

Flight Modes Explained by Sherman Knight

Getting Flight modes is a light bulb moment. One moment the light is off and the next it is on. All flight modes provide is a chance to significantly reduce pilot load.

The best way is to compare it a soaring bird like an eagle. An eagle goes through 5 flight modes.

1. Taking off it must do everything it can do to create lift to get off the ground and start moving forward. You see deep wing movements (flapping). With a sailplane in launch mode, the flaps and ailerons are down to create lift, Aileron differential is set to 90% or higher (no need to roll on launch), Aileron to Rudder mix may be increased so the right stick can steer the plane on tow like a boat rudder,

2. Zoom and Speed. The eagle pulls in its wings to shorten span and to fold in all its feathers used for slow speed work. It only needs to make smaller wing movements to control because of its higher speed. During launch the sailplane needs to switch from launch mode to speed mode. By flipping one switch, the flaps and ailerons move to a reflexed position (The sailplane cannot fold its wings but it can decrease drag by reflexing the trailing edge of the wing, reducing drag and allowing it to climb higher), snap flaps may be turned on so the aircraft rotates better in the dip to the zoom, additional down elevator travel may be added to help push the airplane over at the top of the zoom, Differential is switched back to 60% or so and aileron to rudder mix is seriously reduced. Because it is speed mode, the control rates may be reduced to eliminate any PIO.

3. Cruise. The eagle is moving around covering a lot of ground looking for lunch. The wings are modified for minimum sink, but not for thermaling. This is the sailplanes general setting mode. If your sailplane did not have the controls and servos to take advantage of flight modes, this would be the one mod you would fly everything in. trailing edge is set somewhere between thermal and speed. Some like to mix ailerons to flaps and set up the rates so the sailplane controls are crisp, but not crazy.

4. Thermal. The eagle wants to fly to the next county but without much effort. When the eagle encounters lift, wings are full extended, trailing edge and wing tip feathers are fully extended. The sailplane, to create extra lift cambers the trailing edge and probably puts in a couple of clicks of up trim. Control rates are probably reduced because you are often flying at distances where the sailplane may be difficult to see so flying smooth is important.

5. Landing. The eagle needs to slow quickly from 18 to 22 mph to a standstill in about 6 feet. The wing pitches up dramatically and the wing becomes a big speed brake. Sailplanes do something similar by deploying flaps, some times as much as 90 degrees. this has the same effect as a dramatically increasing angle of attack of the wing. Because speed may be slow, control rates may be boosted. A special mix is flap to

elevator so when the flaps are deployed, the aircraft does not pitch up.

Before Flight modes, the radio was covered with switches. Lots of switches and possible switch position combinations. WAY to many to keep track of in your head. So lets take an example before flight modes.

To go from cruise to thermal you did the following. 1. trim flaps down. 2. trim ailerons down. 3. Reduce aileron rate. 4. Reduce elevator rate. 5. reduce Ruder rate. 6. increase aileron to rudder mix. 7. increase aileron differential. Way too many switch positions.

With flight modes, you pre-program the radio and flip ONE switch. All five flight modes with just two three position switches. Pilot load is nearly gone. On my contest setups, only TWO switches are active. All others are inhibited.

The only downside to flight modes is figuring them out BEFORE you start programming.

Flight modes are not for everyone. but if you have a radio with the horsepower and a sailplane that is capable, you really should give them a try.

Sherman Knight
Team Horizon Hobby Sailplane