# Session Two – Selecting Your First Plane

So you are ready to buy your first plane. What should it be? I recommend you choose a plane that has the following characteristics:

a. **Flies slow** – gives you time to react to how it is flying.
b. **Tri-cycle landing gear** – easier to take off and land.
c. **Large enough to see in the air** – big planes do better with wind gusts.
d. **Choose a color that is easy to see in the sky**.
e. **Choose a high wing configuration** – Better stability

**Planes to consider:**

1. **Hobbyzone Sport Cub S RTF** RC Airplane with SAFE Technology.

**Features:**

- Spektrum DSMX® receiver with AS3X® technology, installed
- Powerful 480-size, 960Kv BL outrunner motor, installed
- 18A brushless ESC, installed
- Aileron, elevator and rudder servos installed
- Durable Z-Foam™ construction
- Oversized tundra tires
- Includes 3S 1300mAh 20C Li-Po battery
- Includes DC 3S Li-Po fast charger
- Requires a full-range 4+ channel (5+ channel with flaps) DSM2®/DSMX transmitter, sold separately

Why? It's made from foam, has an electric motor which is easy to start. Has a **beginner flight mode**. Cost: $200.00

2. **Hitec/Multiplex** makes a good stater plane called the **SkyScout.**


- **Model:** SkyScout R2GO
- **Type:** Electric Ready to Fly
- **Distributor:** Hitec RCD (hitecrcd.com)
- **Wingspan:** 54.5 in.
- **Wing Area:** 372 sq. in.
- **Weight:** 24.5 oz
- **Wing loading:** 9.48 oz./sq. ft.
- **Radio req'd:** 3- to 4-channel (ailerons optional)
- **Motor req'd:** 235 watt brushless outrunner (included and installed)
- **Price:** $249.99 (R2GO), $219.99 (H2GO), $164.99 (P2GO), $79.99 (SkyScout kit)

**Hitec/Multiplex HIGHLIGHTS:**

- ⊕ Lightweight and rugged
- ⊕ Complete and easy to assembly
- ⊕ **Easy and fun to fly**

### 3. Flyzone Island Wings DHC-2 Beaver Rx-R 59.5"

## Features:

**Construction: AeroCell foam**
**Wing: Two-piece with carbon fiber spars, hinged flaps**
**Aileron Control: Dual servo**
**Motor: Brushless**
**Electronic Speed Control: 40A**
**Servos: Four micro**
**Landing Gear: Conventional landing gear with 3.5" (89mm) tundra-style tires, and floats with water rudders, steerable 1" (25.4mm) tailwheel**
**Stabilizer: Carbon fiber reinforced**
**Propeller: Plastic construction, 12x6**
**Spinner: 1.8" (45mm) diameter plastic with chrome finish**
**Battery Hatch: Easy access on bottom of fuselage**

**Includes:**

**Rx-R Island Wings DHC-2 Beaver Bush Plane with Brushless Motor**
**40A ESC**
**Floats with Water Rudders**
**Wheels**
**Micro Servos**
**Navigation & Landing Lights**
**Instruction Manual**

**REQUIREMENTS:**

**Radio: 4+-channel (if using flaps, 6ch radio is required)**
**Battery: LiPo 11.1V, at least 1800mAh**

**Specification:**

**Wingspan:** 59.5" (1510mm)
**Weight:** 48-52 oz (1360-1470 g)
**Center of Gravity:** 2" and 2.50" (51mm and 64mm) back from leading edge of bottom of wing
**Cost: $180.00**

## 4. Freewing Pandora 4-in-1 Red 1400mm (55") Wingspan – PNP

## Features:

- High wing and low wing configuration included in one plane
- Tricycle landing gear and tail dragger landing gear included
- Included BIG wheels
- Molded wing pocket for optional flap servos - hardware and push rods are included
- Durable EPO foam construction
- Nylon hinges on all control surfaces
- Brushless motor, ESC, and 4 micro servos installed

## Requires:

- 4 Channel Radio
- 4 Channel Receiver
- 3 Cell 11.1V 2200 mAh Lipo Battery with XT60 Connector

| | |
|---|---|
| **Wingspan** | 1400mm/55.1in |
| **Length** | 1180mm/46.5in |
| **Flying Weight** | 1500g / 53 ounces |
| **Power System** | Brushless 3536-800Kv |
| **Speed Control** | 30A, Internal BEC, XT60 connector |
| **Propeller / EDF** | 11x6 3 blade prop |

## Reasons for picking these planes:

1. **Foam construction** – easy to repair
2. **Designed to fly**
3. **Sturdy landing gear** with **large wheels** or no restriction to increase wheel diameter.
4. **Pusher Prop** planes - Protected motor and prop arrangement.
5. **Configurable wing setup**.
6. **Motor and electronics included.**
7. Cost: Not terrible expensive

What ever you buy, buy extra batteries and 2-blade props.

## Things to consider to insure a safe and successful first Flight

1. Use a servo testor to center the servos and secure the horn as close to the 90 degree position.

2. Adjust pushrod lengths to insure control surfaces are neutral. Lengthen or shorten pushrods at the clevis end to get the proper length.

3. Locate the receiver and ESC close to the Center of Gravity (CG). The CG is located 25-28 % of the root cord, measured from the leading edge of the wing. Most ARFs include in the assembly instructions a range for setting up the balance point. Recommend you use the 28% length to locate the CG. Refer to the old RCCD website for the CG calculator.

4. Use a balance device to locate/verify the CG.

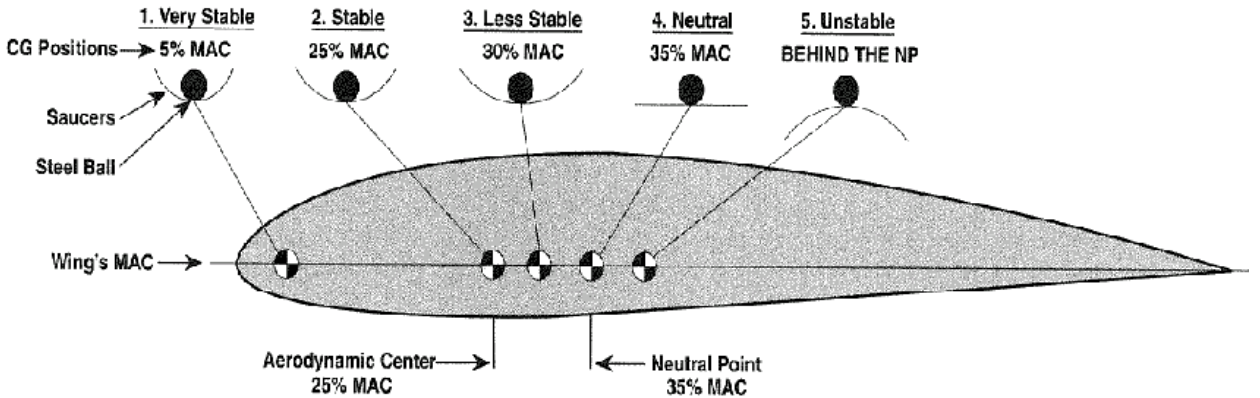
5. Include the flight battery in the model BEFORE you try to balance the plane. High Wing planes are positioned on the balance points UNDER the wing.

6. **LOW wing models are inverted** on the balancer with the retracts in the wing.

7. **Move the battery** forward or back in the fuselage to achieve a LEVEL balanced plane. Mark the location of the battery in the fuse for future reference. If you use several batteries, mark the weight of each battery and balance with the lightest battery. Using a heavy battery will make the plane nose heavy. You can reposition the heavy battery to achieve level balance, and mark its location.

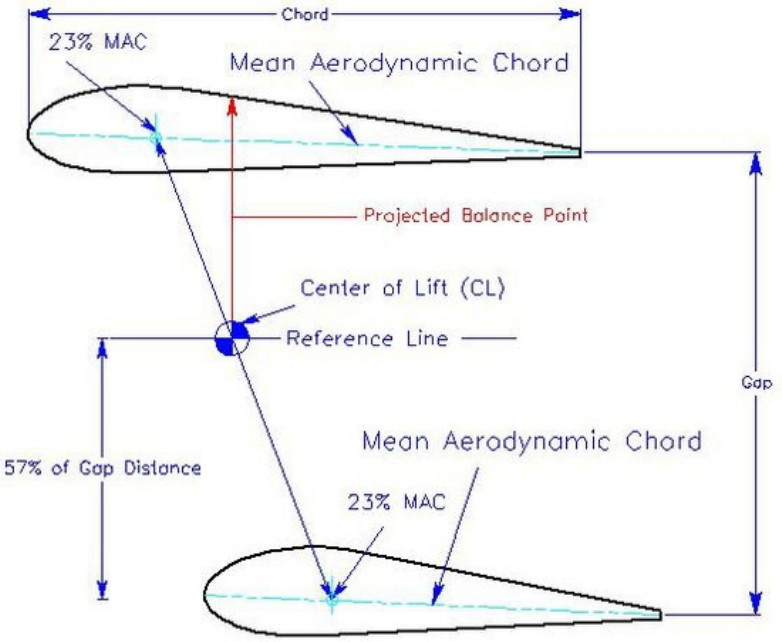
8. **Mark the location where the plane balances**. One tip is to take a pin with a ball head and cut the length of the pin down and push and glue it into the wing. This will help you finger balance the plane in the field.

9. If you have to add weight to the nose, carefully position the extra weigh on the outside of the plane as far forward as possible to achieve the balance point. Add additional weight to balance and note the location of the extra weight and transfer the weight to the fuselage. I would not recommend securing the weight in the cowl.



# Center of Lift

for Biplanes with positive stagger and unequal wing chords.




Once you have the MAC for both wings and the CG balance point as a percentage of the MAC, connect the two CG positions with a line. Measure up between the wing Gap distance and place your center of lift (CL) at the 57% reference line. Project this location up and balance your biplane at this postion (see red lines). A CG forward of the CL makes the model more stable, Placing it aft of the CL makes model less stable.

***Simple Method to Find CG:***

***This method applies to simple stagger wing biplanes; which both the upper and lower wings have a straight continuous leading edge and trailing edge that are parallel to each other (both Hershey bar style wings) with no swept back or taper.***

*"To find the total cord length that you need to consider in calculating the CG, you simply* ***level the plane on your work table*** *into the biplane's flying attitude. Using a* ***carpenter's square placed*** *on the work table and* ***against the forward edge of the leading wing edge draw a mark on your work table.*** *Then re-position the carpenter's square on the table against the* ***trailing wing edge of the rear wing*** *(including the ailerons if they are strip ailerons), and draw a mark on your work table in line with the first mark.* ***Measure the distance between the marks.*** *You* ***use this total distance and multiply it by 28 percent.*** *This will give you the distance you use to measure back from the leading edge of the forward wing. Now, while the biplane is still in the flying position, measure back from the forward wing's leading edge and mark that distance on the bottom of the upper wing. This is the point you balance the biplane on." Pete Mlinarcik*

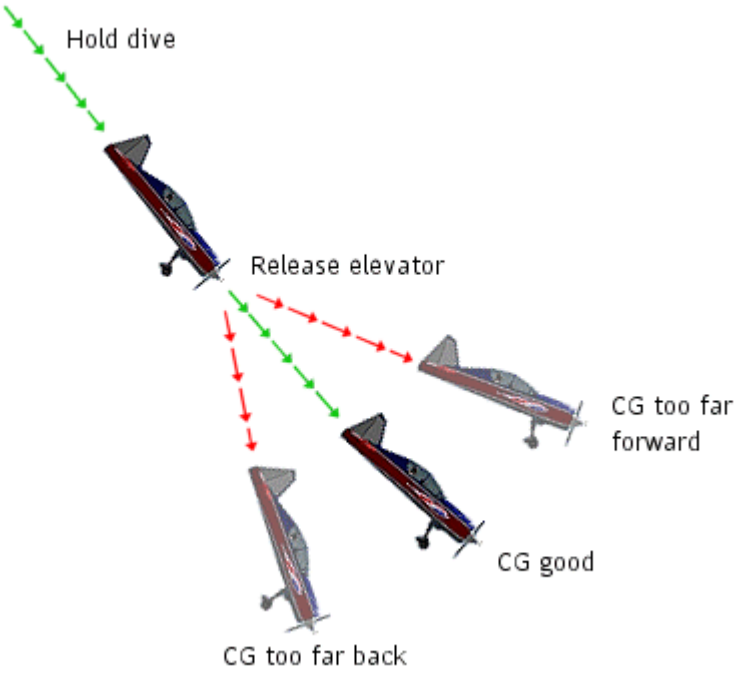
10. **Balance your props** before flight.

11. Ok, at the field, insure the receiver is bound to the TX (do a range check). Check the stick movement to insure the servos are moving in the right direction. Consider programming expo (stick sensitivity) and limiting control surface travel (Low rates is 70% of travel) in the TX initially to give you adequate control.

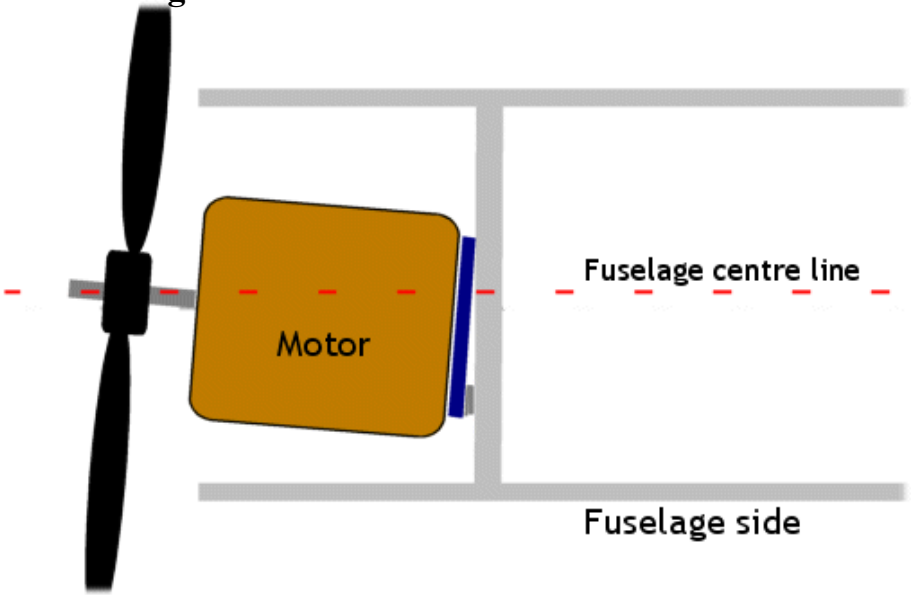
12. Once airborne, **DON'T** take you eyes off the plane. Get high to trim out the plane until it flies level. Your instructor can help you with the trim process. Land and disconnect the battery before you leave the flight line. Return to a table, remove the prop and turn on the TX and then turn on TX and connect the battery again and observe how much trim you had to make to get the plane to fly level. You can leave the trim settings, OR zero out, one at a time, the trim for each control surface and lengthen or shorten the push rods

to get the desired trim setting. This is referred to mechanically trimming the plane in lieu of doing it in the TX. Turn everything off, install the prop, return to the flight line and turn on the TX and connect the battery. Fly again and see if your adjustment allow the plane to fly level w/o any right stick inputs.

13. **Checking CG location: While High in the air**, level the plane, shut the motor, and do a dive test (45degrees). Observe how the plane pulls out of the dive.



14. **Motor Thrust Angle**

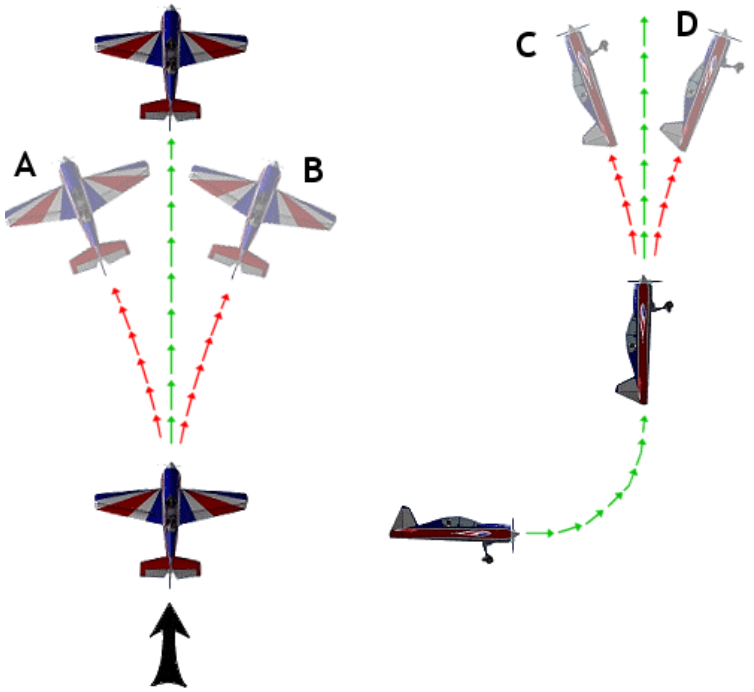



Thrust angles are factored in to an rc airplane's design where necessary. The two common types of thrust angles are **right thrust** whereby the motor is angled slightly to the right, when viewed from above, and **down thrust** whereby the motor is angled downwards slightly.

Right thrust is more common than left thrust because the majority of rc planes have anti-clockwise rotating propellers (when viewed from the front), and the combination of motor torque and prop wash spiraling around the fuselage and hitting the left side of the fin can cause an unwanted yaw and/or roll to the left when the plane is under power, so right thrust compensates for this.
Typically right thrust values amount to just two or three degrees, but the exact amount will vary from plane to plane.

To check your plane's side thrust, fly a straight and level pass at cruising speed. Apply full power and **pull up in to a vertical climb**, using rudder only to straighten the climb initially. As soon as you can, center the rudder stick and see if the plane yaws one way or another as it's climbing vertically.
If it yaws to the left, then more right thrust is needed, if it yaws to the right then there is too much right thrust. If it climbs vertically then the side thrust is OK.

To test the **down thrust you can perform the same vertical climb**; if your plane wants to pitch inwards as if starting a loop then there's not enough down thrust. If it pitches outwards then there is too much down thrust.




Above: using a vertical climb to test motor thrust angles -
**A** = insufficient right thrust
**B** = too much right thrust
**C** = insufficient down thrust
**D** = too much down thrust.

**Another simpler way** to test the down thrust is to fly the straight and level pass at about 1/2 power, then quickly apply full power. If the plane pitches up wildly then you need to increase down thrust. If the plane suddenly pitches downwards when you apply the power, the down thrust is too much. Ideally you are looking for nothing more than an increase in speed and a slight gain in altitude when you increase power, this gain being a result of the increase in lift as the airspeed increases.

## 15. Trim, trim & trim again!

The trick to trimming your rc airplane correctly, and well, is to just keep trimming it until it flies nicely and goes where you point it, without you having to fight the sticks all the time.

### In Summary:

1. Check all control surfaces move in the proper direction. It's a good idea to do this check every time you prepare to fly.
2. If you haven't flown a particular plane in a while, or changed the battery, balance the plane again.
3. Only use props that have been balanced.
4. OK, you should be ready to take off. Indicate your intentions on the flight line and taxi out on the field, note the flying direction being flown, take off into the wind.

## Have a good time flying and good luck with the landing. That's another topic for discussion.