Model Aviation's Sport Aviator
The e-zine for the new model pilot
www.MASportAviator.com

Calmato RTF Basic Trainer

Author: Bob Karasiewicz
6/20/2008

We'll imagine, for a bit, that we are in a magnificent ultra large hobby shop. The Buyer, That's me, looks at all the basic trainers and frowns a bit. That is what I have been told to get from the more experienced RC pilots at the field. I need to listen to them as they know more than I do at this point (but I will catch up). However, what I really want is a jet fighter, an F-104 or F-15, with all the gadgets there are!

I think the hobby shop owner has seen this syndrome before. Because his first words to me (guess I had that jet look) were "Whoa, let's learn to walk before we run. Even though my heart says "JET" his counsel convinces me that the prudent thing to do is to buy a basic trainer and learn to fly. "It's a progression" he says. "Stick with it and in a few years you will be flying all sorts of advanced airplanes".

OK, a basic trainer it is. I would like to get into this sport as soon as possible so, are there any airplanes that I can fly right away? I don't want to spend my valuable time building a kit. The hobby shop owner leads me to the Ready-To-Fly (RTF) trainer section. WOW! There are a bunch.

The first one he shows me is a small electric trainer complete with everything for under $200. But, he warns me, they don't fly in wind very well. They're great on a calm morning but, when the wind is over 5 MPH they don't do so well.

On we go to the gas (glow fuel) powered airplanes. Oh my, they are close to $400; I wanted to spend around $300 or even less. But, he says, they are ready to fly in just 20 minutes. Of course you will need to charge the batteries; that takes overnight.

Photo 1

Finally (you guessed it) we come to the Kyosho® section. There is an ARF (Almost Ready to Fly) trainer and an RTF (Ready To Fly) one. Kyosho® calls it a 'Readyset ready to fly'. And it's only $290.

It has the radio already installed including the pushrods. It has the engine already installed including the tank and fuel tubing. All I have to do, according to the hobby shop owner, is to glue the wing halves together and glue the horizontal stabilizer (it's called a rear wing in the instructions) to the slot in the fuselage. The owner says I need to use 30 minute epoxy to do this.

I buy the required epoxy for $5. I like it. I don't even need to charge the batteries—the Calmato uses AA dry cells. I buy it. Along with the fuel and fuel pump and glow igniter (it's explained in the engine manual) I have everything I need. All together I paid just slightly over $300. A hundred less than those other RTF's and all I have to do is glue two things together. Tomorrow I'm going flying!

Photo 2 Photo 3

OK, the fantasy is over. We're going to build this airplane. Don't worry, it will not take long. We are just going to align some stuff and all will be well with the world.

There are three manuals included with the Calmato. The 'maintenance manual' is the one that tells us how to build the airplane. Lets just spend a short time with the 'instructional manual'; just the first 7 pages.

Read the manual's precautions. They are all real and worth paying attention to. Next the 'glossary' which will get you acquainted with all the parts of the airplane. In common usage in the USA, we call the tail wing the' horizontal stabilizer'; which is the functional description of the unit—it stabilizes the airplane in the horizontal attitude. Likewise, we call the vertical fin the 'vertical stabilizer'.

Now, onto the maintenance manual and the first step; joining the wing. We have the 30 minute epoxy at hand. Trial fit the wing joiner dry—no glue. Mine fit perfectly; if yours is a little snug just a light sanding with fine sandpaper is needed. Less is better.

To be honest, Kyosho says that the wing does not *need* to be epoxied together. The front dowels and wing bolts keep the wing together in flight while the small, white center tape holds it together once the wing is removed. OK, that works but experience has shown that, over time, wood weakens and things become a little sloppy. Besides, you have to assemble the wing anyway so why not spend a few extra minutes applying some adhesive during the process?

Photo 4

Now mix up some epoxy. Equal amounts of part A and part B. A piece of waxed paper is good for this. Squeeze equal lengths of Parts A and B onto the wax paper. Maybe 6 inches worth of epoxy is good. If you mixed a little too much, that's OK but not enough is not good.

Photo 5

Now spread the mixed epoxy on one of the wood roots (they are the inner ends of the wing halves that will be glued together) and inside the wing joiner slots on both wing halves. The wing joiner is also called the dihedral brace. Slide the wing together, you will notice that the wing is bent in the middle now as it should be, and prop it on the table with weights to keep the ends tightly joined together.

Photo 6 Photo 7

On mine, the wing halves did not line up perfectly, the joint was tight (that's good) but; the trailing edge was not aligned. It was easy to put a clamp in the trailing edge and align it perfectly (photo 7). You may want to clamp it with a clothes pin. At this point you should wipe off the excess glue that squeezed out of the joint. Use a paper towel or a disposable rag moistened with rubbing alcohol.

(*Ed. Note: You might also find it a good idea to wrap some #64 rubber bands around the dowels in the front to keep the entire wing clamped tightly together.)*

This procedure takes longer to describe than to do, even the first time. The 30-minute working time of the glue will give you plenty of time to get everything correctly aligned. The glue takes 30 minutes to set but, overnight to completely cure.

Leave the steps about the aileron controls until later when the glue is well set; several hours at least.

Epoxying the wing together is much stronger than the usual RTF metal tube/nylon clamp wing joining system. Actually, this is the wing joining system used on ARF trainers and ARF airplanes

designed for high-stress aerobatics. Some RTF wing joints have been known to loosen over time, under flight stresses and with the occasional dragged wing tip. This can require replacing the aluminum spar and/or epoxying the wing halves together anyway. While a little more work, the Calmato's epoxied wing is as strong as any found on any ARF airplane.

Photo 8

Let's do the landing gear while the wing cures. Look at the diagram of the nose wheel and put the white plastic control horn on the wire sticking out the bottom of the fuselage before mounting the strut.

Photo 9 Photo 10

The main landing gear is easy. Be careful to cut ONLY the plastic film over the landing gear plate. It's plywood so it is not really a problem. It's just good practice when removing covering film to not score the wood underneath. I'll show you the best way to do that later.

Now is the time to connect all the pushrods (except the elevator).

Photo 11

The cover of the transmitter case has a little 'box' in it where I put all the small parts so they would be handy. There is a section of heat shrink tubing that you will put over each clevis. When the clevis is attached and adjusted you can shrink the tubing and the clevis will not open and

disconnect from the control surface. Shrink the tubing with heat—from a hair drier, or from a cigarette lighter. Please be very careful if you use an open flame, you do not want to get the nylon horn hot and you do not want to overheat the covering material.

Photo 12

Here is an example of how the pushrods are connected. All that must be done to finalize this is to put in the set screws and tighten them with a drop of thread locking compound. ALL screw connections on a model airplane should have thread locking compound on them. This stuff keeps the screws from loosening due to the vibration of the engine. All single cylinder engines have monstrous vibrations which can loosen connections and ruin electronic gear. That is why all the servos are rubber mounted—look closely at the mountings. It is also why the receiver and airborne battery are mounted in foam rubber.

Photo 13 Photo 14

Let's install the horizontal stabilizer or the tail wing as it is sometimes called. This is the most critical point in the construction of any model airplane. The stabilizer needs to be even with the wing both horizontally and from the top view. Look at the pictures. I am measuring the distance from the outer trailing edge of the main wing to the front outer edge of the horizontal stabilizer. Both sides must be the same. Also the stabilizer needs to be centered in the fuselage cut out.

Measure from the fuselage side to the outside of the rear of the stabilizer. Both sides need to be equal. If you are a 32nd of an inch off, that's as far off as you should be. Try to make it a 64th or less. That's not easy but it will pay off in better flying.

There are three things you need to have correct on the horizontal stab (of ANY airplane).

1 CENTERED in the fuselage

2 Equal distance from the outside trailing edge of the wing to the outside of the stabilizer.

3 MOST IMPORTANTLY, the wing and stabilizer should be in the same plane. That is, looking from the rear, the stabilizer and wing should not be tilted with respect to each other. This is vital

as a stabilizer that is not parallel with the wing's plane will induce a roll every time the elevator is inputted.

With this airplane most of that is easy. The wing is centered and perpendicular to the fuselage centerline. It is built straight to begin with. Then, adjusting the horizontal stabilizer is pretty easy.

Photo 15

OK it is all adjusted and pinned in place so it can't move. Take a soft pencil and scribe a line on the stabilizer underneath and on top on each side of the fuselage where it meets the stabilizer. The next step you're going to hate me for. Take it all apart!

Photo 16 Photo 17

You must take off the covering between the lines you just scribed. You can use a sharp knife or, and this is the best way, use a small cheap soldering iron and burn off the covering just *inside* the lines you just scribed. A 25 watt iron from Radio Shack is fine. Try it this way. It is so much easier and safer. The wood cannot get scored. Score lines are weak and can fail in flight. You do not want that to happen.

Photo 18 Photo 19

Peel off the covering and lightly sand the wood to get the residue of the covering off. Mix up some more of that 30 minute epoxy and smear it all over the uncovered wood. Push the stabilizer into the slot in the fuselage. Then line it up with the pencil lines you did just a few minutes ago. All is again well with the world. Everything is aligned properly and your airplane is going to fly great because of the good work you just did. Again it takes longer to read than it does to do.

Photo 20

Give the epoxy about an hour to cure and find the two holes in the rear of the fuse. Pierce with a sharp knife and drill a hole slightly longer than the two large screws. Use a 3/32 inch drill. The directions say to use an awl but, be careful if you do. An awl could split the wood blocks inside and weaken the structure. Screw in the screws and you are almost finished. Use some glue on the screws (any kind will do).

These screws were probably originally meant to hold the stabilizer in place without epoxy. It is nearly impossible to clamp the stabilizer in place and then accurately drill the holes without moving the stabilizer. Plus, holes through wood tend to enlarge during use making for a sloppy fit.

The epoxy system is so far superior that it is almost a “must” on this, or on any trainer. Again, the Calmato RTF uses ARF stabilizer construction for extra strength and rugged durability not usually found in RTF aircraft.

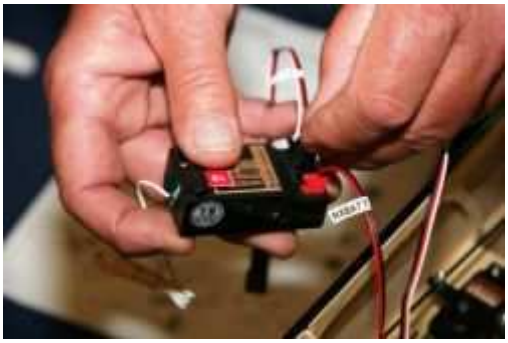

Photo 20A

Connect up all the clevises, put the batteries in the transmitter and in the battery box; and turn on the radio. Connect the servos to the receiver according to the diagram in the maintenance manual (photo 20A)

Center all the control surfaces, put the tiny set screws into the fittings on the servos, and with the supplied Allen wrench tighten the screws to hold the pushrods in place. Don’t forget the thread locking compound. For complete control surface details, see the Sport aviator article “Ready-To-Fly?...Maybe”.

FLYING

Give the epoxy a day to cure before flying. Then put the propeller on the engine. Get out the engine manual (Kyosho GX40 Engine instruction manual). Read it. I have not seen better engine instructions than this anywhere!

I started the engine with a chicken stick. You do not really need an electric starter. Follow the instructions and you will not go wrong. This is a very easy to use and setup engine. It was not needle valve sensitive and had no idling problems. In fact, this engined reliably idled at just 1,900 rpm. For any glow engine, that is an extraordinary idle speed. But for a new, high-performance .40 cu. in. engine, it is a little short of amazing.

Here is just my own word of advice: Don't put you fingers near the propeller! Repeat that to yourself several times. The Calmato's color scheme is an attractive green, blue and white. It is unique in its own right and really does not need any added red coloring. Understand?

Photo 21

You're ready to fly—go get your instructor. Yes, you must have an instructor. Don't let all your work go to waste. Do what he says. You didn't just get in a car and drive yourself at first, did you? If you did, I hope the statute of limitations has expired. Don't try this by yourself. Repeat that 100 times. Almost all RC clubs are friendly and have willing instructors ready to assist you and other beginners. They remember when they were novices.

Photo 22

The Kyosho Calmato is a very different looking basic trainer. The color scheme is attractive and surprisingly easy to see in the air. The airplane has a very sleek look that seems to say "speed" and this had me a little concerned. Basic trainers should not require extra speed to fly well and this airplane looked like it would. It was going to be very interesting when this aircraft was slowed down to training speeds.


Photo 23 Photo 24

The first takeoff happened almost before anyone knew. The airplane did not “leap off the ground” but it reached flying speed so quickly and started a gentle climb out before I had time to do anything. Later tests showed that this airplane started each flight better if the throttle was set at about 75%. Ground control was simple and didn’t need much rudder input to roll straight.

In a nutshell, the Calmato flies as well as any trainer I have ever had the pleasure of flying. I have been instructing for 23 years. It is stable, gentle and easy to handle. At low throttle, say ¼ to 1/3, it is the perfect trainer. The airplane is almost impossible to stall. It can be forced to stall but, in most situations it is difficult to do so. At 1/3 throttle it will loop—nice round loops if you do it right, your instructor will help you when you are ready.


Photo 25 Photo 26

With the engine out, the Calmato will glide in from almost anywhere as long as it is up two mistakes high. Yes, I deliberately killed the engine. I found this engine to be very reliable. Because of high grass at our field (it happens every spring), I switched to an 11-6 prop then to a 10-6 prop.

Not many trainers can do a reverse outside loop from level flight. This one can! This trainer has a dual personality, at low speeds it is gentle and forgiving yet at high speeds it becomes very aerobatic. Nice. The Calmato will carry a novice from his/her first flights to some really neat aerobatics. You will be satisfied with this airplane for a long time.

(*Ed. Note: I had a chance to fly this airplane during the photo/video session. I can honestly say that it is one surprising airplane. The best trainer speed is right at 30% throttle just as Bob reports. But what he didn’t say is that at this low throttle setting, the airplane flies* forever. *It just doesn’t use any fuel. Longer flights will speed learning time and this airplane does just that.*

Yes, stalls are about impossible. The airplane flies even during deep stalls and the ailerons remain somewhat effective [most trainers’ ailerons stop working at such slow airspeeds] but there is some adverse yaw at very low airspeeds. Read Eric Henderson’s Sport aviator Review of the Midwest AeroStar trainer in the” Hall of Fame” Section of On The Flight Line to learn how to manually set the aileron servo to prevent this

But the really amazing part happens when you open up that engine. The Calmato will actually climb vertically, from takeoff, to about 400 ft. before running out of airspeed. Rolls, loops outside loops and even figure "M's" are possible. This one airplane can take a student, as Bob reports, further up the aerobatic ladder than almost all other trainers tested so far. Yet, landings, even cross wind ones, are predictable, fairly slow and as easy to fly.

There is also an Almost-Ready-to-Fly version of this airplane. It features the same airframe assembly but costs only $110 vs. the RTF's low price of $290. If you already have an engine and radio, or want to use a more advanced radio system, then the ARF version is a good idea. But the RTF makes it so easy. The choice is yours.

More information on this surprisingly agile yet gentle trainer can be found at:
http://www.kyoshoamerica.com/airplanes/index.php?part_num=11212

The ARF version can be found at:
http://www.kyoshoamerica.com/airplanes/index.php?part_num=11211

Photo 27 Photo 28

Sport Aviator tested the green version. For those who might like a different color, red and gold versions are also available as shown above. We stole these photos from the Kyosho America website but hopefully they will be too busy to notice they are missing.

✈

Specifications

Manufacturer: Kyosho
Cost: $290.00
Radio: Kyosho 4-channel
Servos: 4 x KS 101-BK
Engine: Kyosho GX 40
Airfoil: Flat bottom with slightly raised entry (Almost a Philips entry)

Length: 48.0 in.
Wingspan: 63 in.
Wing Area: 677 sq. in.
Wing Loading: 17 oz./sq. ft.
Weight: 5.08 lb.

Special Airframe Features: High Lift Wing., Vertical Fin Factory Installed, Strong ARF-type structure; Engine Reaches 14,000 rpm on 10 x 6 in. Propeller

Notable Positives
A good trainer with the capability of more advanced aerobatics
Strong airframe
Extremely strong engine with very reliable idle. As strong as any .46 engine
Light flying weight
Good basic trainer performance
Attractive “sleek” look

Notable Negatives
Don’t use an awl for mounting the stabilizer
Included directions are for the ARF version. Can be confusing