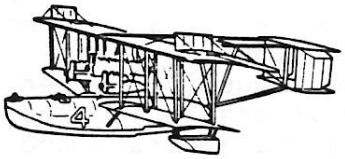
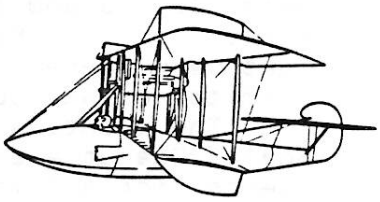
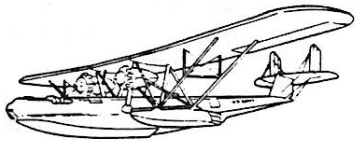
First Amphibious Flight – 1912



Transatlantic Recordholder – NC-4



Primary Trainer U.S. Navy – 1918



High-Wing P3M-1 of 1933

MAX - FAX

THE NEWSLETTER OF THE D.C. MAXECUTERS

NOVEMBER/DECEMBER 1987

MEMBERSHIP

Dues for membership in the D.C. Maxecuters is $10.00 per year for residents of the U.S.A., Canada, and Mexico, and $11.00 for all other countries. Your mailing label indicates the year and month of the last issue of MAX–FAX for your current membership. A red mark next to your mailing label is a reminder that your current membership is nearing its end. Send a check, payable to D.C. Maxecuters, to the Treasurer.

MEETINGS

The D.C. Maxecuters hold meetings on the first Wednesday of every month at the College Park Airport, the oldest continuously operating airport in the world.

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ALLAN SCHANZLE
20008 Spur Hill Drive
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********** NOTICE **********

THE "DREADED RED X" NO LONGER APPEARS ON THIS PAGE. IT NOW APPEARS NEXT TO YOUR MAILING LABEL ON THE OUTSIDE COVER. THE INCREASED VOLUME OF SUBSCRIBERS, AND HENCE "RENEW-EE'S", DICTATES THIS CHANGE TO BE NECESSARY.

****

UPCOMING EVENTS

Nov	7 1987:	Indoor contest at Pax River. See Flyer this issue.
Nov	21 1987:	Sherwood H.S., 4:00-7:00 PM., 14 gm Bostonian contest.
Dec	5 1987:	Sherwood H.S., 4:00-7:00 PM., 7 gm No Cal contest.
Dec	12 1987:	Christmas banquet. See notice in this issue.
Dec	19 1987:	Sherwood H.S., 4:00-7:00 PM., Pennyplane contest.
Jan	9 1988:	Sherwood H.S., 4:00-7:00 PM., Comet 10 incher contest.
Jan	30 1988:	Sherwood H.S., 4:00-7:00 PM., WW-I mass launch contest.
Feb	13 1988:	Sherwood H.S., 4:00-7:00 PM., Coconut scale contest.
Feb	20 1988:	Sherwood H.S., 4:00-7:00 PM., Peanut contest, Mooney rules.

CLUB NEWS

ALLAN SCHANZLE

Let's get to the important stuff right away. The FAC NATS, which we

announced in the last issue would be hosted by the D.C. MAXECUTERS, will be held July 9 and 10 1988, at the National War Plane Museum in Geneseo New York. This is the same location as last year, and all you lads and lasses that were there know that the facility is first class. Even the food at the dormitories was outstanding.

The events will be the same as last year with one exception. The FAC Scale Peanut event will be eliminated. This still leaves two peanut scale events for all you "peanutteers": GHQ Peanut, and the WW I mass launch.

A new typing of the rules has been completed under the direction of Don Srull, and this was submitted to Lin Reichel in mid August. A number of general clarifications were made, but the primary area of change involved a much clearer definition of bonus points for multi-engined aircraft and a definition of what planes are eligible for the racing events. Any changes, of course, must be approved by Lin, but it has now been over two months since the proposed rules were sent for his review, and he has not yet responded despite the pleading of this editor. We are aware that many of you are already building, or at least planning to build, for next years gala event. If Lin has not published the new rules by the time you get this "ish", and you would like a copy of what was sent to him, send the editor of this bi-monthly trash wrapper a self-addressed and stamped envelope (Note, NOT a 22, but 39 cent stamp - the rules include ALL FAC events, and have become rather lengthy) and I'll forward what we submitted to Lin. But please, remember that these will only be provisional.

There will be more news about the FAC NATS in the following issues of MAX FAX, and hopefully, in the FAC NEWS. Plans are underway to get dormitory facilities, arrange for meals, trophies, T-shirts, guest speaker for the banquet, and a multitude of other items that need attention. One thing is for sure.....we will keep you well informed of what is going on. Also, let me thank all of you who have written and offered to help with the NATS. When we get down to the nitty-gritty, I'll probably be calling on you for some assistance.

Now let's talk about the Summer Fun Fly. For those of you who have attended this bash for the past few years, you know that the weather has been kind. Sure, we've had some hot days, and some that were windy, but we have never been rained out, and the contest has been held for about ten years. But this year, it looked bad. The east coast had been seeing rain for a week, and the forecast gave a 90% chance for more fluid from Heaven. On friday evening before the contest, we had a get-together at Don Srull's house, and about 10:00 PM, it started to thunder with lightning. The rain came down like a monsoon in the Philippines (really, Pat, it was a walla-paloser). I "figgered" our luck had run out. Saturday morning it was overcast, but no rain. The humidity was 100%, and if someone had spit, it would have seeded a downpour. But like the idiots we are, we went to the field and set up shop. Still no rain, but the dark clouds sure looked threatening. On with the contest, and I tried to speed up the events as much as possible. Here on the East coast, this type of weather condition will guarantee the angels shedding their rath on us mortals by 4:00 PM, if not before. Occasionally, a few dark clouds appeared on the horizon, but they skirted to the left or right. The last event was completed, the scores tabulated, and only the final trophies were yet to be awarded when the local farmers got some more of their liquid gold. It started slowly, a light drizzle, and even when we got to the local choke 'n puke for some food, it was still only a light rain. But then it started to come down by the bucket full. We sat at Roy Rogers, reminiscing about the contest and telling lies about future building projects. It was beautiful....we had escaped once again.

There was a short lull in the downpour, and Bill Bell went to his Van and returned with his newly completed, non-flying, 42 inch span B-17 made from a Guillows kit. My Gawd, is that thing a piece of work. I hope Tom got a picture that we can put in this newsletter.

Some other things happened at the contest that should be mentioned. To begin with, a relative newcomer to our local group, Tom Yanosky, showed up

with a good looking Corbin Super Ace, and with the help of Dave Rees and Hurst Bowers, it was flying darn good; in fact, so good, that he won the Golden Age Mass launch event!! I think that this was the first flying contest Tom had entered in many years, although he has built several static display models for the Smithsonian. It turns out that Tom and Earl Stahl, who ignored the weather forecast and once again came up from Yorktown, Virginia, were old high school flyin' buddies.

The Trans-Atlantic event was every bit as much fun as we had expected. I had unraveled a roll of toilet paper to represent the coast of France, and an "X", also made from Scott's finest, about 100 feet down wind to denote Paris. (OK, now, no comments about this being another "crappy" event dreamed up by the CD). There were seven planes entered, and all launched simultaneously, with the goal of landing as close to the "X" as possible, but requiring a landing beyond the "coast". Now, you must remember that the wind had been blowing all day, so the launch location was set about 500 feet from gay "Pear-ree", and all of us are launching into the wind, which is exactly the opposite direction of the target. As the count down gets to about 20 seconds, the bloody wind stops...only a light drift. Everyone launches, including "Wrong Way Rees", who proceeds to weathervane to California. Talk about being "steamed". I think that's the first time I've ever heard Dave raise his voice. Oh well, it was fun, and you can review the results elsewhere in this issue.

We want to thank Jack Bolton for donating another beautiful replica of a Hamilton Standard prop, which was awarded to Kevin Sharbonda as the Grand Champion. Also, Tex Baird donated one of his magnificent hand carved props, which was given to the winner of the Jumbo event, Don Srull. And while we're on the subject of Jumbos, I should mention that none other than the Glue Guru, a.k.a. Leon Bennett, came down from New York City. One week after the contest, I received the following letter from Leon.

"Just a sullen note of thanks for the courtesy shown me by your crowd at the recent Summer Fly event. Maps, beer, even hand holding all the way back to my hotel (it was real dark) came effortlessly from your nobel tribe.

"As for Comsat, well, let's just say that it set me yearning for good old Taft. Yes, a dose of Comsat makes those desert rattlesnakes look like friendly little fellers. At least they're low to the ground and don't bit models. On the other hand, those Comsat trees.....

"Now it's true that Thoreau gained fame by putting up a shack in the middle of a forest. Walden. But only you guys seek fame by flying in the middle of a forest.

" The one technical question I got repeatedly from your crowd had to do with the purpose of those little wheels on the bottom of most models. I know this is hard to believe, but sometimes models land and roll to a stop on those things. Smashing models into trees is not the only way of terminating flight. Honest.

"Anyway, thanks for the hospitality. As for Comsat..." Leon Bennett.

Leon, me lad, as editor of this rag, I doth protest your condemnation of Comsat. For it was you who chose to launch that yellow, wheeled, wonder Jumbo about 200 feet upwind of those trees. One would think, that after the first launch, which flew oh-so-gracefully until it's novice pilot pounded the poplar, one would move to a different portion of the field for the second launch of said pilled-up-Piper. But no, you chose to stay in that same 10% of the field and again launch 200 feet upwind of the trees. With similar trim and wind conditions, is it really any surprise that the re-paired pilled-up-Piper once again pounded into the poor pummeled poplar? For my money, you can go to Taft and do battle with Ralph the rattler. Me, I'll stay at Comsat, observe a short trim flight or two, and arrange to land on the 8 inches of grass.

On a more serious note, Leon, it was good to see you again, and we thank you for coming to the affair. Our discussions at the Friday night

gathering of the clan were enjoyable, and I appreciate your comments on the many subjects we discussed.

If you check the Upcoming Events, you'll see that the Christmas Banquet is scheduled for December 12. It will be held at the same location as last year, the Old Europe Restaurant, and I suspect we will again be asked to select from the same superb German groceries. A cash bar will be open at 7:00 PM and dinner will be served at 8:00. As in the past, the ladies are encouraged to attend. Our guest speaker will be none other than Paul Garber. To make a reservation, send a check for $18.00 per person to Paul Spreiregen, 2215 Observatory Place N.W., Washington D.C., 20007. Make the check payable to Paul.

The upcoming Events also indicates the dates for our indoor flying sessions. As you know, the weather around here has a tendency to be rather nasty during the winter months. If, on a scheduled date, the heavens have produced some of the pure white stuff and you wonder if the school will be open, call the following number for a recorded message concerning school closings: (301) 279-3673.

Tom Schmitt, Dan Driscoll, Marve Yoder, and I went down to North Carolina to attend the Contest sponsored by the Kudzu FAC Squadron. This affair was put on by CD Bob Wedel, Tom Odom, and Dave Rees, with quite a few folks from South Carolina attending. To say that the weather was ideal is an understatement. What little wind appeared was in the direction of due "up", and at last count, 5 models were taken by Hung to the great airstrip in the sky. Let me replay the final round of flying for the Golden Age event. There were five of us left, and the event director had called for the first two down to be eliminated. We launched into what looked like gentle lift, but two of the planes failed to be in the "good" stuff, which left Tom Odom, myself, and someone else (whom I don't recall) floating around up yonder. My Fairchild came down, after about two minutes, but Mr. unknown had caught the center of the thermal and was well on his way O.O.S. Tom's Rearwin Speedster was also in the good stuff, but not centered, and he cruised downwind, then to the right, then back toward us, then again downwind, and was last seen drifting over the distant trees after 5 1/2 minutes, with Tom in hot pursuit. Now, what does one do. We started with 5, eliminated the first two, as prescribed by the event director, but of the remaining three, one is definitely O.O.S. and Tom hasn't returned 10 minutes after his little Rearwin chose to join the Yankee Air Force on the other side of the trees (nearly 16 minutes after launch). Well, I felt a little strange, but I put in about 30 winder turns to the Fairchild and launched for a resounding 20 second flight. Yes, I was declared the winner, but somehow, it didn't seem right. Tom Schmitt assures me that he will have a caption for a photo in the next issue of MAX-FAX that will do justice to my cowardly deed of making the last flight with only a few winds. Go ahead, call me a Chicken, but don't call me stupid!!!

All contestants appreciated the donation of merchandise by Hayes Hobby House, located in Fayetteville, and the trophies awarded by the CD, Bob Wedel. It was a splended affair.

We received a note from one of our readers in jolly 'ole England, Lindsey Smith, noting that he has begun to produce a line of goodies for us free flight scalers. His company is called Small Scale Custom Services, and currently is selling the following vacu-formed wheels, pilots, and radial engines, as well as a "stuffing" stick.

Wheels: Golden Age.... 2.5", 2.0", 1.5".
WW-II..... 1/24th, 1/12th scale.
Pilots: Mc Hard (Sidcot suit, helmet, goggles) 1/24th, 1/18th scale.
Golden Age civilian (helmet or bare headed).
Modern Military (helmet, bone dome, goggles, oxygen mask).
Radial Engines: Large 1/24th scale (for Telco CO_2)
Small (for Peanut Scale)

Lindsey sent a few samples and a price list, in terms of British currency,

(items vary from about $0.75 to $1.50) but not postage requirements for shipping to the U.S. The samples were very light weight and well detailed. For more information, contact Lindsey Smith, The Red House, Oxborough, Kings Lynn, Norfolk, PE33 9PS, England.

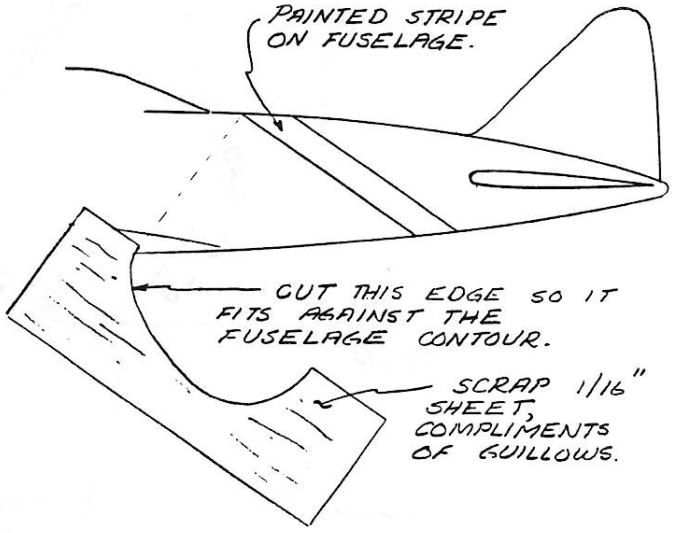
And while we're mentioning Lindsey and his new line of products, this issue features a Peanut plan of his for the Cavalier Mustang, a predecessor to Piper's recent effort called the Enforcer. Both of these are (or perhaps more appropriately, were) intended as COIN (COunter INsurgency) aircraft. In addition, you'll find an excellent article by Bud Carson on the effect of weight on flying times. This appeared in the NFFS Symposium this past year, but we felt it was worth reprinting. Contest results for the Summer Fun Fly, a hint on how to define contours for colored bands on oval fuselages, some 3-views, and, of course, photo pages compliments of Tom Schmitt, fill out this issue.

PAINTING STRIPES ON ROUNDED SURFACES

ALLAN SCHANZLE

Photo number 3 in this issue shows me holding another of my CO_2 powered Guillows 16 inch WW-II aircraft. I've built four of these so far, and powered two of them with a Brown peanut engine. The latest, a Zero, was painted with the colors noted in a Profile Publication. This involved an overall gray color, with a blue strip on the fuselage between the wing and stab, and canted at 45 degrees to the vertical. This stripe indicated a "shotai", or section leader, in the Japanese scheme of things. From the side view, the stripe had to appear perfectly straight. (See sketch). Unfortunately, the photo does not show this very well.

I pondered for quite a while before figuring out how to define the outline of this stripe so it appears straight in the side view. As with most things, it was obvious, and as one of my more memorable professors used to say, it was obvious to those to whom it was obvious!! The solution was to simply use a piece of the pseudo balsa wood supplied by Guillows (and manufactured by the Bethlehem Steel Corp.) that I had fed to the waste basket. After hoisting this scrap wood with a two ton crane, I proceeded to make a sequence of cuts into the sheet balsa, not unlike the inside of formers used in constructing half-shell fuselages. With this as a philosophy, I kept carving away until the cut-a-way section followed the contour of the fuselage when canted at 45 degrees. Using this non-flexible balsa guarantees a straight line when viewed from the side.



Once the template has been cut to shape, simply use it to draw a light line on the fuselage to represent the front of the stripe. Then measure the width of the stripe and mark off the rear of the stripe. This is easier then cutting another piece of balsa. With the front and rear edges defined, you can mask off the lines and spray paint the stripe.

Pat Daily made a suggestion for stripes that run perfectly up and down, (perpendicular to the center line of the fuselage). Simply use rubber bands to define the leading or trailing edge, then proceed as noted above.

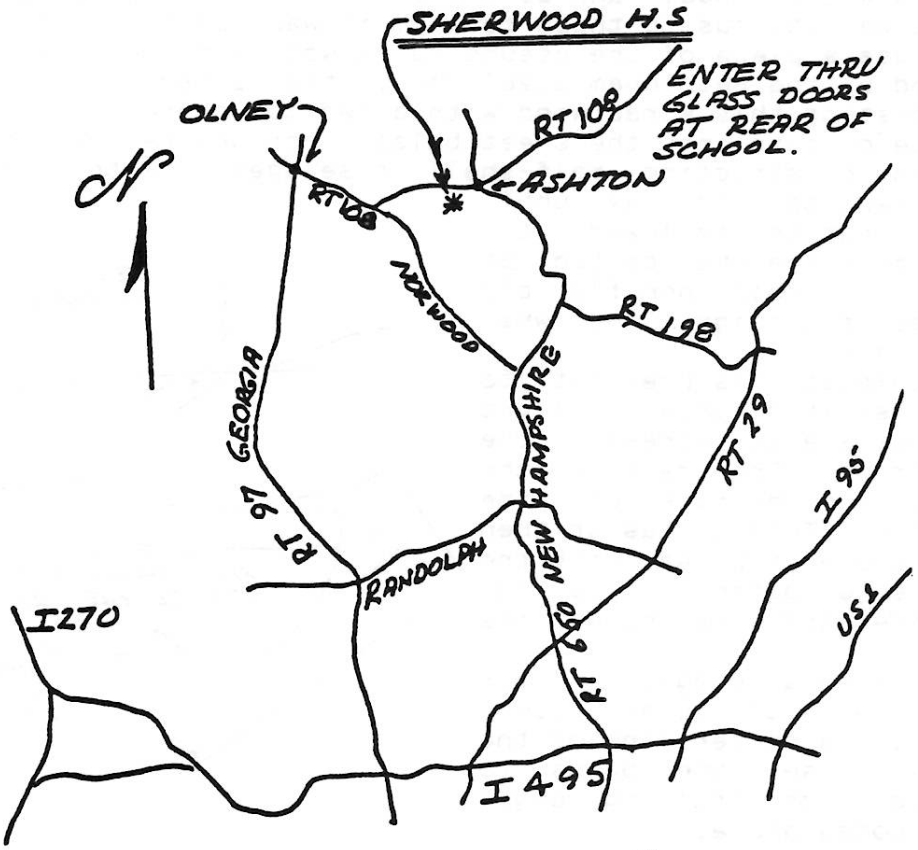
PHOTO PAGES

TOM SCHMITT

1. Bill Bell with his beautiful display model from the Guillow B-17 kit; we are encouraging him to install four electrics and fly it.
2. A Miles Mohawk ready to go aloft by Stew Meyers.
3. Our editor with his latest CO2, a Zero adapted from the Guillow Rufe kit. See note this issue.

Summer Fun Fly '87

4. Our eagle eye judges, Stew Meyers and Dan Driscoll with Paul Gaertner's electric powered Dornier, formerly CO2.
5. The 'Glue Guru' journeyed down from the Big Apple with his Jumbo Cub, which attempted twice to knock down one of Shangrila's infamous trees. Unfortunately, it did not succeed!
6. Rowland Hoot brought along this very pretty Avro Baby.
7. Jack Bolton holds for Walt Eggert winding his high flying SE-5.
8. Hurst Bowers with his Golden Age Military Blackburn Airdale.
9. A Oiseau Canari by Dave Rees from Hurst's plans in MAX-FAX.
10. Another Canari by Doug Buchanan, this time electric using the rewound disc camera motor.
11. John Houck with a cute little Gee-Bee.
12. Professor Bud Carson always shows up with new aircraft such as this Corben. Ask him to show you his computer generated lozenge tissue; terrific!
13. Marv Yoder's Ercoupe reaches for a thermal.
14. Tom Yanosky shows us how to fly Golden Age Mass Launch with his Corben; a winner the first time out.
15. A very pretty and great flying Albatros D-III by Jerry Paisley from Pat Daily's plan in MAX-FAX.
16. Larrie Schaeffer built this great Blackburn 'Blackburn' from Hurst Bower's plans also in a previous MAX-FAX; photo by Larrie.
17. How is this for a terrific PEANUT? Jiro Sugimoto's BD-5 poses for its photo way off in Japan; photo by Jiro.



MAP TO INDOOR SITE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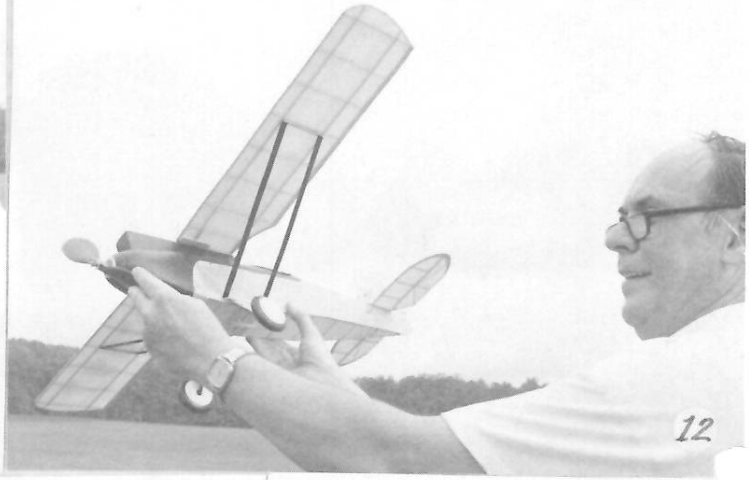

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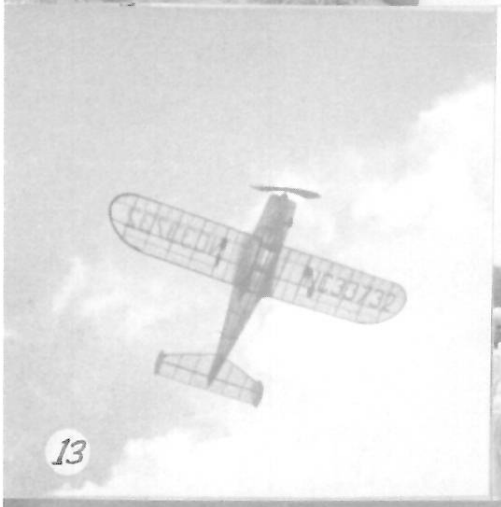

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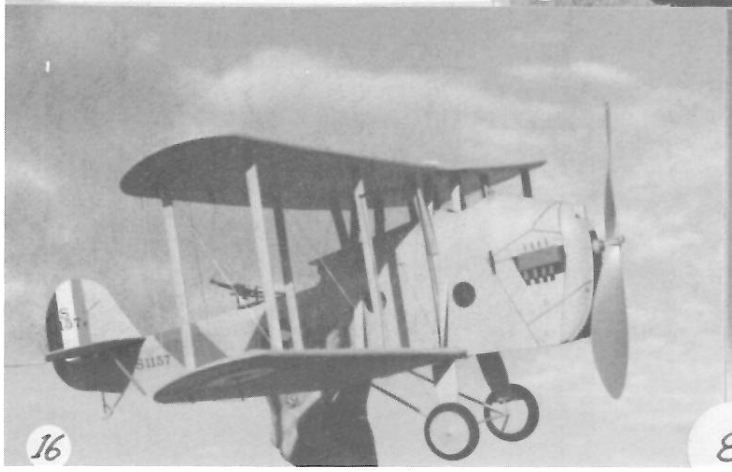

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EFFECT OF WEIGHT ON RUBBER MODEL PERFORMANCE

Bud Carson

FROM 1987 NFFS SYMPOSIUM.

INTRODUCTION

It is a known fact that if two rubber models are identical in all respects except their unpowered weights, the lighter model will have a competitive edge over the heavier model. A simple explanation for this is that if the two are identical aerodynamically, then both have the same lift-drag ratio for maximum endurance; and since the heavier model needs more lift, will also have more drag. The heavier model must fly faster than the lighter one to produce more lift, and thus the rate of energy expended per unit time will be greater. If both models have the same weight of rubber and propeller efficiency, then both have the same amount of useful energy available for flight but the lighter model uses its energy over a longer period of time, and so it has the greater endurance.

For this reason, the rules governing several competitive rubber classes specify a minimum airframe weight; otherwise, the field would quickly narrow to those few modelers who were able to build extraordinarily light models, and the challenge of aerodynamic design and flying techniques would become secondary to minimum weight.

In addition to a minimum airframe weight, several competitive events specify a maximum allowable rubber weight. It is clear that when both weight restrictions apply, the best model will have, among other things, an airframe weighing no more than the minimum required, and a motor weighing no less than the maximum permitted. The latter is usually more easily achieved than the former; in powering such models, the modeler has very precise control over the rubber motor weight, but not nearly so much with respect to the structural weight of the model, although some modelers will pay very close attention to weight in the design and construction of their aircraft. Others, however, appear not overly concerned if the model turns out somewhat heavier than the minimum weight spelled out by the rules for the particular type of aircraft, placing their trust in aerodynamic improvements and flying skills to compensate for any penalties thus incurred.

The purpose of this paper is to examine and quantify the endurance penalty that results when a given aircraft is overweight. Thus in the following develoment a baseline aircraft is assumed which exactly meets the minimum weight rules for a given design, and against which performance degregation due to excess weight is measured.

THEORY

The standard endurance formula for a rubber model of weight W comprised of an airframe weight W_o and a motor weight W_r can be found in many references, or easily derived by assuming that there is an average airspeed that characterizes the flight, and that any excess power expended in the early portion of the flight beyond that required to produce this airspeed results in a climb. Thus excess energy is converted to potential energy and later recovered in the gliding phase. For a given aircraft, the dependence of time of flight on weight turns out to be

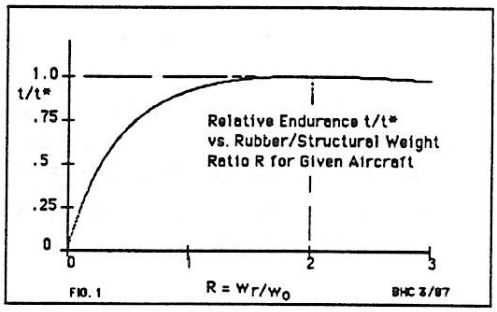
$$t = F\,R/\{(1 + R)^{3/2}\sqrt{Wo}\} \quad (1)$$

where $R = W_r/W_o$ and F is a function of aerodynamic parameters, (L/D, wing area, propeller efficiency, lift coefficient), air density, and the specific energy content (energy per unit weight) of the rubber. This is, of course, the "still air" time, and does not account for atmospheric assistance, i.e., thermals.

This equation has a maximum when R = 2, i.e., when the total flying weight of the model is two parts rubber weight and one part structural weight. We denote the time t when R = 2 as t*. Then it turns out that for any other R, the ratio of endurance time to the optimum is

$$t/t^* = 2/(3^{3/2})R/(1 + R)^{3/2},$$

allowing a plot of t/t* against R to be made. This is shown in Figure 1.



From this figure it can be seen that a "knee" develops at about R = 1/2, t/t* = .75, beyond which quite large additions of rubber weight are required to make significant gains in endurance. In addition, there are structural considerations that limit outdoor models to values of R far less than the theoretical optimum. In short, this optimum does not appear to be a very useful baseline against which to assess the the effects of structural weight on

performance. Even more realistically speaking, most oudoor competition models are flown at values of R in the vicinity of 0.25 or less. An exception to this are aircraft designed for indoor flight where R values around 1 are commonplace.

As it turns out, even the rubber weight fraction R by itself is not a completely reliable measure of performance when a model weighs more than the rules require, due to the additional weight factor in equation (1). For example, suppose two P-30's are built to the same plans but one weighs the minimum permissible 40 grams, while the other weighs 50 grams. The lighter model is flown with 10 grams of rubber, as the rules allow, but the other is flown (illegally) with a 12.5 gram motor. Now both have an R of .25 and we might suppose that they would thus perform identically. But at least in theory, the lighter model still wins, because of the weight factor in eq. (1). In other words, merely adding rubber to obtain an equivalent R is not enough. An even greater amount is needed to match the lighter model's performance, because part of the added rubber must be used to compensate for its own weight.

THE INFLUENCE EQUATION

We will now quantify these observations in a form that provides quick estimates to the effect of an overweight condition on performance.

This is made possible through a mathematical technique known as "logarithimic differentiation" that lets us assess the effects of small departures from a known solution to a given function. When this is done to equation (1), we get an "influence equation" that will be explained in the following.

The influence equation just referred to is

$$\Delta t/t = \{ (1 - R/2)/(1+R)\} \Delta R/R - .\Delta W_0/2W_0 \qquad (2)$$

where "Δ" means "a small difference" We now show how this works: for the above example, the baseline P-30 has an R of .25, and a W_0 of 40. If these values are put into eq. 2, we get the P-30 influence equation as

$$\Delta t/t = -0.0125\ \Delta W_0 + 2.8\ \Delta R \qquad (P\text{-}30)$$

Now if the heavier version is motored with 10 grams, its R is .20 (that is, 10/50) and its W_0 is 50.

Thus $\Delta R = .20 - .25 = -.05$, and $\Delta W_0 = 50 - 40 = 10$.

(note that in determining the Δ's, we use the formula

Δ = actual model value - baseline model value)

Therefore,

$$\Delta t/t = -0.0125 \times 10 + 2.8 \times (-.05) = -.265,$$

or a 26.5% reduction in endurance is predicted.

Earlier, the claim was made that even if the heavier model is flown at the same R value, it still will not perform as well as the lighter version. This follows directly from the influence equation; if the heavy model is flown with a 12.5 gram motor (so that its R is 12.5/50 = .25) then ΔR is zero, but the weight term shows that there will still be a 12.5% reduction in endurance, which not only proves the point, but quantifies the conclusion. We can also determine how much rubber is needed to bring the heavy model's performance up to the baseline, by setting $\Delta t = 0$ and solving for ΔR. The reader can verify that the heavier model must have a motor weighing 14.7 grams, or nearly a 50% increase in rubber, to perform as well as the lighter one.

The influence equation for other popular classes can be developed as follows:

For Coup d'Hiver, the baseline values are: $W_0 = 70$ grams and $W_r = 10$ grams.Thus the influence equation is

$$\Delta t/t = -0.00714\ \Delta W_0 + 5.69\ \Delta \qquad \text{(Coup d'Hiver)}$$

Likewise, for F1-B (Wakefield), $W_0 = 190$ grams and $W_r = 40$ grams. Thus,

$$\Delta t/t = -\ 0.00263\ \Delta W_0 + 3.51\ \Delta R \qquad \text{(F1-B).}$$

The influence equation can also be used for general rubber endurance models. For example, a scale model has a $W_0 = 50$ grams and flies with 10 grams of rubber. What will the effect be if the rubber weight is increased to 13 grams, but three grams of nose ballast must be added to maintain the same center of gravity?

The baseline R value for this model is 0.2 and so the influence equation is

$$\Delta t/t = -\ 0.01\ \Delta W_0 + 3.75\ \Delta R,$$

and the new value of R is 13/53, or .245.

Thus, $\Delta R = .245 - .2 = 0.045$, and $\Delta W_0 = 3$. Therefore,

$$\Delta t/t = -\ .01 \times 3 + 3.75 \times .045 = 0.1378,$$

or about a 14% increase in endurance can be expected. This assumes, of course, that the propeller efficiency is the same for either case.

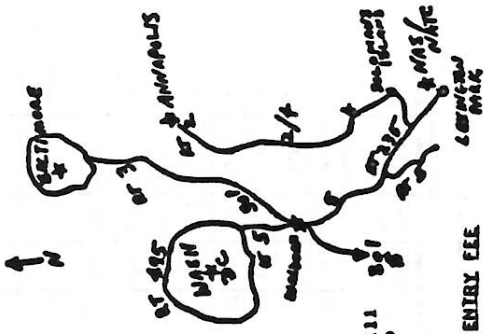
THE WEIGHT-GROWTH SPIRAL

This analysis illustrates an effect known to aeronautical engineers as the "weight-growth spiral," where seemingly small amounts of excess weight can lead to an unexpectedly large degredation in performance. To illustrate this, let us return to the P-30 example above. Suppose the 10 grams of excess weight in the heavier model originated when the tail assembly was built three grams heavy, which required 7 grams of bose ballast to offset it. The result is a 27% loss in endurance, which works out to be a 9% loss of performance for each unnecessary gram of structure in a model flown at 60 grams! This explains why at least according to the author's personal experience, some models perform so brilliantly while others built to the same design but only slightly heavier, turn out to be "dogs."

Readers might be interested in knowing that the P-30 example used in this paper was drawn from real life. The author's first attempt produced a tail-heavy model that weighed 51 grams when it was balanced. A second was built, coming in at exactly 40 grams. The still-air performance with identical 10 gram motors increased from 90 seconds to 125 seconds, almost the exact difference predicted by this analysis. In fact, it was this large difference that led to the present investigation in the first place, because it was difficult to see intuitively how "a few grams" could account for the large spread in endurance times.

CONCLUSIONS

There may be valid reasons why a model would be deliberately built heavier than necessary; one authority claims that there is less risk in losing a model in strong thermals if it is heavier than required, but this would seem to be a matter of developing a better dethermalizing system. In general, however, the above analysis shows that serious performance degredation can be expected when a model is built even slightly heavier than necessary. Likewise, no matter how well a heavy model performs, it will perform even better if it is made lighter. This is summarized in the aeronautical engineer's mandate: "Simplify, and add lightness."



INDOOR MODEL AIRPLANE CONTEST

NOVEMBER 7 1987

9:00 AM - 5:30 PM

ROTARY WING HANGAR, BUILDING 111
NAS/NATC PATUXENT RIVER, MD
LEXINGTON PARK, MD

FAC RULES — NO ENTRY FEE

MASS LAUNCH — **OTHER EVENTS**

MM-I	1:00 PM	FAC SCALE
NAVY SCALE	2:00 PM	NO-CAL (7 GM. MINIMUM WITHOUT RUBBER)
PEANUT SCALE	3:00 PM	BOSTONIAN (RDG, 14 GM. MINIMUM WITHOUT RUBBER)
GOLDEN AGE (1920 - 1934)	4:00 PM	NOVICE PENNYPLANE (AMA RULES)

SPECIAL EVENTS (NO TROPHIES)

INDOOR HANDLAUNCH GLIDER
FAC POWER SCALE (4 OZ. MAXIMUM WEIGHT)
INDOOR COCONUT SCALE (1 OZ. MINIMUM WITHOUT RUBBER)
WINGSPAN MINIMUMS: MONOPLANES, 36"
MULTIWINGS, 30"

AWARDS: 5:10 - 5:30

FAC JUDGING STARTS AT 11:00 AM. NO QUALIFYING FLIGHT REQUIRED.
ALL FLIGHT SCORES SUBMITTED BY 4:30 PM.

LOCAL RULE: ONE MASS LAUNCH EVENT PER MODEL.

INFORMATION: COORDINATORS: CLAUDE POWELL (301) 872-4105
TOM SCHMITT (301) 530-0327
CONTEST DIRECTOR: ALLAN SCHANZLE (301) 840-5884

SPONSORED BY: NAVAL AIR STATION/NAVAL AIR TEST CENTER, PATUXENT RIVER, MD AND ST MARY'S COUNTY RECREATION AND PARKS.

CONTEST RESULTS FOR F.A.C. SCALE

NAME	AIRCRAFT	STATIC					FLIGHT (SECONDS)				TOTAL PTS.	PLACE
		CONST. 0-30	CONF. 0-30	WGT. 0-25	BONUS	TOTAL	1	2	3	FLIGHT POINTS		
JOHN HOUCK	BELL XFL-1	21	15	9	10	55	61	-	-	60.5	115.5	4
DAVE REES	CANT 1007	29	18	12	35	94	40	-	-	40.0	134.0	3
DON SRULL	VOISIN	29	19	12	40	100	61			60.5	160.5	1
JERRY PAISLEY	ALBATROS D-3	21	17	10	15	63	27	31	36	36.0	99.0	7
ROWLAND HOOT	SANTOS DUMONT	29	19	12	30	90	71	-	-	65.5	155.5	2
GREG. MEYERS	SKYRAIDER	10	12	6	10	38	32	45	36	45.0	83.0	8
WALT EGGERT	FARMAN SPORT	23	16	9	15	63	36	49	40	49.0	112.0	5
GEORGE MEYERS	ARADO 96	19	17	8	10	54	44	58	36	58.0	112.0	6

CONTEST RESULTS FOR GOLDEN AGE MILITARY FAC SCALE

NAME	AIRCRAFT	STATIC					FLIGHT (SECONDS)				TOTAL PTS.	PLACE
		CONST. 0-30	CONF. 0-30	WGT. 0-25	BONUS	TOTAL	1	2	3	FLIGHT POINTS		
DAVE REES	LOENING	20	17	10	5	52	58	41	-	58.0	110.0	1
BERT PHILLIPS	PZL 8/II	21	15	8	5	49	30	25	21	30.0	79.0	4
WALT EGGERT	OS2U-1	20	16	8	5	49	25	23	31	31.0	80.0	3
BILL BELL	MARTIN T4M-1	27	15	10	15	67	21	35	21	35.0	102.0	2
BILL BELL	BOEING F2B-1	27	15	10	15	67	20	19	23	23.0	90.0	-

CONTEST RESULTS FOR F.A.C. POWER SCALE

NAME	AIRCRAFT	STATIC				FLIGHT (SECONDS)						TOTAL PTS.	PLACE
		CONST. 0-30	CONF. 0-30	WGT. 0-25	TOTAL	BONUS	1	2	3	FLT. TIME	FLT. PTS.		
TOM SCHMITT	RWD 10	27	17	11	55	3	33	65	90*	90	75	130.0	1
ROWLAND HOOT	AVRO BABY	27	17	11	55	15	21	45	-	60	60	115.0	3
WALT EGGERT	FOKKER DR-1	24	15	9	48	20	52	-	-	72	66	114.0	4
MARK HOUCK	T-CRAFT	10	5	5	20	0	30	34	90*	90	75	95.0	6
JOE BARISH	GRAHM WHITE	20	17	10	47	15	56	-	-	71	65½	112.5	5
DOUG BUCHANAN	BERNARD 191	25	12	8	45	0	39	29	28	39	39	84.0	8
PAUL GAERTNER	DORNIER DO-18	20	15	11	46	15	31	32	-	47	47	98.0	7
DON SRULL	CURTISS OC-2	20	16	10	46	15	90*	-	-	90	75	121.0	2

* 90 SECOND MAX DUE TO WEATHER

CONTEST RESULTS FOR WW-II

NAME	AIRCRAFT	ROUND ELIMINATED										PLACE
		1	2	3	4	5	6	7	8	9	10	
FLIGHT A												
ROLF GREGORY	HEINKLE HE 100	X										
JOHN HOUCK	HEINKLE HE 100					X						2
TOM SCHMITT	WILDCAT	X										
DAN DRISCOLL	HELLCAT		X									
WALT EGGERT	P-47	X										
KEVIN SHARBONDA	F4-U											1
GEORGE MEYERS	GRACE		X									
FLIGHT B												
MARK HOUCK	P-51			X								
CLAUDE POWELL	HURRICANE				X							3
DAVE REES	TENZAN	X										
MARV YODER	P-51			X								
ROWLAND HOOT	VENGENCE			X								
RANDY KLEINERT	HELLCAT		X									
GREG. MEYERS	TYPHOON	X										
BOB WEDEL	MIG-3	X										

CONTEST RESULTS FOR EMBRYO

NAME	BONUS PTS	FLIGHT TIMES (SEC.)					TOTAL PTS	PLACE	
		1	2	3	4	BEST 3			
MARK HOUCK	0	55	56	78	34	189	189		4
CLAUDE POWELL	0	70	46	54	-	170	170		5
MARVE YODER	0	66	90	-	-	156	156		6
ROWLAND HOOT	0	89	78	74	-	241	241		1
BUD CARSON	0	75	50	65	-	190	190		3
DOUG BUCHANNAN	9	89	70	54	-	213	222		2
BOB WEDEL	9	43	53	-	-	96	105		7

CONTEST RESULTS FOR F.A.C. JUMBO SCALE

NAME	AIRCRAFT	STATIC					FLIGHT (SECONDS)				TOTAL PTS.	PLACE
		CONST. 0-30	CONF. 0-30	WGT. 0-25	BONUS	TOTAL	1	2	3	FLIGHT POINTS		
JOHN HOUCK	F-82F	21	17	9	30	77	21	-	-	21.0	98.0	3
DAVE REES	GADFLY	26	17	9	10	62	65	73	-	66.5	128.5	2
MARV YODER	ERCOUPE	18	15	7	10	50	27	34	34	34.0	84.0	5
BILL BELL	T-CRAFT	18	16	9	0	43	21	30	-	30.0	73.0	6
PAUL GAERTNER	FIESELER STORCH	19	13	10	0	42	55	53	-	55.0	97.0	4
DON SRULL	CANT	28	18	11	35	92	42	-	-	42.0	134.0	1

CONTEST RESULTS FOR GOLDEN AGE

NAME	AIRCRAFT	ROUND ELIMINATED										PLACE
		1	2	3	4	5	6	7	8	9	10	
FLIGHT A												
TOM YANOSKY	CORBIN SUPER ACE											1
ROLF GREGORY	BELLANCA		X									
WALT EGGERT	FAIRCHILD C1	X										
JOHN HOUCK	Y10-43				X							
TOM SCHMITT	REARWIN SPEEDSTER	X										
DAVE REES	BERNARD 191			X								
BUD CARSON	DAYTON WRIGHT		X									
RANDY KLEINERT	J-3 CUB	X										
DON SKULL	MUREAX				X							
BILL BELL	TAYLOR CUB J2		X									
FLIGHT B												
DOUG BUCHANNAN	ALLIED SPORT					X						3
MARK HOUCK	AERONCA CHAMP	X										
CLAUDE POWELL	PUSS MOTH		X									
DAN DRISCOLL	J3 CUB		X									
MARV YODER	CURTISS ROBIN		X									
BERT PHILLIPS	BEECH B-17	X										
ROWLAND HOOT	FAIRCHILD 24			X								
GEORGE MEYERS	LEOPARD MOTH						X					2
GREG MEYERS	REARWIN SPORTSTER	X										
PAUL SPREIREGEN	FAIRCHILD 24			X								

CONTEST RESULTS FOR CATAPULT GLIDER

NAME	FLIGHT TIMES (SECONDS)							PLACE
	1	2	3	4	5	6	TOTAL	
ALLAN SCHANZLE	(63)	35	(47)	27	36	(38)	148	3
MARK HOUCK	(29)	(30)	(29)	–	–	–	88	4
JOHN SITES	(75)	37	18	26	(49)	(37)	161	2
RANDY KLEINERT	(77)	22	(63)	19	21	(32)	172	1

CONTEST RESULTS FOR HAND LAUNCH GLIDER

NAME	FLIGHT TIMES (SECONDS)							PLACE
	1	2	3	4	5	6	TOTAL	
MARK HOUCK	(26)✓	12	16	(30)✓	(22)✓	16	78	4
JOHN SITES	34	(54)	(49)	16	(67)	21	170	2
ROWLAND HOOT	28	–	–	–	–	–	28	5
RANDY KLEINERT	(77)	(69)	22	(71)	44	30	217	1
GLEN SIMPERS	(55)	23	(35)	31	(49)	21	139	3

CONTEST RESULTS FOR TRANS-ATLANTIC CROSSING

NAME	AIRCRAFT	ROUND ELIMINATED										PLACE
		1	2	3	4	5	6	7	8	9	10	
FLIGHT A												
ALLAN SCHANZLE	MONOCOUPE											1
DAVE REES	BERNARD 191		SPLASH!									
BILL BELL	CURTISS ROBIN		SPLASH!									
ROLF GREGORY	BELLANCA		SPLASH!									
DOUG BUCHANNAN	BERNARD 191		SPLASH!									
PAUL SPREIREGEN	PUSS MOTH											2
HURST BOWERS	BERNARD 191		SPLASH!									

CONTEST RESULTS FOR THE RACES

NAME	AIRCRAFT	ROUND ELIMINATED										PLACE
		1	2	3	4	5	6	7	8	9	10	
FLIGHT A												
JOHN HOUCK	GEE-BEE SPORTSTER											
BERT PHILLIPS	CESSNA											
GEORGE MEYERS	SUZY											
KEVIN SHARBONDA	CHAMBERMAID											
RANDY KLEINERT	CHAMBERMAID											1
DAVE REES	MR MULLIGAN											

CONTEST RESULTS FOR WW I

NAME	AIRCRAFT	ROUND ELIMINATED										PLACE
		1	2	3	4	5	6	7	8	9	10	
FLIGHT A												
JOHN HOUCK	FOKKER D7	X										
JOHN STRONG	CAMEL		X									
DAVE REES	MARTINSYDE S1		X									
BERT PHILLIPS	MICRO PLANO VALE2	X										
ROWLAND HOOT	SE-5				X							3
BILL BELL	FOKKER D-7	X										
ROLF GREGORY	NIEUPORT 17		X									
FLIGHT B												
MARK HOUCK	FOKKER D-7			X								
WALT EGGERT	SE-5											1
GEORGE MEYERS	MARTINSYDE S1			X								
KEVIN SHARBONDA	DH-6					X						2
RANDY KLEINERT	SE-5	X										
JERRY PAISLEY	ALBATROS D-3	X										
PAUL SPREIREGEN	FOKKER D-7	X										

THE CAVALIER MUSTANG

Lindsey Smith

This is not a contest winning peanut. Its best time to date in competition has been 36 seconds and being a low wing monoplane it does not qualify for many bonus points, in the UK at any rate! It is, however, an interesting model to build and fly. I hope you will have a go.

The real aircraft was a one off attempt to produce a potent COIN aircraft by mating a F51D two seater conversion to a Rolls Royce Dart Turboprop by the Cavalier aircraft Corp of Sarasota, Florida in 1968. The result was quite successful but was not bought by the military. The airframe was later re-engined with an Avco Lycoming T55 and the whole concept was bought by Piper who are still working on the idea under the name Enforcer.

Scale data with two color photos are available in Air International Vol 18, No. 1, Jan 1980, and there is a good 1/72 three view in Airfix magazine annual for, I think, 1980. The upper surfaces are tan and two tone green; undersurfaces grey. The Humbrol HU colors look pretty good. Use an air brush, of course, and only the lightest of coats. Add control and panel outlines as required and the white registration N 6167 U to the fin half way up and forward of the rudder. No other markings were carried.

This model has a long nose moment and is very sensitive to thrust alterations. The original was a brute to trim at first but about 1 bond paper thickness down thrust and 1/64 packing under the tail trailing edge produced beautiful fast left circuits which look really impressive. My model weighes 15 grams and uses one loop of .125 inch Pirelli 16 inches long.

CONTEST RESULTS FOR ATLANTIC CROSSING EVENTS

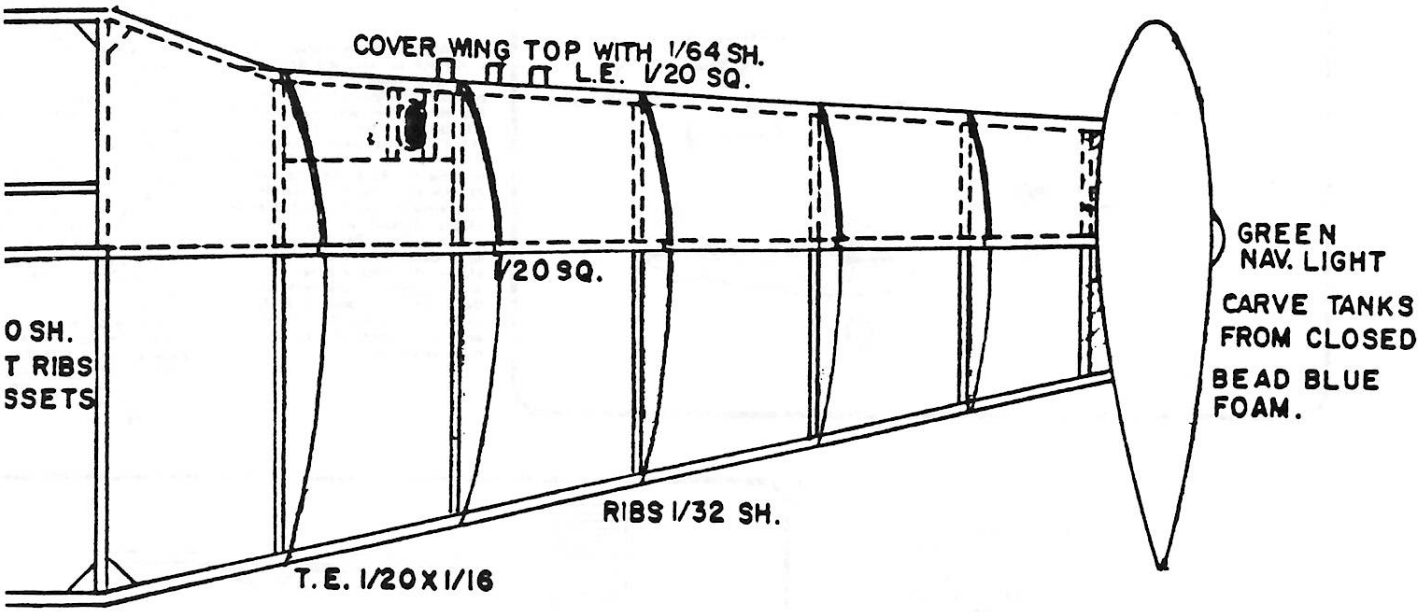
The following contestants entered all 5 events.

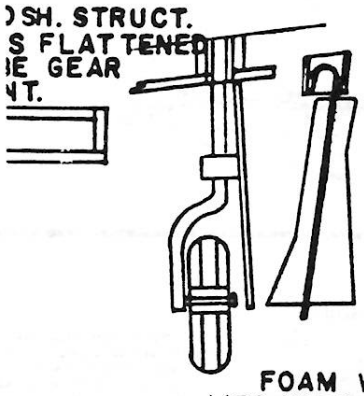
NAME	AIRCRAFT
Allan Schanzle	Monocoupe
Hurst Bowers	Oiseau Canari
Doug Buchanan	Oiseau Canari
Rolf Gregory	Bellanca Columbia
Bert Phillips	Stinson Detroiter

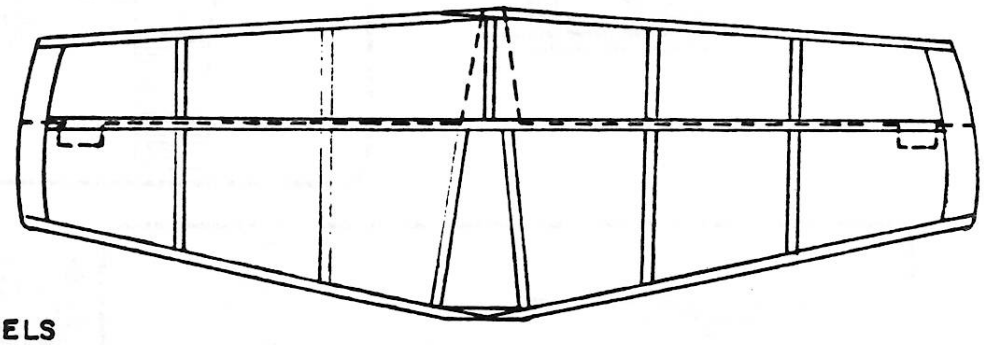
**********RESULTS**********

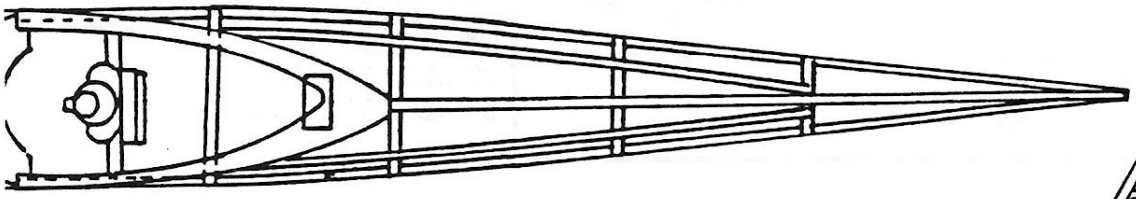
PLACE	EVENT				
	MASS LAUNCH	SCALE	TARGET TIME	SPOT LANDING	ATLANTIC CROSSING
1 st	BOWERS	BOWERS	GREGORY	BUCHANAN	BOWERS
2 nd	SCHANZLE	SCHANZLE	BOWERS	PHILLIPS	GREGORY
3 rd	GREGORY	PHILLIPS	SCHANZLE	GREGORY	-------
4 th	BUCHANAN	BUCHANAN	BUCHANAN	SCHANZLE	-------
5 th	PHILLIPS	GREGORY	PHILLIPS	BOWERS	-------

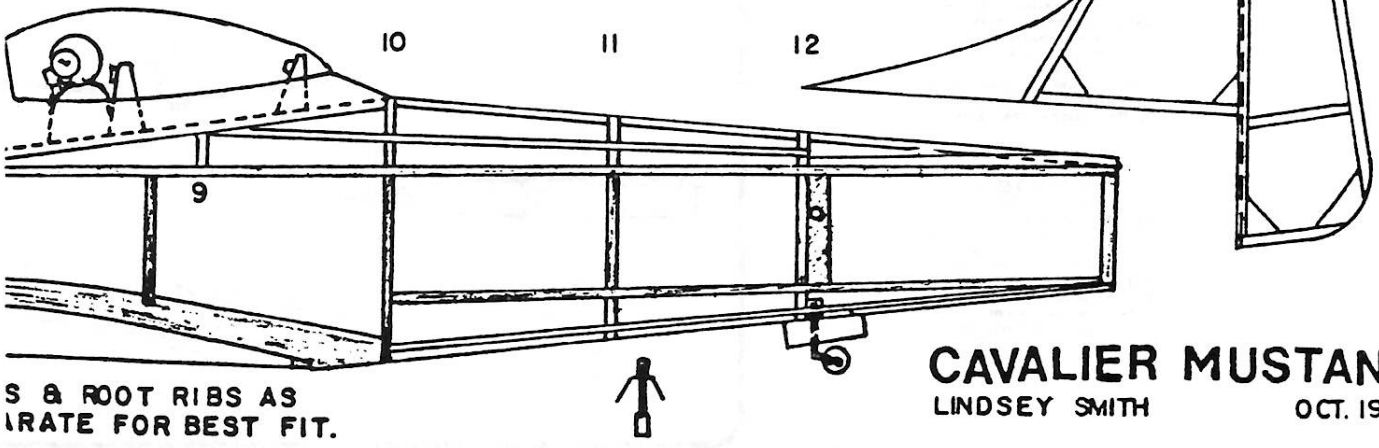
********** GRAND CHAMPION.....HURST BOWERS**********





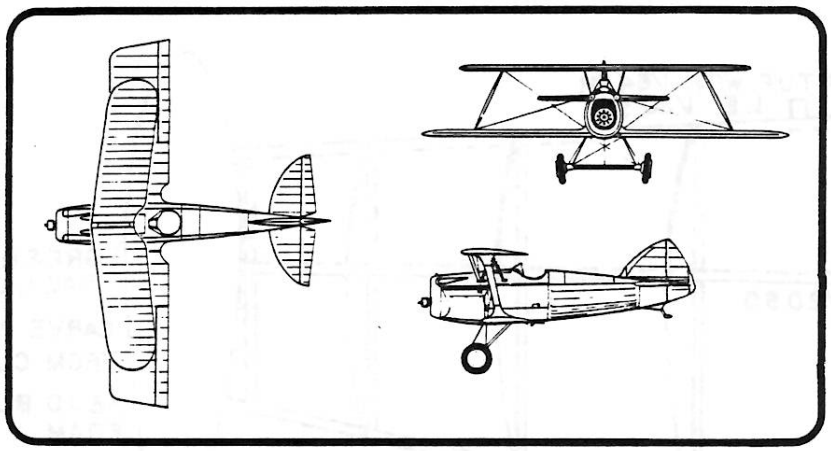






CAVALIER MUSTANG

LINDSEY SMITH OCT. 1984



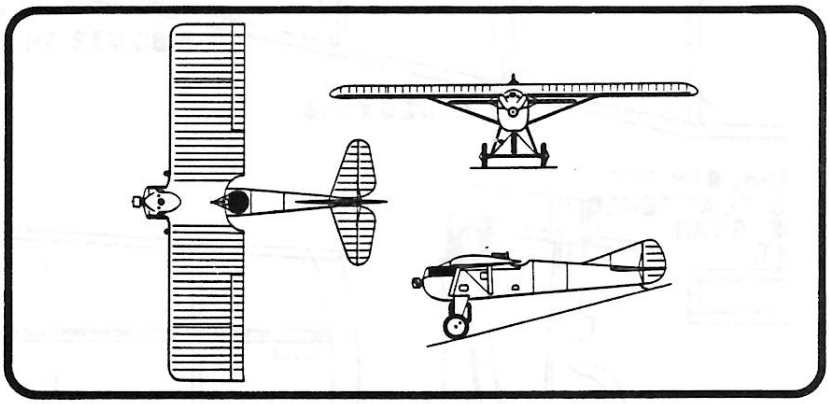
40 - SPAD 91/3 : Ex-91/2, cet appareil reçut successivement deux types de moteurs Gnôme-Rhône « Jupiter » : 420 puis 480 ch, devenant alors le Spad 91/5 qui allait être détruit au cours d'un meeting. Sous cette dernière forme, il fut crédité de 265 km/h.
41 - SPAD 91/6 : Le type 91/4 devint 91/6 par modification cellule : augmentation de l'entreplan et saumons elliptiques, qui permirent d'atteindre 294 km/h. L'empennage surbaissé visible sur la photo ci-desus fut essayé au cours du premier vol. Le 91/6 survivant, en 1936, fut offert à l'Espagne républicaine par les ouvriers de Blériot.
42 - SPAD 91/7 : Par combinaison des fuselages, train et moteur du 91/6 avec l'aile inférieure du 91/4 et une très petite aile supérieure, on espérait offrir simultanément la même rigidité qu'une voilure biplane classique, une meilleure visibilité et une traînée moindre.

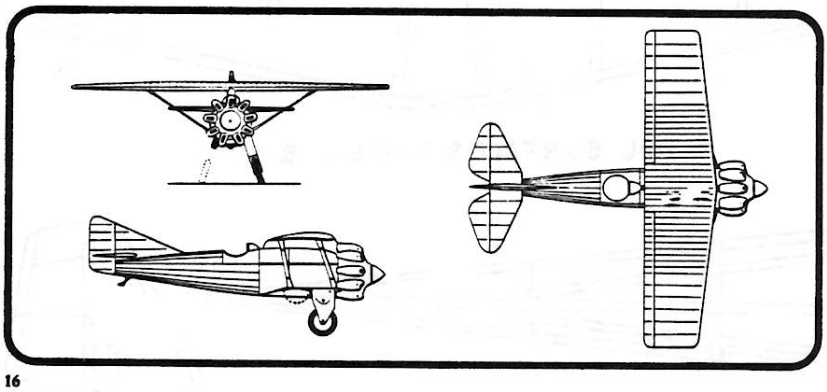
After being reequipped with a 420 HP Jupiter, the Spad 91/2 was redesigned 91/3. It later became the Spad 91/5 with a 480 HP Jupiter and was written off during an accident.
41 - Following some structural modifications the Spad 91/4 had become the 91/6 and attained 294 km/hr. The prototype of this aircraft was handed over in 1936 to Republican Spain by workers of the Bleriot firm.
42 - Combining the lower wing of the 91/4 with a new small-spanned upper wing and the remainder from the 91/6 gave birth to the 91/7 in an attempt to improve drag and pilot visibility.

14

14 - DE MARÇAY 4 : Monoplan à ailes très épaisses, ce second et dernier chasseur construit par E. de Marçay fut refusé surtout à cause de la très mauvaise visibilité du pilote vers le bas et vers l'avant.

14 - Second and last fighter designed par E. de Marçay, this aircraft lacked forward and downward visibility.





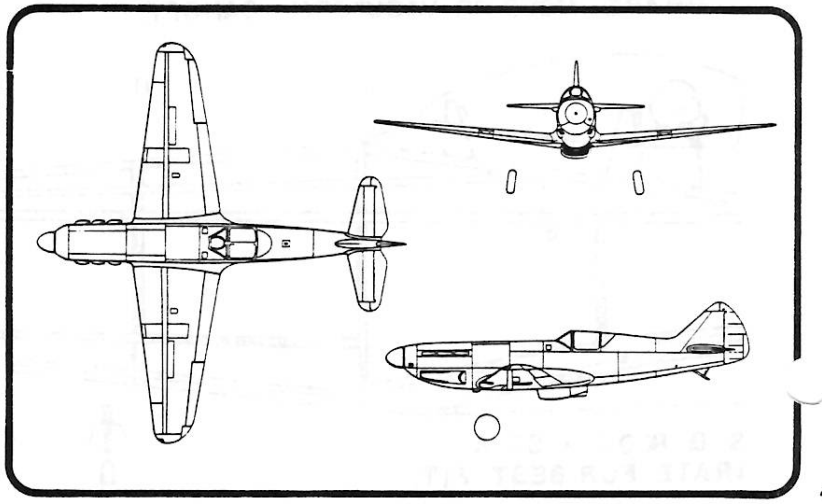
16

16 - GOURDOU-LESEURRE type I ou 30 : le monoplace illustré ci-dessus n'était pas un avion de chasse, mais un appareil de « vitesse » dérivé d'un projet de chasseur et caractérisé par son train d'atterrissage escamotable, un des premiers utilisés en France. Il était estimé capable d'atteindre 360 km/h. L'avion d'arme apparut finalement sous une forme plus conventionnelle, avec un train fixe et une aile plus généreuse, qui lui firent perdre toute supériorité de vitesse sur ses concurrents.

16 - The aircraft illustrated was a "speed record" machine derived from a fighter project and equipped with a retractable landing gear. It was estimated capable of attaining 360 km/hr. The conventional fighter that appeared later showed no improvement as compared with its contenders.

4 - A military version of the "high-speed" D. 550, the Dewoitine 551 was a lightened and refined intended successor to the Dewoitine 520 which would probably have demonstrated performance in the international class.

4 - DEWOITINE D 551 : Développé du D 550 de vitesse, obtenu lui-même par affinement et allégement max. du 520, le D 551, qui ressemblait beaucoup à ce dernier et qui devait le remplacer, aurait probablement atteint des performances de classe internationale.



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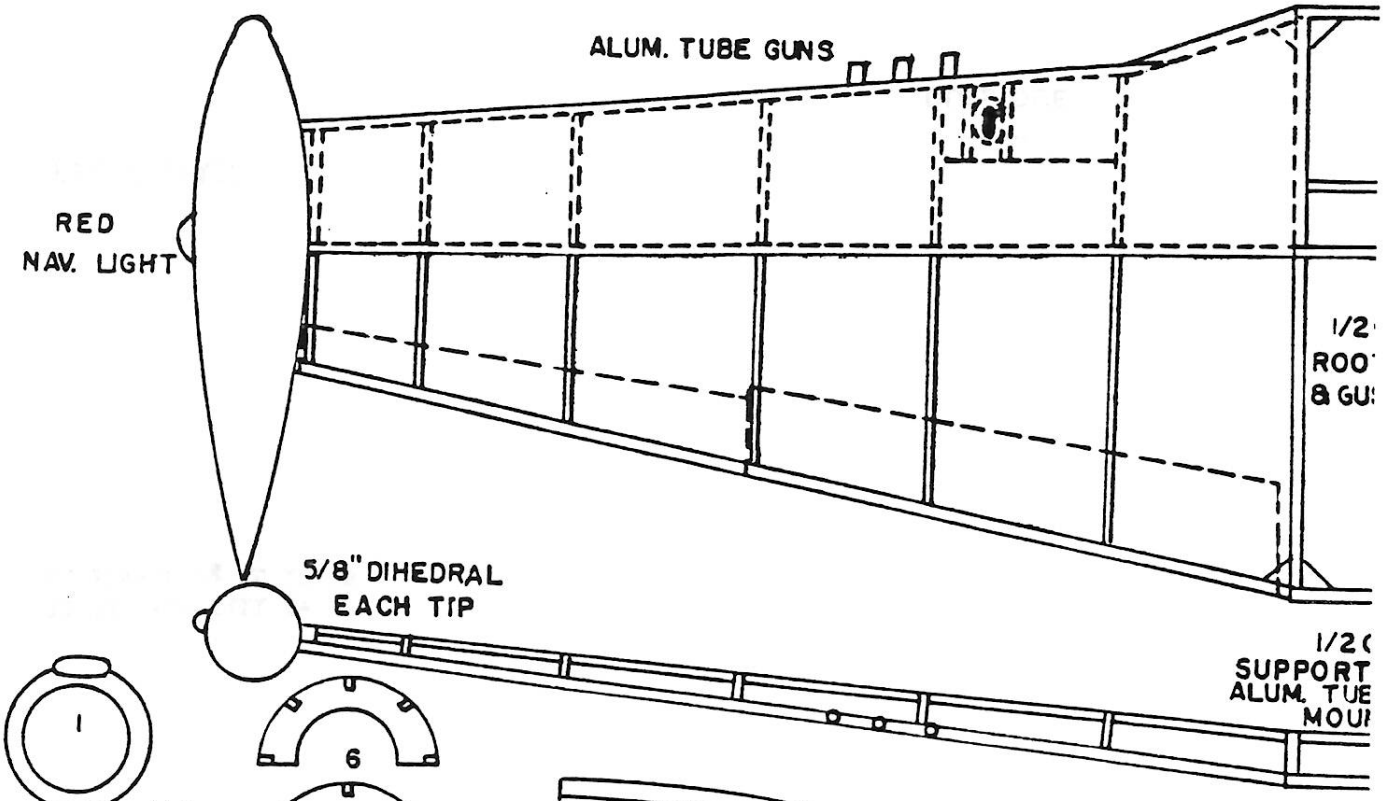
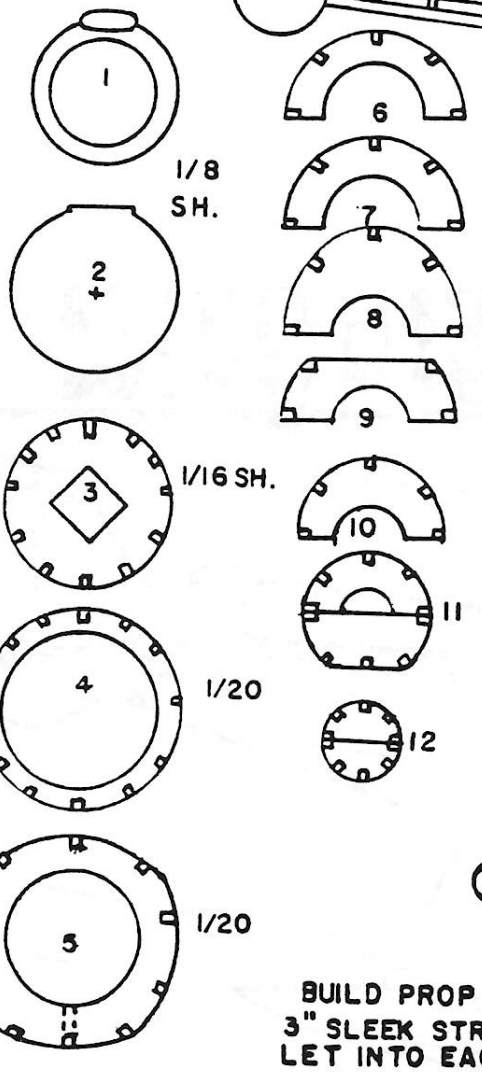
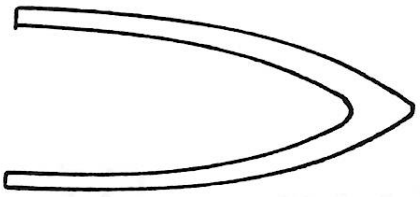
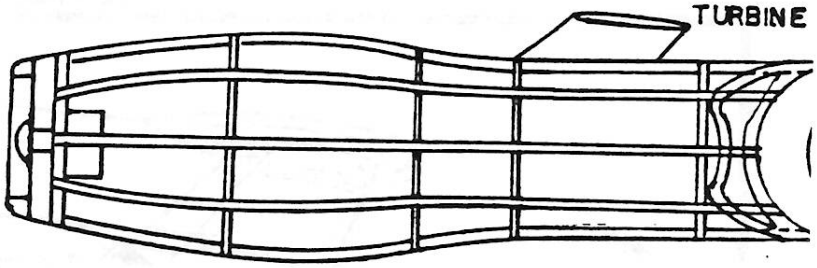


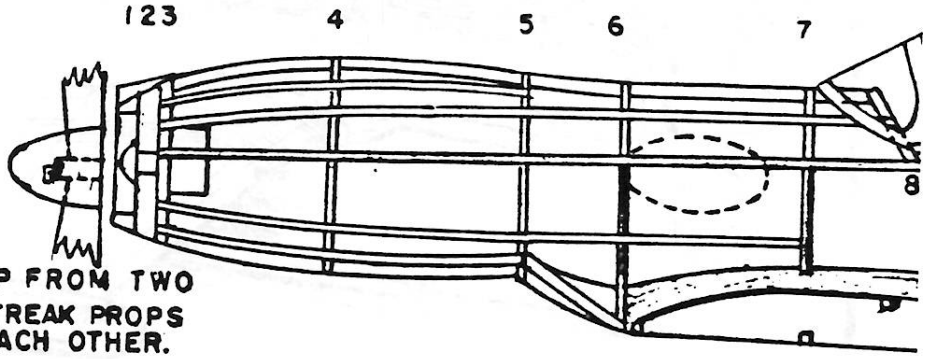




FUSELAGE STRUCTURE
1/20 SQ. TOP & BOTTOM
NOSE CRUTCHES 1/20 SH.

ALL 1/20 SH.





BUILD PROP FROM TWO
3" SLEEK STREAK PROPS
LET INTO EACH OTHER.
VACUFORM SPINNER OR USE
PEN CAP TO ALLOW FREEWHEEL.

CUT SIDE PIECE
ONE PIECE. SEP

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FIRST CLASS

DUES DUE

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