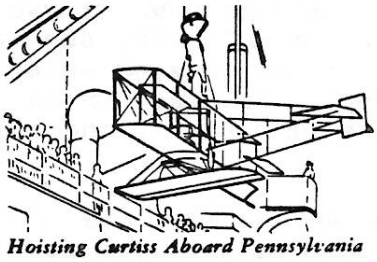
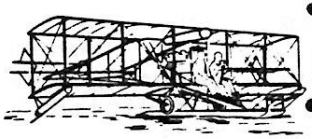


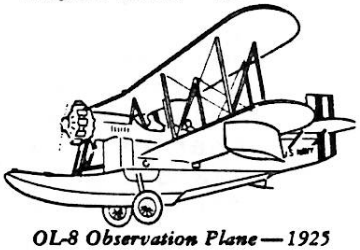
Hoisting Curtiss Aboard Pennsylvania

Navy HD-1 Scout — 1920

MAX-FAX



Retractable Landing Gear — 1911



OL-8 Observation Plane — 1925

THE NEWSLETTER OF THE D. C. MAXECUTERS
MARCH/APRIL 1988

MEMBERSHIP

Dues for membership in the D.C. MAXECUTERS is $10 per year for residents of the USA, Canada, & Mexico, and $11 for all other countries. Your mailing label indicates the last year and month for your current membership. A red X next to the label is a reminder that your current membership has ended. Send a check, payable to the 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.

PRESIDENT

Bill Ceresa
11410 Blueridge Dr.
Beltsville MD 20705

SECRETARY

Bert Phillips
1709 Crofton Parkway
Crofton MD 21114

TREASURER

Allan Schanzle
20008 Spur Hill Dr.
Gaithersburg MD 20879

UPCOMING EVENTS

March 19 1988: Sherwood H.S., 4:00-7:00 PM, Peanut and Coconut contest.
March 26 1988: Indoor contest at PAX River. See Flyer in this issue.
April ??? : We start flying at Comsat on Sunday afternoons and evenings, as soon as the weather permits.

CLUB NEWS

ALLAN SCHANZLE

If you intend to fly in WW-II at the FAC NATS, be forewarned. ***THE Heinkel He-100 IS NOT ELIGIBLE ACCORDING TO FAC-GHQ.*** Accordingly, the CD will disqualify all He-100's from this event. Models of this aircraft are, of course, eligible for FAC scale.

YOU HAVE BEEN WARNED ! ! !

We should mention one other note concerning the FAC NATS. Issue # 115-41 of the FAC NEWS (May/June 1987) contains FAC NATS INFORMATION SHEET NO. 2. These pages include many items about how the contest will be run and YOUR responsibilities as a contestant. In addition, a registration form is included which details how to make reservations at the dormitories. It is "must" reading for all those intending to go to Geneseo this coming July. We have received a copy of the mailing labels for the FAC NEWS from GHQ so we can correlate the subscribers. This will allow us to mail a copy of this

document to those of you who subscribe to MAX-FAX, but not FAC NEWS. If you have not yet seen this document, and plan on attending the FAC NATS, send a self addressed and stamped large envelope to this editor. We have, however, included as part of this issue, the registration form required to make reservations at the dormitories. Motel reservations are up to you, and are discussed in the INFORMATION SHEET NO. 2.

We received a note from Don Ross, who requested we mention the "One Design Contest" to be held at the Eastern F/F Championships on June 25/26 1988 at Galeville. The model is called the Flying Aces Sky Gull, and is a 30 inch version of the Flying Aces Moth. A kit for this plane can be obtained for $14.00 postpaid from Fresno Model Airplane Co., 4267 North Charles, Fresno Ca 93722. The model meets SAM O.T. qualifications, and Class C cabin, a new event for under 150 square inch models. For additional information, contact Don Ross, 38 Churchill Rd., Cresskill NJ 07626.

As you may know, the AMA publishes their own newsletter, which is a compilation of segments of other newsletters. In the latest issue, they have a section entitled "AERO HONOR SOCIETY FOR NEWSLETTER EDITORS", in which the following appeared.

"This month we honor Col. Lin Reichel of Erie, Pa., who edits an excellent newsletter, the 'FLYING ACES'. Lin's newsletter is fastinating (their spelling, not mine. Ed.) to read. ..... Col. Reichel's style of writing is fastinating (again, their spelling. Ed.). When you read it you don't know if the subject material is real or fiction. The style is reminiscent of the Flying Aces mag of the 30s. True or false, it is so interesting, who cares? It's fun to read."

The article then gives some examples of material as it appeared in FAC NEWS. As editor of this bi-monthly trashwrapper, I appreciate the effort that goes into putting together a newsletter, and endorse their choice of aero honor society editor with no qualifications whatsoever.

This issue features one of the best flying models this editor has ever seen attack the atmosphere. It is Don Srull's Piper Vagabond, a small scale version of Walt Mooney's full size aircraft. This sucker floats like a balsa block in water. We also present a second plan this month, a Bostonian by Kevin Sharbonda. This is another winning model, as it was good enough to beat me out of a kanone at a recent indoor contest. In addition, you'll find Part II of Bud Carson's series on Aerodynamics, a registration form for making reservations at the 1988 FAC NATS, a flyer for the up-coming contest at PAX River, an enticing 3-view by Dave Stott, and photos by Tom Schmitt. What else could you ask for? Three pound balsa? See ya at PAX River.

THE BOSTON PUP

Allan Schanzle

I recently completed Bob Peck's Bostonian kit, the BOSTON PUP. This is a straight forward model with the traditional Peck lines, and went together easily. I had considerable difficulty getting the thing to fly well until Tom Schmitt suggested turning to the right. Bingo. The propwash on the cabin acts just like a competition gas powered F/F pylon model. My model, which was stock in all ways, came out at 14 1/2 grams. With a little more work, I may just beat Kevin Sharbonda next time.

REGISTRATION FORM

FAC NATS MK VI

MAIL TO:
DOUG BUCHANAN
10 ORCHARD DR.
THURMONT MD 21788

NAME(S): (1)_____ (2)_____

AMA NO.(S): (1)_____ (2)_____

ADDRESS(S): (1)_____(2)_____

(1)_____(2)_____

(1)_____(2)_____

I wish to make the following advanced reservations for the FAC NATS MK VI.

_____ entry fees at $ 13.00 each. ..... $ _____

_____ banquet tickets at $ 16.00 each (with no dormitory reservations). ..... $ _____

_____ reservations for double occupancy with meals and banquet at $ 112.00 each. ..... $ _____

_____ reservations for single occupancy with meals and banquet at $ 128.00 each. ..... $ _____

TOTAL ENCLOSED $ _____

Please note that we are unable to refund cancellations received after June 15th. If you plan to share a double occupancy with someone else, please indicate their name so we can direct the University to set up the proper room arrangements. _____

It would be helpful to us if you would indicate with an X which events you plan to enter. This is not a commitment on your part, and you may change your mind at a later time.

JUDGED EVENTS

_____ FAC RUBBER SCALE

_____ FAC POWER SCALE

_____ FAC JUMBO SCALE

_____ GHQ PEANUT SCALE

MASS LAUNCH EVENTS

_____ WW-I PEANUT

_____ WW-I

_____ WW-II

_____ GOLDEN AGE

_____ THOMPSON RACES

_____ GREVE RACES

EMBRYO ENDURANCE _____

PHOTO PAGES

Tom Schmitt

1. Don Srull and his Vagabond, a great flyer and the subject of this issue's featured scale plan.
2. A bonus plan for this issue, Kevin Sharbonda's nifty Bostonian.
3. Mike Hostage, a member while a teenager, has joined us again; here with his daughter winding a No-Cal Beech Staggerwing. Mike is now an Air Force pilot, currently flying a desk at the pentagon, but shortly to return to the seat of an F-16.
4. Another of our regular flying pairs, our Secretary and his daughter Evelyn winding a No-Cal Curtiss Owl.
5. Bill Bell with a pretty reincarnation of his own Interstate L-6 after conversion to civilian status.
6. Jerry Paisley enjoying the comments concerning his terrific Flying Tiger P-40; a mean looking bird, the P-40 that is!
7. Two delightful all-foam aircraft by Bill Weaver.

GUEST PHOTOS

8. Don Typond's beautiful Fairchild from Earl Stahl's plans; photo courtesy of Bill Hannan.
9. After several jugs of "Mead", Doug McHard tries to explain the finer points of his Heinkel 46 to Don; must have been a great party! Photo from Don.
10. Bob Schlosberg does it again; his terrific photo of a P-39 built from one of Joe Fitzgibbon's great kits.
11. The difficult ones do not deter Bob Wetherell. Behold these great bones of twin CO2 powered Dragon. We are looking forward to seeing it fly at the FAC NATS MK VI. Bob's photo.
12. Nick Ropar sends a photo from Albuquerque of the beginnings of his latest aircraft, a FW 189 from plans by Hoby Clay. Come back for a visit Nick; we miss you and your accurate weather forecasts.
13. The Corben is often modeled and is always a great flyer; this one by Don De Loach in Dallas. Photo from Don.
14. From far off New Zealand comes this realistic photo by Graham Lovejoy of John Templeman's Taylorcraft O-47 and a Renard R31. Looks like Earl Stahl's O-47.
15. Our Pres holds aloft this Photo Editor's electrified Earl Stahl Wildcat. It is a very good flyer with the British KP 01 Electric Flight Unit.
16. The first mystery photo for '88; the fourth reader who identifies two of the modelers and who has not attended a D.C. Maxecuter contest wins one years paid membership and six issues of MAX-FAX. Answers and winner next issue.

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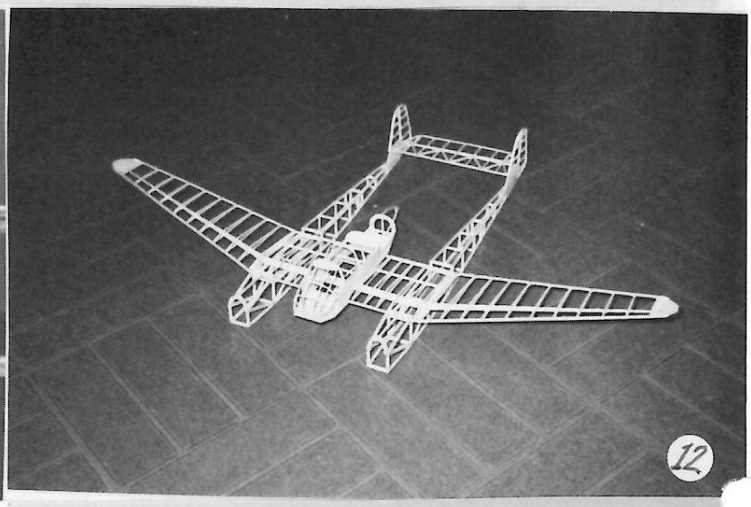
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BASIC AERODYNAMICS

-Bud Carson

PART II: SCALE EFFECTS AND SIR OSBORNE'S MAGIC NUMBER

Last time we looked at pressure drag and the beneficial effect of streamlining, which tends to equalize fore and aft pressure on a shape. There is yet another source of drag called "skin friction," which is drag caused by the air sticking to a shape as it moves along. Difficult as it may be to believe, the laws of physics tell us that there can't be any relative motion between a liquid or a gas and a body moving through it, right at the point of contact. This tells us why, for example, it is not possible to blow the fine dust off our cars simply by driving fast. The dust particles are so close to the surface that there is almost no "wind" at that point to dislodge them. So even streamlined bodies will have skin friction; it's unavoidable.

It would be nice if we could say in simple terms how much drag is produced by friction on any given shape but it turns out that this is nearly impossible unless we dig a little deeper and look at the total "damage" friction does to the flow. For friction not only causes drag, it also causes flows to separate, preventing full pressure recovery on streamlined shapes, in some cases to a degree that the benefits of streamlining are completely lost. Friction also limits how much lift a wing can produce. This may seem surprising; it is obvious that skin friction will cause drag, but it not nearly so obvious that friction also affects lift.

These things are not easy to sort out unless we are willing to take the time to look at them in detail. How much or how little the friction enters the picture in any given situation depends on a number of things which combine to describe the "scale" of the flow. So we will devote the remainder of this part simply to getting this straightened out, and will then be better able to understand not only the "how," but the "why" of this curious and rather complex aspect of airflow.

Most of us have heard of these strange "scale effects" at one time or another that are usually blamed when our models do not fly as we would like them to, but few people really understand how they originate. When we build scale models, it is customary practice to enlarge the stabilizer out of proportion to the true scale size, a practice we ascribe to "scale effects," without knowing why. The question is, what do we mean when we talk about scale effects? Actually, we live in a world of scale effects but probably do not recognize them as such. For example, here is something we have all seen; a small wind-up boat is placed in the bathwater and set free. The boat chugs along until it hits the bathtub, where it bounces off harmlessly and then moves on in a new direction.

Compare this with the "full scale" case, where a real ship hits a solid object such as an iceberg. Whatever the outcome, we would probably not describe this encounter as "harmless"!

What is the difference between these two examples? In everyday terms we would say that the toy boat has far less "weight behind it" than the real ship, and this is not a bad way of looking at it. Actually, a more accurate description involves the concept of inertia - the tendency of things at rest to stay at rest, and those once set in motion to keep on going. The inertia of a body is proportional to its mass,(meaning the "amount of matter" that the body represents) and the rate of change of its speed.

When air flows past an object, it too has inertia. As it happens, air also has another property, called viscosity, which, reduced to simple terms, means that it is a "sticky" substance. All fluids and gases have this property to some degree, and air (which is a mixture of gases) is no exception. We are most familiar with the term "viscosity" through our automotive experiences, and all know that the higher the viscosity of motor oil, the thicker (or "heavier") the oil will be. The viscosity of air is many times "thinner" than that of motor oil, but it still exists. And its effects cannot be ignored.

These two properties of air, its inertia and its viscosity, interact in an interesting and important way when we study airflows past solid surfaces. The inertia of the air causes it to continue in motion, while the viscosity exerts a braking action. Just how effective the brake will be depends on the size of the surface, compared to the volume of air that is being slowed down.

Now, here is something to ponder: if we increase the size of anything by a given scale factor, then its surface area increases by the factor squared, while its volume increases by the factor *cubed*. Thus doubling the size of an object results in *four* times the area, but *eight times* the volume. Of course, just the reverse is true; if the size is halved, its area will be reduced to one-fourth the original area, while the volume will be reduced by a factor of one-eighth. Think about that the next time you peel

potatoes. The work goes a lot faster if you select the larger potatoes (leaving the little fellows to some other unsuspecting soul) because they have a far lower surface-to-volume ratio, and you get "more potato per peel" (i.e., more volume of potato per unit surface removed) with the larger ones.

So what do potatoes have to do with airplanes? Well, a moment ago, we were talking about the retarding effect of viscosity when air flows past a surface, such as a wing. The wing operates in a sea of air, and it is difficult to say exactly just how much air is influenced by the passage of the wing through it. Nevertheless, it is possible to say that if we mentally scale up the picture, things will proceed according to the "square-cubed" law just discussed. The inertia of the affected air will increase with the cube of the scale factor, while the surface of the wing will increase as the square. Since the inertia of the air is proportional to its volume and the retarding force is proportional to the wing area, we see that *the retarding force per unit volume of moving air will actually be less for the larger wing than the smaller wing.* This is the basis for the so-called "scale effect" that we modellers hear so much about. Simply stated, the bigger the wing, the less drag it will have per unit area (at the same airspeed, of course) and vice-versa.

In aerodynamics, we are accustomed to thinking of the ratio of these two forces, the inertia force (which we might say is the "weight behind the flow") divided by the viscous force (which is "putting on the brakes"). This ratio is called the *Reynolds number*, named for the British scientist, Sir Osborne Reynolds, who studied this effect in flows of fluids through pipes about a century ago. The Reynolds number is thus a measure of the scale of a flow, which not only takes into account the viscosity of the air, but the actual dimensions of the aircraft as well. This number is exactly what we need when we try to assess the "damage" done to a particular body by air friction. As for the actual number - well, ironically, Reynolds defined his magic number upside down, so it turns out that the *greater* the Reynolds number of a flow, the *less* the damage done by friction, but that is a minor matter and should cause little confusion once we understand it.

What may seem confusing to most modelers when they run across Reynolds numbers is that they seem outlandish and difficult to relate to. This simply results from the fact that since air has such low viscosity, the Reynolds numbers that are quoted are mysteriously large. The question is, how large is large, and what do these numbers mean?

We can get some idea of the relative magnitude of Reynolds numbers by looking at familiar examples. A microfilm model wing operates at a Reynolds number of 4000, and for a typical 24" scale model, the number jumps to 20-30,000. This goes right on up; for an RC pattern ship, the Reynolds number is about 500,000, and for a typical lightplane, perhaps 10 million. At the risk of sounding like Carl Sagan, the Reynolds numbers for jumbo jets are "millions and millions" (perhaps 100 million) and for the giant airships of the past, "beelions and beelions."

For practical purposes, you can quickly estimate a Reynolds number by enlisting an old rule of thumb; at 100 mph, the Reynolds number for a wing is about one million per foot of chord. Thus a model flying 10 mph has a Reynolds number of 100,000 per foot of chord, and if the chord is 4", (i.e., 1/3 of a foot) then the number works out to roughly 30,000.

What this amounts to is that the lower the Reynolds number, the more the air seems like a sea of glue to the aircraft. A fruit fly probably thinks it's flying through motor oil, or even molasses, rather than the thin, sweet air that full-scale airplanes see. Of course, it's the same air, but the situation is different. As Einstein said, it's all relative.

If all this seems a bit confusing, don't feel like the Lone Ranger; it took aerodynamicists many years before they figured out why their wind tunnel tests did not predict full-scale results very well. Even more maddening was that the same wing tested in two different wind tunnels often produced widely different results. It was only when the full implication of scale effects, as described by a single measure (the Reynolds number) was appreciated, that wind tunnels became the useful tools they are today. Any wind tunnel data you may see in model mags or elswhere will always include the test Reynolds number. If by chance this key information is omitted, the figures presented are virtually worthless.

If confusion still reigns, then let it go. For the present, it is only necessary to understand that big fast wings work better (i.e., go to higher angles of attack before stalling) and are more "drag-efficient" than little slow wings. In the next article we will examine this more closely.

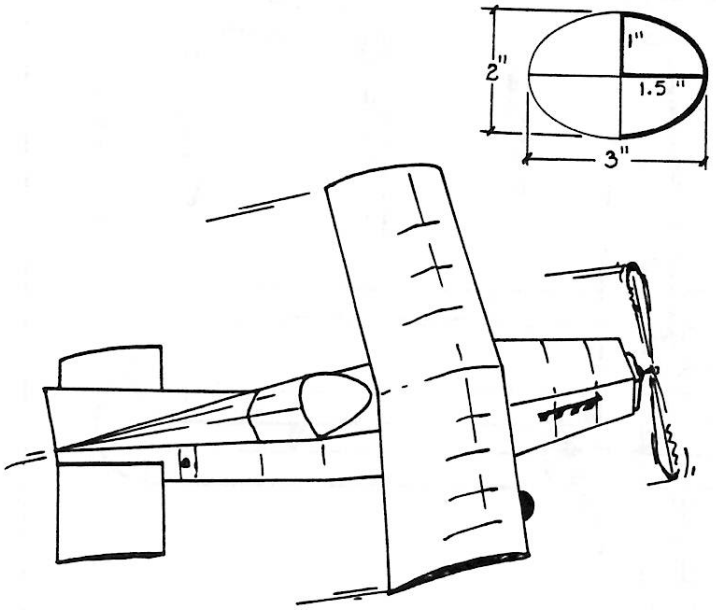
(I once knew an aerodynamicist who was so exclusive that he had an unlisted Reynolds number, but that's another story!)

KEV'S BOSTON RACER

i.e. - The "Sherwood Special"

The goal of the design was for a Bostonian ship that was easy to build and had that "racer" quality.

Use standard construction methods. Make two fuselage sides and form a box using cross pieces shown on the top view. Cockpit formers are then glued to top, and stringers added. The landing gear was just glued to the sides of the fuse. The undercamber on the wing worked great on the prototype as did the lifting stabilizer. First flights were stable and slow left turning circles with a little left thrust for turn. The ship won a Bostonian mini contest right off the board at Sherwood School in Ashton, Maryland with the Maxecuters Club, thus the name Sherwood Special. Just hedging out Alan Schanzle by 2 seconds with the best of 2 flight times. As a note I calculated the area for the windshield with the area formula for an ellipse: area equals the sum of one half the two legs times π.



Area = $(1)\times(1.5)\times(\pi)$; $\pi = 3.1416$
= $(1.5)\times(3.1416)$
= 4.7124 Sq. In.
Windshield is about ½ of ellipse
so ÷ by 2 Area = 2.3562 Sq. In.
meeting the 2 Sq. In. requirement.

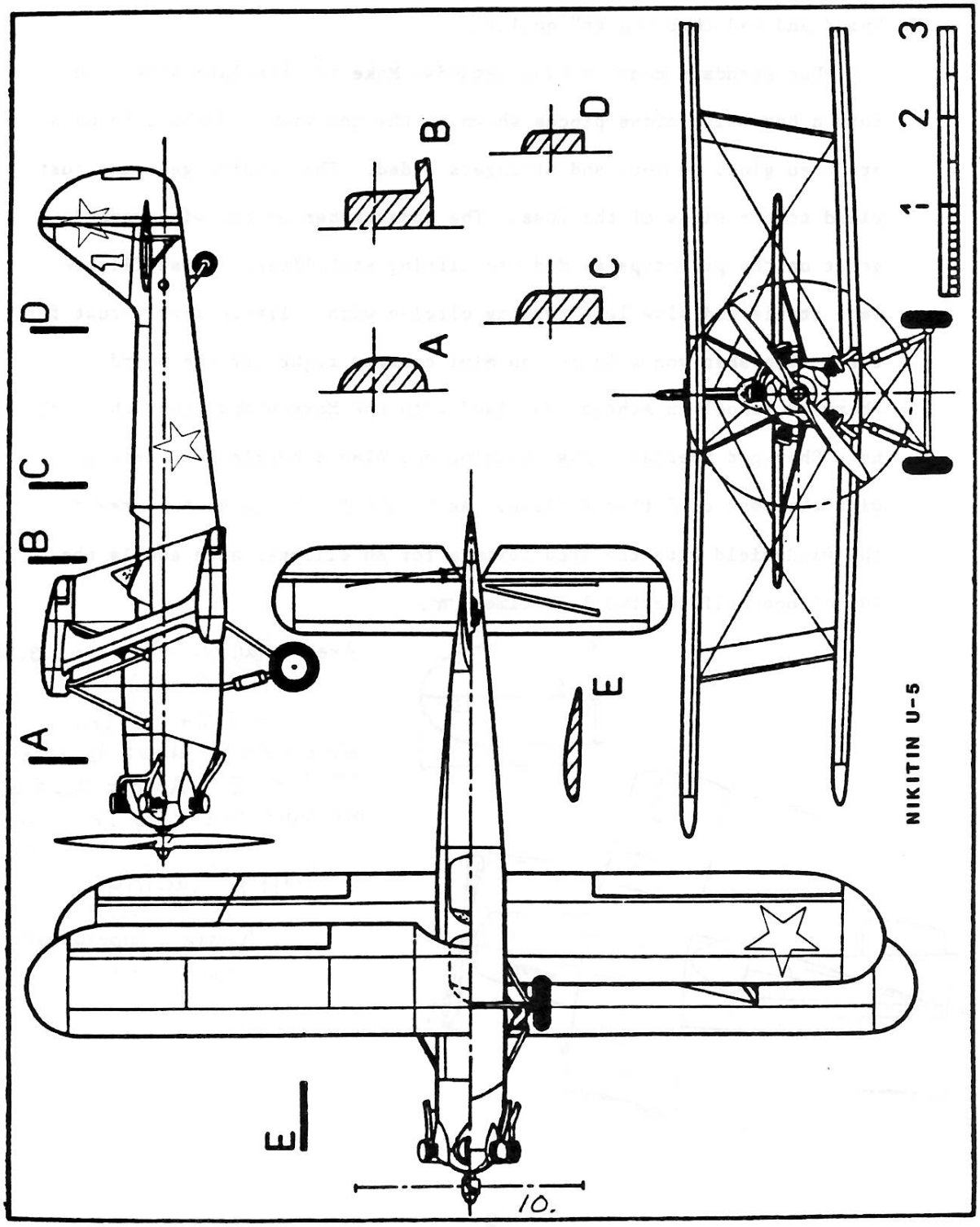
Happy Racing
Kevin Sharbonda
Nov. 1987

NIKITIN U-5

Dave Stott

This was enlarged from a drawing as given in the Czech publication LETECTVI & KOSMONAUTICA (# 21 and 22, 1977). I added the markings as shown in a color rendition from another issue of the same publication. Colors:

All over olive drab with light blue undersurfaces. Struts and wheel disks olive drab. Red star insignia in locations shown. There is no insignia on the upper surface of the top wing. The numeral "1" on the fin is mustard, with an outline in white.



INDOOR MODEL AIRPLANE CONTEST

MARCH 26, 1988

9:00 AM - 5:30 PM

ROTARY WING HANGAR, BUILDING 11
NAS/NATC PATUXENT RIVER
LEXINGTON PARK, MARYLAND

NO ENTRY FEE & FAC RULES

MAJOR EVENTS (Trophies awarded)

MASS LAUNCH			OTHER EVENTS	
1-	WW-I	12:00 PM	5-	FAC SCALE
2-	NAVY SCALE	1:00 PM	6-	COCONUT SCALE*
3-	PEANUT SCALE	2:00 PM	7-	BOSTONIAN (14 gm)
4-	MILITARY GOLDEN AGE (1920-1934)	3:00 PM	8-	NOVICE PENNYPLANE (AMA RULES)

SPECIAL EVENTS (Prizes awarded)

1- INDOOR HAND LAUNCH GLIDER (AMA RULES)

2- FAC POWER SCALE (4 oz maximum weight)

3- NO-CAL (7 gm min weight w/o motor)

* COCONUT RULES - 1 oz minimum weight w/o motor
Mimimum wingspan - monoplanes 36 ins.
- multiwings 30 ins.
Scale Judging - Modified Mooney Rules

AIRCRAFT FOR SCALE JUDGING MUST BE TURNED IN BY 11:00 AM
NO QUALIFYING FLIGHT IS REQUIRED

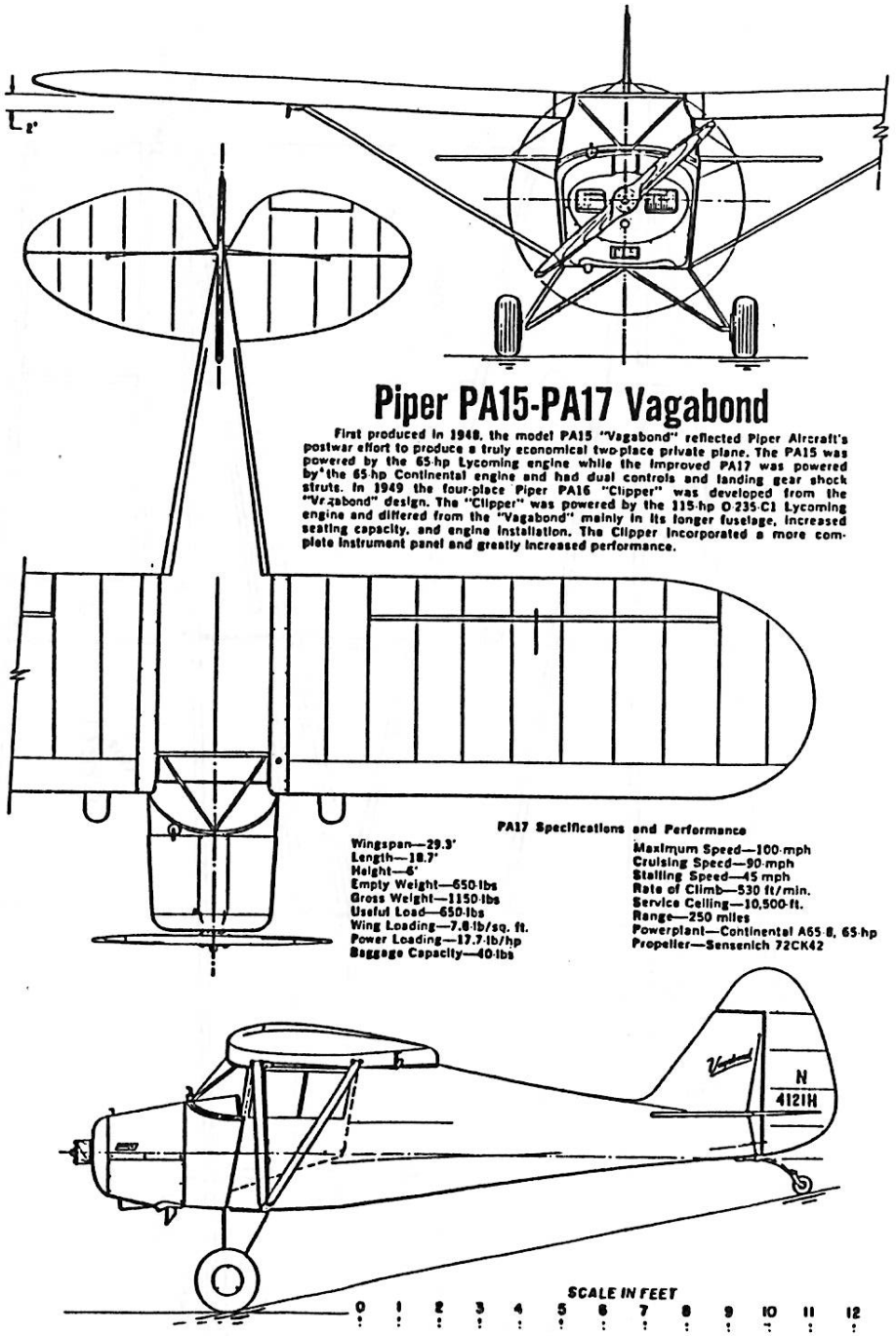
ALL FLIGHT TIMES MUST BE SUBMITTED BY 4:30 PM DEADLINE
AWARDS: 5:10 - 5:30

LOCAL RULE: ONLY ONE MASS LAUNCH EVENT PER AIRCRAFT

INFORMATION: COORDINATORS: CLAUDE POWELL 1 (301) 872-4105
TOM SCHMITT 1 (301) 530-0327
CONTEST DIR: ALLAN SCHANZLE 1 (301) 840-5884

On-base housing may be available for both men and women at this contest; please contact Claude Powell at least two weeks prior to contest date.

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



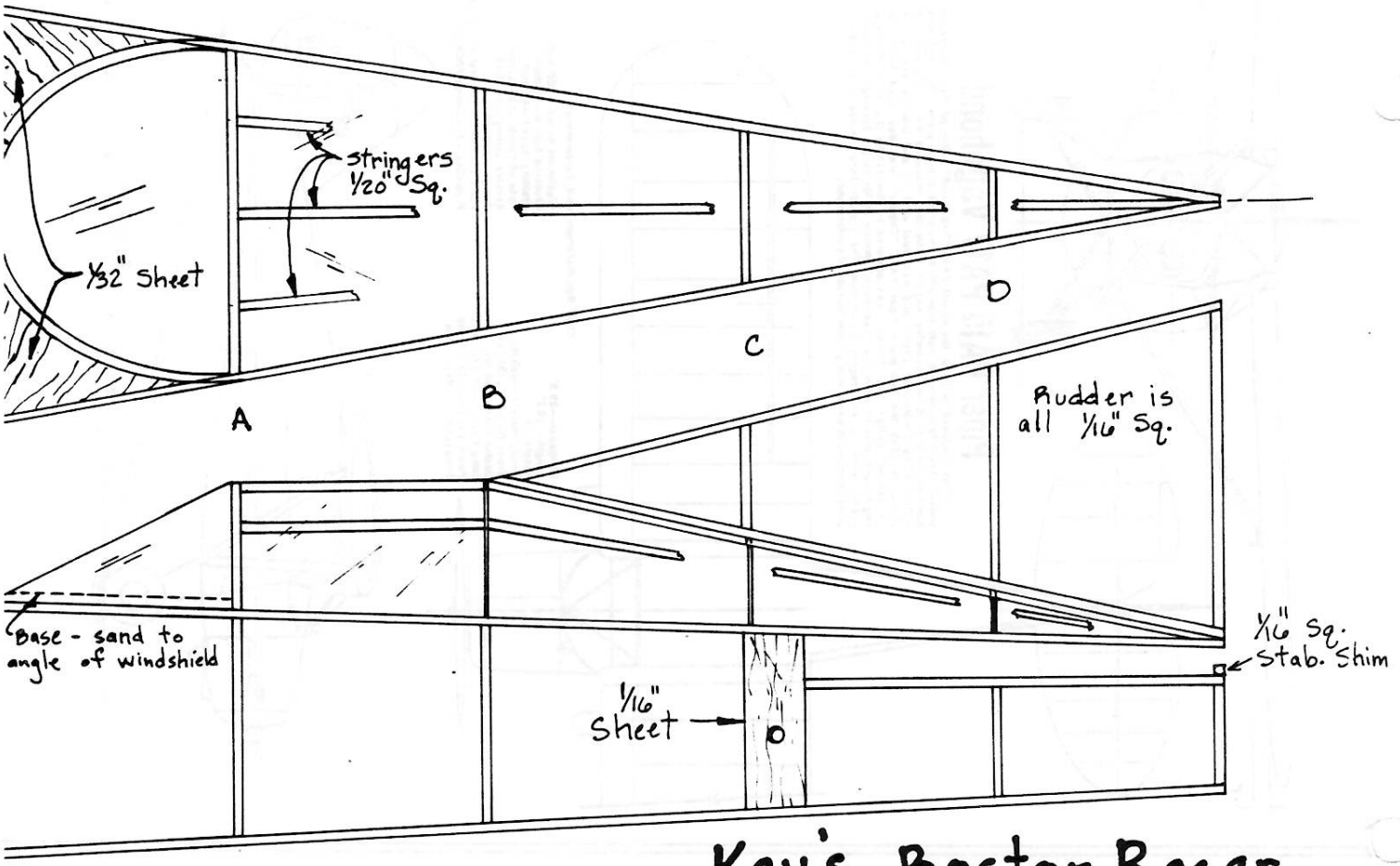
Piper PA15-PA17 Vagabond

First produced in 1948, the model PA15 "Vagabond" reflected Piper Aircraft's postwar effort to produce a truly economical two-place private plane. The PA15 was powered by the 65-hp Lycoming engine while the improved PA17 was powered by the 65-hp Continental engine and had dual controls and landing gear shock struts. In 1949 the four-place Piper PA16 "Clipper" was developed from the "Vagabond" design. The "Clipper" was powered by the 115-hp O-235-C1 Lycoming engine and differed from the "Vagabond" mainly in its longer fuselage, increased seating capacity, and engine installation. The Clipper incorporated a more complete instrument panel and greatly increased performance.

PA17 Specifications and Performance

Wingspan—29.3'
Length—18.7'
Height—6'
Empty Weight—650 lbs
Gross Weight—1150 lbs
Useful Load—650 lbs
Wing Loading—7.8 lb/sq. ft.
Power Loading—17.7 lb/hp
Baggage Capacity—40 lbs

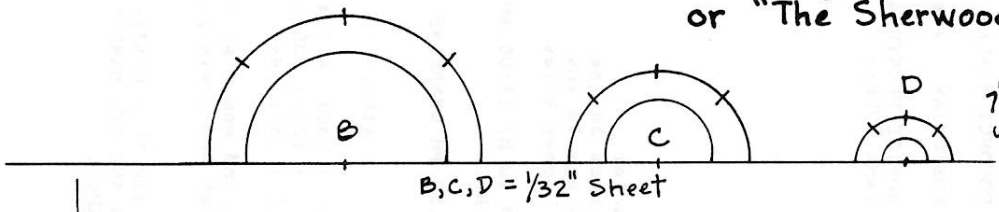
Maximum Speed—100 mph
Cruising Speed—90 mph
Stalling Speed—45 mph
Rate of Climb—530 ft/min.
Service Ceiling—10,500 ft.
Range—250 miles
Powerplant—Continental A65-8, 65-hp
Propeller—Sensenich 72CK42



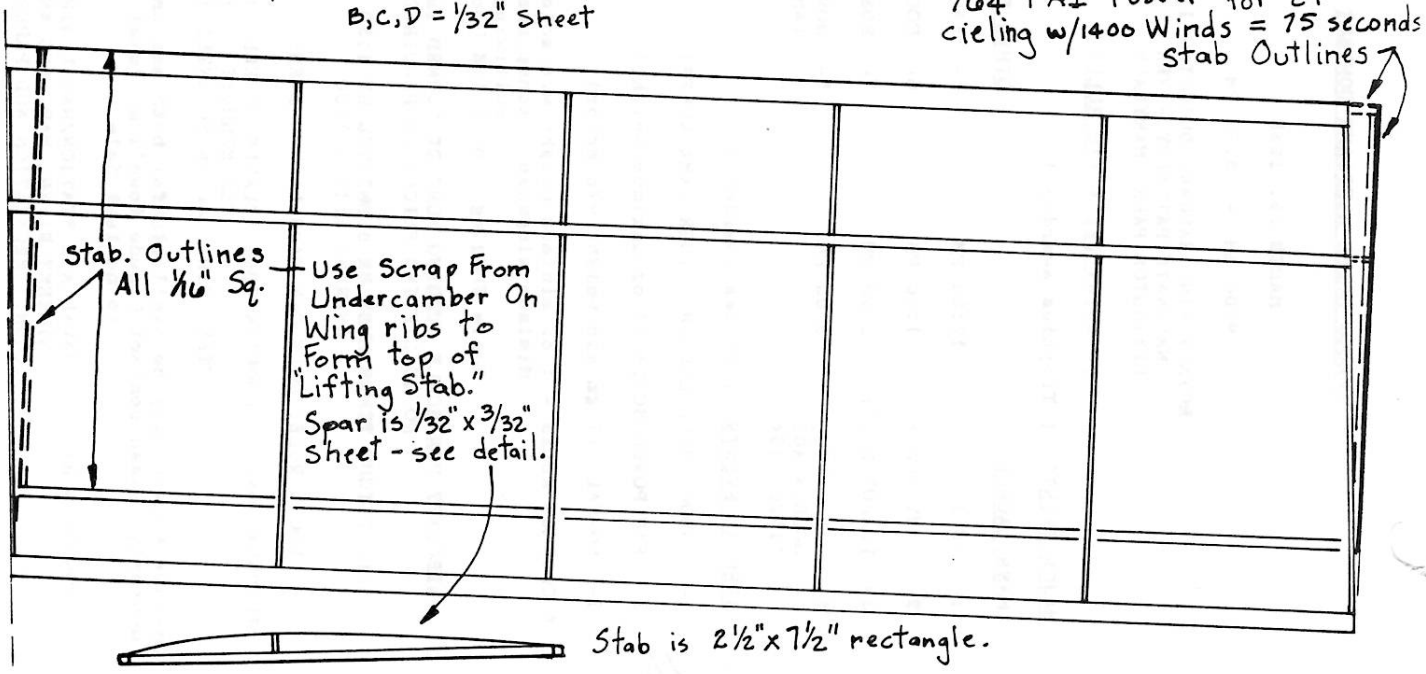
Kev's Boston Racer

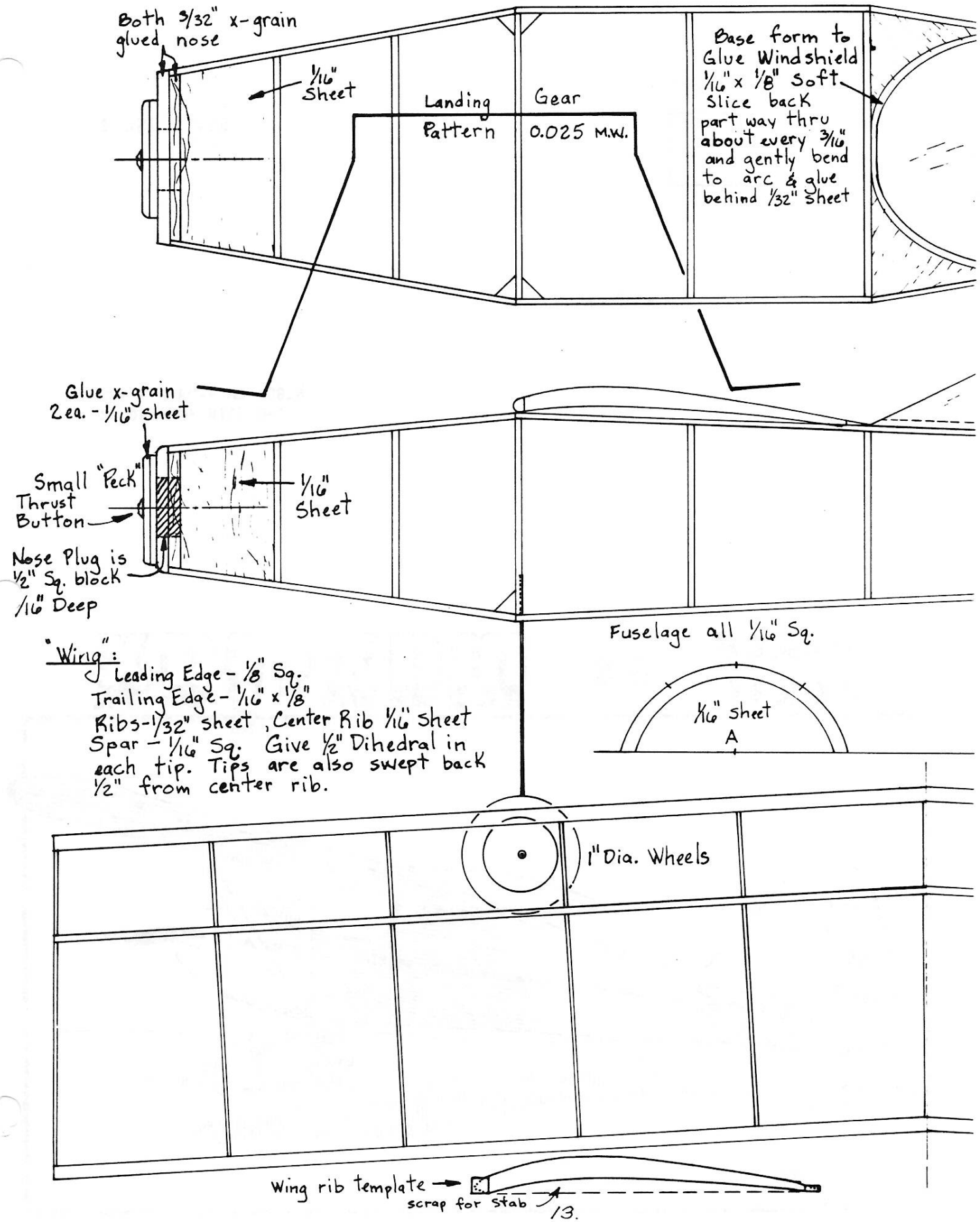
Designed & Drawn - Kevin Sharbonda Nov. 1987

or "The Sherwood Special" 14 gram.



Flown with "Peck" plastic prop. 7" or 7½" cut down to 6" with braided 24" loop of 7/64" FAI rubber for 24' cieling w/1400 Winds = 75 seconds



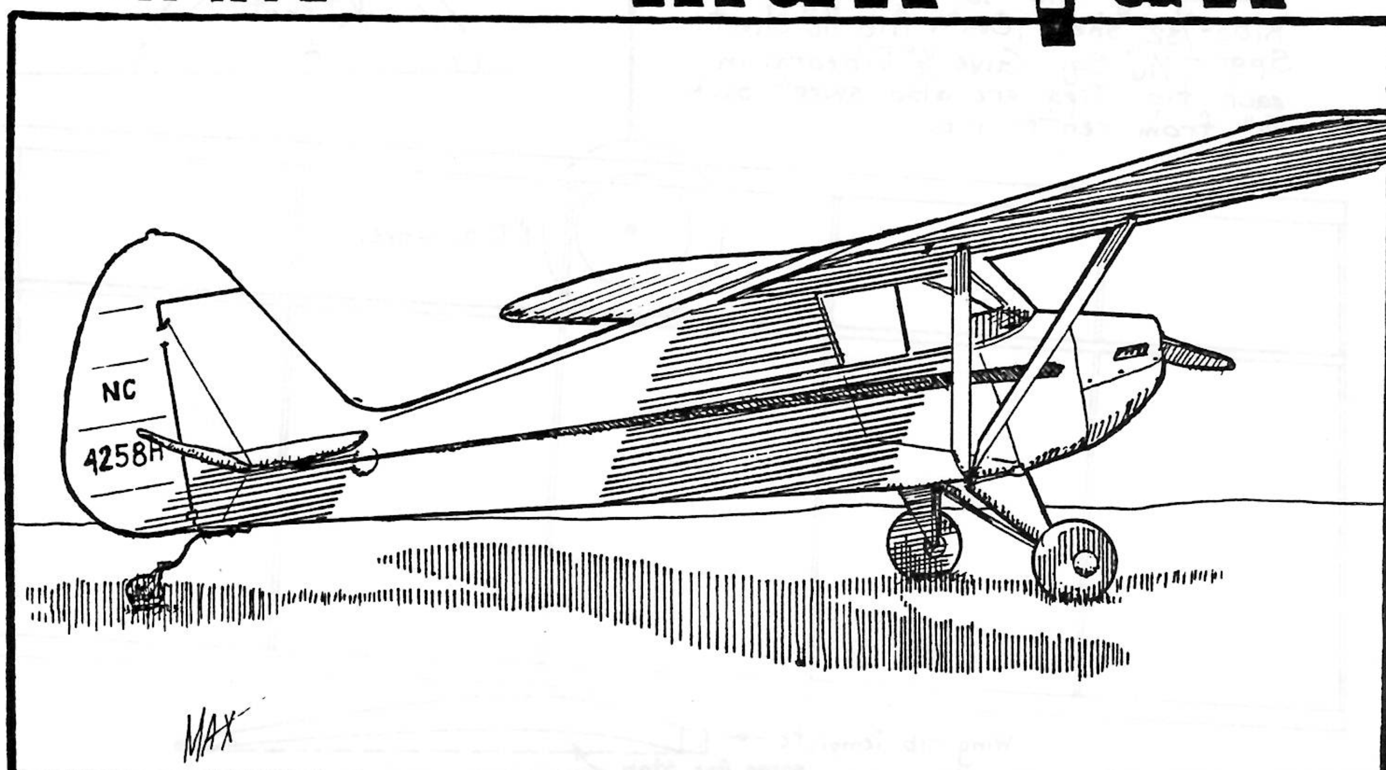

Both 3/32" x-grain glued nose
1/16" Sheet
Landing Gear Pattern
0.025 M.W.
Base form to Glue Windshield 1/16" x 1/8" Soft. Slice back part way thru about every 3/16" and gently bend to arc & glue behind 1/32" Sheet
Glue x-grain 2 ea. - 1/16" sheet
Small "Peck" Thrust Button
1/16" Sheet
Nose Plug is 1/2" Sq. block 1/16" Deep
Fuselage all 1/16" Sq.
"Wing":
Leading Edge - 1/8" Sq.
Trailing Edge - 1/16" x 1/8"
Ribs - 1/32" sheet, Center Rib 1/16" Sheet
Spar - 1/16" Sq. Give 1/2" Dihedral in each tip. Tips are also swept back 1/2" from center rib.
1/16" sheet
A
1" Dia. Wheels
Wing rib template
scrap for Stab

FIRST CLASS

DUES DUE

20008 Spur Hill Dr.
Gaithersburg MD 20879

MARCH APRIL '88 max-fax



PIPER VAGABOND

24 7/8" SPAN 107 IN² AREA
PA17 SCALE: .85" = 1.0'
DESIGNED & DRAWN BY DON SRULL '79

FILL BETWEEN CENTER SECTION AND 1ST TWO RIBS' FRONT SPARS WITH 1/16 SHEET BALSA.

1/16 x 1/8 DOUBLER TOP ONLY

1/32 SHT.

1/16 x 1/8 STRUT SUPPORT

3 LAMS OF 1/32 x 3/32 BALSA

BOND PAPER WING JOINT COVERS

STRUTS

1/16 GUSSETS

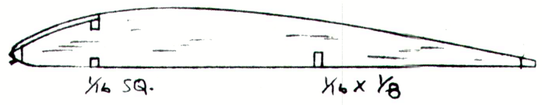
1/2" DIHEDRAL (SCALE = .37")

THREAD TAIL BRACING

COLOR

"N121H" BELONGS TO WALT MOONEY, AND IS YELLOW OVERALL, BLACK TAIL MARKINGS, BLUE INTERIOR.

3 CENTER RIBS 1/16, OTHERS 1/32

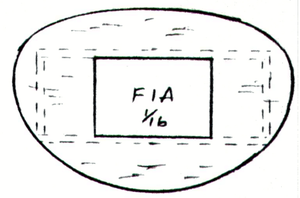


WING STRUTS OF 1/16 x 5/32

.005" ACETATE WINDSHIELD PATTERN

USE 7" OR 8" PLASTIC PROP

3° RIGHT ℄
2° DOWN THRUST



TAIL: OUTLINES OF 2 LAMS. 1/32 x 1/16 BASS; 1/16 FRAMEWORK

PROTOTYPE
- 40 GMS. EMPTY
- (4) STRANDS OF 1/8 FAI 32" LONG

1/16 x 1/8 STRINGER TAPERS TO 1/16 SQ. AT NOSE ℄ AT WING T.E. STATION

3/8 BALSA REMOVEABLE NOSEBLOCK

1/16 SQ. FIRM BALSA FUSELAGE

SIDE WINDOW SECTION

1/16 ROUND BALSA

1/16 SCAB

1/16 SHT.

1/16 SHT. GUSSETS

STRINGERS 1/16 SQ.

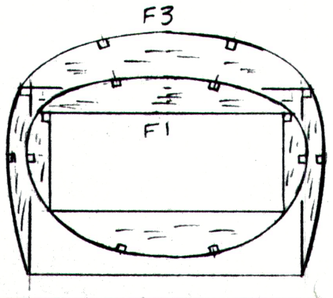
F4 F3 F2 F1 F1A

DOOR, RT. SIDE

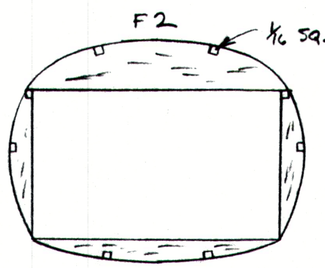
GLUE GEAR LEGS TO 1/16 x 1/8 CROSS-PIECES

.020" WIRE OUTLINE, BALSA WHEEL, PAPER LEAF SPRING

F3



F2

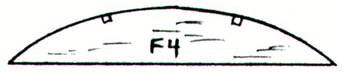


1/16 SQ. STRINGERS

1/16 SHT. FILL

BOND PAPER COWL COVERING

F4



1/16 SHT. FORMERS

1" TREXLER, OR 1 1/4" x 1/2" BALSA WHEELS

1/32 WIRE GEAR