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THIS MONTH'S COVER

Lovely Kim Hauguel of South Bend, Indiana, poses with Firestreak, designed and built by Joe Mergen of Mishawaka, Indiana. Firestreak is a .15 powered spoof scale of the Lear Fan with lots of spirit. Clean, trim, and responsive, it has a very distinctive jet look when reaching for the clouds after a high speed, low pass across the field. Firestreak is featured as a construction article in this issue beginning on page 36. Ektachrome transparency by Jerry Smith.

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FROM THE SHOP

Don Dewey

Coverage of the Scale Masters Championships is in this issue. We have watched this program very closely and are quite pleased with its progress and success.

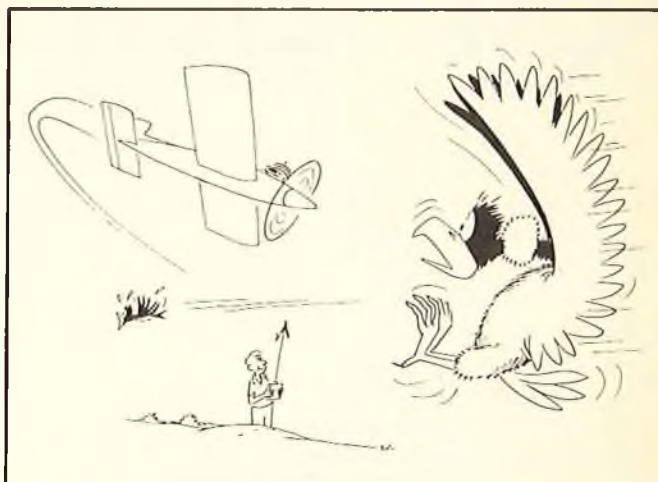
As with anything new or different, the program has been subjected to a large amount of criticism, primarily by non-participants. We can't remember an event where the contestants were as enthusiastic and enjoyed the fly-off as much as this year's Scale Masters. The program was organized by and conducted for the serious Sport Scale modelers.

The 1982 program had a rather radical approach, one class of Sport Scale using the AMA Giant Scale rules for maximum size and weight. While this might appear a bit strange, it allowed the modeler to select the size airplane and engine that he considered to give him the best chance of winning, be it 1/2A, 60, 90 or Quadra. You can believe it worked, up until the last round of flying almost any of the contestants could have been the Scale Masters Champion.

The monetary aspects of the program was interesting



Mr. Takayuki Ura, Jonan-Ku Fukuoka-Ski, Japan, built this Salto FA-30 powered Pou Du Ciel from RCM, November 1981 article (plan no. 852). Mr. Ura reports that he has enjoyed many fine flights with his Pou.



and well-received by the participants who appreciated the financial assistance for making the trip to the West Coast. Also, the major portion of the funds was raised outside of the hobby industry.

Our congratulations are extended to Harris Lee and the rest of the officials for an imaginative and extremely well-conducted program. And then, Harris tells us, "You ain't seen nothing yet, just wait to see what we have in mind for the 1983 Scale Masters Program."

Ed Sommer

1909-1982

by Dave Herbert

Ed was my flying partner and best friend.

He was a retired aeronautical engineer and pilot.

He even flew a real Heath Baby Bullet in his younger years.

His 1/4 Scale Baby Bullet is hanging in my garage.

We flew together every Tuesday afternoon and every Friday night for three years.

I did all the take-offs and landings and Ed did the flying . . . at age 73.

He shot the night flying photos that appeared in RCM October 1982.

He did not get to see his work in print.

He had never soloed R/C.

Only I had the honor of flying Ed's airplanes.

On a Tuesday afternoon in August Ed decided the time had come for his first R/C solo at age 73.

It was a beautiful flight, as though he had been doing it for years.

Ed succumbed of a heart attack that very night.

My heart is with him on his greatest flight,

His flight to eternity.

On a recent occasion Leon Shulman was to be honored with an award. Leon was unable to attend and requested a friend, Charlie Bauer, to accept the award in his behalf. Charlie's acceptance comments were as follows:

"Leon Shulman's modeling experience dates back several centuries. In fact, one of the earlier models that he designed and kitted resembled a bird. The kit consisted of a bale of bird feathers and a vase of honey which was applied to the arms and legs. He sold this early kit to an Italian citizen who followed his instructions and jumped off a cliff. You all know how that worked out!! In those days, he was known as 'Leonardo!' — obviously, because of this incident, he had to change his name!"

★

Oh Boy! It has been a short summer, so until next time, we'll see you at the field. □

SUNDAY FLIER

Ken Willard



On August 21 and 22, there was a very enjoyable "fly-in" of large remote piloted aircraft at Hill Country Air Museum. Some of them were scale models of man carrying aircraft, such as the Fleet, a P-47, a Bristol Monoplane, Nieuport 28, and others. The others were original design type aircraft --- something that the builder thought would do a good job of flying under remote control and later might be blown up to man carrying size. A third group was just some airplanes that were designed for remote control, without being models of any full size airplane or intended to be. Because of the various types, I thought it best to identify the fly-in as one of remote piloted aircraft rather than the official title of "Mammoth Scale." Matter of fact, I didn't see a single mammoth there.

Anyway, the guys really had fun, and the airplanes flew beautifully. Kelly Ogle, the announcer, kept the crowd well-informed about who was flying what, and what the maneuvers were. He also did a very wise thing. Periodically throughout the day he warned the audience to stay alert, since the radios in the aircraft were subject to potential malfunction due to outside interference, internal failure, or other causes such as incorrect pilot input, commonly called pilot error.

Along about mid-day, Kelly wanted to take a break and have lunch while looking over some of the planes in the display area. He asked me to spell him for a while on the mike, so I did.

As luck would have it, shortly after I took over, and was telling the crowd about a DeHavilland Moth which was preparing to fly, Murphy's Law prevailed --- "If anything can go wrong, it will." The Moth started its take-off, veered crazily, left the ground, gyrated wildly towards the crowd and crashed in their midst! Yet no one was hit by the airplane.

Why not? Luck? Maybe. Pilot skill? No way --- the airplane was out of control. Or did the crowd see the plane coming, and, having been forewarned, had time to duck out of the way? That's the way I saw it. When the airplane started to veer, I yelled into the mike "Look out!" The crowd saw well in advance that the airplane was headed their way, and scattered.

One of the reasons they saw well in



Forrest Edwards' 5 cylinder 4 stroke radial.

advance that the airplane was in trouble and headed their way was because the model was quite large, and even though some distance from them, the gyrations were evident. Another reason was that the model's air speed was marginally slow, which allowed time for the crowd to react.

"Boy, we really lucked out on that one!" That was the general feeling --- and not unjustified. But I think there was more than that. Hear me out.

A couple of years ago, at a radio controlled demonstration where I was the announcer, we had a Quickie 500 race. The crowd had been warned to be alert.

As luck would have it, in the middle of the race, spurious signals came through on the monitor. One of the racers crashed on the field. The other went veering off at high speed. The pilot had intermittent control with some surfaces, but no throttle control.

"Watch out for airplane out of control!" I called out over the public address system. Oddly enough, some of the spectators thought it was part of the show!

The airplane came back towards the field, still only partially under control, but at full throttle. Again the warning "Look out!" The model went into the crowd. They tried to duck, but the speed of the model was too great. It hit one of the spectators a grazing blow, crashed into the ground, the engine broke off its mounting and bounced into another spectator, causing a bad

bruise and welt on his back. There just wasn't enough time for the spectators to get out of the way.

So what's the point, you ask. And when I make it, I expect a lot of flak from some of you who will disagree with me. Fair enough. After all, it's only an opinion.

Let's digress momentarily. What's the difference between opinion and fact? Simple. Opinion is what someone thinks, based upon evidence available to him --- which may or may not be complete. Fact is based upon a true compilation of proven scientific, mathematical, physical, chemical formulae which cannot be disputed.

That's my opinion. And that's a fact. Huh?

Now let's get back to the point in the two examples I've related. The point is this; within the current performance envelopes of radio controlled aircraft, it is my opinion that the larger scale aircraft are safer than the smaller models!

Gad, what heresy is this, coming from the Old Chief Sunday Flier and small plane enthusiast?

There are several reasons that can be put forth in support of the view that large radio controlled models are safer than small ones. There are also several reasons that can be stated to support the opposite view. Let's review both sides.

Small airplanes are safer. They don't have the weight to strike a hard

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ENGINE CLINIC

Clarence Lee



The past few months I have devoted quite a bit of space to engine and product reviews. As a result we have gotten behind with the letters. So this month the column will be devoted strictly to letters.

The April 1981 issue of RCM carried an excellent article by Robert H. Munn on solving problems inherent to the Webra Dynamix carburetor. This was an extensive article that dealt with proper adjustment of the Webra Dynamix carburetor. Over a year and a half has past since the article and a whole new bunch of fliers are experiencing problems with the Webra carburetor. Evidently Webra has yet to do anything about the problem of not being able to richen the mixture enough for the engine to four cycle. This is very important when the engine is new. Actually it is a bit of a puzzle why Webra continues to produce an otherwise excellent carburetor with this problem. The past few months I have received quite a few letters from fellows looking for a solution and also several letters from fellows who have come up with a cure. For those who may not have seen the original article (not in Engine Clinic) I suggest you pick up a back issue.

Our first letter this month offers a simple cure. Many others have also sent in this basic solution which is very much appreciated.

Dear Clarence,

I purchased a Webra .61 F Champion engine last summer for use in a Sig Skybolt and later a Bridi Dirty Birdy. The power output of this engine is really something that has to be seen to be believed! This is with Sig 7 1/2% fuel and a Top Flite 11 1/2 propeller, using muffler pressure to the fuel tank as I have been doing for the past several years with different engines and airplanes. The only thing that worried me was that I couldn't richen the mixture enough to cause a drop in rpm at wide open throttle, much less coming anywhere near a four cycle condition. Thus, I used the engine on only a few short flights at less than full bore.

Seeing the first reference in RCM to reaming out the high speed jet, I reamed mine almost to the point of having no restriction at all! No better; still as lean as ever. I then proceeded to check over the metering rod for burrs, incomplete machining, etc. Still

nothing. Then, taking another careful look at how the thing worked, I then filed a flat starting at the cross — drilled hole and sloped at the same angle as the metering groove until the flat was about one-half the depth of the groove. I flew the beast the next day with the high speed needle turned in 1/2 way. More filing that night until the flat was nearly as deep as the metering groove. The next day I had to turn the H.S. needle in until it was only 1/4 the way out to go from 4 cycle to a rich 2 cycle. The Dynamix carb now functions beautifully on muffler pressure at all throttle settings! I hope this helps others using the Dynamix carb as these Webra engines are too fine a piece of machinery to burn up running on a lean mix. This is the second Webra with Dynamix in our club to have this problem and we plan to try the altered metering rod in the other engine to confirm the fix. It is sure a lot less bother than playing with pumps, regulators, etc. Incidentally, one can tailor the depth of the filed flat to match the available fuel pressure. I can even run mine on straight suction!

Yes, we fly in the winter, too. Even at -20°C., 0°F. My current winter plane is a Bridi Sun-Fli 4-20 on skis and powered by a six year old O.S. Max .35 and it goes great. The take-offs and landings are much smoother than on wheels. Should try it some time!

*Yours faithfully,
Jack Sladek*

Winnipeg, Manitoba, Canada

Solutions were also received from Bill Neuman, Norm Stone, and others that were based on filing the slide valve in conjunction with enlarging the fuel passages slightly. My own experience has shown that a combination of filing the slide valve and enlarging the fuel passages seems to be the most successful. All that is required is to enlarge the fuel feed hole in the center of the slide valve with a #53 (.059") drill as well as enlarging the fuel supply hole through the slide valve with the same size drill. Opening up the fuel feed inlet or nipple (where you attach the fuel line) with a #50 (.070") drill will also help. In fact, I would recommend drilling out the holes first and if you still cannot get the engine to run rich enough then start filing the slide valve.

Dear Clarence:

I have a "new" Wasp Twin (.60) engine (Serial #638) that has been in my tool box for 30 odd years. I've often threatened to resurrect it for a special old-time project (such as a C-3 or other authentic 2 cylinder design). In looking over the engine, even though it's well-preserved (no corrosion) it now seems frail and even a little crude — especially the crankcase seal (?) and those lower rod caps. What's your opinion on use of this engine? Can it be considered durable in today's world — or would I just be throwing it away and be better off polishing it and putting it on the shelf to look at?

I recall running the engine a few times on ignition and once or twice on glow about 30 years ago. It seemed rather powerful (on a 14/6) and perhaps even "over vigorous" on glow. Have you any hints on improving or preserving it? I vaguely recall that it was built in Glendale or Burbank, California. Is there anything else you can tell me about it or the people behind it?

*Sincerely,
Peter Mohr
Livermore, California*

The Wasp Twin was manufactured at Van Nuys Airport in Van Nuys, California, known as "Metropolitan Airport" back in 1946 when the Wasp first appeared on the model market. There were actually three distinct models of the Wasp twin. Among engine collectors the first model is known as the "6 bolt Wasp" due to the crankcase halves being joined by 6 bolts. Leakage problems occurred so the die was changed and 4 more bolt bosses added. This second model is known as the "10 bolt Wasp."

Both of these engines were good running twins for their day, especially the 10 bolt Wasp. Both the 6 bolt and 10 bolt engines had die-cast crankcases and were painted with black crackle paint. Following the success with the 10 bolt engine, the Micro Model Co., manufacturers of the Wasp, decided to come out with a new "Super Wasp." This engine used a one piece permanent mold crankcase and was actually crude in comparison to the previous two engines. In order to cover up bad casting flaws, the engine was given a buffed finish. Whereas the first two Wasp twins had off-set cylinders, the Super Wasp had both

cylinders on a common center line with the rods off-set. This led to disaster. The engines were returned to the factory with broken rods as fast as they were shipped out which, in turn, put the company out of business. According to a gentleman named Randy Chase, who purchased the remaining inventory, tooling, and dies, etc., after the company went out of business, only 78 Super Wasps were assembled and about 60% returned with broken rods.

A total of 793 6 bolt and 10 bolt Wasps were made, so from your serial number your engine would most likely be a 10 bolt Wasp. This was the best engine of the bunch but in no way should ever be run on glow ignition. To do so will be asking for a broken rod or crankshaft and there are no replacement parts available any longer. Randy Chase had parts for a few years but has now depleted the supply. As long as you run the engine on spark ignition as it was intended to be run, you should get a fairly useful life from the engine. It was quite happy turning a 14/6 prop. Frankly, I hate to see fellows putting these old time engines to use other than for the old time free-flight events. They are nice collector items and the engine could be sold to a collector for enough to purchase a modern day engine. Of course the availability of twin cylinder engines is pretty limited in the .60 displacement size.

Dear Clarence,

I have a Merco .61 which is approximately 10 years old. The engine runs very well with two plugs, except for stalling on take-off. It swings an 11/8 T.F. prop on a Contender and will only run on Dukes fuel. The tank is correct and the only thing I can come up with is the engine seems to run a little hot. The Dukes fuel seems to be able to handle the extra heat. Any comments would be appreciated.

Before closing, I wonder if you could give me some information concerning parts for this engine. I understand the company is out of business.

Thank you,
Tony Ferrelli

Staten Island, New York

Tony, you hit the nail on the head with your thinking — the old Mercos were noted for running hot. This was caused by several factors. The engine was designed to be run on straight alcohol/castor oil fuel. Also the piston rings had a lot more wall tension than they should have had which caused considerable friction, in turn, resulting in heat. Add to this the fact that most fellows in this country ran the engine on nitro content fuels and you had a hot running engine. Duke's fuel contains castor oil. One of the

functions of the oil is to carry away heat which castor oil does better than the synthetics. It also provides better lubrication at higher temperature than the synthetics. Lowering the compression with a .015" head gasket will help lower the operating temperature but there is nothing you can do about the high dragrings. Some of the early Merco pistons were also fit a little on the tight side. If you notice any shiny bands around the piston (especially the very top or just below the lower ring), the piston is expanding and causing a bind. A little #360 emory paper and oil applied to the high shiny spots will help here.

I am not sure if the Merco Co. is out of business or the engine is just no longer imported into the U.S. I believe I saw an ad in an English publication a while back for Merco engines but these may have been leftover stock some hobby shop had. Royal Products in Denver were the U.S. importers of the Merco engines. I do not know if they have anything in the way of parts or not but you might give them a call and see. It is doubtful that they would have any parts for the older engines, however.

Dear Mr. Lee:

On page 23 of the *R/C Engine, Vol II*, Larry Renger states that he uses 1/2 oz. Hoppe's No. 9 per pint of fuel with Cox engines to keep varnish from forming — or 1 oz. per pint to cut it out, once formed.

(1) I am using an O.S. Max .61FSR and like to mix my own fuel as per your instructions. Would it be permissible to use the Hoppe's in this fuel at the above ratios?

(2) Have you discovered any synthetic with a higher flash point than Klotz which would be preferable as a fuel lube?

(3) In making diesel fuel (Davis Diesel .60) is it advisable to substitute a non-detergent oil for the castor oil? If so, which weight?

(4) Finally, I wish to convert an O.S. Max .61 ABC to a diesel, but wonder whether the sleeve would expand properly under the cooler operating temperature of the diesel? Also, do you break in the ABC version any differently than the ringed version?

Thank you for your help. Your articles in RCM are what keeps me buying it.

Sincerely,
John P. Hantla
Sioux City, Iowa

Right after Volume II of "The R/C Engine" came out I did a bit in the column about using Hoppes gun oil in model fuel. I also had to read the riot act to the guys at RCM about running material from other authors that

might later be attributed to me. Quite a few fellows read that bit in the book without ever noticing that I had not written that particular article. You do not want to use Hoppes gun oil in your fuel as it is composed mainly of nitro benzene — a very toxic chemical known to cause cancer. It can be absorbed through the skin and is accumulative in your system. This is the stuff that smells like shoe polish and was used in many model fuels for years until its dangerous side affects became known.

Klotz oil is still the best of the available synthetics. For example, Union Carbide puts out several synthetic oils formulated expressly for model engine fuels but only sell in commercial quantities. Castor oil has a viscosity of about SAE 50, so any non-detergent oil of this weight can be used for making diesel fuel. Klotz will also work well in diesel fuel but the addition of 5% castor oil will give a little more film strength. I might point out that Klotz KL-100 is 25% castor oil right out of the can. Mixed in your model fuel you end up with about 5% castor content. However, the castor that Klotz uses seems to form considerable varnish. Klotz KL-200 is straight synthetic and is the oil that I recommend. If you want to add 5% castor, use Baker AA and you will end up with a lot less varnish.

There should be no problem converting an ABC engine to diesel operation. If the piston/sleeve fit is "squeaky" tight then the fit should be loosened so that there is just a little "grab" as the piston passes top center. The same as with low nitro fuel. The higher the nitro content of the fuel the tighter the fit of an ABC piston/sleeve should be.

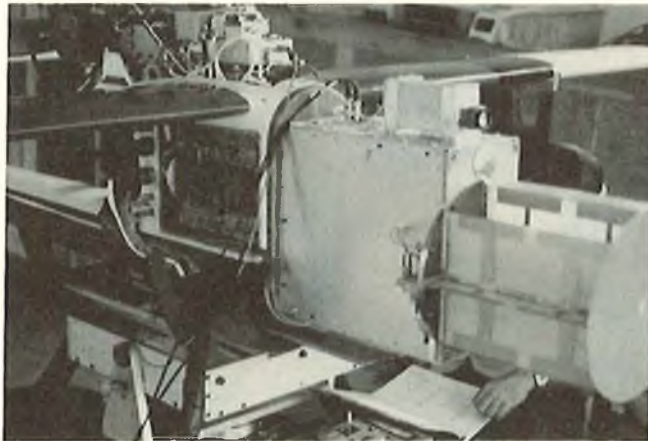
Break-in for an ABC engine is entirely different than for a ringed engine. A ringed engine should be run slobbering rich the first few flights with a gradual leaning-out each flight so that by the sixth or seventh flight the engine is being run in a slightly rich two cycle.

An ABC engine should never be run in a complete four cycle other than on initial start up. Due to the piston/sleeve fit being tight, if the engine is run overly rich it does not come up to operating temperature and the fit remains tight. This means the piston is pushed up and pulled down on each stroke resulting in stresses to the rod, wrist pin, etc. Many fellows new to the operation of an ABC engine, have used break-in procedures the same as for a ringed engine — running the engine in a fat four cycle on the bench. When the rod breaks, they wonder what happened. So any ABC engine should be broken-in by

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FLYING LOWE

Don Lowe



Close-up of XBQM-106 Drone showing multiludinous electronic equipment required for experimental target strike investigations.



Your's truly checking controls prior to test flight of XBQM-106 Mini-Drone. See text for details, note vertical fins on wing.

Big is Awesome

Sorry about missing last month's column; I spent the last two months at Eglin Air Force Base, Florida, flying another R.P.V. (Remotely Piloted Vehicle) project, sponsored by the U.S. Air Force. This was the seventh in a series of demonstrations in which we allow seeker controlled vehicles to guide on and impact a variety of targets. The photos included here show the vehicle design used. It was developed in my former USAF R.P.V. project and is called the XBQM-106. For this test series the vehicles weighed about 210 pounds and were loaded with a variety of electronic equipment, including telemetry, T.V. and an automatic seeker. The vehicles were powered by a 2 cylinder, 2 cycle engine, producing 18 hp. It turns a 28"-13 pitch prop close to 7000 rpm static. The aircraft are launched by a pneumatic launcher and we can recover them by landing on a belly skid. The ships cruise at about 85 knots and land at 55 knots. Flying qualities are extremely good and stall is controlled by 3° washout in the wings.

The crafts are controlled by a microwave digital proportional control system and we use a version of the very large Futaba FPS-14 servo for control. We can fly the ships in manual mode using standard model control box set-up, plus two autopilot modes. We fly "through" the autopilot for most of the missions in an "attitude command" mode. This is super easy to fly and one of these days we will have



Landing the XBQM-106. Recovers on hardwood belly skid — no shock absorbing landing gear.

model autopilots which will make everyone an accomplished pilot. In performing a typical mission, we launch the aircraft and climb to a mission altitude of 2000'-3000'. We then fly the ship into a racetrack pattern and aim the ship at the target. The ship locks on the target and proceeds to dive towards impact. We then initiate a manual control pull-up by turning off the seeker and climbing back to racetrack altitude. We may perform 12-16 practice dives on the target in a single flight during which we evaluate the performance of the seeker and aircraft. Once we are satisfied that the ship will accurately impact the target, we simply leave the seeker on until impact.

An operational version of these vehicles would not contain telemetry, command system or T.V. They would incorporate a navigation system, plus seeker and warhead and enough fuel for 4-6 hours flying. It would be strictly a one-way expendable mission.

The aircraft that we use in these experiments have a lot of modeling

technology. This includes fiberglass fuselages, strategically reinforced with graphite. The wings are "plug-in" fabricated of a foam core and fiberglass skin. We use a 2" diameter aluminum tube as a spar.

You may discern from the photos the peculiar vertical fin placed half span on each wing. These we call "side force generators" and are basically employed to augment the yaw steering capability of the vehicles. We can fly the vehicles without banking at all and simply yaw steer around the sky. They are used primarily in the dive on the target where we do not bank at all and simply steer with rudder and elevator. These surfaces do not detract from the directional stability of the aircraft at all since they are placed very close to the center of the wing lift. If you want to try something for kicks sometime, install fins similar to these on your favorite sport model and amaze your friends with flat skidding turns. We had to play with the area distribution of the fins in order to preclude roll and pitch

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BIG IS BEAUTIFUL

Dick Phillips



Fly Baby prior to installation of dummy engine on cowl. Covering is dacron, paint is acrylic lacquer over Knox Gelatine and latex primer (see text). Model is 1/3 Scale and impressive airborne or on the ground.



Fly Baby cockpit and panel details. Gauges and instructions come with the kit. Dresses up what could be pretty plain cockpit. Landing wires are attached with Kwik Links but turnbuckles could be used. Gas cap on top cowl is fill tube for model fuel tank.

Couple of tips to start off with this month. As many of you already know, I've been trying to find a better way to cover and finish than the traditional methods we have used for years. I'm beginning to suspect this may have become something of a quest for the Holy Grail. The Grail was never found and I may not ever find the perfect way to cover and paint either!

I've had some feedback on the envelope covering method which I have been using with the dacron fabric I get from Aircraft Spruce and Specialty and it seems your enthusiasm for the method is similar to my own. It's a simple and quick way to cover, with the results being a superb job every time.

The fly in the ointment has been getting an acceptable finish on the fabric with a minimum of sanding. I have used the automotive primers under acrylic lacquers with some success, but it took a good deal of primer (red oxide) to fill the fabric and then you laboriously had to sand most of it back off the fabric to prepare for the paint. Messy, time consuming, and the ever-present danger of getting too heavy handed and sanding right through the dacron. Unlike some other fabrics, dacron doesn't "feather" up as you sand it, it just goes zzziiippp, and there you are with a neat slash across the edge of support within the fabric. Very disconcerting, and hard to hide. So long as the sanding is done with a very fine paper and the touch is light.

Anyway, the red oxide primer was too messy and too much hand work to

be the "perfect" method. I then tried Knox gelatine as reported here earlier and it worked well, but not with all paints. With some paints, the Knox seemed to break down a bit and the surface of the paint remained a little tacky for a long period after painting. Not "perfect" either!

Then, using a latex based primer thinned way, way down to an almost watery consistency was tried over the Knox gelatine and then entirely without the gelatine. Both work fine, but there is still a small fly visible in the ointment. The latex primer is not sprayable and must be brushed onto the fabric. It works fine, but if you are not really light fingered and smooth it out well while still wet, you'll end up with brush marks. Some light sanding is still needed and I have been having some acceptable results with the aluminum grit papers and a light

touch, then spraying acrylic lacquer over top of the latex primer. It works well with a couple of well-thinned coats of the primer right on the fabric and then a dusting coat of acrylic followed by a wet coat. Results are quite good and in particular they look great on airplanes which were fabric covered as they do not end up with a high shine which was not typical of most fabric covered airplanes. In the case of a show type model, a coat of clear gloss sprayed on over the acrylic will produce the showy shine some desire in the finished product. They look a bit phony to me and I don't bother with this last step.

The other tip is a small thing but one that has worked well for me. The all but final step in the making of a model is the application of the decals. Most of today's are pretty thin (because that's what we said we



Royal Maxi-Titan servo mounted on removable plate held in position by rails. Easy removal for service or replacement, when required. Top cover screwed in place retains servo plate on proper position.

wanted!) and therefore pretty delicate. Using a cloth to squeeze out the water trapped under the decal can result in the whole thing breaking up and you're stuck with a lot of scrap decal and no way to properly finish off the model until you get another set. (A week, a month or better!)

I was adding the decals to the Fly Baby last night and decided that a small squeegee would be just the thing to get the water out from under the decals. A credit card came to mind (they should be able to get you out of trouble as well as into it, right?). But thought it to be a bit too hard to use for the purpose without fear of damaging the decal. The item I eventually came up with did an excellent job and is something available to us all with little or no cost. I used a strip of light card stock as a squeegee and as it got wet and soggy, trimmed the end off. The card I used was the pocket pass from Toledo, but a business card is about the same weight of card stock and it's something useful you could do with all those cards you have lying around from people you don't remember, don't want to call and have no other use for.

It worked really well, squeezing the water out from under the decals without harming the decals themselves. It remains quite soft and harmless until it gets too soggy to do the job any more and then you cut the soggy end off and use it again. I put on 16 decals last night using a couple of 1" sections of the card I had and am pleased with the way it works.

Some time ago I mentioned a large model built here in St. Albert a few years back by Maurice Robinson. It's not a rendering of any particular aircraft and was built in the early days when we didn't know a great deal about the flying qualities of the larger model. It ended up weighing something around 40 pounds and was, to say the least, a rather disappointing performer on the only engine available at that time, the Quadra. It could barely stagger into the air and was flown about with great caution as it seemed almost on the verge of falling out of the sky and it probably was.

Several engines were tried with little success until a Titan was recently installed in it and the change was all but miraculous. The power of the Titan engine changed what was a real dog into a real pussy-cat. The model now flies very well indeed, with take-off runs averaging 100' or less. The model is capable of being looped and is most impressive on the back side of the loop as the power is backed off and it rounds out into level flight again.

The Titan is an engine with no vices

we have found. It starts very well, despite its compression, it is extremely well-made and will last a lifetime in the use we put it to. Its claimed 6.5 h.p. is not hard to believe as it moves that 40 pound bird with considerable authority. The engine runs extremely smoothly throughout its rpm range and has never missed a beat in the air or on the ground. It is fairly tightly cowled in the present installation and has shown no signs of overheating problems. In short, it appears to be an excellent power plant, well-made and certainly worth the money. If you have a particularly heavy model, or one from which you expect better performance than you have had with your present engine, give the Titan a try, judging from our experience here, you won't regret it. Further information is available from Roush Manufacturing, P.O. Box 251, Sandyville, Ohio 44671. At \$289.00, it may seem a bit expensive, but it certainly delivers on its promise in the air. Fuel consumption does not seem excessive and it spins a 24/14 prop at a respectable number of rpm.

This is one engine you want to be pretty careful around the sharp end of. With the power available it could do you a good deal of harm if you got careless or stupid while in front of it. For that reason, treat all large engines with the care and respect they deserve . . . safety is still no accident!

Our First Annual Western Canada Giant Scale Rally at Bawlf, Alberta, back in July, had been planned as the premier such event in the West of Canada. Unfortunately, the weatherman had other ideas and the only flying done was on the Thursday and a few hours on the Saturday. The rain was so convincing there were several thoughts about building an Ark, and they weren't all tongue in cheek!

Wilf Blackwell, who owns the property and maintains the superb flying site as part of the hobby shop complex told me he had not seen it rain so hard in July in all the years he has lived there. This was borne out by the weather service reporting that we had gotten more rain in the first four days of the month than we normally get in the entire month.

Those who did brave the elements and attend had a good time, just not very much flying. We are going to try again next year on the same weekend and hope for better things. Dick Everett from California, long time modeler and one time columnist for a magazine no longer with us, was present. It was a real pleasure to meet Dick and share his company for a few days. He was on his way back to California from Alaska and stopped with us long enough to attend at Bawlf

and to fly in the Canadian Nats. Dick is first and foremost a glider pilot and, only having two or three gliders with him, he drove well over a hundred miles to Calgary, bought another kit and spent a good part of the rainy weekend building, covering and finishing the new bird. As if that wasn't enough of a challenge he did this in a small truck camper and lived in it at the same time. With the bad weather, it wasn't too pleasant to be outside so he managed a goodly amount of building during the weekend.

Subsequent to the debacle at Bawlf, the Canadian Nationals were flown in Edmonton, Alberta, and the weather cooperated a bit more with that event. Only a few models were entered in the scale contest and only one large model was flown. Brian Weekley of Vancouver, B.C., brought along a Bridi CAP 20L which had been flown only a day or two prior to the event. Powered with a geared pair of twin .60's, the model performed very well and was most impressive in flight. Ivan Kistensen, Canada's top pattern flier was persuaded to try his hand with the CAP 20 and showed what the big model could do in capable and experienced hands.

In talking with Ivan later, I asked what he thought of the larger model as a pattern vehicle and he told me that although he liked flying them from time to time, he was still very much in favor of the performance of the smaller pattern models. Maneuvers are crisper and the smaller pattern plane is a bit more agile than what we have come to expect of the larger bird.

Ivan had flown in the TOC at Las Vegas of course so is quite familiar with the performance of both the standard pattern plane and the larger model in competition. The competition at the TOC being the absolute best in the world, of course, I doubt we'll be seeing Ivan switch to building Big Is Beautiful just yet!

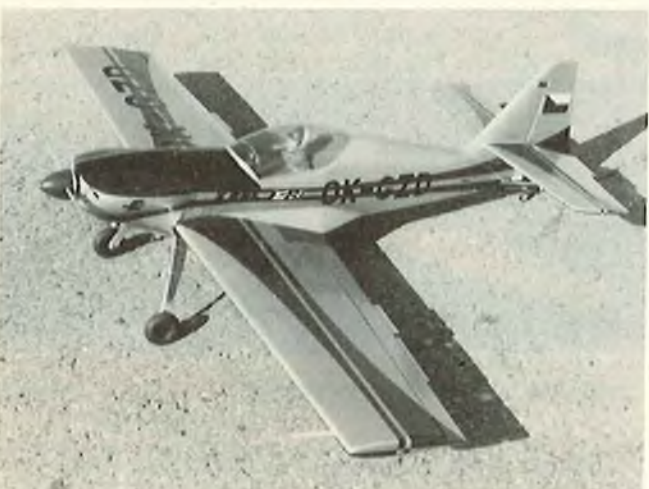
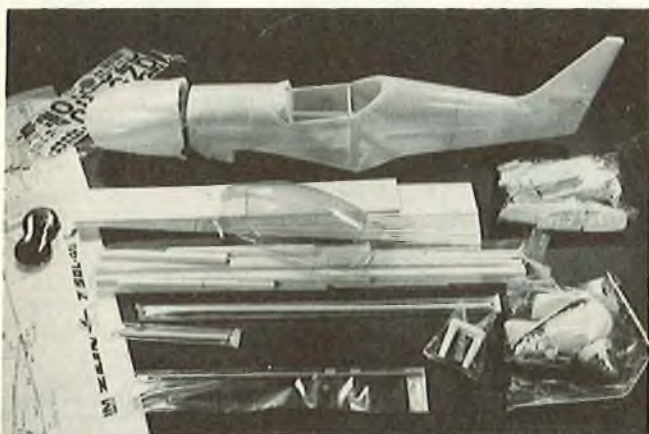
My Balsa USA Fly Baby Monoplane has just been completed and painted and I am delighted with the results. I've suggested to you before that I am a bit of a hacker and this latest product from my shop belies that claim a bit. I am taking a bit more care (and applying a lot more patience) than has been the case in the past and the results are starting to show a little. Painting was using the method described at the beginning of this column and, while there is probably not a "perfect" method of painting, I'm pretty satisfied with it on the Fly Baby.

The kit is a dandy and, at under \$100, is a real bargain. The contents of the kit box are very complete, the

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RCM PRODUCT REVIEW

Circus Hobbies
ZLIN Z50L



SPECIFICATIONS

Name	ZLIN Z50L
Aircraft Type	Scale
Distributed By	Circus Hobbies 3132 S. Highland Dr. Las Vegas, Nevada 89109
Mfg. Suggested Retail Price	\$134.95
Circus Price	\$94.95
Available From	Direct from Circus Hobbies
Wingspan	59 Inches
Wing Chord	9 7/8" (Avg.)
Total Wing Area	635 Sq. In.
Fuselage Length	44 1/2 Inches
Stabilizer Span:	24 1/4 Inches
Total Stab Area:	140 Sq. In.
Recommended Engine Range	40-50
Recommend Fuel Tank Size	240cc (incl.)
Recommended No. of Channels	4
Rec. Control Functions	Rudder, Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Fiberglass
Wing	Balsa
Tail Surface	Balsa
Building Instructions	Yes
Instruction Manual	Yes (1 Page)
Construction Photos	No

RCM PROTOTYPE

Radio Used	Proline 6 channel Comp. 6
Engine Make & Displacement	K & B .61
Tank Size Used	supplied
Weight, Ready to Fly:	116 oz.
Wing Loading:	26.3 oz./sq. ft.

SUMMARY

WE LIKED THE:

Excellent performance, truly outstanding flight characteristics.

WE DIDN'T LIKE THE:

Fiberglass cowl and fuselage were of "poor" quality (details in text).



Circus Hobbies, 3132 South Highland Drive, Las Vegas, Nevada 89109, is offering the Zlin aerobatic sport plane that looks like it could hold its own with the best. Well, there are looks, and there are looks. Let's take a close one of this rascal and see how it stacks up.

The Zlin Z50L arrived in a sturdy carton that measured 37 1/2" x 12" x 7 1/2", and was filled with parts. Packaging was very neat and orderly with wood parts bundled with rubberbands. Although parts were not marked or labeled, it was quite a simple matter to identify them.

Construction:

Included in the kit was one 48 1/2" x 35" single sheet drawing, and one sheet 14 1/2" x 10" of drawings and instructions. The latter was mainly concerned with wing construction. As we proceeded, we found that assembly was straightforward, with parts fit being very close. Die-cutting was excellent, and although machined parts were minimal, the quality was exceptionally good.

The fuselage was nicely designed with scale detail molded in. Bulkheads were already in place, along with reinforcement stringers. The mold work on the cowlings was also very well-done. What wasn't so good was the glass work itself, especially when compared with other kits on the market in this same general price range.

The glass work was thin, tended to be on the brittle side, and had numerous voids and pinholes. Surface imperfections were taken care of later (see: Covering,

below), but the fact still remains that improvement in the glass work is definitely in order.

During construction, there were several unusual techniques that was discovered that we felt should be brought to the attention of the future builders of this kit. The wing dowel pocket design borders on an afterthought. Proper re-spacing of ribs #2 would have gained the same end results and all the extra alignment problems of W20

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CUNNINGHAM ON R/C

Chuck Cunningham

All pictures by Fred Bartzen



The 1982 version of the Southwestern Jumbo Fly-In was fantastic. Early on Saturday morning the campers, vans, station wagons, automobiles, horse carts, motorcycles, or what have you,

started arriving, with occupants just itching to get their aircraft into the wild blue. The thermometer nudged into the upper 90's both days, but the normal south breeze moving over Lake Benbrook kept everything

pretty comfortable in the shade.

The hottest things were the aircraft. This year's turnout of 68 registered entrants produced over 135 fantastic aircraft. Many more builders text to page 24



Most Impressive Trophy was awarded to Gail Phillips, Houston, Texas, for his P-47. A Nosen kit with retracts and a Kawasaki 3.15 engine.



Best Scale Trophy was won by Mike Cook, Houston, Texas, with a Corsair.



An Impressive B-36 with 10' wingspan by Steve Dooley. Featured electrically operated wing flaps.



Rusty Allen's beautiful Sopwith Pup.



Bob Dorsey, Burleson, Texas, brought a Douglas C-47, 8½' wingspan.



Garland South, Cleveland, Oklahoma, doubled the dimensions of a Pica Waco. Has 10' span, weighs 54½ lbs., and a 5 c.i. engine.



A very nice Monocoque, builder unidentified.



What would a fly-in be without a Jenny? No info provided.



The C-130 and P-51 were built by Kenneth Greer, Willow Park Texas.



A sharp Shrike Commander but builder is unknown.



Mike Cook also brought a neat scratch-built Grumman Ag Cat.



An excellent rendition of the Fly Baby by Restee Hawkins, Dallas, Texas.



Gail Phillips' P-47 was flown by Ted White.



A small portion of the Jumbo Fly-In, Lake Benbrook in background.

Beginner's luck.



If you're a beginner in R/C flying, you can thank your lucky star for OrLine.

The Star is the versatile airplane for beginners and experienced pilots alike. First-time pilots might want to build The Star with tricycle landing gear, rubber band held down wing with plenty of dihedral, a docile .19 engine and a 3-channel radio setup. More experienced flyers will want to set it up as a taildragger, with ailerons and no dihedral on a bolt down wing, and a hot .40 powerplant. Beyond that, you can choose from three different wingtip configurations — cub style, STOL, and standard. All the parts are there.

Simple box type fuselage construction allows fast building, with plenty of room for 3 or 4 channels of radio equipment. Landing gear wires are prebent; machined and die cut plywood and balsa parts assure accuracy. Wing leading edges are preshaped. The step-by-step construction manual is highly detailed, with photographs and drawings that complement the full size plans.

Flying The Star is a real thrill. OrLine has produced a plane that, built as a trainer is simple and easy to fly, with forgiving characteristics. In a hotter configuration, it will bore holes in the sky.

Wing span: 58 in. Length: 48 in.
Wing area: 652 sq. in. Flying weight: 4 lbs.

Versatile
THE STAR

Beginner's luck. It doesn't end when your plane leaves the ground.

If your hobby shop doesn't have the OrLine kit you want, call us and we'll tell you where to get it.

**You
know
it'll
fly!**

Fairchild 22 • Sopwith Pup • Fokker DVII
Beechcraft Bonanza F33A • Freedom Stick
Polycraft • Buccaneer • Deweyville Special
Victory Stick • Beechcraft Bonanza V35B
TheStar • Piper Tomahawk • Liberty Stick



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CUNNINGHAM ON R/C

from page 22

brought their models to the field, but, because they were not going to fly, did not register, but simply put their aircraft in the pit area for others to look at.

The aircraft at this year's Fly-In seemed to be much more wide ranging in subject matter than in any other Fly-In. Smokers (aircraft not the pilots) were much more in evidence this year, with most using Don Harris' smoker system and diesel fuel for the smoke generating material.

This year we instigated the use of the IMAA airworthiness inspection format and, while time consuming, it really did prove its worth. The inspectors, Al Willart and Al Alman, both from IMAA Chapter 21, North Texas Miniature Aircraft Association, handled the inspection chores like the old pros that they are. The inspection only grounded one aircraft as not being suitable for flight. But, and this is really the best value of the inspection system, it saved five aircraft from taking off to a very short life. In each of these five cases the flier had forgotten to hook up something. Ailerons, battery pack, elevator pushrod, you name it, it was forgotten. Each of these aircraft made a successful flight after the error was found and corrected. Each would have perished on take-off if the inspection had not been done. Well-worth the time and effort.

This year the transmitter impound was moved from a covered van to tables placed under one of our three shelter houses. The transmitters were housed in racks, each rack designed to hold twenty-five transmitters. This proved to be not enough rack space, so next year we will add a couple more racks.

My old pal, Helmer Johnson did his thing as flight safety officer, and kept the runway clear for outgoing and incoming aircraft for the two days. All of the registration, accounting, and raffle ticket selling were handled for the fifth time by my dynamic duo, my long suffering wife Jan, and my super daughter Cindy. Without them, I would not be able to put on the Jumbo Fly-In. Hard working judges this year were Gary Skrasek and Don Winfield. This Jumbo was sponsored by Sky Master Industries, and hosted jointly by the Fort Worth Thunderbirds and the North Texas Miniature Aircraft Association.

Now, to the aircraft. Each year we present trophies in three categories, Most Impressive, Best Scale, and Best to page 180

Johnnie Casburn's

Super Lucky Fly II



Super Lucky Fly II for .45 to .65
LIST ...\$ 109.95 SPECIAL\$ 89.95

Little Super Lucky Fly II for .35 to .45
LIST...\$ 99.95 SPECIAL\$ 84.95

Prices Subject to Change Without Notice.

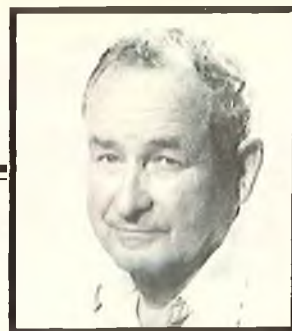
- "Ready-Built" fuselage
- Pre-finished wing ready to join
- Wing covered with 1/64" plywood
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- Excellent Plans
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SOARING

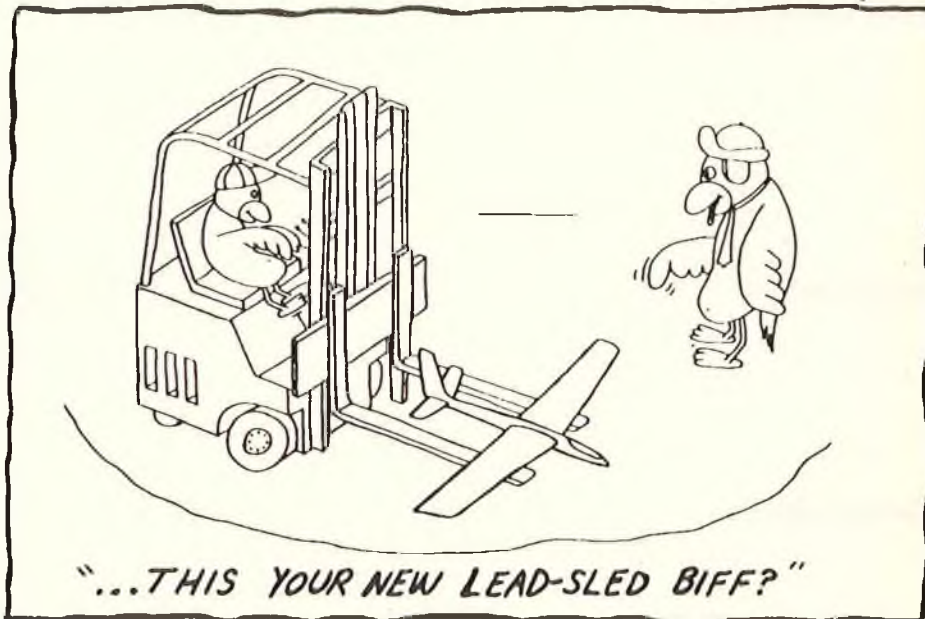
Al Doig



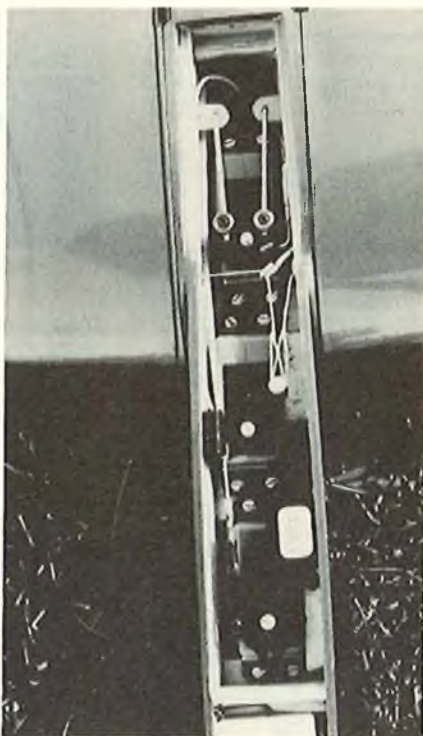
One problem with ailerons is that they are in the wing, and the servo is usually in the fuselage. Providing a positive connection, with quick disconnect capabilities, has provided a challenge to the inventors amongst us. One of the most clever solutions I've seen is provided by Terry Edmonds of 1 Lakeview Knoll, RR6, Iowa City, Iowa 52240. Bellcranks protrude from the wing root ribs into the fuselage. The bellcranks, of course, drive the ailerons through a pushrod. A 1/16" wire with a 90° bend in it simply drops into the bellcrank hole when the wings are assembled. A block on the hatch bottom keeps the wires in place. Terry's sailplane is as unusual as the linkage. It is called Callisto and has 100" fully sheeted wings. In 1981, Terry won eight first places on the Midwestern contest circuit with the Callisto. It has elevator, coupled rudder/aileron, and spoilers. The weight is 42.5 oz. with a wing loading of 7 1/4 ozs. Plans and building

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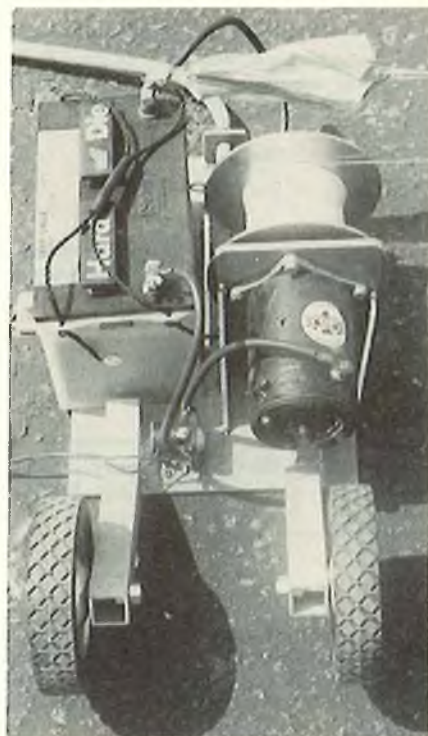
OZZIE & BIFF *by Gene Stottrop '82*



Terry Edmonds' Callisto — plans available from him.



Clever aileron disconnect by Terry Edmonds.



The "Lecudalia Cannon." Rick Schramacks' FAI winch.

SILENT POWER

Jim Zarembski



Mini Bird of Time built for electric power. See text for details.



Jim Zarembski with the Mini Bird of Time.



Interior of the Bird of Time shows the radio and electric system installation.



DeWayne Evans of Maumee, Ohio, with an original design canard "Starfire." Uses Astro Cobalt 05, 32 oz.

If you are a newcomer to R/C, or an old hand, and have not tried to fly electric, you may have a pleasant surprise ahead of you. Today's electric flight systems provide ample power and duration for

spectacular performance when the right combination of motor, battery, radio, and aircraft is used. What are the successful combinations? What should the electric powered R/C novice know to make an intelligent selection

of equipment and aircraft? In this Silent Power column we will explore several of these "motor, radio, aircraft" systems and suggest a number of options that you can use to select your electric powered R/C



Keith Shaw launching Leisure 05 powered Zomby with Astro gear box. This model has to be seen to be believed.



John Hickey, Jim Zarembski, Dan Graver and Bob Kopki at KRC field, June 1982. Note the broken airplane.

TABLE 1
RECOMMENDED ELECTRIC FLIGHT COMBINATIONS

System	Flight Battery	Motor Wt.	Battery Wt.	Total Wt.	Prop	RPM	Duration	Proven Successful Aircraft
Astro 05	8 cell .55 Ah	5.50 oz.	9.00 oz.	14.5 oz.	6/4	12,500	4-5 min.	Super Malibu, Astro Sportstor, Velie Monocoupe, RCM Mini Jacket, Gentle Lady, Drifter, Piece of Cake, House of Balsa 2x2, 2S, Olympic 650
Astro XL05	6 cell 1.2 Ah	5.50 oz.	11.5 oz.	17.0 oz.	6/4	13,000	6-8 min.	Same as above
Astro Challenger 05 (Cobalt)	6-8 cell 1.2 Ah	5.50 oz.	13.0 oz.	18.5 (7-cell)	7/6	12,000	5-6 min.	Barbarian, Super Monterey, Electrolite + all 05 aircraft
Astro 075XL	7-8 cell 1.2 Ah	6.50 oz.	13.0 oz.	19.5 (7-cell)	8/4	11,500	8-9 min.	Super Monterey, Electrolite, all large 100-110" sailplanes
Leisure 05 Pattern	6-7 cell 1.2 Ah	6.00 oz.	11.0 oz.	17.0 oz.	6/4	12,000	7-9 min.	Leisure Playboy*, Mini Bird of Time, Gentle Lady, Barbarian
Leisure 05 Racing	6-7 cell 1.2 Ah	6.00 oz.	11.0 oz.	17.0 oz.	6/4	13,000	5-6 min.	Barbarian, Kraft Cardinal, Kraft Chipmonk, Playboy*, Gentle Lady, plus all 05 models

* with gear drive

model. As a special feature, we'll show you how to convert a Mini Bird of Time kit to Silent Power.

Flight Systems:

First and foremost, the selection of your electric flight system is critical. I suggest that you purchase a new, rather than used, electric motor and flight battery. In this way, you'll be sure to have the latest technology available today with no hidden problems.

There have been drastic improvements in power and duration in the last two years and you should have the advantage of these when you first try Silent Power.

Although a number of exotic batteries have been used for electric powered R/C planes, the quick rechargeable nickel cadmium battery is the energy storage unit which has made Silent Power possible.

Individual battery "cells" generally are rated at 1.2 volts and range from .225 amp hour to 1.8 amp hour. Voltage is a measure of the strength of the electron flow. The ampere hour rating refers to the capacity of the cell.

Amperage is a measure of how fast the current stored is used. A battery rated at .55 Ah will theoretically deliver current at 1 ampere for .55 hr. If your electric motor draws 10 amperes, the motor can be calculated as follows:

$$\text{Time} = \frac{\text{amp hr capacity of battery}}{\text{ampere draw}}$$

$$= \frac{.55 \text{ Ah. cap.}}{10 \text{ amp draw}} = .055\text{hr} \times 60\text{min.} = 3.30 \text{ min.}$$

Electric flight systems sold in the

United States use either .55 Ah or 1.2 Ah capacity. The advantage of the 1.2 Ah cells is greater duration. Of course, the penalty is higher weight. Any of the systems commercially available use either General Electric or Sanyo batteries which can be quick charged in 15-20 minutes.

You should consider how the flight system you select will be charged. For systems up to 8 cells a number of simple chargers are available at a modest cost that plug in directly to your car cigarette lighter. You always have a powerful 12 volt DC source for charging your flight system when you use your car battery.

The larger systems using 10, 12, 16, or 20 cells require a charging voltage greater than 12 volts. You can purchase a Field Charger from Astro Flight which uses two 12 volt motorcycle batteries or four 6 volt Gel Cells, or you can use an Astro Flight Power Booster. The Booster is clipped onto the terminals of your automobile battery and boosts the 12 volt car voltage up to 24 or 30 volts. Either of these approaches work well.

However, for your first entry into electric power, I recommend an 05 size system simply because the cost of the charger and flight system is quite low.

When you get hooked on electric flight, the charger can be used in tandem with a Power Booster to give you full charging capability.

There are several types of 05 systems available in this country today. However, two companies are dominating the 05 market. They are Astro Flight, who offer several

systems in the 05 range, and Leisure Electronics, who market two highly successful versions of the 05.

A wide selection of systems is shown in Table No. 1. Virtually all of these combinations will work well if you build the model light and use a lightweight radio. The radio should weigh in at no more than 8 oz. for a three channel system. Futaba, Airtronics, Kraft, and Cannon all make lightweight radio equipment. Use the small 225 mA flight battery and the mini servos. Check with your dealer or with the manufacturers for the systems data.

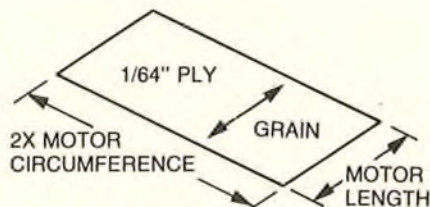
Once you purchase your flight system, radio and aircraft, it's time to begin construction. What is different about an electric model? Use less adhesive and sand more wood off the model.

If you scratch-build or build a conventional kit, be sure to use a lightweight adhesive. I personally use Sig 5-Minute Epoxy and Carl Goldberg Super Jet for all construction, with the exception of applying wing skins over foam cores where I use Dave Brown's Southern Surghum. The nicest features about these products are ease of use, light weight, high speed of curing, and astonishing high strength.

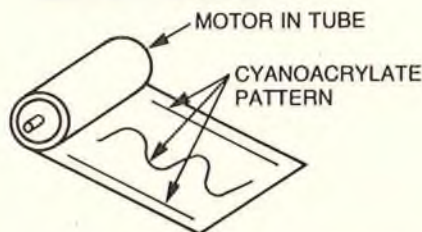
Before proceeding, determine where your flight battery is going to be placed and how you'll mount the motor. Where applicable, I recommend either of the two mounting tube procedures shown in Figure 1, depending on the height and width of your fuselage at the nose.

FIGURE 1 ROLLED PLYWOOD MOTOR TUBE FOR ELECTRIC MOTORS

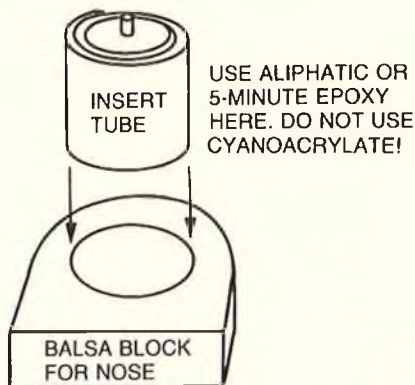
1. CUT OUT A SHEET OF 1/64" PLY AS SHOWN SO THAT THE GRAIN IS ORIENTED FOR EASE OF WRAPPING.



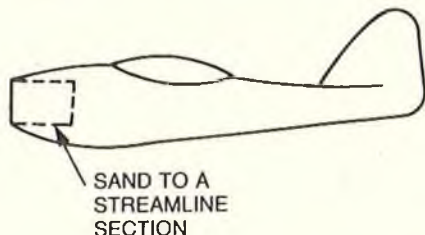
2. WRAP MOTOR IN PLASTIC WRAP. WRAP THE TUBE COMPLETELY AROUND THE MOTOR UNTIL YOU OVERLAP TWO REVOLUTIONS. APPLY SUPER JET AS SHOWN.



3. SLOWLY ROLL TIGHT AND HOLD THE TUBE CLOSED.
4. WAIT A MINUTE AND INSERT TUBE WITH MOTOR INSIDE INTO A CUT BALSA NOSE BLOCK USING 5-MINUTE EPOXY OR ALIPHATIC RESIN (TITEBOND).



5. INSTALL ON AIRCRAFT AND SAND TO A STREAMLINED CROSS SECTION AT NOSE.



However, the easiest approach is to build an aircraft that has a plywood motor mount so the motor can be fastened to the front of the aircraft with two machine bolts.

Mini Bird of Time:

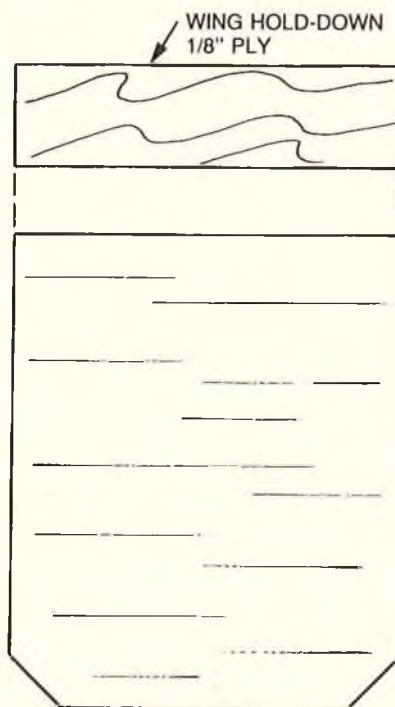
Since R/C electric powered sailplanes are quite popular, I felt it would be interesting to demonstrate how a standard sailplane can be converted to Silent Power. The Mini Bird of Time, manufactured by Mark's Models, was chosen because of its lightweight construction and its conformance to those criteria required for the success of an electric powered sailplane.

The vital statistics of this two meter ship are: wingspan, 79"; length, 40"; wing area, 609 sq. in.; weight as an R/C sailplane, 25 oz. It was felt that as an electric powered sailplane we could replace the 500 mA flight battery with a 225 mA pack and could eliminate the need of any nose weight. This should save about 3 oz. When you add 16 oz. for an 05 size system, the net weight of the electric Mini Bird of Time was estimated to be about 38 oz. for a wing loading of 8.98 oz./sq. ft. This is, in fact, how the model turned out.

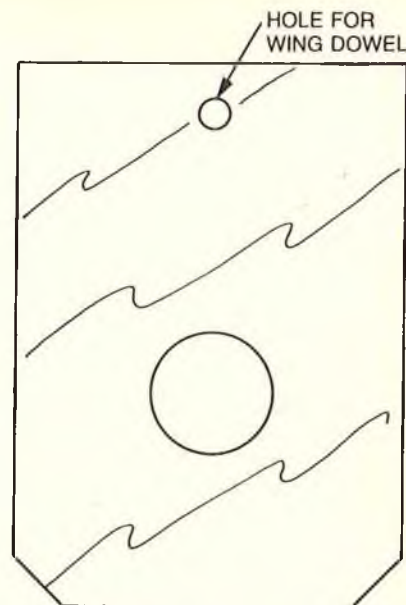
Conversion:

You will quickly become aware that the Mini Bird of Time does not have a fuselage wide enough for an electric power installation. Therefore, it was necessary to replace the fuselage formers in the kit. The formers designed to widen the fuselage for batteries, etc., are shown here full size in Figure 2.

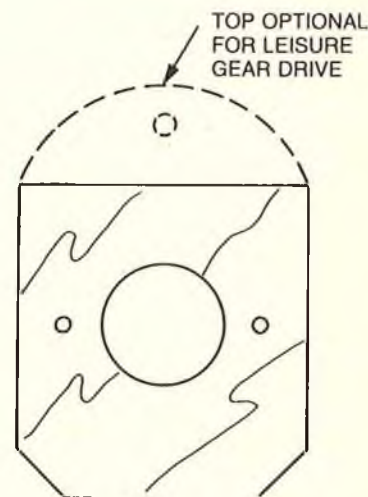
FIGURE 2 MINI BIRD OF TIME ELECTRIC CONVERSION FULL SIZE FUSELAGE FORMERS



K10 — F5
3/32" BALSA



K10 — F11
3/32" PLYWOOD



K10 — F3
3/32" PLYWOOD

This typifies the plywood fuselage front approach for mounting electric motors. The only other major modifications to the kit were the elimination of the 3/8" balsa hatch by a sheet of 3/32" balsa and the introduction of a doweled and bolted wing hold-down rather than the use of rubberbands.

Build the wing, stab, and fin per the instructions. I used the 8% thick wing. Included as part of the kit is an 11% thick airfoil option. The die-cut ribs are cut to 8% with an 11% filler die-cut above each rib. If you intend to use the thinner airfoil section, just punch out the ribs. However, if you want the thicker section, you must first cement the top of the rib to the bottom by running a bead of cyanoacrylate or white glue in the die-cut crack at the top of each rib.

The plywood/balsa fuselage sides included in the kit were used with the



KRC's John Hickey with Astro 05 powered original.

only modification required being the addition of 2% downthrust to the nose. The new formers were cut out and formers K10-F5 and K10-F11 were epoxied to one of the fuselage sides lying flat on the building board, held upright with triangles to assure they were perpendicular to the fuselage side. When the epoxy is set up, the other side of the fuselage was placed on the building board and the formers were epoxied, making sure that there was an alignment at the nose, top, bottom, and rear.

When dry, the rear formers were added with Super Jet and the K10-F3 nose former was epoxied in place along with the wing hold-down bearer.

The remainder of the aircraft assembly was routine. The radio installation required that the rudder and elevator servos be placed at the rear of the compartment under the wing. The motor battery was a 6 cell Sanyo pack stacked in two rows of 3 cells each. The flat pack, as marketed by Leisure, will also fit, but the radio installation is more cumbersome.

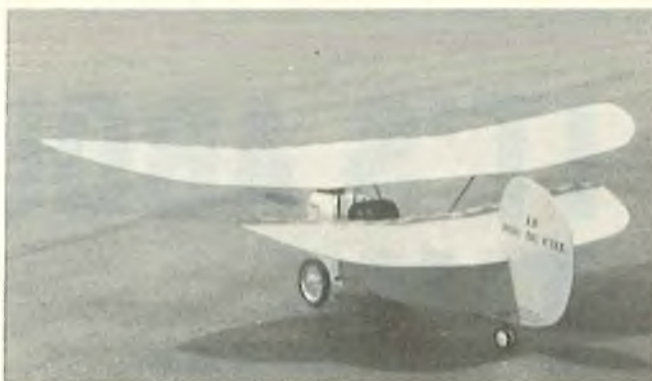
The radio battery on-off servo for motor control, and the receiver, were placed in the front compartment. As noted, the RTF weight of the Mini Bird

of Time is 38 oz.

The model has been flown with the Astro Cobalt 05, both the Leisure pattern and racing motor and the Astro XL 05. The most spectacular climb to date is with the Cobalt 05. The nose former K10-F3 shows a modification for the installation of a Leisure gear reduction. I did not try this, but feel that it should work quite well.

At first, I didn't like the Mini Bird of Time in the air. It seemed sluggish and always on the verge of a stall. It was my fault. I tried to fly it too slowly. The Mini Bird of Time is fast, as 2-meter sailplanes go, and for best performance must be flown as intended. It is a tremendous thermalling machine, especially on windy days. A big advantage is the use of the high speed gained with a little down trim to quickly travel from one thermal to another. The flight times are generally 12-15 minutes in still air. The longest thermal flight to date is around 45 minutes.

If you elect to convert a Mini Bird of Time to electric power, I'm sure you'll be pleased. The techniques used in converting this kit apply to dozens of other sailplanes.



The next Silent Power will include a report on the electrifying activity of Mel and Dick Thomas of Milwaukee. The "Pou Du Clei" has a 66" span and is powered by a geared Astro 15 using a 13/8 prop — flies nice!

Interesting Electrics

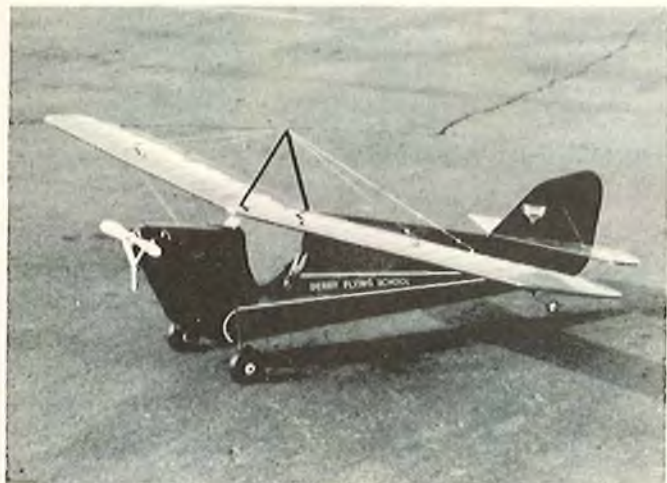
Included in this month's interesting electrics are DeWayne Evan's "Starfire" and Keith Shaw's "Zomby." The Starfire is the third canard put together by DeWayne. It is quite impressive in the air and is very stable. The model shown uses a built-up wing. A foam wing version is under construction.

Keith Shaw's Zomby was included in the coverage of the 1982 Toledo Show. The model flies even better than it looks. Keith can pull the Zomby up to 800' three times per charge.

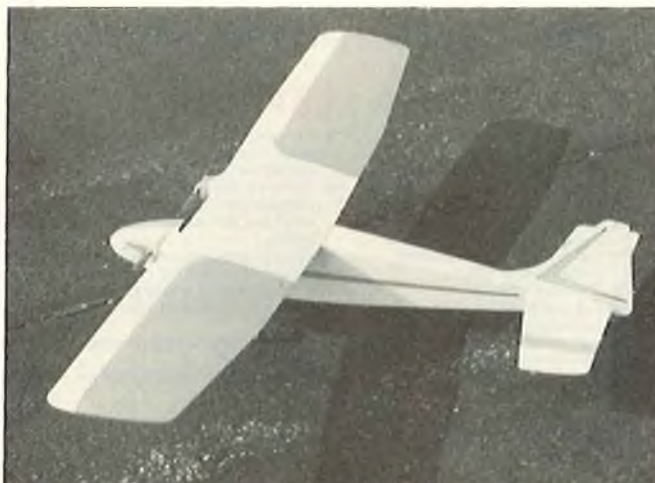
The summer of 1982 was personally exciting for me. I had the opportunity to visit the Keystone RC Club in Pennsylvania, the last club of the annual KRC Electric Fly. I proceeded to knock the nose off my airplane with an unfortunate altercation with a factory! The next Silent Power will feature a full report on the third annual KRC Electric Fly.

In addition, we'll introduce you to Mel and Dick Thomas, the Silent Power dynamic duo from Milwaukee.

Until next time, Good Flying!

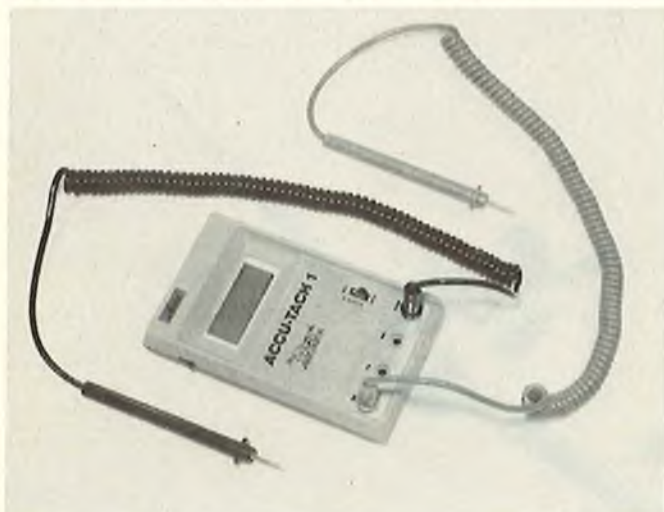


Aeronca C-3 by Mel Thomas. Four channels used with a direct drive Leisure 05. This C-3 weighs in at 32 oz. with 375 square inches.

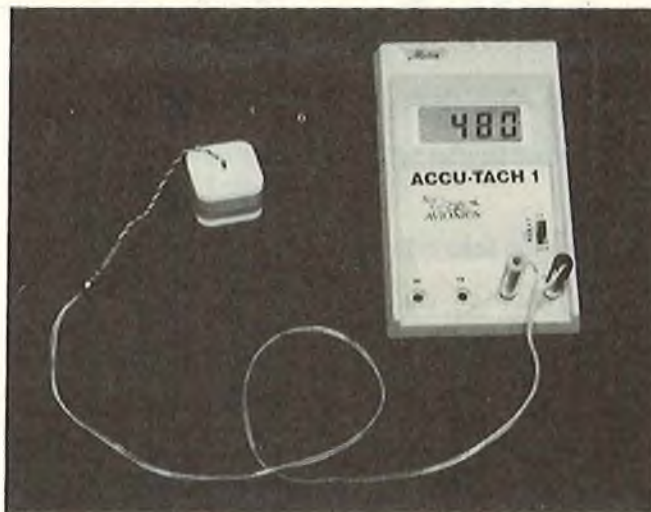


Another Mel Thomas original — a twin 020 powered sport model which uses a Cannon Super Micro radio (3 channels) for an all-up weight of 28 oz. with 310 square inches.

ACCU-TACH 1 DIGITAL TACHOMETER



Accu-Tach 1 using Radio Shack test probes (on 0-20 D.C. voltmeter scale).



Reading Ace R/C 100 mAh receiver battery pack voltage of 4.80 volts D.C. (set on expanded scale for receiver battery packs).

The Accu-Tach 1 is the latest tachometer entry into the R/C modeling field. It is manufactured by Norcal Avionics of Sunnyvale, California.

The Accu-Tach 1 is an optical pick-up, digital readout tachometer. What makes the Accu-Tach 1 unique is that it also serves as an expanded scale voltmeter and as a 0 to 20 DC voltmeter.

Virtually all of the currently available R/C modeling tachometers can be grouped into two distinct categories. There are the mechanical types, which are simply held in contact with the engine crankshaft tip, the prop nut, or spinner nose; and the optical pick-up type units which function via reflected light from the propeller (or marked flywheel) blades.

(Several years ago, audio tachometers were also introduced into the R/C modeling world. These units, for whatever reasons, soon disappeared.)

The Accu-Tach 1 has two different scales. The 10X scale is effective up to 20,000 rpm and the 100X scale is for use up to 35,000 rpm. The 100X scale reads in 50 rpm increments. A large liquid crystal display (LCD) is used, which can be easily read, even in the brightest sunlight.

In addition to its primary use as a tachometer, the Accu-Tach can be used as an expanded scale voltmeter for receiver and transmitter battery checks and as a 0-20 DC voltmeter. In this capacity, it is particularly useful for monitoring fast charging of batteries at the flying field.

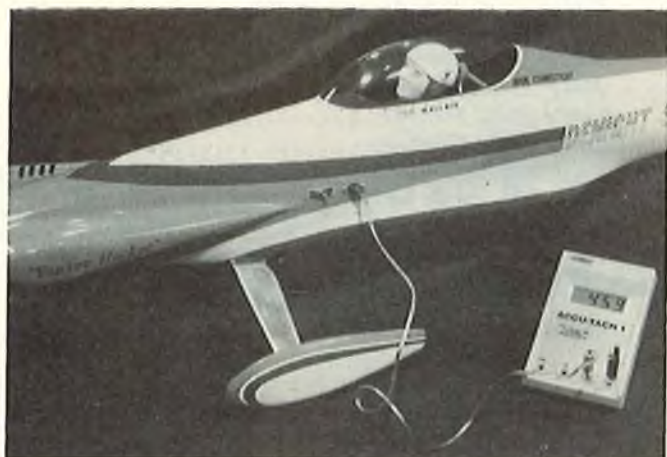
The Accu-Tach is a compact unit

which measures $5\frac{1}{2}'' \times 3\frac{1}{4}'' \times 1\frac{1}{8}''$. A 9 volt (standard transistor radio type) battery is used to power this unit. It is priced at \$79.95 list, which makes it the lowest priced digital tachometer available.

The Accu-Tach has separate built-in jacks for measuring the receiver, transmitter, and general 0-20 DC voltages.

Somewhat surprising to us was the fact that no test leads or plugs are included with the Accu-Tach. However, the necessary plugs are standard "Banana" types which are readily available. A trip to the local Radio Shack equipped us with a set of test probes (#278-750A) for \$3.99, and an extra set of plugs (#278-721) for 99¢. The test probes are most useful for

to page 163



Reading airborne battery pack voltage of 4.59 volts D.C. (via radio system charging plug).



Accu-Tach 1 reading high throttle rpm of 12,530 on O.S. .35 engine.

FIRESTREAK



A look-alike of the full size Lear Fan Supership, this model is a real performer. Powered by a .15, when airborne, hold onto your hat.

by Joseph M. Mergen

The writer has been intrigued by the configuration of this design since the Douglas XB42 "Mixmaster" Bomber prototype days, circa 1946. The advent of the new Lear Fan 2100 brought it all together again and the temptation to build it as an R/C model would not go away.

This type of airplane actually predates the Douglas. Paulhan-Tatin built and flew a similar configuration with a 50 hp Gnome engine in 1911. The only data which can be found is that it "outperformed all others" in its power class doing 80 mph.

The writer had actual experience with the "Mixmaster" having designed and built the propellers while Chief Design Engineer at the old Curtiss Wright Propeller Division.

The Douglas outflow everything around also and was abandoned only because of gear box troubles and the advent of the jet engine. The lack of public and government interest in anything military in the demobilization days of 1946 may have had something to do with its demise also.

Anyway, here it is again in the Lear Fan 2100. Somebody re-invents this airplane every 35 years. Some valid claims can be made for this type airplane and are as follows:

- Symmetrical thrust during single engine operation.
- Drag reduction due to lack of slipstream over the fuselage, empennage and some of the wing and fuselage boundary layer clean up.
- Improved stability due to propeller normal force behind the C.G.
- Clean fuselage and surface shapes with minimum interference drag points.

- Low cabin noise and vibration.
- Lack of structure through cabin such as the wing spar, etc.
- Good visibility.
- Good appearance.
- Efficient structure.

FIRESTREAK

Designed By: J.M. Mergen

TYPE AIRCRAFT

Aerobatic Sport

WINGSPAN

40 Inches

WING CHORD

8" (Avg.)

TOTAL WING AREA

320 Sq. In.

WING LOCATION

Low Wing

AIRFOIL

Symmetrical (NACA 63012)

WING PLANFORM

Double Taper

DIHEDRAL EACH TIP

19 1/4 Inches

O.A. FUSELAGE LENGTH

34 Inches

RADIO COMPARTMENT SIZE

(L)11" x (W)2 1/2" x (H)2 1/2"

STABILIZER SPAN

17" (Proj. V-Tail)

STABILIZER CHORD (inc. elev.)

4 1/2" (Avg.)

STABILIZER AREA

76 1/2 Sq. In.

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

3 1/2 Inches

VERTICAL FIN WIDTH

3" (Avg.)

REC. ENGINE SIZE

.15 Cu. In.

FUEL TANK SIZE

4 Oz.

LANDING GEAR

Tricycle

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Ruddervator, Ailerons, Throttle

(V-Tail w/Mixer) Opt. Flaps

BASIC MATERIALS USED IN CONSTRUCTION

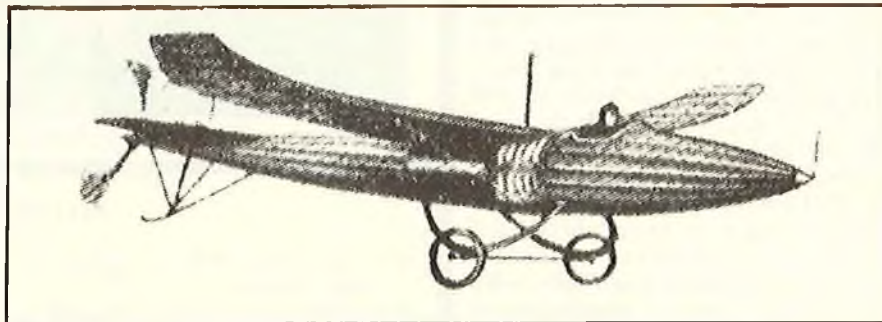
Fuselage Balsa, Spruce & Ply

Wing Balsa, Spruce & Ply

Empennage Balsa & Spruce

Wt. Ready To Fly 45 Oz.

Wing Loading 20.25 Oz./Sq. Ft.



First known aft fan by Paulhan-Tatin in 1911. 50 horsepower, 80 mph.



1946 aft fan bomber by Douglas. Military designation XB42. Two engines geared to two counter rotating propellers.



1981 aft fan by Lear — Lear Fan 2100. Two turbo-prop engines geared to a single propeller.

So much for the big one. The model has almost everything going for it that the big one has except people in the cabin to enjoy the quiet and Reynolds number. Even the Reynolds number

isn't too bad being 430,000 at 70 mph.

"Firestreak" is not a scale model of the Lear, but is close enough to suggest it is the same airplane. Making it to scale was abandoned when it was discovered that a scale wing would be so small that the wing loading would be undesirably high for a 40" wingspan model. A larger model with a .40 or .60 CID or even larger engine might be built to Stand-Off Scale with great success. Maybe some day — but back to the present.

Flight testing the model proved to be a delight. Prior to flying, the writer was concerned as to the directional stability due to the long nose ahead of the wing and undesirable sensitivity in pitch due to the close coupling of the tail. Neither problem arose and, with the surface travels shown, the handling is excellent. Stability is outstanding. It has been flown "hands off" many times. The airplane is very nimble and maneuverable but has no unpleasant handling qualities or surprises.

The speed with this small engine is impressive. "Firestreak" is the proper name. It has been clocked at 82 mph.

Oh, by the way, the only clean-up job after flying is to wipe the oil off the prop, spinner and left ruddervator. Won't that be new to us glo-engine users?

CONSTRUCTION

Please note that a permanently attached wing is used on this model. A removable wing was considered, however, a more rugged model is obtained with the wing cemented in place. Also the airplane is small and easily transported in one piece.

Construction of the semi-oval fuselage may seem complicated but really is no harder than a flat one except for lots of sanding.

Attention must be paid to keeping the radio components in the location shown to balance the engine weight. Their location also provides very good accessibility.

Care should be taken to use reasonably light balsa for fuselage planking and empennage parts for good balance.

The above will also help the total weight which should be kept at 45 oz. or less with a full fuel tank.

The prototype was built with a fixed wing and using standard Futaba 4 channel radio gear balanced right at the 30% location shown without ballast. Flight testing has shown this to be a very satisfactory C.G. location.

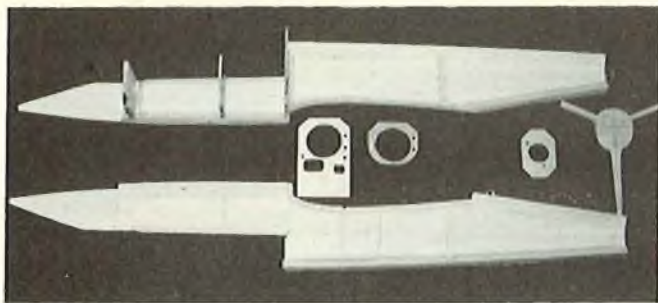
Since this is a pusher airplane using a right hand rotation engine (you can't get a reverse rotation engine in this size), it requires a left hand propeller. Fortunately "Zinger" has just gone into production of an 8/4 pusher or left



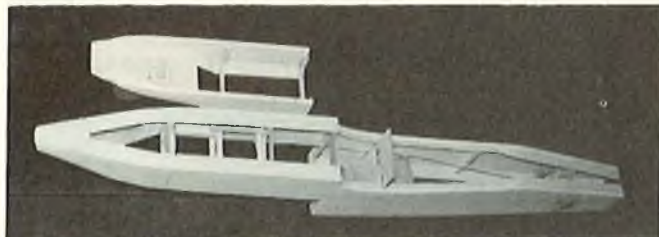
Firestreak on final approach. Note partial flaps.

BILL OF MATERIALS

- (5) 1/4" x 3" x 36" — balsa — fuselage sides, top, W1, stabilizer, ruddervators, wing trailing edge, ailerons
- (3) 1/2" tri. x 36" — balsa — fuselage longerons
- (1) 1/8" x 3" x 36" — balsa — fuselage bottom, F8, fuselage doublers, inner leading edge
- (2) 3/32" x 3" x 36" — balsa — ribs, W2, W3, W4, W5, W6, W7
- (1) 1/4" tri. x 36" — balsa — wing saddle, etc.
- (1) 3/8" x 1/2" x 48" — balsa — wing leading edge
- (3) 1/16" x 3" x 36" — balsa — planking, spar webs
- (1) 3/4" x 7/8" x 12" — balsa — wing tips
- (1) 3/8" x 3" x 8" — balsa — cabin top, windshield
- (1) 1 1/2" x 1 1/2" x 2 1/4" — balsa — nose block
- (1) 1/16" x 1/4" x 16" — spruce — cabin tracks
- (2) 3/32" x 3/16" x 48" — spruce — wing spar caps
or (3) 3/32" x 3/16" x 36" — spruce — (spliced)
- (2) 1/4" x 1/4" x 24" — spruce — stab spars, servo rails
- (1) 1/4" dia. x 3/4" — hardwood dowel — wing dowel pin
- (1) 3/16" x 6" x 10" — ply — F4, F9, F9A, stab spar doublers, wing center web
- (1) 3/32" x 6" x 12" — ply — F4A, F5, F6, F6A, F6B
- (1) 1/8" x 6" x 5" — ply — F7, F10, F9A, hatch block
- (1) 1/16" x 6" x 12" — ply — F9, F9B, F7A, wing spar doubler, wing center web, hatch, hatch tongue
- (1) 3/8" x 5/8" x 9" — pine — landing gear blocks
- (1) .010-.015" x 6" x 5" — soft aluminum — cowling, exhaust def.
- (1) 1/8" dia. x 36" — music wire — main landing gear
- (1) 1/8" O.D. 3/32" I.D. x 1 1/2" — brass tube — fuel line
- (1) 1/8" dia. Goldberg SN 180 — nose gear assem.
- (4) 1/8" dia. — WC 180 — wheel collars
- (1) 3/16" dia. x 36" — Nyrod Assem. — ruddervators
- (1) 1/8" dia.-1/16" dia. — cable assem. — throttle
- (3) #2 thd. brass cable ends — throttle
- (6) #2 thd. steel threaded rods — throttle, ailerons, ele.
- (3) Steel clevises — throttle, ailerons
- (2) #4 ball joints — ailerons
- (1) 3/32" dia. x 8" — music wire — aileron horns
- (2) Small nylon horns — ruddervator
- (1) Du-Bro mixer — ruddervator
- (3) Small nylon clevises — ruddervator, throttle
- (4) #1 x 3/8" — screws — hatch, cowl
- (4) #4 — "T" nuts — engine mount
- (4) #4 — bolts & lockwashers — engine mount
- (10) #2 x 1/4" — screws — landing gear & hatch
- (4) .032" x 3/4" x 1/4" — alum. sheet — landing gear clips
- (2) #2 x 1/4" — screws — exhaust deflector
- (1) Sullivan round fuel tank — 4 oz.
- (1) 3/16" dia. x 24" — fuel line
- (1) 1/16" dia. x 7" — music wire — nose wheel, steering
- (1) Robart Super Pumper
- (1) 2" dia. — std. wheel
- (2) 2 1/4" dia. — std. wheel
- (1) KM15 — engine mount
- (1) 1 1/2" dia. — Goldberg spinner
- (1) 8" dia. x 4" pitch pusher prop — Zinger
- (1) O.S. .15 engine
- (1) 4 channel radio
- (1) 1/16" x 1/8" x 2.5" soft rubber — cowl vib. isolator
- (1) Roll MonoKote or equivalent, epoxy, cyanoacrylate, aliphatic cements, solder, foam wrap, as required
- Optional flaperons
- (1) Du-Bro Mixer — flaperons
- (1) 1/16" ball joint — flap-throttle arm
- (2) #2 x 12" threaded rods — flaperon pushrods



Fuselage side assemblies ready to join. Note marked frame locations and saw cuts in longerons.



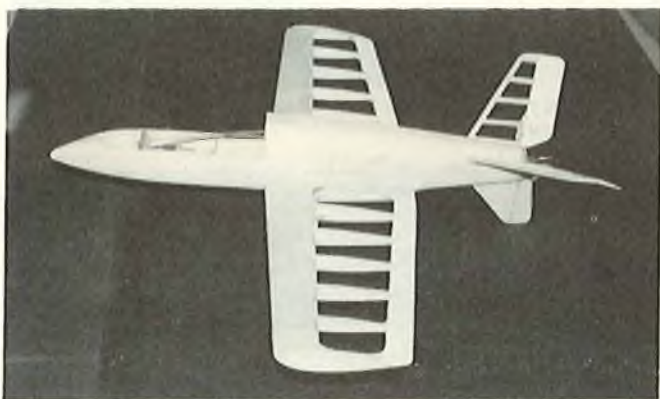
Bottom view of fuselage and cabin showing throttle cable tube.



Finish sanded fuselage. Stabs are fully installed. Note partial wing fairing at trailing edge (see text).



Top view of finished wing with ailerons and hatch in place.



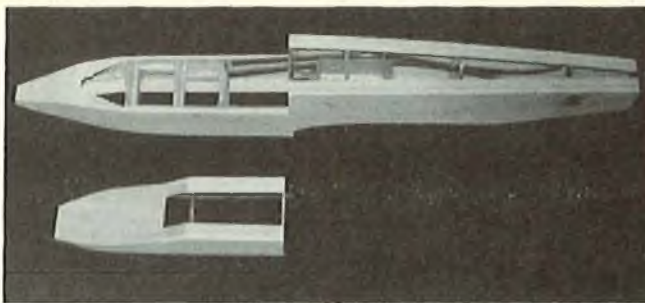
Since a permanently attached wing was chosen, the whole airframe was assembled at this point. Ailerons and ruddervators are hinged with MonoKote.

hand propeller. This seems to be just right for this airplane. The photos show a "Grish" 8/6 cut down to a 7 1/4" dia. The airplane flies reasonably well on this prop, but loses some thrust

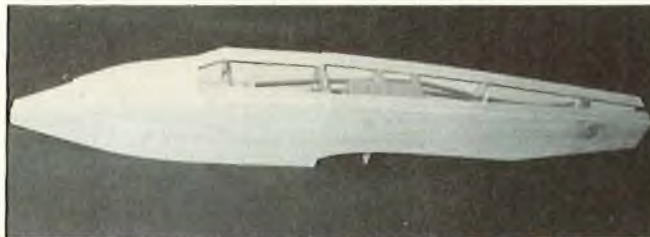
compared with the 8/4.

Fuselage:

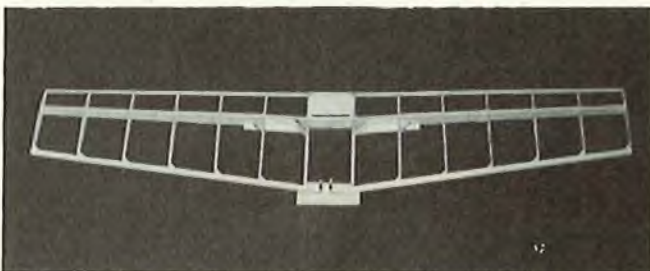
Start the fuselage by cutting out all frames including the partial frames for the canopy and the nose block. It



Fuselage and cabin with all frames in place except F8. Assemble F8 when rough sanding is completed. Nyrod tubes, servo rails, and fuel tank in place.



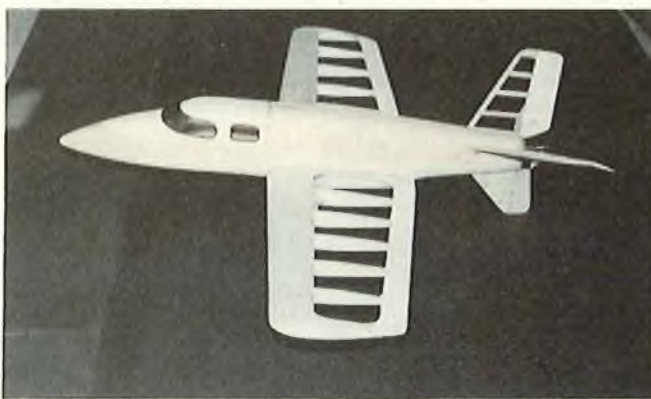
Fuselage with cabin in place. Don't worry, it will look better with top planking and sanding.



Wing frame less tips and planking. Aileron horns are installed at this time.



Bottom view of finished wing.



Assembled airframe with finished and covered cabin in place.

will be convenient to cut out and cement F8, F8A and the stab spar reinforcement to each other. Also drill and assemble the "T" nuts for the nose gear and engine mount.



Front view of airframe. Windshield and windows are chrome MonoKote.



Firestreak finished and ready to fly. Graphics are MonoKote on MonoKote. Lettering and numbers are Rub-On transfers covered with clear MonoKote.



Rear three quarter view of Firestreak. Note trailing edge fairing.



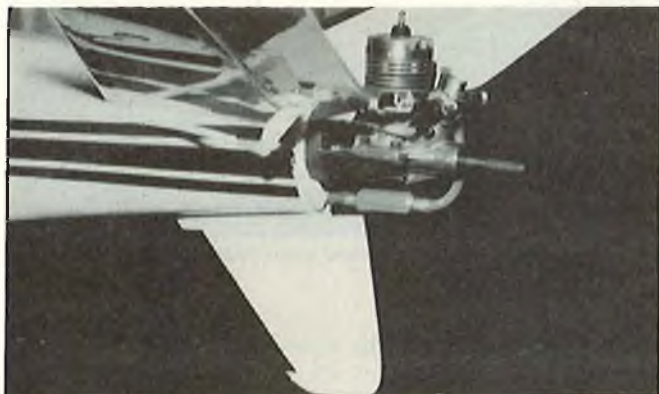
First place in "Unique Class," Concord R/C Show.



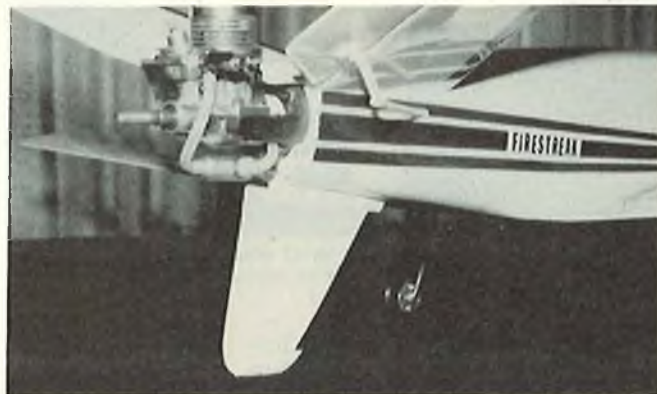
Detail of power plant from the rear. Note details of home built exhaust deflector.



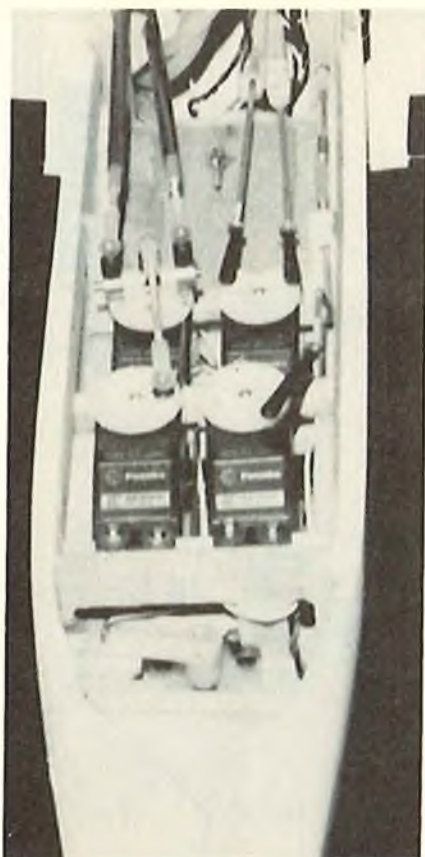
Detail of aft end of fuselage from front showing power plant and ruddervators.



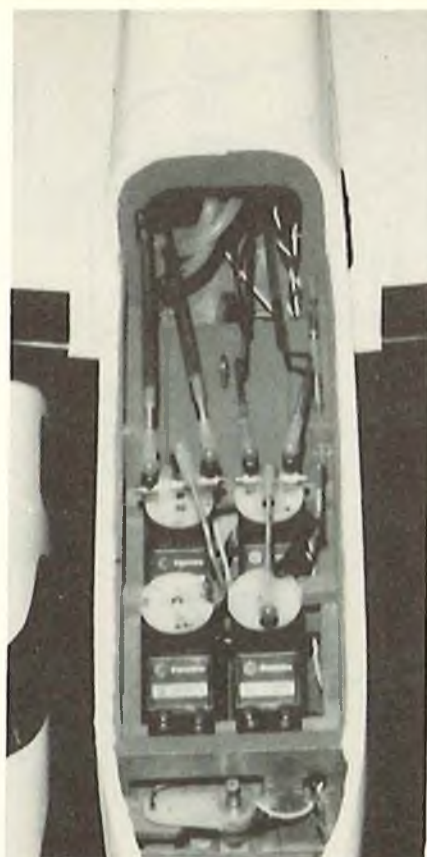
Left side of engine installation showing throttle linkage and pumper installation. Hardwood cowling block is shown.



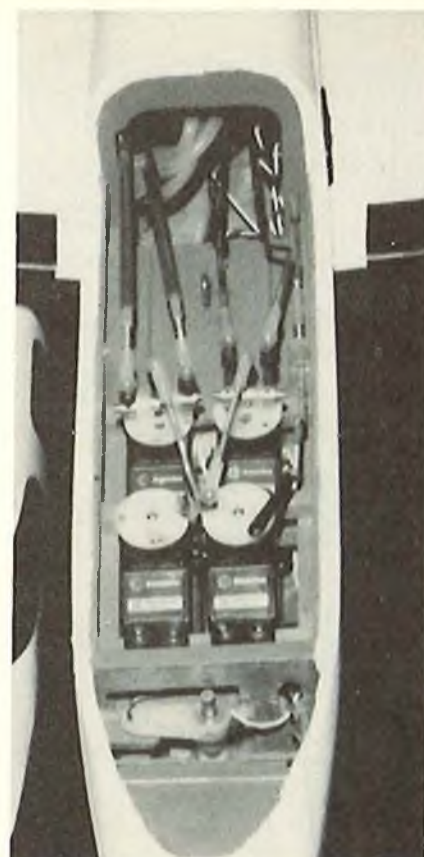
Right side of engine installation. Note side pumper line connects to center of rear crankcase plate which must be drilled, tapped, and have fitting installed. Pumper lies on cowling.



Cabin removed to show control system. This is aileron only hook-up (top right hand servo).



Optional flaperon arrangement. Mixer added to aileron servo and controlled by throttle servo. Shown in full throttle-flaps up condition.



Optional flaperon arrangement. Mixer added to aileron servo and controlled by throttle servo. Shown in idle throttle-flaps down condition.

Next, butt join the 1/4" x 3" fuselage side material along a horizontal line (the W/L is convenient) and cut out fuselage sides. Note that the canopy separates at the forward side of F4 and at the waterline. Also note the splice at F1. The 1/4" thick fuselage sides stop here. Now assemble the triangular longerons, triangular wing saddles, and canopy rails. Don't be afraid to use razor saw cuts to make bending easier. Cut out the nose sides from 1/8" sheet and splice at F1 as shown. Do not assemble doublers or triangular longerons ahead of F1 at this time.

The fuselage sides are joined by cementing to F1, F3, and F4. Make sure these frames are square with the centerline. Next add F5, F6, and F7. Check alignment of sides with sides of F8 but do not install F8.

The fuselage nose ahead of F1 is made of 1/8" sheet to facilitate bending. Soak the 1/8" sheet, bend, and cement to nose block. Next, add the triangular longerons and 1/8" doublers to this forward section. Razor saw cuts will facilitate bending the longerons and doublers.

Build up the cabin in the same way. The top, windshield block, and nose top can be assembled on the canopy.

After installing the ruddervator nyrods, throttle cable, fuel tank, and

line, the fuselage top and bottom planking can be cemented in place. This is as good a time as any to put in the servo rails.

For sanding the fuselage to shape, templates can be made for each station, etc., however, the writer did not take all these pains with the contour but sanded the fuselage to shape as follows:

Square off the aft end at F8 and, using the F8 assembly as a template, mark the end of the fuselage. Lay out the shape of the top of F4 on the aft end of the cabin and sand the top to shape. After taping the cabin on, the contours can be eyeballed between the windshield and F8 using the cut-away portion of the longerons as a guide to thickness. This sounds a little "barbaric" but seems to work. At the wing trailing edge, let the fuselage sides come almost straight down. Then aft of the trailing edge, blend in the oval contour again. The result will be a very nice looking partial wing fairing.

When the rough sanding is completed, recess the fuselage end to receive the stab spar reinforcements and F8A and cement the F8 assembly in place being sure to square up with the wing saddles.

Empennage:

Using light 1/4" sheet balsa you

may strip the parts needed for the stabilizers and ruddervators. All parts are balsa except the spruce spars and the wedges between F8 and the spars. Leave the root rib out until the stabilizers are attached to the fuselage.

Assemble the stabilizers to the fuselage as follows:

Lightly scribe the "waterline" on the fuselage with a soft pencil. Draw a zero incidence line using the "waterline" as a reference and measuring from it to the bottom of the spar extension on F8.

Trim the leading edge so that it butts against the fuselage when the spar and spar extension on F8 fit. Cement in place. Then carefully fit the root rib and cement in place.

Using 1/2" or laminating two 1/4" sheets, shape the two pieces of the ventral fin and cement in place. Sand flush with F8A.

This completes the empennage and fuselage which are now ready for final sanding and covering.

Wing:

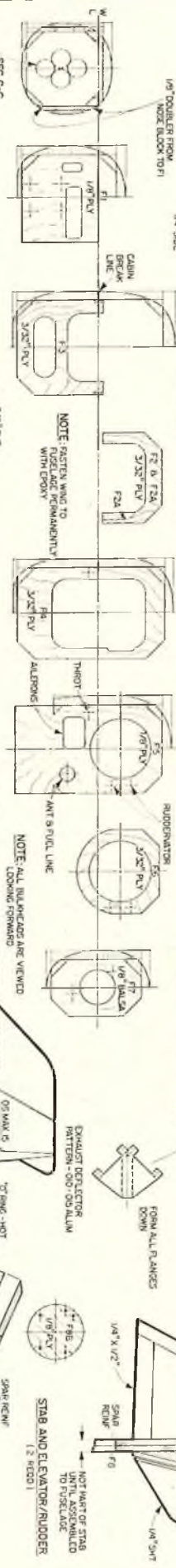
The wing section used on "Firestreak" is a high speed NACA 63012 symmetrical section. This section has very little center of pressure travel and practically zero moment about the aerodynamic

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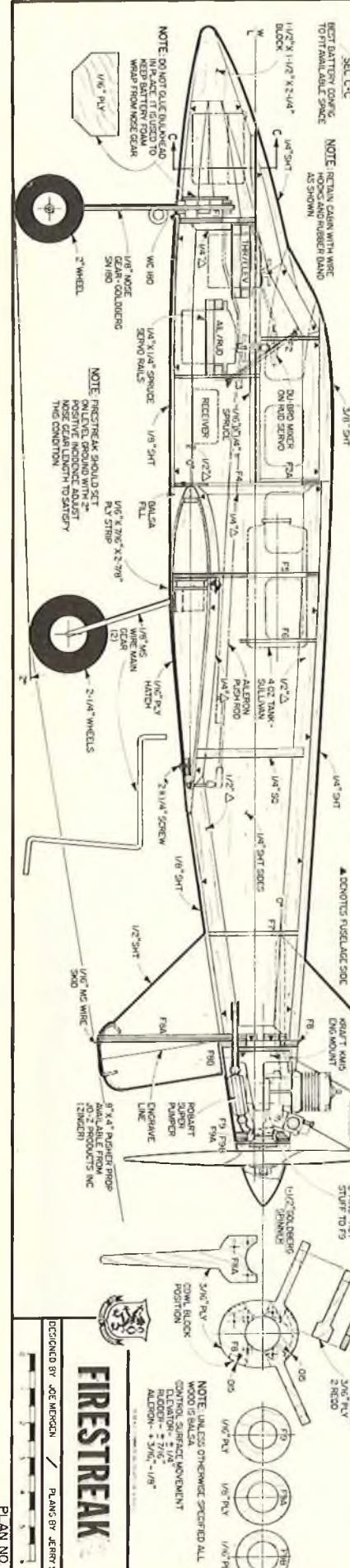
DU BRO SMALL NYLON
HINGES - INSTALL 3 ON



SECTION B-B



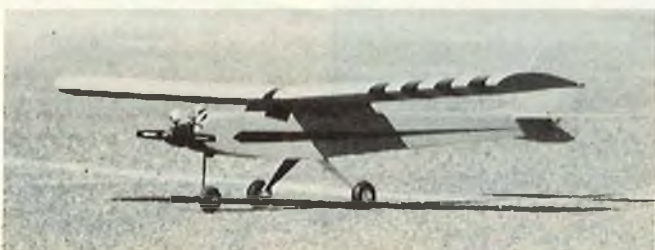
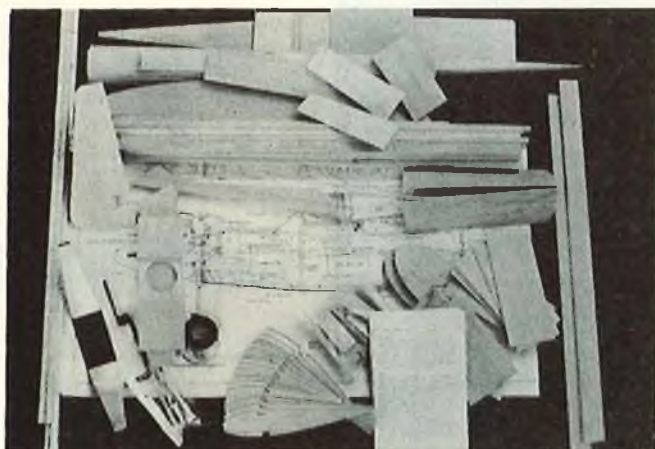
UNIL ASSEMBLY
TO FUSELAGE



PLAN NO. 879

RCM PRODUCT REVIEW

**Kraft Systems
4-SEASONS 40**



The "4 Seasons 40" was designed by Joe Bridi for Kraft Systems' new series of kits under the label of "Kraftkits."

Designed as an intermediate trainer or Sunday Flier that would be easy to build and would offer good solid flight performance. The engineering involved becomes obvious during the construction process. The first thing that caught our eye, when we opened the 37½" x 6¼" x 3½" box, was the total absence of die-cut parts. Each piece from the wing ribs to the fuselage parts, were sanded or sawed to shape. The tri-stock for the wing tips had been cut from the same block to ensure equal density and sandability. The hardware package included a Kraft mount, Dural gear, nuts, bolts, blindnuts, aileron torque rods, and miscellaneous hardware.

Construction:

During our review of the instructions and plan, we decide to change the wing mounting to the old standby of a leading edge dowel and two 1/4 x 20 bolts in the trailing edge. The plan indicates four 1/4 x 20 wing mounting bolts, but the forward ply plates make the radio box access difficult for a ham-handed builder. Either method will work, but the layout as drawn on the plans will be stronger.

One well-drawn plan sheet measuring 31" x 58" and an error-free instruction manual of 16 pages, which includes a complete parts list, function as an easy to follow guide to construction.

The fuselage sides are built over the plans using pre-cut 3/16" balsa parts. When the sides are dry they can be joined over the plans using the 3/16" balsa bulkheads and 1/4" ply firewall. The aft fuselage top is cut to shape from 3/16" balsa and will help keep the fuselage straight. The tank compartment has a removable hatch which was also cut to shape. The fuselage bottom from the gear mount forward is sheeted with 1/16" plywood. We used Goldberg Super Jet for all construction to save time and weight. The fuselage was very easy to build primarily because of the pre-cut and

SPECIFICATIONS

Name	4-SEASONS 40
Aircraft Type	Sport/Trainer
Manufactured By	Kraft Systems 450 W. California Ave. Vista, California 92083
Mfg. Suggested Retail Price	\$64.95
Available From	Both Mfg. & Retail
Wingspan	58 Inches
Wing Chord	10.6 Inches
Total Wing Area	615 Square Inches
Fuselage Length	46 Inches
Stabilizer Span	22.4 Inches
Total Stab Area	123 Square Inches
Mfg. Rec. Engine Range25-.45
Recommended Fuel Tank Size	8 Oz.
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., All.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (16 pages)
Construction Photos	No

RCM PROTOTYPE

Radio Used	Futaba FP4FN
Engine Make & Displacement	O.S. Max .40
Tank Size Used	Kraft 8 Oz.
Weight, Ready to Fly	66 Oz.
Wing Loading	15 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Overall high quality, plans and instructions, hardware package.

WE DIDN'T LIKE THE:

See text.

pre-shaped parts.

The wing was as easy to build as the fuselage. The wing design is semi-symmetrical, but will build on a flat surface without shims or jig blocks. The wing is constructed using 3/32" balsa ribs, 1/4" x 3/8" balsa spars, 3/32" balsa shear webs, and sheeting. Goldberg Super Jet was used to build both wing panels and the center section joint. The center section was reinforced with 6 ounce glass cloth and K & B resin. The ailerons are made using 1/4" balsa stock and only require light sanding before hinging and covering.

Both horizontal and vertical surfaces take about 5 minutes to construct using Goldberg Super Jet. Both surfaces, as well as the rudder and elevator, are pre-cut 1/4" balsa sheet stock. A minimum of gluing and sanding is needed before they can be joined to the fuselage assembly.

Before the final sanding we installed the landing gear, engine, fuel tank and lines. All control surfaces were hinged and pushrods installed and checked for free travel.

Covering:

We did the final sanding with 220 grit paper after applying K & B polyester resin to the fuel tank and engine area to seal the wood. Top Flite FabriKote orange was used

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1982 IMAA

Ida Grove is a small town, in west central Iowa, of about 2500 population, but for a few days in late August its population quadrupled and it became the center of world activity in large scale models. Byron Originals has already made an impact on the large model fraternity and the International Miniature Aircraft Association (IMAA) Annual Festival was the whipped cream on the cake for three days.

A few statistics may help you appreciate the magnitude of the influx on tiny Ida Grove. 327 pilots were registered and there were approximately 400 models present. (Counting them was a bit like counting ants in an ant hill with the many activities taking place.) The 2700 member IMAA had an attendance of over 10% of their membership coming from many countries and paid admission to the site was between 7500 and 8000. More than adequate parking was provided at the site and many events were scheduled in addition to the model flying.

The site was Byron Godberson's estate just outside Ida Grove. The flying site was on top of a small hill a

few hundred yards from the Godberson's impressive home, overlooking the surrounding hills and the airport just across the highway. Several large tents were erected on the property to provide exhibition space for the many manufacturers and suppliers to show their wares, in which to store models, and for a headquarters tent and transmitter impound. The colorful tents added a real carnival air to the site; food services, parking and sanitary facilities were all present.

As an example of the size of the landing strip, both Duane Cole and Hazel Sig landed their full sized aircraft on it. Duane with his Clipped Taylorcraft and Hazel with her Clipped Wing Cub. Hazel's blue and white sunburst Cub is familiar to all who have ever seen a Sig catalogue and it certainly attracted a good deal of attention as a companion piece to the Quarter Scale model of it ably flown by Mike Gretz who won the US Nats with the full span version of the kit. I noticed a slight wrinkle in the fabric at the trailing edge of the left wing on the full scale machine and found my model of it is more accurate than I had thought in that a similar wrinkle exists on my model. I was going to get rid of it but am now going to leave it as is!

There was a good deal of full scale activity in addition to the many hours spent flying models. Duane Cole put

on a display of flying skill with his T-Craft and, in addition, a Christian Eagle was very ably flown aerobically as well. Its performance exceeds that of the many Pitts' I have seen flown and, in particular, I was impressed with the small amount of top rudder required for knife edge flight. The rudder deflection was hardly visible from the ground. Its tail slide was also impressive with the airplane disappearing in the smoke cloud and then falling out and recovering. Snap rolls were unbelievably quick and all maneuvers were very smooth — quite a machine.

The EAA's replica of The Spirit of St. Louis was present, along with the black and orange Fairchild chase plane which accompanies it. Vince Mariani brought his Waco VKS along and it's a very fine looking machine in red and cream colors.

Privately owned and restored military aircraft present added several exciting fly pasts to the event. These included a flawlessly restored P-47, an A-4 Skyraider, several T-28's, A TBE, and they were accompanied in their fly pasts by the EAA aircraft and a Rutan Vari-Eze. The latter providing a very impressive look at what is being done with composite construction in the home built area and also amazing with its speed on relatively tiny engine displacement. Very slippery airplane. In addition, the Iowa Air National Guard provided





FUN FLY

By Dick Phillips
Photos By Jerry Smith

a jet display on Saturday which added to the full scale activity.

All of the full scale machines were flown from Byron's airport which was within easy walking distance of the model flying site and tractor drawn transport was provided continuously for those who wanted a closer look at the full scale aircraft.

The hangar at the airport is also a convention center and at least half of the 800 people attending the banquet on Saturday night were seated inside the hangar which is carpeted and is about as far from looking like a hangar interior as you could get. I overheard one lady wish her house looked more like Byron's hangar and less like a hangar!

Bus tours to the Byron Original's factory were available to all who wished to have a look at the manufacturer of the many Byron kits & was worth the time away from the flying site. The various manufacturing areas were available for guided tours and parts of some of the airplanes marketed by Byron Originals were made while the visitors watched. The story of the development of the ducted fan used in the model jets was most interesting and you could only appreciate the amount of work put into this unit by seeing the many assemblies which either failed or came up short of producing the required thrust. If your wife thinks you spend a lot on your

hobby purchases, she should see the amount of R & D money which has gone into producing the Byron line!

A return to the flying site and a stroll up and down the flight line eyeing the models present gave a wide ranging view of the varied interest present within the ranks of the big enthusiast. J-3 Cubs, P-51's, Fleet Bipes, Pitts', kits from Sig, Nosen, Byron and Balsa USA abounded, along with many "one of a kind models" designed and scratch built by their owners. Several very outstanding models, unique in their size and design, were present and flown, including Bob Campbell's B-29 which is most impressive but which

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Stinson Tri-Motor, Model U, 99.5 lbs., 16½' wing. Fred Kouka designer — Arle Kline and Al Feeley builders.



Joe Farris and scratch-built 1/4 Scale Pogo.



Starduster II, 21 lbs., and Charley Singer, West Virginia.



Waco Taperwing, Kawasaki 3.15, and Phil Maxwell, Wheeling, West Virginia.



Beautiful Howard DGA15 by Walt Clark, L.A., California.



Merlyn Graves, Chicago, Illinois, and 30% Scale Tony— 12' wing, 47 lbs., excellent workmanship.



Bob Nelitz readies his super scale Cub for flight — Bill Johnson looks on.



CAP 21 designed by Dick Garmhousen, Miles Reed pilot — Canton, Ohio.



Excellent Fly Baby Bipe built by Rick Quinlan — owned by Steve Wood.



Cockpit detail showing interior.



Northrop P61 Black Widow, 11' wing, 55 lbs., built by Harry Darrah, Riverside, California.



(L to R): Iowa Governor Bob Ray, Byron Godberson and President Don Godfrey.



Don Anderson readies his CAP 20L for flight. Lou Stanley holds.



F4B2 and Norm Grobarchik, Milwaukee, Wisconsin — Morse plans.



Balsa USA Sopwith Pup by Walt Moucha, Jr. Crazy paint job man!



Piper Pacer 135 and Dale Martin, Columbla Statton, Ohio.



Absolutely gorgeous Waco ARE by Darlo Brisighella (Mr. Quadra). Plans are available.



CAP 20 with fancy paint job — Cliff Bennett, Granger, Indiana.



Great looking Piper Tomahawk by Mel Santmyers, Anaheim, California.



B29 by Bob Campbell of RC Kits. 150 lbs. of machine. Now that's a lot of machine.

suffered some minor landing gear problems on landing. RC Kits Shrike Commander was also flown and was quite impressive with two Titan engines beating against one another. Gary Gray and several of his compatriots from Germany were on hand with their B-17 and it was again impeccably flown. Of all the very large models I have seen in the air, this B-17 is among the most stable and realistic fliers. The German crew had built and intended to bring with them a 40 pound Ford Tri-motor powered by Technopower II Radials. Unfortunately, it was damaged prior to leaving and had to be substituted for by the B-17. A photo of the Ford was presented to Byron and it looked like a most impressive bird indicating the fine craftsmanship of the German team. We'll have some pictures of the Ford in a future issue with some details as to how the corrugated finish was accomplished.

One of the really impressive models present, of the very large variety, was the Stinson Model U Airliner mentioned in Big Is Beautiful in a recent issue of RCM. The model is very impressive in its maroon and blue livery of American Airlines of some years ago. The model flies on two 35 cc Quadras and a 2.44 c.i. Kioritz and is reportedly a little sluggish at its all-up weight of 99.5 pounds. The wind prevented its being flown while I was on the flying site but I'm sure it is a most impressive sight in the air and should perform much as its full sized counterpart must have done. It certainly exemplifies the finest workmanship and finishing I have seen in quite a while.

If there were problems with the flying, they were caused by the high winds which persisted for much of the flight time. At one point, the winds were directly across the runway and created some problems for the smaller and lighter large models present. The wind also downgraded the effect of the



The largest X-mitter compound in the world. All turned off — hopefully.



Typical flight line boxes. Oriented so spectators could view aircraft with ease.

many models flown with smoke systems on board, blowing the smoke away almost as soon as emitted. There are a number of smokers on the market and all produce smoke of one kind or another. One of the most impressive is that marketed by Don Harris. I had only seen pictures of his system in action prior to Ida Grove and was most impressed with the density and quantity of smoke it produces. Don flew his new Half-Breed with a smoker on board and the performance of both the model and the smoker were impressive.

The other problem on the flight line was the sheer number of models present. The flight line was open from 9:00 a.m. to 5:00 p.m. which is only eight hours, and with the number of models present, it was often a long wait for the pin. The flight line was also shut down while the full scale fly pasts and the aerobatic displays were taking place, plus the Byron Originals

group had a short period set aside for the flight demonstrations of their products and all of this limited the number of flights which could take place in the time available for flying. There is a good possibility that, in the future, two flight lines will be operated and the new, still pending, frequencies could well make a significant difference when approved.

Sunday the final day of the festival, produced thunder showers and an end to any thought of flying, model or full scale. This greatly interfered with the expected attendance as it was believed by the local people that there would be large numbers of Ida County residents showing up due to the television coverage and advertising which had been done prior to the event. However, it was not to be and those attending avoided the rain as best they could while packing up and leaving for home.

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West Germany contingent with B-17, 1/8 Scale, 13½' wing, 4 K & B .61's, completed 28 flights. Pilot and designer Manfred Poznanski, bullder Gary Gray, Peter Distler and extra pilot Wolfgang Willer.



View from Telemaster. Flight line in foreground, storage and charging tent upper right, Byron Originals and manufacturers tent upper left.

GIVE IT A WHIRL

John Gorham



Grand Tour

In the last column I reported the AMA National Competitions to you and mentioned that we had planned to drop into a number of major cities on the return journey home. As it happens a personal reason arose to go to Chicago and so the first stop was with some old helicopter acquaintances in that area. Before we left Chicago we got on the telephone and made arrangements through several local hobby stores to meet with the helicopter fliers of that particular city or town to swap notes and do some flying together. It would take up much too much of this column to report this trip in detail since it was such a fascinating one but I'll try to summarize the highlights for you.

Our first stop was Des Moines, Iowa, where the friendly local hobby store

owner had drummed up an interest, a flying field and about 30-40 interested modelers (some heli fliers, some just curious). We had a great time chatting and flying. Flew little ones, big ones, scale and aerobatic. Finished up when it started to get dark and we had to get on our way again. While the flying was proceeding we showed video tapes in the motor home.

Our second stop was in Kansas City where we visited hobby stores again and chatted with many of the local fliers. We didn't have time to fly with them on this occasion but since they had attended the Kansas City "Schluter Cup" the day before they'd already seen enough flying to last them for a few days at least. However, even though we didn't fly, we learned quite a bit of how the fliers are progressing and what they feel about their particular helicopters and the

movement in general. More about this later.

After spending an evening in Kansas City we traveled on down through Wichita to Oklahoma City. While in Wichita we telephoned a number of helicopter fliers in Southern Kansas and Oklahoma and invited them to get together with us in Oklahoma City. It's amazing how many fellow fliers you get to meet and know in this R/C helicopter field. Would you believe Bob Braden of Ponca City, has flown nearly all of the helicopters available, and sets up lessons for would-be fliers over a radius of at least 50 miles. Bob does this just for the love of the R/C movement and says that he'll help anybody that needs it in his area. His phone number is: (405) 762-2527.

On to Oklahoma City where we met the following morning at the flying



Flying with the group at Albuquerque.



Imagine dining under these — Flying Lady at Morgan Hill.



Early morning with the Redwood City crowd.



The big "B17" at Sacramento and your's truly.

field of the well-known 'Torks' (The Oklahoma Radio Kontrol Society) club. The 'Torks' flying field is a nice facility with its own shaded areas, tables, benches and, of course, runway. A good crowd of people turned up — 20 or maybe more helicopter fliers and we all had a great time discussing mutual problems and achievements. Altogether a great welcome and a good time except for the 25/30 mile per hour wind, gusting to 40, which was presented to me just in time for the flight demonstrations. Several of us flew, however, in that wind and since I knew Bob Braden of Ponca City fairly well (although the others didn't) we had some fun with the crowd on one occasion by my launching "Cricket" into the high wind and then handing the transmitter over to Bob who happened to be standing near me. I'm not sure if Bob or the crowd was more surprised but Bob did a great job and brought the helicopter down to a safe landing. Several really accomplished fliers in the Oklahoma City area!

We left Oklahoma City and traveled on to Albuquerque where there is a very strong R/C helicopter movement. Again we made our arrangements through the local hobby store and, on this occasion, when we arrived we were surprised to find a large and excellent store which contained a crowd of at least 25 or 30 people all interested in talking about, touching and flying R/C helicopters. Well, as you must know, Albuquerque is at an altitude of around 6,000 feet and at this time of the year the equivalent pressure altitude is nearer to 8,000 feet. The fliers at these altitudes have a special problem of lack of power because what we normally regard as a well-powered helicopter at sea level turns out to be one which will hardly stagger off the ground at high altitudes. Also a helicopter which we believe to be a "bomb" at sea level and which will do consecutive loops and

rolls may **just** manage to struggle through a loop and perhaps a very poor roll up in this very 'thin' air. So there are unique extra problems for these fliers, over and above the standard ones which we all have who live at sea level.

Well, we all met at the local flying site (which happened to be a road in an open area) and where I was obviously expected to put my helicopter down on the road and give some flight demonstrations. Of course, I was well-aware of the potential altitude problem but my helicopter was well set-up and had a good engine. So, after bringing it into the hover and making a couple of adjustments for mixture, I hit rudder and power and pirouetted the helicopter up quite fast. I then flew around, admittedly with a limited aerobatic capability, and came in for a landing. One flier said, "We've never been so well 'sand bagged' in our lives, John." The truth of the matter is that on the way to the 'Nationals' I had stopped off at one of the view points on the way in to Albuquerque without realizing how high it was, and had a bit of fun flying my helicopter just to keep my hand in. After I had landed, a spectator told me how high we were! So when I took off at the demo I was aware that it would fly okay — sorry, fellows. The explanation for why mine flew well and some of the local fliers machines did not, I believe, is in the setting-up, both of the controls and the mechanics. With my own helicopters I take a special care that all of the gears are meshing exactly right and that all the shafts and bearings are well-lubricated and free. It's so easy to have a little binding here and there, which can add up to quite a loss of power — just the power that you'll need to make the difference between the helicopter flying or not flying at high altitude, whereas you may hardly notice it at sea level. In addition, rotor blade angles and throttle have to be set just right and

any vibration can bleed valuable power away. But the main difference, I believe, between the machine I was flying and other similar machines was the mechanical set-up which reduced the power loss due to friction to a minimum. My knowing this was a bonus from the early days when the ratio of engine power to helicopter weight was poor and every bit of power was needed even to get off the ground. And, if you **did** get off — the engine would soon overheat and down you came again — fast! I don't believe that the word "Schnuerle" was even known in the model engine field in 1971!



New from O.S. Is this 0.28 FSR which is a real powerhouse. Made for the helicopters, it will open up new flying areas in the higher altitudes.

The Albuquerque visit was very interesting for me and I hope for the local fliers, too. I was able to appreciate many more of their problems due to the higher altitude and I hope that maybe I passed on some information which may help them to get more performance out of their machines. Incidentally, I also flew a 0.60 powered aerobatic machine which was fitted with a 0.50 engine. Again it was set up nicely and it flew quite well at that altitude but although the loops were reasonable, the rolls were certainly not so good. That same machine set up well with a 0.60 engine would probably do very well up there, however. My scale 'Lama,' which placed first in the

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7TH ANNUAL EAST COAST R/C HELICOPTER CHAMPIONSHIPS

FINAL STANDINGS

Event	Place	Contestant	Score	Model
AMA Novice Max Score = 5400	1st	Dwayne Stephens	3555	Gmp Cricket
	2nd	Dick Walter	3525	Kavan J.R.
	3rd	Wally Saber	3225	Schluter HB
AMA Intermediate Max Score = 6300	1st	Tom Dalusio	4770	Kalt Baron .20
	2nd	Larry Smith	4245	Schluter HB
	3rd	Harry Lodovico	3945	Kavan J.R.
FAI Max Score = 4140	1st	Ralph Dalusio	2938	GMP Competitor
	2nd	Bob Belluomini	2644	Schluter Mini-Boy
	3rd	Bill Jensen	2617	Amer. RC Commander
AMA Scale Max Score = 3150	1st	Bill Cane	2214	Kavan J.R.
	2nd	Sam Newhouse	1838	Kavan Alouette
	3rd	Dick Walter	1615	Kavan J.R.

FOR WHAT IT'S WORTH

Gunther Priester, Princeton, Kentucky, submits his idea for a hatch cover. Gunther has used 1 pound coffee cans for this purpose. Of course, larger or smaller sizes can also be used. They all come with a reusable plastic top, which fits tightly over the can. About an inch below the the rim, cut off the can. Then cut 1/2" slots from the cut side, bend the resulting tabs up 90 degrees. With the help of the tabs, epoxy assembly into boat, plane, etc. Since the plastic top goes on and comes off easily, it eliminates screws or clamps to hold the hatch cover on. It also makes a water tight seal, if used on boats. No need to mount switch externally.

With the variety of sizes and shapes of cans on the market, which use the plastic top, a number of uses and applications are available, with this idea. Gunther has used it on his swamp buggies for a long time with

good results. Of course, after repeated use of plastic covers, they will crack eventually, therefore he always keeps plenty of covers on hand.

John Durant of Fremont, California, shares his helpful covering discovery with us. While putting MonoKote on his Super Kaos, John discovered something other modelers might find interesting and useful. While applying maroon MonoKote he had unknowingly gotten some adhesive and maroon coloring from the MonoKote on his iron. After completing the maroon, John commenced to apply some cream colored MonoKote only to find he had maroon streaks throughout it from the iron. At that point he tried removing the coloring from the iron with a paper towel and found it impossible to remove. John then took his iron and model into the garage and attempted to remove this coloring with turpentine and paint thinner, without any success. He then happened to notice a small can of automobile brake fluid and recalled reading that it would remove paint. Well, he tried a little on the iron and found it removed the unwanted coloring very easily. He then tried it on the cream MonoKote and found it removed all the maroon streaking. The brake fluid did leave a slight oil residue which he removed with a Windex type cleaner. As you most likely know, brake fluid is highly flammable so the iron must be cool before using and, as usual, care must be observed as with other flammable materials.

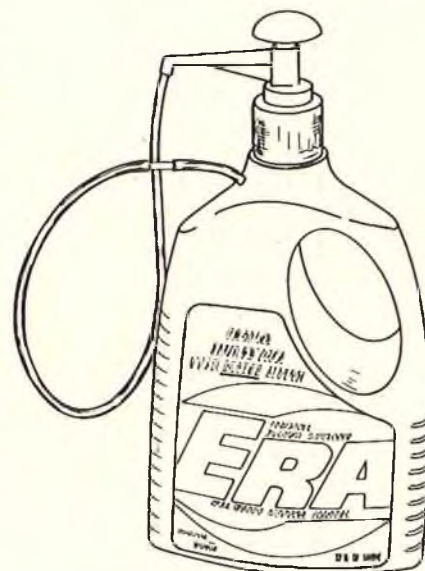
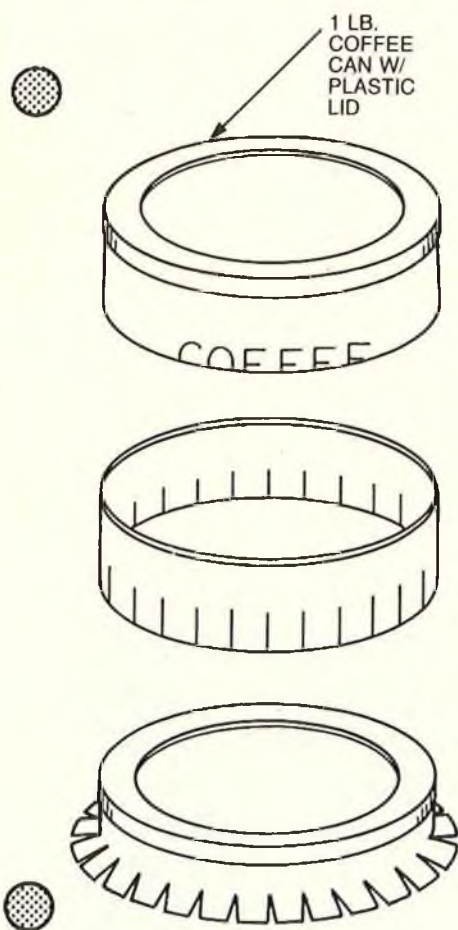
Ron Farkas, Coram, New York, solved his search for an inexpensive but practical smoke fluid storage container with a built-in pump.

When Ron installed a smoke system in his airplane he started looking around for some kind of pump to transfer smoke fluid into the plane. Most squeeze bulbs and hobby pumps, even those designed for model engine diesel fuel, do not hold up well when

used with automotive diesel fuel and other strong chemicals.

Just by chance Ron spotted an empty gallon liquid laundry detergent bottle with a pump dispenser next to his washing machine. He flushed out all the soap residue and tested the pump with his smoke fluid. It pumped very well, each stroke delivering two ounces. So he tapped the nozzle 8 x 32 and installed a large pressure fitting to which the neoprene tubing was attached. Another fitting was installed near the neck of the jug to be used as a return. See accompanying sketch.

After months of use the pump has worked very well and there has been no deterioration of the plastic parts. This particular pump is available for Era liquid laundry detergent and can be ordered from the address on the back of the gallon size bottle. Some other brands may offer the same deal.



Chuck Johnson of Kent, Washington, submitted the following: A nice easy way to add a unique trim pattern to your favorite model is to use the "Contact" brand of adhesive backed vinyl shelf paper. It is easy to cut the pattern you desire and, to make the opposite copy just reverse the backing peeled from the first pattern and trace around the edges.

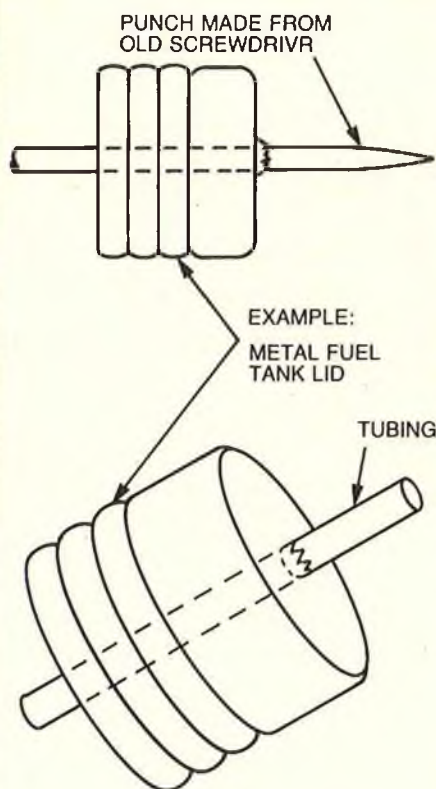
FOR WHAT IT'S WORTH

Once the trim is in place it can still be lifted and repositioned, yet maintains its good adhesion. It is fuel proof, fade resistant, and available in a multitude of colors and textures. Best of all, the price is right; about 80¢ per yard at most hardware or home improvement centers.

Ken Runestrand, Roseville, California, has a dandy approach to installing tubing in fuel can caps as the accompanying sketch shows.

Everyone knows how hard it is to neatly drill thin wall metal for chores such as putting brass tubing into fuel tanks.

It can be very easy. Take those old worn Phillips screwdrivers of varying sizes and grind them down to sharp ice pick points. When correct size is used, the tubing fits into a belled hole that provides a much larger solder surface that a drill job would. Your punch has a handle and no hammer is necessary.



This oldie but goody was submitted by Walter Clary of Riverside, California, and is worth repeating.

Walt's tip is on the ever present problem of glassing wing sections, engine mounts, etc. This method will eliminate the hours of sanding irregular lumps, bumps, and ugly center sections forever. Here's how he does it. First, tape off the wing about 3/4" from where the cloth will lay. Then, use Hobbypoxy Formula II epoxy and brush it on fairly heavy. Lay the cloth on the epoxy and, using your finger, smooth out any bubbles which may appear. At this point the cloth will look dry on the top so, grab your heat gun and lightly go over the glassed area. This allows the warmed epoxy to flow easier. You can actually watch the epoxy rise up through the cloth and then settle back down. Sometimes Walt uses his finger to push the cloth down a bit and when all the bubbles are out he goes back over the entire area again with his heat gun. The epoxy will smooth itself out completely, in fact, so well that no sanding is necessary. The seam where the glass overlaps will require a small amount of sanding but the major part will need none. Just clean it off with acetone and you are done. Walt has saved hours of sanding by using this method; the main trick is not to get it too hot, just enough to allow the epoxy to flow up through the cloth.

This solution to a worrisome problem was sent in by Bill Fitzgerald of Garland, Texas. When installing the ply plates for retracts in a foam wing, it has been troublesome keeping the epoxy from getting into the threads of the 4-40 blind nuts used to bolt in the gear. As a result, Bill now uses a circle of masking tape or contact paper stuck to the blind nut's backside. (The circles are obtained using a standard paper punch.) After the epoxy has set up, Bill gently pokes or drills out the epoxy from behind the blind nut and creates a cavity by inserting a piece of red hot wire. This causes the foam to "shrink back" away from the wire and provide clearance for the mounting screw.

Bruce Smith of Dryden, Michigan, tells of his method of installing hinges. Instead of using epoxy and then drilling the wing and shoving a toothpick through the hinge, Bruce uses RTV Blue gasket maker (Permatex Silicone). First he smears it on both sides of the hinge, thus plugging the holes, and then fills the opening in the hinge slot in the wing, aileron, etc. Upon shoving in the hinge, the excess will be forced out. This can easily be cleaned due to the drying characteristics of the silicone. The RTV that was previously smeared on the holes in the hinge now unites with the RTV in the hinge slot thus forming "nails" which secure the hinge.

Ian Laing of Roodepoort, South Africa, submits his idea for an economical ballast material. When next you need weight to balance a model, the cheapest, most readily available weight is sand. Mixed with resin or a slow epoxy you can pour the mixture into the front section of the model where it will spread out, taking up little space.

This problem solver was submitted by C.W. Eilermann of Cincinnati, Ohio. Many modelers have the X-Acto cordless power drill and are not too impressed with it as a tool. It is powered with two "C" cells but if you substitute four 1/2 sub "C" nicads for the two "C" cells you will really have a useful tool. The motor in the drill easily accepts the additional voltage and the four 1/2 sub "C" nicads fit perfectly.

to page 60

**Send your hints & kinks to
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FOR WHAT IT'S WORTH

from page 58/57

Ed Turner of Cheyenne, Wyoming, sent in his solution to an old problem. For several months now, Ed has been staggering across simple solutions to problems which have bugged him for forty years --- solutions so simple that it is impossible that they are new.

Here is the latest one:

The problem: The rib template skids all over the rib material whenever you attempt to use it to cut ribs directly.

The usual solution. You draw around the template with a ballpoint, then attempt to cut just inside the ballpoint line, the result being inaccurate at best, wibbly-wobbly

undersize at worst.

The simple solution: Drill two small holes in the template and epoxy thumbtacks through the holes. Simple. You can leave the tacks long enough to stick through the material into your cutting surface, or trim and re-sharpen them so that they only go into the rib material itself. □

18 CHANNEL R/C SPEED CONTROLS



KY3 Keykoder system adds 12 on-off channels to your R/C set. Controls bells, lights & motors directly without servos & switches. Perfect for submarines & robots. The new channels are piggybacked onto one channel of your radio. Remaining sticks & servos operate as before. The 12 button Keypad mounts on your transmitter & companion Receiver plugs into your receiver like a servo. Receiver has 12 individual outputs each capable of switching 2.5amps, 4.8-28vdc. Receiver: 6 1/4" x 3 1/2" x 2 1/2" 14 oz. Factory installed.

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RET-4 reversing speed control for boats, tanks, robots. Proportional forward & reverse from 1 channel. Eliminates rheostat, servo, switches & relays. Plugs into receiver like servo; draws 12ma. Ideal for Astro 05-10, Dumas, Mabuchi 540 & other stock 05's. Rated 4.8-12vdc & 10amps continuous or 25amps surge. Loss @ 7amps typically 0.8 vdc. 3 1/4" x 2" x 1/4" 3.7 oz.

PRICE \$79.95

HW-5 reversing speed control for competitive 1/12 & 1/10 cars with Hot-Wind motors. Same size as RET-4. Selected output transistors for loss of only 0.7vdc @ 15amps & 50 amps surge rating. Excellent brakes.

PRICE \$114.95



ET-3 proportional speed control for planes & performance boats. Extends flight time. Eliminates rheostat, servo, switches & relays. Plugs into receiver like servo; draws 6ma. Great for Astro, Kroker, Robbe, Keller, Dumas motors. Rated 4.8-36vdc & 25amps continuous or 50 amps surge. Loss @ 20amps typically 1/2 volt. 3 1/4" x 1 1/4" x 1" 2.5 oz.

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ET-3W watercooled version of ET-3 for boats w/larger motors and closed cabins.

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PIT STOP

Gene Husting



The 1st 1/12 Scale Electric R/C Car World Championships was held in Anaheim, California, at the Grand Hotel parking lot across the street from Disneyland. 50 drivers from the USA plus 70 drivers from overseas competed for the honors. The race was sponsored by Sanyo batteries.



The track as seen from the Grand Hotel on the first practice day. It was a very fast, smooth, high traction track, ideally suited for a World Championship event.

1982 1/12 Electric World Championships

The first ever 1/12 Scale Electric R/C Car World's Championships was held in Anaheim, California, USA in August 1982. 120 of the best electric car drivers from all around the world were entered in this race, including 50 from the USA.

But let's start at the very beginning. ROAR President, Mike Reedy, made a proposal for the first ever 1/12 Electric

World Championship race at the 1981 EFMAR (International Federation of Model Auto Racers) meeting. The delegates of ROAR (USA), EFRA (Europe), and JMRCA (Asia) immediately agreed to the idea and to a uniform set of rules.

Then, Mike Reedy disclosed how the USA drivers would qualify. This was at a series of four races located all around the USA. The first qualifying race would be the 1981 USA ROAR Nationals in Boston. Next would be the US Indoor Championships in Cleveland, then the Southern California Regionals in Los Angeles, and finally the 1982 Winternationals in Florida.

At the same time, the EFRA countries were using a similar system to qualify their drivers with a point system. England, Denmark, Sweden, Norway, Germany, Italy, France, Austria, Holland, as well as South Africa, sent forty of their National Champion drivers. And from the JMRCA countries came thirty of the best drivers from Japan, Australia and New Zealand.

Mike Reedy then formed a National volunteer Organizing Committee of Bob Rule, Don McKay, Ken McDowell, Gary Kyes, Roger Curtis with Midge Husting as Treasurer. These people then made all the basic decisions necessary to stage this World's Championship event, to make sure everything was as fair as possible for everyone, obtain publicity for the event as well as sponsorship. It cost a great deal of money to put on an event like this, and it can only happen with the help of great sponsors. The main sponsor of the entire race was Sanyo

batteries. We owe them a very big thank you! Kraft Radios sponsored the turn marshalls and Futaba Radios sponsored the lap counters. Thank you, too!

Next, Reedy needed help, a lot of help to run this race. This was not a one man race, but was staged by the Southern California Auto Racers Club whose members gave up a weeks vacation time to run this race. Tim and Marilyn Toland started months ahead of time working on this event and were still working after the race was over. Bob Forsythe seemed to be



A covered pit area with tables and chairs were provided for the racers. This is the Japanese Team.



Before each race, every car was thoroughly tech inspected and then impounded.



ROAR President, Mike Reedy, was instrumental in starting this first 1/12 World Championship event.



The cars went from the impound area directly to the starting line.

everywhere helping out everyone, you name it, he did it. Gary Johnson was the Track Steward, Technical Inspectors were Chuck Kimbrough and Jim Greenemeyer, Terry Ballard coordinated the Turn Marshalling. Radio impound was perfectly handled by Chuck Boldetti and all radios were electronically checked by Bob Novak with all scoring handled by Laurie DeWald, Robin Grey-Ballard, Wayne Taylor and Sam Ellis.

One of the things that made this such a great race was the scoring system designed and built by Roger Curtis. This was a computerized scoring system that timed every cars' individual lap and then, within minutes, gave a complete printed readout of every single lap turned by every car, which was immediately posted on a bulletin board right after each race. Every racer could immediately see exactly how many laps he turned and exactly how fast each of his laps were. This sure cut out the, "They missed a lap," syndrome. Thank you, Roger.

At the Indoor Championships in Cleveland, Mike Reedy was impressed by the Race Director, Bill Jeric. Even though Bill was on a different team than Mike, Mike felt Bill was the only choice as Race Director for the World's Championships. And a better choice could not have been made. The whole week long event just ran super smooth. Bill was as fair and impartial as anyone can be. I never heard of any major problems. Thank you, Bill. Bill also had some help on the announcing from Frank Killam and Mike Toland, who both added a lot of color and excitement to the races.

The Southern California Auto Racers club selected the parking lot of the Grand Hotel for the track location. The Grand Hotel is directly across the street from Disneyland, which made it an ideal location for all the visiting racers and their families. The track was very smooth, but it had been re-sealed, so the track surface was sandblasted, which then gave super traction and increased tire wear. The track layout was ideal. It was so good the local racers were wishing they could use it year round, but this did not happen.

A covered pit area was supplied with benches and chairs. The Polaris Battery Co., supplied 12 volt batteries for charging.

Friday, Saturday and Sunday were open practice days, with Monday controlled practice by heats. On the open practice days, you could run anytime you wanted, as long as you had a frequency clothespin on your antenna. At one time I counted 22 cars running on the track at the same time, with no radio problems. There were

STOCK CLASS SEMI #1

1.	Frank Killam	USA	Associated	33-494
2.	Mike Toland	USA	Associated	32-482
3.	Jimmy Davis	Eng.	Associated	32-483
4.	Bud Bartos	USA	Parma	32-486
5.	Mike Hickman	USA	Associated	32-493
6.	Kevin Orton	USA	Delta	32-494
7.	Naoki Ishihara	Japan	AYK	32-494
8.	Bill Maisey	Eng.	Phantom	31-486
9.	Craig Kelly	USA	Bolink	31-490
10.	Jerry Case	USA	Associated	31-493

STOCK CLASS SEMI #2

1.	Mike Lavacot	USA	Associated	32-481
2.	Bruce Hickman	USA	Associated	32-482
3.	Butch Berney	USA	Associated	31-481
4.	Robert Cavazos	USA	Associated	31-486
5.	Tim Neja	USA	Associated	31-487
6.	Curtis Husting	USA	Associated	31-488
7.	Joel Johnson	USA	Associated	31-489
8.	Finn Gjersoe	Denmark	Parma	31-490
9.	Kunsei Takeda	Japan	AYK	31-491
10.	Ken Stephenson	USA	Associated	16-259

MODIFIED CLASS SEMI #1

1.	Ralphie Burch Jr.	USA	Jomac	33-493
2.	Frank Killam	USA	Associated	32-483
3.	Jerry Case	USA	Associated	32-484
4.	Neal Francis	Eng.	Phantom	32-488
5.	Tony Wells	Eng.	Associated	32-491
6.	Joel Johnson	USA	MRP	32-500
7.	Curtis Husting	USA	Associated	31-485
8.	Rich Lee	USA	Associated	31-486
9.	Larry Stevens	USA	MRP	31-493
10.	Rick Davis	USA	Associated	21-316

MODIFIED CLASS SEMI #2

1.	Mike Lavacot	USA	Associated	33-480
2.	Kevin Orton	USA	Delta	33-483
3.	Butch Berney	USA	Associated	33-488
4.	Mike Hickman	USA	Associated	33-490
5.	Bruce Hickman	USA	Associated	32-480
6.	Robert Cavazos	USA	Associated	32-481
7.	Kunsei Takeda	Japan	AYK	32-486
8.	Bill Maisey	Eng.	Phantom	31-484
9.	Roman Hlasensky	S. Africa	Delta	31-486
10.	Randy Tentschert	USA	Associated	31-493

STOCK CLASS WORLD CHAMPIONSHIP FINAL

1.	Kent Clausen	USA	Associated	33-489
2.	Re-Pete Fusco	USA	Associated	33-492
3.	Frank Killam	USA	Associated	32-486
4.	Jimmy Davis	Eng.	Associated	32-487
5.	Mike Lavacot	USA	Associated	32-489
6.	Bud Bartos	USA	Parma	31-484
7.	Ralphie Burch Jr.	USA	JoMac	31-484
8.	Mike Toland	USA	Associated	31-491
9.	Bruce Hickman	USA	Associated	30-480
10.	Arturo Carbonell	USA	Delta	24-420

MODIFIED CLASS WORLD CHAMPIONSHIP FINAL

				Motor	
1. Arturo Carbonell	USA	Delta	Delta	33-483	
2. Frank Killam	USA	Assoc.	Checkpoint	33-488	
3. Jimmy Davis	Eng.	Assoc.	Reedy	33-489	
4. Mike Lavacot	USA	Assoc.	Reedy	33-492	
5. Re-Pete Fusco	USA	Assoc.	Reedy	32-480	
6. Kevin Orton	USA	Delta	Delta	32-491	
7. Mike Hickman	USA	Assoc.	BRM	31-480	
8. Butch Berney	USA	Assoc.	Reedy	31-484	
9. R. Burch Jr.	USA	Jomac	Trinity	29-478	
10. Kent Clausen	USA	Assoc.	Reedy	22-349	

cars everywhere! But the important thing was, everyone got to run as much as they wanted, until they were thoroughly familiar with this track. And this is as it should be.

It was the first time most of these racers had a chance to race with people from other countries. Nobody really knew whether or not the Japanese were going to be faster than the English, or whether the English would be faster than the Americans. It was an unknown for everyone. One thing was certain. The most popular car used by these Champions from around the world was the Associated car. There were 49 Associated cars entered, with the next closest being JoMac with 15, AYK 11, MRP 8, Delta, Scorpion, BoLink, Mugen, Phantom, Gemini, Parma, Mirage-I, and Tamiya were being raced. And remember, it only takes one car to win.

During the practice days, it was hard to pick a favorite. Mainly because when you saw someone who looked a little faster on the track than the other cars, it was probably because he had just put his car on the track with fresh batteries, while the other cars on the track had already been running for 3, 4, 5, 6, or 7 minutes, so a speed comparison was impossible. But some things were evident. The Japanese were certainly very disciplined drivers. They all used the very shortest way around the track, similar to the styles used by Lavacot or Ralphie Burch, Jr. The English drivers Neal Francis, Bill Maisey and Phil Greeno also took similar lines, but their cars did not appear to be as smooth in the corners. They were running the Lexan chassis which work exceptionally well on polished floors. They had modified them for the asphalt track and they were going quite fast but not smooth. There were a lot of USA drivers running quite well, and it would have been impossible during the first few days practice, to say this one or that one was the one to beat. We would have to wait for qualifying to see who was one second faster than someone else in 8 minutes. Yes, it was that close!

I think everyone enjoyed going around the pits and talking to other racers from all around the world. It's quite surprising how many could speak English, making communication quite easy. I'm sure everyone there had to learn something from everyone else.

The racing consisted of two car classes — Stock and Modified. The cars for both classes were the same, with stock motors being used in Stock class and modified motors being used in Modified class. 99% of the cars were kit cars, with ball bearings. Most used ball differentials, a few used gear

differentials. Every car I saw used Sanyo batteries. Sports car bodies were the only way to go, although I did see a couple GTP bodies, which were later changed to sports bodies. Most of the cars were lightened to bring their weight down to the minimum allowed. The stock 05 motors were supplied by Yokomo in Japan. Each motor was labeled and numbered and the endbell was epoxy sealed. Don McKay questioned how the motors would be distributed. Reedy informed him that each racer would reach into the box and pull his own motor out of the box without examining the motors. Reedy told McKay that Don was free to mix up the motors any way he liked, or Don could even hand out the motors to the racers. Don decided the original plan was just fine. But to stop any more questions, Bill Jeric took the motors and mixed them all up himself. Each racer also had the opportunity to purchase two more motors, but only one at a time, if he thought his motor wasn't fast enough. A check later of the qualifying times showed only 1½ seconds between the Top Qualifier and the fourth place qualifier! Also, three different teams were represented in the top four cars. How much closer can you get?

Each racer got six qualifying races. Eight racers were scheduled to run in each race and each race was 8 minutes long, plus the last lap. That would be 480 minutes plus the last lap. Three qualifying rounds would be run on Tuesday and three on Wednesday. The drivers were split into two groups, A and B. The A group would qualify Tuesday morning and Wednesday afternoon.

Before each qualifying race the cars were presented to the Technical Inspector who weighed the cars on a digital scale, checked for proper motor, legal batteries, tire goop, etc. Then the car was impounded there. When that heat was called to the line, the racer was then given his car and radio transmitter. The car was presented to the lap counters for identification and immediately placed on the starting line. The Race Director announced one minute before the start of the race, then 30 seconds, 15 seconds, 10, 5 and then a horn was sounded to start the race. The one lap penalty for a jump start was so severe that I think there were only two jump starts the whole week, and I'm sure they were accidental, because there was no way to anticipate when the horn would sound. It was as close to as perfect a system as I've seen.

Stock Class Qualifying

After the first round of qualifying was over, Mike Lavacot, USA, had the best time with a 32 lap time of 484.0.

Only 2 seconds behind was Joel Johnson, USA with 32 laps-486.3. Next was Kevin Orton with 32-491.0. Fastest of the overseas entries was Jimmy Davis from England with 32-492.8. Jimmy is the 1982 European Champion, and the way he was running, he proved he was the fastest in Europe.

Lavacot's time held up through the 2nd round, where Arturo Carbonell, USA had the best time of 32-486.3, which opened up quite a few people's eyes. A whisker behind was Re-Pete Fusco, USA 32-486.5 and then Craig Kelly, USA, 32-487.3.

Round three belonged to 16 year old Re-Pete Fusco from New York, USA. Re-Pete drove as only he can and turned a super 33 laps in 493.0 seconds which stood as Top Qualifier of the Stock Class. Closest to Re-Pete in this round was Kent Clausen, USA, with 32-484.2 and right behind Kent was Mike Toland, USA, 32-484.5.

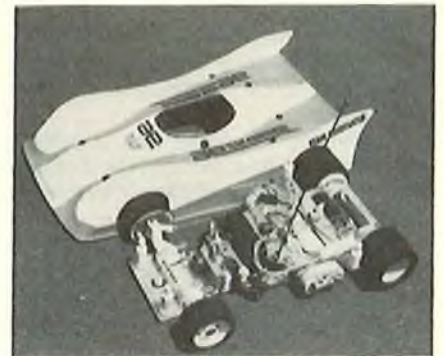
So the first day of qualifying was over. Quite a few surprises so far. The USA, as a team, was the early favorite. Then England, and then Japan. But unless England and Japan could get some more speed out of their cars, they would be in for a long week.

Day two of Stock qualifying. Kevin Orton, USA had the best time in the 4th round at 32-480.6 with Mike Lavacot USA, next at 32-483.2 and Kent Clausen USA, 3rd at 32-485.5.

In the 5th round Arturo Carbonell USA, cranked off a 33-494.6, which was flying. Next was Kevin Orton, USA, with 32-483.3 and Curtis Hustung, USA, with 32-484.4.

The top four qualifiers would go straight to the Main Event, while the next twenty drivers would run in two Semi-Mains with six drivers from the Semis moving up to the Main. Right now only two drivers had turned 33 laps, Re-Pete and Arturo and it looked like it would take 33 laps to make a sitout. So in the last round, everyone was going for it. Ralphie Burch, Jr.,

to page 130



Re-Pete Fusco's Top Qualifying car is a stock Associated RC121 with a Futaba receiver, Novak servos, Sanyo batteries, graphite axle with ball diff, and TOJ body.

SCALE VIEWS

Col. John deVries



Documentation

Hot dog! Another column about documentation --- maybe the scale modeler's favorite subject! Just kidding. Putting together a documentation book is probably the least thrilling thing having to do with scale R/C models. But, I betcha that the reason why it isn't a lot of fun is bound up in a very common misconception --- that you have to do a lot of research just to fill those six pages that the "good book" limits you to if you enter Sport Scale contests. Pure balderdash and other archaic expressions of disbelief! Bolting together a documentation booklet takes about an hour and a half of concentrated effort (less if you can type fast) and gathering the info is simplicity personified!

If you're building your model from a kit, you probably have all of the information you need right at hand. The good kits include three-views right on the drawings. The model magazines are taking the clue too. Several scale model articles are beginning to show up with documentary three-views together with the construction drawings. Then, too, as you detail your model, it's practically impossible to do it correctly without a selection of photographs or an appropriate plastic model to refer to. All of this can do double duty --- help with the construction and be used in the documenting booklet that you'll present to the static judges. Six 8½" by 11" pages fill up fast with a minimum of research effort!

We're faced with two problems as far as documenting are concerned. We have to present information, drawings, photographs, or an undecorated plastic model to show what the real airplane looked like from various aspects. In the second place, we have to present similar items that document the colors and markings of the R/C model we've built. There's a "sleeper" in the rule book when it comes to color and markings. The rules permit a description of the colors used on the real aircraft. Considering the wild variations of opinion as to what constitutes the proper color for a model and that all methods of color reproduction

(including printing and color photographs) are prone to inaccuracy, a description of colors "from a reliable source" might be just the way to go. There'll always be people who'll invest their life savings in a set of genuine World War I color "chips" and match their model to 'em. But --- for Sport Scale?

Filling our six pages (two less, if we use a plastic model) isn't going to be all that difficult, particularly if you can find appropriate photos to serve as Accuracy of Outline and Colors and Markings documentation. But let's be really careful here. Make sure your documentation represents your model! This isn't as dumb as it sounds --- some modelers present a three-view or a series of photographs showing the radial-engined variant of an aircraft to document their model patterned after the same bird with an inline engine! Photos are particularly touchy. They should be examined closely to make sure that a different Mark or model isn't represented. It's better to go "light" on the documentation than try to dazzle the judges with a bunch of inappropriate photos or three-views! During your research you'll probably come up with three or four different sets of three-views of the bird you modeled. Choose the most exact drawings available --- a short task with ruler and calculator. Have the three-views you've chosen re-photographed and printed to just fill a documentary book page or two. Don't split a good drawing

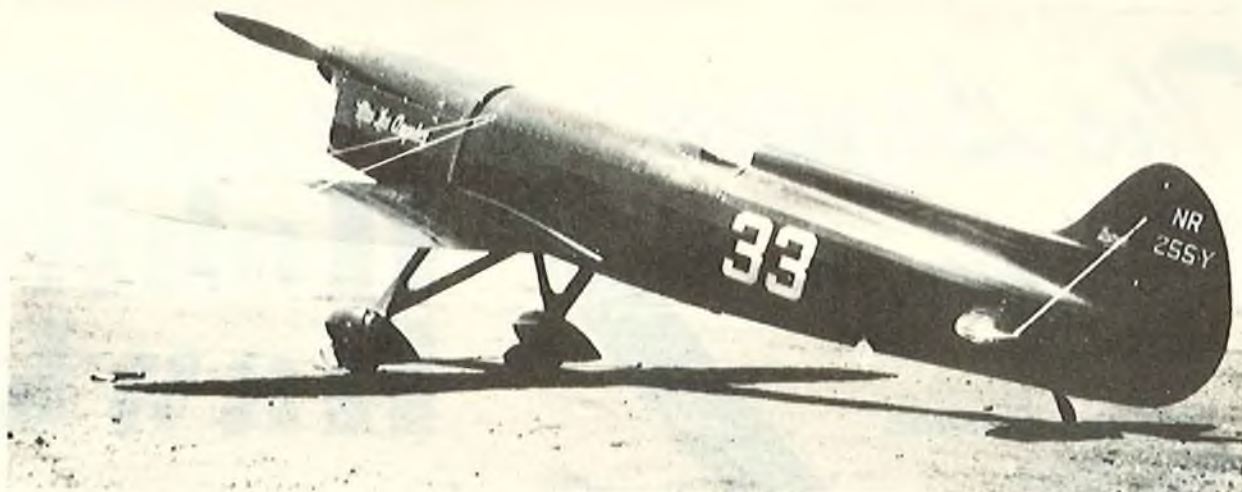
in the middle one of the views --- but give the judges a break. Let him see what the real airplane looked like! Same thing holds true for photographs. Choose them carefully to show the outline of the real airplane and then use prints that are sufficiently large so that the airplane can be seen (at least 2¼ by 3¼). Big drawings, big photographs --- the documentation pages are filling fast!

There's something else that has to go in the documentation book. It doesn't come out of your six pages (although it could). It's the "declaration" concerning the parts of your model that you didn't make (like: wheels, canopies, formed fiberglass parts). A good place for this signed affidavit seems to be inside the rear cover of the documentation book.

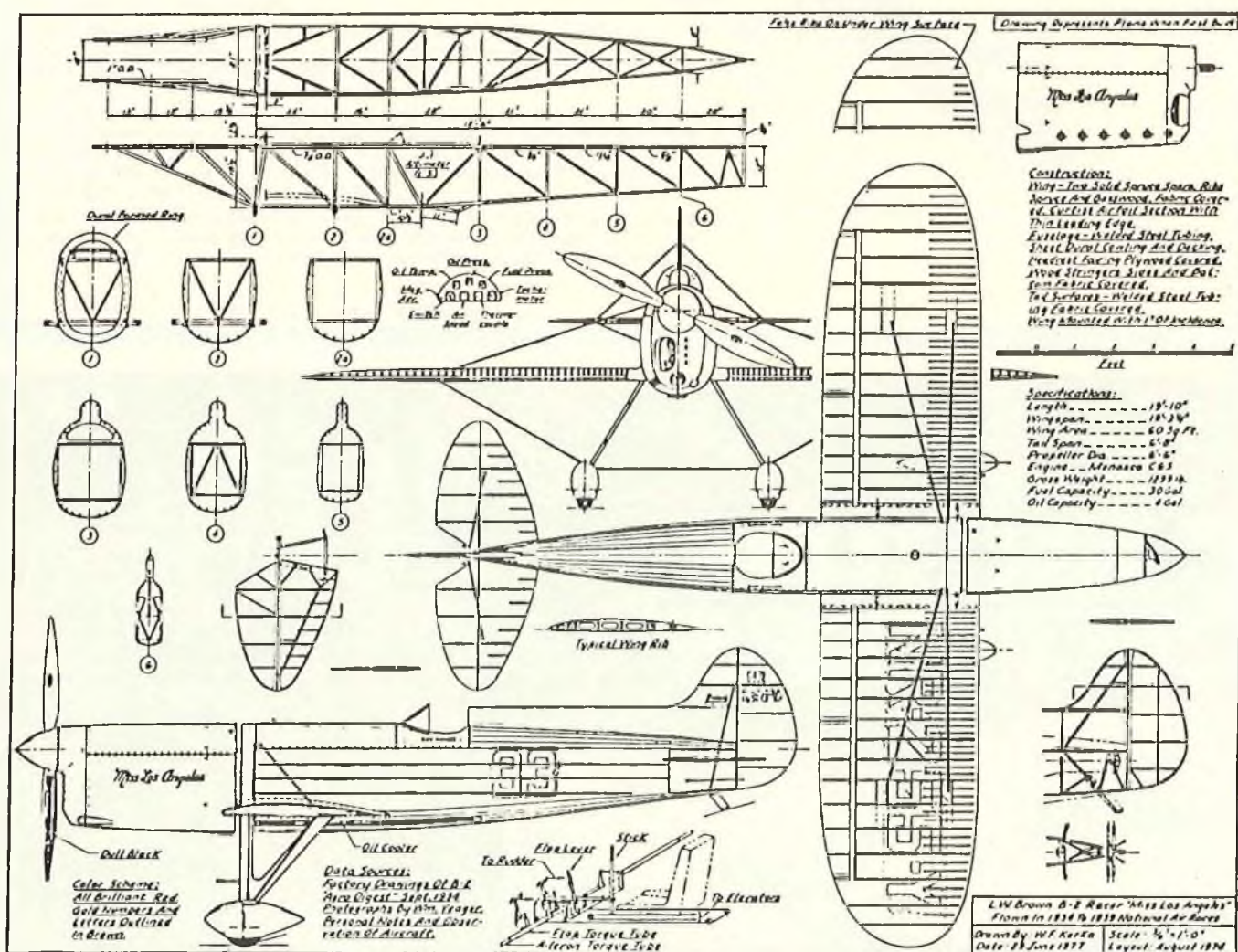
Okay, what should the book look like? Many modelers prefer to use those thin file folders that have internal metal bands to hold things in place. From a good appearance viewpoint the front cover of the folder might note the name or type of your R/C model and your name (press-type letters are good here) and some logo or motif to set things off. For example --- a U.S. insignia for a Mustang documentation book; a red rising sun for a Zero; or the logotype of the aircraft manufacturer for a civilian aircraft. Avoid pictures or photographs on the cover --- some nit-picker might count it as a page of documentation! The data inside can be arranged in any tasteful way. Most



Ruth Barron's clipped-wing Monocoupe with the beautiful red, white and blue paint job --- but the author was unable to find out which color went where! Bird was lost in a mid-air fire. When the author's clipped-wing is designed, he'll use Harold Neuman's all-white "L'il Mulligan" paint job. Photo from Jim Harvey, Monocoupe Club.



This rare photo was obtained from American Aviation Historical Society (membership required). The Brown B-2 underwent several configuration modifications and it is important that the photos match the 3-view drawings as is shown here.



people use transparent sleeves to hold drawings and photos --- they protect the data and usually are sold with black paper inserts to which you can tape or glue documentation. You have the choice of six pages on one side --- or three if you use both sides. Psychologically, if you have a bunch of good data, it might be a good idea to

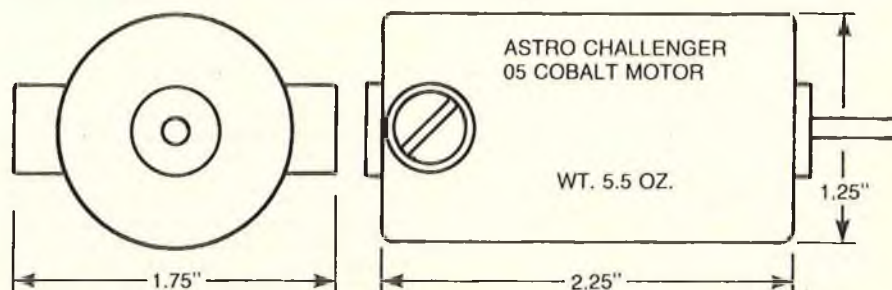
go with six plastic sleeves. Spread it out, lavishly. On the other hand, if you have only the basic required data (not knocking it!) using both sides might make a better presentation. Neatness counts --- but don't make a fetish of it!

No sweat, sez you. Agree, sez I. But where do we get the stuff to put into the book if the kit manufacturer has

been remiss or the magazine article only indicates the references the author used? The book I turn to first is the RCM Scale Reference Guide (plug!). The Guide lists practically every scale model published in the model magazines in the past 40 years --- many of which are darn good

TABLE #1

	Prop	RPM	Climb	Glide	Total Flight (mins/sec)
Astro 05 Blue Label 8 cell (.55AH)	Cox 7/3½	11,000	1:00 mn.	2:35	3:35
Astro Challenger 05 6 cell (1.2AH) 6 cell (1.2AH)	Cox 8/4 7/3½	10,500 13,200	1:00 mn.	3:28	4:28
Astro Challenger 05 7 cell (1.2AH)	Rev 8/4	12,200	1:00 mn.	4:30	5:30
Astro Challenger 05 8 cell (.55 AH)	Cox 7/3½	16,000	1:00 mn.	4:42	5:42



RCM PRODUCT REVIEW

By Jim Zarembski

ASTRO CHALLENGER 05 MOTOR

The use of Samarium cobalt magnets in fractional horsepower electric motors has become increasingly popular in industry in special situations where high efficiency, high power, lightweight motors are required. This application has spread to R/C electric powered aircraft in the last few years. In the modeling press there has been a steady stream of reports on the progress of the use of Samarium cobalt motors in Europe for high performance sailplanes, pylon racers, and aerobatic ships.

Bob Boucher, President of Astro Flight in Venice, California, felt that the success of the cobalt motor as

presented in the modeling media had led to a demand for such a motor in this country. In early 1982, Astro Flight built the first pilot samples of a new line of cobalt motors which will include the Challenger 05, 15, 25, and 40.

We were quite pleased to receive a sample Challenger 05 for an RCM Product Review. A five page instruction booklet is included which includes several performance curves for various combinations of cells and propellers. The Challenger 05 is actually smaller in size than the standard Blue Label 05 motor. It is 1.25" in diameter and 2.25" long. The most striking feature of the motor is

the two brush holders which protrude from the rear sides of the motor. This design was incorporated to allow for the installation of a new heavy duty silver graphite brush assembly that can commutate up to 25 amps without failure. The motor can be run with 6, 7, or 8 cells with a variety of propellers ranging from 6/4 to 8/4.

The RCM flight tests of the 05 were conducted on two aircraft. The first was a stock Super Malibu sailplane built from the Astro Flight kit. With this ship we investigated the climb rate with the Challenger 05 compared to the normal permanent magnet motors generally used. The second test

to page 96

TABLE 2
Astro Challenger 05
Installed in 300 Square Inch Aerobatic Model

	Model Wgt.	Prop	RPM	Flight Duration	
6 cell, 1.2AH	32 oz.	7/6	11,500	6½ min.	Aerobatics with ease, rolls inside loops. Significantly better than non-cobalt systems.
7 cell, 1.2AH	34 oz.	7/6	13,000	5½ min.	Added cell adds much speed, vertical rolls from level flight.
8 cell, 1.2AH	36 oz.	7/4	15,700	4 min.	8 cells allow for outside loops.

BUILDING WITH FOME-COR®

By Michael Garze

This article is a basic "How To" on the finer points of using Fome-Cor® to construct your own R/C aircraft. It is a fast building, lightweight, inexpensive way to build as the author Mike Garze describes. The club that Mike belongs to calls him the "Foam Kid."

Building with this material, you can end up with virtually no twist in the finished product. It is a great material for trainers since it can be spliced and patched easily and you're back in the air.

Mike has developed some new procedures using Fome-Cor® which RCM plans to bring to its readers in the very near future.

Materials Required:

- (1) Soft lead pencil (No. 2) or black felt tip pen.
- (2) Piece of carbon paper 8½" x 11".
- (3) Scrap piece of Fome-Cor® board or cardboard.
- (4) Epoxy or aliphatic resin glue.
- (5) X-Acto knife and #11 blades.
- (6) Large 30°/60° drafting triangle or carpenter's large square.
- (7) Metal or thick plastic straightedge (I use a 48" x 1¼" acrylic edge).
- (8) 24" x 2" dia. wooden dowel or heavy cardboard tube at least 20" long.
- (9) Fome-Cor® board 3/16" thick, depending on length of wing. When buying board, make sure grain of cardboard runs in the direction of the length of your wing if it's being built without any dihedral. Otherwise, you could buy a smaller piece and glue two wing halves together.
- (10) Gallon paint cans for weight.
- (11) A nice flat piece of 1/2" plywood composition board that won't bend, to



ABOUT THE AUTHOR

Michael Garze of Edison, New Jersey, is an architectural draftsman, married to a very understanding wife. They have two sons, Michael and Glenn. Mike is one of those modelers who likes to experiment with different materials. A few years ago, Mike, along with his close modeling friend Joe Ravelle, began to do some work using Fome-Cor®, manufactured by Monsanto. The past few years have brought about many new methods of working Fome-Cor® for model aircraft use. Mike has put together a good general step-by-step illustrated method of creating your own Fome-Cor® R/C aircraft.

lay over your wing when you are closing the top to keep the weight distributed evenly.

(12) 5/8" x 1/2" balsa x 48" long, as trailing edge, for aileron attachment or whatever trailing edge you would need.

Finishing Materials:

(1) Cook & Dunn, primer, sealer, and filler with talcum powder — this does not attack foam of any type and gives a nice sanding surface (allow overnight drying). I've been experimenting with balsa filler and found this pretty good.

(2) Urethane foam for wing tips is

great for sanding and weight. This material will take dope, lacquer paints, thinner, enamel — almost anything — without breaking down.

(3) Paint — Hobby Shack Foam Paint (Yellow) or any paints for foam.

(4) 320 and 400 wet/dry silicone carbide sandpaper used dry. Water will cause warping on the cardboard if left too long.

Step #1:

Use 1/8" piece of plywood for cutting template.

Step #2:

Either outline the actual rib with pencil on the 1/8" plywood (as shown) or cut 3/16" off the rib around complete perimeter. If you don't mind destroying the rib, this would be easier than illustration #1 shows.

Step #3:

Trace outline of rib (3/16" smaller than the original) onto a 1/8" plywood scrap piece. Then cut out rib. This will be your template for cutting out Fome-Cor® ribs.

Step #4:

Using (2) tack pins pressed through 1/8" plywood template, stick into Fome-Cor® board and cut out your ribs. Use #11 X-Acto blade.

Step #5:

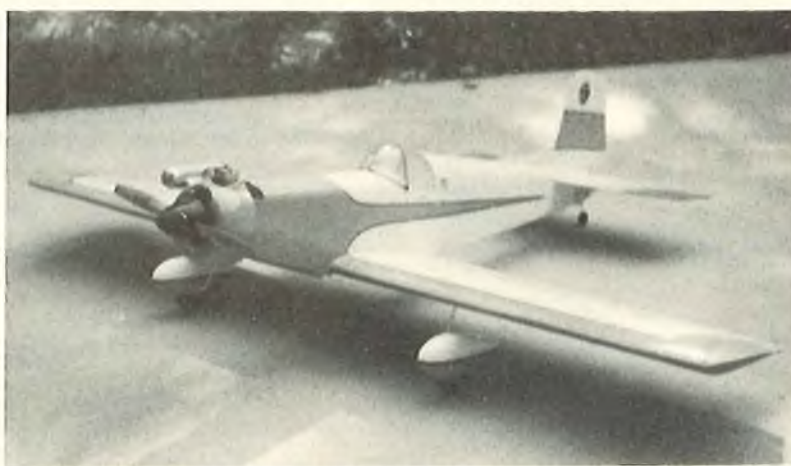
Quantity of ribs are based on size of wing. If you have landing gear in the wing, allow for (2) extra for each half of wing section. See illustration #3.

Step #6:

To determine what size of Fome-Cor® board to use to complete one half of wing, use a tape (cloth or any flexible material that won't stretch). Line up edge of rib with end of tape. Pull tape up and over contour of rib pretty tight. This gives you a more accurate reading. Record this

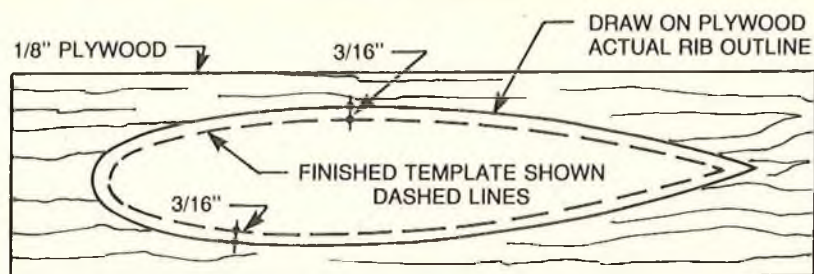


Original Halry Canary (all Fome-Cor®).



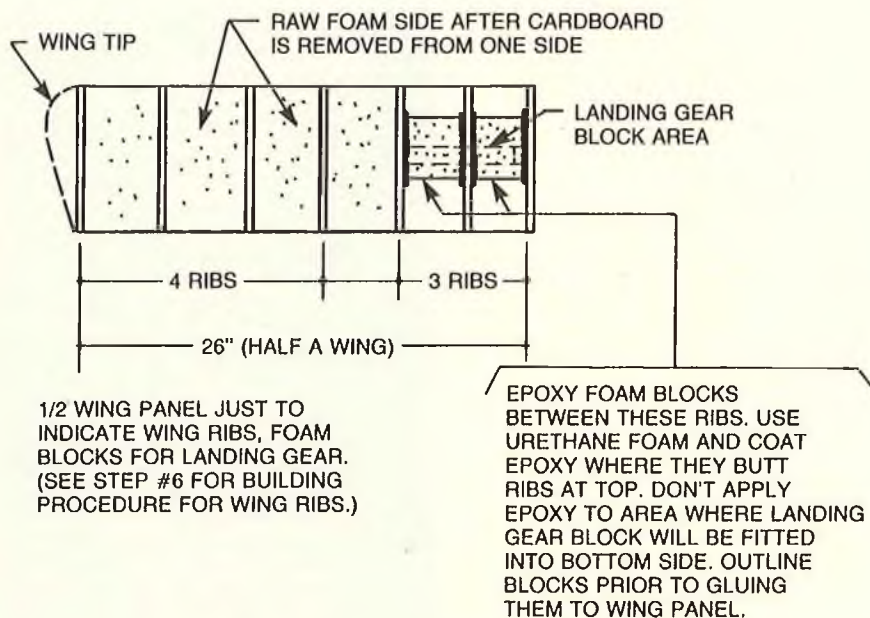
Latest Sport Flyer II at 4¼ lbs. with K & B .40.

ILLUSTRATION #1



THIS ILLUSTRATION TO BE USED IF YOU DON'T WANT TO RUIN THE RIB BY CUTTING IT AS PER STEP #2 WHICH WOULD BE EASIER. MEASURE IN 3/16" AROUND SOLID OUTLINE AND MARK WITH DASH LINE; THIS IS YOUR CUTTING LINE TO GIVE YOU YOUR TEMPLATE FROM THE PLYWOOD

ILLUSTRATION #3



1/2 WING PANEL JUST TO INDICATE WING RIBS, FOAM BLOCKS FOR LANDING GEAR. (SEE STEP #6 FOR BUILDING PROCEDURE FOR WING RIBS.)

EPOXY FOAM BLOCKS BETWEEN THESE RIBS. USE URETHANE FOAM AND COAT EPOXY WHERE THEY BUTT RIBS AT TOP. DON'T APPLY EPOXY TO AREA WHERE LANDING GEAR BLOCK WILL BE FITTED INTO BOTTOM SIDE. OUTLINE BLOCKS PRIOR TO GLUING THEM TO WING PANEL.

ILLUSTRATION #4

NOTE: IF ALIPHATIC RESIN GLUE IS USED, CUT OR DRILL HOLES IN RIBS FOR AIR CIRCULATION WHICH THIS TYPE OF GLUE NEEDS (SEE ILLUSTR. #4).

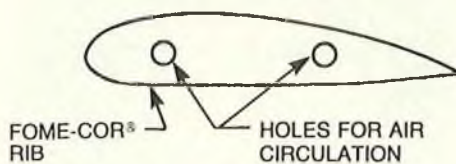
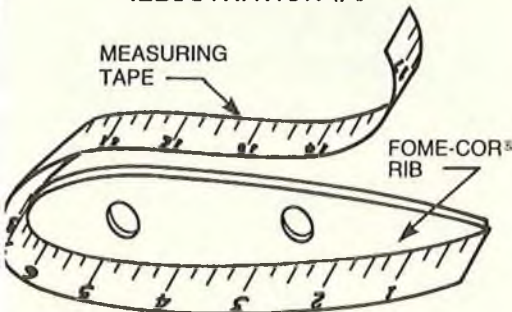


ILLUSTRATION #5



dimension — this will determine the width of the board. The length depends on the wing size. See illustration #5.

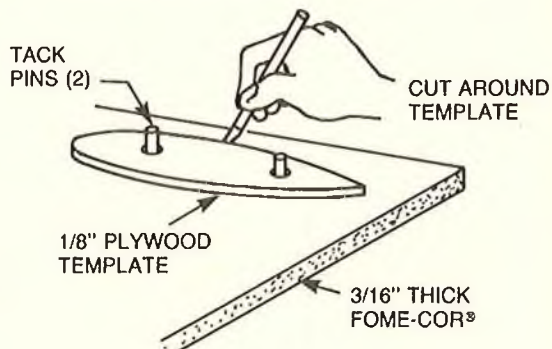
Step #7:

Note: Read carefully.

Before cutting Fome-Cor®, note that both sides has a grain direction. To check this direction, hold the board material at an angle to the light and look for faint lines running all one way. They will usually run the short dimension. This will be your cut and bend direction. Take dimension recorded from illustration #5, measure in the longest of the board dimension (this would be 40") and mark the dimension you recorded. Say it was 19", mark this, then do it at middle of board and at bottom. See illustration #6. Standard sizes that I have found locally are 30" x 40", 40" x 60", and 48" x 96". This was 3/16" thick with white cardboard on both sides. 48" x 96" sheets have been purchased and the grain was parallel to the 96" dimension.

ILLUSTRATION #2

CUTTING RIBS WITH PLYWOOD TEMPLATE TACKED TO FOME-COR®



Step #8:

Take the piece you just cut (19") and peel off one side of the cardboard. Try going along one edge to get it started, then take a tube (cardboard, rolling pin, wood dowel, etc.) and lay it up against the already started edge. See illustrations #7 and #8. **Note:** You will notice while removing (or after removing), the cardboard will curl up. The smaller the curl, the cleaner you made the cardboard separate. You probably will have patches that didn't lift. Take an old towel, wet with warm water, and ring it out. Rub the moist towel along the area just hard enough to moisten patches. You will then start to see the remaining cardboard roll up in little pieces.

Step #9:

Make sure you made an outline of your finished airfoil from index of these instructions. If you have, you're ready; if you didn't, then add 3/16" to the template you cut from plywood. Draw on a scrap piece of Fome-Cor® more than half way along airfoil. Cut the same amount as the ribs you are using. This will act as a clamp as you will see later. See illustration #9.

Step #10:

As shown in illustration #10, this is what you should have, the same amount as your ribs. You'll see later it makes a great clamp for the wing skin.

Now You Are Ready To Build

Step #11:

Take your Fome-Cor® board and tack it down on your level work bench. Lightly mark, with pen or pencil, the location of the ribs and landing gear blocks. You will note that one end will most likely curl so just lay a piece of board on it to hold it down. Using epoxy or white glue, apply to about one third of the rib, starting at the trailing edge. Locate these ribs on the reference line you have already marked on board. Make sure ribs are straight and pin in place to hold until dry. (Illustration #11 shows what it looks like at this point.)

ILLUSTRATION #6

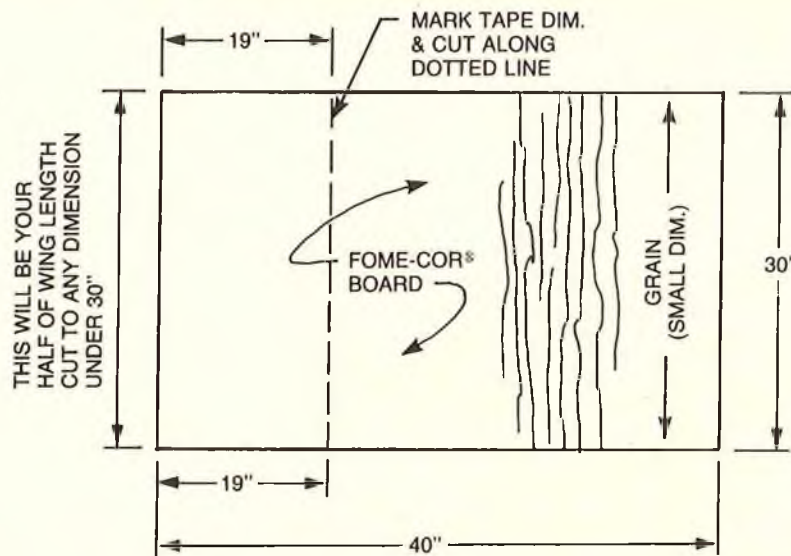


ILLUSTRATION #7

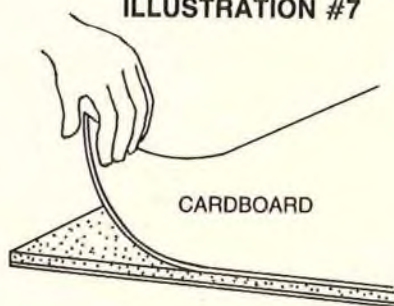


ILLUSTRATION #8

FOLD (1) SIDE OVER WOOD DOWEL (ETC.)
& START PEELING CARDBOARD OFF.
THIS SHOULD MAKE IT EASIER.

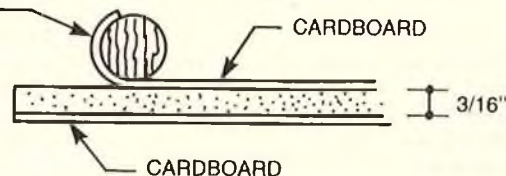


ILLUSTRATION #9

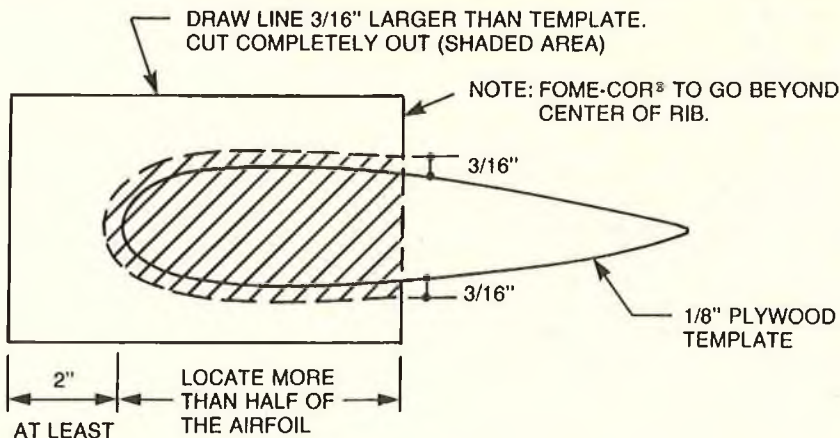
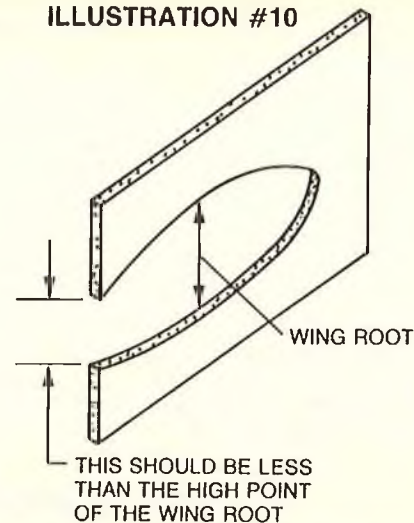


ILLUSTRATION #10



HAIRY CANARY

Designed By: Joe Ravelle
& Mike Garze

TYPE AIRCRAFT

Pattern/Sport

WINGSPAN

46 Inches

WING CHORD

8.5 Inches

TOTAL WING AREA

367 Sq. In.

WING LOCATION

Low Wing

AIRFOIL

Symmetrical

WING PLANFORM

Constant Chord

DIHEDRAL, EACH TIP

None

O.A. FUSELAGE LENGTH

39" (w/o rudder)

RADIO COMPARTMENT SIZE

(L)9" x (W)2½" x (H)4.5"

STABILIZER SPAN

19 Inches

STABILIZER CHORD (Incl. elev.)

6 Inches

STABILIZER AREA

74 Sq. In.

STABILIZER SECTION

Flat

STABILIZER LOCATION

Center of Fuselage

VERTICAL FIN HEIGHT

7.5 Inches

VERTICAL FIN WIDTH (Incl. rudder)

6 Inches

REC. ENGINE SIZE

.35 C.I.

FUEL TANK SIZE

6 Oz.

LANDING GEAR

Tricycle

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Strip All., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	FOME-COR® w/Ply
Wing	FOME-COR®
Empennage	FOME-COR®, Balsa
Wt. Ready To Fly	56 Oz.
Wing Loading	21.96 Oz./Sq. Ft.

ILLUSTRATION #11

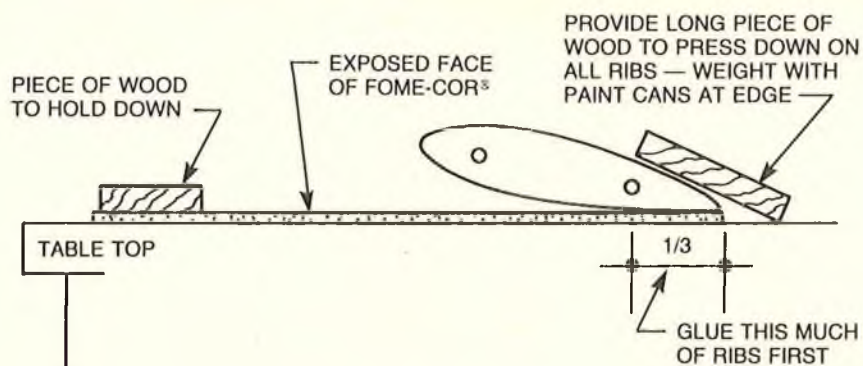


ILLUSTRATION #12

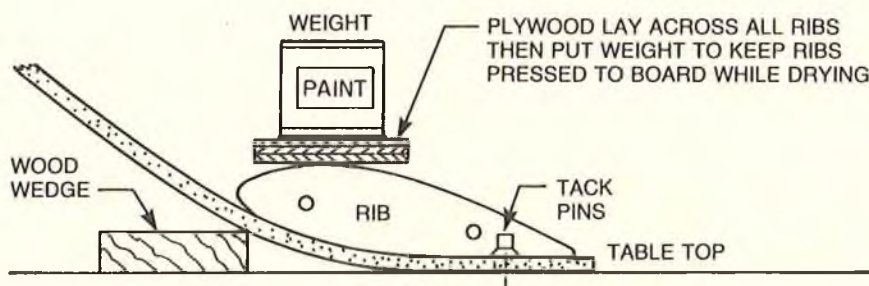
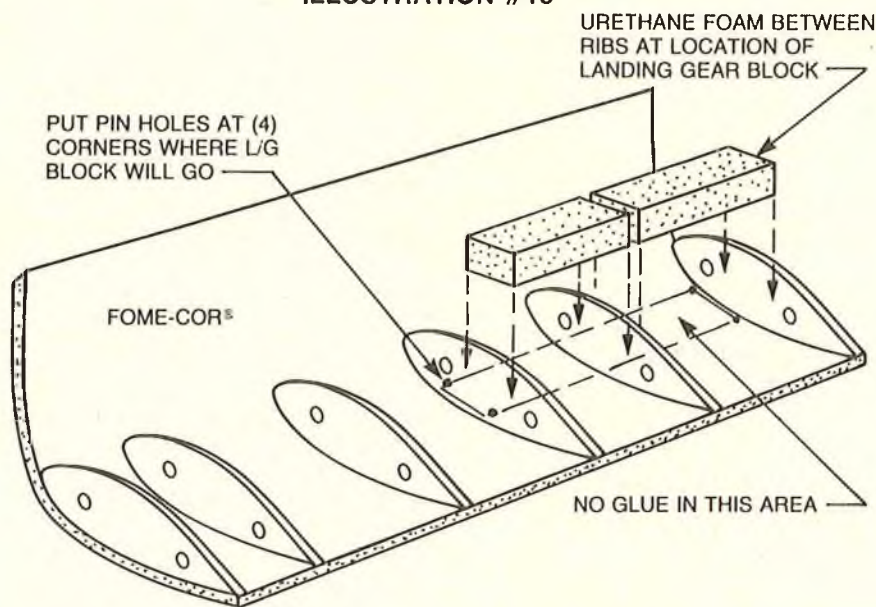


ILLUSTRATION #13



Step #12:

After the ribs have dried, leave in tack pins. Place board over top of ribs and bend board over the leading edge towards the trailing edge. Do it slow and make a couple of bends just to get the feel and flexibility of the Fome-Cor® board. Now, apply glue along the lines you marked locating the ribs. Then lift up the front of the board and put a wood wedge under the leading edge. See illustration #12.

Step #13:

Now, where you have located the landing gear block location, put pin holes at all four corners. You can then

locate it when you cut this area out from bottom. As shown in illustration #13, epoxy the two urethane foam blocks between the ribs at the landing gear mounting block location. Epoxy securely, leaving only the area to be cut out for l/g block, free of epoxy. After the foam blocks have dried, remove tack pins and remove wing from building board. Start bending the remainder of the Fome-Cor® over ribs to get a snug fit over the entire contour.

Step #14:

Now apply glue on all remaining parts of the ribs (shown with an arrow

in illustration #14). Take Fome-Cor® and fold over ribs. Holding it tight, align the trailing edge, but also make sure the leading edge is tight. Now is the time to use those nice clamps you made. At each rib, slide a clamp over the Fome-Cor®. These clamps will fit nice and snug so your wing will be rigid. (Illustration #14 shows clamp in broken lines.) Locate wing at edge of work bench to let clamps overhang. This can prevent a warp in case your clamps are not cut square. Put a board across with heavy weight. Let dry thoroughly. See illustration #14A.

Step #15:

Turn the wing over and locate the (4) pin holes as per Step #13 and illustration #13. Connect the (4) holes with a pencil line and cut out only the thickness of the Fome-Cor® board. If you're using a thicker piece of wood for l/g mount, then cut required depth. See illustration #15. Epoxy the gear mount into place as shown in illustration #15A.

Step #16:

As shown in illustration #16, wing tips are your choice. Epoxy a balsa trailing edge of any size and sand to the desired shape. It is advisable to apply masking tape at the joint to keep from sanding into the Fome-Cor® board. Fiberglass cloth is wrapped completely around the center section after the two panels are epoxied together to the selected dihedral angle.

Fuselage:

This fuselage drawing is not intended to be used as scale for exact dimensions. It is to be used as a guideline for creating your own Fome-Cor® fuselage and tail to go with your wing. The following will explain some of the highlights of construction. Between Joe Ravelle and myself, we had been experimenting with fuselages, wanting a one piece and just closing up the bottom.

To start, I took a piece of Fome-Cor® board 40" long. We figured the approximate depth and width of the fuselage and added 2" to the dimensions for a plus or minus. It came out to be approximately 18" wide. With Joe's figures, I started to plot the dimensions off a centerline (see pattern on drawing). This gave us a profile of the fuse when bending both sides 90° (see fuse perspective on drawing). The next step after cutting out this pattern was to peel the cardboard off of one side down to raw foam (see wing section for peeling instructions).

After this is completed, take 1/4" piece of plywood and figure the width, which was 2 1/2" inside; cut this piece out for firewall shown as F-1 on the drawing. Locate this and epoxy in

ILLUSTRATION #14

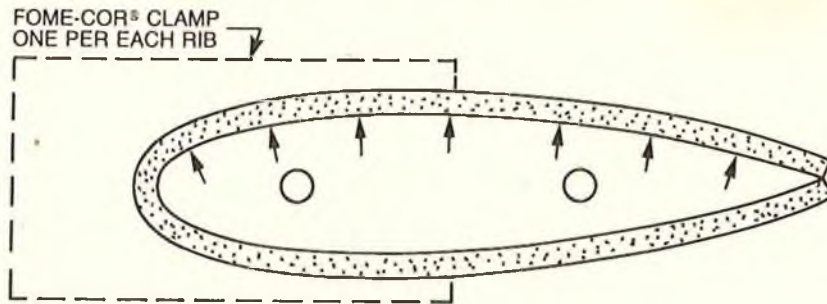


ILLUSTRATION #14A

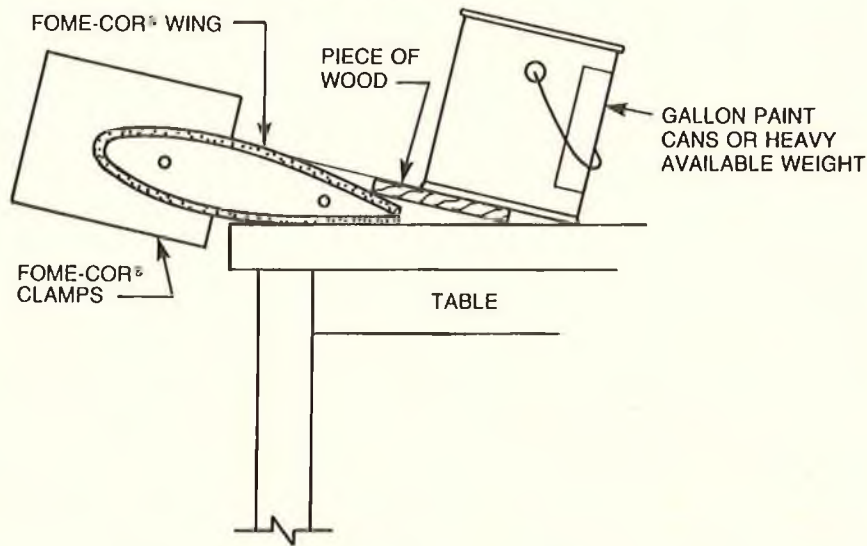


ILLUSTRATION #15

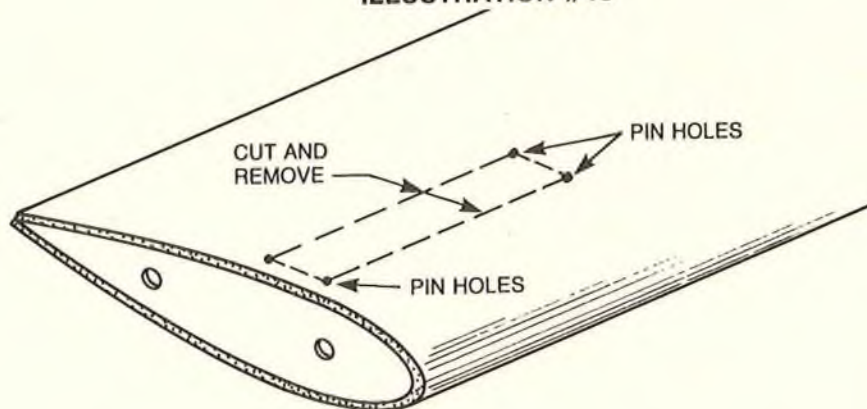
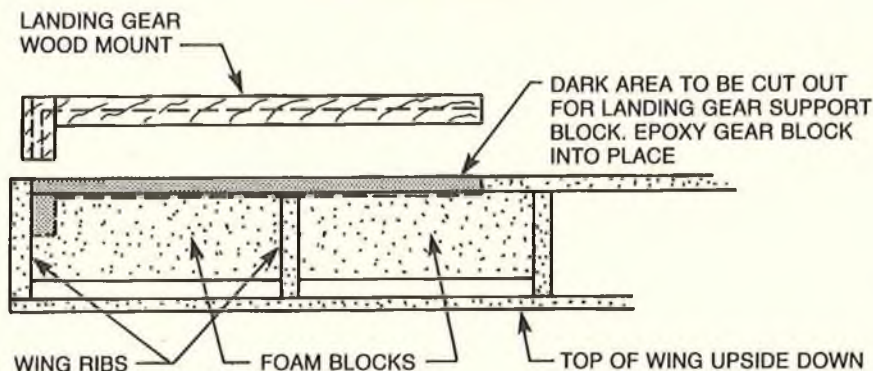


ILLUSTRATION 15A



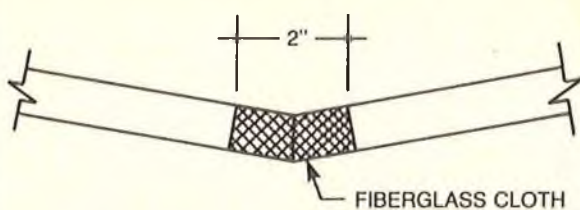
place after you take fuse and bend it 90° each side to compress the foam and create a nice curve around the centerline. Next make F-2 from 1/8" plywood. Put elastic bands along fuse to maintain the curvature. From here on, take a ruler and measure from inside top to bottom of fuse. This will give you the length of formers F-2, 3, 4, and 5. After F-2 is cut and installed, then cut F-3, 4, and 5 from 3/16" Fome-Cor® board measuring the length as mentioned. Then glue all formers with epoxy. Locate between F-1 and F-2 a 1/8" plywood piece as doubler. (This is the tank and battery areas.) Make two 1/8" doublers for wing area between F-2 and F-3. Provide two 1/8" plywood gussets behind F-3. These pieces will support the 1/4" dowel which can be installed as your next step. Drill 1/4" hole and epoxy dowel from inside fuse. Locate the servo blocks with the plywood 1/8" support braces glued to the doublers. Use nyrod pushrods. Punch holes from F-3 through F-5; install rods and glue in place.

The next step is to slot fuse for vertical fin and horizontal stab. First draw 3/16" parallel lines along centerline at top of fuse to accommodate the width of the Fome-Cor® board. Measure base of rudder and that will be the length of slot, then parallel to top of fuse at 0° incidence to wing, draw two 3/16" wide parallel lines at side of fuse for stab and cut out. Cut flat at point of stab that butts against fuse (see Stab Sketch Note A on drawing).

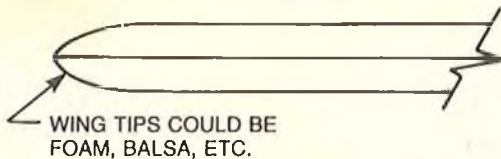
Next, epoxy stab into place and align as needed. Then epoxy rudder into slot, making sure rudder is glued directly to stab, then glue to fuse, align fin and let dry (all glue for this area should be epoxy). Provide 1/2" x 1" hardwood blocks with hole drilled in 1" direction for mounting hatch under tank and battery area. Epoxy blind nut at top for screw (size of bolt is whatever you have available). Rear bottom of fuse can now be closed. Make sure pushrods are in place before closing. Take time in doing this and when it's finished, you will have what appears to be a neat mitered corner. Lay fuse on a piece of the Fome-Cor® board that is wide and long enough from F-3 to end of fuse. Take a pencil and outline the contour of fuse on this board. Next, take a straightedge and cut this out, which leaves you with a tapered piece of 3/16" Fome-Cor® board. Measure 3/16" from each edge along the length and draw a line parallel to each side. Now lay a straightedge along this line and, with a No. 11 X-Acto blade, lightly cut through the top layer of cardboard and lightly into the foam,

text to page 146

CENTER SECTION



WING TIP



TRAILING EDGE

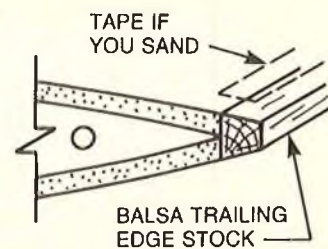
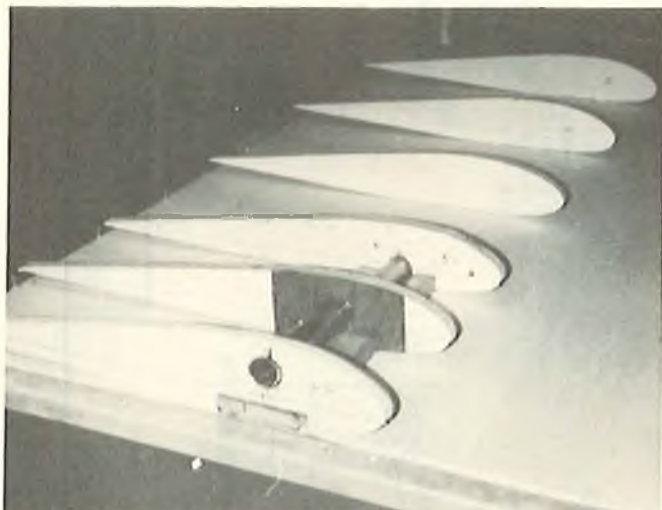
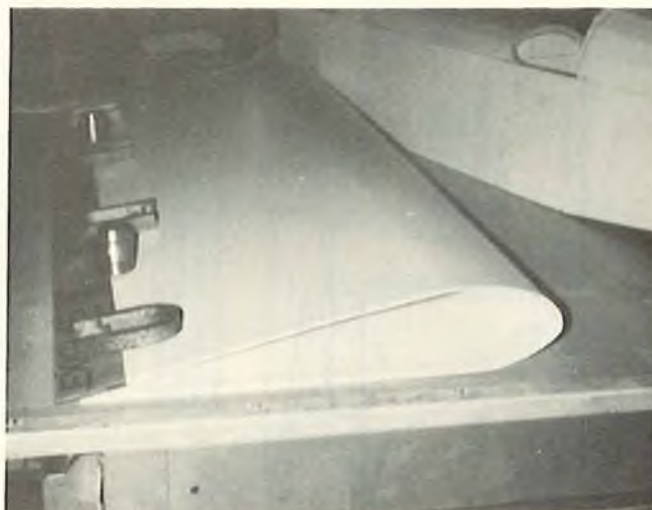


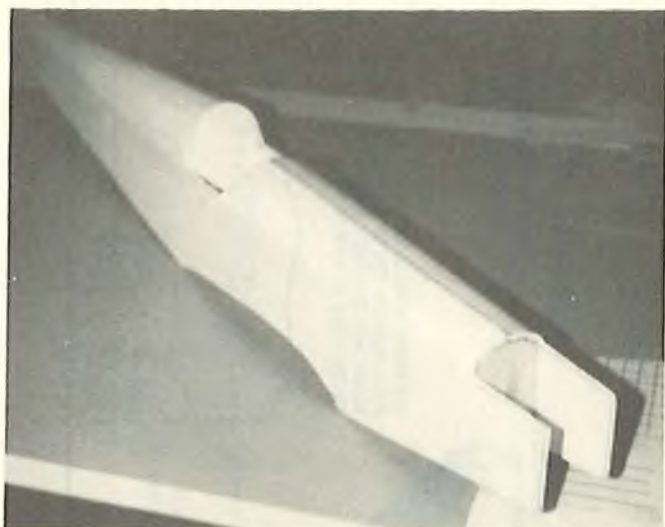
ILLUSTRATION 16



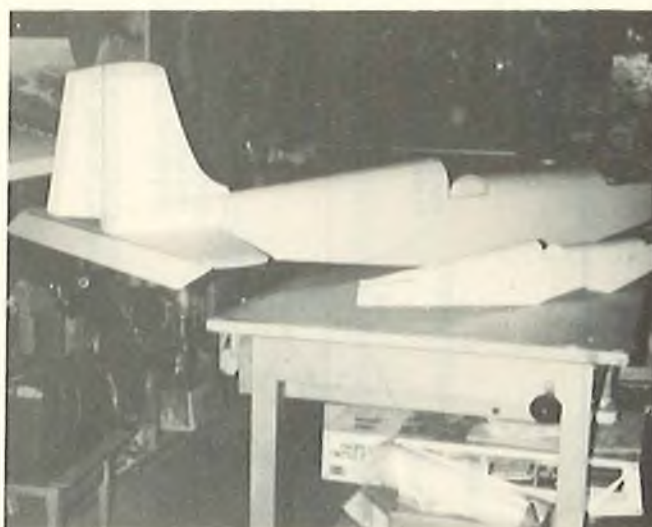
Mike's into big ones — wing uses 1/2" foam insulation board.



Wing nearing completion.



Fuselage for big one — note nice turtle deck.



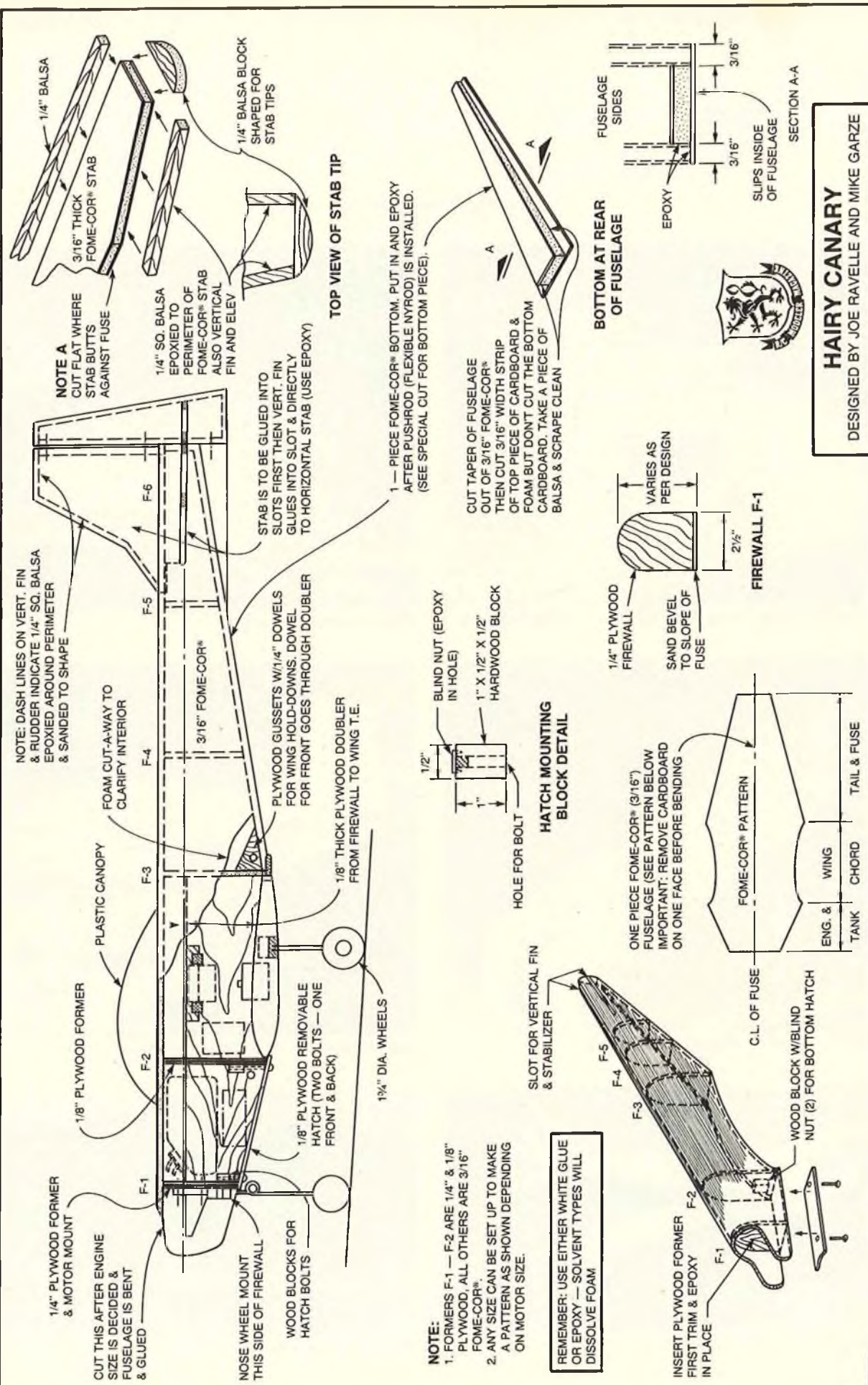
Big fuselage and Sport Flyer II fuselage.



Big foam job using an Evra 190 for power.



Mike out doing what he likes best.





Lockheed's smallest and least publicized project was the Little Dipper shown here in its final configuration.

THE LITTLE DIPPER

By Dick Tichenor

About twenty years ago this writer started a search for information on aircraft that were powered by a two cylinder horizontally opposed engine. The purpose was to build a scale model in which could be mounted a two cylinder engine that I had built using cylinders, pistons, and heads from two Super Cyclones.

Among the subjects researched were the Aeronca C3, Piper Sky Cycle, and Lockheed Little Dipper along with several others. Working in the aircraft business at the time was beneficial as I had several friends who had all sorts of good stuff stashed away in desk drawers. As the material was being accumulated, my work load was increasing and my modeling time went down the tubes. Even though the fascination for the Little Dipper was tremendous, the means of producing a canopy at that time was practically nonexistent so the whole idea became dormant.

The years rolled by, then this year, Saito produced a superb four stroke twin, and Hobby Shack made it available at a most reasonable price. After seeing that Saito jewel and with the aid of my Visa card, I now possess one. Out came the information on the Little Dipper. Sawdust is clouding the shop and the CA is smoking.

To my knowledge, this is the first scale model to be specifically designed for the Saito twin (in the USA). The Saito fits realistically in a Quarter Scale Little Dipper which works out to a 75" wingspan. This size is quite

A Bit Of Lockheed History

comparable to our RCM Funster (RCM August 1982) and should have excellent flight characteristics. We are working on plugs for a fiberglass nose cowl and a butyrate canopy so that those items will be available at a nominal price. A full blown construction article will be forthcoming as soon as flight tests verify our enthusiasm.

Why are we using valuable space to ballyhoo something we haven't finished yet? It is because we are really turned on and have lots of confidence. From the photos in this article, we think a lot of our readers will like it also. Then too, there is the sneaky side, here is an excuse to get that Saito twin on the Christmas list. For a lot of guys who have been intrigued by the Saito but didn't know what to put it in, here's the answer. Isn't Yuletide the best opportunity to get that new goodie?

As for the original Little Dipper, following is the story as gathered from Lockheed sources. It was probably Lockheed's smallest and least publicized project:

We all cried tears as big as billiard balls when the Little Dipper was chopped up — even some of the engineers. She was the cutest little airplane we'd ever seen."

That was the opinion of an old timer among the experimental mechanics. But the start of the Lockheed model 33, back in April of 1944, began on a

note of enthusiasm and optimism — and came from a flight-hungry engineer.

There was no private flying in the Los Angeles area during World War II. The military forbade it. To many private pilots, the craving to feel a throttle under their hand and watch the ground slipping by below was almost insurmountable. To get around this suffering, Lockheed engineer Johnny Thorp found a solution.

He started designing the dream plane he'd build after the war. He spent night after night at his drawing board after work, channeling the driving hunger for flight into the work of designing an ideal private airplane.

One day he showed the plans to Mac Short, head of the special projects group after the Lockheed-Vega merger. Short liked the plans. He pointed out that the ship was underpowered for two people, but single place, it would be a hot article.

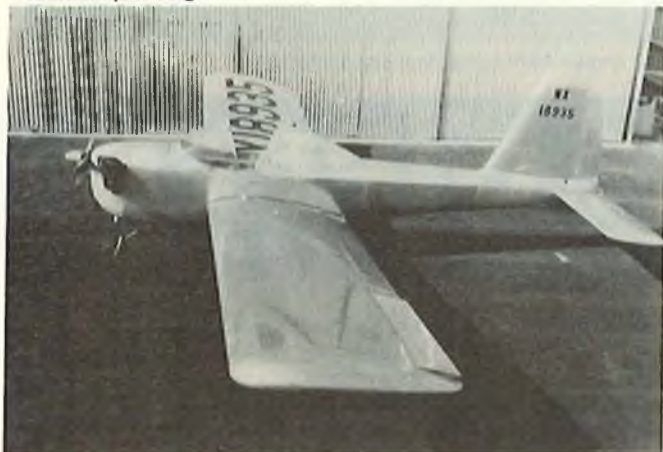
Short then showed the plans to Robert Gross, President of Lockheed. Gross had always liked private planes and this one especially took his fancy. This plane met a requirement he'd stated many times:

"... my ideas are quite different from the conventional approach to private airplane design. My thoughts are largely directed toward cheap, safe, slow flying, rather than expensive fast flying which requires a pretty good degree of piloting skill."

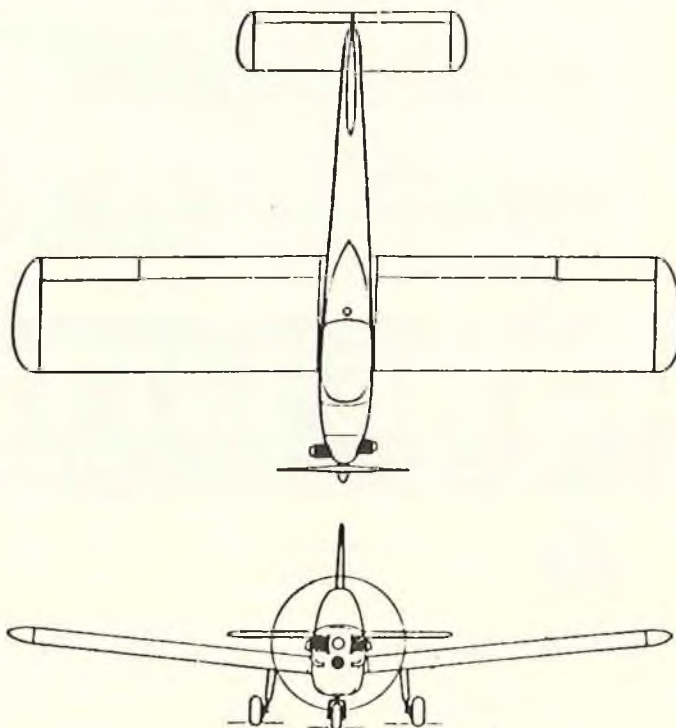
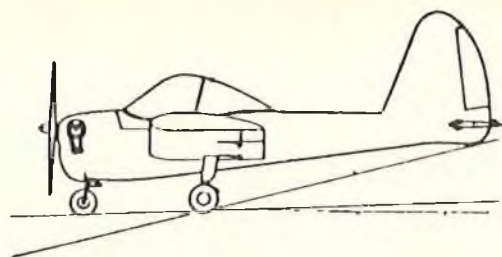
Gross had often spoken wistfully of a private plane which could be flown off a tennis court, an aerial



The fuel tank for the Little Dipper was contained in the headrest. A personality item of Lil' Dipper was fuel gauge recessed in headrest padding.



An early configuration of the Lockheed Little Dipper. Most noticeable is the windshield which was later replaced with a full canopy. The carburetor air intake had a filter added later.



LITTLE DIPPER AIRTROOPER Three View

Span	25'-0"
Length	17'-0"
Height	7'-7"
Wing Area	104 Sq. Ft.
Wheelbase	53"
Wheel Tread	73"
Propeller Dia.	60"
H.P./R.P.M.	50/3000
Wing Loading	7 lbs./sq. ft.
Power Loading*	14.5 lbs./H.P.
*At Gross	Wt. of 725 lbs.

conveyance for the "flying man." Thorp's design came close to that goal. It was cheap, mass-producible, and had good performance.

"We can't build a private plane now," Gross said, "but perhaps we could interest the Army in a small one-man aircraft like this."

The Army showed interest in the design for an "aerial flying motorcycle." They called it the "Airtrooper," and the special projects group went to work to build two hand-made prototypes of the Airtrooper.

Army cavalrymen particularly liked the Airtrooper. They envisioned an aerial cavalry with every trooper having his own aerial mount. By "locust swarming" attacks, they would be able to take almost any strong point by sheer numbers and maneuverability.

An ideal engine was not available for the Airtrooper. But engineers worked out a deal with Air-Cooled Motors whereby two cylinders from a Franklin engine would be mounted on a special crankcase. The resulting two cylinder, 50 hp Franklin turned out to be almost ideal.

In lapses between the terrific pressures of wartime, Gross tried to keep track of progress on the Airtrooper. He'd also puzzled over a name to carry on the Lockheed tradition of naming ships after heavenly bodies. One day he was talking with Mac Short when it came to him:

"Don't know why I didn't think of this before," he chuckled. "That plane's no bigger than a minute — why not the Little Dipper?"

Gross proposed the name in jest but the Little Dipper it became and is still remembered long after Airtrooper has been forgotten.

Date of the first flight of the Little Dipper has been lost in history. Bud Martin flew it first, but his first logged flight is October 16, 1944. John Thorp's personal flight log shows he flew it October 3, 1944, and he recalls Martin flying it "several days earlier."

Other pilots who flew the plane still recall its outstanding performance. One was Johnny Margwarth, former manager of fighter flight test in the California engineering flight test department. He said;

"It was an amazing thing to fly ---

the nearest thing to a man flying around like a bird I've ever encountered. We flew demonstration flights for the military and never left the boundaries of Lockheed Air Terminal.

"You'd wind up the engine, let go the brakes, reach down and pop the flaps and you're in the air --- within 100'. It climbed 800' a minute, hit 100 mph at full throttle and cruised at 90.

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1982 U.S. Scale Masters



Nation's Top Scale Modelers Battle For Scale Championship In California Skies

By Frank Tiano

Photos By Dick Tichenor

It all started on Friday morning, August 20th. That's when the campers, vans, trucks, and cars started pulling into Mile Square Park in Fountain Valley, California. Some would drive 2,000 miles just to spend three days at a contest! Oh, but what a contest it would be. The 3rd Annual U.S. Scale Masters was just beginning and 30 of the best scale builders and pilots in the country assembled on Friday to get their birds static judged and maybe grab a flight or two.

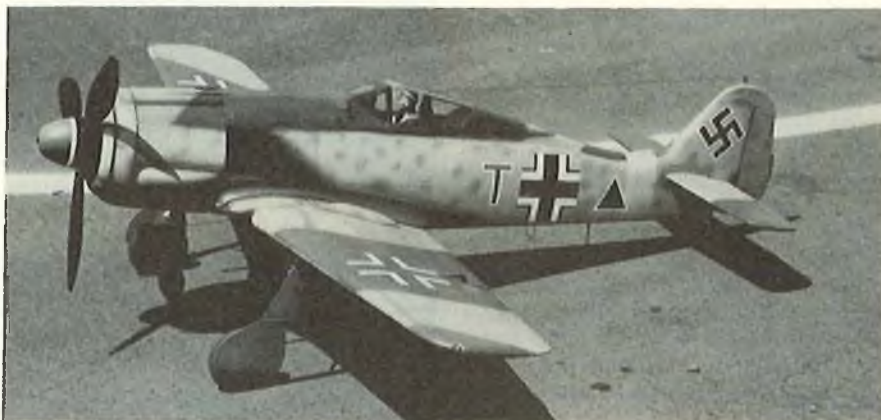
To do any contest justice, the reporter really shouldn't be in the running for the money. That's why RCM chose me to write this bloody account! No, seriously though, when I write about a contest I try to get all the legwork done before the flying starts and this wouldn't be any exception. Everybody who would be competing was registered by 2:30 p.m. so it was pretty easy to roam around the pits and grab a few pictures and scrawl a few notes. The Granddaddy Scrawler, Dick Tichenor, from RCM was there, too, getting some static shots of some of the finest scale aircraft in the country — no, make that the universe!

The Masters competition is so tough that an 87-90 static is almost a must to stand a chance of placing in the top 10 finishers. And, if that ain't enough to impress ya, you better fly at least an 80 along with that 87 static score. And if you're really ambitious, if you'd really like to do well, say the top 5, you better plan on flying close to a 90 average! With all this in mind, the Southern California Scale Squadron, our hosts, did everything possible to make all the contestants feel at ease at all times. The Squadron chose Harris Lee to handle the chores of Contest Director for this prestigious event and I can't think of anybody who could have done a better job. Of course, Harris had plenty of help from the other Scale Squadron members and they all are to be commended for doing just a super job.

Getting back to my tour through the pit area, any modeler would have to be impressed with the quality of aircraft present this year. At any contest other



Kent Walters' thumbs and this Douglas SBD Dauntless won the Scale Masters Championship. Webra .91, 15 lbs., static score 91.



Don Lien captured 2nd Place with a FW 190-G from an Ortego kit. O.S. .90, 15 lbs., static score 91.

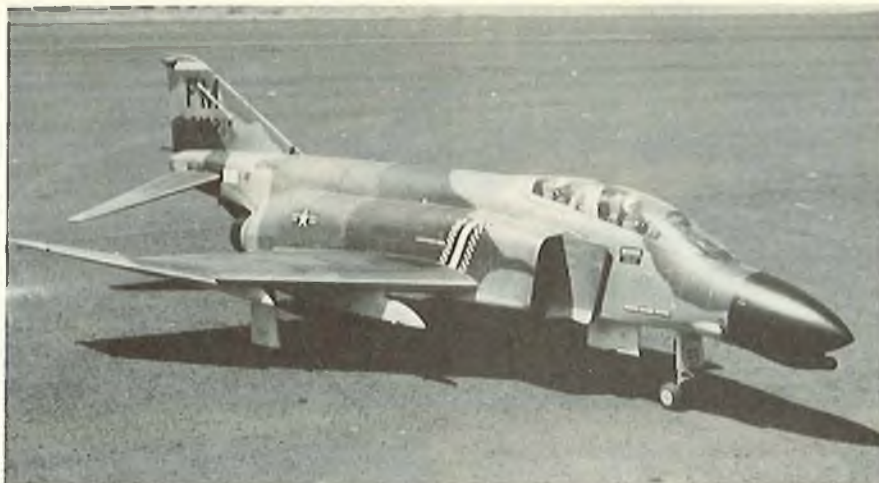


Art Johnson was 3rd with a scratch-built Republic P-43. Quadra, static 91.

than the Masters any given ship would score in the high 80's or low 90's and a few would undoubtedly score in the high 90's. "Enough," you say — "tell us what we missed!" Well, in no specific order, here's what we saw: Tom Cook's F4C Phantom just couldn't go unnoticed, even if you don't care for scale airplanes. This was a brand new bird all done up in Vietnam colors of Col. Robin Olds' famous F4. Tom won the Masters last year and from the looks of his new bird, he would definitely be in contention this year. Next, I got a look at Tommy Weems' Gee Bee Model E. This was a brand new ship too, just completed only days before the contest. Tom said that he camped out in his workshop for 5 weeks to get the Gee Bee ready after a disastrous crash 6 weeks before. Cleeta Weems, that's Tom's wife, said he would make up for the 5 weeks spent building by spending a few extra days and a lot of extra dollars in sunny California after the contest was over. Next we saw Joe Dolans' Fly Baby from a Balsa USA kit and powered by a Quadra. Olen Trenary brought along a 1/4 Scale Pitts that looked like a Byron job and very, very pretty. A beautiful Waco Taper Wing (CTO) was entered by Larry Scott and this ship featured one of the best finishes there. Dale Cordes brought along his Piper PA-18 Super Cub, highly modified from a Sig J-3 kit and did it up in a pretty blue and white color scheme. Lynn Jorgensen fielded a good looking Stephens Akro, while Al Kretz entered a super good looking Smith Miniplane that he also sells plans for. This Miniplane is a bit larger than the popular Sig kit and can accommodate any .60-.90 sized engine. It isn't often that you see a Goodyear racing aircraft at a scale contest but leave it to Dan Santich to come up with something different. His Ole Tiger looked about 1/4 Scale and was .90 powered. I do believe the MonoKote finish may have cost him a few points!

Bill McCallie drove all the way from Florida with Art Johnson and they brought a couple of super looking ships. Bill's F8F Bearcat was stunning with its high gloss, museum finish and Art's Quadra powered P-43 was just coming off a big win at the Scale Masters Regional in Maryland. Mr. S. Bronowski gave us a look at how competitive a Piper J-3 can be. His Cub was one of the nicest I've ever had the pleasure of seeing, anywhere.

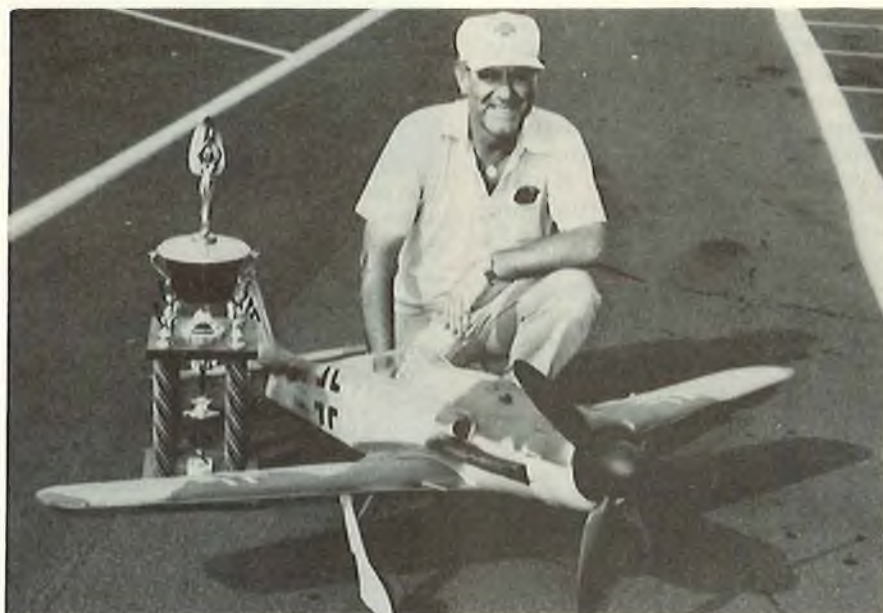
Dean Copeland, Byrons' test pilot, showed us the new CAP 21 now being kitted by Byron. The ship featured a gorgeous white finish, was Quadra powered and weighed a mere 14 pounds. Another 14 pound aerobatic type was fielded by Joe Solko. Joe



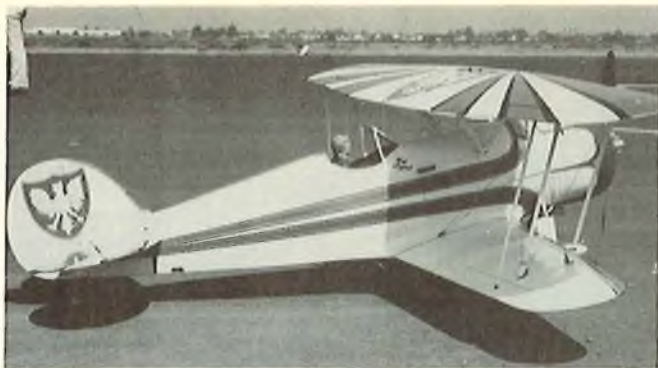
Tom Cook's F4C Phantom placed 4th. The operable canopy, drop tanks, and drogue chute was the klt of the meet. Turbax/K & B 7.5 (2 ea.), 19 lbs., static 88.



Garland Hamilton placed 5th with a Spitfire Mk 24. HP .61, 8 7/8 lbs., static 86.



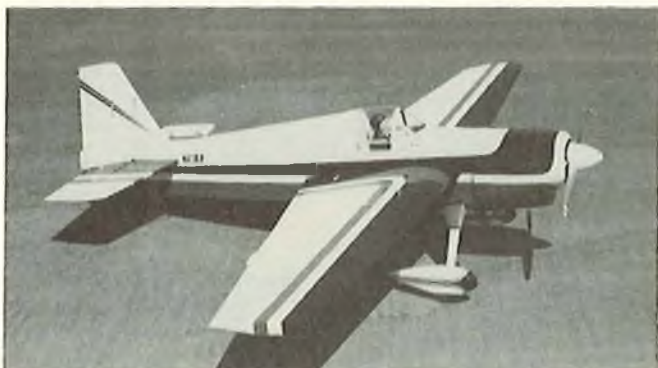
Jerry Ortego came in 6th with his long nose Focke Wulf FW 190 D9 built from his klt. .90 power, 14 lbs., static 89.



A beautifully finished 1/4 Scale Waco CTO Taperwing by Larry Scott. Kawasaki 3.5, 28 lbs., static 85.



Frank Tiano builds neat airplanes but chooses strange color schemes as evidenced by this red FW 190 A8. 2½ snap rolls on take-off, H.P. .61 Gold Cup, 10½ lbs., static 78.



Stephens Akro by Lynn Jorgensen. Quadra, 15 lbs., static 81.



Dean Copeland brought a 1/4 Scale CAP 21, to be killed by Byron Originals. Successfully performs a snap roll on take-off. Quadra, 16 lbs., static 80.



What a Jug! Bert Baker's P-47D is a real performer. Webra .91, 20 lbs., static 86.



Dan Santlich's aircraft was a 1/4 Scale Ole Tiger. Static 71.

came in from Maryland with a Quadra powered Laser 200.

The One Eighth Air Force was very well-represented at the Scale Masters this year with the likes of Kent Walters and his infamous SBD Dauntless, Garland Hamilton with his new bubble top Spitfire, Bob Frey and his very heavily modified Sterling Spitfire, and your's truly with my red Focke Wulfe 190 in captured markings. Two other Focke Wulfe's were present also. Both were from Jerry Ortego kits, one a long nosed FW 190 D-9 entered by Jerry himself and the other a short nosed 190A entered by Don Lien. Both were very striking models in approximately 1/5 Scale and both were powered by .90 sized engines.

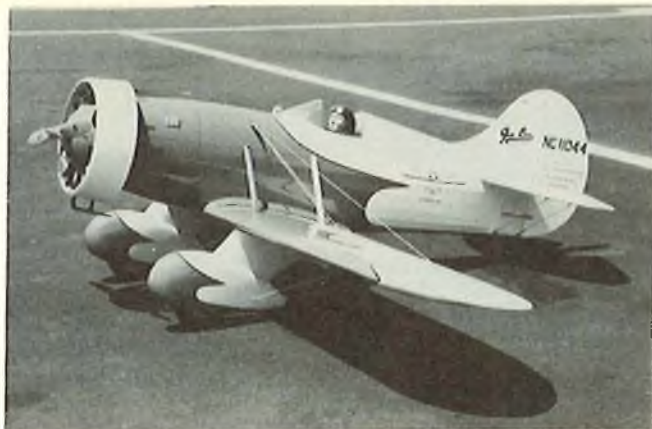
Mike Mann gave us a look at his well-executed F4U Corsair and no one could help notice Chuck Fuller's large PT-17 done up in a flashy blue and yellow color scheme. Jack Aycock came down from Colorado with a 1/4 Scale Nieuport 28 powered by a Quadra. This was a beautiful rendition from the new Proctor kit. And, Bob Walter had one of the nicest Hellcats to be found anywhere. The last two ships I saw were probably two of the most impressive aircraft at the Masters. I know that big is supposed to be beautiful and all that jazz, but all I can say is that big is certainly impressive! Dave Platt's P-51D and Bert Baker's P-47D, without a doubt, were very impressive. Both ships fly on .90 power and both were extremely

authentic in appearance.

Before I get into who finished where, there are a few bits of information I've accumulated that I think you might find interesting. Every contestant was given a ballot to vote for the aircraft he thought most impressive. The winner of this Pilot's Choice Award went to Tom Cook and his awesome F4 Phantom. Another item: of the 26 aircraft that actually got airborne at the contest, 11 were models of Civilian types and 15 were of the Military type. Of the 15 Military ships, 12 were models of WW II aircraft. Another interesting note: 14 models were of, what I would call, large scale, and 12 were .60 sized. Of the larger aircraft, 6 were .90 powered and 8 were motivated by a gasoline



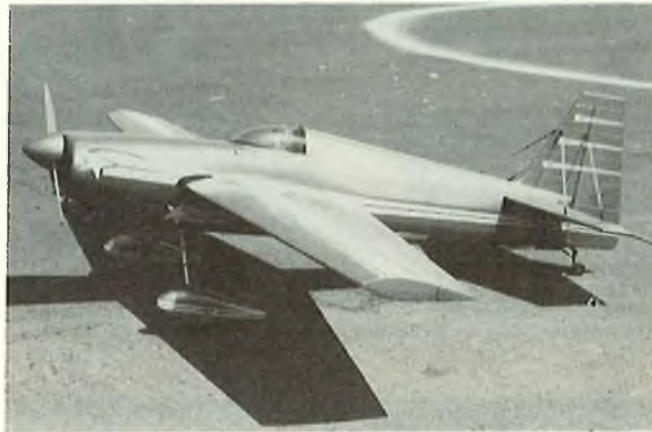
Dave Platt's masterpiece was a near perfect P-51D. Rossi .95, 17½ lbs., static 92.



Tom Weems entered an exciting Gee Bee Sportster Model E. Webra .91, 11½ lbs., static 85.



Joe Dolan competes with his fun flying Fly Baby Bipe. Quadra, 19½ lbs., static 78.



Joe Solko entered a 1/4 Scale Laser 200. Quadra, 16½ lbs., static 85.



Bob Walter had an excellent F6F-3 Hellcat. O.S. .90, 11½ lbs., static 84.



A beautifully finished Pitts Special by Olen Trenary. Quadra, 18 lbs., static 84.

powerplant.

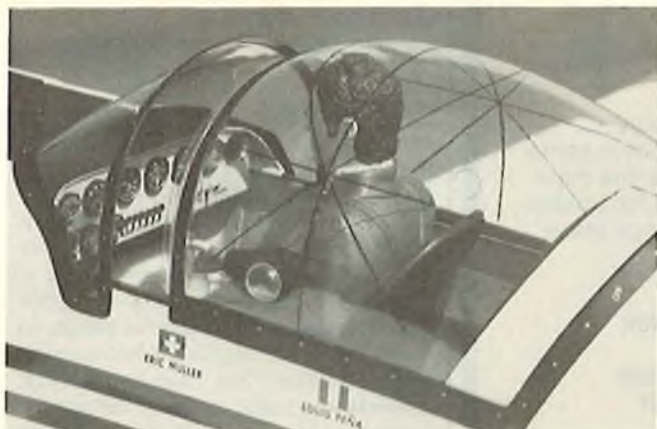
A new judging format was introduced for Masters contestants to better evaluate their static scores. There were many pro's and con's concerning this new method of scoring and as a result, some ships scored lower this year than last year. In any event, there was only a 4 point spread in the top 9 static scores. High static was shared by Dave Platt and Jack Aycock, both had a 92. Next came Kent Walters, Art Johnson and Don Lien, all with 91, followed by Jerry

Ortega and Chuck Fuller with 89 each. Tom Cook and Bill McCallie both earned a score of 88. The point spread between the final top finishers at the contest was 10.625 points.

Kent Walters went on to win this year's U.S. Scale Masters. This was Kent's second win out of three Masters. Don Lien and his FW took second place! Third place was grabbed by Art Johnson. Tom Cook, last year's winner, placed 4th this year and Garland Hamilton took a well-deserved 5th with his new

Spitfire. The spread between 5th place and 10th was only 3 points!

This is the only contest I've ever been to where everyone entered is a winner. Even last place is an honor. When you consider that 26 of the best our country has to offer are all out there battling each other, you suddenly realize that only one person can win. The Scale Squadron, through their intense efforts, made sure that everyone felt like a winner. Instead of awarding that fabulous Datsun automobile, the club was successful in



How's this for clean detail work? Dean Copeland's CAP 21.



The old master Dave Platt authentically detailed his P-51D.



Bob Frey's Spitfire Mk V B started out as a Sterling kit. S.T. Blue Head .61, 11½ lbs., static 86.



Sharing top static honors was Jack Aycock's Nieuport 28 (Proctor kit). Magnum, 16 lbs., static 92.



Chuck Fuller's big Stearman PT-17 had a high flight score of 87.75. Kawasaki 3.15, 30 lbs., static 89.



Marine Corps. version of F4U Corsair by Mike Mann. O.S. .61, 13 lbs., static 85.

turning the car into cash to finance the best contest ever. Every contestant received a beautiful plaque and a new \$100 bill just for registering. A fabulous cocktail party and a fun-filled banquet were free of charge to all entrants and their wives or pitmen. Outstanding merchandise and large plaques were awarded from 6th to 10th place and cash, radios, and beautiful trophies were awarded to the top 5. A worthwhile event indeed and I would like to personally thank Datsun, Futaba, Rhom, Top Flite,

Jerry Ortega Models, and every other donor who made this contest one we will never forget.

Before finishing up I'd just like to say a couple of more things. First, any of you can compete in the Scale Masters program. Next year will be even easier because from what I understand, there will be money forwarded to all qualifiers, on a per mile basis, so that the expense factor will decrease. Don't think that only a super hot shot can qualify either. Only Kent Walters, Tom Cook, Bob Frey

and myself have attended all three events so far. That means that 25 or so other people have competed each year. Also, there are enough Regionals so that at least 60 people can qualify. So, maybe next year, with the help of Datsun, we'll have twice as many contestants! Last, but not least, I'd just like to say that I had a real ball out in California. It was nothing short of fantastic to see all my old friends again. I wish I could see them more often. So I'd like to say thanks to

to page 94

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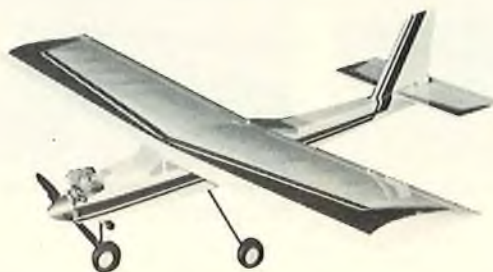
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U.S. SCALE MASTERS

from page 93/89

Dennie DeWeis and Shane Cramer for keeping my spirits up, to Bert Baker for keeping the sun out of my eyes, to Dave Platt for the lessons on how to fly a P-51, to Don Dombrowski for giving all the contestants samples for our new ZAP products (saved me a fortune!), to Harris Lee for putting me and Bunnie up in a fabulous condo, to Bob Frey for calling for me because my regular caller got into some Jack Daniels and coke, to Jerry Ortega for being lovable Jerry Ortega, to Chuck Fuller for showing me how to slip a Stearman, forever --- to Dean Copeland for showing me how to do a double snap-roll on take-off, to Tom Cook for talking to me, to Kent Walters for giving me some sound advice on how to stay out of last place, and to Brian O'Meara for the thoughtful T-shirt momento he brought down from Denver.

That's the U.S. Scale Masters, from the inside and outside for the 3rd year. Take a look at the pictures for a more in-depth look at the quality of machine entered. If that ain't enough for you, there's only one thing left to do --- go out in 1983, qualify, and join us in sunny California for the 4th Annual U.S. Scale Masters. See you there, I hope! □

LITTLE DIPPER

from page 88/87

"Once in the air you could fly around trees, chase birds, fly under telephone wires, stooge along near highways and keep exactly even with cars doing only 40 mph --- the wartime speed limit. I've never seen a plane that would fly so slow with such good control. It was a real flying machine. It landed easily within 75 feet."

But the Little Dipper was not to be for the military. The Army Air Force finally said there would be no flying cavalry. In the resultant dispute between the Army and Air Force the Airtrooper was shut out.

Following the war, everyone looked hopefully toward the Little Dipper as a production airplane for personal flying, all except one. Robert Gross took a close look at the private flying field and regretfully said no in 1945.

"The light aircraft now being built will not satisfy the needs of the average man," he said. "There is not the mass market for aircraft we'd need to build the Little Dipper."

Gross predicted the current light aircraft boom would fall flat by 1947 and "probably not pick up until around 1955." History of the next 10 years proved him right.

to page 96

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LITTLE DIPPER

from page 94/87

Then the finance department moved in on the Little Dipper. To justify the writeoff of the Little Dipper as an investment loss, it would have to be destroyed so that the company "derived no value from said investment."

Many employees sought to buy the Little Dipper, but Federal Government tax laws are inexorable. The flying model and the partially finished second prototype were chopped up and sold as scrap in January, 1947.

Editors Note: Have patience, our Sport Scale version of the Lockheed Little Dipper is coming. □

ASTRO CHALLENGER 05

from page 79

bed was a 300 square inch sport aerobatic ship which uses the NACA 2410 airfoil. This is a 10% thick

slightly thinner version of the Goldberg Falcon 56 airfoil.

How do you evaluate an electric motor in a sailplane? Bench tests don't really give you all the answers. Certainly the amperage and rpms on the ground drastically change when the model is in flight. Therefore, we conducted a simple comparison. We flew five flights consisting of 1 minute motor runs with a regular Blue Label 05 with 8 cells (.55AH) and five flights each with a cobalt motor with 6 cells (1.2AH), 7 cells (1.2AH), and 8 cells (.55AH). The total flight time was averaged as shown in Table #1.

Thus, the Challenger 05 in the direct drive mode can significantly improve the climbing ability of your R/C sailplane. It appears that for the Super Malibu the best climb can be attained with 8 cells .55 AH and a 7/3½ prop. However, if you are not contest oriented and are after duration for sport sailplaning, the 7 cell system is probably the best combination. We found we could easily climb to 600 ft. three times per charge. The total flight time averaged about 14 minutes in still air conditions. Another benefit of the Challenger 05 is that the prop is stopped by the powerful magnets when the juice is turned off. A windmilling propeller is like flying

with a pie-plate at the nose of your plane while the glide with a stopped prop is significantly better.

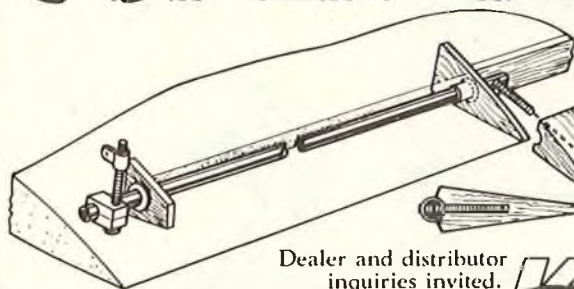
The cobalt motor was installed in an original design aerobatic model equipped with aileron, elevator and motor off-on. The aircraft weighed in at 32 oz. with 6 cells, 1.2 AH up to 36 oz. with 8 cells, 1.2 AH. We tried several propeller/cell combinations and compiled the data shown in Table 2.

The combination of 7 cells and a 7/6 prop seemed to be the best compromise between performance and duration. We tried 6/4 props and got inferior performance with 6 and 7 cells. In fact, the model would be better off with a regular XL05 motor which is wound for a 6/4 prop. With 8 cells the 6/4 did work, but not nearly as well as the 7/4.

We feel that this motor followed by the other cobalt Challengers will give the R/C electric fliers in the country a system second to none in terms of quality and performance. The retail cost of the cobalt 05 is \$75.00 which does not include batteries. This is due to the fact that the cobalt magnets are extremely expensive and that these motors are literally hand-made. Astro Flight has even gone to the trouble of breaking in the motors for an 8-hour period in their shop so that the models

to page 104

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ASTRO CHALLENGER 05

from page 96/79

need only be plugged in to fly. We predict a whole new wave of high climbing sailplanes and truly aerobatic electric models designed around these motors in the next few years. □

SCALE VIEWS

from page 77/76

sources of scale data. The Guide lists three-views, too. The magazines referred to may be out of print but there are several old magazine sellers usually advertising in the RCM "Classifieds" who can provide the items you need. Some of them are known to reproduce plans from the older, more obscure magazines (assuming the copyright has expired!) and may be able to furnish them for a price.

Aviation magazines as well as model publications carry advertisements from people who can provide beautiful documentation photos at a reasonable figure. You may be pleasantly surprised, as I have been, when you send away for photos of obscure flying machines. Hank Clark (36 Highwood Drive, Dumont, New Jersey 07628) who does the cut-away drawings in Model Aviation, provided me a set of beautiful photos of the Lockheed Altair I'm building (his son has Hank's fabulous collection of aircraft photos and makes the actual prints from Hank's negatives). Leo Kohn (Collect-Air Photos, P.O. Box 14103, Milwaukee, Wisconsin 53214) has a photo library that'll knock your sox off --- and he sells photos! There are other sources, too that'll do a good job. I mentioned Hank and Leo because I've had good results from them both.

One of the other sources is Scale Model Research Photos, P.O. Box 675, Orange, California 92666, which, in reality, is Dale Willoughby, a long time modeler. Dale offers color photo packets showing overall views and numerous close-up detail. Send \$2.00 for his catalog. The number of subjects will surprise you and the quality of his photos is first class.

From personal experience, there are some tempting documentary sources that are better left alone! High on the list are aircraft manufacturers! With few exceptions, most "manufacturer supplied" drawings are pretty poor. Most are drawn to a 1/20 Scale (which converts very obtusely to usual model airplane practice!) and they're usually

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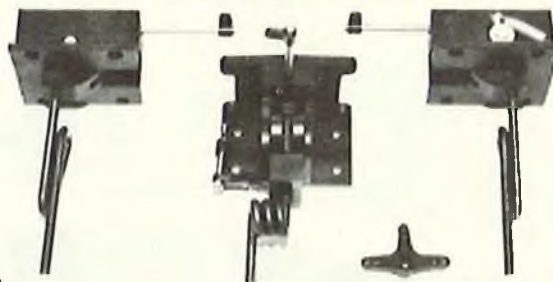
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SCALE VIEWS

from page 104/76

drawn by "artists" rather than engineers. If you can come up with some construction drawings for the real airplane, they'll probably be of value as documentation but 99 times out of 100, you'll have to rephotograph 'em to size. The general run of "manufacturers drawings" are pretty inexact. Then too, because of current economic conditions, many aircraft manufacturers have discontinued sending out drawings or photographs of their products to enquiring modelers. So --- don't bug the companies. The information is better acquired from other sources! There are always exceptions to this rule --- but they're very rare. I had the good fortune, recently, to uncover a set of factory drawings for the Alexander Bullet, the first airplane to be ATC'd as a low wing retract equipped bird. What's unusual about these drawings of a defunct airplane manufacturer is that they were used for the stress analysis of the real airplane. Since the analysis was done using descriptive geometry, the drawings couldn't be

more exacting. But --- this is the exception and totally unexpected.

Another documentation source that appeals to a lot of R/C modelers is the Profile publication series of aircraft monographs. The little booklets originally cost 50¢ each --- they're a lot more expensive today. They're a possible photo source, if you want to cut up reference books. And, although there are many modelers who've enlarged Profile drawings and built flyable models from them, there are other drawings sources that are more precise. Not knocking Profiles, but they've bred a bunch of models all with the same colors and markings! Their ready availability may have limited the proliferation of unique or different scale subjects. They're just too good! After all, with a book that completely documents a model, why look elsewhere for inspiration?

There is a great source of documentation information that, with a bit of diplomacy, tact and a 20¢ stamp, may be the best obtainable! I'm referring to the dedicated antique airplane "nuts." Not only do they restore and fly museum pieces; they band together in "Type Clubs" to exchange parts and information. Both the EAA (Experimental Airplane Assn.) and the AAA (Antique

Airplane Association) have "Type Clubs" on their rosters. Many of the clubs publish fully illustrated newsletters, often complete with three-views, photos of aircraft under construction and pictures of fully restored birds. Better yet, the proud aircraft builder or restorer's name and address are included in the newsletter. A modeler with a camera is often welcome by the "antiquer" or "home builder" who wants to show off his beautiful airplane. There's a guy around here who's rolled out his pristine Beech Staggerwing just so a local modeler could shoot three rolls of 35mm film for a model documentation project. It's certainly worth the drive to a remote airport (after contacting an aircraft's owner by letter or phone) to photograph and/or measure the real thing! So --- hit the "Type Clubs" for good info.

If your model is a War Bird, there are chapters of the Confederate Air Force all over the country. If you're a racing aircraft fan, there's the AARS (American Air Racing Society). Of this latter organization, Rudy Profant, the President (4060 W. 158th St., Cleveland, Ohio 44135) offers a magnificent set of Golden Age racing aircraft three-views drawn by Bill Kerka --- in two scales! We're talking

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over 30 different, relatively obscure and well-known racers (I've gone ape and acquired all of 'em).

And, we haven't said anything about EAA and AAA regional and national Fly-Ins. They're "photo opportunities" without peer. Just an example of what you can come up with: I want to "do" a large scale model of a clipped wing Monocoupe in 1/4 or 1/3 Scale. It's going to be based on Vern Clements' great drawings but I need good color documentation. Looking over the potential color schemes I wasn't too thrilled by Johnny Livingston's yellow and red paint job, despite the scallops. The bird that really turned me on was Ruth Barron's "Baby Ruth" clipped winger. It was red, white and blue, but all of my references put the colors in different places. So, a friend was going to the Antique Fly-In at Blakesburg, Iowa. I asked him to shoot any clipped wings that might show up. As luck would have it, Harold Neuman showed up with "L'il Mulligan," his all white clipped wing Monocoupe. It's painted like Benny Howard's "Mr. Mulligan," gold numbers and all. When I start drawing my "Giant Scale" version of the short winged Monocoupe, it'll be "L'il Mulligan" because I have the color slides that can be converted into color prints by my photofinisher!

Another hint that might help you cure the "documentation blues." There are a host of books, being published today, that are written not only for the aviation buff and historian, but the model builder as well. Although it may be a "pre-plug," I've just completed nine years of research on the Alexander Aircraft Company (Eaglerocks!) and Historic Aviation (3850 Coronation Road, Eagan, Minnesota 55122 --- an RCM advertiser) will be publishing it soon. The point --- the book will contain views of all of the Alexander aircraft ever designed, drawn from the company's construction blueprints. A much better draftsman than I is doing the three-views and they'll be suitable for documentation or model building purposes. But, there are many, many other authors doing the same thing --- catering to the real heroes of R/C --- the scale builder!

If you're a Sunday scale flier or limit your outside flying activity to Scale Rallies, you don't have a book documentation problem. But, you can still find something to whet your appetite for scale information in the info presented here. If you hit the contest trail or enter the local club's scale contest, I hope we've helped you with your documentation efforts. Filling those six pages isn't all that difficult. Have fun doing it! □

'Nationals' this year, was underpowered but it weighed 10½ pounds and had a 0.50 engine. With a 0.60 it would have been fine. By the way, the new "OS 0.28 (yes, 0.28!) FSR" is really a powerhouse. Will provide all the power that "Cricket" needs at high altitude. At sea level the throttle never gets past half! I'd guess at least 20% more power. A great new engine.

After leaving a lot of new friends at Albuquerque we finally arrived back at Los Angeles, although between then and writing this column we have now made similar tours down to San Diego and up to the San Francisco area. We were well-hosted and had a great time in Redwood City. Lots of interest and some good fliers, too. Probably worth mentioning, too, is that we are attempting more these days to mix it with the fixed wing boys, not to necessarily fly our helicopters with them, but to get to understand some of their new advancements in their area of modeling. After all, a lot of the tricks that they have discovered while using gas engines in Quarter Scale, for instance, will be a great help to us when we use these engines more in our helicopters (like radio interference from the spark ignition!).

So, while we were in the South Bay area, we visited another fixed wing event — the well-known annual scale fly-in meet at Morgan Hill. This occurs every year and is hosted by Mr. Perch, the owner of the Morgan Hill facility. Morgan Hill is a beautiful grass flying site which is dominated by a most unusual restaurant, the "Flying Lady." Any time you pass this area you really must drop in for a visit if only because it is a beautiful place with a great bar and a good restaurant. But the most spectacular aspect is when you sit down to eat. Hosts and hosts of scale R/C model airplanes are running around over your head on a track. Look at the photograph and get some idea of what it is like there. In addition, hung up on the ceiling is a full size replica of the Wright Brothers' machine and several other early airplanes. Not a single helicopter, however, but I did talk to Mr. Perch about this and maybe we can put that right in the near future. By the way, the restaurant is closed on Mondays and Tuesdays.

Finally, we visited Sacramento for the Giant Model Fly-In, which is held every year at the Merwin Ranch

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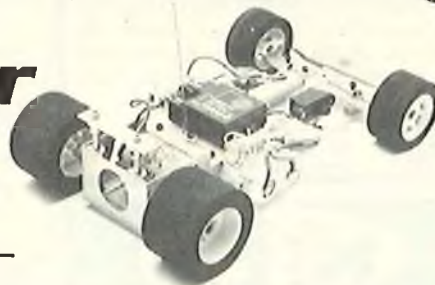
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We intend to do a lot more of these visits now that we have a mobile capability to do so. So please drop me a line if you are interested in us "touching base" with you during our itinerary for the rest of this year and next year.

In summary of these visits, I learned two important things. One is that there are now many more people that you can confidently hand your transmitter to and let them fly your helicopter than there were a year ago (and some can fly d..n well!). And secondly, there is a new breed of younger flier arising who is pushing up the standard of our flying up fast in the United States. I'm now certain that we will soon have enough excellent R/C helicopter fliers in this country to take on any country in the world. Also I became convinced that us older guys who helped to start this thing off will now have to sit on the sidelines and watch; or maybe they'll let us judge for a few more years.

**7TH ANNUAL EAST COAST R/C
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Now to report on the 7th Annual East Coast R/C Helicopter Championships held at Lincroft, New Jersey, on August 15th. This event is hosted by the Monmouth Model Airplane Club and since Horace Hagen, who was C.D. of this event, has sent me a beautifully written report of the meeting I will just include his report in this column for you to read. I certainly agree with Horace's idea regarding the need for us to get going

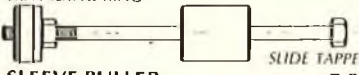


Horace Hagen congratulating Ralph Dalusio for his win of the FAI Class.

to page 122

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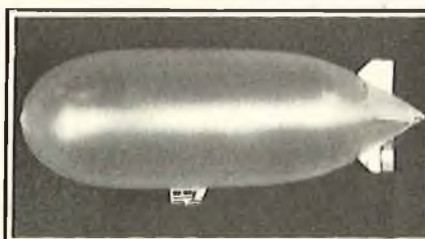
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GIVE IT A WHIRL

from page 120/55

in the FAI maneuvers. It ties in well with my observations that we have a whole bunch of up and coming new fliers who can "take on the world."

At the end of last year's contest the Monmouth Model Airplane Club agreed to run the event again in 1982 because we had a good attendance with 24 entries. We fully expected to have as good a turnout this year in light of the magazine articles that we have read telling us that the helicopter activity is on the upswing.

The weather on Saturday (the practice day) was perfect, and some of the contestants arrived that afternoon. The weather forecast for Sunday was also very good.

In anticipation of a large turnout we set up two flight lines. We were fooled because at the start of the 1st round (9:30 a.m.) we had only 15 entries and thus decided to use only one flight line. This turned out to be a mistake because during the first round another 14 contestants arrived which dragged out the first round to four hours.

The second flight line was opened for the second round and this was completed in about two hours.

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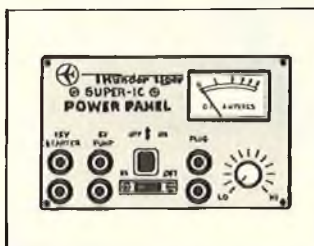
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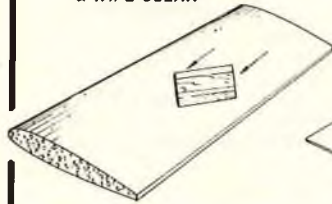


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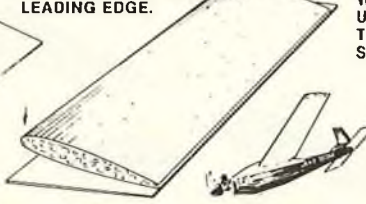
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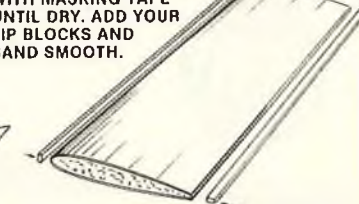
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Although 2 lines speed things up considerably they create another problem. Because the intermediate and FAI classes require a substantial amount of real estate for the course layouts, it is quite difficult to lay out two of them on the same field without creating safety problems or unfavorable wind situations.

Thus, we did not lay out two identical courses but instead combined the novice and scale events on Line 1 and the intermediate and FAI classes on Line 2. This resulted in 17 contestants on Line 1 and 15 contestants on Line 2. A decent split you say? Yes, but it creates a

nightmare for the frequency coordinator as he spent considerable time between rounds to organize things to achieve a smooth flow of frequency control pins. It is not a neat system to be sure. But it does work.

At large (70 entries) fixed wing contests sponsored by the Monmouth Club we have used a system of four flight lines with four airplanes in the air simultaneously most of the time and only two landing circles. Each line has two or three frequencies assigned to it making the frequency control very neat. This system does not lend itself to R/C helicopters because helicopters do not always fly at great

speed even at altitude. As an example, picture a machine hovering during a "Tophat" while another pilot is flying the procedure turn trying to occupy the same airspace. The pilot doing the hovering will no doubt lose his concentration. Not an acceptable situation.

A number of new experiments were tried at this year's contest. The major item was the use of the FAI class in place of the AMA Expert class. We expected this to be met with some resistance but decided that in the long run we must adopt this class if we are ever going to field a World

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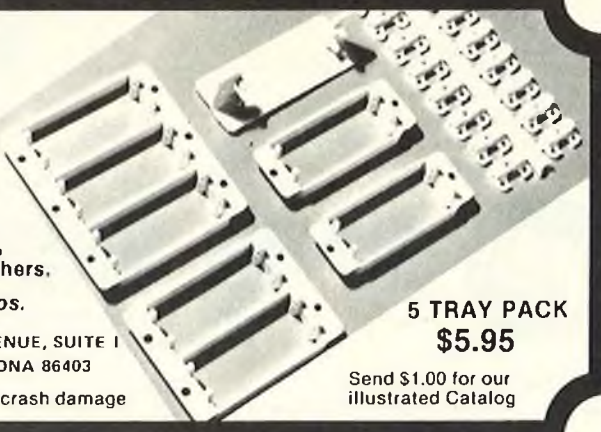
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GIVE IT A WHIRL

from page 123/55

Championships team.

I also had a more immediate reason for running this class because as the USA representative to the FAI F3C R/C helicopter subcommittee I have been unable to effectively argue for or against the proposals due to a lack of experience. Running the event has

definitely resulted in a better understanding of the FAI class by not only this CD but also the contestants. I think it also safe to add that the contestants were considerably less apprehensive with regard to the maneuvers after the contest than before. As a point of interest I would like to add that the FAI class actually favors non-aerobatic helicopters because 10 out of the 15 optional maneuvers are of the non-aerobatic type. These maneuvers stress precision flying and carry the highest "K" factors. I would like to encourage all CDs running R/C helicopter contests to use the FAI class, if not in

place of the AMA Expert, then in addition to that event.

We did not expect to have the excellent turnout in the FAI class but this turned out to be a blessing because the rules really got a trial by fire. The maneuver that created the most controversy was the eye level figure eight (mandatory maneuver number 3). A few pilots elected to skip the maneuver because they did not feel comfortable with it. Other expert pilots were heard to say after the contest that they welcomed the change/challenge that the FAI maneuvers presented.

Another experiment tried at this year's contest was the streamlining of the AMA Intermediate class by dropping some of the Novice class maneuvers. Novice maneuvers 2 through 5 were not flown by the Intermediate pilots because it was felt that the hovering skills of the pilot and the machine can be tested by flying maneuvers 1 and 6 only. Although this represents a minor change to each contestant, the net effect of this will be that as we get larger entries in helicopter competitions, we will be able to get more rounds in per day.

When the registration desk was closed at about 1:00 p.m., we had 29 pilots and 32 entries (3 pilots entered scale and another event). The 11 entries in the Novice class represented an improvement over last year's 7, but we have had as many as 18 in the past. The Intermediate and Scale classes drew 6 entries each which was one better than last year. The biggest surprise to me was the large entry in the FAI class which tells me that there are expert pilots out there who would like to and are able to compete on a World Championship level. With the distinct possibility that the first World Championships will be held in 1984 we should have enough time to gain experience with the FAI maneuver schedule.

I would like to thank the members of the Monmouth Model Airplane Club who participated in running the contest. A special thanks to Linda Goedkoop for taking the responsibility of the food concession and Dick Robbins for being assistant CD.

Horace G. Hagen CD
AMA 231

Rotor Systems

I had intended this month to talk more about helicopter rotor head set-up and characteristics since I have been learning from the full size people of their problems. It may be of some consolation to you to know that in full size machines, setting up controls and blade tracking, both in hover and

to page 128

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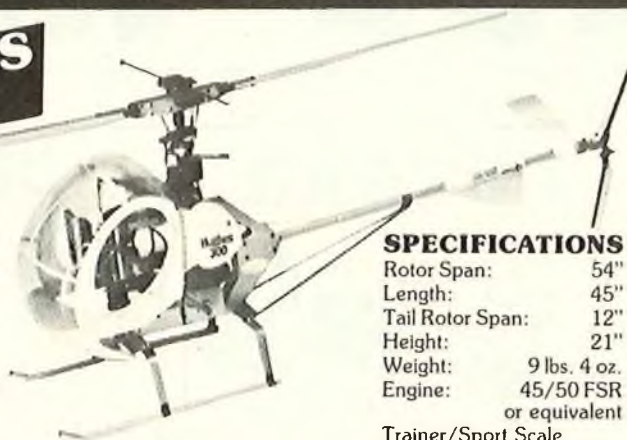
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GIVE IT A WHIRL

from page 126/55

forward flight, still has some elements of an art and is not yet totally a science. In other words, some of it is empirical! In the last few years the full sized 'setter uppers' have been much helped by the development of new, advanced track and balanced analyzers. A company named "Chadwick Helmuth" of El Monte, California, produces one which helps to analyze the main rotor system dynamic problems and gives readings and information on how to correct them. I'll talk more about this soon. It's my intention to devote a whole column to the subject of comparing our model rotor systems with those of the full sized machines as soon as I can get the information together to do so.

Everyone Does It

Finally, during our recent trips we are observing that R/C helicopter flying seems to be practiced and enjoyed by people of almost every age



12 year old Robert Greenall flying his Cricket at the East Coast meet.



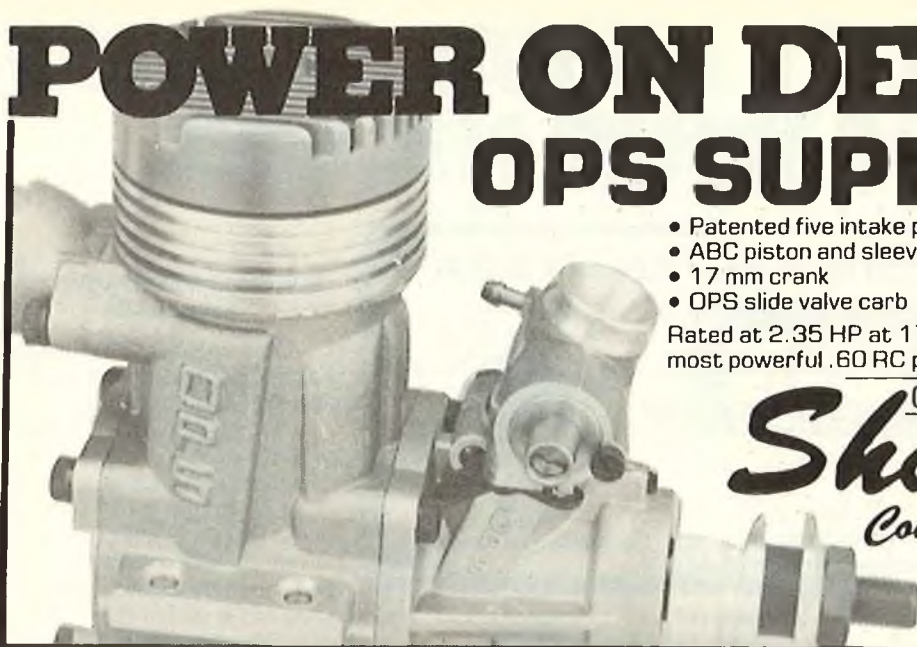
Beautiful Kathy Takata of L.A. doing her thing with her R/C helicopter.



A couple of the new young breed probably flying inverted — or something.

to page 130

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GIVE IT A WHIRL

from page 128/55



"They finally caught up with us."

and background. So for your amusement, we include photos of 4 certainly very different R/C helicopter fliers. The first, one of the youngest contestants in the East Coast R/C Helicopter Championships — 12 year old Robert Greenall who flew his "Cricket" in the Novice class. Second, a delightful young Japanese lady,

Kathy Takata from Los Angeles, who is learning to fly quite quickly, and quite well I should add. Third, a group of the new breed 'kids' who seem to be winning everything these days, and last, the 'old man' wondering what happened and if he should really go out and fly at all in the face of all this competition! So you see, people interested in R/C heli's span a wide range from the 12 year old boy through the young, aggressive fliers, all the way across to the ladies and, finally, the old veterans like myself. It's really growing, fellows, so stick with it. Soon you'll have a whole bunch of people who will either be able to help you or at least commiserate with you when you have problems.

See you next month. □

PIT STOP

from page 74/72

USA, did his thing with a super fast 33-493.1 which put him in 2nd place

overall. Next, Kent Clausen, USA, turned 33-494.0 taking 3rd place overall. Mike Lavacot, USA, turned 32-481.3. The stock motors were turned back in to the impound area and tomorrow will start Modified qualifying.

Modified Qualifying

These were the faster motors which most of these racers run normally. Another surprise was due today. Jimmy Davis, England, really flew around the track in the first round and turned a fantastic 34-493.9. Closest to him was Arturo Carbonell, USA, with 33-481.0, and next was Curtis Hustung, USA, with 33-485.5.

Round two had Mike Hickman, USA, fastest with 33-485.0 and Jimmy Davis, England, right behind with 33-485.3. Third spot went to Kevin Orton, USA, with 33-486.3.

The last round of the day saw Arturo Carbonell, USA, come close to Jimmy Davis with a 34-495.1, followed by Kent Clausen, USA, 33-482.7 and Jimmy Davis, England, 33-483.0.

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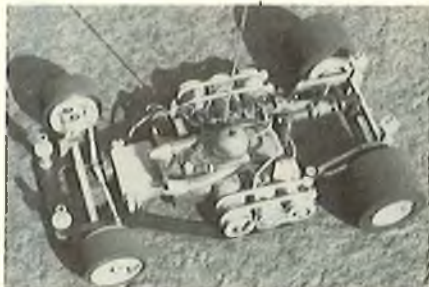
PIT STOP

from page 130/72

The next day Arturo Carbonell, USA, started things off with another 34-492.1. It looked like Art found the combination he wanted. Re-Pete Fusco, USA, wasn't far behind with another 34-494.8 followed by Kent Clausen in 33-482.1.

Arturo had the only 34 lap heat in the 5th round with a 34-488.7 followed by Jimmy Davis, England, again in 33-483.2 and Ralphie Burch, Jr., USA, a tick behind in 483.6.

The last round was coming up now



Arturo Carbonell's Top Qualifying car is a Delta with a new flexi chassis featuring Novak radio, Sanyo batteries, Delta-Igarashi motor, Delta shock absorber, Associated wheels, diff and TOJ body.

and it looked like it was going to take 34 laps to make the sitouts. Arturo cranked off another 34-489.2. He was certainly consistently fast. Kent Clausen, USA, got right in there with a 34-491.0. The sitouts then went to Arturo Carbonell, Kent Clausen, Jimmy Davis and Re-Pete Fusco.

Stock Semi #1

The first and second place driver from each Semi moved into the Main Event plus the next two fastest drivers from either Semi.

Now I don't know how to tell you what happened next. How can you write about the impossible? But I saw it happen — so what can I say. Towards the end of the first Semi with Frank Killam leading, it started to rain! It didn't rain long, only about 2 minutes, and not very hard, but just enough that the cars were spinning out, and the Race Director stopped the race. It had been perfect weather all week with temperatures in the 80's, but today started off cloudy. It had been raining in other parts of the County but we were hoping we wouldn't get any, but it did actually rain 2 minutes on the track. It immediately dried off and in a half hour the Semi Main was re-run.

Frank Killam must have wanted the win awful bad as he started in the

lead again and never looked back. Buddy Bartos was in 2nd with Jimmy Davis in 3rd. But Mike Toland, who had gotten a bad start, was now flying and before long he was in 2nd. Jimmy Davis caught Buddy right near the end to take 3rd place.

Stock Class Semi #2

Bruce Hickman jumped out in the lead with Mike Lavacot close behind in 2nd and Joel Johnson 3rd. Lavacot was slowly closing on Bruce and after about 6 laps he passed Bruce to take over the lead. Butch Berney and Robert Cavazos were having their own race. Joel started having problems and Butch took over 3rd.

Modified Class Semi #1

Rich Lee got the start in this race with Joel Johnson 2nd and Ralphie Burch, Jr., 3rd. Rich kept the lead for 8 laps with Joel and Ralphie getting closer and closer. Joel passed Rich and then as Ralphie tried to pass Rich he hit Rich and spun him out. Joel kept the lead for about 20 laps when Ralphie got past and took over 1st. Joel kept 2nd until his batteries dumped and everyone went by.

Modified Class Semi #2

Mike Lavacot got the start and was long gone with Kevin Orton giving chase followed by Butch Berney.

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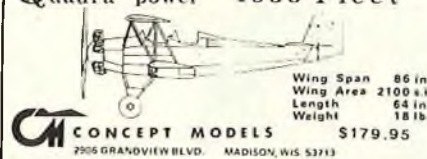
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PIT STOP

from page 132/72

Brothers Mike and Bruce Hickman were having their own race for 4th place. Mike wasn't making any mistakes and went on for the win with Kevin 2nd and Butch 3rd. Check Lavacot's time. He should have saved it for the Main.



Stock final drivers (from the left) Bruce Hickman, Jimmy Davis, Kent Clausen, Bud Bartos, Re-Pete Fusco, Arturo Carbonell, Ralphie Burch Jr., Frank Killam, Mike Lavacot and Mike Toland.

Stock Class World Championship Final

There were 1½ hours before the start of the final race to give all the racers time to prepare their cars. When the drivers were called up, their cars were placed on the starting grid for a photo session of cars and drivers. Bill Jeric then announced each driver one by one for the crowd. Finally the cars were made ready and everyone awaited the start of the race.

Kent Clausen and Re-Pete Fusco got a good start and went through turns 1 and 2 side by side, but in turn 3 they bumped each other and Ralphie Burch, Jr., jumped into the lead, followed by Mike Toland. Clausen recovered and passed Toland at the finish line to take 2nd place. Clausen was now closing on Ralphie. As they got to turn 3 Ralphie cut the corner a little too tight and spun out and Clausen took the lead with Toland following in 2nd place.

A lap later, Toland got a little



Modified final drivers (from the left) Jimmy Davis, Mike Hickman, Kent Clausen, Kevin Orton, Re-Pete Fusco, Butch Berney, Ralphie Burch Jr., Arturo Carbonell, Frank Killam and Mike Lavacot.

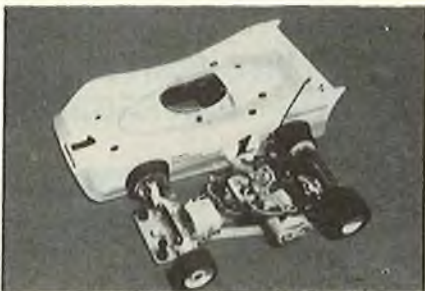
sideways and Arturo Carbonell took over 2nd. Re-Pete Fusco was now running fast and on the next lap he passed Art to take over 2nd place. A couple laps later Toland passed Art to take over 3rd.

Clausen was now about 5 seconds ahead of Re-Pete with both cars running about the same speed and pulling away from the rest of the field. Carbonell was now right in front of Frank Killam and they were about the same speed on the track lap after lap, then Killam got by Art. It was now Clausen, Re-Pete, Killam, Arturo, Jimmy Davis and Mike Lavacot.

Re-Pete was ever so slowly gaining on Clausen, but there was no way he was going to catch Kent. Kent was going fast and not making any mistakes. The slower cars on the track were letting the faster cars go by, which is as it should be.



Stock Class World Champion — Kent Clausen — with Re-Pete Fusco 2nd, and Frank Killam 3rd.



Kent Clausen's winning car is a stock Associated RC121 that Kent has lightened and dyed some of the parts black. Car features Novak radio, Sanyo batteries, Yokomo motor, graphite axle and ball differential.



Somewhere around 20 laps, Arturo started taking some strange lines around a corner now and then. This wasn't Art. Something was happening

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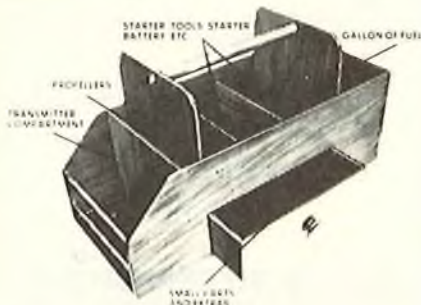
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with the car. A few laps later it got worse and worse and turned out to be the steering servo.

Nobody was going to catch Clausen and nobody was going to catch Re-Pete. But 3rd place was anyone's race. It seems Frank Killam wanted it the most as he held off Jimmy Davis by only one second with Mike Lavacot another 2 seconds back in 5th.

Modified Class World Championship Final

There was another 1 1/2 hours for the drivers to get ready for the Modified Final. Motors, tires had to be changed. Batteries changed or charged. It's interesting to note, only a very few drivers thought they needed new batteries. The faster cars namely Re-Pete, Clausen and Arturo did not need new batteries every run to get their outstanding performances.

The cars were again made ready, photos taken, and finally the race began. Arturo and Clausen got great starts. Too great. They were side by side going into the 1st corner, when they bumped. They both got squirrely. Re-Pete was right behind Art and ran into Clausen. They both went into the boards with Re-Pete getting stuck in the boards. When Clausen hit the boards it took some teeth off his servo gears because he wasn't using a servo saver.

Meanwhile Mike Lavacot, Frank Killam and Mike Hickman all got by Arturo. Art got by Hickman and took off after Killam. Within a lap he was right behind Killam and in another lap he took over 2nd. Lap 4 Lavacot was still leading with Arturo 2nd, Killam 3rd, Butch Berney 4th, and Ralphie Burch, Jr. 5th.

Lap after lap Arturo gets closer and closer to Lavacot, then Lavacot hit a dot in the esses and spins out and Arturo takes the lead. It's now Arturo, Lavacot, Killam, Re-Pete and Jimmy Davis. Re-Pete started dead last, stuck in the boards and by the 12th lap he was in 4th place. The lap charts show Re-Pete was turning 13.8 to 14.0 second laps, while Arturo was turning 14.0 to 14.2 second laps. Arturo had a half lap lead over Re-Pete, so there was no way Re-Pete was going to catch Arturo.

But Re-Pete did catch and pass every other car on the track, finally taking over 2nd place on lap 40. Re-Pete held 2nd place until the last lap when his batteries dumped and Frank Killam, Jimmy Davis, and Mike Lavacot drove right on by. Art took the checkered flag 5 seconds ahead of Frank Killam, with Jimmy Davis 1 second behind and Mike Lavacot 3 seconds back. A very exciting race for the spectators.

to page 138

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PIT STOP

from page 136/72



Modified Class World Champion — Arturo Carbonell — Frank Killam 2nd. Frank had the best overall finish with one 2nd and one 3rd. Jimmy Davis 3rd Place. Jimmy is also the 1982 European Champion.

**World champion
Driver Profiles**

**Kent Clausen — Stock Class —
World Champion**

Kent has been ROAR National

Champion twice, USA Indoor Champion, as well as winning numerous Series races and Championships in California. When he is running to his satisfaction, as he obviously was here, he is very fast indeed and is capable of beating the best there is. He has just graduated from college in San Jose and with



Kent Clausen and Arturo Carbonell —
World Champions!

working full time cannot devote the time to R/C cars as he would like. He has certainly earned the right to wear the solid gold ring with the #1 on it. Incidentally, 2nd through 10th places received solid silver rings.

**Arturo Carbonell — Modified
Class World Champion**

Arturo is the current 1/8 Scale Gas World Champion and now with the 1/12 crown, he is a double World Champion. Is Art qualified to be World Champion? He certainly proved it to everyone who was at the race. It's also interesting to note that Arturo was a ROAR National 1/12 electric champion driving a different brand of car. He gave us all a small sampling of his electric racing abilities there. This new gold ring with the #1 on it should wear well with his other one.

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Engine: .29-.40-.55 Channels: 3-4
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from page 84/80

just enough so as not to cut the bottom layer of cardboard. Then take a piece of hard balsa and scrape this area out down to the cardboard. See sketch on drawing identified as "bottom at rear of fuselage." This is what the finished piece should look like.

This is now epoxied into fuse bottom; note that the overlap covers

the exposed foam edge along the fuse and gives you a miter corner (which is cardboard touching cardboard). A light sanding will give you a nice clean corner.

The stab is trimmed with 1/4" square balsa epoxied to the Fome-Cor® board edge, likewise, the same for the rudder. Sand balsa to rounded edges.

This plane was painted with Hobby Shack Foam Paint (spray type). The plastic canopy was painted black glued with Hot Stuff to the Fome-Cor® board.

Because this was a different building method for me (without your normal materials), it was a real thrill to take-off and watch this plane fly. The O.S. Max .35 really moved this plane and it flew a bunch of maneuvers which, at the time, I was very limited at pattern flying. The total strength of this plane is remarkable. The weight came in at 3 1/2 pounds, strip ailerons, 1 1/4" wheels and 6 ounce tank. The radio was MRC-765. □

IMAA FUN FLY

from page 50/46

Several of us stayed around to depart the following day which dawned misty preventing many of the full scale machines from departing to complete their appearance schedule for the following few days. Wet mags were the order of the day preventing several of the aircraft from getting started. The extra day did, however, provide us with the opportunity for a short visit with Byron and Bruce Godberson, along with a delightful lunch provided on short notice by Mary Lee, one of the many Midwest employees involved in making the festival such a success.

While there were a few problems with feeding such a large number of visitors, especially for the first time, most of the events went off relatively well.

There was a mass balloon ascent one evening prior to a picnic supper. The colorful event with 10 balloons involved was a sight seldom seen in

to page 150



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Ida Grove and attracted many local people both at the site and along the highways following the slow moving hot air envelopes. I went along with Dario Brisighella, whose wife was riding with Dario Jr., in his balloon brought in from Denver, as part of the recovery crew. It was an uneventful trip for us, on the ground, mostly spent sitting and waiting for the slow passage of the balloon to catch up with us. Uneventful, that is, until the rig landed in a farmers freshly seeded field. We were reluctant to enter the field until the farmer came along and invited us in to recover the balloon, unconcerned over the damage we might cause to his crop. We were soon on our way back to the take-off point and arrived just in time to get in on the remnants of the fried chicken. A few minutes later and we'd have been left with nothing but our fingernails to chew on!

The banquet Saturday night hosted 800 visitors and was marred by a shortage of food for about 70 people at the tail end of the line. Rather than being caused by a breakdown in providing for the number of people (which had increased markedly as the date approached) it was caused, at least in part, by simple human greed. I saw plates heaped beyond capacity and items being taken which could not possibly have been eaten, leaving nothing for the few who were at the end of the line. I've always been proud to be a member of what I consider a pretty elite group of builders and was disappointed and disgusted by this display of outright greed on the part of modelers. This feeling was increased the following morning when a modeler told me his field box, complete with all his gear except for transmitter, had been stolen from the model storage area. I guess there are bound to be a few bad apples in every barrel, but it was discouraging to find that we, too, have a few in our ranks.

One other thing disturbed me a bit, in that there was a short period of what seemed a good deal like self congratulation during the banquet program. I've seen this sort of thing in the past at such events and it is in very poor taste. If a group wishes to tell everyone how great they are, they should do it by actions rather than words, and if they are to be congratulated, such kudos should come from outside the organization, not from within. With the IMAA's growth to 2700 members and hearing

100 chapters, self congratulatory activities at such a prestigious event are unnecessary and out of place. Judging by some of the comments I heard, I doubt it will happen again.

IMAA President Don Godfrey took rather testy exception to the AMA's recent application of a 55 pound weight limit for insurance for large models and, I felt, could have been a great deal more tactful in his objections. However, AMA President John Grigg joined IMAA later in the evening and apparently both he and John Worth, AMA Executive Director, have large models in construction or planning stages so it looks as if they may well be with us rather than agin' us!

As you may well imagine, to be totally immersed in such an event, surrounded by things aeronautical and great people, looking back over the event produces a kaliedescope of mental images, colors and conversations difficult to sort out and see in a comprehensive way. It gets a bit jumbled and hard to keep in order. At the time, the events which had taken place over three days seemed to stretch back about a week. Looking back now, it seems as if it all happened in an afternoon and passed far too quickly.

There are a couple or three things which really stand out in my mind about having been at Ida Grove. The complete dedication of Byron, his family and his employees to making the festival a success. Many of them worked long hours to assure the comfort and convenience of those attending, they were unfailingly courteous and helpful and a special thanks should go to Ginny, Mary Lee, and to Byron himself. Despite the significant costs involved, the hassle of catering to several thousand people, and some abuse from a very few disgruntled late diners, Byron unfailingly had a smile and a word for everyone. It is, incidentally, not true that I took large quantities of cold Canadian air down there with me, it came down on its own!

Ginny, the head lady in Byron Originals' office, must have won a thousand hearts during the weekend. A lovely and helpful lady, she worked tirelessly to assure we all enjoyed ourselves and Mary Lee's food services were strained to the limit and still managed to keep us all going. Well done, ladies!

The people of Ida Grove really put themselves out to make us feel at home with them, and their hospitality and good cheer were much appreciated. I had the chance to speak with many of the local people, just as another modeler, and they were

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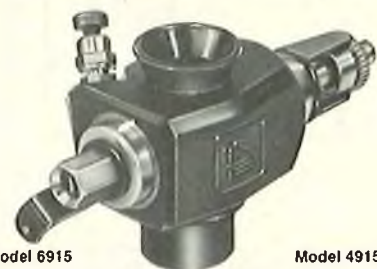
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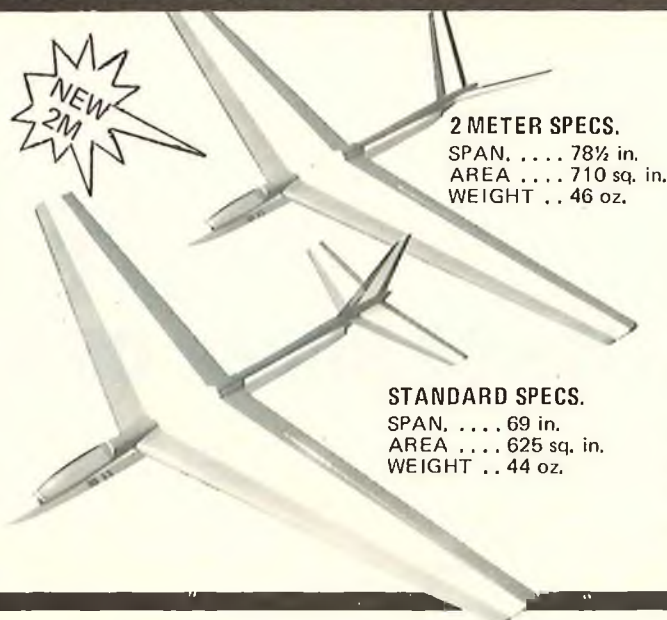
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IMAA FUN FLY

from page 151/46

unfailingly helpful and generous of their time. I had forgotten how great small towns can be and they certainly reminded me of it. Had it been possible to do so, I think I would have stayed there quite contentedly for the rest of my life.

To Byron and all his staff, congratulations on a job well-done. Despite the costs involved and the time devoted to arranging such a large scale event at the local site, Byron intimated to me that he would be prepared to do so again, possibly as early as next year. Now that's got to be dedication! If you have yet to attend one of these annual IMAA festivals,

start planning for next year's event — you certainly won't regret it if Ida Grove in 1982 was a representative sample.

It was also a real pleasure to work with Jerry Smith who did the photo coverage of the event. Jerry is uniquely well equipped for such a venture, having brought his camera carrying model with him. I'm sure you'll agree that he does nice work glancing through the pictures appearing with this coverage of IMAA's Second Annual Festival. Last, but perhaps most important of all, thanks to all the pilots who brought their models to Ida Grove, without you there wouldn't have been a festival at all. Your dedication (and in some cases, raw courage) in flying in the winds that existed exemplifies the best "show must go on" traditions of such events. □

4-SEASONS 40

from page 43

.... to cover the complete model. The FabriKote has a fantastic rate of shrink and goes around a compound curve better than anything we have used to date. The only problem we had was that the FabriKote did not stick to itself which required a coat of Goldberg Jet on every seam. The trim was cut from a roll of black Con-Tact brand plastic (shelf paper), which was easy to apply and provided the needed contrast for easy visibility. All flight controls were installed after the covering was completed.

Engine:

We installed an O.S. Max .40 RC with stock muffler, using the mount and hardware provided in the kit. A

to page 156

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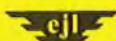
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4-SEASONS 40

from page 154/43

Kraft 8 ounce tank, Aero Trend fuel line, Master Air Screw 10/6 prop, and a Goldberg 2" spinner completed the power package.

Radio:

The radio installation will be tight if the model is built exactly to the plan specifications. The change to a dowel in the leading edge of the wing will open up a large amount of room and make the installation of the radio package much easier. We used a Futaba FP4FN radio with FP S-18 servos mounted on the standard Futaba tray. The battery was mounted all the way forward followed by the servo tray and receiver. Goldberg hardware was used to connect the pushrods to the servos.

Flying:

The C.G. came out on the money without ballast. We set the flight control travels as indicated in the instructions, and completed pre-flight and taxi checks before we went to the field for the test flights. The first flight was for trim out only. The "4 Seasons 40" was rock solid and displayed great flight performance with an extremely wide speed range.

It is a super Sunday flier and we have enjoyed our weekend outings with this model.

Conclusion:

The "4 Seasons 40" could be built by a beginning modeler by following the instructions and used as a basic trainer with a flight instructor on the buddy box. This kit will really be appreciated by the Sunday flier who wants a good flying airframe that looks good and is easy to build without a die-cut part in the box. □

FIRESTREAK

from page 41/36

center. The result is a very stable but highly maneuverable airplane.

There is nothing unusual about the construction. Begin by cutting out the ribs. Leave a little stock at the trailing edge (1/32") to allow for fitting to the trailing edge spar.

If you do not use a jig, build the wing upside down on your flat table. Pin the upper spar cap down on the plan which has been covered with waxpaper. Add the ribs and bottom spar cap. Block up the trailing ends of the ribs for trailing edge alignment and cement the trailing edge in place from W1 to W7.

to page 158

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FIRESTREAK

from page 156/36

Leave out the center section. Align the 1/2" inner leading edge and cement between W1 and W7. Leave out the center section.

Now cut the bottom spar cap at the centerline. Turn the wing right side up and form the dihedral by pinning down the center and blocking up the tips.

Add the 1/4" center web. Add all 1/16" vertical shear webs and complete the trailing and leading edge center sections.

Add landing gear blocks and the 1/16" plywood bottom doubler. Fit the hatch and hatch block. Install aileron cranks, rib caps and planking. The leading edge outer pieces, tips, and fuselage fill block come next. The wing can now be sanded.

Engine Cowling:

Cut out F9, F9A, and F9B. These pieces are circular but F9 and F9A are shaped to give clearance around the carburetor. The center hole in F9 should be made a tight fit on the engine nose section to help fit the cowling and opened up later to accept the rubber vibration damper. Add two 1/4" x 1/4" x 1/2" hardwood blocks at 4 and 8 o'clock on F8 to take cowling screws. Install the engine and after laminating, install F9, F9A and F9B.

Using the pattern on the drawing, cut out a paper pattern and fit on the balsa upper cowl piece, the hardwood blocks on F9, F9A and F9B. When satisfied with the fit, use the paper pattern to cut out the aluminum cowling. Shape and fasten with (5) #0 x 1/4" flat head screws at the spinner end and one screw at 4 and 8 o'clock at the blocks mounted on F8. Open up the hole in F9 and cement in a strip of soft rubber "O" ring as shown.

Assembling and Finishing:

Finish sanding the fuselage, stab, fin, ruddervators and wing. Cement the wing in place now. With a little fitting the juncture of the wing and fuselage can be very smoothly covered, leaving no line or gap.

The fuel tank is mounted as usual with the "clunk" to the rear.

The writer used two fill and vent lines, bending both to go to the top of the tank. Two 1/8" O.D. x 1" brass tubes were cemented in just aft of F4 on the bottom right. These extended 1/2" below the fuselage and were scarfed 45° toward the front to prevent any reduced pressure in flight. The tubes were connected to the tank by two short lengths of fuel line.

to page 162

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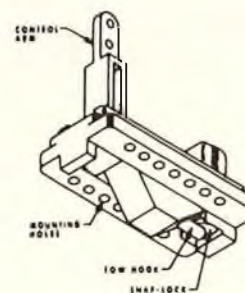
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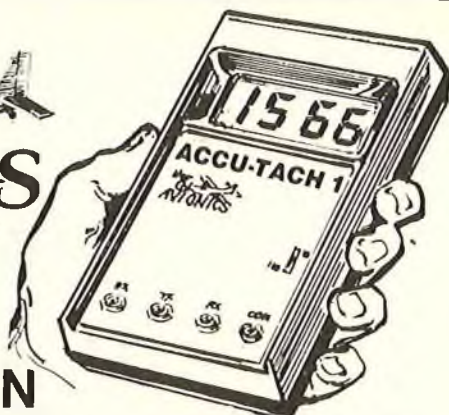
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FIRESTREAK

from page 158/36

Don't try to get away without the pumper. The system will almost work but not quite. The tank is just too far away, and will cause flooding in a climb and running too lean in a descent, particularly at idle power.

The drawing should be self-explanatory regarding the controls. You will probably have to reduce the width of the mixer nylon block to get the right amount of rudder sensitivity. This is convenient since it provides clearance for the end of the nose wheel steering bar.

The writer strung the RX antenna from the RX forward to F4 and then back down the other side of the fuselage to the tail bringing it out just ahead of F8 and making a small knot. Range testing and over twenty flights to date have shown everything to be okay even though some of the flights were nearly out of sight.

The main landing gear is simply two pieces of 1/8" diameter music wire bent as shown with a short vertical bend extending through holes in the block at W1. The struts are secured by .015" x 1/4" x 3/4" aluminum tabs screwed to the block at W1 and W2 with #1 x 3/8" screws.

A pair of 1/16" diameter M.W. hooks cemented to F2A and F3 and a #64 rubberband are used to hold the cabin in place.

While a standard 500 mAh battery pack will fit, a more convenient, lighter and less expensive pack can be made by soldering four nicad AA's together in the configuration shown on the drawing.

Flying:

"Firestreak" flies just like any other plane in its class but probably a little faster. Take-offs are conventional tricycle gear operations. In spite of the absence of slip stream over the tail, rudder and elevator effectiveness at low speeds do not seem at all impaired.

In high speed flight the airplane seems to be very adroit and at the same time grooves very well. Inverted flight is stable and smooth. Since the airplane is so clean the tendency is to land fast. In spite of the relatively high wing loading for this size model it will float and must be slowed down until it wants to "pay off" just as the wheels touch.

As stated earlier, the airplane does not have any bad habits in spite of its unusual configuration and I'm sure you will really enjoy flying it.

Addendum:

After 20 test flights to optimize the airplane it was decided that the high landing speed could be substantially

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improved by adding flaperons. Since there was not much room for a fifth servo, it was decided to actuate the flaps with the throttle servo. In other words full throttle — flaps up, idle — flaps down. By using another mixer on the aileron servo and controlling it with an over center arm on the throttle servo, the flaps stay substantially up at throttle settings from full to one-half and then are deployed rapidly on the way to idle.

This worked out very well and provides a very flexible power schedule with flaps up, and then a great reduction in speed and glide slope for approach and landing.

So, a very fast, highly maneuverable airplane is made to approach slowly with a good glide angle and have a very positive touchdown with the addition of the optional flaperons.

The maximum flaps down angle is 30°. The aileron throws with flaps up remain the same. You will note that the aileron action increases slightly by the selected geometry when the flaps are down. This seems to work out just right.

Unlike conventional aircraft, with flaps, which pitch up, this high V-tail configuration produces a slight pitch down when flaps are deployed. □

ACCU-TACH 1

from page 33

general DC voltage monitoring and checking, while the extra plugs can be used to make up a harness that is equipped with the matching receiver and transmitter charging plugs for your particular radio system.

In the past, a tachometer was generally found only in the field box of the competition type flier or serious RC'er. For the RC'er who is active in competitive racing, a tachometer is an absolute must! The serious pattern flier is equally dependent upon a tachometer, and with the ever growing popularity and use of tuned pipes; a tachometer is rapidly becoming a necessity rather than an optional accessory! As any modeler who has had a fair amount of experience with tuned pipes will tell you, setting the needle valve by "ear" with a tuned pipe is largely a "hit or miss" procedure. The engine repair consequences that result from a "lean run" are well-documented. The RC'er who wants the added performance that a properly set-up tuned pipe will deliver, quickly realize that a tachometer is a very valuable piece of equipment.

to page 167

Best Wishes ... Joy and Peace This Holiday Season!



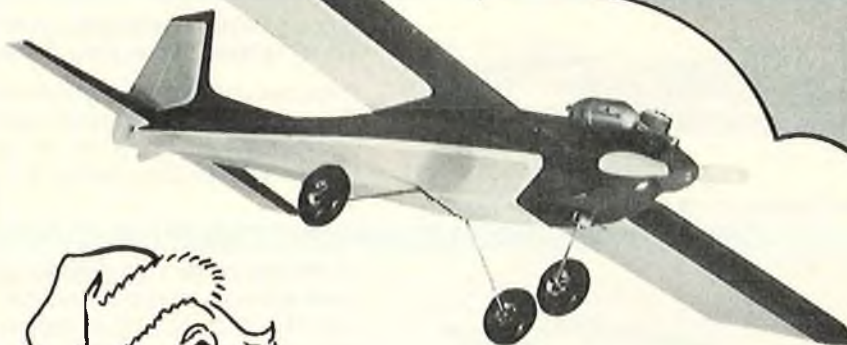
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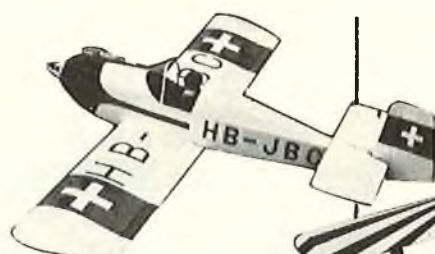


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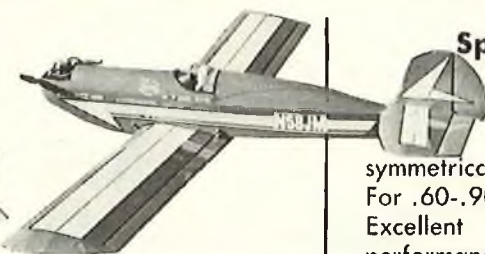
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ACCU-TACH 1

from page 163/33

As an avid R/C racing enthusiast, with a primary interest in Formula I racing, this reviewer has long used the Royal Pro Tach. The Pro Tach is probably the most popular tachometer currently in use. Not having "one of each" of the other available tachometers to compare with the Accu-Tach, we will give you our general impressions of the Accu-Tach's performance in comparison to the Pro Tach.

This comparison was a side by side, at the flying field, type of test and should not be interpreted as a technical evaluation.

While the (Tech R/C) Royal Pro Tach is a conventional meter type and the Accu-Tach is a digital read-out type, both units are optical pick-up tachometers. We used both tachometers with trainer and sport type aircraft, giant scale gasoline engines, electric powered models, and with Formula I racing types.

The Accu-Tach performed very well in each comparison. The 10X scale functioned reasonably well with an electric motor which did not fluctuate

much in rpm, but was less effective with ever-changing numerals on the digital display, when used with all other types of engines. The 100X scale with its 50 rpm read-out numeral change factor, is by far the most useful scale.

In reduced light conditions (setting sun or dark, shaded areas), the Pro Tach appeared to have an edge in obtaining a steady rpm reading. This may be a minor point perhaps (or one only associated with the two units being compared), but nonetheless, it was one that we encountered. Varying and swapping positions, or angles of

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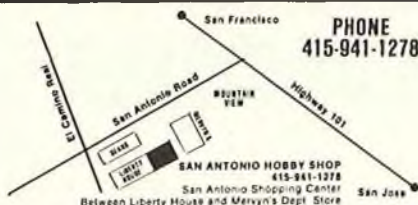


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ACCU-TACH 1

from page 167/33

both tachometers did not alter the Pro Tach's reduced light, performance advantage.

On high rpm engines, this reviewer felt that the Pro Tach, with its meter type read-out, was the easiest unit to effectively use. The Accu-Tach does provide a more accurately defined rpm reading once the needle valve on a racing engine is set. However, the constantly changing blur of numerals on the digital readout of the Accu-Tach, as a racing engine is "needled in," greatly detracts from its race use efficiency. It should be emphasized that this is a personal observation, and was only encountered with high speed racing engines that are "re-needled" for each flight. In all other comparisons the Accu-Tach performed equally well. Both units were generally within a 100 rpm of each other over a broad range of rpm readings.

The Accu-Tach, with its voltage reading capability, is an especially appealing unit. We compared the Accu-Tach's expanded scale voltmeter features with an expensive digital read-out type voltmeter and found the Accu-Tach readings to be virtually identical to the readings shown on the laboratory type voltmeter.

In summary, the Accu-Tach is a compact, lightweight, well-made unit that performs very well as a digital tachometer, as an expanded scale voltmeter, and as a 0 to 20 DC voltmeter. It is attractively priced at \$79.95 list. If the price of an expanded scale voltmeter unit is deducted from the Accu-Tach's purchase price, it is an even more appealing unit for the RC'er who does not own either piece of equipment.

The digital (LCD) versus a meter type read-out is largely one of personal preference; much the same as a digital wrist watch in comparison to a conventional watch face.

Each type of read-out has its own advantages and disadvantages.

Certainly, the Accu-Tach deserves the serious consideration of any RC'er who is contemplating the purchase of an optical type tachometer. □

SOARING

from page 26

instructions are available from Terry.

★

Here comes the horsepower race. At

the 1981 World Soaring Champs, the Canadians showed up with a winch nicknamed the "Canadian Cannon." This bomb used 36 volts on the motor and flung sailplanes into the sky at 150 mph. In 1982, the FAI rule makers decided to put a stop to this horsepower madness by limiting winch voltage to 12 volts, and inserting a "weak link" of one millimeter monofilament line in the winch line. There's an old saying, "He who launches highest, wins." While not exactly true, it is more right than wrong.

When Dan Pruss returned from Paris with the news of the 12 volt limitation, wheels began to turn here and there. People began to reckon that with smooth acceleration and a proper trajectory, 150 mph launches were still possible even with the 88 to 110 lb. breaking strength of the "weak link." One group started looking into gasoline motor drive; another was gearing two 12 volt motors to a single 12" drum. Rick Schramack of Leucadia, California, decided he would have none of this subtlety; he went for raw power. Rick found a company that built starter motors for Formula I race cars. These motors are custom wound with epoxy impregnation. They have special brushes and special everything; they have awesome power and speed. They also cost one heckuva lot of money.

I'm beginning to believe that things like Indoor, and the like, are the only pure form of the model aircraft hobby; it's man and machine against man and machine. When I first heard that at the '82 World Intergride contest in Warwick, England, only hand towing was permitted, I thought they were out of their tree. On further reflection, however, maybe they know what they are doing. But, in truth, I couldn't run fast enough to keep a Gentle Lady airborne, so we'd better fight this winch thing through.

★

One area of sailplane design that is rarely discussed is the fuselage. While the fuselage provides a convenient way to hold the wing and tail in proper positions and provides a place to put the radio gear and something to hold on to during launch, it really doesn't do much for you aerodynamically; except to contribute to drag. In sailplanes of the Paragon/Oly II, etc., class (i.e., slow flying floater type), the fuselage is a square box with very high drag. However, at the slow speeds, airflow separation is not much of a factor compared with the drag due to profile and acreage. The advantages of ease of building and ample equipment room outweigh any drag disadvantage. The box fuselage does

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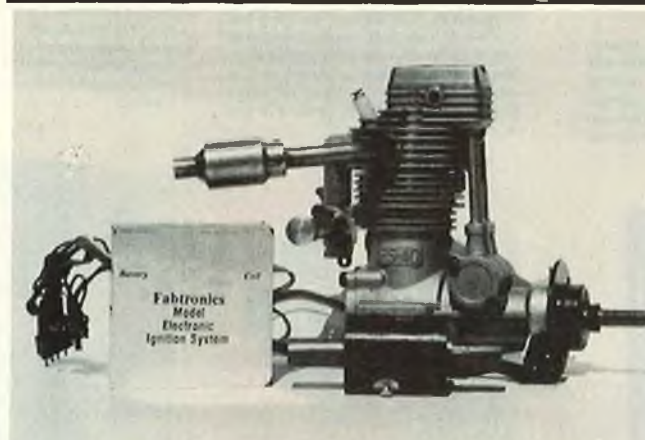
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affect the flight characteristics. The slab-sided fuselage when yawed has very high drag. The aft sides also contribute effective fin area which, when coupled with a large fin and a tad too little dihedral, could tend toward spiral instability.

From the efficiency standpoint, the best fuselage is the smallest possible fuselage with the least surface area. The greatest volume for the least surface area is contained in a circular cross section. The problem with a round fuselage is that radios are not round and by the time you make the circular cross section large enough to contain all the square corners, it has more surface area than a more elliptical shape. The thing to avoid is sudden changes in cross section. This is hard to avoid in the nose section as that is the residence of the batteries, radio, etc. Fortunately, less drag is developed due to an increase in cross section than a decrease (i.e., teardrop streamlining), so that "necking down" should be done gradually. The typical pod and boom certainly defies this rule, as the cross section changes radically at the boom. It's not apparent to me whether the high drag caused by the discontinuity is offset by the very low drag of the boom.

A big contribution to drag is made by airflow separation at the junction of the wing root and fuselage. This is caused by the sudden changes in cross section. These abrupt changes in cross section can be mediated with fillets between the wing root and fuselage. Filleting should start ahead of the leading edge, smoothly reach a maximum cross section at the leading edge, tapering off to the wing root high point. It should then smoothly increase in cross section to the trailing edge, and then slowly taper to nothing. This all sounds neat, but is a mechanical complexity that most sailplane builders avoid. Whether the complexity is warranted depends upon performance requirements of the designer. The complexity of filleting is compounded by the fact that it is not just a "streamlining" exercise. Their function is to change the aircraft cross section in a particular way but the design is largely empirical.

The fuselage will fly at an angle with respect to the airflow, which is determined by the angle of attack of the wing. The wing must fly at an angle of attack which will generate enough lift to keep the sailplane airborne. At high speeds, the angle of attack of the wing will be low, at low

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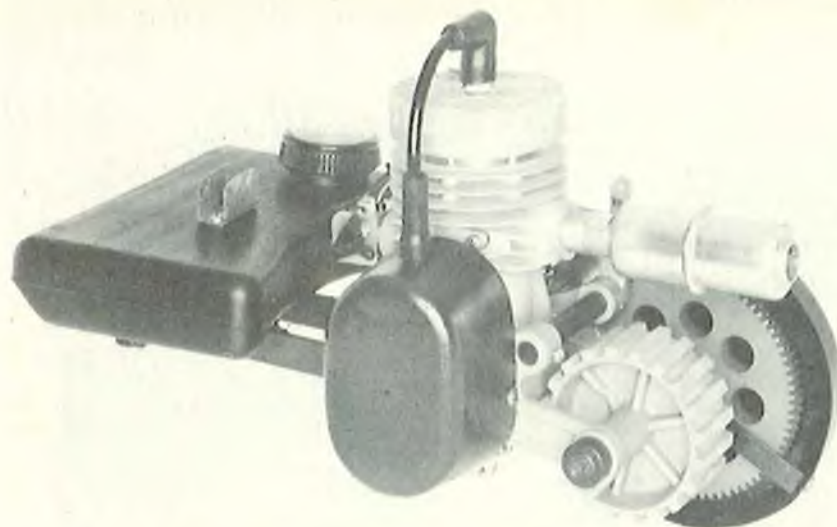
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speeds the angle must be increased to generate enough lift. Therefore, the fuselage will change its angle to the flow of air depending on the speed. At high speed, the fuselage will be more "nose down" than at low speed. It seems apparent to me that the minimum fuselage drag would occur when the centerline of the fuselage is in line with the airflow. If this thinking were true, the designer who wishes minimum fuselage drag when thermalling should set the wing with a high angle of attack with respect to the fuselage (at the angle of minimum sink). The designer who wishes low drag at high speed should set the angle low. However, there is sufficient disagreement (among people a heckuva lot smarter than I am) for me to say, "Man, you're on your own on this one." I will point out a couple of consequences though. A classic "nose down" configuration is the Hobie Hawk. While a whale of an efficient sailplane in the air, it is a bear to land. Landings are way out on the tip of the nose and the thing goes unstable and does the famous "Hobie Roll" to an inverted position. The only guy I've seen who can land one is Frank Cox, from Florida / San Diego. And, it's taken ten years of flying nothing else, to learn. Most designs set the wing at about 2½ degrees with respect to the fuselage, and tend to fly tail low at low speeds.

One factor to consider in this "tail high — tail low" is the position of the horizontal stab. One would like the horizontal stab out of the wing/fuselage wake. In a tail low configuration at a high wing angle of attack, a low stab location, or a "T" tail, will keep the stab out of the wing/fuselage wash. I have a sailplane with a mid stab position. When coming in tail low with flaps, I lose some elevator authority due to wing wash. When I also put up spoilers, the stabilizers actually flutter due to the tremendous turbulence. My "T" tail ship does not show these characteristics.

Anyway — it would seem prudent to fit the fuselage to the junk you're going to put inside. Wasted space inside just means more drag outside. It is also advisable to round the fuselage as much as possible. It is especially important in the nose area to start with as clean an airflow as possible. Slap-sided nose areas have even more effect on yaw stability than those aft of the wing, and will require added fin area. If you are not going to use filleting, keep the fuselage width constant in the area of the wing root. And, of course, avoid sudden changes in cross section or contour.

★

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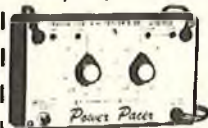
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SOARING

from page 176/26

I recently got my hands on two publications that are fascinating. The first is *Model Airplanes and the American Boy 1927-1934* by Frank Zaic. This is a collection of articles, plans, advertisements, etc., that appeared in the *American Boy* magazine under sponsorship of the American Model League of America. If you want to see how it was done back in the '20's this will keep you occupied for many evenings. I don't know what the price is but Frank Zaic can tell you — Box 135, Northridge, California 91328.

The second was dropped off by a New Zealand visitor, Reg Fleet. The title is *The Encyclopedia of Model Aircraft*, edited by Vic Smeed with foreword by Henry J. Nicholls: Published by Octopus Books, Ltd., 59 Grosvenor St., London W1. This book tells you all you would like to know about all phases of modeling from plastic kits to R/C, including free flight, control line, electrics, scale, etc. It is quite modern, having been first published in 1979, and gives a very good view of the different facets to model aircraft. Catch you next month, all being well. Howzat! ☐

CUNNINGHAM ON R/C

from page 24/22

Non-Scale, as well as a trophy to the entrant who has journeyed the longest distance to enter. This year the aircraft that took home the award for Most Impressive was a 42 lb. P-47 constructed from a Nosen kit. The finish was in silver with all panel lines drawn in. The power was a Kawasaki 3.15 engine. An added touch to this aircraft was that it was towed to the flight line by a small radio controlled truck. Gail Phillips of Houston built this beauty and it was flown by Ted White.

The Best Scale award went to Mike Cook, also of Houston, and repeat winner from year's past. Mike's Corsair had folding wings, a bomb drop, weighed in at 36 lbs. and flew great. Piloting of this bird was by Bob Crane, also of Houston. Bob told us he was going to lay a bomb from the Corsair on a spot, and proceeded to lay it exactly on the spot. Bob is an excellent pilot and does his flying with the handicap of a missing left arm.

Best Non-Scale was taken by Paul DeVries from Plano, Texas, with his

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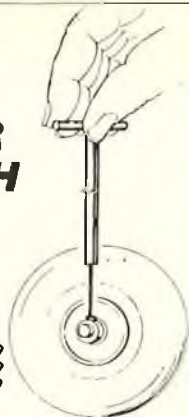
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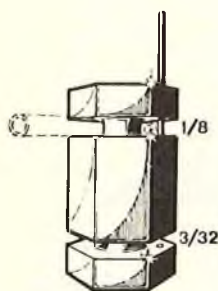
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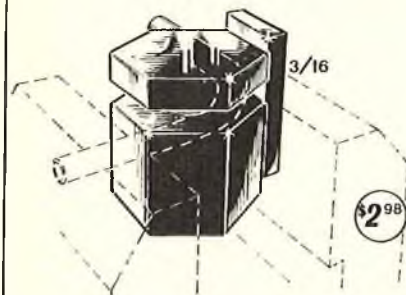
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The trophy for the entrant making the longest trip went to Don Downing who motored up from the far south city of Harlingen, Texas, over six hundred miles from Fort Worth. Entrants also came from Oklahoma, Kansas, Missouri, and Louisiana. This year, due, I expect, both to the recession and the proliferation of local fly-ins, no entrant came from as far as the East Coast or West Coast as had been the case in earlier years.

A repeat spectator, who attended both last year and this year, came from England to visit his sister in this area, but coordinated his trip so that he could bask in the Texas sunshine and watch the Jumbo. An interesting thing is that all spectators at the Fly-In are there because they are interested in large models. There is no local advertising of this affair. Spectators are there because they have read about the Jumbo in my column, or have seen a flyer posted in hobby shops in the Fort Worth, Dallas, Houston, or San Antonio areas. With absolutely no publicity we attract over two thousand of the faithful each year. The cars were parked for two miles along the road leading to Thunderbird Field. If we advertised locally, I expect that ten thousand would show up from this aviation oriented area, and we are hard pressed to handle two thousand, much less ten thousand.

One of the aircraft that I enjoyed looking at the most — both in the air and on the ground — was built and flown by Garland South of Cleveland, Oklahoma. Garland has attended each of the Jumbo Fly-Ins and this year he brought his recently completed Waco biplane. It was scaled up from the Pica kit of the Waco Bipe — scaled up to double the Pica kit, thus having a 10' wingspan. This aircraft tipped the scales at 54½ lbs., and was powered by a 5 cubic inch gas engine swinging a 32/10 custom carved prop. The sound of the engine was very realistic, but the sight of this aircraft in the air really turned back the pages of time. To say that it is graceful is an understatement. If the pilot could have waved his arm as he flew past the runway the illusion would have been complete. A really outstanding aircraft.

This Fifth Jumbo Fly-In was even more super than the four before it because it really belongs to the modelers who attend. I just get it ready and turn it loose and let

to page 184



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CUNNINGHAM ON R/C

from page 181/22

everyone have a good time. So, with that in mind, next year (the third weekend in July) will see the Sixth Annual Jumbo Fly-In taking to the skies over Thunderbird Field, just west of Fort Worth, Texas. Plan now to attend, you'll have a great time, and so will all of us. □

ZLIN Z50L

from page 15

..... and W21's would have been eliminated. Horizontal stabilizer supports are a must, as the horizontal stab has no constant spar — possibly a consideration to add.

Before leaving construction, we must say a word or two regarding the accessories that were included. There was a wing construction jig, glass filled engine mount, prop spinner, fuel tank, main wheels, dural landing gear, tail wheel and spring, decals, pushrods, clevises, control horns, hinges, wing bolts, and a clear canopy. This collection of hardware proved to be all that was needed, and we were impressed by the completeness and quality.

Covering:

The wing and horizontal stabilizer were glassed using polyester resin and 3/4 ounce cloth. The rudder was covered with Coverite. Surfaces were filled with automotive primer, and a final finish of acrylic lacquer applied.

Engine:

We installed a K & B .61 engine, and a Tatone muffler, utilizing the supplied engine mount and fuel tank.

Radio:

The radio system used was a 6 channel Proline Competition. We found sufficient space on board for the flight system, but found that everything had to be kept as far forward as possible in order to achieve the proper C.G. The battery pack was in the cowl area, and servos were just aft of the fuel tank.

Flying:

The C.G. call-out was very close to the drawing. For scale flight, we suggest a little further forward, and for aerobatics, just a little further aft. Control travels shown on drawings were perfect.

The Zlin had no bad traits and, if you'll forgive an over-worked expression, flew right out of the box. The performance was truly excellent, and it accomplished all maneuvers with no problems. Flying proved to be fun and easy, and we felt we were in control at all times.

Conclusion:

In general, the Zlin proved to be a very satisfying kit, and when considering building ease and flight characteristics would have to be given serious consideration if you are looking for a very competitive contest plane. If the glass work is brought up to the current state of the art, it would, indeed, be a tough act to follow. □

BIG IS BEAUTIFUL

from page 13/12

wood is good to excellent, the die-cutting really is "drop out" quality and the kit is very complete, including the bracing wires for the landing and flying wires, the necessary parts to make a good looking panel for the model and the outlines are claimed to be scale. It finishes up as a fine looking flying machine and could be flown on a large glow engine although mine has a Quadra in the engine room and weighs a bit more than it needs to for that reason.

I've switched to the exclusive use of Hot Stuff and Hot Stuff "Super T" in my building and the Fly Baby went together mighty fast with the use of these adhesives. Sure makes a big difference when you can do the gluing and then immediately remove the structure from the building board and go on to the next piece.

The F/B has one flight on it at the present time and that trim flight determined that it needs some down thrust in the engine (something I have not found necessary in the past) and that it is a tough bird. An engine shut down in flight resulted in a flip over in the long grass and, other than a few stretched wires, it survived without a scratch. A pushrod which had been lengthened due to a miscalculation in initial construction and been stretched with a piece of brass tubing, parted and that put an end to the flying for that day. Other than these slight corrections, it looks to be a nice flying airplane and at 1/3 full size, looks very impressive both on the ground and in the air.

Speaking of Hot Stuff, if you or your group have not yet had a look at the video tape produced by Satellite City, order up a copy and have a good look at it. Some of the tips mentioned in the tape are already in use in my shop and if you too would like to build without having to pin everything down to the plan, get the tape and learn how you can eliminate driving pins from your building practices. There are a couple of demonstrations on the tape to show the strength of the two Hot Stuffs and

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they are most impressive, if you have any doubts (as I once did) about the strength of the glued joint with cyanoacrylates, see for yourself on the tape just how strong they are. Good information and the perfect program for a club meeting.

I got my hands on a really nice little tool (or rather set of tools) recently. These are sanding items put out by D.G. Products Co., 209 Carlands Dr., Dayton, Ohio 45429. Trademarked Perma Grit, they are four varying sized metal strips, two curved and two flat, covered with a permanent sanding grit. They are about the handiest items in sanding I have seen, being a cross between a file and sandpaper. As they are quite rigid, they are great for getting at hard places to sand with sandpaper and they sure chew the wood off in a hurry. The curved pieces are only grit on the convex side, which is a pity as I have already found a couple of places where they would be handy if they were grit on the concave side, rounding off wing tips is one application where they would be very good, for example. They seem to stand up well to use and if they are as permanent as the name implies, they'll be around for a good long time. For further information, try your local hobby shop, or the address above ... handy little item.

I have been trying a couple of Royal Electronics new Maxi-Titan servos in my Fly Baby on the ailerons and they certainly seem to be one answer to the problem of moving large control surfaces with authority. Specs are as follows: 1.8 ounces in weight, 54.1 oz./in., transit time is .5 seconds, carbon pot, Signetics IC, and the top post support is ball bearing. Just about everything you could ask in a servo priced at about four for a hundred bucks.

I much prefer to have good access to all my radio gear with some provision being made for easy removal if necessary. The Royals are mounted (see photo) on a lite ply plate which is made to slide into rails glued to the adjacent wing ribs. The plate is free to slide out at any time the top cover is removed and the cover holds the assembly in place in the wing without slop. Connection to the aileron linkage is by Du-Bro ball link connector and they stay in place, plus permit the conversion of a rotary to a linear movement without binding or hanging up. To date, I have not had them separate except when I wanted them to. As you can see by the photo, the servo is mounted at the root rib and requires no long servo lead and provides a quick and easy method of disconnecting when the wing is removed. Works well and is very convenient.

I'll be starting on the Nick Zirolì AT-6 in the near future and will only say at this point that an inspection of the kit on arrival shows it to be the sort of thing that can cause even the strong willed to put everything else aside in order to get started on it. The fuselage is glass and even on close inspection, seems to be as smooth as anything you could imagine. There won't be much filling to do on it, for sure. The wing is built up and will be started as soon as the retracts arrive here. Material for the wing is first class all the way and the ply wing ribs have been sanded before going into the box. Cowl and air scoop are also glass and the firewall and wing blocks are already sealed in place in the fuselage. All in all, it looks like a very nice piece of work and will be on the building board very shortly.

Drop by again next month as there seems no end of good things coming our way for the construction of BIG! □

FLYING LOWE

from page 10

couple with yaw. The fins on the ship shown are located below the wing to help reduce a proverse roll couple that we have with yaw. One of these days I will do a special article on these fins since they tend to open up an additional avenue of vehicle maneuvering.

Trimming the Beast

I had a call the other night from friend Jeff Tracy in Australia. Jeff has developed a new CAP 21 aerobatic design for the upcoming Circus Circus Tournament of Champions held in Las Vegas every two years. Jeff's ship weighs about 17-18 pounds and is powered by the twin Webra geared set-up. His problem is encountered in vertical lines up and down where the ship wants to pitch up. A lot of pattern aircraft have this problem; some will even pitch down in these same maneuvers. Trying to resolve the problem usually requires cut and try and sometimes redesign. In my Phoenix design I find it possible to resolve the issue by adjusting the engine thrust line very slightly up or down. Also, sometimes moving the C.G. forward or aft with a consequent retrimming of the elevator helps. I had a problem with my large Laser 200 where it would pitch down in a vertical up line. In fact, it was so bad that it would eventually assume level flight by itself. I resolved the problem with engine up thrust. It now pulls perfectly vertical and there seems to be no other maneuver penalty for so

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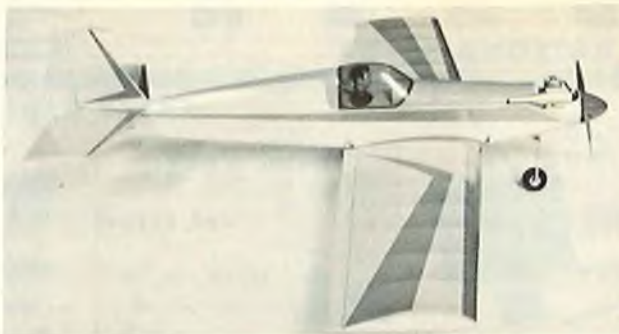
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FLYING LOWE

from page 187/10

doing. By the way, I have also found it necessary to use a little offset right thrust on these big models to make it hold a straight line. This is due to the larger torque effect of the big slower turning props.

If we examine the basics of the problem it looks something like this: The aircraft is trimmed for straight and level flight supporting one G or the weight of the model. When we pull it vertically, that trim condition should make the ship pitch up since the wing no longer supports the aircraft. There are compensating factors, however, one of which is the influence of down wash from the wing

onto the stab and the change in apparent trim angle that it sees. Basically, as you unload the wing, the down wash goes away and the stab is seeing an increased angle of attack which tends to trim the nose down; a compensating factor. This compensation varies with the design, and is influenced by wing loading, the tail loading, and the horizontal and vertical placement of the tail.

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Enough of this theory! What do we do to eliminate the problem? As I previously suggested, trimming the wing and stab incidence may do it, or a combination of both. I would start by trimming the wing and stab incidence and see if you can see an improvement or maybe it gets worse --- at least you should see a trend. If it improves, try more of the same; if it gets worse, go the other way.

You must remember that the most fundamental important relationships are the wing, tail and thrust line relationships, not their alignment to the fuselage. The fuselage simply ties them all together. Of course, it is an aerodynamic body (a very poor one) also and will have secondary effects. You can cause the fuselage to fly at a wide variety of body angles by changing wing and tail incidence. Importantly, you can change the vertical relationship of the wing and tail by playing with incidence. I have always found this to be influential on pitch up or down in knife-edge flight. I sincerely hope that this hasn't confused more than it helps. There are complicated aerodynamic forces at play and things aren't always straightforward. The experimental approach is usually the best one, but always proceed systematically, preferably changing one thing at a time and noting trends.

Worth Repeating

I have previously discussed a problem that modelers have had with strange radio operation where extended servo wire leads are used. This is commonly required in large models, particularly where a servo is used in each wing with resultant additional wire length. The symptoms are usually reduced range or glitching occurring at all ranges. The solution to the problem is very simple: install a .001 to .002 MFD capacitor on the decoder board in the receiver, between the servo control lead and ground. This is required **only** on the channels with extended leads. Terry Ferentinos and Bill Williamson both recently resolved this problem in their Mallory Laser 200 ships with this modification. Terry had tried the commercial external chokes without success. In every instance where we have used this mod it has worked. Also, in every instance, to my knowledge, where extended leads were used, the change was required to restore normal operation. I have never found chokes to be very effective. This mod was first used in my military RPV project over ten years ago to resolve a problem we had in flying large models. It has been required on every radio brand that I

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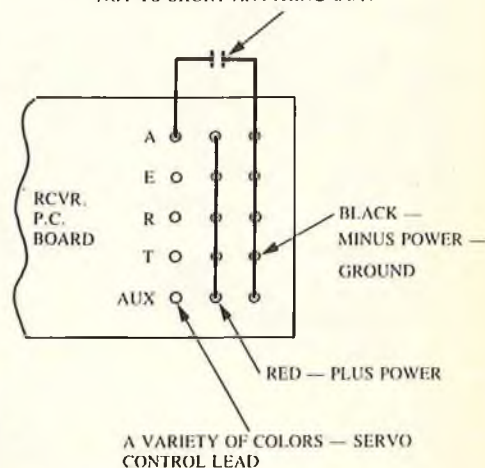
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FLYING LOWE.

from page 193/10

know of. Terry's radio is a JR and Bill's is a Futaba. Typically the fix looks like this:

CAPACITOR GOES BETWEEN CONTROL LEAD AND GROUND (ANYWHERE ON THE BOARD). BE VERY CAREFUL. NOT TO SHORT ANYTHING OUT.



ENGINE CLINIC

from page 8/7

running in a rich two cycle.

Dear Mr. Lee,

I'm a dealer and try to run new engines that are unknown to me, so that I can talk about them with some degree of knowledge. I've been trying to run a Tartan 1.34 by World Engines — out of the box with regular glow fuel (K & B 500 and Red Max 10% blend). I cannot get more than an idle, it just won't go any higher. Tried tank high gravity to carb, tank C/L with carb, tank below carb, none of the above helped. Installed all new fuel lines, no help; mixed up 90% methanol, 10% castor (Bakers AA) and it now runs up to 1/4 throttle. Blew into tank with engine running and got full throttle, no trouble. Tapped muffler, no good so tapped crankcase and installed Robart Super Pumper IV — now can get 1/2 throttle but not above that. If I pinch off the return line to the tank from the pumper, I get full throttle (7000 rpm) (18/6 prop) but too much fuel at lower throttle settings, and the engine floods out. I'm using K & B long RC plugs and Fox long RC plugs — have tried several of each. Any ideas would be appreciated.

Yours truly,
Harley G. Hart
Walla Walla, Washington
From the description of your

problem I would sure guess that there is a fuel restriction somewhere in the carburetor that is not allowing sufficient fuel to reach the engine. This is pretty much varified if the engine will run at full throttle when applying pressure to the fuel tank, and when using a Robart Super Pumper and pinching off the Automix fuel return line, which increases pressure to the carburetor. You did not say what size of fuel line you are using but I rather suspect you may be using fuel line with too small of a diameter. The fuel requirements for the Tartan is in excess of what the line can supply. Change to a larger fuel line throughout the system, including the pick-up tube in the tank. If the tank you are using had only a 1/8" brass tube through the neck, replace this with 3/16". I'm betting this will cure the problem. If not, there is something blocking the fuel flow in the carburetor — metal burr, foreign matter, etc.

Dear Mr. Lee

I always wonder why the manufacturers of model engines use the stop screw in the carburetors that limits the travel of the carburetor barrel. It is the servo travel that limits the travel of carb barrel, therefore, the stop screw is not only unnecessary but creates a problem if the servo travel is larger than the stop screw permits. For myself, I always take out the stop screw from my Perry carburetors and I turn a groove on the others that need the stop screw to limit axial displacement. Keep up your good work.

Jacob Bergman
White Plains, New York

Removing the idle speed set screw is not a good idea. On some engines this cannot be done as the slot in the barrel is cut on an angle so that rotation of the barrel, in turn, causes it to move in and out. This in and out movement, in conjunction with an idle mixture needle valve, regulates the idle mixture. Even on carburetors, such as the Perry, that do not rely on side movement of the carburetor barrel to meter idle mixture, it is not a good idea in my opinion. A lot of idle problems can be traced to fellows removing the idle speed screw or backing it out so that they can kill the engine with throttle trim. The stop screw provides a positive means of setting the idle speed. Depending upon your servo stopping in exactly the same spot every time is something that few servos actually do. Servo travel will vary with battery voltage and temperature, more so with some makes of radios than others. You can also get over-shoot at the end of the servo travel, i.e., the servo, when moved rapidly, goes past the normal

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travel position and then returns. Again, more so with some makes of radios than others. I have personally owned two EK, three Kraft, and two S & O, all of which had this problem to some degree.

I realize it is common practice to back out the idle screw so that the trim can be used for engine shut off, but I have also seen a lot of fellows doing this griping about idle problems when they forget to reposition the trim or set the idle speed a little too low and the engine dies at an inopportune time.

A lot of fellows, including myself, prefer to have a positive idle stop. It takes a lot less fiddling at the transmitter trying to set the right idle speed.

Dear Mr. Lee,

I have a question that's been bugging me. My K & B .40 starts vibrating when it idles real slow. The engine is mounted to a Sig Kadet with the Sullivan 6 oz. tank about 3/8" below the carb. I have a Du-Bro Mufflaire II with pressure to the tank. My props are Master Airscrew 10/16's. The shuddering occurred on another Kadet a couple of years ago with an O.S. .35, but no problem with an O.S. .40 in a Kougat. The question is: Is my engine trying to shake itself apart and how can I stop it besides speeding up the idle? I have noticed this on lawnmowers too. What causes this mysterious (to me) phenomenon?

Thanks for your time and help.

Sincerely,
Lonnie McIntosh
Middletown, Ohio

All model engines will shake somewhat at idle. How much depends on how solidly you have the motor mounted. I would guess that you are probably trying to idle the motor too low. Check the rpm of the engine. You do not want it to idle below 2500 rpm. Below this speed will cause the engine to start shaking as the propeller no longer has the momentum to carry the engine through smoothly and dampen out the power impulse, i.e., the propeller is losing its flywheel action. The use of a spinner will help smooth an engine out at idle due to the added flywheel action. You may also be idling the engine with the mixture too rich. A rich idle will be rougher than a leaner idle although the idle mixture should be set on the rich side.

You may be trying to idle the engine down slow enough so that the aircraft will sit still which is pretty hard to do without brakes — a mistake a lot of fellows make. If the aircraft will not sit still with the engine idling at 2500 (few will), then put a brake on the nose wheel — either a drag brake or conventional brake using down elevator for application. □

blow. They don't fly as fast. The structures usually aren't as strong as the large jobs, and will break up more easily on impact, causing less damage.

Big airplanes are safer. Relative to their size, they do not appear to be flying as fast as small jobs, and their movements, generally speaking, are slower and can be anticipated that much better. Big airplane builders are far more aware of the potential dangers inherent in their models, and tend to fly more safely, with greater regard towards the safety aspects of flying.

There are, of course, other arguments to support both views. As I see it, it becomes a matter of degree. How small is small, and how big is big?

I have a little twenty inch flying boat, a biplane, that weighs eight ounces. The engine is mounted between the wings, and the spinning three inch propeller is well-aft of the blunt prow of the hull. If that model were to hit you at full speed, the odds are that, if you didn't whack it out of the air first, it would hit you in the arm, which you have instinctively brought up in protective mode. The airplane would be wrecked and you would be irritated, but not injured. It's a small model.

I also have an eight foot racing glider. Fully ballasted, it weighs eleven pounds. Fortunately, I've never hit anyone with it, but Gerry Wolfram has one about the same size. During a race he completed the course and was landing. These models are fast --- over 100 miles per hour on the straightaway --- and they land fast. Gerry misjudged, his plane hit him in the arm, and broke his arm. It was a big model. But not a really big model.

Recently a modeler was killed by a five foot biplane model, weighing about seven pounds. Small model? Or Big?

No definitive size has ever been established to differentiate between small models and big models, but most of us think of models in the five and six foot wingspan range as being "average" or "small" compared to the eight to ten foot "giant" scale jobs, which weigh anywhere from fifteen to thirty pounds, and, of course, the recent spate of really big models --- B-25s, B-17s, B-29s and others weighing up to 100 pounds and more.

To date, there have been no fatal accidents involving models in the

to page 202



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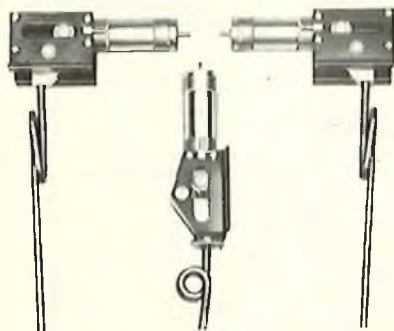
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SUNDAY FLIER

from page 199/4

forty to fifty pound weight range. Ah, you say, but the potential is much greater!

Really? Let's look at some factors. There's an equation that goes $E = mv^2$. Energy equals mass times velocity squared. Pattern planes fly around 100 mph, and weigh around nine pounds. 9 x 100 x 100 comes out 90000 units. A Concept Fleet Quarter Scale biplane weighs around 20 pounds, flies around 40 mph. 20 x 40 x 40 comes out 32000 units. That's about one-third as much as the pattern job. Looks like the potential is much less for the biggie.

But there's another factor. Unfortunately, it's highly variable, but nevertheless important. That factor is the human ability to react to impending danger. Let's take another example, this time one where the energy factor is in favor of the smaller model.

Sport model, five foot span, sixty mph, six pounds. 21600 units. Concept Fleet, at 32000 units, has about half again the energy. Which is potentially the more dangerous? Consider the human factors. First, the Fleet is more than half again as big in wingspan, and more than twice as big in area. It's a lot easier to see. Moreover, because of its size, its maneuvers are slower by comparison. The speeds are roughly comparable, but the bigger model can be much more readily seen at any distance, and when it does go ape, you can see it a lot sooner --- and have more time to get out of the way if it heads towards you. And that's the human factor in action.

As the models get into the 80 to 100 pound range, you've got a different ball game. That's a lot of mass tooling around in the sky, and you better keep an eye on it. But it's so big it's easy to keep an eye on it.

There's no solid answer.

"Little planes, big planes, the energy is such. Big planes, little planes --- is the danger as much?"

What do you think?

★ ★ ★

No matter how you feel about the big models, you have to admit that the engines for them are getting better. For quite a while, about all there was for the Quarter Scalpers was the Quadra. It's still a favorite, and even more so what with Dario Brisighella's improved version. Now, in addition to the Quadra, there's the Tartan, the Magnum II, the line of Kioritz, just to

to page 204



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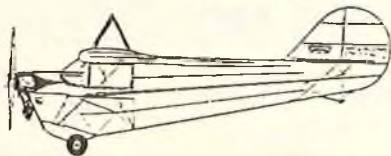
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SUNDAY FLIER

from page 202/4

mention a few. Then there's the "ultimate engine for large model aircraft." The Kavan FK50 --- priced at \$1500.00.

Sorry, Kavan. That's not the ultimate --- although it may be insofar as large production numbers (how large?) are concerned. I saw the truly ultimate model engine at the Morgan Hill Fly-In. Forrest Edwards was there with his latest handmade, original design, five cylinder, four stroke radial. It is the most immaculate, flawless, and beautiful model engine I have ever seen.

I talked with Forrest about this latest creation.

"How many hours did it take to build it?" I asked.

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"Then you've got roughly a thousand hours tied up in it."

"That's right."

"Let's see, then. Currently, in the San Francisco auto repair shops, the going rate for mechanics is \$48.50 an hour. Now, none of those guys are capable of the skilled work that you've done, so, being generous, your time, on a comparable basis, should be worth at least fifty dollars an hour. You've got a thousand hours invested --- that's \$50,000.00 per engine!"

Forrest smiled. "Yeah, I guess you could say that. But that's the first one, if I made any more, it would be less."

Curious, I pursued the matter. "How much would you make one for, then --- if someone wanted to buy it?"

"Sorry, but I can't even consider it, I have too many projects already in work now."

I saw him fly his engine on his Quarter Scale Fleet, treating it like it was an old used 1/2A engine. Full power maneuvers at 6000 rpms --- even higher when the prop, a Zinger 22-8 unloaded --- and then idling along with the engine ticking over at 900 rpms. What a beautiful sound! What a beautiful engine! I would like to have one just to listen to it run.

Incidentally, if you do want to get in touch with Forrest, don't write to me; I don't have his address. I understand he lives on some sort of converted Navy boat down in Long Beach and has his machine shop set up in the chain locker!

Forrest Edwards. A master mechanic, machinist, draftsman and engineer.

And also a Sunday Flier. □