Foam RC Airplane

by tak145 on January 3, 2009

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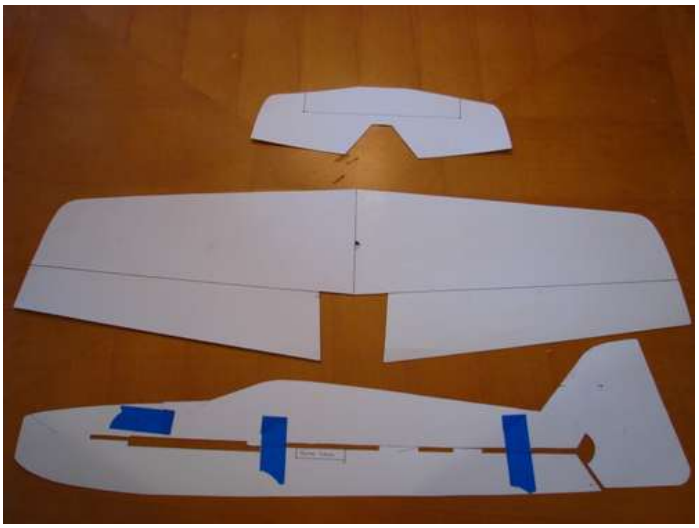
Intro: Foam RC Airplane

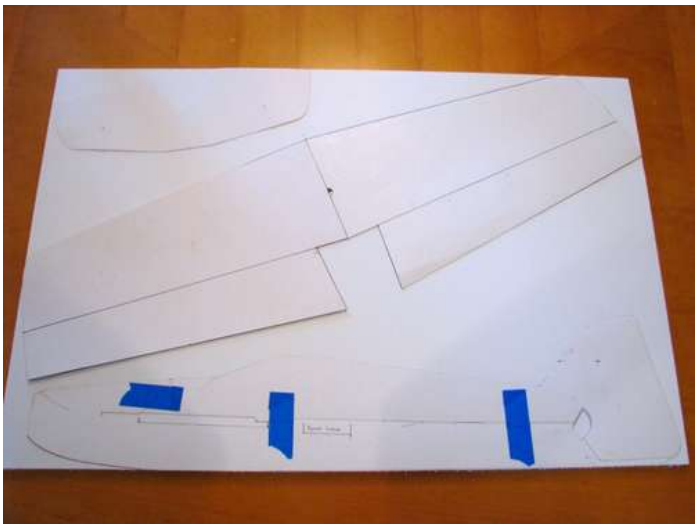
If you are like most RC enthusiasts you have spare spare motors, servos & batteries. This instructable shows you how to make a flat foam airframe in a couple hours.

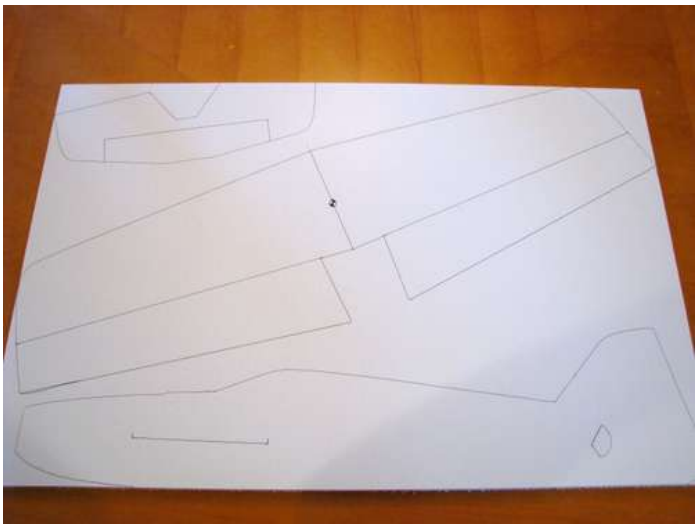
I've modified free plans from http://www.foamyfactory.com/ for a faster build that is also stronger.
This requires just 1 foam core board that can be purchased from a craft store.
I used the 1/2" thick board instead of the more common 3/16" version I've used in the past.

Step 1: Airframe Layout

Print out the full scale design available free from http://www.foamyfactory.com/
Put the design on poster board so you can easily trace out the design for future builds.
I've found that making just the vertical profile of the fuselage, the whole wing and the tail is all you need.
Trace out the designs on the foam board.







Step 2: Cut it out

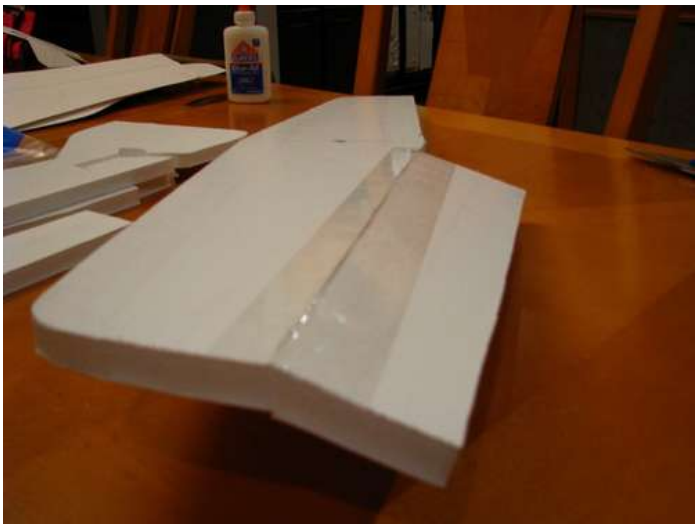
Cut out the design using a jig saw. You could also use an Exacto knife but the jig saw is much faster and easier. Cut out the slots where the wing fits and the tail fits as well. We'll cut the servo mounts out later.

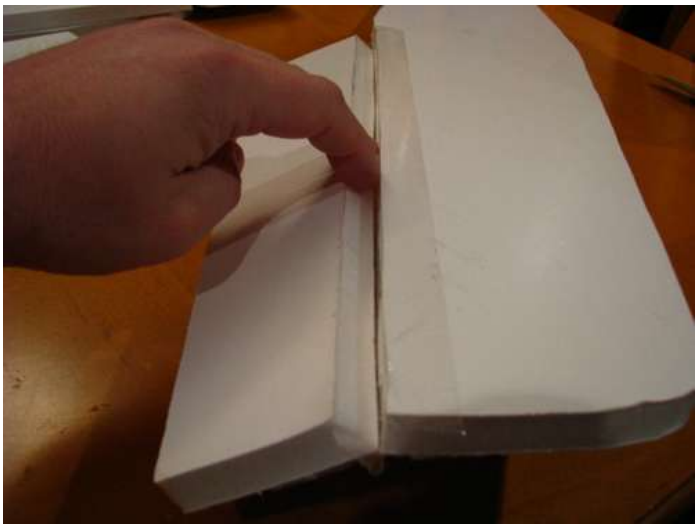
Step 3: Making the wing control surfaces

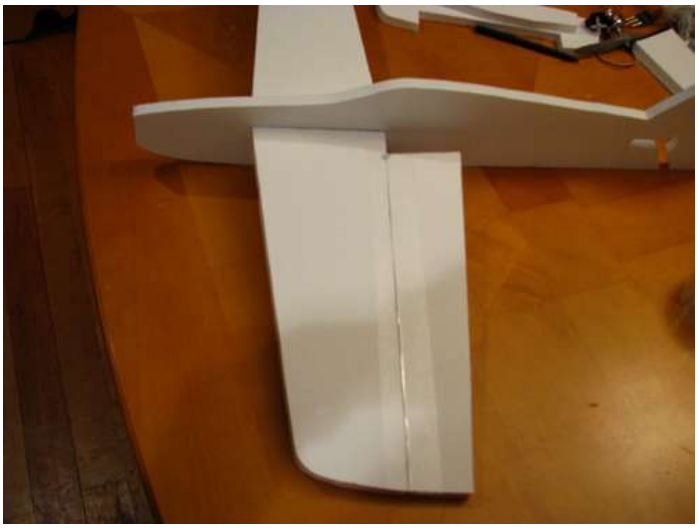
I do limited stunt flying so all I use are ailerons and the elevator. You can make a rudder for more advanced flying but I left it out of this instructable but you can apply the same techniques. The simplest control hinge is made from packing tape.

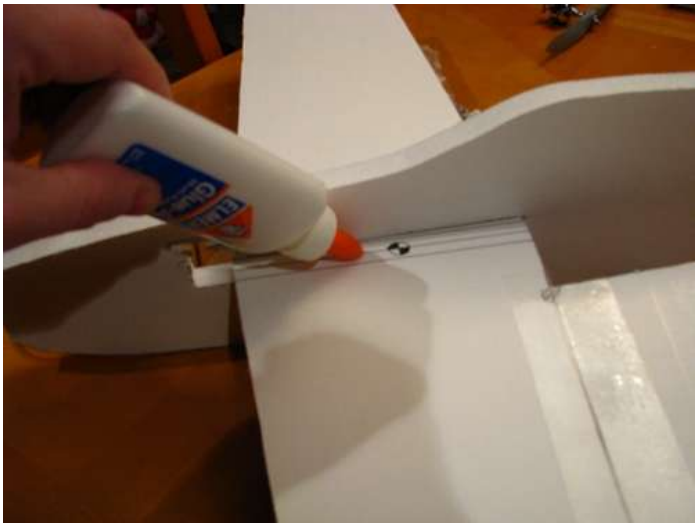
Using the jig saw cut both ailerons at a 30-45 degree angle where the control surface meets the wing. To make the hinge, mate the control surface to the main wing body at the cut angle and apply the tape along the length. Then fold the control surface the other direction and tape under side of the wing and aileron.

Next, slide the wing through the slot in the airframe. Apply glue to the center of the wing and slide in place. Allow the glue to dry then repeat the taping procedure on the other side of the wing.





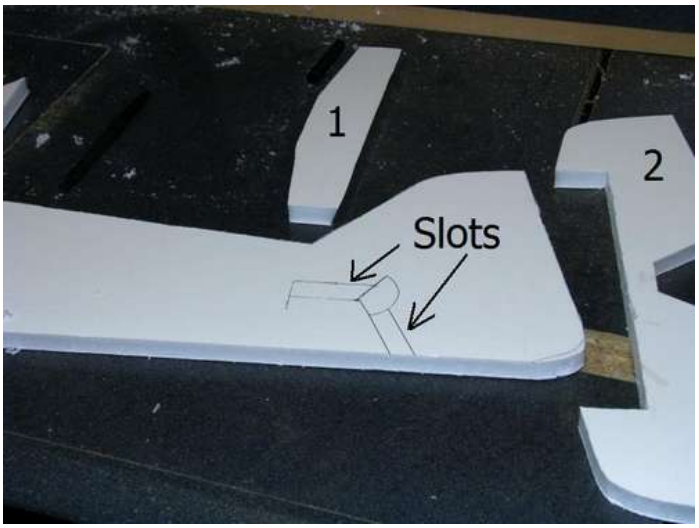




Step 4: Making the elevator

Cut out the slots to fit the elevator in the airframe. See photo for locations.
Instead of angle cutting the elevator (#2), cut the stationary piece labeled #1 in the photo at the 30-45 degree angle just as in step 3.

Slide and glue piece 1 into place. Slide part #2 into place and tape the elevator hinge just as described in step 3.

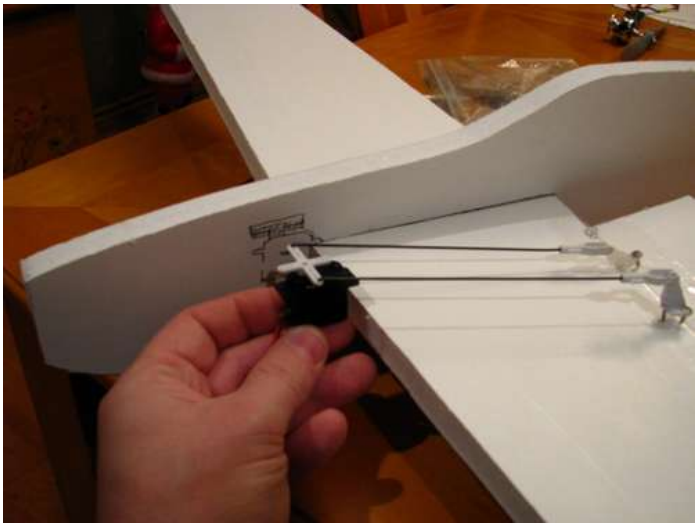


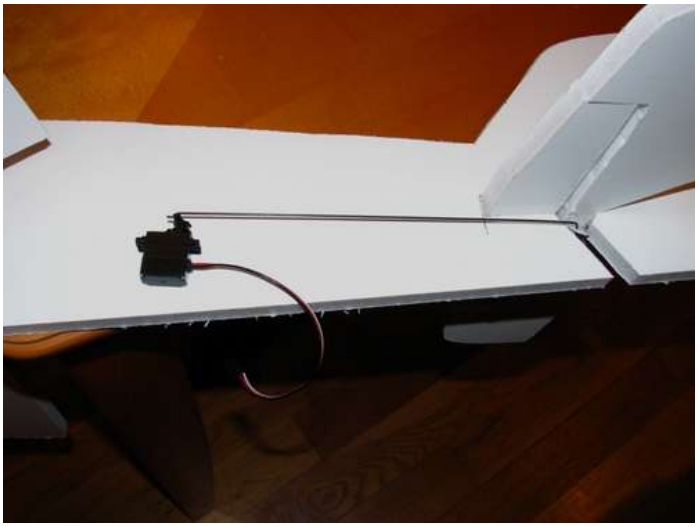
Step 5: Install Servos

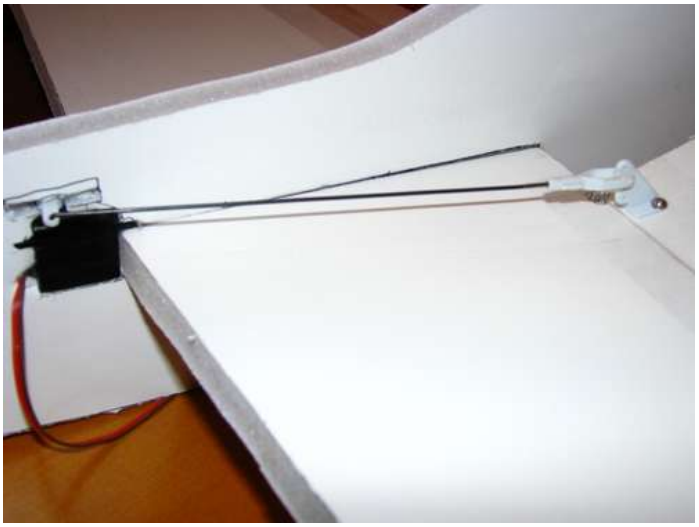
Find your servos and control linkages. The length of the control linkages dictate where the servos should be mounted.

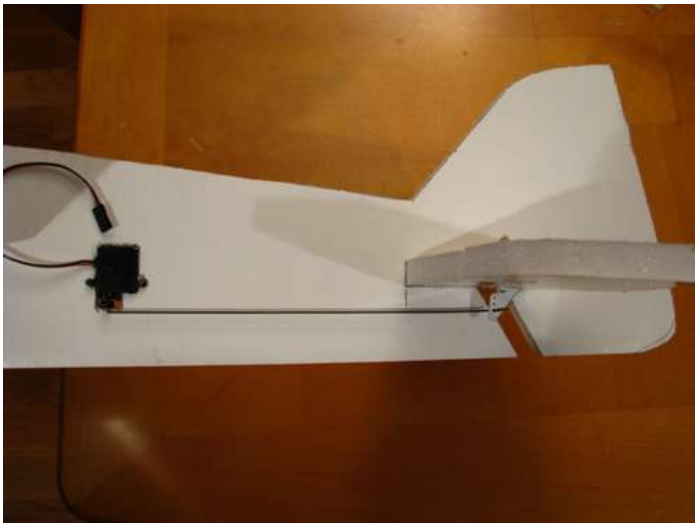
Simulate the locations of the control horns then make an outline of the servo on the airframe. Repeat this for the elevator. Cut out the servo locations.

Use a hot glue gun to fix the servos to the airframe. Screw down the control horns or hot glue them in place.





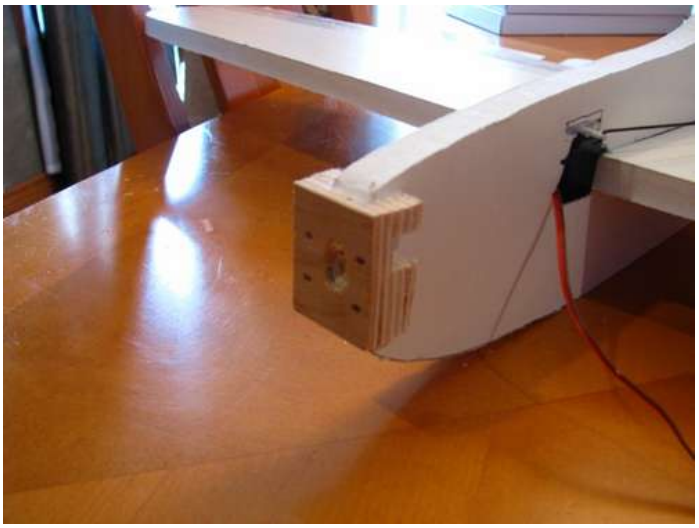




Step 6: Mounting the motor

Use a table saw to cut out a slot in a block of wood to mount your motor on. Pre-drill the mounting holes in the block. Glue the block to the airframe. Mount the motor to the block.

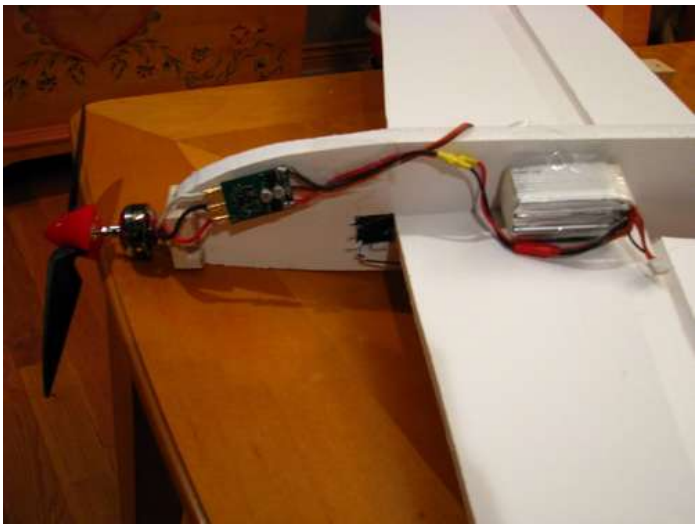
I recommend using a folding prop so you can belly land the plane and you won't need landing gear.



Step 7: Mounting the rest of the electronics

You now need to mount the ESC, Radio, and Battery.
I just use tape to mount the electronics.

Use the battery to balance the plane. Make sure the plane balances about 1/3 to 1/2 the wing cord length back from the leading edge of the wing. The further back the more unstable the plane becomes. Its also easier to do 3D aerobatics.



Step 8: GO FLYING!!!

You are done. Go flying. These planes are light and have very little surface area resistance so they fly well. With the right brushless motor these planes can takeoff vertically right out of your hand.

Related Instructables

Awsome Straw Plane by smileys

RUBBER BAND POWERED FOAM PLATE AIRPLANE by TECH GEEK

Beginners Guide to Radio Control Airplanes by nickademuss

A index card paper airplane holder. by Apollo2947

Acrobatic Paper Airplane (Photos) by Nicepolicy16

mini airplane by bangbang007

Comments

50 comments **Add Comment** view all 62 comments

likestobuild says: Mar 12, 2011. 9:40 PM **REPLY**

Im kind of a newb with rc stuff so would u recomend I build this model, or should I build a different/easier model?

ashwintunga says: Mar 7, 2011. 6:39 AM **REPLY**

how much is the range of cost of making this

mathursharad says: Jan 20, 2011. 7:44 AM **REPLY**

Hi I can you explain in detail how you actually cut the foam? What kind of knife, technique?

I am also trying to cut foam that is as thick as yours and the edges are not coming out straight. I don't mean the long edge, I mean the short edge that are on the side of the foam. The reason mine are not straight is because I find it hard to keep the knife at a 90 angle to the cutting mat.

Do you have some tips on how to keep the knife perpendicular to the cutting surface?

Thanks

tak145 says: Jan 20, 2011. 6:30 PM **REPLY**

I use an electric jig saw. See step 3. In that picture I'm showing how to cut the bevel on the control surfaces. The jig saw makes the process go quickly. I used to use and exacto knife but unless its extremely sharp you'll have to take several passes to cut through the board.

sham1990 says: Dec 29, 2010. 2:19 PM **REPLY**

Nice & simple! But its better to make the wing and elevator wing boarder smooth curve for better aerodynamic. Your design good for indoor.

eieio706 says: Oct 1, 2010. 3:10 AM **REPLY**

what size motor ? thanks Ray

ciragan says: Aug 20, 2010. 5:09 AM **REPLY**

if that plane flies, than everything else on earth can do so... no way..

Madrias357 says: Aug 31, 2010. 12:45 PM **REPLY**

It flies because it's very lightweight and has a massive amount of power on the nose.

cillianm564 says: Aug 11, 2009. 9:27 AM **REPLY**

I want to build one which material would be better balsa wood or foam

Madrias357 says: Jun 22, 2010. 11:34 AM **REPLY**

Foam is easier to fix, and if you ask me, more fun. A crash with foam means tape and glue. A crash with balsa wood means a full repair job.

Limpimento says: Aug 30, 2010. 5:46 PM **REPLY**

Couldn't agree more. I love to build but I would rather fly than repair. A little tape or foam glue is hardly a repair and your up in three minutes. Although, Just for the sake of arguement, and to be fair, Balsa repair really is not as bad as some would think(for a minor crash), but it does end your flying for the day.

Madrias357 says: Aug 31, 2010. 12:25 PM **REPLY**

Exactly. A balsa plane crash ends your day. Foam planes, it's time to get out the foam-safe super glue and the fiberglass reinforced tape and stick the pieces together.

Limpimento says: Aug 30, 2010. 5:41 PM **REPLY**

First, tak145 thanks for the contribution. I have noticed there are several negative comments as to the quality and design of this plane. Based on my experience of 12 years of experimental r/c design flight, and I still learn new things eveyday, I would like to make a few observations. 1) I have never come across a plane that would not balance unless it was due to a horrible design issue. That doe not exist here. These plans are nearly identical to several commercialy produced kits on the market. 2) This is a 3D profile style plane. I have built several out of 3/16" foam core WITH bamboo dowel supports for the wing. If you want a plane you can run up to max power on you throttle and yank back on your elevator, and keep it in one piece, don't build this plane. Tak145 may not agree, but then again, he made his out of 1/2" foam. 3) could you put a nitro on this. yes but see point #2 above. When I first started out flying all I had was a 2 channel radio, a $3 walmart foam glider, amd a cox .049 engine. So yeah its possible. The important thing is to experiment. This is a great guide for getting you started but dont look to insult someone if you base your battery position off of someone elses picture and it doesnt balance. Ask, don't insult, especially if you went though all the fun of building this then scrap it because of a kink or because you thought you were building a HI-PO Jet.

Thanks.

awang8 says: Aug 11, 2010. 9:49 PM **REPLY**
Can this plane actually fly? I've notice that the wing lacks the all-important aerofoil property that provides lift.

tak145 says: Aug 12, 2010. 5:18 PM **REPLY**
Yes. The motors are so powerful there is no need to have an airfoil. Check out the videos in this link. http://www.foamyfactory.com/videos.htm

mrcayouette says: Jul 13, 2010. 6:00 PM **REPLY**
would i be able to put a small nitro powered motor like a .10 on this remote controled plane?

yuvraj kanda says: Jul 6, 2010. 12:22 AM **REPLY**
ITS ONLY JUNK NOTHING

yuvraj kanda says: Jul 6, 2010. 12:20 AM **REPLY**
THE PLANE COULD NOT BALANCE

Motordude says: Jun 18, 2010. 2:04 PM **REPLY**
how much do you think the plane weigh

sdfgsdfg says: Jun 8, 2010. 11:57 PM **REPLY**
Try sanding the foam. It will make it more aerodynamic: less speed for flight etc.

erod998 says: Apr 3, 2010. 12:25 PM **REPLY**
i want o see a vid of this thing flying and multiple pics of different parts of the plane/ Can u post some . If u cant that fine great instructable anyway

FURAT SUBHI says: Mar 29, 2010. 12:45 PM **REPLY**
Coooooooooooooooooooooooooooooooooooooool!

FURAT SUBHI says: Mar 29, 2010. 12:43 PM **REPLY**
Cool!

rodneyroy says: Feb 18, 2010. 11:25 AM **REPLY**
ive looked at these plans before, and they look easy enough. but im not sure if i would trust them, becaouse i made the bipe from the same website and it didnt fly very good. maybe it was the kind of foam. who knows.

elecsl says: Jan 14, 2010. 8:35 PM **REPLY**
What is the motor you have used? Is it brussless DC motor? I have tried some project like toy airplane . I like try this as well. thanks.

tak145 says: Jan 14, 2010. 9:20 PM **REPLY**
Its a brushless DC motor. They are powerful and exactly what's needed for a plane like this. It can climb straight up with no problem. I've since used a brushless outrunner from bphobbies.com. They are good and inexpensive.

absolute zero says: Jan 1, 2010. 3:40 PM **REPLY**
where would one go about getting these parts? and how expensive is the plane made in this 'ible?

tak145 says: Jan 14, 2010. 9:17 PM **REPLY**
There are lots of online rc hobby stores. If you are getting started with a first plane i recommend you buy a brushless plane that has all the components. When you crash, and everyone does, you can salvage the parts and build a foam plane.

prof88 says: Nov 15, 2009. 3:03 AM **REPLY**
thanksssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss

davidneth says: Nov 13, 2009. 10:59 AM **REPLY**
Great instructable! I am building a electric combat plane using foamboard for the fuselage, finally someone out there that has had the same idea I have had. what type of glue did you use to tack everything/hold it.

tak145 says: Nov 14, 2009. 3:43 PM **REPLY**
I like to use hot melt glue to hold the servos in place. Otherwise I use Elmers everywhere else. I've never had a glue failure. I started out using foam safe glue but found its not needed. Good luck with your plane. I'd love to see it.

davidneth says: Nov 14, 2009. 7:29 PM **REPLY**
Yeah, Ok, maybe I will make an instructable about how to cut foam with a hot wire cutter, and show my plane when complete.
Thanks for the encouragement!

smanzie4 says: Oct 24, 2009. 3:06 AM **REPLY**
can you post me the plans, the site is not working
by the way nice instructable.

wild1357 says: Oct 3, 2009. 12:41 PM **REPLY**
Very nice project, is there anyplace I can get parts in Canada, or a place that ships to Canada (cheaply)?

Patented says: Sep 14, 2009. 5:55 PM **REPLY**
Woah!! Thats a nice project!! A vid would be awesome! 5* man you did a really good ible!

stumpffy345 says: Jul 18, 2009. 12:57 PM **REPLY**
thats cool i may build one of these

Cubie2 says: Jun 11, 2009. 7:07 PM **REPLY**
I made one from scratch like this before, It was meant to take off from the water though, It had a weird design, the two main wings were the same shape as any other planes, but I didn't have any tail or elevators. It's rudder was attached directly to the back of the wings with 3/4's of it below the plane. The motor was situated at the front of the plane with the propellor in the middle of the wings, opposite of how you usually see a prop engine I also cut out a rectangular hole in the wings where it was so half was under the plane and half on top. I had 3 servos in my plane, 1 for each "ailron" (they move seperatly) and one for the rudder. I then added a curved front to the wings like a boat. The finished product had wings similar to a p-51 mustang. It had a 3 foot wingspan and was 1 foot long. If you build on remember, the position of the motor is very crucial, put it about 2/3rds the way up the plane from the end of the rudder and it should push the plane, not pull it. Put the battery and receiver in the curved part in front towards the back I flew if 5 times from the surface of a pond. i than proceeded to take it apart and build something new. I'm still working on that. Keep yu posted!!!

matrix43547 says: Jun 8, 2009. 8:52 AM **REPLY**
Nice job, you should check out the rc groups forum (http://www.rcgroups.com/forums/index.php), ton of great stuff about rc

noah1r says: May 20, 2009. 12:33 PM **REPLY**
what kind of foam are you making it out of

tak145 says: May 20, 2009. 5:55 PM **REPLY**
This one is foam board. The major craft stores carry it. Many people make it from fanfold which can be found at a home improvement store. Fanfold can be flimsy so people stiffen it with carbon fiber rods.

noah1r says: May 22, 2009. 12:12 PM **REPLY**
thank you

tak145 says: Jan 4, 2009. 3:16 PM **REPLY**
The lift for a flat (profile) plane is generated by the forward motion of the plane coupled with the elevator. In fact a plane can hover with just the power of the motor. Check out this cool video.
http://www.youtube.com/watch?v=8XUOdiobO70

TheLucster says: Feb 1, 2009. 11:46 PM **REPLY**

Thats crazy, that stuff is indestructible! Are there any good beginners guides to building RC foam planes? I had an old Firebird a couple of years ago, and one good crash broke the tail - ever since then I haven't managed to fix it, but want to keep on with the hobby!

tanmanknex says: May 21, 2009. 10:51 PM **REPLY**

you look like a person i can talk to. i had a airhogs plane, but it didn't fly well at all. i took it apart and salvaged all the electronics and chucked the body in my closet. i got a larger body from tech in school and am putting the electronics in. i have added range, maneuverability, and speed to my plane. I started three months ago, but i could only work every other day, and i took time off to build a penny hockey and a robot. i am very close to being done, like i have to solder two joints and i'm ready to fly. you might consider getting a foam plane from online somewhere and putting the electronics inside it. if you could post some pics when you're done, whatever you do, even if you just fix it, then that'd be great. i'll post some pics too. happy flying!

kanth491 says: May 21, 2009. 9:14 AM **REPLY**

without landing gear how will it takeoff and land.

tanmanknex says: May 21, 2009. 10:44 PM **REPLY**

hand launch, belly land.

kanth491 says: May 16, 2009. 6:58 AM

(removed by author or community request)

tak145 says: May 20, 2009. 5:56 PM **REPLY**

The motor is strong enough to hand launch. It can land on its belly since the prop folds back.

bishal says: May 16, 2009. 1:38 AM **REPLY**

how can it be controlled to move sidewards?

tak145 says: May 16, 2009. 5:48 AM **REPLY**

The control surfaces on the wings cause the plane to bank left or right. Then moving the elevator control surface causes the plane to turn. The rudder (not on this plane) keeps the turn "coordinated". That just means the plane doesn't slip through the air. The lack of rudder is un-noticeable for most types of flight maneuvers. There are some 3D stunts that need a rudder but I don't do that type of flying.

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