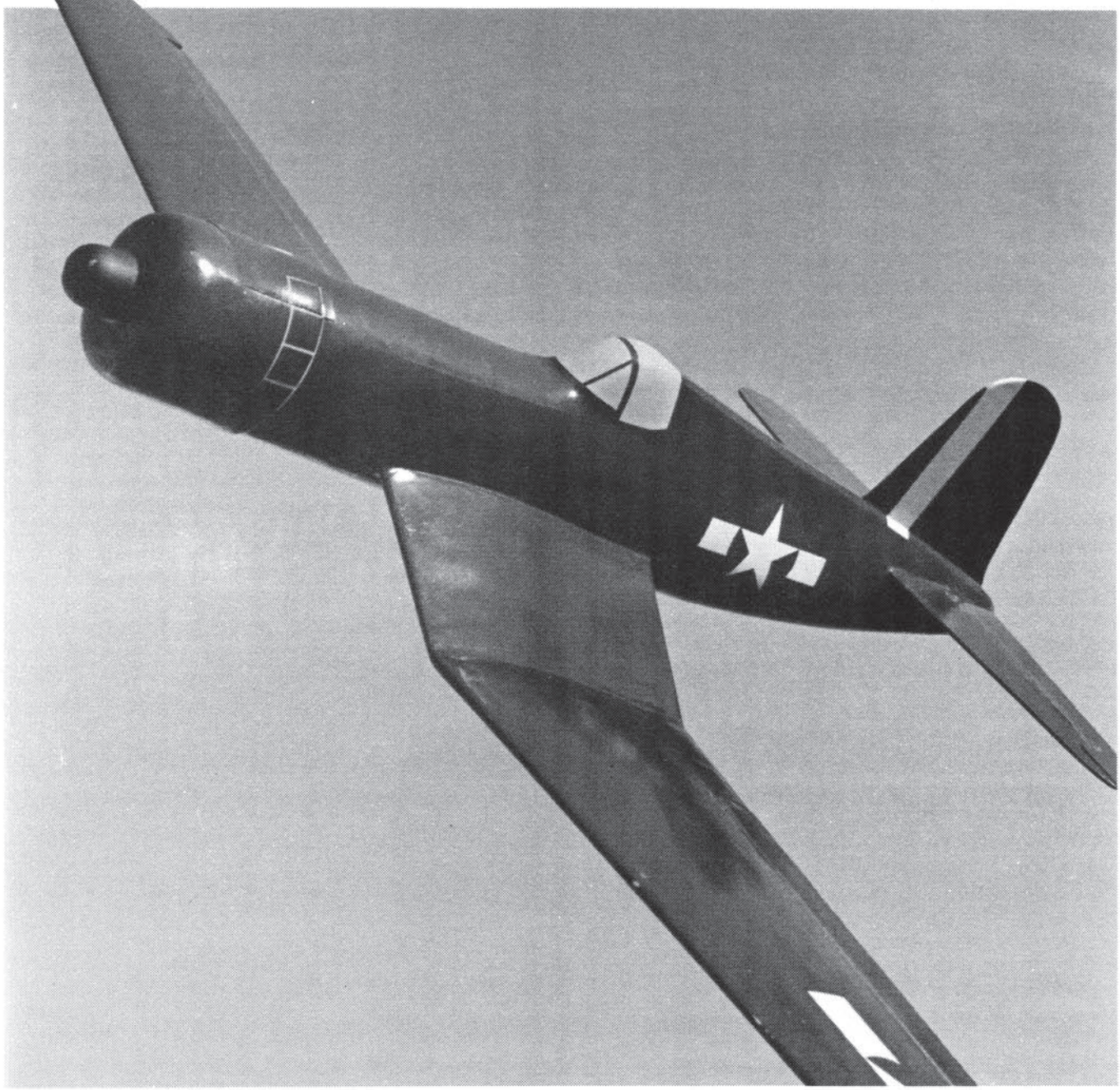
Hottest Warbird Yet!

Cliff Hanger Models Introduces That Bent-winged Beauty, the Corsair F4U

Slope Soaring News

Vol. 1 No. 4 December 1988 $1.50



PLUS: International Modeler's Show Preview—What's new for '89? • How to Vacuum Form Plastic, Part 2 • RadioTech columnist John Veale's NiCd Battery Tips • SSN's first kit test: Lynx 140 ARF • Lift, and How To Find It.

Wingin' It

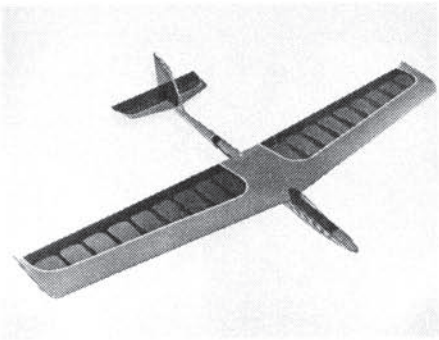
CURRENT EVENTS

It's finally happened: I have too much material to fit into one issue.

There's no room for the Aerobatic Adventures of Tipstall Wingover, III, and I can't even find a page to use for "Scraps" (our bits 'n' pieces column). I talked with a number of people and I planned to put their information into "Scraps," but instead I have to offer this apology and promise to get them in next time. I'm very sorry! There. The hard part's done. Now, let's get on to the fun stuff.

International Modeler's Show

Going to the International Modeler's Show? It's being held on January 14-15 weekend at the Pasadena Convention Center.



From mild...
Buzz Waltz's Predator is designed with the fledgling aileron pilot in mind. It's built using conventional construction techniques, and despite its sleek appearance, it's a gentle, forgiving flier.

We'll be there, both to get our fair share of look/touch/talk/dream/drool over the new slope soaring toys – and to show off our own product. Yes, we have a booth! We're located in the hall where Bill and Anita Northrup put all the new guys. Be sure to stop and say hi on your way through. We hadn't planned to use electricity ($30 extra) in our booth, but the IMS people warned us about the dark hallway, so bring your flashlights.

There will be some very interesting new planes on display. I'm referring to the Marty Silberstein and Steve Peacock's (Cliff Hanger Models) power scale planes, Richard Jarel's (J.A.D.E.) amazing new twin-tailed, forward-swept-wing canard, Ken Stuhr's (VS Sailplanes) Rotor pitcheron-controlled sailplane, Buzz Waltz's Predator, a new aileron trainer, Mark Hambelton's (DCU) stealthy-looking Striker, and who knows what else? Neither VS Sailplanes nor Buzz Waltz have a booth, but we're told you can meet the designers and see their products in Gary Anderson's American Sailplane Designs booth.

Happy Holidays!

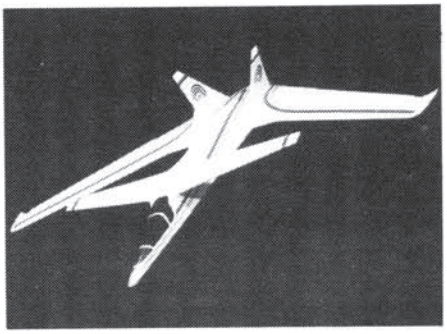
We'd asked model companies to send us information on their new products, so that we could put together a Christmas Buyer's Guide. Several companies responded enthusiastically, and things were looking bright for a while. But in the end, we hadn't received enough response from the manufacturers to put together a reasonably-sized section. Maybe next year. We will use the information we've received in an upcoming issue. Thanks very much to those who cooperated with our effort!

International RC Scale Soaring Fun Fly

The Tri-City Soarers hosted a very successful event last May, and they're going to do it again in '89. The three-day event will be held on May 26-28, and we're definitely not going to miss it. We'll keep you informed as the date draws near, but there's no time like the present to begin building your scale or power-scale glider. Contact the Tri-City Soarers, 632 Meadows Drive East, Richland, WA 99352; 509/627-5224, for information and your entry blank.

(Continued on p. 15)

...to wild!
Richard Jarel's latest sloper almost defies description! I think this twin-tailed, forward-swept-winged canard needs a flat-black paint job with panel and rivet lines to make it into a certifiable alien invader.



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EDITORIAL CONTRIBUTIONS are welcomed. Unfortunately, we can't pay for them. Editorial material is selected based on its perceived value to the slope-soaring community, and the publisher assumes no responsibility for accuracy of content.

CLUB CONTRIBUTIONS are welcomed. Please keep us notified of your club's events and/or fun flying activities. Material printed will be selected at the discretion of the editors.

ALL CONTRIBUTIONS should be addressed to SSN, c/o Charlie Morey, 2601 E. 19th St., #29, Signal Hill, CA 90804. All contributions requested for return must be accompanied by return postage. The editorial deadline is the 15th of the month preceding the cover date. All material is subject to editing and revision as necessary to meet SSN requirements. We can accept Ascii text files over the phone or work with your IBM-compatible 3-1/2" or 5-1/4" disk. Please call first for details at 213/494-3712. Don't get depressed if you get our answering machine. Just leave your name, phone number and the purpose of your call, and we'll get back to you.

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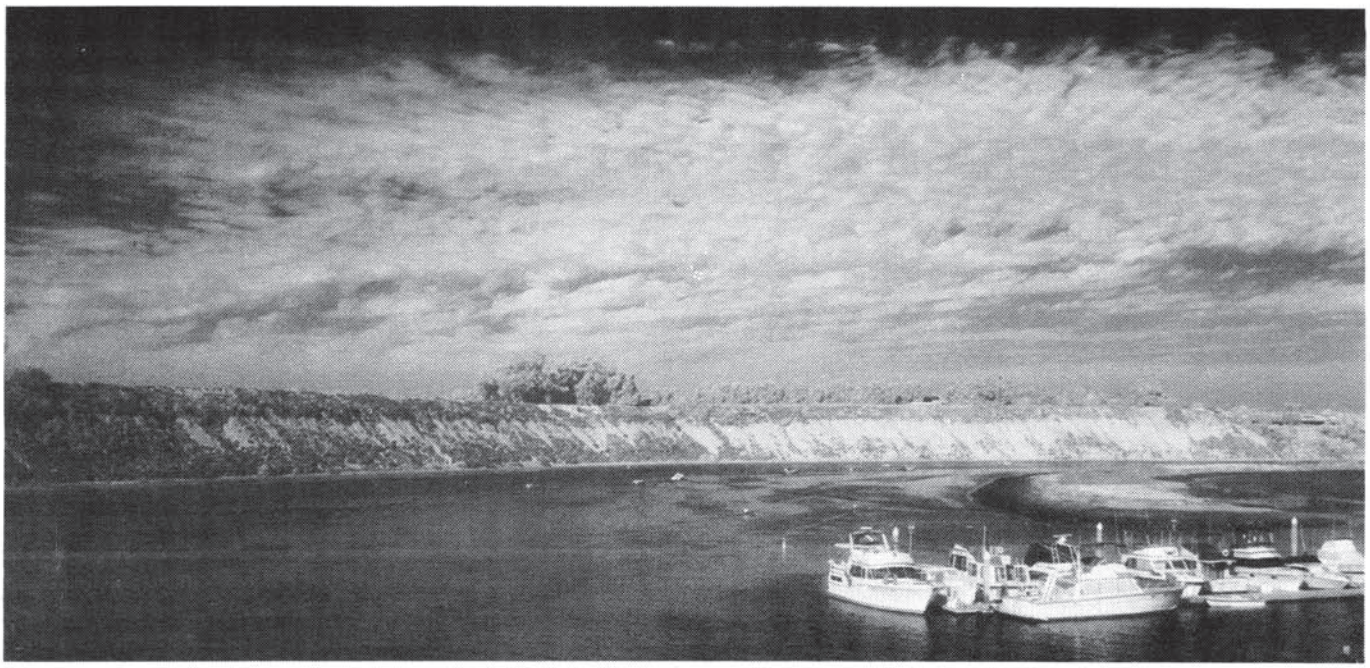


Newport Beach's southeast-facing Back Bay ridge.
It's one of Southern California's prettiest sites, good for morning flights before the westerly afternoon shift.

Site of the month

BACK BAY

By Chuck Korolden

Back Bay is located in Newport Beach, California. Before you non-SoCal readers justifiably groan about a report on another flying site that's not in your area, let me assure you that our intention is to report on spots all over the country. The problem is too many projects and not enough time. So unless any of you out there know of a place where they have 48-hour days, please bear with me. If you do know of such a place, Charlie and I would be very interested!

Okay, back to Back Bay. This is a very good flying site on the right days. The slope faces due south and is about 100 feet high. The wind comes over the water, the slope itself is almost vertical and the landing zone is flat with high grass and weeds. Sound great? It is, on the right days.

The wind has to come from the south. You can see from the photo that the slope is curved or bowl-shaped. Unless the wind is blowing straight in, things can get downright rude.

When I say rude, I mean rude. The first time I was there was with a friend doing some slope scouting. From Pacific Coast Highway, you can see the site, so we found our way there from the parking lot of the Lutheran Church on Dover Drive. (There is a closer place to park.) We thought we'd found a secret flying site, but we found out later that almost everyone we knew had been there at one time or another.

Well, we checked the wind direction and launched our pod planes. Brandy was using a speed wing, and I opted for a more forgiving floater wing.

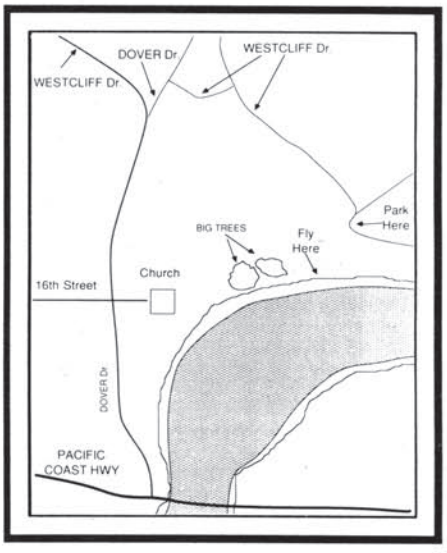
The lift was incredible. Brandy was doing rolls, split-Ses and Cuban-8s, while I felt out the top of the lift. As soon as I maxed out the altitude, I came in to change to a faster wing. I brought her in, way behind the slope, and landed in the tall grass. Very forgiving.

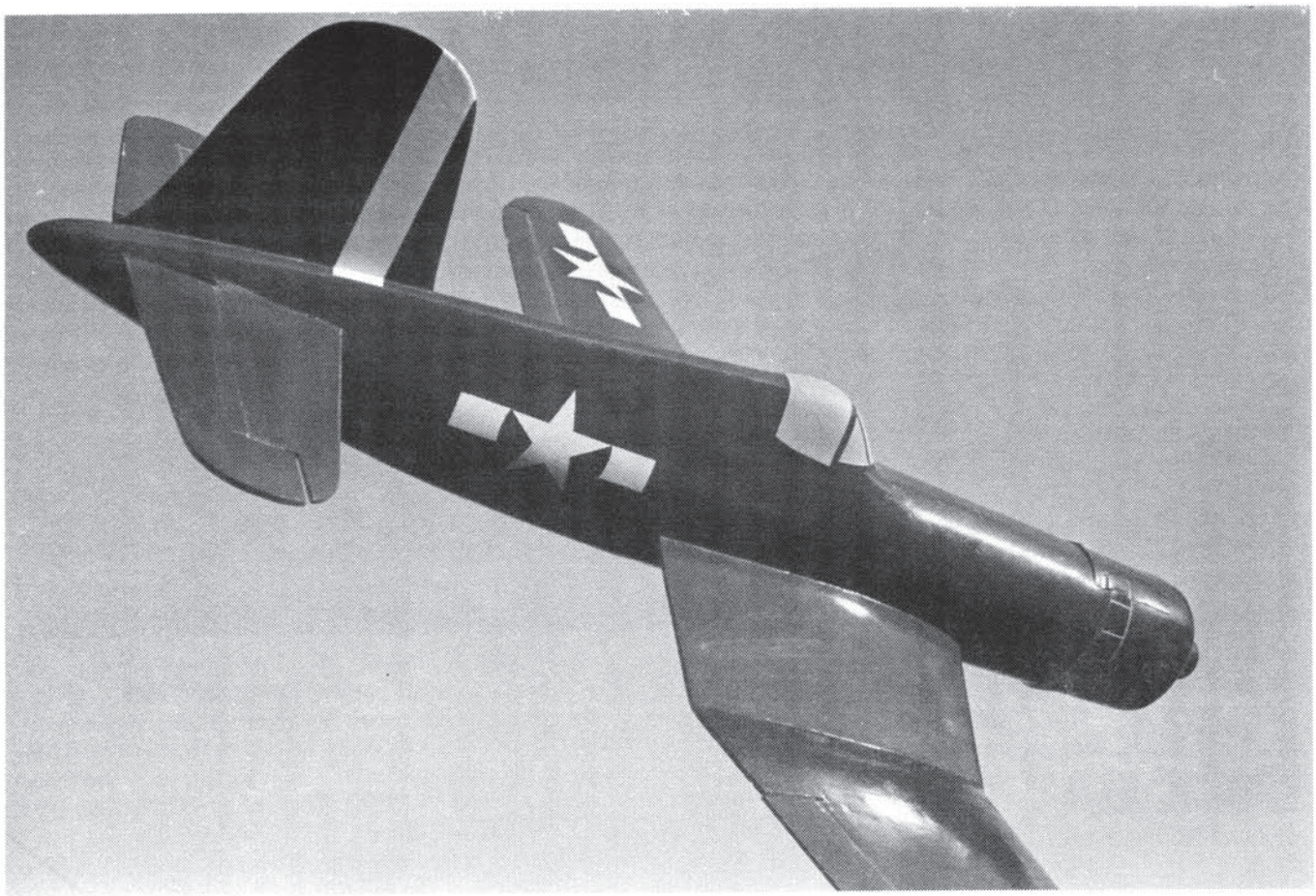
With the new wing on, I was about to toss off when the wind switched to the west, just a little. And that was all it took. Brandy found himself fighting some weird turbulence and crashed into the slope halfway down. Brandy is a very good pilot, but because of the way the slope curves around on the right, it can create some radical changes in the lift pattern. Add to that the fact the slope is almost vertical and before you know it, you can get your plane into some rude situations.

From talking to some of the locals who fly there, it seems this is not what you would call a sanctioned site. Sometimes they are asked to leave (a.k.a. kicked out). When I drove by to get some shots of the site I saw a large sign on the roadside of the empty lot that read, "RESIDENTIAL AREA, The Irvine Group, 714-GET-LOST."

So, it goes without saying (but I'll say it, anyway) tread lightly and treat the natives with care.

HOW TO GET THERE: From I-405, take the Newport Freeway (55) south. The freeway turns into Newport Boulevard. Follow Newport Blvd. to Pacific Coast Highway and head southeast. Turn north on Dover Drive. Just past the second light is the south end of Westcliff Drive. At the stop sign, turn right and go to the next stop sign and turn right again. The road goes left and downhill at that point, so find a place to park. You'll see a path between a fence and some trees. REFERENCE: See Thomas Bros. California Road Atlas & Driver's Guide, p. 199, C-4, D-4 or The Thomas Guide for Orange County, P. 31, E-4, E-5.





Right now, you'll have to visit Bluff Cove to see this one.
But if Marty Silberstein and Steve Peacock have anything to say about it, the Corsair will be on display in your local hobby shop soon! They're taking it to the Jan. 14-15 International Modeler's Show. See you there?

Cliff Hanger

Wait till you hear how it ends...

By Charlie Morey

Cliff Hanger Models. Remember the name. Marty Silberstein and Steve Peacock are changing the company name (it used to be Sailplanes Only), more than doubling the product line, and heading for the big time at the International Modeler's Show.

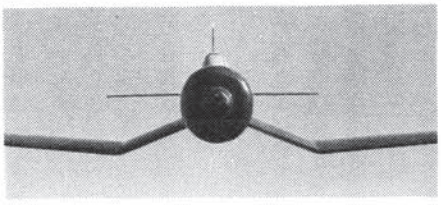
You won't want to miss their booth. In it will be hanging some of the neatest power scale jets and WWII warbird slope soarers you've ever seen. If you fly in big lift and enjoy fast, nimble aircraft, be forewarned: you'll leave the show with one of their boxes under your arm.

Born to be wild

Power scale slope soaring in Southern California is not the same game as practiced in England. There, builders fanatically construct almost perfect scale models with contest-quality detail. Here, the little fighter planes are built to conform to our local Murphy's Law of slope soaring: The better the lift, the worse the landing area. Anyone who's flown at Point Fermin, Bluff Cove and especially Parker Mountain in Acton will understand.

Marty and Steve are Bluff Cove regulars, and their planes show it. The typical Bluff Cove glider is designed for three things: speed, maneuverability and landing toughness. You won't see rivet lines, clear canopies with little pilots inside reading full instrumentation, scale antennae or carrier landing hooks. Each one is a solid chunk of fiberglass and balsa. Attention to detail is given a cursory nod with semi-intricate paint schemes...sometimes.

"...it's a must-have item on every power scale slope pilot's list."



Full metal

They're also designed to handle regular, full-size (cheap) radio gear. The standard Futaba four-channel package with a flat 500-mah battery pack does the trick. Everything is mounted way forward in the nose for correct balance without adding lead, including the aileron servo. Long control rods reach back to standard strip aileron linkage. It's typical to glue and mold the wing in place, so don't skimp on hardware in your aileron linkage. I recommend not using any plastic parts.

Go full metal with clevises and horns and avoid having to saw your plane in half to repair a broken 29-cent part.

The planes are recommended for experts only, and so are the kits. One of the first steps in their construction is to join the two fuselage halves. They're well-finished, though, to make the task a little easier. After being removed from the molds, the fuse halves are rough trimmed, then placed back into the molds and sanded flush with the mold edge. If you've ever tried joining fuse halves that haven't been finished this way, you'll appreciate the ease of establishing the joining line without having to use the "guess, sand, fit and guess again" method.

Corsair F4U

Talk about proud. You should see these two guys with their Corsair. Building the first U.S. glider kit of this popular warbird, solving the problem of routing aileron linkage through the bent wing and then experiencing a dream-come-true first test flight...who can blame them? It flies great! They even have a video to prove it.

The Corsair has a 50" wing span, a 31" fuselage and weighs 38 ounces with no ballast. The airfoils on all Cliff Hanger Models gliders were designed by Marty. They were developed by a "combination of hits and misses" that ultimately yielded a successful airfoil for both light and heavy conditions, he says.

The kit configuration hadn't been finalized when I talked with them, but the Corsair will probably include the following: 12-page instruction manual, fuselage halves, foam cores, paper templates for the tail flying surfaces and a wing-construction jig to help you set the correct angles on that bent wing.

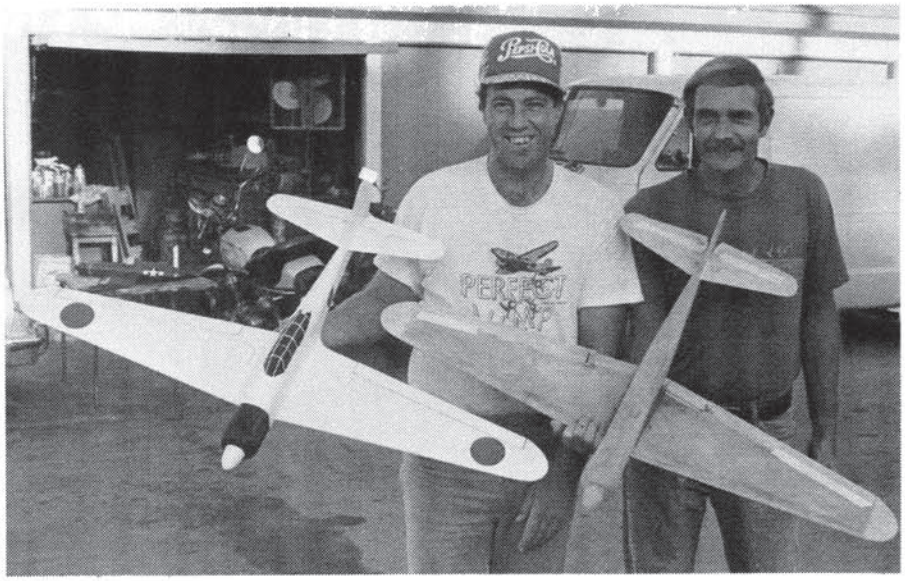
Suggested list price on the Corsair is $69.95, and it's a must-have item on every power scale slope pilot's list.

KAI-100-2

Say what? That thing looks like a Zero!

Close. The Kawasaki KAI-100-2 was designed to replace the Mitsubishi Zero and give the Japanese pilots a fighting chance against the allied planes like the P-51 Mustangs. Unfortunately for them, it came too late to make the difference, but it was a vastly improved airplane. The model looks great, too.

Ron Robinson designed this one. He used one of Marty's airfoils in the 44" wing span. The fuselage length is 29-1/2". A weight of 32 ounces gives the KAI a wing loading of over 17 ounces per square foot. Should be fast!



Steve, Marty and a pair of KAI-100s.
They'll bring out the Samurai in you and give the P-51 pilots fits.

The KAI-100 kit includes fuse halves, instructions, foam cores and templates and is offered at $59.95.

F-20 Tigershark

This one's very new. When we talked with the guys, the prototype was being built. They offer a similar tried-and-proven model jet – an F-5 – so figuring out this one should be no problem.

It does have some interesting measurements. The F-20 has a 42" wing span, a 4-1/2" tail moment and a nose moment that would put Pinnochio to shame. Should be very interesting trimming the elevator on this one!

The Tigershark kit is set up basically like the others and is offered at $59.95.

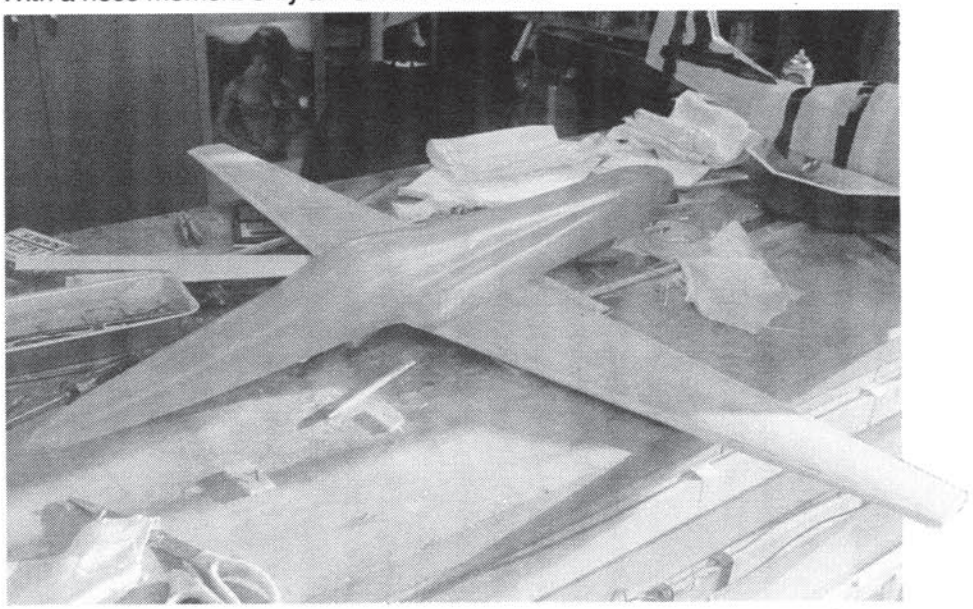
The "old stuff"

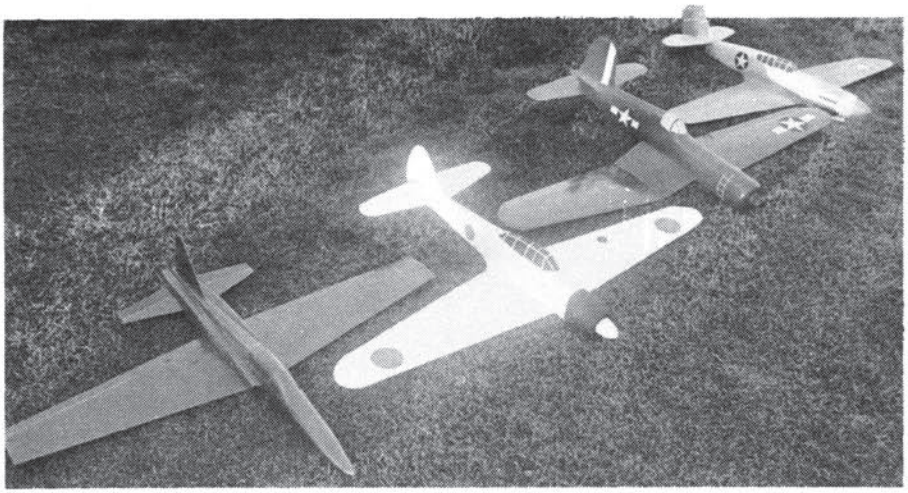
Cliff Hanger Models will continue to offer the former Sailplanes Only kits: a P-40 Warhawk and the popular F-5. Both have become Bluff Cove favorites and have proven themselves superior performers. The kits include instructions, fuse halves, foam cores and templates and sell for $59.95.

The latest!

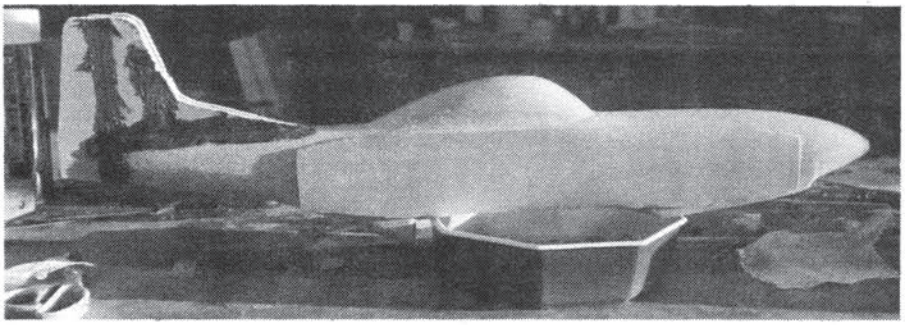
While we were poking around the Cliff Hanger shop, we noticed a familiar-

Sure it's an F-20. Use your imagination!
With a nose moment only a mother could love.





Above, the current crop. Below, a peek at the future!
Lounging on the lawn are an F-5, a KAI-100, a Corsair F4U and a P-40. Below, the rough beginning of a new fiberglass fuselage, a P-51 Mustang!



shaped block of balsa sitting on the bench. It was obviously the beginning of a new fiberglass mold plug, and even in this early hint of form, it looks like the most accurate scale P-51 Mustang we've seen.

They plan to have a prototype finished in time for the International Modeler's Show, but for now, this "spy photo" of the unfinished plug is the best we can offer.

Also in the future is an aileron trainer kit. The projected prototype date is mid-February. This kit will be offered with a full fuselage (rather than halves) for the less experienced builder, with a performance envelope to match. It should be slower, gentler-handling and more forgiving than the experts-only military aircraft.

The ending to this tale depends on whether Cliff Hanger Models is successful in finding distribution channels at their show debut. Like any "cliff hanger" story, we'll be kept in suspense until the last moment. Stay tuned...

For more information on Cliff Hanger Models, call Marty or Steve at 213/320-4530.

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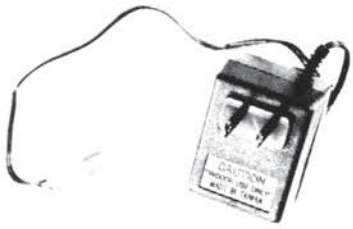

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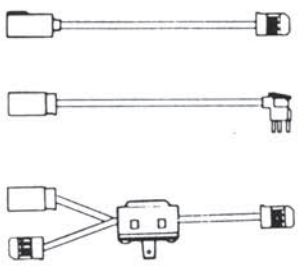

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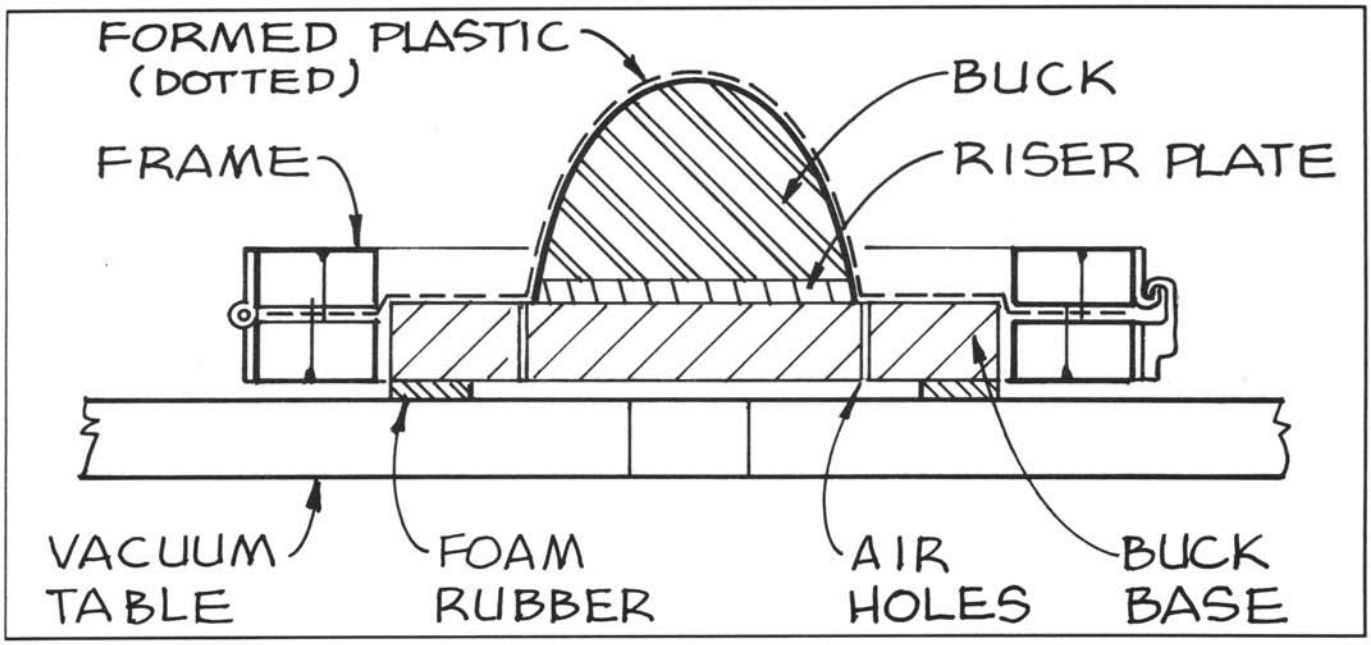


Here's how it works!
Notice that the vacuum is formed by two critical seals: (1) at the foam rubber between the buck base and the vacuum table and (2) between the plastic and the top of the buck base.

PRACTICAL VACUUM FORMING

Part 2

By Harry Finch

Last month, we made our vacuum-forming table. This time, we'll describe how to make the "frame" which supports the plastic during heating and forming and the "buck base" which is the changeable tooling plate used for forming the parts.

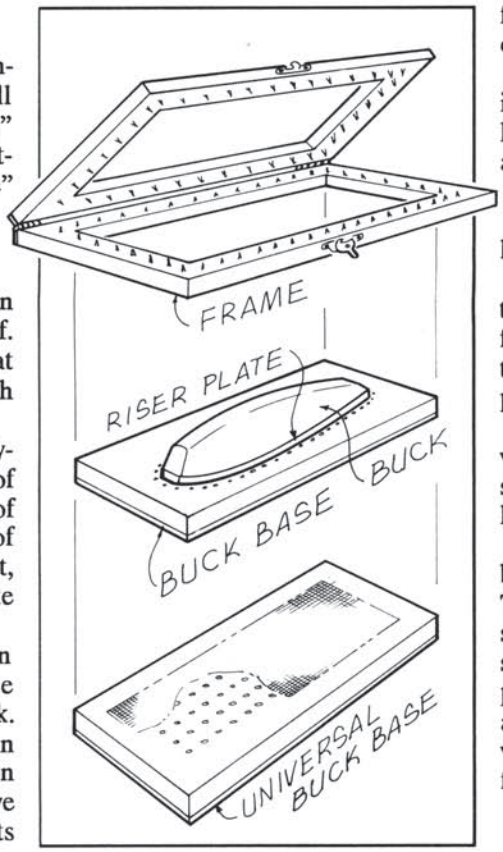
Here's how to determine the size of the frame and buck base. First, design the forming tool or mold (buck) itself. The buck base must be made so that every dimension is at least one inch larger than the buck in all directions.

It's important to consider that deeply-formed parts cause a lot of stretching of the plastic which results in thinning of the finished part. (A certain amount of thinning will take place with any part, but deeper parts are likely to create more problems.)

On deep-drawn parts, you can decrease thinning by increasing the amount of flat area around the buck. Part thickness can be controlled to an extent by the way you place the buck on the buck base. Sometimes you just have to experiment until you get the results you want before you mount the buck permanently to the base.

The size of the frame is directly related to the size of the buck base. The inside dimensions of the frame are 1/8" larger than the outside dimensions of the buck base, allowing the frame to fit down over the base.

Nothin' to it!
Just apply your basic modeler's skills to create this miniature plastic molding system.



The frame must firmly clamp the plastic around the perimeter so that when the forming takes place, the plastic is forced to stretch rather than being drawn in, which would cause wrinkling.

A simple frame construction is shown in the drawing. I generally use 1" x 2" lumber. The frame is hinged at one side and latched at the other with a simple window latch to exert clamping pressure when the plastic is inserted. On larger frames, use two or more latches.

Nails are driven through the frame so that their points protrude about 1/16" from the opposite side. When the plastic is heated they'll bite into the softened plastic, holding it firmly.

The buck base is a flat plate onto which the buck is mounted. Pretty simple stuff. Refer to the drawing to see how they go together.

The lower half of the frame and the buck base should be the same thickness. The buck base receives a perimeter strip of firm foam rubber (weather strip) 1/4" or 3/8" thick. The foam provides a seal between the buck base and the vacuum table allowing a vacuum to form beneath the entire surface of the buck base.

The plastic is heated in your oven. The

The plastic is heated in your oven. The frame is pushed down over the buck and held firmly in place until the vacuum grabs it and magically sucks it tightly around the buck. The plastic itself must form the vacuum-tight seal right at the perimeter of the buck, as shown in the drawing.

Consider making a couple of universal buck bases and frames. One about 6" x 12" can be used for most small parts such as canopies or cowlings. A somewhat larger one could accommodate larger parts you may wish to make.

The universal bases are drilled with 1/8" vent holes spaced on a 1" x 1" grid pattern. Place some 1/8" mesh hardware cloth on top of the buck base so that the vacuum will circulate all around under the various pieces of tooling. Be sure you keep the vent holes and hardware cloth back at least 1" from the perimeter.

Every piece of tooling must be placed on a riser plate. The riser plate must be at least 1/4" thick to provide the required overdraft. (If you don't pull the plastic down past the final trim edge of your part, it will leave a radius and require more hand finishing.) The line between the buck and the riser block should be sufficiently distinct that you can see it as you trim the part to finished size. On fuselages or other symmetrical halved parts, I always form both parts on the same buck base at the same time.

After experimenting with location, secure the buck to the base permanently with flathead screws from the bottom side. Then, drill 1/16" holes spaced 1/4" apart through the buck base all the way around the perimeter of the buck. These holes allow the vacuum to draw the plastic down tightly around the buck to the base. As you work with the tooling and experiment with your own setup, you may find it necessary to drill more holes to evacuate air from a troublesome area.

That's the basics. Volumes have been written about vacuum forming, and I recommend you pick up a book or two at the local library if you feel you need more information.

Next month, in our final part of this series, we'll discuss the selection of materials and the actual vacuum-forming sequence.

This three-part vacuum-forming series originally appeared in R/C Soaring Digest. Thanks to Jim Gray for his cooperation and assistance in providing Harry's original drawings.

S.O.S.!
Save Our Slopes!

Are you flying at an endangered site? Is it a situation where letters from responsible citizens could influence the decisions concerning your site's future? Then tell us about it. Write to Slope Soaring News, S.O.S., 2601 E. 19th St., #29, Signal Hill, CA 90804.

HELP!

Are you a skilled, meticulous model builder?
Are you an experienced slope pilot?
Are you located reasonably close to Signal Hill?

If so, *Slope Soaring News* needs your help. We'd like to be able to build and test slope-glider kits, but with our limited staff, we just don't have the time. So, we're looking for a few good modelers who would be willing to take a kit, build it exactly to manufacturer's specs, take it out and test fly it and then give our writers some objective input.

We need to know about the quality of the kit, if it came with good instructions, if you had any problems with it, how it performs... You know, all the things you yourself would want to know about a kit before you buy it.

Your comments, pictures of the kit you built and pictures of you flying it would be included in the story. We can't offer financial reimbursement for your work, just a certain amount of semi-fame and near-notoriety within the slope-soaring community as part of the SSN testing team.

Thanks, as always, for your support!

Lookin' down the barrel.
Chuck Korolden puts the MiniCraft Lynx 140 ARF through its paces for Charlie's camera on the Long Beach bluff. It's a surprisingly-capable performer – fully aerobatic, yet gentle and smooth enough to be a good aileron trainer.

Slope Soaring News Tested!

MINICRAFT LYNX 140

A cat that goes ARF?

By Charlie Morey

I had the first-test-flight jitters. Standing alone on the Long Beach bluff, the shiny new Lynx 140 in one hand and my trusty Futaba Conquest transmitter in the other, I took a deep breath, mentally prepared to get my hand back on the stick as quickly as I could, and threw the plane over the edge.

There was no wind. I didn't expect it to fly. I just wanted to put it through a test glide to the soft sand beach below and get a feel for how it was going to handle...or mishandle.

My toss sent the Lynx straight out about 20 feet. From there, it went into a slightly too-steep glide, picking up speed and my heart rate with it. I gently pulled back on the stick, and the Lynx pulled up into a flat, level, slow, smooth glide. I was shocked.

This plane has a full-sized Futaba Conquest flight pack in it with all three servos: ailerons, elevator and rudder. It weighs 29 ounces, and with 2.97 square feet of wing, that adds up to a 10-ounce wing loading. It's not a floater. Yet, as I'd find out in test flights that followed, it'll stay up in surprisingly light lift and it'll kick butt when the wind starts cranking!

"...it'll stay up in surprisingly light lift and kick butt when the wind starts cranking!"

The Lynx, even with its nose pulled up, turned smoothly using the ailerons. I made a large sweeping S turn and greased it in on the beach. The heavy plane (by my 10-ounce pod-and-boom-plane standards) touched lightly and slid for 50 feet on the smooth sand, leaving a straight, light trail behind it. Pretty, I thought.

I trotted down to fetch it, grinning from ear to ear. That's the ideal first flight, in my opinion. Not instant perfection, but a successful flight and landing, hinting at the promise of things to come. I knew what to do next. A couple of hand tosses on the park lawn had it trimmed up a lot from my original 0°/0° wing/stab setting to about 2° positive

wing/stab incidence for the very light conditions.

The second windless toss off the bluff yielded a gentle glide down to the sand. These trim adjustments were made with the radio for the current conditions; I left the mechanical adjustments at 0°.

Now, we needed some wind!

Getting it together

Assembling the made-in-Thailand Lynx 140 should have been a cinch.

All the new owner has to do is epoxy the two completely finished wing halves together, route the control surface cables, trim and mount the clear vacuum-formed canopy and install the radio flight pack. All the major parts are completely assembled, shaped, sanded and covered. Using five-minute epoxy easily makes it a one-evening job.

I ran into a couple of problems, however, that made it a two-evening job and required more modeling skill (and equipment) than it should have.

General complaints concern the care that wasn't taken by the assemblers at the factory. Gluing seems to be a hit-or-miss deal. In some cases, hinges were glued solid, but one was missed completely, and it came loose on my first flight with real lift. The glue joint down the lower right side of the fuselage was forgotten completely, yet the opposite side sported a broad fillet.

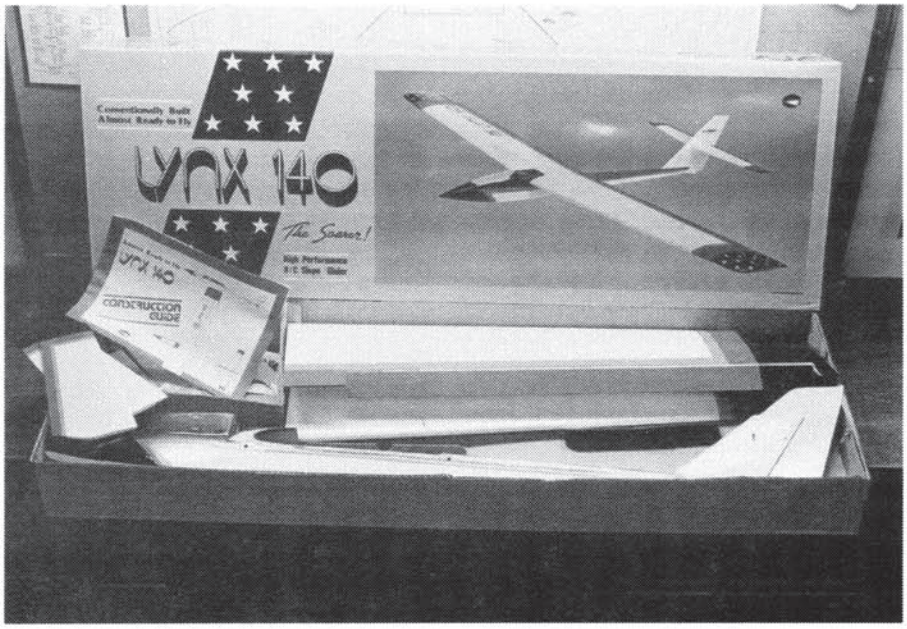
But these are minor problems. Any beginning builder can inspect his new kit and assure that all the glue joints are solid and glue them himself if they aren't. No big deal. Just be aware that it's part of the assembly requirements for this kit.

The most annoying problem I had assembling the Lynx 140 was having to correct another factory error. The full-flying horizontal stabilizer assembly is very well-designed. A brass bushing is already installed midway up the vertical stab, and it's a simple matter to slide a piece of wire through it and slip the fully constructed and covered stab halves over it. Unfortunately, the bushing was installed crooked, as you can see in the photo.

For a modeler with a well-equipped shop, this is merely a minor annoyance. For the inexperienced builder who's got the kitchen table covered with newspapers and a one-night-stand time limit, it's a major setback.

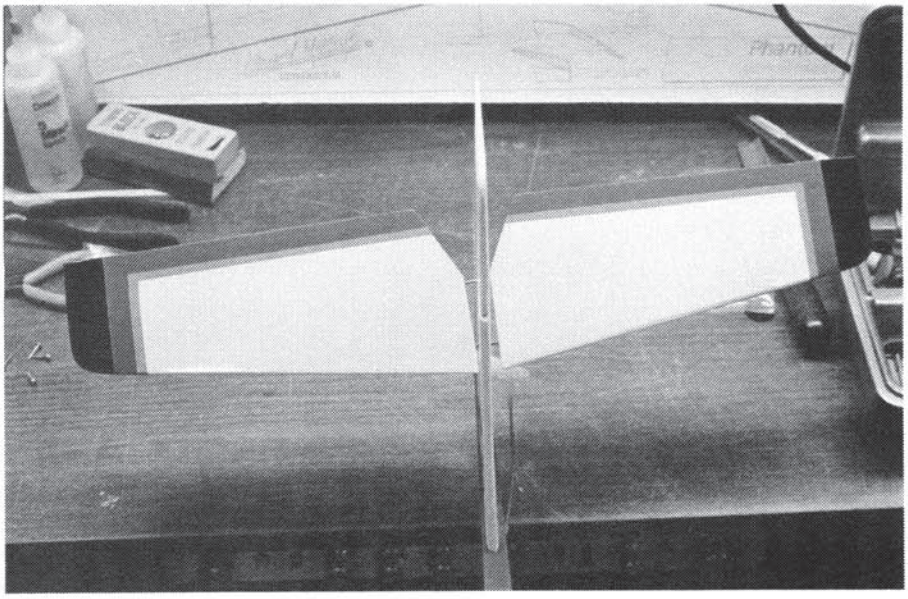
I popped out the bushing and threw it away, grabbed a handy piece of dowel from my scrap pile, cut it to length and glued it into place. Then I set the tail flat on my Dremel drill press attachment and drilled a new hole at the correct 90° angle. I didn't have any brass tubing that was the correct size for a new bushing, so I used a brass control cable end (the threaded type you solder on), made a new bushing and glued it in place.

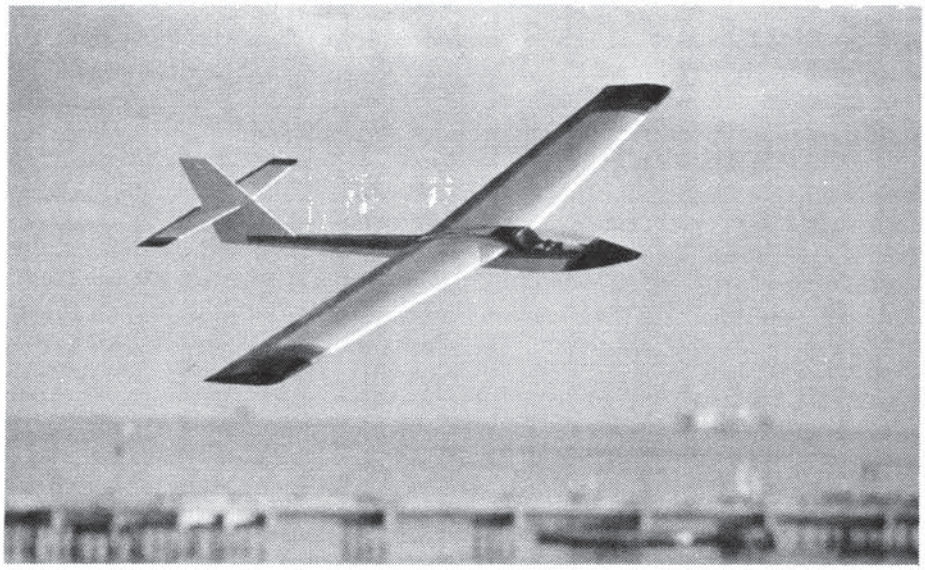
For shops (or kitchen tables) not so well equipped, I recommend the following procedure: Carefully cut and peel the covering back from around the bushing. Then, cut through the vertical stab, ahead of and behind the bushing, with a standard X-acto knife, leaving it attached top and bottom. Insert the wire, pivot it square and reglue the bushing. Check for squareness both from the top view and the front view,



A boxful of big pieces.
There's no real building at all, just assembly of the major components and installation of your radio.

The cat came with a crooked tail.
This factory error made the Lynx not-so-ARF and added a second evening to our building time. Fixing it wasn't a major problem, but repairing faulty workmanship shouldn't be part of an ARF project.





Soaring sedately over Long Beach...
...or flat out at Fermin, the Lynx can play both games. Three-channel control makes it fully aerobatic; a conservative wing keeps speeds reasonable yet lets it fly in light air.

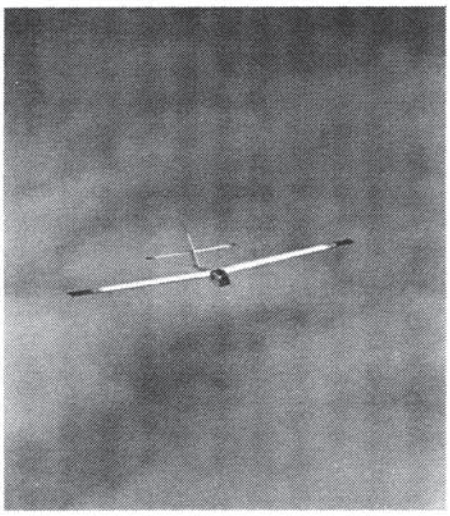
and cut and tweak as necessary before gluing. Touch up the ends and the glue joint with a small sanding block, then stick the covering back down.

I have suggested to Jesse Chao, the owner of J.C. Model Supplies who furnished us with the kit, that he relay these complaints back to the factory. Hopefully, future Lynxes will be made with better attention to detail.

Understand, please, that this kit is not at all difficult to build, even with its flaws, yet I feel that an ARF customer should not have to redo work that was incorrectly done by the manufacturer. If that's the case, he might just as well build it himself in the first place and get it right.

Back to the slope

Any aggravation the Lynx 140 may have caused me on the work bench was soon forgotten once I got it airborne in good lift. It's an amazingly capable flier and would make a good aileron trainer for the flier making the transition from rudder/elevator to aileron/elevator planes. It is very difficult to stall, and when it does, it's easy to recover. It can fly in light lift, and it can fly very slowly.



It's very aerobatic. The only thing I've found so far that it won't do is go fast. I mean really fast; it'll move out OK – as fast as many fun fliers want to go – but it's not a fast slope plane.

A typical two-channel pilot, I enjoyed using the three-axis controls. Now I can really do a stall turn or hammerhead instead of a chandelle, just by using the rudder instead of the ailerons. I also got a kick out of trying to feed in the correct amount of rudder with the ailerons to produce a coordinated turn, just like the "real" airplanes.

The Lynx 140 is a very pleasant plane to fly. I've taken our test model out on several light-lift days at Long Beach and an exceptionally brisk day at Point Fermin. It handled both sets of conditions easily (though at vastly different adrenaline levels!) and gave me full afternoons of flying fun.

Despite my criticism of the factory's workmanship, I like the Lynx very much. It's a good flier. With the minor shortcomings understood, I'd recommend it for the average sport flier (like me), and especially to one whose schedule limits his building time and who feels that buying a $130 ARF is a good deal.

What's Hot

Ease of flying
Light-lift ability
Aerobatic ability
Assembly time
Fun factor

What's Not

Faulty workmanship

Building Tips

- Check all glue joints and fix as necessary.
- There is no mechanical trim adjustment in the elevator linkage. We added a threaded cable end at the servo-end snap-link.
- Forget about using the aileron servo tray included. It's too small for standard servos. Plan on installing your own servo rails instead.
- Set up the aileron linkage with differential – more "up" than "down" – to improve turning performance.
- Set the C.G. as described in the instructions – 3-3/4" back from the leading edge – but allow yourself a means of moving it back after your first few flights.
- The instructions call for 1-3/4" of dihedral. We discovered when gluing the wing halves together, that the wing joiners allow a minimum of 2" dihedral. Don't worry about it; the Lynx flies great with the little bit extra.

Specifications

Lynx 140

Suggested list price	$189.95
Introductory price	$129.95
Wing span	56"
Wing area	2.97 sq. ft.
Fuselage length	37.5"
Weight, as tested	29 oz.

J.C. Model Supplies Company
P.O. Box 2406
Fullerton, CA 92633
213/690-2019, 714/879-3266

RadioTech

The Use, Care and Feeding of NiCd Batteries

By John Veale, N6RKW

Welcome to the RadioTech column! Each month I will try to unravel the mysteries of the high-tech side of our hobby. This month, I am going to look at the use, care and feeding of Nickel Cadmium (NiCd) batteries.

How long can I fly?

NiCds are rated in milliampere-hours (mah). This represents the total power that can be drawn from a fully charged battery, in terms of how *much* current for how *long*. For example, 500 mah means a current of 500 milliamperes for one hour.

Well, almost. As in everything in life, we must read the fine print. Usually, the rating refers to the "10-hour" rate, that is, our 500-mah battery is really good for 50 milliamperes for 10 hours. At higher currents, the capacity of the battery is lower. (The difference disappears as heat).

Also, the capacity is measured until the output of the battery is zero volt. That's well below the point where your radio stops working.

In practice, one can expect the usable capacity of a NiCd battery to be about 50% of the rating in our application, so expect a 500-mah battery to give about 250 milliamperes for one hour.

What about 100-mah packs?

So what about using 100-mah batteries in our small planes? Well, yes, with care. As I said, a 100-mah battery could give about 50 milliamperes for one hour, or 200 ma for 15 minutes.

Ah, but what do the receiver and servos need from the battery? The average receiver draws about 10 ma, and each servo also about 10 ma. These currents are for servos not in motion. As soon as the servos move they draw peak currents in the order of 250 ma (!). Fortunately, even the most hot-shot pilots do not move *every* servo *all* the time, so we need to know how often we move something. It turns out the worst case is that the servos are moving about 20% of the time, for an additional current of 50 ma per servo. These numbers apply to servos with no excessive loads, such as binding push rods or hinges.

So the total current for a two-channel system looks like this:

Receiver	**10 ma**
Elevator Servo (10 ma + 50 ma)	**60 ma**
Aileron Servo (10 ma + 50 ma)	**60 ma**
Total	**130 ma**

So, at a total drain of 130 ma we could expect a fully charged 100-mah battery to be good for about 50/130 of an hour, or about 22 minutes.

Well, 22 minutes isn't bad is it? No, but...

Wear and tear

Sorry to tell you this, but there is more bad news. The numbers I just listed refer to a brand new, fully charged battery. In actual practice, a NiCd battery wears out each time it is charged, at a rate of about 1% per charge. And as batteries get older, they start to self-discharge at a rate of about 1% per hour. This means that if you charged your battery yesterday, it may only have 75% of the charge today, and if you ever abuse a NiCd (shorting out or overcharging) serious loss of capacity could result. No wonder planes crash!

So, how do we deal with all this bad news? Follow these rules:

a) Use only high-quality new battery packs. Buy from a supplier with fast turnover to get fresh batteries. Do *not* use surplus batteries!

b) Charge the batteries just before flying. Use a field charger if possible before each flight. If possible test batteries before each flight. Do *not* overcharge!

c) Do not fly more than 15 minutes per charge (100-mah batteries).

d) Replace batteries after about 100 charge cycles, or if testing indicates any loss of capacity, or if they have not been used for a long time (in the hangar) or if they have been accidentally abused, such as shorts or overcharging. This is much cheaper than building new planes. Use new batteries in a new plane.

e) Make sure there is no binding in the control-surface linkage. Be very careful not to get adhesives (especially cyanoacrylate) on servo bearings or hinges.

f) Do not let NiCds get too hot or too cold (Keep the planes indoors, if possible.) Use prewired packs if possible, as soldering batteries can easily overheat them.

g) Keep your batteries charged, even if you don't use them for an extended period of time. Don't let them sit around uncharged, or you won't get full life out of them.

All the above rules primarily are for 100-mah packs, but most comments apply to all sizes.

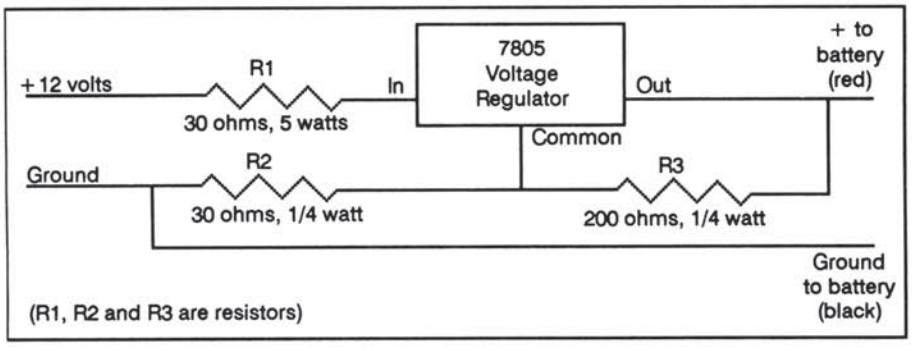
Use the largest size battery your plane can carry, and put the battery in the nose of the plane as nose weight. It doesn't make much sense to use 100-mah packs and then have to add nose weight!

Take charge!

The next subject is how to charge these 100-mah batteries. Actually the most important thing is not to overcharge them.

Build an automatic Rx battery charger for only $10.

John Veale's CCCV charger senses when your 4.8-volt receiver pack is fully charged, then cuts back to a trickle from a 150-200 ma quick-charge rate.



In general, the most current a NiCd can handle without overcharging is 1/10 of the rating. For a 100-mah pack this is 10 ma.

To fully charge a NiCd battery (from fully discharged) requires about 120% of its rating. For our 100-mah battery this could be 10 ma for 12 hours.

The chargers that come with the radios usually put out about 50 ma. (okay for a 500-mah pack) This current can be reduced to 10 ma for the 100-mah packs by inserting a series resistor of about 200 ohms (That's for Futaba; others may be different.)

It is okay to charge the 100-mah packs at 50 ma or even higher if you do not overcharge. For example, use the standard charger for about 2-1/2 hours only. This is obviously a little risky.

A better way is to use a constant current, constant voltage (CCCV) charger. (No they are not made in Russia). Please refer to the schematic on p. 13.

This circuit can be easily assembled from common parts and can be powered either from a car battery (cigarette lighter), a 12-volt gel cell (starter battery to you power types) for field use or a 12-volt DC wall transformer.

This circuit will charge a four-cell (4.8v) 100-mah pack at about 150 ma and reduce to a trickle when the pack is fully charged. Then, it can be used in the field between flights to maintain full charge.

In upcoming months, I will be discussing such things as electronic mixing, separate servos in wings, frequency control and anything else that comes up. If you have any specific questions, please write to me care of *SSN*.

EDITOR'S NOTE: John has a limited supply of 12-volt wall transformers and all the components needed to complete the CCCV charger circuit. They are available for a total of $10, plus $2 shipping. Contact John Veale, 1116 A Eighth Street, Manhattan Beach, CA 90266; 213/370-6237.

What To Look For

By Chuck Korolden

In part two, I'll go into a little more depth about what makes good lift, and what can cause it to change. The study of atmospheric phenomena is very complicated and involves a lot of strange formulas. I won't go into that much detail, but if you want to, the best place to start is with Dennis Pagan's *Flying Conditions – Micrometeorology for Pilots* book I mentioned in the last issue. Here I'll keep it simple.

There are four main factors involved in creating lift:

1. Air density.
2. Entry path to the slope.
3. Wind direction in relation to the slope.
4. Size and shape of the slope.

Air density

This is the most misunderstood and ignored aspect of lift dynamics. There are two main influences that dictate what the density of the air will be – temperature and humidity. These two factors can turn a small breeze into booming lift or take the punch out of a good strong wind.

When the air is hot and humid, it's less dense, especially when it's foggy. Some people out there are probably saying that with all that water in the air it has to be thicker. I won't go into a long dissertation as to why this is not so, I'll only add that the water molecules force the air molecules to spread apart. This isn't a very complete explanation, but I don't want to turn this into a seven-part series.

"If there are trees, houses or other things in the way, the turbulence they create can be felt for thousands of yards past the object that spawned them."

Now, why is this so important? Not everyone flies at a place with great conditions. If, one day, you find yourself sweating through aerobatic maneuvers that were easy a few days earlier, and the wind is blowing hard and from the right direction, it might be because of a change in the density of the air.

So to recap. Dry and cool is good. Hot and wet is bad.

Entry path to the slope

This refers to what the wind has to go over on its way to the slope. Be it water, ground or objects of size.

If the wind comes right over the water, it will develop no turbulence and therefore generate smooth lift. If it blows in over the ground, no matter how smooth and unobstructed, it will have turbulence associated with the lift it makes. The closer obstructions are to the slope, the worse it gets.

If there are trees, houses or other objects in the way, the turbulence they create can be felt for thousands of yards past the object that spawned them. An example is apparent at Long Beach's Bluff Park. At around 11 a.m. or noon, the wind is usually coming straight in, and the lift is good. Then, at about 1 p.m., it will switch to the west just a few degrees. That puts it in line with some off-shore oil rigs that are at least 600 yards away. The lift gets very patchy until it switches a little more to the west and clear of the oil rigs. Then it smooths out, and the flying is good again. This brings us to the next factor.

Wind direction in relation to the slope

This one's easy. The straighter in the wind blows, the stronger the lift. And as the wind angle becomes less perpendicular to the slope the less lift there is.

Size and shape of the slope

Smooth, solid air, straight in and no obstructions means zilch if it has nothing to blow against. Ya gotta have the hill. And the dimensions of the hill,

"Sometimes I use the Olympic pool building in Belmont Shore because it's got a big flat wall facing the wind."

(Continued from p. 2)

Please mention that you heard about it in *Slope Soaring News*!

Our Favorite Dealers

We recommend you do your hobby shopping at the following *Slope Soaring News* dealers.

Wilshire Model Center
2836 Santa Monica Blvd.
Santa Monica, CA 90404
213/828-9362.

Chuck's Model Shop
14005 Hawthorne Blvd.
Hawthorne, CA 90250
213/644-5000.

California Model Supply
1064 S. Brookhurst Road
Fullerton, CA 92633
714/871-0616

West Coast Hobbies
4690 Convoy St., #108
San Diego, CA 92111
619/569-9633

Covina Hobby Center
140 North Citrus Ave.
Covina, CA 91723
818/331-1910

San Antonio Hobby Shop
2550 W. El Camino Real
Mountain View, CA 94040
415/941-1278

PEC's Hobby Supply
947 N. Shoreline Blvd.
Mountain View, CA 94043
415/968-0800

Please mention *SSN* when you call or visit. Thanks!

Combat!

Cheetahs only, no streamers attached. Wilshire Model Center will sponsor three consecutive weeks of Hughes Hill combat on January 15, 22 and 29. Two categories will be accepted, Stock and Modified; rules are "touch tag" style; prizes will be awarded. Contact Bob Ratzlaff at 213/828-9362 for information.

The Hanger BBS

Got a computer with a telephone modem? Dial this modelers' bulletin board at 714/740-0551 (1200 8-N-1), say hi to Tim and join the soaring message base conversations. The soaring message base has been kind of slow lately. Let's fill it with good slope soaring information and conversation.

Back issues

I'm sorry, but there aren't any. Several subscribers have asked for our earlier issues, but we printed only as many as we estimated we could sell. Unfortunately, we guessed right.

Charlie Morey

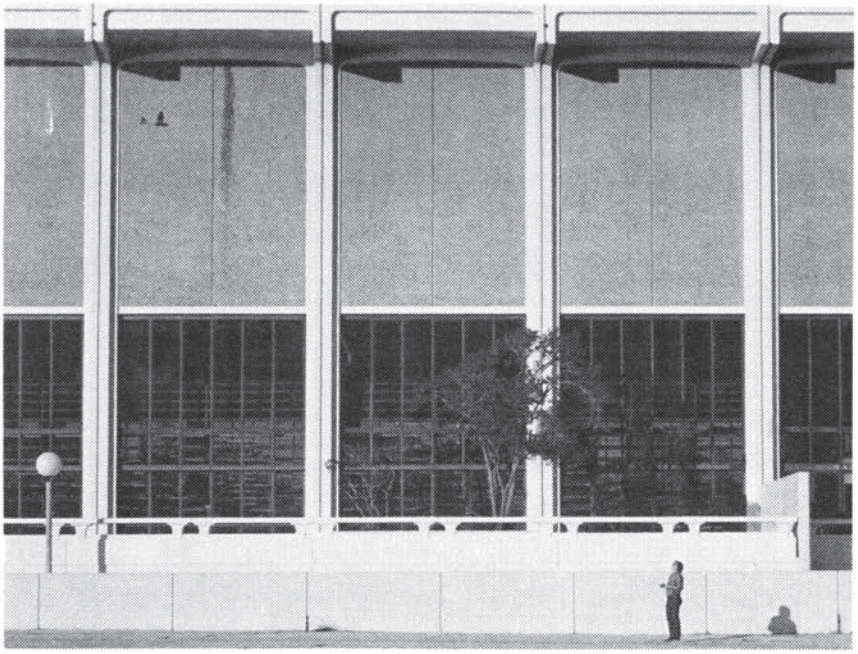
cliff, slope or bump are what puts it all together.

This one is self-evident. The higher up, the better. The more vertical, the better.

But don't limit yourself to just natural heaps of dirt and rocks. There are some places you might never think of as a place to fly. Sometimes I use the Olympic pool building in Belmont Shore because it's got a big flat wall facing the wind. A friend of mine was stationed in Oklahoma for a few months and used hay barns to get his lift. Watch the seagulls and other soaring birds; see what they use for their free ride and try the same.

Well that's it. I hope this gives you something to work with and opens up more flying possibilities. The most important part of all this is to be observant. Watch what happens at all the places you fly, and with time you'll get to know it. A good surfer knows every kind of wave because his fun depends on it. Our wave is similar, only invisible, if we don't know how to look.

Lift is where you find it.
But be careful! Chuck 's hand-launch glider is actually 100 feet away from the Belmont Shore pool building. He tossed it up, caught the ridge lift on the face of the wall and soared with the seagulls till it was time to go home. It's possible to fly on much smaller "slopes" than this one. Use your imagination...with caution!



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