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## The FP-3S. Worth the wait.



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#### THIS MONTH'S COVER

features Dave Platt's daughter, Shelley, posing with his 1/4 scale Jungmeister featured as a construction article on page 33. Ektachrome transparency by Gene McCabe.

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DON DEWEY

onday mornings aren't usually known as a time for joy around most offices. It is no different at RCM, however, we always wonder what our Assistant Editor, Dick Tichenor, has been up to over the weekend. On the last few weekends it was the Formula I races at Bakersfield, the International Science and Engineering Fair at Anaheim, the World War II Scramble at Morgan Hill, the airport at Oceanside with RC'ers and their full size airplanes, plus nosing around local R/C flying fields and printing pictures in his darkroom.

The following are a couple of items of interest that he would like to pass on to our readers:

#### SUPER SCALE NOTE

At the risk of stealing a bit of thunder from Dick Phillips' Super Scale column, we want to toss in a few "Big is Beautiful" words. In the fall of 1977, Ed Morgan organized a Quarter Scale Fly In at Las Vegas, Nevada. It was virtually unpublicized and yet 32 of the large flying machines appeared. On September 28, 29, 30 and October 1, 1978, Ed will, under the auspices of the Quarter Scale Association of America, conduct the Las Vegas Second Annual QSAA Fly In.

The Fly In site will be a 10 square mile, concrete smooth, no obstruction dry lake bed that is a short distance from Las Vegas. The dry lake bed is suitable for full size aircraft operations for those traveling in personal aircraft. At the time this is being written, Ed advises that he is expecting more than a hundred Quarter Scale models to participate.

The Fly In will not be the usual formal contest, flying with no pressure will prevail. Enjoyment is the key word with only a minimum of rules and restrictions that will be required in the interest of safety. The most prominent rule is the grouping together of models on the same radio frequency for better and easier frequency control. Trophies will be awarded in certain categories (Best of Show, Best Finish, etc.) and those winners will be determined by a majority vote of the model owners.

A watermelon feast or picnic at the lake bed and a cocktail party are planned with a very reasonable fee.



Quarter-Scale PT-19 designed and built by Jim Folline (Left). Flown at Morgan Hill WW II Scramble by Lee Taylor (Right). The 28 pound model is powered by Quadra.



RCM's Dick Tichenor wanted to take Jim Folline's Quadra powered Quarter-Scale PT-19 (all 28 lbs.) home with him but Lee Taylor wouldn't let go. It happened at Morgan Hill.



Shoestring has a new look! Paul White (Left) has rebuilt the perineal winner to go even faster. Famous racing pilot/owner Ray Cote (Right) approves.

Morgan has arranged reservations for a large block of rooms at the Circus Circus. Anyone planning to attend should contact Ed Morgan, 2310 Cimarron Road, Las Vegas, Nevada 89117, as soon as possible for room reservations and rates. If you wish to participate in the Fly In. Ed needs to know your arrival and departure dates, type of model(s) and radio frequency. Besides the get-togethers for Quarter Scale discussions, there are unlimited other forms of entertainment in Las Vegas, Fun Capitol of the World.

Ed has arranged for four man carrying hot air balloons to be flying during the Fly In which should provide for some jazzy aerial photos of the event.

The interest in large models has become the fastest growing aspect of R/C model aircraft. Inquiries concerning the Fly In have been received from throughout the U.S. and Canada. There is no doubt that Ed Morgan's Quarter Scale Fly In will be one of model aviation's highlights of the year and RCM will be there.

#### **BIG, BIG SCALE**

For more than a year now, we have been keeping a photo progress sequence on Cliff Weirick's project. Cliff is building a 1/2 scale F4U Corsair. No, it is not R/C, it is for him to ride in, but he is using Kraft KPS-9 servos for rudder, elevator, and aileron trim. His Corsair has a 108 h.p. Lycoming engine in the nose and the airframe has a spruce and plywood structure with blocks of foam for shape. It will be flying before the end of this year and we will run a feature article on it. It is the most fascinating big model we have ever seen.

After getting photos of Cliff's foam application on the Corsair, we had the opportunity to visit Paul White's hangar. Paul is the gentleman who built the full size super-duper Super Fli for Phil Kraft. Paul was also one of the go-fast guys in the early days of R/C Formula I and Quarter Midget racing. His retracts on a P-51 Quarter Midget was a bit ahead of its time and really shook up the QM enthusiasts.

Paul is re-building the full size Shoestring Formula I racer. He is putting to page 184

## You won't believe this until you open the box, but ... all these beautiful balsa and Polyflite planes are A-R-F's!

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Did you ever see a better looking seaplane? Here's the easiest way for you to start flying off the water. 57" span, 540 sq. in. wing area for .35-.40 engines and 4 BC channels. A nice feature is that the pre-built polyflite fuselage is automatically water tight.



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n. area. For .60 size engines and 4 channels.

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The wings are made of cut foam or injection-molded foam, and are already sheeted with balsa. The tip blocks are in place and then the wing is sanded smooth. You only need to sand the edges and apply the finish. (Try Superkote and your wing will look like it was painted.)

The stab, fin, elevator and rudder are all balsa and are nicely precut. You just sand the edges, finish with Superkote or paint, and install hinges.

The fuselages are fully built with wood bulkheads, and doublers. Originally all the J.L. Modelcraft kits had fiberglass fuselages. But, J.L.M. discovered a better material than fiberglass. They call it Polyflite. You might think that it's fiberglass when you see it (it paints and glues like fiberglass) but it's better. No pin holes to fill, no uneven thicknesses, no brittleness. You just sand the seam (if you like) and spray paint it—it's done.

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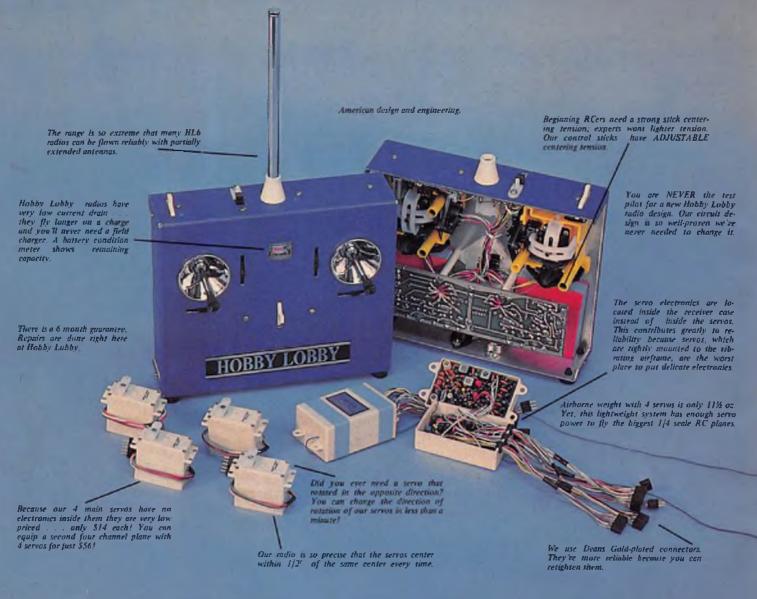
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god ale spring and summer time. Last winter all we did was gripe about the terrible weather. This complaint was heard from all parts of the country, but now, as I am writing this, and still, as you are reading this, the flying season is with us. Not much time for building, what with mowing the grass, and trying to slip out on the long evenings to get in a little mid-week flying. But, if you were planning ahead and got your building work done last winter, then now you're enjoying flying. Unless of course, you're a bit like me, and are always wanting to experiment with something new - then, it really does get hard to get any serious building done in the spring and summer.

But, since this is the flying season, let's take a little look this month at an often overlooked source of potential problems. We've talked in the past about checking out the airframe, the radio installation, the pushrod set up, and the care taken in setting up the geometry of the aircraft. But one field that we haven't given too much thought to is the receiver wiring, and what the receiver wires connect to. Almost all receivers have a wire cable coming from it to connect to the battery. Then it has several sets to connect to the servos, or are plugged into the case as in the EK-logictrol design. And, one other wire eminates from the receiver case - the antenna.

Let's start with the antenna wire first
--- an often neglected, usually misunderstood, small and insignificent piece of colored wire --- hardly larger than a piece of carpet thread. That little piece of thread is the connection from your airborne aircraft to your hand held transmitter. We'd look kind of silly flying an aircraft around trailing a super long piece of extension cord back to the transmitter, so that bit of antenna wire is the radio's sole link with your thoughts and commands, so treat it well. It's not an insignificent piece of string — it's your airplane's life-line.

To begin, remember that the antenna wire can become broken from a crash, or fatigue, or abrasion. If it does become broken, then the length of the antenna has become altered, and the radio becomes de-luned. The same is true if you decide that you don't want all of that wire flopping around the outside of your aircraft and grab up the trusty old razor blade and slice off the offending 10" or



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so left over. **Don't do it.** Never cut off the antenna wire to suit yourself. This will completely screw up the reception of the receiver, and ultimately screw the aircraft very tightly into the ground.

When routing the antenna wire from the receiver through the fuselage side and back to the tail of your aircraft, do it carefully. Use a small button or something similar to make a strain relief point just before the antenna exits the fuselage. Make sure that a slight loop of wire is left back to the receiver so that you do not strain the connecting point of the antenna and the receiver. If your aircraft has a balsa fuselage, then a simple hole through the balsa will be just fine. Vibration of the aircraft will not cause the balsa to cut the wire. If your aircraft has a fiberglass or plastic fuselage, then this is another problem, because then vibration will cause the fuselage side to saw through the antenna wire after a period of time. The simple solution is to slip a small piece of fuel tubing over the antenna wire and into the hole, thus making a grommet to protect the wire. A couple of drops of Hot Stuff will hold it in place. Make sure that the exit point of the antenna is on the side away from the engine exhaust. If you put the antenna on the gloppy, gloopy side, the antenna will act as a wick to conduct the oil residue back inside the aircraft, even into the receiver.

Once the antenna has exited the fuselage and starts back towards the tail, the easiest way to treat it is to let it lay upon the side of the fuselage, or to angle up to the top of the rudder. You can stick a slightly bent pin into the side of the fuselage or the top of the rudder, with a drop of Hot Stuff to hold it in place. Tie a small rubber band, about the size that comes on a newspaper, to the antenna, loop the other end over the pin, and you have a shock resistant antenna mount. If the antenna wire is longer than the fuselage of your aircraft, then simply run it from the top of the rudder down to the tip of the elevator, and make the rubber band connection at this point. Or, if you stretch the antenna wire along the fuselage, then make a right angle under the horizontal stab and run it on out to the tip of the stab. Again, never, never, cut off the antenna wire. Also, it's a good idea not to let the antenna wire dangle behind the aircraft. I saw this in a Formula I racer several years ago. The pilot's helper was holding the aircraft at the start line, engine all revved up and screaming. The starter's flag descended, the holder released his hold, the aircraft dashed away from the starting line, suddenly took to the air, turned upside-down, and ended its race splattered all over the runway. The trailing antenna wire was still firmly

to page 180

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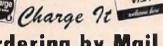
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Engine Clinic CLARENCE LEE



n the April Engine Clinic, in answer to a reader's inquiry regarding the use of low oil content fuels in motorcycles, I made mention of a new oil manufactured in Switzerland that could be used in model engines in concentrations as low as 3%. However, the oil is extremely expensive prohibiting its use in model fuels from a commercial standpoint. Lalso speculated that George Aldrich might be using a similar oil in the Magnum fuels he formulates for Carl Goldberg, possibly having found a less expensive source. This past month I received a note from my old friend George and it seems as though my passing comment has caused him some problems. First off, George is not using the Swiss oil in his fuels. Although George does not wish to disclose what he is using for lubricants for obvious reasons, he did say the lube is not a true synthetic and partially organic in nature. Also, the lubrication package contains a minimum of 3% Baker AA castor oil in conjunction with the other lubricants. The problem that has arisen is due to fellows having read my comment on the Swiss oil and assuming that George is, in turn, only using 3% oil in his fuels. One hobby shop in particular in the mid-west quoted me directly as saying that Magnum fuels only contain 3% lubrication. This is not the statement I made and it is not true. Although George did not specify the lubricant percentage he is using in his fuels, it is considerably higher than 3%. George asked that I set the record straight on this matter. One of the problems I have run up against in over ten years of writing this column is the number of times that I have been mis-quoted on things that I have said. Most times from people who do not even read the column and picked up their information second or third hand

Dear Sir.

As the number of R/C helicopter fliers around the United States increases, I'll bet lots of them, like myself, would like to hear from you about break-in and care of R/C helicopter engines. In particular, what about break-in? I would imagine that you'd suggest breaking in the engine on a plane, but what about people who can't or won't, go that

route? What would you recommend for a person who has a new helicopter engine (.60), ABC, and whose helicopter must be muffled because of design requirements? What, in your recommendations, would you change if the engine was not ABC?

As you probably know, most fixed pitch helicopters are usually operated under conditions where the engine spends most of its time in mid-range (this is especially true for beginners). It rarely, if ever, spends any time going full bore. Would you predict longer engine life for an engine operated under these conditions than one which is continually operated full bore, as in the case for collective pitch machines?

In one of your recent columns, it sounded as though you recommended that ABC engines be exempt from the prolonged rich running of non-ABC types. You also suggested that lean runs were not particularly bad either, due to the expansion of the liner as the engine overheats. Would this still be true under the conditions that most helicopter engines run hot and muffled, with minimal cooling?

You can probably guess that I'm a helicopter flier with a new ABC .60 that has to be muffled. I hope you can tailor any answer you give so that it would be general enough to apply to most helicopter pilots. Thanks in advance for any consideration you might give to this letter in your column.

Sincerely, Tim Peters Jennings, Kansas

Any ringed or ABC engine that has been properly fit and assembled by the factory can be flown right out of the box without any bench running as long as the owner uses good judgement and does not try to run the engine too lean or expect maximum power the very first flight. Some of the smaller displacement engines do have lapped piston/sleeve assemblies and it is usually advisable to give these a little bench running before installing in an aircraft. Lapped piston/sleeve assemblies do have a tendency to be a little more "sticky" when new. By lapped I am referring to cast iron pistons. Although the ABC piston/sleeve assemblies are also lapped we are dealing with an entirely

different combination.

In the case of a helicopter, it would be desirable to give the engine half a dozen flights in a conventional aircraft first. However, many fellows started R/C flying with a helicopter and do not have any conventional aircraft flight time. So in the case of helicopter break-in, it is generally best to run two or three tanks of fuel through the engine on a test stand before installing in the helicopter. Whether the engine is ringed or ABC, does not really make that much difference. The only thing to remember with an ABC engine is that the piston/sleeve are fit slightly tight at the top on purpose to allow for differential expansion. The sleeve grows more than the piston, the hotter the engine gets. This feature virtually eliminates any seizing of the piston/sleeve. However, if the engine is run excessively rich, as in a slobbering rich four cycle, it does not come up to operating temperature and the piston/sleeve fit remains tight. This can only result in unnecessary wear of the piston/sleeve assembly. So, whereas a ringed engine can be run slobbering rich (actually desirable), the ABC engine should be run in a fast four cycle on the verge of breaking into a rich two cycle during the first few runs. The purpose of the initial bench runs before installing in the helicopter is just to give the engine a brief "polishing in" period with ample cooling. After installing in the helicopter, the engine should naturally be run on the rich side of a two cycle even after fully broken-in. To run it peaked flat out with the helicopters limited cooling is only asking for an engine with short longevity.

Dear Mr. Lee:

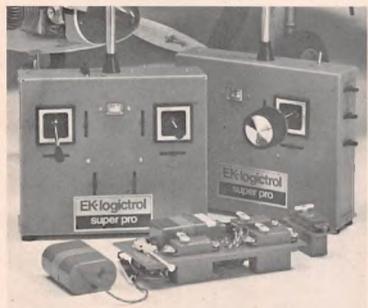
In response to one of your reader queries, you indicate that salt water is required to initiate galvanic corrosion. More accurately, galvanic corrosion will occur when moisture of any form combines with dissimilar metals. The action is enhanced when wide operating temperatures accompany the metallic couples and include moisture. Subsequently, the reader may have significantly retarded galvanic action by selecting a bearing from an alternate source. Alternately, if he picks days to

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ENGINE CLINIC

from page 10

fly when the relative humidity is 50% ± 5% he can reduce the corrosion even more – but may not get much flight time during the year.

Metal alloys can be formed using a wide selection of base metals to meet their physical performance requirements.

On the other hand, these physically similar metals can have widely different corrosion characteristics and changing bearing sources may be a pragmatic approach to the problem. Using the Lee method (22% oil content and 3-In-1 oil after each flying session) minimizes the problem — but I can detect different levels of, as well as types of, corrosion in various engines I own — some of which do not rust at all but discolor, pit, etc.

Sincerely, G.N. Burkhardt

What you say is certainly true but I doubt if galvanic corrosion is of any significance in model engines. The combustion process leaves residual acids that attack the particular metal. Aluminum alloy crankcases vary in composition — containing copper, zinc. magnesium, etc. Naturally some makes of engines are going to be more susceptible to corrosion than others.

Actually the Nitromethane in our fuels is the real cause of the problem due to Nitromethane being derived from Nitric acid. Many synthetic oils are of acid base also which doesn't help matters any. If an engine were run on a fuel of straight Methanol/castor oil there would be virtually no corrosion. Of course, you then have the gum problem of the castor oil.

Dear Mr. Lee,

I am new to the RIC hobby and have some questions that probably would be of value to all new modelers. It concerns RIC throttle engines and mufflers.

I own a Fox RC .25 engine which I guess was made previous to the muffler rule, because it had a baffle plate in the exhaust outlet! When I first put a muffler on it, I left the plate in, when I got to the field I found out it was a no-no. So the plate was removed and the muffler reinstalled. Well that left two holes and it makes one heck of a mess, not to mention a lack of muffling! So how do I plug up the holes? I do not have a lathe to make up plugs. Are plugs for my engine commercially available? If so, where?

My second question is: I lost my muffler while flying, and purchased a new Du-Bro Mufflaire. The instructions say add a number of plates to give proper back pressure and muffling. Well how does one determine proper

back pressure? I have seven plates on the muffler. I feel my engine is running slightly hotter than when I had the standard Fox muffler on. Any suggestions?

> Thanks, Eugene Rizzardi N. Tonawanda, New York

There isn't really anything wrong with leaving the exhaust baffle in the exhaust stack when installing a muffler as long as you lock it in place so that it cannot rotate. It would be even more desirable to keep the baffle in operation along with the muffler but this is usually not possible due to interference with the muffler mounting straps, etc.

Several muffler manufacturers include baffle hole plugs with their mufflers. Semco and Murphy both do. Although the plugs are available, few hobby shops bother to stock them individually. I suggest you write direct to Semco or Murphy. If there are any other muffler manufacturers out there offering baffle hole plugs, let us know.

When using the Du-Bro muffler you want to start out using all of the plates supplied. If the noise level is too high for your club rules, remove them one at a time until the noise requirement is met. Each time you remove a plate, you are going to increase the back pressure, increase operating temperature of the engine, and experience an rpm loss. If

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RECENTLY, 1 WAS ASKED BY A FELLOW CLUB MEMBER FOR SOME HELP. Sid Greenleaf was flying a Sig Cadet with an OS35, but had never gotten a complete flight because of engine problems. The engine felt stiff to me, and after starting it with his well-known national brand fuel, it wouldn't idle. From a moderate 2-cycle, it would flood out when the throttle was opened. I fiddled with it for some time, and finally decided to fly the ship with the engine nearly full throttle.

After take-off and flying out about 300 ft., and making a 180° turn, the engine quit as though it were lean. I brought the plane in, resterted the engine, set the needle valve 5 clicks richer, and took off. Again the engine quit the same way. With Sid's permission, I drained his tank and filled it with Magnum Power 10. We restarted the engine, set the needle valve, and Sid noticed an immediate improvement. We now had a good idle and good transition from low to high. I took the plane off, got up to altitude, and handed Sid the transmitter. For the first time all summer, the engine ran fine for a complete flight. After landing, Sid said that Magnum Power had made a tremendous difference in the way his engine ran. It was much freer and the first few minutes of running had cleaned out all the varnish from the old fuel. Sid then made

many more flights, and his engine ran reliably from the beginning to the end of the tank.

Another time, Dr. Alan Spievack asked me if it was true that engines ran longer with Magnum Power. Alan flies a tri-motor Stinson with three OS Wankels. He was getting only 8 or 9 minutes running time with his fuel (also a well-known national brand). I gave him a gallon of Magnum Power 10, and he decided to run a test. Using a regular fuel, he flew an entire flight until the engines quit — rather daring with a scale job. He then filled with Magnum Power, and restarted. He had to lean his engines more than with his old fuel, and picked up several hundred RPM as measured with a tach. He then flew an entire flight again until the engines quit. After landing, he could immediately touch the engines, which he had not been able to do for several minutes with his old fuel, since they ran hotter with it. He also noticed a black residue that had been cleaned out by the Magnum Power, and now his exhaust was clear and clean.



Dr. Allen Spievack with his tri-motor Stinson with 3 O.S. Wankels.

He was extremely surprised to find he was getting well over 10 minutes with Magnum Power. He now had plenty of time to complete his schedule of running maneuvers. Alan went on to run tests with various airplanes and engines, and found that everything that is said about Magnum Power is true and then some.

These two cases just confirm all the experiences I have had with this fuel. In every case when Magnum Power was substituted for the previous fuel, there was an immediate slight RPM increase, the engine ran longer per tankful, and the exhaust was very cool and clean. There is no doubt in my mind that Magnum Power fuel has something that none of the other fuels has.

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#### It's Happy Dum-Dum Time!

ello out there to all you Sunday Dum-Dums from the old Chief Sunday Dum-Dum. It's time to listen to some of the high priests of our cult, and award the most devout practicing Dum-Dum his prize for being so dumb. And, of course, having the courage to admit it.

As a connoisseur of the art of being dumb (and a practicing specialist as well), I gotta tell you that this year's contest really made it tough for me to select a winner. Oh, there were some of the old regulars — like driving to the field and finding you had left the wing, or fuel, or maybe the needle valve for your engine at home — but for sheer variety, you fellows really outdid yourselves.

Here, in no particular order of excellence (excellent dumbness?) are some of the more outstanding Dum-Dums. Let's begin with this thrilling tale of derring-do submitted by Patricia Dugay, secretary of the Connecticut Balsa Bugs in Milford, Connecticut:

Dear Sir;

Enclosed is an article which I thought you might be interested in and which I would like to enter in your Dum-Dum contest.

All the facts in the article are accurate, but I have written the story with a degree of literary license.

Be assured that everyone concerned with the story have given their permission to have this story told.

Enclosed also is the newspaper clipping which appeared Saturday, March 25th, in the Bridgeport Post.

Thank you for your consideration in this matter

Sincerely, Patricia A. Dugay

It started out as a good day to get some fresh air and get in a little flying at the same time.

Everything was going well. Everyone had had at least one successful flight and it was Ray MacLean's turn for a second flight . . . and then it happened . . . disaster on MacLean Airways Flight II. The plane was suddenly deadstick over the Seaside Triangle!

Upon arrival at the scene of the airplane crash, the rescue team discovered that rescue from shore was impossible.

Captain Frank Castro, of the ground crew, returned to headquarters in order to obtain a rescue boat to enable the team to reach the downed plane. By the time Capt. Castro returned with the boat, the aircraft had been blown out to sea.

Bravely, Junior Officer Mark Griswold volunteered to man the rescue boat and set off on his perilous voyage out to the downed plane.

With minor difficulty, Griswold was able to reach the plane and rescue both it and its valuable cargo of receiver, servos and engine. Those of us on shore were elated about the success of the rescue operation.

But our problems were just beginning, or rather Mark Griswold's were. The wind had definitely picked up and the tide was still going out, as a matter of fact, so was our rescue ship! All attempts by Griswold to reach shore seemed to be of no avail. (Unknown to us on shore – he was fighting water in the boat caused by choppy seas and a plane that threatened to leave the boat with every stiff gust of wind).

After watching these futile attempts to reach shore for over one hour, we finally decided to call in some highly trained specialists in sea rescue – The United States Coast Guard. Unfortunately they were on duty over one and one half hours away. No help there. Okay, so we check on the Bridgeport Rescue Boat – no help there either. The boat was still in dry dock. Meanwhile, our man is still bobbing around like a cork way out there in Long Island Sound.

Our only other hope is the Bridgeport Fire Department. We have already seen how great they are at rescuing downed aircraft from trees, so we give them a call.

They agree to help us and within minutes are launching their rescue boat, to go after our rescue boat, which went out to rescue our downed aircraft!

The mission is successful, Man, boat and plane are rescued without a hitch.

The rescue boat returned with one wet boat, one destroyed plane, and one

very cold and soggy Mark Griswold, whose first words were, "your D\_n boat leaks, Frank."

And that's how it was ... Good Friday Afternoon ... March 24th, 1978.

(Reprinted from the Bridgeport Post, Saturday, March 25, 1978.)

#### FIREMEN RESCUE MILFORD MAN

Mark Griswold, of 52 Sylvan Court, Milford, was rescued by firefighters from Engine company 7 yesterday at 2:30 p.m. after the rubber raft he was using to retrieve a model airplane was blown out into the waters of Long Island Sound, off Seaside Park, by a strong wind and a change in the tide. Griswold, wearing blanket, refused medical freatment.

A great story, Patricia, and I'm sure all the readers will enjoy it. However, you have to admit that it is a bit difficult to figure out who was the Dum-Dum. Was it Frank, for having a leaky boat, or Mark, for not checking it before putting out to sea? So --- honorable mention to the entire group for an entertaining R/C adventure.

From Niles, Michigan, "Wrong Way" Ken Johnson writes:

Dear Ken,

I am married and have two boys, one flies U/C and the other (3 years old, says daddy's plane fall down go boom). Well it seems I have this mother-in-law problem. My wife tells her mother how I am doing flying the RIC models. (Stuffed one last week.) Well mother-in-law says she would like to see an R/C model fly as she has never had the opportunity. So my handle being "Wrong Way", Hoad up the brand new Live Wire Jenny with a MRC 3 channel radio and slightly used .35 something or the other engine I purchased for a small amount. Just didn't have enough dollars to buy that new engine. Oh, yes, the wife and kids get in and we drive 185 miles to mother's place for the weekend.

Saturday afternoon looks real nice so everyone heads for the flying site right next to a senior high school. The shiny new Jenny and the radio look just fine so

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I fire up the .35 and take-off. At about 100 feet of altitude and a couple hundred feet down the runway, the engine quits. Well old "Wrong Way" stuffs full left and a touch of up to turn around and land. I have done this quite often, but "Old Wrong Way's" mother-in-law says, "It's going to crash, it's going to crash." I get to thinking maybe it will so I ease off the controls and the Jenny settles into a perfect glide, right through a plate glass window. Well, sure enough it crashed, mother-in-law was right. So now if anyone says, "Hey your wing just came off," I say, "that's all right, we don't need it anyway."

Your faithful reader, "Wrong Way" Ken Johnson Niles, Michigan

I've heard stories before about planes going through windows; Ken's novel twist is in the premonition of his mother-in-law about the impending crash. But not really too dumb on the part of Ken — just pilot error.

Naturally, I received several letters about flying models with wings held on with rubber bands, but the modeler forgot to put more than a couple on, with the expected results. Now here's a switch; Stan Winke Jr., of Streamwood, Illinois, is a strong runnerup for the honor (?) of greatest Dum-Dum. Stan writes: Dear Ken:

I have been flying for 5½ years now. I'm no expert, but I get 'em up and get 'em down (sometimes they will actually get up again without repair).

I've been flying a Little Stick for 4 years and I got mighty tired of messing with rubber bands, so I decided to fix the thing for bolts. Well, Sir, after that 4 years I had some mighty oil soaked wood and I wasn't sure that the threaded blocks would stay in the fuselage, so once I finished the thing I bolted the wing on and started to shake it. I shook it like mad for about 4 seconds and then the wing snapped in two – not evenly either, but the blocks held and that's what I wanted to find out anyway.

Now you might think that's dumb, but it's not the dumbest thing I've ever done, that honor goes to the fact that I'm writing you this letter to try and tell the world about it. Now that's dumb!

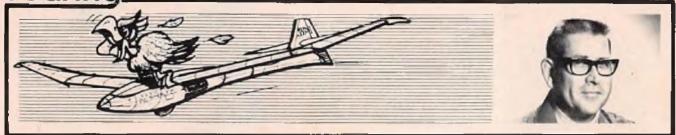
Sincerely (and embarrassingly), Stan Winke Jr. Streamwood, Illinois

Took a lot of courage to write that letter, Stan. But read on.

I kinda like this one from Ron Bergmann, who teaches at Bella Vista High School in Fair Oaks, California. Maybe not the greatest Dum-Dum, but his approach to the logic of flight control movements on the transmitter is, to say the least, amusing and different. Here's Ron's report:

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Soaring AL KINDRICK



imilar to the San Francisco
Giants and the Los Angeles
Dodgers rivalry, the
North South Challenge Meet was held
with the same fierceness and
competitiveness as the two major
league ball clubs.

Visalia, mid-way between Los Angeles and Sacramento, California, was the chosen battlefield. Jack Alten coached the North team while Chuck Beeman led the South Challengers and the whole prestigeous affair was CD'd by Tom Williams.

Upon arriving at the host field of the Central Valley Fliers late Friday evening, a few eager pilots were tuning up their sailplanes for the big event. Mark Smith had graciously set up his winch so we could all get in a few warm-up flights. The evening air was heaven, no wind, no clouds, no smog - - - just lift. I am glad we took the time to look over the field because the landing area was something else.

Many of you have read where airport safety crews will spread foam over runways whenever an approaching aircraft has suspected landing gear troubles; our landing circles were no exception - - - mowed straw. A sailplane, making a normal airliner approach, would grease its way completely through the circle. Lots of times a pilot will see that his approach is too fast so when his ship is on the ground he will dip a wing tip to attempt a ground loop to stop his forward motion, no way did this scheme work; the straw was so slippery that even with the wing tip dragging it still went forward

After our warm-up flights Friday evening, we made our way into beautiful downtown Visalia for our evening meal. The town "Pizzaree" was invaded by a group of motley pilots consisting of Dave Thornburg, Mark Smith, Leo and Kaye Lake, Kirk Hanson, my son Keith, and myself. This get together turned out to be the highlight of the weekend. I don't know what got the most belly laughs, Dave Thorburg's stories and jokes or Mark Smith trying to figure them out or Mark's episodes in the field of helicopter flying. After two and a half hours of this tom foolery, it was time to grab some Z's.

Saturday dawned bright, clear and hot. Tom Williams and crew got things going quickly. This event was all pre-registered so the field of 114 pilots



Contest Director for the North/South Challenge, Tom Williams, discussing rules prior to start.



Scoring at the N/S meet was expertly handled by Dave Peltz and Terry Koplan. Kirk Hanson looking on.



To kill all rumors that Hi Johnson doesn't fly. Dave Thornburg is launching Hi at the N/S meet.

was processed within 1/2 hour. The rules and scoring were discussed and flying started at 8:15 a.m.

Rick Pearson and Lee Renaud were co-winch masters and kept the pace going rapidly. Winches were plentiful with Bill Mueller providing the necessary 12 volt jobs for the "Biggies". The only sad note of this whole affair was that even with the pilot skill so evident at this meet, they still had to be told to winch down the lines. It's too bad that some winches had to be re-strung and untangled which slowed the whole pace because the winches were not properly manned.

Only one thermal passed through, but that was okay - - - it lasted all day long, if this is true to central California, it is a wonder that anything not nailed down should be above ground level. With the "stump lifter" air it could be seen that the marbles would be divided at the landing circle, and this is where most of the antics occurred. With the slippery landing surface, the pilot muttering was just as fast as the landings. I personally am in favor of the graceful airliner type approach but you could see that to be competitive in this contest you had to put your tongue in your cheek and spike your landings.

A blow by blow tally was kept of the team standings throughout the contest and Saturday it was close all day; very few points separated the teams.

Midway through Saturday's flying, a full size 15 meter Nugget circled and played in our lift for 45 minutes, staying well outside and above our air space. With the clear blue sky and the brilliant sun on the highly polished white sailplane, the pilots and spectators watched it with awe like it was the first sailplane that has ever flown. After our friend left, and before he wore out all the air, a large mulitcolored hot air manned balloon floated to the west of our flying site --- a truly spectacular afternoon.

Three full rounds were completed Saturday with two to finish Sunday.

On Saturday night, a night flying session was going at the camp ground next to the flying site. A two meter "Soar Birdy" was outfitted with Cyalume Lights. The winch line parachute was replaced by a light stick and the flying started. The night air was so calm and so light that we hated to stop, but by 10:30 everyone was very tired.

Sunday morning was a Zerox of Saturday. Flying started promptly at 8:00 a.m. The lift was still there, but much lighter. Rick and Lee kept the pace very brisk and the 106 participating pilots finished two rounds by 1:30 p.m. Dave Thornburg was in the last flight group and he dazzled the crowd with his

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"Bird of Time" sailplane maxing out at car-top altitude. One more item before we get to the results. Each pilot was officially timed by a member of the opposite team and you could have an assistent or timer if you so desired. Each contestant was challenged by a member of the opposite team and every heat was

#### Contest Rules

The total contestants who participated in the challenge was 106 (54 for the south, 52 for the north). Contest results were broken down by Landing, Precision, Duration and Overall.

#### Landing:

- 1. B. Nibley
- 2. J. Lowe
- 3. D. Thornburg

flown man on man.

- 4. C. Nikkel
- 5. S. Whitney
- 6. J. Newman 7. B. Thacker
- 8, S. Condon
- 9. B. Gerbin
- 10. D. Fredricks
- 11. P. Harris

#### Precision:

- 1. G. Noritake
- 2. B. Thacker
- 3. F. Weaver
- 4. G. Auman Jr.
- 5. B. Sutton
- 6. R. Clarke 7. F. Leppla
- 8. L. Kramer
- 9. R. Norwood

#### **Duration:**

- 1. D. Edburg
- 2. G. Auman Jr.
- 3. K. Kindrick
- 4. F. Weaver
- 5 B. Nibley
- 6. J. Yee 7. D. Tatum
- D. Fredricks
- 9. S. George
- 10. R. Buxton 11. A. Kindrick

#### Overall:

- 1. B. Nibley
- 2. G. Auman Jr.
- 3. J. Newman
- 4. B. Thacker
- 5. D. Thornburg
  - 6. D. Fredricks
  - 7. D. Tatum
  - 8. K. Kindrick
  - 9. M. Reagan
- B. Nelson

The South flyers were victorious and all of them were awarded a printed Tee Shirt stating they had participated on the winning team.

The standings for landing and duration were listed out to the Eleventh Place because in both instances the scores were all tied from the Sixth through the Eleventh Places.

Many thanks to all of the workers involved; winches supplied by individuals and soaring clubs; field preparation and the scoring chores. All of these necessary duties made the contest a very memorable affair.





Jimmy Ealy III, his smiles, his sailplane and his awards. 9 years old, look out Sailplaners, here comes a winner.

Jim Ealy Jr. of Pottstown, Pennsylvania, proudly sends in a picture of his son, Jim Ealy III, with all of his trophies. He soloed with a Hobie Hawk when he was five years old and was eight years old during this past season. He has several legs on Level Three for LSF and placed 13th and 14th in Standard and Unlimited. He won the Open Class at the Canadian Nats.

Besides flying and starting to build some simple scale ships, he helps with his father's line of soaring products,

to page 168

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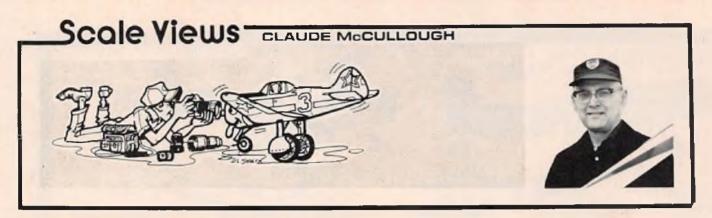




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#### SCALE SPOTLIGHT





enry Haffke (Vineland, N.J.) is known for his scale copies of famous racing aircraft. His Benny Howard "Ike" has been a steady winner in both static and flying contests. as can be seen by the hardware collection in the photo. Flying qualities are excellent and it will do about any aerobatic maneuver. Henry has all of the stunts he performs in a contest, documented as authentic by Harold Neumann, who flew the real racer in the National Air Races and owned it for a while. Neumann is still active and I've seen him perform many times at Antique Airplane Association Fly-Ins with a white Monocoupe. The "Ike" model is light and makes a long, flat landing approach. It looks, from the profile, like this is one scale design that wouldn't need any lead in the nose to get it balanced properly. The ship is built entirely from balsa, covered with Super Coverite and painted with Randolph dope. Surface detail includes rivets, rib stitching, and pinked rib tape. Scale hinging was used on the control surfaces and all horns and actuating rods are concealed. The muffler is completely enclosed and the exhaust exits through the scale exhaust stacks. Since mufflers are now required on all scale competition models, this looks like a good way to get some extra points, although if a muffler is exposed, no penalty can be given. Also, if a muffler is only concealed but not exiting through the scale locations, my opinion would be that it would not be eligible for any extra consideration. This would be the same as deducting points from other entrants who had exposed mufflers.

#### SMALL STUFF

Nothing gives a model the final touch of authenticity like the reproduction of the rivets, screws and bolts used on the full sized prototype. While they can be simulated with glue dots and other imitation methods, for perfect uniformity these tiny items are best done with miniature hardware. There are a surprising number and variety of precisely made products of this nature available that are of interest to the scale modeler.

Photo 1 shows some typical miniature screws. From the left, the thread sizes shown are 1-72, 0-80, and 00-90 in round, flat, hex and fillister head styles. These come in 1/8", 1/4" and 1/2" lengths and are brass. All sizes have matching hex nuts and washers when needed. On the right hand end of the row is a sample round head stainless steel self-tapping screw in 00 size. They are available in 1/8", 3/16" and 1/4" lengths. All of these items are carried in the Sig catalog. The black screws, second from the right, is a 0 x 3/8" wood screw (made from steel) and is from Perfect Hardware Pkg. No. 101, stocked at many hobby shops.

While the sizes shown in Photo 1 get



down to fairly diminutive measurements, there are even smaller versions made. J.I. Morris, 394 Elm Street. Southbridge. Mass. 01550, has the same head styles in 0000-160 and 000-120. These are so incredibly liny that it would be hard to get a good picture without a microscope! However, they look exactly like those in to page 24



Midget tools of the detailing trade: Morris E-Z tap and die set, E-Z socket wrenches, X-Acto 6412 Carbon Drill Stand Set with bits from No. 80 to No. 61, jeweler's screwdrivers.

#### DIMENSIONS OF MINIATURE SCREWS AND NUTS

11545	THREAD SIZE	0000-160	000-120	00-90	0-80	1-72
HEAD	BODY DIAMETER	.021	.034	047	.060	.073
HEX	ACROSS FLATS	3/64"	5/64"	5/64"	3/32"	7/64"
HEX	HEAD HEIGHTH	.025	.033	.042	.042	.055
no luin	HEAD DIAMETER	860,	.059	.085	.106	.130
ROUND	HEAD HEIGHTH	.019	.028	.041	.047	.055
F1 4 7	HEAD DIAMETER	.040	.061	.089	.108	.136
FLAT	HEAD HEIGHTH	.011	.016	.024	.035	.043
TH 1 1 C T C O	HEAD DIAMETER	.035	.056	.078	.091	.111
FILLISTER	HEAD HEIGHT	.019	.031	.043	.0.51	.062
MILIT	ACROSS FLATS	3/64"	5/64"	5/64"	3/32"	7/64"
NUT	THICKNESS	.025	.033	.040	.048	.063

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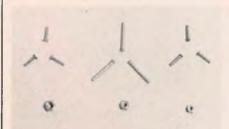
#### SCALE VIEWS

from page 22

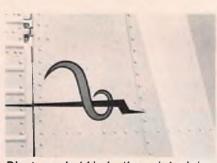
Photo 1, they are just smaller. An accompanying table of sizes will give you a good idea of what size screw will come out right in the scale at which you are working.

To facilitate use of this hardware in the best way, a set of taps and dies are needed. This will allow holding parts and assemblies together in exact scale fashion, by threading them to take the appropriate screws or nuts. Operating landing gear scissors, opening hatches, removable panels and cowl retaining fasteners in correct locations are a few of the possibilities. 12" brass rods in 00 (.046"), 0 (.059"), 1 (.072") and 2 (.085") are available (Sig) when a project calls for threaded shafts. Or you can get fully threaded rods from 0000-160 on up to 2-56 (Morris).

Photo 3 shows three types of rivets that are valuable for this important effect. At top left, is a copper rivet, 1/32" flat head x 5/32" long. In the center group, aluminum rivets, 1/32" round head x 5/16" long. On the right is a round head copper rivet, 1/32" x 5/32". The copper rivets are most useful when actual mechanical hammered riveting is indicated, or when soldering of parts will be done. For the usual metal panel riveting reproduction, aluminum rivets are best and lighter as well, something to consider when using several thousand on one model.



Below the Sig rivets (described in the text) are some miniature hex nuts. From the left: 1-72, 0-80 and 00-90.



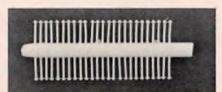
Rivets are held in by the paint, gluing is not necessary. Note the scale rudder hinge in upper left, made with a 00-90 hex head miniature bolt.

Before beginning installation of rivets, the wood should be covered and/or filled up to the point of the last couple of color coats. Mark the locations of rivets with a pencil dot. Punch an undersized hole in the sheeting with a pin or needle and push the rivet into the wood. Since they will only be going into wood 1/8" or so thick most of the time, it is worthwhile to shorten them. I use a fine tipped pair of needle nose pliers with integral cutting jaws. You soon develop a knack for cutting the rivet shank off, gripping the remainder in the needle nose and inserting them. It sounds slow and it isn't fast, but you'll find it will take longer to plot the pencil dot locations onto the model from pictures than it will to add the rivets. And it is a fine way to unwind from a hectic day at the office.

I've used a lot of these rivets and soon found that it is not necessary to glue them in the holes - - - luckily, since gluing makes a real mess with plenty of wiping up required. When the final color coats are applied, be they dope, epoxy or enamel, a little cap is formed over each rivet. It is sufficient to hold the rivet in the wood, even though the finish may not be sticking to the rivet head all that well. To get one out, it is necessary to cut around the head base with a razor blade. I've seldom, if ever, had one come out of balsa wood. This doesn't hold true when they are inserted in a plastic or fiberglass cowl since the finish does not seem to get such a good grip. In this case, I bend them over on the inside and put a seam of Epoxolite or epoxy glue over the line of rivets.

In hammering these rivets to pean the back, a bucking tool should be made to protect the round head from being deformed. Grind a hole with a Dremel tool engraving cutter No. 105 in the metal, shaped like the head of the rivet. Don't get the hole too deep, leave it shallower than the heighth of the head or the head will be pushed away from the surface by the hammering on the other side. Use of the rivets in this fashion is limited by the necessity for access to the inside, but it is helpful in making small sub-assemblies or fastening them to larger parts of the model.

Photo 5 is a brand new item that should find a ready market. These injection molded plastic rivets were to page 26



No! Not Seattle Slew's curry comb, but a "tree" of 50 tiny injection molded plastic rivets from England's Mick Charles Models.

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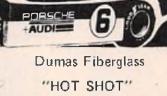
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#### SCALE VIEWS

from page 24/22

brought to the Toledo Show by Mick Charles, former World Scale Champion of Kingston Upon Thames, England. They have heads measuring .046, the shank is .020 and length 1/4". One handy feature is immediately evident—they can be shortened with scissors 25 at once. Mick is arranging for distribution of these rivets in the U.S. and I'll bring further news on this when it's available.

#### IT'S A TOUGH GRIND

The problems posed by hard substances like spring steel music wire



The cutting abrasive in Tuf-Grind wheels is impregnated in a fabric-weave material, making them stronger.

can wreck all the files and saws in a modeler's workshop, as well as his disposition. If you haven't discovered to page 164



3/16" spring steel music wire can be cut cleanly in a few seconds with a House of Balsa "Tuf-Grind" wheel.



nyone who is reading this column is probably a helicopter enthusiast, or is thinking about getting his or her first helicopter. I hope that whoever reads this month's column will take the time to express their feelings on the following subject.

As you know, the NRCHA (National Radio Controlled Helicopter Association) is in a sink or swim position. If it is to survive it will only be by the help and support of those who are interested in such an organization. But it all has to start somewhere and this is the time to show your interest and support. The first thing to realize is that any undertaking of this nature is done by people just like yourself, so don't feel it should be left up to the better qualified. The qualified people are those like you who enjoy helicopters. That is all that's necessary. I hope all of you will take an active part and pitch in and help make this organization grow.

The following letter is from Walter Knaus, London, Ontario, Canada, who is one true helicopter enthusiast and who has already done a lot to help bring together those of us who share the same interests.

#### To All Former NRCHA Members:

As you know, the NRCHA is officially dissolved, and I, personally, feel this to be a very sad state of affairs. Though the NRCHA was not a very close knit organization, it was the only organization that we helicopter pilots had. We could contact other pilots through the association and there was a feeling of unity and identification; also information could be obtained when required.

I had discussed my feelings about the NRCHA with Don Chapman on more than one occasion, but was completely shaken when I discovered I had been nominated by this worthy gentleman to try and resurrect the NRCHA on the North American Continent, I think most of you would have appreciated my surprise when your letters began to arrive indicating that, "if I required any assistance all I had to do was ask." Well, I am asking.

I have given some considerable thought to this and have decided that I will try to get the NRCHA moving and will continue to do so until someone more qualified than I am can take over



Al Lobaito from Staten Island, New York, sent this picture of his American RIC Hughes 500 fuse with Kavan Alouette mechanics. Al flys a Jet Ranger. Says the Hughes is his favorite bird and really handles the wind much better with this body.

the job - and I know there are several of you out there who could do this job with your hands tied behind your back. This, for me, is a monumental task and without help I cannot undertake the work, so I need everyone's assistance and enthusiasm.

In my opinion it is important that we do not let the NRCHA disappear into antiquity, but to have a successful and respected organization with a world-wide reputation for integrity, we must be active. One way to prove we have life is to have a newsletter - - - this does not have to be a high gloss fancy expensive production but one that we can all relate to. There should be monthly articles from widely known helicopter pilots, plus articles from manufacturers, both the model manufacturer, and the manufacturer of the real McCoy. There should be articles and questions from pilots who have something to say and ask, and it should be remembered there is no single question too simple or a problem too small. Every member is important and has something to contribute. Constant contact between all pilots must be an integral part of the new organization.

I have enclosed a questionnaire that I would request you answer and return at your earliest convenience. Let's get this

show on the road.

Sincerely. Walter Knaus

#### QUESTIONNAIRE

- Indicate if the new organization should be a National or International organization.
- Do you want a monthly newsletter?
- Should manufacturers be approached for support?
- Should the dues be raised from \$4.00 to \$15.00 or \$20.00 to cover costs?
- Should the present Grade Levels be maintained?
- Should a Board of Directors be appointed by the members?
- If a Board of Directors is to be appointed, how long should the term of office be: 1, 2, or 3 year term?
- Should Directors be elected or appointed for each State and Province?
- Should the old membership numbers be retained or should we start a new membership and new numbers?
- Explain how you would be willing to support the new organization in getting it started.

to page 160

## DIGITAL COMMANDER THREE CHANNEL SYSTEM

SINCE ITS INTRODUCTION LAST SUMMER, our Three Channel System Kit has gained tremendous popularity in the field. Its flawless performance, easy assembly, sensible mechanical layout, and low price all have combined to make a radio system kit that is one of the best bargains in the industry today.

Now we are adding another dimension to this concept: transmitter conversion kits so the Three Channel System can be upgraded to five or seven channel operation , , , the builder can start at an economical novice level with a Three Channel System and, as he gains competence, he can add functions at a minimum of expense; none of his equipment is ob-

The conversion contains an additional stick assembly, a new case, and complete instructions for performing the conversion. All existing electronics and hardware are utilized.

Since the receiver has eight channel capability, all that needs to be added is more wires and connectors plus additional servos for each additional channel.

If you didn't buy a Three Channel before because you knew you would want to go to more channels later, you no longer have any excuse.



THREE CHANNEL SYSTEM KIT WITH STANDARD FLITE PACK 10G30 \$119.95





THREE CHANNEL SYSTEM KIT WITH MICRO FLITE PACK 10G30M \$124.95



FIVE CHANNEL TRANSMITTER CONVERSION 11G35 \$21.95

SEVEN CHANNEL TRANSMITTER CONVERSION 11G37 \$26.95

#### TRANSMITTER

- \* Expandable
- to more than three channels.
- \* Open gimbal two axis stick.
- · Quality throttle stick with trim. \* Battery condition meter.
- \* Uses 9V dry battery.

#### RECEIVER

- \* Double deck design for small aircreft.
- . CMOS Decoder for low current drain
- \* Eight channel capability.
- " Light weight

#### AIRBORNE BATTERIES

- GE 450 mah or 100 mah Ni-cds.
- " Charger furnished.

#### SERVOS (TWO FURNISHED)

- \* Quality D & R Bentam
- or Dunham Micro mechanics. \* High performance Signetic 544 amp.
- \* One comes assembled.

AVAILABLE ON ALL AMERICAN R/C FREQUENCIES.

CE R/C, In

#### NOW, WHAT EVERYONE'S BEEN WAITING FOR!

## DICIPACE 1



34G15

Ace Digipace I, assembled \$94,95

34G16 Ace Digipace I, kit 79.95

A sophisticated piece of lab quality equipment for cycling ni-cd batteries. Accurate, dependable, and attractive.

-- Automatic discharging and recharging of both receiver and transmitter batteries, simultaneously or independently.

-- Switch for three different transmitter voltages, (6V, 9.6V or 12V).

-- Switch for two different receiver charge rates, (20 ma or 50 ma).

-Four digit LED readout; no mechanical clock motors.

-- Modern design and tight tolerance components insure total accuracy down to 1% and 1/10 of a minute.

-- Available in kit form or assembled and tested.



BOX 511, HIGGINSVILLE, MISSOURI 64037

#### SHIRT TRANSFERS

Be proud of your hobby! Put some iron on transfers on your jacket, shirt, or jump sult,
Works on any cotton or cotton blend material.
"R/C Ace" is on a light purple background.

and looks good on blue, black, and white, it measures about 10" high, "I Love R/C" is on a warm yellow back-

ground and looks best on green, brown, or yellow, it's also about 10" tall.

The Ace R/C logo measures about 4" X 10" and is red in the middle blanding to blue. Looks good on red, blue, black, or white.

24K108-"I Love R/C" Shirt Transfer 24K109-"R/C Ace" Shirt Transfer 24K110-Ace R/C Logo Shirt Transfer \$1.98 1 49



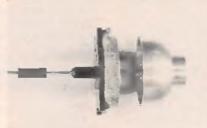
#### 1/2A BLEND MODEL ENGINE FUEL

1/2A Blend, from Ace R/C, is specially formulated for use in model engines in the 1/2A or smaller category. It contains a high percent of nitro for strong, consistent performance but not so much that engine life suffers. Such additives as anti-oxidents, igniters, and detergents plus a non-foaming agent and a wetting agent produce a fuel that is perfect for all around use in 1/2A planes, cars, and boats.

Much study and experience went into the development of this top quality fuel which assures you peak performance and long life from your 1/2A engine.

16L440 Ace 1/2A Blend Fuel, 1/2 gal,

\$10.95



#### REED VALVE ENGINE THROTTLE

This simple, yet ingenious throttle designed Raiph Cooney of Fourmost Racing Products will fit all Cox rear rend valve 049 engines. the Babe Bee, Golden Bee, Black Widow, and

It doesn't cut any RPM's off the top and as an exhaust restrictor would and effectively idles the engine down to less than 3000 RPM's adds only a few grams of weight. Still allows use of a mulflar.

501,630-Ace Reed Valve Throttle



#### STICKY FOAM

Protecting the receiver and battery pack in small airplane installations is always a problem because there is no room for a bunch of foam

Ace R/C has found a solution with this fairly dense black foam rubber that is only 1/8" thick and has an adhesive backing to adhere to the re-ceiver or battery pack case so minimum room is taken up and yet the components are isolated from vibration and offered some crash protection. Also makes good wing saddle cashion material.

50L330 - Ace Sticky Foam 1/8" X 2" X 36" roll

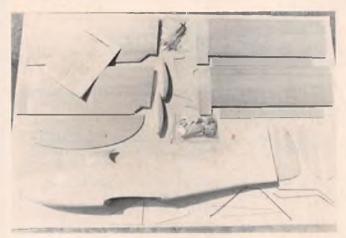
Please send me your complete catalog. Enclosed is \$1.00 which is refunded on my NAME first order. (Add \$ .50 for 1st class mail return; add \$1.00 handling on all other

ADIMES

BOX 511B, HIGGINSVILLE, MO. 64037.

## RGM PRODUCT TEST

## GEMINI



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	£	G	A	F	P
Packaging						Pre-Shaped Parts					
Plans						Parts Match to Plans					
Written Instructions						Overall Parts Fit					
Quality of Hardwood						Ease of Assembly					
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials						Flight Performance					
Accessories						Overall Appeal					
Die-Cutting			NA								

E Excellent / G Good / A Average / F Fair / F Poor



he Gemini builds extremely fast because the wings are already covered with 1/16" balsa and the fuselage halves are already joined together. A unique feature of this new type of plastic is its compatibility with polyester resins. The fuselage is joined together with glass cloth and resin. The wing hold blocks along with the firewall and motor mounts are already installed with resin and filler. The wing tip blocks and leading edges need only to be sanded to a round contour to complete the wing. After joining the wing halves together, I used Hobby Lobby's SuperKote for a fast finish. My fuselage was left in its natural white finish with only 1/4" black D.J.'s tape put over the seam. Trim MonoKote was used for striping on both wings and fuselage sides. The white plastic fuselage can be painted, if you so desire, with any dopes, epoxies, or enamels.

Flying the Gemini is just as easy as it is pretty. Just a few little things for you to look for when setting up the controls: The balance point is important as it can mean the difference between a sensitive airplane or a docile airplane. Balance at  $1\frac{1}{2}$  in front of the bottom wing. This will require some weight added to the front end. The ailerons need only  $1\frac{1}{4}$  up and down for a very quick roll. Rudder and elevator can be set for 1" in both directions for a very fast snap roll.

I suggest that to strengthen the front end, to protect the plastic from vibration, that you line the engine compartment with glass cloth and resin. The reason I suggest this is because you must cut away much of the side to get your muffler to clear. I used a Hallco landing gear on my Gemini instead of the wire gear that comes with the kit. This is only because I prefer a wider gear stance and not for any reason of the kit gear being inferior. The wheel pants that come with the kit are of ABS plastic and not of the Poly Flite type that the fuselage is made of. I used Celastic and dope thinner to join

#### **SPECIFICATIONS**

Name GEMINI
Aircraft Type Sport Biplane
Manufactured By Hobby Lobby — J.L. Modelcraft
Rt. 3. Franklin Pike Circle
Brentwood, Tennessee 37027
Mfg. Suggested Retail Price
Mig. Suggested netall Price
Available From Both Mfg. & Retail
Mig. Recommended Usage
Wing Span 46 Inches
Wing Chord 8½ Inches
Total Wing Area
Fuselage Length
Radio Compartment Dimensions (L) 8" x (W) 4" x (H) 5"
Wing Location Biplane
Airfoil Symmetrical
Wing Planform Constant Chord
Dihedral
Stabilizer Span
Stabilizer Chord (incl. elev.)
Total Stab Area
Stab Airfoil Section Flat
Stabilizer Location Mid Fuselage
Vertical Fin Height
Vertical Fin Width (inc), rud.)
MIg. Rec. Engine Hange
Recommended Fuel Tank Size
Landing Gear Conventional
Recommended No. Of Channels
Recommended Control Functions Rud., Elev., Throt. & Ail.
Basic Materials Used In Construction:
Fuselage Poly Flite plastic & Wood
Wing Foam & Balsa
Tail Surfaces Balsa
Hardware Included In Kit See Text
Plan Size
Building Instructions on Plan Sheets
Instruction Manual
Construction Photos
Kit Includes
Mit District Weight 400 0-
Mfg. Rec. Flying Weight
Wing loading based on rec. flying wt

#### RCM PROTOTYPE

Weight, Ready To Fly
Wing Loading
Engine Make & Disp Super Tigre .61
Muffler Used DuBro
Radio Used Cox Sanwa
Tank Size Used

# THERMALON



ron-on films. It is a woven polyester fabric that is coated

plied, the fabric will adhere to the uncovered structure and will shrink tightly into place.

## **WHY USE THERMALON**

- Thermalon saves time! It offers one-step, easy-on convenience
- Thermalon gives the deep-gloss, quality look of a silk and dope finish. Ultragloss Thermalon gives a deeper, more scale-like gloss than the plastic films or competitive iron on labrics.
- Thermalon stays shrunk! Once applied it won't resag like the plastic films tend to do over time
- Thermalon can be applied within the heat range of most covering irons. The working temperature is 300° F, which is far less than the maximum and beyond iron temperatures required of some competitive iron-on fabrics.
- Thermalon has superior handling characteristics on compound curves. It takes much of the work out of covering
- Thermalon is lighter than the leading competitive iron on fabric! If weight is a consideration, you can save approximately 10% by using ultragloss thermalon.
- Thermalon accepts most paints or comes in colors if you prefer not to paint. It is available in red, white, navy blue, prange and yellow. Thermalon will accept Pactra dope, K&B, Pactra and Hobby Poxy apoxy paints. It will also accept Perfect and Pactra polyurethane paints.
- Thermalon comes in gloss or matte finishes. The matte is called Superweave and is lighter still than the gloss (Ultragloss) Thermalon. It can be used where weight is critical or for scale where matte finishes are desirable
- Thermalon is strong! Since it is a woven fabric, it is far stronger than any of the plastic films

How does it come?

#### SUPERWEAVE THERMALON

The lightest thermalon! It comes in a matte finish only.

44" x 41" \$ 7.95 44" x 15" \$32.95

**ULTRAGLOSS THERMALON** 

44" x 38" S 8.95 44" x 15" \$39.95

#### THE ROYAL LINE OF SCALE R/C KITS

	• • • • • • • • •	TE OF SCALE	11/010
.6080 SIZE		WING AREA	
		706 sq. in.	
		736 sq. in.	
Cessna 182	_	700 4/5 sq. in.	\$89.95
		652 sq. in.	
FW - 190 Focke - V	Vull	642 sq. in.	\$89.95
		723 sq. in.	
		669 sq. in	
K1+43 Oscar		613 sq. in.	\$89.95
Piper Colt			
		777 sq. in.	
		676 sq. in.	
		958 sq. in	
		856 sq. in.	
		830 sq. in,	
		907 sq. in.	
		654 sq. in.	
F4J Phantom		477 sq. in.	\$82.95
ME - 109 Messerso	hmitt	697 sq. in.	\$94.95
.40 SIZE			
Bleriot		564 sq. in.	\$54.95
		496 sq. in.	
		475 sq. in.	
		527 sq. in.	
Hien		468 sq. in.	\$59.95
		480 sq. in.	
.20 SIZE			
		356.5 sq. in.	\$55.95
		372 sq. in.	
		388 sq. in.	
		405 sq. in.	
TWINS			
	.4061 Size	767 sq. in.	\$109.95
		725 sq. in.	
		750 sq. in.	
		754 sq. in.	
		695 sq. in.	
P68 Victor		502 sg. in.	



790 W. TENNESSEE, DENVER, CO 80223

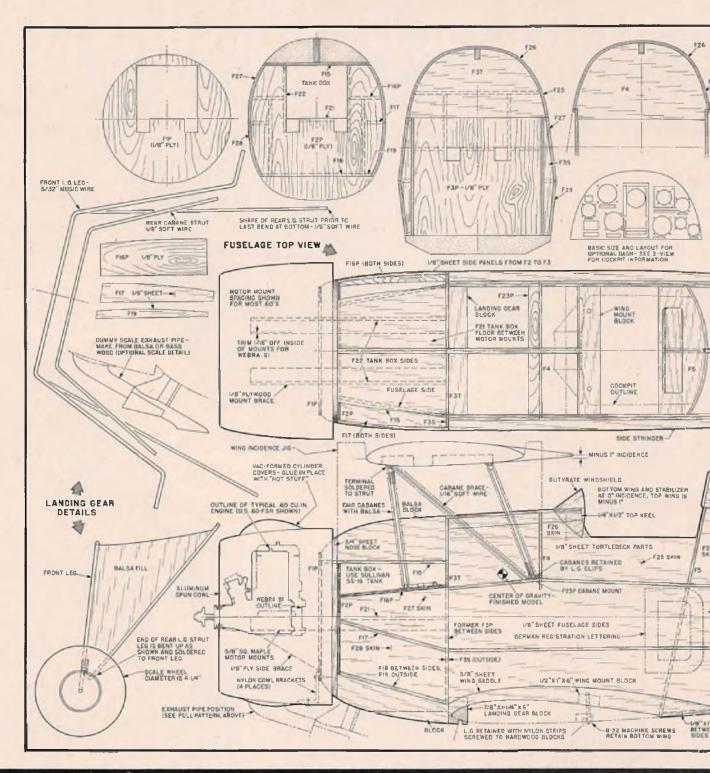


(1) Tidy front end – Webra .91 and Semco muffler fit inside cowling. Slim-Line and Tatone also working on all-inside mufflers. Note accessible fuel tanks; TV jack for glo battery. (2) Starting up for test flite – cowl removed. Playing field is unmowed, but big Jungmeister excellent rough field plane. (3) Easy lift off at half-throttle. (4) Fully trimmed and cowl in place, Bucker climbs away. Needs a pilot – who'll be first with quarter-scale jockey? (5) Ready for static judging. The scale prop is shown on plans – 21" diameter! (6) Inverted flypast a famous Jungmeister show stopper – model does it equally well.

# BÜCKER JUNGMEISTER

Dave Platt's outstanding scale designs are known throughout the entire modeling world. RCM is pleased to present his latest design which is in 1/4 scale.





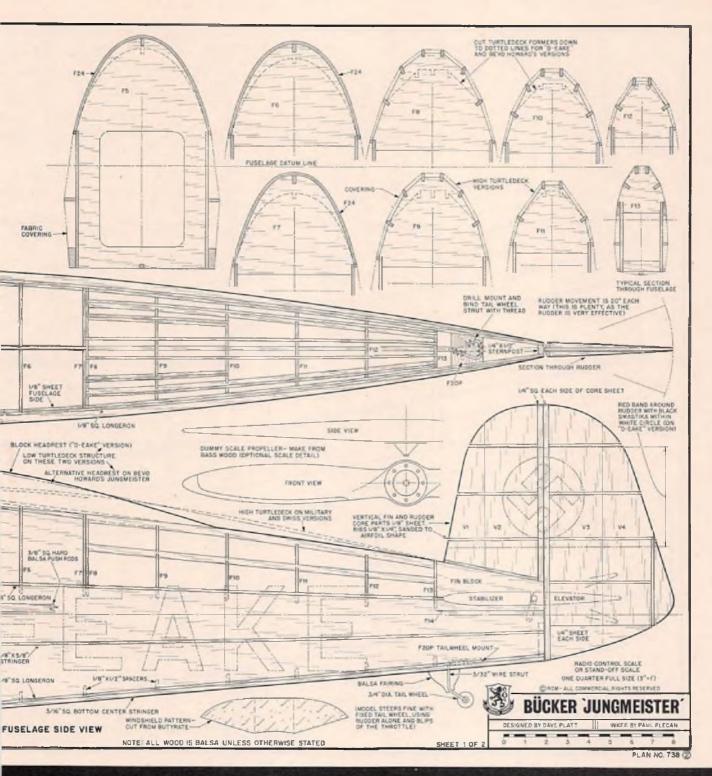
f somebody were to make the baid statement that the Bucker Bu 133 Jungmeister was the finest aerobatic biplane ever designed, he might get an argument. If so, this would come from some who might say the Pitts take it. I'm not looking to bicker with anybody, so I'll only say this — the Jungmeister is the finest aerobatic biplane ever designed for an R/C model.

One of the difficulties with small biplanes, as R/C subjects, is that they often have to have such big bodies, giving us a power problem. Then, too,

sometimes they have such short moments that flying one is kind of like trying to balance one ball-bearing on top of another.

For such a small airplane, only 21'+ wingspan, the *Jungmeister* is unusually well proportioned: a deep, yet narrow, body, long nose and tail moments, gracefully swept wings. For a model, it would be difficult to fault. Even the radial cowl lends itself to totally enclosing any engine, along with a muffler.

I decided to jump right on the topical trend and make my *Jungmeister* as a 1/4 scale model. Saying "quarter-scale" normally brings visions of some great monster. Not so here. With a wingspan of 65", the *Bucker* fits into a car handily—a Kenilworth isn't needed. Then too, it will fly nicely with a Schnuerle .60 engine (regular direct drive) turning a 13/5 prop, although I have a Webra .91 in mine. The Webra, running on a 16/4½ Rev-Up, flies the model through a beautifully slow and realistic aerobatic routine, at no time needing more than 1/2 throttle. Forget speed! You won't need it; indeed, at half throttle on the 16" prop, the *Jungmeister* will not stop in a vertical climb. It just hangs on that big



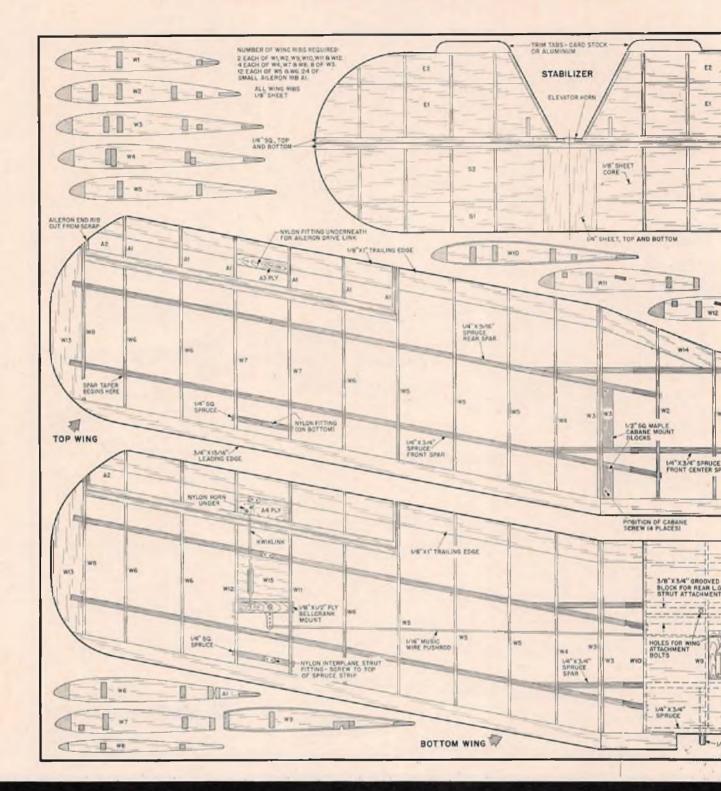
fan and keeps going up, just as slow and pretty as can be. After his usual W.W. II fighters, your author found this a whole new way to fly!

As built, my prototype (shown in the pictures) weighed about 10 lbs. With almost 1200 square inches of wings, this seemed about right until I flew the model. An unexpected problem arose in that, rolling at even a very low speed (such as in a landing roll-out), the model has so much lift that it wanted to keep floating into the air again. After adding some more detail, and a little tail weight, I figured the extra 1 pound added would

help it to "sit down" on the runway, it did help, somewhat. Even then, the ship must be landed carefully and I now believe that 13 or 14 lbs. all-up might even be better. Now I know what Ron (I forget his last name) meant, when he told me at Toledo, of adding six pounds of lead to a 1/4 scale Champion to get it to fly right!

Although I term the model "Stand-Off Scale" the outlines are in fact scale, and anyone who cared to go the whole nine yards with detailed engine, full cockpit, etc., would have an AMA Precision Scale entry. The only deliberate change

involved the wing airfoil. For some unaccountable reason, the full size Jungmeister has a flat bottomed airfoil — odd, considering its fame as the king of the low, low inverted pass. Playing a hunch, I went to a semi-symmetrical airfoil, but stayed with the equally weird force arrangement used on the plane: bottom wing and tail set at zero, the top wing at negative 1°. Lo and behold - - - it worked. The model flew without any adjustment to the pitch trim. Given the center spar arrangement in the wings, it would be easy, for anyone who is super fussy, to sand the ribs out to a flat



bottom. If this is done, however, I'd suggest the stab be rigged at least 1° positive.

Mention of spars gets us to the structure. This was an easy design job since the full size *Jungmeister* is, itself, similar to a model in many respects. The wings will be a breeze to anyone who ever built a Goldberg *Falcon*, which I guess most of us have done. Center panels are made first, then the spruce spars of the wing outer panels are joined on at the correct dihedral. The ribs are slipped in correct order onto the spars and the L.E. and T.E. complete the basic

wings. The ailerons (four of them) are made separately. The tail feathers are merely sheets cut to outline, with strips added each side for the correct effect when sanded to airfoil and Silkspan covered. Add the "stitches" if you want. I did; it takes very little time with white glue and a hypodermic needle and does add greatly to the appearance of the finished model.

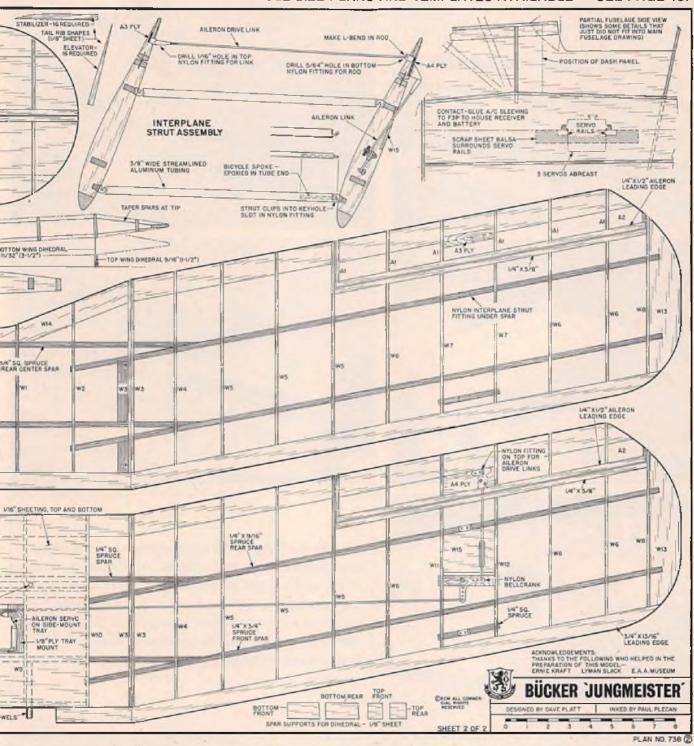
The fuselage is likewise a very uncomplicated affair. Mine, with the parts cut out, went together in only two evenings. The front parallel section is erected first. The sides are then drawn

together at the rear, and turtledeck bulkheads and stringers added. Note that a number of variations of the Jungmeister are possible. The one I made has the high turtleback, but if you choose to duplicate aerobatic ace Bevo Howard's ship, you'll need to use the cut-down rear bulkheads. These are all shown on the plans.

The fuselage front end assembly is completed next, including the tank box which is designed to fit the Sullivan 16 ounce square tank. (Incidentally, contrary to reputation and, therefore, my

text to page 38

### FULL SIZE PLANS AND TEMPLATES AVAILABLE - SEE PAGE 187



### **BUCKER Bu 133 JUNGMEISTER** Designed By: Dave Platt

TYPE AIRCRAFT Stand-Off Scale or Scale Biplane WINGSPAN 64 % Inches WING CHORD 9 ¼ Inches **TOTAL WING AREA** 1170 Square Inches **WING LOCATION** Biplane AIRFOIL Semi-Symmetrical WING PLANFORM

DIHEDRAL, EACH TIP

3 Bottom -

1 ½° Top D.A. FUSELAGE LENGTH

58 Inches RADIO COMPARTMENT AREA

(L) 10" X (W) 6" X (H) 7" STABILIZER SPAN

24 Inches STABILIZER CHORD (incl. elev.)

8 1/2 Inches STABILIZER AREA

178 Square Inches STAB AIRFOIL SECTION Symmetical

STABILIZER LOCATION Shoulder **VERTICAL FIN HEIGHT** 

VERTICAL FIN WIDTH (incl. rudder)

11 Inches **REC. ENGINE SIZE** 

Schneurle .60— .91 cu. in. FUEL TANK SIZE 16 Oz.

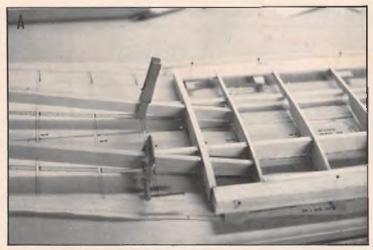
LANDING GEAR

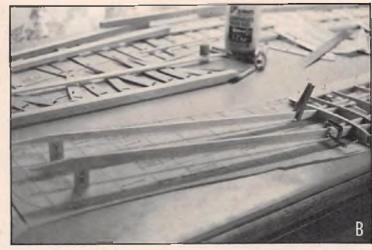
Conventional REC. NO. OF CHANNELS

**CONTROL FUNCTIONS** Rud., Elev., Ail. & Throt

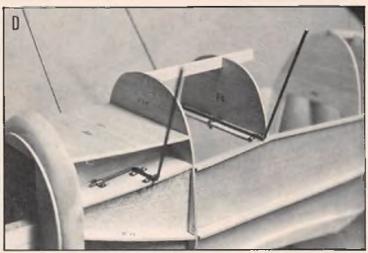
### BASIC MATERIALS USED IN CONSTRUCTION Fuselage ...... Baisa & Ply

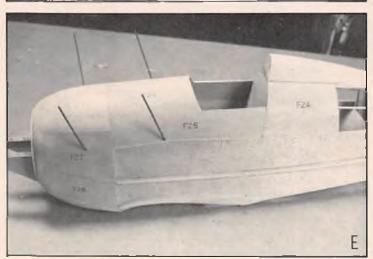
...... Balsa & Spruce ..... Balsa Етреппаде Weight Ready-To-Fly 176 Ounces











(A) After building center panel of wing, spars are glued and pegged at correct dihedral. (B) Supports under spars at tip make dihedral exact. (C) Block in body serves double functions; as L.G. support and dowel key for lower wing. (D) Simple cabane strut arrangement. Uses 1/8" soft wire; easily bent and adjusted. (E) Block and turtledeck skins in place. Headrest shown on some versions.

expectations, the Webra .91 is not at all a gas hog.) The three side stringers, glued on the outside of the sheet sides, complete the pleasant shaping of the fuselage. This, like the wings, is covered with Coverite.

The landing gear is removable from the model. This was necessary for removal of the lower wing and may be handy for those with smallish cars; the disassembled model crowds the back seat of my Mustang but it all works okay. The 4" wheels make for easy ground handling on the roughest field.

And now, scale fans, we get to the interesting part — choosing a color

scheme. Some six hundred Jungmeisters were built, and it's quite conceivable that very few of these were similarly painted. I chose one of the several available Luftwaffe schemes, mainly to be different. Little mention is ever made in aero books of the trainer types, most writers seeming to prefer the combat types of W.W.2. Indeed, a military biplane is a rarity at a contest. If you like to go wild with the bright colors though, the little Bucker had its share of these too. Bevo Howard's was red & white (checkerboards under and sunburst over). Swiss versions sometimes were cream or yellow with red trim. Early (pre-Luftwaffe) versions were silver with gray front ends and German civilian registration numbers. These had the attractive red fin band with the white circle enclosing a black swastika. One thing is certain: it's no problem to find an appealing color scheme. The problem gets to be which to choose! Happy hunting!

(Dave's company, Dave Platt Models, Inc., 6940 N.W. 15th St., Plantation, Florida 33313, has announced that a kit for the "Jungmeister" is in the works --- see ad in next month's RCM --- Ed.)

# RGM PRODUCT TEST

## A4 SKYHAWK II



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	Р
Packaging						Pre-Shaped Parts			NA		
Plans						Parts Match to Plans			NA		
Written instructions						Overall Paris Fit	•				
Quality of Hardwood			NA			Ease of Assembly					
Quality of Fiberglass						Fidelity to Scale					
Other Materials			NA			Flight Performance	•				
Accessories			NA			Overall Appeal					
Die-Culling			NA								

E Excellent / G Good / A Average / F Fair / P Poor



ince the introduction of jet powered flight at the end of World War II, the majority of new full size airplane designs have been jet powered. To the scale modeler it appears, however, as if airplane design stopped in 1945. Despite the profusion of jet aircraft designs, very few models are seen, due to the lack of a suitable power plant. With the introduction of the Scozzi fan unit, a suitable power plant for simulated jet flight became available. With the addition of the Violett Skyhawk a combination scale airplane and power plant suitable for the average modeler was on the market.

The Skyhawk semi-kit comes with a very complete set of plans and instructions, an epoxy glass fuselage, tail cone and wheel pods, cockpit cover and a set of mylar templates for construction of the wing and empennage. The glass work in the kit is the best seen by this reviewer and requires very little in the way of finishing to produce a superb model. The frame locations are marked making installation of these items very easy and accurate.

The wings and tail unit are built-up balsa wood construction. Since the wood is purchased by the modeler, great care must be exercised in selecting only the lightest wood for these parts. Lightness is the key to success with a ducted fan model. The only difficult part in the construction of the model is the mounting of the fan unit and forward ducting, mainly because this part of the building is unconventional. The instructions and photographs help immensely here, and it is worthwhile to study them carefully before commencing.

The model was finished by covering the wood parts with silkspan, then spraying with auto primer. A finish coat of acrylic enamel in the Blue Angels colors was applied, together with lettering and insignia.

to page 158

### **SPECIFICATIONS**

Name	A4 SKYHAWK II
Aircraft Type	
Manufactured By	
Manufactured by	26516 Aiken Dr.
	ksburg, Maryland 20734
Mfg. Suggested Retail Price	,
Available From	
Mfg. Recommended Usage	
Wing Span	471/2 Inches
Wing Chord	
Total Wing Area	660 Square Inches
Fuselage Length	57 Inches
Radio Compartment Dimensions(L)	14" x (W) 41/6" x (H) 5"
Wing Location	
Airfoil	Semi-Summetrical
Wing Planform	Swent I F
Dihedral	
Stabilizer Span	
Stabilizer Chord (incl. elev.)	
Total Stab Area	136 Square Inches
Stab Airfuil Section	Symmetrical
Stabilizer Location	Top of Fuselage
Vertical Fin Height	11½ Inches
Vertical Fin Width (incl. rud.)	
Mig. Rec. Engine Range	
Mlg. Rec. Fuel Tank Size	, , , 16 Oz.
Landing Gear	Tricycle
Recommended No. Of Channels	5-6
Recommended Control Functions	Rud., Elev., Throt.,
	Ail., Flaps, Rets.
Basic Materials Used In Construction:	
Fuselage	Fiberniass Balsa & Ply
Wing	
Tail Surfaces	
Hardware Included In Kil	
Plan Size	60" v 34" /1 cheel)
Building Instructions on Plan Sheets	Vec
Instruction Manual	
Construction Photos	
Kit Includes	
Mlg. Rec. Flying Weight	
Wing loading based on rec. flying wt	29.7 bz./sq. lt.
DOM DESTOTATE	
RCM PROTOTYPE	

Weight, Ready To Fly	140 ounces
Wing Loading 30.	5 oz./sq. ft.
Covering & finishing materials used	
Engine Make & Disp K & B 6.5-Scozzi S	kyhawk Fan
Multier Used	
Radio Used Kra	
Tank Size Used	. 16 Ounces

# NAMBA DISTRICT IX



Approximately one quarter of Roberts Lake at Seaside, California, site of the NAMBA Dist. IX Championships.

The Gold Coast Model Boaters, spearheaded by CD Howard Power. conducted one of the smoothest power boat races we have ever had the pleasure of attending. Over a hundred boat drivers brought about 300 boats to Seaside, California, on the beautiful Monterey Peninsula. The three day Memorial Day weekend of racing was the NAMBA District IX Championships. This race awarded double points for the district standings which provided an extra incentive to attend.

A highlight of the races was Bev Power setting a new NAMBA World Deep Vee Oval Heat Race record of 1:49.3. Not only is Bev a superb boat driver, but she organized the heats (176 of them), worked as timer, lap counter, score keeper, and about anything else that needed to be done. Terrific person!

The old pro, Jim Whitlatch, took First Place honors in the exciting glamour event, Class C Hydroplane, with his Octura Wing Ding. These exotic boats with .60 power go fast and Jim had

plenty of hot competition.

Jim also won the C Hydro Trophy Dash. At the end of the racing in each class, the top six place winners were invited to compete in a Trophy Dash. Trophy Dash winners are listed in our winner tabulation. As sponsor of the Trophy Dash races, K & B Manufacturing awarded an appropriate K & B engine as a prize to the winner in each class.

Ed Fisher, who currently holds eleven NAMBA world records, brought a boat for each class. His three hydro entries were of a new and revolutionary canard design. Our photo shows the configuration. These boats use a wing ground effects principal and are about the speediest and most maneuverable boats we have ever seen. This particular weekend did not go as well as usual for Ed and he was unable to take home his usual share of hardware. In one heat, a beginner, John Brodbeck, had everything working right and gave Ed a nose to nose race. To the excitement of

the spectators, John crossed the finish line about six feet ahead of Ed. Such is R/C power boat racing, everyone has a chance of winning.

Our choice for the most beautiful boat at Seaside was a hydroplane owned by Gary DeLara. The gorgeous rainbow hued hull was embellished with numbers and trim in gold leaf that had been treated to bring out green, copper, and bronze tints. This boat was the subject of one of the nicest acts of sportsmanship imaginable.

Gary was in a hotly contested heat when he hit the wake of another boat. His hydro became airborne, dove straight down, and stuck in the silt at the bottom of the lake. The retrieve boat was unable to locate Gary's boat by prodding with poles. About this time a skiff rowed out, Rich Fish dove in and in a matter of seconds handed Gary's boat to the retrievers.

A couple of heats later Rich was racing Gary who was running the boat that Rich had just rescued.



Bev Power with her A Mono entry. Bev set a new Deep Vee record at Seaside.



Race Heros! Howard Power, CD; Jim Whitelatch, 1st in Class C Hydro and Trophy Dash winner; John Brodbeck, Trophy Dash Sponsor (all classes).



NAMBA Champ, Ed Fisher, holds 11 NAMBA records. Class B Hydro has K & B 6.5 cc power, 15 original revolutionary canard design.

Unfortunately they both went dead in the water and didn't finish. In appreciation for the rescue, Gary presented Rich with a valuable new OPS .60 engine and tuned pipe. Our hats are off to two nice guys.

There is just no way the excitement





NAMBA Dist, IX Commodore Al Wood. Scale English off-shore racer, Webra .61.

### A MONO

- Ron Erickson
- 2. Dick Albert
- 3. Howard Price
- 4. John Buhay
- 5. Joe Monohan

#### B MONO

- 1. Ed fisher
- 2. Guy Davis
- 3. Art Hammond
- 4. Bob Joshnik
- 5. Ron Erickson

### C MONO

- 1. Bev Power
- 2. Mike Beauregard
- Manuel Cardoza
- Ed Fisher
   John Perry

#### A HYDRO

- 1. Howard Power
- 2. W. J. Hines
- 3. Bill Webster
- 4. John Buhay
- 5. Ed Fisher

#### в нурво

- 1. Wray Freitas
- 2. Ed Fisher
- 3. Ron Erickson
- 4. Standa & Tullock R.T.
- 5. Howard Price

#### C HYDRO

- 1. Jim Whillatch
- 2. Wally Stewart
- 3. Wray Freitas
- 4. Roger Hooks
- 5. Nick Gil

### TROPHY DASH WINNERS

A MONO	 Ron Erickson
B MONO	 Ron Erickson
C MONO.	 Ed Fisher
A HYDRO	 Ed Fisher
B HYDRO	 Wray Freitas
CHYDRO	 Jim Whitlatch



and enjoyment of three days of R/C power boat racing can be described in a few paragraphs. We hope that our photos will give a sampling of who was there and what they were running.

In closing, accolades must be given to the officials of the City of Seaside, California. Roberts Lake belongs to ducks (first priority, don't hit one) and the R/C boaters. No boating, fishing or swimming is allowed. For the model boat text to page 158



This is what makes the boat races happen. Drivers and pit men in front, officials on stand in back.



Gary De Lara, Octura Wing Ding, Rossi .65 power. Reporter's choice of most beautiful boat at Seaside.



Marlene Price, Ward Craft Boat, K & B 6.5



David Price, age 12, Sheff Hull, K & B 3.5 cc.



Rich Kassis, Octura Wing Ding, Twin K & B 4.9 cc.



Jack Bishop, Perry Boat, OPS.



David Jense, 10 years, Ward Craft Boat, OPS.



NAMBA Sweetheart, Judy Prigley, McKay & Campbell Boat, OPS .60.



Mike Beauregard (L), Wally Stewart (R), original Canard C Hydro.



Fish & Chips Racing Team (L to R) Steve Bramel, Rich Fish, Terry Monroe.



Santa Cruzzers Racing Team ran Hamiltunnels in A Hydro. A Steve Hamilton design. Front spollers can be rented out for signs.



Mr. Nice Guy Don Reutlinger, Surveyor 21, Rossi .65.



Sanitary Power Plant Installation in Jack Bishop's Perry boat.



Paul Michalczyk, B Mono, 3D Ruff Stuff, OPS .40, Marine Specialties hardware.



Dave Lindsey, Dumas Deep Vee, ST X40.



Craig Glasgow, original C Mono, OPS .60.



Howard Jordan, Hughey 20, K & B 3.5 cc.



Bob Rasmussen, Saturday Night Fever, A Hydro, K & B 3.5 cc.



Don Nicolaus, Sweden Joker, ST .40, Marine Specialities hardware.



Ed Windfeldt, Hughey 20, K & B 3.5 cc.



David Bestpitch, Octura Wing Ding 60, K & B 6.5 cc.



Geared Twin OPS .60 Installation for Jim Whitelatch's Unlimited Wing Ding. Built by Art Hammond.



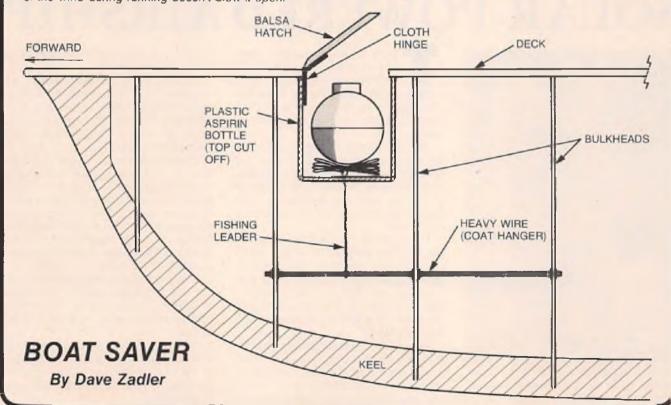
Who is sponsoring who?? John Brodbeck, Ward Craft boat, Circus Circus power.

Here is an idea for the boater that flinches at the thought of loosing his model to the deep.

A fishing bobber, housed in a cut off plastic aspirin bottle, located under a phoney balsa hatch, provides an efficient method of recovery.

Attached to the bobber is fishing line (amount and strength determined by each builder). Wrap this line into a neat roll and allow the bobber to rest on it. Tied to the end of the line should be a wire fishing leader that passes through the bottom of the aspirin bottle and is attached to the piece of wire anchored between the bulkheads. This wire fishing leader provides added strength to prevent snapping when the boat is hauled to the surface.

The basia hatch should be mounted with cloth hinges. These hinges should be mounted toward the bow so the force of the wind during running doesn't blow it open.





Caltech students test their ten foot model of a solar powered airship. Caltech photo by Richard Kee.

### CALTECH STUDENTS TEST

### SOLAR-POWERED AIRSHIP



Caltech students test their ten foot model of a solar powered airship. Caltech photo by Richard Kee.

hree graduate students from the California Institute Of Technology have built what someday might become an important alternative to fossil fuels for air transportation - - a solar powered airship.

After test flying a 10' long model of the device, they've concluded that the concept might be amenable to scaling up to large size, providing that advances in silicone solar cell technology bring down costs and increases the efficiency of the cells.

The students, Ray H. Bartlett, Carl H. Berdahl, and Stephen G. Wurst, are all candidates for M.S. degrees in aeronautics at Caltech. The airship was a project in a course in experimental design taught by Paul E. Dimotakis, assistant professor of aeronautics and applied physics.

"A solar powered airship seemed feasible because the large surface areas inherent in airships could be utilized to mount silicone solar cells," said the students. "Our flight tests have proved the concept to a point, but

obviously it's a long way from being a thoroughly tested idea."

The solar powered airship, as conceived by the students, consists of two 10' long pontoons resembling large sausages. These are bridged by a wing, upon which are mounted enough silicone solar cell panels to produce up to 21 watts of power in bright overhead sun. A 1/14 horsepower motor and propeller, as well as control surfaces, were mounted between the two helium filled pontoons. The 9' wide radio controlled airship weighs only 8½ pounds, and the helium provides 7½ pounds of lift. The remainder of the lift is provided by the wing.

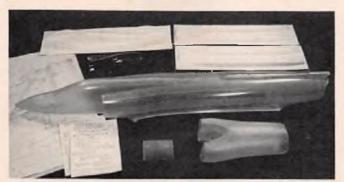
"We chose the pontoon design to give the airship greater stability than most airships, and found that this configuration worked very well," said Berdahl.

"The airship flew quite well the first time we tested it," he said, "which we consider quite an achievement considering all the unknowns we were dealing with.

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# RGM PRODUCT TEST

## Jet Hangar Hobbies MIRAGE IIIC





ne of the most unusual features of this model is that, as a ducted fan, it flies like a sport or pattern model airplane and can be flown by the Sunday sport flier. The model is not recommended for the modeler with low or no model building experience; however, the model can be easily built by the average modeler. There were plenty of notes and instructions on the plans and in the instruction booklet which includes photographs of the building sequence. There were, however, some things that I did not totally understand, such as, why the wing saddles did not fit perfectly around the leading edge of the wing and how to hook up the twin fuel tanks located in the center section of the wing.

A phone call to Jet Hangar Hobbies was the answer to my problems. Larry Wolfe explained the fiberglass fuselage wing saddle, if molded perfectly to the wing, would lock the fuselage in the mold and could not be removed. Larry explained that the gap was filled by using micro-balloons and resin. He also explained how to hook up twin fuel tanks in model boat fashion by pumping pressure from the tuned pipe to the first tank into the vent through the fuel pick-up then directly into the vent line of the second tank. Hook-up instructions for the Jenesco Fuel Manifold show the remaining hook-up for the entire fuel system. I found Larry Wolfe to be very helpful solving these problems.

Since one of the major points stressed in the instruction manual is to keep the model as light as possible, and since this is a semi-kit, one has the opportunity to hand select the best and lightest balsa for the dorsal and wing assemblies. The wing is built primarily of 3/32" light balsa wood, yet, construction is very strong as noted upon several unplanned hard landings. Final covering of these assemblies was done with silkspun Coverite. The dorsal area was finished in the same manner.

The tailpipe ducting is completely covered in the booklet. The tailpipe ducting is made from 1/64" plywood, not included in the semi-kit, but available separately pre-cut to shape. Flights on the model using this plywood tailpipe gave the model a very realistic jet aircraft sound.

Finish on the model was done using Zinger Paneling Tape to page 155

IMPRESSIONS	E	6	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging						Pre-Shaped Parts			NA		
Plans						Parts Match to Plans					
Written Instructions						Overall Parts Fit					
Quality of Hardwood			NA			Ease of Assembly					
Quality of Fiberglass						Fidelity to Scale		•			
Other Materials						Flight Performance					İ
Accessories						Overall Appeal					
Die-Cutting			NA								

E-Excellent / G-Good / A-Average / F-Fair / P-Poor

### **SPECIFICATIONS**

Name Mirage IIIC
Aircraft Type Ducted Fan - Stand-Off Scale
Manufactured By Jet Hangar Hobbies
12554 Centralia Rd
Lakewood, California 90715
Mig. Suggested Retail Price
mig. Suggested Metan Price
Available From Both Mfg. & Retail
Mfg. Recommended Usage
Wing Span
Wing ChordNA
Total Wing Area
Fuselage Length
Radio Compartment Dimensions (L) 7" x (W) 3" x (H) 6"
Wing Location Low Wing
Airfoil Reflex
Wing Planform Swept L.E.
Dihedral 1¼ Inches
Stabilizer SpanNA
Stabilizer Chord (incl. elev.)
Total Stab AreaNA
Stab Airfoil Section
Stabilizer Location
Verlical Fin Height
Vertical Fin Width (incl., rud.)
Mfg. Rec. Engine Range
Recommended Fuel Tank Size
Landing Gear Tricyce
Recommended No. Of Channels
Recommended Control Functions Rud., Elev., Throt., Ail.
And Retract Gear
Basic Materials Used In Construction:
Fuselage Epoxy Glass
Wing Ply & Balsa
Tail Surfaces Balsa
Hardware Included In Kit
Plan Size
Building Instructions on Plan Sheets Yes
Instruction Manual
Construction Photos
Kit Includes
MIg. Rec. Flying Weight
Wing loading based on ree, flying wt
ming reading based on res. Hyring Wi
RCM PROTOTYPE

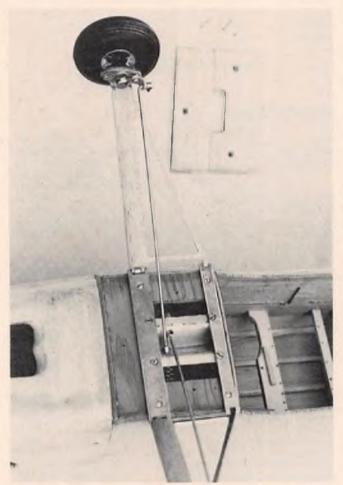
#### RCM PROTOTYPE

Weight, Ready To Fly	. 184 Ounces
Wing Loading	36 oz./sq. II.
Covering & linishing materials used	See Text
Engine Make & Disp X &	B 6.5, Scozzi
Mulfler Used	OPS
Radio Used	
Tank Size Used	16 Ounces

### HERE'S HOW



Functional Skybolt landing gear parts. Strut and fuselage cross members are 2024-S hard aluminum while shock strut in foreground is steel welding rod.



Gear mounted on fuselage. Four screws retain gear to ply support. Note shock springs and lower wheel collar used to level aircraft.

here comes a time when a serious modeler wants to scratch-build his favorite airplane. He suddenly becomes aware of fairings, riveted panels, struts. cowlings, and all the little wiggles and bumps that make up the texture and "personality" of his particular chosen aircraft. So, during the building process the builder must decide just how much realism he wants to impart. Detail can be overwhelming, as well as impractical, when trying to duplicate the real thing. It can also present the builder with insolvable engineering problems. Of course, here is where know-how, ambition and just plain guts to plod into the unknown, play an important part in a successful project. And, by now you must know, that some of these super builders, with a much higher acceptance level at what they set down on the flight line, are leading the way.



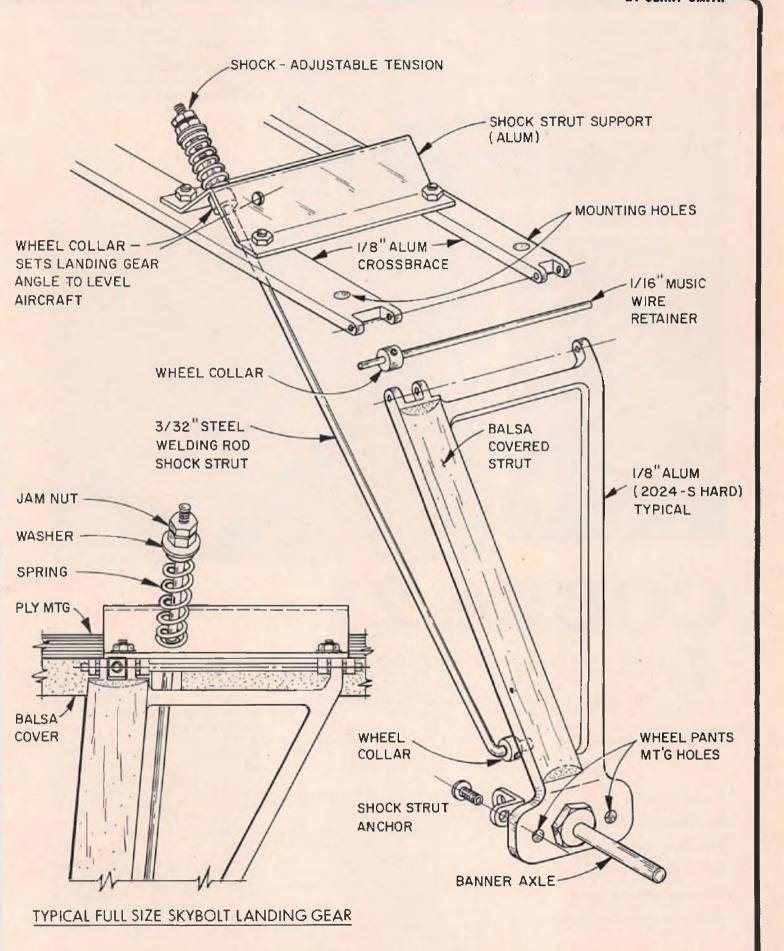
Balsa cover finishes bottom of fuselage and is held in place with three screws. Installation is neat and clean.



Finished landing gear on Skybolt fuselage. An excellent duplication of its full size counterpart.

Ray Dehn of Indianapolis, Indiana, became interested in the Steen Skybolt as a scale project. After looking over a few Skybolts, Ray came to the conclusion that each of them was different in some way. Even the landing gear struts were not the same. So, he finally settled on a Skybolt (N288EB) owned

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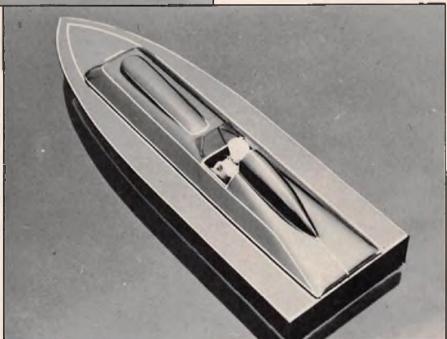




Two views of the finished model in the water, showing the clean lines and the pilot, who contributes greatly to the general appearance. Finish is gloss black and gold trim, after the JPS Formula I racing car.

### COBRA 21 Designed By: David Thomas LENGTH 28 Inches BEA M 8.6 Inches HULL FORM Moderate Vee REC. ENGINE SIZE Electric or .09-.21 cu. in. Glow Engine REG. NO. OF CHANNELS 1 or 2 **CONTROL FUNCTIONS** Rudder (optional speed control or throttle) BASIC MATERIALS USED IN CONSTRUCTION

Balsa & Plywood



## COBRA 21

**By David Thomas** 

t has been evident for some time that there is a renewed interest in electric boats, and especially models capable of high speeds. Among the arguments in favor of such a craft are: silent running, easy starting, lack of mess, and reasonable

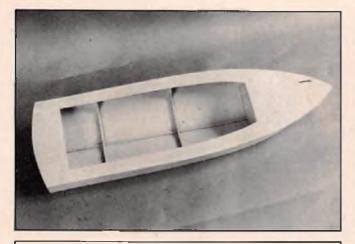
A unique 28"
plywood boat that is
quick to build and
fast in the water.
Can be set-up with
electric or glow engine.

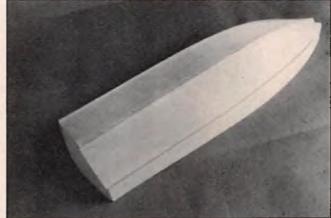
size. With all this criteria in mind, Hooked around for the most powerful electric motor available on the market, and came up with the Kroker Sea Ram, a double-ended motor, capable of handling up to 500 watts. At about 80% efficiency, this gives an output, at the propeller, of some 400 watts, or just over one half horsepower, which is very good for an electric motor. Using 4D size nicad batteries, I figured on a running time of about 6 minutes at full speed, and some 10 minutes at half speed - but with the possibility of rapid recharging from two car batteries in 20 minutes at 10 amps. This would mean that the average modeler would be able to have at least three good runs in an afternoon's boating, and probably more.

Having decided on the power requirements, I next got down to thinking about the hull itself. This needed to be big enough to accept the motor, 12 nicads and the radio gear, without being too cramped, while at the same time remaining a reasonable size for easy transportation and speed. The design finally came out at 8½" x 28", which is a decent size whichever way you look at it. The hull form is a moderate evolutive V, which gives smooth running if the water surface is disturbed, while the flattened V towards the stern gives good turning characteristics. The superstructure is unashamedly traditional speed boat, but looks quite pleasing, especially if provided with a pilot, and is easy to make.

Wanting a model that is easily reproducible, I chose to use plywood for the construction, together with apoxy glue and simple, easy to find fittings, so that anyone who feels like having a go at building a fast model boat will be able to do so without any problems.

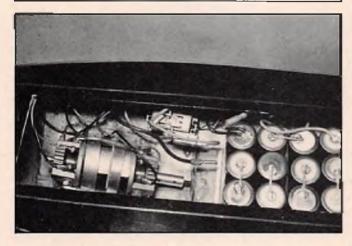
One final word before we look at the





ABOVE: Basic frame complete, showing cut-outs in formers to take installation. ABOVE RIGHT: Underneath of unfinished hull, showing side-skin overhang, ready to take glass-fibre or epoxy fillets to form spray rails. RIGHT: Even a kid can build it? The designer's 3 year old son working(?) on the prototype. BELOW: General view of motor and nicad layout. The servo which actuated the micro-switches can be seen top center. The switches are fixed to the servo case with servo tape, and this works fine. BELOW RIGHT: Radio installation and aerial fixing.







construction. This model was designed around the Sea Ram engine and equipped with it; the boat is very fast. Other engines could be used, but if they are, don't expect to get the same sort of performance from them — the Sea Ram is unique in its power output. It would no doubt be possible to fit the model with a glow engine up to .21 cu. in., and anyone wishing to do so should not hesitate. I have not had time to do so myself with the prototype, but have no doubt at all that equipped in this way, the model would remain stable and fast. If a glow engine is used, the inside of the hull must be thoroughly fuel proofed.

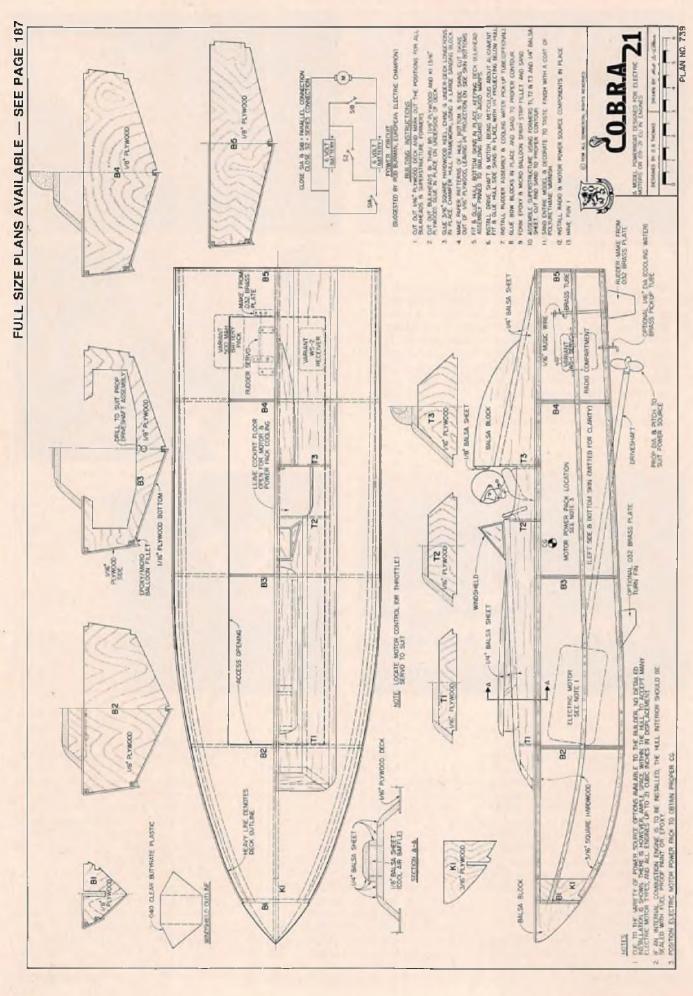
CONSTRUCTION

Having studied the plan, to make sure that you understand just how everything goes together, start by making a kit of the basic parts from good quality plywood. Trace out or mark out, by pricking through the plan with a pin, the deck (either in one piece or in two halves), formers B1 through B5 and part K1. Now pin the deck face down on a flat building board, and mark accurately the positions of the formers. Using a small set-square — you can make one from a scrap of plywood — glue formers B2 through B5 in place on the underside of the deck, using the set-square to make very sure that they are vertical. Glue part K1 and former B1 into position, and then let the entire assembly dry. When it is quite dry, the 3/16" square hardwood keel stringer can be glued into place, again using a fairly fast epoxy glue. The stringer can be held in position while the glue is drying by carefully tapping modeling pins through it into the formers. The pins should be removed

when the glue is dry. Next, the chine stringers are glued in place, and then the under-deck longerons. Leave to dry and, then, using a long flat piece of wood with some medium grade sandpaper contact-glued to it, chamfer all the stringers so that when the skins are added, they will sit flat on the stringers. This is in order to provide a good gluing surface. Take time over this operation, and do it properly; the reward is an accurate and strong hull.

Now take some thick paper — Kraft, for example — and make a pair of templates for the bottom skins. This is easily done by laying the paper in place over one side of the bottom of the hull, holding it with a couple of pins so it won't move, and then creasing it along the chine stringer and the keel. When lifted

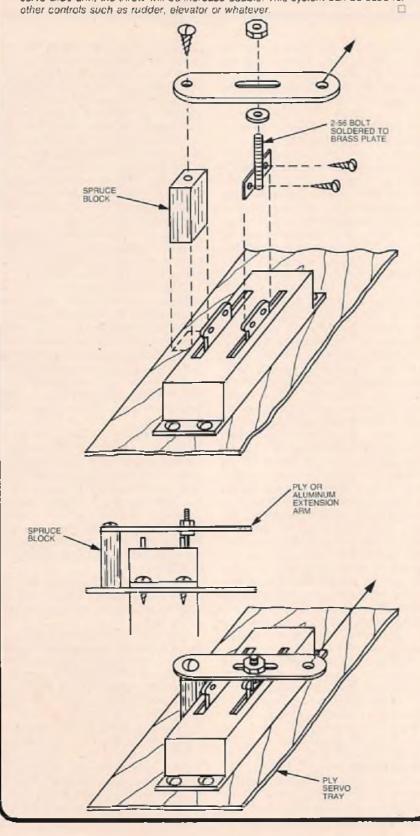
text to page 142



### **INCREASED SERVO ACTION**

By Don Drury

Using the linear type servos in a new 12' span sailplane, I found there was not enough travel to deploy the spoilers through their full range of travel. I used the following idea to increase the servo throw. A small spruce block glued to the plywood servo tray next to the servo is used as a pivot point for the extension arm. The arm can be made from either plywood, aluminum or micarta. Cut a slot in the arm to fit over a 2-56 bolt soldered to a small brass plate. This brass plate is secured to servo slide arm. A small hole at other end of extension arm to connect to spoiler lines via clevises or whatever method needed. A normal linear servo has a 3/8" travel in both directions. If this arm is twice the distance from the pivot point to the servo slide arm, the throw will be increase double. This system can be used for other controls such as rudder, elevator or whatever.



### GYPSY LADY RC'ER STYLE

By Evelyn Odell

hat's me! Nomad of the Northwest, and soon to put in another year of this gypsy life. Up here in the "wild" north there are a bunch of flyboys who are not only crazy RC'ers, but they are nomads --- gypsys --- whatever you want to call them. There is no better place to be one than in the beautiful Northwest.

The Seattle Radio Aero Club (SRAC) has its flying field in Snohomish County, just north of Seattle (about 14 miles from home). It is sometimes under six feet of water or six inches of snow, but there are other playgrounds for the flyers as well Baker Lake, at the foot of Mt. Baker (about to erupt one of these days, so they say) - or one of the many other club fields, all in the wide open spaces, known as Zillah, Chelan, Mt. Rainier, Tacoma and Bellingham. The one common denominator — other than R/C is the mode of living the flyers bring. along, from campers, trailers, motorhomes, to tents.

Have you ever camped with a field box, fuel box, float plane, scale plane, blow boat or sailboat? I can think of the time when a bottle of syrup fell on the transmitter, Ugh!; a lamp fell down and put a hole in the wing, Yeagods!; the trailer jacked down on a fuselage, Ouch!; fuel spilled on the blanket, Peeyew!; but then the beauty and the fun of the outdoors overcomes all these little trifles and the outcome is fun for all.

There are generally around 20 RV's that take to the road from our own club and we camp at various meets and contests throughout the State of Washington which can amount to over 40 bodies, and sometimes many more when all the babies, teenagers, and the like, join in. At night this means two bonfires and a stranger could get confused since it is the older ones around the campfire who are still whooping it up at midnight while the kids have long since hit the sack. There are banjos, guitars, ukeleles, stick and tub, jew's harps, bottle blowing and singing even the strains of an electric organ (run off an inverter), my husband's third hobby (R/C, of course, being his first!). Fun Flies, Pattern and Scale contests

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Radio Spectrum JIM ODDINO



ast month we took care of a few guys who like to know what is going on inside their R/C equipment. This month we have some material that should be of interest to everyone. The basic theme is How To Keep 'Em Flying. Most of you know most of the things I'm going to tell you about, but I'd suggest that everyone read the whole article, because you may learn something new. And, by the way, these comments also apply to boats and cars. and robots or whatever it is you radio control. If you've got some other points you'd like to add, send them in and share them with our readers.

Systems Approach

Your R/C airplane, boat or car is a system and, in order for that system to complete its mission, all the sub-systems and components must function properly. Once in awhile we can have a failure that will not cause us to crash but, quite often, a ten cent part failure can destroy a thousand dollar investment. In this way a model airplane is a unique system. If a tube fails in your TV set it doesn't wreck the picture tube, cabinet and the back end of your house. If it did, you'd probably complain to your TV repairman like you do to the R/C service station. Another thing that doesn't happen in a TV set, usually, is to have a string of failures due to an earlier failure.

However, in a model airplane this is often the case. You crash once, everything does not get repaired properly. And, presto, another crash, and more components weakened. The moral of the story is, if you don't want your radio to crash your airplane, don't crash your radio. You can turn that statement around and you can substitute other words such as engine, and propeller in it. In other words, there are many things that can cause a crash, and once you have crashed, these things are more likely to fail causing more crashes.

### Things That Crash Airplanes

Most of the time the radio gets the blame when we crash, but there are many other things that can do us in. I've made a list which I think most people would agree, can cause failures that might be blamed on the radio.

Let's start with the airframe. If the wing breaks, it is pretty obvious what

caused the crash, but knowing what the original failure was, doesn't help the serviceman find all the problems in the radio. So be sure anything you fly is structurally sound. A good example of a structural problem that could cause a crash that could be blamed on the radio is illustrated in the following story.

I was out flying one day when the guy next to me started yelling the familiar, "I ain't got it." I was busy trying to keep my own airplane in the air, so I didn't see what was happening, but I was told later that the airplane was doing loops all by itself. The guy finally throttled back and got the airplane down and after I landed. I went over to see if I could help him find the trouble. We checked the batteries and ran some range checks and everything looked okay, so I told him to pull the radio out, and I'd take it home and check it over. By the way, radio problems don't fix themselves. If you get an indication something is wrong, get it on the ground and fix it. I've seen many guys try one more flight, and destroy a good plane, plus make it difficult to find the original problem. Back to the story. While I went ahead and flew another flight, Charlie pulled his airplane apart. When I landed, he told me not to worry about his radio, that he had found the problem. His servo rails had broken loose. If the airplane had crashed, we probably never would have thought of that and would surely have blamed the radio. I remember another instance when a plane started doing loops all by itself. We would have suspected the elevator servo except this was a rudder only airplane. What had happened was the pilot didn't put enough rubber bands on the wing (high wing plane) with the result that the incidence was changing at the bottom of the loops, enough to start another one. The plane eventually crashed. A similar situation occurred at the Nats one year, when a flyer from Mexico would do a snap on the bottom of his outside loops (low wing airplane). I'm sure he had the same problem.

Okay then, rule one is to make sure there are no structural problems in the airframe. The next thing to look at is the control system excluding the radio and servos. Pushrods, hinges, control horns, clevises all have been known to crash airplanes. I took a new plane out one time, and noticed that everytime I picked

up speed, it started digging for the ground. A real drastic down trim condition. I was just about ready to tear out the stab and stiffen it up, when I got the bright idea of constraining the elevator pushrod so it couldn't bend in the middle. That fixed it. However, I can picture some hot shot making a low, high speed pass with his new bird and be into the runway before he knew what happened. Another recommendation is to always fly plenty high with a new plane to give yourself time to react in case something does go wrong.

Read the recent series in RCM on flutter - - - another control problem that could crash you. Do whatever it takes but be sure to eliminate flutter.

I also have a story about clevises. I got to the field one day and Bill Simpson was complaining about his elevator servo not neutralizing properly. He was just about to pull the servo when he discovered one of his elevator clevises was borken. Yes, luckily he had a split pushrod, one to each elevator, and that saved him. If he'd only had one, and it broke, he would surely have said the elevator servo failed.

Make sure you have plenty of clearance in all pushrods. When you put the wing on, you don't want the aileron pushrods hitting the elevator servos. Or how about this actual experience. Taxi out to the end of the runway; check all controls; everything fine. Hit the throttle; the aileron servo cable which is tangled in the throttle servo gets unplugged and the airplane does a nice slow roll into the ground on take-off.

I've also heard of ailerons fitting so tight, that a little rain, a little swelling and, what do you know - - - the servo can't move them.

Let's get off the control system and move on to the propulsion system. You may be asking how your engine can crash you. Well I think it is just as important to have a reliable engine as it is to have a reliable radio. If your engine quits a second or two after take-off, you are probably going to ding your plane unless you fly on a dry take or some other wide open spot. Also, if your engine quits when you're out in the boonies and you land on the other side of the rise, blind, you stand a good chance of busting things up. I don't have to tell you what happens if you are in the

middle of a low inverted pass and it quits. And, of course, the engine needs good fuel lines, filters, tank and, if you use one, a reliable pump.

The propeller and spinner are very important parts of the propulsion system that can get you. I've seen propellers break in the air, and control surfaces vibrate off before the change in sound got to the pilot. At the recent Valley Flyer's contest. Don Weitz's spinner came loose and in short order his rudder came off. If the vibration can do that it can break your receiver. I saw Bob Upton lose a racer, when a broken prop caused vibration which broke his receiver crystal. So make sure everything is on tight and balanced. I've seen engines shake loose and even fall off. When that happens you almost always crash. One day I was flying with Frank Capan when he hollered that his hatch, fuel tank and battery pack fell out. I asked him what he was going to do. He said "crash" and he did.

I hope you guys aren't laughing about now. This column reminds me of a film we saw at a club meeting one night. A guy had just moved to California from the midwest and he had put together a movie of about thirty flights with twenty-five crashes. Probably a typical spring day in St. Louis when everyone brings out their new planes. About half way through, the audience started adding their own sound effects with the result that everyone was laughing so hard the tears were running down our cheeks. The guy showing the film didn't think it was so funny and it really isn't when it happens to you. So dry your tears and read on.

The next thing to worry about is field conditions. Don't fly in areas that are unsafe. Buildings, power lines, trees, obstacles on or near the runway, all can take their toll. One day many years ago we were running some open pylon races. in Sepulveda Basin and we had a card table set up out on the course. My engine quit and I was making a down wind landing in the middle of 30 acres but, you guessed it, I hit the table. In fact, I think I've hit everything that flies including free flights and kite strings. Crowded skys can be just as dangerous as poor runways. Mid-airs can spoil your day. And how many times have you heard about guys "flying" that wrong plane while theirs was flying off into the wild blue yonder.

Visibility is another consideration. More than once I've flown into clouds and fog and, let me tell you, your heart skips a beat. I'm sure many planes have been lost because the pilot let it get where he couldn't see it properly and then — what do you know — the radio wasn't responding right. There is more than one story about guys with their plane on edge, pulling full up elevator, and they can't understand why they aren't gaining altitude. So, don't fly

where you can't see, whether it's behind buildings or into smog.

Wind. There was a time when people didn't fly when it got windy. With the airplanes and engines available today. the wind doesn't seem to slow anyone down. However, I've seen some pretty good fliers dump their planes due to wind conditions. Sometimes you're a lot better off saving it for another day. The classic case is the down wind turn. The plane seems to be going plenty fast. It is relative to the ground, but the airspeed isn't that great. The pilot tries to pull the same radius turn relative to the ground that he does in calm air, and bang, a high speed stall. And one thing is for sure, the airplane never responds to your radio commands when it is stalled. Of course the most likely time to stall and fall is during landing approach. Too many beginners don't let their planes settle and end up "landing" when they are still ten feet in the air. Very hard on equipment although it may not show up till a few flights later.

Another thing to watch, is to allow plenty of room for error when doing new maneuvers. If you're a pylon racer and decide to go to a pattern contest, do yourself a favor and fly high so if you pull up when you're upside-down you have room to recover. If you are going to try some rolls for the first time, try to do them so that you are gaining altitude. Pull up and try to maintain the rolls on a straight line of 45 degrees. If you can do that, it should be easy to bring them down to horizontal.

Some things that you should be sure to avoid are known problem areas. If you have an outer marker beacon close to your field that interferes with 75.64 MHz, don't fly on 75.64 MHz. If there is a boat pond or a glider site nearby, coordinate frequencies with those guys. In other words stay away from known interference. Sometimes buildings and fences can cause glitches. Ignition engines, which are coming back, can cause interference. Don't keep flying in these conditions, Change something or sooner or later you'll be picking up the pieces.

Well we've talked about many things that can crash your airplane which, in turn, can damage your radio control system. Once you've done that you stand the chance of your RC system failing and, in turn, crashing the airplane. This can cause a lot of people to get discouraged and develop great hatred for the manufacturer when indeed he has only himself to blame. However, there is the other side of the coin.

### How Radio Control Systems Crash Airplanes

So far I'm sure I must sound like a manufacturer or radio repairman who turns out nothing but perfect equipment. I think I can safely say that no system is perfect when it is new, much less after it has been crashed and repaired. There is

always some weak link that will fail sooner or later when subject to the model airplane environment. We can prolong the life of the radio by minimizing the environment and we could even put off the crash indefinitely by judiciously replacing things before they fail.

For this discussion we will assume that we are starting with a "good" system as opposed to the few lemons that every manufacturer puts out once in awhile. I'm not saying that all brands are equal, but once you've made your choice you'll want to do everything you can to extend the life of your system whether it is for one year or ten years.

Probably the biggest killer is vibration. We've talked about broken props and loose spinners and whay they can do, but even balanced props and spinners don't make a one cylinder engine very smooth. You want to isolate your receiver, servos and battery pack as much as possible from the airframe. The battery and receiver should be packed in foam, and these packages should fit loosely in the airplane. If you have to squeeze the whole mess in, you will compress the foam and defeat the whole purpose. Servos should be softly mounted in the trays supplied and/or on grommets. If you don't isolate your equipment, the vibration will break a wire or a component and then your radio will crash your airplane.

Contamination is another cause of radio failure. Servo motors don't like to work in a mixture of oil and dirt. Try to get a good seal on your radio compartment. Wrap your receiver and battery in Baggies before you wrap them in foam. Don't spray paint your airplane with the servos installed. Once in awhile open the servos and clean up the gear trains and the feedback pots. Keep the connectors clean. A poor connection on any one of the leads to the aileron servo can wipe out a good airplane. The aileron connector is the one that gets the most use and this is the place you are most likely to get broken wires. How many people disconnect by simply pulling on the wing or lifting the fuselage off the wing without disconnecting. Make sure you have service loops in all cables so there is no strain on any wires. If the wires start looking shabby, replace them. Also beware of stiff and brittle cables. Cabling and connectors are some of the most unreliable components in your system. But catastrophic failures can be avoided by careful inspection by most modelers. Some other incipient failures are hard to detect, but there is no excuse to crash due to old and beat up cabling.

While on the subject of connectors, it is a good idea to tape them together or use some kind of keepers. Then float the whole thing in foam. Having one side of the connector hard mounted on the airframe is a no-no. And for goodness

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### MH-17 RC HELICOPTER

By Larry Hoffman



Koichi Saito (Left) and Akira Shimizu (Right) check out the MH-17 just prior to a test flight.

ot too many years ago our hobby of radio controlled models was embellished with the introduction of an RC helicopter, the result of several years of research by a German doctor. Originally available only in kil form, the growing array of commercial models has also been augmented by a large number of original designs as well.

Japan also has produced any number of designs in both kit and OD formats. Thus, one may wonder about the MH-17: "Just what's so different about this model?" The difference is both conceptual and mechanical. Designed by Koichi Saito and test flown during its development by Akira Shimizu, the MH-17 was conceived with the expressed purpose for use in a commercial venture. The first of its kind in Japan, and quite possibly in the world. these two gentlemen established a corporation for the design, construction and use of an RC rotor blade airframe. Utilization is by an electric power distribution company for stringing high-voltage cables through mountainous regions of the country.

Some of the features designed into the MH-17 are a heavy payload capacity, 3.8 kgs at sea level or 2 kgs for up to 30 minutes flying at a nominal altitude of 500 meters, and a Stabilization Augmentation System (SAS) to handle gusting winds commonly found along the slopes of mountains. The design also

incorporates a messenger cable container of unique design which permits the entire cable to be carried aloft, thus eliminating the drag problems of snagging trees when pulling the free end.

The helicopter is equipped with 4 servos for collective pitch, yaw, longitudinal and lateral controls, and a 5th servo for either cable cannister release or a separate release hook. The hook was added when the designers found there were other uses for their choppers. At the moment, plans are underway for further development that will permit remote photographic or TV filming. This will expand application to

such uses as remote monitoring of difficult to reach, very high or hazardous locations, to effect preventative maintenance checks, or for collecting pollution samples.

Demonstrations of air-sea rescue—
the dropping of life supporting flotation
equipment— have been held with
notable success and the fire department
has been impressed with rescues
effected by dropping life lines to persons
trapped on top of a burning building!
Other Government agencies have been
contacted regarding use of this RC
helicopter service for stringing safety
lines across rivers swollen during times
of heavy rain.

According to its designer, Mr. Saito, the MH-17 can hover in winds up to 10 meters/seconds, with its tail facing into the wind, a feat he claims not possible with other RC helicopter designs on the market today. The reason for this, he says, is the unique circuit employed in the SAS. Further, for anyone with some experience at flying RC choppers, transition to the MH-17 is quite simple due to its stability intensifying control system.

With its prime use in the rugged mountains that constitute some 7/8's of the land surface in Japan, the MH-17 can be assembled or disassembled in approximately 2 minutes making possible easy transport to the operating site. General construction includes an all-metal body and a sturdy, we'll supported tail boom. As Mr. Saito puts it: "even if it should crash, about the only part to sustain damage will be the main roter, and this is easy to repair!"

The uniqueness of this device, however, doesn't stop at just the air frame. The most important feature of the design lies in the flight control system. With the aid of one of Japan's RC equipment manufacturers, a number of transmitter/receiver systems have been modified to provide a means of automated control transfer. Here's how it works: If a flight between two points is to be conducted over a distance too far



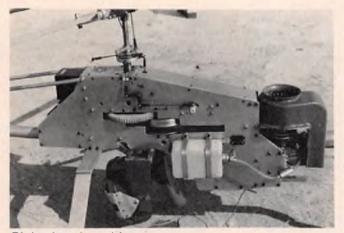
MH-17 ready for a mission. Note messenger cable canister below.



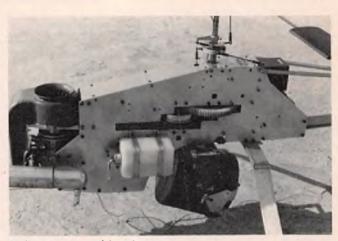
Akira Shimizu hovers the MH-17 with cable canister attached.



MH-17 lifts off with cable canister and a full gallon can of missile mist fuel.



Right side view of fuselage.



Left side view of fuselage.



Close-up of main rotor head.



Close-up of tail rotor.

for visual safety, the primary pilot takes off and flies in the direction of his target. When he reaches what he feels is the limit of his control capability, he pushes a button on his transmitter. This signals the secondary pilot who is listening for the signal, with an earphone, from a special receiver built into his transmitter. At the same time the signal is flashed by the first pilot, the control of the first transmitter is relinquished and the second pilot automatically takes over! Should the distance require more than

two pilots the process is repeated when the second pilot pushes his button and the third pilot takes over...etc!

the third pilot takes over ... etc!

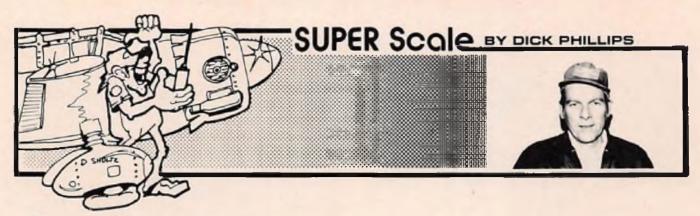
When the problem of flying over a mountain is confronted, two pilots are positioned on either side of the mountain with one on top acting as relay. It goes without saying that some measure of practice is required for such a flight plan, however, tests so far have proved the system to be quite feasible. The mechanism that makes all this possible is presently being patented by Saito and

Shimizu.

The ball doesn't stop rolling at this point, however, and plans are now underway to develop newer and more versatile versions of the MH-17 with an eye on expansion of their services. With larger capacity air frames and a team of experienced pilots, plans for this unusual enterprise are limited only by the fertile imaginations of its founders.

A few words about these two modelers would seem appropriate:

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must apologize to those of you who were receiving my privately produced Super Scale News prior to RCM's acceptance of this as a regular feature. Several have written to me regretting that I was no longer producing the much more limited edition of SSN they had been receiving. Their chief reservation was that this column had not been the same as its predecessor in that it did not seem as personal. This may partly be due to the fact that I was printing it on an offset press whose normal usage was producing a catalogue, and the print quality was nowhere near RCM's quality. Besides, it is quite possible I had been overly impressed with having a regular column in these widely circulated pages and that may have affected my own attitude towards SSN. Anyway, from now on, it's back to normal procedure; this is supposed to be fun as well as informative! From here on in, it will be.

The fourth method of enlarging plans is possibly the easiest to do, but as with all the others we have discussed, it can create a monster. By this, I mean that if you are not careful, you'll create a plan from which you will be unable to build accurately. Better not to bother!

The method is photographic and it can take a number of forms, using various set-ups and varying equipment.

Most cameras of any quality at all have lenses which will cover a large enough field of view to eliminate any distortion in the negative or slide. But use the best camera and lens available to you, and the largest film size.

As far as cameras are concerned, the best one to use for this copying purpose would be a view camera. However, such cameras are used mainly by professional photographers and will not be available to all.

Generally speaking, the larger the film size you can use, the better, but most of us will be using 35mm cameras. The better the quality of the camera and lens, the better the results will be.

Producing a usable plan photographically consists of two basic steps, (1) taking the picture of the original, and (2) projecting the slide or negative for the new enlarged plan. We'll

consider these two steps separately and the best equipment to use for each of them.

Exposing the slide or negative of the original requires precise alignment of the plane of the original and the plane of the film. The exposure can be made on either color slide film or black and white negative. I prefer using black and white negative film for a reason which will become obvious a bit later.

Remember, if you are enlarging a small plan, the enlargement will make everything larger, including the thickness of the lines.

For example, enlarging the usual 8½" x 11" page to quarter scale dimensions requires enlargements of 15 to 17 times. Therefore, a line 1/32" wide on the original will become a 1" wide line on the projected image. That's a pretty wide area to fool around with. It's my personal opinion when faced with this situation to use the center of this 1" wide space. I feel comfortable with this arrangement, and as long as you are consistent with this, you should be okay.

Enlarging a full sized 2" to the foot plan to 3" to the foot, remember to check the original plan against the original aircraft if you want true scale. As discussed previously, many such plans have been altered slightly in order to provide better flying qualities in the model. Such alterations are much less necessary all quarter scale, as you can be dead on scale and have a model which will fly very well indeed without changes.

Enlarging from 2" to the foot to 3" to the foot, you should plan on shooting two negatives (or slides) of each sheet of the plan for better resolution and less possibility of distortion. Avoid filling the negative to the very edges, if your lens does have any distortion inherent in it, this distortion will be along the edges of the film, especially along the short edge of a rectangular film size.

In order to minimize the possibility of distortion in the projected image. I put a mark on the original plan in several locations so they will appear in the projection. These are placed in each corner of the original and, in my own case, I use a rubber stamp of an easily measurable shape (i.e., a 1" square) and place these in the appropriate

places on the original. In this way, they will all be identical and you can stamp as many as you like easily and quickly. A 1" Maltese Cross is also a good shape to

Choosing a film to use is important; we want good resolution, fairly fine grain, and a reasonable exposure index. I prefer Panatomic X for the above qualities and try to get fine grain developing done as I no longer process my own film (not always available, unfortunately).

Setting up for the exposure is the hardest part. A copying stand is a great help but few of them were made to copy the sizes we are to be dealing with, so you'll have to make your own or pin the plan to a wall and shoot from a tripod. Make sure the plan is flat and tight to the wall (any bulges or slack areas are going to create problems later on). It is imperative the plan and the film be absolutely parallel to one another, for good results. If you cannot manage to achieve this, then save the film for shooting pictures of the models at the field. Unless this parallel situation can be achieved, you're wasting your time and vour film.

As for the technical details of exposure, lighting, etc., these will vary with the type of film used and your own special circumstances. Presumably you have the background in photo work or have been smart enough to get knowledgeable help.

Arrange your shot so that your rubber stamped marks appear in each corner of the negative. A view camera, or a ground glass back for your own camera, helps here, although a single lens reflex will work okay. We are going to make good use of these marks later.

Once the negative or slide has been processed, we are ready to produce our enlarged plan. If possible, it would be as well to use an enlarger for the projected image, rather than a slide projector. The enlarger will have a better lens than a slide projector, generally speaking, and less distortion will result. Ideally, we should make both the original exposure and the projection with the same lens, but this is not always possible and we may have to accept a bit less than we would like for the sake of convenience. In any case, choose the best lens

available to you for the projection. If using an enlarger, make sure you will not harm it operating it at right angles to its normal direction as we will be making our new plan by projecting the image on a wall, and this requires projection parallel to the floor rather than at right angles to it.

Mount (or prepare) the film for the projector or enlarger to be used and, again, keep the plane of the film parallel to the surface being projected upon. Mount the material for the new plan on the wall, again making sure it is flat to the wall. As mentioned in previous articles, I prefer tracing linen or mylar which permits reproducing the plan again and again later. It's just as well to back up the material with a white card stock or paper in order to show up the lines properly. This material can be obtained in rolls large enough to provide sufficient areas for this use.

In making our parallel alignment, we have some help in the form of the stamped markings we placed on the original. These will assure both the correct ratio of enlargement, and the parallel condition required. Assuming a 1" square on the 2" to the foot original, we now want a 1½ square on our 3" to the foot reproduction. All of these squares must be the same size and they must be square. Once we have satisfied these conditions, we can be assured that our new plan is the right size, and that the size is constant over the entire surface.

Now, the reason for using negative film rather than slides will be obvious. Our projection, given an original of black lines on a white background, will now be reversed and consist of light lines on a black background. It now becomes a simple matter to draw in the light lines in pencil creating our new plan. As the lines are drawn, the light area shows what has been done and what is still left to do. This is much easier than it would be if we had used slide film, where the lines would be black and the background light; the newly drawn lines wouldn't show.

Once pencilled to completion, the plan can be removed from the wall, inked and lettered and it is ready to make more prints from. However, if construction is to be started immediately (or even if it is not) while everything is set up, it is possible to place cardboard in the projected area and create patterns of the parts which will subsequently be required to build the model. We can even, if we choose, place the wood in the projection and draw the parts required right on the material we will use in the construction process. Wing ribs, formers, and the like, can be done in this way and will be ready when construction

Placing the material in the projected area in order to make the parts will slightly after the size of the part, due to the thickness of the material moving its surface closer to the lens than the

original plan. This difference will be so slight as to be negligible.

And that's all there is to it. You can enlarge almost anything this way so long as you observe the necessity of keeping the planes parallel and arrive at the proper size. Even a one page three-view can be enlarged in this way, although it will require the utmost care in alignment and in tracing the new plan to avoid distortion. The projected lines will be very wide indeed and it will take some care to keep them in the middle of the wide area which will result in the projected image. If there is someone in your club (or in your area) who is particularly well informed and capable in the photographic field, enlist his help. He'll likely be pleased to have been asked, and his equipment will likely be as good as anything around. If he does his own processing, so much the better. Cultivate him, he's a good man to have around!

Regarding the Quadra engine, some of the earlier engines had a potential problem which could be serious if not attended to. The screw in the carburetor throat which holds the butterfly valve in place can back out due to vibration. If this should happen and the engine ingests the screw or the butterfly, you will have a very serious case of engine indigestion. More recent engines have had this problem taken care of, but check yours anyway. Just look into the carb and make sure the screw is tight. If not, you may have to remove the carb to tighten the screw. Place a drop or two of Loctite on the screw to prevent it from backing out.

On the base of the Quadra crankcase. there is a screw which is sealed with silicone seal (it's the only one sealed). If you remove the bottom housing, tap this hole to 8-32, it will take a pressure tap (same as fits a muffler). However, as the crankcase pressure is pulsating between suction and pressure, you're halfway home. We need a method of holding the pressure, but eliminating the suction. Any one-way valve will do this for you, but finding one seems to be the problem. If you have a medical supply house handy (or a friendly nurse or doctor) there is a one-way valve used in medicine in I.V.'s which can be adapted to our task. If you can get your hands on one of these, you'll soon solve the problem. This will produce about 5 pounds pressure which can be used to pressurize a smoke solution tank. introducing a smoke mixture into the hot exhaust system. You'll be surprised at how much smoke it will produce. One correspondent assures me that in two minutes, it produced so much smoke he couldn't even see the strip, let alone his airplane!

I have only had two reports of interference problems with the Quadra. One of these was caused by the use of mis-matched radio components. One

make of receiver, another make of transmitter and still a third type of servo. Once the radio in use had been mated, the problem disappeared. The other problem was related to me by Pete Waters, who is pilot for Andy Sheber's Pitts S2-A. Pete and Andy had been having an interference problem and Pete, who services radios professionally, had checked their Kraft system every way from Sunday, and still the problem existed. I'm happy to report the radio was not at fault. After trying everything they could think of, they replaced the spark plug in the Quadra, which was a bit fouled, and the problem disappeared. Moral: Keep the plug clean, and don't use any more oil in your fuel mixture than is called for, It isn't necessary and will certainly foul the plugsooner than would be the case with the correct mixture.

Speaking of Andy Sheber's Pitts, it's available in 1/3 or 1/4 scale. (The 1/3 scale is 80" wide and huge.) I have one under construction and it is very big. We have one already in the air here and I can tell you that it is a most impressive bird. Andy's was flown at the Tournament of Champions, as mentioned previously here, and made quite an impact on those present to see it. The performance of ours here is a bit less than we would like, but we have been unable to try more than one or two props on it to date and expect to liven its performance up a bit with a change of prop. The plan is available from Big Art's Models at 20620 Emmett, Taylor, Michigan 48180. Big Art also has a 1/3 and a 1/4 scale Kraft Super Fli at 93" and 731/2" span, respectively, along with many other good things for the models. Drop Big Art a note including an S.A.S.E. for a list and prices.

I had a note recently from Dave Henshaw who is no stranger to Canadians as he is a real triple threat (or maybe more than that!). Dave flies pattern, scale, gliders, and just about everything else and, worst of all, he does them all well. At a recent club meeting in Windsor, Ontario, Andy Sheber and Pete Waters put in an appearance and shared their experiences with the biggies with the guys in the Windsor Club. Dave says they answered 1001 questions - - - I wonder what happened to the rest of the questions? Andy and Pete covered the Pitts in detail, as to construction, materials, and methods, giving the guys a good idea and the benefit of their experience. If my own experience is any criterion, there will soon be a few biggies under construction in the Windsor area.

George (Woody) Clapp of the Allegany New York STARS (Southern Tier Aero Radio Society) has shared a couple of things with me and I wanted to

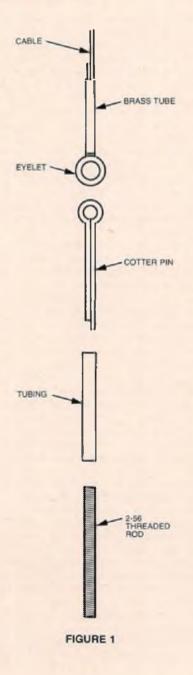


George 'Woody' Clapp and his first RC model. A Sopwith Triplane which was drawn and scratch-built by Woody. Now that's a fairly ambitious project for a first time RC modeler, small wonder he's wearing such a broad grin. Wires are functional and the spoked wheels are scratch built as well.

pass them along to you. One of the Stars has developed a method of making up control cables or rigging cables out of commonly available materials which are both strong and adjustable. As you will know if you have been following SSN ! suggest using control cables working from both sides of the servo arm to a double horn on both elevator and rudder. Making these cables up is a problem if you haven't had to do it before and the Stars solution is a good one. Referring to Figure 1, the parts required are, from left to right: the cable, a short piece of brass tubing, an eyelet, a cotter pin, another short piece of tubing and a section of 2-56 threaded rod.

The eyelets, incidentally, can be obtained from the small packets of Perfect parts we have been using for years. I used to save these to make up the ends of wire control lines and still have a few around although I have not much use for Perfect parts in my RC yentures.

Making these up is simplicity itself - - the cable is passed through the brass tube, looped back through the brass tubing again, and then snugged up around the eyelet. The brass can then be swaged shut and soldered, pulled up tight on the eyelet. Then open the colter pin up so it can be passed through the eyelet, close it again, trim off the ends of the cotter pin to the appropriate length, insert it into the second piece of brass tubing, inserting the 2-56 rod into the other end of the tube, and solder or silver solder together. I don't like using the silver solder on the cable as the heat required can seriously weaken the cable. At the other end (i.e., cotter pin, tubing and rod) I'm not so concerned about the heat doing harm; dealers choice here anyway. The other end of the cable can be fitted permanently to the hold-down, or can be soldered to a solder link (with keeper) and then on our



newly made up end, we can thread a Kwik Link (with keeper) and we are ready to adjust for length in the case of a control cable, or for tension if it is to be used as a flying or landing wire. Simple, easy, and reliable. Thanks to Woody Clapp, and the STARS.

Woody is also in the process of building Dick Barron's quarter scale Stinson Reliant (SR-9). Not very unusual, as there must be many of them under construction around the country. Woody being a bit of an innovator has added a new twist. He is building the fuselage out of 1/4" aircraft grade steel tubing. He had the fuselage fully framed when I last heard from him, and it was done to scale; not only that, but finished weight is 334 pounds! That can't be much heavier than building according to the plans with conventional materials (conventional, that is in quarter scale). Woody has promised some pictures of this beauty he has constructed and I'll include them with this column if they arrive by deadline date.

Just to really dazzle you with the talents of this multi-faceted individual, he has been in touch with North American, and they have supplied him with details and specs on the B-25. You guessed it, he and a couple of the STARS are working on a quarter scale model of this famous aircraft, meant to be powered with a pair of Quadras! I have asked Woody to keep me in touch with this project and will keep you all up to date on its progress.

The STARS are the guys who are currently flying a squadron (seven at last count) of quarter scale Bristol Scouts in shows around the New York/Pennsylvania area. They are currently planning on a second addition to the 'squadron' concept but have not yet hit upon the subject. Can you picture a squadron (or even a flight) of B-25's snarling it's way into the air? The thought boggles the mind.

The Jim Davis team in England are currently flying a squadron of Spitfires at ten foot span and one of these has been flown across the English Channel to France. They also have an ME 109 and a four engined Lancaster bomber which I understand, requires three radios and three pilots to fly it. It is advertised at 27 foot span and Ron Shettler of Quadra tells me it now has four Quadras providing the power. The sound of those four engines beating in unison must be enough to bring the hair up on the back of one's neck! Anyone else out there planning, building or flying a multi-planed team in quarter scale? If so, I'd love to hear about it and will be pleased to pass the word along to others.

Just a note to those who have been writing me. I promised to answer all letters written to me and much as I hate to go back on a promise, it looks as if it is

not going to be physically possible for me to keep that one. I may have to go to a form letter with answers to questions hastily written in. Rest assured, I'll do the very best I can. Mail started coming in shortly after the first column appeared back in March and it continues to increase. RCM tells me that it is going to become even greater yet, and I must admit it is good to hear from you all. I'll do the best I can, but please don't be offended if the reply is a hastily scrawled note (and boy, can I scrawl when I'm in a hurry!).

I had a note recently from Hank litzsch of Seekonk, Massachusetts, inquiring about the new Grish and Top Flite props in the larger sizes. I've seen them advertised, of course, but they haven't reached me here in Canada yet so I'll have to rely on the comments of others. on their performance. Naturally, any engine will perform a bit differently on the same prop in different models, so it is important to try a few different props on an engine when it's in a new model. Slight changes in size and/or pitch will make a model perform differently, so it is always a good idea to try a few before you settle on the one you'll use. Mostly I have had letters from those who tell me the 20" props seem to do well on the Quadra, and the pitch I'll leave to you and Grish, depending on what works best for you and what Grish and Top Flite put on the market. Punctilio in England have been supplying us with props here and although theirs work fine, the sizes stop at 18/6 which is still a bit undersize for such engines as the Quadra, Some 20's and 22's with pitches up to around 8 and 10 would not

A few fellows have made a change to their Quadra engines that takes it a bit easier on the prop center. They take a longer bolt than is fitted to the Quadra, paint the threads inside the prop adapter with Loctite, or similar product, thread the new bolt into the adapter, cut off the head of this bolt (after the Loctite is set up) dress the raw end of the bolt and fit it with a large prop washer and nut. Using a larger washer over the prop center is a good idea as it spreads the compression load over a wider area which is less likely to deform the prop hub.

It is extremely important to balance all props used on these larger engines as the possible vibration level from an unbalanced prop could be disastrous. In addition, and perhaps even more important, be sure you check the tracking of the prop, much as the helicopter guys do with their rotors. The easy way to do this is to set up a piece of card stock so that the prop tips just touch it as you turn the engine over by hand. A bit of pencil lead rubbed onto the tips will make a mark on the card stock, and both tips should touch in exactly the same spot. If this is not the case, the prop hub

is probably crushed slightly off center and the wobble created can cause a vibration as bad or worse than that caused by a prop out of balance.

I have had a number of inquiries from modelers in the U.S. as to the status of flying their large models in relation to AMA insurance. I was not in a position to comment on this until recently, when a correspondent forwarded a copy of a letter from John Worth, AMA Executive Director, to Pappy DeBolt, who needs no introduction. The letter states, "There's no problem of insurance, as yet. Our insurance is based on how you fly, not what you fly. On that basis it doesn't matter how big the plane is. Flying over people is prohibited by the AMA Safety Code. There might be no insurance coverage in such cases." There it is guys, that's the definitive word from the guy who is in the best position to assess the situation.

Recently, received some information from Dave's Custom Models (1844 West Glenoaks Blvd., Glendale, California 91201) announcing they are now stocking the Eastcraft Specialty Products Electra-Starter system. This is an electric starter for the Quadra (and presumably other) engines, operating from its own on-board nicad pack. The system is claimed to be capable of starting the Quadra up to 100 times from one charge. The batteries and starter motor may be located at will in the fuselage to preserve balance. The starter is coupled to the engine with a clutch that totally disengages after the engine fires so places no load on the engine after it has started. The system will operate from an auxiliary channel on your Tx. The engine can be both started and stopped from one channel. Parts (when necessary) are off the shelf available so repairs should not be a problem. The total weight of the system. is 40 ounces, not a problem for most of the quarter scale models around. Cost is \$129.95 and a charger for the nicad pack is \$9.95. Eastcraft's address is P.O. Box 25, Irwin, Pennsylvania 15642. Try your local hobby shop, but if not available there, write Dave or Eastcraft. The information related here comes from an advertising piece received recently, I therefore, cannot speak for the quality or the operation of the unit. Comments from those who have will be much appreciated by this cowboy!

I had an interesting note from Bob Stater in Phoenix a while back and while his letter is a bit lengthy to reproduce here, he made a point about judging which I think bears repeating. In a Scale or Stand-Off Scale contest, there is an obvious disadvantage in judging varying sized models against one another with the current judging distance. For

example, a quarter scale model and a Half-A model (to take the extremes) judged in the same contest from the same distance makes for a rough deal for the Half-A model. The Quarter scaler is at an advantage in that super detailing. a large model is less of a task than doing the same thing for a Half-A model. Bob suggests the judging should be done from a distance equal to 5 times the wingspan of the model (forty feet for the quarter scale model and approximately eight feet for the Half-A). Sounds like a great idea to me and a fairer way to go. Far be it from me to make suggestions to the AMA (being a Canadian) but I suspect the idea warrants further study. and a formula should be worked out to reduce the obvious disparity in the case stated above.

Bob also commented that Super Scale is the wave of the future (with which I cannot disagree, obviously!) and that there are literally dozens of motorcycle and other engines in the two cycle arena which will lend themselves to adaptation to our needs. Not to mention that Quadra and others must already be working on engines to supplement those already available. feel sure we are going to see some remarkable new engines in the foreseeable future and would ask that if you hear of any, or are involved in their development, please let me know so the word can be passed to those who are interested.



Ron Kobilka's L'il Swift, from RCM plans. Swift yes, but not l'il anymore. More details in Super Scale News.

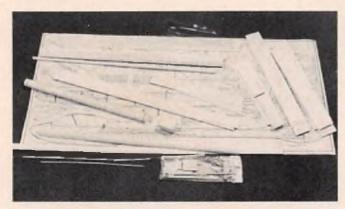
Some months ago RCM printed a plan for a .40 powered model called a L'il Swift. It really appealed to me at the time, and I built one. It was conventional construction with a foam wing, and the one I built flew like the original flying brick. In all fairness to the designer, it was more likely my fault than his. I had to oile a great chunk of lead in the nose of nine to get it to balance properly and it did not, as you may have gathered, fly well at all

Ron Kobilka of Cottage Grove, Minnesota, dropped me a line recently telling me about his L'il Swift. The wing span is 96", length is 69", the model weighs 19 pounds and flies on a Quadra with an 18/8 prop. The wing is foam with

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# RGM PRODUCT TEST

# Hobby Shack DAS SUPER SLUPEN THING





as Super Slupen Thing is a sport sallplane designed by Bob McVickar, and sold by Hobby Shack. Das Super Slupen Thing (will you forgive us if we shorten this to Das SST?) ... anyhow, Das SST is a nicely proportioned, polyhedraled big brother to (what else?) Das Slupen Thing, and boasts a 108" span with a generous 957 square inches of wing area. With credentials like this, you can see right off that this is a bird to reckon with.

Digging into the kit, we came across what seemed to be at least a cord of balsa wood, a plastic envelope full of accessories, a beautiful clear plastic canopy, a set of wing wires, and two sheets of full sized plans. Since the plans were so good, we might as well tell you that they were done by Vince Micchia, and approved by Paul Bender. The first sheet of plans covered fuselage and tail section construction, and included no less than four perspective sketches of the fuselage in various stages of assembly; one sketch of canopy installation; and two of these fine helpful little drawings were of the elevator and rudder. Also included on the first sheet was printed instructions for building the fuselage. There were no instructions or notes for the vertical or horizontal stabilizer construction, but then, none was needed so well done were the drawings. Sheet 2 of the plans contained full size drawings of both wings, plus perspective sketches showing various details of rib, spar, and wing tube placement. As with the sketches on Sheet 1, these little drawings are very well done. and proved to be an excellent aid in building. No written instructions were included on Sheet 2, however, for the most part, none were needed. More comments regarding this later.

All things considered, this kit was found to be well planned and put together, with the sole exception of the lack of written instructions for building the wings. Balsa wood quality was very good, and die-cutting ranged from excellent to fair. The die-cut balsa parts, for the most part, separated cleanly, and no problems were encountered here. The 1/8" ply fuselage sides and doublers were examples of what excellent to page 120

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		•				Pre-Shaped Parts	•				
Plans						Parts Match to Plans		•			
Written Instructions		-	•			Overall Parts Fit					
Quality of Hardwood		•				Ease of Assembly					Ī
Quality of Fiberglass			MA			Fidelity to Scale			NA		
Other Materials						Flight Performance	•				Γ
Accessories		•				Overall Appeal	•				
Die-Cutting											

E - Excellent / G - Good / A - Average / F - Fair / P - Poor

### **SPECIFICATIONS**

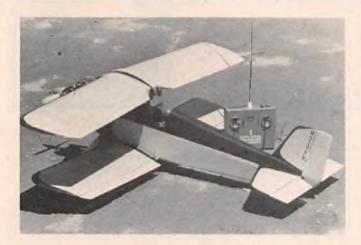
Name	DAS SUPER SUUPEN THING
Aircraft Type	
Manufactured By	
manufactored by	
	18480 Bandiller Circle Fountain Valley, California 92708
MG D I Dot U.D.I.	rountain valley, Galifornia 92706
Mfg. Suggested Retail Price	\$44.95
Available From	Mrg. & Retail Dutlets
Mtg. Recommended Usage	
Wing Span	
Wing Chord	
Total Wing Area	
Fuselage Length	, , 50 Inches
Radio Compartment Dimensions	(L) 9½" x (W) 2½" x (H) 3"
Wing Location	High Wing
Airloil	Flat Bottom
Wing Planform	. Center Section — Constant Chord
	Outer Panels — Swept L.E.
Dihedral	3 Inches
Polyhedral	2-7/16" - 2nd panel
Stabilizer Span	
Stabilizer Chord (incl. elev.)	
Total Stab Area	
Stab Airfoil Section	
Stabilizer Location	
Vertical Fin Height	
Verlical Fin Width (Incl. rud.)	R'' (Aug.)
Mfg. Rec. Engine Range	
Mfg. Rec. Fuel Tank Size	MA
Landing Gear	NA.
Recommended No. Of Channels	
Recommended Control Functions	
Basic Materials Used In Construction	cievator & nuquer
ruselage	Balsa & Ply
	Ply, Balsa & Spruce
	Balsa
Hardware Included In Kit	See lext
Plan Size	24" x 56 /z" (2 sheels)
Building Instructions on Plan Sheets	
Instruction Manual	
Construction Photos	
Kit Includes	
Mfg. Rec. Flying Weight	
Wing loading based on rec. flying w	t Not Given

### RCM PROTOTYPE

Weight, Ready To Fly	56 Ounces
Wing Loading 8.25	oz./sq. ft.
Covering & finishing materials used	. See Text
Engine Make & Disp	NA
Muffler Used	
Radio UsedF	S Systems
Tank Size Used	NA
	Wing Loading 8.25 Covering & finishing materials used Engine Make & Disp. Muffler Used Radio Used 8

# RGM PRODUCT TEST

## Balsa U.S.A. Phaeton Biplane



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	6	A	F	P
Packaging						Pre-Shaped Parts			NA		
Plans						Parts Match to Plans			•		
Writien Instructions				•		Overall Parts Fit					
Quality of Hardwood			•			Ease of Assembly			•		
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials		•				Flight Performance					
Accessories	-					Overall Appeal	•				
Die-Cutting											

E-Excellent / G-Good / A-Average / F-Fair / P-Poor



any modelers are turned on by the mid-sized biplanes that are in such profusion today, and I am no exception. Unfortunately, most of these exotic bipes are out of the financial reach of most Sunday fliers. Again, I am no exception. Now the money troubles are over. A new bipe entered the market a few months ago called the Phaeton Biplane; it is the answer.

The Phaeton Biplane is manufactured by Balsa U.S.A. for the remarkable price of \$22.99. This price becomes even more remarkable when you open the box and find the kit much more complete than you would guess. The manufacturer has done away with the unnecessary items such as the kit box (the balsa is packed directly in the shipping carton), and over-simplified plans (anyone with a little common sense and the experience to fly a bipe will have no trouble). Using square balsa blocks instead of pre-shaped pieces such as wing tips, etc., is another price cutter. However, the finished aircraft is not affected by these.

The kit has many quality features that more than make up for the cost cutters. A few of these are; rolled plans, good die-cutting, a very complete hardware pack (horns, hinges, strip alleron torque rods, windshield plastic, and a pre-bent aluminum landing gear). Some of the balsa was a little fuzzy, but a few strokes of #320 sandpaper smoothed it right out.

The actual building of the kit is not as easy as the Ugly Stick type of kit, but it is as easy as the older kits such as the Esquire or Tarus. The wings are semi D-tube with leading-trailing edge planking with cap strips. The fuselage is slab sided with formers and sheet planking for the top cowl and turtle deck, and the tail surfaces are sheet balsa.

The only shortcomings I discovered while building were that the hardwood cabane strut material was 1/4" wider than shown on the plans, no given finished weight to use as a goal (probably wouldn't have helped, but it's nice to know), and not even one sketch of the finished aircraft.

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### **SPECIFICATIONS**

Name Aircraft Type Manufactured By	
	Marinette, Wisconsin 54143
MIg. Suggested Retail Price	Disput team Min
Mfg. Recommended Usage	Gen Soort & Adv. Trainer
Wing Span	Top 48"-Bot. 44"
Wing Chord	Tap 8¼"-Bot. 8¼"
Total Wing Area	
Fuselage Length	(1) 734" • AND 314" • (H) 5"
Wing Location	
Airtoll	
Wing Planform	
Dihedrai	Top 0" — Bollom 3/4
Stabilizer Span	177/s"
Stabilizer Chord (incl. elev.)	
Stab Airfull Section	
Stabilizer Location	
Vertical Fin Height	
Vertical Fin Width (Incl. rud.)	
Mlg. Rec. Engine Range	Not Given
Landing Gear	
Rec. Number of Channels	
Recommended Central Functions	Rud., Elev., Throl., & Ail.
Basic Materials Used In Construction:	Salas & Div
Fuselage	
Tail Surfaces	
Hardware Included In Kit	See text
Plan Size	62" x 29" (1 sheet)
Building Instructions on Plan Sheets	You (2 name)
Instruction Manual	
Kit Includes	Die Cut Parts
Mlg. Res. Flying Weight	Not Given
Wing loading based on rec. flying wl.	Not Given

### RCM PROTOTYPE

Majoht Book To Ele
Weight, Ready To Fly
Wing Loading 18.5 ez./sq. ft.
Covering & finishing materials used See Text
Engine Make and Disp K & B .40
Mulfler Used
Radio Used Hobby Lobby
Tank Size Used 8 Gunces





Glen Dye, owner of Performance Model Parts, builds fine TWA engines. Here, Glen shows us a piped rear rotary .60 --- puts out over four horsepower (see text). This would be a fine mill for an assault on the R/C FAI speed record.

#### TWA ENGINES

"You want to see over four horse power out of a .60?" Glen asked.

"You bet!"

Glen strapped the TWA to the bench, closed the test booth door, and handed me some asbestos gloves, ear

protectors, and a megaphone.

"When I give you the nod, slip that megaphone on the exhaust and stay out of the prop plane. The asbestos glove will get hot, so when you can't stand it any more, disconnect and take it off," Glen said.

The engine fired right off, and Glen tweeked the needle valve. I got the nod, and gingerly plugged on the megaphone. Holy cow! The tach jumped to 21,000 RPM -- that test booth was a mighty unpleasant place to be. We shut down and calculated the horse power using Kavan test equipment --- 4.05 H.P.!

Glen tore down the engine and showed me its 'innards'.

"Here's the secret to keeping one together at 4 H.P.," he said.

Glen was holding the con rod --- a titanium beauty with needle bearings on both ends.

"It's an expensive item, but the only way to go. Several .60's on the market can approach 4 H.P. - - - design-wise they're close - - - but in the metallurgy department they fall short. The rod is the

weak link," he explained.

Glen's con rod costs \$50.00. It takes four hours to produce from a solid chunk of titanium that goes for \$10.00 per pound. Glen says to produce horse power, it's either cubic inches or cubic money that counts.

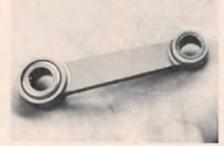
Glen Dye is the owner of Performance Model Parts, 1015 S. 6th St., Minneapolis, Minn., the manufacturers of TWA engines and a host of fine accessories. On a recent lay-over in Minneapolis, I visited Glen's plant, and was treated to a modeler's paradise. Glen eats, drinks, and sleeps model engines, and is very generous with his time and talents. I 'picked his brain' for several hours - - a real gentleman.

Scattered throughout the shop are models used as test beds for engines — R/C, control-line, boats and race cars — some of the finest to be seen anywhere. And the engines — many displacements for most applications. Of particular interest to the RC'ers are the throttled engines. The Perry pumper pattern .60 with tuned pipe is really something - - - it

text to page 112



Glen is big on boats - - - uses digital readout equipment accurate to .0005 inch.



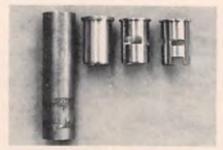
Dye's secret of keeping a .60 together at four horsepower - - - a titanium rod with needle bearings.



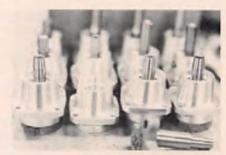
Performance Model Parts impressive line of TWA engines.



Finished ABC piston and sleeve for .40 Sch. R/C.



Steps in machining brass sleeve.



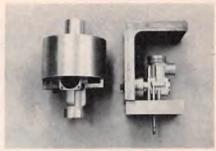
Front end and cranks for rear rotor .60.



Breakdown of .40 Sch. R/C.



.40 Sch. R/C with Perry Pump - - - Glen uses Kavan test equipment.



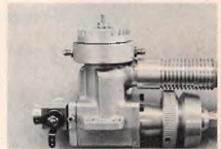
Drilling and turning fixtures for .40.



Accessories produced Performance (see text).



Beautiful TWA Sch. pattern .60 with Perry Pump, carb and pipe.



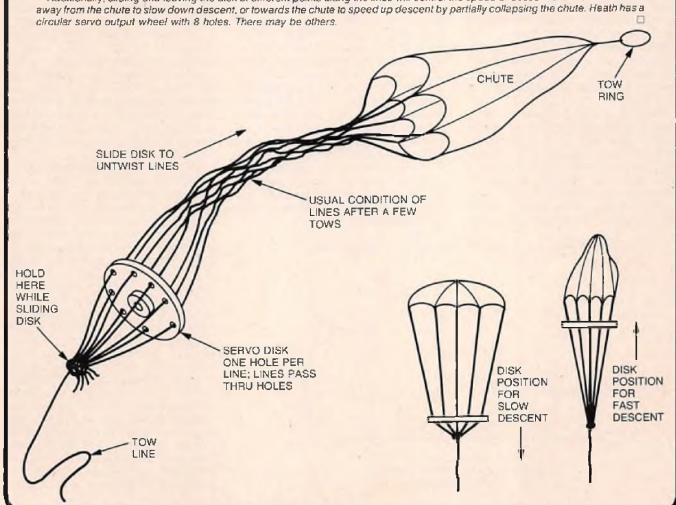
Boaters droof - - - .40 Sch. R/C Marine.

### A BETTER WAY

By David L. Peltz

The parachute lines used at the end of R.C soaring "high starts" and winches twist and tangle quite easily during a short flying session. The simple addition of a spare circular servo output disk, drilled to accommodate the correct number of parachute lines will provide a rapid means of untwisting the lines. Merely slide it up and down once, and the lines will untwist, by themselves.

Additionally, sliding and leaving the disk at different points along the lines will control the speed of descent of the chute. Slide it



## SONIC LOCATOR

By Alfred I. Anderson

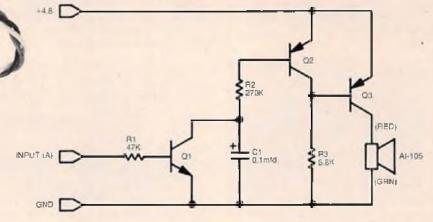


FIGURE 1 SONIC LOCATOR FOR POSITIVE PULSE SYSTEMS

everal times last summer I tramped through tall corn fields trying to find a downed airplane. When the stalks are over your head and as thick as a hedge, you have to literally walk on top of the plane to find it! I decided there must be a better way to implement the standard search techniques. After considering (and rejecting) the automatic release of a balloon for flares, the concept of a Sonic Locator evolved. Initially it was only to provide a homing signal to allow the pilot to walk directly to his downed plane, however, other benefits immediatley became obvious. This simple circuit will provide at least four useful functions. First, it does an excellent job of helping to find lost aircraft. Second, it reminds you to turn your receiver off when you're done flying! Third, it makes for an extremely simple way to range-check your equipment. Finally, you can easily check to see if anyone else is using your frequency.

When completed, the Sonic Locator is smaller, weighs less, and draws far less current than a KPS-12 servo. It consists of a loud audio indicator and a control circuit. It may be attached to an unused channel of your receiver or may be paralleled onto a servo.

Construction of the Sonic Locator should pose no problems to anyone at

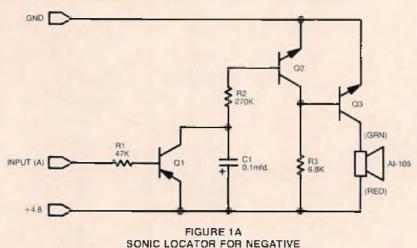
all familiar with electronic circuits. Figure 1 is the schematic which describes the circuitry.

The circuit is designed to turn on the audio indicator whenever a lack of servo control pulses is detected. Normally the signal imput (point A in Figure 1) goes positive for a millisecond or so about sixty times a second. These are the pulses that position the servo in response to the control sticks on the transmitter. Each time a pulse is received, transistor Q1 discharges the storage capacitor, C1. This keeps the voltage across the capacitor near ground insuring that transistor Q2 is saturated causing nearly 4.8 volts across the resistor R3. This state keeps the output transistor, Q3, cut-off so that no current flows into the audio indicator A1 and no sound is produced. The quiescent current draw is typically less than one milliampere.

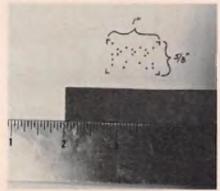
If the imput pulses are discontinued the situation changes. Q1 no longer discharges the storage capacitor. After a short time, the voltage across C1 increased to the point where Q2 becomes cut-off. This drops the voltage across R3 which turns on Q3 causing current to flow into the audio indicator, A1, producing the tone. The active state current flow is around twenty milliamperes. The above description assumes a positive pulse system such as Heathkit, Kraft, etc. If your R/C system uses a negative pulse (such as World Engines), refer to Figure 1A. This is exactly the same circuit with the polarity changed and the PNP and NPN transistors interchanged.

This circuit has been designed around the AI-105 audio indicator available from Projects Unlimited, Inc. It is ideal for our purposes. This is not a simple buzzer but a small transistorized oscillator that drives a miniature tuning fork. This produces a 400 Hz tone at about 80 db. Since there are no mechanical points (as in a buzzer) there is no radio interference or vibration sensitivity. By mounting the Sonic Locator to the frame of our aircraft, a large sounding board is realized. The 400 Hz tone is easy to hear and will cut right through corn, tall grass, etc. This is the only part of the circuit that I recommend you do not substitute.

The first step in building the Sonic Locator is to produce a printed circuit (pc) board which is about the size of a postage stamp. Although this is not absolutely necessary, it is simple to do and will result in a neat assembly. If you have never made a pc board before, the following procedure is guaranteed to succeed. This technique is suitable for



**PULSE SYSTEMS** 



Cut the pc board to the size specified in the drill diagram.



Cement a copy of the drill diagram to the side of the cut pc board without any copper.



Drill the holes with a #59 drill.

all prototype projects and is quite economical. Pick up some pc board, etchant, and a resist pen. I buy mine from Radio Shack but these can be purchased through the mail from many sources. Cut a piece of pc board to the dimensions indicated in Figure 2. Use a

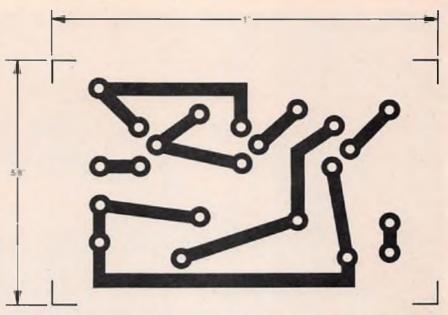


FIGURE 2
LAYOUT DIAGRAM, FOIL SIDE

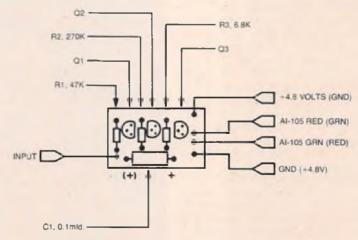


Apply the resist to the copper side of the pc board as shown in the layout diagram.

thin piece of paper to trace the holes as shown in the pc board layout. Then use rubber cement or Scotch Tape to hold this against the pc board and drill the indicated holes with a #59 drill. Next clean the board with an abrasive cleanser such as Ajax or Comet until the copper side of the board is bright and shiny.

After drying the board, use the resist pen to trace the pattern shown in Figure 2 onto the copper side of the pc board. These lines are the places where the copper is not to be removed in the next step. Pour the etchant into a plastic tray that is sitting in a pool of hot water. Immerse the board and agitate it if you are so inclined. About twenty minutes later you will find all of the unwanted copper removed. Rinse the board well and again clean with Ajax or steel wool. That is all there is to it!

After your finished board is dry, insert the components as shown in the component placement, Figure 3. To to page 99



( ) ARE FOR NEGATIVE PULSE SYSTEMS ONLY

FIGURE 3
COMPONENT PLACEMENT



Designed By Joe Bridi

ach time we do a construction article for RCM, we try to keep the words down to the bare bones by sticking mainly to the building sequence. Somehow, it seldom works out that way though. It seems that with each aircraft there are some cautions to point out along with special ways of assembling different parts that will make it go together better. And each special idea takes a few more words. Ah well, we keep trying.

The Rearwin Speedster Model 6000 is a new Bridibird designed by the man for the experienced R/C pilots among us who are interested in the 1/4 scale scene. A sturdy design that will eat up your MonoKote. Solarfilm, or Coverite faster than the 454 engine in my pickup truck eats gas on the trip to the flying field; the airplane can be flown with a Quadra, .80, or .60 with a prop reduction unit. To help out your construction, RCM is making the epoxy-glass cowl, wheel pants, and dural landing gear available.

### Building The Stabilizer, Elevator Halves, Fin, and Rudder

We'll begin construction with the tail feathers because they go together quickly and don't require much in the way of special comments. The only caution we want to mention is that the leading edge of the fin extends into the fin plate on the top of the fuselage at the tail. Also, the fin tail post extends to the bottom of the tail of the fuselage. Finish the building job by cutting the necessary hinge slots and adding the control horn insert. Easy, huh?

### Preparing To Build The Wing

Next, the wing, especially since it must be built to finish the fuselage. Here are the preparations to be made. Use the template provided on the plans to draw the airfoil shape on the spar end of the center tip block. Note that the airfoil is semi-symmetrical, so mark the top of

REARWIN SPEEDSTER M6000M Designed By : Joe Bridi

TYPE AIRCRAFT

1.4 Size Stand-Off Scale
WINGSPAN
96 ¼ Inches
WING CHORD
14 ¼ Inches
TOTAL WING AREA
1420 Square Inches
WING LOCATION
High Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord

DIHEDRAL, EACH TIP 1/2 Inch Overall Fuselage Length

69 ½ Inches Radio Compartment Area (L) 17" x (W) 5" x (H) 6" Stabilizer Span

34 inches STABILIZER CHORD (incl. elev.) 10 % inches (Avg.) STABILIZER AREA 365 ½ Sq. in.

STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION

Top of Fuselage VERTICAL FIN HEIGHT 13 Inches VERTICAL FIN WIDTH (Incl. rudder)

15" at Fuselage REC. ENGINE SIZE .60, .60 w/reduction unit,

1.5 or Quadra FUEL TANK SIZE 16 Gunces LANDING GEAR

Conventional REC. NO. OF CHANNELS 4 (2 servos reg. for allerons)

CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.

 BASIC MATERIALS USED IN CONSTRUCTION

 Fuselage
 Balsa & Ply

 Wing
 Balsa & Ply

 Empennage
 Balsa

 Wt. Heady-To-Fly
 200 gz. w/1.5 eng.

.......... 20.28 Oz/Sq. Ft.

Wing Loading

Photos - Text by Ben Strasser

each piece center tip block to prevent mishaps later. Also, be sure you mark a right and left piece. Stack ribs #2-#9 (8 ribs total for each wing panel) and drill the hole for the aileron pushrod. Either 1/16" piano wire alone may be used, or the hole through the ribs can be drilled to accept an outer NyRod tube to minimize friction

By studying the plans, you'll find that the wings are held to the hardwood sparsupports on the fuselage with a 4/40 screw that passes through a clearance hole in the bottom of the front and rear spars. They screw into the threaded hardwood pieces. A square 1/16" ply plate is glued into the bottom of both spars, both to offer a hard surface for the screws and to reinforce the spars at that point, so the screws can't compress them. Relieve the spars in the location of the screw plate. Glue the square plate in place. Next, relieve all of the spars for the long ply plate so when it is added it will be flush with the surface of the spar. See the wing side view on the plans. Glue the long plate into the inboard end of each spar.

Because webbing is used along the front and back spars, we recommend preparing these pieces before the ribs are glued in place. Also, the ply plates used in the first bay and the webbing pieces should be cut so they stop about 1/8" from the surface of the top and bottom spars. In that way they won't show in your covering material. By preparing these webbing and ply pieces now, they can be used as a guide when the ribs are installed to insure a snug webbing to rib fit. Number the webbing pieces for the appropriate bays unless you've stacked sanded them to make sure they're all exactly alike. Then, use one of the hardwood spar supports to prepare a spar spacing template. Cut the piece about 1" long and the exact top

### REARWIN SPEEDSTER M6000M

to bottom width of the hardwood spar support. This template will be used when the top front and rear spars are installed to insure that they are properly spaced to accept the hardwood pieces.

To complete your preparation, select two of the ribs and number the rib #14. Using the false rib side view on the plans as a guide, mark the datum line — which is not the rib centerline because the rib is semi-symmetrical — down the length of the rib. This line will be needed later when you prepare to sand the wing tips to the desired shape.

**Building the Wing** 

Plans are provided for both wing panels so you can build them at the same time if you have the room to do so. With the plans covered with plastic kitchen wrap, and remembering that the bottom spars have the square ply insert, pin the front bottom spar onto the plans with the square ply insert side down. A 3/16" strip of balsa is used to block up the bottom rear spar. Use the root wing rib as a guide to assure the proper spacing of the front and rear spars. The rear spar should be angled slightly so it fits squarely into the cut-out in the wing ribs.

Using the ply pieces in the first bay and balsa webbing for the other ribs to get the proper spacing, glue the 1/4" root rib and other ribs (except the geodetic tip rib) in place. Use a carpenter's square to assure that the root rib is at 90° to your building board and to the leading and trailing edge. Then, with a piece of 1/2" balsa strip under the leading edge as a block, pin and glue the leading edge in place. Add the trailing edge, making certain it is properly aligned with the trailing edge of the ribs. Glue the top front and rear main spars in place with

the long plywood plate side down. Use the spar spacing template to get the proper spacing between the top and bottom ribs in the first bay. If necessary, it's okay for the top spars to extend a bit above the ribs to get the desired fit to the template, and to the spar support. If they do extend a bit above the top of the ribs, the spars can be sanded later as you detail sand the wing panels. Add the ply plates on both sides of the spars and triangle stock reinforcement pieces in the first bay. Add the webbing as shown on the plans.

Using the rib contour drawn on the spar end of the center tip block, pin and glue the center tip block in place to the top and bottom forward spars. When this block is properly aligned, the top and bottom spars will extend a bit above and below the block. Use scrap balsa to block up the center tip block as necessary so it is centered on those spars and is parallel to the surface of your workbench.

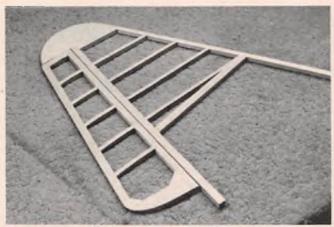
Add the leading edge block so it is centered on the side of rib #13 and on the rib contour drawn on the inside of the center tip block. Install the rear tip block

If you haven't gotten into the 1/4 scale models, give Joe's a try. It makes a good first "biggie" for the experienced flyer. The Rearwin is a long time favorite of many modelers. in the same way. Glue in the sub spar behind the leading edge. This spar can be bent slightly down at the tip end to glue to the leading edge block. Use the aileron as a guide to glue in the tip trailing edge block and inboard trailing edge piece. Sand the leading edge of these pieces to assure they line up properly with the wing rib contour.

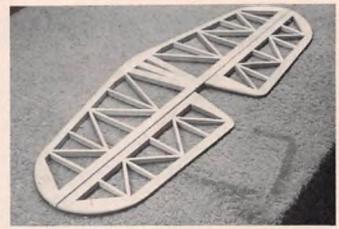
When the adhesive has set up, the wing should be removed from the building board. The rear top and bottom spars are to be cut off flush with rib #14. Trim the leading edge and spars at the root rib as necessary. Add the tip geodetic rib, the bellcrank/bellcrank plate assembly, the servo mounting plate - which is glued just below the top surface of the wing - the three ply strut plates for each wing panel, and the balsa sheeting for the aileron pushrod exit. Cut out the rectangular holes in the root rib on each wing panel for the hardwood spar support. Prepare the aileron servo compartment access hatch. Drill the hole through the root rib for the servo

Detail sand the wing. By referring to the plans you'll note that from the front view, the curve on the top of the tip is greater than the curve on the bottom. To sand the wing tip to the desired shape, a reference line is needed. Pin the wing panel down on your building board with the trailing edge blocked up such that the datum line on rib #14 is parallel to your building board. Stick a pin through a block of balsa so the point sticks through the other side and lines up with the center of the trailing edge at the aileron. Move the block around the wing tip to scratch a mark from the trailing edge to the leading edge. Note that at the leading edge this mark will be a bit below





Completed fin & rudder. The leading edge of the fin is not yet cut to length.



The nearly completed stab and elevator halves. Hardwood joiner yet to be added.

the center of the leading edge because of the semi-symmetrical airfoil. Then, use a soft pencil to darken the line so it's easy to see. Sand the top and bottom of the wing tip to this line.

To sand the leading edge to shape, pin the false rib (which is to be glued to the fuselage sides later) to the root of the wing panel. Trace around the front of the false rib to guide your sanding. The leading edge must fit this shape exactly. Add the aileron clevis rod and the servo to bellcrank linkage and you're ready to cover the wings. Because of the difficulty in removing and installing the servo arm screw in this installation, a metal solder-on clevis may be used. If you wish to use an adjustable clevis, a coupler may be used to solder the clevis rod to the piano wire pushrod. Make certain that the coupler will be located in the center of one of the bays so it won't bind on a wing rib as the servo is operated.

### Preparing To Build the Fuselage

In preparing to assemble the fuselage sides, you have 24 cross braces to cut. And, the cross braces at different locations are to be cut from either 3/8" x 1/2", 3/8" x 3/8", or 1/4" x 3/8" balsa strips. By looking carefully at the fuselage side view you can determine which size is required for each location.

Because the fuselage sides are parallel from the nose to the trailing edge of the wing, all of the cross braces in this area are exactly the same length. The width of the landing gear plate can be used as a guide to cut these cross braces. When the cross brace just behind the trailing edge of the wing is installed, the sides of this brace will have to be sanded down slightly to fit. The top view of the fuselage on the plans can be used as a guide to cut the cross braces at each of the locations behind the wing.

With all of the cross braces cut, glue the cross braces to the front and back of the landing gear plate as shown on the plans. Next, cut the rectangular holes in the 3/8" balsa cabin top blocks for the hardwood spar supports. To mark the

cut-outs, pin the cabin block template cut out from the plans to the root rib of one wing panel. Because 1/8" sheeting will be glued to the top of the cabin block, the template should be pinned to the root rib 1/8" below the top surface of the wing. Using the holes in the root rib as a guide, mark and cut out the rectangular holes in the template. Then, use the template to mark the holes to be cut in the 3/8" balsa cabin top blocks. Cut out the holes. Save the template to mark the rectangular holes in the false ribs to be glued to the fuselage sides later.

#### **Building the Fuselage Sides**

To assure the fuselage sides are exactly alike, the second fuselage side is built on top of the first side over the plans. When the first fuselage side is completed, a piece of plastic kitchen wrap is laid over the fuselage side before construction of the second side begins. The kitchen wrap is pressed down over the pins. So the hold-down pins won't have to be removed as the second side is built, groups of three pins are used to bracket the wood pieces without piercing them. Then, when the second side is built, the balsa pieces can be set in place between the pins. If needed, however, the top fuselage side parts can be pinned directly to the lower fuselage side. Normal straight pins rather than "T" pins are used so the kitchen wrap can be easily pressed down over the pins.

Begin construction by splicing the bottom longeron pieces together as shown on the plans. Epoxy should be used for this joint and all of the other construction in this sequence. As you assemble the fuselage sides you will be cutting and installing the bottom, center, and top 3/8" x 3/8" longerons, the 3/8" x 1/2" upright immediately behind the front bulkhead, the long one-piece angled upright that glues to the forward end of the cabin top block, the shorter angled upright piece that runs from the middle longeron to the bottom longeron at the location of the center of the landing gear plate, the angled piece that

runs from the location of the back of the landing gear plate to the middle longeron, the vertical piece that runs from the middle longeron to the bottom of the cabin top block, and the 3/8" x 3/8" angled piece at the top rear of the cabin. In addition, you'll install that upright at the aft of the servo compartment, the cabin top block, and the upper and lower vertical pieces in the middle of the fuselage behind the wing, those directly under the leading edge of the fin, and at the tail.

When cutting and installing the center longeron, note that it is installed in three pieces. One piece runs from the back of the bulkhead to the first angled upright. another from there to the upright at the aft of the servo compartment, and the last piece from the servo compartment to the upright at the tail of the fuselage. When cutting the 3/8" x 3/8" vertical piece at the aft of the servo compartment and installing the balsa top block and top longeron, the forward end of the top longeron must extend 1/8" above the cabin top block and rest on the top of the upright piece. This is required to mate properly with the sheeting to be added to the top of the cabin top block later in the construction sequence.

Also install the 1/4" x 3/8" angle brace in the bottom rear of the servo compartment and those above and below the middle longeron aft of the servo compartment. Do not install the balsa pieces shown on the plans above the stab at this time. They are custom fit to the stab and stringer later.

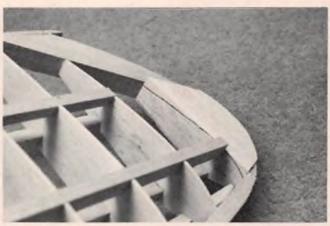
To finish work on the fuselage sides, add the ply cabin block doubler to the inside of the fuselage sides. This doubler overlaps the 3/8" x 1/2" forward and 3/8" x 3/8" rear pieces. Mark the location of the landing gear plate on the inside of each fuselage side.

After the adhesive has set up on both fuselage sides, they may be removed from the building board and the rectangular holes cut through the ply doublers.

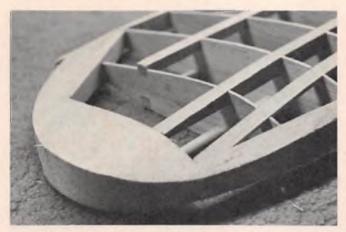
Assembling the Fuselage Sides



Wing panel all framed up. Webbing yet to be added.



Wing tip blocks glued in place. Note rib contour center tip block.



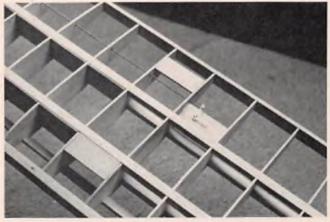
Tip configuration sanded to top view. Geodetic rib yet to be installed.



View of wing tip showing reference mark for sanding.



Wing tip with geodetic rib installed.



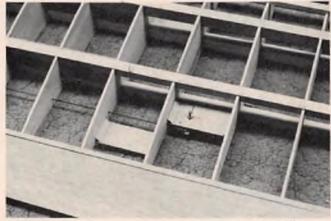
Bellcrank and outboard strut mounting plate detail. Inboard mounting plate not yet installed. Bottom view.

Remember that the ply cabin block doublers are on the inside of each fuselage side. Lay one fuselage side on your workbench with the "inside" up. Using 5-minute epoxy, glue in all of the cross braces and ply landing gear plate from the nose to the upright at station "C". Use a carpenter's square when you glue these cross braces in place to assure they are at 90° to the fuselage side. Do not, however, glue in the cross brace at the wing trailing edge. Then, the

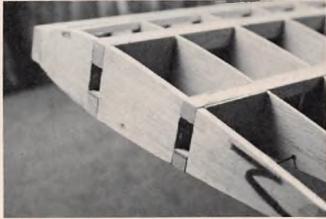
other fuselage side is to be glued in place to those cross braces and landing gear plate. Use a slower set-up epoxy to give you plenty of time to align the fuselage sides before the epoxy cures. Use a carpenter's square along the bottom, nose, cabin blocks, top and tail to make certain the fuselage sides are perfectly aligned with each other. A couple of books or other weight can be laid onto the upper fuselage side to hold it accurately in place while the adhesive

sets up.

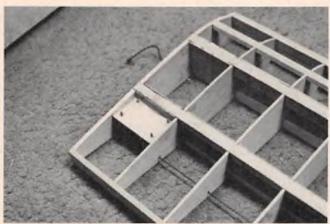
With the front of the fuselage sides glued together, the fuselage is to be shifted to an upright position. Glue the fuselage sides together at the tail. To do so, however, the inside of the fuselage sides at the tail will have to be sanded so when they are glued together the tail will be approximately 1/16" outside of the fin tail post on each side of it. This approach will allow you to add filler at the step and sand to the fuselage contour without



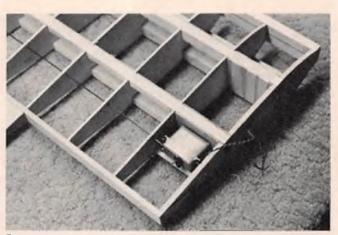
Belicrank and outboard strut mounting plate detail - top view.



Root rib cut-out, ply plates added to form spar box. Triangle stock not yet added.



Top view of wing showing servo mounting plate detail. Servo mounting bracket screws may have to be cut down.



Bottom view of wing showing servo installation. Triangular braces not yet installed on ply spar support braces. Aileron servo wire exit not yet drilled in root rib.



Fuselage with landing gear installed.



Inside view of ply landing gear mounting plate.

sanding down the back of the fin tail post. Add the cross braces on the middle and bottom longerons from station "C" to the tail.

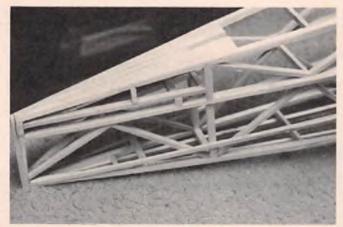
Next, the fin saddle block is to be cut and glued in place at the tail between the longerons. The 3/8" slot on the centerline is both for the fin leading edge and the top stringer. When properly installed, the back end of this block should be flush with the top of the longerons while the front edge should be

1/8" above them. Add a piece of 1/8" balsa scrap onto the top of the longerons along the length of the fin saddle block.

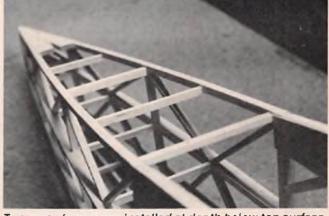
By looking at the plans you'll find that the cross braces along the top longerons are glued in place at an increasing depth from front to the rear below the top surface of the longeron. To glue these cross pieces in place, begin by sanding the edges of the cross brace at the wing trailing edge for a custom fit. Glue it in place 1/8" below the top surface of the

longerons. Then, to locate the remaining cross braces, temporarily put the top stringer in place so it rests on the cross brace just installed at the wing trailing edge and fits into the slot in the fin saddle block flush with the top surface. Using a straight-edge along the stringer, glue the remaining cross braces in place so they contact the bottom of the stringer. Do not glue the top stringer in place yet.

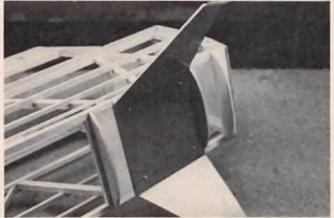
Install the triangular stock braces at the nose of the fuselage. If you wish, the



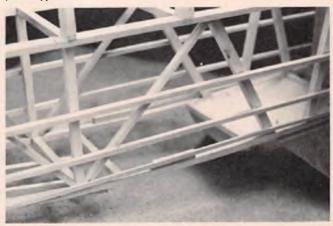
Fuselage details at tail section.



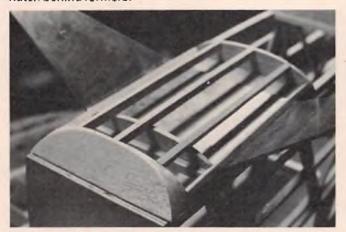
Top cross braces are installed at depth below top surface of longerons. Cabin top sheeting removed in this prototype.



Bottom fuselage – landing gear installation. Balsa strips not yet installed down bottom of landing gear. Access hatch behind formers.



Side stringer detail showing bottom stringer brace.



Bottom view of fuselage front showing stringer detail.



Fuselage bottom showing access hatch detail. Note rounded front former and angular rear former.

firewall may be temporarily held in place to align these pieces. Glue the two formers in place on the top front of the fuselage and add the top sheeting. As you did earlier, the firewall may be used as a guide to align the front of the former and sheeting. After the sheeting is glued in place, the ply bulkhead is to be installed. Note, however, that the bulkhead should be down below the surface of the curved sheeting just enough so when the cowl is in place on

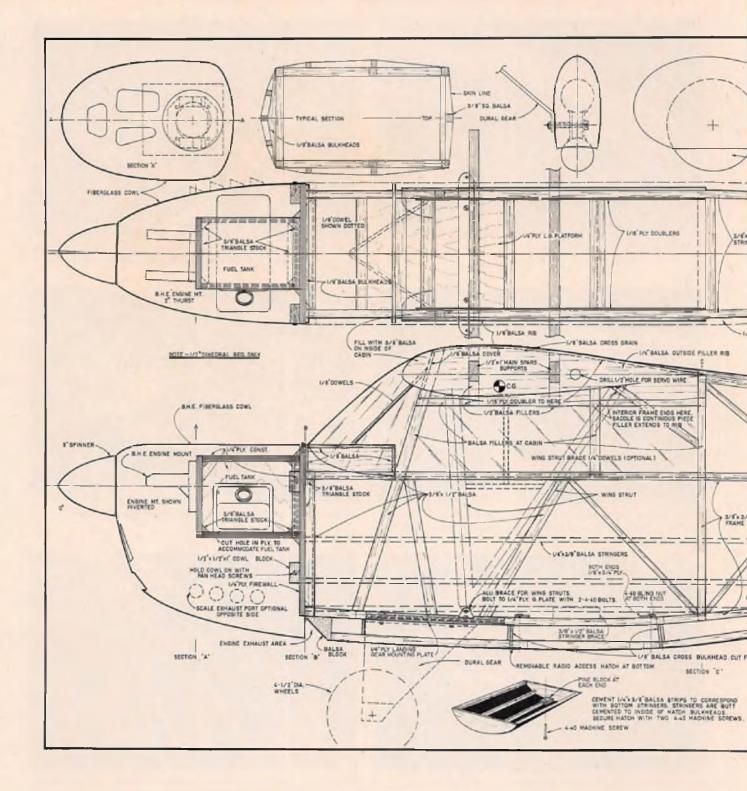
top of the bulkhead, the top of the cowl will be flush with the top of the sheeting. Use epoxy to glue the bulkhead in place.

Next, the top of the fin saddle block is to be sanded to form a straight line from the base of the fin to the side of the longeron. Temporarily put the fin in place and draw a line down the fin saddle block along both sides of the base of the fin. Remove the fin from the fuselage. To prevent sanding into the longeron when you shape the fin saddle

block, stick a piece of masking tape along the side of the top longerons so the tape aligns the top edge. Use a sanding block to sand the fin saddle block and balsa scrap pieces on top of the ailerons to a straight line from the side of the fin to zero at the corner of the longerons. Sand carefully so you don't nick the sharp edge of the longerons.

Adding the Bottom Stringers and Access Hatch

Turn the fuselage upside down. Add



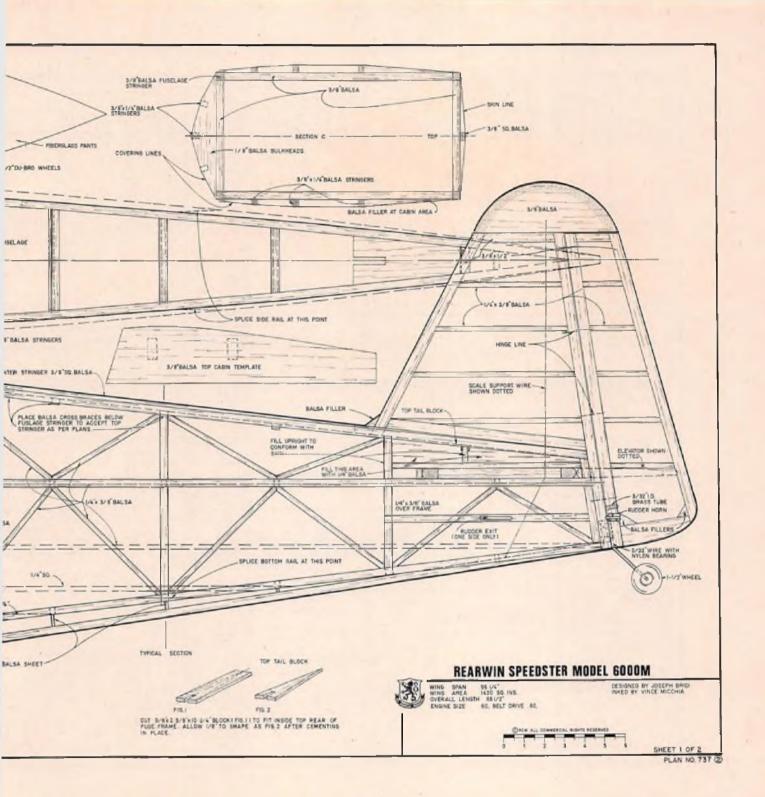
the triangular shaped block and two formers between that block and the access hatch. Mount the dural landing gear. Add the three stringers forward of the access hatch. Add the piece of 1/4" x 3/8" balsa to each side of the bottom of the front fuselage with 5-minute epoxy so that these pieces align with the longerons from the bottom and glue to the bottom of the dural landing gear. These pieces provide a base to which the bottom covering material is applied to the fuselage along the bottom of the landing gear.

Cut the remainder of the triangular

shaped formers which are located aft of the access hatch. To do so, refer to the plans and measure the side to side width and top to bottom height of each former. Note that each former overlaps only half the width of the bottom longerons. Cut out each former as a rectangle. Then, mark the width of the center stringer on each former. Draw a straight line from the outside of the stringer to the bottom corners and trim the formers to shape. Each should look like a triangle with the point cut off. See the section "C" cross section view on the plans. Glue all of the formers aft of the hatch in place and add

the stringers.

To build the radio compartment access hatch, cover the longerons in the hatch area with a piece of plastic kitchen wrap. Pin the rounded forward and triangular shaped rear hatch formers to the fuselage formers at the front and rear of the hatch opening. Glue and pin down the two 1/4" x 3/8" balsa pieces that run along the longerons from the front to the rear hatch formers. These pieces should take the gentle bend of the longerons on which they rest. Add the two side stringers between the two formers. You'll note that the center stringer has a

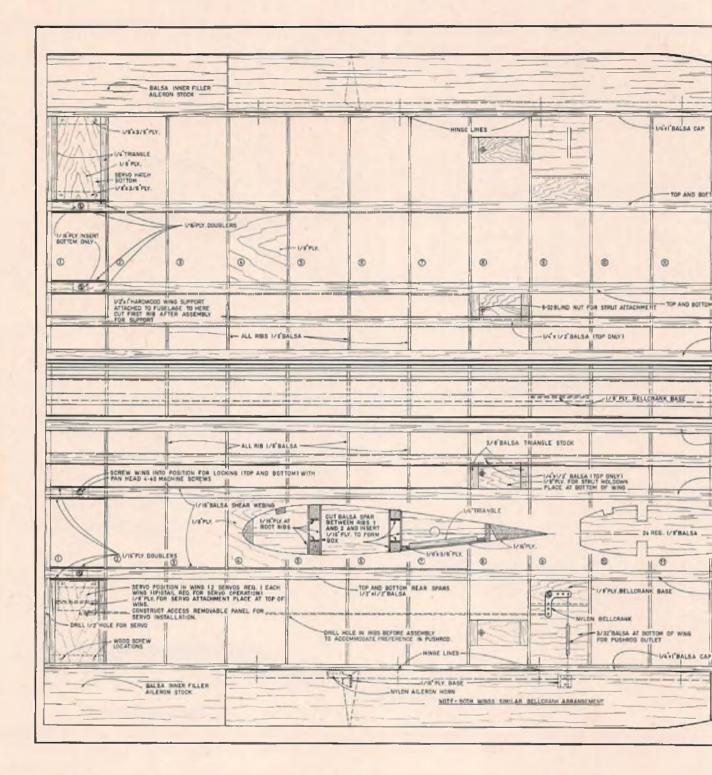


pine hardwood block glued to each end. These blocks are to accommodate the hatch hold-down screws. Glue the block to both ends of the center hatch stringer with the grain running parallel to the stringer. The face of the rear block will have to be sanded to an angle to mate square with the angled former. Put the bottom stringer/block assembly temporarily in place. Mark it so you can shape it to the shape of the front and back formers. Shape it and then glue it in place with epoxy. Add the two 1/8" ply plates between the longerons for the 4/40 hatch mounting screw blind nuts.

Drill the clearance holes through the blocks and hole through the plates for the blind nuts. Remove the hatch from the fuselage and install the blind nut in each one. To complete the construction of the hatch, the edge bottom 1/4" x 3/8" pieces are to be shaped to the contour of the hatch formers. To do so, stick a piece of masking tape to the side of the longeron in the area of the hatch. Mount the hatch. Use an X-Acto knife or sanding block to shape the hatch bottom pieces to the former contour. Do not sand into the edge of the former.

Next, add the side stringers to the

fuselage. Note that the two upper stringers are 1/4" x 3/8", the next is 1/4" x 1/4", and the bottom stringer is 1/8" x 1/4". The two 3/8" x 1/4" stringers will have to be spliced for the required length. To prevent the covering material from distorting the bottom stringer as the covering is applied, a brace is added in the area of the hatch and another to support the stringer under the stab. When the stringer that is glued to the middle longeron is installed, the top surface of the stringer should be flush with the top surface of the longeron. Glue the side stringers in



place.

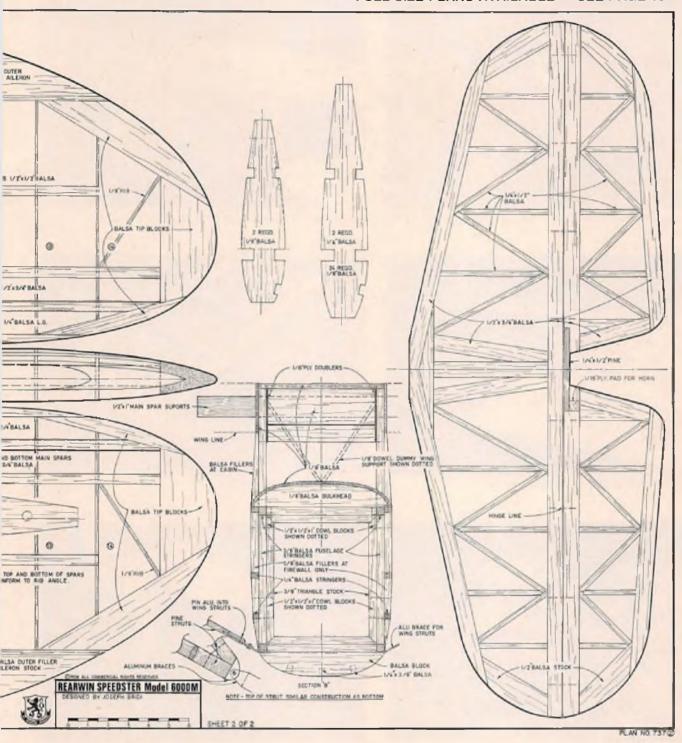
Once installed, all of the stringers are to be tapered to zero at the tail in top view. Draw a vertical line across the side stringers on both sides of the fuselage approximately 2½" in front of the fin. Use a straight-edge to draw a straight line from this point to zero at the tail. Cut the stringers to shape.

In order that the covering material will follow the proper contour from the middle longeron stringer up to the cabin top block, wedge shaped pieces of balsa are to be added next. A wedge shaped piece is to be prepared for the front,

middle, and rear supports in the cabin area. The front two are cut from 3/8" x 1/2" baisa. The other is cut from 3/8" x 3/8". They run from the stringer to the center line on the balsa rib shown on the fuselage side view. Cut the balsa to length. To form the wedge shape, they are cut in side view from the width of the stringer at the bottom to zero at the top. Cut and glue these pieces in place. Next, a similar wedge shaped piece is to be added to the upright piece at the leading edge of the fin. Cut from 3/8" x 3/8" balsa, this piece runs from the width of the stringer at the middle longeron to

zero at the top edge of the top longeron. Finally, a wedge shaped piece is added to the angled piece at the upper rear of the cabin. Cut from 3/8" x 3/8" balsa, this piece runs from the upright to the false rib center line. The wedge is shaped from the thickness of the wedge along the upright to zero at the rib center line. Note, however, that this wedge shaped piece must also be shaped to the angle of the wedge at its root. Tricky, but necessary for a good job. Shape it and glue it in place.

Checking the Wing Alignment and Installing the Spar Supports



Put the spar supports temporarily in place and install the wings. Check the wing incidence, which should be zero with the stab. If it's necessary to raise or lower either or both of the wing spar supports, a hardwood shim must be used to fill any gaps between the hardwood spar supports and the balsa cabin block. Also, double check the alignment of the wing panels to each other. As you check the alignment of the wing, it should not fit flush to the cabin blocks because the false ribs have not yet been installed.

When the wings are perfectly aligned

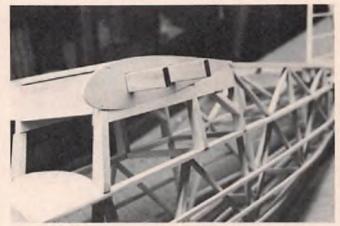
to each other and the fuselage, set at the proper incidence and, still in place on the fuselage, tack glue the hardwood spar supports in place by working through the top of the cabin. Then, add the balsa blocks above and below each spar support as shown on the plans.

Remove the wings. Put a bead of 5-minute epoxy on the cabin blocks around each spar support. Use a blade screwdriver to press the epoxy into the spar support/cabin block glue joint. Use the cabin block template you used earlier to cut the rectangular holes in the cabin blocks to mark and cut the holes in

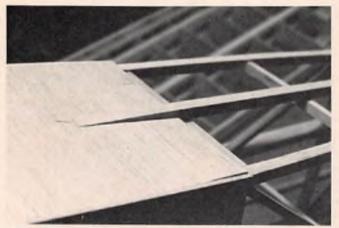
the false ribs. Remember to allow 1/8" at the top of the template for the sheeting when you align it with the contour of the top of the false rib. Slide the false ribs onto the hardwood spar supports and put the wing panels in place again. Align the false ribs perfectly with the root rib of each wing panel. As you do so, draw a line along the bottom of the false ribs on both sides of the fuselage. Remove the wings and the false ribs. Cut off and remove the part of each wedge shaped piece under the false ribs so the false ribs will mount flat to the cabin top block on each side of the fuselage.



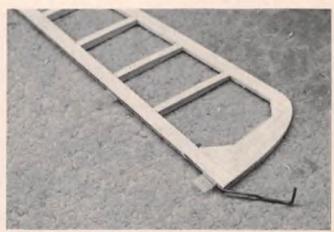
Hatch detail. Note rear angular former and rounded front former.



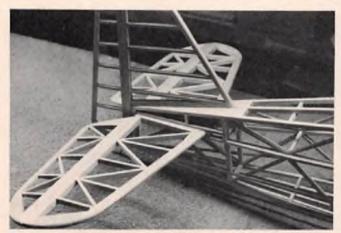
Cabin detail showing false rib and balsa filler block.



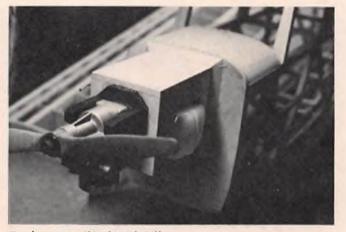
Cabin top showing spar sanded to contour.



Tail wheel strut installation.



Tail section completed and glued in place.



Engine mounting box detail.

To glue the false ribs in place, put a coat of epoxy onto the cabin block side of each false rib and slide it in place onto the hardwood spar supports. Before the adhesive sets up, slide the wings in place and perfectly align the false ribs with the root rib of each wing panel. Be certain that the false ribs are held snug to the root rib of the wing panels while the adhesive sets up to make a perfect wing to fuselage fit.

Remove the wings from the fuselage

and fill any gaps between the false rib and cabin block with some epoxy. Next, the piece of balsa sheet cut to mate with the contour of the bottom of the false rib and extending to the bottom edge of the cabin block is cut into pieces so it can be glued in place between the wedge shaped pieces. When properly located, these pieces of sheeting should assume the angle of those wedge shaped pieces and be flush with them. Add the 1/8" balsa top cabin sheeting. Check the fit to

the false ribs before the sheeting is installed so a shim can be added along the top edge of the cabin top blocks if needed.

### Completing the Fuselage

Glue the top stringer in place. The forward end overlaps the cabin top sheeting and is shaped to the contour of that sheeting. Add the upper balsa stab brace by first laying the stab in place in the fuselage. Cut the balsa piece for a

to page 99

Power Boating DAVID THOMAS



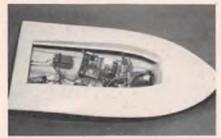


ou may remember that a couple of months ago I mentioned the Mocontrol VCB electronic speed control unit for electric motors, made by Galler Electronic Industries, P.O. Box 87, So. Wapole, Mass. 02071. Well, the model I had was a prototype, and while it worked, it did have a couple of problems. After trying it on four or five different motors, a couple of different radio sets, and voltages ranging from 4 to 12, I came to the conclusion that something was wrong somewhere. So, I wrote to the firm, and told them of my findings. This confirmed what they already suspected, that a value of capacitor was not what it should be. The simple change from one value to another has turned an average speed controller into a very good one, with very fine progressive control, a wide neutral. and progressive reverse. But the most interesting aspect of this unit is the power bypass relay. To be quite honest, I have used a similar idea myself, on a couple of servo operated speed controllers, where the trim at the top end of the stick movement has been used to close a micro switch, to give full power. This is necessary, because in every electronic speed controller, some power loss exists. The Mocontrol is much more sophisticated than my rather rustic outfit, and as the stick comes to the end of its travel, full power is switched by the relay across the motor.



The Mocontrol VC electronic speed controller, now sorted out and working very well.

I would suggest that this controller is ideal for scale models, where the speed of the boat can be regulated within very fine limits, to simulate exactly the performance of the full sized vessel. It is also useful for models where the full battery power is necessary. Incidentally,



The Mocontrol and the Astro-Flight 05 marine motor in the prototype boat, running on an 8-cell power-pak. Experiments are afoot to watercool the power transistor on the o-controller.

there is a power rating of 20 amps max. for two minutes, but experiments are now under way to water cool the power transistor, in order to improve on this, and I'll keep you all posted.

I also mentioned that I have been playing with the Astro Flight 05 Marine electric motor and, in fact, this is the motor that has been used in most of the foregoing tests. As can be seen from the photos, it is in the prototype balloon bursting hull, which the motor suits very well. I must say that these motors are a very good value for the money, since they develop quite a lot of power for their size and weight, and stand up to quite a lot of abuse. I have had mine too hot to handle, after a long run on an 8-cell power-pak, and it seens to have done it no harm at all. Once again, we'll come back to this one.



The new 2-part thixotropic epoxy glue from Hobbypoxy. This should be very useful for fitting the hull skins on model boats, since it doesn't run.

Finally, a week ago, I had an unexpected letter and parcel from Petit

Products, manufacturers of Hobbypoxy. In the parcel there were samples of a new thixotropic glue and a new, sandable epoxy filler. (The origin of thixotropic has me puzzled: the prefix thixo- is Greek and means a touch, and my edition of Partridge gives the definition of thixotrophy as being the property of some gels, when shaken, of becoming fluid. So I'm lost - any ideas?) What it means, in modeling terms, is that if you put this glue on a



Hobbypoxy's new sandable resin tiller -I haven't had time to try this one out, but as soon as I do, I'll talk some more about it.

vertical surface, it won't run down it, and you have to admit that that can be pretty useful. Anyway, Petit has asked me to evaluate these two products for marine model use, so that's yet another job. Boy, I'll get out to that lake and play, if it kills me!

I keep on telling you that one of these days I will show you how to make models skiers that can be towed behind a boat, taken over jumps, and so-on. Well, the day has come, and I can only apologize to those who have gotten fed-up with waiting, and cry pressure of work. Anyway, here we go.

Way back, around 1968-69, I saw a modeler with a water skier behind his boat, but I didn't much like it, because the thing was made with skils so big that it floated due to the size of them, and was completely non-scale. I decided that I would like to try and develop one that looked scale, and that behaved in a scale-like manner. The crux of the whole model is the doll. This is a realistic one, about 27 cms high, made of a fairly hard plastic in Taiwan, and available just about everywhere. Having gone out and



The doll from Taiwan, as it comes, dressed and on a stand. Make sure that the plastic is hard, and not supple.



The doll undressed, and ready to be modified.

bought yourself one (why not buy two while you are at it — you'll see why in a minute), the first thing is to undress it; you can keep the material to make the swimming costume.

The job now is to fix the legs so that they are locked rigidly some 16 cm apart. Take them off the trunk, and make



The doll with the legs off – note the pencil mark on the right-hand leg, this is where the top of the leg is to be cut off, with a razor saw.



The doll with the legs welded into position; I got the left leg slightly lower than the right one, but this is not important, provided the error is small.

a pencil mark on them, as per the leg on the right of the photo. Now cut right across this line, on both legs. Don't throw away the piece of plastic you cut off, this is needed for cementing. And here comes the only really awkward bit: it is difficult, not to say impossible, to find a glue that will hold the legs in position with sufficient rigidity. So, I use a small soldering iron, and I melt the plastic. It sounds difficult, but it isn't. Place the legin position, angled slightly forward, and touch the place where the leg is in contact with the body lightly with a small soldering iron. Do the same on the opposite side, and let the plastic harden. This will tack the leg in place. Now, if it looks okay, do the same thing all the way

Next, cut some slivers of plastic off that piece you kept, and use the iron to melt them into the trunk and leg all the way round the joint. Try to keep the joint as neat as possible by stroking the plastic with the tip of the iron, but don't worry if it doesn't look too tidy, the joint

will be hidden by the costume. Use plenty of spare plastic, because this joint is going to take a lot of pressure when the skier is on the water. A look at the photo of the finished job will show that I got one leg very slightly out of place on the trunk initially, but this really doesn't matter.

The next job is to ballast the doll. I always wait until the legs are done but, in point of fact, the ballasting could be carried out before attaching the legs to the trunk. The ballast consists of some very small bore gun shot, or fishing leads, which are poured through the arm holes, until each leg is full up to the top of the calf. Then a little 5-minute epoxy is poured in to hold the weight in place. And there she is, one skier ready for use, except, of course, for the swimming costume. The easiest way around this one is to cut the material to shape, and then contact-glue it in place. Or, if you have a wife, or girlfriend, or mother, who is handy with a sewing needle, get her to make-up a real little bikini for you. Failing that - and this is what I did on the original - paint a bikini on her . . . the doll, I mean! Seen from a distance on the water, no one will know the difference.

Now we come to the skiis. These are made from two laminations of 2 mm



The double strips in place, glued and clamped down. Leave them like this for at least 24 hours, preferably more.



The finished ski, showing the smooth curve to aim for.

plywood — and it is better, though not absolutely necessary, to choose a good grade of material. With a saw of some sort, cut out four strips 42 cm long and 2 cm wide. Now mark a line across the center, as shown. Take an old piece of flat board, a block of hardwood 4-5 cms high and a clamp. Place two of the laminations on the block, as shown, and fit the clamp in place over the center line. and tighten it down. This will give the front half of the skiis a nice upward curve. Now look along this curve, and make sure that it is a good, fair curve, with no awkward bends, due to a weak spot on the wood. If there are any, they

can be removed by using other, smaller blocks to prop them up. Do the same with the other two laminations, and then take them off the board. Now spread a good epoxy glue on the top of the two bottom parts, put the top laminations in place, and clamp down. It is now very important that the skiis are left in this position for at least 24 hours, and longer if possible, to make quite sure that the glue has fully set. If they are taken off the board before, the glue will give, and the curve will slowly disappear --- and those skiis will **not** work without the curve

As for the glue used, this is not important; I have used a variety of glues on this job, and they all seem to work. A good, slow setting one, such as Hobbypoxy 2, is probably one of the best. I recently had to give a demonstration, and didn't have a skier in good condition, so I made one up rapidly. Not wanting to wait 24 hours for the skiis, I clamped the laminations down and ran Hot Stuff into them. Five minutes later I unclamped them, and they were perfect. Okay, but it takes quite a lot of Hot Stuff, and this is a rather expensive way of doing it, but if you are in a hurry, I can tell you that it does work.

Now, if you have a Dremel saw, cut the tips to shape, and then clean up the whole thing on the sanding disc attachment, and the skiis are made.

The big difficulty is, of course, to persuade the skiis to remain at the same distance apart, and parallel. It has to be remembered that when the skier sinks up to her neck in the water, and is then towed up to the surface on accelerating, a lot of pressure goes onto the skiis, so they have to be solid. But at the same time, we want them to look as authentic as possible. Okay, let's go. Take two small wood screws with countersunk heads, and drill a hole in each ski, on the centerline. Working from the bottom of the ski, countersink the hole carefully and push the screw up through it. Now. screwit up into the foot of the doll, so that she is leaning well back, as shown. Do the same with the other ski, and then spread a generous layer of epoxy all around the foot and on the ski. Use the same glue to hide the screw head. I have found that Araldite works pretty well here, but it does help if the plastic is roughened up first.

To keep the skiis parallel, two music wire struts are necessary. These need to be quite stong, so use about 1 mm diameter wire. Measure the distance that the skiis are apart — this will vary according to the distance that you set the legs apart. Now bend a right angle at each end, as shown. Take a small piece of tin-plate — you can cut this from a can of some sort, it doesn't matter what sort — drill a 1 mm hole in the middle, and solder it to the leg on the music wire at each end.

While we are on the subject, a word about this soldering business. Most

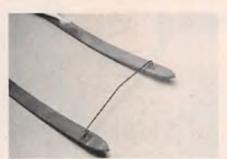
people have been made very lazy by the multitude of resin cored solders available on the market: but it must be pointed out that these solders were originally designed for electronic components soldering. It is my experience that they do not work very well on music wire. Use the same solder, but get some liquid soldering flux — any brand will do — and put some on the joint to be made; this will allow the solder to "wet" the metal far more easily.

Having made the two struts, drill holes at the front and back of the skiis as shown, fix the struts in place, and spread on a good layer of epoxy. Leave it to set well.

Finally, drill a hole about 2 mm in diameter in the tip of each ski, to take the towing line, and paint them the color of your choice.

The towline itself is rather special. I have experimented with several materials, and have found only one that works really well. This is heavy duty flax button thread. That's right, the one they use for sewing on buttons! But get the heaviest grade you can find, because that line will take some punishment if you want to practice jumping. Why can't we use an artificial line, such as nylon fishing line? The answer is quite simple - nearly all these synthetic lines are monofilament, and will give slightly. You can use it, but you will find that your skier will have a very jerky movement on the water, and that doesn't look too good. The thread should be black, so it doesn't show at all on the water, and the two struts should be painted matt black for the same reason.

The bridle is made of thread and



The music wire strut in place at the front – note that it is bent up in the middle, to avoid creating spray, which does not look very scale!



The finished skier, ready for painting. The tow-bar is glued to the doll's hands.

attached as shown to the tips of the skiis. The tow-line proper, which can be anywhere between two and four metres long, is attached to the exact middle of the bridle. At the other end, fit a snap-ring for quick fitting to the towing boat.

In order to be quite authentic, it would. of course, be better if the doll held a bar with a white nylon tow-rope attached to it. A little thought will show that it is quite impossible to tow with this rope. because the result would be to pull the doll over on her face. However, there is a trick that can be used here. Glue a dowel rod to the doll's hands, make up a white nylon tow-rope, and attach it to the snap-ring, but leave some slack in it, so that the black button thread is doing the actual work of towing. This is quite effective, because, as mentioned already, the black thread is almost invisible on the water and it looks as though the white rope is towing the skier. It may be necessary to experiment a bit with the respective lengths in order to get it just right, but it is certainly worth the extra bit of trouble.

As far as the boat is concerned, anything will do - just about any boat with a reasonable turn of speed and a .29 engine on up will do the job. Having said that, it is obvious that it would be preferable to have a model boat that is in keeping with the skier. For many years I had a much-modified Rorqual, which started life as a racing model. It was made of plywood throughout and, as time went by, the fuel residues got at the wood, despite everthing I did to prevent it, and eventually it just fell to pieces. (I well remember that we had a solemn funeral byre at that time, it was a well beloved boat. For anyone who is wondering about the name, here's the explanation. My wife, who is French, had been trying to get me to re-paint the kitchen for just ages. She caught me putting several fresh coats of paint on the boat, in the kitchen, and came out with, "It is not useful painting that thing; it would be much better if you got on and did the kitchen!" in French. "Not useful" in French comes out phonetically as "Pazutil", hence the name of the boat. And yes, I did eventually paint the kitchen!)

Ever since then I have been looking around for a replacement. I have tried out five different models now, and not one of them has given entire satisfaction. And then, the other day, going through the graveyard of model boats in the cellar, I came across an old glass fibre cabin cruiser, and I have a feeling that changed over to ski-boat configuration it will be just fine.

Well, that's it for this month, gang. Go out and buy some dolls, and make some skiers — why not? And I used the plural advisedly, because next time I'll tell you how to adapt them to go over a ski-jump, and we'll talk a bit about suitable boats. See you then.

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Location of the 1st World Cup R/C Race was in Monaco at the same site the Formula I cars race on. The location and race preparation was the best ever seen. It was standing room only to watch the race.

### 1st World Cup R/C Car Race

ou're probably going to find it hard to believe what I'm going to tell you, because this actually happened to us and we all found it hard to believe. We being, Butch Kroells, Bill Jianas and Gene Husting, 1st, 2nd and 3rd at the 1977 World's Championships, Roger Curtis - ROAR 1977 National Road Champion, Arturo Carbonnel - former ROAR Champion and John Thorp - former ROAR Champion. We were invited to participate in the 1st World Cup R/C Car Race, to be held in Monaco on the French Riviera, at the same location as the Monaco Formula I race which was run 3 weeks earlier!!

Sunday, May 21 — Our group of 4 racers from the Associated Team boarded an L1011 jet, flew to New York where we picked up Arturo from the Delta Team and then flew to Paris in a 747 jet. Thorp would be leaving 3 days later. We dreaded the thought of having to unpack all our boxes of car parts at the French customs, but we showed them our invitations to the race and they let us through.

Monday, May 22 — It was now Monday and we flew to Nice, in France, where we rented a VW bus to handle all our luggage and proceeded to get lost on our way to Monaco. But it was fantastic! We ended up on a road through the mountains that is used for the Monaco Rally races in the

wintertime. I don't see how they could race on this road with snow and ice on it, when Jianas was having a hard time on it in the dry. Actually we thought Bill was doing very well at the time, but we later found out he would have been classified as a Sunday driver in the USA.

We eventually found Monaco and were immediately captivated by the area!! It's everything you might think it would be, only a whole lot better. We found the track, which was located next to the starting grid for the Formula I race, which was still painted on the street. The Formula I race is run through the streets of Monaco. A lot of you probably saw the Monaco FI race which was televised live.

At the track working hard was Richard



Phil Greeno wins the 1st World Cup R/C Car Race to become the 1st World Formula R/C Car Champion.



Phil Greeno's P.B. car with March body and OPS engine.



Differential used on Phil Greeno's car worked very well on this type track.



Fastest car in the Main event was Giulio Ghersi's Associated car. Ghersi was also fastest qualifier for the Main Event, and was 1977 Italian Sports and Formula Champion.



Debbie Preston drove a very good race to take 2nd Place in the Main, undoubtedly making her the best woman driver in the world.



Fastest qualifier for the Semi-Mains was Phil Booth.



Gene Husting's Lotus FI was the highest qualified USA entry. Gene's Associated car was changed somewhat to move the European muffler to the center of the car for better handling.

Lajoux, President of the Aero Club de Monaco, which was the sponsoring club. Behind most events like this, there is generally one man who is the real organizer. This is Richard. He had been organizing this race for months and was now working night and day on the final details. Richard gave us a tour of the facilities. The timing tower, including all the Swiss Timing equipment for the Formula I race, were also to be used for our R/C car race. This included a computer which gave a printed readout of the finishing position, laps and time of



High driver's stand with starting benches and pit crews below. Electronic sign gave constant position of 1st, 2nd, and 3rd place cars.



Track course contained 2 sets of esses which were marked with 4 foot diameter red markers 3" high. This photo only shows 1/3 of the long course.

each racer within seconds of the end of the race! And just in case there should be any problems, all the racing would be tape recorded on television cameras. All the race operations would be handled by 75 people. This had to be the most prepared for R/C car race ever.

We then went to the top of the 10' high drivers stand. It's a good thing it was this high, because this straightaway was twice as long as the longest straightaway we have ever run on, and it was only 12' wide! On the inside corners were these hugh red dots 4' across and 3" high. There would be no way anyone would be cutting any corners.

That night Richard invited us to dinner

with his wife, and Patrick, Jean-Louis and Robert. We thoroughly enjoyed ourselves.

Tuesday, May 23 — In the morning we took a walking tour of Monaco. The whole town looks like it's right out of a Hollywood set. In the afternoon we went with Jean-Louis Bevacqua and Robert Molinari for lunch. Right here and now I want to say that man for man and woman for woman, the drivers in Europe are twice as good as the drivers in the USA. They have to be. I drive a Firebird at home because I like the size, horsepower, and handling. In Monaco, a Firebird is way too big. A Honda Civic is just right. The roads are so narrow and

twisty that it requires a very small maneuverable car to get around. Also, there are no parking lots. I rode with Jean-Louis to Italy and I swore we were on a qualification run for the Monaco FI race. If the people drove like this in America, they'd all get arrested for reckless driving. But in Europe, that's just the way it is. Also, everyone parks on the sidewalk, that's the only room there is. On the way back from Italy we took a freeway and the Honda speedometer was pegged all the way -through tunnels around trucks, other cars, etc. It was all mountain roads. No straight lines. It was interesting.

At night we went to the Casino, made our deposits, and took a tour of the Monaco FI race circuit through the streets.

Wednesday, May 24 — John Thorp and the rest of the racers from around Europe and South Africa arrived today. We did some bench racing and then went over to Jean-Louis's hobby shop to mix our fuel. Karlheinz Will, from Germany, was also bringing some fuel for us. Wednesday night it rained.

Thursday, May 25 — The track was damp, but it dried out in a couple hours. It seemed like all the cars were either running into each other or over the red markers. I was up in the last practice heat and I found out why. The track was super slippery and it was just impossible to go fast without hitting something. Everybody was constantly replacing broken parts, but by the end of the day the bite started to come in.

Friday, May 26 — The track was much better today, but everyone was still doing an awful lot of crashing — into each other and the red markers. There were two tight esses in the track marked by these red markers. If you touched a red marker, your car summersaulted through the air. Also the last half of the straightaway was fairly rough, causing most cars to be out of shape, making passing almost impossible, but this didn't stop most guys.

Saturday, May 27 — Today was qualifications. It rained last night. The track was damp but there were no puddles. We got four qualifying races of 15 minutes each. After the first round, Arturo Carbonnell had fast time, but everyone knew as soon as the track dried out, the times would be faster.

After the 2nd round, Phil Booth of England had the fastest time. I was in 6th place overall among the 48 invited drivers. Before my run I was determined to do my best to keep off the red markers. I only hit the red markers once, but I wasn't going as fast as I wanted. I was losing brakes at the end of this long, long straightaway. This caused me to coast too long and lose too much time in the sweeper. As the day wore on and the traction got better and better, it was apparent we had guessed wrong on how to set up our cars for this track. We had

installed smaller carbs so the cars wouldn't be so violent under power in the corners and this had worked out very well in testing the cars on Thorp's track. But on this track, due to its design, you coasted around the corners and only applied the power after the car was going straight. We could have used the power we left at home.

The PB cars were equipped with new prototype differentials, and were doing very well, coasting the corners and punching the straights. Ronnie Ton had a new experimental muffler, not a tuned pipe, that made the Super Tigre engine in his SG car as fast as the K & B's. None of the other Super Tigres in the SG cars were nearly as fast without this muffler. Naturally, he wouldn't tell me how it was constructed. And Phil Greeno was running an OPS that was almost as fast as the K & B's. But I'm sure the 50% nitro added to his performance. Another interesting fact is that rear tires did not wear at all, because we were coasting the corners. The back straight was so long you had to shut down the last quarter of it to make the turn, and the straights before the esses were long enough that you punched them and then coasted through the esses. We used one set of tires for both days of practice.

My one good qualifying time looked like it would be good enough to get me in a Semi-Main, but the rest of our group wasn't doing very well at all. Arturo's first qualifying run on the damp track was his best, but it was too slow and on his next three rounds he had nothing but problems — he tried a Super Tigre glo

plug and burned it out in the middle of the run, part of his rear tire came off on another run, and he missed the start of another heat when he was in the pits repairing his car. Thorp made some good runs, even winning one of his qualifying heats, but his times weren't fast enough. John said the car was fast enough but he couldn't drive quick enough through the esses. Jianas never ran more than 8 minutes at a time and the qualifying heats were 15 minutes long. On his first dry track qualifying heat, he was smoking the track, on his way to an easy Semi-Main spot, when he hit a sideways car at the end of the straightaway and killed the engine. At the start of the next heat the engine wouldn't idle down and we found the crash from the heat before had bent the pod and cracked the engine case. He put another engine in before his last race, but we didn't get a chance to get it set right and it was running too rich and it died. Roger Curtis had one real good qualifying run, but he tried to stretch his fuel stop to 71/2 minutes and he ran out of fuel. Butch Kroells had nothing but engine problems all four days and never got enough time on the track to even learn the track.

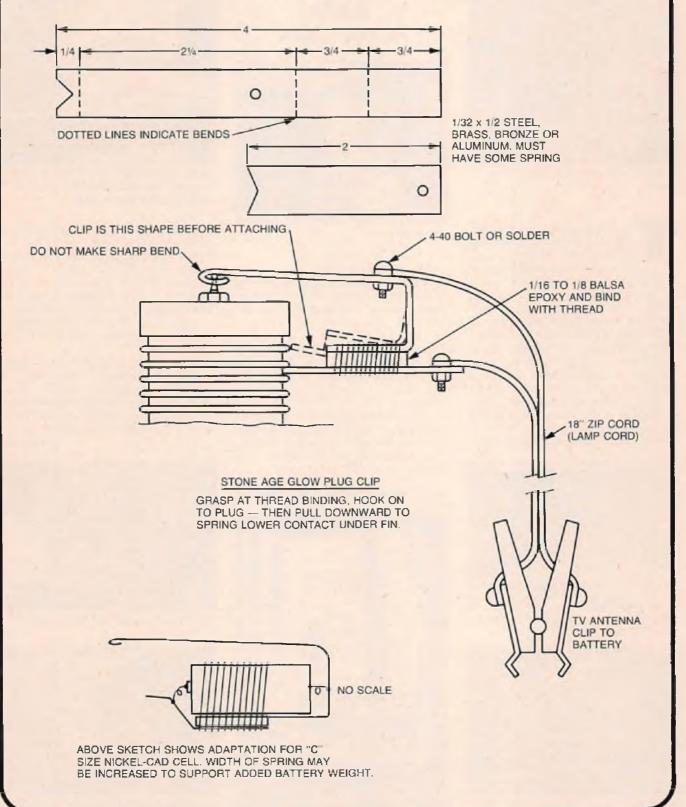
Sunday, May 28 — A really beautiful day, sun shining and about 75° temperature. The atmosphere of this day can never really be adequately described by anyone. You would just have to be there to appreciate it. The location — right at the starting grid for the Monaco Formula I race. The same to page 98

		1ST SEMI-MAIN	
		TOT GERMANA	
PLACE	NAME	LAPS	COUNTRY
1	Phil Booth	103	Great Britain
2	Ronnie Ton	102	Netherlands
3	Guerrino Stanzani	98	Italy
4	Keith Plested	97	Great Britain
5	Per Gustafsson	94	Sweden
6	Mario Marzocchi	89	Italy
7	Masse Mares	67	Italy
8	Franco Sabattini	60	Italy
		2ND SEMI-MAIN	
1	Giulio Ghersi	107	Italy
2	Phil Greeno	105	Great Britain
3	Pieter Bervoets	103	Netherlands
4	Debbie Preston	102	Great Britain
5	Gene Husting	101	USA
6	Patrick Gabbiani	89	Моласо
7	Giovanni Bellia	85	Italy
8	Hans-Olof Olsson	65	Sweden
		MAIN EVENT	
			CAR
1	Phil Greeno	162	PB
2	Debbie Preston	155	Associated
3	Phil Booth	154	PB
4	Keith Plested	143	PB
5	Ronnie Ton	135	SG
6	Guerrino Stanzani	129	PB
7 .	Giulio Ghersi	124	Associated
8	Pieter Bervoets	88	Serpent

### **GLOW PLUG CLIP**

### By Ed Gerhardt

Having recently finished assembling a Revolution helicopter, only to find I could not start the engine because none of my glow plug clips would fit the available space. After some head scratching, I made the clip shown in the accompanying sketches. It works as well as anything I have ever used. It is basically a semi-circular spring which applies downward pressure on the plug and upward on the engine fins to make contact. The spring is made from two pieces of flat metal strips which are insulated from each other by a piece of balsa, fiber or what have you. The clip as shown was made for a .40 engine but works as well on a .19 through .60 engine size. By bending, it can be adapted to most engines. Included is a sketch showing how to adapt the clip to a pocket size battery.



# PAUL EXPERT OF A LOW RETURNS OF THE LITT OF THE LITT OF A MARIEN WING.

Science Fair exhibit by Arthur C. Grantz.

he International Science and Engineering Fair (ISEF) is held annually with student (grades 9-12) contestants competing from the United States and foreign nations. It culminates a selection process involving thousands of school and regional fairs, their student participants and judges.

This year the ISEF was hosted by a committee composed of representatives of Orange County, California, education industry, and government. The fair's objective is to promote activities involving the discovery of new knowledge and to encourage young people to participate in the world of science; from laboratory research to the



Wind Tunnel and test models used by Arthur Grantz.



Instrumentation devices atop wind tunnel,

# RC Projects At International Science and Engineering Fair

By Dick Tichenor



Gregory L. Tyler shows his winglet experiment.

communication of results.

Approximately 450 students competed in 11 scientific disciplines for cash awards, scholarships, trips and summer work study at research institutions. While we were overwhelmed with the complexity and the detailed presentation of so many projects, we are limiting our reporting to only those involving radio controlled models.

"The effect of Low Reynolds Number Winglets on the Lift and Drag of a Model Sailplane Wing" was a project of Arthur C. Grantz, age 16, Menchville High School, Newport News, Virginia, Arthur

Airfoil research project by Gregory L. Tyler.





John C. Hoover displayed a STOL project. Clipped wings to meet 30" max booth requirements.

designed and tested various winglet configurations in a wind tunnel that he built. Tests were conducted at air speeds up to 60 mph, some of which used smoke trails to aid in visual observation. Dial indicators connected to wing sections inside the wind tunnel, by means of an elaborate leverage system, provided data for his calculations.

A radio controlled Craft-Air J-Bird sailplane was modified to include the winglet configuration proven most efficient in the wind tunnel tests. Utilizing the wind tunnel results and actual flight tests, a winglet was shown to be

to page 98



Split trailing edge flap tested by John C. Hoover.



Klein-Fogleman airfoil test project by Gregory L. Tyler.

### SERVO HELPER By E.R. Andrews The following units can be used to take the load off of your servos when building those large 1/4 size models. The full size template shown was used on Bud Nosen's 9' Trainer. Be sure and consider that while the servo load is reduced, also the control surface movement will also be reduced by a corresponding ratio. 0 0 (MATERIAL) 1/16" MED. HARD ALUM. 0 DRILL FOR 10-24 ROUND HEAD BOLT DRILL SERVO 3/8" HOLES TO **FIT NEED** TO SERVOS 10-24 NUT (BOTH SIDES) TIGHTEN NUTS THE MORE TO SNUG FIT LEVERAGE YOU NOT TIGHT USE THE LESS WORK FOR SOLDER NUT YOUR SERVOS AND WASHER TO BOLT TO NOSE WHEEL SHAFT ARM TO GIVE YOURSELF #10 FLAT MORE UP OR DOWN, JUST CHANGE YOUR WASHER (OIL BETWEEN CENTER HOLE MOUNT FLAT WASHERS) TO WHAT IS REQUIRED. TO ELEV. SERVO TO RUDDER 10-24 BOLT (ALL THREAD) **TIGHTEN NUTS** CAN BE FOR A NO MOUNTED PLAY FIT ON VERTICAL AND SOLDER INTERIOR PANEL TO WORK AREA

1/8" CLEARANCE TO BOTTOM

#6 SHEET METAL SCREWS

FOR MOUNTING

SOLDER 10-24 NUT AND #10 FLAT WASHER TO

10-24 BOLT



husband, the ASC, did one in a quilt pattern ("Patches" RCM April 1974) and another in the family tartan ("Bonnie Lass" RCM May 1975) but there was nothing there identifying feminine creativity.

What is it that people identify women with more than anything? Why flowers and perfume of course. Flowers we will take up now and Chanel No. 5 perfumed castor oil will be our next project. I talked him, the Apprentice Senior Citzen (ASC) into building, for me, one of Cox Airtronics Q-Tees and while he filled the balsa dust factory with balsa dust I headed for the public library to do some research in botony. I found lovely designs that could be used, in books such as Good Housekeeping's Complete Book of Needlecraft, Adventures in Needlepoint and, also, Beginner's Needlecraft, I toured the local craft shops and the variety stores looking for other ideas. Not only did I get ideas for flowers but I discovered hundreds of useful decals. You can find anything you want; flowers, several kinds of birds, butterflies, bees, vegetables, kitchen-ware and all kinds of Early Americana. Another idea I ran into would be crewel work in MonoKote or 1/32" striping tape which would take hours of time but would be decidedly feminine.

I finally decided to use a basic design of petals, leaves and stems, so anyone could rearrange, add to, or take away, from the design without too much trouble. I made several full size drawings of the wing and tail to work out the basic pattern and position of the flowers in order to get a design that would be pleasant to the eye.

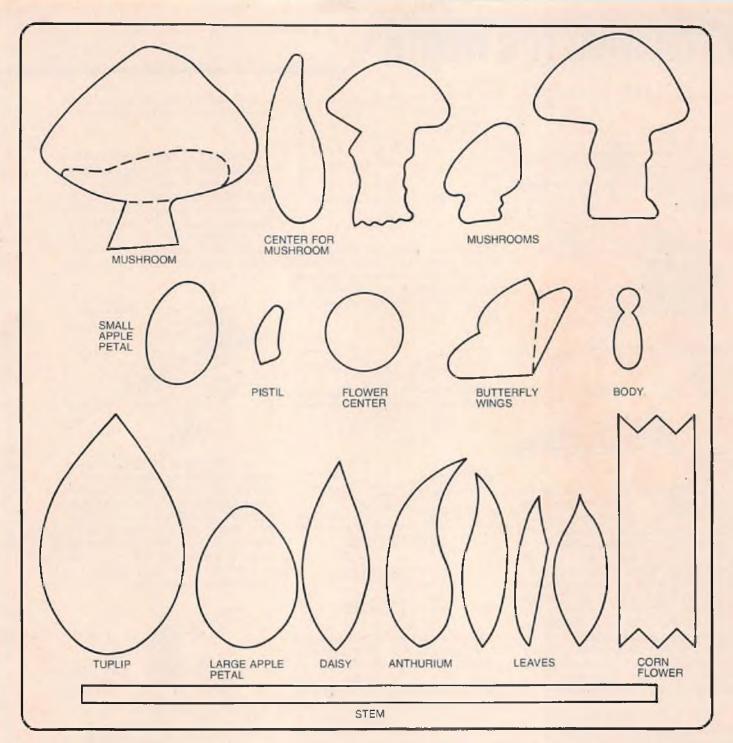
When the design was finalized I decided that a neutral background would be appropriate so we covered the wing and tail assembly with cream SuperKote. Since this is a very low heat material, I decided to make my applique

# FLY IT WITH FLOWERS

By Jeri Denson

hile looking over the planes at the last fun fly it gradually dawned upon me - - - in all of that beautiful array of planes there wasn't a single one you could identify as belonging to a woman contestant. Oh yes! We do have members of the fair sex in our club. They fly and they hold office - - - but where were their planes? There were planes with sunbursts, stripes, letters, checkerboards and insigna. My





from Trim MonoKote. I made a quick check of the scrap plastic covering drawer out in the shop and found it woefully lacking in the colors I needed. After three hobby shops and getting a, "Pink what?" reply, I finally decided they just don't make pink and baby blue Trim MonoKote. Well, there went the pink roses and bachelor buttons. I accepted the fact that a woman did not have anything to do with choosing the colors for Trim MonoKote, so my flowers fit the old axiom, "What you see is what you get."

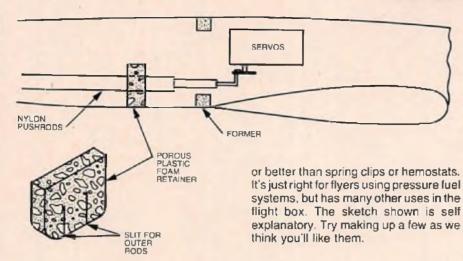
I made templates from lightweight cardboard using my drawings as patterns. Then I placed the template on the MonoKote and drew around it with a wax marking pencil sharpened to a chisel shape. I cut out each part with scissors (there might be an easier way but this seemed to work for me). I placed each part of the flower in its position on the wing in accordance with the pattern I drew. Do this before you remove the paper backing, you can arrange them as necessary, but once you take off the backing they will stick and it is next to impossible to remove them. Now it is just a matter of taking your time and putting them on piece by piece.

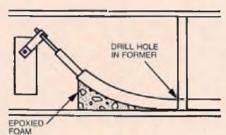
I am not real sure that the ASC insisted that I go to the field the following Saturday to watch the 'maiden voyage' or to insulate him from the type of comments he expected from his flying buddies when he showed up with the 'Flying Flower Garden'.

Needles to say, the Q-Tee flew beautifully, attesting to the quality of design and, as expected, the comments regarding the covering design were many and colorful. Overall they were complimentary and there was no doubt in anyone's mind that a feminine hand was involved.

When your "flower garden" shows up at the next Saturday fun fly or contest, everyone will know that it belongs to a member of the distaff side. So let your imagination go, and, using this design as a start, come up with some novel ideas for decorating model planes and people will not only be surprised that you enjoy the fabulous sport of RC modeling but are artistically creative too. Happy Flying.

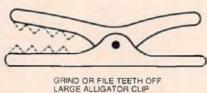
# FOR WHAT IT'S WORTH





A very easy and effective way to make nylon pushrod supports comes from Paul O'Dell of Calumet Park, Illinois. Paul uses a piece of porous plastic foam lightly smeared with epoxy cement. Cut the foam oversize and slit to approximate location of the outer rods. smear with epoxy and push into place with the mixing stick. In tight quarters and particularly when the servos are near the rear of the wing saddle, this method gives proper support where you want it. It will not cause undo binding because the rod is mounted too close to a rotary servo arm. The accompanying sketch should be self-explanatory.

Ron Farkas of Coram, New York, has come up with a fuel line pinch clamp that costs about 50 cents and works as well





FILE TOP & BOTTOM WITH SOLDER & SAND SMOOTH

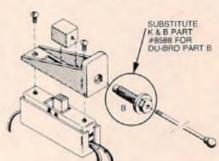
FOR EVEN LESS ABRASION PUT HEAT SHRINK TUBING OVER TOP & BOTTOM

GREAT FOR 1/2A FLYERS USING PEN BLADDER TANKS

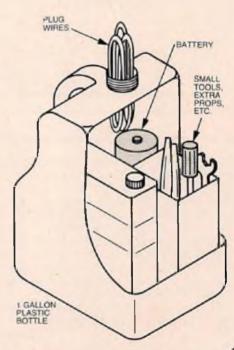
Here is an idea sent in by John Pamer Jr. of Cuyahoga Falls, Ohio. John finds pumping fuel with a Du-Bro Kwik Fill Pump with a Sullivan starter is really great; but no means is provided for defueling. Here is a simple and inexpensive way to solve the problem of reversing the direction of the starter so pump will defuel also. He used a Radio

Shack switch. The wiring diagram shown explains how the problem was solved.

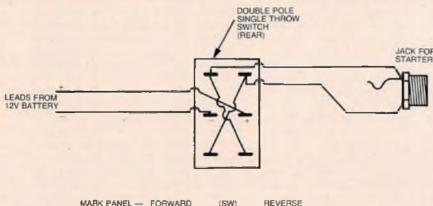
Raymond T. Prada of Norway, Maine, suggests if you are building a waterproof box for a radio to use in a boat or float plane and need a waterproof switch, use a Du-Bro Kwik-Switch Mount and substitute for Part "B" (see sketch) a K & B Pushrod Seal Assembly 1/16 diameter Part #8588 which is identical except drilled and fitted with "O" ring seal.



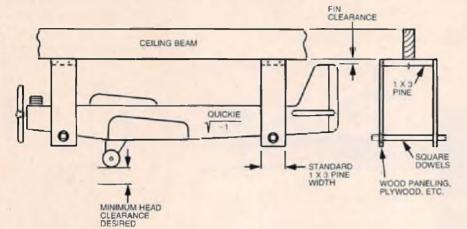
Don Heckmann of Millburn, New Jersey uses a one gallon detergent or milk jug, with the front upper half cut out, for his 1/2A flight box. It can easily house a dry cell, quart of fuel, small tools and extra props. The glow plug wires are stored in the top of the jug with the cap removed. Also, the handle on the container makes it easy for transportation. See sketch.



This self-explanatory sketch from Dick Swartwout of Penn Laird, Virginia, shows how to make a simple, exposed

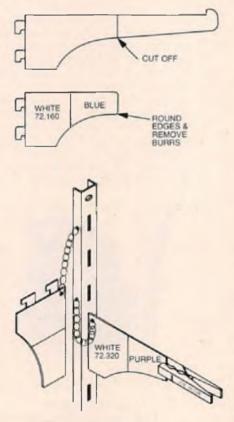


# FOR WHAT IT'S WORTH



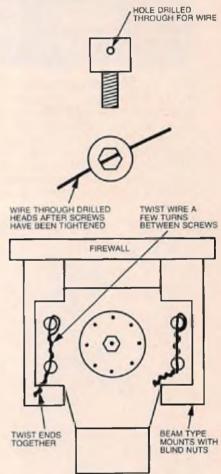
beam basement or garage ceiling brackets for planes, wings, balsa, etc., from scrap lumber. The square dowels rotate in the side holes to conform to fuselage angle and permit "drop down" removal of the plane by withdrawing the dowels. The brackets can be as long as desired so long as you don't hit your head on the landing gear. The width is your choice. It is advisable to be holding onto the plane when you pull out the dowels.

The Arvada Associated Modelers required a frequency control system that would allow a number of flyers to be in the air at the same time and yet be portable enough that it could be removed with a minimum of trouble. The field that they use is on public land and could not put up a permanent installation. It had to be portable so it could be moved to a new site when it became available. Ron D'Andrea of Arvada, Colorado, came up with a simple yet effective frequency pole that was inexpensive to construct. Using standard aluminum brackets and standards that can be purchased at any hardware store, he removed the end of 8" brackets and painted them with the appropriate frequency color. A 3/4' conduit was driven into the ground and the standard was placed into the conduit. The brackets are attached to the standards with a small length of chain and the flyer who is using a particular frequency, hooks the bracket to the standard and attaches his pin to it. A quick glance will tell if any frequency is in use. Upon completion of his flight, the pilot removes his pin and removes the bracket from the standard allowing it to hang on attached chain. This arrangement has proven to be very effective. If you do not wish to attach it with a chain, the brackets can be permanently attached with a screw. The standards can be attached to a wooden post or the side of your flight building or set into a conduit/pipe such as the club used. Use a separate standard for each set of frequencies (ie., 27/54/72 meg.) See the accompanying sketch which should be self-explanatory.



If you need a good way to secure engine mounting screws, you might try this method suggested by Ken Schaeffer of Bellefonte, Pennsylvania. This is the same method used on full sized aircraft and is done in the same manner. Ken uses socket head screws so they can be drilled through the heads for the wire. Use a small diameter drill. (It would be best to use a drill press with

drill press vise to aid you in drilling straight holes.) Use any wire such as copper or brass, however, be careful not to use any wire that breaks easy. This method is called safety lock wiring and works great. There is no chance of your mounting screws working loose unless your safety wire breaks. This method may seem like alot of extra work but, with the investment you have in your aircraft, should be well worth the time it takes. The sketches shown should help clarify the explanation.



To keep the radio switch clean, LeRoy Humphries of Jefferson, Oregon, uses a Playtex Rubber Glove. Cut a square from an old glove slightly larger than the switch plate. Burn the holes for the switch screws by heating a nail over the stove or use a fine tip soldering iron. Place the piece of latex rubber under the plate and over the switch. Trim the edges after it is mounted in your model. It keeps out dirt, fuel, water and other foreign material. The switch can be turned on and off right through the latex. rubber cover and will last from six months to a year. The gloves come in several different colors.

All items appearing in Showcase '78 are press releases supplied by the manufacturer of the product and/or their advertising agency unless otherwise specified. Note: The review or discussion of any product by Radio Control Modeler Magazine does not constitute an endorsement of that product nor any assurance as to its safety or performance by RCM.



### HOBIE HAWK DORSAL FIN

Techni Models, P.O. Box 9382, Glendale, California 91206, introduces their new Hobie Hawk Dorsal Fin. Price is \$2.50 plus shipping. Techni-Models also has available many other parts for the old favorite Hobie Hawk - - - wings, fuselages, tail surfaces, canopies and hardware. Available through dealers or direct.



### 1977 RCM MAGAZINE REFERENCE GUIDE

A new 48 page reference guide for R/C Modeler Magazine has been released. It covers the 1977 issues in detail, giving not only the specific article you are looking for, but articles related to the subject as well.

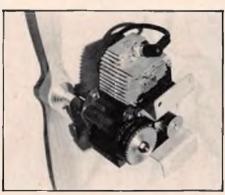
You can save many hours of looking through back issues trying to locate an article you are sure you have seen. RCM has found these reference guides to save us many hours in researching past issues, trying to locate articles to satisfy a phone call or answer a letter. This 1977 RCM Magazine Reference Guide

is available direct from Rein Krone, 4660 Ross Road, Gary, Indiana 46408, (219) 838-7087, at \$4.95 if you are unable to obtain it at your local hobby shop. Rein also has the Reference Guide available for 1976 (RCM) at \$3.95.



### KIWI

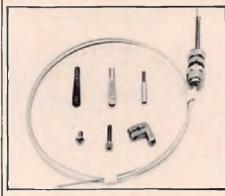
Sig Manufacturing, 401 S. Front St., Montezuma, Iowa 50171, introduces their new RC Sport Pattern "KIWI." Designed by Hank Pohlmann, it is compact, builds fast, and is strong. It has a 54" wingspan and Sig suggests a .35-.45 engine and a 4 channel radio. The "KIWI" kit features: built-up wing, die-cut Sig balsa and plywood, printed balsa fuselage sides - built directly on the wood, sheet balsa tail surfaces. shaped balsa, ply and hardwood parts, clear bubble canopy, pre-bent torsion bar main landing gear, coil spring nose gear, nylon nose gear bearing and steering arm, aluminum motor mounts, nylon strip hinges, nylon control horns, wire alleron torque rods, nylon wing bolts, RC links and threaded rods, screws, blind nuts and other small hardware, full size plan, illustrated instruction book, and decal sheet. The price is \$37.50. See your dealer or order direct from Sig Manufacturing.



### SUPER DRIVE FOR QUADRA ENGINES

From Andy Sheber, Inc., 18497
Brentwood, Livonia, Michigan 48154, comes the "Super Drive" for Quadra engines. It has a thrust of 22 lbs. measured (Standard Quadra 18 x 6-8200 rpm - 16 lbs.); the weight is 1.70 lbs. plus Quadra engine; propeller size — 24/10 Grish Brothers; propeller rpm — 4400 to 4600 (depending on engine); engine rpm — 8800 to 9200 (depending on engine); drive ratio — 2 to

1; material — steel brackets and Aluminum Timing Pulleys; installation time — 30 minutes - bolt on assembly. For further information, contact Andy Sheber, Inc.



### EXHAUST THROTTLE LINKAGE KIT FOR K & B OUTBOARD ENGINE

The K & B Exhaust Throttle Linkage Kit comes complete with all the parts necessary to hook up from throttle linkage to servo. Included are easy to follow, step by step, instructions, a complete list of parts, and an illustration showing the entire hook-up. All parts are called out and identified on the illustration. Available at most hobby shops. Manufactured by K & B Manufacturing, 12152 Woodruff Avenue, Downey, California 90241.



### SPRING STARTER

Here is a new spring starter for the Cox T.D. or Medallion .049 engines. Suitable for glow or diesel powered engine. No batteries required. Made of plated spring steel, it gives you that quick snap over start for even the most stubborn of engines. From Davis Dieseal Development, Box 141, Milford, Connecticut 06460, it is priced at \$2.95 plus 50¢ postage and handling, or see your dealer.



### PROP CLOCKS

The beauty of natural wood and the accuracy of Quartz crystals have been combined to create a distinctive, handsome and highly functional

timepiece. The 4 ply laminated hardwood prop is 46" in length. Hub face is 5" in diameter by 334" deep. Finish is hand rubbed lacquer and waxed with prop tips striped in red. The cordless movement is an extremely accurate USA made quartz-pulsar design, keeping time within one-half second per day. Two ordinary C cells will last for one year. All props and clocks are guaranteed and come complete with hang hardware. The prop can be personalized with your AMA number at a nominal cost of \$3.50. Props are available in 4 hardwood laminated types. Natural Fir \$89.50; Light Birch or Maple \$149.50; Antique Dark Mahogany \$109.50; Black Walnut \$199.50. Available direct only from J.A. Enterprises, 1422 Tesla Drive, Colorado Springs, Colorado 80909.



### **INSTRUMENT PACKAGE**

J.P. Products, P.O. Box 58, Harrisburg, Illinois 62946, introduces the 1 "Private Package", 35 scale instruments with 3/4" face design to satisfy the quarter scale crowd. The instrument package sells for \$1.50. Other scale instrument packages available from J.P. Products are: WW II Military Fighter Package with 1/2" face and suggested scale 2" = 1'0", selling for \$1.00, Jet Package, 20 scale instruments in two suggested scale sizes 11/2" = 1'0" and 2" = 1'0" selling for \$1.00 each. The instruments are printed clean and sharp. When installed per manufacturers instructions they make a realistic looking instrument panel in your model.



DUMAS NEW COMPETITION SERIES DEEP VEE

With the increasing interest in .21

class racing, Dumas Products, Inc., 901 East 17th St., Tucson, Arizona 85719. has developed a new boat for the popular Deep Vee Class. Created from the proven successful Deep Vee 40 hull and modified through suggestions by two of the East's better racing drivers, the new Competition Deep Vee .21 promises to be a winner. The freeboard has been reduced, yet retains a scale appearance; length is 30" and beam 11"; a new deck has been designed providing more room for radio gear. tanks and tuned pipe as well as to closely resemble the current full-size offshore racing boats. The new Competition Deep Vee .21 is well suited for rough water, yet no significant loss of speed on "mirror-like" surfaces has been noticed in prototype tests. Its hull design handles the increased power of the new 3.5 racing engines very well. By popular demand of many racing drivers, the new Competition Deep Vee .21 is available as a plywood construction kit. The Dumas 20 CF which has done so well in the 3.5 outboard class will still be available in fiberglass.



### THE KENDEL TWIN

The Kendel Twin is 1.2 cu. in. realistic in appearance, rear flanged firewall mounted engine. It has been tested in excess of 13,000 rpms - 11000 with a 14/6 prop and 10,000 with a 16/5 prop. As you can see it is quite a potent engine and it should haul the larger ships easily. It has instant throttle response with very good idle. Tuning is simple. The best way to set it would be to remove one plug and run one cylinder and set the best running speed and idle, repeating same on the other cylinder. Both fuel lines must remain on the carbs at all times to lubricate the cylinders and rods. This is necessary because the engine is designed to operate as two separate engines and the carbs cannot cross over into each others crankcase cavities. A bearing fit at the center of the crank prevents this from happening. The fact that it is an opposed twin makes it very smooth running with very little vibration. With dual carbs and "separate" crankcases, over lean or rich mixtures under all flying conditions common with all twins should be a thing of the past. A fuel pump is recommended. For additional information please write to Kendel Model Engines, 43443 Telegraph Rd., Elyria, Ohio 44035.





# MIDWEST PRODUCTS MCDONNELL-DOUGLAS A4D-1 SKYHAWK

We doubt very much if any model company - outside of the plastic kit industry - has ever before had the courage to undertake a project of this magnitude. Nick Ziroli's widely publicized .049 ducted fan, balsa and foam model, was used as the base expanded polystyrene foam ARF version. Nick's model has accumulated considerable flying time and was therefore, well proven; it only remained for Midwest to restyle Nick's rather utilitarian lines to the gently sweeping curves of the full size airplane, bringing the model closer to scale and to the aesthetic lines of the McDonnell product. The world of ducted fan models is unique. With the conventional engine/propeller, the modeler only really builds the 'outside' of the airplane, but for a ducted fan to realize its greatest efficiency, equal care must be taken with the inside, to ensure that air flows smoothly and easily to the fan. For the fan to be fed with turbulent air means a considerable reduction in thrust. Likewise, the air leaving the fan must also flow smoothly along the exhaust pipe, with the minimum of obstruction or friction. With this knowledge, considerable effort was put forth by Midwest to eliminate the work of duct fabrication by the modeler. The photos reveal the complex curves and transitions inside the model; an almost impossible task for the average builder. The magnitude of the task can be

gauged from the fact that their engineering personnel, on the fuselage alone, made 54 cross section drawings which involved techniques used extensively on the Concorde supersonic airliner. In order to achieve the smoothly flowing lines of the ducting and to blend the complex changes of shape on the outside of the A4D, they were forced to cross section their drawings not only laterally, like the average modeler, but vertically and horizontally, too! This mammoth task on just the fuselage occupied two weeks of full time intensive drawing ... aero engineers will recognize this technique as 'lofting.' By comparison, the wing and tail were simple and the credit for translating their complex drawings into 3-D wooden patterns, from which the highly expensive metal molds are cast, must go to their pattern maker. From Midwest Products, 400 South Indiana St., Hobart, Indiana 46342.



### CARL GOLDBERG RETRACTS

Carl Goldberg Models, 4734 W. Chicago Ave., Chicago, Illinois 60651, thought modelers might like to know about a worthwhile improvement in their retracts. Starting with the tri-gear unit, they are going to one coil only on their main gear struts from the three coils on the basis of what the experts have found. New struts will be made available on request.



### HALF-A HEAVY HUB

Available from Harry B. Higley & Sons, Inc., 433 Arquilla Drive, Glenwood, Illinois 60425, is the Half-A Heavy Hub, a 1/2 ounce nose weight made from nickel plated brass hex bar stock with the front end rounded for safety and appearance. A standard prop wrench is used to tighten this hub. Two sizes are available, one fits Cox, the other is for the Testor engine. The Half-A

Heavy Hub for Cox engines is provided with a steel stud cut to the proper length. Price \$.99 each.



### "THUNDER VOLT"

Thunder Road Automotive, a division of Tatone Products Corporation, now has available the "Thunder Volt", a 1/12th scale electric racing car. It features a one piece aluminum front end, a fully adjustable motor mount, and support for ny-liner bushings. The chassis plate is pressure laminated fiberglass which is light weight and extremely durable. It uses standard JoMac front spindles and rear axle. Optional equipment is also available for use in the new Roar Modified Class, such as ball bearing rear axle and mount to locate motor in front of rear axle. This car is ideal for four and six cell operation. Chassis kit less wheels is only \$29.27 and available at all hobby shops or can be ordered directly from TRA, 1209 Geneva Avenue, San Francisco, California 94112.



### LARGE DIAMETER PROPS INTRODUCED BY TOP FLITE

Top Flite Models, Inc., 1901 N. Narragansett Avenue, Chicago, Illinois 60639, is expanding its prop line to include a complete selection of low-priced, large props for today's bigger planes with large engines or reduction units. Crafted from rock-hard, straight grained maple, Top Flite's new props are available up to 20" in diameter and in an assortment of pitches to meet your flying requirements. Economically priced, the big props are suitable for R/C racing, sport scale, scale, and pattern

flying. Each features accurate balancing, a high luster fuel-proof finish, true aerodynamic pitch and a highly efficient airfoil for maximum thrust. And, because each long lasting Top Flite prop is made of rock-hard maple, you'll experience less splintering and nicking in virtually all flying conditions. Plus, regardless of the diameter and pitch, each prop is designed with the same dedication to craftsmanship you have come to expect in all Top Flite props. Sizes and Prices are 16/4, \$5.95; 16/6. \$5.95; 18/6, \$6.95; 18/8, \$6.95; 18/10, \$6.95; 20/6, \$7.95; 20/8, \$7.95; 20/10, \$7.95. Contact your local hobby shop for your choice of big props from Top Flite, or the latest up to date prop chart.



### 1/72 SCALE DOUGLAS WORLD CRUISER

Williams Bros. Inc., 181 Pawnee St., San Marcos, California 92069. introduces the 1/72 scale Douglas World Cruiser which will appeal to the historical minded model builder. During 1924, the history making Douglas World Cruisers made the first around the world flight. Covering some 27,533 miles, the epic voyage lasted 175 days. Now you can construct a highly detailed model of one of these famous aircraft of yesteryear. The kit features: Decals to allow finishing model as any of five different aircraft: Seattle, Chicago, Boston, New Orleans, and Boston II, and wheels and pontoons. At a price of \$4.95, it is suggested for the experienced model builder.



### T2-40

Bob Smith R/C Aircraft, 9525 Cozycraft Ave., Unit H, Chatsworth, California 91311, presents their new T2-40 epoxy fiberglass kit. The specifications are: Engine size, .40; Wing span, 57"; Wing area, 540; Weight, 5½-6½ lbs.; Root airfoil, 16.5%; Tip Airfoil, 18%. Priced at \$89.95, the kit features epoxy fiberglass fuselage with molded in canopy and fin; detailed full-size plans; precision cut foam wing &

stab (1/64 ply wing/stab covering supplied); all balsa parts machine cut; all hardware supplied; and build it fixed gear or retractable. Distributor and dealer inquiries invited.



### RE-USABLE EXPLODING BOMB

Vortac Mfg. Co., P.O. Box 469, Oak Lawn, Illinois 60453, has something new for sport and scale flyers alike. This WW II American type bomb scales to approximately 500 lb. size for Top Flite Stand-Off kits and 1000 lbs for the House of Balsa .40 powered P-51 Mustang. The bomb is hollow and may be filled with chalk, flour, charcoal ash, etc. On impact it separates into two halves and discharges the powder giving off a puff of smoke. The two halves may be snapped back together and used again. The bombs are made of high impact polypropylene and their molded on shackles are compatible with Vortac's Bomb Release Mechanism. They are \$5.98 each and \$9.98 for two.



### THE DREAMER

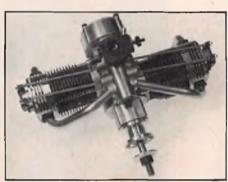
Gee Bee Products, P.O. Box 18, East Longmeadow, Massachusetts 01028, introduces the Dreamer, a hi-performance sport biplane. It has a 38½" span, weighs 4½ lbs., and is powered by a .40-.45 engine and 4 channel radio. All hardware, pre-bent cabane struts, wheel pants with exclusive "pant-loc" are included. Building jig not required. Introductory

offer is \$42.50 p.p. USA. Direct only from Gee Bee Products.



### 1/12 SCALE WHEEL KIT

Thorp Manufacturing, 1655 East Mission Blvd., Pomona, California 91766, has a new 1/12 scale wheel kit. These wheels are ideal replacements for all existing 1/12th scale cars or for scratch building. The six spoked nylon wheels mount to aluminum hubs with three 2-56 socket head cap screws. The hubs are set screwed to a round 1/4" axle. A key is furnished for use with the JoMac gear. Available direct from Thorp or your local hobby shop. Priced at \$22.50.



### INTRODUCING THE DAMO FS 218 - FOUR-CYCLE TWIN CYLINDER MODEL ENGINE

Until recently, production of four-cycle model engines have been almost non-existant. That is true especially with regard to multi-cylinder types, designed and built for practical field operation. After a prolonged period of testing and development, we are happy to announce the availability of the DAMO FS 218, knowing it to be close to the ultimate in four-cycle model engines. Now, that is a somewhat bold statement. however, we base it on experience, earned the hard way. They have spared nothing in terms of time, hard work and costs, developing the DAMO into a rugged yet sophisticated model power plant, built to give the utmost of satisfaction, dependability and quality. The DAMO FS 218 was designed having two main aspects in mind. The first one, quiet operation, is of utmost importance these days. The second one was to have a scale-like power plant available for big 1/4 scale models, now catching on rapidly in popularity.

Being a four-cycle, the DAMO FS 218 is very subdued in an unmuffled state,

utilizing mufflers, it is just about audible at a short distance. That feature alone makes it the ideal power plant, besides scale applications, for sport models, helicopters, and power boats, all of which can be operated without fear of generating too much noise. A whole new dimension has been brought into flying of big scale models by the appearance of the DAMO FS 218. It has the power and torque to swing really big propellers and, in doing so, produces the most satisfying scale exhaust note. Watch that 1/4 scale J-3 coming in low and slow, the DAMO on a fast idle. Listen to the sound of air rushing past the airframe. One can not come closer to the real thing. Hear the throbbing of four cylinders in that big DC-3, just going to full power, changing the exhaust note for a low-pitched drone when climbing for altitude. That is realism one has been just dreaming about.

Besides being quiet in operation, scale-like in appearance and full-scale in the exhaust note department, the DAMO FS 218 has a few more advantages. As a multi-cylinder four-cycle, it produces very little in the way of vibration. It operates on straight methanol, making use of the very slight lubricating properties of the methanol itself. That makes for very clean operation, leaving model and pilot clean and tidy after a day out flying. Operation with nil oil content in the fuel is made possible by using the very highest quality metals and hardening processes, utilizing the very best available in ball and needle bearings, keeping a super watch on tolerances and taking the highest possible care in the hand fitting of each engine. The result is a precision piece of machinery, built for trouble-free operation and a minimum of maintenance. All engines will carry a serial number and comes packed in a sturdy shipping box with comprehensive instruction and maintenance sheets and parts list. Available in the U.S. from Nelson Model Products, 6929 W. 59th Street, Chicago, Illinois 60638.

### "SEAL-IT"

Devcon's new "Seal-It", clear, silicone rubber is packaged in an attractive 3 oz. tube with a 2½" long tapered nozzle and tube tightening key. "Seal-It" makes a durable and waterproof gasket for boats or seaplanes and fastens securely to almost anything. It's guaranteed not to shrink or become brittle for 10 years, and its high temperature rating (500°) will make it useful for muffler gaskets. Attractively blister packed, one per card at \$2.75. For further information, write Du-Bro Products, Inc., 480 Bonner Road, Wauconda, Illinois 60084.

# WORLD ENGINES R/C KITS

From top to bottom the kits pictured on the right are — Mr. Mulligan, Miss World, Jet Hawk, Champ and Piper Club.

GENERAL — Except for the Jet Hawk the models feature die cut plywood sides and bulkheads. Sheet balsa tail assemblies are pre cut. Miss World fuselage is 85% assembled.

These kits are over engineered from a strength standpoint — much more so than the average airplane model. They can be covered with film, paper or silk. These models with silk covering are vitually indestructible and should last for a thousand flights.

The models have been reviewed in several magazines and have come through these reviews with flying colors. In June 1978 Model Builder, Northrop had Nick Ziroli, Jr. review the World Engines J-3 Cub. In three or four pages young Nick said the models were easy to build, a little on the heavy side but very strong. We appreciate the candor of young Nick's comments particularly about the weight.

Our thinking in offering these kits to the beginner or near beginner market was that we would trade some weight for strength. Also the most difficult maneuver for the beginners is the landing. Our kits are easier to land than some of their lower wing loading counterparts because they come down when one throttles back. This is particularly interesting for people who's airstrip is surrounded by trees or telephone wires.

The Mulligan kits sports a beautiful nylon white cowl with wheel pants from Williams Brothers.

The Champ cowl is vacuum formed and the Cub cowl in nylon. Both the Cub and the Champ have scale like sturdy aluminum landing gears. Plans are straight forward. With the exception of the Jet Hawk, all of these planes are basically three channel airplanes.

POWER REQUIREMENTS — We recommend from 25 to easy running 40's for the Cub, Champ and Miss World. The Mulligan takes a 30 to a strong 40. For the Jet Hawk a very strong 40.

We have the moulds for the Duane Johnson's X-15 in the United States, Here again we are in the position to trade fans and fiberglass parts for the wood parts to make kits.

WORLD ENGINES – Wholesale distributor to dealers of all major radio control and U-control lines. Also FF. Exclusive distributor for OS, Supertigre, World Engines kits and Expert radios. Dealers write for info.

# WORLD ENGINES



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from page 86

superior to both a plain round wingtip and to end plates in reducing the vortex action downstream of the wingtip. The addition of the winglet also resulted in a reduction of induced drag and in a significant increase in the total lift of the sailplane wing. The data developed in this research project indicates that the winglet is a practical method for increasing the performance of a competition radio control sailplane.

John C. Hoover, 17 years old, Bentley Senior High School, Burton, Michigan, displayed "Project S.T.O.L." The object of project S.T.O.L. (Short Take-off Or Landing) was to experiment with different wing-flap and other LID's (Lift Increasing Devices), searching for the most effective combinations. Different propeller sizes and pitches were utilized. The S.T.O.L. models were single engined, and tricycle landing gear was used. A shoulder mounted wing was utilized for ease of removal, and simplicity of design. The aircraft was built from Hobby Shack's Pilot QB 20S kit and additional wings incorporating various LID's were interchanged for testing.

The focal point of LID testing was concentrated on several wing flap configurations. His tests proved short inboard split trailing edge flaps to be most effective for that particular model.

The project of Gregory L. Tyler, age 15, John Marshall High School, Oklahoma City, Oklahoma, was "Designing and Testing a Remote Piloted Supercritical Airfoil: Kline-Fogleman". The Kline-Fogleman Airfoil was selected because it is purported to have the ability to correct itself when in stall conditions.

The problem was researched by testing smoke tunnel models of the airfoil at the Federal Aviation Administration Center; wind tunnel models at the Oklahoma University Aeronautical Laboratory; and remote piloted gliders which he designed and built. Tests of the Kline-Fogleman were compared to tests of the Clark Y Airfoil.

The tests indicate the Kline-Fogleman Airfoil is superior and can be utilized for safety and fuel conservation purposes in future aircraft designs. However, the weight/strength penalties and the construction difficulties do not make it most practical for radio controlled sailplane models.

RCM wishes to commend each of these young people for a job well done. They just might be the ones to achieve the scientific wonders of tomorrow.

from page 84/82

timing equipment and scorers that did the FI race. All 50 of the race officials were in matching light blue shirts and dark blue pants, all 25 corner marshalls in orange overalls. All of the huge grandstands were sold out, with people paying to stand 6 deep along the main straightaway.

The pits were right behind the drivers stand with every driver having a 4" x 8" table of his own, with a roof covering. On the other side of the pits was the National Swim Stadium, which was always full of lovelies to further distract your efforts, but it was all just fabulous!!!

The first event of the day was the first half hour Semi-Main. This ended up as a 2 man race with Phil Booth doing a great driving job holding off the super power of Ronnie Ton. Phil beat Ronnie by just one lap in a very close race with a total of 103

The second half hour Semi-Main was next. 18 year old Giulio Ghersi from Italy, just literally tore up the track, winning with a total of 107 laps, which was 4 laps better than the first heat. Ghersi is the 1977 Italian Sports and Formula Champion. Phil Greeno was 2nd with 105 laps. I finished 5th with 101 laps. I felt much more confident with my driving, but I really missed the horsepower engines we left home. Even so, I ended up 7th overall, which should have been good enough to make the Main. Unfortunately, they took the first four finshers from each Semi-Main, which meant that two slower cars than mine, made the Main. That's the way it goes.

There were a series of 10 minute Consolation Races before the start of the Main event and Per Gustafsson of Sweden was the fastest of this group of racers with 37 laps. Giovanni Bellia of Italy was right behind, also with 37 laps. Hans-Olof Olsson of Sweden and Dave Martin of England, both with 36 laps, followed by John Thorp, USA, and Karlheinz Will, Germany, with 35 laps.

THE MAIN EVENT

The cars were all teched in, and brought to the starting line for photos, as the packed stands waited for the Main to begin. A couple minutes later they were started up and brought to the starting line. David Thomas of RCM gave a complete rundown on the cars to the audience, in both French and perfect English. He also really kept the enthusiasm of the crowd alive, by keeping them informed as to what was always taking place.

With the cars ready, the starter raised the flag and they all took off. Ghersi immediately took the lead with Phil-Greeno right behind. Ghersi started to open up a lead, driving incredibly fast, considering the obstacles on the course. This was a 45 minute race, so it was

necessary not only to go fast, but to finish as well. Ghersi continued to open up his lead and was just about to lap Phil Greeno, when he pulled in for his first pit stop. The engine died in the pits! But he had a big enough lead that after the engine was restarted he pulled back onto the track, still in the lead and driving as fast as ever. Phil Greeno was still in second, with 16 year old Debbie Preston, a short ways behind in 3rd,

After the first pit stops, Debbie Preston had moved into 2nd, which she held for about 10 laps. Ghersi then had another flame-out, which was just the start of his bad luck as he ended up with seven flame-outs during the race, which dropped him out of contention, but while he was on the track there was no one as fast. He is in the same drivers class as Jianas and Carbonnell.

The middle of the race had Phil Greeno in front with the next three spots changing hands between Keith Plested, Phil Booth and Debbie. Debbie had lost some time when the rubber on her front wheel started to come loose making the car hop on the long straightaway. After the wheel change, Debbie worked her way back up to 2nd.

I watched the last part of the race from the drivers stand and Greeno must get as excited as I do, because his hands were really shaking, but it didn't seem to affect his driving any, as he was very smooth on the track. He now had over a 5 lap lead but was still going very fast without taking any chances.

Phil Greeno continued on to take the checkered flag and become the first R/C Formula Car World Champion, Debbie Preston followed in 2nd to establish herself as the best woman R/C car driver in the world. Phil Booth was right behind in 3rd followed by Keith Plested, to give England a well deserved 1, 2, 3, 4 car sweep.

Phil then was given a huge bottle of champagne on the drivers' stand, which he immediately sprayed all over the crowd below. At the awards presentation Phil was presented a beautiful gold plated cup trophy and then six guys picked him up and threw him in the pool.

The Americans didn't do so well as hoped for in the race, but we really enjoyed our stay in Monaco, due to the great hospitality of all our new found friends there. I even got to pilot Mr. Bilardello's 40 foot Chris Craft ship along the French Riviera from Nice to Monaco. We then spent another three days in Geneva to see the track for the World's Championships next year and again received wonderful hospitality from Monica and Stig Anderson. We'll have further reports on this race later.

I would have to say again that it would be almost impossible to match the atmosphere of this race location, or the thoroughness of the race organizers. They deserve the thanks of everyone.

### from page 76/66

snug fit and glue it in place. Note that the side of this piece is flush with the side of the tail block at the rear and flush with the wedge shaped piece at the front end. Let the stab brace extend far enough out of the side so after it is installed it can be sanded to the angle of the wedge shaped piece at the forward end. Add the vertical piece between the longeron and stab brace at the front of the stab. making sure you allow room at the back end of the stab for the elevator torque rod. Then, add the vertical piece that runs up from the stab brace to the upper longeron. Sand the side of the stab brace to the angle of the wedge shaped

The fin and stab may be installed at this time, or after they are covered. Before you glue the stab in, the elevator must be in place. Check the fit first, though, and relieve the tail of the slot as necessary for clearance of the elevator torque rod. Add the gusset at the front of the fin after the fin is installed. Fill in the step at the fin tail post and sand to the fuselage contour. Then, the rudder may be hinged. With the location of the rudder and elevator horns determined, the pieces of balsa for the elevator and rudder pushrod exits are to be cut and glued in place as shown on the plans. They should be flush with the side of the angle braces to which they are glued so there will be no indentation in the covering material in the area of the pushrod exit.

The cowl is mounted to the nose of the fuselage with one screw down through the top of the cowl into the top of the bulkhead. Hardwood blocks are added to the front of the bulkhead to which the bottom sides of the cowl are screwed. See the plans.

As shown on the plans, the engine is mounted to a ply box glued to the front of the bulkhead. The plans show an engine mount system for a regular .60 engine. If you're going to use a prop reduction unit, pumper, or Quadra, the engine mounting box will have to be modified accordingly. When building the engine mount system as designed or modified for a different engine, it's important that the engine be mounted at zero to the stab. The face of the box should therefore be at 90° to the center longeron — which is the datum line for the aircraft. In addition, 2° right thrust is required. The back of the engine mount may be sanded to achieve this thrust angle. Build and install the engine mounting box using epoxy.

With the engine mount prepared for the desired right thrust, the cowl is used as a guide in the installation of the engine mount. First, the position of the engine on the engine mount is determined so there will be 1/16" clearance between the spinner back plate and cowl. Then, the engine is positioned on the ply box so the prop shaft is centered as necessary on the front of the cowl. To do so, hold the fuselage on its tail. Lay the engine mount-engine in place onto the front of the engine mount box. Carefully put the cowl in place. Using a long screwdriver inserted through the air intake, move the engine mount as necessary to center the prop shaft. Remove the cowl and mark and drill the holes into the face of the box for the engine mount screws.

Add the piece of 1/8" balsa sheet across the front of the fuselage between the forward cabin supports. Glue in the reinforcement blocks that are to be added to the front inside end of each false rib. Install the strut mounting plates onto the ply landing gear plate as shown on the plans. A piece of scrap balsa is to be glued to the top side of the aluminum bracket as was done with the landing gear so you'll have some place to fix the covering material above the plate. Add the dowels in the area of the windshield as shown on the plans.

Slide the wing in place onto the hardwood spar supports, making certain it is snug to the fuselage. Turn the fuselage/wing over and drill the pilot holes for the wing mounting screws through the plates in the bottom spars and partially into the hardwood spar supports. Remove the wing and enlarge the pilot holes for clearance. Finish drilling the pilot holes through the wing spar supports and thread them for 4/40 mounting screws. Do the same for the other wing.

Build the wing struts. To make the job a bit easier than suggested on the plans, K & S airfoil tubing may be used for the main struts. To mount the dowel cross brace, the ends of the dowel should be sanded to fit snug to the cross brace. By adding a short piano wire pin in each end of the dowel and drilling a hole in the aluminum struts, the dowel cross brace can be glued to the struts. The upright from the dowel cross brace can be glued to the dowel. It can be attached to the inboard strut plate by attaching a piece of aluminum with a 90° bend to the wing and using a clevis on the upright. As shown on the plans, an aluminum plate on the upper end of the struts is screwed to the plate in the wing. When the exact location of the strut mounting plate is determined, blind nuts are installed in the plate. A nut and bolt is used to attach the bottom of the strut to the bracket on the fuselage. Drill the hole in the cabin top block for the aileron servo wire. Detail sand the fuselage. Install the remaining servo linkage, servos and wheel pants. Commercially available wheel collars with a flange may be used.

Resin should be used to seal the firewall and engine mounting box. The aircraft may be covered with any of the plastic heat shrink film covering

materials. Or, silk and dope may be used. Add the windshield and side windows

In an .049 Rearwin Speedster M6000M construction article by Larry Maynard in the December 1977 R/C Modeler Magazine, the author indicated two sources for historical data he used were the Northrop Institute's American Hall of Avaition History and photographs from John Underwood of the American Historical Society. In that article, Mr. Maynard commented that he found contradictions in the historical data which were due largely to inaccurate press releases given out by the Rearwin Company, Aviation and Aero Digest articles published when the certificate AR661 was issued, indicate the NC 15865 prototype flew with the Cirrus Hi-Drive engine. Yet, they also suggest that the power plant was the Menasco C4 or C4S. It turned out that all of the 11 aircraft produced used the Menasco engine, hence the M6000M designation.

The best source he found for the color scheme, was a Mr. Gene Salvay who worked for Rearwin as a college student. Now that's finding resources. According to his data source, all of the Speedsters were either Stearman vermillion and light Curtiss blue trim or vise versa. All had the same silver stripe on the fuselage and wheel pants outlined in black pin stripe. NC 19410 and NC 20741 were vermillion with blue. NC 19412 was blue with vermillion. NC 20741 in its current configuration is Cub yellow with a black design on the side of the fuselage. The shape of the design and N number can be found in a photograph in the September '63 issue of Air Progress. Our thanks to Larry Maynard and RCM for the helpful information.

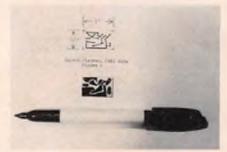
Good flying.

### SONIC LOCATOR

### from page 65/64

make a neat assembly, I put a glob of silicone rubber on the side of the audio indicator and placed the circuit board on top of that (like an Oreo cookie).

Attach the Sonic Locator to your receiver or, if you choose, parallel it to a servo. Turn your receiver switch on and



The board should look like this prior to etching.

to page 102

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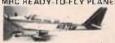
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The Micro-Vagabond by Bryce Petersen—a .020 powered model for small field flying with the new small radios.

### **FACTORY APPROVED SERVICE**

In celebration of our move to larger facilities we will continue our pre-season check-out special through September 30, 1978. A complete system check-out — alignment — calibration — including cleaning servo pots — just \$20.00 \*.

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\* Parts additional — plus \$3.00 postage and handling

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### SONIC LOCATOR

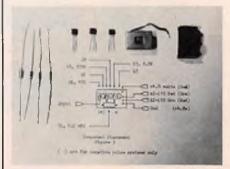
from page 100/64



Immerse the board into the Etchant.



Remove the black resist with steel wool.



Follow the component placement diagram when inserting components.

to page 112

# YOU'VE BEEN ASKING FOR IT

# - NOW IT'S HERE!

**ANNOUNCING** 

# 1978-1979 TOWER HOBBIES R/C CATALOG



- 294 Fully illustrated pages
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- Easy to use indexes to help you find exactly what you need
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# THE GUIDE TO ALL YOUR MODELER NEEDS

The new 1978-1979 Tower Hobbies Catalog is the finest, the largest, and the most complete R/C catalog ever published by anyone in the industry. It is more than just a list of available items at super low prices. It is actually a modeler's reference guide. There are two indexes, both a manufacturer and a product index to make finding a needed item super easy and fast! Once the item is located, an in depth description of the product by the manufacturer follows. Hopefully this description will answer any questions you have about the product. But if it doesn't you can use the TOWER ACTION POSTCARDS supplied with your catalog and write directly to the manufacturer for more information. This is just another Tower first you have come to expect! We've also included an all new, revised, updated accessory completion guide in a new easy to use chart format. It tells you what you need to com-

plete any kit in this catalog. Throughout the catalog are special section introductions. If you've only been in the hobby a short time, these introductions should greatly increase your R/C know how. But even if you've been a Tower customer for years, hopefully the introductions will answer some of your questions, provide you with helpful hints and suggestions, or just entertain you.

The Tower catalog was developed for you, the modeler, and we sincerely believe it is everything you have asked for and waited for! If you've never ordered through Tower Hobbies your catalog will be sent to you free with your first purchase, or send \$1.50 and we'll send you a catalog today!

There are 294 pages full of every item you need in order to have a great flying season! And there's no reason to wait another minute for your copy!



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CHAMPAIGN, ILLINOIS 61820

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### TOWER HOBBIES SIX & THREE CHANNELS

Tower Hobbies digital proportional radio control systems are absolutely the finest value radios on the market today. Take a close comparitive look at the Tower systems against *any* other brand and you will quickly see that you get unquestionably the most radio for your money with Tower!

QUALITY: Tower radios are made for us by Kraft Systems in California. They are manufactured to our exacting specifications which include the latest technology of design, the finest components, precision assembly, and outstanding quality control. Kraft is the World's finest R/C systems manufacturer and Tower Hobbies is the most reputable R/C distributor in the industry - the combination of the two guarantees you the finest possible product and service all at the lowest possible price.

WARRANTY: Tower radios are warrantied for 180 days from the date of first purchase. Five convenient warranty service centers are located accross the Country for fast, dependable, and precise service.

COMPATIBILITY: The Tower 6 and Tower 3 components are fully compatible with the previous Tower 5 model as well as the entire line of Kraft Systems radios (except for the "A" series). This gives you the greatest accessory and feature availability in the industry — Interchange flight packs, servos, chargers, trays, output arms, or anything from the Kraft lineup of outstanding products.

COMPONENTS: The Tower 3 channel comes standard with two KPS-14 servos and a lightweight 450 MAH ni-cad receiver battery pack, giving an airborne pack weight of only 7.9 ounces. The Tower 6 channel comes with your choice of four KPS-14 or KPS-15 servos and a powerful 550 MAH receiver battery pack, giving an airborne pack weight of only 11.9 ounces with 14's and 13.5 ounces with 15's. Both systems come with lightweight slimline receivers that make for very convenient installations. Both switch harnesses have external recepticles for charging convenience.

FEATURES: Both Tower systems feature a dual function mater that allows you to check RF and absolute battery voltage. This allows you to monitor your flying time in addition to being able to check for possible cell malfunction. This deluxe feature is usually only found on systems in the \$500.00 price range.

POPULARITY: Tower radios enjoy a high degree of popularity at flying fields all across the country. When you show up at the field with a Tower radio your flying buddles will know that you are a no-nonsense flyer that demands top quality equipment but at down to earth prices. Your choice of a Tower radio says a lot about your astute ability to recognize true value — it shows you're a smart shopper!

APPEARANCE: Tower Hobbies radios are attractive. There is just something very elegant about that rich ivory color accented with black trim pieces. But that's in keeping with the total quality feel of Tower radios — that first class feeling. We just don't think that a radio should look weird or stranga — because we feel that the radio you fly is a reflection of your own personality. With Tower Hobbies radio control systems you go first class in quality, performance, and appearance.

PRICE: Tower Hobbies radios give you absolutely the maximum amount of radio for the least amount of money — and that's value! There is nothing cheap about a Tower radio. The design is the latest, the manufacturer is the finest, the quality is peerless, and the service is second to none. So how then can the price be the lowest in the industry? Simple. Tower's tremendous buying power allows us to create economies due to volume — and there are no middlemen between us and the manufacturer to artificially jack up the price. You're paying the bottom dollar price for the top of the line product. We can't think of any reasons why you should pay more to get less.

ORDER NOW! I Both systems are in stock for immediate delivery on the 72 mHz frequency of your choice. Call Toll Free right now for immediate COO delevery or send your order in the mail along with purchase amount plus \$2.00 for postage. If you are not 100% satisfied with your Towar radio after receiving it then simply send it back in original condition within 10 days for a full purchase price refund.

### TOWER SIX

The Tower 6 channel transmitter comes in the popular 2 stick closed gimbal configuration. Standard equipment includes a fully proportional fifth channel, toggle switch sixth channel, choice of four KPS14 or KPS-15 servos, slimline high range receiver, ni-cad batteries in both transmitter and receiver, charger, switch harness, servo trays, full servo accessories, and a dual function meter that indicates both RF and absolute battery voltage.

This is a top of the line complete radio system that is perfect for all radio control applications. From ½A to pattern ships, it offers all the performance you could ever ask for.

Six channels, top performance, high quality, and outstanding service after the sale — all at the lowest price in the hobby. Can you think of any reason why this shouldn't be your next radio? Retail \$350.00 Stock #TOW88462

ONLY \$199.95

### TOWER THREE

The Tower 3 channel transmitter comes in the popular single stick closed gimbal configuration. Standard equipment includes a fully proportional third channel, two KPS-14 servos, slimline high range receiver, ni-cad receiver battery, charger, switch harness, servo accessories, and a dual function meter that indicates both RF and absolute battery voltage. The dry cell transmitter (battery not included) can easily be converted to ni-cad operation by adding ni-cad pack.

This is a top of the line complete radio system that is perfect for small aircraft, gliders, boats, and cars. It's lightweight, yet very rugged.

Same outstanding performance, quality, and service as in our 6 channel and again all at the lowest price in the industry. This is the system that makes sense for the beginner that needs three or fewer channels.

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This popular all balsa trainer has A super hot %A engine ideal for engine. A high quality kit.

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A new ni-cad battery tester, cycler, and charger. Works great!

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9.6 volt 6 volt

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COX TD .049 DUNE STD. ENGINE 38% OFF

a 52" span and takes a ,35 + .49 free flight, control line, %A R/C, and more. Limit of 2 per order.

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> Features reel, tubing, towline, parachute, stake, tow ring, and strong construction. For sailplanes of 100" wingspan and larger. Limit 1.

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with this high quality tester.

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4 AND 6 CHANNEL SYSTEMS

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We believe these sets offer by far the best value in the radio control field. They are identical except for the difference in the number of channels. The 4-channel can be converted to the 5 or 6 channels when the customer desires. Contest type open gimbal sticks are featured for accuracy and smoothness in control. The miniature receiver incorporates a double tuned RF section with exclusive noise and interference rejection circuitry. For convenience, the receiver antenna plugs in. The rugged KPS-14IIA or KPS-15IIA servos are standard. Systems include a transmitter, 4 servos, receiver, rechargeable receiver and transmitter battery packs, charger, switch harness and servo tray.

\*Note, 1977 and 1978 Sport Series systems feature a longer than normal digital time base for greater simplicity. Therefore, they are not compatible with other Kraft systems or components but a complete line of accessories is available to Sport Series specifications.

#### TOWER HAS KRAFT AT BEST



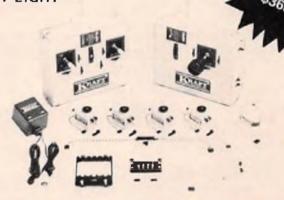
KP-5C KRA88252

\$269.98 each

KP 5CS KRA88251

The KP-5C and KP-5CS five channel systems establish an entirely new level in quality and performance in the medium price field.

The transmitters feature an internal plug-in frequency module accessible by removing the back. The transmitter meter monitors relative R.F. output. A trainer system is optional and can be easily added at any time. The low cost KPR-5C five channel receiver does not have plug-in modules but is completely interchangeable without the need for matching to the transmitter. Pictured in the system are the optional KPS-15II servos which combine great power with high speed of operation. Also shown is the optional lightweight 450 MAH KB-4M battery pack. Systems include a transmitter, receiver, rechargeable receiver and transmitter battery packs, charger, switch harness, four servos, and servo trays.



KP-7C KRA88272 \$369.98 each

KP-7CS KRA88271

For competition or sport flying, the KP-7C and KP-7CS seven channel systems are loaded with features and extra controls to suit the requirements of the most complex model. The systems feature external plug-in frequency modules in both transmitter and the standard

Three function dual meters in the transmitter indicate R.F. output, transmitter battery voltage, and via a jumper cable, receiver battery voltage. For greater accuracy and long life, transmitter control pots are expensive precision instrument type. A trainer system is standard. The antenna disconnects and retracts into the transmitter case.

Optional KPS-1411 servos and KB-4E battery pack are pictured with this system. Because of its small size and rugged gear train, the KPS-14II is an ideal all around servo. Systems include a transmitter, receiver, rechargeable receiver and transmitter battery packs, charger, switch harness, four servos and servo trays.

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This all molded foam scale model comes complete with a Cox .049 engine, prop, push rods, horns, and all other fittings already installed. 36" span. Cox 2 Ch, recommended.

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cycle battery, or any other 12 volt

battery, we now have this high

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This custom model is great for covering with Monokote, Solarfilm, etc. It features adjustable temperature, teflon shoe, and a handy stand, Excellent quality.

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RETAIL

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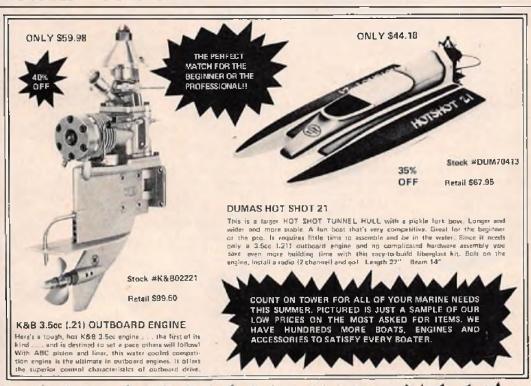
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This 8.5 ft, wingspan all wood, fast building trainer is designed for a .60 size engine & 3 or 4 channel radio,

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This popular all balsa trainer has a 58" span and takes a .40 - .60 engine. High quality, flies great.

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This popular almost-ready-to-fly features a 63" span and takes a .50 - .61 engine. Great trainer.

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box is compact vet has room for everything you need.



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K & B .61

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K&B .40 RC ENGINE

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The most popular .40 ever made ! Features a Perry carb.

Quantities are limited. Limit of 1 engine per order until sold out.

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KWIK FILL **FUEL** PUMP 36%

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HOUSE OF BALSA 30% P-51D (.29-.40) OFF



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This tine V

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This outstanding engine features a Perry carb and muffler.

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DUMAS 24"

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HOT SHOT TUNNEL HULL





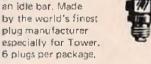
This die-cut mahogany and birch plywood kit is designed for a 3.5 cc outboard like K&B's.

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These excellent glow plugs feature an idle bar. Made by the world's finest plug manufacturer especially for Tower.



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special hardware and decal sheet. Requires a .049-,10 engine and a 2 channel radio.

This all balsa 36" span kit features

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gun features a 3 position switch, nazzle attachment, 2 speed heat control, and long motor life. Great for Monokote, Solarfilm etc.

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40% OFF

WEBRA .61 46% R/C SPEED OFF SCHNEURLE



This popular and powerfull engine comes with a muffler. Super value.

This complete wing & fuse jig holds alignment within .1%. Allows you to make up to a 6 foot wing. Fuse jig fits on without tearing down your wing jig.

This "in-line" fuel pump is a simple, easy, and reliable way to

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RETAIL

engine is one of the most powerful and most popular engines on the market.

This outstanding

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This 1/12 scale sports car has 2 forward and 2 reverse speeds. Electric motor for indoor or outdoor quiet running.

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20% MIDWEST ATTACKER

35% OFF



35% OFF **ANDREWS** AFROMASTER

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This all molded styrofoam kit builds fast and files great, 48" span and ,19-,35 engine, Very popular.

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NOW ONLY \$25.98 Stock #MID73134

This speedy all-wood racer can take an outboard engine or normal outdrive hardware, 30" length.

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**NOW ONLY \$27.88** Stock #DUM70371

38%

The most popular Bipe in R/C11 52%" span, 910 sq. in, area, .60 .78 engine. All balsa construction.

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AIRTRONICS AQUILA

30% OFF



This popular glider has a 99.9" This airboat has a plastic hull and wingspan and is very easy to fly. cabin with balsa and plywood parts. It uses a 2 channel and a .15 to .35.

STAFFORD

RETAIL \$39.95

NOW ONLY \$25.98 Stock #STE70027

30%

LANIER JESTER II



This almost ready-to-fly kit features a 63" wingspan and takes a .50-.61 engine. Gets you in the air in a hurry! Very durable.

RETAIL \$73.50

NOW ONLY \$ 45.58 Stock #LAN74123 O.S. MAX .25 RC

31% OFF



This popular and powerfull engine comes with a muffler. Super value,

\$69.95 Stock #AIR71206 **DUMAS BIG** SWAMP BUGGY

Good for thermal or slope.

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This museum scale twin engined favorite is always in high demand. It's all-balsa, has a 72" span, and needs two .40 engines.

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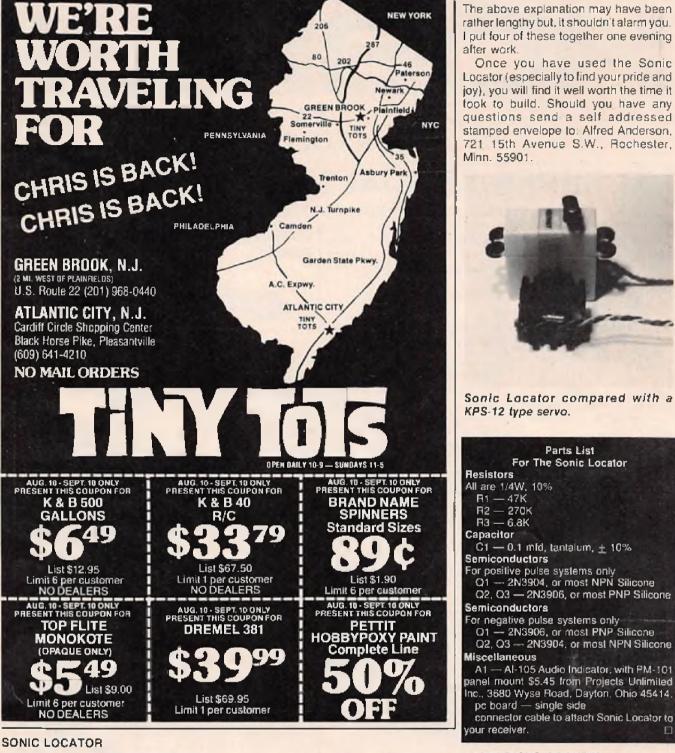
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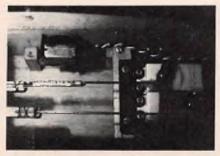


from page 102/64

the tone should start. Turn your transmitter on and the tone should stop.



Sonic Locator ready for final assembly.



Sonic Locator installed in a Sweet

#### CAP'N DICKS COCKPIT

from page 62

runs an ABC set up, but can be obtained with a chromed sleeve and a ringed alloy piston, if desired. The same .60 is produced with a plain carb and in a marine or race car version. The .40's and .45's are also produced in the previously mentioned configurations. The list of engine 'goodies' is too long to print (see photo).

Accessory-wise, Performance Model Parts fabricates needle valves, carbs,

to page 114



#### New Lamborghini Countach from Cox.

A car called Lamborghini Countach better be spectacular. And this one is. You start with a full 2-channel radio system packed right in the box. Then, speed. Any speed. Because the Lamborghini Countach has fully proportional speed control, forward and reverse. No "hi/lo" only.

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\$395

All you need to carry fuel and to fill or empty the fuel tank of your model. No batteries or pumps needed — just press down to fill, release to empty tank.



#### CAP'N DICKS COCKPIT

from page 112/62

air filters, venturi inserts, ABC pistons and sleeves, rods and pins, for many



TWA Rear Rotor .60 with megaphone.

mass produced engines popular in our sport. Glen does all this on modern digital read-out equipment that makes an embryo machinist like me droot. He even has a furnace and does his own casting.

Glen told me that every engine that leaves his shop is test run and comes up to his personal expectations of performance. Each engine is shipped with a horse power chart of its actual performance.

All in all, I was greatly rewarded by my visit. It was great to see the intensity of research and development put forth to enhance our hobby - - - thanks, Glen.

From Cap'n Dick's Cockpit.

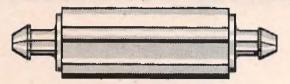
#### from page 61

When the balsa dust had cleared from the air, the bipe stood finished at the somewhat heavy weight of 96 ounces. However, I must mention that I usually build with a heavy hand and also had to add 16 oz. to the nose to balance out all of the putty I smeared around the tail fillets. The ship was covered with yellow Permagloss Coverite (wings only), and the fuselage was painted with yellow Formula-U, then trimmed in metallic green.

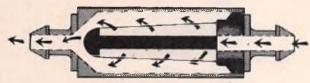
The engine I chose to use was a K & B .40 that had about 500 flights on it and the carb of an S.T. .23. (Perry parts are

to page 116



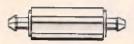


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## LARGE

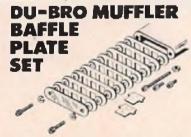


These new Large Brass Threaded Couplers are made to fit perfectly over Du-bro pushrod and Engine Control Flex-Cable stock. long with 11/16" of 2-56 thread to use with Du-bro Kwik-Links and Ball Links.



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480 BONNER ROAD WAUCONDA, ILL. 60084

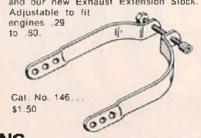


Complete, replacement Baffle Plates for the Universal Muff-I-aire and can be used in conjunction with our new Exhaust Extension Stock. Cat. No. 217... only \$2.95

DU-BRO PRODUCTS INC 480 BONNER ROAD WAUCONDA, ILL, 60084

#### STEEL MUFFLER STRAPS

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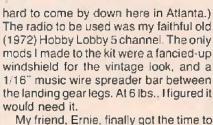
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For engines .10 & up. One piece brass barrel snans on to plug for positive starting. 24 - 1/2" long with attached battery lugs. An excellent accessory for today's kind of modeler.



No. 147 - . . . \$2.25

from page 114/61

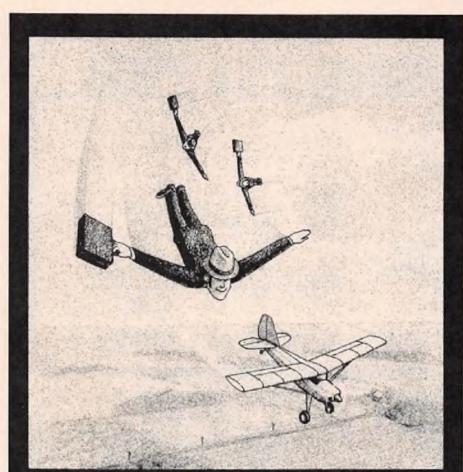


My friend, Ernie, finally got the time to take some free photos for me and forced me to get some instant nerve for the test flights. Out at the field my laid back image was somewhat disturbed by my rubber legs, but I got it all put together and gassed up. The .40 came to life on the third flip and I had no choice but to taxi out and go. I felt like the coward calling the bully's bluff as I advanced the throttle. The bipe headed into the wind and in 10' it had raised its tail; the speed kept building and after about 90' I eased back on the stick and to everyone's amazement, it lifted off easily and climbed out like any sport ship. Then, with shaking thumbs, I flew the bipe through a few loops, rolls, spins, inverted flight, and low passes. The bipe handled just like a Senior Falcon! Then came time for the final fear - - - landing. I chopped the throttle, and the engine died. I could almost hear Murphy laughing. But the bipe fooled him, it simply nosed down into an easy glide to settle gently to the ground in front of me.

After flight testing the bipe, I found the ailerons a bit slow, rudder very slow in flight, very fast on ground to where only a fixed tailwheel is needed. The elevator is normal. The final opinion is the overall flight characteristics are smooth and realistic.

The Phaeton Biplane is satisfying to both build and fly. It never fails to draw a crowd at the field (and I am one of two who fly there), and most of the comments that I get is that it looks just like the real thing up there. This is probably due to the rather long tail moment, and the fact that it is not over powered. The bipe has also proved itself to be very rugged, as it has tangled with some glitching on lift-off and made a full speed landing into a pile of coconut sized rocks, emerging from the fight with only dents on the lower wing and a wiped out landing gear. Total fixing time was 1/2 hour. Anyone who has built a few

to page 120



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#### PHAETON BIPE

#### from page 116/61

ships and generally knows where things go, will have a real ball with this bipe. I have even tempted fate by upping the weight to 7 lbs. for bomb dropping work, and it flies the same - - - terrific!

NOTE: The review or discussion of any product by RCM does not constitute an endorsement of that product nor any assurance as to its safety or performance by RCM.

#### DAS SUPER SLUPEN THING

#### from page 60

... die-cutting was all about. Not some of the 1/16" ribs, however. These were, in some instances, not die-cut deeply enough to allow for the easy, clean separation we had come to enjoy when we were working with the 1/8" ply, or the balsa. In fairness, all die-cutting was quite acceptable and, as we said, ranged from excellent to the minor bit of problems we just mentioned when we got to the 1/16" ply ribs ... some of those rascals just didn't want to let go without a fair amount of persuasion on our part.

Das SST was not what we would call difficult to build, but at the same time, it is NOT the one to start out with if you've never built from a kit before. As we mentioned, instructions are on Sheet 1 of the plans, and are confined to assembly of the fuselage only. For the tail section, and the wings, you are on your own. We feel a first-time builder could use a bit of a guiding hand in these important areas, even though perspective sketches are excellent.

The fuselage is all balsa ... no plastics here! Running down the bottom, center of the forward portion of the fuselage is a 1/8" ply keel that gives the thing a slight look of a boat hull (from the bottom angle), and adds immensely to its strength. The tow hook is anchored through the ply keel and, needless to say, we haven't pulled it out yet . . . and don't expect to. The fuselage is built of 1/8" ply sides with the same material serving as doublers in the forward third. Formers are also 1/8" ply, so an idea of the strength of this beauty can be realized. Lest you think it is too heavy, the bottom "vee" of the fuselage is covered with die-cut to shape 1/8" sheet balsa. The remaining top and bottom of the fuselage is covered with 1/16" sheet balsa. It all adds up to a very, very strong, lightweight fuselage that furnishes plenty of room in the radio compartment, is attractive, and goes together not badly at all. That 9' wing goes together like all 9' wings (does anybody really like to build wings?).

And, speaking of wings, these have to be built to be really appreciated. Counting those that serve as

to page 122



#### Instead Of Giving Up Your Dream To Fly Radio Control Perhaps You Should Give Up The Expensive Radio!

There are many people who would like to get into radio control, but one thing more than any other stops them - Price! Also, as a modeler gains in experience and has built many models to fly, he finds that being the owner of several radio systems is desirable. The dream of getting into radio control, or of adding extra systems, may be forgotten by many who feel that purchasing an expensive national brand radio system doesn't make any sense. Now, the Hobby Shack Aero Sport Systems offer thousands of people exactly what they are looking for. Aero Sport has all of the reliability, performance, electronic technology and all of the other advantages of the higher

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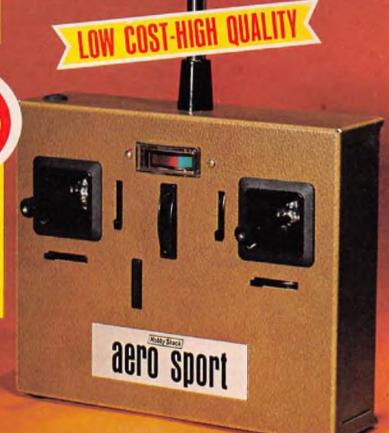
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#### DAS SUPER SLUPEN THING

from page 120/60

turbulators, the wing has a total of six spruce spars, plus a husky 1/2" x 1/2" balsa leading edge!

Adhesives used throughout included Carl Goldberg's Jet Super Glue, Hobby Shack's Kwik Tak, and Devcon's 5-Minute Epoxy. We covered Das SST with Super MonoKote on the wings, and Solarfilm on the tail section. Both were done in opaque yellow, and trimmed with D.J. stripping. The fuselage was

finished in white and striped with D.J. tape. Just to do things up right, we affixed a beautiful (free!) F/C Modeler decal to the rudder (I'd "rudder" be flying). With all its makeup on, Das SST looked great, and you might well ask at this point, "How did it fly?"

And how did it fly? Well, just beautiful. Going up on the hi-start, it looked majestic, with manners to match. This is a fair sized bird, and speeds look considerably slower than they really are. We had (secretly) been a mite worried that there wasn't enough rudder area for all that much up ahead, but our worries were groundless. Rudder and elevator response was very effective and

positive. The rather long tail moment gives these controls an iron hand when the need is there, and gave us the feeling of being in full command of the sailplane. The polyhedral wings gave good stability, and allowed full circling without any great loss in altitude. Glides were nice and shallow . . . so much so that a couple of times when we overshot our larget (the whole field, that is), we just cranked her around in an easy flat sort of turn, and gave it another try. Landings were fun . . . all the time in the world, and good control right down to the instant of contact. All in all, a very satisfying flying machine . . . to build, to to page 124

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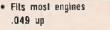
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#### DAS SUPER SLUPEN THING

from page 122/60

fly, or, as we are doing right now, to just look at! And, finally, we must say that in its price category, Das Super Slupen Thing is really a Super Dooper thing!

NOTE: The review or discussion of any product by RCM does not constitute an endorsement of that product nor any assurance as to its safety or performance by RCM.

#### SUPER SCALE

from page 59/56

3/4" x 3/8" pine spars. Ron covered the wing with 1/16" ply and he uses a servo

in each wing for the allerons. The fuselage is conventional balsa and ply construction and is covered with Coverite. Tail feathers are foam, ply covered. I had mentioned to Ron some time ago about my disappointment with the Swift and he is unable to understand it as his flies great. As you can see from the accompanying picture, his looks great too! (I wish I'd thought to do it myself!) Good flying Ron.

I wasn't aware of it when I mentioned Woody Clapp earlier in this column, but he is a newcomer to our hobby/sport. Just to establish the kind of expertise this guy has brought to the hobby, the accompanying picture of his quarter scale Sopwith Triplane is his first ever R/C model. In addition, he designed and scratch-built it without outside help. Rest easy America, ingenuity is alive and well in Olean, New York! Just for

background, Woody (more properly, Dr. George W. Clapp II, DDS PC) has been around full scale aircraft for many years and currently has a full scale AT-6 under rebuild, along with a number of other full sized aircraft, plus several antique fire engines, various and assorted other vehicles, one of which is being converted to resemble a WW I ambulance which will be used to transport the STARS models to contests and then used as part of the show. Talk about a multiple threat, Woody has to be one of the most capable around.

The Sopwith Tripe was flown recently and aside from a few minor adjustments flew well. The initial landing (to correct the trim) was a bit hairy and required a 'go-around'. Woody said that at full throttle this 19 pound monster climbed 'like an arrow'. He also said it looked like a drunken staircase with all those wings resting on that stubby fuselage. Woody

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says the idle speed moves it through the air at about 20 mph, and full bore it moves out at about 50. He feels the Quadra is about double the power actually required except in panic clawing. out of the weeds. You scale guys in the Eastern states had better look to your laurels, I think this guy is going to be a pretty serious competitor in a very short time!

From a bit further afield, a letter from Oivind Amlien of Norway, indicates he is currently working on a 2.75:1 scale model of a Bowers Fly-Baby. He has indicated he'll let us know what happens when it is finished and flown. Coincidentally a local friend of mine, Les-Vaughan, is doing exactly the same thing. I recently had a look at the fuselage, and it is going to be big. Les is currently a very fine 'B' Class pattern flier and is going to be something of a threat

to the scale guys when he gets the Fly-Baby in the air.

I'm a bit premature with this information, but the modeler I have mentioned previously who built a large Beaver for the Quadra has created a plug for the fuselage and is presently trying to interest a glass-fibre manufacturer in producing it for sale. He has also created a set of quarter scale fiberglass floats (I'm expecting mine within a short while) and when they are available, I'll print an address and price. etc., on them. I have seen his set, and they'll be flown on the Beaver within the next few weeks, so I'll have a chance to report on their performance. They look very good and complete with struts and cross bracing, they weigh about three and a half pounds, not a serious load for the Quadra powered model.

Anyway, as is obvious, more and more good things are becoming available for the quarter scale fraternity. You can bet we are going to stay on top of it and keep you informed about what, where and how much. More next column.

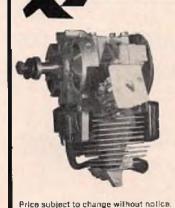
#### MH-17 RC HELICOPTER

from page 55/54

Koichi Saito is 46 years old and received his start in the hobby of RC models about 14 years ago. Then a member of one of Japan's leading modeling clubs, (author's note: I was also a member of this club) he started flying fixed wing aircraft of the stunt variety. About 6 years ago, his background in mechanical engineering moved him toward the budding interest

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in Japan, at that time, of RC choppers. One of his most outstanding designs, the Baron, has been sold widely, both in Japan and overseas, and is reputed to be one of the better models available for the beginner helicopter pilot.



Bottom view of fuselage. Note dual fuel tanks. Tail boom removed in this picture.



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#### MH-17 RC HELICOPTER

\*Pat. pend.

from page 126/54

Akira Shimizu is 41 years old and his pre-teen experiences with models included U-control with ignition engines. Akira has quite a large collection of antique engines and keeps an active interest by adding to it whenever the opportunity arises. Following his early years with modeling, a large gap in time, up to three years ago, intervened. When he did get back to it, his re-introduction was to helicopters and as Mr. Shimizu puts it: "I don't think I can even change a prop on a fixed wing aircraft!" Although he has no knowledge of how to fly a lifting-wing RC model, this has not hurt his skill-development with choppers. Considered one of the finest helicopter pilots in Japan, Akira has demonstrated his fine touch on television, at special events, at festivals and is proud of his record of helping any number of modelers with their first attempts at helicopters.

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#### RADIO SPECTRUM

from page 53/52

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sake don't do what I've done more than once. If you put your wing on and trap the aileron cable between the wing and fuselage, take the wing all the way off and start over. Once I lost the ailerons on the second flight after simply loosening the wing and poking the cable inside. I was lucky and saved the plane by landing with rudder that time, but I had another occasion when I'm pretty sure it was that stunt that put me in the corn field.

Probably the biggest cause of crashes with basically reliable radios, is dead batteries. Back in the old days before rechargeable batteries, there was always a tendency to try to get one more flight out of the batteries. Some guys still play Russian Roulette even with nicads. There is no excuse for this with battery testers and fast field chargers available. However, you've got to use these devices. They won't help you in your tool box.

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to page 130

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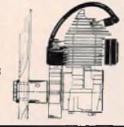
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#### RADIO SPECTRUM

from page 128/52

batteries should last many years. If there is any indication that they won't hold a charge or take a charge, replace them. A battery pack is a lot cheaper than a new plane, radio and engine repairs. Also be on the lookout for excessive battery drain. This will show up on your ESV very quickly. Normally a pack will only drop about .05 to .1 volts after each ten minute flight. If it drops .2 or .3 volts after a flight, stop and find out what is wrong. Look for stalled servos. This can be caused by a throttle bottoming out or a retract landing gear hanging up. These are things you can fix yourself. If a servo is buzzing you'll probably have to send it in to get it fixed but, whatever you do. don't keep flying with this condition. Another power system component that has been known to crash airplanes is the switch. Keep them clean. Make sure you get into the detent when you switch it on, or vibration is sure to turn it off for you. If you mount the switch inside the airplane and turn it on and off with a pushrod, keep the mass of the pushrod down. I've seen cases where a big wheel collar started vibrating and actually turned off the switch.

Care must be exercized when making antenna installations. Run the antenna through tubing or a grommet where you exit the fuselage especially when the fuselage is made of fiberglass. Put a knot or something inside so when you snag it you don't pull on the receiver...

If you take care of installing and maintaining your RC equipment you'll be amazed at how long you can go without crashing. If you do crash, you better run a pretty thorough test program before flying again.

Testing

There are a lot of tests a guy can run without a lot of fancy test equipment. You should start out with extensive bench checks. Run your system in the shop and observe the servo response. Is it smooth with no dead spots? Does it come right back to the same neutral everytime? Many of the experts put long pointers on their servos which serve to magnify non-linearities, excessive dead band, etc. It would also be useful to have some kind of a load tester. This might be something as simple as hanging a weight on the servo. Quite often faulty motors will show up in this test (they no longer lift the weight) prior to catastrophic failure.

Don't be afraid to turn the system off and on many times. If there is something marginal in the oscillators it usually shows up at turn on. Put the whole thing in the freezer and see how it operates. Run the batteries down and make sure it still works at low voltages. After you

to page 132

#### SERVOS, RECEIVERS, COMPLETE FLITE PAKS REGULAR OR MICRO, ASSEMBLED OR KITS

Litco filte paks or components can be purchased assembled or in kit form. Assembled units are pretuned and ready to use with transmitter specified below. All units use Deans connectors. Servos are supplied with extra female Deans connector to simplify installation.

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#### RADIO SPECTRUM

from page 130/52

install it in the plane, play with it for a couple of evenings before flying it. Try it in all attitudes, upside down, on its nose, etc. Run range checks with the antenna on if possible. After you establish that the range is good, take off the transmitter antenna and determine the antenna off range. Start the engine and have some buddies hold the plane by the wing tips while you run another antenna off range check at all engine speeds. If everything is still looking good, you are ready to fly. If this is a new

radio or one that just came back from the service station, you'd better have it in an old plane that you know flies, and won't lose any sleep over if it doesn't.

When you take-off, get some altitude fast but stay in close. Circle around on the upwind side in ever increasing radius circles. Keep your antenna up in the air and don't point it at the plane. As you get confidence that everything is fine, start pointing the antenna at the plane. If it still works, grab the antenna with your hand. If it still works you've probably got enough safety factor. After a couple dozen flights in the old kluge, you are ready to put the radio in your good plane. Go through the same routine again. The

installation is different and the vibration is different so take it one step at a time. After a season consider breaking in a new set of servos for your primary controls. Put the new servos on rudder and throttle for a couple dozen flights and then switch them over to aileron and elevator. Two new servos a year is cheap compared to your other flying expenses and compared to losing a plane.

One thing I forgot --- be sure and check the direction of all controls. When you change anything, there is always a chance to screw up. The aileron is the critical one. There aren't too many old

to page 134

#### NEW REVENGER

#### .60-Size Pattern Designed by Dick Russ

Revenge can be so sweet with your new Revenger, a pattern design you can win with.

The 70-inch span laminar-flow wing with a 747 square-inch area helps it perform all AMA-FAI maneuvers with a new kind of smoothness. You can read all about it in the April 1978 RC Modeler.

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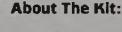
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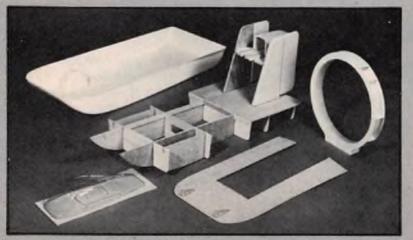
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from page 132/52

timers who can say they haven't done that trick at least once. These new transmitters with reversing switches have contributed also. So when checking allerons, make sure they go in the proper direction.

The bottom line is to constantly be on the lookout for problems. Take the time to look and listen. Consider taking notes. Keep track of the hours on your equipment. You may determine that your brand of servo needs the motor replaced after 20 hours; that the pots need cleaning after 40 flights, etc. Make periodic inspections. Take everything apart and put it back together again. Keep it clean. I think you will be surprised to see how long you can go without crashing, if you approach it systematically.

I would like to dedicate this column to the typesetters, or whatever they're called in this computerized world, and the artists at RCM. Notice we have no equations, no sketches, no schematics. Hope you enjoy your vacation gang!

(Thank you, Jim ... the Gang at RCM.)

#### **GYPSY LADY**

from page 51

with Pylon Racing and 1/2A Racing, bring the gypsies together from Oregon to Canada to Idaho.

The opening meet is Polar Bear at the SRAC field. The name is self-explanatory since the contest is held in March. Friday night the RV's start pouring in. We have set up the trailer in wind, rain and snow at 20 degrees above (which is rather unusual), and while my husband flies his R/C, I fly my trailer — the battery doesn't work and we have no lights; the refrigerator won't stay lit and we have no ice cubes (this is really roughing it, you realize); the bed is damp because of all the beautiful Northwest rain; the heater doesn't work and we freeze. It always takes the Polar Bear meet to get all the kinks out of the trailer.

My husband and I were novices at camping. We rented our first RV to try it out to decide whether we wanted a camper or a trailer and from that time forward we have acquired a reputation—waterless. I have never become used to the fact that you do not let the water run to get it cold in a trailer—you soon run out, and no matter how hard I try, a 30 gallon water tank is just not big enough for me. Therefore, at our Annual Banquet in November, about two years ago, when all the trophies were given out

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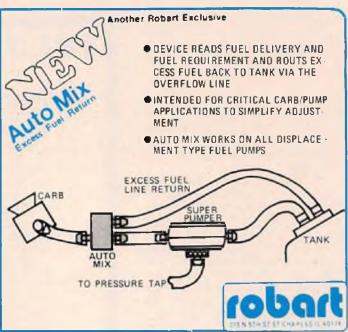
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for the Man of the Year, Modeler of the Year, Best Improved Flyer, etc., we got one we have always prized above all others - - - on a small wooden plaque sits a miniature toy travel trailer with an airplane wing sticking out one small window and a toy water tank with a hose attached sticking out the other little window of the travel trailer and a little, tiny lady carrying buckets in each hand walking behind the trailer.

Polar Bear goes from Friday to Sunday afternoon with Pattern the main event. The RV's park on both sides of the road going into the field and sometimes, because of the weather, there are several that will be in need of help to get out when it's all over. I have often felt on the last day one should crack a whip and holler "Roll em out!" as they did in the days of the wagon trains.

From Polar Bear we leave our own field and travel 170 miles over the Cascades to Zillah — to country so

opposite you hardly believe you are still in the State of Washington. Here it is dry and hot and dusty. The host club provides good fun, good food, and a good contest generally held around Mothers Day, with the highlight, the pancake breakfast on Sunday morning. This brings together not only campers from our own club, but campers from all over the State and being an annual event, one gets to see acquaintances again and chat about kids, dogs, cats, and, oh, of course, R/C.

After Zillah it's back to SRAC Field for the R/C Carnival. This is another strictly fun fly with cash and merchandise prizes held in May, and then on to one of the most important, and looked forward to, outings of the year, referred to as "Baker Lake", 90 miles out of Seattle, at the foot of Mt. Baker (on the south side). Here we have float plane flying, blow boating and sailboat racing with a stow flying hand-launched plane along the shores.

The "powder puff" derby brings the women out and they are allowed to manipulate the blow boats in a race to the finish with all kinds of encouragement, and good and not-so-good advice from their husbands.

There was one "Baker Lake" we will never forget. We had first put up camp on the lower level of the lake since the water was way down (this is a reservoir lake with a dam controlling the water pile-up). Overnight the lake started filling up and the rains came along with the wind. Our awning blew down at 2:00 A.M. with my husband out in his p.j.'s trying to rescue it before it took our whole trailer with it. Early the next morning we woke to find the water at our doorstep. Hurriedly, we (and when I say "we", I mean about 15 RV's) piled everything in the trailer and pulled onto higher ground only to find the lake was coming up even to page 138

#### From the Golden Age of Aviation The Velie Monocoupe

America's most popular trainer from the golden age of aviation, the Velie powered monocoupe is said to have accounted for nearly 90% of all light planes produced and sold in this country during its heyday in 1928. This just released kit contains all hardware, premium balsa, and spruce necessary to build the most popular variants Models 70 and 113. Structured like its namesake, the model brings together the perfect combination of lightweight for sparkling flying performance and rugged strength to shrug off a beginner's errors. The spritely Short field performance of the original is virtually duplicated in our Half A beauty whether you opt for glow or electric power.



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Featuring innovative new design utilizing "Helical Cut" final gear - more bearing surface for smoother mesh, less noise and better wear for ultimate reliability. This is a compact three wire servo that is rugged, lightweight and provides high power output with high resolution and low power consumption. It has two monolithic IC's, 74 transistors, 13 diodes and 79 resistors — for a total of 165 parts. SIZE - L: 41.5 mm, H: 35.5 mm, W: 19.5 mm.



The Cirrus Radio System's new features are: new triple tuned front end receiver; the RF amp is controlled by AGC (Automatic Gain Control) and the Three & Four systems have a new BA-663 decoder chip. The six channel alone features a double sided, copper clad, fiberglass PC board with the same decoder as our previously successful Cirrus radios, which in fact does have a custom made chip. It's the only system we know of having a single conversion receiver with triple tuning, which causes high image rejection plus high rejection of inter modulation distortion.



The Cirrus stick assembly features an all metal ball bearing in a closed gimbal, surrounded by a first class styled bezel, which is chromed for ultra smooth operation and that expensive appearance. All trims have built-in ratchets which are light to the touch, yet will hold their positions accurately. The throttle stick features a spring dampened ratchet. All plastic parts are precision quality, with self lubricating bales. Pots are the highly reliable deposited carbon types.

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#### **GYPSY LADY**

from page 136/51

more. Once more we piled everything inside and ran to higher ground. By then I felt that if I could just grab the tongue of the trailer and pick it up and run, I would have done so. Having to hook the car up each time was a bit too much, but the third time, being the charm it generally is, we finally hit the right spot, the sun came out and it was one of our better "Baker Lakes". Besides the R/C happenings, there is fishing, boat riding and, if we hit a good year and warm weather, even some wading and

swimming, although at the end of May the weather is still pretty shaky with rain and wind.

We hit the trail in June for Chelan on the east side of the Cascades again, where it is hot and humid, but beautiful lake and forest country, right in the heart of the apple country. We camp on the airstrip that is surrounded by apple orchards. It was so hot that six of us (women) spent the entire afternoon sitting under the sprinkler system that was used to irrigate. How the men could fly in that weather was beyond us, but you know RC ers — they are as tough as postmen — nothing stops them. From Chelan it's on to Bellingham, north of

Seattle for CANDO, a contest between the SRAC Club, Bellingham Club, (playing host), and the Canadians; hence, Canadian, American Duel and Outing or CANDO. This is a three way meet with points going to each club and the one getting the most points, of course, takes home the trophy. The events are fun fly and several involving the whole family. This is again in 102° weather - because it does get hot here - in the middle of a hay field, no air conditioning, no lake, no electricity, but they do have water piped in and a spot is always saved for us right by the water spigot. I think people get tired of seeing to page 142

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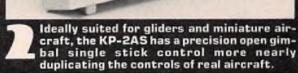
# 3 Ways to Operate 2 Channels

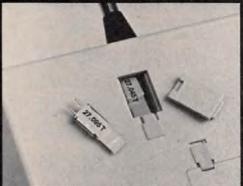


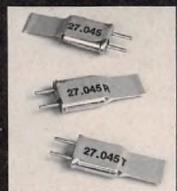




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26	9			111

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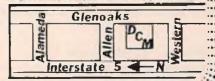
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The Fox 19 defies explanation. It has neither ball bearings or schneurle porting yet in Club 20 Racing it has so consistantly outuan all comers that 1977 Club 20 rules handicap Foxes to 6 mm exhaust outlet, Webras, Tigres, Tripans, OSs & Vecos are permitted to run stock. For 1977 the Fox 19 has been given a beauty treatment, an improved carburetor and the crankshaft and rod have been beefed up a bit. We invite you to fit one of these remarkable motors in your model.



Improved for 1977. Case enlarged to accommodate a beefed up rod. New glass bead finish. Leaning out suffered by some of the earlier models has been eliminated. The two ring piston holds compression better and starts readily by hand. Burns less fuel and weighs less. It does not make very good sense to pay \$50 more for a fancy import when a Fox Eagle will deliver all the power you can use. The service on the Eagle is better too. In event of a minus two foot landing you can call the factory direct for parts and have your engine ready to go for next Sundays flying.



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### **GYPSY LADY**

from page 138/51

us sneak off for water all the time in our four 5 gallon containers that we bring along, and we tried doing it at night, but it's very hard to find the hole when it is pitch black. September (Labor Day) it's back to Baker Lake for the final outing of the year for the club together and, in October, for some really adventursome gypsies, across the border to meet with our Canadian neighbors in a final contest for the year.

My gypsy summer life can sometimes average 14 contests totaling almost 3,000 miles. We have seen four years going on five now, and it probably would not be so exciting to some, but to us Lady SRAC'ers, it's fun, it's challenging, it's invigorating, and we have one bunch of happy husbands to see the winter through, building new float planes, new scale jobs, and new boats for a bigger and better nomad life next year.

Roll 'em out, guys, but don't leave me behind!!

#### COBRA 21

from page 49/48

off, it can be cut with scissors along the crease marks. Check when it is cut out that it is, in fact, the right size. When the template is right, use it to mark out the skin on the sheet of 1/16" plywood. A good idea here is to make the skin slightly larger on the chine side, in case there is any error. (Don't do this on the keel side, because it will be quite difficult to get rid of the excess in that area.) When the skin has been cut out - you can use a sharp modeling knife for this thickness of plywood — put it in place and check that it is the right size. If all is well, it can now be glued to the hull. using a slow setting epoxy glue, to allow you time to get it in just the right place. and to hold it down. This latter can be done by raiding your wife's clothes basket for all the clothespins available. Use these to hold the skin flat on the keel and chine stringer. In addition, it is a good idea to drive a couple of pins through the skin over each former, to make sure that it sits tightly on them. Do the same with the second bottom skin. but this time you will have to use pins to hold it flat on the keel. Leave the hull assembly for a good 24 hours to let the epoxy cure completely.

The next job, with the hull still pinned to the building board, is to cut away any excess skin along the chine stringer, using a modeling knife and then the sandpaper, until the edge of the skin is

to page 144

Pattern and Standoff Scale Flyers

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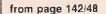
		A	MA NO.		FCC NO.	
		CITY	r	STATE		ZIP
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Frequency: Pat	ttern:		MHz Scale		MHz	
		RCLE EVENT: Novice Frequency: Pattern:	CITY RCLE EVENT: Novice Advanced		CITY STATE  RCLE EVENT: Novice Advanced Expert Masters	CITY STATE  RCLE EVENT: Novice Advanced Expert Masters S/O Scale

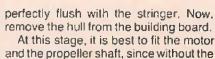
#### IMPORTANT:

Pre-entry—No entries will be accepted after September 15, 1978. When classes are full, earliest postmark determines acceptance.

Due to limited accommodations, be sure to make motel reservations early for Hitachi R/C Classic at Lakeshore Inn,\* 21330 Lakeshore Drive, California City, California, (714) 373-4861

\*Tell them it's for the Hitachi R/C Classic, or you won't get in. Insist on Reservation Guarantee.





At this stage, it is best to fit the motor and the propeller shaft, since without the side-skins, the horizontal alignment of the two can be checked more easily. I have not shown any particular engine mount, since there are so many. I used a polyester molding I made myself, but you could also use two shaped blocks of wood, or metal plates screwed to the mounting holes in the motor, bent to suit the hull floor, and epoxied in place. The important thing is to get the end of the motor as close to the front former of the motor compartment as possible, to keep the Center of Gravity in the right place. The prop shaft can be either a traditional rigid one, or a small diameter flexible drive — both are widely available at good hobby shops. If you are using the Sea Ram, the prop should not exceed 1.6" in diameter, and should have a fairly fine pitch. Drill the hole in the hull floor for the prop shaft tube, fit the tube, couple the shaft up to the engine, and then, with the hull suitably supported, move the whole lot around until the tip of the upper propeller blade just clears the bottom of the hull by about 3/32". At the same time, the motor and prop shafts should be in perfect alignment. This is extremely important, because any error in alignment will mean a loss of power. My own favorite trick is to get everything about right, and then couple one single nicad cell to the motor. At this very low voltage the motor will turn over very slowly (depending on the motor used you may need two cells). Now move it allaround until you get a maximum of revs from the motor with a minimum of noise from the coupling. This is the correct position. Again, my own favorite trick is now to Zap the motor mount and prop tube into place. Then glue the motor mount and drive shaft with liberal quantities of slow setting epoxy, and leave it for 24 hours. (Before applying the epoxy, check again with the nicad, to make sure it is still in line - it is much easier to move it when it is only lightly Zapped then when it is solidly glued in place! I know, I've done it!)

The next job is to make templates for the side skins; cut them out, and fit them in place, using pins to hold them. However, this time the bottom edge of each skin should be cut 1/4" longer than necessary. When they are securely glued in place, this projecting edge should be reduced with sandpaper to exactly 3/16" from the stern to B2, and then reduced progressively to zero at the bow. Then, using some epoxy mixed with micro-balloons, make a smooth

to page 146



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#### COBRA 21

from page 144/48

fillet in the angle between the side and bottom skin, as shown on the plan. This provides a very efficient high-lift spray rail. A good trick to get this smooth is to run a length of Scotch Tape along the fillet while it is still wet, and leave it there until all the give has set. Then the

remaining irregularities can be removed with fine sandpaper. Finally, the bow block is made from balsa blocks and faired into the line of the hull with a small plane and sandpaper.

The rudder assembly can be a commercial one, or you can make up your own with some .032 brass sheet, music wire and a brass tube. The turn fin is shown, but did not prove necessary on my model. If an i.c. engine is used, the

boat will be much lighter, and it may be necessary. The water cooling pick-up tube is optional — the Sea Ram is provided with water cooling facility; other electric motors generally don't have it.

At this point, a stand is very useful for holding the model still while you are working on it, so why not make one? The radio installation is not at all critical, except that if an electric motor is used,

to page 150

### ENGINE 45" to 60" Size \$65.00

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# 1978 SIG IMAC CHAMPIONSHIPS





Above: Two firsts were taken by Leonard McCoy with his Sig Super Chipmunk and Sig Skybolt. Peggy pitted for the double win. Below, left: K. K. and Gwen McClure, poised for takeoff. Skybolt had only been flown twice before the contest but Keith placed second in Advanced, says "Flies pretty nice!" Below, right: Norm Casella enters the "box" to begin his pattern, uided by caller Mike Roselli.



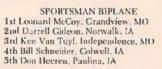
### FLIERS FROM NEW JERSEY TO CALIFORNIA COMPETE IN JUNE 17 - 18 MEET AT SIG FIELD

The 4th annual International Model Aerobatic Club contest held in Montezuma continued to grow in size, with 75 entries flying in the 5 events held. Flying weather was mixed, with a dicey cross wind and overcast on Saturday. Sunday turned out better—sunny and less wind—good conditions for model aerobatic flying as well as the noon-time full size air show. Pete Myers, well known air show pilot, with his smoke equipped Decathalon, was a last minute addition to the Sig Mini-Air Force Air Show.

Sportsman Biplane continued to be the most popular event, with 46 fliers competing. The newer events for aerobatic morphanes are beginning to catch on and become a solid part of the program.

As was the case last year, the contest was operated by a hard-working crew from the Des Moines Modelaires. Not enough can be said about their invaluable contributions to the success of the competition. With people like this involved, it's a great hobby!





ADVANCED BIPLANE
1st Norm Casella, Rutherford, NJ
2nd K.K. McClure, Bartlesville, OK
3rd Bill Heger, E. Peoria, IL
4th Gene Pond, Napa, CA
5th Don Kadous, Spencer, IA

SPORTSMAN MONOPLANE, 1st Leonard McCoy, Grandview, MO 2nd Al Kretz, Peoria, IL 3rd Denny Baker, Manito, IL 4th Larry Stroufe, Aberdeen, SD 5th Dean Maupin, Cordova, IL

ADVANCED MONOPLANE 1st Bill Heger, E. Peoria, IL 2nd Chuck Jones, Spencer, IA 3rd Heno Echard, Washington, IL 4th Jewell Ness, Cannon Falls, MN 5th Howie Wayne, Rochester, MN FLIGHT LINE DIRECTORS Roger Schlenker Gordon Boudewyn

JUDGES Gwen McClure Dick Wickham Brenda Boudewyn Leonard Tinker Fred Miller Al Grier Charles Austin John Mertz Roger Bocox Dave Harker

SCORE SHEET RUNNERS
Dean Lee Steve Smith
Paul Austin

SCORE KEEPERS Ramona Schlenker Marty Lee

MAMMOTH SCALE 1st Larry Scott, Harlan, IA 2nd Gary West, Davenport, IA





Above: A long way down Interstate 80 from California, Ralph Yount, Gene Pond and Gene's Skybolt. Below: Darrell Gideon flew his Sig Smith Miniplane to second place in Sportsman Biplane.



Above: Hazel Sig took contestants for rides in her Clipped Wing

Cub. Below: Bob Camarata's Sig Liberty Sport climbs out from







The Skybolt was the undisputed favorite design at the 1978 Championships. 28 contestants flew Skybolts and we got 25 of them together for this picture. Sig Skybolts were flown by 25 entrants, one used a Soarcraft, one an M.A.N. Noll Skybolt and Norm Cassella had his prototype Cass Skybolt.









Top, left: Denny Baker on takeoff with Sig Chipmunk. Above: A study in concentration! Junior age contestant Larry Kramer flying a Skybolt. Father Vern lends support. Above, right: Terry Edmonds had a smoke system on this slick Skybolt. Tobison markings. Left: Pete Myers waves to the applauding crowd after a spectacular performance in his red Bellanca Decathalon. Right: Pete Frankenthal's Skybolt feeling for the ground. Skybolts handle well on the ground for a tail dragger. Below, right: A long contest! Jewel Ness's son grabs a short rest under his dad's Clipped Wing Cub. Below: Contest Director Maxey Hester pites prizes on the line while Hazel Sig and Flight Line Superintendent Roger Schlenker look on. Every contestant received a prize and no entry fee was charged.



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### COBRA 21

from page 146/48

the receiver and antenna should be mounted as far towards the rear of the hull as possible. In the prototype, no form of noise suppression was fitted to the Sea Ram, and at no time was any interference experienced, though this may not necessarily be the case with other electric motors. A couple of TV chokes should handle any difficulties in this direction.

The superstructure is made from 1/4" balsa sheet and three 1/16" plywood

formers (T1, T2, & T3) and is very simple to construct. Once made, it is carved down to the approximate shape and then sanded down with sandpaper to the final outline. Do not omit the air scoop, and do not put a floor in the cockpit—this allows a flow of air through the hull, cooling both motor and nicads.

Motor control may be achieved either by using micro-switches actuated by a servo, or by using a commercial electronic speed controller. However, if you are using the Sea Ram, be careful. This motor can draw up to 40 amps on a big prop, so make sure that the controller you use can handle this current. The only suitable one I know of is the

controller made by Kroker Engineering. For most other electric motors, the Astro Flight controller will handle 20 amps with ease.

If micro-switches are used with the Sea Ram (they are available from Kroker Enginering and I used them in the prototype), then three should be used, to give Off — Series — Parallel switching. This is because if the motor is switched directly from Off to Parallel, the model will just sit in the water with the prop ventilating. A circuit is included on the plan to show how the switching should be wired up, using cams driven by a serve.

to page 154

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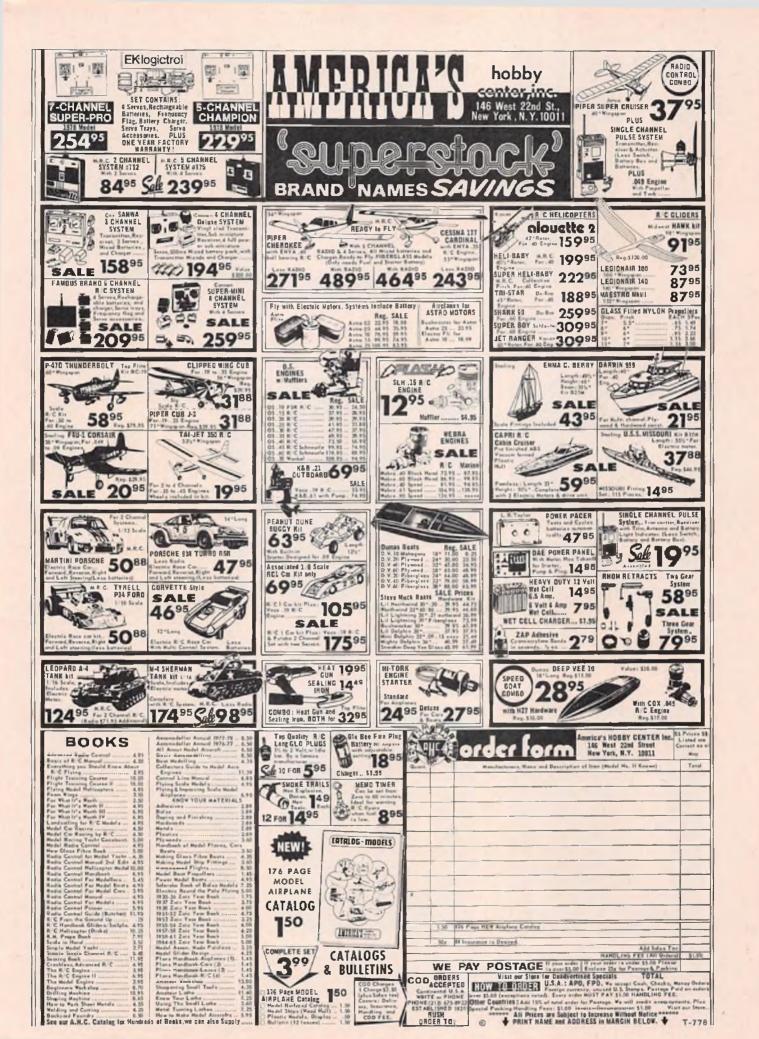
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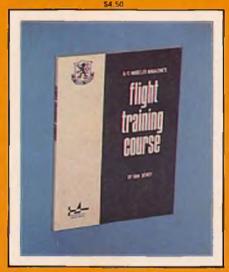
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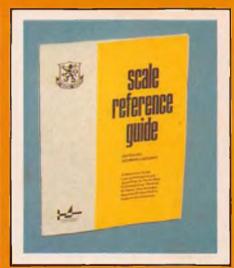
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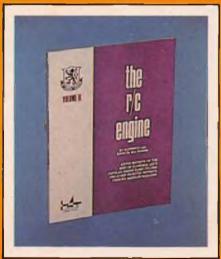
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### COBRA 21

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from page 150/48

A word of warning concerning electric motors: with a new motor, it is always a good idea to run it in, using a high capacity battery — such as the car battery — for about an hour without any load, but at about 75% of the rated voltage. This is to allow the brushes to bed themselves in properly. If you run a brand new motor directly on heavy load, any high spots on the brushes will burn grooves in the commutator, thus reducing the efficiency and power output of the motor.

All that remains now is to finish the model. I brushed three coats of Hobbypoxy Formula 2 onto the model, leaving for 48 hours each time, and rubbing down with 400 grade wet-and-dry emery paper, used with a mild soap solution. This gives an incredibly smooth finish. Any good quality paint can be used, three or four coats, rubbed down with 600 grade between coats; the last coat rubbed with 1000 grade (if you can find it!) and then finished off with silicone wax car polish.

As far as charging the nicads are concerned, anyone not too sure about this can refer to Model Power Boating in the the October 1977 issue of RCM where I have plenty of details. Alternately, your model shop should be able to give you any information you require.

### RUNNING:

Once everything is charged-up and ready, off you go to the local lake to try the boat out. Before doing anything else, check that all radio functions work correctly, and that when you give a right rudder command, the rudder, in fact, turns the boat to the right! Place the boat in the water with the bow pointing out towards the center of the lake, make sure there are no obstructions in the way, and let it go. If the Center of Gravity is in the right place, you will find that at high speed the hull will not slam. If it does so, then the Center of Gravity is too far aft. One cure for this is to fit high lift spray rails to the hull bottom from B3 aft to the transom. These will have the effect of lifting the stern at high speed. thus eliminating the slamming. If your model is very light, it may skid slightly in tight turns - if this is the case, fit the turn fin. After a couple of minutes running, bring the boat in, take off the cover, and check that the motor is not running too hot, and that there is no water in the hull (water and electrics just don't mix!)

And there it is — I hope that anyone building this model has as much fun with it as I have had with the prototype — and if anyone fits an i.c. engine, do write and let us all know how you got on. Happy boating!

from page 46

... by Bert Beverly, hangared nearby, as his subject.

The landing gear arrangement on this particular Skybolt interested Ray as a challenging project. The sketch and photos presented show how Ray solved the landing gear problem by duplicating the real thing. The finished landing gear looks rather fragile and delicate in comparison to the usual sheet metal strut we are used to looking at; however, they are completely functional, just like their full size counterpart, and are quite strong.

For the most part, the struts and cross member supports are made from 2024-S hard aluminum. They are first blanked out to rough shape. Then, a fair amount of hand filing is required to shape, finish, and fit the strut to the cross members which are bolted to the fuselage. The forward strut is covered with balsa, on either side, for added thickness.

For best feature of Ray's landing gear arrangement is the spring shocks in which the tension can be adjusted for soft or firm action. By raising or lowering the lower wheel collar, on the shock strut, the aircraft can be leveled to a very accurate degree.

Admittedly, it will take some effort on your part to build the landing gear shown here. Perhaps it can be adapted to a model that you plan to build in the future. But, the fact remains that someone has shown us the way. I am sorry that full size drawings of the landing gear could not be presented. Hopefully, the information shown is sufficient. Our many thanks to Ray Dehn, a true modeler with great ideas, for showing us the way.

### MIRAGE IIIC

from page 45

R & S Perfect Paints with Mirage V Israeli markings. I modified the model with the optional nose for the Mirage V and also added the dorsal web in front of the dorsal fin. The radio used was a Kraft 7 Channel using only 5 channels, the fifth being used for retracts. Although the plans show Rhom-Air retracts, I used Multicon retracts, which I had on hand, and found this conversion very easy and would suggest any pneumatic or electric retracts would work just fine.

As for flying the model, I feel that this aircraft can be flown by most Sunday

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Sport Fliers. I found several things that I would like to recommend to other fliers of this model: The model is flown on a 4" column of air and recovery from unusual maneuvers or stalled conditions require more altitude than prop driven models. Landings are easy with slow speeds. Approaches to the final leg should be maintained with some power on the engine until approach angle is established. Then power may be

reduced to idle for final touch-down. Ground handling of this model is excellent.

The model is capable of flying Stand-Off Scale maneuvers with loops in excess of 200' diameter. Rolls are quick and easy. The model grooves where pointed and has exceptional inverted flight characteristics. The model has a wide speed range — from very slow with no tip stall characteristics,

to well over 100 mph. I found that the model flies similar to that of a pattern type model airplane.

For assistance in building or flying of the Mirage III, contact Larry Wolfe, Jet Hangar Hobbies, (213) 860-7612.

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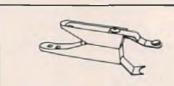


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from page 44

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The students discovered a few special quirks which might affect how pilots maneuver a solar powered airship. For example, climbs were best done with the airship's back to the sun, a position which exposed the solar panels to the maximum light and gave maximum power.

The airship model, constructed of plastic sheeting, weather balloons,

wood, wire, and string, cost about \$200.00 to build. The solar panels could be assembled out of commercially available solar cells to give the same amount of power for about \$700.00. "Obviously, such costs would have to be reduced drastically and the power output of solar cells increased by upping their efficiency, before solar powered airships could grace the skies", said the students.

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### NAMBA CHAMPS

from page 41/40



Judy Prigley presented cake to Pat and Charlie Pottol returning from vacation in Australia.

races, the city brings out and erects bleachers for spectators. They also provide the portable outhouses and a large quantity of trash barrels. They allow motor homes to remain overnight and have periodic police patrols to assure that all is well. On the morning following the races, maintenance crews come out to clean up and haul everything away. All of this is considered a civic service at no charge to the modelers. Wouldn't it be great if more communities had this kind of attitude.

You meet the nicest people in model boating!

### A4 SKYHAWK II

from page 39

The Scozzi fan unit is assembled and the aluminum motor mount carefully drilled and tapped to take the K & B 6.5 motor. (Make sure that the fan is centered in the shroud before drilling and tapping. This is important.) The tips of the fan blades will clear the shroud by about 3/32"; for increased performance this should be reduced to 1/32". This was done by cutting 1/32" deep slots across the thickness of the tip and building up the end of the blade with Hot Stuff and baking soda, use masking tape to hold the baking soda in place. The fan blade was then carefully balanced. This is very important because of the high rpm.

The engine used was a K & B 6.5 control-line engine with OPS .40 sized pipe and a .60 size Perry carburetor. A Robart Super Pumper and pipe pressure was used to supply fuel to the engine. The flight performance of the model is excellent; take-offs are long and smooth with about 30° climb out. The Skyhawk is an easy airplane to fly—it responds well to the controls.

to page 160

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- . Number of Channels: 5.
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- . Type Pots: CTS 5K ceramic.
- Power Supply: 9.6v nicad.
   Type Meter: RF and battery condition indicator. Modes Available: Two stick, Mode 1, Mode 2,
- and single stick also special order stick arrangements.
- Frequencies Available: 27, 53, 72 MHz
- · Weight: 19 oz. with antenna & nicads.
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### RECEIVER Model 520R (5) (4)

- Case Material: Nylon.
- Size: 23/32" x 1-19/32" x 1-27/32" (18 x 40.5
   Motor Size: 8 ohm, 16 mm. x 47 mm).
- Weight: 1.24 oz. (35.1 gr.) for 5-channel.
- . Type Decoder: C-MOS 8-bit shift register.
- . Type Front End: Double tuned, dual FETS. FET RF AMP. Feeding a FET Mixer.

### **SERVOS Model CE-4**

- · Case Material: Nylon
- Size: 3/4" x 1½" x 1½" (19 x 38 x 38 mm).
- Weight: 1.25 oz. (35.4 grams).
- . Output: Flotary type.
- . Output Controls: Arms.

- Type Amplifier I.C. amplifier, utilizing T.i. 28604 I.C. chip.
- Servos: CE-4 (Dunham Mechanics)

### SYSTEM

- · Airborne Power: 500 mah (Nicads).
- Type Connector: Deans 3-pin.
- Type Charger: Dual nicad charger, 2 charge indicators.
- Servo Trays: Full set.
- · Shipping Container: Plastic outer, foam plastic inner.
- Service Available: Warranty service thru Mac's P.O.B. 909, BELLFLOWER CA. 90706. Other service available from Service Centers throughout U.S.A. and Canada.

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### A4 SKYHAWK II

from page 158/39

Since there is no prop wash over the elevator, changes in pitch are much smoother. The model does an axial roll better than the average paltern plane most probably due to the deep fuselage and high elevator. Landings with the engine on idle are perfect, the model hangs in without any trace of a stall. With the engine stopped the nose must be kept down so as not to lose airspeed and the internal drag of all the ducts tends to slow the model down rapidly.

All in all the model is an excellent flyer and is certainly a show stopper. The instant the K & B is fired up everybody

stops flying to watch.

NOTE: The review or discussion of any product by RCM does not constitute an endorsement of that product nor any assurance as to its safety or performance by RCM.

#### **GEMINI**

from page 30

the pants together.

After about 20 hours of total building time which included installing the Cox Sanwa Radio. I was ready for the first flight. The only thing that I found wrong with its flight performance was that I had not balanced at 1½" in front of the bottom wing. This only meant that the elevator was a little too sensitive. After adding some weight, the next flight was much more stable and much smoother.

With only three flights on the Gemini, I then headed out of town for my first biplane contest. The Gemini performance was spectacular. Everyone there was very impressed. If you are curious as to how I finished, I came in 2nd, missing 1st by only 1/4 of a point. This was lost on the last flight after leading for the whole weekend. So as you can see the Gemini by Hobby Lobby is not only a pretty biplane, but a contest worthy biplane also.

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### HOVER

from page 27

11. What suggestions do you have to make this organization better to serve you and others?

As Walter has said. "let's get this show on the road." So please take time to answer the questions in this questionnaire and send them in. The sooner you do this the sooner this show will be on the road. Either send it to Walter Knaus, 82 Eldorado Ave., London, Ontario, Canada N5W 1S5, or to me, Don Chapman, 355 Geneva Ave., Tallmadge, Ohio 44278.

It's always a good feeling to have lots of hot talk and new developments to write about when trying to put together a monthly column such as this and this month there is plenty. First, let me give some much needed credit to someone who deserves it, and that is Charles Gilbert of Fullerton, California, who is one of the most active helicopter enthusiasts in the country. Charlie is an engineer and his thing is scratch-building. Charlie is the guy responsible for the Hughes 500 fuselage for the Jet Ranger mechanics which was used by John Minasian and Ernie Huber in the movie "Capricorn I." I had mentioned in the June issue that John Minasian made the fuselage for the 500 but had forgotten to mention who did the real work to make the fuselage possible and that was Charlie who, some years ago, made the mold for it. In talking with Charlie he informed me that the mold for the 500 is for sale. Now for someone who is interested and has the knack to work with fiberglass, here is your chance. If you should be interested in buying the mold, write to Charles Gilbert. 2101 Camino Rey, Fullerton, California

Charlie also sent me some pictures of his electric Bell 47 powered by an Astro 10 motor that he has been working on plus more pictures of his 40 size Jet Ranger fuselage for the Heli-Baby, Revolution, and Alouette mechanics. From what I understand, one guy has even installed Kalt mechanics in it. Now if that's not enough he is planning to kit a 40 size machine 40" rotor diameter to be called the Gilbert Twister. I'll have more details and photos on this later. Now in his spare time he is carving out a mold for a scale 500 in the 40 size. Now that's what I would call a real helicopter enthusiast.

More good news for hover lovers. I had a call from Hubert Bitner of Houston, Texas. Hubert tells me that there will be yet another helicopter kit on the market in 1979 --- a new design with much thought in the design from a flyer's standpoint. Prototypes will be flown in the upcoming AMA Nats and NRCHA Nats. From what he tells me about the machine, it really sounds good. I'll try to get pictures and more information as soon as I can because there is some real fresh thinking in this new helicopter.

to page 164

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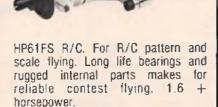
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### HOVER

from page 161/27

For those of you flying the .40 size machine, the new OS .45 FSRH seems to be a real powerhouse with more power than the Webra Speed .40 which has worked about the best of any of the .40's for helicopter use. The .45, which is housed in the .40 case, will fit where the .40 would, but with more mid-range torque and horsepower along with cooler running than the OS, 40 FSR - - and even as cool as the Webra Speed. The built-in head heat sink, along with port timing changes, seems to really make the difference. Of course the Dykes ring isn't hurting anything either. All in all it looks like one of the engines to get first when choosing an engine for the .40 size bird.

A neat idea from Bob Jones of Cleveland, Ohio. Bob carries his Alouette in the trunk of his car and, like most helicopters, although you have wiped them down after flying, they still drip oil. Well, not wanting his Alouette to drip on the covering in the trunk, Bob has come up with idea of using a cookie tray to set the machine in. Now it can drip to its heart's content but it's all caught in the tray. The trays come in various sizes so pick one for your machine. Good idea, Bob.

Well, that's about it for this month. Keep the stick forward.

### SCALE VIEWS

from page 26/22

them before, an emery cutting wheel on a hand motor tool can churn its way right through wire and other hard metal. plastic, or fiberglass substances. Up to now the catch has been the inclination for the thin, brittle cutting discs to shatter unless handled very carefully. We recently tried House Of Balsa's new reinforced "Tuf-Grind" cutting wheels in our workshop and were favorably impressed. They cut rapidly and have high resistance to breaking. Even deliberate attempts to break them by cutting at an angle failed. At two for \$1.98, they are worth the price, lasting through a number of difficult cutting jobs. Even though they don't break easily, be sure to wear safety goggles, because a shower of hol sparks comes off the cutting wheel.

### TAILOR-MADE SCALE PRESENTATION

There are so many aviation publications available that few model

builders get to see them all. In this more or less regular department, I will call attention to some especially good examples of material that can be of benefit in building a scale model, finishing it in authentic colors and, most important, preparing a judging presentation for use at contests.



Sport Aviation is the official publication of the Experimental Aviation Association, the national organization of home-builders. The cover of the February 1978 issue features a spectacular red, white and black Skybolt, an example built by Dr. Dean Hall. Beautiful is hardly an adequate word to describe this gem. It really is enough to make me want to build another Skybolt just to paint it in this striking color scheme. But the cover is only the beginning. Inside are seven more color pictures, including a view from above and one from below, plus both sides from various angles. If ever there were a tailor-made scale presentation, this qualifies. It can, in fact, serve as the entire presentation, since a 3-view drawing is not required by the AMA Sport Scale rules if you can show the prototype airplane from all angles with pictures. As a supplement to this main collection, the October 1977 issue of Sport Aviation has an exact side view picture in color that is perfect for getting the lines of the blue-tinted bubble canopy and the special shape of the wheel pants just right. These back issues can be had for \$1.50 each, postpaid from EAA, Box 229, Hales Corners, Wisconsin 53130.

Gene Chase, director of the EAA Air Museum (and a model builder) tells me they have plenty of copies of this Skybolt masterpiece feature available. I like to think that one reason the airplane makes such an impact is the input from the R/C flying backgrounds of Skybolt designer LaMar Steen and builder of N52DH Dean Hall.

Lest I be suspected of prejudice in the case of the Skybolt, I'll plead that it's only coincidence that I designed the Sig kit and hasten to give equal time to two other good Skybolt kits that would also be subjects for duplicating N52DH. Soarcraft has been making a Skybolt kit for several years and Norm Cassella's Cass Engineering (he is well known for his Pulsar bipe) has recently introduced

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a Skybolt. Both of these kits feature fiberglass fuselages and pre-cut parts.

### MAIL CALL

Dear Claude:

I read most of the model magazines, especially construction articles, picking up a hint or two, especially in finishing and detail work. I mainly build scale RIC, not generally AMA but sport, or something that at least looks somewhat like the real thing. In several articles, authors have mentioned using K & B Super Poxy primer, covered by dope. I have tried it twice and had good and bad results. I must say that the primer works extremely well and fills amazingly, considering the thin nature

of it. I put it over light silkspan that had been covered by two coats of Sig Lite-Coat Clear. It went on great. sanded down very smooth. It was on about three days before I got around to putting the color on, which consisted of Sig butyrate, brushed. It looked fine, but when I later masked off some striping and pulled the tape (carefully), in many places the butyrate lifted just like a large decal right down to the primer. I later had occasion to speak to Joe Bridi at the Mint Julep meet; he said to leave the primer a couple of weeks to let some sort of vapors evaporate out before putting dope over it. I like the primer very much and the way it works, but I am

wary of using it on a good scale plane, as I like to use butyrate. Any ideas would be of help.

> Thanks, Fred E. Williams Evansville, Indiana

I've used K & B Superpoxy Primer and agree that it is an excellent filler coat. I go along with Joe's idea on allowing plenty of curing time and this rule applies to other combinations of two unlike finishing products also. In addition, try sanding it down with a grade of sandpaper in the vicinity of, and no finer than, 220 grit 3-M Tri-M-Ite Pre Cut Finishing paper. This doesn't give you to page 168

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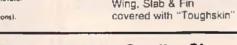
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### SCALE VIEWS

from page 166/22

the glassy, polished surface on the primer that something like 400 wet paper. would, but the result has some "tooth" that will help the dope grip the primer. The color coats will fill in the "teeth". Don't use ordinary masking tape, it has too much ripping power. Get some drafting tape, which is low tack and doesn't stick on so hard. I like 3-M, available at art supply stores. Have it on only as long as necessary to get the job done. Tape sticks down tighter the longer it is on. Once the masking tape is off, top the entire job with several coats of clear. My experience has been that if you live through removing the tape, there will be no more trouble.

#### SOARING

from page 18/17



Tuning up for the 2nd Annual Daniel Boone contest is William Meleske launching his Stretched Aquila.

which consists of foam cores for most of the Standard Class ships and a full line of scale plans and kits. Jim is Advertising Manager for Sailplane Journal, the publication of the NSS.

Lan Douglas, of Pomona, California, sent in his diary of his four hour slope attempts. It's too long to present in its entirety, so I will relate to you the good

and exciting points.

Third Attempt: Moderate winds following storm. Cloud cover; 60°F. --shivered for four hours. My support crew brought a blanket. Plane never got below crest of hill, except once. Highest altitude estimated 1000 feet. Trying to avoid mid-air with 7 planes in the air. 3 hours and 30 minutes: Shocked to discover transmitter output down from 7 instead of pegged beyond 12. Called for help to remove back of transmitter and plug in external battery. 'Okay, but you have to let go of the handles first." Battery switch accomplished. Plane lost

50 feet and headed directly into the hill when controls resumed. Plane landed at 4 hours and 2½ minutes.

Gerald Zeigenfuse has informed me that last years 1st Daniel Boone R/C Sailplane Contest was such a huge success, that they are repeating it August 5th and 6th. Gerald is inviting any sailplaner in that part of the country to participate. Camping is available and special events for the ladies are planned. If interested, contact: Daniel Boone Silent Flyers; 8 Craig Drive, Crestwood Reading, Pennsylvania

Good Lift.

SUNDAY FLIER

from page 16/15

Dear Mr. Willard:

To encourage students to enroll in drafting courses I had a suggestion from an experienced RIC modeler to develop a drafting program around R/C models. Since boats and gliders needed relatively inexpensive radio gear, we decided to start with boats. Being a novice modeler, boats seemed most logical to run without mishap. But, after a fashion, I looked for a new adventure. I thought aliders would be simple and challenging. Boy, were they challenging!

For the past two years I've been hand launching and pushing and pulling the stick. Each time I pushed I figured the plane should go up and when I pulled down it should go down. Well, after one major high start and several minor crashes, I found one student who told me up was down and down was up. I figured only a student could have such silly logic. Whoever heard of up being down and down being up? Chicken Little, maybe! But behold it worked! I still can't fly much better but I'm now teaching a new scientific concept of up is down and down is up.

Accidently inverted, Ron Bergmann Fair Oaks, California

Ron, it's a matter of space orientation. All you need to do is fly upside down then push is up and pull is down!

Joe Thorpe of Columbia, Missouri, might well have won the Dum-Dum award with this letter:

Dear Mr. Willard:

Since I enjoy your Sunday Flier column in R/C Modeler so much, I decided I should respond to your call for incidents which may quality for a Mr. Dum-Dum award. Herewith are two, each of which brought me right up to the brink of disaster.

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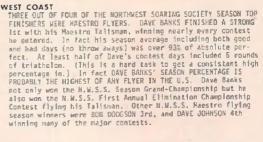


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I have a World Engines "Das Box Fly Bipe" which now has close to 400 flights on it and is still going strong. It is almost overpowered with an O.S. .40. Also, since the fuselage is much shorter than my receiver antenna, the latter trails a good 8"-10" beyond the elevator. One fine day at the field where our club, the Mid-Missouri Radio Control Association, flies, I switched on, fired up the .40, grabbed the transmitter and prepared to taxi out to the runway (our flying site is part of the former municipal airport - really nice). The bipe was sitting still at low idle so I blipped the throttle stick a little to get her rolling. The trusty .40 surged but the plane didn't. Thinking vaguely of a pebble under one wheel or a gummy axle, I gave it another burst - still no movement, though the .40 was really responding. This is the point where -at least it seems so in retrospect - the old brain cells apparently stopped functioning. There I stood staring in puzzlement at this old bipe while I pushed the throttle steadily forward. The old .40 was screaming at full power and that little model was thrashing and quivering like it was going to come apart but still not moving! Like it was on the end of a tether, I thought dumbly. Then I finally realized I was standing on that trailing antenna! Fortunately, I got my head reconnected to my thumbs and throttled back before I lifted my foot. I shudder to think what might have happened had I first moved my foot. Grinning sheepishly, I proceeded with a more normal taxi and take-off. I've taken off before with a collapsed transmitter antenna, but this is the first time I've come so close to taking-off minus the receiver antenna. A simple, plastic, strain-relief button installed on the antenna wire inside the fuselage saved

The other incident involved my grossly mislocating the C.G. on a newly finished Super Kaos .60. Preparatory to checking the balance on this superbly finished model (excuse my modesty), I wanted to mark the underside of the wing with small pieces of tape just at the C.G. point. I had the plans of the fuselage spread out on a bench in front of me and the wing on another bench directly behind me. I identified the C.G. location on the plans and thought, "One inch to the left of the main gear." (Now this is the embarassing part.) I then did an about face, picked up the wing and, holding it in a vertical position placed the pieces of tape precisely one inch to the left of the main gear. Upon assembling this beautiful bird I was surprised to discover how nose-heavy it was - I have a tendency to over-build which usually makes for tail-heavy aircraft. But, figuring that Mr. Bridi knows more about this sort of thing than do I, I proceeded to cut open the rear of

me all sorts of heartache.

to page 172

### Realistic

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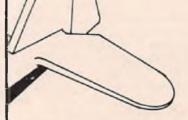
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### R/C MODELER MAGAZINE'S MODEL OF THE MONTH CONTEST

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Each month R/C Modeler Magazine will award a 371 Variable Speed Moto-Tool as illustrated in the photograph. The second and third place winners each month will receive a one year subscription to R/C Modeler Magazine or, if they are a subscriber, an extension of their current subscription.

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### FIRST PLACE

Charles R. Williams Decatur, Georgia

A kit built Tiger by Trueline with a wing span of 53". length is 44" with total weight of 82 ounces. Powered by K & B 6.5 with Robart Super Pumper and Tatone 305RX muffler, Uses an MRC 710 radio. Completely covered with SuperKote airforce aluminum.

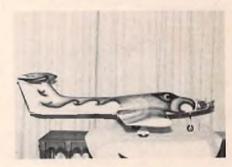
### SEPTEMBER WINNERS

#### SECOND PLACE

Gord McTavish Ontarlo, Canada

Spittire MK IIb modified from Dave Platt kit. Span 65", length 521/2" and weight of 71/2 lbs. Powered by OS Max .60 and using a World Engines Expert 5 chan, radio system, R & S Hobby Products Perfect camoullage flat paint finished the model which took approx. 525 hours.





THIRD PLACE

Robert H. Oliveira Abliene, Texas

Scratch built from original plans, the "T-Bird" is pattern type, teaning more toward the Sunday Flyer. Span 64", length 59" with weight of 81/2 lbs. Powered by Super Tigre G60 Bluehead P.D.P. and uses a Proline Comp. (5 ch.). Fiberglass (uselage from own molds with foam wing and ply skin covered. Super Poxy was used in the finish.

### RULES

- Model Aircraft Origin
  - Any let wood, liberglass, loam, or ARF kit is eligible. Any scratch-built aircraft built from magazine or original plans is also eligible.
- Category
  - 1. All types of radio controlled sirplane models a Scale
  - b. Pattern

  - c. Racing d. Fun-To-Fly
  - e. Original Design.
- C. Entrants to submit
  - 1. Color photo or slide, size 35 millimater or larger
  - 2. Black and white glossy photos (any size) of both sides, top, rear, front, and bottom
  - Close-up photos may be submitted on datail work if desired.
     A short write-up giving dimensions, weight, power, radio, etc.

  - 5. A statement that
  - a. The submitter was the sole builder of the model.
  - b. Parts and or accessories used were part of the kit or available to all modelers at retail outlets
  - c. All non-available or special parts were built by the hands of the submitter. Judging will be on
  - 1. Workmanship
    - 2 Quality of finish
    - 3. Attention to detail
    - 4 Subject of model or difficulty of the project will count in judging
- Judging will be done by RCM Editors Don Dewey and Pat Crews
- Persons not eligible.
  - 1. Members and employees of RCM or any other model sirplane publication.
  - 2. Members and direct or indirect employees of Dremel Manufacturing Co.

- 3. Members and employees of any manufacturer of hobby kits, hardware or succiées
- 4. Anyone engaged in the wholesale or retail distribution of hobby kits, hardware or supplies as a major source of income
- G. Models not eligible for submittal are:
  - Models that have been submitted for judging of workmanship at any major AMA sanctioned contest and have placed 1st, 2nd, or 3rd in that judging. Flying points. as a final standing do not apply.

  - Models that have been built for display purposes only.
     Models that have been built for manufacturers demonstration purposes.
  - 4. Models that have won a similar award in another publication.
- H. Entrants who have models that qualify under these conditions are eligible to enterincluded with the entry should be the entrant's AMA and FCC numbers, and also, the name of his club, if any
- Prize Information:
  - 1. A Oremet 371 Variable Speed Moto-Tool will be awarded to the monthly winner. An illustration and description of the kit will be included each month along with the winner's name, address, club, etc. The second and third place runners-up will be awarded a one year subscription to RIC Modeler Magazine.

    2. Dremet Manufacturing Co., of Racine, Wisconsin will be notified of the monthly
    - winner immediately after a decision is reached by the judges so that the kit award can be received by the winner prior to the issue of that months RCM.
- - 1. All contest entries must be addressed to RCM Model of the Month Award Program, R.C. Modeler Magazine P.O. Box 487, Sierra Madro, California 91024.
  - 2. All photographs and materials submitted by the contestant will become the property of R/C Modeler Magazine and none will be acknowledged or returned.

This contest will be null and void in any state or locality where specifically prohibited by law.

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SUNDAY FLIER

from page 170/15

the fuselage and epoxy in about three ounces of lead in order to obtain the "proper" balance. I must say, at the time it did strike me as a bit odd that not much more than a breath on the tail feathers and the model rocked back on its rear. Fortunately, once again my brain began to function before trying to fly the thing. Presumably the observation of the fall on its tail tendency kept working at me in some inexplicit manner because the night before the planned maiden flight, just as I was drifting off to sleep, I suddenly had a vivid visual image of what I had done in turning from the plans to the wing, misguided by the statement, "One inch to the left". Yes, I had placed the tape a

total of two inches to the rear of the correct C.G., thus "creating" the unusual nose-heavy model! Unfortunately, I made the mistake of relating this incident to one of my fellow modelers - one I had once thought of as a friend. Now he never fails to find some occasion to look beneath the tail of my aircraft and wonder aloud what all that scarring is on an otherwise fine looking model. I did have a bit of trouble digging out that lead!

> Sincerely, Joe Thorpe Columbia, Missouri

No question about it Joe, what you did started out to be dumb. But, if you had lifted your foot off the antenna, and the model had gone roaring off before you were ready to control it, or in the other instance, if you had tried to fly the thing "before your brain began to function," you could have been a winner. Winner?

Well, the fact is, to win the Mr. Dum-Dum award, you've got to be a loser.

As I said at the start, it was hard to pick the winner (loser?). Finally, though, I narrowed it down - but I just couldn't decide between the next two as to which one took the prize. So, I have called it a draw. George Turco, Carmel, New York was almost brilliantly dumb:

Mr. Ken Willard:

You are certainly correct in assuming there lurks a true Dum-Dum among the modeling fraternity! I hereby admit one such unintelligent act to cause the re-kitting of a favorite plane, the demolision of a great turning engine. and various electronic items strewn throughout the countryside.

The plane was a Goldberg Skylark 56. The engine an O.S. Max .35 R/C with World Engines radio. The covering material was Solarfilm. Now Solarfilm is



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very low heat activated, correct? Well nobody told me to remove the protective plastic material – that is nobody till Mother Nature. At about 150' or so the stab lost its stabilizing qualities when the material was swept away in some slipstream. We all know what happened afterwards . . . pretty dum, huh?

I must say one thing: no more ignoramous for me – it's read the instructions from now on.

Sincerely, George Turco Carmel, New York

Equalling George in the degree of uniqueness with which he displays outstanding dumbness is Charlie Snyder from Brandywine, Maryland. Charlie confesses:

Dear Mr. Willard:

Your request for candidates for the

"Dummy of the Year" award was very touching, in that it asked John Q. Modeler to bare his soul in front of the world. This is contrary to the nature of the beast since the average RIC modeler doesn't make stupid mistakes. Only us experts, with more than adequate glory to bask in (as evidenced by our supply of reusable parts) can afford to be big about it and admit the one possible error in our modeling careers.

Being below normal is not a fault, unless you don't believe it yourself. Since this isn't true in my case, let me pose the question to you:

Who could be dumber than the clown who, after disassembling an OS.40 and an Enya.45 in preparation for cleaning, proceeds to get his cans switched and winds up soaking them overnight in contact cement? As a result of this scientific test, I learned a number of

things: (1) contact cement does not clean engines, (2) contact cement gets rubbery when it dries, (3) contact cement likes metal so it really sticks, (4) you have two alternatives, either junk the engines or spend hours picking off the rubber.

Everyone I tell about this gets a funny look on their face and leaves. Maybe they can't stand the company of anyone so smart.

Hope this restores your faith in our fraternity.

Sincerely, Charlie Snyder Brandywine, Maryland

P.S. It sure tightens up an engine.

Yes. Charlie, Now I know, along with all the thousands of other Dum-Dums, that no matter what I do that's dumb, somebody, like you, and George, and all the rest, can, as you put it, "restore my faith."

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And thanks again to all you Dum-Dums out there who will just have to keep trying until next time. Keep reading.

Your Chief Sunday Dum-Dum will let you know.

#### **ENGINE CLINIC**

from page 12/10

the rpm loss is in excess of 500-600 rpm, then you know the engine is operating with excessive back pressure and can expect increased operating temperature. This being the case, change to a less restrictive muffler.

Dear Mr. Lee,

I am writing to you on behalf of a member of my club who is out of his mind with a Merco .61 Mk 4 RiC engine and trust you might be able to help.

The motor is litted upright in a biplane running on straight fuel and for the past year has given no trouble until recently. when for no reason at all, it started to cut in the air. As the compression was not as good as it might have been, the engine was stripped, overhauled and a new ring fitted; it was run in for one hour on the ground, but in the air we still had the cutting problem! New plugs were tried, also different fuels; the in-line filter was removed. It was run on exhaust pressure and without, and new fuel lines were fitted. It would run out a full tank on the ground, but in the air after a couple of minutes, it still cuts whether in straight flight or not. Oddly enough, we had exactly the same trouble with an OS 40 R/C a year ago and never found out what the trouble was! Well, if you can help us, we should be very much obliged.

> Yours truly, Ken Murgatroyd Manchester, England

You did not say if the engine would run the tank out if set off very rich. If so, then this would indicate a problem in the engine. An over the hill engine will have a very narrow two cycle range and, if set off too close to peak, will lean out in the air and simply cut off as the fuel level drops. This is easily detected on the ground by the very narrow two cycle range. Rather than having a broad two cycle range with the engine sagging when leaned too far, the two cycle range will be very narrow with an abrupt shut off of the engine if leaned too much. Even though the engine was over-hauled with a new ring, many times

fellows will neglect to replace other parts that are badly worn also — piston, sleeve, etc.

If the problem persists with the engine set off very rich, then the trouble has to be in the fuel system. There is a hole in the pick up line, a crack in the tube to which the pick up line attaches, etc. This is assuming that the head, back cover, etc., are all tight with no leaks.

Dear Mr. Lee:

Please answer the following questions concerning the K & B 6.5cc front rotor rear exhaust model plane engine.

I have had problems getting a muffler or tuned pipe for this engine. Could you send me a list of manufacturers who market tuned pipes or mufflers for this engine?

I would also like to know if the Perry Aeromotive pump plus carb set would fit the K & B 6.5cc front rotor model plane engine (the set for the K & B .40 that is).

If not, would any other pump plus carb set fit my engine?

Thank you for your help.

Sincerely, Tat-Lam Wong Canada

The K & B 6.5 front rotor engine is offered in two versions. The #9000 sport engine that comes with a Perry carburetor and muffler, and the #9020 that is intended for free-flight and pylon racing. This engine comes with a standard venturi insert rather than carburetor and 4" mini-pipe. I am assuming that this must be the engine you have. The muffler and adapter for the sport engine can be installed but you would not want to do this as the engine has "pipe" timing and will not perform properly without either the 4" mini-pipe or a full length tuned pipe.

As far as mufflers for the engine — besides the stock K & B muffler, Mac's Products, 8020 18th Ave., Sacramento, California 95826, has a muffler for the 6.5 that exits to the side.

Several manufacturers offer tuned pipes that can be used on the engine. OPS and Rossi both have .40 size pipes that can be used. International Products, 1010 Morse #4, Sunnyvale, California 94086, had a complete line of tuned pipes and adapters including a .40 size.

A Perry pump carburetor will fit the engine, but Perry does not make a pump for the engine. The K & B.40 pump does not extend deep enough into the case. This can be used if approximately 3/16" is removed from the back of the crankcase. In lieu of this, a Robart Super Pumper can be used with the Perry pump carb but, due to the lack of a regulator, you will notice a variance in mixture between a full and empty tank. This would not be as great if the standard .60 (non-pump) carburetor is to page 178



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- · Wing Area 540 sq. in.
- Weight 5%- 6% lbs.
- Will adapt to all makes of retractable landing year

## KIT CONTAINS:

10 oz. epony glass fusciage with fin & canopy midded in. Precision cut foam wing & sab. 1664" ph wing stab covering supplied. All bufsa parts machine cut.

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Detailed plans & instructions



## KIT CONTAINS:

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supplied Build it fixed-gear or retractable All balsa party machine cut.

All hardware supplied Detailed full-size plans (Step by step instructions)

# Kit Price \$109.95

- SPECIFICATIONS:
- Engine Size .61
- Wing Span 64.75"
- Wing Area 679.8 sq. in.
- Roof Airfoil 16.5% Tip Airfoil 18.5%
- 51ab Span 27"
- Slab Area 168.75 sq. in.

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Designed by Bob Dellacamera Featured in RCM July 1976



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Kii Price \$149.95

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Wing Span 64"

KIT CONTAINS:

d oz. epnin glass fusetage Machine cut ribs Extra fine quality balsa & spruce Tinted lexan canopy

full size plans
Detailed step by step instruction

# SPECIFICATIONS:

Wing Span 98

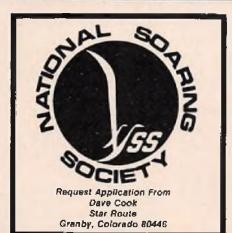
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# ENGINE CLINIC

from page 175/10

used. This is the carburetor supplied on the #9000 engine.

Dear Mr. Lee.

I have a Super Tigre 23 by World Engines, I run an 8/6 prop and use a 4 ounce Kraft tank. Every year it breaks a connecting rod; it's been replaced twice. I got it July 4, 1975, and it runs good for a year, then it quits. I run Stanfields Premium 10% fuel. Why does it break a connecting rod?

> Sincerely, Darren S. Davis Parker, Idaho

Any number of things could be causing the rod to let go in your S.T. .23. Just plain running the engine too lean a previous crash that has caused a mis-alignment between the crankshaft and cylinder bore — a defect in the engine allowing the piston to hit the head at top center or piston skirt to hit the rear bearing or crank at bottom center back firing and throwing the propeller, in turn, allowing the engine to turn up free etc., etc. Too many variables involved. here to give a positive answer.

Dear Mr. Lee:

After its last crash and rebuilding, my Super Tigre .60 gives out black exhaust oil. In the crash, the front end of the crankshaft was bent but I was able to straighten it to a total run out of .0002". With new bearings, it turns over by linger and thumb without any binding when fully assembled. The black in the oil I assume is coming from aluminum wear. The back plate shows signs of the connecting rod rubbing on it. The connecting rod is free to float forward and rearward on the crank pin and wrist pin. In vertical climbs it might drift rearward and rub on the backplate.

There is no loss of power apparent in the performance, but I do not like the black oil. Please let me have your advice.

> **Bud Phillips** Ontario, Canada

More than likely, the crash has caused a mis-alignment in the engine. Possibly the crankshaft is no longer 90° to the cylinder line. If sprung upward slightly, this would cause the rod to be driven to the rear rubbing more than normal on the back cover. Polish marks from the rod are normal on the back cover. If it starts to wear a groove, it is not normal, Are you sure that when you straightened the crank it is dead free? The counter balance should rock to dead bottom by its own weight. If not, there is a bind that must be corrected. Usually when a

to page 180



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BANKAMERICARD





## from page 178/10

crankshaft gets bent, the front plate gets. bent as well causing a bind. This will result in black in the exhaust. There is always the possibility that whatever is binding will wear itself in but it would be better to find out where the black is coming from to begin with.

# **CUNNINGHAM ON RC**

## from page 7

anchored under the helper's foot. One of the outstanding accessories that EK produces is a simple little grouping of plastic parts to make the antenna attachment to the aircraft. It is super, and I strongly recommend that you try their method. It works very well.

The wire cable that connects the receiver to the battery is normally intersected by a switch harness and charging plug. These, too, should be mounted on the fuselage away from the engine exhaust. I like to mount the switch inside the aircraft with only a push-pull stick poking through the fuselage. Sometimes I mount the charging jack inside the fuselage, and sometimes to the fuselage side. depending upon the way that the radio is installed. But, in mounting the switch and charging jack, and in routing the wire cable from the receiver to the battery, make sure that the cable does not contact a ply bulkhead or other abrasive part of the fuselage. Since prolonged vibration can cause the part of the fuselage to act like a saw upon the cable, the result is that sometime during the life of the aircraft, the battery will wave bye bye to the receiver, all of the time you're waving bye bye to the airplane. It helps to be careful.

While you're being careful that the cables are okay, make sure that the battery is installed in such a manner that it will stay in place no matter how wildly the aircraft is gyrating. A loosely installed battery can flop around inside the aircraft, getting wound up in its own cord, and eventually unplugging itself. Wedge it in place with chunks of foam rubber. The best friend that your radio can have is a good supply of foam rubber so that you can pad everything inside the fuselage with foam. Not only does this protect the radio and battery in case of a crash, but also protects it from that old demon, vibration.

The same is true for the cables going from the receiver to the servos. Make sure that they are routed so that they are not cut or abraded by some part of the fuselage, and that the connections are held firmly in place. Some plugs are not quite tight enough to hold from just a wedge, or friction fit between the male and female members. A bit of tape wrapped around the plug, or a connecting bracket, or a bit of pipe

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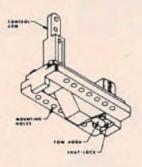
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cleaner wired so that the plugs can not unplug themselves, is an extra bit of insurance that is worthwhile. While checking all of this, take time to make sure that movement of the servo arm or the pushrod does not contact any part of the antenna wire or the servo cables. It's also a good idea to check your aircraft every now and then to be sure that nothing has changed or moved from its original location. As an extra precaution, it is a good idea to take the time to investigate the inside of your aircraft after a too-hard landing. The aircraft may look okay on the outside, but you just might have popped a servo support bracket loose from the servo rail. You might not notice it while the aircraft is sitting on the ground, but once in the air ... you'll notice it. The fliers who have the least amount of trouble are those who have developed a system of radio installation that eliminates as many trouble spots as possible, as well as taking the time to check over their aircraft after an unusual bit of contact with the ground.

Back along time ago in my early days of enjoying radio control, I was blessed with an engine that vibrated like crazy. It wasn't just my engine that vibrated this much, all of that particular type did. They were quite powerful, but they vibrated. I would have been way ahead of the game to throw this engine away and get another, though possibly less powerful, engine, because I lost several airplanes and at least one radio to this vibration. If you are plagued with vibration, first check the prop to see if it is balanced and runs true. If in doubt, throw the propaway, and check the engine. If it still vibrates rather than runs smoothly, then take it out of your aircraft, polish it up until it gleams, and then make a bookend out of it. Most of today's engines are very smooth running, but if you do get one that vibrates, don't use it - - - you will be much better off in the long

A couple of months back, I mentioned one of my pet dislikes, the letters from clubs soliciting contest prizes. I have received quite a bit of mail from others in the hobby industry who are also deluged with requests for prizes, so much so that most have decided that they cannot possibly donate to anything more than their immediate area. However, I did receive a letter from Bill and Bob Hunter of Satellite City, manufactures of Hot Stuff, that I would like to pass along to you:

Dear Chuck,

Bill and I read your column with interest and in the June '78 issue on page 180 we noted your item regarding donations for raffles and contest prizes.

We read your ideas with great interest because we have worked out a system which seems to be working along these

to page 183





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any of these issues







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## CUNNINGHAM ON RC

from page 181/7

same lines for everyone concerned. We are enclosing a pad of 1/2 price contest vouchers which are self-explanatory.

When we receive a request (we average about eight a day) from a club, we send a pad of twenty of these vouchers and a 'thank you for thinking of us' letter. We feel that this method will do several things. We can donate to every club request and the recipient will have his choice of goods at a very reasonable price.

If all manufacturers would do this, it

would provide a continuous flow of desirable merchandise for contest winners and if the clubs would think about it, they could subsidize the winners desire on any voucher from contest entry fees, rather than expending retail dollars for dust collecting trophies which eventually end up being set aside.

As an example, \$500.00 spent for trophies on a retail basis would purchase \$1,000.00 in useful hobby items of the competitors choice.

We don't propose a "carte blanche" deal from any company's catalog sheet – better a maximum dollar figure such as \$25.00 retail per voucher (or catalog sheet marked as a voucher) with a certain percentage being sent in with the order.

We'd like to know what you think of our approach and, as far as the enclosed pad is concerned, perhaps some other manufacturers would be interested in the idea, or you may have a club who would like them for their next contest.

Finally, please note that we've dated and initialed each voucher in blue ink (for obvious reasons).

Best regards, Bob Hunter

It seems to me, the Hunters have come up with a really good, workable

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idea. A copy of the voucher is reprinted on page 7 so that other manufacturers can take a look at it to see if it just might solve the problem for them too. Along this same line, hobby shops could print up gift certificates that could be purchased by the awarding club at a reduced price, allowing the hobby shop to make a profit on the sale, yet awarding a prize to the contestant that he can use. Fiscal reform ideas as well as tax reform ideas are sweeping through the country, and along with these reform ideas needs to be a reform in the method of soliciting prizes for contests. Congratulations, Bill and Bob, for a great idea, and I hope that others will follow suit. As for that pad that you sent along, it was used at the Jumbo RC Fly In.

Before winding down this month, one more comment about economics and the model builder. Most companies in the modeling industry are very small. Even the large ones are very small by standards applied to other industries. These small companies are trying their very best to bring you a new, better, different product, and also trying to make a profit while doing it so that they can stay in business. It's the famous old American way of free enterprize, and no place is it more evident than in this hobby's industry - - - small businessmen trying to be successful by bringing you a product that does a good job for you. Just because XYZ Company didn't donate to your club contest, don't knock em. They simply can't afford it. To bring you better and better modeling products takes lots of time, money and effort. We are all reaping the rewards of this effort in even better planes, engines, radios, hardware, and ideas. It would be a shame to stem this flow just for some contest prizes.

Time to step down off of the soap box for this month. If you like Bob's ideas, write him and tell him.

# FROM THE SHOP

from page 2

his well known superb craftsmanship into the Shoestring with the anticipated performance to exceed 300 mph. At the same time, Paul is building his own Formula I racer which he is calling Snowshoe. As if that isn't enough, the Thorpe that he has just built is in the paint shop getting its final trim colors.

While we were snooping around the hangars. Vern Meznmer rolled out his gorgeous EAA award winning Cavalier, that he built and roared off into the blue. Vern is a prominent electronics type with Kraft Systems. Also from Kraft was Marty Barry; he was involved in the unglamorous chore of stripping his Cessna in preparation for a new paint job.

Maybe that Sunday at Oceanside airport had nothing to do with R/C, but it was RC'ers doing their thing with full size aircraft and it was enjoyable.

# WE ONLY HAVE ONE PAIR OF EYES — PROTECT THEM!!

Why do we risk losing our precious eyesight, especially when we know better? Is it because we have done dumb things before and have gotten away with it? Is it because it simply hasn't been convenient to protect ourselves from ourself?

Hobby Products, 18719 Covello Street, Reseda, California 91335, is marketing a dandy pair of safety glasses for \$2.69. They are made of a tough shatter-proof, lightweight, clear plastic and will fit over regular glasses. You can get them from your hobby shop who, in turn, can get them from ACE R/C or A & L Distributing. If there is no hobby shop close by, order direct from Hobby Products or Ace.

In working with the exotic chemicals that we use, such as epoxies, resins, instant glues, etc., a little dab in the eye can not only ruin your whole day, it can possibly ruin your whole life. We also know that when we use power tools for drilling, grinding, sanding, and buffing, we should be wearing eye protection. At their reasonable price and convenient availability, there is no excuse for not doing yourself a favor by wearing them. At least, get a pair and use them.

Now that we have the safety glasses, let's look at a new and safer grinding disc being introduced by House of Balsa. They call it Tuf-Grind. It is a fiberglass disc impregnated with an epoxy/abrasive mixture and cured in a die under high temperature and pressure. It is used in a motorized grinding tool in the same manner and for the same purposes as the carborundum cut-off discs that we have considered a vital model building shop tool.

The fiberglass provides a reasonable amount of flexibility without shattering. How often have we had the old solid disc shatter from a slight misalignment while cutting off a piece of music wire with the broken pieces striking us in the face or ricocheting around and sticking in the super slick paint job of our latest pride and joy model? How often have we finished using the grinder only to watch the disc shatter when we slightly bumped something while not being too careful laying it on the work bench? We aren't saying that you can't break them, we are saying that they will survive 90% of the abuse that destroys the old solid discs.

Naturally, you must wear your safety glasses while using Tuf-Grind. You will still have the grinding particles and sparks flying around that can harm you.

Please protect your eyes, how would your read all the good stuff in RCM without them?

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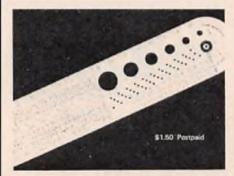
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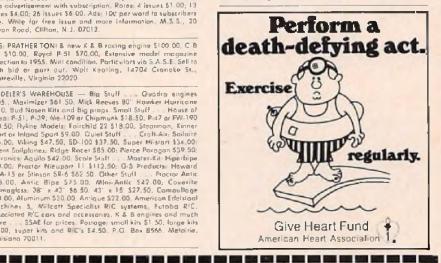
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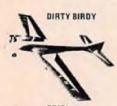
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