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SPECIAL REPORT: SCALE WORLD CHAMPIONSHIPS

02479

VOL. 8, NO. 6

DECEMBER 1982

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CANADA

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SCALE R/C MODELER



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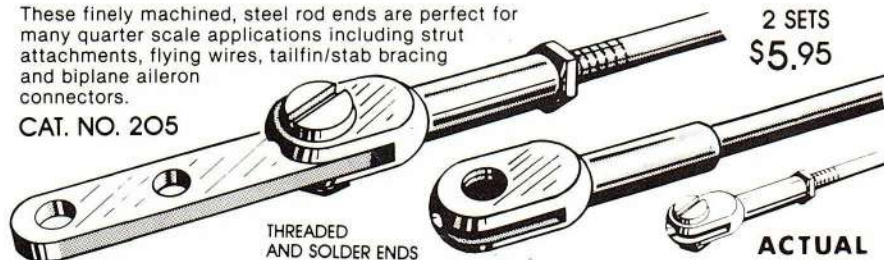
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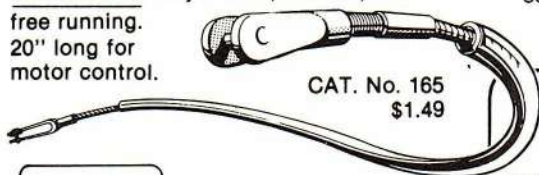
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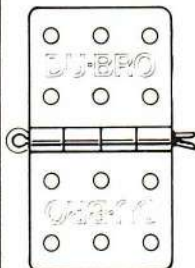
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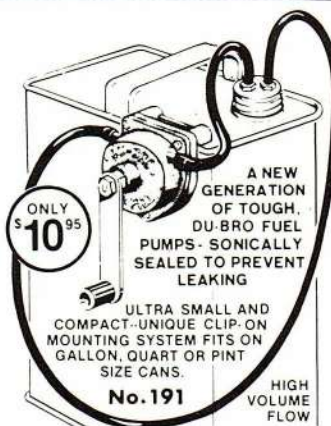
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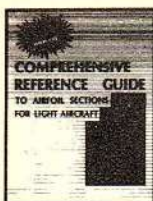
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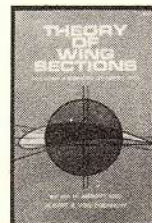


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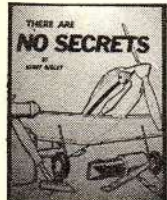
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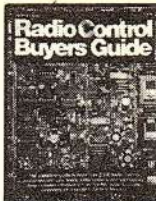
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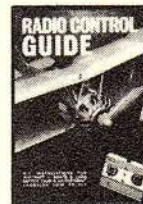
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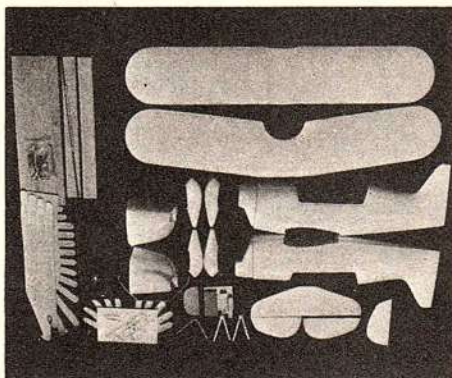
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EAGLE

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Wing Span: 68"

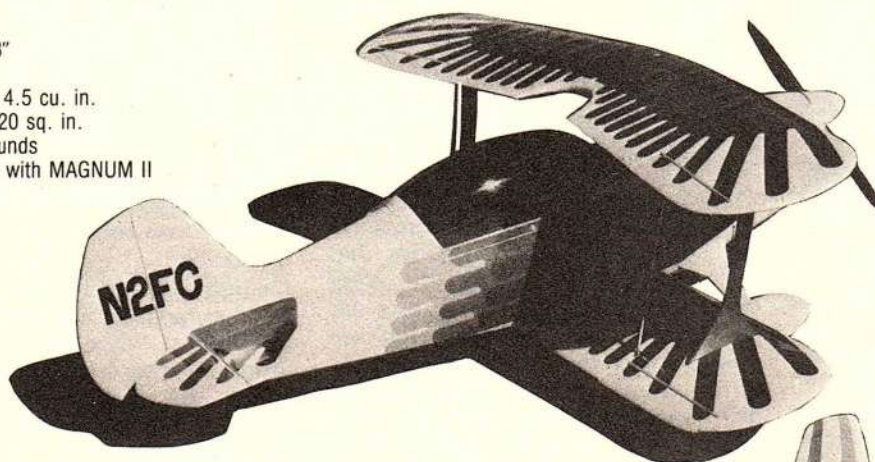
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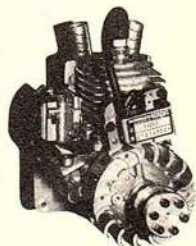


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Wing Span: 81"

Length: 68½"

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planning a FUN-FLI!

**SOME HINTS ON MAKING YOUR NEXT BIG BASH
A BIG SUCCESS, AND NOT A BIG BUST**

By Walter Clark, President
San Fernando Valley Giant Scale Squadron

J. R. Naidish photos

*The busy pit area at Sepulveda Basin.
The crowd just about doubled on Sunday,
and crowd control was critical. Bleachers
are provided directly behind pit fence.*



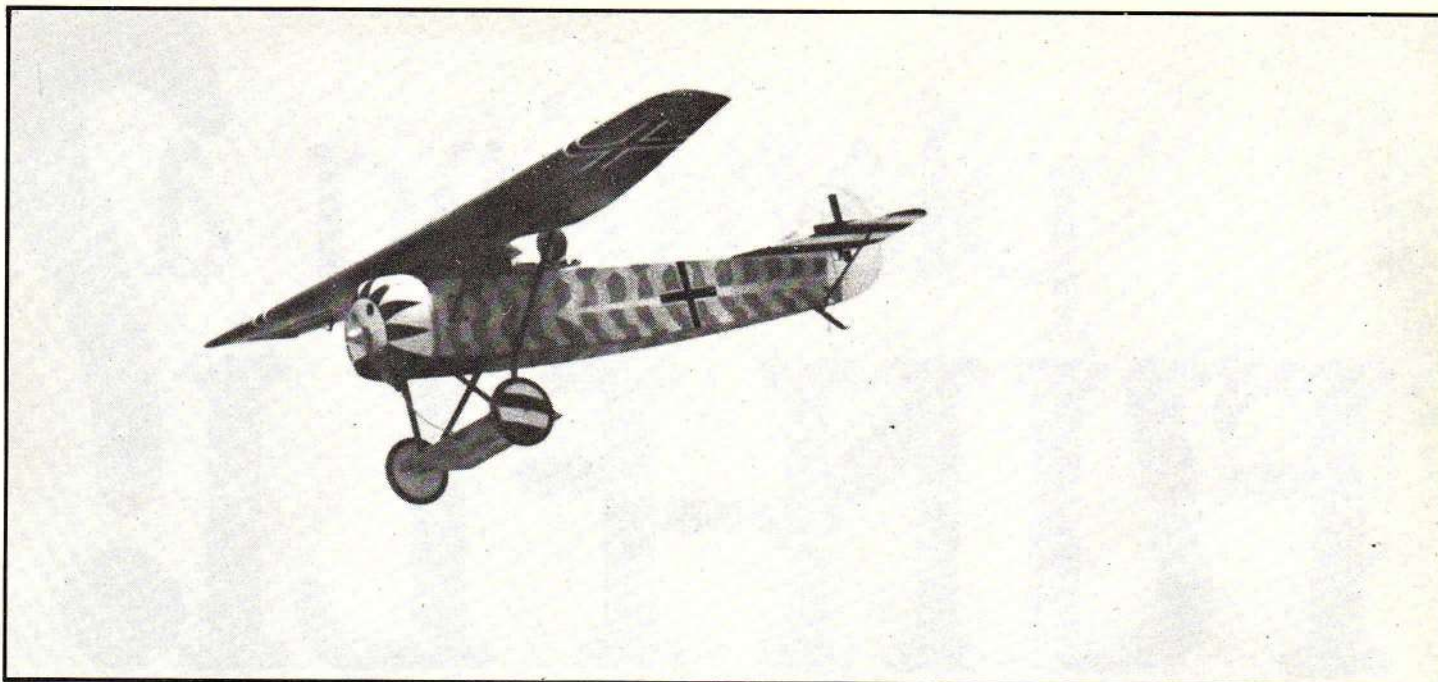
After the success of the IMAA Chapter 79 and QSAA Chapter 7 Fun-Fli, the Editor asked me to share some of my pre-game strategies for running a large event. This year's get-together drew some 89 participants, from a three-state area (California, Nevada and Arizona).

Actually, what really was impressive was that, by comparison, the

previous year's meet was almost a total disaster. We went through all of the planning stages, and official notices had been mailed, bulletins were posted in hobby shops, etc. When it looked as if all systems were go, the City of Los Angeles decided to re-vamp its storm drain system. The ten-foot diameter pipes were going to cut right through the runway at the

Sepulveda Basin flying site! Panic hardly described our situation. We hurriedly made arrangements with a nearby club to use their field for the weekend, but many of the fliers never received the notice in time, or were confused by rumors of the meet being canceled because of the torn-up flying field.

As the president of the club this
scale r/c modeler 11



You can always count on Harry Apoian for a little comic relief, but most spectators were looking for a red D-VIII!

year, I felt it imperative that we make a strong showing, to overcome the handicap of having put on a weak event last year. The San Fernando Valley Giant Scale Squadron is a very strong group, with lots of involved members . . . and that's the crucial item for any successful meet. If you don't have manpower (and by that I mean more than just bodies), you aren't going to be able to effectively function.

Russell Asher's CAP-20 was nicely detailed, and it flew well. If you look closely, you can see his muffler hanging by a fuel line behind the wheel pants.

Many clubs go into an event like this with a Pollyanna attitude, thinking that participants will beat a path to their flying field. Unfortunately, that is rarely the case, and we've been to events which were great one year, then changed for the worst the next year. This usually resulted from a change in club membership. The modelers tend to remember such things, and it can be a real chore to get these attendees to come back again, especially if any great traveling distances are involved.

Even though the event was scheduled for May, we were already in the planning stages the previous Fall. Magazine lead times can be as much as three months, so we needed to have some good-looking ad copy

ready to mail by the end of February. Even with months to spare, we barely got it out in time. Human nature will always add extra wasted time to your schedule, so count on some procrastination and sandbagging. On critical items, you may want to insure completion by using a buddy system, so that two people are working together. Remember, people get sick, change jobs, etc., so plan accordingly.

I decided that our group was so well organized that a formal committee-type organizational chart would work best. You may find that the "personality" of your club works best with a more casual attitude. No matter what your style, you are ultimately responsible for making



I ♥ SNOOPY

sure that everything gets done, so don't get yourself painted into a corner with the whole bag of jobs in your lap at the last minute.

My Department Heads were classified as follows:

- Registration
- Aircraft Inspection
- Transmitter Impound & Scanner

- Public Address System
- Snack Stand.

Your particular flying facility may require other personnel, such as flightline expeditors, frequency clip runners, etc. Just make sure that the buck for each job (or potential problem) falls on someone. You might

want to have two people on the P.A. system, so that one man doesn't have to talk himself hoarse. Be sure that these guys know their airplanes and have that natural gift for gab which keeps the crowds both educated and interested. The loudspeaker announcer should not be used to page fliers or do other func-

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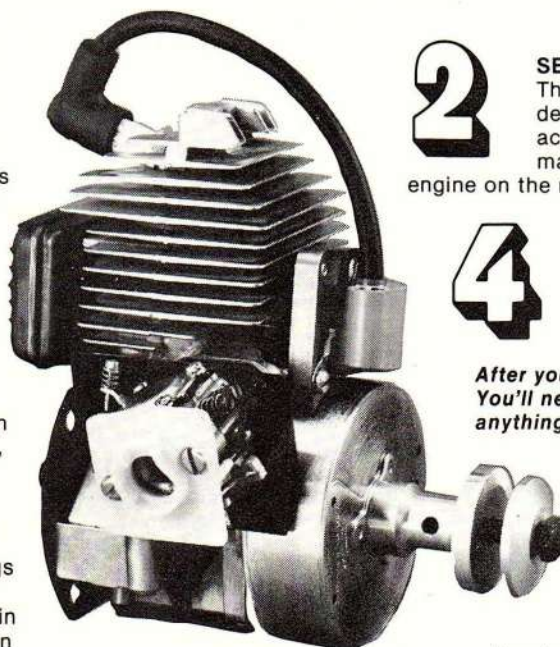
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John Brassner flew this Tiger Moth, which was originally built by John Pahlow.

tions that a flight expeditor could do better. He should also keep plugging the sponsors, any raffles and the snack bar—after all, someone has to pay for all of this.

Publicity is where most clubs seem to fall short. Fliers have egos, and it can be a real downer to not have a throng of spectators to cheer everyone on. Use the local media for support. Call the local newspaper, and try to get some advance publicity. Have someone in the club get some black and white photos ready, and send these, along with a press release (a letter explaining all the details is usually sufficient) about ten days before the event date. Newspaper reporters appreciate having the information "spoon fed" to them. Call three days before the weekend and ask the reporter who is handling that department whether he can send a photographer out. If you get a hesitant "probably not," then offer to call him on Monday and give him the story, and ask if he'd like a photo from your photographer.

The same holds true for radio and,

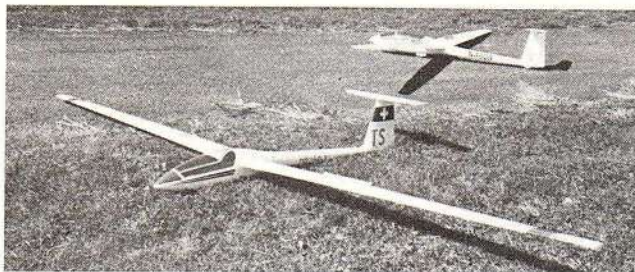
to a lesser degree, TV. The FCC keeps an eye on radio and TV, and mandates that they respond to public service type affairs. Call the stations and ask what they require to get a free spot announcement in their "Community Affairs" time slots. The radio stations usually only want a postcard with the day, time, location, etc.

TV is a different matter. You can get a spot announcement usually by supplying them with details in a press release, as well as submitting a slide of the activity (TV likes to have something visual to put on the screen while the announcement is being made). Some of the more progressive stations can use video tape, but that's a remote possibility. How-



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DIAMANT
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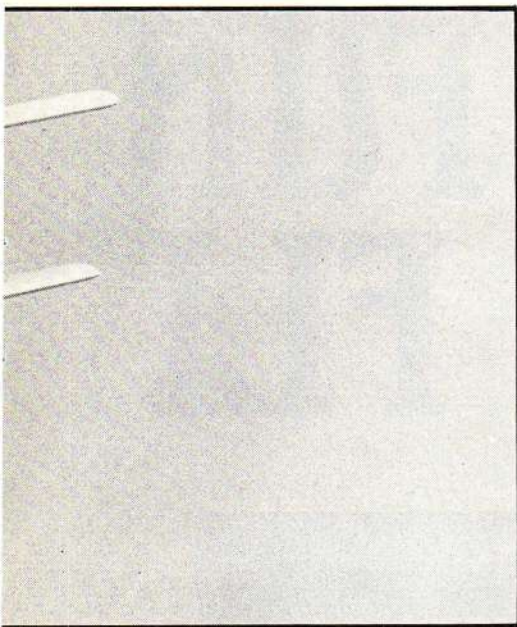
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ever, such a tape could be used in conjunction with a personal interview on a talk show. No, you aren't going to be on the Carson show . . . more likely, you'll be aired at 6 a.m. However, this is still good publicity, and you might be pleasantly surprised to wind up on the Sunday morning talk show the day of the big event.

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Another CAP-20L, this one by Neil Sweeney. This was one of the most popular aircraft designs at the meet.

pulled at least that many, and people were being turned away because the main access road to the field was being blocked by cars.

Naturally, the importance of crowd control gets critical with that many bodies roaming around. The Sepulveda Basin is a superb field for spectator events. There are bleachers, and a fence to keep onlookers

out of the pits. However, the pit area is small, and even an extra dozen people who don't belong there can be a problem. We decided to use a badge system. Pilots had a badge identifying them, and the Pit Crew was also identified by badges.

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Bob Adams' Citabria drops parachutes, and has an on-board camera for taking photos.

The Department Heads wore badges labeled "Official," and the assistants wore "Committee" labels. Everyone else was courteously asked to remain outside the pit area. Make sure that the spectators can get to the concession stand.

We did a mailing of some 100 letters to QSAA and IMAA chapters and members within a three-state area. I also sent about 90 letters to manufacturers who make items related to giant scale. These manufacturer solicitations are tricky business. They are inundated with such requests, and they usually decline to send merchandise. Don't take this as an insult, for these

people would quickly go out of business if they tried to support every meet. We were lucky and managed a raffle which had three chain saw engines, five 1/4-scale kits, sixteen bottles of Hot Stuff and Jet, eleven magazine subscriptions and over a dozen big props.

It is wise to touch base with the Department Heads on a frequent basis, but I found it better to do it on an informal basis, rather than at the monthly club meetings. The need to communicate can't be over-emphasized. The weekend before the big day, the Department Heads all congregated at a restaurant near the flying field. We hashed out all of the details, so that everyone could appreciate his interdependence with the next man. We threw out hypothetical problems . . . everything from bad weather to a major injury on the field. We anticipated every contingency.

The one thing we couldn't control happened to have been cooperative. The weather was 74 degrees and calm all weekend. By Friday afternoon, the out-of-town fliers were arriving, and the parking lot started to fill with campers. By the 9 a.m. pilot's meeting, there were 62 modelers entered, and eventually we signed up 89.

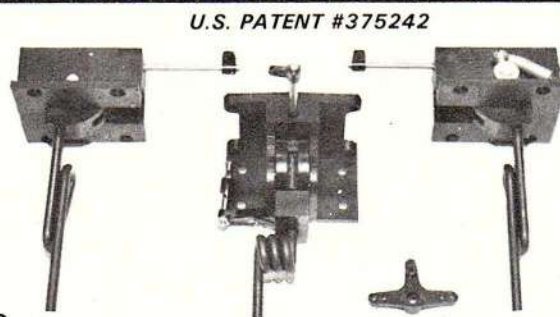
If this all sounds like a lot of work to you, then maybe you really don't want to host a full-fledged fun-fli. Actually, spread over 5-6 months, there is no real workload on any one person, providing that you are working with a cooperative club. The key to success is planning and organization. Once you've done it, the exercise becomes much simpler the second time. We found, from experience, that it takes just as much work to put on a bad fun-fli as a good one. The weekend of the meet was anticlimactic. We were so well organized that most of us even managed to have some fun! □

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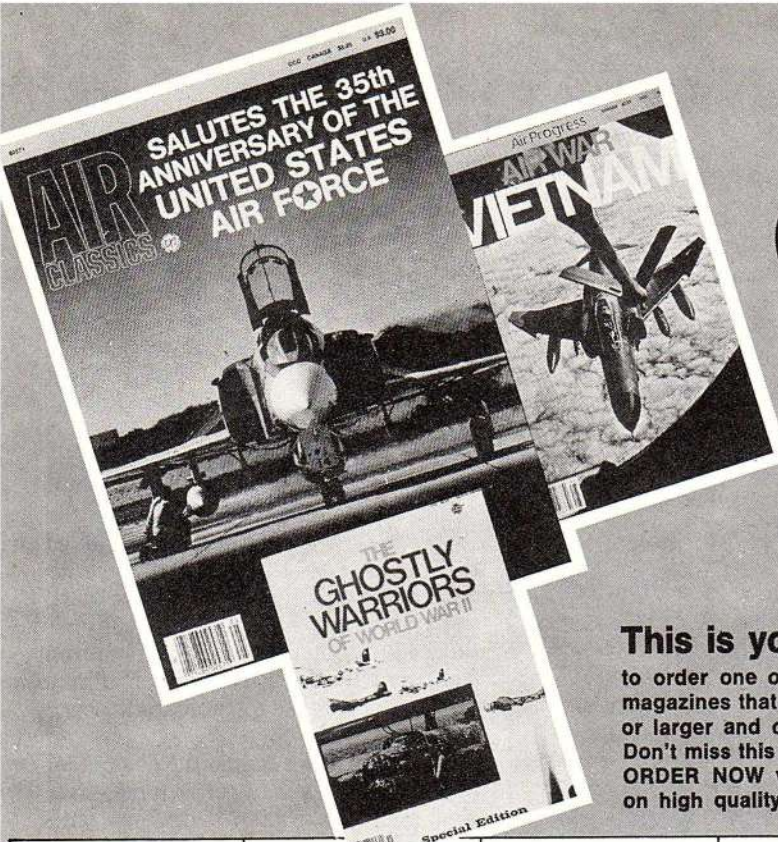
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A BETTER IDEA

Keep those wheelpants on!

By Jack Strickland

Here's a quick and simple way to keep the wheelpants on that scale model from twisting, or getting knocked off. I developed this concept for the Contempo Christen Eagle, and it has worked flawlessly, even surviving some almost disastrous landings.

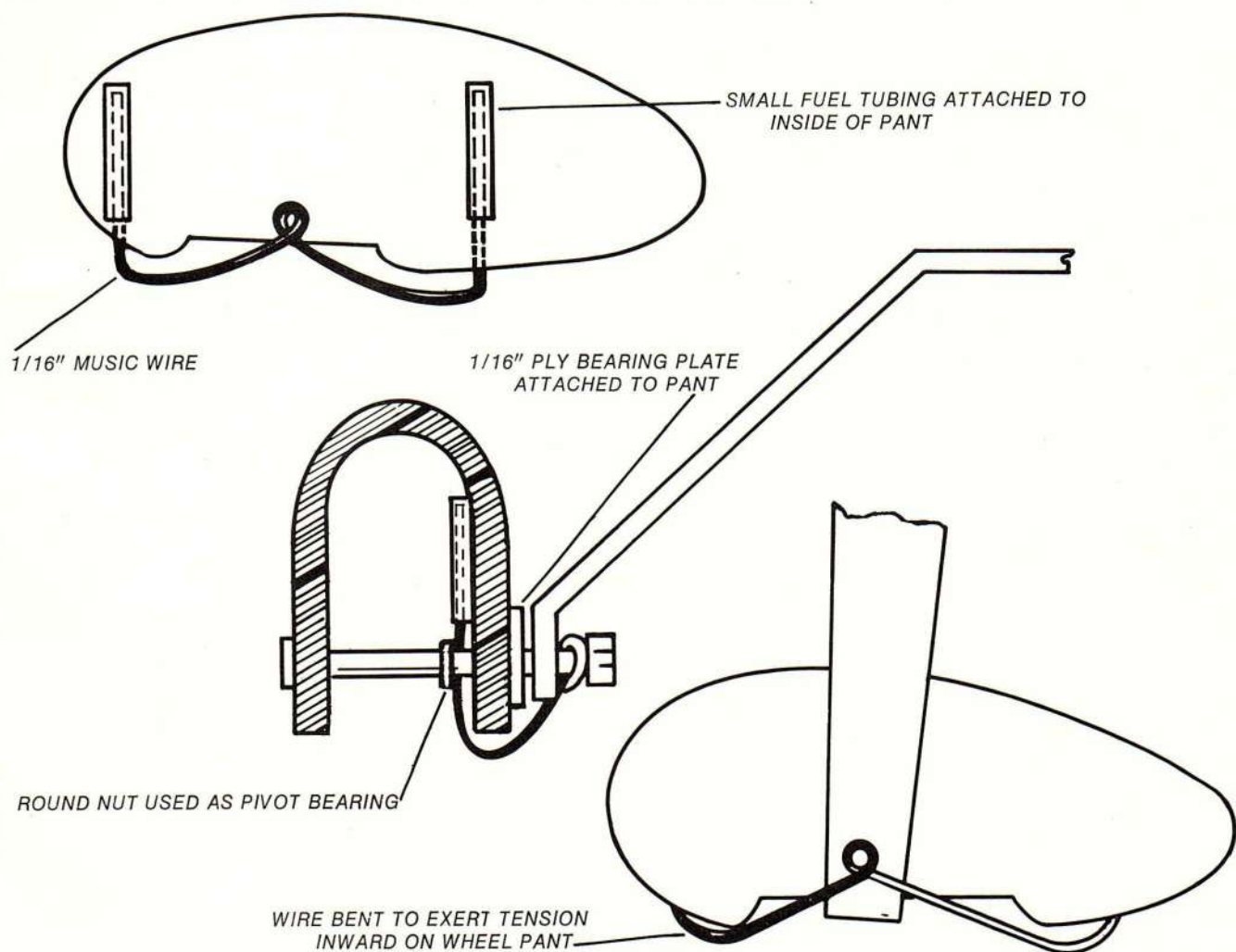
The concept is a coiled retainer spring, which is bent to vaguely resemble a pair of steer horns. The center loop attaches outside the pant to the inside retaining of the axle, while the two whiskers or horns rest inside the wheelpants. They provide both a load to hold the pant against the inner axle, but they also keep

the pant from twisting. The ends of the wire are captured in lengths of small fuel tubing, which are epoxied directly to the inner wall of the wheelpant. Note that a 1/16" ply bearing plate is glued to the outside of the wheelpant to absorb any friction from the strut leg. Also, the inside of the wheelpant has to be free to rotate, so we use a round nut as a pant bearing. The pant is supposed to be able to pivot slightly, to take up the impact of a nose-over, etc., yet still be rigid enough to not be deflected by air loads in flight. The entire pant can be removed by pulling the wire whiskers down.

* * *

If you have a better idea, why not share it with your scale friends? We will pay \$5 if your idea is used. Please attach a sketch or photo of your idea to help clarify the concept, and submit a brief written description. It's a good idea to include your phone number, in case we need to verify information.

Send all your hot ideas to: "Better Idea," SCALE R/C MODELER, 7950 Deering Avenue, Canoga Park, CA 91307. □



Part II

NOSTALGIA SPITFIRE

By Bob Frey

J. R. Naidish photos

The conclusion of our two-part article on modifying the Sterling Spitfire for contest work. There's life in the old kit yet!

The October issue carried Part I, which was a discussion of the events which led up to the author's selection of the aged Sterling Spitfire kit as a suitable scale model for Masters-level contest work. The first installment deals with the necessary modifications Mr. Frey made to the kit in order to improve its contest worthiness.

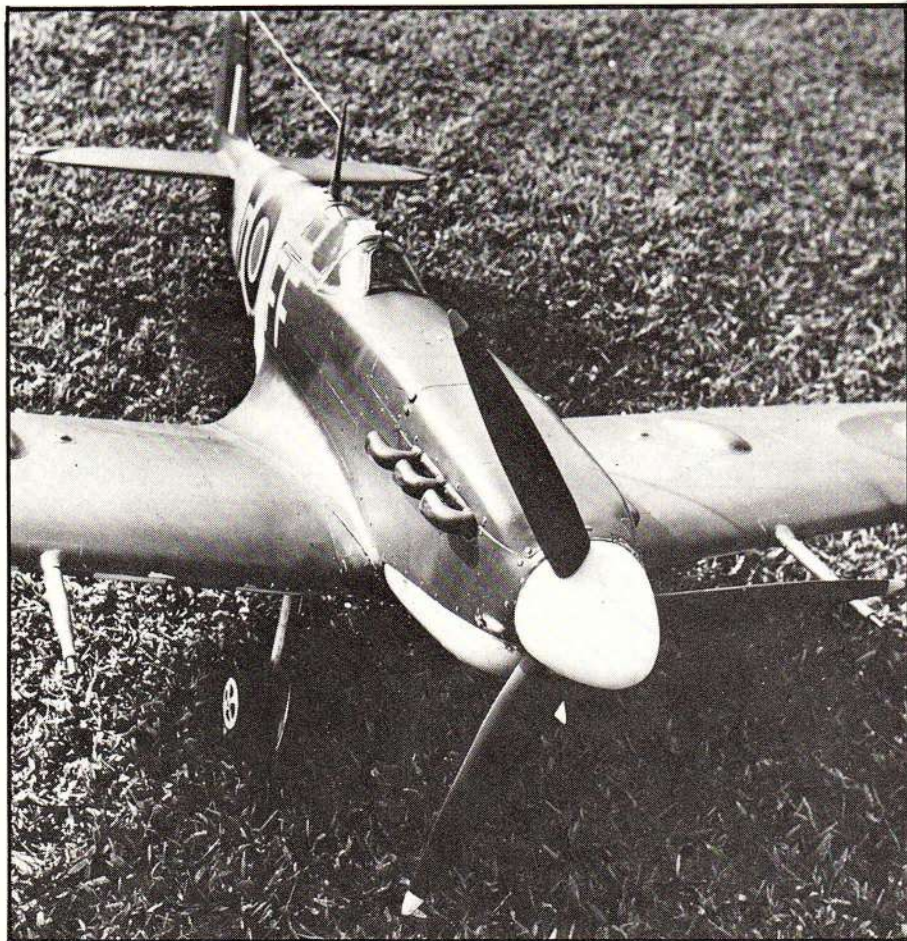
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Time to start gluing A to B. But first, a raft of additional parts must be fashioned. Templates were traced from the sketches drawn into the plan, then transferred to the various materials and cut. As many of the additional parts as possible were made now, so as not to disrupt the flow once actual assembly began. One thing to be avoided is to modify existing kit parts prior to their assembly. Better to wait and test fit these parts. A mismeasurement or other error in your drawing could otherwise cause the waste of a perfectly good kit part.

My high hopes of sprinting through the basic framework assembly process were dashed on the rocks for a number of reasons. Of course, test fitting, adjusting and insuring the workability of additional parts for mods took some time. But there were other great time bandits to be dealt with which I hadn't anticipated . . . die cutting quality, for example. This appeared to have been done by some undernourished individual wielding a soft aluminum cookie cutter. Virtually all the die cut balsa parts had to be trimmed a great deal, but the plywood items had to be sawed out in each case. All of the parts fit well once trimmed, and I have since learned that "die crushing" was not an uncommon characteristic in all kits of this vintage. In fact, some merely had parts drawn on the various ply and balsa sheet thicknesses, with all cutting left up to the builder.

In addition, I was becoming quite

The trouble with the old Sterling kit is that a lot of the wood was hard and heavy. Also, be prepared for a lot more parts than today's kits have.



concerned as to whether this kit was indeed manufactured from balsa wood. The stuff was light enough, all right, but it had all the other qualities typically associated with hard rock maple. Not only was this wood sandproof, but also Hot Stuff proof. Truly amazing.

Some questioning of the old hands who had built such kits solved these mysteries. In the first place, wood selected for the scale models of yesteryear usually was medium hard or just plain awful hard balsa. It was felt strength was a prime requirement . . . due to the prevailing high number of mishaps. Also, less warpage is encountered when using dope on harder wood. The fact that the wood in this kit had completely dried out during countless years on the shelf not only added to the hardness problem, but also made the wood cyanoacrylate resistant. Apparently some sort of moisture is needed for Hot Stuff, ZAP, etc. to "kick" properly. *(Also the resins in the wood must maintain the proper pH value. PHP)*

Well, the old plywood sanding block was cast aside in favor of a Black & Decker loaded with 80 grit. A damp rag was always kept handy for preparing parts destined for the Hot Stuff treatment. The problems were solved, but precious time was lost in the bargain . . . and that's one item you just can't buy.

The fuselage went together pretty fast, though. No big surprises, but there were a few more "stick" style parts than most current techniques include. There is also an enormous 1/8" ply doubler for the main side sheeting, which runs all the way from the firewall to just aft of the wing saddle. This type of thing is also rarely seen in this day and age, when weight saving is of the essence.

Slim-Line Mufflers were temporarily out of the three-pipe version of their in-line exhaust stacks. Since they were located nearby, I paid them a visit just to be sure everything would indeed fit. Exact measurements were taken so as much preparation work as possible could be completed prior to the actual installation. With this information, the remainder of the nose structure was undertaken, including tank compartment and engine mount. The battery location is above the tank and it is insulated in a compartment between the exhaust pipes, giving maximum forward location.

Both a top and a bottom hatch are used to facilitate easy access to both the engine head area and the exhaust stack/battery area above. The top and bottom of the fuselage nose

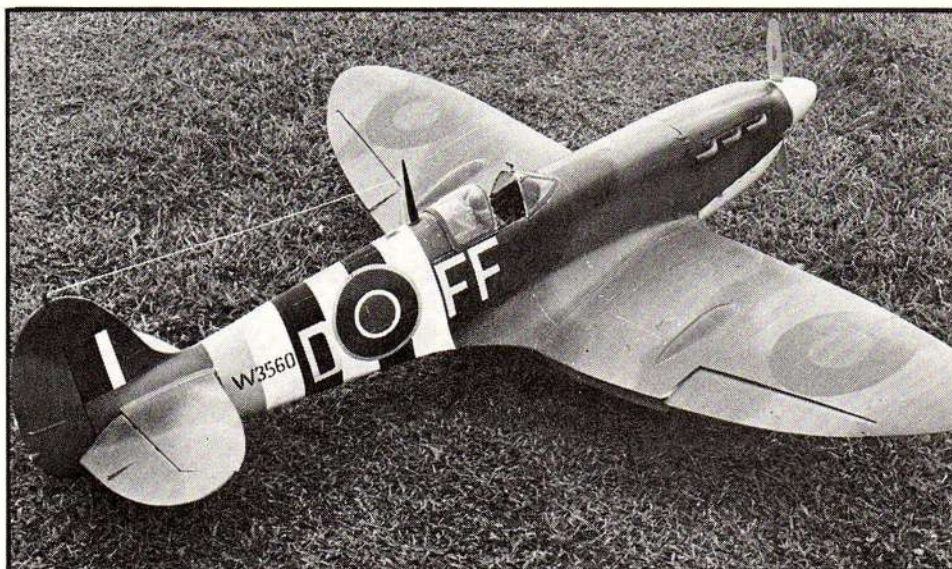
is provided as large preshaped hard balsa blocks in the kit. The lower hatch requires a little more attention, to avoid cooling problems. The cowl was relieved at the rear in a forward sweeping angle, to attain a 3/4" air exit gap at the bottom center of the cowling itself. An air entry hole just forward of the cylinder head location was cut to the size of a half dollar. The cowl just aft of the head is relieved as much as possible beneath the skin, to provide an unrestricted flow around the head, then back and out.

At this point, serious concerns still remained regarding this cowl arrangement. How would air be supplied to the carb venturi—which was up forward of the air inlet hole—in the otherwise sealed nose. Also, the rule of thumb is that twice the air intake area should be provided for a given exit area. This was certainly

over periods of time. There is no friction or binding. My model uses a third pushrod for the tail wheel steering. No problem here, as the arrow shaft is really very light, yet stiff.

Those big wing fillets look impossible on the plans, but the pre-cut parts give just the right effect when assembled. The flat wing center section is built first, along with all of the landing gear and wing mounting changes. You will be glad if you pre-cut all the extra parts needed for these mods. Jig tabs are provided for building the outer panels onto the center section. Very traditional construction, is used throughout the wing.

Once the outer panel framework is completed, add the top sheeting to the entire wing. This will ensure a minimum of warping when the wing is flipped over to add flap



The author had to add sheet balsa to the fuse sides, to modify the contours of the body.

not the case on this installation. Yet, I certainly hated to butcher the beautiful Spit nose any more than needed. I have a lot of faith in SuperTigres, and I decided to hold off any further cutting until running tests had been made. Besides, maybe those giant Slim-Line pipes would act as heat sinks.

As much work as possible was completed on the fuse including servo, pushrod and control surface installation. The cut-down horizontal stab actually looked small on that big long fuselage. One quick word on pushrods. I prefer those fabricated from an arrow shaft, with the shortest possible piano wire and end connections. Any type can be used, of course, but for me this arrangement seems to cause the least problems

spars, wheel wells and other parts. All remaining control linkages, air lines, etc. are added before the bottom sheeting is installed. I located the landing gear air tank fill valve out of sight in the wheel well.

It should be noted that the kit shows an open structure design for the outer wing panels. This is accurate for the earliest versions of the Mk.I Spitfire. Any other Mk. chosen will require a fully sheeted wing, as mine did.

Once the wing to fuse matchup was completed, a couple of passes with 80 grit made what looked remarkably like a Spitfire. Certainly a great deal had been accomplished. It was only July 9th, and friend Garland Hamilton was staying over on the way to the Pueblo, Colorado, regional qualifying contest, a mere 800 miles away. I had done virtually no practice flying (and very little of anything else for that matter). So

it didn't take much persuasion on Garland's part to lure me and the old Jug along with him to Colorado. This little vacation would surely nurture the love side of my relationship with the new Spitfire.

The Pueblo contest was a great success. The folks who ran the affair, especially Jerry Bible, fashioned one of the friendliest, well planned meets I've attended. But my failure to practice really was readily apparent, even though I was flying the old unreliable P-47. A 103 degree heat wave was just not conducive to operation of a 40-oz. wing-loaded aircraft, especially at the 5,000-ft. elevation. But a good time was had by all and, by the time I got back to Phoenix, I had a fresh outlook.

Sanding and filling are the next steps. The use of spackling compound for this fits a hurried schedule well, because the stuff dries fast and is easy to sand. Only use it for small cracks and imperfections however, because it has no strength, and the weight can build up fast. It was during this stage that I noticed something amiss in the outline appearance of the model. Not the sort of thing that jumps right out at you, but the type of thing you have trouble putting your finger on. It finally dawned on me that the whole length of the fuselage was slab-sided—not just the nose area (which is correct when squared slightly). The rear sections were much too square when viewed from the quarter-front or quarter-rear angles. This can be very easily overlooked, as there are no section views included in the plans. Only side or isometric drawings are shown. The more you look at this type of discrepancy the more apparent it becomes, and surely the judges would find it in short order.

At this point, there was only one way out. Two 48" lengths of nice soft 1/4" balsa sheets were glued onto

the slab sides. Black and Decker came to the rescue once again. When the dust cleared, a much more pleasing, acceptable, and gently curving fuselage emerged.

Looking back on this exercise, it might have been possible to have modified the fuselage formers to correct the slabsided condition. But the last ditch approach used on my ship really didn't work out too badly and it probably took less time. Some filling was necessary, of course, and no doubt unneeded weight was added to the aft fuselage. Either method should be addressed back in the planning stages.

All operating equipment was now installed and tested. The engine, of course, was not started. Those Slim-Line custom scale exhaust pipes were installed . . . it was difficult to keep from just a teeny-weeny run to see if they sounded as mean as they looked. The messy Hydra-Lock installation was also left for later. Other than that, all controls were checked, then removed for the covering process. With almost two weeks left in the schedule, I was confident that at least enough finish work to allow an on-time test flight could be accomplished.

That's when the fiberglass resin decided to turn funny. I can't imagine how the stuff could be reluctant to cure in the extreme high temperatures of Phoenix's summer desert. A full day had to be wasted while the Spitfire baked in the back yard sun.

Next, all the detail items were added. Radiator, scoops, masts, guns, lights, canopy, and cockpit details were glued on and filleted in with micro-balloons and resin. These scale details are made from a variety of materials, including lithographic aluminum, 1/64" ply, card stock, brass tube, dowel, basswood and balsa. Your creativity will show in this step. Next, an initial coat of K&B

primer. I was beginning to get back into more familiar territory, and the Spit just kept looking better and better. Again, love sprang eternal.

After two coats of K&B primer, and sanding with 320 grit paper, panel lines are drawn on the finish in pencil. The pencil lines are used as guides to apply regular one-inch masking tape. A thickened coat of K&B primer is then applied over the edge of the masking tape. Feather sand when dry. When the tape is removed, a raised, extremely slender panel line remains. I do all horizontal panel lines in one pass, and all the vertical lines in another.

Rivets were also added at this time. Various methods should be used, as different sizes and shapes were employed in full-scale production. A sharpened 3/32" brass tube makes nice simulated Dsutz fasteners. A seamstress' starwheel lightly rolled along the panel lines provides a subtle hint of flush riveting. More pronounced bolt style rivets or screws are made using white glue drops applied with a hypodermic needle.

A light coat of K&B primer, a quick swipe or two with 400 paper and a canopy mask job were all that were needed to get the Spit ready for paint. However, time had slipped away, and hardly enough remained for the paint to dry.

The first step of the paint job was two light coats of Aero Glos silver aluminum dope. This provides an undercoat to show the weathering techniques applied later. The use of butyrate dope insures as little weight gain as possible. This coat is carefully sanded with #600. Color coats were applied using R/S Perfect Paint, in authentic World War Two camouflage colors. I have been using these for quite some time now with good results, but I understand that they have been discontinued.

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Since the author was building a later version of the Spit, he sheeted the wing's outside panels.

cans by far the easiest and best method of applying color. Use two light coats sprayed fifteen minutes apart, and with no sanding. If you choose to use your spray equipment, you will save quite a bit of money. Thin the stuff ten percent and use two light coats from an airbrush. Don't use any thinner other than R/S. Use of a big automotive gun will not give the desired results. Epoxy paints would be a good alternative.

A slight problem arose at this time, owing to my increasing haste. After applying the base colors to the assembled model, I sat back to relax and compare the ship to my documentation. This would have been very satisfying, had the Spitfire been painted the proper color. Yet, undeniably, it was just not right. Hate springs eternal, too!

I immediately called on our 1/8th Air Force group philosopher, Al Casey, to provide some much needed moral support. I was experiencing an overwhelming desire to shuck the whole project and do a wing walk. After telling me a lot of cornball stuff about integrity, tenacity, unwillingness to sacrifice goals and the "American Way," he plied me with a few beers and got down to the point. "Why don't you just repaint it?" It was easy for him to say! The second try was much better.

Weathering with the Perfect Paints is very easy, and should be done sparingly. Not only does a little go a long way, but the finish has a natural weathering tendency while the model is in use, especially if applied over Aero Glos dope. I use a dentist's tooth scraper to peel paint off the raised panel lines, and around



the access panels or fasteners. Steel wool and various light grit sandpapers are the primary tools used to scuff high wear areas, like the cockpit entry and the leading edges (especially at the wing roots, behind the prop arc and the horizontal stab). A few other arbitrary areas can be weathered—here and there—but don't overdo it.

With the base colors on the ship, it was sufficiently protected for the test flight. There is wisdom in doing this deed prior to painting on all those beautiful insignias. As I stuffed all the gear back in, I was thankful that it had all been tested before.

The extremely short nose moment of the Mk.Vb results in a very tail heavy situation. Despite the broad wing, the Spitfire is very critical of C.G. location. Be sure that it is at least as far forward as the plan location. I had figured on a little tail heaviness all along, but not to the

degree which finally resulted. After hanging all sorts of heavy paraphernalia on the prop shaft and then weighing all of it, the total requirement was shockingly clear.

A mere 12-oz. on the very tip of the prop shaft should just about do it. Another quick call for help from a friend with a lathe resulted in one of the heaviest prop nuts anywhere, which fit neatly under the C.B. P-51 spinner. The total weight dry—lacking only a few minor details—added up to 10½ pounds. This is very close to a perfect flying weight for a model of this size and amazingly light, considering the tough construction.

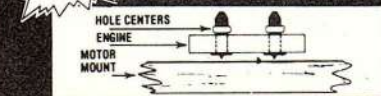
Totally lacking markings of any kind, gear doors, pilot or other details, the ship looked sadly dull. But the day of reckoning had come, and it could not be denied that it was a Spitfire. Better yet, it was airworthy. I had been burning the midnight oil so long that I had not

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really had time to worry about flying the thing. Again, the hatred welled up, for I had been robbed of one of the most titillating experiences this hobby offers . . . the anticipation, the risk.

It's the unknown, and I enjoy worrying about it throughout the entire construction cycle. It crescendoes until I can hardly stand it. More often than not, if your homework is done right and you are successful, the feeling of pride and achievement which follows the first flight is incredible. But the Spitfire had denied me the usual emotional build-up. I had to cram.

Here was a brand new zero-time SuperTigre Blue Head ABC, with its beautifully fluted porting. How would this untried factor contribute? And the guesswork cooling system for the lower cowl hatch. You couldn't even see the cylinder head protruding from the graceful nose, but it certainly would be a shame to parboil a new engine on the first flight. It's been done before.

Then there was the cut-down tail, sitting there looking smaller than ever. Would this lead to the old "run out of elevator in the flare" syndrome? Now the landing gear. Undercarriage, the English call it. Even

attempting to cram, I really hated to think about the landing gear. It looked more like something that might be seen on a gag banquet trophy. It seemed to say "Go ahead, stupid, give me a try." It was easy to hate the undercarriage. After a little more worry about C.G. and overall weight, I was satisfactorily convinced that the Spit just could not fly.

With everything checked, the Tigre lit up (as advertised) on the second or third flip. A just-barely-two-cycling setting was selected. Taxi into position and hold. The 1980 U.S. Scale Masters Champion, Kent Walters, had come along for moral support. Looking for some kind word at this moment, he casually responded with: "Oh, are you going now?" He was completely expressionless, except for the long guttural and somehow diabolical sigh which Kent is famous for. There was just enough time to ask myself why I bother flying with this guy, before the throttle was slowly advanced and the fighter slowly began rolling in a sort of bouncy, crow hopping manner. So far, so good.

The tail popped up at about 25 feet of roll, but with no apparent tendency to nose over. Directional

stability was amazingly good. The ship actually needed somewhat less right rudder correction than most models, to maintain a straight track. Even though the engine never did develop a full two cycle, the Spit gracefully broke ground and settled into a fairly steep rate of climb. Except for a tad too much up elevator, very little trim fiddling was necessary. The ailerons were very positive and very fast. Maybe a touch of rudder was needed in the loops. It was the type of aircraft which was immediately groovy, especially with that going down the hill look. I was amazed as the ugly Spit moved along at a good clip, and performed most of the maneuvers in the book, while the SuperTigre droned on in an even four cycle.

Usually first flights are pretty conservative, but this felt just too good to hold back. The love relationship had finally won out. It was wedding day, and I didn't want to spoil anything. Dumping the flaps and finding no appreciable trim change, I set up a tight descending, 180-degree approach to landing, rolling the wings level just at the flare. The Spit loved it, with the wheels brushing lightly and the tail still defiantly high. There was still no

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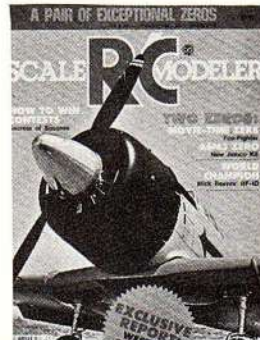
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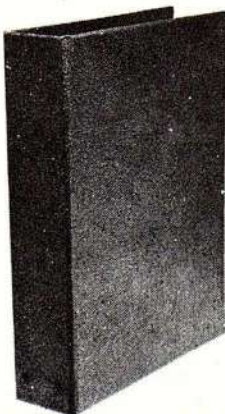
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desire to go up on its nose or to lose heading.

Nineteen flights were managed prior to leaving for the Louisville Masters. This may not seem like a lot, but the Spit, just like the girl of your dreams, is easy to get intimate with quickly. All the finishing paint touches, insignia and the scale prop were finished while the flight testing progressed. I used an old C.B. P-40 spinner for static display, building up the sides with balsa to replicate the shorter, rounder Mk.Vb spinner.

One problem did prove rather difficult to overcome. In crosswinds of 10 mph and above, the plane maintains its ability to stay straight. However, it does tend to drag the downwind wing tip. It seemed that no modification of the takeoff/landing speed or attitude would correct this. The real problem being the extremely narrow gear.

The answer was found, but most scale modelers who are used to nice wide-stance gear may find the trick difficult to apply. It involves "flying the ailerons" all throughout the landing or takeoff roll. With the gear fixed firmly on the ground, some degree of aileron effectiveness is negated—and therein the difficulty lies. Once mastered, however, this

technique will produce picture perfect takeoffs and landings even with reasonably high crosswinds. If not mastered, there will be much wing tip scraping and loss of points . . . but the Spitfire will fly anyway. I suppose the procedure could be applied to various other narrow-gear scale models.

This whole project generated many new conclusions. Foremost, of course, was the Spitfire's presence and fine acceptance by my friends and competitors at the Masters. However, those events comprise another story. Suffice it to say that the ship was competitive enough. There's much more to modeling than competition, fortunately. In this case, the modification strategies had paid off in a model that was not only a competitor, but also as easy and fun to fly as it is to look at.

The Spitfire is really a simple machine, when compared to other fighter designs of World War Two. No complicated fairing doors, no retracting tail wheel nor bomb mechanisms to fool with. Both the beauty and effectiveness of the Spitfire stems from its superior performance. This can eclipse all the gadgetry. My Sterling version is light and agile in all flight attitudes, it will turn on a dime, and climb like a homesick angel. So once again, I am amazed at the incredible duplication of prototype characteristics in the model. The Sterling acts the same as the Supermarine.

A word about the modifications.

They all worked well, but they must be kept as simple and problem-free as possible. Enough can't be said for the SuperTigre Blue Head. It may well be the most adaptable engine for a .60 size scale project. It certainly is the most reliable. Coupled with the Slim-Line pipes, the powerplant emits a grizzly popping sound while idling on the ground and belches little puffs of white smoke when it is loaded. The stacks may actually do a little scavenging, as the power seems remarkably high. My first use of Hydra-Locks proved delightful. If your basic system is in good shape, these units will work flawlessly and they can slow the gear down to any speed desired. Air conditioning compressor oil is slightly heavier in viscosity, and is as pure as the driven snow. My setup uses it and the gear ran at just the right speed with no restrictors at all.

I really have developed a passion for the simple, light and reliable Spitfire. This account has outlined the procedure necessary for producing an all-out, full-blown contest machine. Many of the steps would not be needed or even desired for a fine scale job built just for fun. This kind of project will give you the added satisfaction of knowing you have saved a seemingly antiquated, outdated pioneer from languishing forever on the hobby shop's dusty shelf. So why not do a little rummaging and get yourself a piece of nostalgia with a Supermarine Spitfire? □

The narrow gear, modified from the kit's wider stance, posed no ground handling problems, even in slight crosswind situations.





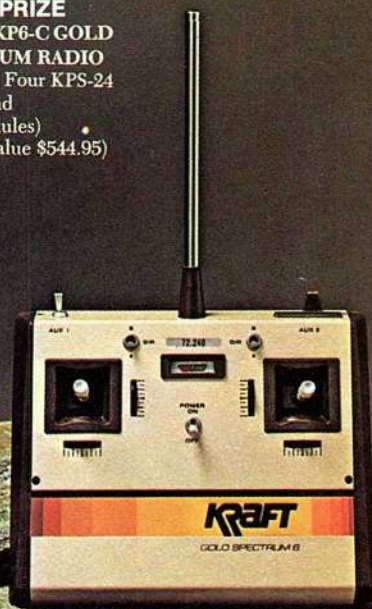
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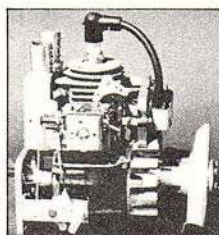
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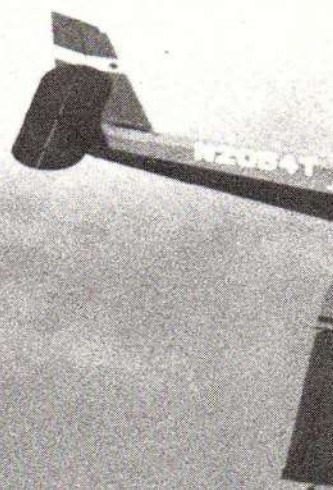
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Aero Scale '82



The big winner in F4C Precision Scale was Terry Melleney, of the U.K. His Moth Minor is seen here doing a go-round while a full-size Schweitzer sailplane lands on the parallel runway at Stead AFB.



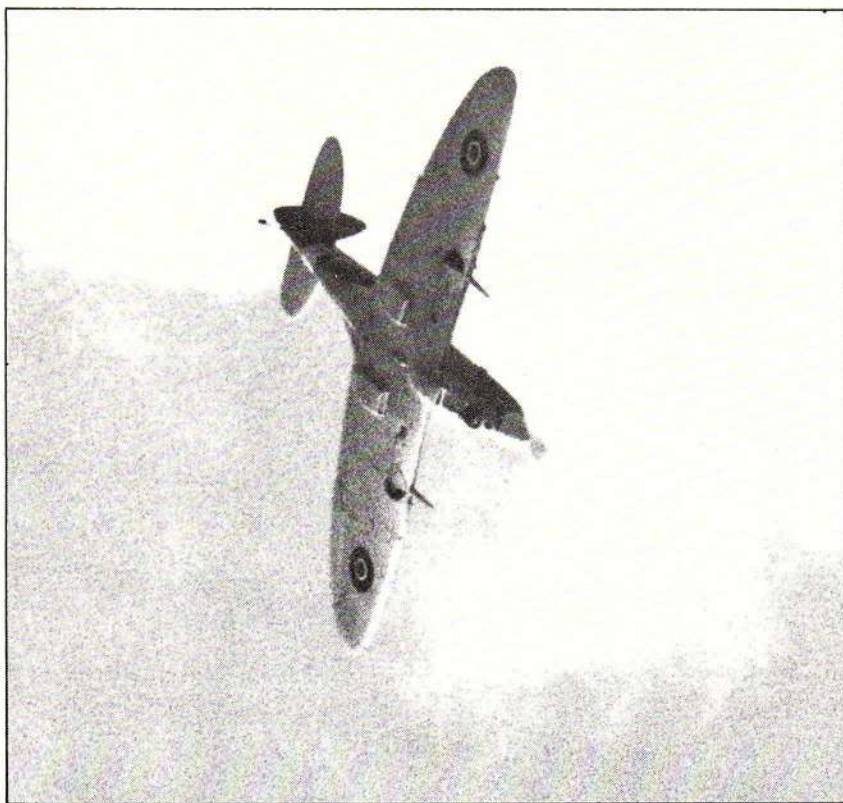
The U.S. hosts a Scale World Championships.

Staff Report

Every good journalist knows that a story must contain the six key elements: What, Who, When, Where, Why and How.

For our story on the 7th R/C Scale World Championships, the "What" was easy. Officially billed as AeroScale '82, it was the gathering of scale modelers from some 13

countries (that covers the "Who"). The meet was an official World Championships, flown under the strictest FAI rules for F4C Precision Scale. Stand-Off Scale was also flown, but this is still a provisional event in the FAI scheme of things. In the heirarchy of Scale as a competitive event, this is the big marbles. The rules require 17 pages of small type, which immediately tells you what kind of an event to expect! For the average Sport Scale buff, nit-picking technicalities such as K-factors would be too much to bear (a K-factor of four for "Special Ingenuity" in judging Fidelity-to-Scale and Craftsmanship?!).



Mick Reeves' Spitfire Mk IX dives into a maneuver. He placed second in the Precision event.

J. R. Naldich photos

The modelers who traveled to the U.S. earned the right by winning equivalents of the Nats in their respective countries. Some had to survive a series of elimination meets, while in some countries the delegates kind of got picked by default . . . there being really no one else qualified to represent their country. As one might imagine, the quality of aircraft (and pilotage) varied dramatically. The Swiss entry in Precision Scale static scored 1,095 points, while the eventual winner's aircraft had almost triple that amount, with 2,836 points in static judging . . . quite a point spread!

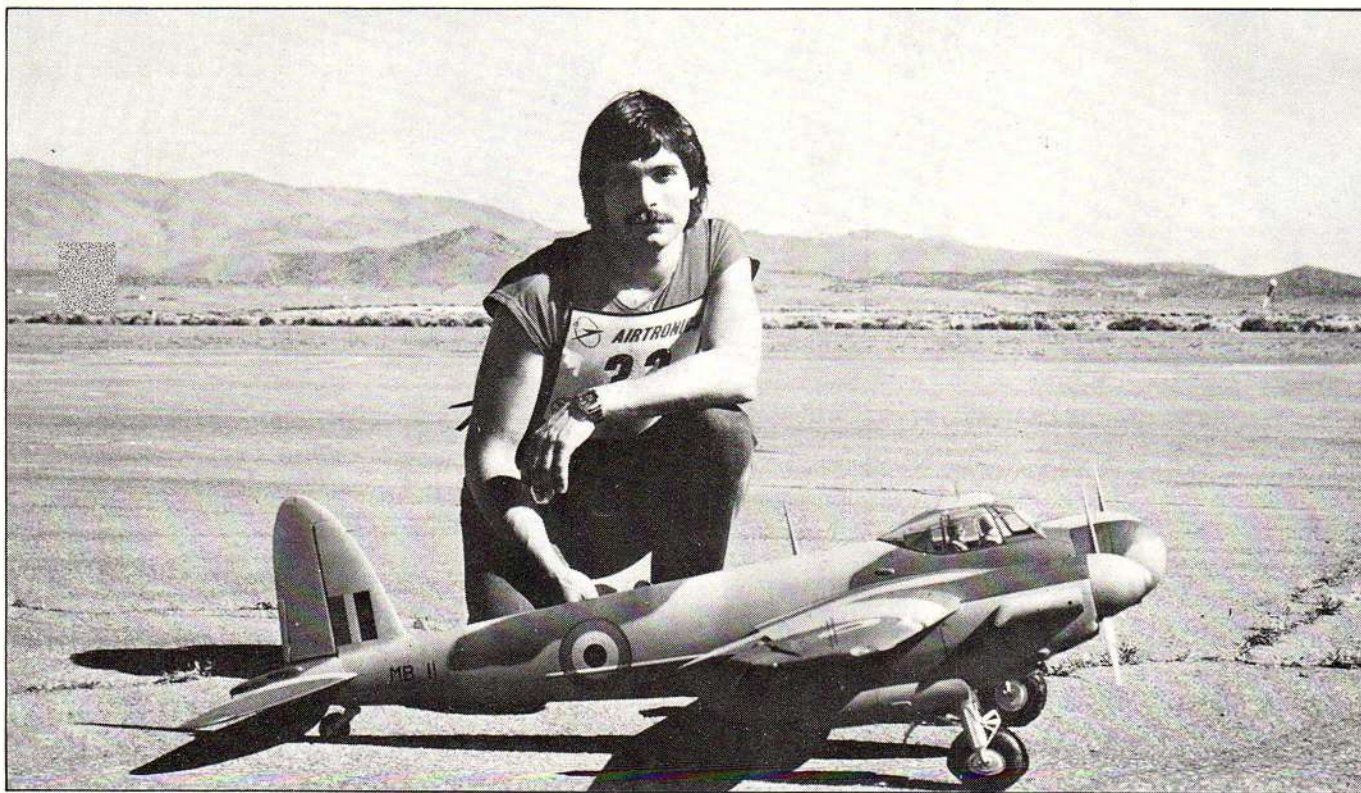
But, we're getting ahead of ourselves. The "Where" and "When" are stories in themselves. The dates of the World Championships were June 13-19. That, in itself, isn't significant. However, if you place those dates at the selected site of Stead AFB, outside of Reno, Nevada, you have the makings of some rather atypical contest conditions. For those who aren't familiar with the area, this facility is literally in the middle of the desert, with sagebrush growing right up to the edges of the runway.

To call it inhospitable would be an understatement. Having lived two years in Reno, and having flown at the Stead site numerous times, we feel qualified to evaluate it as one of the worst contest locations in the U.S. The altitude is 5,400 feet. That will only impress those scale enthusiasts from places like Denver's mile-high flying field, and the '82 U.S.

Mick Reeves hunches over his Spitfire, preparatory to making an official flight. Unusual to see a military craft place so highly in the Precision event.



Overall champion in Sport Scale was this de Havilland Mosquito, as flown by Wim Reynders, of Belgium. A complex project, flown to perfection.



1



1. Earl Thompson's FW 44J finally made it on the team this year, but he couldn't even post a complete flight. 2. Wim Reynders' winning de Havilland Mosquito. 3. Jungmeister, by Johan Ehlers of South Africa. 4. Fourth place in Precision Scale was Marcel Jonckheere's (Canada) Stearman 4EM Senior Speedmail. 5. Zlin Akrobat by K. A. Elofsson (Sweden).



2

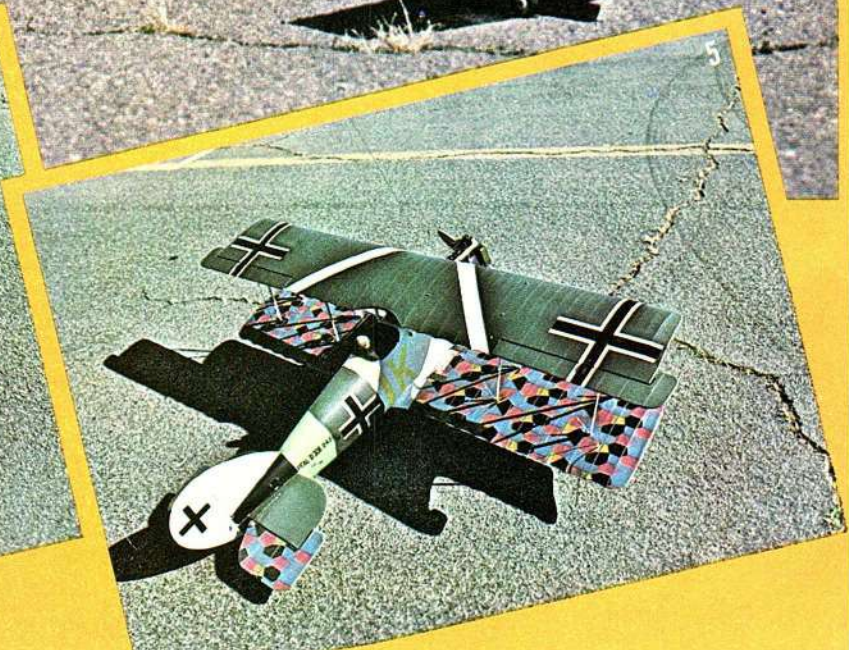
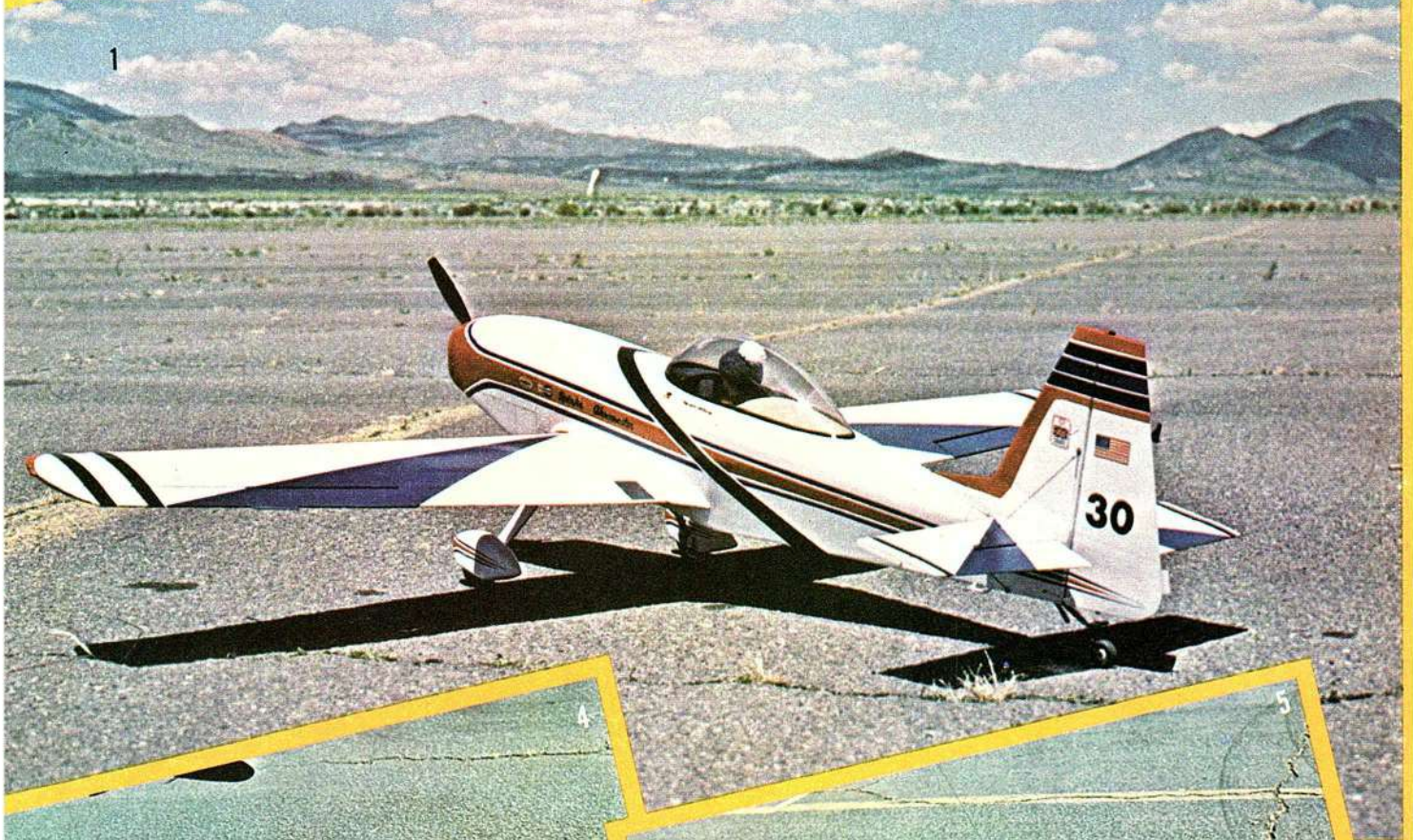


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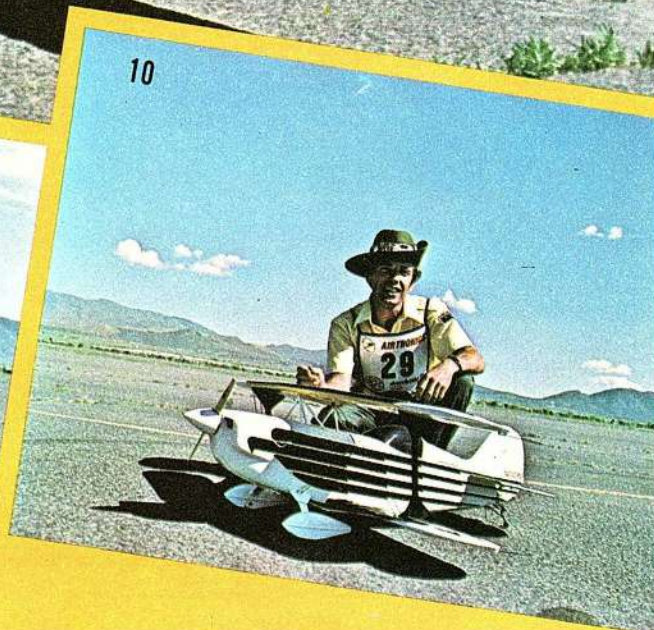
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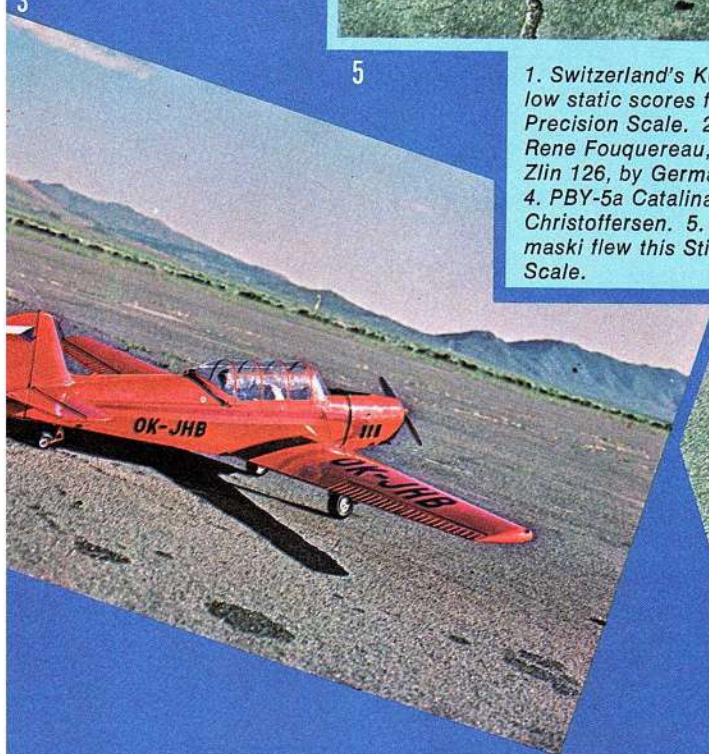
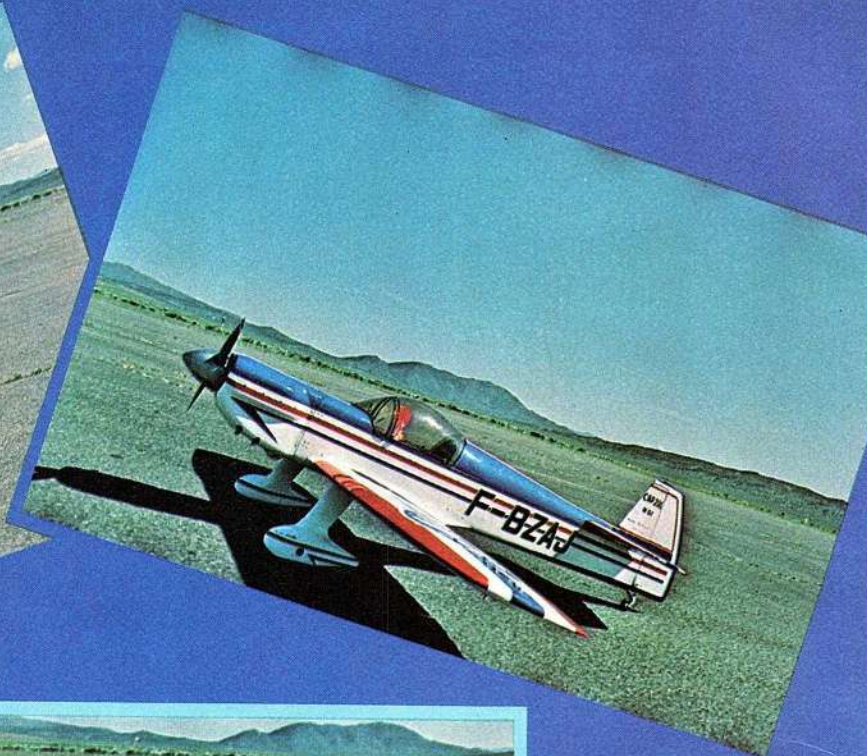
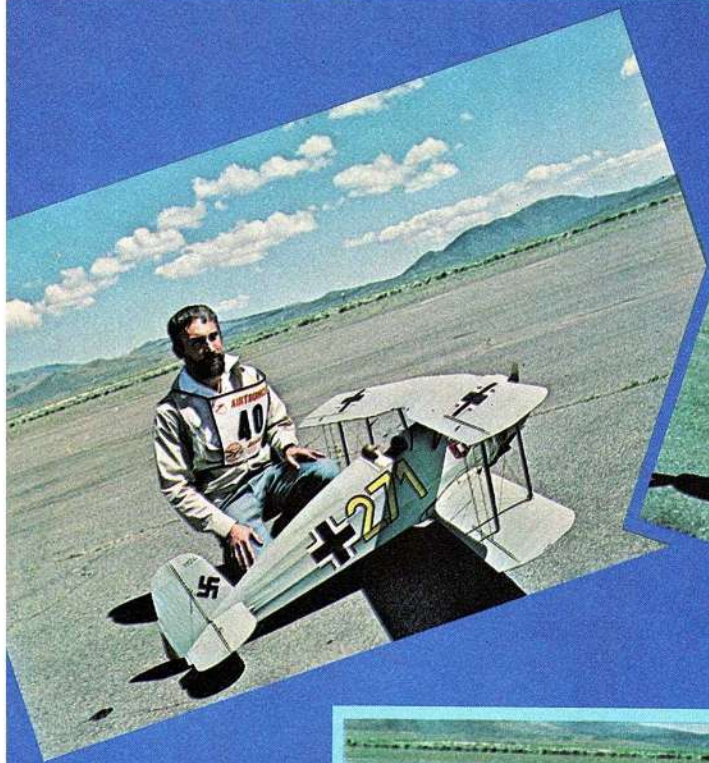






1. Patrick Martin (S. Africa) flew this Sopwith Pup in Sport Scale (14th place). 2. U.S.'s George Rose flew his old standby P-6E Hawk. 3. Big Tiger Moth by Sweden's Roy Nilsson. 4. Cliff Tacie's Spezio Tu Holer had a light wingloading. 5. Michael Carlson (Sweden) flew this Pfalz D-XII to second place in Sport Scale. 6. Spinks Akromaster by Anton Van Wyk (S. Africa). 7. RV-3 entered by Canada's John Swift. 8. Bertil Frilander's (Finland) KZ VII, Danish lightplane was entered in Precision Scale. 9. Mick Reeves' Spitfire, from England, was second in Sport Scale. 10. The finish on this Christen Eagle, by Australia's Greg Watson, was all free-hand painted, with no masking tape!





1. Switzerland's Konrad Oetiker got very low static scores for his Jungmeister in Precision Scale. 2. Colorful CAP 20L by Rene Fouquereau, of France. 3. Unique Zlin 126, by Germany's Herbert Reger. 4. PBV-5a Catalina, by Denmark's Herbert Christoffersen. 5. Italy's Carlo Bergamaski flew this Stits Playboy in Sport Scale.

Scale Masters finals were voted down in Denver just because of the altitude. Take a heavy scale model and try to fly it at that height, and you'll have one of the ultimate eye-opening experiences of your modeling career!

As any pilot knows, the temperature can make an altitude problem even worse. Referred to as "Density Altitude," this formula is the altitude corrected to the temperature. With temperatures on the desert runway approaching the mid 90s, the scale aircraft were operating at somewhere around a real 8,000-foot level! This was dramatically brought



Carlo Mapelli, from Italy, flew this Baby Ace "D" to third place in Sport Scale.

FINAL STANDINGS F4C PRECISION SCALE

Rank	Name	Nation	Static	Bonus	Flight			Total	
					1	2	3		
1	T. MELLENEY	UK	2826	5	2321.5	2506.3	2178.7	5342.3	Moth Minor DH 94
2	M. REEVES	UK	2618	10	2621.3	2092.2	2426.6	5239.3	Spitfire IX
3	J. ROUSSEAU	FRA	2249	5	1984.5	1757.7	2575.6	4824.6	Cap 20
4	M. JONCKHEERE	CDA	2165	10	1844.7	2467.3	2614.7	4779.7	Stearman 4EM
5	G. DALE	CDA	2229	10	1830.4	2312.2	2440.9	4669.9	Pitts 2-ZA
6	D. DRAHEIM	GER	2070	5	2063.2	2485.3	2599.8	4669.8	Bolkow 207
7	J. MAYER	GER	2384.5	5	1993.9	2205	0	4589.5	Turbulent D31
8	R. NILSSON	SWE	2742	15	1368.5	1246.6	1728.4	4470.4	DH82 Tiger Moth
9	T. MANLEY	UK	2358	10	2099.9	0	1886.5	4457.9	Blackburn Shark Mk.I
10	G. ROSE	USA	1845	10	2225.3	2506.9	2305.6	4351.9	Curtiss P-6E Hawk
11	J. SWIFT	CDA	1910	5	2198.7	2356.2	1896.3	4266.2	RV3 Homebuilt
12	K. OETIKER	SWI	1095	10	2174.7	1086.8	2750	3845	Jungmeister
13	H. REGER	GER	1229	5	1886.8	2284.8	2249.1	3513.8	Zlin 126
14	A. DEPAUX	FRA	1890.5	5	1612.8	0	977.5	3503.3	Cap 21
15	R. FOUQUEREAU	FRA	1805	5	1351.3	0	0	3156.3	Cap 20L
16	E. THOMPSON	USA	2244	10	0	874.5	0	3118.5	Focke-Wulf FW44J
17	B. WISCHER	USA	2338.5	5	586.9	0	0	2925.4	Ryan SCW
18	B. FRILANDER	FIN	1465	5	598.5	979.6	802.2	2444.6	KZ VII Lark

FINAL STANDINGS F4 STAND-OFF SCALE

Rank	Name	Nation	Static	Bonus	Flight			Total	
					1	2	3		
1	W. REYNERS	BEL	2650	20	2564.4	2902.8	2377.2	5552.8	DH Mosquito
2	M. CARLSON	SWE	2650	15	1844.6	2599	2501.2	5249	PFALZ DXII
3	C. MAPELLI	ITL	2545	5	2471.7	2395	2656.5	5201.5	Baby Ace Mod "D"
4	S. UIBERLACHER	CDA	2670	20	1842	2140.8	2520	5190	DH Mosquito
5	K. A. ELOFSSON	SWE	2742.5	10	1533.4	2389.2	1900.8	5131.7	Zlin Akrobat
6	L. HELMBRO	SWE	2622.5	10	0	2413.4	2246.2	5035.9	Mitsubishi 'Zero'
7	C. TACIE	USA	2695	5	1483.6	2004.4	2087.4	4782.4	Spezio Tu Holer
8	J. EHLERS	AFR	2495	10	2270.4	2126.3	2253.9	4765.4	Jungmeister
9	G. SMITH	UK	2347.5	15	2109.1	1994.1	2389.7	4737.2	Pompilio PE
10	C. BERGAMASCHI	ITL	2385	5	1771.3	2262.7	1882.6	4647.7	Stits Playboy
11	C. CHAMBERS	USA	2572.5	10	0	1905.2	1404.7	4477.7	Grumman Cougar
12	A. VAN WYK	AFR	2175	5	1436.4	2043.3	2033.8	4218.3	Spinks Akromaster
13	M. REEVES	UK	2777.5	10	1346.4	0	0	4123.9	Spitfire V6
14	P. MARTIN	AFR	1930	15	2029.7	2125.2	0	4055.2	Sopwith Pup
15	G. WATSON	AUS	2482.5	10	1531.2	1230.9	0	4013.7	Christen Eagle IF
16	G. GHILARDI	ITL	2515	10	1498.2	0	0	4013.2	Liberty Sport
17	M. CHRISTOFFERSEN	DEN	1985	20	1268.4	1480.8	2005.2	3990.2	Catalina PBY-5A
18	P. SIBILLE	USA	1640	10	1819.4	2315.5	2341.9	3981.9	Spitfire MK IX
19	R. BOTTEN	AUS	2120	5	875.7	1233.7	1838.5	3958.5	Ryan STM-2
20	B. BORLAND	NZE	2085	5	1048.9	1810.2	1337.7	3895.2	Miles M2 Hawk
21	D. PAQUETTE	CDA	1592.5	10	2140.6	1518	1378.3	3733.1	Hawker Sea Fury
22	L. R. G. ACKROYD	NZE	1730	15	944.1	1497.3	1714.6	3444.6	Tiger Moth
23	R. GAREAU	CDA	1250	10	1439.9	1884.3	1850.2	3134.3	Summerside PEI
24	W. SCHUBACH	AUS	1520	5	853.6	0	1582.3	3102.3	DH Moth Minor
25	A. CEULEMANS	BEL	2017.5	10	0	0	0	0	N. American Mustang

home when the first official flight proceeded to make a staggeringly slow takeoff, then moments later the model snapped and spun in.

By Wednesday of the week-long event, it was becoming obvious that the meet was going to be a survival and endurance contest. As the full-size aircraft, which operated from a parallel runway, staggered skyward in an effort to clear the mountain peaks which surround the valley, the scale models were thinning out through attrition. Mick Reeves lost his Sport Scale Spitfire on its first flight when the plane stalled coming out of a loop. Other pilots forgot to reckon with the dangers of density altitude and planted their beautiful machines into the tarmac, or lost valuable points because they were unable to execute such basic maneuvers as loops or rolls in the rarefied air.



3



Carlo Mapelli's Baby Ace does a very impressive touch-and-go. This kind of flying earned him a third place in Sport Scale.





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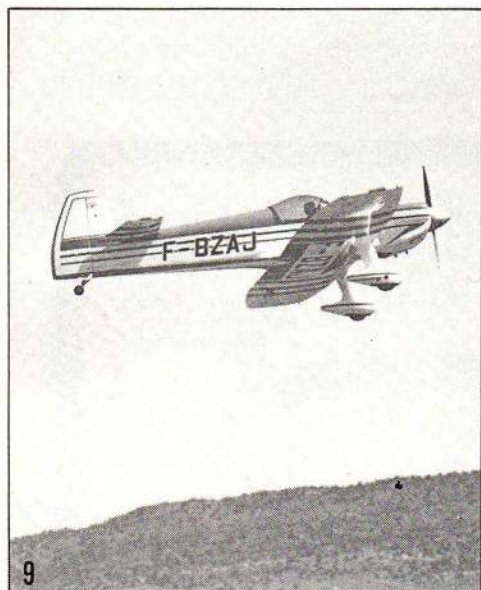
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1. Anton Van Wyk flew his Spinks Akro-master to 12th place. 2. Bertil Frilander's KZ VII Lark had the dubious distinction of finishing last in Precision Scale. 3. Cliff Tacie's Spezio wings overhead. 4. Herbert Christoffersen (Denmark) flew this unusual Catalina PBV-5a. Flew well, but low static points. 5. Detlef Draheim's Precision Scale Bolkow about to touch down on a dead stick landing. Gear-driven engine. 6. Miles Hawk, by New Zealand's Brian Borland, wound up in 20th place in Sport Scale. 7. West Germany's Josef Mayer took 7th place in Precision Scale with his Druine Turbulent. 8. Roy Nilsson (Sweden) used a 4-cycle engine to power his big Tiger Moth to 8th place in Precision Scale. 9. Rene Fouquereau's CAP-20L (France) flew to 15th place in Precision. Three of France's four entries were CAPs, and most had geared engines. 10. Phil Sibille's Spitfire was a little too old and tired to score well in Sport Scale.





Michael Carlson tweaks the engine on his superb Pfalz D-XII, which captured second place in Sport Scale. Note vertical whip antenna.

This one element of the meet skewed the entire results. The lightly loaded aircraft suddenly had even a greater advantage. We watched Cliff Tacie, one of the U.S. entries, fly his Spezio Tu Holer to an altitude of about 200 feet above the runway, desperately trying to gain enough

altitude to do his next maneuver . . . and the model just refused to climb a foot higher. That's the first time we had ever witnessed a model actually reaching its maximum altitude (comparable to a full-size J-3 Cub trying to climb over 15,000 feet!).

Fortunately, the demanding rules of F4C Sport Scale and Precision Scale almost force the competitive modeler to build a lightly loaded

airplane. While extra points can be gained for twins, biplanes and other complex aircraft, the seasoned competitor builds a low-key model which can be judged in a straightforward manner. Too complex a model gives the judges more opportunity to nit-pick, so simplicity is one of the keys to success. Such aircraft (usually homebuilts, or biplanes) tend to be lightly loaded, which helped immensely in this contest.

The U.S. team went into this competition with models which already had the cards stacked against them. Cliff Tacie, as noted, had a big, lightly loaded model, which contributed to his eventual 7th place standing. However, Phil Sibille's well-worn Spitfire and Charlie Chambers' ducted fan Cougar were at a definite disadvantage. The fact that Charlie managed an 11th place is totally commendable, and he really worked hard for it, smashing up another model just practicing to fly in the thin air.

Modelers from all countries were running around looking for advice or help with engine problems. European engines run FAI fuel, which is usually five percent or less Nitro (typically none of the expensive additive is used). Now, there was a

(Continued on page 72)

The All New Silver Seven Receiver



Five-Channel receiver shown — one to seven channel operation possible. Dean's connector version available with either End-Block or Pig-tail-type connectors.

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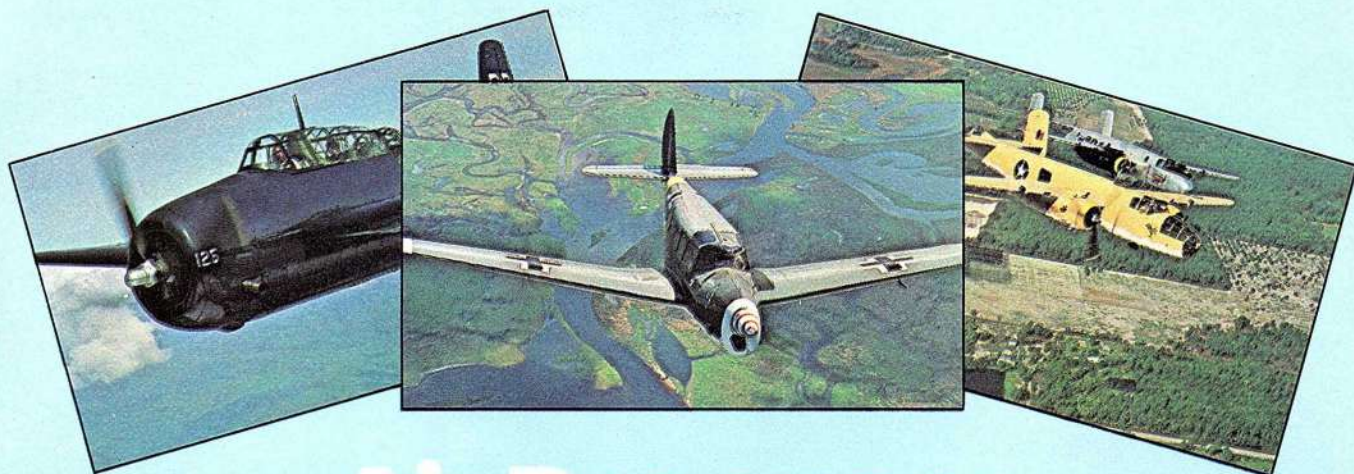
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1.
3.



WESTERN SCALE NATS

**THE SCALE SQUADRON SCORES ANOTHER
SUCCESS WITH A MAJOR SCALE CONTEST**

Patrick H. Potega, Executive Editor J. R. Naidish photos

1. Garland Hamilton's F6F-3 placed second. 2. While not officially entered, Jim Meister's new .90-sized P-51 was one of the hits of the weekend. 3. Don Pierro entered this star-beclustered Byron Pitts, with a Tartan twin for power. 4. John Bashore's 1/4-scale Chipmunk took second in Sportsman . . . a Don's Custom kit.



2.
4.

There isn't, as far as we know, anything mystical or magical about the number 51. There must be something almost astrological about it, however, since the last two or three Western Scale Nats have had exactly that number of registrants (if memory serves correctly, the last Un-Contest the Southern California Scale Squadron held also hosted 51 entries!).

While this may be nothing more than sheer coincidence, the real magic on the field over the three-day contest weekend was in the hands of a few hot-shot fliers. Everyone is already jokingly referring to the meet as the "Kent Walters Invitational," since this Arizonian has won the last four straight contests!



Forest Edwards' Fleet sports one of the fanciest homemade engines ever seen.



Kent's SBD Dauntless, which is an old veteran to the contest scene, took a commanding lead right from the start. Friday's static judging (three circles were kept busy for most of the morning) put Kent in a commanding lead, with a staggering 96 static score. The new scoring system was being used, which redefines the point-scoring for various parts of the airplane. To get an 85 under this new system is an accomplishment, and a 96 is so close to museum scale that you might as well consider it a perfect score.

If that raises your eyebrows, there was one model which had an even better static score. Granger Williams' Gee Bee R-1 got a remarkable 98. With points like that, the model should be in a museum! There were three other aircraft above 90, but Kent was already sitting in the driver's seat even before his first takeoff.

After reviewing the static scores, in an overview, we're not too sure that the new system has really done anything to improve the inequities which will always exist when human beings are making subjective decisions. We found it hard to believe that a Byron F-16, with its wire undercarriage, could score as well as a very decent Kawasaki Ki-61. We can now closely define the particular areas of the model being judged, i.e., fuse, undercarriage, empennage, etc., but this still doesn't offer a solution for making sure that the better airplanes wind up with the higher scores.

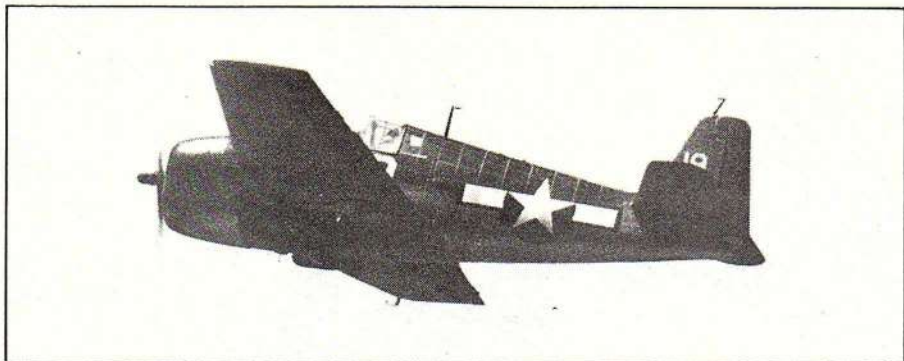
Lest we be misunderstood, no one was protesting the static scores . . . we are just passing along an observation made impartially as an aside to the actual contest. As a matter of fact, the contest was amazingly devoid of protests and bad feelings. Sure, the competitive level was high, and there was a lot at stake this year for a shot at being on the Masters list of elite scale modelers, but the contest was run so well that no one left in a huff.

With 50 planes, the Squadron had its hands full. Three flight lines were kept busy throughout the weekend, and four complete rounds were flown. Only Sportsman, Expert and Team Scale were flown, with the latter being only provisional and having no basis for Masters qualifying. No Precision Scale will be flown at the Masters this year, so the event was not slated for this regional (and no one really seemed to miss it!).

When we showed up at the field, we immediately noticed that Mile Squares' huge runways had been totally redone. The 1/4-mile long runway which the R/C modelers use



The Grand Champion again this year was Kent Walters, with his spectacular dive-bombing SBD Dauntless.



Garland Hamilton's Hellcat flew spectacularly. From the Holman Plan Pac.

had been repaved (the runway is at least 100 feet wide). New pit areas had been painted, and the entire area looked like brand new. We were so impressed that we looked up C. D. Bert Baker, to congratulate the club for having so much clout with the County. As we learned, the club was out flying the week before, and some official vehicles pulled up on the runway and the fliers were informed that the field would be closed for four days.

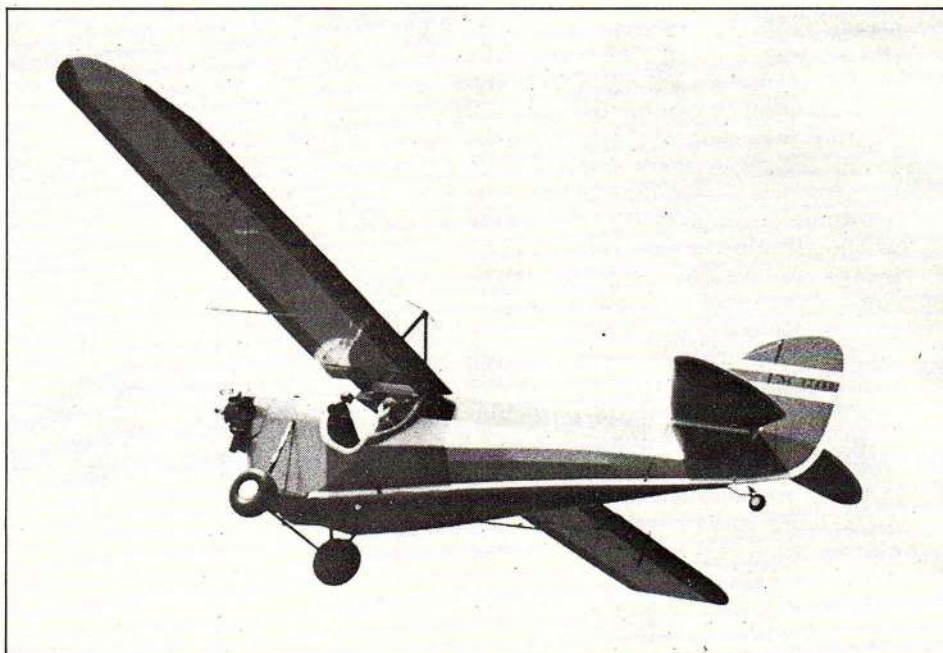
The site has been in jeopardy on-and-off for years, with the constant threat that any time there might be a "closed" sign posted. Everyone thought that this was the fatal day, and there was only a week to go before the Western Scale Nats. How would they ever find a new site on such short notice?

Four days later, a few club members went to the field. Lo and behold! There was a newly paved runway, smooth and clean as a baby's bottom. No one had even asked for the repaving, but no one was about to argue. As it turned out, the County

2



3



1. Don Lien flew a Jerry Ortego kit Fw-190 to third place. 2. Shane Cramer's P-47 took third in Sportsman, with the new Scale-Flight kit. 3. Steve Tillotson's Aeronca wound up in seventh place in Sportsman. 4. John Bashore makes a fly-by with his giant-scale Chipmunk. 5. Bashore's Chipmunk used a Harris smoke system for authenticity.

4



5

was using the facility as a school to train their employees to lay black top. The club certainly benefited from that program!

Datsun representatives showed up on Friday, with the Nissan Stanza which is to be awarded at the Masters. Their publicity people snapped some pictures, and it was nice to see a major corporation supporting our

efforts. Dale Findley, who was instrumental in bringing Nissan's sponsorship to the Masters, was on hand on Saturday, and he was totally amazed at the number of fliers . . . and even more amazed at the throng of spectators. Cars were parked two rows deep along almost the entire length of the 1/4-mile runway, and we would conservatively estimate the

total crowd for the weekend at in excess of 5,000 people. And they all showed up without any advance publicity. The concession stand was sold out of food on both days by mid-afternoon.

The Squadron does a good job on their raffle every year. This year's prize was a ready-built trainer by Jerry Ortego Models, with a Futaba



Jerry Ortego proved that his FW-190 kit was competitive, with a fifth place in Expert.

radio and a K&B engine. This was a great stimulus to ticket sales, and the lucky winner has a superb trainer for getting started in R/C.

It was obvious this year that Kent Walters' influence on scale modeling

is being definitely felt. We have never seen so many fighters dropping bombs, doing torpedo passes and high-altitude vertical bomb runs. As a matter of fact, seven of the top ten pilots had some sort of bomb or tank drop as part of their optional flight maneuver routine, and at least four of these aircraft did multiple bomb/torpedo/drop tank passes.

Three of the airplanes in question demonstrated vertical dive bombing missions.

We were anticipating a large turnout of Giant-Scale aircraft, since the weight limits and engine sizes were raised this year to allow up to 3.7 c.i. engines. Surprisingly, only two or three big planes entered, and all of them were Stearmans, except for

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John Lockwood opted for a very big B-25, but the judges were not too kind to the huge twin.

one Fleet and a 1/4-scale Chipmunk. Only one giant model was entered in Expert, and Chuck Fuller flew the pants off his beautiful PT-17, for a well-deserved sixth place.

In Expert Class, three of the top ten winners flew airplanes with engines larger than a .60. The 1/5-scale planes are exhibiting their superiority, and Jerry Ortego's popular FW-190 placed both third (by Don Lien) and fifth (by Jerry himself). Bert Baker's .90-powered P-47 took seventh (*In spite of Bert's own unique style of landing!*), and Shane Cramer took third in Sportsman flying an-

(Text continues on page 63)

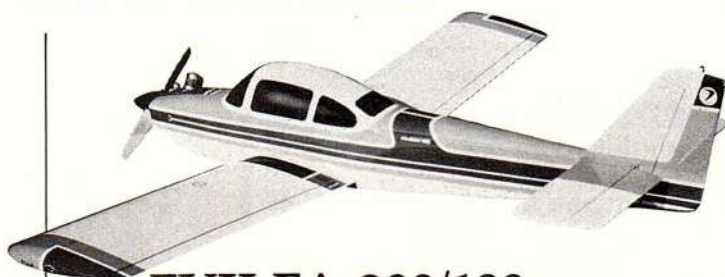
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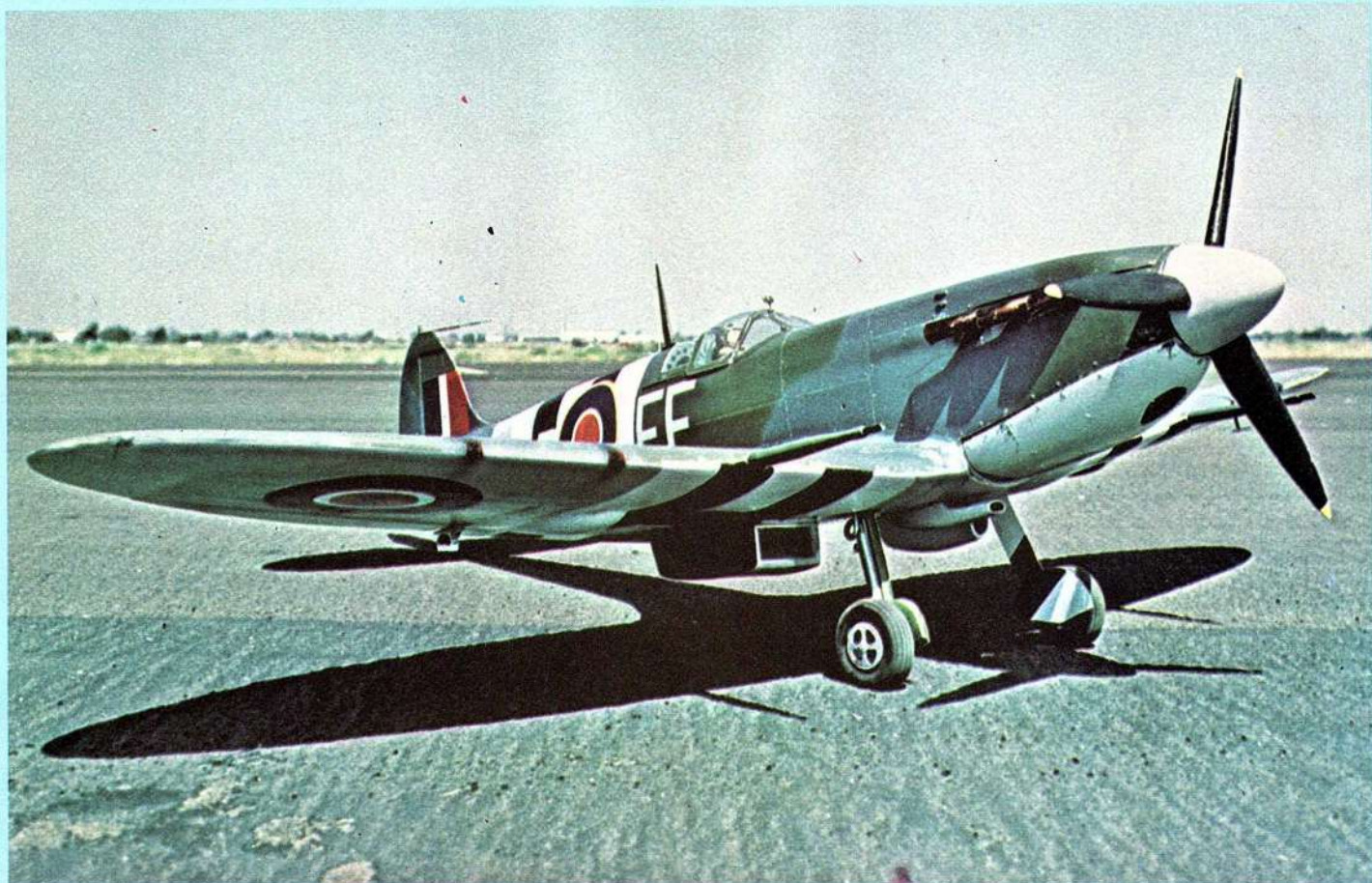
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Bob Frey's Spitfire is a fracture article in this issue.



Larry Wolfe flew his new Panther, which is a projected ducted fan kit.



HOT ZIG

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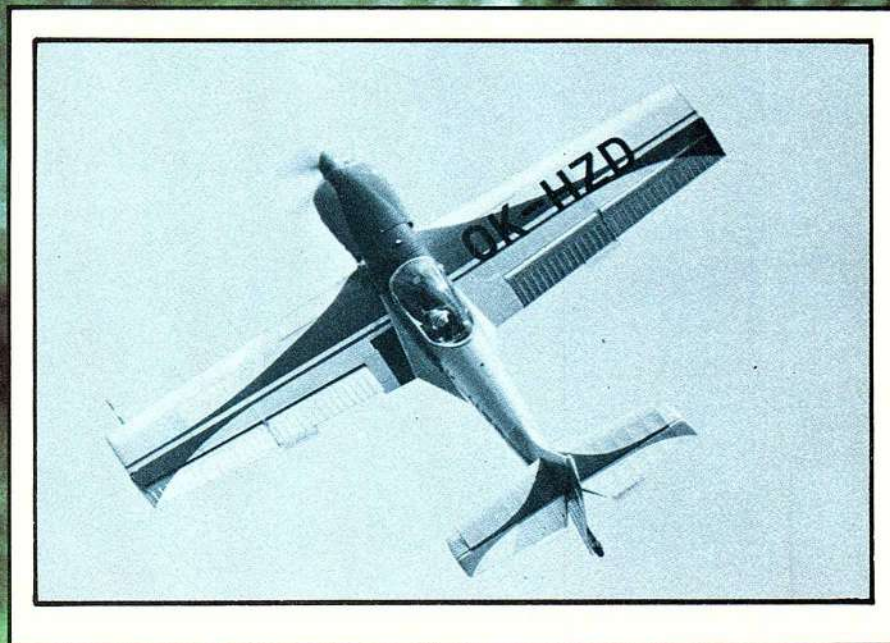


GITY ZLIN

DAZZLE THE JUDGES

By Aldo Van Owen

J. R. Naidish photos



The Zlin Z50L is the plane responsible for changing the shape of aerobatic monoplanes in international competition. Moravan, the Czechoslovakian manufacturer of the Zlin series, had always been world leaders in maneuverable world-class aerobatic aircraft. Their Zlin Z-526 (and the later AFS version) were hot retractable gear airplanes. But, they were big—as big as the Russian Yak 18—and that began to be a disadvantage in world competition when the Pitts biplane gained ascendancy in the mid-'60s. The small biplane caused some serious rethinking of design philosophy, even though the Pitts name had been around since the mid-'40s.

The trend started to move toward smaller, more agile (and more overpowered) aircraft . . . a trend which would culminate in such superb machines as today's Lasers. The Czechoslovakian engineers went to work. They clipped a few feet from the wingspan. The retractables were gone, with a fixed streamlined Wittman-style gear taking its place. A fat-and-sassy 260 hp Lycoming engine (coupled with a three-blade Hoffman prop) provided enough impetus to take the small monoplane straight up within the "box." The metal and fabric monoplane sported huge ailerons (a Zlin trademark) and anti-servo tabs on all surfaces. The NACA 0018 airfoil, long a favorite of the aerobatic crowd, was employed, tapering to an NACA 0012 section at the tips of the generous wing.

At first, it looked like the petite Zlin was fated to a career of only mediocre performance in world competition. From its first appearance in late 1975, the monoplane was getting a reputation of being the proverbial bridesmaid. Finally, it took the superb pilotage of Ivan Tucek (a Czech, by coincidence) to get the most out of the Zlin, and it was the World Champion for the '78-'79 season.

* * *

One only has to look at the Zlin, and you know that a model designer had something to do with the layout and general arrangement of the Z 50L. The model is just too much like a Pattern ship in moment arms and areas to be otherwise. Take all of the articles on model aircraft design, synthesize them, and you'll come out with the dimensions and parameters of the Z 50L. The stabs, slightly canted downward in an anhedral mode, weren't even "discovered" in Pattern flying until Bob Violett popularized them. The squarish wing is

repla-zlin

For the scratchbuilder, a complete package . . . including documentation.

By Robert Underwood

Photos by the author



The Zlin Z 50L is an aerobatic pilot's dream machine. Perhaps it hasn't been in the headlines recently as much as the Laser, but it's still a supreme flying machine. Reports from pilots who have flown the Czech machine have been glowing in their praise. How about a triple roll . . . going straight up! I've read of people who saw the factory pilot do a triple vertical eight . . . that's three half loops going upward, with a half roll at each intersection, followed by the same thing on the way back down. One can just imagine what the power-to-weight ratio must be!

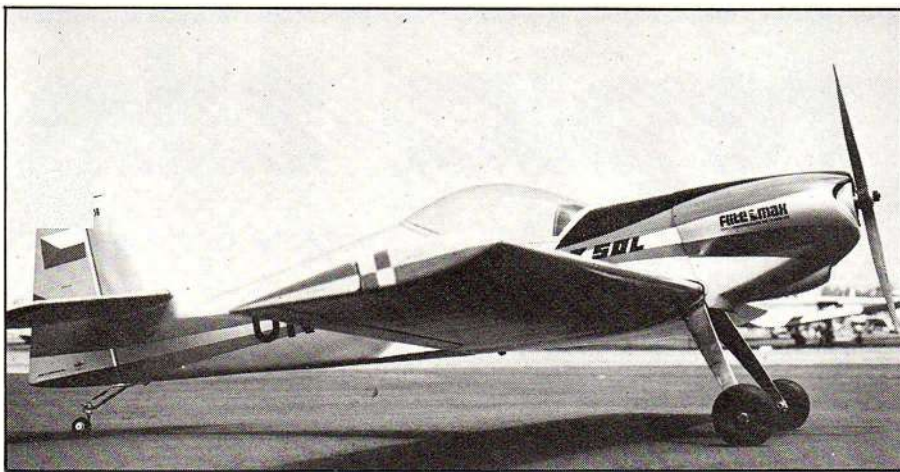
The Zlin will do aileron rolls just as quickly as it will do snap rolls. The trim tabs on the ailerons are unusual, and assist in such maneuvers. The one on the left wing is a conventional geared tab, while the one on the right wing is cam driven at small deflections, but reverts to gear driven when large aileron inputs are called for.

With such credentials, the Zlin fascinated me as a potential model-

ing subject. I wondered if a model could be made to perform as well as the full-size ship. As luck would have it, Bob Morrison had just returned from the ninth World Aerobatic Championships, and he already had a prototype Zlin model underway. In the course of his trip to the Championships, he had gathered photos of the Z 50L, and had even taken a tape measure to the airplane, to verify dimensions.

When I finally got the Repla-Tech plans, I was delighted. They came on four sheets, and were extremely well detailed. I had also ordered the "Repla-Build" booklet, which is the building instructions. The "Repla-Sketch" pamphlet gives historical and structural data on the full-size machine, and its well worth having. But, the real bonuses were the 18"x24" three-view drawings, and the set of ten color photos of the full-size airplane. Each of these items

(Continued on page 68)



Other than the narrow tread of the landing gear, the Zlin has no vices. Guess who left the static three-bladed prop at home?!

Lots of wing area makes the Z-50L very manageable. Stab areas are very ample, for good pitch stability.



reminiscent of the Koas and Super-Fli school of model design, and even the three-bladed prop has been experimented with in model flying. There truly is nothing new under the sun!

The Zlin kit, by Circus Hobbies, is a welcome addition to their line of scale kits. The Cessna Bird Dog (reviewed in the October issue), has already received wide acclaim as a masterpiece of construction engineering. The Zlin is cut from the same cloth. It's got wood parts which fit so well that instant glues are fine for almost all of the primary construction. This kit features a very nice fiberglass fuse, complete with very intricate rivet and panel line detail. The cowl is also fiberglass.

The flying surfaces are built up, which helps to keep the weight down—don't be surprised if you get this

model in at around six pounds! The wing is built up, which is the most important element in making the model so light. We suggest using a wing jig, to avoid getting a warp into the wing. The wing is fully sheeted, which keeps the strength up there. The unique use of a warren truss structure to reinforce the spars makes the wing almost unbreakable under any flight loads. With those huge ailerons, the integrity of the wing must be flawless to withstand all of the stresses.

The kit includes documentation in the form of a copy of *Aeromodeller*, which contains some good drawings of the Z 50L. For those who need something more, Bob Morrison, of Repla-Tech, Int'l. has not only large format three-views, but also a superb selection of color 3x5 photos, and a Repla-Sketch booklet. Write for

prices on these items to: Repla-Tech, Int'l., 48500 McKenzie Hwy., Vida, OR 97488.

The photos of the Zlin accompanying this article do not show the stabs correctly positioned. Because the stabs slide off in sailplane fashion (a great feature when you are transporting the model to a contest), I forgot to bring along the stab supports. The stabs should not have the droop seen in the photos, or at least not as much. Actually, the full-size Zlin did have a slight amount of anhedral in the stabs. The stabs were built so that the bottoms were straight along their datum line, which gave the tapered sections a slight droop when referencing the top surfaces. Since the stabs are separate pieces, a double pushrod is used. Be sure that this is stiff, and won't torque under high G loads.

The full-size Zlin sported fluted ailerons, which could be readily simulated by gluing on thin slivers of balsa to simulate corrugations. While you're at it, you might want to add some panel detail on the wing and stabs, as well as the rudder. Since I had no intention of flying the model at anything more than weekend fun-flies, I didn't waste too much time trying for an immaculate and accurate exterior.

To say that I was impressed with the kit would be an understatement. The parts fit was exceptional, and the plans clearly detailed everything. I wasn't too keen about the landing gear mounting onto a relatively vulnerable part of the fuse, but so far it has held up well. The fiberglass fuse really speeds construction and, since no retracts or other extras are needed, the final airframe goes together very quickly. I would suggest side-mounting the engine, so that the location of the fuel tank doesn't get critical (the centerline of the tank must be aligned with the carb).

Remember to keep the finish light. Originally, I contemplated the idea of using Monokote on the flying surfaces, and Super Pox on the fuse. However, I felt that getting a good color match might be difficult, so I did it all the hard way, with Super Pox overall. By sanding almost all of the surfacing resin away, and keeping the primer coats light, the weight build-up can be minimized. If you are planning to enter the model in competition, painting the airframe is the only logical choice.

With its 59" span, this model is slightly larger than most Formula 1 racers (although it won't be quite as streamlined, of course!). The wing area is 635 sq. in. which makes it

a real floater when built in the six-pound range.

The Zlin is a taildragger, and I strongly suggest that you have some background in handling a model which requires rudder corrections on takeoff. From a grassy runway, you'll probably have almost no problems, but the main gear are rather narrow, so be awake on a paved surface. Before you fly the model, check the incidences, the C.G., and give a careful look for warps and twists. This is a high-performance model, and it has to be straight in order to trim out properly. Pay attention to the mass balances for the ailerons. Use lead to get the ailerons to rest at neutral without the servo connected . . . this will save you potential flutter problems in the high-speed dives.

We took the extra time to mass balance the elevators, too. This helps reduce servo loads. If you are really going for an all-out scale model, the anti-servo tabs could be made functional on the ailerons and elevators . . . the tab moves in the opposite direction of the control surface deflection. This is done by anchoring the anti-servo pushrod to the wing, so that it is effectively pushing when the aileron servo is pulling, and vice



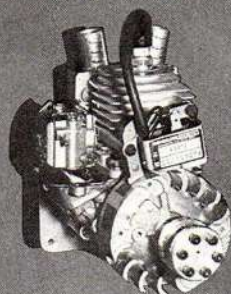
Not an authentic setting for an aerobatic model, but this vernal setting accentuates the flowing lines of this attractive model.

The stab droop is all wrong in the photos, because the author did not install the stab struts.



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DEALER INQUIRIES INVITED



Steve Alvarado built this Zlin in six days! Three days to frame up the model, and another three to do the paint scheme.

versa. This is a simple thing to do, and it really relieves the loads on the servos.

If you have everything adjusted correctly, and you built the Zlin straight, you'll be blessed with a first flight which will require no trim changes. I had that kind of luck, and after about three minutes of flying, I felt as if I had been piloting the Zlin for several dozen flights . . . it seemed like an old friend, right off the bat. I was doing Lomcevak's almost at once, but I had to add considerably more elevator and aileron deflection to get a crisp flop at the top. Dual rate radios are almost essential for optimum performance. With the amount of control deflection required for the Polish Hammerhead and Lomcevak, the plane is too sensitive in normal flight.

This model snap rolls so fast that the old term "flick roll" seems more appropriate. I constantly overshot the level exit, until I started using reduced rate during the maneuver. Enter the maneuver clean, with a lot of speed from a Split-S, and you can get a double snap, as pretty as a picture. The same type of hot entry should be used for knife edge, which is basically a power maneuver.

You'll find that the Zlin is compact enough and responsive, so that it can be kept easily within a normal aerobatic box. Square loops, embellished with snaps, is a most pleasing maneuver. I personally like the variations on the Figure 8. Do a full roll at the intersection, or even a snap, just for variety.

If you balanced the control surfaces (or installed anti-servo tabs) you'll not be straining the servos at all in even the most violent maneu-

vers.. Being a tail dragger, the worst maneuver in the Z 50L's repertoire is the simple touch-and-go. They can be done, but you should keep it hot on the final, and never let the model slow down enough to allow the tail wheel to settle . . . the torque isn't so bad as long as the tail is up.

Although models like the Zlin have not been extremely popular in Sport Scale competition, I think that the FAI World Championships being held in the U.S. this year will change our emphasis . . . and it will be a movement away from WWII machines and toward the more basic models which tend to score better under F4C rules. This would make the Zlin a hard airplane to beat. There's tons of documentation, and you could virtually build the model to Precision Scale standards (externally). The kit outlines are perfect.

The flight judges should really appreciate a break from the monotony of bomb drops and retract or flap demos. An exciting and well-executed aerobatic flight is just as worthy of top points as is a strafing

run. Again, the whole assumption here is that there will be an increased awareness of the FAI rules . . . and this may or may not happen. Even if it doesn't, it may not be a bad idea to break out of the mold, and make a statement to the judges that's individualistic . . . and you just can't get any more individualistic than aerobatics.

Whatever your motivations or objectives, building the Z 50L is bound to bring some personal satisfaction. It's a good machine to have around to keep the old stick reflexes sharp . . . and we can all use some assistance in that department. I use mine as a weekend fun model, but I wouldn't hesitate to build another one and trick it all out for scale contest work. It looks as if Circus Hobbies has come up with another winner. The last word I got on the Bird Dog was that they were no longer available, which is a real pity, for it was a superb kit. I hope they will have the wisdom to keep the Zlin around, for kits of this quality are just too hard to come by. □



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GIVE THE BEST
GIFTS AROUND...



The PA-18 Super Cub can be modeled in either 1/6 or 1/4 scale.

By Jack Capen and Larry Bissonette

Photos by the authors

super cub



When the 1/4-scale bug bit us at Biz Cap a couple of years ago, I knew that Larry Bissonette and myself were destined to build our two favorite aircraft, the Fokker D-VII (August 1980 *Scale R/C Modeler*) and my long-time love, the Piper J-3 Cub.

My first Cub was a black J-3, full-scale no less, but it came with the provision that I would assemble it before I could fly it! That was more years ago than I care to remember, but I'll never forget building that aircraft, and the joy I felt seeing it fly.

My first 1/4-scale project wasn't a J-3, but an early model P-18. The 1/4-scale plan came from our earlier 1/6-scale plan, the prototype being built by our good friend and fellow modeler, Dick Watz. We have both plans available, but I'll use the 1/4-scale model as the basis for this article.

The Piper Super Cub evolved from a long line of Cubs. The first was called the E2 and was designed by C. G. Taylor. The E2 was powered by a Brownback Kitten engine, that was so unreliable you had to take the car along to tow it home. Eventually the more dependable Continental A40 (37 horsepower) was used.

After the company went bankrupt, Bill Piper bought the assets for around \$600. He promptly formed the new Taylor Aircraft Corporation, installing C. G. Taylor as President and himself as Treasurer. The company received certification for the J2 in June of 1931.

In 1936, Taylor sold out to Piper. Shortly after this, the factory burned down. Undaunted, Piper moved his operation to Lock Haven, Pennsylvania, and in 1938 built the first J-3 Cub. Around 13,000 Cubs were produced from 1938 to 1946 for civilian and military use.

In 1949 the Super Cub came into existence with the same J-3 airfoil, basically the same J-3 fuselage and pretty much the same outlines. The changes in outward appearance were in rudder outline, a fully cowled engine and metal fairings over the landing gear bungee shock cords. Later Super Cub models (with 150 hp engines) have a larger Scott tail wheel for better ground handling. Flaps on the early model Super Cubs were optional, but are standard on today's models . . . along with an increase in horizontal tail area.

The construction on our Super Cub models follow closely the full-scale Cubs—the deviations being the materials used. We chose an earlier model Super Cub for the project, with flaps being included on the 1/4-scale plans if you wish to use them. Both the 1/6 and 1/4-scale prototypes were built without them. Both models have two-piece wings which plug onto the fuselage.

The 1/4-scale Cub has a conventional silver brazed landing gear using 1/8" bungee shock cord wrapped on the shock struts. Wheels for the 1/4-scale are Du-bro 4 1/2", being as close to scale as are commercially available. The full-scale Cubs have a very fat, small diameter tire and our plans show how to attain a profile of the full-size tire using an aluminum spacer and two pieces of



The giant-scale Super Cub offers plenty of opportunities for detailing, right down to the rivets on the window moldings.

Jack Capen, of Biz Cap Plan Service, gets ready to prep the 1/4-scale Super Cub for a flight.



bicycle inner tube. If the people who manufacture wheels for modelers would open their eyes to the need for these super fat tires, they surely could sell thousands of pairs in various sizes instead of always making the modeling public improvise with make-do types. How many Cub models have you seen with wheels that look like they belong on a Goodyear racer?

CONSTRUCTION

We will be working with the 1/4-scale version in this article. Let's start with the wing construction. We used Luan ply door skins for the ribs, but 1/8" balsa or lite-ply can be substituted. The spars are 1/4" square basswood with 1/32" ply webs between each rib, as specified on the plans. The leading edge is 1/2" square basswood, set at 45 degrees in notches in the leading edge of the ribs. The trailing edge is 1/8x1/4" basswood, with ply gussets at each

rib. The leading edge skin, cap strips and all other sheeting is 1/32" ply. The wing tip is laminated from 1/16x3/8" basswood, with six pieces for each tip.

To begin construction of the wing, make the laminated tip outlines which will be added later, then pin the lower spars to the plan. Next install the ribs, after ribs W-7 through W-11 have been cut to length for the ailerons. Four extra aileron ribs are needed for each wing. All ribs are installed, except for W-13. Put in the top spars and gently crack upper and lower spars at W-12 so they touch at the laminated tip. Then install W-13 and the tip. The tip should have about one inch dihedral at a center distance between the front and rear spars. (At this point the maple wing mount blocks should be mounted in ribs W-2 and W-3, flush against W-1 before installing rest of ribs.)

Shape the leading and trailing
scale r/c modeler 59

edges and the tips. Mount filler blocks between W-8 and W-9, then add 1/32" plywood webs to the spars and set this aside until you have the servo mounts constructed, as shown on plans. Put the 1/32" ply leading edge skin in place and add the rest of the 1/32" ply sheeting and cap strips.

After the wings are framed up, install a servo in each wing panel making sure you have a large enough hole in ribs W-1 and W-2 (in proper location) for the servo plug and wire to pass through. Mount C. B. pulleys to W-9 and mount a 1/16" micarta horn between the aileron ribs at W-9 (it takes two pulleys for each wing, mounted one above the other, about one inch apart).

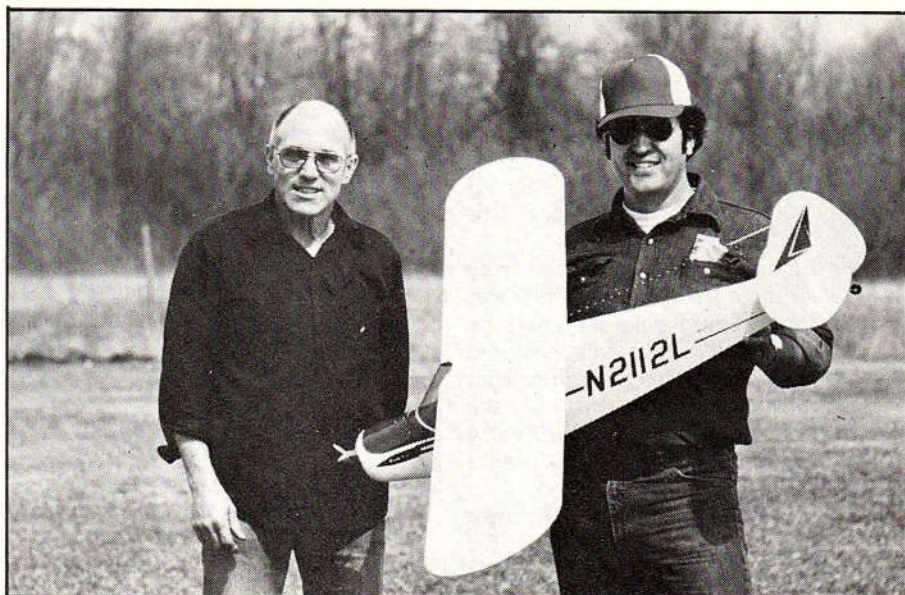
The cables are next and are attached to the servo output arm, one on each side, with Du-bro metal snap links threaded onto their brass connectors. The cable is soldered into brass connectors, and passed through ribs W-2 through W-8 (holes located on plans) and around the pulleys to the aileron horns. Again, use the snap links and connectors.

The ailerons should have at least four hinges apiece. The hinges are mounted at the top, with the slots cut at a downward angle and set flush with the top of the wing.

The strut brackets are made from patterns on the plans and mounted in the locations indicated.

The elevator surfaces are pretty much the old fashioned method of construction, with 3/8" square stock for the stabilizer trailing edge and elevator leading edge. All ribs are 3/16x3/8" basswood. The diagonals are made of 1/8" square basswood.

The Super Cub is a good basic project for those just getting into scratchbuilding. No complex building chores.



Jack Capen, and chief test pilot Dick Wentz, with the smaller 1/6-scale version of the PA-18.

The gussets are 3/16" ply and the outlines are 1/16x3/8" basswood laminated in six pieces. The elevator horn is made as shown on the plans and epoxied in place.

The rudder and fin are built in much the same manner, with all tail outlines rounded. Make sure a smooth rounding job is done, as the outlines represent steel tubing on the full size aircraft.

The stern post of the fin is notched to accept the upper and lower longerons, while the rudder post is notched at the lower end to accept the steering horn for the tail wheel, as per plan. The steering horn is installed and drilled for 0-80x1/2" bolts (Morris Tool Co.). After the tail surfaces are completed, install rigging clips in the stab and fin and set aside until the fuselage is completed.

Start the fuselage construction by cutting out all the formers and parts needed. If the parts are accurately cut now, a well aligned and neat airframe will result.

Two F-6s are required, a right and a left. The right side is cut out for the door, where indicated by dashed lines. Lay the two F-6 pieces on the plans, one on top of the other, and proceed to build the two body sides at the same time. Install the upper and lower longerons, uprights and diagonals. When these are dry, build the cabane struts using 1/8" piano wire. Bend and fit the three pieces, using the side and top views for proper lengths and widths, then silver braze them together.

When the body sides are ready, clamp F-13 in its proper location, clamp the cabane assembly to the fuse sides and install F-3 and F-4 into their locations. The firewall is now epoxied in place and the landing gear blocks (with proper width and depth grooves) are installed. After being sure everything is aligned



and squared up, epoxy the cabanes, F-3, F-4 and F-13.

Next, cut all the cross-pieces, pull the longerons together at the tail, carve the inside of the longerons at the tail so they measure 3/8" when pulled together and glue in place. Then, glue in the cross-pieces and put in all the formers. F-14 should be fitted and installed before the two F-12s are glued in place. The F-2 should now be put in place and the proper nose sheeting installed and shaped to side and end views (before this sheeting is put in, the bottom ply sheeting and triangular block against the firewall and fuselage sides should be glued in place).

Next, install all stringers. The two top side 1/4" stringers are brought together like the longerons, at the tail end. The top stringer is fitted to the leading edge of the vertical fin (do not install fin at this time). Assuming the elevator and stab are completed, they should be covered at this time. Hinge and install in slots of F-12. Glue them securely in place.

The elevator cables will have to be installed at this time, again using the Du-bro snap links and threaded couplers. Make sure the cables are long enough for your servo installation. The prototype has the elevator and rudder servos just back of the door with the receiver and battery pack just ahead of them.

The side stringers are sanded flush at the tail post, starting at about the midpoint of the fuselage and gently sanded down until flush with the post in a smooth even taper. Mount the vertical fin on the fuselage and glue in place, making sure the fin

is centered on the fuselage and is 90 degrees to the stab.

Wood detailing can be added at this time on the outside of the upper cabin area. The 1/4" stock maple wing mount blocks (drilled and tapped for 1/4"-20) are inserted in the slots provided in F-6 and F-5, protruding equally on both sides and epoxied in place. While those are drying, construct the upper and lower doors, as per plans.

Install all trim pieces, as per plan. Fabricate the landing gear and epoxy into slots in the landing gear blocks. When dry, smooth in with Epoxolite putty. Build the tail wheel assembly. You can use pan head sheet metal screws to hold the tail wheel to the 3/16" ply plate on the bottom rear of the fuselage (take the assembly off for covering and painting).

Mount the rudder and install the cables, as explained, for the elevator and ailerons. Next, mount the rudder and elevator servos and cut the cables to the correct length with adjustable ends.

Now is the time to temporarily mount your favorite chain saw-type engine of about two cubic inches in displacement. We use a Quadra and recommend an 18x8 Dyna-thrust prop for a model in the 20-pound range. A C. B. Quadra mount is advised, as it will save a lot of work making a plywood standoff and facilitates easy engine installation and removal.

Remove the engine and the frame should be ready for covering. We use Super Coverite, but you have quite a choice of this. We chose Coverite because it gives a good scale-like appearance and is easy to work with. The only place that any great care must be taken is the vertical fin. That is where we started on the

prototype. Cut the two pieces, a right and a left side, with the grain running horizontally and tack to the side of the top side stringer. Next stretch the material to the top corner of the rear post and then to the leading edge at the top, again stretching taut. Seal down to the top stringer and fin post then tack along the leading edge, pulling taut as you go. Seal down all edges after trimming and repeat on the other side (do not seal down to any ribs). Apply heat and the covering will fare into the fuselage as on the full size Cub.

The top of the fuselage is covered to F-4. From F-3 to F-4 is covered with clear acetate. Before any windows, the windscreen or top clear acetate is installed, the interior should be painted, the instrument panel glued against F-2 and all other painting of the model should be done.

The wing struts are made of .035 wall steel tubing and diameter as shown on plans. Make the struts as accurate to the plans as possible, as they govern the amount of dihedral the wing should have.

After the entire model is covered, you might want to do the extra work of enhancing your model's appearance by adding rib tapes. We found, by way of a Canadian modeler, an easy method. The product is called 3M-hair curling tape! This tape has pinked edges and is the scale width for 1/4-scale. It has a sticky side which you press in place, and then coat with clear dope to seal permanently.

We finished our model with three coats of clear dope and sprayed on three coats of color. The fuselage was then masked off in the desired places, and the trim color sprayed on. Make sure you use a low ad-

The small version of the Super Cub can be built with optional floats, included with the construction plans.



hesion tape, such as some types used by auto paint shops for masking.

The wing strut brackets are installed on the rear maple landing gear mounts and slip over the rear landing gear leg, as shown on the plans. They are bolted in place through the four holes provided. This should be done before painting. The brackets should be recessed into the landing gear block. Countersink the holes and use 2-56 flat head machine screws. The step is mounted just behind the rear landing gear leg (right side only) using 1/8" soft brass tubing.

Our fuel tank is a 16-ounce Diamond nut can, cut to 3 1/2" in length with a round front added so it would fit between the firewall and instrument panel. If you're not up to building a tank, any 10-to-12-ounce tank will be adequate, but it will extend into the cabin area. Remember to use a good grade of rubber tubing for the gas lines, as silicone tubing tends to swell up and get rather gummy when emersed in gasoline.

If you decide on the Du-bro 41 1/2" wheels and want them fat like the full-scale Cub, we have a fat kit available. It includes spacer, longer bolts and smooth tread rubber that you

stitch over the tires and center up. We also have fully welded landing gear and cabane assemblies. T&D Fiberglass has epoxy-glass cowls available. Send for brochure and prices.

The plans for both the 1/6-scale and 1/4-scale versions of the Super Cub are available direct from: Biz Cap Plan Service, 4777 South Iva Rd., Merrill, MI 48637. The smaller version sells for \$16.50, while the giant-scale Cub sells for \$25.00 (Postpaid in mailing tube). The 1/6-scale version includes plans for floats. The Balsa U.S.A. float kit is perfect for the 1/4-scale version.

The finished prototype weighed in at 21 pounds dry weight. The center of gravity is five inches back from the leading edge of the wing, giving a slight nose heavy configuration.

FLYING

When the day rolled around for the first flight, we called on Dick Watz to do the honors. Dick does the test flying for Biz Cap and has probably built more variations of the Cub than most modelers have built total airplanes! He built, as mentioned earlier, the 1/6-prototype and

couldn't wait to fly the 1/4-scale version.

We picked a cool fall evening and all met at the Saginaw Valley Sod Farm. Dick taxied out while Larry and I waited expectantly and Dave Schneider snapped the pictures.

The Cub lifted gently and was amazingly realistic! After making a couple of trim changes, Dick proceeded to put the Cub through its paces. After we persuaded him to stop having fun, he came around low and slow for the photo passes. Again, we were amazed at the realistic sound of the Quadra and the realistic flight performance of the aircraft.

The landing was smooth and easy with a gentle touchdown and a short rollout. Ground handling was very stable and positive.

We have since put many flights on both the 1/6 and 1/4 Cubs and have really enjoyed their easy but scale-like flight characteristics. □

FULL-SIZE PLANS AVAILABLE DIRECTLY FROM: BIZ CAP PLAN SERVICE, 4777 SOUTH IVA RD., MERRILL, MI 48637. THE 1/6-SCALE VERSION IS \$16.50, AND THE 1/4-SCALE VERSION IS \$25.00. (POSTPAID, IN MAILING TUBE).




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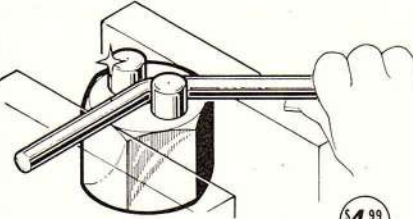
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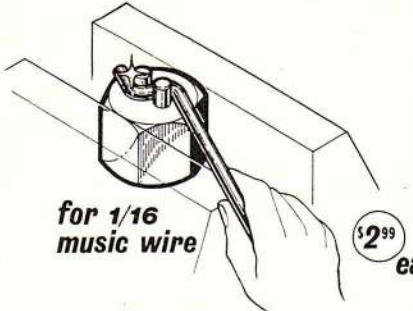
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WESTERN SCALE NATS

(Continued from page 49)

other rendition of Bert's soon-to-be-available Jug kit In Sportsman, over half of the top ten winners' list were airplanes with engines larger than .60s.

We had previously mentioned that Datsun/Nissan were sponsoring the Masters, and that a brand new car was to be grand prize. Well, it seems that the original agreement with the company was that some \$10,000 in additional funds were to be forthcoming, to accompany the car. This additional money was to be used to help defray the travel costs of the contestants. As it turned out, this part of the deal fell through at the last minute. The Masters council talked it over, and they agreed that, rather than letting one Grand Champion walk away with a car, it would be best to sell the car and use the proceeds to split up the prize more equitably among the larger group of winners.

While it was nice to think that a flier was going to drive away from the Masters with a new car, we feel that the concept of dividing up the wealth is much more in keeping with the true spirit of Scale competition. We have always had mixed emotions about putting price tags on placings

in contests, since people's personalities can change dramatically when the rewards change from a trophy to something more tangible (and valuable). A lot of people worked hard this year, trying to qualify, in the hopes of winning a car, and we're sure that their rewards (while not as great if they could have been as skilled or lucky as to come out in the number one spot) will be just as significant without the car as grand prize.

One thing for sure, the spirit of competition couldn't have been higher than at this year's Western Scale Nats. In looking at the scoreboard, there were only 11 zeroed rounds, in over 200 flown! That's pretty stiff pressure! In Expert Class, the preponderance of flight scores were above the mid-70s range, and a similar situation occurred in Sportsman. It's too bad someone in the club can't get a basic computer to run a program on the scores. It would be interesting to start chronicling the flight and static scores, so that we could look at them in future years in reference to judging trends, etc.

But, leave it to guys like Kent Walters to skew all of the curves, and tilt the database toward the near-

perfect end of the scoring spectrum. How do you stop a guy who posted a 92.5 flight score on his first attempt (typically, most pilots have their worst score on the first "trim" flight)? In some six years of contest flying, Kent has only flown in one contest where he hasn't posted the highest flight score, and that was last year's Masters Finals.

The only one who was even pushing "Cowboy" Kent was Garland Hamilton. This guy looks as if he just stepped out of a Marine recruiting poster. Clean cut, square-jawed, with the manners and mannerisms which only Marine life could breed, Garland is a superlative builder, and an Ace of a pilot. This year he is campaigning a new F6F-3 Hellcat, with bombs and a drop tank. His previous career was as an illustrator, so you can imagine how detailed his models are. Last year, we speculated that he was the dark horse who was going to sweep the Masters . . . and we'll still take even money on that bet for this year. By the way, Garland looks like a spitting image of a Marine recruiting poster, maybe because his reassignment in the Marines is . . . you guessed it, as a recruiter!



Bob Purcell flew his new A-26 in Team. Very stable.

Garland posted a 91.2 flight score on his first flight, which immediately put everyone on notice that this guy was playing for keeps. Garland managed to keep within a point of Kent on each succeeding flight, but that wide spread in static scores (Kent's 96 to Garland's 89 made the final difference. However, come the Masters Finals, we still think it's going to be the Cowboys *versus* the Marines.

Third place was a real surprise . . . or, at least, a pleasant surprise. Don Lien's name was in the winner's circle time and again a few years ago. He was Grand Champion at Morgan Hill, and won the Western Nats. He relocated, changed jobs, and went through the usual traumas of getting back into the swing of every-day life. Modeling, as is usually the case, sort of slipped, but Don's the kind of guy you can't keep down. He tinkered around with the Jemco .40-sized models, but last year his old friend Jerry Ortego talked him into building one of his .90-sized Focke Wulf FW-190s.

The bigger, more stable model really fit Don's smooth and open flying style. His takeoffs were so smooth that there was an almost imperceptible transition from ground to air. This pilot could well be on the trail back to the victor's circle, and he'll be a factor to contend with at the Finals.

In mentioning Jemco, we must comment that the nicest model at the meet was one which didn't compete. It was Jim Meister's latest project . . . a .90-sized P-51. No, that wasn't a typo, for Jim has abandoned the

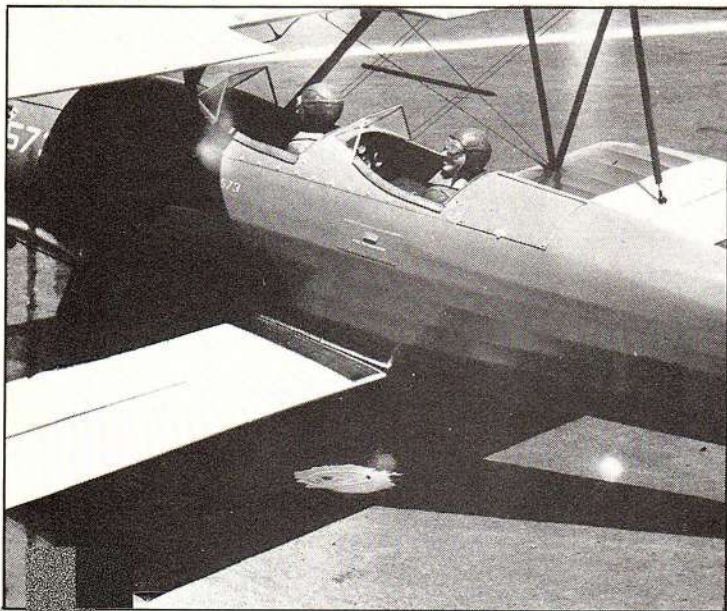


Erik Richard flew this big Ercoupe to fourth place in Team.

whimsy of .40-sized models and is now a staunch proponent of the larger machine. One only has to look at the detail on this Mustang to see why. The plane is so well engineered and so authentic (over a year's research and development to get the prototype ready) that it is a guaranteed winner. Jim will be adding this to his deluxe custom kit line probably by the time you read this,

along with the already popular SBD Dauntless.

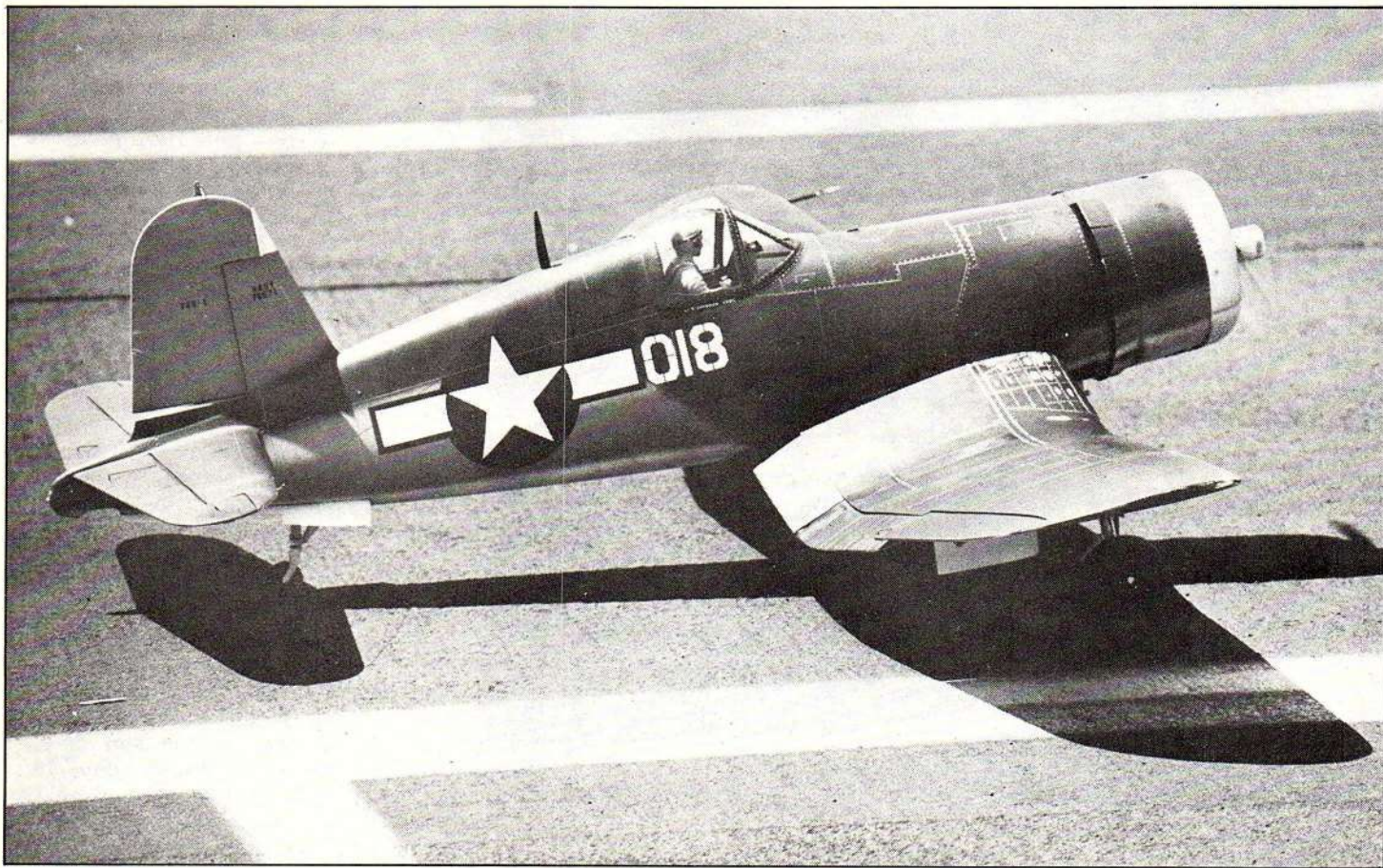
The P-51 will have such unique features as a cooling system which has no opening in the cowl, with the hot gasses actually passing over the wing and out the oil cooler area in the belly. Functional tail wheel, and his own mods for the main retracts add to the authenticity of the Meister Mustang. This will be one of the



Look carefully at the spill below Chuck Fuller's 1/4-scale Stearman. That's a functional pilot relief tube! The Stearman took sixth in Expert Class.

64 scale r/c modeler





Mike Mann's Corsair took fourth place.

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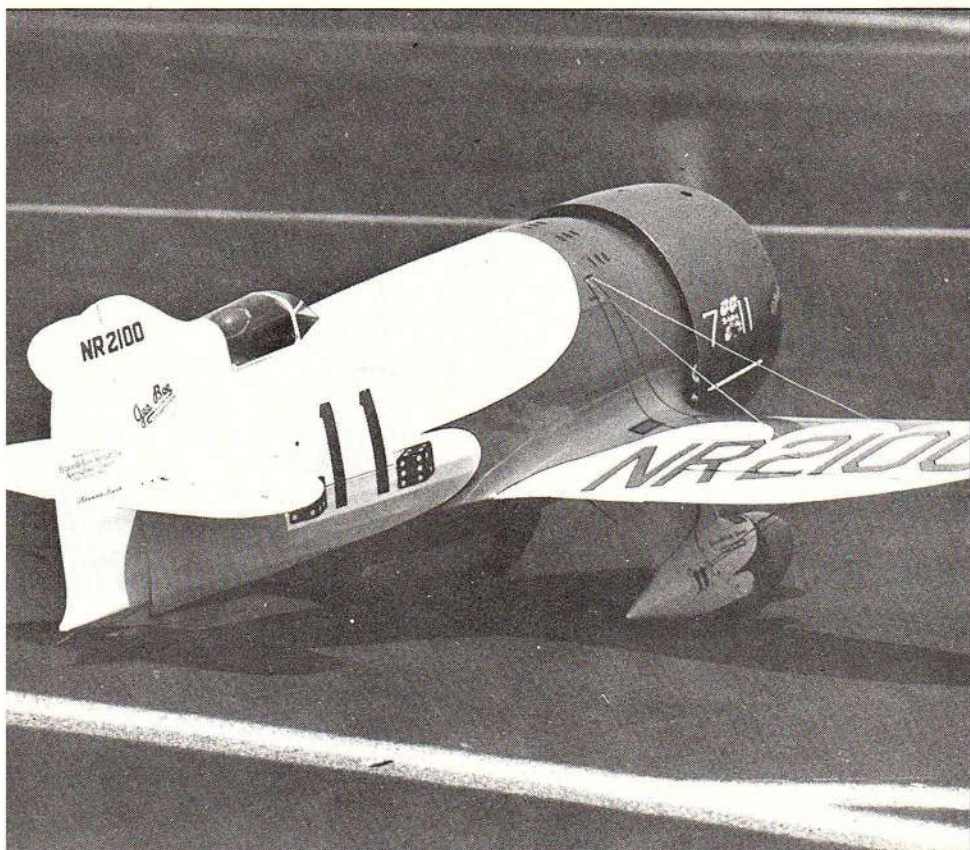
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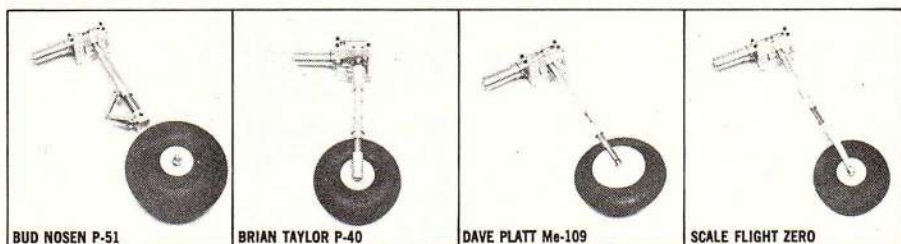
Highest static score was Granger Williams' Gee Bee.

most accurate Mustangs to ever be put into kit form.

If we had to vote for the most impressive airplane of the meet, it would be a toss-up between Jerry Ortego's FW-190, and Bert Baker's (Scale-Flight) new P-47. The Jug is a machine, with a span approaching 90". Even though the prototypes weigh in at 18-20 pounds, the production machines will weigh about 16 with their glass fuses. We were very impressed with not only the physical size of the machines, but also the sheer impression of massiveness and stability which is so characteristic of the P-47. For flight realism, these Jugs took top honors, and they were planes which looked like they would need a Quadra, yet they flew fine on .90s.

Talk about great contest banquets, this one was the most unique yet. The Squadron commandeered the Tiki, which is a large Tahitian-style ship. There were hot hors d'oeuvres and liberal amounts of libations, as the boat majestically sailed into the Pacific at sunset at the end of a typically perfect California day. It was disappointing that more people didn't attend (we must confess that we virtually missed the boat after grabbing a late afternoon nap to

(Text continues on page 81)



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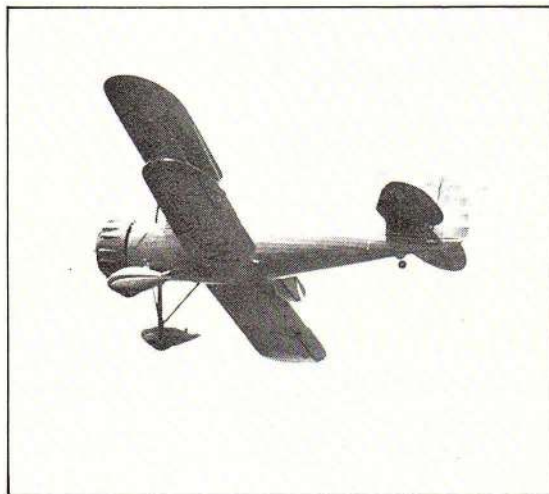
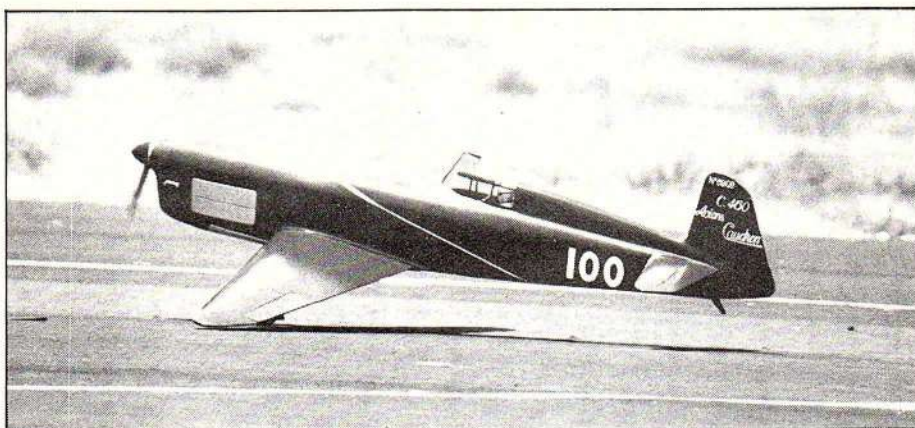
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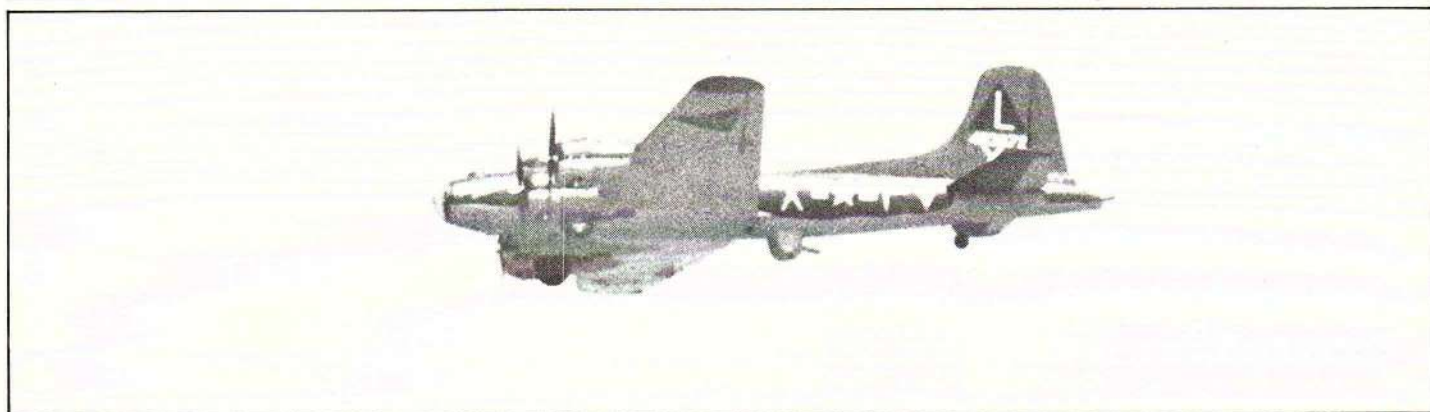




5

1. Forest Edwards' Fleet flew well on his homebuilt engine. 2. Col. Thacker's Caudron drags a tip on takeoff. 3. Buzz Watson's giant Zlin flew very well. 4. Bob Richards' Waco proved a stable machine. 5. Top Flite P-40 was the team entry flown by Ron Wiser, in second place. 6. Tony Arand flew his Royal B-17 into fifth place in Team Scale.

6



repla-zlin

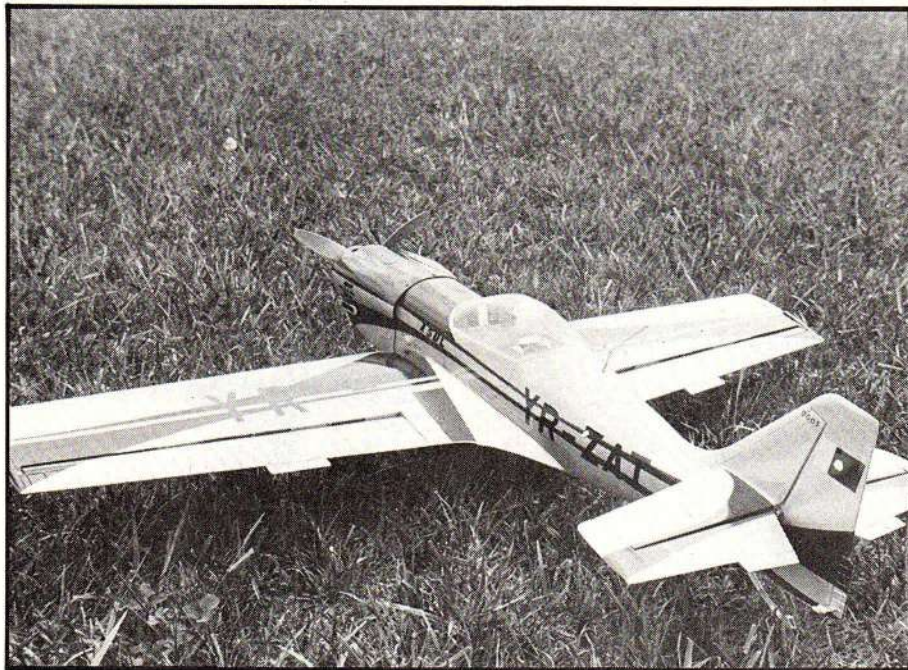
(Continued from page 53)

can be ordered separately, and we suggest that you write directly for current prices to: Repla-Tech Int'l, 48500 McKenzie Hwy., Vida, OR 97488. All of the items mentioned above can be ordered at a special price of \$9.50.

For those who are going to build the "Repla-Zlin," as I refer to it, here are a few mods which you might want to consider. First, make sure you particularly note the two design change sheets which come with the plans, since these make critical changes to the firewall and stab areas. I added plywood doublers to the spars, and also on the doublers where the wings slide onto the fuse.

I used threaded blocks to secure the wing to the fuse, instead of the nuts called for on the plans. I also opted for a fixed canopy, instead of the hinged one shown. You can order the canopy from Repla-Tech for \$6.00. The tail wheel was modified to the steering type, instead of fixed. This is a very important change, since you aren't going to taxi too well without it.

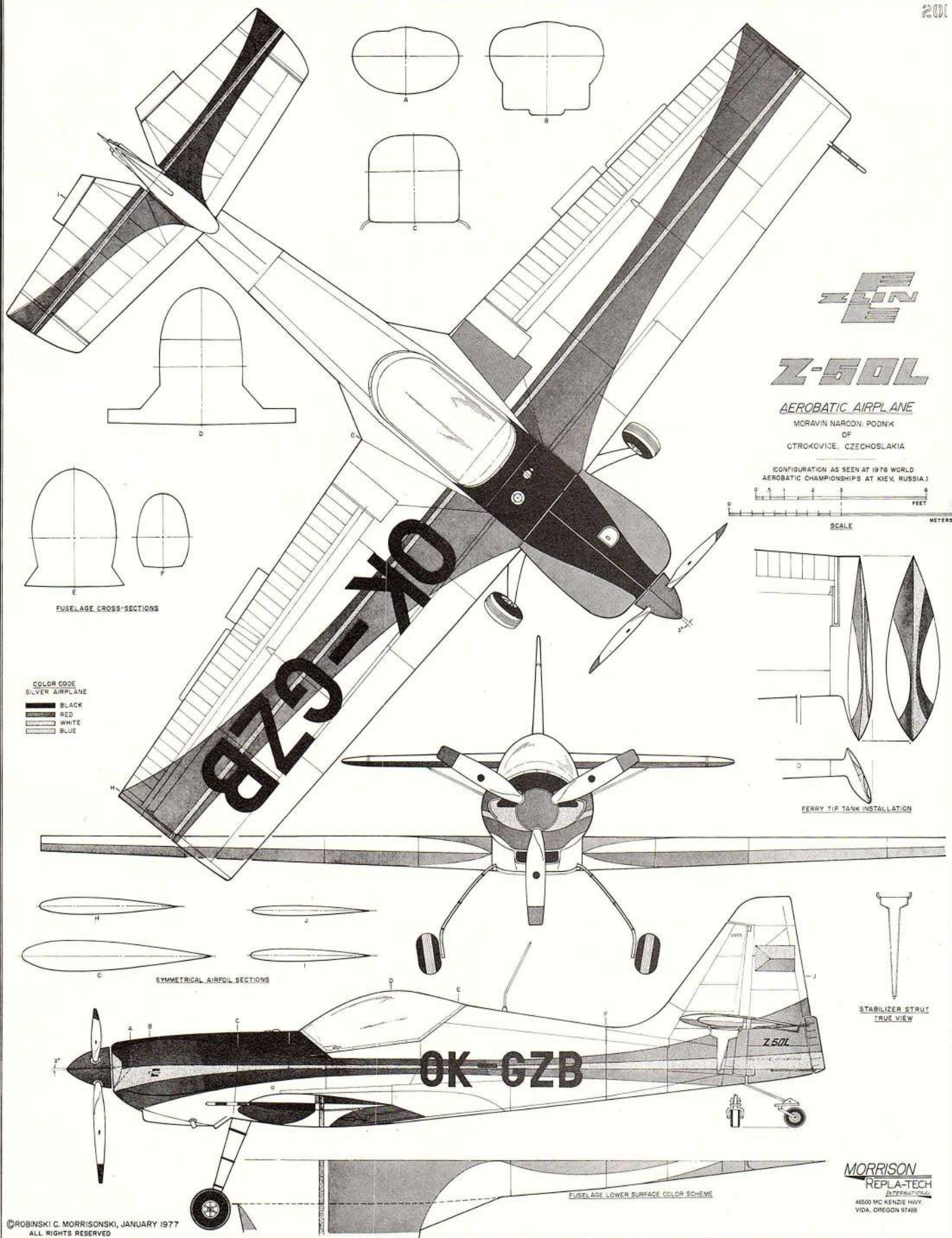
I extended the ply doublers from the firewall back to the cockpit area, and I installed hardwood blocks in the landing gear support area. I also glass reinforced the landing gear areas and firewall box. The other small changes I made were to make a plywood bottom hatch and I set all incidences at zero degrees. I feel very strongly that the modeler should



With all of the mods discussed in the text, the Zlin turns out to be a very contest-worthy machine.

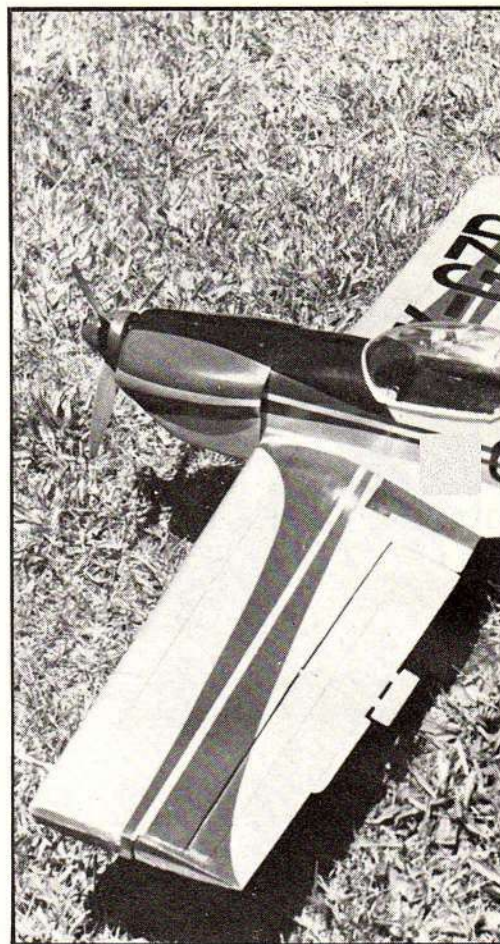
The author's Zlin scored the highest static score of the contest on its first outing.







One of the Czech teams Z-50Ls. Note the very thick cross section on all of the flying surfaces, especially the fin.



This is Bob Morrison's own Zlin, built from his plans to verify the accuracy of the drawings.



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disregard the sailplane-style wing mounting system shown on the plans, and build the wing as a one-piece affair.

The mods were rather basic and common sense. Once completed, the model is very good looking. With all of that documentation, I was anxious to get the model into competition. I went out for a quick test flight, and was amazed that the Zlin flew like a well-trimmed Pattern ship. I put it through all of its paces on the first tank of fuel, with loops, rolls, inverted maneuvers, etc.

The contest turned out to be anticlimactic. I'm proud to say that the Zlin got the highest static score, which is a good testimony to both the scale outline and the fabulous documentation. Because of mechanical problems, I really couldn't put together a good flight, but I have no doubt in my mind that the Z 50L would have been right on top if things had gone correctly.

If you like to scratchbuild, the Zlin is a nice project. Having a fiberglass cowl would have saved some time, but that's the only real lacking item I can think of. I enjoyed the Zlin, and I hope you get the fun and satisfaction from yours that I have gotten from mine. ☐

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Alepo Scale '82

(Continued from page 40)

sudden need for more power, and a lot of experimenting (and bad engine runs) were the result. It's pretty obvious that, if the U.S. ever wants to be competitive in the world scale scene, we are going to have to change some of our modeling habits, as to the type of aircraft we build. With our built-in penchant for military machines, such a transition would be psychologically very difficult.

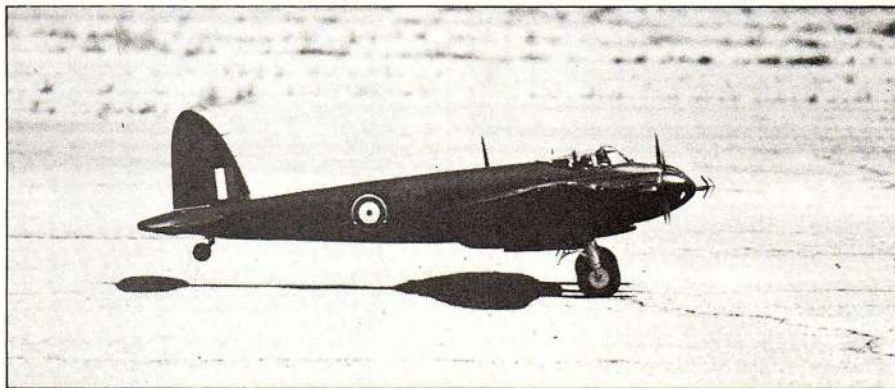
Just to make liars of us, the model which eventually surfaced as the winner in Sport Scale was a heavy de Havilland Mosquito. The difference here was the superlative pilotage of Belgium's Wim Reynders, who handled the twin-engine bomber to perfection . . . he's one of the smoothest and most practical fliers we've ever had the pleasure of watching. Those K-factors for multi-engine didn't hurt much, either!

The desert heat raised havoc with the pilots, as well, and the meet was one of survival. The only shade for miles was under the umbrellas provided for the flight judges. The hangar in which the models were kept was hundreds of yards away, so the models and pilots simply did their best to cope with the heat.

As one can imagine, such a venue was not conducive to spectators. We can't imagine why anyone would want to leave the airconditioned luxury of the Reno gambling casinos to watch model aircraft fly, and that's just what happened . . . no one except a few die-hard modelers, showed up. There was almost no publicity in advance (although spot



Jean Rousseau's Cap 20 flew very well, and wound up in third place in Precision Scale.



The Canadians did well at the Championships, and Sepp Uiberlacher's Mosquito took fourth in Sport Scale.



coverage of the meet did air afterwards as far away as Los Angeles). For those who did show up, the contest management made it very difficult for the viewers to enjoy the meet. The models, as mentioned, were coveted away in a hangar (which few spectators know about). The models on the flightline were almost totally hidden by officials and related contest equipment (all congested into a little square in the midst of an expansive runway).

For those who braved the heat to come out and watch, the meet would unexpectedly come to a halt at mid-morning, while the judges (the only ones sitting in any shade) took a break! At noon, the judges simply stopped for a 45-minute lunch. No wonder there were so few faces behind the barriers after lunch!!! Of course, such international events

Canada's Gerry Dale got off to a bumpy start, but really put in some great later flights with his Pitts S2-a, to wind up in fifth place in Precision Scale.

move at a snail's pace. Because there is so much riding on the outcome, no one makes any attempt to expedite the flightline. During the Precision Scale event, we sat around while one flight got off every fifteen minutes (many of these being called "attempts" when the engine died after the mandatory taxi maneuver). If you want excitement, don't go to a World Championships!

But, all of the above can be overlooked. So what if the weather was hot, and so what if there were no spectators! After all, this is a contest, and we were there to fly and select a World Champion. Circus Circus Hotel/Casino is to be commended for their cooperation in providing a superb facility for contest headquarters. Aside from that, however, the question of our role as a host must be raised.

The World Championships has always been associated with a certain amount of pomp and circumstance. In Poland, several years ago, the modelers were received by royalty, and paraded through town. In Canada, the hospitality was impressive, and each country had its own sheltered canopy. We were somewhat embarrassed that our modeling friends from overseas were given a view of the United States which couldn't be more non-representative of our country.

Cliff Tacie, of the U.S., with his Spezio Tu Holer. The right airplane, but he could only hold onto seventh place.



Kjell-Ake Elofsson, from Sweden, had one of the highest static scores on his Zlin Akrobat, and he finished in fifth place in Sport Scale.

Of all of the superb facilities available from coast to coast, the selection of Reno was a tragic blunder. Yes, Stead did have a lot of ingredients which, on the surface, would make it seem a likely place to hold a championships. The runway had a terrible slope to it, which made for some interesting takeoff maneuvers. But, the critical ingredient of a great

place to visit was totally missing. Sure, the gambling in Reno was unique, but that wears thin in short order. Several modelers from this country mentioned the "ugly American" syndrome, and we were admittedly somewhat awkward about welcoming our foreign friends to such a contest location. Somehow, we felt bad that one of the highpoints of the week was a tour of Virginia City, Nevada . . . what kind of a memory is that to take back home?!

The Reno modeling club is to be commended for their hard work. This small group of dedicated modelers





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put in 14-hour days all during the week to make sure that everyone was comfortable (they even brought folding chairs out to the flightline for contestants and team members).

In spite of all of the negative comments, this was still a World Championships. There were 47 entries, which is a very respectable turnout. If you were looking for odd aircraft, this was the place for them. How many contests have you been at lately which featured planes like the Bolkow 207, Blackburn Shark, KZ VII Lark, Pompilio PE and Summerside PE-1? The vast majority of the models were scratchbuilt, and many of the Sport Scale class models were so well executed that they could have passed for Precision Scale entries. On the other extreme, many of the models suffered terribly in craftsmanship, yet they mysteriously were awarded respectable scores.

In order to achieve flight realism (something which receives very high judging attention) many of the modelers were using either four-cycle or geared engines. As a matter of fact, the Precision Scale models were preponderantly powered by geared engines. Those big, slow-turning props certainly made for convincing flight characteristics. Putting it all together to emerge victorious took a real combination of talents. One had to be somewhat of an engineer, with the skills to make such exotic hardware as a scratchbuilt gear drive system. One also had to be able to execute a model to near flawless perfection, then have the ability to fly

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George Rose's stand-by P-6E Hawk didn't seem to impress the judges this year, and George wound up in 10th place. George is from the U.S., of course.

it realistically in the rarefied air of the desert.

As noted, the eventual victor in Stand-Off Scale was a pilot, *par excellence*. In Precision Scale, the winner was a pilot of some expertise, but the real deciding factor was a static score on Tom Melleney's beautiful Moth Minor DH 94 that was simply unbeatable. It was interesting to note that Mick Reeves, also from Great Britain, took second place in Precision flying a very atypical model. His Spitfire Mk. IX would traditionally be considered taboo in such an event, being too complex a model to score well. However, the Spitfire got the third highest static score and Mick, having learned a bitter lesson by smashing his Stand-Off Scale Spitfire because of the density altitude, flew this version perfectly (ironically, the Precision Scale version of the same plane weighed two pounds less than the Stand-Off Scale version).

In team standings, the U.S. finished fifth in Precision Scale, and third in Stand-Off. The judges seemed unimpressed with George Rose's old standby P-6E Hawk, and they gave it a very low static score. Earl Thompson (Focke Wulf FW 44J) and Bob Wischer (Ryan SCW) both had respectable static scores, but they couldn't post even a semblance of an official flight. Things just were not going our way at this contest.

Our showing in Stand-Off, in the opinion of this reporter, was much better than we deserved. We were flying the wrong kinds of airplanes

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Detlef Draheim has published his sailplane designs in *SCALE R/C MODELER*, and he is a champion in that event in Germany. His Bolkow 207 managed a seventh place, due to some very smooth flying. Detlef suffers from a disease which has left him practically incapacitated, but he is a trooper of a competitor, nonetheless.

for the conditions at the site, and Phil Sibille's model was showing definite signs of age with continuous equipment problems. The static scoring seemed sporadic. We still can't understand how Cliff Tacie's Spezio, while a good model, outscores Charlie Chamber's F8F Cougar by over a hundred points. And we're still scratching our head as to why Phil Sibille's Spitfire got one of the lowest static scores of the meet.

We make no pretense of understanding how the F4C system of determining the best combination of model and pilot works, but we know that it's an entirely different philosophy of contest scoring from what we practice in the U.S. We frankly have reservations as to how successful a competitor from the U.S. can be in worldwide competition. We don't routinely fly the F4C rules in this country, so we tend to not build the right kind of airplanes, and we don't practice the same type of flying and scoring that the other countries do. You can't just have the event as an option at the Nats every two years to select a team. Instead, you have to use the rules at weekend contests . . . to win FAI, you have to learn to think FAI.

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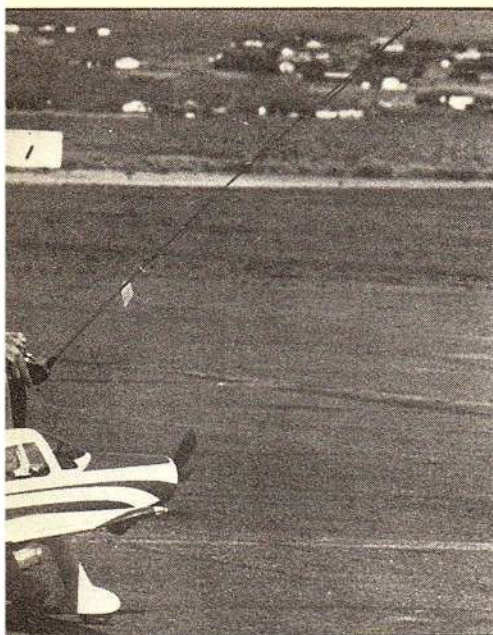
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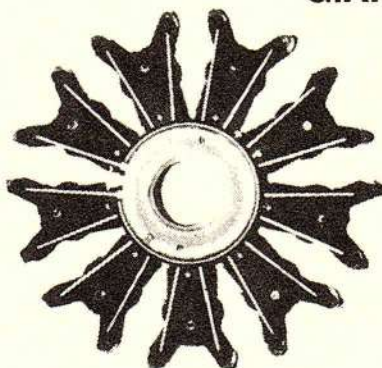
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rules were being provisionally flown at a handful of local meets. Surprisingly, the fliers liked them, and we went to the World Championships last year with a great team, and Dwight Holley walked away with all of the marbles.

Perhaps, now that we've hosted our first World Championships in Scale in almost a decade, there will be a renewed interest in FAI events. It certainly is worthwhile taking the time to read the rules in the AMA Rule Book. The Mint Julep flew the FAI rules this spring, as a warm-up for the Championships, and there were no major problems for the judges.

One thing for sure, is that we can't expect to field a good team by using a one-shot team selection system at the Nats. A full program like the Masters would be better suited to selecting the optimum team, since the process of national eliminations would tend to bring out the top models which typified the spirit of FAI competition. Time will only tell whether the fliers, themselves, have enough motivation to pursue the course of F4C competition. It's just too bad that the one stimulus which could have triggered a renewed interest in international competition—a World Championships in our country—turned out to be a downer.

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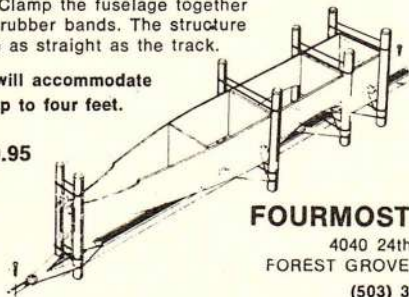
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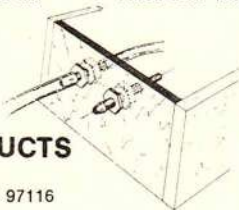
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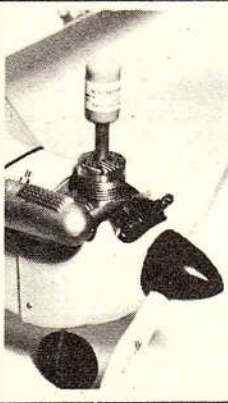
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EDITORIAL



A great example of Olive Drab paint is Ken Runestrand's L-4 Cub, as was featured in the December '81 issue. (Lee Taylor photo)

PETTIT PAINT POINTERS

Petit Paints, the manufacturers of Hobbyoxo, have established a new service for the scale buffs. Each month (or as their paint chemist's time permits), they will send us a formula for a U.S. paint color. As the company explains:

"We know that one of the most difficult aspects of producing an authentic finish is matching the exact color of the prototype aircraft. Even when a color chip is available, it isn't always easy for the average modeler to know how to mix that color from existing paints.

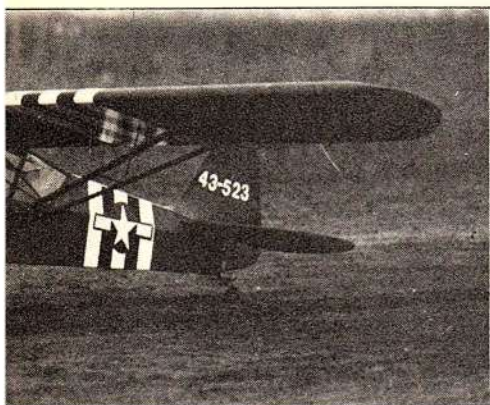
"To make life easier for the scale model builder, we've put our laboratory color experts to work creating formulas for mixing the most-asked-for World War Two camouflage colors, using standard Hobbyoxo paints.

"The first one we worked up is the ever-popular and very elusive OLIVE DRAB 41, also known as pre-1964 Federal Standard 34087. As you know, the color of OD was changed in 1964; but the Feds, in their perversity, gave the new color the same FS number as the old discontinued color . . . much to the chagrin of model builders everywhere. Fortunately, we were able to obtain the proper FS chip and our lab has come up with a perfect match.

"Here's the formula: Two parts H66 Dark Red, two parts H81 Black, one part H10 White and one part H49 Cub Yellow. Mix them together, add an equal amount of Part B Flat Hardener and you've got WWII Olive Drab.

"To go along with the OD, we next matched NEUTRAL GRAY 43, FS 36173, so you can paint the un-

(Continued from page 6)



dersurfaces of those USAAF aircraft.

"The formula for this color is: Four parts H10 White, two parts H81 Black and one part H26 Light Blue. Again, use Part B Flat Hardener for the proper matte finish.

"A WORD OF CAUTION. These formulas were developed using Hobbypoxy epoxy enamel standard colors. You won't be able to use any other brand of paint to achieve the same result, as their pigment concentrations and colors are not the same as ours.

"And while on the subject of color accuracy, it should be noted that the apparent hue and value of any color will shift depending on the type of light it's viewed in, and that matte colors will appear darker as the surface gets glossier and lighter if you spray them a bit "dry." The formulas given produced an exact match to the Federal Standard chips we worked from, when mixed 1:1 with Flat Hardener. To assure accuracy, please mix each component color THOROUGHLY before blending with other colors. And be sure the Flat Hardener is thoroughly mixed as well to achieve the proper degree of flatness.

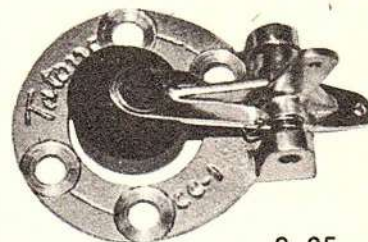
"We know these color formulas will be of great interest to scale model builders and hope you'll find room in your magazine column to publish them. Our lab is now working on Sea Blue 35042, Intermediate Blue 35164 and White 37875 for all those Corsairs, Hellcats and other WWII Navy aircraft. After that we'll do RAF and Luftwaffe colors. We'll send you the formulas as we develop them.

"In closing, we'd like to thank Claude McCullough for all the help he provided on this color-matching project."

We'll publish the new color mixing formulas as they become available, so stay tuned to future issues. □

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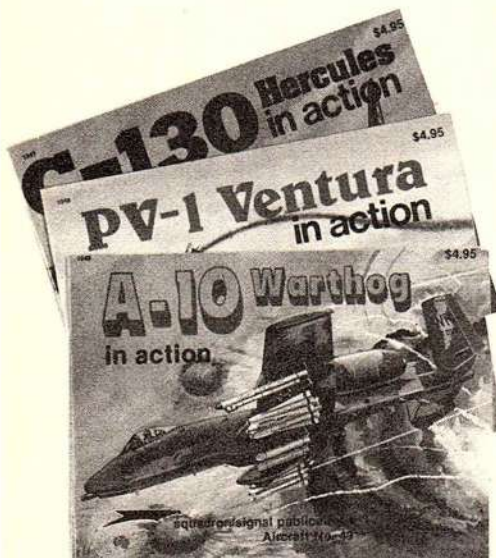
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Book Notes

(Continued from page 9)



This review is going to cover three different titles, primarily because each one, of itself, is not of critical interest to scale modelers. However, as good secondary or specialty interest titles, they do deserve some attention. As part of the "In Action" series by Squadron/Signal publications, the *A-10 Warthog*, *PV-1 Ventura*, and the *C-130 Hercules* all are aircraft which either have been, or should be, modeled.

Each of the titles is replete with photos (more photos than text for those of you who hate to read), and each title has a special treatment of color profiles and/or three-views. Each title contains about 48 pages, and the books are designed especially for modelers, and they can accurately be described as self-contained documentation packages.

Look for these at better hobby shops, as published by: Squadron/Signal Publications, 1115 Crowley Drive, Carrollton, TX 75006. Price \$4.95 per volume. ☐

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WESTERN SCALE NATS

(Continued from page 67)

recover from the blistering heat of a California July day).

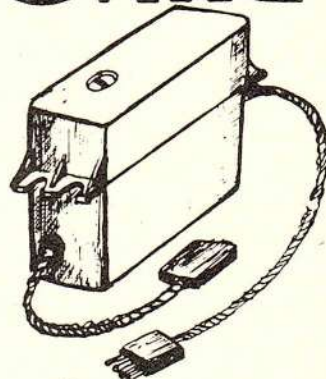
We are glad to see such innovative approaches to the rather lackluster activity known as a banquet, and we strongly suggest that clubs which have creative thinkers plan such activities either as mandatory ("the bus leaves the field at 4 p.m., and all contestants are invited" . . . and they have already paid for it as part of their entry fee), or else plan an activity that will allow some R&R for exhausted fliers on Saturday night (perhaps an afternoon barbecue at the field, or a quick hospitality hour at the local pub immediately after the day's flying). All too often, contestants who would like to socialize are stuck with repairs on Saturday evening, or are just too tired (or hyped if they are doing well) to want to spend several hours on Saturday evening (all of the above comments are made to exempt the 1/8th Air Force, which needs no excuse for a party at any hour of any day!).

By the time you read this report, the Masters for 1982 will be history. Since it will be flown in California, the final outcome will be interesting. Kent Walters is the "local favorite," as is Garland Hamilton (who recently relocated from Arizona to Southern California). The judges will be from all regions, so that may cancel out. Tom Cook has some surprises up his sleeve (again, in the vein of very big ducted fan models), and the expansive runways at Mile Square will favor his type of aircraft.

That's not to exclude all of the other top-notch modelers who have qualified from around the country. This year's Masters has more entrants than ever before, which mathematically means a greater probability of an unexpected upset. One thing for sure, the level of competition will be higher than at any other scale contest, and it will be one of those contests you just won't want to miss.

If the Western Scale Nats is any index of the caliber of contest to come at the Masters, it is going to be hot and heavy every minute of the long weekend. With a new runway, experienced judges, and the best field of highly motivated contestants ever, there is the promise of a weekend to remember. □

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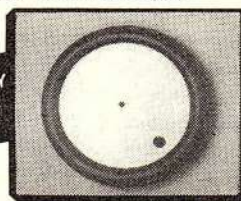
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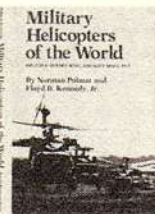
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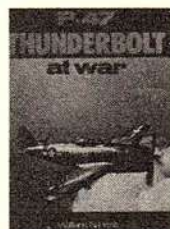
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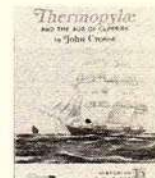
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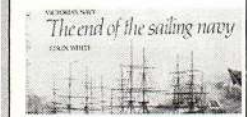


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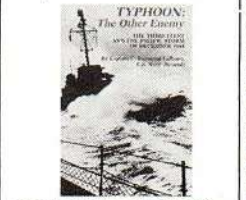
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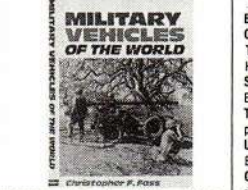


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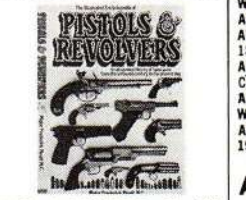
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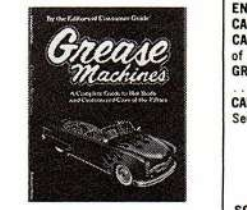
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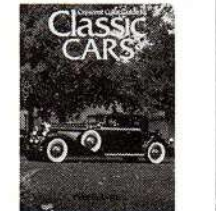
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3 NEW TIGRES

Supertigre is a model airplane factory that has been operating out of Bologna, Italy since World War II. Since World Engines started representing them in 1953, they have moved twice to larger facilities. They are the largest engine manufacturers in Italy and one of the largest in Europe, if not the largest. In recent years they have automated their production and also concentrated on grinding equipment to insure maximum roundness in their pistons and sleeves. Also, they have developed a patented system of fixturing these parts to alleviate any distortion that might be caused from clamping the parts into the machine. They have recently made many changes to their race car engines. Some of the technological advances in these engines is spilling over into their model airplane engines. Their new TST porting is a combination of basic schnuerle porting strategy and the Supertigre airfoil porting system that was made famous in the late 50's and 60's. Supertigre has also come up with a new sleeve design that has a large boss on the top end. The head design is different as it does not extend down into the sleeve. These things are done to reduce to an absolute minimum any distortion, particularly at the top of the sleeve where the highest pressures are exerted against the compression seal. You can notice that the engines are beginning to appear a little different. The fin area is larger to accommodate the ring on the top of the sleeve. Keep in mind that Mr. Garofoli of Supertigre was the innovator of ABC — aluminum pistons running in chrome plated brass sleeves and in quite a number of model airplane engine concepts. We are introducing three new engines in this advertisement.

S-61 ABC WITH PIPE

This is a very high performance 61 for competition flying and also for sport and scale fliers who prefer ABC to Ring. The shaft is large — 17mm with 5/16 shaft through the prop and a larger front bearing. The rear bearing is probably the largest diameter used on 61's. \$169.95

S-61 RING VERSION

This engine comes with steel sleeve and cast aluminum piston with one ring. This is a good combination for sport and scale.

The all metal Supertigre Mag series carburetors feature refinements and reflect twenty-four years of carburetor development which insures good idle and good speed transition.

Supertigre engines are known for their long life and the S-61 will be no exception. Also, compare the price — all this at bargain prices. \$144.95

S-75 RING WITH MUFFLER

This .75 cu. in. version is produced in the same crankcase casting as the 61. This is possible because of the very robust design of the 61.

This engine will be of extreme interest to builders of large scale models and large models are becoming more and more popular. Often large engines are very expensive but this 75 is offered at only a little more than the 61 price. \$154.95

Deliveries on these three new Tigres should start from World Engines about June 30, 1982.



EXPERT MARK III-A

EXPERT MARK III-A

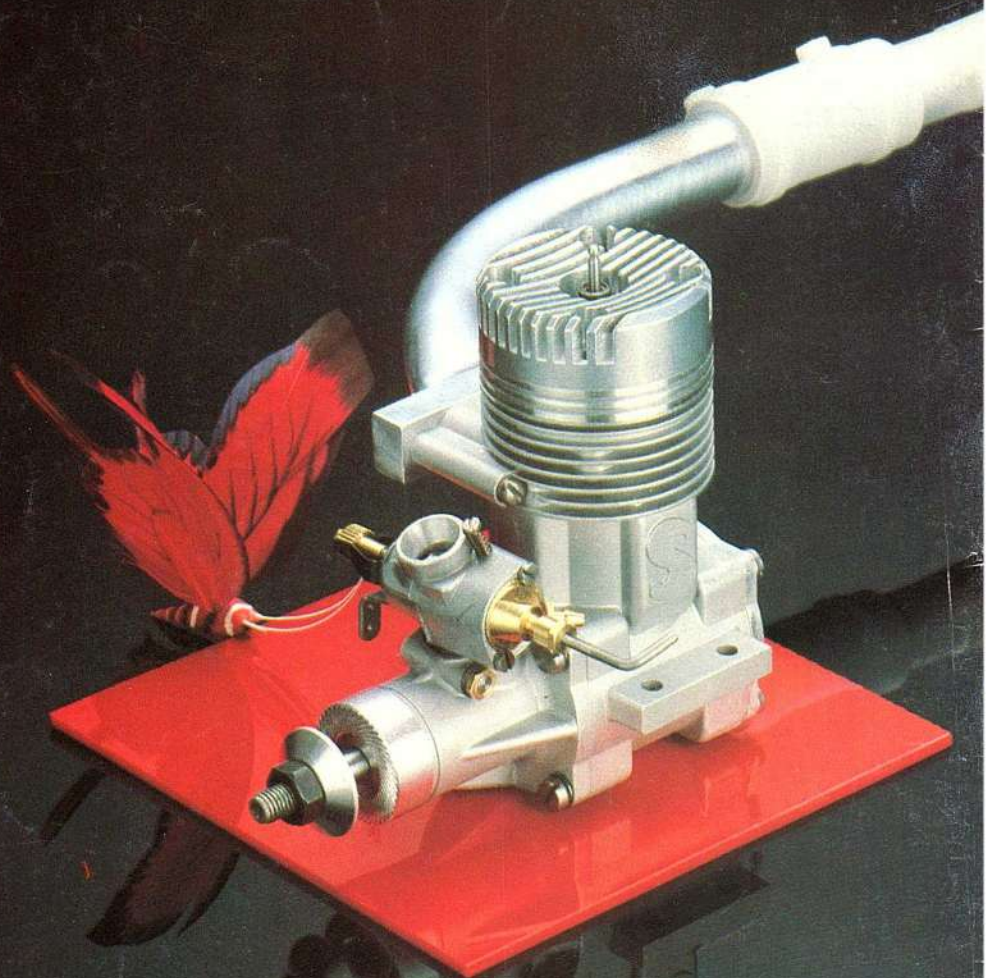
What is an Expert Mark III-A System? It is a seven channel with dual rate aileron — elevator, roll button, throw reversing, and on the main four functions you can set total amount of throw. The end retract points can be set. The electronic stick trim pots are cross trimmed. \$185.00

Supertigre



Side Exhaust S-Series

61-75



WORLD ENGINES

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