Flying in the simulator

A MSFS 2024 native hang gliding experience

Richard Sebastian

CTO NextWave Mobile Apps, LTD

Table of Contents

The Hang Gliding Files

The hang gliding files is a project of the NextWave Mobile Apps company. We are building tools, aircraft, models, whatever is necessary to fly hang gliders in the MSFS 2024 flight simulator.

Be as realistic as we possibly can.

But we also must leverage and bend to the environment that we are trying to do that in. This simulator gives us a great simulated Earth with complete geography, photogrammetry, weather and physics engine. It lets us explore this world as an Avatar. That Avatar happens to be an aircraft and all our interactions with this environment is as if we were this avatar. That makes it a flying simulator (as opposed to say a fishing simulator).

But a hang glider (flex wing types especially) does not fly or operate like any other aircraft other than they move the air and use aerodynamic physics to "fly"

Moving in the air.

Flying a weight-shift controlled glider within MSFS 2024 is not native to the simulator nor is it intuitive or natural to most simulator pilots or others that are not fluent with hang gliding flight controls.

Just getting into the air is a completely different experience to most pilots, but flying is also very different. In all other aircraft, the pilot never moves while flying. They move controls using peddles, yokes, levers to make the aircraft control surfaces move to change direction, roll, yaw, pitch up/down and change speeds. None of that applies here. In a flex wing hang glider, it's the pilot who moves and is the only method of controlling the aircraft. It is a weight shift controlled craft where the roll and pitch of the aircraft is determined by where the center of gravity is. Moving CG in any other aircraft makes that aircraft unstable in flight, and it does in a hang glider as well. That instability is what allows it to work. Constantly changing CG. But it also has a flexible wing! The wing flexes, changes shape, angle of attack, twist, billow with each CG change that both help with control as well as naturally stabilizing the aircraft at the same time. In a perfectly centered CG condition (no pilot movement), the glider itself will return to stable flight – straight and level. That is its natural flying state and the glider planform itself will always be trying to center itself. The two forces together (unstable CG movement) + (self-correcting flight stability of the wing) = controlled flight.

First person reality

Flying hang gliders (weight shift) is a physical experience unlike normal flying which is more about planning, navigation, knowledge and is hand-eye mental calculation. We add that 1st person element by manipulating cameras (First person POV) and using a game controller for the average gamer to experience it. Pilots flying in VR or using head trackers do not need this feature.

Flying a foot launched glider in the simulator is more like a first person shooter video game than a traditional flight simulator.

Entering the simulator

You must get into the simulator somewhere to start. You only have 2 native choices:

At an airport

You can search using multiple ways to find an airport to start with. Really does not matter unless that is where you want to start towing from. But even if you are going to fly from some mountain, or dune, or wherever you choose, you will have to start at some airport.

In Mid-air

This is by far the simplest way to start flying! You can choose any location (**other than an airport**) by simply clicking on that location in the world map. The simulator will just plop your glider there mid-air at a pre-determined AGL of your

choice (setup). You will start with zero air speed and zero acceleration, so you will dive immediately! Just fly out of the dive, and there you are: FLYING. For this type of flying, the entire rest of this document is not necessarily for you, but we encourage you to read on and see what else your glider can do.

Teleportation

Unless you have installed custom hang glider airports and then started at that airport, you will need to move your glider to a launch site after entering the simulator. This is done using the EFG application we provide (see EFB Documentation). This will simply put the glider onto any known hill, mountain, ski area, beach, even airports, ready to start flying.

But here is the trick. You need to get your glider to launchable position, facing into the wind to be able to foot-launch a glider. This is not like taking off from a runway, there is no runway. There is no motor or tow vehicle. Just you and your feet.

To do this: YOU **NEED TO MOVE ON THE GROUND**.

All controls will be shown mapped from standard events to controller keys.

Mapping these simulator events to your specific controller is up to you. We provide this controller mapping as part of the basic product.

Human based flight controls

There is no cockpit. There is no instrument panel. There is just you (the pilot) out in the open air with nothing else around you (other than the control bar). The visual experience of hang gliding is very much first person point of view. What you see and how you see it defines the entire experience. That makes hang gliding one of the best VR experiences. We support using VR and encourage it, but we also want to create the widest possible audience to experience this first person experience. That comes down to cameras.

Understanding how to use the camera controls is very important for pilots to learn and use to enhance their hang gliding flying experience.

Camera Styles

MSFS 2024 has a fixed infrastructure of cameras and camera use. You can use them all normally in the hang glider, but we have modified it and added to it. See MSFS 2024 instructions on how to manage cameras in general. This discussion will only be about what we have modified or that we recommend that you use while flying and/or using the instruments, VG or other interactions with the glider.

Avatar mode

Button	Description	Sim Event
 	This button combination will toggle you into and out of Avatar mode.	**TAKE CONTROLL OF CHARACTER**

You can get out of and back into the glider anytime you are **on the ground**. This is called the avatar mode. In avatar mode, you can walk around (anywhere) and check out the site, check out gliders. You can even do a pre-flight of the glider before flying! Very fun.

While ready for tow

If you go into Avatar mode while connected to a tow plane, the glider will remain attached to the towplane while you are out walking around. Getting back into the glider puts you back in the harness, ready to tow.

While ready for foot-launch

If you go into Avatar mode in any state other than towing, you will be put into the Set Down mode (glider is basically stable). This means that it won't get blown around and move while your are not in it.

Cockpit view

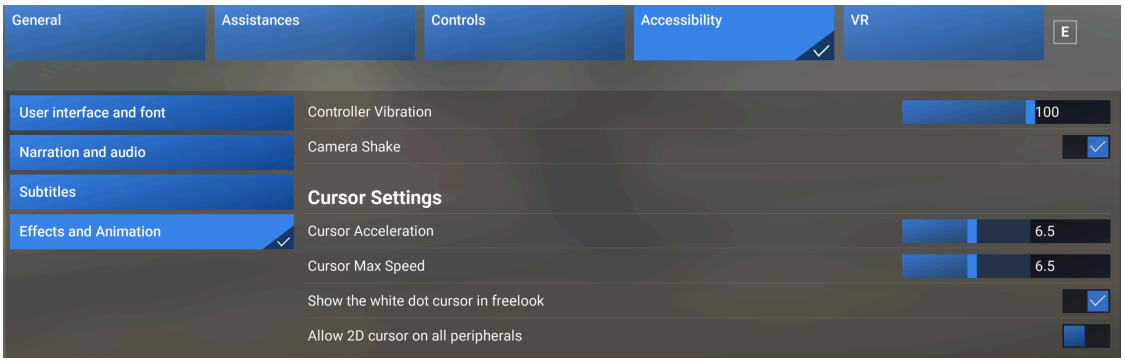
This is the normal first person view from inside the aircraft. It is built to be a fixed camera to depict the seated pilot looking at and around the cockpit. You can look around the cockpit if you want to, but most pilots do not as it not that important to flying. Those that do value looking around can control that feature here by using a head tracking system or VR mode to move where this camera is pointing. To look around, in other words.

In flying a hang glider, you **NEED** to look around. It is part of both the experience and necessary to flying the aircraft effectively.

In this mode:

- The pilot POV does not move. The camera position is fixed.
- The camera can point from this position in any direction.
- The camera position can always be re-centered to its original position.

We like to have this setting turned ON as it helps in locating where the freelook cursor is to help you locate items to be selected when you are looking around at things.



SHOW THE WHITE DOT CURSOR IN FREELOCK

When you are in this mode:

- You can look around in any direction using the right controller joystick
- You can look at things in the control bar and activate or change them
    - You can operate the VG rope
    - You can toggle wheels on/off
    - You can release from Tow.
    - You can call for a Tow.
    - You can turn the HUD gauge on/off
- You can look at the vario keypad and operate any keys
    - See variometer documentation for all button uses
    - You can change where the vario is located.
- You can look at the wind tell-tail and turn it on/off
- You can turn wheels on/off
- You can turn Points of Interest on/off.
- You can turn aircraft tags on/off.

NOTE: You can do many of these things using specific controller buttons that can control things like FLAPS or GEAR or CALL FOR TOW or RELEASE FROM TOW. But not all (most) of them have events that can be mapped to controller buttons. You need to LOOK at them, HIGHLIGHT them, and then ACTIVATE them using the freelook cursor.

Moving pilot point of view

This is a new camera mode only available to hang gliders. It is the movable pilot point of view. When you are in this mode, the camera automatically moves with the pilot as the pilot makes control movements (weight shift). This does not happen in the standard cockpit view. In this view, you cannot look around or interact with instruments or control bar buttons. This would be your normal flying camera until you need to look around or use buttons. This view also remembers where you last looked in cockpit mode. If you were looking to your left and then switch to moving pilot mode, the moving pilot mode stay looking to the left until you switch back to cockpit mode and change where you are looking or you re-center your view.

External Views

Sometimes when you are flying or on launch, you may want to go into the external view. This is great for times you may want to fly *out of body*. You still have complete control over the aircraft, but you are watching the aircraft from outside of the glider. Also great for pictures and video recording.

Flying Camera Button Mappings

The following is all the controller button mappings you need to know to control the hang glider cameras.

Switching Camera Modes

This is the MOST IMPORTANT controller button you need to understand and use while flying

Button	Description	Sim Event
	This button will toggle between cockpit mode and moving pilot mode	**TOGGLE VARIOMETER SWITCH**

Resetting camera view

Got yourself into a bad camera state and need to be back to normal, like right now?

Button	Description	Sim Event
	This button will reset the camera view no matter what your current active view state is	**CAMERA RESET VR CAMERA RESET**

Pilot Pose position camera modes

This is physical simulation as well as flight simulation. We must move the camera eye position regardless of what **Camera Mode** we are in. This is because the pilot himself is changing is pose depending on what he/she is doing at any given time. These are also visual cue to you as to what state your pilot/glider is in.

IN FLIGHT

These are the pilot poses you can be in while flying.

Button	Description	POSE
<No Button>	This is the standard flying pose whenever you are flying normally. This pose is automatically set when no other overriding pose exists. It is automatic in all tow states as well.	**PRONE**
	This button will put the pilot into the Upright position. Ready for landing. **SPOILERS UP is the event this is connected to**	**UPRIGHT**
	This button will put the pilot into the prone position. Normal flight mode. **SPOILERS DOWN is the event this is connected to**	**PRONE**

ON GROUND

These are the pilot poses that you can be in while on the ground

Button	Description	POSE
	This button will toggle your camera view. It will first go into the Set Down Cockpit view, then Set Down pilot point of view, Reset the camera to re-start the cycle. See the ground handling documentation to see how this affects how you can move.	**SET DOWN**
	This button will toggle your camera view. It will first go into the Pickup Cockpit view, then Pickup pilot point of view, Reset the camera to re-start the cycle. See the ground handling documentation to see how this affects how you can move.	**PICKUP**

Button	Description	POSE
	This button is the same as the Pickup Cockpit view and can be used at any time on the ground. IF YOU ARE NOT POINTED INTO THE WIND – you will get an error message. **Do not use this pose until you are ready to launch.** See the ground handling documentation to see how this affects how you can move.	**LAUNCH MODE**

Cockpit/Freelook mode

When you are in cockpit mode, you are also in freelook mode. That means you can look around (in any direction) and can look specifically at interactive components on the glider and then interact with that component using the controller.

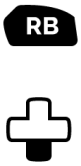
Interactive Components:

- Variometer/Flight Computer
- Variometer position elements
- Variable Geometry rope
- Wind indicator
- Control Bar buttons

NOTE: See documentation for each of these elements to get detailed information about each.

If you do not see reactions to the following controller actions, it will be because you are NOT IN COCKPIT VIEW MODE.

Button	Description	CAMERA
	This controller joystick will control where the camera is pointed at while in the cockpit mode. You can look around while still controlling the aircraft (that would be the L joystick). If your camera gets near to	**LOOK AROUND**

Button	Description	CAMERA
	any interactive object, you will see the freelook cursor (a white dot). That indicates precisely where you are looking. When positioned over an interactive object that object will turn BLUE.	
	This button combination changes your camera zoom level by zooming closer to what you are looking at	**ZOOM IN**
	This button combination changes your camera zoom level by zooming farther away from what you are looking at	**ZOOM OUT**
	This button will activate whatever is being highlighted.	**SELECT/ACTION**
	This button will toggle between cockpit view and external view.	**TOGGLE EXTERNAL VIEW**
		**ZOOM EXTERNAL VIEW**
		**UNZOOM EXTERNAL VIEW**
	This button combination will toggle between cockpit view (**looking around**) and freelook view (**move the camera**	**TOGGLE INSTRUMENT VIEW FREELOOK**

Button	Description	CAMERA
	around). Really cool for pictures and videos	

The Flying Experience

Lets go through a typical hang gliding flying experience in the simulator. This will be going for the most realistic version of a flight, but you can of course skip any part of it if you like.

Before takeoff

You will always start visually, in the glider, prone and behind a tow plane on some runway, somewhere. At this point, you are ready to go flying (if you want to tow)

You can choose to go to any site on the planet. (**use the EFB app to find a site**)

If you choose to go to a flying site, you probably will be doing a foot launch. It is best to get out of the aircraft (use Avatar mode) and walk around the site and look for the best possible launch for today's weather and wind conditions. (**You should always use real-weather settings**). You might want to collaborate with other pilots (**flying multiplayer**) about what today's best options are. You can choose a task (**find nearest task in vario, if any**) or just declare a goal on the vario. Once everyone agrees (*or just you*), you need to maneuver the glider to any launch point (facing the wind) and off you go.

If you go to a site that supports towing (must be an airport and some custom sites are defined as airports), you can then call for a tow plane and off you go!

Using Launch Mode

Any time you switch to launch mode when on the ground, we interpret that to be your wish to start a new flight, and all prior flight information is erased and prepared for a new flight.

After takeoff

You run off the hill, dune, mountain or cliff using the launch mode. You will be automatically in the Pilot point of view mode. The camera will move with your controller actions. You can switch to Cockpit view and back as you wish.

Automatic takeoff recognition

The HUD system will automatically recognize when you have launched (in any manner) and begin tracking your flight. You start out visually in the PICKUP state while running and then move to the UPRIGHT flying state once you are airborne.

Automatic Upright/Prone recognition

The HUD system will then automatically put you into the prone (normal) flying position once you reach a safe altitude above the ground (you are not likely to have to land or crash). If you have spoilers on (for any reason), this will not happen and you will remain in the upright visual position. This is how you know you have spoilers on (**they affect glide performance**).

In flight

Once you are up and flying, everything visual is meant to help you stay up and make goal (if that is what you are doing). To do this, you need to control the glider and its functions. You need to look around at your surroundings and make judgments about what to do next. You need to interact with variometer from time to time to get information. And sometimes, you just need to know what is happening around in the ambient world (you are exposed to the elements).

Sound is the most basic thing you will notice in flight

You are not in a cockpit! You will always hear the wind, and it is clue to your air speed. You will also hear outside noises, like aircraft or even wildlife (birds, etc.). It is virtually impossible to recognize if you are going up or down (vertically) using just vision. You need to listen to the variometer chirps to give you these cues. These 2 elements give you most of what you need to fly and soar, thus allowing you to concentrate on what you see outside the aircraft. By looking around!

VG changes

You can control the variable geometry of your aircraft! Physically change performance while you are flying. (see HUD gauge documentation for details). You can look over at your VG gauge to see your current setting, and you can change that setting by looking at and selecting the VG rope using camera FREELOOK mechanism. Or you can use controller button keys mapped to FLAPS.

Spoiler changes

You can control your rate of descent by changing your flying position from Upright/Prone at any time.

Gear changes

You can control if your feet are out of the harness or inside the harness at any time (affects drag) by using the controller buttons mapped to GEAR POSITION. Visually, you will only see this condition when looking at the aircraft from the EXTERNAL mode.

Using Slew while flying

You are free to use the slew mode at any time while flying, but it has consequences! Since we **allow you to use slew mode as a means of launching**, it is always interpreted as a new launch. That means using slew mode during a flight will erase all prior flight data and tracking and start a new flight. If you don’t care, you don’t care. If you do care, don’t use slew.

Visually seeing ambient wind direction

The most important visual information you can get ambiently while flying is knowing the wind direction. You need to know this to launch, land or soar. So basically, all the time.

In real-life situations, you can get this information only by seeing wind effects on the ground or on water and other cues. But that level of detail is not implemented in the simulator as powered aircraft flying or even sailplane gliding does not require this feature.
We had to improvise: You can get visual ambient wind information on your HUD display on the control base bar. This control is meant to show you information that you can see/feel in person, without instrumentation. There is a lot of information on this display. See HUD guidelines documentation for details.
You can also get wind direction from windsocks when present, but most of your flight they will not.

Using the Variometer/Flight Computer

There is a LOT of information you can get visually from your variometer/flight computer during your flight. To fully understand what you can do with this instrument, see the Variometer/Flight computer documentation.

Moving the variometer position

Visually, you may not like where or how the variometer is positioned on the control frame. Everybody has a different preference. Left, right, center and tilted in or out.

You can modify this at any time just by looking interactive areas around the variometer and activating them. The left and right Velcro attachments. The control bracket tightens knob, and the control bracket extension.

Activating the variometer buttons

To use the variometer, you will need to change screens, change settings, choose tasks, among other things. To do this, you will need to be able to push the buttons on the vario. To understand what all the screens and buttons do, you will need to read the Variometer documentation. What we are concerned with here is just selecting and activating button.

All the screens and buttons in the vario can be operated on a PC using your mouse. But pilots flying using a console and game controller or PC pilots using a game controller need to do something else.
Again. All you need to do is look at the buttons (in cockpit view) to the point where the button is highlighted and activate the button. All those button controls are defined in this document.

Turning the vario on/off

You even have the option to turn the vario off completely. No sound, nothing. Or turn it back on. Just using look, highlight and activate methods.

Using the HUD

The HUD is basically all the control(s) found on the control frame. These are buttons (8) that are configured for different actions. See the HUD documentation for a description of each and how they are used. These can be activated using a mouse or the game controller as described here.

Landing

Landing a hang glider is relatively easy but you must always land into the wind to do so safely. The glider will do a few things for you automatically as you approach the ground for landing.

Automatic Approach to landing state

Once you get within approach height (AGL) of the ground, the glider will automatically put itself into the upright pilot position. You may see this happening if you fly too close to the terrain.

Automatic Gear Down state

Once you get within landing height (AGL) of the ground, you landing gear will automatically be deployed (your feet). This does not happen if you have wheels on.

Automatic Flair State

Also, once you are within landing height (AGL) of the ground, your pitch sensitivity is greatly increased. You will be able to push the nose of the glider to near vertical with full elevator make the glider stall almost instantly.

Flying Again!

It is not uncommon in real-life hang glider flying to land back on top of the launch site and then launch again. Or perhaps your tow was not so good, and you want to try again. Whatever the reason, we support re-launching in all the tracking software that is watching and tracking your flights.
On the ground, ground handling takes over again. Just walk to the nearest launch and launch again. Or, you can walk to the nearest runway, center the glider and call for a new tow.

This is not normal for sailplane type gliders, but it is normal for all other aircraft.

Post Flight analysis

After every flight, you can use the vario to do some post flight reviews.

We keep a gamer score for your flight, and each flight will generate a “score”.

We keep track of crashes and damages that you can review if you like.

We have a built in IGC compliant flight recorder that will create a file you can upload to your favorite flight tracking website and see your entire flight in 3D.

We have built in task scoring and management so that you can track how you did against others in flying common tasks.

You can use our EFB apps to post your latest flight updates to our website that will track longest flights, best scores, site records, etc. If you want to, but certainly not mandatory or automatic.

Future

The future? The future isn’t here yet! Well, it is. We can’t wait to see what is next.

How to help

Join our Patreon and help us continue this journey. Patreon is where you will find all of our 2025 products and services. For MSFS 2020 type products you can find them on flightsim.to

Become a Patreon: Patreon Membership

See what The Hang Gliding Files is all about: The Hang Gliding Files

Watch our YouTube channel: YouTube Channel

Chat with other pilots, organize flights: Virtual Reality Hang Gliding Discord