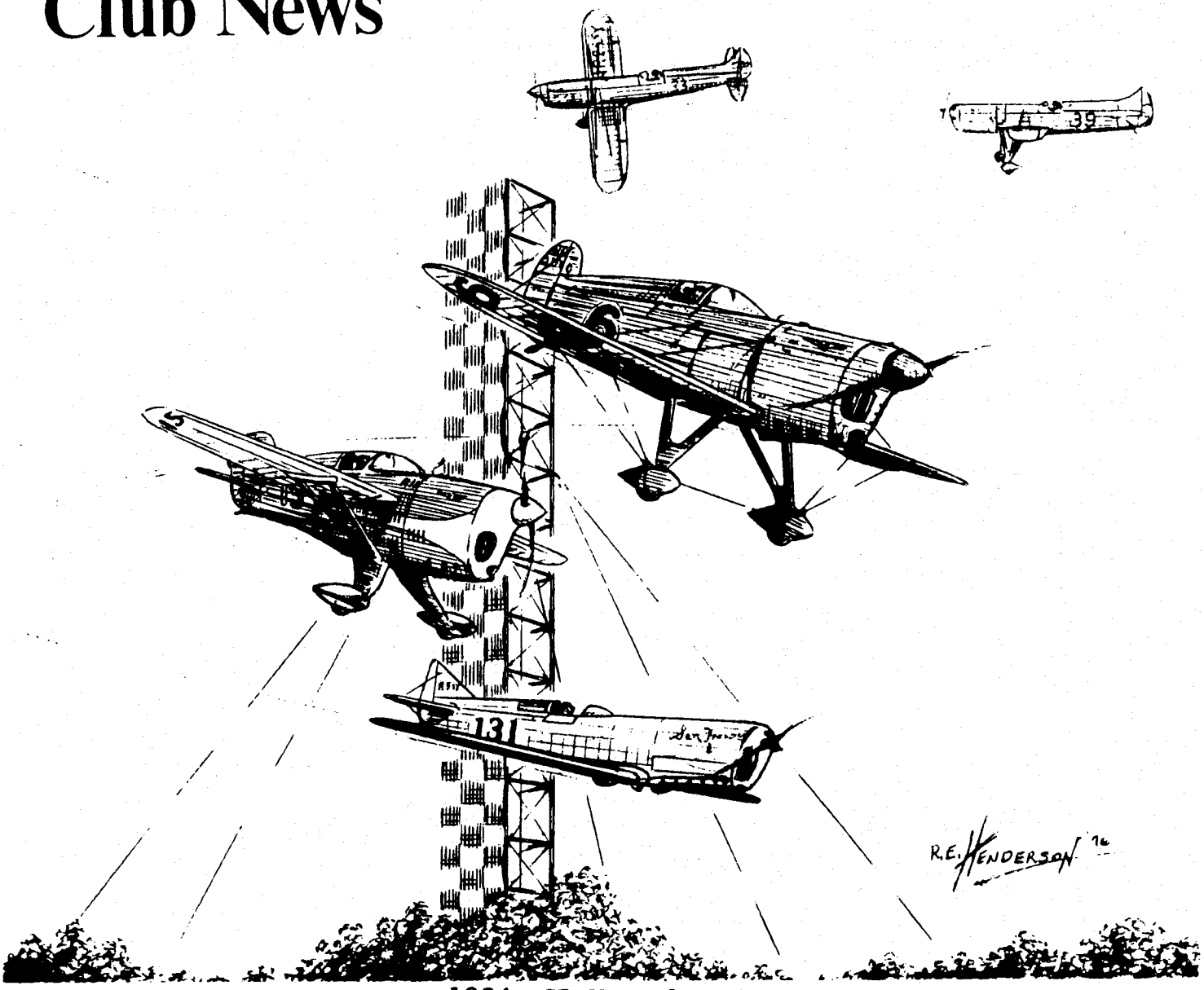
FLYING ACES

ISSUE #238-164 Nov./Dec. 2007

Club News



1934 GREVE RACE

COVER STORY; The cover on this issue first appeared on an issue of the "American Air Racing Society's" newsletter of July 1976 and was drawn by Ron Henderson. Ron's drawing portrays a typical heat in the Greve Trophy Race. The race was flown in three heats and each finishing position was awarded points. Lee Miles, in the Miles and Atwood Special, number 6 in the drawing, earned the most points and won the first Greve Trophy in 1934. And he won against three formidable racers powered by 6 cylinder Menasco engines. Miles won the first heat at 206 mph beating out Roger Don Rae by less than 2 mph. Harold Neumann won the second heat in the Howard "Ike" at 211 mph while Miles came in 3rd at 203 mph.

In the last heat Miles placed second 203 mph behind Roy Minor in the Brown "Miss Los Angeles" who won at 213 mph. Lee Miles' 1st place, 3rd place and 2nd place in the three heats gave him the most points. Tied for second place in the final standings was Art Chester in his "Jeep", and Roger Don Rae piloting the Keith Rider R-1. Third place was awarded to Harold Neumann in the Howard "Ike" and fourth place went to Roy Minor in the Brown B-2 "Miss Los Angeles". They are all shown in Ron's fine drawing.

Lee Miles did very well at the 1934 races taking 3 firsts in the 375 cu. In. class races and each time beating Art Chester by just a mile or two average mph. Lee was also first in the Shell Speed Dash for the 375 cu. In. class with a speed of 233.44 mph. Then to top it off he took away from France the 100 kilometer closed course speed record for planes weighing less than 700 pounds. A fine showing by Lee and his little metallic green gem of a plane. His prize money was nearly $4,000 from the 1934 Nationals.

The plans in this issue are from; Greg West (Lloyd CV), Dave Stott (Durham Mystery Plane), Lloyd Willis (Northrop Delta D-1), and from our files are the Northrop XP-56-1 and the Lockheed Orion. We will award a prize to anyone who builds the Northrop XP-56-1 and is able to get at least a qualifying flight (20 sec.), must have two witnesses. Thanks to everyone who contributed to this issue.

MEMBERSHIP DUES INCREASE! Sorry to have to do this to you members, but it has been many years since we have had to raise the dues for the FAC membership. We have no choice! Since the postal rate increase in May of this year (2007) we have had to pay an additional cost of $350.00 per issue. This adds up to roughly around $2,100.00 per year! And, the other costs of getting this newsletter to you are also increasing as well. Over the years we have been able to keep the cost of membership where it has been for many years due to the fact that the membership has been buying our plans, t-shirts, etc. which took care of our increase in costs. Starting with the Jan./Feb. 2008 issue the dues will be $18.00, for Canada it will be $25.00 and for overseas it will be $30.00 all in U.S. funds. You can escape the dues increase for 2008 by sending in your dues before December 31, 2007. We know many of you are on fixed incomes, etc. but we need you all and hope that you can stay with us, we must keep this part of the hobby alive! We are not the only newsletter that is experiencing financial troubles. I receive a lot of newsletters and almost all of them are increasing their dues up to as much as $5.00 per year. So we are not alone with this problem. EFF--AAA--CEEE!!!!

The FLYING ACES CLUB

is a society of unique individuals with a common interest that at times borders on a passion. It is our intent to preserve and promote the traditional building and flying of free flight stick and tissue model aircraft. Although competitive at times, the sharing of innovations, assistance and camaraderie is second nature to all that believe in the unique spirit of the

FLYING ACES CLUB

We have lost two long time members of the FAC since the last issue. They are William Burris from Penn Yan, N.Y. and Eric Marsden of England. We extend our condolences to their families and many friends. They will be missed.

In answer to an FACer's question about the thrust line on various plans of the Chambermaid Greve racer being in the wrong position; This was discussed at the recent FAC Council meeting and their answer to the question appears in the current rule book, page 4 , the very first paragraph. Also this FACer would like to see us keep the rubber powered jet event, we are!

We have had a suggestion from one of our Clubsters to the designer of original plans for the newsletter. Can you please give instructions as to the prop size and amount of rubber used on your original model along with any other pertinent information, it would sure help the newer members as well as those of us are returning to the hobby after a very long time.

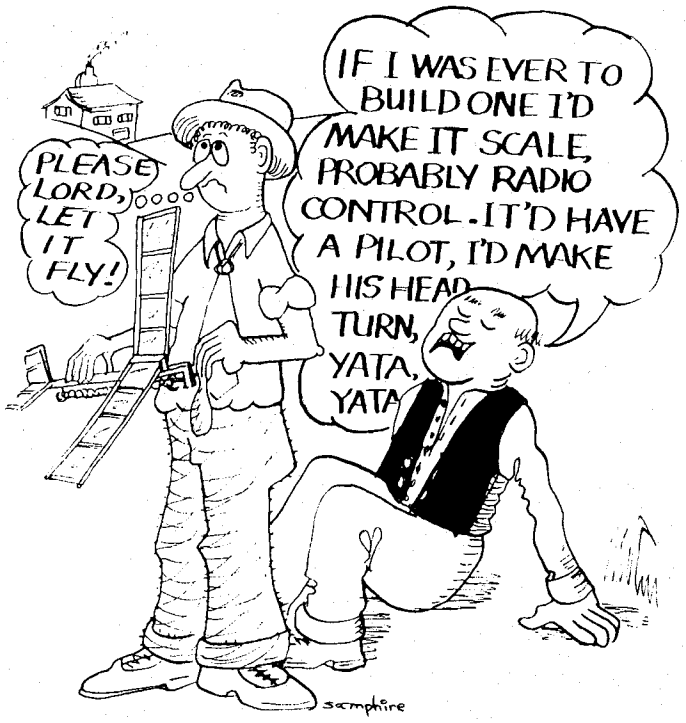
This one escaped us with the plan of the Ambrosini 207 in the last issue. It should have side stringers as the fuselage was definitely rounded.

A lot of Clubsters have had their newsletters returned to GHQ with the note from the Postal Service "temporarily away" attached to it. If you have been away for some reason we may have your newsletter here. Let us know and we can send it to you.

Great news from the H.A.G. Museum at Geneseo (our home field), they have recently received two Culver Cadets and one of the only two flying Douglas A-20 "Havocs" in the world! Get to the FAC-Nats next year to see these beauties.

BUILD---FLY---WIN!!!!! EFF--CEEE--!!!!!!!!!!

Col. Lin Reichel, CinC, FAC



FROM THE STAFF AT FAC-GHQ

SEASON'S GREETINGS

If the box on the right has the dreaded RED "X" in it, it is time to renew your membership which includes the newsletter. Cost is $15.00 per year in the United States. Cost for Canada is $20.00 per year. Overseas the cost is $25.00 per year. All in U.S. dollars. Six issues per year, published approximitly every other month. Please make checks payable to; Flying Aces Club. Send to; FAC-GHQ, 3301 Cindy Ln., Erie, Pa. 16506.

FAC NEWSLETTERS BACK ISSUES. FAC-GHQ, 3301 CINDY LN., ERIE,PA. 16506
$3.00 per issue, postpaid

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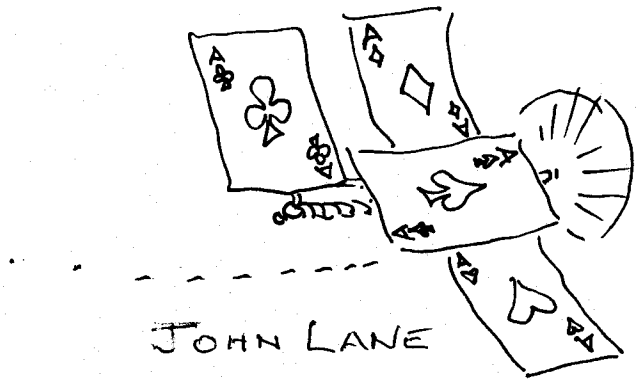
GENESEO
A really bad poem by Chuck Wenlock

A wonderful thing takes place each year
when the air is fresh and the sky is clear.
Tents and sun shelters line the road
and there are the cars that hauled the load.
Men take to the field in a jovial spirit,
as a plane takes off and no one can hear it.
The models are crafted with the greatest of care
and one by one they take to the air.
The types are many, just every kind,
with colors that dazzle and boggle the mind.
The delicate planes of wood and of tissue
make cares of the day simply no issue.
Close by the field stand kids with their mother
as planes climb to the sky, one after the other.
The children just stare with smiles on their faces.
"These men", Mother says, "are the Flying Aces".



FAC-NATS FOR 2008

The FAC-Nats for 2008 will be held on July 16 (scale judging), and the flying on the 17, 18 , 19, 2008 with the awards banquet being held on the evening of the 19th. The events as we have them now are as follows in no particular order. Also, some of these events, besides the traditional events may be mass launch events. All of the events, etc. will be finalized in the next issue of the newsletter.

Rubber Power Jet	Sparky O.T.	Giant Scale	Jumbo Scale
FAC Scale	Power Scale	Hi-Wing Peanut	Old Time Rubber
Greve Race	World War I	Golden Age Civil	Modern Military
Embryo	A.T.-6	No.Cal Scale	Contra-Prop Scale
Fiction Flyer Scale	Pioneer Scale	Old Time Stick	Jimmie Allen
Thompson Race	World War II	FAC Peanut	Modern Civil
Golden Age Military	2 Bit + One O.T.	O.T. Gas Replica	B.L.U.R. Race
Dime Scale	Low Wing Trainer	G.H.Q. Peanut	Guillows Fairchild "24"
Goodyear Race	Rapier Jet Scale	O.T. Kit/Plan Scale	Shell Speed Dash

We will be using the 15% rubber rule in the following events; A.T. 6, Greve Race and World War II. The A.T. 6 event also requires a 7" Peck plastic prop. An entry form and complete details for the FAC-Nats Mark VI will be in the next issue. The 2008 contest will mark the 30th anniversary of the FAC-Nats and we want to make this one special. Please send us your ideas to help us make it that way. Some of these events may be deleted and other events may be added by the Jan./Feb. 2008 issue.

FAC RULES

At the FAC-GHQ Council's recent meeting there were several rule changes discussed for GHQ to consider for the 2008 rule book. We won't get into all of the proposed rules, just the ones that we have decided on for next year.

The "Three flight average" scoring system in the scale events went over big at the FAC-Non-Nats in 2007. So we are putting that rule into affect and making it the contest director's option to use it or the traditional way.

Two new events will be added as official FAC rules; Rapier Jet Scale and Rubber Jet Scale.

Dime Scale; Can gray or white tissue be acceptable for silver paint? Gray, yes, white, no.

Gears; Will now read, The **ONLY** gear arrangement allowed will be 1 to 1 in any FAC rubber powered event.

"Rib stitching should be added to the "ignore" list.

"Dummy" nacelles; the word dummy will be dropped.

No-Cal; The prop may be positioned at the front of the spinner if the full size aircraft had a spinner.

Slab sides in mass launch events; The grandfather clause for flat sided models is terminated. The only slab sided models allowed are ones that were slab sided on the real aircraft. Burden of proof lis with the model builder and the decision of the CD is final.

Two Bit O.T. Rubber; After discovering that many O.T. rubber models have a wingspan of 26" we decided to include them in the event and the event will now be called; Two-Bit + One.

Experimental rules at the FAC 2008 Nats; The O.T. Gas Replica will have a different target time for each flight. The total deviation from the total target time will decide the winners.

Here is the rules proposal for power scale as sent in by Mike Midkiff and it will be tried at the 2008 FAC Nats.

120 seconds is still max but use the full range of 120 available flying points.
Add the full handicap points now in existence without factoring.
Scale scoring is the same.

Thusly the 40 point handicap model has the potential of scoring some 222 points.
This is a 60% increase in scoring opportunity that every model now will have and virtually eliminates ties by spreading out the top scores. The averaging of three flights will also be used here.

The benefits are; Simple scoring, Recognition of true handicapping, More unusual models, Spread the scoring range.

T-SHIRT SALE

We have some t-shirts we have to move out of here before we order next year's shirt. The following shirts are priced just right for Christmas at $10.00 each postpaid; Douglas O-43 xx-l (1only), Spartan Executive xx-l (1 only), Cessna Phantom x-l (1 only), Grumman Wildcat lge., x-lge. (2 only) xx-lge. (1 only), Douglas Dauntless, lge., x-lge. xx-l., and xxx-lge. (2 only).

Priced at $15.00 postpaid we have the FAC Outdoor Champs t-shirt in the following sizes; Large, x-large and xx-large (2 only). This one has the Rearwin Speedster on it. Send your orders to; FAC-GHQ, 3301 Cindy Lane, Erie, Pa. 16506.

JUST WHAT WAS A TEN CENT KIT?

By The Comet Kid

Economical would be the first thing to mention in answer to the question above, The ten cent kit became popular in times when a thin dime was not easy to come by in a society recovering from the Great Depression. But, this is not what concerns us as model builders of today. Today, the Comet Kid has wrinkles and grey hair. One of a vanishing breed of FACs who would like to relate the endearing and enduring charm those unsophisticated kits have infected many of us with.

The ten cent kits were mostly renditions of contemporary full scale airplanes, or war planes from The Great War of 1914-1918, with a few historically significant types included. More than half were American civil airplanes Of course, no kit company would omit at least one stick model, and sport model from their line

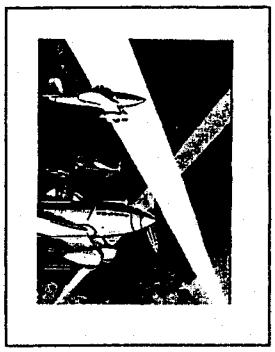
Were they accurate scale models? Well, let's say they were identifiable to one degree or another. Most seemed to have been drawn from photographs of their full scale counterpart. Even those which, upon first impression, seemed quite accurate, were not. If one took the primary dimensions of the full scale airplane, and converted them to model size, this became evident.

For example, models by Comet simply had longer than scale wingspans. Why? Perhaps to meet the advertisement ballyhoo, and still be able to fit the rest of the drawing on the desired plan size paper. For scale fidelity, none came close to the line of Cleveland kits, the cost of which usually reserved them as birthday or holiday gifts to the boy modeler. (There were very few girls who found interest in the hobby then)

Economy was not limited to the purchaser. One of the chief characteristics of the ten cent kit model was sparse structure. Wing rib spacing, especially. The less structure, the less wood cost to the manufacturer Being able to cover a complete model with the tissue provided in the kit took nothing short of wizardry. Placing the wing and tail on the tissue sheet in any manner regardless of grain direction, one then saved each and every scrap in hopes of being able to cover the entire fuselage with what remained.

Common pins, not provided in the kit, were often called out to serve as wheel axels and motor pegs. "Stiff paper" was not provided, either. "Make windows from candy wrapper" was another way of keeping cost down. .There was no plastic other than cellophane, celluloid and bakelite, so props were usually machine cut balsa blanks. Some companies used sheet balsa blades from the print wood. Wheels went from turned hardwood to printed on the sheet wood. Guillow hardwood wheels looked more like wooden buttons, than wheels. Maybe Paul K. Guillow, "former naval aviator", hit on a bargain carload of them.

Ease of production was also a consideration. One company defined the color scheme of their model thus, "Cover wings and tail one color, and fuselage and rudder the other", thus eliminating the need to package specific colored tissue. When Comet designed their ten cent ROG model, the Phantom Flash, it was done so as the kit parts would not differ from the standard used in the rest of the line. Landing gear legs were sheet balsa rather than wire. Another piece of sheet balsa spanned the gap between the legs and held the usual kit nose plug. The rear hook was a bent pin. In another clever move, the outer and inner face of wheel pants were made of paper cut from the plan.



In order to cut all the strip balsa one size, (1/16 sq.) Comet had you glue two strips of them together if 1/16 by 1/8 strips were needed. In order to limit the sheet wood in the kit, some companies had you form strip wood curves by rolling them under a pencil, or, in the case of sharper curves, wet and kink the strip wood repeatedly with the fingernail!

Burd kits had the darkest fuzziest balsa ever seen by anyone! There must have been a carload bargain in this, also. .Most kits included a hardwood nose plug, while some simply told you to push the prop shaft through the balsa nose block! Comet instructed you to remove the rubber eraser from a pencil and rotate the ferrule to cut the nose plug hole in the nose block.

One company called for a straightened paper clip to be used as a prop shaft! The bonus in Comet ten cent kits was the wire prop shaft with hook ready bent which was packaged by sticking it diagonally through the upper left corner of the plan. It was tough for a kid to bend a hook on the end of a piece of wire, especially without a pair of round nose pliers! Glass beads and brass washers to reduce friction were reserved for the more expensive kits regardless of who made them.

Did they fly as designed and built according to plan? Seldom. Most stabilizers were too small. No true view layouts were there to construct any of the landing gear or struts for biplanes and parasols. Consequently, the models sat close to the runway with biplane wing gap that was too little, or too great. "Well gee, I dunno. That's the way it come out", was the inevitable reply from the builder if questioned on the strange appearance of his model. Incidence, decalage and down thrust, were unknown to us. Sometimes a plan would give instructions about CG

location. Most times it was simply, "If model stalls, bend flippers down. If model dives, bend flippers up."

So, why is it we want to build these quaint models of models, for that is what they are. For older FACs, it may be to make the changes allowable and needed to see them fly as they never did in their first childhood. To younger FACs it might be relaxing, for they are not very demanding. After all, they are not supposed to be FAC Scale models with a 16 inch span limit, nor were they intended as such. But, at an altitude of 25 feet or so, the visual effect is about the same.

The desire to have worked as a designer for one of those kit companies denied us by Father Time has brought about the Pseudo Dime Scale modeler, who can travel into the past while at his drafting table. Many of these FACs have faithfully made their layouts in the same format as the Comet plans conformed to. Some have picked up on the features mentioned above, as well as the sketch of the broken razor blade to be used in cutting parts. (Back in those days a razor blade could be snapped without bending it.)

The earliest ad the author has found in which ten cent kits were shown was that of Donald E Duncan, Inc. of Chicago, Ill. Although many model companies produced simple unsophisticated kits prior to this, their cost was high in comparison. It was by cutting the contents in the kit that the cost could be reduced.

These early kits contained just about everything needed to build the model. Some even had the tissue printed with the stripes, lettering, or insignia required! Pins, thread, brass washers, glass beads, formed wire parts, ready made Paulownia wood props, vials of glue and banana oil, rubber, etc. Typical of these were Ideal and National, to mention two.

If you decide to join the ranks of pseudo ten cent kit designers, why not take a few minutes to study the plans of the genuine renditions. Look over their shoulder as the designers sat at their drafting boards. Copy their style. You are sure to get more enjoyment out of your own work. Drawing your plan will take on a new meaning that will elevate it from being a task.

When you present your ship and plan to some wrinkled grey haired CD or judge for a rules compliance check, his smile (or is it a grunt?) of satisfaction will be felt by your inner self as well. Who knows, *he* might even be the *Comet Kid!*

The Rearwin Speedster event at the 2008 FAC Outdoor Championships

I don't know how I ever got myself into this. I guess because every time old Ralph " Rottensox" Kuenz asked me what I thought the model for the FAC Outdoor Championships should be I replied "well, my favorite golden age civil airplane is the Rearwin M6000 Speedster so why don't we try that"?

Ralph finally pinned me down and said come up with a plan and we'll do it. Not a problem I thought. I had already built three Speedsters for FF (all three flew away) and two more for Ukie so a plan shouldn't be an issue.

I dug out my old Jumbo Scale drawing and off to Kinko's we went. The giveaway plan for the 2007 Champs was reduced to a more manageable size from my original drawing and retraced in ink with new wood sizes etc. inserted. While at it I made some corrections to the structure from the original drawing which was done over 25 years ago. Digging through my 3 inch thick pile of documentation folders on this aircraft brought out some things that just needed correcting. Little items like around the landing gear and the windshield. The LG was just not right on the original drawing and on the prototype the windscreen goes from the cowl to the trailing edge of the wing. Areas like this were corrected so the windscreen is now one piece and the center of the wing does not touch it and is painted black to resemble the fuselage framing of the original.

Regardless of my ramblings, this model will be a special event at the FAC Outdoor Champs in Muncie in 2008 and will replace the Fairchild 24 event at that contest. The model will be flown with the same rules as Golden Age, with the sum of three flights with a 2 minute max being the total score. Three max ties will be decided with a fly off. The winning models will be checked against the plan with the only allowable changes being the motor peg placement, nose block arrangement, and the stab mounting arrangement. Wood sizes must be the same or greater than shown on the plan and the profile and plan form of your model must match it. No extended noses or bigger stabs guys.

If you were unable to attend the 2007 Outdoor Champs and did not receive the plan in the packet they are available postpaid, with documentation, from FAC-GHQ for the measly sum of $5.00.

Mike Welshans

*** * Blade Section * ***

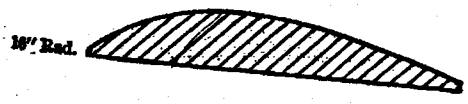
Mumbo Jumbo # 132 by the Glue Guru

Which blade section is best? Rubber powered models mostly use some sort of undercambered section, as below. The gas engine people tend to go with the flat bottomed section. Does the difference reflect production cost or what? For that matter, is there a difference?

Good old NACA ran some tests on this issue way back in 1917, when propeller design was still, let us say, up in the air. Yes, their model tests used too big a model to be really satisfactory (about half of full scale) but there is still something to be learned from the results.

Their summary was: "The plain sectioned propellers are markedly more efficient than those of cambered sections... The difference is more marked for narrow blades than for wide ones."

Their standard was the ability to convert power supplied the propeller into thrust, and in general the zero undercamber prop section did a better job. However, there were grey areas where the difference was negligible. One such occurs as the blade becomes very broad. For that matter, narrow blades proved more efficient than broad no matter what the camber.



Source quoted:
NACA; Third Annual Report; 1917; by William Durand; Report # 14; p87-129.

In a perfect world, all rubber modelers would have narrow, non-cambered props. Why don't we ?

I think the catch is the efficient prop's inability to absorb power, other than by running away. Given too much power, the narrow, efficient prop lends itself to being spun too quickly. This leads to excess RPM, a high climb rate, and a short motor run. Thus, given the usual unstable model, too much prop efficiency leads to trouble.

In contrast, the wide bladed, low efficiency type of prop that most of us use has a peaceful disposition, and offers a long cruise as the motor unwinds slowly.

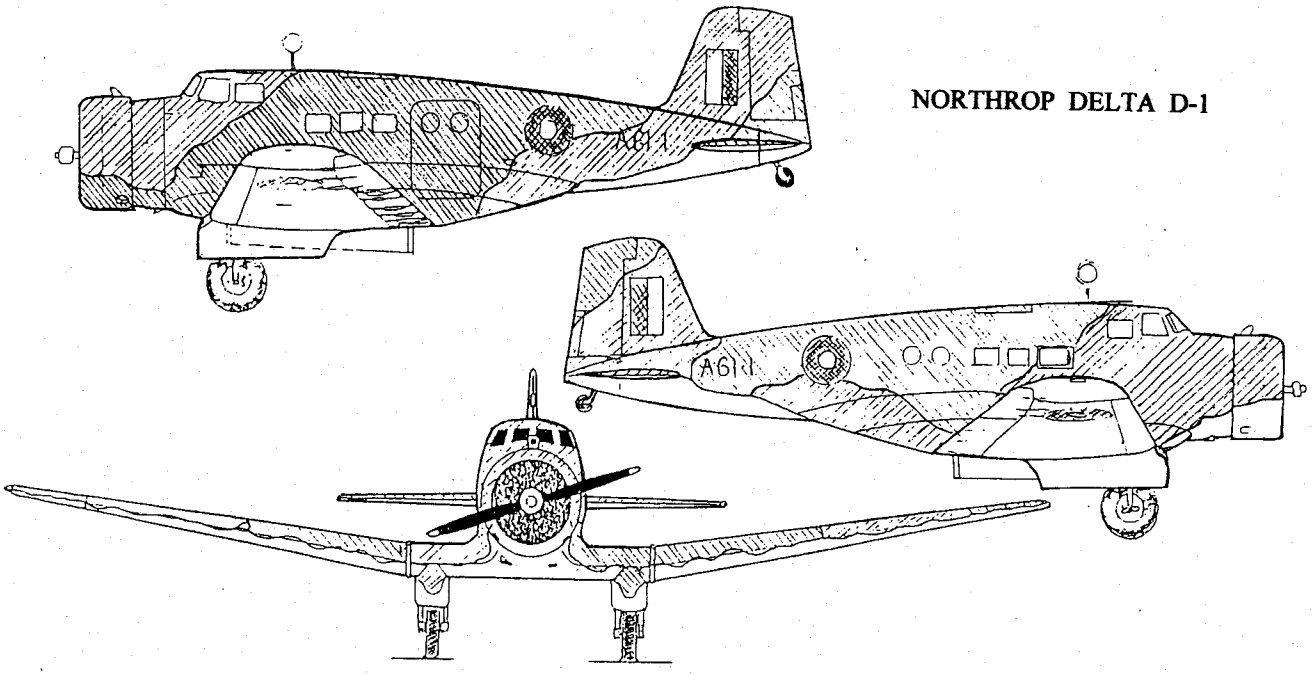
Somewhere along the line, we have decided that it's better to have a friendly prop than a too efficient one. For those rebels seeking more efficiency, the same NACA source suggests: (1) use of a low pitch, (2) carving the contour form into the conventional elliptical outline as compared to a simpler rectangular form, (3) using a constant pitch.

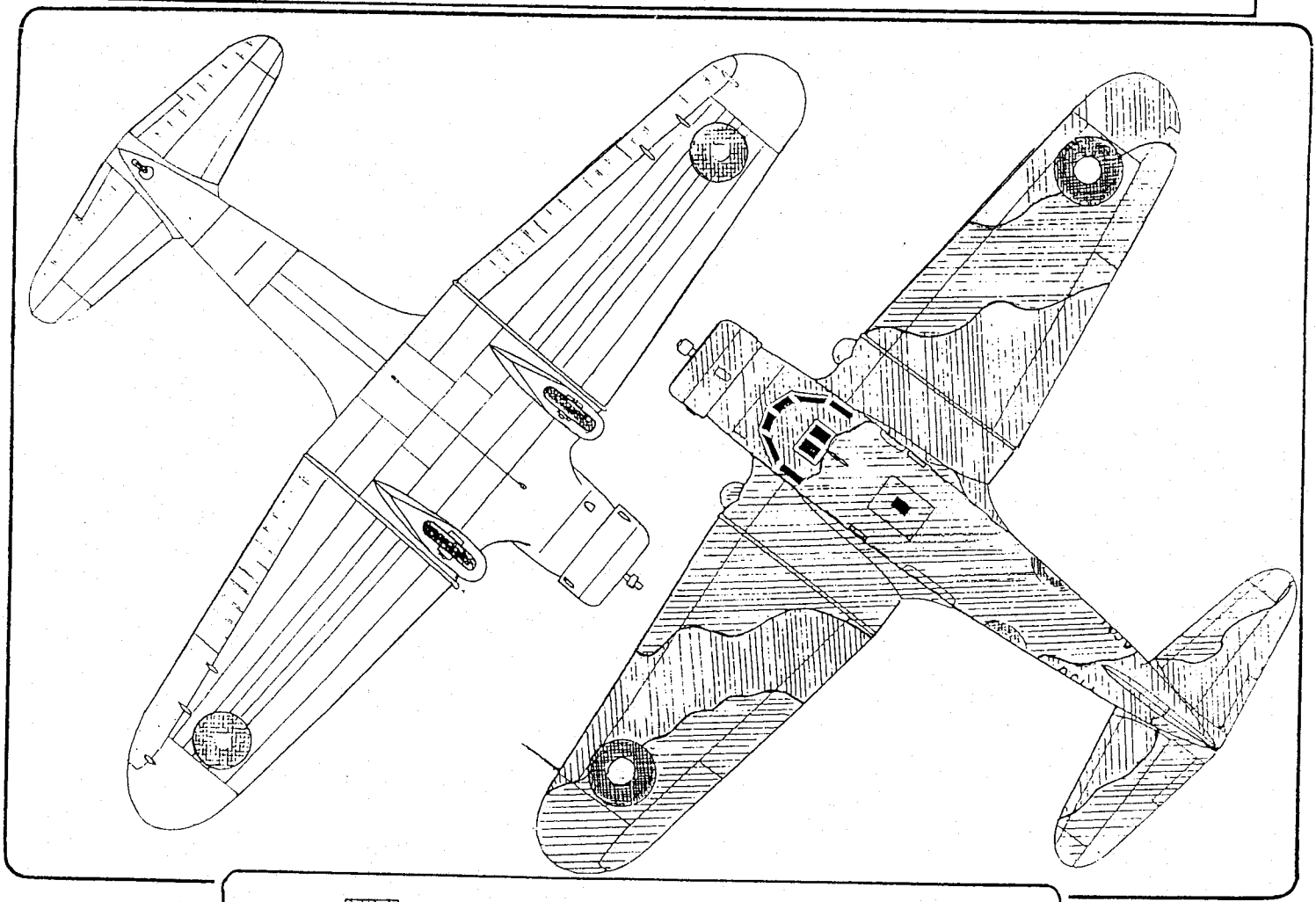
Given our topsy-turvy world, perhaps these are things to avoid. Consider the indoor duration flyer. He employs a blade angle, i.e. pitch, set very high to deliberately hold down the RPM and thrust, thereby preventing striking the arena ceiling and also greatly extending duration. As for the extremely low resulting thrust, he makes it suffice by holding down the total model weight. There is something useful for us outdoor types here: hold down the weight and nuts to too much prop efficiency!

An Advert for Myself

For Glue Guru type reasoning extended to the Red Baron's fighting and flying, see "Three Wings for the Red Baron" and "Gunning for the Red Baron" by Leon Bennett, available at all the usual bookstores including Amazon and B & N.

NORTHROP DELTA D-1





FOLIAGE GREEN

EARTH BROWN

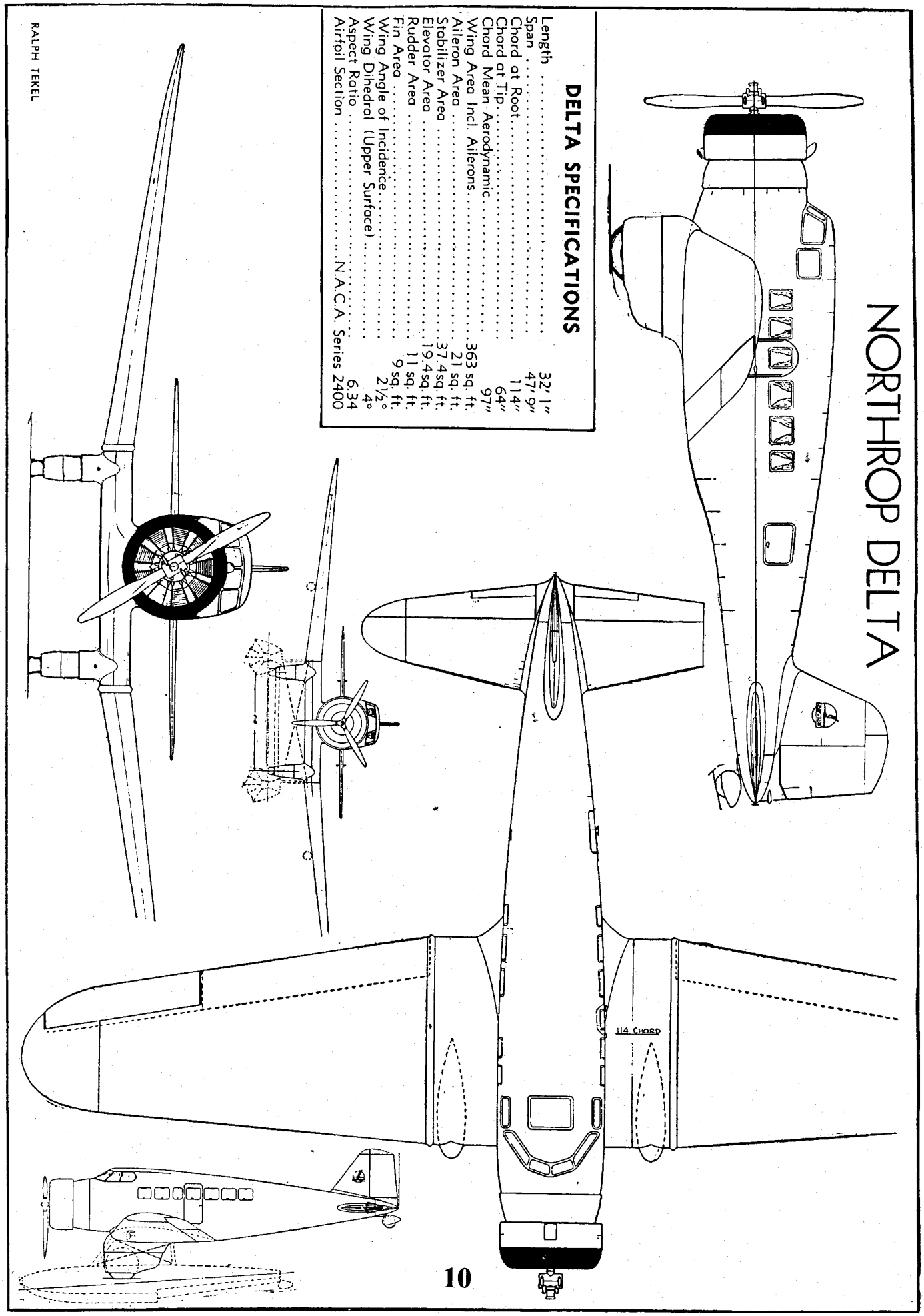
SKY BLUE (UNDERSURFACES)

WHITE (INSIGNIA)

DARK BLUE (INSIGNIA)

Serial number A61-1 in mid grey, shown in black for clarity.

NORTHROP DELTA TRANSPORT



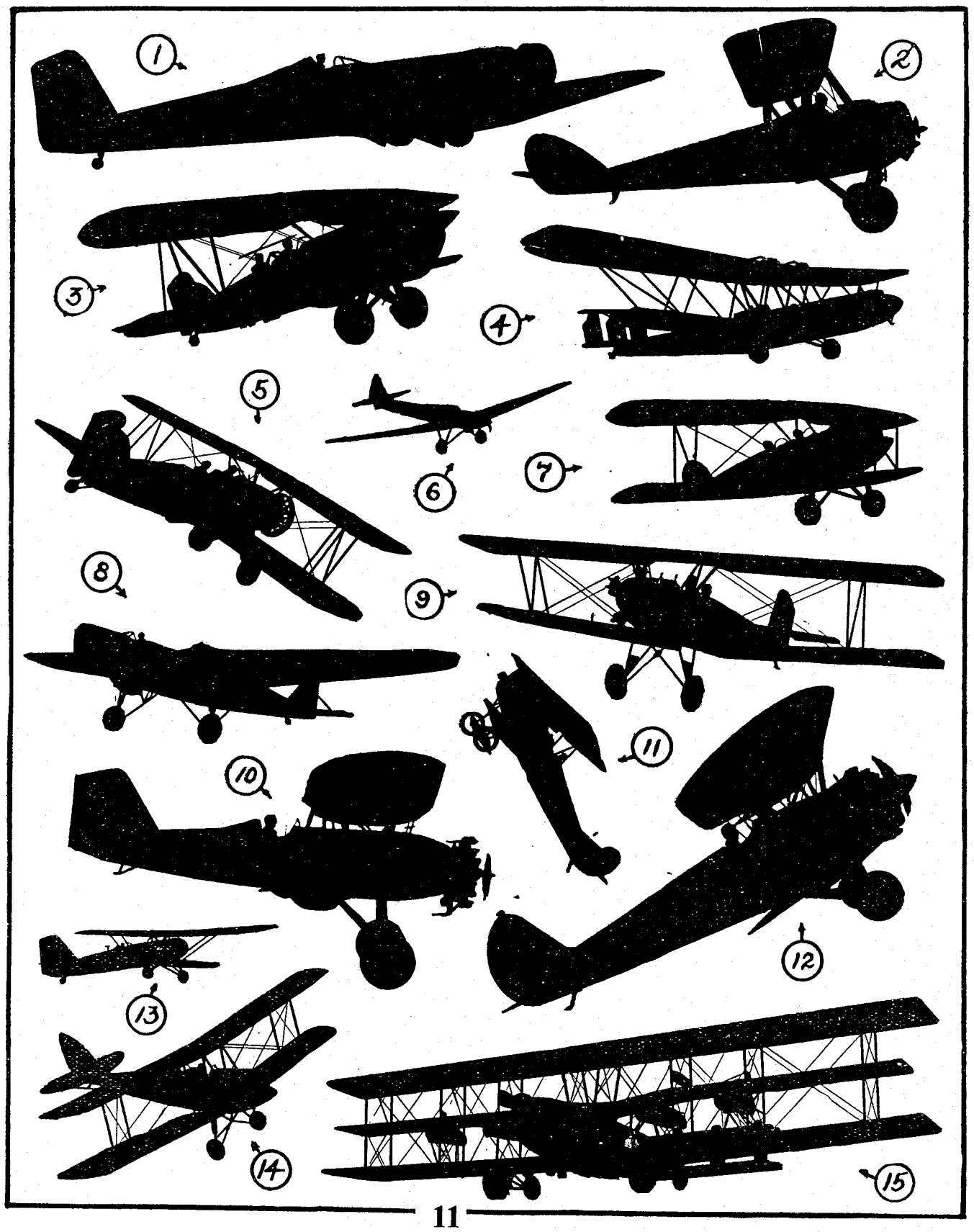
DELTA SPECIFICATIONS

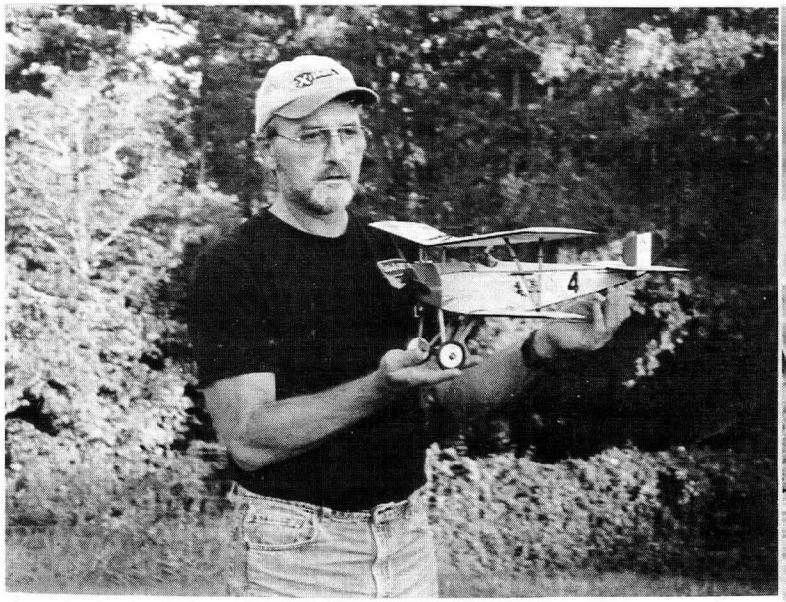
Length	32′ 1″
Span	47′ 9″
Chord at Root	114″
Chord at Tip	64″
Chord Mean Aerodynamic	97″
Wing Area Incl. Ailerons	363 sq. ft.
Aileron Area	21 sq. ft.
Stabilizer Area	37.4 sq. ft.
Elevator Area	19.4 sq. ft.
Rudder Area	11 sq. ft.
Fin Area	9 sq. ft.
Wing Angle of Incidence	2½°
Wing Dihedral (Upper Surface)	4°
Aspect Ratio	6.34
Airfoil Section	N.A.C.A. Series 2400

HOW WELL DO YOU KNOW YOUR AIRPLANES ?

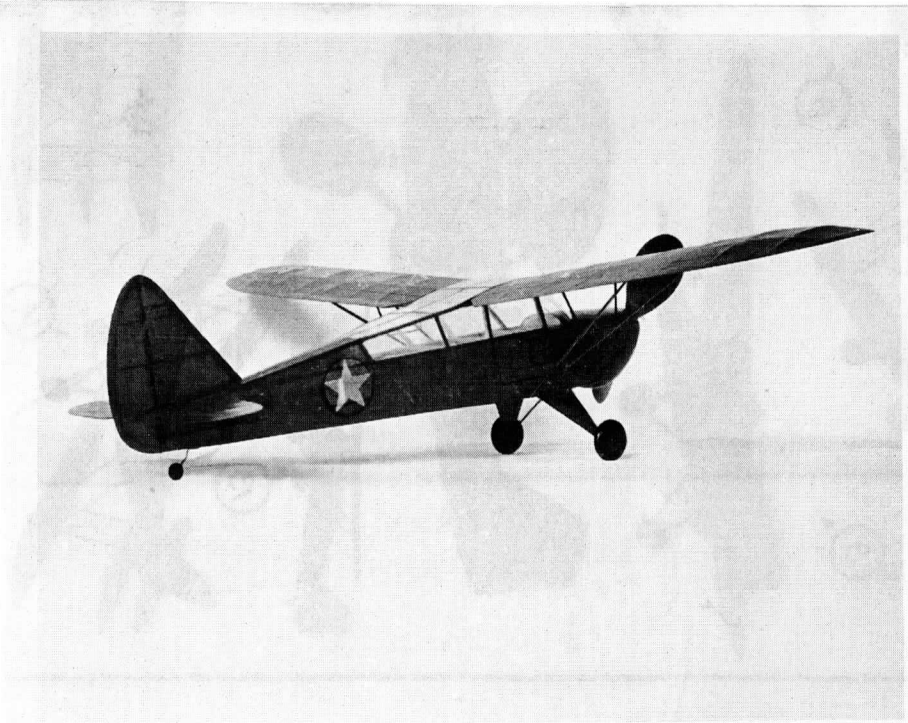
What Are the Names of the Airplanes Silhouetted on This Page ?

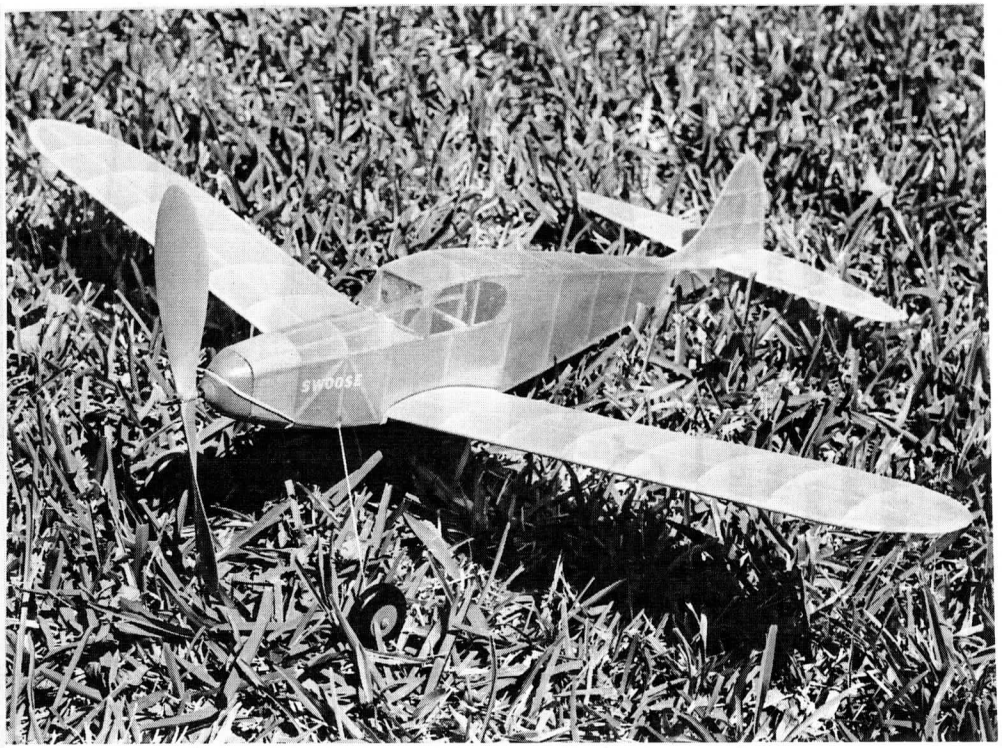
Do you think you know the names of all these airplanes? Send in your answer by December 31, 2007 and the winner will receive a prize from GHQ. In the case of ties we will use the earliest postmark to determine the winner. If that doesn't solve it we will give duplicate prizes. Send your entries to; FAC-GHQ, 3301 Cindy Lane, Erie, Pa. 16506

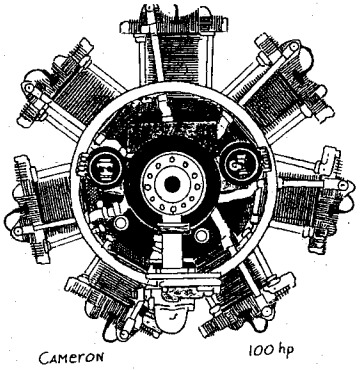


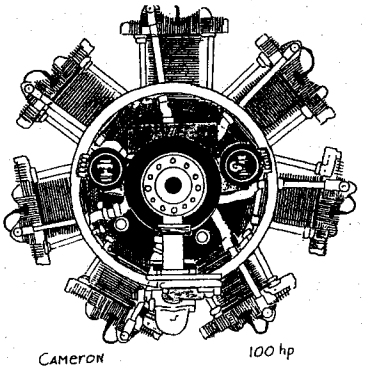


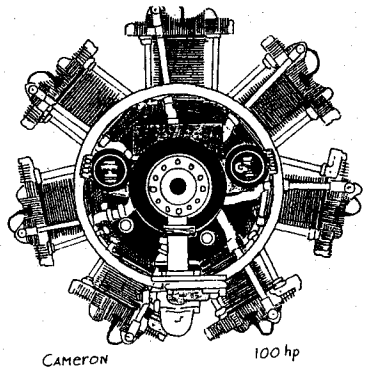
Top photos from Jim Bailey with his electric powered Nieuport 11 converted from a Guillows kit. Bottom photos from Al Cleave of two of his models from yesteryear. Interstate L-6 and O.T. Rubber Swoose, 25" span. Both plans available from GHQ, see ad in this issue.

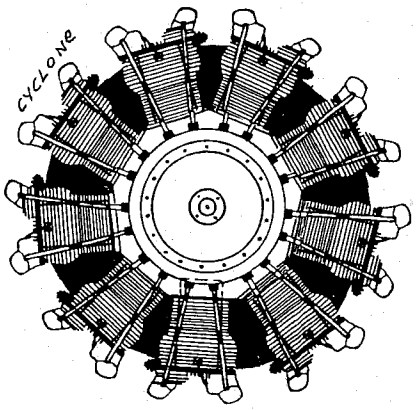


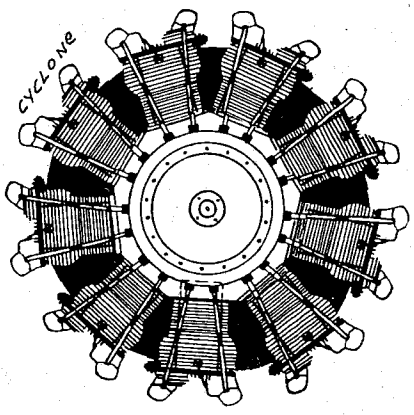


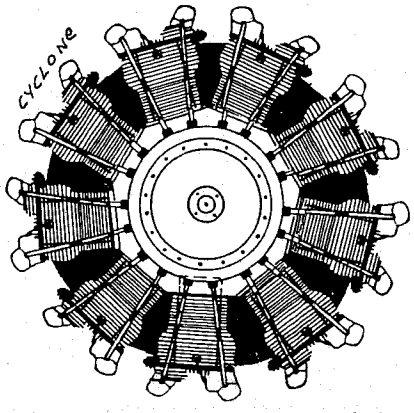












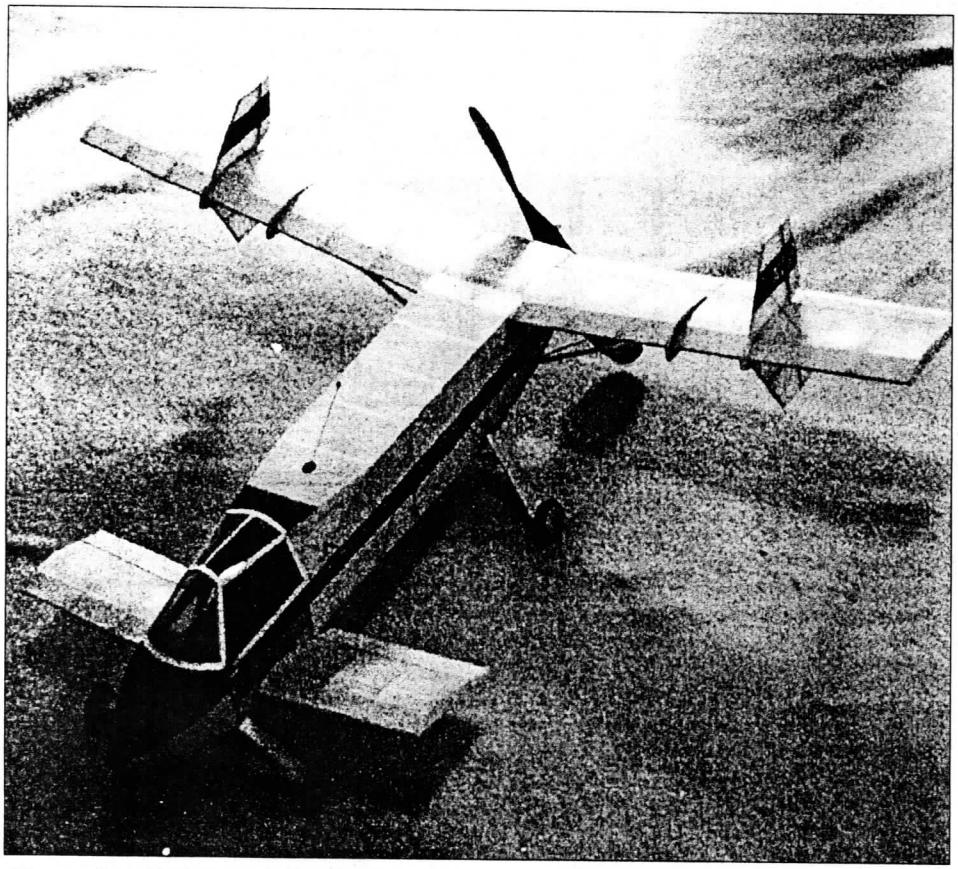
Jake Larson sent in these drawings of engines. Just right for those models requiring them in competition. Thanks Jake!

THIS ARTICLE TAKEN FROM THE NAT. FREE FLIGHT DIGEST.

Part 2: Canards and Twins

Why Free Flight Scale?

Vance Gilbert *Arlington MA*



The author built and flew this model of a Lockspeiser LDA, a British homebuilt, during the 1980s. The canard configuration's inherent stability, once past initial trimming flights, made it a winner. (Gilbert photo)

There's nothing like the look on the face of a sport modeler when a canard or twin-engined free-flight subject floats by overhead. As complex as these ships seem to the nascent modeler, they are often—believe it or not—far easier to fly than conventional jobs. And their non-conventional layouts garner a few more bonus points when competing in FAC Scale.

Canards. This configuration is, in my mind, the easiest to set up and trim of all free-flight aircraft. The "duck" ("canard," translated from the French), is so forgiving, and a difficult layout to get to stall. I flew a Lockspeiser LDA in the mid-late 1980s. Once I got the power portion worked out, she was a cinch to fly, and insanely stable in windy weather.

This design is a box, structurally, and its flying surfaces are as squared-off as a Lacey. Testament to this ship's ease of trimming: It was successful when I was only three years into the hobby! Mark Fineman, a stalwart FAC master, racked up an impressive number of wins with his Earl Stahl-designed XP-55 Ascender.

Most canards are powered by a pusher prop. Set up is a follows:

Rear wing incidence—0%;

Front (canard)—+10%(!);

Downthrust 3–4 deg down, 3–4 deg right.

Dihedral. Same as for high, low, or bipe-winged layout, depending on what is appropriate. A little dihedral in the canard surface, if not ruinous to the look of the plane, is desirable.

CG. Between 1/2 and 1 average chord's length in front of the L.E.

That really is all there is to it. The hardest thing about canards—especially canard pushers (which most canards tend to be), is orienting yourself, the builder/flier, to what downthrust and right thrust actually look like on a pusher ship.

Look directly at the ass-end of the plane at the prop and downthrust means the freewheel/latching part of the prop faces—yep—down. If the whole shebang looks tilted to the right, you have right thrust (i.e., the plane will head right) and so on.

Canards use their surfaces for lifting a little differently, too. The late William McCombs liked to refer to canards as having "a small wing and a large tail." The canard surface, also thought of as a front stab by some, works far harder than a conventional stab in supplying lift, some 3-10 times as much.

Again, pardon the seat-of-the-pants science, but that front canard verily "hydroplanes" on the wind with that high angle of attack. No, that 10% recommended incidence is not a misprint.

When out of trim, CG wise and stalling, canards generally sort of mush out of the air harmlessly, as the front stab just stops lifting and the rear main wing corrects, all

this managing to take place without maddening oscillation.

Twins. I can hardly express the pulse-quickening sensation of having a twin-propped job successfully leave your hand in free flight for a blue sky.

I've built a mess of them in my modeling career, as have a lot of my Scale brethren. Yet twins have gotten a bad rap as being "complex" and requiring "too much thinking" to get to go. Here's a list of reasons why twin rubber-powered ships are the end to all means of modeling for some:

(1) They look great in the air;

(2) If you use counter-rotating props, the only thrust adjustment you need to consider is *down*, as the rest of the gyroscopic voodoo of one prop and side thrust is virtually eliminated;

(3) You get to build at least two fuselages;

(4) They look great in the air.

Okay. Here's the downside list:

(1) Holding both props prior to launch;

(2) Remembering to wind the other prop oppositely if you employ counter-rotating props;

(3) Making counter-rotating props (if you go that route);

(4) Build at least two fuselages;

(5) Alignment of props' thrustlines are critical;

(6) Rubber becomes like shoes: If you break one motor, you replace both motors.

All the above said, the positives on the top list far outstrip the negative aspects of the bottom list. All the above said again, rules for setup for any type of free-flight ship prevail.

Many published schemes show how to fashion counter-rotating props: from cottage cheese-container blades on a chopstick or skewer mounted on a hub, to the time-honored method of carving two propellers to the same P/D ratio, but oppositely "twisted."

One of the grand thing about twins (that didn't make the above "plus" list) is that with counter-rotating props, the model will tolerate a higher prop pitch, making shorter, fatter motors tenable. Now twin modeling subjects don't need to have nacelles that extend from here to kingdom come.

My FAC Nats-winning De-Havilland Flamingo has 35-in. span, weighs 68 grams empty, swings 8-in. props. Each motor is one loop each of 1/8 and 3/16 nearly 30-in. long—in a space less than 6-in., motor hook to rear peg!

For those who would rather use stock propellers, you must institute "differential downthrust." Let's say we want to save some prop carving/forming time and just grab a pair of stock 8-in. Peck plastic props. The port prop may have 0-3 deg downthrust, while the starboard prop will have 3-6 deg downthrust.

Applying swishy science once again to the effects of gyroscopic progression, this extra downthrust on the starboard side "keeps that wing down" for level flight, stopping the ship from screwing it's way to port and heading into terra firma. Chris Starleaf uses it almost exclusively in his twin ships. The late Bob Bojanowski's Tigercat flew like gangbusters with either setup, as did Starleaf's A-26!

In either case, you need more downthrust that you might imagine in a twin, so it behooves you to build in 3 deg of downthrust in each nacelle. For ships with spinners, design the nacelle to cant downwards from the wing (not noticeable) or facing the nacelle faceplate down that much during construction (a little more noticeable). If no spinner is involved, get downthrust any way you can.

If you do nothing else when building a twin, follow these rules:

(a) Keep it lighter–than-light everywhere, especially all structure *in front* of the CG. Remember, you have twice the propeller, freewheel latch, noseblock, and prop hook in front of the CG. It will surprise you, if you build light, how often you'll need a bead of clay on the fanny of your twin job.

(b) Make the noseblocks fit so tight that removing them is a two-handed operation.

(3) When you shim the noseblock, make sure all four sides (except the bottom if the peg is indeed square) or all around the plug (if it is rounded) is shimmed.

(4) You want counter-rotating props to spin so the blades swing "out at the top;" i.e., (if you were sitting in the cockpit) the port prop, spinning to the left; the starboard prop, to the right.

This noseblock stuff is vital: If something on one side moves even the slightest at full winds, you'll likely take that plane home in a matchbox.

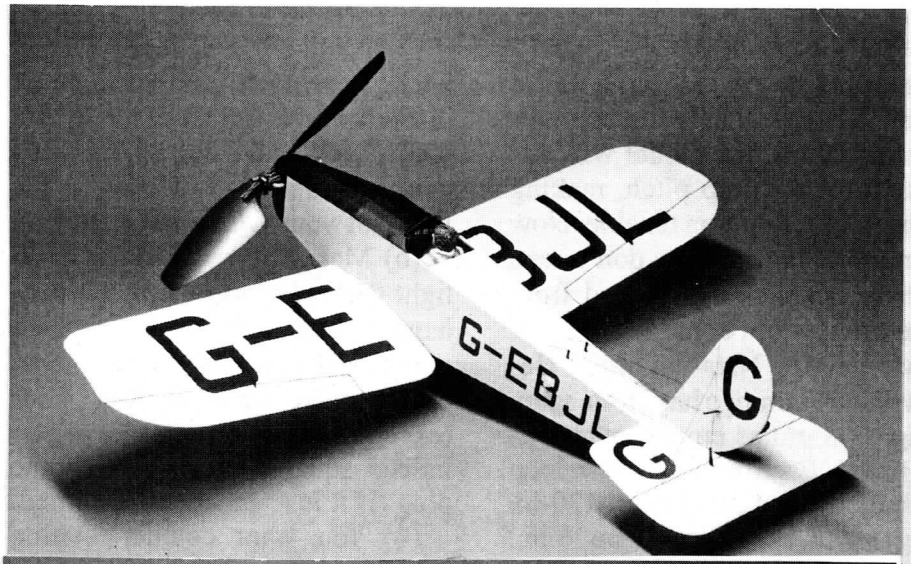
Here's my favorite way of holding the props and launching a twin. At the same place in each noseblock (anywhere near the center of the prop's arc) drill a 1/16 hole and CYA in a short length of 1/16 tubing.

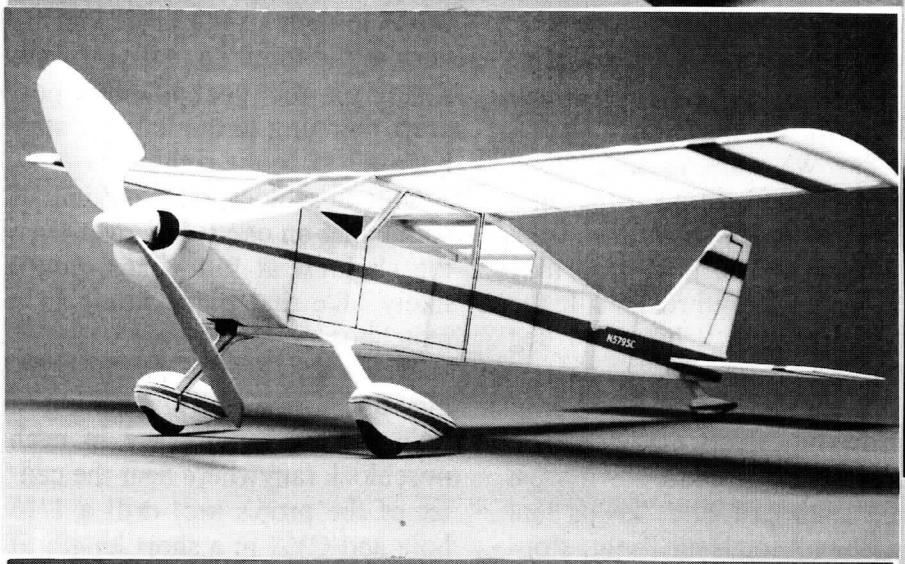
Now you construct a "pull stick". Measure the distance between the two "pull holes", and get yourself a ruler, chopstick, dowel, etc., and cut it to just about that length. Drill a hole through the stick at each end, tying a 12-15-in. length of string through each hole. At the other end of each string, attach a 2-in. length of wire that will fit into the 1/16-in. tubing. Just bend a loop on one end of each wire and tie those suckers on. This is your prop-stop. □

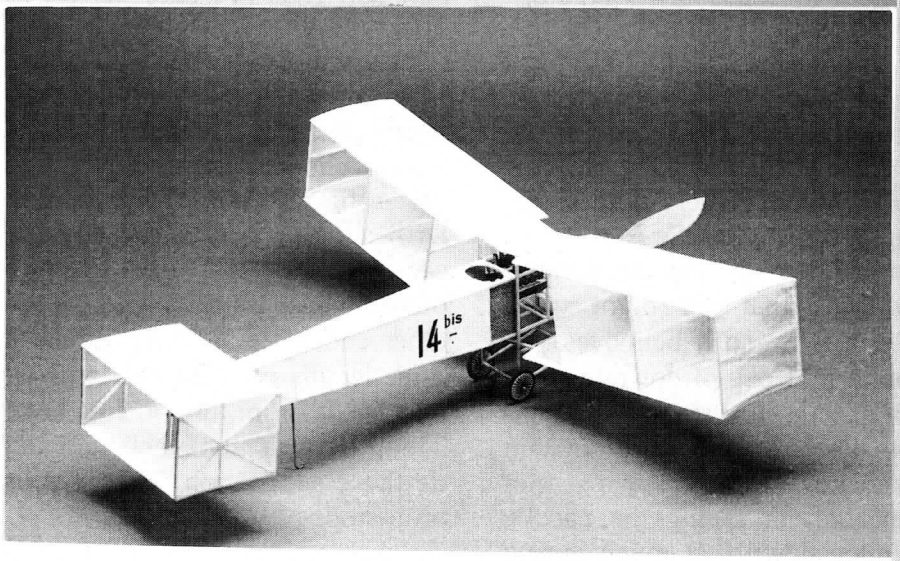
Errata: Dihedral for Bipes

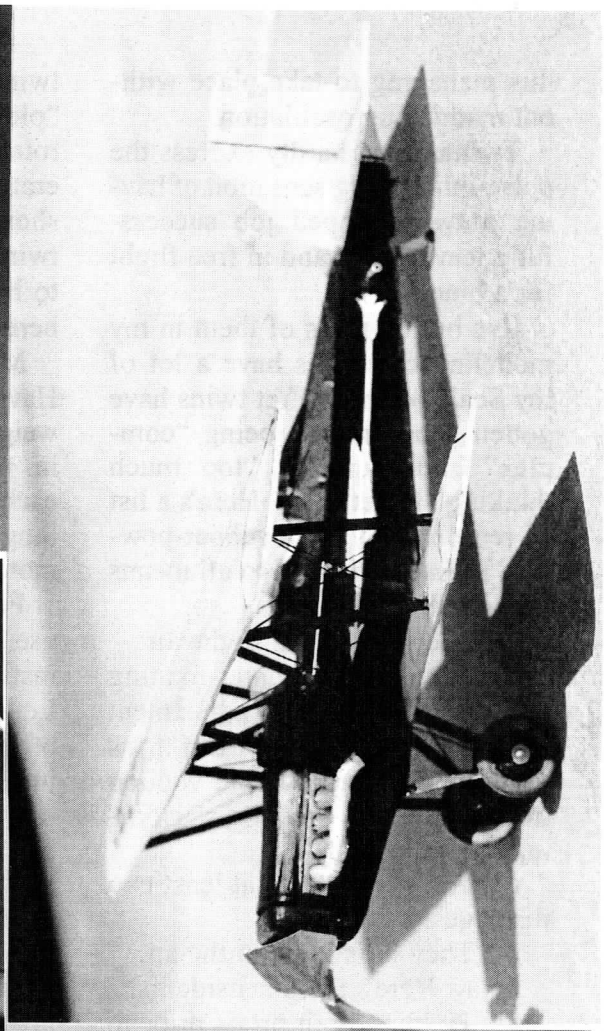
Part 1 of Vance Gilbert's series on scale (January, p. 13) stated recommended dihedral for biplanes as "1/4-in. per 30 in. of wingspan."

That should have read "1-1/4 in. per 30 in. of wingspan."





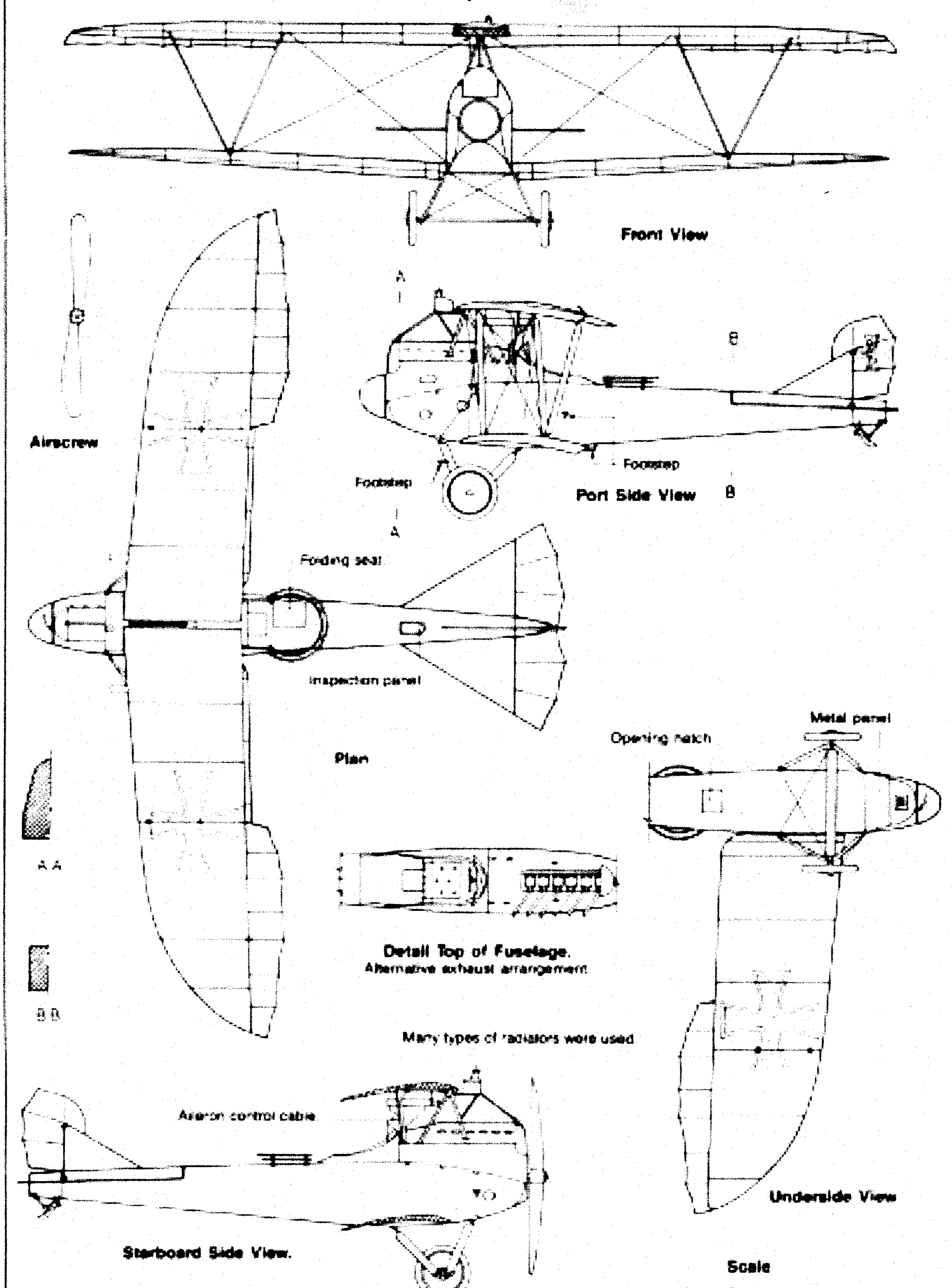




LEFT COLUMN; THREE PHOTOS FROM JIRO SUGIMOTO FROM JAPAN. PEANUTS BRISTOL BROWNIE AND BEDE 4 AND AT THE BOTTOM IS HIS PISTACHIO SCALE SANTOS-DUMONT 14BIS WHICH WON A RECENT INDOOR CONTEST WITH A FLIGHT OF 117 SECONDS!

RIGHT COLUMN ARE TWO PICS FROM JAKE LARSON OF HIS PITCAIRN FLEETWING BUILT FROM A "CLASSIC AIRCRAFT MODEL CO.'S LATEST KIT. SEE AD IN THIS ISSUE.

Lloyd CV



SOURCE: W.K.F. general arrangement drawing

ACKNOWLEDGEMENTS: Special thanks to G Haddow, R Stach and P Grosz

X - AIRCRAFT

by
Fran Ptaszkiewicz D.S.M.

The McDonnell Aircraft Corp. was formed in St. Louis Missouri on July 6, 1939 by James Smith McDonnell, following his previous association with Glenn L. Martin in Baltimore. A period lasting from 1932 thru 1938, where McDonnell was appointed Chief Project Engineer for landplanes and responsible for the Martin B-10 and B-12 series of bomber's which saw service with the U. S. Army Air Corps and other foreign air forces before and during the early part of World War II.

The new company's first design to win a construction order, was for a twin-engine, single-seat,long-range fighter that had been developed in response to U.S.A.A.F. specification R-40. Interestingely, the company's design team had already been working on this project since July 1939 when the company was founded.

The XP-67 had originally been designed to have pusher propeller's. However, after review by the military, this design submitted in August 1940 was rejected. A second design featuring tractor propeller's was submitted on July 29, 1941, accepted, with an order placed for two prototypes.

Utilizing the latest aerodynamic design theory's, the airplane was a smooth blend of wing, fuselage, engine-nacelles and tail assembly. These faired flowing lines, were in such harmony that when viewed from a slight elevation, gave the aircraft the look of a Bat or called "Moonbat" by some.

The engine nacelles,located in mid-wing, were to house two 1,350 hp Continental XI-1430-17/19 inverted-vee, 12 cylinder liquid cooled turbo- supercharged engines. Unfortunately these new experimental power-plants became a constant source of problems, particullarly with the turbo-superchargers which were prone to catching fire before the difficulties were resolved. As a result the new engines never achieved their design rating, falling short and reaching approximately 1,060 hp at best.

In anticipation of being a bomber-destroyer, armament was to consist of six 37mm cannons in the wings or a mix of six .50 caliber machine guns and four 20mm cannons. A 75mm cannon was also considered to be a possibility, however this installation and it's attendant hardware would leave little or no room for fuel storage. As it was the fuselage which was semi-monocoque and Alclad covered, had most of it's interior space taken up by fuel tank's.

In January of 1944, after innumerable delay's, the airplane made it's first flight from Scott Field, Illinois. After an excessively long take-off run, the pilot reported the aircraft to be easy to handle but possessed a slow rate of climb. Also the anticipated top speed of 472 mph was never reached with the ship struggling to do 400 mph at 25,000 feet. Cruising speed was 270 mph.

Sadly, on another later test flight, one of the engine's caught fire and although the airplane landed safely, it was totaly destroyed after only 43 hours of flight time. As a result all work was halted on the second prototype which could have been a better performing airplane as it was planned to use Rolls-Royce "Merlin" engines.

A some what radical design feature of that time was the implementation of an interest by McDonnell in the use of engine exhaust gasses. This thrust augmentation as it was called, utilized a good portion of those gasses by ducting through small jet nozzles located at the rear end of the engine nacelles, creating a jet assist type of effect and therby using the burned and unburned gasses, thus converting them to a useable power assist source.

Sadly, with the new engine development problems proving it's undoing, this proposed high-altitude, twin-engine, single place fighter which featured another innovation of the period, a pressurized cockpit, never reached production status. The result, it's potential impact as a fighter was never realized.

Some XP-67 specifications were; Wingspan 55 ft., Wing Area 414 sq. ft., Length 44 ft. 9 in. and Height 15 ft. 9 in.

The three-view drawing is from the June 1945 issue of Model Airplane News and was drawn by W.A.Wylam.

This design should be a good candidate for an electric powered free-flight scale model

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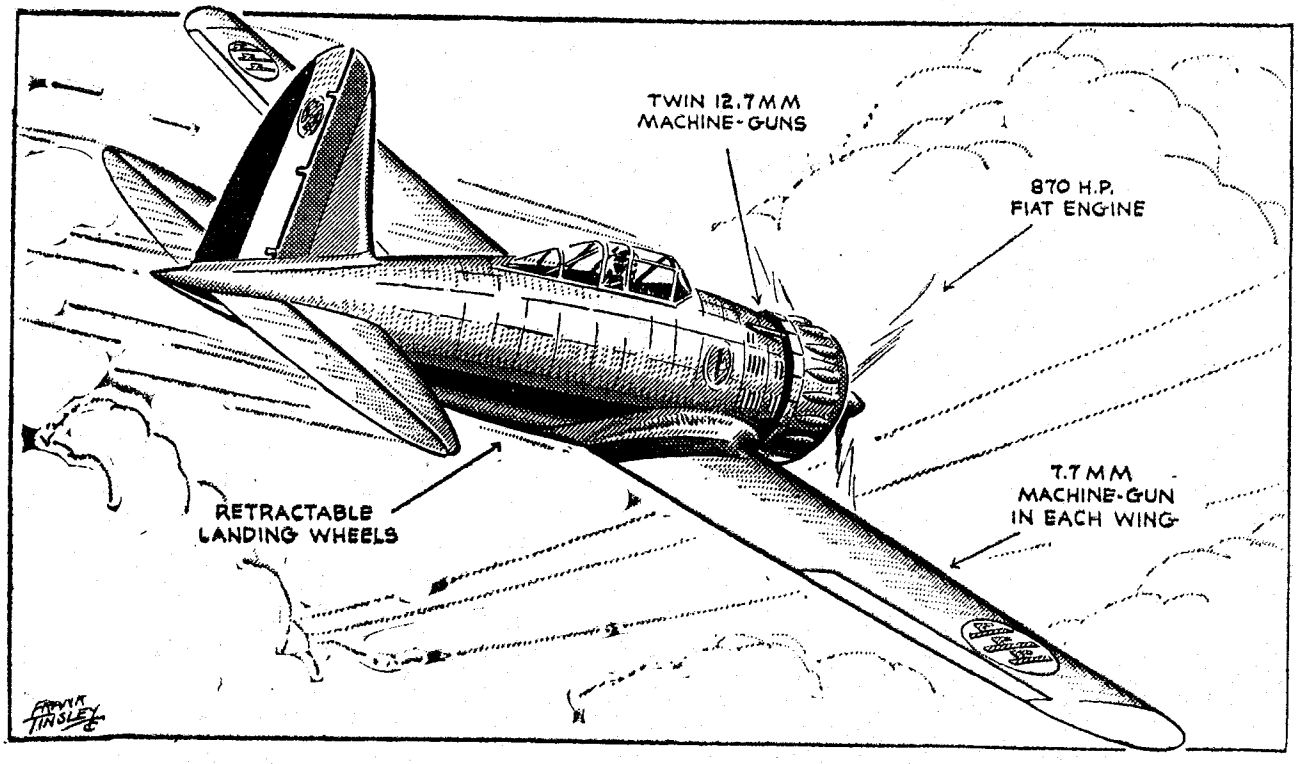
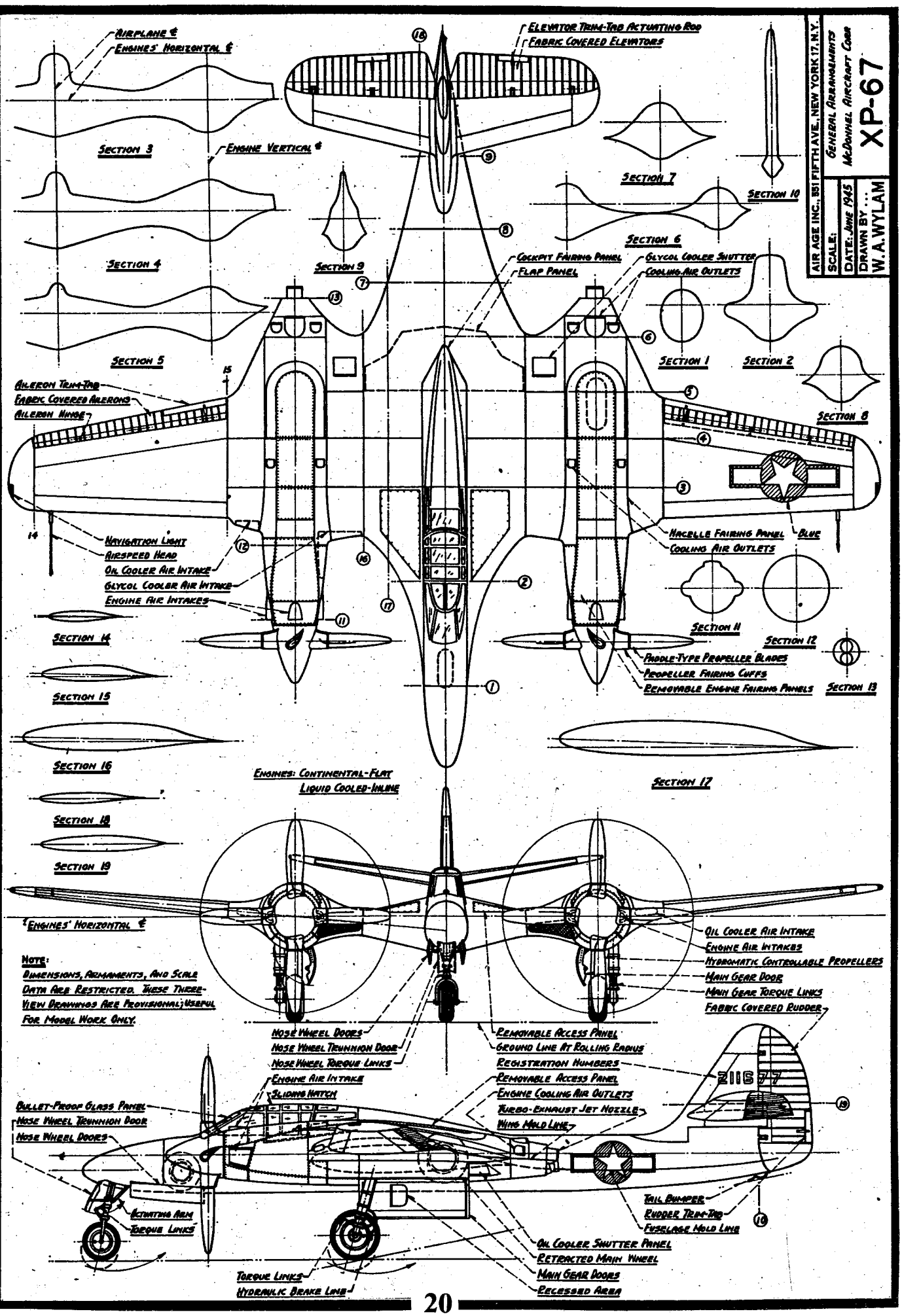
Portfolio of War Planes

BY FRANK TINSLEY

MACCHI C-200



Designed by Mario Castoldi, producer of the world record-breaking seaplane, the C-200 is the latest and best of Il Duce's single-seater fighters. Powered with an 870 h.p. Fiat radial engine driving a constant-speed Hamilton propellor, the 200 hits a maximum speed of 313 m.p.h. It climbs to 20,000 feet in a little over six and a half minutes and has an absolute ceiling of 33,000 feet. Armament consists of two Breda "Safat" 12.7 mm. machine guns mounted in the fuselage and a pair of 7.7 mm. guns in the wings.


AIRPLANE ℄
ENGINES' HORIZONTAL ℄
ENGINE VERTICAL ℄
ELEVATOR TRIM-TAB ACTUATING ROD
FABRIC COVERED ELEVATORS
SECTION 3
SECTION 4
SECTION 5
SECTION 6
SECTION 7
SECTION 8
SECTION 9
SECTION 10
SECTION 1
SECTION 2
COCKPIT FAIRING PANEL
FLAP PANEL
GLYCOL COOLER SHUTTER
COOLING AIR OUTLETS
AILERON TRIM-TAB
FABRIC COVERED AILERON
AILERON HINGE
NACELLE FAIRING PANEL
COOLING AIR OUTLETS
BLUE
NAVIGATION LIGHT
AIRSPEED HEAD
OIL COOLER AIR INTAKE
GLYCOL COOLER AIR INTAKE
ENGINE AIR INTAKES
SECTION 11
SECTION 12
SECTION 13
SECTION 14
SECTION 15
SECTION 16
SECTION 17
SECTION 18
SECTION 19
PADDLE-TYPE PROPELLER BLADES
PROPELLER FAIRING CUFFS
REMOVABLE ENGINE FAIRING PANELS
ENGINES: CONTINENTAL-FLAT
LIQUID COOLED-INLINE
℄ ENGINES' HORIZONTAL ℄
NOTE:
DIMENSIONS, ARMAMENTS, AND SCALE DATA ARE RESTRICTED. THESE THREE-VIEW DRAWINGS ARE PROVISIONAL; USEFUL FOR MODEL WORK ONLY.
OIL COOLER AIR INTAKE
ENGINE AIR INTAKES
HYDROMATIC CONTROLLABLE PROPELLERS
MAIN GEAR DOOR
MAIN GEAR TORQUE LINKS
FABRIC COVERED RUDDER
NOSE WHEEL DOORS
NOSE WHEEL TRUNNION DOOR
NOSE WHEEL TORQUE LINKS
ENGINE AIR INTAKE
SLIDING HATCH
REMOVABLE ACCESS PANEL
GROUND LINE AT ROLLING RADIUS
REGISTRATION NUMBERS
REMOVABLE ACCESS PANEL
ENGINE COOLING AIR OUTLETS
TURBO-EXHAUST JET NOZZLE
WING MOLD LINE
BULLET-PROOF GLASS PANEL
NOSE WHEEL TRUNNION DOOR
NOSE WHEEL DOORS
ACTUATING ARM
TORQUE LINKS
TAIL BUMPER
RUDDER TRIM-TAB
FUSELAGE MOLD LINE
OIL COOLER SHUTTER PANEL
RETRACTED MAIN WHEEL
MAIN GEAR DOORS
RECESSED AREA
TORQUE LINKS
HYDRAULIC BRAKE LINE
AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.
SCALE:
DATE: JUNE 1945
DRAWN BY ... W.A.WYLAM
GENERAL ARRANGEMENTS
McDONNEL AIRCRAFT CORP.
XP-67

NEW PLANS AVAILABLE

Stout Outdoor O.T.R.	Model Aircraft	30"	$5.00
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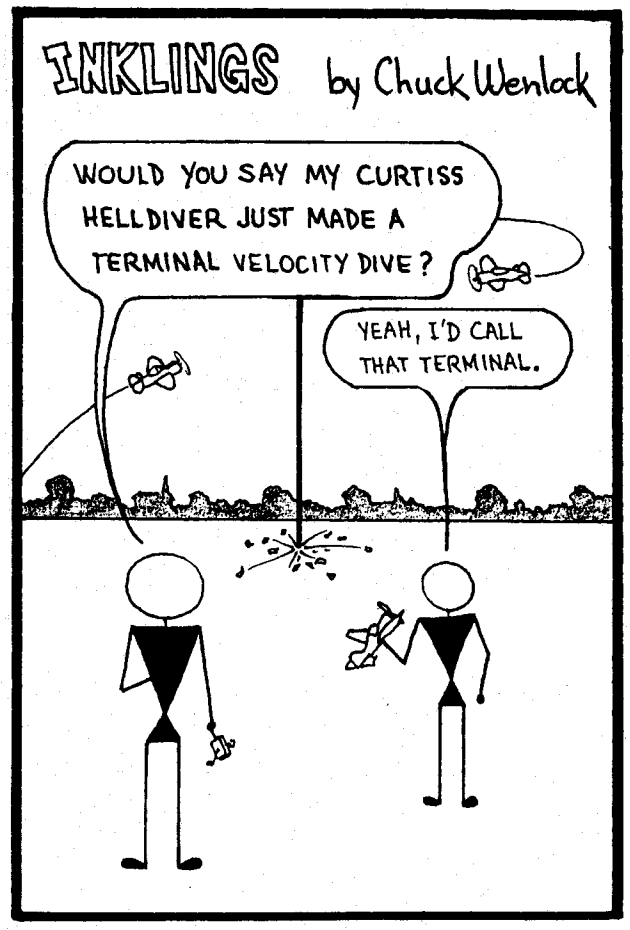
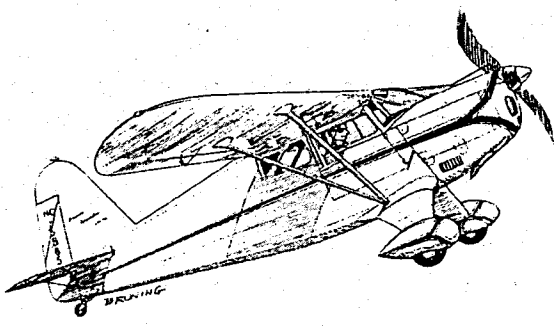
Interstate L-6	Cleave	28"	5.00
Swoose (old time rubber)	Cleave	25.5	5.00
Sopwith ½ Strutter	Tom Nallen I	20"	6.00
Vought Vindicater SB2U	Tom Nallen I	22.5"	6.00
Lavochkin La-11	Tom Nallen I	22"	7.00

Send a self addressed stamped envelope to; FAC-GHQ, 3301 Cindy Lane, Erie, Pa. 16506 for a complete list of Plans for sale.



2008 FAC CALENDAR IS NOW READY

The 2008 FAC Calendar is now ready for shipment. It features photos of some of the finest models you will see anywhere, built by some of the finest model builders in the world. To get yours send just $20.00 (postpaid) to Flying Aces, 3301 Cindy Lane, Erie, Pa. 16506.



The T-shirt for this year's FAC Outdoor Champs is now ready For all you Clubsters. It is sure A beauty! Design on the cover Of this issue by Pres Bruning. White shirt with the Rearwin in Red, Beautiful! All sizes in stock. Small, med., lge., X-lge., XX-lge, XXX-lge. $15.00 each postpaid. Send your orders to; FAC-GHQ, 3301 Cindy Lane, Erie, Pa. 16506.

POSTAL CONTEST

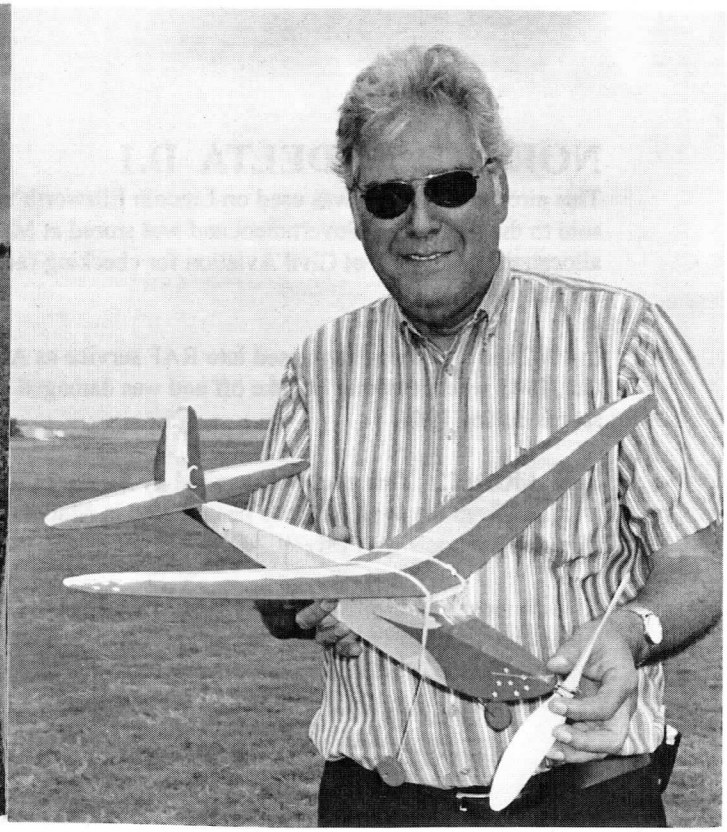
WE ARE STARTING A POSTAL CONTEST AS YOU READ THIS. THERE WILL BE 4 DIVISIONS; INDOOR PEANUT, OUTDOOR PEANUT, INDOOR NO-CAL, OUTDOOR NO-CAL. FLY YOUR MODEL AND SEND YOUR TIMES TO; FAC-GHQ, 3301 CINDY LANE, ERIE,PA. 16506. CONTEST TIMES ALSO COUNT. WHENEVER YOU BETTER A TIME WITH A PART-ICULAR MODEL SEND IN THE TIME. ENTER AS MANY MODELS AND AS MANY TIMES AS YOU WANT. CONTEST CLOSES ON APRIL 30, 2008. ENTRIES POST-MARKED AFTER MAY 1, 2008 WILL NOT BE ACCEPTED.

S.O.S.---S.O.S.---S.O.S.

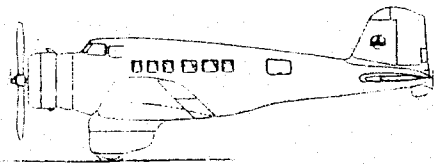
Bruce Conway, 3850 Marburg Ave., Cincinnati, Ohio, is looking for the Following; plan copy of 30"-- 40" Monocoupe by Eagle Model Co., print wood copy for Berkeley 37" P-51 controliner, Ideal boat kit #1544 "Sea Breeze", instruction copy for Comet P-10 Taylorcraft and P-1 Blackburn Shark plus print wood Copies, Phone (513) 321-5182.

CAMCO KITS

CAMCO'S LATEST KIT IS NOW AVAILABLE; THE PITCAIRN FLEETWING, 16" SPAN, DESIGN-ED BY DAVE STOTT, $15.00. ALSO AVAILABLE; REARWIN CLOUDSTER,$14.00, HOLLY-WOOD HAMILTON, $14.00 AND JIMMIE ALLEN SPECIAL, $14.00. SHIPPING $7.25. CAMCO, 3301 CINDY LANE, ERIE,PA. 16506



Photos by Fred Wunsche from Muncie, In. Sept. 8-9, 2007. Top; Mike Welshans with his Rearwin Speedster, plan available from GHQ, see ad in this issue. Pete Azure and his O.T. Rubber ship (?). Bottom row is Alan Shields with his Curtiss Helldiver from an Easy Built kit and Wally Farrell with his Bell P-63 Kingcobra.



NORTHROP DELTA D.1

This aircraft (N14267) was used on Lincoln Ellsworth's final Antarctic expedition 1938/39, and was then sold to the Australian Government and was stored at Mascot (Sydney) in Feb. 1939. In 1940 it was allocated to the Dept. of Civil Aviation for checking radio navigation aids and was registered VH-ADR in August 1940.

In 1942 the Delta was impressed into RAF service as A61-1 and was flown by 34 and 37 squadrons until 19 Oct. 1943 when it swung on take off and was damaged beyond repair, ultimately being dismantled for spares during 1944.

THE MODEL; This plan was inspired by Steven Portellis Co2 model of several years ago, which was enlarged from the Walt Mooney peanut plan in Model Builder. Its stable flights dispelled the myth that "low wing models won't fly"!!

As with most of our plans, build it as drawn (21" span) or enlarge to suit your needs. A few extra wing ribs may be needed in a larger version, and perhaps sheeted leading edges. Thanks to Stephen for the drawings showing the RAAF markings and colors, etc. We took this plan from the newsletter of the FAC Squadron in Australia.

NEWS RELEASE

Bob's AIRCRAFT DOCUMENTATION [formerly SCALE MODEL RESEARCH], the World's Largest Commercial Collection of FULL–COLOR Aircraft Documentation FOTO–PAAKS and 3-view drawings has expanded their inventory again.

The 233 page, 22nd Edition of their Catalog, now on CD, lists over 8,200 different FOTO–PAAKS *(200 **new this issue** representing 400,000 photos in stock)*, 39,000 3-view drawings, and includes 10 scale related articles written by some of the top competitors and authorities in the scale movement.

The FOTO–PAAK *(studies)* are full-color 3½"x 5" (or 4" x 6" upon request) pictures taken with the modeler in mind, to show details like paint scheme, markings, instruments, landing gear, etc. These Paaks are sold on a satisfaction guaranteed basis, and because of the large inventory, orders are usually mailed within 24 hours.

Bob Banka, the owner/photographer, states that in his Catalog you will find different FOTO–PAAKS listed for approximately:

300 - Pre 1920's	350 - Sailplanes	350 - Helicopters	650 - Aerobatic
215 - Seaplanes	700 - Jets	1,750 - WW II Fighters/Trnrs	200 - Racing
750 - Multi-engine	4,200 - Civilian	135 - Aircraft engines	100 - Rockets
			Bombs & Guns

For example, this includes FOTO–PAAKS of:

245 - P-51's	100 - Stearmans	50 - Corsairs	15 - Jennys
80 - Extras	40 - Spitfires	50 - Tigermoths	50 - DC-3/C-47's
35 - P-40's	60 - J-3 Cubs	30 - Monocoupes	45 - F-86's
200 - AT+6/SNJ's	30 - P-38's	32 - P-47's	50 - B-25's

Most FOTO-PAAKS have 3–view drawings available that will enable the modeler to have complete documentation for their project. The 3–views are either KOKU-FAN drawings, or copies of drawings gleaned from modeling and/or full-size aircraft magazines and other sources. Bob has more than 39,000 drawings in stock. Many are obscure and unusual aircraft not commonly available.

Modelers and enthusiasts can get their **22nd Edition of Bob's AIRCRAFT DOCUMENTATION** *(CD Catalog)* by sending $5.00 ppd *(USA, Canada/Mexico, all other countries $8.00 - includes Air Post) to:*

Bob's **Aircraft Documentation**
3114 Yukon Avenue
Costa Mesa, CA 92626
(714) 979-8058

Bob's Aircraft Documentation, is a full time business run from his home/office and when not there, he is usually off shooting pictures at an airshow or museum or at a Model Trade Show or event. The best times to call are 8:00 a.m. to 9:30 a.m., or 12:00 noon to 6:00 p.m., all Pacific time, of course. Credit cards accepted.

Bob's AIRCRAFT DOCUMENTATION [Scale Model Research] has dealers in Argentina, Australia, Denmark, France, Germany, Italy, Netherlands, Norway, South Africa, Spain, and Sweden.

You can find the Bob's Aircraft Documentation on the internet at www.bobsairdoc.com.

EDITORS and COLUMNISTS ONLY: If you are in need of documentation for your next Scale Kit Product Review or Plan Presentation, I will gladly provide the photos and 3–views **FREE!** (I would, of course, appreciate acknowledgment). **Please contact me stating when and where the article is expected to run and which documentation you want. Please feel free to edit irrelevant information if using this material for your column.**

LLOYD CV

AUSTRO-HUNGARIAN
2 PLACE FIGHTER
BY GREG WEST
PSEUDO-DIME 16" WS

ALL WOOD 1/16TH. STRUTS SPLIT VENEER FROM CIGAR BOX OR SPLIT BAMBOO. BUILD LIGHT! RIGGING AND DETAILS CAN BE FOUND WITH A LITTLE RESEARCH.

Cover top toward section with paper

CENTER WING STRUT

SOFT BLOCK

S1

S2

S3

METAL ABOVE DOTTED LINE

B

A

CG

46.0"

METAL ON BOTTOM TO

6 CYL EXHAUSTS

Soft balsa spinner

B1

SA

S3

B-E

A-C

B-D

MAKE STRUTS LONG TRIM TO FIT

PAPER TRIANGLES

3

4

FORMER 4 IS SLIGHLY SHORTER

2.

1.

GUN RING IS GLUE SOAKED THREAD WRAPPED AROUND CELLOPHANE WRAPPED CORE TILL DRY

GUN CASE 1/8TH TISSUE COVER

1/16 HARD

REPRESENT WING GAP WITH BLACK TISSUE LINE OVER CENTER RIB

C

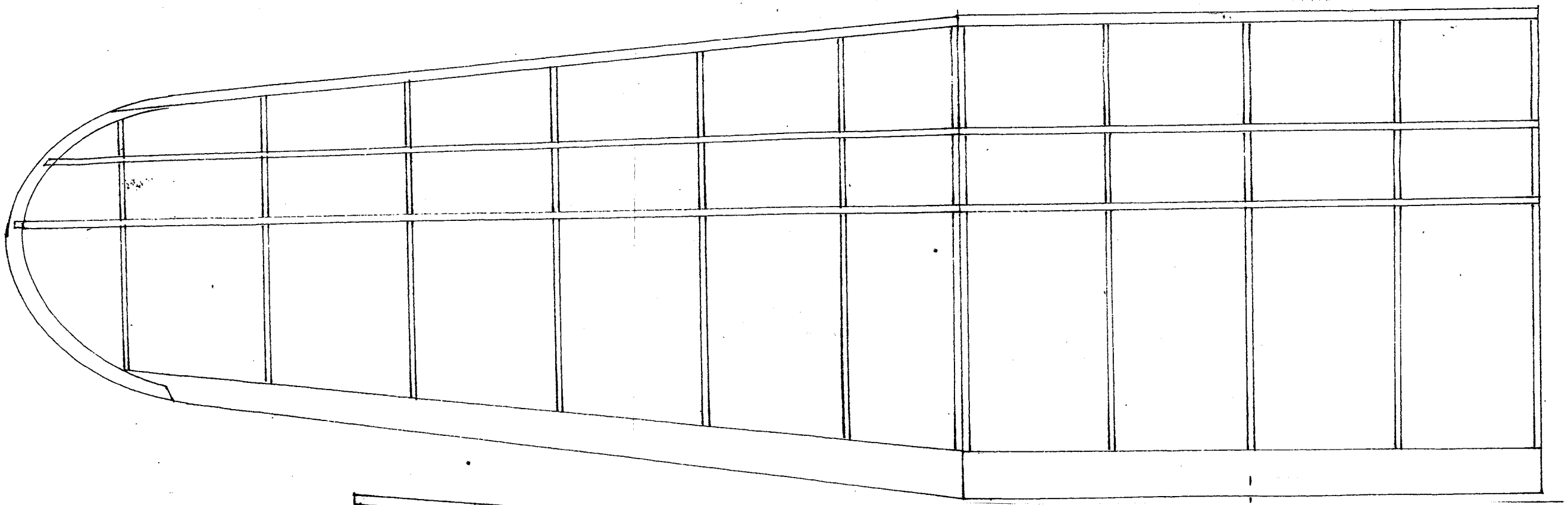
D

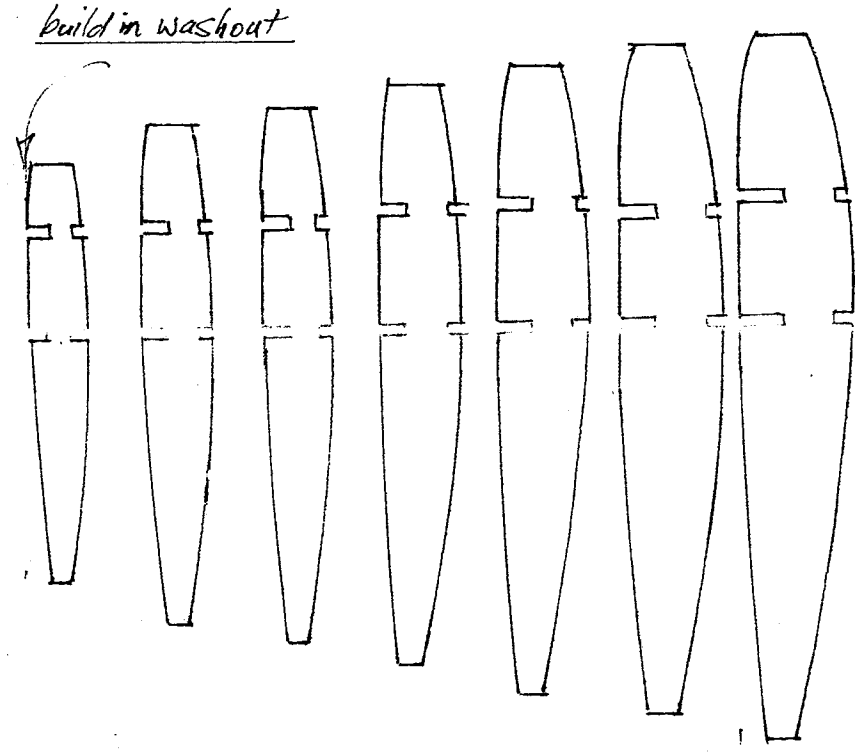
D

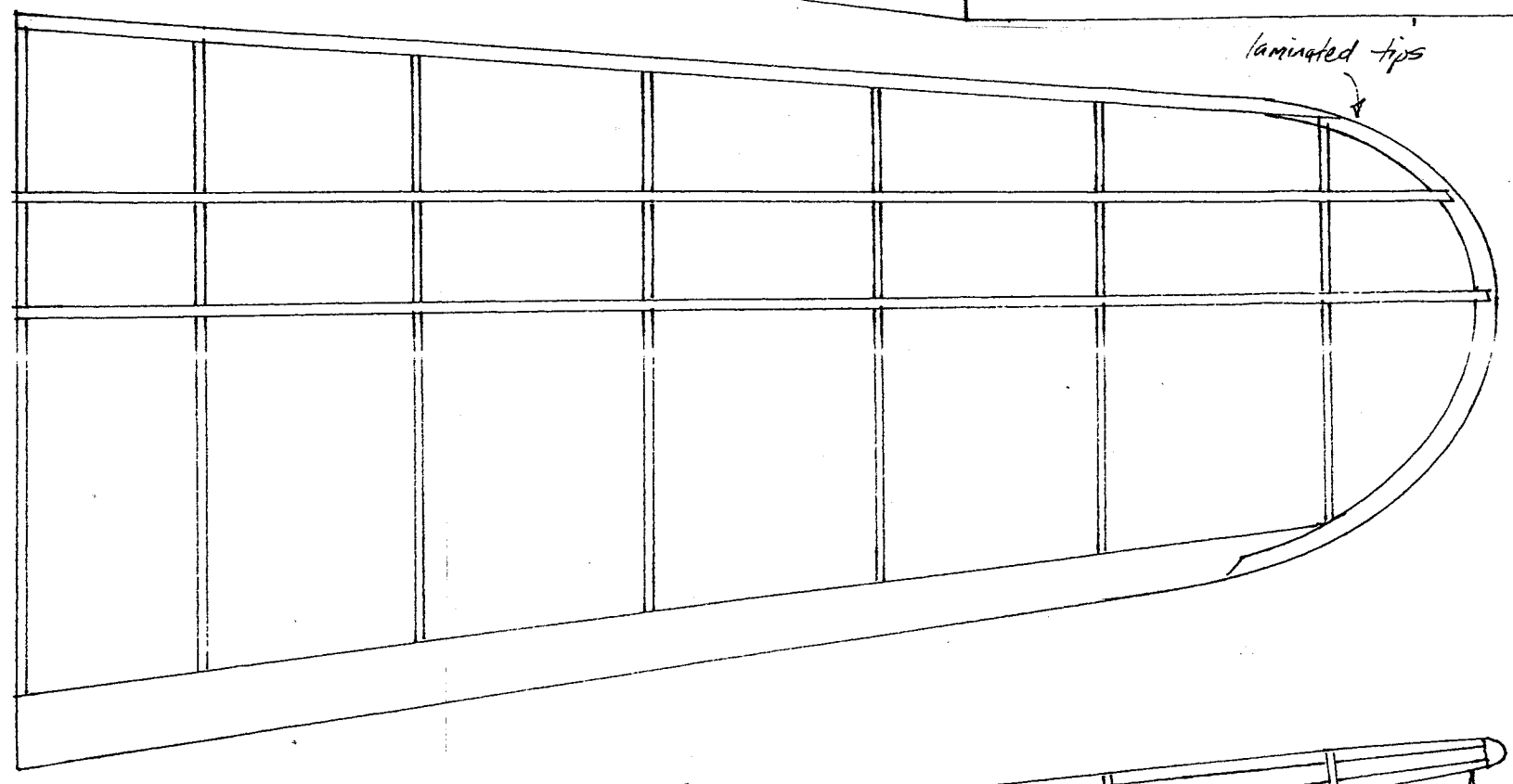
AILERON WHITE

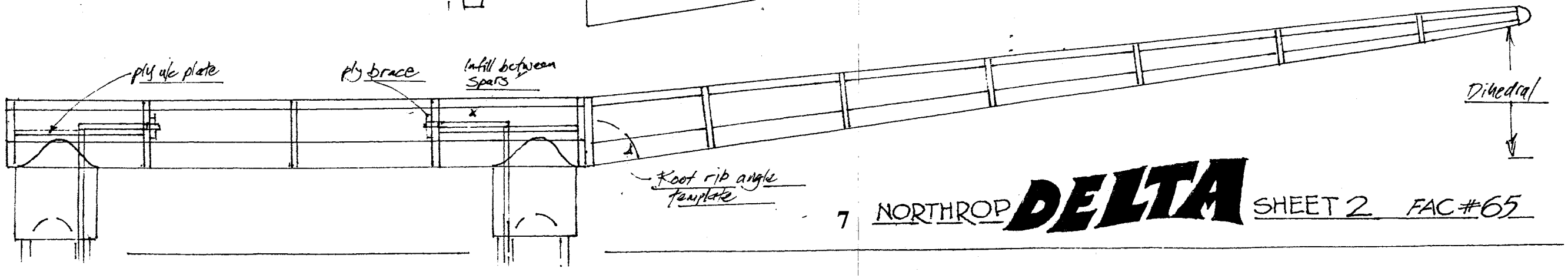
WHITE BLOCK BLACK CROSS

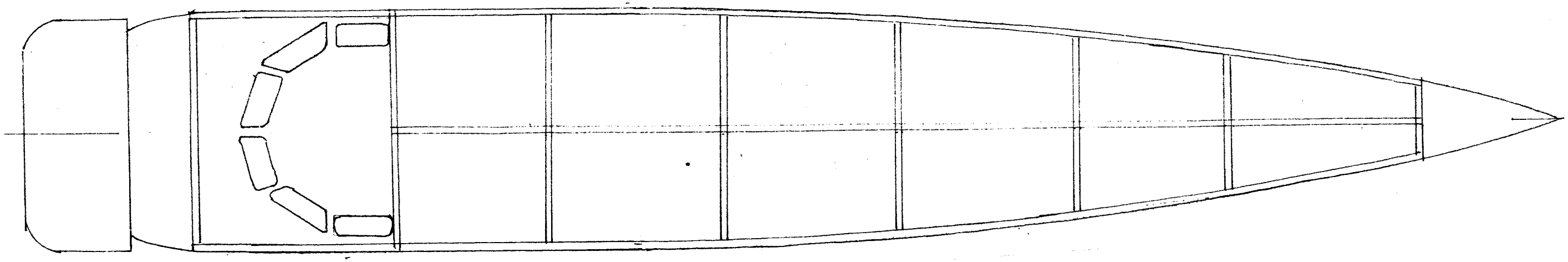
PLANE IS MAHOGANY PLYWOOD WITH LINEN AILERONS, STAB, AND FIN.
DIHEDRAL IS 3/4 INCH LOWER PANELS. TOP PANEL IS 1/2" EACH SIDE. WASHOUT
TIPS 1/16TH




build in washout


laminated tips


ply u/c plate
ply brace
infill between spars
Root rib angle template
Dihedral

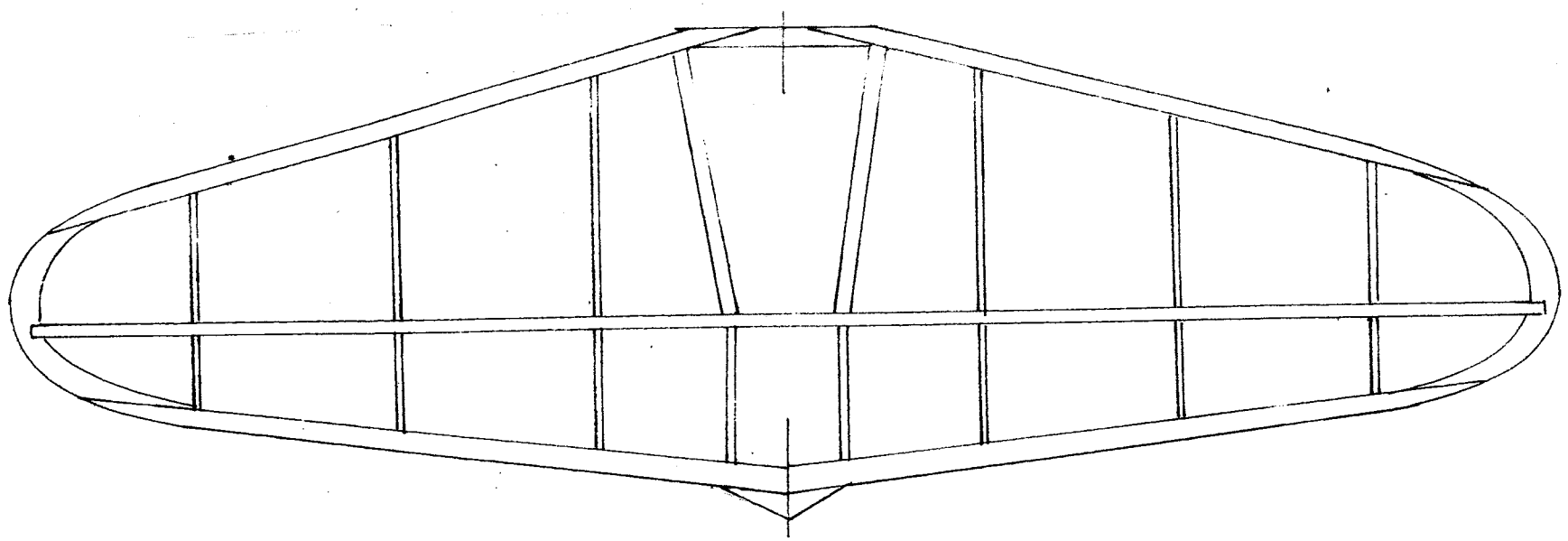


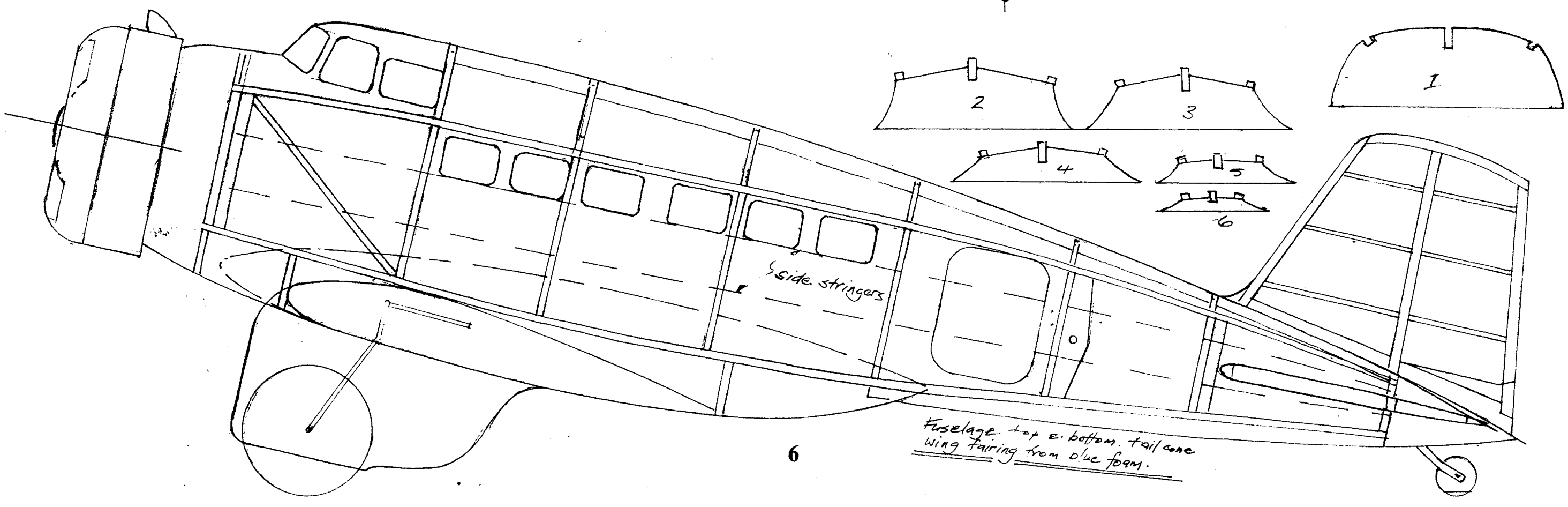
NORTHROP

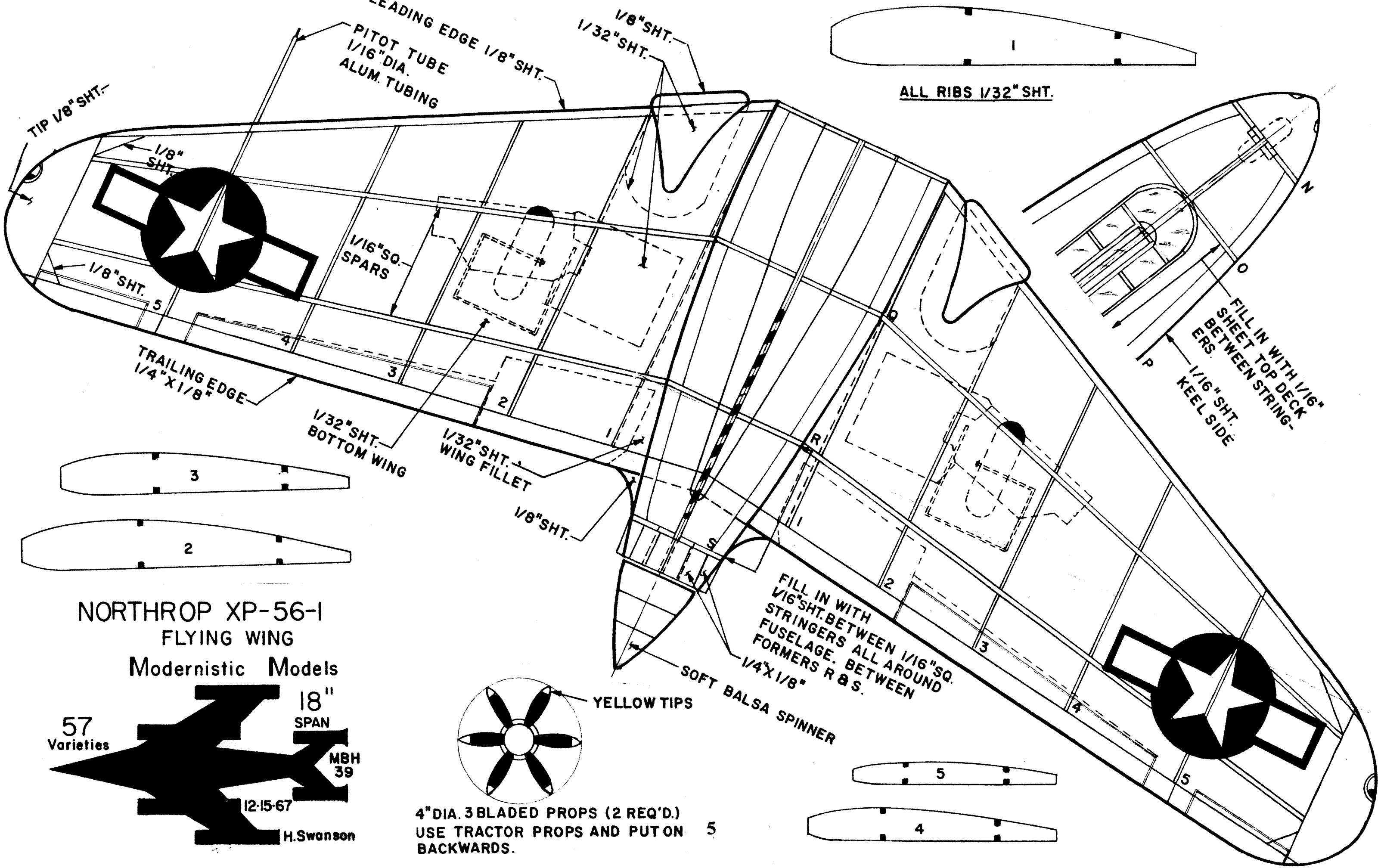
DELTA II

BASED ON STEPHEN PORTELLI'S
CO2 POWERED MODEL.
enlarge to suit your needs

Drawn by LLOYD WILLIS for
FLYING ACES DOWNUNDER
Chapter 65







NORTHROP XP-56-1

FLYING WING

Modernistic Models

57 Varieties

18" SPAN

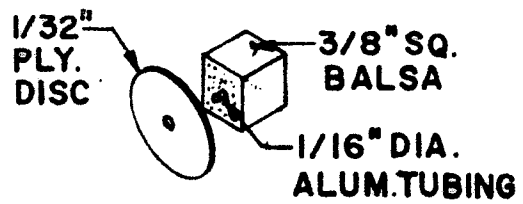
MBH 39

12-15-67

H. Swanson

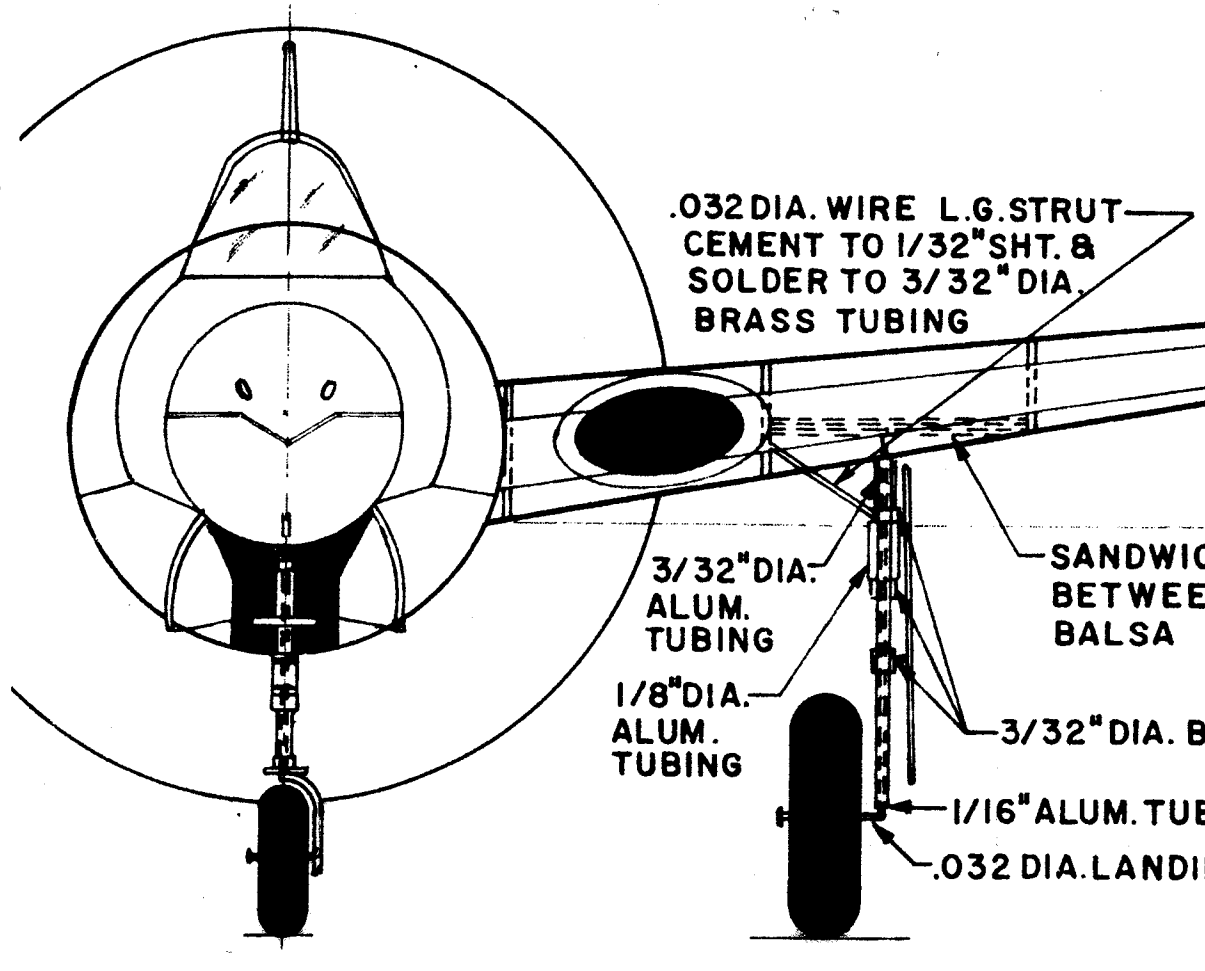
5

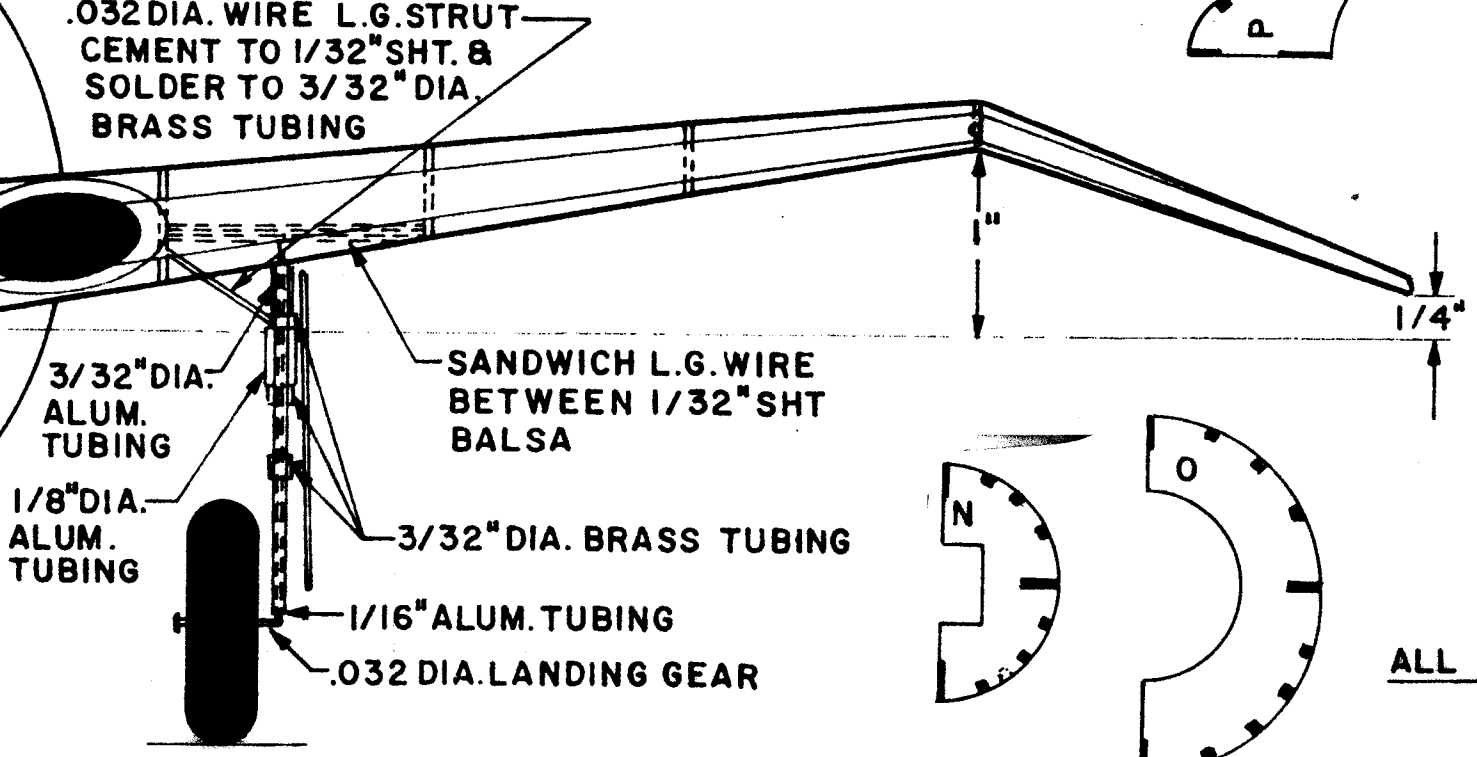
FILL IN WITH 1/16" SHT. BETWEEN STRINGERS ALL AROUND FUSELAGE. BETWEEN FORMERS N & O.

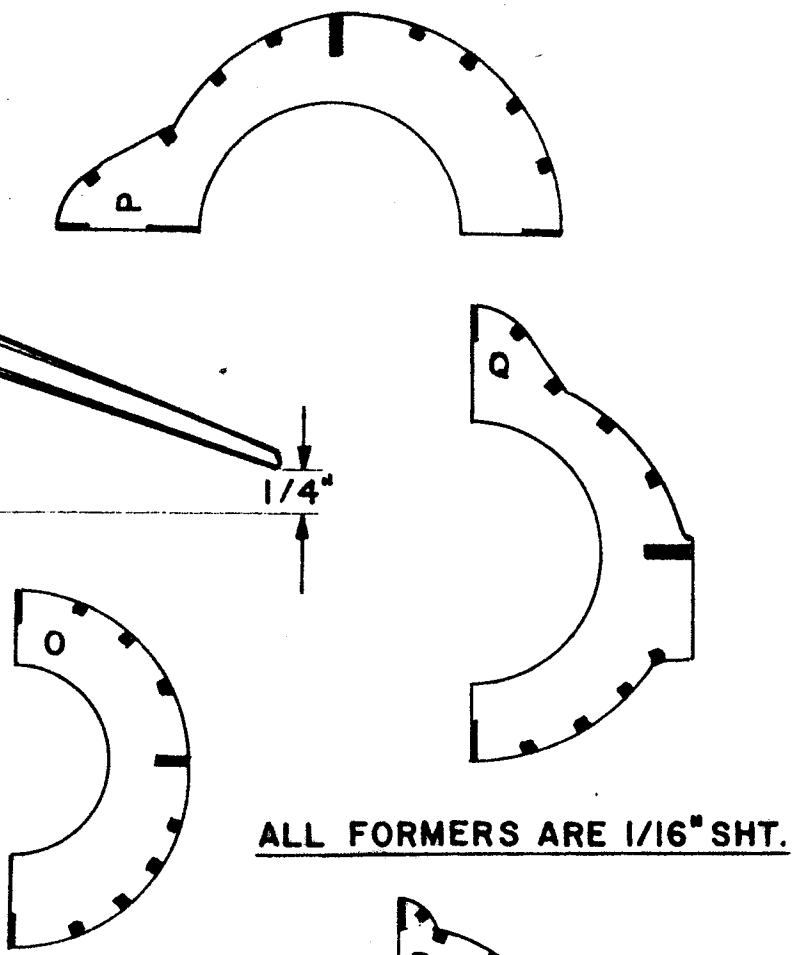


NOSE PLUG DETAIL

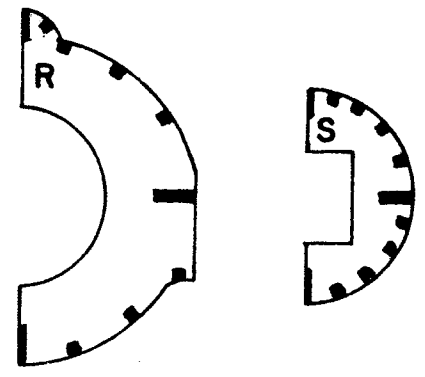
NOTE:
FILL IN WITH 1/16" SHT. BETWEEN STRINGERS. TWO STRINGERS EITHER SIDE OF BOTTOM KEEL BETWEEN FORMERS N TO P.

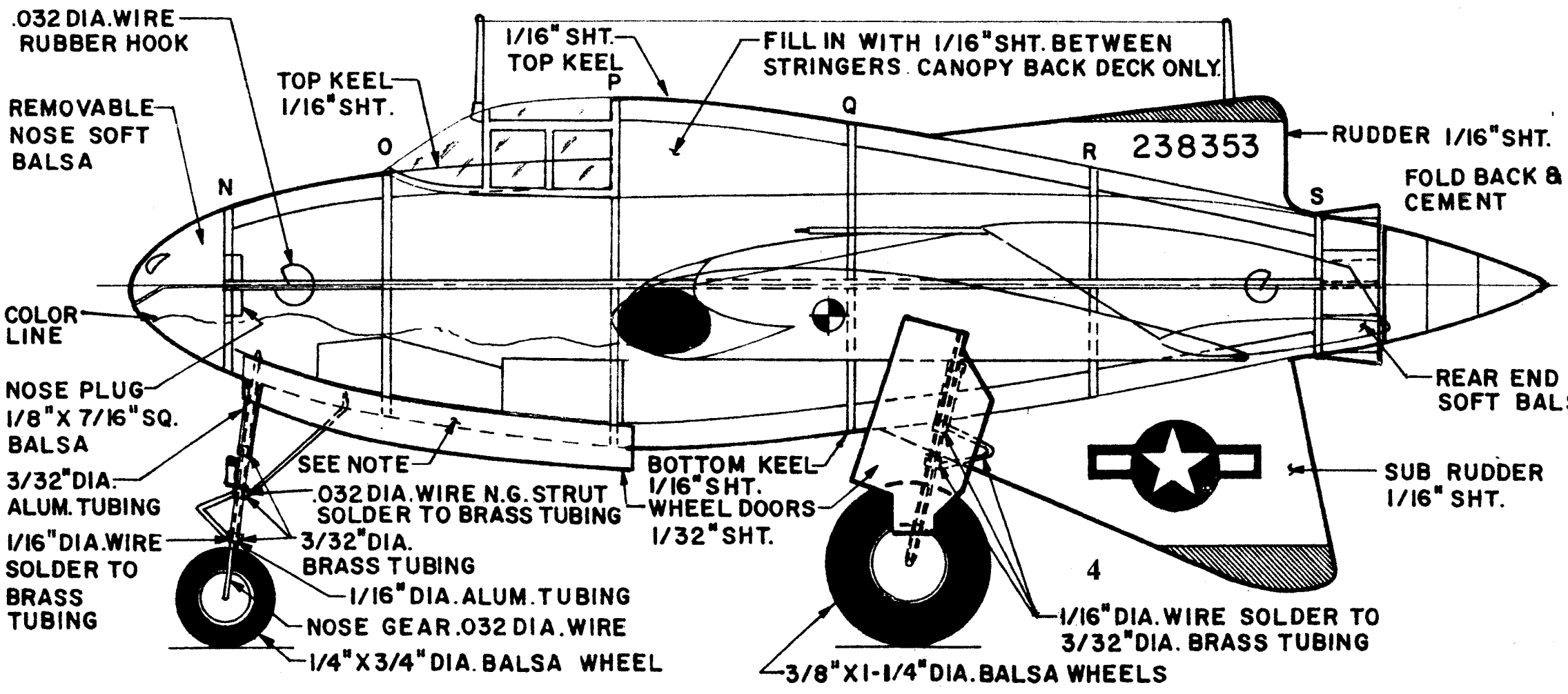


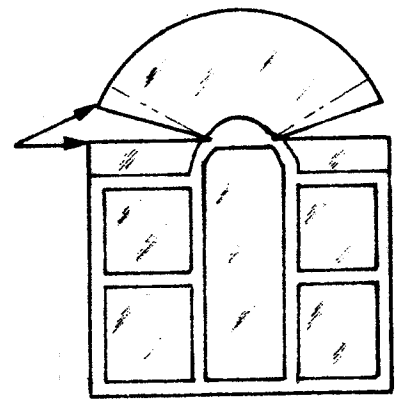




ALL FORMERS ARE 1/16" SHT.







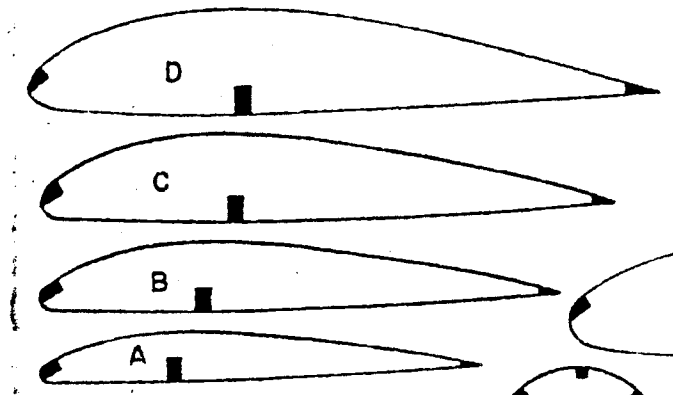
CANOPY PATTERN
.008 CELLULOID

COLOR

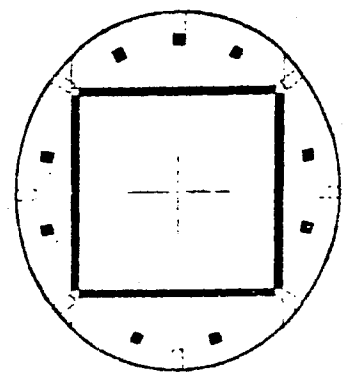
ORANGE
OLIVE DRAB TOP OF PLANE
LIGHT BLUE BOTTOM OF PLANE
BLACK PROP BLADES

NORTHROP XP-56-1 DATA

Prototype Single-seat experimental fighter
Engine: 1 x Pratt & Whitney R-2600-29 of 2000 Hp. Estimated max. speed 460 Mph.
Projected armament 2 x 20 mm. cannon and 4 x 0.5 in. mach. guns.
First flight Sept. 30-1943.



WING RIBS



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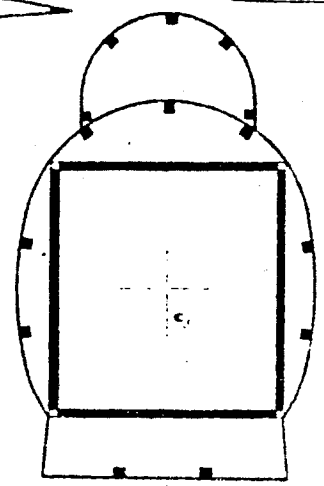

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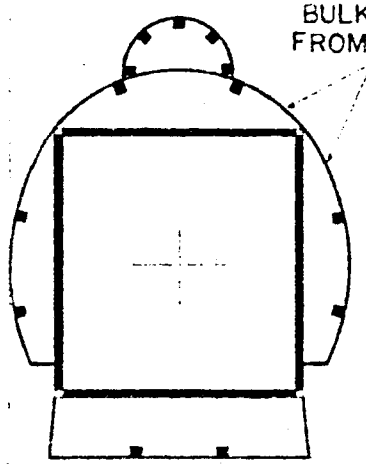
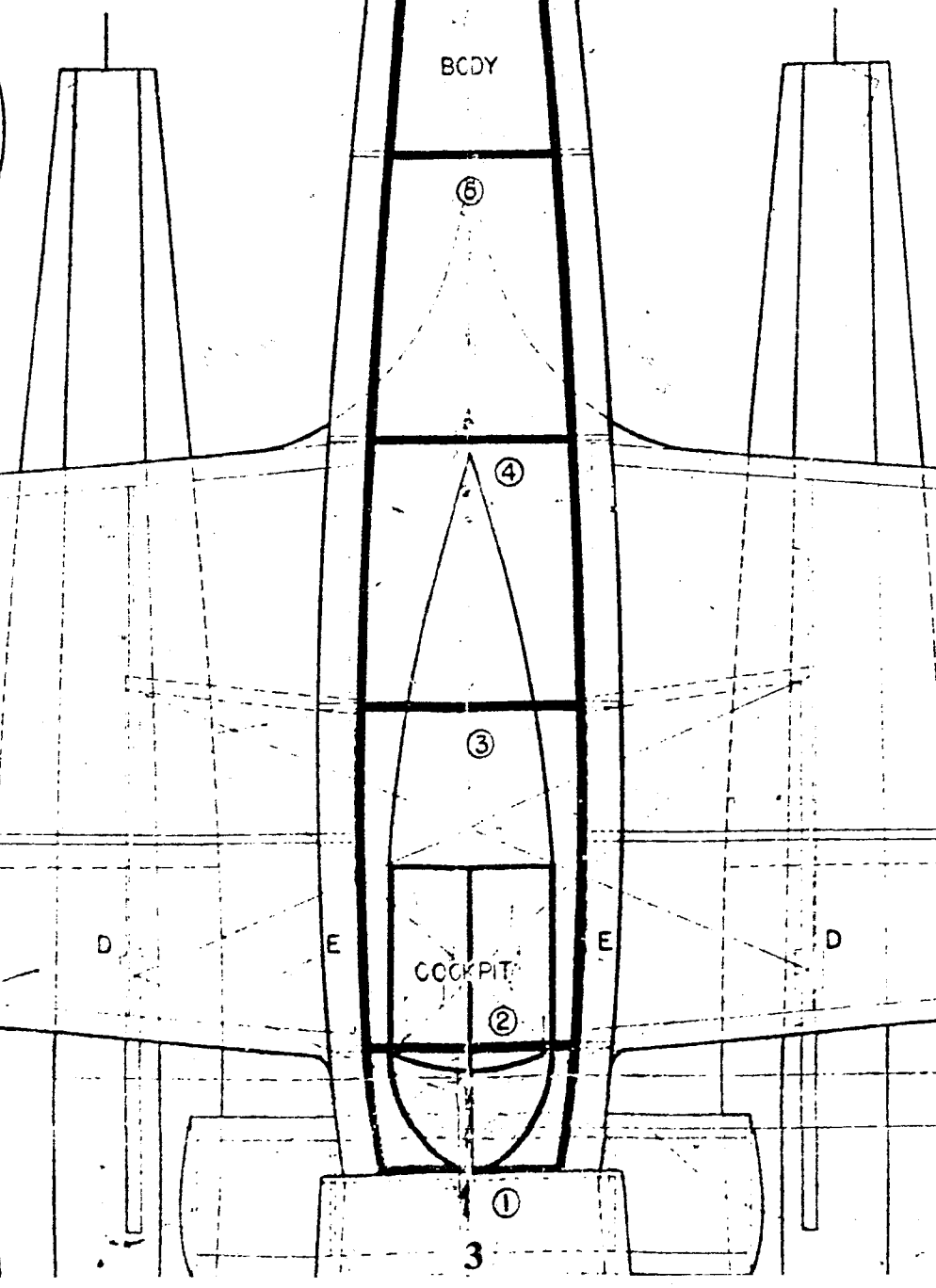


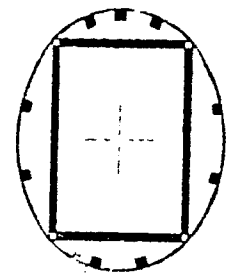
3

BODY CROSS SECTIONS

BULKHEADS CUT FROM PRINTED SHEET



ALL HEAVY LINES 1/16" X 1/16" BALSA



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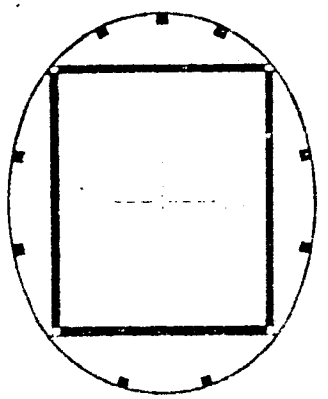

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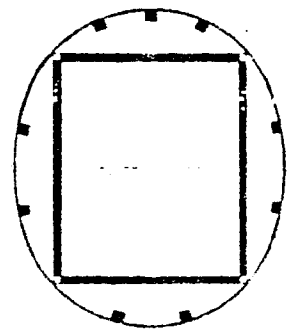


5

BODY CROSS SECTIONS

TRAILING EDGE 1/16" X 1/8"

AILERON

PAPER HINGES

WING

SPAR 1/16" X 1/8"

RIBS

A B C D E E D C B A

A B LANDING LIGHT C

WING TIP

LEADING EDGE 1/16" X 1/8"

PROPELLER

PLAN VIEW

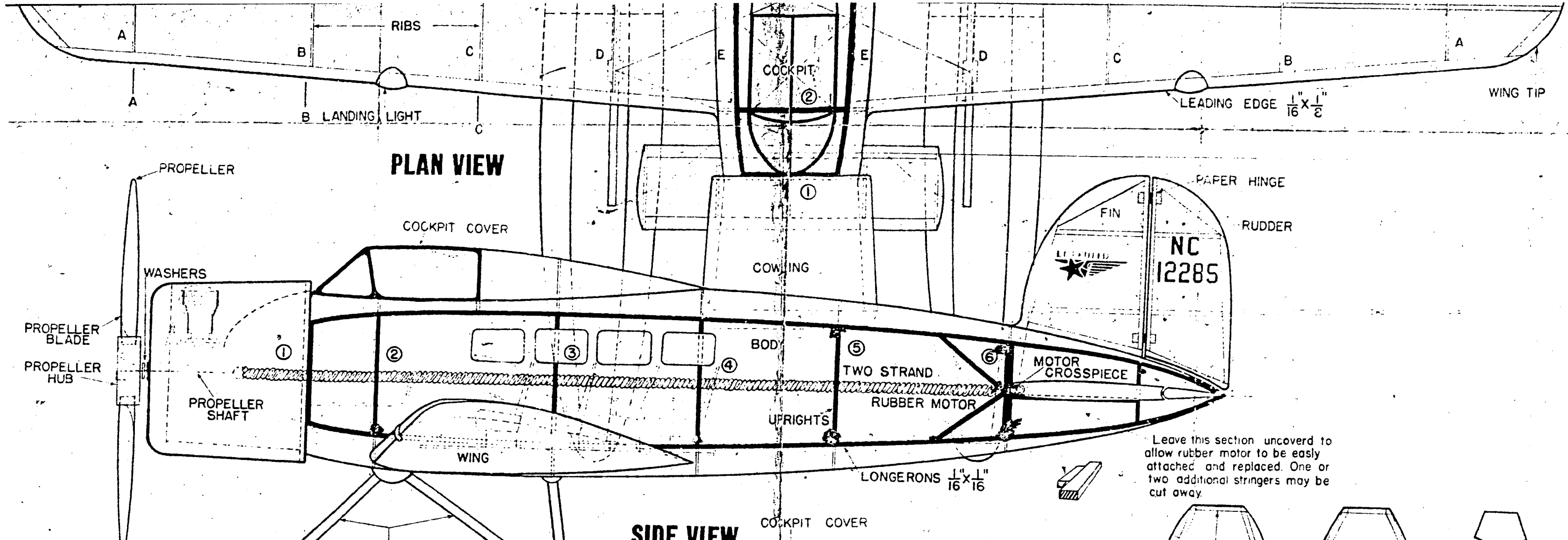
COCKPIT COVER

PAPER HINGE

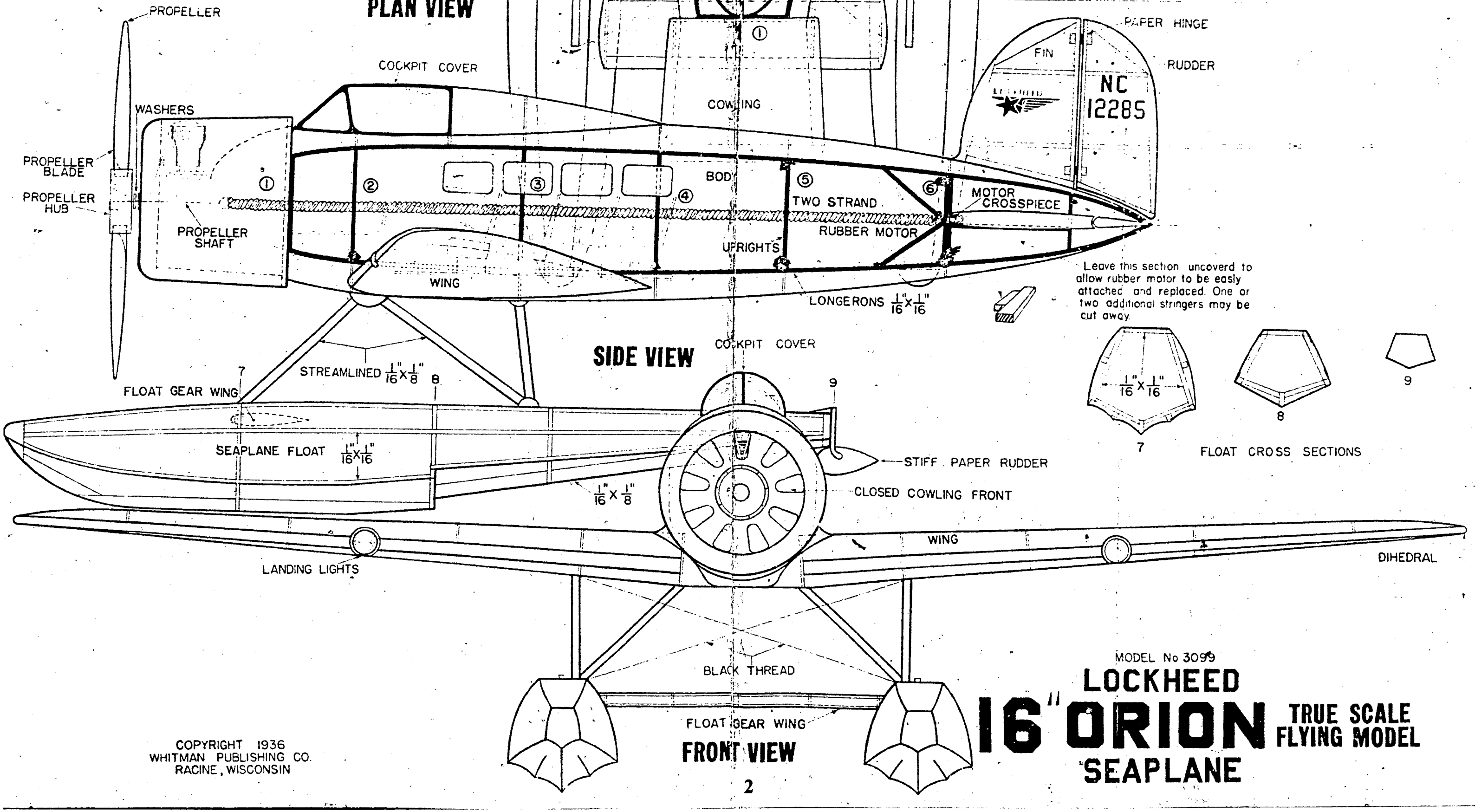
FIN

RUDDER

PLAN VIEW



SIDE VIEW



FLOAT CROSS SECTIONS

FRONT VIEW

MODEL No 3099

LOCKHEED 16" ORION SEAPLANE

TRUE SCALE FLYING MODEL

C

A

B

RIB C

RIB A

RIB B

RIB A

RIB A

RIB B

RIB A

RIB C

1/16" x 1/8"

3/32" SQ

WING TIP PATTERN

WING TIP

WRAP WITH THD. & GLUE

LANDIN GEAR .025 M. WIRE

1/16" SQ

* WINDSHIELD & MANIFOLD OPTIONAL

1/16" SQ

1

1 1/2

3/8

7/8" DIA WHEELS

* PANTS OPTIONAL

WING POLY HEDRAL

MEET EMBRYO REQUIREMENTS

1/16 x 1/8

DURHAM MYSTERY PLANE

REJECTED BY G.O. THERMALS "HUNG" AND FOUND BY DAVE STOTT 7/15/03

*OPTIONAL ITEMS FOR EMBRYO POINTS

W.G.S