Model Aviation's Sport Aviator
The e-zine for the new model pilot
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A Combo Package with All the Right Stuff

The Hobbico HobbiStar 60 Select

By Ron Farkas

The Hobbico HobbiStar 60 Select is one of the few truly ready-to-fly (RTF) glow engine powered trainer models currently on the market. It takes the almost-ready-to-fly (ARF) concept a step further by including a suitable engine and radio system, already installed and set up at the factory. In addition, a few modifications have been made to the airframe in order to create a bolt-together assembly rather than a glue-together operation. Really, just a Phillips head screw driver, and a pair of pliers are necessary to complete the assembly. It took about two hours, not counting the photography chores.

Photo 1

Photo 2

What a boon to the hobby this is for getting newcomers on the right track to success. It is not just a matter of saving the construction time, but is also one of providing a high quality flight-ready system of compatible components. Many seasoned instructors can relate stories of students arriving at the field with poorly constructed trainers, warped surfaces, sticking hinges, problem engines, controls reversed, and the like. Hobbico's Select RTF series eliminates those risks.

Photo 3


Photo 4

Photo 5

Photos 3 and 4 show what comes in the large box. There are just a few major airframe components, which are the two wing halves, horizontal stabilizer and elevator, vertical fin and rudder, and the fuselage (photo 3). The structure is built from balsa and light plywood materials. It is covered with an adhesive-backed heat-activated plastic film, in white and blue, with red and orange accent striping. All control surface hinges are installed, as are the control horns. The hardware (photo 4) includes a large steel wing joiner rod, pre-bent tricycle landing gear legs with wheels installed, wing hold-down dowels with plastic end caps, rubber bands, a prop spinner and assorted screws. The O.S. Max .65 LA engine, with muffler, is pre-installed and fuel lines are connected between the engine and installed fuel tank (photo 5).


Photo 6

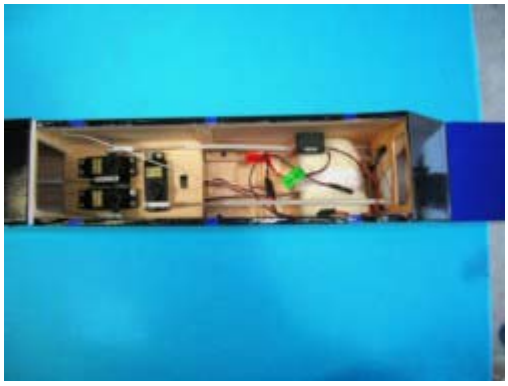
Photo 7

A foam radio system box contains the Futaba Skysport 6YG six-channel transmitter and dual-output system charger (photo 6). The airborne components of the Skysport 6YG system consist of an R127DF (7 channel) receiver, four S3004 standard size ball bearing servos, a 600 mAh Nickel Cadmium (NiCd) battery, and switch harness. These airborne radio components are pre-installed in the fuselage (photo 7), and the aileron servo is installed in one side of the wing at the root (photo 24). All the pushrods are installed and are adjusted to the right length. A 16-page illustrated instruction booklet is provided for the airplane assembly. Separate instructions from O.S. Max for the engine and from Futaba for the radio system are also included.

Photo 8 Photo 9

The HobbiStar 60 is a trainer aircraft. Two obvious characteristics are the high wing placement and a cabin-style fuselage, much like a full size Cessna 150 trainer. Another is the ample wing dihedral, or V-shape angle at the center. Neither the instructions nor the Hobbico advertisements make much distinction between basic and advanced trainer aircraft. However, with its semi-symmetrical wing airfoil section, the HobbiStar 60 has some of the qualities of a basic trainer and some of an advanced trainer.

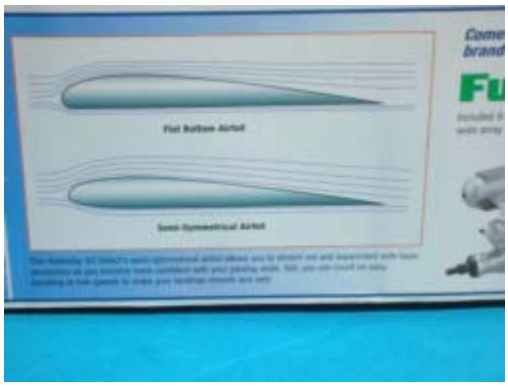

Photo 10

There is a short discussion of this on the side of the box (photo 10). Semi-symmetrical means that both the top and bottom are curved, but there is less curve on the bottom. The amount of curve directly affects the amount of lift, and the amount of drag produced by forward motion. This wing is designed to have the most lift when it is upright, but to also have some when it is inverted. This contributes to the HobbiStar's aerobatics capability. Plus, this kind of airfoil reduces the airplane's lift, or pitch, sensitivity to speed changes.

It is generally acknowledged that a basic trainer has stronger self-righting aerodynamic characteristics than an advanced trainer. So a basic trainer would have a flat bottomed airfoil section for the greatest lift, and lots of dihedral for returning to straight and level flight. The theory here is that the aircraft would recover by itself from the student's mistakes if he or she just let go of the sticks. The necessity for this kind of stability is lessened by the student having good aptitude, eyesight, reflexes, and a good instructor, or by using a buddy-box for sharing control with the instructor. It is recognized that too much self-righting can work against the advancing student, to some degree fighting his or her control inputs, particularly during aerobatics. Therefore the happy medium for an advanced trainer is to have a semi-symmetrical airfoil and just moderate wing dihedral, like the HobbiStar 60.

This model has another attribute that makes it a good trainer, whether basic or advanced. That is its large size. It is certainly easier to see than a .40 or smaller size trainer. The large size and moderate engine power tend to produce slow and gentle reactions to the controls, giving the student pilot time to think and to make the next move. That large wing, with lots of lifting area, also makes for nice slow landing approaches and touchdowns.

Combining and balancing all its many attributes, the HobbiStar 60 really is a basic trainer for the new RC pilot, but one whose flying abilities can take the advancing pilot through aerobatic maneuvers too complex for most basic trainers.

Assembling the Few Parts

I followed the instruction manual, just as the newcomer should. The process is straightforward, but I recommend checking off the numbered steps to make sure that nothing has been forgotten. The first task was simply inspection of the covering material and ironing out any wrinkles. I was really surprised to find no wrinkles at this time. I did not find the covering sagging over open framework either. Therefore, I moved on to the assembly steps. Note, however, time spent out in the sun did produce some wrinkles later on, but none that couldn't be ironed smooth again once back in the shop.

Photo 11

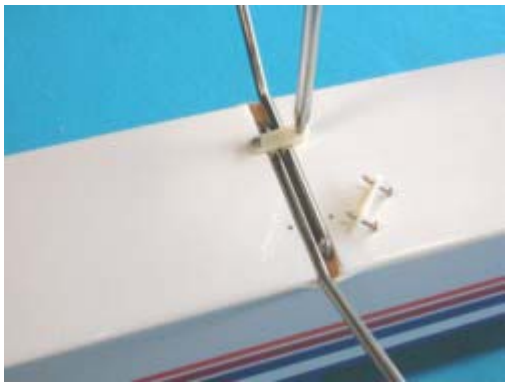

Photo 12

The main landing gear wire legs had to be inserted into the bottom of the fuselage (photo 11). This is the most common style of landing gear and mounting in sport, that is non-scale, models. The horizontal portion fits into a channeled block while the vertical portion is captured by another internal block in the fuselage. The effect is to produce a torsion-bar suspension system. The legs are retained in the channel by two plastic straps and wood-screws into the block (photo 12). Before inserting the gear legs into the holes, it is a good idea to bevel the interior sides of each hole to allow room for the metal

wire as it makes the 90-degree bend. This insures the gear lays flat inside the fuselage channel.

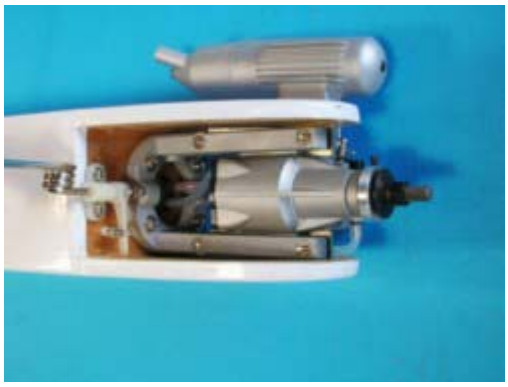

Photo 13

The nose gear leg was pre-installed into a bearing on the front of the firewall (photo 13). It has a steering tiller arm that is connected by a wire pushrod to the rudder servo. Most novice pilots like the tricycle style landing gear, since it produces more predictable ground steering response than a tail-dragger, and more protection from those prop-breaking nose-over landings.

Photo 14 Photo 15

Two hardwood dowels were provided for holding down the wing with rubber bands. The dowels were to be inserted through holes in the fuselage sides (photo 14). They did not need to be glued in place. Instead, plastic caps were provided to cover the exposed dowel ends, and each was secured by a single screw. These caps ensured that the dowels remain centered while protecting the bare wood (photo 15). The result was a neat finished look to the wing hold-down system.

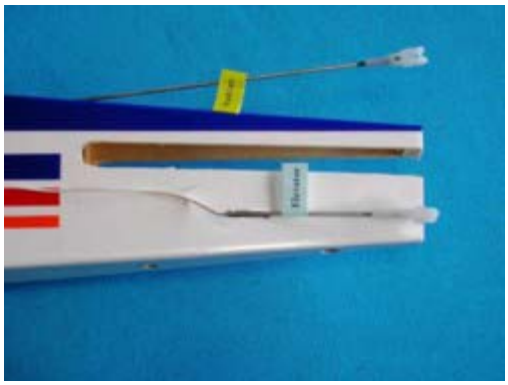

Photo 16

Photo 17

Next, the tail section was installed. The rear control rods are already installed (photo 16).I was really impressed by this particular design. In an RTF airframe it is typical for the tail to be captured by two long threaded rods from the base of the fin, through the stabilizer and fuselage, with nuts on the bottom. What may happen, over time, is that the stabilizer shifts and the holes become out of round. To prevent this, Hobbico uses fairly large plastic tubes that come up through the fuselage and tail, to be screwed onto the normal threaded rods (photo 17). These tubes are a snug fit in all of the mating holes in both the fuselage and stabilizer. It also appears that the top surface of the stabilizer has thin plywood inserts around the holes to prevent wear. The only concern here would be to not over tighten the plastic tubes, and strip the threads inside.

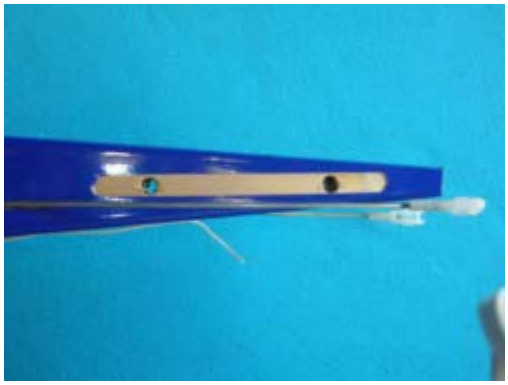

Photo 18

Photo 19

The plastic tubes must engage both the fuselage and stabilizer. It is best to align the holes first (photos 18 and 19) before inserting the tubes. Alignment was perfect on this HobbiStar. Then insert the tubes (photo 20) and screw in place (photo 21)


Photo 20 Photo 21

Once the tail section was firmly attached, the pushrod clevises could be snapped in place. However there were a couple of things to consider here that were not mentioned in the instructions. One is that I found it necessary to flex the rudder and elevator control surfaces several times to loosen up the hinge material. Another is that I had to be very careful to line up the clevis pin with its mating hole before pressing the sides together. Otherwise I just bent the pin over and risked ruining the clevis. I have found this to be a common problem on ARFs from the Far East. Some spare clevises were provided, although I did not need any. Finally, the instructions were adamant about using the silicone loop clevis keepers to prevent them from popping open under flight loads.

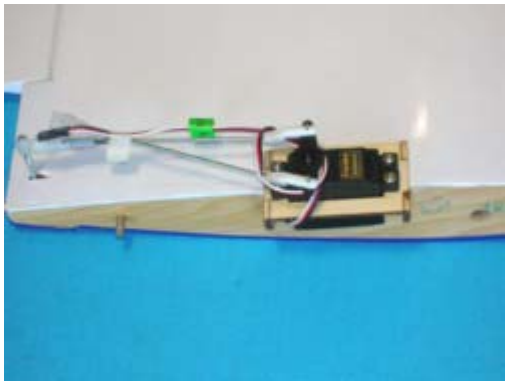


Photo 22 Photo 23

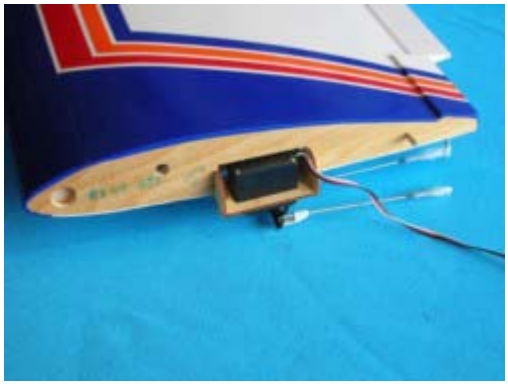

Photo 24

The wing assembly is next on the agenda. The wing panels are intended to be joined by a thick strong steel rod, and held together with small steel straps and screws. Therefore

the wing could easily be disassembled for storage or transportation. In order to make this practical, the single aileron servo is mounted in a light-plywood tray that is permanently pre-installed into one of the panels (photo 22). I was a bit concerned with this approach, so I tugged on it in a few directions to determine that it was secured well. Even though it was, I would suggest applying some epoxy or CA glue around the joints, or at least inspecting it once in a while, during the life of the airplane.

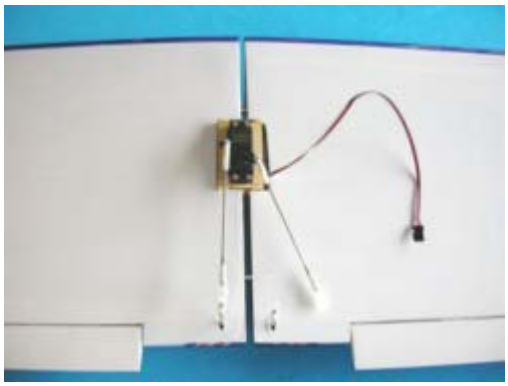
Photo 25


Photo 26

The wing joiner rod was a good fit into the tubes in the wing panels, neither loose nor binding. However, the hole drilled for the rear small steel alignment pin was not deep enough to allow the root ribs to mate together (photo 25). I deepened the hole just enough by manually twisting a 5/32” drill bit to remove some material (photo 26). This only took a few seconds.

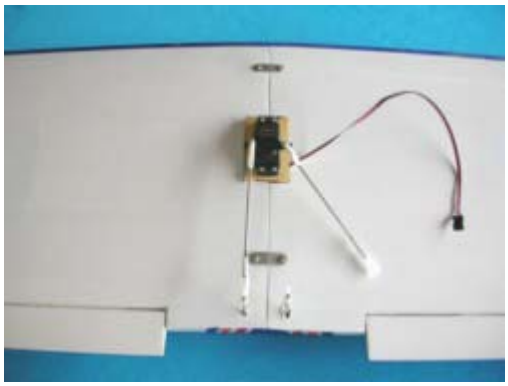
Photo 27


Photo 28

After that, the wing panels mated evenly at the root ribs. I located the pilot holes for the steel straps with a straight pin, and installed them with the wood screws provided (photo 27). Then I connected the clevises to the aileron torque rods. This essentially completed the aircraft assembly (photo 28).


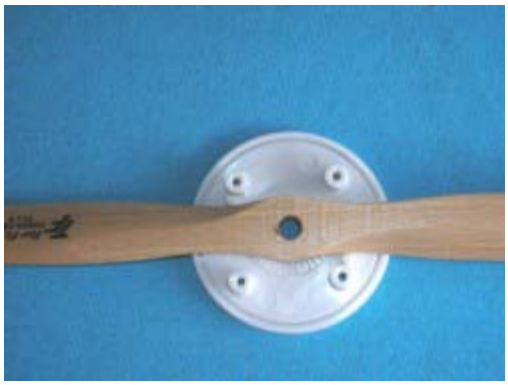

Photo 29 Photo 30

Considering the kit's high level of completeness, I was surprised to find that no propeller was provided for the O.S. Max.65 LA engine. A spinner yes, but prop, no. Nor was there any step in the instructions for installing the prop and the spinner. A quick look through the separate engine instruction booklet showed that a 12"x6" prop was recommended for engine break-in. That is my regular choice for sport flying with an engine of this size. Props of this size are produced with a 1/4" shaft hole that has to be reamed out to 5/16 in. (photo 29). Both English and Metric prop reamers are available at any hobby shop.

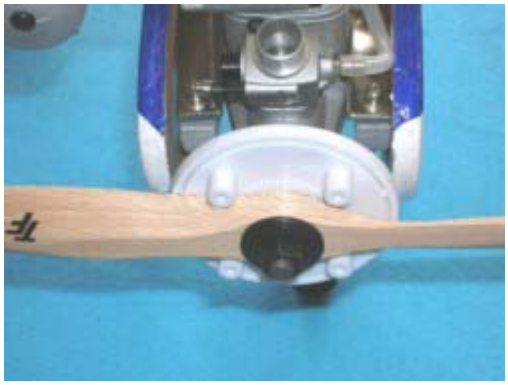
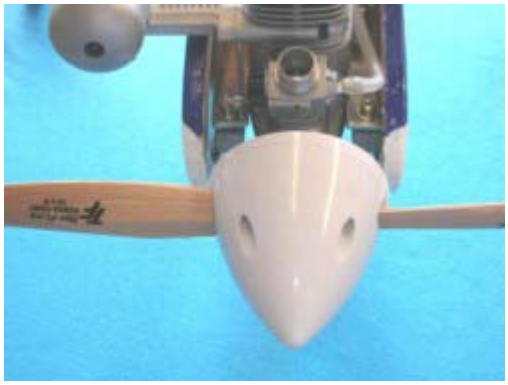

Photo 31 Photo 32

There is something about installing a prop that a newcomer should know. The prop should be positioned horizontally at the beginning of the compression stroke (photo 31). The reason is that, in case of a dead-stick landing, the oncoming air stream will hold the prop level where it is less vulnerable to landing damage.

Preflight Checks to Protect Your Investment

Now that the airplane looked ready, it was tempting to rush out and fly it. However, Hobbico has devoted a significant portion of the instructions to preparing the model for flying. One thing is to check the tightness of all the screws in the engine and radio compartments. I was able to take up a quarter turn on the engine mounting bolts, but otherwise everything was secure. Another thing to check is the control surface throws and neutral position. The elevator and rudder clevises were attached to the outer hole of the nylon control horn, which provided the proper amount of throw. I had to unscrew the rudder clevis two turns to center the surface, not bad at all, but I needed pliers to hold the wire end. I also found the aileron throws to be right on. The Futaba transmitter's dual rate switch was even set for about 75 percent of full throw, in case the controls needed

to be de-sensitized in flight. (*Ed. Note: For complete pre-flight check details, read "Ready To Fly? … Maybe" in Sport Aviator's Flight-Tech Section.)*

I balanced the model on a Great Planes CG Machine (a pivoting stand) just like the illustration in the manual. Although, the instructions noted that stick-on weight might be required, none was necessary on the review model.

Next I reviewed the LA-65 engine instructions for the break-in requirements. As expected, a rich needle valve mixture was required for two tanks of fuel before flying. After that, the engine could be flown with a rich mixture that may be adjusted progressively leaner as the number of flights builds up. On the very first starting attempt, using an electric starter, the engine would fire momentarily on the prime but not keep running. I found the needle valve closed almost all the way, something I should have checked first. At the correct opening, the engine ran consistently well and very rich. For a brand new engine, it had a very reliable idle, and it seemed that the throttle lever and throw was set up just right.

Getting Airborne and Becoming Familiar

The review model was not instrumented, as are some of the projects here at Sport Aviator. As a result, I have not attempted to judge the speeds or ascent and decent rates while flight testing, except to determine if they are appropriate for a trainer. (*Ed. Note: We are fortunate that the ARF version of the HobbiStar 60 is being readied for flight testing now. The ARF version will be instrumented and a complete flight report will soon be available in Sport Aviator's "Test Pilot" Section.)*

My club field has a paved runway, with a grass strip next to it, on the far side of the pits. An advantage of pavement is that the model quickly accelerates to takeoff speed, but a disadvantage is that ground steering can seem more sensitive. During takeoffs, I found the model harder to hold in a straight line on pavement than on the grass. Overall, I would say that the steering was too sensitive for a beginner. Nevertheless, I did most of the flying from the runway because it is closer to the pilot flight stations.

Photo 33


Photo 34 Photo 35

On the first flight the engine was set very rich, so I let the model roll about 100 feet and then pulled the elevator stick back about one quarter to make the model rotate and take off. Its wings stayed level and it stayed on heading, so its controls were initially well trimmed. It had a leisurely climb at a suitable pace for the student pilot. To an experienced pilot, the model felt sluggish to the controls, but just about right for its basic training mission. Besides, I knew it would have more agility later when the engine was running leaner and developing more power. I stayed in the designated traffic pattern, making a succession of right turns, and got up to about 400 feet of altitude in one circuit of the field. Most of that flight was spent doing lazy circles to the left and right, slow flight, stalls and touch-and-go's, just to become familiar with its handling characteristics. The model certainly was well-behaved, gentle and predictable, just as a trainer should be.


Photo 36 Photo 37

Photo 38 Photo 39

A student pilot will start making turns by simply banking the airplane with the ailerons and pulling back on the elevator to get through the turn. The HobbiStar 60 will turn pretty well in this manner. However, a high wing trainer with dihedral will turn better with some coordinated rudder along with the aileron command. The rudder assists the wings in

banking the airplane into the turn. The rudder authority on the HobbiStar 60 is very strong, only a little is needed. I found the rudder so strong that I could easily turn the airplane with just rudder and elevator. Although that is not part of the initial flight training, rudder control will eventually be needed when ailerons are ineffective, as in a stall.

While the wings are banked into a turn, the nose will drop a bit and the HobbiStar 60 will begin to pick up speed through the rest of the turn. When the desired heading is reached, it is necessary for the pilot to level the wings with a little opposite aileron, and to use the elevator to bring the nose back up to level. The student's objective, of course, is to feed in the elevator at the beginning of the turn, so the nose does not drop. When all three control inputs are timed properly, this aircraft does a picture perfect coordinated turn, just like a full size trainer. But, while the student is still rough around the edges, this model is very forgiving of mistakes.

Once the novice pilot is up on the learning curve, the semi-symmetrical wing airfoil provides a few benefits over the flat-bottomed wing basic trainers. One is that it reduces the effect of adverse yaw, an aerodynamic condition that causes the drag of the outboard wing to tug the nose away from the direction of the turn. Adverse yaw fights the pilot's attempts to make smooth turns, and requires the coordinated use of rudder along with ailerons. Still another benefit is that it reduces the tendency of the aircraft to balloon due to excess airspeed when the wings are leveled at the end of the turn.

Photo 40

Photo 41

Photo 42

The HobbiStar 60 does not float at low speed as much as would a basic trainer with a flat-bottomed airfoil. An airplane stays on heading better when it does not float because disturbances such as wind gusts do not have as much of an effect. That benefit is especially appreciated during the landing approach. I like to fly a rectangular approach as described in "Basic Landing Techniques" elsewhere on Sport Aviator. The HobbiStar 60 has very good low speed handling characteristics. It is easy to make those 90 degree turns at the corners of the approach, and the aircraft does not wander off heading. The

ailerons are quite effective even when the nose is held high (by using up elevator) to control the drag, and thus the decent rate.

Photo 43 Photo 44

Careful use of throttle on the landing approach, allowed me to put the airplane down in just the right spot, neither too short nor too long. When I made my approach with the nose high, the model would touch down on the main gear first, followed by the nose wheel. When my approach was flatter, then a little flare at the touchdown was necessary.

As a test, I tried approaches that were *too* flat and too slow. The sink rate became excessive and the model had a tendency to bounce. The main landing gear legs might be too soft and springy for such abusive landings considering the size and weight of this airplane. Some “bad” landings resulted in the nose gear flexing so much that the spinning prop hit the ground. But the HobbiStar always remained undamaged and ready to fly again.

The model had very good manners in slow flight at minimum controllable airspeeds. At the approach of a stall the ailerons lost their effectiveness for turning, but the model did not drop a wing. I could maintain a heading or steer to a new one with the rudder. With the mild elevator throw set for training, I could not get a stall break, the sudden nose drop past level due to loss of wing lift at very slow airspeeds. The model would just level its nose, pick up a little speed and continue flying. This is a great safety feature for training purposes.

Recovering From Unusual Attitudes

Trainers should be forgiving of beginners’ mistakes. We know that a basic trainer, with a lot of built-in positive stability, would attempt to right itself from unusual attitudes without pilot help. The process would be for the pilot to recognize a mistake and simply let go of the sticks, and hopefully cut the throttle to idle. The success of the recovery is highly dependent on how much altitude is available for self-recovery. Now, a more advanced level trainer, such as the HobbiStar 60, has less self-righting tendency, and does require some pilot input for a full recovery. That means it usually requires more altitude for recovery without pilot input.

About the most common beginner mistake is to over-bank in a turn and let the aircraft get into a spiral dive. So, I deliberately got the model into this attitude at several hundred feet high, and let go of the sticks plus I cut the throttle. Well, the model slowly stopped spiraling, and the nose started to return to level, but it would not have cleared the ground. I did this several more times, in both directions and from different altitudes. I also tried this from a stall turn and got similar results. Not surprisingly, I always had to help the model with some elevator up command near the end of the decent. However, since the

aircraft leveled its wing each time, recovery required just a simple “up” elevator input. That is a generally accepted compromise for the benefit of higher performance potential in the same design.

Getting Pretty Aggressive About Flying

After half dozen flights or so, I had progressively leaned out the engine to produce nearly full power. That reduced the takeoff distance to about 50 feet on pavement and 75 feet in the grass. The flight speed picked up quite a bit, and the control feel improved from soft to crisp. Thus, full throttle was ideal for sport flying and aerobatics, while three quarters throttle was best for training. Later, we will see how some of a trainer’s stability characteristics work against good aerobatics.

Full throttle straight and level flight was very solid, what is sometimes referred to as groovy. With the semi-symmetrical wing, the flight trim did not change much at all from medium to high speed. The larger size and weight of this airplane gave it a sense of momentum that carried the airplane from one place in the sky to another. It did not seem to be buzzing around like some of the forty powered trainers on steroids. The high-speed low flybys were right up the runway centerline. It was fun to show off like this with a trainer.

For a stall turn, the model was pulled up to vertical direction and the throttle cut to bleed off airspeed, then a tap of rudder to cause a tight 180 degree turn to the down line. Well, that was the theory anyway. What actually happened was that the combination of the powerful rudder and trainer dihedral caused the aircraft to start banking in the turn. The result was the same both to the left and right.

The correction for this was to apply some opposite aileron to counteract the bank. It took several tries to get the timing right, and this was another case for going easy on the rudder. However, all trainers react this way since all have generous wing dihedrals which create “roll coupling” that causes the wing to bank with rudder input.

I was not able to get into a true spin, where the wing is stalled and the model rotates about an imaginary axis. Instead I got a sort of spiral dive. This was expected, since the model did not want to actually stall with the recommended control throws and center of gravity location. However, I would expect that increasing the throws and moving the CG back would eventually enable a spin.

The HobbiStar 60 did great loops easily from level flight. The engine had enough pull to get the big model right over the top every time. By throttling back somewhat on the down path, the speed could be held constant and the symmetry of the loop maintained. Even without throttling back they were respectable, since the model does not really accelerate much when the wing is at a high angle of attack, such as pulling out of a loop. The model also stayed on heading well through the loop and showed no signs of dropping either wing tip. Since loops are so easy to do, they are very satisfying for a beginner to perform.

There was plenty of control authority to do horizontal rolls, but the aerodynamic forces on a high wing trainer really work against doing them nicely. The semi-symmetrical wing does help, though, to reduce the adverse yaw which produces sort of a corkscrew effect. There were several variations of a roll that I tried, but none were truly axial, that is one constant speed rotation around a straight line with no change in heading or altitude. Just slamming the ailerons over produced a wobbly roll and some altitude loss. Adding in some down elevator while going past the inverted position reduced the altitude loss. Easing off the aileron just after the inverted position also helped to maintain heading. Adding in some rudder command created a twisting motion, resulting in a barrel roll.

Photo 45

The HobbiStar 60 was remarkably easy to fly inverted, both straight across the field and flying circuits. Again, that is the more aerobatic airfoil helping out. It took about one quarter of the elevator down command to maintain altitude. The model could even be flown around at minimum speed, while using all the down travel. However, this slow flight required constant attention and small aileron corrections to keep from rolling over to upright. The model also performed very nice outside loops, starting from either inverted or upright.

Photo 46

Photo 47

The HobbiStar 60 Select is a fine trainer model to start out with if you have an instructor, and certainly if you are using a buddy-box for training flights. Even without the buddy-box, this big slow model gives you adequate time to recover from mistakes. It does not completely recover from mistakes without some pilot corrective action, and it may be too responsive for a novice who is all alone. Because of its semi-symmetrical wing airfoil, the aircraft has just a moderate self-righting tendency, but it provides much more aerobatic capability. This is a model that the newcomer can learn to fly on and progress well into sport and aerobatic flying without having to change planes along the way.

Aircraft Specifications

Manufacturer: Hobbico	Length:	55”
Cost: $399.99	Wingspan:	71”
Radio: Futaba Skysport 6	Wing Area:	875 sq. in.
Servos: Four Futaba S3004	Weight:	7 lbs. 13 oz.

Engine: O.S. Max .65 LA Wing Loading: 20.29 oz. per sq. ft.

Airfoil: Semi-Symmetrical

Special Features

Ready-to-fly condition, low parts count, just bolt together, no glue required, semi-symmetrical airfoil for advanced training, excellent O.S. engine installed, excellent Futaba radio system installed.

Notable Positives

Foolproof combination of products
Unbelievably easy assembly
Strong, well-built airframe
Good blend of trainer stability and aerobatic potential

Notable Negatives

Soft, springy landing gear
No propeller included