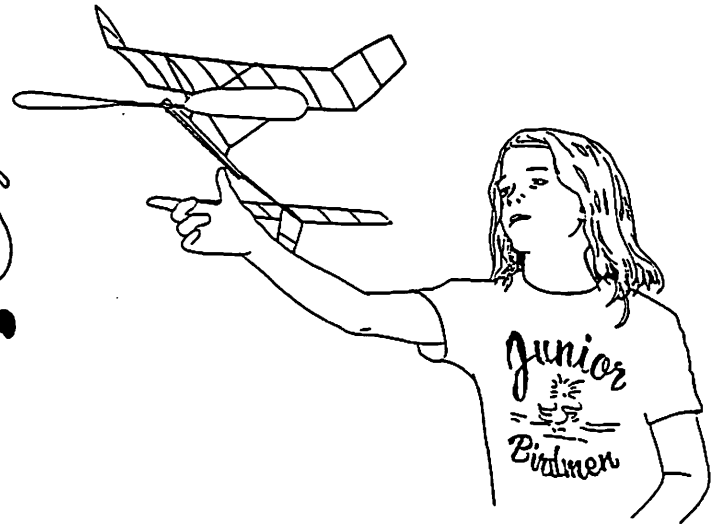
Indoor News



Issue 27 June 1994

DIARY

18-19 June Orleans France	**13th International Indoor**, F1D + Beginner + EZB, J. Delcroix, 7 Rue de Foncemange, 45000 Orleans, France, tel. +34 925 130923
25-28 Aug Liège Belgium	**18th International Indoor**, All classes, Bernard Delhalle, rue de Souvret 62, B-4100 Sclessin-Liège, Belgium.
28-29 Aug Cardington England	**British Indoor Nationals**, Index over 2 days; 28th: EZB, Lim.PP, Catapult, 29th: F1D, LRS. L. Barr, Herries Cottage, Winter Hill Road, Pinkneys Green, Berks. SL6 6PJ, England. Ring Laurie the Friday before (tel. 0628 487544)!
20-25 Sept Slanic Romania	**1994 Indoor World Championships**, Federatia Romana de Modelism, see details in this issue.
26/27 Sept Slanic Romania	**F1D Open International**, Federatia Romana de Modelism, see details in this issue.

1994 Indoor World Championships

The 1994 Indoor World Championships will take place in the saltmines in Slanic, Rumania. There will be a world championship for seniors and juniors. The saltmine measures 64m high, 33m wide and 118m long. The mine is well thermo-insulated and draught-free. The temperature is constant at 12-13°C and rel. humidity is 70%.

Time schedule:
Sept 20 - arrival, registration
Sept 21 - practice, technical meeting
Sept 22 - opening ceremony, rounds 1 & 2
Sept 23 - rounds 3 & 4
Sept 24 - rounds 5 & 6
Sept 25 - reserve day, award ceremony
Sept 26 - departure
Entry fees: seniors, team managers $150, juniors $75, supporters $40.
Accommodation: "Balnear" Hotel, 2km from saltmine, $35/pers/day x 6 days = $210 in motel, meals in restaurant, local transport. Banquet $15/pers.
Jury: Pierre Chaussebourg, Ian Kaynes, Werner Groth, Mihail Zanciu (reserve).

Euroindoor Open Cup 1994
F1D Senior and Junior
Held also in the Slanic Salt mine.
Time schedule:
Sept 25 - arrival, registration
Sept 26 - rounds 1,2,3
Sept 27 - rounds 4,5,6, award ceremony.
Entry fees: seniors $50, juniors $35.
Accommodation: "Balnear" Hotel, 2km from saltmine, $35/pers/day.
Information about both events: Federatia Romana de Modelism, Str Vasile Conta 16 Sect 2, 70139 Bucarest, Rumania. Tel. 40-1-2110160, fax 40-1-2100161.

1996 Indoor World Championships

The Czech Republic has offered to host the 1996 Indoor World Championships.

COLOPHON

Indoor News is published at least four times a year and covers all types of indoor models, from peanuts to microfilm. Texts can be sent in Dutch, English, German and French (I can read the latter two, but not write them). Please type your texts on 12,5 cm width. Texts can be sent on floppy disk (3½ or 5¼) in Wordperfect or ASCII format.

I can make the drawings, if you are no draftsman. I prefer payment of subscriptions per six issues. Paying by Eurocheque, Postal Money Order or sending bank notes is free of handling charges to the recipient. Please bear the handling charges yourselves when paying by Eurogiro or with foreign checks. The Eurogiro account number is 4406860.

Editor:
Thedo André
Meijhorst 35-43
NL-6537JD Nijmegen
The Netherlands

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TORQUE METER FOR LRS MOTORS

By Kai K. Halsas (FIN)

GENERAL

In the following are listed typical values of torque for some indoor models:

LRS:	0,15-0,25 oz.in.
F1D:	0,4-0,85 oz.in.
F1D-Beg.:	0,8-1,5 oz.in.
Lim.P-P.:	1,0-1,5 oz.in.
Peanut:	3,5-6,0 oz.in.

It is noted that the LRS (Mini-Stick) motor has the lowest torque. The LRS is also the lightest of all indoor models and is very sensitive to the torque, especially when flying in low ceiling (living) rooms. I feel that a special torque meter should be designed, only to be used with LRS motors. The inspiration for this study was received from the two excellent articles (!) by Reg Boor in the Aeromodeller magazine.

CALCULATIONS

In Appendix No.1 are shown the calculations needed for the design of the torque meter. The formulae are gathered from different sources. Max. turns formula is by J. Korsgaard (2) and the Max. torque formula is from the Reg Boor article (1). Torsion bar length and dial face angular deflection are calculated from formulae by Ken Rice (3). The formulae are presented in a format suitable for computer calculation.

A typical LRS motor could have the following specification: Motor weight (g) = 0,245 g, loop length (l) = 305 mm, k = 0,245 (this coëfficient is from my own tests with Tan rubber; k = 7,75 for a motor length in cm.).

The smallest size piano wire I had available was ϕ0,3mm (.0118"). This size wire gives a reasonable length 146 mm (5,75") for the torsion bar. I used T = 0,4 oz.in. as design torque. This is about twice the normal torque of 0,2 oz.in.. The indicator needle does one full rotation, that is 360°, with the design torque.

DIAL FACE DESIGN

The dial face can be drawn with 360/8 = 45° between each 0,05 oz.in. marking. The angular deflection can also be calculated as shown in the formula in App. No.1. The 45° angle can easily be divided with help of a compass in four parts. The smallest marking will then be 0,0125 oz.in.. A large size dial face can be scaled down to a suitable size on a copying machine.

TORQUE METER DESIGN

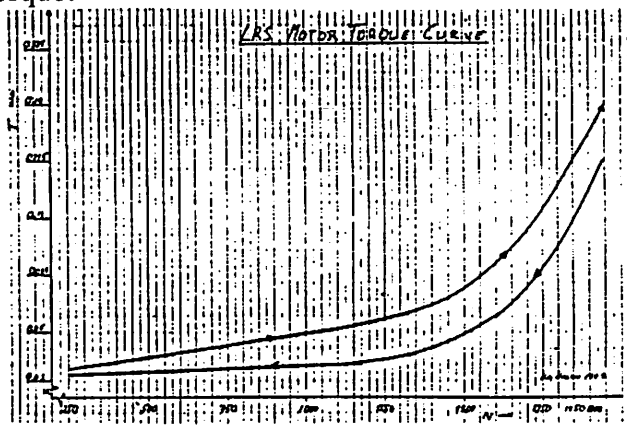
The construction of the meter follows mainly the design shown by Reg Boor (1). As material I used what I had available. The frame is 2 mm (.08") aluminium sheet, the hooks are 1 mm (.04") wire and the bearings are plastic nose buttons. I did not solder the torsion bar into the hooks, the torsion bar was wrapped around the hooks and epoxied. The dial was made of 2,5mm (.1") plywood and the face bond paper. I have recently learned from my friend Vernon Hacker (4) that he has also designed a torque meter especially for LRS motors. I do not yet have details.

TORQUE CURVE

Fig. 1 shows the torque curve for one of my old LRS motors. The motor data are as follows:

Quality:	Tan
Motor weight:	0,38 g
Loop length:	288 mm
Motor size:	0,66 g/m
Calculated max. turns:	1940
Calculated max. torque:	0,195 oz.in.

The torque meter reading at 1950 turns was 0,1875 (0,19). This corrresponds well with calculated torque!



TYPICAL LRS MOTOR DATA

Appendix No.2 shows some data, which I have compiled about typical LRS motors. This data is directed mainly to beginners, to assist them in motor selection. The formula for calculating max. turns is by Otto Rodenburg (5). The resulting turns are approx. 85% of max. theoretical turns for Tan rubber (Otto's formula was derived for Pirelli rubber (T.A.)).

REFERENCES

1. Reg Boor: "TORQUE & TURNS", Aeromodeller, August, September 1993.
2. J. Korsgaard: Indoor News 1/1985
3. Ken Rice: "CALIBRATING A TORQUE METER" (Name of magazine is not mentioned on my copy)
4. Vernon Hacker: Private correspondence, 1993
5. Otto Rodenburg: "RUBBERMOTOREN VOOR INDOOR", Indoor Modelvliegen, 1993.

Appendix 1.

Definition of Symbols:

L = Rubber motor length, mm
g = Rubber motor weight, g
k = Constant (0.245 for Tan)
N = Max. turns
TB = Torsion bar length, mm
a = Angle of indicator defl., degr.
d = Torsion bar diam., in.
^= Symbol, raised to the power
C = Constant (36.5)
T= Torque, oz.in.

Max. Turns

(L*k)*(SQRT(L/g))

N	L	k	g
2002	305	0,245	0,425

Max. Torque

(1000*g)/N

T	g	N
0,21	0,425	2002

Torsion Bar Length

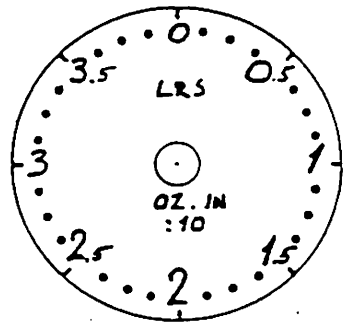
((a*(d^4)*G)/(C*T))*25,4

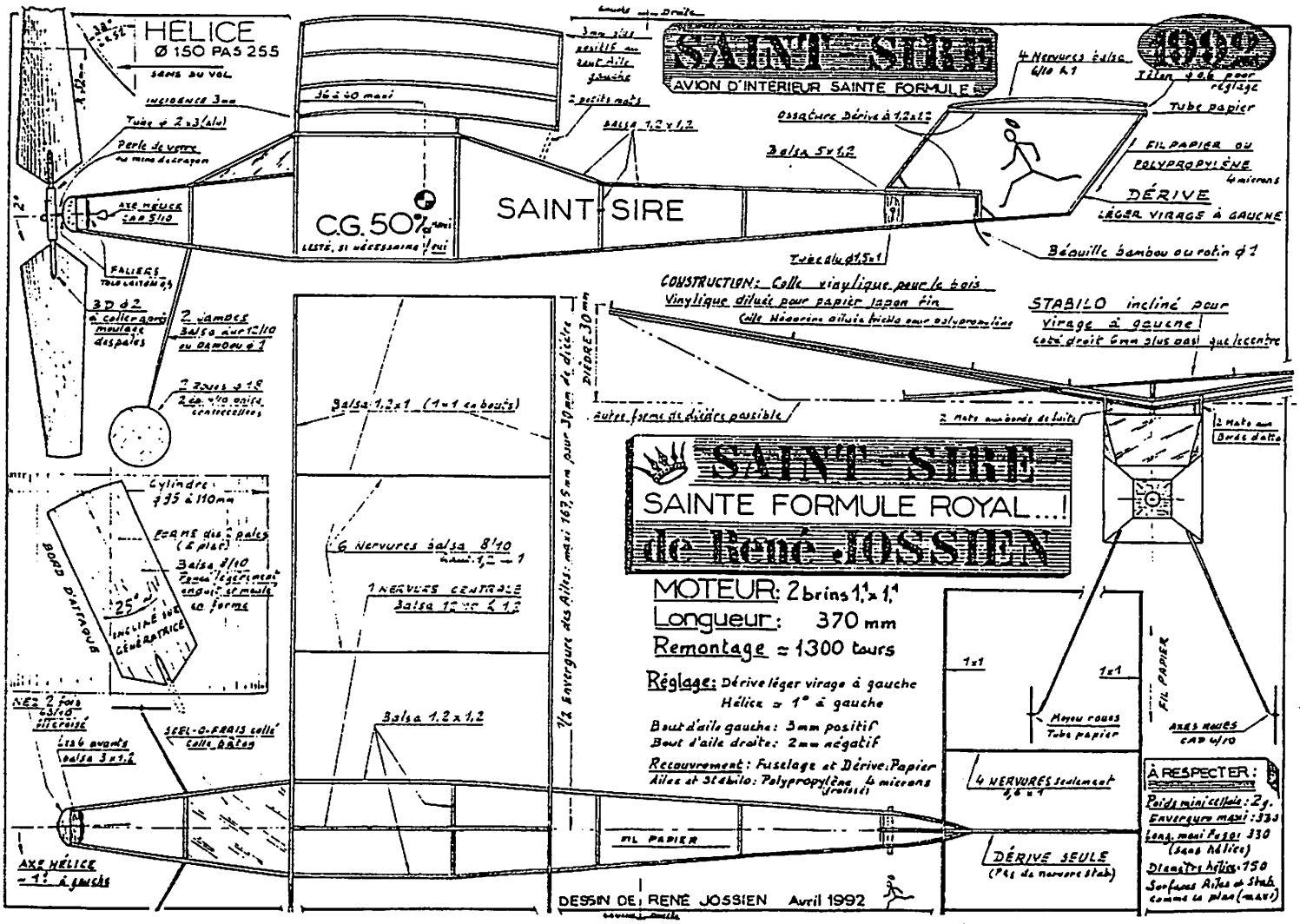
TB	a	d	G	C	Des.T
146	360	0,0118	12000000	36.5	0.4

Dial Face Angular Defl.

(C*T*TB/25,4)/(d^4*G)

a	C	T	TB	d	G
45	36.5	0.05	146	0.0118	12000000





Appendix 2

LOOP LENGTH AND MAX. TURNS FOR LRS RUBBER MOTORS. (85% of theoretical Max., Tan rubber)

Torque oz.in.

(2300*g)/(g/m^1,5)

N	g	g/m
1364	0,15	0,40
1143	0,15	0,45
1818	0,20	0,40
1524	0,20	0,45
1301	0,20	0,50
1128	0,20	0,55
990	0,20	0,60
2273	0,25	0,40
1905	0,25	0,45
1626	0,25	0,50
1410	0,25	0,55
1237	0,25	0,60
1097	0,25	0,65
2727	0,30	0,40
2286	0,30	0,45
1952	0,30	0,50
1692	0,30	0,55
1485	0,30	0,60
1317	0,30	0,65
3182	0,35	0,40
2667	0,35	0,45
2277	0,35	0,50
1974	0,35	0,55
1732	0,35	0,60
1536	0,35	0,65
1375	0,35	0,70
1239	0,35	0,75
3637	0,40	0,40
3048	0,40	0,45
2602	0,40	0,50
2256	0,40	0,55
1980	0,40	0,60
1756	0,40	0,65
1571	0,40	0,70
1416	0,40	0,75
1286	0,40	0,80
2537	0,45	0,55
2227	0,45	0,60
1975	0,45	0,65
1767	0,45	0,70
1593	0,45	0,75
1446	0,45	0,80
1321	0,45	0,85
1212	0,45	0,90
1118	0,45	0,95
2819	0,50	0,55
2474	0,50	0,60
2194	0,50	0,65
1964	0,50	0,70
1771	0,50	0,75
1607	0,50	0,80
1467	0,50	0,85
1347	0,50	0,90
1242	0,50	0,95

((g/g/m)*1000)/2

L	g	g/m
188	0,15	0,40
167	0,15	0,45
250	0,20	0,40
222	0,20	0,45
200	0,20	0,50
182	0,20	0,55
167	0,20	0,60
313	0,25	0,40
278	0,25	0,45
250	0,25	0,50
227	0,25	0,55
208	0,25	0,60
192	0,25	0,65
375	0,30	0,40
333	0,30	0,45
300	0,30	0,50
273	0,30	0,55
250	0,30	0,60
231	0,30	0,65
438	0,35	0,40
389	0,35	0,45
350	0,35	0,50
318	0,35	0,55
292	0,35	0,60
269	0,35	0,65
250	0,35	0,70
233	0,35	0,75
500	0,40	0,40
444	0,40	0,45
400	0,40	0,50
364	0,40	0,55
333	0,40	0,60
308	0,40	0,65
286	0,40	0,70
267	0,40	0,75
250	0,40	0,80
409	0,45	0,55
375	0,45	0,60
346	0,45	0,65
321	0,45	0,70
300	0,45	0,75
281	0,45	0,80
265	0,45	0,85
250	0,45	0,90
237	0,45	0,95
455	0,50	0,55
417	0,50	0,60
385	0,50	0,65
357	0,50	0,70
333	0,50	0,75
312	0,50	0,80
294	0,50	0,85
278	0,50	0,90
263	0,50	0,95

1000*g/N

T	g	N
0,12	0,15	1300
0,14	0,15	1100
0,11	0,2	1800
0,13	0,2	1500
0,17	0,2	1200
0,11	0,25	2300
0,13	0,25	2000
0,15	0,25	1700
0,18	0,25	1400
0,11	0,30	2700
0,13	0,30	2300
0,16	0,30	1900
0,20	0,30	1500
0,27	0,30	1100
0,12	0,35	3000
0,13	0,35	2600
0,16	0,35	2200
0,19	0,35	1800
0,25	0,35	1400
0,13	0,40	3000
0,15	0,40	2600
0,18	0,40	2200
0,22	0,40	1800
0,29	0,40	1400
0,18	0,45	2500
0,20	0,45	2200
0,24	0,45	1900
0,28	0,45	1600
0,18	0,50	2800
0,20	0,50	2500
0,23	0,50	2200
0,26	0,50	1900
0,31	0,50	1600

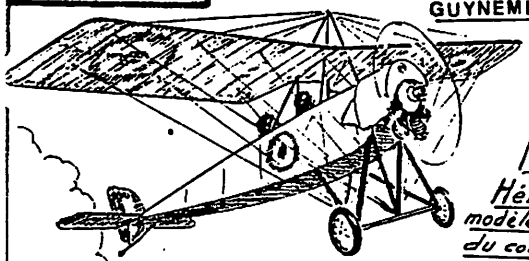
The French Arachide

Le parasol MORANE SAULNIER type L

Monoplan biplace d'observation à moteur rotatif Rhône monosoupape 7 cylindres Guerre 1914/18 : cet appareil a été le premier avion de chasse de GUYNEMER

Documentation :
les Aéroplanes 1914-1915
Aéromodeller Mars 86
Aviation Suisse . le MRA
Multiguide Elsévier 1
Hachette 1 et 33
Fighters 14/18
le Fana de l'Aviation

Maquette Volante taille "PEANUT" longueur 230 par E Fillon Aéromodéliste

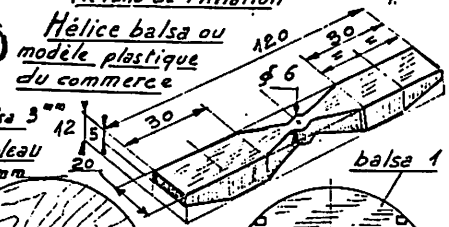


Centrage

Couleur générale toile écrue ou Kaki ; capot moteur alu ; train et mâts Noir . cocardes . Bku . Blanc . Rouge

1°30 à droite
3°

Hélice balsa ou modèle plastique du commerce



Broche tube alu ϕ 2
24

Axe cap 8/10

Capot acétate 2/10 Vacuoformé

Cp. balsa 3
Cp bouleau 1,5 mm

balsa 1

à l'échelle

Paille ϕ 1 + balsa 1x2 profilé

balsa profilé 1x2

Doigt d'entraînement cap 6/10

Roue balsa ϕ 23

Soudé

Rondelles Téflon

Palier nylon

Tube papier

Carter et capot alu

balsa 4/10

Recouvrement général papier condensateur Tendu à l'alcool

balsa 0,8x0,8

bambou ϕ 8/10

Carter et 7 Cylindres Williams 3/8" Scale

Fil invisible Nylon noir ϕ 0,12

Cap 4/10

Couper en biais les cylindres

Coupe vent

Toutes les baguettes balsa moyen 1x1

balsa 0,8

acétate 2/10

Moteur caoutchouc une boucle de 1,8 gr de longueur 400 pour un poids de cellule de 12 gr

balsa 1

Paille ϕ 1

épingle ϕ 5/10

Accès au moteur

Contours à l'échelle

balsa 0,8x0,8

Papier bristol leger Enlarge 141% Balsa moyen 1x1

bambou ϕ 0,8

Paille ϕ 1,2

Bambou ϕ 1

élastique

Points d'attache des cables

feille ϕ 8

bois dur

bambou ϕ 1

balsa 1x1

Dièdre ici 10

Balsa 1

Tressage des mâts

Fil laiton 2/10 collé cyano après recouvrement

Balsa 1x2

Nervures balsa 6/10

à enlever après assemblage

Echelle 1/26,22

News Indoor

GLIDE TESTING FOR THE NEUTRAL POINT

by Reg Boor (GB)

The whole aircraft neutral point, which we shall call "hn", is usually measured in fractions or a percentage of the wing mean chord aft of the mean chord leading edge and is defined as the point where the rate of change of whole aircraft pitching moment with whole aircraft lift coefficient is zero. We write this as....

$(dCm/dCL)a/c = 0$ .....(1)

The neutral point is important because, for static stability, the centre of gravity of the model must be forward of it. For dynamic stability the c.g. must be forward of the manoeuvre point, but as this point is aft of hn, balancing for static stability will ensure dynamic stability as well. The pilot of a full-size aircraft will have difficulty in controlling the craft with its c.g. too near the neutral point as control column motions and forces become very sensitive. As a consequence, stability requirements, which are normally framed in terms of control forces and motion, effectively demand a minimum margin for the c.g. in front of hn and as you all know, this is called the s.m. or static margin. It is unusual for a manually-controlled aircraft to have a c.g. more aft than 35% of the mean chord. Modern F1L and F1D models, because of their large tailplanes, often operate with c.g. positions greater than 100% of the mean chord. The c.g. can be behind the wing trailing-edge. For efficiency in the design process it is useful to be able to predict the position of the neutral point for a new layout and many modellers have either theoretical or empirical methods for doing this. However, as far as I know, a method for testing to validate the neutral point position has not yet been proposed for models.

It is not practical to test for a solution to equation (1) but using the mathematical "chain rule" we can expand (1) so as to give ....

$(dCm/dCL) = (dCm/dNt) \times (dNt/dCL)$ ....(2)

Where we have written Nt to mean the tailplane setting angle.

Now, the first term on the right-hand side of (2) is the tailplane pitching power and because it is the product of the tailplane lift-curve slope and the tail volume, it is constant to a first order. Conversely, the second term inverted, dCL/dNt, is the power of the tailplane to trim the aircraft lift-coefficient and this is strongly dependent upon the c.g. position. Consequently, we should test for the c.g. position where...

$(dNt/dCL) = 0$ .....(3)

and this balance point will be the neutral point. However, it is not necessary to test further and further aft c.g. positions, it can be found by graphical means after simple, but careful testing at two arbitrary c.g. positions, as will be described.

THE GLIDE TESTS

The model will have to glide in a straight line, so the tail tilt and fin offset will need to be adjusted to achieve this, also, remove the propeller and rubber motor to do the testing. Presumably, you will already have flown the model, so if you ballast it to the c.g. that you have used, the first glide tests can take place at that c.g. position, which you must note in mm aft of the leading edge or some other datum, and at the tailplane angle used for flight. Ideally, the tests should be done at constant model mass and you can ensure this by replacing the motor by its mass in ballast at the motor c.g. and replacing the propeller by its mass in ballast at the propeller position. Launch the model from a convenient height. Shoulder height, perhaps, about 1.5 metres. But note the height and keep it consistant. Time the flight of the model and measure the horizontal distance flown. You may wish to do this a number of times to ensure consistant results. The speed of the model is simply the airpath distance, found from the launch height and horizontal distance using Pythagoras' theorem, divided by the flight time. The lift coefficient is ....

$CL = 16016 \times m/Sw \times V^2$ ....(4)

where,
m is the model mass in gms,
Sw is the wing area in mm^2,
V^2 is the velocity in m/sec^2.

The second glide should be at the same c.g. position but with the tailplane angle reduced by a measurable amount. This will steepen the glide and keep the model away from the stall. Once again, when you are satisfied that you have obtained a consistant result, calculate the velocity and the lift coefficient. Divide the change in tailplane angle by the change in lift coefficient and note down the value against the c.g. position. This value is a measure of dNt/dCL from equation (2). There is no real need to know the tailplane movement in degrees, you can work in the height of its trailing-edge above the motor stick. But do remember that it is the CHANGE in Nt and CL between the

two glides that you need. Repeat the glides for a more forward c.g. position which you can obtain by simply moving the motor ballast to the propeller position. This also keeps the total mass constant, as we required. Do the arithmetic and the value of dNt/dCL that you obtain for the forward c.g. position should be larger than that for the aft. Forget about signs in this arithmetic. You now have two pairs of results. Plot a graph of dNt/dCL against c.g. position in mm as the bottom scale. Put a ruler against the two points and continue the graph as a straight line until it crosses the zero value of dNt/dCL on the c.g. position scale. That is where the neutral point is in mm aft of your datum.

A SIMULATED VALIDATION

From the title of this section you will realise that I have not, in fact, done this test myself! A room length of at least 10 metres is required for a start and the last time I thought that I would have the opportunity the room in question had been hired for a children's party. Not conducive to testing an EZB. So I am reduced to simulating the tests using a computer program that calculates the trim given model geometry, mass, c.g. and lift coefficient. The program has been validated by glide tests but not to obtain hn. The candidate model that I used for the simulation was Bernard Hunt's Tandem Two F1L. The details of which were given in their entirety in the 1986 B.M.F.A. "Expert's Forum". I "glided" the model at the flying c.g. of 127mm aft of the wing leading-edge and two whole aircraft lift coefficients of 0.9 and 0.7. Moved the c.g. to 56.44mm by shifting the motor mass to the propeller position and "glided" it again at the same two lift coefficients. So, the change in lift coefficient is 0.2 for both sets of test, the change in tailplane angle was 1.111 degrees for the forward c.g. and 0.3 degrees for the aft. Giving values of dNt/dCL of 5.555 and 1.5 for fore and aft c.g. respectively. Which, incidently, illustrates the increase in sensitivity of the control that we spoke of earlier. The graph with this report shows the plotting technique and gives the hn position as 153mm aft of the wing leading-edge. This is exactly where I calculated it.

MORE BONUSES

There is much more to be extracted from simple glide tests such as these. Even if you only do one test you have obtained the model flying speed and its lift coefficient. But the horizontal distance flown divided by the launch height is the lift-drag ratio, CL/Cd. So if you divide the CL by this you will get the drag coefficient, Cd. You can now calculate the power factor $Cd/CL^{1.5}$. Remember that these are trimmed aircraft glides, so the Cd that you obtain includes the drag due to lift, or induced drag of both the wing and the tailplane. If you do sufficient glides at a number of tailplane angles you will be able to plot the "drag polar" of Cd versus CL and get some indication of the zero-lift drag. You will need more than two tailplane angles to do this because the drag polar is not linear. Quite a lot of information from quite simple tests. But they do demand a lot of patience.

BUILDING A PROPELLER PITCH GAUGE

by Ulises Alvares (UR)

Experience shows the advantages of a propeller with adjustable pitch. The system presented allows the modeller to adapt a propeller to a given rubber motor in a much easier way than by reducing the width of the strands adapting it to a fixed propeller.

Through the same means the thrust can be adjusted to the available ceiling height.

And finally, it is an efficient way to control lateral stability or roll.

All things considered, this leads to the need for a pitch measuring gauge as described hereafter. Let us first remember the basic concepts:

Absolute pitch is the longitudinal travel of the propeller in one full turn.
Relative pitch is the same travel divided by the diameter of the propeller: $P_{rel} = P_{abs}/D$.

An absolute pitch gauge would not be practical, because it will be only for one propeller diameter. A relative pitch gauge instead can be used for all diameters. Let us remember also that we call "geometrical" pitch the geometrical evolution of a helicoil in one full turn and "aerodynamic" pitch the actual travel of the propeller "sliding" through the air in one revolution. Lastly let us remember that this is a little lower compared to the first. The gauge we are about to describe here, wil measure relative geometrical pitch to a constant absolute pitch along the radius.

Fig. 1 shows gauge actual size (enlarge 1.41x).
Fig. 2 shows the components:
"f" - Gauge base of 2 mm pasteboard. Trace quadrant carefully as in Fig.1.
"d" - Dial indicator in 1 mm cardboard.
"e" - 0,3 mm wire epoxy glued underneath of indicator with ends overlapping quadrant.

"a","b","c" - b: cardboard 1 mm; a and c: 0,5 mm plywood. Glue one on top of the other. The components are then glued perpendicular to the axis of the indicator.
"g" - Cut off pin through "f" and glue in drilled holes d and b, acting as pivot axle.

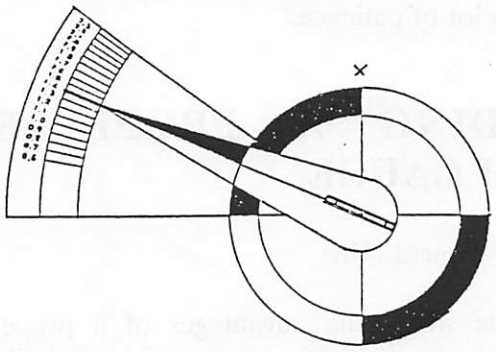


fig. 1

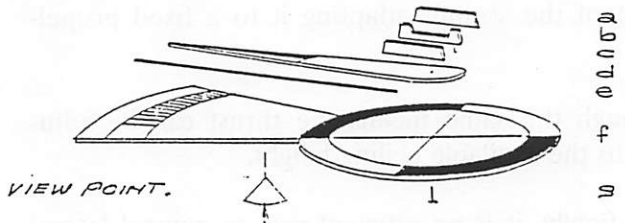


fig.2

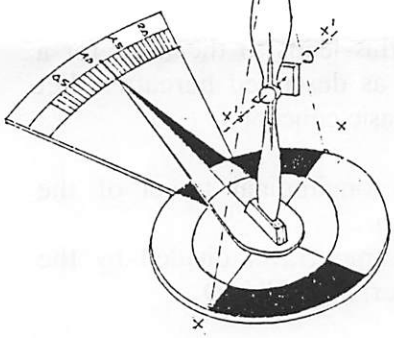


fig. 3

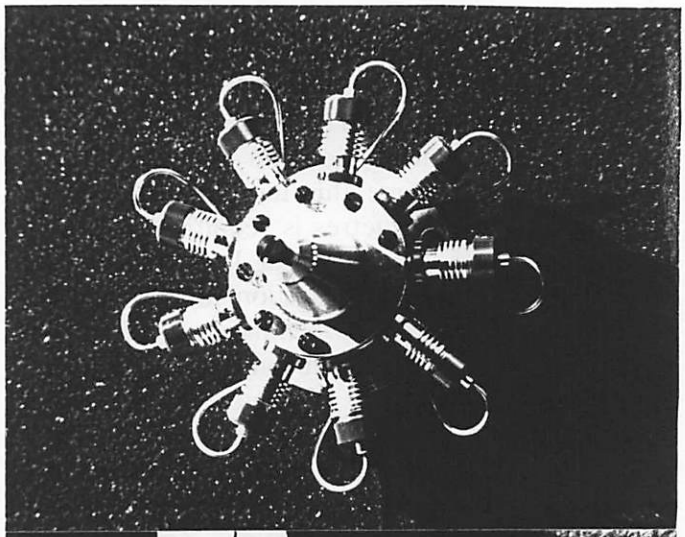
HOW TO USE: Place tip of blade inside groove of indicator. Superpose visually propeller axle X'-X' over X-X of the gauge. Ends of the indicator will then measure over the quadrant right relative pitch.

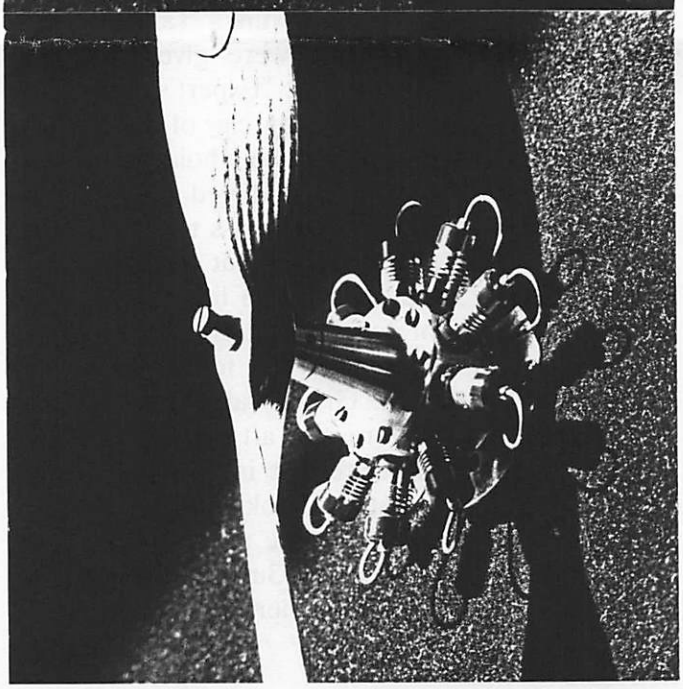
NEW GASPARIN MOTORS

Klaus Jörg Hammerschmidt (GER) reports:

A good scale model should be equal in design and colour scheme to the original aircraft... sometimes even wheels and instruments are reproduced exactly to scale. But model builders have always had a lot of problems making an accurate copy of an engine. They usually put a single cylinder CO_2-motor into the fuselage (such that nobody could see it) or they bought a single cylinder and added some dummy cylinders. Some types of aircraft allowed the use of a twin engine (f.e. a BOWN B-200 or a Gâsparin GM-120T) because the real airplane also had a twin engine. But there were no three, four, or more-cylinder CO_2-motors on the market, which could be used on so many oldtimers.

Now the situation is much better because mr. Gâsparin came out with two different 9-cylinder CO_2-motors. One is working like a normal engine runs, the second one is a rotary motor!



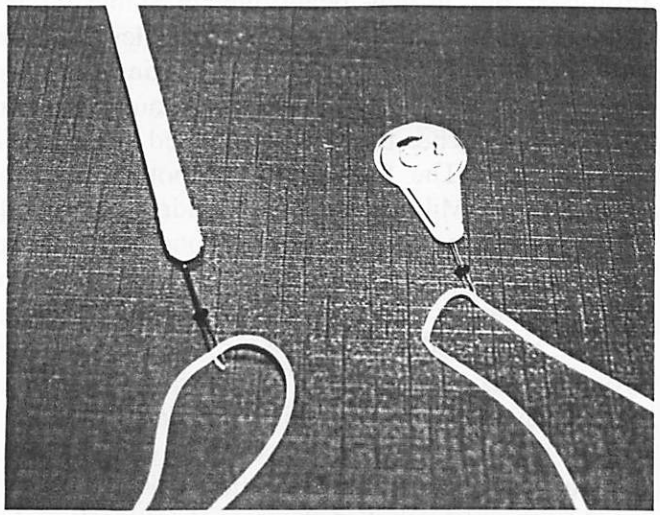


You can see the G-24N on the photographs. This motor has a volume of 9x23.75 mm^3, the bore of the cylinders is 3.175 mm and the stroke is 3 mm. The weight of the motor is 36 grams and the motor powers a wooden propeller of 180 mm diameter. The tank has a capacity of 13 cm^3, which is big enough for a long duration at a high power setting. Where to get? SAMS in England offers this motor for 275 pounds. SAMS, The Chapel, Sandon, Buntingford, Herts, SG9 0QJ, England.

O-RINGS

by Kai Halsas (FIN)

I am using rubber O-rings for my indoor rubber motors. Threading the O-rings onto the motors has allways been very difficult. My good friend Vernon Hacker (USA) sent me a small "instrument" which makes the threading quite easy. It is a loop of ϕ0.2 mm piano wire glued to a stick.



You can also use commercial "needle threaders" which you can buy from some stores. Maybe this is nothing new for indoor experts, but I hope it could help at least some beginners.

PERSONALIA

Shigeyoshi NONAKA (JAP)

Mr. Nonaka has been awarded with the 1992 FAI Paul Tissandier Diploma. From CIAM FLYER: "After 15 years of activity with F1B, Mr. Nonaka started engaging in F1D in 1970. As Chairman of F1D Commission in Japan, he has been exerting himself to leading juniors as well as improving his technical skill. He has been a regular participant in F1D World Championships since 1972 and he managed the 1984 F1D World Championship in Japan. His great contribution to the progress of aeromodelling in general through his profound knowledge and high technical skill cannot be undervalued."

Richard DOIG (USA)

Richard's address has changed to another city and postal code: 6 Canary Hill Drive, Orion, MI 48359-1812. He and Melody are new parents. Cristopher Doig was born Feb 18, congratulations! Richard also tells that they have found a new site near home. It is an inflated "bubble" over a golf practice range. It is 80 ft (24m) high (Cat.III). His best flight was 35'15. The site has a floor as large as Johnson City, and the ceiling is smooth teflon fabric. Rent is $500.00 per day, so two sessions are planned per year.

From Gt Lew's book (see pg 15)

WHERE TO GET CURRENT INFORMATION AND SUPPLIES

ABOUT 1930 FRANK ZAIC started to supply builders with all the exotic materials for Indoor as well as experimental research, plans, and publications on a grand scale. Since then Indoor has grown and changed. About 1959 my MICRO-DYNE PRECISION PRODUCTS and MICRO X expanded interest in Indoor by providing how to do it information through kits and publications. The quality of balsa and supplies, interest, and records all increased. FROM MY EXPERIENCE, and in my opinion it will be impossible to maintain today's level of BALSA QUALITY at reasonable cost without the monetary base provided by the sale of OTHER SUPPLIES and THE CONTINUED SUPPORT OF THE PUBLIC. THE WORK REQUIRES a full time effort and income. YOUR PURCHASES from the most dedicated suppliers is a requirement for the perpetuation and the continuing development of our hobby.

THE MAGAZINES below cover ALL TYPES of flying models. In addition, you will see advertisements for SUPPLIERS. The column on Indoor covers Indoor Clubs, plans, articles and contests. As a newcomer to Indoor, you will probably want to get some back issues from used book stores, and visit your library. Model Aviation is the publication of the Academy of model Aeronautics (AMA), the organization that regulates all types of flying model activity. They record all National records, offer an insurance program, rule book, and representation in Washington and the Magazine is available at your newsstand or hobby shop and all are available at a big savings by a yearly subscription.

Model Builder
34249 Camino Capistrano
Capistrano Beach
CA 92624

Flying Models
P.O. Box 700
Newton, NJ 07860

Model Aviation
1810 Samuel Morse Dr.
Reston, VA 22090

Aeromodeller
P.O. Box 35, Wolsey Hs.
Wolsey Rd., Hemel,
Hempstead
Hertfordshire, HP2 4SS UK

A CLUB NEWSLETTER within your area will provide you with information on activity near you, a calendar of events, suppliers, theory, technique, and plans. Write for a sample copy to determine which ones best suit your needs. INCLUDE ENOUGH money to cover CURRENT postage plus $1.00.

Indoor News
Meijhorst 35-43
NL-6537JD Nijmegen
The Netherlands

Domeduster Newsletter
1810 Pine Street
Philadelphia, PA 19103
U.S.A.

Flapper Facts
3140 Rt. 209 #2A
Kingston, N.Y. U.S.A.

New York Indoor Times
67 Riverside Drive
New Yourk, N.Y. 10024 U.S.A.

Indoor News and Views
2505 White Eagle Trail SE
Cedar Rapids, IA 52403 U.S.A.

TOMAC Free Flight Topics
3425 S.W. Arrowhead Rd.
Topeka, KS 66614-3845 U.S.A.

BMFA 1994 INDOOR SCALE NATIONALS

Nottingham, April 17, 1994

Report by Reg Boor (GB)

Held for the first time in the large hall at the University of Nottingham, which continental visitors to Interscale '91 and '93 will remember as the venue for those meetings, this year's UK Indoor Scale Nationals were an outstanding success, with a record number of entries to the competitions and a record number of spectators. From early morning to the prizegiving at 1800 hrs the viewing gallery was crowded, the bar busy and SAMS shop apparently doing great business. The models of Barry Hetherington in F4D and F4E were a pleasure to watch. Barry does not build to the museum standards of some of the competitors and he choses uncomplicated prototypes (the outer engines of his tri-motor free-wheel) but from take-off to landing his flights were never in doubt and were applauded by the onlookers. Ray Johnson has a similar approach to the hobby, his models are always reliable flyers but are often beaten by museum quality models that also fly well. And there were some of these, of course, but this year they did not completely triumph.

Mike Goldby's Bristol F2B is a superb reproduction which flies nicely, but needs to be hand-launched. Nevertheless, despite loosing take-off points, his static score, which was 100+ points above any of the others in F4E, ensured him a place. The Bleriot Monoplanes of Paul Briggs are also of a high quality and this year flew well enough to gain him well deserved places in both F4E and F4D.

With its large floats, Mike Allen's Sopwith Schneider looked very impressive in the air, but it could not take-off. Another regular competitor at the UK Nationals, Ken Bates made some good flights with his Piper Vagabond and was pleased with his result in F4D. In F4F Peanut, and to some extent Pistachio, the domination of the Lacey M10 has been replaced by the domination of the Voisin Canard Floatplane and the SE5a. Both of which can be awarded many static complexity points and can be made to fly well. Perhaps it is time for an arbitrary rule change, to keep the class interesting. Although as you can see from the number of entries, all of whom made a flight, F4F Peanut retains its popularity.

Your reporter helped Mike Green in both the Air Race and the Kit Scale Mass Launch events and consequently did not have much chance to see what went on. But here are some impressions. In the Air Race the requirement for heats preceding a final seems to have been abandonded, with this event now being a 10 minute scramble to achieve the maximum number of laps around four pylons from a "le Mans" start. It drew 11 entries, ranging from geniune American racers to Hurricanes, Jodels and Ercoupes, but I want to mention one particular model. Peter Smart flew a Mauboussin T10. This is a Peanut which complies with the 229mm length rule but is about 457mm span. A very short model, with a high wing of something like a 5 to 1 taper ratio it looks a most unlikely prototype but it flew beautifully in stable circles around the pylons. The race winner flew 33 laps and the loser 5 laps in 10 very exciting minutes. There were 10 models in the Mass-Launch and in successive launches these were reduced to 9, 8, 6, 4 and finally 2. The final two were both Ercoupes, belonging to Mike Green and Andrew Halstead. Both were flying for about 45 seconds and so the final round promised to be very tense. But Andrew broke his motor and did not have a replacement. So the best model from the previous round was brought back, Ian Pallister's Hurricane. But what should have been an easy win for Mike turned into drama. His Ercoupe climbed and climbed and eventually hit a roof obstruction, dived, stalled, recovered and landed at 33 seconds, just after the Hurricane. The spectators went wild.....

F4E CO_2/Electric		Static	Flight	Total
1. P. Briggs	Bleriot Parasol	764.5	1042	**1806.5**
2. B. Hetherington	S 8 4004	628.5	1170	**1745.5**
3. M. Golby	Bristol F2B	879.0	738	**1617.0**
4. K. Wallace	Corben Super Ace	643.0	880	**1523.0**
5. C. Newman	RWD-8	690.0	824	**1514.0**
6. C. Strachan	Bristol Prier	295.0	1182	**1477.0**
7. D. Sheppard	Piper Vagabond	777.0	634	**1411.0**
8. R. Johnson	De Havilland 5	572.0	792	**1364.0**
9. P. Smart		679.5	650	**1329.5**
10. M. Allen	Sopwith Schneider	490.0	835	**1325.0**
11. M. Green	Anec 1A	374.5	724	**1098.5**
12. J. Hovell	1909 Antoinette	696.5	0	**696.5**
13. T. Rushby		101.0	560	**661.0**
14. D. Hanks	FW189-V1b	429.5	0	**429.5**
15. P. Robinson		0	336	**336**

F4D Rubber		Static	Flight	Total
1. R. Johnson	Pilatus Porter	830.5	1112	**1942.0**
2. P. Briggs	Bleriot Parasol	929.0	842	**1771.0**
3. B. Hetherington	Travel Air 5000	774.0	970	**1744.0**
4. D. Sheppard	Curtis Robin	848.5	850	**1698.5**
5. P. Lee	Lacey M10	690.0	988	**1678.0**
6. L. Smith	Arado 76B	716.5	960	**1676.5**
7. P. Frostick	Eastbourne Mono	746.5	902	**1648.5**
8. D. Masters	SE5A	987.5	637	**1624.5**
9. A. Halstead	Pilatus Turboporter	791.5	805	**1596.5**
10. K. Bates	Piper Vagabond	614.0	952	**1566.0**
11. C. Strachan	Owl Racer	695.0	806	**1501.0**
12. R. Crossley	Boeing XF7B1	780.0	676	**1456.0**
13. G. Ball	Heinkel HE46	882.0	492	**1374.0**
14. J. Lawson	Avro IV Replica	777.0	496	**1273.0**
15. D. Reece	Chrislea CH3 Ser 2S	489.0	692	**1181.0**
16. M. Green	Leningradec	163.0	492	**655.0**

F4F Peanut

		Static Sc.	Pos.	Flight Sc.	Pos.	Total
1. M. Harris	Voisin Hydroplane	54.5	5	127	1	6
2. D. Masters	SE5A	67.5	2	89	5	7
3. R. Horwood	SE5A	53.5	6	96	4	10
4. M. Hadland	Tiger Moth	64.5	3	73	9	12
5. I. Pallister	Spartan Arrow	62.5	4	70	10	14
6. R. Crossley	Polikarpov I-16t24	48.0	8	79	7	15
7. P. Lee	SE5A	45.0	10	75	8	18
8. P. Boys	Hamilton H47	47.0	9	68	11	20
9. P. Briggs	Daro Bullseye	71.0	1	39	20	21
10. S. Firth		31.5	19	107	3	22
11= D. Knight	Hunter	43.0	11	65	12	23
11= J. Lawson	MaxHolsté Broussard	33.0	18	89	5	23
13. M. Green	Leningradec	28.0	23	115	2	25
14. C. Strachan	Midget Mustang	43.0	11	49	17	28
15. L. Smith		50.0	7	10	24	31
16= K. Bates	Whitman Buttercup	42.5	13	45	19	32
16= V. Masters	Lacey M10	36.5	17	53	15	32
16= A. Balding	Lacey M10	38.0	16	52	16	32
19. P. Robinson	Bellanca Citabria	30.0	21	60	13	34
20. G. Hannah	Aero Torpille	30.0	21	56	14	35
21. T. Kingston	Jodel Bebe	42.0	14	18	22	36
22. B. Pursglove	Tinm Collegiate	41.0	15	12	23	38
23. R. Skerrett	Whitman Tailwind	30.5	20	33	21	41
24. B. Stichbury	Farman F170 Jabiru	25.5	24	46	18	42

Pistachio

		Static Sc.	Pos.	Flight Sc.	Pos.	Total
1. D. Masters	SE5A	33.0	1	101	2	3
2= M. Harris	Voisin	29.0	3	86	3	6
2= P. Frostick	Lacey M10	27.0	5	151	1	6
4. G. Dimes	SE5A	31.5	2	20	5	7
5. P. Briggs	Bleriot Parasol	28.0	4	20	5	9
6. G. Hannah	Eastbourne Mono	21.0	6	71	4	10
7. A. Halstead	PZL M18 Dromader	17.5	7	15	7	14

Living Room Stick Postal Contest 1994

		time	height	points	
1. W. van Gorder	USA	9'12	6.78	901.36	Overall Champ
2. J. O'Donnell	GBR	7'02	2.84	860.38	1st UK
3. L. Coslick	USA	6'50	2.74	842.85	1st Int
4. L. Mzik	USA	8'12	6.10	827.66	2nd Int
4. V. Hacker	USA	8'12	6.10	827.66	joint
6. R. Lotz	GER	6'25	2.28	824.41	3rd Int
7. B. Hunt	GBR	8'30	7.57	807.03	2nd UK
8. A. Abell	GBR	6'14	2.34	796.61	3rd UK
9. D. Yates	GBR	6'27	2.84	789.02	
10.R. Eberle	USA	6'13	2.44	787.16	
11.T. Yatabe	JAP	8'33	9.00	771.48	
12.S. Nonaka	JAP	8'23	9.00	756.44	
13.A. Cromberg	AUS	6'13	2.99	751.99	
14.T. Vallee	USA	7'10	5.67	737.87	
15.J. Clem	USA	7'35	7.01	736.01	
16.S. Takeuti	JAP	7'43	7.91	723.43	
17.J. Kagan	USA	6'54	5.49	716.75	
18.K. Hasimoto	JAP	7'51	9.00	708.32	
19.R. Miller	USA	7'50	9.14	703.40	
20.J.F. Frugoli	FRA	5'36	2.53	703.35	

A total of 85 entrants posted 264 competitive flights. Flyers from 10 countries flew in sites ranging from 9.14 down to 2.21 meter. I hope you all had fun flying this little model and I hope you will enter next year's event which will start on the **1st January 1995**. Thermals forever even indoors,

Mike Colling

MINI STICK, how it all began.

by Thomas Vallee (USA)

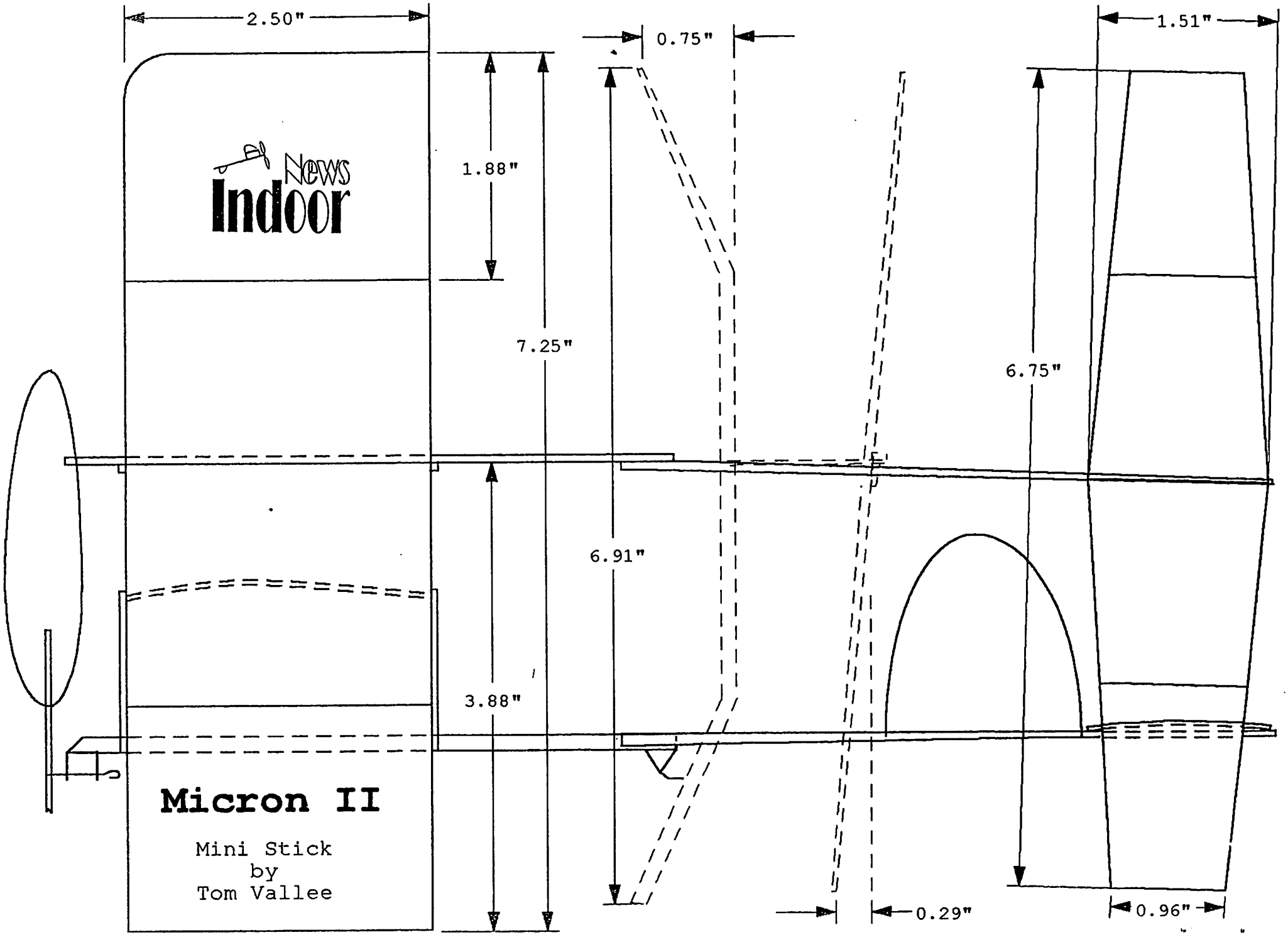
It may be of interest to note that the Mini Stick (Living Room Stick) event was originated by Pete Staehling and myself as a special fun event for an "indoor bull session" of the Goddard Indoor Flyers. At these sessions we would do planning for the groups upcoming flying season and discuss indoor matters in general. We would also drink a good deal of good beer and consume generous amounts of home made baked beans or 3 alarm chili. Thus, a beer party was the inspiration for Mini Stick.

This is how the first Mini Stick contest came to be held in my living rrom. We had six contestants and the winning time was about 3'30. Since then Mini Stick has come a long way. The original rules were almost identical to present rules except that there was no weight limit. We determined the proper weight limit by weighing all the models. The .015 ounce (.43 gram) minimum weight is heavier than models built by our indoor experts but slightly lighter than the models built by our beginners. It seems to have been a good choice.

After the first few contests we saw possibilities of Mini Stick as an ideal entry level event which could be fun for expert and beginner alike. We began to promote Mini Stick outside our own group with great success. One thing we liked about the event was that it filled a special need not met by other events. It could be flown seriously in small rooms not suitable for other large indoor models. Mini Stick was a partial solution to the flying site problem. Our motto was "IF YOU HAVE A LIVING ROOM, WITH MINI STICK YOU HAVE A FLYING SITE". This was the inspiration for Mini Stick's alternate name, Living Room Stick (LRS).

I realized just how far Mini Stick has come since those first days, when I saw about sixty of these little ships filling the air in the Mass Launch* competition at the US Indoor Championships (* we have both standard duration and mass launch competitions at the USIC). Developing Mini Stick has been a lot of fun for me. It has been particularly pleasing to see so many people, having so much fun with our little brainchild, particularly the beginners.

Hope you find this history of the origins of Mini Stick to be of interest.


2.50"
0.75"
1.51"
1.88"
7.25"
6.75"
6.91"
3.88"
0.29"
0.96"
News
Indoor
Micron II
Mini Stick
by
Tom Vallee

NAGOYA NUTS

Georg Tornkvist (SWE) told me about a Japanese Peanut and Pistachio event called "Nagoya Nuts". Every two years this event is international and open to proxy entries. Georg entered his Tiger Moth Pistachio in the 1993 event. It is pictured below in the hands of Jiro Sugimoto, who himself won in Flemalle and Nottingham.



This picture as well as the next one was sent by Shoichi Uchida, who organises the Nagoya Nuts and edits the Japanese newsletter of Shonai Peanut. This is a very fine newsletter with many nice plans, but sadly it is in Japanese only! Which makes me all the more curious to know what they are doing. Maybe one of our readers can translate for Indoor News and/or report about Japanese activities. This year they hold a special event for 13" (330mm) No-Cal Gee Bee racers. The next picture shows Shoichi's Gee Bee Z. Write for details to him at: Shoichi Uchida, 3-24 ASANAKA, OGAKI-SHI 503, JAPAN. Details about next year's Nagoya Nuts later this year.



INTERSCALE 1995

The Dutch indoor flyers are investigating the possibility of hosting Interscale 1995. A suitable site has been found in Maastricht: two large tennis halls with hotel accomodation, swimming pool, etc. on the spot. The planned date is August 19-20, which is one week in advance of the Liège/Flemalle international competition. No definite decision has been made yet, but you can already keep it in mind for next years holiday planning.....

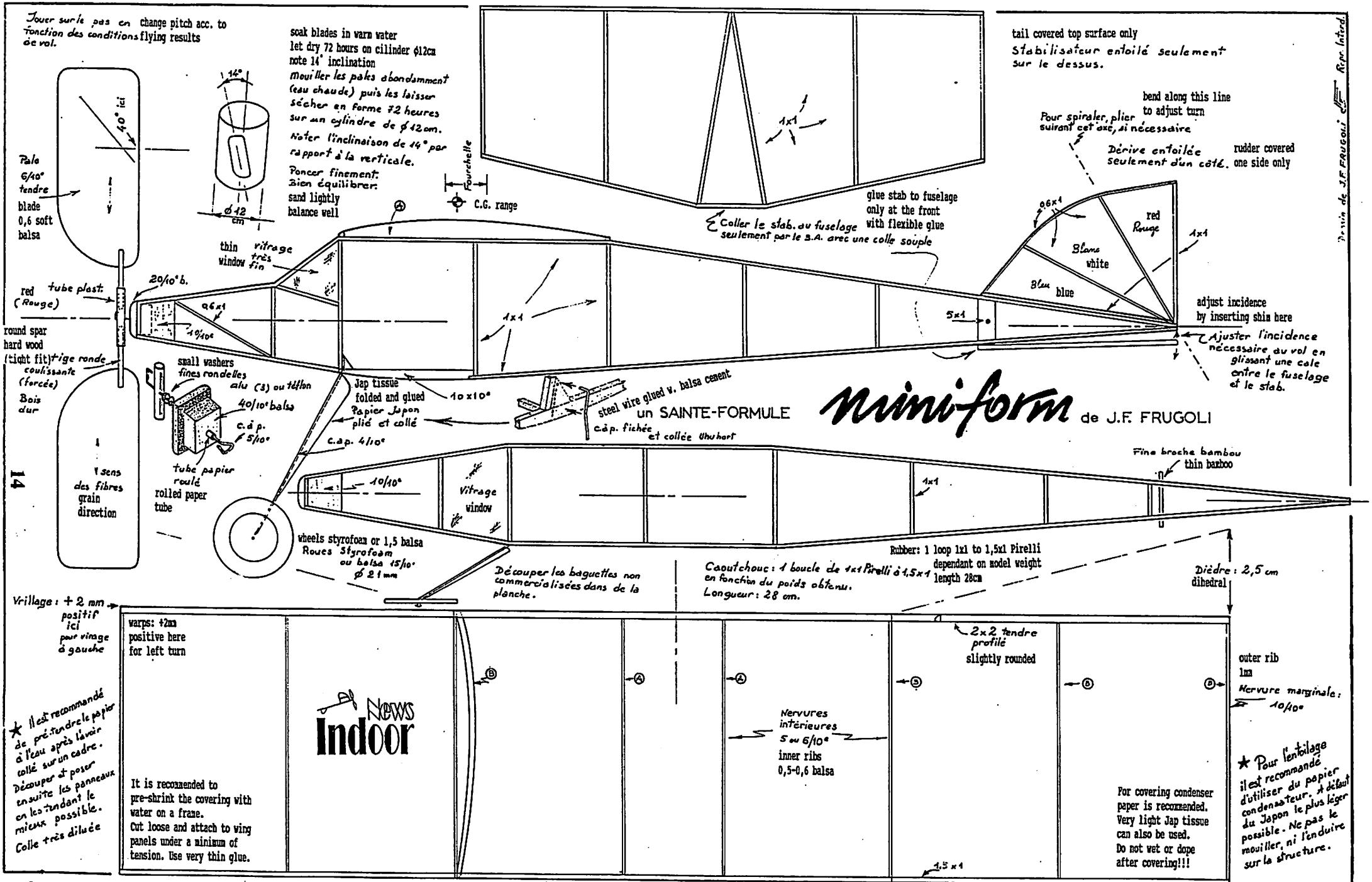
INOMHUSFLYG I BLÅ HALLEN

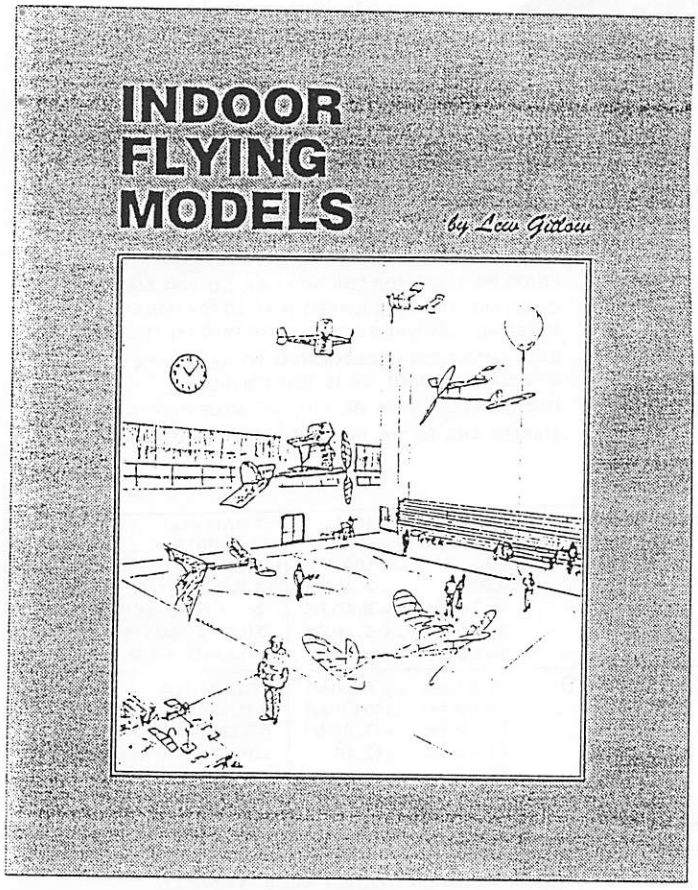
by Sven-Olov Linden (SWE)

Once a year the SLM (Stockholms Läns Modellflygförbund - Federation of Aeromodelling clubs in Stockholm) arrange a meeting in the City Hall, the same hall where the Nobel Prize Dinner takes place. The meeting has to be called a propaganda meeting and not a contest. Otherwise the organizers have to pay a costly rent.
This year it took place on January 8. Quite a lot of spectators came as there was info in the local papers as well as on local radio. The Solna MSK (Model Sport Club) entered a lot of youngsters, under the able guidance of "the old man" John Hagedahl. The young people flew a range of designs "Flugan" (=AMA Cub), "Tre Kronor", "Antoinette", "Flying Carpet", "Flying Wing, "Duck", "Bumble Bipe" and "Mini Tummeliten" (Tom Thumb). Most popular were the No-Cal models.
Some 25 planes took to the air. The participating two ladies Ginger Sjöberg and Birgit Ulvfot put up best performances! Ginger got a box of chocolats and Birgit a chocolat cake! Best of the show was Willy Blom's "Sea Bee". Its 4-bladed prop was powered by a rubber motor with a half-circular extension shaft.



Sven Pontan with CO_2-powered Sperry Messenger
(Photo from SLM Newsletter)


Jouer sur le pas en fonction des conditions de vol.
change pitch acc. to flying results
soak blades in warm water
let dry 72 hours on cilinder ϕ12cm
note 14° inclination
Mouiller les pales abondamment (eau chaude) puis les laisser sécher en forme 72 heures sur un cylindre de ϕ 12 cm.
Noter l'inclinaison de 14° par rapport à la verticale.
Poncer finement.
Bien équilibrer.
sand lightly
balance well
14°
40° ici
Pale 6/10° tendre
blade 0,6 soft balsa
ϕ 12 cm
Fourchette
C.G. range
1x1
tail covered top surface only
Stabilisateur entoilé seulement sur le dessus.
bend along this line to adjust turn
Pour spiraler, plier suivant cet axe, si nécessaire
Dérive entoilée seulement d'un côté.
rudder covered one side only
glue stab to fuselage only at the front with flexible glue
Coller le stab. au fuselage seulement par le B.A. avec une colle souple
0,6x1
red Rouge
blanc white
bleu blue
1x1
5x1
adjust incidence by inserting shim here
Ajuster l'incidence nécessaire au vol en glissant une cale entre le fuselage et le stab.
thin vitrage window très fin
20/10° b.
red tube plast. (Rouge)
round spar hard wood (tight fit) tige ronde coulissante (forcée) Bois dur
0,6x1
1%/10°
1x1
small washers fines rondelles alu (3) ou téflon
40/10° balsa
c.à p. 5/10°
tube papier roulé
rolled paper tube
Jap tissue folded and glued
Papier Japon plié et collé
10x10°
steel wire glued w. balsa cement
c.à p. fichée et collée thuhart
c.à p. 4/10°
miniform de J.F. FRUGOLI
un SAINTE-FORMULE
Fine broche bambou
thin bamboo
10/10°
Vitrage window
1x1
sens des fibres grain direction
wheels styrofoam or 1,5 balsa
Roues Styrofoam ou balsa 15/10°
ϕ 21 mm
Découper les baguettes non commercialisées dans de la planche.
Caoutchouc : 1 boucle de 1x1 Pirelli à 1,5x1 en fonction du poids obtenu.
Longueur : 28 cm.
Rubber: 1 loop 1x1 to 1,5x1 Pirelli dependant on model weight
length 28cm
Dièdre : 2,5 cm
dihedral
Vrillage : + 2 mm positif ici pour virage à gauche
warps: +2mm positive here for left turn
2x2 tendre profilé slightly rounded
outer rib 1mm
Nervure marginale : 10/10°
Nervures intérieures 5 ou 6/10°
inner ribs 0,5-0,6 balsa
1,5 x 1
★ Il est recommandé de pré-tendre le papier à l'eau après l'avoir collé sur un cadre. Découper et poser ensuite les panneaux en les tendant le mieux possible. Colle très diluée
It is recommended to pre-shrink the covering with water on a frame. Cut loose and attach to wing panels under a minimum of tension. Use very thin glue.
For covering condenser paper is recommended. Very light Jap tissue can also be used. Do not wet or dope after covering!!!
★ Pour l'entoilage il est recommandé d'utiliser du papier condensateur. A défaut du Japon le plus léger possible. Ne pas le mouiller, ni l'enduire sur la structure.
Dessin de J.F. FRUGOLI
Aero Journal
News Indoor
14
Enlarge 141%



INDOOR FLYING MODELS

by Lew Gitlow

CONTENTS

Information and supplies 5

Flying models in our schools ..... 7 – 31
Material for teachers and students

An Introduction to Indoor Skills ..... 32 – 51
Tools, The Novice Class Penny Plane, Laying out the plan, Basic Techniques ..... 32 – 41
The I.M.S. Penny Plane Plan ..... 42 – 45
Penny Plane – Winning Designs ..... 46 – 47
The Open Class Penny Plane ..... 48 – 51

Toward Serious Building & Flying ..... 52 – 57
The Easy B ..... 53 – 57

Moving Forward ..... 58 – 90
Hard & Easy B's 58
Cutting Tools ..... 60 – 62
Measuring Tools 63
Bearings & Prop Shafts 64
Indoor Balsa ..... 65 – 66
Build a Beam Balance ..... 67 – 68
Covering with Mylar ..... 69 – 70
To Store Energy 71
Contest Winning EZB & Motors ..... 72 – 74
Using Stored Energy & Propellers ..... 75 – 81
Designing & Building Propellers ..... 82 – 83
Hard B's – Winning Plans ..... 84 – 89
Trim Tests 90

Intermediate Stick to F1D Class ..... 91 – 106
Plans ..... 104 – 106

FAI Microfilm Models ..... 107 –
How to get started with microfilm ..... 109 –
Covering an EZB with microfilm ..... 111 –
Making & using microfilm ..... 113 –
F1D – The World Championship Event ..... 116 –
Variable Pitch Props ..... 122 –
F1D Plans ..... 118, 125 –

Experimental Aircraft ..... 130 –
I.M.S. Starship – A Canard ..... 131 –
Ornithopters ..... 133 –
Helicopters ..... 138 –
Autogiro .....

Scale Models ..... 141 –
Designing Your Own ..... 144 –
Propellers .....
The Basic Fuselage ..... 150 –
Covering ..... 152 –
Ultra Light Models ..... 154 –
Flying Scale Models ..... 158 –
Scale Plans ..... 160 –
No Cal Scale Class ..... 168 –
Bostonian Class ..... 170 –
Manhattan ..... 174 –
Cabin Models .....

Indoor Gliders ..... 178 –

Flight Log Sheet .....

For more Information .....

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Cover art by Mark Allison

Indoor Flying Models is approximately 160 pages, 8.5" x 11", with loads of plans. Many of the plans are full size and include I.M.S. Kits in addition to the original designs of famous contest winners like Banks, Coslick, Brown, Hunt, and dozens of others. The scope covers gliders to the F.1.D. international microfilm class models. With all the illustrations, technical data, building and experimenting with his own models, it comprises years of work.

You will find a development that starts with a theme of man's first dream of flying and how with imagination and the use of experimental models he actualized this dream. Then with a strong message for instructors he presents material that can be used to stimulate interest before the instructor adds his own experience. The basics of tools, materials, and "the right moves" lead you from the most simple to the most complex models and techniques, including "How to brew your own microfilm solution" and the secrets of the experts are revealed including "What your best flying buddy won't tell you."

By Lew Gitlow

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BULLETIN D'ENGAGEMENT ~ ENTERING FORM

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CATEGORIES CLASSES		CHRONOMÈTRAGE TIME-KEEPING
	F 1 D	
	BEGINNER	
	E.Z.B.	
	MICRO 35 SENIOR	
(1979-1976) →	MICRO 35 JUNIOR	
	MICRO 35 CADET	

SENIOR 100 F.F. LA PREMIÈRE CATEGORIE . FF 100 THE FIRST CLASS
50 F.F. PAR CATÉGORIE SUPPLEMENTAIRE. FF 50 OTHERS CLASSES
CADET-JUNIOR FF 40 THE FIRST CLASS FF 20 OTHERS CLASSES
40 F.F. LA 1ère CATÉGORIE . 20 F.F. LES AUTRES

TOTAL →

NOMBRE DE REPAS LE SAMEDI MIDI
NUMBER OF LUNCHES ON SATURDAY } x F.F. 55 →

NOMBRE DE REPAS LE DIMANCHE MIDI x F.F. 55 →

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TIME KEEPING EACH COMPETITOR IS REQUESTED TO HELP WITH THE TIMING OF A CLASS IN WICH HE IS NOT COMPETING.

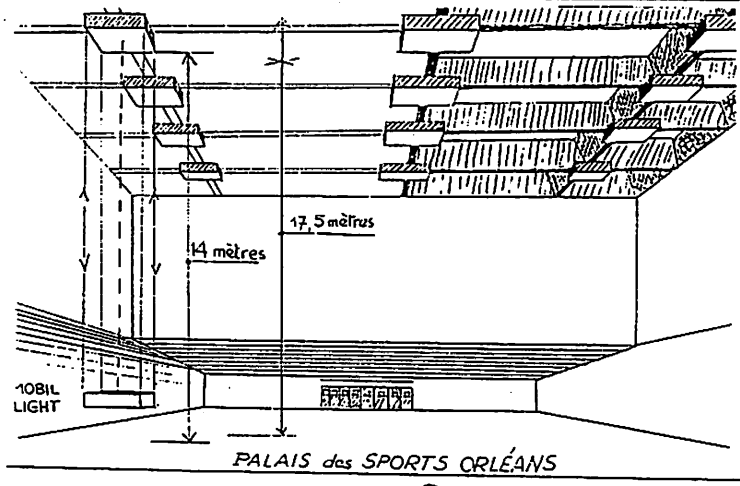
TIME SCHEDULE THE SCHEDULE MAY BE CHANGE ACCORDING TO CIRCUM-STANCES AND TO THE NUMBER OF COMPETITORS IN EACH CLASS

SATURDAY JUNE 18	8.30 AM → 10.40	TRAINING
	10.40 AM → 12.	3 FLIGHTS E.Z.B
	12. → 1.00 PM	LUNCH AND TRAINING
	1.00 PM → 2.20 PM	3 FLIGHTS CLASS BEGINNER
	2.20 PM → 3.40 PM	3 " MICRO 35 CADET-JUNIOR
	3.40 PM → 5.00 PM	3 FLIGHTS CLASS MICRO 35 SENIOR
	5.00 PM → 9.40 PM	8 FLIGHTS F 1 D
SUNDAY JUNE 19	8.00 AM → 9.00 AM	TRAINING
	9.00 AM → 10.20 AM	3 FLIGHTS CLASS BEGINNER
	10.20 AM → 11.40 AM	3 FLIGHTS CLASS MICRO 35 SENIOR
	11.40 AM → 12.40	LUNCH AND TRAINING
	12.40 → 2.00 PM	3 FLIGHTS CLASS E.Z.B
	2.00 PM → 3.20 PM	3 FL. CL. MICRO 35 CADET SENIOR
	3.20 PM → 6.00 PM	4 FLIGHTS F 1 D
	6.30 PM	PRESENTATION OF PRIZES

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