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SKY-SCRAPERS BKLYN NY
AMA Club Charter 470

FLYOFF

Round 21 / Spring 1993

The **SKYSCRAPERS** Quarterly

Edited by Bob Hatschek

What's up? XXI

Nippert tops the domestic flyers

Highest flying Skyscraper on the US 1992 free-flight circuit was Vic Nippert—who ran up a total of 1817 points. Jack Nix scored 1477 points for second. And Bob Hatschek, at 1264, was third. Brownie points go to Jean Pailet, Clark Darling, and Jo Darling—who placed 4, 5, and 6, respectively—for reporting their totals, but the rest of the club gets a Bronx cheer for failing to report. Do it this year!

And 1993 starts with a bang!

First meet of the New Year, of course, was a windy and rainy King Orange, Jan 1-3, at Palm Bay, Fla. Your editor's plans to attend fell through, but there were a bunch of competitive 'Scrapers there (including Bocckinfuso, Carbone, Davidson, and Nix). Top of the bunch was Jim Bocckinfuso—an 'absentee' Skyscraper now living in Virginia. Jim tallied enough points to take the overall KOI meet championship. Congratulations, Jim!

Galeville Maintenance Fund, 2/26/93

Previous Contributions	**Amount**	**Balance**
Skyscrapers	2279.00	
Friends of the Skyscrapers	2540.00	
		4819.00
Previous Expenditures	—2200.00	
		2619.00
New Contributions		
Skyscrapers		
Tom Waddington (12/92)	225.00	
		2844.00
Friends of the Skyscrapers		
John Oldenkamp (10/92)	12.00	
Bob McLinden (11/92)	50.00	
Tom Fennell (12/92)	10.00	
Don Ross (12/92)	10.00	
Joe Williams (12/92)	20.00	
SAM 7 / Carmen Botticello (12/92)	50.00	
Bath Area Modelaires (1/93)	50.00	
		3046.00
New Expenditures		
None (as of 2/26/93)	00.00	
Current Balance (2/26/93)		**$3046.00**

Sincere thanks to all who have donated. We welcome additional contributions for continuing work. A separate account is reserved for this, and full accounting is published in *FLYOFF*. Send donations (payable to "Skyscrapers") either to Tom Waddington, 3504 Carol Ct, Yorktown Hts, NY 10598 or to *FLYOFF*. Thank you!

The St. Valentine's Day Massacre

The Galeville season was to have started Feb. 14 with "The Skyscrapers First Annual Saint Valentine's Day Massacre." But excessive snow, ice, and wind—on the highways as much as on the field—resulted in postponement to some as yet undecided date. We'll let you know.

The last meet of 1992 was in New Zealand

At Christmas time one meet remained in the 1992 World Cup Series, the New Zealand Nats. At that time there was a three-way tie for first in F1C among Claus Wachtler (Germany), Eugene Verbitsky (Ukraine), and absentee Skyscraper Koei Tsuda (Japan)—each with three firsts in '92 World Cup meets. (Scoring is limited to three meets, but additional meets count for tiebreakers.) Both Wachtler and Verbitsky had second-place scores in their fourth WC meets, while Tsuda had flown only three.

Well, Koei (currently living in Australia) topped 'em all at the NZ Nats. Three-views of his Cosmo-Skyscrapers will be presented in a future issue of *FLYOFF*.

In his initial letter, Koei also chided this editor for calling him a "former Skyscraper" when we reported in *Round 19* that he had won F1C at the Kotuku Cup, the Pacific Championships, and the Australian Nats. He wrote: "Please do not call me 'ex-Skyscraper.' I am a real, genuine, and one of the most active members of the Brooklyn Skyscrapers. And I am always proud of it."

And we're proud of Skyscraper Koei Tsuda, winner of the 1992 World Cup in F1C! Congratulations, brother Koei!

How I won the World Cup for F1C

—by Koei Tsuda, the Skyscrapers

At Christchurch Airport, I was greeted by a local modeler, Kevin Barnes, handed a 1-liter bottle of FAI fuel for practice, and was instructed to head to Bill Sargent's home in Ashburton—my accommodation during the New Zealand Nats. Mr. Sargent was the head of this very well organized contest, and he also headed the retrieval team.

On my first evening, there was a party at the Sargents' home and I met Roger Withell, who was to be my helper. I have never had a helper in any contests in the past, but this time the situation was quite different: I had to win this contest to win the World Cup, second or lower would only give me third place. Retrieving by myself had been very difficult at both the Kotuku Cup and Pacific Championships in winds of 5-9 meters/sec (11-20 mph) —even using a 150-sec d/t. Therefore I had asked Mr. Sargent to arrange for a local helper in case of high wind.

On the first practice day (Dec. 27), I went to the flying site at 5 a.m. to test engines because the temperature was some 10-15° lower than at our site at Wivenhoe Pocket in Australia. As I anticipated, my Nelsons were not picking up so well as in Australia with a cold type glow plug that usually gave 400 rpm over heavy-duty Nelson plugs in the temperature of 25-40C (75-104F). I knew I had to change to Nelson plugs and/or change

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head shims. I chose the easiest first; and the plug change resulted in 26,700-27,100 rpm with my Chinese props—about 300-400 rpm lower than in Australia, but still good at 28,700-29,200 rpm equivalent on Russian type props. All four of my models showed no changes in power patterns or glide circles. They steadily climbed straight up and high enough for 6-7 min.

As usual, something did happen on the last flight of the day. One model landed on a fence and broke a wing tip. The damage didn't bother me much because I firmly believe "a hurriedly repaired model flies much better than the original." During the afternoon, in Mr. Sargent's workshop, I repaired the wing. The next day I retested it and then spent most of the day watching other contestants and their models. It is very important to me both to socialize with other modelers and to identify whose models will be the strongest competition. And I spent a few hours exploring retrieval routes.

The contest day dawned beautifully! The distant mountains were capped with snow, even in this midsummer in the southern hemisphere. All the sheep and cow properties are surrounded by green pine, cedar, and poplar trees. It's the most beautiful combination of Canada and Switzerland.

Despite the very beautiful scenery, however, conditions were a disaster! At the 6 a.m. start, the wind was already blowing 5-9 meters/sec (11-20 mph)—in the worst direction. At 500m downwind was a big farmhouse with a milking station. About 1 km farther was a highway and another farmhouse—this one with a 200-300m windbreak of poplar trees about 20 meters tall and facing the launch line. And at 2.5-3km downwind was a big river sandwiched by very dense woods. Past the riverside woods was a very flat, treeless area covered with 10-15 cm (4-6 in.) soft grass. But there were no bridges nearby to give access to it.

Because of the wind, my strategy was to use a short d/t (120 sec) and to carefully watch the results of modelers with sturdy, low-aspect models. I knew they would try to win by flying short, retrieving quickly, repairing quickly, and flying all seven rounds—typical windy weather contest tactics.

One big problem was that, even with a short d/t strategy, there were almost no good places to land within 3.5km. I had to risk damaging my models even with the short d/t. In that case, I thought it might be better to fly a full 4 or 3 min to take the lead even if it meant losing a model. That was the big decision I had to make.

I was very nervous in this high pressure situation—the meet was vital to either win the World Cup or blow it. Then a thought struck me: My fellow Brooklyn Skyscraper and my brother in aeromodeling, Bob Hatschek, used to say that "these bad conditions apply not only to you but also equally to your competitors." Encouraged by this 20-year-old advice, and confident in four thoroughly tested models, I decided to go with a shortened d/t strategy that had worked so well in the past two World Cup events.

Anyway, the contest began with nine contestants. It wasn't a regular flying contest; instead it was a kind of crashing contest, survival game, or death match—whichever you may call it. All of the contestants damaged at least one or two models. The only exception was Dave Thomas, of Australia, who gave up early and fortunately found the model he lost in the first round 6 km downwind unharmed. He saved his models, but he lost the contest after spending more than $2000 for his and his wife Jan's travel.

Unfortunately, I was no exception. My lost model was finally found in the woods hanging from the top of a very high tree. With winds gusting extremely high, we heard a loud "bang" at the top of the tree—the sound of the wings breaking. Soon after that the model came down looking like a heap of aluminum garbage. Another model of mine had wings damaged beyond repair when it glided into the same woods. Even my model that landed in the flat sheep property sustained a broken wing tip. Despite d/t'ing at only 120 sec, they were landing exactly 3 km from the starting point in or near the woods along the river. My expertise in locating models and my helper Roger Withell's knowledge of the local area worked very well together.

Only once, between 9:00 and 9:30 a.m., did the wind drop low

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FLYOFF 1993 Contest Calendar for Northeastern Free-Flighters

(As of Feb 25,1993)

Any sponsor of a FF meet (unrestricted entry) within 500 miles of New York please contact *FLYOFF*. We will list as many as space allows.

This list is not complete. Some entries are incomplete; others may change. We regret any errors. Contact sponsor to confirm all info.

Dates	Site	Meet	Event guide	Info contact (Phone or send S.A.S.E.)
4/18	Floyd Bennett, NY	Blue Nose Indoor Flying Assn.	In,+	R. Ainbinder, 12-7 Pond Way, Manorville, NY 11949
5/2	Caleville, NY	Skyscraper May Monthly	A,F,N,O,+	Dave Acton (914/628-0526), RD#3 Box 227, Mahopac, NY 10541
5/15-16	Petersburg, VA	Brainbuster Spring Meet	A,F,Fm,N,O,+	A. Van Dover (804/877-2830), 112 Tillerson Dr, Newport News, VA 23602
5/30	Westover AFB, MA	SAM 7 Spring Rally	O,N,A	Carmen Botticello (203/568-5733), 30 Bluefield Dr, East Hartford, CT 06118
5/30	Bong, WI	Aeromuts Spring OT Meet	O	Charlie Sotich (312/735-1353), 3851 W 62 Pl Chicago, IL 60629
5/29-30	Galeville, NY	Skyscrapers Intl Challenge	2,3 F,Fm,+	Bob Langelius (914/949-6083), 32 Clinton St, White Plains, NY 10603
6/3-6	Johnson City, TN	USIC/AMA Indoor Nats	In	Chip Smith (AMA) / Tom Iacobellis (914/747-9038), 198 Manhattan Ave, Hawthorne, NY 10532
6/12-13	Sturgis, MI	MAMOT FF Meet	O	???
6/19-20	Wright-Pat AFB, OH	FFMAS AMA & NosGas	A,N	???
6/26-27	Bong, WI	FAI Intl FF Meet	F,A	Charlie Sotich (see 5/30 above)
6/26-27	Galeville, NY	EFFC Championships	2,3, A,F,Fm,N,O,S,+	Bill Poythress (914/246-8850), 2 Hemlock Ct, Saugerties, NY 12477
7/3-4	London, Ont.	Canadian (MAAC) Indoor Nats	In	Jim Moseley, Apt. #406, 2000 Sheppard Ave. West, Downsview, Ont. M3N 1A2, Canada

7/4	Westover AFB, MA	SAM 7 Summer Outing & Picnic	O,A	Tom Lucas (203/875-5293), 19 Burke Rd, Rockville, CT 06066
7/5-10	Centralia, Ont	Canadian (MAAC) Nats	C,N,O,Fm,S,+	Jim Moseley (see 7/3-4 above)
7/4	Galeville, NY	Skyscraper July Monthly	A,F,N,O,+	Dave Acton (see 5/2 above)
7/10-11	Geneseo, NY	Warplane Museum FAC Contest	S	Lin Reichel (814/833-0314), 3301 Cindy Ln, Erie, PA 16506
7/10-11	Muncie, IN	Intra-City FAI Meet	F	???
7/17 ? (Tentative)	Muncie, IN	Jetex Rally	Jetex (?)	Roger Wathen (317/547-5963), 3242 N DeQuincy St, Indianapolis, IN 46218C4
7/17-25	Lawrenceville, IL	AMA RC & CL Nats	S = only FF events	Chip Smith, AMA HQ (703/435-0750)
7/24-25	Wright-Pat, OH	CIA OT & NosGas Meet	N,O	Harry Murphy (317/642-7377), 3824 Oakwood Blvd, Anderson, IN 46011
8/1.....	Westover AFB, MA....	SAM 7 Summer Rally.....	O,N,A.....	John Hodgkin (203/379-2197), 42 Benton St, Winsted, CT 06098
8/1	Bong, WI	Bong Eagles / Pelicans FF Meet	A,O	A. Italiano (414/782-6256), 1655 Revere Dr, Brookfield, WI 53005
8/1	Galeville, NY	Skyscraper Aug Monthly	A,F,N,O,+	Dave Acton (see 5/2 above)
8/7-8	Wright-Pat AFB, OH	NOFFA FF Meet	A,N,O,+	Marge or Warren Weisenbach (216/671-8623), 4568 W 146 St, Cleveland, OH 44135
8/7-8	Fayette, NY	Empire State FF Champs	A,N,O,Fm,S,+	Bill Burris (315/536-9479), 209 Hamilton St, Penn Yan, NY 14527
8/10-12	Gananoque, Ont	SAM 86 Great Grape Gathering	O,N,S,+	Noel Kirby (613/592-5744), 5 Tiffany Crescent, Kanata, Ont, K2K 1W1 Canada
8/15	Bong, WI	Midwestern States FF Meet	A	Charlie Sotich (see 5/30 above)
8/15	Galeville, NY	Mid Hudson Modelmasters	(?)	Vic Nippert (914/382-1967), 6 Douglas Dr, Lake Katrine, NY 12445
8/21-22	Cuckoo, VA	3rd Cuckoo Challenge	A,N,O,F,Fm,S,+	Bill Saunders (301/593-7196), 11613 Le Baron Terr, Silver Spring, MD 20902
8/21-22	Wright-Pat AFB, OH	COFFC FF Meet	A,N,O,+	Bill Hale, 334 N Remington Rd, Columbus, OH 43209
8/29	Bong, WI	Aeronuts Fall OT Meet	O	Charlie Sotich (see 5/30 above)
9/1-5.....	Muncie, IN.....	USOC/AMA FF Nats.....	2,3,A,F,Fm,N,S,+.....	Chip Smith (AMA 317/741-8285)/Jim Kutkuhn, (316/733-0979), RR 5, Box 430, Augusta, KS 67010
9/3-6	Muncie, IN	SAM 57	O	Don Sachtjen (812/384-3102), RR 5, Box 56B, Bloomfield, IN 47424
9/4-5	Muncie, IN	FAC contest	S	Lin Reichel (see 7/9-11 above)
9/4-6	Lost Hills, CA	USFFC, NFFS NosGasChamps	2,3,A,F,Fm,N,O,S,+	Mike Myers (818/241-9154), 911 Kilmary Ln, Glendale, CA 91207
9/4-5	Westover AFB, MA	SAM 7 EC OT Champs	O,N	John Stott (203/426-5190), 8 Bradley Ln, Sandy Hook, CT 06482
9/11-12	Gananoque, Ont.	Eastern Canada Open	C,N,F,Fm,O,S,+	Jerry McGlashan (514/695-7415), 170 Fairhaven Ave, Pointe Claire, Que, Canada H9S 4A7
9/12	Sturgis, MI	Michigan State FF Meet	???	???
9/12	Galeville, NY	Bath BAM Bash	A,F	Clay Ott, 6018 Nor-Bath Blvd, Bath, PA 18014
9/18-19	Muncie, IN	CIA Ann. Regional FF Meet	A,O,N,+	Moe Whittemore, (317/861-4266), 2348S, 700W, New Palestine, IN 46163
9/19	Galeville, NY	Skyscraper Sept Monthly	A,F,N,O,+	Dave Acton (see 5/2 above)
10/2-3.....	Lost Hills, CA.....	California Invitational.....	1,2,3, F.....	Juan Livotto, 13212 Lake St, Los Angeles, CA 90066
10/2-3	Lawrenceville, IL	Tri-County Aero Club Meet	???	???
10/4-9	Lost Hills, CA	FF World Championships	F	AMA HQ (703/435-0750), 1810 Samuel Morse Dr, Reston, VA 22090
10/9-10	Galeville, NY	Skyscraper Fall Annual	2,3, A,F,N,+	Dave Acton (see 5/2 above)
10/10	Westover AFB, MA	SAM 7 Fall Rally	O,A	Jack Whitlea (508/255-5920), P.O.Box 1976, Orleans, MA 02653
10/10-15	Taft, CA	1993 SAM Champs	O	Bill Booth, Sr (209/227-7271)
10/16-17	Sacramento, CA	Sierra Cup	1,2,3, F, Fm	Ken Oliver (916/363-2017), 2213 El Cejo Circle, Rancho Cordova, CA
10/17	Petersburg, VA	Brainbusters Fall Meet	A,F,Fm,N,O,+	Ed Sullivan (804/596-6104), 19 Frederick Dr, Newport News, VA 23601
10/24	Galeville, NY	Skyscraper Oct Monthly	A,F,N,O,+	Dave Acton (see 5/2 above)
11/13-14.....	Lost Hills, CA.....	Patterson FAI Challenge.....	2,3, F, Fm.....	Bill Hartill (805/266-2546), 3313 Fairfield Ave, Palmdale, CA 93550

Notes: FF events only. Most meets similar to 1992. 1 = World Cup. 2 = Americas Cup. 3=Selected contest for '95 Team. "Event Guide" codes indicate type of events or source of rules (As: SS Val meet, C'dH, P-30, HH Cat would list as Fm,A). May not include all such events (check info sources for list). Codes follow: A=AMA gas/non-gas; C=MAAC gas/non-gas; N=NosGas; O=Old-Timer gas/non-gas; S=Scale; F=FAI (F1A,B,C); Fm=FAI mini (F1G,H,J); In=Indoor; +=Special added events.

A remarkable P-30: The Window Plane

By Art Ellis, the Skyscrapers

The Window Plane is quite different from the typical P-30. It has a dramatically larger wing and stab area, it uses a much longer motor run, and it is covered with the clear Mylar that gives it its name. These gross design elements, combined with a number of less obvious features, result in still air times in the 3 to 4-minute range—a quantum jump in performance over the 2-minute still air times of a well-executed standard P-30.

[Note: This model won P-30 at the 1992 Nats with a duration 13 minutes ahead of the second-place model.—the Editor]

Understanding how this plane works is probably more valuable than simply seeing the detail. At the same time, comparing its design and performance to more typical models, such as the Square Eagle and the Sparrow Hawk, helps to put its characteristics in perspective.

The flight of a typical P-30 consists of a motor run of approximately 30 sec to a height of 150 ft and a 90-sec glide. The Window Plane's flight profile consists of a 60-sec motor run to 200 ft and a 150-sec glide. The three major differences are the longer motor run, the 50-ft increase in altitude, and the slower rate of descent. The first two are interrelated, are more difficult to explain (if not to understand), and will be discussed second.

The slower descent of the Window Plane is simply a function of its large wing area. The Square Eagle has a chord of 4", and the Sparrow Hawk a chord of 4.75". In contrast, Window Plane has a whopping 6.25" chord—nearly a 50% increase in area to almost 190 sq. in. These wing areas result in a glide speed for the typical P-30 of about 10 ft/sec and for Window Plane of 8 ft/sec. If the two planes are equally clean aerodynamically, they will have the same lift to drag (L/D) ratio and glide slope, but the slower plane will descend proportionately slower.

The trick is how to build a plane almost 50% larger to minimum weight and how to make it stable enough so as not to be upset by turbulence. The 1/4-mil Mylar covering is singularly the answer to the weight problem. This Mylar weighs .75 gram per sq ft. Typical P-30 tissue and dope weighs 3-4 grams per sq ft. The weight cost to cover a Square Eagle is about 8.6 grams. The most recent Window Plane was covered for 6 grams—including the Sig Stix-It used to attach the Mylar to the frame. That represents a 2-gram weight saving for a wing that is 50% larger! And Mylar is more than adequately stiff for the P-30 structure.

The stability issue is mainly solved by using a relatively forward CG and a very large stab. The CG is at about 60%, and the stab is a huge 4" x 16". The stab is also mounted on the bottom of the fuselage, which (together with negative incidence in the wing tilting the whole fuselage) gets the stab away from the retarded slipstream caused by the windmilling prop and makes the stab more effective.

There is no question that the use of Mylar is critical to the design. The component weights illustrate this:

Fuselage with fin and rubber peg	10.0 grams
Wing with DT tube and paint	15.0
Stab	3.4
Prop and nose block	9.8
Rubber bands and motor hook	1.2
Ballast	0.6
Total	40.0 grams

Source for the 1/4-mil Mylar is Branford Hobbies, 609 Boston Post Rd, Branford, CT 06405. Phone 203/488-9865. Cost is $10 per order plus $1 per yard x 54" wide.

The climb of the Window Plane is demonstrative. It is not dramatic; it is noticeably slower. But it seems to go on forever and ever, with a final result that is very high and a timekeeper's watch that reads 1 min. There are three elements to this improved climb: Light weight, miniature bearings on the prop shaft, and a very efficient climb profile.

The rubber motor can store a specific amount of energy. How that is dissipated determines the climb. The Window Plane is right on the minimum 40 grams. A typical P-30 weighs 43 grams. If both put the same energy into gaining height, the 40-gram plane would be 7.5% higher.

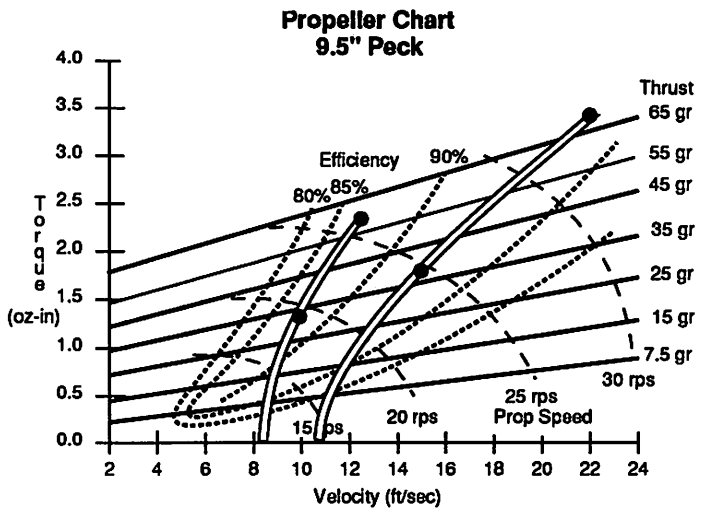
The Window Plane uses miniature 3/16" ball bearings on a .055" shaft. The bearings are a press-fit on the shaft, eliminating almost all vibration, as well as making a very easy-running front-end. The standard Peck journal bearing and a shaft have considerable friction at the 20-25 revs per sec of a P-30 motor. A good indication of friction loss is noise. If the bearing makes any noise, you can be sure considerable energy is being lost. My own measurements show that the ball-bearing front end delivers as much as 5% more energy to the propeller. Two sources for these bearings, which cost about $10 each on my last order from Berg, are: Winfred M. Berg Inc, East Rockaway, NY, phone 516/599-5010, part No. B2-17. Also PIC Design, P.O.Box 1004, Benson Rd, Middlebury, CT 06762, phone 203/758-8272.

The climb profile of the Window Plane is a big gain—approximately 18% more efficient than the standard climb profile. The Window Plane uses the Peck 9.5" prop, which has a large area and relatively low pitch. I typically measure these props at a P/D ratio of 0.9. The slower flight speed of the Window Plane is needed to make this prop efficient.

Two charts are included. The first plots the aerodynamic characteristics of the Peck prop and the second is a model of the Window Plane's climb performance. The two are used together to define the total efficiency of the model.

The "Propeller Chart" is a standard item in the aircraft industry—no one would specify a propeller for a plane without one of these charts. The big difference in this chart is that I use real numbers instead of coefficients. The information comes from a software program I wrote about two years ago. The program uses a strip integration technique that is not particularly elegant. But, as the predictions seem to correlate well with what we know, the program's output seems reasonably valid. My "gut sense" is that the predicted efficiencies are 3-6% high. With this chart, when you know any two of the following variables, you can determine the other three: velocity, torque, prop speed, thrust, and propeller efficiency. Every prop has a different chart.

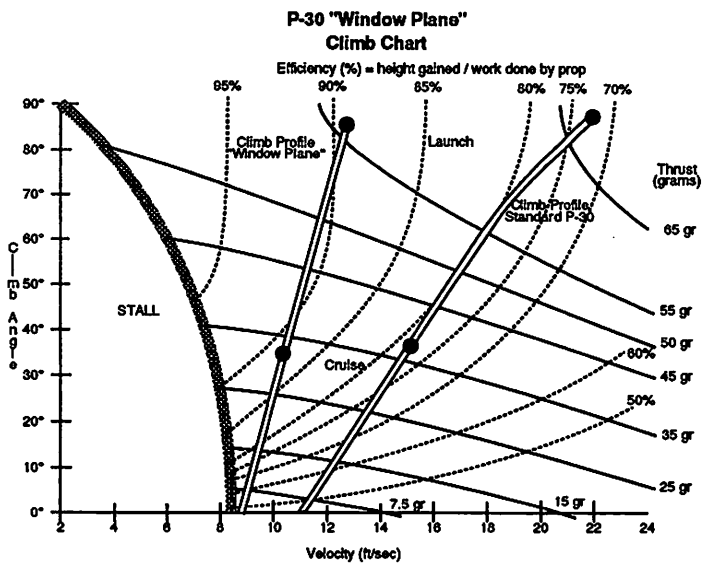
Overlaid on top of this propeller chart, I have drawn the motor run for the Window Plane on the left, and the motor run of a standard P-30 on the right. The Window Plane uses three strands of 3/16" (9/16" of total rubber width) FAI tan 25.5" long wound to 1150-1350 turns and producing 2.6 oz-in. of torque just after launch and 1.3 oz-in. in the cruise. A standard P-30 uses 12/16" of rubber (typically six strands of 1/8", 19" long, wound to 750-850 turns, yielding 3.4 oz-in. after launch and 1.7 oz-in. at cruise). The key fact is that the reduced speed and torque of the Window Plane places it on the left—the slow side—of optimum instead of on the right where a 12/16" motor would be. With a higher pitched prop, as you'd use on a Wakefield or Coupe, this high-perfor



mance ridge is significantly farther to the right and for which a 12/16" motor would be appropriate.

The editor has questioned the quantitative values of torque at launch of only 2.6 and 3.4 oz-in., drawing on the valid evidence of his torque meter. He winds a 12/16" motor to over 10 oz-in. To test this, an apparatus must be built that will measure the running torque of the motor, and this has not yet been done. However, one could expect that the unwinding motor would be quite inefficient with losses from cooling of the rubber as it relaxes, friction of the unwinding strands, and the friction of the prop shaft. Has anyone done this study?

Suffice it to say that the 12/16" motor is too powerful for the Peck prop. The advantage of being on the left side of the performance ridge becomes apparent when you move to the plane's Performance Chart. To go slower is always better as far as the plane is concerned (don't stall) for the simple reason that less work is going into flying the plane and more is going into altitude gain. With a higher pitched prop it doesn't pay simply because the performance of the



propeller drops off dramatically at slower speeds. Remember, drag goes up as the square of velocity, and so does the power required to fly the plane. The Window Plane's low wing loading makes it inherently fly slower, which is especially important in the cruise portion of the climb.

The most important ingredient for flying slow in the early part of the climb is "speed stability." In this portion of the climb, the plane is essentially a helicopter flying on the prop. Good speed stability means that if the plane gets off track, it will return quickly to its proper speed and climb angle. Often a plane gets too steep, climb stops, and recovery is made when the plane does a tail slide or a severe roll off to one side. The flip-side problem is a high-speed circle under high initial power before the normal climb resumes at reduced power.

The secret to good speed stability is a strong pitch-down moment when speed decreases and a strong pitch-up moment when speed increases. From the propeller chart, one sees that at a constant torque (a valid assumption over the time-frame associated with stability), thrust goes up as velocity drops (which is not always true for higher pitched props). Good stability will be achieved if this increase in thrust results in a pitch-down moment. This effect will occur when the wing is set at negative incidence relative to the thrust line. (Jim Brooks taught me this and it only took me a year before I believed him.) For this reason, the Window Plane carries 3° of negative incidence in the wing —and more might even be better.

A few other miscellaneous comments may be helpful to understanding some of the peculiar details:

Rudder size. The plan calls for a piece of 1/32" sheet on top of the vertical tail. To get good directional stability in the climb, the rudder should be as small as possible. But if it's too small, Dutch roll (the sashaying couple of roll and yaw) will be excessive in the glide—dependent on the amount of dihedral. Four inches of dihedral requires an 8 sq. in. fin, and 4-1/2" dihedral requires 9 sq. in. I find it easier to make the fin get bigger than to have to remake one smaller; hence I use the 1/32" sheet.

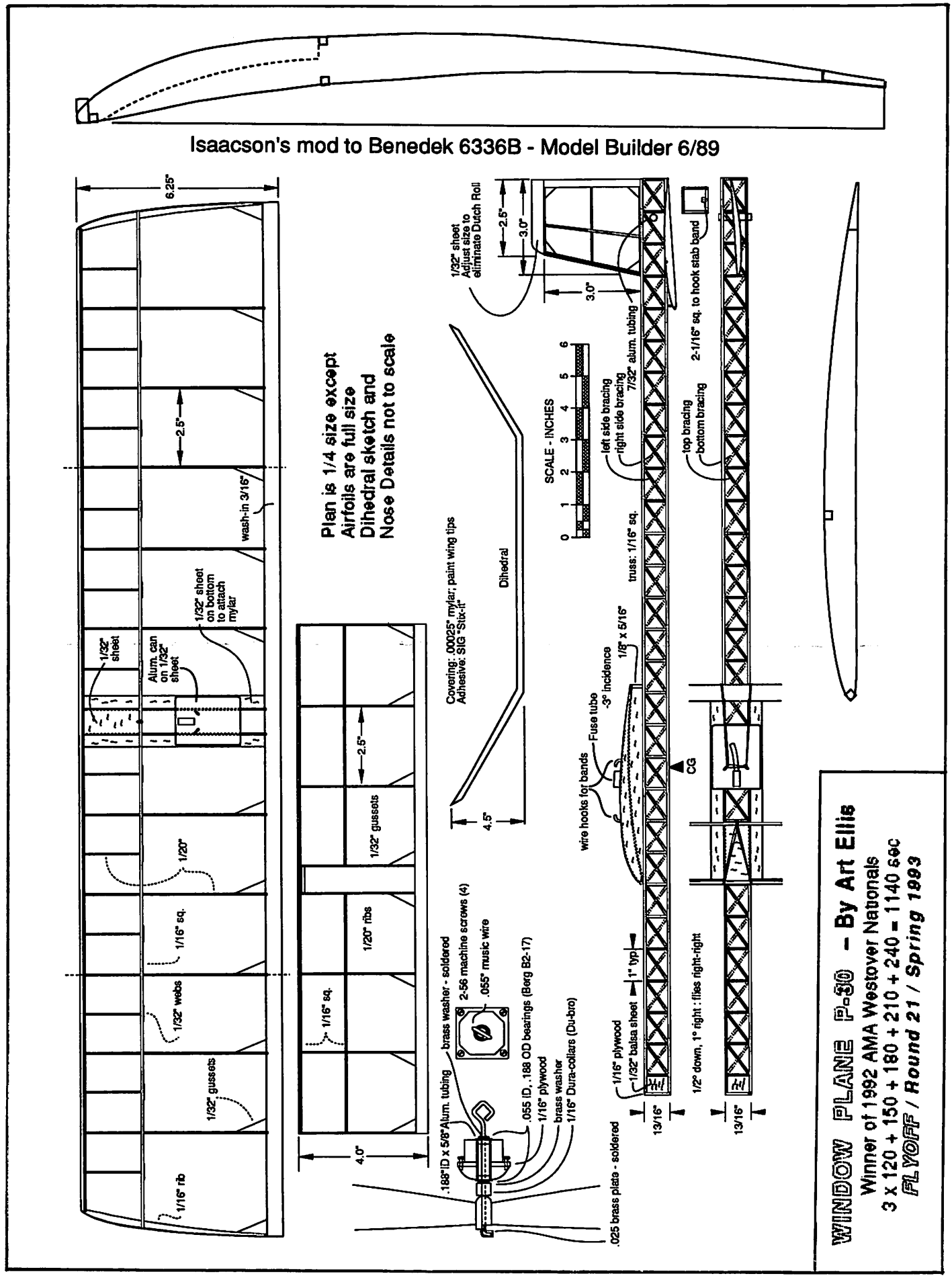
Wing DT. The Window Plane burns through the rear wing band to dethermalize. I originally thought this would give a near nuclear DT. However, much to my surprise, the result is the nicest slow inverted spin you ever saw.

Nose block adjustment. Four 2-56 machine screws are used to trim the thrust line. The difference between a so-so climb and a spectacular one is less than three quarters of a turn in adjustment.

Right wing wash-in. In the initial climb, this wash-in helps prevent the quick rolloff to the inside that can waste so much energy. In the glide, this wash-in results in a flat turn and forces the right wing to stall first in turbulence. When the inside wing stalls first, recovery is snappy and little altitude is lost.

Winding. I remove the stab to get the rear peg into the winding stooge.

Free wheeler. This ancient free-wheeling arrangement is simple, works masterfully, and is widely used. I'm indebted to Stan Colson for showing it to me. The compression from the motor is carried by the 1/16" landing gear collar. The prop is pulled forward when attached to the wound motor. When torque dissipates, the prop slides rearward to free-wheel.. Warning: Pushing the prop rearward with the motor wound results in a shaft run at speeds approaching a Dremel tool. The results to your hand are about equivalent.


Isaacson's mod to Benedek 6336B - Model Builder 6/89
Plan is 1/4 size except
Airfoils are full size
Dihedral sketch and
Nose Details not to scale
WINDOW PLANE P-30 - By Art Ellis
Winner of 1992 AMA Westover Nationals
3 x 120 + 150 + 180 + 210 + 240 = 1140 sec
FLYOFF / Round 21 / Spring 1993
6.25"
2.5"
wash-in 3/16"
1/32" sheet
Alum. can on 1/32" sheet
1/32" sheet on bottom to attach mylar
1/20"
1/16" sq.
1/32" webs
1/32" gussets
1/16" rib
4.0"
1/20" ribs
1/16" sq.
1/32" gussets
Covering: .00025" mylar; paint wing tips
Adhesive: SIG "Stix-it"
Dihedral
4.5"
SCALE - INCHES
0 1 2 3 4 5 6
1/32" sheet
Adjust size to eliminate Dutch Roll
2.5"
3.0"
3.0"
left side bracing
right side bracing
7/32" alum. tubing
truss: 1/16" sq.
top bracing
bottom bracing
2-1/16" sq. to hook stab band
wire hooks for bands
Fuse tube
-3° incidence
1/8" x 5/16"
CG
.188"ID x 5/8" Alum. tubing
brass washer - soldered
2-56 machine screws (4)
.055" music wire
.055 ID, .188 OD bearings (Berg B2-17)
1/16" plywood
brass washer
1/16" Dura-collars (Du-bro)
.025 brass plate - soldered
1/16" plywood
1/32" balsa sheet
1" typ.
13/16"
1/2° down, 1° right : flies right-right
13/16"

[Continued from page 2]
enough to fly for a full max—to our delight. After that, I was very busy constantly checking the scoreboard to see who was catching up to me. While we were waiting in vain for another calm, we had time to compare the accuracy of different kinds of wind meters; all of them showed between a low of 6m/s (13.4 mph) and a high of 12m/s (26.8 mph).

At around 10 a.m., local TV and newspaper interviewers came to me because the organizers had told them I might win the World Cup. It was very upsetting because it was in the middle of a contest when no one can predict a winner. Finally, I talked to them, not as a winner, but because it was a good publicity opportunity for our great sport. Soon after, Rex Bain of NZ told me that someone was within 10 sec of my time. At once I regretted giving the interviews and swore not to do it ever again in the middle of a contest.

In a later round I had a bad over-run with only 5 min to the end of the round. I assembled another model and set the engine run at 5 sec. The engine started exactly 2 min before the end of the round. It climbed rather badly and the glide was worse. It was mashed out badly and landed at 54 sec or so. I really felt I had fallen down from Heaven into Hell. At the same time, I realized that that is typical in any contest.

Even without finding the over-run model, I asked Roger to take me back to the site 30 min before the end of the round because I wanted to have enough time to make my final flight. On our return to the startiung line we found, to our great surprise, there were no starting poles and most of the cars had already left. Rex Bain rushed to our car and asked whether I wanted: "the good news or the bad news" I said I preferred the good news, and was told that I had won without flying the seventh round by 4 sec over Wes McAnelly That meant I was the 1992 World Cup Champion!! I had done it at last!! My dream for so long had come true.

After the contest, we looked for my lost model in the rain and strong wind, across the river and into the woods, through blackberry bushes and other thorny plants. Even with heavy military trousers, which I always wear at contests, it was very tough going. We eventually found the lost model at the top of a high tree—with the previously noted results).

I drank cans of beer with New Zealand flyers and Johnny Walker Black Label with the Thomases. I slept well that night, but woke with a hangover the next morning.

On my return flight to Australia my mood was an odd mixture of triumph and despair. I had won the World Cup, but I had lost all confidence in my models. I had thought that one very good thing about my models was that they were trimmed to fly consistently in both calm and wind, and in the past they always had. But yesterday, on the contrary, they had shown me only one consistent flight; the others veering left or right under power and mashed out on glides and taking a long time to recover.

I went through my log book, which has a full history of every flight I have made over the past 18 months. I could not find a clue, and I felt a can of the airline's bitter ale was really "bitter." Finally I decided to take a nap remembering the beautiful Ashburton countryside covered with green pines and poplars.

That's it!! That's it!! Now I clearly remembered that not only downwind but also upwind there had been a big wall of poplars. Some 100-150m upwind there was a 300m row of poplars 25m high—planted like a wall. It had made the strong wind very turbulent 50m above the launching point. I tested this theory by flying my remaining two models at our home flying site—and they flew consistently as in the past.

Returning to my home in Australia I shared the celebration of my victory, New Year's Day and my 24th anniversary with my wife Naoko. After drinking some Japanese sake, Naoko suggested that it was time for me to rest after one and a half years of hard work for the World Cup Championship. She said I had enough time to prepare for the 1993 World Champs in the USA in October.

All I replied was "No, no, and no!!" For the World Champs there is a team selection at Easter—not far away. I also have to work on new models because I have consumed two in New Zealand. So I asked my wife to prepare a packed breakfast for me as usual because I had to leave the house at around 3:30 the next morning—just like I have been doing for the 18 months. It's the beginning of a new year of struggling and joy.

Two reviews — by Jean Pallet, the Skyscrapers

I have just had the pleasure of reading a marvelous book about the history of model aviation titled "*Do You Speak Model Airplane?*" by Dave Thornburg. And I've also had the pleasure—repetitious, yes, but pleasure is the only right word—of viewing the new NFFS videotape *"The Joy of Flying Free."* Both belong in the library of

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any serious aeromodeler, and particularly any free-flighter!

Dave's book is available from Pony X Press, 5 Monticello Dr, Albuquerque, NM 87123 for $19.95. It thoroughly covers all facets of our hobby's history and just about anyone (person or business) who contributed to its development and progress. Reading about the men and manufacturers that we all knew, or knew of, should dampen the eyes of any nostalgic modeler. Best of all, the writing is literate and fluid, and the details covered and uncovered should be of interest to all.

The NFFS videotape is available from Tony Italiano, 1655 Revere Dr, Brookfield, WI 53005 at $25.00 plus $3.00 postage. This purely free-flight video is a professional product that is a joy to watch. It has segments about every type of free flight model imaginable and encompasses the past as well as the present. Look carefully and you'll spot a lot of Skyscrapers—famous and not so famous. But it's the models and the photography and the narrative that steal the show. And a great show it is!

Commercial notes of some interest

FLYOFF normally does not publish new product press releases unless we also see the product itself and come to our own conclusions (as Jean did above) about its potential value and usefulness in the free-flight "real world." But the mailbox has recently yielded several intriguing items.

Wakefield. Ron Felix (P.O.Box 74, Solebury, PA 18963. Or call 215/297-8712) offers catalogs on Wakefields and Wakefield components offered by Vladimir Feodorov (the Russian whose F1B craftsmanship we all saw at our 1991 Challenge) and Sergey Dolzhenko (a Lithuanian F1B flyer). Two bucks to Ron will get you the catalogs. For $700 you can have a complete Feodorov F1B (like the 3-view in Round 16); $120 will get you a feathering DPR front end; $30 gets either a multi-function timer, a 550-mm Kevlar motor tube, or a 750-mm lightweight dural-carbon-dural tail-boom; or $5 will bring a molded carbon fiber stab saddle. Those are from Feodorov; Dolzhenko's listings are similar.

Radio retrieval. The CIA *Informer* brings word that Moe Whittemore (2348S, 700W, New Palestine, IN 46163. Or phone 317/861-4266) is offering an interesting tracking system. The transmitter—including battery, antenna, etc—is said to weigh "about 4 grams" and costs $50. It fits in a "box" 1.05 x 0.85 x 0.55 in., according to Moe, and you use any CB receiver to track it. Units for Channel 14 are available now, others soon. Range varies with terrain, of course, but appears more than adequate.

Rocket components. Apogee Components (19828 N 43 Dr., Glendale, AZ 85308. Or call 602/780-2946) makes model rocket parts, some of which seem eminently convertible to use in model airplanes. Example: a 24-mm-ID phenolic tube available in a 12-in. length (9 grams) for $2.10, and 30-in. length (19 grams) for $3.60. The weights are competitive with tissued-and-doped balsa tubes. I believe the catalog is free. Our thanks to *FLYOFF* reader Greg Stewart (Minneapolis) for the tip.

Anemometer. Herb Sessums (P.O.Box 754, Bishop, CA 93515) is a free-flighter who wants to know the wind velocity —don't we all?—so he's become a dealer for the Kilo Marine cup-type windmeter. We haven't seen it, but literature reproduced in *SCATTER* looks interesting. Specs indicate it's small and light enough to put atop your streamer pole. Sorry, no price is quoted.