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ON THE COVER

Great action shot taken by Larry Conover at the 1995 SAM Champs shows veteran rubber flier Herb Kothe of Lafayette, Colorado launching his Lanzo Duplex for another max in the 4-ounce Wakefield event. Herb recorded three 3-minute maxes plus a 3:07 flyoff flight for a 12:07 total—good enough for 2nd place. Chet Lanzo originally designed the Duplex in 1936 to meet the existing weight rules (1 ounce per 50 square inches), under which the model held national records of 48:45 as a fuselage model and 18:10 as a stick model. The following year the rules were changed to 3 ounces per 100 square inches. The Duplex was a featured construction project in the September 1937 issue of Air Trails. See page 50 of this month's Model Builder for Larry's report on the '95 Champs.

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BY FRANCIS
REYNOLDS

• Hovering RC Airplanes

• The Aero- dynamics of Almost No Air

In the January 1993 column we talked about RC model airplanes with more thrust than weight, and their interesting ability to go straight up indefinitely—hotdog flying for sure. But at least some models which have thrust in excess of their weight have another interesting capability, the ability to *hover*, with their noses high in the air, “hanging on the prop.” Note that I said such *models* have the capability to *hover*; their *pilots* are very much less likely to have learned to fly airplanes in a hovering mode.

I am one who has had thrust-exceeding-weight airplanes, and have flown straight up as long as I could see the model; but I can't hover one. That's a skill I haven't spent the time to develop. I'm therefore not qualified to teach you how to hover such a model; but

there is some interesting Technical Stuff we can talk about in connection with such hovering.

Back about 1990, as I recall, there were unbelievable (for that time) photos in some of the model magazines of RC model airplanes hovering by hanging vertically from their props, low to the ground, and under complete control. The perpetrators of this ridiculous-looking stunt were a couple of talented full-scale pilots and modelers by the names of Dean McInnis and Rhett Radford. For a time they were selling plans for building their “BOSS Hovercraft Trainer.” The accompanying instructions admitted that learning to hover such an airplane is a real challenge. At that time, Dean and Rhett could do it and they knew of a few others who had mastered it.

As near as I can remember those photographs, Rhett and Dean hovered their models with the fuselages completely vertical. Hovering a helicopter is more difficult than flying it forward at good speed; but what they were doing with an airplane was doubly difficult since conventional airplanes aren't configured to fly at zero velocity. Their control surfaces need airflow in order to function.

In flying straight up, the wing lift goes to zero, but there is still velocity which permits the generation of attitude-control forces by the elevator, rudder and ailerons. Slow the sucker down to zero velocity, however, and these aerodynamic control forces tend to go away because the “dynamic” part of the deal went

away. The only thing which makes the stunt possible at all is that there is still a small amount of airflow over the control surfaces due to the propwash.

If the prop, rudder and elevator are large, and the tail moment arm isn't too long, considerable propwash reaches the tail, so the yaw and pitch control are still fair; roll control becomes the biggest problem. Needless to say, strip ailerons which extend clear in to the sides of the fuselage are used. In normal flight the aileron area near the wingtips is the most effective in producing roll, since the roll moment arm is the greatest out there. But in hovering there is no airflow near the tips; in this case the only useful aileron area is in near the fuselage where it catches some prop blast. I see that in the BOSS hovering model design, the ailerons have twice as much chord at the fuselage as they do at the wingtips; the reason is obvious.

It is now 1996 (or almost, as you read this). Lately an enterprising outfit by the name of Morris Hobbies has been advertising and marketing several different RC airplanes which will hover as well as do a number of far-out (but close-in) stunts. Taking off and landing on card tables, for instance. Walter Morris tells me their very latest stunt is to descend in a flat spin, then apply power and climb out while still flat spinning! They also sell videotapes of these models in hovering and aerobatic flight. I have the tapes. Walter Morris, designer Tom Stryker, pilot Tony Ayre and several other members of the organization are experts in the art of hovering; but in watching the tapes I notice that a significant change has taken place.

A few years back Rhett and Dean hovered their models truly vertical, except for slight tilting in pitch and yaw for control. Morris and company ain't usually doing that—they're hovering with the nose around 60 degrees above the horizon,



Photo supplied by Walter Morris shows one of the country's top hovering pilots, Tony Ayre, demonstrating his skills with a Morris Hobbies “Morris The Kalle,” designed specifically for this sort of flying and capable of all kinds of other outrageous stunts. How is it that a fixed-wing aircraft can be made to hover continuously in one spot and yet be under complete control? Answers in text.

"Thanks to you, modeling is even more fun!"

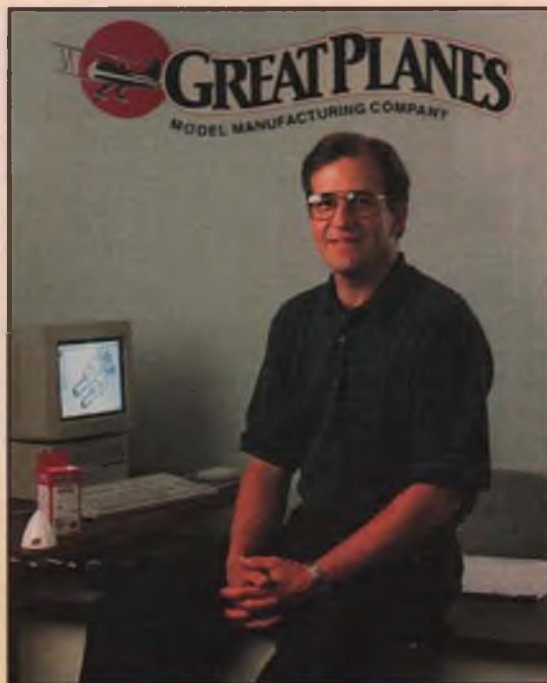


From the desk of Don Anderson

Two years ago, we unveiled a new system of model hardware products called Great Planes Model Manufacturing Parts & Accessories. This product line was created in response to a need for model plane hardware that was more practical, more functional and made building and flying more enjoyable.

While we had hoped that you would appreciate the innovations that our engineers came up with, even we did not totally anticipate how favorably the line would be received. In a remarkably short time, Great Planes Hardware and Accessories has grown into one of our most popular introductions ever. **YOUR SUPPORT HAS BEEN ESSENTIAL TO ITS SUCCESS**, and for that, we want to say... **Thank You!**

Don Anderson



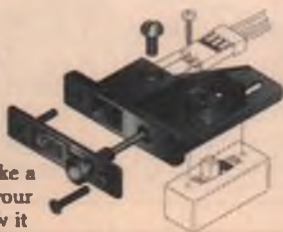
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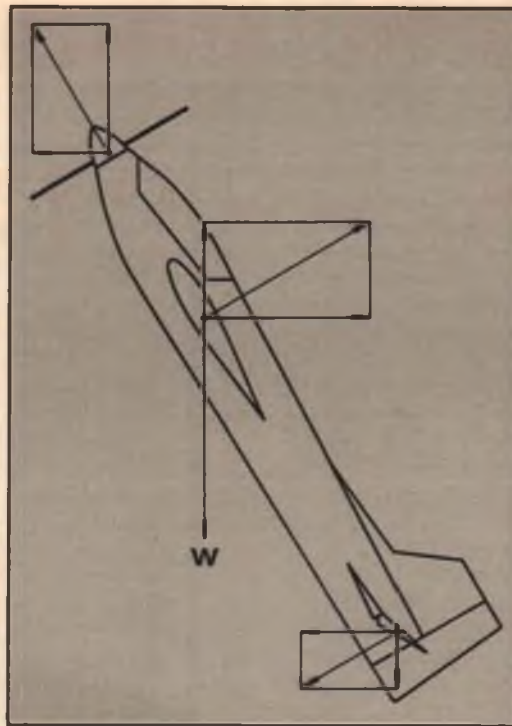
not vertical. It seems to me that this significantly simplifies the hovering problem. (Not easy enough so that I plan to undertake the challenge personally, but easier.) I've just talked by phone with Tony Ayre, and he agrees, the angle does simplify flying in a hover.

Rhett and Dean were hovering vertically with no aerodynamic forces on the wing, except for very marginal roll control. All of their lift was due to prop thrust alone. The Morris models, on the other hand, are usually hovering with considerable wing lift! Have a look at the diagram.

Do some of you need a little help in understanding the illustration? A vector is a quantity, such as a force, which has both a magnitude and a direction. In diagrams, vectors are shown as arrows, where the length of the arrow is the magnitude (of the force in this case), and the orientation of the arrow and its head show us the direction of the force. We can resolve "resultant" vectors into horizontal and vertical components, as shown.

I pause here to note that "lift" is a controversial term in this case; let's go back to some basics. For an airplane flying horizontally, the "resultant" aerodynamic force generated by the wing is mostly up, but leaning slightly back. For convenience we normally resolve that resultant force into a horizontal component we call drag and a vertical component we call lift. Drag is parallel to the airflow, and lift is at right angles to it. Wind tunnel tests are usually conducted with those frames of reference.

For steady flight at constant altitude, the lift must equal the weight and the thrust must equal the total drag of the airplane. In this hovering case the thrust and the airflow (due to the prop) are not horizontal,



Side view of a model aircraft in a steep-angle hover with the nose 80 degrees above horizontal. In order for this to be done successfully, all of the vertical forces must balance out, and all of the horizontal forces must balance out. Explained in detail in text.

but at an angle of, say, 60 degrees. Since we're used to wind tunnel data which calls lift the force at right angles to the airflow, let's continue to call it that, even though in hovering flight the wing "lift" is closer to horizontally backward than it is to vertical.

At any rate, when we get the definitions all sorted out, in order for the airplane to hover, all of the vertical forces must balance out, and all of the horizontal forces must balance out. If they don't, the airplane will drift up, down, forward, back, or sideways, depending on the direction of the unbalance in forces. The accompanying

diagram covers the pitch plane only; we could make another one for the yaw plane, showing the lateral balance of forces.

Not only must the forces in all directions be balanced out in order to hover, but the moments must be balanced out in all directions as well. If there are any unbalanced or net moments, the model will pitch, yaw, or roll. This balancing of forces and moments of course occurs in normal forward flight also, but since hovering is a new ballgame, we need to think about it in a different light.

Some wing lift is there in an angled hover, even though the forward velocity of the hovering airplane is zero, because of the propwash over the inboard portion of the wing. But in order to develop a force on the wing due to the propwash, there must be some positive angle of attack, some camber in the airfoil, or both. Tony Ayre tells me that the Morris hovering models are actually built 0-0-0 (thrust, wing and stab incidences all zero), but since they all have flaps coupled with the elevator control, there is effective camber during hovering at an angle.

This nose-high-but-not-vertical hovering mode is easier to fly because there is always an elevator deflection. If the model is truly vertical the elevator will be nominally at zero deflection, and passing back and forth from slightly positive to slightly negative for pitch control. I think that when the model is truly vertical the interruption of the propwash flow by the wing will tend to make that near-zero elevator control erratic and difficult. In the angled hovering mode, I feel (and hover-pilot Tony agrees) that the pitch control is much more predictable and stable. (Stable, my foot! Any hovering airplane of this type is going to be in an unstable mode and will have to be flown by a very alert and experienced pilot every split second or it will splat.)

Tony says that in practice, breeze is a

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major factor. The stiffer the breeze, the lower the hovering angle. That's easy to understand; in a wind the model is actually "flying" forward in the air mass, but may "hover" with respect to the ground. Completely vertical and stationary hovering is therefore only possible in completely still air. According to Tony, 75- or 80-degree hovering is also possible in still air, but not lower-angle hovering. Tony also confirms what I predicted—that aileron control is much better and easier when hovering at an angle.

All pilots agree that use of the throttle becomes extremely important in hovering. Not only is it the control for determining ascent and descent, but contrary to what one might think, the throttle, not the elevator, is the prime pitch control in hovering. In the nose-high-but-not-vertical hovering mode, some up elevator is always being held. If the nose starts to drop, a quick burp on the throttle will give a sudden increase in flow across the elevator and whip the nose back up much faster than an increase in elevator angle would. It's a bit like taxiing some taildragers without tailwheels; a short blast of throttle will increase the flow over the rudder and turn the plane much better than rudder alone will.

This trick of pitch control by throttle in the slant hover mode is another reason why the slant hover is easier to do than the completely vertical hover. In a vertical hover the elevator will be at zero deflection, so a

blast of throttle would have no effect on the pitch attitude of the airplane.

Of further interest, Tony told me they've found that deep profile fuselages, which all of the Morris hovering models have, are considerably easier to hover than normal thick fuselages, due to the profile "board" doing a more effective job of straightening out the helical slipstream. When the elevator is at zero degrees in a helical slipstream, does the model pitch down due to the helical flow hitting the bottom of the left half of the stab, or pitch up due to the flow hitting the top of the right half of the stab? If the helical flow were nice and stable, in theory things would smoothly balance out, but in the real world the whirlwind is going to be erratic and therefore so is the pitch (and yaw) control.

I wish I were young and had nothing to do but learn to hover an airplane, and a few other fun challenges.

THE AERODYNAMICS OF ALMOST NO AIR

Normally we airplane types are concerned with the aerodynamics of atmospheric air, from 14.7 psi down to a fraction of that for high altitude flight; but I have also been interested in the basics of high vacuum systems, because the dynamics of the almost-no-air involved is so very different!

In a high vacuum system there are so few gas molecules remaining that they sel-

dom collide with each other; but they are still wandering around and still collide with and bounce off the internal walls of the chamber. This fact makes for some new and surprising ground rules for the design of high-vacuum systems. One can rapidly suck most of the air out of a vessel through a small tube, but the higher the vacuum we wish to achieve, the larger the pipe to the pump needs to be. The problem is that the few remaining molecules don't collide with each other often enough to provide a "pressure" to push each other into an area of less "pressure." For all intent and purposes, the remaining gas molecules become independent of each other (and very lonely) because they are so isolated.

If there is only a small tube from the vacuum pump to the vacuum chamber, it will take forever for the last few gas molecules to happen to wander through that small tube and get removed by the pump. And it matters little how good the pump is; no vacuum pump can "attract" gas molecules, it can only trap unsuspecting molecules which get pushed into, or randomly wander into, its clutches. The highest vacuum systems have huge pipes leading to the pump, enough for a huge flow of gas under pressure; but here we are talking about a "gas flow" of only a few molecules per hour. To get a high vacuum in a reasonable time we must have a large path to the pump so that more molecules will

continued on page 88

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- Futaba Corp. of America, 4
- Studebaker, Irvine, CA 92718;
- (714) 455-9888.

GOLDBERG'S BIG BIPE

- For those who like 'em big
- and with two wings, Goldberg's
- new sport scale Bucker
- Jungmann is just the ticket—a



- high-performance, wildly aerob-
- batic biplane that's sufficiently
- well-mannered to be flown by
- the average Sunday flier. The
- model spans 64.75 inches,
- wing area is 1,152 square
- inches, flying weight is 8.8-
- 9.8 pounds, and the power
- requirements call for a .61-
- 1.20 two-stroke or .91-1.50
- four-stroke. Included in the
- \$299.99 kit are pre-formed
- canopy, cowl and wheel
- pants, as well as a pre-bent
- aluminum landing gear
- and a unique pre-formed,
- self-aligning cabane strut
- setup for easier building.
- Check it out at your favorite
- hobby shop. From Carl
- Goldberg Models, 4734 W.
- Chicago Ave., Chicago, IL
- 60651; (312) 626-9550.

FREQUENCY CLEAR?

- Find out for sure before you
- turn on with Kyosho's Personal
- Frequency Monitor, a palm-



- size unit that works with all 72
- MHz frequencies, AM, FM and
- PCM. Simply plug in a receiver
- crystal (Futaba crystals work
- best regardless of the brand of
- radio you're using) and turn it
- on; a green LED indicates the
- unit is on, and three red LEDs
- indicate the interfering signal's
- proximity—one lit LED means
- the source of the interference
- is with 2600-4900 feet, two
- LEDs indicates 1600-2600 feet,
- and all three lit means the
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- retail. Futaba crystal sets
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VINYLWRITE'S BACK!

- That's right, after almost two
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- Northridge (California) earth-
- quake of 1994, Art and Cynthia
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- Vinylwrite—our personal favor-
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HL'S ELECTRIC ARFS

- Hobby Lobby is importing
- a couple of pre-built, pre-
- covered rudder/elevator/
- throttle electric RC models, one
- being a 59-inch span sailplane,
- the Timothy 400, designed for
- a Graupner Speed 400 motor
- and six-cell battery pack; the
- other is a conventional
- tailedrager power model, the



- Helio Courier, for the larger
- Speed 600 motor and seven
- cells. The Timothy 400 is also
- offered as a basic sailplane (no
- provisions for an electric power
- system) for the same price. Both

continued on page 31

NSP Let Your Dreams Soar!

Obsession HLG

High performance in a small package. Experts only!

The expert pilot, performance is Obsession. This sailplane has all the attributes you look for, starting with light wingloading and low sinkrate. Its low drag planform and new Selig S4083 airfoil provide startling improvements in glide ratio, speed range and launch height.

The Obsession is a no-compromise competition handlaunch. A very slim composite pod and boom fuselage has a carbon fiber rod anchored perpendicular to the fuselage. The rod facilitates an unusual two-fingered launch, so you can bring much more force to the launch. Minimal frontal area, along with the superior properties of the S4083 airfoil,



gives you the ability to launch the Obsession very high. At high speeds, the S4083 provides a 15% improvement in L/D over the SD7037. This means greater penetration and the ability to work the broken lift typically found near the ground.

In the hands of an experienced pilot, the Obsession launches higher, ranges farther and thermals better than any other HLG we have seen!

WINGSPAN: 59"
AIRFOIL: S4083

Introductory Price **\$159.00**

Avocet

The future of high performance is available now!

Introducing the very competitive Avocet. We took the great flying characteristics of the Sparrow and added new technology and improved turning capabilities for racing—all in a 60" package. With its S7012 airfoil and light airframe, the Avocet is a wonderful light lift performer. With its generous control surfaces it has a very quick roll rate and performs aerobatics with ease. In light lift and on dual rate it is an armchair flyer an intermediate can easily fly.

The Avocet is a no-compromise composite performance sailplane consisting of carbon fiber skinned foam wings and fiberglass skinned Spyder foam tails. The Kevlar/fiberglass fuselage is designed to have the longer



tail moment need to give smooth pitch response and no loss in the turns. The long nose moment requires little or no weight nose weight to balance the plane.

Sixty inch slopers don't get any better than this! If you are looking for a fast composite slope ship that's capable of lots of fun, or maybe kicking butt at the next slope race, look no further.

WINGSPAN: 60"
AIRFOIL: S7012 MODIFIED AT TIP

Reg. 300.00
Introductory offer: ARF Kit **\$268.00**

Dove II

Sets a new standard in two meter sailplane performance.

I took three years of testing and research to attain the performance we could be achieved in a two meter sailplane.

Its high aspect ratio and very low weight and wingloading, coupled with an extremely low drag planform, result in a sailplane that offers a distinctive, superior glide ratio. The Dove II has over 20% less frontal area (read: drag) than any of its competition.

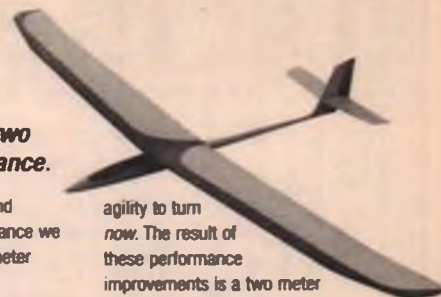
The Dove II has a light wingloading for a very low sinkrate; its high strength airframe will withstand severe winch launches and a sustained 45-degree dive with no damage to the airframe. Maneuverability is one of the Dove II's high points. Ample flaps and ailerons combined with lightweight tips and tails, give it not only control authority, but the

agility to turn now. The result of these performance improvements is a two meter that will out-turn and out-thermal anything in its class.

Landing speeds are brought to a crawl by the he light wingloading and generous flaps, making the Dove II unbeatable in the winners circle. The Dove II is without a doubt the highest performance competition sailplane available today. If you need the best, the Dove II is it. Period.

WINGSPAN: 78.75"
AIRFOIL: SD7037 MODIFIED AT TIP

Regular \$239.95
Special while in stock lasts **\$218.00**



Victory

...can be yours!

The Victory not only has the looks we all crave, but its sure to be in the winner's circle in competition and in the heart of the intermediate sport pilot.

This beautiful open class sailplane has a Kevlar reinforced FG fuse with a long, slender tail boom, and a sleek nose to slice through the air with minimal drag. The wings are triple tapered, with a strong spar. The airfoil was specially designed to maximize L/D, so handling is a dream. Manufactured strong but light to aid in its low wingloading,

the flaps, ailerons and servo bays are routed out.

The Victory has very smooth handling characteristics, good penetration in windy conditions, will float like a butterfly and the price won't sting like a bee.

WINGSPAN: 121"
AIRFOIL: SPECIAL SD7037

Reg. \$350.00
Victory Introductory offer **\$279.00**



Sparrow

One of the most popular and versatile sailplanes on the slope

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AIRFOIL: S7080 OR RG15 OR SD8000

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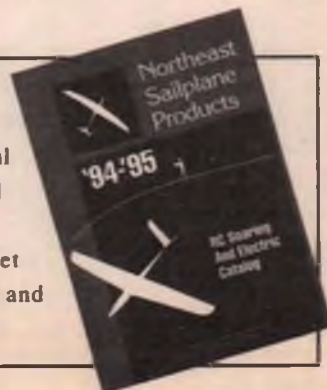
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ELECTRONICS CORNER

BY ELOY MAREZ

• Futaba MCR-4A Mods

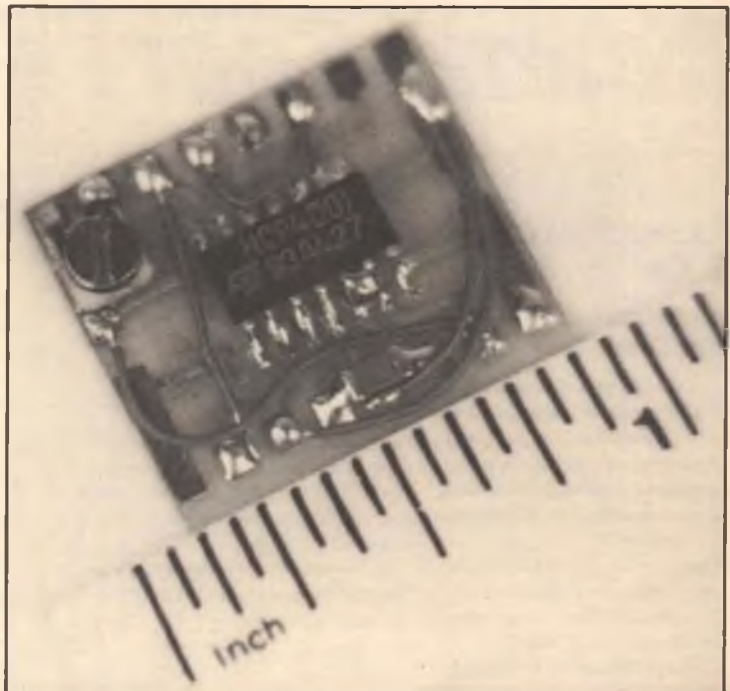
• C vs. D NiCds

• High Sky's On-Off Motor Controller

Welcome to 1996—I can't believe it's here! It's also an anniversary for Electronics Corner, this marking the start of Year Fifteen! I can't believe that either—but thanks to all of you for putting up with me for that long, for your letters and for your support!

The Madera Unlimited Air Races, 1995 Edition, will have taken place by the time you read this. You may have read or heard that some deliberate frequency interference took place at the 1994 races. An individual with a transmitter hooked up to his car's battery and antenna, with crystals for all channels, was picked up in the parking area. He's probably lucky that the site is completely treeless and that rope is not part of racing equipment, or he might have experienced some old-time western justice!

For the past year, race sponsors have been working to bring this individual to trial, but



A lightweight SMD (Surface Mount Device) servo reverser based on the circuit published in the January 1988 column, small enough to fit inside many receiver cases. Works well in most cases, but not in the Futaba MCR-4A receiver/speed control unit as hoped.

have been hampered by a lack of understanding within the legal system, where the "toy airplane" image has worked against us.

However, things have finally turned around, a trial date has been set, and the person involved is under a court order not to come within 10 miles of any RC field.

Here's a real-life example of how our less-than-serious image in the public eye can work against us. I have long felt that flying hamburgers, lawnmowers and doghouses contribute to this public idea of "grown men playing with toy airplanes." Disregard the fact that they may be a design masterpiece, difficult to con-

struct and to fly; the general public is unaware of this and sees them in a completely different and frivolous light. We can't—and shouldn't—try to control such activities in general, but in my opinion, they should not be allowed as part of AMA public showings by AMA registered show teams. This is a serious hobby/sport; why can't we present a serious side to the world?

FUTABA MCR-4A MODS

Actually, this one did not work as intended, but I did learn something which some of you will be able to use. For this one, you have to thank Irl Whitten of Birmingham, Alabama, who contacted me some months back about a possible mod to his Futaba MCR-4A receiver, which is the combination receiver/speed control furnished as part of the 4NBL Attack-E four-channel system for electric-powered models. Irl likes the MCR-4A—he has four—but doesn't care for the transmitter and prefers to use something else. The combina-

continued on page 16

LOUIS J. ANDREWS

The following was received from Don Krafft, AMA VP District 1:

Lou Andrews, a well-known designer and manufacturer of model aircraft, passed away on May 10, 1995. He lived in North Reading, Massachusetts for over 29 years before moving to Barnstead, New Hampshire about 12 years ago. Lou was a designer for Guillow before starting his own business, the Andrews Model Aircraft Company (AAMCO). Some of his designs were the Aeromaster, Sportmaster, Trainermaster, S-Ray, H-Ray, A-Ray, X-Ray and the Big H-Ray. The Aeromaster was probably the most successful model aircraft design to date. The company was sold to Great Planes in the early 1980s.

Lou was a founder and Life Member of the Cape Ann Model Aircraft Club and was a Life Member and in the Hall of Fame of the Academy of Model Aeronautics.

The photo was taken in the spring of 1986 and shows Lou with the original Aeromaster.



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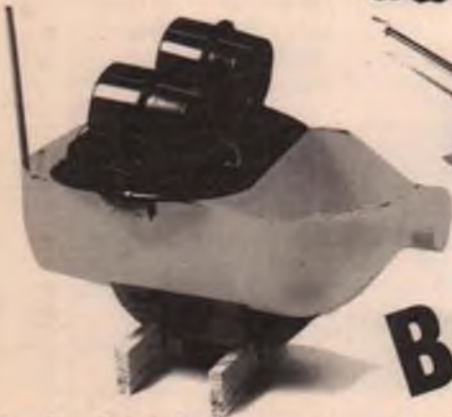


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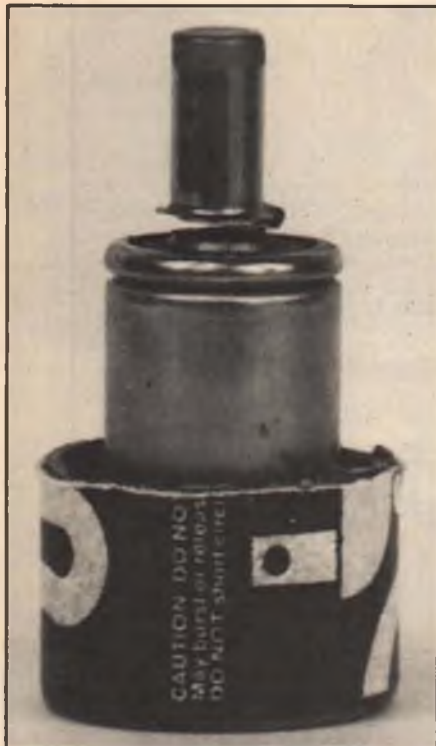
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tion of "something else" and so many receivers sometimes runs him into the need for servo channel reversing. So as to not have to remember when to shift and when not to, it seemed worthwhile investigating if the MCR-4A itself could be reversed. Irl sent out a receiver for me to smoke over. To make a long story short, I found a way



Maybe the reason you haven't been getting the expected 4.0 AH capacity out of that "D" size NiCd is because it's like this one—actually a sub-C in disguise! More in text.

to do it, not too painful, and which seemed to work—but more about that later.

The MCR-4A uses a proprietary IC which includes all the decoding as well as the ESC drive functions, and cannot be re-

versed. Fortunately, however, the throttle channel output comes out of the IC and is then fed back in to the ESC drive through another pin. Once this was worked out, the plan was to use a reverse circuit that I know works well, and was previously published in *MB* in January 1988!

But whoa—there isn't a whole lot of space within the MCR-4A case for an IC, 10-turn pot, capacitor and a bunch of wires. The answer lay with SMD—Surface Mount Devices. Fortunately, the required IC, CD-4001, is available in SMD, and so are the other parts.

Ultimately the change was made and the receiver went off to Alabama for flight testing, where friend Irl ran into problems. It turns out that the voltage regulator (BEC) used in the MCR-4A is not an IC, but a transistor circuit known as "series pass." Whereas an IC regulator maintains its output steady as long as the input is above its design minimum, the series pass regulator's output varies with the supply voltage. To complicate things, the servo reversing circuit itself is voltage conscious, so that as the receiver's voltage changed, so did the centering of the reverser. As the battery voltage dropped, it became impossible turn off the motor! Yes, a better VR could be included in the mod, but the lack of space complicates things and that idea was abandoned.

So what did we learn? Well, the servo reversing circuit as presented originally can be built lighter and smaller, and in non-electric applications could successfully be incorporated inside the receiver. Pictured this month is a photo of the SMT reverser, built on a No. 9161 "Surfboard" and using a CD-4001BCM SMD IC. Though a 4mm SMD pot was used in this case, I recommend that a regular pot be temporarily wired in place, adjusted to the transmitter in use, then read and a fixed resistor of the proper value permanently installed. SMD

resistors as well as the other parts mentioned are available from Digi-Key—(800) 344-4539 for catalog.

C VS. D NiCDS

NiCd batteries are a subject of discussion here just about every month, and this month is no exception. There's no question that the non-RC world has also discovered them; they are readily available in many types of stores. These consumer-quality NiCds are not without their problems, or maybe just confusion.

When it comes to the batteries in your RC equipment, *do not* use any of the "Brand-X" NiCd cells from the drugstore; use only known name brands from one of the many RC suppliers you will find in any magazine. However, for fuel pumps, glow plugs, etc., these unknowns can save a buck or two, and if they don't do the job, nothing is hurt but your pocketbook.

There is one type of NiCd cell, though, that can lead to some of the confusion I mentioned earlier. It is the consumer-grade "D" cell—which in many cases turns out not to be a D cell at all. An honest-to-goodness NiCd D is rated at 4000 mAh—4 amps. However, many of those available outside RC channels are not true Ds, but actually sub-Cs, of from 120 to 1700 mAh capacity, in a D package! Naturally, they are not going to perform as you would expect them to had you planned on 4.0A capacity.

Other than cutting one apart as I did for the photograph, how can you tell? Some include charging instructions on the side; the recommended time multiplied by the recommended current will give you the capacity. For example: "Charge at 120 milliamperes for 10 hours" will work out to 1200 mAh—this is not a true D cell.

If it's possible to compare weights, just put one in each hand. You'll know which is the good one—electrons are heavy! In

continued on page 18

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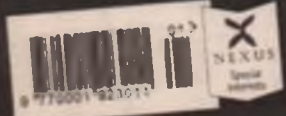
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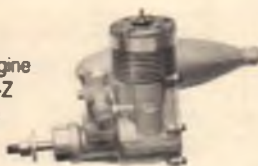
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ELEC. CORNER *cont. from page 16*

rare cases the cells can actually be identified by their markings. For example, Radio Shack has a "standard" D which it rates at 1600 mAH, and a "high-capacity" D rated at 4.3A. In this case, it pays to read the small print. And yes, the 4.3A cell costs over twice what the smaller capacity cell does. Marketing people have a phrase for this: *caveat emptor*—let the buyer beware!

ELECTRIC POWER NEWS

High Sky, producer of a number of interesting electronic devices, formerly of San Diego, California, has moved its operation to 322 Maple Lane, Nappanee, IN 46550; (219)773-4705.

Among its products, High Sky has a lightweight on-off motor controller that should prove useful in many electric power applications. Its small size (0.63x2.2x1.3 inches) and light weight (1.2 ounces) makes it especially attractive for small and medium-size airplanes.

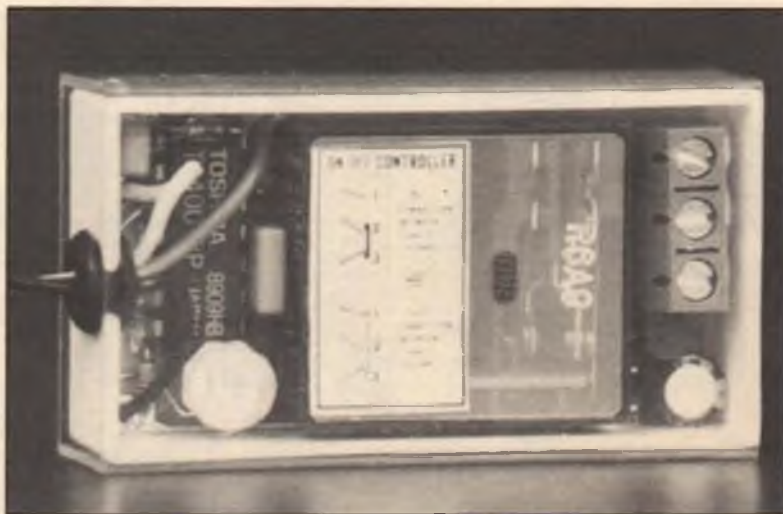
The High Sky controller is rated at 20

tric flier friends questioned whether it would be even simpler if the blinking feature were omitted. Well, yes, and I can see that a lighted LED would be enough of a warning to most fliers.

All that is needed, in addition to the LED, is a series resistor to limit the current through it. In this case, taking the 5 volts available at the receiver servo connections, which could come from either a separate battery or from a BEC as a source voltage, the value of the required resistor for a 20 milliamp LED current would be 160 ohms (actually it works out to 165, but 160 is the nearest standard value).

LEDs have the disadvantage of diminished visibility in sunlight. Mounting them within a small diameter tube, such as an inch of soda straw, greatly improves their apparent brightness and visibility. Of course, it reduces the radius of visibility, but is still a good tradeoff.

On the subject of LEDs, there's a interesting new development in the field. We're all used to red LEDs, though less commonly seen but still readily available are green, yellow, and amber. For a long time, there was talk about a blue LED soon to appear—



The small, lightweight electric motor on-off controller available from High Sky. Simple to install and requires only adjusting the desired trip point.

amps, with all normally used battery voltages. The loss is stated as 0.06V at the 20A rating. A prop brake function is available when required. Installation requires only wiring the battery and motor per instructions, plugging it into the receiver, and adjusting a single pot for the point of turn-on desired. This unit can be adjusted to overcome the problem encountered with PCM systems, in which the motor can be turned on by the failsafe if the transmitter is turned off first. A good point, however, it's always better to turn on the transmitter first, turn off the receiver first!

In the September column I discussed the merits of a "receiver-on" blinking LED warning circuit previously published, with my suggestions for one more economical of battery power. Though the circuit contains only five parts, one of my local elec-

and when they did they were close to \$100 each! Well, whatever barrier existed has been bridged; blue LEDs are listed in Digi-Key's late catalogs, at only 88¢. They come with their own specs of 3.4V at 30 and 40 mils.

An interesting development of the blue LED is a multiple element unit with two blues, a red and a green in one three-pin package. By controlling the current and thus the brilliance through the various elements, any one of eight colors can be obtained. Not badly priced at \$3.09 each. Someone will find an application for these sooner or later. When it happens, and some Japanese RC company takes the credit, remember you first read about blue LEDs here, and that they are made by Cree Research, in North Carolina, USA!

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HLA107	95"	.60	balsa/ply kit
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The Electrified Minimax 1000X Revisited

Back in the July '93 *Model Builder* we featured an article on converting this big 3-meter lightweight soarer to electric power; now the author is back with a couple of ideas for making it perform even better.

By Craig LaChance

With the publishing of my article on converting the 3-meter Minimax 1000X kit sailplane to a self-launching electric (July '93 *Model Builder*), I thought that the plane, as it was then configured, represented the ultimate package for the sport floater enthusiast. A low-tech approach had intentionally been used in its construction, with only moderate costs incurred for the equipment, to keep it all consistent for the type of flier to whom this setup would appeal.

In all, it was a most rewarding project, as its performance seemed out of proportion to the somewhat modest amounts of time, effort and expense involved in its creation. Since then some further development has brought this combination to a significantly higher level of refinement. If you have a converted Minimax or are contemplating a similar project, what is presented here may be of help to you.

My original electrified Minimax weighed 57 ounces, and with its 1095 square inches of wing the loading came out to 7.5 ounces per square foot. The geared Astro 05 FAI and seven 1,700-mAH SCRC cells would take it to 360 feet (as recorded by an on-board Casio altimeter watch) five times on a single charge, for a total altitude gain of 1,800 feet. Climb rate was a decent but less-than-exhilarating 570 feet per minute, and total dead-air flight times were right at 30 minutes.

Although its weight is now up to 63 ounces, the updated Minimax 1000X now climbs at a sparkling 1,140 feet per minute initial rate (double the original!) with the total altitude gain on one charge now up

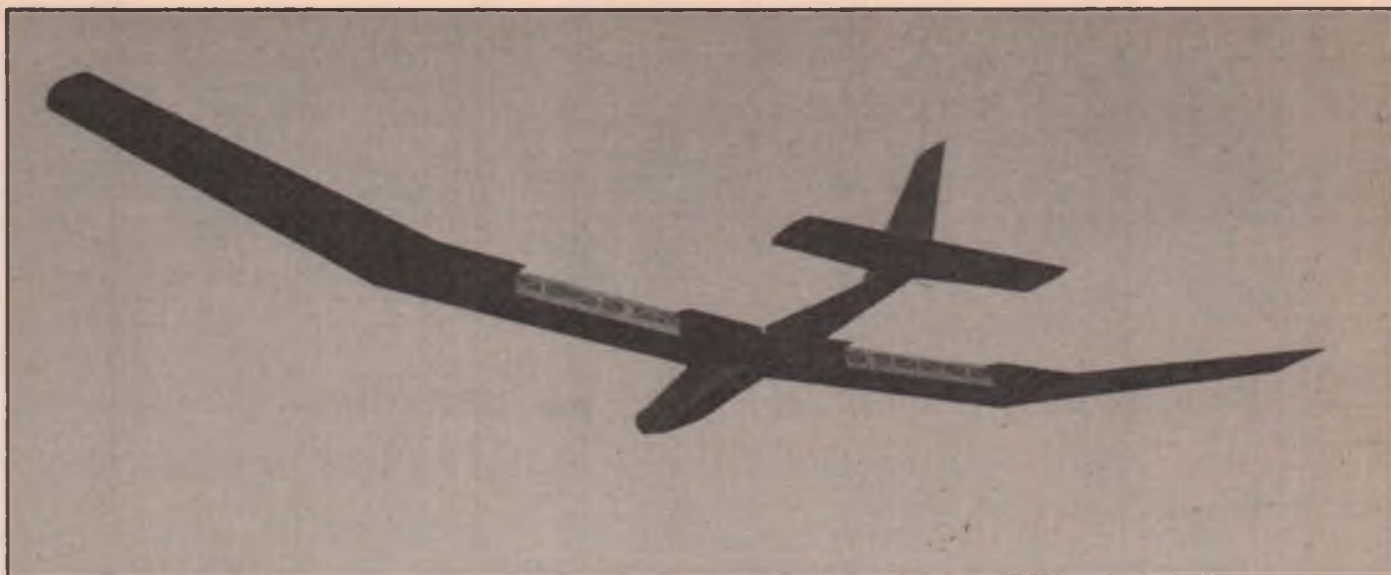
to 2,340 feet. Six climbs to 390 feet are available, but I usually take it up to what looks like a good winch-launch height (about 600 feet), which it will do four times. The wing loading has increased to 8.3 ounces per square foot, but the minimum sink rate hasn't suffered much and the dead-air time is just shy of 35 minutes.

This dramatic change in climb per-

The young lady is the author's daughter, Amber, and the model she's holding is his electrified Minimax 1000X sailplane, now equipped with flaps and a more powerful electric system for greatly improved performance.

Copies of the July '93 *Model Builder*, which featured the author's original Minimax electric conversion article, complete with full-size parts patterns, are still available from Galant Models at \$5.75 postpaid.





The author's big floater on the way down with the big harddoor flaps fully deployed. The flaps are six rib bays long (14-3/4 inches), 2 inches wide and can be dropped about 80 degrees. Craig says if he had it to do over again he'd add another two rib bays to each flap, making them even more effective.

formance was achieved by employing an Aeronaut 14x7 folding prop and adding an eighth cell to the motor pack. This prop, along with the Master Airscrew 12x8 and

the Sonic-Tronics 13x7 folders, all draw within a couple amps of each other, but the Aeronaut is by far the most efficient (at least in this particular application) and

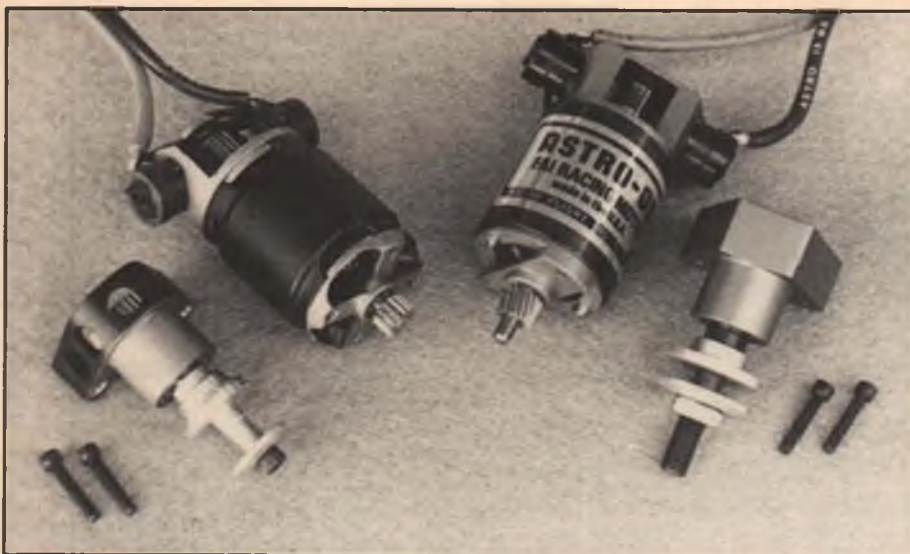
worth its exorbitant price.

The Astro 05 motor can withstand this heavy loading (52 amps static) safely for about 45 seconds at a time if it has had the end bells opened up for better cooling. As shown in the photo, the newer Astro 05 geared motors are made this way; my older motor was modified by Kirk Massey of New Creations R/C for a very reasonable fee. (Kirk can also supply the Aeronaut props.) The high amp draw also necessitated a change to a high-capacity motor controller; the one I'm using from High Sky is rated at 80 amps, has a soft start and brake feature and has worked perfectly. It's also necessary to substitute braid or large-gauge wire for the welded tabs between motor battery cells, as drawing anything over about 30 amps causes the tabs to act as resistors and diminishes performance.

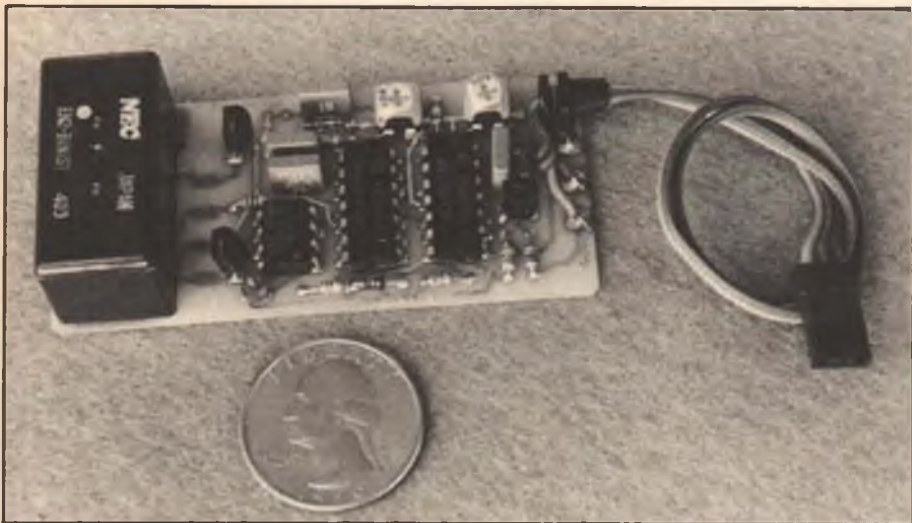
(I should mention that the five-turn Astro FAI motor was tried but was found not as suitable for this application as the six-turn. Although the initial climb rate increased to 1,480 feet per minute, performance fell off more rapidly as the battery was depleted, producing a total climb of 2,100 feet. Also, extra cooling was required, and the increased drag from the air-



The addition of flaps effectively eliminates the 1000X's tendency to float on landing, making it a truly small-field airplane in spite of its 18-foot span. The sailplane is kitted by Minimax Enterprise; see their ad elsewhere in this issue. It's an excellent all-wood kit with all machine-cut parts. Definitely on our list of "to do" models.



The older-style stock Astro 05 FAI used in Craig's original Minimax is working considerably harder in the updated model, so he sent the motor off to Kirk Massey of New Creations R/C to have him do one of his "Stage V" conversions (left), part of which involves opening up the end bells for lighter weight and better cooling. The newer Astro 05s (right) are manufactured with cutaway end bells, elliptically machined fields and a few other improvements.



To handle the increased power of the new electric system, Craig chose the High Sky Power Switch 1410, an on-off controller capable of handling up to 80 amps and a far higher number of coils than you'll ever use. Measures 1-11/32 inches wide by 11/16 inch high by 2-7/8 inches long, and weighs 29 grams. Has no BEC circuitry, so a separate receiver battery is needed. Price is \$49.95, with your choice of Futaba, Airtronics or JR connectors. More in text.

flow ducting seemed to affect the soaring performance.)

One of the biggest advantages of flying electric is not needing a large clear area to accommodate a winch or high-start. Unfortunately, with the Minimax as originally presented you still need a somewhat sizable area because, with its light loading and no glidepath control, any small bubble of lift encountered close to the ground can cause you to overshoot a landing by a large margin. What a shame to need no more room to launch from than where you stand, but to not feel comfortable with landing in any area much shorter than a football field!

This situation was remedied on the updated model by installing flaps. A micro servo on each side directly drives each flap, with the servo leads exiting the wing root and connecting into a Y-lead in the fuselage. This not only allows safe, consistent entry into relatively small landing areas, but also permits safely exiting strong lift without overspeeding (and oversteering) the aircraft.

These few modifications made an already good airplane much better. Although I've enjoyed most of the models I've built, there haven't been many I would build again. In fact, I usually find myself mentally toying with a new and different project before I've finished building the current one. But after some 400+ flights the electric Minimax remains a favorite in my small fleet, and if lost or destroyed, I guess I'd just have to replace it—it's that good. Hope these tips help to make yours just as enjoyable!

PRODUCT SOURCES

- Minimax Enterprise, P.O. Box 2374, Chelan, WA 98816; (509) 683-1288.
- New Creations R/C, P.O. Box 496, Rt. 2 Box 500, Willis, TX 77378; (409) 856-4630.
- Astro Flight, 13311 Beach Ave., Marina Del Rey, CA 90292; (310) 821-6242.
- High Sky, 322 Maple Lane, Nappanee, IN 46550; (219) 773-4705. MB

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Length 42 in.
Weight, ready to fly 19 oz.
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Wing Loading 3.8 oz. sq. ft.
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Wing Span 16 ft.
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Now you can convert your Gold Edition P-51D Mustang Kit (TOPA0110, available separately) to the rare "B" version! Our P-51B Conversion Package (TOPA1615)—available on a continuing basis—includes everything you'll need for the modification: die-cut ply fuselage pieces, "turtledeck" canopy, "Shangri-La" decals, plans and instructions. Use it whether your "D" is still in the box, partially built, or entirely assembled!



P-51B Mustang (TOPA0111):
Wingspan: 65 in, Wing Area: 734 sq in,
Weight: 8-10 lb, Length: 56.5 in, Requires: 2-stroke
60-90 or 4-stroke 90-1.20 engine and 4-6 channel radio

P-51B MUSTANG

PRODUCTS IN USE

■ By Gordon Ruff
Photos By Skip Ruff

THE FALCON III FROM CARL GOLDBERG MODELS

The return of a classic! The Falcon III has been on the market for a couple of years now and is still one of the best sport trainers you can buy.

Over 31 years ago, Carl Goldberg Models, Inc., introduced a new model airplane that was destined to become a classic. Called the Falcon, it had a 56-inch span, required an .09-.19 size engine and could be flown with one, two or three channels. Advertised as for beginners, with its streamlined good looks and semi-symmetrical airfoil, it was a radical departure from the typical boxy-looking, flat-bottom, high-wing trainers then on the market.

Less than a year later, a smaller version, the Junior Falcon (37-inch span) was introduced, and in 1965 a larger version, the Senior Falcon (69-inch span), followed. The Falcon itself underwent a name change to "Falcon 56" to avoid confusion with its siblings.

Today the Junior and Senior Falcons are long gone, but the original Falcon 56 lives on as the Falcon III, a further refinement of the Falcon 56 Mark II (introduced in 1977) which was the first update of the original design.

At first glance the Falcon III looks almost identical to its 1962 ancestor, except for its swept-back vertical stab and reduced dihedral. Internally, though, it's pretty much a new airplane with the necessary modifications to adapt it to today's power, speed and radio requirements.

Two words describe the kit—excellent and complete! The wood selection and die-cutting are first-rate and the supplied hardware includes the motor mount, hinges, pushrods, clevises, control horns, nuts, bolts, etc. It's up to the builder to supply other items such as covering, wheels, fuel tank and a few minor items.

CONSTRUCTION

With the illustrated 30-page manual and full-size plans provided, a builder with one or two other ships already under his belt

shouldn't experience any significant difficulties. Another booklet in the kit supplies general information on building and flying—a good idea for the low-time builder/flier.

The fuselage is built up from die-cut lightly formers, sides and top and bottom pieces. The interlocking tabs and slots on the side, top, and bottom pieces insure that the fuselage is straight and true once completed.

The wing and horizontal stab are built essentially the same way they were back



Having built several Falcons over the years, the first one some 30 years ago, our author was the natural choice to review the "new and improved" version of the old classic. The Falcon III is of course an entirely new model, featuring modern construction and materials and a bolt-on wing, but the Goldberg designers have done a good job of keeping the overall appearance very close to that of the original.



Falcon history. On the left is the ad in the October 1962 *American Modeler* describing the original Falcon (note the \$9.95 price tag!); on the right is an ad in the July 1977 *Model Builder* for the updated Falcon 90 Mark II, which featured a longer fuselage, a canard tail and was generally stronger and easier to build.

in '62, with a very thick pre-formed balsa leading edge and internal spars, no sheeting (except in the center section) and no shear webs. Although it doesn't offer the best strength-to-weight ratio, this type of wing construction is simple and quick, and with the main balsa wing spar capped with 1/8x1/4 basswood, the strength is certainly adequate.

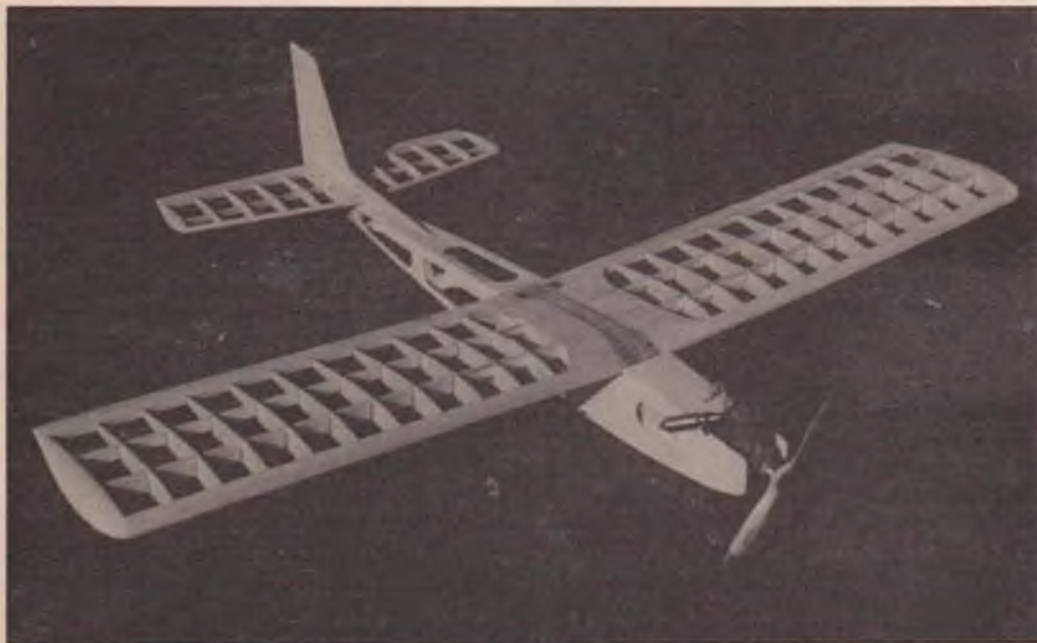
As usual, some minor trimming and fitting of some of the die-cut pieces was necessary—no big deal. The only real glitch I found during construction was the drilling of the two holes at the rear of the wing for the wing mounting bolts. On my plane, at least, following the instructions resulted in my trying to drill the bolt holes through the

aileron torque rods! Simply moving the holes 3/16-inch forward solved that problem. Considering fitting tolerances and different building styles, this may not occur on anyone else's kit, but it's something to be aware of.

All in all, the construction went smoothly and very quickly with the aid of Goldberg's Jet CA, which was used for 99 percent of the assembly.

FINISH

The Falcon III was covered with red and white MonoKote, and the factory supplied decals were applied. All bare wood areas were sealed with a thin coat of epoxy.



The Falcon III retains the original model's massive pre-shaped leading edges and through-the-ribs solid balsa wing spars; the front spar is capped with 1/8x1/4 basswood for even more strength. Fuselage sides, top, bottom and bulkheads are die-cut lite-ply with interlocking tabs and slots for fast, accurate assembly. Practically all of the construction was done with Goldberg's Jet CA glues.

GOLDBERG'S FALCON III

WINGSPAN 56 in.
WING AREA 558 sq. in.
FLYING WEIGHT
4-4.5 lbs. (4.5 lbs. as tested).
WING LOADING
16.5-18.6 oz./sq. ft.
OVERALL LENGTH 46.5 in.
RADIO Four channels required.
ENGINE .35-.45 two-stroke,
.45-.61 four-stroke
(O.S. .48 Surpass
four-stroke used).
SUGGESTED RETAIL \$109.99.

Produced by Carl Goldberg
Models, Inc., 4734 W. Chicago
Ave., Chicago, IL 60651;
(312) 626-9550.



ENGINE

The manufacturer recommends either a .35-.45 two-stroke or a .45-.61 four-stroke for power. Being a four-stroke lover, I was fortunate, indeed, to have an O.S. FS-48 Surpass supplied for this review. Having used O.S. engines for well over 20 years, I've found their quality to be second to none, and their .48 four-stroke is no exception. It started, ran, and idled beautifully right out of the box, and is a powerful, beautifully made, precision powerplant.

RADIO

My trusty old Futaba 7FGK with four S-148 servos and a 500-mAH receiver pack was used for guidance. No problems here, there's plenty of room for most any brand of radio and servos. Control throws were set according to the gauges provided in the kit with the exception of the ailerons. With the aileron torque rods canted forward, as depicted on the plans, you end up having more down than up travel—just the opposite of what is considered ideal. Of course, this can be rectified by using a servo wheel instead of the arm depicted in the instructions, and having the hole in the wheel for the aileron pushrod ahead of the centerline of the servo output shaft. I decided to just go with the servo arm and see if I could detect any adverse flight characteristics with the wrong-way aileron differential.

FLYING

A considerable amount of weight had to be added in the tail to bring the model within its CG limits. For that reason alone, I would recommend not using any four-stroke larger than a .50 un-

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Specifications(40/60 size):

Length:	52/66.5 in.	Flying weight:	5/8 lb.
Wing span:	47/56.5 in.	Wing Area:	536/736 sq. in.
Engine:	.40 - .46/60 (2C)		
Radio:	4/5 ch.	\$285.00 / \$395.00	



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Size: 5.1" x 1.5" x 2.1"
 Wt: 7.0 oz (with wires)
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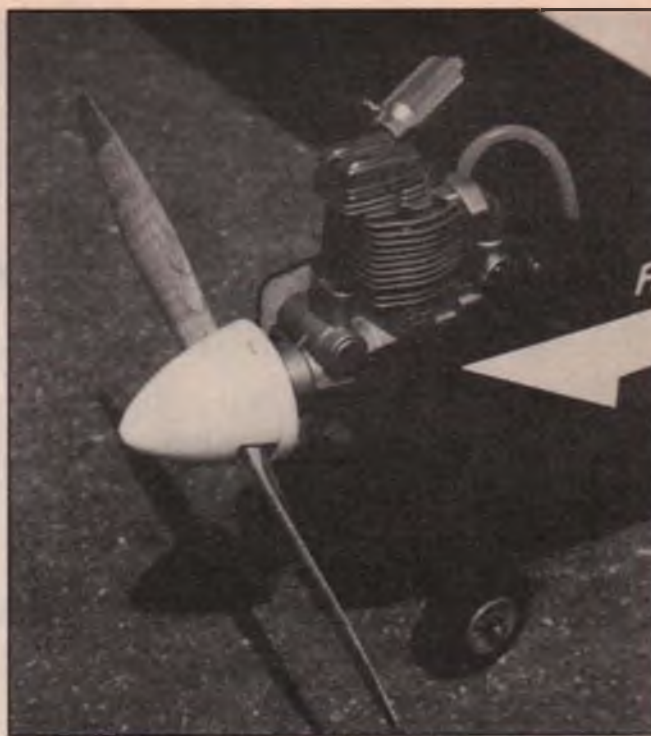
Here's what the '80s version of the Falcon kit looks like. Gordon found the overall quality of the materials, die-cutting and supplied hardware to be exceptionally high.

less the firewall was moved back a couple of inches. Personally, I consider a .61 four-stroke just too big for this model, but, I'm sure there are many who will disagree with that.

Minus fuel, the flying weight came out at 4-1/2 pounds (the top end of the recommended weight range) with the CG at its forward limit.

Having built and flown several Falcon 56s in the mid-1960s with a single-channel escapement radio and a Fox .09, I can attest to its excellent flight qualities back then as a forgiving, gentle floater. The Falcon III today flies equally as well, but in a *much* different way! With probably half

again as much weight and at least five times as much power, today's Falcon is fast, groovy, and certainly as aerobatic as any of the other sport/aerobatic trainers in its class. With the urge of the powerful O.S. .48 Surpass, loops, rolls and inverted flight are no sweat. Any effect the "wrong way" aileron differential throw had on flight characteristics was imperceptible, at least to my 66-year-old peepers! The only things



Although at the lower end of the recommended four-stroke size range, Gordon finds the O.S. .48 Surpass to be a perfect match for the Falcon III, and in fact feels that a .61 (the max recommended four-stroke size) would be just too much, in terms of both power and weight.

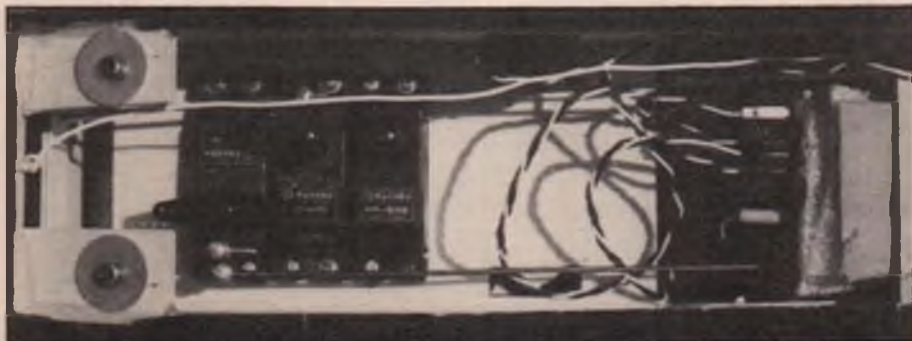
my model wouldn't do were stalled maneuvers (snaps and spins) due, probably, to the forward CG. For the low-time pilot, this is a definite advantage, especially during landing.

The suggested retail for the kit is \$109.99, but it seems you can pick one up most anywhere for \$65-\$70, which seems a fair price. Whether you build a Falcon III for nostalgia, training, or just as a good sport knockabout, I believe you'll be happy with the results!

Manufacturers List:

- Carl Goldberg Models, Inc., 4734 W. Chicago Ave., Chicago, IL 60651; (312) 626-9550.

- Great Planes Model Distributors (O.S. engines), P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300. *MB*

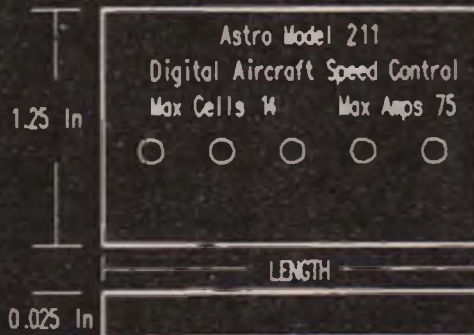


Radio installation—plenty of room for a full-size Futaba receiver and standard servos.

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The smallest, lightest, most efficient and most affordable Digital Electronic Speed Controls ever made.

Model	204	205D	210	211
Max. Cells	36 Cells	36 Cells	16 Cells	14 Cells
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MOSFETS	4-IRFZ48	4-IRFZ48	3-SMP60	4-SMP60
On Resistance	0.005 Ohms	0.005 Ohms	0.003 Ohms	0.002 Ohms
Brakes	No	Yes	No	Yes
Switching Rate	2800 Hz	2800 Hz	2800 Hz	2800 Hz
Heat Sink	Yes	Yes	Yes	Yes
Connectors	Zero-Loss	Zero-Loss	Zero-Loss	Zero-Loss
Length	2.5 Inches	2.5 Inches	1.6 Inches	2.0 Inches
Bare Weight	30 gm	30 gm	20 gm	25 gm
Retail Price	\$129.95	149.95	\$84.95	\$109.95



Astro Flight Inc. 13311 Beach Ave. Marina Del Rey, Ca. 90292 Phone (310) 821-6242 FAX (310) 822-6637

ASTRO FLIGHT'S NEW MODEL 110D DIGITAL PEAK CHARGER

Astro Flight has a real winner with this sophisticated yet easy-to-use charger. Also discussed: The newly formed League for Electric Soaring.

I recently received one of the brand new Astro Flight Model 110D DC/DC digital peak chargers to test; Bob Boucher sent it to me and asked me to try it out and let him know what I thought. Well, Bob, it's *super!* And it couldn't have come at a better time. I had already planned to go flying the day after I got the charger in the mail, so I was able to give it a full workout.

As you can see in the photo, the 110D is similar in appearance to other Astro Flight chargers. It has a current adjustment knob, a red START button, a resettable circuit breaker and a two-line, 16-character digi-

tal display that tells you all you need to know about the battery pack you're charging. There are also two charge modes: fast and slow. The slow mode charges the battery at a pre-set, constant 400-500 milliamps (useful for small airborne radio system batteries or for the very first charge on a new motor battery); the fast mode sends an adjustable current from 1 to 5 amps into the pack. Both modes will continue to charge the battery until either the pack peaks or a pre-set time limit is reached. On slow mode, the pre-set maximum charging time is 5 hours, and on fast

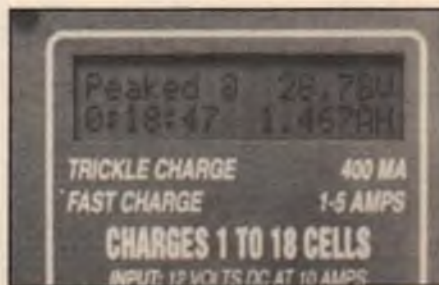
mode it is 45 minutes.

The 110D is extremely easy to use. Just connect a 12-volt source battery or 12V 15A power supply; the display will read ASTRO FLIGHT INC. MODEL 110D/111D for a couple of seconds, then changes to NO BATTERY. (More on the 111D charger in a minute.) Hook up the battery to be charged; if its voltage is greater than 0.5 but less than 29.5, the display reads READY TO CHARGE. Push the red START button once for slow mode or twice for fast mode, adjust the current (fast mode only), and leave it alone. The digital character display shows the charging current in amps, the charging mode (fast or slow) and the battery voltage on the first line; the second line displays the total charge time in minutes and seconds and the total amp-hours of current that have been delivered to the battery. When the battery pack reaches its peak, the display says PEAKED and shows the peak voltage and elapsed time in hours, minutes and seconds.

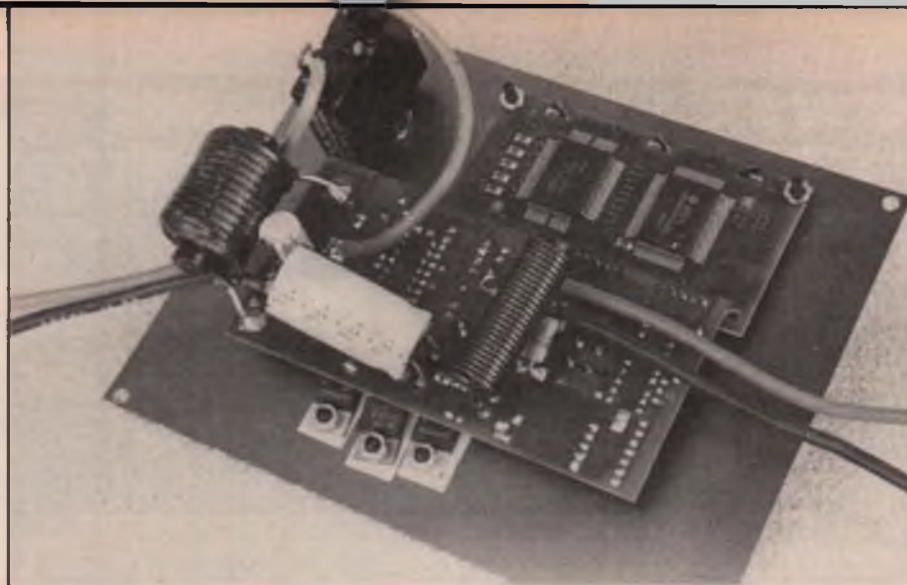
Using the 110D, the pack of 16 1300-mAH SC cells that I use in my Cermark Islander (reviewed in last month's *Model*



Don't be fooled by the lack of buttons and knobs and switches; Astro's high-tech 110D features digital circuitry, two charge modes, adjustable charge current, and an LCD screen that displays all of the pertinent information about the battery being charged. Would be an excellent unit for someone just getting involved in electric power. Comes complete with alligator clips for 12VDC input and one of Astro's Zero Loss connectors for the battery.



An example of the information displayed on the 110D's screen. After charging a pack of 16 1300-mAH Sanyo SC cells, we see that the pack peaked at 28.78 volts, took 18 minutes 47 seconds to get there, and that 1.467 amp-hours went into the battery.



Inside the 110D. Circuitry is based on Astro's proprietary 1901 eight-bit digital microprocessor. The upcoming Model 111D AC/DC charger will use basically the same electronics but will offer the added convenience of being able to charge your batteries at home from a 110VAC outlet.

Builder) successfully peak-charged flight after flight. I noticed that at a charge rate of 5 amps, the peak voltage topped at 28.35 volts. The charger has an overvoltage protection system that shuts it off if the battery exceeds 29.5 volts. Obviously, charging an 18-cell pack at this rate will activate the failsafe, so in this case, Bob suggests lowering the charge current; this will lower the peak voltage and keep it under the overvoltage threshold. To give the unit a thorough workout, I charged a number of other packs of different sizes and capacities with good, consistent results each time.

The 110D charger uses a proprietary microprocessor chip and software program. This system operates the digital character display, performs the current regulation and implements the peak charge detection algorithm. When the battery voltage decreases by 1/2 to 1 percent of the maximum running voltage, the microprocessor detects this as the peak and shuts down the charger. When starting the charging cycle, this peak-detection algorithm kicks in after a short delay to give you time to adjust the current.

Bob alerted me to one of the unit's quirks: when you connect the 12V supply voltage, if an alligator clip falls off and you reattach it right away (maybe after a second), the microprocessor brain will turn to mush and it won't do anything but give you gibberish on the display. If this happens, just disconnect the supply voltage, count to ten and reconnect it. The computer will reset itself and you'll be in business once again.

This charger is a real winner—it's easy to use and it consistently delivers a peak charge to any NiCd battery pack of up to 18 cells. And what about the 111D charger mentioned above? It's basically identical to the 110D, but in an AC/DC version. Astro Flight should have them ready by the time you read this. For more information about the 110D/111D chargers, contact Astro Flight at 13311 Beach Ave., Marina Del

Rey, CA 90292; (310) 821-6242.

LEAGUE FOR ELECTRIC SOARING

Ken Cashion sent me a letter introducing the League for Electric Soaring, an organization for electric pilots whose goals and objectives parallel the popular League of Silent Flight. To quote Ken: "Back in the early '70s when Le Gray and a few others proposed to the modeling press that they were starting a League of Silent Flight, it might have been difficult to explain it and what they expected it to do. Now, few sailplane modelers are not aware of the LSF and its tremendous Flight Accomplishment Program."

Like the LSF, the League for Electric Soaring, or L.E.S., is a flight achievement program for pilots who launch their sailplanes using electric power. There are six levels of progress on the L.E.S. ladder. The criteria for achieving a Level I position are two 10-minute thermal flights and ten spot landings within 10 feet of a mark. Level II requires two 15-minute thermal flights, ten

spot landings within 5 feet of a mark and a competition entry resulting in at least 2,000 points (computed using a formula derived by the L.E.S.). The tasks become increasingly more difficult as you go. To reach Level VI, you're required to fly two 1-hour thermal flights, make a 2-mile unpowered goal-and-return flight or a 4-mile powered goal-and-return flight, and chalk up competition performances resulting in three wins and 8,000 points.

If you want more information about the League for Electric Soaring, send me an SASE and I'll send you a copy of the announcement. (Or do it via e-mail if you like.) To join the L.E.S., send a note to Ken Cashion, c/o League for Electric Soaring, 157 Tennyson Cove, Picayune, MS 39466, stating that you understand the aims of the L.E.S. and would like to participate. A Level I voucher will be sent to you and your name will be entered into the database as an L.E.S. aspirant. You can take as long as you want to complete each achievement level; the database will remain open. Please be sure to include three 1st class (32¢) postage stamps with each correspondence—that will keep the L.E.S. in business.

HSS CATALOG

I want to thank Denny Atkins from Hobby Supply South for sending me their most recent catalog. They advertise themselves as "The Airplane People," and judging by the contents of their catalog, they really are! They offer kits and accessories for many different types of planes, including gas power, free flight and electric. Most of the kit listings are keyed so that you know how many channels it requires, the wingspan and recommended engine or motor size. Their listings include kit manufacturers that you don't see too often, such as Airsail (from Australia), Aerographics (from England), Ben Buckle (superb old-timer planes also from England), and Easy Built Models (from the USA).

The Easy Built series really caught my



Beautiful building job on Dave Grilo's 81-inch span DeHavilland Mosquito, powered by two geared Astro 40s turning three-blade 12.6x3 props. Thirty-six 1700 3CRC cells provide 5-1/2 to 6 minutes of realistic flight time.

eye because there is a wide range of models from which to choose. You can take your pick of a Waco Bipe, PBY Catalina, Morrisey Bravo, Ryan ST, Taylorcraft or a dozen other planes. The recommended motor size is also listed so you can match the kit to what you have on hand. This is a builder's catalog; it's geared mainly toward kits. The only electric motors they offer are two ducted fan units.

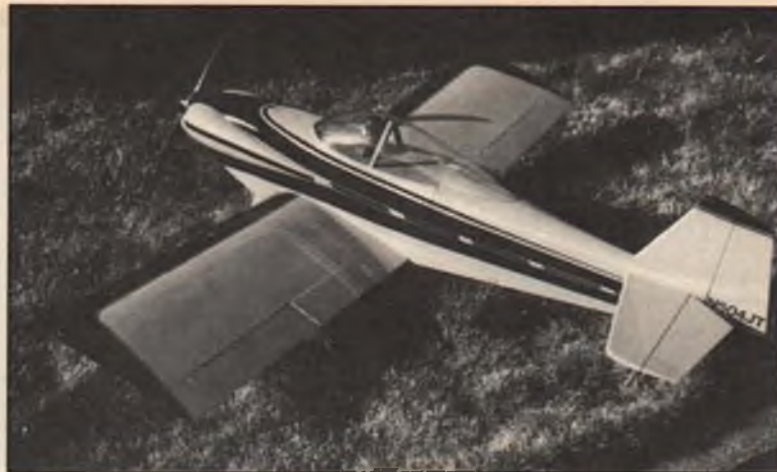
Hobby Supply South is definitely worth a look. Their retail shop is located 40 miles north of Atlanta, Georgia, and they welcome mail order sales. You can get a catalog from them by sending \$4 to Hobby Supply South, 5060 Glade Rd., Acworth, GA 30101; or call (404) 974-0843.

READER PHOTOS

Gene Norman sent a photo of the DeHavilland Mosquito entered in last year's Southeastern Electrify. It was scratch-built by Dave Grife of Coldwater, Michigan using Brian Taylor plans. The Mossie spans 81 inches with 1,000 square inches of wing area. It uses two geared Astro 40s running on 36 1700-mAH SCRC cells. The plane features pneumatic retracts with sequencing doors, and was covered in clear MonoKote, then painted. It flies for 5-1/2 to 6 minutes, and Gene says it's stunningly realistic in flight.

This version of the Southeastern Electrify had no flying competition, at the request of most of the competitors from

Full-scale homebuilt make excellent subjects for electric power; this is Dennis Weatherly's scratch-built, geared Astro 40 powered, 1/8-scale RV-4. Sports simple all-balsa construction with a balsa-sheathed foam core wing. Originally equipped with an 18-cell pack, Dennis has since added two more cells for even better vertical performance.



previous years. Open flying was the rule of the meet and Gene reports everyone liked this more relaxed get-together much better. It was a bit on the warm side, but that's Atlanta in June!

Dennis Weatherly, one of my longtime e-mail correspondents, sent photos of his scratch-built 1/6-scale electric RV-4. He drew his own plans from the factory three-views, and the outline and control surfaces were not modified for model flying purposes. It has a 57-1/2 inch wingspan and weighs 8 pounds with a geared Astro 40 motor and 18 1400-mAH SCR cells. He built the glass cowl and stretch-molded the canopy because nothing on the market even came close to what he

needed. Dennis says the performance is spectacular, with takeoffs in about 30 feet and with all aerobatics possible. Flight times are 4 to 5 minutes at full throttle.

As I write this, I am on a motorhome vacation at a beautiful campsite on the Ventura, California beach with my wife, kids and nieces. The sun is shining, there is no breeze and you don't know how much I wish I had brought a small electric sailplane along! If you want to write and rub it in, you can do so to 6462 Sunny Brae Dr., San Diego, CA 92119; (619) 463-4453 (8-5 Pacific time, Monday-Friday). To rub it in electronically, send e-mail to me at 74164.3237@compuserve.com. **MB**

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450TL	4-1/2" (114mm)	1.325"	33.65mm
500TL	5" (127mm)	1.500"	38.10mm
550TL	5-1/2" (140mm)	1.700"	43.18mm
600TL	6" (152mm)	1.850"	47.00mm
400TL - 600TL Tires have a 3/16" (5mm) Axle Dia.			

Field Testing Reports

Dan Webb, 1st Place Winner of the Post 1935 Military class competition at Bomber Field, notes:

"Your new tires are the answer to a scale builders prayer! I thoroughly tested your 6" treaded lightweight wheels before entering my 39 lb. P-47 airplane in the competition at Bomber Field. I now have over 75 take-offs and landings on these wheels - all on concrete. You can't even tell they've been out of the package."

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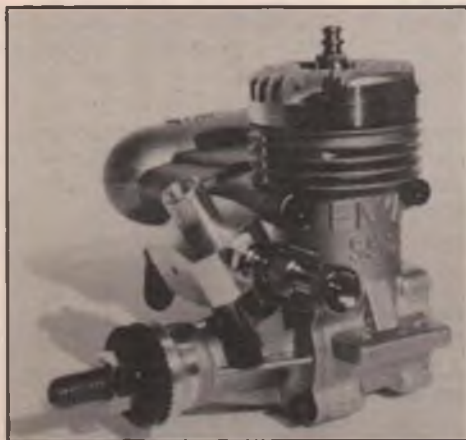
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OVER THE COUNTER *cont. from page 12*

are produced in Eastern Europe by Hacker Models. Hobby Lobby's Catalog 26 describes both of these attractive models in detail; catalogs are available to new HL customers for \$2.50, which includes a \$6 voucher toward your first purchase. Hobby Lobby, 5614 Franklin Pike Circle, Brentwood, TN 37027; (615) 373-1444.

ONE HOT .15

The engineers at Enya, perceiving a renewed interest in .15 size engines, have replaced their old reliable .15 IV TV with a totally new Super Sport series engine, the SS15 TV, factory rated at almost twice the horsepower—up to .45—and that's with the



new design M154 muffler in place. Features an ABC piston/cylinder and a 5.0mm I.D. RC carb that lets you tune both the top end and idle mixtures. Complete with muffler, the SS15 TV weighs only 6.34 ounces. It's available through any retailer stocking Enya engines, and is distributed in the U.S. by Altech Marketing, P.O. Box 391, Edison, NJ 08818-0391; (908) 248-8738.

TOM'S "FLYING SILO"

We figured he would do it sooner or later, and now he has—Tom Herr has come out with a 1"=1' scale, 25-inch span rub-



ber-powered model of the Gee Bee R-2 racer! The kit sells for \$36.95 and features over 100 precision laser-cut parts, all required building materials, prop, rubber, tis-

continued on page 77

FAIL SAFES

RAM has originated more "fail safes" than any other R/C manufacturer. Check out the latest versions at your local hobby shop or send a stamped, #10 envelope for full info.

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RAM 26	BIG BATTERY CYCLER discharges 4.8V batt. up to 4000 MA.....	24.95
RAM 49	IGNITER 800 MA on board driver/starter for 20 & 21 engine.....	49.95
RAM 50	IGNITER 1300 MA on board driver/starter for 35 & up engine.....	49.95
RAM 62	SERVO FAIL SAFE adj. safe point & delay, waterproofable.....	24.95

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1.4 oz	38"	plain	10 yds +	\$1.35/yd
1.4 oz	63"	plain	10 yds +	\$2.30/yd
2.0 oz	38"	plain	5 yds +	\$1.90/yd
3.0 oz	38"	plain	5 yds +	\$1.90/yd
3.0 oz	38"	satn	5 yds +	\$2.95/yd
3.0 oz	50"	plain	5 yds +	\$2.25/yd
3.0 oz	50"	satn	5 yds +	\$4.00/yd
4.0 oz	49"	plain	per yd	\$3.90
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HANNAN'S HANGAR

BY BILL HANNAN

"The best things in life are not things."

The above quotation, from a Paradise, California church bulletin board, may serve as a reminder for all of us to appreciate more the people who share in our hobby.

KEN HAMILTON

Sadly, we must report that *Model Builder* contributor Ken Hamilton passed away at age 79, following a long illness. A top-notch engineer with North American Aviation prior to his retirement, Ken had been a life-long modeler. Perhaps his most-remembered design was his British Flying Flea, originally published in a 1935 *Flying Aces* magazine, and republished in the April 1981 *Model Builder*. More recently, his reproduction of Joe Weathers' rubber-powered speed model appeared in *MB*. This commemorative "Old Timer" model bore special significance, as Joe Weathers was a renowned modeler when Ken first visited him many years ago, to learn more about the hobby. Ken subsequently returned to the Weathers household for an entirely different reason—to date Joe's sister, Mariana, and later, to marry her and raise three children.

Ken sustained three spare-time interests for most of his

life: model airplanes, railroad-ing and esoteric automobiles. He also was a vital sparkplug in the Southern California Flightmasters model club, coordinating sponsorship by North American Aviation, serving as a contest judge and much more. Every task Ken undertook was tackled with enthusiasm, careful analysis and patience. This dedication extended to his correspondence, and I feel personally privileged to have received numerous letters from him, some of which pertained to this column.

Our sympathy is extended to Ken's family and worldwide network of friends. Thanks to Bruce Hamilton and Bill Warner for their assistance in composing this tribute.

THE PERPLEXING PISTACHIO

Ever have a model that wouldn't perform properly, no matter what you did? My guess is that we all have stubborn airplanes now and then. Sometimes it seems the more one knows about this hobby, the more remains to be learned. After more than 50 years' experience with "toy" airplanes, I still occasionally feel like a beginner. Case in point: My

Renard SR-7B. And the question: *How can anything with only an 8-inch wingspan be such a big problem?*

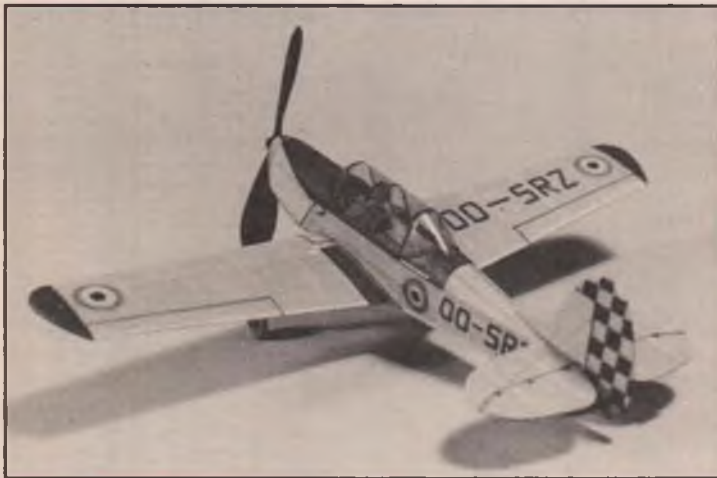
The 1987 Flemalle, Belgium International Indoor Contest included a special event for flying scale models of any Renard design, and proxy entries were invited. Alfred Renard had been in the Belgian aviation business since the 1920s, so there were plenty of subjects from which to choose. My selection, the Stamp-Renard SR-7B, is an aerobatic aircraft with clean lines, a bright orange color scheme and intriguing markings. Thanks to generous help from Fernand Van Hauwaert, Otto Kuhni, John Underwood and Alain Parmentier, lots of reference material was located. Alain also sent me photos from France of Jacques Cartigny's flight-proven Peanut Scale SR-7B, so I deluded myself into believing a Pistachio-size version would be easy!

My previous year's Pistachio entry, a Farman Mosquito, had been successfully proxy-flown in Belgium by Van Hauwaert and Roger Aime; in Florida by Mike Arak; and in Japan by Jiro Sugimoto. Thus I approached the Renard project with great confidence, on a leisurely basis. The construction phase went smoothly enough, although as more details were added, hours passed with frightening rapidity. Carving the girl pilot (with genuine blonde hair, courtesy of Meredith Lueken), took much longer than anticipated, and the intricate model markings, all cut from tissue, soaked up time like a sponge. My main concern was allowing for enough transit time to Europe. Fortunately, Shiro Takeuchi's model mailing box was on hand, however adapting it to hold the Renard and its documentation took nearly half a day.

When the model was more or less complete, only one day before my shipping deadline, the local sky turned black and began pouring rain! By the following morning it had stopped, and the Renard was gingerly

Bill Hannan's world-traveling Pistachio Scale Farman Mosquito, which won 1st place at the big international indoor contest held annually at Flemalle, Belgium, in 1986. An excellent flier, it prompted overconfidence when choosing and building a subject for the following year's contest! Story in text.





Despite its seemingly "normal" proportions, this Pistachio Scale Renard SR-7B, our columnist's 1987 Flemish entry, proved to be an exercise in frustration both for Bill and the proxy fliers in Belgium who tried valiantly to make it fly.

test-flown over soaking wet grass, with its tissue sagging—on which I blamed the equally soggy performance. Since the model had been assembled with water-based glue, I dared not risk too many wet landings. Thus, contrary to all admonishments against sending improperly prepared models to contests, I hastily packed the damp little Renard and rushed it to the nearest post office.

A tantalizing factor in a proxy contest is the suspense. One can never be certain that a model will reach its destination on time, or intact, or at all! Imagination can run wild, generating all sorts of disaster scenarios. What if the box is crushed in the bottom of a heavy mail sack? What if it's detained by customs agents? What if it gets soaked by water? Far-fetched possibilities, of course, but something to worry about anyway. However, there was nothing to do but wait. And wait . . .

Oddly, the first news to arrive, some weeks later, came from Germany. Benno Sabel, who had attended the Belgian contest, reported: "*Flug instabil—schade.*" I didn't have to speak the language to understand there had been problems!

Robert Hutchison, also of Germany, was a scale judge at the meet, and wrote: "Your Pistachio was a real jewel and your documentation was the hit of the show! The Koutnys, Lubomir and Peter, of Czechoslovakia, tried hard to get you off the ground, but they just didn't have enough time." How depressing.

The next message came from Lubomir Koutny himself: "Big problem with Hannan's scale SR-7B, it was totally new, some heavy, its airfoil can not help it fly. The German boys tried it too. Bill wrote in his instructions that it should fly to the left. But the model's wings said to the right and I accepted that. At the end it flew some to

the right." That puzzled me.

Finally, Contest Director Van Hauwaert wrote: "Regarding your SR-7B, it is a pity it didn't do better. It arrived here with the right wing unglued. After reparation (M. Fraikin repairer), it turned to the right." Aha! One small mystery solved!

The model returned home safely and was taken to a San Diego Scale Staffel club meeting for analysis. Here are a few of the members' comments, as recorded that night. Walt Mooney: "Wash-out both wingtips and move CG forward." Robert Womack: "Try smaller fin/rudder and larger stabilizer." Tom Arnold: "Use a smaller prop and equal wing wash-out." Joe Havlik: "Fuselage twist causes misalignment in small models." John Hutchison: "Canopy too large, blocking airflow over rudder, affecting directional stability." Mark Knight: "Try trim to fly left with left thrust offset." Don Munn: "Must be draft in the cockpit, because girl's hair is blowing. But it needs more dihedral."

George Harris and Ray Crowell (answering independently of each other): "Girl pilot should have red hair instead of blonde." Jim Alaback felt that the instability problems were a combination of wing/stabilizer incidence settings plus improperly located CG.

Later, Jose Tellez and Dave Linstrum examined the Renard. Said Tellez: "It looks as if it would fly right off the board." Linstrum had a different point of view: "If it is truly unflyable, donate it to a museum."

My own answer was to put it back in the box and hide it under the bedroom couch.

About a month before the 1988 Belgian contest, I suddenly realized almost a year had passed, and that I had nothing to send. The Mosquito was no longer competitive, and since I am a very slow builder, a new model was out of the question. But why not try to revive the stubborn SR-7B?

After reviewing all of the above suggestions and choosing the easiest ones, the model's wings were realigned, the dihedral increased and provisions were made for adjusting stabilizer incidence.

Outdoor flights showed improved stability, a fairly consistent left turn circle, but poor duration. Changes in prop blades, rubber motors and adjustments were made with very little improvement, and unsteady air conditions made test results uncertain.

With the mailing deadline rapidly nearing, Jim Alaback came to my aid by arranging the use of a recreation hall, and offering advice and assistance. The veteran Farman Mosquito was taken along for comparison purposes, and flew well almost immediately.

The Renard was a different



Success at last! The triumphant expression of proxy indoor flier extraordinaire, Siegfried Glöckner, says it all. Siegfried managed to get it trimmed out well enough to place 6th at the 1988 Flemish contest.

HANNAN'S HANGAR

story. It would R.O.G. nicely and circle to the left (usually), however it was inconsistent and refused to climb dependably in spite of changes in adjustments and rubber motors. Eventually, after hours of fiddling and frustration, we pronounced the SR-7B a lost cause, and went home.

Since the model was such a failure as a flier, yet remained in remarkably good condition, I decided to send it to Belgium to be given to Mr. Renard as a souvenir. The rubber was removed and the propeller blades cut down for a more scale-like appearance; the model packed and dispatched, with a certain sense of relief. Out of sight, out of mind.

Some weeks later a letter arrived from Benno Sabel. Imagine my shock to find that the Renard had been flown in the contest, placing 6th out of 13 entries! Its best flight was only 17 seconds, however it had received the highest static scale marks of any Pistachio. How perplexing. And what magician had made it fly?

The answers soon arrived. Siegfried Glöckner, of Germany, had been the proxy pilot, ably assisted by Alb Jansen, of Holland, and here is what he said: "I regret that I could not achieve longer times. The tiny propeller needed to turn fast to give enough thrust to fly the model. The small wing with nearly symmetrical airfoil needs much speed to keep the SR-7B aloft, which also needs some energy from the rubber. So the 1,000-1,100 turns which I wound into the small rubber motor ran down in 15 to 17 seconds. When more than 1,100 turns were wound into the rubber, flights became unstable. To achieve a longer flight and better climb, less torque on the prop was necessary. I reduced the pitch of the



Michael Morrow offers plans and special markings for this fine No-Cal Bell P-63 King Cobra and others too. More in text.

prop blades a little bit and after another try, I decided to use a longer rubber motor."

His concluding comments were: "Your model attracted attention when it was flying. Though there were longer flight times, the speed and (later) consistent flights were admired. The prop stopped running on roll-out on every flight. I had a lot of fun with your SR-7B."

What can we learn from this experience? The power of persistence. Don't give up on that recalcitrant model; instead, swallow your pride and ask your fellow model builders for help—they are among the most generous, talented and caring people in the world.

PRODUCT NEWS

At last there is a U.S. source for the Japanese Union Model Company condenser-powered model kits. The initial shipment has been received, and more are expected soon. These kits include the electric mo-

tor, flight condenser, special propeller, charger, construction plans, balsa, tissue and everything else needed except the charger batteries. The kits are priced at \$29.99 plus \$3 postage from Campbell Model Supply Co., 37742 Carson St., Farmington Hills, MI 48331.

Michael A. Morrow has launched a new business and offers a catalog featuring assorted Peanut and No-Cal model plans, documentation drawings and photographs, and "other neat stuff." One of our photos shows Michael's profile Bell P-63 King Cobra racer, complete with detailed markings, which are available separately. For a complete catalog and prices, send \$1 to Michael A. Morrow, 1327 44th Ave. S.W., Seattle, WA 98116.

SIGN-OFF

When contemplating your next project, reflect for a moment on this bit of wisdom from the pen of ancient Greek philosopher Plato: "The beginning is the most important part of the work." MB



REPORT CARD ON HINGES

After ten years, everybody thinks that school's out on hinges. Let's grade the competition and see who needs more classes.



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Tear Strength	A	A	A	A	B	A	B
Surface Treatment	A	F	F	F	F	F	F
Delamination Strength	A	D	D	C+	D	C+	D
Slots or Holes	A	A	A	A	A	D	D
Glue Action: Wicking	A	A	B	F	F	F	F
Delayed Cure	A	C	C	F	F	F	F
Average Grade	A	C+	B-	C	C-	C-	D

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PRODUCTS IN USE

■ By David M. Sanders

THE RADICAL "TRI-STAR" CANARD FROM SIG MFG. CO.

Sig has something really unique in this swept-wing, twin-fin canard. Best part is that you can build the Tri-Star for either glow or electric power, or as a slope glider—which is how our author, one of the local slope maniacs, chose to test it.

For those who enjoy a step away from the ordinary, Sig has produced something truly different in the form of the Tri-Star, a unique model in more ways than one. The most obvious departure is the canard configuration, but it goes much further than this.

This model has been designed to please just about everyone in that it can be con-

Aesthetically, the Tri-Star is very pleasing, with many little extras such as a beautiful vacuum-formed clear canopy and a very rugged molded ABS tail cone and belly pan which also serves as a quick-change battery compartment for the electric powered version. The kit comes packaged in a sturdy box with bright and inspiring graphics, and self-adhesive decals are enclosed

dimension and clean edges, allowing nice, strong joints. The foam wing cores are nicely wire-cut from low-density foam, assuring a lightweight wing structure. All the hardware is of outstanding quality, and is packaged in units that segregate it for use in any of the different versions.

A very complete and detailed plan sheet is provided, along with a terrific, 21-page, thoroughly illustrated instruction manual that even a novice builder would find easy to follow. Well done, Sig!



Comin' at ya! The Tri-Star shows off its futuristic lines in this head-on shot. The model was designed by LeRoy Satterlee, well-known among RC soaring competitors for his contest-winning sailplane designs.

structed as a slope glider or with electric or .09-.15 glow power. They've even provided instructions and the basic components necessary for a landing gear installation if your flying field is not "belly friendly." Now how's that for mass appeal?

to reproduce any of the snappy color schemes presented on the box.

The wood materials provided are of outstanding quality and well graded for their intended use. Many of the wood parts are laser cut, which yields parts of perfect

THE AIRFRAME

The two outboard fins are simple balsa slab affairs, two pieces each, sanded to a taper toward the trailing edge on the inboard side. Be careful to make a left and right. If you're building an electric model, some weight could be saved by cutting lightening holes in the fins. The canard wing and elevators are also of slab construction.

The wing is typical foam core construction with balsa sheeting on the leading and trailing edges and capstrips in between. The instructions specify 3M "77" spray contact adhesive or Sig Kwik Bond for applying the sheeting, however I opted to use epoxy, as I always do on my foam wings. The left wing panel's leading edge receives a plastic

tube in its rear face that acts as an antenna routing channel (very clever), then the leading and sub-trailing edges are epoxied to the wing panels. I found the trailing edge material in my kit to be a little undersize for the thickness of the wing, so I replaced



The author finished his Tri-Star in a patriotic red-white-blue "sorta-Thunderbirds" scheme; Air Force markings are provided in kit. For those inclined to personalize their kit models, it wouldn't take too much effort to make the Tri-Star look like a Long-EZ or E-Racer or Bertot hornbill.

it—a minor thing. When finishing the leading and sub-trailing edges, be careful with the 1/32 wing sheeting as it won't take much to sand through. Final assembly of the wing (aileron installation, etc.) comes later.

The fuselage construction is pretty straightforward; it's basically a slab-sided arrangement with plywood doublers and triangle stock at the corners. The laser-cut balsa and plywood parts make for a really super parts fit, and it all fell together without a hitch.

The fuselage top access hatch is built

"in place" over the previously constructed fuselage lower half. I had some trouble getting the rear hatch former to stay in place because the glue joints were so small, so I installed the hatch top panel first, then placed the rear former after removing the hatch from the fuselage. Care must be taken during these steps to not accidentally glue the hatch to the fuselage lower half.

The hardwood servo rails supplied were not quite long enough to reach across the inside of the fuselage, so I got some of my own from the "boneyard" under my bench and epoxied them in place. Finally, the nose

block is installed and the entire fuselage and hatch assembly sanded to shape. Take your time here, sand carefully and you'll get a fuse with very clean lines.

The canopy, tail cone and belly pan are molded plastic parts that need to be trimmed and fitted to the basic fuselage. The belly pan is an unusual arrangement that is held in place with three small nylon bolts that allow it to "hinge" open for battery access and wing placement/removal.

The canard placement is fool-proof, as it fits into a slot formed in the fuselage sides. I decided to use hinge tape on the canard for a sealed hingeline, so this was done after covering. The ailerons were hinged with the provided Sig Easy Hinges, which I really like and use frequently.

I wanted to conceal the aileron linkages, so I bent up some new torque rods and installed them at the aileron root ends. This allowed a typical strip aileron setup with the servo in the wing center section and all linkages concealed inside the fuselage. This arrangement would probably be practical only for the glider version, as there's a lot of "stuff" in the belly pan area for the other powered versions.

I installed a motley assortment of radio gear, including a standard size Cirrus servo for the ailerons, a JR 507 servo for the elevator, a home-assembled 250-mAH battery pack in the tail cone and a JR Max 4 AM receiver. All this gear made beautiful music together.

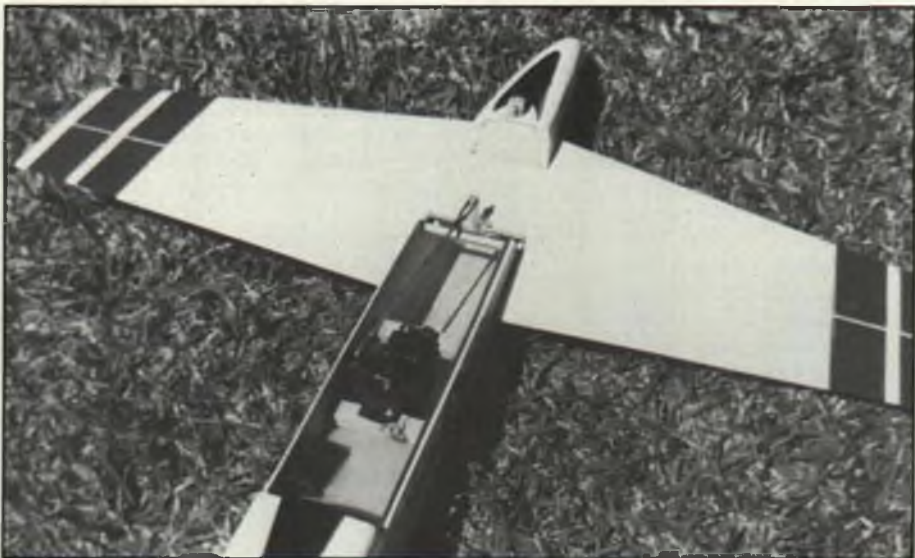
My Tri-Star was finished in a patriotic



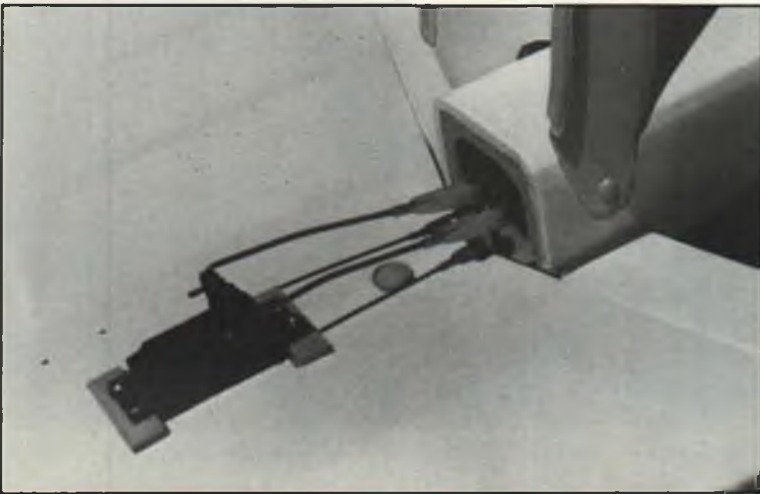
In the air the Tri-Star presents a striking profile from any angle. Dave found the CG and aileron reflex settings to be quite critical to achieving the very best performance, so don't be afraid to try different combinations while getting the model sorted out.



All framed up and ready for covering. Model features a partially sheeted foam core wing, conventional sheet balsa fuselage and canard. Belly pan is molded ABS plastic and is rugged enough to stand up to some pretty rough landing abuse.



Removing the upper fuselage hatch reveals the elevator servo installation and linkage. There's plenty of room for the standard-size Futaba S148 servo in the otherwise empty fuselage of the glider Tri-Star. Receiver is wrapped in foam and sits directly behind the elevator servo. Battery pack is placed in the tail cone.



The ABS plastic belly pan is hinged at the back; raising it provides access to the aileron servo and wing hold-down bolts. Dave cleaned up his Tri-Star by bending up some new torque rods and changing the aileron linkages to an internal installation—probably practical only for the glider version, on account of the additional equipment required for either the glow or electric powered models.

Ultracote red, white and blue pseudo-Thunderbirds color scheme accented with the excellent USAF markings provided in the kit. The canopy frame was painted on the inside surface with black paint, and the belly pan and tail cone were painted white to match the covering, both colors being

SIG'S TRI-STAR

WINGSPAN	47.5 in.
WING AREA	350 sq. in.
CANARD SPAN	20 in.
CANARD AREA	70 sq. in.
FLYING WEIGHT	31 oz. (glow) 43 oz. (electric) 18 oz. (glider); 22 oz. as tested.
WING LOADING	12.7 oz./sq. ft. (glow) 17.7 oz./sq. ft. (electric) 7.4 oz./sq. ft. (glider); 9.1 oz. as tested.

SUGGESTED RETAIL \$69.95.

Produced by Sig Mfg. Co. Inc.,
401-7 S. Front St., Montezuma, IA 50171;
(515) 623-5154.

Pactra Formula U. Looks pretty sharp, eh?

A half-ounce of lead in the tail cone with the battery pack was all that was required to get the CG in the specified range. All-up weight came to 22 ounces—a little heavier than specified, probably due to my radio gear, but fine for flying around here.

FLYING

Here's where the story gets really interesting. The first flight was on a typical weekend at our local coastal fly spot. The wind was a little gusty—10 to 15 mph. All the locals and I examined the plane and determined it flyable for the current conditions, so off the bluff it went, do or die. Death did not ensue, but it came close. The Tri-Star had a tendency to porpoise, and couldn't gain any energy. We obviously had a problem, but what it was, was not apparent at the time as we all stood scratching our heads.

After a safe landing I took it home and checked the trim. I had the ailerons set up so the trailing edge fell about level to the hingeline, and the CG was at the forward end of the range. Had the model been under power, I'll bet everything would have been fine, but the efficiency required to glide just wasn't there with this setup.

continued on page 43

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PLUG SPARKS

BY JOHN POND

• Old Warden Doings

• Old Time CL Stunt

• The Oliver Tiger Mk. II Diesel

• Thracy Petrides' Dolphin

It seems this writer just finished a column on model flying in Old Warden Aerodrome in England. Telephone calls and correspondence have resulted in a series of models photographed at Old Warden from noted modeler Peter Scott, of 12 Forest Glade, Brockenhurst, Hampshire, SO42 7QY, England.

The Old Warden Vintage Weekend emphasizes the sport end of things. As mentioned before, the delightful thing about this flying get-together is the complete lack of discipline in flying. You simply plunk yourself down on the nearest (and best) clear area and set up shop. Seen in Photo No. 1 is Peter Scott with a little-seen Petrides "Dolphin" (they spell it "Dolfin") in a "clear" spot. Note the number of models in this small area.

One thing about the average English O.T. modeler is his penchant for building something different. Unlike the follow-on SAM 1066 Champs, where competition is the keynote, a tremendous variety of models is seen at Old Warden. Photo No. 2 is an excellent example as seen in a Wigdor "Firebird," which was detailed in the 1938 Zaic Year Book. A photo of same appeared in *M.A.N.* of 1937-38.

To illustrate the point, Photo No. 3 shows a Charles Tracy "At Ease" as depicted in the 1937 Zaic Year Book. This writer is extremely gratified to see this complete model as he went to a considerable detail to produce suitable drawings to create an accurate model. Even the spring-loaded landing gear was calculated to withstand hard landings!

Willard Mayers is to be commended for this fine version of Charles Tracy's model. Tracy was editor of the Cleve-



Photo No. 1. Peter Scott won the Best Construction award at Old Warden with his magnificent Thracy Petrides Dolphin. This Antique streamliner was first built in 1937 but didn't appear as a construction article until 1939. Was a popular choice for early RC flying. All Old Warden photos this month were supplied by Peter Scott.

land *Plain Dealer* and as such, did an outstanding job of promoting free flight gas models in that early era of flying. Tracy has an outstanding record of staging contests in his area and publicizing same. The Cleveland boys owe Charlie many thanks for his efforts.

Getting on with favorite model/engine combinations, Photo No. 4 shows a very neatly built "Midget" with an Oliver Tiger diesel engine. Photo No. 5 is another example of what can be done with small

diesel power. Seen is an English biplane design called the "Coquette." This model is quite similar in appearance to Frank Ehling's Elf Biplane, a very popular model in the USA and abroad. Biplanes have an appeal all their own. In flight, they are startlingly attractive and realistic to watch. The glide is nothing to write home about, but the plus side of things is that they don't get lost in thermals as quickly as competition-type monoplanes.

What better way to wrap up

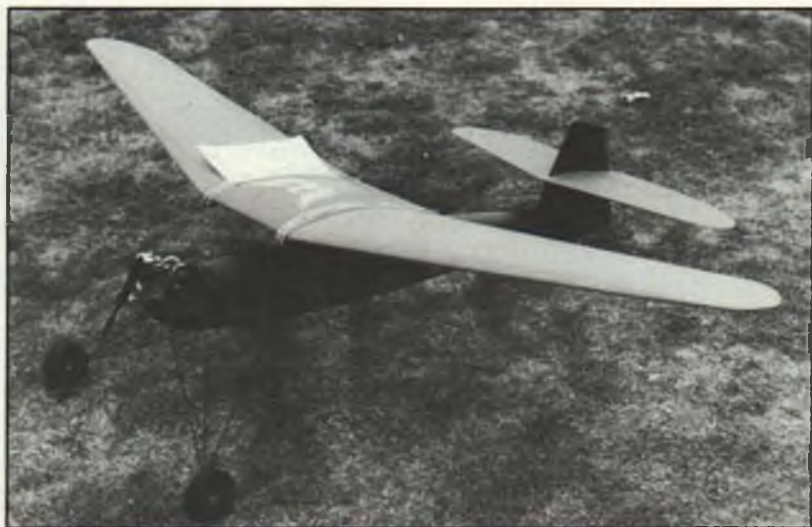
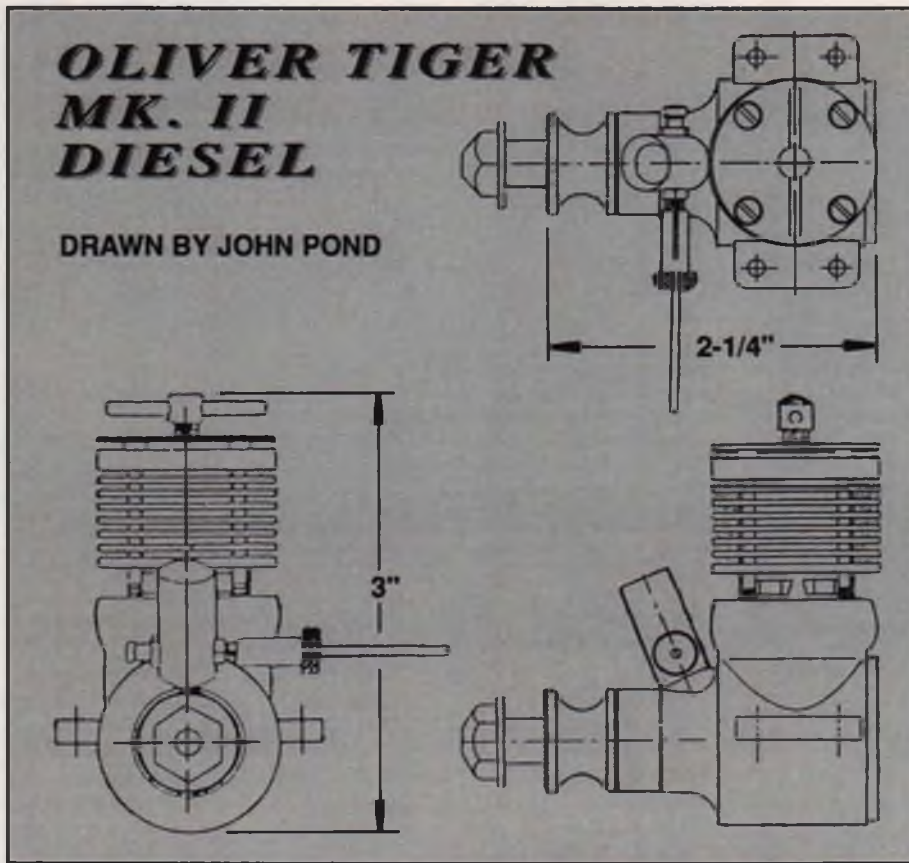


Photo No. 2. An RC version of the Wigdor "Firebird" from the 1938 Zaic Year Book, powered by a Saito .40 four-stroke. Builder's name was not supplied.

OLIVER TIGER MK. II DIESEL

DRAWN BY JOHN POND



ENGINE OF THE MONTH

this report on English activities at Old Warden than to talk about Bowden's models. "C.E.," as Col. C.E. Bowden was affectionately called by his friends, was Britain's foremost pioneer in gas models begin-

ning in 1933. His "Blue Dragon" set a record in 1934 that was not surpassed until four years later.

Bowden's models were not things of beauty in the early days, but by 1937, he had some

good-looking designs featuring elliptical wings and tails and streamlined fuselages (see Photo No. 6). Bowden produced such a variety of models—low wings, biplanes, parasols, etc.—that one could



Photo No. 3. The first example we've ever seen of Charles Tracy's "At Ease," as built by master craftsman Willard Mayers. An original sketch was published in the 1937 Zalc Year Book; Pond has full-size plans.

spend a lot of time acquainting himself with the various designs.

It's interesting to note that after using those heavy Comet engines, et al, he obtained American engines such as the Brown Jr., Baby Cyclone, Ohlsson 23, and Elf, for testing and evaluation in new designs. In short, Bowden was the acknowledged expert on model planes, engines and flying in those days. During WWII Bowden wrote a column on gas modeling that appeared in *Aeromodeller* for over six years. A prolific modeler!

OLD TIME CL STUNT

In the years following the end of WWII, the control line craze generated a terrific amount of interest in stunt models and good engine technique. In the San Francisco Bay area, the Western Airplane Modelers (WAM) arose with over 100 clubs and 2,000 members.

WAM contests were something else! No fewer than 100 trophies were given out at each contest. The San Francisco Vultures (a FF/CL club) got a nasty shock when staging their first annual at the Fleishacher Zoological Extension (popularly known as the "Goat Patch") when 110 trophies plus sweepstakes was considered a small contest. Those were the days!

Recently received was Photo No. 7 of Dave Marshall (one of the outstanding CL fliers) with his special long-span stunt model. This sensational model is shown in the San Francisco "Goat Patch," which was a convenient place for CL flying. This writer remembers the area fondly, recalling there was only room for 70-foot circles.

As can be seen in the background, the area was completely surrounded by eucalyptus trees that formed an excellent windbreak. About the only time one couldn't fly was when a heavy fog rolled in from the beach at 48th Avenue. (Not too often as the fog came in high.)

Of interest is the restraining

PLUG SPARKS



Photo No. 4. A popular RC subject in England, an Oliver Tiger powered "Midget."



Photo No. 5. A very popular English subject, the "Coquette," resembles Frank Ehling's Elf Biplane.

who built a fancy complex of homes, apartments and condos. All at very fancy prices.

ENGINE OF THE MONTH

Considered the "Cadillac" of 2.5cc (.15 cubic inch) diesel engines was the outstanding Oliver Tiger Mk. II produced by John Oliver of England, located at the time at 136 Radford Rd., Nottingham. This was THE engine for FAI free flight and FAI CL team racing.

Oliver engines were impeccable in appearance and starting ease. The engine started and ran so smoothly at high rpm, it was nicknamed the "English Dooling," not because of appearance but because the engine ran so similarly to a red-hot glow engine that would unload in flight. This characteristic was always good for at least another 1,000 rpm, running quite similar to the later Cox .15 that exhibited tremendous acceleration in the air.

In 1950, Oliver engines were not
continued on page 84

cable to keep spectators back. This was erected by the S.F. MAC control line club, of which most members were absorbed by the Vultures. No excuse for not knowing where to position your model as bare spots caused by fuel spills completely eroded the grass at the starting line. Unfortunately, the Goat Patch fell victim to the contractors

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The fix was to reflex the aileron trailing edge up about 1/16 inch and move the CG back about 1/4 inch. We took her out again on a 15-18 mph day and this time she flew great! Moral: The Tri-Star can be very sensitive to variations in setup. It may take a little more fine tuning than you're used to, but be patient and experiment a little and you'll end up with a terrific flying plane.

Now I got to really explore the Tri-Star's flight envelope. Stalls take some getting used to because you can get into a stalled condition without even knowing it due to the canard configuration's inherent tendency to not drop the nose. It doesn't tip stall, either. As a matter of fact, you can hold full up elevator and it will just keep on flying, but you're losing airspeed the whole time and eventually the plane will begin to lose altitude in a flat attitude.

Rolls are a little different than with your typical conventional aircraft. You need to be real judicious with the elevator compensation or you can induce a spin. The roll rate is really great, and after some practice I was making 'em real pretty. Point rolls can be a little tricky with the swept wing, but after a while you'll be nailing the points pretty clean. Loops require some energy, so let it build up some speed before you pull into one. Inverted flight is very nice, and frankly, surprising. It exhibits the same mellow stall characteristics when inverted, so pay attention or you may see soil before you know it.

I tried split-Ss, diving rolls, pumps, stall turns and all the rest and found the Tri-Star tracks really well through all the maneuvers. It's not real fast, but it's very aerobatic, which suits me fine. Be extra careful on your first few landings, because if you slow down too much, that stick will go limp in your hand before you know it and you'll be a victim of fate! I boffed her real good one day with that mistake but the plane survived it without any dismemberment, and it hit hard, too.

I find the Tri-Star a real joy to fly. It always stirs up lots of controversy in the crowd and, to its credit, kind of puts the anti-canard bunch in the doghouse.

CONCLUSIONS

Neat plane. Easy to build, fun to fly, real sexy looks and a true head-turner.

The Tri-Star has proven to be pretty rugged, and it's so light it's hard to build up enough energy to break it very seriously. I wouldn't put it in the trainer class, but it would be fine for a second aileron plane. One thing for sure, its unusual shape is very distinctive and its flight characteristics are pleasing. The power options would make it practical for any kind of flying you'd like to try and I could see it as a really handy "crossover" plane for folks who fly both gliders and electric power. **MB**

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THE AERONCA O-58A/L-3A DEFENDER

The oddballs are nice for a change, but here's one you *know* will fly. Reprinted from the April 1977 *Model Builder*.



The small, two-place airplane that was most popular and numerous during the late '30s was most often called the "Cub" or the "Piper Cub," and to the general public, all such high wing, strut-braced, fabric-covered, two-place light airplanes were "Cubs." Sometimes a name has a great deal to do with success, and Piper lucked out. As a consequence, not many people realized that the "Cub" had any competitors.

Piper did have two very significant competitors prior to WWII: Taylorcraft and the Aeronautical Corporation of America (Aeronca). The Defender, or O-58A, or L-3A, was a product of Aeronca, which by the time the Defender was built, was called Aeronca Aircraft Corporation, and was

based in Middletown, Ohio. The Defender was announced in 1941 and could be purchased with a choice of Continental, Franklin or Lycoming engines. It was an improvement of a previous tandem trainer, was purchased by the Army for use as a "Grasshopper," and was known as the O-58A in military maneuvers in the southwestern part of the U.S.

The reasons for the ascendancy of the Cub over the Defender should be attributed, in the opinion of this author, to two things. First, the Defender was a little more crowded in the cockpit, and the Cub was crowded enough. And second, its flying characteristics were not as nice, especially with respect to adverse yaw due to aileron

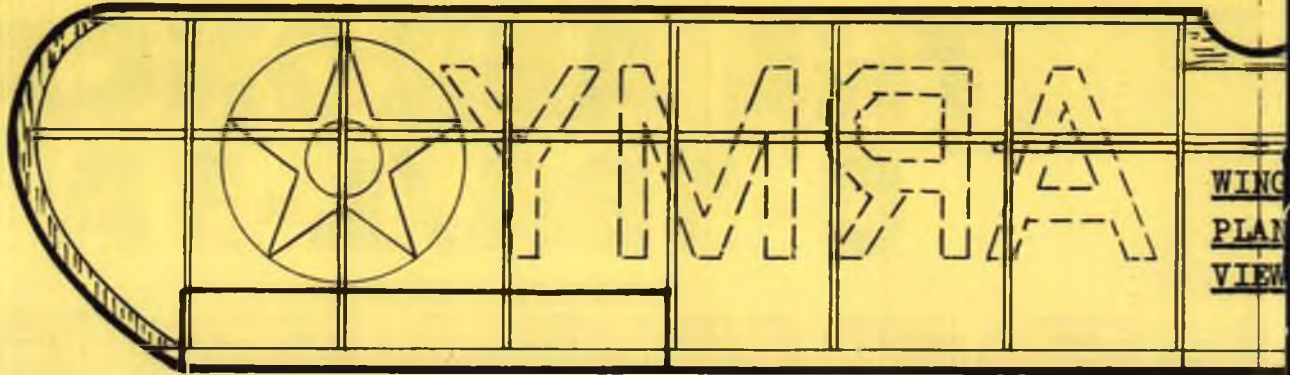
use, and directional stability. Therefore, it was harder to fly well and somewhat less forgiving of ham-handed pilots.

These shortcomings are certainly not detrimental to free flight scale models (no ham-handed pilots; no pilots, in fact) and may even be beneficial in a Peanut, where they tend to give some inherent spiral stability. In any case, the Defender makes a good Peanut.

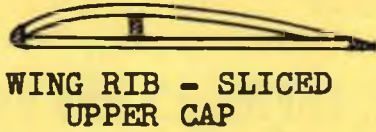
Construction of this model follows tried and true construction techniques. In fact, it might almost be considered old-fashioned.

All structural parts, with the exception of the landing gear wire, motor peg and propeller shaft, are balsa. The fuselage is

COLOR SCHEME SHOWN FOR AN AERONCA O-58-A USED IN PRE- WW II MANEUVER
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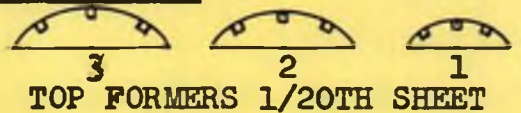


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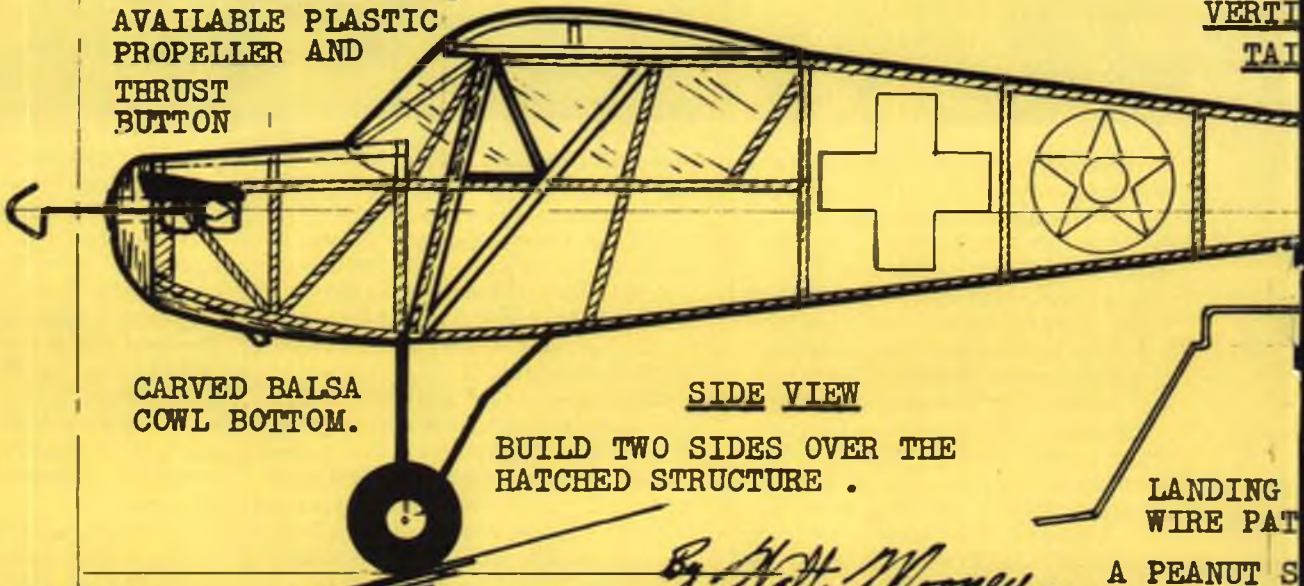


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DUMMY ENGINE
CYLINDERS.



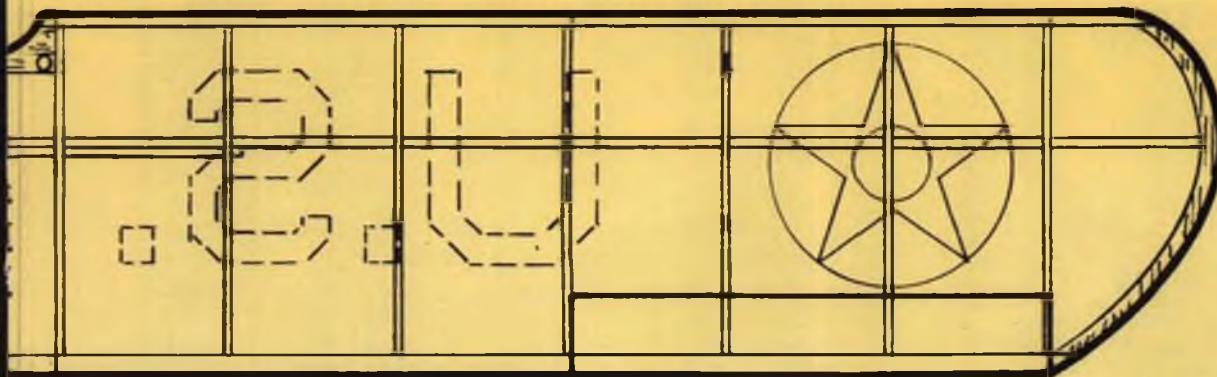
USE A COMMERCIALY
AVAILABLE PLASTIC
PROPELLER AND
THRUST
BUTTON

VERTI
TAIL



By Matt Mooney

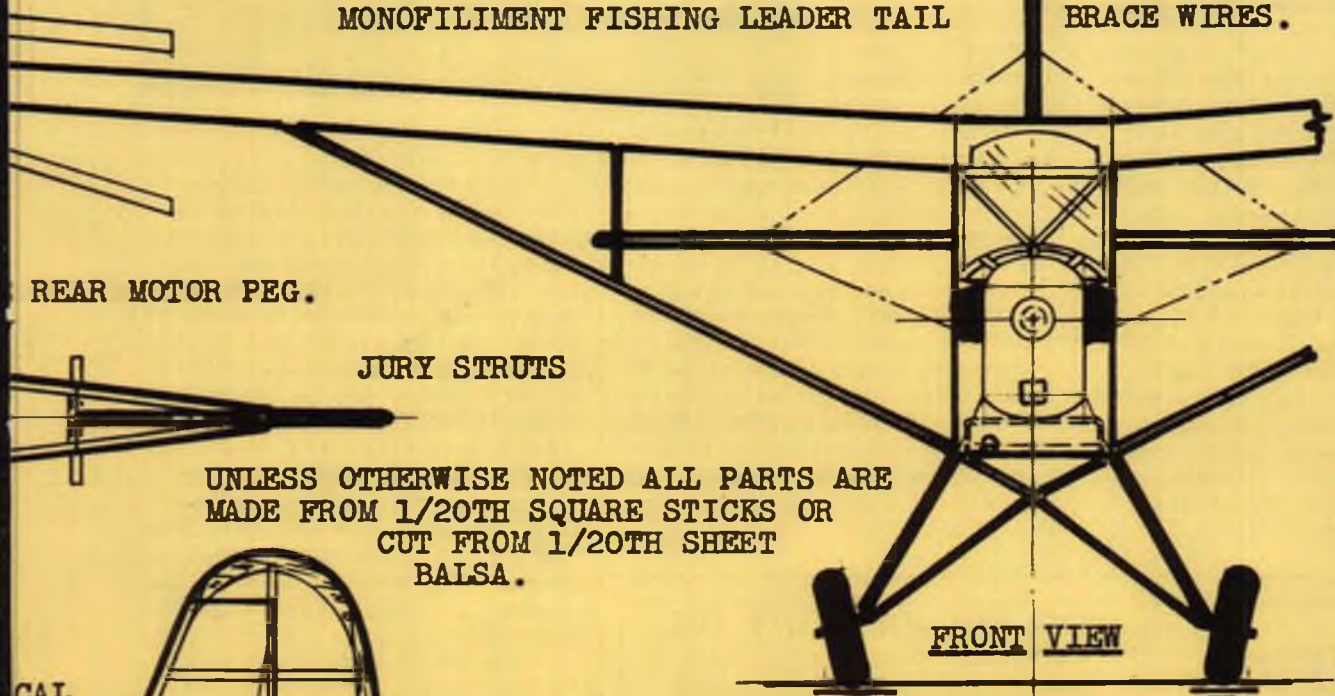
S. BASE COLOR OLIVE DRAB, STAR INSIGNIA TOP AND BOTTOM OF BOTH
 PLAGE . BLACK "U.S. ARMY ON UNDERSIDE OF WINGS.



1/8 FOR LEADING AND TRAILING EDGE AND THE SPAR.

MONOFILIMENT FISHING LEADER TAIL

BRACE WIRES.

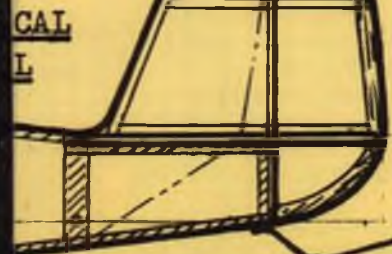


REAR MOTOR PEG.

JURY STRUTS

UNLESS OTHERWISE NOTED ALL PARTS ARE
 MADE FROM 1/20TH SQUARE STICKS OR
 CUT FROM 1/20TH SHEET
 BALSA.

FRONT VIEW



WIRE TAILSKID

1/20 BY 1/8
 TRAILING EDGE



HORIZONTAL TAIL

GEAR
 TERN

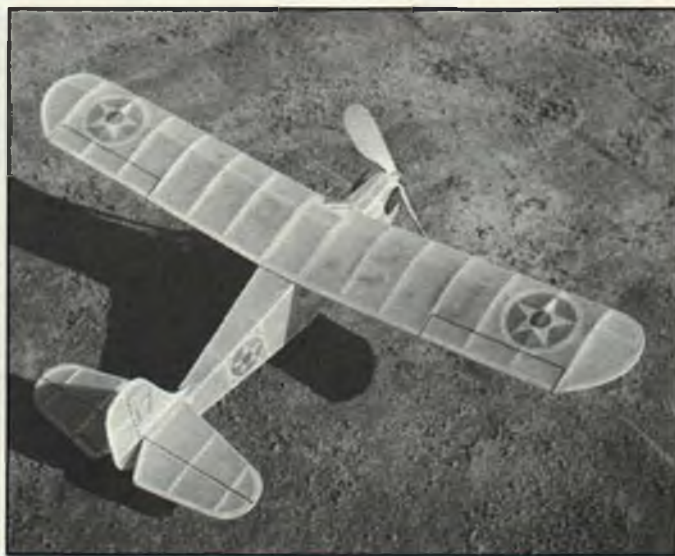
COVER WITH TISSUE, WATER SHRINK AND GIVE THE FUSELAGE
 TWO COATS OF THIN DOPE, REST OF AIRPLANE GETS ONE COAT.

SCALE OF SEVERAL FACES: AERONCA O-58-A, OR L-3A, OR DEFENDER TRAINER.

THE AERONCA O-58A/-L3A DEFENDER



What can you say about a model so simple and basic as the Cub-like Aeronca Defender? It's the elementary scale model airplane. Model is an excellent flier.



made by laying down two fuselage sides over the plan. The hatching in the side view indicates how the side structural pieces are assembled. When the two sides are dry, remove from the plan and separate them, using half of a single-edge razor blade. Then cement the sides together at the aft end and cement cross braces in place top and bottom working forward to the nose. Add formers 1, 2 and 3, then add the three nose stringers. The nose block is carved from 1/4-inch balsa. Cement a piece of 1/8 balsa to the back of the nose block after cutting it to fit snugly in the opening at the front of the fuselage structure.

Use 1/8 sheet balsa to cover the bottom of the fuselage forward of the landing gear. Then carve this to the contours shown in the front and side view.

Bend the landing gear wire and cement it in place.

The wing uses the sliced-rib technique for lightness. Build it over the plan by pinning the leading and trailing edges in place, then cement the bottoms of the ribs in place. Next cut out the wingtips and cement them in place. Block up the extreme tips so that they match the front view. Now cement the spar in place on the rib bottoms. Then cement the rib tops in place.

When this assembly has dried, cut the leading and trailing edges, and spar, for the dihedral break. Cut out the dihedral brace, slip it into the root ribs and cement the spars to it. Note the shape of the leading edge cutout in the center; cut and fit a piece of 1/16 sheet for it. Cement all the

dihedral breaks.

The tail surfaces are built flat over the plan. Tips are made from sheet balsa.

Prepare the parts for covering by sanding the entire structure with fine sandpaper—280 or 320 grit is ideal, but any fine sandpaper will work. Give the outline of the tail surfaces a round cross-section, except where the vertical tail will be attached to the fuselage. The leading edge of the wing should be rounded and the trailing edge tapered as shown in the drawing. The tips should be rounded also.

The structure should be covered with lightweight tissue. If the tissue has noticeable grain, make sure it goes lengthwise of the part being covered. Water-shrink the covered parts, then give them a single coat of thin dope.

Generally, it's easier to add insignia, lettering and other decoration such as movable surface outlines, while the model is disassembled. So do that job next.

Make up the struts and landing gear fairings. The struts should have teardrop, streamlined cross-sections and the leading and trailing edges of the fairings should be rounded.

Assemble the model. Make sure it is assembled true to the plans. Then add the windows and windshield.

Either carve a propeller or select one of the many plastic props that are on the market. Bend the prop hook, and using a Peck-Polymers thrust bearing, install the propeller on the nose block.

Use scrap balsa to simulate the engine cylinders.

A single loop of 1/8-inch flat rubber will power this model for outdoor flights. For indoors, smaller rubber should be used.

Have fun with your Aeronca Defender! **MB**

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Dual Rates		X
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Digital Trim	X	X
Mode I / Mode II	X	X
Timer	X	X
All/Rud Mix	X	X
Elevon Mix	X	X
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THE GREAT SAM CHAMPS OF 1995

The "Nationals" of the Society of Antique Modelers just keeps getting better and better each year. The 1995 meet, held at a huge open field in Colorado Springs, is going to be mighty tough to beat!

By Larry Conover

There was another "Field of Dreams," but that country baseball diamond was only a vapor compared to the 15 square mile (9,600 acres!) Old Timer flying field near Colorado Springs this past September.

As you thread your way through the Fountain-Widefield area and pass between the double wide green gates, flags on either side, some little roadside signs out of the 1930s, beg your attention. In orderly succession they read: FOLLOW THE TRACKS—NO CUT ACROSS—BE YE KIND TO COW AND HOSS—Burma-SAM. Or: STAY THE COURSE—DON'T DRIVE ON GRASS—YOU RUIN MY FOOD—I'LL KICK YOUR . . . CAR!—Burma-SAM. (Courtesy of Shirley Moore.)

Like an idea whose time has come, there was a wonderful coming together of old time fliers, members of SAM, the Society of Antique Modelers, at the 1995 SAM Champs. There were 268 official entries from places like Nacodoches and Napa,

Longtime free
flyer Warren
Weisenbach of
Cleveland,
Ohio has a big
smile for his
Forster .20
powered
Zipper. Lots of
good-looking
Zippers at the
Champs.





The 1st place winner in 8-Ounce Wakefield by almost 200 seconds, Ed Small of Littleton, Colorado gets his Lanzo Classic ready for a flight. This is the same ship he flew at the European SAM Champs at Middle Wallop, England in 1994. Ed is in his 70s and still going strong.



Junior Birdman Jim Adams, former SAM president and longtime editor of SAM Speaks, has lately been doing one heck of a lot of building and flying, flew a Miss Fortune-X in the RC Brown Jr. L.E.R. event.



An old favorite for FF Rubber Scale is the Lanzo Puss Moth; this example, just having been retrieved by John Camp (left), was built by Gene Wallock, who took 2nd place with 824 seconds.



Don Blackburn (left) of Amarillo, Texas flew a 6-foot Torpedo II in the Ohisson Sideport event. Bill Alberta could have just let go and she would have climbed right out. A very slick looking airplane from the 1938 Zalc Year Book.



Launching for a flyoff flight in the hotly contested Large Rubber Cable event is Canadian modeler Don Reid, who finished 3rd with his 1940 Lanzo Cable. Don started flying in the early '40s, dropped out from 1965 until 1988, when he found out about SAM and took off again. His wife Cynthia is a great help on the field.



One of the most famous members of the British contingent, Ron Moulton, of Watford, England, former longtime editor of Aeromodeller, flew a Bill Dean-designed Slicker 50 using an old Torpedo .15.



Elbert Weathers' classic 1937 cabin design, the 9-foot span Westerner, as flown by Eut Tileston of Carmichael, California. Takes off quick with an Enya .60 up front. More on Eut in text.



Some of the O.T. hand-launch glider guys, all with Hoguelet models, from left: Dick Wood of Phoenix, Arizona (3rd place with 173 seconds); Frank Roberge of Scottsdale, Arizona; and Ray Combs of Orlando, Florida. There's a reason why Frank is giving Dick the stink-eye, but you'll have to ask 'em yourself!



From Pioneer, California, Tom Smith's Lanzo RC-1 with blue head Anderson Spitfire. Tom flew lots of events at the '95 Champs, placed 3rd in RC Texaco with a flight of 40:04. RC Contest Director Ken Kullman (right background) monitors the flying.



What would a SAM Champs be without Sai Taibi? His club and friends recently threw him a 75th birthday party, and Sai in turn celebrated the '95 SAM Champs by winning Class C with his Playboy and taking the title of Power Grand Champion!



Nicely built (and colorful!) Gil Shuman's Rambler with Super Cyke power is the work of Bruce Augustus of Sea Valley, Idaho, took 2nd in Class C. Bruce is the new editor of SAM Speaks, the official bimonthly publication of SAM.

Littleton and Leicester, Watford and Worcester. They came from the far countries of England, Germany, New Zealand and Canada.

I've been to lots of Nationals over the years, but I never have seen such a group of world-class fliers all in one place, except at FAI World Championships. But this was special, because so many of them came up through the 1930s and '40s and '50s. They paid their dues a long time ago. Perhaps the "Spirit of SAM" is better caught than explained. You just have to be there.

We'll try to take you along through these photos and stories. You won't see all of the famous fliers, because we made room for many of the almost-famous. But first I have to tell you about Eut Tileston of Carmichael,



A member of the English contingent, Mike Blöddick, caught in a copybook launch of his 44-inch span Contoslor, an old Bill Dean design. Plane came from a fellow running a back-alley hobby shop off a barge in Amsterdam.

California. He does have quite a reputation in RC Old Timer circles. The story is called:

WHY WINNERS WIN

There were two in the flyoff for Antique, Tileston and Texas flier Joe Percy. Late in the afternoon, thermals were elusive, hard to pick up. The usual lift at extreme altitude, above the inversion layer, was missing. Both fliers got very high, but with minimal thermal activity it was only a matter of time. Percy had flown his Bomber a bit later and it was still at good altitude when Eut's big silver-and-yellow Westerner was passing through the 300-foot level.

Suddenly the right wing rose up and Eut whipped that long-span Westerner around in a left bank and moved into the center of a small column of rising air. He milked that little ground riser for 519 seconds and a total of 2,319. Joe Percy apparently was not aware of this turn of events and landed downwind with 451 seconds on the clock, making a total of 2,251 for 2nd place. Very few on the field realized what had happened, but Eut Tileston showed us what it takes to be a winner.

PLAY IT AGAIN SAM

There's another side to winning, as you old timers well know. The times when things just don't work out as planned. Take Herb Kothe for example. When he flies in the rubber event, he wins. Anywhere he competes, he wins. He's been on Wakefield

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The Twin Pusher mass launch is always fun to watch. Winner was John Camp with a flight of 169 seconds.

teams, went over as team manager in '87. Well, he was overheard saying: "In 40 years of flying, this has never happened before. The rear peg let go on two of my models, in mid-air, while they were climbing at good altitude."

His Korda whistled in from 200 feet with all the rubber slammed against the noseblock. Wiped out the front end. It was almost as bad on his big Puss Moth, the fuselage was scrambled. He missed the Korda Challenge mass launch by two minutes, because he got there two minutes late and was still winding when the countdown started. His red-and-white Korda climbed highest on the field when he did launch, but nobody was timing it.

A clean release by Kirby Hinson as Tom Jozwiak's big 12-foot span Lanzo Racer begins its takeoff run for a Texaco flight. Engine is an O.S. .81 four-stroke with custom spark ignition points installed.



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THE GREAT SAM CHAMPS OF 1995

Hard-to-beat Al Richardson was going up fast for his second max in 4-Ounce Wakefield. It was a hot thermal—too hot! The black-and-yellow 1935 Gordon Light winner rolled over out of a beautiful climb and followed the vortex right into the ground, smashed back to the cabin.


John McRae, who won 1st in 1/2A Texaco, was going high and fast in the Class C Glow flyoff. It was that gusty Thursday and the wind pushed the big Westerner over into a loop. It was too much for the wing and the 1-inch-deep hardwood main spar snapped. I swear it took 30 seconds for the wingless model to hit the ground.

Eut Tileston did almost the same thing and collected the Worst Crash trophy.

The moral of the story: There are lots of Duracell fliers in the Old Timer Movement. They just keep going and going and going. Another taste of the Spirits of SAM. MB



Frank Roberge flew a George Reich design, the Double Feature, in Small Cabin Rubber. While winding for his first contest flight, the hook pulled out of the winder and totaled the first two bays of the nose. Fortunately Frank had some balsa sticks on hand and rebuilt the front end right on the field; to re-cover the nose he stripped off part of the Mylar covering from one of his other models and soon had the model back in the air. Didn't win or place, but he sure came away with a fun story to tell!



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6 X 2	1	1.59	8.75 X 7.0	5	3.95	11 X 6		2.49	12.5 X 12.5	7	7.95	14.4 X 12	10	12.95	20 X 10		25.00
6.3 X 4	2	3.95	8.75 X 7.5	5	3.95	11 X 7		2.49	12.5 X 13	7	7.95	14.4 X 13	10	12.95	20 X 12		25.00
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7 X 5	15	1.59	9 X 9		1.99	11 X 12		7.95	13 X 13.5N	9	7.95	15.5 X 13N	10	12.95	24 X 10		38.00
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1995

AERO DESIGN WEST

A look at a fascinating annual engineering competition that gives students an opportunity to apply knowledge learned in the classroom, particularly as it applies to aircraft design.

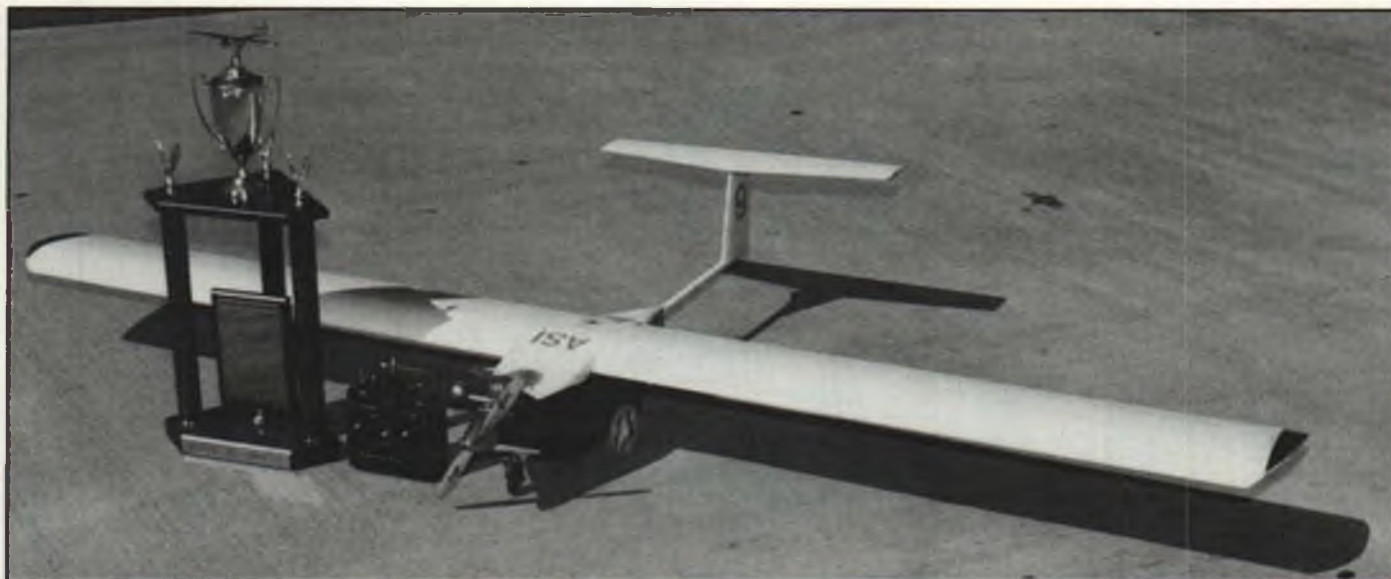
By Eloy Marez

The Society of Automotive Engineers held its annual Aero Design contest, essentially a weight-lifting contest for RC aircraft, on April 29-30 at Mile Square Park

The competition is divided into design and flight categories. The contestants must present their design criteria, and demonstrate accuracy by predicting the maximum payload that can be flown. Obviously, the

flight competition consists of being able to take off with that amount of payload on board, and of course get back down on the ground in one piece.

Aircraft are limited to fixed wing only;



Winner of all the marbles at the 1995 Aero Design West was the "Clydeadaie" as designed and built by California Polytechnic Institute, Pomona students Garrett Miller, Justin Albright, Ian Stewart and Andra Birkitt. Aircraft features a conventional, logical configuration—constant chord wing, tricycle gear for positive ground handling, fuselage pod just big enough to hold the equipment and payload, tubular tail boom for minimal projected surface area (see rules), and a T-tail to keep the stab out of the downdraft of that heavily loaded wing.

in Fountain Valley, California. The Aero Design competition, held annually for SAE member college engineering students, includes a similar contest under the same rules in the eastern U.S. for schools there. The different engineering schools form teams, who then design and build—and in most cases, learn to fly—an RC aircraft with the sole intent of lifting as much dead weight as possible.



Designed specifically for SAE heavy lift competition, this is the 11.83 percent thick Selig S1223 airfoil as used by Cal Poly Pomona's winning aircraft. Note the heavily cambered, super-thin trailing edge—precludes the use of anything other than composite foam/glass construction.



Pilot for the Cal Poly Chydesdale was Ian Stewart, an active RC flier. Ian credits their success to proper preparation on the part of all of the team members.

but also the fuselage, horizontal stabilizer, flaps in an extended position, etc., etc., etc. Even the engine and any of its accessories that have horizontal surfaces, including such seemingly inconsequential things as a spacer between the engine and the muffler, are counted.

The only engine allowed is an unmodified K&B .61 with stock muffler. "Blueprinting" the engine is prohibited, as are tuned pipes, gearboxes or metal props. A standard spinner or safety nut must be used. Fuel is limited to 10 percent nitro.

The cargo bay must measure 5x6x10 inches and must fully enclose the payload, which consists of a heavy aluminum base with bolts to secure additional metal

plates to bring it up to the desired weight. Effectively, it's a heavy hunk of metal, assembled in such a manner that its center of gravity coincides with its geometric center.

The maximum number of points possible for each design area are as follows: Plans—25; Report—25; Presentation—30, and Payload Estimation—20. The overall score is the total of the design score plus the flight score, minus any penalty points.

THE AIRPLANES

You'd think that the strict rules would result in rather basic look-alike designs, but that's far from the truth. In addition to meeting the design requirements, a lot of individuality was seen. Everything in what we normally think of as "normal" RC airplane design changes when the fact that these airplanes will be called upon to carry two or three times their own weight as payload is added. Even the landing gear requires more than the usual attention, and in some cases was seen to create some problems. The



Southern California's Mile Square's pits on this weekend looked entirely different from their usual complement; adequate work spaces and all necessary facilities were furnished to all contestants.

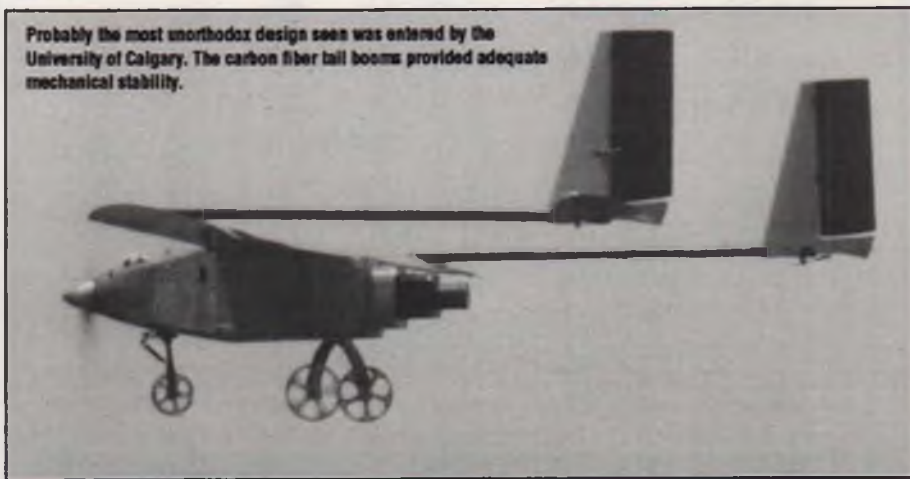
no lighter-than-air or rotary wing designs are permitted. All entries are obviously designed for only one purpose, but it was just as obvious that more than a little imagination was applied!

THE RULES

AMA rules apply, and are religiously enforced. The judges are all aviation experienced, coming from the aircraft industry, and in some cases, from the U.S. Air Force. In the interest of safety, and recognizing that this is not primarily a pilot's event, the pilot does not have to be a member of the team.

The rules specify a maximum planform area of 1,200 square inches. Planform area is defined as all vertically downward projected area; it includes not only the wing,

Probably the most unorthodox design seen was entered by the University of Calgary. The carbon fiber tail booms provided adequate mechanical stability.





■ ABOVE: Note the interesting aft fuselage construction on Grove City College's (Grove City, Pennsylvania) design; three carbon fiber tubes between the cargo compartment and the tail assembly—most likely done to reduce the fuselage's projected surface area.

■ LEFT: The only flying wing entry, built and flown by the USAF Academy Team No. 22, being readied for flight. Unfortunately, it was unsuccessful in taking off, and therefore did not qualify.

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design teams all had perfectly logical reasons for their design criteria, but the proof of their thinking came when the K&B's throttle was advanced and it was time to head for the wild blue yonder.

I was impressed by the camaraderie of everyone involved. All of the teams watched each other's flight attempts, groaning with them when things didn't go well and cheering with them when they did. I was also impressed by the number of female team members, all of whom were as involved and worked as hard as did their male counterparts. There were no female pilots, however. Next year, huh girls?

THE WINNERS

The entrants, initially totaling 26, from the U.S., Canada, and Mexico, were ultimately reduced to 15 through no-shows and non-qualifications. After five rounds of flying, the following category winners were announced:

Design (points)

1. California Polytechnic Institute, Pomona, California: 89.982.
2. Ecole de Technologie Superieure, Montreal, Quebec: 83.15.
3. University of California, Los Angeles, California: 75.11.
4. B.C. Institute of Technology, Richmond, B.C.: 72.95.
5. University of Calgary, Calgary, Alberta (Team #26): 71.55.

Payload (pounds)

1. University of California, Los Angeles, California: 25.75.
2. California Polytechnic Institute, Pomona, California: 25.25.
3. University of Calgary, Calgary, Alberta (Team #16): 24.00.
4. B.C. Institute of Technology, Richmond, B.C.: 23.75.
5. University of Calgary, Calgary, Alberta (Team # 26): 22.00.

Overall Scores

1. California Polytechnic Institute, Pomona, California: 190.98.
2. University of California, Los Angeles, California: 178.11.
3. B.C. Institute of Technology, Richmond, B.C.: 167.95.

Vince Miller Designs - Established in 1951



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in stock or we will build from the kit of your choice. We offer more cash & trade-in for old Ignition engines, parts & TWIN glo or /4-C engine. Send \$2.00 & Double stamped SAE for Giant Sales Bargain catalog to: CARL V. MILLER, 1773 Blueberry Dr. N.E., Rio Rancho, NM 87124. Phone: 1-505-891-1298.

4. University of Calgary, Calgary, Alberta
(Team #16): 166.95.
5. University of Calgary, Calgary, Alberta
(Team #26): 159.55.



The engine required by the rules is an old RCer's favorite, the K&B .61, seen here mounted as a pusher in this interesting lifting body fuselage design by the University of Arizona.



The Canadians showed up in force, with teams from their Ecole de Technologie Supérieure (Montreal), British Columbia School of Technology (Richmond), University of Calgary, and University of British Columbia (Vancouver).

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A special award for the best use of advanced composites, donated by a maker of such, KCI Fiberite, of Tucson, Arizona, was also awarded to the University of California team.

The winning airplane was the work of Cal Poly, Pomona, Team #9. The team members were Justin Albright, Andra Birkitt, Garrett Miller and Ian Stewart. The airplane, called the "Chydesdale," weighs in at 8 pounds empty, uses the Selig 1223 airfoil and is constructed of foam and composites. Wing area is 998 square inches, the horizontal tail adds 100 additional squares. The K&B up front, as expected, performed flawlessly.

Ian Stewart, the pilot of the winning Cal

Poly airplane, is an active RC modeler, and describes this event as "the most fun and the most work-intensive project" he has ever been involved in. He also points out that, as at many RC events, the winning airplane is not necessarily the best one, but the best prepared one. Cal Poly will be there next year to give the rest of the teams another shot at the title!

A large group of local RCers were in the ranks of the spectators. We all thoroughly enjoyed this contest, and are looking forward to the 1996 Aero Design West, planned to again be held at Mile Square. We'll be looking for some team to beat 26 pounds! Anyone for 27? MB

FREE FLIGHT

BY BOB STALICK

•Reflections

•The Baby
B Bomb
for 1/2A
Nostalgia

•Free
Flight
Cottage
Industries

In January 1982, *Model Builder* magazine publisher Bill Northrop asked me to take over the Free Flight column from Tom Hutchinson, who had just passed away. I've been on board without interruption since then.

Occasionally the column waxes poetic, sometimes it's informative, and I hope it's always interesting. I have noted the passing of the seasons, of our heroes, and of our fancies. Time and human development have pushed outdoor free flight ever further from the mainstream where our living history passes by every year. It's a grand and glorious past. The future is not so clear.

Sometimes we are our own worst enemies. We have cultivated our competitive hobby into something attainable only for an increasingly smaller number of dedicated and well-to-do experts, ignoring the training and development of replacement experts to solidify our future. We have developed many new events, to the extent that everyone who flies can win something, but since so few enter any of these



Bruce Kramer of Pacific Palisades, California designed and built this huge 8-foot span, 600 square inch rubber-powered model. The ship features a V-tail and a geared motor, and is covered with Polyspan. Photographer Sal Frucianno says it's a great performer.

events, the victory is hollow. No new beginner event ever remains the province of the beginner. Somewhere, an expert is looking for a loophole to give him an advantage.

So it is a time for reflection,

and since the weather outside my window today shows the onset of autumn, it is also the time to take stock of our supply of models. Which ones finally need replacement? Which ones need repair? In



Peanut Scale Koelliker F.K. 55 is one of Michael Morrow's projects. This particular model has turned in a high time of 61 seconds with a plastic prop. Plans are available - see text.

what new events do you wish to compete? What's the best design to use? To help you with these choices, this month's column features a brief rundown of some of my favorite suppliers and what they have to offer. Let's kick off 1996 as a banner year for free flight, right here at *Model Builder*.

PLAN OF THE MONTH

The NFFS Nostalgia Committee, headed up by Bob Larsh, is responsible for approving unpublished but provable designs for inclusion on the list of acceptable models for Nostalgia competition. Recently the committee approved this month's featured model, the Baby B Bomb, designed and flown by Ed Stone. According to Ron Sharpton, a mem-

As you look over the drawing, you'll spot several features that make this model worth considering as one to build. One is that it has a very high pylon and a profile-type fuselage. The wing is high aspect ratio, only about 160 square inches in area; the model would therefore be a good subject for the Early Nostalgia event. It should build light with a target weight under 5 ounces. The plan calls for engines from .035 to .074. Since the model was designed in 1951, that means the Cub .049 or similar engine would have been a popular choice.

As with many free flights from this period, the Baby B Bomb was trimmed to climb to the right with a bit of right thrust in the engine, and the glide was to the left, using stabilizer tilt

is \$5 per set postpaid.

JANUARY MYSTERY MODEL

OK, OK. I get the message. The most recent mystery model examples have been too esoteric. Catering too much to the greybeard set. Too many from the 1940s and 1950s. I get the picture. Present examples that are relatively recent. Not so obscure. Give the younger folks a better shot at winning. Here goes!

This month's design was published in *M.A.N.* by a free flyer who is still active and was last seen in Oklahoma. The model itself is a pusher, powered by a Cox Pee Wee .020 or tired old Cox reed-valve .049. It is all balsa and is as cute as a bug's ear (whatever that's supposed to mean!). Obviously it

and send it to *Model Builder* magazine. Your card along with all the others who answer correctly will be tossed into a hat and the winner drawn at random. That lucky person will receive a free one-year subscription to *Model Builder*. What a deal! What are you waiting for? Do it now!

MYSTERY MODEL WINNER

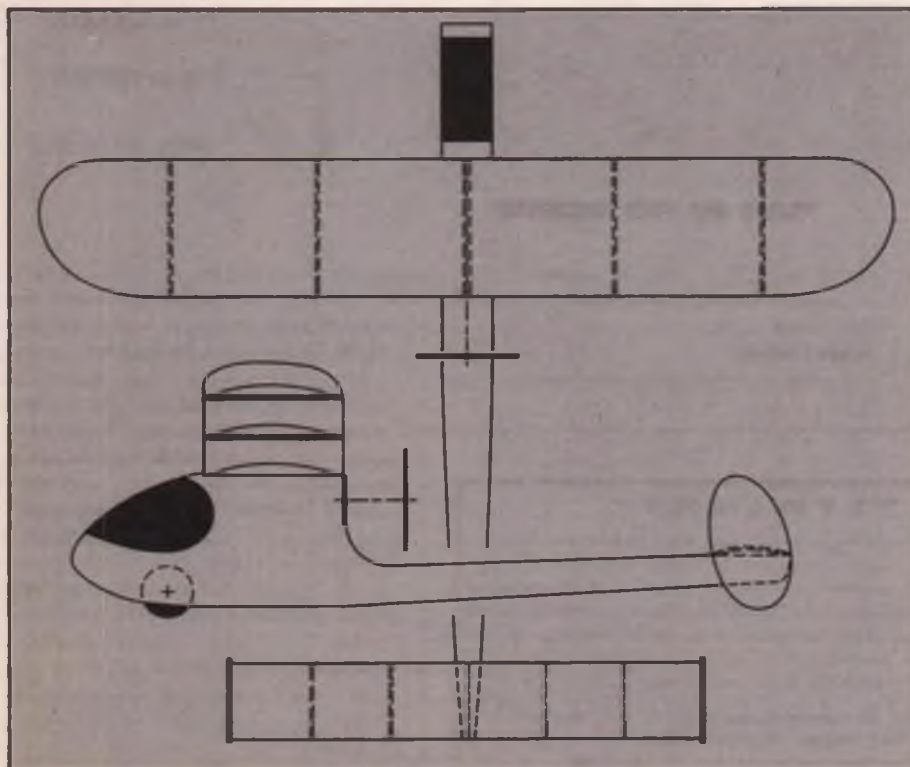
Although never known for his contest wins, Paul E. Del Gatto will surely be remembered as one of the most prolific model designers of all time. The December 1952 issue of *Flying Models* featured his "Forerunner," billed as a competition 1/2A or A free flight but which was a radical departure from the normal pylon layout, what with its smooth lines, shoulder-mounted wing, fully cowled engine, retractable landing gear and highly touted laminar flow airfoil section, which looked much like a normal reflexed airfoil flying backwards. Of the eight replies received, frequent Canadian MM entrant John Bortnak was drawn as the winner of the MB sub.

FREE FLIGHT COTTAGE INDUSTRIES

The model airplane hobby as a whole is served heavily by cottage industries. This fact is especially pronounced with free flight manufacturers and suppliers. As you look over your winter projects, wondering which ones to toss out, which to repair and which to replace or build anew, consider supporting the following suppliers.

Starline International

Starline is led by Sal Fruciano and serves as one of the premier importers of foreign products aimed primarily at the FAI market. Starline features Polish timers of different types, carbon fiber parts, VIT units, the Andruikov collection of Wakefield components, and Polyspan tissue, a product that is rapidly gaining popularity as



JANUARY MYSTERY MODEL

ber of the committee, the Baby B Bomb was very competitive during the early 1950s in Florida, where Ed Stone lived and flew.

and a bit of left fin offset. Full-size Baby B Bomb plans are available from Grayson Anderson, 60 Jessamine Trail, Lawrenceville, GA 30245. Cost

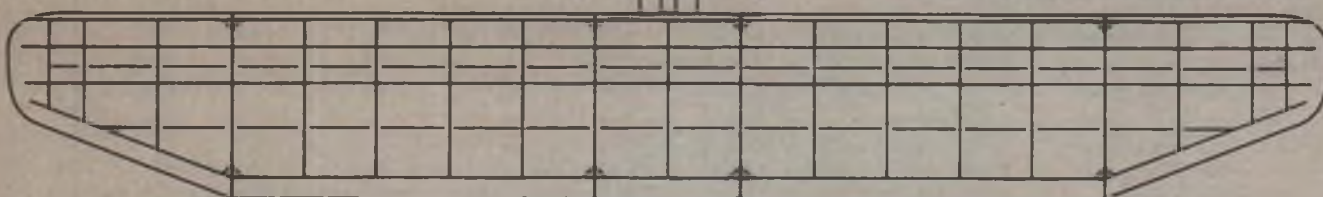
was designed strictly for sport flying, not competition.

Here's the skinny: write the model's name on a postcard, enclose your name and address

FREE FLIGHT

Wingspan — 36 in.
Wing Area — 157 sq. in.
Overall Length — 24-1/2 in.

Five-panel wing (flat center section), four 1/8 square spars, undercambered airfoil



"BABY B BOMB"

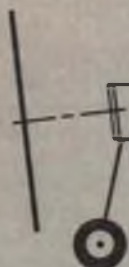
A Nostalgia-legal Class 1/2A or A Free Flight designed in 1951 by Ed Stone, for .035-.074 engines

Fuselage made of 1/8x1/4 longerons and uprights, 1/16 balsa each side. Pylon is 1/4-inch sheet balsa.

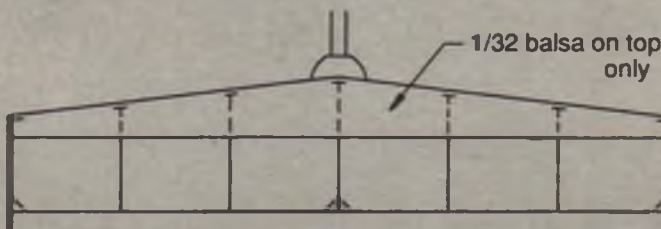


Balsa block

Full-size plans available from Grayson Anderson, 60 Jessamine Trail, Lawrenceville, GA 30245. Cost is \$5 per set postpaid.



Flat-bottom lifting stab, 63 sq. in. (40%)



1/32 balsa on top only

Fins at stab tips

NOT TO SCALE

PLAN OF THE MONTH

THE covering material here in the U.S. Many of the parts are hand-made by model clubs in Europe, especially in the former USSR, and are of the highest quality. If you're looking for anything high-tech,

check out Starline first. The address is 6146 E. Cactus Wren Rd., Scottsdale, AZ 85253; (602) 948-5798.

Texas Timers

Hank Nystrom took over the business

started as Texas Timers by Jim Summersett shortly after Jim passed on. Hank has developed new products and improved the original timers over the past four years, and is now the premier high-quality timer manufacturer here in the U.S. Hank's two newest products are the Texas Max III, which has an adjustable fuel shutoff and a separate scroll for the DT; and the new Texas Old Timer, which is designed specifically for O.T. models with spark ignition engines. Hank notes that this timer has an electrical switch mounted on the back and is actuated directly by a cam attached to the shaft, which makes for positive shutoffs. Contact Hank at Texas Timers, 3317 Pine Timbers Dr., Johnson City, TN 37604; (615) 282-6423. Send an SASE for a catalog.

The Scratch Builder's Almanac

Ever wonder what happened to ex-Model Builder publisher Bill Northrop? Well, he moved to Nevada and has set up his own plans service. He deals with a sizable collection of plans and scale documentation, including a nice selection of free flight power, rubber and scale plans. He

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Michael Morrow's beautifully detailed No-Cal P-39 Airacobra recorded a 4:17 flight at the Kibbie Dome in July, 1995—obviously an excellent flying model. Michael offers plans and markings for this and several other models; see text.



The Texas Max III is among the newest products from Texas Timers; there's also a Texas Old Timer with a microswitch for shutting off spark ignition engines. See text for details.

also claims to sell the best CA adhesive available today. You can get his catalog, entitled *The Scratch Builder's Almanac*, for a mere \$1 bill. You'll get 32 pages of plans

ably has it in his catalog. Silver nitrate dope—it's in there. Balsa wheels—they're in there. So are Chicago-style rubber model hubs, bamboo, Jasco bobbins, and several

listing and other stuff. Send to Bill Northrop, 2019 Doral Court, Henderson, NV 89014.

Oldtimer Model Supply

Ken Sykora has been the proprietor of this cottage business for quite a number of years now. If you're looking for weird free flight stuff, Ken prob-

hundred model plans of all sizes and shapes—mostly scale and scale-like. It's quite a collection of goodies, and Ken spices up the pages with some of his wit, to wit: "I never met a modeler I didn't like . . . but some took a lot more work than others." Send \$2 to Ken Sykora and ask for the latest Oldtimer Model Supply catalog. He's located at P.O. Box 7334, Van Nuys, CA 91409.

Michael Morrow's No-Cal Plans

Michael Morrow is a northwest free flyer who has developed quite a reputation for his beautifully crafted and excellent flying No-Cal scale models. He now produces a small catalog listing his range of plans and other goodies. Perhaps most interesting is his supply of computer-generated "You-Paint-Em" MacTac marking sheets which are available for all of the No-Cal models. All of Michael's designs are unique and unusual subjects. The catalog sells for a buck and can be obtained from Michael Morrow, 1327 44th Ave. S.W., Seattle, WA 98116; (206) 937-2851.

All of these cottage industries serve you, the free flyer. I can personally vouch for the quality of these products and these individuals, as I either know them or have been a customer of theirs in the past. These folks provide us with the equipment we need and use. Their work is not full of profits, it is more likely a labor of love. Tell them you read about their wares in *Model Builder* Free Flight. They (and I) will appreciate it.

THE END

Thanks for your support during the past 14 years. I look forward to another great year in 1996, and don't forget to take some photos of the activities in your area. Bob Stalick, 5066 N.W. Picadilly Circle, Albany, OR 97321. MB

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TAMING THE SIDEWINDER

Getting consistent engine runs with a sidewinder-mounted engine, such as that used on a profile CL model, can be a frustrating experience. This month, precision aerobatics expert Tom Dixon clears up some of the myth and mystery surrounding sidewinders.

The most common form of control line airplane is the profile style. The slab-fuselage plane is quick and easy to build, is durable, and there are a thousand designs available, from the simple flapless classic Ringmaster to sophisticated precision aerobatics competitors.

Not only is the profile the choice of beginners—virtually every modern trainer plane is a profile—but it's also by far the most common style of plane used by the experienced sport flier. Profiles also are used by precision aerobatics fliers in their early efforts. For a beginner or intermediate level flier, a well-trimmed profile can fly just as well as a full-blown stunt plane.

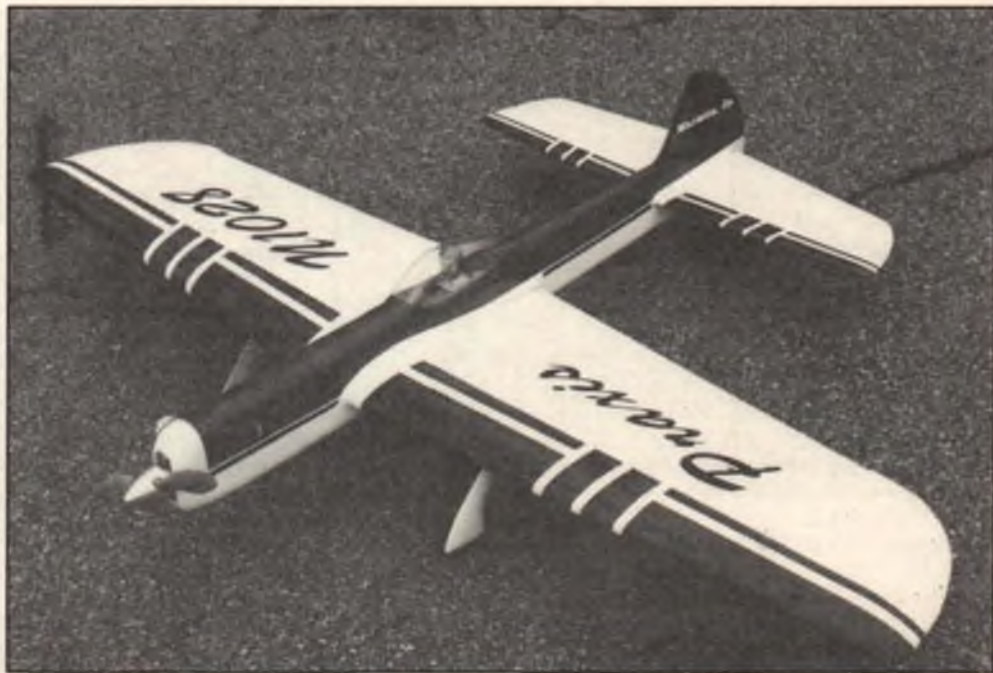
The profile, however, has some drawbacks. One of the most prominent of these is the fact that the engine is mounted sideways, which can cause some problems for the novice in getting the proper engine/tank/fuel system combination in that unbalanced arrangement.

Over the years, CL fliers have solved most of those problems. Recently, precision aerobatics expert Tom Dixon offered to clear up some of the myth and mystery surrounding sidewinders. Here are his observations:

One of the "truths" of CL stunt is that a side-mounted engine, cylinder to the outside of the circle, can't be made to run correctly for CL stunt use.

There is some basis for this belief, as certainly a Fox .35 with the tank mounted with its centerline on the same centerline as the engine will cough and spit and run rich on outside turns and inverted flight.

The problem has always been tank lo-



Tom Dixon's "Praxis" stunter has a side-mounted Merco .61 for power, and it runs perfectly. See text for Tom's advice about how to make a sidewinder engine setup run well. The Praxis has a 660 square inch foam wing and weighs 62 ounces. Tom Dixon photo.

cation, not the engine. For years, article after article said, *Mount the centerline of the tank on the centerline of the engine, so everyone believed this was correct.*

It is not!

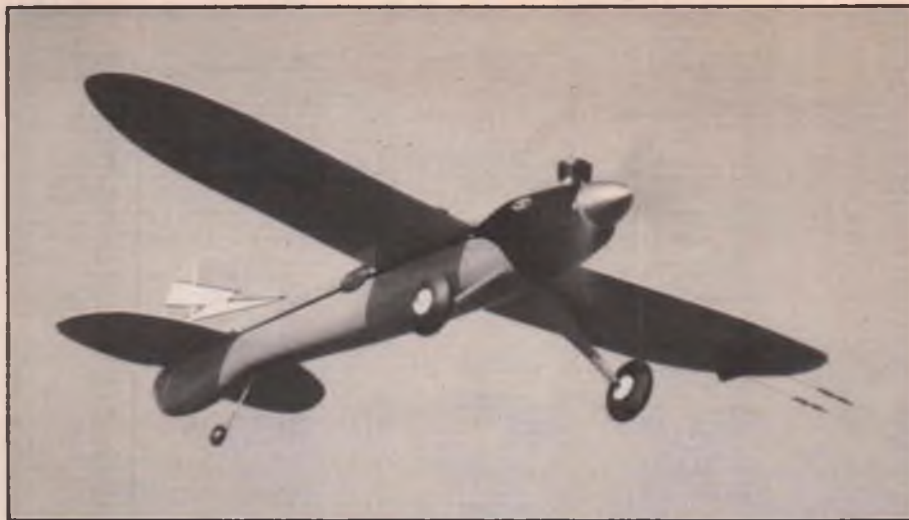
The reasons why are too numerous and theoretical to get into, but the fact is that the Fox .35 and nearly all other side-exhaust engines will require the tank centerline to be about 5/16-inch higher than the engine centerline. Just adjust the tank height until you get the same level flight speed in upright and inverted laps. Raise the tank (with the plane upright) if it runs richer in inverted flight; lower it if it's leaner while inverted.

In most cases, we're talking about side-

mounted engines on profile models. A major contributor to poor engine runs is flexibility of the nose on profiles.

Where rules allow, the nose should be stiffened with a 3/8-inch or 1/2-inch balsa inboard "cheek" that extends at least to the end of the plywood doublers. This both stiffens the nose and ties the wing and fuselage together more effectively.

The flexible fuselage hurts the engine run by causing fuel in the tank to foam. The foaming also can be stopped by adding one good "squirt" of Armor-All silicone protectant, or other similar silicone product, to each gallon of fuel. The tiny amount of silicone very effectively stops the tendency of fuel to foam. It's quite dramatic!



The Skylark 60, a 1947 design, as built by Frank Macy and flown at the 1995 Northwest Regionals. Fred Cronewett photo.

A fourth factor about outboard, exposed engines is cooling. Since the cylinder or entire engine is exposed, it tends to cool better. Therefore a slight reduction in oil content may be called for if you encounter misfiring and rough running. In the case of a Fox .35, for example, I find 24 percent castor Carolina-Taffinder precision aerobatics fuel to run better in this configuration than 28 percent Taff's FoxFire (or Fox Superfuel). Don't reduce oil too far or you'll be frying engines!

Also, experiment with glow plugs. Standard "control line" plugs are nearly always too cold for stunt use. I've had best results on a variety of sidewinders using Sig four-stroke plugs, Sig RC longs, and Hobby Shack's Thunderbolt No. 3 plugs.

Lastly, avoid muffler pressure! Muffler pressure to a uniflow tank often can cause lean runs due to higher pressure air entering the tank near the fuel pickup and getting pulled into it, leaning the mixture. However, muffler pressure also can worsen any richening tendencies during outside turns. Sometimes just running the engine on suction, instead of pressure, solves all the problems.

So, to recap, for good side-mount runs:

1. Tank position—5/16-inch above engine centerline.
2. Stiff structure.
3. Anti-foaming fuel.
4. Avoid excessive oil in fuel.
5. "Hot" glow plug.
6. Avoid muffler pressure.

With all these points in order, your engine runs will be no different at all from an upright/inverted engine of the same type. You'll need less tip weight, and most of the exhaust residue will stay off the plane!

Thanks to Tom Dixon for help in sorting out some of the maddening problems of side-mounted engines!

On the subject of precision aerobatics, Charlie Bruce, president of the Model Engine Collectors Association, has announced plans to sponsor a unique special event in

conjunction with the 1996 Vintage Stunt Championships, to be held March 22-24.

The VSC (this will be No. VIII!) is THE must-attend contest for those interested in Old-Time and Classic stunt. It draws the world's largest field of Old-Time Stunt competitors, and many of the pioneers of the hobby attend every year.

This year, the contest will include a special "Roll Your Own" event for Old-Time Stunt with spark ignition engines, to be directed by De Hill.

The normal Old-Time Stunt rules require that planes entered had been published or kitted in 1952 or earlier. This excludes any original designs by model aviators that may meet the date criteria but were not published or kitted.

The Roll Your Own event invites fliers to fly any airplane of the OTS period that has not been published or kitted. It must use a spark ignition engine, and must not have wing flaps; otherwise the rules are the same as the Precision Aerobatics Model Pilots Association rules for Old-Time Stunt.

Charlie advises: "You will need some sort of documentation on your airplane to prove it's from the early years of stunt. Pictures are good, plans are better. Notes from old witnesses or your mother, or your doctor or your mother's doctor will work. Final decision on eligible designs will be made by the sponsor, Charlie Bruce, and De Hill, along with a Mystery Expert to be named later."

He also notes that you may use your Roll Your Own plane in the separate OTS Ignition event.

Questions are welcomed. You can reach Charlie Bruce at Rt. 1 Box 766, Milano, TX 76556; (512) 455-9543 or fax (512) 455-3921.

SPEAKING OF OLD AIRPLANES . . .

The photo of the attractive old-timer in flight is a 1947 design called the "Skylark 60," which was manufactured as a kit in the late 1940s in Portland, Oregon by Ken's Model Supply. The one in the photo was built recently by Frank Macy of Portland, a tireless worker in the preservation of the history of CL model aviation. Frank had the plane out for demonstration flights at the 1995 Northwest Control Line Regionals in Eugene, Oregon.

Frank worked for Ken's Model Supply after school and in the summers from 1947-49. He was well acquainted with Jim Walker and Bob Smurthwaite, among other pioneers. What a time and place to be a kid flying model airplanes!

The other unusual plane pictured was passed along by Fred Cronewett of Canoga Park, California. Lots of model magazine columns have a "mystery plane" feature but this one is a *true* mystery.

The plane was purchased by racing competitor Dave Braun at a garage sale. It was equipped at the time of purchase with a rusty Enya .29. The design's name and originator are unknown. Fred is curious to



A true mystery plane. Dave Braun bought this delta-shaped old-Emer at a Southern California garage sale. Does anybody have any idea what it is? Fred Cronewett photo.

know whether any *Model Builder* readers will recognize it and be able to shed some light on its origin. To give an idea of scale, the plane was equipped with a 10x6 prop for the photo. Fred reports that Dave has no plans to fly the plane but would like to know more about it. Readers?

Don't forget to send contest flyers, contest results, club news, photos, questions, technical tips and other items of interest to control line fliers to the *Model Builder* Control Line column. Write John Thompson, 295 W. 38th Ave., Eugene, OR 97405. E-mail at JohnT4051@aol.com. MB



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WING AREA: 338 sq. in.
WEIGHT: 26 - 38 oz.
RADIO: 2 - 3 Channel
(Aileron, Elevator, Throttle)



CAUTION: The Wonder is not recommended for beginners or the faint of heart. It's fast!

THE 1995 TPG FALL HAND-LAUNCH GLIDER CLASSIC

San Diego has become a hotbed of RCHLG activity in Southern California. Bill reports on some of the high-tech ships being flown by the local hot pilots.

This year the Torrey Pines Gulls club of Southern California held their annual one-day Fall Hand Launch Glider Classic on Saturday, September 9, at their club field in Poway. It was billed as a club meet with open invitation to any AMA member. Turnout was lower than expected at 16, but one flier, Brian Allan, traveled all the way from Walnut Creek (in the San Francisco Bay area)—a drive of over 9 hours!

The day was absolutely perfect for HLG flying with light-to-moderate dry breezes and blazing hot California sun hanging in a cloudless blue sky. Temps were probably around 90 degrees with thermals rushing through on a regular basis. Getting up and out quickly in most rounds was not a problem. Knowing when to bail from a thermal downwind so as to fly back to the field boundaries (a must to register a score)—that was the only real problem to avoid. At least two fliers got caught up in questionable downwind thermals and didn't make it all the way back.

Typical of California HLG contests these days, the task schedule was a bit complicated, requiring strategy as well as flying skill. All rounds were flown in 10-minute time slots or windows and scored man-on-man within each flight group, all scores in each group being normalized to 1,000 points.

The importance of a strong throwing arm was lessened somewhat by a rule which allowed another person to throw for you if you desired. The only hitch was an amendment which stated that the thrower and pilot must "tag up" with each other between every landing and launch. In the past, throwers and pilots have worked their way to opposite ends of the field, effectively doubling the sky available for exploitation. The tag-up rule made sure you were only borrowing an arm, not a second potential launching point upwind.



The winner! George Joy went from 4th to 1st place in the flyoff round, flying a not-quite-stock Climmax. George decided to thin out his factory pre-shooted wings for better penetration; he V-bagged the 57037 wing to 18 inches of mercury, which compressed the foam and reduced the thickness of the wing by about 2 percent of chord! Then he routed out holes in the wing to make it lighter. It now has incredible penetration with no apparent loss of climb, and little loss of strength.

Round 1—Most Number of Flights. Here the trick was to record flights at sequentially increasing 10-second intervals. Your first flight is 10 seconds, your second flight 20 seconds, third flight 30 seconds, etc., all the way up to 1:40.

Round 2—Most Flight Time from Increasing Flights. Here the trick was to record a minimum of three required flights, each one longer than the last, and the first flight no shorter than 15 seconds.

Round 3. One of each: In any order, you

had to fly a 2-minute, a 3-minute and a 4-minute flight. Your closest three flight times would count.

Round 4—Four Longest Flights. Here the catch was not to exceed a 3-minute max. A 10-point penalty was assessed for each second past the max flight time².

Round 5—Nine-Minute Add-Em-Up. Here the catch was to record six flights (no more, no less) which, when added together, would total 9 minutes of air time. Every second past 9 minutes cost you 20 points.

AMA/LSF SOARING NATIONALS WINNERS

Quickly now, I'd like to congratulate the winners of the 1995 Soar Mats. I thank Tom Gressman for sending me his copy of the results downloaded from the internet, specifically Mike Lachowski's RC Soaring Exchange, and give the AMA a "shame on you" for not replying to my two phone calls in spite of saying they would . . . twice.

FAI-F3J

This is the head-to-head event that runs inside a 10-minute time slot. Winds were light, temps were in the 90s, and it was humid. Good lift was had in the morning, but the afternoon was much more interesting. Thirty-three fliers entered this event, 32 recorded scores. Here are the top ten, the top five with what they flew:

1. Mike Fox (Scorpion 112) 4,997
2. Gordon Jennings (Blackhawk) 4,956
3. Mark Hankivil (Olympic II) 4,945
4. Mark Stokaty (Magic 6) 4,866
5. Mike Lachowski (Skyhawk) 4,742
6. William Wingstedt 4,581
7. Rich Burmoski 4,536
8. Jim McCarthy 4,509
9. Joe Conrad 4,423
10. Jerry Bannister 4,388

JUNIOR F3J

1. Allan Kukral (Sagitta)

FAI/F3B

Boy, here's an event that needs help. You gotta be really dedicated to fly this event. The equipment, the labor, the complexity, the cash outlay, the freight bills and hassles, the support staff needed both by organizers and by competitors . . . it's too much for most of us. How much longer will it survive? Here are the top five of the 16 entries:

1. Jim McCarthy (F3B Eagle)
2. Steve Condon (F3B Eagle)
3. Tom Kallevang (F3B Eagle)
4. Skip Miller (F3B Eagle)
5. Dennis Pholan (Synergy III)

RCHLG

Basically the same weather as F3J. Eight rounds were flown. An amazingly high 63 entries were taken for this event, all of them recording scores. Again, the top ten with the top five including aircraft flown:

1. Steve Cameron (Orbiter-2) 7,623
2. Rusty Shaw (Wasp) 7,480
3. Mike Lachowski (Monarch 95) 7,203
4. Skip Miller (Solitaire) 7,015
5. Gale Leach (Zephyr) 6,916
6. Joe Conrad 6,898
7. Art Markiewicz 6,813
8. John Hauff 6,760
9. Steve Condon 6,672
10. Joe Hahn 6,403

JUNIOR HLG

1. Dusty Miller
2. Nathan Evans
3. Jeff Pfister

TWO-METER

Here another amazingly high number of entries were recorded at 113 (112 with scores):

1. B.J. Weisman (Super-V) 10,856
2. Steve Condon (Swift) 10,679
3. Art Markiewicz (Super-V) 10,631
4. Tom Kallevang (Swift) 10,574
5. Jim Frickey (Super-V) 10,571
6. Rusty Shaw 10,526
7. Skip Miller 10,445
8. Rick Lake 10,413
9. Mark Levco 10,264
10. Joe Conrad 10,088

JUNIOR TWO-METER

No results available.

UNLIMITED

A rather normal 127 entries were taken in this event which has always been the most popular of all events. Here I only have the top five:

1. Aaron Valdes (Prism)
2. Gordon Jennings (Blackhawk)
3. Dale Nutter (Super-V 110)
4. Rick Lake (Falcon 800)
5. Mike Lachowski (Skyhawk)

JUNIOR UNLIMITED

1. Dusty Miller (Thermal Eagle)
2. Nathan Evans (Thermal Eagle)
3. Chris Burns (Pseudo-Magic)



Art Markiewicz is a real hand-launch fanatic. He's long been his own aircraft designer, but he's now also a regular contest winner. His airfoil of choice is the RG15, a fast, low-drag section which he can modify into a good thermal section using camber changing—note the curve under each wing. Construction is molded glass fuselage, glass sheeted foam wings . . . no wood anywhere.

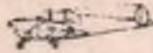


UCSD student Aaron Valdes, fresh from his Soar Mats victory, almost pulled off another win at the Fall Classic. He dropped to 2nd place after a tough flyoff round. He flew an Art Markiewicz design based on a Climmax fuselage and Art's hot-wire cut, fiberglass sheeted RG15 wings and symmetrical stab. Pre-preg carbon fiber spars are just under the 1.5-ounce glass cloth. Model takes four Futaba S133 servos to operate the flaperons and mixed V-tail.

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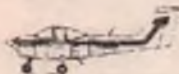
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Besides the C.R. Aircraft Models Climax (a favorite of the Torrey Pines group), the only other commercially available HLG entered was this Monarch 85 flown by Bill West.



Fourteen-year-old Bo Matheson with his dad's spoiler on equipped, as yet unnamed kit prototype HLG. The model features the "avant guard" S40E3 HLG airfoil and a generous 440 square inches of wing area, which supports a 14-ounce (polyhedral) or 18-ounce (alleron) flying weight. Model features a molded fiberglass pod with aluminum arrowhead boom, and pre-shaped foam wings. Interested? Contact Bob Matheson at Cloud-9, 2125 Hilldale St., Oceanside, CA 92054; (619) 754-2657.



Mike Ziascas tries in vain to get into a thermal which has just blown through the area. Three other HLGs have already corralled the IIR zone and are in the process of skying out. HLG flying is the most challenging form of thermal duration, and the most rewarding.

Closest pilot to 9 minutes wins the heat.

Round 6—Fly-Off Round. For the top eight pilots, there was a sixth round. This was one last chance to improve or degrade a final score. The task was to record as many 2-minute maxes as possible with a six-throw limit. The longest flight time would win the heat and add 1,000 points

continued on page 82

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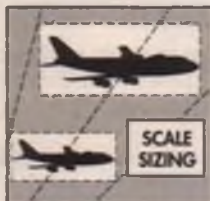
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Helicopter World

■ BY JAMES WANG



Century's Ninja Pro Master and the Thunder Tiger .36H/.46H Heli Engines

James reviewed the Ninja Pro in the December '94 Model Builder; now he offers an in-depth look at the new deluxe version, and reports on two red-hot heli engines from Thunder Tiger.

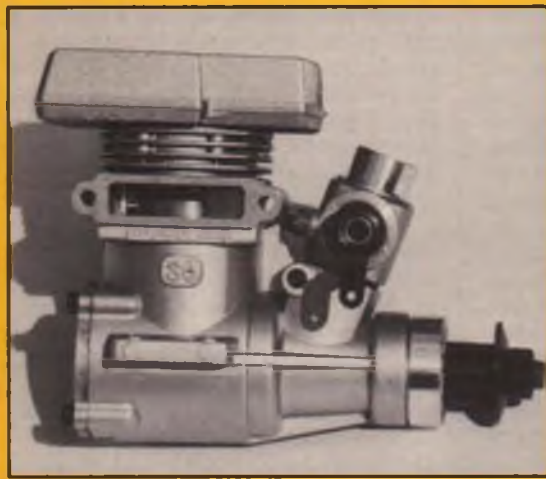
Century Helicopter Products now offers four different Ninja helicopter kits: the standard Ninja Pro 30 and 46, and the Pro Master 30 and 46, priced at \$425, \$445, \$470 and \$490 respectively. Basically, the only differences between the 30 and 46 kits are a different size engine mount, cooling fan and cooling shroud. The Pro Master kits include 14 more ball bearings than the standard Ninja Pros; the extra bearings are used on the main rotor seesaw and Bell-Hiller mixers,

and on the new shaft-starting system. Whereas the Pro has a belt-start system, the Pro Master uses a shaft-start system with a hex-shaped receptacle. The kits include a hex tip starting shaft that will fit most 12-volt electric starters. Century sells a shaft-start conversion kit for the Ninja Pro, however, after hundreds of flights with the belt-start system on my old Pro, I'm well adapted to the belt. My only complaint about the starting belt is that it leaves black streaks on your hands.



The Ninja Pro Master is available in both 30 and 46 versions, features a new canopy design, more ball bearings on the rotor head and cyclic control mechanisms, new engine starting setup, new paddles and tail blades, and more. As James mentions in the column, Century also has several new aftermarket accessories available to fit this and other similar sized machines.

Helicopter World



To say that James is impressed with the performance of the new Thunder Tiger .30H (pictured) and .40H engines would be an understatement—see last for his comments.

The Pro Master kits come with new Hiller paddles and tail blades. These new paddles have a swept tip, and are thicker and heavier than the old paddles. I really like them. They make the model more stable and give crisper cyclic response. They fit all .30-size helicopters. The new molded plastic tail blades have a reflexed airfoil and are more efficient than the old blades.

The Pro Master includes a new tail drive belt (CH2002-183, \$22.95) which is reinforced with Kevlar. This belt is very supple and makes for a free-running tail drive system from the start. The old black timing belt is rather stiff when new, but after 30 or 40 flights it becomes supple too. My original black tail belt has lasted over 100 flights and is still working perfectly.

While we're at it, Century has also introduced some aftermarket upgrade items not included with any of its kits. One is a graphite tail boom (CH2125, \$29.95) for the Ninja and Shuttle. This boom is half the weight of the stock aluminum boom. And the graphite cloth weave is very pretty.

Another new item which I have not tried is a purple anodized machined aluminum cooling fan for the .30-size Ninja only. The fan has 10 blades and the blades are angled to give more effective cooling.

Century has introduced a new set of pre-built 550mm length wood blades for the Ninja and Shuttle, called Aerotech blades (CH2300, \$39.95). They come with lead weight already installed and covered with white heat-shrink tubing. The blade has a curved, swept tip to reduce drag. The blades make a "whishing" noise in flight, which is probably from the swept tip.

The Aerotech blades I'm using weigh 95 grams apiece. Their performance is better than the blades that came with the kit. In fact, they are better than many of the .30-size fiberglass blades available. I highly recommend these blades for the Ninja or any other .30-size helicopter that can accept 550mm blades. They give good top speed and lots of lift for right-side-up or inverted climbouts. These blades, together with the new Ninja FAI paddles, will noticeably improve hover and forward flight stability and make the cyclic response more predictable.

To get more power from your engine, Century has introduced a new line of Aerotech tuned pipes and headers for the Ninja and Shuttle. The .30-size pipe is \$54.95 (CH3039) and the .40-



The Ninja Pro Master's new glass-filled nylon tail rotor blades have swept tips and an efficient reflexed airfoil.

.46 size is \$59.95 (CH3040). They give good performance, but are louder than the Century Torpedo muffler or the Century forward-mounted muffler. The O.S. .32SX and the Thunder Tiger .36H and .46H, Aerotech muffler and 30 percent nitro fuel seem to work very well together. Century also makes different headers to fit the Concept 30, Enforcer and X-Cell 30.

To make the Ninja agile, it's necessary to keep the weight down. My original Ninja 40 weighed 7 pounds; now it weighs 6 pounds 6 ounces because I removed the horizontal stabilizer and the two tail boom support struts. Surprisingly, my Ninja flies much better without the horizontal fin. It used to pitch up in high-speed forward flight, but no longer; this is mostly due

to the CG having shifted forward. In fact, it even dives slightly in high-speed flight. I like it much better now.

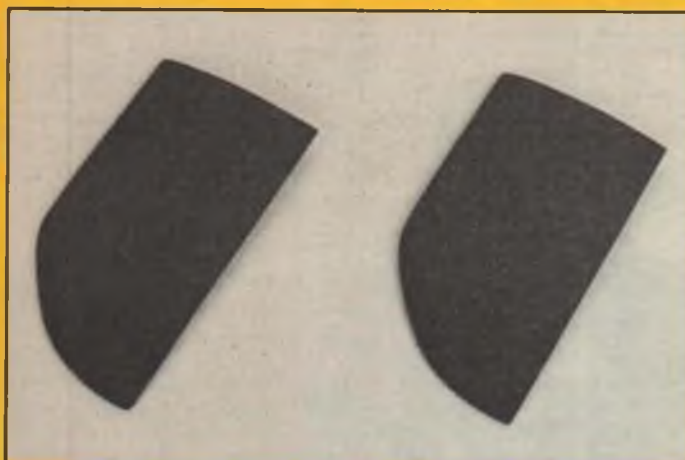
If you remove the two boom supports, you may notice a slight tail boom shake. Without the boom supports, it becomes more important to have a balanced main rotor. I've also noticed that without the boom supports, my Ninja is very sensitive to whether or not the main rotor shaft is running true. A minor tipover can easily cause the main rotor shaft to be out of true by .003-.004 inch—enough to cause vibration at the tail boom.

I've noticed that the Ninja's tail rotor shaft can wobble slightly if there is play in the shaft's two ball bearings. An unbalanced main rotor or slightly bent main rotor shaft can aggravate the wear of these two flange bearings. Therefore, make sure the main rotor blades are balanced, that the flybar paddles are equal distance from the center, and that the main shaft is straight. Check the main shaft by rolling it on a flat piece of glass. Check the 3mm bolts on the tail rotor gearbox frequently; vibration can cause them to come loose. Recently I added an extra tail rotor gearbox side plate and bearing (CH2002-185) on the right-hand side of the tail gear box. This makes the tail rotor shaft run truer and improves tail rotor control.

Another benefit of removing the rear boom supports is that I can slide the fuel tank in from the rear. There's enough room for a Du-Bro 12-ounce fuel tank, which gives 20 percent longer flying time. Sliding the tank in from the rear is better for aerobatics because the fuel pickup clunk is at the rear instead of on the left side of the aircraft. When it's on the left side, the engine may starve in a right-hand turn or when doing a spin to the right if the fuel level is low.

I've been using the Century .40-size forward mounted muffler since day one. However, instead of mounting the muffler underneath the front radio tray, I mount it on the side to get

Helicopter World



These are the new FN Flybar paddles supplied with the Ninja Pro Master and available separately for all other .30-size helicopters. They're thicker and heavier than the old paddles; James says they make the helicopter more stable and provide a crisper cyclic response.

better cooling. Simply reverse the header so it points to the rear. Then, the muffler is attached to the lower sideframe using a 3/4-inch long aluminum standoff and a 1-inch long 3mm bolt. With this mounting arrangement I could even remove the front intake scoop to reduce drag. With the Thunder Tiger .46H and this arrangement, my Ninja does 60 mph in level flight.

• • •

Now let's take a look at the new Thunder Tiger .36H and .46H engines that I've been flight testing in my Ninja 30 and Ninja 46 helicopters. Both engines feature an ABC piston and sleeve and dual ball bearing supported crankshaft. I found the carburetors to be very easy to tune. There is a needle for high speed and a screw for idle/hover mixture control. In hover, both engines are extremely smooth; no burbling or fuel tank foam-

ing. The transition from hover to full-throttle climbout is instantaneous. Even after prolonged idling on the ground, there is no hesitation when throttling up. (I used an O.S. #8 glow plug and Cool Power 15 percent fuel during the tests.)

The .36H easily puts out as much power as my O.S. 32SX or my old O.S. .40 FSR. My Ninja 30 was very much

alive with the Thunder Tiger .36H. I could roll the model over and gently climb out inverted. I rate it as one of the most powerful .30-size helicopter engines, and the price is very competitive. The engine fits perfectly in the Ninja, Shuttle, Concept 30 or Enforcer. I don't think you'll be disappointed with the power!

The Thunder Tiger .46H will give some stiff competition to other .40-.50 size helicopter engines. I first read about it in a dealer publication from Horizon Hobby Distributors. Their reviewers said the engine made their X-Cell 40 a rocketship. Hmm, I was curious to check it out. Sure enough, my Ninja 46 performs better with this engine than with my old O.S. 50FSR-H. The model just peels away when the throttle is punched. My Ninja can tumble end-over-end and the rpm never bogs down. The only thing that prevents my Ninja from climbing faster is that I run out of collective pitch travel. This phe-

nominal performance was all done on 15 percent nitro and the Aerotech tuned muffler. The engine was set to run rich with a good amount of smoke in hover and forward flight. The crankcase beam mounting holes and the muffler mounting holes are the same as on the O.S. 40/46. Therefore, it will easily fit the X-Cell 40 and Schluter Moskito.

A unique feature of the Thunder Tiger .46H is that it comes with three different low-speed needles. They are labeled as #1, #2 and #3. Each has a different length and taper which allows the modeler to manipulate the mid-range mixture to suit his flying style. The #3 needle gives a rich mid-range which is good for contest-style smooth hovering maneuvers. The #1 needle gives a leaner and crisper mid-range and quick pickup, which is great for hotdogging. The #2 is a good compromise between the other two. I suggest you start with the #2 needle and then try the other two also.

Which needle is best for your flying style will also depend on the type of fuel, plug and muffler used. For example, lower nitro fuel works better with the #1 needle because using a lower nitro fuel generally requires leaning out the main and idle needles by a few clicks. Using the #1 needle instead of the #3 needle is similar to leaning out the mixture. The #3 needle works great with a hot plug because the rich mixture likes a hot plug for good burning. Supplying an engine with three different mixture needles is quite a novel idea.

If every Thunder Tiger .36H or .46H is as good as the ones I have, then I think we have some winners here. I can definitely recommend these two engines for the Ninja or any other helicopter! *MB*



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DEAR JAKE

Advice for the Propworn

DEAR JAKE:

Judges aren't fair! They are humans and that means they make mistakes and they have prejudices and they see what they want to see, not what really happened.

It doesn't matter if it's RC Pattern, or Giant Scale, or U-Control Stunt, or Olympic Ice Skating. If it's judged by a person, then some competitors will be the beneficiaries of overly high scores and others will be screwed by unjustly low scores.

Is there a solution? You bet there is! Eliminate all subjective events judged on the basis of somebody's opinion and have only objective events scored against a clock or a ruler or some other measuring device. We should take a lesson from track and field. Style and precision count for nothing. The only thing that matters is how far or how fast you throw, jump, or run. Golf has the right idea, too. It's how many strokes you take and nothing else.

For the modeling hobby, this means competitions should be limited to races, time trials, endurance events, etc. Free Flight and RC Soaring are already on the right track, with time aloft as the only determining factor. Pylon racing and Ukie speed are also relatively free from the whims of human judging, although some

pylon racing airplanes are handicapped based on scale fidelity and paint job, which must be assessed by some prejudiced human, so forget those.

What do you think? Don't you agree that eliminating the subjective human element would make things a lot fairer and we'd all be better off?

Justin in Jericho, NY

Dear Justin:

Sorry, but I can't go along with your way of thinking.

If you don't have the judges to blame for a poor performance, then you just might have to start believing that you actually earned the bad result, and I, for one, can't handle that.

Jake

DEAR JAKE:

You don't hear much about Star Wars anymore. Weren't there supposed to be nine of them?

Movie Goer in Muncie, IN

Dear Movie Goer:

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Jake MB

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MODEL BUILDING 101

BY J.J. LEVINE

**Please
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celebrating!**

MB101 has been granted a 501(a) status by the IRS based on the information furnished and our compliance with same. Our entire organization is ecstatic. Considering how difficult this designation is to obtain normally and how reasonably fast this application was processed, we can only believe it was due to the expertise and guidance of Ms. Barrs (IRS), Don Gettle (attorney) and Jim Mathis (CPA). Middle school children throughout the country should be grateful to these individuals for their efforts above and beyond the normal requirements of their professions.

Actually, as you may know, this now permits MB101 to allocate tax deductible status to individuals for their donations which fall within the definition of the IRS code for not-for-profit organizations. Since we attempt to provide free time and material to public schools, during the promotion of aeronautics via the building of model aircraft, this may relieve some of our financial pressures that are constantly present.

The MB101 format for sixth, seventh and eighth grade courses is *not* an after-school activity or a "baby sitting" agenda. Rather, it is part of a creditable science school curriculum and the teachers involved present the subject as such.

It was sometime during the later part of my elementary schooling that the teacher brought in a copy of the *New York Times*. For those not familiar with this almost 14x22-inch sheet, it is quite a handful for a 10-year-old, since the size overpowered anyone trying to turn pages and read portions of text. By the way, so that you might have this class in proper perspective, it was comprised of students who pronounced "deez" for *these* and "doz" for *those*. Bear with me, I'm making a point.

Holding the paper up high in front of the class, "teach" explained that in order to read and absorb the news from this

publication, you had to fold it into a format that was comfortable and allowed you to proceed to any section without disrupting the sheets' sequence. She demonstrated by folding the front section in half, lengthwise, surveying each side of the front page, then by folding the right half of the front sheet over the left front half, she demonstrated how you could read the left half of page 2.

Patiently, she repeated the steps until the last column of the final page was available to read and not one sheet was out of sequence.

So what? Well, that was over 60 years ago and to this day, every time I start to read the *Atlanta Journal*, which is also as cumbersome as the *Times*, a vision of that caring teacher flashes through my mind. For all these years, that little insight into reading has stood me in good stead.

For those in the Model Building 101 program that instruct, with the teachers, the wonders of aviation through the building of flying models, ponder how many and which ones will retain the image of you granting them this life-long gift, far into their future.

In Simpson Middle School of Cobb County, Georgia, where MB101 practices what it preaches, we will have completed assisting the seventh grade teachers to instruct approximately 180 students to build and fly our Tennyson Step Two model. Of course, each student would have first built our Delta Step One as a prerequisite to the Step Two and Step Three models.

In March and April of '96 we are scheduled to have 270 sixth grade science students build the MB101 Step One Delta. These students will be eligible, upon successful completion of building and flying this plane, to receive a free four-month subscription to *Model Builder* magazine.

Finally, during March of '96 there will be about 190 eighth grade students who will build our new RUEL R/C (RU-bber,

EL-ectric, R/C, in case you wondered where the name came from).

As a homework option, eighth graders may accept assignments that involve designing and building their own planes within our overall dimensions. Instructors will critique these plans prior to students building them at home. We anticipate the skills acquired during our courses in the sixth and seventh grades to have furnished sufficient basic knowledge for them to successfully complete the assignment. Award certificates will be given to those who design, build and fly their craft during the semester.

Throughout the country, there has been a huge increase in the number of students enrolling in all grades of the public school system. MB101 is determined to maintain an ever-growing momentum to assist as many middle grade school children, as finances and volunteers will allow, learn the wonders of aeronautics through model building.

Obviously, despite none of our officers or instructors receiving a salary, MB101 is in need of funds for normal operating expenses (stamps, printing, telephone, etc.). Since this issue will reach you during the holiday season and prior to the end of the year, we hope our being capable of designating your gift as a tax deductible item may prove to be an added inducement for you to help. Please consult your accountant for specifics pertaining to your situation.

We truly welcome any donation, large or small, that would enable us to provide our program to schools whether a student can or cannot pay for the supplies. Please send a check or money order, in any comfortable denomination, made out to Model Building 101, Inc., 1891 Branchview Dr., Marietta, GA 30062. As always, we can also be reached at (770) 973-3598 or FAX (770) 422-2765. **MB**

OVER THE COUNTER *cont. from page 31*

sue, full-size computer-drawn plans, water-transfer decals, hardware, canopy and a seven-page illustrated instruction manual. For those looking for a real building and flying challenge, this is it! The R-2 kit is available at hobby shops or can also be ordered direct from Herr Engineering Corp., 1431 Chaffee Dr., Suite #3, Titusville, FL 32780.

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John Kasteloot of JPK Enterprises advises that he's now offering detailed canopies for 1/4-scale P-51 Mustangs, P-47 Thunderbolts and DeHavilland Chipmunks, vacuum-formed from sturdy .060-inch thick GE Lexan. He's also got quite a variety of wheel pants and cowls on hand, and has the facilities and equipment for doing custom vacuum-forming and die-cutting. John says most of his work is done on a custom order basis—call or write for a quote if there's something in particular you need. JPK Enterprises, 5000 W. Oakey #E8, Las Vegas, NV 89102; (702) 870-0216.32795-3042; or call (407) 330-1448.

continued on page 86

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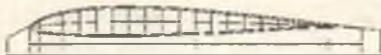
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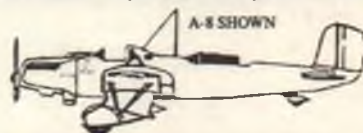


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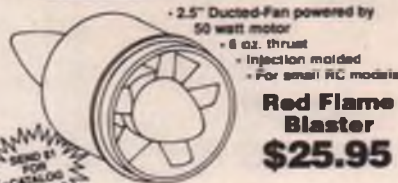
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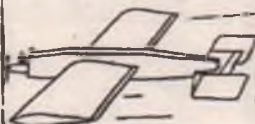
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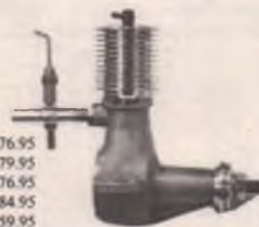
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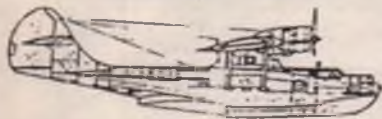
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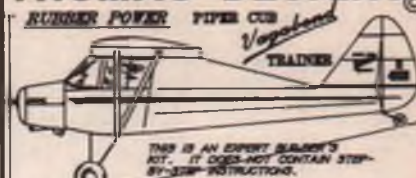


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Mark Gumprecht used to fly curved and bent-wing HLGs; now he's into ailerons! The wings are unshoed pink foam covered with EsonaKote. The spar is a 1/32 vertical grain shear web with I-beam style top and bottom caps of carbon tow. It bends tremendously (with no wrinkles in the covering), but doesn't break. Airfoil is the S7837 thinned at the tip. Wing area is 340 square. Flying weight is 11.5 ounces. Ailerons are built up and were very prone to warping in the sun until he buried a 3/32 aluminum tube in the L.E. as a stiffener, now it's trouble-free—tweak it, it stays put!



Brian Allan drove 500 miles to attend the SD meet. His HLG, which he calls the "Wisp," is a fine example of cutting-edge original design. Glass fuselage was laid up in a friend's mold, wings are Brian's own. He first tried the E387 airfoil, which he said did not perform as well as his current S4083 wings, which he likes. He says he's going to try the S7837 next.

to the running total.

George Joy had the skill and the opportunity to pull off a big come-from-behind win in the flyoff. After five rounds he was in 4th place behind Aaron Valdes (1st with 4,995 out of 5,000), Mark Gumprecht (2nd, 4906) and Art Markiewicz (3rd, 4895). His



A picture-perfect catch by 12-year-old Ryan Fry. His plane is a Climmax-based modified design with S4083 wings and V-tail cut by Fred Sage. Sure is great to see the kids getting involved—and it's the 1.5-meter class that's attracting them.

4,875 became 5,875 after his 1,000-point victory which bumped him all the way to 1st place.

THE MODELS FLOWN

There continues to be a movement of the more competition-minded pilots toward aileron designs. Of the 16 entries, at least six

had some form of direct roll control—most commonly large, near full span flaperons. Some HLG pilots claim that flaperons are an advantage in a couple of areas—primarily in precision landings, but also in thermalling and thermal hunting. In addition, to be able to pitch the nose over and come home from any height or distance by controlling the speed of descent (flaps) or wind penetration (camber) helps, provided you have the piloting skill to know how and when to use these tools.

The most numerous of the commercially available RCHLG designs present at this meet was the C.R. Aircraft Models Climmax. Interestingly, many of the original designs present were based on the Climmax fuselage, which can be purchased direct from the factory.

It seems that among competitive HLGers, there is a tremendous amount of experimentation going on. Guys are trying many different airfoils, looking for the one that's best suited for their particular style of flying. All of them are hot-wiring blue or gray foam for profile section accuracy, and most of these are employing fiberglass wing skins laid up wet and V-bagged. A few are skinning with 1/32 balsa. Using these methods, with a minimum of work and fuss you can have a top-notch competition machine.



Bob Hays has the best of both worlds when it comes to handling and glidepath control: his polyhedral Climmax has flaps! He can even use the flaps to some advantage in a light thermal. Obviously Bob has seen Dave Thornburg's video, the one where Dave says peel the shirt and feel the lift!

Most are still ending up going polyhedral for simplicity, but in increasing numbers these experimenters are switching over to ailerons or flaperons.

Here are the final top eight fliers—note that there is only one stock kit plane in the group!

1. George Joy (modified Climmax) 5,875
2. Aaron Valdes (O.D.) 5,753
3. Art Markiewicz (O.D.) 5,691
4. Don Van Gundy (O.D.) 5,685
5. Mark Gumprecht (O.D.) 5,357
6. Brian Allan (O.D.) 4,850
7. Mark Navarre (O.D.) 4,229
8. Ron Scharck (Climmax) 4,212

Bill Forrey, 3610 Amberwood Ct., Lake Elsinore, CA 92530; (909) 245-1702, or e-mail me at BFORREY@AOL.COM. I prefer phone calls or e-mail if you just have questions, but submittals are always welcome at the above street address. MB

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PLUG SPARKS *cont. from page 42*

cheap—about \$35 in the U.S. Many modelers, pleased with the engine's performance, induced John Oliver to put out a customized speed engine for an extra \$30. Seemed high to this writer at that time, but like the old saying goes, "You get what you pay for."

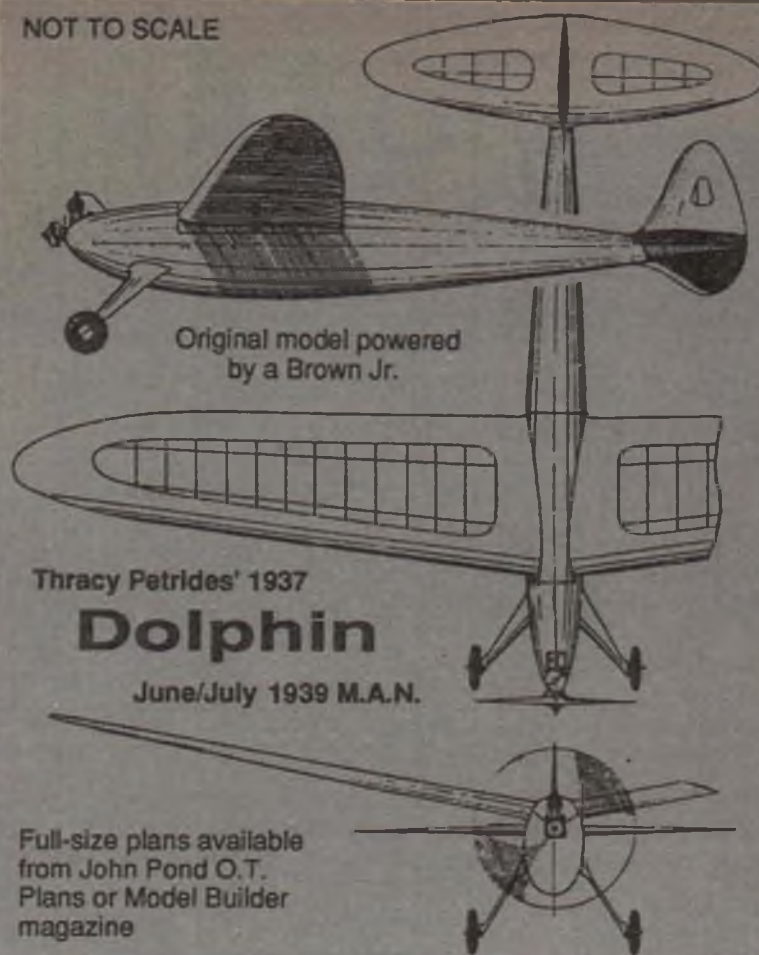
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MODEL OF THE MONTH

It only seems appropriate that we should select the Thracy Petrides "Dolphin," inasmuch as Peter Scott's model is featured at the beginning of this month's column.

This beautiful design first appeared in the June and July 1939 issues of *Model Airplane News*. According to Petrides, the original model came out at 5.3 pounds, giving a wing loading of 9.3 ounces per square foot. The model proved to be a formidable soarer as it promptly flew out of sight

NOT TO SCALE



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•**FUSELAGE** — 68 inches long, has 12 elliptical formers glued to a 1/2x1 center keel, with 1/4x1/2 soft balsa planking over all, sanded to 1/8 inch thick. Nose section built up from balsa blocks, carved to shape.

•**TAIL** — Stabs have symmetrical airfoils and full-depth spars, and are almost fully sheeted with balsa.

MODEL OF THE MONTH



Photo No. 6. One of Col. C.E. Bowden's better looking designs was the low-wing "Mallard," this Ross! .80 powered example having been built for our columnist by his friend Bob Munn.

on its first test flight, made the morning of the Texaco event at the 1937 Nationals.

Three days later, the model was spotted 24 miles away by an airplane pilot who answered Petrides' ad in the local newspaper. Locating a model in a wheat field from the air is no great problem, but just try to walk to the model! In wheat, instead of nosing up on landing, large models tend to land flat, making them difficult to spot. Fortunately, after a couple of tries, the model was finally retrieved.

The original Dolphin was powered by a Brown Jr., the favorite in those years.

However, due to the model's size and weight, Petrides recommended the use of a Forster .99. He also noted this model and engine combination would make an excellent radio controlled model.

Later on, Petrides organized an RC development company. During this time, again noting the lack of a powerful engine to lift the load, a twin-engine version of the dolphin was designed and marketed with some success as Berkeley already had the twin-engine Custom Cavalier.

John Pond, P.O. Box 90310, San Jose, CA 95109-3310. MB



Photo No. 7. Dave Marshall produced this really high aspect ratio CL stunner of about 8-foot span, back in the late '40s/early '50s. Amazingly maneuverability! Photo was taken at the fondly remembered "Goat Patch" flying site in San Francisco—more in next.

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catalog, a compilation of around 90 electric model plans that have been published in the British and German model magazines—*Radio Modeler*, *Radio Control Models & Electronics*, *Silent Flight*, *RC Model World* and *Flug- und Modelltechnik*. All types of models are represented—scale, sport, gliders, racers and more. Catalog price is \$3, which you can take off your first order of over \$15. Get your copy from Bob Holman Plans, P.O. Box 741, San Bernardino, CA 92402; (909) 885-3059. **MB**

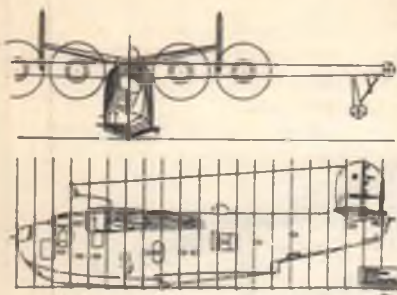
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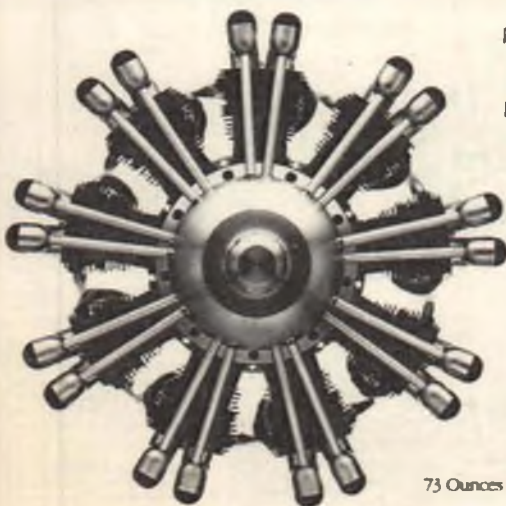
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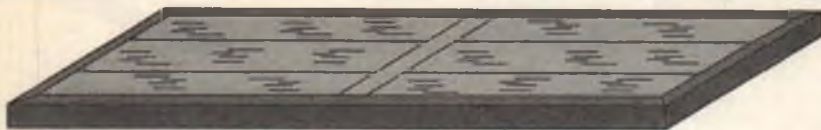
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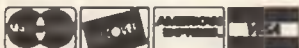
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TECH STUFF *cont. from page 10*

stumble through it.

The vacuum of space in low earth orbit is about 10⁻⁷ torr (atmospheric pressure at sea level is 760 torr). The best man-made vacuum systems do better, getting down to 10⁻¹¹ torr. (This is about 10 trillion times fewer gas molecules per unit volume than at sea level pressure.) We wish we could get still lower, because in a better vacuum we could make still better integrated circuits.

In the July 1995 issue of *Air & Space* magazine there was an article on NASA's efforts to very locally improve the vacuum of low earth orbit, and to use it to make better integrated circuits up there. No, they don't take a super vacuum pump into space; their approach is much simpler. They use an umbrella-like device to keep most of the few remaining gas molecules away from their IC substrate deposition experiment.

The umbrella they are using is called a "wake shield." It's roughly 10 feet in diameter and is towed behind a space shuttle. The gas molecules in the path of the wake shield are intercepted by it. The wake behind the shield is largely free of molecules in the same way that there is a dry area below an umbrella in the rain. The wake area right behind the shield is where the electronic parts are manufactured.

So far, NASA has produced ICs in space which equal the best that can be produced on earth, and they are convinced they can do much better. Their calculations indicate that a vacuum of 10⁻¹⁴ torr should be possible. That would have a thousand times fewer molecules than the best vacuum made on earth.

No, this item isn't directly about model airplanes, but someday we may be using space-made ICs in our model RC systems. And besides, isn't nearly-airless aerodynamics interesting?

PARTING WORDS

"Flying is the second greatest thrill known to man. Landing is the first!"—Hi-Flier, of the Northcoast R/C Modelers.

And now for something completely political.

"NASA's High Speed Research Program, currently funded at over \$200 million a year, is conducting research to develop the technology that can provide environmental compatibility and economic viability for future supersonic airliners."—Aerospace America (AIAA). I wonder how much it will cost us a year to work the next stage; to consider the possibility of starting to think about planning to evaluate the feasibility of undertaking the preliminary design of a hypothetical airplane.

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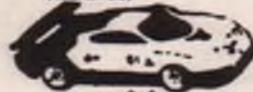
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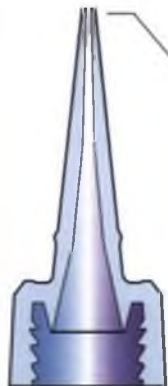


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