TESTS: RS SYSTEMS · HOBBY LOBBY 5

radio control
RC MODELER
48758 DECEMBER 1972 $1.00

Scale Victa Airtourer 115

Don Dewey's Standard Class Centurion

Quickie · · First Quarter Midget Trainer

FROM THE SHOP

BY DON DEWEY

It is with regret that, effective with this issue of R/C Modeler Magazine, the cover price of our publication has had to be increased to $1.00 per copy while the annual subscription rate has been increased from $7.50 to $10.00 per year. While we have tried to hold the line for as long as possible in the face of increased production costs, the final blow was dealt by the Postal Service Corporation who has instituted a 127% increase in Second Class Magazine and Newspaper Postage Rates. The drastic increase in postage rates, has dealt the death blow to smaller publications in other specialized fields and has caused larger publications to increase their individual copy and subscription rates as well as advertising rates. Unfortunately, no improvement in service by the Postal Service Corporation has accompanied their drastic rate increase to magazine publishers.

The best method of explaining the current situation is to quote the following excerpts from the office of U.S. Senator Alan Cranston (D-Calif.):

"The survival of California's 718 magazines – particularly the small journals of opinion – and more than 5,000 jobs are being threatened by unparalleled hikes in postal rates, according to Senator Alan Cranston.

"Cranston is co-sponsoring a bill (S.3758) to curb a 127% increase in Second Class Magazine and Newspaper Rates. A 33-1/3% increase has already gone into effect with further increases scheduled between now and 1976.

"Postal officials claim the increase is necessary if newspapers and magazines are going to pay the full cost of delivering each issue.

"However, the net effect will be to inhibit the public's access to new ideas and diverse points of view, Cranston maintains. Since 1792 Congress has encouraged low postal rates for the distribution of publications through the mails. For 178 years, Congress recognized the need for this form of national subsidy as a vital component of public education and self government.

"Cranston pointed out that without the postal subsidy, this vital channel of communication would be diminished and practically every person who wishes to remain a magazine subscriber may find himself paying an additional $2.00 – $3.00 per year for each publication that manages to survive the postal rate hike.

"Cranston, a former correspondent for the International News Service, and sponsor of a bill that would protect newsmen from revealing their news sources, cited the case of Sunset Magazine of Menlo Park, California. Sunset's primary circulation is in 9 Western states. Its yearly mailing costs have already been boosted 33-1/3% to $1,22,475.00. Additional postage hikes will raise it more than $500,000.00, Sunset officials report. Both subscription and advertising fees will be raised to make up the difference.

"Nationally, Time-Life publications will be forced to pay an additional 27 million dollars under the new rates, Cranston said.

"But the real losers will be smaller publications directed towards specific audiences. Unlike Sunset and Time, Cranston said, limited interest publications have the option of dropping some issues, publishing less content, trimming their staffs and raising rates to subscribers. Some may do all four, while others may simply fold up."

Let's take a specific look at the case of R/C Modeler Magazine. The thought of cutting down on the amount of material presented each month as well as the number of pages presented in each issue were, to our editorial staff, unthinkable. We feel a very strong and continuing obligation to you, our readers, to present the best and most well-balanced material that

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RC MODELER

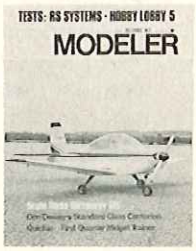
FEATURES

PRODUCT TESTS

DEPARTMENTS

VOLUME 9 1972 NUMBER 12

DECEMBER



THIS MONTHS COVER

George Hahn's magnificent Victa Airtourer 115 is a featured scale construction article in this month's issue. Ektachrome transparency by George Hahn.

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Today's Toy Airplanes Are SOMETHING ELSE

An Exclusive Reprint From a Paul Harvey News Telecast.

By Paul Harvey

Over my shoulder a backward glance. Last Friday's absence from this microphone afforded for me a most memorable day.

The sport-hobby is a fascinating fringe benefit of affluence.

Thirty years ago golf moved from the cow pasture to the country club, became acceptable, then fashionable.

Fifteen years ago . . . bowling.

Now that Presidents do it we've almost forgotten that just a generation ago the bowling alley was in disrepute.

Over the years some spectacular specialists have surrounded with excitement such mundane games as billiards, bridge and now chess.

During the past five years, unnoticed by most, a sport hobby more technological than logical has emerged from adolescence to maturity: Model aircraft.

Miniaturization of electronic controls has made possible a generation of radio-controlled model planes, sailplanes, boats and cars of phenomenal sophistication.

The gadget which opens garage doors electronically has been adapted to a highly precise complex of controls for maneuvering model aircraft.

The modern model airplane is no longer a toy powered by a twisted rubber band in the hands of a schoolboy. More likely it has a wingspan of four to six feet and, complete with engine and radio gear, it represents an investment of hundreds of dollars and thousands of hours.

But a man – trying to explain his fascination with small airplanes to "outsiders" – inevitably ends up defending "big boys' toys."

To some men it's perfectly plausible for a mature adult to chase a defenseless white rubber pellet for six miles around a golf course beating at it with an expensive stick . . .

That makes sense . . .

But hours over a workbench creating a flying machine – or outdoors refining its maneuverability and his own dexterity – for this some men still feel they must apologize.

This past week the world series of model aircraft construction and control was held at Glenview Naval Air Station, Illinois.

From over the world the best builders and pilots converged to compare their craft and their skills.

One class of planes, designed for aerobatics, competed in one section of the Navy's vast airport – every maneuver any big plane ever performed.

On another runway pylon racers raced – at speeds topping 150 mph – so fast that each is flown by a team - - - two hands are enough, but it takes four eyes to watch the clock and the competition and cut the corners.

Elsewhere the free-flight fliers. In another part of town radio-controlled sailplanes.

This, as I say, was the annual meeting of the best of the best in a sport-hobby which has grown so fast in the past five years that its publications now have a wider circulation than those of any other avocation.

As a fledgling modeler myself – and as a guest of the Academy of Model Aeronautics – I visited those flying sites last week, inspected scale-models made in micrometrically precise detail – watched from the shadow of a pylon while the racers raced – sat with professional Navy watching semi-pro performers execute maneuvers with almost monotonous preciseness.

This was the 25th National Meet but, as I say, the accelerated evolution has taken place in just the past five years.

Today the champion pylon racing team is likely comprised of two airline pilots . . .

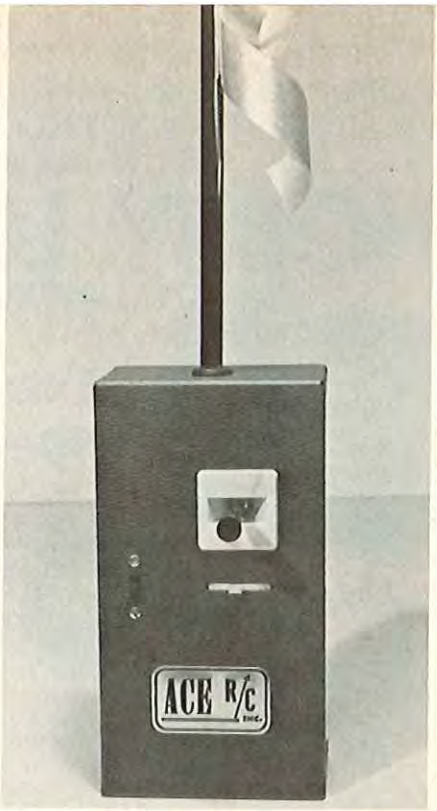
Or may be a husband and wife, one of which has a degree in aeronautical engineering . . . **to page 100**

PULSE PROPORTIONAL: 1972

In An Era Of Full-House Digital Systems, Single Channel Systems Sales Have Hit An All Time High. Here's Why...

During the past year there has been an almost unprecedented growth in sales of single channel, pulse proportional radio equipment. Many years ago, following the superregen receiver and single or cascaded escapements, pulse proportional came into prominence as the first form of proportional control for radio controlled aircraft. At that time, pulse proportional was, virtually, a "tinkerer's nightmare." The term "mickey mouse" was applied to pulse proportional systems by dyed-in-the-wool escapement fliers who viewed, with distain, the intricacies of a single, or multiple, function pulse proportional system with its flapping control surfaces and somewhat erratic operation. Yet, pulse proportional was the first step towards the introduction of the digital proportional systems we all fly and enjoy today and which are, in large part, due to the efforts of these determined "tinkerers" of a few years past. Now, with digital proportional systems being manufactured in large quantities, and with a high degree of reliability and at a far lower price tag than when they were first introduced, it would seem that the pulse proportional system would be relegated to a nostalgic place in RC's history as a vintage curiosity. In point of fact, just the opposite has happened!

Ace R/C Incorporated, 203 W. 19th St., Higginsville, Missouri 64037, headed up by one of the greatest gentlemen in our industry, Paul Runge, is today, as it has been in years past, the pulse capitol of the world. And, now, in the era of exotic digital proportional systems, the sales of the single channel pulse proportional systems far exceeds those sales figures of a few years ago. Throughout the country the warranty cards sent out by Ace R/C with every single piece of their equipment are being returned with a questionnaire on the back completed by the individual purchasers. In virtually all cases, the new owner of an Ace single channel system already owns one or more digital proportional sets. Why, then, this seeming step "backward?" Why would there, for example, be entire clubs who specialize in flying rudder only pulse proportional to the virtual exclusion of any other form of radio equipment?



The highly reliable Ace Commander transmitter.

We were determined to answer these and other questions about this renaissance of single channel proportional in our investigation of the past few months.

First of all, our interviews with numerous pulse proportional enthusiasts verified the information received on the warranty questionnaires by Ace R/C – that is, the individual RC'er wanted a small, compact aircraft that he could fly from local school yards, vacant lots, and other confined spaces, during the evenings after work and between the weekend flying sessions when he would normally fly his .60 powered gas gulper. In ad-

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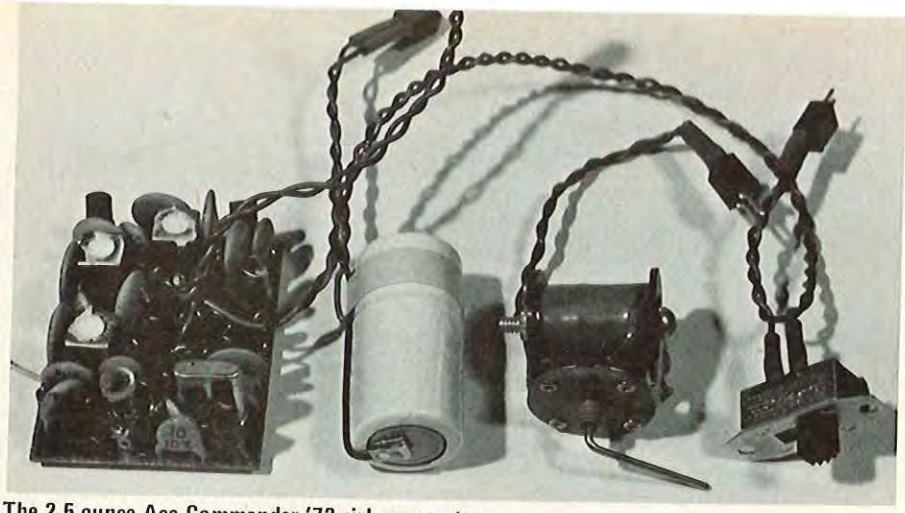
The newest offering: Mattel's Electric Signal Command System.



The 2.5 ounce Ace Commander '72 airborne system.

dition, many of these RC'ers had taught their wives and children to fly with the single channel equipment and had turned this simpler form of radio equipment into a family project. And, family participation can convert a mere tolerance of a hobby into genuine enthusiasm for a sport, quite rapidly! Other fliers simply enjoyed the simplicity and economy of single channel proportional flying and had totaled up hundreds of hours of flying in a span of time where they normally would have only a few hours on their larger, faster aircraft requiring all of its attendent accessories, not to mention the requirement for a larger and, often, more distant flying field.

Currently, there are two primary single channel systems available to the R/C flier. The first of these is the Ace Pulse Commander, a complete plug-in system consisting of a transmitter with the receiver-decoder, a magnetic actuator (available in several sizes and power output) and rechargeable nickel cadmium batteries for the airborne system. In operation, the transmitter and encoder, communicates information to the receiver which decodes the information and converts it into mechanical energy by means of an Adams Magnetic Actuator to move the rudder. The pulser, built into the transmitter, is controlled by the transmitter stick. The pulser "keys" the audio oscillator in the transmitter at a rate of approximately 4-6 pulses per second. The rudder is flapping back and forth at the same rate as the magnetic actuator and connected to it by means of a torque rod. In flight, the airplane is not affected by the equal right and left "wagging" of its tail, but does respond to the average position of the rudder. If the rudder spends more of its time on the right side than on the left, the airplane turns to the right, and vice versa. The amount of time the rudder stays to the right or left is determined by the transmitter stick position.

The Ace Commander '72 Rudder Only systems come completely wired and tested with transmitter, receiver, actuator, nickel cadmium battery airborne pack, charger, and switch and connectors. The transmitter battery is not furnished, but is a standard 9 volt unit available at most all hobby shops. System choices include the Baby System priced at $69.95, the Baby Twin System at $72.95, the Standard System at $71.95, and the high powered Stomper System priced at $74.95. Ace Commander systems are available on all 27 MHz frequencies. The airborne weights run from 2.5 oz. for the Baby Flite Pak up to 4.8 oz. for the Stomper Flite Pak, the latter being capable of powering ships in the .25 – .30 engine category.

During the past few months we have put in hundreds of flights on the Ace Commander '72 Rudder Only Pulse Proportional System in aircraft ranging from simple compact sailplanes such as the Gypsy presented in a previous issue, to small powered sailplanes like the venerable old Nomad, as well as numerous other power ships and larger sailplanes. We have never experienced a failure or problem of any nature to date with any one of our three test units from Ace R/C. We have also gained a deeper insight into the relaxing and pleasurable aspects of simple, uncomplicated flying with none of the attendent drawbacks of the early days of single channel proportional systems.

Another form of single channel flying made its appearance just recently in the form of the Mattel Signal Command pulse proportional rudder only electric airplane. We purchased one of these units from a local hobby dealer and proceeded to assemble it from the very complete instruction manual prepared by Mattel Inc. Priced at $150.00 and currently being offered through some mail-order houses for less than $100.00, the Mattel Signal Command is a small aircraft consisting of a plastic fuselage, extremely thin styrofoam sheet hroizontal and vertical stabilizers, and a hollow styrofoam wing consisting of a styrofoam sheet wrapped around internal ribs. The heart of the Mattel Signal Command unit is an electric power module con-

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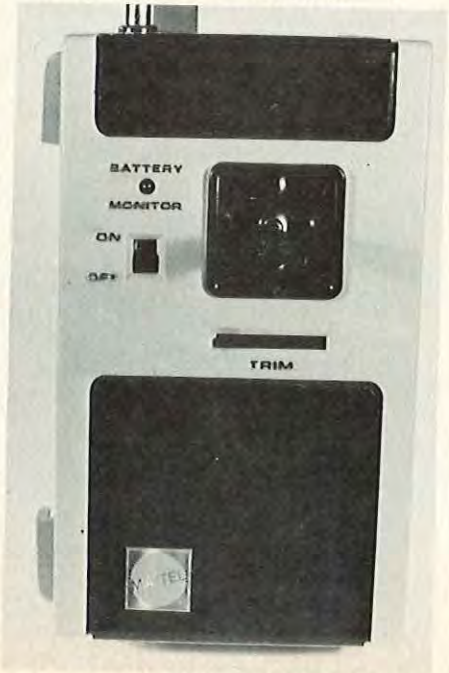
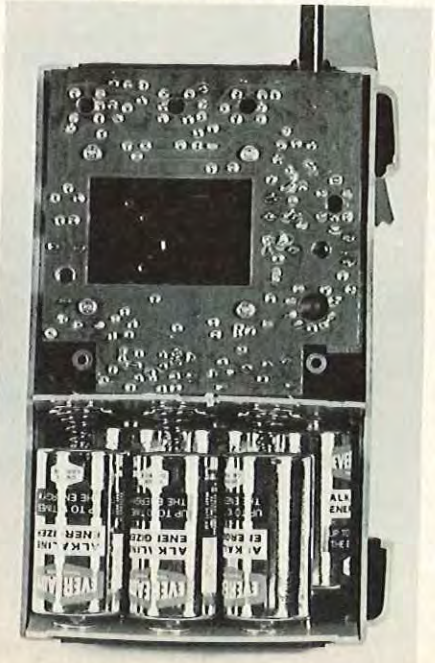
The Signal Command transmitter.



Inside the Signal Command transmitter.



engine clinic

By Clarence Lee

Dear Clarence:

I have been curious for some time about the mating of ingredients in good fuel and how they effect different engines.

Now, Duke Fox's new Eagle .60 likes Missle Mist. Granted, I feel Duke is trying to sell more nitro, but my S.T. .60's and .40 also love nitro – yet my K & B F.V. .40 and Enya .60 seem about the same with low or high, until the nitro percent is very high. The H.P. .61 FV doesn't like nitro at all. It seems most happy and powerful on 75/25.

I would like an explanation of sorts, if possible. Also, how can I (if possible) get more power from a stock engine? Increase nitro? Increase compression?

Now to fuel. For the home-brewer, what's the "best" formula for R.C. Pattern and fun flying. Is there any truth that methanol needs an additive in order to blend well in a 75/25 mixture? If so, what?

Finally, have you modified or done anything to your Veco .61's lately? Haven't heard much on them for some time. Webra and H.P. seem to have the game going their way now – especially dollar-wise.

Sincerely
D.R. Major
Greenville, S.C.

The amount of nitro-methane an engine will tolerate in the fuel depends upon the compression ratio, port timing, and operating temperature of the particular engine. A higher compression engine that runs a little on the hotter side will operate better on a low nitro content fuel than will a low compression cooler running engine. Operating temperature not only depends upon the cooling fin area of an engine but also exhaust and bypass port timing. Large ports that open early, as used in racing engines, allow a larger quantity of fuel to pass through the engine. In fact, most racing engines, if operated below their peak horsepower range, will blow raw fuel out the exhaust. This extra fuel causes the engine to run cooler. As a result, the engine would be able to tolerate a higher nitro content fuel. Most of your engines manufactured in this country are designed to be run on fuels containing nitro-methane. In Europe, where nitro-methane is difficult to obtain or, as in England, banned from use, the engines have been designed to be run without nitro-methane in the fuel, i.e. Merco, H.P., etc. The compression ratio is higher, port sizes smaller, and timing slower so that the engines will work best on the straight alcohol-castor oil fuels. Generally, more power can be had from an engine designed for fuels that do contain nitro-methane.

As far as getting more power from our stock engines, this is pretty hard to do. Every manufacturer is trying to get the maximum amount of power they can from their engines in order to be competitive. The old days of raising the compression ratio, changing the port timing and, in general, hopping up the engine are over. The engine comes to you already "hopped up." There is not much left to do other than to make sure the engine is free and properly fit. If the compression ratio for a particular make of engine is correct to begin with, then raising it higher would not buy you anything and could actually result in a decrease in power due to pre-ignition. The same thing holds true for increasing the nitro-methane over the amount the engine can tolerate. The fuel pre-ignites, the engine over-heats, and the engine loses power. Few stunt engines can tolerate more than 25% nitro-methane and the majority are happier with fuels in the 10% – 15% range.

I don't know about being the best, but 5% – 15% nitro methane, 22% Baker castor oil, and the balance methanol makes a very good R/C fuel. If you like synthetic oil instead of castor, you can substitute Klotz which seems to be the best of the synthetics. You get this at Go-Kart and Minibike shops. If you are going to mix straight methanol-castor then it is a good idea to add about a half ounce of Amyl acetate to a gallon. The castor oil has a tendency to separate from the alcohol and the Amyl acetate will keep it in suspension. If you use synthetic oil this is not necessary, or if any nitro-methane is used in a fuel it is not necessary as the nitro-methane will serve the same purpose although nitro, itself, will not stay mixed in percentages much over 50%. Amyl acetate is ordinary banana oil and can usually be obtained from any larger drug store.

The Veco .61 has undergone extensive modification and by the time you read this it should be in the hobby shops. The Dykes ring has been dropped in favor of a single conventional expansion type ring. Although the Dykes ring is desirable for maximum power output it was felt the conventional ring holds up better under the abuse many R/C fliers give their engine, i.e., running too lean, under dirty conditions, etc. Bronze bushings

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SCALE IN HAND...

BY DAVE PLATT

This Month – Surface Detailing.

In the last column we began an examination of the various finishing techniques, and had just about brought ourselves to the point of the model being ready to paint. Those readers who were here with us on that occasion may recall that we discussed the resin-finishing technique, and that this writer felt some reservations about this process inasmuch as the model is not covered, as such, with any binding layer of material. That is, according to the recommendations given with the resin products.

Before proceeding with this month's installment we'd like to mention that having now had the experience of surfacing a model with the resin in the prescribed manner, we are satisfied that some layer of covering is essential. The model we made without this (a ducted-fan RC scale Hawker Hunter) developed serious structural problems during initial trimming by way of stress-splits along the grain, and also impact-induced breakages well beyond what could be called reasonable for the forces involved.

Our next effort, a regular "hack" sport RC model, used the resin but reverted to covering and in many dozens of flights has proved in all ways to be satisfactory. Without going into extensive detail, the system we used consisted of (1) one coat of clear dope on the bare balsa, (2) a layer of Heavyweight Silkspan (paper) applied wet and using clear dope to adhere, (3) 2 coats clear dope to impregnate paper, and allow (4) a good sanding. This is followed by (5) 2 coats of Francis Resin and (6) a final good sanding, as per the Francis instructions.

Before actually doing all of this, we tested the ability of Francis Resin to set up (cure) properly over clear dope and found that no problems were encountered with Sig Butyrate Clear, Testors Butyrate Clear, or Cooper's Nitrate Clear dope. However, when we tried the Resin over AeroGloss clear dope, it was reluctant to cure, although it eventually did.

The foregoing basic finishing process would be well suited to a scale model of a metal sheet-covered airplane, such as most WW II subjects.

Okay, so now we're ready to paint, right?

Not quite. It is at this time that the model gets much of its surface detail. Using a soft black pencil, a 4B is ideal, mark out the major panel lines, rivet lines, hatches, etc. Wherever you want a panel joint to show, try the trick shown in Figure 1.

A. Lay down 2 layers of Scotch tape adjacent to the required panel line.
B. Give a heavy coat of Francis Resin extending ½" or so from the edge of the tape.
C. Sand resin flush with upper surface of tape and blending into wing surface at its far edge.
D. Lift up tape; and bingo! One sharp beautiful panel joint!

Many panel joints and hatches etc., can be signified in this manner. The next stage depends on the rivet situation on the subject involved. If the rivets were of the flush type, these are left until after painting. The round-head, or "brazier" rivets are applied prior to painting. There are a number of ways that such rivets can be applied. Several years ago this writer developed a system which consisted of applying tiny droplets of glue (Titebond proved best) to the surface from a hypodermic-type container. This basic method works well. Well-known scale RC modeler, Walt Moucha, later told us of a refinement to this idea whereby the glue is placed in a flat bath, and applied by means of inserting a regular hair comb (sometimes with every second tooth removed) in the glue, and then transferring same to the surface. This gives a whole row of rivets in one operation.

More recently, still other modelers, notably Claude McCullough, obtained and applied actual metal rivets – obviously, very tiny – and indeed Sig Mfg. sells such rivets in several kinds.

Which of these methods is "best" is open to debate and, in our view, depends mostly on the subject involved and its scale. Undoubtedly, for a modern light plane, such as Claude's *Shinn 2150*, built to a fairly large scale (at least 2" = 1') the Sig rivets would be the best choice. On the other hand, a 1½" = 1' model of, say, a *Stuka* would be better done with the glue droplets, as they are smaller and, a subtle point, agreed, also tend to be more realistic looking inasmuch as they vary somewhat in prominence as would be found on such an aircraft. The real rivets have a tendency toward a clinical look which would be unsuitable in some cases, while perfect in others.

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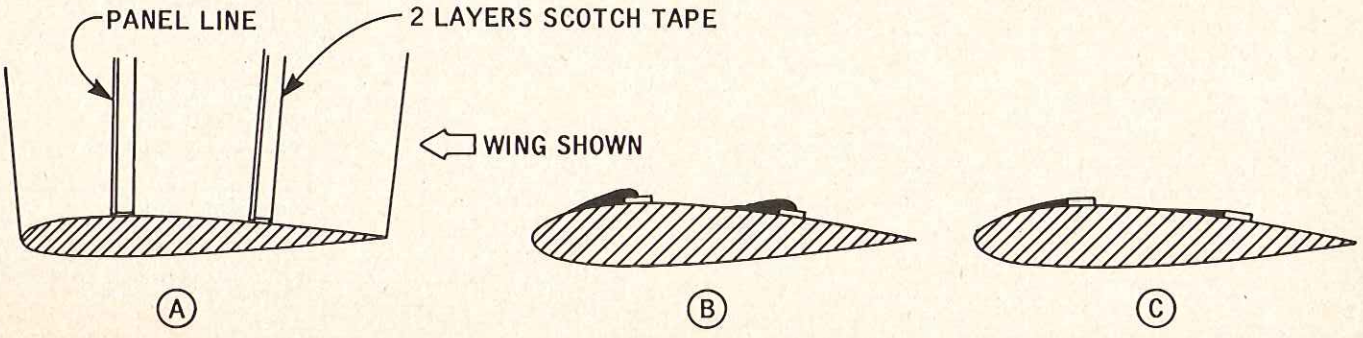
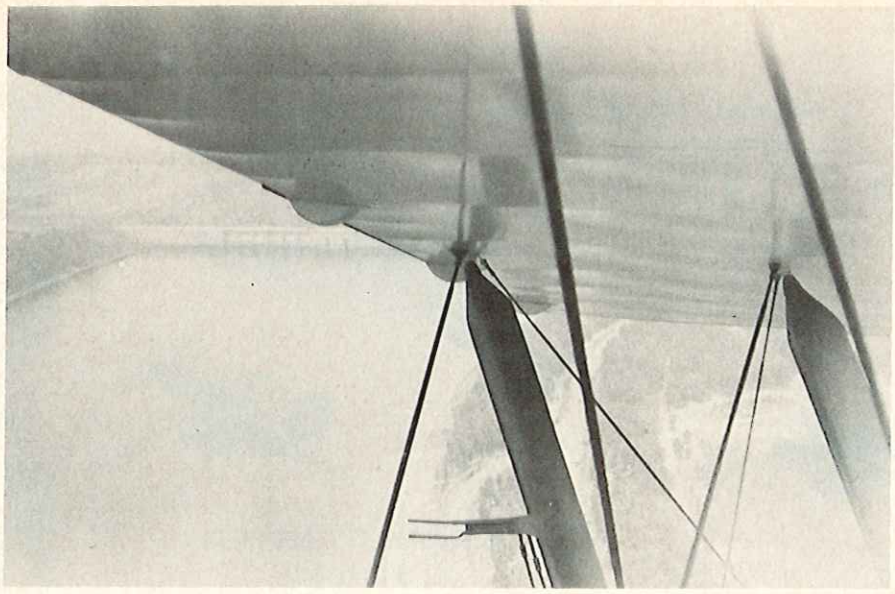


FIG. 1



- - - - through the Tiger Moth's wing struts.

CUNNINGHAM ON R/C

Due to the skill and persistance of my good frined, Rex Johnson, the pictures that I mentioned last month of the Tiger Moth have been slightly salvaged. Notice the shot taken through the wing struts showing the lake and dam. I hope that all of you can take a similar trip someday. It's a lot of fun for a dyed-in-the-wool R/C flier. Who knows, may have to give the big birds a try one day. Big bipes, that is!

•

For the past several months I have been bringing to you some thoughts on getting over the rough spots in getting into the sport/hobby of building and flying RVP's (Remote Piloted Vehicles). Since I began this series old Uncle Don has finally brought out his 239 page Flight Training Course. I urge all of you who are thinking of getting into this hobby to invest your first ten bucks on this book – it will be the best money that you will ever spend on this sport! A more complete coverage simply cannot be written, and the hundreds of pictures are worth as much as the words. It will be a reference work you will use for years.

•

Speaking of RPV, Time Magazine dated September 11, 1972, had a full page article on the military aspects of RPV. The article mentioned what you and I already know - - - that a pilotless aircraft can be built much simpler, more economically, and much more manuverable than a piloted aircraft. In several tests, RPV's have out-flown and out-fought manned aircraft, and the future holds much for this new military weapon. As a matter of fact, after World War I, in the early twenties, the decision was made by the military minds to concentrate their efforts on manned military aircraft rather than on remote piloted aircraft. In a weighty book written by Vandevar Bush, called 'Modern Arms and Free Men,' which was part of my required military reading during the Korean War, this subject was discussed at great length. Today, we know just how capable our R/C models could be as objects of war and, no doubt with a military push, they will become even more sophisticated. The only problem is that many of the manufacturer's that we rely on to provide our equipment may be lured to Uncle Sam's flying field. I would sure hate to see the end result of a 12 ounce radio rig once the Defense Department gets through writing the spec's on it! No doubt it will weigh at least 100 pounds.

•

This weeks newspaper brought the news that the FAA has set down guidelines for model aircraft flying. By the time that you read this they may have set forth more positive rules and regulations. I hope not. One way that each one of us can do his part to try and forestall any positive regulations covering model flying, is to exercise as much care as possible to see that each and everyone of us fly in a safe and harmonious manner. If your field is located near the flight course of full size aircraft, then use good sense and get all of the models down low whenever a full scale aircraft is near. At any rate, always fly at 400' or less, unless you have special permission to the contrary. Sailplane fliers are the worst hit by this altitude limitation, and it may come that certain areas will be designated by the FAA as areas in which model flying is authorized, and full size aircraft will not be allowed to violate our air space. Certainly, in many areas that sailplanes are now being flown, this is a strong consideration. The use of mufflers should also be encouraged at all flying fields. Even if your flying field is not adjacent to residential areas, it would be a good idea to try to eliminate as much noise as possible. I know that a .60 powered R/C engine flying high, wide, and handsome, can be heard for several miles downwind. If we all pitch in and attempt to comply with the regulations, we may have a chance for survival. If we don't try to keep our own house in order, and some aircraft tangles with a model, then, friends, you had better learn to sail R/C boats and run race cars. That's all that will be left.

But, since this possibility has not yet become reality, and because it probably won't happen if we all cooperate, let's get on with some more thoughts on getting your first aircraft into a flying condition.

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Virtually all construction articles, and most kit instructions are pretty sketchy when it comes to installing your radio equipment. One of the reasons for this is that the writer of the construction article, or the producer of the kit, has no idea as to what type of radio equipment you are going to install. Let me cite you an example: I have designed a simple Quarter Midget Mustang and at least eight or nine have been built and raced in this area. I originally designed the aircraft around the ultra small proportional systems. At our last Quarter Midget race one of my fellow Thunderbirds showed up with his Mustang sporting an EK-logictrol 2 radio and the total weight of this little bird was four pounds! How he got all of that old style radio crammed into that little ship is a wonder to me. But, he did,

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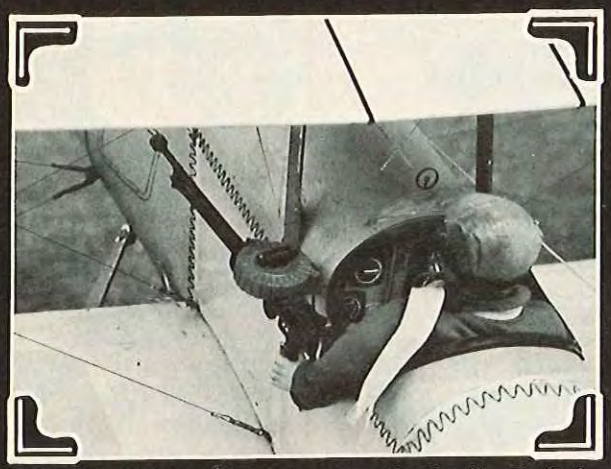
A Page From Dick Tichenor's

PHOTO ALBUM

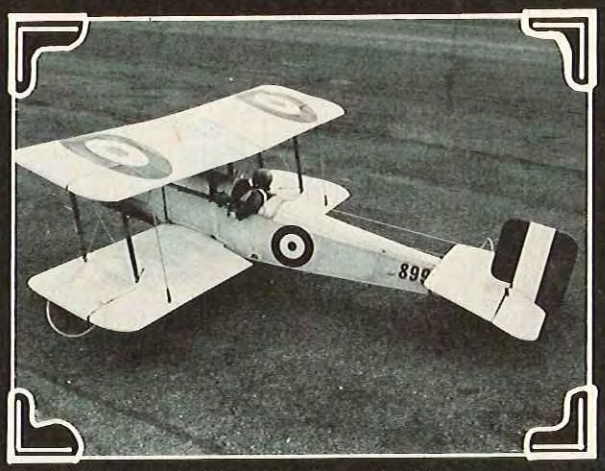
A MAGNIFICENT R/C SCALE RENDITION OF

BOB UPTON'S BRISTOL BULLET

World War I British Bristol Bullet by Bob Upton is an excellent example of detailed craftsmanship by a top notch R/C pilot.

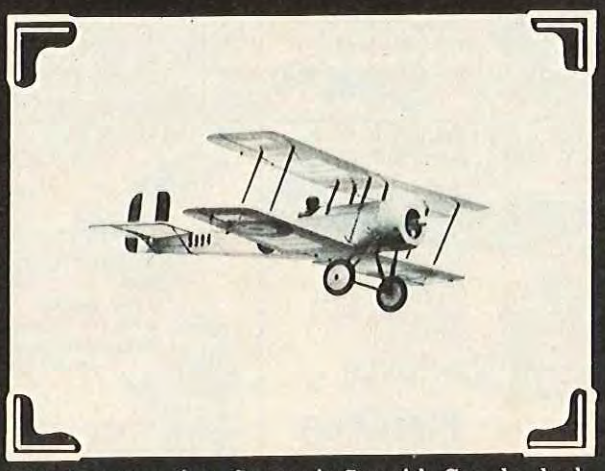


Bob outdid himself with authentic details. Scale is 2" = 1'.



Sir Cedric is sorta' shooting from the hip.

The stately Britisher loses some of its dignity when getting the inverted engine started.



This is neater than Snoopy's Sopwith Camel – look out, Red Baron!

TEST REPORT

Product Test: Don Dewey
Photography: Rita Lord

The bright orange, vinyl-clad RS Transmitter evidences the highest degree of technical know-how and quality control.

RS SYSTEMS

three channel radio is one of the most precise available today.

RS Systems, 2289½ South Grand Ave., Santa Ana, California, is not, perhaps, one of the most well known radio manufacturers of digital proportional systems. While they do not mass produce systems in the same quantity of many of the larger manufacturers, what they do produce is one of the most outstanding radios available to the consumer today.

The 6 channel and 3 channel systems are the latest in configuration and circuitry of this company's six years in the radio control industry. The quality features of construction and workmanship are in a class second to none as evidenced by the physical appearance of this system. Not so evident to the inexperienced eye is the fact that in many critical areas of circuitry are employed parts manufactured to Military Specifications. These parts are of necessity, more expensive than many items of a commercially available grade, but their application augments, if not virtually assures, a consistency of performance and reliability of the highest order.

The 6 channel digital proportional available from RS Systems, offers all of the most desirable features of any top line system, with a few bonuses besides. Included as standard is the popular "buddy box" feature, allowing any two transmitters to be used in a Master/Slave combination for training or instructional purposes. This system comes in 6 channel form rather than the usual 4, and at a considerably lower price than other top line 4 channel units. All connectors employed in this system are of the gold plated Mil-Spec variety for less contact resistance and higher reliability.

The system tested by RCM is the 3 channel system which we obtained primarily for competition sailplane flying.

The RS System's transmitter is world famous for high power output and stability, and the basic circuitry was the first to be type-accepted by the Federal Communications Commission for operation on the 72 MHz band. Mechanically, the transmitter is extremely smooth and precise on control stick action and is convenient and comfortable to handle. A co-axial antenna terminal is used and is the only one of its kind in the industry.

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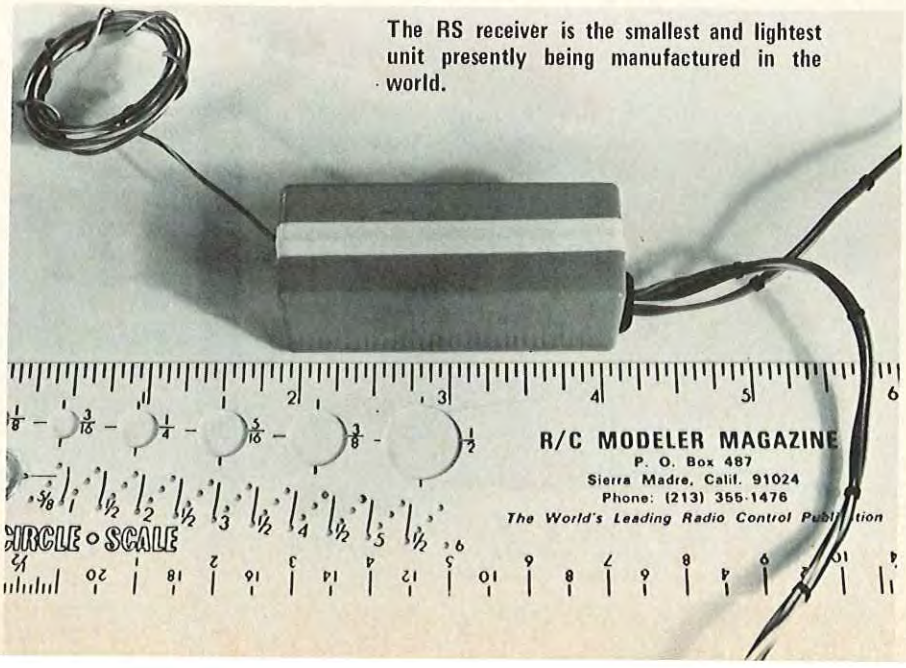
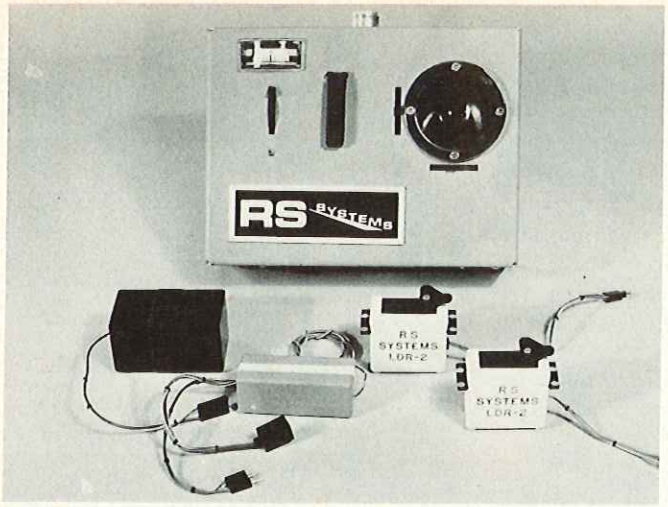
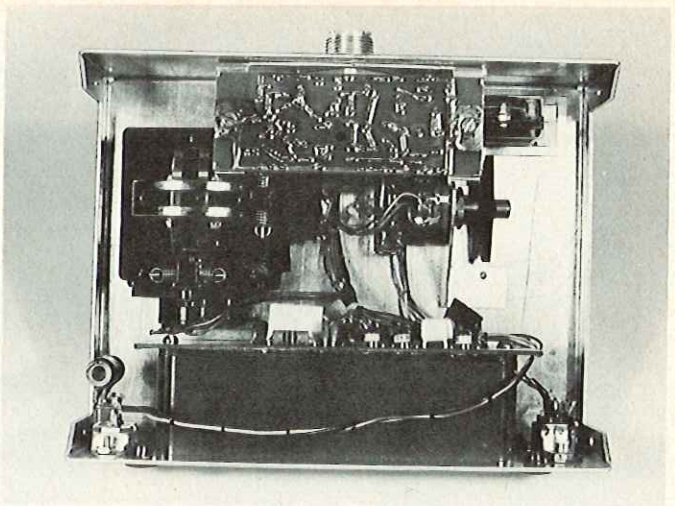


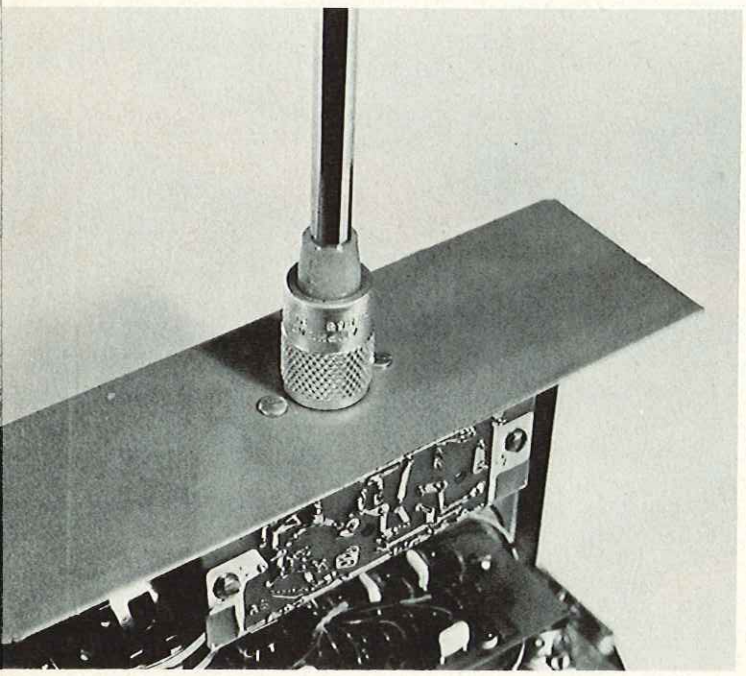
The RS receiver is the smallest and lightest unit presently being manufactured in the world.

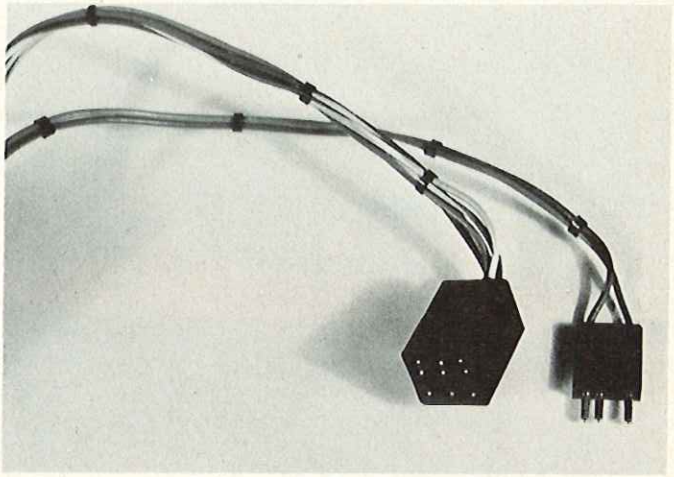


The 3 channel digital proportional system (switch harness not shown) with two servos.

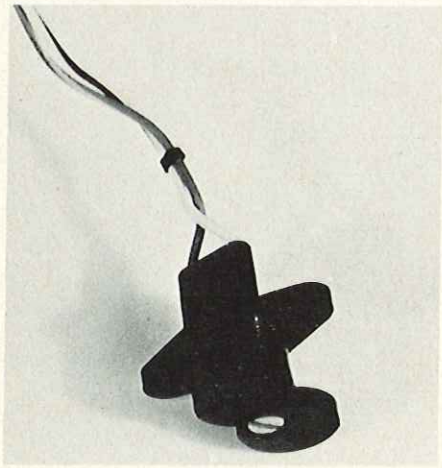


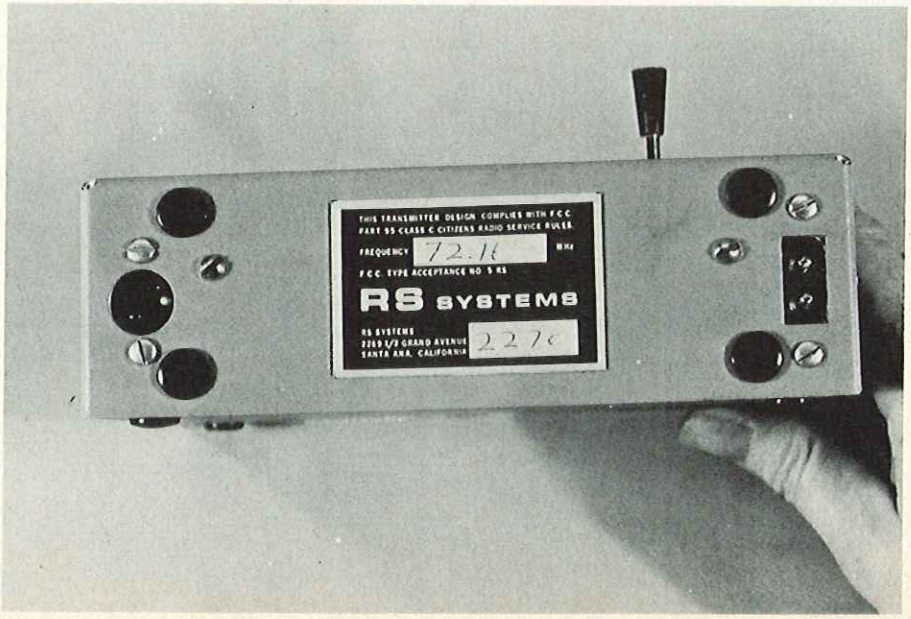
Inside the 3 channel transmitter. Note compactness and deceptive simplicity.





LEFT: RS Systems is the only proportional manufacturer to utilize a co-axial antenna terminal. ABOVE: All connector plugs are gold plated Mil-Spec for maximum reliability. Note ties used on all wire bundles.





ABOVE: Neat charging plug with cap. RIGHT: View of bottom of 3 channel transmitter.


10

QUICKIE

A High Performance Sport Plane Designed For .09 To .15 Engines And Two Or Three Channel Radios. By Fred Reese.

The "Quickie" is a high performance sport plane designed to respond to rudder as if it had ailerons. Roll response is truly axial and is achieved without the additional aileron servo, linkage and attendant weight. The generous dihedral and tall rudder give the Quickie positive roll response. The large rudder does **not** allow "hands off" recovery from a spiral as does a trainer and the Quickie **must be flown at all times** just as you would a normal pattern ship. The Quickie is, in reality, a Quarter Midget racer disguised as a high wing cabin monoplane. Its dimensions meet all current Quarter Midget rules except for the scale part. Actually, with a few slight changes to the tail shape, it could be called a "Midget Monocoupe" which did race. With a .15, the Quickie is quite fast and can race with all the .60 powered beasts or other Quarter Midget racers. It is **not** an aircraft for the inexperienced flyer, despite its configuration!

In spite of its racing heritage, the Quickie was really intended for weekend fun flying. Ground handling is excellent as is its slow landing speed. Landings are a real joy and touch-and-go's are really easy. The high wing configuration allows it to be easily hand launched, if needed. If you fly from a rough field it might be desirable to use nylon bolts or rubber bands to attach the landing gear.

For more docile flying a Max .10 or an Enya .09 will give very good performance though not as spectacular as a .15. The Quickie is an ideal airplane for one of the two channel brick systems and an .09 or possibly a .15, although throttle control is desirable when a .15 is used. If you are flying near houses or buildings, use a muffler. I use a Murphy Muffler on mine and I cannot detect any loss of performance. It is just quieter.

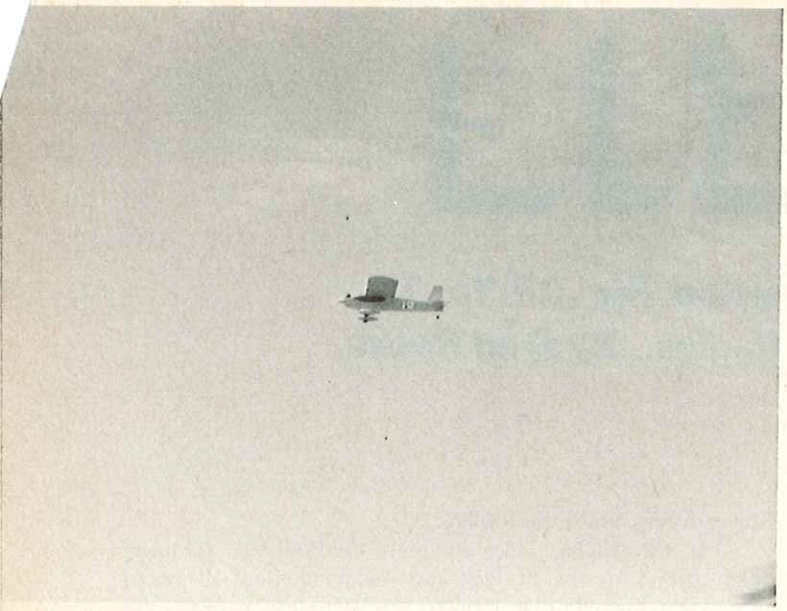
The Quickie was also designed to build up quickly with all of the structure reduced to a minimum and utilizing plywood in areas of stress. 5-Minute epoxy was used for all of the fuselage construction except for contact cement on the doublers. Titebond was used for the basic wing construction.

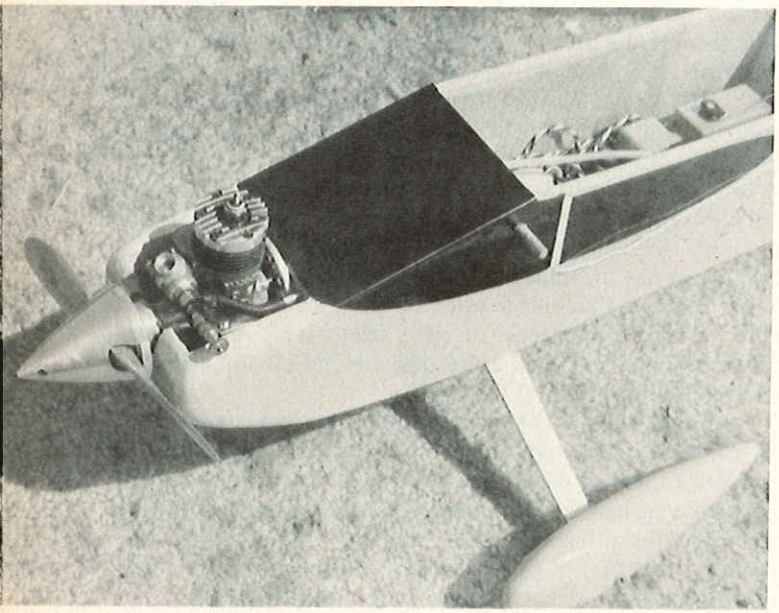
Let's begin with the wing as it only takes a short time and while it is drying you can start the fuselage. First, make up two sheets of 1/16" x 8" x 36". Pin one of the sheets down to a flat surface and mark off the rib locations. Pin down and glue the ½" square leading edge and the 1/16" x 3/8" filler strip. Glue down all of the ribs including the center two. These two ribs should be about 1/16" apart and angled slightly for the dihedral. When all of the ribs have dried, fit the top sheet and trim away any excess wood and bevel the trailing edge. Use Titebond and lots of pins and weights to glue the top sheet down over the ribs. While the wing is drying, build the fuselage.

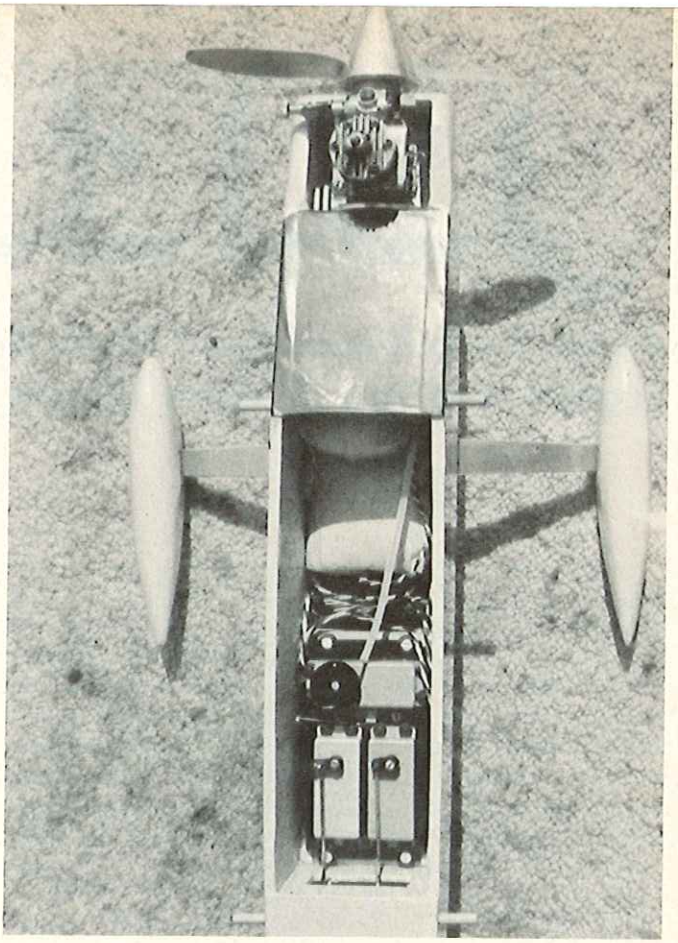
Cut the fuselage sides and all of the doublers and mark the locations for the firewall and bulkhead. Coat all pieces with contact cement and press firmly together when the cement has dried. Be sure to leave a slot between the doublers for the firewall. Epoxy the firewall and bulkhead to one side and, when set, add the other fuselage side. Epoxy the 1/16" plywood forward cabin top and cabin bottom. Add the 1/8" plywood landing gear mount in a puddle of epoxy to the cabin floor. Pull the tail together, add the 1/16" balsa crossgrain sheeting and the 1/16" plywood tailwheel piece to the rear of the fuselage. Add the ¼" sheet to finish the front of the fuselage. Sand the fuselage to final shape. Cut out the tail surfaces from medium hard 1/8" sheet balsa. Slide the stabilizer into the slot in the fuselage and glue. Sand two pieces of ¼" square x 3" to triangle cross-section to be used as vertical fin braces. Epoxy these and vertical fin to top of the fuselage.

Remove all of the pins from the wing and cut the wing in half between the two center ribs. Use a large sanding block and bevel the two wing halves to give 4" total dihedral. Join the two wing halves with epoxy. Use waxed paper and blocks to insure the proper dihedral. Add the 1/8" dowel to the trailing edge in the center to protect the wing from the rubber bands. To strengthen the center joint I used a 3" wide strip of Celastic which is distributed by Sig. For those who haven't used Celastic, it is quick and not as messy as is fiberglass. Celastic is cloth empregnated with powdered plastic. When the material is dipped into butyrate thinner or acetone, everything fuses and bonds to the balsa. When dry, it can be sanded and painted. Fiberglass or gauze and glue would work equally well. Add the tip blocks, shape the leading edge and sand everything. The wing is ready for finishing. I used Super MonoKote on my prototypes and Don Dewey used Solarfilm on his. Either Hobbypoxy or Superpoxy would also be a good choice.

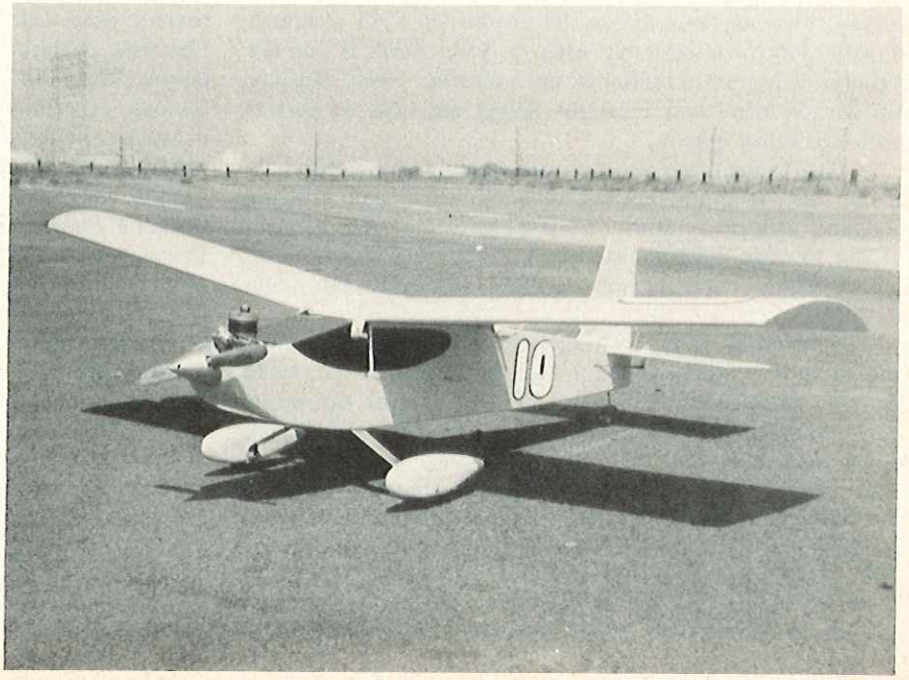
When all is finished and trimmed, bolt on the landing gear (Hallco B105-3 or similar) and engine mount. Bend the 1/16" piano wire tail gear except for the bend at the top. Solder a washer on the wire as shown on the plan. Drill a 1/16" hole up through the fuselage bottom and out the top at the base of the rudder. Slide the tail gear up through the fuselage and bend the wire back 90 degrees at the top. The tail gear slides into a hole drilled into the rudder and, after hinging, the rudder horn is bolted over the wire to prevent it from breaking out. Do not angle the tail wheel back any further than is shown on the plan as it increases the loads put on the rudder during taxiing or landing. **text to page 117**



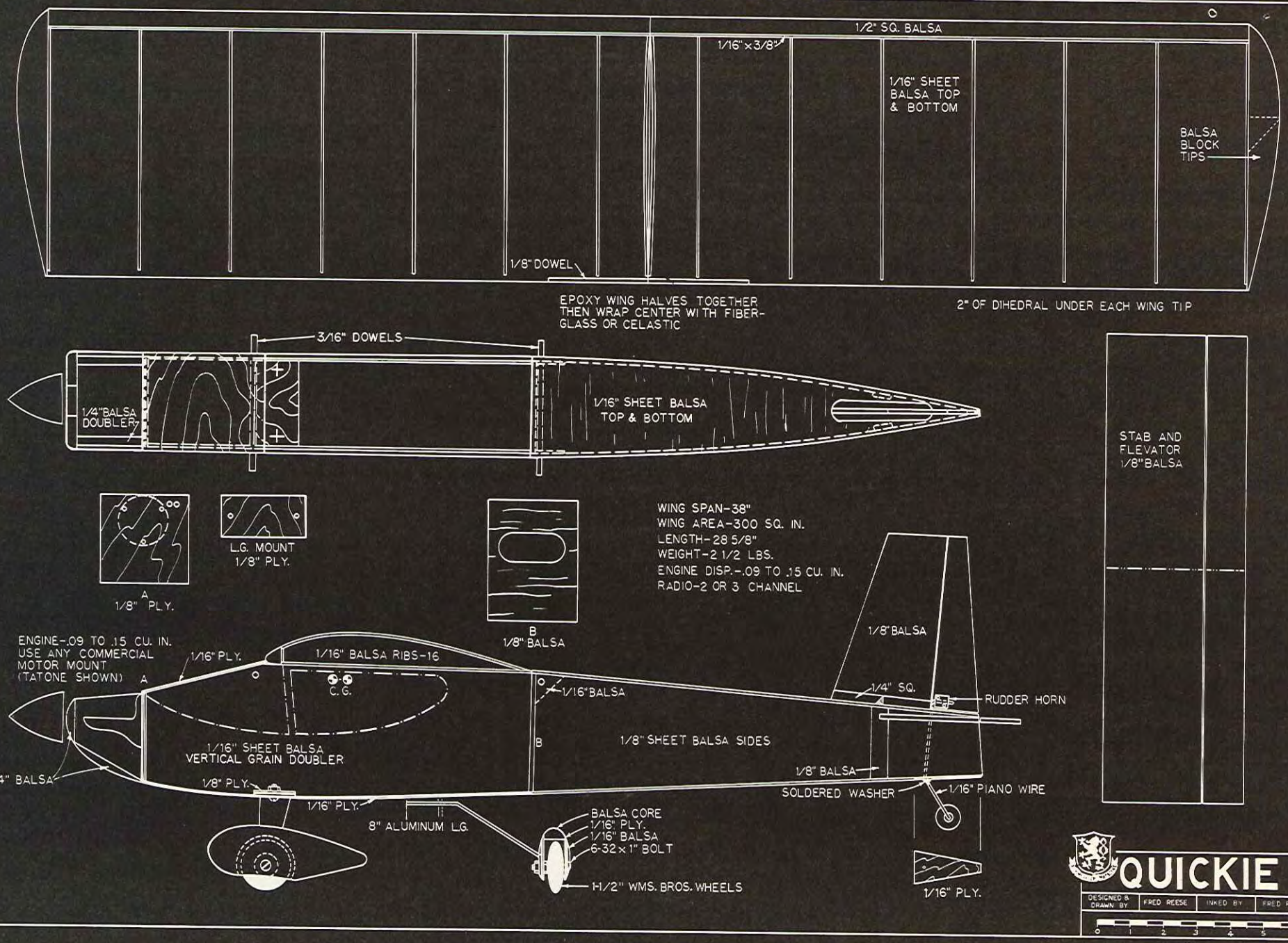




The Quickie is not a beginners airplane, but a Quarter Midget disguised as a high wing sport ship. Prototypes have been built as light as 2 lbs., 2 oz. and, with a Max .15, have held their own with .60 sized ships. The photos on this page show different views of the author's original Quickie, #10. Even with that small rudder, the roll rate is quick to say the least!



FULL SIZE PLANS AVAILABLE – SEE PAGE 118



CENTURION

A 75" Span Maximum Performance Sailplane Designed By Don Dewey For All-Out Competition In The Standard Class.

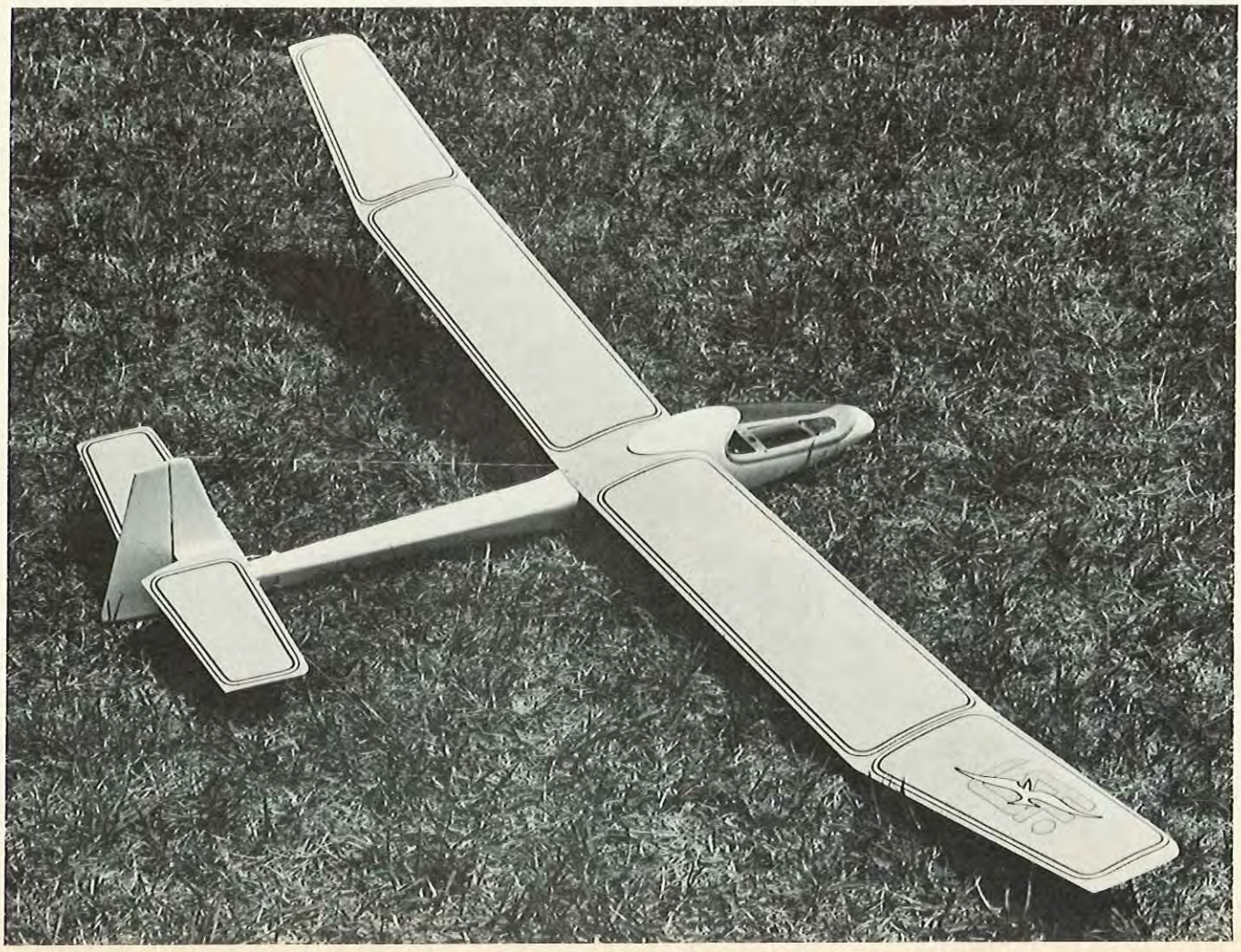
Several years ago, our good friend Willie Richards, came up to the shop with a prototype of an original sailplane design he had just completed. On the initial test flights he had experienced difficulty in achieving satisfactory flight performance and asked for some assistance in correcting the problems he had encountered. After making a few suggestions as to incidence changes, modifying the stab area, etc., the Gus was born. Within a few months after the publication of the Gus, this design became one of the most popular sailplane plans ever to be published.

My own experience with the Gus consisted of three prototypes built from the finalized plans and well in excess of a thousand flights with these prototypes over a two year period. Although designed primarily as a sport sailplane, the 75" span Gus had placed high in numerous sailplane contests around the country and I even managed to miss a first place win by one point flying this amazing little ship.

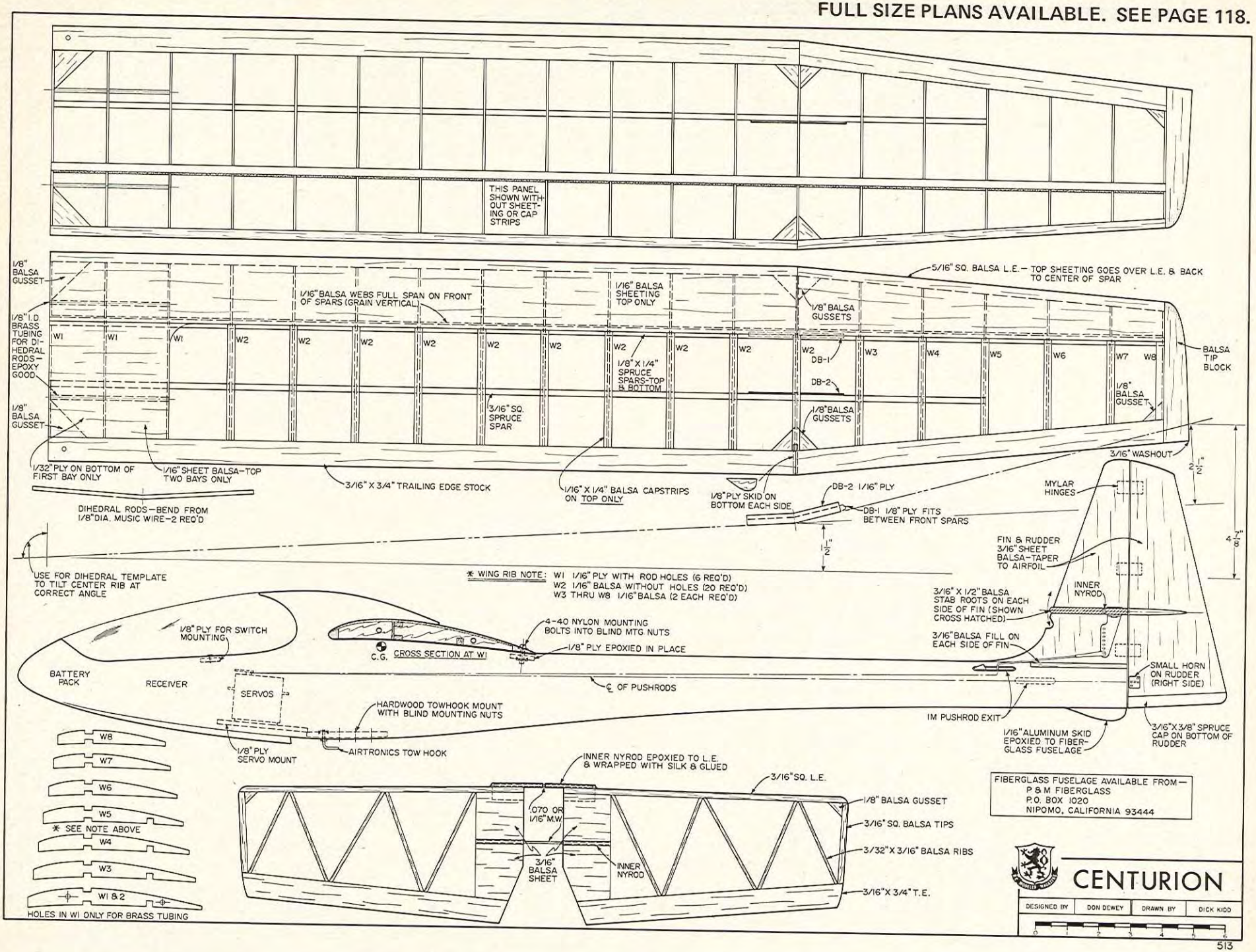
Yet, during the two years in which we flew the Gus against many different sailplane designs, the experience we gained indicated a need for a higher performance machine that would be capable of the tasks required by present day sailplane contests. Thus, I kept notes on the modifications I felt would be necessary to take this design to a higher plateau of competitive performance while retaining many of the desirable characteristics of the original design.

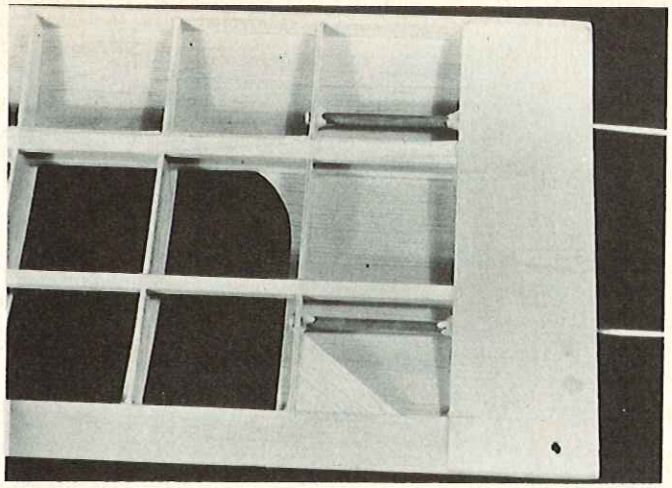
The Centurion is the result of these two years of "research" on the original design by Willie Richards. First of all, one of the greatest areas of maximum drag on a sailplane is at the junction of the wing to the fuselage, accounting on some sailplanes for as much as 30% of the total drag. Thus, it was decided to have a custom fiberglass fuselage made for the Centurion by one of the master craftsmen in the field of fiberglass lay-up. The criterion I established for the construction of the fuselage seemed to me impossible to accomplish in fiberglass, but it was decided to give it a try.

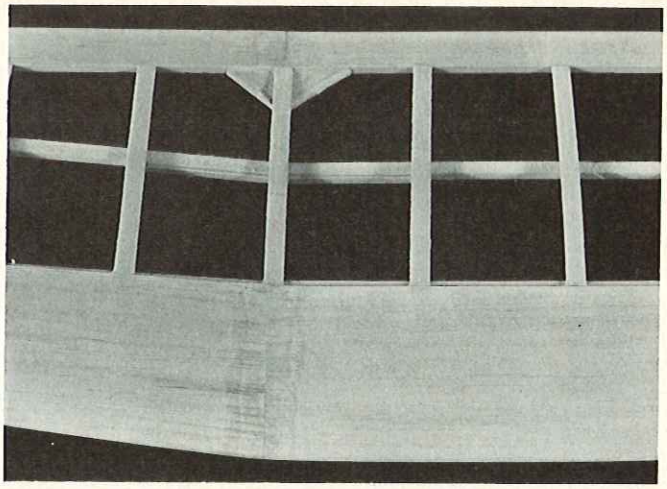
text to page 104

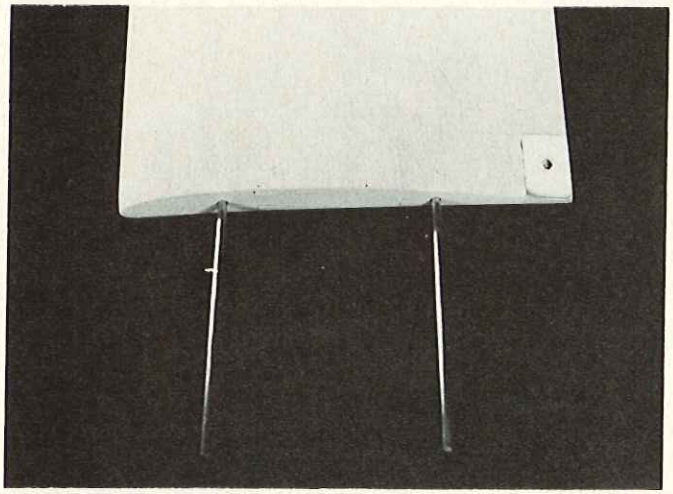


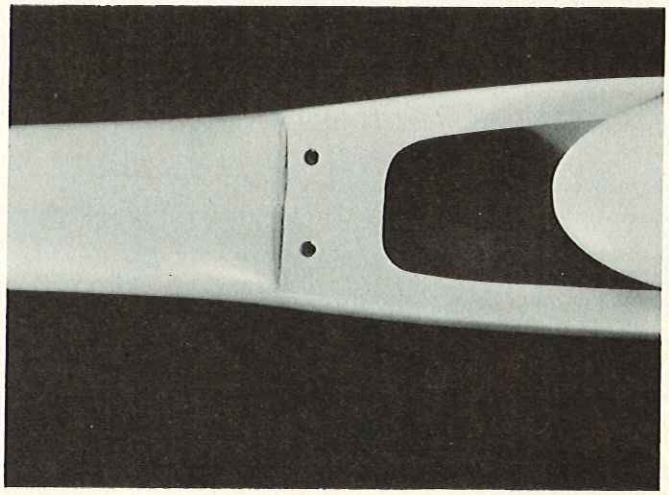
FULL SIZE PLANS AVAILABLE. SEE PAGE 118.

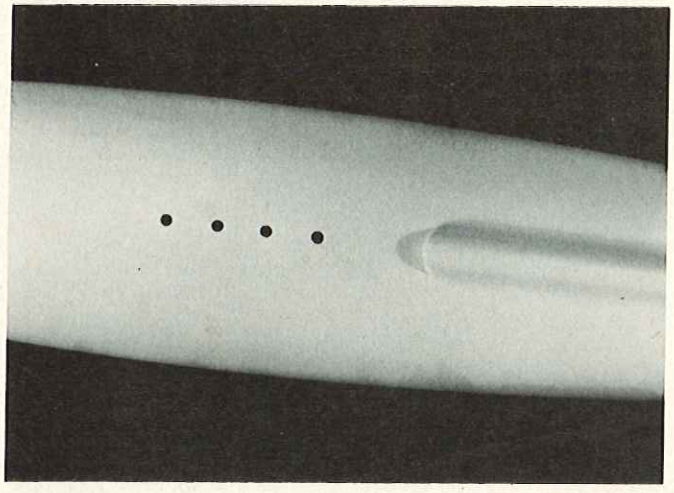


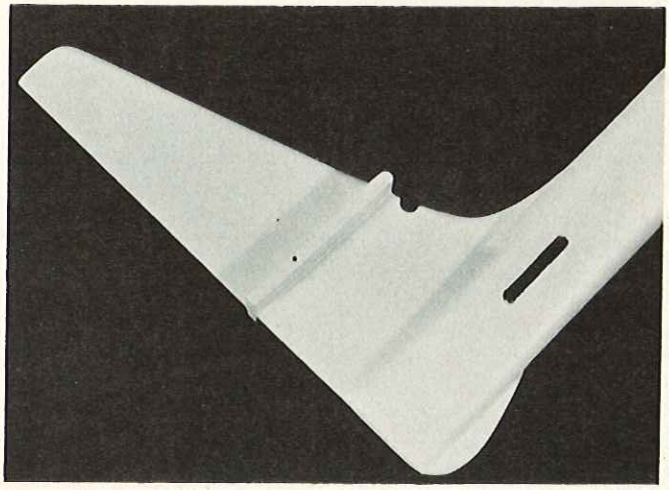


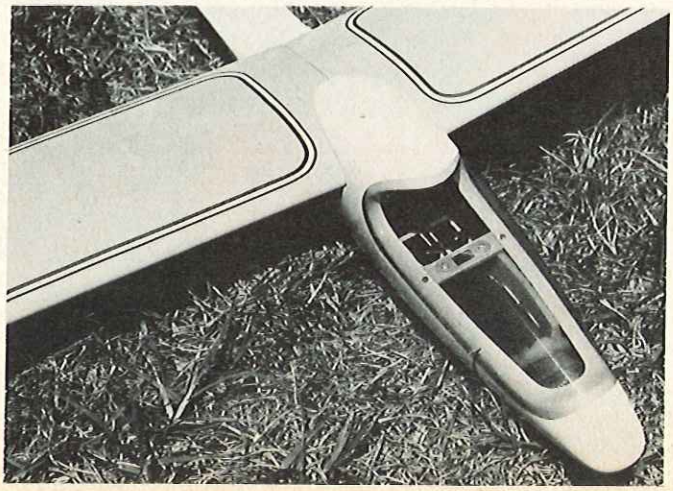




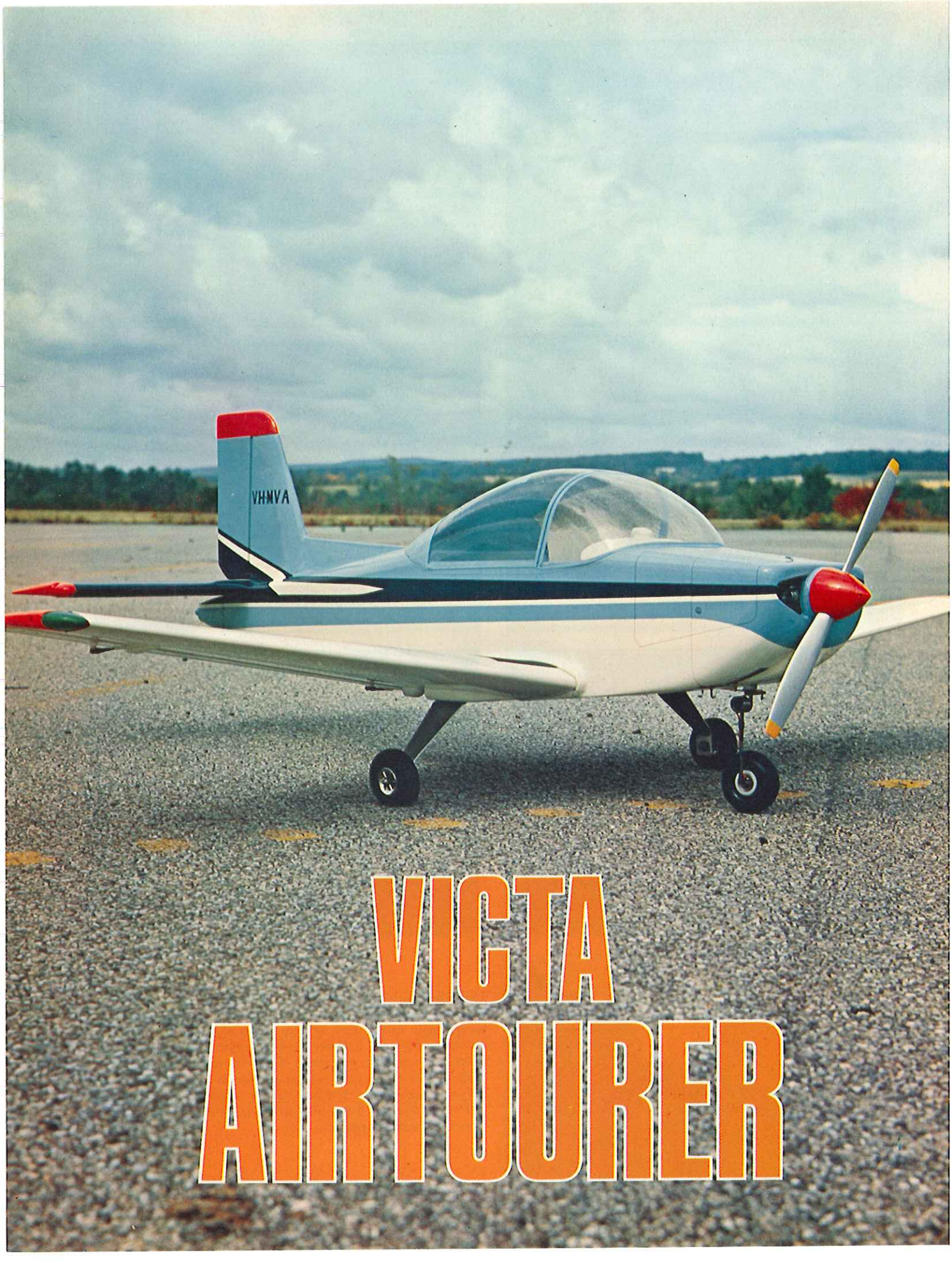








TOP ROW: (L) Underside of wing. Note 1/32" ply sheeting over center bay. (R) Thin, light cloth and glue used to reinforce dihedral breaks. 2ND ROW: (L) 1/32" ply inserts in trailing edge for wing hold-down bolts. (R) 4-40 blind mounting nuts in 1/8" plywood plate epoxied to underside of fuselage flange for nylon wing bolts. 3RD ROW: (L) Holes drilled in fuselage bottom for Airtronics tow hook, (R) empennage set-up. Notch in fin for stabilator pivot clearance. LEFT: RS Systems 3-channel installed in Centurion. Note internal location of switch to minimize drag.



VICTA AIRTOURER

A Magnificent Scale Model Of The Australian Victa Airtourer 115. For .60 Engines, This Is One Scale Model That Flies The Way You Wished All RC Models Flew! By George Hahn.

The June/July 1963 issue of Air Progress featured two photographs of the Victa Airtourer which immediately caught my eye as its proportions seemed ideal for Radio Control flying. Correspondence was initiated with Victa Ltd., Aviation Div., Horsley Rd., Milperra, N.S.W. Australia, and a factory print was gracing the drawing board in a matter of weeks. Since that time, I have had a great deal of correspondence with Victa who has been most cordial in cooperating with me as far as sending additional information. I have recently been informed, though, that the company no longer is manufacturing the Airtourer.

The drawings and basic balsa structure were all but completed by December of 1963, but that was all I could accomplish for a full year, finally finishing the model by the late Spring of 1965. The one and only problem was to be forming the large (8" x 17" x 4½") canopy. A commercial contract for the canopy was prohibitive from a cost standpoint (minimum $50.00) and a homemade process was finally hit upon at minimum cost and with excellent results.

Two models of the Airtourer (110 and 115) are shown on the factory print, and my choice of the 115 model, due to the longer and cleaner nose moment, was toward a plane that might balance more easily. The choice appeared right, as the model balanced on the spar line and flew "off the board." Although the plane weighed 8½ pounds and a small wing area of then 586 square inches gave it a loading of over 34 ounces, the model had a tendency to climb on full throttle; going to 1/2 to 3/4 power on the ST .56, without changing the trim setting, gave the plane a most realistic air speed. Handling was very smooth, with ailerons being no problem if one prefers them sensitive.

If you've noticed, I have been mostly using the past tense the last few sentences. The reason being a disaster at the 1965 Nationals when a poor aileron linkage and a balky servo combined to distract me enough from observing an upcoming stall at about 20 feet. The results of this crash prompted me to rebuild the front end, completely enclosing the engine, plus a new wing was to be built – full scale. The original wing was balsa using the V-spar construction found in most models; landing gear was formed wire. The new wing is a foam core, box spar type, and scaled down to a dural aluminum gear, bolted to basswood spars. Flaps have also been added as the model is "hot" due to the high wing loading. In addition, a decreased landing speed may be desired by some modelers who will build the Airtourer.

The flaps, in fact, are practically a must for take-off's from a short field. I presently use only about 1/3 flaps for take-off's, although our field is quite large. If you've never used full flaps before, I heartily recommend them as they make your touch downs not only more realistic, but less nerve-racking from high speed approaches, as the wing loading is now up to 40 oz./sq. ft.!

The plans show interior fittings which have been included on the rebuilt model. These call for servo installation at the cockpit rear and may present a problem to some, when balancing, due to differences in servo weight or individual construction choices. This problem may be compensated for by placing the battery pack to the left of the engine or installing servos on the larger servo rail and not including a full-scale cockpit. In either case it is recommended that the 3/8" x 1/2" servo rail be installed for the strength factor alone. The receiver is mounted at the location of the right seat if a cockpit is included.

The rebuilt plane, using a ST .60, now weighs in at 9½ lbs., plus any weight needed for balancing. It balances between the spar and rear C.G. with approximately 3 ozs. of lead in a compartment right behind the front of the cowl.

The instrument panel was fabricated from 1/8" aluminum sheet in two pieces. Tatone paper dials are glued to the back of the instrument section which is then bolted to the main panel; the main panel, in turn, is bolted to the front of the cockpit where blind nuts have been inserted.

A feature not common to aircraft is the position of the joystick, which is on the center console for use from either seat. The cockpit seats and console are a box affair which is attached via blind mounting nuts on the main servo rail.

If you want a full scale model that flies just the way you wished all your planes would fly, this is it! The plane grooves so nicely I have been putting off a temptation to build a duplicate or two for my everyday flying. Try one and see if you agree.

CONSTRUCTION

FUSELAGE:

The fuselage construction begins by cutting out the 3/32" side sheets following the corners marked S. Add 1/4" square balsa members as shown by shading, **except** those three pieces between F1 and F2. Cut the 1/32" ply doubler and glue to the side sheets. Now add the three members between F1 and F2 to the ply doubler.

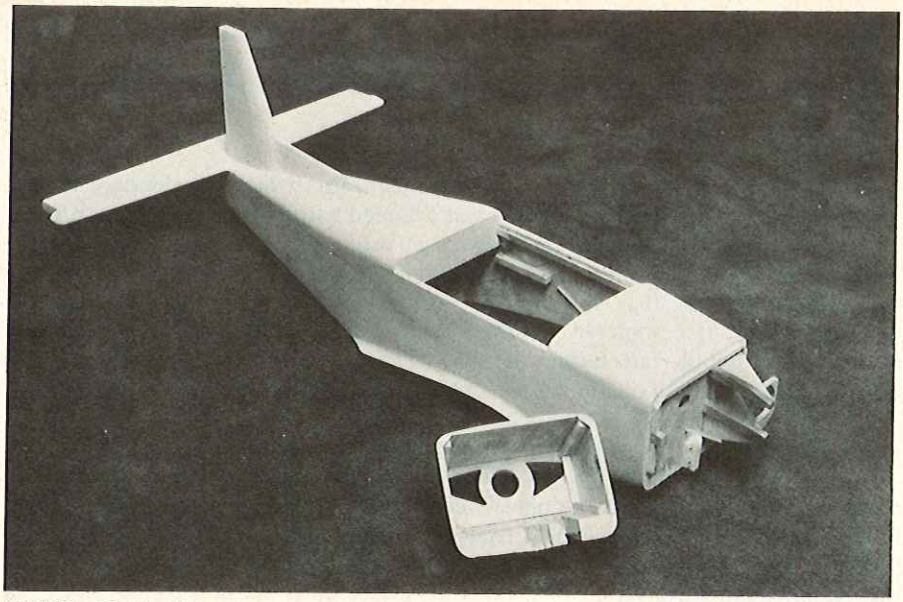
Cross framing is now added to the fuselage rear as are formers F3, F1 through F8, and F6. Add 1/2" bracing at the point shown on the top view of the plan. For clarification, the plans do not show 3/32" x 1/4" stringers which are now added, as is the 3/32" sheeting to the top and bottom. Foam addicts can make these body contours by shaping the desired form and sheeting, then adding the whole assembly to the wood structure.

Now support the body squarely and add the 1/4" ply F2 to begin nose construction. **Epoxy** all ply and hardwood in this phase of the construction. After F2 is set-up, add F1, the 3/8" square hardwood braces, and the 3/8" x 1/2" hardwood motor mounts. Be sure your **alignment** is true prior to the hardening of the epoxy, especially where the aluminum motor mount sets.

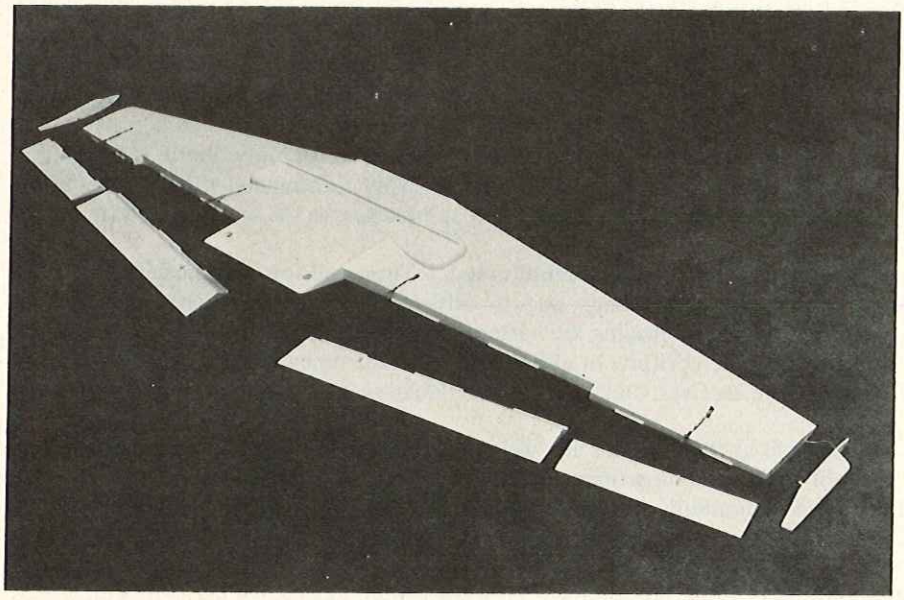
Before further exterior construction is done, the nose gear mounting should be made, and boxes are to be constructed as per the plan if using the listed battery and gas tank. It is **also imperative** that the throttle and nose gear linkage tubing be inserted at this point, unless individual preferences are toward straight linkages and unfinished cockpits, which will allow easier placement of the servos.

NOSE & BLOCKAGE DETAIL:

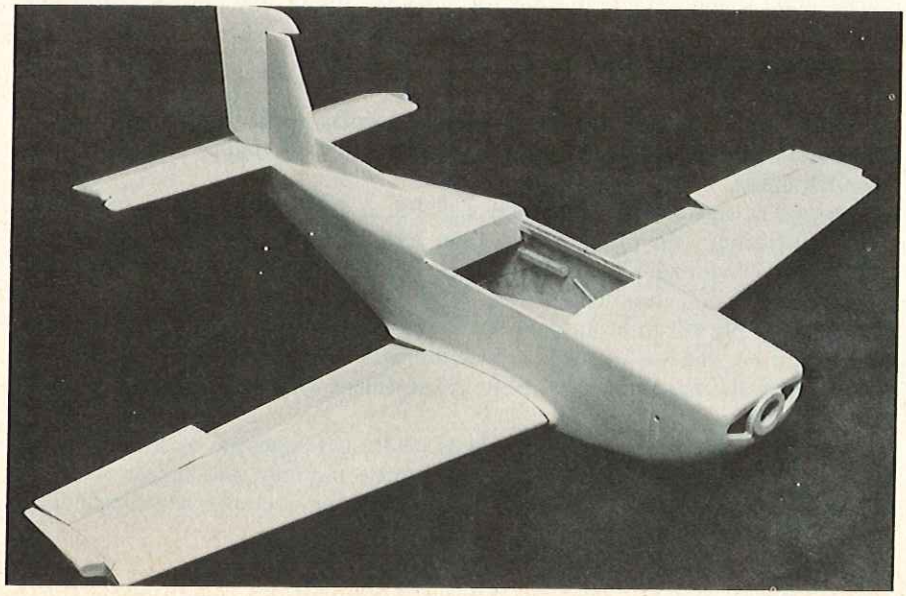
Balsa blockage is now glued to the top of the dash backing (F2 area) and against the ply doublers, as indicated by No. 1 and No. 2. Add the 1/4" side sheets SS then more blockage as indicated by No. 3. The blockage acts as . . . . . .



ABOVE: The fuselage structure. BELOW: Basic wing components.



BELOW: The complete Airtourer structure, less canopy.



bracing and is needed as fill when sanding the top to the required contour, (use the top of the dash panel as a contour guide). *When gluing side sheets SS, the sides are to be tacked only at points C. Determine the method of attaching the cowling before continuing and add the balsa blocks to the interior of the cowling for strength and shaping needs. My model has hardwood inserts on F1 which rest against the inside of SS and have blind mounting nuts in them. If all linkages are made, the bottom blocks can now be attached. The nose piece N is outlined on 1/4" sheet as per detail, and using the center lines as guides, glued to the front.

Sand the front to shape and add the air scoop block to the bottom. The air scoop can be 2½" to 3" wide. The cowling can now be cut through at point C (where it should have only been tack glued to the sides) and removed in one piece. Fillets are best made after the wing is assembled and fitted in place, then building material is added to the proper height and contour. The rear block can be hinged for elevator access at point shown.

WING:

As mentioned above, the wing was originally balsa and open spaced between the ribs. As a truer scale and possibly stronger wing can be made with foam, and the full-scale Airtourer is all-metal, solid sheeting should be the rule both for the wing and stab sections. The foam wing is made in three sections. To make easier repairs to the tip and lights, which are usually the first and most often damaged, I have made the wing tips removable.

Foam cores are cut as per the template outlines given on Secion C-C or B-B. To insure the proper incidence, and undercamber, the rib templates should be placed against the foam blocks as per the reference lines shown on the plan. The outer wings are cut to a length of 25-1/8" as per the Foam Cut Reference lines, and bellcrank cutouts are made where shown or preferred. The bellcranks are now attached to the 1/8" ply mounts and inserted; the wire linkage is attached without being of excessive length so that the sheeting can be accomplished. The sheeting is best done by placing the bottom sheet over the plan, starting with the trailing edge, then dropping the wing down by reference to the spar line as a centering guide. The top sheet is then added and, if a solid leading edge is preferred, cut through

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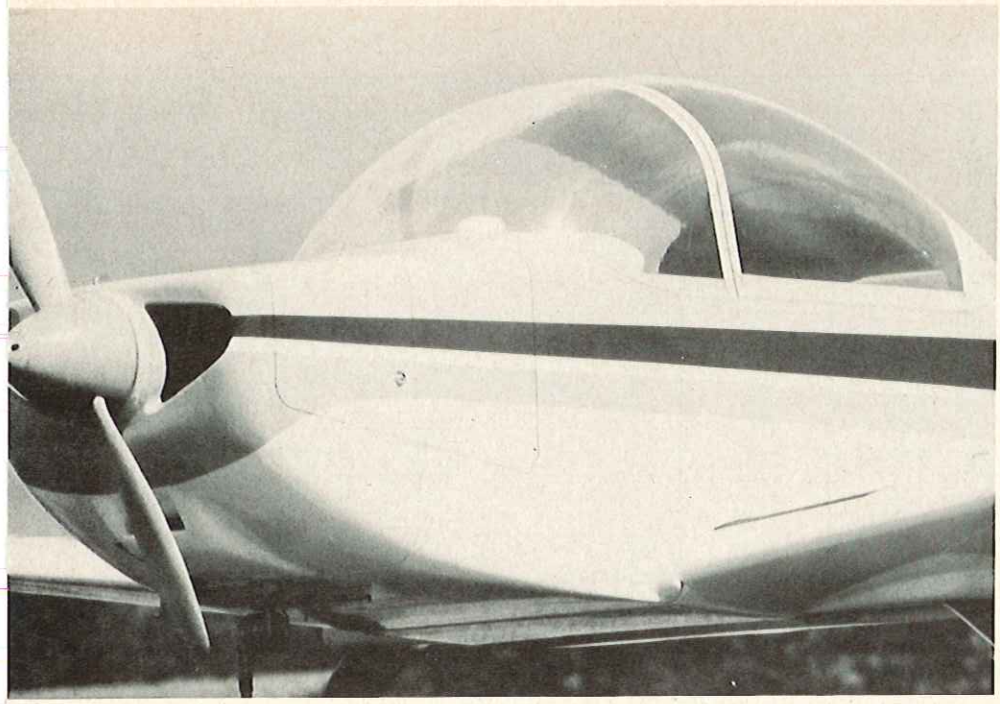
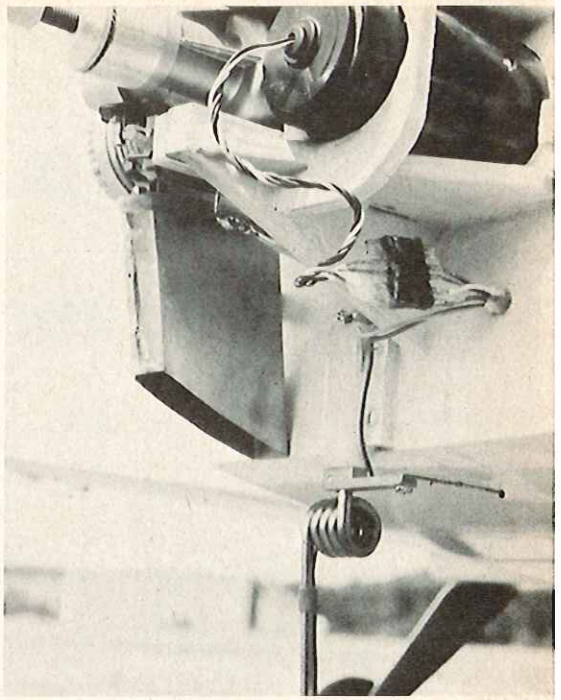
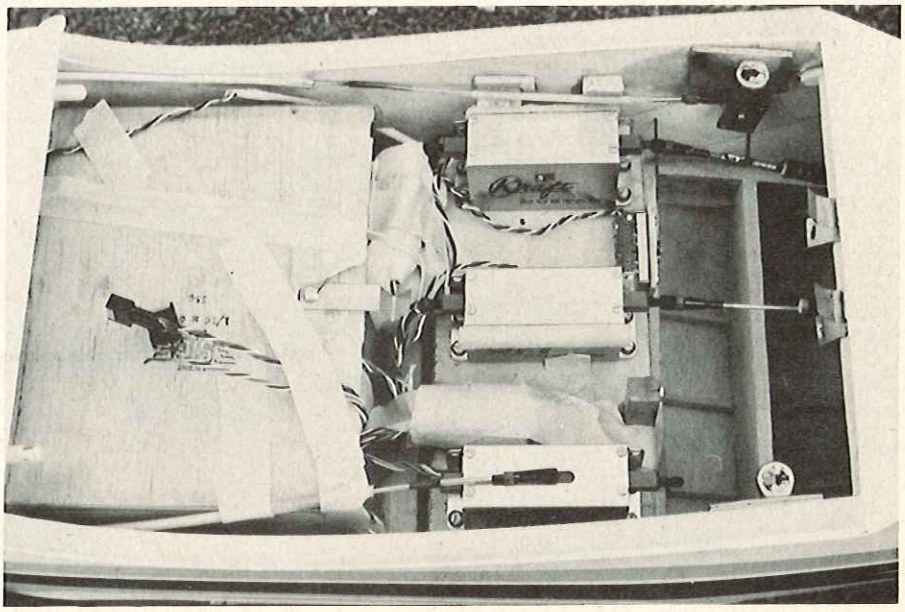
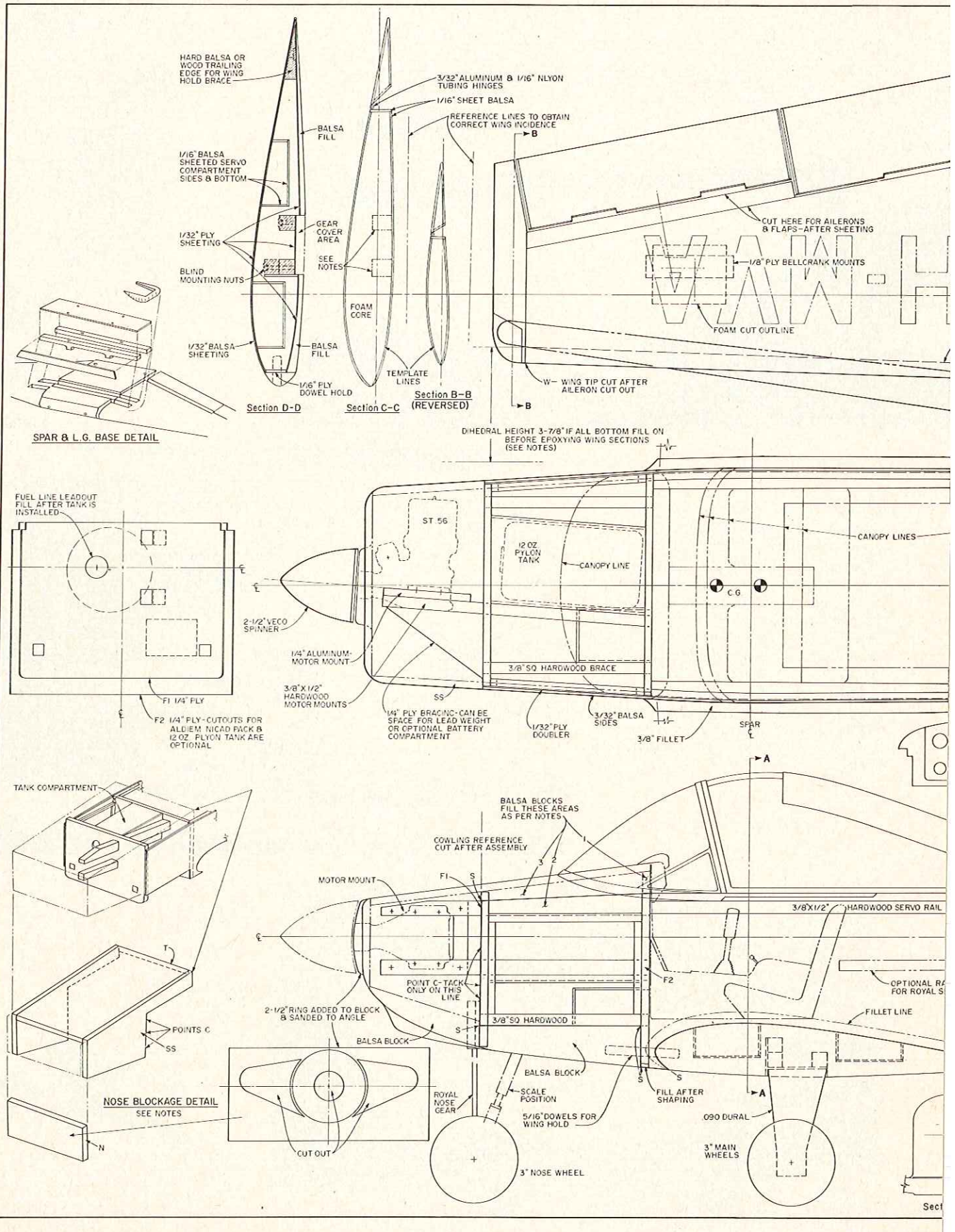
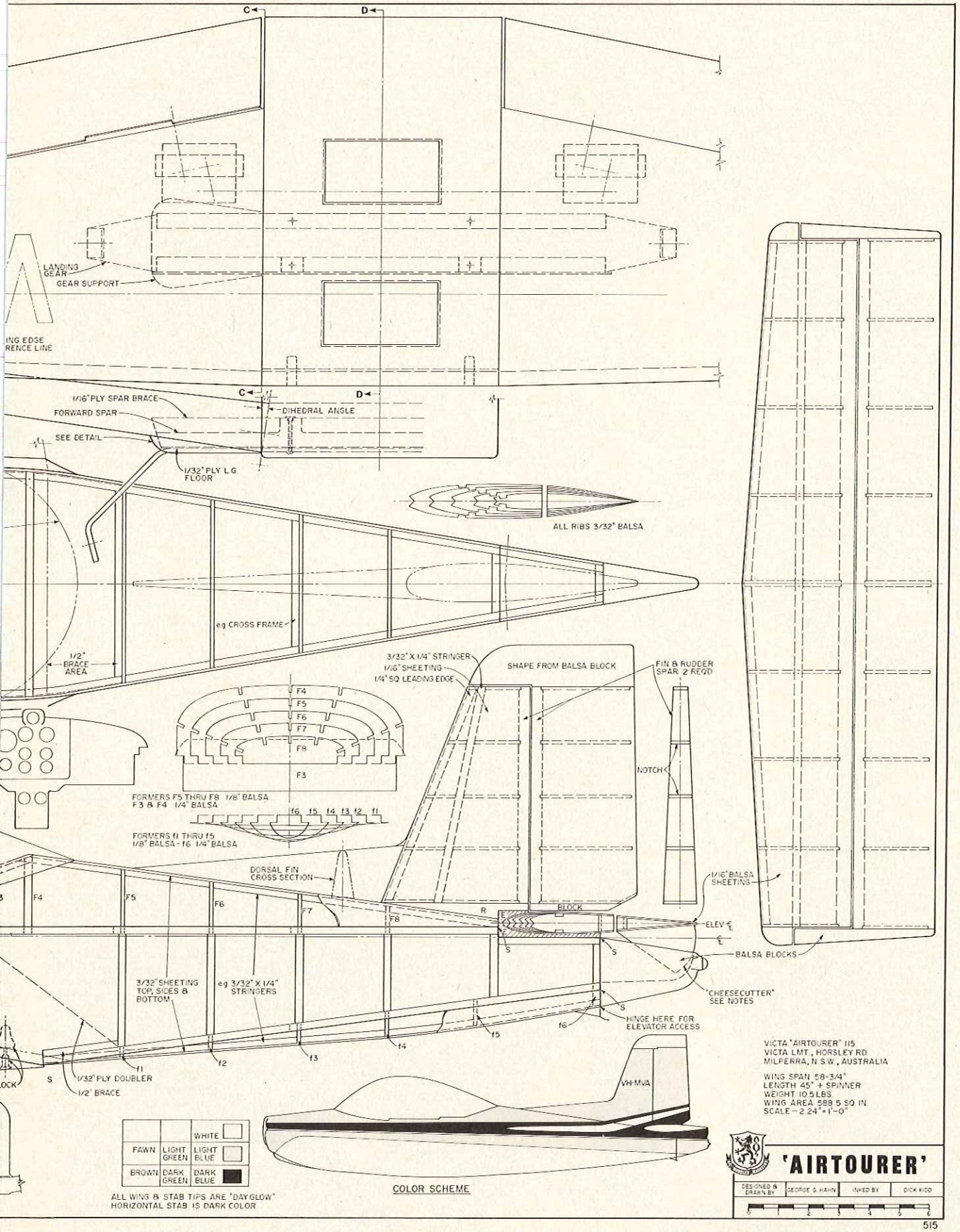


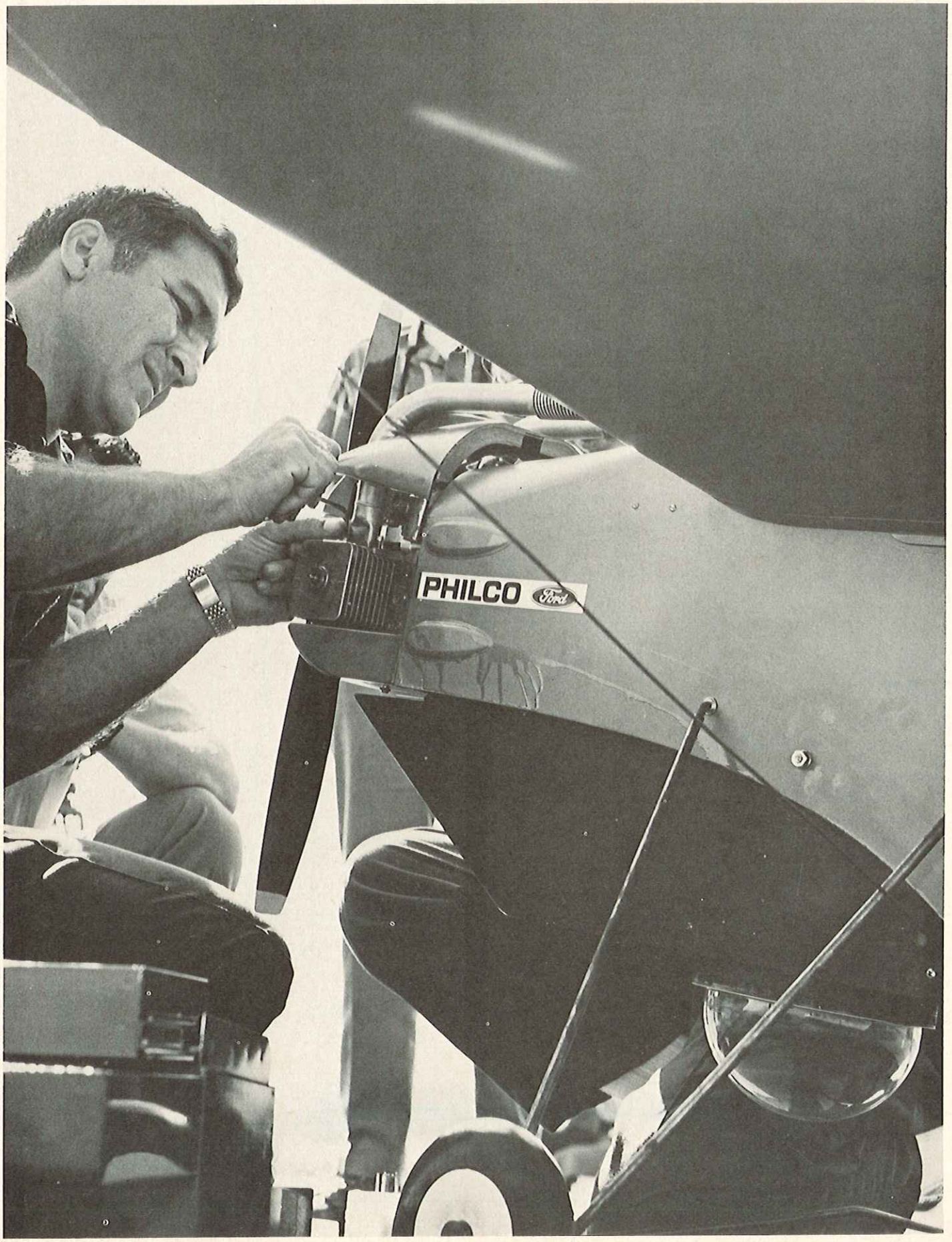


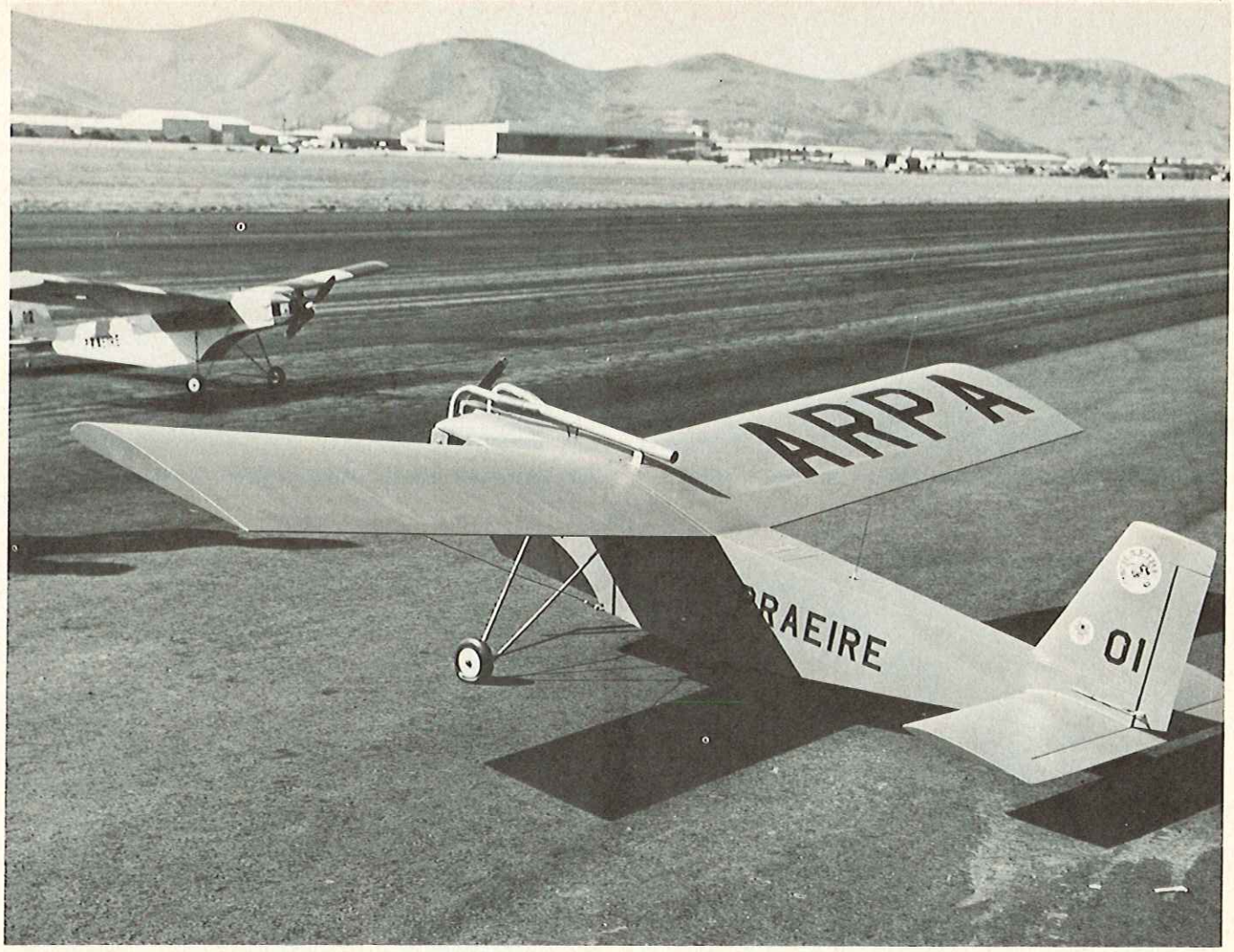


ABOVE, LEFT: Close-up view of Victa Airtourer cowl and canopy. Text details method of forming canopy. **ABOVE, RIGHT:** Battery pack is carried in cowl, opposite engine, to achieve proper C.G. **RIGHT:** View of radio equipment from underside of plane. 'Boxed-in' section is floor of cockpit. Radio system is carried aft in order to provide room for full cockpit detailing. **BELOW, LEFT:** Low angle shot of completed Victa Airtourer. **BELOW, RIGHT:** The Airtourer, while somewhat sensitive to ailerons, grooves in a way that you would like all of your aircraft to fly - - - and does it at a 40 oz./sq. ft. wing loading!


HARD BALSA OR WOOD TRAILING EDGE FOR WING HOLD BRACE
3/32" ALUMINUM & 1/16" NLYON TUBING HINGES
1/16" SHEET BALSA
REFERENCE LINES TO OBTAIN CORRECT WING INCIDENCE
BALSA FILL
1/16" BALSA SHEETED SERVO COMPARTMENT SIDES & BOTTOM
GEAR COVER AREA
1/32" PLY SHEETING
SEE NOTES
BLIND MOUNTING NUTS
FOAM CORE
1/32" BALSA SHEETING
BALSA FILL
1/16" PLY DOWEL HOLD
TEMPLATE LINES
Section D-D
Section C-C
Section B-B (REVERSED)
CUT HERE FOR AILERONS & FLAPS-AFTER SHEETING
1/8" PLY BELLCRANK MOUNTS
FOAM CUT OUTLINE
W- WING TIP CUT AFTER AILERON CUT OUT
SPAR & L.G. BASE DETAIL
DIHEDRAL HEIGHT 3-7/8" IF ALL BOTTOM FILL ON BEFORE EPOXYING WING SECTIONS (SEE NOTES)
FUEL LINE LEADOUT FILL AFTER TANK IS INSTALLED
ST 56
12 OZ PYLON TANK
CANOPY LINE
CANOPY LINES
C.G.
2-1/2" VECO SPINNER
1/4" ALUMINUM MOTOR MOUNT
3/8" SQ HARDWOOD BRACE
3/8" X 1/2" HARDWOOD MOTOR MOUNTS
SS
1/4" PLY BRACING-CAN BE SPACE FOR LEAD WEIGHT OR OPTIONAL BATTERY COMPARTMENT
1/32" PLY DOUBLER
3/32" BALSA SIDES
3/8" FILLET
SPAR
F1 1/4" PLY
F2 1/4" PLY-CUTOUTS FOR ALDIEM NICAD PACK & 12 OZ. PLYON TANK ARE OPTIONAL
TANK COMPARTMENT
POINTS C
SS
NOSE BLOCKAGE DETAIL
SEE NOTES
N
BALSA BLOCKS FILL THESE AREAS AS PER NOTES
COWLING REFERENCE CUT AFTER ASSEMBLY
MOTOR MOUNT
F1
S
3/8"X1/2" HARDWOOD SERVO RAIL
POINT C-TACK ONLY ON THIS LINE
F2
OPTIONAL RA FOR ROYAL S
2-1/2" RING ADDED TO BLOCK & SANDED TO ANGLE
3/8" SQ HARDWOOD
FILLET LINE
BALSA BLOCK
BALSA BLOCK
SCALE POSITION
FILL AFTER SHAPING
ROYAL NOSE GEAR
5/16" DOWELS FOR WING HOLD
090 DURAL
3" MAIN WHEELS
CUT OUT
3" NOSE WHEEL
A
B


C
D
LANDING GEAR
GEAR SUPPORT
ING EDGE
RENCE LINE
1/16" PLY SPAR BRACE
FORWARD SPAR
SEE DETAIL
DIHEDRAL ANGLE
1/32" PLY L G FLOOR
ALL RIBS 3/32" BALSA
eg CROSS FRAME
1/2" BRACE AREA
3/32" X 1/4" STRINGER
1/16" SHEETING
1/4" SQ LEADING EDGE
SHAPE FROM BALSA BLOCK
FIN & RUDDER SPAR 2 REQD
NOTCH
F4
F5
F6
F7
F8
F3
FORMERS F5 THRU F8 1/8" BALSA
F3 & F4 1/4" BALSA
f6 f5 f4 f3 f2 f1
FORMERS f1 THRU f5
1/8" BALSA - f6 1/4" BALSA
DORSAL FIN CROSS SECTION
1/16" BALSA SHEETING
BLOCK
ELEV
BALSA BLOCKS
"CHEESECUTTER" SEE NOTES
3/32" SHEETING TOP, SIDES & BOTTOM
eg 3/32" X 1/4" STRINGERS
HINGE HERE FOR ELEVATOR ACCESS
1/32" PLY DOUBLER
1/2" BRACE
VH-MVA
WHITE
FAWN
LIGHT GREEN
LIGHT BLUE
BROWN
DARK GREEN
DARK BLUE
ALL WING & STAB TIPS ARE "DAYGLOW"
HORIZONTAL STAB IS DARK COLOR
COLOR SCHEME
VICTA "AIRTOURER" 115
VICTA LMT., HORSLEY RD
MILPERRA, N.S.W., AUSTRALIA
WING SPAN 58-3/4"
LENGTH 45" + SPINNER
WEIGHT 10.5 LBS.
WING AREA 588.5 SQ IN.
SCALE – 2.24" = 1'-0"
'AIRTOURER'
DESIGNED & DRAWN BY
GEORGE S. HAHN
INKED BY
DICK KOD
0 1 2 3 4 5 6
515


PHILCO
Ford



Sakert-Riggs first RPV's immediately before their maiden flights.

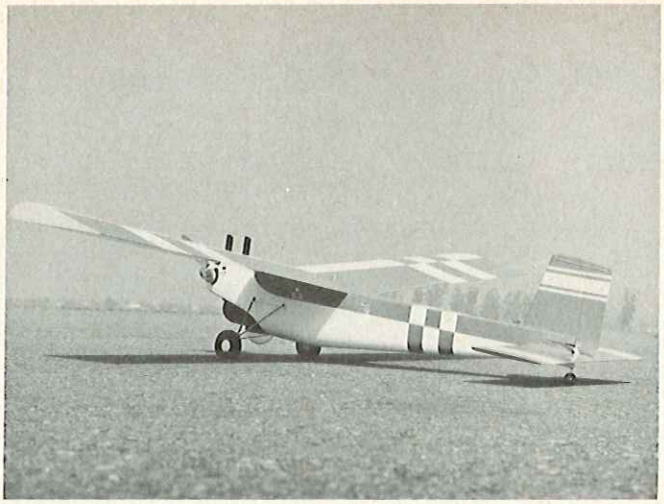
SOMETHING OTHER THAN SUNDAY FLYING

Photos And Text By
DICK TICHENOR

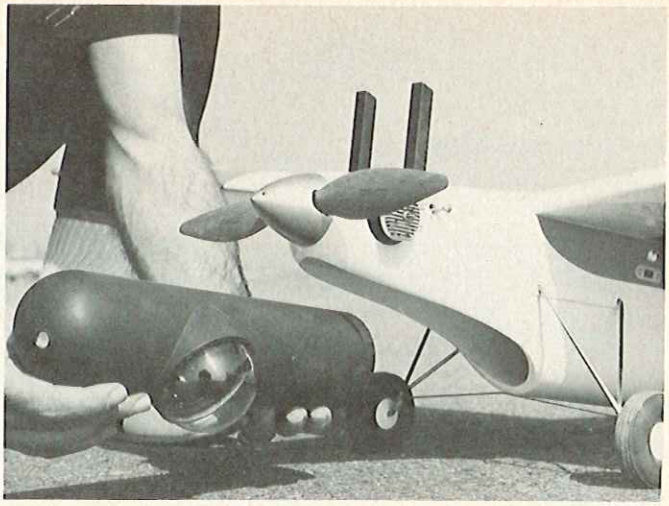
Are there model builders anywhere who don't day dream and shoot the breeze, while the glue is drying, about making a lucrative business out of their hobby? Did you every carry the dreams farther and wonder what it would be like? Here is a story of a couple of RC'ers who are traveling down that road.

Jan Sakert and Dick Riggs are our subjects. Both are very well-known modelers whose dossiers can be envied by anyone familiar with their background. Jan was a model builder in the NACA labs at Langley Field, Virginia, almost before space had been invented and has been active with modeling and full size aircraft (he's a licensed pilot) over many years. Dick was competing in model meets and working in Boeing's experimental shops at the end of World War II. Over a decade of developing radio control equipment with Orbit, qualifies him as an authority in the R/C field. And, both are meticulous builders whose models reflect both their talent and experience.

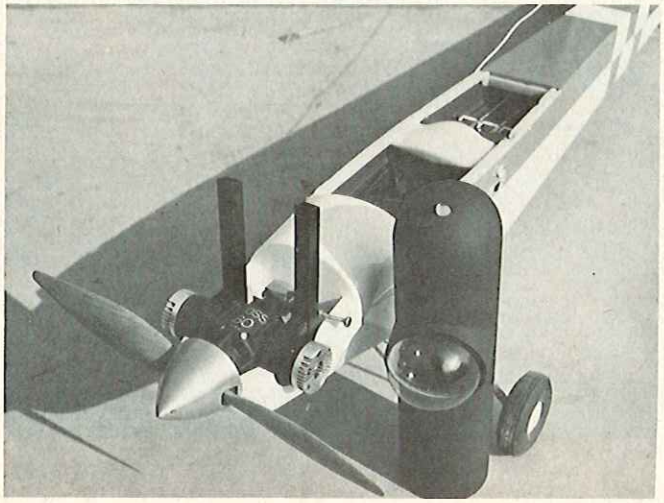
This saga begins in late January 1972 when Jan and Dick were furiously building up their stable for the coming pylon racing season. One of Southern California's prominent aerospace companies asked them to come over and discuss a project which involved model building experience. Our fantastic modeler's grapevine and rumor mill had already clued them in on several companies in the model industry having been contacted on this project and of their general reluctance to participate. Simple curiosity would be incentive enough to take a look so they went over to see what it was all about.



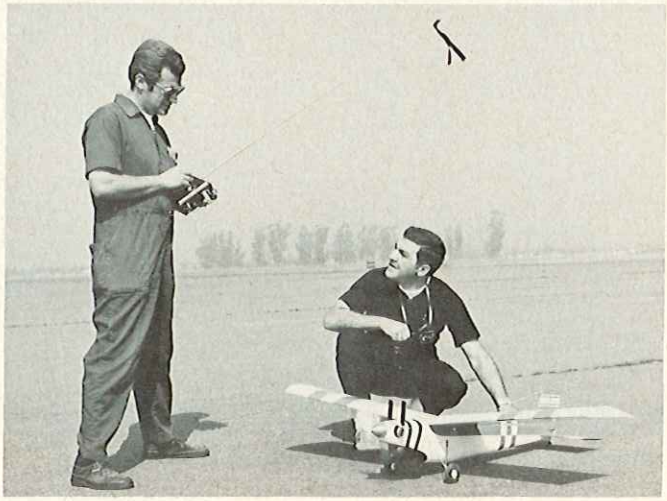
Half size model of original concept that proved design integrity.



Early payload configuration allowed attractive fuselage lines.



Ross twin provided ample power with minimum vibration. Note vertical exhaust stacks.

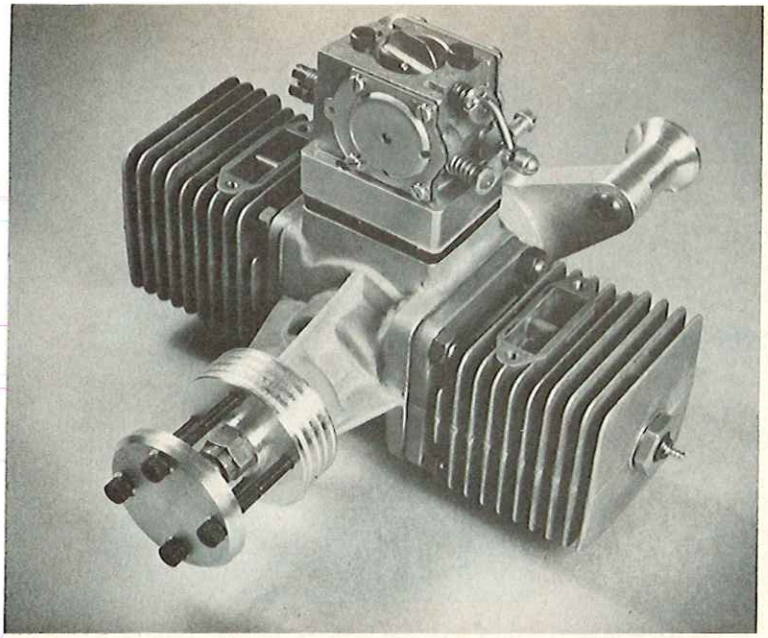


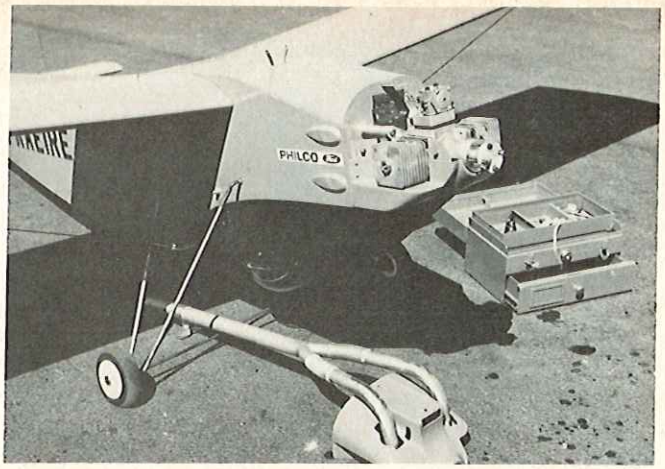
Dick Riggs and Jan Sakert readying half size model for its first test flight.

The turn of events related to world conditions and our nation's position during the last few years has prompted our military leaders to explore possibilities in many areas. Requirements to perform necessary military missions while being faced with public clamor over ecology, POW's, MIA's, drafted manpower and tighter budget controls have the Pentagon caught up in something of a squeeze. Heavy emphasis has been placed on remotely piloted vehicles (RPV) in a wide variety of applications. It also just happens that in both the Pentagon and at Wright Field there are quite a few prominent people who enjoy flying R/C model aircraft. Requests for proposals were issued to the aerospace industry asking for proposals to perform various missions with RPV's utilizing conventional model aircraft technology and off-the-shelf materials and equipment with MIL spec's being neither required nor desired.

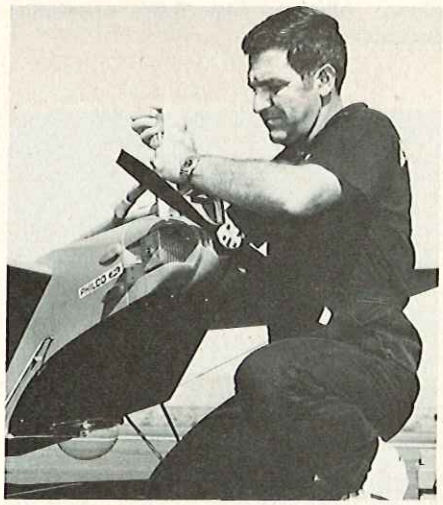
Jan and Dick made their visit to the aerospace company, their first exposure to that unique business world, and experienced their share of fascination, amazement, and frustration. Model aviation has never really been held in very high esteem by the full size aviation world *(Ed. Note: Our author spent over thirty years in the aerospace industry)* there is practically no authoritative data available on model airplane design and performance and there is a need for information upon which to base a proposal for programs of considerable value. The sheer challenge of the project prompted our two modelers to agree to an arrangement to provide the design for the proposal. In essence, a major corporation relying on two model builders in a home workshop to provide the vehicle design to carry their exotic electronic payload package!

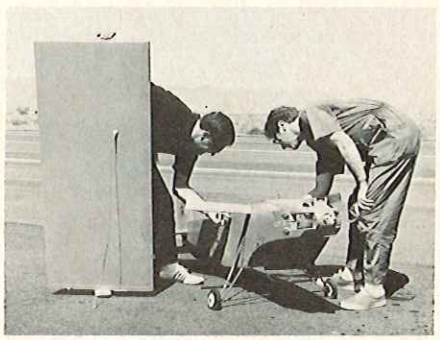
Designing a model aircraft to perform a specific mission requires the appropriate know-how and, if you have the proper expertise, it's really no big deal. Their most difficult problem was in convincing their client's engineering staff of the validity of modeling know-how learned through years of experience but not documented in text books. Their design was being incorporated into the proposal even though the client indicated considerable unspoken apprehension concerning the project. As a matter of pride, Jan and Dick built a half-size model of their design, installed a two cylinder engine for vibrationless power, simulated the payload size and weight, and proved their point by accumulating impressive flight performance data that exceeded their design



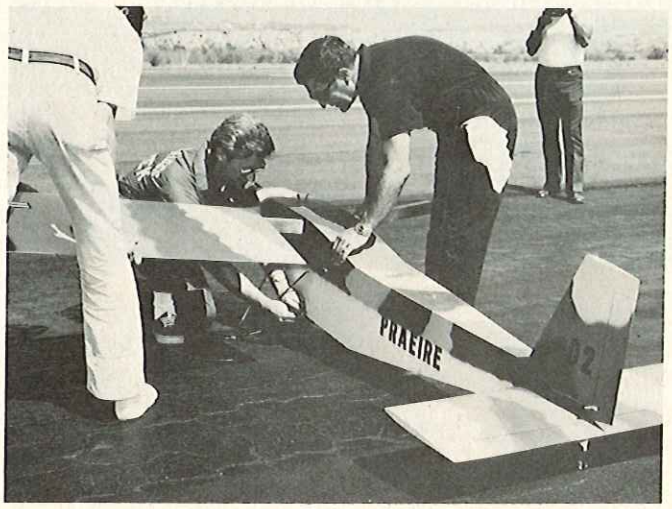


LEFT: Model SR 245 engine developed to Sakert-Riggs spec's by K & B. An outstanding power plant. ABOVE: Fiberglass engine cowl and exhaust stack are easily removed.

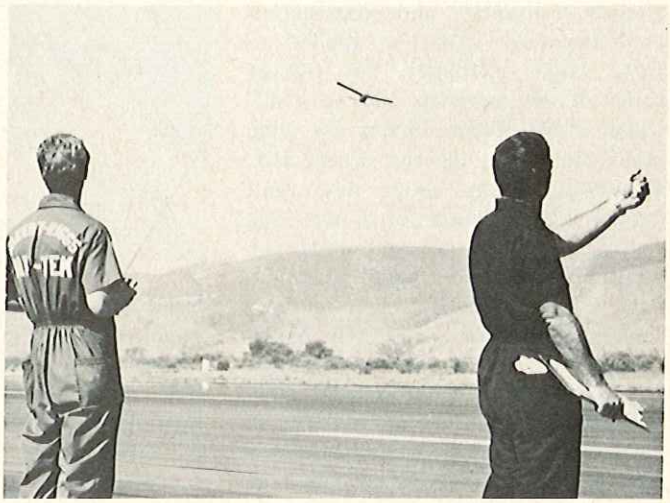




RIGHT: Payload configuration changes dictated a revised fuselage bottom and nose shape. ABOVE: Manifold routes exhaust over top of fuselage to keep payload optics clean. ABOVE, RIGHT: Relative wing panel size is shown here. Wings are sheet balsa over foam core.



R/C sailplane flyers will recognize wing installation technique. Field assembly is quick and easy.



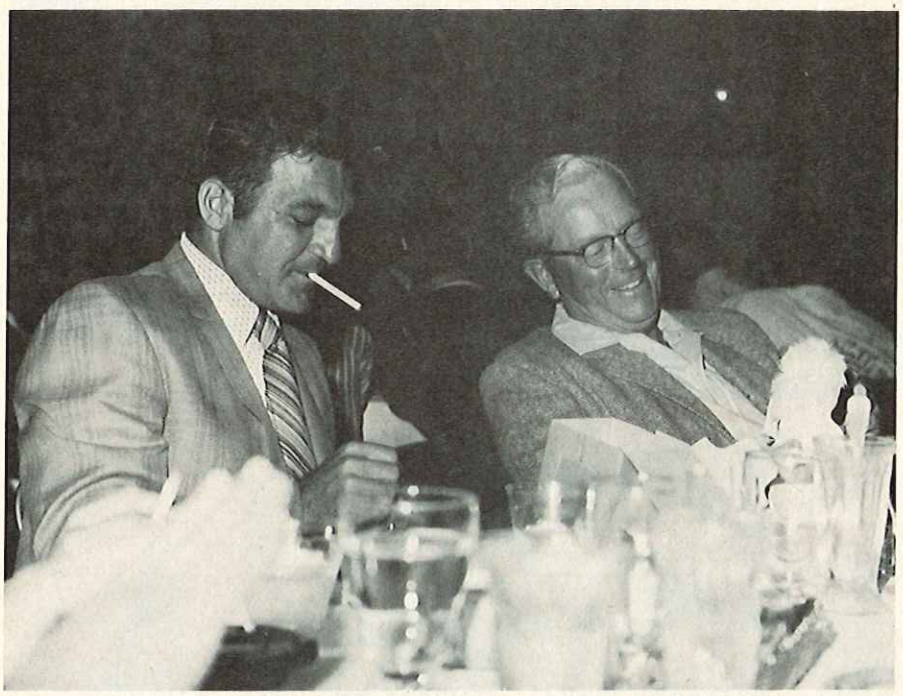
Accumulation of actual flight performance data has given Sakert-Riggs an authoritative position in the RPV business.

parameters. This actual data and additional demonstration flights were influential in the awarding of a feasibility study contract for prototype RPV's.

While all of this interesting activity was taking place there were other aspects that must be considered. For example, there are legal requirements associated with conducting business. A corporation was formed; Sakert-Riggs Air-Tek is licensed as a consulting firm whose services include the designing and manufacturing of Remotely Piloted Vehicles. Their foresightedness

LEFT: Start of a timed run over a measured course. ABOVE: Post flight engineering discussions.

RIGHT: Does Macy tell Gimble? Jan Sakert and Lockeed's Mr. RPV, Ken Willard.



was timely as other companies in the RPV business have availed themselves of Sakert-Riggs Air-Tek's services.

Designing a vehicle and backing it up with a working model can be a big step but you really get down to the nitty-gritty when you have to build and demonstrate the real thing. Model aircraft technology and construction techniques can easily be applied to these larger airframes, but finding some of the materials can be a different story. Foam blocks for wing cores are pretty big by normal R/C standards. Hobby shops just don't carry 1/8th plywood for 8 foot long fuselage sides. You can't hold the wings on with rubber bands when you have a gross take-off weight of more than 75 lbs. Your average R/C model doesn't have to carry twice its weight in a payload nor does it have to be designed with the inherent stability to keep it out of trouble when flown by a G.I. without R/C experience and be stressed to withstand his less than perfect landings!

Sakert-Riggs have carefully considered all the requirements which resulted in a straightforward functional design that lends itself to the simplest possible manufacturing methods. This is an extreme contrast to some of the exotic competitive RPV's that are more complicated to build, are heavier and more difficult to operate and maintain. A clever quick change method of installing the payload allows for removal and replacement in a couple of minutes. An area of much concern was the engine. Calculations to determine power requirements led to displacement and propeller sizes. Minimum vibration was a pre-requisite that led to a simultaneous firing horizontally opposed twin offering the best in static and dynamic balance. It must be 2 cycle, glow plug ignition and be able to operate on a gasoline/oil fuel. Naturally no such engine existed so arrangements were made with K & B Mfg. to develop the engine exclusively for Sakkert Riggs Air-Tek who are, incidently, the engines' sole marketing agent. The combined talents of John Brodbeck, Roger Theobald and Paul White produced the desired power plant identified as a model S-R 245 referring to 2 cylinder, 4 cubic inch, 5 horsepower. It swings a 22 inch diameter, 9 inch pitch propeller at more than 7,000 rpm and delivers in excess of 30 lbs. static thrust. An ingenious carburetion system insures even and equal fuel flow to each cylinder and smooth throttle control at all speeds. Now that they have a capable airframe and

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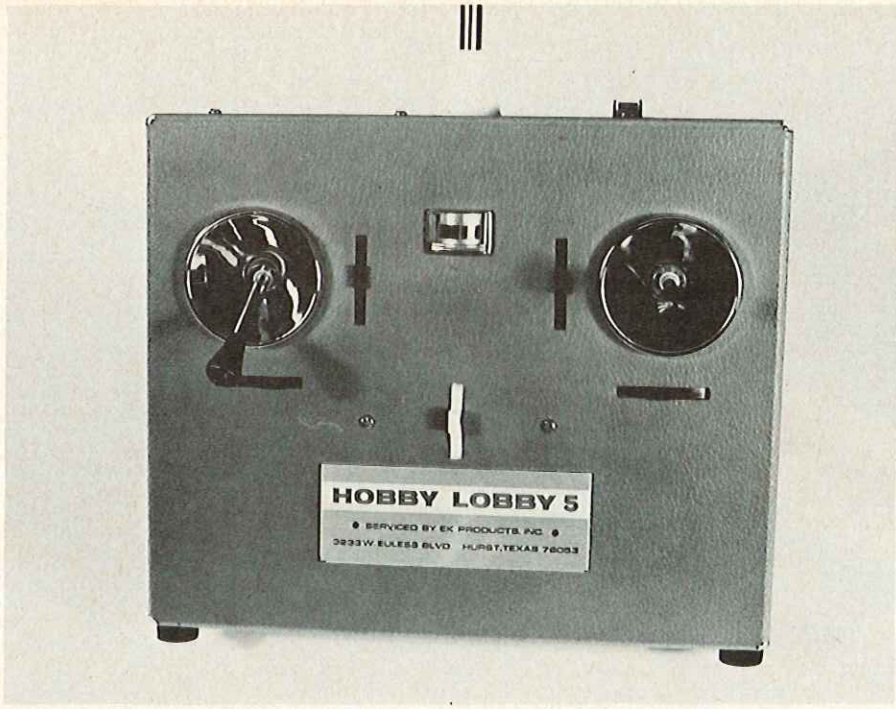
TEST REPORT



The Hobby Lobby 5 transmitter employs two closed gimbal control sticks housed in an attractive bright blue vinyl-clad aluminum case.

HOBBY LOBBY 5

Since you would expect to pay over $400.00 for a 5 channel proportional system complete with 4 servos, our first question upon receiving the 1972 Hobby Lobby 5 digital proportional system was how it could be sold for a retail price of $209.00 – about half the price for comparable top quality 5 channel systems?

Our answer from Jim Martin at Hobby Lobby International, Route 3, Franklin Pike Circle, Brentwood, Tennessee 37027, was simply this: "When you pay for other radio systems you're paying not only for the radio but for distribution and advertising costs and for the manufacturing inefficiencies created by 'many option' production. The Hobby Lobby radio is made in one configuration and one configuration only – two stick, 5 channels, with the same superb receiver-servo combination every time. Such manufacturing costs as nylon mold expenses are distributed over very great production quantities. Thus, by avoiding the frills of short run production you obtain a radio of solidly established quality for a saving of up to $210.00. And, because Hobby Lobby's name is on the radio, you get a radio that is quality protected by the most reputable company in the R/C mail order business."

Now, let's take a look at this 5 channel digital proportional system which is priced well underneath its competition. The transmitter is housed in an attractive bright blue vinyl-clad aluminum transmitter case. It employs two closed gimbal control sticks of a

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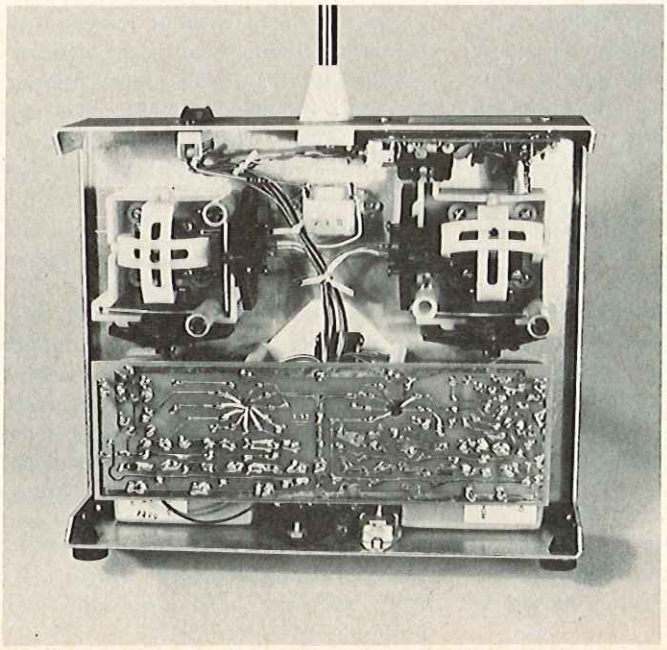
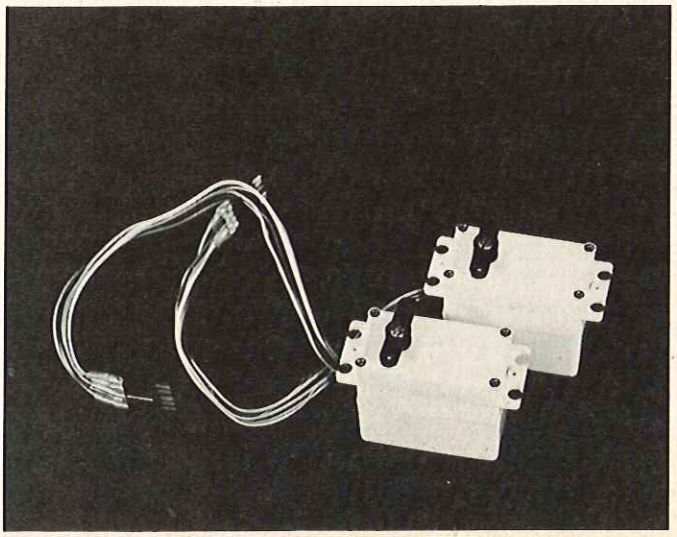
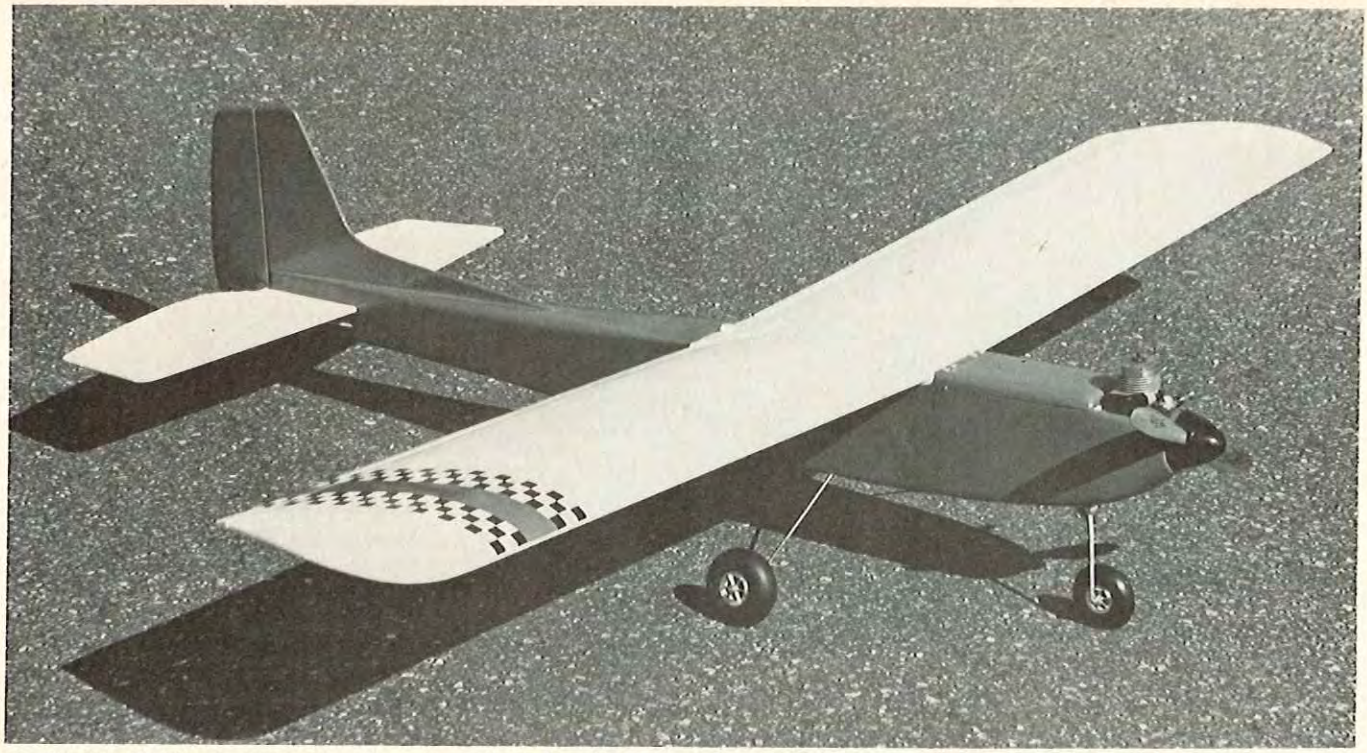


LEFT: The interior of the transmitter evidences quality workmanship and a layout designed for ease in servicing. BELOW: These servos are the smallest manufactured to date.





The Sterling Fledgling is designed for the novice RC'er to fly with little or no assistance.

For The Novice: Step-By-Step How-To For Building The

STERLING FLEDGLING

BY BERNIE MURPHY

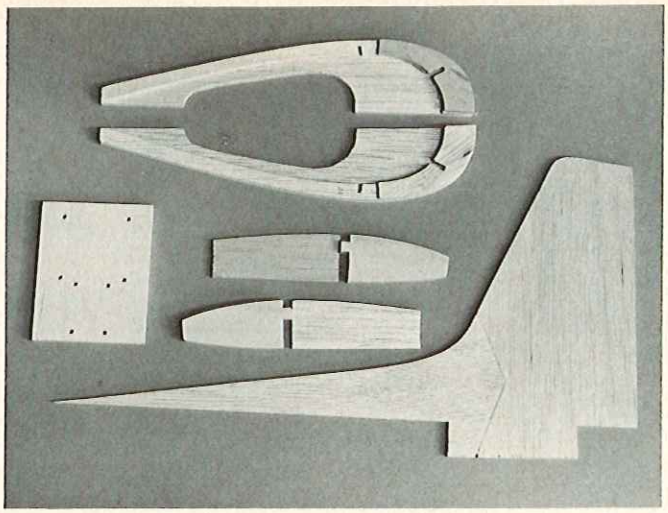
Several months ago, Sterling Models introduced their new Fledgling kit, a model designed for the sport flyer or newcomer to R/C.

The ship is a convenient size, with a 56" span, requiring an engine size from .23 to .40 cubic inches. The price of $24.95 also seems pretty comfortable, especially when you consider that the kit includes most of those "extras" such as horns, clevises, etc.

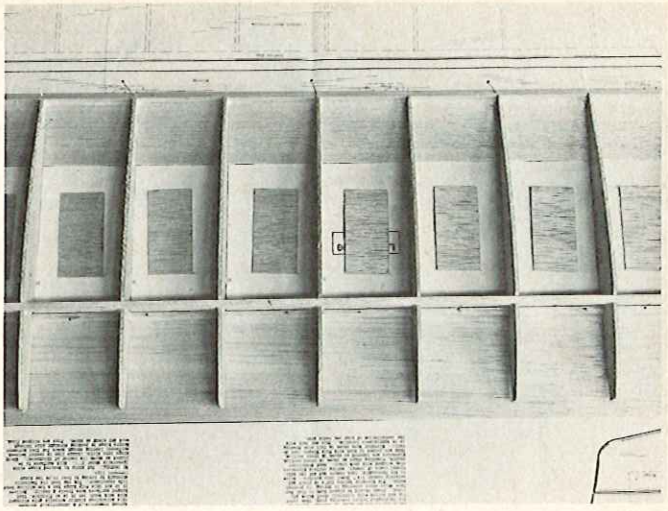
Our kit was stock, "off the shelf," from the local hobby shop. The wood in the kit was above average and seemed well graded for its intended purpose. The die-cut parts were a pleasant surprise, being very cleanly cut, about the best that we have seen – excellent. The hardware package included a steerable nose gear, aluminum engine mounts, blind nuts, horns and clevises, and assorted bolts, screws, and nuts. The plans appeared clear enough, and we envisioned a simple sport ship which could easily be built in a weekend.

Per the instructions included on the plans, several sub-assemblies should be completed first; these include the firewall, wing tips, fin and wing rib sockets for the wing attachment dowels. The wing on the Fledgling is attached to the fuselage by means of two dowels in the leading edge, and a single nylon screw in the trailing edge (no rubber bands). Since the dowels seat into sockets built into the wing panels, and must mate with a prenotched block in the fuselage, it is advisable to build the wing first. In this way, the fuselage block is available to be used as a spacing jig when installing the sockets in the wing panels, and again when joining the wing halves, assuring an accurate fit between the wing and fuselage. Besides, we like to get the wing out of the way first!

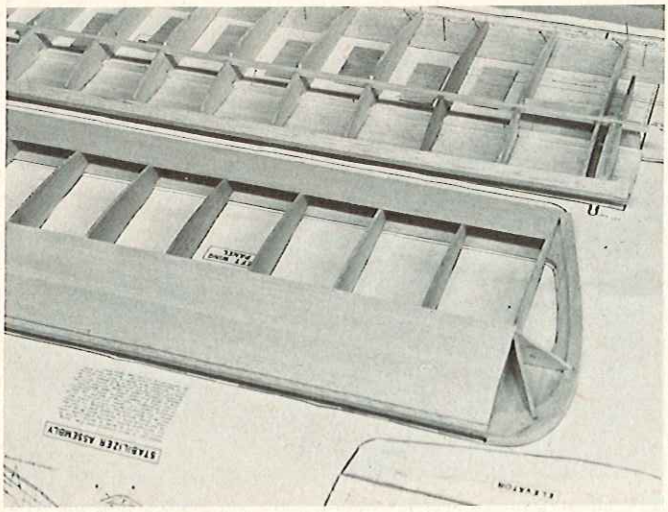
Construction of the wing has been well thought out, allowing each panel to be completed without removing it from the building board, thus assuring a true wing (assuming a flat building surface). The lower trailing edge and leading edge sheeting are first pinned down over the plans. The layout of the plans is such that both panels can be built simultaneously, a feature we appreciated. The lower spar is then glued to the sheeting, followed by the ribs. The die-cut webbing, which fits between upper and lower spars, should be temporarily set into place when positioning the ribs, thereby accurately positioning the ribs and holding them square. Once all ribs have been glued into place, the top spar, leading edge, trailing edge and webbing are added. The trailing edge top sheet is glued to the trailing edge and the ribs. After removing any pins from the leading edge lower sheeting, this is



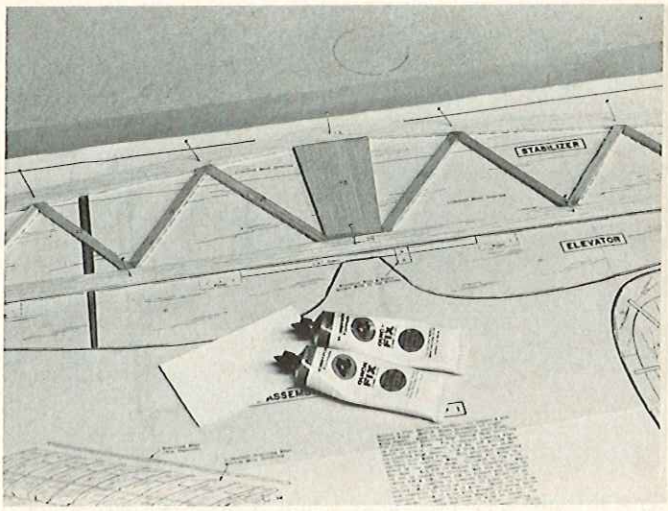
Sub-assemblies are glued together first. This way they will be ready when needed.



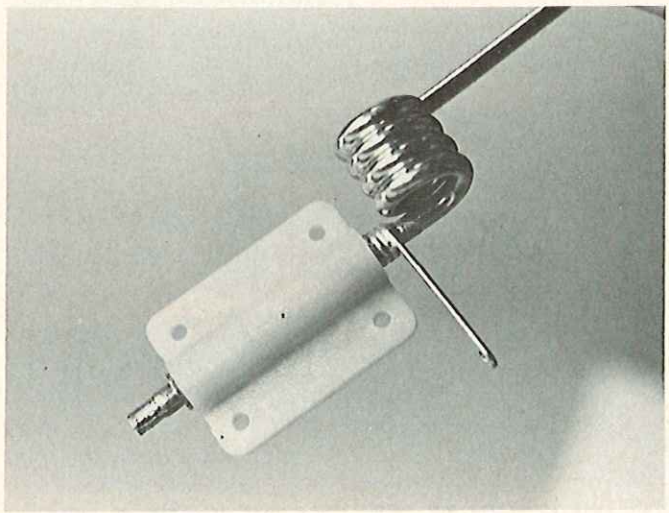
Basic wing structure. Die-cut webbing used to position wing ribs then later installed in bay where originally fitted.



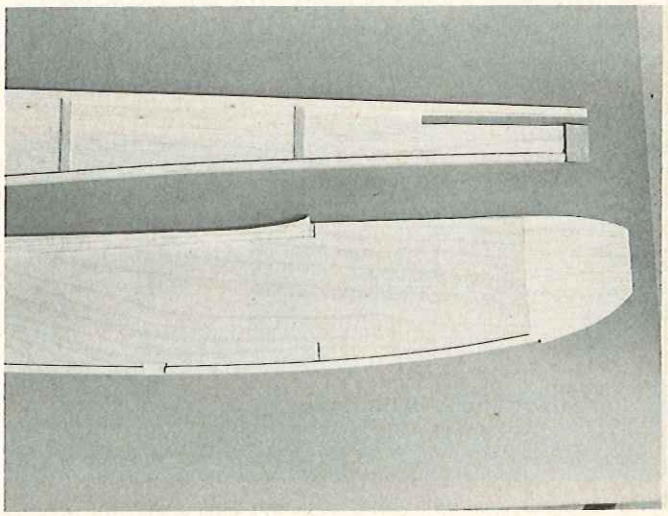
First panel completed, second panel ready for top sheeting. Plan layout allows both panels to be built simultaneously, saving time.



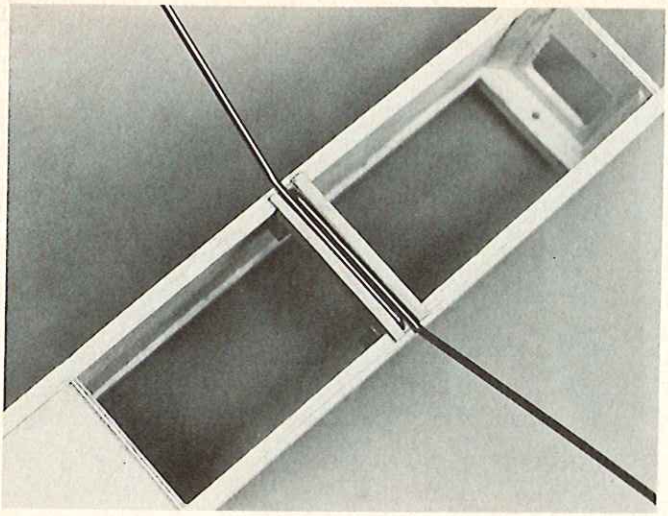
Stabilizer framework glued up over plans then sandwiched between 1/16" sheeting. Hobbypoxy Quick Fix speeds this assembly.



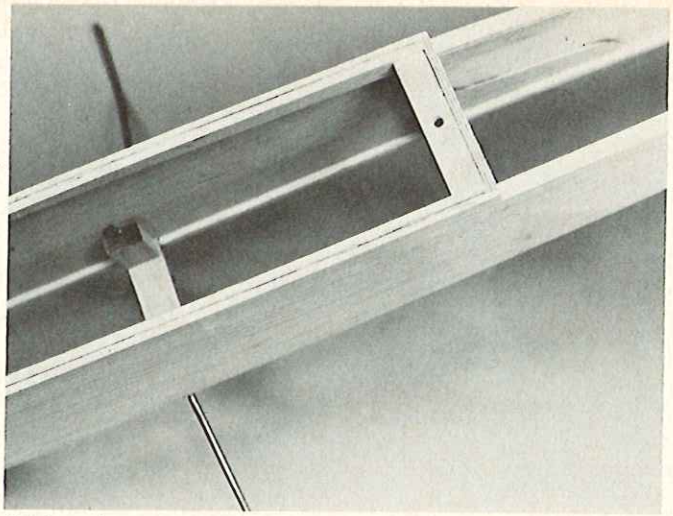
Nose gear eyelet requires quick soldering to prevent melting nylon block. Gear must be bolted to firewall before installing latter in fuselage.



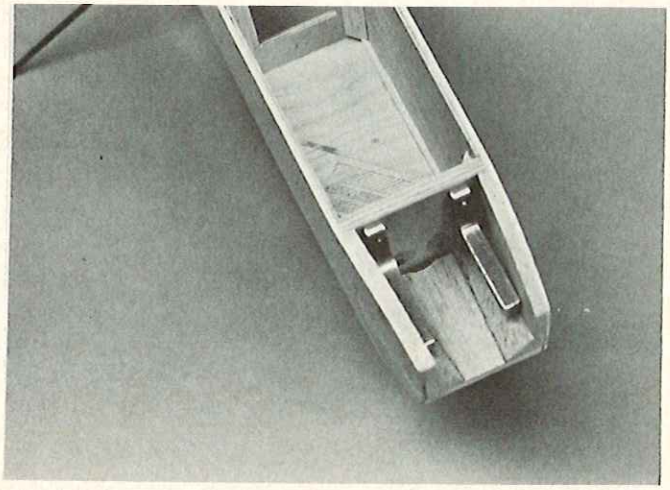
Plywood doublers added to forward fuselage sides, stringers and tail block at rear. Remember, one left side, one right!



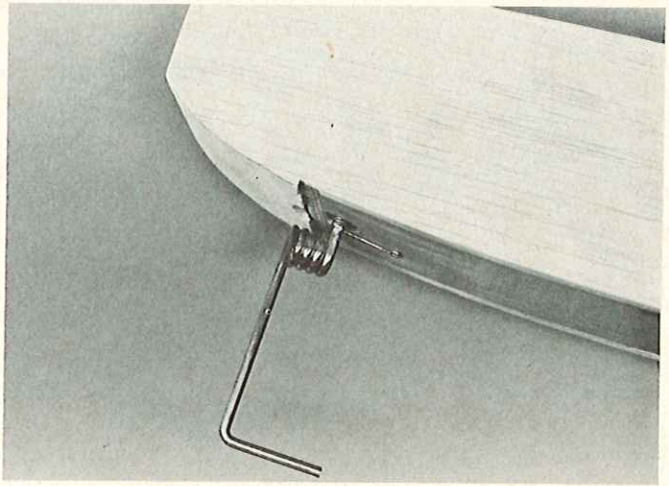
Torsion landing gear block mounted between sides and securely glued.



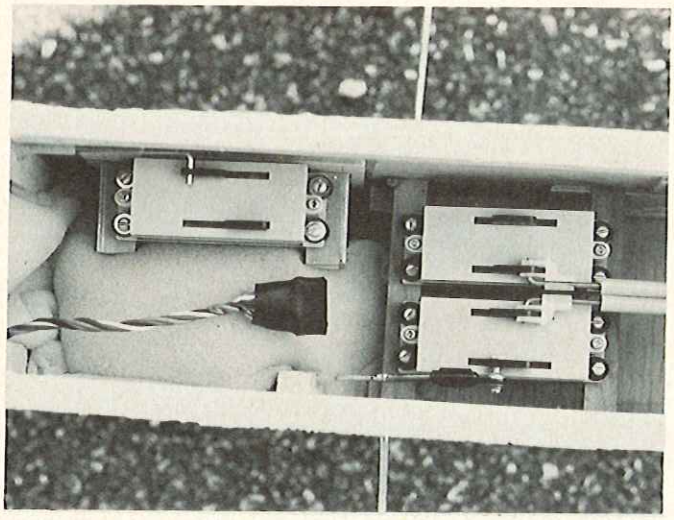
Hardwood screw block used to attach rear of wing with single #10 nylon screw. Note block glued to sides support vertical leg of landing gear.



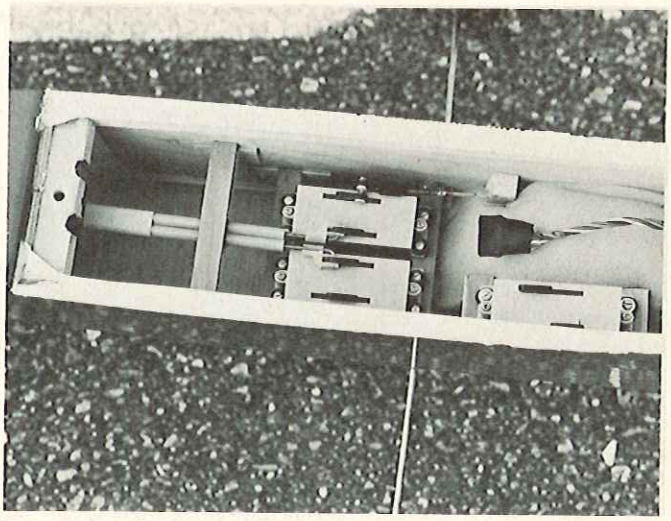
Extruded aluminum engine bearers must be drilled and tapped to suit engine used.



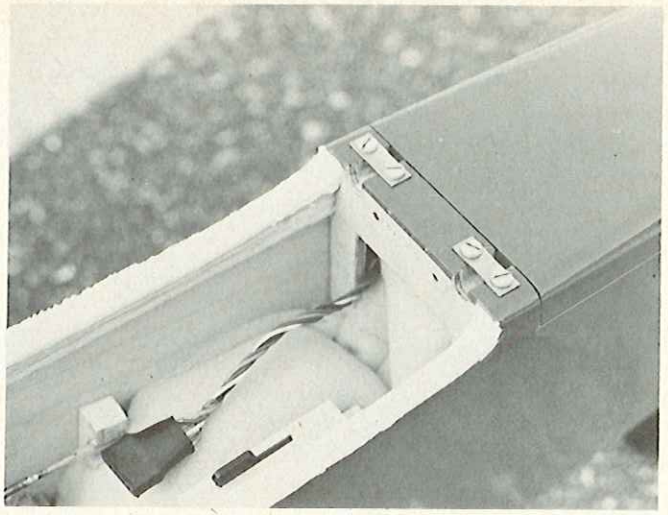
Note close clearance between steering arm and fuselage bottom. Arm should be bent down to clear or moved to top in battery compartment.



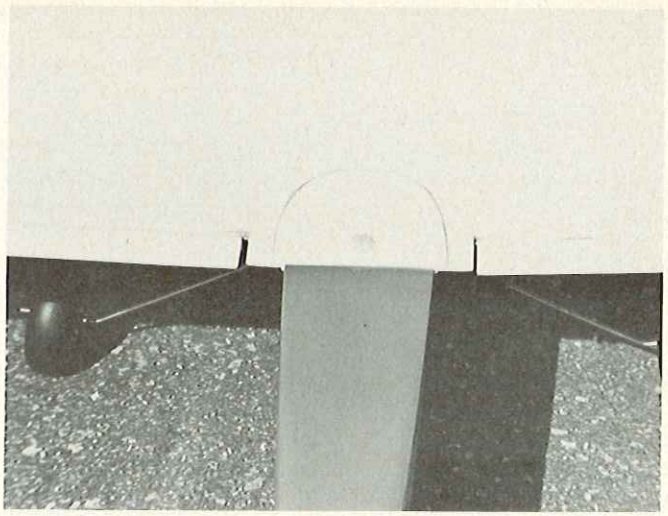
Servo installation on 3/8" square balsa rails capped with 3/8" x 1/8" spruce. Throttle servo mount fabricated from hardwood and balsa. Loose connector for aileron servo.



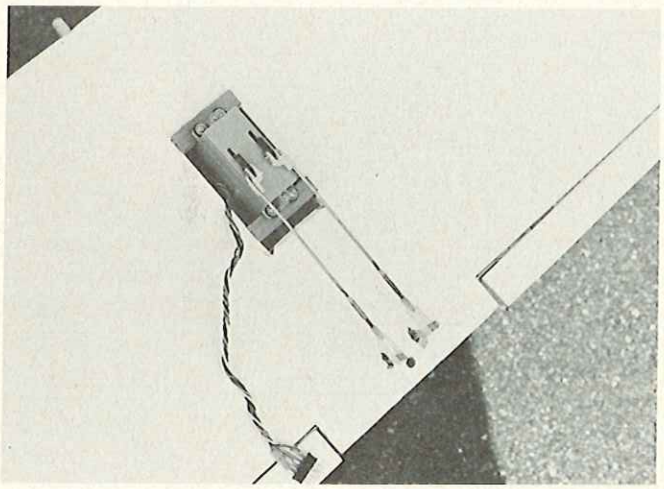
Note cutouts in rear nut block. These must be added in order for aileron horns to swing. Cutter on Dremel Moto-Tool makes smooth cutout.



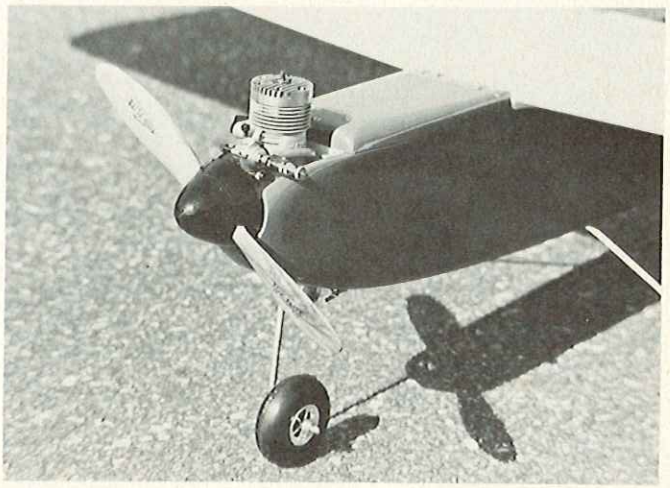
View of wing hold-down straps and dowel sockets. Pair of wing dowels seat into notches in fuselage, securely attaching leading edge.



Single #10 nylon screw holds the trailing edge in place – quick, simple assembly at the field.



Underside of wing showing servo installation - - - balsa rails added, then capped with 3/8" x 1/8" spruce to firmly hold mounting screws.



O.S. Max .30 supplies ample power for the Fledgling.

glued to the ribs and leading edge, using scrap shims to hold up into place (be sure to securely weight the panel so that only the sheeting is pulled up). When dry, the top leading edge sheet is added, and the pre-assembled wing tip is added, completing the panel with the exception of the center section planking. The attachment dowel holes can be drilled through the leading edge, but the dowels should not be permanently installed until **after** the wing has been completed and covered.

Once the panels have thoroughly dried, the sheeting is carefully trimmed at the center and the panels fitted, using the block from the fuselage to maintain and position the dowel spacing. Planking of the center section and the addition of aileron horns and trailing edge sections completes the basic wing structure. After sanding smooth, the center seam should be reinforced with cloth tape and resin (Hobbypoxy Kwik Prep works well here), then the plywood plate for the hold-down screw glued or epoxied over the trailing edge. The strip ailerons are hinged to the trailing edge with the hinge material provided. The plywood plate supplied to be installed in the aileron servo opening could, in our opinion, be omitted (unless the servo is installed with double faced tape, which is not recommended). This will allow setting the aileron servo deeper into the wing. Overall, the wing is simple to build and is quite strong, both features being especially valuable for the novice RC'er.

Assembly of the fuselage is again quite easy. Plywood doublers must be attached to the fuselage sides. For this we would recommend either a good contact cement or epoxy glue. Both are quick, strong, and cause no warping of the sides. The nosegear must be bolted to the firewall before the latter is installed. Be sure that, in assembling the nosegear, the steering arm is positioned on the strut so as to allow the spring coil of the gear to clear the fuselage bottom. The steering arm will most likely have to be bent to clear the fuselage bottom. We feel that it might be better to put the steering arm on top of the mounting block (in the tank compartment). This would make the linkage from the servo simpler.

The fuselage sides are joined at the rear, then spaced with two bulkheads and the firewall. The top and bottom are added and presto – one fuselage! A slot must be cut in the rear top block for the installation of the vertical fin. This slot **must** be positioned accurately to prevent a "built-in" turn.

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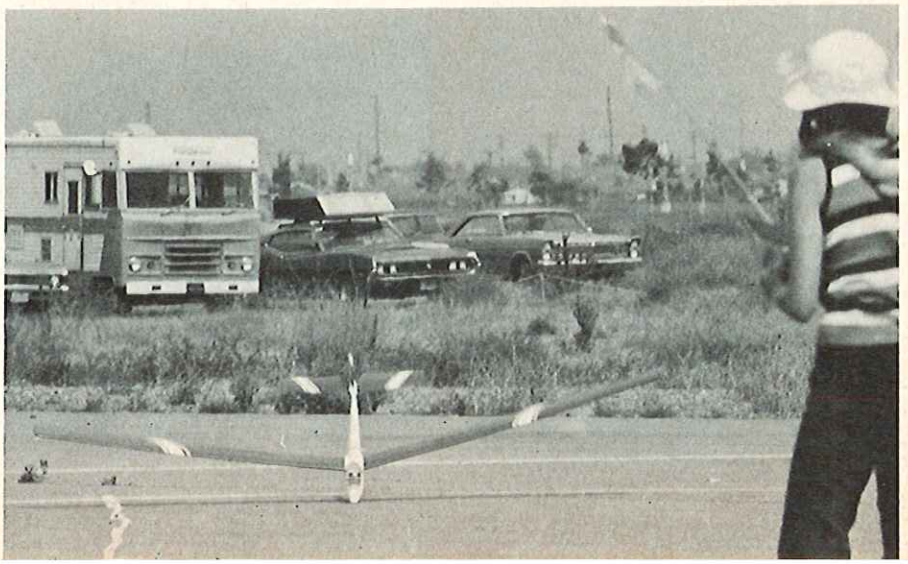
The following 'article' is actually an on-the-spot recording by Ken Willard, dictating his impressions of the 1972 LSF Soar-lympics as he actually was participating as a contestant. While Dick Tichenor captured the event on film, RCM's Chief Sunday Flier, captured for us the actual excitement and anguish of the two-day event on tape cassette – as it happened, and from a competitors standpoint. The following is a transcription from that taped narrative.

– Don Dewey

I'm talking to you this morning at 25 minutes to 9:00. I arrived here at the LSF Soar-lympics site a little bit late and find that the winches are already set up and the first round is underway. The whole contest appears to be extremely well organized. The frequency control is by the timers wearing colored hats of the frequency which is being flown. For instance, right now I see Rick Walters going out with his timer wearing a green and white hat. I notice, too, that the spot landing markers are on the asphalt and this means that the bottoms of the sailplanes are going to get scratched up pretty heavily. A lot of them have put on what they call a "G-pad skid" which does two things: (1) It helps protect the bottom of the sailplane and, (2) it makes your sailplane stop, and stop faster than it would otherwise. Take the precision event for example – Hugh Stock was all set up to come in, made his time 1 second off from a perfect score, and was right on his landing but, unfortunately, his G-pad skid slid off and so he slid in about 18' beyond the spot. That's how important a part that the G-pad plays in precision landings on asphalt.

It's a nice morning, and there's a low overcast which is just starting to break up. I'm sure there are going to be thermals all over the place a little later on in the day. The winches are set up cross-wind at the moment but they tell me that the wind gradually comes around in line with the runway. The organization is really great and they have group flights with all the transmitters in group boxes. They don't call up an individual flier – they call up a group and, once your group is called, you'd better be in the area!

Once again, the trophies this year are the free form glider sculptures done by George Popa. These are beautiful trophies, and most unique in their characteristics. The detail George Popa is able to get in these trophies

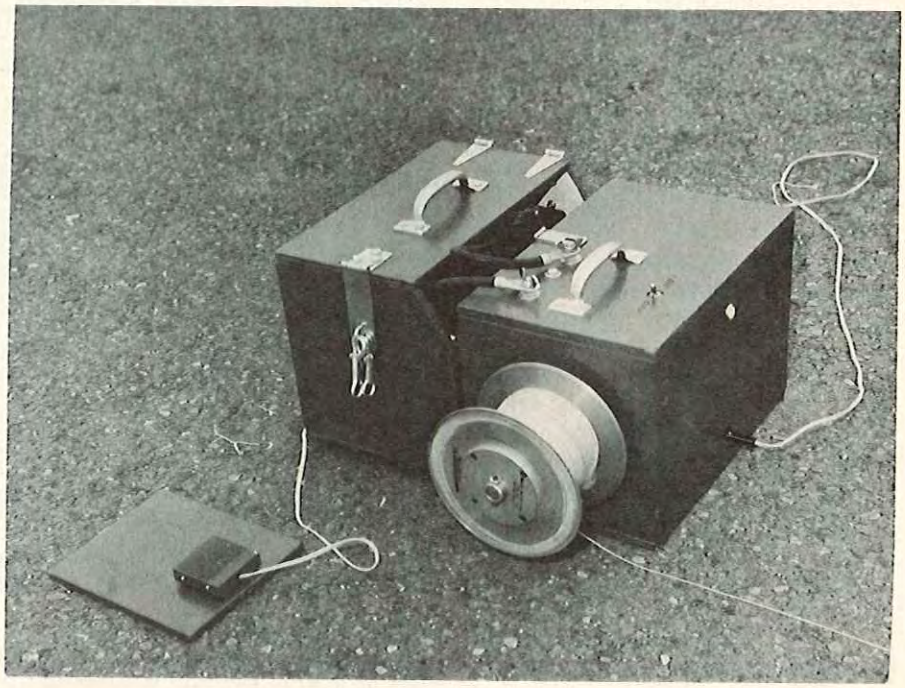


ABOVE: Intense concentration is written on the face of Barbara Henon, Grand Champion of the LSF 1972 Soar-lympics. BELOW: Barbara's Cumulus comes into the spot the hard way! One of nation's few women competitors, she earned her way to the championship over impressive list of top sailplane pilots.

Grand Champion, Barbara Henon, flanked by winners of 1972 LSF Soar-lympics.

Le Gray on mike; Mr. & Mrs. Jack Seely, officials.

RIGHT: One of six official LSF electric winches used in tournament. ABOVE: Straw hats, painted with frequency colors, were issued to timers by impound attendant.



LEFT: Hardest working person at '72 Soar-lympics was Bobbi Powell, part of tow-line retriever crew. ABOVE: A scale Diamant comes in for a landing.

just by using wire is always amazing. For instance, in the inside cockpit of the sculptured sailplanes are little wire seats.

Here we are in the scale area - - - here's an ASW 15 by Stan Powell; a Slingsby Kestrel 19 of unidentified ownership; Hans J. Langer with an ASW 15; here's an ASW 17, again an unidentified owner; an ASW 12 - - - I guess the reason they don't identify the owners is so that the judges won't be too impressed by a name. Here's a Kestrel 19, and a K8B, and a beautiful HP 14 by John Donelson.

I have just walked down to the Scoremaster's table and we've got Jim Hale here as an official. He's doing some scoring – looks like he must have a computer between his ears in order to figure out all that stuff in front of him! I see they've got it all on tables and all he has to do is take the time and the distance and look on the table and he's got a score almost automatically. That's good – it's a go-no-go type of arrangement.

•

The first round wound up right around 10:30 in the morning and they're now going on the second round. The first task was the Two Minute Precision event – we don't know what the results are but in my own case I came down in exactly two minutes and was 2'6" from the spot. Following right behind me, Sid Axelrod of Top Flite put his Top Sailer up, everything was going well until he started to porpoise a little bit. I told him that at the bottom of one of the dives as he started to climb, to give it a little down elevator to level it out. When he gave it down elevator it went into a straight vertical dive from which it did not recover – it dove right into the ground from 200'. I was absolutely amazed to go over and see that all it did was crush the nose of the prototype Top Sailer and break the wing. With a little 5-Minute Epoxy and 2 hours of work, he'll be ready for Round Number Two. Whether he wanted it or not, it was an excellent demonstration of the ruggedness of the molded ply-balsa fuselage concept.

•

We're well into Round Two now and as I watch the sailplanes, most of them are maxing out . . . there's some tremendous thermals around here. It's also true that whenever there's a lot of thermals, there's often some attendant sink, and one or two guys will come in at 3 minutes just because they happen-

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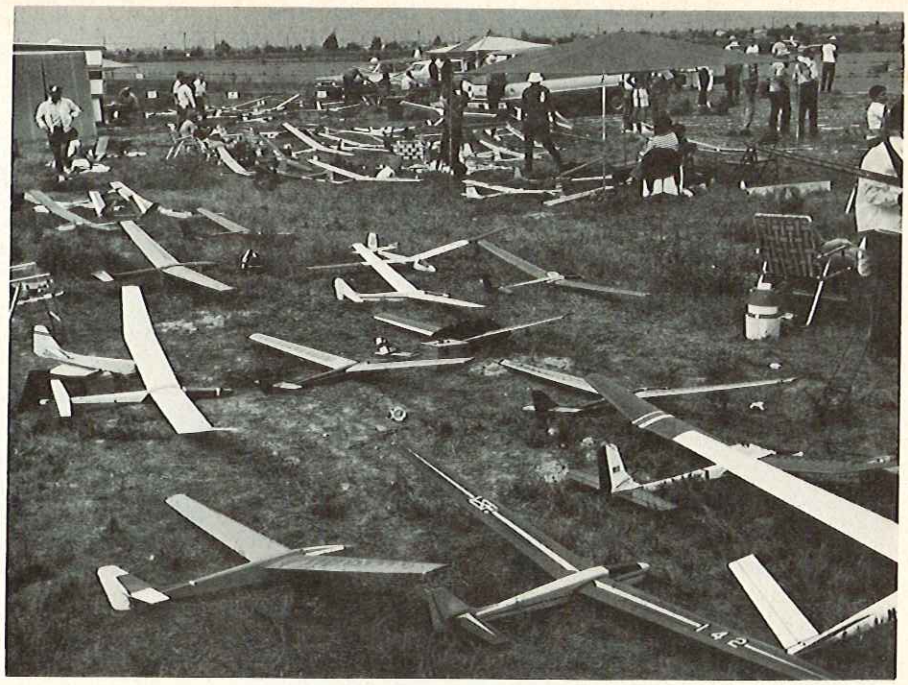
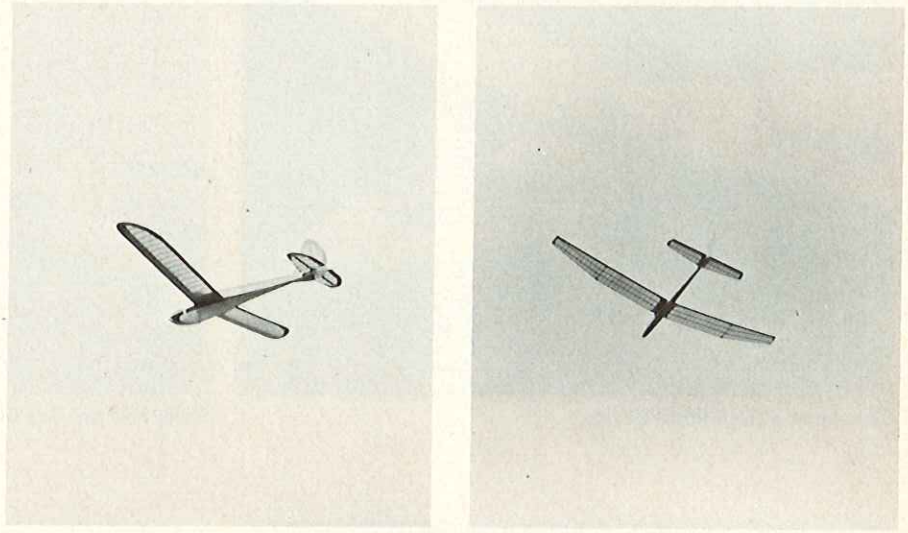
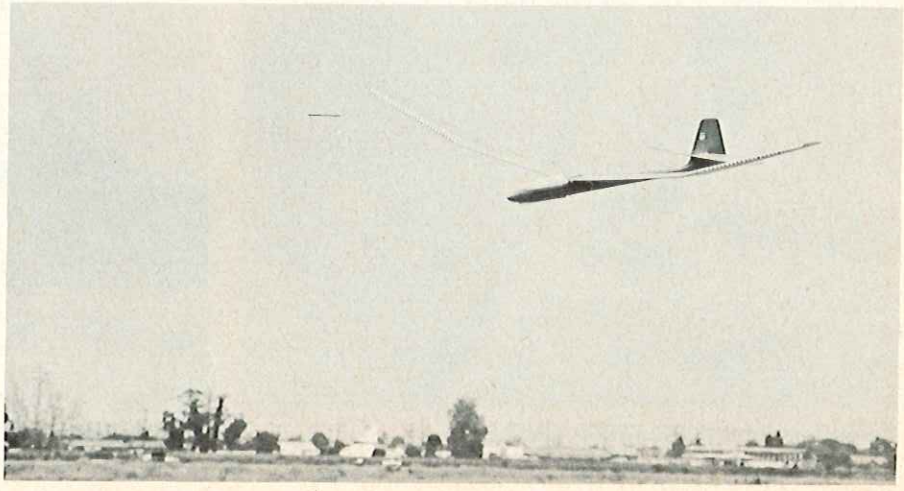


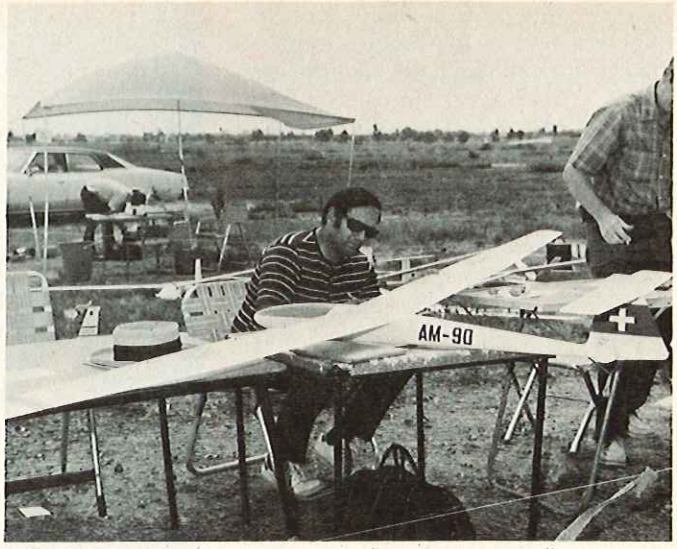
On the ground, just a portion of the largest gathering of sailplanes of the 1972 contest season.



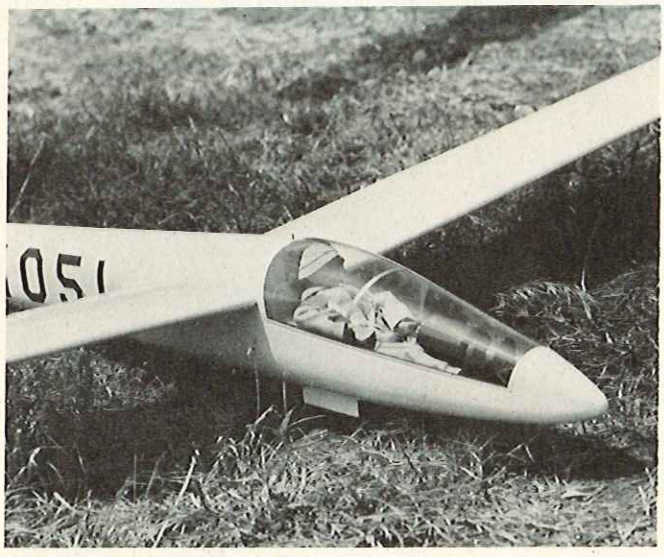
And in the air - - - ABOVE, LEFT: An Airtronics Olympic 99. RIGHT: A new kit design from Southwestern Sailplanes. BELOW: Ken Willard's Top Sailer.



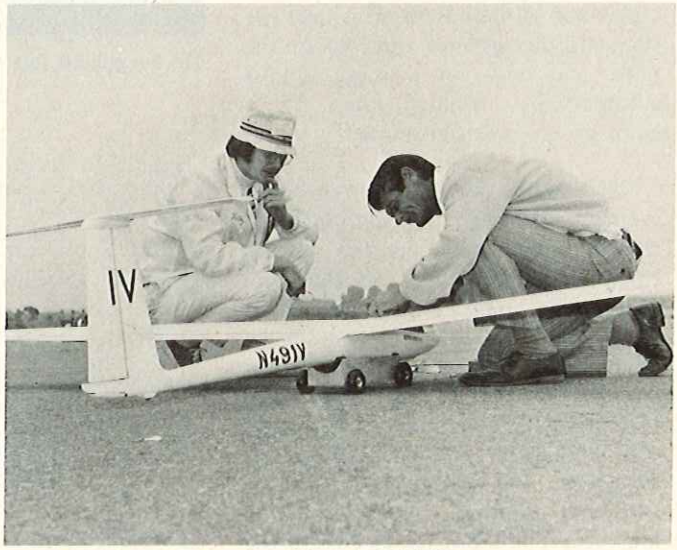
Irv Stafford and HP-14.



Fernando Ramos, scale judge, with Bill Davidson's Diamant.

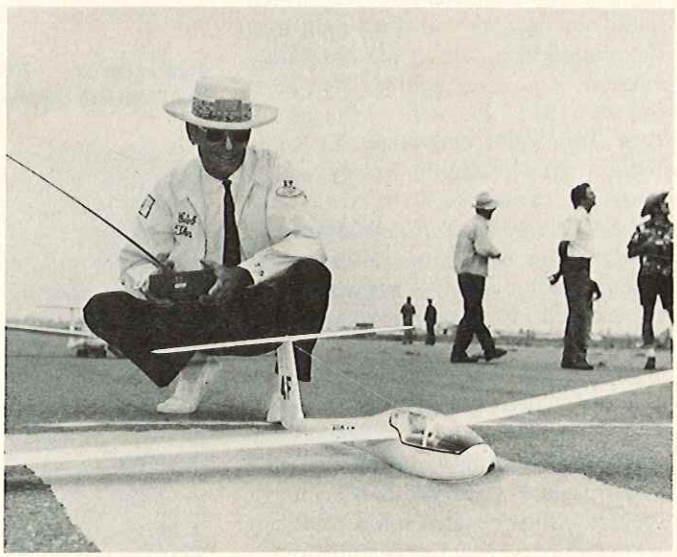


Close-up of a magnificent HP-14.

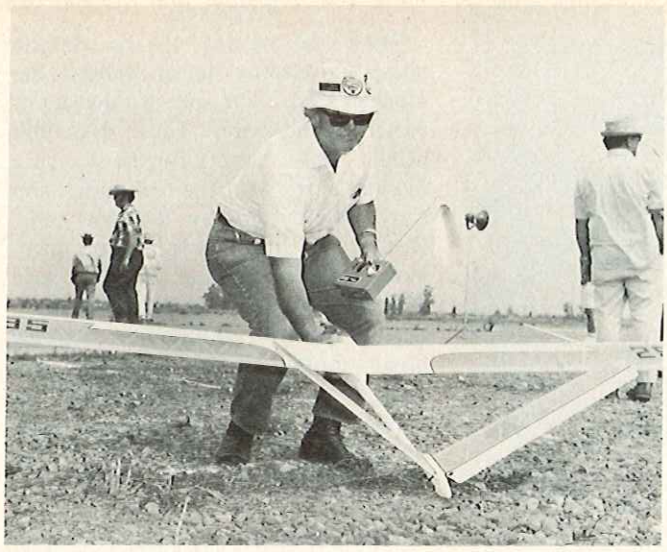


Kelly Pike and Bob Crumley with scale ASW-12.

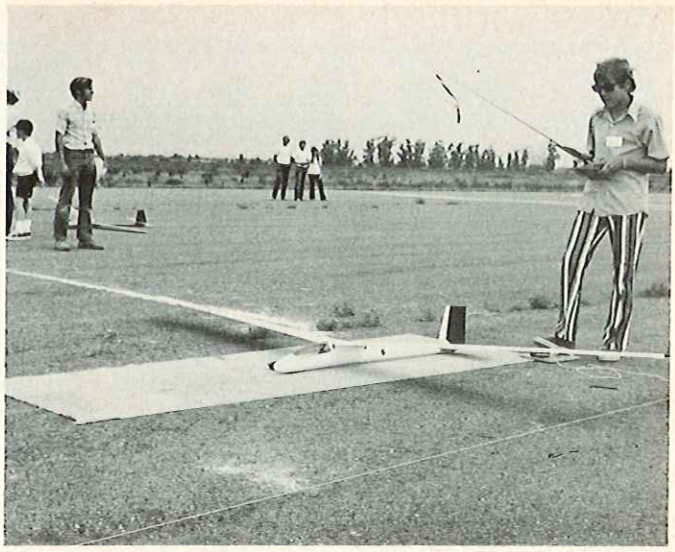
Roland Boucher with Astro-Flight ASW-17.



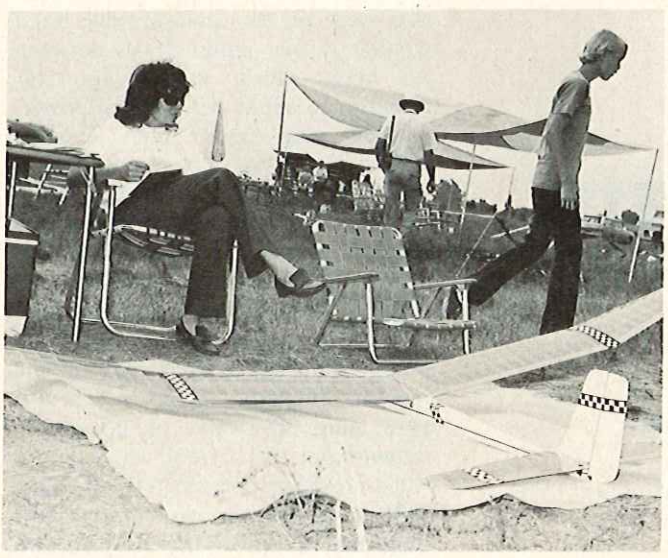
Col. Bob Thacker with his beautiful Kestrel.



Bill Davidson readies his Airtronics Grand Esprit.



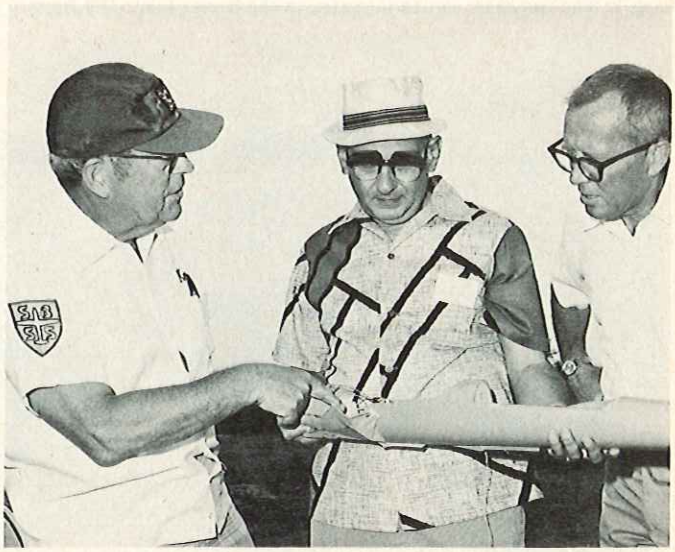
A JP Models Dart ready on the winch.



An Airtronics Olympic 99 between rounds.

Joe Martin and ARF sailplane.

John Camp and Grand Esprit.



Ken Willard puts a finger on Sid Axelrod's problem. Le Gray just looks sad.

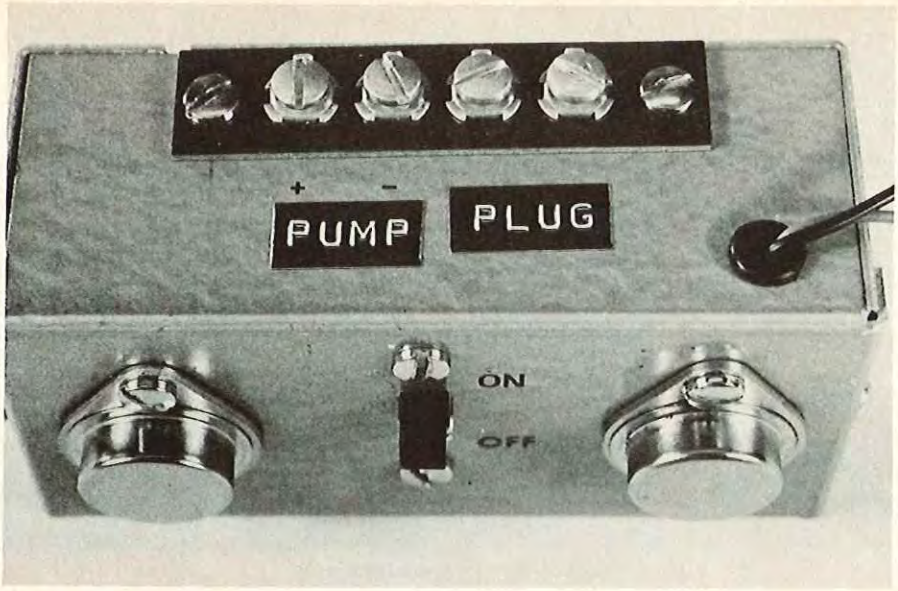


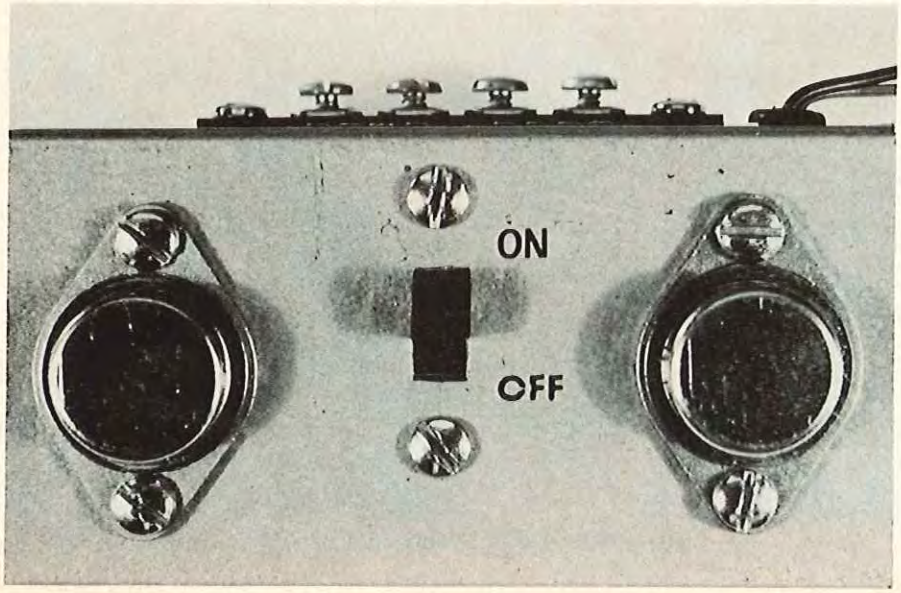
Fig. 1: The 12V DC-DC Converter.

You can build a 12V DC-DC CONVERTER

Now Your 12 Volt Battery Can Operate Your Starter, Fuel Pump, And Glow Plug With Maximum Efficiency And Minimum Current Drain.

By Henry Lopez

Fig. 2: The converter can be mounted to the front of any 12V battery.



PREFACE

With the advent of the electric pump and electric starter systems, the modeler's box is becoming a myriad of batteries and wires. These days you need a 12 volt battery for the starter, a 3-6 volt battery for the fuel pump, and a 1½ volt battery for the glow plug. Recognizing that this is just too many batteries, our ingenious modelers have already started to minimize the number of batteries required by tapping down on the 12 volt battery and/or using resistors for supplying the lower voltages to the fuel pumps and glow plugs. There is a third way to "skin the cat" and that is the use of a dc-dc converter.

The converter approach is costlier but offers the advantage of higher efficiency which, in turn, means less drain on the 12 volt battery. (I could also argue on the ecology issue, but I won't.) A fuel pump draws between 2-3 amps which, at 3 volts, corresponds to about 6-9 watts of power. A glow plug draws about 4 amps which, at 1½ volts, corresponds to 6 watts of power. To run the pump directly from the 12 volt battery via resistor means the battery has to supply 24-36 watts, the difference between the supplied power from the battery and that consumed by the pump being dissipated as heat in the resistor. Similarly, in the case of the glow plug, 48 watts of power are drawn from the battery while only 6 watts are being consumed by the plug. This means, in the case of the glow plug, that 87½% of the power drawn from the battery is wasted in the resistor.

The converter to be described and shown in Figures 1 and 2 operates at an overall efficiency of about 75%. This is a vast improvement over the use of resistors. Admittedly, this may be gilding the lily, but it was fun to design the converter, and it can be built from scratch for about $11.00 worth of parts, which isn't an unreasonable cost. For those who do not have a junk box to draw from and wish to save themselves the time of running around rounding up the parts, a complete kit of parts is available from Walteria Toys, 24242 Hawthorne Blvd., Torrance, California 90505, for $11.95.

CIRCUIT DESCRIPTION

A schematic of the circuit is presented in Figure 3. The heart of the system is the toroidal transformer, T^1. This transformer is not available from

stock and must be wound. This is not a difficult task and can be readily done with a bit of patience. In fact, once you have finished the transformer you are downhill all the way. Q^1 and Q^2, in conjunction with the toroidal transformer, constitute a square wave oscillator which chops the input 12 volts. This results in a peak-to-peak square wave voltage of 24 volts across the primary of the transformer. The toroidal transformer steps this voltage down to secondaries S^1 and S^2 which are used to supply the correct voltages to the pump and glow plug. The ac voltage from secondary winding S^1 is rectified by diodes D^1 and D^2 and filtered by capacitor C^1 to provide 3 volts dc for running the fuel pump. This voltage can be tailored to any number desired provided the output power does not exceed 9 watts. Secondary winding, S^2, provides the voltage for the glow plug. You will note that this winding is not rectified and filtered and that the ac voltage is directly used to operate the plug. This presents no problem since the function of the plug is to generate heat, and ac does as good a job as dc. Several units have been built and are in operation, and no difficulties have been encountered in operating the pump or the glow plug with ac. For those who have good hearing, the converter has an interesting side benefit which I found out by accident, and that is that it can tell the condition of the glow plug without having to remove it from the engine. When in operation, there is a high frequency whistle from the converter. It turns out that when you connect the converter to the glow plug, the whistle frequency drops when the plug is good, stops whistling completely when the plug is shorted, and does not change at all when the plug is open. (I would like to take credit for this design feature, but I really can't.) Equation 1 can be used to calculate the number of bifilar turns for pump voltages other than 3 volts.

$$N_{SBF} = 2.565\ V_S + 2.82 \quad \ldots\ldots\ (1)$$

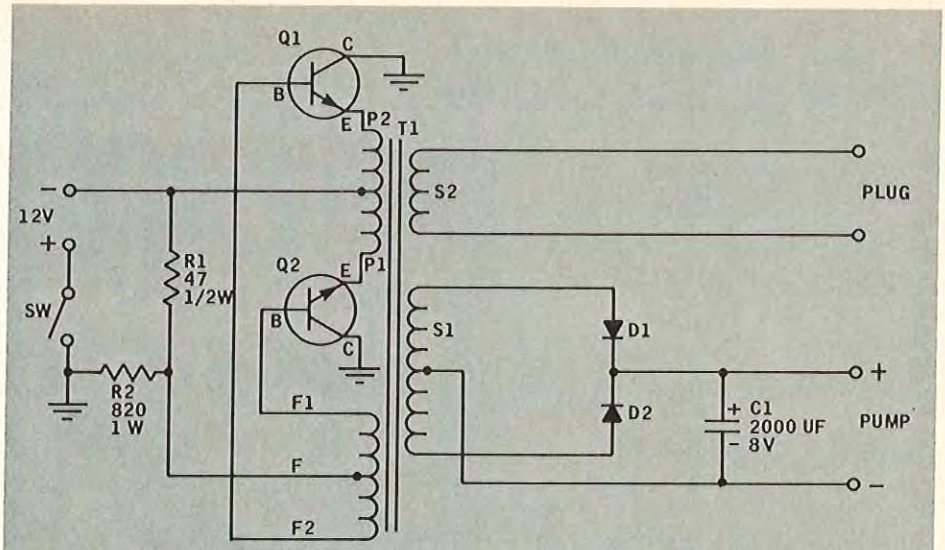
where

V_S = desired secondary voltage

When using the equation, round out to the nearest whole turn. It should be mentioned that as you approach pump voltages in the 8-9 volt category, that the converter does not offer any significant advantage over a resistor for driving the pump.

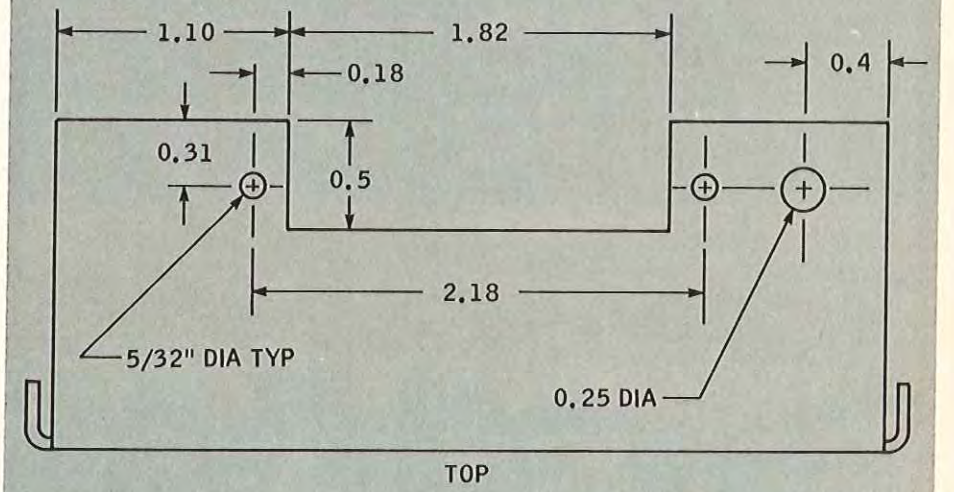
CONSTRUCTION NOTES

With the exception of the toroidal transformer, all standard parts are used

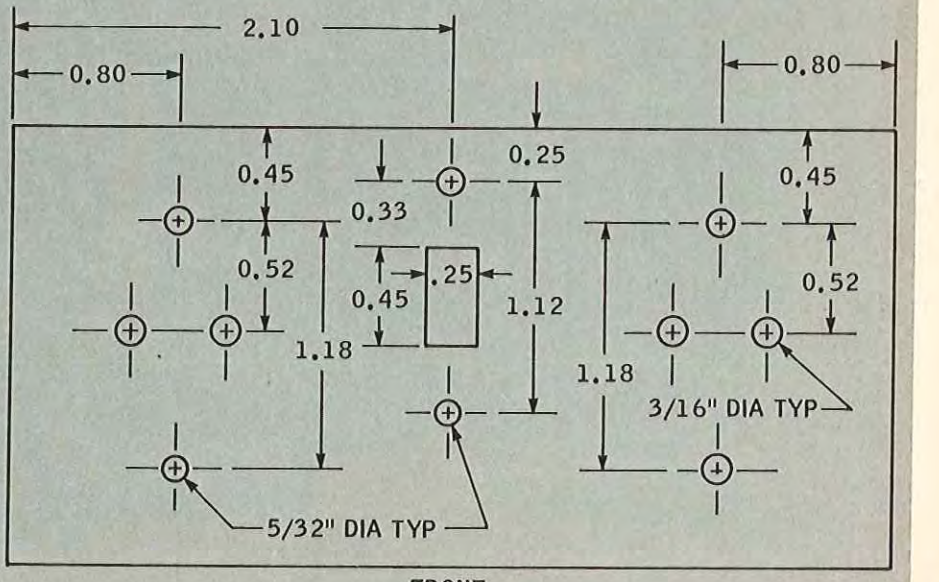


Q1, Q2 10 WATT, 1 AMP RATING, MOTOROLA MJ480, RCA 40372
D1, D2 3 AMP, 25 VOLT RATING, 1N4719
T1 SPECIAL TOROID SEE TEXT, CORE ARNOLD 3-T8906-D2-AA

FIGURE 3 CONVERTER SCHEMATIC



TOP



FRONT

FIGURE 4 BOX LAYOUT

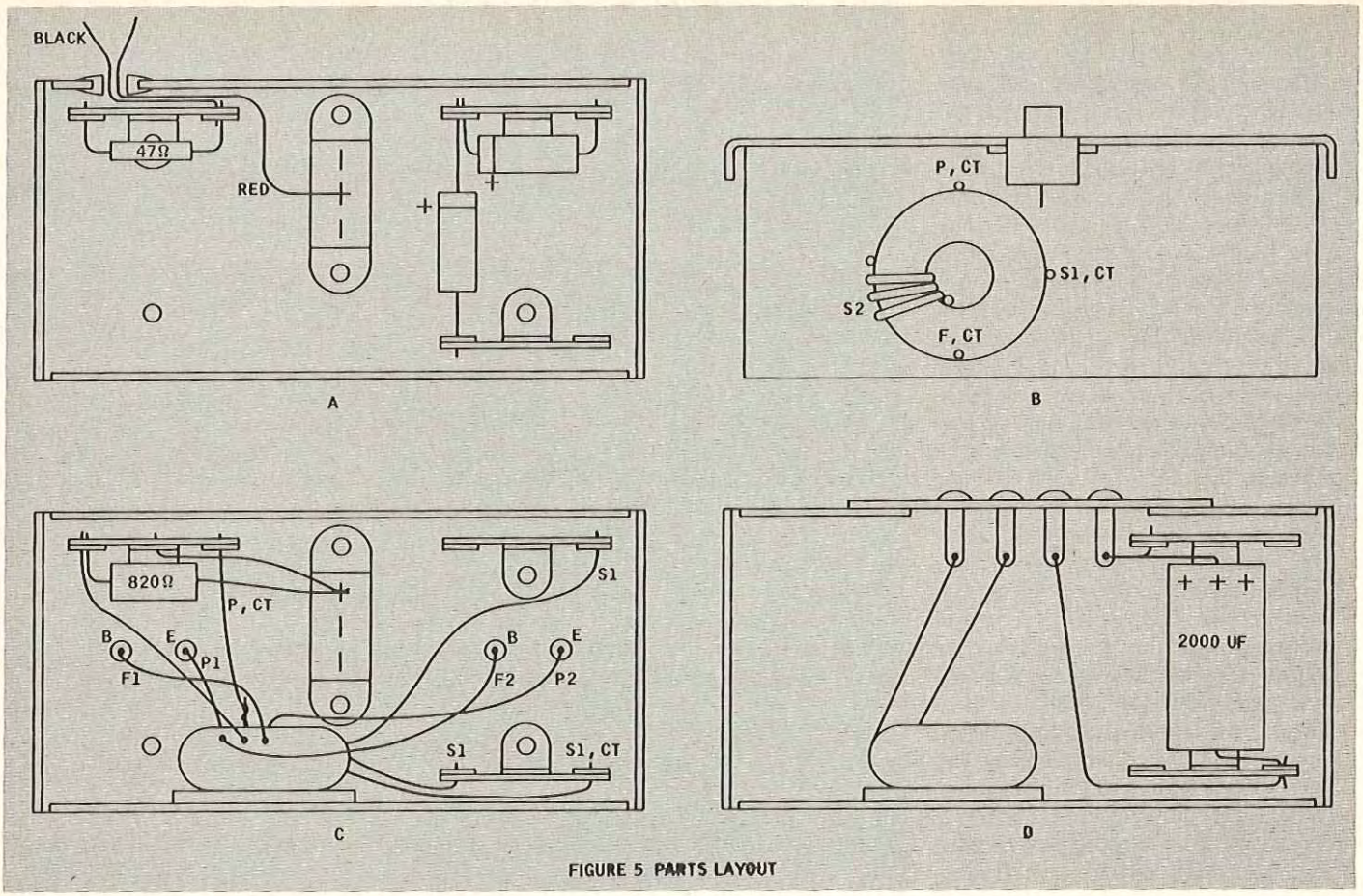
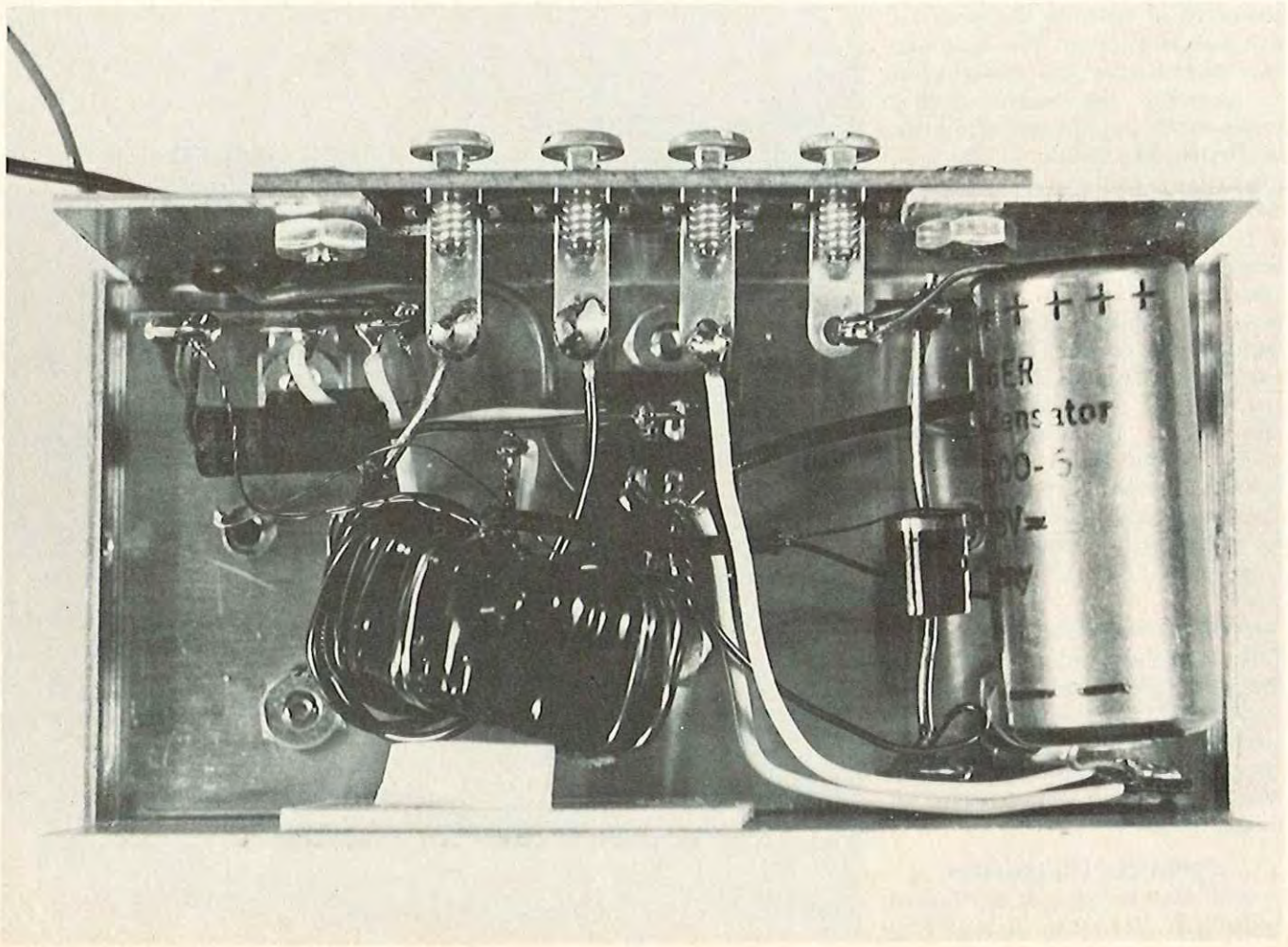


FIGURE 5 PARTS LAYOUT



and construction of the converter is straightforward. The toroid core characteristics are important, and the more readily available powered iron cores are not satisfactory. The selected core is a tape-wound unit having a saturation flux density of 14,000 kilograuss, and is available from Arnold Engineering, 1551 E. Orangethorpe, Fullerton, California 92634, or Walteria Toys. The converter is built into a LMB-00 aluminum case which is attached to the battery via the use of servo tape. Layout of the aluminum box is shown in Figure 4, and the parts orientation in Figure 5. Assemble the unit in the sequence indicated by Figure 5A through D. The toroidal transformer is held in place by the use of servo tape. Note the transformer orientation in Figure 5B. A simple, 4-lug terminal strip is used for the output from the converter. Obviously, the converter can be made as fancy as desired by the use of special plugs and sockets for the output power. Transistors Q^1 and Q^2 are mounted directly on the case without the necessity of having to insulate the transistors from the case. To avoid having a live case when the power to the converter is off, the switch is used in the positive lead of the battery which applies power to the collectors of the transistors and the case. The converter will withstand accidental shorts across its terminals without any harm to the parts. A good procedure to follow during construction of the unit is to mount the switch, Q^1 and Q^2 along with all the hardware and wire R^1, R^2 and the switch; then wind the feedback and primary windings and temporarily hook up the transformer in the circuit to make sure that these two windings are OK, and that the unit will oscillate. With the exception of the primary and S^1 secondary winding center taps, the specified lead lengths on the transformer will permit wiring directly into the circuit. As a precaution, you should use insulating tubing over the leads as necessary. Use hook-up wire for connection of the primary center tap.

When testing the converter, if at all possible, it is desirable to use an ammeter in the 12 volt line. If the converter is operating, turning the switch on should result in a high frequency whistle in the vicinity of 2000 Hz and an input current of 140-190 milliamperes without any load on the converter. If the converter fails to function, in all probability what is required, is to reverse the feedback winding leads on the transistors which provides the positive feedback for proper oscillator operation. If, after reversing the feedback winding, the unit still fails to operate, you probably have a short in the transformer. Once, having ascertained that the unit will oscillate, remove the transformer and cover the windings with tape, as described in the transformer instructions, and proceed to wind the two secondary windings. This construction approach will avoid the heartache of the possibility of having a short in the feedback and primary windings after you have wound all the secondaries. The way the two secondaries are wound on the core, it is not likely that you will have a short in either one of these windings. A word of caution – the one thing that will instantly destroy your converter is to hook it up backwards to the 12 volt battery. Be extremely careful in connecting the unit to the 12 volt battery so that the collectors of the transistors go to the positive lead of the battery, and the center tap of the primary winding to the negative side. If you make a mistake in this area, you will instantly wipe out both power transistors.

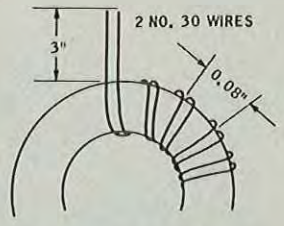


FIGURE 6 START WINDING F

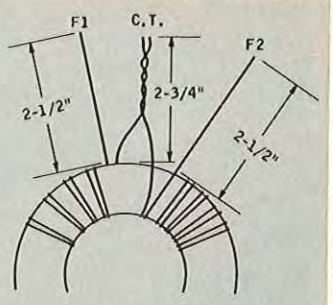


FIGURE 7 LEAD LENGTHS

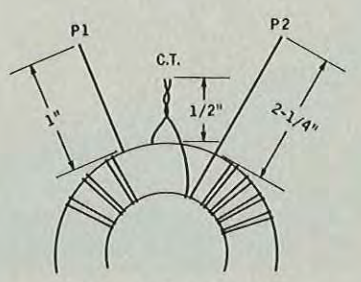


FIGURE 8 PRIMARY WINDING

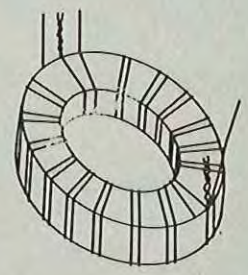


FIGURE 9 PRIMARY AND FEEDBACK WINDINGS

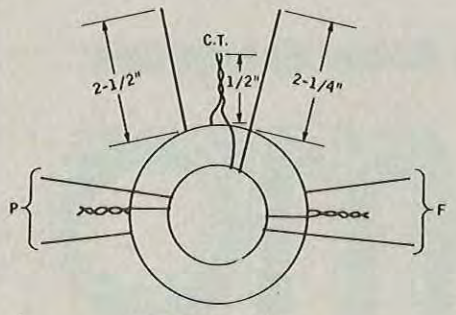


FIGURE 10 S1 LEADS

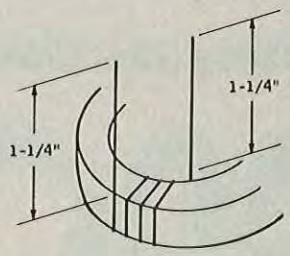


FIGURE 11 S2 LEADS

WINDING THE TOROIDAL TRANSFORMER

Winding the transformer will take a little time but with a little care you shouldn't have any trouble. If you are going to go wrong, Step 4 is the place. Be sure you form the center tap as described. Following are step by step instructions for winding the transformer:

(1) Make a winding bobbin from 1/8" balsa. The bobbin should be 5" long and 5/16" wide with a "V" cut at the end.

(2) Wind 2 strands, 63" long, of No. 30 wire (the thinnest wire) on the bobbin. This wire is used for the feedback winding, F.

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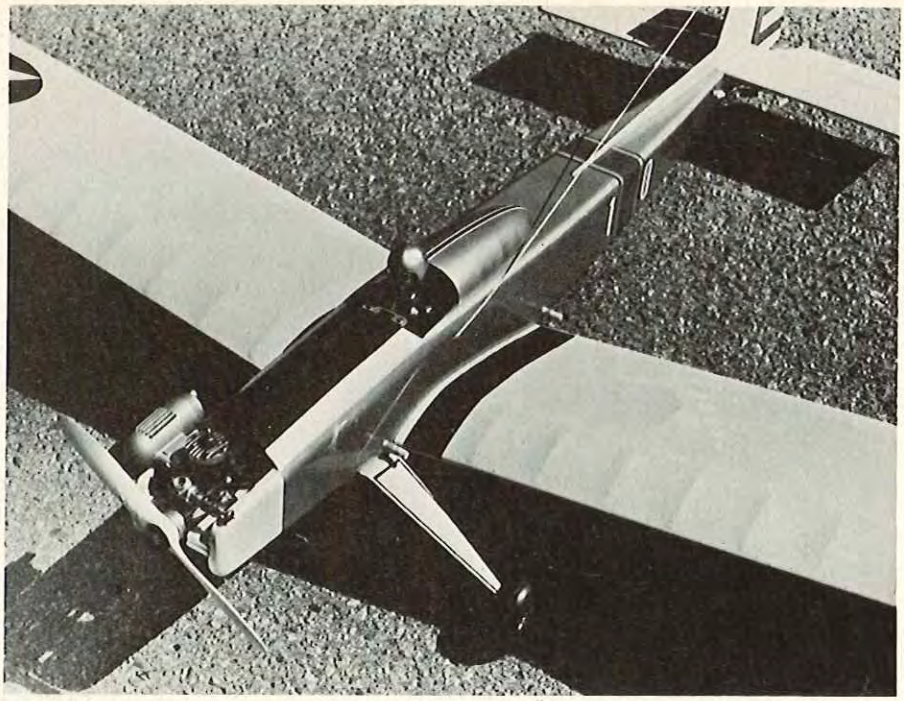
TEST REPORT



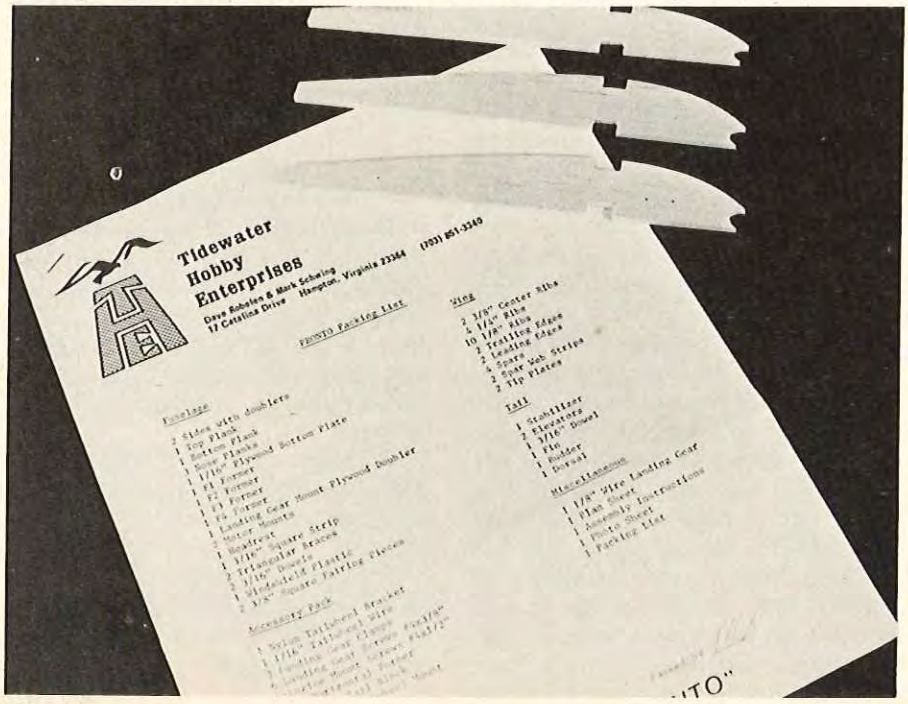
The completed Pronto. Yellow and aluminum Solarfilm covering, MonoKote trim.

PRODUCT TEST: BILL O'BRIEN
PHOTOS: DON DEWEY

Building The Tidewater Hobby Enterprises

PRONTO

A complete parts list accompanies each kit. Separate parts by grouping.

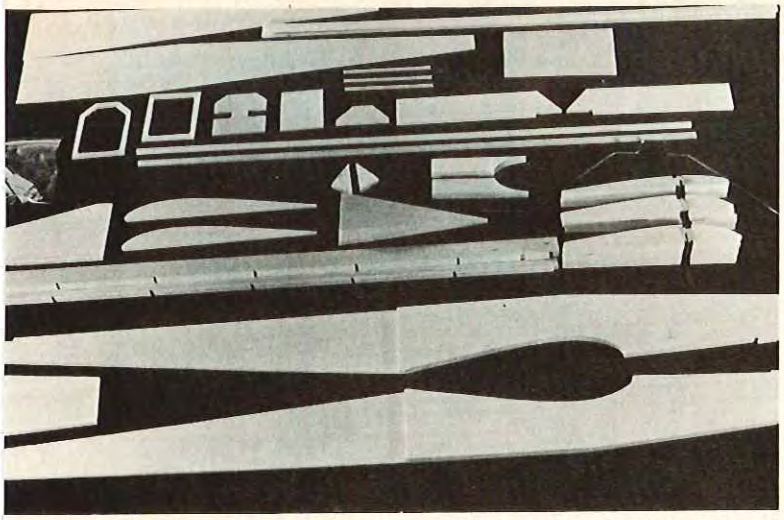


A new kit from Tidewater Hobby Enterprises, 17 Catalina Drive, Hampton, Virginia 23364, is the Pronto design by Dave Robelen. With a 48" span, and designed for engines from .09 to .23 c.i., the Pronto is a new concept in an R/C trainer. This is a low-wing design with high wing stability. The kit features precision pre-cut balsa and plywood parts and a 4-6 hour assembly time.

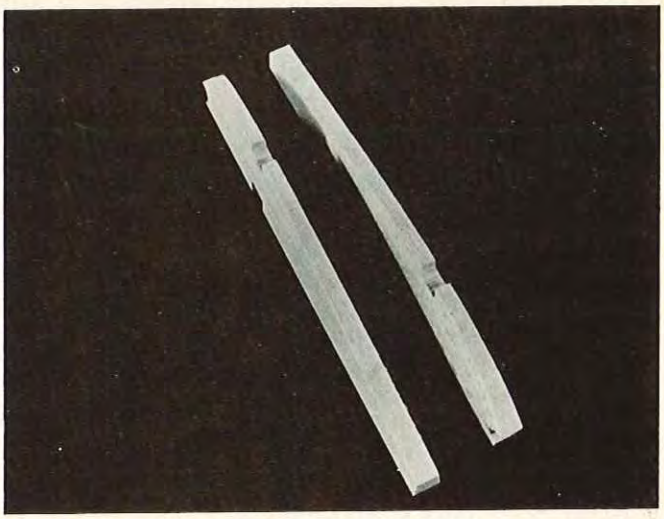
Priced at $18.95 with standard dealer discounts, we were completely amazed at the high degree of pre-fabrication in the Tidewater Pronto kit. As an example, the 1/8" balsa fuselage sides were already pre-glued to the 3/16" balsa doublers. All plywood bulkheads had been pre-cut on a jigsaw; the hardwood motor bearers pre-cut and shaped; the top and bottom sheeting cut to exact size and shape; the head rest pre-shaped; the wire landing gear completely bent to shape; the 3/16" wing ribs shaped and stacked complete with a pre-cut and tapered center dihedral rib; absolutely arrow-straight 5/16" dowel leading edges for the wing; a hardware package that included landing gear straps and screws; tail wheel bracket assembly & control horns as well as many other hand fabricated parts. Plans were quite complete including a photo page for easy reference. Additionally, a four page instruction manual was included so the Pronto could be built even by the pure beginner.

Our prototype kit of the Pronto was built in one day's time and another day used to completely cover

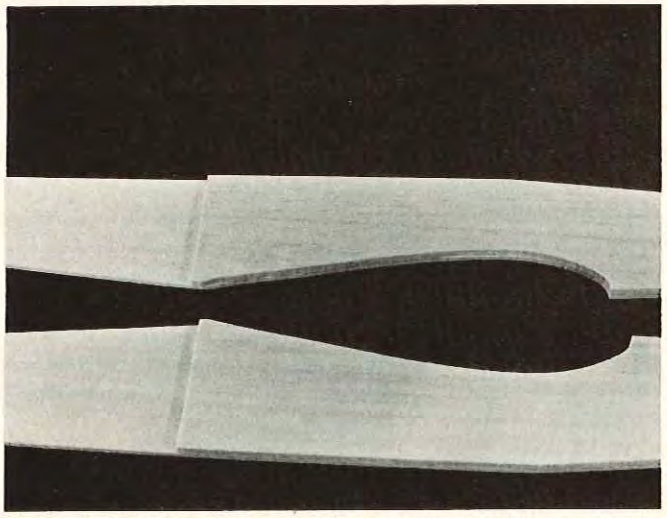
to page 74



The kit parts as they come out of the box - - - total prefabrication of the highest quality.

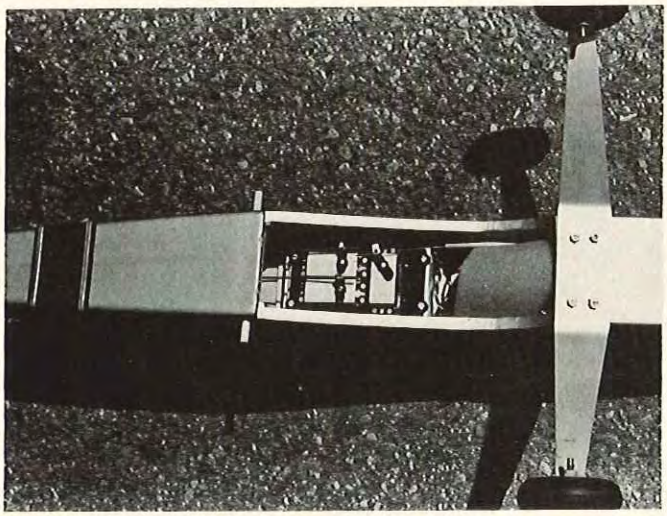


Pre-shaped, wedge-type ribs assure proper dihedral.

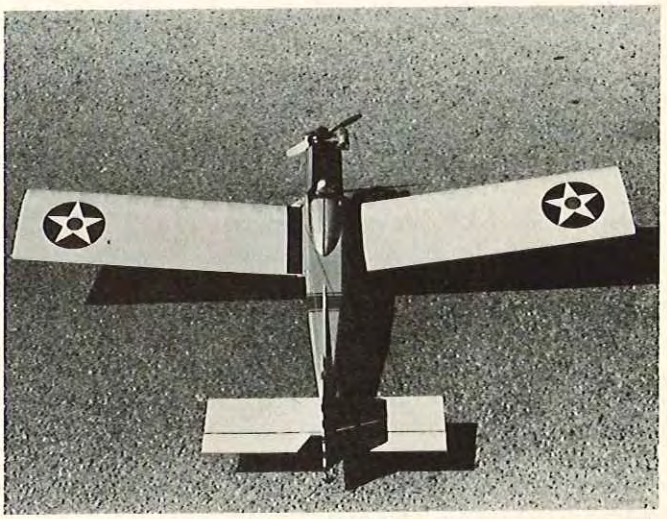


Doublers are already glued to the fuselage sides by Tidewater Hobby Enterprises.

The Pronto, less engine and radio equipment. Quite light, but sturdy.



Kraft KPS-12 servos installed for this photo. Flight tests made with World Engines radio.

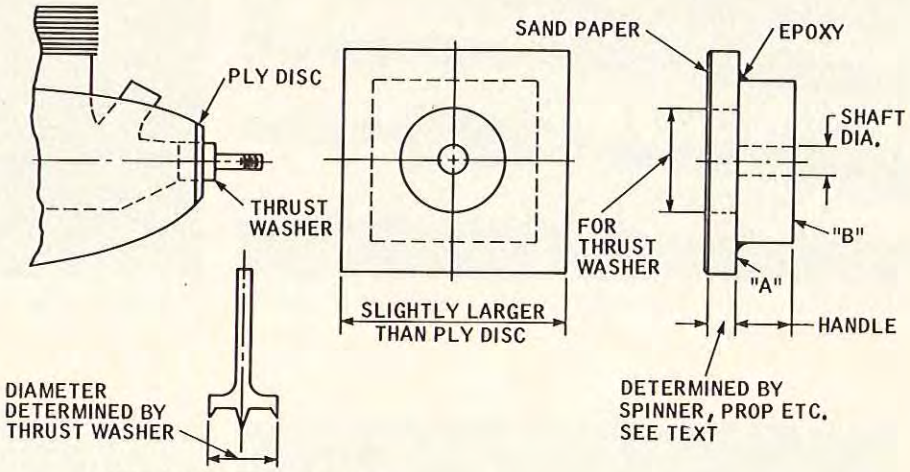


Top view of completed Pronto. An airplane that is a pleasure to fly, for novice or for pure sport flying.

FOR WHAT IT'S WORTH

From the Flypaper, the monthly bulletin of the Greater Pittsburgh Aero Radio Control Society, comes an idea for a better way to fit a spinner. When you get to the engine mounting stage of construction on your new bird, install your engine with sufficient stock in front to meet the back of the spinner. Remember, some spinners are affected by the pitch of the prop you are going to use. Also, most plane designs have a plywood ring just behind the spinner so keep that in mind as well. Looking at the sketch, Part A should be as thick as the distance the spinner overlaps the back of the prop plus the thickness of the plywood nose plate and the clearance desired. Part B should be about 3/8" or 1/2" thick. The size of Part A is determined by the diameter of the fuselage where the plywood plate will be attached. Make it a little bigger than the fuselage, as shown. Part B is your grip, so don't make it any bigger than you can comfortably grip from the front. Glue Part B on to Part A, as shown in the sketch, using glue around the perimeter of B only. Locate the center of Part A and drill, using the type of bit indicated. The diameter of the bit should be the same as the diameter of the thrust washer for the engine you intend to use. When the bit has cut through Part A stop using that bit and remove the plug from the hole. Since you only had glue around the perimeter of Part B, the plug will come free. At this point drill Part B using a bit the same size as the threaded shaft of your engine. If you have access to a drill press, use it, but if not, then make the hole a little oversize. Glue coarse sandpaper on to the face of Part A and cut out a hole the size of the big hole in Part A. Install the whole unit on the engine using the prop washer and nut to help with alignment. Tighten the nut only enough to put pressure on the sandpaper against the front of the fuselage. Take out your glow plug and rotate the assembly. Tighten the nut as necessary until the front of the thrust washer is inside Part A and against Part B. Be sure to cover the engine with a plastic bag to keep the sawdust out.

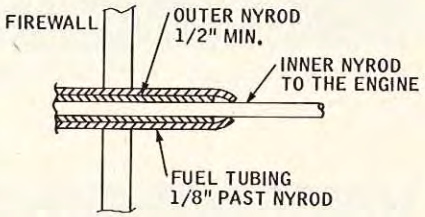
Ens. M.L. McQuigg, Jr., USN, FPO



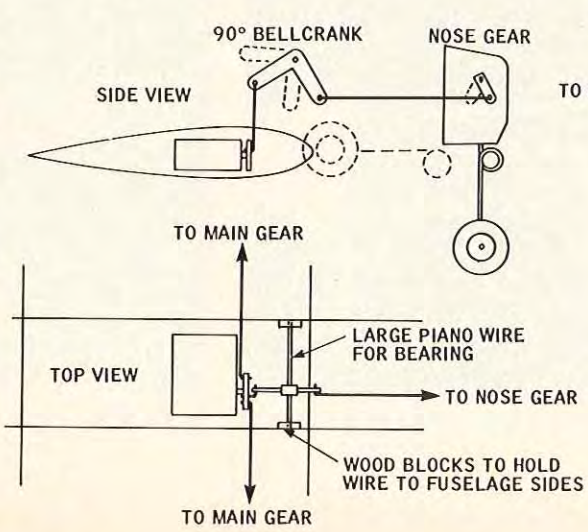
THRUST WASHER DRILL BIT

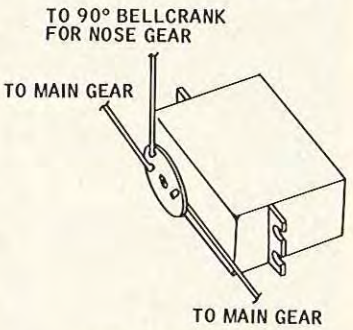
San Francisco, California, submitted the sketch showing the method he used to hook up a tricycle geared Goldberg retract set. Since he needed a direct shot with as few bends as possible to the main gears, it was necessary to lay the servo flat. To actuate the nose gear he used a 90 degree aileron bellcrank to translate the vertical travel to a horizontal motion. The wires connecting to the output wheel have to be bent as necessary to avoid binding. Adjustable links were used to "fine tune" the gear and also for ease of assembling the wing.

Fred Jackson of Macon, Georgia, recently had a problem with castor oil running down his NyRod from the engine compartment to the throttle servo, the oil causing the throttle servo to slow down. Fred cleaned the servo motor and solved this problem as shown in the sketch. Be sure to leave 1/8" of fuel tubing over the end of the NyRod. Also, have at least 1/2" of fuel tubing over the outer NyRod which will completely seal the radio compartment. This should also be excellent for R/C seaplanes where water is definitely a problem.

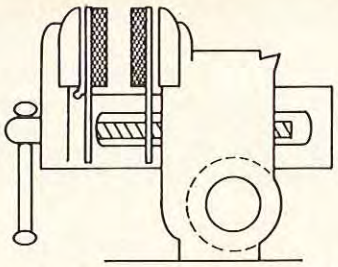


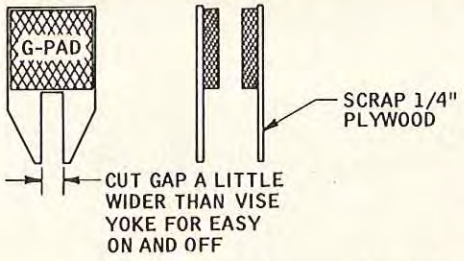
A very useful and simple device for





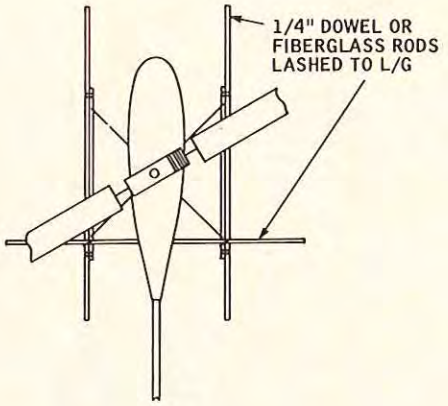
USE ADJUSTABLE LINKS TO FINE TUNE THE GEAR ALSO FOR EASE OF ASSEMBLY



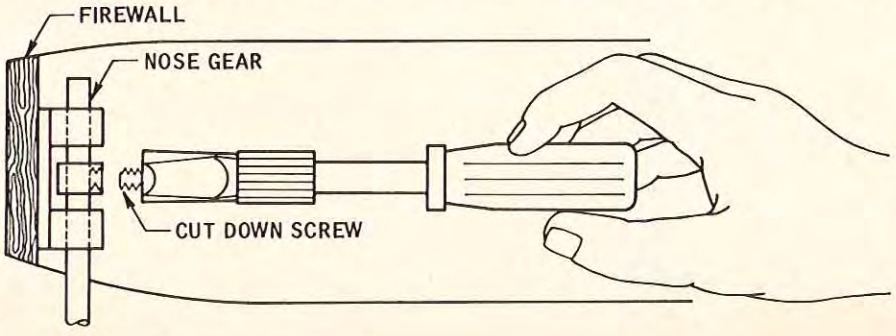


holding cowl blocks, delicate parts, etc., for filing and sanding can be quickly made for your bench vise from 2 scraps of 1/4" plywood and scraps of G-Pad, soft rubber, or other soft material glued to the face of the ply pieces as shown. The padded plywood plates just slip on or off the vise yoke when needed. This idea was submitted by Earl Milliron, Portland, Oregon.

For those modelers building the Du-Bro Whirlybird 505 helicopter, Bill Baker, of Norman, Oklahoma, suggests that many a rotor blade can be saved by building up an oversized training gear using ¼" diameter dowel or fiberglass arrowshafts as shown in the sketch.



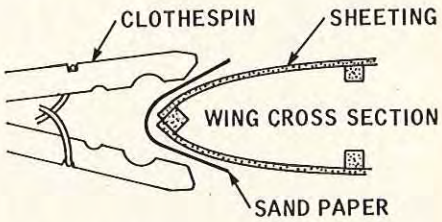
Stephen Morimoto, of Belmont, California, suggests an easy way to obtain access to those hard-to-reach nose gears in order to put a wheel collar in place. First, take out the screw for the collar and replace it with a cut off 6-32 screw with a head on it. Now it is easily put into place with a screwdriver and Handy Clamps.



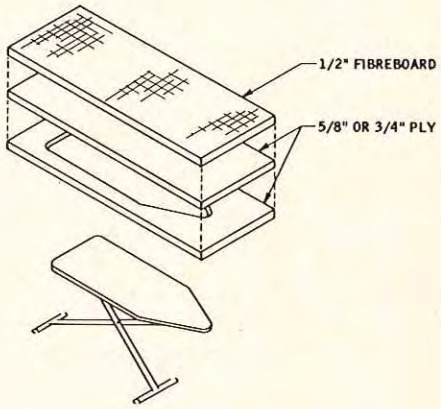
Want to try the best method you've ever used for brushing? After painting your model, use Hobbypoxy Clear and, by following this method, depending upon the age and eyesight of the judges, they will think that you have presented them with a plastic or miracle finished product! The brush is called Snap A Brush and is manufactured by U.S. Plywood, Division of Champion Papers, Inc., of New York. The brush is made of sponge rubber with a removable handle while new sponge rubber refill blades simply snap into place. The brush costs $1.09 with two refills while extra refills are two for $.74. The latter can be thrown away or cleaned after each use. This idea reprinted from the Smoke Signals Newsletter of the Meroke RC Club Inc., of New York.

Another use for the excellent Polytherm Heat Gun is one suggested by J. Fred Baun, of Poland, Ohio. Fred used the Polytherm Heat Gun to shrink many sizable wrinkles out of the plastic covering on a Lanier Comet wing after a serious "uncontrolled landing." The plane flew well the very next day with its new repair job being tight enough to show the styrofoam grains just below the taut plastic covering. It took a little more time and patience than required with the other shrink coverings, but the end result was well worth the effort.

If you've had trouble with clothespins shooting off the front of your wing while trying to hold freshly glued leading edge sheeting in place, try this idea from Mike Dills, of Louisville, Kentucky. Mike wraps a piece of 300 grit sandpaper to the leading edge then places the clothespin in place. This will prevent the clothespin from coming off while being used.



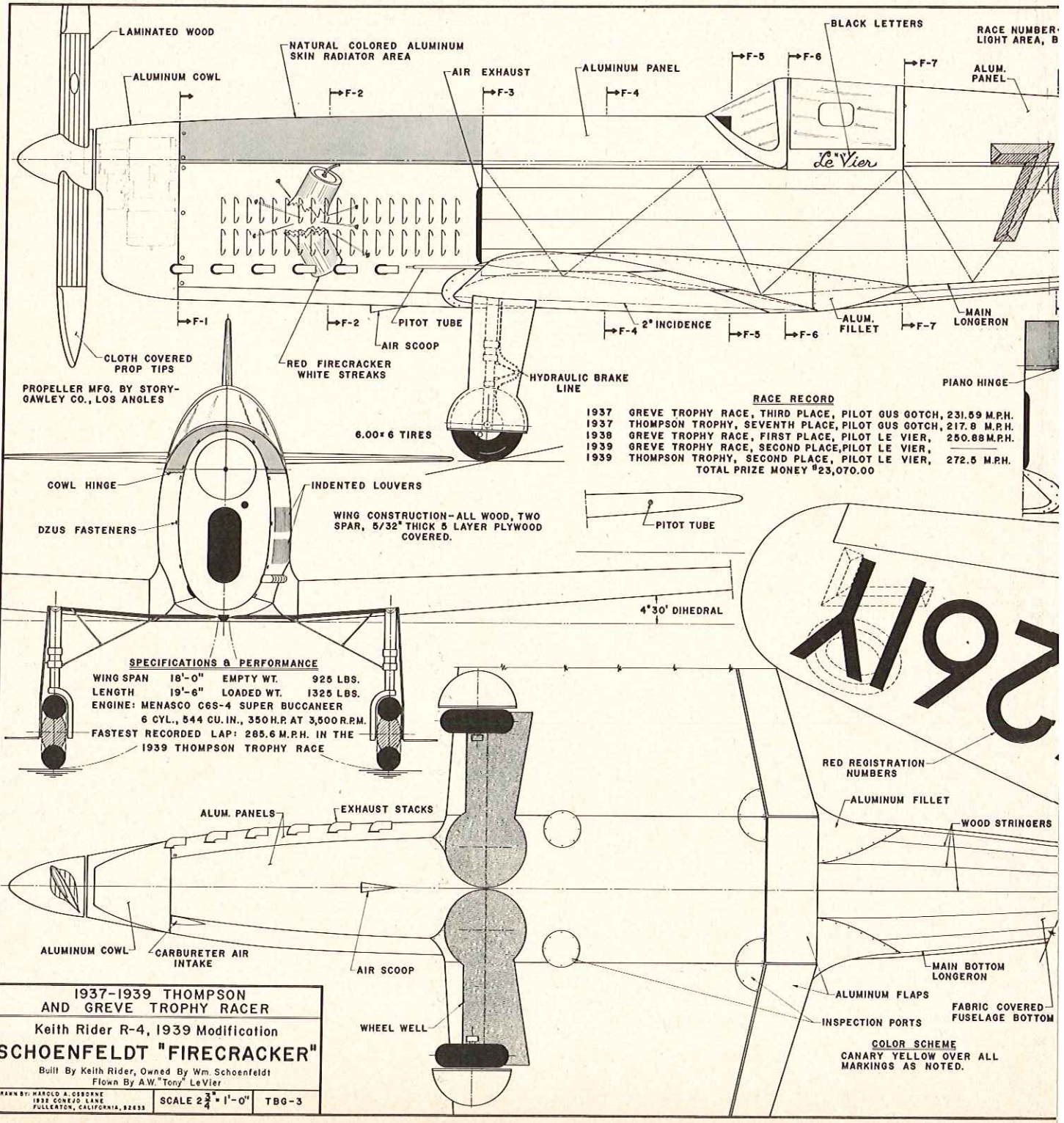
H.R. Rourke, of North Vancouver, B.C., Canada, mentions that apartment dwellers don't have the excuse of having nowhere to work if they build this portable and storable workbench. The only problem is talking your wife into releasing the ironing board!



Exhaust extension pipes are frequently desirable to lead the oil away from your model. Plastic tubing for this task has the advantage of easily bending to the desired shape, but the life of the tubing is usually quite short. Aluminum tubing is superior in this respect but bending the tubing may be difficult without collapsing it at the bend. Using the following procedure, aluminum tubing may be bent to complex shapes. First, seal one end of the tubing and fill it with solder. Lead does not work as well. Solder can be obtained in 2 or 5 lb. rolls and is re-usable many times. Pad the vise with balsa scraps or leather and bend the tubing around a form of the proper diameter. A form may be made of wood (pine will do), or, in a pinch, you can use a 1¼" socket to obtain the proper radius. Multiple bends are no problem. After bending the tubing to the desired shape, reheat it with a torch to melt the solder. The molten solder may be collected in a can and saved for future use. This idea was reprinted from the Ohming Pigeon Newsletter of the Bucks County RC Club of Feasterville, Pennsylvania.

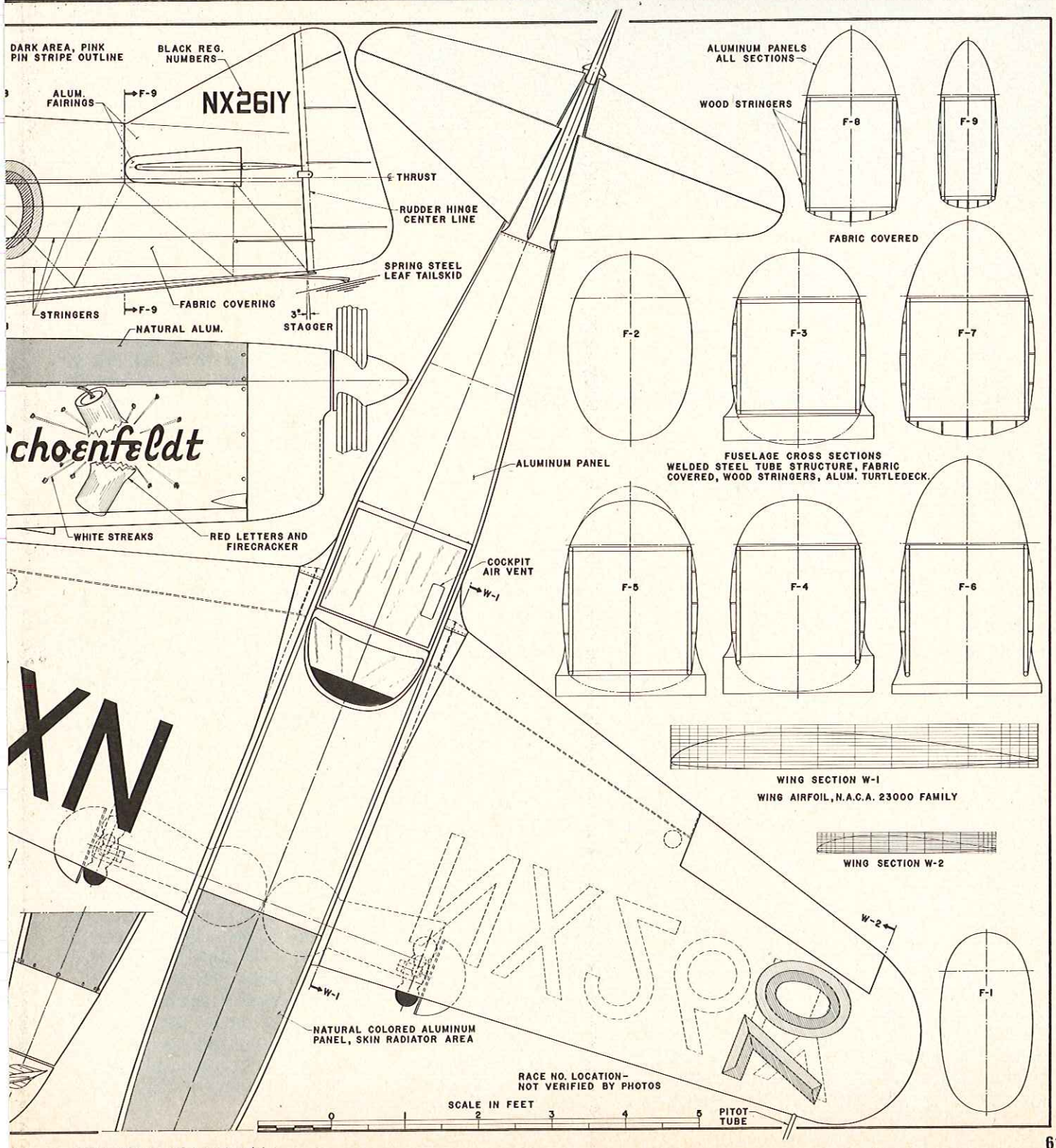
R/C MODELER MAGAZINE'S SCALE PLANS FOR THE SCRATCH BUILDER

SCHOENFELDT



PRINTS OF THE ORIGINAL DRAWINGS AT SCALE 2¾" = 1'0", 50" WING SPAN, 500 SQUARE INCH WING AREA ARE AVAILABLE FROM HAROLD OSBORNE, P.O. BOX 2033, FULLERTON, CALIFORNIA 92633. PRICE $3.00 POSTPAID 3RD CLASS. FOR FIRST CLASS ADD $.50. FOR AIR MAIL ADD $.75.

FIRECRACKER"



Southwestern Sailplane's...

DOODLER

A $10 Sailplane Kit That Can Be Ready To Fly In Three Hours ?

What do you do with a Doodler?

As a matter of fact, how do you describe a sailplane kit that contains virtually no prefabrication (as we are accustomed to it) yet can be built in approximately 3 hours, ready to fly? Also, how can you retain any degree of credibility in explaining a $10.00 sailplane kit where the retail price of the balsa wood is more than the total price of the kit?

By the same token, how can you explain or describe an "ugly" sailplane that is beautiful in concept and, from the same kit can retain either its basic configuration or can look like a Schweizer, can have a swept back wing, a double tapered wing or a "Thermic 100," instant nostalgia 1930 style wing, a high-aspect ratio wing; can be modified to have a pod and boom fuselage to make a semi-scale "Baby Albatross," can be modified to take a T-tail, or can be flown on single channel with a V-tail, can be made into a low wing sport sailplane or can have a turtle deck added to make it look like a semi-scale Fournier, or can be completely changed around to make a flight-tested Canard? Or, if you prefer, and if its too cold for thermals, you can simply saw the nose off and screw on a .049 engine for power assisted soaring. All of these modifications are included in the 7 page instruction manual that accompanies the Doodler kit from Southwestern Sailplanes, 917 Princeton, S.E., Albuquerque, New Mexico 87106.

If we have thoroughly confused you by this time, we'll try to explain the Doodler to you, truly one of today's biggest kit values. The Doodler was designed by Dave Thornburg who wrote an article several months ago for R/C Modeler Magazine entitled "Slope Soaring in the Colorado Rockies." In that article, Dave was flying an all-balsa sailplane which he hurriedly constructed to take along with him on the motorcycle trip through the Rockies. It had to be a quick-building, all-balsa, sailplane that could be easily transported. This basic design eventually resulted in the Doodler kit, which Dave is currently kitting.

The design is quite simple in basic concept in that it contains a fuselage, wing, and empennage. But here, all similarity ends! This 72" span all-balsa sailplane has up to 500 square inches of wing area and is designed for 1 to 3 channel digital systems, single channel, or free flight! And, believe it or not, it flies quite well in all of those modes! The kit contains two 3-foot precambered sheet balsa wing panels that need only be sanded, butt glued together, and covered with two pieces of Celastic provided in the kit. Selected sheet balsa has been picked for the fuselage and tail; the nose block is included; all pushrod material; control horns; adjustable hook up links; hinges and everything but the glue and the radio is included in order to get you airborne in 3-6 hours. When we mentioned that there was little or no prefabrication, as we are accustomed to the word, what we meant is that the simple box-like fuselage is drawn out with ball point pen (quite accurately, we might mention) on the sheet balsa fuselage sides as is the nose block on the 3" x 3" balsa block. All that is required is 6 cuts with your Dremel Jig Saw, or a hand saw, to completely cut out the stabilizer, elevator, vertical fin, rudder, fuselage sides, and nose block. First, the wings are rough sanded and butt glued together with 5-minute epoxy, blocking up the proper dihedral under each wing tip. Then, a panel of Celastic is soaked in dope thinner and applied to the top center section of the wing. The wing is then turned over and another piece of Celastic applied to the bottom of the undercambered sheet balsa wings. The wing is now ready for final sanding and is completed. The fuselage is assembled by cutting out the two fuselage sides, gluing the two plywood stiffeners to each side as well as the triangular stock top and bottom longerons. The two fuselage sides are then glued to the nose block and the tail is spot glued together. The fuselage contains no bulkheads and is quite thin for a minimal amount of frontal drag. Next, the fuselage is turned over and the flat rear section of the fuselage is glued to a piece of 3/32" sheet balsa provided in the kit. When this has dried, the excess top sheet is trimmed off and the bottom of the fuselage is planked with 3/32" balsa with the grain running crosswise for maximum strength. The fuselage is completed by gluing in

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the 1/4" sheet top piece and then rough sanding the nose and rounding off the corners.

The 3/16" sheet stabilizer and elevator are hinged together, sanded, then glued to the bottom of the fuselage. The vertical fin and rudder are hinged together with the hinges provided in the kit, rough sanded, and glued to the top of the fuselage. A piece of 3/64" music wire is provided in the kit for the pushrod ends and for the tow hook. After making a couple of simple bends in the length of the wire, the tow hook is inserted in the bottom of the fuselage, tack glued in place with 5-minute epoxy, and then a piece of 2" x 12" Celastic is soaked in thinner and applied to the bottom nose section of the Doodler. This serves as the sailplane's nose skid as well as holding the tow hook in place.

At this point, your two channel radio system can be installed by wrapping the battery pack and receiver in foam and shoving it into the nose of the sailplane. The servos can simply be taped to the side of the radio compartment using servo mounting tape. The pushrods are fabricated from the pushrod stock provided in the kit and the wire ends attached to the control horns at the tail surfaces. The adjustable control clevises (also provided in the kit) are attached to the servo and all mechanical trim adjustments are made at the servos themselves.

The completed Doodler, built in its basic configuration, uncovered, with control horns and pushrods installed, weighed 16 ounces. Thus, the completed Doodler with radio installed and ready to fly in the raw, weighs 20-24 ounces. If you so desire (we did), you can cover the entire aircraft with Solarfilm or MonoKote with very little weight penalty.

The Doodler should balance between 2½" and 3" back from the leading edge of the wing. Designed for either slope or thermal flying, it is an extremely stable aircraft yet can turn quite quickly due to its large rudder. The wing loading of the Doodler is quite surprising since, with the all-sheet construction, we had a tendency to believe it would be heavy - - - it is not, since the wing has between 432 and 500 square inches of area, depending upon the tip configuration you choose, with an all up weight of approximately 24 ounces. Thus, the Doodler has a wing loading of 8-9 oz. per square foot - - - quite respectable in any soaring circle.

As Dave Thornburg points out in his instruction manual, the Doodler is the biggest R/C kit value on the market today. In looking over the material you'll find that the wood alone is worth almost the price of the kit. Note, too, that there's no die cutting — you'll have to make all 6 major cuts yourself (two wing tips, two fuselage sides, a rudder and a stabilizer). For this privilege you save about $5.00, the cost of die cutting on a kit of this size. But, economy isn't the only reason for omitting die-cut parts. Pre-cutting eliminates creativity and a fully die-cut kit will build one, and only one, design and that design is always someone else's, never your own.

With the Doodler, however, you're free to do your own thing. If the rudder shape doesn't please you — change it! If you'd rather have a pod and boom fuselage, get out a pencil and redraw it. If you've always had a secret yen for a Canard, the

material for a flight tested one is right there in the kit!

On the other hand, if you're new to R/C soaring, or merely anxious to get airborne quickly, you may prefer to follow the basic Doodler layout – it really isn't a bad looking model compared to many of the trainers you see advertised. What it is, is an extremely quick building (3-6 hours maximum) all sheet balsa sailplane that can be built in many different configurations or custom designed to your own sketches. It can be flown in the raw without any covering or finish, or can be covered and trimmed out as previously mentioned. It flies extremely well on a Hi-Start for thermal soaring and is equally at home on the slopes. For slope soaring we'd recommend that you fly in winds of 12 mph or less, unless you add weight to the ship for penetration.

We were highly impressed with the Doodler since it is a radical departure from the vast majority of kits on the market today. In fact, it is unique in its concept from the basic idea all the way through to the $10.00 price tag – almost unheard of in today's realm of $50.00 – $100.00 kits! We

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12 V CONVERTER

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(3) Wind 39 bifilar turns counterclockwise around the core and clockwise along the core (78 single turns). Space evenly along the core. Figure 6.

(4) Connect the start of one wire to the end of the other to form the center tap. An ohmmeter should be used to identify the end of each wire. This will avoid accidentally connecting the end to the start of the same wire. Trim the leads as in Figure 7, and scrape the enamel off the ends for about a half inch.

(5) In a similar way using 2 strands, 48" long, No. 24 wire (the medium size wire), wind the primary winding. Start the primary winding 180 degrees away from the leads of the feedback winding. Wind 30 bifilar turns. Keep the turns close together so that they are touching on the I.D. of the core. Connect the start of one wire to the end of the other to form the center tap. Trim the ends as in Figure 8. Scrape the ends.

(6) Orient the leads up as in Figure 9 and cover the windings with a layer of electrical plastic tape. This is best done using strips of tape ¼" wide and about 12" – 14" long.

(7) Wind S^1 using 2 strands of No. 20 wire, 24" long. Start 90 degrees clockwise from the primary leads and wind 2 turns. Skip over the feedback leads and wind six turns between the feedback leads and the primary leads. Skip over the primary leads and wind three more turns for a total of 11 bifilar turns. Trim the leads as in Figure 10. Scrape the ends. As with the primary and feedback windings, the center tap is obtained by connecting the start of one wire to the end of the other.

(8) Cover the six turns between the primary and feedback windings with a layer of tape.

(9) Wind S^2 using a single 10½" length of No. 18 wire. Wind exactly 3¾ turns and trim the ends as in Figure 6. S^2 is close wound over the taped section between the primary and feedback leads.

(10) Wrap three layers of tape, ¼" wide, around the O.D. of the toroid.

(11) All the leads should be emanating from the top. This completes the transformer.

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TESTING AND OPERATION

Testing of the unit is minimal since once the unit oscillates, not much else can go wrong. Connect the unit to the battery, and try operating your pump or glow plug. Incidently, the unit cannot operate both simultaneously. If the glow plug does not operate, the unit is not oscillating. Failure to oscillate is caused by 1) feedback winding improperly phased; 2) one diode put in backwards; 3) a short on the output of one of the secondary windings, or a short inside the transformer, so start checking. If the glow plug works but the pump does not, you have a bad capacitor. If you have a VTVM you should measure about 3 VDC at S^1 with the pump operating. Measuring the open circuit S^1 voltage is not too significant because of spiking in the square wave form and diode voltage drop and may be between 4 – 6 VDC. To measure the output voltage of S^2 with the glow plug on, use the a.c. peak-to-peak scales on your VTVM. You should measure 2.8-3 VAC peak-to-peak which is the equivalent of 1.4 – 1.5 VDC. If the peak-to-peak voltage is above 3.0 VAC, spread the leads of S^2 away from the transformer core until you get 3.0 VAC or slightly less.

The converter is designed to operate continuously under the idle current conditions, and hence, you could turn it on when you get to the field in the morning, and leave it on until you leave. A better procedure, though, is to turn the converter off after each time you use it. This will conserve the 12 volt battery. (After all, we are doing all of this in the name of efficiency.) Well, go ahead and build your converter, and you will wonder how you ever got along without one before.

PARTS LIST

Q_1, Q_2, MJ480 or RCA 40372
D_1, D_2, IN4719
T_1, Wound on Arnold core 3-T8905-D2-AA
R_1, 47Ω, 1/2W
R_2, 20Ω, 1W
C_1, 2000 uj, 8V
SW, Switch SPST
Box, LMB-00
2 – 2 lug terminals
1 – 2+ ground terminal
1 – 4 lug output strip terminal
1 – 1/4" grommet
10½ feet No. 30 wire
8 feet No. 24 wire
4 feet No. 20 wire
10½ inches No. 18 wire
8 – 6-32 screws & nuts
8" Servo Tape

DOODLER

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began construction on ours on a Saturday morning, dictated 9 articles for this issue during the construction and while the glue was drying, and had the sailplane completed at the end of the day. At that point it was approximately 30 minutes away from flying with only the radio gear needing to be installed. However, we did take the extra time to Solarfilm the aircraft to provide an extra degree of strength on the extremely rough field on which we fly.

The Doodler is some value - - - we're not quite sure how the manufacturer does it, but he has turned out an excellent sailplane for either the beginner or experimenter who would like to create his own sailplane design from a flight tested and proven basic concept. We highly recommend the Doodler from Southwestern Sailplanes to your consideration. □

PRONTO

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the model with yellow Solarfilm on the wings and tail surfaces and aluminum colored Solarfilm on the fuselage. MonoKote trim was used to simulate pre-WW II Army insignia. Large letters spelling out "U.S. ARMY" were cut from flat black Contact shelf paper and pressed in place on the bottom side of the wing. A World Engines

proportional system was installed and an O.S. Max .15 engine with muffler was used for power. The only modification we made to the kit was to add a false rib between each main rib to eliminate any possible sagging due to the wide rib spacing. This probably was not necessary but added so little time that we decided to make this modification. All up weight of the model ready-to-fly was 2 lbs., 8 oz.

The Pronto is an exceptional model in many respects. First of all, it builds up quite rapidly and is quite an attractive vintage-type aircraft. It is extremely stable in flight and, with a .10 or .15 engine, can be handled by a beginner with a minimum of assistance. The model tracks well on the ground with no tendency to ground loop. With a .15 or larger engine, the Pronto is capable of quite a number of maneuvers and recently, one of the prototypes, took first place in a Class A Pattern Event.

We were quite impressed by the kit we received from Tidewater Hobby Enterprises and feel that their Pronto kit is not only a well thought-out design that fulfills all of the manufacturers claims for it, but is an exceptional kit buy at its price of $18.95. And, even if you are not a beginner to the sport and hobby of R/C, you'll find the Pronto an exciting change-of-pace for small field sport flying.

The Pronto kit from Tidewater Hobby Enterprises has been thoroughly Tested and is Approved and Recommended by R/C Modeler Magazine. ☐

LSF SOAR-LYMPICS

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ed to be between thermals and they couldn't find anything to go up with. Occasionally a flier goes into a thermal, doesn't recognize it, and goes right through it. Now they've posted the scores for Round One and they normalize it. In Round One, on Saturday, Mat Tennyson won the event – he was 2 minutes dead on, and 21" from the spot. That gave him 1,000 points. I came in second, with 2 minutes dead on, and 30" from the spot, receiving 985 points. As we go through the list I see various and sundry names here such as Rick Holzapple with 933 and Walt Hinman with 928 points. There are very few in the 900's though, but quite a few in the 800's and some in the zero's, like poor old Sid! It's really something to walk around through the area with all these sailplanes – you never saw such a conglomerate group of machines in all of your life. I think there's a sailplane here that would represent every configuration that you could possibly want from the classics to the originals. Right now I'm looking at an original – I don't know what it is, but it's got a little pod up in the front, the wing is mounted on a pylon, and it's got a T-tail. Going back to the T-tail is a fiberglass fishing rod as a boom. V-tails are very much in evidence. There's also quite a few Windfree's from Mark's Models. Wing spans on these sailplanes range all the way from 6' to 13-14 feet. It seems to be just about evenly divided between the straight V-dihedral and the polyhedral configurations.

•

Believe it or not, I finally had that luck I've been waiting for. In Round Two, which was the 7 minute Duration, the winch next to me broke and the winchmaster had to fix it. Having had to wait until it was fixed, I waited right through a period of sink. As a matter of fact, the winch was fixed just in time for Jerry Wolfrom to put me up right smack into a thermal and I maxed out for a perfect flight. And that's the first time in the last 3 years that's happened to me in the LSF Tournament! I'm known as the "Big Sinker!" I usually go right up into the sink between thermals. This time I lucked out. For the first time, I think I've got a chance – and at the moment, I'm pretty happy!

•

It's now about 5 minutes after three in the afternoon and they're just winding up Round Three which is a speed event. It'll be interesting to see how that turns out. In this event, the fastest time so far was put in by Paul Christian at a time of 1:12 with Rick Walters second at 1:13. There's quite a few under 1:20 and I happen to be one of them at 1:19. Pat Dennison, who was leading in the first two rounds, had a Jedelsky type wing and, in the speed event, he just lost out timing two minutes, so that will drop him from first place. Whether we have a Fourth Round or not still hasn't been announced. If we do, and at the rate we're going, some of the fellows will probably be going for thermal flights around 6:00 tonight! They may not be too happy. I understand that Le Gray has a $10.00 bet that he's going to run four rounds, so he probably will, even if we're flying at midnight! We'll wait and see.

•

It's now just a few minutes after 6:00. They did fly the fourth round and they're still flying. Interestingly enough a standing wave appeared just at the end of the tow and the smart fliers went up and right into the wave. It would appear and disappear – it's hard to explain – being there for a whole series of maxes then, all of a sudden, the guy would come down in 2 or 3 minutes. I went up and right into the standing wave and it looked great. I was up 3 minutes and as high as it normally would take me about 4 minutes to get down from a max. The standing wave disappeared, the sink behind it came down, and I didn't max out. I came down at 5 minutes and 41 seconds. Rick Walters went up a little bit later and had the same luck that I experienced. So here we are at the end of the first day – four rounds have been flown and the scores haven't been posted. We'll get those tonight at the banquet. Unless someone did something fantastic, I think I should wind up the first day in the lead with Rick Walters a very close second, and John Baxter and Paul Christian close thirds. The South Bay Soaring Society is really doing a great job here. Incidentally, insofar as that's concerned, the Valley Silent Flyers who organized this event, have done a fantastic job,

just out of this world – this is one of the best organized and best run meets that I've ever seen. I would only say that I still think that the fourth round was a mistake even though I lucked out in it, since during the first 3 rounds we were all having fun – in the fourth round, it suddenly became work and soaring should never be that - - - it should always be fun.

•

I just sat down in my hotel room after driving back from the field. It's now 25 minutes to 7:00 and my feet hurt, my face is burned, and I just suddenly realized that I left my transmitter out at the field. I was just getting ready to go back and pick it up and I saw Le Gray, the Contest Director. He was coming back from the field and he says they're all closed up but they've got field security and my transmitter was in the impound area. That's the way it is - - - I've left wings at home and I've launched airplanes and forgot to turn on the transmitter - - - but this is the first time I've ever left a transmitter at the field! Oh well, I guess I'm excited at the end of the first day being in first place. Like one guy says, tomorrow, I'm the rabbit they've got to chase. A nice place to be!

•

It's now Sunday morning, the time is 9:25. We started at 8:00 and the first round was the One Lap Speed event. It was obvious that this was **total** speed and there was no need for any thermaling. In other words, the faster you went the more likely you were to win. I went for broke, adding 2½ lbs. of weight to the Top Sailer. It can carry this weight, but there was a cross-wind and a slight down-wind and we had to make a decision, and that was to use 12 volts on the tow. It was a bad decision! When we started off, and as soon as I started the rotation, the power of the tow was more than the wing could take and the wing broke. The break was not complete - - - I was able to come off the line and, with a crippled wing, was able to land the sailplane. However, being in first place at the end of Saturday, and with zero points in this first event on Sunday, unless something miraculous happens, I've lost the contest. I'm now going to go and make an effort to see if I can use some 5-Minute Epoxy to get it back together for the remainder of the

contest. Sunday is another day for sure!

•

After breaking my wing in the first event, the second event, an 8 Minute Precision task saw nothing but thermals ahead of me. I'm looking up now and the sailplanes are virtually out of sight in the sky. And what happened? I went up into zero sink and then down timing 4 minutes and 39 seconds! Everyone else is getting maxes – well, I won't say that, John Baxter didn't max out, but, you know, luck is a funny thing, yesterday I couldn't lose for winning and today I can't win for losing. How do you figure it?

After hitting the sink and not maxing out on the 8 Minute Precision, the next event is Round Two of the Precision task. Now, I took second place in this event yesterday, and all I needed to do was a really first class job and I might come out with a Precision trophy. Obviously, I'm completely out of the running for the overall trophy. I winch up, it's beautiful, 3 minutes, and I have to fight it down because of the thermals. I'm perfectly positioned for the final 1 Minute Precision; I start my dive for the necessary speed for precision and accuracy on the control; everything is perfect, at 20 seconds, I begin my final; at 15 seconds, I'm in good position and it looks like I can't miss; at 12 seconds a gust of wind came through and blew my airplane 15' high and from that I had to recover. I did the best I could, making a violent 360 and recovering, but the wind, by that time, had blown me just a little too far down. I did manage 3 minutes and 3 seconds, but I missed the spot. I was just outside of 25' so no spot precision points. If there's one thing that you can say about soaring tournaments in the various events, it sure is a humbling experience! Yesterday, first place . . . today, if it were two separate contests, I'd be in last place right now – how about that!

•

Well, that's it, it's now 2:00 and I have just gone up for the 8 Minute Precision Flight. In the 3 Minute Precision Flight, I had to fight my sailplane down, otherwise I'd have been up for half an hour. In the 8 Minute Precision Flight I went up to the end of the tow (on the tow lines that they have here my time in dead air from the end of the tow would be roughly 3½ minutes) and came down in 2 minutes – the giant hand hit me again! John Donelson, flying in the same

time with me was even pushed down faster – 1 minute and 29 seconds! It's hard to believe but that's the way it is. Yesterday, everything all right – four rounds today and absolutely everything went wrong! I wouldn't believe it if it hadn't happened to me, personally.

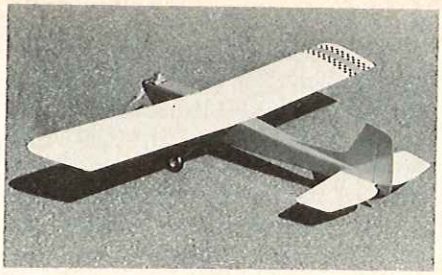
•

That's the end of this contest for me and I'm packing my Top Sailer away and I'm going up to Santa Barbara for a day of fishing and relaxing. If there's anything good about this contest insofar as I'm concerned, it's that the acceptance of the Top Sailer by the people was great, and now Top Flite is really pressured to get it out. The fact that it didn't fly the second day was just the luck of the elements. It's still a great airplane. But, oh boy, when, just when will I have a contest where I can get some of that luck? Maybe if I went to church on Sunday – I don't know. At any rate, that's it for today, and if it sounds like I'm disappointed, you know damn well I am!

•

It's now 5:00 and I have just arrived at the Breakwater in Santa Barbara. Just to show you that the day is consistent, there's a couple of things I forgot about . . . earlier this morning when I started to check out of the hotel I went up to pay my bill and the guy gave me the figure and I said, "Whoa – wait a minute, what do you mean?" I had a special reservation at $16.00 a night through the LSF, but they'd given me the bill at the regular price of $25.00! As you know already from what I've said, that this has been quite a day! Well, I got up to Santa Barbara and, as I was coming through town, a guy up ahead of me was dragging his heels and I was commiserating with myself over my misfortune so I didn't pay any attention to him. As I went around to pass him, the first thing you know, what do I see in back of me – a cop! Well, I just kept right on, right on through town, and very carefully at the next off-ramp, turned off - - - you know it, he turned off right behind me and, pulled up along side of me at the stop signal. So then I turned left, I stopped, and he turned and went on. Well, I want to tell you that's the **only** thing that's turned out right so far all day!

Well, now I'm going to see what the sport fishing was like today and make arrangements for tomorrow morning. Let's hope tomorrow is another day and completely different from today!



STERLING FLEDGLING

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Run a line from the center rear to the center of the firewall. Position the fin slot to this line.

The stabilizer consists of a 1/16" top and 1/16" bottom sheet, with a truss structure sandwiched in between. Using 5-Minute epoxy, the entire stab can be completed, ready for sanding, in 20 minutes. That's easy!

Construction-wise, this leaves only the hinging of the rudder and elevator. Total time – less than one weekend.

The installation of the radio control equipment is not detailed on the plans, although a general equipment position is indicated. This is probably due to the wide variations in equipment, both in size and configuration. The photos clearly show how we installed our MRC 710 radio in the Fledgling. If one of the sub-miniature systems had been used, it would be possible to install the servos three abreast on a plywood plate, or servo mount, on rails either along the fuselage sides or across the fuselage. With the larger servos, the forward (throttle) servo could be mounted in an "aileron mount" to the fuselage side or, alternately, the entire servo installation could be shifted back far enough to pack the receiver forward of a tray holding all three, though this would probably require added weight in the nose.

We chose to install Pylon Brand Gold-'N-Rods rather than the pushrods supplied. This decision was largely a matter of simplicity, although the use of Gold-'N-Rod does eliminate the need for a double 90 degree bend in the pushrods where they would exit the fuselage. This type bend can cause flexing of the pushrod, and we try to avoid using it whenever possible. We found it necessary to relieve the wing nut block in the fuselage, in the area where the aileron horns pivot, otherwise aileron travel is very limited.

The entire ship was covered with Solarfilm and MonoKote (how's that for non-committal?). The aluminum engine mounts were drilled and tapped

to accept our O.S. Max .30, and a 6 oz. pylon tank was fitted into the tank compartment. The total weight, ready to fly came out as 4 lbs., 1 oz.

Before heading to the field, the entire ship and installation should be given a thorough check out. The balance point **must** be as indicated on the plans. Controls **must** move in the proper direction (ailerons are easy to hook up in reverse). The wheels should turn freely, and the batteries fully charged.

On the field, the ship flies well and handles easily. The novice should begin with all linkages set in the outer-most hole in all control horns (farthest from hinge line). This is particularly true of the elevator. As experience is gained, they can be moved in closer, one hole at a time.

Our ship required no trim whatsoever, and was quite docile with control throws at a minimum. By moving the clevises into the second hole, the Fledgling becomes very active and loads of fun. By utilizing a small engine (.30 or under) with a muffler, it is capable of flying from small fields.

During flight evaluation tests, our ship was flown by several novice flyers, with excellent results. One minor mishap did point out an area which could be improved. On a less than perfect landing, the ship hit on a wheel, nosewheel, and a wingtip. *(Ed note: Bernie's standard 3-point landing).* As a result, the ship flipped around striking the rudder and tailskid sideways. Both obligingly broke. The addition of a piece of 1/32" or 1/16" plywood across the lower end of the rudder (under horn to trailing edge) on each side will prevent breakage. The tailskid should be moved back so that the rear edge is even with the rear of the fuselage. In this position, it is attached directly below the tailpost, consequently being able to withstand considerably more abuse. Of course, if you're a pro, these mods are unnecessary.

The Sterling Fledgling is a fine kit, which will produce an equally fine flying machine, with a minimum expenditure of time and capital. The novice would do well to study our photos and/or enlist the aid of an accomplished builder for an assist on equipment installation. The reward is a tough, easy handling aircraft, which you can fly with little or no help.

The Fledgling is, in our opinion, Sterling's best. Tested, Approved and Recommended by RCM. □

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new design that more effectively matches the stick movement to the inherent precision of the servos. The control sticks have adjustable stick tension so that they can be set up to the individual's own particular requirements and will center accurately even when adjusted to only 2 oz. of control pressure. There are mechanical trim levers for the 4 main flight controls. The transmitter is extremely light weight to reduce arm fatigue for extended periods of flying. The standard control stick set-up is throttle and rudder on the left stick and aileron and elevator on the right stick, or, as commonly called, Mode II. (Mode I is available upon request.) The transmitter has a 600 millowatt power output for a solid and effective long range. Last year we tested the Hobby Lobby 4 proportional system and we find that the 1972 Hobby Lobby 5 has a better control stick bearing than before. The new 5 has a metal ball and socket arrangement which is smoother and more precise around neutral. The 5th or auxiliary channel control lever is located dead center in the middle of the transmitter directly below the meter.

One of the first impressions you have is that the servos are the smallest manufactured to date while the receiver seems quite large compared to most proportional systems currently available. The reason for this is that the servo amplifiers are built into the receiver case with the exception of the auxiliary channel amplifier. While this idea is unusual among the current crop of proportional systems, it has two definite advantages. The first is that since even though manufacturer's instructions tell the flyer not to screw down their servos too tightly, the majority still do it, thus inviting servo failure due to vibration damage to the components. Thus, with only the servo mechanics and motor contained in the servo case all of the soldered connections normally found inside a servo have been reduced down to the five

soldered connections inside a Hobby Lobby 5 servo, thus minimizing the possibility of servo amplifier damage due to vibration. Another advantage is that individual servos can be purchased for $12.00 each instead of the normal $40.00 usually charged for a servo that contains all of the electronics.

The receiver-decoder-amplifier has an outside dimension of 2½" long by 1-19/32" wide by 1-7/32" high. The receiver case is ivory colored nylon and is complete with four mounting lugs so that it, too, can be mounted on rails instead of foam wrapped if so desired.

Hobby Lobby 5 Super-Mini Flight Control Servos are the smallest and lightest servos currently being made. The weight is only 1 oz. each and, thus, the ultra light weight and low inertia give the servos unusual resistance to vibration-induced problems. The gear train, potentiometer, and amplifier combination give the system the amazing resolution and centering ability of less than .0005. Individual servo dimensions are 1-3/8" long by 23/32" wide by 1-3/8" high with servo cases of ivory colored nylon. The connectors used on the servos and receivers are Deans units which have been field proven over the years as extremely reliable and providing a better degree of insurance over the crimped type of connector. As we previously mentioned, an individual Flight Control Servo costs $12.00 while an entire airborne system sells for $135.50. The 5th channel uses a different servo than the 4 flight control channels, employing a 4 wire amplified servo that looks exactly like the other servos but has its amplifier inside the servo instead of the receiver. You're cautioned not to plug a standard Flight Control Servo into the 5th channel since it will knock out two channels. When ordering a servo for the 5th or auxiliary channel, specify the 4 wire amplified auxiliary servo.

The airborne battery pack is a flat 4.8 volt General Electric rechargeable nickel cadmium unit in a Royalite case. The switch harness is an integral part of the battery, itself, and the switch is double paralleled for safety. A separate charging connector is provided so the airborne battery can be charged without unplugging it from the receiver. The total airborne weight with 500 mah battery, 4 servos, and receiver is 11½ oz.

It is interesting to note that Hobby Lobby International is staffed by active R/C fliers and they are particularly "fussy" about checking each radio before it is shipped. For example, Jim Martin range checks the sets with no transmitter antenna and with the receiver antenna wrapped around the receiver, in a room with fluorescent lights, and expects 40' of operation with no servo jitter and without running out of range. This test would be considered ridiculous by most manufacturers, but Hobby Lobby sends any set back to the manufacturer that fails this test. In our checks of the Hobby Lobby 5 digital proportional system, we found that this system had an extremely long range, in fact, out-of-sight to be exact. The system has proven to have exceptional reliability with servos that have extremely close centering and precise resolution. We particularly liked the adjustable tension control sticks on the transmitter since they can be adjusted to the individual "feel" the flyer desires. We also found that the system has unusual resistance to short range "swamping."

With regard to service facilities, all Hobby Lobby 5 systems are serviced by EK Products and Hobby Lobby

insists on prompt turn-around servicing both in and out of warranty.

So what do you get in a 5 channel digital proportional system that sells for approximately 1/2 the price of competitive units? You get a system that is extremely reliable, powerful, and equals or exceeds all of the manufacturer's advertising claims for it. As a matter of interest, our test system has performed flawlessly under all conditions and its performance has equalled or exceeded systems selling for twice the price. What you **don't** get is a long list of available options. In other words, you have a choice of any one of the 27 or 72-75 MHz frequencies and a choice of Mode I or Mode II transmitter stick configurations. Beyond that point there are no options available and each and every Hobby Lobby 5 digital proportional system is alike. By thus being able to produce a radio in a constant run without switching molds from servo configuration to servo configuration, and without a lot of accessories to manufacture, the price can be kept to a minimum. Yet, there is no sacrifice in performance or reliability. If you wouldn't be happy without a single stick system or without a retract gear toggle switch on top of the transmitter, then the Hobby Lobby 5 is not for you. But, if you want an extremely precise system that will offer you years of reliable service, then we seriously recommend the Hobby Lobby 5 to your consideration.

It has been Tested and is Approved and Recommended by R/C Modeler Magazine. □

The flight pack complete with switch and charging jack.

SOMETHING OTHER . . . .

from page 40

reliable engine, how are they going to control it? Read on - - -

A call was made to Vista, California, where Kraft Systems is located. The world's leading radio control manufacturer has an executive vice-president who spent 20 years in the U.S. Navy as an electronics technician, much of the time on guided missiles and radio controlled drones. I won't go into Cliff Weirick's R/C model accomplishments other than to say that he knew what they were talking about. Arrangements were made for Kraft Systems to produce the radio

control system; the fancy name in the RPV business is data-link. Would you believe they are using standard Kraft-Hayes servos to operate the 75 pound machine?

This writer was invited to observe the first test flights of the prototypes. Except for the size and weight of the RPV's, it was just like the many times I've watched Jan and Dick test fly a new model. The same careful attention to details, no more, no less. Everything assembled and checked and fueled up. A little prime in the engine and it roared to life on the first flip of the prop. Power checks, control checks at different throttle settings, a few taxi runs, steering checks, everything looks good so it was taxi out for take-off. The first flight was to be made with the dummy payload some 30 pounds light. On came the power, the tail gently lifted as it picked up speed, and the bird just flew right off the runway! They had done their homework well because it didn't take a bit of trim on any control! About 15 minutes of flight tests included timed runs through measured distances at various power settings that verified everything they had promised. The approach and landing was so smooth and normal that it was almost boring. A thorough examination of the bird revealed that everything was just as it should be so the quick change of the payload was demonstrated to install the full weight package. For a better perspective, I attempted to lift the bird at full gross weight. I didn't quite make it – it felt like it was nailed to the runway!

I don't think that engine knows that it is an engine. Once again it started on the first flip, and you had better believe that when Jan pulls the propeller through, he gets his hand out FAST! The only difference between the two flights was that Dick held this one on the ground longer and built up a safe speed margin before letting it lift off. Again, the flight tests were made and, again, everything checked out. It did the job it was designed to do and did it so well that it really wasn't the most spectacular flight I've ever seen.

Other agencies have ordered additional quantities of the prototype design with various modifications and a rather comprehensive test program is being planned. The pot of gold at the end of the rainbow is a production contract for several thousand RPV's. Meanwhile, the racing season has come and gone without Jan and Dick beating Bob Smith and Larry Leonard, but they have accomplished something else . . . . they learned how to survive in the aerospace industry! The real answer can probably be found in the smile on Jan's face when leans back in the leather of that brand new big black Mark IV . . . . . □

RS SYSTEMS

from page 20

The transmitter circuitry is housed in a bright orange vinyl clad transmitter measuring 6-9/16" long by 5-1/16" high (exclusive of antenna) and 2-1/16" deep. A single closed type stick is used to control the roll and pitch modes while the third channel lever is located to the left of the transmitter directly under the transmitter meter. And on-off switch is provided near the center of the transmitter with a switch cover guard that virtually precludes inadvertently leaving the transmitter switch in the on position when not flying. Trim levers for the primary control stick are located to the left and below the stick

housing. On the bottom of the transmitter are two receptacles for the charging cables, the charger being housed in the transmitter. The transmitter stick is the smoothest closed stick that we have operated to date and compares favorably with the open-gimbal type of stick which is normally more precise.

The 3 channel and 6 channel receiver is the smallest and lightest unit presently being manufactured in the world, but this tiny unit is a giant in performance. All silicon semi-conductors are used throughout the circuitry, which means no significant performance change through an extreme of temperature variations. The logic section employs integrated circuits built to Military Specifications. All RF portions of the receiver use capacitors of Mil-Spec quality to insure stability and reliability. Each receiver is adjusted to a very precise sensitivity level and checked for selectivity before shipment. As can be seen from the photographs, the receiver is so small that it could become lost in almost any normal sized radio compartment!

While two servo configurations are available, we chose the LDR-2 miniature servos for use with our system. These servos, the mechanics manufactured by D & R Products, reflect an unmatched standard of mechanical quality and workmanship. These powerful, precise units are built of special and varying materials to suit particular applications. As an example, one type of nylon is used for the gear train to yield the high strength and stability required for unvarying mesh and power transfer. A different material is used for the case and mounting flanges to provide toughness with a reasonable degree of flexibility to absorb vibration, shock, and impact. The unique design of the gear train allows much faster traverse time with no power loss, through reduction of friction and load.

The servo amplifier employs all silicon semi-conductors as well as the well-known "Schmitt trigger" drivers to the output stages, allowing much less dead band and very high resolution while yielding extremely accurate positioning and centering. This type of circuitry requires a higher component count and greater complexity than that used by most other major manufacturers, but the difference is noticeable and significant. Servo performance is the very heart and essence of a radio control system and both the LDR-1 and LDR-2 are among the finest servo mechanisms available anywhere at any price.

The battery packs available with the system are either a flat or square pack configuration with either pack containing four 500 milliampere hour capacity rechargeable nickel cadmium cells. The transmitter pack is 8 cells of similar style and capacity. The theoretical maximum duration of operation from a fresh charged cycle is 4 hours at which time both packs will be exhausted and ready for recharge. It is suggested by the manufacturer that maximum continuous or accumulated time be limited to about 3-3¼ hours to allow reasonable safety margin. Also available is a small 225 mah rechargeable nickel cadmium pack which physically measures 1-7/16" square by 13/16" deep. A separate charger is available to charge this small airborne pack.

A complete line of accessory mounting hardware and various individual and multiple servo tray configurations are available from RS Systems.

Following our testing of this

system, we came to the conclusion that just about everything about the 3 channel digital proportional system impressed us. The use of a co-axial antenna connector is excellent from a maximum radiated power output standpoint. The precision of the closed stick matched to the tremendous power and precision of the small LDR servos are virtually unexcelled. The use of the gold plated connector plugs as well as the cable ties located on every cable "bundle" are indicative of the manufacturer's close attention to even the most minute detail of engineering and manufacturing. The power output of the transmitter matched with the sensitivity of the receiver is such that you could fly an entire competition pattern with the antenna partially collapsed, although this is definitely not recommended.

The 3 channel and 6 channel digital proportional systems manufactured by RS Systems represent a highly successful attempt by one manufacturer to produce the highest quality possible in a digital proportional system to a point where each system is custom made for the individual consumer while offering all of the time and field tested benefits of known repeatability.

You might have to wait a short while after ordering an RS System, since large scale mass production techniques are not used in the production of the 3 channel or 6 channel systems. You will find the wait well worthwhile. The 6 channel is priced at $469.95 and the 3 channel with two servos is $219.95. The 3 channel system has been Tested and is Approved and Recommended by R/C Modeler Magazine. □

CUNNINGHAM ON R/C

from page 16

and it flew, although it took forever to get off the ground. It's impossible to show detailed information on individual plans as to installing your radio, so let's see what we can do about taking the mystery out of the average installation.

Most of today's popular radio sets

utilize very small servos which have their mounting lugs located midway up the case of the servo. Many of the popular radios come equipped with plastic servo boards designed to mount their own servos. It does save a lot of wear and tear on the servo-mechanisms if you will use these servo boards for all of your radio installations. I know that many sailplanes are designed to be very small, and you simply cannot use the servo boards in these aircraft, but then, you don't have any vibration either, and this is what causes most servo malfunctions. If your radio set does not come with servo mounting trays, and you cannot find a commercial tray to fit your set, then simply construct your own servo board from either 1/8" plywood or micarta. Be sure, when constructing your own board, that you make the hole for each servo large enough so that, when the servo is mounted to the board, the case of the servo does not contact the board at any point except at the rubber grommet protected mounting lugs. Your main concern is to protect the servo from engine vibration. Do **not** have the servo cases touching each other, either. Design your servo board so that you can use larger rubber grommets for attaching the servo board to the servo rails in your aircraft's fuselage.

Now, let's consider the method of attaching the servo board or tray to the fuselage. Glue in runners, made from either hard balsa or spruce along each side of the aircraft. I suggest that you use ¼" square spruce for these bearers, gluing them to the fuselage with epoxy. Be sure that they are absolutely parallel to each other. Actually, it's a pretty good idea to glue these runners to the inside of the fuselage side while you are building your aircraft, securing them in place before you join the sides to the bulkheads. Just be sure and check that your servos will clear all around in the place that you have located the side bearers. Don't let the cases bang the top of the fuselage, either.

Now, with the runners in place you can glue in cross braces made from 1/8" plywood, and approximately ½" wide. The location of these braces is found by checking the plans for the general location of the servos, then putting your servo board in this area and marking the exact location with a nylon tip marking pen. If you are a heavy builder, and you think that you just might have built your bird a shade on the tail heavy side, then you may need to move your servo tray forward of the location shown on the plans. The final location of your radio equipment should be held off until your aircraft is painted. Then, with the engine, nose gear, tank, etc., in place, locate your radio so that the Center of Gravity of the aircraft comes as near as possible to that indicated on the plan. If in doubt, you can go a bit forward on the C.G., but stay away from a tail heavy aircraft since it will only cause you problems in the long run. This is especially true in balancing a racing aircraft such as a Formula I or Quarter Midget. Balance them nose heavy and you will enjoy many races. Balance them tail heavy and you will quickly learn how to pick up the pieces from your smashed airplane! Pulling a tight racing turn with a tail heavy aircraft will almost certainly lead you to disaster.

For you fliers who build pretty aircraft, locate the pushrod exit holes for the rudder and elevator pushrods before you paint your aircraft. Make these slots, paint your airplane, and then install some of Roy Klett's beautiful nylon exit guides. For the rest of you balsa butchers like me, wait until you have everything finished and then

chop a hole in the aft end of the fuselage in line with the tail control horns. Whatever you do, be sure that the location of the hole is in line with the control horn, and make the exit hole parallel with the line of the pushrod. With your servo board located in the area over the wing make your pushrods to fit the space between the control horns and the servo arms. The most simple pushrod to construct uses a metal or nylon clevis at the control surface end, and a bent wire to go through the servo arm at the other. Make sure when you are setting up the length of your pushrod that you screw the clevis half way on to the threaded portion of the wire. This way, when you finish, you will have each half of the threaded space to take up any mistaken dimensions, or to correct for any balance or building errors. I like to use fiberglass arrows for pushrods, or the nylon rods such as Sullivan manufactures under the trade name Pylon Brand. The fiberglass rod system is quite simple - - - just fasten the clevis end to one end of the fiberglass rod by bending a 90 degree angle in the wire and sticking it through a 1/16" hole drilled in the rod, about 3 inches from the end. Then wrap this end with black electrical tape, well stretched as you wrap. Lay this portion of the rod along the outside of the fuselage and approximate the length of the glass portion of the rod. Cut it off, and attach a straight piece of 1/16" wire to the servo end in the same manner as you did with the control surface end. Make a 90 degree bend in the wire where it goes into the servo arm and attach this wire to the servo with any type keeper. Be sure that it is secure, and cannot possibly work loose under any flying load.

Next, hook up the throttle controls and the nose gear pushrod. The best way to do this is to route these pushrods through guides made from inner NyRods, or something similar. Several years ago I purchased a 100 foot coil of 1/8" nylon tube from Cadillic Plastics Co. and have used this tube for all kinds of things, from guide tubes for pushrods to pick-up tubes from fuel tanks. They work well for these applications, and can be formed into perfect bends by working over the heat from a candle.

Be very sure when hooking up your nose gear pushrod that you have a right turn on the nose wheel when you apply right rudder. Both the rudder and the nose gear should be turned to the right. If one goes left and the other goes right, you really will have fun and games when it comes time to make your first take-off!

Now, we must install the aileron pushrods. Very few kits, or magazine designs use the conventional, or "barn door," type of ailerons, most using full-span strip ailerons. These are easier to install, but a lot more trouble to adjust for a turning problem in your aircraft. I like to use strip ailerons simply because the linkage is easy to install. You must be sure to mount your aileron servo in such a manner that it will not come in contact with the other servos in the fuselage when the wing is strapped in place. It is wise to have the fuselage servos installed as deep as possible in the fuselage in order to allow plenty of room for your aileron servo to function. Since a servo board is generally not provided, or needed, for a strip aileron servo, you can install the latter by cutting a hole in the wing center section and gluing cross braces of 1/8" plywood in place on which to mount the servo. When making the strip aileron linkage connecting the ailerons to the servo pushrods, be sure that you make this

linkage so that the aileron rotates freely and that, when the wing is installed to the fuselage, that there is no binding, either from rubber bands passing over the torque tubes, or from the wing saddle. Let the torque tubes come into the fuselage far enough so that they are pretty much in line with the servo arms. If the servo pushrods move in a line parallel to the wing chord to actuate the ailerons this is much better than letting the arms swing in an arc. Again, make these pushrods from one piece of wire, with a clevis at the torque rod end, and a 90 degree bend at the servo arm, secured to the servo with keepers. The Du–Bro aileron linkage works very well at the torque rods, and is very easy to adjust. Operate the servo with the radio, with the wing removed from the fuselage. Note how all of the linkage works, and be sure that it works freely. Next, strap the wing to the fuselage and, again, see how it works. If it binds any place locate the cause and eliminate it. This will save damage to your servo, as well as a possible crash. Be sure to do the same for all of your pushrods.

Remember, when fastening down the screws that hold each of your servos in place, do not tighten them past the point where they just make contact with the rubber grommet. You want them fastened securely, but **not** rigidly.

Next month we will take up the mullets answer to finishing and painting your bird, or how to get into the air with a minimum of effort. Good luck, and good flying. □

SCALE IN HAND

from page 12

For representing hatches, doors, etc., a suitable system would be to cut the shape required out of Regular MonoKote (the "sticky-backed" kind sold for trim) and laid carefully in place. Sometimes, two layers might be needed as the MonoKote is only two-thousandths thick.

Rib-stitching in fabric covered areas varies widely in prominence on real ships. In some cases the rib-tape which is doped over the stitches all but swallows the stitches and fairly well levels them; other times (as on several German WW II aircraft control surfaces, and also a *Curtiss P-6E* we examined in the Air Force Museum) the stitches are exceedingly obvious, often ¼" high! As an illustration of this, we noted that on the aforementioned P-6E, we could clearly see each stitch on the tip rib from the **other** wingtip, some 30 feet away.

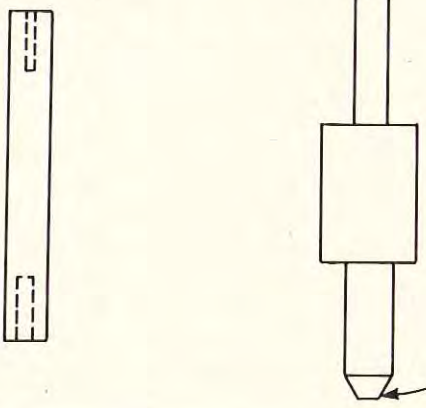
The method here calls for a variation of the glue-rivet technique, whereby the glue is dragged into a short line instead of one spot, usually spanwise across wing ribs, but occasionally at a 45 degree angle. The rib locations are finally covered with a "tape" (as on the real plane) doped into place. A suitable method for this is to cut strips of draftsman's detail-paper against a serrated or toothed cut-off strip as found on many wrapping-film products. This will give the "pinked" edge common to rib-tapes. The paper should be well soaked in water during application, to render it lifeless and thus able to lay down well over the stitches.

Another area of surface detailing, which gives many a scale modeler fits, is canopy frames. Here again, a number of useful systems have been developed. Of the ones we've tried, two stand out as possibly the best. The first one consists of molding (or lay-

ing, if no compound curves are present) a layer of thin (.010 – .020) styrene sheet over the existing canopy, cutting out the "windows" and gluing down the remaining framing after painting it. This method produces the best results, but for various reasons is often difficult to do, and even more difficult to apply without getting glue all over the canopy. Method No. 2 is safer and consists of strips of self-adhesive aluminum tape (3M No. 425) or several layers of MonoKote, pressed into place. Wherever possible, painting should be done before applying, for obvious reasons.

We left flush-type rivets till last because, as we said, these are invariably applied after painting. They do qualify, however, as surface detailing and thus are included here.

This column has, in the past, suggested that much can be learned from a close examination of the most minute details of real aircraft. Nowhere is this more true than with the flush rivets. Perhaps, with the coming of "peace" in 1945, and the resulting easing of the desperate need to produce aircraft quickly, quality standards rose greatly, and it may well be that airplanes of recent vintage have **flush** rivets. Prior to this, things weren't always so! On countless planes of the war period we've examined, such rivets were anything but flush. Some stick out like regular rivets, others were impressed deeply causing a local dent in the metal skin. On occasion, we've seen rivets which were deep enough to break the skin. And there are some which are flush. Very often a single plane will display examples of all of these types. Therefore, it is well to remember that, depending on the subject in hand, strict neatness will not always produce the most accurate result.



ENLARGED SECTION OF TIP
(NOTE ROUNDED EDGE !)

The technique for applying flush rivets is an obvious and simple one – a tube, pressed or twirled on the skin. But even here there are refinements. Size is important; seldom, if ever, does an airplane have rivets of all one size. So we need tubes of various sizes.

Some materials have proven poor to use. Brass is very bad because it wears rapidly and leaves a dirty ring. Steel is much better. We finally evolved a satisfactory tool shown in the sketches.

1. Drill the end of a piece of ¼" steel with a hole the size you want the rivet. (The tool can be made double-ended for different sizes.)

2. In a lathe, turn the outside to the shape shown.

Lastly, the tool should be hardened. Oddly enough, the wear on such tools is high and an unhardened tip may last for only one model. A hardened tool is a permanent additon to the workshop.

Next month . . . painting.

*

(Scale In Hand welcomes letters and comments. Or, if you've been searching for data and drawn a blank, try me. I may be able to tell you where to get it – Dave Platt, 104 Talcott Ct., Bolingbrook, Ill. 60439.)

ENGINE CLINIC

from page 10

have been added to the wrist pin holes in the piston and both ends of the con-rod are bronze bushed as well. Timing changes have been made to both the crankshaft and sleeve and a squish band head is also used. The crankcase has had the bypass enlarged and the exhaust stack modified for a bolt-on muffler that comes with the engine. Mounting dimensions remain the same so the engine is interchangeable with the older style engines.

Dear Mr. Lee:

My first question deals with mufflers. I read your comments in the August RCM, that super-quiet mufflers raise engine temperatures too high. I just finished making a muffler that is really quiet and ran two flights on it. One problem, I noticed, was very little sound over 300 yards and I can't tell what's happening. After depending on sound feedback for so long, I don't like that much quiet.

Then I read your article and I'm scared to use it anymore. I have no way to check cylinder head temperature before and after (with and without).

Why can't engine manufacturers just make larger cooling fins so we can use more effective mufflers and prevent over heating? Or is the problem more complex than I realize?

Question two: why can't a glow plug and engine be designed to run on gasoline? It sure would be a lot cheaper.

Sincerely,
George Weber
Long Island, N.Y.

George, you do not need to check the cylinder head temperature to tell if your muffler is causing any harm to the engine. Just check the rpm drop with the muffler installed. If the rpm drop with the muffler installed is no more than 200-300 then you can be relatively sure the muffler is not causing excessive back pressure and resulting heat. However, if the rpm drop is in the neighborhood of 1000 or more, then the chances are pretty good that this muffler would damage the engine.

Increasing the cooling fin area on the engine is not the way to go. What is going to happen when someone uses the engine with a muffler that does not cause the engine to overheat? The engine with the extra cooling fins would run too cool and not perform properly. A certain amount of heat has to be present in order to keep the glow plug lit and the fuel to ignite. It will not do this if the engine runs too cool. The correct solution is a muffler design that silences without a power loss or increasing the operating temperature of the engine.

A glow plug engine can be run on gasoline and quite a few fellows have

done so. Back in the late 40's and early 50's when U-control team racing was very popular, quite a few of the fellows ran gasoline mixes for the 100 lap events where a little speed could be sacrificed to gain economy which meant fewer pit stops. The Williams brothers who now have an extensive line of R/C products used to use the gasoline mix with considerable success. In order to use gasoline, nitro-propane is substituted for nitro-methane. Castor oil does not want to mix with gasoline. In the old days SAE 70 petroleum oil was used (usually Valvoline) although Francisco Labs, who still manufacture fuels, had a special castor oil that would mix with gasoline and many fellows used this. Today we have the synthetics that will mix with gasoline. While being cheaper, however, gasoline mixes do not develop near the power as do the methanol-nitro-methane mixes, and run considerably hotter.

Dear Mr. Lee:

I have a brand new K & B .40 which seems to throw a lot of oil out the front bearing. How can I tell if it is excessive? I also have a Veco .61 which has been broken in according to your recommendations. It idles good and has excellent power, however, it has had a very narrow two-cycle range since it was new. I noticed that the Perry carb idle disc does not have a hole next to the slit as in the latest models. Could this be a problem?

I have been adding extra castor oil and Lubricin to K & B 100 for break-in, and I would like to know if there is any difference in lubricating properties between Baker AA Standard and Baker AA U.S.P.

Finally, what is the nitro and oil content of K & B 500? Should Lubricin be added to it for normal running?

Yours truly,
Mitchell Pawlowski
Philadelphia, Pa.

A slight bit of leakage out of the front bearing is perfectly normal and, in fact, desirable. It assures ample lubrication of the front bearing. However, if you can actually see a slight spray or a lot of foaming of fuel around the front bearing housing, then leakage is excessive. In extreme cases the nose of the airplane will actually get wet. In this case the engine should be returned to K & B for a new front plate.

Generally if an engine has a very narrow two cycle range it is due to a

bad piston-cylinder seal. In the case of your Veco .61 this means the ring is worn or not sealing for some reason. This is usually an indication of a tired, over-the-hill engine. However, this can happen to even new engines if run too lean, dirt allowed to get into them, etc. The hole next to the slit in the idle mixture adjusting disc on the later model Perry carburetors only allows more fuel to pass at full throttle. Fuel demands were such on some engines that the mixture could not be richened up enough. Drilling the hole allowed the mixture to be set richer. I doubt if this is the problem in your case. If you have trouble getting the engine to four cycle, then drilling the hole will cure this. If you have no trouble getting the engine to four cycle, then drilling the hole would do nothing for you.

There is no difference between the lubricating properties of Baker AA Standard and Baker AA U.S.P. (U.S.P. means United States Pharmaceutical.) The castor beans used for this grade are raised under government control. Beans for the standard grade can be grown in Mexico, etc. Processing is the same so it is simply a matter of where the beans are grown. Commercial fuel manufacturers use both Standard and U.S.P. depending on which grade Baker has the most of on hand at the time.

K & B 500 is 15% nitro-methane and 22% synthetic oil. You should not add Lubricin to the 500. Lubricin is intended for use in castor oil where it increases film strength and has a slight detergent action. It does not seem to be compatible with your synthetics.

Dear Mr. Lee:

I'm currently building a VK Nieuport, and since starting this project, many friends have told me of engine over-heating associated with this type of design. Is there any merit to these claims? The Nieuport has an extremely large opening in the cowl, and appears adequate for cooling.

I will be using an S.T. .51 in the Nieuport. The plans call for a flush mount (engine bolted directly to the firewall using a special rear case cap with a mounting flange). However, I've been unable to locate such a cap. Do you know a source? If this mounting procedure is used, should I expect a little more vibration?

Thank You,
Keith Lindsay
Hawthorne, Calif.

Keith, the May '72 Engine Clinic

column was devoted to proper cooling of the engine in scale models. I recommend you purchase a back copy and read it. It will answer most of your questions. You will have no heating problem as long as you provide adequate exit area for the air. As explained in the article, just having a large opening in the front is not all that is necessary. Unless the heat has a way to get out, there will be no air flow and no cooling. One problem associated with designs such as the Nieuport and radial type mounting is that the engine cylinder fins usually set right up against the firewall. The back of your cylinder is the hottest part of the engine (excluding the exhaust stack). By having the cylinder right up against the firewall there is little circulation of air. Some sort of a relief should be made in the firewall to allow circulation behind the cylinder.

By rear case cap, I am assuming you mean a mounting plate to which the engine bolts by the back cover screws and the plate, in turn, bolts to the firewall. To my knowledge no manufacturer markets such an item. You will have to make this yourself. Just be sure to use at least 3/16" thick aluminum plate and make the outer diameter or dimensions as large as possible to make the mounting to the firewall as rigid as possible. Fellows have been using this type of mounting for years in earlier Quik-Fli's, etc. The engine, itself, will bounce around a little more, but there will be no increased vibration to the airframe.

Dear Mr. Lee,

I have two questions concerning engine tuning: 1) When tuning for maximum power on the ground, how far in should the needle valve be when it is set so the engine just barely 2-cycle's?

2) How far in should it be when tuning for maximum power in the air?

Yours Truly,
Ralph Finch
Paradise, Calif.

There are no specific number of turns that the needle valve should be opened or closed. If this were the case all I would have to do would be to say set your needles at two and a half turns and everyone would solve all of their mixture setting problems. This is a variable that not only is different between engines, but can change for the same engine during the course of the day. If you start flying early in the morning when the air is cooler, and most likely damper, you will have to open the needle farther than you will later in the day as the temperature warms and the air dries out. In other words, as the day warms up you will be able to turn the needle in further. The make of fuel you are using, glow plug, size of propeller, tank position . . . all play a part on how far open the needle will be for correct setting. With a low tank position the needle is going to have to be open

farther than with a high one. Added to this can be variations in manufacturing tolerances. Some spray bars of the same make are going to have the seat drilled a hair deeper than others, etc. So setting the needle properly is something you are going to have to play by ear, Ralph. There is no way I can give you a pre-determined number of turns. It would sure make things simpler if I could!

Dear Mr. Lee:

You have stated that you should never use less than 20% oil in any home brew fuel for sport flying, and preferably 22%.

Well, here at Lajes we have a big fuel problem – we have no access to nitro, but we have methane and we have Klotz for oil. Most of us use 75/25 during the Summer but during the Winter this makes the engines a bit stubborn.

We get very, very little real fuel from the States so we make what we have stretch. I use 3 quarts of methane, 1 quart of Klotz, and 1 quart of Dukes. I have been told I don't need this much Dukes and Klotz to get enough nitro for smoother starts and still keep 22% and above oil.

Can you suggest a good mix that would help our club keep good engines good and still not use up too much of our precious Dukes?

Probably, a lot of servicemen at other isolated locations have the same problem we have and your answer would help them also.

Thanks,
Chuck Theis, USAF
Mid-Atlantic Aero Modelers
Lajes, Fld, Azores, Port.

To start with, Chuck, I believe you have a mix up in words and what you call methane is actually methanol. By using three quarts of methanol and one quart of Klotz oil you have 25% lubrication which, due to the fact that no nitro-methane is being used, is probably a little more oil than you need. The addition of one quart of Dukes which is 22% oil cuts the oil content slightly, but not enough to matter. Add a little more alcohol to your fuel so that you do have 22% lubrication. As far as using Dukes to spike your fuel – Dukes is 10% nitro, or 3.2 ounces of nitro in a quart. This amount of nitro in five quarts only makes the nitro content of your fuel 2%. Although better than none at all, this is hardly enough to matter. It usually takes at least 5% nitro to begin to notice any benefit. So I certainly wouldn't put any less Dukes in your mix. If anything, it should be increased. What's with your PX officer? He should be able to get commercial fuel shipped out there to you. A case of Fox Missile Mist, which is 25% nitro, would sure help in the spiking department, and the 40-40 would be even better.

As far as suggesting a good mix, the one you are using is fine. There is nothing wrong with using 25% lubrication. Your engines will last a lot longer, and it is great for break-in. However 22% is plenty of lubrication for a broken-in engine.

We'll end the column this month with the following letter which does not require an answer. The sender, Ernie Debardelban, solved both his engine problems and that of a flying field as well. I imagine Ernie will be a popular guy in his area.

Dear Clarence,

I learned two things about engines this week that I thought you might want to pass on to the rest of the

modelers.

First, (this isn't one of them) I solved my flying field problem. I bought a frozen orange grove on a lake and moved out here. The front of my house faces a 300 foot sand beach from which I fly Ken Willard's Wavemaster, powered with one of your Lee Veco .61's and a Perry carb. The most amazing thing to me and the rest of the people around is to take that plane down after not being in use for several weeks, gas it up, set the engine on idle and the blamed thing starts on the first flip. When it does that I just stand there grinning like a mule eating sawbriers. But to fly from the water I need reliability to be sure I get out in the lake and back again without having to get the boat out to go get it. At the back of the house I pulled up all the frozen trees and I have my flying field. 175 feet wide and about 1200 feet long. I took a road grader and leveled the field out and then dragged a bedspring over it to smooth it out. Then I got my slaves (kids) and we raked the field. Not a stone nor piece of wood is on the field. The field is now covered with St. Augustine grass and I cut it close every week. This way I fly when I want to and if something goes wrong I just go back to the shop, fix it and come fly again. You can't beat that. That is how I found out these two things I am going to tell you about.

A servo slowed down on landing on the field one day and the plane hit nose first and hard. This got a lot of sand in the carburetor and all around the engine. Since that was all the damage, there was no reason why I shouldn't fly again right away. So I walked up to the house and took the Lee Veco from the Ugly Stik and started to clean it up. Took the Perry carb off and dropped it in lacquer thinner – then the engine. I usually let it sit from one day to the next before cleaning it but I wanted to get back flying again so I started to rinse the carburetor off. Then I noticed the carburetor was sticky and the plastic from it was coming off in my hand. Check and see if lacquer thinner won't eat up the carburetor body of a Perry carburetor. Bet it does. Anyhow, I hurried up and got it off and used alcohol after that. If you find that lacquer thinner does eat up the plastic you should put it in your column – what would happen if I had left my carburetor in the thinner overnight?

(Read the instruction that accompanied the carburetor, Ern. They specifically say, "Do not soak in any solvent." C.L.)

I was flying my A-Ray powered by a Webra Glo Star .21 and everything was working swell – engine started easily, idled good, no complaints. Then I crashed it and broke the needle valve body. I put a new one in and the trouble started. First off, I made sure the hole in the body was straight up and down. In the Webra the hole goes straight through. The engine was hard to start, would not start if hot and would only run at high speed. If you idled it, it would go dead. I tried all air bleed spots, nothing the matter. I got tired of messing and quit. I read the R/C Engine book over again. Again I fiddled and no luck. I put in new glow plug, nothing new – new fuel, same trouble – all new lines, same trouble. Read all old magazine columns of Engine Clinic. I started to write Lee and MRC and send the engine to MRC but instead I got up early one morning and figured if I closed the air bleed and started out 1/8 turn at the time, like you say, I would only have to start the engine 40 times. It was bound to get right somewhere along the way.

I started the engine and brought the throttle down to mid-range, noticed the gas rush back to the tank even at middle range speed and knew this wasn't right. Then I remembered the hole in the needle valve assembly, and also the picture in the R/C Engine book about turning the hole a little toward the front of the engine. I looked at the hole with a magnifying glass and I swear, Clarence, that the hole was no more than 3 or 4 degrees clockwise past the bottom of dead center. I turned the hole counter-clockwise till it was barely pointing to the front of the engine, flipped the prop and gas rushed to the carburetor. I adjusted the carburetor quickly and it started every time. On take-off the plane crashed into a tree, hanging nose down. I gave it low throttle to kill the engine but it didn't kill – just ticked away slowly.

Clarence, emphasize in your column that the position of that hole has a heck of a lot to do with the way an engine runs.

Thought you might be interested in these two items that I learned about the hard way.

Ernie Debardelban
Orlando, Florida

TODAY'S TOY AIRPLANES

from page 4

Today's model aircraft may be used for refining components, for training, for military drones.

Yet many participants and even some publications remain self-conscious, defensive, even half-apologetic.

Their individual flying clubs conduct necessary business relating to frequency clearance, insurance and so-forth in a properly businesslike manner – yet many of them are edited with flippancy, with a conspicuous pretense at indifference to insure that "nobody thinks that we really take all this seriously!"

And I find myself remembering the early agony of Bob Goddard. It was heresy to speak of space travel in 1899 when Bob Goddard was experimenting toward that end. In the 1920's he and his wife were still trying to convince the world that their "toy rockets" had a greater importance.

But when he died in 1941 – the world remained unconvinced. Now there's a space flight museum in his name but his last earthly recollection was of being laughed at. □

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sisting of an electric motor and a "ring" of rechargeable nickel cadmium cells designed to accept a fast 5 minute charge from a 12 volt battery such as a cigarette lighter plug-in in a car, or with the proper adapter, from a standard 12 volt motorcycle battery. This fast high output charge to the nickel cadmium cells provides approximately 2-3 minutes of time on the electric motor module. Incorporated into the plane is a Japanese built single channel receiver with vertical whip antenna. The actuator used in the module is very similar to the Adams Magnetic Actuator used in the Ace R/C systems.

We were completely impressed by the ingenuity and amount of engineering that went into the power module concept of the Mattel Signal Command system. The power of the electric motor is quite surprising and, in our estimation, falls somewhere between a .049 and a .09 engine in actual delivered thrust. The airborne weight of the aircraft complete with power module and radio is 26 oz. However, beyond the ingenious and unique engineering concepts used in this aircraft along with its quite powerful motor, we were somewhat less impressed by the construction of the aircraft and its performance.

To begin with, the radio system is constructed overseas by Mattel Inc. The transmitter has a far higher power output than is necessary for this type of aircraft, an apparent attempt to overcome the rather insensitive receiver utilized in the system. This is not a direct criticism of the receiver design, itself, since it would have to be fairly insensitive due to the possible interference from the electric motor. The model airplane is, in our opinion, poorly constructed and it is highly doubtful that it will survive even a few flights in the hands of younger fliers, without the need for replacement parts. As an example, the extremely thin sheet styrofoam stabilizer folded during our very first landing. We found that the aircraft, as designed, had so much thrust that it required 3/16" of shims under the trailing edge of the wing to achieve a normal climb out under power. However, with that amount of decrease in the normal incidence in the wing, the aircraft had a tendency to drop like a brick with

power off, thus indicating a definite necessity for down thrust. In addition, virtually every remedy was tried to obtain some degree of left rudder, but to no avail. The airplane turned right beautifully but full left trim as well as bending the hairpin wire on the rudder to its extreme, still would not obtain any degree of left control. In addition to this, one of the weakest links in the power module is a rubber coupler "boot" which acts as a "universal joint" for the prop shaft. During the first flight, the entire prop shaft and prop fell out of the airplane in mid-air. Attempts to re-insert the prop shaft resulted in one failure after another of the prop shaft to remain in the coupler. Finally we were able to insert the coupler far enough to obtain one more somewhat erratic flight on the Mattel Signal Command unit. Even with the amount of shims placed under the trailing edge of the wing and virtually dead calm air, we were unable to obtain enough penetration with the aircraft to keep it upwind of our location. In summation of this unit, we can say that it consists of an ingenious electric drive unit which could stand a definite refinement where the prop shaft is coupled to the power module, the addition of down-thrust in the engine, and an alteration to the actuator to obtain an equal amount of rudder travel in both directions. We understand that these changes are currently being made to the Mattel Signal Command unit prior to full production shipment in January.

Thus, in a day when digital proportional systems operating not only the basic control functions, but a multitude of accessories such as flaps, retractable landing gear, and the like, dominate the radio control scene, we are witnessing a renaissance of single channel and all of its attendent simplicity. Properly designed and packaged, such as is the case with the Ace R/C Commander '72 systems, single channel can give you many hours of flying fun between those weekend sessions with the larger more exotic ships. If you don't beleive us, seek out the nearest single channel flyer putting in a half a dozen flights between the time he gets home from work and dinner, and ask him what he thinks about it – you may find yourself a convert to week-day single channel flying! □

FROM THE SHOP

from page 2

we can present in each and every issue. In addition, R/C Modeler Magazine carries a higher percentage of advertising than any other model aviation publication in the United States. To reduce the number of pages while retaining the same amount of advertising would virtually turn RCM into a hobby products catalog. Add to this the fact that the Second Class rate for a publication is based upon a certain rate of postage per pound. This rate is divided into the percentage of editorial and advertising content. For example, a number of magazines are weighed, and the rate of Second Class postage charged for the advertising portion of the magazine is approximately 14 times that for the editorial or non-advertising portion of the publication. Thus, as the percentage of advertising in the magazine goes up, the postage rate goes up by a factor of 14 to 1.

From a newsstand standpoint, the next price break for a publication above 75 cents is a tag of $1.00 per copy. This amount, at the present time, is more than enough to cover the increased production and postage costs. The surplus amount of money received per annum will be directed into additional pages, such as the recent increase in number of pages by R/C Modeler Magazine, as well as the use of full color and secondary color within the pages of the publication. All new lay-out styles, and more and better material are planned for the future.

Thus, we are sorry that the cover price of R/C Modeler Magazine has had to be increased - - - unfortunately it is a factor over which we have no control. Quite simply, it was a matter of survival in the light of the recent Postal Service rate increases which are, in our opinion, all out of proportion to the service they render. As an example of the latter, although our mailer in Los Angeles mails individual subscriber copies ahead of the bulk shipments to hobby shops and newsstands, the latter invariably arrive before the individual subscriber copies. Why? Simply because the Postal Service does not want large packages sitting around their Post Office taking up space. Thus, it is far easier for them to get rid of the packages and work the individual copies when they have time! We have complained to the Postal Service concerning this matter on every level from the local office from which our magazines are mailed all the way up to the Postmasters Office in Washington, D.C. - - - all to no avail. Thus, we're paying a lot more now, and we're going to pay a lot more in the future for Second Class postage, the only way a magazine can be mailed. Yet, it appears that the service we receive will not be increased proportionately. At least, no evidence of this has been given to us in the past.

This, then, is the story on the price increase of this individual publication. It will become a familiar story in months to come for those small publications that can survive the new massive rate increases. It was our choice to pursue this route and increase the size and content and quality of the publication rather than to trim the publication down to a skeletal form with an extremely high advertising content and very little material in order to retain the old cover price structure. We hope that this and all subsequent issues will be to your liking and that the content of each issue, including the many time and money saving "how-to" features, will more than offset the 25 cent increase in cover price. □

VICTA AIRTOURER

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sheeting and foam as per the Leading Edge Reference line on the top view of the wing. The dihedral angle is now sanded from the butt area of the outer wing sections. NOTE: The 8" wide center section is cut using section D-D

as a template and the addition of a solid leading edge is preferable. Cut out the servo compartments and linkage slots and install the compartment sheeting for servos. The slots for hardwood (or basswood) spars are cut at this time, in the **center section only**. The center section shown has a 1/16" ply dowel brace behind the leading edge, solid trailing edge filling, and 1/32" ply covering before the 1/32" balsa sheeting and bottom fill was added. This method greatly increased the overall wing strength and allows a dowel-camlock arrangement for the wing hold-down and the bolting of an aluminum landing gear to the center section. The bottom fill can be added after assembly and while the wing is fitted to the fuselage. The wing sections are now epoxied together **only as far as the flap cutout line**. Be sure the alignment is correct. The spar slots are now cut in the outer wing sections. The front spar and brace, rear spar, and 1/32" ply landing gear floor are now epoxied in as per the exploded detail.

The ailerons and flaps can now be cut out noting that the wing tip should be cut at line W. Solid blocks are then shaped for the tips and made detachable, if desired. The hinging method shown is 3/32" brass tubing with 1/16" nylon tubing inserted through its full length. The hinge is added by inserting the nylon tube into the cut brass pieces, then epoxying alternate pieces to a flap or aileron. After drying, the other pieces are matched and epoxied to the wing. This method of hinging is well worth the effort as it gives a **friction free** action especially suited to proportional equipment. The hinge strength is received when silk is applied over the brass tubing. Epoxy alone will not fully bind the brass to the wood. It is also advisable to reinforce the area where the wing sections join, by either using fiberglass or pinking tape.

STABILIZERS:

Foam stabs can be made using the rib templates as shown, or they can be made from balsa as per the plan. In balsa, cut, shape, and notch the stab spars as shown. Make the ribs and add to the spars with stringers and leading edges, then sheet with 1/16" balsa. The blocks are best added and shaped for the tips after the hinging is attached (brass and nylon tubing may also be used here) and the stabs are mated with their flying areas.

Block R is now shaped and glued to the body; the stationary vertical stab is

then aligned on it. Glue the dorsal fin to the stab and body and contour the butt area with the fill of your choice.

Shape area E and insert it with the installation of the stationary horizontal stab. Shape the excess balsa and fillet all the butt areas. The "Cheese-cutter" is a knife-type sheet added to the elevator for horizontal stability in turning.

CANOPY:

The canopy was molded using a "ring-and-plug" method. A plaster (or balsa, foam, etc.) mold is shaped as per the outlines (blow up Section A-A 3X and use for front view template). The mold should be about 1/8" undersize as a **good grade of felt** is glued directly to it and does not necessitate a finely finished mold. (The felt also acts as its own release agent.) An extruded Cellulose Acetate Butyrate of about .040 in thickness is then attached to a "ring" (actually two rectangular frames clamped together), leaving about 1/2" clearance around the "plug" (male mold) which is raised above a level surface approximately 4 inches. The "ring" with the cellulose is held in an electric oven at about 350 degrees until the cellulose is seen to sag throughout the whole area. The assembly is **immediately** drawn from the oven and dropped (and pushed) **directly down** over the canopy form. If heating and dropping is done correctly, the result will be a clear canopy. A poor drop may be lifted and reheated with possibly only a few stress marks showing or, alternately, a thinning out of some areas.

COLOR & TRIM:

A Hobbypoxy finish was used as two shades of blue can be purchased and no extra blending of colors is required. All tips are Day-Glo and the elevator is painted solid in any dark color of your choice, i.e., dark blue with Day-Glo tips. Use Scotch tape for trimming; contrary to many modelers saying that Scotch tape will pull the Hobbypoxy away, I have found that pulling the tape on a 90 degree angle leaves a very sharp line with little tearing of the tape.

The registration letters are typical but different to the same extent that each plane will have a specific letter designation per our NC and numbers. I feel it would be best to write the company requesting a picture or brochure asking the color of the plane if it is in black and white.

Good building and fast flying. □

CENTURION

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The first requirement was that the fuselage should weigh no more than 6 oz. complete - - - a 2 oz. weight reduction from the original built-up balsa fuselage. The second requirement was to add an additional inch to the tail moment, a factor that we felt would be a definite improvement over the original design. A third criteria was to eliminate, as much as possible, the amount of drag created by the wing-fuselage junction. Thus, it was decided to fair the fuselage in smoothly over the top of the wing and to use no method of hold-down except a friction fit between the leading edge and the top of the wing and the fiberglass fuselage and two 4-40 nylon hold-down bolts at the trailing edge. This, I

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felt, combined with a very streamlined fuselage, would reduce the overall drag factor to an absolute minimum. Another factor we wanted incorporated into the fuselage was one whereby absolutely no bulkheads of any kind had to be used in the fuselage for, as is characteristic of any fiberglass fuselage, the normal breaking point in the event of a crash is directly adjacent to the union of a bulkhead with the fiberglass fuselage. Thus the fuselage had to be light, strong, and completely free of any bulkheads or internal wood bracing. In addition, we wanted to allow enough room in the cockpit area to take any of the currently available proportional systems instead of limiting the design by a confined equipment area to the microminiature proportional sets, as seems to be the practice with many designs currently available.

The job of manufacturing the fuselage was given to P & M Fiberglass, P.O. Box 1020, Nipomo, California 93444. Several months later, several prototype fuselages were given to us, the heaviest of which weighed 5.95 oz. complete with canopy! All of the design criteria were incorporated in these prototype fuselages including a sturdy molded-in skid, a "rolled" wing seat and cockpit area, all double filled in areas where maximum strength was needed. This fuselage is one of the prime factors for the outstanding flight performance of the Centurion, and thus, if you want to build this high performance Standard Class sailplane, you will have to purchase a fuselage for $19.95 from P & M Fiberglass. No built-up fuselage is shown on the plans since we have proven to our own satisfaction that any attempt to duplicate this fuselage in balsa detracts immeasurably from the performance of the aircraft.

The wing has the same basic configuration as the original Gus insofar as the planform and overall area is concerned. However, here the similarity ends. The wing structure of the Gus was quite weak and suffered the most damage over long periods of flying. In addition, the excessive polyhedral that was employed on the Gus overshadowed the tight turning characteristics that can be gained from polyhedral by causing a severe rocking motion in normal flight attitudes. What we wanted to accomplish on the Centurion was the advantages to be offered by polyhedral without its disadvantages. This, coupled with an all flying stabilizer of generous area, would achieve the extremely tight turning radius we desired while the overall reduction in drag and the streamlined characteristics of the Centurion would give us the necessary penetration when moving from one thermal to another. One of the problems with the original Gus was that, while it had excellent ability to thermal in even the lightest air, it did not have a wide speed range and was unable to penetrate rapidly from one thermal to another when lift diminish-

ed in the area in which you were flying. These problems have been overcome by: (1) a reduction in degree of polyhedral, (2) streamlining of the entire aircraft, (3) the introduction of an all flying stabilizer, (4) increased vertical fin and rudder area, and (5) the location of the flying stab at an optimized point on the vertical fin.

Before you decide whether or not you want to invest $20.00 in a fuselage and begin building the Centurion, let's examine the flying characteristics of this sailplane. First of all, let's look at what the Centurion is **not**: To begin with, it is definitely **not** a model for the novice sailplane pilot. There are many suitable trainers on the market, but the Centurion is not one of them. Secondly, this sailplane is **not** an 80 mph speed merchant and it will **not** do the FAI Pattern on the slope, or anywhere else for that matter. Finally, while it is an extremely high performance sailplane for its size and designed for sport flying or for competition in the Standard Class, it will **not** beat a 12' high performance sailplane designed for all-out competition. In my own opinion, a good big sailplane will always beat a good small sailplane, all conditions being equal, although I, personally, prefer the smaller sized aircraft. It is for this reason that this sailplane is designed to compete in the 100" or under category. In that realm it will hold its own with virtually any of today's prominent designs. And, it will hold its own against many of the larger sailplanes which have been designed as "compromise" machines. For example, you need not hesitate to put this design up against a Cirrus in any thermal competition, be it precision or duration – given flyers of equal ability it will beat it 9 times out of 10. But, again, this is only my opinion based on previous experience and you will have to prove it to your own satisfaction. One final note before beginning construction - - - the Centurion is designed so that the two stabilizer halves and the wing panels are quickly removable and the entire aircraft can be stored in an average size kit box for easy transportation. This certainly eliminates banging up stabilizers and trying to find out what to do with long one piece wings!

CONSTRUCTION

WING:

The wingspan of the Centurion is 72" – 75" depending upon the size of wing tips that you use. This was purposely done in order that the Centurion might qualify for the new Formula 72 event which has been gaining in popularity in California. This event prescribes only two design parameters - - - the first being that the wingspan shall be 72" or under and that the wing loading of the sailplane will be no less than 8 oz. per square foot. Thus, the first design parameter has been met by keeping the balsa wing tips to a minimum so that your span will come out to 72" while the second requirement of an 8 oz. minimum wing loading can be easily achieved by using a slightly heavier radio and adding some ballast to the model, since the Centurion has a total wing loading of approximately 7 oz. per square foot.

The airfoil section used on the Centurion is a slightly modified 6409 undercambered foil which gives excellent lifting characteristics in calm air, such as normally found in the Eastern part of the United States, while retaining a relatively good degree of speed and penetration. Other design factors were included to compensate for the loss of penetration in speed

range normally caused by the use of this particular airfoil. Thus, the good points of the airfoil were retained while its few drawbacks were compensated for in other design factors affecting this particular sailplane.

The construction of the wing, while fairly time consuming as is the case with most sailplane wings, is quite conventional in construction. You are cautioned to select your wood carefully with an eye towards light weight combined with maximum strength. The wing, in two panels, consists of 1/16" sheet balsa ribs, 1/8" x 1/4" spruce main spars with vertical grained 1/16" webbing on the front of the spars and running full length of the wing. The rear spar is a length of 3/16" x 3/16" spruce which ends at rib W5. The leading edge is made from 5/16" square balsa and pre-shaped with a razor plane prior to gluing in place. This is done to facilitate the gluing of the 1/16" leading edge sheeting down over the top of the leading edge itself, thus tying the entire structure together and adding a maximum of strength to this area of the wing. The first two bays of the wing are sheeted on top with 1/16" balsa while the first bay on the bottom of the wing is sheeted with 1/32" plywood when the wing is finished. The trailing edge consists of 3/16" x 3/4" trailing edge stock. Cap strips are 1/16" x 1/4" balsa. Be sure to check the rib section carefully and prop up the front of the trailing edge and the bottom main spar so that the proper rib profile is maintained throughout construction. 1/8" sheet balsa triangular gussets are used at the polyhedral break at the leading and trailing edge along with a 1/16" plywood dihedral brace on the rear spar and a 1/16" plywood dihedral brace between the two main spars. Be sure to build in 3/16" washout in the trailing edge of the wing tip. This is best accomplished by tapering a piece of 1/4" balsa sheet that is 11½" long and tapering from 1/4" at the tip down to a fine point at the other end. This long thin wedge can be placed under the trailing edge of the tip panel and the trailing edge stock held firmly in place so that the washout can be built into the wing. When the tip gusset and tip blocks have been added, you will find that the necessary washout is a permanent part of the wing.

The first three ribs in each half of the inboard panel are made from 1/16" plywood to carry the load of

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the 1/8" I.D. brass tubing for the 1/8" diameter wing rods. Be sure to epoxy these tubes firmly in place in the plywood ribs and to tilt the end rib in the appropriate amount to give the desired dihedral angle. I use Titebond glue throughout the construction of the wing. When construction is completed, be sure to allow the wing to dry for 24 hours before removing it from your building board. This will minimize any warps creeping into your wing due to an insufficient drying time for the adhesive.

Before sanding the wing, inlay the 1/32" thick plywood hold-down bolt braces at the trailing edge of the wing where the two panels join together. By inlaying these pieces into the wing, rather than surface mounting them, you will provide a neater surface on which to apply your finish as well as reducing any drag in this area.

Our wing was sanded down with progressively finer paper until the wing was completely smooth. It was then wiped clean with a tack cloth and covered with yellow Solarfilm. Pin striping was applied using DJ's Multi-Stripe, available from your local hobby dealer, or from DJ's Multi-Stripe, P.O. Box 41105, Los Angeles, California 90042. This striping tape is similar to that used on expensive automobiles for pin striping, and is a PVC material which will form around even the most severe compound curves. Do not stretch the tape when applying it but lay it on carefully and smoothly. Once in place to your satisfaction, simply set the wing in the sun for approximately two hours and the striping tape will be permanently bonded to your wing. It is not effected by any material with which you will clean your sailplane and cannot be removed once "baked" in place. In fact, you would have to chip the striping off as if it were actually painted on!

EMPENNAGE:

The first step in the construction of the empennage is to cut the vertical fin and rudder from 3/16" thick medium balsa. When the vertical fin has been cut to shape, glue the 3/16" x 1/2" balsa stab roots on each side of the vertical fin exactly as shown on the plans in order to maintain the proper incidence angle of the stabilizer in

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relationship to the wing. 5-Minute Epoxy can be used for this operation. The next step, while not difficult, must be extremely precise and accurate. This involves drilling a 1/8" hole through the stab roots and vertical fin into which is glued a length of inner NyRod which acts as a bearing for the stabilator pivot rod. Roughen up the length of inner NyRod with a piece of sandpaper and glue in place by lightly smearing the NyRod with epoxy. Be sure you do not get any epoxy into the inside of the NyRod. Once this step has been accomplished, the vertical fin can be glued in place on the fiberglass fuselage using Hobbypoxy Formula I glue. Make sure the vertical fin is perfectly aligned and exactly perpendicular to the platform on which it rests. Next, take two scrap pieces of 3/16" balsa and glue in place on either side of the fin to act as fillets. Fair these into the fuselage by sanding carefully until the proper contour is achieved. The rudder is cut from 3/16" medium balsa to which a strip of 3/16" x 3/8" pine is glued at the base of the rudder to act as a stiffener. The rudder is then sanded to airfoil shape.

The stabilator, or flying stab as it is commonly called, is built up of a 3/16" square balsa leading edge and tips with a 3/16" sheet center section and trailing edge. The Warren Truss ribs are 3/32" x 3/16" balsa strips. Again, a length of inner NyRod is imbedded into the 3/16" sheet intersections of the stabilator halves to act as the other bearing point for the pivot rod. These must be aligned exactly with the NyRod being used in the stabilator root ends which have been previously affixed to the vertical fin. After determining the proper position for these bearings, simply cut a 1/8" slot completely through the 3/16" balsa, then cut a thin strip of 1/32" balsa to fit in the base of the 1/8" slot. Roughen up two sections of inner NyRod cut to the proper length and epoxy them in place on top of the 1/32" strip. This will center the NyRod in the 3/16" balsa sheet. Use 5-Minute Epoxy to which has been added a sufficient quantity of microballoons to completely fill the void between the balsa and the NyRod, giving a flush and smooth surface. Another length of inner NyRod is

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roughed up with sandpaper and glued to the leading edge of each half of the flying stab. This acts as the front joiner for the stabilator. These lengths of NyRod are epoxied to the leading edge of the stabilator panels and then wrapped with a piece of fine silk and coated with glue. Sand them lightly and the entire stab can be covered with Solarfilm to match the wing. The pivot rods should be .070 or 1/16" music wire cut to the proper lengths.

FINISHING:

The final construction details for the Centurion include installing a tow hook of your choice. We would recommend the use of the Airtronics Adjustable Tow Hook available from Airtronics, 145½ Montecito Ave., Sierra Madre, California 91024. A piece of 1/4" plywood can be epoxied into the base of the fuselage and the tow hook mounted to this ply base.

A small piece of 1/8" plywood should be epoxied inside the fiberglass fuselage at the rear of the wing saddle to act as a bearing for the nylon wing hold-down bolts. Drill two holes through the fiberglass wing seat and the plywood underneath, and install two blind mounting nuts inside the fuselage using epoxy glue. The best method for doing this is to install the wing in place with the wing rods and then drill through the wing, the fiberglass fuselage, and the plywood plate so that the holes line up properly. Finally, install your blind mounting nuts and secure the wing in position with 4-40 nylon bolts and washers.

Before painting the fuselage, install your radio equipment, keeping the servos as far forward as possible. In order to further reduce drag, we simply mounted a small 1/8" plywood plate across the fuselage underneath the canopy lips and installed our switch in that plate, so that it would not be mounted externally. Before mounting the servos, epoxy a piece of 1/8" plywood in the base of the fuselage just ahead of the leading edge of the wing. We then used servo mounting tape between the two D & R servos and on the base of the servos and secured them to the plywood plate. Our RS Systems receiver and battery pack were placed as far forward as possible. You will find that there is more than adequate room in the Centurion for virtually any radio you want to use. One of the prototypes of the Centurion was flown with one of the old style early model Bonner proportional systems with the Transmite type servos — even then,

there was more than adequate room in the cockpit area.

Our pushrods consisted of 3/16" dowels with 1/16" wire ends and Du-Bro Kwik Links. To further streamline the fuselage and reduce even the most minute amount of drag, we used IM pushrod exit guides at the rear of the fuselage as pushrod fairings. To protect the rudder, a piece of 1/16" aluminum was cut into the shape of a tail skid on our Dremel Moto-Shop and glued to the bottom rear of the fuselage with Sears Filled Epoxy.

The entire fuselage was lightly sanded with 400 paper as was the vertical fin and rudder. The latter, constructed of balsa, were given two coats of Quick Prep Resin from Hobbypoxy Products, sanding between each coat. A third coat may be necessary if you have not succeeded in filling all of the grain of the wood. Next, we used a sprayed on coat of K & B Super Poxy Primer over the entire fuselage and lightly sanded it until the fuselage and vertical fin and rudder were glass smooth. Two coats of Hobbypoxy White were then sprayed onto the fuselage using Hobbypoxy H-06 Quick-Spray Hardener. We allowed this to dry overnight and then lightly wet sanded the fuselage with 600 paper, used wet, and then rubbed the fuselage out with DuPont White Rubbing Compound. At this time the fuselage could be held up to the light evidencing a mirror-like finish with a minimum addition of weight.

We advise you, strongly, against fastening the canopy in place with any type of canopy floor, screws, or the like. This is due to the fact that a fiberglass fuselage, in order to retain its strength must be resilient in the case of a rough landing. If the canopy was firmly positioned in place, the forward portion of the fuselage would lose its flexibility, and thus we used a piece of double sided Scotch Tape on either side of the canopy where it contacts the fuselage. This holds it firmly in place and all that is necessary to gain access to the interior of the cockpit is to simply pull on one side of the canopy.

And that completes the construction of your Centurion. Make sure that the Center of Gravity is located where it is shown on the plans. The all-up weight of the Centurion should not exceed 25 oz. if you have built it properly. However, if it weighs up to

30 oz., it still will fly quite well since its wing loading is still within reason.

I sincerely hope that you will take the time and effort to build the Centurion for the next contest season. It will be a serious contender in the Standard Class contest circle in the hands of an experienced pilot. Again, if you are a novice to R/C sailplanes, we recommend that you begin with a more docile trainer than the Centurion. The all flying stabilizer is extremely sensitive and provides the contest pilot with the amount of control he needs for precision work in the thermal as well as for accurate spot landings. To the beginner this would be a definite hazard and he would find himself over-controlling the model from the very beginning. If you are an experienced sailplane pilot with no interest in competition whatsoever, try the Centurion for a high performance change of pace - - - you'll enjoy it! Drop us a line and a photograph of your model - - - we'd like to hear from you and of your experiences with this sailplane. □

QUICKIE

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Install the fuel tank so that the pick-up and vent tubes pass through the firewall where shown on the plan. I used an SS-4 Sullivan slant tank which really gives long flights on a Max .15. The battery pack is wrapped in foam and placed in a Baggie and positioned under the fuel tank. Now just stuff the rest of the radio gear in the airplane and rubber band the pushrods to the rear sides of the fuselage and check the CG. Position the servos as needed to get the proper CG location. Epoxy two pieces of ½" square spruce or pine across the fuselage as servo bearers. Install the pushrods, throttle linkage, switches, engine, etc., and you are ready to fly. Use a 7/6 prop on a .15 or a 7/4 on an .09 or .10. Set both the rudder and elevator to move only 5/16" in each direction which is minimum servo movement. Make sure all surfaces are straight with the trim levers centered.

FLYING: Just imagine that the Quickie has ailerons and go fly. The model presents no problems and is really a lot of fun. Use a fairly long approach on landing as the Quickie can really be slowed down until it touches down on all three wheels.

Do it! □