Condor 2 Manual

by Condor Soaring

1. User Guide

Updated for Condor 2.1.7

We thank you for joining the Condor community and wish you many hours of enjoyment with Condor 2.

Condor Team

2. How to install and reinstall Condor 2

This section covers getting Condor properly installed and configured on your computer

2.1. Computer specification

PC

To install and run Condor you will need

- Windows 7, 8 or 10
- Intel i3, i5, i7 CPU or equivalent.
- 5.5 GB of free space on hard drive or SSD
- A dedicated graphics card with 1 GB memory. The graphics card should have benchmark (www.videocardbenchmark.net(http://www.videocardbenchmark.net/)) result of 1000 minimum, 4000 is very good and 8000 perfect.
  (Integrated graphics cards and cards with benchmark result below 1000 are usable, but with severely reduced graphics settings)
- Internet connection required for activation

Apple Mac

To install and run Condor you will need

- Windows 7, 8 or 10 running in Bootcamp*
- Intel i3, i5, i7 CPU or equivalent.
- 5.5 GB of free space on hard drive or SSD
- A dedicated graphics card with 1 GB memory. The graphics card should have benchmark (www.videocardbenchmark.net(http://www.videocardbenchmark.net/)) result of 1000 minimum, 4000 is very good and 8000 perfect.
  (Integrated graphics cards and cards with benchmark result below 1000 are usable, but with severely reduced graphics settings)
- Internet connection required for activation

** Note: Our understanding is that Directx11 uses direct GPU register access and this is not possible under emulators or virtual machines. The only way is Bootcamp. In future the developers of solutions such as Virtual box, or Wine, etc., may find a way round this. If you have success with different solutions on Mac, please let us know by putting in a support form so we can pass the information on to other users.*

Controls

To be able to fly in Condor, you do not need a joystick. The glider can be controlled using mouse or keyboard. However we do strongly suggest that you should use at least a joystick with a twist rudder support. For the ultimate experience we recommend using rudder pedals and a joystick with force feedback.

Since Condor supports multiple input devices, you can create real analogous controls for all glider controls.

2.2. How to download and install on your computer

To get your copy of Condor 2, go to the Buy page on our website www.condorsoaring.com. The buy link takes you to Share-It who do the distribution for us.

When you have entered all your details and paid, you will receive an email from them with your download link and license key.

Save the license key in a safe place, you will need it later.

Download the software from the link. When it’s completed, we strongly suggest you make a backup copy of it on a CD or USB stick. Also make a text file on your backup with your license key. This is most important because computers do fail and it’s important not to lose the installer or your license key.

To do the installation, run the setup program you downloaded. When it is complete, Start condor and follow the instructions in the next section.

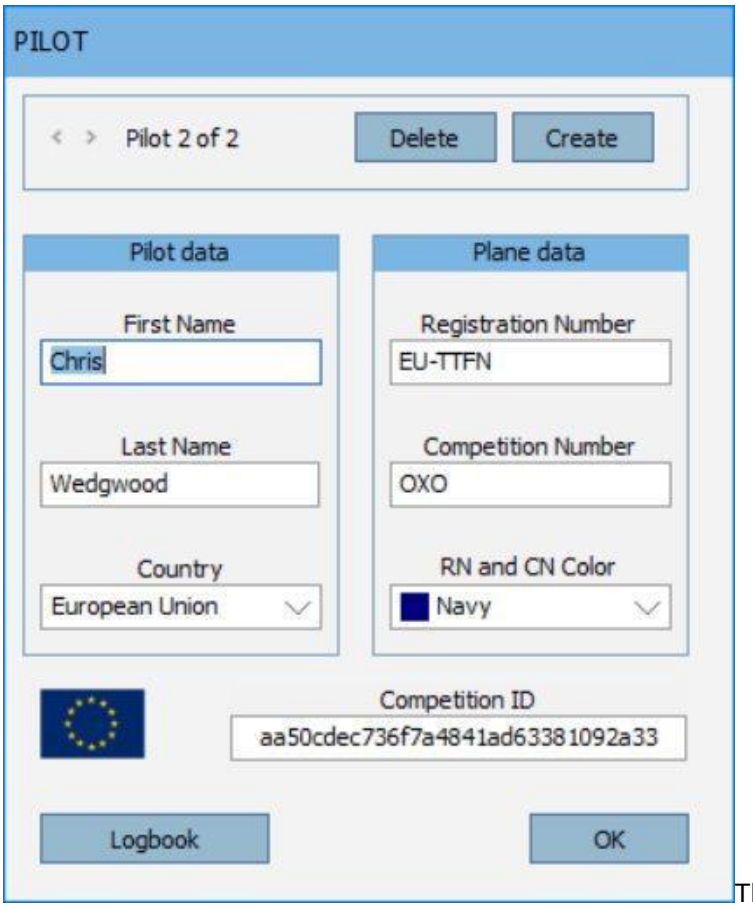
Keep updated!

The Condor Team will release updates to Condor from time to time. These updates will fix bugs and add additional features to Condor. If there is an update it will usually be announced on the News page of the website and on the official Condor forums.

The update files are provided on the download page which you can

find here(http://www.condorsoaring.com/downloads-2/)
. While updates are not required to play Condor, you may not be able to join online races if you don't have the latest version installed.

2.3. First actions



The first time you run Condor, you will be prompted to enter data for a new pilot.

The pilot's name will be used in multiplayer, replays and flight tracks. Registration number appears on plane's fuselage and on the lower side of the left wing. Competition number along with country flag appears on the plane's vertical stabilizer.

When you click OK, you enter the main menu.

On first run you must register your copy of Condor by clicking REGISTRATION and entering your License Key. Keep your License Key safe in a secure place in case you should reinstall Condor later.

The next thing you should do is setup your hardware. Every pilot has his own settings. When you press SETUP button, you can alter settings for the current pilot.

2.4. Adding more planes

Condor 2 is supplied with 7 gliders of varying types. This is enough for the new pilots to learn soaring and also for the ambitious pilots to enjoy the thrills of competition soaring.

Of course, the default selection of planes is not enough to satisfy all pilots. Some would like to fly their favorite

real life glider, some would like to try out the hottest new ships for the fraction of their real life cost and also some would like to experience the early days of soaring with an old, wooden glider.

We are therefore periodically releasing new types of gliders. Initially these will be at monthly intervals, and we have a schedule to cover the first 12 months after release of Condor 2.

The selection of planes will be mostly based on their popularity and user demand. Users can express their wishes at our planes forum or even try to create the 3D model of their favorite glider which can then be finished by us and included in one of the plane packs.

Why no 3rd party planes for Condor?

Condor uses an advanced flight dynamics model which demands a lot of accurate input data for every plane. To assure realistic flight characteristics of the planes, the data must meet our quality standards and must be critically reviewed and adapted to our flight model. We are convinced this can only be achieved by having a thorough understanding of the internals of Condor's physics model.

That's why we have decided not to allow the development of 3rd party planes for Condor. It would result in potentially nice looking gliders but with unrealistic and uncomparable flight characteristics which would ruin the soul of Condor which is fair, realistic simulation of competition soaring.

We have, however, given users the possibility to design the 3D models of the gliders they would like to see in Condor. With some knowledge of 3D modeling, with our cooperation and feedback, it is possible to build the glider to the phase where we take it over and finish it. We add pilot animations, moving surface animations, instrument panel gauges, textures, flight model and, if required, custom sounds. The plane then goes to testing to our beta team and when all errors are fixed, it's ready to be released in one of the plane packs.

Installing and activating planes

After you purchase the plane, download the latest Hangar Update from the download page(http://www.condorsoaring.com/downloads-2/)
if you have not already done so. Please shut down Condor before installation. When the installation is done, you can activate the plane in Condor by pressing the Activate button in the HANGAR tab of the flight planner and entering your plane pack license key that you got during the ordering process. Please make sure you are connected to the internet as the validity of the key is checked online at our servers.

2.5. Installing extra landscapes

It is possible to add additional sceneries to Condor. Maybe your favorite soaring area or even your home airfield has already been made. These sceneries can be downloaded from various sources. Additional sceneries are not made by the Condor team nor are they checked by us, so quality may vary.

Some sceneries are provided as installers. This should make adding them to Condor easy. However some come in the form of archives*. This can be a single archive or a set of ".7z" files. To add these to Condor, place the downloaded file in "C:\Condor\Landscapes". If the scenery consists of multiple files, place them all in the Landscapes folder. Then right click the file (or the first file in case of multiple files) and select extract. Once the process has finished the scenery should now be available in the flight planner window.

If your new scenery does not show up in the list, please check that the file structure is correct. The most common error is that the file structure looks like this: "C:\Condor\Landscapes\SceneryName\SceneryName".

* *If you make a scenery for Condor and you provide it as an archive, please make sure that they extract correctly if a user follows these instructions. We recommend to provide an installer.*

2.6. Moving your Condor installation

Copies

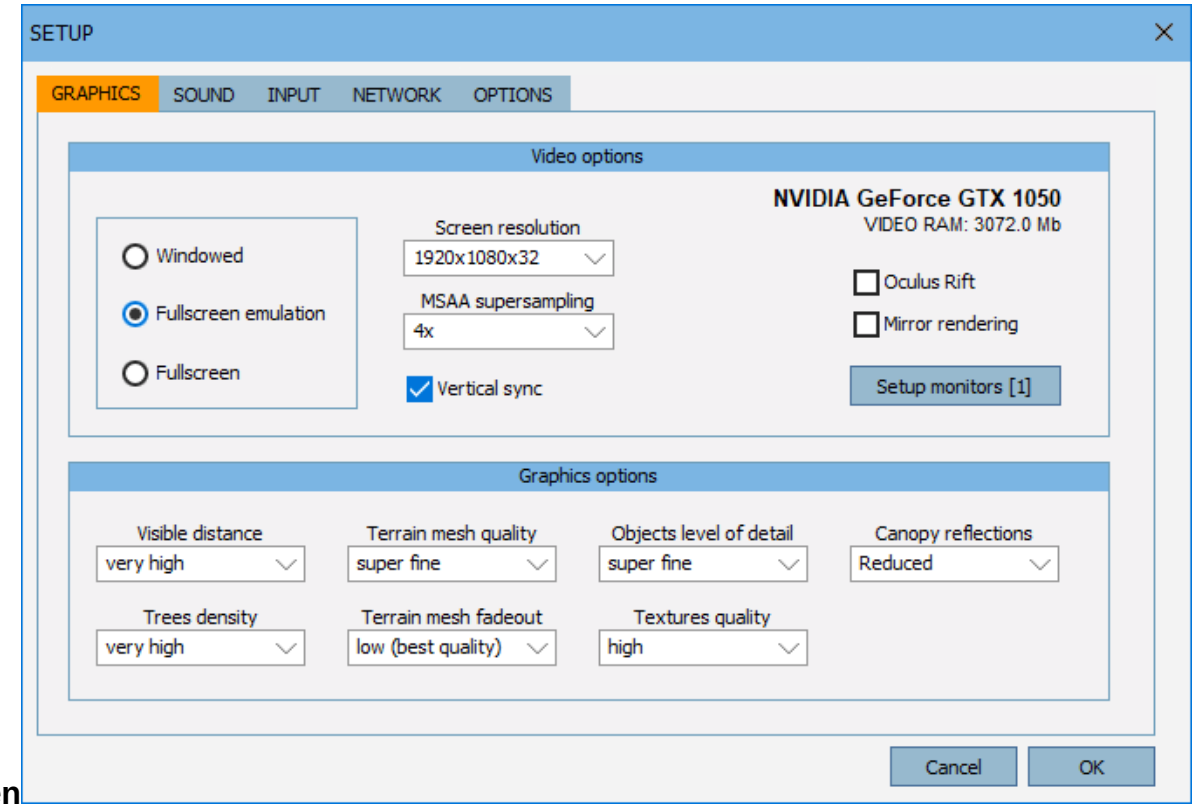
We allow you to install Condor 2 on two Computers. You are not allowed to run both at the same time. This is to let you to have one on your pc at home, and another on laptop while travelling, or away at school etc.

New PC

When you get a new computer and want to move your Condor installation to it, first install Condor and check everything is working. Then copy your Condor/Pilots folder and Documents/Condor folders to the new pc, putting them in the correct locations. Finally, uninstall Condor from your old PC.

3. Configure Condor for your system and preferences

3.1. Setting graphics options



Fullscreen

Fullscreen graphics mode.

Fullscreen emulation

As Fullscreen, but allows Alt-Tab between running apps.

Windowed

With windowed mode you can set the dimensions of Condor window.

Oculus Rift

Configure Condor to drive an Oculus Rift or similar compatible VR headset. Please see the VR section for more details.

Mirror rendering

Displays the VR headset display on the PC monitor.

Setup Monitors

Configure condor to run on multiple displays with adjustable direction offsets.

Screen resolution

Select in-game screen resolution. Higher resolutions require better graphic card but not higher CPU power. Only 32 bit color is supported so make sure you use 32 bit color for your desktop if you run Condor in windowed mode.

MSAA supersampling

Multisample antialiasing to reduce the appearance of jagged edges on the display. Setting higher values takes more GPU power so find a setting which works well for your pc configuration.

Vertical sync

When using fullscreen mode, you can synchronize game refresh rate with monitor refresh rate. Use this option only if your game refresh rate is higher than monitor refresh rate.

Visible distance

Select visible distance. Higher values require more CPU power. Medium option is recommended for most systems.

Trees density

Select density of trees. Higher values require more CPU power. Medium option is recommended for most systems.

Terrain mesh quality

Choose geometric quality of the terrain. Super fine is recommended for most systems. Choose lower quality only if you have an old graphics card (GeForce 2 or lower)

Terrain mesh fadeout

Choose how the terrain mesh quality degrades with distance. Low (best) is recommended for most systems. Choose higher fadeout only if you have an old graphics card (GeForce 2 or lower).

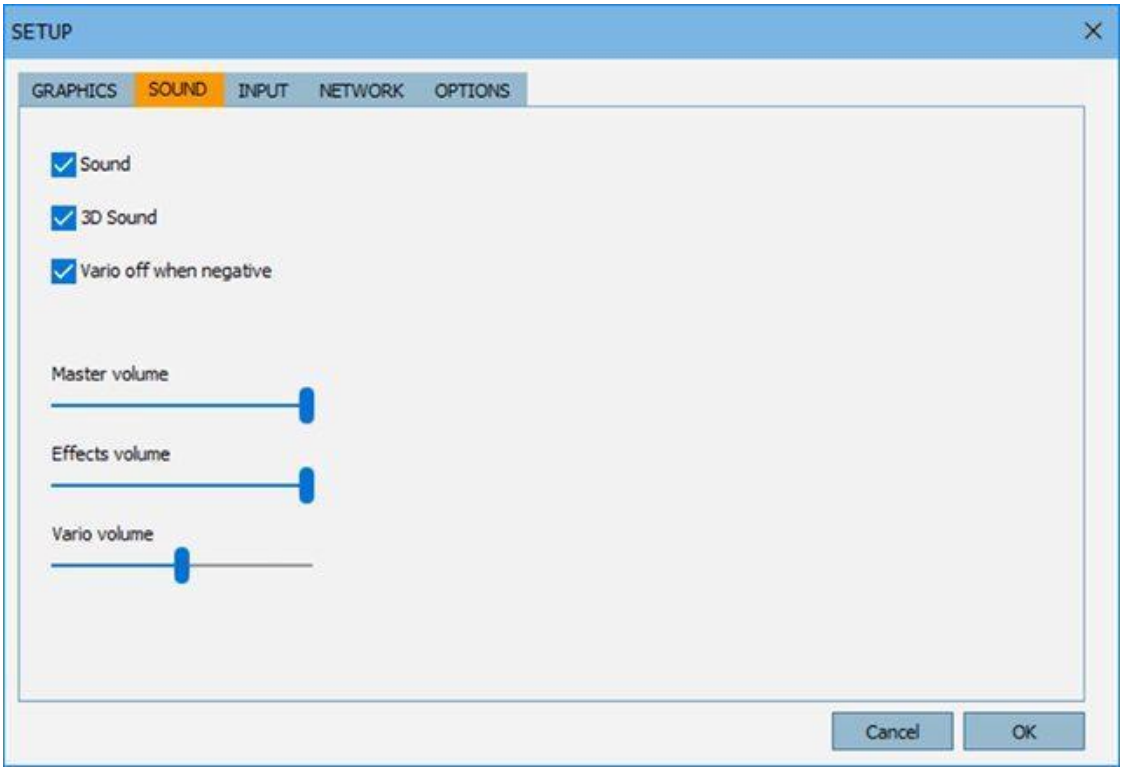
Objects level of detail

Choose how the level of detail of objects (planes etc.) degrades with distance.

Canopy reflections

Simulates reflections on the canopy surface in the cockpit.

3.2. Setting up the sounds



Sound

Toggle in game sound (useful for debugging)

3D Sound

Toggle in game 3D sound (useful for debugging)

Vario off when negative

Variometer beeps only in lift

Master volume

Affects volume of all sounds in the game

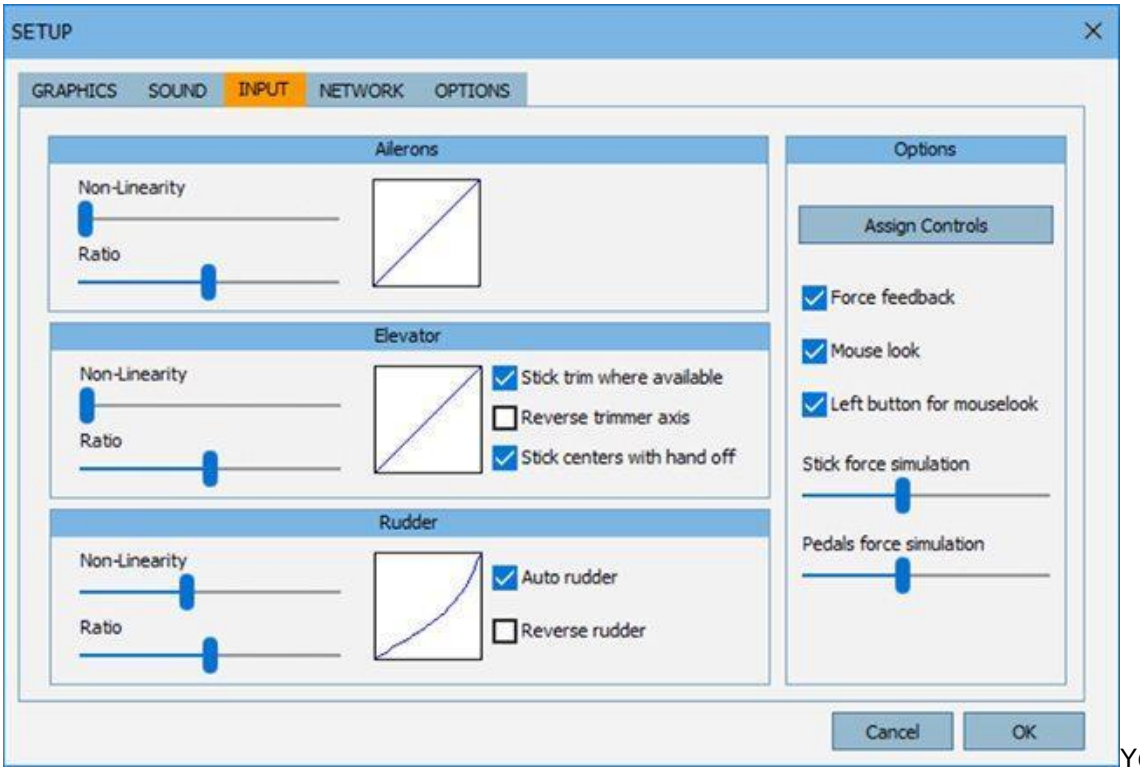
Effects volume

Affects in-game effects volume

Vario volume

Affects variometer volume (can also be adjusted in game)

3.3. Setting the control inputs



You can choose non-linearity and ratio for all three plane axes. The graph on the right shows the input device to control surface mapping when you move the sliders.

Non-linearity

Higher values produce less responsive commands in the center of your device, however maximum deflections remain the same.

Ratio

Higher values produce more responsive commands, but saturate before you reach maximum deflection. Lower values produce less responsive commands and also lower maximum deflections.

Stick trim where available

Check this option to simulate normal trimmer on planes with stick trimming.

Reverse trimmer axis

Reverse the trimmer axis.

Stick centers with hand off

Pilot stick is centered because of airflow when the right hand is not holding it, for example when dropping water or raising gear.

Auto rudder

Enable automatic rudder.

Reverse rudder

Reverse the rudder axis.

Force feedback

Recommended for force feedback devices. Has no effect when using non-force feedback devices.

Mouselook

Used to control cameras with mouse. You should disable this option or enable “left button for mouselook” when using mouse to control the pilot stick.

Left button for mouselook

You will have to press left mouse button to control cameras with mouse. Use this option when using mouse to control the pilot stick.

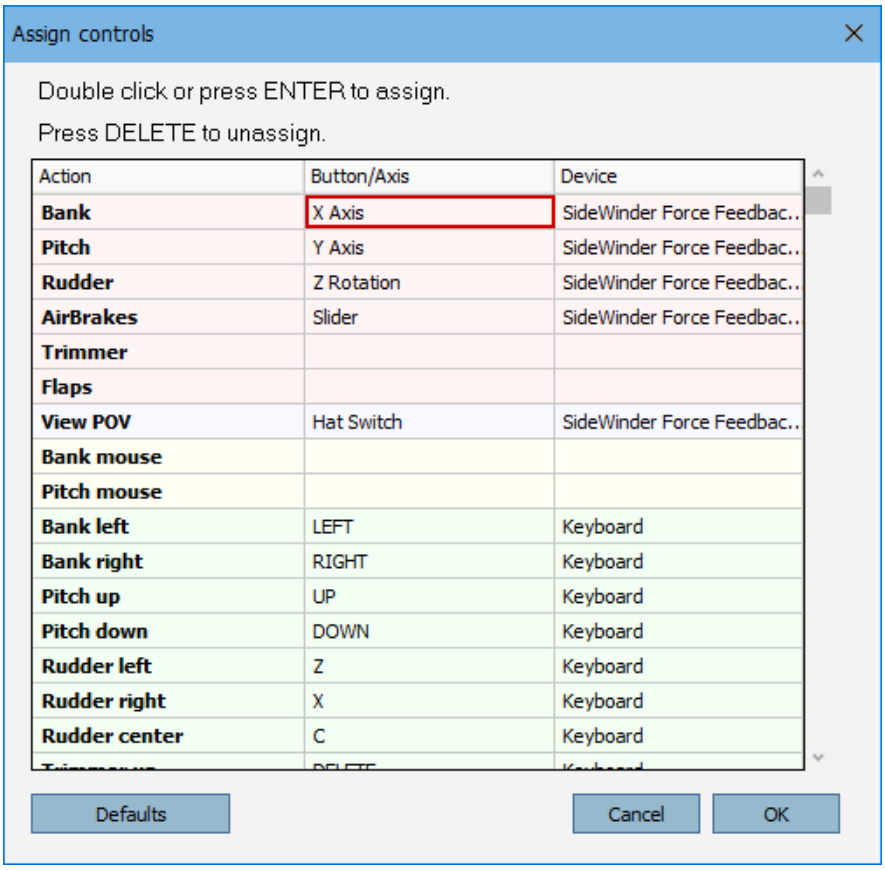
Stick force simulation

With this option Condor can use lag in command response to simulate pilot stick forces. Higher values produce more lag. Lag also increases with plane speed. This option can also be used to smooth out jerky input of some joysticks.

Pedals force simulation

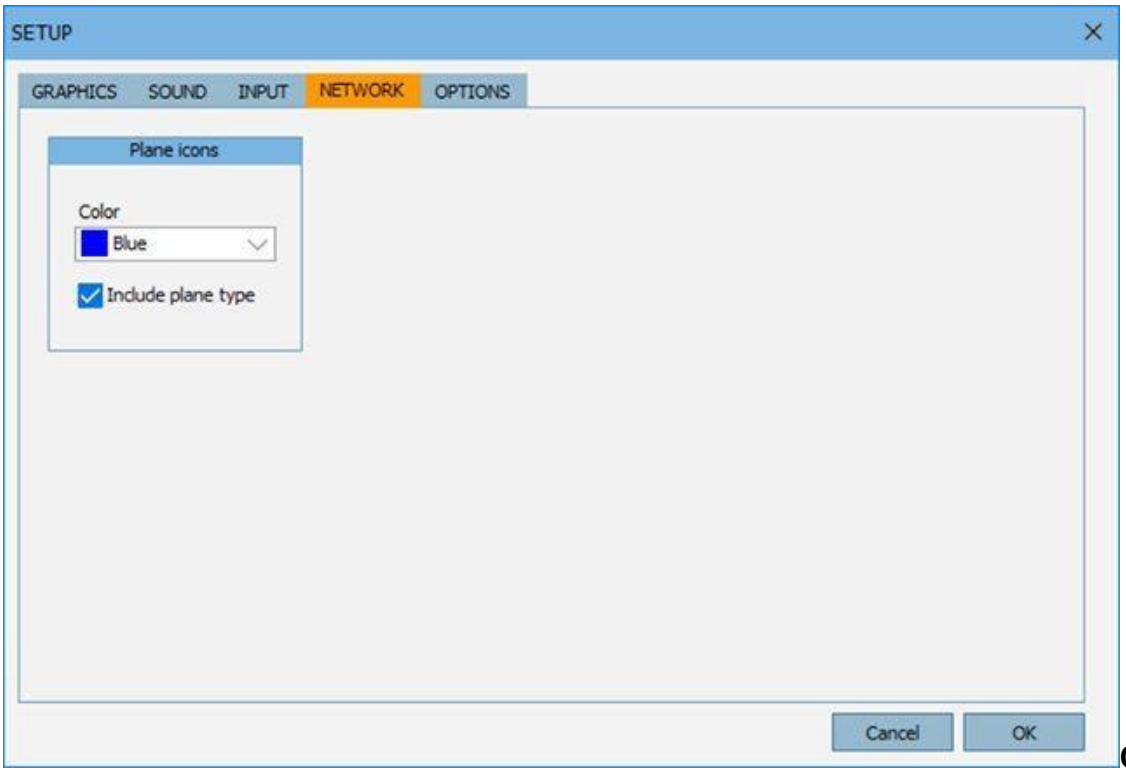
Analog to stick force simulation.

Assign controls



Pressing this button allows you to reassign every control in Condor from default buttons/axes to your custom buttons/axes.

3.4. Set network options



Color

You can select a color for plane icons. Plane icon is textual information of the plane that is shown in game along with the plane.

Include plane type

Include plane type in plane icon text

3.5. Using VR devices

Since version 2.0.5, Condor 2 supports the use of VR headset devices. We have started with the most common type, Oculus Rift, and other devices are possible by using compatibility apps downloaded from the internet.

Oculus Rift

Before getting a Rift, it is important to check that your computer is sufficiently powerful to use it. The Oculus website has a system check tool to perform that for you. Go to https://www.oculus.com/(https://www.oculus.com/)

Using Rift with Condor is easy. Get your Rift setup correctly with the Rift sensors and position yourself at the correct height etc.

Then start Condor and tick the Oculus Rift checkbox in Setup.

HTC Vive

Similarly, the Rift website has a system check app. Go to https://www.vive.com(https://www.vive.com)

To use Vive with Condor you must use the Revive compatability layer app available

from https://github.com/LibreVR/Revive(https://github.com/LibreVR/Revive)

Installation steps:

- Install SteamVR (which Vive users will have anyway)
- Install Oculus Home without doing initial setup
- Install Revive
- Install Condor and copy the content of Revive\Revive folder into Condor folder (x86 and x64 Revive injectors and their related folders)

The first three steps are the usual Revive install routine, unrelated to Condor.

To run Condor 2:

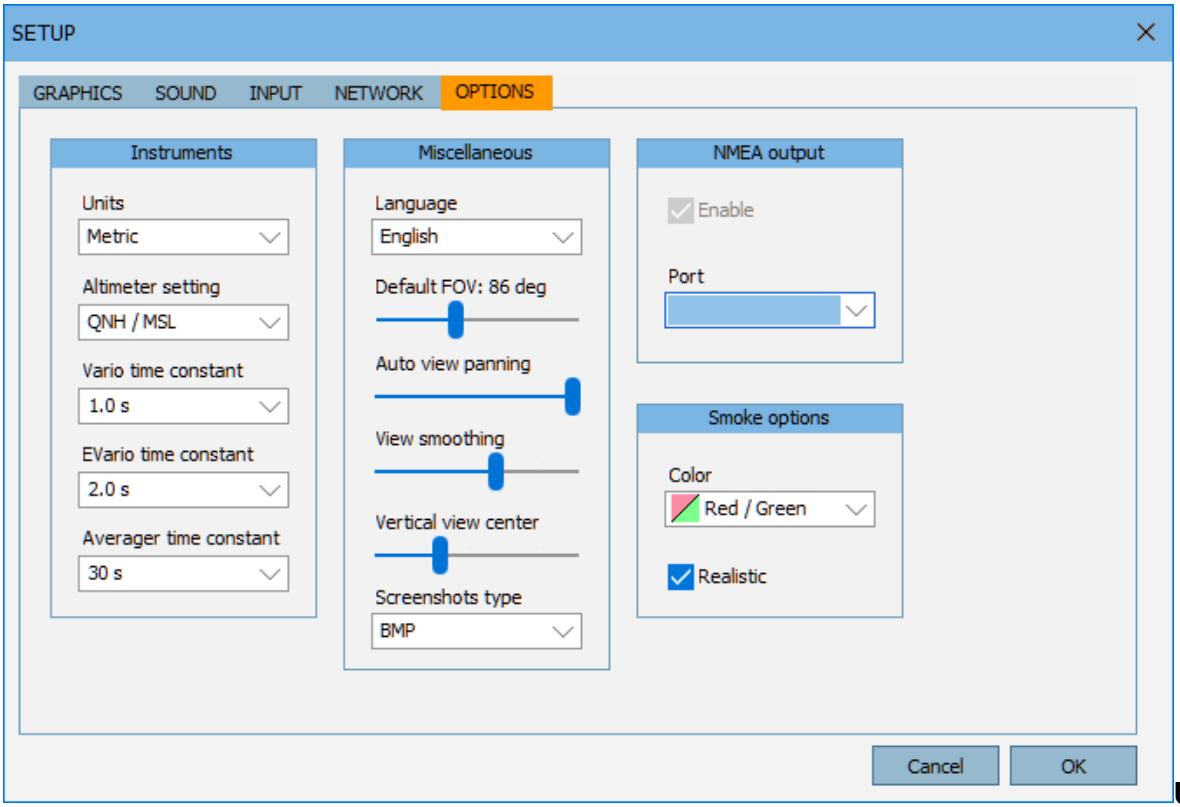
- Start SteamVR
- In the SteamVR dashboard pick the Revive tab
- Drag and drop Condor 2 to ReviveInjector_x64.exe (we have 64bit machine/OS)
- Fly

Note: It may be required to set MSAA to zero for Vive.

Google Cardboard

— COMING SOON —

3.6. Set other Condor simulation options



Units

Select metric/imperial/Australian units used in menus and in game

Altimeter setting

Select QNH or QFE altimeter setting. Fine adjustment of the altimeter is also required in game before each flight because of air pressure changes.

Vario time constant

Select pneumatic variometer time constant. Lower values indicate shorter response times, higher values indicate longer response times.

EVario time constant

Select electronic variometer time constant. Maybe the best solution is to set a fast pneumatic variometer and a slower electronic variometer.

Averager time constant

Select averager time constant. Averager is a special variometer with very long response time that “averages out” small variations in vertical movement and reports “average” lift.

Language

This option will be made available in the future, for the time being Condor is only in English.

Auto view panning

Condor can pan your view direction according to plane movement direction. The lowest value results in straight forward view – no panning, higher values result in more panning.

Default FOV

Sets the Field Of View of the camera. If you have multiple monitors, this will affect the offset of the side monitors

View smoothing

The level of camera movement smoothing.

Vertical view center

You can set the pitch of the pilot’s view in F1 camera.

Screenshots type

Select between JPG and BMP format for screenshots taken during the game. Select BMP for higher quality, but much bigger images.

NMEA output

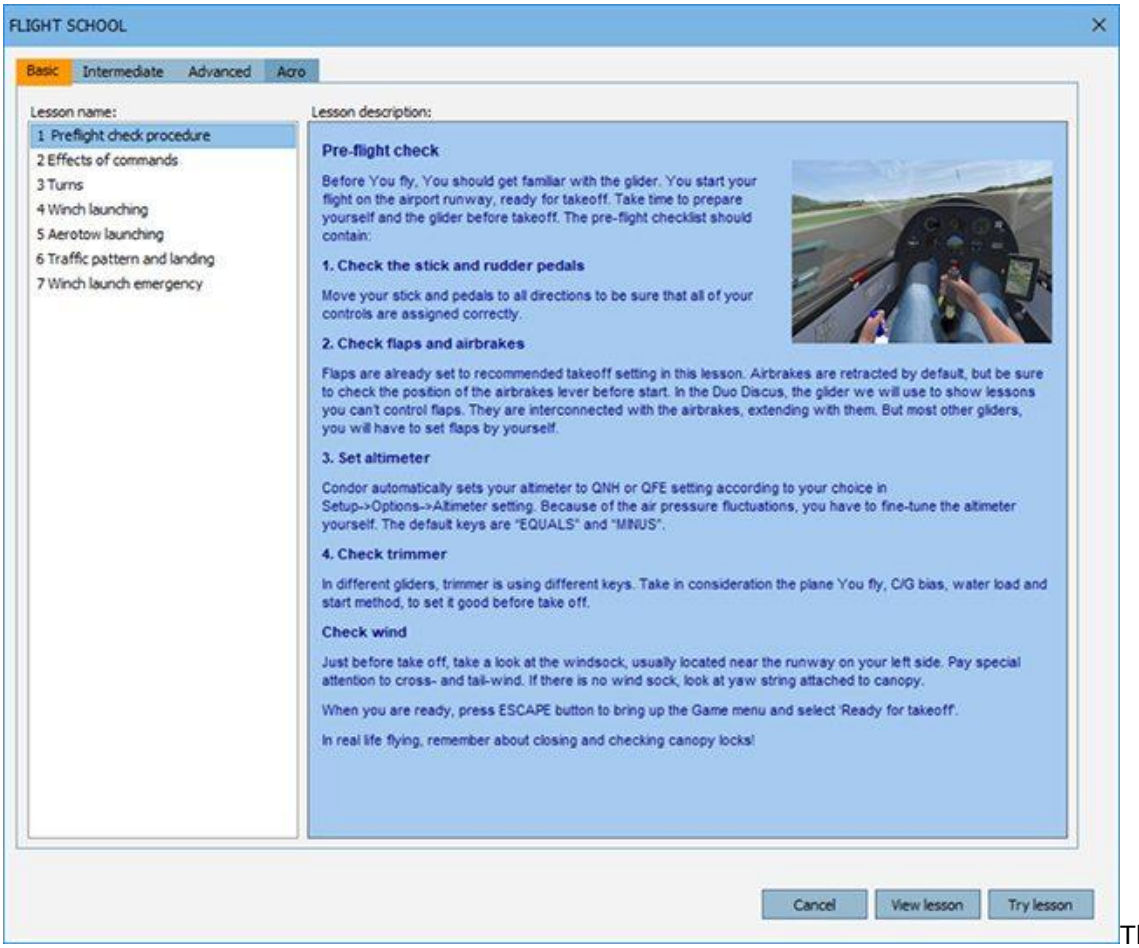
You can enable NMEA output to one of your serial ports and connect a Palm, PocketPC or other navigation hardware that supports NMEA.

Smoke options

You can set the smoke parameters

The Color box sets the colors of the left/right smoke plumes

4. Flying lessons



The purpose of flight school is to provide all necessary information to teach you how to fly, how to soar and how to compete in soaring.

Flight school is based on lessons. After you read lesson description you can view the lesson with “View lesson” button. The instructor will guide you trough the lesson with comments on top of the screen. When you feel ready, you can try the lesson yourself by clicking “Try lesson” button.

The lessons are divided into five groups:

Basic

The basic level will teach you how to fly. It is recommended to start with the Basic level even if you feel it’s too easy for your knowledge. The reason for this is that the basic lessons will also teach you the keys and commands that are essential to fully exploit Condor.

Intermediate

Weather is the motor of soaring flight. The main purpose of intermediate level is therefore dedicated to teach you how to use weather for soaring.

Advanced

Here you will learn how to use your knowledge of soaring to successfully take part of competitions. Good soaring techniques are essential but not all you need to be fast. This lesson will therefore also teach you how to optimize your flight in lift and between lift and how to use modern instrumentation to navigate and round turnpoints efficiently.

Acro

Acrobatic lessons for advanced pilots.

Custom

Custom lessons.

4.1. How to best use flight school

Flight school consists of practical lessons. The textural information of the lessons that follows is also included in the simulator itself. You should read the text and follow all the lessons as they not only provide information about soaring but also information about using Condor.

Basic – Pre-flight check

You start your flight at the airport runway, ready for takeoff. Take time to prepare yourself and the glider before takeoff. The pre-flight checklist should contain:

1. Check the stick and rudder pedals
   Move your stick and pedals to all directions to be sure that all of your controls are assigned correctly.
2. Check flaps and airbrakes
   Flaps are already set to recommending takeoff setting. Airbrakes are retracted by default, but be sure to check the position of the airbrakes lever before start.
3. Check trimmer
   Trimmer is set to neutral position on default. Depending on your C/G setting you may want to trim your glider up or down.
4. Check wind
   Take a look at the wind sack, usually located near the runway on your left side. Pay special attention to side- and tail-wind.
5. Set altimeter
   Condor automatically sets your altimeter to QNH or QFE setting according to your choice in Setup->Options->Altimeter setting. Because of the air pressure fluctuations, you have to fine-tune the altimeter yourself. The default keys are “EQUALS” and “MINUS”.

When you are ready, press ESCAPE button to bring up the Game menu and select ‘Ready for takeoff’.

Basic – Effects of commands

Use elevator to change the sailplanes pitch.
Use ailerons to change the sailplanes bank.

Use rudder pedals to change the sailplanes yaw.

Basic – Turns

To turn, deflect ailerons and rudder to the direction you want to turn. Try to keep the yawstring centered. You will also have to pull the stick gently backwards to prevent the nose from dropping.
When you reach 30 degrees of bank, center ailerons and rudder, but maintain backward pressure on the stick. The glider now turns with a constant rate. Try to keep bank and pitch constant by applying small corrections with the stick.
Slightly before you reach the desired direction, apply ailerons and rudder to the opposite direction of the turn. You will also have to release the stick gently forward to prevent the nose raising. When the wings are level, your nose should point to the desired direction. Center all commands.
After you master normal turns with 30 to 45 degrees of bank, try some steeper turns. Steep turns require more airspeed and a lot more backward pressure on the stick. You can also practice S-turns to improve your coordination of commands.

Basic – Winch launching

Winch launching can be hazardous if the plane and the pilot are not well prepared, so be sure to make a good pre-flight check first.
With commands centered, press ESC and select “Ready for takeoff”. The wings will level and the winch will apply throttle. The glider will start to accelerate quite fast. Maintain wings level and when the speed reaches some 80 km/h, gently pull the stick to pull of and gradually climb into a steeper angle.
For most gliders the speed in steady climb should be around 110 km/h (60 kts). Maintain constant speed with wings level.
The climb angle will slowly become less steep as you reach the top of the climb. When the vertical speed drops to below 1 m/s (2kts), pull the release handle. Gear up and you are ready to soar.

Basic – Aerotow launching

Again, make a good preflight check to prepare the plane and yourself for towing.
Press ESC and select “Ready for takeoff”. The towplane will start its engine and taxi in front of your glider. The wings will level and towplane will apply throttle. The glider will start to accelerate. Maintain direction and try to keep the wings level. This can be quite tricky as the commands are less responsive at low speeds.
When the speed reaches some 80 km/h (45 kts), gently pull the stick to lift the glider of the ground. Try to follow the towplane some 1 – 2 m (3 to 6 feet) above the ground until the towplane starts to climb. In aerotowing, the towplane should be located at your horizon or slightly above.
When turning, try to keep the same angle of bank as the towplane. Apply small but prompt corrections and follow the path of the towplane. If anything goes wrong, release immediately.
The towplane will tow you to your task starting point and then try to find thermals nearby. When you reach the desired altitude, the towplane will rock the wings, which is a sign you should release. Gear up and you are ready to start soaring.

Basic – Traffic pattern and landing

In soaring, traffic pattern is very important as the gliders don’t have a second chance like motor planes if anything goes wrong. So traffic pattern should be your standard practice even if landing out.
When you start traffic pattern, you should be located parallel to the landing point some 300 – 500 m (yards) from the runway, around 200 m (600 feet) above the runway. At this point you should check that landing gear is down and then fly downwind parallel to the runway. Maintain at least 90 km/h (50 kts) throughout the pattern. In turbulent or unpredictable conditions add 10 to 20 km/h (5 to 10 kts).
Traffic pattern should ideally look like rectangle from above. The task is to adapt the position of the two following turns so as to fly your final approach with half airbrakes open and land at the beginning of the runway. This, of course, takes some practice to master, especially in windy conditions.

When you approach the runway in the final approach, always try to fly on the line of the ideal glide angle, that is the angle with half brakes open that finishes at the beginning of the runway. This means that when you are low, you will retract the airbrakes to reach the ideal line as quickly as possible and vice versa. When you are on the ideal line, just keep airbrakes half open and maintain the speed.
When you are 5 to 10 m (15 to 30 feet) high, slowly pull the stick to stop the glider some 50 to 100 cm (2 feet) above the runway and then try to maintain that altitude for as long as possible to reduce the landing speed. When the speed is reduced, the glider will land by itself. Be careful to maintain the wings level when rolling out.

Basic – Winch launch emergency

Sometimes things just like to go wrong.

During a winch launch, cable sometimes can break, leaving the pilot with low speed, low altitude and nose pointed into sky.

When this happens at the beginning of the launch (up to 50 meters), push stick forward, make sure that airspeed is at least 90km/h and not dropping, and land ahead.

When this happens later,(at about 100 meters), push stick forward, make sure that airspeed is at least 90km/h, and not dropping. Then do gentle, about 30 degrees change of course to the downwind side of runway. After this maintain straight flight for couple of seconds, and turn back against the wind about 210 degrees until flying along the runway. Then land, but remember about tailwind, so use more airbrakes, because ground speed is higher.

When cable break happens above 150 meters, just keep calm, keep airspeed, and do tight landing circuit, with first two and last two turns are connected, so it is actually two 180 degrees circuit.

In this lesson, the second case will be flown.

Intermediate – Thermal soaring

Thermals are vertical columns of rising air that is warmed from the hot areas on the ground like fields, villages or slopes facing the sun. They have roughly round cross-sections with diameters from 100 to 500 meters (The visual indications of thermals are cumulus clouds that form when the rising air cools down below dew point and the water vapor starts to condense. When the reservoir of warm air at the ground is exhausted, the lift starts to weaken and finally the cloud dissipates and the cool air starts sinking.
In windy conditions the thermals are usually inclined and are moving with the wind at the same time. So a good place to find thermals on a windy day is downwind of thermal generators. You circle in inclined thermals almost as if they were not inclined as the wind shift is the same for your glider and for the rising air itself.
In Condor you can visualize otherwise invisible thermals by pressing the default H key. Updrafts are colored red and sink is colored blue. Still air is white. Try to find thermals in the early stages of development – under small, developing cumulus clouds or even if no cumulus cloud is formed yet. Avoid old, dissipating cumulus clouds as you will likely find only sink below them.
When the air is very dry or if we have too low temperature inversion layer, no cumulus clouds will form, but that doesn’t mean there are no thermals, there are – they are called “blue thermals”, but they are far harder to find.
Thermal soaring is usually the main source of lift in soaring and very long distances can be covered by circling in one thermal and gliding to the other. The better pilot will find stronger thermals and climb faster to reduce the overall task time.

Intermediate – Ridge soaring

Ridge lift is generated when the wind blows towards a mountain ridge. The air is deflected upwards in the front part of the ridge but sinks back down at the lee side of the ridge. In ideal conditions the wind is strong, and the ridge is long and perpendicular to the wind direction.
The lift extends vertically about two times the height of the ridge, in ideal cases even more. When we fly below the

ridge top, it is usually best to fly close to the ridge, but when we are higher, the area of best lift shifts slightly towards the wind. We avoid the lee side of the ridge since sink and turbulence can be expected.
When flying along the ridge we must search for areas where the terrain is concave. In such areas the lift is stronger as the air speeds up because of the air flux conservation.
Very long ridges can be flown in ideal conditions. Flights over 1000 km (500 miles) have been flown using exclusively ridge lift.

Intermediate -Wave soaring

Wave lift can be found in special conditions at the lee side of the mountain ridges.
If the wind is blowing perpendicular to a long ridge, then on the front side of the ridge the air will rise and normal ridge lift can be expected. The air will then sink at the lee side. If the atmosphere is very stable and the wind is strong, the air will rebound upward once again. This upward swing is called wave lift. The height of a wave lift can surpass the height of the ridge lift in front of the ridge and often reaches 5000, sometimes even 15000 meters.

Intermediate – Upslope winds

Upslope winds are formed at the sunny sides of the slopes. The air is heated and therefore rises up the slope all the way to the top of the ridge.
Upslope winds are usually not very strong, but are quite consistent and predictable. Glider pilots can fly long distances by just following the ridges. At northern hemisphere, we look for east facing slopes in the morning, south facing slopes at midday and west facing slopes in the evening.

Intermediate – Outlanding

Sometimes there is no chance to land on airfield. Ability to safe landing the glider in terrain is vital to make cross-country flying safe.

When conditions are deteriorating, it is good to think about terrain that is below glider. It is best not to fly between mountains or big forests at less then 500m, as sudden sink can leave glider without a safe option for landing. Below 300 meters above the ground, there should be potential outlanding field chosen.

Best fields should be plain, without obstacles and aligned with the wind, with at least 250m length and 50m width. If there are buildings or trees on the side, where landing is planned, another 200m should be added to minimum field length. Landing maneuver is similar to airfield one and downwind leg is last good moment to have a good look at chosen place. It is crucial to plan landing so final leg is against wind, and if we are too high even for full airbrakes, sideslip maneuver should be considered.

If outlanding happens in hilly terrain, landing direction should be always done uphill, and with little more speed. It may be good idea to purposely put one wingtip on the ground on last moments of rolling, so the glider will turn about 90 degrees and stay safe from rolling back.

Advanced – Starting task and navigation

The task you set in the flight planner should be flown as fast as possible. The time starts running after a specified period of time – “Race in” time, set in flight planner. After takeoff, you should try to quickly gain height to start the task as high as possible. In the upper left corner of your screen you can see when the race will start.
When the race starts, you must round the starting turnpoint. You should pass through the turnpoint sector, drawn in red color on your PDA screen 1. Ideally you should already be in the starting sector when the time starts running.

You can navigate to the next turnpoint in three ways:

1. Using PDA screen 2. The black dot on the screen shows the direction of the next turnpoint. When the dot

is in the center of the screen, you are flying directly towards the turnpoint. This screen also shows various data related to the next turnpoint: bearing, heading, distance, VMG – velocity made good, TTG – time to go and ETA – estimated time of arrival.
2. Using moving map on PDA screen 1. You can estimate your direction from the plane icon drawn on the moving map. The next turnpoint sector is coloured red.
3. Using task helpers – default J key. The turnpoints are visualized as vertical stabs. The stab of the next turnpoint is colored red and yellow while other stabs are colored in red and white.

In addition to normal FAI sectors you can also set “Window” type of turnpoints. To round this type of turnpoint you must fly through a window of specified width and height. The orientation and altitude of the window is also set in flight planner. If you are not using task helpers you should use PDA screen 3 to correctly fly through the window. The red dot must be brought to the center of the screen. That means that you are at the correct height and that you are flying towards the window. However, to fly trough the window in the right direction, you must also get the blue vertical line to the screen center. This line shows your relative position to the window direction centerline. You complete the task by rounding the final turnpoint.

Advanced – MC theory

When trying to maximize your cross-country average speed, you come to the question of how fast to fly between thermals. You can fly fast to reach the next thermal as quick as possible, but you will lose a lot of height that will have to be gained back in the next thermal. On the other hand, you can fly slowly and preserve your height, but you will loose too much time to reach the thermal.
The problem was solved by Paul McCready and his theory is called MC theory. It says that the optimal speed to fly between the thermals is the same as the speed of best glide when flying trough sinking air with vertical speed that is equal to the rate of climb in the next thermal. Sounds complicated?
Today we luckily have computer instruments on board of every modern glider that show us how fast to fly. There is one important thing that the pilot must estimate himself though: the expected rate of climb in the next thermal. This rate of climb is usually called MC setting. If we expect 2 m/s climb, we set the MC to 2.0 and the computer will output the optimal speed to fly.
One would expect that the optimal speed to fly remains constant till we change the MC setting. It is indeed the case in still air. But if we fly through the air that moves either vertically or horizontally, then the optimal speed will change. But the pilot has nothing to worry about as the computer does the job – the pilot only follows the given speed.
We can switch from vario to “speed command” with the default RIGHT CTRL key. The vario needle will then show if we are flying too fast or too slow. If the needle shows up, we are flying too fast and vice versa. To relieve the pilot from watching the vario all the time, the sound signal is also emitted. If we are too fast, the tone is high, if we are too slow, the tone is low and if we have the right speed, the vario becomes quiet.

Advanced – Final glide

When circling in the last thermal of the task, the pilot usually asks himself how high to climb. This is of course important for him to reach the airfield. But when racing, the height of departure from the last thermal has also a big influence on the time it takes to reach the finish point.
Again, MC theory does the job. We set the MC to the rate of climb we currently have. The computer will assume that when leaving the thermal, you will fly with the speed that corresponds to that MC setting. Given the estimated speed, the computer can compute the estimated glide ratio and as it also knows the distance to the finish point it can also compute the optimal height to leave the thermal.
Our final glide computer is found on the PDA screen 3. The red dot shows the height at which we will cross the finish line if we will fly with the speed that corresponds to the current MC setting – assuming the air will be still in our final glide. If the dot is below the screen center, we are higher that required and vice versa.

Advanced – Flaps, water and improving speed.

Cross country racing is game against nature and opponents that is played on three levels.

Level one is skill and handling. This is how well you fly a sailplane, how smooth turns are or how much time does it take to find a thermal under the cloud. Basic and intermediate lessons are teaching this. You can also adjust glider to individual style of flying using center of gravity position. Moving it forward makes glider more ‘heavy on nose’ and also stable. It means that it’s easier to handle but less maneuverable. Moving CG backward, to position ‘heavy on tail’ makes glider more agile but also harder to control.

Level two of soaring is skill and experience. This layer is about situational awareness. How fast glider should fly between clouds, what cloud should give lift and what place is better to avoid. Intermediate and advanced lessons were about this. Racing gliders are making this more complex with possibilities of taking water ballast and using flaps. Having plan for next 5 minutes is mandatory if one wants to be successful on cross-country flight.

Level three is risk management. This cannot be taught. Is it better to stay in weak lift, or to go for that nice cloud just 15kms away? Pilot who flies too aggressive is going to land out often, or find himself low and with only weak lifts to use. Pilot who flies too safe will waste time on thermalling often, when keeping himself high.

As stated racing gliders have possibilities of using flaps and water ballast. This is new, after flying Duo Discus.

Making glider heavier with water makes it fly faster, while sink is also bigger. In fact, glide ratio is not changing, just speed increases. This is good for cruise flying, allowing to cover the same distance in less time. However heavy gliders are more difficult to handle, and are not so good in thermals or other conditions that require to maneuver or fly slow. During flight, you can drop water. ‘W’ key opens and closes valves of water tank. It takes several minutes to empty all water from glider. Of course it is one way – you cannot gain water during flight!

Flaps are surfaces at the trail edge of wings that are deflecting up or down. Deflecting flaps up (‘f’ key), decreases both lift and drag coefficients – increasing glider’s performance at high speed and decreasing low speed one. Flaps down (‘j’ key) are better for low speeds. Usually, lowest possible position of flaps is not improving glide ratio at all, but allows glider to fly slower. This is useful for landing or very tight thermals.

Last but not least – most advanced and sophisticated device onboard is not PDA, not variometer but pilot’s brain. Use it.

Acro – Stalls and spins.

Stall is what happens when glider is flown below minimum speed. Angle of attack is increasing, but lift coefficient is not. When glider passes critical angle of attack, lift is dropping. Last warning for the pilot about this, are wings shaking.

If stick is not pushed forward fast enough, glider loses it’s lift, nose goes down with a tendency for a wing to drop and possibility of an inadvertent spin

Spin is what happens when rotation is not stopped fast enough. Fast autorotation of glider, ailerons becoming unresponsive and rapid altitude drop are making spins dangerous if not stopped. To stop gliders spinning, push opposite rudder to spin direction and stick slightly forward. When rotation stops, get rudder neutral and pull from the dive. Do it fast so glider not overspeeds, but gentle so there is no control lost.

Spins are happening to inexperienced pilots when thermalling or making turns during landing circuit. Accidentil spin at low altitude is extremely dangerous.

Acro – The Loop

To fly a loop, start a 45 degree descent to gain speed. Take the runway below as a reference of your flightpath.

When you reach 200 km/h (125 kts), level your plane.

Start to pull the stick. Nose is raising and speed is dropping. You have to reach the top of the loop before your

speed is too slow. Check your g-load to not crash the plane.

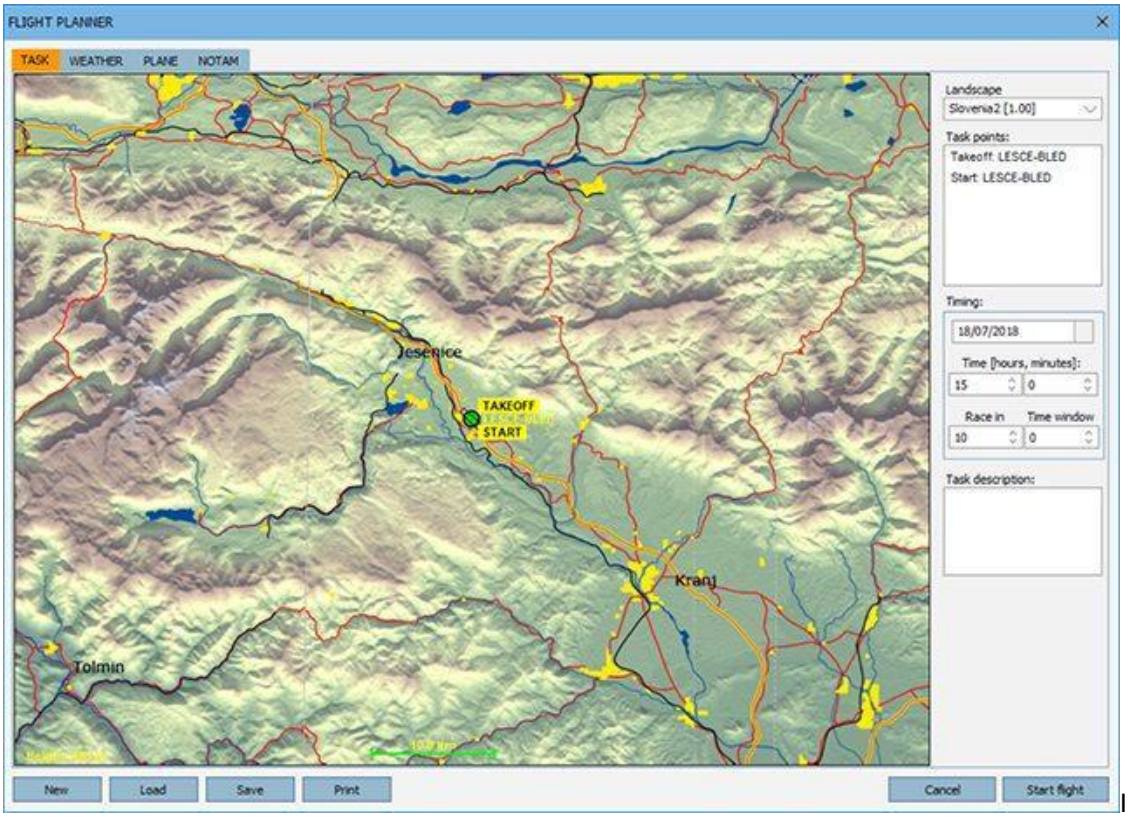
Finish your loop with the plane leveled. That is all.

When navigation helpers and acro box options are enabled, by pressing ‘J’ key You can enable virtual cube that You should fit aerobatics in.

5. Flying alone

Free flight or single play mode starts with Flight planner, where you define every aspect of your flight. When you define your flight plan, you can save it to file and load it later. You don’t need to manually save your last flight plan as it saves automatically and then loads the next time you enter Flight planner.

5.1. Planning a goal for your flight



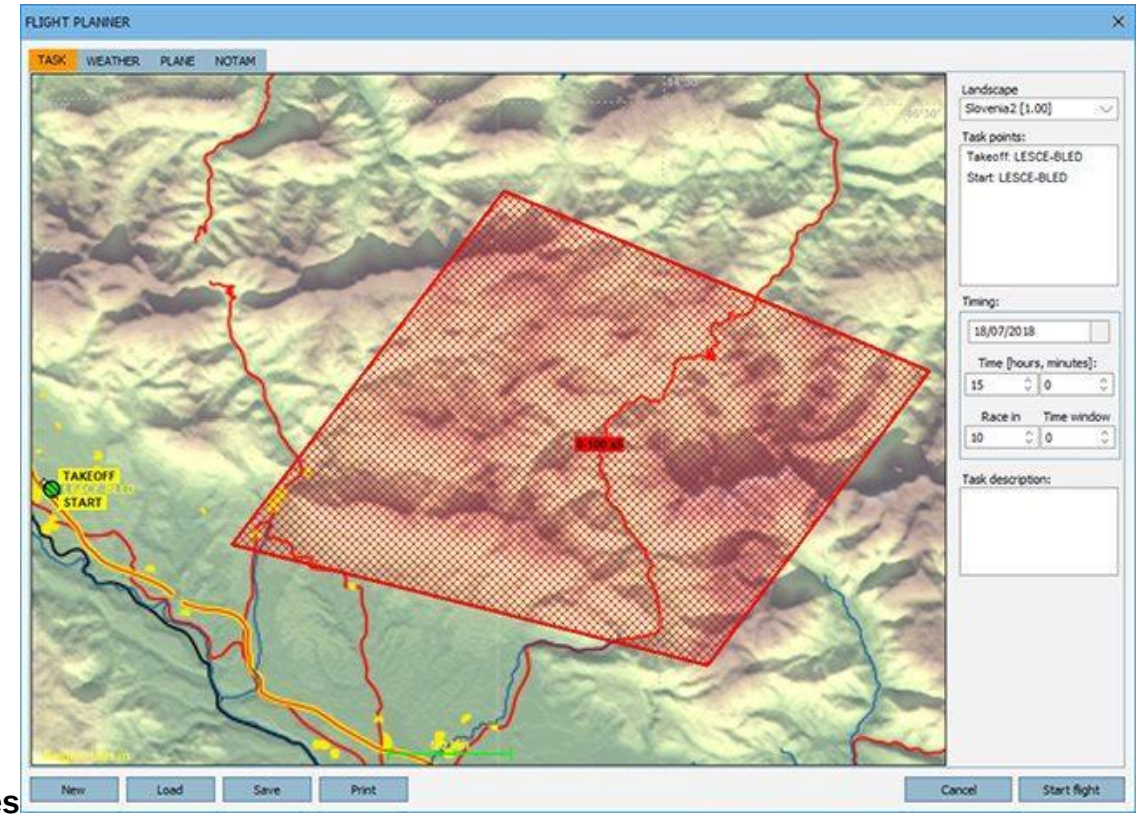
In this tab you define your flight task. You do this by selecting your take-off airport and then continue adding turnpoints with the mouse. One way to stop adding points is to select your start or takeoff point again. Another way is to bring up the popup menu with right click and to select Finish task.

When the task is defined, you can move turnpoints by dragging them to a new position. If you want to insert a turnpoint, just hold CTRL and drag an existing turnpoint to a new position. Another way is to bring up the context menu with right click and selecting Insert. If you want to remove a turnpoint, select Remove from context menu. You can change the properties of selected turnpoint by selecting Properties from context menu.

Condor uses two sector types that you can assign to turnpoints: classic type and window type. If you select classic type, the turnpoint rounding will be successful if you fly through the sector zone. You can specify sector radius, sector angle, minimum and maximum height. Window type sector is actually a window that has to be flown through for successful turnpoint rounding. You can specify its center altitude, width, height and azimuth. Azimuth

is the direction in which the pilot has to fly trough the window.

Note: It's quite difficult to round window type sector, especially without 3D task helpers enabled. It's therefore recommended to use classic type sectors for beginners.



Penalty Zones

Condor also allows you to specify Penalty zones. These are user defined areas in the airspace that are prohibited to enter. If the pilot enters one of these zones, he gets penalty points. You define a new penalty by clicking New -> Penalty zone from the context menu that you bring up with mouse right click. Then click on the map three more times to finish the penalty zone. When the zone is defined you can drag its corners with your mouse. To change the properties of the penalty zone you first have to select it by moving the mouse inside the zone. Then bring up the context menu and click Properties.

Here you define the bottom and the top of penalty zone and amount of penalty points that the pilot gets every minute when flying in the zone.

To delete the penalty zone you first have to select it and then click Delete from context menu.

Start time

Here you specify the day time of simulation start (hours, minutes).

Race in

Here you specify how long after last tow the race starts (minutes).

Time window

The pilots can start the task in specified time window after the race starts. If you set time window to 0, the start will

be regatta type – all pilots start at the same time.

Task description

Here you can write a description of the task. Especially important if you will be hosting this task online later so other pilots can undersatnd it.

Shortcuts:

- Zoom in/out: press SHIFT key together with left or right mouse click to zoom in/out.
- Insert turnpoint: press CTRL key and drag the selected turnpoint to insert a new turnpoint after the selected turnpoint.

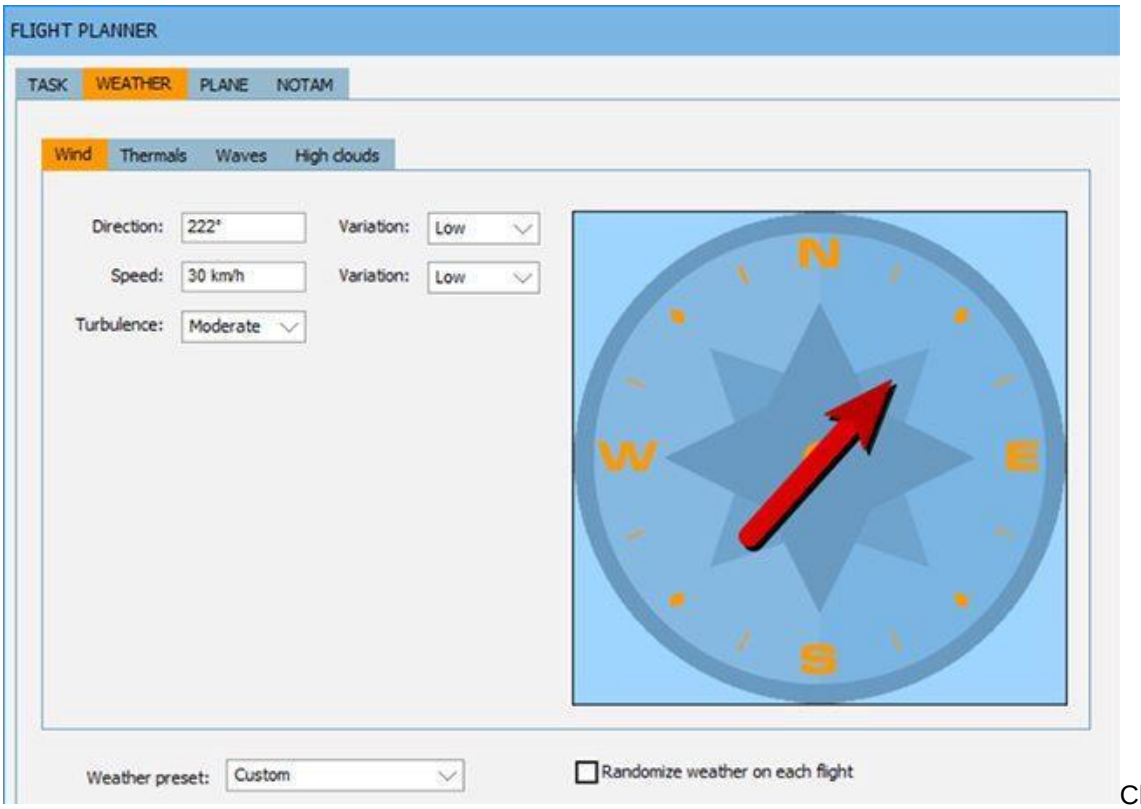
Custom landscape maps

You can create or download custom landscape maps for the scenery area. Just put a custom bitmap with the same dimensions as original LandscapeName.bmp file to Condor/Landscapes/LandscapeName directory (LandscapeName is the actual name of the scenery). In Flightplanner, right click, select Maps and choose your preferred custom map. The map used in flight planner will also be used on your PDA navigational screen.

5.2. Controlling the soaring conditions

This tab allows you to define weather for your flight. You can choose one of the Weather presets in the lower left corner. If you choose Custom, you will be able to change all weather settings manually.

Wind panel



Click on the wind rose to select wind speed and direction. Hold CTRL key to get more course directions and speeds. The wind you define in this way is synoptic wind and defines general wind speed and direction. Condor then computes wind

speed and direction according to altitude, terrain etc.

Direction variation

Here you specify the amount of daily general wind direction variation.

Speed variation

Here you specify the amount of daily general wind speed variation.

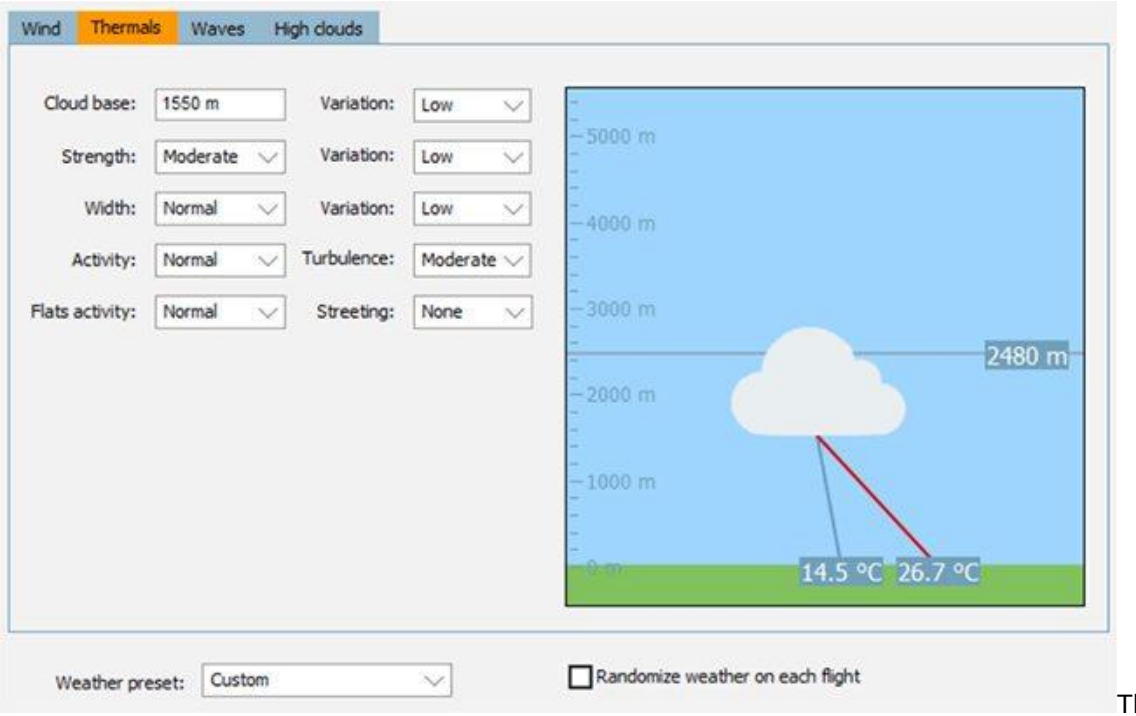
Turbulence

Here you specify the general amount of mechanical turbulence caused by wind. Mechanical turbulence is then computed according to this setting, wind speed, terrain etc.

Note: Among wind shift, wind also influences slope and wave updrafts.

5.2.1. Thermals

Thermals panel



The image shows a graphical representation of cloud development. The cloud base is dependent on surface temperature and dew point. You can alter temperature and dew point by dragging them left or right. The cloud base changes accordingly.

You can also change the height of the inversion layer (subsidence inversion) by dragging the label up and down. If the inversion layer is above cloud base, cumulus clouds will form. If you set the inversion layer below the cloud base, only blue thermals will form.

Note: Thermals have some persistence and will not stop immediately after reaching the inversion height.

Cloud base variation

You can specify the spatial variation of cloud base. If the variation is low, the clouds will have nearly equal cloud base height. If the variation is high, cloud base heights will be more scattered.

Strength

Here you specify general strength of the thermals. The strength also depends on cloud base height. The higher the cloud base, the stronger are the thermals.

Strength variation

Here you specify the strength variation between individual thermals. If the variation is low, all thermals will have nearly equal strength. If the variation is high, strength difference between thermals will be high.

Width

The width of the thermals.

Width variation

Width variation of the thermals.

Activity

The activity (number) of thermals.

Turbulence

Here you specify the turbulence caused by thermals. Thermal turbulence also depends on thermal strength.

Note: The frequency of thermals depends on cloud base height. Lower cloud base causes more frequent thermals and vice versa.

Flats activity

In mountainous areas which adjoin flat land, it is common for there to be thermals in the mountains, bu none on the flat land. This setting let you inhibit flatland thermal activity.

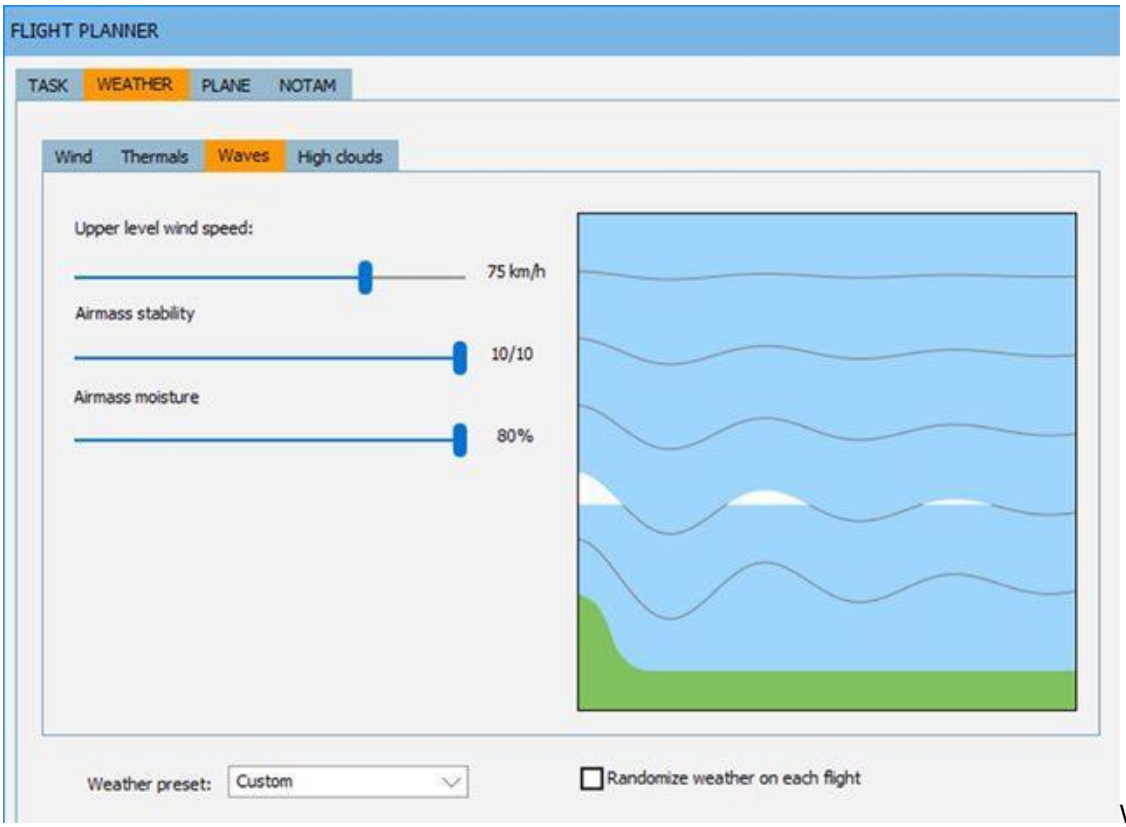
Streeting

When there is a reasonable strength wind, thermals can form into long lines downwind from the source(s). This is called cloud streeting.

Randomize weather on each flight

On every flight, the weather will be randomized within the weather preset limits.

5.2.2. Waves



With the right conditions and mountains to trigger, lee waves are formed downwind. This panel allows you to set up those conditions.

Upper level wind speed

Sets the wind speed above the inversion level

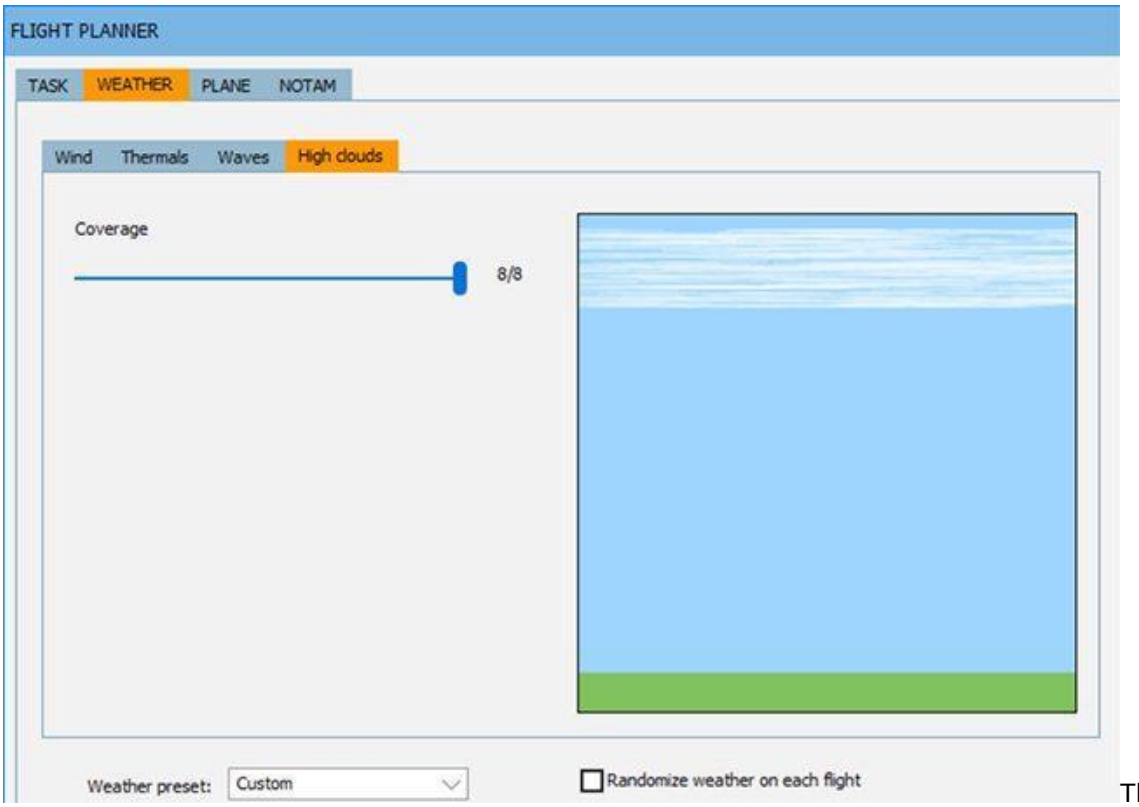
Airmass stability

A more stable airmass gives stronger waves

Airmass moisture

With more moisture, lenticular clouds will form. With low moisture, there will still be waves, but more difficult to locate and soar.

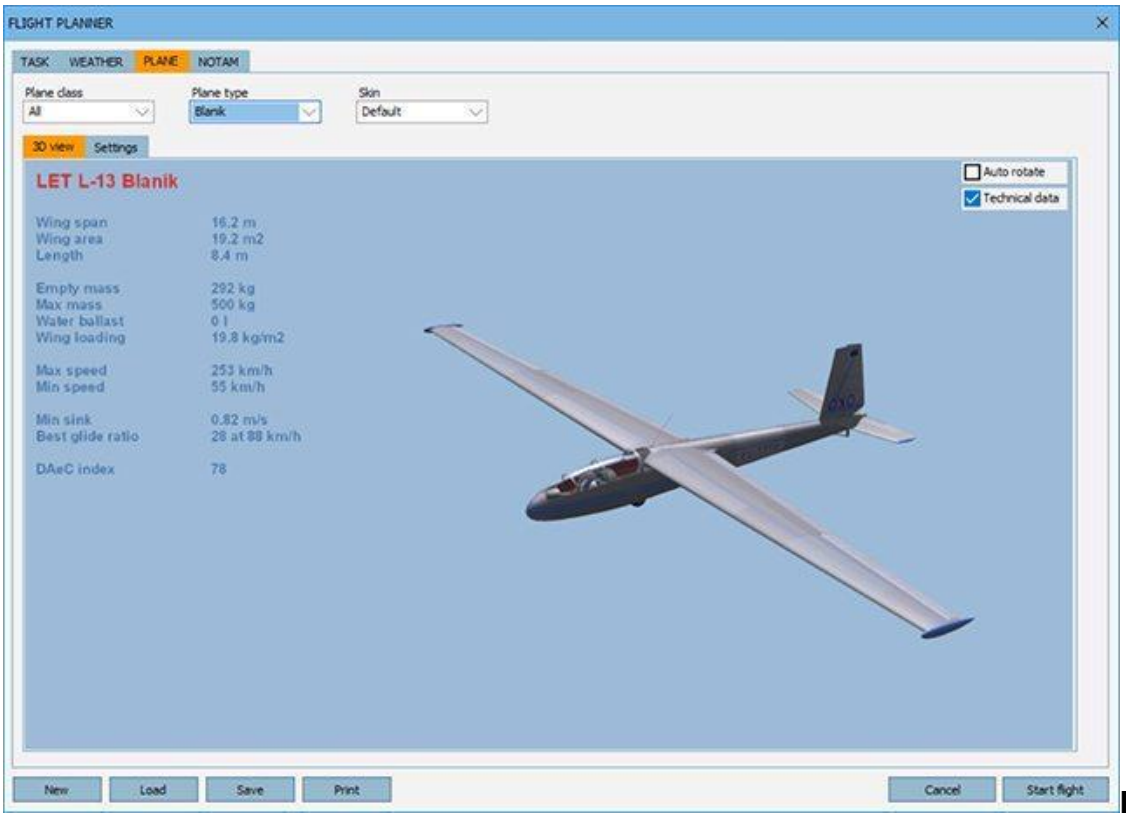
5.2.3. Cirrus



The high clouds (or *cirrus*) can be set with this control.

5.3. Choose your glider

In this tab you choose the glider and alter its settings.



Plane class

Here you define FAI competition class.

Plane type

Here you define the type of the glider.

Skin

Here you define the skin of the glider. Some are supplied with Condor, and you can also make your own design

Note: Skins are custom paint schemes. Read more about skins and how to use them at Condor's website (www.condorsoaring.com/forum).

3D view

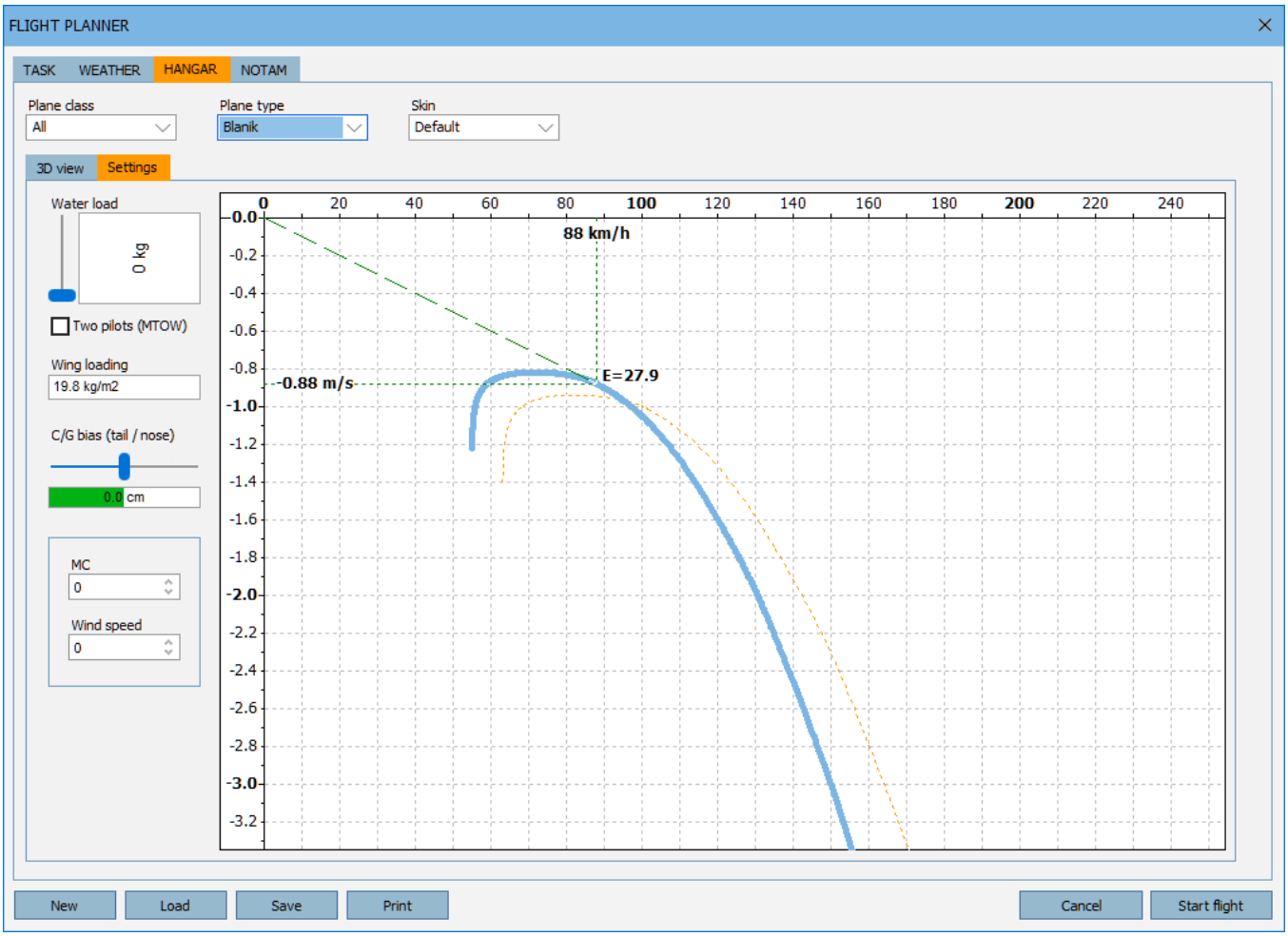
You can rotate and zoom the glider by dragging with left or right mouse button.

Auto rotate

Here you choose if the glider rotates automatically.

Technical data

Show basic technical data of the glider.



Settings

In this sub-tab you can see the speed polar of your glider. The thick blue line represents the polar with current water ballast amount. The dotted lines represent the polars for no water ballast and for full water ballast respectively.

Water load

Here you specify the water load amount. The speed polar changes accordingly. Please note that when Club class is selected, water is not allowed. If you would like to fly club class planes with water, you must select them from All class.

Fixed ballast / Two pilots (MTOW)

For single-seaters, this allows to set the plane weight to MTOW, if this is not possible with full water-ballast

For 2-seaters, lets you choose if there is a pilot in the rear seat.

C/G bias

Here you specify the relative position of your plane's center of gravity (C of G). The influence of this setting on performance is very small. The more important effect is glider handling.

MC

This setting does not influence your flight in any way. It’s provided to visualize the effect on optimal glider speed.

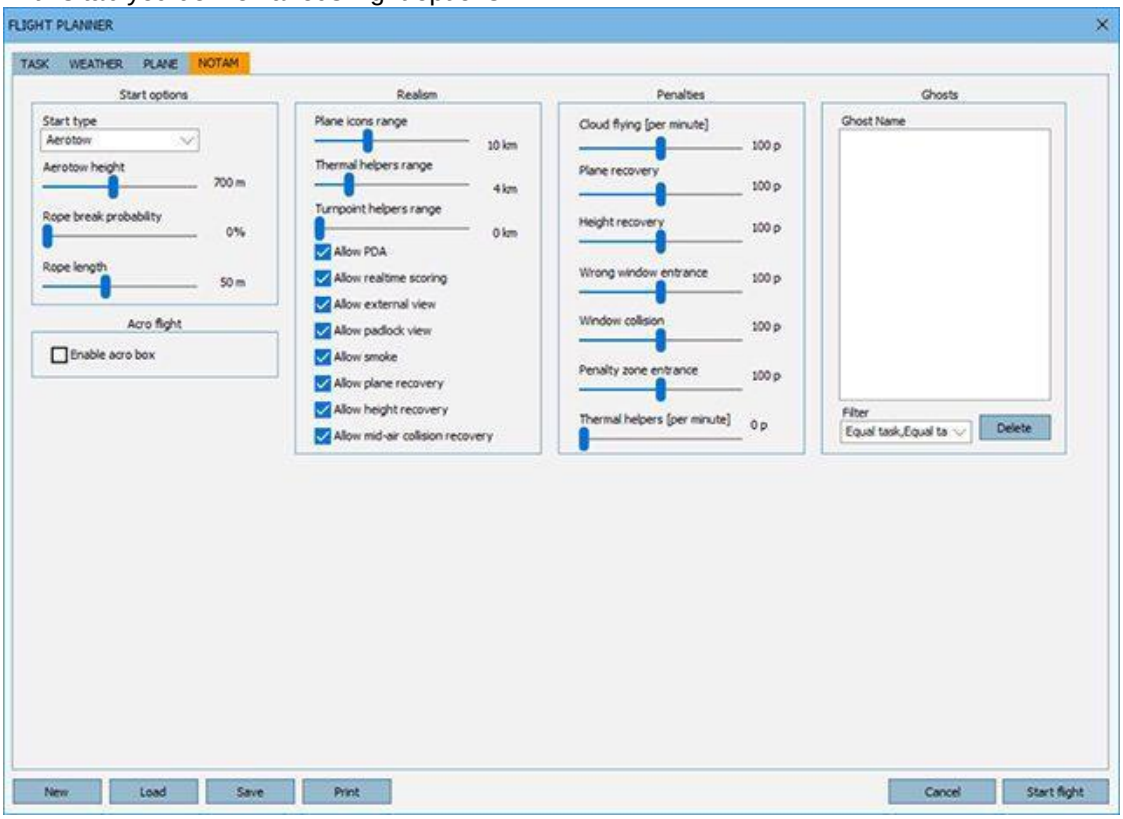
Wind

See MC.

Note: For more information on glider speed polars and settings see Flight school’s advanced lessons.

5.4. Flight settings

In this tab you define various flight options.



Start options

Start type

Choose from aerotow start, winch start or airborne start

Aerotow/airborne height

Specify the height of the aerotow or the starting height when starting airborne.

Rope break probability

Specify the probability of the rope break during winch launch.

Rope length

Adjust the length of the aerotow rope between towplane and glider. Long tow ropes are easier to fly for beginners.

Realism settings

Plane icons range

Select how far you see icons of other planes. To turn icons off, move the slider all the way to the left.

Thermal helpers range

Select how far you can see thermal updrafts as visual puffs. To turn off thermal helpers, move the slider all the way to the left.

Turnpoint helpers range

Select how far you can see turnpoins as vertical stabs and other visual task indicators like penalty zones. To turn off turnpoint helpers, move the slider all the way to the left.

Allow PDA

Check this checkbox to allow the use of PDA in the cockpit of modern competition gliders. With this option disabled, you will also have to make a photo of each turnpoint from the turnpoint sector. Left wing must be visible in the photo.

Allow real time scoring

Check this checkbox to allow pilot to display the real time scoring during the race.

Allow external view

Check this checkbox to allow the pilot to use external cameras.

Allow padlock view

Check this checkbox to allow the pilot to automatically pan the view in direction of other pilots.

Allow smoke

Check this checkbox to allow the pilot to use smoke trails on wingtips.

Allow plane recovery

Check this checkbox to allow the pilot to recover the plane damage from mid-air collision or structural damage.

Allow height recovery

Check this checkbox to allow the pilot to gain 500 m of height instantaneously.

Allow midair collision recovery

Check this checkbox to allow the pilot to recover the plane damage after mid-air collision.

Penalties

Penalty points are directly deducted from player score. You can specify the number of penalty points imposed for various infringements.

Cloud flying

Specify the number of penalty points for every minute flying in clouds.

Plane recovery

Specify the number of penalty points for recovering damaged plane

Height recovery

Specify the number of penalty points for height recovery

Wrong window entrance

Specify the number of penalty points for wrong direction of window type turnpoint rounding.

Window collision

Specify the number of penalty points for collision with turnpoint window borders.

Penalty zone entrance

Specify the number of penalty points for entering penalty zone. You also get penalty points when flying in penalty zone according to penalty zone properties setting.

Thermal helpers

Specify the number of penalty points for every minute of using thermal helpers.

Acro flight

Enable acro box

Check this checkbox to see acro zone and ground marks.

Ghosts

Ghosts are recordings of your or other people flights. In this panel you can select ghosts to escort you during your flight.

Filter

You can filter out the ghosts with different flightplan settings.

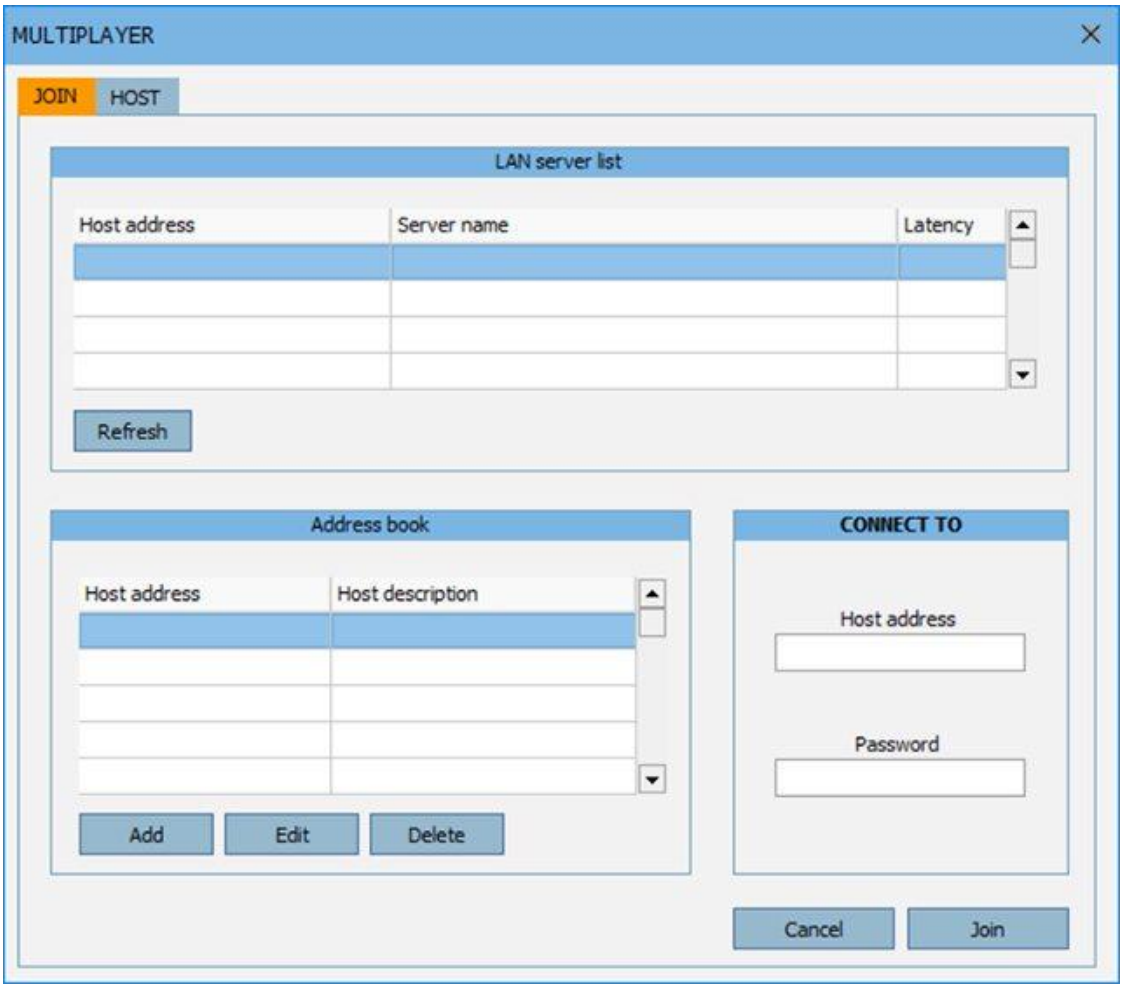
Note: Technically ghosts are flight track files (.ftr). You can save your flight track in debriefing screen.*

Click Start flight to start the flight.

6. Flying with other pilots

Multiplayer allows you to fly or compete with other pilots using a LAN or Internet connection. You can join an existing Condor server or you can host a game yourself.

6.1. Join a multiplayer fllight



LAN server list

If you would like to connect to a LAN server, you can use LAN server list to see the servers currently running on your LAN. Just click refresh to populate the list. Double click on the server to connect.

Address book

Address book is used to store server addresses that you often connect to. You can store LAN or internet servers. Double click on the server to connect.

Connect information

To connect to a new server, enter host address in the “Host address” field and click Join. Host address can be an IP address or a URL address. To connect to servers that are password protected, enter the password in the “Password” field.

Note: If for some reason a LAN server does not appear on the “LAN server list”, try connecting to it by explicitly entering host address in the “Host address” field.

When you join a server, you will automatically receive the flight plan from the server and enter Flight planner. The settings in Flight planner are controlled by the server and can not be changed, except for your plane settings.

Note: Only planes from server defined plane class can be selected. If server creates a teamplay race, you must also set your team in Planes tab.

In the Chat tab you can see the list of connected players and chat with them.

Click Join flight to start the flight.

6.2. Internet flights

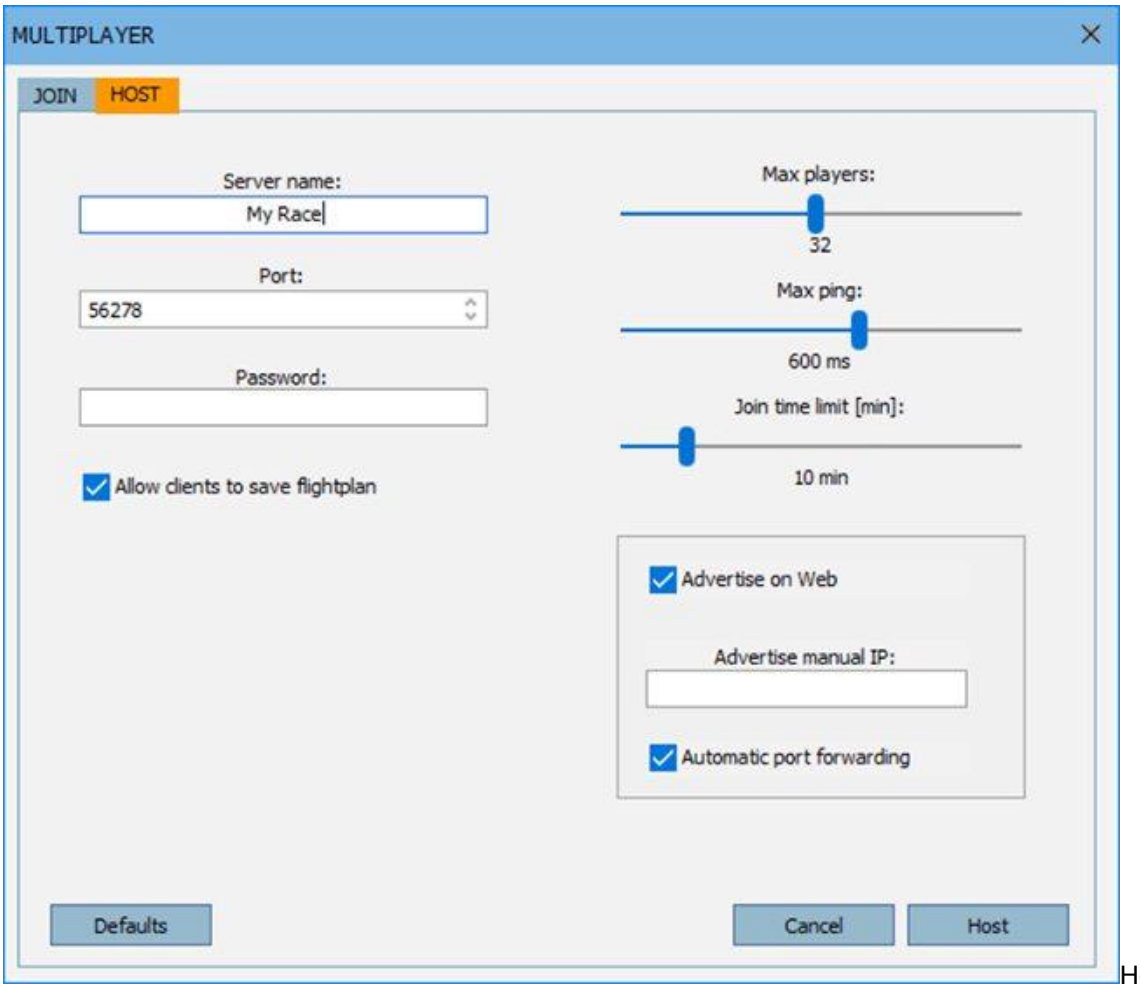
Joining an online flight is much simpler than LAN flight, because we host a server list at Server List(http://www.condorsoaring.com/serverlist/)

Open the link using your pc browser and the serverlist will be displayed.

Click on “CONDOR V2 SERVERS” to have the list display only those servers which are hosting Condor 2 flights. When the list refreshes, you can choose whichever you want and click on the JOIN button. This will start Condor 2 and you can then continue and set up your chosen plane, then enter the sim.

Note: Remember to check that you have the landscape needed for that flight before joining.

6.3. Hosting a flight for others to join



Hosting a server can require a high amount of bandwidth. This is usually not a problem on LAN connections. But if you intend to host an internet game, be sure to have a fast and reliable ISP connection, especially if you expect a lot of pilots to join.

Note: When you host a game, players from LAN or from internet can connect at the same time.

Server name

Here you specify your server name (not address), that is visible to connecting players.

Port

Set the port that the server will use to host the game.

Password

Set the password if you wish that only players that know it can connect to your server.

Max players

Set the maximum number of players that can connect to your server. More players require more bandwidth. Setting the slider all the way to the right allows unlimited players. Be careful with this, as it will be possible to exceed your bandwidth and make Condor unplayable ofr the connected pilots.

Max ping

Set the maximum ping to prevent players with bad internet connection to spoil the party by warping.

Join time limit

Here you specify how long new players can connect to game (minutes). This option is only used in multiplayer.

Advertise on web

Here you specify if the server description is advertised on the Servers list of the Condor website.

Advertise manual IP

If your IP address is not correctly propagated to the Servers list, you can manually enter the IP that will be advertised on the Servers list.

Note: By default, Condor uses port 56278. Do not alter this setting if you don’t need to. For more information on ports, firewalls, NATs etc. visit Condor’s website at www.condorsoaring.com.

When you click Host, you will enter Flight planner. Define the flight plan for the hosted game as you would in free flight mode. There are, however, some changes in NOTAM tab.

Max towplanes

Set the maximum number of towplanes.

Teamplay

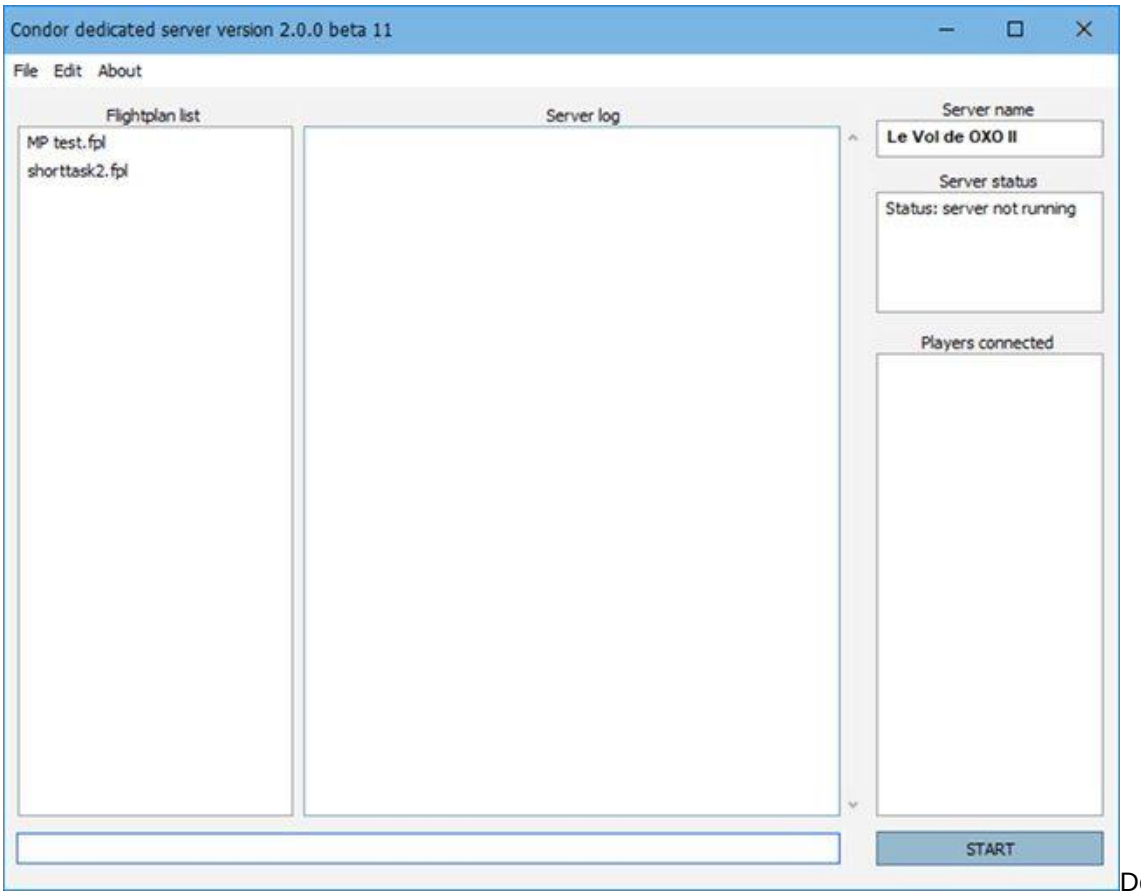
In teamplay, every pilot will be part of a team and the winning team will be the one with the highest score. The team score is computed as an average of scores of all players within the team.

Number of teams

Here you set the number of teams. If you don’t want to use teamplay, drag the slider all the way to the left.

Click Start server to start the flight.

6.4. Stand alone server



Dedicated server is a standalone executable and a part of Condor installation. The purpose of dedicated server is to host Condor multiplayer games on a standalone PC (Win 2000, Win XP or Server 2003).

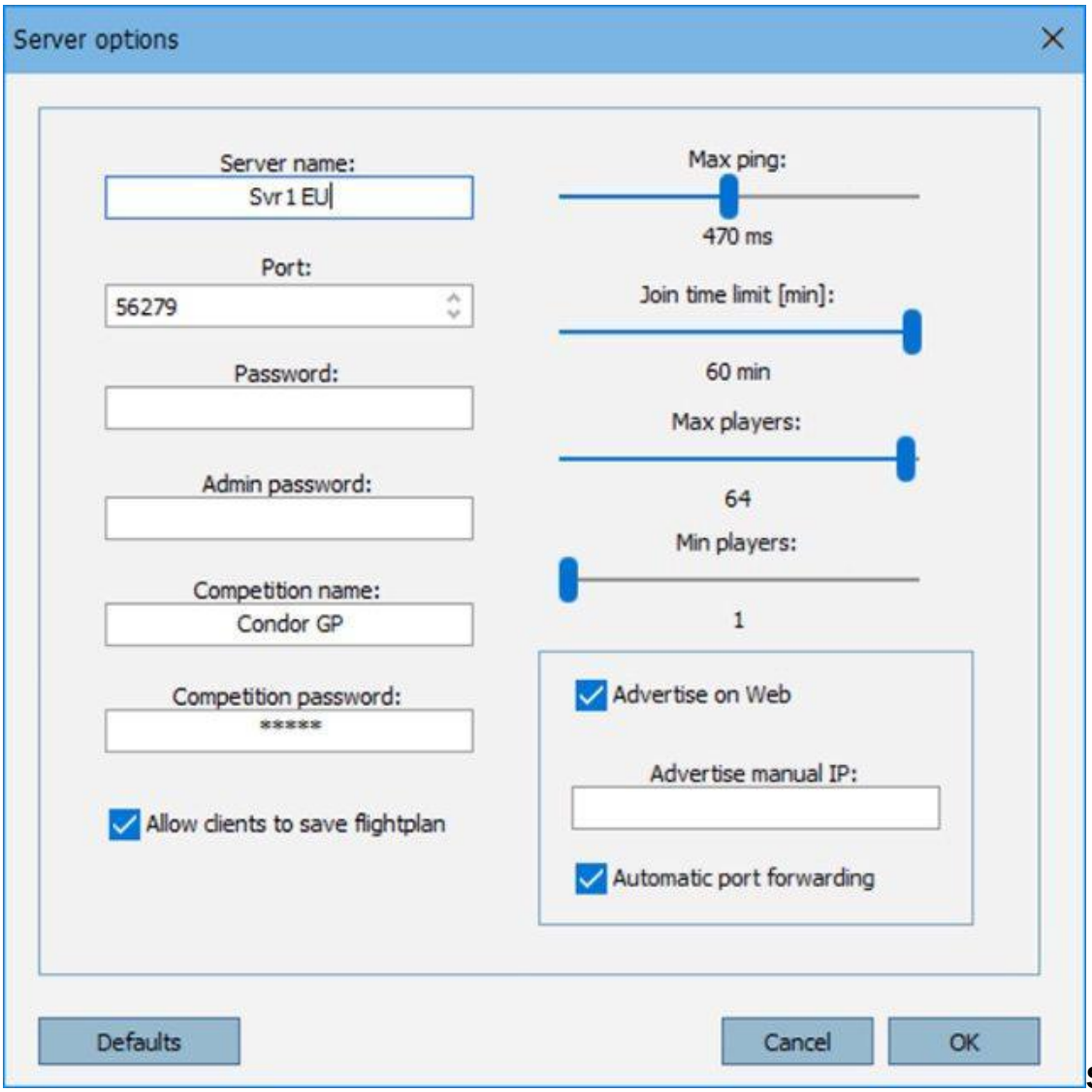
Dedicated server screen

Dedicated server is designed to cycle a list of flight plan files (*.fpl), defined and saved with Condor's flight planner.

Setting up flightplan list

To setup a flight plan list, add flight plans from the context menu by right-clicking the 'Flightplan list' and choosing 'Add flightplan'. The order of flightplans in the list can be changed by dragging them up or down. Individual flightplans can be deleted with 'Delete flightplan' command from the context menu.

The flightplan list can be saved to flightplan list format (*.sfl) and loaded later. Only *.fpl references are saved to this file format, so moving flightplan lists to another computer is not wise.



Setting up dedicated server options

Edit – Server options

The settings are similar as with normal server setup. There are three additional options:

Admin password: Here you set the dedicated server administrator password. If other clients know this password, they can become administrators with .admin dot command.
Competition name: Official competitions can be registered (contact us at condorteam@condorsoaring.com). Such competitions can be shown separately on the web server list.
Competition password: Password protection for official competitions.

Running the server

The server is started and stopped with START / STOP button. When the server is running, you can enter admin commands and chat messages to the input line in the bottom of the screen. Press ENTER to send the message.

When the ‘join in’ time is over, the server automatically proceeds to then next flightplan in the list if the number of players drops below minimum player count, set in the Server Options dialog (Edit menu).

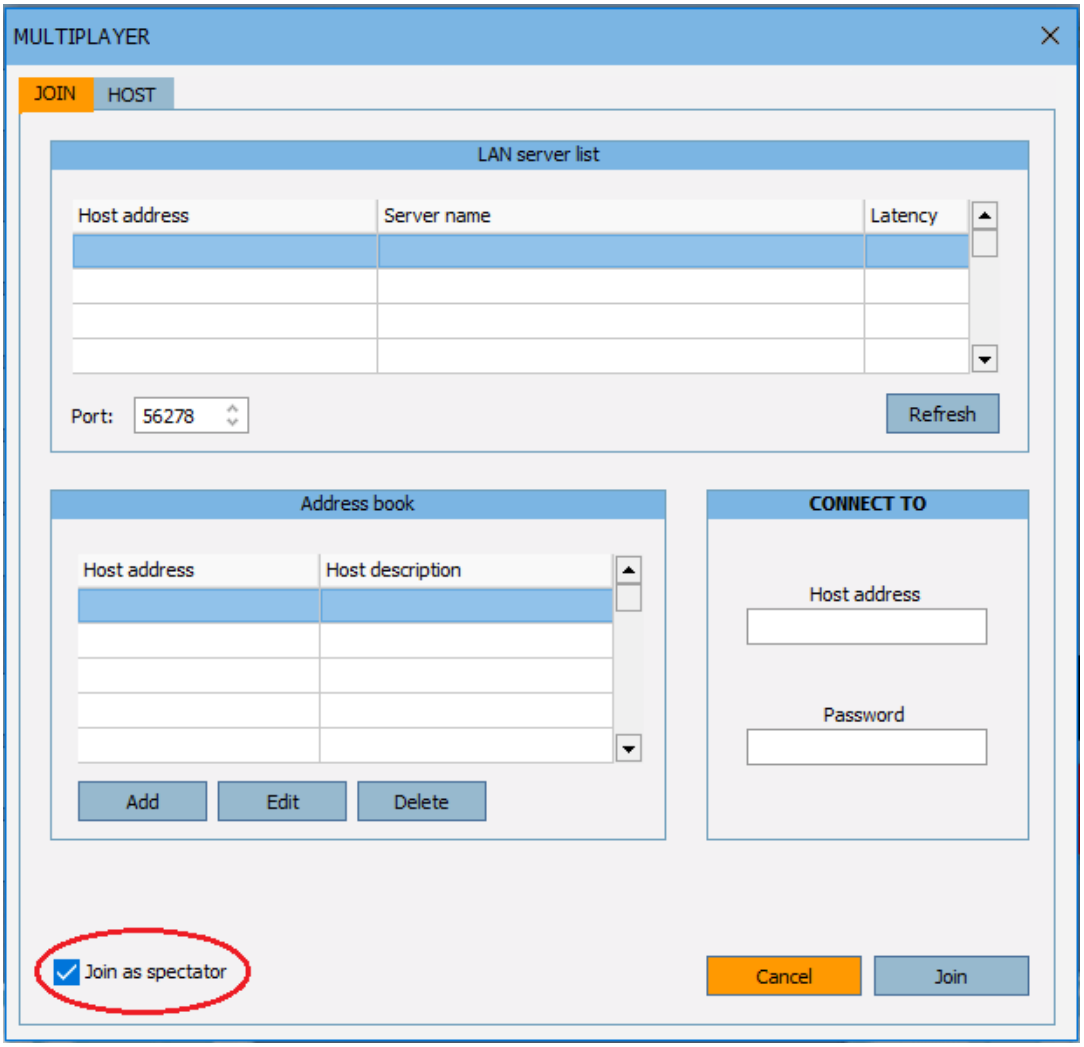
The server log is saved to CondorDedicatedLogFile.txt file in Condor /Logs folder.

6.5. Spectator mode

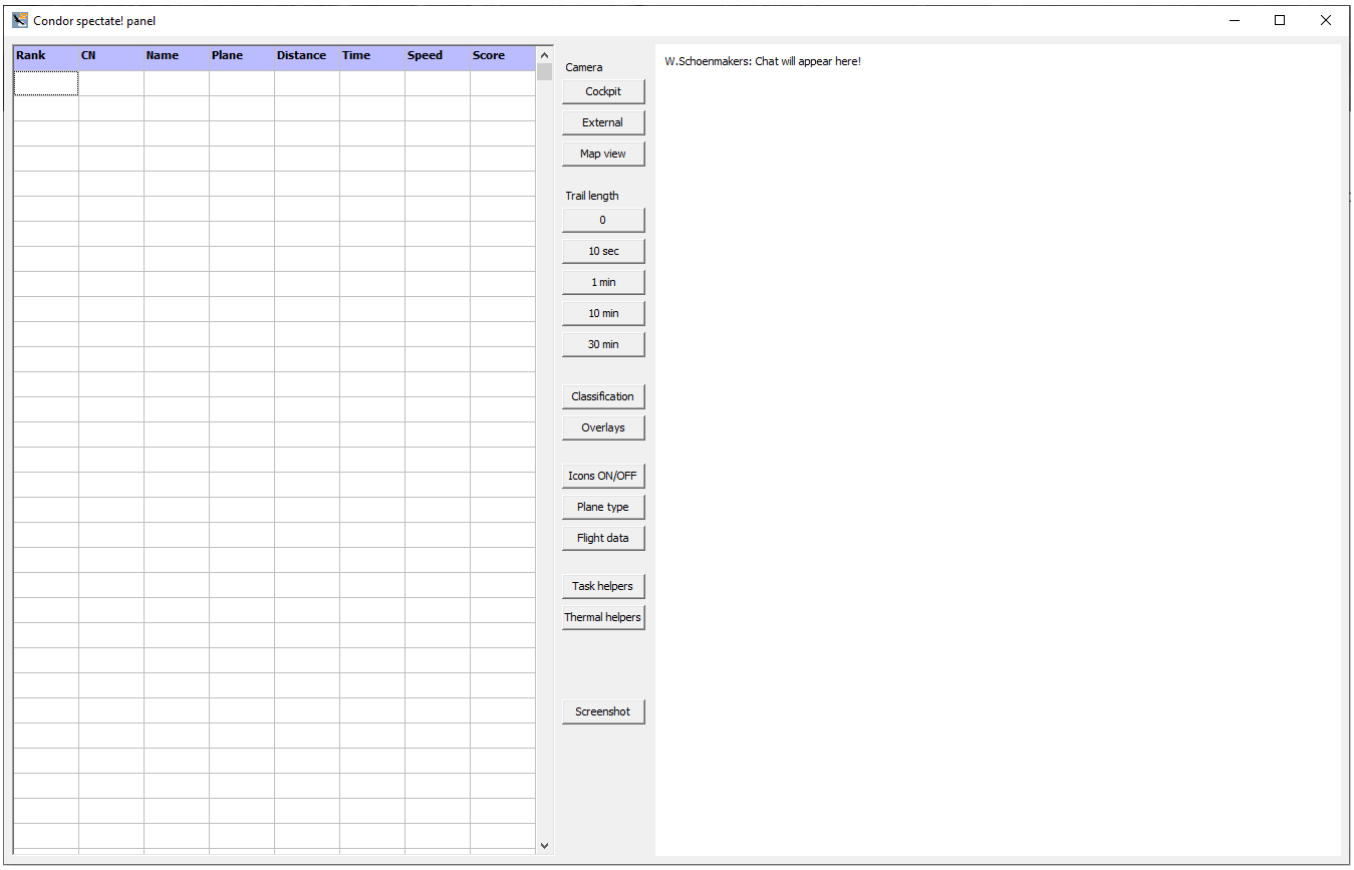
Spectate! allows you to watch online Condor races. It is a way to do live commentary, or just watch a race, or your favorite pilot. It is also a usefull training tool to do flighttraining or cross-country coaching. You are even able to join a server as spectator even after the jointime has expired.

You can use Spectate! on any server in the serverlist (You still need the password if the server is private). You can also join servers as spectator from your address book or by manually entering the server address in the field in the multiplayer window in Condor. To join as Spectator, tick the checkbox “Join as spectator”.

Note that the host may have limited the number of spectators or turned off the ability to use spectate.



After you join you can see the task information like you would see if you join as a player. Selecting a plane has no effect except that if you choose a plane without PDA (like the Grunau Baby or SG38) you will not see the PDA of other players. When you click on Join flight, Condor will load and a new window will open. This is the Spectate! Panel. This allows you to Control the display in Condor.



Ranking

Here you see a list of all connected pilots. Clicking on a pilot in the list will switch the camera to this pilot. You can sort the lists by the different columns by clicking the blue labels at the top.

Cockpit

Shows cockpitview of the selected pilot.

External

Shows external view of the selected pilot.

Map view

Shows a top down view centered on the selected pilot.

Trail length

Turn on trails behind the pilots. You can select different lenghts. Each pilot will have his own colour.

Classification

Turns on the onscreen classification table in Condor.

Overlays

Removes the chat and bottom informationbar from the screen.

Icons ON/OFF

Turns off the glider labels.

Plane type

Toggles the glidertype display in the labels.

Flight data

Toggles between distance, altitude, speed and climbrate in the labels.

Task helpers

Turns on the turnpoint helpers (always shown at maximum range, independent of the FPL NOTAM settings)

Thermal helpers

Shows thermal helpers when enabled by the tasksetter in the NOTAM tab.

Screenshot

Takes a screenshot

Camera area

Area displays the ingame chat. It is also used to move the ingame camera around. Controls are the same as in game. Left mousebutton to pan the camera, right mousebutton to move the camera forwards and backwards.

JSON output

Condor (when connected in Spectate! mode) can act as a HTTP server on localhost, serving JSON files with data about all pilots in the race. The default port for HTTP requests is 8080, but can be changed with the Spectate.ini file which should be put to the Condor\Settings folder. The content of the Spectate.ini file is as follows:

[General]

Port=8081

Usage:

http://localhost:8081/selectedPilot(http://localhost:8080/selectedPilot)

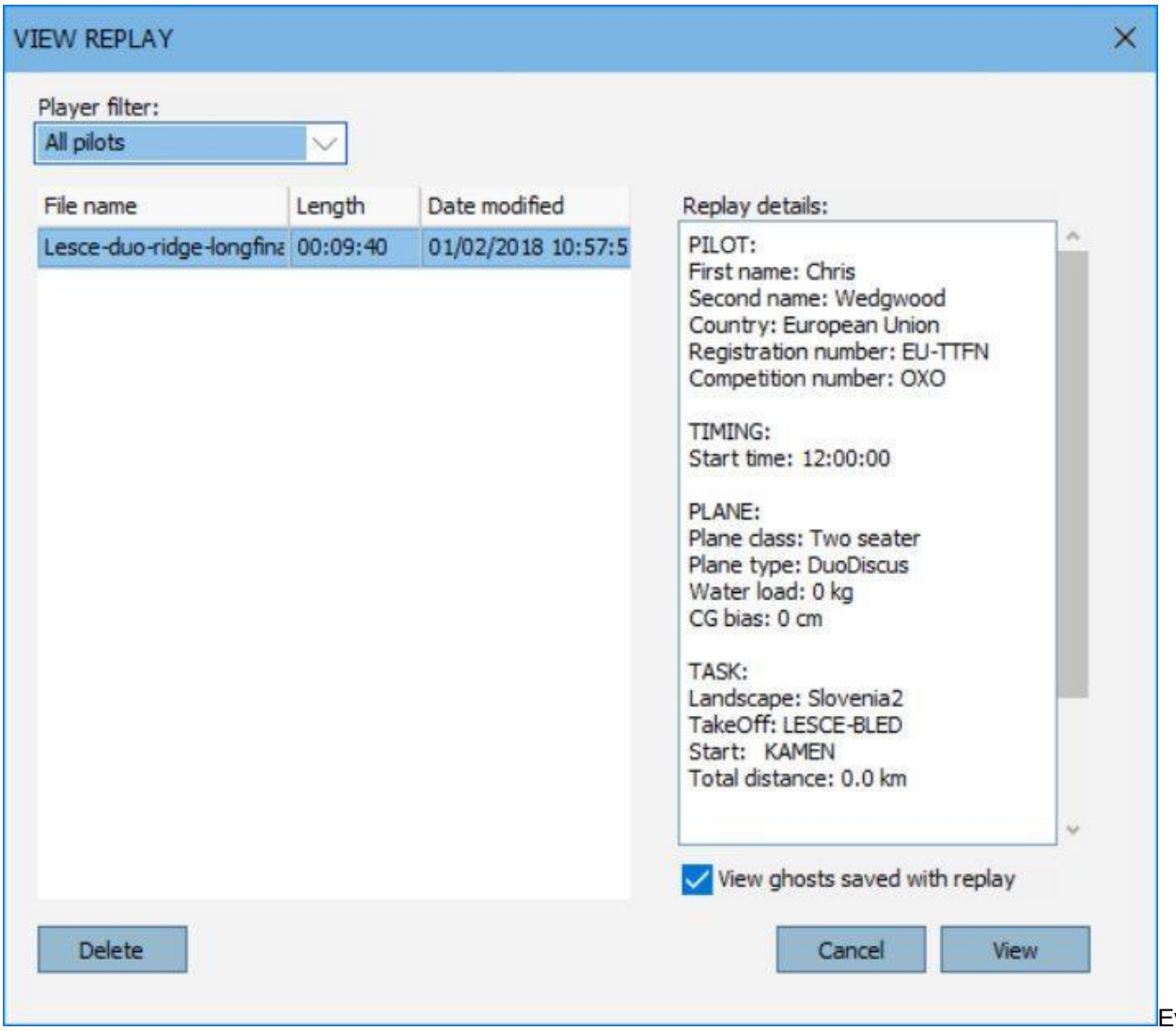
http://localhost:8081/allPilots(http://localhost:8080/allPilots)

The JSON data can be used in software like OBS Studio to create real time overlays about the selected pilot or all pilots.

Example output (returns are added for clarity)

{
“ID”:”3103807898?,
“CN”:”JD”,
“RN”:”F-CTJD”,
“firstname”:”Jean-David”,
“lastname”:”Thoby”,
“country”:”France”,
“plane”:”Ventus3-15?,
“latitude”:”45.53.345N”,
“longitude”:”013.53.071E”,
“altitude”:”118?,
“speed”:”70?,
“heading”:”268?,
“vario”:”0.02?,
“playerstatus”:”Warmup”,
“rank”:”1?,
“score”:”0.0 p”,
“penalty”:”0.0 p”,
“averagespeed”:”—“,
“dist”:”—“,
“time”:”—”
}

7. Replay flights



Every flight can be saved and viewed later. You save the replay of your flight in debriefing room after flying. Replay files have the extension ‘rpy’ and are saved in the Documents/Condor/Replays folder of your virtualstore.

Note: Multiplayer flights can currently not be recorded.

You can also get replays from other pilots, put them into your Documents/Condor/Replays folder and view them. To view a replay, click on View replay in the main menu.

Before you can change views when viewing a replay, you have to toggle replay camera/manual camera with the F9 key

Player filter

Only replays from selected pilot will be shown. If you want to view a complete list of replays in the folder, then specify ‘All pilots’.

File name

Filtered list of *.rpy files in /Replay subdirectory.

Length

Length of the replay.

Replay details

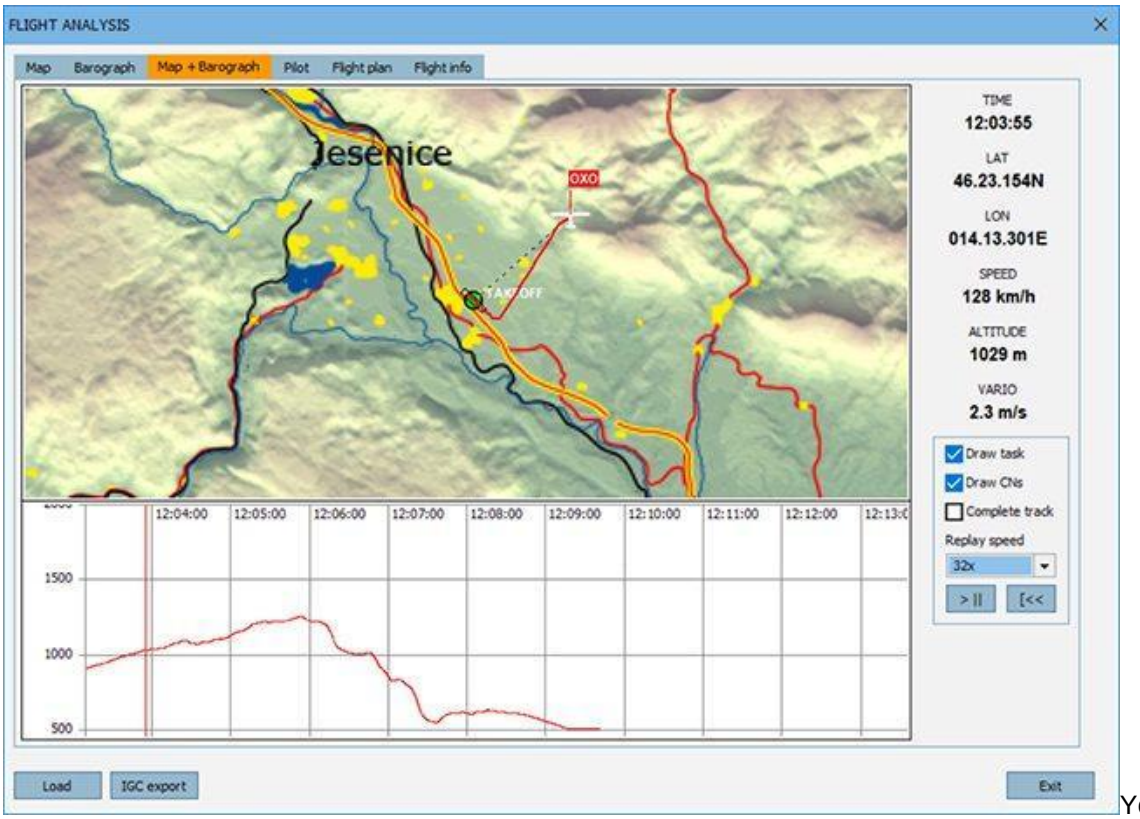
Replay details.

View ghosts saved with replay

View ghosts that were saved with replay.

Click View to view the selected replay.

8. Review and analyse your performance



You can analyse your flight by clicking ANALYSE FLIGHT from the DEBRIEFING menu or analyse saved flights by clicking FLIGHT ANALYSES in the main menu. When entered from the DEBRIEFING menu, the Last Flight is already loaded (LastFlight.ftr). When you enter ANALYSE FLIGHT from the main menu, you first have to load your saved flight by pressing the load button and select a flight track file. Every time you load a file it is added to the window. So you can compare the track to other tracks. The menu has several tabs with different information stored in the flight track file. Barograph, Pilot info, Flight info and the Flight plan. If you press the play button the plane icon will move along your flight path.

Flight track files
You can save your flight to a flight track file (*.ftr) by clicking the SAVE FLIGHT TRACK button in the DEBRIEFING window that is visible after you exit your flight. If you forgot to save your flight track, you can use the ‘LastTrack.ftr’ file that is automatically overwritten every time you exit a flight. So if you need it, don’t enter and exit an other flight without making a copy of it. Flight track files are stored in the Documents\Condor\FlightTracks folder of the current Windows User. They can be shared with other pilots or used as ghosts. They can also be used as a proofing tool for successful task completion or record flights.

IGC files
If you would like to export flight tracks to IGC format to view them with an external IGC file viewer, click IGC export in the FLIGHT ANALYSES menu.

Flight analysis options
When you right-mouse-button click in the window you can zoom and select different moments in the flight.

Draw task
Draws the task legs, turn points and sectors

DrawCNs
Draws the competition number(s) of the glider(s)

Complete track
Draws the complete track. The track you already travelled is drawn with a thicker line.

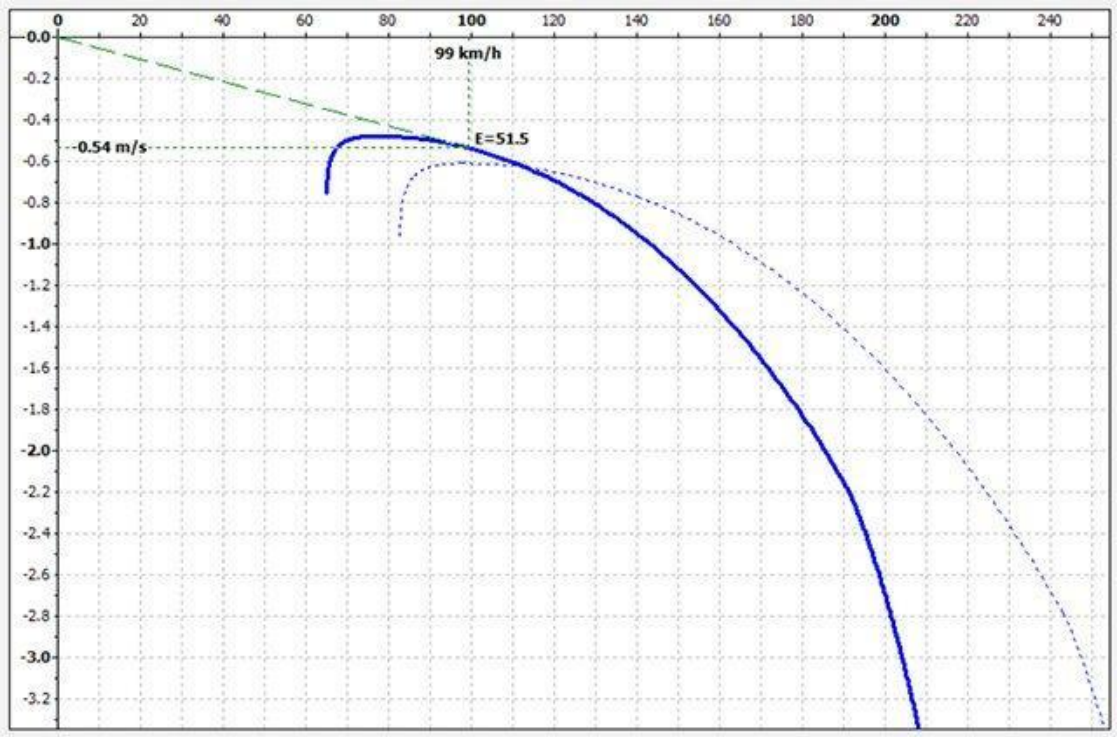
9. All the theory you need

Introduction to soaring

Soaring is one of the purest forms of flying. It uses no internal power sources, only energy from the moving air, just like soaring birds. In still air, the sailplane sinks slowly to the ground, but if the air is rising, the sailplane is rising with it. The true beauty of soaring is trying to understand natural phenomena that cause vertical air currents which allow the sailplane to stay aloft.

There is, however, some energy needed to bring the glider high enough to start using those air currents. Today, the most common form of launching a sailplane is aerotowing. With aerotowing, the sailplane is connected to a motored towing plane with a top rope.

9.1. Sailplane performance



Speed polar

The performance of the sailplane is best described with speed polar. The speed polar is a graph of speed vs. sinking speed.

There are several important points on the speed polar:

Minimum speed

The point of minimum speed is the leftmost point on the polar curve. Sailplane can not fly below minimum speed, because it can not produce enough lift to counteract the gravity of the sailplane. Minimum speed should be as low as possible as it means shorter landings and lower radius of circling in thermals.

Minimum sink

The point of minimum sink is the topmost point of the polar curve. If the glider flies at this speed, it will have the lowest sink speed. Obviously, the minimum sink speed should be as low as possible and it should be obtained at lowest speed as possible.

Best glide

At specific speed, called speed of best glide, the glide angle is the shallowest. If the glider flies at this speed, it will fly the furthest. We can get best glide angle by drawing a tangent to the polar through the origin of the axis system.

Glide ratio

The ratio between speed – v and sink speed – w is called glide ratio – E:

E = v / w

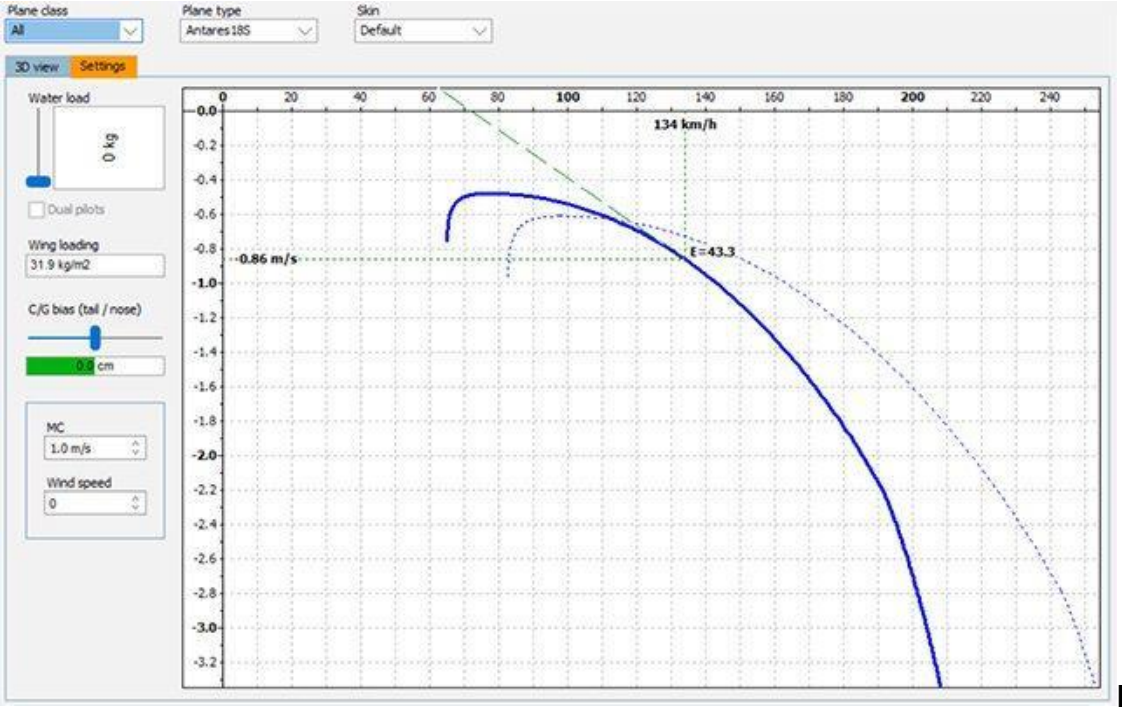
From a diagram of forces it can also be shown that glide ratio is ratio between lift force – L and drag force – D.

E = v / w = L / D

We can get the glide angle from glide ratio as follows:

tan(?) = E

Typical glide ratios of modern sailplanes range from 40 to over 60. That means that in still air the sailplane will fly 60 kilometers from 1000 m height before it will reach the ground.



MC theory

When flying between updrafts, soaring pilot has to decide how fast he will fly. If he is flying only to stay aloft, then he might choose the speed of best glide to cover as much distance as possible. This will give him the greatest chance of finding another updraft. But if he is flying cross country or in a competition, he will want to achieve the highest possible average speed.

So he might fly as fast as possible to the next thermal – but this will not give him the highest average speed as he will lose a lot of time gaining height again. He might fly with the speed of best glide – again he will not have the best average speed. This time, he will lose too much time to reach the next thermal. The optimum speed is somewhere in between.

To find the optimal speed, Paul McCready invented “optimal speed theory”, later known as MC theory. According to this theory, to compute the optimal speed between updrafts, you need three things:

– the speed polar of your glider
– vertical speed of the air that you are currently flying trough and
– the expected rate of climb in the next updraft

The speed polar is known and the current vertical air speed can be measured by instruments. Today, using modern electronic equipment, these parameters are automatically entered into flight computer. The pilot only has to enter one more value: the expected rate of climb in the next updraft. Usually, this value is called MC value or simply MC. The output from the flight computer is the optimal speed to fly to achieve the highest average speed.

Graphically, the speed to fly is found by drawing the tangent to the polar from the point of expected rate of climb.

Finding optimal speed to fly

We are expecting to climb 1 m/s at the next updraft and we can see that the optimal speed to fly is 134 km/h. It can also be shown that the average achieved speed is the point where the tangent cuts the speed axis, in our case around 72 km/h.

10. Key mappings

New wpDataTable

	Command	Key	Remarks
wdt_ID	Command	Key	Remarks
1	Bank Left	LEFT	
2	Bank right	RIGHT	
3	Pitch up	UP	
4	Pitch down	DOWN	
5	Rudder left	Z	
6	Rudder right	X	
7	Rudder centre	C	
8	Airbrakes in	N	
9	Airbrakes out	B	
10	Flaps up	F	

11. In-game commands

	Command	Parameters	Description
wdt_ID	Command	Parameters	Description
1	.d	No params	delete last replay comment
2		Comment text	add replay comment
3	.team	Red, Lime, Yellow, Blue, Fuchsia, Aqua, White, Black	Changes the current team (before race start)
4	.admin	Password	Add client to dedicated server admins
5	.towinfo	No parameters	Debug command used if the towplane does not start
6	.password	Password	Sets dedicated server

	Command	Parameters	Description
wdt_ID	Command	Parameters	Description
			password
7	.listids	No parameters	Lists IDs of all players
8	.kick	Player ID or Player CN	Kicks player from the game
9	.ban	Player ID or Player CN	Kicks player and adds them to the ban list
10	.stopjoin	No parameters | minutes | inf	Sets stop join time

12. Simkits and UDP outputs

Condor features streaming of data like instruments readings and plane data to external applications which can use this data to move instruments and 3D motion platforms.

Condor natively supports Simkits hardware (www.simkits.com) and additionally provides generic UDP output for custom built instruments and cockpits.

Simkits support

Currently, four instruments are supported:
airspeed indicator
altimeter
electronic variometer
compass

Variometer data is sent out as »attitude_bank« parameter because some older Simkits controllers (SIC) don’t support variometer natively. Just plug the variometer to attitude indicator connector.

Simkits.ini

Simkits output is enabled by setting »Enabled=1« parameter in the »Simkits.ini« file found in the Condor\Settings installation directory:

```
[General]
 Enabled=1

[ScaleFactors]
 Vario=5.9
```

```
 Airspeed=1.944
 Altimeter=1
 Compass=1
```

With »ScaleFactors« you can calibrate the instruments so they correspond to actual values.

Generic UDP output

Condor can stream data to external applications using UDP protocol.

UDP.ini

UDP output is enabled by setting »Enabled=1« parameter in the »UDP.ini« file found in Condor installation directory:

```
[General]
 Enabled=1

[Connection]
 Host=127.0.0.1
 Port=55278

[Misc]
 SendIntervalMs=1
 ExtendedData=0
 ExtendedData1=0
 LogToFile=0
```

In the same file host address and port are also set. Send rate is controlled by SendIntervalMs parameter which specifies the time interval between two consecutive data packets. Some additional parameters are available if ExtendedData or ExtendedData1 are enabled. The output can also be logged to file for debug purposes by setting the »LogToFile=1« parameter.

UDP Packet data

The data packet is an ASCII stream of ‘parameter=value’ pairs with the following parameters

Note: all values are floats with ‘.’ as decimal separator
* available only if ExtendedData1=1 in UDP.ini

	Parameter	Value	Units
wdt_ID	Parameter	Value	Units
1	time	in-game display time	decimal hours
2	slipball	slip ball deflection angle	rad
3	altitude	altimeter reading	m or ft according to units selected
4	vario	pneumatic variometer reading	m/s
5	evario	electronic variometer reading	m/s

	Parameter	Value	Units
wdt_ID	Parameter	Value	Units
6	nettovario	netto variometer value	m/s
7	integrator	integrator value	m/s
8	compass	compass reading	degrees
9	slipball	slip ball deflection angle	rad
10	turnrate	turn indicator reading	rad/s

13. PDA in flight computer

Condor has a built in PDA flight computer. To make the PDA easier to read, you can zoom in on the panel (default key Y).

The condor PDA has 4 screens. You can cycle through the screens either by pressing the Handheld Next Screen key (default key is M), or by pressing any of the handheld screen keys (default keys 1 through 4) to access each screen directly.

Screen 1 shows a moving map with your turnpoints. You can zoom in and out by using the Handheld Zoom keys (default PgUp and PgDwn). Pressing the 1 key a second time will toggle the topographic map on or off. The next turnpoint (or start/finish zone) is displayed in red, and will turn green when you pass through it. If the turnpoints have altitude limits, they will be marked as text in the zone.

In Screen 2, the black dot shows the direction to the next turnpoint. When the dot is in the center of the screen, you are flying directly towards the turnpoint. This screen also shows various data related to the next turnpoint: bearing, heading, distance, VMG (velocity made good), TTG (Time to Go) and ETA (Estimated Time of Arrival).

In PDA screen 3, the red dot works similar to the black dot in screen 2, but it works in two dimensions: if the dot is above the main centerline, it means that the glider is too low to reach that turnpoint. If its below the centerline, it means you should be able to reach the turnpoint. This will also be shown by the numbers, DDH is the estimated altitude at which you will arrive at that turnpoint, taking in to account your McCready setting to estimate speed, and DH is your current altitude above (or below) the turnpoint. TTG is Time To Go and ETA the Estimated Time of Arrival.

With PgUp and PgDn keys in screen 3, you can perform the same calculations but spanning multiple waypoints. A +1, +2 etc will appear to show you its calculating the glide using more waypoints than just the next.

PDA screen 4 will alternate between a wind rose and the thermal helper each time you press 4. The wind rose shows the estimated wind strength and direction, the thermal helper shows your flight with a trail in different colors to represent vertical speed, which can help you center a thermal or locate wave.

14. Using Condor with external PDA

XCSOAR

Connect Condor to XCSoar running both on different devices via internet/wifi connection

1. Install HW VSP3 – Virtual Serial Port.
http://new.hwg.cz/files/download/sw/ver … _3-1-2.exe(http://new.hwg.cz/files/download/sw/version/hw-vsp3s_3-1-2.exe)

You can choose standalone installation (without Server/Client option)

2. Condor device (computer) and XCSoar device (Computer/Android phone/Kobo Mini) must be connected to same WiFi network /router

3. Note IP address of XCSoar device e.g. 192.160.0.12

4. In XCSoar FLY mode go to Config / Devices / Edit Device e.g. Device A
Port: select TCP Port
TCP Port: 4353 (note this number if different because you have to enter it into TCP Client in HW VSP3)
Driver: Condor Soaring Simulator

Note: You must select the “Condor Soaring Simulator” in the device list (Config/Devices/Edit/Driver) in order to have correct altitude readings.

5. Start Condor, go to Setup > Options > NMEA Output and check number of the last existing COM port (e.g. COM4). Exit Condor.

6. Start HW VSP3, go to Virtual Serial Port tab and set:
Port name: COM5 (Choose COM number higher than the last existing one in step 5)
IP Address: IP address of Computer / Android / Kobo Mini on WiFi network (e.g. 192.168.0.12)
Port: 4353 (port from XCSoar device A configuration)

Click “Create COM”, leave HW VSP3 window in the background.

7. Start Condor, in Setup > Options enable NMEA output and choose virtual com port (e.g. COM5 created in step 6)

8. Start flight!

Next time you want to fly, you only need to start HW VSP3, go to Virtual Serial Port tab and click “Create COM” before starting Condor.

Additional maps for XCSOAR can be found at:
https://www.xcsoar.org/download/maps/(https://www.xcsoar.org/download/maps/)

A flight plan converter for XCSoar, LK8000 and SeeYou as well as speed polars for Condor gliders can be found at: https://www.condorutill.fr/