

Park View: Multiplex Gemini

BY SHAWN RUBUSH

A classic-looking sport biplane made from a space-age material

This model's impressive looks are possible because of the molded-Elapor-foam construction. The solid white material is ready for paint or the supplied decals.



The airplane slows quickly for landing, and the author recommends carrying a little power until the wheels touch.

The Gemini is capable of sport and precision aerobatics with the recommended Himax power system and Hitec radio equipment.

SINCE THE BEGINNING of flight, biplanes have held a special place in aviation history. Many of their pilots and designs come to mind, such as the Wright brothers and the Red Baron, who is commonly associated with flying the bright-red Fokker Dr.I triplane.

Then there are those seemingly fearless pilots from the 1920s who made barnstorming so widely popular with their endless array of sometimes death-defying stunts, some of which didn't turn out as well as planned. Have you seen one of those

black-and-white clips of a biplane crashing through a barn?

Fast-forward a couple pages in history. Those memories of biplanes from the past are still alive and well, especially when you look at all that aircraft designer Curtis Pitts has done and all the full-scale EAA (Experimental Aircraft Association) homebuilt aircraft that are available. Many people still hold the styling and grace of those classic airplanes dear, including me.

Model-aviation enthusiasts worldwide have been intrigued by the prospect of

building and/or flying a biplane but have yet to "take the plunge" for one reason or another. Could it be because of the complexity of building such an aircraft or the added cost that is usually associated with such a build?

Well, no more excuses! Say hello to the Multiplex Gemini from Hitec RCD USA. It's a sport aerobatic biplane made from durable Elapor foam. Both cost and complexity have taken a turn for the better.

Whether you choose the 200-watt power set Hitec recommends or upgrade to a 250-watt power system (such as the Himax HC3510-1100), you'll find the Gemini to be a satisfying solution to scratching that



The builder can choose to paint the inside of the cockpit before attaching the tinted canopy with cyanoacrylate glue.

The front hatch encloses the 3S 2500 mAh Multiplex Li-Poly battery, which should be located as far forward as possible.

biplane itch you might be having. For me it's time to start building.

Assembly Overview: After my initial inventory and inspection of the parts included in the kit, I found it hard to ignore the quality and effort put into this model. The section of the manual covering tools included no mention of sandpaper, and for good reason. The Elapor-foam parts were nearly flawless. Besides, sanding makes the foam fuzzy, which is okay for gluing areas but bad for decoration plans.

As I made my way through the building instructions, one tidbit of information that is seldom associated with building foam models grabbed my attention. The manual recommends the use of medium- and high-viscosity cyanoacrylate—not foam-safe cyanoacrylate. On the following page is an important note concerning the use of proper adhesives that you do not want to overlook.

Following the steps in building the Gemini I had no trouble understanding the explanations, which included bold part numbers next to the parts referenced. Figure illustrations located on following pages completed the step-by-step assembly description.

Someone with building experience could



The assembly process can be finished more quickly because the hinges are molded into the control surfaces.



The airfoil-shaped I-struts are glued to the top and bottom wing. The wing assembly is removable from the fuselage.



Hitec HS-55 servos complement the control surfaces. They fit perfectly inside the molded pockets and are held in with hot glue.

Pluses and Minuses



- Elapor-foam durability with great looks
- Great parts fit and hassle-free assembly
- Easy wing assembly and storage
- Motor mount accepts a wide variety of power systems and can be fine-tuned to adjust thrust angles



- The recommended power combination is nice for sport-flying but requires full throttle for most aerobatics.
- Live hinges cause servos to work harder than necessary and do not allow for full control-surface deflection.



A profile view shows the built-in thrust and incidence angles. Fuselage decals hide the elevator and rudder servos as well as the pushrods. Motor thrust is adjustable.

Specifications

Model type: RC sport

Pilot skill level: Intermediate to advanced

Wingspan: 36.2 inches

Wing area: 527 square inches

Length: 36.2 inches

Weight: 32 ounces

Wing loading: 7.21 ounces/square foot

Motor: 200- to 250-watt outrunner motor

Radio: Four channels (minimum), four miniservos

Construction: Elapor foam

Price: \$109.99

Test-Model Details

Motor (Multiplex Power Pack M993224): Himax HC2816-0890 motor, Multiplex BL-27 ESC, APC 10 x 5E propeller

Battery: 3S1P 2500 mAh Multiplex Li-Batt

Motor current: 18 amps max

Motor output: 200 watts at 20,000 rpm (gas equivalent: .15)

Radio system (Multiplex Flight Pack M999224): Hitec Mini-6S receiver, four Hitec HS-55 Feather servos, two Hitec 6-inch aileron extensions, Hitec Optic 6 transmitter

Flight duration: 10-15 minutes

almost put this project together by following only the illustrations in sequence. It's hard to imagine anyone having an unsuccessful building experience.

I could give you systematic instructions for the build, but, as I just mentioned, you have more than enough with the manual. I will touch on the points of interest that arose during the course of assembly.

The first step instructs you to assemble the "control snakes," also known as pushrods. The following step is to glue the servos into the fuselage halves.

Before gluing the servos in place, do not forget to have them all centered and the correct control horns installed. This makes good sense, especially when installing the servos in the bottom wing. The recessed pockets for the aileron servos are snug and, once in place, do not provide room for removing the control horns without damaging the wing.

When gluing the control snakes in place, I dry-fit them and then exercised the servos to ensure fluid movement of the control rods. When I was confident of the positioning I glued the outer sleeves in place, being careful not to glue them to the inner sleeves. I left enough of the sleeve end loose at the tail end to permit the needed range of movement.

The next step is to install the motor mounts, with strong emphasis on using a sufficient amount of glue—unless you want to watch your motor eject in midflight. I suggest roughing up the contact areas of all the parts to give the cyanoacrylate something more to "bite" into, making a more secure bond between the joined parts.

Before gluing the canopy to the canopy frame I detailed the cockpit to add a little flair and then opted for the fully enclosed version instead of the "open-top" option. The box art shows an open cockpit; the choice is up to you.

The horizontal tail has a nice, tight fit, but it is hard to determine whether or not it is level unless the wings are attached; that building step is much further down the line. The only way to get accurate alignment is to



The Elapor construction is rugged. Even the spinner is made from the material, which was painted silver with Rust-Oleum spray.

Gemini's 3-D Cousin: The AcroMaster

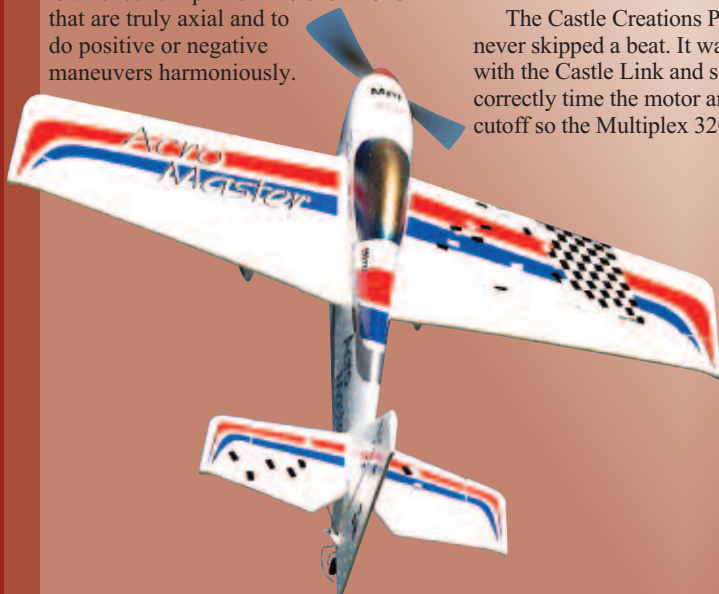


The AcroMaster uses a 350-watt Himax power system while the smaller Gemini power system puts out 250 watts.

THE GEMINI IS such a great-looking product that Shawn and I decided to build the Multiplex AcroMaster at the same time. Comparison showed that although the two models differ greatly in looks, they share the same attention to high quality and superb engineering.

The Elapor construction isn't like that of those "beer cooler" models made from beaded Styrofoam. The airplanes' finish is good enough for the multicolored graphics to be applied straight away, or with a quick wipe of alcohol they can be covered with *any* kind of paint.

The AcroMaster is purpose-built to be a graduate model for the foamy flying expert who is looking for an aircraft to take outdoors to increase his or her flying skills. The midwing design is an excellent platform to show rolls that are truly axial and to do positive or negative maneuvers harmoniously.



The AcroMaster hovers easily at half throttle. A 3200 mAh Multiplex battery will provide at least 10 minutes of aerobatic performance.



The AcroMaster has hollow wings and requires control-surface hinge installation. It and the Gemini share a high level of quality.

The thick, symmetrical airfoil and wide-body fuselage allow the airplane to maintain a constant airspeed. The plug-in wings and oversized canopy hatch make the model "quick-flight" compatible.

Elapor foam is tightly molded, so it's rigid, but the material is flexible enough that it can absorb the torque a novice aerobatics pilot might force it to endure. Even the spinner is Elapor, and it can take a beating, as will the wire landing gear and nylon-reinforced plastic parts.

We used the power kit Multiplex USA recommended (item M993215). The Himax 3516-1130 motor has literally spoiled me; it has so much power.

Advertising mentions that the AcroMaster has the ability of a 30-size glow model, but I have to disagree. It's way better, with low-speed torque that smoothly holds the AcroMaster in a rock-steady torque roll.

The Castle Creations Phoenix-45 ESC never skipped a beat. It was programmed with the Castle Link and software to correctly time the motor and set the voltage cutoff so the Multiplex 3200 mAh Li-Batt

BX three-cell battery wasn't drained excessively.

Also recommended and used was the Hitec Flight Pack (item M999215). We complemented this precise radio equipment with my Hitec Eclipse transmitter, which makes programming the model for RC Aerobatics and 3-D aerobatics simple.

We use a flight condition instead of the rate switches to change between the two flying styles. Even though the control-surface movements between the two conditions are radically different, the Hitec HS-85BB and HB-65HB servos performs strongly and smoothly.

The Gemini biplane is an excellent sport model with elegant lines a Top Gun builder would cringe to replicate from conventional materials and make as light. The AcroMaster has all that going for it *and* it excels at 3-D and can be a great model for practicing Aerobatics. I think Shawn and I will be trading airplanes real soon. **MA**

—Michael Ramsey

Specifications

Wingspan: 43 inches

Wing area: 557.27 square inches

Weight (as tested): 40.2 ounces

Wing loading: 10.4 ounces/square foot

Length: 45.25 inches

Power: 350-watt system

Battery: 2500-3200 mAh, 11.1 volts

Price: \$119.99

temporarily mount only the bottom wing to the fuselage and then sight down the fuselage to assure that the horizontal tail section mounts parallel to the wing.

After gluing the horizontal tail section in place, the tail-wheel assembly needs to be installed in the rudder. The tail-wheel wire is spring steel and tough to bend. Putting it upside down in a vise or clamp seemed to be the easiest way to achieve the needed 90° bend without causing undue stress to the plastic control horn and bracket. Once completed, the tail fin installs quickly.

You are to apply the decals before starting the wing assembly, which makes perfect sense. Once I started I finished all the decals except those on the sides of the fuselage, which cover the elevator and rudder servos.

I waited to apply those until after all the electronics were mounted—in case the servo centering and operation needed to be changed. The lightweight, three-color graphics add a great deal of character to the model; I did not want to take the chance of damaging them.

Nothing was out of the ordinary with installing the top and bottom wings. However, do pay attention to the aileron link horns; the holes in each end are different sizes and are easily reversed.

Before the top and bottom wings are joined, with the landing gear in place, the receiver is installed inside the fuselage. I found that the most convenient place for it was through the bottom of the fuselage.

I placed the receiver just forward of the opening on the right side to offset the weight of the ESC, which would be mounted on the left side in the front battery compartment. That way the 6-inch aileron extensions could easily exit the bottom wing opening. This placement also helped to obtain the proper CG.

With all the electronics installed, except the motor, I joined the one-piece wings to the fuselage. The easiest way to get the fuselage between the wings was to lay it on its side and roll it into place. Without “rolling” the fuselage, a lot of prying was necessary to fit the assembly and the ailerons were difficult to connect.

Before installing the motor I had to reverse the shaft to correctly install it on the supplied mount and use the included collet-style propeller adapter. The motor bolted to the center of a nylon-reinforced adjustable mount with the adjustment screws turned to the recommended offset (maximum right thrust and no downthrust).

With the airplane assembly complete I set up the controls with the recommended low rates and full control throw on high rates. After verifying proper operation I rechecked the CG, applied the fuselage side decals, and topped off the Multiplex Li-Poly battery. Wow, what a great-looking biplane!

The Fun Part: The local soccer field

seemed like a perfect place for the inaugural flight. The Gemini had to be at full throttle to take off from short grass, but it was smooth and predictable using the recommended control settings. Putting the airplane in a vertical climb made it apparent that 3-D maneuvers would not be on the manifest; it didn't have the power.

The Gemini seemed comfortable in a straight-ahead stall, whether upright or inverted. Inverted flight indicated that I had the CG a bit too far aft. The model seemed to be fairly neutral after I moved the battery forward approximately 1/4 inch.

Rolling right and left proved that aileron differential would need to be programmed to get the rolls to perform more axially, but it's not as unmanageable as it was. The Hitec Optic 6 transmitter I was using employs Channel 1 and Channel 5 for differential mixing, so the Hitec Mini-6S receiver wouldn't have to be changed out for a higher-channel-count version.

All I had to do was move the servo plug from the Channel 6 position and exchange the flaperon mix function for differential. Only roughly a 20% mix was required to help the rolls look straighter.

Pulling off a knife edge required an intimate knowledge of coupling, not to mention a good amount of altitude if a good head of steam couldn't be maintained. Most aerobatic maneuvers required full throttle. To extend the initial flight I backed off the throttle to conserve power, and the Gemini proved that it was comfortable flying at slower speeds.

When landing the model my first reaction was to drop the power and glide to a nice touchdown. Quickly realizing the additional wing drag a biplane has, I had to carry approximately one-quarter power on the approach to prevent an early stall. The stalls were straight ahead in the air, so dropping a wing wasn't a concern.

At touchdown I throttled down before the tail wheel touched, causing the airplane to nose over. Call it a lesson learned on soft grass fields. With nothing hurt but my ego, the next flight was as good as the first and finished without the ground loop.

Adding the Multiplex Gemini to my aircraft collection has definitely been a good building and flying experience. From start to finish I had eight to 10 hours invested, including the cockpit detail and spinner paint job. I built it and flew it on the same day. How many biplanes can be assembled this quickly? *MA*

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Products Used in Review:

Transmitter, servos, receiver:
Hitec RCD
(858) 748-6948
www.hitecrcd.com

Motor:
Maxx Products International
(800) 416-6299
www.maxxprod.com

Other Review Sources:

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