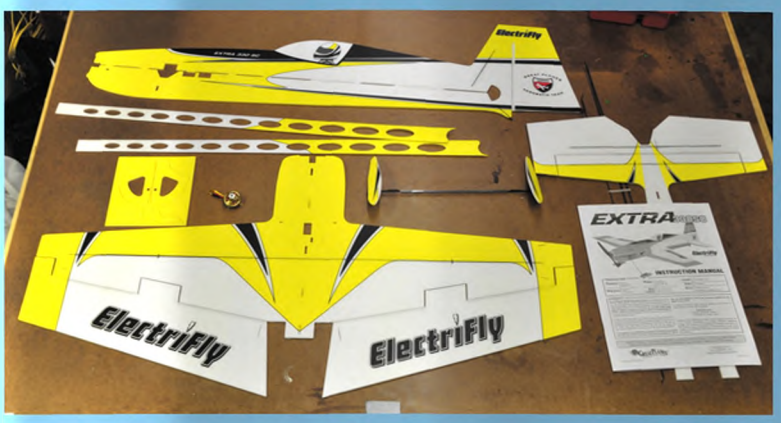
February Issue 283

RC REPORT Online!

Offering unbiased product reviews and informative articles for radio control aircraft enthusiasts around the globe

Light winds and fair weather are on the way, but there is still time to do a bit more indoor flying, so have a look at our review this month. The Extra 300SC from Electrifly!



We have a winner for our first online smiley face contest. Can you find them all this month?

RCReport Online Index

February 2010

RCReport Online
Test reports:

Columns:

Cassie and Isabelle complete the morning FOD check just prior to a flight on a nippy January day in Huntsville

Bird on a Wire

by Terry Dunn

This month I'd like to talk about using gearboxes on electric motors. For many of us, dealing with motors alone is confusing enough, and gearboxes only compound the issue. Once you understand how proper application of a gearbox can dramatically improve an airplane's performance, you might consider the topic worthy of your attention. I'll kick things off with an email I received from reader, Karl Bruck:

> *"...I have a Cermark Phoenix AL 2 meter electric sailplane that is difficult to handle for me. I was wondering if I changed the Cermark 7 battery pack (1900 mAhr nicads) for an equivalent capacity and size mAhr lipo battery pack, it would be lighter and fly better for me..."*

The Cermark Phoenix that Karl mentions is your typical 2-meter wingspan powered glider. There are numerous, similar models available from a slew of manufacturers. I don't find them terribly exciting to fly, but I love oxymorons, so powered gliders have a special place in my heart. It also helps that my first truly successful electric airplane was a powered glider; the Carl Goldberg Electra. When I look back on that Electra and note some of the boneheaded things I did with it, I'm surprised that it flew so well. Their forgiving disposition is probably the best attribute of powered gliders. They are forgiving not only of egregious piloting mistakes, but they will also fly on rudimentary or even ill-prepared power systems. On the flip side, powered gliders encourage the development of smooth piloting skills and reward success with long flight times. They also respond well to power system changes. That makes them a superb test bed for observing the effects of power system tweaks.

The tweak that Karl suggests in his email is to swap out the Phoenix's heavy 7-cell 1900 mAh NiCad battery with a lighter, lithium-polymer (LiPo) equivalent. By switching to a 2-cell lipo of around 2100 mAh, Karl would probably shave about 10 oz from the flying weight of the Phoenix. That is a significant weight reduction in a 3-pound airplane (about 20%). Since the voltage of a 2-cell lipo is about

the same as that of the 7-cell NiCad, the power output of the motor would also be approximately the same. Changing to the lighter battery would have the effect of reducing the wing loading while increasing the power loading. Both are good changes to make when you're looking for better climb performance.

It seems that this simple and relatively inexpensive change will get Karl started towards the performance boost he seeks. However, there are two things to keep in mind before making the swap. First of all, many powered gliders require the battery to be located near the nose for proper balance. If you suddenly switch to a battery that is 10 ounces lighter, you may have to add lead to the nose to maintain the CG. Every ounce of lead added to the nose negates an ounce saved with the lighter battery.

My second concern is that the Electronic Speed Control (ESC) may not have a low-voltage cut-off feature that will help protect the lipo. Nicad and Nimh batteries are typically very tolerant of being overly discharged. Therefore, many ESCs, particularly those that come with NiCad-powered ARFs, do not bother to monitor battery voltage. Lipos ARE sensitive to excessive discharge. Permanent damage to the battery could occur if you drain a lipo below about 2.5 volts per cell. Most modern, aftermarket ESCs have a low-voltage cutoff (LVC) feature that will notify you, by pulsing or stopping the motor, when the battery voltage approaches the danger zone. Of course, you can use a lipo on an ESC without LVC; but the burden is now on you to monitor the battery voltage. There are a few techniques for this, but that's beyond the scope of this month's column.

Now that you've seen a brief evaluation of the benefits of changing to a lighter battery, I'll admit that I advised Karl against it. Honestly, I think that his powered glider would see a more significant increase in climb performance by keeping the heavy battery and adding a gearbox and larger propeller to the existing power system. I agree that it's a bit counter-intuitive to think that adding weight and complexity with a gearbox will improve performance, but that is exactly what happens. Well, usually. Let's take a look.

Most 2-meter powered glider kits include a power system that features a brushed "can" motor and a small (7" or 8" diameter) prop that attaches directly to the motor shaft. The many appeals of this set-up are obvious. It is simple, streamlined, very inexpensive, and it's good enough to make the airplane fly. Despite its charms, as you peel back the layers of this power system, you'll see that that it is far from the ideal onion for a powered glider.

I've pulled together an example to illustrate my point. The specific power numbers will vary between manufacturers, but the trends are the same. So don't get too focused on the details. With an average can motor, in this case a Multiplex Permax 600, a Master Airscrew 7x4 prop and a 7-cell 3300mAh Nimh battery, we produce 173 watts of power while pulling 21 amps of current. The result is 25 ounces of thrust with a pitch speed of 52 mph.

What is pitch speed? Simply put, it is the speed of the breeze off the back of the prop. To calculate pitch speed, you multiply the pitch of the prop by the RPM and convert the units. In this case, 4" pitch at 13,684 rpm equals 54,736 inches per minute. That converts to 51.8 miles per hour.

Unless you've just added a fresh coat of Teflon wax, pixie dust and greased lightening; your glider is never going to fly anywhere near 52 mph under power. Using energy to generate that much pitch speed on a slow airplane is simply a waste of electrons. Equate it to a car driving down an icy road with the engine racing and the back tires spinning like crazy. Yes, the slipping tires will generate some degree of forward motivation, but it's a very inefficient way to get around.

Now let's take that same can motor and 7-cell battery, but this time we'll use a 2.5:1 gearbox and a 12 x 8 prop. The load on the motor is almost exactly the same as it was before. It is now pulling 22 amps of current and producing 183 watts. The main difference is that we are now generating 38.9 ounces of thrust at 40 mph. That 50% increase in thrust will definitely translate into better climb performance. In most cases, the difference is quite dramatic.

The essence of this whole lesson boils down to this paragraph. To produce the thrust that your airplane needs to fly, you can utilize your motor's finite power to either move a small column of air very fast or a large column of air less fast. Unless you are dealing with a slippery speed demon, the large, slow (relatively speaking) column of air will almost always be the most efficient option. More efficient use of the power available means you'll get better performance. I used a powered glider as an example, but the same principals apply to most of the world's sport plane fleet

Before I get too far with this argument that bigger props are more efficient, I should explain that there are practical limits involved. I suppose you could use a 500:1 gearbox to swing a 48" prop on your park flyer, but I doubt it would work very well. At some point, the mass of the prop itself becomes a significant factor. You must also factor in all of the escalating gyroscopic and torsion forces involved with spinning large props. It soon becomes evident that there is a point of diminishing returns. Determining the sweet spot is up to you. However, I think that physical boundaries such as the length of your landing gear will often determine your max prop size.

Now that I have convinced you that geared motors and larger props will make our sport planes perform better, I'm sure that you've already begun salvaging gears from your old VCR and you've chopped down the oak in the front yard for prop blanks. After all, with all of this efficiency to be gained, only a fool would be caught using a direct-drive motor, right? Actually, there are some very legitimate reasons for not using reduction gearing.

One reason to omit a gearbox is that you just don't have a place to put it. Despite the wide range of gearbox styles and the room they require, there might be cases where you simply don't have the space you need. On some powered gliders, I've resorted to placing the gear drive on the outside of the firewall. I was willing to take

the aerodynamic and cosmetic hit for the sake of performance. Some of you may not be so eager. I think that the most common reason for passing on the gearbox option is to avoid the added complexity. Most gearboxes are not complicated devices, but even simple units introduce another potential failure point, additional maintenance, additional weight and additional cost. If you get acceptable performance with a direct drive motor, the performance boost of a gearbox may not be worth the added complexity.

One example of "good enough" is the Zagi flying wing from Trick RC. For many years, I flew my Zagi with a Speed-400 brushed motor and a plastic push-on prop. This modest set-up was noisy and horribly inefficient. Yet is was also tough-as-nails, reliable, cheap, and provided pretty good performance. That power system was well suited to the life of abuse that most Zagis lead. It was not uncommon for me to fly the Zagi into the ground or some other immovable mass and then toss it right back in the air after a cursory airworthiness inspection. Gear drives need more TLC than that.

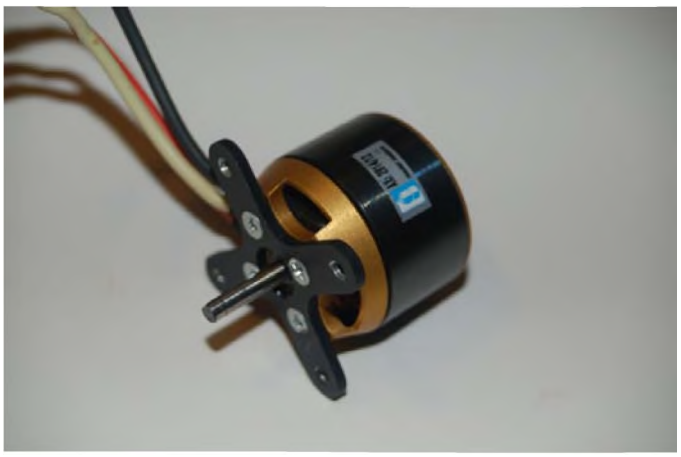


Photo 1: One of the big reasons that outrunner brushless motors such as this are so popular is that they can reap the benefits of spinning big props without the need for a gear drive.

A conversation about the complexities of adding a gearbox would not be complete without discussing outrunner brushless motors (Photo 1). The reason that outrunner motors are so hugely popular is because they essentially replace the traditional inrunner/gearbox combination. For the most part, outrunner motors produce more torque and less rpm than a comparable inrunner equivalent. This means that they can generate that large slow column of thrust without having to worry about a gearbox. Outrunners are not typically as efficient or adjustable as a geared motor. However, most modern electrics have power to spare, so the choice to avoid the gearbox is an easy one. I think this is why you'll see that the majority of brushless electric models use outrunners.

So far, we have talked about why you may want to use a gearbox and why you may not want to use a gearbox. Now let's take a look at a few of the different types of gear boxes that are used in RC. The most common type of gearbox is the simple pinion/spur version like that shown in photos 2 and 3. These gear drives are about as

Photo 2: This GD-600 from Great Planes is a good example of a simple, yet very adjustable pinion/spur gear drive unit. I've used them on powered gliders and sport planes up to .40-size.

simple as it gets. A small pinion gear (brass or steel) is attached to the motor's output shaft with a set screw or glue. The pinion gear drives a larger spur gear (usually nylon) that spins the output shaft where the prop is attached. That's all there is to it. The best thing about the pinion/spur gear drive is that many versions are highly adjustable. Some drives allow you to change the size of the pinion and/or spur gear to alter the gear ratio for a wide range of applications. When mounting this type of drive, it is vital to remember that the output shaft spins in the opposite direction of the motor and the output shaft is offset from the motor shaft. Pinion/spur gear drives are readily available in many sizes and are very inexpensive.

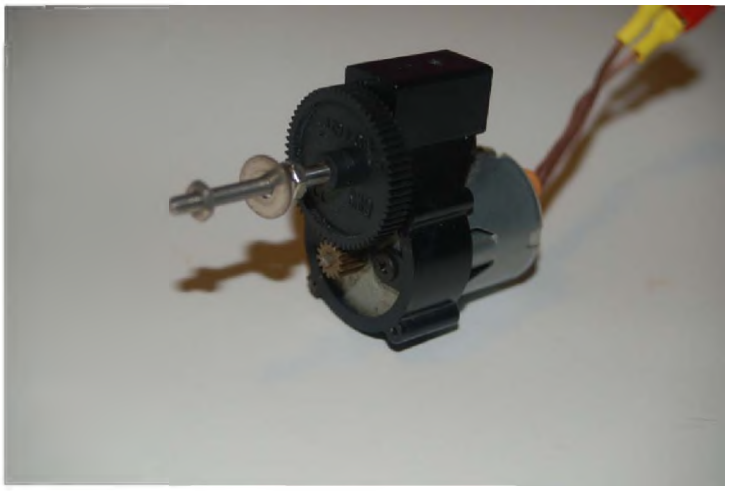


Photo 3: This is one of the very popular gear drive units that made GWS foam airplanes a big hit. Without them, the small brushed motors just wouldn't have the clout to pull most park flyers through the air.

The inner-driven gearbox shown in photo 4 is also a pinion/spur type, but the teeth of the spur gear are not located on its outer circumference. Instead, the inverted teeth are placed on a lip of the spur gear. This means that the output shaft will rotate in the same direction as the motor shaft. Most inner-driven gearboxes do not have adjustable gear ratios. Plastic inner-driven drives for park flyers are quite inexpensive.

Photo 4: This disassembled inner-driven gearbox shows how the gears interact. They are much like standard pinion/spur drives but the output shaft spins in the same direction as the motor.

The planetary type gear drive is very popular with high-performance sailplane (Hotliner) flyers. The pinion gear attached to the motor shaft spins three or more satellite gears that in-turn spin the inner-driven spur gear. This all takes place inside of a sealed, compact housing that is usually no larger in diameter than the motor (Photo 5). With so much engagement of gear teeth and all-metal construction, planetary

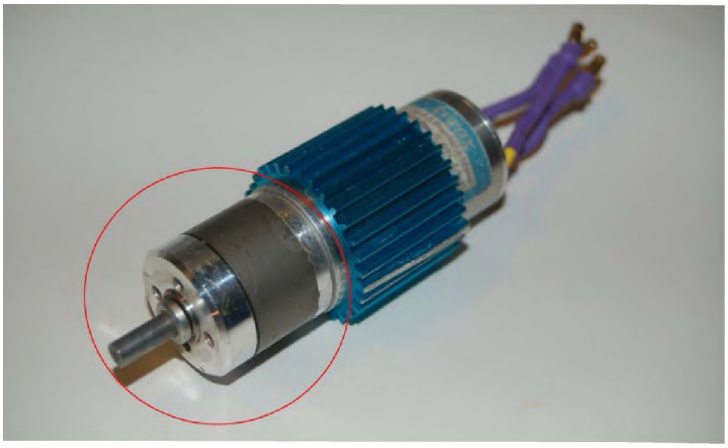


Photo 5: The planetary drive (circled) on this brushless motor can handle a lot of power and will fit in a small space. They're often used in high-performance gliders.

gear drives can handle a lot of power. Because they are compact in size and the output shaft is in line with the motor shaft, they are ☺ easy to install into small streamlined airframes. The drawbacks to planetary drives are that the gear ratios are fixed, they tend to be noisy, and they can be expensive (starting at around $50).

Like any potential hop-up, adding a gearbox and larger prop to your plane will be beneficial only if you do it properly. The techniques for setting up a geared system are the same as those I've discussed before. You're just introducing another variable into the equation. Rather than rehash all of that prior info, I'll provide a couple of tips:

1. Power loading is unaffected by adding a gear drive. I aim for 100 watts/pound with my sport planes whether they are geared or not.
2. The larger the gear ratio of your gear drive, the larger the prop must be to maintain the same power output from the motor.
3. The full-throttle pitch speed of your system should be at least three times the stall speed of your model. Stall speed can be estimated with the following formula:

   Stall Speed (mph) = 3.7 * (sq. rt. of wing loading in oz/sq ft)
4. Plagiarize shamelessly. There's no sense in reinventing the wheel when other folks have already done the work. Copy other set-ups.
5. Don't be afraid to experiment. Starting with a computer-based estimation tool will let you get your gear ratio and prop size in the ball park without wasting time in the shop. Motocalc (www.motocalc.com) and P-Calc (www.brantuas.com/ezcalc/dma1.asp) are two popular tools.

Well, there you have my high-altitude overview of using geared power systems. Please e-mail me if you have any specific questions.

More Plastic Mods

Last month, I showed you the cockpit upgrade kit from Park Flyer Plastics that I installed in my Multiplex Easy Glider. This month, I wanted to show you another of Keith Sparks' upgrade kits. This one is for the popular Multiplex Twinstar II. This kit includes a cockpit kit with a clear canopy. In this case none of the stock Multiplex parts are required to build the upgrade kit. I assembled the plastic parts per the instructions on www.parkflyerplastics.com and glued a 1/12 pilot bust inside.

The clear canopy is a neat way to individualize my Twinstar II, but it is hardly the highlight of the upgrade kit. The really cool part is that Keith designed a plastic hull and tip floats to turn the Twinstar II into a sea plane! Lastly, the kit includes a pair of bulbous observation windows (like those ☺n the PBY flying boat), motor cowlings, and decals to emulate radial engines. I havent quite completed the upgrade to my Twinstar II, but I can show you the progress I've made so far (Photo 6). The cockpit is mostly complete, as is the hull. I just need to finish up installing the tip floats and cowls. This has been

Photo 6: This upgrade kit from Park Flyer Plastics will transform the Multiplex Twinstar II into a radial-engined seaplane. Test flights should be coming soon.

slowed a little since I decided to upgrade the stock Speed-400 brushed motors with a pair of brushless units. I think I'll need the extra power to get her off the water. By this time next month, I should have completed everything and test flown it. With any luck, I'll even get in some water flights.

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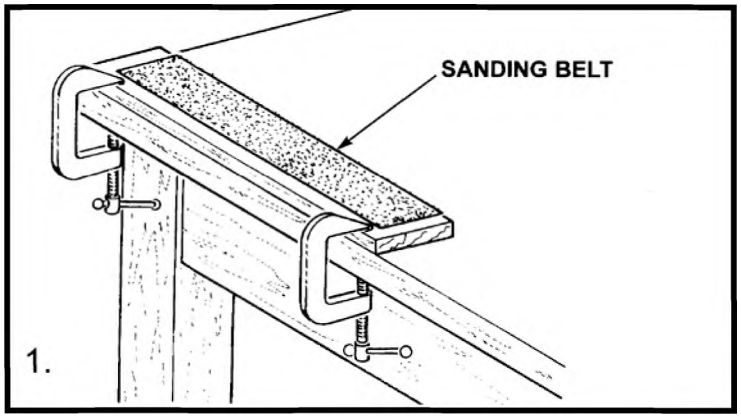
Here's How....

by Walt Wilson

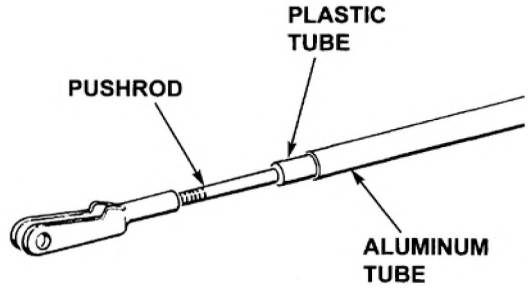
Share your best ideas and building tips with others. Send your "Here's How..." ideas to... Walt Wilson, 3000 Persimmon Drive, St. Charles, MO 63301, or e-mail them to rallyo@charter.net. Please be sure to include your full name and email address. The first submitter of an idea used here will receive a free one year subscription or renewal to R/C Report Online. If the subscription is to be a gift to someone else, please state this when submitting the idea.

The plane I'm holding at the right is my redesigned and scratch-built, electric-powered, 60%-size, variation of a Sig Four-Star 40. This is the third version of this plane I've built, each with some subtle modifications. This one has a balsa-sheeted afterdeck (The Four-Star 4☺ and my previous versions have open stringers.) so the canopy will fit without any gaps. An Electrify Rimfire 28-30-950 motor, with an E-flite 25 amp ESC and 2100 MAH LiPo battery, powers it. It will do anything acrobatically that the full-size .40-powered Four-Star will do, and will outrun most of them. I usually don't like to build the same type of planes more than once, but this series has been a joy to develop and fly.

1. **Sanding Long Surfaces Evenly:** From Stan Cottrill, of Melbourne, FL. When building a kit, you often come to the point where the leading edge of the wing must be sanded into a rounded shape. Naturally, you would like to get this edge as straight as possible. To do this, consider the following: First glue the leading edge to the wing. Then buy a three-inch wide sanding belt and a three or four foot long 1"x 4" piece of lumber. Cut and glue the sanding belt to the wood, leaving 1" on each end of the wood exposed. Using C-clamps, clamp the wood to the top of your workbench at the edge. Sand the leading edge, holding the wing in both hands, and maintaining the same pressure on both hands. Purchase two different grits of sanding belt and glue one to each side of the 1"x 4" wood, keeping the sanding belts on opposite edges of the wood.



2. **Stiffer Pushrods:** Marshal Emmendorfer, of Lothrop, MI, used to make pushrods out of wooden dowels, but as his models grew in size and weight, the dowels began to flex under the load. Now he uses a length of music wire inside a plastic tube. He slides an aluminum tube over the plastic. The aluminum tube keeps the whole assembly stiff and straight. Marshal slightly crimps the aluminum in three places to keep the plastic tube from sliding in and out. The pushrod assemblies should be installed before the fuselage is sheeted, or covered, as they should be supported in three places. The control horns on the flying surfaces and servos should be installed first, so the assembly can be mounted in a straight line from the servo to the horn. Glue the aluminum tube to the inside of the fuselage and sand the plastic tubes flush with the outside of the fuselage. Solder threaded couplers onto the music wire so you can use clevises to connect the wire to the servos and control horns. Pre-threaded commercial pushrods can also be used, if available.

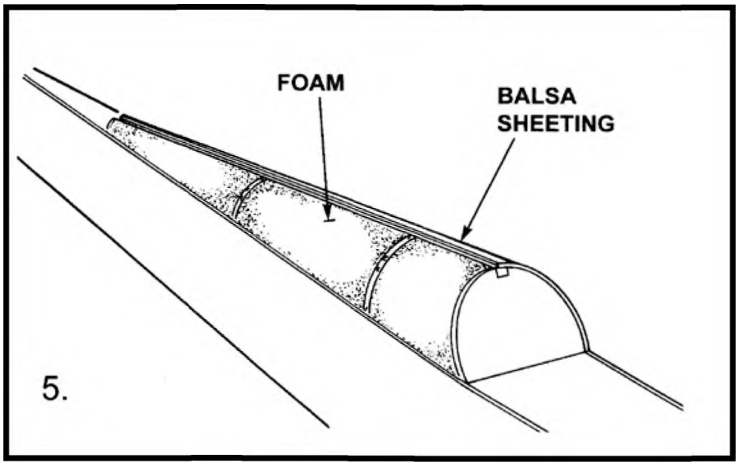


2.

3. **Fast-Curing Thick CA:** (No illustration) From Don Fitch, of St. Charles, MO. If you want to get almost instant curing when using thick CA, dampen the wood slightly before applying it. Don says to be sure and wet the wood before applying the CA. Once, he wet it afterwards, and he'll give us some more suggestions, as soon as he gets it off his tongue!

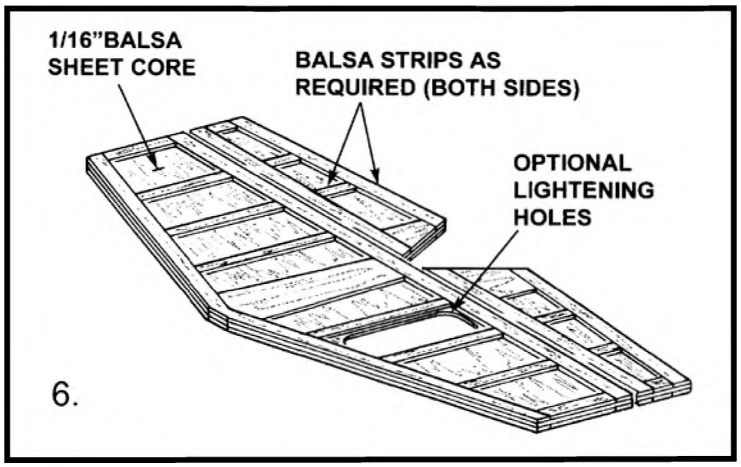
4. **Mini-Servos for Throttles:** (No illustration) From Bob Phillips, of Rockhampton, Australia. In most cases, very little torque is required to operate throttles. Using mini-servos, or micro-servos, for operation of throttles can save space and weight. This is particularly useful on multi-engine aircraft. Instead of complicated linkage, simply use an individual servo for each engine.

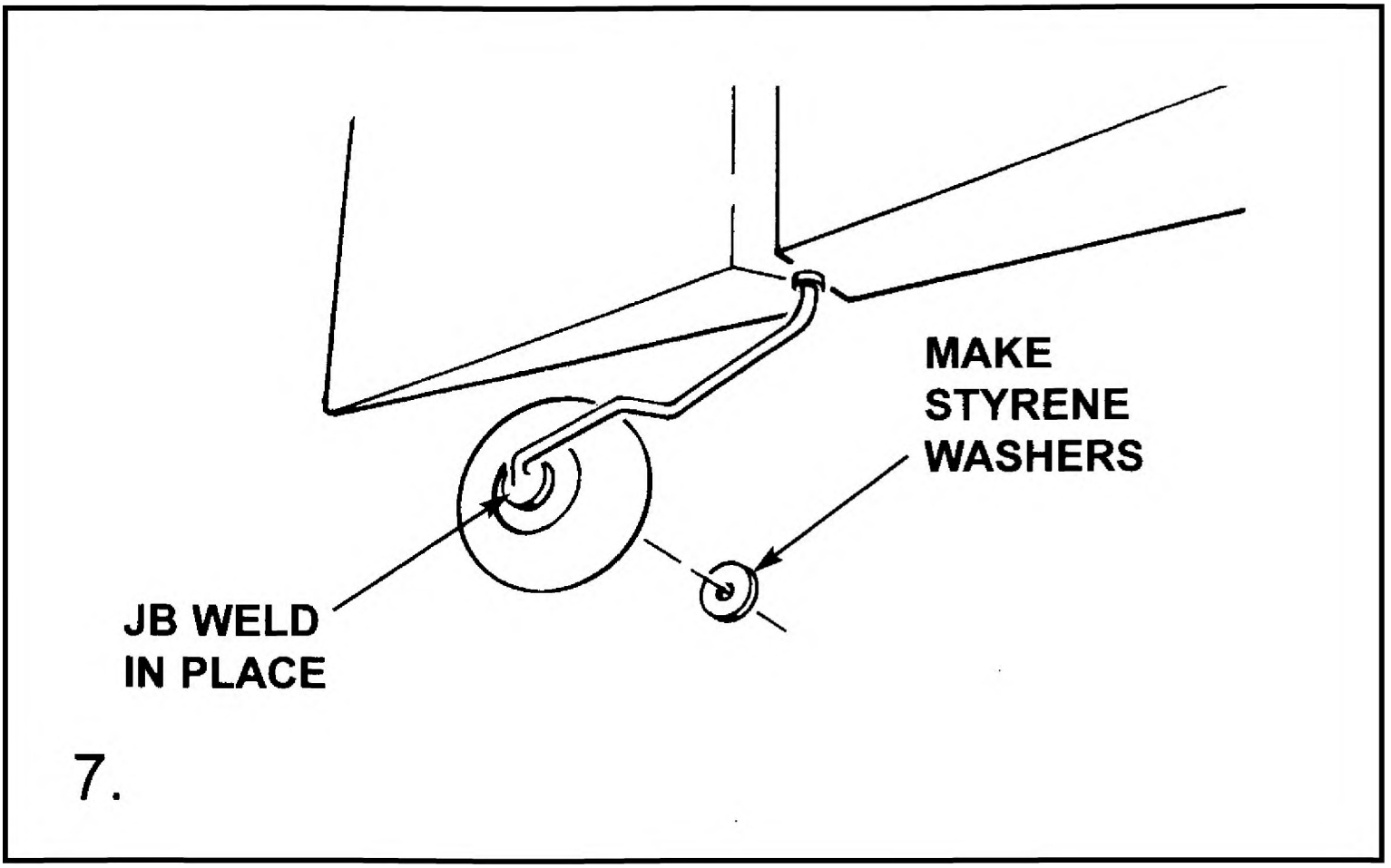
5. **Styrofoam Formers:** Here are some ideas from your friendly writer. One thing about the Sig Four-Star series, that many modelers would like to have differently, is the five-pointed open structure on the upper rear fuselage, to be matched with a smoothly rounded canopy. This setup leaves four gaps at the rear of the canopy. The shape of the formers would not properly support lightweight sheeting. If you want to have a smoothly curved, sheeted, rear deck on your Four-Star 40, 60, 120, or other plane with similar open framework, try the following: build the fuselage in accordance with these directions. Install the top, center stringer, but leave off the side stringers. Using insulation foam, from home improvement stores, or pieces of scrap packing foam, cut pieces to fit between the formers on each side of the top stringer and glue in place. Use foam-safe CA or aliphatic glue. Sand the foam to a curved shape using the former at the back of the cockpit and points of the aft formers,



where the side stringers would have been, as guides. After shaping and sanding, insulation foam could be covered with a low-temperature covering. If you want to sheet it with balsa, sand the side edges of foam and formers in from the side structure as far as the thickness of the desired balsa sheeting. The foam backing allows the use of very thin balsa (1/32") for sheeting. Wet one side of the balsa and apply to each side with a seam down the middle on the top stringer. Sand as required and cover with your favorite material. The final weight is almost the same and the canopy fits!

6. **Lightweight Tail Surfaces:** If you are scratch-building, here's a quick way to build light-weight tail surfaces. Cut pieces of 1/16" balsa to the desired shapes for the fin, stabilizer, rudder, and elevator, with the grain running lengthwise. Select the proper thickness of balsa strips to make the surfaces the thickness you want. If you cut your own strips, use a balsa stripper to cut pieces to the desired width to make leading and trailing edges, and using thin CA; glue in place. If the edges are curved, the scrap from cutting the original outline can sometimes be used as doublers. Cut more strips to make ribs, perpendicular to the center grain, and CA in place. Repeat all the doublers and ribs on the other side of the surface. Sand the edges to the desired shape and cover with your favorite material. If a knife-edge is desired at the trailing edge, install ribs and sand to a taper, but don't use a doubler in that location. If desired, lightening holes can be cut in the center pieces after assembly. This makes a lightweight, but strong, rigid structure and is very quick to build.





7. **Tail Wheel Washers:** When installing a tail wheel, did you ever run into the situation where you don't have any washers the same size as the wire axle, usually 0.062"? If you want some washers that fit the wire, keep some structural sheet styrene plastic, about 0.040" thick, on hand (The thickness isn't that important.). It's available at most well-stocked hobby shops that handle model trains. Drill a hole the size of your wire axle in a piece and cut it into a round washer with scissors. Use JB-Weld to hold it in place and it will probably outlast the airplane. If you insist on metal washers and soldering, use 0.016" brass.

This column is dependent upon ideas submitted by you our readers
Send them in, guys!
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LOOK WHAT THE AUSSIE CAN DO

I have just completed a test and review of a very nice new 56 cc gas engine that is designed from the blueprints up to be used in model aircraft. (PHOTO 1) No crude convert, no 'rough as guts' adaptation, an engine made for model applications. It has a slanted plug (lower overall height), (PHOTO 2) rear induction with an absolute top of the line four reed block, (PHOTO 3) single overhung crank with twin sealed front bearings, two rings and one of the happiest engines to start and run that I have seen for a long time. It comes ready to fuel up and use.

Photo 1: The YD-A 56 engine; a nice bit of work.

All you need to supply is a battery pack for the ignition. Now for the best bit: fully made in Australia by an engineer, who runs an engineering company, with a very keen interest in 3D flying. This 56 cc (6.2 hp) is the little brother to the 112 cc; and the soon to come horizontal twin, probably around 60-70 cc. Look for it around April of this year. Quite a few of the

engines have been tried and tested on your island by established US modelers and they are being sold by RC Aero Products LLC - www.rcaer.com and all service is carried out by Bill Jensen, well known engine man at www.bj-model-engines.com. A few areas that impressed me, often 'pretty ordinary' in some of the super economy priced engines, were the following: the key drive for the prop hub, engineering grade Woodruff key bed and groove; no metal locking compound needed. Even more still: the

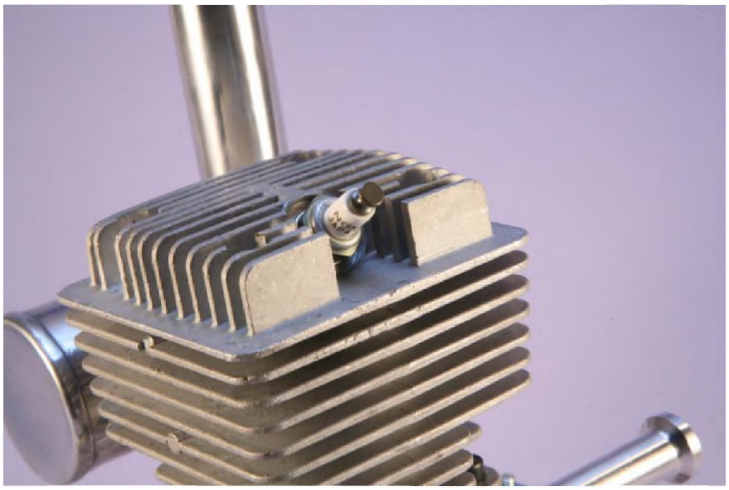


Photo 2: By using a slant position for the plug, the head has a very interesting combustion chamber shape.

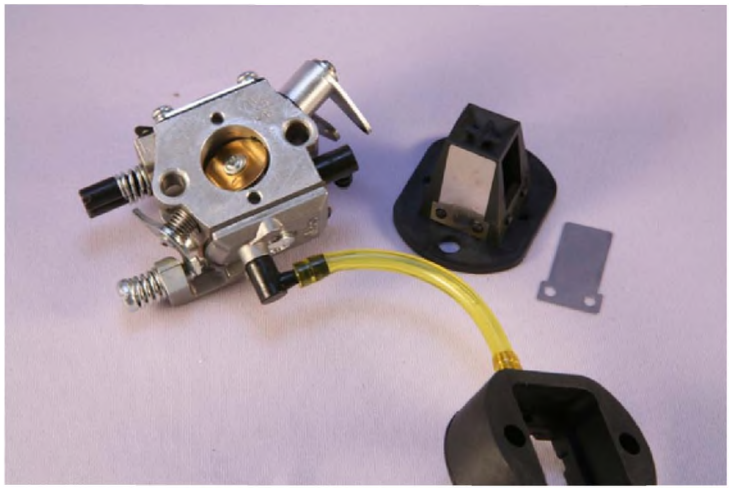


Photo 3: The frustum reed block and one of the stainless steel reeds.

carburetor and reed block are secured by cap head bolts that go right through and thread into the rear maincase, a very neat long throttle arm in place of the little horror commonly fitted, no spinning threaded section of the shaft out the rear case and a small CM6 plug nestled down at an angle to the head; to name a few. If you decide to purchase one, as a special deal (We Aussies are very generous blokes. LOL), contact me and I will tell you my special method of starting the engine with no more than 3 flicks right from the first time with no cranking the propeller for ages to get fuel up to the carby. Deals like this occur only in this magazine.

WALBRO - THE CARBURETOR

There are two types of modelers who own engines fitted with Walbro carburetors: those who hardly ever think about them and those who get all fussed up about them. The first example are modelers who turn up at the field, start the engine in their model then fly it…and enjoy it. You might ask them what they think about their Walbro carby and they might ask you what you are talking about. You explain. They reply, "Oh yeah, now I know…you mean the carby bit on the engine…never consider it…it just keeps working…you know…if it ain't broke, don't fix it. Why would you worry about it?" Well, I have to agree, why DO you worry about it? Generally speaking, the most common problem with Walbro carbies is the person who owns it. Think about it. You have a delightfully simple piece of equipment that has only two user access parts: the high and low needles. Other than those, the only other item you access is the choke. Close it to start; open it to run. Where's the complication in that? Any reasonable quality petrol engine you purchase will have a very simple section for the carburetor in the instructions along the lines of; the carburetor is fitted with two adjustable needles for high and low mixture. (PHOTO 4) The low mixture adjustment interacts with the high RPM operation of the engine as you transition from low to high. The needles are marked [H] and [L]. The default setting is, according to the individual engine, 1.5 turns open for the [H] needle and 1.25 turns open for the [L] needle. What's complicated about that?????? The needles in the carburetor will be set to the default setting when you receive the

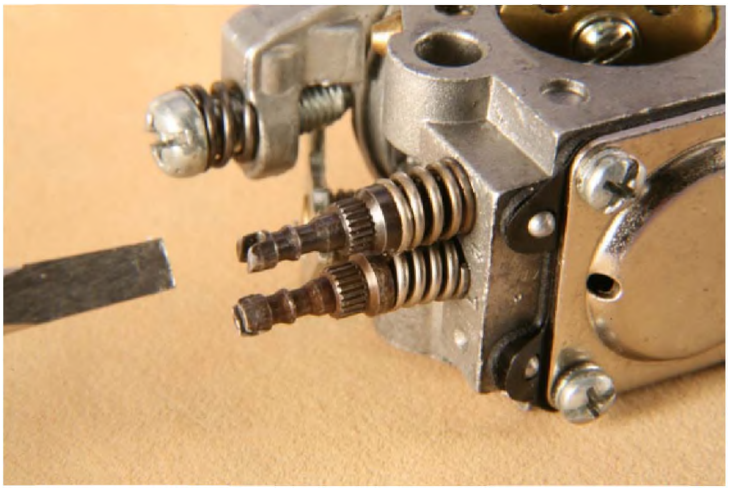


Photo 4: Walbro HIGH and LOW needles; screwdriver adjustment in small amounts.

engine so all you need do is note well the default settings. Any variation from these setting will be in the order of a maximum, as a rule, of ¼ turn according to the area you live: maybe high altitude or extremes in weather conditions. Note that I said extremes. A little bit cooler in the afternoon is not going to make enough difference for you to get out the damn fool screwdriver, or the damn fool using it, to start winding the needles up and down like winding up an eight day clock. You will NEVER have to wind those needles multiple turns. Actually, I really doubt that you would ever have to wind either one by one turn from the default setting. We are dealing with a delicate part of the 'machine' here. Inside the threaded holes where the needles are fitted, down the bottom of the hole, is the needle seat, a precise hole in brass that is part of the metering process together with the tapered end of the hard steel needle. Are you thinking here? A small hole in brass, a soft metal; and a hard steel tapered needle. Yes, the hole in the brass can be damaged beyond use with the injudicious use of the needle. The hole will distort or bell-mouth and that's the end of the carby. You can toss it away, as there is no fix for the job. Well, no fix that would not be more expensive than a replacement carby, anyway. If you are new to petrol engines or not so new, but do have problems; first thing to remember is that the engine must reach operating temperature before it will run as it should. This is lost on a lot of people these days due to modern automobiles with fully automatic and computer controlled starting procedures. You turn the key

and drive off. The computer makes all the allowances for a cold engine, so generally, the engine runs okay; maybe a little fast for a minute or so. In days past, when the driver had some input into the operation of the engine, you pulled on the choke (or it was a simple automatic system) and you let the engine run before pulling away steadily to let the engine warm up. Well, maybe you noticed that your gas engine does not have a computer. One that I know of does have an automatic choke as an option, but as a rule, you listen to the engine warm up before pushing pedal to metal, so to speak. This is the first area where confused modelers can get even more confused. They start the engine and it is running rough. It must be out of tune. Stop the engine, wind the needle or needles one way. Hoping it is the correct way; then start or try to start it again. It will run even worse, or not even start so the winding procedure starts. In. Out. More turns until the chances of starting the engine have gone down the gurgler. That is, you now have no chance whatsoever. The reason being that all the cranking and adjusting has filled the sump (crankcase) with fuel and the spark plug is wet; and keeps getting wet every time the engine is cranked over. Here's the problem. If you wet the plug in a glow engine, you just leave the power on for a bit and the plug will dry out. The red hot element will burn up the fuel wetting it. Senior modelers, old farts, will remember the days before mufflers when you would listen to the crackling inside a wet engine, and as soon as it stopped; you flicked the prop and the then dry plug would fire up the engine. No so with a spark plug. It fires with a spark sent from the ignition system and there is no heat until the engine is running. The plug will sit there wet and forlorn, but it will not spark unless you leave it for some considerable time to dry out or attempt to start the engine at full throttle. This is okay for a flooded auto engine, but never for a model airplane engine of the large spark variety. If it did start, there is every chance it will lunge forward and chew flesh - your flesh! Incidentally, a little off track for a moment, why DOES a flooded automobile engine start when you turn it over with the pedal floored? Well, when you fully open the throttle, a load of air (atmospheric pressure) rushes in, and as the engine turns over; the air rush dries a few plugs enough for the engine to roar into life. Okay, back to the flooded aircraft engine and what to do about it. First off, switch off the ignition battery, or better still; disconnect it. Now, wind both high and low needles down GENTLY, until they come to a GENTLE stop; remembering seat damage. Now, wind both out to the default setting, or if not known (or remembered); 1.5 turns each. No more; no less. Remove the spark plug and spin the engine as fast as possible. An electric starter is a great help here. Be aware that petrol is going to blow out the plug hole like a whale blowing stale air after a long, deep dive. Keep spinning until all the petrol is blown out, no more mist coming from the plug hole. Replace the plug,

reconnect the ignition, open the throttle about ¼ , switch on; and there is a very good chance the engine will fire up in one or two flicks. This time, now that it is running again, let it warm up until the engine runs reasonably or completely evenly. If you feel the tuning needs adjustment, do so with the engine stopped and not more than 1/8 of a turn each time with a maximum of ¼ turn from default.

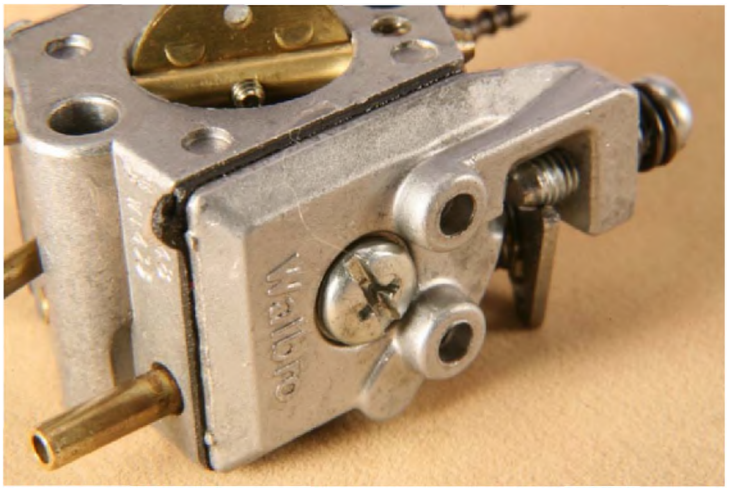


Photo 5: This is the cover you remove for access to the filter.

REAL PROBLEMS

By 'real problems' I allude to problems really with the carby as opposed to the carby operator. Again, this is delightfully simple and relatively free of problems other than normal usage wear and tear, as is said. The first matter to look at is, again, really a user problem and that is a blocked filter inside the carby body.(PHOTO 5) Gray and bare topped modelers might remember an old song/story about Liza ('There's a hole in the bucket, dear Liza, dear Liza. A hole in the bucket dear Liza, a hole.), and poor Henry ('Fix it dear Henry - fix it.'); who tried to collect water in a bucket with holes in it. He was instructed to patch it with grass and clay (mud), as this would seal the holes and the bucket would then hold the water. Well, here we have a very similar story that concerns the filter. If you do not use a very fine filter in your fuel line, the concave (bowl shaped) filter element, which is very fine mesh, in the carby will become lined with fuzz, slime and animal hairs and it will become a very effective 'repaired bucket'. It will retain a small bowl of fuel but not let it pass through the mesh. (PHOTO 6) Result? No fuel into the engine; the engine won't start, and often times 'dear Henry' aka the modeler, will lapse into a frenzy of needle twitching, ignition checking and coming to the decision that the engine is a lemon. If 'he' reads this article he will learn that it is a very simple process to remove the cover from the carby, gently lift the filter element out with a fine dressmaker's needle (Pins are a bit blunt for a good job.) and give it a clean. Now we come to the caution. This element is rather fragile in that it can be easily crushed or distorted; so handle it carefully. Don't try cleaning it with compressed air as there is a more than good chance you will blow it "to be never seen again", the place where all very necessary and hard to replace small items rest out of sight until forgotten. My recommended method of cleaning this part is to

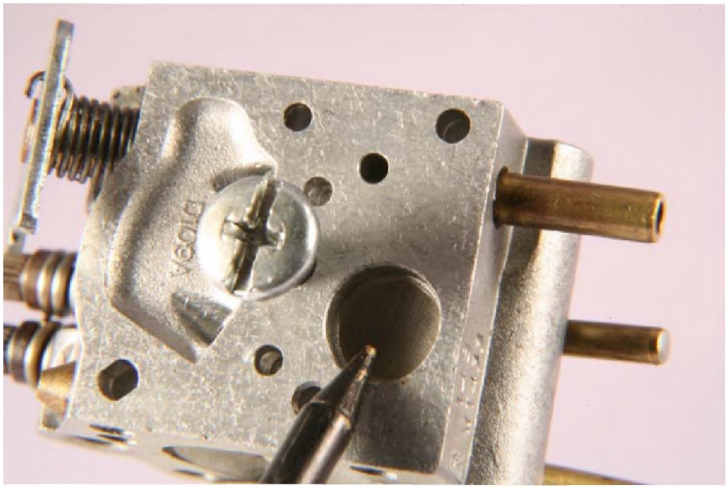


Photo 6: My pointer is indicating the filter. Note the very fine mesh.

Photo 7: Gaskets and the diaphragm are keyed in place by opposed pegs.

move it up and down, round side up, in a small bowl of petrol or mentholated spirit to flow the lint and other debris out of the bowl shape. Give it a blow, human breath, and replace it carefully. I use the knob on a small knitting needle to get it correctly in place. Removing all the gaskets, the valve and diaphragm is really no big deal if you go at it carefully. As you should always do when disassembling any item; observe well before removing. See and note how and where the bits go. Fortunately, all the gaskets and the diaphragm are keyed by pegs or the holes for the assembly screws, so only brute force and ignorance would prevail to reassemble the sections incorrectly. (PHOTO 7) If you consider that the little flap valves are not sealing correctly (They are each way: in and out.), you can perform a simple test with a length of fuel tubing. Fit it on the fuel nipple then blow and suck; should be nothing either way. Even though, for a healthy person, we can generate only around 4.5 psi; this is enough for a reasonable test. Want to go a bit higher? Convince a baby human (still on milk) to blow and suck, if you dare, as they can generate around 6 psi. Here's a picture for you. In the local supermarket a young Mum is screaming for the police. "Help, (scream, shriek) a weirdo is molesting my baby" (more screaming and shrieking). Imagine your luck trying to convince the unfriendly officer of the law, who has your arm right up your back, that you just wanted the baby to test your carby for you. I don't like your chances in court, mate, and the bruises inflicted by the young Mum on you with the can of beans

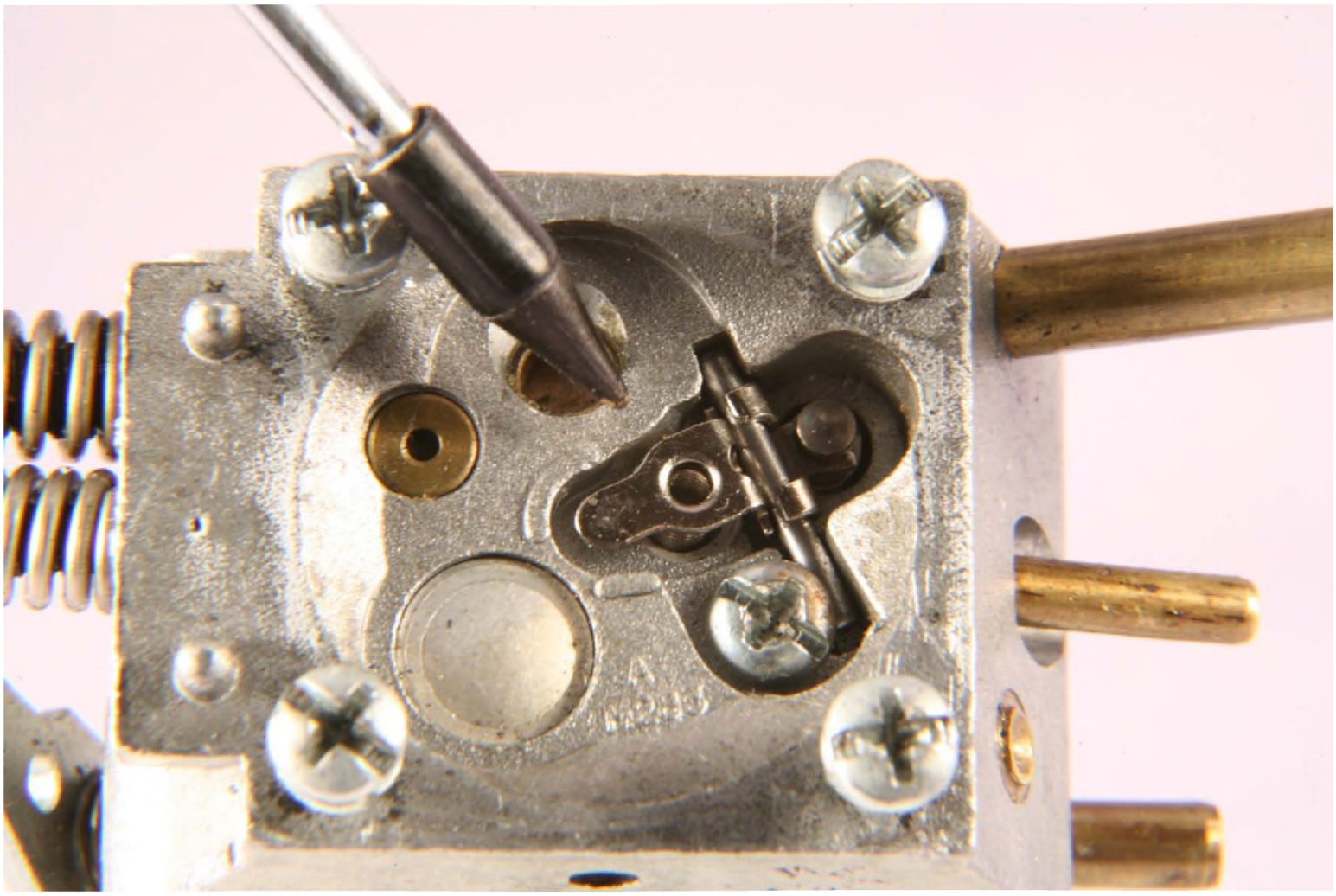


Photo 8: This is the 'NO TOUCH' needle and seat.

she had in her hand are going to take a long time to fade. Okay, so that's a no-no and leads us into another definite no-no. Don't let any, unqualified, person convince you that the needle as in 'needle and seat', inside the body of the carby, needs adjusting. (PHOTO 8) This is definitely not on as a rule. First off, you would need a Walbro needle setting gauge for that carby. There are several different gauges. Not to mention, the know-how to do the job. It is very rare for the amount of use we would give our engines that the needle would need to be replaced or, perish the thought, adjusted. I have a Stihl chainsaw I purchased new sometime in the 70's, and it has done a lot of sawing over the years. So many blade sharpens (I have an electric sharpener.), so many worn down blades replaced and it still runs like new. I regularly clean the felt air cleaner, completely clean and oil the entire machine; feed it fresh filtered petrol and top grade synthetic oil for the chain. I have yet to rebuild the carby, and never adjusted the internal needle (aka needle and seat). Actually, I could count on one hand the number of times I have adjusted the main needles, and then just a mere whisker; probably due to the springs getting a bit weak. The engine in the saw is the same, in many cases, as those we use in models; but it rev's out much higher and is subjected to much more varying loads than our model engines would ever be subjected to. If you want to test the needle and seat; pour in some methylated spirit and see if the needle holds it there. If it leaks out reasonably quickly then you might consider that a small piece of grit is disturbing the needle seat. Flush it with a syringe

and metho while lightly pressing down on the needle arm. Working correctly, the needle will not leak at all. Now getting back to the blow-suck bit, since by now the bruises have faded and the judge has let you off with a stern warning. If you detected a failure, then a recondition kit is for you. You will probably start nail biting again when you see the parts in the packet: gaskets and flap valves of which nothing like the ones you removed and many more than you have on the bench. (PHOTO 9)

Photo 9: This is a common two flap valve - some new ones are deep blue.

The kits, for economy reasons, are suitable for several different carbies, so you simply use the parts you need for your job. This is less costly than packing up individual packs to suit every type of carby. Believe me, cutting the bits is an incredibly low cost. Hand packing the packets is quite expensive. For the misers and penny pinchers, you really aren't paying for something you don't need. You AREN'T paying for the individual packing by hand. Another thing, the replacement parts might be a different color as a higher grade material is being used currently for some packs. Now, before you install the new bits; clean all surfaces very well. I use methylated spirit in a spray bottle and give it a good squirt and slosh around then finish up with soft tissue (Actually, good grade loo [toilet/bathroom] paper) and cotton buds (The cotton tips you shouldn't, but do use to clean the bugs and dust etc. out of your ears.) Check, particularly, the surface areas where the little flap valves sit. You don't want any scratches, lumps or bumps that would disturb the seating of the valves. When you refit the diaphragm; ensure it is the correct way. The metal center disc has, in most cases, a small rod that contacts the arm of the needle (needle and seat). (PHOTO 10) If there is no rod, you will find evidence of the contact side (shiny wear area) that will guide you as to which way is up. All other pieces will fit only the correct way around, and are an easy fit into position. No jamming, pushing or shoving, please. Finish the assembly. Don't lean too

Photo 10: The pointer indicates the small extension on the diaphragm that activates the needle arm.

heavily on the assembly screws for the covers. Check that the main needles are set to the default position, and fit it back onto the engine. Now, I am going to give away the secret method I offered in the first section for instant starting. I really don't expect you to have to purchase an engine to learn it, but it would still be to your advantage to buy the engine 'cause they're good stuff. Okay, the pump section in any carburetor is great for pumping petrol (gasoline), but lousy for pumping air. This is why, in the instructions for many gas engines you will read, 'crank the engine (flick the prop) 20 or 30 times to get petrol up to the carby. Well, my old cranking arm has had a lot of use and is getting a bit tired and worn. Don't know how many more cranks are left in it, so I don't intend wasting any cranking petrol up to a carby. I let the engine do it, and it does it really well. I have a fuel proof syringe, one I use for filling fuel tanks for diesel engines, and I use this to inject a good dose of petrol onto the carby of the gas engine. I don't open the throttle butterfly for this, as the squirt would flood a piston valve engine; unless the piston was at the bottom of its travel. An engine fitted with a reed valve would not be a problem as the reeds would prevent the gas going into the crankcase. The fact is, a good part of the squirt does dribble out, but a fair amount stays in the venturi. If you think about the fuel consumption of the engine, a very small amount will run the engine for a surprisingly long time. Okay, I then open the throttle about ¼, switch the ignition on and flick the prop. Note, I am not using the choke. The engine will fire up and run in 1 or 2 flicks, and during this brief run, it will pump the petrol up to the carby. If the fuel line is not too long there is every chance the engine will keep running as the carby has been well primed. I sometimes get lucky like this on the test bench, but not always as the fuel line is rather long from the tank to the various engines I test. If it doesn't keep running it will start again on the next flick and then keep running. So easy and it saves a lot of dry cranking and arm wear.

As I said at the start, the Walbro carburetors are the most common, as they make such a huge range of types to suit so many applications and they have an excellent reputation.

One final warning, at the end of the flying day, run the carburetor dry of fuel by running the

engine and shutting off the fuel supply. It could be quite some time before you get a chance to fly that model again, and during the non use period, the petrol content of the fuel will evaporate and leave the oil which will convert to a form of varnish that will form flakes and these will cause internal troubles; in the carby, not you; although, you might get a pain in the gut from trying to figure out why the carby does not work.

PARCEL P☺ST - ONE WAY.

I received a very nice couple of emails from Ron Fiedler of Prescott Valley, Arizona, and he finished off by inviting 'shrimp brain', my illogical assistant, to stay a while in his guest room if he ever went over that way. In the second email he also invited me (very nice chap), but does he know how much I eat???? Anyway, I filed the invitation in my 'would like to do sometime' file. Actually, I have a few similar invitations...one day, but the thought of the resident fool stayed with me. He has been watching a team of construction workers setting up a huge platform over a section of the river close to my home, and I could see something was stirring in his feeble brain. The huge columns the men are constructing are into the river bed. They dig a large hole way down into the river bed and then place a very complex steel frame in the hole. The steel frame is made up of many lengths of reinforcing rod all tied together with smaller metal rods and thick wire. This frame forms the inner strength for the poured concrete column. When the frame is in position a large crane places a huge tube over the frame and down into the hole. The tube is bias wound cardboard, silver foil and reinforcing wire. It is pushed down into the mud then the water inside is pumped out. When all is ready a huge concrete pump fills the tube with, obviously, concrete. Later on, when the concrete is set and the next stages of the job are in progress, the wire is cut and the cardboard tube is unwound off the now solid concrete column. In case of rain or other contamination, the workers often fit large plastic caps over the end of the tubes. Well, beetle brain somehow convinced the construction boss to give him a very large diameter tube and two end caps. What story he spun is beyond me, but one thing I do know is that he is honest so he would not have stolen them. Anyway, he had the tube, about 7 feet long and 2 feet in diameter, in the yard at the back of the workshop and he was calculating or figuring something on a paper pad. To me, it looked like a giant mailing tube. What he had in mind was, obviously, something weird as he kept crawling in and out of the tube. When inside he was completely enclosed, but why?? Suddenly, several things came together for me: him fitting inside, the mailing tube, and the invitation to Arizona. Quick as a flash, I jumped when he next went into the tube and jammed the caps on both ends. Twenty yards of gaffer tape later, I had the ends firmly sealed on and a few holes drilled in for air. I then filled about 30 feet of garden hose with water, plugged the ends and fed it into the tube through one of the holes. Twenty tubes of peanut paste poked through the same hole would feed him for some time, and a couple of yards of shredded bubble wrap would stop him from bumping around too much. I stuck on a large label, called the freight company for a pickup and now he is on his merry way: first class parcel post to Ron Fielder, Prescott Valley, Arizona. He's all yours, Ron! Enjoy your Oz guest for as long as you want him; at least for a year or so.

Well, that's a bit of peace for me for a while, so let's adjourn to a better place where it is time for

APRILWUN-DOT ROT-DOT CON.

In this section we are exploring the weird world of strange people, and the odd things they say or write. These are 'signs of the times' I have noted at times that have been written and installed by 'people in authority' to guide us, warn us or simply confuse us. Some signs might be slightly changed to protect the innocent or really weird people. This month we have a warning about…a warning.

THE OILY HAND: Covering engine topics and working with metal for models. Send your comments or questions to:

oilyhand@bigpond.net.au
Brian Winch
33 Hillview Pde, Lurnea
NSW 2170, Australia.

International Response coupon (Post Office) required if you want a written reply.

The BIG Picture

by Dick Pettit

In case I forgot, HAPPY NEW YEAR!

OK, now that that's over, let's get down to the business at hand. It's the beginning of yet another year and I have been trying to make plans for what I'll be doing for the readers during 2010. It seems that the downturn in the economy has made a big dent in just about everything, including my travel plans.

I will be making the trip to Toledo in April and to Top Gun in May, but I probably will not be traveling all that much to other events this year, like the Perry Swap Shop or Monster Planes. You will be reading and watching the photos and probably some video of Top Gun, and lots of photos from Toledo. I will be talking to as many of the manufacturers and distributors in attendance about prospective product reviews in the coming months. We sure need a bunch of reviews, don't we?

This month, I'll be showing you a few quite interesting experiments I did over the Christmas holidays, including some more information on the care and feeding of A123 batteries, a conversion of a PC power supply into a piece of useful shop equipment, a flight report on the Hitec 2.4 GHZ module and receiver system I described last month and a way to keep the wheels on that vintage airplane while also keeping it looking good.

Okay, Let's get started!

MORE A123 DISCOVERIES

A few issues ago, I described how I assembled a number of A123 (Lithium Nano-Phosphate) cells into receiver batteries at a relatively low cost and also what the operating characteristics turned out to be. At that time, I mentioned that it was a bit more difficult to measure the amount of useable charge left in an A123 battery during a flight session, since the voltage measured at the output terminals was extremely constant when compared to that of more conventional battery chemistries.

A few days ago, I was reading about charging A123 batteries and found that their recharge efficiency was quite high. This is the amount of charge taken out of a battery during use divided by the amount of charge needed to fully recharge the battery. The recharge efficiency of NiMH and other such battery chemistries is in the neighborhood of 75%, meaning that a battery must receive 125% more charge than was removed before it is considered to be fully charged. ☺n the other hand, the A123 chemistry batteries are 90% efficient, meaning that only 110% more charge must be put back before it is considered to be fully charged.

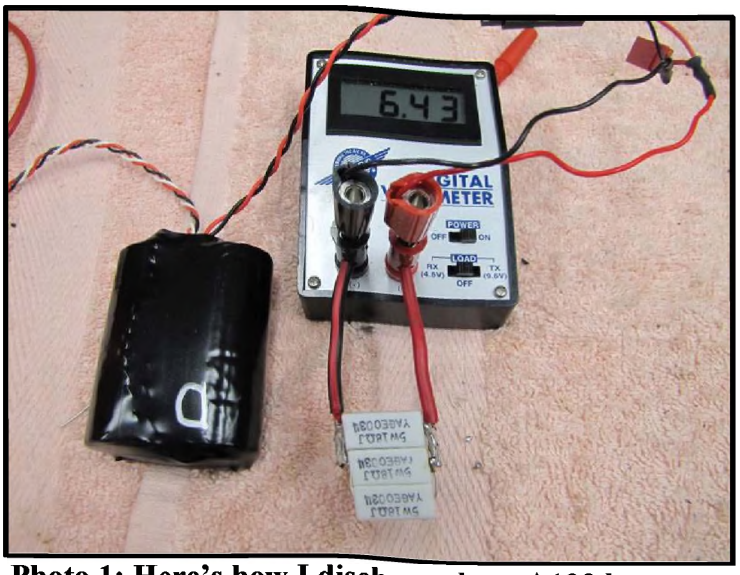


Photo 1: Here's how I discharged my A123 battery to a known charge level.

First I would have to fully charge an A123 battery and then discharge it at a controlled rate. (**PHOTO 1**) shows the A123 battery connected to an expanded scale voltmeter and a quite accurate 1 amp load resistor. Since the voltage of the A123 battery doesn't change much, the discharge current does not change much either, which would make the load current constant enough for these tests. I allowed the battery to discharge for 60 minutes, a nice even number, and then I could calculate the amount of charge taken out of an A123 battery. This works out to 1000 milliamp-hours taken from the battery. I would then have to measure the amount of charge put back into it. I found a piece of test equipment in my "electric airplane" storage area that would help measure these numbers. The Astro Flight Super Whatt-Meter, (**PHOTO 2**), is normally used to measure the amount of voltage and current used by electric motors in airplanes. If it could measure the amount of power (voltage times current) used by a motor; it stands to reason that it could measure the mount of power put back into a battery being recharged.

Photo 2: The Super Whatt Meter from Astro Flight used to measure charge replaced.

Photo 3 shows how I connected up all the components to measure the amount of charge put back into a discharged battery. From the upper left and going clockwise, I use a converted PC power supply (More on that later in this column.) connected to my 12 volt field charger. That is connected to the Super Whatt Meter input, which is then connected to my 'Dapter A123 charge adapter and then to the battery terminals. I set up the components, set the charge current to 800 milliamps and began to charge the battery. In about an hour, the charger beeped at me; indicating that the charge cycle was complete.

The Super Whatt Meter showed me that 1115 milliamp-hours was put back into the battery, proving that the A123 chemistry battery was indeed very close to being 90% efficient while being recharged (1000 mAh replaced plus 10% equals 1100 milliamp-hours, close enough for me.)
This experiment also showed that I could also use the same application to determine the status of a radio battery during a flying session by measuring the amount of charge put back into a battery after flying several times. I fully charged the two 2300 mAh A123 receiver batteries,

Photo 3: Recharging the A123 battery and recording the results.

connected to my receiver in parallel through two power switches, in my Giant Ugly Stick along with the 1100 mAh ignition battery and headed to the flying field. I flew the plane for about 45 minutes in three flights, flying normal maneuvers as would be done during a typical flying session. I took the plane home and began to recharge the batteries, one at a time. You have to remember that A123 batteries have practically zero self-discharge characteristics; meaning that they will stay at the same state of charge even after sitting for weeks or months.

I used the Super Whatt Meter and the 'Dapter to recharge each battery, writing down the amount of charge indicated to fully charge each one. ☺ne battery needed 219 mAh and the other needed 226 mAh, resulting in 445 mAh put back into the combined packs. Since the charge is 10% higher than the actual amount of power taken from the battery, the actual power removed from the two batteries during this 45 minute flying session is 400.5 mAh.

Also, since 45 minutes is 0.75 hours, you can divide the mAh used by the radio system by the

time and get the average current drawn from the battery equaling 534 milliamps, average.

So, with all this information floating around in my head, it seems that I could now determine how long I could fly before recharging the batteries. The batteries are rated at 2300 mAh and there are two of them in parallel, making a 4600 mAh battery. Since I only removed about 400 mAh from both batteries in 45 minutes, I figure I could fly for about 4 hours (240 minutes) before recharging with a 100% safety margin. Try that with your NiMH's!

Comments? I'd be happy to answer all your questions via email, and maybe both of us may learn something new.

HITEC SPECTRA 2.4 FLIGHT REPORT

Last month I wrote a description of the brand new Hitec Spectra 2.4 transmitter module and Optima 7 receiver, and said I would be making some test flights to report back on the operation of the radio system in one of my planes. The Giant Ugly Stick used in the A123 battery tests was equipped with the Optima 7 receiver and my Hitec Eclipse 7 transmitter had the 2.4 GHZ module plugged into the back of it, and I am pleased to report that both of the devices worked flawlessly.

I have to apologize for the lack of photos, but I have my reasons. First, the receiver mounted in the airplane was just about impossible to see under the foam padding. Second, the plane looked just the same in the air as it did in the video shown on the video page. Third, and most important, there was nobody at the field to take any photos. You'll just have to use your imagination.

It didn't take long to program the radio and set up the fail-safe according to the instructions supplied with the units. At the field, I made a preliminary range check with engine power off and the transmitter set to "power down mode"; and I had to walk at least 250 feet away before I lost contact with the model. With the engine running, this distance was about the same and I was satisfied that control in the air would be no problem.

And, I was right. The Giant Ugly Stick was flown through normal flight maneuvers, at low and high altitudes, some high enough where the plane was just a dot in the sky. Remember that this is a VERY large airplane! At no time was control compromised and I was very satisfied that the Spectra Module and Optima 7 receiver would function this way under just about any flight condition.

BRAVO, Hitec! These products took a while to get out to the modeling public, but the wait was well worth it. Thanks!

STANDOFF AT FIREWALL GULCH

I was working on mounting another engine on my Giant Ugly Stick and found out that I needed spacers between the mounting lugs and the firewall. A set of standoffs were supplied with the engine, but they were about an inch too short; meaning that the firewall had to be cut out to clear the carburetor. I didn't want to cut a hole in that really sturdy firewall, so I looked around for longer standoffs.

Yes, there are a lot of standoffs available out there: red ones, blue ones, round ones, machined ones and everything in between. They also come with a price, with some costing more than $20.00

for a set of four. Yes, I am a frugal modeler, and I had to find a less costly solution.

The standoffs seen in **PHOTO 4** came from McMaster-Carr online (www.mcmaster.com) and are 3" long. They are tapped at each end for 10-32 bolts and are hex shaped to allow them to be tightened with a wrench. To top it all off, they work perfectly! Remember to install a flat washer, the "fender washer" kind, between the standoff and the wooden firewall to keep it from digging into the wood.

These standoffs are about $2.00 each in this size, but be prepared to spend more once you take a look at the McMaster Carr online catalog and see what neat stuff you just have to buy. Happy shopping!

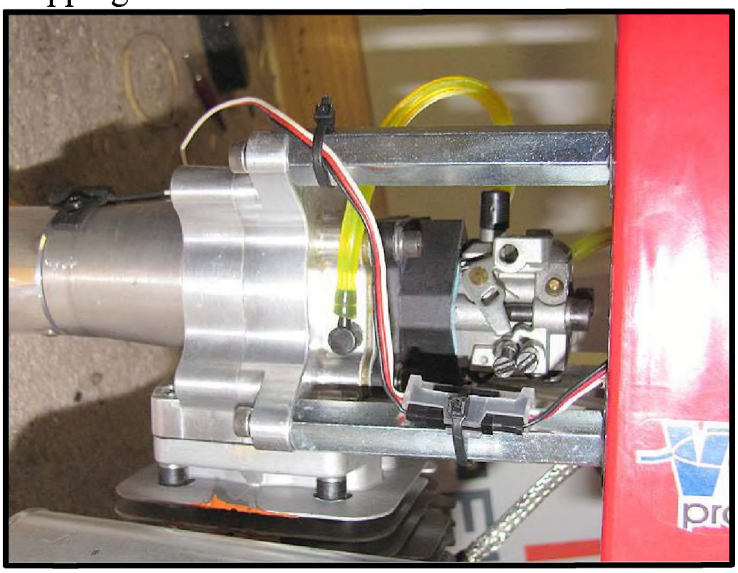


Photo 4: Standoffs used on my plane are available at reasonable cost.

POWER TO THE PEOPLE

Back at the top, I showed how I used a converted PC (personal computer) power supply into a 12 volt supply that can be used to power just about any 12 volt R/C accessory. Many of them can deliver more than 9 amps and they can be had for practically nothing, providing you are willing to do a few simple modifications. If you can figure out how to program a modern computer radio; you can do this. You'll also need a 10 ohm 5 watt power resistor that you can get at the local "Shack" that sells "radios".

The main cause for PCs to go bad is not the power supply. Usually it's the mother board or the hard drive, meaning that there are lots of PCs out there with perfectly good power supplies. Ask your friends if they have one and get the supply out of the case to convert. Do not plug it into the wall until you make all the changes.

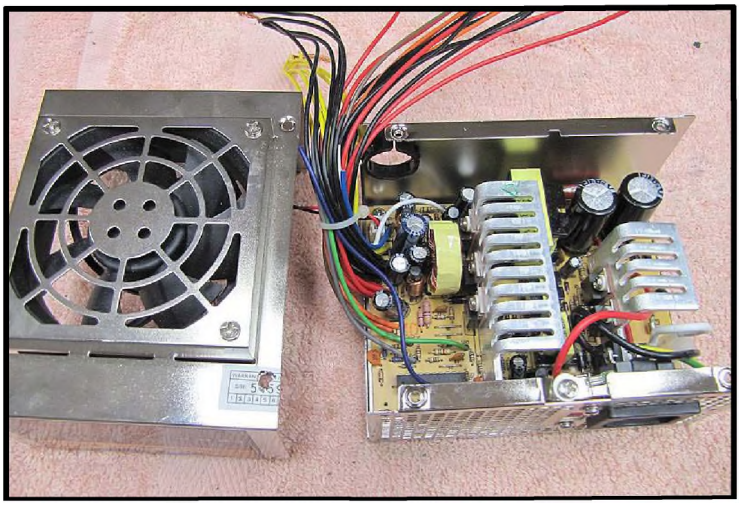


Photo 5: PC power supply used to make a 12 volt utility power source for shop use.

Open the case (There are four small Phillips head screws which you don't want to lose.), and pull the top half off the bottom. There are a gazillion wires that connect to a bunch of plugs and jacks which, for the most part, will not be used. Don't start cutting just yet because you need to know the color code. The black wires are the ground leads and you'll need several of these. The yellow wires are the 12 volt leads and you will need several of these, too. The red wires are the 5 volt leads and you will need one of these. There is also a brown wire somewhere in the bundle and you will need this, too. A typical unconverted power supply is seen on **PHOTO 5.**

Start by cutting off all the plugs and sockets from the wires. Select about seven of the black wires, and cut the rest off at the printed circuit board

with a pair of diagonal wire cutters. Select about five of the yellow wires and cut the rest off at the board. Select one of the red wires and cut the rest off. Separate the brown wire and cut all the other wires from the board, no matter what color they are. You should now have 7 black wires, 5 yellow wires, one red wire and one brown wire hanging off the power supply circuit board.

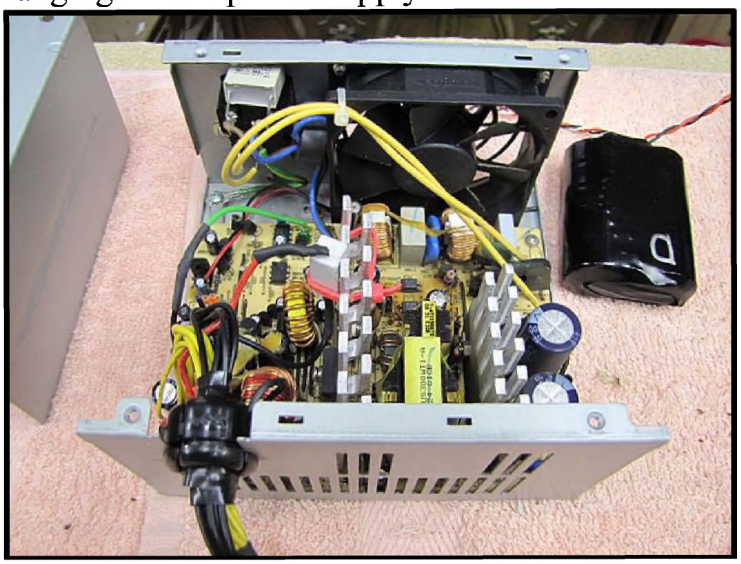


Photo 6: Here's what the PC supply looks like after most of those wires are removed.

Strip the insulation from one black wire and the brown wire and solder them together using rosin core electrical solder. Use heatshrink tubing on the joint. You can shorten these two wires to fit inside the case more easily. Solder the red wire to one end of the 10 ohm resistor and solder the other side to one of the black wires. Heatshrink tubing on all the exposed wiring will insulate things. Use a small zip tie to hold the resistor to the heat sink, that aluminum thing that looks like a really coarse hair comb.

You now have 5 black and 5 yellow wires left. Strip the insulation from all of them and solder the ends of the black wires together (this is ground) and then solder the yellow wires together (this is 12 volts positive). You can use any type of connectors at the ends of the wires. I like to use banana plugs and jacks, but there are many other types available; so use what you like. A typical converted power supply is seen in **PHOTO 6.**

Put the cover back on the supply. You did remember where you put those 4 tiny screws, eh? Do not operate the power supply without the cover installed. Plug the power cord into a working AC outlet and your supply will turn on automatically. As an option, you can put a small toggle switch in line with the brown wire that is connected to the black wire which will now act as an on-off switch.

You can now measure the output voltage with your DVM (digital volt meter) and you should get somewhere around 12 volts, as seen in **PHOTO 7**. If, in the event you don't get the correct output, unplug the supply and take a look inside to see if you connected the wires together correctly. If you did, you probably found the one and only PC power supply that actually went bad over the last 15 years. You will have to try another one while the rest of us use our converted PC supplies to power all sorts of hobby related stuff; doing so at a very low cost.

Photo 7: Look at the meter. 12 volts is exactly what we were looking for

KEEP YOUR WHEELS ON!

Many of the Golden Age and WWI models use wheels that simulate the ones used on the full scale planes, spokes and all. DuBro Products and Williams Brothers have several types of vintage and golden age wheels available. However the effect is totally spoiled when you have to use an ugly wheel collar to keep the wheels on the axles. Remember, also, that those collars have nasty habits of loosening and falling off at very critical times.

Here's a better solution. Locate a piece of brass tubing that fits snugly over your music wire axle. Cut the tubing to a length that is about ¼" longer than the length of the axle hole in your wheels. This is seen in **PHOTO 8**. Make a mark in the axle as shown to indicate where the tubing has to end when installed on the axle. Clean the axle with some sandpaper, remembering to wipe the dust off with some alcohol. Find a washer that is a tight fit on the axle and install it past the point where the mark is drawn. It will be soldered later.

Photo 8: Brass tubing and music wire axle used to mount vintage wheels.

Using a propane torch and solder, apply a light coat of solder to the axle, tinning it completely. Put a bit of soldering flux on the inside of the brass tubing. Once the axle is tinned, use a pair of pliers to slip the tubing over the axle and you will find it may not fit well. Heat the solder a bit and the tubing will slip on easily. Do not push it past the mark you made on the axle. Use the pliers to move the washer to the edge of the tubing and add a bit of heat and solder to attach it in place. Make sure there are no solder blobs on the "wheel side" of the washer. The completed axle assembly is seen in **PHOTO 9.**

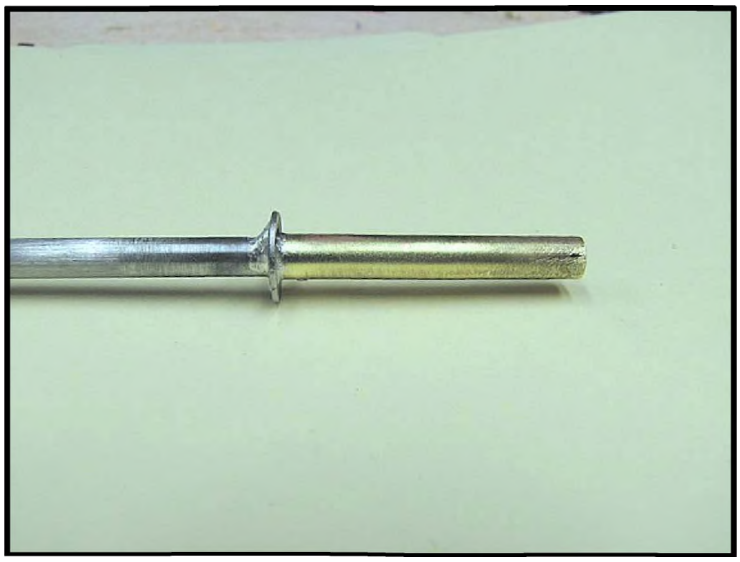


Photo 9: Here's what the axle looks like after soldering

Let everything cool. This will take a long time due to the thermal mass of the music wire and the tubing. Clean off any residual flux and dress up the solder on the back of the washer. If the tubing is larger than the hole in the wheel; drill it out. Put the wheel on the tubing and see where the exposed end is located. Between the wheel and the end of the tubing is where you will be drilling a 1/16" hole through the tubing for a cotter pin. Dress up the hole, removing any burrs and put the wheel back on. A small cotter pin can be used to keep the wheel in place, as seen in **PHOTO 10**.

Photo 10: And, here's the wheel mounted with a cotter pin

This sure looks better than a nasty old wheel collar, doesn't it?

That about does it for this installment. You have probably noticed that all the photos used in this edition were mine. This is because nobody sent me any photos of their new project, their old project or even one of their friend's projects. Please send us some photos, digital if at all possible, using either email or on a CD. There's not much going on this time of year, but I'm sure some of you have a new "toy" sitting on the bench just waiting for those flashbulbs to pop. I am really showing my age there. I would really appreciate any photos you can send.

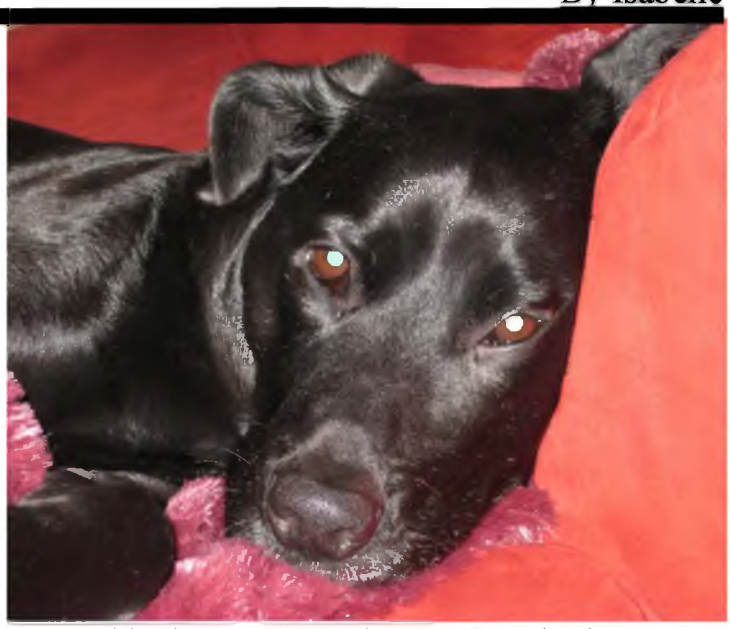
I would also appreciate any comments you have as to what you'd like me to be doing for R/C REPORT Online in 2010. This includes product reviews, projects, instructional material, field trips and other items that would make worthwhile reading. If the management says I can do it, and provides me with the backing; I'd be glad to do just about anything for our readers.

Thanks again and have a very Happy New Year! See y'all at the field.

Dick Pettit
pettit@ti.com

Tails from the Other Side

By Isabelle



Happy Valentines to all of you RC Report Online Subscribers out there! I recently had to go to see my Auntie Merrill, who is the world's greatest veterinarian by the way, and she gave me the most disturbing news…I have gained five pounds! Gasp! No more treats for me. ☹ So just a word of advice, from a current chub: DO NOT BUY YOUR WIFE, GIRLFIREND OR SIGNIFICANT OTHER CHOCOLATE FOR VALENTINE'S DAY! I REPEAT: DO NOT! Flowers are much more appreciated or jewelry. Yes, jewelry is good. And if you are just stuck on chocolate, try chocolate pearls (Mom's anniversary gift from Dad last year.) or chocolate diamonds (Mom's Christmas present from me last year.)

Chocolate Pearls…YUM! Sweet and no calories!

Well, I'll share with that my first month as an author has been rather bittersweet. I have received several really nice emails from some of you and had an opportunity to take a look at some fine looking pets from all across the country. More on that in a bit…and the announcement of RC Report Online's very first Pet of the Month! It appears, though, that others are not so crazy about the addition of my column to the magazine. I'm a little stubborn (like Mom), so I will continue to try to bring you news about current events in the RC world AND share a little of my world with you, too!

So, let's take a look at what's happening!

Coming up in a couple of days is the Licking County Radio Control Club's 25th Annual Swap Shop and Auction in Columbus, Ohio, on February 6, 2010. It's not too late to attend! See the flyer in the issue for more details.

I hesitate to tell you about this next event because it falls during Valentine's weekend, but it does seem to have a bit of an edge to it…sexy, with some teeth. You know the kind, right?

Think "Top Gun", (The movie; not the event…more on the event in a bit.) and Val Kilmer and Tom Cruise and the volleyball game (More on that, too!) on the beach.

See? Edgy with teeth! Who knew guys played volleyball, too?

Welcome to Desert Jet Storm, held in beautiful Wittman, Arizonia, on February 12-14, 2010. This is the 5th year for this event: three full days of jets! Head northwest of Phoenix and look for the Speedworld RC Flyers. There are three paved runways and a permanent Pylon Racing Course. They are a part of the Speedworld Raceway Park venue where there are NO NOISE ISSUES and access to the field is via paved roads. For more information, visit www.speedworldrcf.com or email Jim Allen at jamesea1@earthlink.net.

Head my way the next weekend (2-20-2010) for the QCRCC Swap Meet in Florence, Alabama, held at the Underwood Petersville Community Center. For information, contact Eddie Krieger at 256-648-1425. Set up is at 7:30AM. $5 admission includes a free table and additional tables are $5 each. Times are from 8AM to 2PM. Refreshments are available.

While you are here on the east coast, take a little trip farther north, and a bit more east, to Gaston, SC, on February 27, 2010 for the Congaree Flyers 2nd Annual Helicopter Fly In held at their home field. While in SC, dad would like you to stop by and visit with his mom in Sheldon. My mom, on the other hand, suggests that you detour over to Myrtle Beach and enjoy a nice steak at J Edwards Great Ribs and More. Sheldon is just a map dot and Myrtle Beach is…well, it's the best beach ever! Besides, Mom has all the answers to your questions, well most of the time. In the end, I'll just let you use your best judgment as to whose advice to follow! Contact John Morgan at johnm.morgan@yahoo.com for more information. Action starts at 9AM and ends around 4PM. Pilots' registration fee of $10 includes a BBQ lunch, noon time demo, auto rotation contest, and drag racing events. Join them for plenty of flying, fun, food, fellowship. No channel 20, please. Visit www.congareeflyersinc.com.

The following weekend (2-27-2010), give the 6th Annual Rocky Mountain Aeromodelers Expo a shot! Held at the Wings Over The Rockies Museum in Denver, Colorado, it is sure to be a fun time! For Information, contact Randall Eaker at 720-870-3874. Doors are open from 10AM to 4PM, static displays of all types, shapes, sizes of model aircraft, live demos: indoor free flight, heli, electric, 3D, U Control Outside, jet run-up outside, and much more! B-52 open for tours (weather permitting), hobby shops, flight simulators, food and drink available.

Jumping right into March, last month, I mentioned the Southeastern Model Show held in Perry, Georgia. This two-day event will be held at the Georgia National Fairgrounds and Agricenter. Email Norman Deputy at ndeputy@bellsouth.net with questions or see the flyer in this issue. Admission is $10, tables are $15. Hours are: Friday, 1-7PM and Saturday 8AM-5PM. I know that I got you all excited last month when I mentioned that I might be attending this event, but sadly; I will not be. You see, volleyball season has started and only Cass is allowed to travel during this time of year. (Cass, you know Cassie!) Mucho Dinero, you know? I did that just for you, Cass. I know how hard Spanish has been for you this year. It's tough learning a second language, taking Honors classes and being an epic volleyball player!

Penn State coach Russ Rose and Cassie in Austria last summer!

I LUV U! Thanks for letting me share your room. On occasion, I like to have a time out from the twins. And don't worry; I know that when you leave for college in three years; the room does not automatically become mine. A puppy can dream though, right?

Here's another one for you helicopter fans! Don't miss the first ever Heli Fun Fly, held March 12 – 14, 2010, **in** San Antonio, TX, at Cannon Airpark. William Wuest is the CD. Email him at wawviper77@peoplespc.com. Friday evening night fly and dinner for registered pilots with a paid $20 landing fee, and Saturday lunch with registration. GPS coordinates N.2913.00 W 09833.00. (I left the part in about the GPS coordinates, but I personally don't trust those things.) Visit www.als-cannonfield.com for more information.

The next event is in its 40th year, so you know it has to be good! Visit all the nice folks in Columbus, Ohio, for the Westerville Model Aeronautics Association 40th Annual Model Show and Swap Shop at Aladdis Temple located at 3850 Stelzer Road. For more information, email Paul Krumm at pckrumm@aol.com. Doors open at 9AM on March 20, 2010. Tables are $15 in advance. Admission for adults is $5, under 12 is $3, under 6 is free.

Round out the month in Delray Beach, Forida, March 27 & 28, 2010, for the Rhinebeck South Jamboree at Regional Park. Robert Temple is the go-to guy. Email him at rft725@comcast.net.

One more thing, I know that Top Gun, Frank Tiano's event in Florida, is still a few months off; but I would like to finalize my travel plans. I understand from Mom that both Dick Pettit and Dick Watz will be attending. Volleyball season will be over, so…who's

picking me up on the way down to Florida? One of you call me! I'll be waiting by the phone. Hope all this keeps you hopping over the next month or so. I had to shed my Labrador roots and become a Bloodhound to hunt down all this information! Maybe next month, I could talk Don Lewis' Bloodhound into giving me a helping paw! Hi, there Gracie Lou!

I really enjoyed your email last month and you are a cutie! Gracie Lou, by the way, is an English Bulldog, as you can see by the picture. Her big sister is the Bloodhound in the family.

"Well, we going to fly, or what Dad?" says Gracie Lou

If you have an event that you would like for me to promote, please send me an email with the information and attach a flyer, too!

Now on to the Pet of the Month…I did receive several entries via email. After much discussion, it was decided that a winner would be selected by random drawing…the cuteness factor was just too high to be able to only pick one! I am pleased to announce that RC Report Online's February 2010 Pet of the Month is Baby, from Helena, Montana. Baby's dad writes:

Baby with some of her dad's fleet, on snowy Hauser Lake near Helena, Montana.

Dear Isabelle, I must say never wrote to a dog before, but maybe you would be interested in my pet Dinosaur "Dick's Dino" or just plain ole Dino. He is the long neck variety and comes to watch us fly from our 1000 acre flying site, while we are walking on the water.

Can you see Dino? The cat had to point him out to me. Smarty pants cat!

When there is enough snow, it's a great time to test the latest creation. If things don't work out, just look for a hole in the snow and reach in and retract the model. When this happens, it tends to clean any dust off the model as well. Of course, if you don't forget to cut the throttle, they can go pretty deep. Never had one hit water yet; probably a good thing as I would forget about flying and start fishing. Baby, my Springer

Spaniel, says "hi." She likes to run under the low flying planes, if they are slow enough; and gets a good work out, too. She is also a bed warmer!
Keep on with the interesting stuff. I'll send you pictures of Dino when the lake gets wet again, but here in Montana one never knows when that might be. Could send pictures of the fleet; they are all on pontoons or sea plane types which work well in the snow or water.

Your friend
Dick.

Dick and Baby will receive a free premium subscription for one year to RC Report Online, which can be used as a gift or as a renewal; AND a $20 Petco gift card.

Many thanks, again, to all that entered this month! Entries received this month will automatically be included in next month's drawing, but I am always looking for new faces and friends!

How do you enter?

Just submit a picture of your pet or pets, including their name, approximate age and a brief description, with or without one of your planes for a chance to win a toy from my "Toy Box"! All types of pets are eligible: with fins, fur, feathers, scales, farm animals, etc. Just so you know; Mom loves cows! And you know what? I'm just a little spoiled, so I have some great toys to share! Toys are selected randomly and may be anything from a toy for your pet or a toy for you! Each month a pet will be selected from all entries received by the 15th of the current month. Entries received this month will have the chance to be selected as RC Report Online February 2010 Pet of the Month. If you have more than one pet, you can enter multiple pets each month. If your pet is not selected as "Pet of the Month", you can always try again the following month. You can email your picture (preferred method) or you can mail it by regular mail. Only photos received with a self-addressed stamped envelope will be returned. Someone has not set-up my email account (hint, hint), so for now; you can send emails to Mom at juliac@rcreport.net. Please put "Pet of the Month" in the subject line and make sure that you receive a confirmation email verifying that I received your entry. Even computers make mistakes and I would not want your pet to miss out just because of a computer error. I would certainly appreciate other correspondence as well, such as funny or heartwarming stories about your pets or anything else you would like to share. Birthday shout outs are welcome, too!

☺ne last thing, just like Here's How by Walt Wilson, this column will depend on input from all of you. So send in your pictures and event details to me and your ideas to Walt!

Well, until next month,
Isabelle

Smile! You could be the next Winner!

O.S. .46 AX

O.S. .55AX

O.S. .75AX

Smiley Face Contest #2 2010!

We are bringing back the smiley face contest. Throughout this issue we have placed five or more Smiley Face Figures like the one shown here (☺), but as before this page doesn't count. Write us and tell us where at least five are, and you'll be eligible for a random drawing in which the winner gets to chose from the three engine shown above. Two more winners will receive one year subscriptions or renewals to RCReport Online. Winners will be selected by a random drawing from all the correct entries received no later than March 1, 2010. No entries will be accepted after this date. Entries must be sent via US mail or E-mail only, and reference the correct contest number in subject line or address. Hobbico employees, RCReport Online employees, columnist and advertisers are ineligible for prizes. No Purchase Required. Valid in USA and Canada only.

smileys@rcreport.net Subject line: Smiley Face Contest #2 2010US Mail: Smiley Face Contest #2, 2010 PO Box 12051 Huntsville, Al 35815

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

FIVE!

Fred Herrmann, Huntsville, Alabama

Smiley's are as follows: back to making us go blind! I love that! EIGHT!

Dan Schaller, Kinsley, Kansas

EIGHT!

Manfred Decker, Wahpeton, ND

EIGHT!

That is enough, I guess. Thanks for bringing back the contest.

Jaime VanDiver, Camden, NY

I found the following Smiley Faces. EIGHT!

It was fun again!

Jim Mahoney, Lakeland, FL.

Hey Julia, never met ya, but you sound like a sweetie Now I've played this game for years...never won and may not this time 'cause those smiley's are awful small but here it goes. NINE

Hey you all doin' a great job up there!

Thanks, plane doc

Phil Castner, Sr, Magnolia Springs, AL

These bring back ole memories. I hope everyone enjoys them. Down to paper they go. I enjoy the magazine as before. I found 11 smiley's.

Larry Slowiak, Rhinelander, WI

Well I've not tried this before but now that your mag is online; I thought I'd give it a try. I found 6, not counting the frowny.

Great magazine just chocked full of info at every turn of the page. Wish I started getting it sooner but I'll settle for scavenging old issues that show up in our field box on rare occasions.

Gary Clifford, Member of Colonial Virginia Aeromodelers, Williamsburg, Virginia.

Hooray! I'm really happy to see the return of the contest! I did not realize how much I had missed it until I started paging through, straining my eyeballs and readjusting my computer screen to get a clearer view. It also gives me a wonderful overview of everything and gets me psyched about going back to read the articles in depth!

Frank Maguire, South Portland, ME

Since I got them all, Smiley Faces that is, I'll be expecting a first place prize like a WACO 1/5th scale is fine with me. ELEVEN!

Thank you in advance!

Karl Bruck, Cheshire Castle, beautiful Newberg Oregon

Well everyone I am glad to say that the smiley contest has had great response. The winner will be contacted and announced in the March issue. The winner will receive his choice of one of these three engines: OS .46AX, OS .55AX, or OS .75AX. Keep searching those articles and columns.

Total Smilevs for January 2010 issue was 11, plus one frowny face!

Tony Coberly

tonyc@rcreport.net

Fun Aerobatics

by Ed Moorman

MANEUVER OF THE MONTH: TRIANGLE LOOP

How about something a little different this month? I have covered square cornered loops, both inside and outside, so let's go with a triangle loop.

DESCRIPTION OF THE TRIANGLE LOOP: The triangle loop is a three cornered maneuver shaped like a triangle with the point at the bottom and a long inverted side on top. Some of the aerobatic patterns have a triangle loop with a roll in the top leg, but we'll keep it simple this time. The first and last corners are 60 degree turns while the two corners at the top are 120 degrees.

KEYS TO DOING THE TRIANGLE LOOP: The key to doing a triangle loop is like the key to the other square cornered loops; your plane must be able to do a fairly tight corner with snapping out. You also need power for the steep climb.

AIRPLANE SET-UP FOR DOING THE TRIANGLE LOOP: If you have done the other square cornered loops, you'll be in fine shape. You need a good bit of up elevator, but not enough to stall and snap the plane.

DOING THE TRIANGLE LOOP: As always; we need to start from the Standard Set-up.

STANDARD SET-UP:

1. **Full power**
2. **Parallel to the runway**
3. **One mistake high.**

The triangle loop should be started with the plane flying into the wind.

What to do:
Check the maneuver card for the picture. We do the triangle loop with the point down and a long flat leg on top. Your first pull up and the pull out on the bottom is 60 degrees. The other two corners are 120 degrees. Do not yank the stick. Use the same amount of elevator, about half, that you did for the square loop.

The Pull Up:
This is an easy corner. Pull up to 60 degrees. This is pretty steep and many people make the pull up too shallow. Remember, halfway to vertical is 45 degrees and a 60 degree pull up is steeper than that.

The Up Leg: This leg can be a little difficult. As the plane slows down, the nose wants to drop so you may have to compensate by tweaking in a little up elevator. Watch the line and try to make it straight. Climb a comfortable amount for your plane. For a first try, use the same height as you did for your square loop.

The First Top Corner: The top corner where you pull to inverted is a tight one. You are rotating the plane through 120 degrees. If you pull really hard, you will lose a lot of speed. The corner will be fairly tight since your airspeed has been slowed down by the climb. Take it easy here until you learn your plane's capabilities.

The Inverted Leg: To keep this leg level, you'll need a little down elevator due to your slow speed. The speed will be building up so watch the line of the leg so you'll have to adjust the elevator as needed. Fly as far as you went up for the first leg.

The Last Top Corner: This is another 120 degree corner. When you make this corner, try to stop the rotation with the plane aimed at the point where you first pulled up to start the triangle. Like the last corner in the square loop, you may want to reduce power before pulling to keep the speed down on the descending leg. This depends on you and your plane. If you need to cut power for square loops, try it that first on triangles.

The Descending Leg: Fly the descending leg trying to point the plane at the entry point. It's easier than the climbing leg because the speed will be increasing. Keep the nose down, as it's very easy to let the plane shallow out and make a curved leg. Shoot for the same altitude for your level off that you entered at.

The Level Off: This is an easy corner, so don't overdo it with too much elevator. Add the power back, if you reduced it.

You can see this isn't a really hard maneuver; it just takes a little practice. To make it a little more challenging, after you can do all three corners, try doing a full roll in the top, inverted leg. You'll be holding some down because the plane is slow after the climbing leg. There is a tendency to release the down as you start the roll; letting the nose of the plane drop. I think Mode I fliers have it easier on this maneuver since they can hold and adjust the elevator with their left hand while rolling with the right.

RC REPORT MAGAZINE	
TEACH YOURSELF AEROBATICS CARD	**TRIANGLE LOOP** By *Ed Moorman*
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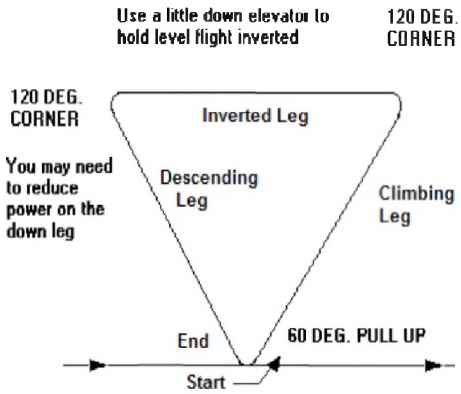
STANDARD SET-UP: 1. Full power, 2. Parallel to the runway, 3. One mistake high. The triangle loop should be started with the plane flying into the wind, take off and landing direction.	
WHAT TO DO: Pull up 60 degrees. The two middle corners are 120 degrees. The pullout is 60 degrees.	
THE PULL UP: This is an easy corner. Pull up to 60 degrees. Remember, halfway to vertical is 45 degrees and a 60 degree pull up is steeper that that.	
THE UP LEG: This leg can be difficult. As the plane slows down, the nose wants to drop so you may have to compensate by adding a little up. Climb a comfortable amount for your plane.	
THE FIRST TOP CORNER: The top corner where you pull to inverted is a tight one. You are rotating the plane through 120 degrees. If you pull really hard, you will lose a lot of speed.	

Photos

Photo1: Check this out, a Big Stick 40 with anhedral. It's not mine. It belongs to Frank Tanforan, who has it powered by a Saito .65. It's an excellent flying plane.

Photo2: Here's another of Frank Tanforan's planes. This one is a Doc Matthews' design that Frank scratch built from plans. The power is a Saito 150. He says it makes him look good.

TRIANGLE LOOP



THE INVERTED LEG: To keep this leg level, you'll need a little down elevator due to your slow speed. The speed will be building up so watch the line of the leg and adjust the elevator as needed. Fly as far as you went up the first leg.

THE LAST TOP CORNER: This is another 120 degree corner. Like the last corner in the square loop, you may want to reduce power to keep the speed down on the descending leg.

THE DESCENDING LEG: Fly the descending leg pointing the plane at the entry point. Shoot for the same altitude as your entry.

THE LEVEL OFF: This is an easy corner, so don't over do it. Add the power back if you reduced it.

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Ed Moorman E-mail: emoorman25@gmail.com

Photo3: This is Ed's Stinger 40 ARF with Plane Fun Floats, U-Can-Do gear for struts and Saito .91 power. Yes. It's a dead stick. Can you see why? Note the green pressure line hanging down. The pressure fitting vibrated loose, and then stripped out the muffler. No muffler pressure and you'll usually get a dead stick.

Photo4: This is Flaps' new Microwave, electric ducted fan jet. He built it from plans. The weather hasn't cooperated enough for us to test fly it. It seems to have plenty of power.

Photo6: Another view of Flaps and his modern Burnelli jet design. Note that the fuselage is a big, thick airfoil. Don't ask where the CG goes. We're going to wing it! I'll keep you advised on the testing.

Photo5: Flaps' new creation has no name yet. You might remember the CBY-3 Burnelli, lifting fuselage design he built and I flew. He found an artist's drawing of a modern Burnelli design with jet power that he liked. To top it off, it was a canard! He just had to build it. The electric ducted fans were on order when this was written.

Photo7: This was Flaps' twin CBY-3. It was easy to find the CG on a model of a full scale design because the center of lift of both the wing and the fuselage airfoil are located at the same point. We balanced between 25%-30% back on the wing and it flew great.

FEATURE OF THE MONTH:
World War II Army Fighter design and tactics in the Pacific theater.

I have always been a World War II buff. I lived through it. Yes, I'm that old; I was born in 1937.

As far as coverage goes, the European Theater got the most. Everyone knows about Mustangs, Spitfires, Thunderbolts, B-17s and B-24s. The US Army Air Force has approximately 20,000 combat planes in the European Theater.

The next most studied area was the Navy and Marines in the Pacific Theater. Wildcats were the fighter to start with, then Hellcats and Corsairs. The Navy and Marine Corps had over 9,000 combat planes in the Pacific Theater. I haven't forgotten the Buffalo, but there were very few of them at the first of the war. The Navy hated the Buffalo and gave them all away. Funny thing about the poor old Buffalo, it ended the war with the best kill-to-loss ratio of any fighter in the war. The Finns, who fought both the Russians and the Germans, bought a bunch of them from Brewster. They loved it so much, a 30.6 to 1 kill ratio for 4 years and a 67.5 to 1 ratio in 1941 will do that, that they acquired the design and built their own Buffalos.

Third, we get to the Army Air Force in the Pacific Theater. They only had 22,000 combat planes in the Pacific. That's more than the AAF had in Europe! I didn't realize that until I did some research. They also didn't have any sexy fighters for a long while. They started out with a few P-39s and a bunch of P-40s. They finally got the P-38 and late on in the war they got the P-47 and P-51. In the early part of the war, 1942, the P-40 fought for and won air superiority over China and never gave it up. It also did yeoman work for MacArthur in New Guinea until the P-38s arrived.

Finally, the theater that hardly gets any mention, from the air power point of view, is the North African Theater. P-39s and P-40s were the Army's only fighters and did exceptionally well.

Now, let's look at fighter design in the late 1930s and why our first two modern fighters flopped in Europe. In the late 1930s, the bomber generals and colonels held sway in the Army Air Corps. The Air Corps became the Army Air Force in June, 1941, just before the war started. They felt that heavily armed bombers could fight their way to the target and would not need fighter escort. For this reason, fighters were designed to be used for ground support. The engines either had no supercharger or a single stage, integral supercharger as opposed to a two stage tubro supercharger, which fighters needed for high altitude work. The P-39 and P-40 were designed this way.

At altitudes above 15,000 feet, both planes were fair and above 20,000 feet, they were poor. Below 15,000 feet, and the lower the better, they were great. Let me give you a couple of examples. Take the P-39. It was supposed to be no darn good. However, the British captured a German Me-109E, which was a very good airplane. They also had several P-39C models. They tested the two planes together. Below

15,000 feet, the P-39 could out run, out turn and out climb the Me-109. They put the Me-109 on the tail of the P-39 at 10,000 feet and initiated a tight turn. By the time the Me-109 had made one 360 degree circle, the P-39 had completed two!

I remember reading one account from a P-39 pilot flying in North Africa. Montgomery and Patton were fighting Rommel's forces at the time. He said he was returning from a ground support mission at around 5,000 ft. The P-39 with the 37mm cannon in the nose was a good plane against tanks and bunkers. He came upon a flight of three Me-109s. I know what you're thinking. Common knowledge would think the P-39 pilot was in big trouble. The pilot related about how none of the P-39 pilots were afraid of Messerschmitts' at low altitude, so he turned toward them and set up a firing pass. He stated he shot down two of them and the third took off.

The second example is about the P-40, supposedly obsolete at the start of the war, while the Japanese Zero was one of the great fighters of the war. I have read statements by four P-40 pilots who flew in China. Three were in the American Volunteer Group (AVG), the Flying Tigers, and the fourth was in the same unit after it became part of the Army Air Force. All four dispute any claims that the Zero was a superior plane. They state that the P-40, if you kept your speed over 275-300 mph, could out roll, out turn, out run and out dive the Zero. The Zero was light so it had a marginally better climb rate. They also said that the Zero never used its cannon unless they were at point blank range due to its slow rate of fire. Its other guns were rifle sized, .30 caliber; while the P-40 was throwing heavy lead, .50 caliber.

Naturally, neither plane was any good at high altitude escorting bombers. They weren't designed for this mission; they were specifically designed for low altitude work.

Next, let's look at tactics. In the late 1930's and early 1940's both services were run by men who had flown biplanes and who were used to the WW I style turning dog fights. It had worked during the last war so it had to be the way to fly and fight. It was in the regulations and it was how everyone, Army and Navy, trained. When new ideas were proposed, as they were by Claire Chennault, they were disregarded or forbidden. Chennault got so angry about it; he left the Army and took a position in China. It took a war over there for his ideas to be tested and proven.

It was also hard to change tactics. Leaving a dogfight was not an approved option. In the US Navy, leaving a dogfight was a court marshal offense, and in the British service it was considered treason. This does not make it conducive to newer climb and dive, hit and run tactics. There was no thought given to adapting tactics to use your plane's advantages against the enemy plane's disadvantages.

When the Chinese finally talked the US into selling them some old P-40s, Chang put Chennault in charge of the American Volunteer Group, the AVG, which we know as the Flying Tigers. He taught them the hit and run tactics, which took awhile for most pilots to accept, but they found out he was right. Later they found that

the Zero or Oscar had a fairly low red line speed, in the 350 mph range. Over that, the Zero was likely to lose an aileron or even a wing. The P-40 could dive at nearly 500 mph. In addition, at over 275 mph the Zero's roll rate was terrible and at these higher speeds, the P-40 could actually out turn the Zero. Since the AVG only lost 4 planes to enemy air-to-air action, and shot down nearly 200 planes; I would say the tactics worked pretty well

This kill ratio also speaks well for the old P-40. Most were like the C model with the long nose and small, set back air scoop. It turns out; however, they had good engines. I found out that the Chinese bought the planes without engines, and then negotiated for the engines. Allison had several engine parts that were in a warehouse because they were out of spec. These were built up into engines and sold to the Chinese for their P-40s. Since all the parts were out of spec, the Allison people hand-fit and assembled the engines by test fitting all the parts. The AVG got what amounted to blueprinted, hand-fit engines that put out a good bit more horsepower than the stock engine. I have seen estimates by pilots of as much as 200 hp more. A little more horsepower always helps out the tactics.

Also helping out with the ability to use the tactics was self-sealing fuel tanks and armor around the pilot and the engine coolant tank. I have read numerous accounts from AVG, Army, Navy and Marine pilots about hearing a "plink-plink" sound and then realizing it was Japanese .30 caliber bullets bouncing off the seat armor. That would certainly boost my confidence in my plane. The

AVG P-40s had two .50 calibers in the nose and four .30 calibers in the wings. Later P-40s had four or six .50s. The .50s had a lot more range and hitting power than the rifle-sized .30 caliber guns. There is nothing like out ranging the enemy's guns and throwing heavier metal at him.

Finally, the air war in Europe was mostly fought at high altitude where a fighter with a two-stage turbo supercharger was a necessity. In the Far East and Africa, the air war was fought at medium to low altitude where the non-supercharged and single-stage mechanical supercharged engines worked great.

The bottom line is, don't believe everything you read by so-called "experts." Nearly all of them haven't flown combat and can only go by specs. A whole bunch of pilots made ace in the old, obsolete P-40. Certainly, they couldn't get to European bomber altitude, but when the fight was down low, 15,000 and below, they were one tough airplane, especially when they were used to maximize their attributes.

Ed Moorman
Fun Aerobatics
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Combat Anyone?

by Chris Handegard

RC COMBAT FOR DUMMIES

In simplest form RC combat is the art of the fighter pilot; trying to cut the streamer off the opponent's plane while they are simultaneously trying to do the same to you. The goal? "to survive and overcome!" All who enjoy competition and good-natured fun are hereby invited and challenged to make RC Combat a part of your model aviation hobby!

This article is not intended to take the place of documents on rules and how-to information that is readily available, but will include links and descriptions intended to help the curious become informed, and experience firsthand the most exciting 5 minutes in RC! Watch your "six" (Ya know, Behind you!)

Step 1: READ UP!

The RCCA is the AMA SIG for combat and their website is the best source for information, contest listings, discussion forums, event debriefs with

Photo 1: Just a bunch of us waiting to get it on!

photos, and is where National Points System rankings are posted. Membership is a whopping $15 per year.

http://www.rccombat.com/index.asp

Step 2. GEAR UP!

Here are links to several manufacturers of combat kits that are cheap, easy to build and repair, able to withstand the average mid-air, and fly great. They also offer many of the other building materials and equipment best suited for the well dressed combat aircraft.

- http://www.airscharnell.com/team_scharnell_avenger.htm
- http://www.treneffrc.com
- http://www.hattrickrc.com

Basic shopping list to complete the glow powered version…..

OPEN B class combat kit

Read Rules!

One O.S. FX.25, or Magnum .28, etc., three standard servos, one receiver, one 300-400 mAh battery pack, colored packing tape or low temp iron on covering.

A 6oz. fuel tank, tubing, miscellaneous control horn and linkage hardware.

SSC (Slow Survivable Class) combat kit

Read Rules:

One Magnum .15XLS, or O.S. 15LA,three standard or micro servos, (if micro they should have same torque as standards and metal gears are preferred, one receiver, one 300-400 mAh battery pack, colored packing tape or low temp iron on covering. 4oz. Fuel tank, tubing, misc. control horn and linkage hardware.

2548 Scale Class

Read Rules!

One O.S FX.25, three or four standard or micro servos (if micro they should have same torque as standards and metal gears are preferred),one receiver, One 300-400mAh battery pack, colored packing tape or low temp iron on covering (scale in appearance). 6oz. Fuel tank, tubing, misc. control horn and linkage hardware.
Specialty building materials:

- Bi-directional filament packing tape (available from kit manufacturers, Office Depot, or some Home Depots / Lowes)
- Polyurethane glue, such as Gorilla Glue or Elmer's Ultimate, available at most Home Depots / Lowes.

Step 3. SUIT UP AND SHOW UP!

Go to the RCCA contest calendar for events in your area, sign up, and most importantly, follow through and show up! Every year Combat is one of the featured segments at the AMA NATS in Muncie Indiana as well.
http://www.rccombat.com/events/index.asp

Here's my e-mail
chandegard@peersonaudio.com
Put the word COMBAT in the subject line and I'll be happy to answer questions and share all I know about the most fun you can have in RC with your clothes on! Don't miss out!

Chris Handegard

Mail Call

Received this little ditty in an email from Larry Slowiak from Rhinelander, Wisconsin. Thanks for the funny, Larry

WOW!!

Ole and Sven were drinking buddies who worked as aircraft mechanics in Minneapolis and one day the airport was fogged in and they were stuck in the hangar with nothing to do. Ole said, "I vish ve had somethin ta drink!" Sven says, "Me too. Y'know, I hear you can drink dat yet fuel and get a buzz. Ya vanna try it?" So they pour themselves a couple of glasses of high octane hooch and got completely smashed. Next morning Ole woke up and is surprised at how good he feels. In fact he feels GREAT! NO hangover! NO bad side effects. Nothing! The phone rang. It was Sven who asks "How iss you feelin dis mornin?" Ole says, "I feel great. How bout you?" Sven says, "I feel great, too. Ya don't have no hangover?" Ole says, "No dat yet fuel iss great stuff – no hangover, nothin. Ve oughta do dis more often." Sven agreed."Yeah, vell, but dere's yust vunting." Ole asked, "Vat's dat?" Sven questioned, "Haff you farted yet?" Ole stopped to think. "No " "Vell, DON'T, 'cause I'm in Milvaukee."

Tony,

I tried to look for the A123 Li-Ion cells as you described in your column in the Oct 2008 issue. What I discovered is that the VPX battery packs have been discontinued by Black & Decker and are no longer available. Do you have any suggestions on other sources for these cells? Several tool manufacturers sell Li- Ion powered tools, but I have no way of determining if the packs contain A123 cells.

John Georgen

John,

Right after that article came out, they were indeed discontinued and the item sold out quickly in stores. DeWalt lithium packs are A123 cells, but they cost more. My local hobby shop is carrying A123cells them now. Try your local hobby shop or one of the mail order big boys like Horizon Hobby or Tower Hobbies.

Tony

Tony,

I found the DeWalt packs on E-bay and bought an 8 cell pack for $57.94 including shipping. This was only $ $7.25 a cell, much less than the $11-15 price at the various hobby outlets.

John

Well folks keep your questions and comments coming. We will do our best to answer each and every question asked of us. We will continue to post a few each month for the rest of the readers to see yours questions and comments.

RCReport Online Staff!

Webb Scale

by Gary Webb

I cannot believe another month has past us by so quickly. As I'm writing to you, here in the first week of January 2010, snow is coming down fast and heavy, and its 17 degrees to boot! I decided to lift my spirits by doing my column today and dreaming of warmer weather and being out at the old flying field with friends and flying scale!

Last month we stopped with Robert's Rufe build with the planking of the main float. Okay, pull up a chair, get your cup of hot coffee and let's get down to building scale. We start this time with building the strut for the main float. Photo #1 is of the main struts center former to which everything else will be attached. It was made from five ply 1/8th inch aircraft plywood for maximum strength. You can see how it is keyed into the bottom of the float. This will be permanently attached to the float at this juncture. Also, note that Robert has added lightening holes to stay with his plan to keep the all up weight of the model at or under 30 pounds. The best method I have found to make lightening holes is with a Forstner bit, though they are somewhat pricy. (*Editor's Note: Forstner bits are drill bits that drill larger holes in wood and have nice flat bottoms on them. Yes Gary, they can be a bit pricey, but not if you have a local Harbor Freight store. I have seen sets of five different size bits for $29.95)*

You can get away with other flat chisel bits and hole saws, but they do not leave as nice of a finished hole as the Forstner bits do. It's your choice, of course. No one is going to see them after the part is skinned, right? It's just personal pride of doing a job well done.

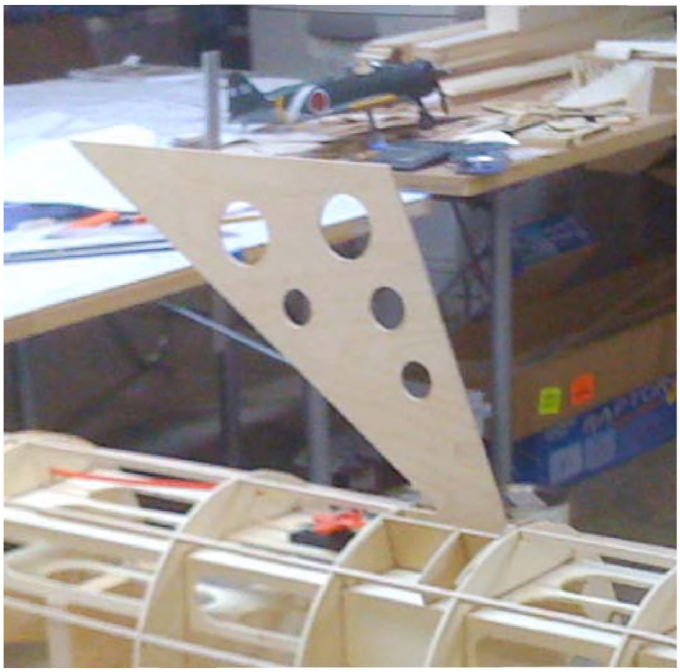


Photo 1: Main float strut center former, note lower anchor point and lightening holes strategically placed to help keep weight down and strength up.

Photo #2 depicts Robert gluing the formers onto the main forward strut. Notice how he is using the balsa sheet to keep the two halves aligned at the top of the strut; also more lightening holes in the center former. In photo #3 we see that Robert has added six carbon fiber rods to the formers t☺ add a tremendous amount of strength, but with little added weight. The strut is also now being fitted to the bottom of the wing with the aid of the laser to make sure it is properly aligned. He has sanded the shape of the top of the strut to fit the dihedral of the wing to give him a tight fit. This also allows maximum surface area to distribute the weight to the wing skin when the full weight of the plane is resting on the strut. Next he made the strut top saddle from three layers of five ply plywood of 1/32nd inch thick, sandwiched with two layers of 3 oz. fiberglass cloth. Due to the wing dihedral the 1/32 ply was made from two elliptical shaped pieces for each layer. A tag board template was fashioned until the two pieces fit the crown of the bottom of the wing. He laid down plastic wrap to the bottom of the wing to keep the two surfaces from bonding during the process.

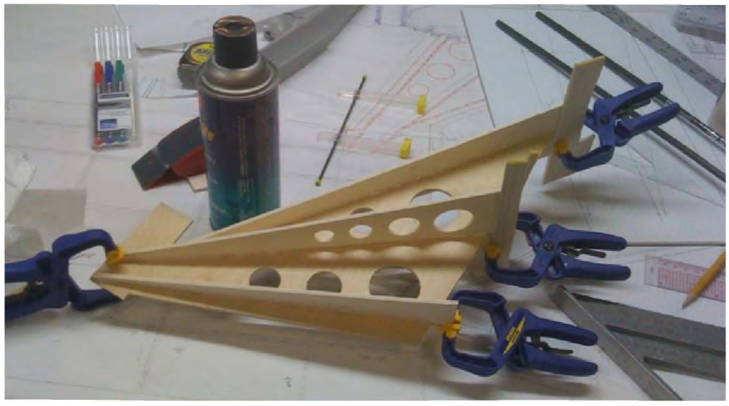


Photo 2: The main float center former with the rest of the structural formers being clamped in place while glue cures. Note the use of Balsa plates at top of strut to keep both former halves at 90 degree angle to main former.

The center strut is removable from the bottom of the wing, and is held in place with bolts from the top of the wing through to the strut, thus allowing removal of the center strut and main float assembly from the wing.

Photo 3: A Laser being use to align the main strut to the bottom of wing. This allows Robert to get the shape of the top of the formers to match the wing dihedral before top plate is installed to it.

He used shot filled bags to hold everything in place until the epoxy cured. After the epoxy cured, the strut was again fitted to the wing using the laser to keep it both vertically straight to the wing as well as aligned to the wing root, front to back. Then he added ¼ inch ply plates to the six locations on the saddle for the hold down bolt positions and inserts.

Robert proceeded to add the skin to the back side of the strut first using the aforementioned flight skin, Photo #4. Again he used Gorilla glue to fasten the skin to the formers and wing top saddle. You can also see the ¼ inch ply mounting plates through the skin in the photo.

Photo 4: Depicts the skinning process of the main strut using Flight Skin. You can also see the rudder servo lead extension, along with the ¼" mounting plates.

Also note the use of micro balloons and epoxy to fill the voids at the bottom of the strut, thus sealing it. The rudder servo extension lead can also be seen protruding from the bottom of the strut. He then proceeded to finish skinning the front of the strut as seen in Photo #5. After the glue cured, he then trimmed the skin to match the saddle.

The next thing Robert had to do was build a jig to align both the main float strut assembly and the wing. Photo #6 is what Robert came up with. Even the jig looks professionally built. Nice job!

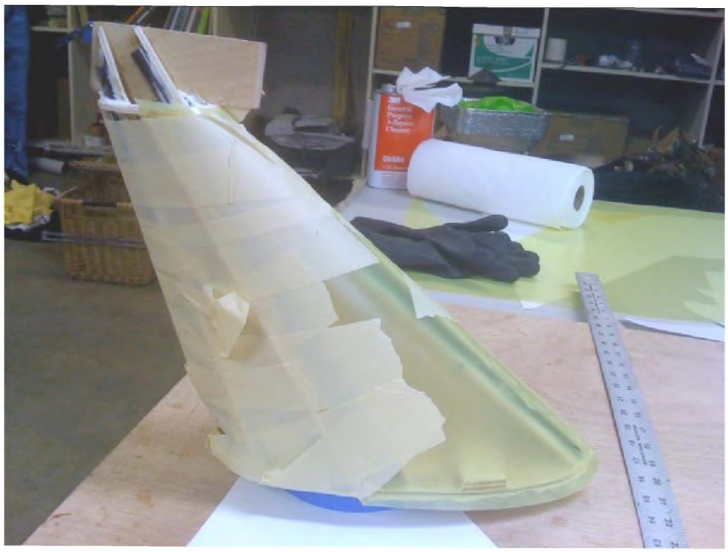


Photo 5: This is how Robert keeps the skin in place while the glue cures. Gorilla glue used to hold skin to strut frame.

Photo 6: Jig horse built to aid in alignment of fuse to main float. The lower part also is used to hold the model after it is assembled. Notice adjustability in the float stand for proper alignment to the fuse datum line.

The standing jig support horse for both the aircraft, and the main float, was built to fit the bottom of the float contours, and bottom of the wings so that the float would be held square and level. Photo #7 The standing jig was adjusted so

Photo 7: The main float, strut, and V struts all in alignment on the jig with the fuse and wing, ready for permanent attachment. Note tape holding float in place along with wooden shims to help in the alignment process.

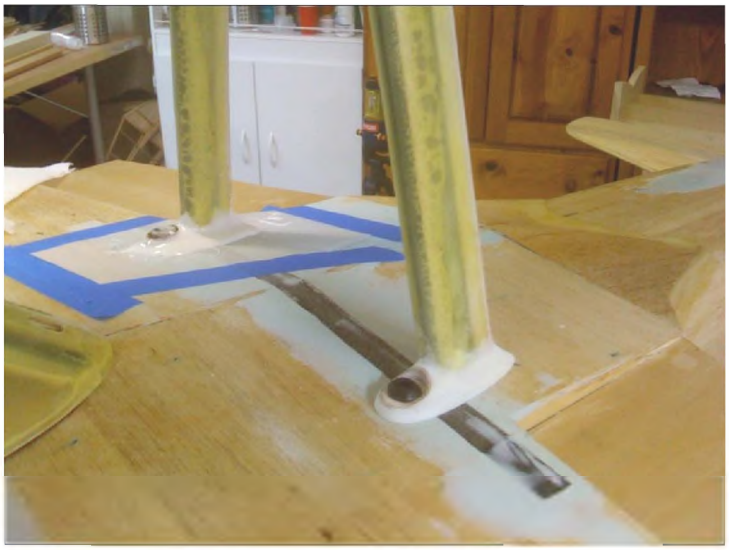


Photo 8: Here we see the way the top of the V struts are made. First ply plates are attached to the struts and then micro balloons and epoxy mix added to give shape. Note plastic sheet between strut and bottom of wing to act as a parting agent, and the carbon fiber tape glued into the bottom of wing along the rear spar for added strength.

that the aircraft was held level on all axis. This was easy to do because of the horizontal and vertical datum lines on the fuse using the laser level. The top of the main float is parallel to the planning surfaces, so it was squared up and leveled parallel to the fuse datum lines. It's also important to note that Robert had to get the step of the float directly under the CG of the fuselage as part of the alignment process so that the aircraft will get up on step properly so it can break free of the water on take off.

The float was removed from the stand and the main forward mount was installed on the bottom of the aircraft. Using the laser to line up the front center of the mount male tab, a center point was determined on the rear vertical support of the standing jig. ☺This was done to insure that the main float was in line with the fuse; being that the laser would be blocked from lighting the rear of the float if it were in alignment.

Next the V struts were installed permanently to the float while using attachment tabs and bolts to the underside of the wing. These bolts also hold the wing to the fuselage. Photo #8 depicts the ¼ inch ply hold down plates attached to the top of the V struts which are hidden by epoxy and micro balloons to give them their shape. You can see how he accomplished this in the photo. He again used plastic wrap to form a barrier to keep from gluing the strut to the top of the wing, and then applying the micro balloons to the mount. Then when cured, carve and sand to shape. The V strut, closest in the photo, has already been carved and sanded to shape while the farther one is still waiting to be finished. Also note the carbon fiber tape reinforcement, through the center section of the bottom of the wing, gives the mounting area more strength.

Next on the agenda was the outer wing tip floats. Robert deviated from the build up version on the outer floats due to them not having to carry as much a load as the center line float. In Photo #9, you can see he used a center line profile plate

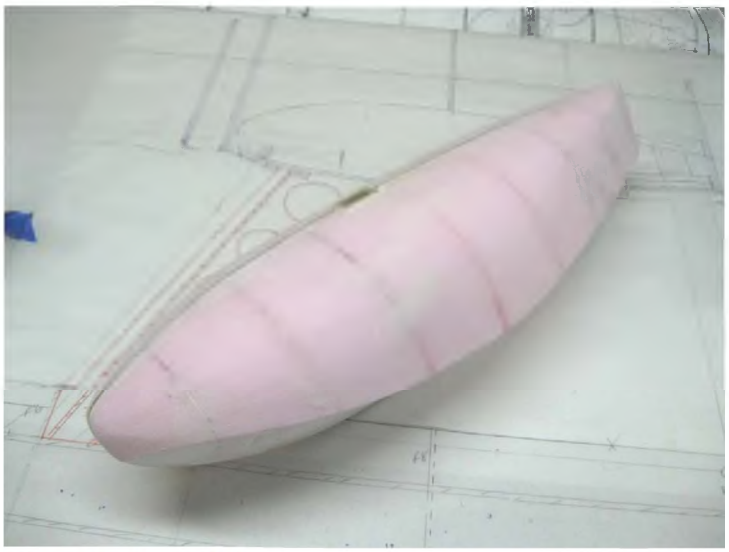


Photo 9: One of the outer floats before the fiberglass skin was applied. The float was made from plywood formers and pink foam sandwiched between the formers to give shape and add floatation.

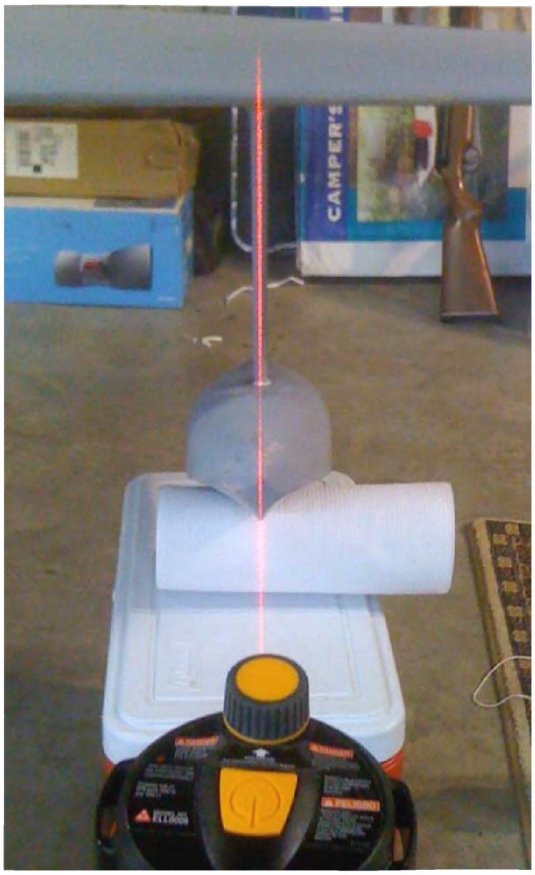


Photo 10: Here we see the outer wig tip float being aligned with the wing using the laser level. Notice the float's bottom hull is level with the wings bottom skin. This way, when the wing comes down the float is level in the water and not at an angle.

with shaped formers attached to it. He then glued blocks of pink foam between the formers and sanded to shape. He then proceeded to glass them. He formed the float struts exactly like the V struts with carbon fiber rods covered with flight skin to give them their aero shape. Photo #10 shows how he used the laser to insure proper alignment of each of the outer floats.

Well, that about winds it up for me this month. We will look at putting on the finishing touches to the cowling, sliding canopy, and doing some of the surface detail next month.

Fair winds, blue and warmer skies to all you Scale Guys!

Brrrr…did I mention it was snowing and cold up here? Thank God for indoor flying, eh?

Gary Webb
gcwent@woh.rr.com

Please send photos of all your new scale projects for me to share with our readers.

Come see RCReport in the Mcgill building tables W1-W4!


SPEEDWORLD RC FLYERS
PRESENTS
DESERT JET STORM
3 BIG DAYS
Surprise, AZ
Fifth Anniversary Jet Rally
FEB 12th - 14th
2010
TOP RC PILOTS and AIRCRAFT PERFORMING - COMPETING
Watch jets as they do BOMBING RUNS
WITH REAL LIVE EXPLOSIONS
Food will be available
Overnight Parking
Half Time Demos
For details, area map, and hotel list, go to
SPEEDWORLDRCF.COM
JetCat USA
RC JETS DIRECT
evoJet
VERTIGO
AIRCRAFT DEVELOPMENT USA
WWW.AIRSHOWRC.COM
BVM
FRANKS HOBBY HOUSE

Sparky's Revolt

by Tony Coberly

Well it's still cold, but spring is on the way. I have been spending some time in the shop getting straightened up and prepared for a building blitz. While doing some testing with some new motors from Neurotics, I ran across a question that I decided to try to answer in a somewhat "shade tree" way, as to not need your local Electrical Engineer.

What is efficiency as it applies to my electric motors for my airplanes?

We first need to go back to science class from high school. The definition of efficiency according to http://www.thefreedictionary.com is *"The ratio of the effective or useful output to the total input in any system."* When we size and test electric motors for any given aircraft, we can generally only measure the input current between the battery and the speed controller. So the efficiency we need to consider in this case, is how much of the measured electrical current into the speed controller is being converted into mechanical energy. I am not going to address the efficiencies that are internal to the motor or ESC. In others words we are not talking about the wire size or the resistance of the motor.

My theory is as follows. Take the known kV of any given motor and the battery voltage that you are going to use. So let's look at my Neutronics 1915 225kV motor that does not have a gearbox. This motor is going to run on 10 Cells LiPo. Now this motor will not turn any faster than the kV of the motor multiplied by the actual voltage input into the motor. 10 Cells LiPo will provide a maximum voltage of 42 volts. So 42 volts multiplied by the 225 kV of the motor will result in (42x225=9450RPM). Now this is the maximum RPM that the motor will turn with a 100% efficiency state. This maximum RPM is theoretical maximum capability for the motor. Even without a prop, the motor itself will put at least some load on the batteries, so the voltage will be somewhat lower than that of the no load resting state of the pack. Generally we can assume that a motor without a prop running on 10 LiPo cells will result in a loss of one volt. So we recalculate 41Vx225kV=9225. This will be our reference RPM number. Now there is no such thing as 100% efficiency due to the laws of thermo dynamics, but it's a shade tree starting

point. If our math says that we should have 9225 RPM but we are only realizing a measured RMP of 6000, what does that mean?

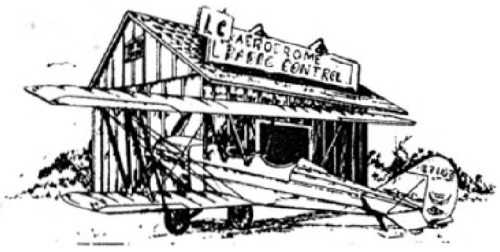
Well 6000 is only 65% of the maximum possible RPM. That means that loosing 35% of our possible power output. Well what happened to that 35%? The conversion from electrical energy, our initial battery voltage of 41V, to mechanical energy, the spinning of the shaft, always creates heat. It does not matter how you measure it, but watts in equals watts out. If those watts are not being converted to mechanical energy buy turning the motors rotor shaft and therefore turning a prop, then that lost wattage is being converted to heat! If the motor is pulling say 2800 watts to get to that 6000RPM, we can now apply the efficiencies that we calculated earlier. 2800 watts times the computed efficiency of 65%. That means the motor is only using 1820 watts to make that propeller turn. The loss from that power system 920 watts. Have you ever tried to get rid of 920 watts by simply cooling it off? Most single burner hotplates for your kitchen counters run on about 900 watts. This hot plate can boil water, so what happens to our motor with that kind of heat trapped in it. We can only move the excess heat away from the motor by passing air over and inside the motor itself. Do you think you can get a fan large enough to blow on a hotplate and keep it cool? NOPE! Now this is a bit of an extreme example, but it happens more times them modelers will admit too. When the smoke is let out of a motor it is almost always because it overheated and melted the varnish off of the internal copper windings.

Now these are very general figures and there are several other factors that will change the actual numbers we have came up with, but that's why we look at percentages first. It really doesn't matter if the motor is an older brushed 480 can motor or this new ultra efficient brushless motor. Where ever possible we need to allow our motors RPM to run as efficient as possible while still providing us the power we are looking for. What is a good number to look for then? Well the example I used is obviously a bad example and you would not really want to be in this range. (although I have flown with numbers similar to these) I believe that if you try to keep your RPM in the range of 75% of the rated maximum kV based on your voltage, you should be in a good ballpark. So in this example you would like to see an RPM more like 6900. We have been looking at worst case scenario under a full throttle condition, so this is another reason why good throttle control is important too!

That's all for know, see ya next month!

Tony Coberly

Tonyc@rcreport.net



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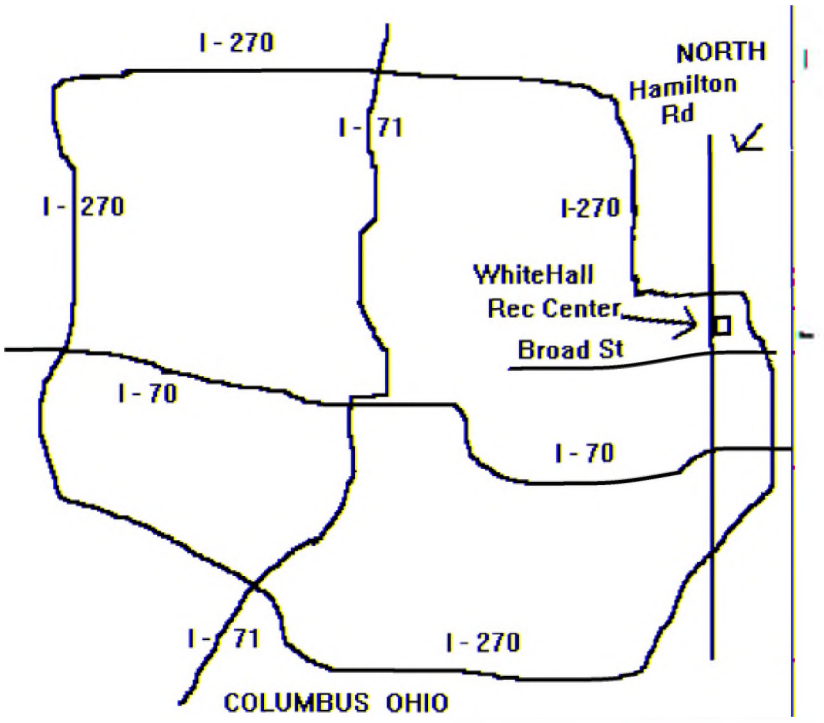

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Model:.....ElectriFly Extra330SC

Airplane Type:.....Foamy 3D

Manufacturer:.....ElectriFly by Great Planes
3002 N Apollo Dr.
Suite 1
Champaign, IL 61826-9021

Typical Price:.....$79.99

Sale Price:.....$49.99

Wing Span:.....Advertised:.....32.5 in.
Measured:....32 in.

Wing Area:.....Advertised:...267 sq. in
Measured:...274 sq. in

Airfoil:.....Flat Symmetrical

Wing Type:.....Foam

Wing Joiner:.....NA

Fuselage Length:.....Advertised: 35 in.
Measured: 35in

Pushrod Type:.....Carbon rods

Hinges included:.....Yes

Hinges Installed:.....Yes

Rec. Controls:.....4:ail, rud, thro, elev

Engine Mount Installed:.....NO

Rec. Motor:.....250 size brushless

Landing Gear Installed:.....NO

Wheels Included:.....Yes

Advertised Weight:.....6.2-6.8 ounces

Hardware:.....Metric

Hardware Included:.....Motor mount, pushrods, control horns

Items needed to complete:.....Prop, motor, 8 amp ESC, 2-cell 300mAh LiPo pack, micro receiver, three micro servos, Foam Safe CA glue

Covering Material:.....Painted foam

Estimated Assembly Time:.....6 hours

Estimated Skills required: Building: Intermediate

Flying: Intermediate

Drilling required:.....Yes- Servo arms

Assembly Tools required:.....hobby knife, #0 Phillips screw driver, straight edge, soldering iron

Adhesives required:.....Foam safe Thin CA

Completed Model Specifications:

Finished Weight:.....6.7 ounces

Wing Loading:.....Advertised:...3.4-3.7 oz/sq.ft

Measured:.....3.52 oz/sq.ft

Motor Used:.....GP Rimfire 250 brushless
Propeller Used:.....APC 8X3.8

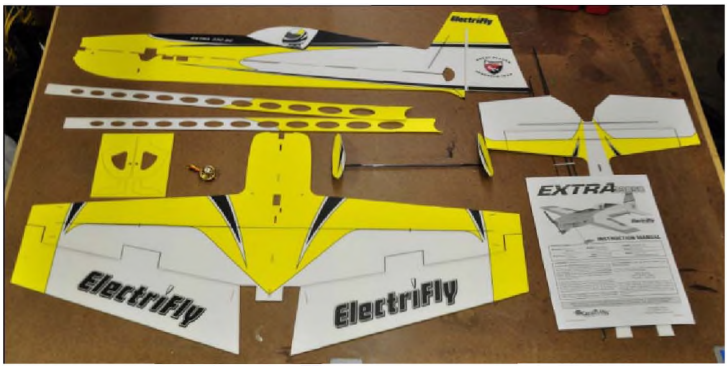
Battery used:.....GP 300mAh 7.4V LiPo with micro Deans connector

Speed Controller: ...ElectriFly SS-8 Brushless ESC

Radio used: Futaba R60044FF 2.4GHZ FASST Micro 4ch receiver, Futaba 12FG Tx

Foam, foam and more foam! These days nearly every model manufacture has some sort of foamy 3D aerobat out there, and I say I love it! I don't care what kind of flyer/builder you are, a foamy will "Free your mind!" to quote a popular Sci-Fi movie! Now I don't think that everyone should throw away their scale and sport models. I just think that everyone should have a small lightweight foamy of some sort to bang around and have fun with. This month I have the ElectriFly Extra 330SC 3D foamy designed for primarily indoor use to build and fly, so let's get with it.

The ElectriFly Extra 330SC comes packed in plastic bags and taped to the top and bottom of the box. Carefully, I cut the tape and bags open and survey what we have to work with. Now, over the years I have learned to carefully cut the tape and bags. I am tired of ordering replacement parts because I broke them off when trying to extricate them! Take your time and use a hobby knife or scissors! Okay, back to the Extra! One odd thing I see is a lot of extra parts that are just raw white foam? Strange. Guess its time to open the manual and see what's next.



Well, the manual says we are to start building our fuselage first. We glue an ABS landing gear plate to each side of the main fuselage piece and we get right into those extra white foam pieces I referenced earlier. These white pieces called crutches are supposed to allow us to build

and align the foamy easier and more precisely! This reminds me of an article I wrote awhile back where I made my own jig for foamy building. It's a simple box made out of blue hardware store foam and duct tape! I'll not use my box here, so let us just continue.

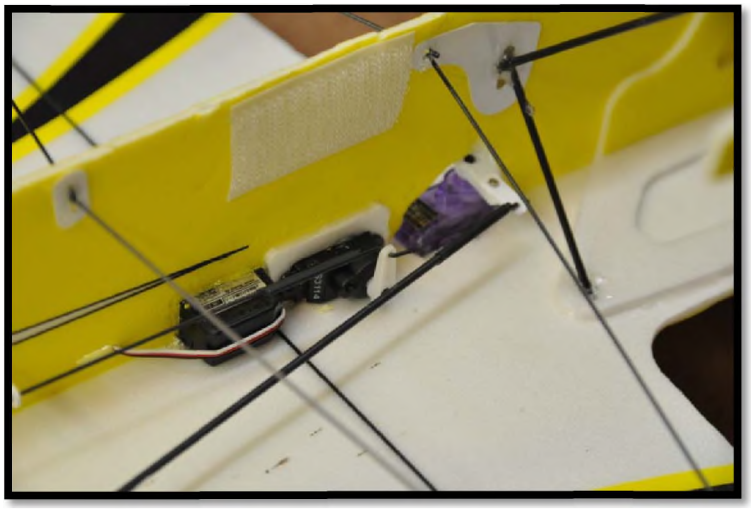
The crutches are assembled and the fuselage pieces are inserted and I then run into the first problem. The factory has pre-hinged everything for us with 3M brand Blen derm tape. This is a great help and speeds up the assembly process, but in order to fit into the crutches provided for us, the rudder counter balance must hang off the end of the bench! Now in all fairness, the black and white picture shows something that could possibily be the end of a bench, but the text never mentions it!

Photo 1: I supposed it's not too bad to hang it off the bench, but seriously? How much would it cost for a little additional foam?

Now we set everything on the bench with the fuselage inverted, resting in the lower crutches. We install a second set of crutches above the others and carefully glue two of the four together with foam safe CA glue. I am using Bob Smith "Super-Gold" that I picked up at our great local hobby shop in Huntsville, R/C Hobbies. Now we have a semi-rigid structure that should keep the surfaces at the correct angles. Now for the fun part…carbon fiber reinforcement rods!

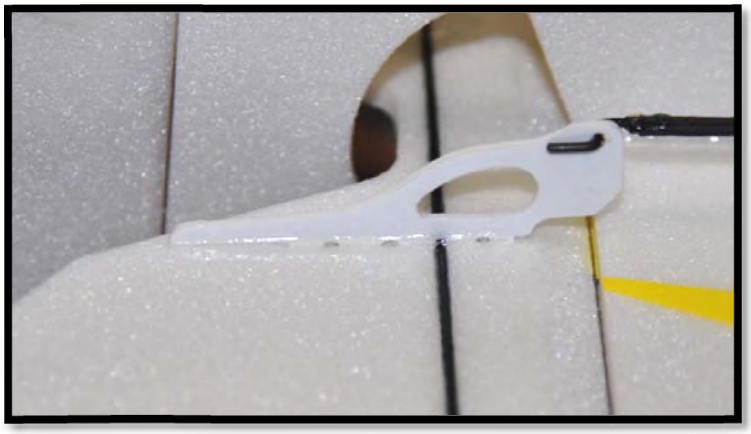
We need to install several ABS plastic spacing and reinforcing members to support the carbon fiber reinforcement rods. These plastic pieces are outlined extremely well in the manual, as are the various placements of the carbon rods. The rods are glued to the wing and fuselage in a particular order; moving from the wing tips moving back to the fuselage. This is where you end up with CA all over your fingers and pants; so have a few towels ready! With the four carbon rods installed between the wing and fuselage, we can move onto the foam doublers for the nose of the fuselage behind the firewall.

The doublers are simply extra pieces of foam cut to fit the areas in the nose to stiffen up the rear of the firewall. They are glued on with more foam safe CA. Additional doublers runs down each side of the vertical fuselage. It is kind of funny to see a piece of foam with lightening hole in it for this. The motor mount is glued on next and we can move on to the radio gear installation.



Here we have all three servos installed. Notice the white foam space between the elevator servo and the fuselage.

The servo installation is typical for most foamy planes. We glue the servo in the cutout provided for the rudder servo. Behind and opposite the rudder servo, we install a small foam spacer to offset the elevator servo a bit so the pushrod will clear rear of the case of the rudder servo. I am using the recommended Futaba 3114 micro servos for the aileron and elevator. ABS pushrod guides are installed down the length of the fuselage for the rudder and elevator carbon pushrods. The manual is very clear that we need to get the guides installed, and hook up our servos and control horns before we glue in the guides. This is very important because we have to manipulate the pushrods a bit to get them adjusted while we glue in the ABS plastic control horns in the elevator and rudder.



We need to be careful with the control horns, though, because a slot in them fits over a carbon fiber strip in the elevator. The carbon strip is strong, but it will break if the control horn is forced over it. I had to make the slot a bit larger to accommodate the glue on the carbon strip. Okay, we have everything ready to temporally power up the servos to center them so we can finalize the pushrod installation. With the aileron and elevator servos centered, we just twist the ends loose, if necessary, to adjust them until the surface is straight and then apply a drop of CA back to the area where the wire pushrod end enters the carbon fiber rod. Finally, we are back where we started and we can glue in the pushrod guides; making sure that they are at right angles to the fuselage sides.

The aileron servo I am using is a bit larger than is needed, but it is what I have on hand. The Bluebird BMS 371 is slightly larger than the hole provided in the wing so a bit of shaving with the X-acto knife and it falls in. The kit comes with a special servo arm that attaches to the arm that comes with the servo. This arm is longer for more throw on the ailerons, but more importantly it is swept towards the front of the plane. This offset allows for the throws of the ailerons to move evenly in both directions. This will make the slow high alpha rolling maneuvers much more axial and smooth. CO☺L! The ailerons hook up the in the

same manner as the rudder and elevator do, with carbon rods and wire ends.

Finally, we are to the power system side of things. I am using the recommended tiny little GP Rimfire 250 brushless outrunner motor. This motor is rated for 90 watts continuously with 120 watts in short bursts. Retail price for this motor is $49.99 with most street pricing of $37.99. The motor simply screws into the motor mount with three screws from the kit making sure the wires from the motor are pointing down, of course. Next, we connect the ElectriFly BL 8 Brushless ESC to the motor and add some Velcro fastener to the bottom of the fuselage to secure the ESC. The BL-8 already has a micro Deans connector attached. The receiver is next located slightly back of the ESC. This tiny little Futaba R6004FF is just the thing. Its four channels on 2.4GHZ, with only a single tiny green antenna.

A few minor adjustments of the 2 cell LiPo to achieve the required CG and quite a bit of time with my Futaba 12FG to get all the recommended low, high and 3D rate throws! Considering that the Aileron 3D rate is 3.75 inches!!! This should be some insane indoor FUN!!

Prop, motor, and radio gear installed.2-cell LiPo attached opposite side of the fuselage

Flying the Extra 330SC

The Extra 330 SC is simply a blast to fly, even outdoors after a rain when it's dead calm! The thrust of the little 250 Rimfire is more than ample to pull out of a hover with authority, yet the APC 8x3.8SF prop keeps the speed down. The 3.52oz/sq.ft wing loading allows the Extra to fly responsively at a muscle relaxer induced pace. The rudder authority is amazing and there is little to no roll while standing on the rudder pedals! The 300mAh pack will give you about five minutes flight time with god throttle control. The carbon fiber reinforcements help keep the horizontal stabilizer very rigid. This rigidness makes life a lot easier during rolling maneuvers and in harrier snap rolls. This is a great plane for anyone who wants to pursue 3D flying, and happens to have a gym or indoor warehouse nearby. The Extra can be flown

outside, but you need dead calm air otherwise you will only end up frustrated and broken!

The full retail for this Extra 330SC, as built, will cost you about $190.00 without receiver and transmitter, but it's a boatload of fun and well worth it this time of year!!

Tony Coberly

tonyc@rcreport.net

Model:.....Escapade Sport ARF

Airplane Type:.....Sport ARF

Manufacturer.....Great Planes

3002 N. APOLLO DRIVE

SUITE #1

CHAMPAIGN, IL 61822

Typical Price:.....$149.99

Sale Price.....$99.99

Wing Span:.....Advertised: 52.5 in.

Measured: 52.875 in.

Airfoil:.....Semi-Symmetrical

Wing Type:.....Built-up balsa

Wing Joiner.....Aluminum tube

Fuselage Length:.....Advertised: 46in

Measured: 45.5in

Pushrod type:.....Wire

Hinges included:.....Yes

Hinges Installed:.....Yes

Rec. Controls:.....Ail, El, Rud, Throt

Engine Mount Installed:.....Yes

Rec. Engine:.....40-.55 cu. In. 2-stroke

.52-.70 cu. in. 4-stroke

Landing Gear Installed:.....No

Wheels Included:.....Yes

Advertised Weight:.....5-5.5 lbs

Hardware:.....SAE

Hardware Included:...Spinner, pushrods, control horns, wheel collars, axels, plastic clevis

Items needed to complete: engine, 4 standard servos, flight battery, transmitter and receiver

Covering Material:.....MonoKote

Fuel Proofing required:.....No

Estimated Assembly Time:.....4-6 hours

Estimated Skills required:

Building: Beginner

Flying: Beginner

Drilling required:.....Yes-Servo arms, servo screws, motor mount, optional control horns

Assembly Tools required: Hobby knife, small drill bits, pliers, side cutters, and various screw drivers

Adhesives required:.....Thin CA glue

Completed Model Specifications

Finished Weight:.....5 lbs. 7 oz.

Wing Loading:.....25.6 oz/sq. ft.

Engine Used:.....O.S. .46 AX 2-Stroke

Propeller Used:.....Master Airscrew 11x7.5

Fuel Tank Used:.....as provided

Main battery used: .Futaba 4-Cell 1500 mAh NiMh

Radio used: .....Futaba R617FS 7 Channel 2.4 GHZ Futaba 12 FG transmitter

Servos used:.....Three Hitec 475HB, 1-Futaba 9001, 1-Futaba 3004

The Great Planes Escapade Sport ARF is a low wing sport plane that has a classical design and would work well as a second aircraft for the novice pilot. The Escapade requires a four channel radio system and can be powered by a glow or electric power system. You will need as little as three servos for an electric power system, at least four servos for the glow setup. You also have an option to use five servos by installing a single servo on each aileron for more advanced flaperon or spoiler setups. Okay, that is the jist of it. Now let's get to building the Escapade.

The Escapade comes in the average size box for most 40 sized ARF models. The fuselage, wing sections, tail feathers and hardware packages are packed separately in their own plastic bags. So now we carefully remove everything from the bags and inspect everything. The covering scheme is somewhat of a classic design from the early eighties, similar to that of the pattern planes of the time. The covering is applied very well and there are only a few places that we need to go over with the iron. It appears that all the control surfaces are pre-hinged for us! Moving on, it's time to make our way through the manual and build this Escapade.

We are first instructed to go over our model with an iron to shrink out any wrinkles, but I prefer to for this last, so we now will install the aileron servo. We have two options for aileron servos. First we can install one servo in the center of the wing, or we have an option to install a single servo for each aileron. I am using dual servos, so I move onto page 9 for the "Dual Servo Option". The holes for the ailerons are covered over with covering so just hold each wing panel up to the light to locate the servo bays.

The instructions give us five pictures on how to carefully cut the covering out from the servo bay, seal the excess covering down and install the servo in the bay. There are strings provided in the wing panels to pull the servo extensions into the wing and out at the center of the wing. To install the servos into the wings we need to pre-drill the holes for the servo screws, hard the holes with a drop of CA and reinstall the servos. Now I very seldom use the servo screws provided with my servos. I prefer to use socket head screws from my RTL Fasteners Master collection. The Hitec 475HB servos I used on the ailerons fit the holes perfectly, and I like to use the heavy red arms that come with the servos. The supplied pushrods use plastic clevises' on the control horn side and use a ninety degree bend into the servo arm. The optional aileron control horns are provided for us, but not installed so we line up the control horn with the servo arm and screw it into the aileron. The pushrod is lined up, marked, bent over and trimmed for length. Install the pushrod connector on the servo arm and the aileron servo installation is complete. (Photo 1)

Photo 1: One servo complete of the dual servo setup

All these steps are covered very well in the manual and will allow a novice to complete it with minimal problems or questions. One item that was not mentioned is to cut off the unused torque rods at the center of the wing. These rods are only used if you use a single servo option, so they are not needed anymore. Simply cut them off with a pair of side cutters. (Photo 2)

Photo 2: Wing strap on and torque rods cut off

The wing panels are joined together next, but not glued. The manual has us install a wing tube and a small strap to hold the wing together. The wing panels fit together very tight; too tight in my opinion. Should you desire to pull the wings apart you must be very careful not to break something when the panels finally budge. I found a problem at the leading edge of the wing where the wing panels join together. The center tabs did not line up top or bottom. (Photo 3)

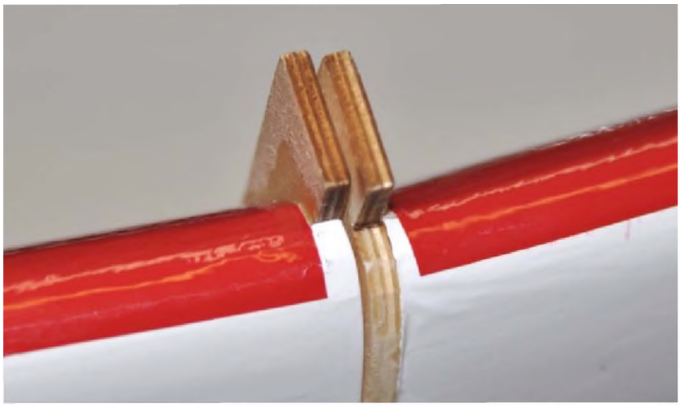


Photo 3: Notice top and bottom edged off by about 1/16th inch

Because the wings are not joined with any type of adhesive, there is a bit of flex with the center pins. I was able to sand a little material off the bottom of one side and a bit more off the top of the other side. I fit the wing onto the fuselage a few times until I got a good fit. I do not see this as a big problem, but a novice building his first or second plane may be discouraged.

Now it's time to work on the tail feathers of the Escapade. The horizontal stabilizer simple sits on a flat area on the rear of the fuselage. The vertical stabilizer has bolts that pass through the horizontal, through the fuselage and out the bottom. Two 4/40 locknuts are screwed onto the bolts until tight. To assist in installing the receded locknuts, we are provided with a plastic socket tool to help us! Now I am always a bit leery of just bolting on a tail system, so I made a small modification. Once the tail feathers were installed and the locknuts tightened up, I drilled a small hole in the bottom of the fuselage. I dropped several drops of thin CA down into the fuselage and onto the bottom of the horizontal stabilizer. This will add some additional strength should the locknuts loosen up!

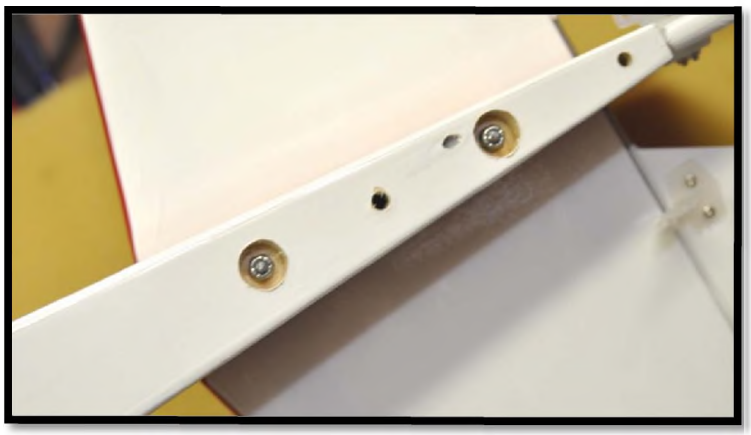


Photo 4: Note the small hole between the nuts. This is where I added the thin CA glue and allowed it to soak into the fuselage and stabilizer.

Now we move on and install a very nice tail wheel assembly that is illustrated very clearly in the manual. The elevator and rudder control horns are already installed for us so we can slide our pushrods into their respective tubes and attach the clevises' onto the preinstalled control horns. Now we are told to work on the servo tray area under the canopy in the fuselage. I prefer to deviate slightly here by installing the two piece landing gear mains before the installing the servos. This allows for a stable platform to work from while hooking up the rods to the servo arms. The two piece gear are simply bolted onto the bottom of the fuselage with the four 6/32 screws provided.

I chose to use another Hitec 475HB servo for the rudder and a Futaba 9001 for the elevator servo. Once again I used socked head screws to hold the servos in place. With the control surfaces straight, the pushrods are simply lined up with the servo arms and marked with a felt tip pen. Just create a ninety degree bend in the pushrod wire, and insert in the servo arm. Servo wire retainers are clipped on and cut off the excess wire.

Now we are instructed to install the landing gear, but of course that's done already. Now we just install the axles, wheels and wheel pants. The holes in the wheels were slightly too small so the wheels did not roll freely. I had to run a drill bit through the wheel hubs to get the wheel to run freely on the axle. The axles need a small flat spot on the end to keep the wheel collar in place, and then we can install the wheel pants. The wheel pants are pre-painted molded fiberglass with two blind nuts already installed for mounting to the strap landing gear. The pants

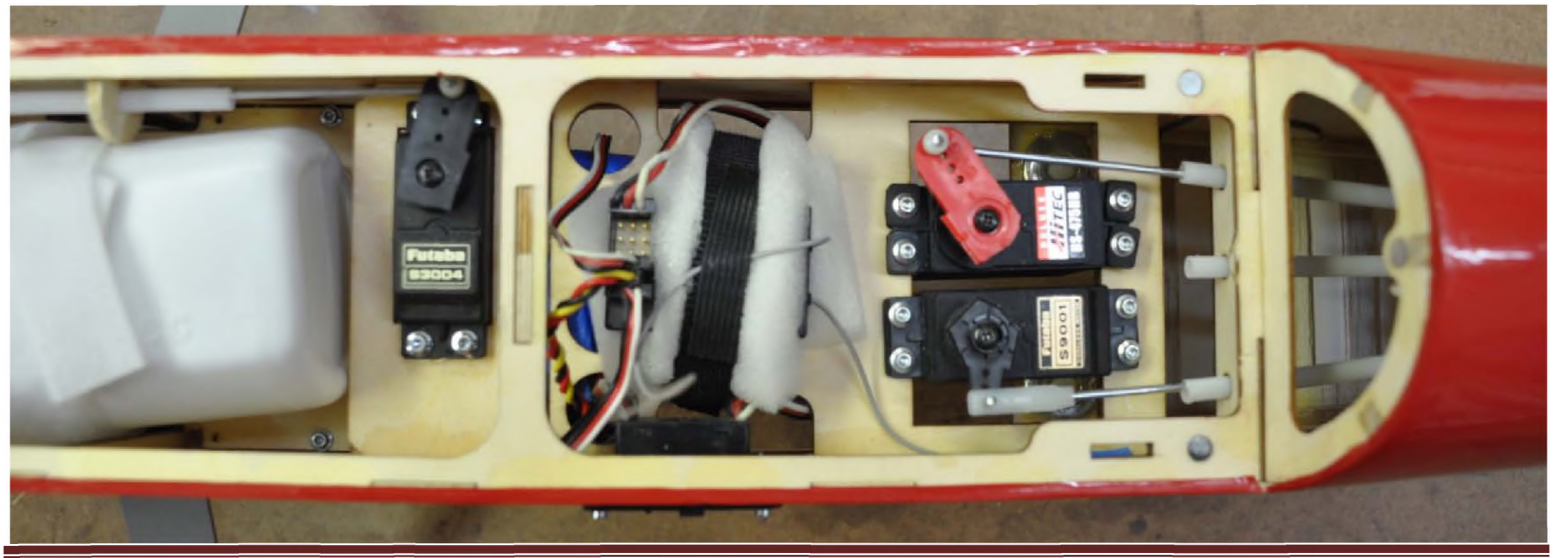
fit over the wheels very well and the spacing was great. The Blind nuts did not quite line up so some minor adjustments by filing on the glass a bit to get the pants finished up.

Now it's time to install our power system. I have chosen to build this as though it was being built as a second airplane. I am using parts that would come off the average trainer plane. The engine I am using is a very reliable and powerful O.S. .46 AX 2-stroke engine. The instructions give us two pages of installation instructions for an electric power system, and then moves on to instructions for 2-stroke and 4-stroke motor installations. The engine mount is already installed for us, so a cursory check of the bolts for the mount and we can set the O.S .46 AX in place.

The polymer engine mount just needs to be drilled out and bolted down with four 4/40x1 socket head bolts form my screw assortment. I chose not to use the provided Phillips head sheet metal screws. Note here that you should not put the engine back on until AFTER you install the fuel tank. There is just not quite enough room behind the motor to "fish" the lines through later. So mark and drill the mount, then install the fuel tank. Now install the motor and you are nearly done.

Finally we can install the throttle servo and pushrod. Because we are using an O.S. AX series engine, we can use a hole predrilled in the firewall for us. The throttle servo mounts in a plywood plate that we glue in behind the fuel tank. A pushrod tube runs next to the fuel tank and is glued in. The throttle pushrod hooks to the arm on the carburetor, and a ninety degree bend is used again to connect to the servo arm. The instructions show us all these steps very clearly as well as how to install a 4-stroke engine. We are nearing the end here, so it's time to finish up the radio gear and head toward the field!

The receiver and battery are installed in the compartment behind the throttle servo and in front of the elevator and rudder servos. The seven-channel Futaba FASST receiver mounts on top of the tray and the main servo battery pack mounts below the tray; nothing special here, just a very nice tidy fit for everything. Now we need to set the control throws per the instructions. Finally we need to check the CG and see what we have. I need to add 3 ounces of lead in the nose to reach the 2.5 inch aft of the leading edge of the



wing. This is not entirely a surprise due to having one of the smallest engine options and a larger that average 150☺ mAh battery in the plane. One other note about the receiver: I decided that since the best positioning for the antennas in a 2.4GHZ system is to be ninety degrees to each other and in different horizontal planes where ever possible, I made a minor modification to the canopy. I drilled a 1/16in hole in the bottom directly behind the pilot figure. When I put the canopy on I run the tip of one antenna through this hole. Kind of a neat look!

Flying the Escapade

The maiden flight of the Escapade required six clicks of up elevator trim and two clicks of right trim. The O.S. 46 AX is more than enough power to haul the Escapade into continuous loops from take off until landing. The Escapade was faster than expected, until I remembered that the final weight was only 5.7 pounds. The weight coupled with a wing span closer to that of a .30 sized plane the performance is great. The low rates allow for smooth aileron rolls, yet the elevator could probably be cut back an additional 5% for the comfort of a true novice pilot. The high rates allow you to have all kinds of fun; when you are ready for it!

The Escapade is a great second airplane that comes in at a great price. Easy to build using everything from an original trainer, yet adding another servo coupled with a computer radio you can play with things like flaperons and spoilers! I suppose you could use this as a first trainer plane for a father teaching a child or something like that, but the 25.6 oz/sq. ft. is not the floaty feeling of a trainer. It flies great, straight and true.

Tony Coberly

tonyc@rcreport.net

RCREPORT CLASSIFIEDS

The following are BIY kits:

1. NIB-Goldberg Tiger 2 - $90
2. Un-started Goldberg "Anniversary Cub" (not a laser cut kit and it would be NIB except the construction manual is a copy and the box is worn) - $80
3. NIB- Direct Connection "Fantasy" - $100
4. NIB - Ace 1/2A "Whizard", Collector Quality - $60
5. NIB- Balsa USA "Northstar" - $100
6. NIB- Norvel .061- Never seen fuel or motor mount - $35

The items above Plus Shipping

The following are completed models and cannot be shipped. I will deliver within 125 miles of Prescott, Arizona and send photos upon request.

7. Balsa USA "Enforcer" Completed! Never flown, w/ new, bench run only "Magnum 61XL", pusher prop, Hi-tec Servos, fixed gear, complete and ready for your receiver and flight battery . . . Beautiful bird, crafted by a master model builder. - $300
8. House of Balsa 1/2A "Chipmunk" Completed, never flown. OS .10LA included (installed) ready for your mini servos and battery. This is another beauty, - $110
9. Great Planes "Super Decathlon" 40 Completely built and finished in red and white w/ 21st Century Fabric.(like new) Set up for 60 size engine on Great Planes adjustable mount w/ rear mounted remote needle valve. (engine and servos not included) Looks great, flies better! - $125

Contact Ron Fiedler at 928-710-9564 or rfiedler@cableone.net

Original instruction sheets for many model airplane engines: Fox, Enya, Super Tigre, McCoy, K&B, Magnum, OS, and many others. Originals - not copies. $5 each, postage included. Let me know what you are looking for and I will reply as to whether or not I have it. Don Runnells, 970-669-3418 (please, no calls after 9 p.m. MST) or by e-mail: drunnells2@msn.com

Wanted: Ace Digipluse multi charger Email marshalemmendorfer@hotmail.com Best to call 810-348-6390