



# REPORT

December  
2011

**ONLINE!**

Issue  
305

**Merry Christmas and a  
Happy New Year to all!**



**Where were you 20  
years ago?  
Well we included a  
legacy issue from  
December 1991!!  
WOW!! The times  
they have a  
changed!**



## **RC REPORT ONLINE**

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**CHRISTMAS BONUS...ISSUE #65 - DECEMBER 1991**



## OFFICE NOTES

Well, 2011 is winding down for sure now. Haven't you heard? It's December! I hear tell Alabama actually had snow the week after Thanksgiving. There was no accumulation in my area, but a cousin up on the mountain had a blanket of the fluffy stuff in her yard. Maybe I should move, huh?



Happy Belated Birthday to columnist Ed Moorman! He turned 29 on November 29. Drop him an email and send along your best wishes!

Would love to hear from you all out there about what Santa left under the tree for you...or what you gifted yourselves with this year. Send me

some pictures and make all your friends jealous!

The Kindle version slipped past us last month. Please accept my apologies for that. It's a completely different process than the upload and it just got overlooked this month. Look for the December issue in a few days.

I have a couple of different email distribution lists hanging around in my Outlook. If you are an iPad user; you can have the PDF version emailed to you each month. Kindle and Nook users can request that the Kindle version be sent to you also. I have also created a list for subscribers who are having difficulty downloading the PDF. Please email me if you would like to be added to one of these lists with the list you want to be added to in the subject line.

We are still socializing on Facebook. Join us! Click the Facebook icon to go directly to our home page!



Wishing you all a very Merry Christmas and a Happy New Year! God Bless!

Bye for now,

Julia

# *Smile! You could be the next Winner!*



## **Smiley Face Contest #12, 2011!**

Throughout this issue we have placed five or more Smiley Face Figures like the one shown here (☺), but as before this page doesn't count. Write us and tell us where at least five are, and you'll be eligible for a random drawing in which the winner will receive a free 12-month Premium Subscription to RC Report Online. The subscription may be used as a renewal or be gifted to someone else. Winners will be selected by a random drawing from all the correct entries received no later than December 31, 2011. No entries will be accepted after this date. Entries must be sent via US mail or E-mail only, and reference the correct contest number in subject line or address. Hobbico employees, RC Report Online employees, columnist and advertisers are ineligible for prizes. No Purchase Required. Valid in USA and Canada only. smileys@rcreport.net Subject line: Smiley Face Contest #12, 2011

US Mail: Smiley Face Contest #12, 2011 PO Box 12051 Huntsville, AL 351015

*All terms subject to change without notice. This contest is void in any area, state, or locality where taxed or prohibited.*



Hey!

*11 smiley's for 11 of 2011!*

*Happy Thanksgiving to RC Report Online!*

**Larry S**

***Twas not on purpose, Larry, but thanks for pointing it out! Julia***

*Dear Julia,*

*I'm late this month; my excuse is the crazy weather here in Maine. After receiving several inches of snow on Halloween weekend we got almost summer weather again, so I went from no flying at all to some beautiful sunny flying days. The magazine had to wait!*

*Now I've scanned it from end to end, finding that I really need to go back and read Brian Winch's engine column and Tony's battery info. Most of the other magazines don't get down to good basic stuff for modelers the way you do. Now if only a couple more experienced writer/modelers would join your "staff" I'd have good reading for the whole month.*

*This month I found ten little grins (you don't have to tell me how many I missed but I know you will.) They are on pages 8, 8, 32, 34, 36, 40, 42, 43, 44 and 45.*

**Frank Maguire**

***Frank, it would be no fun if I didn't, but quite honestly, I forget sometimes how many there actually are. I do try to plan ahead so I can remember and even that doesn't work all of the time. Julia***

*Smiley Face Contest # 11 2011*

*ELEVEEN!*

*That is enough for this month.*

*Greetings from North Dakota,*

**Manfred Decker**

***You found every last one, Mr Decker, so I would say so! Julia***

*EIGHT!*

**Dan Schaller**

***Please note that not all Smiley Face entries will be published each month. On occasion, I finish this page early in the month, but all entries are considered when determining the winner.***

**Julia**

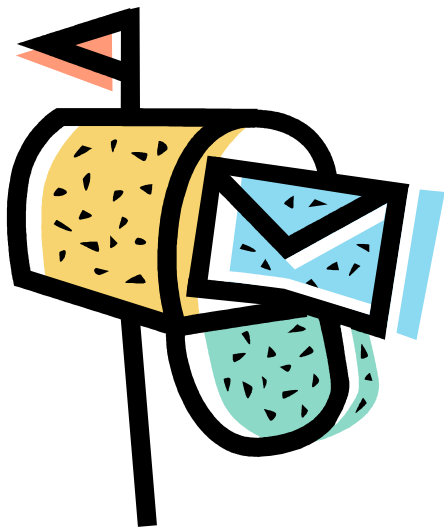
*Still loving the smileys! The winner will be announced in the January issue. The winner will receive a 12-month premium subscription to RC Report Online. Keep searching those articles and columns.*

*Total Smileys for the November 2011, issue was eleven!*

*☺ctober's winner is H. B. "Skip" Delius!*

*Thanks for your submission, Skip!*

*Julia Coberly*



# Mail Call

Well, folks keep your questions, comments and jokes coming.

A little Christmas funny (that I saved from last year) from Larry:

There was a man who worked for the Post Office whose job was to process all the mail that had illegible addresses. One day, a letter came addressed in a shaky handwriting to God with no actual address. He thought he should open it to see what it was about. The letter read:

Dear God,  
I am an 83 year old widow, living on a very small pension. Yesterday someone stole my purse. It had \$100 in it, which was all the money I had until my next pension payment. Next Sunday is Christmas, and I had invited two of my friends over for dinner. Without that money, I have nothing to buy food with, have no family to turn to, and you are my only hope. Can you please help me?  
Sincerely, Edna

The postal worker was touched. He showed the letter to all the other workers. Each one dug into his or her wallet and came up with a few dollars. By the time he made the rounds, he had collected

\$96, which they put into an envelope and sent to the woman. The rest of the day, all the workers felt a warm glow thinking of Edna and the dinner she would be able to share with her friends. Christmas came and went. A few days later, another letter came from the same old lady addressed to God. All the workers gathered around while the letter was opened. It read:

Dear God,  
How can I ever thank you enough for what you did for me? Because of your gift of love, I was able to fix a glorious dinner for my friends. We had a very nice day and I told my friends of your wonderful gift. By the way, there was \$4 missing. I think it must have been those jerks at the post office.  
Sincerely, Edna

Another Christmas funny from Larry: (And while it is funny; I'm not quite sure of the truth in it!)

When four of Santa's elves got sick, the trainee elves did not produce toys as fast as the regular ones, and Santa began to feel the pre-Christmas pressure.

Then Mrs. Claus told Santa her mother was coming to visit, which stressed Santa even more.

When he went to harness the reindeer, he found that three of them were about to give birth and two others had jumped the fence and were out, heaven knows where.

Then when he began to load the sleigh one of the floorboards cracked, the toy bag fell to the ground, and all the toys were scattered.

Frustrated, Santa went into the house for a cup of apple cider and a shot of rum. When he went to the cupboard, he discovered that the elves had drunk all the cider and perhaps the liquor too (he couldn't find it!). In his frustration he accidentally dropped the cider jug, and it broke into hundreds of little pieces all over the kitchen floor. He went to get the

broom and found that the mice had eaten all the straw off the end of the broom.

Just then the doorbell rang and an irritated Santa marched to the door. He yanked it open, and there stood a little angel with a great big Christmas tree.

The angel said very cheerfully "Merry Christmas, Santa. Isn't it a lovely day? I have a beautiful tree for you. Where would you like me to stick it?"...and so began the tradition of the little angel on top of the Christmas tree.

One more, from my dear friend, Mel: (Just because I want to leave you with a note about the true meaning of Christmas.)

#### The "W" in Christmas

Each December, I vowed to make Christmas a calm and peaceful experience. I had cut back on nonessential obligations -- extensive card writing, endless baking, decorating, and even overspending. Yet still, I found myself exhausted, unable to appreciate the precious family moments, and of course, the true meaning of Christmas.

My son, Nicholas, was in kindergarten that year. It was an exciting season for a six-year-old. For weeks, he'd been memorizing songs for his school's "Winter Pageant."

I didn't have the heart to tell him I'd be working the night of the production. Unwilling to miss his shining moment, I spoke with his teacher. She assured me there'd be a dress rehearsal the morning of the presentation. All parents unable to attend that evening were welcome to come then. Fortunately, Nicholas seemed happy with the compromise.

So, the morning of the dress rehearsal, I filed in ten minutes early, found a spot on the cafeteria floor and sat down. Around the room, I saw several other parents quietly scampering to their seats. As I waited, the students were led into the room. Each class, accompanied by their teacher, sat cross-

legged on the floor. Then, each group, one by one, rose to perform their song.

Because the public school system had long stopped referring to the holiday as "Christmas," I didn't expect anything other than fun, commercial entertainment - songs of reindeer, Santa Claus, snowflakes and good cheer. So, when my son's class rose to sing, "Christmas Love," I was slightly taken aback by its bold title.

Nicholas was aglow, as were all of his classmates, adorned in fuzzy mittens, red sweaters, and bright snowcaps upon their heads. Those in the front row-center stage -- held up large letters, one by one, to spell out the title of the song. As the class would sing "C is for Christmas," a child would hold up the Letter C. Then, "H is for Happy," and on and on, until each child holding up his portion had presented the complete message, "Christmas Love."

The performance was going smoothly, until suddenly, we noticed her; a small, quiet, girl in the front row holding the letter "M" upside down -- totally unaware her letter "M" appeared as a "W."

The audience of 1st through 6th graders snickered at this little one's mistake. But she had no idea they were laughing at her, so she stood tall, proudly holding her "W." Although many teachers tried to shush the children, the laughter continued until the last letter was raised, and we all saw it together. A hush came over the audience and eyes began to widen. In that instant, we understood the reason we were there, why we celebrated the holiday in the first place, why even in the chaos, there was a purpose for our festivities.

For when the last letter was held high, the message read loud and clear:

"CHRISTWASL ☺ VE"

And, I believe, He still is.

Amazed in His presence; humbled by His love.

May each of you have a Merry Christmas as you reflect on His Amazing Love for us.

Hope you all have a wonderful Christwaslove holiday season.



# ~It's Classified~

## **Non-Commercial Ads**

Ads from subscribers are published free of charge for one month on a space available basis. Free ads are limited to one per subscriber per month and may contain up to ten items. Add \$1.00 per each item over ten. Add a photo for \$5.00. Please email your ads to [juliac@rcreport.net](mailto:juliac@rcreport.net). Include your name and email address.

Phone numbers are optional. Modeling items only!

## **Commercial Ads**

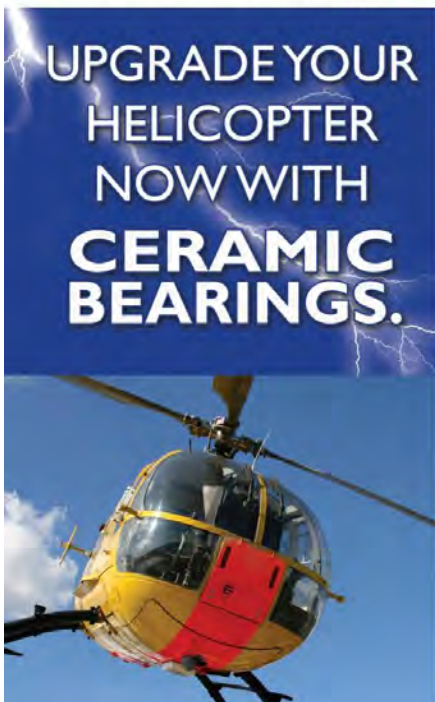
Commercial Ads are those offering a service, more than one of the same item, soliciting business, etc. If in doubt, call or email for details. Commercial rates are \$.25 per word and must be prepaid. Please contact the office for special multiple-month discounts. Cancellations will be accepted by mail, email or phone, but are non-refundable.

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# PHOTO OPS



From Royce Tivel: I have just received a Telemaster Electro ARF from Hobby Lobby. I have attached a photo showing the fuselage on my improvised workbench (which resides in my trailer bedroom). As you can see, I've just about reached the limit of the size airplane I can put together. I Plan to put the Telemaster on floats and have ordered floats from Ralph Smith at [planefunfloats.com](http://planefunfloats.com). Both Ralph and Jason Cole, from Hobby Lobby, are giving me great support with the project. I will also be getting support from the experienced members of my float club. I am documenting the project as I go along and plan to submit an article to you when the project is completed. I have been a member of the local float club for a long time, now, and it will be nice to actually fly with the group.



Another one from Royce: As for flying indoors, I am sure that will begin before too long. I have attached an image from one of our "fly-ins." It is great fun and a club member let me fly his helicopter last year. For the first time, I realized that a beginner *\*can\** fly one of these micro aircraft. It's loads of fun, too, especially when there are several aircraft in the air at the same time. Fortunately, the aircraft are very rugged and easy to repair. One of the best aircraft features is that they are not expensive--ready to fly. Perhaps I'll be able to put an article together about indoor flying when we start up again.





Hello Julia,

Thank you for the RC Report Online subscriptions. Attached is a photo showing some of the shoppers looking over the 175 tables of goodies.

I hope you have a wonderful Thanksgiving and again on behalf of the Middle TN R/C Clubs Association we appreciate your support.

Charles Waterson



Aero Radio Club of Syracuse  
Syracuse Thunderbirds Aero Radio Society  
Central New York Indoor Flying Society



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***MODEL AIRCRAFT FORUM***

***and Electric Fly-In***

***[Swap Shop too!]***

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**9 AM to 4 PM**

**at**

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***See back for map***



# **4rd Annual West Virginia R/C Hobbies Expo Bigger New Place**



**Date :** Saturday February 18, 2012  
**Where :** Jackson County Armed Forces  
Center 8832 Point Pleasant Rd . WV  
25262

**West Virginia's  
Largest**

**Time : 8:30 - 3:00**

**Admission : \$5.00 For Adults  
10 and Under Free**

**Drawings And  
Raffles**

**Auction Starts at 1:00**

**100 tables sold out last year!**

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# BUZZARD BUSTER



RC Club 9<sup>th</sup> Annual



# SWAP MEET

8:00 a.m.

Saturday, December 3<sup>rd</sup>, 2011

Hico, Texas

Junior High School Cafeteria

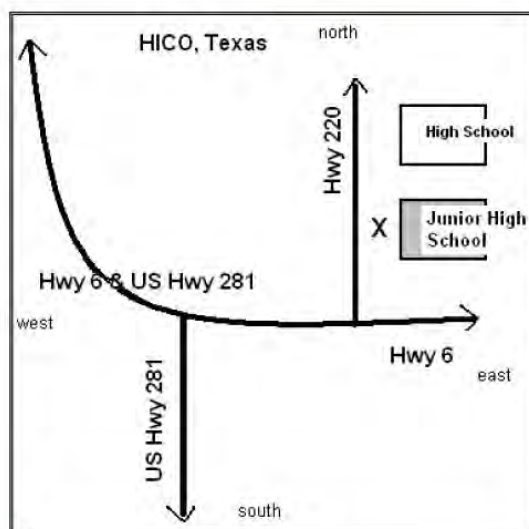
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## SUPER TIGRE GS 45

## BRIAN WINCH

CONFIGURATION	ABC RINGLESS, FRONT INTAKE, SIDE EXHAUST
DISPLACEMENT	7.5 CC
BORE	21.85 mm
STROKE	20.0 mm
WEIGHT	524 g
STATED POWER	1.45 BHP @ 16,000 rpm
R.P.M. RANGE	Idle to 16,000
PROP' RANGE	9 x 8 - 11 x 6
FUEL	18 - 20% oil - up to 15% nitro methane
SHAFT THREAD	UNF ¼ x 28 tpi
SUPPLIED WITH	Glow plug, exhaust system, Allen key, instruction manual, decals, and 3 year warranty.
AVAILABLE FROM: THE HOBBY HEADQUARTERS- most model shops.	

## FOREWORD

Before we move into the review - let's clear some air. The term 'ABC', has crept into model engine terminology as an, almost, generic classification for any engine that is not fitted with a piston ring. This is incorrect. We now have ABC (Aluminum/Brass/Chrome) - AAC (Aluminum/Aluminum/Chrome), ABN (Aluminum/Brass/Nickel) as 3 examples and these initials (almost accepted as acronyms) refer to the piston (Aluminum) - the liner (Brass) and the coating on the liner or direct onto the inner cylinder wall as Chrome or Nickel. Any of these configurations could also include a piston ring (R.) as in, for example, a Saito engines which are of AAC configuration with a piston ring. This engine on test is ABC configuration - no ring. Of special interest is that Super Tigre engines set the bench mark for this configuration as Jaures Garafoli, the original designer and manufacturer (in Italy) was the first manufacturer to develop and use, successfully, the ringless aluminum piston in a chrome plated liner for his high speed engines. When Mr Garafoli moved onto matters celestial, the business moved to China and the manufacturers there continue to produce the engines with the same very high quality and performance. If anything, they have improved the engines to some degree as the carburetors are now extremely smooth and even in operation plus, with the ringed engines, the need for a protracted run-in period is now gone as they will perform almost out of the box. Much the same for the ABC non ringed engines. They need a reasonable brief run-in at close to full tune and RPM then straight into a model for a short continuous run-in, then full blast. It is a bad mistake to attempt to run-in this

configuration engine with overly rich running. The engine needs almost full operating temperature to expand the liner and relieve the tight fit of the piston at Top Dead Centre as is felt by the 'pinch' when the engine is turned over cold. To run the engine very rich, and subsequently, cold, is more likely to damage the engine or, at the very least, cause premature wear in the piston/liner fit. Okay, let's see what I did on the bench to get it screaming.



### **A proven design that goes back to the earliest RC-ST engines.**

Using 20% Coolpower blue oil, 10% nitro and 70% methanol, I primed the engine then gave it a couple of flicks to ensure it was well lubricated for the initial start, connected the plug, opened the throttle about  $\frac{1}{4}$  and flicked it into life with the first flick. It was really humming right from the start. My method is to run the engine up to full RPM at a slightly rich setting while I hold the cylinder head. As soon as my fingers start to sizzle I stop the engine and let it get absolutely cold - no residual heat whatsoever. (I go and do something else while it cools). I repeat this procedure 5 to 10 times - depending on the engine while monitoring the rising RPM and engine temperature. When both are stable I get right into it - let it howl, scream



and generally perform in the manner for which it was intended. Still monitoring the RPM and temperature, I record the RPM then continue on with the different propellers. The ABC Tigres are really enjoyable to run like this as they are so willing to perform and they really get howling. During the running and use of various propellers, I record my observations of the process as follows.

## BENCH NOTES

The engine ran first hit out of the box - the piston pinch was quite evident when cold and still could be felt even when the engine was just stopped after a test run. This is good for hot starts by hand (if this is how you start the engine). The engine was rearing to go every propeller change and the RPM climbed steadily as I advanced the throttle and made minor tuning changes to suit the different propeller load and change of RPM. At full throttle it was steady as a rock; idle was a gentle, reliable tickover never missing a beat and the transition was like tearing calico - an instant 'rip' up the RPM scale. As soon as the engine reached operating temperature it was quite smooth with a very low vibration level. The engine was quite cool (no overheating) and the lower crankcase never got much more than finger touch warm - indicating a well aligned front housing and bearing arrangement. The tuning was responsive; muffler quite acceptable in sound and the engine was clean as new after all testing. All in all - quite enjoyable to run and good fun if you like to hear the sound of powerful, high RPM.

I have run two of these engines in the past and recorded the RPM so I had a reference for the propeller range and RPM for comparison. The

very slight changes I recorded would be due to different weather conditions and the very small variations you would expect from a mass produced engine.

Now for a brief examination of the parts.

## CRANKCASE



**Look at the '45' and note the stylized 'G' surrounding it.**

High quality aluminum alloy casting, fine details and no blemishes in the material. Of note is the stylized letter 'G' surrounding engine size designation. This will forever stand as a reminder of the founder - 'G' for Garafoli.

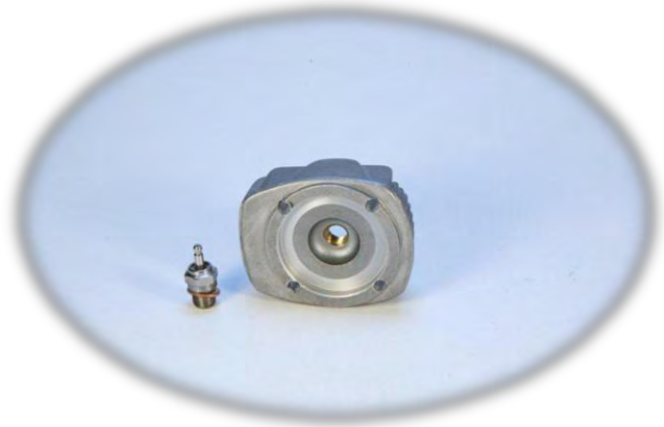


**This unique manifold provides almost unlimited muffler positions.**

The engine mounts are sturdy and the holes well spaced (wide spacing reduces vibration transmission to the airframe), exhaust manifold is very solid and the method of muffler retention is by 'through' bolts - bolts through from the rear of the engine case - that retain the separate muffler manifold with spring washers and nuts. The carburetor is retained by a pinch bar (don't over tighten this) and this allows you to fine tune the carby position if you like the needle as far back from the prop as possible (or to fine tune your throttle linkage if needed). There is no law that states carbies must be at ninety degrees to the crankshaft - angle it if you like.

The front housing is short and well braced with two ball bearings to support the crankshaft.

All neat and nice.



**Typical ST head - note the brass thread for the plug.**

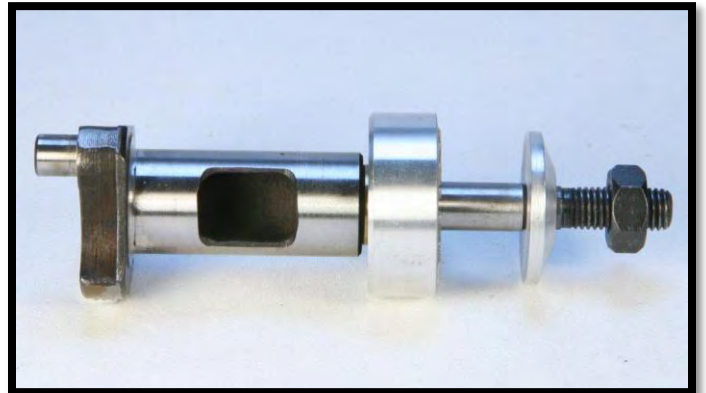
Of note is the cylinder head with its typical ST deep finning, 'hemi' combustion chamber, and rare these days, a threaded brass insert for the glow plug.

## INNER WORKINGS



**The machine marks on the piston are from the honing process to ensure perfect roundness.**

The chrome plated brass liner is an easy slip fit into the finned barrel, the piston is externally honed for absolute roundness and it is cast in very high tensile and thermally stable aluminum alloy - a very tough customer with a very long life potential.



**One piece high tensile steel - fine surface finish is typical of ST crankshafts.**

The conrod is a bit of a benchmark for ST engines - super tough - fully machined and bronze bushed both ends.

The crankshaft is another tough customer machined from bar stock high tensile steel alloy, heat treated and super finely surface

machined on all working sections. The cast, 26.2mm propeller drive hub is well splined, propeller washer is taped face aluminum and the propeller nut is 11 AF (Across the Flats). Neat, nice and trouble free.



**Thick walled brass liner with the hard chrome inner plating.**

## IN AND OUT

The carburetor is the typical Super Tigre style - fuel metering (needles for both mixture ranges), rubber sealed to prevent grit wearing the throttle rotor or the carburetor inner surface, throttle arm is the long standing clamp on composite piece that allows infinite adjustment for position and throw trimming, the main needle is very accessible with a good finger grip plus a sturdy ratchet and the idle mix adjustment has a cross slot head for easy adjustment with a flat blade screwdriver. On the top of the body is a spring loaded screw that acts as a throttle stop for idle speed - little used as it would prevent shutting the engine right down when the flight is finished. In the event of a 'nasty' landing that damages the carburetor, the mainjet and needle assembly is replaceable simply by accessing

two small cross slot screws - a long standing feature of ST carbs.



**Undo two screws and you can replace the complete fuel metering system.**

The 'quiet' series muffler clamps onto an exhaust stub attached to the engine manifold. This design allows for almost a full circle adjustment of the muffler position - a point often missed by modelers. For an in-cowl installation, the muffler can be set to point up, down, straight back or at many angles to suit the model. As far as I know, this is the only engine muffler that allows such a great range of positioning.



**The 'Quiet' muffler - set it at the desired position then lock it in place with the clamp screw.**



## SUMMING UP

I have had Super Tigre engines from way back in the dim past and they have always been great performers. This engine is no exception - in fact - it is a little surprising as to just how well it performs with its ease of operation and use. Definitely a good bit of gear that will give many hours or even years of reliable service. See just how it performed with the prop tests.

## PROPELLER TESTS

### APC

9 x 8	15,100
9 x 9	14,150
9 x 10	13,090
10 x 6	14,560
10 x 9	11,950
10 x 10	11,180

### BOLLY

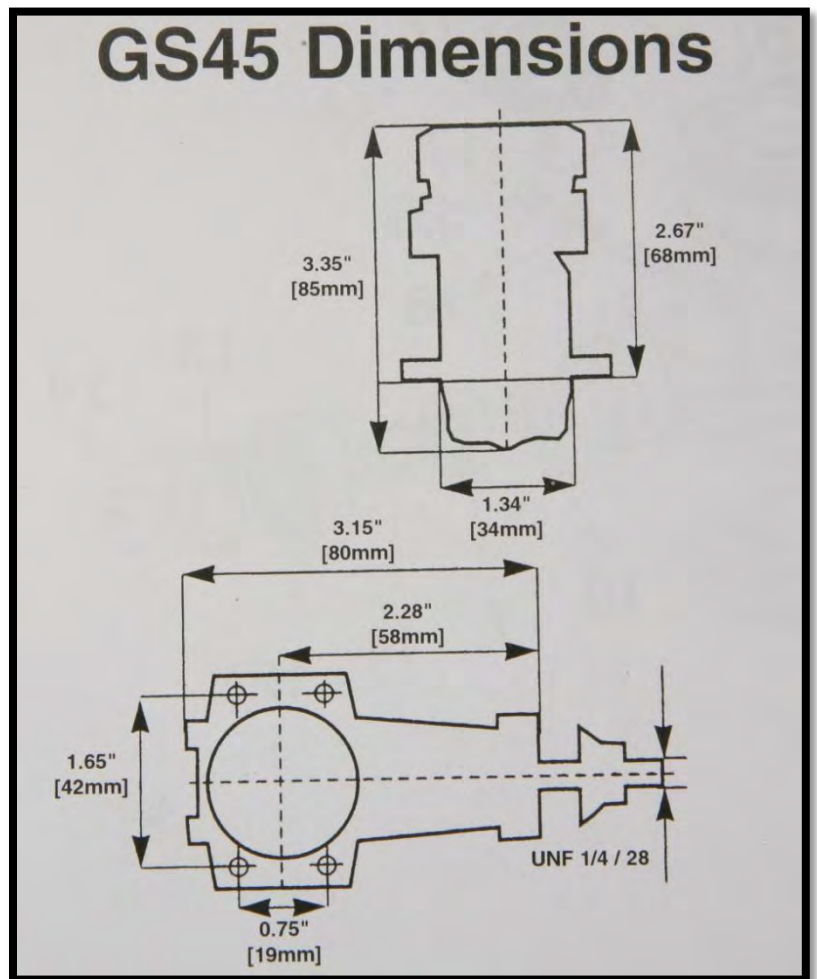
11 x 6	13,930	2,200 idle
--------	--------	------------

### APC

11 x 7	12,325	2,180 idle
--------	--------	------------

## STRESS TEST

11 x 4	14,617	2,150 idle
--------	--------	------------



Engine dimensions





## NGH - GT25

## BRIAN WINCH

CONFIGURATION	Single cylinder two stroke - spark ignition - petrol fuel
DISPLACEMENT	25cc
BORE	33.2mm
STROKE	29mm
WEIGHT	960g complete
STATED POWER	2.7HP @ 11,000 RPM
R.P.M. RANGE	1,600 - 11,000
PROP' RANGE	15 x 10 - 17 x 6 (tested)
FUEL	3% oil general running
SHAFT THREAD	UNF 5/16" x 24
SUPPLIED WITH	All running equipment, toolkit, spare gaskets, operation manual
AVAILABLE FROM:	CHRISTIAN TRADERS

## FOREWORD

For readers who have not yet seen or read about this brand of engine, let me assure you that it is of very high quality, designed from the blueprints up solely for use in model aircraft and a brand we are going to see more of as time moves on. The owner of the manufacturing company has a long history in the field of model engine production having produced a range of very successful two stroke glow engines for many years. He contacted me some time back to discuss the needs of modelers interested in petrol engines as to styles, designs and sizes. I was able to offer some assistance in that area and suggested attention to some of the areas of design lacking in so many petrol engines now on the market. We need engines purpose designed for model aircraft use - engines with specific characteristics including external features such as carburetor positioning, ease of throttle connection, uncomplicated mounting and flexibility in regards the position and mounting of mufflers or header pipes. One other factor that is always on my mind is the balance of the engine. Many of the converted hand tool engines (chainsaws, leaf blowers, whipper snippers and the like) are balanced generally for the main operating RPM which is usually full speed or very close to it. The loads on these engines are greatly different to the loads we impose with the range of propellers and this requires operation as smooth as is possible (for a single cylinder engine) at any operational speed. It is not possible to balance a single cylinder engine totally and all engines have a harmonic period - brief period of vibration over an RPM range but...it the engine is balanced as much as is possible for varying RPM operation, it suits our application really

well. You will find this engine is particularly smooth in operation - really smooth for a single cylinder 25cc capacity engine - and it boils down to quality of manufacturing, absolute best balancing and...a point often missed - low compression.

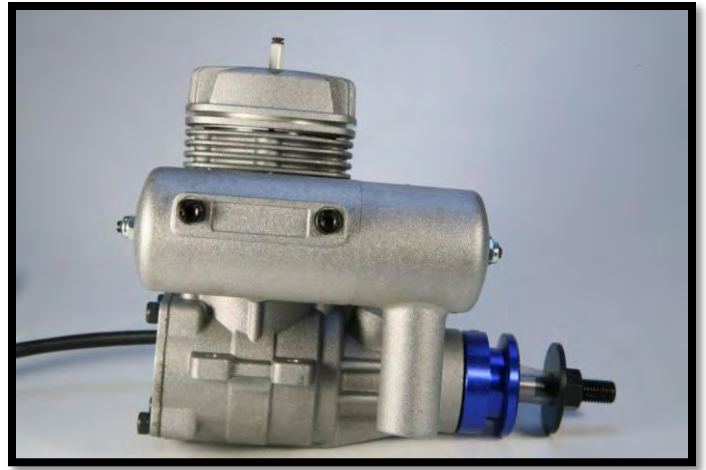


**Carburetor is angled for easy access to the throttle arm and the tuning needles.**

Regarding the features of design, note the carburetor position for a start. On the front of the engine using a port in the crankshaft (as the common design of so many of our glow engines), it is canted around to one side and mounted directly onto a purpose (cast in) manifold that is part of the main case. The reason for the angle position is to allow for absolute direct connection from the throttle servo to the throttle arm - no bellcranks, bent wires, binding cables - a simple, straight connection. This also puts the mixture adjustment needles well back from the propeller and extremely easy to access for those minor adjustments from time to time. I do not recommend adjusting the needles when the engine is running, but it is nice to be able to access them without, virtually, standing on your head to do so as is often the case. Another consideration regarding the carburetor position

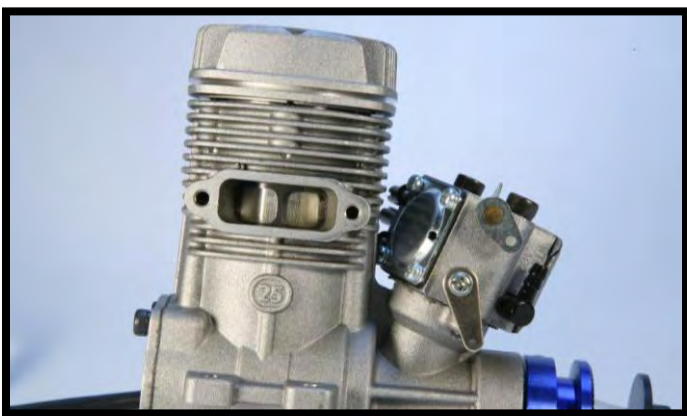
is that it is a 'clean' air position - no high/low troughs or passing air to create a problem as is the case with many side mount carbies and no hot, stale air as can be a problem with some rear mount carbies. The carby is subjected to a clean, fresh airflow at all times from the forward motion of the aircraft and the backwash of the propeller.

Next feature is the beam mounting and this is always a winner with me. From way back in 1cc diesel days (first engine in 1949) I found the beam mounting to be the easiest to set up and the best for reducing the engine vibration from being transmitted throughout the airframe. Engines are less likely to 'free flight' off the front of the model - often taking the firewall with them and it is an easy operation to check the mounting bolts from time to time. Ideally, a pair of hardwood rails built into the front of the model as part of the construction is the better way to set up the mounting platform. However, if you have an ARF model or a model you wish to adapt for this engine, a set of aluminum mounts firmly attached to a well fitted firewall is a second option.



**The muffler can exhaust up - down or sideways at almost a full circle.**

Next consideration is the muffler and here we have a winner. As the engine is supplied, the exhaust system is bolted onto the solid and substantial side exhaust manifold in the common style. Perhaps this does not suit your model or will not fit in the cowl of your scale model so you have to layout lumps of money for an expensive - and often stifling after market muffler to put the exhaust at the up or down (inverted or upright running. Well, here's the good news. The supplied muffler is universal in this respect in that the outlet can be pointing down (for an upright engine) or up (which is also down) when the engine is inverted. In my photo you can see the muffler outlet pointing down with the engine upright for the test running. I later re-mounted the muffler to have it still pointed down when I ran the engine inverted which, as many modelers know, is ideal for petrol engines - they don't care which way they are - they just keep running.



**Good, wide exhaust manifold. Note the throttle arm position.**





**Having a front carburetor and a compact muffler provides a narrow profile to fit inside almost any cowl.**

## BENCH NOTES

Right then, starting to like what you read? Stay with me and read my first impressions noted during the (laboratory type) testing on my test bench.

When hot the engine will hand start with a good flick or two but an electric starter spin has it purring instantly. The transition was smooth and responsive, RPM at all ranges was steady and even, the vibration was very low (as mentioned above), and within the operational range requirements, the engine ran cool and cooled quickly when stopped. (If an engine runs too cold it is not efficient). The tuning was quite simple with less than ¼ turn required for all the different propeller loads and different RPM, except for a small seep from the muffler at the start, the engine was quite clean after all the testing was carried out. Summing up - a very friendly engine that grows on you after not much running.

Okay, a brief look at the makeup.

## THE PARTS STORY



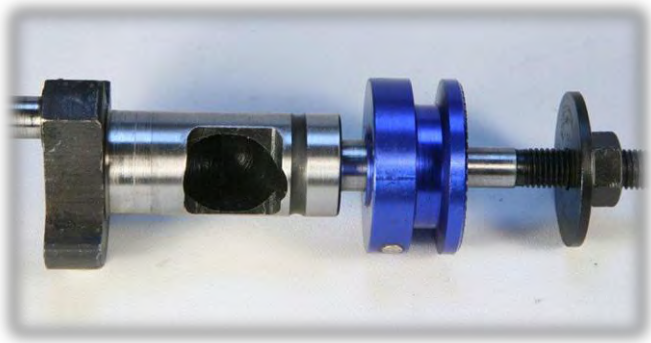
**Note the gudgeon pin retained by the stepped hole in the boss. The conrod is all bronze.**

The cylinder liner is heat treated steel (long life job) that is a snug fit in the cast barrel. The piston is machined from a permanent mould casting and is high tensile, controlled expansion aluminum alloy; one cast iron ring is fitted. The gudgeon pin is retained by one circlip plus a stepped hole and it pivots in a very nice bronze connecting rod - ideal for the low oil content in the fuel.



**Very reliable Rcx1 ignition equipment is now used on many engines – even badged with the particular engine brand.**

The crankshaft is a nice bit of work fully machined in one piece of high tensile steel. The



**Very substantial crankshaft machined in one piece from high tensile alloy steel.**

main journal (thickest shaft section) is 20mm diameter providing loads of strength around the 15mm port bore. The blue anodized 34mm diameter propeller drive hub is machined from aluminum alloy bar stock and it is driven by a Woodruff key (half moon shape) in the crankshaft. This provides the drive and also maintains the timing position for the magnet that excites the ignition sensor. Propeller washer is tapered face steel and the nut is 13mm AF (Across the Flats). The groove in the shaft journal (see photo) is an annular ring for oil retention (lubrication of the port area) and also prevents oil from moving forward along the front housing. As the front bearing is full sealed, it is lubricated for its life so it needs no further lubrication from the engine.



**Well cast, finely finished maincase. Note the Tygon connection from the transfer passage to the intake manifold to drive the fuel pump.**

The carburetor is a genuine Walbro - extremely popular carby for so many engines - and is a model WT6640 that requires an external pulse from the engine to operate the pump diaphragm. In the photo you will see the Tygon tube connection from the front bypass (transfer passage) to the intake manifold. The mixture needles were set spot for basic running as the engine came from the box. Only a very minor adjustment was needed as mentioned above. Take the hint, don't fiddle with these needles - it they ever need adjusting it is only the smallest amount - just a few degrees.



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The muffler is cast aluminum alloy with a baffle and the rear section can be rotated to suit your application.

#### CASTING OFF

Quite a pleasant engine - runs very well, well made and for a really good price from the authorized distributor - an excellent first petrol engine. The testing was carried out on the 26:10:11 with the temperature at 16.7C and humidity at 79%. Fuel was unleaded petrol and 5% Coolpower blue oil. (Oil supplied by Tates Toys and Hobbies)



The combustion chamber shape is known as a 'hemi head' due to the hemispherical shape.

#### PROPELLER FIGURES: APC PROPELLERS USED

15 x 10	8,928	1,760 Idle
15 x 12	8,450	
15 x 14	7,960	
16 x 8	8,325	1,420 Idle
16 x 10	8,690	
17 x 6	8,990	



Double transfer ports in the liner provide a smooth flow into the transfer passages.



“All I want for Christmas is...” I have not quite made up my mind. What do you want? Mom tells me she would appreciate an extended vacation and someone to help her with the Christmas baking. Anyone out there interested in spending Christmas in Alabama learning how to make oatmeal cream cookies? Email Mom if you want to visit. We can cuddle under the Christmas tree and drink eggnog. I am allowed to have a little as long as it doesn't have any alcohol in it.

Happy Belated Birthday to Ed Moorman! Sorry I missed you last month, Ed! Hope you are staying warm down in sunny Florida!

Let's see what happening in 2012!

1/6/2012 - 1/8/2012 -- Ontario, CA (E) AMA EXPO. Site: Ontario Convention Center. Lora Knowlton CD Email: [cocoug@aol.com](mailto:cocoug@aol.com). Visit: [www.amaexpo.com](http://www.amaexpo.com). This three day expo provides a world-class display of the latest and greatest products for the modeling enthusiast and fun activities the whole family can enjoy, including flying demos, model rocket and plane build and fly stations, as well as interactive displays, static model competitions and guest speakers. With more than 100 unique exhibitors and expert modelers on hand, the expo will be entertaining for all modelers. Sponsor: ACADEMY OF MODEL AERONAUTICS



1/8/2012 -- Celina, OH (E) 25TH ANNUAL RC SWAP MEET. Site: Celina Senior Hs Auditorium. Timothy Moorman CD PH: 419-678-3211 Email: [timbob@bright.net](mailto:timbob@bright.net). 7:30AM vendor set up, table rent \$10 reserved, \$12 at the door. Reserved tables must be paid in advance. Reserved tables held until 8:45 day of show. 50/50 drawing, planes boats and cars welcomed. Sponsor: CELINA FLYING SPORTSMEN

1/8/2012 -- Waukesha City, WI (E) 34TH ANNUAL AUCTION AND SWAP SHOP. Site: Waukesha City Airport Expo. Scott Jones CD PH: 414-461-6013 Email: [onehobby@happyhobby.com](mailto:onehobby@happyhobby.com). Sponsor: MILWAUKEE ASSOCIATION OF R/C CLUBS

1/14/2012 -- Angola, IN (E) TRI STATE RC SWAP MEET. Site: Indiana National Guard Armory. Stephen White CD Email: [ssw3@verizon.net](mailto:ssw3@verizon.net). The swap meet runs from 9AM to 12PM. Tables rent for \$12 and admission is \$5. A free admission is included with the rental of two tables. Prizes will be given. There will be a 50/50 raffle. RC airplanes, cars, trucks and boats are all welcome. Free coffee and sweet rolls will be available. Sponsors: STEUBEN MODEL AIRCRAFT KLUB, BALSA BUTCHERS

1/14/2012 -- Urbana, OH (E) THE MOST UNIQUE RADIO CONTROL SWAP MEET. Site: Grimes Field Airport. David Millner CD Email: [dmillner@woh.rr.com](mailto:dmillner@woh.rr.com). Visit: [www.flyurbana.com](http://www.flyurbana.com). The swap tables are located under the wings of real B-25 and C-47. Admission \$5 suggested donation going to Aviation Museum. Sponsor: MAD RIVER FLYING ASSOC

1/15/2012 -- Mars, PA (E) M.A.R.S. ANNUAL SWAP MEET. Site: VFW Post 7505. John Froehlich CD Email: [frodove@comcast.net](mailto:frodove@comcast.net). Visit: [www.marsrcclub.com](http://www.marsrcclub.com). Forty-five 8' tables at \$15 per table; in advance only. Admission \$3 adults, children under 10 free. Door prizes. Always a sellout, register early. Send checks to MARS c/o Chuck Dufford, 106 David Dr Butler PA 16001. All tables are first come first serve, do not count on getting one at the door. Sponsor: MODEL AIRCRAFT RECREATION SOC

1/21/2012 -- Springhill, TN (E) CRCFM SNOWTIME SWAP MEET. Site: Uaw Local 1853. Sherman Maggard CD Email: [smags11@gmail.com](mailto:smags11@gmail.com). Visit: [www.columbiarc.com](http://www.columbiarc.com). 8AM to 2PM. Auction to follow. 140+ tables, buy, sell, and trade all types of remote control airplanes, helicopters, gas, electric. Full range of equipment. Please call for reservations. Sponsor: COLUMBIA RC FLYING MODELERS

1/29/2012 -- Iowa City, IA (E) 9TH ANNUAL IOWA CITY AEROHAWKS SWAP MEET AND AUCTION. Site: National Guard Armory. Richard Vedepo CD Email: [rich.vedepo@3e-co.com](mailto:rich.vedepo@3e-co.com). Visit: [www.iowacityaerohawks.com](http://www.iowacityaerohawks.com). The area's largest. Our 120+ tables sell out early, so book soon! Set up 8AM, sales 9AM, auction at noon. Great, new location. Easy park/unload. Admission \$4, 12 and under free. 6' tables \$11 (includes 1 admission). Additional tables \$9. Sponsor: IOWA CITY AEROHAWKS INC

1/29/2012 -- Billerica, MA (E) MIDDLESEX COUNTY RC FLIERS 20TH HOBBY AUCTION. Site: Marshall Middle School. Gerald Crowley CD Email: [info@mcrcf.org](mailto:info@mcrcf.org). Visit: [www.mcrcf.org](http://www.mcrcf.org). Registration 11:30AM, auction 12:30AM to 4PM. Refreshments available. SS radio and 50/50 raffles, cash only, 10% of sale to club. Visit website for details/rules. Sponsor: MIDDLESEX COUNTY R-C FLIERS

1/28/2012 -- Prague, OK (E) SHAWNEE THUNDERBIRDS SWAP MEET. Site: Prague Community Center. Roger Radell CD Email: [prgeyedr@yahoo.com](mailto:prgeyedr@yahoo.com). Admission \$5, tables free. 8:30AM until ? Directions from Hwy 62, go north on Westlawn for one block. Sponsor: SHAWNEE THUNDERBIRDS

Maybe there are places that are still warm enough to fly...

1/7/2012 - 1/8/2012 -- Cedar Falls, IA (C) EXPO IN THE UNI DOME. Site: Uni Dome. Stan Sweet CD Email: [sweet@cfu.net](mailto:sweet@cfu.net). Visit: [www.expodome.org](http://www.expodome.org). Sat 9AM to 8PM, Sun 8AM to 5PM. Open flying all time except air show at 1PM both days. Pre-arrange exhibition flights with CD. Pre-registration recommended, see website for details. Sponsor: BLACK HAWK RC PILOTS INC

1/14/2012 - 1/16/2012 -- Eloy, AZ (C) SOUTHWEST REGIONALS RC OLD TIMERS. Site: Toltec Rd. Robert Angus CD Email: [bangus@comcast.net](mailto:bangus@comcast.net). Sponsor: SOUTHWEST REGIONALS MODELERS ASSOCIATION INC

1/14/2012 - 1/16/2012 -- Dade City, FL (C) FLORIDA WINTER FLY SAM RC CONTEST. Site: Withlacoochee River Park. Fred Mulholland CD Email: [fredbarbl@verizon.net](mailto:fredbarbl@verizon.net). Events 1/2A Texaco O & R sp, O & R 23, C Glow LER, Elec LMR, Elec Texaco, C Ign LER, A/B Glow LER, Brown Jr LER, Spirit of SAM elec Wakefield, Elec speed 400, Nostalgia, A/B Ign LER Texaco comb, Antique Comb, Fox a Coy, A Texaco. Sponsor: FLORIDA FLYERS

1/22/2012 -- Laurel, MD (C) FSA WINTER INDOOR FUN FLY. Site: Laurel Armory. Rob Clark CD Email: [rotorheadbob@mac.com](mailto:rotorheadbob@mac.com). Visit: [www.freestateaeromodelers.org](http://www.freestateaeromodelers.org). This event is for slow flying micro radio controlled airplanes and helicopters. This is the third year of FSA's indoor fun fly series and we're having a blast. Come join us. The largest plane is 50 grams; the largest helicopter is a Blade SR 120. This event runs from 1PM to 4PM. Sponsor: FREE STATE AEROMODELERS

1/21/2012 -- Spring Hill, TN (C) INDOOR OPEN. Site: Club Field. Tom Chism CD Email: [tom\\_chism@yahoo.com](mailto:tom_chism@yahoo.com). Visit: [www.columbiarc.com](http://www.columbiarc.com). Come to our swap meet then fly indoors with us. Flying starts after swap meet around 3PM. No landing fee. 16 oz max weight airplanes, helis or anything that flies. Sponsor: COLUMBIA RC FLYING MODELERS

1/21/2012 -- Chantilly, VA (C) NVRC SNOW FLY. Site: Poplar Ford Park. Harold Chadsey CD Email: [fly.bear@verizon.net](mailto:fly.bear@verizon.net). Visit: [www.lnvrc.org](http://www.lnvrc.org). Events include loops, rolls, timed flight and spot landing. Sponsor: NORTHERN VA RC CLUB INC

1/26/2012 - 1/29/2012 -- Mesa, AZ (C) 8TH ANNUAL ARIZONA ELECTRIC FESTIVAL. Site: Superstition Airpark. Aaron Lichtenwalner CD Email: [aaronl12@cox.net](mailto:aaronl12@cox.net). Visit: [www.arizonaelectricfestival.com](http://www.arizonaelectricfestival.com). Visit website for event information and updates. Sponsor: ARIZONA MODEL AVIATORS

1/27/2012 - 1/29/2012 -- Geneva, FL (A) THE BLUE MAX. Site: Club Field. Phillip Spain CD Email: [pespain@att.net](mailto:pespain@att.net). Visit: [www.thebluemaxrc.com](http://www.thebluemaxrc.com). Event 523(JSO). The Blue Max is an adjudicated event that combines a traditional, informal "dawn patrol" style fun fly for scale models of flying machines from the earliest years of aviation. Participation is limited to aircraft built between 1903-1919. Flying fee \$20 per pilot. Camping on site, no hook ups. Concession stand, cook out on site. Sponsor: SANFORD AER ☺ MODELERS



1/29/2012 -- Wapakoneta, OH (C) LARKS 6TH  
ANNUAL ELECTRIC INDOOR FLY IN. Site: 1  
Redskin Trail. Rodney Metz CD Email:  
[dts@bright.net](mailto:dts@bright.net). Visit:  
[www.larksclub.homestead.com](http://www.larksclub.homestead.com). Fee \$10 includes  
\$3 admission. Sponsor: LARKS

There seems to be a little more going on in January  
than last month. Aren't you glad? Merry  
Christmas and Happy New Year! Be blessed and  
know the true meaning of  
Christmas!

Let me hear from you! Send in  
your event information by email,  
via the office:  
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small! Attach a flyer, too! If  
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# R/C REPORT

SERVING RADIO CONTROL MODEL AIRCRAFT ENTHUSIASTS EVERYWHERE

ISSUE 65

DECEMBER 1991

\$2.50



**This Month's Reviews: Pica's 1/5 Scale P-51D  
Great Planes' Fun One & Ace R/C Skyhawk**

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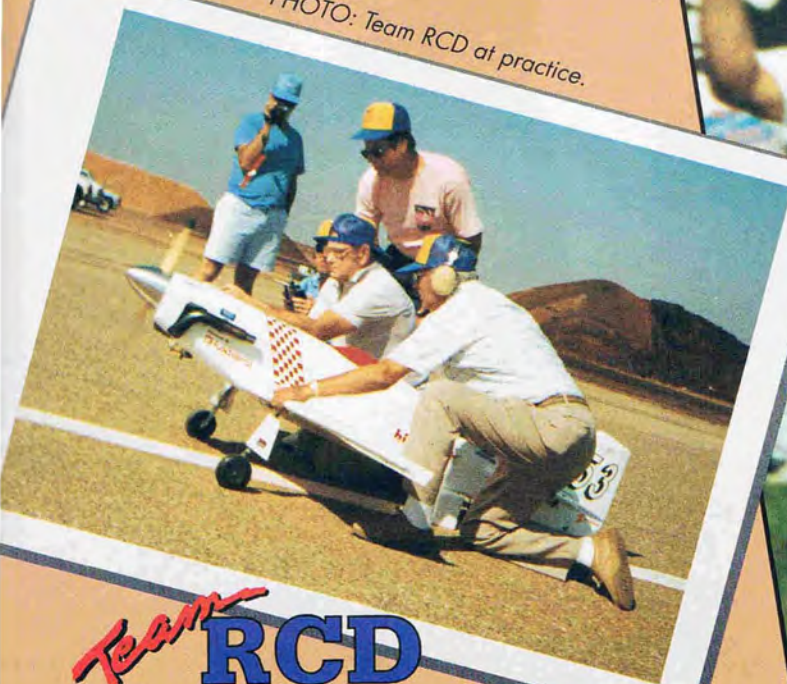


# THANKS TO:

## R/C Unlimited Racing, Inc;

Tom Easterday, Cliff Adams, Loraine, Bonnie & Gail, Doug Wilber John Elliot, Cal Orr, George Steiner, Madera R/C Club, City of Madera, CA., and all the valuable volunteers.

PHOTO: Team RCD at practice.



## Team RCD Suppliers:

The following equipment performed **FLAWLESSLY** in a total test of all odd and even R/C frequencies used under the most grueling temperatures and physical abuse possible.

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### \*PRODUCTS:

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Custom Color Graphics  
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"Glitch Buster" Servo Isolators

\*Products purchased and used by sponsor for race

*We'll See You Next Year in the  
WINNER'S CIRCLE!*



PHOTO: "Team RCD" immediately after winning two of top five places in the final, fastest, "Gold Trophy Race".

## Team RCD

(Shown from left to right.)

David Abbe- RCD/Sponser, Larry Kosta- Handler,  
Bob Dible- Caller (kneeling), Jim Kelly- Manager,  
Jim Miller- Builder #53 & #053 Stiletos, Tom  
Strom- Pilot #53(kneeling), J.R. Wilbur- Caller,  
Carlos Grageda- Crew, Brian Richmond- Pilot  
#053 (kneeling), Dan Abbe- Crew (kneeling)





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Team RCD and ALL of our fellow competitors for  
your contributions to the TOTAL SUCCESS of the  
first R/C Unlimited Air Races.**

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# R/C REPORT      December 1991      Issue #65

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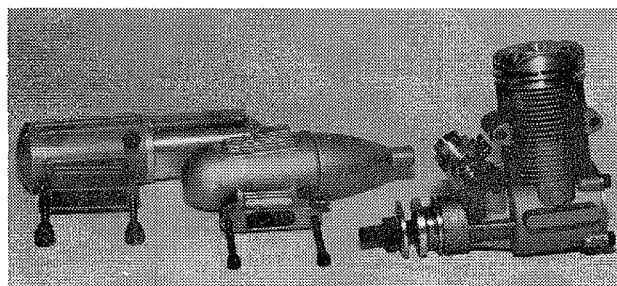
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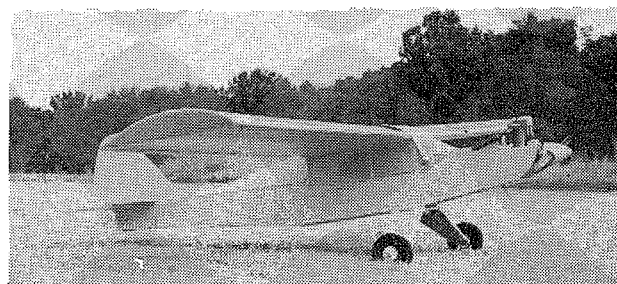
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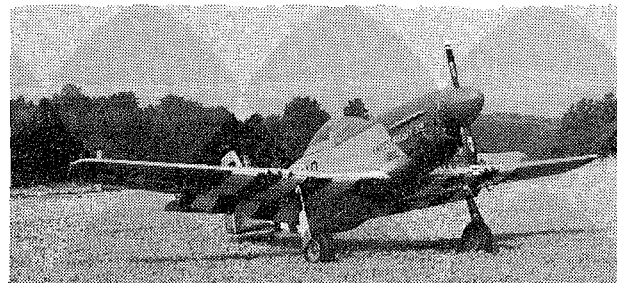
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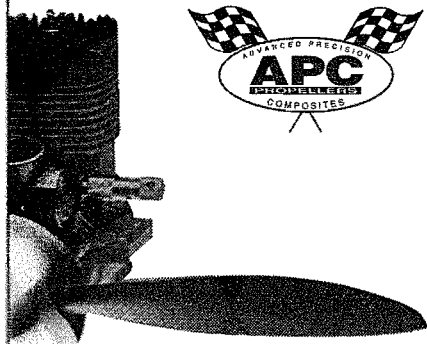
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Cover: Bob Fiorenze's fantastic F/A-18 Hornet! The 72" span 118" long model weighs 25 lbs., uses a Futaba PCM radio to control 14 servos... one of which enacts the disc brakes! Power is from a pair of O.S. .91 engines driving Dynamax fan units. Model is painted with acrylic lacquer. (Mike Richardson photo)



# APC PROPELLERS

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 11x3\*, 11x4\*, 11x5\*, 11x6, 11x7, 11x8, 11x9 ..... **\$ 2.49 EACH**  
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## Reverse Pitch Pusher

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## Competition

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 13.5x9\*, 13.5x12.5, 13.5x13.3\*, 13.5x14, 14x6\*, 14x8, 14x10, 14x12, 14x13\*, 14x13.5\*, 14x14, 14.4x10.5, 14.4x12, 14.4x13\*, 15x8, 15x10, 15x11\*, 15x12, 16x8, 16x10, 16x12 ..... **\$12.95 EACH**

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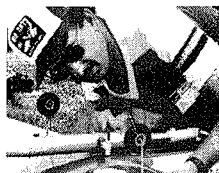


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# From the Editor...

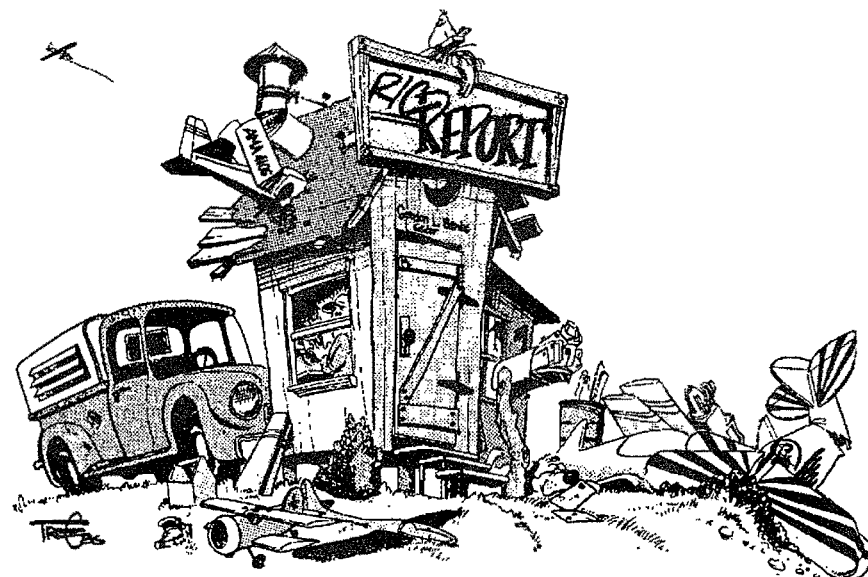
by Gordon Banks

We have several times been told that static engine tests are worthless. According to some people, the performance measured during static testing (that done with the engine fastened to a test bench) is so far removed from in-flight performance that such testing is worthless.

Uh-uh. We don't think so. In fact, without some very sophisticated and prohibitively expensive test equipment, published results of in-flight engine testing is probably closer to being worthless. This is because the test model would usually be so different from that of the average reader that the results would be totally meaningless to him. If we tested a new Acme .45 in a 5 lb. trainer, what would that tell you about its performance in a 6 lb. aerobatic model? Or vice versa?

We believe that static testing is in fact the *best* way to inform you of how a test engine performs. Why? I thought you'd never ask.

Although not all magazines do this, RCR strives to use the same brand and mixture of fuel, and the same readily available brand of propellers in our engine tests. Not only does this allow you to duplicate our test procedures, it also makes it easier for you to relate two or more comparative engine tests. If you want to see which was the more powerful, the Acme .45 FSR or the Voodoo .45 FSR, you'll find that the engine is the only controllable variable that's been changed in our tests of these engines. Both engines will have been tested with Omega 10% fuel, and both will have been tested with Zinger wood props. These brands are readily available to you, so you can not only duplicate our tests with those engines, but with your



own engines to see how they perform in comparison.

We don't use difficult to duplicate homemade fuel. We don't use props that you can't buy. Our engine tests are kept simple and consistent.

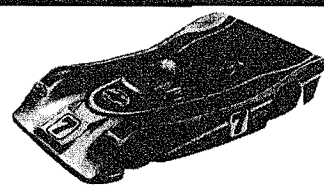
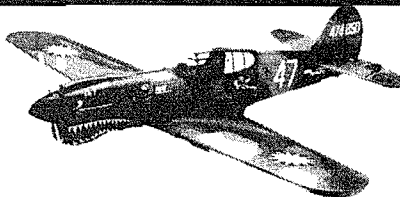
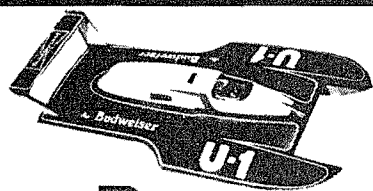
Responsible modelers fly with mufflers the great majority of the time. We know that in some cases some of you fly without them, but we discourage the practice as a rule. Rarely ever will you see an engine tested in these pages without a readily available muffler installed, preferably that supplied or recommended by the engine manufacturer. Sometimes we'll run *additional* tests with other exhaust systems, but these are not in lieu of tests with the "regular" muffler.

Along with measurable physical aspects of an engine, we provide you with the best performance figures we were able to obtain in certain areas. Granted, the engine we test might turn out to be a rare lemon or a rare fluke that performs much worse or better than the average item of the breed, but you have the same chances of coming up with such an engine, so you obviously want to know about

that, too. We have, however, several times procured a second or even a third example of an engine that surprised us with unexpected performance. We were so startled by the unexpected brute power from the little Fox .40 BB STD that we reviewed a second example soon after the first. The second one was slightly even more powerful! On the other hand, we were so disappointed by the Como .61 that we tested a second one. It turned out no better than the first one though.

Anyone can do bench testing, and anyone can make their own direct comparisons to the published tests. Not everyone can install a new Acme .45 in a model identical to one that we or another publication might use for in-flight testing.

With exceptions too rare to be significant, a .45 2C, for example, that turns higher rpm on a test stand with a given prop will turn higher rpm in the air with that prop as well. If the Acme .45 we test is stronger on the bench with an 11x6 prop than the Voodoo .45 you're now flying, then the Acme .45 will perform stronger with an 11x6 in



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your model as well, at least 99% of the time.

Why do we test engines on so many different prop sizes, to include some sizes that are rarely flyable on that engine? Again, for comparative purposes. Different brands of engines are designed differently. An Acme .45 may be a real screamer with an 11x6 but fall flat on it's face with a 12x6, while another engine with a flatter power curve might produce less rpm with the 11x6 than did the Acme, but be stronger on the 12x6. And your particular model may fly better with a 12x6 than an 11x6.

Are static thrust readings meaningless? No! And don't believe people who tell you that! I think what these people are *trying* to tell you is that static thrust measurements do not necessarily tell you how well that engine will perform in your model... and that

much is true. But, by knowing how much thrust the Acme .45 produces with that 11x6 prop, and by knowing how the Acme .45 compares to what you're flying now, can't you then predict whether performance would be improved or not by switching to the Acme? See what I mean?

What else does static thrust tell you? The greater the static thrust of a given engine-prop combination, the better your model will climb. If the static thrust exceeds the weight of your model by 20-25%, you will probably be able to climb straight up... out of sight if you're nuts enough to try it. An oft heard question at this point is "If the engine and prop produces as much or more thrust than the weight of my model, then why won't it go straight up?" Well, you need to understand several things about thrust:

1. The faster you go, the less useable thrust you have. This is why airplanes, cars, motorcycles, boats, whatever... all have a "top speed". At a certain point, the engine is producing at max and cannot produce any more. At that point, you can no longer accelerate.

2. The thrust comes from the air being propelled backwards by the prop. Some of this air blast is being spent against the airplane itself... the cowl, canopy, wings, struts, flying wires, etc. Only that blast of air that gets by the airplane propels the model forward. How much forward thrust is lost depends on the model, and how much surface is in the prop blast. A biplane, for example, will have more loss than a slick pattern plane or streamlined racer.

3. When pointing straight up, in most cases the fuel tank and fuel level is at it's lowest point relative



# 10 "R/C REPORT"

to the engine. This makes it harder for the engine to pull fuel, and it usually makes for a leaner fuel mixture and reduced power. Sometimes it leans out to the point that the engine will die. A good fuel pump would help keep the power constant.

4. A given engine will produce just so much power, and it's up to you whether you select a propeller for maximum speed, maximum thrust, or a happy combination of the two. A good .40 2C engine will run quite happily with a 9" diameter prop in pitch sizes up to about 10". That same engine will probably run well with a 12" prop too, but only up to about a 5" pitch. A good rule of thumb with a .40 2C is not to prop it so heavily that it won't turn at least 10,000 rpm on the ground.

At max rpm, the 12" diameter prop will almost always give much more thrust than that 9" prop, even though the 9" prop will spin at much higher rpm. Conversely, since the rpm will be much lower with the 12" prop, and you'll have to use less pitch too, the 9" prop can be expected to provide more speed.

A good analogy here is the transmission in your car. You use low gear for lots of "thrust" and high gear for more speed. If you prop your engine for maximum thrust, don't expect much speed from it, and if you prop for maximum speed, expect your acceleration and climbing ability to suffer. Since our engines generally use fixed (non-variable) props, we can't shift gears so we have to select a prop offering the best compromise. But keep in mind that the best compromise for one modeler may be quite different for another. I'm more of a "thrust" flyer, and I prefer slower flying biplanes. In my models it's not unusual to find an engine one size larger than recommended by the designer, and a prop one or two

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sizes larger than recommended by the engine manufacturer. A lot depends on the engine, of course. You certainly wouldn't want to try running a 14x6 prop on a Supertigre .61, for example, but a K&B .65 swings it quite happily. On the other hand, you won't find many pattern ships with a K&B .65, whereas ST.61's are rather common. The ST.61 needs to really turn up to produce it's best power. The K&B .65 is happy slogging along even as low as 9,000 rpm.

For example, in a Telemaster 40 I had a K&B .65 with a Zinger 14x6 prop. The guys flying .40 and .45 powered Telemaster 40s with 10x6 props can fly circles around mine when it comes to speed. But I can pull the nose up and climb straight up out of sight. The .40/.45 powered models can't. The higher thrust improves acceleration too, for significantly quicker and shorter take-offs.

Think about what you can learn from static engine tests. Think

too about how you can use what you learn to compare one engine to another. And once you can compare a test engine's performance to that of your own engine... the one you're flying now, I'm sure you'll find that to a great degree you can make some worthwhile predictions on how well that engine will perform in your model.



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# Readers Write

Dear Gordon:

With your permission, would you please ask Brad Booth, Bill Skipper, Dick Ballard or anyone on your staff (you?), if they could find the time to do a test on the shock resistance of foam rubber versus other materials (you or your staff may already have the information) and inform our fellow modelers, in "R/C REPORT", of the importance of using foam rubber for our radio installations.

Articles have been written but evidently some of our more recent modelers are uninformed.

I've seen modelers using everything from packing material, man made foam, to styrofoam. They sacrifice hundreds of dollars worth of aircraft and radio by not using three bucks worth of foam rubber.

I'm 66 yrs. old and have been flying RC for 27 yrs. I know it works.

Years ago, before Sig, Goldberg and others made foam rubber available, we procured it from chair cushions. Today, these products contain everything but foam rubber.

Thank you for your attention.

M.X. Cary, Endwell, NY

*Thanks for the suggestion, and perhaps we'll look into just such an article. In the meantime, however, LISTEN UP NEWBIES! Wrap those receivers and battery packs in material that will insulate them from vibration, and help protect them in a crash. You can generally find foam rubber scraps for free from upholstery shops, etc., and you can buy specially made items from various companies such as RCD, Model Aviation Products, and others. Remember, it if doesn't help isolate the item from engine vibration, then you're not using the right stuff. Glider pilots and electric fliers have it a little easier, but here too some crash protection is worthwhile.*

Gordon,

You may want to re-visit your past reviews of the Fox 74 for an update of the overheating problem for your readers. This is the second modification update by Fox since your last article. This mod resulted in the replacement of the piston and cylinder. The cylinder head was not

replaced. Without tearing down the engine, I don't know of any other parts replaced, or machining done to the engine. The results of their efforts are in my engine and I'm well satisfied. It is still not an O.S. .61, but for the price differential between the engines, it is just as good if not better.

Thanks for an excellent and unbiased magazine. Your product reviews are deadly accurate. I fully appreciate the lack of "Motherhood" or "Weasel" words in your product reviews. I've never been surprised, and have experienced exactly the same characteristics encountered in your reviews.

The only negative comment I have is that you were never with the 1st Air Cav. Div. I would have liked to have met you during TET!

John D. Piggott  
Frankenmuth, MI

*Thanks for the kind words, John, and I'd have liked to meet you during TET too, like somewhere near Atlanta, or New Orleans, or...*

Dear Gordon,

Some months back, in the

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District 8 News in **Model Aviation**, District VP Gene Hempel mentioned a pending lawsuit against AMA over a control line speed accident.

I was very upset to find that the individual that is suing "US" is one of "US". The amount of the suit is somewhere to the tune of \$15,000,000.

If we are to retain our AMA insurance at a reasonable rate, we need to let all modelers know what is going on "Behind Closed Doors". The individual was apparently permanently injured in one of his legs, but is this worth \$15,000,000 of his friend's... "OUR" money.

He was due to retire from a career as an Airline Pilot in three years.

Having been a club president for two years overseas at Zweibrücken Air Base, Germany, I was able to experience the prompt attention that AMA pays to each, and every claim, and the 'after the fact' follow up, that I cannot believe one of "US" would do this to "US".

I have been told that AMA has already paid out a large sum of money for medical expenses for this individual, and plans to help him as much as possible.

This is yet another example of the Tort Law abuse that has adversely been affecting the hobby

for the last several years.

If we as modelers don't try to change this at our state levels, the AMA as we know it today, will cease to exist, and all the work we have done together will have been lost!

Please print my letter as a plea to modelers around the country, and the world, to come together as a large voice and write to your state legislators, Congress, Senate, and even the President, if necessary, to **LET OUR VOICE BE HEARD!!**

Thank you for your consideration and cooperation.

Respectfully,

Sgt David C. Jones  
San Antonio, TX

*Dave, I'm not aware of the incident you relate, but I join you in your disgust, and I gladly print your letter.*

*The AMA is US, fliers, and we need to take care of one another.*

Gordon,

Stop publishing the disgruntled reader's replies. If they can do better than your crew is doing, let them do their own "R/C REPORT".

Keep up the good work.

Willard Heckendorf  
Merrill, WI

*Thanks for your vote of support, Bill, but disgruntled readers too offer input that has helped us shape the magazine into*

*December 1991. 13 what it is today. We always want reader feedback, and we need it from unhappy readers as well as the happy readers.*

Dear Gordon,

In the beautiful November Issue of "R/C REPORT", the letter from 'what's his name' was ridiculous. If I want cut-and-dry airplane talk, I'll send to the Smithsonian. Gordon, you can "jump in" any ol' time you like. (Editor's Note: Thanks. Jumping in, flying off the handle, and climbing the walls is about all the exercise I get nowadays.)

Your feature writers don't appear to be miffed. They're probably glad that somebody is correcting their grammar and spelling and don't have to see glaring errors forever frozen in print. If, however, an error should slip by, they can always blame you and I'm sure they do. (Editor's Note: Yeah, well, that's one of the drawbacks of being guilty as sin!)

Keep up the "chit chat", Gordon. We love your humorous interjections. When you stop looking over your writers' shoulders, we'll all know "nobody is watching the store".

Very sincerely yours,

John P. Cuomo  
Forked River, NJ

*"Chit Chat"? You dare to refer*

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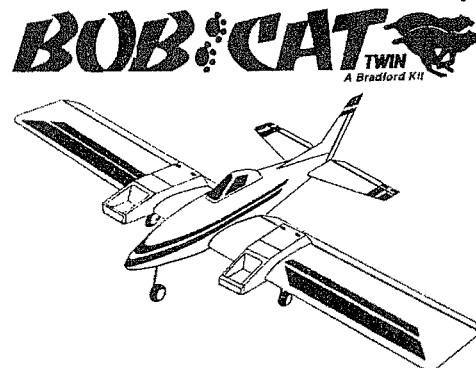
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# 14 "R/C REPORT"

to my brilliant and profound pearls of wisdom as "Chit Chat"?

*I am Wounded!*

Dear Gordon,

Just read November's "Readers Write" and wanted to send you a short explanation for Mr. Scottile's uncomplimentary comments concerning your humor. As a former Long Islander, I feel quite certain he has lost his sense of humor from either spending countless hours (which could have been spent flying or building) traveling on the Long Island Expressway, or spending too much time impersonating a sardine while traveling on the Long Island Railroad!

Keep up the great work, love the new format, and keep the humor coming.

Bob Miller, Kingwood, WV

*Yeah, ain't it a bummer that we have to WORK for a living. Well, that is, SOME do. Heh heh. (Yes, Mom, I'm looking for a job!)*

Dear Gordon,

Just reading through the November issue and thought I'd let you know the new cover is okay, but I prefer the newspaper cover. I can live with it since I love "R/C REPORT"; however, please don't

change the inside pages. What makes it so good is the down to earth advice that the average modeler can use. I also enjoy the little Editor Notes that are occasionally stuck in articles and I'm glad you won't be changing that.

How about doing a product test report on one of Dynaflyte's warbird kits such as the Corsair or Spitfire? Enclosed is a picture of my Spitfire. It flies great and is easy to handle, unlike many other warbird kits.

Ken Stevanus, Clinton, MD

*Thanks for the kind words, Ken, and we'll keep on trying to please as many of you as we can.*

*By the way, we have a Dynaflyte kit in the works right now... the one most requested by readers.*

Dear Gordon,

Don't wish to hurt anyone's feelings, but the Playboy Sr. review in the October issue is something I can't keep quiet about. It appears to me, upon a second reading, that you were had by bad instructions. Number one, the sheeting on the Playboy fuselage stops at about the trailing edge of the wing, and the aft fuselage is strong enough if firm 3/16" is used. I have built several,

and covered with silk or Monokote, never had a problem with the aft fuselage. That is not where they break. The cabin version tends toward nose heaviness, so I suggest spruce longerons for it.

The second and worse error is the center of gravity. With that large lifting tail, the CG should be about 66% of the MAC. In other words, about two thirds of the chord aft of the LE, not the one third of chord wanted for a non-lifting tail. Twenty-two ounces of lead?? I assure you, thousands of Playboys in all sizes have been built for S.A.M. competition. They float like corks with the CG right. So, get the lead out.

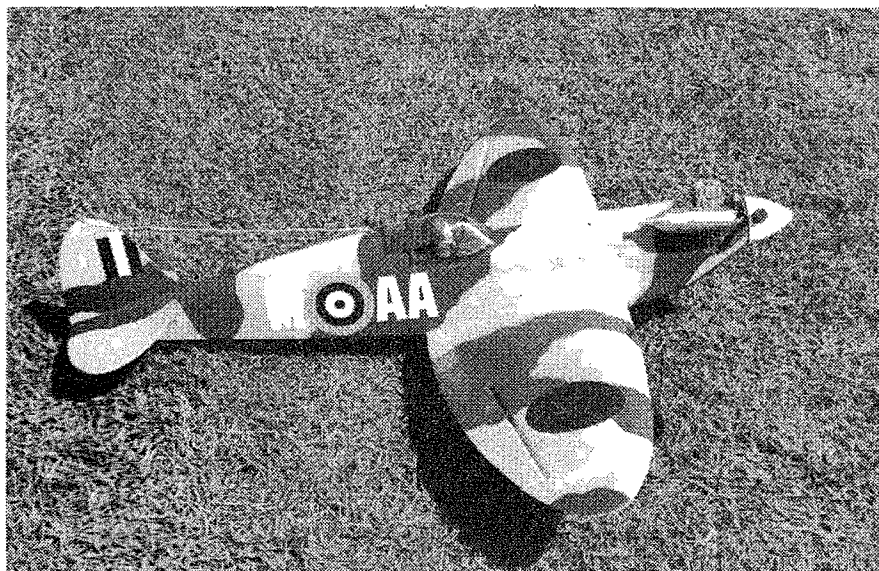
I have to add...I have been disappointed with the two Ben Buckle kits I have seen. You would have been much better off with a kit from Hobby Horn, or a P&W, or Midway Models old timer kit. That's my opinion.

Really enjoy your magazine, especially for its honesty. The other magazines, without exception, actively promote new releases, glossing over obvious problems. Keep on keeping on, and again referring to your Playboy, there are three things to remember. Keep it light, don't let it get heavy, and it shouldn't weigh much.

Sincerely,

William L. Baker, Norman, OK

*We got a surprising number of letters on our heavy Playboy, but you were about the only one to land the nail right where it belongs. Guys, John simply followed the instructions as best he could figure them out... to include where the CG was supposed to go. Indeed it did fly better with the CG moved further aft, and indeed it would have flown better yet if modified for less weight. We occasionally do modified kit reviews, explaining the mods and why, but this wasn't one of them.*



Ken Stevanus' Dynaflyte Spitfire

Dear "R/C REPORT",

I'm a past modeler revived. The last plane I built was in 1962, the "Nobler", a U/C stunt plane which I still have (stored away and dusty!!)

I joined an R/C club in June 1991 and the AMA at the same time. I have a need to become an "educated" R/C pilot. Indeed, I find I have an obligation to become an "educated" R/C pilot.

My first copy of "R/C REPORT" was received via the special coupon offer in the AMA catalog. I read your magazine, cover to cover, twice. Yes, including the corny jokes!

The magazine, for this newcomer to R/C, was informative without being too formal. A seemingly relaxed approach, sort of being with the club members in a bull session.

In fairness, I do subscribe to and read other magazines. Their subscriptions, as is yours, was initially for one year. Will their's be renewed? Will yours? With one issue, yours has already received my (reserved opinion) approval.

Sincerely,

Lawrence A. Belesca  
Nashua, NH

*Corny jokes? WHAT corny jokes? Our jokes are classics! They must be... most have been around at least that long!*

*Glad you liked the magazine, Larry, and we agree that modelers should read several each month. Nearly all of the modeling magazines have a lot of good information in them, easily worth more than 1/12 the price of a one year subscription.*

*Welcome back to modeling, and may you enjoy, enjoy, enjoy!*

If you're yearning for the "good old days", just switch off the air conditioner.

# JTEC

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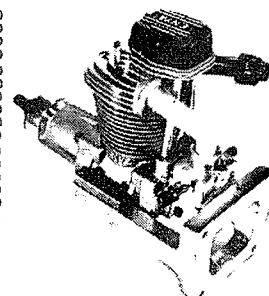
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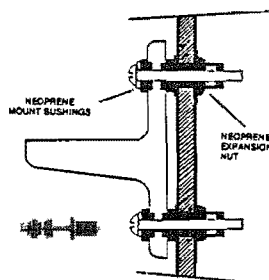
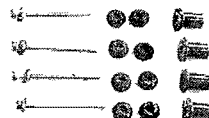
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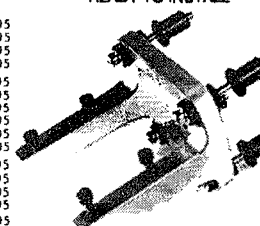
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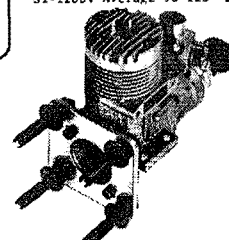
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# In The Beginning...



by Richard Ballard

## SOLDERING - A HOT SUBJECT!

This month's subject is about a modeling skill that we don't hear much about. Try to build a kit with wire landing gear, or convert a servo plug to work with your new receiver, and you will soon find

that you need a new skill or two! Most of you have either done or seen someone soldering something. How about the new hot water heater the plumber installed in your home, or the radiator repair job after you wrecked your old car that time? In both cases the guy that knew what he was doing used a gas torch of some kind and looked more like a welder than a person who works on model airplane landing gear. But both jobs both heavy masses of metal that had to be heated rapidly in order to get the acid-fluxed solder to work properly.

Flux? Oh yeah! I forgot to mention that. Flux comes in many forms and types depending on what solder you are using and what metal you are working on. In the case of the plumber and the auto repairman, they might have used an acid core

solder or an acid based flux to clean the metal and allow the molten solder to flow into the joint. Without clean metal, solder just won't work.

But do you want to use acid on your new model airplane? Well, come to think of it, I've had one or two that...

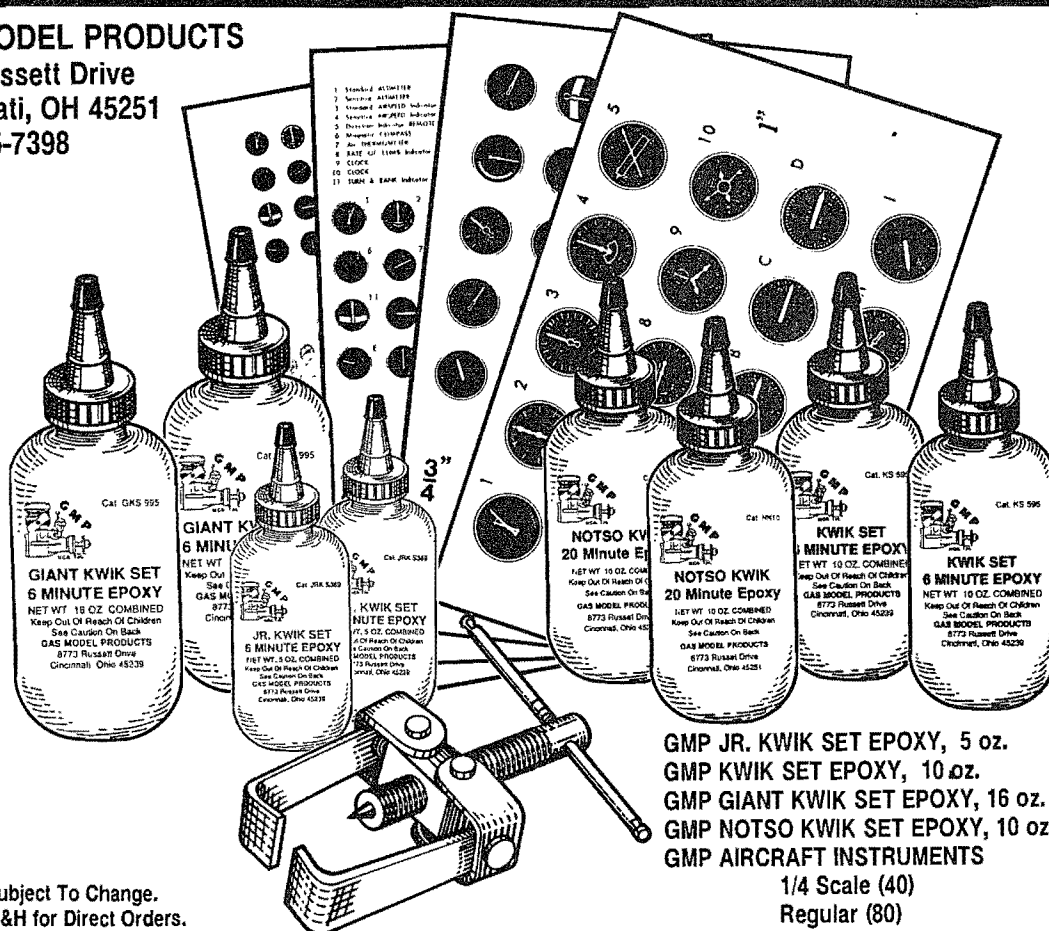
But yours isn't like that, so we need to find out what solder and which flux best fits the job at hand, be it a wire landing gear or a servo connection.

First lets look at wire landing gear, cabane struts, and other music wire structures commonly found on models.

The first thing you need to be concerned about is getting everything to fit together correctly. Don't even consider soldering anything until you are sure

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alignment and fit are as good as you can get it. If you proceed, whether with solder or glue, when something isn't quite right, you will be sorry later! Believe me! It will be *much* easier to correct a problem now rather than after everything is stuck together!

#### WHAT DO YOU NEED?

To do a good job on music wire soldering I can only suggest one kind of solder. The brand name is Sta-Brite Silver Solder (not to be confused with any other kind of Silver Solder designed to be used with an acetylene torch!) Silver Solder comes in many types and heat ranges but what you want is Sta-Brite brand name silver solder. Why, you might ask? Well the best reason I can think of is that it will work for what you are doing without any special skills on your part. How's that for a good reason??

You will need a *big* electric soldering gun or a torch. Either can be bought at a discount store for less than \$20.00, and either will come in handy for lots of other jobs sooner or later. You might as well get one or the other. My personal choice is the propane torch but it's real easy to get wire gear too hot and take the temper out of it. The

choice is yours, but if you choose the torch, please take a little time to practice with it before you try it on a giant scale \$700.00 kit!

You will also need to go to the hardware store and pick up a roll of 24 gage galvanized steel wire. Why? Well, if all else fails you can hang yourself with it! On the other hand, I find that it works even better than the copper wire usually included in kits for binding music wire before soldering, and is also much stronger. It's also cheap! One roll will most likely last you the rest of your life unless your wife has you hanging pictures all over the house! Take my advice and spend two bucks on a roll.

#### WHAT TO DO FIRST!

Get out your sandpaper or steel wool. The wire and everything else needs to be sanded all over to remove any grease or oxidation. If you plan to paint the wire later you might as well clean it all up now while you can still get to it. It will be much harder after it is all soldered together! What you need to work for is a brite, shiny surface on everything you intend to solder together. Do a good job now or wonder how to do it later when the solder sticks to half of the wire and not the other half!

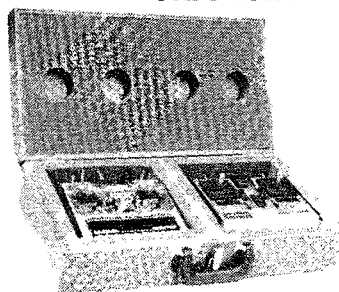
#### FIRE!

By now you should have carefully aligned the music wire parts where you want them and wrapped them with the steel wire. The next step is to fire up your new torch or electric soldering gun and heat the joint. **BE CAREFUL! YOU'RE GETTING IT TOO HOT!** What you need to do is watch the music wire and make sure you don't get it hot enough to change the color. If it turns blue you have removed the temper. Might as well get some more music wire and start over!

Start putting on a drop or two of the flux from the little bottle that came with your Sta-Brite kit. Just a drop or two at a time until the temperature gets just right and you will see it do its thing. All of a sudden your wire parts will take on a clean frosty look. The flux has done its job! At exactly this time you need to start applying the silver solder to the joint a little at a time until it flows into the wire wrapping and covers the joint. Don't use more than necessary, but don't try to skimp either. Solder is just like glue and adhesive. Enough is enough but more than that is weight! All you need to do is cover the wire wrap and joint with a continuous film of solder. That's as

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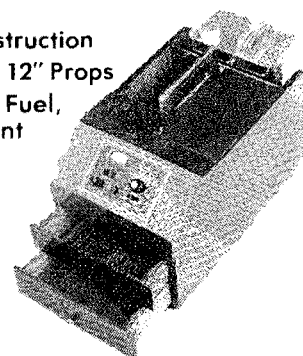
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strong as it gets! Any more is only a solder blob which is not as strong as the wire you are trying to stick together!

The only thing left to do now is to WAIT FOR THE PART TO COOL OFF, then take it to the sink or whatever and wash it off real good! The flux has to be washed off right away or your shiny solder joint with the Music Wire attached will rust before your very eyes. How do I know? Uh... that is... well, someone told me. Yeah, that's it. Of course, I really don't know if it's true or not!

WHY?


Why did I suggest Sta-Brite? Because it is easy to use, takes a lower heat than would ruin your wire gear, and is the best I've ever seen for the job. What more could you ask from a product?

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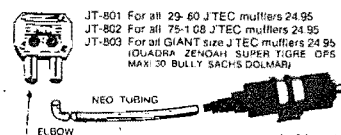
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## ELECTRONICS SOLDERING?

I will leave this subject up to someone like Brad Booth. In order to solder something you first have to know what to solder! When it comes to radio wires I leave it up to someone who knows a -POS from a +NEG and a \*Signal from a &Jumper. As far as I know they are all the same, or they could be! Anyway, at least I know I shouldn't solder them with a propane torch or use acid flux!

How about you?

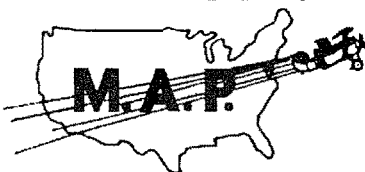
SAY GOOD-BYE!

When you get done soldering a music wire "whatever", and you pick it up immediately to look it over, don't look at it very long! The scars on your fingers will become quite unsightly. How do I know *that*, you ask? Don't ask!

FLY SAFE!

-Richard L Ballard

## MODEL AVIATION PRODUCTS



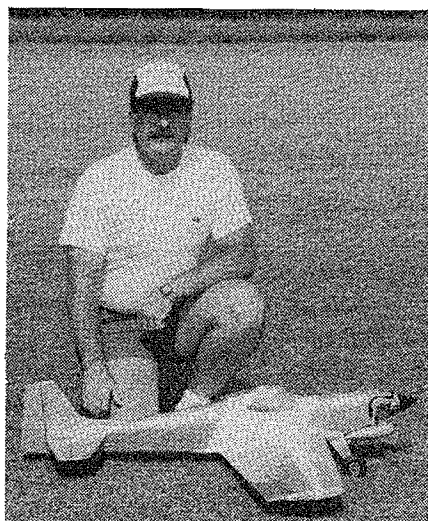
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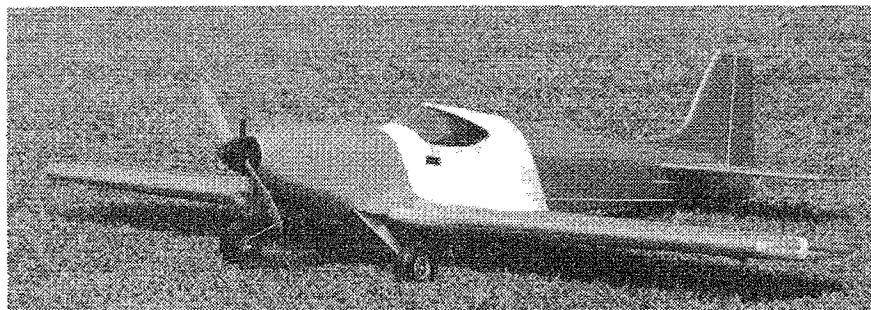


by Tim Batt

Subject: The El Gringito completion.

For those of you that have been following the El Gringito project, I thank you for your patience. The rest of you may wish to follow along on the next project, which I think you will really like. More about that later.

The El Gringito has been built and flown and I must say that it flies great! It performs like a very well mannered sport airplane. I don't know why any modeler would not be proud to have an airplane like this in his collection. It is attractively designed (the design is now 18 years old) and does just about anything that would be asked



of a good 40 sized sport plane.

My El Gringito is powered by a hot .45 2C turning an APC 10x6 prop. The finished weight is 4 lb. 12 oz. The covering is pearl teal, pearl blue, and white Monokote. A lot of positive comments were heard when I brought the airplane out to the field.

Some of you have asked what I think about the construction of the El Gringito from a scratch builder's point of view. This is where the airplane suffers, in my opinion, but you must take into consideration the age of the design and how far we have come since. The El Gringito is not a good first time scratch building airplane, in my opinion. The plans lack some necessary information about details that the first time scratch builder needs. Details concerning the landing gear arrangement are just about nonexistent.

One thing that the El Gringito did do nicely was to pose several

unique problems. My solutions to these building problems were then illustrated so that I could show you how I handled them. This made the building experience worthwhile for this column.

At present, I'm building the sister ship to the El Gringito, which I have modernized. It will be appearing soon and will fix several headache areas of the original design. The foam core turtledeck was a pain and will be done differently on my version.

In past columns I have covered scratch building basics, including tool selection and use. I've gone over wood grading and purchasing, and finally we built an airplane from start to finish right here in the column. It is now time for the next logical step in scratch building.

Here is what I have in store for you scratch building addicts. What if we start off with a set of

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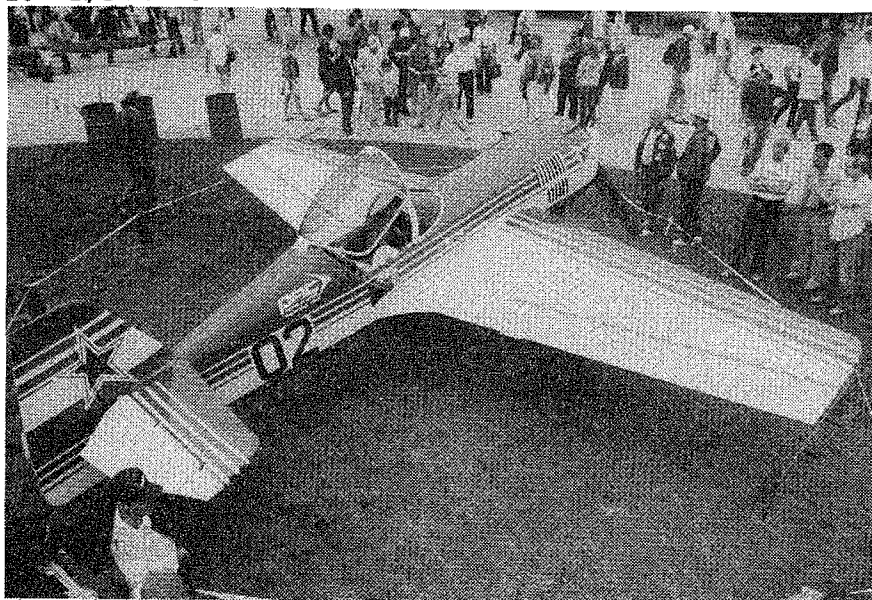
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three-views of a really interesting airplane, and draw our own plans to build from? The airplane should be a fun to fly scale, sport scale, or fun scale design. It should have fixed landing gear, a bubble canopy, and an easily designed and built engine cowl configuration.

Have I got the plane for you!

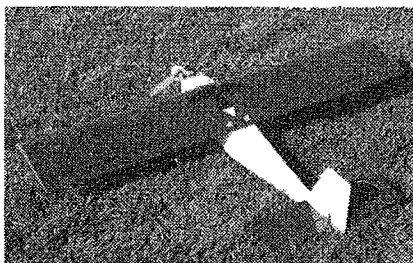
Bob Banka (Scale Model Research, ph. 714-979-8058) just sent me a package of information on the Sukhoi SU-26M aerobatic competition airplane. Yes, I know that there are plans available for this airplane in large scale, but I

don't know of any available for 40 size. No problem... we'll just make our own. What I'm going to try and do is explain the hows and whys as I go about drawing my own plans. The basic task of creating plans to build from is easier than what you may think. Don't think that drawing your own plans will be too difficult. You are probably used to seeing plans with lots of detail. The level of detail on a set of commercially available plans is needed so any modeler can understand them enough to build the airplane. The plans you create for your own use need only the information that *you* require. You won't need fancy but time consuming custom lettering. Hand written notes will suffice. Some parts won't need to be drawn at all since they can be built using the airframe while under construction.

When drawing out a set of plans for my own use only, I keep

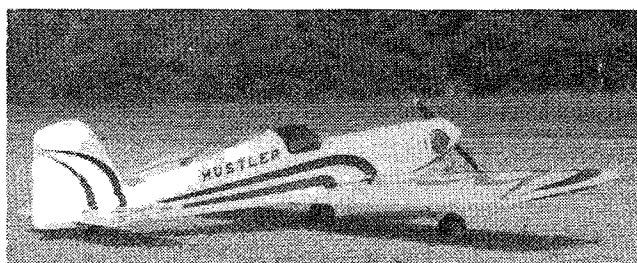
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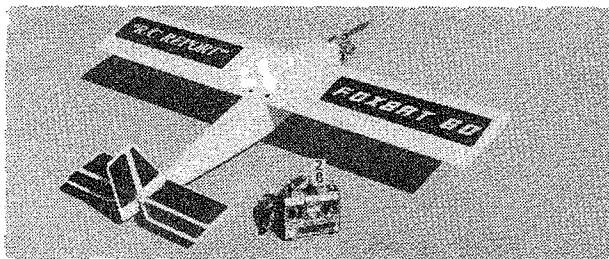
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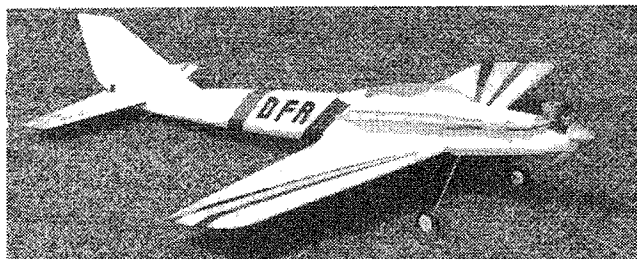
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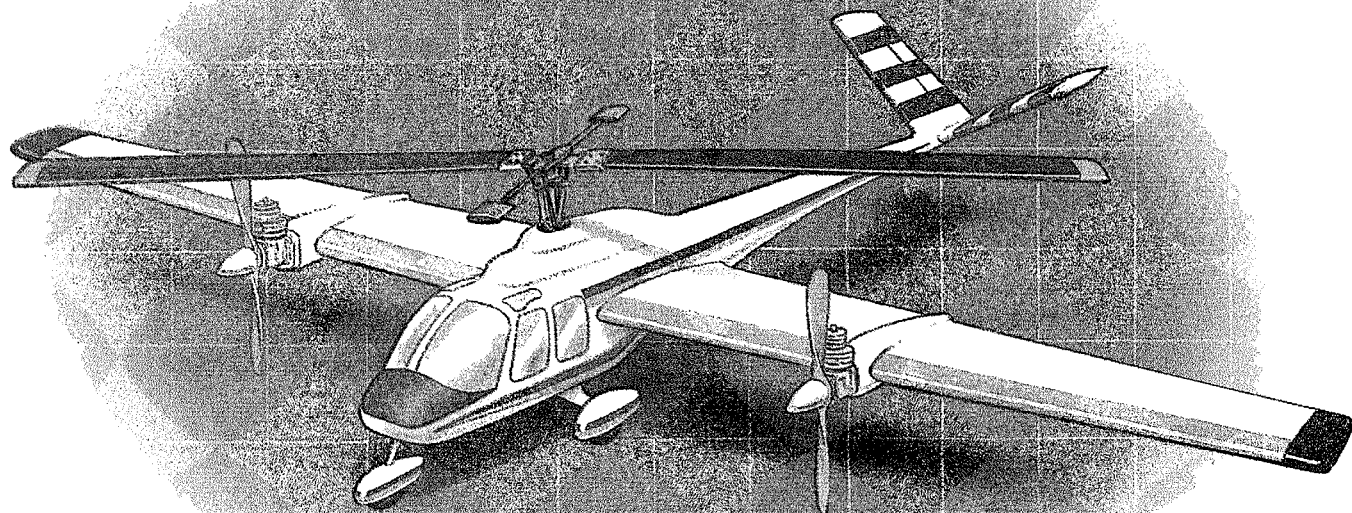


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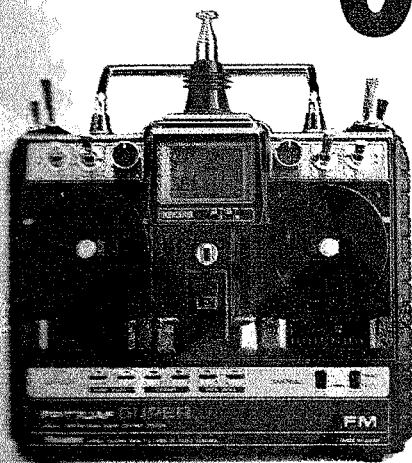
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the drawing as simple as possible. Details such as wood grain are not drawn in but represented by a simple arrow to show direction. It's all that detail work that takes so much time... not the actual design.

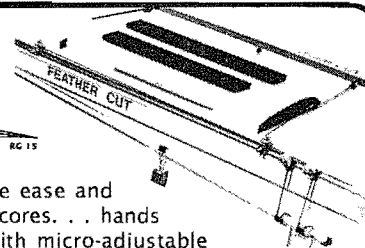
Although I will be doing my plans on my computer, I will be presenting it to you as if doing it by hand. How? As I draw a part on the computer, I will describe the method of drawing the part onto paper (the two methods are very similar). I can then use the parts I create on the computer (scaled down to fit in the magazine) so that you can follow along. I will also try and point out alternative methods so that what you learn can be applied to a other designs of your own choosing.

Now don't think that you have to have a computer or an engineering degree to design your own airplane from a set three views. In my third year in R/C, I designed and built a 69" span Mr.

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Mulligan. I wanted one that size and no kit or plans were available for it. I used the kitchen table as a drawing board and some common tools to do the drawing. A simple pocket calculator is all the computing power you will need. And don't worry about the math either. I will present what you'll need so simply that even Gordon will be able to understand it. Well, maybe. *(Editor's Note: But why in the world will we need a calculator for designing simple pockets? I'm already confused!)*

The Sukhoi SU-26M is a very interesting plane and a lot of information about it can be found in the December 1987 issue of MODEL AVIATION. The reason this airplane was chosen is that it has several good features for this project. The airplane is simple in design but offers some unique challenges to the RC modeler. Take a look at the size of the control surfaces. This airplane should be a blast to fly. Another benefit of building this design is that more than likely you will have the only one at your flying site. Having unusual or rare airplanes is a major attraction to most scratch


builders.

Next month, I'll present the three-views and we'll start off with the basics of drawing plans. I believe this will be a fun project for us both.

Meanwhile, have a very Merry Christmas, and may Santa fill your stockings with R/C goodies. Til' next year.

-Tim Batt

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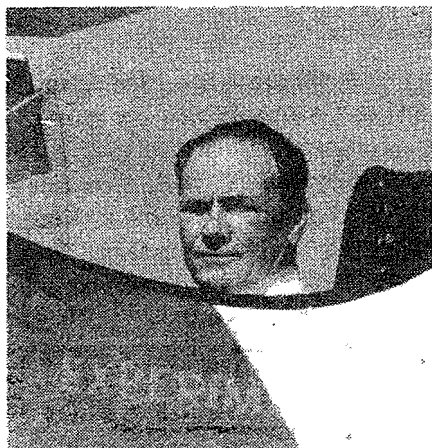
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# Let's Talk BIG



by Bill Skipper

A columnist is never so alone as when sitting down to an empty screen with no ideas on what to fill it with.

Fortunately, such is not the case now, even though for the past few months a great upheaval has been ongoing, all but destroying

what peace, serenity and complacency there may have been up to now in this writer's life.

As many readers may recall, I lost my beloved wife in January of 1989, and after long contemplation, have sold my home after nearly nineteen years of occupancy. I will soon be moving to another home within two miles of here, a home smaller than this huge brick, and a smaller yard to care for.

What has all this to do with a column about Large Scale R/C models? Plenty! Those just entering this fantastic hobby have no idea how much accumulation 60-odd years can amount to! It means completely dismantling a workshop which has been in operation for nearly nineteen years and in which some 94 models have been built. It

means sifting through a staggering collection of treasures hoarded for all these many years against the day they will be needed. Not much remains of the beginnings in the late 1920's, but I find slivers of 1/16x3x36" balsa sheets hand priced at 12¢. Ah, the nostalgia!

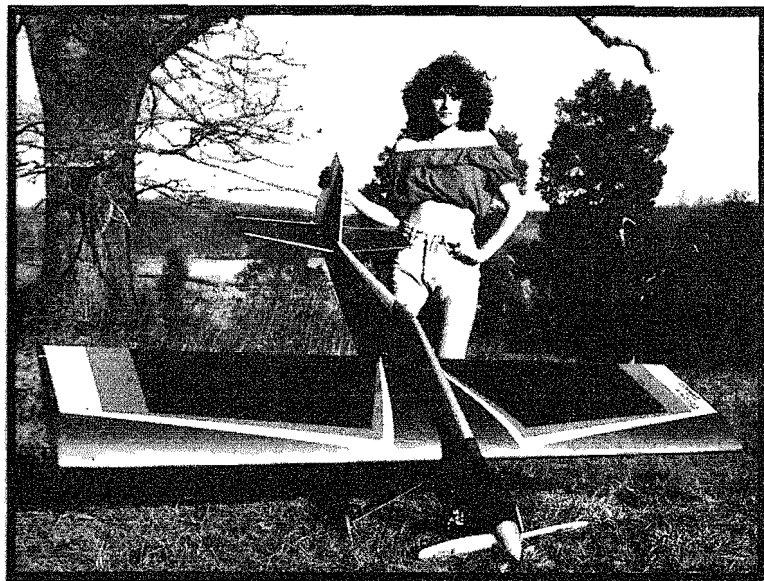
But there comes a time, and between local modeler friends, the trash dumpster in the alley, and my own boxes labeled "SAVE AT ALL COSTS!", the accumulation is being slimmed down to reasonable proportions. Of course, it will begin all over when I am settled in my new home and shop.

Now, let's take time out to answer some mail.

*Dear Bill,*

*I don't know if you remember me, but I met you in Leota, KS one*

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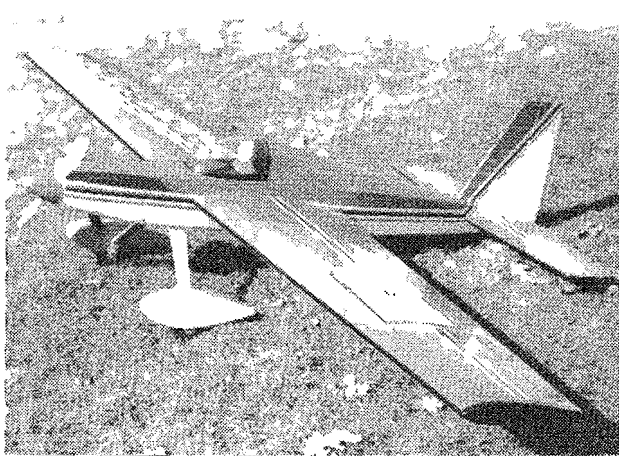
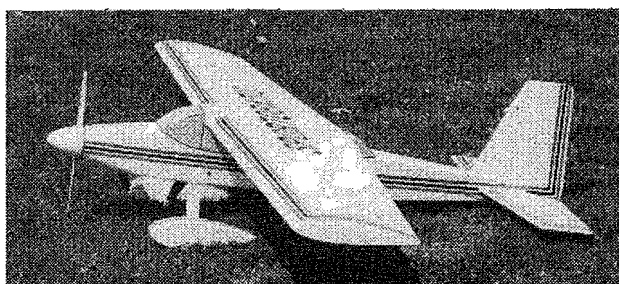
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hot summer day in 1970 when you were there to fly an air show with Harold Krier. I saw your ham radio call sign on your little orange biplane, and being a ham myself, invited you to my home for lunch. As we ate, we talked about ham radio and flying. You told me about the radio controlled models you build but I had no interest in those at that time.

After lunch, I drove you back to the field where the air show was to begin at 1:00 p.m. The day was a hot one with a temperature high of 107 degrees and a gusty south wind from 20 to 35 MPH. I was

sure the show would be canceled, but you and Harold flew anyway. At least a dozen times I swore that first one or the other of you were going to plow a furrow in the ground deep enough to fit an 18-wheeler, but you didn't. I was so relieved when the show was over!

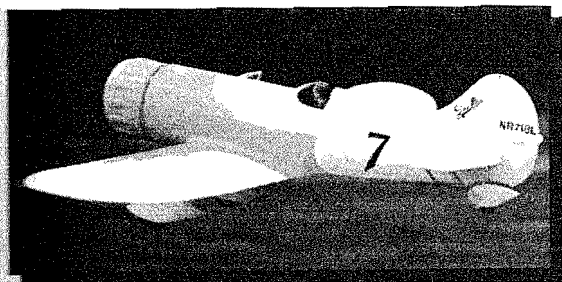
But now for the real reason for this letter. I have been bitten by the R/C bug. In working with a ham radio buddy who lives in Amarillo, TX and who is also a R/C model builder, your name came up. My friend sent me several copies of "R/C REPORT" with your columns in them, so I have a question for

you.

I built my first model last Spring, a DuraBat. The idea was to have a model small enough to fit in my car. It fit a lot easier coming home than going out, after taking everything reusable out and discarding the remains in the trash barrel. It lasted for maybe eight seconds after takeoff.

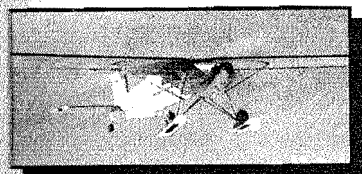
My second was a Box-Fly .40 which lasted a bit longer, like ten seconds, so I was improving. But I really don't like the small, fast models, and after hearing that the Giant Scales fly a lot easier, and since I am partial to the Warbirds

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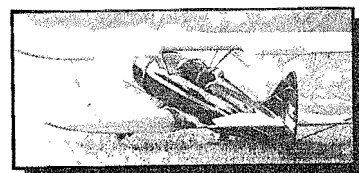
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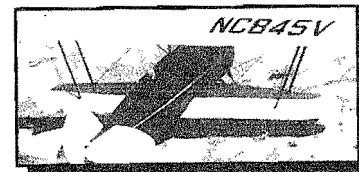
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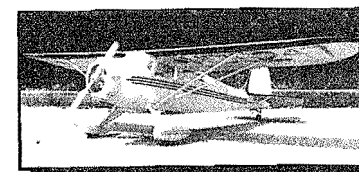
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of WW2, I'd like to build one of those for my third model. I notice there are quite a few 1/5 scale jobs like the P-51 Mustang, P-40 Warhawk, F4-U Corsair and the P-38 Lightning on the market. Which one of those should I buy and build?

Thanks in advance for any helpful advice you might have and you can use this in your column if you want to. But I would like an answer in the envelope I've enclosed, if you don't mind.

Your friend, J. B. Dutton

I don't mind at all, J.B. And as you can see, I am using your letter. It is typical of those from newcomers to R/C and particularly to Large Scale, to ask such questions as yours. So this is a great opportunity to pass out a bit of sage advice... since you asked.

First, welcome to one of the most satisfying and challenging

hobbies ever devised. There's nothing else like it. Also, welcome to the STFC (Short Time Fliers Club), which I just invented!. Eighteen seconds flying experience is a start, at least. But there are better, quicker and less expensive ways to Happy Flying than choking folks to death on dust with all this crashing business.

You did not mention any local R/C'ers that might lend a hand, but if there are, it would pay handsomely to enlist the help of one to give you some pointers on flying. If not, then you may have to teach yourself, which is not at all uncommon. But since there is neither the time nor space here to start you from scratch and go up through your first big contest win, let me say that just about any modern hobby shop has on hand a variety of books on the subject. Pick one aimed primarily at the

beginner and go from there. I doubt that you will find many recommending either the DuraBat or Box-Fly .40 as neither are primary trainers.

I have never considered the typical .40 powered small "trainer" type models as ideal for all beginners. I have always regarded the ideal primary trainer as something on the order of a two meter glider or sailplane. Such models are slow and easy-going rascals that give you time to think before acting. They can be hand-launched, towed, or mechanically launched with a tow line. They need not be "full house" since a great deal of control may be had with rudder only, though the addition of elevator is nice. Nor need they be powered. That is a matter of choice. But the point is, begin with something slow and sedate and work up to the more



complex types with all controls, including throttle. This, I believe, is where most so-called primary trainer types serve best.

There are those, especially the young, who can start right out on .40 trainers and have little trouble getting the hang of it. But the later in life we begin, the more difficult it is to learn quickly. Our reflexes need more time to adapt, and the big thing is mastering orientation.

Yes, I remember that summer day in 1970 at Leota, KS very well. Most air shows are flown during the worst part of the day for the performers, but it goes with the job. Cancellations and "rain dates" are seldom worthwhile, so the idea is to get it over with if at all possible. Flying through a sequence of precision aerobatics near the ground really isn't as hazardous as it looks because the pilots and performers make allowances and don't allow themselves to be lured into impossible situations. When the temperatures are high and the winds gusty and treacherous, the pilot simply makes further allowances. I never thought spectators were entitled to see me scrape my head on the runway for the price of admission.

A letter from Don Yarbro of Lovington, NM says in part:  
*Dear Bill:*

*In your October 1991 column, you mention the use of sheet metal screws (PK's) in our projects and of drilling pilot holes for them.*

*I use them often but it is sometimes difficult to find the right sized drill bit, so that the screws are neither too tight nor too loose. In my search, I found what I needed in the "Standard Aircraft Handbook" by Bungay and Leavell. I am enclosing a copy of the page that shows the drill bit sizes for PK screws from #2 through #10.*

*Numbered drills may not be familiar to some readers, but they*

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*are drill bits numbered from #80 up through #1. In practical use, drill bits smaller than the #60 are too small for ordinary model construction...*

By "numbered" drill bits, Don is referring to what is commonly called "wire sized" bits. As he mentions further, these drill bits are measured in decimal fractions of an inch and offer far more precision than drill bits measured in common fractions such as 1/16", 5/64", 3/32" etc.

My own set of wire-sized drill bits, which dates back more than 25 years, is in a steel "drill index" box. There are four hinged index "leaves" holding drill bits from #60 (the smallest at .040" in diameter) to the #1 (the largest at .228" in diameter). Stamped in raised numerals under each drill bit is its wire size and diameter in three decimal fractions. In addition, there are indexes showing tap sizes for

bolts and machine screws from 1/4-20 down to 2-56 and corresponding wire-sized bits for unthreaded pilot holes. Also included are wire "body sizes" for the same range of bolt sizes. Very, very handy. And as Don says, a "must" for the serious modeler.

Don continues:

*An investment in an inexpensive set of these drills makes operations such as drilling proper sized holes for taps a simple matter. The fractional drills are too widely spaced for accuracy. Tim Batt has mentioned these drills, and if you like to build, especially from scratch, they are almost indispensable. A good set of 60 wire-sized bits is available from Harbor Freight for \$19.99, Item 00713-OCMB. Telephone 1-800-423-2567.*

I might add that almost any good hardware store carries a full line of replacement wire sized bits.

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If they are used much, attrition is bound to claim one now and then, especially the smaller ones. And since the very small ones do not have their numbers on the shank, and since they get mixed up in their compartmented drawers, it will pay you to get yourself a wire drill gauge and take it along with you to the store. The gauge is simply a stainless steel plate with all the wire drill sizing holes numbered as in your drill index. The gauge costs about five bucks.

There isn't room here for the photocopied page Don sent, but here are the drill sizes for the #2 to #10 PK sheet metal screws:

Screw Size	Drill Dia.	Drill No.
2	.063	52
4	.086	44
6	.104	37
8	.116	32
10	.128	30

Don adds: One other matter I would like to bring up is DynaThrust propellers. I had an 18/10 on a Magnum II throw a blade, breaking the crankshaft. I don't remember dinging the prop earlier, though I may have, so I can't rightly blame it on DynaThrust. But I have heard of similar incidents and was wondering if you have any information on this prop.

Thanks for your letter, Don, and the kind words at the end. No, I have never used a DynaThrust prop, but maybe someone else out there has and can enlighten you. Readers? Don's address is 703 North Main, Lovington, NM, 88260.

See you all next month — providing I get moved and got the IBM set up and running in time.

-Bill Skipper



Yes sir, I know that postage rates increase more often than do phone rates.

Yes sir, I realize that the phone company gives better service.

Yes sir, the phone company does give refunds when they make mistakes.

Sir, you have to realize, the government doesn't run the phone company!



# Scale



by Jeff Foley

## Finishing: Part Four

In our continuing saga of "Freddie the Finisher", we will now discuss some procedures for producing neat little surface details that look so impressive. Panel lines, hatches, rivets, fasteners, etc., all add so much character for the small amount of time involved it's almost a crime not to add them. Hey, if the control line stunt and R/C pylon guys can do it, you can too! The only difference is, we want them to stand up and be 3-D instead of an ink line. Another major detail that people overlook is the wing and stab fillets. Imagine a P-40 or a Northrop Gamma without wing



Some say "Real Airplanes Have Round Engines". Well, it's hard to argue that when you look at this lovely Aeronca from a previous NATS. Nice fabric work.

fillets. It would look a bit silly wouldn't it?

Since this series is primarily about finishing, I won't go into making wing fillets in detail. We covered that in a previous column and will again in the future. Basically, they can be formed with a mixture of micro-balloons and polyester resin. Mix the two

ingredients until a thick slurry is obtained and trowel it in place between the fuselage and wing (you must have a release agent on the wing so the mixture won't stick to it). As the material starts to cure, it will have the consistency of a piece of cheese and can be carved and shaped roughly while at this stage. I use a circular X-acto blade for



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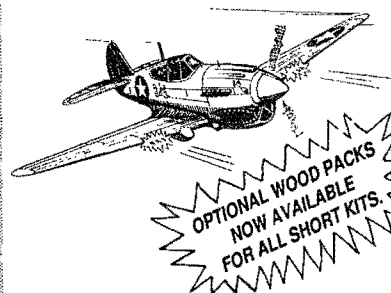
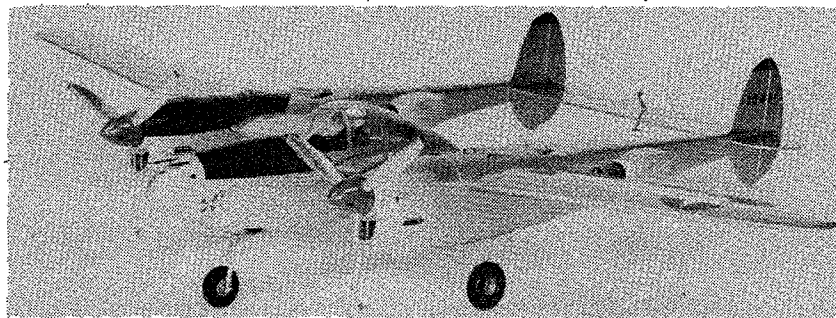
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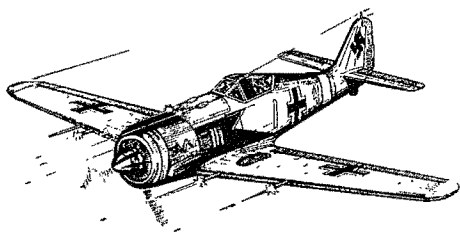
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Next month we will talk about different kinds of paint and how to use them. Mixing colors, compatibility, and masking will all be covered.

**Engine Choices:** On occasion modelers ask me what engine they should put in their new scale model. Of course there are several answers I could give depending on

the type, size, and performance desired of the model. Personally, I still prefer the good old fashioned two-stroke glow engines. When you consider the cost, power to weight ratio, and simplicity of operation, they are hard to beat. But you really have to consider the subject. A Cub looks and sounds wonderful with a four-stroke, as do

most any of the "Golden Age" subjects. When you get over 20 lbs., you have to start looking at the gas-burner two strokes to get adequate power, although there are some fairly large displacement four-strokes available (if you can afford them!). Keep in mind that 90% of the models we build are grossly overpowered. My Dave



P-40 Warhawk



Spitfire



P-39 Airacobra

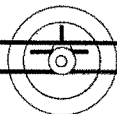


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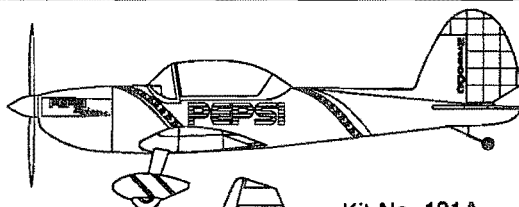
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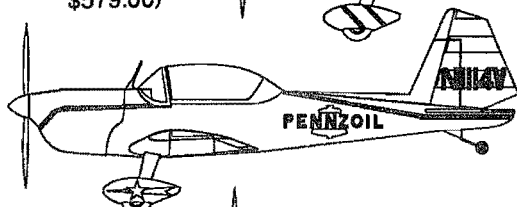
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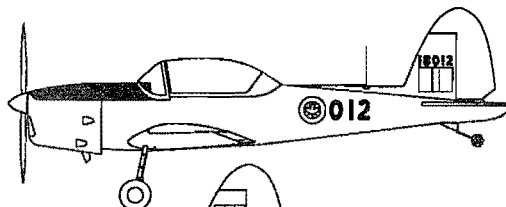
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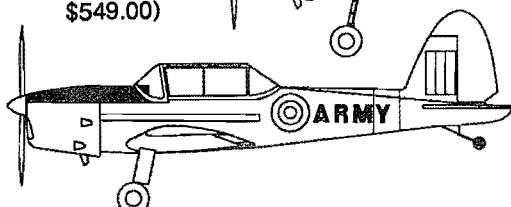
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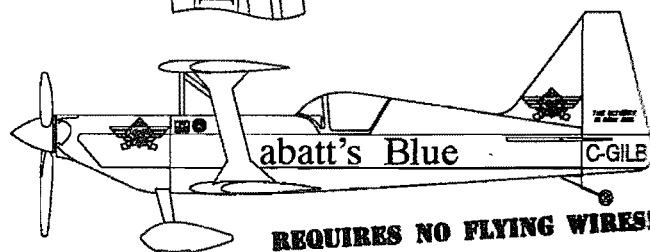
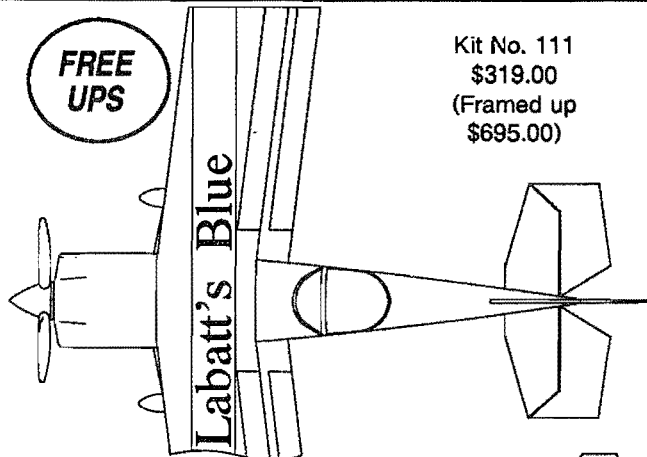
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this and shape it as closely as possible before a complete cure takes place. Once it is completely cured you can sand it to the final shape with a sanding block of the proper size (a dowel with sandpaper wrapped around it works well). The same procedure can be used to form fillets around the stabilizers.

After your fillet work is complete, the canopy or windshield needs to be installed. Trial fit it to the fuse and trim as necessary to get a good fit. There may be some areas that need to be faired into the fuse with the micro-balloon mixture later. Once you are satisfied with the fit, look to see what areas you are unable to reach after it has been glued in place and work on them now. Cockpit detail, painting, pilot figure, etc., are the usual things that need attention now. Don't forget to paint the canopy framing on the inside so that the color you use on the outside will not show through.

When you are ready to permanently glue it in place, avoid using CA adhesives since they may cause a "fog" on the inside that you can't reach to clean off. R/C 56 works well and dries crystal clear. If you have to use CA, don't use any accelerator.

Now, the fun part. Get your three-view or whatever drawing you have, an accurate measuring device, and a china marker. A divider comes in handy also. Start with the bottom of the wing and using your drawing as a guide, draw light lines with the china marker everywhere that there is a panel line. You will very quickly see the need for building an accurate model!

Realistically, most of you will not have things work out perfect. Just fudge things the best you can and keep the lines that are close to protrusions like radiators or struts in the right place. The amount of space in between them will not be

as noticeable. You may have to refer to some photographs to differentiate between panel lines and hatches on the drawings since the hatches will be reproduced differently.

After you finish the bottom of the wing, complete the remainder of the model in the same manner. Run down to the local drafting or art supply store and buy some 1/64th" wide drafting tape (color doesn't matter). Start applying the tape to the panel lines (not hatches) that you have marked on the model. After completing this step, lightly spray five or six coats of primer over the *lines ONLY*. By now your model will look like a giant tabby cat. Wet sand around the lines with

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the tape still in place to feather the edges with 400 grit paper. You may find that lightly scuffing the top of the tape to remove the paint will help the tape come off easier. You may go ahead and remove the tape after this, carefully cleaning out the slot with mild solvent to remove any adhesive residue. Now, using the already applied lines as a guide, locate the position of the hatches, panels and doors. To simulate these items, I use a thin, soft aluminum foil with pressure sensitive adhesive, cut to the appropriate shape. By now your model is starting to gain some character. Notice how the details will break up the vast expanse of surface area on something like a wing panel.

Now for one other final touch before painting... Rivets! You will need some type of reference showing the rivet pattern for your model, some R/C 56 glue, and a

method of application. I use a tool that I have developed and sell called the "Riveter". It is basically a polyethylene squeeze bottle with a stainless steel nozzle similar to a needle without the sharp point. You can use a syringe, although it is awkward to squeeze and move at the same time. Practice on a piece of scrap material until you can form small, round rivets with equal spacing easily. You can use a grid sheet to help with the spacing, but I have found that once you develop a rhythm, it goes faster without it. You may have to thin the R/C 56 slightly with water, but don't overdo it. Start with the bottom of the wing in the center and work outwards. By the time you reach the tip, the center will be close to dry. You will find that if you let the drop of glue pull off the tip from cohesion, rather than let the tip touch the surface, the rivet will be much more rounded. You may

vary the size of the rivet by pressure, and if you need to make large ones to simulate screws, keep in mind they take a little longer to dry. When the large drops are about 75% dry, you can press into them with a tiny phillips head screwdriver and form a nice screw head. You can also use this same method for simulating rib stitching on a fabric surface.

One more thing you should do before painting is install any other external details such as exhausts, scoops, blisters, etc., that can be formed from plastic or fiberglass. Some of these items may seem trivial now, but you will be glad you took the time for them later.

You are now ready to paint!

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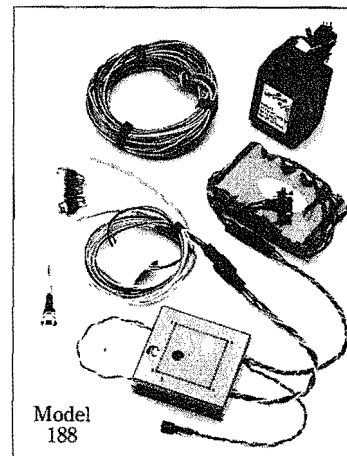
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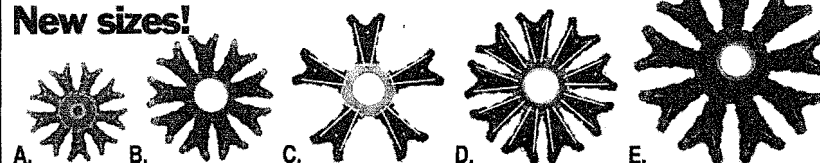
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Platt Zero flew fine at 19 lbs. with an O.S. 1.08 for power, but I have read of people putting a Tartan Twin in the same model!

One warning I can give is that the large gas burning two strokes usually vibrate like crazy! Some type of vibration dampening is a must! I worked on an RPV project last year that was using a 5.8 Sachs

for power (on a 70 lb. vehicle!) and I'm not quite sure how the thing stayed together. When it was idling, the control surfaces were a blur!

-Jeff Foley



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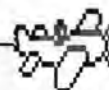
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# Afterburner



by Kevin Greene

I recently read an interesting article in *High Flight* magazine concerning ducted fan aircraft. *High Flight* is published quarterly by the International Miniature Aircraft Association (IMAA). In the 1991 Summer Issue, an article written by Al Hensen "Could There Be A Giant Jet In Your Future?" caught my attention. To quote Al: "I now propose to the IMAA Board of Directors that our by-laws be amended to allow for the inclusion of ducted fan model aircraft to be flown by IMAA members. Under the provision that the model meet the dimensional total of one hundred and forty inches (140") when added the wingspan and length of the fuselage together."

I was under the assumption that *any* aircraft with a wing span of 80" or greater (or true quarter scale) was IMAA legal. However, the manner in which Al Hensen wrote his article suggests that ducted fans are currently excluded, regardless of size.

I would like to thank Al for his lobbying efforts to the IMAA concerning ducted fan aircraft. Under his 140" proposal, aircraft such as the Byron F-20 Tigershark, F-15 Eagle, and Yellow Aircraft's SR-71 and F-18 Hornet would become IMAA legal. Ducted fan

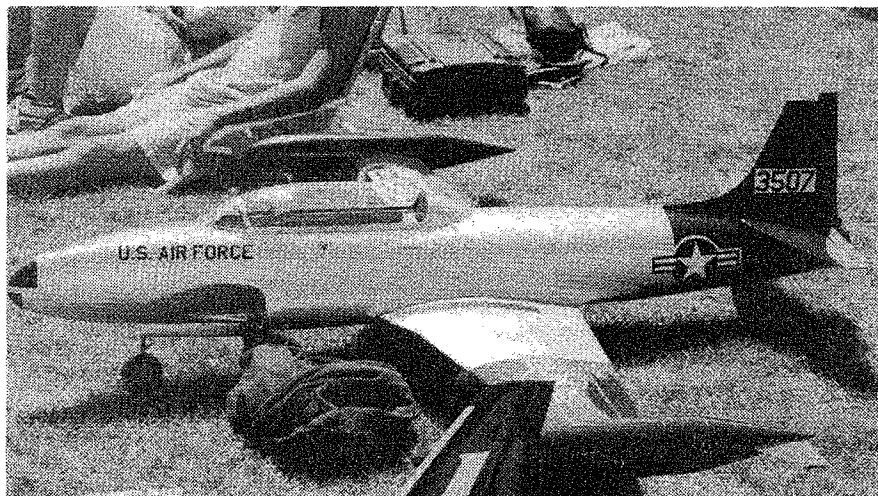
models such as Bob Violett Models T-33, Yellow Aircraft's F-14, and Knights of the Air's U-2 would qualify under the standard 80" monoplane wingspan rule.

I believe that ducted fans would be an asset to IMAA. By including ducted fan models in their program, they will grow, gaining "new blood" with fresh ideas. I have been asked to demo my ducted fan models at IMAA events and the response is always the same... Enthusiastic!

If you would like to voice your opinion concerning ducted fan

aircraft being accepted into the IMAA, then write to me in care of "R/C REPORT". I will forward all letters to Al Hensen.

What's new on the ducted fan scene? Plenty! Bob Violett debuted his prototype T-33 at Byron's Aviation Expo this year. Powered by a new prototype Nelson .91, the 80" wingspan model was more than adequately powered, displaying unheard of vertical performance for a 14 lb. aircraft. The model is scale, with pre-sheeted flying surfaces, scale panel lines, and all hardware.

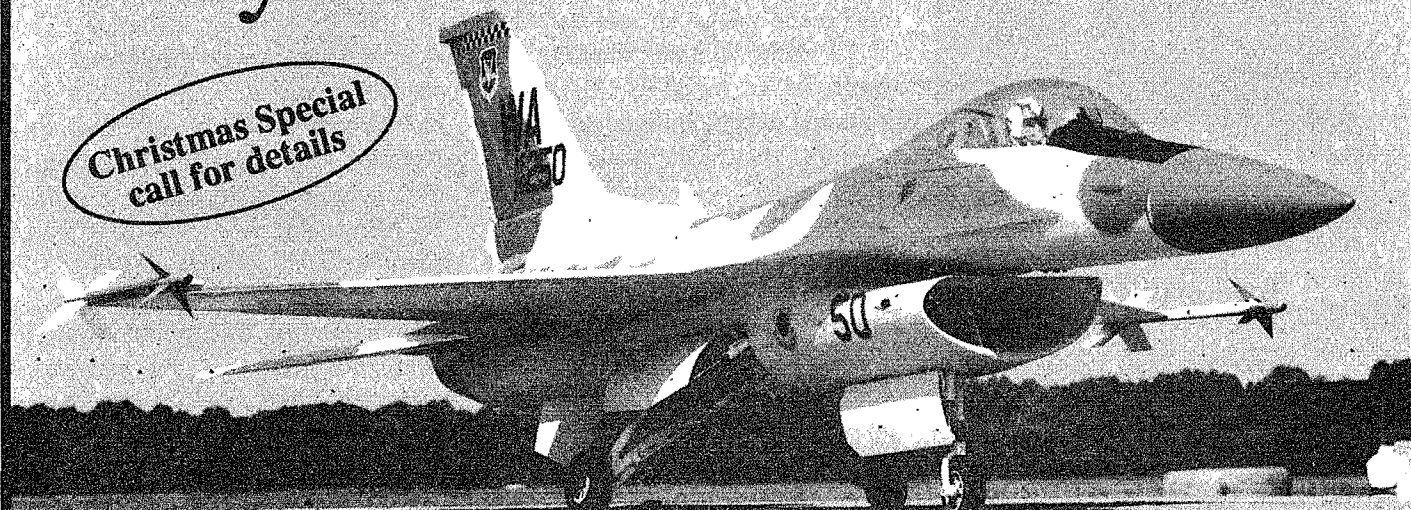


Bob Violett's new Prototype T-33. Note the gyro in the radio compartment.



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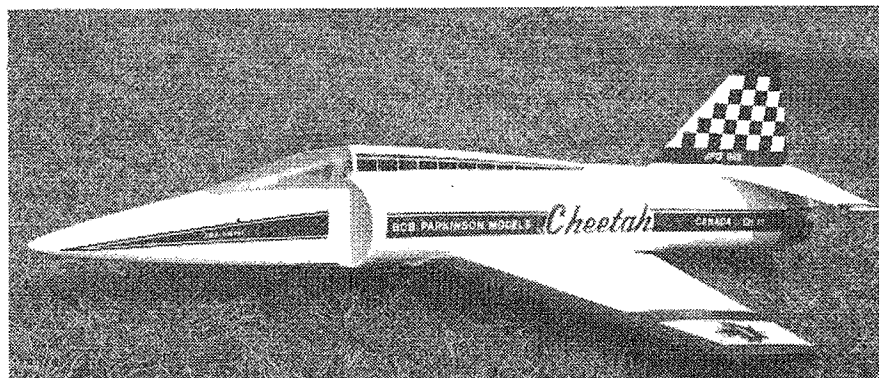
The fiberglass fuselage is formed in two pieces, joining on a scale panel line that doesn't require filling. All of the fiberglass components are lightly gel coated to make painting chores a breeze. For more information, contact Bob Violett Models at (407)365-5869 or 1-800-899-1144 (orders only), 1373 Citrus Rd., Winter Springs, FL 32708. If you are serious about purchasing a Violett T-33, send in your deposit and get in line!

Bob Parkinson, of Bob Parkinson Flying Models, has a new sport jet of unconventional design now available. Bob's new jet, the Cheetah, is constructed entirely of vinyl with foam wing cores sheathed with vinyl. I witnessed the aircraft flying at the Superman Fan Fly and the Dynamax/O.S. 65 powered Cheetah

flew well. The Cheetah is designed with the experienced ducted fan or sport flyer in mind. Bob claims if you can fly a Sig Kouger or Great Planes Sportster, then you can fly the Cheetah. As of this writing, the price is only \$169.00. Bob Parkinson can be contacted at (705)536-7041, or Box 856, 11th and 25th, RR #1, Stouffville, Ont. Canada L0L 2M0.

Some time ago, I reported that Bob Fiorenze was experimenting with a jet "smoker" fuel. The fuel is now out of the experimental stage and is now available. I've tried the fuel and it performs just as advertised, leaving a visible smoke trail behind the aircraft. Neither idling or top end performance is hindered as far as I can tell.

Bob Fiorenze is the owner of



Bob Parkinson's new ducted fan model is called "Cheetah".



Fiorenze Hobby Center and caters to the ducted fan modeler. For a complete catalog, send a SASE to 420 W.S.R. 434, Winter Springs, FL 32708, (407)327-6353. By the way, the smoker fuel is available in 7% and 12% nitro content.

I have a couple of topics to discuss concerning this month's tech tip. The first tip concerns proper engine socket headscrew maintenance. At a recent fan fly I witnessed a brand new O.S. 91 experience what seemed to be a routine flame-out. Upon closer inspection, though, it was discovered that the socket head screws retaining the front crank case housing had vibrated loose. Two of the four screws had fallen out! The engine was removed from the aircraft to replace the screws. To the modelers disgust, he found that the crankcase was cracked from stem to stern from the force of the loose crankcase/crankshaft assembly.

The modeler had checked all of the screws on the engine before installation, but this alone is insufficient. I recommend that all of the socket head screws be removed from the engine, cleaned in alcohol, and reinstalled using blue Loctite 242 thread locker.

I disassemble all of my new engines, soak them in alcohol, and reassemble with Loctite. If you do not wish to disassemble your entire engine, you can clean the threads in the crank case with TV tuner cleaner in a spray can available from Radio Shack. The small extension spray tube really gets into the small threaded holes in the crankcase. Remember, if you do disassemble your entire engine, reassemble it using some type of oil. I use common automatic transmission fluid.

O.S. engines seem to be more prone to loosing screws due to expansion and contraction of the



Author with Colonel Bob Thacker on the flight line at Byron's Expo. Model is a Hurricane Fans "Cobra".

metal. The Loctite should alleviate these problems. However, you should still frequently check all of your socket head screws for tightness, especially the head screws.

Another tip concerns tuned pipe retaining springs. It seems that no matter what brand of spring is used by ducted fan modelers, it will eventually break. I don't use any of the commercial tuned pipe springs. They seem to be hardened too much (too brittle) and are prone to breaking where the hook connects to the metal flange.

I've used common hardware store variety springs with excellent results. The spring that I use doesn't have a particular number. It's a medium duty, 1/4" diameter item. Note the large size. Perhaps the smaller springs designed for tuned pipe retention vibrate easier than the larger spring, experience metal fatigue, and then break.

In a tractor fan configuration, chances are if you break a spring, the only thing that will happen will be that the pipe comes off of the header that is bolted to the engine. If you're lucky, you won't flame out. On the other hand, in a pusher

configuration (for example: Byron Fan Unit), the results of spring breakage can be disastrous. I've seen springs get sucked into the fan, wrapped around the rotor, shatter the rotor, and in extreme cases, completely destroy the model from the inside out. The spring gets wrapped around the rotor and can just about literally cut your model in half as the spring rotates with the rotor.

I don't know if Bob Violett has a patent on his tuned pipe retention system, but I'd sure like to see all headers constructed like his. The Violett, or "Viojet", tuned pipe system requires no retention spring. Instead, a groove is machined into the header, enabling the header to slide onto the "O" ringed portion of the header that is screwed to the engine. The pipe locks in place with a click, and believe me, the pipe *won't* slide away from the "O" rings unless the "O" rings are severely deteriorated. I've never had a Violett pipe come loose.

Bob Fiorenze has learned to accept the fact that tuned pipe retention springs will eventually break; hence, Bob uses two springs instead of one. If you continue to

use the small retention springs designed for tuned pipe use, I suggest that you frequently check them and discard it at the first sign of wear. At my local hobby shop, the retention springs only cost \$2.50. Using two springs is an excellent idea, but remember, discard them at the first sign of wear.

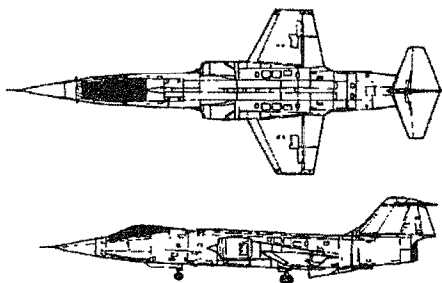
If you are a regular reader, you know that I emphatically suggest that you attend the fan flys. At the fan flys, you can see what does and doesn't work, ask questions, and meet interesting people. At the Byron Aviation Expo, I had the opportunity to rub elbows with Colonel Bob Thacker. Colonel Thacker has set aviation records and has test flown multitudes of aircraft, including jets.

I really had a good time chatting with Bob. What's he like? Hilariously amusing and extremely knowledgeable. He and Steve Korney, of Hurricane Fans, make quite a pair. Bob flew a Picco 80 powered Hurricane Fan's "Cobra" dressed in Paris Air Show F-20 livery. Bob's "Cobra" exhibited nearly unlimited vertical performance and had respectably good speed.

When I grow old and look back on my life, I will remember meeting folks like Colonel Thacker. These memories will be the highlight of my modeling career.

Attend the fan flys. You never know who you might meet, as well as what you might learn!

Fly safely, -Kevin Greene



## NAME THE PLANE CONTEST



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Just jot down the name of the aircraft and mail it along with your name, your UPS address, and your

subscription number if you have one, to "R/C REPORT" FTE Contest #45  
P.O. Box 1706  
Huntsville, AL 35807

The winner will be determined by a random drawing from all the correct entries received by Dec 15, 1991. Illegible entries, and those mailed elsewhere will be discarded. Please do not include your entry with any other correspondence since one or the other tends to get lost.

All prize merchandise is donated by Frank Tiano Enterprises.  
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### CONTEST RESULTS

#### NAME THE PLANE

#### CONTEST #43

Now, we have to give Frank credit this time for a clear and sharp contest photo, and the airplane was darned easy to identify, too. And, in such an easy one, one of our most often represented entrants has done it again. Our winner this month, again, is...

Dan Lutz,  
of Fallbrook, CA

Dan wins \$100 worth of ZAP Sticky Stuff for correctly identifying the aircraft as the North American F-86F Sabre. Dan also correctly named the kit manufacturer as Bob Violett Models, but the builder was incorrectly named. The builder was actually Bill Harris.

Congratulations once again, Dan, for your knowledge and your darn good luck!

As usual, we received some interesting entries that didn't win. This month we have some real doozies, too, to include...

The plane pictured is a NORTH AMERICAN F-86 SABRE, flown by the Royal Canadian Air Force. The F-86 was not only built in the U.S., but also in Australia (CAC Sabre), and in Canada (Canadair Sabre). The power plant that the U.S. used was a General Electric J47-GE-27 turbojet. In Australia they used a Rolls-Royce Avon turbojet, and in Canada it was an Orenda turbojet.

The prototype was first flown in October 1947. The design of the F-86 used German research information captured during WWII, such as the swept wings.

This plane went through many changes starting with the F-86A. The F-86F used a different wing, the F-86D was a night and all-weather fighter, the F-86H was a fighter-bomber using the J73 turbojet engine, the F-86K was a simplified version of the F-86D, and the rebuilt version of the F-86D with larger wings and better electronics was called the F-86L.

Getting back to the pictured model, it's a Bob Violett Models kit built by Dave Melchione. Mr. Melchione won the Best Finish Award with his F-86 at the 1991 RAAM's Fan Fly in Rome, NY.



F-86F Photo from Contest #43

**Other Notes:** The Royal Canadian Air Force lent this Sabre to the country of Subee, to use in putting down a sixteen (13) year long revolt in their small country. The only function of this Sabre was that of a Day-Night-Fighter-Bomber-Escort-Transport-Tanker-Trainer-etc., etc., but due to some inability of the Subillian pilot, it only saw duty as a display model in a local Scale Contest. It earned only 10 points for Best Finish.

Thanks for the fun mag. Karl Sebesta, Little Canada, MN P.S. If you believe any of the "Other Notes", I've got a bridge I'd like to sell you.

Why shouldn't I believe it? Besides, I wouldn't mind having another bridge. I already bought one in New York named after our first President.

Dear Gordon,

The model pictured is an F-86 Sabre Jet. It was built by Bill Harris from a Bob Violett Models kit. I think it is the prettiest one I've ever seen.

I really enjoy your magazine and I like the new format.

A special thanks to Frank Tiano for sponsoring these contests.

My twelve year old son has just gotten interested in model building and although he hasn't completed a plane yet, he sure

has used up a lot of glue, so I really need this stuff!

Thanks,

Donald Wynn Sauls  
Commerce, GA

You were one of the very few to correctly identify Bill Harris as the builder. But alas, your entry wasn't grabbed by the computer.

Better luck next time guys.

-GLB

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# R/C Aerobatics



by Dick Hanson

This month, I would like to review power-to-weight ratios and their relationship to performance. But first, I wish to thank Daryl Ireland for sending me the pictures shown here of his beautiful scratch built Bud Light Laser. Daryl lives in Tillar, AR, and shares our interest in good aerobatic models.

If you are not familiar with this design, note the "hole" under the wing. This is a window on the actual Bud Light Laser and is necessary for the pilot to see the ground and horizon as he attempts to keep oriented through the various maneuvers. Looking at the top view, you will see that the pilot has a field of vision which is limited drastically by the wing placement. That's one reason for the window. The other is to watch sunbathers.

Daryl told me that this model has a 82" span and weighs 13-1/2 lbs. which means that it is "light" and with the O.P.S. 30 powering it, an excellent aerobatic model.

The full size Laser was begun by Leo Laudenslager in the late 1960's. It was originally a Stephens Akro he built from plans and constantly modified until in 1975 it was essentially "completed" and became the Bud Light Laser. The changes over this period included different wings and airfoils, a turtledeck and canopy, larger

tailplanes, three different spinners, five different propellers, three cowlings, and diet of lightening holes all over the place including the canopy rails.

The performance of the full size machine is spectacular for a 200 hp Lycoming powered craft and one would think that little else could be done to exceed *that* performance. Wrong!

One of the latest aerobatic designs, the S-300, has a big six cylinder Lycoming which probably puts out over 300 hp and appears to be a solid competitor in the race for VTO (vertical take off) aerobatic designs. It presently weighs 1300 lbs. but is going on a diet (low fat oil and unleaded gas?).

Most of the current designs have a power to weight ratio of roughly 4:1, or 4 lbs. per hp.

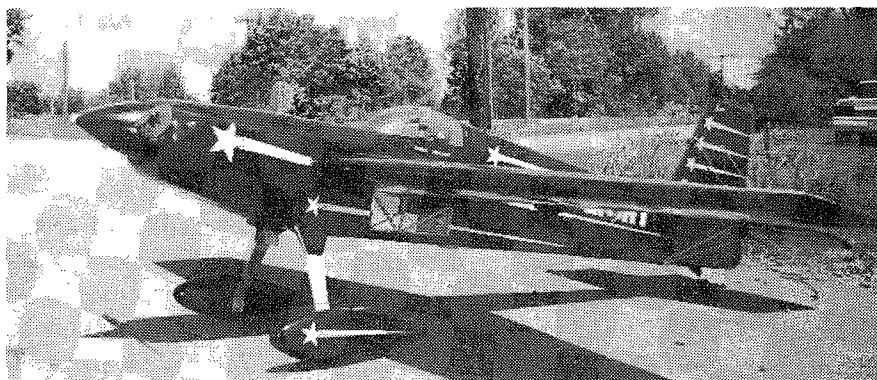
A quick automobile usually has a power to weight ratio of 10:1 (2000 lbs. 200 hp.).

Really quick motorcycles figure in at around 5:1. Formula 1 race cars are up to less than 2:1, and fast drag machines are way over the 1:1 ratio. Our aerobatic models have about a 4:1 ratio as did most of the models at the last TOC (Tournament Of Champions) in Las Vegas.

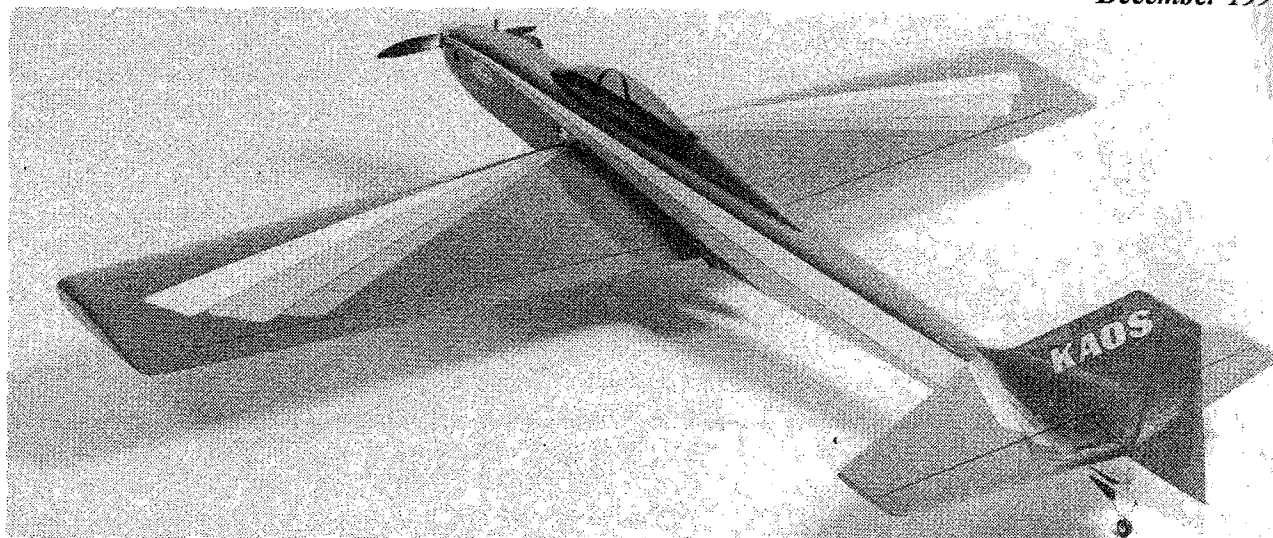
Now that we have all become accustomed to these power to weight setups, the further increase of power seems obvious. Our own research shows that a power loading



Daryl Ireland's beautiful Laser. Note the window beneath the wing. See text for the window's purpose.

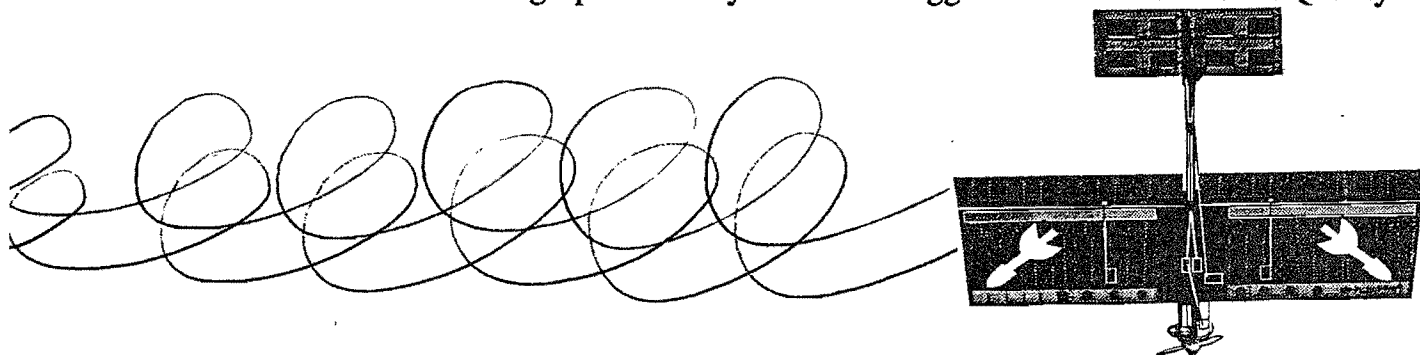


Daryl's 82" span Laser weighs but 13-1/2 lbs., which is very light for its OPS 30 engine.



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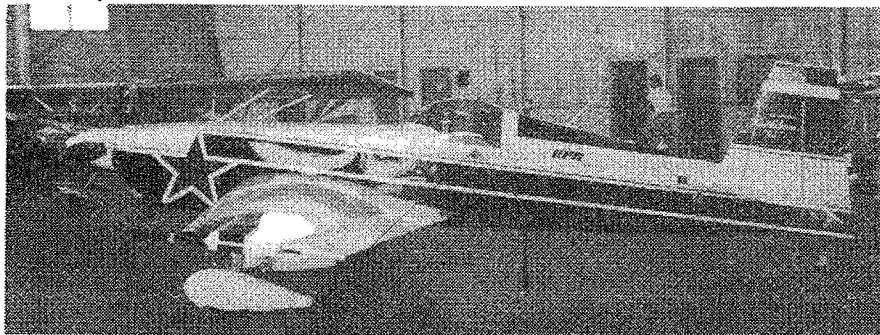
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The S-300 has a six cylinder Lycoming which probably puts out over 300 hp.

of 3:1 will give a lot better low speed control, providing the model has the proper layout and large enough control surfaces.

Little bitty propellers and high revs work well on some aerobatic designs, notably the ultra-light Competition Fun Fly types. This arrangement, however, gives way to BIG props turning slowly on the large models.

Part of this switch is due to laws of physics which prevent propellers from being efficient unless their size/rpm relationship is carefully observed. For example, ducted fan engines are terribly inefficient at low rpm because the blades are so tiny.

If, however, you have ever observed a full scale C5A (which has fan engines), you probably noticed that the fans turn slowly in order to stay below the supersonic tip speed limit. Our model engines can run at high revs because the speed of the moving parts (in feet per minute) is really very conservative.

I threw in the above background stuff to help explain why our various setups are as they are.

It seems to me that the only way we modelers can get better power to weight ratios is basically to get more torque at a given rpm from an engine package that weighs a given amount. It really doesn't matter if the engine is made up from many cylinders, has internal gear reductions, is supercharged, uses mouse sweat for fuel, or has

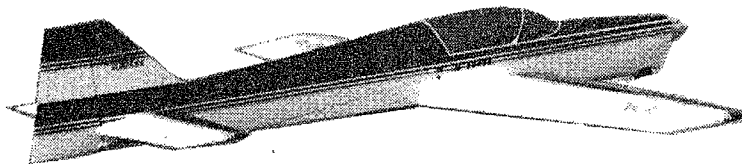
four overhead cams.

The crucial factor is if it turns the necessary airscrew at the required speed to get the job done.

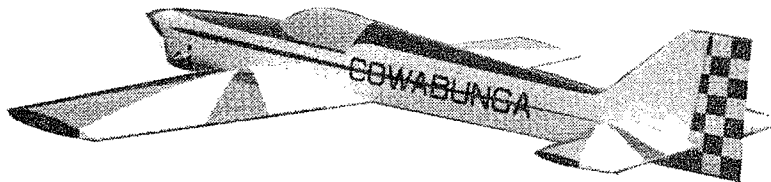
For example: a light .60 will pull a bigger prop than a heavy .40. The power packages may WEIGH the same and the hp at a given rpm may be the same but the TORQUE at a given rpm will almost always be produced by the larger engine.

4C engines are usually considered to have more torque,

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primarily because they can develop higher cylinder pressures than 2C designs. The torque we want can be obtained from 2C cycle setups by gear reduction. This method yields a torque increase directly related to the gear ratio. For example: if the gear reduction is 2:1, the prop speed is halved but the torque is doubled, allowing the use of larger props. Simple enough.

My experience shows that the old O.S. gear box .60 engines are equal to the present 1.20 4C OR 2C engines in how well they can swing large props.

In each setup, however, the vibration levels, the noise levels, and the fuel consumption varies. They all weigh about the same with the big 2C being the heaviest.

My plan at this time is to try another homemade twin-engine gear arrangement using tuned exhaust 2C engines. These setups are not new but they haven't been widely used due to the obvious complexity. Hanno Prettner demonstrated the advantages of this arrangement a number of times at the TOC events. I was impressed.

One of the most widely discussed maneuvers seen at the last TOC was the torque roll as demonstrated during the free style events. This trick requires enough static thrust to hover AND provide control by careful use of all control surfaces.

The models demonstrating the hover obviously had static thrust exceeding 1:1, but the hp to weight was somewhere between 3-4 lbs. for each hoss.

I didn't get a static thrust reading on these models but I venture that it was around 30 lbs. The static thrust ratio would be 1.5:1 if this is accurate, knowing that the models used weighed approximately 20 lbs.

For most fliers, the power to weight ratios of their .40 sport model is around 6:1. This is figured using .75 hp and 5 lbs. The advertised horsepower on .40 engines is usually 1.0 hp or more, but that is frankly an optimistic figure, and figured at very high revs. A good FAI pattern model has about 2 hp tugging an 8 lb. design for a 4:1 ratio.

The latest 1.2 4C engines will approach 3 hp if they are properly motivated and lubricated. The result is that we have 2 lb. engines which will swing 15" by 10-12" props at efficient rpms.

For what it's worth, the Supertigre 2000 is the closest thing in a 2C (same displacement) to the 1.20 4C, but it weighs 42 ozs. Although not everyone will agree, I feel that the O.S. 1.08, which is closer in weight, has less torque. If you use a tuned pipe setup for low rpm, it is close in low speed power but the pipe takes up a lot of space.

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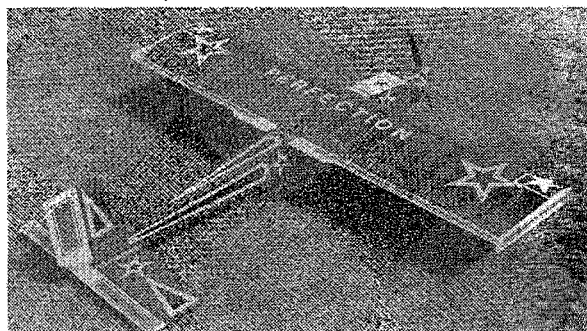
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Obviously, there are many paths to the same result. You pay your monies and take your chances.

Finally, let's look at what these high torque setups do on the model.

You have probably heard that you have to allow for torque and that is true. Usually, the allowance consists of setting the engine a few degrees to the right. Two to four degrees is common.

The torque tries to roll the aircraft to the left (remember the old law that states "for every action there is an equal REaction in the opposite direction").

Also, as you climb, the torque will be joined by a force that causes the aircraft to veer left (under power).

However, as you dive the model, the rudder correction will not be the same and you may even find that right rudder correction is required at times. I found this out when trying to determine how much the looping maneuvers were affected by different props.

The lesson learned is that you must learn to fly using constant rudder corrections just as you would use constant aileron or elevator corrections. There simply is no fixed trim which will insure

perfect loop trimming when we are dealing with high torque.

I have tried different mixing setups with the transmitter, but for me this creates more problems than it cures. So, is the extra torque worth it? I think so.

The ability to recover from any attitude or make corrections with power really is handy.

The model can also be flown more slowly because there is less need to build momentum.

-Dick Hanson



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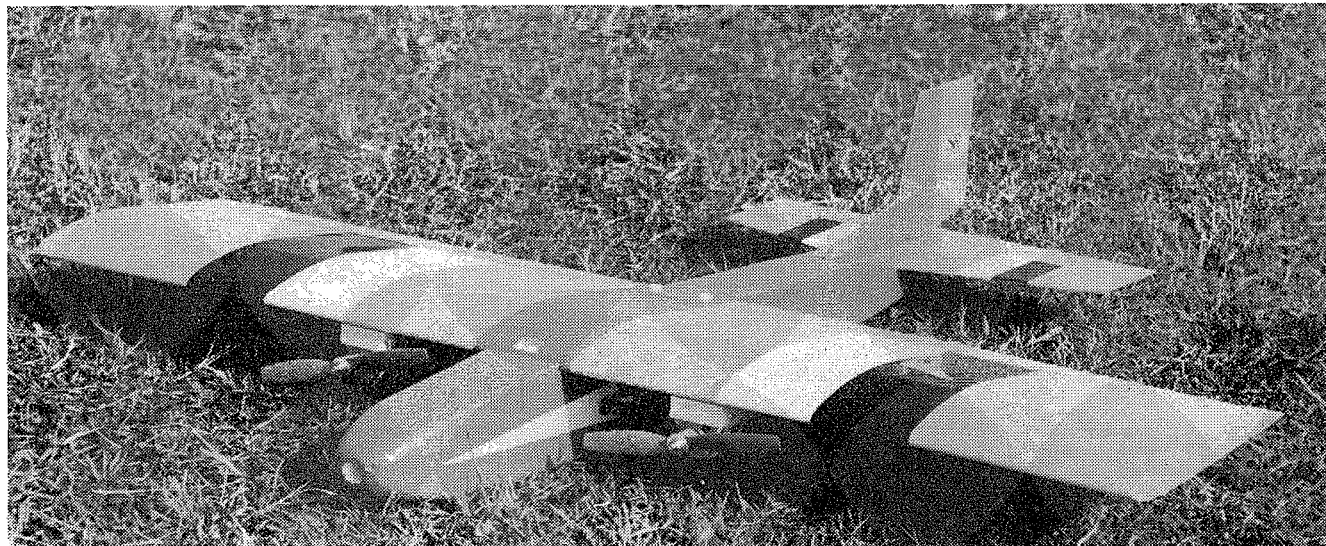
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by Charlie Spear and Dr. John Mountjoy



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Wing Span ..... 36"  
Wing Area ..... 288 sq. in.  
Airfoil ..... semi-symmetrical  
Fuselage Length ..... 29-1/2"  
Rec. Controls ..... 3 (motor, elevator, ailerons)  
Rec. Motors ..... (2) Mini Olympus, geared  
Rec. Weight ..... 32-37 ounces  
Basic Materials ..... Balsa and plywood  
Instructions ..... Good  
Plans ..... rolled, detailed, and complete  
Hardware Included ..... all that's necessary  
Items Needed To Complete ... propellers, motors,  
radio system, motor battery pack, speed  
control, adhesives, and finishing materials.

## COMPLETED MODEL

Finished Weight ..... 35 oz.  
Wing Loading ..... 17.5 oz/sq.ft.  
Motors Used ..... two Astro Flite 020's  
Prop Used ..... Cox grey 6x4  
Motor Battery Pack ..... Eight SCR 900's  
Radio Used ..... HiTec  
Speed Controller Young's Off-Low-High with BEC

Covering/Finishing Used .. Hobby Lobby Oracover  
Special Items ..... None

**CHEERS** - Deluxe kit includes motors; strong but light construction; parts fit; equipment easy to install; fast and very aerobatic, yet stable flight characteristics.

**JEERS** - front wing bolt plate stripped easily; model needs a skid or some light landing gear for better landings.

While at the 1991 Toledo Show John talked to Azarr, at Air Flair Models. Hidden under other boxes was an intriguing, small, twin-engine electric kit that looked like an excellent project. John obtained the standard kit without motors.

Everything needed to construct the model is in the box. The balsa is light and the wing ribs are router cut. There is a complete hardware package and the rolled plans are of scratch-building quality. The instructions carry you step-by-step through the building sequence and equipment installation procedures.

All assembly was done with CA adhesive. The only change in the fuselage was to substitute laminated 1/64th ply and 1/16th balsa sheet in the forward section where an eight cell 900 mah pack would fit to power the motor. The indicated battery access hatch is really not needed, as most would use an external charging jack and not remove the battery pack, which sits far forward in the nose.

We wouldn't recommend this kit for a beginner, but it sure went together nicely for us. The wing construction is straightforward. There is no dihedral and the engine pods mount on the undersurface of the wing. If the instructions are followed to the letter, perfect alignment is obtained. John did have to modify the mounting system slightly to house the optional Astro Flight 020 direct drive motors. Before covering the wing one must not forget to route the motor wires. The plans show a parallel motor drive system which John was not in favor of, so a series connection was used.

The wing was covered with bright green fluorescent Oracover which is very visible, and standard green Oracover on the fuselage. Air Flair has included a blue foam block carved as a nose cone and John found it quite difficult to apply Oracover over this without some wrinkling. The installation of all the electrical components was quite easy as the fuselage is large and spacious. The elevator servo and receiver mount as far aft as possible.

John has been experimenting with the new Young ESC-3X controller which sits nicely in between the receiver and battery pack. This new Young controller is something that has been in the development stage for the past year

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\*\*\*\*\*  
and comes in several forms. The one that John is presently using has a pigtail which allows for the connection of a BEC module (\$8.95) and lists for \$39.95. This is not a proportional controller but an off/medium speed/high speed unit that should be more than adequate for the sport flyer. It is lightweight, compact, and performs the intended functions. One first adjusts the off position with a small trim pot, then the full on position with another small trim pot. With the throttle stick at the middle position one adjusts still another trim pot for the rpm desired in the mid-range. After many flights there have been no glitches.  
The two Astro Flight 020's

# Air Flair

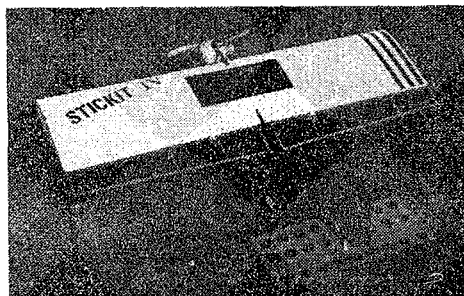
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with Cox 6x4 props mount under the wing, rubber-banded to the motor mounts. As mentioned before, a series hook-up was used which allows both motors to obtain approximately the same rpm and you can't have just one motor go out. If you do use parallel connected motors, we would recommend larger batteries such as 1700 SCE's. Remember, if you have a parallel connected system the amperage draw will be higher, which is why we recommend larger cells. The Young connector comes with a BEC on/off switch which allows you to turn the system on or off, but use an arming switch just to be on the safe side.

After the photos were taken, the two 020's came to life and the plane jumped into the air, rolled, looped, flew inverted, and made that wonderful "twin" sound. Since there is no rudder, some maneuvers are not obtainable. The rolls are not quite axial, but who cares with this fast little sport twin.

After 4-1/2 minutes, she slows nicely and lands on the belly skid. One problem we did notice was that in the grass the props tend to catch and the motors will flip out of their mounts. John has been thinking about going to a small gear or a wire skid to prevent this. After several more flights, which included vertical rolls and low fly-bys which sound terrific, John noticed that the bolt anchoring the wing leading

edge had stripped out. We should have known that it wouldn't hold in the thin ply that was supplied. John later added a block underneath the ply and re-threaded the hole and have had no further problems.

The plane was flown at the Ann Arbor, MI meet and fellow contestants were quite impressed with the speed of this small twin. John is impressed with the kit and the fast aerobatic characteristics that it displays. As mentioned above, John will be rebuilding a wing with the recommended motors and will pass along his flying impressions of the Twin Mini Olympus Schtick.

After the model was built, we received Air Flair's Deluxe kit which includes two Mini Olympus motors. John built a new wing with these two small motors, retaining the original fuselage. The second wing was built with the motors wired in parallel as per the directions. On seven cells, they drew 11 Amps each using a nylon 7x6 Top Flite prop.

First, John used his eight cell 900 mah SCR pack (as had been set up for the two Astro 020 motors). The speed was slightly slower than the 020 powered plane, but all the basic maneuvers were still easily done. Flight times dropped to 2-1/2 minutes due to the high current draw. John then tried a seven cell 1200 mah SR pack. This gave him 4-1/2 minutes of full power plus

aerobatics as before. The added weight didn't hurt the performance one bit.

**Summary:** Either configuration works well and since Air Flair is supplying the motors, we recommend you go with their Deluxe Kit. If you have two 020 Cobalts, then try the basic kit using your motors and the series wiring as John did.

-Charles Spear &  
Dr. John Mountjoy

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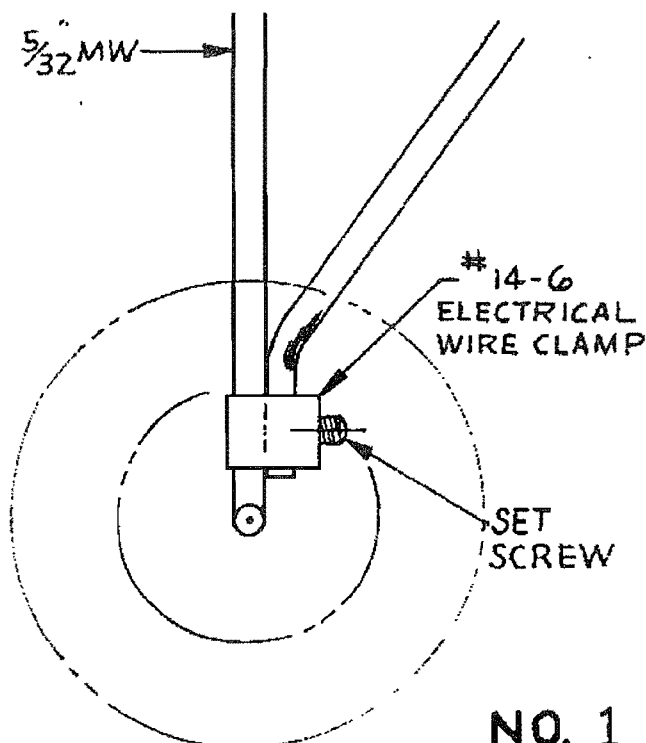
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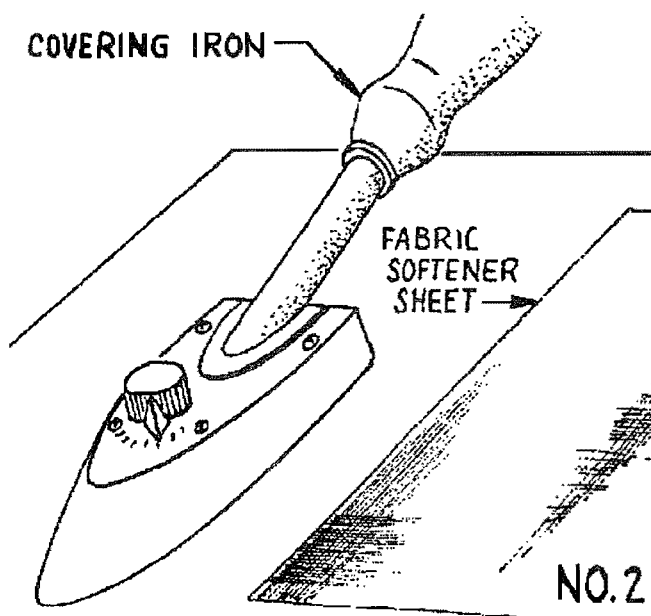
# HERE'S HOW...

by LeRoy Satterlee



NO. 1

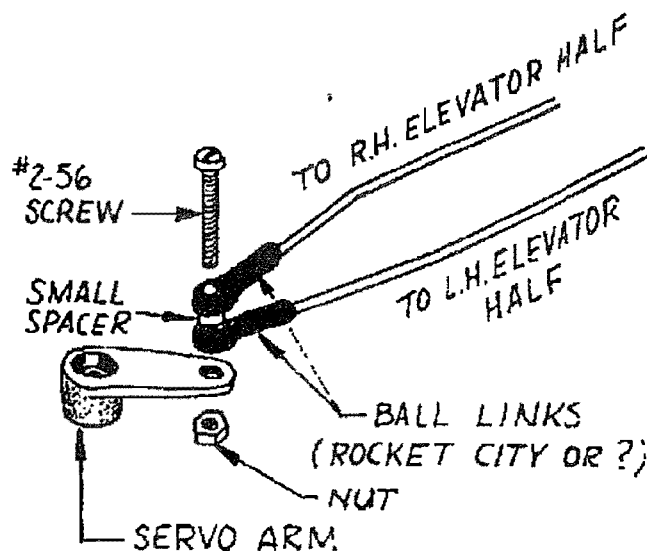
1. ...Herb Prater, of Thebes, IL, gets around the tough job of soldering music wire. Herb uses #14-6 electrical wire clamps instead of soldering. It works perfectly on 5/32" music wire.



NO. 2

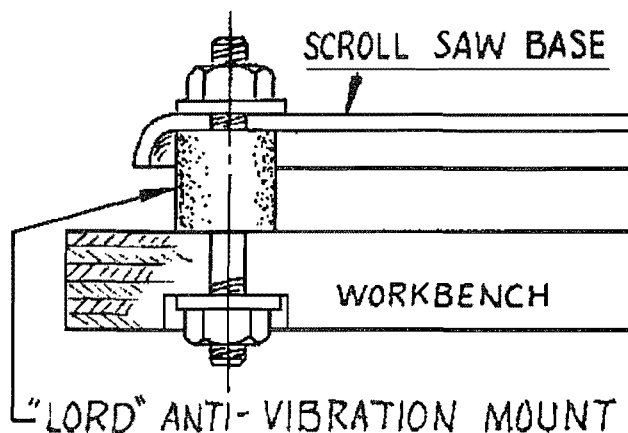
2. ...Louis McKinney Jr., of Lithonia, GA, keeps the sticky goo off his covering iron. Tape a sheet of fabric softener cloth (any brand) to your bench near where you cover. Rub the HOT iron over it occasionally, then

rub it on a clean dry towel. Works every time!



NO. 3

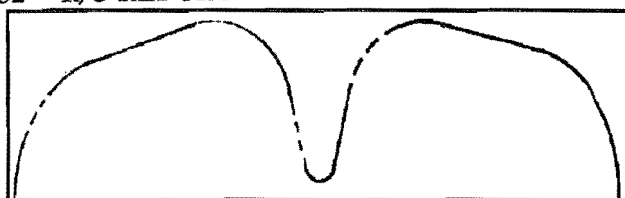
3. ...John Van Hassel, of Helena, MT, solved his split push rod problem. Instead of a "Y", John uses two complete push rods, one for each elevator half. You can use dowels, music wire, or cables for the push rods, your choice. Be sure both horns are the same size and exit the same face of the control surface.



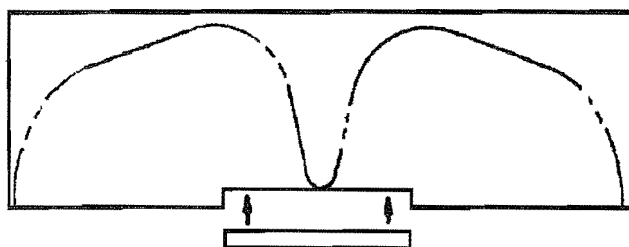
NO. 4

4. ...Mike Martin, of Reidsville, NC, takes the shake out of his Dremel Scroll Saw. Mike suggests using one of the currently available anti-vibration mounts for engines to calm down your shaking shop machinery.

5. ...George Acacia, of Staten Island, NY, keeps the halves of a split elevator straight and true. He starts



STEP 1. DRAW OUTLINE ON WOOD

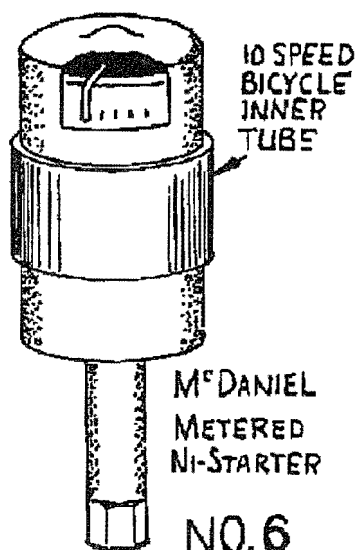


STEP 2. NOTCH &amp; INSTALL JOINER PIECE

STEP 3. FINISH CUT OUT AFTER  
GLUE IS DRY

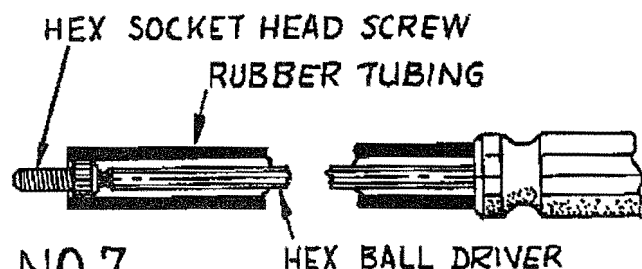
NO. 5

with a drawing of the halves on a single piece of wood. Notch for, and then install the joiner piece with epoxy. Finish cutting out the elevator halves after the epoxy has cured.

10 SPEED  
BICYCLE  
INNER  
TUBEM<sup>C</sup>DANIEL  
METERED  
NI-STARTER

NO. 6

6. ...Ron Riesbeck, of Lake Villa, IL, fixes his Metered Ni-Starter when the tape that joins the two halves falls off. Just cut 1" or so from a ten speed bicycle inner tube and stretch it over the joint. This creates a nice tight, fuel proof seal. Your local bicycle shop will likely have a ruined tube that you could scavenge some scraps from.

HEX SOCKET HEAD SCREW  
RUBBER TUBING

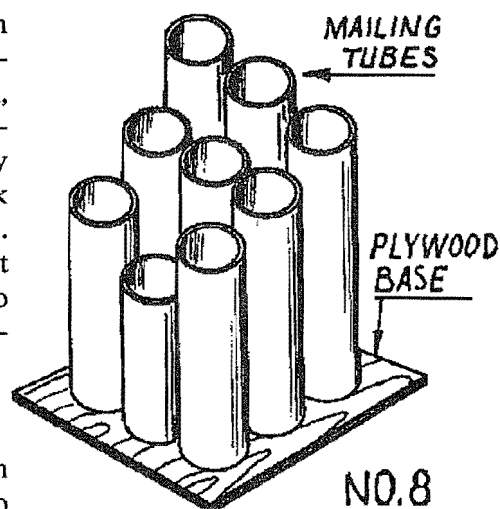
HEX BALL DRIVER

NO. 7

7. ...John McKee, of Baytown, TX, uses his hex ball

driver to start screws in nearly in-accessible places. Use a rubber tube (fuel line?) that will snugly fit the screw head, and is slightly longer than the shank of the ball driver. This will keep the screw engaged on the ball driver until you can get the threads started.

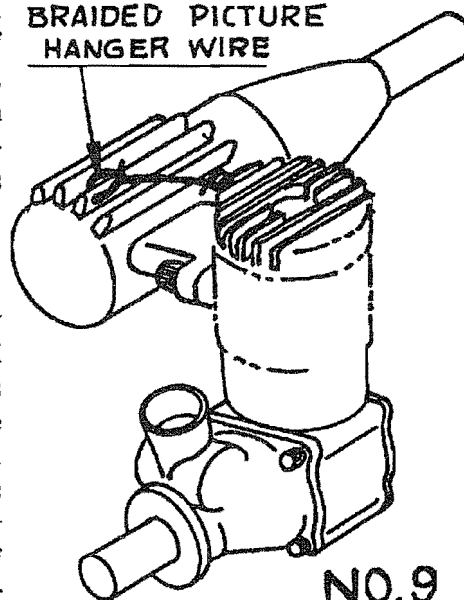
8. ...Keith Love, Milpitas, CA, keeps everything handy to his work bench area. Use a Hot Glue gun to fasten cardboard tubes of various lengths and sizes to each other, and to a plywood

MAILING  
TUBESPLYWOOD  
BASE

NO. 8

base. Keep this unit near your work bench. It will store almost anything, from full sheets of wood to sticks and music wire, depending on the length and diameter of the tubes. Only your imagination sets the limits.

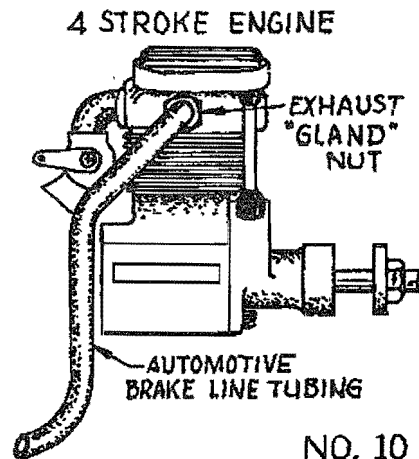
9. ...Don Dever, of Pueblo, CO, keeps from losing expensive mufflers from his engines. Old Timer mufflers are very hard to find replacements for, so are worth saving. Don suggests drilling a tiny hole in one of the cylinder head fins, and another in the muffler, in a fin or some other obscure spot. Now you can tie the two together with a short length of picture hanging wire. The braided kind is best and the knots that you tie in the ends will stay put.

BRAIDED PICTURE  
HANGER WIRE

NO. 9

10. ...Robert Wakeman, of San Mateo, CA, gets rid of the exhaust goo from his 4C engines. Bob has found that automotive hydraulic brake line tubing, which

comes in various sizes, makes excellent 4C exhaust pipes. It can be flared using standard flaring tools purchased from your local auto parts store. You can use the "gland" nut supplied with the engine. Take the nut with you when you go to select the tubing, to be sure of the fit. The tubing bends easily and can be routed neatly out of your engine compartment. This idea applies particularly well to Saito and O.S. 4C engines.



NO. 10

Send your HERE'S HOW ideas to LeRoy Satterlee, 1604 Huntington Rd., Waterloo, IA 50701. If your idea is used in the magazine we'll award you a two-year subscription (or renewal) to *R/C REPORT*. If your subscription is getting real long already, you can award the subscription to a friend.

-LeRoy Satterlee

## THE PLAN

Submitted by William L. Baker

In the beginning there was "The Plan",  
and then came the assumptions,  
and the assumptions were without form,  
and the plan was completely without substance;  
and darkness was on the face of the workers;  
and they spoke unto their group heads saying;  
*"The Plan is a crock of manure and it stinks."*

And the group heads went unto their section heads and said;  
*"It is a pail of dung and none may abide the odor thereof."*  
And the section heads went unto their managers and said unto them:  
*"It is a container of excrement and it is very strong,*  
such that none here may abide it."

And the managers went unto their director and said unto him:  
*"It is a vessel of fertilizer and none may abide its strength."*  
And the director went unto the executive director and said:  
*"It contains that which aids plant growth and is very strong."*  
And the executive director went unto the vice president  
and said unto him:  
*"It promotes growth and is very powerful."*

And the vice president went unto the president and said unto him:  
*"This powerful new plan will actively promote growth and  
efficiency of the department and this area in particular."*  
and the president looked upon the Plan and saw that it was good.  
**The Plan became Policy.**





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already working the crowd. ...this year's first Fun Fly was going to be

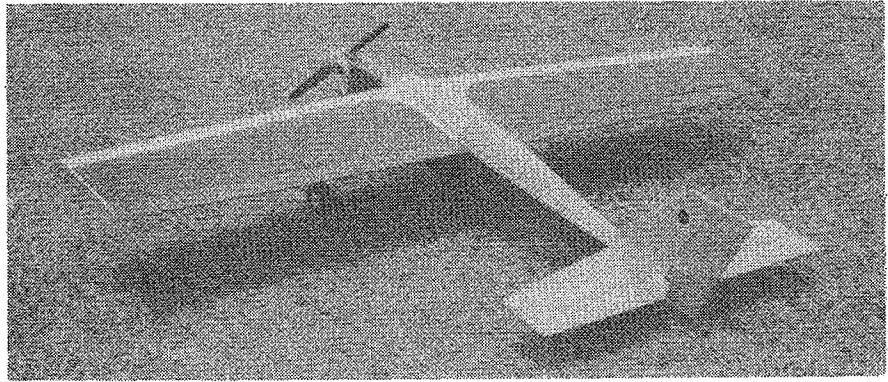
different. I reached for my Great Planes Fun-One, knowing this time the fun would be mine.

Rolls came faster than you could count them. Spectators missed a dozen while doing their double takes. Loops were tighter than my old blue jeans! Throughout the crowd jaws dropped ankle-high.

The new Great Planes Fun-One makes any pilot look like a Fun-Fly champ."

Great Planes ad

Excuse me while I gather myself up out of the floor after falling victim to fits of uncontrollable laughter. I sure hope whoever wrote the above ad copy did so with their collective tongues firmly planted in their cheeks. "Loops tighter than my old blue jeans"? Either the copy writers have a great sense of humor or... no, surely they don't... they *couldn't* really believe that the Fun-One is a *serious* Fun-Fly machine? The typical "wing-on-a-stick" aircraft that are being flown almost exclusively at the major Competition Fun Fly contests, such as the recent Competition Fun Fly National, are capable of maneuvers that the Great Planes Fun-One hasn't even *thought* of yet! No pilot is going to be able to wring ten consecutive four foot diameter 'LOOP-and-goes' out of this plane. Why, the wing loading is TWICE that of the genuine Competition Fun-Fly machines. But, a highly respected top-notch kit designer from Great Planes Model Mfg. was seen in the pits at the recent Competition Fun Fly National. Could it be that we may soon see a *serious* Fun Fly plane coming



through the Great Planes pipeline?

Now for the good news. The Fun-One is a superb *sport* airplane. Bolt a good .40 2C to the nose of this plane and you have the ingredients for some genuine fun flying. The appearance is sleeker than the typical 'Stick design, even though the nose looks less finished than the rest of the plane, and the quality of the kit will have you on the flight line in short order with a minimum of building hassles. AND, in spite of the stones already thrown, you may find the Fun-One to be a competitive *fun* fun-fly plane... on the club level. Please don't misunderstand my intentions here. I like this plane, but if you buy it hoping to be a top-level fun fly competitor, you have been sucked in by advertising hype.

For some reason the copy on the kit box is upside-down... no, wait... it's the PHOTO of the plane that is upside-down. In spite of finally figuring out this bit of marketing trickery, I still turn the box wrong-side-up every time I want to read some of the info on the top. Regardless of which way you finally open the box, you will find it stuffed with high quality wood, an excellent instruction manual, and lots of good hardware. The die-cutting is as good as I have ever seen and the fit of the fuse parts has to be seen to be believed. The kit designers at Great Planes

have got this computer design stuff nailed. There is NO WAY you can mis-assemble the fuse so that it is not absolutely straight (Okay, if you are the type that drives the same old pickup truck and believes ALL the advertising hype, maybe you CAN build the thing into a banana). I found no errors in the assembly sequence and no material problems surfaced to mar the building steps. In four hours the fuse and tail group was framed and ready for covering; Three more hours saw the wing assembled and in a total of ten hours the plane was ready to cover. Your mileage may vary depending on driving conditions. The point is, the Fun-One frames up in a relatively short time. HOWEVER, the time could be shortened even more if you decide to leave off the turtle deck and canopy. Not only would you save weight, but how do you think the sleek canopy is going to look after you botch an inverted limbo? Matter of fact, without the canopy the Fun-One begins to look like a... well, a run-of-the-mill (Sweet Stick, Ugly Stick, FoxBat, Miss Martha, etc.) hot-dog plane. Could it be that the canopy is nothing more than a marketing ploy that was influenced by the ad copy guys that drive old pickup trucks and wear tight jeans? NAWWWWW.

If you are one of the fortunate many that have built an Ultra Sport



inspired kit, the wing will look very familiar. Hard balsa spars and sheeted leading edges combine with built-in rib jigs to yield a strong, light, and straight wing. A bit unusual is how the wing bolts are located on the *leading* edge of the wing, a necessity due to the presence of the dubious canopy which ALSO is responsible for the wing fairing that results in said bolts being recessed in said fairing. My opinion is to GET RID OF THE \*&#\$ CANOPY!!

The instructions point out the advantages of having two aileron servos instead of one, and the parts are provided for whichever route you take. Trust me on this one... install two servos. My Fun-One presented me with a full-blown case of bad aileron flutter at speed until I went back and installed a servo on *each* aileron. Trimming the ends of the ailerons to a taper failed to stop the flutter, even though this often cured other planes that have experienced the same problem.

Parts are also supplied for your choice of tail dragger or trike gear. I decided to build the conventional gear version even though Gordon will probably make some snide remark about my posterior. An engine mount is supplied, but if you use anything larger than a .32 you will need to supply your own mount. You can trust the manual on the recommended control throws. Do not exceed the stated elevator throws unless you want a plane that will perform a high-speed stall with subsequent snap roll whenever you apply full elevator. This can get your pulse-rate up to melt-down level when you exit a vertical dive just a few feet above a tree-line. Trust me on this one!

The instructions also advise you how to set up flaperons with a computer radio. This is to enhance

looping maneuvers. I passed on this since the radio I had available didn't have this feature and I really think the majority of these planes will be flown with conventional radios.

Insignia blue and yellow Monokote was stretched onto the Fun-One and trimmed with white pinstripe tape. The landing gear was sprayed with yellow Formula-U and the Fox .40 was bolted to the nose. The CG came out 1/4" ahead of the recommended point so we were ready for test flights. No ballast was needed and the plane flies so well with the CG at this point that no efforts have been made to move it aft.


After squirming into my tightest jeans (a great way to raise your voice a couple of octaves), I threw the Fun-One into my old pickup and headed out to the field. Sure enough, the same hot-dog pilots were already working the crowd. Jaws dropped ankle-high as the guys laughed at the sight of my beat-up old truck and skin-tight jeans. They *really* howled as I called out for channel 28 in a falsetto voice.

The Fox was fired up as the spectators got ready to do double takes while they missed a dozen of my rolls that would no doubt be too fast to count. With the roar of the Fox and the sound of over-stretched denim splitting, the Fun-One took to the air. Only minor trim adjustments were necessary to achieve well-behaved flight characteristics. That is, until the flutter started. I had to wait until the addition of the second aileron servo until I could really wring out the plane. During subsequent test sessions, the Fun-One demonstrated a good inverted flight profile that inspired enough confidence to make repeated low inverted passes, much

to the amusement of the same old spectators. Climbing knife-edge was possible and a knife-edge loop may be in this plane's repertoire. Rolls were not too fast to count unless you stutter a lot, but still were quick enough. I'm not sure how tight loops would be if you used the computerized set-up, but they no doubt would still not be nearly as tight as the radical fun-fly ships (or old denim garments). The Fox .40 Std provided ballistic rates of climb with an APC 10x6 prop, and the plane could surely be flown easily with a good .25-32 2C.

All-in-all, the Fun-One proved to be a capable sport plane. What we have here is a contemporary make-over of the tried and true stick sport planes with a bit of cosmetic jazz. I really don't believe this plane possesses any flight characteristics that several other similar planes don't have, but if you want a kit that has great fitting components and you like the looks of this plane, then you will find the Fun-One to be a good value.

You know, you'll probably enjoy this plane even if you drive a shiny new sports coupe and wear cotton dockers. -Sam Buchanan



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# MIND BENDERER PUZZLES!!

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(and go half-blind to boot!)

For this month's Mind Bender, we've returned to a list of models, all of which can be found in the Ace R/C and Sig Mfg. catalogs. You know, between those two companies, they have just about all the models one could build in an average lifetime.

Remember, letters can be shared by more than one word, but no two words can occupy *all* the same letters in either word (i.e., you cannot count the Senior within Seniorita).

Your entry should contain the list of words (and in alphabetical order, if you don't mind) along with the location of the first letter of each word, giving first the column designator (a letter) and then the row designator, as in a-1, not 1-a. Remember, those words in the list in (parentheses), blank spaces, dashes, etc. will not be in the puzzle.

Send your entry, along with your name, UPS address, and your subscription number if you have one, to December Puzzle, c/o "R/C REPORT", P.O. Box 1706, Huntsville, AL 35807. No Purchase Required.

The winner, to be selected at random from those entries received by Dec 15, 1991 having the correct locations of all the words in the list, will receive a two-year subscription or renewal to *R/C REPORT* magazine.

### DECEMBER WORD LIST

1. AIR SCOUT
2. ALL STAR

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t
1	F	D	T	R	E	C	A	P	R	E	P	U	S	D	O	U	B	L	E	R
2	J	R	U	T	A	B	O	R	K	A	N	I	L	Z	K	O	U	G	A	R
3	U	A	O	A	T	L	O	C	O	R	E	T	S	A	M	A	E	S	N	K
4	N	Z	C	I	T	V	T	V	R	E	D	N	A	M	M	O	K	A	Q	W
5	I	I	S	W	N	S	T	A	A	A	I	R	B	A	T	I	C	Z	U	A
6	O	H	R	I	V	E	N	L	N	R	Y	E	X	T	R	A	F	N	E	H
7	R	W	I	K	Y	J	S	A	O	T	B	U	H	R	E	T	O	A	N	Y
8	K	M	A	K	O	M	E	T	Y	B	R	Y	O	O	C	A	U	N	A	K
9	A	T	I	R	O	I	N	E	S	R	Y	U	E	P	A	Y	R	O	L	S
10	R	E	K	L	A	W	E	C	A	P	S	K	M	S	P	L	S	B	P	K
11	E	N	O	N	H	C	A	M	P	M	A	C	S	Y	I	O	T	G	I	I
12	R	J	S	U	P	E	R	S	P	O	R	T	T	T	B	R	A	O	N	N
13	E	V	O	K	G	N	A	T	S	U	M	M	E	R	N	C	R	H	I	G
14	M	Y	K	A	V	A	L	I	E	R	D	A	D	E	A	R	N	O	M	K
15	M	B	U	C	R	E	P	I	P	U	D	X	A	B	H	A	I	R	M	O
16	U	H	L	G	K	L	I	P	P	E	R	W	K	I	P	F	N	T	R	B
17	H	B	I	N	G	O	B	L	U	E	M	A	X	L	L	T	J	S	I	R
18	L	A	Q	U	A	S	O	A	R	S	P	E	C	I	A	L	A	A	S	A
19	Z	E	R	A	T	S	D	I	M	E	L	G	A	E	Y	S	A	E	E	E
20	Z	E	Z	R	A	T	S	L	L	A	P	R	O	D	I	G	Y	E	R	S

3. ALPHA
4. ASTRO HOG
5. BINGO
6. BLUE MAX
7. BONANZA
8. CITABRIA
9. COLT
10. DOUBLER
11. EASY EAGLE
12. EXTRA (230)
13. FOUR STAR (40)
14. GLH
15. HUMMER
16. (KADET) JUNIOR
17. KADET (JUNIOR)
18. KAVALIER
19. KING KOBRA
20. KIWI
21. KLIPPER
22. KOBRA
23. KOMET
24. KOMMANDER
25. KOUGAR
26. LIBERTY SPORT
27. MACH NONE
28. MID-STAR (40)
29. (SMITH) MINI-PLANE
30. MORRISEY BRAVO
31. MUSTANG
32. NINJA
33. PACER
34. PIPER CUB
35. PRODIGY
36. QUASOAR
37. RISER
38. RYAN STA
39. SCAMP
40. SEAMASTER
41. (KADET) SENIOR
42. SENIORITA
43. SKYBOLT
44. SKYHAWK
45. SPACEWALKER
46. (WEEKS) SPECIAL
47. SUPER PACER
48. SUPER SPORT
49. TANTRUM
50. TAYLORCRAFT
51. T-MAX
52. WHIZARD
53. ZLIN AKROBAT

# **OCTOBER PUZZLE WINNER and SOLUTION WINNER**

**Dave M. Collett  
of Marion, SD**

Dave, along with over a hundred others, found the 37 occurrences of the word AIRCRAFT as listed in the October issue, and then (wisely?) quit. As it turns out, however, there were actually 38 occurrences, and nearly a hundred of you dug out that extra one.

The proper locations, in alphabetical order, of course, are...

- |         |         |
|---------|---------|
| 1. i1   | 20. m11 |
| 2. q1   | 21. c12 |
| 3. h2   | 22. d12 |
| 4. g3   | 23. q12 |
| 5. q3   | 24. t13 |
| 6. h4   | 25. f14 |
| 7. i5   | 26. j14 |
| 8. p6   | 27. k14 |
| 9. a7   | 28. l14 |
| 10. h8  | 29. b15 |
| 11. i8  | 30. e15 |
| 12. o8  | 31. j15 |
| 13. h9  | 32. r15 |
| 14. k9  | 33. s15 |
| 15. k9  | 34. d17 |
| 16. m10 | 35. f18 |
| 17. n10 | 36. p19 |
| 18. n10 | 37. h20 |
| 19. p10 | 38. m20 |

Notable comments included...  
I got a little confused about the spelling of all these words. Are you *sure* they're all correct?

Whew! That's about like trying to drink a whole glass of water one teaspoon at a time. Ever try it?

Eugene Rhoads, Stockton, CA

No, I can't say I have ever drank a glass of water one teaspoon at a time. But hey, that's okay. You go right ahead and do whatever primes your pump. Your hobby is

your business, but if you do complete a new model this decade, do let us know about it, okay?

I spent HOURS putting this in alphabetical order!

Alan Hoffman, Johnson City, NY

Yeah? Well you still got it wrong. "City" should be between "Alan" and "Hoffman", but the rest of it is correct.

I figured that if my wife could win one of these, so could I!

Barry Katz, Blacksburg, VA

Marya won last month and you lost this month. So what else is new? Say, are your kidz called kintenz?

Thanks for having a contest where I knew all the names of the planes.

Royce L. Freeman, Gresham, OR

You're welcome... but you lose.

I think I can spell Heirkraft now?! A good name for this puzzle might be "AIRCRAFT". Pretty novel thinking, huh?

Steve Malinoski

N. Windham, CT

Yeah, cute idea. Why didn't we think of that? For the winning suggestion you get a free cup of coffee. Come get it.

Note that all are in alphabetical order for easy checking.

Bruce Zabransky, Naperville, IL

No, easy checking comes from have plenty of cash in the bank.

Well, I found the word AIRCRAFT 38 times instead of only 37 times. And that's not even counting the clever attempt to fool us with AIRCRATF at e15!

Keep up the good work. I

look forward to the puzzle every month. Of course, the articles are OK to read too.

Daniel Miner, Clinton, MA

AIRCRAFT? You know, I think I built one of those once. When the Tail comes before the Front, don't they call it a duck? Or at least the French word for it, Canard?

Boy, you're really weird!

Jack Cooper, Show Low, AZ

Why, thank you, Mr. Cooper. And I really enjoyed you in the Little Rascals TV shows.

This puzzle was easy to do. Now tell me, what can I do to get rid of writer's cramp?

Lou Ferrante, Munroe Falls, OH

Lou, Lou, Lou. How many times have your parents had to tell you, never go writing within an hour after eating!

You really shoulda known!

You goofed. The word at e16 is not spelled correctly. However, send my Ni-Starter anyway, I need a new one. Besides, I found two words at k9 and n10.

Robert Holland, Cataula, GA

Boy, are you embarrassed now!

I haven't flown for two days because of this contest. I hope you're satisfied!

Mike Mendence, Pawtucket, RI

Really. It only took most people one day. Oh well, at least this explains the Safety Award I received from the mayor of Pawtucket.

Nice puzzle. I want to win. Nobody else does. Pick me. I need it bad. Pleezzzzze?

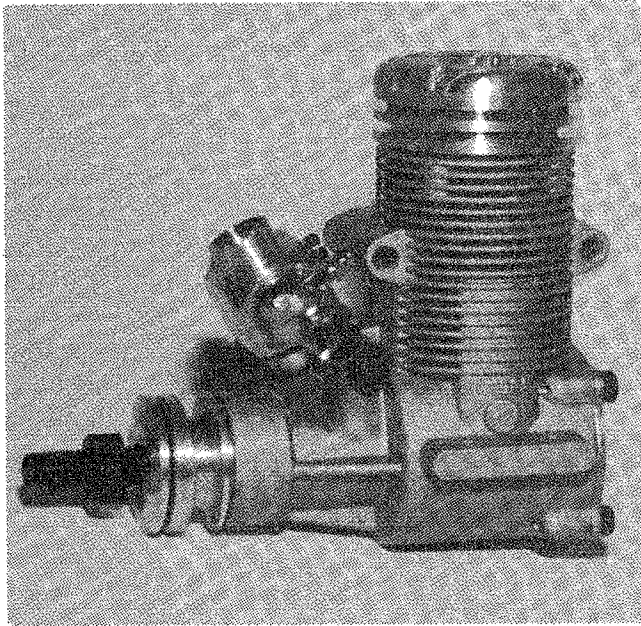
Mike Mendence, Pawtucket, RI

Now I understand the Two Days!



# ENGINE REPORT

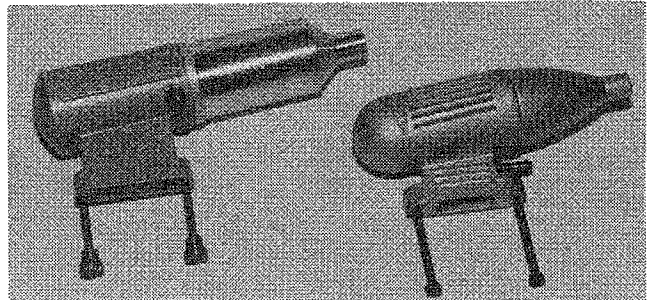
by Brian Lee



Engine .....	Webra Speed 32
Manufacturer .....	Webra Engines, Germany
Importer/Distributor .....	Hobby Dynamics
	P.O. Box 3726
	Champaign, IL 61826-3726
	(217)355-0022
List Price .....	\$190.99
Warranty .....	Two Years
Muffler Included .....	No
Glowplug Included .....	No
Tools .....	None
Accessories .....	Instructions and Webra decals
Schnuerle Ported .....	Yes
ABC Design .....	Yes
Ball Bearings .....	Two
Engine Weight .....	8.9 oz.
Muffler Weight .....	See Note 1
Overall Length .....	3-7/8"
Overall Height w/plug .....	3-9/16"
Overall Width at Mount .....	1-49/64"
Overall Width at Carb .....	2-15/32"
Firewall to Prop, minimum .....	2-15/16"
Firewall to First Mounting Hole .....	19/32"
Crank Center to Outermost Point .....	2-15/16"
	(muffler not included)
Mounting Beam Width .....	1-1/4"
Mounting Hole Centers .....	side to side 1-1/2"
	front to rear 19/32"
Propshaft Length .....	7/8"
Propshaft Diameter .....	1/4"
Muffler Length .....	4-3/4"
Muffler Screws Centers .....	1-3/8"

Muffler Diameter .....	1-15/64"
Side Projection .....	3-3/32"
Rear Projection .....	2-7/8"
Fuel Used .....	Morgan's Omega 10%
Glowplug Used .....	Fox R/C Long
Weather/Power Factor .....	.9848

NOTE 1: All Test Props are Zinger wood props unless otherwise noted, and all tests were run with the .40 size muffler except where noted.

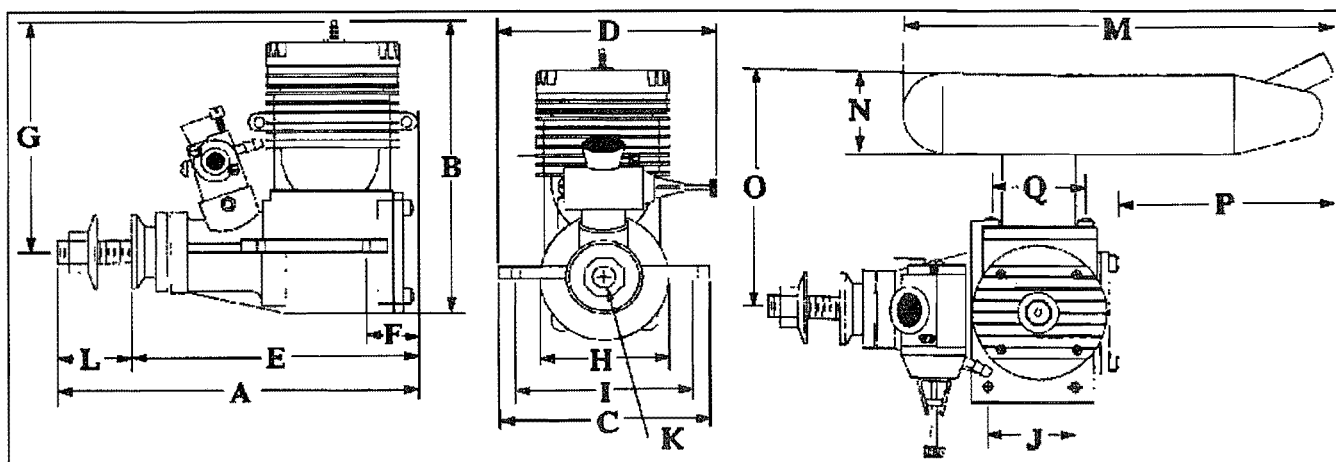


Note 2: There are two mufflers available from Webra for this engine. The .20/28 Muffler is smaller, quieter, and weighs but 1.4 oz., but permits less power. The .40 muffler is larger, weighs 2.5 oz., is considerably louder, but permits more power. Both mufflers list for about \$27.00.

Minimum Reliable Idle	
Propeller	RPM
8x6 .....	3200
9x6 .....	2500
10x5 .....	2300
12x4 .....	1700

Maximum Measured Noise	
Propeller	dB(A)
8x6 .....	99.5
9x6 .....	95.5
10x5 .....	95.5
12x4 .....	91.0

Maximum Measured RPM		
Propeller	RPM	Thrust
8x5	19,200	67
8x6	16,800	54
8x7	14,500	N/A
9x4	16,900	81
9x5	16,500	76
9x6	14,200	72
10x4	14,800	93
10x5	13,200	83



Propeller	RPM	Thrust
10x6	12,000	79
11x5	10,800	86
12x4	10,400	92

#### OTHER 9x6 PROPS

APC	15,000
Graupner	13,900
Grish Magnum	13,700
Master Airscrew	15,800
RevUp Pro 3	15,100
Taipan	15,100
Top Flite	13,800

#### USING THE .20/28 MUFFLER

Prop	Max RPM	dB(A)
8x6	16,000	96.0
9x6	13,500	93.0
10x5	12,700	92.0

**CHEERS** - two year warranty; overall appearance; light weight; easily adjusted carburetor; leak-free clean running; extremely easy hot starting; smooth reliable low idle; outstanding instant acceleration; outstanding power.

**JEERS** - comparative cost; comes without muffler or glow plug; louder than average with the higher output muffler.

First of all, we were wrong about this engine being a punched-out Webra Speed .28. Although many specs are the same, the .32 is larger overall, with an all new main crankcase. Oddly enough, even

A - 3-7/8"	J - 19/32"
B - 3-9/16"	K - 1/4"
C - 1-49/64"	L - 7/8"
D - 2-15/32"	M - 4-3/4"
E - 2-15/16"	N - 1-15/64"
F - 19/32"	O - 3-3/32"
G - 2-15/16"	P - 2-7/8"
H - 1-1/4"	Q - 1-3/8"
I - 1-1/2"	

though the engine mounting bolt patterns are the same, the .32 requires an engine mount with beams spaced 1-1/4" apart, whereas the .28 will fit between beams 1-3/16" apart. The .32's head is also taller, making the overall height 5/16" greater. Engine weight, however, is but .3 oz. heavier.

But we're not here to compare the two Webra engines... we're more interested in comparing the hot little Speed .32 ABC to the O.S. .32 and Supertigre .34 as reviewed in the August 91 and October 91 issues respectively. While sport fliers everywhere will be interested in all of these engines, they will be of particular interest to competitive Fun Fly types looking for the most bang from the lightest engine.

Well, so far, this is it! The Webra Speed .32 ABC engine weighs the same as the O.S. .32 ABC engine, and depending on the exhaust system selected, could weigh a little more or less, but not significantly so.

As is so often the case, power

seems once again tied to the almighty dollar. Of the three engines, the Webra is the most expensive and most powerful, while the Supertigre .34 is the least expensive, the least powerful, and the heaviest by a full ounce. Granted, one ounce doesn't sound like much, but in this case it is a full 12% more, and in airplanes weighing only 3 lbs. or less, an ounce is considered significant.

Webra engines come without mufflers. Webra offers two different mufflers that fit this engine, the .20/28 size muffler, and a .40 size muffler. The lighter and quieter .20/28 muffler throttles the engine a bit, but is small, light, and fairly quiet. The .40 size muffler is larger, heavier, and a bunch louder, but it certainly lets the engine breathe better to produce some much more impressive power measurements.

Before we look closely at the power, let's take a moment to look at what we felt was the most surprising aspect of this engine as it compares to the O.S..32 and ST.34.

Starting: The Webra wins this one as strongly as it does the power war. Once adjusted and broken in, the Webra was an almost instant hand-starter regardless of whether it was hot or cold. It was, in fact, one of the easiest starting engines we've ever

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tested. With 8" and sometimes 9" props, it sometimes started backwards, but that was no problem to correct... flip it the wrong way so it will start the correct way! This is a common trait of some much larger engines, and one we've quite accustomed to.

Nevertheless, it was almost uncanny how this engine, properly primed and with good glow plug power attached, of course, would start on the first or second flip at least nine time out of ten. Whatever you call it, it was certainly a major improvement over either the O.S. or Supertigre.

**Acceleration:** The Supertigre .34 had an acceleration lag that we were never able to tune out. It was nothing that couldn't be tolerated by the sport flier, but we can readily see where a competition flier would have fits with it. The O.S. was much better. I even called it "excellent"... but that was before I'd run the Webra. Once again, the Webra demonstrated a clear superiority in this area too.

**Idle:** Simply put, the Supertigre .34 loses, while the O.S. and Webra tie for the win. The latter two idled smoothly and reliably, and at a surprisingly low speed.

**Noise:** All R/C'ers should be concerned about the noise problem we all share, but it's acknowledged that competitive fliers more or less have to look the other way when this subject comes up. Although the R/C REPORT COMPETITION FUN FLY NATIONAL imposes an annually decreasing noise limit, not many other Fun Fly organizers bother. Nevertheless, some of the top fliers have come up with exhaust systems that are not only quiet, but more powerful than the standard mufflers to boot! It can be done!

Using the manufacturer's mufflers, the noise situation seems

directly tied to power. The most powerful, the Webra with the Webra .40 size muffler, was also the loudest. The Supertigre muffler is by far the best of the group in sports usefulness (telescoping, swiveling, and effectiveness), but may also contribute to that engine having the least powerful output. The O.S. is only slightly louder but is slightly more powerful, too. Then comes the Webra with it's high output... noise *and* power!

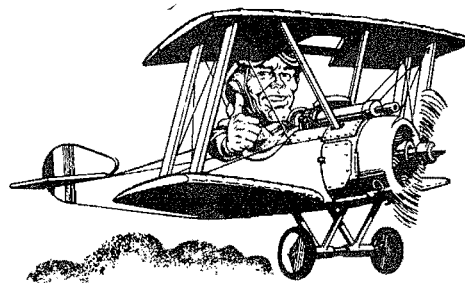
According to Gordon, a recent caller gave his Webra .32 high marks in all areas but one, vibration. According to Gordon, the caller felt that the engine vibrated too much to use on extremely light models. Well, I have to agree that the Webra does seem to vibrate more than the O.S., and *maybe* even a little more than the Supertigre, but I *disagree* that the vibration is objectionable. Perhaps Gordon will add something on this as I understand that he will be mounting it in a Competition Fun Fly model as soon as he gets it back. *(Editor's Note: Brian, and readers, I am now flying this engine in the very same airplane with which David Grantham won the 1991 Competition Fun Fly National. The all-up dry weight is 3 lbs. 2 oz. I see no problem whatsoever with the vibration level of this engine. But, there is a noticeable decrease in vibration here over my Stickit III with the Fox .40 Deluxe engine in it, and I'm having no problem with it either. Almost all of the top fliers claim the Fox .40 vibrates too much, so maybe I'm just less critical. Whatever the case, I'm enjoying the Webra powered model immensely, using a home-made muffler from Jerry Smith attached to a MACS header. This exhaust set-up is lighter, quieter, and more powerful. Needless to say, with my flying capabilities, the Webra .32 is*

*more than sufficient in this model!!)*

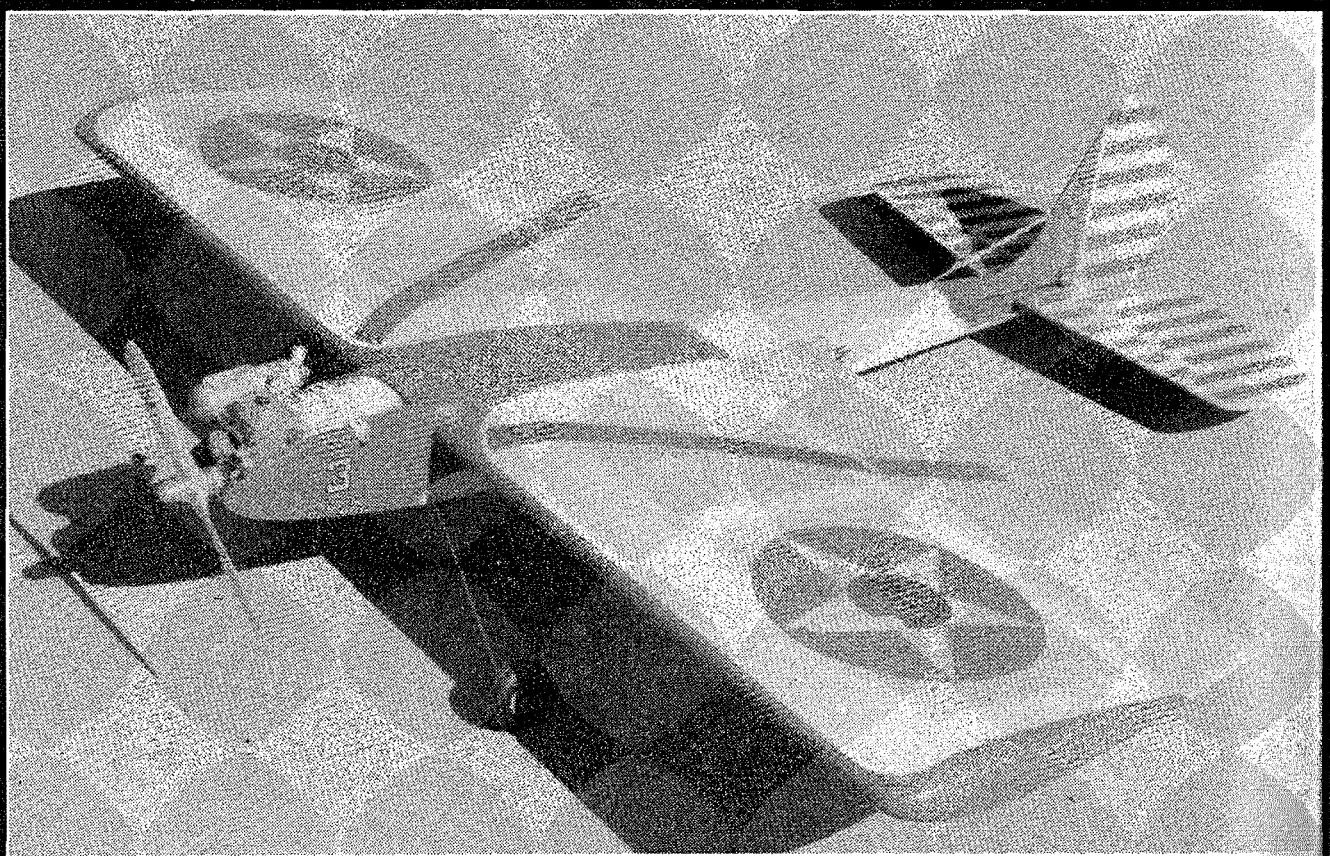
The Webra Speed .32 ABC has impressed me about as much as any engine ever has. The price hurts, although I know not what the selling price might be through mail order discount houses, but power costs money now just as it always has, and the Webra has the power. Actually, the list price of the Webra is almost identical to that of the O.S. .32 ABC, but the O.S. comes with a muffler that sport fliers will probably use, even though the competitive flier probably won't.

The Webra Speed .32 ABC simply does everything well while giving up nothing to sport engines of the same size. Depending on your skills as a competitive flier, you might want more and you might opt for a larger engine. But, you might be making a mistake too, for the Webra .32 and even the O.S. .32 offers all the power an intermediate or beginner could use in one of the "Wing-on-a-Stick" models so popular in Competition Fun Fly circles. Gordon recently flew the Air Flair Stickit IV review model which is powered by the same Supertigre .34 I reviewed in the October issue, and related that even it had a surplus of power for a 3-1/2 lb. airplane.

I said I loved the O.S. .32, and I do, but to put it in proper perspective, I don't love it quite as much as I did before running the Webra. The Webra makes me delirious!  
-Brian Lee







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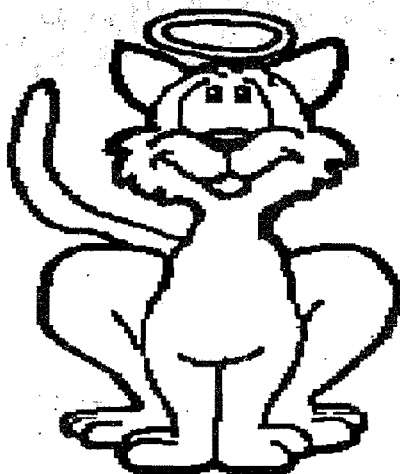
# NOTHING IS GOING TO RUIN MY DAY

by Jim Chaffee, Larry Reeve, and Friend

Sunday morning: I'd been waiting all week for Sunday morning! It was the last day of my week-long vacation, and I had set it aside to spend at the flying field, enjoying our wonderful hobby. It was a busy summer for me, so I had planned to spend most of my vacation working around the house, but saving the last day for some "fun". Remembering Dad's old saying, "Work before fun.", I thought about airplanes all week as I finished painting the house, making some needed repairs, and checking off every other item on the "honey-do" list.

Everything had gone according to plan. The chores were pretty well finished on Saturday, and the weather was looking good. I had monitored the local weather forecast religiously every day in anticipation of the coming weekend. Saturday night's forecast indicated Sunday would be a "bluebird" August day, with highs in the 80's, and light variable winds. Because there was a slight chance of showers towards late evening due to an approaching front, I arranged to meet my flying buddies no later than 9:00 a.m. After watching the forecast on TV again, I checked that my plane was on charge, set the alarm on our new microprocessor controlled digital alarm clock (MCDAC for short) for 7:00, and hit the hay!

I remember dreaming about competing in the fly-offs of an international pattern meet. Going into the last round of flying, I was in 1st place in front of Hanno Prettnner, and half way through a perfect "10" flight, I was suddenly awakened by a very annoying high pitched sound. *Chirp... Chirp... Chirp...* There was also the sound of my lovely wife bidding me to do



great permanent damage to the MCDAC, which was proudly announcing that it was 3:00 a.m.! I hit the "stop" button on the clock, and the room returned to silence. Assuming I had set the MCDAC wrong, I reset the alarm to go off at 7:00, and quickly drifted off back to sleep...

The international pattern meet was now over, and while graciously accepting my award for 1st place... *Chirp... Chirp... Chirp...* announced the arrival of 4:00 a.m. I sleepily repeated the earlier routing.

When the damn thing went off again at 5:00 a.m., I decided to check the Owner's Manual, and discovered that I had accidentally programmed the "hourly alarm" feature to begin at 3:00 a.m. By this time, the sun was beginning to rise. Since I was still dead tired with bags under my eyes, I decided to get a couple more hours sleep before heading out to the flying field. Besides, my plane was all packed and ready to go, so I wouldn't need much time to prepare.

The next sounds I heard were the hysterical cries of my five year old standing at the open doorway to our bedroom screaming, "The cat is dead... the cat is dead...!" I leapt to

my feet and followed my son downstairs to the workshop, where I found the family pet hanging by my radio charge cord. Sure enough, the cat seemed dead alright! Apparently, she had jumped off the work bench and gotten tangled in the charge cord the night before. I quickly delegated the duties of cat disposal and soothing broken hearts to my wife, so I could begin preparing for a relaxing and fun day at the flying field. I whispered to myself, "Nothing is going to ruin my day!"

Returning to the bedroom, I glanced at the MCDAC. It was now 8:45 a.m.! The damn MCDAC hadn't wakened me at 7:00 a.m. as it was instructed to, and I was now LATE! Here I was in my PJ's, and I was supposed to meet my flying buddies at the field in 15 minutes! In view of this, I decided to abandon my usual morning grooming session for a splash of cold water in the face. I also skipped my usual Sunday morning bacon and eggs, trading it for a quick glass of milk and a week old cookie. My wife volunteered to clean up the mess from the glass of milk which I spilled in my haste to get going, while I gulped down the second glass and proceeded with my preparations. "Nothing... nothing is going to ruin my day!"

Returning to the basement, I checked my radio batteries with my handy dandy voltmeter. The reading was marginal at best! The darned cat had pulled the charge cords from the airborne plug. Oh well, no sense blaming a dead cat. "Besides," I thought to myself, "this will give me an excellent opportunity to try out my new field quick charger, which plugs into the car's cigarette lighter. I'll just

charge the batteries in the car on the way to the field. Nothing is going to ruin my day!"

I proceeded to load up the car with everything I'd need for a relaxing day of fun. To avoid forgetting anything, I had made up a checklist the night before: airplane, field equipment, sun shade, lawn chairs, etc. I had also packed myself a lunch so I wouldn't get hungry during the long day of flying. I smiled to myself as I finished loading the wagon, "Sure enough, the sky is blue, and there's only a slight breeze from the southwest. It's going to be a great day! Even though I'm late, I still have all day to fly..."

It was actually a good thing that I was going to charge the radio batteries in the car on the way to the flying field using my new field charger, because it wasn't until I went to plug in the charger that I realized I'd forgotten to include my transmitter on the checklist!

Plugging the charger into the car cigarette lighter, and then into the airplane and transmitter, I smiled. It sure would have been very upsetting to have to make the half-hour drive back to the house from the field to get my transmitter! "Nothing is going to ruin my day!"

Everyone was still pretty upset about the stupid cat, so I decided to avoid getting involved. I simply opened the back door to the house a crack and hollered in "Goodby Honey, I'm leaving..." and quickly headed for the car.

I was about half way to the car when I noticed that the vehicle was filled with smoke! I dashed over, opened the tailgate, and feverishly emptied the contents of the wagon. Something was on fire, and I had to save my airplane! I soon learned the cause of the smoke: my new field charger had transformed itself into a heap of molten plastic smoldering on the

carpeted bed of the wagon. Apparently, there was a short in the charger plug... Ugh! Although I rushed to disconnect the charger from the cigarette lighter, it was too late: the charger was a goner! "Oh, that blasted no good feline!"

But, why get angry at a dead animal? At least I had caught it before my airplane went up in smoke. Oh yeah, or the car.

Although the airplane batteries still had only a marginal charge, I decided to clean things up and head to the flying field anyway. Even if I get only a few flights in, I'll still enjoy a day of fun and relaxation. Maybe my buddies will let me fly their planes. "Nothing is going to ruin my day!"

I aired out the car and carefully repacked the field gear. The field charger was melted into the carpeting, so I decided to just leave it for later. My spirits lifted as I looked around at the clear blue sky, and the leaves on the trees which were barely moving.

I was actually smiling again as I turned the key in the car's ignition and listened to total silence. I guessed immediately just what had happened. The shorted field charger had drained the car battery. I jumped from my seat, popped the hood latch, slammed the car door, and kicked the front tire as I stomped by. I jerked open the hood so fast I hit my chin. I had been silently cursing the cat at that particular second, too, and I must have been right about at the word "the", too, because I quite nearly lost the tip of my tongue.

Boy, if that cat *wasn't* already dead...

Looking up, I noticed the neighbor lady passing by on the sidewalk with a look of fear and disgust on her face. She never could understand how a grown man could spend his free time playing with "toy airplanes". How embarrassing...

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Twenty minutes later, I was tooling down the road on my way to the flying field and feeling better. With my wife's help and a pair of jumper cables, I had managed to get the car going. The radio was playing my favorite song, and I was singing along. Finally on my way, I knew that the rest of the day would be great. "Nothing is going to ruin my day."

Have you ever run over a skunk? I wasn't sure right away what it was I hit, but just before turning off the highway at the flying field I noticed something jump in front of the car, followed by a loud "thump". It seems I just hit a skunk just right, the whole undercarriage of the car got sprayed with the stinky stuff. Soon after the impact, that familiar smell was filling the interior of the car, and I had to roll down the window to catch my breath. The road to the flying field is a dirt road, so I usually go slow to avoid too much dust and dirt on the car. However, this time I put the pedal to the floor and stuck my head out the window in order to get enough fresh air than my lungs. Boy, did it stink inside the car! Skunks look sorta like cats, don't they? Besides, had I not been delayed by that blasted cat, the skunk and I would have arrived at different times!

Speeding along at warp speed, my eyes were watering from the dust and wind, but I still couldn't get my head far enough outside the window.

WHAM! went the very large bug as it slammed into my right eye! The car swerved to a stop and I jumped out, grabbing a handkerchief to wipe the mess from my eye and face. After a few minutes, the stinging in my eye had subsided and I could see well enough to drive. I climbed back into the car and drove on, eyes tearing from the smell... and the dust... and the bug. That bug sure



had guts!... "but nothing is going to ruin my day!" I continued on, now cursing the damn cat out loud.

By the time I finally arrived at the flying field I was three hours late. The field was crowded! Apparently the whole club was taking advantage of the beautiful day! My buddy Pete hollered from the pits, "Where have you been? We've all got a hundred flights in!" Deciding not to waste good flying time with a long drawn-out explanation, I simply lied, "The damn alarm clock didn't go off!" It didn't take me long to unload the essentials from the car, and get my plane assembled. Checking the status of frequencies, I learned that there were four others on Channel 38. Ugh! They were taking turns with the frequency pin, and my name was added to the end of the line.

With an average of 15 minutes per flight, I figured I had about an hour to wait before I could fly, so I sat down to eat my lunch. Without much breakfast, I was really hungry. Opening up the lunch bag, I was surprised to find a sales slip and two cans of cat food. I must have grabbed the wrong bag from the kitchen table! My stomach let out a loud growl in response to my discovery, and my buddy jokingly asked, "Some kinda new diet, Joe?"

Then someone else asked, "JEEZZZ! What's that smell? Did you cook your own lunch again?"

"I knew your model was aerobatic, but I never realized it was so *aromatic* too!"

"Wow, Joe! Ever thought of bathing??"

"Ha Ha Ha Ho Ho!"

Oh everybody just thought they were tremendously funny. Well, just wait until my turn to fly. I'll show them some real flying! "Nothing is going to ruin my day!"

I pulled the fuselage from the car, grabbed the wing, scooped up the transmitter, and sat down to



curse the poor dead cat in silence while waiting for my turn with the frequency clip... well downwind, of course. Even though everyone else was keeping their distance from my amazingly aromatic self... I was determined to fly. "Nothing was going to ruin my day!"

Finally they called out my name. It was my turn at last. Now I'd show them! I was heading toward them to get the clip when it came flying at me and landed at my feet.

"That's close enough!", someone called out, and then they laughed and laughed and...

I carried my airplane to the flight line, attached the frequency clip to the transmitter, and drew my flight box up close enough to fuel the model. Fuel? I'd unloaded the smoking car in such a hurry, I'd overlooked putting the fuel bottle back! Boy do I hate that cat!

With the tank filled with borrowed fuel and ready to start, I began backing away with the transmitter to perform the range check. I still had solid control at twenty paces, but concerned about the low batteries, I backed away some more while working all the controls.

Actually, someone did yell a warning, but it was too late to prevent me from tripping and falling backward over a stump.

My elbow hit a rock, tearing open my shirt and skin, and I felt a

strange "crawly" feeling on the back of my neck, but I'd had the presence of mind to hold the transmitter up so that it wasn't damaged. "Nothing was going to ruin my day!" Still, I remember thinking then that it was almost a shame that the cat was already dead.

Finally it was time to take-off. I taxied out onto the runway, headed into the wind, glanced around to make sure I was clear of the others, and gave it full throttle.

I'd been too busy at the time, but they told me later that even though I'd dropped the transmitter and began furiously ripping off my shirt, the airplane had made a fine left turn as it headed for the tree... the *only* tree... within a hundred yards of the runway. And then, after they helped me get the airplane down, and all the pieces gathered up, they counted all the red ant bites on my back and neck.

With the wrecked airplane loaded back into the car, and my shredded shirt back in place as best I could, and the blood wiped anew from my elbow, and all the car windows rolled down, I headed home, irresistibly scratching at my neck and back.

Arriving at home, I silently carried my... stuff... into the garage. A loud growl had sent the staring neighbor lady scurrying for safety.

As I came into the kitchen my eyes and mouth popped wide open. There, sitting happily in a chair with my smiling son petting her... was the cat!

"Oh honey look!", cried out my wife. "The cat didn't die after all! She's fine! I hope worrying about her didn't ruin your day."

-Jim Chaffee, Larry Reeve, and friend.

(Editor's Note: Will anyone knowing the current address for Larry Reeve, formerly of Wisconsin Rapids, WI, please ask him to contact us? Thanks.)



# **WORKSHOP LOAN POLICY**

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MISS HELEN WAITE.  
IF YOU WISH  
TO BORROW  
SOMETHING,  
YOU CAN GO TO  
HELEN WAITE**



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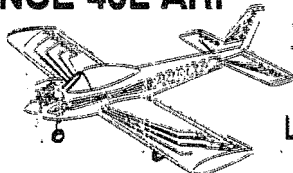
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## PRINCE 40L ARF



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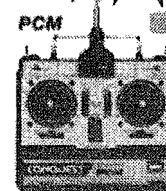
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Still the **Best Buy** in a .40 ARF! 57" wingspan, 575 sq. in. pre-built with complete accy. pkg. .40 to .46 engines.

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**\$174.95 SALE!!**

Futaba 5 CHANNEL Conquest PCM 5 NLP w/4 S148 servos - complete. 1991 TX and RX. Servo reversing and 2 dual rates. Good selection of channels. (6M also available)



## FILE SET \$3.99!!!

This is too dumb to have a picture of, but we give you a set of ten (count 'em, 10) "Swiss" model maker mini files of all shapes and types, made in China at the disgustingly cheap price of \$3.99. You will pay from \$5.95 to \$7.95 anywhere for these. At this price you can afford to buy them by the dozen and give them away at the flying field.

## .28 HELI ENGINE!

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BLUEBIRD .28  
HELI ENGINE.  
Ball bearing AAC.  
(Muffler NOT included)

## ARF CHEROKEE



FDR .25 TO .35 ENGINES - 51" Wingspan  
485 Sq. in. Pre-built Balsa and lite Plywood  
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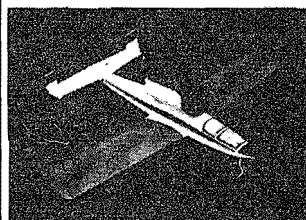
## ARF EAGLE GLIDER!



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## MIDWEST JETSTER 20

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The Midwest Jetster 20 was designed by Dick Sarpius back in the late 70's to be an entry level ducted fan plane. Not too many people really into ducted fans so it sat around until we designed a conversion for it! Sure, you can get a Kress Ducted Fan set and fly it that way, but we put a standard rudder on it and cut off the long nose and mounted a .28 on it and it turned out to be one of the finest little sport planes to come along in a long time. The wing is slightly tapered and semi-symmetrical. Span is 48" with 430 sq. in. area. You can use from a .25 to a .35-but the .28 and .30 seem best. A good hardware package is included. We include a separate plan sheet for the easy simple conversion and the price for this Midwest quality kit is only \$32.95

## 1200 MAH 4.8V

## SANYO PACKS!

We have some industrial grade, Mil. spec. high temperature rated packs, Shrink wrapped with double pairs of leads,

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COMPARE AT \$18.95

## ARISTO 425 CHARGER

**\$59.95**



The answer to all your weird charging needs. This automatic, delta peak fast charger will handle everything from a 4.8 volt pack to 12 volt packs and cell sizes from 270 mah to 1.8 amps. You can field charge your transmitter and receiver pack as well as packs for electric planes. It also will efficiency check packs (similar to cycling) so you can know the condition of the pack. Works in the field from car battery and lists for \$99.95. In one mail order company's catalog they offer it discounted to \$89.90. All the time we sold them for \$69.95, however, we are dropping the price on these to only \$59.95

## GUILLOW'S AERONCA ELECTRIC TRAINER

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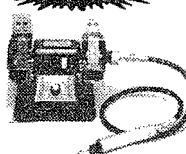


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We have the regular clip on glo plug lighter, complete with 1200 mah nicad and 110v charger absolutely way, way below anybody else's price. Closing them out at \$10.95 (believe it!) each. compare anywhere! Did you say \$10.95?? Yes, **\$10.95**..No Limit on quantities.

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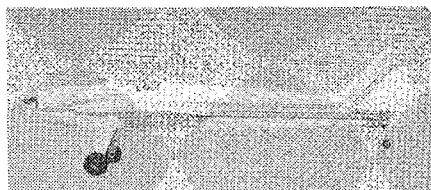
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C.O.D. ADD \$3.75  
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# NEW PRODUCTS

The following product photos and descriptions have been submitted by the manufacturer, distributor, etc. In most cases, "R/C REPORT" has not even seen the product, much less tested it. NEW PRODUCT announcements are published only to inform readers of new releases.



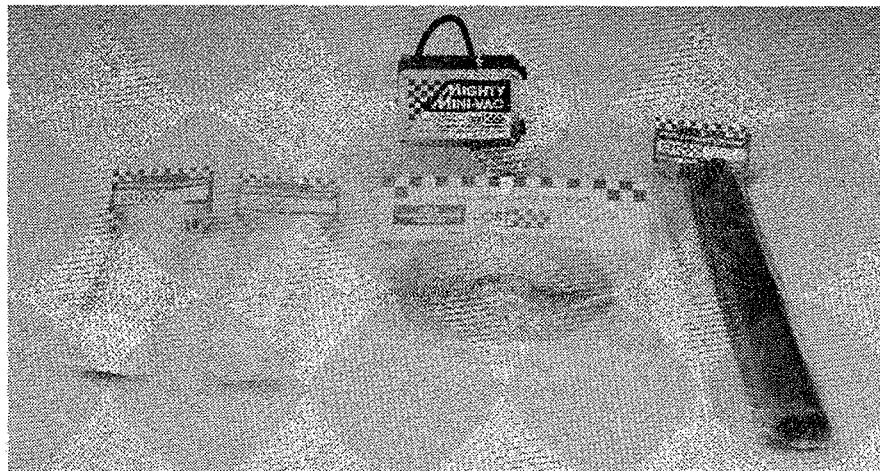
## Hobby Lobby Romeo

NEW from Hobby Lobby: Rodel Modelle's "Romeo", a beautiful sport stunter kit for .40 to .61 engines. Romeo is streamlined with a hidden channel for the exhaust pipe. Wingspan is 63", wing area about 570 sq. in. The low price for this superb kit is \$139.00.

Romeo and dozens of other NEW items are fully described and pictured in Hobby Lobby's NEW

Catalog 18. Catalog 18 is FREE in the USA! Just call or write Hobby Lobby and ask for it. Hobby Lobby,

5614 Franklin Pike Circle, Brentwood, TN 37027, (615)373-1444.



## CST Vacuum Bagging System VACUUM BAGGING MADE EASY

Build stronger models faster and easier with the economical Mighty Mini-Vac System, from Composite Structures Technology. The continuous operation electric Mini-Vac pump has a preset vacuum pressure safe for all foams and is very quiet during operation. Everything needed to vacuum bag wood skins to foam cores is included in the Mighty Mini-Vac System: nylon bagging tube, breather strip, bag sealant, tubing, fittings, and instructions, all for only \$75.95. With the optional rigid mylar sheet, fiberglass skinned wings with a glass smooth finish are quickly completed.

CST vacuum bagging systems and supplies are available through your hobby dealer. Direct orders can be placed by calling 1-800-338-1CST. For a catalog, write to: CST, Dept. 181, P.O. Box 4615, Lancaster, CA 93539.

## WHIRLWIND Aircraft

### S.W.T.F.O. SEMI-SCALE R/C AIRCRAFT

Excellent model for the intermediate builders and the beginner pilots. It's also a great second aircraft. Features include the JT88 airfoil for superb anti-tip stall and inverted flight, with super slow take-offs and landings.

#### SPECIFICATIONS

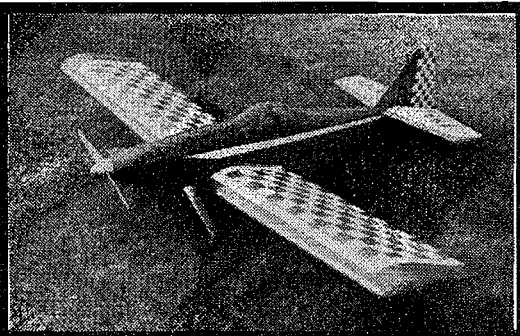
Span ..... 75 in.  
Area ..... 1020 sq.in.  
O/A Length ..... 60 in.  
Weight ..... 6.5-8.5 lbs.  
Engine ..... .45-90 2C  
                                    .70-1.20 4C  
Radio ..... 4 Channel R/C

Features aluminum landing gear, ABS cowl & wing tips, clear canopy, precision cut select balsa & ply, full size plans & drawing for AG-DEVIL cockpit, and complete building instructions. No hardware included.

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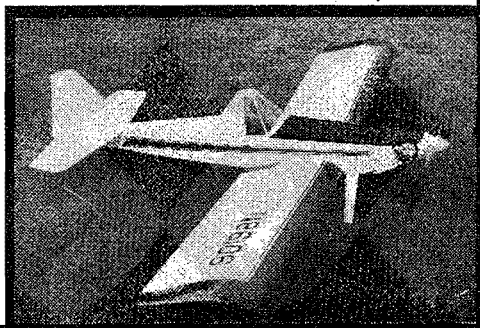
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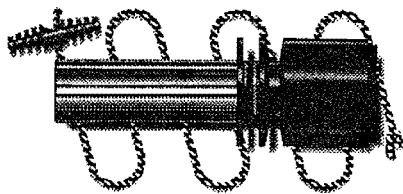
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**AG DEVIL - \$159.95**





Ace R/C Power Handle

**THE ACE POWER HANDLE**

Every modeler with an engine should have a Power Handle. This revolutionary, portable starting device is for all model airplane engines, big or small. **NO BATTERIES REQUIRED!**

If you are into large gas or glow engines, the Power Handle is a must for several reasons. Since your arm supplies the power, even the biggest engines are pussycats. With the Power Handle, you don't have to worry about losing a finger by flipping the prop with your hand, because you don't have to touch the prop, EVER! Proper use of the Power Handle requires two people, so you are forced to observe this most basic rule of safety.

A reversible, tough, rubber insert makes the Power Handle universal, whether you have a large or small spinner, or just a prop nut. It works great on engines from .09 cubic inches on up to the largest gas burners.

Even if you already have an electric starter, you'll want a Power Handle as a back-up. Don't let your day be ruined by a dead flight box battery!

If you're interested in safety, ease, and economy, dependable simplicity makes the Power Handle a necessary part of your flight box.

Get safe and quick starts from any size engine, at a fraction of the cost of an electric starter. Don't risk being without one!

Power Handle, \$24.95. Power Handle Replacement Rubber Insert, \$5.50. ACE R/C, 116 w. 19th St., P.O. Box 511, Higginsville, MO

64037, (816)584-7121. FAX: (816)584-7766.



Great Planes Spirit 100

**SPIRIT 100:** Great Planes Model Manufacturing is pleased to announce the release of their newest R/C airplane kit, the Spirit 100, a beginner to expert standard class sailplane.

One great airframe plus two wing options equal one awesome sailplane kit! Never before has one sailplane kit been able to satisfy so many soaring enthusiasts.

**WING OPTION #1** offers a novice an easy to fly sailplane that will perform great and stand up to the rigors of everyday flying. The Spirit 100 utilizes the Selig 3010 airfoil and optional spoilers, and offers a very wide speed range. Yet, it is very easy and quick to build. This wing is ideal for people who want great performance in a simple, easy to fly, plane.

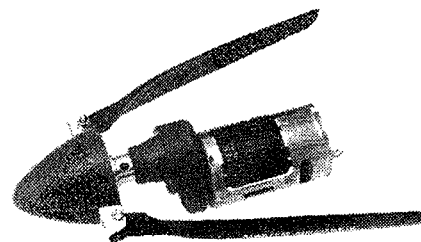
**WING OPTION #2**, with flaps and ailerons, can take an experienced pilot straight to the winner's circle, thanks to state-of-the-art aerodynamic technology combined with the ability to take full advantage of computer radios, providing full camber control and CROW type mixing for pinpoint

landings. Utilizing one of the newest airfoils available, the Selig 7037, this super-efficient wing uses flaps and ailerons to provide precise maneuverability usually found only in sailplanes costing several times as much as the SPIRIT 100.

The kit also features a pre-formed ABS cockpit, clear canopy, all necessary hardware, interlocking construction, fully illustrated instructions, and computer drawn plans.

The Spirit 100's sleek looks combined with the triple taper wing planform and Selig airfoils assure that you own a state-of-the-art model sailplane at a very reasonable price. Simply put - the best sailplane value available!

For more information on the Spirit 100 Sailplane, and a free catalog of the entire Great Planes line of fine kits and accessories, write: Great Planes Model Mfg., P.O. Box 788, Urbana, IL 61801.

**Master Airscrew Electric Flight Pack****NEW MASTER AIRSCREW  
ELECTRIC FLIGHT PACK**

Modelers looking to improve flight performance will want to check out the new Master Airscrew Electric Flight Pack. With an 05 electric

**RS 4-STROKE  
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**New Location:**

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motor, 3:1 gearbox, and 12x8 folding prop, this kit puts together all the elements required to dramatically increase rate of climb and flight time over direct drive/fixed blade systems.

The kit is aimed at the beginning to intermediate modeler flying 2-meter sailplanes and similar models, as well as modelers who have flown direct drive and are interested in improving flight performance with a gear reduction and folding prop system. The motor is a 7.2 volt 8019 can ferrite with a built-in capacitor. The gearbox is a compact, lightweight unit with a rugged 3/16" steel shaft unconditionally guaranteed against bending. An output gear, molded directly onto the shaft to prevent slippage, is in turn mounted in two precision ball bearings. The folding prop gives the advantages of a large propeller disk without the power-off drag of fixed blade props, offering greater thrust and longer glides. Undercambered, glass-filled nylon blades hinge to a lightweight aluminum hub, and a spinner completes the prop assembly.

The Electric Flight Pack comes completely assembled with wiring diagram, instructions for each piece, and a spare parts list. Wiring is not included. List price is \$39.95.

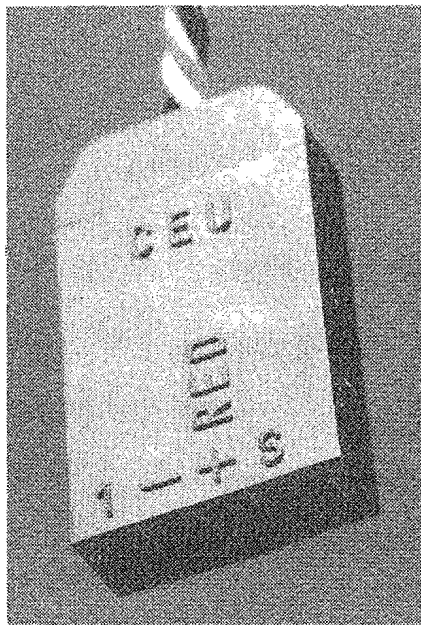
**WINDSOR PROPELLER COMPANY**, 3219 Monier Circle, Rancho Cordova, CA 95742.

Custom Electronics introduces its New "CEU" Universal Radio Connector.

The "CEU" Connector is a four pin, three wire FEMALE radio connector that will mate with Airtronics, Futaba J, JR, Hitec or the new World Engine servos and RX battery packs. In addition to being a universal connector, it is the only connector of these types that you can solder wires to.

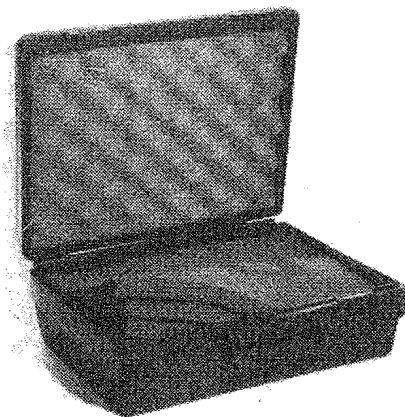
Sold assembled with 8" of

wire attached for \$3.00 each or unassembled where the modeler can attach his own wires for \$2.50 each.



**Custom Electronics CEU**

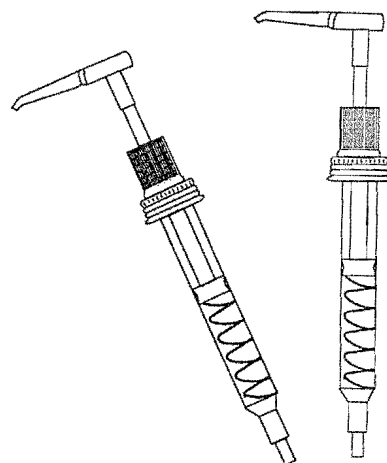
Distributed to all major hobby shops through Ace R/C, Inc., Higginsville, MO, (816)584-7121 or direct from Custom Electronics, P.O. Box 1332, Alta Loma, CA 91701, (714)980-4244.



**Hobby Hardware TC-1**

Hobby Hardware's TC-1 Trans:case is a solidly built transmitter case, made from durable industrial grade plastic materials, with a scratch resistant outer surface and twin positive locking latches. Inside are four layers of high density, impact absorbing, foam which can be easily cut to conform to any style transmitter.

The special mylar owners/transmitter identification label provides for quick personalized identification of the channel numbers and your name and address. Features a one year limited warranty. For more information, contact Hobby Hardware, 7903 S. Grandview Ave., Tempe, AZ 85284, (602)838-2085. Fax (602)730-1599.

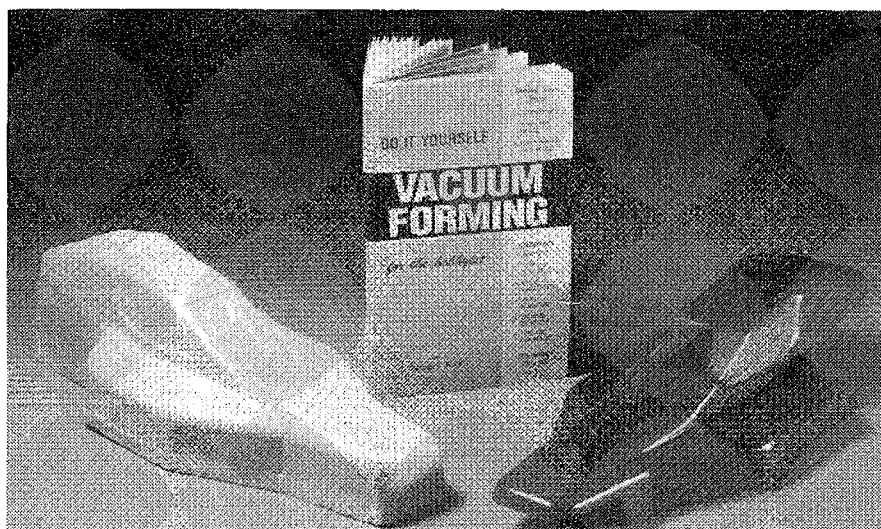


**EL-Lam Dispenser Pumps**

Epoxy Dispenser Pumps. To make working with EZ-Lam Epoxy truly convenient, Aerospace Composite Products now offers calibrated dispenser pumps. These laboratory quality pumps are pre-set to dispense one ounce of resin per stroke, and 1/2 ounce of hardener per stroke...the exact mixing ratio for EZ-Lam Epoxy. No more calculating, weighing, and fussing with getting the correct proportions...just pump out equal numbers of pump strokes. The dispenser pumps are available to fit pint, quart, and gallon cans.

EZ-Lam Dispenser Pumps retail for \$6.00 per pair and are available from your hobby dealer or direct from Aerospace Composite Products. Dealer inquiries are invited. AEROSPACE Composite Products, The Source for Light Weight Materials!, P.O. Box 16621, Irvine, CA 92714, (714)250-1107. Fax (714)250-0307.





**Vacuum Form Book**

**VACUUM FORMING BOOK.** Do it yourself! This new 128 page illustrated book shows you how. Make R.C. car bodies, Helicopter canopies, Airplane parts, Boat hulls and more. This easy to read information will enable the average hobbyist to make high quality plastic parts at home.

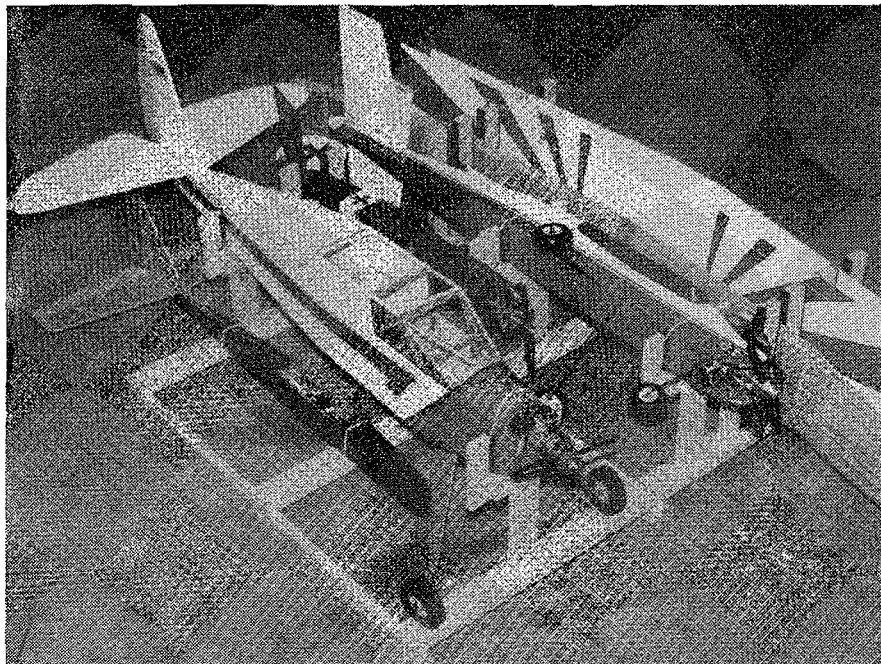
For the first time, this book takes the mystery out of vacuum forming and boils it down to its simplest form. The reader is finally presented with a low-cost easy alternative to fiberglass, and an exciting way to make custom or

reproduction parts out of a wide variety of clear or colored plastics. The equipment used is made from ordinary parts from the hardware store or around the home, and requires no special skills to make or use. It's easier than you think! Try it! The price is \$9.95.

Vacuum Form, 272F Morganhill Drive - Dept 100, Lake Orion, MI 48360.

#### JENNINGS PRODUCTS MODEL AIRCRAFT CARRIER AND STORAGE RACK.

At last, a simple device that



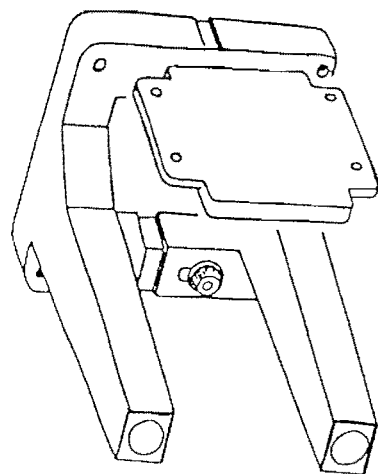
**Jennings Products Model Aircraft Carrier & Storage Rack**

will allow you to transport your model aircraft to and from the flying field in complete safety. No more hanger rash or accidents during transport.

In addition, this carrier serves as a complete storage unit in your shop. Simply slide it out of your vehicle and place it on the wall in your shop. It organizes your equipment for the next flying session.

The carrier has many unique features, but perhaps its best is its versatility. It is totally adjustable and can accommodate almost any size and shape aircraft. Designed to hold from three to four aircraft.

The price is \$49.95 plus \$5.00 for shipping and handling; shipped via UPS. Available from: JENNINGS PRODUCTS, P.O. Box 1121, Hendersonville, TN 37077-1121, (615)824-0475. FAX (615)824-5150.



#### Engine Drill Guide Templates

New from Ernst Mfg. Inc., Engine Drill Guide Templates for most OS, Royal, Supertigre, Saito, Rossi, and YS singles. Complete sets range from \$3.95 to \$5.95.

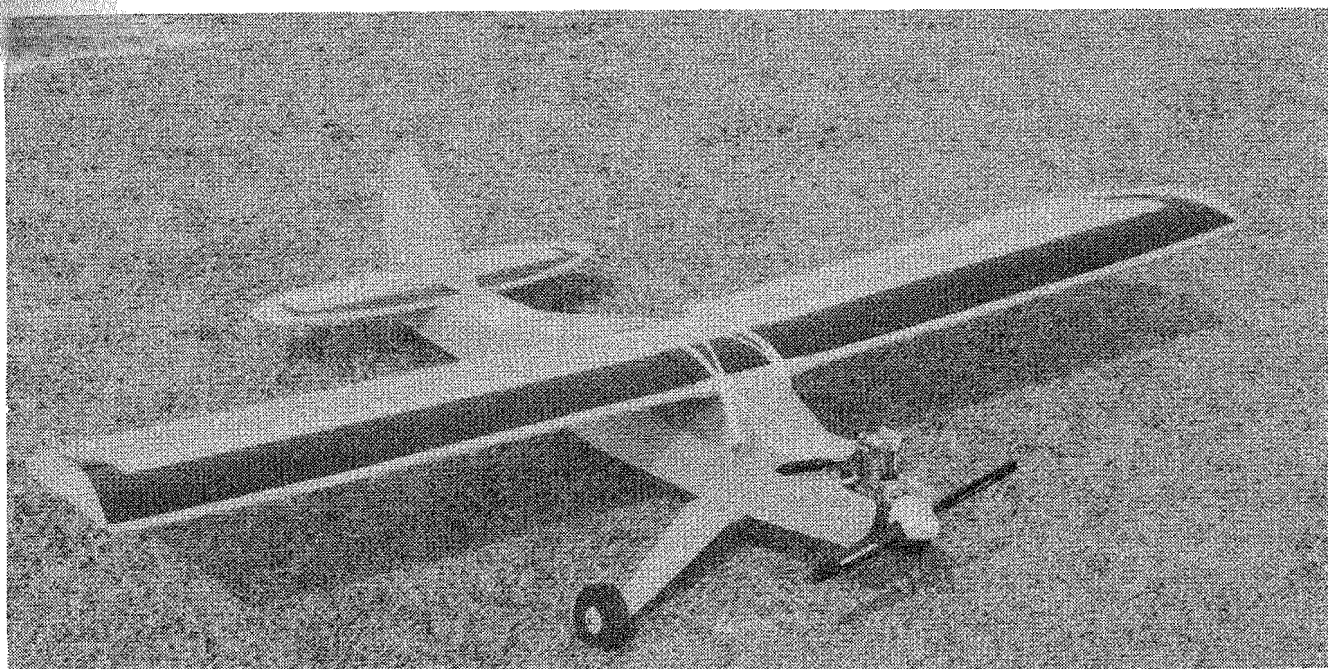
Check your local hobby shop. Ernst Mfg. Inc., 37396 Ruben Lane, Sandy, OR 97055.

The only reason for these two lines is to fill this empty space!..

# PRODUCT TEST REPORT

December 1991 73

by Sam Buchanan



Model ..... Classic 40  
Type ..... Sport  
Manufacturer ..... U.S. Aircore  
4576 Claire Chennault, Hanger #7  
Dallas, TX 75248  
(214)250-1914

Suggested Retail Price ..... \$129.95  
Wing Span ..... 64.0"  
Wing Area ..... advertised - 704 sq.in.  
measured - 734 sq.in.  
Airfoil ..... Flat-bottom  
Overall Length ..... 45.25" w/o engine  
Rec. Controls ..... 4-5 (Ail, Rud, El, Throt)  
(optional flaps)

Rec. Engine ..... .40-.45 2C, .50 4C  
Re. Weight ..... .575 lbs.  
Basic Materials ..... Corrugated plastic  
Instructions ..... 32 page book  
Plans ..... None needed  
Hardware Included ..... Everything except...  
Items Needed to Complete ..... optional spinner,  
propeller, engine, fuel line, radio gear, wheels and  
wheel collars, adhesives, #64 rubber bands, and final  
trim materials.

## COMPLETED MODEL

Finished Weight ..... 6.0 lbs. (96 oz.)  
Wing Loading ..... 18.8 oz./sq.ft.  
Engine Used ..... Saito 50 4C (15.2 oz.)  
Propshaft to Ground ..... 8.75 in. (held level)  
Fuel Tank Used ..... Sullivan 8 oz. (included)

Radio Used . Futaba 6 ch Conquest w/S148 servos  
Covering Used ..... None required  
Special Items ..... Goldberg Spinner,  
Dave Brown 3" Lite Flite wheels, Dubro 1" tail wheel.

**CHEERS** - Completeness of kit; instructions; flight characteristics; apparent durability; quick building.

**JEERS** - Crude appearance; no mention in instructions of need for aileron differential and engine down thrust for optimum flight characteristics.

Well, here we go again. Another airplane with an alternative construction to good old balsa and plywood. There seems to be a surge in interest in using new and contemporary construction materials in our models. We certainly can't fault anyone for experimenting with new and novel materials and techniques for our hobby. After all, where would we be if no one had looked for an alternative to ambroid glue or silk and dope?

This is the hobby that has embraced space-age adhesives and complex computerized radios. Should we be surprised if someone tries to replace balsa with modern materials... such as plastic cardboard? This report will not only be testing a particular model, but will attempt to answer your questions about whether or not we are looking at a construction material of the present/future, or the answer to a question no one asked.

The Classic 40 is the third of a novel line of planes from U.S. Aircore. The claim to fame of all

## 74 "R/C REPORT"

these planes is the corrugated plastic used in their construction. AirCore, as the stuff is called, supposedly has several advantages over old-fashioned balsa. U.S. Aircore claims their stuff is fuel and water-proof, strong, and possesses a "memory" that will allow it to return to its original shape after various indignities have been inflicted upon it. The color is molded into the material and its corrugated nature provides for built-in hinges.

Also incorporated into the

design is what they call their "Power Cartridge". This is a plywood bed that carries all the radio and engine gear and allows you to quickly remove the goodies from the assembled plane. This allows you to move the engine and radio package from one plane to another quickly and easily, as long as both planes incorporate the "Power Cartridge" design. This is not a new idea, and the same basic concept is already offered by another manufacturer. It does work, and is not a bad setup for those

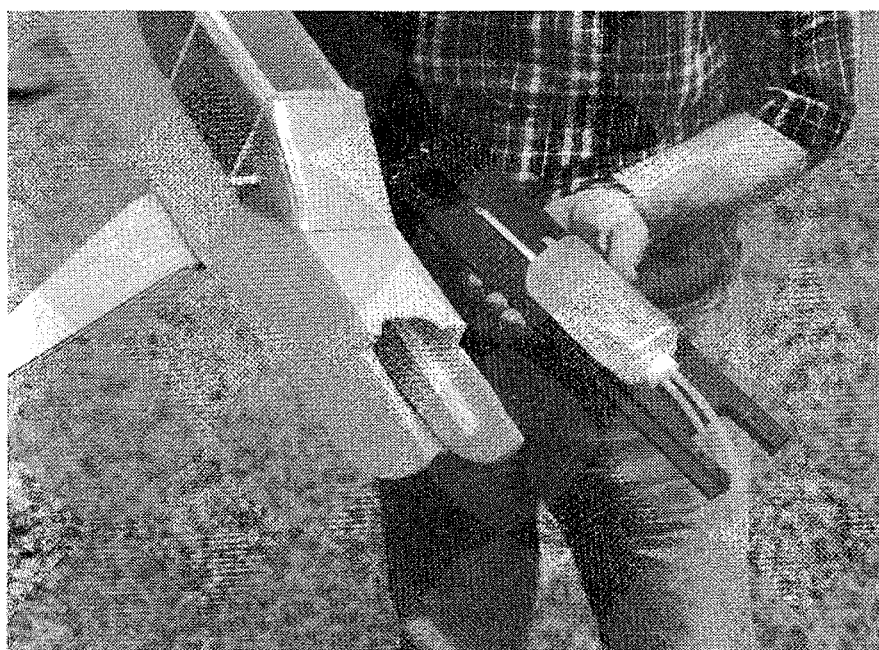
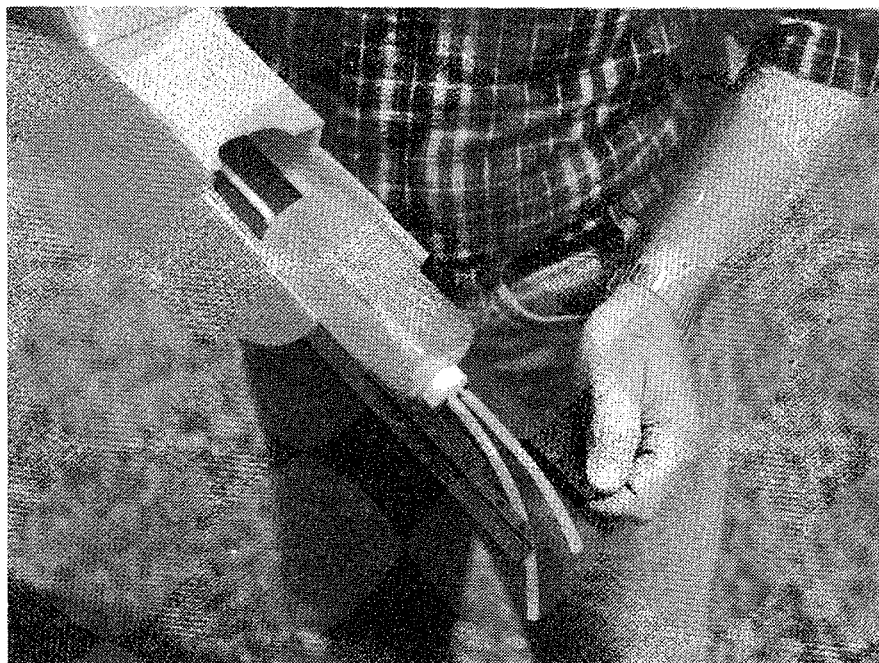
wishing to use the same engine and radio in more than one plane.

The kit is packed in a box that sports an attractive full-color photo of a Classic 40 and a commendably accurate list of the additional items and supplies needed to complete the kit. The list of additional hardware needed is a short list, though. Only an engine, prop, radio, fuel line, and wheels with collars are needed to get the Classic airborne.

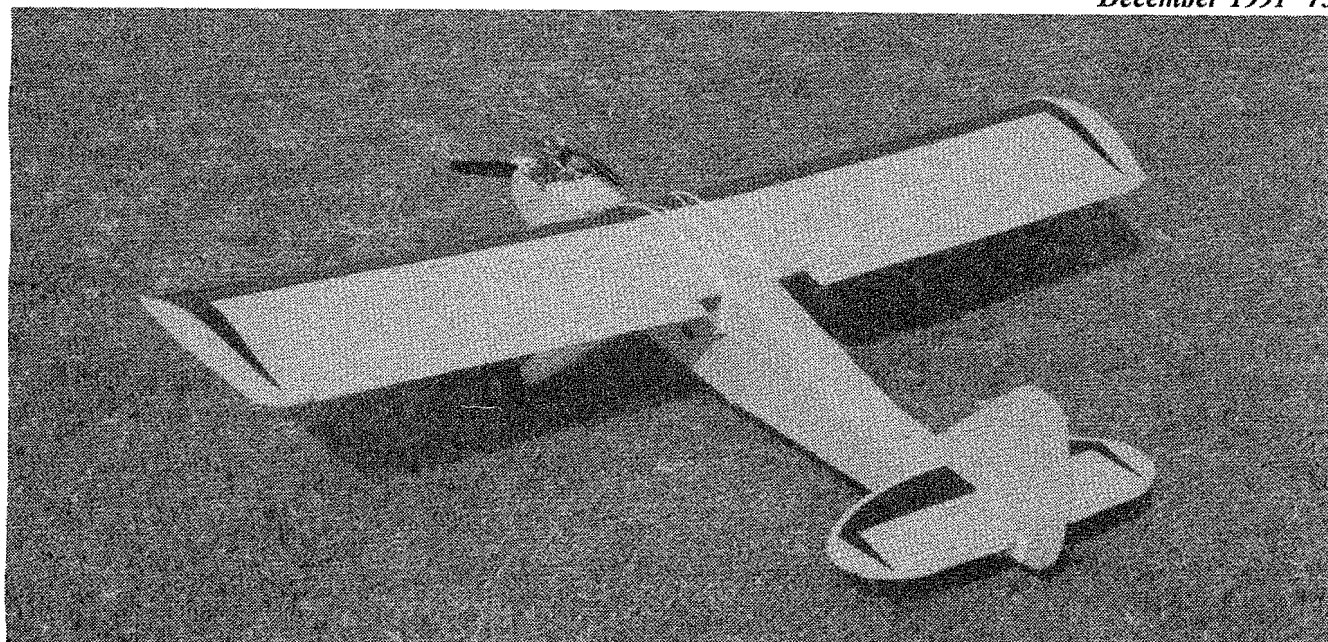
The plane itself is a generic high-winged Cub-like design with a flat-bottomed airfoil and a rather boxy fuselage. The yellow color is molded into the material and requires no additional finishing other than the selected trim scheme.

AirCore (the material) is easily cut with a knife and can be heated with a hair dryer if it becomes necessary to encourage the stuff to bend (I never found heat to be needed). The instructions are well written in an easy-going conversational tone that encourages you to construct the Classic over a four evening period. The authors seem to anticipate that there is going to be some raised eyebrows at some of the construction techniques used and gently admonish you to take your time and get acquainted with their way of doing things. Naturally I skipped a lot of that stuff and just got down to the business of building it. New techniques never bother me. Why, I'm still trying to figure out how to build an inflatable giant-scale trainer out of old tractor inner tubes.

One item in the list of building materials did concern me though. The designers strongly suggest that you use contact cement along with disposable foam brushes to stick the plane together. They insist that the cement be of the flammable flavor. As I stood in the aisle at the local Wal-Mart and contemplated my tightly sealed basement workshop, I read the







emphatic warnings on the label about using the cement only in WELL VENTILATED places, and the dire consequences to yourself and your offspring if you inhaled too many vapors. I decided to stick with the known effectiveness of good ol' medium CA. My spouse would probably never speak to me again if I managed to detonate the entire first floor of the house with a combination of cement fumes and an electric spark.

The instructions said that you needed to let the cement "set" about five minutes before pressing the parts together. Because of the above concerns and not wanting to stretch out the building process beyond four evenings, this Classic 40 was successfully pasted together with ZAP and ZAP accelerator, and various doses of RC-56 and Zap-A-Dap-A-Goo.

I'm not going to bore you with a lot of garble about the construction other than to say that the plane went together pretty much according to the instructions. The fuse is folded around a system of formers and doublers and the wing skin is likewise folded around a hardwood spar that you construct. The only other major part of the process is mounting the engine and

radio to the plywood power cartridge. A novice could probably build this plane, especially if he wisely consulted a more experienced builder as suggested in the instructions. On second thought, the more experienced builder might take one look at the toy-like plastic appearance of the Classic and tell the novice to go buy a *real* kit. And that brings us to some of the questions that went through my mind as I assembled the Classic.

This plane really doesn't look like a serious R/C aircraft. The experienced modeler is likely going to be put off by the... uh... well, *crudeness* of the plane's construction. There is no way that you will be able to get this plane to look like it is made of anything other than cardboard, short of jacking up the windshield and running a Goldberg Cub under it. While the plastic material does appear that it would stand up the beginner's thrashing around, most novices that I have been around want even their first planes to look like Top Gun award winners rather than something that came from Toys-R-Us. So I guess I am a little confused about just who is going to really be attracted to this line of planes. Maybe the greatest potential

market lies with us old pasture fliers that realize that throw-around durability is ultimately more valuable in an everyday sport plane than a slick finish.

Okay. So now we know that we won't be winning any scale contests with the Classic. With this in mind, I felt that it would be a bit silly to spend much time trying to get this bird to really look like a Cub. Especially silly were the included cosmetic(?) wing struts since the instructions warned that they very likely would flutter in the breeze caused by an energetic engine.

My aim was to create a *trim* scheme that would be easy for a low-time pilot to follow after the Classic's testing days were done (The Classic has been subsequently purchased by a low-time pilot for use as a tail-dragger trainer. The instructions say "Do not use a polyurethane paint. It will not stick... You can use Krylon or Pactra sprays, then cover them with a clear epoxy coat." HUH? Krylon and Pactra Formula-U ARE polyurethane paints. So I got out the trusty Rustoleum polyurethane which I have found will stick to nearly anything, and sprayed the red trim after buffing the plastic



## 76 "R/C REPORT"

with 400 wet/dry, and cleaning it with lacquer thinner. Stuck good too.

The power cartridge made the Saito 50 easy to install along with the Futaba Conquest radio. I do have some doubts about how many pilots are going to use this feature to swap out flight packs between airplanes, though. R/Cers seem to use additional planes as an excuse to buy more radios and engines.

The cartridge slides into the fuse on nylon rails that are securely trapped in the fuse doublers. A question I had that was not addressed in the instructions was how are you supposed to keep oil and crud from migrating back into the fuse from the open engine compartment since there is no conventional firewall? I ended up stuffing foam and paper towels into the cavities behind the engine to seal off the radio compartment. Yecch!

The kit box boldly proclaims that the Classic is the "Ultimate Bush Plane". Does that mean that it flies well from bushes? Or maybe that it will often end up in the bushes? Maybe it is a referral to the vague similarity to the Alaskan float planes if you install a set of optional Explorer floats. Anyway, I managed to avoid all encounters with bushes and low-lying trees because the Classic actually flies much better than it looks. The wing loading is very trainer-like at around 18 oz./sq.ft., and the flat-bottom wing flies in a very familiar manner. Familiar also is the way that most flat-bottomed high wing designs like to have aileron differential to make coordinated turns, which the instructions to the Classic failed to mention.

Familiar also is the way the same type of plane likes to have down thrust in the engine setup so there won't be drastic elevator trim changes when the throttle is chopped... likewise omitted from

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the instructions.

But with these easily remedied exceptions, the Classic is a rather stable plane to flog around the traffic pattern. You may want more elevator travel than the instructions recommend (I did), and while you are fixing the aileron differential go ahead and crank in some more aileron travel as well. Wildly aerobatic behavior is going to require more thrust than the Saito 50 could provide, along with a substantial rearward shift of the CG.

During a couple of moderately fast dives I detected the buzzing of control surface flutter, but due to the flimsy nature of the plastic I was unable to determine which surface(s) was(were) fluttering. I suspect it was the ailerons. But, since it would be difficult to stiffen them, just don't do high powered dives.

Well, I still don't quite know what to make of this new kid on the block. Even though it assembled and flew without any anxious moments, I really don't think I will be getting another one. A few more bucks will get you a more nicely finished albeit less durable ARF, and a few more hours spent in construction will give you a very nice PT40, or Eagle 2, or Kadet, or

Kadet Senior, or....hey, even a REAL Cub.

There is a niche out there for the Classic 40 and its kin, but as far as I am concerned, bring on the balsa.

-Sam Buchanan

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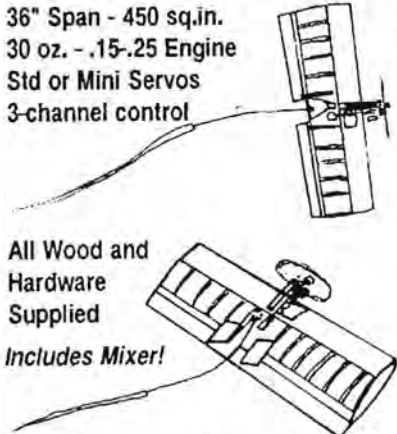
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# GIANT SCALE KIT REPORT

by Dick Pettit



**Model** ..... P-51D Mustang  
**Type** ..... Giant Scale  
**Manufacturer** ..... Pica Enterprises  
 2657 NE 188th St.  
 Miami, FL 33180  
 (305) 935-1436  
**Suggested Retail Price** ..... \$319.95  
**Wing Span** ..... 89"  
**Wing Area** ..... Advertised - 1356 sq.in.  
 Measured - 1386 sq.in.  
**Airfoil** ..... Semi-symmetrical  
**Fuselage Length** ..... 72" w/o eng/spinner  
 77-1/2" with spinner  
**Rec. Controls** .. 5-6 (Ail, El, Rud, Throt, & Flaps)  
 Retracts optional. (See text  
 for suggestions on servos.)  
**Rec. Engine** ..... 1.08 to 1.80 2C  
 Supertigre 2500-3000 suggested.  
**Rec. Weight** ..... 15-18 lbs.  
**Basic Materials** ..... balsa, plywood, hardwoods  
**Instructions** .. 8x11" 50 page book w/hundreds of  
 illustrations, "Cripes-A-Mighty" history, background  
 info on it's pilot, complete list of parts, addresses for  
 additional scale information, illustrations of the die-cut

sheets, and more!

**Plans** ..... two full size rolled sheets  
**Hardware Included** ..... all bolts, screws, nuts,  
 formed main gear music wire, plastic clevises,  
 pushrods, control horns, etc. Formed plastic pieces  
 include cowl, canopy, air scoop, gun ports, wing  
 fairings, exhaust ports, bomb racks, and miscellaneous  
 scale pieces. Decal sheets (two 12 x 12" and one really  
 huge 10-3/4 x 44") include numbers, pilot and crew  
 names, detail markings, airplane names, kill markings,  
 stars n' bars, and more.

**Items Needed To Complete** ..... 5-1/2" spinner,  
 propeller, engine, fuel tank & lines, radio system,  
 wheels (two 5", one 2"), hinges, wheel collars,  
 adhesives, and covering and finishing materials.

## COMPLETED MODEL

**Finished Weight** ..... 18 lbs. 7 oz. (295 oz.)  
**Wing Loading** ..... 30.65 oz/sq. ft.  
**Engine Used** .... Supertigre 3000 (48 oz. w/muff)  
**Propshaft to Ground** ..... 17" (held level)  
**Fuel Tank Used** ..... DuBro 16 oz.  
**Radio Used** ..... Futaba 7UAP w/7 S-148  
 servos and a 1200 mah flight pack battery.





### Covering/Finishing Used:

Hobby Lobby Oracover and Rustoleum spray paint.

### Special Items:

DuBro 5" scale military main wheels, Dave Brown Lite Flite tail-wheel, Pica (made by Jo-Z) 5-1/2" P-51 spinner, J-Tec muffler, Sig Easy Hinges, Dynathrust 18x8 prop.

**CHEERS** - excellent quality wood parts - each pre-cut piece fit exactly as intended; solid framework; VERY complete decal sheets (3); most plastic parts were good; most hardware included; plans and instructions were *excellent*.

**JEERS** - no recommended elevator throw specified; one piece of wood missing (one of the *hundreds* in the kit!); very thin plastic wing fairings; wing sheeting balsa was too narrow; supplied nylon clevises were of questionable quality.

P-51 MUSTANG. Just

mention that name to any R/C modeler and you're sure to get their juices flowing. Images of low level strafing runs, high altitude dog fights, and tree skimming fly-bys are recalled from memories and imagination. The North American P-51 Mustang is one of the most widely modeled scale aircraft, second only to the J-3 Cub. Even the beginning R/C flier dreams of someday flying a P-51 (some even as their first plane!). There are already many Mustang kits on the market, ranging from Fun Scale sporty planes to fiberglass exact replicas, from .049 size to huge giant scale. We won't mention the custom built all metal P-51 supposedly available after a sizeable down payment.

Pica Enterprises now offers both 1/6th scale and 1/5th scale versions, the latter of which is the subject of this review.

The very large kit box was well packed. Individual plastic bags

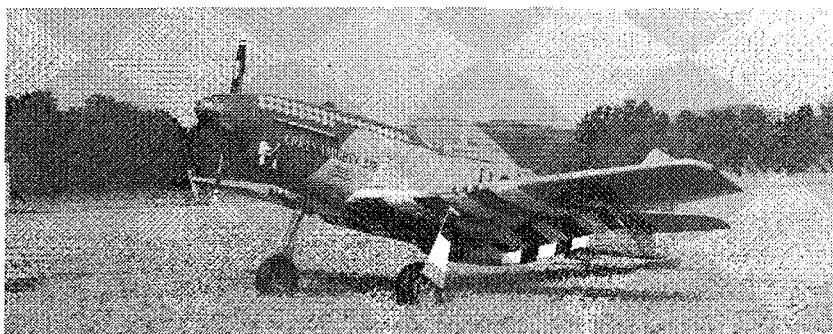
contained parts for each sub-structure along with a parts inventory list. This made it very easy to locate all the parts.

A few days after the kit arrived, it was shown to several local modelers, one of whom who built and flies a huge Bud Nosen P-51 powered by a Super Tiger 6000 twin. Talk about big! After just looking through the plans and materials in the Pica kit, two local modelers ordered their own kits... including the guy with the big Bud Nosen Mustang. That's how impressive this kit is!

The instruction manual consists of over 50 pages with step by step instructions, many fine details, cross section drawings, and lots of other information. Each step refers to a part number, a bag or bundle where it will be found, and the material the part is made from. Not counting hardware, there are over 500 pieces in this kit, most of them pre-cut to the exact size and shape for a perfect fit.

There was *one* piece missing, a part easily produced in the shop, and even that error has been corrected in later kits. The hardware included was complete except that the supplied nylon clevises seem weak to me for a model of this size. I replaced them with metal clevises. Pica recommends that a sandable aliphatic resin, such as Pica GLUIT, be used for all construction instead of CA's, which they claim become brittle with age. I chose to use Elmers Yellow Carpenters Glue and found it to work well.

The full size rolled plans are very well drawn. Wing panel drawings show both fixed and retractable landing gear, and flaps driven either directly or by bellcranks (yuk!). The fuselage sheet shows panel lines, paint schemes, . and invasion stripe



locations. Other detail drawings show exact locations for the multitude of high quality self-stick decals. Since the Pica P-51 can be built following several prototypes, lots of decals are provided.

The Pica P-51 fuselage is built from lite ply formers and ribs, sheeted with 1/8" or 3/32" balsa. All fuselage sheeting is cut to size and fits exactly. An ABS cowl and air scoop are provided, along with a clear canopy made of PETG. Other plastic parts include gun fairings, wing fairings, shell extractors, and navigation lights. To give you an idea of the thoroughness of this kit and design, the vertical fin and rudder contain 44 pre-cut pieces of balsa and hardwood! This is not to say the Pica P-51 is hard to build. This is just how Pica arrives at the desired results without excess weight.

The Pica P-51 is scaled down from a restored Mustang based in Florida and owned by Kermit Weeks. This plane was copied from a WWII P-51 named "Cripes-A-Mighty 3rd", the most successful P-51 flown in the European Theater of Operation. It's pilot, the late Major George Preddy, was the highest ranking Mustang Ace in WWII. To give you an idea of just how good Major Preddy and his Mustang were, they shot down six German fighters during one mission, *in just five minutes!* Talk about precision! (*Editor's Note: Aww, I betcha I coulda done that.*)

There are several subtle differences between Kermit Weeks' P-51 and the original, the most noticeable being the name appearing on both sides of Kermit's plane but on one side only of Major Preddy's. This is a fine detail for the true nit-picking scale buff, but Pica provides both names in the correct script style. Either way, of

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course, you're still scale.

Also in the instructions is a mini-biography of Major Preddy and several sources for scale photos and additional information. I was privileged to receive a copy of a video tape biography of Major Preddy, produced by Musten Communications and Samuel Sox. Ironically, Mr. Sox lives less than 25 miles from my home and was more than eager to provide any details he could. He has researched Major Preddy and his Mustang for over 20 years and is anxious to see the finished model. The video contains actual film footage of Major Preddy and the P-51 along with some spectacular shots of Kermit Weeks' plane. The video is a biography of a person, however, not the plane, and therefore has more talk than action. It is, however, exciting and well worth watching. But enough history for now. Lets start building!

The fin and rudder are built first, each from a solid center core, with ribs and leading and trailing edges added, each pre-cut to the

exact size and shape required. These assemblies are then covered with sheeting made from several 1/16" balsa pieces. Strength and lightness are the key words here.

Next is the horizontal stab and elevator, built in the same fashion. The elevator is one piece, driven by a single pushrod to a single control horn hidden inside the fuselage. The elevator control horn is actually a 4-40 bolt and nut attached to the plywood elevator joiner with a nylon fitting to connect to the pushrod via a Z-bend. It seemed strong enough...

Next come the HUGE flaps which are made to operate similarly to the full size P-51. Pica gives the builder the choice of how the flaps are to be driven, either directly from individual servos or by a pushrod/bellcrank arrangement driven by one or two servos. I chose to directly drive the flaps with individual servos, hidden in the wings and covered by an aluminum hatch.

The fuselage is built flat on the board, beginning with the two

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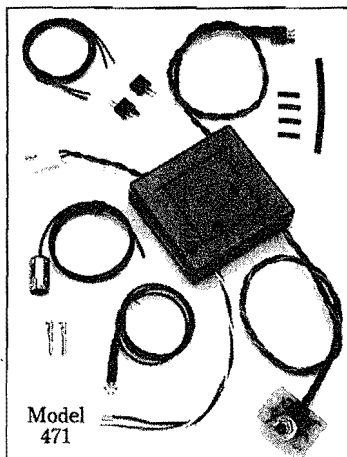
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balsa crutches, upon which the upper half of the formers are added. The plan is to add a few formers, then a few stringers, then more formers, etc., until the top half is done. Then you begin sheeting. All this time the fuselage is securely pinned to your building board to ensure a straight structure. The sheeting is added a piece at a time and each piece represents a sheet of aluminum on the full size plane. When this assembly dries, it is lifted from the board and turned over. Now you get to build the bottom half the same way.

Before starting on the wing you have to decide whether retracts are to be used. Also, since the aileron and flap servos are designed to be mounted in the wing ribs, the builder must make provisions for them as well. In order to make the servos accessible, this builder decided to mount the servos in a more normal manner, with access hatches on the bottom wing surface. At this time, Pica does not have their special retracts available for the P-51, but I'm sure any of a

number of manufacturer's retracts could be used successfully. Since this plane was to be flown a lot and not tinkered with a lot, retracts would not be included.

The wing structure is built from 1/8" lite ply ribs, with balsa spars and leading edges. Each panel is built flat on the board, with washout included by using a balsa stick under the ribs. The wing halves are joined and sheeting is done with 3/32" balsa. Here is where another minor error occurred. The sheeting was prepared according to the instructions, but did not match the plans. A section was removed from the leading edge area and added to the rear and then the sheets matched. Pica assures me that this problem has been corrected in later kits. Washout is further ensured by the use of wing jigs included in the kit. Ailerons are made from pre-formed solid balsa.

The Supertigre 3000 with a J-TEC STB muffler was used. The cowl didn't clear the muffler. Pica plans to offer a special muffler that fits within the cowl, but it was not

available in time for this review. The J-TEC muffler, however, was thick enough to allow enough filing and grinding to clear the cowl, but the cowl had to be cut anyway for air circulation and for the exhaust pipes. A 16 ounce fuel tank was installed in the tank box behind the engine. There is plenty of room for larger tanks, maybe not a three liter R/C Cola bottle, but more than enough room is available for reasonable sizes. Holes for glow plug, needle valve, and carburetor choking were also cut in the cowl. Several L-brackets hold the cowl to the fuselage. The supplied plastic dummy exhaust pipes and air inlets must be split since they connect to both the cowl and the fuselage. The other plastic parts are installed later.

The plastic fairings for the wing were extremely thin, and I elected not to use them.

Five rolls of covering were needed for the Mustang. Jim Martin from Hobby Lobby asked me to try ORACOVER on this project. I began on the control surfaces and immediately found that ORACOVER is *very* easy to use. It goes around curves nicely, and it can be lifted and repositioned if necessary. This is what sold me on ORACOVER. All the other surfaces were covered normally except the fuselage. There I cut the ORACOVER into pieces representing the metal panels on the P-51. Each was applied individually with a tiny bit of overlap. All plastic detail parts were added using CA glue.

Ah, Painting! Most Mustangs were aluminum, not steel colored, tin foil colored, or chrome plated. The only way to duplicate this to my way of thinking is to spray the ORACOVER with aluminum paint. (Well, there is another, but I chose NOT to sheet the plane with thin



aluminum plates.) (Editor's Note: COWARD!)

Rustoleum aluminum paint adheres quite well to ORACOVER, provided the film is cleaned well first. This paint is first sprayed on lightly, followed by a heavier coat a few minutes later. The aluminum paint dries much quicker than the colors and therefore it is harder to obtain an even coat. Once the paint dries, it can be cover-coated with flat or satin finish clear. The blue, black and white paint took several hours to dry but looked very nice.

The multitude of self-stick decals were applied following the details on the plan sheets. I chose to follow Kermit Weeks' P-51 and put "Cripes-A-Mighty 3rd" on both sides of the fuselage. All the decals were colorful, easily read, and not so thick they appear as "plates" instead of paint.

Pica offers a cockpit interior kit which really makes the vast space under the canopy look more like a P-51 than a packing crate. You really need that interior kit. Maybe Pica can include them with every P-51 for a few bucks more. The pieces included in the cockpit kit form a front and rear area, a seat, and a complete instrument panel and hood. Also included are a few *hundred* pins to be used for switches and knobs. Instruments too are included, as are seat belts, etc. After painting, the interior looked really great. Pica also offers a scale 5-1/2" spinner which is made from spun aluminum and really looks nice. It's a shame to have to paint it blue.

Sig Easy Hinges were used to secure the control surfaces. The flaps are designed to be mounted on a pin and bracket arrangement, simulating the full size flap motion. Radio installation is very easy and plenty of room is available. The

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1200 mah battery pack I used could be positioned for balance. The elevator, rudder, and throttle were each driven by one standard size servo. I questioned the use of small servos, but Pica assured me that they would be adequate.

Once all the major components were assembled, I noticed that the model could not be balanced at the specified location. It would require at least 16 ounces of weight to balance. I began to check the location of the CG and, according to Pica, there is only 16-1/2% of the wing area ahead of the CG. I questioned this location but Pica insisted that it was correct due to the scale airfoil and all. Incidentally, it took a full 16 ounces to properly balance the Mustang. I added two 8 oz. weights to the motor mount beams. This brought the total weight of the model to 18-1/2 pounds, with a wing loading just over 30 oz/sq/ft. This is not too high for a model this size, and the flaps will slow the plane on landing.

The ST3000 provided all the power necessary to drag the model around my yard in the tall grass. I suppose I should mow it some day, but it's time to fly now. Maybe I'll mow it next week.

A roll of photos were taken and the plane was ready to fly. I asked a friend to video-tape the first flights for me. There were several dry runs up and down the runway, and even a few aborted take-offs. It needed a lot of right rudder to keep

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it going straight down the runway, even though the fin is offset giving some built-in right. Also, the rear end kept coming up too soon without a lot of up elevator. So, I finally gritted my teeth, aimed the P-51 down the runway, and poured the coals to it. About halfway down the runway, the Mustang broke ground and was actually flying. The ST3000 provided more than enough power to pull the 19 lb. plane around very nicely. A little aileron trim was needed and the elevator was very sensitive. The P-51 was cruising solidly (more or less) around the sky. Several spectators commented that the plane seemed to fly pretty well for a first flight, and that it seemed to respond well to control inputs. I now feel that the location of the CG as shown on the

with no elevator.

Then, all was silent. When the crash investigation team arrived on site, the fuselage was demolished from the cockpit forward. The wing was an Oracover bag of balsa and plywood parts. The spinner was BEHIND the prop drive washer. Surprisingly, the rear half of the fuselage was not badly damaged.

We think we found the problem. The elevator pushrod was still connected to the servo and both still functioned. The rear Z-bend was still on the nylon fitting, and the fitting was still screwed onto the 4-40 bolt control horn. That bolt, a 10 cent item at most, I'd guess, had sheared off. A normal 4-40 bolt might have *bent* if the flight load was excessive, but to have sheared off the way it did, we must

indication... and goodness knows we've reviewed the video *dozens* of times now. The plans, instructions and materials provided in the kit are first class. The P-51 is an extremely complete kit as well, leaving the builder only the normal items to purchase. Although extremely disappointed in the loss, I am left with the conclusion that the Pica 1/5 scale P-51D Mustang would make a very nice and valued addition to any giant scaler's hangar.  
-Dick Pettit

*(Editor's Note: From my experience with over 100 models, I use two elevator servos on split elevator halves, and two aileron servos (one per side) in the following types of models: those powered by a .90 2C or 1.20 4C or larger, those weighing 10 lbs. or more, and those 1/5 scale or larger in size regardless of their engine or weight. Sometimes I use them on smaller models as well, depending on the circumstances. I do this not only for the additional power (which you could get with a single larger servo), but for the redundancy of two control setups. I urge you all to consider something similar. We have ordered another kit from Pica in order to present a more encompassing flight review, and I have requested this specific modification to be included in the replacement model. The replacement, by the way, will probably be finished in a sport motif instead of a military finish.)*

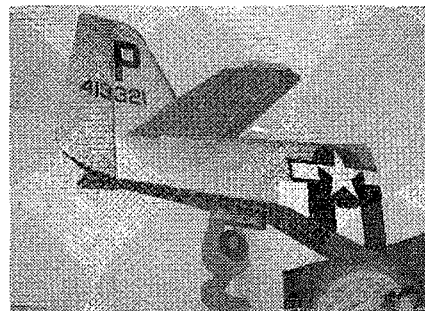


plans was just about right.

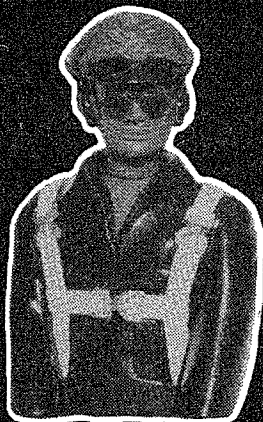
After only two laps around the flight area, during a left turn, I experienced a sudden and complete loss of elevator control. I was able to turn the P-51 away from the field, meaning that I still had radio control. I was pulling on that elevator stick so hard I thought I'd bend it. I reduced throttle and the ST3000 cut to idle, but the plane was still coming down really fast,

assume the bolt to have been defective - a rare incident at best. In the post-crash investigation, I found a bent crankshaft and a broken needle valve on the ST3000, and one broken servo on the aileron. The rest of the plane was simply not worth saving.

The Pica P-51 Mustang is a sturdily built model, and surely capable of flying very well... if the few minutes we flew it were any



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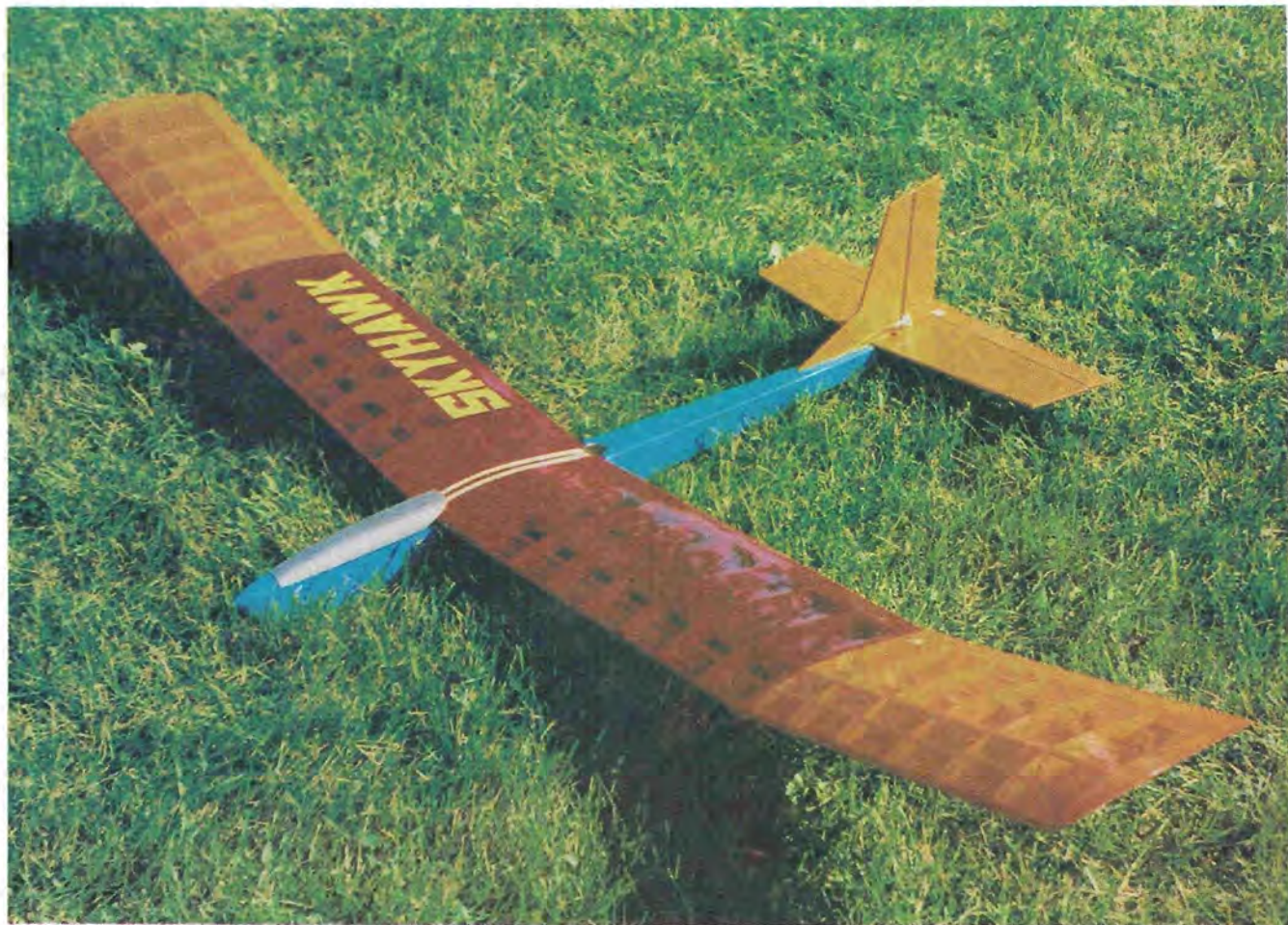
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# KIT TEST REPORT

by LeRoy Satterlee



Model .....	Skyhawk
Type .....	Entry Level Sailplane
Manufacturer .....	Ace R/C
	116 W. 19th St., P.O. Box 511
	Higginsville, MO 64037
	(816)584-7121
Suggested Retail Price .....	\$39.95
Wing Span .....	78-1/2"
Wing Area .....	655 sq. in.
Airfoil .....	flat-bottom S4061
Fuselage Length .....	41"
Rec. Controls .....	2 (Rud, El)
Rec. Wing Loading .....	6 to 7 oz./sq. ft.
Rec. Weight .....	26-32 ozs.
Basic Materials .....	balsa, ply
Instructions .....	ten page manual, 51 photos
Plans .....	one full size rolled sheet
Hardware Included .....	everything needed to complete
Items Needed To Complete .....	two channel radio,
	adhesives, covering materials

## COMPLETED MODEL

Flying Weight .....	36 oz. (see text)
Wing Loading .....	8 oz./sq.ft.
Radio Used .....	Tower Hobbies Gold 6 Ch
	with mini-Rx and two mini-servos
Covering/Finishing Used .....	Monokote
Special Items Used .....	None

**CHEERS** - very thorough plans and instructions; strong design; very comfortable to fly, with gentle control response; makes almost "Hands Off" launches.

**JEERS** - fragile turbulator strip (broke several times during covering process); some of the color coded sticks were miss-identified.

The Ace R/C Skyhawk is a simple, easily built, entry level sailplane. It's a good alternative to the ever popular Gentle Lady, or the venerable Sig Riser. In my opinion, it is stronger than the Gentle Lady, but not quite as strong as the Riser.



Building the Skyhawk is a snap, as it should be. After all, the new enthusiast wants to get to flying ASAP, doesn't he? The ten page instruction book is very thorough, leaving little if anything to the imagination. The photos on each page make every step clear and concise. The building order makes good sense too, beginning with the simplest components first, and progressing to the more difficult parts as construction proceeds.



The elevator and rudder surfaces are built from color coded sticks for easier identification (the ends of the sticks are colored to aid in size selection). I had a little difficulty finding the WHITE sticks, until I started measuring and found that they were actually PINK. Apparently, they had been misidentified as red and then marked over with white, which rendered them a nice shade of PINK. Once this was sorted out, the construction continued without a hitch.

The wing is a polyhedral design utilizing spruce spars and shear webbing for strength. There are three spruce spars in the center section and two in the tip sections. Vertical grain shear webbing is placed between the spars all the way out the wing except for the very last rib bay on the tip.

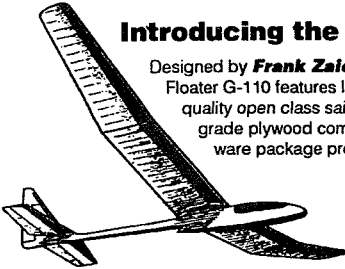
The airfoil is stated to be a flat-bottom S4061. I disagree with this method of describing an airfoil

because it possibly gives one the notion that it will perform like a Selig 4061, which it will not. In any event, the airfoil utilizes the top profile of the S4061 but with a flat bottom for easy building. The ribs are sawed and sanded and fit the spars very well. The flat-bottom S4061 flies much like any other flat-bottom airfoil, which is SLOW. And that's not bad, either, because if you're a beginner, slow flight gives you more time to think about your next move.

The wing is a constant chord planform which gives lots of area and is conducive to easy building. It utilizes a turbulator spar to keep the flow attached, and a shaped balsa leading edge. The turbulator spar, which is the smallest piece of wood (1/8" sq.) in the kit, was also the softest piece of wood in my kit. I broke it numerous times during the covering process. I would like to suggest to Ace R/C that they

consider changing the turbulator spar to 1/8" sq. spruce. I would also suggest changing the shaped leading edge to spruce to better resist damage from the rough landings that beginners are so famous for. I realize that this might add a few cents cost to the kit, but I would consider it worthwhile in view of the time it takes to rebuild a broken wing.

The Skyhawk fuselage is typical light-ply and balsa construction. The sides and bulkheads are lite-ply, as is the bottom back to the wing trailing edge. The remainder is balsa with the grain laid across the structure and triangle stock used to reinforce the corners. Basswood strips are used to stiffen the fuselage openings at the wing and radio compartment. A carved block is used for a hatch, which is held on with rubber bands. The wing is attached to the fuselage with rubber



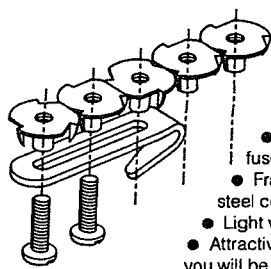
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bands to allow the wing to move, rather than break, during those hard landings. The wing band dowels are buried in the fuselage for cleaner airflow. All in all, the Skyhawk is a pleasure to build, and builds quickly. With a couple of minor mods to the kit, it could jump from a fine kit to an excellent kit.

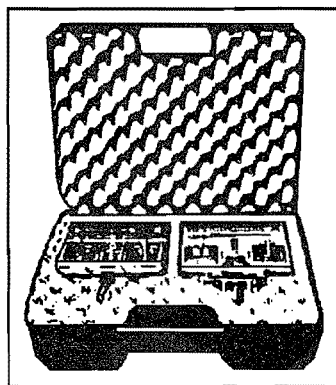
My Skyhawk was covered with Monokote, which I consider to be the premier sailplane covering material. It offers a spectrum of color choices second to none, and adds considerable strength to your sailplane. The model was finished in transparent red (wing center-section), transparent orange (wing tips), opaque orange (tail and rudder), and opaque blue (fuselage). It's instantly recognizable in the air.

The two servos are mounted just behind the bulkhead at the front of the wing, and the Rx is in a foam block immediately ahead of the wing. The 500 mah battery pack is in the nose compartment.

Flying the Skyhawk didn't turn up any surprises, which is the way it should be for a beginner sailplane. Predictable performance in an entry level glider is an excellent attribute. I was surprised to find that I had to add seven ounces of nose weight to get the balance point in the right place. This may have been due to the fact that I used the lightest radio system I have. Any standard size radio system will fit the Skyhawk, and it would probably balance better with larger equipment. At any rate, 2-1/4 lbs. isn't all that heavy.

Launches are sooooo easy with the Skyhawk, it's almost unreal. Several times I launched with a standard class hi-start while holding the transmitter down by my left thigh, never touching the sticks at any time during the launch. She goes up straight as an arrow, time after time. Turn response is proportional to stick movement, and is very gentle with small

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movements of the control sticks, and very responsive with larger movements. The glide angle is very flat, and its flying speed is very slow.

For an experiment, I added ballast until I had increased the wing loading up to 12 oz/sq.ft. (a 50% increase). Flying speed increased somewhat, but sinking speed increased more noticeably.

Most flat-bottom airfoils don't respond well to ballasting.

In summary I would say that if you're in the market for an entry level sailplane, then you should consider the Ace R/C Skyhawk. In ease of construction, strength, and gentle flying qualities, it has a lot to offer.

-LeRoy Satterlee



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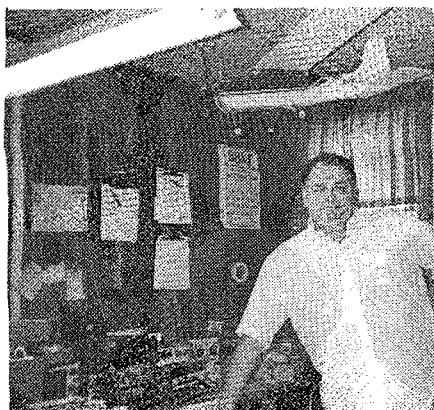
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# Electronics



by Brad Booth

The long, hot summer is finally dwindling and the autumn leaves are a welcome sight. After all the leaves have fallen, it's a good time to go looking for that model you couldn't find during the summer months.

If you recover a model which has spent several months hidden away in a tree, you'll be surprised how decomposed it will appear.

If the radio shows signs of moisture, watch out, the magnet iron in the servos can become very rusty during exposure. If the servos appear useable, test them servos in an old worn model for several weekends.

The batteries and receiver are not so vulnerable, so if they look good, they probably are good. Look for oxidation and corrosion, though.

The engine will probably be okay if you were using castor oil fuel, but rust will attack the synthetic-lubed engines.

## BIPOLAR TRANSISTOR

This is the granddaddy of solid state electronics. It's easy to understand and quite remarkable. I'm not going to talk physics and transistor theory, we just want to know how the darn thing works when dabbling in practical electronics.

Most instructors start teaching

voltage parameters at this point, but, alas, the bipolar transistor is a current sensitive device. Therefore, we'll begin with current and end with voltage.

Bipolars always have three terminals; the base, the emitter, and the collector. The base terminal operates similar to a volume control or control valve (water hose technology). As current passes from base to emitter, the current from collector to emitter will follow. Any increase in base current will cause an increase in collector current, a decrease in base current will result in a proportionate decrease in collector current.

The base current is always quite small compared to collector current. A ratio of 10:1 is common, but ratios of 100:1 are easily obtainable.

Operating a transistor with a ratio of 100:1 means that a base current of 1 mA will cause a collector current of 100 mA to flow. We can also refer to the device as having a **GAIN** of 100.

Referring to figure 1, we can put our NPN transistor to work operating a small light bulb.

For the purpose of discussion,

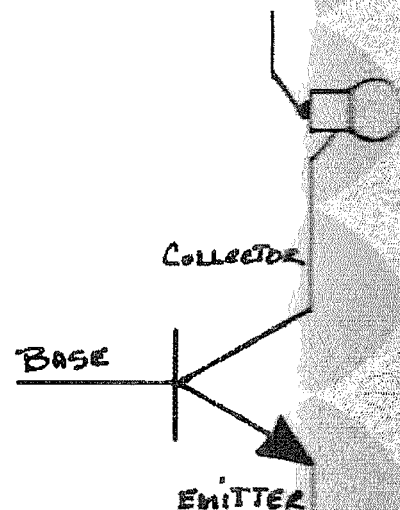


FIG 1

we'll assign the transistor a gain of 10 and the light bulb will glow with maximum intensity at 100 mA.

When 1 mA of current is applied to the base of Q1 (the transistor), the collector will conduct 10 mA, causing a very dim light bulb. But, as base current is increased, the collector current will increase proportionately until the bulb is at maximum current (and intensity) of 100 mA.

Let's now refer to the "family of curves" (see figure 2). The

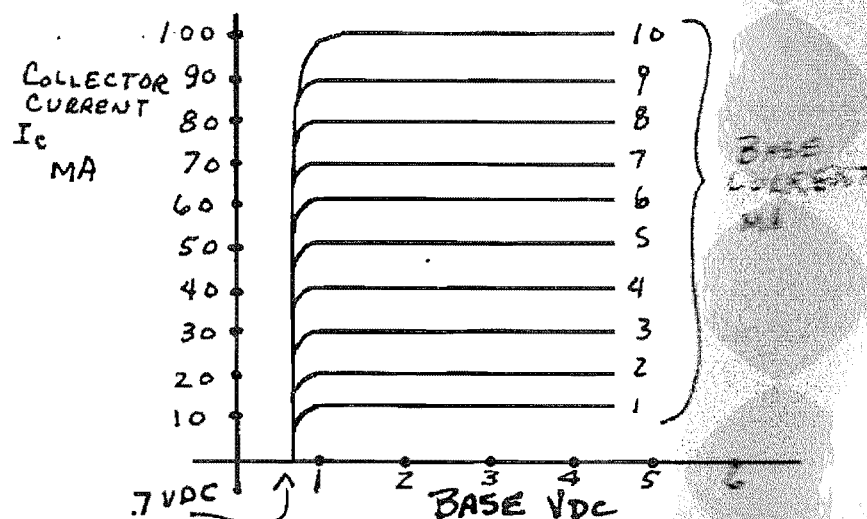
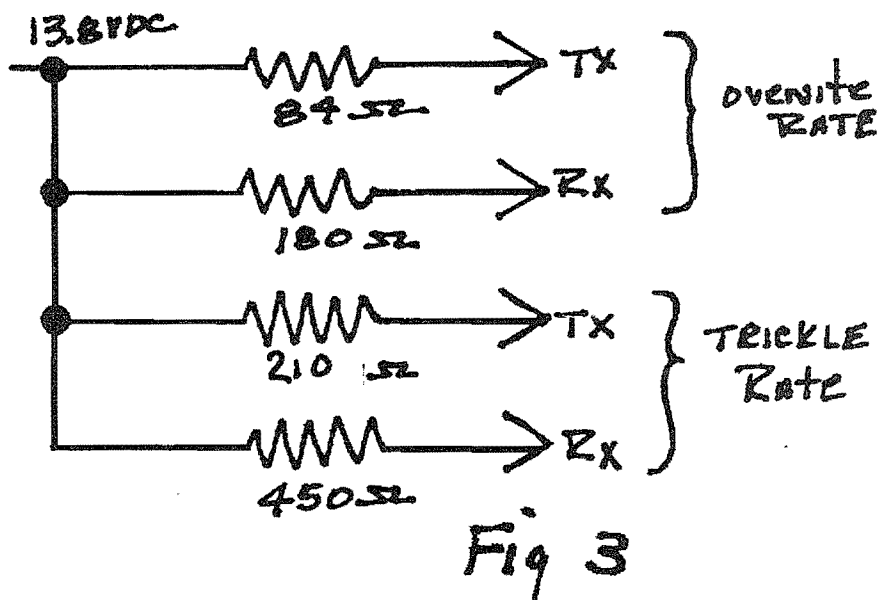


Fig. 2

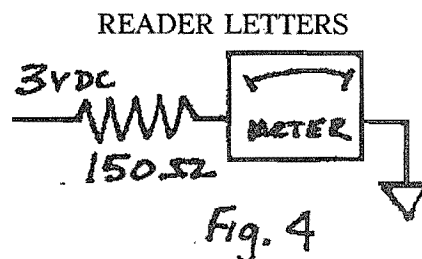


graph shows the base current/collector current relationship with a transistor having a gain of 10. Don't be taken in by the stepped appearance of the graph. The graph presents the base current in steps of 1 mA increments. This is simply a display of the data, all bipolar transistors are infinitely variable. The characteristics of a bipolar transistor are easy to understand and, with a little

imagination, we can find thousands of applications for the device.

Figure 2 also shows a very important characteristic of a silicon transistor (silicon is the primary material used in manufacturing). The transistor base-to-emitter junction is actually somewhat of a diode. That means it will have a .6 or .7 volt drop across it when it's conducting. When the transistor is in operation, this voltage drop can

be measured with a voltmeter. It should be noted that the transistor will not conduct current through the base to emitter junction until this voltage is reached. Once the .6 or .7 VDC requirement is achieved, the transistor will be "forward biased" and current will be our only variable. We'll continue to talk more about transistors next time!

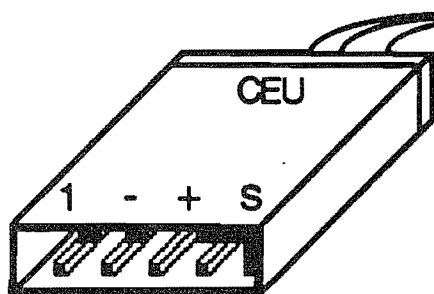


QUESTION: I'm making a field charger but ran into a problem with resistor values. I want to trickle charge and overnight charge receiver and transmitter batteries from a 13.8 VDC car battery.

Dan Stolarczyk, White Lake, MI

Great project, Dan! Let's share your idea with the rest of our

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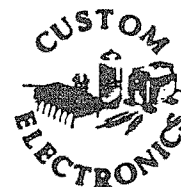
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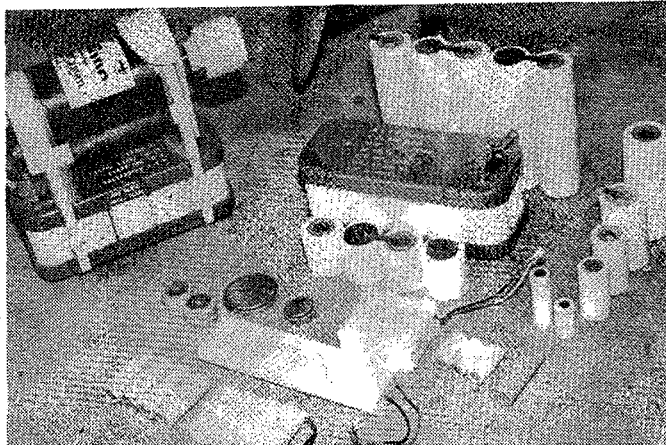
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electronic buffs. Resistor values can be found easily, using Ohm's Law and reasoning.

STEP 1. Supply Battery voltage (13.8) minus charging pack voltage (4.8 for 4-cell flight pack) = Voltage to be dropped across the resistor.

STEP 2.  $13.8 \text{ VDC} - 4.8 \text{ VDC} = 9$

STEP 3. Resistor value = Voltage across the resistor divided by the current through the resistor.

STEP 4.  $9 \text{ VDC} \div 50 \text{ mA} = 180$  ohms (50 Ma = overnight rate).

$9 \div 20 \text{ mA} = 450$  ohms (20 mA = trickle rate).

STEP 5. The transmitter resistor values can be determined the same way, (transmitter batteries are usually rated at a nominal 9.6 VDC)

$13.8 \text{ VDC} - 9.6 \text{ VDC} = 4.2 \text{ VDC}$  across the resistor.

$4.2 \div 50 \text{ mA} = 84$  ohm resistor

$4.2 \div 20 \text{ mA} = 210$  ohm resistor

It's important to know that transmitters won't take a complete charge using a 13.8 volt battery for charging. The transmitter nicad batteries will climb to about 12 VDC when charging, so the "charging current" will drop off as the batteries charge due to the fixed

resistor value.

CHECK IT OUT!  $13.8 - 12 = 1.8$  VDC across 84 ohm resistor.  $1.8 \div 84 = 21.4 \text{ mA}$  charging current.

Resistors will always dissipate electrical power. This power is given off in the form of heat. When selecting resistors for a project, it's always a good idea to determine the amount of heat dissipation. Then select a resistor which can do the job.

Resistors are rated in wattage; the higher the wattage rating, the more power the resistor can dissipate. Most resistors used in electronics are in the neighborhood of 1/8, 1/4, & 1/2 watt. Industrial resistors often dissipate so much heat the ratings are 50, 100, and greater. The higher the wattage rating, the bigger the resistor will be in physical size.

The wattage rating for a resistor is easy to calculate and it's often more desirable to go to the next larger size to handle the heat more efficiently.

Voltage drop across the resistor x current through the resistor = wattage rating.

Transmitter Example:  $4.2 \text{ VDC} \times .050 \text{ Amp} = .21 \text{ watts}$  (use .25 or .5 watt resistor).

**QUESTION:** In the August issue (RCR), you stated that a 1.5 VDC battery and glow plug pulled 3 Amps of current. Then you said a 1.25 VDC battery and glow plug pulled 3 Amp. Which is it? Also, you said batteries were rated in Amps. Shouldn't that be Amp/Hours?

**Weldon Smith, Cary, IL**

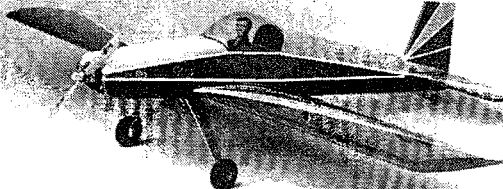
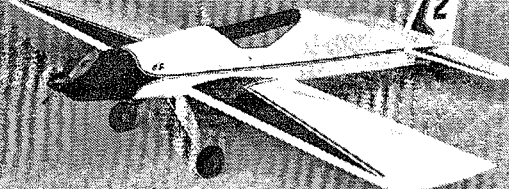
You're correct, Weldon. Mathematically, it would be impossible to arrive at the same current with the two different battery voltages.

You're also correct when you say batteries are rated in Amp/Hours. Often I refer to a device rating in Amps, which, in bench conversation, is acceptable. The unit Ampere is always relative to a one hour time period, therefore the hour (in Amp/Hour) is intuitive and is not always required to make your point.

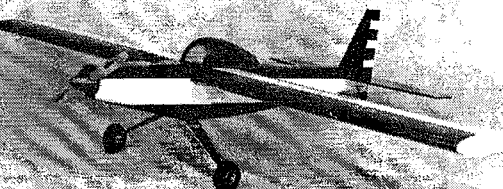
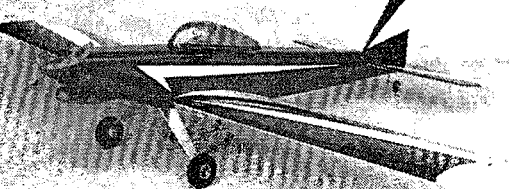
I guess I could refer to 1 Amp as  $6.242 \times 10^{18}$  electrons drifting at a uniform velocity past a given point for the period of one second. But, if we start talking like that, we'll lose readers and there won't be anybody left but you and me, Weldon.

**QUESTION:** I have a meter



	<table border="1"> <tr><td>60</td><td>SPAN</td><td>56</td></tr> <tr><td>800</td><td>AREA</td><td>700</td></tr> <tr><td>70-91</td><td>4-C</td><td>60-91</td></tr> <tr><td>50-61</td><td>2-C</td><td>40-61</td></tr> <tr><td>7-8</td><td>WT</td><td>6-7</td></tr> <tr><td>21-23</td><td>LOAD</td><td>20-23</td></tr> </table>	60	SPAN	56	800	AREA	700	70-91	4-C	60-91	50-61	2-C	40-61	7-8	WT	6-7	21-23	LOAD	20-23	
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which will deflect full scale with 20 mA of current applied. How do I determine the internal resistance.

Gerard Augustine, Vero Beach, FL

Gerard also mentioned in his letter that he used a 3-volt battery and a 150 ohm (figure 4) series resistor, so this shouldn't be too difficult with that much information.

Let's first determine the voltage drop across the resistor:

Current x Resistance = Voltage.

.02 x 150 = 3 VDC drop across the resistor.

It's clear at this point that the meter has little or no internal resistance. If the meter had a meaningful internal resistance, we would have a voltage drop across the meter. Since we have a 3-volt

battery, and 3-volts across the resistor, the meter has little or no resistance. It's an un-shunted current meter with a 20 mA movement (full scale deflection). This meter would make a good voltmeter by scaling it with the single series resistor.

To measure 3 VDC, simply use this existing 150 ohm resistor and re-mark the meter face to read 0-3 VDC.

To use it as a 0-5 VDC meter, re-select the resistor:  $5 \div .02 = 250$  ohms.

How about a 9.6 VDC meter for transmitter batteries?  $9.6 \div .02 = 480$  ohms.

It's important to remember that the nicad batteries always read a higher voltage when fully charged. I would scale the meter to 6-volts for receiver packs and 12-volts for transmitter packs. Good

luck.

I would like to thank all the other modelers who sent letters in. Unfortunately, I just haven't the column space to answer them all here, but I do answer all your letters, and everyone who writes will receive an answer by mail. I also would like to thank the guys for their patience. I'm not always able to reply in a timely fashion. At this time I'm all "caught up" and my desk is ready for more! I'm truly amazed at how many modelers enjoy the "Practical Electronics" theme of the column. I'm also equally impressed with the interesting projects I've been hearing about in your letters. Thanks for the continued interest and support.

Until next time; Wheels up, flaps up, I'm on my way.

-Brad Booth

# Current News



by Charlie Spears &  
Dr. John Mountjoy

As a follow-up to last month's column we are pleased to report that John has acquired a TRC Impulse Six Charger from TRC Engineering, Inc. 10972 10th Ave. Grand Rapids, MI 49509, (616)453-8527. John reports the charger does everything quietly (unlike the previous Impulse chargers), efficiently, and reliably. John has been using the charger for a couple of months now and has had no problems. On the many-cell packs, the charger maintains a rather constant amperage input (which is something of a problem with Astro Flight's Super Charger on 28 cell packs). As you know from our previous columns, John has been using Astro Flight's Super Charger along with Tim Ahern's peak detection module and really likes the combination. Now we have two

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chargers that are outstanding. For the active electric flyer the only charger one needs now would be the TRC Impulse Six, as it covers the entire number of cell combinations that one presently can use. The Impulse Six is available from TRC and from Hobby Lobby International.

One of the more unusual models that John has built was the "Chick-A-Dee". This was a scratch built model built from a set of plans that Charlie had acquired from his old flying buddy, Ernie Heyworth of Horseheads, NY. From our understanding this is to be a construction article in another magazine. John reports that the "Chick-A-Dee" was one cute model and easy to build. Unfortunately, on its maiden flight the model encountered our macadam runway at a high velocity and the only part undamaged was the wing. John is sorry that he cannot comment on the flight characteristics as one flight of such a short duration is not enough to form an opinion.

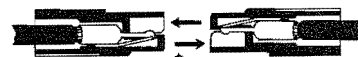
On the way home from the very successful electric meets held in Ann Arbor, MI in July, we stopped to visit Gary and Carole Hutchison in Sidney, OH. This proved to be a very fruitful visit. Carole is the head of Su-Pr-Line Products, that very fine line of push rod systems and antenna tubes, while Gary manufactures the Altec gearbox for 100 watt motors. Gary is working on both a new hinge system that looks very promising, and the Altec gearbox. The improvement to the gearbox is a special drive gear that is both tougher and quieter. Only after thorough testing will anything be released by Gary. As you have read in our previous columns we have

been very impressed with the second generation Altec gearbox. It is quite versatile as it readily adapts to 100 watt can and Cobalt motors, as well as some of the Graupner line. Gary has a very complete machine shop in his basement (and a seven acre flying field in his front yard) as well as a working dynamometer for testing electric motors. The good news is that in talking to Gary we found out that he has a very sophisticated way of measuring the thrust of various props and he has assured us that in the very near future he will be sending us an article that should be quite revealing! Have you ever heard the sound a motor and prop makes when it unloads in the air? We have!

John has just completed the building of an Aerodrome Models Ltd. Fleet Biplane. As was usual with Aerodrome kits, the quality is outstanding. Since the Fleet Biplane was originally designed for an .80 4C engine, John had to do a lot of lightening and some wood substitutions to make it suitable for electric use. From the onset it was decided to use Astro Flight's new FAI Cobalt 40 size geared motor for the power plant. Keith Shaw had advised us earlier that the Aerodrome Fleet Biplane does fly but that it was overweight. For that reason John went through the

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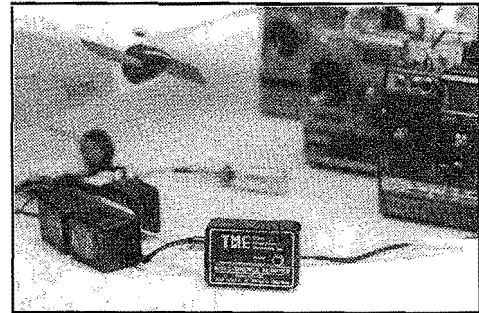
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lightening procedure, plus the use of a more powerful motor, and a total of twenty-one 1500 mah cells. All of the wiring used the new Astro Flight Zero-Loss connectors which we described in an earlier column. The covering was

Coverite's brand new 21st Century Film, for which we would like to thank both Art Kramer and Jeff Troy for the pre-production samples for testing and evaluation.

Joe Pasquito, of 168

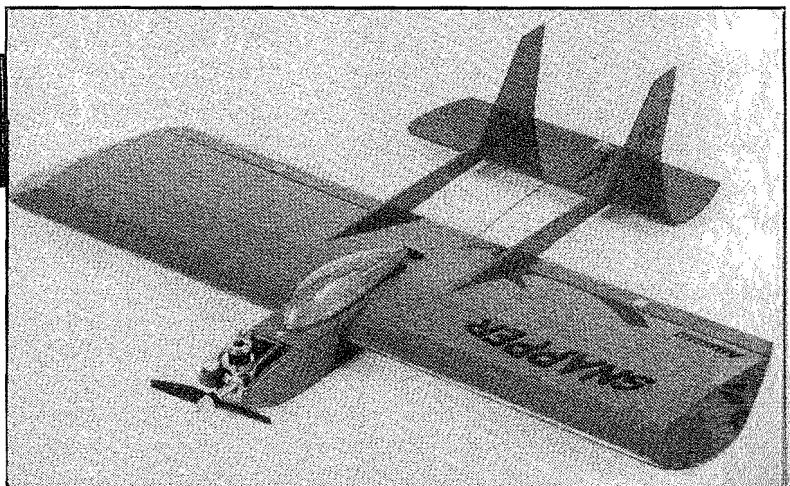
Gainsboro Road, Lawrenceville, NJ 08648, (609)882-9049 has supplied us with some outstanding machined aluminum radial motor mounts in sizes ranging from 020 thru 60. But when it came time for John to insert his new FAI 40 motors into

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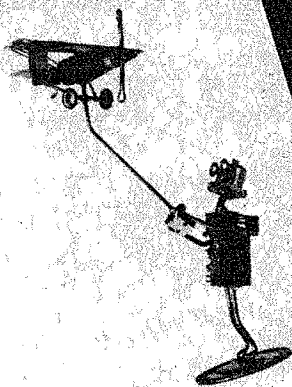
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one of Joe's mounts, it didn't fit. Astro Flight had increased the diameter of the motor slightly over their regular 40 size. A quick call to Joe rectified the situation and within two weeks a new motor mount arrived. We think Joe will add this size to his line-up. We feel all electric flyers should consider using Joe's mounts as they are easily installed and they hold a motor securely. Now Joe has sent us a brand new type of motor mount that he has under development which is intended for beam mounting of a motor. The mount is lightweight and shaped in the form of a V with wings. The motor is secured by means of a hose clamp (as with his radial mounts). On each side of the mount are two mounting lugs (wings) that are designed to attach on to wood or metal beams that are anchored to a firewall. The mount will cradle an 035, either direct or geared, up to and including an Ultra 1600 motor. This new mount looks like a very versatile motor mounting system where one can use beams protruding thru a firewall with the mount resting in between. For cowed airplanes one can then adjust the mount, either fore or aft, for proper cowl clearance. It is also versatile in that one can quickly change motors for flight evaluation.

Mitch Poling's column in the October issue of **MODEL BUILDER** had an interesting article on static thrust measurements of motor and prop combinations. Worth reading!

In the Product News section of the October issue of **MODEL AIRPLANE NEWS** is yet another speed controller. The press release states: "The Electro System Micro Speed Controller weighs approximately 1/3 ounce. You can adjust it to work with most radio systems, and it has proportional

control and a BEC that guards your reserve power. A unique wiring setup enables you to mount this controller anywhere you want. For \$1, Model Tronics offers a catalog with information on three revolutionary electric models. Price \$87.50 (Electro System without connectors). For more information, contact Model Tronics, Inc., 3824 24th Ave. West, Seattle, WA 98199.

We wish manufacturers would send out their press releases on new products for the electric flyer to *all* of the model magazine and to *all* of the electric columnists. We sure hate to read about a new item on electrics in other magazines.

The September issue of "The Ampeer" had an article on "How to Install Noise Suppression Capacitors On Electric Flight Propulsion Motors". A SASE (business size) sent to Charlie will get you a copy.

An interesting newsletter has added our names to its mailing list. This one is called "Peak Charge" and comes from the Silent Electric Flyers of San Diego. Thanks to Roger Jaffe, Secretary, for thinking of us.

Need batteries for power packs? Just a few days before the annual KRC meet Charlie discovered his "All Up-Last Down" airplane was giving signs of poor performance. With three dead cells in the power pack, no wonder. A quick call to Steve Cermak at Cermak Electronic & Model Supply Co., PO Box 2406, Fullerton, CA 92633, (714) 680-5888, solved his problem. A new pack of N-1400 SCR's arrived two days later via UPS Blue Label. Thanks Steve for the very prompt service.

Hey fellow electric flyers. Are

you enjoying your Airtronics Infinity Radio? We have already seen a few of them at some contests we have attended. We are not sure what the problem is, but it has been highly advertised with little follow-up from buyers. We've had one on order directly from Airtronics since the end of February, and have not received delivery as of this writing!!

Please don't forget to order your Hobby Lobby International Catalog #18. The motor statistical chart on Page 42 and the Electric Motor Thrust Chart on Page 43 will be invaluable to the electric flyer. Besides that, one can droll over the many full color photos of their electric airplane kits available. Order yours today... it's Free! Write 5614 Franklin Pike Circle. Brentwood, TN 37027 or call (615) 373-1444.

#### LATE BREAKING NEWS

Following a full week of mid-90's temperatures, Quakertown, PA was descended upon by a cold front right out of Canada the weekend of September 21-22. Normally this would not be an uncommon occurrence except that it coincided with the Keystone Radio Control Club's 12th Annual KRC Electric Fly. Saturday's temperature was cool and windy. Winds averaged 15 to 20 mph, sometimes gusting much higher, and thus preventing a lot of scale and untried models from flying. However, Saturday's events were 20 Loops, Barnstorming, Stand Off Scale and Pilots Choice. P Air Flair's Stickit IV seemed to be the choice for the aerobatic events. Stand Off Scale was again won by Keith Shaw of Ann Arbor, MI, with one of his outstanding models. Second place in scale was won by Carl Small of Stoney Creek, Ontario, Canada, flying a 1/6 scale Morrissey Bravo (watch for this one to be a kit by Easy Built Models).



Carl Small and his excellent Morrissey Bravo



Everett Rubendunst and his cute little rendition of a Curtiss Wright Junior

Third in scale was an unusual Curtiss Wright Junior flown by Everett Rubendunst of Foster, RI. Pilots Choice went to Steve Neu, all the way from California, with his spectacular F3E sailplane, which goes straight up, rolling all the way!

Sunday dawned bright and clear with diminishing winds, much to the relief of the contestants. The events this day were 30 Rolls, Best Old Timer, Pilots Choice, plus KRC's old standby, All Up Last Down. The latter was won by John McCullough from Raleigh, NC,

who handily beat all other contestants with a flight that may have approached an hour (we did not get the exact time). Next month we may try to feature John and his consistent All Up Last Down winner. Both days, Larry Scribner of SR Battery fame, presented well attended seminars on the care and feeding of nicads. Thanks Larry. By the way, watch for his new "Satan Charger".

We will attempt to give our reader's more complete coverage of the 1991 KRC if we receive the information from either John





Steve Neu and his world champion F3E sailplane.



John McCullough talks about winning the All Up Last Down

Hickey or Bob Lane, the CD and Manager respectively.

Some notes we did make that we are sure would be of interest to our readers... to give you some idea of the scope of the KRC Meet, there were 158 entries, from AL, CA, CT, DE, FL, GA, IL, MA, MD, MI, NC, NJ, NY, Ontario, PA, QUEBEC, RI, VA, WI and one

Dave Durnford from Hillingdon, England. At one point we counted over 167 transmitters in the impound area! We quit counting when we reached the 200 number for aircraft and helicopters that were being flown in about an eight acre field. AMA's ten station paddle system for all 50 frequencies was used for control. This did

create some problems for those contestants on the more popular frequencies, as waits for a paddle sometimes ranged from three to four hours.

Some things you can say for the annual KRC is that it is well organized, has nearly 100% participation and support by the Keystone Radio Control Club, its hospitality, and the simple fact that it draws the "Who's Who" of electric flying. If you were not there, you missed a terrific weekend.

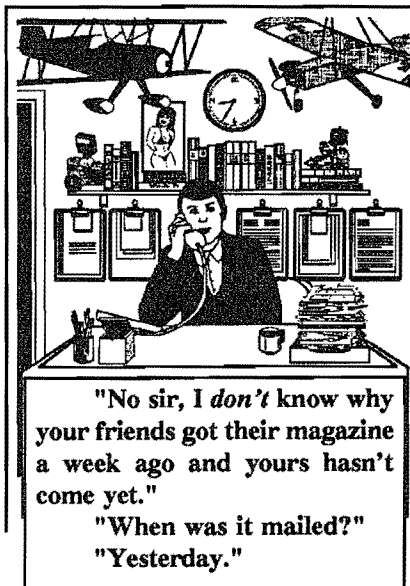
So, until next month, keep the juice flowing.

-Charlie Spear &  
Dr. John Mountjoy

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"When was it mailed?"

"Yesterday."

# From the Kitchen Table

December 1991 97

by Jim Kitchen



Author with Ken Willard designed Headmaster trainers. (1972 Photo)

Ken Willard is one of the pioneers of our hobby. Ken is a proponent of small models, with seaplanes being a special favorite. He has many model designs to his credit, his recent Seamaster designs

being the most popular flying boats ever kitted.

I learned to fly R/C on one of Ken's Headmaster designs. This one was kitted by Top Flite about 20 years ago. It was a 48" span semi-symmetrical wing model designed for .09 to .35 engines and

3-channel control.

I read every one of his Sunday Flier Columns in RCM since I bought my first issue in April 1972.

Ken won a 1/4 scale pilot at the Toledo R/C Exposition in 1982. He was challenged to build a model in which to fly the pilot. He responded by designing and building a model of the Stits Sky Baby biplane. This airplane held the World's Record for the smallest man-carrying airplane to actually fly. The quarter size model had a span of less than two feet (21-1/2" to be exact). The model was very unstable, as the full sized version must have been. It crashed several times during test flights.

In late 1984 George Arden of Sabina, O sent a poem to Ken, as an inspiration not to give up on his Sky Baby project. I liked this poem (although I am not normally a literary person), saved it, and memorized it. I like to recite it to myself when things are not going very well for me. Here is the poem as a tribute to Ken:

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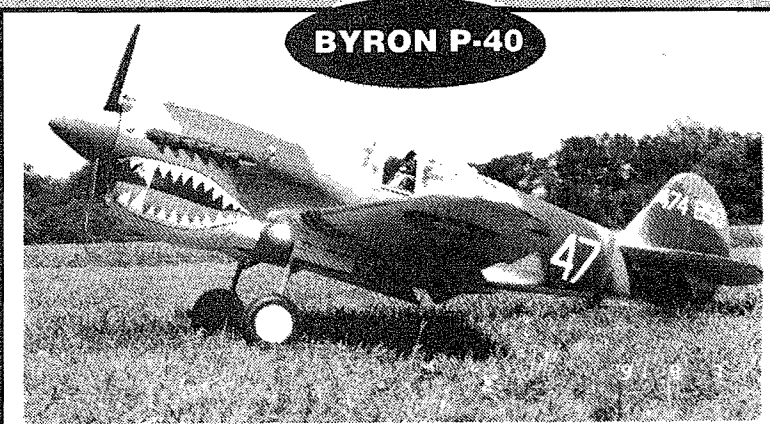
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When the road you're trudging  
seems all uphill,  
When the funds are low and the  
debts are high,  
And you want to smile, but you  
have to sigh,  
When care is pressing you down  
a bit --  
Rest if you must, but don't you  
quit.

Life is queer with its twists and  
turns,  
As every one of us sometimes  
learns,  
And many a failure turns about  
When he might have won had he  
stuck it out.  
Don't give up though the pace  
seems slow --  
You may succeed with another  
blow.

Often the goal is nearer than  
It seems to a faint and faltering

man;  
Often the struggler has given up  
When he might have captured the  
victor's cup;  
And he learned too late when the  
night slipped down,  
How close he was to the golden  
crown.

Success is failure turned inside  
out --  
The silver tint of the clouds of  
doubt,  
And you never can tell how close  
you are,  
It may be near when it seems  
afar,  
So stick to the fight when you're  
hardest hit --  
It's when things seem worst that  
you mustn't quit.

Here are a few items that I use  
as a part of my building and flying  
equipment:

Ni-Starters: I read in another  
magazine that the McDaniel  
Ni-Starter design is now ten years  
old. It was introduced at the 1980  
Toledo Show. It's a fabulous idea  
to combine a nicad battery with a  
locking device for attaching the  
whole unit to a glow plug. This  
makes a self-contained battery unit,  
eliminating the battery wires which  
are always a potential hazard  
around spinning propellers.

I am sometimes slow in  
embracing new ideas. I continued to  
use a 1-1/2 volt dry cell battery  
with wires and a twist lock  
connector to fire my glow plugs  
until I got my first Ni-Starter about  
four years ago. Almost immediately  
I wondered why I hadn't gotten one  
sooner. You can't beat them for  
convenience of use. They may even  
pay for themselves in terms of the  
dry cell starter batteries that are no  
longer needed. My Ni-Starter is the





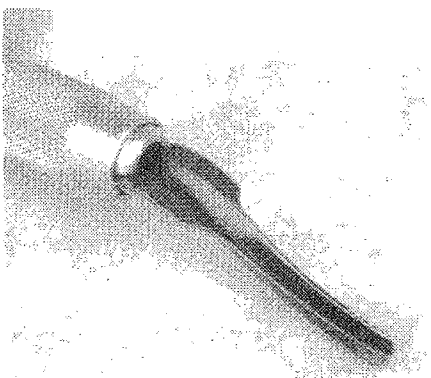
McDaniel Ni-Starter compared to old-fashioned dry cell system.

latest version with a built in dual-faced amp meter which tells me if the glow plug is drawing enough current for an engine start. The meter, plus the engine kick back as you pull the propeller through the compression stroke, lets me know that she is ready for a start. The Ni-Starter comes with a charger to keep the cell full of electrons. We owe Bob McDaniel, of McDaniel R/C Products, a big vote of thanks for making it more convenient to start our engines.

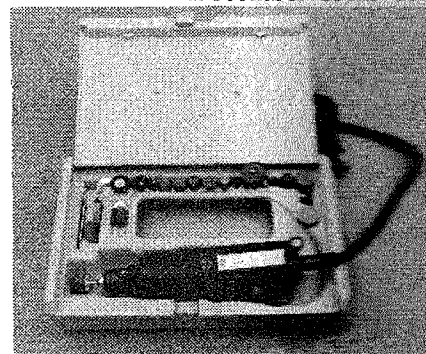
There is just one minor problem with Ni-Starters! Or, let's say the problem rests with the hand that attaches the Ni-Starter to the glow plug and then detaches it from the running engine. It needs to be locked on securely or it can vibrate off once the engine starts running. You need to have a good grip on the Ni-Starter when taking it off the running engine because if it vibrates off, or slips out of your hand, you may have a hole in the wing covering to repair. I speak from experience!

**X-acto Grooving Blade:** A grooving blade in an X-acto knife handle is a specialized, but extremely useful tool. I use mine to groove the slots for strip aileron control rods. The rods usually come with nylon

tubing around them for use as a bearing. They need to move freely. The rods are embedded in pieces of the trailing edge that are glued to the wing at the center section, and they extend past the juncture with the ailerons. The ailerons are also grooved so that the rods will nestle into the aileron leading edge, and are then anchored into the aileron by right angle bends in the rod inserted into holes drilled into the ailerons.

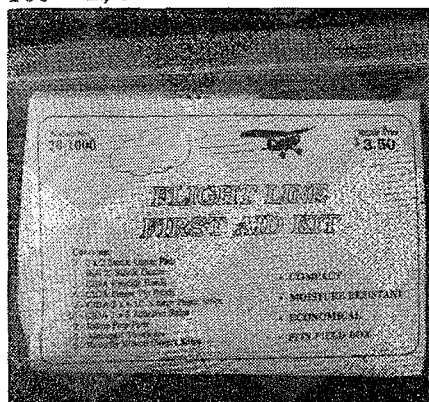


Another use for the grooving blade is connecting wire pushrod ends to wooden pushrods. I use 1/4" square balsa and spruce for pushrods, and anchor the wire ends similar to the way that aileron torque rods are anchored to the aileron. I then wrap the connection with carpet thread and smear epoxy onto the thread to complete the pushrod joint.



**Dremel Moto-Tool Kit:** If you have a few extra dollars to spend on the hobby, and are looking for a useful power tool, the Dremel Moto-Tool is a good one. Mine is about ten years old. It has a variable speed power unit which makes it useful for grinding, cutting, drilling, gouging, cutting, polishing and sanding. I also have a Dremel Drill Press stand. The moto-tool mounts on this stand, and can be used as a drill press to drill vertical holes. I use it to drill holes in engine mounts. I then use sheet metal screws for mounting engines in nylon mounts, or tap the holes in metal mounts. The cut-off wheel accessory makes short work of cutting piano wire landing gear and trimming off excess tail lengths from nylon control horn installations. The sanding drums are useful for shaping openings in cowls for the prop shaft opening and cutouts for engine openings. The sanding drums and gouging tools are useful for hollowing out balsa nose blocks, cowls, and any other hollowing that may be necessary.

The Flight Line First Aid Kit is a valuable addition to any flight box. No one expects to get injured at the field, but we all know that accidents can happen. This kit fits easily into any field box and contains enough first aid supplies to handle minor field injuries. These items are packed in a moisture resistant pouch to keep them fresh and ready to use when they are



emergency happens. It's available from Hobby Craft Instruments, 9279 Cody, Overland Park, KS 66214 at a cost of \$3.50. Hobby Craft also offers surgical grade instruments such as scalpel handles, blades, scissors, and forceps. I have a straight forcep in my field box, and regularly use straight and curved forceps as building tools. These forceps are stainless steel. They are reasonably priced, varying from about \$2.50 to \$5.00,

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depending on the kind and size of the forcep.

Let's end up with a good news/bad news joke.

"I've got good news and bad

news." said the galley master to his slaves. "The good news is a double ration of grog for everybody; the bad news is that the Captain wants to water ski today!" -Jim Kitchen

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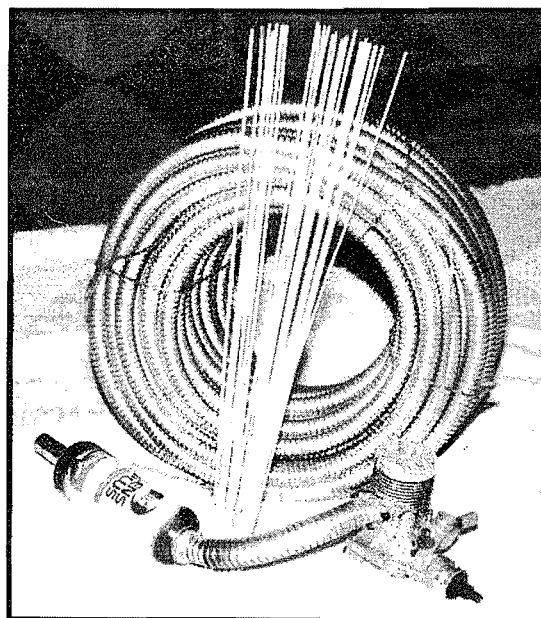
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**"Merry Christmas".**

May God bless you and your family at this joyous time of year, and I hope that you prosper in the year and years to come.

If my count is correct, this is my 33rd column for the magazine. I have done 10 product review articles, six of which were sailplanes, and the other four were power ships. I have, by and large, enjoyed doing these things. Only one thing would make it better, and that would be if more of you would write and let me know what it is that you would like to see in the column. A few people out there have been kind enough to put me on their newsletter mailing list or correspond with me directly. To those of you who have helped me out in the past, I say **THANK YOU**. To the rest of you, I say "please write". The column can be a great tool for sharing with others



This is my first attempt at writing my column with a new word processor. This one is much more compatible with the one in use at RCR headquarters, and if all goes well, it will save Gordon and crew a lot of work in the future. If you ever want to make some points with your boss, just save him a bunch of work, and then let him take credit for the idea. In this case, Gordon *did* come up with the original idea, and I am sort of being the Guinea pig. I guess that I, like most of us, tend to like to maintain the status-quo and not change the things that we're comfortable with. I have been using my old word processor for about five years now, and was really pretty happy with it.

The filing system was really "fool" proof, which in my case was almost a necessity.

Some of the columns that you have been reading lately may seem out of date or out of order in relation to one another. This is mostly my fault. I have had dated material in some columns that I asked Gordon to publish in certain issues, and that usually sets something back for awhile. This has been the case four times now, so some of my columns have actually been set back four times. I am usually at least two, and possibly three columns ahead. That way I'm never late with column material. (Editor's Note: This is true, and **MUCHO** appreciated, too.)

The down side to all of this is that it gets confusing, and I'm never quite sure what will come out in the next issue. Gordon informs me that he has columns on file for Sept., Oct., and Nov., so this must be my December column, which I'm writing on June 21, 1991! I've never done this before, at least not since I've been writing this column, so let me do it right now.

I want to wish each and every one of you a very

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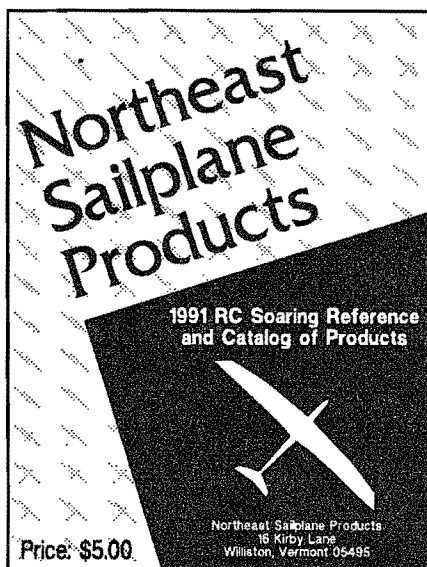
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what you know, or it can be a place to appeal for advice from an expert. Your input can certainly make my job much easier if I know what it is that you're interested in.

I am going to get the Airtronics "LEGEND" done this winter for sure. I was anxious to get one to do a review on for those of you who are tired of seeing only beginner sailplanes reviewed in these pages. I must apologize to Airtronics for the delay. I took on way too many things this past summer, and some of them plainly didn't get done. I have made myself a promise not to let that happen again, but then, I never seem to learn from my own mistakes, so who knows what next summer will bring.

Maybe someone of you out there can help locate an item one of our readers would like to find. It is a sportsman winch which was

manufactured some years ago under the name "FLO-TECH". It used a Bosch starter motor. I'm told that the originals were painted silver (the frame) and the motor was yellow.

It was small enough to be carried in one hand, and we believe that it was originally manufactured in Connecticut. One of our readers would like to manufacture a similar winch for sale to the soaring public, and wants to beg, borrow, or steal one to use as reference material.

If any one of you has, or knows of the whereabouts of one of these winches, please contact Fran LeClerc at 1127 Bond St., Green Bay, Wisconsin 54303, or phone him at (414) 499-6624. Your assistance would be greatly appreciated.

I have another request from a reader to help locate a kit. This kit was produced some years ago by

Bob Martin. It had a "Duralene" fuselage, a high aspect ratio, polyhedral wing, and was called "Sundancer II". If any among you out there know of the whereabouts of one of these kits, or have one that you would be willing to part with, get in touch with Jon McVey, 5 Hillcrest Hts., Mt. Vernon Iowa 53214, or call Jon at (319) 895-6527.

In my work on both the Chuperosa H/L design, and on the recently introduced Alcyon Open Class ship, I created a neat way to hold wings onto the fuselage that I want to share with the sailplane enthusiasts out there. This will work with almost any wing that splits down the middle and uses a wing rod. I've adapted the system to my latest project, which is a highly modified SIG RISER 100. Build the wing according to plans as instructed, because this system

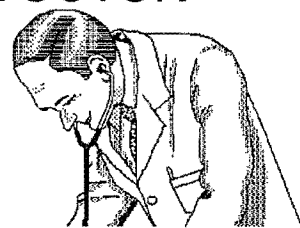
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can virtually be added later, to any "split at the middle" wing.

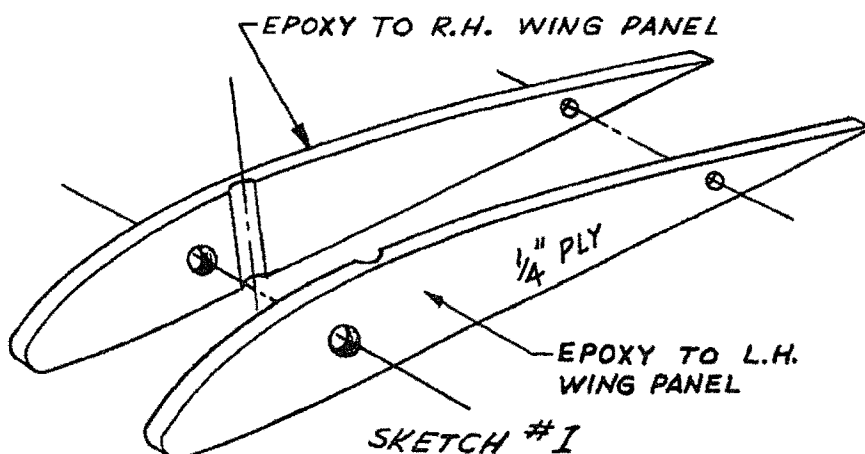
The first step is to cut two 1/4" thick plywood ribs that exactly match the shape of the root ribs on your wing, including the hole for the wing rod, and alignment pins if there are any. Keep the holes for the wing rod, and alignment pins very close to the size of the rods. Ideally you want minimum clearance around the rods. Use good quality 1/4" ply with as many plies as possible. Don't substitute the cheap lumberyard variety that has only 3 plies. Clamp these two ribs together, side by side, using the wing rod hole for alignment.

What we do next is to drill a clearance hole for the wing hold down bolt right on the centerline of the two ribs. I use 1/4" nylon wing bolts so I drill a 17/64" hole. Locate the hole slightly ahead of, or behind the wing rod hole. What you will end up with if you did this correctly are two ribs, each with a

half a hole for the wing hold down bolt.

Epoxy the new rib to your root rib, once again using the rod for alignment. Do NOT epoxy the rod in place. Use some oil, or

of your wing bolt and root rib shape. Mine are made of 1/16" sheet steel. The distance between the two legs should be 1/2". These two small legs keep the wing halves from sliding outward along the

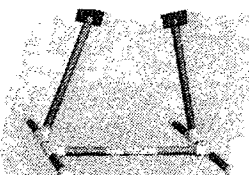


Vaseline to prevent this from happening. The half hole for the wing bolt should face the opposite wing root.

Make up a small metal clamp like is shown in the sketches. The size will be determined by the size

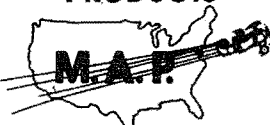
wing rod so you'll need a small recess in the original wing root rib for them. If you want positive wing alignment to the fuselage add some wood blocks to the bottom side of the wing that fit down into the fuselage in the rear. This will keep

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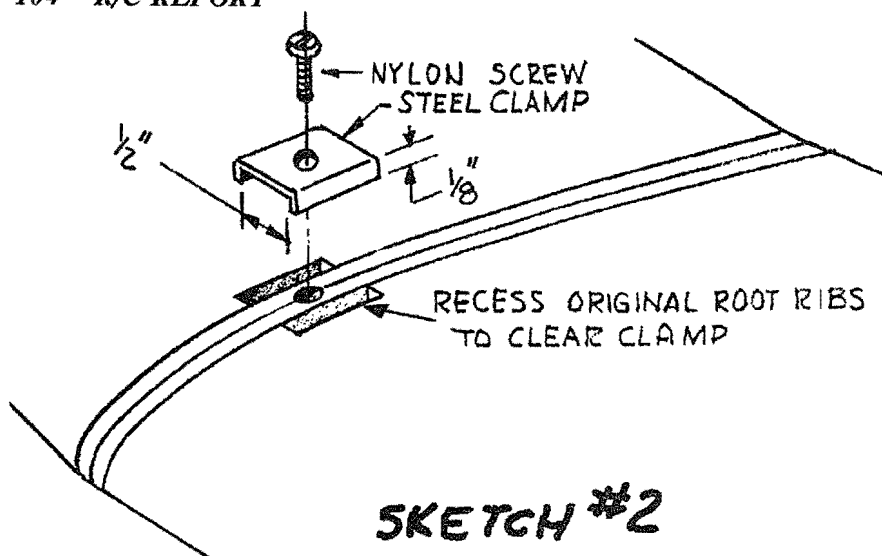
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the wing from pivoting around.

Better yet, a second half hole and a smaller nylon bolt located toward the trailing edge will give you positive alignment, and increased hold down power. The sketches are quite self explanatory so study them closely before you begin. I have found this to be an

easy to make, strong, alternative to rubber bands and other wing attachment methods.

Give it a try, I think you'll like it!!

I have been lucky enough to be placed on the newsletter mailing list of another very fine club, namely the CENTRAL ARIZONA SOARING LEAGUE. The name of their newsletter is "WING TIPS". I'm going to steal this tidbit from my latest issue and pass it along to you newer flyers out there. It was written by Bill Roseberry. *Adjusting and Flying the Basic Sailplane, For The Novice And Intermediate Skill Level.*

We try to fly the sailplane with the natural skill of the soaring Albatross. Sometimes in our feeble efforts, our flying more resembles the antics of the barnyard chicken trying to fly. Before you change sailplanes, or go to flaps and ailerons to gain further skill, try extracting the maximum performance from what you currently fly. Remember, *The Spirit*, and the *Gentle Lady* were on the winners list at last year's nationals.

The Following is offered as a guide only;

#### AT HOME:

A. Static check the CG against the

plans, bearing in mind that this will probably not end up being the final flying CG.

B. Establish a 2 to 4 degree positive incidence in the wing.

C. (Columnist Note) Be sure all controls move in the proper direction.

#### AT THE FIELD:

A. Partner hand launches ship from shoulder height. Adjust C.G. and clevises until flight path is straight and level with all controls and trim levers in neutral position.

B. Now H/L as before and add down trim, (one click at a time) until the greatest flight distance is obtained. Mark this trim setting on Tx. This is our "Search" setting.

C. With trim back to neutral setting, H/L and add up trim until the ship begins to stall. Mark this position on the Tx. This is the "Thermal" trim.

D. Six clicks of trim will usually cover the whole range of operations from "Search" to "Thermal".

E. Practice flying, using the two trim locations.

F. Wind, and turbulence may cause you to make some minor changes to the C.G. or trim settings, but this exercise will get you into the ballpark.

Remember that each airfoil has a speed range in which it performs best. Do not attempt to compare a *Gentle Lady* with a *Falcon 880*. Apples and oranges both come from a tree, but the similarity ends there.

I'll end the column for this month with this wisdom:

"There are two lasting gifts you can give your kids, one is roots, the other is wings".

-LeRoy Satterlee

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CL or UC . . . . . Control Line  
cond. . . . . condition  
DF . . . . . Ducted Fan  
eng. . . . . engine  
exc. . . . . excellent  
FI . . . . . Front Intake  
H or heli . . . . . helicopter  
ign. . . . . ignition  
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RC . . . . . need you ask?  
RE . . . . . rear exhaust  
RI . . . . . rear intake  
RTF . . . . . Ready To Fly  
Rx . . . . . receiver  
SE . . . . . side exhaust  
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w/ or w/o . . . . with or without

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**WANTED:** St. Croix Long EZ Kit. State price and cond. Also plans for a Long EZ or Vari EZ style aircraft. Don Bender, PO Box 317, California, MD

20619, (301)475-8468.

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FOR SALE: Quitting Power - All NIB, Sig 1/3 scale Spacewalker kit, \$190. Zenoah G-38 w/J-TEC Double Snuf muffler, \$210. World Engines Robinhood-80, \$50. Zenoah G-23 w/J-TEC Snuf muffler, \$145. Great Planes Big Stick-60, \$50. Doug Lawrence, 915 E. Palmyra, Orange, CA 92666, (714)771-4242.

FOR SALE: Byron P47 Thunderbolt, glassed & painted w/retracts and doors, ready for eng. and radio, \$1700 & shipping. Joseph J. Kuntz, 7927 Amberly Cir. NW, North Canton, OH 44720, (216)497-9877.

WANTED: Grand Esprite w/fiberglass fuse and a Viking MKII wing kit. Joseph C. Hayes, 705 W. Washington #2, South Bend, IN 46601.

FOR SALE: Parts cut and sanded for Col. Art Johnson's P-38L with 94" wing span, parts only, \$150. New 1/4 scale Cap 21 World Product kit, fiberglass fuselage, foam wings sheeted w/damaged right wing, \$300. David S. Byrd, 2204 Knob Creek Rd., Johnson City, TN 37604, (615)282-0673.

FOR SALE: Yellow Aircraft A-4 Skyhawk, professionally built and test flown, Rhom-Air retracts, OPS 80 Dynamax, all for \$995. \$695 w/o eng. & fan. P. Caulley, 43191 Mirabile Tr., Mt. Clemens, MI 48044, (313)468-2037.

FOR SALE: Eight Ace Bantam Servos, Dean connectors, mounting trays, \$11 ea., Ralph Levine, 300 N. Rampart St., Space 36, Orange, CA 92668, (714)-634-9136.

FOR SALE: 1/5 scale PT-19 w/Saito 120 4C eng., includes on-board switch n'glow, kwik-fill fuel system, four Futaba servos on flaps, ailerons and throttle, eng. only run on test stand, plane never flown, immaculate, \$650. Allen Taylor, 1148 Maple Drive, Griffin, GA 30223, (404)227-4455.

WANTED: Plans for a Gee Bee "E". I have one with a 74" wing span and would like the plans. Write to Thomas

W. Avery, P.O. Box F, Tyrone, NM 88065.

FOR SALE: Ikon N'Wst Monocoupe, 96" span, w/Quadra 35 on glow, 4Ch Futaba (not Gold Stickered), six servos, Ch. #38, \$475. Modeltech Cap 21, 72" span partially covered w/all hardware, rigging, etc. \$250. Bridi Big Bee, ready for eng. and radio, flys great, \$350. Ultra Hots, framed up and ready to cover, \$250. Zimpro Marketing Extra 230 (pre-built), NIB, \$225. O.S. 160 Twin, NIB, \$500. Saito 270, NIB, \$500. David B. Smith, P.O. Box 2402, Aiken, SC 29802, (803)564-3260 evenings.

FOR SALE: NIB Futaba 7UAPS on Ch. 16, \$350. Allan Wehman, 111 Honeysuckle Lane, Summerville, SC 29485, (803)873-5534.

FOR SALE: NIB, American 70 4.2 cu.in. eng. w/smoke muffler, \$300. NIB, ST 3000, \$200. Q50S w/muffler, 1/2 hr. bench run time, \$200. G38 used, good cond., w/mount and muffler, \$125. Q35 used w/muffler, \$85. Prices include UPS. Harry Schremp, 5612 Williams Rd., Norcross, GA 30093, (404)587-0535 ext. 229 (days), (404)-923-5912 (PM).

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**FOR SALE:** NIB Dick Hansen Hippo Tippo, unopened, \$275. Bill Tucker, P.O. Box 167, Zillah, WA 98953, (509)829-5027.

**FOR SALE:** Goldberg Super Chipmunk w/OS .90 FSR, w/flaps, \$300. Goldberg Ultimate w/OS .90 FSR, Futaba 4 Ch Conquest FM, \$500. OS FT 2.40 4C twin, McDaniel glowdriver, exc. cond., \$650. **WANTED:** any big biplanes,

warbirds, monoplanes, w/ignition engines. Jack Uhl, 419 Portland Place, Bloomington, MN 55420, (612)888-6853.

**FOR SALE:** RTF, Smith Special Fun Fly Plane, \$175. New H.P. 40 Gold Cup, \$125. Used H.P. 40 Gold Cup, \$75. New Airtronics 7 Ch (VG7P), Ch 26, \$200. Jerry L. Smith, 3970 Contest Rd., Paducah, KY 42001, (502)554-7413.

**FOR SALE:** X-Cell 60 Custom, OS Max .61, pipe, JR gyro, PCM heli radio, trimmed, like new, w/extras, \$1,200. House of Balsa F-86, Kress & K&B 7.5, RTF, \$450. Ron Crow, P.O. Box 7608, Corpus Christy, TX 78467-7667, (512)882-9200.

**FOR SALE OR TRADE:** 1/4 Scale Starduster Bipe, built by Scale Master Joe Naber. Mint cond., \$250 & shipping. Would trade for good 1/4 scale high wing. Sarge Johnson, 411 Talbot

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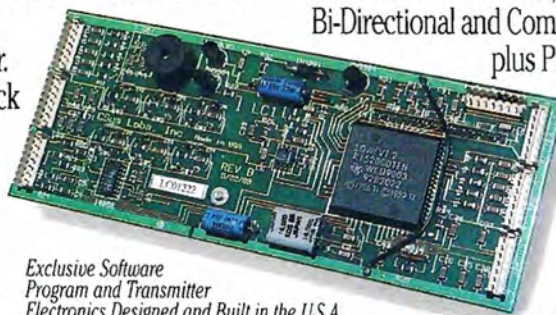
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