

# RC REPORT

ONLINE!!!

ISSUE 279

OCT 2009

**HALLOWEEN TIME, SO LETS SCARE  
UP SOME FUN!**

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**CONVERSION ANYONE?**



**FUTABA'S MONSTER  
S9157 DIGITAL!**

# RC REPORT ONLINE

October 2009



## COLUMNS

<b>From the Editor</b> <i>by Gordon Banks</i> .....	3
<b>The BIG Picture</b> <i>by Dick Pettit</i> .....	9
<b>The Webb Scale</b> <i>by Gary Webb</i> .....	20
<b>Two Old Scale Guys</b> <i>by Bill Hurt &amp; Dick Watz</i> ....	28
<b>Here's How...</b> <i>by Walt Wilson</i> .....	33
<b>Radio Ramblings</b> <i>by Tony Stillman</i> .....	35
<b>The Oily Hand</b> <i>by Brian Winch</i> .....	41
<b>Bird On A Wire</b> <i>by Terry Dunn</i> .....	47
<b>Sparky's Revolt</b> <i>by Tony Coberly</i> .....	52
<b>Fun Aerobatics</b> <i>by Ed Moorman</i> .....	56

## FEATURES

<b>AMA Hall of Fame</b> .....	18
<b>Classifieds</b> .....	73
<b>Event Flyers</b> .....	74

## PRODUCT TEST REPORTS

<b>Great Planes P-40 Warhawk ARF</b> .....	62
<b>E-Batt Lithium Starter Battery</b> .....	69
<b>Futaba's S9157 Servo</b> .....	71

# lines from the editor



## READER CONTRIBUTIONS

Once upon a time, long, long ago, an old flyin' buddy sent me the following. It's an amusing parody of a subject we've gnawed on before, and with our new socialist administration falling on its face almost daily now, while still carving away at the individual rights of citizens, it's a good opportunity to laugh at ourselves for not being more on guard when others (and especially when those "others" represent our federal government) want us to accept and embrace certain viewpoints, without really giving us the whole story. As we all know, not everything is what it appears to be. Just look at what happened to Dow Corning Corp. When the truth was finally told, it was too late for them. So while the following appears to be nothing more than humor, it's also food for thought.

## BEWARE OF BAKED BREAD

*According to a recent newspaper, the smell of baked bread may be a health hazard, and the article went on to describe the dangers. The main danger appears to be that the organic components of this aroma may break down ozone! I was horrified! When are we going to do something about this bread-induced global warming problem? Instead of continuing to attack tobacco companies, when is the government going to go after "Big Bread"? Well, I've done a little research, and what I've discovered should make anyone think twice!*

- 1. More than 98% of all convicted felons are bread eaters!*
- 2. Almost HALF of all children who grow up in bread-consuming households score below average on school tests!*
- 3. In the 18th century, when virtually all bread was baked in the home, the average life expectancy was less than 50 years of age, infant mortality rates were unacceptably high, many women died in childbirth, and diseases such as typhoid, yellow fever, and influenza ravaged whole nations!*

4. *More than 90% of all violent crimes in this and many other nations, are committed by persons who ate bread within the previous 24 hours!*

5. *Bread is made from a substance called "dough", and lab tests have proven that as little as one pound of dough can be used to suffocate a rat. The average American eats more bread than that in one month!*

6. *Primitive tribal societies that do not eat bread exhibit lower rates of Alzheimer's, cancer, Parkinson's disease, and other ailments.*

7. *Bread has been proven to be addictive. Test subjects deprived of bread and given only water, have been observed to beg for bread after only two days deprivation!*

8. *Bread is often a "gateway" food item, leading users to consume even harder item such as butter, jelly, peanut butter, and in some cases, even the meat of animals!*

9. *Bread has been proven to absorb water. Since the human body is more than 90% water, it follows that eating bread could lead to your body being taken over by this absorptive food product, turning you into a soggy, gooey, bread pudding person.*

10. *Newborn babies have been known to choke on bread.*

11. *Bread is baked at temperatures as high as 400° Fahrenheit, a temperature that can kill an adult in less than one minute!*

12. *Many American bread eaters have been found to be totally unable to distinguish between significant scientific fact and meaningless statistical babbling.*

*In light of these frightening statistics, we propose the following bread restrictions:*

1. *No sale of bread to minors.*

2. *No advertising of bread within 1000' of a school, park, or playground.*

3. *A 300% federal tax on all bread to pay for all the social ills we can associate with bread.*

4. *No animal or human images, nor any primary colors which may appeal to children, may be used to promote bread usage.*

5. *The Lord's Prayer should be modified to*

*read, "Give us this day, our daily `nutrition' "...*

6. *Impose a \$4.2 bazillion fine on the biggest bread manufacturers.*

Well, there you go. Personally, I'm shocked! After all, this is no loafing matter!

---

At about the same time I received the above, Bruce Smith, of Overland Park, KS, sent this:

#### ANATOMY OF A MODELER

Who are we, and why are we here? I know this may sound ominous and deeply philosophical, but bear with me, and together we will plumb the depths of our modeler consciousness.

We are the tireless hoards of airplane-brained zombies, craving the sustenance that for many of us is rooted in our long-time fascination with airplanes. We are addicts. We find ways to manipulate, manufacture, dream, and conjure whatever we need to continue blindly and blissfully down our path in pursuit of our fancy. When we spend, we spend with passion. We just have to have that new kit, engine, or whatever. For many of us, before we find the time to devote to developing that new collection of expensive hardware, we often lose our love for it and begin to covet another. How many of us have sold off one illusion (at 40% to 60% of the original value) to fund a new one? Judging from what I see at model swap meets, and ads seen in newspapers, magazines, and on the internet, I'd say most of us have fallen prey to, and continue to perpetuate, this particular practice. I've come to learn that airplane "kits" are not "airplanes", and that is where the fantasy lies.

Try these thoughts on for size and see how they fit you. Many times you're less than honest or fully informative with your spouse or parents regarding where the money came from to get "that new thing you have there." You've felt that you had to sneak a new kit into the work shop, or bring a new airplane into the house one piece at a time, perhaps over a period of weeks, so as to avoid detection by the local "radar." You feel an uncontrollable desire to spend, acquire, collect, build, fly, and daydream about model air-

planes. Occasionally you experience feelings of guilt regarding your hobby, and even acknowledge your insatiable appetite for airplanes as your “mistress.” At times, you find yourself feeling a little ashamed about the amount of time you devote to your hobby, often superseding family time, or conversely, feel angry about the time you don’t get to spend with your airplanes. When you awake to bad weather on your “flying day,” you become depressed and agitated. You have jealous resentment toward those who have more time and money to spend on the hobby, or of those who have more support from their families for spending time on their airplanes. You envy bachelors. Nearly every day, you dream of making your hobby your living. Do any of these thoughts sound familiar?

I know I’m not the “Lone Ranger” of model airplane obsession here. Many magazine articles with humorous intent have hit too close to the bone to feel funny to me, yet our laughter corroborates the fact that not everyone exists in model airplane nirvana. I’ll bet that for nearly all of us, there is never enough time, money, or freedom to match the scope and breadth of our obsession. Now, as much as it might be a valuable endeavor, I’m not suggesting that we become involved in some sort of model airplane twelve-step program, even though our families and friends may wish it. But if we take a deeper look into ourselves, we might gain a greater understanding of why we are “just plane crazy.” And that will have to do for now. Perhaps if we take that long walk down memory lane, we’ll jar loose some semblance of ourselves in a younger, more innocent, and carefree time, enjoying that which we love so dearly, our models. And since I have the floor right now, I’ll begin.

My first glimpse of model planes was by far the finest gift my father ever gave me. When I was very young, he’d work on those beautiful Guillows kits; stick-and-tissue WWI biplanes, Fokkers, Sopwiths, and Nieuports. I absorbed the level of his craft. Each morning I’d wake up and run immediately to his building board to see his progress from the night before. Some

weekends, we’d take an afternoon trip to the model airport. Back then the flying field was lost in the middle of a huge corn field. I memorized the pure, azure blue sky, the air filled with the smell of castor oil, and the sounds of model airplane engines. The site offered enough space for many disciplines of aircraft modeling. There were Control Line circles that were nearly always in use with stunt airplanes. Free-flight aircraft were launched with confidence that only several square miles of open space can offer. And finally, there were the R/C airplanes.

As a kid, I was never any good at hanging onto a buck, and spending my allowance and pop-bottle money on rubber-powered kits was a favorite pastime. I honed my building skills in those days by building prolifically, and by the time I was 15, I built my first R/C airplane, paid for with my own money. My dream of flying R/C was becoming a reality. My obligations were nil, I didn’t have much passion for school work, and my leisure time was my own.

My first airplane was an early sailplane kit called a Monterey. I even assembled my own Heathkit radio system, and I joined the local flying club. I could write volumes just about that experience. In hindsight, that club experience had me rubbing elbows with some of our hobby’s most gifted craftsmen, engineers, and designers.

After flying gliders for five years or so, I made a great tactical error, but one that revealed how much model airplanes had become part of my life. I quit modeling for the next 18 years. During that period, each and every year, like some bizarre homecoming ritual, I would walk into the local hobby store, chat with the owner a while, and buy a magazine or two before leaving. I’d always vow, “I’m gonna get back into this soon.” But “soon” took a while in coming.

During my modeling hibernation, I continued to broaden my knowledge and skills in other areas, to include photography, metal sculpture, and woodworking, which I realized years later were nothing more than extensions of my modeling passion. My love and interest in aircraft

remained intact, proven one day on my annual trip to the hobby shop when I actually did buy an airplane kit, and this time one with an engine!

Well, that fateful day opened the flood gates of my airplane consciousness, and my life has taken a profound turn since. At first I thought my enthusiasm was just an effect of having suppressed my airplane feelings for 18 years. Now, after nearly a decade of being back, I find that my appetite hasn't tapered one bit. In fact, it has increased. I just can't seem to be calm about building, flying, and dreaming about model airplanes. I've built, flown, crashed, sold, and experienced every emotion imaginable. For some reason, which I've come to understand as "that's just the way we modelers are," I tend to wander away from the building plans. With each new project, I find myself wondering how I can experiment and push my skills and experience a little further. And sometimes I wonder if I'm trying to make up for those lost 18 years, or wonder where I'd be if I hadn't stopped back then. These are questions for which I have no answers.

Where I am today regarding my hobby began by looking over my dad's shoulder. What about you? What thoughts and memories came streaming through your mind while reading the above? We're addicts, plain and simple. We are compelled to beg, borrow, or steal a moment in time, to reconnect with our passion and our love of airplanes, and do it so effortlessly it makes us wonder why we tolerate pursuing any endeavor that takes more energy to manifest.

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The following came from a long-time reader of "*R/C REPORT*", Darwin Evelsizer.

#### SAGA OF THE B-52 STRATOFORTRESS

I was recently reading an article on the Boeing B-52 that said it was projected to still be an operational part of the USAF through the year 2044. That provoked some thought, and the following hypothetical situation.

1908: A male child is born and given the name John.

1930: John graduates from college, is commissioned as a 2nd Lieutenant in the U.S. Army Signal Corps, and assigned to operate the new fangled machine called an aeroplane.

1933: John Jr. is born.

1933:1955 John Sr. survives World War II and the Korean War, and rises to the rank of full Colonel.

1955: John Sr. is chosen for command of a new B:52 Bomber Wing.

John Jr. graduates from college, is commissioned as a 2nd Lieutenant in the USAF, completes Undergraduate Pilot Training (UPT), and is assigned to a B-52 training squadron.

John Sr. and John Jr. make their first flight in a B-52. During an informal ceremony on the flight line, Wing Commander John Sr. comments, "This is a great day. I'm 47 years old now, and my son and I will both make our first flight in the new B-52 today."

John III is born later that year.

1977: John III graduates from college, is commissioned as a 2nd Lieutenant in the USAF, completes UPT, and is assigned to a B-52 training squadron.

During an informal ceremony on the flight line, now retired John Sr. comments, "This is a great day. Im 69 years old and my grandson will make his first flight in a B-52 today, 22 years after his father and I made our first flight in a B-52."

John IV is born that year.

1999: John IV graduates from college, is commissioned as a 2nd Lieutenant in the USAF, completes UPT, and is assigned to a B-52 training squadron.

During an informal ceremony on the flight line, John Sr. comments, "This is a great day. I'm now 91 years old and my great grandson will make his first flight in a B-52 today, 44 years after his grandfather and I made our first flight in a B-52."

Assuming that the plane so many of us affectionately call "BUFF" does make it to the year 2044, the last installment of this saga could read...

2043: John VI graduates from college, is commissioned as a 2nd Lieutenant in the USAF, completes UPT, and is assigned to a B-52 training squadron.

During an informal ceremony on the flight line, John VI comments, "This is a great day. I am 22 years old and today I will make my first flight in a B-52, 89 years after my great, great, great grandfather made his first flight in a B-52!" Unlikely, perhaps, but totally possible.

### SIGNS FOR STUPID PEOPLE

Wouldn't it be great if stupid people would wear signs that say, "I'm Stupid"? That way we wouldn't ask them questions, we wouldn't rely on them, and we could better avoid them altogether. It would be like, "Excuse me sir, but could you tell me... Oops! Sorry. I didn't see your sign. Never mind."

One Saturday morning not long ago, I was loading up my truck with three airplanes, my flight box, two transmitter cases, etc., when my new neighbor, David, wanders over and asks, "What's up? Going flying?" "Oh no", I replied. "I just like to load up the van about once a week to see if it all still fits. Oh and by the way, here's your sign."

A couple of weeks ago I drove up and parked at the flying site. Some guy I never saw before walked over, looked into the van, and asked, "Wow! Is that your airplane?" "Heavens no", I answered. "I just found it beside the road a few miles back. Now here, wear this sign."

I was once watching a couple of guys starting the engine on a ragged looking trainer. One says to the other, "There's only two screws holding your engine on, and both of them are loose. Do you think they'll hold?" "Well", says the other, "There's only one way to find out. But here, hold my sign. I don't wanna lose it."

The last time I re-kitted a model, I was carrying the fuel-soaked remains back to the pits when someone walked up and asked, "Gee, what happened? Did you crash?" I didn't say anything... not a word. See, he was already wearing his sign.

Once time when I was trying to sell a complete, ready to fly model, a guy at the field asked to see it fly. I took it up, wrung it out for a few minutes, and then made a nice landing, allowing the model to roll to a stop right at our feet. He reaches down and grabs the muffler, but then let go real fast. "Wow, that's hot!", he exclaimed.

See what I mean? If he'd been wearing his sign I could have warned him.

Jon had just started his engine, and was removing the glow plug battery when it slipped from his hand. Unthinking, he grabbed for it and stuck his hand right into the prop. I was about to hand him his sign, the only one I had left that day, but I had to give it to Gary instead when he walked over, saw all the blood, and asked, "What happened, Jon, did you cut yourself?"

I once asked Wayne to help me carry my airplane and flight box from my van to the pits. When I opened the door he saw a brand new kit on the floor, with the hobby shop sales receipt still taped to the box. "Say, is that a new kit?", he asked. "Nah", I replied. "That's been in here for years. But here's a brand new sign for you."

Allan had used some Zap to fix something on his airplane, but when he was done, he couldn't find the top to the bottle. He set the bottle on the ground next to his flight box, and asked his helper to be careful that he didn't step on it or knock it over.

"Don't worry", said his friend, bending over and scooping up the bottle. "I'll just drop it in my pocket along with my extra sign."

Spectators at the field have their share of stupid people, too. One guy drives up, sees people flying, and sees model airplanes all over the place, but still walks over and asks, "Is this where people fly model airplanes?"

"Yes, it is", I said. "But you can't come in without your sign."

Another gentleman walked over just as Tony made a screaming low pass right down the runway. "Wow!", the gentleman exclaimed. "Was that a model airplane?"

"No", I said. "That was a really hungry hawk chasing a smaller bird. But here, have a sign."

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**COMING SOON!**

Don S P-47    WWI Cockpits    AMR Waco

"R/C REPORT" used to get phone calls from a few pretty stupid people, too. A guy called one day asking if the January issue had already been mailed.

"Yes, it was mailed two days ago", I replied.

"Well, I have a classified ad in that issue. Is it too late to change my phone number?"

"Yes sir, I'm afraid it is, but if you'll give me your address, I'll send you your sign."

Another caller asked if we could use a very pretty but black and white photo on our cover. When I said no, he asked if we could convert his photo into color and then use it. I sent him a nice, four-color sign.

I was having trouble getting a balky engine started one day. I tried flipping the prop by hand, and I tried using my electric starter. No matter what I did, I couldn't get so much as a pop from it. When Wayne came over and asked, "Got a problem?", I was about to hand him a sign until he added, "Have you tried starting it with the fuel line actually connected?" I looked down at the dangling fuel line, and then turned to face him. "Oops, I'm sorry", said Wayne. "Until you turned, I didn't see your sign."

I've just learned that a magazine I once enjoyed, "Computer Shopper", has gone out of business. Instead of offering refunds to their subscribers, they gave or sold their subscriptions list to "Inc." magazine. When my first copy of the latter arrived, I called to cancel and ask for a refund. The cancellation process was easy, but since I hadn't paid them for a subscription, they said, I was not entitled to a refund.

I've *never* received a refund when a magazine went out of business, and I'm wondering if anyone else has. Was "R/C REPORT" the only magazine to give refunds?

-Gordon Banks

[glbanks@knology.net](mailto:glbanks@knology.net)

**Two modelers (both wearing their "I'm Stupid" signs, I hope) met at the hobby shop door. One was leaving, carrying a bag. "Hi, Joe", he said.**

**"Hey, Bob", says the other. "What's in the bag?"**

**"Got me some new props," says Bob.**

**"Do tell? Say now, if I can guess how many props you have in there, can I have one?"**

**"Why shoot", says Bob. "You ain't no Albert E. Einstein you knjow, so if you can guess that, I'll give you *both* of 'em!"**

**"Well *al-right!*", says Joe. "Uh... five?"**

# THE BIG PICTURE

by Dick Pettit

It's getting close to that time of year when leaves and temperatures start falling, and that lazy old sun goes to bed sooner and rises later. My much enjoyed "after dinner flights" will soon come to an end until next year. Luckily, however, there's far more to modeling than just flying, so I'm able to keep happily busy out in my work shop. I'm currently working on several large projects right now, some of which will appear here in the near future. I hope all of you find as much pleasure in your shop as I do.

This month I'll show you some easy ways to possibly enhance your model building experiences, and share several beautiful photos of some great warbird models I've seen at flying fields in my area.

## HOW IT REALLY WORKS

Some people think they've already learned so much about modeling that it's highly unlikely to learn anything new. Personally, I think we can learn something new nearly every day, and we almost have to if we want to keep up with the rest of the world. I like trying new products and new building techniques. We learn from the experience even when we decide to stick with our old ways. Learning what to do is not that far removed from learning what not to do.

A while back I began using Pacer Hinge Glue to install Robart Point Hinges and other brands of pinned hinges. It works well and I've had a hinge failure due to the adhesive. But it can sometimes present a problem inside the wing. If I apply too much adhesive into the drilled hole or hinge slot, it almost always oozes out the back side and into the wing. If the wing is covered in a plastic film, those glue blobs are visible forever unless the model is re-covered.

To minimize or eliminate this problem, I now apply the glue into the holes sparingly, since it doesn't take much to keep the hinges in place.



The water in the glue basically swells up the wood around the hinges, making the joint good and tight. When the glue dries, the hinge is firmly locked into the hole. But I've also learned to position the piece in a vertical position with the hinges pointed downward while the glue dries. This keeps the glue from dribbling into unwanted parts of the structure.

## BIG BAD BRONCO

I remember watching OV-10 Broncos taking off and landing at Phu Bai Air Base in Viet Nam while I was a participant in the Southeast Asia War Games in 1970-71. Their powerful turbo-prop engines got them off the tarmac easily, and they looked so sleek and maneuverable as they flew past the avionics shop. The OV-10 Bronco is not modeled very often, but when it is, it turns heads every bit as much as the full scale version.

Sonny Vickers, of Burlington, NC, brought the beautiful, 82" span OV-10, seen in **Photo 1** with his wife Connie, to a local warbird event. It was built by another noted scale model builder, Joe King, whose son is a Major in the Marine Corps, stationed at Cherry Point Air Station. It's powered by a pair of O.S. .91 2C engines, and uses retracts from Sierra Giant Scale.

The model is covered with fabric, and painted with the same paint used on the full scale



**Photo 1: Sonny Vickers' OV-10 Bronco seen with his wife, Connie**



**Photo 2: Nice flyby of Sonny's OV-10 Bronco**

planes. Sometimes it pays to have a son “in the business”, so to speak. Sonny’s model also has a prototypical lighting system complete with rotating beacon and marker lights. This 18 lb. Bronco looks great in the air and on the ground, as evidenced by **Photo 2**. This thing really brings back some old memories, so my thanks to Sonny and Connie.

#### MAKING DULL THINGS SHINY

As many of you may already know by now, I use a product called SimiChrome for polishing aluminum spinners, landing gear, and other metal parts. I buy mine at a local motorcycle shop, but I’m sure it can be found elsewhere. It works particularly well on aluminum parts, and with diligence can bring the luster to an almost chrome-like brilliance. A small tube costs under \$10, and provides enough paste to polish many, many parts. For some modelers a single tube will provide a lifetime supply.

Anyway, I recently wanted to remove some scuffs and CA fingerprints from a clear piece of plastic that was destined to become a side window in one of my models. Rather than replace the marred piece, I decided to try removing the marks. Acetone and commercial CA removers would take off the fingerprints, of course, but they also usually “craze” the plastic, making it even less attractive. After considering several al-



**Photo 3: Ercoupe PQ-13 by Steve Underwood, of Trinity, NC**

ternatives, I just happened to spot my tube of SimiChrome. Since it removes scratches on metal parts so well, maybe it would work on plastic.

I put a small dab on a folded piece of soft cloth and began to rub the plastic. It took some elbow grease alright, but soon all the scratches were gone! I then tried it on the CA fingerprints. This took a bit longer, but they too eventually disappeared. I'll bet this even works on plastic covering materials, as long as the covering is supported underneath. You have to press down pretty hard to remove visible scratches.

#### MILITARY ERCOUCPE

Many of you will remember the Balsa USA 1/3 scale Ercoupe I built a while back and flew several times at Top Gun. Now every time I see an Ercoupe, be it full scale or a model, it reminds me of the one I had. Steve Underwood, of Trinity, NC, brought the beautiful, 80" span model seen in **Photo 3** to a war bird event, since it was decorated as a PQ-13 test plane.



**Photo 4: Steve's Ercoupe during a low fly by**

Built from Nick Zirolì plans, the model is powered by a BME 1.4 gas engine, covered with Stits covering and FliteMetal, and painted with Stits paint. I asked Steve how much his model weighed. "*It's light enough to fly*", he said. And fly it does, as seen in **Photo 4**. That's a great looking 'Coupe, Steve.

#### TIGHTEN YOUR TAIL

Now I'd like to talk a little about adding tail support wires to large models. These suggestions

can, of course, be used on many smaller models as well. I've built many models with a very limited amount of contact area between the fuselage and the fin, leaving its joint relatively weak. So the main purpose of these braces is to add strength to the tail by tying the parts all together. Full size planes sometimes use lower braces only, or a combination of upper and lower braces, to provide the required strength.

Probably the easiest and lightest method to build tail braces is to use braided fishing leader wire tied to small metal brackets attached to the tail surfaces. This wire is available in the sporting goods department of most major department stores, and while you're there, get a package of ferrules, the little crimp sleeves used to join the wires permanently. Holes drilled through the surfaces need to be reinforced to take the loads, and this can be done before covering by drilling holes for sections of wooden dowel rods glued into place and sanded smooth. Drill a hole for a 2-56 or 4-40 bolt to pass through and you're ready to add the braces.

If your model is already covered, simply drill a hole for a short length of hard brass tubing through which you pass the bolt. This way tightening the bolt will not compress the softer wood surfaces.

Using thin brass sheet (or landing gear straps) cut enough brackets for the job, making them large enough for holes for the bolt and the wire. Bolt the brackets loosely into place and then bend each one to point at the bracket to which it will connect by wire. You can use four wires or eight, depending on your preference. For four wires I suggest placing them between the trailing edges of the fin and horizontal stabilizer, and then to the bottom of the fuselage. That area of the fuselage, of course, needs to be sturdy enough to support the brackets and wires.

The actual wires are added by slipping a ferrule over one end of a wire, then thread the end through one bracket and back through the ferrule again. Slide the ferrule near the bracket and crimp it onto the wires using a nice, high

dollar crimping tool, or a simple pair of pliers. (Later, after all the wires and ferrules are assembled, a drop of thin Zap into each ferrule will add a little peace of mind security.)

Then cut the wire to a length about 6" longer than the distance to the next bracket. Slip on another ferrule, thread the wire through the bracket and back through the ferrule again. Now, being careful not to use too much force, tighten the wire slightly to take out any slack, and then crimp the ferrule. Once all the wires are added, the system should be snug enough to keep the tail pieces stable. Some flyers make their wires adjustable by using threaded wires and clevises at one end of each wire.

Another popular method of adding tail braces is the method used on the Sig J-3 Cub, using 2-56 rods and clevises. Holes are drilled in the surfaces, reinforced, and then metal threaded and solder clevises are modified as follows. Break off the side of the clevis that has the pin in it. Drill out the hole in the other side to fit a 2-56 screw. Thread a clevis onto the appropriate end of a 2-56 rod, remembering to use a jam nut to keep it in place. Cut the other end of the wire rod so that the solder clevis fits properly, and solder the clevis into place. Bolt the rods into place and you now have a secure, and adjustable, tail brace system. The only disadvantage is that this method weighs a bit more than using braided wire, but on the positive side, the rods are adjustable.

If you'd like to buy a ready-made kit, Sullivan Products offers a kit for flying wires and or tail bracing wires (#S546) which has everything you need, including pre-drilled brackets, 2-56 eye-bolts, 0.032" stainless steel cable *and* 0.20" Kevlar cord, and adjustable ends, complete with instructions.

In any case, try not to tighten the braces any tighter than necessary. We're not going to play music here, just trying to keep our tail in place.

There are numerous other methods that work just as well, and I've merely described the methods I use. Give 'em a try sometime.



**Photo 5: P47 Razor Back with owner Robert Underwood.**

#### RAZOR BACK THUNDERBOLT

Another of my favorite military planes is the Republic P-47 Thunderbolt (aka, "Jug"), and when one shows up at a flying event, heads turn immediately. The beautiful P-47 seen in **Photo 5** was built by Robert Underwood, of High Point NC. It started out in life as a bubble top P-47, but Robert converted it to the razor back version and added a Cunningham Zenoah G62 Lite engine with a hidden, scale exhaust system. The 27.5 lb. Model is covered with glass cloth and KlassKote paint, and uses Robart retracts along with a JR 10X radio system.

Great looking Thunderbolt, Robert.

#### WARBIRDS FROM TWO WARS

Forrest Morris, of York, SC, brought two beautiful warbirds to a local fly in, including the outstanding 1/4 scale Fokker DVII, seen in



**Photo 6: Forrest Morris, York, SC and his 1/4 scale Fokker DVII**

**Photo 6**, built from a Balsa USA kit. The model was built by the late Slick Larsen a number of years ago, and when he passed on, it was acquired by Jerry Smith. Forrest later bought the



**Photo 7: Forrest's D.VII on a reconnaissance mission**

plane from Jerry and has been flying it quite a bit ever since. The model uses a Zenoah G38 engine, and is covered with Stits covering and Randolph dope. Forrest says that Slick used Randolph dope and a 1" wide camel hair brush on all his projects. **Photo 7** above shows the nice looking model on a reconnaissance mission.

Time-warping ahead to WWII, another of Forrest's models at the fly in was the Feisler Storch seen in **Photo 8** below. I failed to get much information on this one, as it was making a slow pass with flaps deployed when a gust of wind suddenly lifted the left wing panel and flipped the Storch onto its back. I didn't want to



**Photo 8: Another of Forrest's military planes, a Feisler Storch.**



**Photo 9: Here's the Storch on a low and slow fly by.**

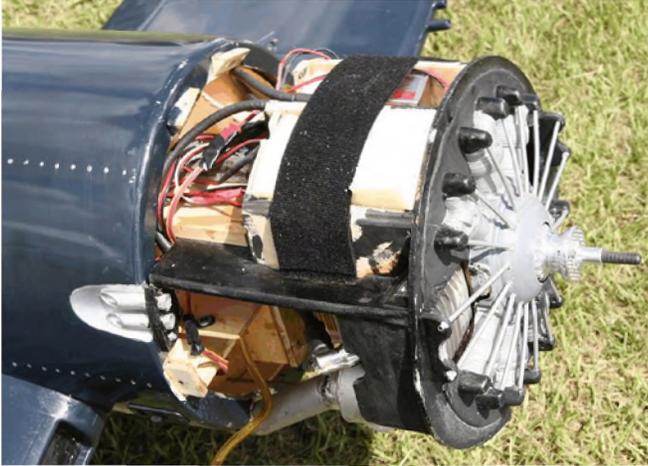
ask a lot of questions about the model at that point. It didn't fly again that day, but I expect to see it again soon. Anyway, both of Forrest's planes looked great in the air and flew well, as seen in **Photo 9** above on a low and slow fly by.

#### RICK'S NEW CORSAIR

My flying buddy, Rick Cawley, of Fuquay-Varina, NC, recently completed an extensive building project, the beautiful Royal giant Corsair seen in **Photo 10** below. Royal kits have



**Photo 10: Rick Cawley, FuquayVarina, NC with his big Royal Corsair**



**Photo 11:** Note the air baffles around the engine not been available for a long time now, but Rick found one that was partially assembled. After about a year of building, re-building, and modifying the structure, he then applied the finish and details before completing about a dozen test flights, all of which were successful.

Rick's finished his model to represent an F4U-5 Corsair with its cowl cheeks that just happened to nicely cover the spark plug boots on his BME 110 twin engine. He also added a number of baffles to guide the air through the cylinder fins and out the cowl for better heat

dissipation. As seen in **Photo 11**, these baffles not only help cool the air, they also provide a nice place for the ignition box, several batteries, and some of the lead weights needed for balance. They also help hold the cowl in place, taking most of the load off the mounting screws at the firewall.

Rick's 100" span Corsair is covered with 1/2 ounce fiberglass cloth applied with epoxy and painted with two-part automotive paint. The military markings and other lettering came from Kirby's Kustom Graphics. Rick uses a JR 9303 radio system with a mix of JR and Hitec servos. You can see the model's high level of detail in **Photo 12** below.

How well does it fly? Viewed through my eyes, it flies just fine. At first Rick noticed a slight wiggle at high speed, which he attributed to a set of rudder pull-pull cables that were a little slack. The flaps work great, as seen in **Photo 13**, and as Rick puts it, "*It was flying with all the laundry hanging out.*" The model weighs about 37 lbs. dry.

Rick plans on taking the Corsair to the DOGS Warbird Fly In, in Dayton, OH, and may



**Photo 12:** Note the fine details on Rick's Corsair



**Photo 13: Rick's Corsair landing "with all the laundry hanging out"**

later bring it to "Monster Planes 2009" in October, since it qualifies as a "monster" in both size and weight. With its goods looks as seen in **Photo 14**, it should get more than its share of attention.

That's all I have this month. I hope to be working on more projects for *RCR Online* in the



**Photo 14: Here's a photo opportunity if I ever saw one!**

coming months. Meanwhile, here's something you can do for us. The next time you go to your flying field or a flying event, please keep spreading the word about *R/C REPORT Online* and how it's thriving in its new, electronic online format. We need all the exposure we can get to spread the word, as there are still many former magazine readers who don't know about the online version. We'd like to have each and every former reader with us again, and you can help in this effort by spreading the word. As I tell everyone, we still have the same format, the same writers, and the same candid honesty. We intend to keep it that way for a long time, too.

Also, if you have any thoughts and/or suggestions for future columns, articles, and/or projects, please let us know so we can evaluate your suggestions, and possibly get them started.

See y'all next month.

-Dick Pettit

5704 Dedmon Ct.

Durham, NC 27713

[pettit@ti.com](mailto:pettit@ti.com)



## NATIONAL ACADEMY OF MODEL AERONAUTICS (AMA) ELECTS DON ANDERSON TO HALL OF FAME

Don Anderson of Mahomet, IL, has been chosen by the Academy of Model Aeronautics (AMA) to receive its highest honor, induction into the Model Aviation Hall of Fame. Anderson joins such distinguished Hall of Fame members as Apollo 11 astronaut Neil Armstrong, and Burt Rutan, designer of the first commercial vehicles capable of sub-orbital flight. "This award was created for modelers who do extraordinary things," explains AMA President Dave Matthewson. "It's a well-deserved tribute to Don, who has done so much to foster the hobby industry for more than 36 years."

An active model pilot since 1969, Anderson often designed and custom-built his own aircraft. Today he serves as the Senior Vice President of Product Development at Hobbico, in Champaign, IL. He is also president and founder of Great Planes Model Manufacturing Co., one of the hobby's most enduring and respected brands. His drive for perfection shapes the concept, design, testing, and manufacturing of products enjoyed by countless model enthusiasts.

Fellow AMA member Art Pesch, Senior Manager of Service and Support at Hobbico, nominated Anderson for the Hall of Fame. "Don's companies are directly responsible for many of the finest radio-control model airplane products available today," Pesch says.

Anderson gratefully acknowledges those who helped him along the way. "I want to thank Art Pesch for the nomination, and the AMA for selecting me to receive this award," he says. "Historically, very few of us in the hobby industry who had dreams of starting a business were successful at it. In my case, I have seen my dreams come true. Back in the early 1970's, Bruce Holecek, founder of Tower Hobbies, and I were the first to establish model businesses in Champaign. Clint Atkins purchased both companies in 1984 and formed Hobbico, which grew into one the largest employers in the Champaign-Urbana area. Today we're an ESOP, and all employees share in our success. I also want to thank my wife, Paula, and my family for working with me through the rough times. I only wish everyone could have had the ride I've had!"

In addition to his many other accomplishments, Anderson has been president of the Champaign County R/C Club and twice donated the money to help build new asphalt runways. He also co-founded and has served in executive positions for the Radio-Control Hobby Trade Association.

#### Don Anderson's Biographical Highlights

September, 1969: First flights with an R/C airplane, and joined the AMA.

May 1, 1973: Founded Great Planes Model Distributors Co.

April, 1981: Purchased Bridi Hobby Enterprises and began Great Planes Model Mfg. Co.

April, 1982: Purchased Andrews Aircraft Model Co.

Fall, 1984: Sold Great Planes Model Distr. to Clint Atkins who joined it with Tower Hobbies to form Hobbico, Inc.

Summer, 1986: Co-founded the Radio Control Hobby Trade Association (RCHTA).

Oct. '86 - Oct. '87: As Vice Pres. of RCHTA, held its first annual Chicago Model & Hobby Show.

Oct. '87 - Oct. '89: President of RCHTA, and Executive Director until Larry Sperling was hired. Worked to promote Model & Hobby shows in Chicago, Los Angeles, and Baltimore.

Spring, 1991: Sold Great Planes Model Mfg. to Hobbico, Inc. and became Sr. V.P. of Product Development for Hobbico.

2005 - Current: Founding Member of AMA Membership Marketing Committee; proposed Park Pilot membership class within AMA.

Feb., 2008: Awarded AMA's "President's Award" for membership marketing efforts.

1982 - Present: Life Member of Champaign County R/C Club

#### Other

Founding Sponsor (FS-024) of IMAA

Contest Director /Leader Member of AMA (#42786 - 4278)

Organized annual Great Plane Fly-In's in the late 70's and early 80's

Sponsor and host of the annual Futaba XFC and E-FEST events.

# The Webb Scale

by Gary Webb

I can hardly believe that by the time you read this, our summer will be nearly gone! Where does the daylight go?

So, now's the time to be thinking about your winter projects, and especially so for us scale guys here in the Great

Frozen North. For you in the South... say, just when *do* you build? I'm guessing in the summer, when it's too hot to go outside. Any comments, Gordon? *(Editor's Note: No, we're mostly winter builders too. After all, in December and January we often see daily temps below 50° when we'd have to wear long sleeves. Brrrr!)*

Have you ever been all excited about flying one of your favorite birds at a distant event, so you drive a long way to a fly-in, open your trailer (van, or whatever), only to find that your pride and joy somehow got loose and was damaged in transit? Your first thoughts usually lean toward words seldom spoken in polite company, right? You know darn well you don't say, "*Oh golly gee whiz*", now do you? Then you begin to realize that you won't be flying that bird this weekend after all, so the disappointment deepens even further. I remember one year when Dino DiGiorgio's beautiful FW190 arrived with its nose damaged and the canopy broken completely off. He and his guys worked their collective tails off overnight to get the bird back together, but he went on to compete and win at Top Gun that year. The problem is, most of us do not have a work shop available in a distant town, nor do we have the materials on hand to fix the problems.



Why am I telling you this? Because it just happened to me! I drove over 60 miles to a scale model fly in at a full scale airport. I was really looking forward to flying the Iron Bay T-28 you see at the top of my column each month. I'd put

the fuselage onto a trailer shelf on a thick, foam pad, and tied it down with bungee cords both front and back. Most of this model's weight is in the fuse because the air systems and retracts are in the fuse and wing stubs. Trying to move the fuse around on the sticky foam is difficult, so I was very surprised to see that it had crept so far forward that the right elevator had been damaged when it came into contact with a cabinet on the wall. "*Ouch!*" is not what I said, exactly, but it will do for this column. Needless to say, that model was on display only that day. The other three aircraft in the trailer had not moved, so they were flown. Desperate to find the silver lining in this dark cloud, I decided that this might be a good time to describe my process of repairing a model with a fiberglassed finish having surface detail.

I first cut out all the damaged wood, and then glued in a piece of balsa a little thicker than the thickest point, and a little wider so the trailing edge would be easier to get straight. I then sanded the aero shape back into the elevator. This, however, also removed the adjacent elevator trim tab lines and some of the button rivets. I then filled in the seams of the joints with light spackling to make sure there were no gaps, and sanded the filler smooth. Then using Zap



**Photo 1: Zap finishing resin is used to attach the gloss cloth**

Finishing Resin (see **Photo 1**), I re-glassed the damaged area. Using 3/4 oz. cloth cut about an inch oversize, I first brushed on a layer of resin and then laid the cloth over it. (Thinning the resin with denatured alcohol will cause Zap's finishing resin to be more rubbery in consistency, which does not sand as easily, so I don't thin that.) When glassing large areas I normally thin the resin 50/50 with denatured alcohol to allow me to brush the resin over the cloth with minimal build up. The second coat I thin 2:1 (two parts resin with one part alcohol). After brushing on more resin to make sure the cloth is saturated, I use toilet paper to remove the excess. (Make sure you're not using your home's only spare roll for this, or you could wind up in deep... just don't do it!) I buy the cheapest two-ply paper I can find). Just roll the roll of paper roll over the area, pressing down on the roll as you go. After a few seconds you then pull the paper back over itself, taking with it the excess resin. This really does save time by leaving less sanding required. I do the bottom first, and then wait until the resin hardens. I then sand the excess glass off the edges with 320 grit paper, and then repeat the whole process on the top, folding the cloth over the bottom cloth at the trailing edge and sealing the edge surface.

Some of you are going to say, "Hey, the cloth won't stay down at the edge. It lifts during the curing process." Well, that's happened to me too, but here's the cure. When the resin is

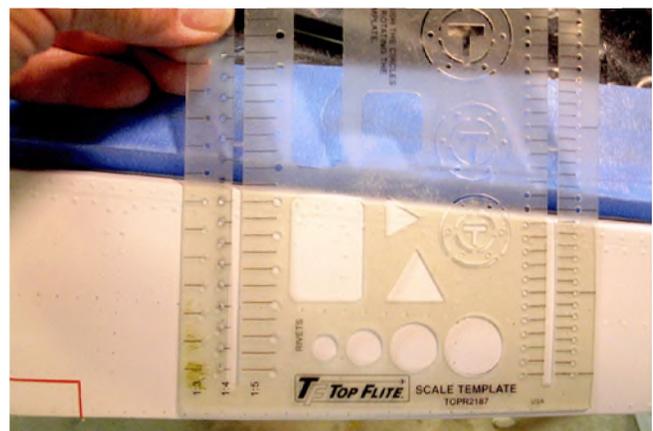


**Photo 2: Elevator ready for primer and surface detail. Note use of black garbage bags for masking. No over-spray can get past the plastic.**

almost cured, I take a piece of wax paper or plastic wrap, and burnish the edges with my finger. Now the cloth sticks! You can smooth out the entire cloth on a flat surface like this.

After curing I use 320 grit wet/dry sand paper to remove the excess glass cloth, and then feather the edges into a smooth surface (see **Photo 2**). I'm using latex paint on this model, so I first spray on a light coat of primer using an air brush. This coat also allows me to check the surface for flaws. After I'm satisfied with the surface, I again lay out the trim tab panel line with 1/32" chart tape. I then apply a layer of primer over the tape. When that dries I'll pull the tape off, leaving a depression in the paint which creates the illusion of a panel line.

Then I mark the locations of the rivets. I've successfully used the Top Flite scale template #TOPR2187 to space and mark the locations of rivets on a lot of my models. In **Photo 3** I hope you can see where I've already marked the loca-



**Photo 3: A Top Flite Rivet Template is used to align and mark the rivet locations**

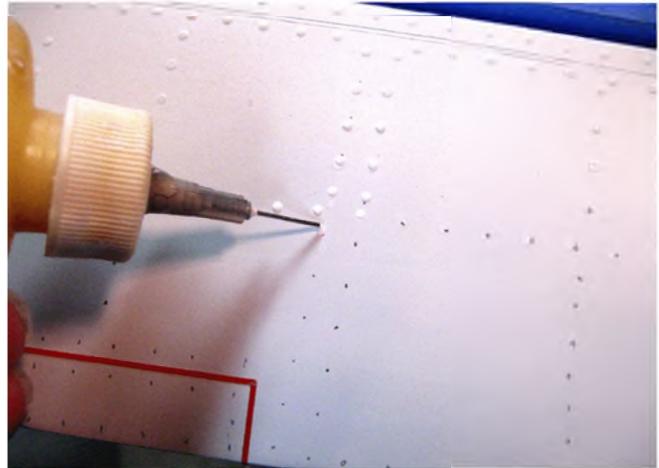


**Photo 4:** Acrylic water based paint used to create the exposed rivets. It comes in a variety of colors, even aluminum. If you plan on weathering and sanding through the color, it will look like bare metal rivets.

tions with a pencil, and am ready to lay down the rivets.

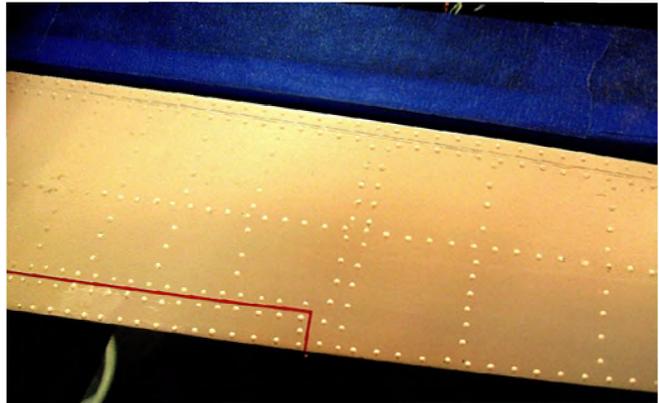
Here's my secret. **Photo 4** shows the tools I use to make the rivets, and the paint I use to create them. I once used RC56 canopy glue to make exposed rivets, but I found that it would often flatten when it dried, instead of holding the rounded shape a real rivet has. A friend showed me how to use an inexpensive water-based acrylic paint like that available in the Wally World crafts section. I don't think I used even half of this bottle for all the rivets on this rather large airplane. The rivet making tool can be purchased at...

[www.rcscaleproducts.com/finish\\_acc.htm](http://www.rcscaleproducts.com/finish_acc.htm)



**Photo 5:** Using a rivet tool to squeeze out paint through needle to create just the right size rivet. Don't touch the surface with the needle. If a mistake is made, just wipe it off with water and a paper towel, and start over.

They also have rivet tape, if you prefer to use that method. **Photo 5** shows the application of rivets onto the surface. I don't allow the needle to actually touch the surface. Notice the nicely



**Photo 6:** Rivets and panel lines finished, ready for the last coat of primer. Notice how round the dried rivets look.

rounded shape of the rivet heads, and the dry, painted ones above (still present from the undamaged area). See how they keep their shape? They really look authentic, too. **Photo 6** shows the finished results awaiting primer and top coat.



**Photo 7: Nelson's Clear was used to protect and fuel proof the paint. Notice the use of a charcoal-filter respirator, and gloves for protection.**



**Photo 8: Project finished, and the plane is flight-ready again. I'll make sure the plane is fastened down better in the future to prevent such damage from reoccurring.**

After final priming and removal of the chart tape, I proceed to apply the top coat color of white using outdoor semi-gloss latex paint (see **Photo 7**). Please note the safety equipment (respirator and plastic gloves) I use during any painting. I also use a dust mask when sanding, and a dust removal vacuum system bought at Sears years ago.

I then clear-coat it to fuel proof the surface if the model will use a glow engine. I use Nelson Paint's gloss clear, using the supplied cross linker to make it more fuel proof. **Photo 8** shows the finished results, but I don't think the details

will be visible. This repair took about 5-6 hours over the course of a week. You must allow the resin and latex paint enough drying time.

Now my T-28 is "Code 1" again and ready for the next event, which in my case will be the upcoming "DOGS" show here in Dayton, OH, at the National Museum of the U.S. Air Force. I'll later share my photos of the scale models flown there this year. (I hope to see some of you there!) Please come up and say hello. I look forward to meeting you all.

Now it's time for my interview with one of the most undeniably outstanding scale modelers in this country today. He is, in fact, the *only* person to have *ever* achieved a perfect, 100 point static score at any Top Gun event in history. He is, of course, none other than Graeme Mears.

Graeme has wowed scale modelers worldwide for many years, and has set the benchmark for outstanding craftsmanship for scale modelers everywhere. In addition to his enviable credits in scale modeling, I find him very candid, honest, and friendly. We thank you, Graeme.

Now, please state your name and occupation. Then have a seat, and remember, you're under oath!

*Uh huh. I'm Graeme Mears, a retired director of photography.*

Graeme, how did you get started in aeromodeling, and at what age?

*I've built models of one sort or another for as long as I can remember, even as early as age 8 or 9, so that would be 60 years ago.*

Graeme, did you start out in R/C, or was it line-control or free flight?

*My first real hobby was model trains, but in my teens I built and flew some U-control. I also built two square-rigger ships, and I still have them in my house, stored in glass cases. Each of those projects took several thousand hours. I got into R/C aircraft about 22 years ago.*

Did someone introduce you to that, and if so who was it?

*No, I was simply looking for an interesting hobby after my divorce.*



**Photo 1A: Graeme Mears and his P-38 Lightning**

What motivated you to build *scale* models instead of simpler sport models?

*Well-done miniatures of anything have always fascinated me, so I guess that is why I am attracted more to scale than other. However I*

*do have a variety of sport models for R/C flying.*

Did you have a mentor to help you get started in building scale aircraft, or did you learn by yourself through trial and error?



**Photo 1B: Graeme's P-38 sitting on the runway**



**Photo 1C: Graeme Mears' Tiger moth taxiing out onto the active**

*My father had a very good workshop in our basement when I was growing up. He had lathes and all kinds of machining tools, and he taught me how to use them. My dad was amazingly gifted at making and fixing things, so I believe at least some of my talents were inherited. However, the first time I competed seriously with a scale R/C model was with Bob Fiorenzi as my pilot. We competed several times together in the early 90's, and Bob taught me a lot about scale competition.*

Have you ever flown full scale aircraft? If so what types, and do you currently hold a pilot's license?

*I don't have a pilot's license, but I have "held the stick" in many full scale aircraft, such as a Waco UPF-7, a Tiger Moth, a Stearman, a Christen Husky (I even landed that one), a Kit Fox, and others, all tail draggers.*

Can you remember the very first scale model with which you competed?

*A P-38 Lightning from a Yellow Aircraft kit, "Mama's Boy". (See Photos 1A & 1B)*

What was the result of your very first scale competition?

*First place in "Team Scale", and "Pilot's Choice" at the first Gater "Shoot Out", at R/C World in 1994. In 1995 I made it to Top Gun for the first time, and got 4th place in Team Scale,*

*both times with Bob Fiorenzi.*

What motivated you to compete in scale?

*After seeing my P-38, Bob (Fiorenze) urged me to do so.*

What is your favorite era and type of aircraft to model?

*I've built a lot of scale airplanes from practically every era except WWI, from biplanes to modern jets, and I truly love them all. However, if I had to choose only one, it would be the Golden Age biplanes. The only problem with them is that they are a lot of work getting ready to fly at the field. (Photo 1C shows Graeme's award winning Tiger Moth.)*

How many hours a week do you average in building and flying your models?

*Uh... a lot!! I log all my time, and I spend over 2000 hours a year building R/C aircraft. Naturally, I also try to get some flying in, so for me, in my retirement, it's more than a full time job. I also make some retirement income by building for customers.*

When preparing for a contest, what's your procedure and how much time do you spend to get yourself ready and confident with your model?

*First of all, I spend a lot of time researching my current scale competition model. And because I'm building for customers too, I'm*



**Photo 1D: Graeme Mears' 100 point static score F-16 on final. You can almost see the pilot waving at you. David Shulman flew this plane to a record high flight score, earning them a Team Scale win at Top Gun 2009.**

often producing a model with which I'm not thoroughly familiar, so I enjoy learning everything I can about different aircraft. In this age, with the internet, you can do a lot of this right at your desk. Then there's the 1000-plus hours it takes me to actually complete a model. I'm now building a completely new model every year for Top Gun. In 2009 I had two new models entered, and I spent over 10 months producing them.

The more prepared you are before the competition begins, the better you are, obviously. But there are always teething problems with a new model. With a modern jet model, for example, the power and control systems can be very complicated. My F-16 "Thunderbird" is extremely complicated, with multiple systems on board for smoke, lights, afterburner, retracts, etc., not to mention the control systems. With telerons, elevons, and flaperons the control mixing alone becomes very complicated, and requires plenty of test and practice flying time to refine (see **Photo 1D**). It's always my target to have at least 12 flights on a new model before I

feel comfortably ready for a competition flight. The pilot also needs to have his flight routine locked down well before a competition flight. The more he's practiced exactly what he's going to show the judges, the better he'll score.

What advice would you offer a new modeler to scale competition?

*Just get started and have fun! Learn from your mistakes and you'll do better next time. You won't be a world champion overnight, so take your time and gain experience.*

*I've been at this a long time, but still quite often when I make a new part, the first six attempts are not good enough, so I keep at it until I think it's perfect. I'm still learning, and I'm always trying to do better. That's how you excel, by always "raising the bar" for yourself. Never accept "good enough" as good enough!*

*To excel as a scale completion modeler, you need determination, perseverance, and discipline, but believe this or not, great patience is not a necessary virtue! It's okay to scream*

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*and cuss when things don't go right and you get frustrated. But you do have to persevere.*

*I think it's a terrible shame that so many young people today aren't prepared to put in the effort necessary. Sitting in front of the computer and playing video games gives much quicker and easier gratification, but then you have little or nothing to show for your effort. But, that's the modern age. Luckily, however, not all youngsters are like that, and we have some very bright young stars on the horizon.*

That's all the questions I have, Graeme, so thank you ever so much for your time and cooperation. We'll always be anxious to see what you bring to the next big event.

By the way, folks, I have some interesting new projects coming up in the next couple of months. One is a very rare model of a Japanese A6M2 "Rufe". You can "Google it" to learn more about it. You've also been asking for some information on making sliding canopies for different models. I'm working on that, but if you have a novel way of actuating a moving canopy, and would like to share it with all of us, please let me know. I've been asked many times how I've done it on some models, but let's *all* share our ideas, okay?

Meanwhile, fair winds and blue skies to you all.

-Gary Webb  
[gcwent@woh.rr.com](mailto:gcwent@woh.rr.com)

# Two Old Scale Guys

by Dick Watz & Bill Hurt

DW: I'll start with an apology this month. Last month I mentioned getting started on a column about sliding canopies, but I had one of those "an elephant ate my homework" moments, and with all the moving and cooking for two families, I simply never found the time to look for photos of some of the canopies I've done, or drawings of actual sliding canopies that I've collected over the years. This month I'll get started. Actually, Bill could probably give you better information on this subject, based on his vast experience with some fine sliding canopies at Top Gun. I'm sure most warbirds at Top Gun had sliding canopies, right Brother?

BH: Sliding canopies? Well, some slid, some raised, some fell off, and some didn't have canopies at all. Those that did slide all articulated in some manner, and not everyone uses the same technology to operate them. Some canopies are opened manually, some use a servo to slide them, and some even used an air cylinder for operation. But all were very nice, and all worked flawlessly.

DW: Now if you've ever wondered what's in all those boxes of small odds and ends (aka, treasures) in scale modelers' work shops, they contain odd pieces of brass tubing and any other small parts that might be used to make and operate a moving canopy, and making the sliding mechanism is not all that difficult. But it must be thought out and well planned so none of it looks like an afterthought.

Boy it's been cold in Michigan this summer. It was 47° last night, and only 58° on my front porch this morning. At least it's warmer at Geezer Gulch where we are, Bill.

Oh look who I'm talking to! Hurricane Bill lives down in Leesburg, FL, where a cold day is 75°! Bill takes great delight in calling me when it's zero here, just to give me a Florida weather report.

BH: Hey now, that's not fair! (I didn't say it wasn't true, though.) I told you a long time ago that I agree that summers in Michigan are beautiful. You just hope that they fall on a weekend. (Snicker snicker.) *(Editor's Note: Dick once told me that if the Michigan summer fell on Saturday they had to cut the grass. But if it fell on Sunday they went flying!)*

DW: Wow, some pal you are! My old bones are freezing while you're giving me a Sheky Green weather report! (Bill says he lives in Florida because it's warmer there. Maybe so, but I think it's because of all the pretty girls in swim suits!)

BH: Doggone it, Dick, you caught me there, but you didn't have to tell the whole world!

DW: Actually, Bill didn't have to move to Florida for pretty girls, he already had the prettiest girl in Tennessee! Oi' Bill doesn't take chances. When he goes to the beach he takes the prettiest girl there with him! You're a sneaky devil, Bill.

BH: I'm not posting any pictures, though. The last time I was at the beach there were some smart aleck kids wanting to help me back into the water. They kept yelling that whales can't live on dry land!

DW: Speaking of pretty things, Bill, how's that Waco YMF-5 coming?

BH: It's coming along nicely, and I'm about ready to begin covering the fuselage. I've tested all the modifications to the fuse and tail group, and I'm satisfied that it will all hold up to some serious flying.

I might as well include some important information while I'm thinking about it. For years, we who've built open cockpit Waco bipes have been complaining about having to add so much down elevator to fly them. Even Dick Pettit mentioned it in his review of the Cox Pica 1/6 scale version. The first plan drawn called for the center of gravity to be at 40%. That's right,

and if you don't believe it, go check. What the original draftsman must have meant, however, was 40% on the upper wing alone. I have a set of the original Waco factory prints, and they have the CG between 26.2% and 28% of the mean aerodynamic chord.

Once this discrepancy was found, I posted the information on a website. Mitch Epstein changed the center of balance on his 33% YMF, and reported that the model was no longer an evil handling beast, but was a real pussycat to fly and land.

Finding the MAC (mean aerodynamic chord) is easy. Assemble your model and jack up the tail until the datum line is level. Then measure the distance from the forward wing's leading edge, to the rear wing's trailing edge, and there's your MAC. Compute the distance behind the leading edge (of the top wing) as a percentage of the MAC, and that's where you want the model to balance. Balance the model using the top wing so the model will hang from the balance point(s), and your Waco should fly as intended.

How 'bout that, Dick, we've all been blindly ignoring what we all knew for years. No more rotten landing characteristics, and no more using all the available down trim for level flight. And better flying models tend to last a lot longer to boot!

Any speaking of "lasting longer", how's your shoulder, Dick.

DW: The new shoulder is doing so well, I can now drive, cut grass, and get back to modeling. Sanding has been a real "no-no" for years, but look out now! World Plan Man (my nickname for myself) is back, and I'm going to draw and build every Waco I can find a 3-view for. So, would you guys and gals please check your collection of 3-views. I'll be happy to swap for them or buy them. What do you think, Bill?

BH: I dunno, Dick. There are a lot of Waco versions to draw and build. Why not get our buddy Nick Zirola interested in doing one of the Wacos? All of Nick's plans build into great flying models, and they can be detailed fairly

easily. All the commercial kit cutters like cutting Nick's kits, and most of them are not too pricey, either.

DW: Bill, maybe we could ask the Waco Brotherhood if they have any 3-views or pictures to help us out.

BH: Well, okay, but don't forget what happened when you wanted some photos of the Cessna 195. I'll ask them, but be prepared to buy one those really big, bulk mail boxes. I'll bet John Howard alone could flood your desk with 3-views.

Why not just reduce the factory drawings, eliminate the internal details, and then reproduce them? Talk about correct 3-views. It might upset some of the kit builders and plans companies though, since they tend to use an incorrect wing thickness, so a correct 3-view would reveal that real quickly.

DW: Now let's take a few emailed questions.

*Dick, when are we going to see you and Eric at the air shows again?*

Gene, Eric is moving into a new house so we've been extremely busy this summer (Yes, Bill... all day!). Things are finally getting back to a pace we can all handle, though, so we'll see you all next summer, I promise. The P-51 is back in the air, too.

*Dick, I just finished one of your Hurricanes. The instructions say (it should weigh) eight to nine pounds, but mine weighs only seven pounds. Is that a problem? Are there any Hurricane's still around?*

Jim, completing a warbird under the suggested weight is never a problem. You may like those extra pounds on a windy day, but I've seen that plane at almost every weight from 7-14 lbs., and they all flew well. I like my Hurricane right around 8 lbs. because I never know what the wind conditions might be at an air show, and 7 lbs. gets bounced around pretty good. The Hurricane is one of the best behaved planes I've ever flown, though. I test flew a Hurricane here in Saginaw that weighed 14.5 lbs. It required a

longer approach and a little extra power, but it still flew great.

Jim, be sure and send us some pictures. The Hurricane was my favorite Aerodrome kit. You might find a kit somewhere, maybe on ebay, but the last one I had went to some crazy guy down in Florida.

BH: Ha ha. And I still have it, along with a couple canopies and cowls. I'm planning to enlarge it to the upper 90" range and build it that way. It's hard, though, to allow yourself to build the last remaining kit of *anything*. If I do build it in the original size, I'll probably just cut a new kit from the plans, and build that, keeping the original in pristine condition. Then Janelle will have something else to get rid of when I croak.

DW: Folks, Bill and I sure could sure use more photos and email from you (aka, y'all). I'm afraid I'm running out of things to write about! Anybody who knows me knows better than that though, right Bill?

BH: Dick, whenever someone has something of value to say, no one ever tires of hearing it. I've never heard you speak just to hear your head rattle, so keep it up.

Guys, the reason Dick and I try to pass along information is simply because we've been modeling for over 120 years combined, and one of these mornings we'll no longer be here. We've learned a lot of useful stuff about things modeling, and we'd like to pass it along rather than taking it with us. If you have a specific question about something... anything related to scale modeling, then ask away. We'll try to answer it in an email or by phone, plus we'll post it here as well.

DW: I've had several requests for a reprint of Eric's piece on covering with MonoKote, so we'll see what we can do about that.

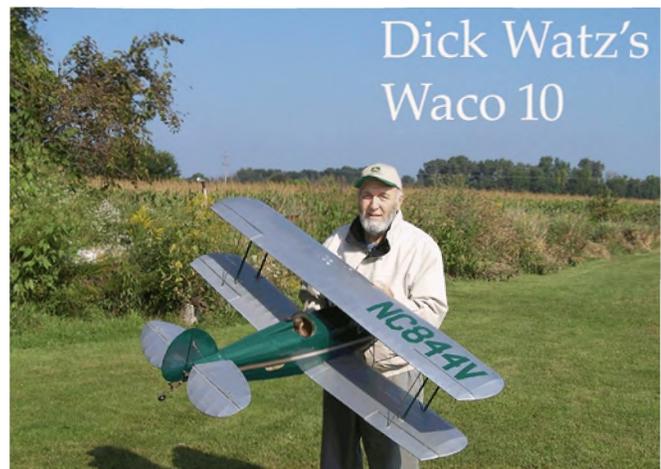
Last Saturday I found a nice Fly Baby at the Saginaw field (see **Photo 1**), built by George Jennings. I've always had a soft spot for the Fly Baby, as it was the first plane I designed for



**Photo 1**



**Photo 2**



**Photo 3**

Aerodrome so many years ago. George's model was well built from plans, uses an FPE 1.3 gas engine, and was covered with 21st Century fabric. Nice job, George.

Some of the other pictures show a flying session at the "Watz Compound." Bob Hozeska's DR-1 (**Photo 2**), my WACO-10 (**Photo 3**), for which I have plans, and a control



Bob with  
Dick Watz's  
Cosmic Wind

Photo 4



Ron Thompson's Waco

Photo 5

line Cosmic Wind (**Photo 4**). I just had to see if I could still fly control line (the devil made me do it!).

The little WACO YMF-5 seen in **Photo 5** belongs to Ron Thompson, who also flew the Cosmic Wind. The pictures of the WACO-10 are just a few to rekindle the old memories. What do you think, Bill?

BH: Dick, I've known of this model for many years, and it's still in unbelievable condition. I made the mistake of allowing a model that I'd

built years before get away from me. I had to pay through the nose to get it back, so you're preaching to the choir about that one.

It's not uncommon to see a model over 20 years old still flying, and flying well. People where I work are always asking how often we crash our models, and my response to them is always in the form of another question: "Gee guys, how often do the airlines crash their airplanes?" The idea is to *not* crash our models, but to take them home in flyable condition at the end of the day.

DW: Yeah, the old girl still looks good after many flights. Meanwhile, I have a UPF-7 on the drawing board, and a big CSO for a 3-cyl Saito 170. I also have a 27% YMF-5 started.

I'm afraid that's all I have this month, Bill. If I put anyone to sleep, maybe you can wake them up with some of your feats of daring-do. Okay, talk to you again soon, Brother. See all you other folks next month.

That's it for Plan Man!

BH: Dick, thanks for a thoughtful column once again.

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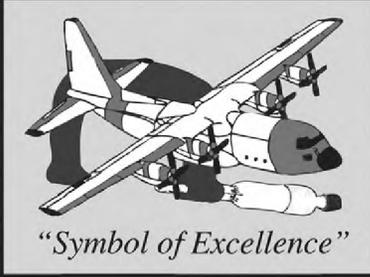
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I've heard from several friends up in the "Great Frozen North" lately, and their new models are spooling up at a great rate. Michael, of AMR, reports that the new 27% UPF-7 is on schedule and should be available soon. John Howard, Terry Lamb, and I have been involved with this one, and I'm looking forward to building one of the first. It was designed for those of us who would love to own a large R/C model, but don't have the space to build a 40% (or larger) model, nor have the space to store one, and don't want to buy a trailer to transport it, either.

When we moved to Florida we down-sized our home, which meant that I'd have a smaller work room. A 33% Waco simply won't fit in my shop now, nor anywhere else in the house. The 27% model, however, will have a 97" span, so with its plug-in wings it will fit nicely into our old station wagon, and it can be stored in one of the spare rooms at home.

Michael also offers models in the 33% and 40% sizes, so I think the 27% version will be a welcomed addition to his fleet.

Oh yeah, one other thing: Our address has changed. Janelle just had to have a new house, and this one is right on Lake Harris, so expect to see a set of floats on at least one of my Waco's.

Janelle grew up here in Leesburg, and not being a great negotiator, I lost the argument, so here we are. I like the area, though, and there are tons of flying fields around here, so the lake will just make it better all around. She always dreamed of living in this area of town, so once again U-Haul, here we come! She's worth every ounce of the effort though.

See y'all (and all y'all) next month! Fly safe!

-Dick Watz & Bill Hurt

[watz7@aol.com](mailto:watz7@aol.com)

[williamhurt@comcast.net](mailto:williamhurt@comcast.net)

# HERE'S HOW...

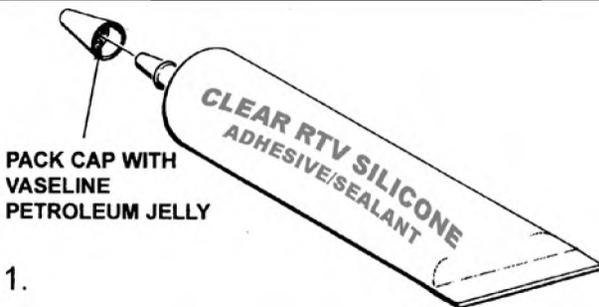
by Walt Wilson

Share your best ideas and building tips with others. Send your "Here's How..." ideas to...

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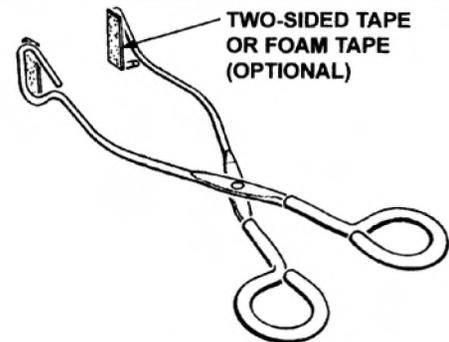
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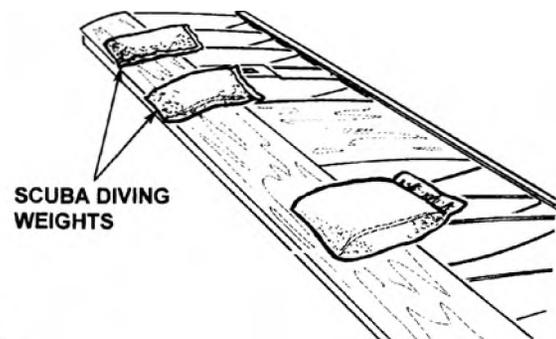


1. Milt Peacock, of Finksburg, MD, says: If you have a problem with silicone sealant curing and becoming hard in the tube, here's a solution. After use, wipe all excess sealer from the tube's opening. Then fill the cap with Vaseline Petroleum Jelly before replacing it on the tube. The next time the silicone is used, the cap will come off easily. Then squeeze out a little silicone and wipe it off the tube to clear away the Vaseline. The sealant will then be as good as new. Using this method of storing the silicone will allow it to last a year or more with no degradation.

2. From Casey Rariden, of O'Fallon, MO: When it's necessary to remove a fuel tank or battery from a location you can't reach by hand, scissors-type tongs can frequently do the job. The grip of the slippery metal ends can be improved by adding two-sided tape or foam tape to the jaws. (And the next time you build a model with a difficult to reach battery or fuel tank, remember to add a strap of nylon-reinforced strapping tape

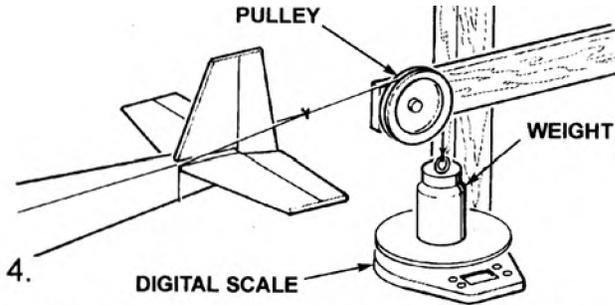


around the item, to use in pulling the item from its compartment.)

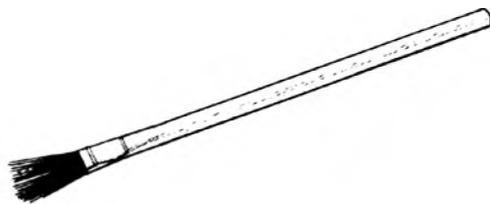


3. Don Mathieson, of Hudson, FL, says: When sheeting wings or performing other tasks that require weights, Don uses bags of lead shot available from scuba diving shops. They come in different weights and sizes and can be used for a variety of purposes. (Editor's Note: I may be revealing my age here, but I can recall when lead-shot was dirt-cheap from gun stores. Not any more! Now it sells for \$2 to \$3 a pound! So

even though they're lighter and sometimes less effective, re-sealable plastic sandwich bags filled with sand or pea gravel are much cheaper now. I still get old, used lead wheel weights free from tire stores for making nose-weights, but they're not much good for weight bags.)

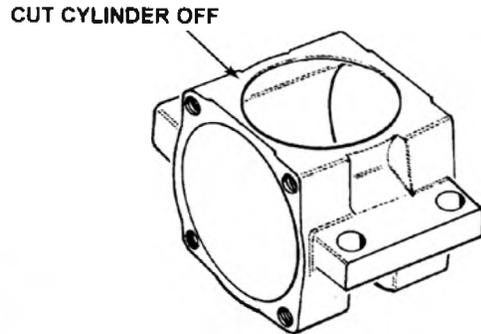


4. Dennis Renneker, of Cadillac, MI, has devised a way to measure the static thrust of his small, electric models in his workshop. First he installed a low-friction pulley on a workbench. A fishing line is then attached to a weight greater than the expected thrust, placed around the pulley, and attached to the tail of the airplane. The weight is then placed on a digital scale and the landing gear of the plane is placed on the floor. As the motor is powered up, the weight measurement on the scale is decreased by the amount of the thrust. Simply subtract the second reading from the first (the weight of the weight). Walt's Note: A large pill bottle containing an appropriate amount of water, nuts and bolts, etc., makes a good adjustable weight.



5. From Bill Hilliard, of O'Fallon, MO. A package of 36 "Acid Flux" brushes is available from Harbor Freight for \$1.99, plus tax. Brushes of this type are commonly used for applying epoxy or polyester resin when fiber glassing, and discarded after use. They're also handy for fuel proofing firewalls, wing saddles, and other wood parts that may be exposed to fuel but are frequently not fuel-proofed on ARF's. These

brushes usually have a 1/4x4-3/4" long rolled tube (looks like tin) handle that can be cut off and used for other things before the brush is discarded. If you can think of a good use for these tubes, it might be worth a free subscription to this website (RCR Online).



6. Jim Crawford, of Merced, CA, says: If you have an engine that's too damaged or worn to use again, don't throw it away yet! Remove all removable parts and store them for possible future use (never throw anything away that might be useful later!). Then lock the stripped crankcase in a vise, whip out your trusty hacksaw (or whatever), and cut off the cylinder as shown in the illustration. Smooth off any burrs or sharp edges that might cause injury, and the remaining piece is an exact guide for drilling motor mounting holes. With the crankshaft and associated hardware in place, it can also be used for locating and mounting cowls before cutting other holes. Walt's note: This is a good and very old idea. The crankcase used to draw the illustration, in fact, is from a Dooling 61 that my dad cut apart nearly 60 years ago!

The plane I'm holding in the photo at the beginning of this month's column is an old House Of Balsa P-51 that I built about ten years ago. The structure has been fiberglassed and finished with Hobby-Poxy aluminum and Chevron Perfect paints. It has a trusty old K&B .40 up front.

Guys, we need your ideas! This column is dependent upon ideas submitted by readers.

-Walt Wilson  
(see addresses at top)

# RADIO RAMBLINGS

by Tony Stillman

## 2.4 GHz STUFF

I'm active on several internet newsgroups, and on one of them I found this note from a subscriber. I thought it was pretty good, so I've decided to share it here.

*I've been reading all the mail going around about the 2.4 GHz subject, and I have a few comments and suggestions.*

*Power glitches can be solved most of the time by purchasing or making a glitch buster. This is basically a large capacitor soldered to a lead (which can be) plugged into any unused port on the receiver. Typically, power capacitors of 0.1 Farad 6V rating or large low voltage electrolytic type capacitor of 470 to 1000 micro-farads 6V will do the trick. Keep the lead from the capacitor short to minimize series resistance, and use good quality, gold plated connectors.*

*When this is plugged in, it will give that extra oomph you need during short, high power consumption peaks such as high speed maneuvers and 3D stuff. The drawback with this idea is that your "Switch On" current will be much higher than normal while the battery is charging the capacitor. Also, when you turn off the system, it won't go completely off until the capacitor is completely discharged or unplugged, so you have to make sure you unplug the capacitor or switch it off somehow.*

*I doubt very much that internal battery resistance is a leading factor. A few decades of electric flight have taught me that wire length and quality, connector resistance, and switch resistance are much more important factors than the internal resistance of the battery.*

*Do regular cleanings of your contacts with a lubricating contact cleaner at the switch and the connectors. Use the largest practical high-quality, multi-strand wiring for all electric-power circuits. This is vital to get maximum performance from your electric model.*

These are good suggestions, and you can find



some of the power capacitors available online, as well as in some hobby stores.

Here's an email from another reader:

*Dear Tony,*

*I enjoy reading your column at RC Report Online. You frequently remind me of things I shouldn't be doing! Now I have come up with a situation which might be fodder for one of your columns, at least as it applies to me!*

*I've been keeping three transmitters and receivers ready for action, using Ace trickle chargers. I discharge and recharge each unit after use, and then keep them on trickle until using them again, whether that period of time is a day or several months.*

*This system has worked well for me until this winter, when one of the trickle chargers began to discharge my batteries instead of charging them! I discarded that unit and found a new one at Ray and Robin's Hobby Center (in the bargain bin since Ace has apparently discontinued it.)*

*The new unit is defective, however, and only the transmitter output works, so it's unusable for me. The good people at Ray and Robin's have told me that there are no trickle chargers available now as single units.*

*Do I have to buy three cyclers to handle three sets of equipment? I want to be able to keep all three sets fully charged, and I have only a single Hobbico Accu-Charger.*

*How should I maintain all three sets and keep them fully charged, without keeping them all on the same workbench? I usually keep two planes ready to go in the garage, and the third in my cellar workshop.*

*Any advice you can give will be appreciated, maybe in a column on maintaining batteries.*

*Thanks,* *Frank Maguire*  
*South Portland, ME*

Thanks for the email, Frank. The subject of batteries seems to be a never ending one, and an area in which many modelers have questions. Sometimes I'm afraid that I cover this topic too often, yet we still get questions.

Personally, I don't use trickle chargers to keep my batteries ready to fly. Now, that doesn't mean they don't work, it only means that I choose a different method. One item I recommended to Frank was the very popular Hobbico Accu-Cycle Elite.

I personally like to fast charge my batteries on the way to the flying site if I didn't charge them the night before. I use a Hobbico Accu-Cycle Elite as my primary charger. I like it because it will handle my transmitter and receiver battery needs, as well as the LiPo batteries I use in small electric models. I also like the fact that this unit can be used with 120 VAC or 12 VDC.

The Accu-Cycle Elite has a bunch of features, and one that I like in particular is its LCD display and the information that it provides. When I start charging something, the display reminds me the battery type I've selected, the voltage of the battery at any time, the length of time it's been charging, and the present charge rate. This helps me eliminate the possibility of improper charge settings.

I can program and save in memory up to 10 different sets of charge settings for the batteries I use the most. Then, with a simple selection, I can recall any of the ten memories to charge a specific battery. I can also manually set up a charging program for a battery not in memory, and easily modify any of the ten memories.

As the battery charges, I can see the voltage at all times. Eventually you develop a feel for how a battery reacts to a given charge rate. Visually checking the voltage as you charge gives you real peace of mind that the battery is operating normally. This technique is exactly what we need when charging LiPo batteries, in order to verify that all is normal. The Accu-Cycle Elite also supports an optional temperature probe that can be connected to the charger and battery being charged, to monitor the battery's temperature. If for some reason the battery begins to heat up, the temperature monitor circuit can shut down the charger, thus avoiding a runaway temperature situation and possibly damaging a battery or even causing a fire!

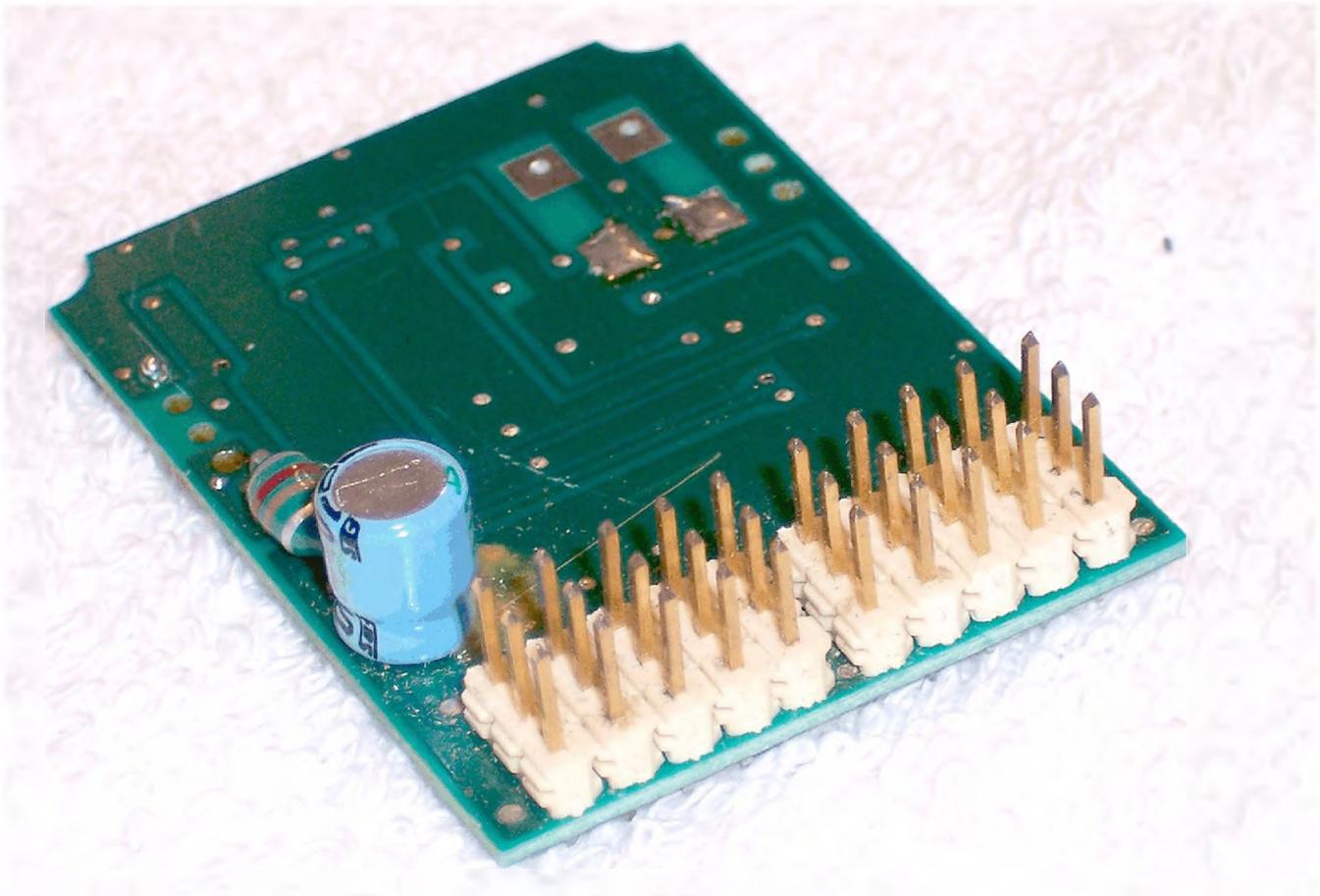
Because the Accu-Cycle Elite is also a dual-output charger, you can charge, discharge, or even cycle two batteries at the same time. I like to connect my transmitter and airplane when I leave home to head for the flying field. By the time I arrive I usually have a full charge, or it may take just a few more minutes until I do. It works great to get in a few three flights right after work!

With a street price of about \$129, the Hobbico Accu-Cycle Elite is not dirt cheap. This is a high-quality piece of gear that works well for me and many others. I know Gordon praises his as well. In fact, I believe he has two!

The Hobbico Accu-Cycle Elite is but one of many good chargers on the market today. Check out the specs of those that interest you, and find one that meets your needs. Some can seem very complex to operate at first, but after using them a few times it becomes almost second nature. Any really good charger will set you back a few bucks, but like a good radio system, it can provide features that will help you enjoy your modeling experiences, and provide peace of mind, which may be the best feature of all!

#### GETTING READY FOR WINTER

As the weather and flying site activities begin cooling off, wise modelers begin to examine the condition of their radio equipment.



### **Gold plated receiver pins that should look like this...**

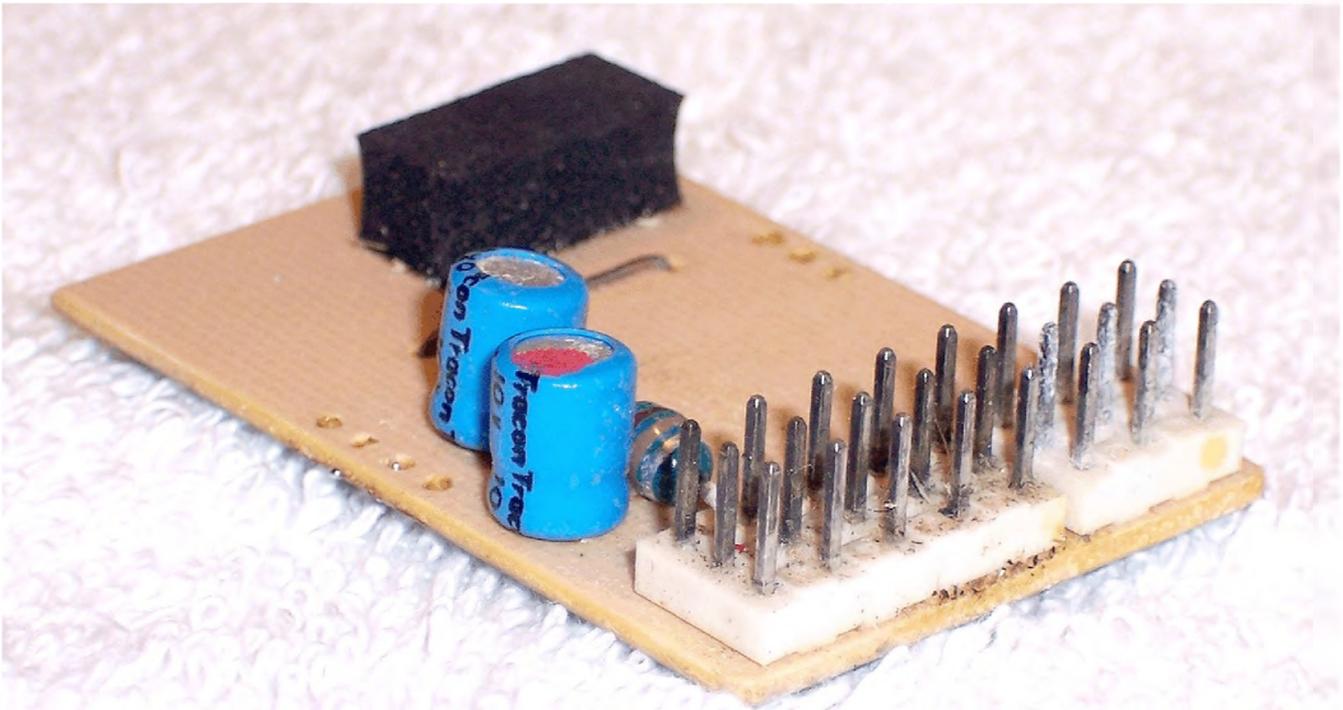
After a full season of flying, it's a good idea to carefully examine all switches and connectors, replace any questionable items, and consider sending in those transmitters and receivers for an annual checkup. Those who wait until the new flying season arrives often encounter long waits at service centers when you're usually in the greatest hurry! Modelers who send in their equipment early often get them back surprisingly quickly, because service centers aren't as busy during the colder months.

For self-examination, where does one begin? First, consider your storage area. It's best to keep your equipment stored in an area where the temperature is regulated and maintained constant. It's also important to keep our equipment away from areas with high humidity. Moisture can cause real headaches with electronics, and transmitters are particularly sensitive to wet conditions (another good argument for high-quality carrying and storage cases). Damp air can promote corrosion on all

sorts of pins, connectors, and metal surfaces. Old batteries that have vented can destroy perfectly good transmitters when the electrolyte from the cells spreads over PC boards, leading to massive and sometimes un-repairable damage. Switch harness connections left unattended can corrode and fuse together, making the connection(s) impossible to separate. This means replacing the whole thing.

It doesn't have to be this way. Take the time to disconnect and examine *all* connectors and receiver ports, using a magnifying glass. Magnifying eyeglasses, available at most drug stores, are very handy when working with electronics.

One of the first bad signs is the wiring insulation being pulled away from the connector. This is the result of pulling on the wire instead of the connector when unplugging connectors. Surely you don't do that, do you? Always grasp the connector by the plastic housing, and gently rock it back and forth to disconnect it. Pulling on



**...are often non-gold plated and look like this. Badly pitted connector pins cannot be repaired.**

wires is a good way to ruin an otherwise good connector. Most connectors are assembled with a crimping tool instead of being soldered. Pulling on the wire weakens this crimp, and may lead to a connector failure. We don't want that!

After you inspect the connectors, you can clean them with rubbing alcohol and a Q-tip or an old toothbrush. Dip the brush in alcohol and scrub lightly. Alcohol will air dry pretty well, or you can use one of those "canned air" products found in computer departments. Just blow off the connector and wipe off any residue with a paper towel.

Once you have the connector nice and clean, spray the wire with a little Armor-All and wipe it clean. This will help keep the insulation from getting brittle and cracking over time. It's a good idea to clean and wipe the receiver antenna wire too.

Dirty receiver connections are easily cleaned, but may require you to remove the plastic case to better reach all the connector pins. Alcohol won't damage any components, but you can use that "canned air" to blow it dry, just to be neat. Badly pitted pins, however, cannot be repaired or replaced. A whole new receiver is required.

All this examining and cleaning does take time, but it can greatly improve the life of your connectors and wiring, and prevent many radio problems. You may also come across some items that have become damaged or worn. Now's the time to replace any questionable items. Many servos, switches, and extensions are inexpensive items compared to the cost of an in-flight failure. Take the time during the off-season to do a little maintenance, and get it done so you'll be ready and reliable come spring.

And what about those batteries? How old are they? You know, it's a good idea to write on the battery the date it was new, using a felt-tip pen. Some guys keep log books with a history sheet on each battery. I recommend replacing radio batteries every two years. Batteries are very inexpensive these days compared to the models that depend on them! Don't pinch pennies when it comes to batteries! When in doubt, replace them with fresh, new cells. Your local hobby shop most likely has them in stock. In fact, it might be a good idea to consider upgrading certain batteries to a larger size for more capability and more peace of mind. And you can't beat "peace of mind"!

(battery clamps have)  
(built-in banana jacks)



(the main brain box)



(optional temperature)  
( sensor not included )



120VAC Power Supply

**The highly capable Hobbico Accu-Cycle Elite is highly recommended.**

While considering new batteries, however, don't forget that if you use a larger battery, you may need a new charger to properly charge the larger cells. Remember how to figure what you need? Use the formula "battery capacity divided by 10 (C/10). If you're using a 1400 mah battery, you'll need a charger capable of charging at 140 ma at least. So check your chargers and make sure you have one that will do the job. If not, this might be the right time to start looking around for a programmable charger that can charge and discharge many different battery sizes. With all the great chargers out there today, you have a bunch to choose from!

Well, that's it for me this month. Get out there and do all the flying you can before the snow falls, and remember to fly safe! Then go to work on examining, cleaning, servicing, and updating your radio gear as necessary, in order to have a safe and properly operating radio syem come spring. Don't wait until the last minute and miss out of those first warm flying days!

-Tony Stillman  
139 Altima Connector,  
Box 322  
Brunswick, GA 31525  
tony@radiosouthrc.com

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**December 4<sup>th</sup> & 5<sup>th</sup>, 2009**

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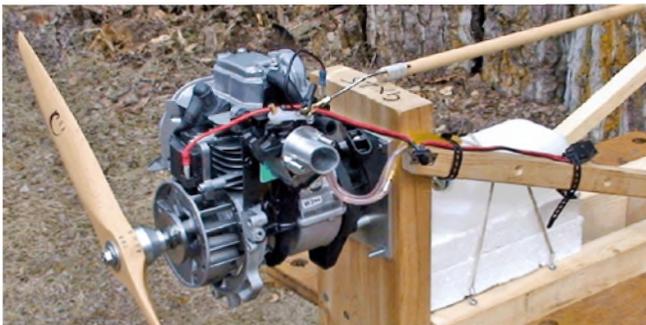
**Background Art Courtesy of Steve Anderson: Du Doch Nicht!!**

# The Oily Hand

by Brian Winch



**Photo 1:** This is how the Honda GX25 looked before Kevin attacked it.



**Photo 2:** This is the GX25 after converting it to swing an airplane propeller.

## HONDA INTEREST

Kevin Blaine, of Alberta, Canada, contacted me recently to discuss converting a Honda stationary engine for model aircraft use. I'm not generally keen on these conversions because quite often the engine is not balanced for our purposes, and you end up with a bone shaker on your hands. On the other hand, Honda engines are particularly well behaved, well balanced, and above all, well made. The Honda GX25 and 35 engines Kevin selected are very good choices since they have a pressurized oil system, so mounting the engine is not a problem. They also run well on basic, lead free petrol, and both have a pull starter that can be left in place after the



**Photo 3:** Here the GX35 has been converted and is ready for testing. It performs very nicely, swinging a 22x6 prop at 5460 RPM. Both engines actually run close to the same speed.

prop drive adapter is installed. I think Kevin is on to something here, and I'll be very interested to see how well his first project succeeds when he fits the GX25 into a Giant Telemaster. Stay tuned for future information. In the meantime, enjoy the photos and, thanks Kevin, for sharing this with us (see **Photos 1-3**).

## BLOW IT OUT YOUR...

...exhaust! Some of you jumped the gun and thought something rude when you read the header, now didn't you! But I suppose the statement is really correct and to the point, as you generally have the exhaust outlet at the rear

of the engine layout, which is, if you must, the ass end. While you come to grips with that thought, intelligent readers will look at some super exhaust systems for both scale and sport applications.

Here in Oz, since the demise of the only custom exhaust manufacturing company, or rather the retirement of the overworked owner, there has been a serious hole in the availability of custom made exhaust systems. We have some very talented model engineers in our fraternity who manufacture some very efficient custom exhausts for their own use, but there are also some terrible jobs done that would frighten even a ferocious junk yard dog! Sadly, some of these horrors land on my bench, attached to a cooked or broken engine. I usually have to cover them with a cloth to avoid a technicolor yawn (aka, nausea) every time my eyes focus on them. And I'm not being unkind here, I'm simply stating a fact. Some blokes simply cannot assemble a neat exhaust system. The main problem is that the metal has to be joined, and this is where most problems occur. Very few modelers will attempt aluminum brazing, even fewer have access to TIG (Tungsten Inert Gas) welding facilities, and few can gas or electric weld thin steel, so the material of choice is copper or brass. And here lies another problem. Brazing is the common method of joining these metals, but this requires skill in using oxygen and acetylene for success. As such, silver brazing (aka, silver soldering) is the ideal choice, but the rods are expensive and many modelers do not understand the need for absolute cleanliness of the areas to be joined. This usually results in a load of money wasted on silver rods, and a truly awful dog-crap final joint. The deposits of (expensive) molten metal often look like dog doings (barker eggs?) on your front lawn. Some modelers resort to using bronze rods (straight brazing), and this can be a woeful event winding up with 500 grams of melted bronze rod on a 200 gram muffler! The final insult is that the style, shape, and/or size of the muffler is an engine killer, choking it to death. Another consideration, while we're on

copper and brass, is that nitromethane reacts with copper (and brass, since it's an alloy of copper), so the pieces get green, grotty, and soon separated. Add to this the often horrendous weight of a thick copper or brass contraption, and you have a rather undesirable addition to your model. Still another problem is the hardening of copper and brass from the application of heat and flexural vibration. Both of these metals suffer very rapidly from fatigue, and when subjected to flexing movement they get harder and harder to the point of extreme brittleness which results in cracks, seam failures, and even whole sections breaking loose. As I said, many modelers do have good metal working skills and can do very credible jobs with aluminum and steel, either of which are the better choices for exhaust systems.

When it comes to the muffler's size and shape we enter a very gray area. There's an awful lot of misguided information concerning the calculations for determining the correct capacity of the expansion chamber. To the best of my knowledge, and this comes after a lot of study and questioning qualified people over many years, that there is no good and accurate "formula". One common misconception is that the expansion chamber needs be no less than 1.5 times the capacity of the engine. If that were true, an adequate muffler for a 10 cc (0.60 c.i.) engine might be only about 1" in length and 1" in diameter, which would be rather constricting and *inadequate*, I'd say.

The principle of muffling is to cool and slow the exhaust gas flow. A firearm silencer, opposed to what you see in the movies, requires special ammunition. You cannot simply obtain the full effect of an efficient silencer while using high power ammunition. The silencer only muffles the sound of the explosion. When a firearm is fired, the noise is a combination of the explosion and the bullet leaving the barrel at supersonic speed. A 12 gauge shotgun firing a solid round at around 800 FPS has a rather dull 'whomp' sound, the actual sound of the cartridge explosion after it has traveled down the

“exhaust pipe”, so to speak. There’s no added sound from the large lump of lead leaving

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the barrel (but it sure packs a big punch!) due to its relatively slow speed. I don’t know if it’s ever been done, but a silencer on a 12 gauge would be quite interesting. But let’s get back to a pistol or rifle fitted with a silencer. As I said, the cartridge explosion may be entirely muffled with a good silencer, and the reason the projectile does not make a big sound is due to sub-sonic ammunition being used, so the bullet is traveling comparatively slowly, much like the big slug from the 12 gauge. In essence, the baffling in the silencer allows the gas to expand within the silencer chamber, and the extra metal surfaces cool it so it loses its sting before the exit. The bullet (and the gas it pushes ahead of it) is slowed down so that it exits with a whisper. In days past I have used a high quality .22 silencer and all you heard when the trigger was pulled was the snap of the firing pin.

To produce an effective silencer for an internal combustion engine, we have to come close to the rifle silencer. We need enough internal capacity and baffling to really cool off the exhaust and reduce its exit speed from the outlet to a snail’s pace. And believe it or not, this can be done with no loss of engine power. One very effective method is to have a series of internal tubes of different lengths through which the exhaust must pass and travel to and fro directed by several baffles until the final expansion area and exit. A point that is often missed by amateur muffler fabricators is the length of the exit. If the expansion area in the main chamber is adequate, the exit can be quite small, but length is very important as you *could* wind up with a super-sensitive tuned pipe effect that will not allow the engine to run properly. This happened some time back with aftermarket mufflers from a rather large and well known

company. On certain size engines, their mufflers prevented a smooth transition past

about 1/4 throttle. Needless to say, this was very frustrating for many modelers.

Another consideration is the reduction of the metal noise... the clatter of the sound waves striking the muffler’s walls. This accounts for quite a considerable amount of exhaust noise overall. On a thin, flat wall of an expansion chamber, the simple application of a strip of silicone compound can make a lot of difference. Brazing (welding etc.) a stiffener strip of metal across the panel is also an excellent killer of the metal ‘ringing’. Anything that prevents or reduces the harmonic vibration of muffler walls is a step in the right direction for reducing sound. As an experiment some time ago, I glued a covering of silicone sheeting on all the outer surfaces of a thin steel muffler that came with a model airplane gas engine. The reduction in sound was amazing, as the clatter was reduced to a dull and low volume clunk sound, a bit like beating a pot lid while you hold your fingers on the surface to quell the vibrations.

Quite a few modelers ask me to make custom exhaust systems for them, but I’m just too busy repairing and testing engines. Besides, I’m supposed to be retired! After a lot of searching here in Australia and overseas, I have found one solution by the name is Keleo Creations. This organization is headed by Kelvin Cubbison, a friendly chap who’s prepared to manufacture whatever exhaust systems you need to fit your model. All his work is built up using 6061 T6 aluminum alloy (tough stuff), TIG welded, and finished in a black satin finish. All the fittings are included, and the job is guaranteed to fit. Believe me, this is top quality work.

My first experience with his work was a ring collector for my Saito 170 (a 3-cylinder radial), and it fit in perfectly with the superb quality of



**Photo 5: My Saito 170 fitted with a twin outlet Keleo collector ring exhaust.**

the engine (see **Photo 5**). My next scrutiny was a pair of scale exhausts ordered by two friends to fit their 1/3 Spitfire models fitted with 50cc gas engines. What a nice bit of work they were! Fully functional (with exhaust coming out every outlet), strong, light construction, and an exhaust growl that made your hair stand on end! I've spoken with Kelvin, and he is quite prepared to supply many stock exhausts, or to fabricate a custom special exhaust system super quick, inexpensively, and with great quality.

He recently sent me some photos of his latest creations for the O.S. IL300 (an inline 4-cylinder engine). One is a pair of vertical pipes (downward pointing) and the other is a magnificent rendition of a Gypsy Moth exhaust looking exactly like the real thing. If you visit his website you can check through the vast range of

exhaust systems on hand. If what you want is not in the list, contact Kelvin directly to discuss your special needs. Keleo Creations, 53875 N.W. Our Lane, Gales Creek, OR 97117 (USA), (503) 359-5318, [www.keleo-creations.com](http://www.keleo-creations.com)

#### FOR THE COLLECTORS

I'm sure many modelers know or have at least heard of David Boddington, the grandpappy of modeling in the United Kingdom. He's designed many kits, drawn many plans, a model magazine editor, and great all around modeler. I'm likewise sure that modelers with a bit of gray on top have seen or heard about a Mills Diesel (.75cc - 1.4cc - 2.5cc) from back around the 50's. Irvine Engines, in the UK, had a run of them manufactured but decided to cease production recently in light of current trends, so



**Photo 6: A delightful little gem, and quite unique.**

the Mills and its clones became very desirable items. Prices on eBay shot up ridiculously.

So, David, being a very keen Mills fancier and user, decided to contract with a company (CS Mfg. in China) to make a batch of 200, which he hoped to sell over the next 12 months. The engines were magnificent, but... they sold out in less than a month! So, he ordered *another* batch, plus some .5cc and 1.3cc engines. All are selling very well, some to collectors, and some for active use in models. The original company (back in the 50's) had a passing thought about a twin, but the thought passed without producing any. David, however, decided to reconsider a twin, so pencil was put to paper. Now a reality, the Boddo CS Twin is a unique little gem that will be a collectors' item worldwide, and a few might even end up in the models of very careful fliers (you sure wouldn't want to lose one!). Imagine the sound of two, alternate firing, .75 cc (1.5cc total capacity) diesel cylinders popping away with incredible reliability. Believe me, it makes me weak in the knees (see **Photos 6 & 7**). If *you're* interested in any of these engines (.5, .75, 1.3, and twin .75cc) plus a range of other reproductions David has, contact him at the address below. And if you're interested in the twin, you'd better jump in real quick as they are of very limited supply. David said he'd hold a few for my readers, so if you want one the keywords are (BRIAN WINCH - RCREPORT - USA). David Boddington, Ivycrest, 26 The



**Photo 7: Compare the size against a standard AA battery. Could this be the smallest production vertical twin ever... and a diesel?**

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#### MAY THE FORCE CONTAIN YOU

Beetlebrain, my self-appointed and totally useless assistant, is finally achieving fame... in a way. He was reading about the character who strapped two jet turbine engines to a board that was attached to his body, and he got them going during a free fall from an aircraft. Apparently he was able to zip around quite well until the fuel ran out, at which time he deployed his parachute... all great fun. So Goofball here figured that this might be the way he could achieve flight using his body and a few little winglets, sorta like Superman with jets. He set up a long metal arm on a center bearing pivot in the garden, and counterbalanced it for his weight. On the extreme end was a platform and two Jetcat 120 turbines. He planned to strap himself onto the platform, initiate the turbines and as the arm rotated he would move his legs and feet to test the effectiveness of the stabilizer plates affixed to them. He had a small can of Jet A1 fuel to feed the turbines, which he figured, would run for about five minutes, giving him enough time to test his theory without building up too much speed. Well, some ornery cuss siphon fed fuel from a mobile tanker into the fuel can, until and there was enough to run both jets for at least one hour! Hose-brain attached

himself to the platform, fired up the full auto start jets, and the arm began to spin. At first he had a stupid grin on his face, and he was moving his legs up and down to test the stabilizers until he realized that the jets were not going to stop soon, and the speed was building up rapidly. After a while he was just a blur in the circle as he spun at incredible speed! His forward motion caused his mouth to gape open, and he was making some really strange, animal type noises. Centrifugal force threw his right arm outward, and centripetal force drew his left arm in. After a while the forward motion was pushing him backward along the board, and humping his back against the rear positioned restraints. Those jets ran full speed for an hour and 37 minutes, and when the rotation finally stopped, ol'



knothead stood up (in a fashion) and just stared into space. His arms had increased in length so much his knuckles dragged on the ground, his back was bent over a fair degree, and his wide open mouth was still making those strange



**Photo 8: A critical sign if I ever saw one!**

noises. I later learned that he was picked up by a traveling circus van, and is currently being exhibited around the country as a great scientific find, the missing link between Neanderthal man and the jungle ape. What a great job he has now, traveling all over, all the bananas he can eat, and all he has to do is make strange noises at the people who pay money to see him. He'll probably end up in a museum where he'll get top billing. But then, I always knew he'd find his calling some day.

#### AARGH! THE QUIETUDE

While I'm enjoying a bit of peace and quiet, I'm taking a little holiday from my workshop which allows me to share a little side-hobby of mine with you. I like reading public signs and notices. I read every one I see for interest, and many of them make me wonder who thought them up. I've even collected quite a few questionable examples over the years. The majority are factual, but a few contain an odd sprinkling of "part fact, part fancy" because I've altered a few... just a little (see **Photo 8**).

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# Bird on a Wire

by Terry Dunn

In the previous two columns I talked about little more than the instructions and outs of aerial photography. I hope dwelling on that topic has not alienated anyone thirsting for knowledge on electric airplanes. As promised, however, this month I'm getting back to electric-oriented themes. I've preached before about the sins of vibrating motors, so this month I'll show you a few ways to exorcize those off-balance demons. But first, I'd like to give you an update on the New Directions RC Vec-Jet PF that I reviewed in the August issue.

## VEC JET UPDATE

A reader, Bud Connolly, recently sent me an email regarding the Vec-Jet PF that he purchased after reading my review. He informed me that the motor mount has been redesigned and now uses a plastic material instead of the hardwood beam that I had to trim. New Directions RC's owner, Dale Mayer, confirmed the change and offered a few comments regarding my review. Dale confessed that the 20 Amp ESC in my Vec-Jet PF kit was a substitute for the lighter 9 & 10 Amp units they usually supply, because he was out of the smaller units when I ordered mine. Dale also added that he believes the top speed of this model to be 50+ mph, and that he routinely gets 20+ minute flights. That sounds like a reasonable duration to me. I usually fly for about 15 minutes with my 1100 mah batteries and I've never run one completely down.

While on the subject of the Vec-Jet PF, let me tell you about a new trick I just learned, which I call the "540 Hammerhead." It's just like a regular Hammerhead, except instead of a 180° rudder turn at the top, I do a 540° turn... fun to watch. My success rate is only about 30% so far, but I'm sure it will get better with more practice. My botched attempts turn into regular flat spins, which are also fun.



## ODE TO A PROP ADAPTER

Now let's move on to tackling those vibrating motors. The first area I'd like to cover is prop adapters. You know what I'm talking about, those little hunks of metal that allow us to mount a propeller to the shaft of a motor, those vital little widgets that transform benign energy into air-grabbing forward motivators. While prop adapters are often humble in appearance, their simplicity masks their importance. Let's take some time to explore the basics.

There are two basic kinds of prop adapters, the "setscrew type" and the "collet type". Within these two categories there are countless variations in shape and size. The setscrew type (also called a "grub screw") is just as it sounds. It features a machined hole with a diameter slightly larger than the intended motor shaft (see **Photo 1**). One or more set screws are then tightened to secure the prop adapter to the motor's shaft. The forward section of the adapter has a built-in drive washer and a threaded shaft to secure the prop. Setscrew prop adapters used to



**Photo 1: I wouldn't go so far as to say that set screw type prop adapters are evil. Let's just say that they aren't my first choice when it comes to airscrew fastening.**

be the only game in town, but they have fallen out of favor in some quarters, with the advent of cheap, collet type adapters.

I personally have several reasons for not liking setscrew prop adapters. First, the little hex-drive setscrews tend to strip too easily. In my case, they always seem to strip when I need to *remove* an adapter, which sometimes calls for drastic measures. Secondly, to get a secure grip on the motor shaft, the setscrew(s) should engage a flat section of shaft. Most motors do not have this, and grinding a flat spot can be a pain. Lastly, I don't think they run as true as collet adapters. This boils down to the necessary clearance required to fit the adapter over the motor shaft. It isn't a precise fit, and that allows some offset to creep in, which can create vibration issues.

My one real gripe about the Park Zone T-28 is its set-screw prop adapter. I love how it looks with its shiny, scale-like prop nut, but it has caused many headaches for me. The setscrew was slightly loose when I bought my kit, and it created a huge vibration issue until I was able to trace and cure the problem. Because my T-28 is a beater plane, it gets worked on frequently, meaning more stripped setscrews. Maybe I'm just ham-fisted, but if I ever locate a collet type adapter that will fit the T-28's uniquely dimensioned, yet very tough prop (which I really like), I'll definitely ditch the stock unit.

With all the above being said, setscrew prop adapters so have a place in this hobby. In fact a



**Photo 2: One particularly useful type of set screw prop adapter is the "wobbly" prop saver. It uses an o-ring to absorb soft impacts and protect the motor shaft and prop.**

very popular prop adapter for small park flyers is a setscrew adapter called a "wobbly adapter", or "prop saver" (see **Photo 2**). This type of adapter uses two long, opposing setscrews and a conical face in place of the prop shaft. The prop "floats" on the conical face and is held in place by a rubber o-ring stretched around the setscrews. As the name implies, it is very wobbly at start-up, but it smooths out as the RPM build. The main benefit of the wobbly adapter is that you're not likely to bend the motor shaft or even break the prop if you crash, although you may need a new o-ring. It's a novel idea that works well with low-powered models.

Aside from wobbly adapters, there are further uses for setscrew prop adapters. I think that they're acceptable in modest power situations (200 Watts or less), where precise centering and balance may not be a critical issue. Just be sure to engage flat spots on the motor shaft when you can, and add some thread-locking compound to the setscrews. It should go without saying that it's also important to use the correct size hex wrench (in good condition) for tightening the setscrews. If the wrench has rounded corners, cut off the rounded portion and use the newly created fresh section.



**Photo 3: Collet prop adapters are my preferred method of propeller attachment. They center perfectly and have a tight grip on the motor shaft. Note the scarred drive washer caused by using pliers for removal. There is a better way.**

Now let's move on to the collet prop adapter seen in **Photo 3**. It's the same basic concept as collets used on lathes, mills, and other machinery where precision centering and a secure grip are mandatory. Collet prop adapters are slotted where the motor shaft is inserted, and have a taper on the outer diameter. The drive washer for the prop is a separate piece that has a taper on the inner diameter to match the taper of the motor interface. As the prop nut is tightened, the tapered surfaces squeeze the slotted section uniformly around the motor shaft, providing a perfectly centered and securely fastened prop.

Now, I really have tried to think of even one drawback to collet prop adapters, but frankly, I can't think of any. It's a simple and sturdy design that does exactly what it's supposed to do, without compromise. The only difficulty that I can see with collet adapters is that the drive washer is sometimes difficult to remove from the prop shaft after it has been tightened. It's just a friction fit, but sometimes there's a lot of friction!

Removing a stuck drive washer should be done with care. I've used all sorts of inelegant methods with mixed results. Using pliers will certainly maul the aluminum parts of the prop adapter. If you apply force even slightly off axis, you could potentially bend the motor shaft. And don't even *think* about using your sledge ham-



**Photo 4: Hyperion makes a useful tool for removing sticky drive washers from collets. I also made several plastic adapters so I can use this tool on smaller collets.**

mer, no matter how great the temptation. If only there was a specialized tool for removing those pesky drive washers. And after only ten years of flying electric airplanes, I finally bought one!

Removing sticky drive washers is such a common task that I'm surprised that I found only one tool designed for the job. There are two versions, however, both made by Hyperion (see **Photo 4**). Both versions are essentially the same, but are designed to work with different size drive washers. I bought the larger version from All e RC ([www.allerc.com](http://www.allerc.com)) for \$14.95 +S&H.

At first glance it seems that Hyperion's tool is much like other tools designed to extract friction-fit parts, such as gear pullers, flywheel pullers, tooth extractors, etc. The housing of the tool grasps the drive washer while a threaded shaft is turned to apply an axial force to the prop shaft. It's very simple, very effective, and very unlikely to damage anything. (Note that I have not yet allowed Gordon to use it, though.)

They say the large version is for removing the drive washer from 8 mm Hyperion Collets, but it fits most other collets of similar size. The 8mm value refers to the prop shaft diameter of the collet. The smaller Hyperion tool is meant for 5 & 6mm collets.

The diameter of a collet's drive washer varies by size and brand. I chose the larger collet puller, and planned to make a few simple adapters that would permit its use with any of my collets. I made the adapters out of some 1/8"



**Photo 5: Standard nylon spinners designed for glow engines are often tough to use on electrics. This model from Hyperion is one of numerous spinners made exclusively for electrics.**

Kydex plastic that I had. Kydex is easy to shape and strong enough to handle the modest forces involved with collet removal. I guess you could also use nylon, aluminum, or even hardwood. Just keep in mind that anything harder than aluminum may damage the drive washer.

#### SPIN TO WIN

For most electric airplanes, a spinner is purely a matter of aesthetics, and it really can make a world of difference in the appearance of a model. Just picture a sleek, shiny P-51 with a puny little prop nut on its nose. Using a spinner meant for electrics will help make the effort of adding a spinner worthwhile. Trying to use a nylon spinner designed for a wet-fuel motor, however, is just asking for a migraine. Typically, those spinners are much heavier than required on an electric since they are built with the intent of being smashed up against the rubber cone of an electric starter. Still, this extra mass wouldn't be much of an issue if the spinner were perfectly balanced and centered. That rarely happens, however. I usually have to ream the spinner's backplate to fit the metric-sized shaft of my prop adapter, and then I have to enlarge the prop cutouts to clear the wide blades of an electric prop. Due to those factors, most of my attempts at using standard nylon spinners with electrics have ended with a frustrating, unbalanced mess.

The bright side of this story is that there are now numerous spinners available that work well with electrics. When I bought my Hyperion Collet Puller, I also picked up a Hyperion spinner for an upcoming project (see **Photo 5**). The plastic Hyperion spinner is 40mm diameter (about 1.6") at the base. At \$4.40, it's comparable in price to a standard spinner. This spinner, however, is lightweight and comes with two metric shaft adapters for the backplate. The prop cutouts are already large enough to clear the blades of my 12" electric prop, with room to spare. So far, I like this spinner a lot. They're available in several different shapes, sizes, and colors. I've also noticed that Great Planes has spinners for electrics, but I've not tried one yet.

There are also spinners available that double as collet prop adapters. In this case, the back plate of the spinner also acts at the drive washer for the prop adapter. This is a great idea because fewer parts mean less chance for vibration. Tru-Turn makes aluminum spinners of this type (see **Photo 6**), and I can attest that they look great and work well. E-Flite too has similar aluminum spinners. Graupner makes a version that uses an aluminum backplate/drive washer and a plastic cone. For smaller electrics, Du-Bro offers spinner/collet combos that are mostly plastic.



**Photo 6: Typical of Tru-Turn's reputation, their electric spinners are high quality stuff. Some include built-in collet adapters for mounting directly to motor shafts.**

## PROPER PROPPING

Speaking of props, let's talk about them for a minute. First of all, allow me to reiterate that you should always balance a new prop. That alone can make a huge difference in the performance of your model simply by removing vibration. I use a finger balancer and add clear packing tape to the back near the tip of the light blade until the prop balances horizontally. I wrap the tape over the leading edge of the blade and smooth it down so there are no wrinkles.

Sometimes it's necessary to enlarge the hole in the hub of a prop. Unless you're a machinist with the skills and equipment to center the hole perfectly, you should always use a prop reamer instead of a drill bit. I own standard and metric prop reamers to fit nearly every situation. The prop reamer is a great tool, but it's no magic bullet. You still must take care to keep the reamer squared-up as you work to prevent the hole from drifting off center.



**Photo 7:** These are both 10" electric props from APC. The standard version on top can tolerate much higher RPM than the Slow Flyer version below. The latter is showing some light-colored stress marks on the left blade, so it's time for a replacement.

APC and GWS both make two types of electric propellers. Their nomenclatures for each type differ, but we can generalize them into "standard" and "slow flyer" (see **Photo 7**). Just by looking it's obvious that the slow flyer props are not meant for high RPM. Spinning them too fast may cause the blades to flex, flutter, or even

detach. That's all bad. I once over-revved a folding prop in a power dive with a hotliner. It only half a second of running with one blade to shake the firewall loose and snap the wing spar. That airplane never flew again, and I never did find the motor. I found the detached blade, though!

When is it necessary to step up to a standard electric prop instead of a Slow Flyer? APC provides limits at their website. To determine the maximum RPM for APC's SF flyer props, divide 65,000 by the prop diameter in inches. A 10" slow flyer prop is good for 6500 RPM. If you need to spin it faster, step up to a standard electric prop. You can, of course, use standard props well below that threshold. Slow Flyer props are typically more efficient in slow-flight applications, but that's no certainty. I encourage experimentation. In case you're wondering, APC's standard props are rated to 190,000/diameter!

GWS does not publish RPM limits for their props, but I was able to find a few sources of data compiled by fellow modelers. I'm content to use their research as the basis for my usage limits. The GWS slow flyer props are good up to 50,000/diameter, while their standard props are okay up to 100,000/diameter.

In my experience, I've found the slow flyer props to be more susceptible to damage. Sometimes just bumping the prop or storing the airplane with something resting against the prop is enough to leave tell-tale white stress marks in the plastic. I know it hurts to throw away a prop that still seems fine, but there's a lot of potential danger in using a damaged unit. Play it safe and replace it when in doubt.

Well that concludes another column, so thanks for your time and attention. I hope this information will help you squash any lingering vibrations in your fleet. I'll be back next month to talk about various techniques for powering receivers.

-Terry Dunn  
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# SPARKY'S REVOLT

by Tony Coberly

Well everyone, we're in the waning months of the year already, and we've had quite a ride. The new *RC Report Online* magazine is going well and the readership is growing steadily. The economy seems to be slightly on the rise as well, so let's hope both trends continue.

Jon Lowe, a club member here in Huntsville, recently discovered a nice item to use as a power source for our battery chargers, a computer power supply for server based systems. I've used many converted computer power supplies in the past, but I've never had good luck with them overall. I've found that converted inexpensive 250-350 watt power supplies simply cannot support the current I need for my larger projects. Jon, however, has had good luck with an Artesyn power supply designed for use as a dual redundant power supply setup for IBM E-Servers (see **Photo 1**). This power supply is rated at a whopping 660 watts output, but there's a catch. This is *not* 660 watts on the 12 volt output



alone! Computer power supplies provide three separate output voltages (12V, 3.3V, and 5V), and each has its own maximum output. The total 660 watt output of this power supply is combined for all three voltages. A close look at the label gives the rating for each output (see **Photo 2**). The 12V output is rated at 37.5 Amps, so when we apply Ohms law we see that 12V times 37.5 Amps equals 450 watts. And 450 watts is probably more power that 90% of out electric flyers will ever need.

First, however, we need to make a little conversion to make this power supply usable with our 12 volt chargers. The rear of the power supply has several brass tabs and a set of jumper pins. Using a volt meter we can test the pins to learn which ones we'll use. When the power supply is plugged in to 120 VAC, there's a green



Photo 1: IBM Server Power Supply

190179

OUTPUT	
电压	电流
VOLTS	AMPS
+ 12.0V	37.5A MAX
+ 3.3V	20.0A MAX
+ 5.0V	35.0A MAX
- 12.0V	0.5A MAX
+ 5.0Vsb	2.5A MAX

MAXIMUM CONTINUOUS OUTPUT POWER IS 660W.  
TOTAL COMBINED OUTPUT CURRENT FROM +5.0V AND +3.3V IS LIMITED TO 45.0A

Photo 2: Here we see the power supply ratings.

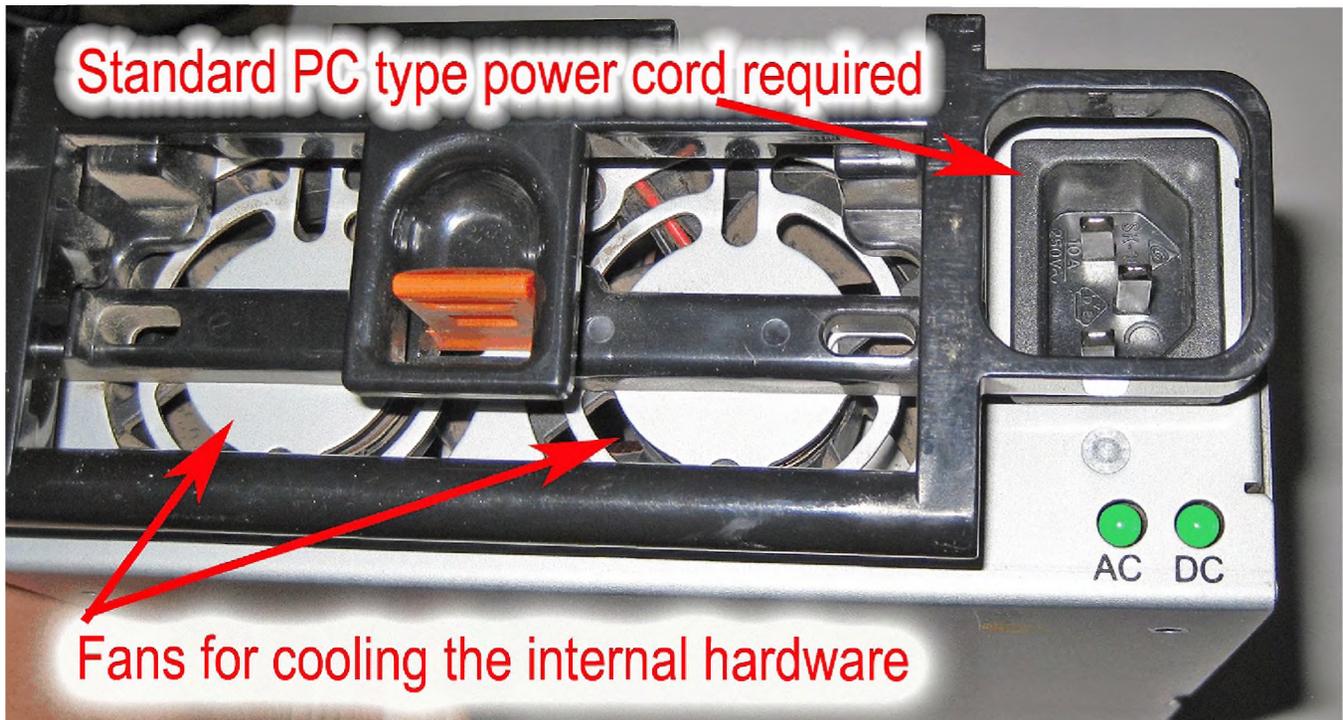


Photo 3: The front of our power supply

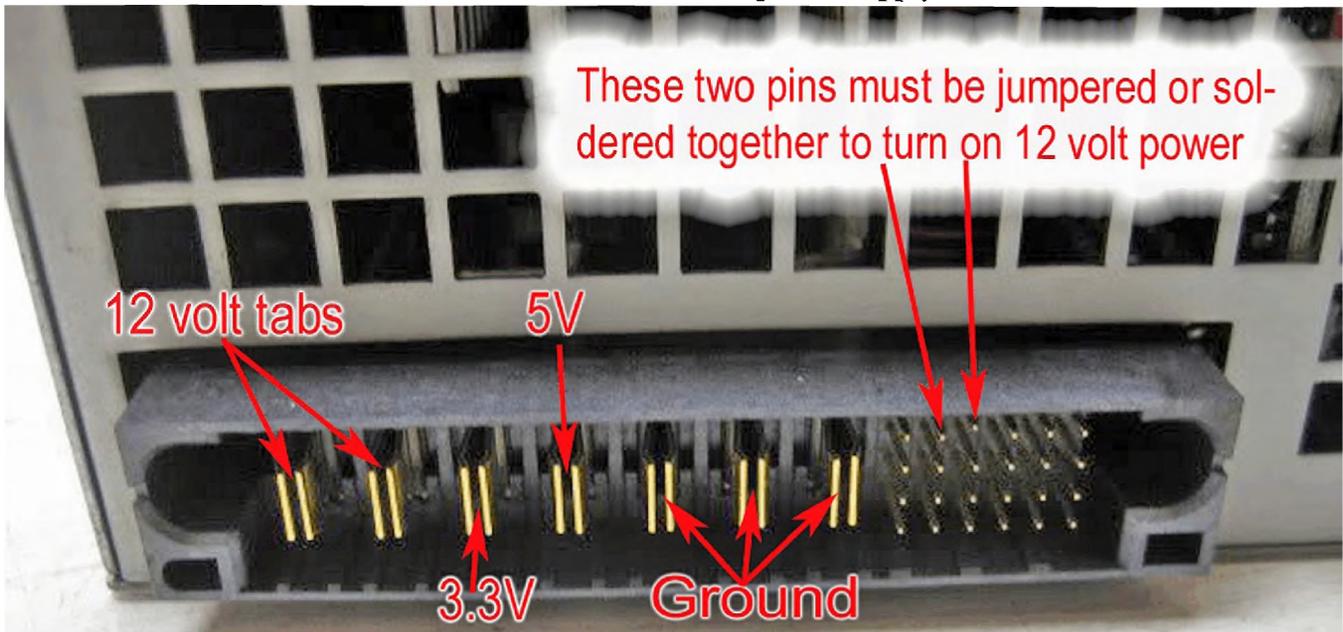
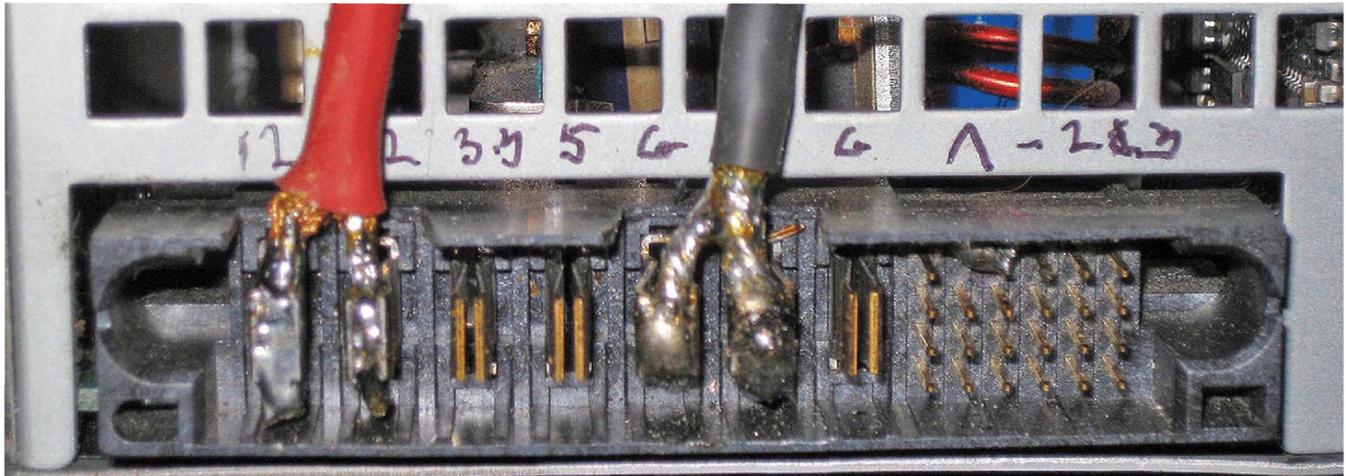


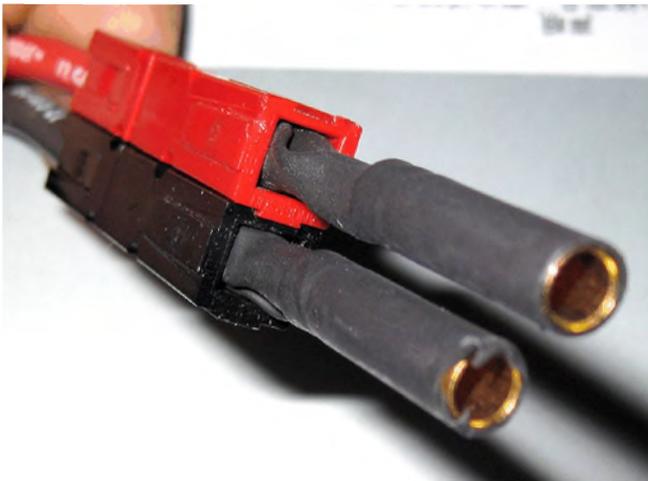
Photo 4: The rear connector before modification

AC LED on the front that illuminates, and an unlit LED marked DC (see **Photo 3**). This occurs because this is a “switching power supply” that looks for a closed circuit before it powers up its DC side. Normally there would be a circuit on the mother board of the server that routs to two wires on the front of the computer to turn it on. Well, with a little searching around the internet I found that the top pins 2 and 3 must be connected to enable the DC output. I

chose to just solder these pins together because I always want both sides of the supply turned on (see **Photo 4**). Because this is a proprietary connector, I decided to solder some 12 gauge silicone wire directly to the brass contacts. I split the end of each wire so I could use *both* of the 12 volt contacts, and for good measure I did the same on the ground wire side. Since all of my chargers have Anderson power poles for the input, I terminated the wires with the same con-



**Photo 5: The rear connector, ready for use, but still needs some insulation for safety**



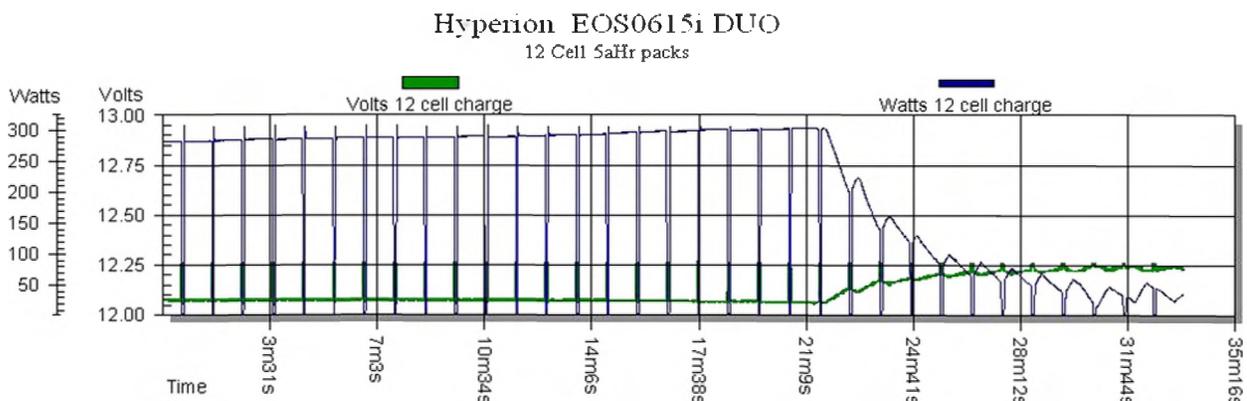
**Photo 6: My Anderson Power Poles/banana plugs adapter**

nectors. By using 12 AWG gauge wire, we can supply over 40 Amps with minimal voltage or current loss, and there's no heat buildup under a full load (see **Photo 5**). I also like to make up an adapter to go from Anderson power poles to standard 4mm brass bullet connectors. This adapter will allow folks with banana plugs on

their chargers to use my power supply (see **Photo 6**).

Okay, now it's time to actually use the power supply and see if it holds up to large batteries.

Here are some actual charger requirements while charging large power systems. I'm using an Oracle data recorder to measure the current that my Hyperion EOS 0615i 6S Duo III charger needs throughout the charge cycle on my largest set of batteries. Balance charging 12 LiPo cells at 5 Amps yields an initial current requirement from the power supply of 279 watts. The battery being charged was about 45% charged when I began the charge cycle. Charging was completed in about 33 minutes, with a maximum draw of 305 watts, and the power supply voltage never dropped below 12.09 volts. **Figure 1** shows the entire charge cycle, with the **green line** (the lower line) showing the power supply voltage during the charge. We can see the regulator within the power supply doing its job very well, keeping the voltage steady, varying only by 0.2



**Figure 1 shows our wattage into the charger, and the power supply voltage throughout the cycle.**

volts. The **blue line** (upper line) in our chart shows the watts the charger is pulling from the power supply. (This line drops to zero frequently when the charger checks the battery's status.)

The maximum watts during this charge cycle was 304. The smooth voltage fed into our charger means that the charger itself has less work to do in trying to maintain the input power. This allows the charger to focus its processing power on the output current, yielding a very good charge on the batteries and less heat in the charger.

This power supply is a great choice for anyone who charges batteries at the flying site when there's 120 VAC available. And the best part about this is the cost! You can usually find these power supplies at online auction sites for \$25 to \$50. At stores like Amazon.com they'll run more like \$60.00. But an Iota or Pyramid power supply in the 30-40 Amp range costs more like \$150 to \$200! Shoot, that's like a two for one special and you *still* get change! Cool!

That's it for me this month, exit stage left, but keep those questions and comments coming. This is your magazine so we need to know what you want to see and read.

-Tony Coberly  
10017 Strong Drive SE  
Huntsville, AL 35803  
tony@rcreport.net

## QUICK THOUGHTS

**Birds of a feather flock together, and then crap on your car.**

**A penny saved is a government oversight.**

**The real art of conversation is not only to say the right thing at the right time, but also to leave unsaid the wrong thing at a tempting moment.**

**The older you get, the tougher it is to lose weight, because by then your body and your fat have gotten to be really good friends.**

**The easiest way to find something lost in your work shop is to buy a replacement.**

**He who hesitates is probably right.**

**Did you ever notice that the Roman Numeral for forty (40) is XL?**

**If you think there's good in everybody, you haven't met everybody.**

**If you can smile when things go wrong, you must have someone in mind to blame.**

**The sole purpose of a child's middle name is so he can tell when he's really in trouble.**

**There's always a lot to be thankful for if you take time to look for it. For example I am sitting here right now thinking how nice it is that my wrinkles don't hurt.**

**Did you ever notice that when you put the two words "The" and "IRS" together it spells "Theirs"?**

**Aging: Eventually we reach the point when we stop lying about our age and start bragging about it.**

**The older we get, the fewer things seem worth waiting in line for.**

**Some people try to hide their age. Not me! I want people to know why I look this way. I've traveled a long way and some of the roads were not paved.**

**Whenever you're dissatisfied with your life, and you'd like to go back to your youth, take a moment and remember "Algebra."**

**You know you're getting old when everything either dries up or leaks.**

**One of the many things no one tells you about aging is that it's such a nice change from being young. Being young may be beautiful, but being old is so comfortable.**

**Long ago when men cursed and beat the ground with sticks, it was called witchcraft. Today it's called golf.**

# FUN AEROBATICS

by Ed Moorman

## MANEUVER OF THE MONTH

### 4-Leaf Clover

We're going to do something a little different this month, the 4-Leaf Clover. Some of you who flew U-control like I did in the old days will recognize it right away. It makes a good R/C maneuver that fits right in with what I've been teaching, because it is made up of four loops. It's also one you don't see often. I do one every once in a while and some of the old timers at my field mention how they remember doing them with a control-line Nobler in the last century.

Speaking of control line, my friend, Dave Kingman, brought out a CL profile stunt plane a couple of years ago. He knew I'd flown CL for 20 years before I got into R/C so he offered me the chance to fly. I took him up on it, but told him to stay out in the center with me just in case. I took off, flew a few maneuvers and after 20 or 30 laps, I was getting dizzy. I asked Dave to take over, which he did just before I fell on my you know what. I was laying n the ground looking up at the sky watching the world spin. I never used to get dizzy. I think I'll stick to R/C now.

### Description

The 4-Leaf Clover consists of four loops (two inside and two outside) arranged in a square pattern. There's a short, straight leg between each loop so the loops don't overlap.

The first leaf is an inside loop, and we complete the whole thing. The remaining "leaves" are three-quarter loops. That is, you enter going one direction, and exit going in a direction 90° from the entry point. Look at the drawing on the 4-Leaf Clover maneuver card.

### Keys to the 4-Leaf Clover

The 4-Leaf Clover isn't a hard maneuver, you just have to go through it step-by-step. If you try to do all four leafs on your first try, you'll probably get lost.



### Airplane and Setup

The 4-Leaf Clover requires a sport acrobatic or fun fly type plane with at least a semi-symmetrical airfoil. A 40-size Stick or 4-Star 40 with a .46 engine is great. Two of the loops are outside loops which are harder to do well with a high wing plane having dihedral. These planes tend to track poorly in outside loops, usually rolling off to one side on their own, making the maneuver harder to do. You'll need to practice a few outside loops, so go back and review that lesson from a few issues ago.

Start off with our Standard Set-up.

1. Full power
2. Fly parallel to the runway
3. Fly two mistakes high. This setup is a little higher than usual, but the second loop of the 4-Leaf Clover is going downward so you'll want some extra ground clearance.

Begin the 4-Leaf Clover flying into the wind.

Step 1: Learn the first two loops. I'll describe the maneuver going from left to right, but this can, of course, be reversed. Look at the drawing on the maneuver card of the first two loops. Note the reference line in the middle. This line divides the maneuver into halves, and should be right in front of you.

Start your run and just before you get right in front of yourself, pull up into a loop using about

half-elevator. When the plane is vertical at point one, it should be directly in front of you.

Continue the loop back around to point four. Level off and fly straight a short distance. You'll have to judge how long you'll need to fly from point four to point five. You want to start an outside loop going downward so that when you hit point eight, climbing vertically, you're back in front of yourself.

Don't worry too much about the distance from point four to point five. You'll probably make a very tight outside loop on your first attempt, so it won't need to be too long. Also, you may want to throttle back as you start the dive into the outside loop. Some people have a hard time coordinating their left hand into the maneuver, and I normally don't throttle back. Some people do, though, at point five, and add the power back in at point seven. Which ever way you use, make sure you've done some outside loops beforehand, and you're sure that your plane has enough down-elevator authority to make it all the way around. We're talking about a full power dive at point six.

After you get around to point eight, continue vertically and break out of the maneuver. The second leaf is the hard one so you need to learn it before you go on to the rest of the maneuver. After learning the second leaf, the rest is rather anti-climatic, and goes zip-zip.

Step 2: Add the third leaf. Check the maneuver card for the drawing of leaves I, II, and III. The third leaf is easy even though it's outside. It always goes nice and slow, sort of like the plane is in slow motion. This is probably because the second leaf went down and gains speed.

<b>RC REPORT MAGAZINE</b>	
<i>TEACH YOURSELF AEROBATICS CARD</i>	<b>4-LEAF CLOVER</b> By Ed Moorman
Description of the 4-Leaf Clover: Basically the 4-leaf clover is four leaves (loops), two inside and two outside, tied together. You can't just do four in a row because they would overlap. This means you have to fly a short straight leg between each leaf.	
Keys to the 4-leaf clover: Go step-by-step so you don't get lost.	
Airplane Required: Sport aerobatic or fun fly plane. A 40-sized Stick or 4-Star 40 with a .46 size engine would be great.	
Set-up for the 4-leaf clover: You'll be doing an outside loop going downward. Make sure you have plenty of down elevator.	
Standard Set-up: 1. Full power 2. Parallel to the runway 3. TWO mistakes high.	
Flight Direction: Do the 4-leaf clover into the wind.	
Step 1: LEARN THE FIRST TWO LEAFS	
Check the drawing of the 1 <sup>st</sup> two leaves. ✓ Note there is a reference line in the middle of the maneuver. This line should be right in front of you.	
<ul style="list-style-type: none"> <li>• Start your run in. Just before you get in front of yourself, pull up into a loop. Use about half elevator. When the plane is vertical, it should be directly in front of you.</li> <li>• Finish the loop. Level off and fly level a short distance to point 5. You will have to judge how far this is. Start an outside loop going downward.</li> <li>• After you get around to point 8 continue vertically and break out of the maneuver.</li> </ul>	

Do the first two loops like you practiced, but instead of breaking off at point eight, continue vertically to point nine. This is why your third loop is so slow. If you don't have a powerful engine, it's probably sucking wind by the time you get back up to point nine. When you're even with the middle of your first loop, add in a small amount of down elevator and do another outside. Trust me, it'll be a slow motion outside loop. When you reach the bottom at point twelve, release the down and hold inverted flight. Once you're stabilized in inverted, roll over and break off.

Step 3: Finish up with the fourth leaf. After you have the third leaf down, it's time to finish up. The fourth leaf is an easy one even though it goes down. It's an inside loop and most every-

one is comfortable with those. Think "Split-S". When inverted you apply up elevator to go down. That's really the fourth leaf. You finish the third leaf and fly inverted until you're back under the first leaf you did, and then you do an inside loop with up elevator. Break off when you're vertical, and continue out the top.

**The Full Sequence**

1. Use up elevator for an inside loop, then fly forward.
2. Use down elevator for an outside loop, but release it while going vertical to continue the vertical.
3. Use down elevator for a second outside loop, but release it while inverted and continue flying inverted.
4. Use up elevator for an inside loop, but release it while going vertical and exit the maneuver.

I like to finish off with a vertical victory roll, and then flat spin back down.

**Likely Errors**

The biggest error is getting lost in the maneuver. This is why I suggest learning it in steps. You have to start high enough (not in the stratosphere, but safely high) so that you have a little extra ground clearance at point seven.

It's harder to do any outside maneuver with a plane that has roll coupling. High wing planes with dihedral can do the 4-Leaf Clover, but such planes want to roll over in an outside loop, and get back right side up. You spend so much time keeping the wing level throughout the maneuver, you don't have time to concentrate on other parts. It's much easier with a plane that has no such coupling.

<b>Step2: ADD THE THIRD LEAF</b>	
<ul style="list-style-type: none"> <li>•Do the first two leaves, but instead of breaking off at point 8, continue vertically to point 9.</li> <li>•When you are even with the middle of your first leaf, put in a small amount of down elevator and do another outside.</li> <li>•When you reach the bottom at point 12, release the down and hold inverted flight. Once you are stabilized in inverted, roll over and break off.</li> </ul>	
<b>Step 3: FINISHING THE 4-LEAF CLOVER</b>	
<ul style="list-style-type: none"> <li>✓The fourth leaf is an easy one even though it goes down. Think split-S.</li> <li>•Finish the third leaf and fly inverted until you are back under the first leaf you did, then you do an inside loop with up elevator. Break off when you are vertical and continue out the top. Finish off with a vertical victory roll, of course, then spin back down.</li> </ul>	
<i>CLIP OUT-TAKE TO THE FIELD-COLLECT THE WHOLE RC REPORT SERIES</i>	
<b>For reprints of Fun Aerobatics or back issues call R/C Report (256) 503-8436</b>	
<b>Ed Moorman E-mail: moorman1@cox.net</b>	

**FEATURE OF THE MONTH**

Different types of speed.

Let's talk now about the different types of speeds encountered with airplanes. Full scale pilots use several different speeds, but we'll talk only about those related to R/C flying, and the differences between R/C and full scale.

The first is "indicated airspeed." On a full scale plane, indicated airspeed is what the pilot reads on his airspeed indicator. This is an extremely important speed because the airplane essentially flies and stalls on indicated airspeed. Measuring indicated airspeed is done so through the pitot (pronounced Pee-toe) tube. As the plane moves forward, air enters the pitot tube and registers on the airspeed indicator. You can often see the pitot tube out on the wing of prop



**Photo 1: Don Warren and his new Hangar 9 “Saratoga” with electric power. I’ve flown this plane and it is very smooth and steady. Don has an E-flite Power 46 motor in it, with a 5-cell LiPo battery. Personally, I’d like to see an OS .55AX in it. I like engine noise, and after many years of flying USAF jets, my hearing is shot anyway.**



**Photo 2: This is Ed Doe with his electric Yak., a very good acro plane. I don’t know the kit name.**

planes, and sometimes on the nose or up on the fin of jets.

Indicated airspeed also depends on the air’s density. At high altitude where the air is less dense, there are less air molecules going into the pitot tube, so the indicated airspeed reads less. And when the air is less dense, the wing makes less lift, too. Actually that’s okay because the speed at which the plane stalls, reaching a point where the wing can’t produce enough lift to support the plane’s weight, is described in indicated airspeed. If your plane stalls at 65 mph, it will burble and drop a wing at 65 mph regardless of the altitude. Altitude doesn’t matter, the plane flies (or not) due to its indicated airspeed. This is really the only speed we need to fly a full scale plane. Sadly, we have no idea what our R/C model’s exact indicated airspeed is! We’d like to know, but we don’t. More on this later.

The next speed is “true airspeed”. This is how fast the plane is moving in the air mass. This may sound a lot like indicated airspeed, but it isn’t the same. Indicated airspeed depends on



**Photo 3: Mike Carroll's Extra. Mike is switching to gas engines, so his Extra sports a ZDZ 50. Is it just me or are a lot of people now flying gas or electric instead of glow? Even Flaps bought a couple of electrics! I'm beginning to think that Ugo and I will be the only two flyers left getting castor oil sludge on our planes. But oh how I love the smell of castor in the morning!**

the density of the air, but true airspeed doesn't. If you have billions of air molecules or just a few, how fast the plane is moving through them is its true airspeed.

Near the ground at R/C altitude for all practical purposes, true airspeed and indicated airspeed are the same on a calm day. Otherwise, the speed we see is not its true airspeed, because the speed we see is affected by the wind.

"Wind speed" is how fast the air mass is moving in relation to the ground. Don't think of wind as a stream of air like a fan blows in your room, think of it like a big bubble of air that's all moving at the same rate.

"Ground speed" ties them all together, the speed of the plane relative to the ground, and the speed R/C pilots see. Ground speed is true airspeed plus or minus wind speed, depending on which way we're going. If we're going *into* the wind, we *subtract* the wind speed from the true airspeed to find our ground speed. When flying *with* the wind, we *add* the wind speed to the true airspeed.

Everyone knows that if we make a full power pass down the runway going upwind, the speed appears slower. Turn around and make the same pass downwind, and the plane appears much faster. The plane's true airspeed, of course, is exactly the same. It's the speed of the air mass in which we're flying (i.e., the wind) that makes the difference.

#### What It All Means To R/C

Let's say our plane stalls at 20 mph, and we'd like to touch down at around 25 mph. We go out late one afternoon, after the wind dies down, and we make several landings. We learn when to level off and touch down without a single bounce... how fast to fly on our final approach, and when to flare. "Man, I've got landings nailed!"

The next time we come out there's maybe an 8 mph wind blowing... not too much, just enough to keep everyone nice and cool. But strangely enough, our great landings have turned to crap! We're bouncing and skipping on nearly



**Photo 4:** Here's a glow engine plane (I had to show at least one!), with a 4C engine. Flaps rebuilt my "Sea Rascal" after the bash that took off the nose, mangled the struts, and broke the floats. These are some light wire struts we had, along with the floats from my old "Sea Fazer". Yes, I know the floats aren't aligned properly. I'm making a new set of struts now. But the Sig .40-size Rascal with an O.S .FS-70 Surpass makes an excellent float-plane conversion. And why not, since it's a great flying airplane in almost any setup.

every touchdown. The real culprit, of course, is the different ground speed. That's what we see, not our true airspeed. With an 8 mph headwind, if we fly the final approach at what we think is 30 mph, and try to touch down at 25 mph, due to the head wind, our true airspeed on final is 38 mph, and we're trying to touch at 33 mph. Since the touchdown is now faster, it's very easy to skip and/or bounce.

The solution is to get more experience flying on windy days. We need to learn how to mentally estimate our true airspeed. If it's slightly windy, fly slightly slower on final and expect the plane to float and land longer than it does on calm days. If it's *really* windy, we need to be extra careful. We may have to fly the plane right to the ground, and then cut power.

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As a final note, the next time someone even *hints* that flying an R/C model is easier than flying a full scale airplane, just smile and know inside yourself that they're very, very wrong. R/C pilots have to learn to steer when our plane is coming toward us and when it's going away. Full scale pilots don't. Plus, *they* have an indicated airspeed meter, while *we* have to estimate our airspeed, using wind and a visual ground speed. Trust me on this one, guys. I taught USAF flight training in T-37's for four years, and have since taught many R/C pilots. I know. The T-37 was easier! (*Editor's Note: It's been said that the biggest difference between the USAF and any other flying club is ammunition.*)

-Ed Moorman

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# 1/12 SCALE P-40 WARHAWK ARF

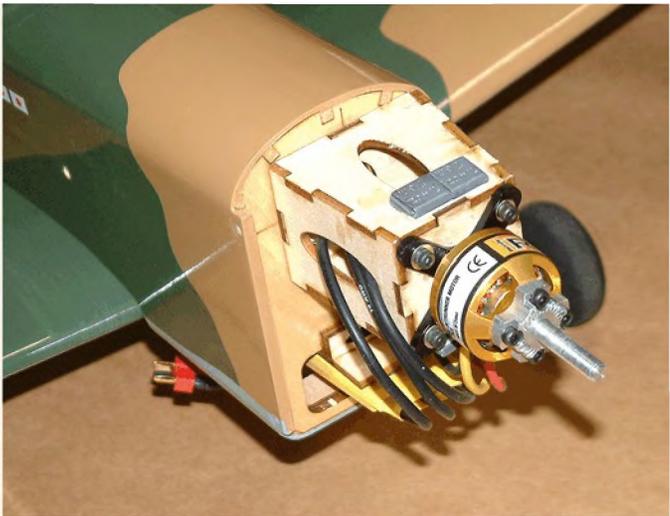
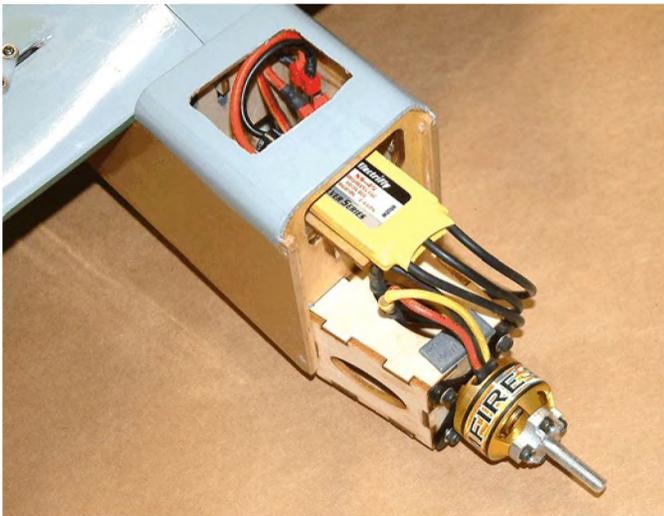


**a product test report  
by walt wilson**



**Model** . . . . . P-40 Warhawk  
**Airplane Type** . . . . . 1/12 scale ARF for  
 glow or electric power  
**Manufacturer** . Great Planes Model Mfg. Co.  
 (Made in China)  
 P.O. Box 9021  
 Champaign, IL 61826-9021  
 (217)398-3630  
 www.greatplanes.com  
**Distributor** . . . Great Planes Model Distr. Co.  
**Suggested Retail Price** . . . . . \$149.99  
**Typical Street Price** . . . . . \$97.99  
**Wing Span** . . . . . Advertised: 38.5"  
 Measured: 38.9"  
**Wing Area** . . . . . Advertised: 242 sq. in.  
 Measured: 245 sq. in.  
**Advertised Weight** . . . . . 38 to 46 oz.  
**Airfoil** . . . . . Semi-symmetrical  
**Wing Structure** . . Built-up balsa and plywood  
**Wing Joiner Method** . . . . . Plywood joiners  
**Fuselage Structure** . . . . . Built-up balsa  
 and plywood  
**Fuselage Length** . . . . . Advertised: 34.50"  
 Measured: 34.13"  
**Pushrod Type** . . . . . Music wire  
**Pushrods Installed** . . . . . Guide tubes only  
**Hinges Included** . . . . . CA-type

**Hinges Installed** . . . . . No  
**Recommended Controls** . . . . . Four  
 (Ail, El, Rud, Throt)  
**Motor Included** . . . . . None  
**Recommended Motor(s)** . . . . . Great Planes  
 Rimfire 35-30-1450kv Brushless Outrunner  
**Recommended Propeller** . . . . . APC 9x6 Sport  
**Motor Mount Installed** . . . . . No  
**Motor Mount Type** . . . . . Plywood  
**Battery Included** . . . . . None  
**Recommended Battery** . . . . . Great Planes  
 LiPo 3200mAh 11.1V 20C Discharge  
**Landing Gear Installed** . . . . . No  
**Wheels Included** . . . . . Yes  
**Assembly Instructions** 32 pages (8-1/2x11")  
 with B&W photographs, parts lists, and  
 instructions for glow or electric power.  
**Hardware: Metric or SAE** . . . . . Metric  
**Hardware Included** . . . . . 2.5" spinner,  
 pre-painted fiberglass cowl, wheels, formed  
 wire landing gear, removable shelf for  
 battery and receiver, motor mount for  
 electric motor, pre-painted clear plastic  
 canopy, wing bolts and blind nuts, nylon  
 control horns, nylon clevises and keepers,  
 pre-formed elevator joiner wire, decal sheet,  
 and other miscellaneous hardware. Also in-



cludes a two-piece composite engine mount with hardware, and a 4 oz. fuel tank for a glow engine.

**Items Needed To Complete** . . . User selected power system (glow or electric), and a 4-ch radio system with micro components

**Covering Material** . . . . . MonoKote

**Estimated Assembly Time** . . . . 7 to 10 hours

**Estimated Skills Required** . . . . Experienced

**Drilling Required** . . . . . Yes

**Soldering Required** . . . Depends on the user-selected power system

**Adhesives Required** . . . . . CA, canopy glue, and epoxy

**Assembly Tools Required** . Normal modeling tools, to include a Dremel-type rotary hand tool with various bits

**COMPLETED MODEL**

**Finished Weight** . . . . . 41 oz.

**Wing Loading** . . . . . 24.1 oz./sq.ft.

**Motor Used** . . . . . Great Planes Rimfire 35-30-1450kv Brushless Outrunner (2.47 oz.)

**Propeller(s) Used** . . . . . APC 9x6

**Propshaft to Ground** . . . . . “ (held level)

**Speed Controller Used** . . . . . Great Planes Silver Series 45A Brushless, with 5V/2A BEC

**Battery Used** . . . . . Great Planes LiPo 3200mAh 11.1V 20C w/Balance

**Radio Used** . . . . . Futaba 6EXA transmitter with a FP-R127DF receiver and three S3115 micro-servos

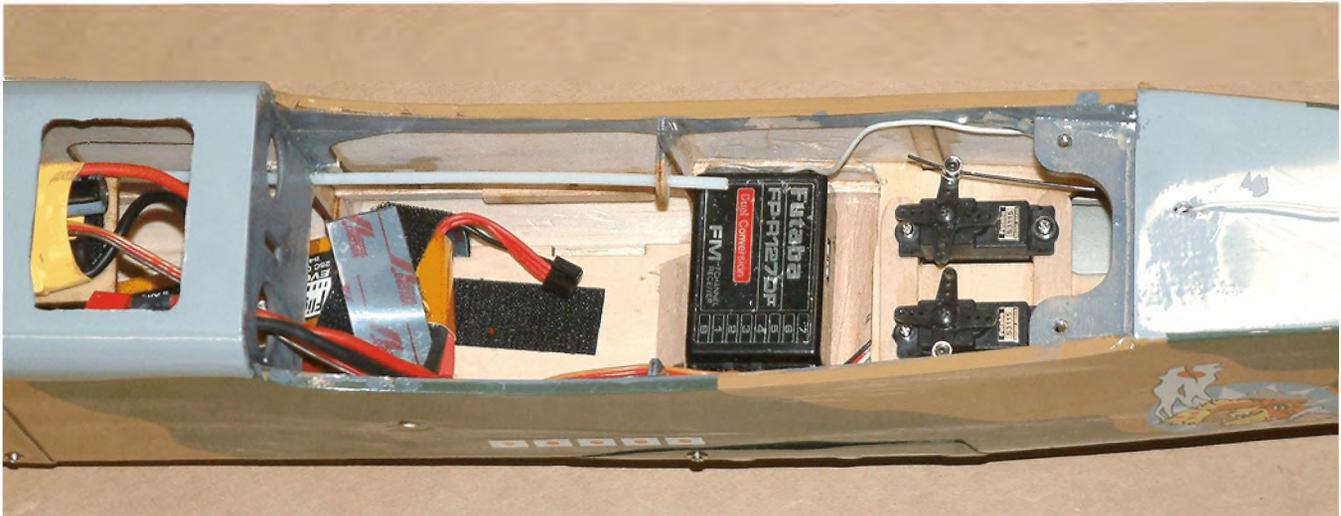
**Covering/Finishing Used** Comes pre-covered

**Special Items** . . . . . Bullet connectors for ESC to Motor

**CHEERS** - Good instructions; kit includes parts and instructions for electric or glow power; excellent parts fit; hardware package is complete and of good quality; good covering with very few wrinkles; spare parts available; very good flying qualities.

**JEERS** - Poor ground handling (no steerable tail wheel); wing must be removed to access motor battery; connectors on the recommended motor and ESC do not match; poor scale representation; simulated rear windows; does not include the scale, dummy exhausts shown on the kit box.

The Great Planes 1/12-scale P-40 Warhawk ARF is designed to be legal for competition in the AMA Event 750, Class 2610 Combat. It can be powered by a glow engine or an electric motor, and has structural provisions for both. The kit comes in a colorful box with all components and hardware sealed in plastic bags and taped in place in various locations. The wing halves and tail surfaces are separated from the fuselage and other components by a corrugated cardboard shelf. The kit includes built and camouflaged MonoKote covered fuselage, wings, and tail surfaces. Also included are a pre-painted fiberglass cowl with the shark's mouth and eyes already applied, plywood parts to build an electric motor mount,



pushrods, a 2.5" spinner, plywood parts to mount the receiver in different locations (depending upon the type of power system selected and battery location), formed wire landing gear and wheels, pre-painted clear plastic canopy, 4-40 Allen-head screws and blind nuts for the wing, nylon control horns, nylon clevises and keepers, pre-formed elevator joiner wire, a colorful decal sheet, and miscellaneous hardware. For glow power, an engine mount and 4 oz. fuel tank are also provided.

All parts arrived in good condition with very few wrinkles in the covering. The completed model, however, bears only a passing resemblance to a full-scale P-40. For example, the side windows that would allow the pilot to look out over his shoulder are represented by gray covering film. There are no wing fillets, the cowl should but does not extend to the leading edge of the wing, the shark's mouth is too small, and there are no dummy exhaust stacks included in the kit (even though shown on the box). In my opinion, it's a nice sport and combat model that just vaguely resembles a P-40.

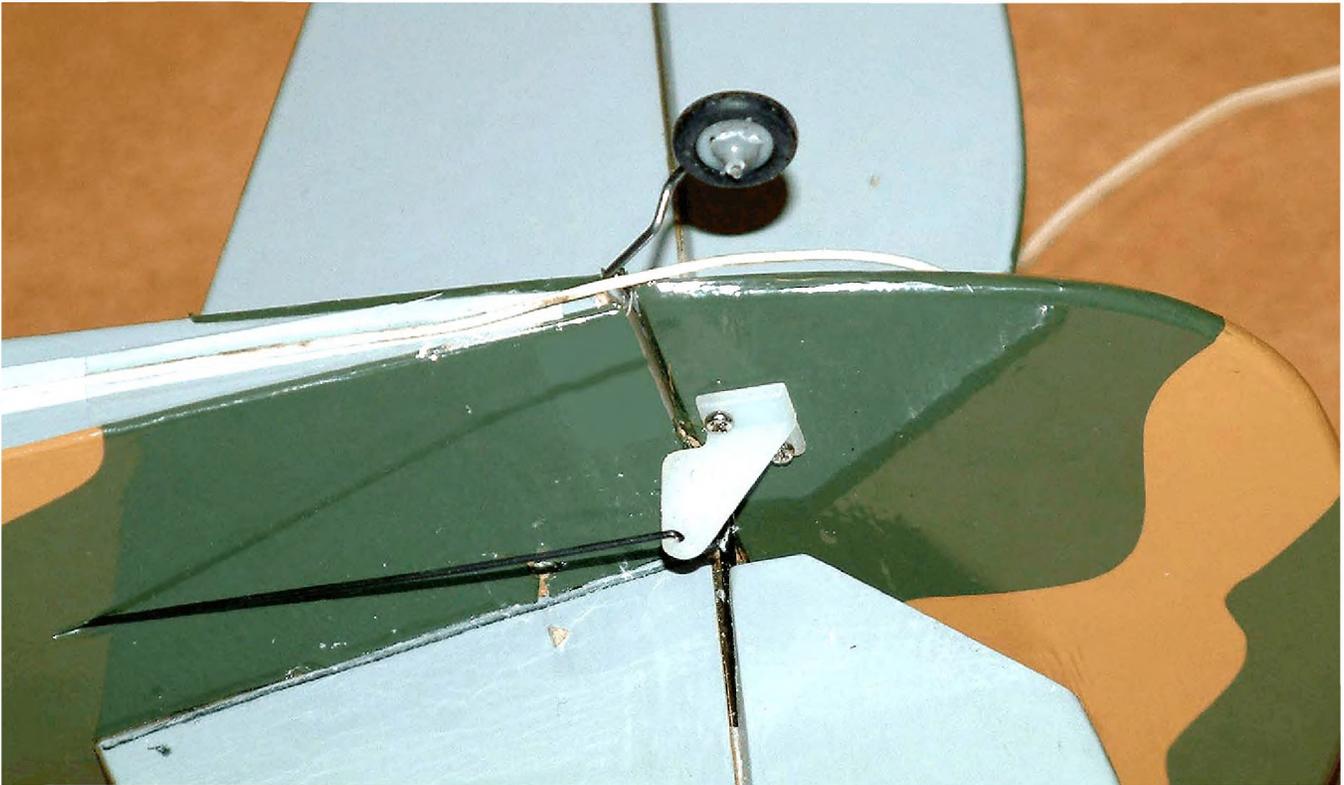
Assembly starts with the wing panels, in which the aileron torque rods are already installed. Torque rod holes are pre-drilled in the ailerons, but it was necessary to enlarge the clearance slots slightly. Otherwise, everything fit very well, right from the box. The pre-cut hinge slots are big and deep enough to do the job. Pins were used to assure the CA-type hinges stayed centered while being pushed into the pre-cut

slots. Once the hinges were in place, the pins were removed and the ailerons were permanently installed using thin Zap and a bit of 5-minute Z-Poxy on each torque rod.

By the way, Pacer adhesives were used throughout this project because I always get great results from their CA's and epoxies.

A two-piece plywood wing joiner must be epoxied together. Each wing half is cut out, at the center rib, to accommodate the aileron servo. Since most servos have a lead coming out at the bottom, it's a good idea to enlarge the cutout in the ribs at the front side of the hole to accommodate the wire. This can be done later if desired, but it's easier to do now, before assembly. The wing joiner is then fitted into the boxes provided in each wing half. In this instance it fit perfectly. I used 30-min Z-Poxy to join the wing halves. The center ribs matched perfectly and the wing halves were straight, so there were no alignment problems. The wing mounting holes were pre-drilled, and exposed by cutting away the covering. A pre-covered plywood wing bolt plate is to be installed on the bottom of the wing. The holes in the wing and blind nuts in the fuselage lined up perfectly.

The instructions don't mention it, but a plywood mount for the aileron servo is provided, which fit the Futaba S3115 servo perfectly. The plywood tray is thinner than I like, so I added two strips of 1/8" lite ply to give the servo mounting screws more to grip.



The appropriate amount of wing covering was cut away, and the servo tray installed with epoxy. It was necessary to grind a small relief on one side of the tray for the servo lead to come out. Making and adjusting the pushrods completed that part of the project, using the plastic clevises provided.

The stabilizer fits into a pre-cut slot in the fuselage after the covering is cut away to expose the slot. The stabilizer was perfectly square with the wing, so no corrections were needed. After checking the alignment and centering of the stabilizer, the covering was stripped from the center, and it was glued in place with thin CA.

The elevator halves were already drilled and slotted for the joiner wire. The tail components came pre-slotted for the hinges, and assembly went well just as directed in the instructions. The fin was aligned and installed with CA. Installing the rudder completed the upper tail area.

A tail skid is provided instead of a steerable tail wheel. A steel washer is installed in the bottom of the balsa skid, to prevent grinding the skid off on a runway. (The completed model's ground handling on an asphalt runway was so

poor, I later replaced the skid with a steerable tail wheel (see photo above). If the plane is to be hand-launched and flown without landing gear, the tail skid would be fine as is, or could be omitted altogether.)

A plywood servo tray comes installed in the fuselage, with openings for three servos. The tray is quite thin, however, so I recommend adding another layer of plywood (or Popsicle sticks) to give the servo mounting screws more wood for better security. Two 0.043" pushrods, each with a Z-bend at one end, screw-lock pushrod connectors, and two control horns are provided. There are two tubes pre-installed in the fuselage for the rudder and elevator pushrods. Installing the servos, control horns, and pushrods completed that area.

A receiver mounting tray, to be installed at the front of the servo tray, is also provided. With 1/4" foam rubber padding, the receiver can be fastened to the tray with rubber bands. Unless the receiver is really small, however, it may interfere with the aileron servo if mounted as per the instructions. I used a full-size Futaba receiver, so it had to be relocated. I cut away the throttle servo part of the tray, and used Velcro to

attach the receiver to the bottom of the cockpit floor, which then provides lots of clearance.

There's no internal tube for routing the receiver antenna, so I simply taped it to the bottom of the aft fuselage.

The plywood battery tray is mounted between the second and third formers. The Great Planes LiPo 3200 mah 11.1V battery fits perfectly and fills the space provided. A 2100 mah battery can also be used, but with shorter flight times. My 2100 mah battery weighs 4 oz. less, but the recommended CG can be maintained by moving it all the way forward in the allotted space. Velcro strips were used to prevent fore and aft movement and make a tie-down for the battery. I also added a 1/2" foam rubber pad between the front end of the battery and the firewall to provide some cushioning... in case of a sudden stop! An opening in the bottom of the firewall is popped out and a plywood ESC tray is assembled and epoxied in place. The ESC can be attached to the tray with double sided foam tape or Velcro.

Holes are already drilled and 3mm blind nuts installed to speed installation of the motor mounts. Right-thrust and down-thrust are built into the firewall, and the mounting holes are offset to keep the spinner centered. The parts of the plywood motor mount box are keyed and go together nicely. The provided mounting screws for the motor mount are 3mm Phillips head. I would have preferred socket-head screws for this because once the box is installed and the front mounting plate is epoxied in place, they are no longer readily accessible.

For whatever reason, the bullet connectors on the recommended motor and ESC are different sizes, and must be adapted. One set of wires can be re-soldered to the other size connectors, or they can be adapted. Part numbers are provided for ready-made adapters, or parts that may be used to make adapters.

This plane was originally flown with a glow engine. The exhaust and other glow engine related holes in the cowl were temporarily patched to direct maximum air flow through the

ESC area for initial evaluation and test flights. A new cowl is on order as this is being written. The P-40 has a generous opening in the cowl for air intake, allowing cooling air to get to the ESC, but little of it flows around the motor. The scoop on top of the nose was also opened for more air flow to the motor. A large air hole is opened in the bottom of the fuselage between the cowl and front of the wing, by cutting away the covering material, providing air egress. The provided spinner didn't run true, even after I tried to correct it by repositioning, so I replaced it with a Great Planes E-Spinner with an aluminum backplate.

A Williams brothers 1/12-scale pilot figure, which seems a bit small for this plane, and the canopy were installed using Formula 560 Canopy Glue, and the decals were applied.

The plane was a bit tail-heavy at first, so 1 oz. of lead was added to the front of the motor mount box, which brought the balance point right to the recommended CG.

Aileron alignment was checked with a Robart Wing Incidence Meter and adjusted. I then set the recommended low and high rate throws using a Great Planes Accu-Throw Deflection Meter. The recommended starting aileron throws are 1/8" up and down for low rate, and 3/16" for high rate. That doesn't sound like much, but from previous experience with planes of this type, that's *just* right for the first flight. The motor was run up and found to provide a *lot* of thrust!

It was then time for photographs and flying. The Spirits of St. Louis R/C Flying Club was organizing it's first Electric Warbirds Race. This plane was originally flown with an O.S. .25 FX glow engine, but I converted it to electric power for the EP Warbird race. Since I'm still recovering from eye surgery, I asked the Spirits' pylon racing guru, Paul Geders, to test-fly the model, and then race it for me if all went well.

Test flight day was a bit windy, but not enough to cause a problem. It's necessary to remove the wing (two screws) to access the battery, so an easily removed hatch would be



**The kit's spinner was replaced with a great Planes E-Spinner, and the scale air intake on top of the fuselage was opened for additional cooling.**

appreciated. Once the battery is installed, it's possible to plug and unplug the leads through the cooling hole in the bottom of the fuselage.

Ground handling is quite good with the steerable tail wheel I added. On takeoff, it tracks straight and lifts off in about 30'. The climb out is smooth and the power impressive. No trim adjustments at all were needed for straight and level flight.

Paul flew several slow fly-bys for the camera. It cruises very nicely at 1/4 to 1/3 throttle. The vertical performance was very impressive when he climbed to a higher altitude for more testing and basic aerobatics. Rolls performed on low rates are a bit slow due to the small deflection of the ailerons. Switching to high rate, however, makes it roll quite well. Paul performed loops and inverted flight, and then slowed to see what happened when it stalled. It would fly very slowly before stalling, and even then it just dropped the nose, gained a little airspeed, and resumed flying. It also glides well with the power off. He then flew a few laps around the pylon course, and it appears well within the speed envelope necessary to be competitive. He also did a few touch-'n-goes, noting that it has a tendency to bounce on touch-down. No matter how well he greased it in, it would still bounce! On one landing the model nosed over, but the only damage was a small, skinned spot on the cowl.

When checked after landing, the motor, ESC, and battery were all roughly equal to body temperature, proving adequate airflow.

In my opinion, the Great Planes P-40 ARF is well-built and makes a very good combination with the recommended motor, ESC, and battery. Its power actually seems at least equal to a good .25 glow engine. Using low rates, the model is a very friendly little airplane to fly. The instructions book is thorough, and the recommended CG and control surface throws are right-on for a comfortable first flight. With the exception of the receiver location for electric power, everything fits well and the model assembles quickly and easily. It would be nice to have an easily removable hatch for battery access, but the recommended battery is physically so large, that may be difficult.

The model makes a good glow or electric powered racer, sport plane, or a competent combat flyer. Increasing the control surface throws and moving the CG aft a bit can make it as wild a performer as most flyers would want. With higher rates, however, it becomes a model for experienced flyers only.

-Walt Wilson  
rallyo@charter.net

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## HEADLINES WORTH HEADLINES!

**“Something Went Wrong in Jet Crash,  
Expert Says!”**  
*(No kidding! Really? Ya think?)*

**“Police Begin Campaign to  
Run Down Jaywalkers”**  
*(Now that's taking things a bit far!)*

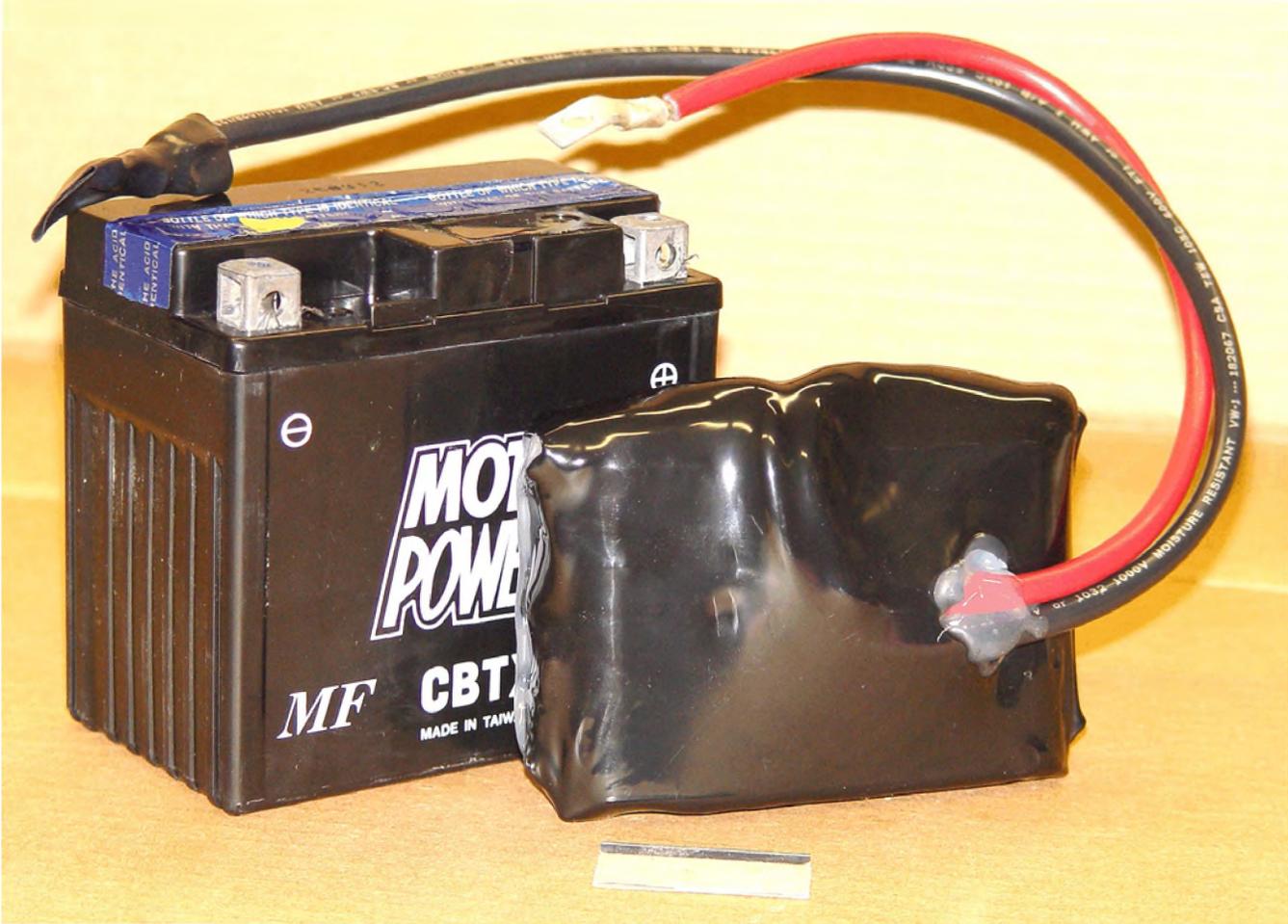
**“Miners Refuse to Work after Death”**  
*(Those no good lazy cadavers!)*

**“Juvenile Court to Try Shooting Defendant”**  
*(See if that works any better than a fair trial.)*

**“War Dims Hope for Peace”**  
*(Yeah, I can see where it may have that effect.)*

# R/C REPORT ONLINE

# PRODUCT TEST REPORT



**Item Tested** . . . . . Lightweight Starter Battery  
**Type** . . . . . 4-cell, 2500 mah, 60C LFP (Lithium Iron Phosphate) 12-14 Volt battery  
**Purpose** . . . . . Replace heavier and larger 12 volt batteries that use other chemistries  
**Manufacturer** . . . . . E-BATT  
 26893 Bouquet Cyn., Ste. C, #441  
 Saurus, CA 91350  
 (661) 297-0400  
**Suggested Retail Price** . . . . . \$79.95 + S&H  
 (I was charged \$10 for S&H)  
**Warranty** . . . . . One year limited warranty

**Applicability** . . . . . Use anywhere you would normally use a small 12 volt battery  
**Dimensions** . . . . . 4.7" wide, 3.2" tall, 1.9" thick  
 (Above figures include wrapping)  
**Weight** . . . . . Advertised at 12 oz., mine weighed 17.25 oz. with shrink wrap and wiring  
**Instructions** . . . . . Very little, and they basically apply only to motorcycles  
**Hardware Included** . . . . . 14" negative (-) and 11" positive (+) 8 AWG wires with spade connectors

**CHEERS** - Successfully replaced a 4.3 lb. motorcycle battery, saving 51.55 oz. (3.22 lbs.); nicely packaged in black shrink-wrap and sealed with clear silicone sealant; comes with long, heavy duty wires; very reasonably priced; compatible with any charger suitable for a 12 volt lead-acid battery (must not exceed 14.4 volts, however); capable of providing 150 Amps.

**JEERS** - The battery I received weighs 5.25 oz. (43%!) more than advertised (seller says the "packaging" (shrink wrap and wiring) account for the extra weight); shown without wiring, the website photos depict the physical size (4.25x2.75x1") to be significantly smaller than the delivered battery; although the website identifies the cells as 2500 mah, the battery itself is not marked or labeled in any way.

---

I actually ordered this battery for one of my dirt bikes, since it will reduce the bike's total weight by 3.25 lbs., which is not only beneficial to its handling in the woods, it makes the bike easier for this old boy to pick up after a fall! The battery in this motorcycle is located quite high, directly under the seat, where any weight reduction also helps lower the overall CG, which even further enhances handling. Although hardly noticeable at slow, trail riding speeds, the weight savings becomes more and more apparent as the speed increases and handling becomes more critical.

Even though the battery's true weight is 5.25 oz. (43%) greater than advertised, the extra weight is not a problem on the bike. It still bothers me, however, that the battery is misrepresented in ads and at the website.

Once I had the battery in hand, however, it occurred to me that it might also appeal to some modelers who use small, 12 volt gel cell or motorcycle batteries in their flight boxes. Although I no longer use gel cell batteries, I have five old ones on hand that I use for building weights, and they vary in tonnage from 62 to 88 oz. (I now use a lawn tractor battery in my flight box, to allow charging large LiPo batteries for my electric

models.) This means that the E-Batt LFP battery will save a substantial amount of weight when replacing a heavier battery (or two), and it will hold its charge longer in storage.

In addition to charging the battery as I ride, via the bike's built-in charging system, I've also used a Yuasa motorcycle battery charger, and both systems seem to work just fine. After discharging the battery down to 9.0 volts, I recharged it using the Yuasa battery charger while carefully monitoring the battery's temperature. It never even felt warm while charging at 3.5 Amps to 13.5 volts.

I also disconnected the bike's spark plug and compared cranking time between the original Yuasa 5 Amp (5000 mah) battery and the E-Batt 2500 mah. As expected, the E-Batt could not match the original battery's cranking time. But since the original battery would not match the cranking time of a larger battery, such as the lawn tractor battery in my flight box, the question is actually, "How much is enough, and at what weight penalty?" As long as the E-Batt has enough juice to start the motorcycle's engine under normal conditions, and maybe in at least one instance of flooding after a fall, I'm satisfied with its performance, and thus its power to weight ratio.

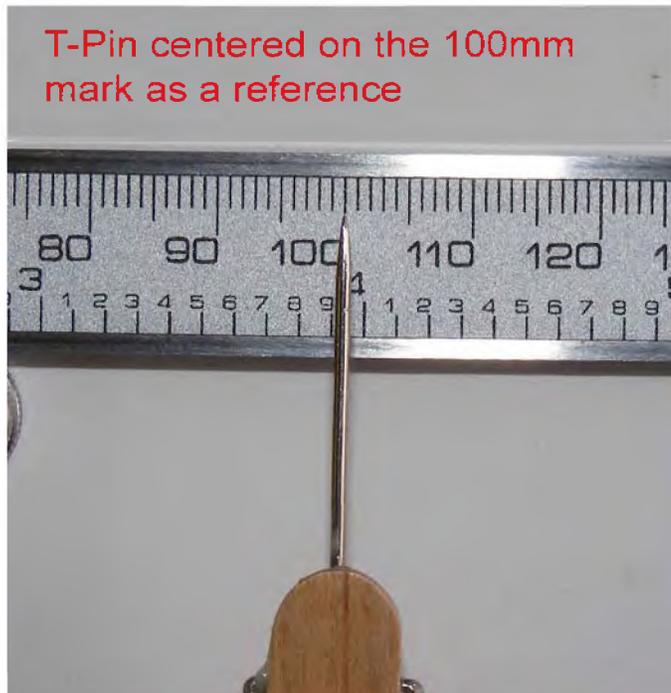
The E-Batt's size, weight, and power appear to make it well suited for a completely portable (cordless?) electric starter, too. I once used a B&P Associates 4.0 Amp NiCd starter battery (10 cells) for nearly eight years before it finally became too weak to continue. The E-Batt 4-cell Lithium battery is both smaller and lighter, and if maintained properly, should last quite a long time as well.

I'm always disappointed to see any product misrepresented in ads, and the E-Batt is a good product at its true weight. I just don't understand why it's advertised at 12 oz. when the battery received weighs 43% more. Nevertheless, I'm more than satisfied with its performance for its weight and cost, so I'll probably order more for my bikes *and* for modeling uses.

-Gordon Banks, [gibanks@knology.net](mailto:gibanks@knology.net)



the specs of this servo, you would never guess that this servo can output 425 oz-in of torque! I guess you could deem this a *Monster Servo*! In the not too distant past you had two options for large control surfaces. First option you would have to gang two or three servos together to drive large control surfaces. Even then we would end up with less power that this single servo is capable of. The second option would use very large bulky servos that are more than double the size and weight of a standard servo. These large bulky servos had one thing going for them and that was the torque. Typically they were slower than average and their precision was sadly lacking. The torque those bulky possess wasn't bad, but still less than the S9157!



The S9157 comes with your basic hardware package from Futaba: grommets, isolators, four servo arm options, and required mounting screws. Now let's look at functionality.

I like to check out the "slop" in gear train of servos. The less slop the better a servo can find center. I attached my six inch servo arm. (It's a mixing stick glued to a servo horn on one end and a T-pin glued to the other) I plugged the Futaba S9157 into a receiver and

powered everything up! Now I just center the T-Pin with my caliper scale, and secure the servo so it can't move. Now I simply put some pressure on the arm in each direction and look for the pin to move. Now I am NOT testing torque, I am just checking for backlash in the gears themselves. I only use about one pound of pressure or so. I was very surprised to see that I could only get the pin to move about ¼ mm on either side of center. ½ mm of total backlash is astonishing for a servo with a six inch moment arm on it!



One thing to consider with this servo is batteries. These servos can draw a lot of current while in use, thus you must use servo packs that can sustain the load. A 600 mAh pack is just not enough anymore. I recommend at least a 1700mAh if you are going to run several of these S9157 servos. Now if you are going fill an entire plane full of these servos, you might consider a Power Box system with a Lithium battery and a regulator or something similar. The Futaba S9157 Coreless Digital servo is a very powerful and amazingly precise servo. Considering that it mimics a standard servo, it can be used in basically any R/C aircraft from a 40 sized trainer up to a 50% Ultimate Bipe!

Tony Coberly [tonvc@rcreport.net](mailto:tonvc@rcreport.net)

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