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## Introduction

As with any piece of software, knowing its capabilities is key to its effective use. The purpose of this document is to help you get off to a quick start with Condor. While designed as a simulation of competition soaring, the emphasis of this orientation is based on using Condor as a learning aid.

## Acquisition (where to buy Condor)

I recommend purchasing the Condor software and peripherals (joystick, rudder pedals) from Paul Remde. Paul has been very supportive of flight simulation as a way to improve glider flight training and proficiency, and provides excellent service and support to the soaring community.

Connect to the [Cumulus Soaring, Inc.](#) website. Scroll down and click on the Condor image / page link. The Condor page begins with a very thorough review of Condor followed by a product selection and ordering section. Related products can be ordered individually or in groups (kits). For new students, I recommend the Condor Standard Kit (Software, Joystick, Rudder Pedals).

## Installation

Condor was originally developed under Windows XP, and by default installs into the C:\Program Files (X86) directory. X86 is a Windows system directory, so messing around inside it often requires administrative privileges. More recently, Windows operating systems began storing all files created by the software in a “compatibility” directory, not in the X86 installation directories where you might logically (historically) expect to find them. Finding and using this compatibility directory can be confusing.

To avoid the operational complexities associated with these operating system “features”, I recommend installing Condor directly under the C:\ drive, i.e., **C:\Condor**. This will require that you change the installation directory from the default specification of “C:\Program Files (x86)” to “C:\” during the installation process.

The advantages of installing directly under C:\ are that you don’t need to be an administrator to find and access your Condor files, and all files are stored exactly where you would expect them to be.

The downside of this end run around the compatibility file feature is that any files created by the software, or placed in your Condor installation subdirectories, would be lost if you needed to reinstall the software. So, it is a good idea to store copies of the Condor files you created in another safe place.

## Registration

The first time you start Condor, you will need to register your installation. This is done from Condor’s main page by clicking on the *Registration* button and entering the License Key that came with your software.

When the registration is accepted, the *Registration* button no longer appears on the main page.

## Functional Overview

Each of the following Condor functions will be covered in more detail later in the orientation. For now, here is an overview of Condor's main-page functions.

## Condor Version

The current version of Condor is "1.1.5".

Software patches, designed to bring your installation up-to-date, are available from the Condor website [Downloads](#) page.

## Pilot

Condor allows multiple Pilots to be defined for a single installation. Each *Pilot* specification is allocated a unique set of *Setup* parameters and a separate *Logbook*.



## Flight School

The Condor developers likely knew non-pilots would purchase their software. Rather than having those folks buy the software, and be frustrated or disappointed by their experience, the developers wisely designed *Flight School* to help these folks get off to a quick start; to learn the essential fundamentals of controlling a glider in flight, to learn something about soaring, and to become familiar with some of Condor's features.

While *Flight School* is nicely organized and reasonably well implemented, it does not, in my opinion, represent high-quality, comprehensive, glider flight instruction. I do not use *Flight School*, nor recommend it, for that purpose.

*Flight School* does, however, have one very useful feature, the ability to begin a flight session at any 3-dimensional point within the selected landscape. 'More about this later.

## Free Flight

*Free Flight* mode starts by enabling you to completely define your flight environment, including location, weather, the glider you will fly, your launch method, etc. Then, as the name suggests, you are free to go flying.

## Multi-Player

Condor was designed to simulate the world of glider competition flying. By networking Condor installations together, locally and/or via the Internet, participants anywhere in the world are able to simulate racing their gliders against each other.

This ability to simulate flying with other piloted gliders, in real-time, also has a number of valuable instructional applications.

## View Replay

Condor's *Replay* function is like having multiple [GoPro](#) cameras positioned on and around the glider, around the tow plane, and on the ground looking up at the glider. After completing a *Free Flight* session, you can "Replay" your flight (like watching a movie, only better), from any combination of these points of view.

## Flight Analysis

During any *Free Flight* session, Condor is continuously recording a specific set of flight parameters, including latitude, longitude, altitude, airspeed, descent rate, etc. It is essentially performing the functions of a real-world flight data recorder.

When played back through the *Flight Analysis* function, the flight data is used to graphically generate and display a ground track (horizontal plot), and/or a barograph (vertical) plot of your flight.

*Flight Analysis* is Condor's equivalent of real-world flight analysis software, such as [SeeYou](#).

## Setup

*Setup* is used to:

1. optimize Condor's video, audio, and data outputs based on your computer system capabilities.
2. establish a number of instrumentation-related and miscellaneous preferences.
3. assign flight control inputs, and various control system function commands, to your computer system peripheral devices (keyboard, mouse, joystick, rudder pedals, etc.).

## Manual

Condor's user *Manual* is available in six different languages in both .PDF and Microsoft .DOC formats. The *Manual* documents are stored in language-specific folders within the **C:\Condor\Manuals** directory in Windows.

When you press the *Manual* button on the *Main Page*, Condor will attempt to open the .PDF document for the language preference you specified during installation. You may need to install a .PDF document reader.

## Exit

*Exit* is used to end (quit) the Condor application.

## Detailed Orientation

Because you will spend most of your time in *Free Flight*, and because all of Condor's other functions either depend on, or replicate the execution of a *Free Flight* session, I have elected to begin the detailed orientation with a review of the *Free Flight* function.

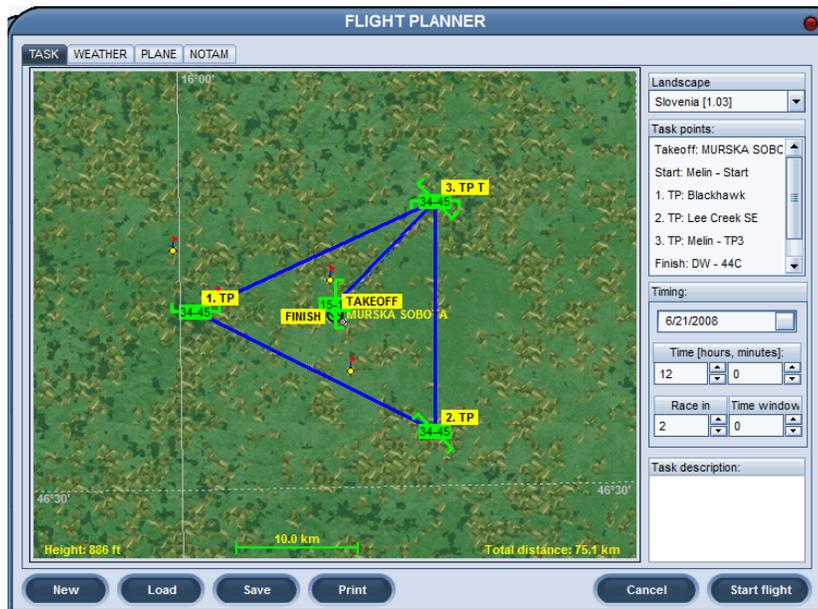
## Free Flight

### Flight Planner

Selecting *Free Flight* from Condor's main page takes you to Condor's *Flight Planner*.

The *Flight Planner* is used to specify a set of approximately 40 parameters that collectively define the flight environment for a given Condor session. A complete set of parameters is called a "*Flight Plan*" and comprises four subsets of related parameters: *Task*, *Weather*, *Plane*, and *NOTAM*.

While Condor comes complete with a set of pre-defined (*Default*) flight plans, you have the ability to create, modify, save, delete, reuse, print, execute, and share your own "custom" (*User*) flight plans.



*Flight Plan* files have a file type extension of ".fpl". The *Flight Plan* files that come with Condor are stored in the "C:\Condor\FlightPlans\Default" directory. *Flight Plans* you create using the *Flight Planner* are stored (saved) in the "C:\Condor\FlightPlans\User" directory. *Flight Plans* you receive or download from other sources may be placed in either the "Default" or "User" subdirectory. I recommend the "User" subdirectory for this purpose.

*Flight Plan* files are physically quite small and can easily be shared/transmitted as email attachments.

I often send my students the *Flight Plan* file(s) they will need for a particular lesson, or have them download the *Flight Plan* file(s) from my website, [gliderCFI.com](http://gliderCFI.com). This saves them the trouble of having to create their own *Flight Plan* and ensures consistency.

*Note:* The task of describing Condor's flight planning process, in detail, reminds me of the joke "How do you eat an elephant?" The answer: "One bite at a time." So let's get started.

## Functions

The *Flight Planner* functions are invoked via a series of buttons located at the bottom of each *Flight Planner* page (tab).

### New

This function initiates the process of creating a new *Flight Plan* by setting all the *Flight Plan* parameters to their default values.

When you press the *New* button, Condor issues a somewhat confusing and disconcerting message:

**“This will discard (the) current flight plan. Continue?”**

The *Free Flight* environment is generated based on the values of the *Flight Planner* parameters at the time you start the flight.

The “... discard ...” message is a warning that Condor is about to replace the current contents of the *Flight Planner* with a set of pre-defined parameter values designed to help create a new *Flight Plan*.

If the current set of parameters in the *Flight Planner* has not been saved as a *Flight Plan* “file”, you are indeed about to have your *Flight Plan* discarded.

However, resetting the parameter values in the *Flight Planner* has no effect on the *Flight Plan* “files” stored (saved) in the *C:\Condor\FlightPlans\*(Default or User) sub-directories.

### Save

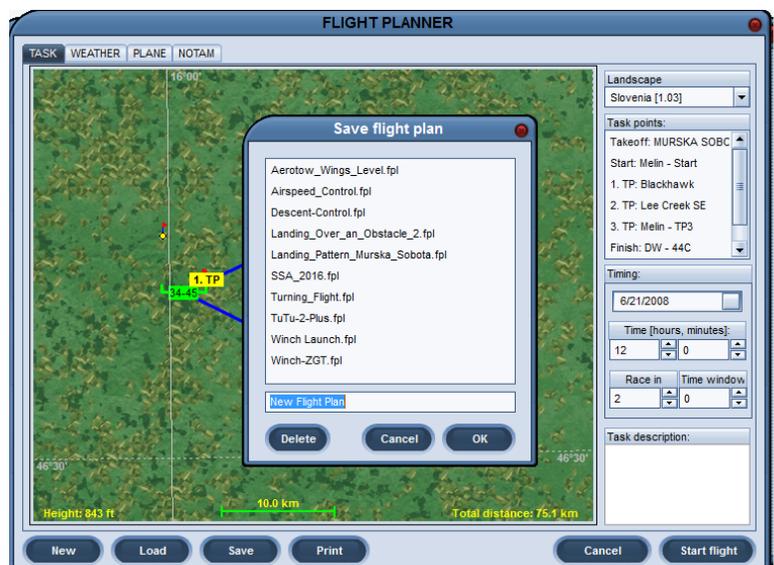
This function saves the current combination of *Flight Planner* parameter values as a named *Flight Plan* file.

Click the *Save* button to open the “*Save Flight Plan*” page and enter the name of the new flight plan.

Clicking OK will save the new *Flight Plan* in the *C:\Condor\FlightPlans\User* sub-directory.

Once you have a *Flight Plan* saved, you can retrieve and reuse it anytime.

You can also use an existing *Flight Plan* as a template (starting point) for creating a *New Flight Plan*. Simply *Load* an existing *Flight Plan* into the *Flight Planner*, make the desired changes, and *Save* the *New Flight Plan* using a new name.



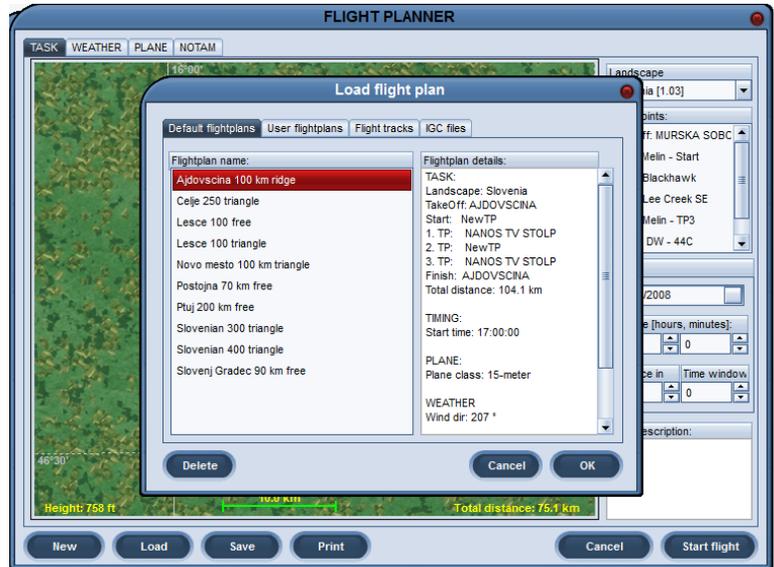
## Load

This function allows you to load the specifications, contained in a saved *Flight Plan* file, into the *Flight Planner* where it can be modified or executed.

Click the *Load* button to open the *Load Flight Plan* page.

The *Default Flight Plans* tab is pre-selected and the *Flight Plan Name* sub-panel (left) lists all the *Flight Plans* that came standard with your Condor installation, i.e., the defaults.

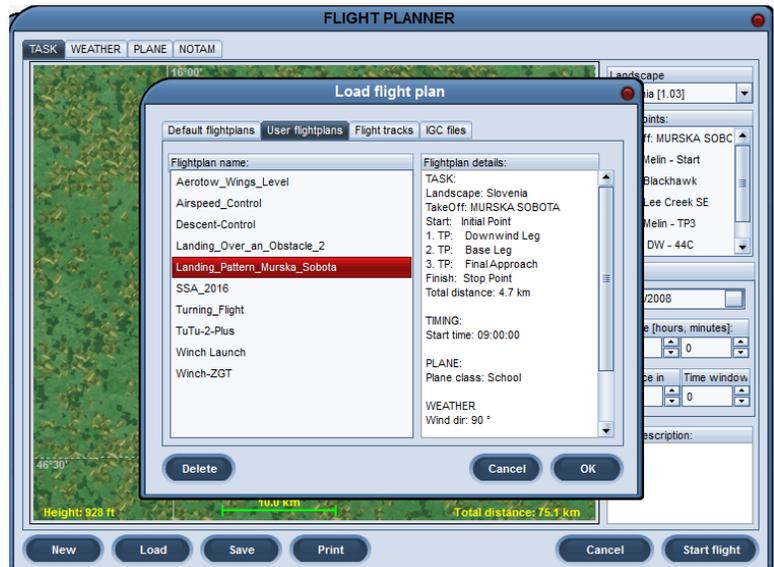
Information about the selected (highlighted) *Flight Plan* is displayed in the *Flight Plan Details* sub-panel (right).



To load a *Flight Plan* into the *Flight Planner*:

1. Click on a source tab (e.g., *User Flight Plans*).
2. Click on a *Flight Plan* name to select/highlight it.
3. Click OK.

Your selected *Flight Plan* is now loaded into the *Flight Planner* and ready to be modified or executed in a *Free Flight* session.

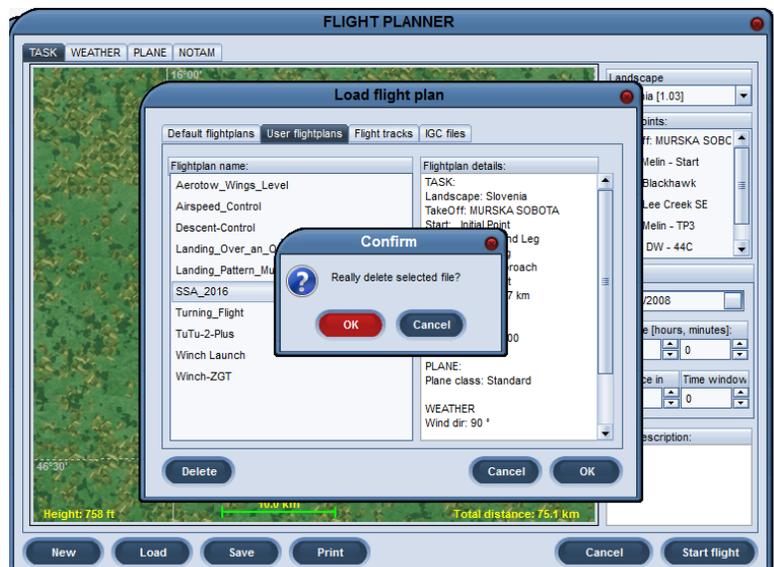


## Delete

To delete a *Flight Plan* file:

1. Click the *Load* button on any *Flight Planner* panel.
2. Click on a source tab (e.g., *User Flight Plans*).
3. Click on a *Flight Plan* name to select/highlight it.
4. Click the *Delete* button.
5. Click the *OK* button on the *Confirm* panel.

Deleting a *Flight Plan* file has no effect on the contents of the *Flight Planner*.



### Print

Apparently you can print a *Flight Plan*. I have yet to find a reason to do this.

### Cancel

Clicking the “*Cancel*” button closes the *Flight Planner* function and returns you to Condor’s main page.

### Start Flight

This function executes the *Flight Plan* contained in the *Flight Planner*. When you click the *Start Flight* button, the Condor application uses the parameters specified in your *Flight Plan* to build your *Free Flight* environment. As the build progresses, you see a static image screen, with a progress/status bar at the bottom, displaying messages like “**Loading Terrain Features**”, “**Calculating Weather**”, “**Loading Planes**”, etc.

When the build is complete, you find yourself seated in your glider, looking out at the world you created specifically for this flight. Condor is now in *Free Flight* mode and, for about 5 seconds, displays the message “**Press ESC to Start**” at the top of the monitor.

To actually begin flying:

1. Press the *ESC* key on your keyboard.  
Condor displays the *Game Menu* panel.
2. Click on *Ready for Flight*.  
At the top of the monitor, Condor displays the message “**The Flight will start in 3 seconds**”, and indeed it does.



Note: Condor always retains the most recently executed (started) *Flight Plan* in the *Flight Planner*, even if you close the Condor application and/or shut down your computer. This is a nice feature, but can lead to some confusion.

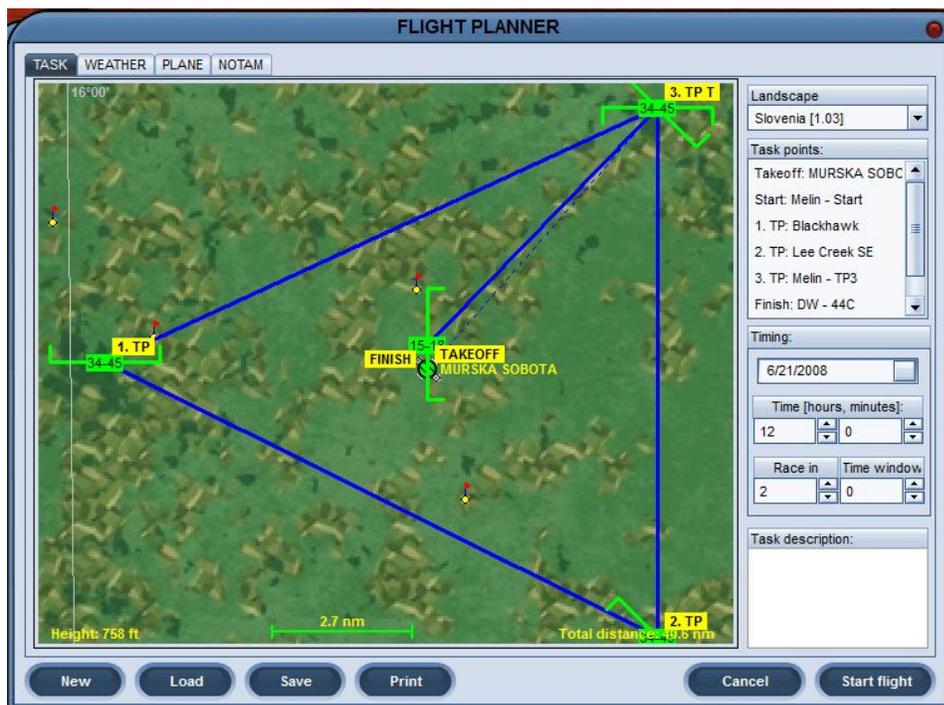
Unless the contents of the *Flight Planner* are specifically saved as a named *Flight Plan*, the contents of the *Flight Planner* will be lost when:

1. a new *Flight Plan* is created or an existing (named) *Flight Plan* is Loaded into the *Flight Planner* and
2. the updated contents of the *Flight Planner* are executed via “*Start Flight*”.

## Task

Condor was designed to simulate competition soaring. Real-world competitions are hosted at airports, so Condor requires that every flight session begin at an airport. In the real world, each day's competition is based on a "task" composed of a start, a series of turn-points, and a finish, so each Condor session requires that a *Task* be specified, whether you think you are racing or not.

The *Task* page is the first one you see when you enter the *Flight Planner*, and comprises the *Landscape*, *Timing*, *Task Description*, and *Terrain Map* sections.



## Landscape

Condor's default *Landscape* is a section of the developers' home country of Slovenia (northeast of Italy). Fortunately, this relatively small area of the planet has a wide-variety of terrain. It has completely flat areas that provide the unobstructed horizon needed for primary training, but also has beautiful, long ridges, and some very mountainous areas where wave flight and mountain flying can be experienced.

Condor's default landscape (Slovenia 1.03) is relatively featureless compared to the photo-realistic landscapes available today. The large-scale terrain features (mountains, lakes, etc.) are clearly obvious, but there are no roads, towns are tiny, wooded areas are sparse, etc. One instructional advantage of this relatively featureless landscape, however, is that students can't rely on ground features (like the local barn) to determine their position in the traffic pattern. They are properly forced to use visual references (e.g., depth perception, slant angle, the size of known objects, etc.) to make a proper approach.

Unlike Microsoft FSX, the entire world's landscape is not available in Condor. There is a landscape development kit that allows folks (with lots of time on their hands) to develop a landscape for their own part of the world. In fact, new landscapes for Condor are being announced almost daily. Many parts of the U.S. are already developed including Minden NV, Harris Hill NY, Mifflin PA, etc. For primary instructional purposes, however, I favor instructing in unfamiliar territory. Lessons learned there can be applied anywhere.

The landscape used in the current *Flight Plan* is displayed in the *Landscape* sub-panel located in the upper right-hand corner of the *Task* panel. All installed *Landscape*s may be viewed and selected from the *Landscape* subpanel drop-down menu

## Timing

This section of the *Task* page includes a date, a *Time* of day, and the *Race In* and *Time Window* values.

### Date

While not specifically labeled, the *Date* value defaults to June 21 (northern hemisphere summer solstice) of the current year; the day the sun is most directly overhead, resulting in the greatest ground heating and therefore the best thermal production (at least on level terrain).

Clicking the shaded box to the right of the *Date* opens a calendar window allowing you to graphically change the date.

### Time

The *Time* (of day) values determine the start time for your simulated flight. It should be no surprise the *Time* defaults to noon. Condor is racing software and a 12:00 PM start time would help ensure good thermal production.

In the same way, however, certain flight lessons are best taught at other times of the day. For example, I prefer to introduce my students to aero-towing in the calm, quiet, smooth air masses characteristic of the early morning or early evening. Thermal flying instruction would best be done from late morning through late afternoon. Being able to control the instructional time of day helps ensure the flight environment is ideal for the day's lesson.

### Race In

The *Race-In* value represents the amount of time between the beginning of your *Free Flight* session and the start of what Condor thinks is a race, i.e., the opening of the *Start* gate. The default value for *Race In* is 10 minutes. The minimum setting is 1 minute.

Three seconds before the *Race In* time expires, Condor emits a series of audio tones that sound like the start of an Olympic downhill ski run; 3 beeps at 1-second intervals followed by a single, higher-pitched, beep. As the *Race In* time expires, Condor also displays “**Race Is On**” in red text, at the top-center of the screen.

The *Race In* time setting can impact instructional resource development. When using *task points* as visual references, Condor indicates the next *task point* using color-coding. The active *task point* (the one you are navigating to) is colored red/yellow. As you pass the active *task point*, it turns red/white, and the next *task point* in the sequence becomes active and turns to red/yellow.

This color-coded sequencing of visible *Task Points* does not begin until the *Race In* time expires. So, if you want the *Task Points* to sequence, you need to set the *Race In* time such that the glider arrives at the *Start* “after” the *Race In* time expires.

The *Race In* timer appears in the upper left corner of your *Free Flight* screen as, e.g., “**RACE IN: 00:00:59**”.

**Timing (cont.)**

**Time Window**

*Time Window* is the amount of time the *Start* gate remains open. The *Time Window* countdown begins when the *Start* gate opens (i.e., *Race In* time expires). The default value for *Time Window* is 0 minutes and is used to establish a “Regatta” start (race begins when the first contestant exits the start gate).

It is not clear to me what affect an elapsed *Time Window* (closed *Start* gate) has. I would think it would prevent a competitor from starting the task, but I was able to start a task normally, in both *Free Flight* and *Multi-Player* (networked) mode, even after the *Start* gate closed, i.e., *Time Window* expired. I must not understand something.

If the *Time Window* value is greater than zero, the *Time Window* count-down appears in the upper left corner of your *Free Flight* screen as “**START GATE CLOSES IN, e.g., 00:02:30**”.

**Task Description**

Text may be entered into this area to more clearly describe the purpose, characteristics, etc., of this *Flight Plan Task*.

Timing:

6/21/2016

Time [hours, minutes]:

12 0

Race in Time window

10 0

Task description:

## Terrain Map

The following paragraphs describe the various features and functions of the *Terrain Map* section of the *Flight Planner - Task* page.

### Height

A *Height* value is displayed in the lower left corner of the *Terrain Map* and represents the MSL (above mean sea level) altitude corresponding to the position of the cursor (latitude, longitude) on the *Terrain Map*. The *Height* value changes as you move the cursor around the map.

### Map Navigation

You can display a different section of the *Terrain Map* by holding the left mouse button down and moving the mouse cursor (click/drag).

### Map Context Menu

A right mouse click anywhere on the *Terrain Map* invokes the *Terrain Map* context menu. The activated menu options depend on the object underlying the cursor when you do a right click.

If the cursor was not highlighting a pre-defined object (e.g., airport, *Task Point*, *Penalty Zone*, etc.), the context menu activates the following three options:

#### View

The *View* option is a map scaling function. The map scale is displayed at the bottom center of the *Terrain Map* and defaults to 5.4 nm (nautical miles), with a minimum of .3 nm, and a maximum of 27 nm.

The *View* function is selected by default and automatically opens a sub-menu allowing you to:

- *Zoom In* (default)
- *Zoom Out*
- *View Reset* sets the scale to the 5.4 nm default

You can also rescale the *Terrain Map* directly from the map by using SHIFT + (LEFT, RIGHT) mouse buttons.

- SHIFT + LEFT mouse button click = Zoom In
- SHIFT + RIGHT mouse button click = Zoom Out

### Maps

Moving the cursor over *Maps* opens a sub-menu comprising two map display options:

1. Slovenia (default)
2. Height Map

Each map display option uses a different color-coding scheme to display the underlying surface features.

### New

Moving the cursor over *New* opens a sub-menu comprising two options:

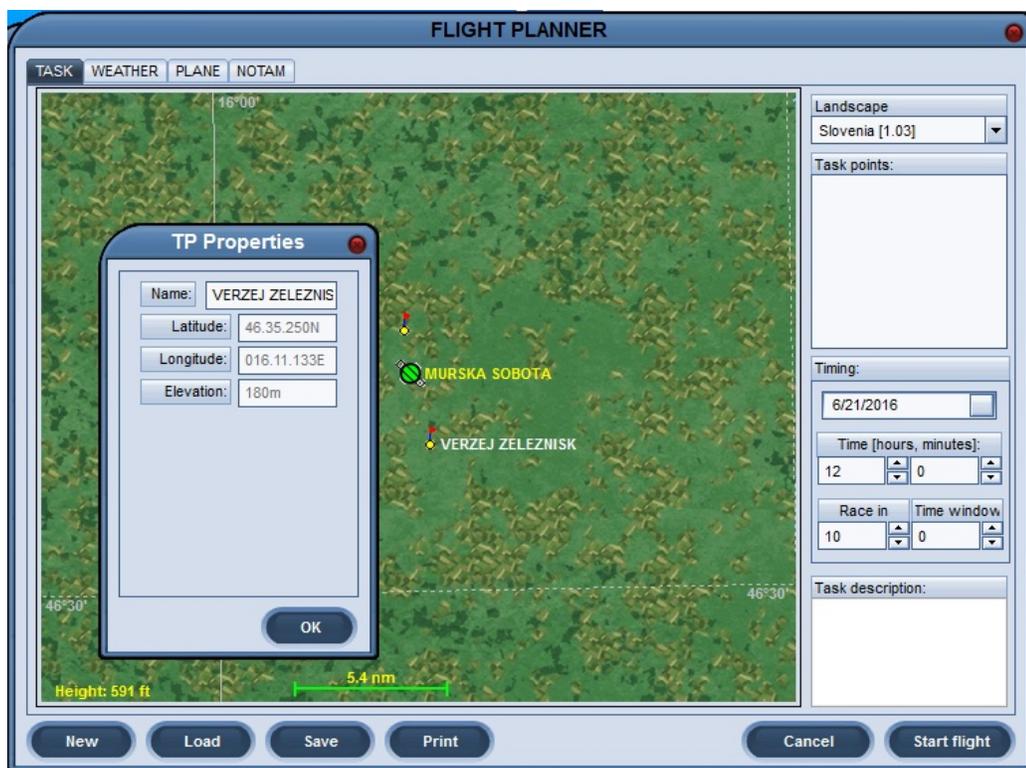
1. Turn Point (default)
2. Penalty Zone

## Map context menu (cont.)

### Turn Point

The Condor installation comes complete with a turn point database. *Turn Points* are pre-defined geographic locations used to easily develop a race task, and appear on the *Terrain Map* as little yellow dots with red flags on top. If you place your cursor over a *Turn Point*, the cursor changes from a pointing finger to an arrow, and the name of the *Turn Point* is displayed.

A right click on an existing *Turn Point* on the *Terrain Map* displays the map context menu with a default selection of “Properties”. A left click on “Properties” displays the “TP Properties” panel, including the *Turn Point*’s name, latitude, longitude, and elevation. Condor seems to give you the option to change the *Turn Point* name, but changing a *Turn Point* name in the *Flight Planner* has no effect on the *Turn Point*’s name in Condor’s turn point database.



The map context menu for a *Turn Point* also enables a “Delete” option which will, in fact, permanently remove the *Turn Point* from Condor’s turn point database. Fortunately, the Delete action requires a confirmation.

To insert a **New** *Turn Point* into Condor’s turn point database:

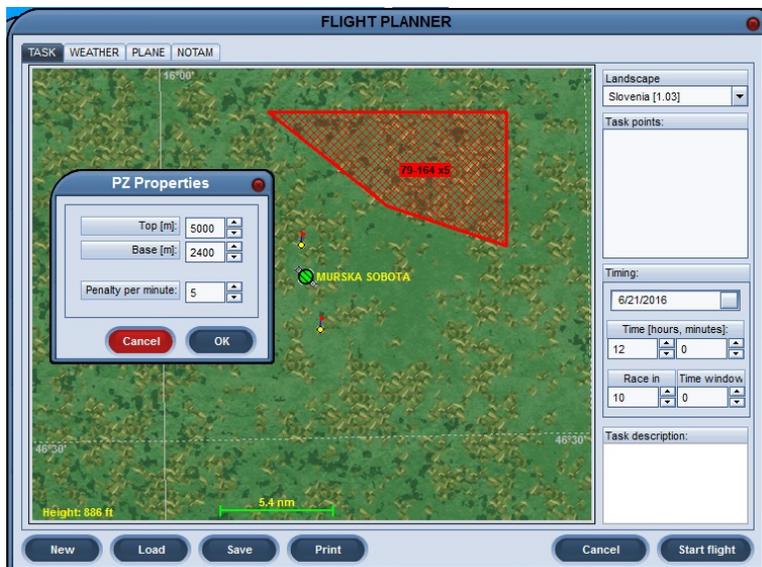
- Place your cursor on the *Terrain Map* at the location of the new turn point
- Right click
- Move the cursor over “New / Turn point”
- Left Click
- Enter the Name of the new turn point in the “TP Properties” window
- Click OK

## Penalty Zone

*Penalty Zones* are three-dimensional areas of Condor's airspace. In a Condor race, you are penalized a certain number of points for each minute you are inside a *Penalty Zone*.

The default vertical limits for a *Penalty Zone* are from the ground to 5000 meters, but other base and ceiling limits can be established. The base and ceiling limits are specified in meters, but are displayed as a range of MSL altitudes (in hundreds of feet) inside the *Penalty Zone*.

To the right of the base/ceiling altitude range is an "x #" indication, where "#" is the number of points the pilot is penalized per minute inside the penalty zone. The minimum number of penalty points per minute is 2; the maximum is 1000. The default is 5.



To create a **New Penalty Zone**:

- Place your cursor on the *Terrain Map* at the location of one corner of the *Penalty Zone*
- Right click
- Move the cursor over "New / Penalty Zone"
- Left Click draws one side of the *Penalty Zone*
- Left Click/Drag draws the 2<sup>nd</sup> (adjacent) side of the *Penalty Zone*
- Left Click/Drag draws the 3<sup>rd</sup> side of the *Penalty Zone*
- Left Click completes the quadrilateral using the vertical limit and penalty point defaults.

To specify base/ceiling altitudes, and/or penalty points other than the defaults

- Place the cursor inside the *Penalty Zone* (the *Penalty Zone* will turn red)
- Right click to display the map context window
- Left click on "Properties" to display the "PZ Properties" window
- Specify your changes
- Click OK

To change the horizontal dimensions (shape) of the *Penalty Zone*,

- Left click/Drag the corners

To relocate the entire *Penalty Zone*,

- Place the cursor inside the *Penalty Zone* (the *Penalty Zone* will turn red)
- Left click/Drag the *Penalty Zone* to the desired location on the *Terrain Map*

## Task Points

Again, because Condor is simulating competition flying, it insists on having a *Task* specified, even if all you want is to do is freely fly around on your own.

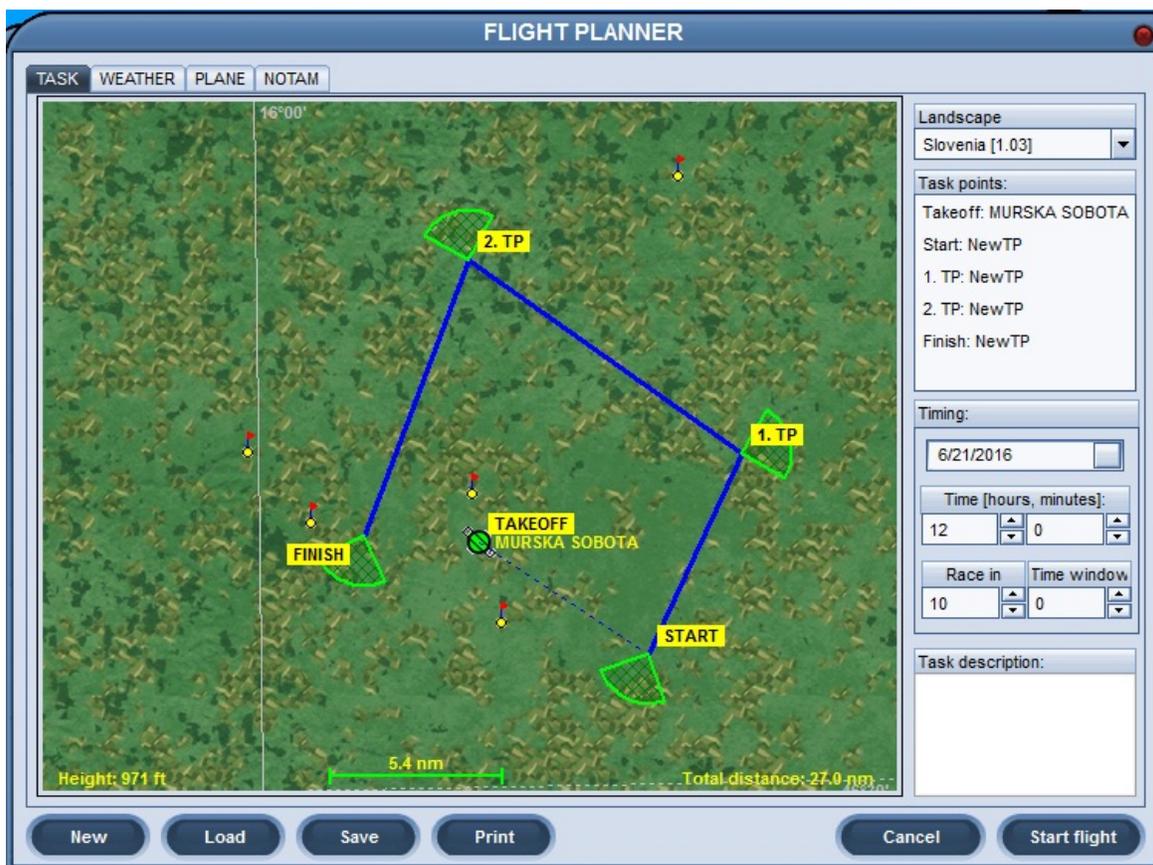
A typical Condor race *Task* is composed of “*Task Points*”. *Task Point* types include:

- *Takeoff* - always an airport
- *Start*
- *Turn Point (TP)* - an optional number of intermediate locations between the *Start* and *Finish*
- *Finish*

### Creating a *Task Point*.

1. Click *New* to start a new *Flight Plan*; then OK to confirm.
2. Place your cursor on an airport icon (the cursor will change from a pointing finger to an arrow).
3. Left Click to create the *Takeoff* and *Start* task points.
4. Drag the *Start* to the desired location.
5. Left Click to anchor the *Start* at this location and to create the *Finish*.
6. Drag the *Finish* to the desired location.
7. Left Click to create an intermediate *Turn Point (#.TP)* where # is a number.
8. Drag the *Finish* to a new location (leaving #.TP at the previous *Finish* location)
9. Repeat Steps 7-8 for each intermediate *Turn Point*.
10. When you have dragged the *Finish* to its final location, Right Click and select “*Finish Task*” from the context menu (bottom).

*Task Points* are listed in the *Task Points* subpanel at the upper right of the *Flight Planner - Task* panel.



**Relocating a *Task Point*.**

To move a *Task Point* to a different location:

1. Place your cursor over the *Task Point*. The cursor will change from a pointing finger to a crossed set of double-headed arrows, and the *Task Point* sector will turn red.
2. Hold down the Left mouse button and drag the *Task Point* to its new location.
3. Release the Left mouse button.

**Removing a *Task Point*:**

Option 1:

1. Place your cursor over the *Task Point* to be removed.
2. Right Click.
3. Left click on “Remove”.
4. Click OK to confirm.

Option 2:

1. Place your cursor over the name of the *Task Point* in the *Task Points* sub-panel at the upper right.
2. Left Click to highlight (turns red) the *Task Point* name.
3. Right Click.
4. Left click on “Remove”.
5. Click OK to confirm.

Option 3:

1. Place your cursor over the *Task Point* to be removed.
2. Left Click/Hold and Drag the *Task Point* onto the previous or next *Task Point*.
3. Release the Left mouse button.

Condor does not allow consecutive *Task Points* to be co-located, so it gets rid of one of the overlapping *Task Points*. If the only two remaining *Task Points* are the *Start* and *Finish*, Condor retains the *Start*.

**Inserting/Adding a *Task Point*:**

1. Place your cursor over a *Task Point*.
2. Right Click
3. Left click on “Insert” or “Add”.

If INSERT is selected, Condor will generate a new *Task Point*.

1. Drag the new *Task Point* to the desired location.
2. Left click to anchor the *Task Point*.

If ADD is selected

- in association with the *Start* task point, Condor will generate a *Finish* task point.
- in association with the *Finish* task point, Condor will generate and anchor a new *Task Point* at the location of the *Finish* and generate a new *Finish*.

In either case,

1. Drag the *Finish* to the desired location.
2. Right Click.
3. Left Click on “*Finish Task*”.

### Task Point (TP) Properties

To view a *Task Point's* properties

1. Place your cursor over a *Task Point*.
2. Right Click.
3. Left Click on "Properties"

### Name

By default, all new *Task Points* are called "NewTP". Edit the *Name* text to change the *Task Point Name*.

If the *Task Point* is co-located with a *Turn Point* in Condor's database, the *Task Point Name* will default to the *Turn Point* name. Changing the *Task Point Name* in the *Flight Plan* has no effect on the *Turn Point* name in the database.

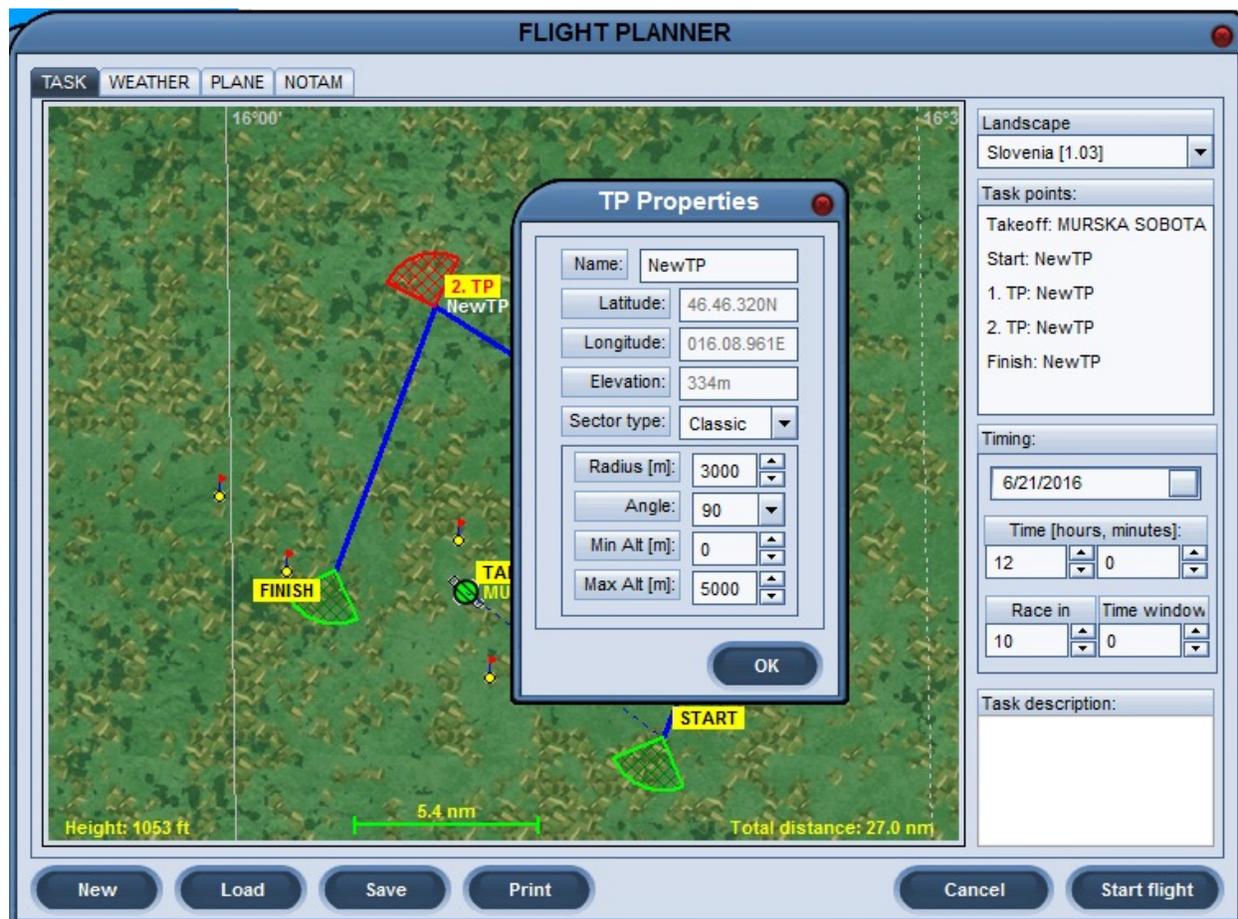
### Latitude, Longitude, Elevation

These values are determined by the position of the *Task Point* on the *Terrain Map*.

### Sector Type

Sector type options are:

1. Classic (default)
2. Window



**Classic**

*Classic* sectors are segments of a cylinder (pie slice cross sections), and are the default sector type for *Task Points* in a new *Flight Plan*.

With “Classic” sector type selected, Condor displays these related properties:

**Radius**

The default sector radius is 3000 meters. The maximum is 5000 meters, and the minimum is zero

*Note: The ability to set the sector radius to zero seems really odd. I set up a zero-radius sector and tried intercepting it. As you might imagine, I couldn't do it.*

*On the other hand, incorporating one or more zero-radius Task Points into your Flight Plan would be a very good way to drive your competitors crazy.*

**Angle**

The default is 90 degrees (quarter of a pie). Other options are 180, 270, and 360 (a full cylinder).

**Minimum Altitude (Min Alt)**

This parameter establishes the floor of a *Task Point* sector, and is an MSL value. The default is 0 (ground elevation). The maximum value is 4900 meters MSL.

**Maximum Altitude (Max Alt)**

This parameter establishes the ceiling of a *Task Point* sector, and is an MSL value.

The default is 5000 meters MSL. The minimum is 300 meters.

The minimum vertical extent (difference between floor and ceiling) of a sector is 100 meters (which explains the 4900-meter maximum value for Minimum Altitude)

Even though *Min Alt* and *Max Alt* are set using meters, they are represented on the *Terrain Map* using the units selected for instrumentation display (e.g., feet for Australian and Imperial).

*Note: See (SETUP / OPTIONS / INSTRUMENTS / UNITS)*

The *Min Alt* (base) and *Max Alt* (ceiling) are displayed at the center of the cylinder segment as a range of values, but only if one of the parameters is set to a value other than its default.

**Window**

*Window* sectors are just that: a rectangular window frame in the sky. They appear to be held in place by a vertical striped pole extending from the ground to 5000 meters (16,400 feet). To the best of my knowledge, *Windows* are not used as turn points in the real world of glider racing. The developers may have included the *Window* sector type to facilitate arcade type tasks.

With “Window” sector type selected, Condor displays these related properties:

**Altitude**

This value represents the vertical center of the *Window* in meters MSL. The default value is 1500.

Positioning a *Window* at a certain distance above the ground (AGL) requires some thinking. You need to compensate for the ground elevation at the *Window*'s location (latitude/longitude) and convert meters to your selected units, e.g., feet.

**Width**

This value represents the total horizontal width of the *Window* in meters. The default value is 100.

The sides of a *Window* are each  $\frac{1}{2}$  the *Width* right/left of the support pole.

**Height**

This value represents the total vertical height of the *Window* in meters. The default value is 100.

The top of a *Window* is  $\frac{1}{2}$  the *Height* value above the *Altitude* setting; the bottom is  $\frac{1}{2}$  the *Height* value below the *Altitude* setting.

**Azimuth**

*Windows* are designed to be flown-through in a particular general direction, e.g., while heading north. Flying through a *Window* in the opposite direction earns you a message that you have been penalized, even if the penalty value (*NOTAM / Penalties / Wrong Window Entrance*) has been set to zero.

Azimuth orients the *Window* to the desired direction of entry. The default value is “N” (North), with the other 7 options at 45 degree intervals (NE, E, SE, etc.). On the *Terrain Map*, a *Window* looks like a wide “U”. The proper entry into a *Window* is from the open side of the “U”.

For some reason, the *Terrain Map* depicts a *Window* to be geographically “much” wider than it actually is.

Note: See “**Creative Uses for Turn Points and Penalty Zones**” (below) for images of *Window Turn Points*, both from within the *Flight Planner* and during a *Free Flight* session.

## Airports

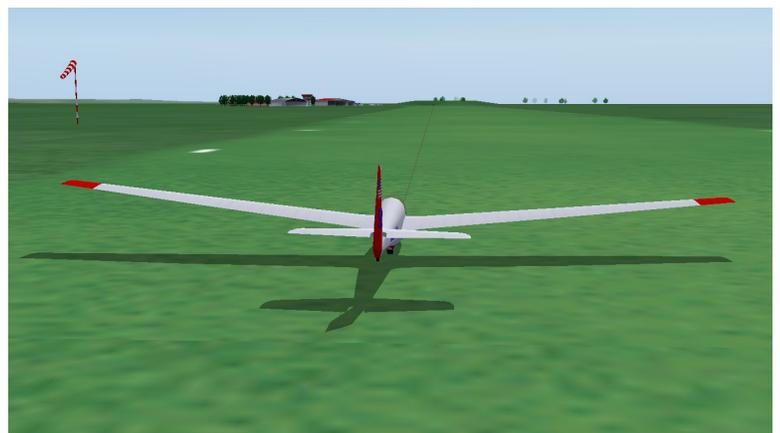
The Slovenia 1.03 (default) landscape has 8 airports to choose from. Based on the lesson objectives, I select the most appropriate airport, taking into consideration the local terrain, the number of runways, runway surface composition, runway orientation, and the number and location of buildings on the airport.

Unfortunately, you cannot determine much about an airport in Condor by looking at the terrain map. The airport icons are all identical and the diagonal runway indication on each icon does not correspond to the airport's actual runway orientation.

To see what an airport actually looks like, you need to establish a simple *Task* at that airport and start a session. A Condor session begins with your glider on the selected airport's active runway (when using an aerotow or winch start) or directly above the approach end of the active runway (airborne start). Once there, you can use your magnetic compass to determine the runway heading and/or use your ability to look around (from the cockpit and externally) to evaluate the airport and surrounding area.

I do most of my primary training at the Murska Sobota airport in the far northeast quadrant of the Slovenia 1.03 landscape. The airport has intersecting grass runways 9-27 and 1-19 (only 9-27 is properly marked) with a building complex on the north side of the approach end of runway 27. The terrain around Murska Sobota is completely flat, providing a clear view of the horizon in all directions, just what I need to teach attitude flying.

As an example of using whatever is available to my instructional advantage, I use the buildings on the airport in my lessons on premature tow terminations. By setting up a left crosswind on Runway 9, the Murska Sobota airport buildings become obstacles in the event of a low-altitude rope break. As part of the pre-takeoff checklist, the student is expected to provide an emergency plan. Based on the direction of the wind, a student using rote learning will suggest a left reversing turn (into the wind) in the event of a low-altitude rope break. My response is: "You mean directly into those buildings?" Lesson learned. Think!



**Creative uses for Task Points and Penalty Zones**

As an instructor, I end up using Condor’s *Task Points* and *Penalty Zones* in ways the developers probably never envisioned. Here are a couple examples.

1. Rather than using it to start a race, my placement of the *Start* task point is meant to trick the tow plane into flying where I want it to fly (see “**Controlling the Tow Plane**”). If the lesson doesn’t require an aerotow (many lessons do not), it doesn’t matter where you put the *Start*. In fact, you may not need a *Start task point* at all.
2. Real-world competition flying doesn’t use anything like Condor’s “*Window*” *Sector Type*. Interestingly, however, today’s most advanced real-world aircraft navigation systems use a concept called HITS (Highway In The Sky) to display a sequence of “*Windows*” that intuitively guide the pilot through 3-dimensional space.

Using Condor’s *Window task points*, I was able to create a “*Highway In The Sky*” *Task* to help students visualize, and learn to fly, a standard airport traffic pattern.

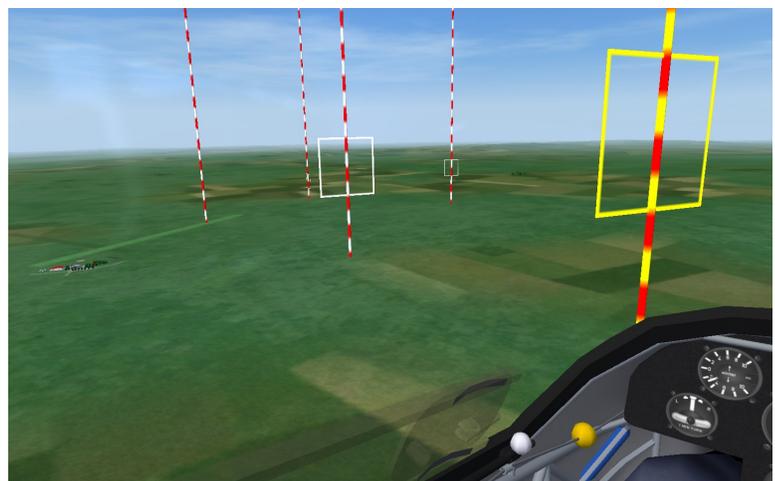


The *Flight Planner Task* page for this HITS flight plan and the pilot’s eye view of the HITS traffic pattern are pictured at the right.

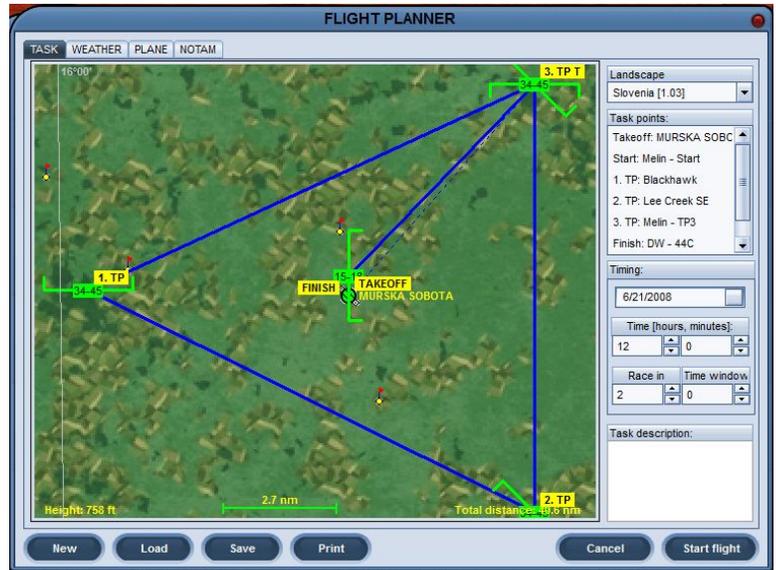
The vertical limits of each *Window* are set to help the student visualize the appropriate slant angle from that point in the approach. The vertical center of each gate is the target AGL altitude at that point in the approach.

Windows are located at the IP (start of the entry leg), the turn onto downwind mid-field, the turn to base, and the turn to final.

The *Classic* sector *Finish* task point on the runway may be used as the aim point, touchdown point, or stop point.



- In a *Flight Plan* developed to introduce Cross Country Flying and Navigation, I used *Window* task points to form a 33-nautical-mile triangular course around a simulated home airport. Each *Window*'s base altitude ensures the pilot has final glide capability back to the home airport, with the *Window*'s ceiling altitude enforcing Class E airspace cloud base clearance requirements. The *Finish Window* base and ceiling altitudes require the pilot return to the airport at 1000 feet AGL, mid-field, on the downwind leg to the active runway.



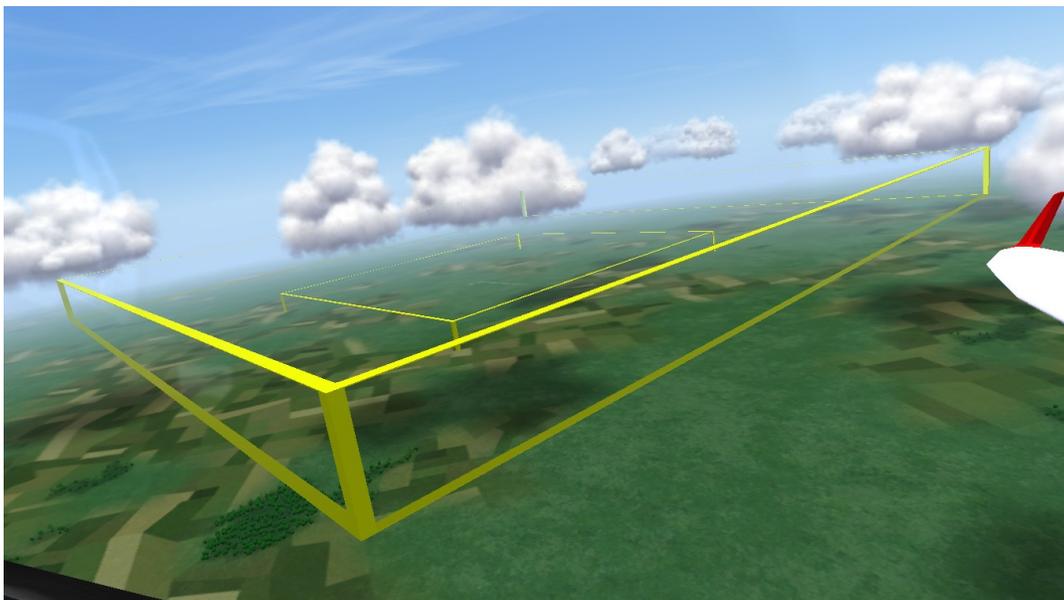
- In my "Landing Over an Obstacle" lesson, I use a pair of adjacent *Windows*, half-buried underground, to create a 50-foot-high obstacle at the end of Runway 9 at Murska-Sobota.

After the student the student has learned the fundamentals of obstacle clearance at the airport, I use a *Window* to guide the student onto a final approach leg that requires clearing a group of trees at the edge of a land-out field.

- For instructional purposes, I use *Penalty Zones* to represent areas of controlled or restricted airspace, e.g., Class B, C, D, Military Operations Areas (MOA), etc.

Unfortunately, the lateral limits of a Condor *Penalty Zone* may only be represented as a quadrilateral (four sided polygon). Cylinders would be better for representing Class B, C, and D airspace, but sometimes you have to work with what the software gives you.

The image below shows two *Penalty Zones*, one above the other, used to represent Class C airspace.



## Weather

One of Condor's many advantages is the ability to completely control the weather. With Condor weather, what you see is what you "set".

## Wind

When you first enter the *Weather* component of the *Flight Planner*, two things jump out at you. One is a large compass rose that takes up most of the left side of the panel. The compass rose is overlaid with a series of 5 concentric circles, each representing 5.4 knots of wind speed. To set the wind speed and direction, place your cursor on the compass rose and click the left (or right) mouse button. A blue wind vector appears emanating from a red dot and the wind *Direction* and *Speed* are displayed digitally below the compass rose.



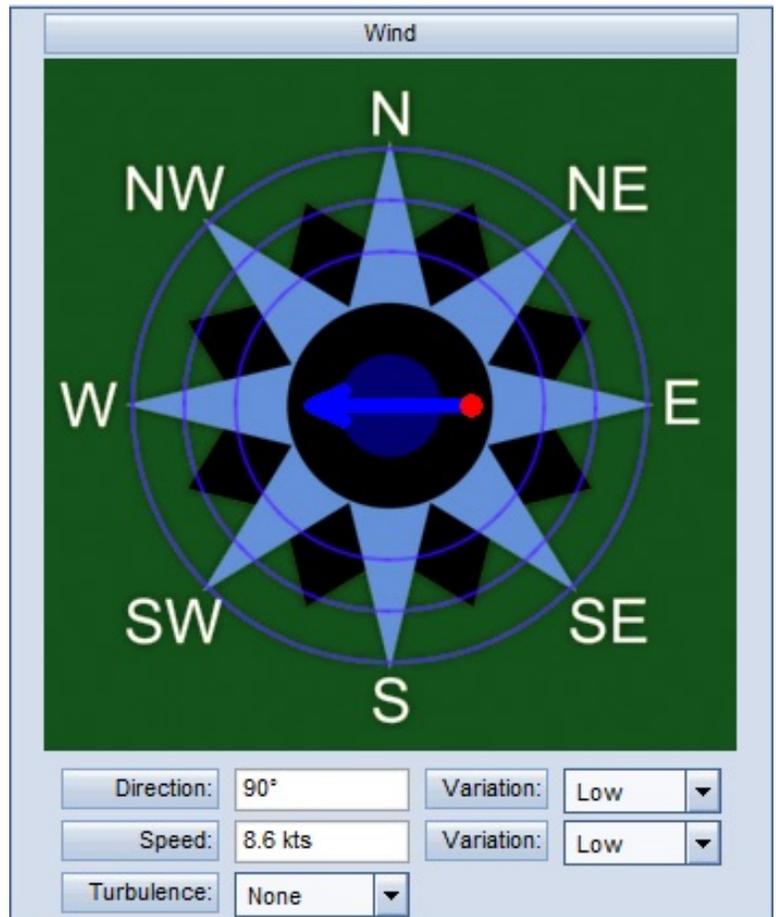
While Condor lets you highlight the digital *Direction* and *Speed* values, it does not allow you to enter them directly. You need to set these values graphically using the *Wind* vector on the compass rose.

You can change the *Wind Direction* and *Speed* by:

1. using the mouse to reposition (click/drag) the *Wind* vector's red dot or
2. holding the CNTL key down, placing the cursor where you want the red dot to appear, and doing a left-click.

This second method sets the *Wind Speed* in increments of exactly 2.7 knots and *Wind Direction* in increments of exactly 22.5 degrees.

To the right of both the *Direction* and *Speed* values is a corresponding "*Variation*" value and drop-down menu. Each menu contains a range of values from "*None*" to "*High*" with a default of "*Low*". The *Direction Variation* lets you determine how shifty you want the *Wind* to be. The *Speed Variation* lets you determine how gusty you want the *Wind*.



The *Turbulence* drop-down menu includes options ranging from "*None*" to "*Severe*", with a default of "*Moderate*". The Condor manual describes this setting as "general mechanical turbulence" caused by wind speed and terrain. Condor wind speed and direction both vary with altitude and are affected by local terrain.

## Thermals

*Cloud Base* is determined the same way Mother Nature does it, using the maximum surface temperature, the dew point temperature, and the convergence of the corresponding dry and wet adiabatic lapse rates.

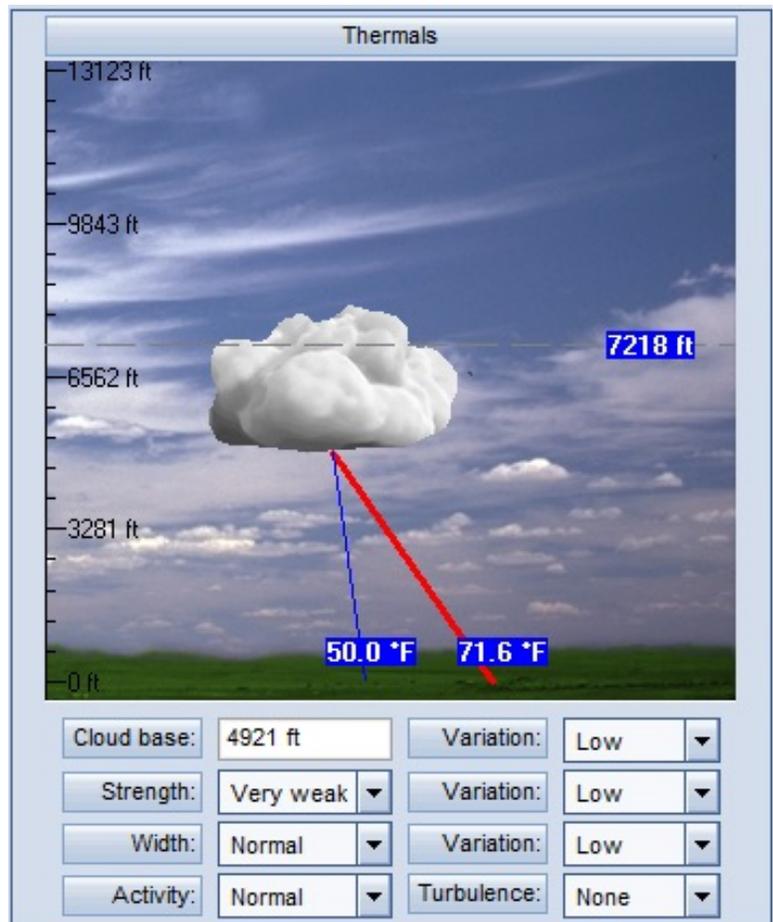
A *New Flight Plan* defaults to a *Cloud Base* of 4921 feet AGL using a surface temperature of 71.6 F and a dew point of 50.0 F. You can set your own *Cloud Base* by repositioning (clicking/dragging) the surface maximum and/or dew point temperature values. Lowest possible cloud base is 3281 feet AGL; highest is 9843 feet AGL.

*Cloud Base* can only be set graphically. It cannot be entered directly.

The *Thermals* graphic also contains an *Inversion Height* value that defaults to 7218 feet AGL. By repositioning (clicking/dragging) the *Inversion Height* value below the convergence point of the surface maximum and dew point temperature lapse rates, you create a “blue” day, i.e., you will find lift up to the *Inversion Height*, but no clouds form.

Along with *Cloud Base*, the *Thermals* sub-panel has three other thermal-related parameters: *Strength*, *Width*, and *Activity*. *Cloud Base*, *Strength*, and *Width* have associated *Variation* parameters, with values ranging from “None” to “High” and defaulting to “Low”. Finally, there is a *Turbulence* parameter specific to thermals.

With the exception of *Activity*, the meaning of the *Variation* parameters is pretty straightforward. For example, with *Cloud Base Variation* set to “None”, one would expect all cloud bases to be pretty much at the same altitude. With a high level of variation, *Cloud Base* heights would vary considerably from the average value specified graphically when setting the *Cloud Base*.



The *Activity* parameter determines the number of thermals per unit area. *High Activity* means lots of thermals spaced closely together. *Low Activity* means widely spaced thermals.

Like real-world thermals, Condor’s thermals cycle. To find out more about Condor’s thermal cycle times, I checked in with Uros Bergant, one of Condor’s developers. Basically, thermal cycle times are a function of the depth of the convective layer and thermal strength. As it turns out, high cloud bases and weak lift produce long-lasting thermals. Thermals associated with low cloud bases and strong lift cycle quickly.

## Presets / Randomization

In addition to being able to *Customize Condor’s Weather* (the default), Condor has a series of 10 *Weather Preset* options (e.g., *Poor*, *Average*, *Bombastic*, etc.) and a *Randomize* feature that sets the weather parameters differently on each flight, within the selected *Weather Preset*.

## Plane

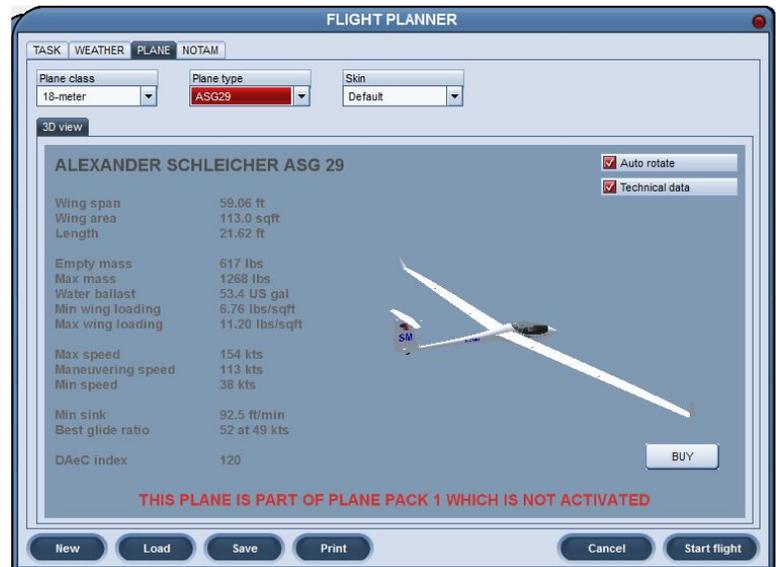
Condor comes complete with 23 different gliders, 13 of which are available (activated) via the standard installation. The other 10 gliders can be “activated” by purchasing the optional *Plane Packs* at a small additional cost.

At the top of the *Plane* panel are drop-down menus for *Plane Class*, *Plane Type*, and *Skin*.

*Skins* are optional glider paint schemes.

*Plane Classes* include *School*, *World*, *Club*, *Standard*, *15-meter*, *18-meter*, *Open*, *Acro* and *All*. *All* is not really a *Plane Class*; it simply allows you to list all 23 Condor gliders, without being limited to a specific *Plane Class*. *World* and *Club* class gliders are only available in one of the two optional *Plane Packs*.

For a *New Flight Plan*, Condor defaults to a *Plane Class* of “Standard” and a *Plane Type* of “ASW28”.



Once you select a *Plane Class*, the *Plane Type* drop-down menu will display all the “available” gliders in that class. If a selected glider is not “activated”, the glider’s *3D View* panel will display with a shaded background, a “BUY” button appears in the lower-left corner of the panel, and the message:

**“THIS PLANE IS PART OF PLANE PACK # WHICH IS NOT ACTIVATED”.**

For activated gliders, the *Plane* panel comprises two sub-panels, *3D View* (default) and *Settings*.

## 3D View

The *3D View* shows the manufacture’s name and glider’s designation (e.g., Alexander Schleicher ASK 13), a set of technical data and a small, rotating, 3D image of the selected glider. Two check boxes at the upper right of the panel allow you to display/hide the *Technical Data* and *Auto Rotate* the 3D glider image. Whether or not you stop the image rotation with the check box, you can control the orientation of glider manually by clicking/dragging on the glider image, allowing you to look at the glider from any perspective. Hiding the *Technical Data* enlarges the glider image.

For instructional purposes, the *3D View* is a great way to introduce the student to the external features and technical specifications of the glider.



## Settings

The *Settings* sub-panel (only available for gliders you have purchased (activated)) contains a number of additional sub-panels including the glider polar, *Water Load*, *Wing Loading*, *CG Bias*, and *MC/Wind*.

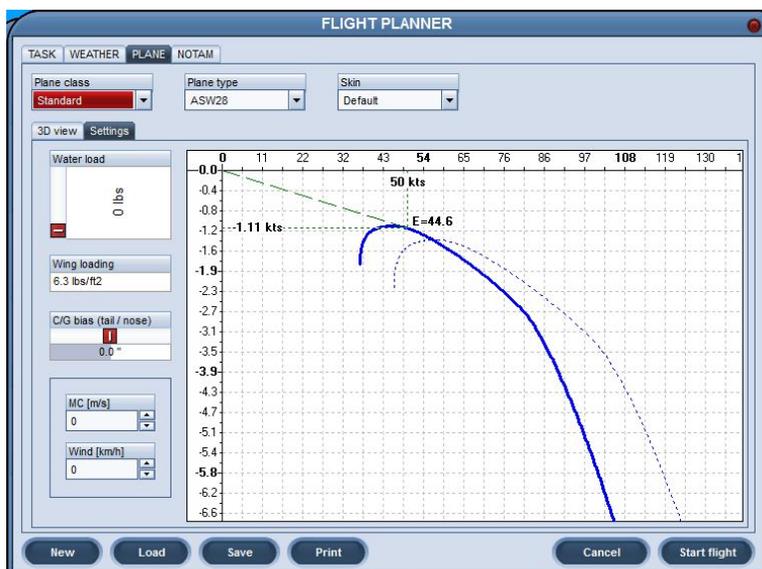
By default, the glider polar is displayed, along with its tangent, as a dark blue curved line and includes the values for best L/D ratio (e.g.  $E=44.6$  for an ASW-28), best L/D speed, and the sink rate at best L/D.

For ships that carry water ballast, the polar curve shifts down and to the right as the *Water Load* is increased using that sub-panel's slide bar. At the same time, the corresponding *Wing Loading* value changes as do the best glide speed and corresponding sink rate. As expected, the glide ratio remains constant. Even as the polar curve shifts with *Water Load*, the dry and fully ballasted polar curves continue to be displayed as light blue dashed curves.

The *CG Bias* of the glider (tail ballast) can be adjusted using that sub-panel's slide bar. Glider handling is affected, but the effect on performance is negligible.

And finally, the effects of lift, sink, and head/tail winds on glide performance can be graphically displayed by changing the *MC/Wind* values. Changing these values repositions the origin of the tangent to the polar curve, resulting in the corresponding and appropriate changes to the glide ratio, sink rate and speed-to-fly, all within the context of the specified *Wing Loading*. Unfortunately, the *MC/Wind* values display in metric units, regardless of how you elect to display speed and variometric readouts, not the end of the world for what you get in return.

From an instructional standpoint, the *Plane Settings* sub-panel is absolute dynamite, a great way to have that difficult Speed-to-Fly discussion.



## NOTAM

The *NOTAM* panel is comprised of 5 sub-panels:

1. **Realism**
2. **Penalties**
3. **Ghosts**
4. **Start Options**
5. **Acro Flight**

### Realism

The *Realism* sub-panel controls the extent to which your Condor session resembles a “real” glider flight. The most realistic flight would have all the *Realism* features turned off (set to zero or unchecked).



### Plane Icons Range

When flying with another glider (networked or using *Ghosts*), Condor helps you see the other glider by displaying a colored line of text called a “*Plane Icon*”. The text includes the glider’s *Competition Number*, optionally the aircraft type (e.g., ASK 13), and the distance to the glider. The *Plane Icon* moves along with the glider like the data tags on real-life air traffic control radar screens.

By default, *Plane Icons* can be toggled on/off using the “\*” (multiply) key.

The *Plane Icons Range* slide bar determines the distance at which you can see the *Plane Icon* attached to a glider in your airspace. The default for a new *Flight Plan* is 11 nautical miles (nm).

If the *Plane Icon* value is set to zero, no *Plane Icons* will be displayed.

### Thermal Helpers Range

*Thermal Helpers Range* determines how close a thermal needs to be to your glider in order for you to see it.

The keyboard “H” is used to toggle the *Thermal Helper* on/off.

For a new *Flight Plan*, *Thermal Helpers Range* defaults to zero. So, if you hit the “H” key and nothing happens, you probably forgot to set the *Thermal Helpers Range* to something greater than zero.

### Turnpoint Helpers Range

*Turnpoint Helpers Range* determines the proximity of visible *turn-points*. *Turn-point* visibility is toggled on/off using the “J” key. This parameter also defaults to zero nm, so check this setting if your *turn points* don’t appear when you think they should.



### Allow PDA

*Allow PDA* determines whether your glider will be equipped with a PDA (Personal Digital Assistant). The Condor PDA is used to display output from Condor's navigation program.

The ASK-13 and aerobatic MDM-Fox will not be equipped with a PDA, even if the *Allow PDA* box is checked.

I think you can opt for a PDA in most every other glider. Having not purchased either of the *Plane Packs*, I don't know if the PW5 and club-class ships use PDAs. I suspect they do.



The PDA comes in pretty handy for initial cross-country instruction. Being able to visualize the *turn-points* using the "J" key helps students better understand, what the PDA screens are telling them.

### Allow Real-time Scoring

*Allow Real-time Scoring* is normally used in *Multi-Player* mode to keep tabs on who is winning a race; however, it is also available in *Free-Flight* mode, as displayed at the right.

By default, the "Tab" key is used to toggle the "Classification" scoreboard on/off.



### Allow External View

This function enables the use of Condor's external views.

For instructional purposes, you want this box checked. The more ways you can help the student visualize a situation, the better. In the real world, the only available view is from inside the cockpit, so to most accurately simulate actual flight, you would leave this box unchecked.

### Allow Padlock View

This view function is only available in *Multi-Player* mode. It actually enables two view functions:

1. Automatic view panning in the direction of nearby gliders  
Pressing the F7 key will automatically pan your view in the direction of the closest glider. Another press of F7 will direct your view to the next nearest glider, etc., eventually cycling back to the closest glider.
2. External view of nearby gliders  
Pressing the F8 key provides an external view of the closest glider. Consecutive depressions of the F8 key show ever more distant gliders, and eventually cycles back to the closest glider.

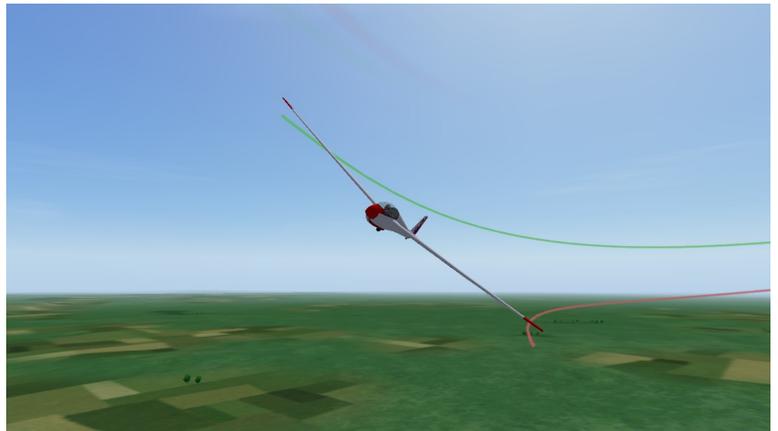
**Allow Smoke**

Keyboard letter “T” toggles the wing tip smoke on/off, but only if the *Allow Smoke* box is checked.

**Allow Plane Recovery**

*Allow Plane Recovery* is one of the “miracle” features available in Condor. In the event you do something that causes parts to come off your aircraft (e.g., overstressing the glider), pressing the letter “Q” on your keyboard reassembles your ship in mid-air, but only if the *Allow Plane Recovery* box is checked.

Otherwise, you get to watch your glider (or what remains of it) spiral all the way to the ground. Mercifully, upon disintegration of your aircraft, Condor switches to an external view so you can imagine what you are watching is actually someone else spiraling to his death.

**Allow Height Recovery**

Allow Height Recovery is a particularly useful instructional feature. It is another of the miracle (“Q”) features and provides you with an additional 1500 feet of altitude anytime you want it. So, if your students need to stay in the air for an hour or two to practice making coordinated turns, no problem. They just hit the “Q” key whenever they get low.

There is a limit (3) to the number of times the “Q” key will buy you an extra 1500 ft. So this function will not allow you to explore outer space. There must also be some upper altitude limit on the function, because sometimes you are allowed only 1 or 2 jumps up. I haven’t yet figured out exactly how that works.

The Height Recovery feature also comes in handy when practicing approaches and landings, especially “landings out”. Once on the ground, you can use the “Q” key to immediately put yourself back into the air. It is the ultimate self-launch, but cannot be used as the initial launch method.

A word of warning:

If you have specified *Allow Height Recovery*, but have not specified *Allow Plane Recovery*, and you crash, pressing the “Q” button will simply loft your wrecked aircraft 1500 hundred feet into the air and let you watch as it falls back to earth.

**Allow Mid-Air Collision Recovery**

Allow Mid-Air Collision Recovery is the last of the miracle (“Q”) features and enables you to completely and instantly repair your ship, in flight, in the event it is damaged in a mid-air collision. With Condor’s limited field of view, mid-air collisions are more likely. For instructional purposes, this feature enables you to continue a flight lesson that might otherwise be cut short by a mid-air.

By the way, to the best of my knowledge, it is not possible to have a mid-air collision with a Ghost (see below), nor with the Condor tow plane. Your glider, a Ghost, and/or the Condor tug are able to simultaneously occupy the same point in space, without experiencing a simulated collision.

## Penalties

At a soaring competition event, real world or Condor, you can be penalized for a variety of reasons.

Condor penalties values range from 0 to 200 points.

Penalties are implemented by subtracting a specified number of points from your racing score.

The only place I have been able to find the penalty point total for a flight is on the *Flight Info* tab on the *Flight Analysis* page.

For instructional purposes, I see no reason to be penalizing students, so I set all penalty values to zero in my instructional flight plans.

### Cloud Flying (per minute)

If *Cloud Flying* is set to a value greater than zero, Condor assesses the specified number of penalty points for each fraction of a minute the glider is inside a cloud, and displays the following messages:

1. ***“(Pilot’s Name) entered cloud.”***
2. ***“(Pilot’s Name) left cloud.”***

### Plane Recovery

Condor will assess the number of penalty points specified in *Plane Recovery* each time you use the *Miracle Key* (“Q”) to reassemble your glider after a disintegration, and will display the message:

***“(Pilot’s Name) repaired his plane on the fly.”***

The *Plane Recovery* penalty will only be applied (and the “Q” key will only cause your aircraft to be reassembled) if “*Allow Plane Recovery*” is checked in the *Realism* section.

### Height Recovery

Condor will assess the number of penalty points specified in *Height Recovery* each time you use the *Miracle Key* (“Q”) to gain altitude, and will display the message:

***“(Pilot’s Name) found an outstanding lift.”***

The *Height Recovery* penalty will only be applied (and “Q” will only grant you addition altitude) if “*Allow Height Recovery*” is checked in the *Realism* section.

### Wrong Window Entrance

Condor will assess the specified number of penalty points, and display the message:

***“(Pilot’s Name) got penalty for wrong turn-point window entrance”***

when the following combination of conditions exist:

1. “*Race In*” time has expired, i.e., “*The Race Is On*” and
2. You are attempting to fly through the “active” (yellow/red) *Window* and
3. You fly the glider through the active *Window* in the wrong direction.

Penalties	
Cloud flying [per minute]	200 p
Plane recovery	0 p
Height recovery	0 p
Wrong window entrance	0 p
Window collision	0 p
Penalty zone entrance	0 p
Lost knuckle	0 p
Thermal helpers [per minute]	0 p

### Window Collision

Condor will assess the specified number of penalty points, and display the message:

***“(Pilot’s Name) got penalty for touching turn-point window”***

when:

1. “Race In” time has expired, i.e., “*The Race Is On*” and
2. You fly some part of the glider through the side, top, or bottom of the active *Window*.

### Penalty Zone Entrance

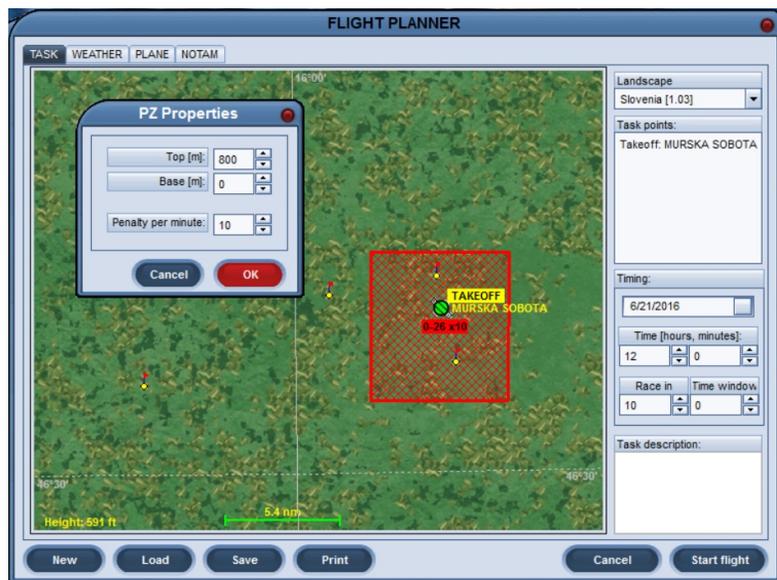
Condor will assess the number of penalty points specified in *Penalty Zone Entrance* on the *Penalties* panel, and display the messages:

***“(Pilot’s Name) entered penalty zone”***

***“(Pilot’s Name) left penalty zone”***

each time you enter/leave a penalty zone.

Condor also assesses a number of penalty points for each minute your glider is inside a penalty zone. The “*Penalty per minute*” value is set in the *PZ Properties* window.



### Lost Knuckle

*Multiplayer* mode includes a feature called “*Tail Hunting*”. If *Tail Hunting* is enabled, each aircraft leaves a trail of “bubble-like” objects called “*Knuckles*”. As near as I can tell, this is Condor’s answer to PacMan. You are penalized if another glider flies through (“eats”) your *Knuckles*.

Because, in my opinion, this feature has little or no value with respect to flight training, I have not bothered to fully research nor document how it works.

### Thermal Helpers (per minute)

Condor will assess the number of penalty points specified in *Thermal Helpers* on the *Penalties* panel, and will display the message:

***“(Pilot’s Name) switched on thermal helpers”***

for each fraction of a minute thermals are made visible.

When *Thermal Helpers* is switched off, the accumulation of penalty points ends, but no message is issued.

The *Thermal Helpers* penalty will only be applied (and thermals will only be made visible) if “*Thermal Helpers Range*” in the *Realism* panel is set to a value greater than zero.

**Ghosts**

In my opinion, the implementation of *Ghosts* is one of the most creative, fun, and educationally useful features of the Condor software.

A *Ghost* is the graphic (visual) representation of a previously conducted Condor *Free Flight* session, generated within the current (live) *Free Flight* session. The result is what appears to be another glider flying within your airspace.

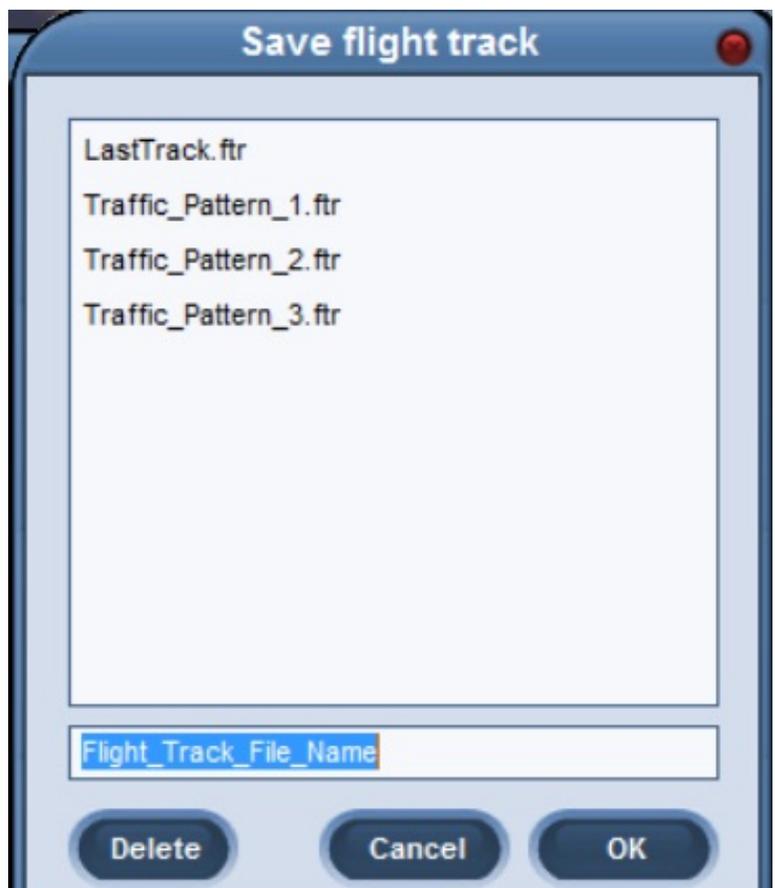
Condor generates a *Ghost* using a *Flight Track* file, so to understand what a *Ghost* is, you first need to understand the concept of a Condor *Flight Track*.

A *Flight Track* is the Condor equivalent of an IGC file. Similar to the operation of a real-life flight data logger, Condor is continuously recording a set of parameters associated with a *Free Flight* session (e.g., latitude, longitude, airspeed, vertical speed, altitude, etc.).



At the conclusion of a *Free Flight* session, you have the option of saving the complete set of parameter records as a *Flight Track*. As you exit *Free Flight*, select *Save Flight Track* from the list of options on the *Debriefing* panel.

When Condor displays the *Save Flight Track* panel, give your *Flight Track* a name and click "OK".



## Ghosts (cont.)

To use your new *Flight Track* file as a *Ghost*, initiate another *Free Flight* session using the same *Flight Plan* used to generate the *Flight Track*.

On the *NOTAM* page of your *Flight Plan*, your new *Flight Track* file name “should” appear in the *Ghost Name* list box.

Check the box to the left of your *Flight Track (Ghost)* name and select *Start Flight*.

As your flight begins, you will see what appears to be another glider sharing your airspace. The other glider, however, is just a “*Ghost*”, a graphic (visual) representation of a previous *Free Flight* session.

While you have complete control over the glider in your *Free Flight* session, you have no control over the *Ghost*. The *Ghost* ship will simply repeat the flight that was used to generate it.

Above, I mentioned Condor “should” display your *Flight Track* file name in the *Ghost Name* list box. Here is why it might not.



In addition to the *Flight Track*-specific parameter data, a Condor *Flight Track* file also contains information about the *Flight Plan* used to create it. If the currently loaded *Flight Plan* differs from the *Flight Plan* used to create a *Flight Track*, that *Flight Track* will not appear in the *Ghost Name* list by default.

Below the *Ghost Name* list box is the “*Filter*” drop down menu. The *Filter* menu comprises:

- *Equal Task*
- *Equal Task Timing*
- *Equal Weather*
- *Equal Plane Class*
- *Equal Launching*
- *Equal Realism*

By default, all the *Filters* apply, as indicated by each check box being checked. As you remove (uncheck) the various *Filter* specifications, Condor becomes less restrictive in its display of available *Ghost Flight Tracks*. For example, if the currently loaded flight plan specifies a Standard Class glider, Condor will, by default, display only *Ghost Names (Flight Tracks)* that also specify a Standard Class glider. To remove that constraint, simply uncheck the “*Equal Plan Class*” *Filter* specification.

The *Ghosts* sub-function enables you to incorporate any previously recorded *Flight Track* into your *Free Flight* session, including *Flight Tracks* sent to you by others. So, the fun and interesting stuff you can do with *Ghosts* is pretty much limited only by your imagination.

## Ghosts (cont.)

In his Cross-Country / Competition articles, my Condor Corner co-author Frank Paynter talked about how he used *Ghosts* to refine his racing strategies by repeatedly racing “himself” (a Ghost) around a task.

Here are a couple of examples of how I have used *Ghosts* for instructional purposes.

To introduce my students to the challenges of sharing a traffic pattern with other gliders, I repeatedly flew the traffic pattern at one of Condor’s airports, and saved the *Flight Track* from each session.

I then provided my students with the *Flight Plan* and my set of *Flight Track* files and asked them to incorporate my *Flight Tracks (Ghosts)* into their *Free Flight* of the traffic pattern.

In the image at the upper right, the glider being flown is 3<sup>rd</sup> in line for landing. The other two gliders are *Ghosts*.



In the image at the right, the view is from the cockpit of the glider being flown, while sharing a thermal with a *Ghost*.



I used this same technique to introduce my students to the right-of-way rules on a ridge.

The trailing, lower glider is the one being flown. The glider in the lead and higher up the ridge is a *Ghost*.



**Start Options**

Condor provides you with three options for beginning a *Free Flight* session:

1. *Aerotow*
2. *Airborne*
3. *Winch*

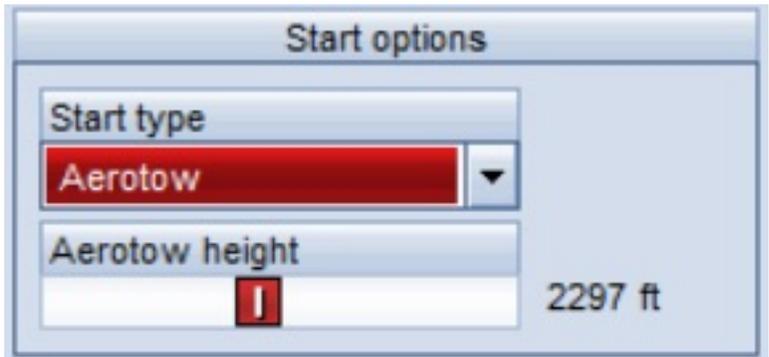
**Aerotow**

*Aerotow* is the default launch method for a new *Flight Plan*.

*Aerotow Height* is an AGL altitude ranging from 164 feet (50 meters) to 4921 feet (1500 meters), with a default value of 2297 feet (700 meters).

Note: 700 meters is the mandatory tow release altitude at a soaring contest.

In the U.S., the required contest release altitude is 2000 feet AGL.

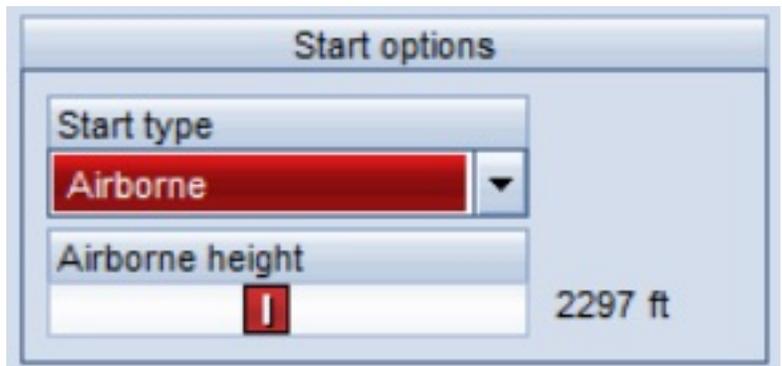


**Airborne**

The *Airborne Start Type* lets you begin a *Free Flight* session in the air.

*Airborne Height* is an AGL altitude ranging from 164 feet (50 meters) to 4921 feet (1500 meters), with a default value of 2297 feet (700 meters).

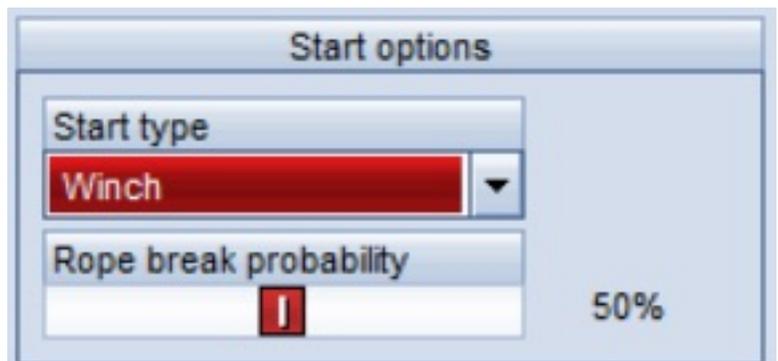
An *Airborne* start positions the glider directly above the approach end of the active runway at the specified *Airborne Height* altitude.



**Winch**

This option provides a very realistic *Winch* launch (without the G forces).

*Rope Break Probability* ranges from 1% to 100%, with a default value of 1%.

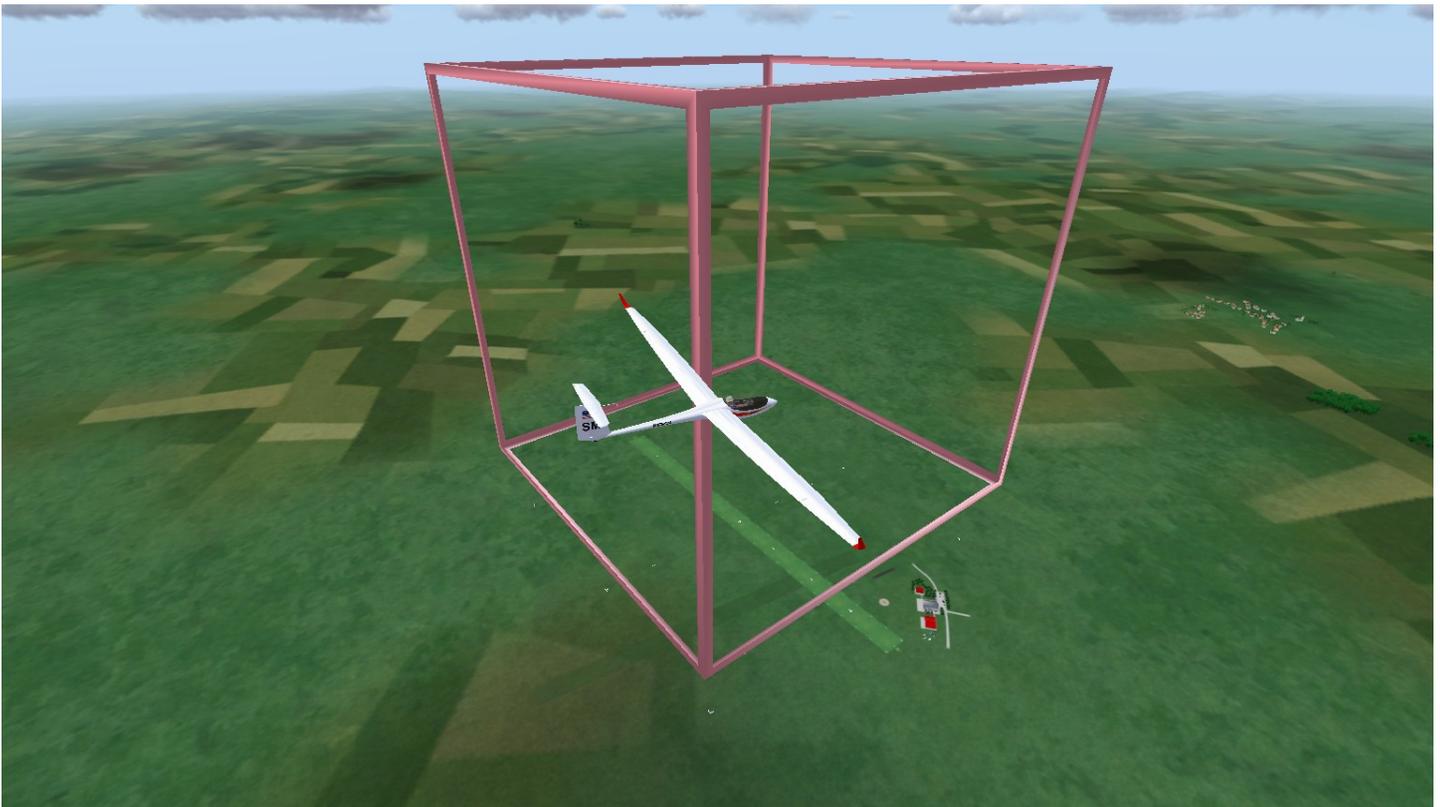
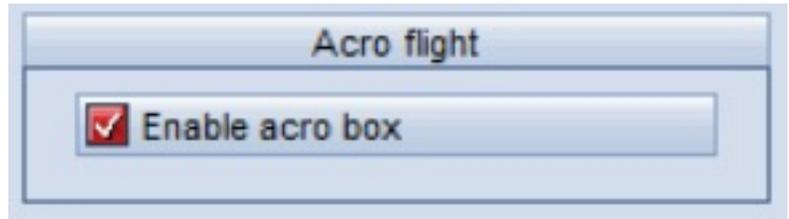


### Acro Flight

When *Enable Acro Box* is checked, Condor generates an aerobatic box and ground markings centered over the airport.

The *Acro Box* is a cube, 1000 meters on a side, with a floor 200 meters AGL.

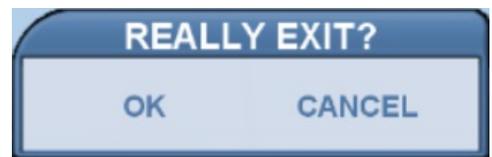
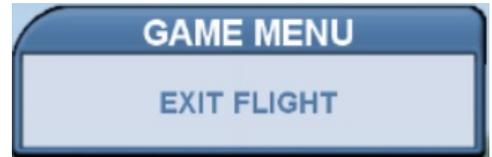
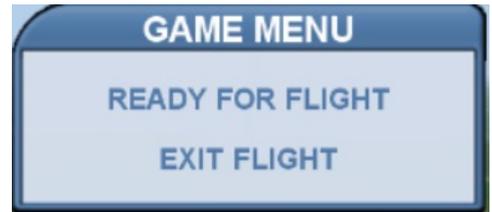
The *Acro Box* ground markings are always visible. The Box itself can be made visible using the “J” key (Task Helpers).



**Exiting Free Flight**

To exit a *Free Flight* session:

1. Press the *ESC* key on your keyboard.  
If you are not yet flying, Condor displays the *Game Menu* panel that includes both “*Ready For Flight*” and “*Exit Flight*” options.  
  
If you are already flying, the *Game Menu* lists *Exit Flight* only.
2. Click on *Exit Flight*.  
Condor displays the “*Really Exit?*” confirmation panel.
3. Click “*CANCEL*” to remain in the *Free Flight* session.
4. Click “*OK*” to exit the *Free Flight* session.  
Condor then displays the *Debriefing* panel.



**Debriefing**

**Re-Fly** initiates a new *Free Flight* session, using the current *Flight Plan*, without having to return to Condor’s main page.

**Analyse Flight** (a.k.a. *Analyze Flight*) initiates the *Flight Analysis* function using a *Flight Track* file called “*LastTrack.ftr*” which is recreated during each new *Free Flight*.

**Save Flight Track** creates a named *Flight Track* file for the *Free Flight*. *Flight Track* files are used in Condor’s *Flight Analysis* function and to generate *Ghosts*.

**Save Replay** creates a *Replay* file for the *Free Flight*.

**Logbook** displays the current *Pilot*’s logbook. The *Logbook* function is also available from Condor’s main page.

**Done** returns Condor to the main page.

*Analyse Flight*, *Save Flight Track*, *Save Replay*, and *Logbook* can all be executed for a given *Free Flight*. Each will return to the *Debriefing* panel upon completion.



Scott Manley's logbook

No.	Date	Plane	Flight time	Distance	Multiplayer	Flight track	Remarks
302	1/26/2016	LS8	00:03:54	0.0	No		
303	1/27/2016	ASK13	00:01:31	0.0	No		Aborted flight
304	1/27/2016	ASK13	00:04:13	0.0	No		
305	1/27/2016	ASK13	00:04:04	0.0	No		
306	1/27/2016	ASK13	00:03:47	0.0	No		
307	1/27/2016	ASK13	00:04:08	0.0	No		
308	2/3/2016	ASK13	00:01:16	0.0	No		
309	2/3/2016	ASW28	00:01:26	0.0	No		Aborted flight
310	2/3/2016	ASK13	00:01:33	0.0	No		Aborted flight
311	2/3/2016	ASK13	00:03:55	0.0	Yes		Aborted flight
312	2/3/2016	ASW28	00:13:21	4.7	No	SSA_2016_I	
313	2/3/2016	ASW28	00:00:47	0.0	No		Aborted flight
314	2/3/2016	ASW28	00:14:52	2.0	No	SSA_2016_I	
315	2/3/2016	ASK13	00:01:36	0.0	No		Aborted flight
316	2/3/2016	ASK13	00:06:14	0.0	No		
317	2/3/2016	ASK13	00:08:28	1.3	No		
318	2/3/2016	ASK13	00:05:41	1.3	No		
Total:			20:45:05	195.4			

Exit

## Features, Tips, Tricks, & Techniques

### Views

Unlike the real world, where your view of the environment is limited to “inside the glider cockpit looking out”, Condor provides you with an entire array of interesting ways to visualize your simulation world.

#### Cockpit

This view is invoked using the **F1** key. This is the only view available to you in real life, and is Condor’s default view.

#### No Cockpit

This view is invoked using the **CNTL + F1** keys (hold down CNTL, then press F1) as a toggle between the *Cockpit* and *No-Cockpit* views.

This view often comes as a surprise to Condor users. I believe it was developed for use in simulations where the flight instruments and outside view are displayed separately, e.g., in a salvaged fuselage where the flight instruments are displayed on a monitor viewed through holes in the instrument panel, with only the *No Cockpit* view being displayed on a projection screen.

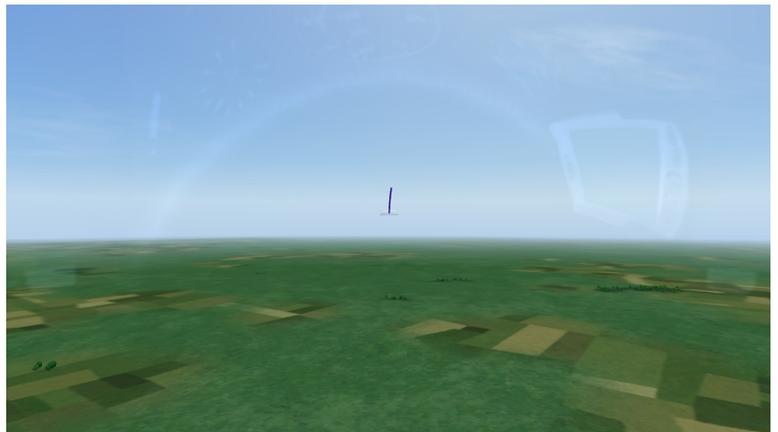
For instructional purposes, this view can be used to teach attitude flying, using the yaw string’s relationship to the horizon for pitch (airspeed) control and the horizon for bank control. Using this view is the Condor equivalent of covering the flight instruments.

#### External Glider

This view is invoked using the **F2** key.

Using one of the view control options (mouse, hat switch, up/down/left/right arrow keys on the numeric key pad) the viewing camera can be placed anywhere around the glider.

For instructional purposes, this view can be used to provide situational awareness and help the student visualize a myriad of situations from a very familiar point of view.



**Fixed Camera Positions**

This set of views is invoked using the **F3** key as a toggle between the following views.

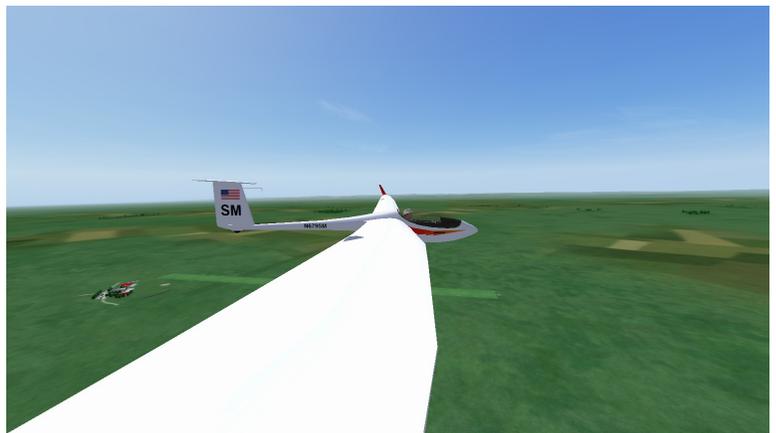
Behind the glider



In front of the glider



On the right wing tip looking at the fuselage



On the vertical stabilizer looking forward



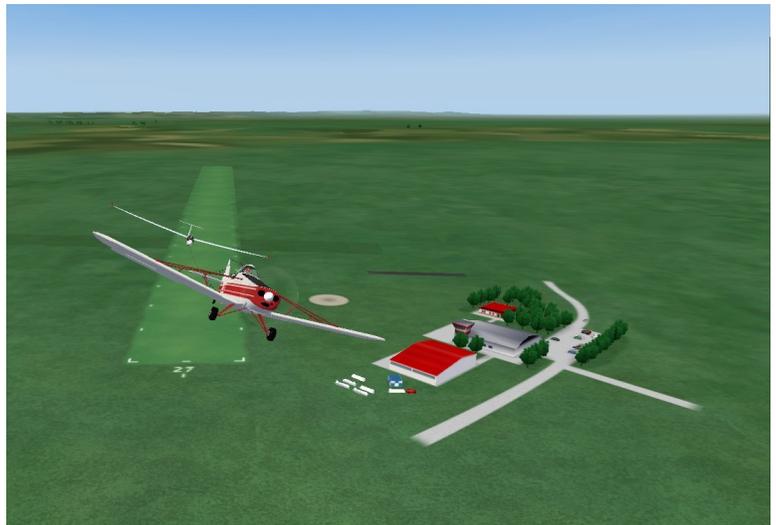
**Tower**

This view is invoked using the **F4** key and provides the perspective of a person viewing the glider from a tower located at the midpoint of the airport's runway.

**External Tow Plane**

This view is invoked using **F5** and is similar to the *External Glider* view except the viewing camera is focused on the tow plane.

In *Flight Plans* that do not use a tow plane (e.g., *Airborne* and *Winch* launches), pressing **F5** has no effect.

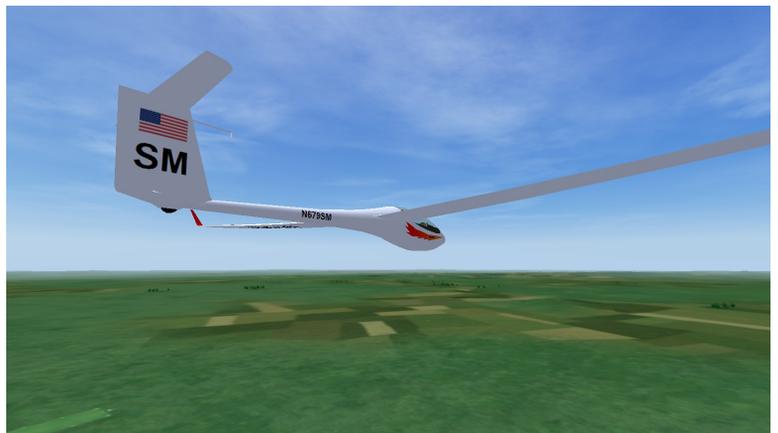


**Fly-By**

This view is invoked using the **F6** key.

Pressing F6 places the viewing camera out in front of the glider. The view camera then continuously tracks the glider as it “flies by”.

The series of images on this page were taken from a typical *Fly-By*.



## Viewing Features

### Zoom

A general *zoom in/out* feature is available in all of Condor's views.

By default, *zoom in/out* are invoked using the “+” and “-“ (add / subtract) keys on the numeric keypad. If your keyboard does not have a numeric keypad, the zoom functions need to be reprogrammed to other keys. I recommend using the letter “I” for zoom-In and the letter “O” for zoom-Out.



### Panel Zoom

*Panel Zoom* is a special zoom feature that temporarily magnifies the instrument panel.

The *Panel Zoom* default key assignment is the letter “Y”. Pressing and holding “Y” enlarges (magnifies) the instrument panel. Releasing the “Y” returns the view to normal *Cockpit view*.

The images at the right show the normal cockpit view (top) and the view with the panel zoomed in.



### Heads-Up Display (HUD)

All of Condor's external views incorporate an information sub-panel called a “HUD” (*Heads-Up Display*)” which provides much of the information normally found on the glider's instrument panel, plus:

- Current View
- Pilot
- Glider make/model
- G-load
- Latitude/Longitude

The *HUD* is displayed on all external views by default. It can be toggled on/off using the “~” key to the left of the number “1” on the keyboard.

The image at the right shows an *External Glider* view with the *HUD* displayed.



The image below shows the *HUD* enlarged.



### Panning (Point of View Control)

Panning may be the most important skill you need to master with respect to computer-based flight simulations.

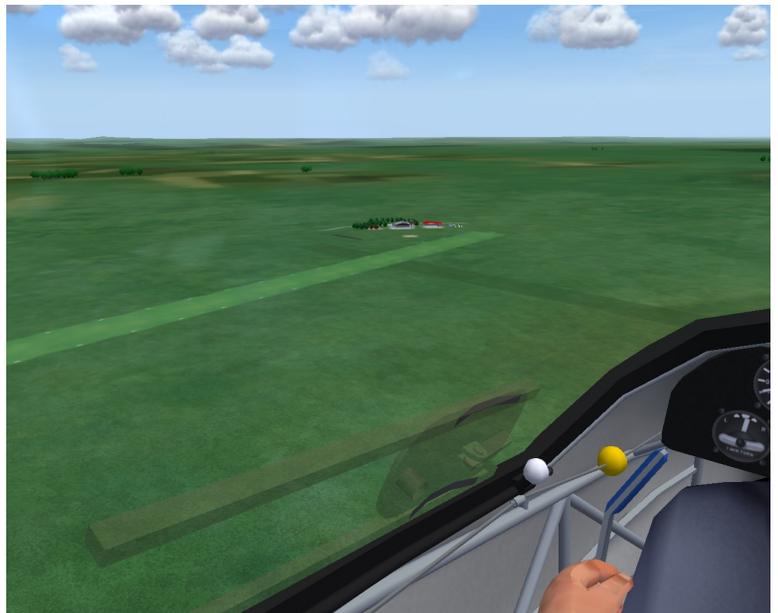
Most of us run Condor on our home computer systems or laptops, using a single monitor designed for applications like word processing, web browsing, and email. However, for graphics programs like Condor, the typical computer monitor affords only a limited visual field of view. I estimate Condor's default field of view (from the cockpit) to be about 40-45 degrees either side of the vertical plane and about 30 degrees above and below the horizon. By comparison, your normal (real life) human visual field, in each eye, extends from approximately 60 degrees nasally (toward the nose, or inward), to around 100 degrees temporally (away from the nose, or outward), and approximately 60 degrees above and 75 degrees below the horizontal meridian.

To compensate for this rather dramatic loss in field of view, you need to learn to "look around" in Condor. Essentially you need to be able to easily and quickly move your available field of view to where you need it.

For example, when flying the downwind leg of the traffic pattern in Condor, using the default (straight ahead) view, you cannot see the runway down and to the side. To establish and maintain your relationship to the landing area, you need to be able to adjust (redirect) your available field of view down and to the side until the runway is visible.

By default, Condor assigns the view panning functions to a subset of your keyboard's numeric keypad:

- 2 – pan down
- 4 – pan left
- 5 – view reset (default straight-ahead)
- 6 – pan right
- 8 – pan up



In addition to the numeric keypad assignments, if your joystick has a hat switch, Condor automatically assigns the POV (point of view) (panning) function to the hat switch. The hat switch changes the point of view in increments of about 45 degrees left and right, and in some lesser number of degrees up and down.

The panning function can also be done using Condor's "*Mouse Look*" feature. *Mouse Look* lets you use your computer's mouse to redirect your available field of view. Because mouse tracking is an analog process, you are able to redirect your field of view exactly where you need it, and do so at a much more natural rate. With some practice, it becomes second nature to use the mouse to look around. Implementing *Mouse Look* does not preclude (override) your ability to look around using the hat switch or numeric keypad.

Assuming you use your right hand to control the joystick, you will need to learn to move the mouse with your left hand. This will take some practice.

**Panning (cont.)**

Using any of the view control methods, it is relatively easy to look away from the straight-ahead (default) view. It is considerably more difficult, and often quite disorienting, to return to the default (straight ahead) view. Having probably come to the same realization, the Condor developers implemented a special “*View Reset*” function that reestablishes the default view with the touch of a button. The default keyboard assignment for *View Reset* is the “5” on the numeric keypad.

*Tip/Trick:*

*The View Reset function can be invoked by simultaneously clicking the left and right mouse buttons: an undocumented feature of the software, but quite a convenience when using the mouse for view control.*

The panning function is available in the following views:

- *Cockpit / No-Cockpit*
- *External Glider*
- *External Tow Plane*

Panning in *External Glider* view is an excellent way to maintain situational awareness in Condor, e.g., your relationship to the airport, especially when flying away from it.

**TrackIR.**

For you gadget types out there, there is a product called [TrackIR](#) that uses a fixed receiver to detect signals from an infrared transmitter attached to your head. Small movements of your head cause the point of view on your monitor to change correspondingly, if not proportionately. I have not tried TrackIR, but many who have seem to like it.

**Screen Messages**

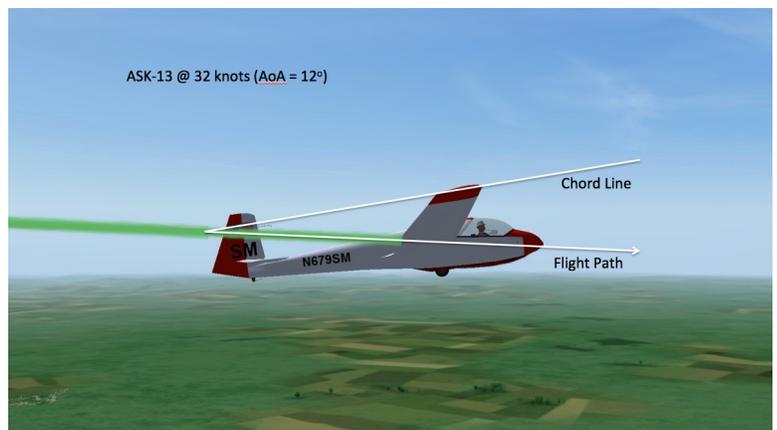
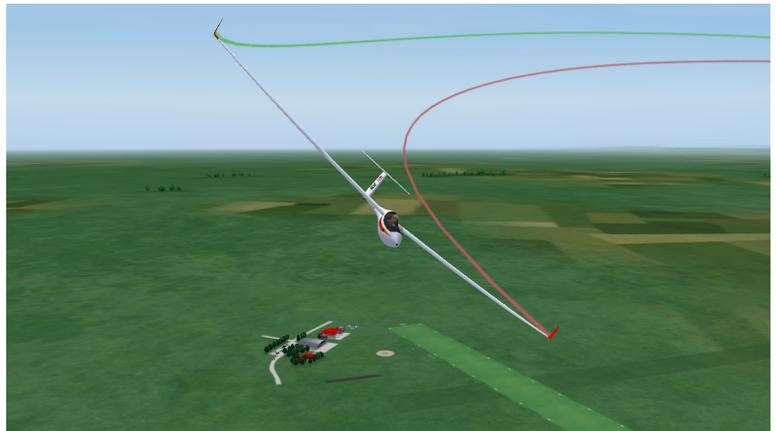
Condor issues a number of on-screen messages, usually displayed at the top or corners of the monitor. Condor messaging can be turned off/on using the “~” key (default). When messaging is turned off, none of Condor’s messages will be displayed.

Messaging is turn “on” by default.

## Smoke

Condor's wing tip *Smoke* is a fun feature. In addition to being esthetically pleasing, Smoke has a number of instructional benefits.

1. The *Smoke* trails trace the glider's flight path, but not indefinitely. Like real smoke, the trails drift with the wind and dissipate over time. Setting the wind speed to zero in the *Flight Plan* can eliminate the wind drift.
2. The *Smoke* trails, just aft of the wing, correspond directly to the relative wind (flight path), thereby helping students visualize the concept of angle of attack by comparing the smoke trail to the wing chord.
3. In instructional scenarios using the "follow the leader" method, *Smoke* trails make the leader easier to see and therefore easier to follow.



## Screenshots

The *Screenshot* feature lets you take a picture of your Condor application monitor at any point in time. The function is available in both live-action and *PAUSE* mode.

Keyboard letter "S" is the default assignment for *Screenshot*. As you press "S", Condor issues a slight audio tone and displays the following message at the top/center of the monitor:

***"Screenshot saved to Screenshots\Shot#.ext"***

where # is the next sequential number based on the current contents of the *Screenshots* subdirectory, and "ext" is the type of image file saved (options are ".jpg" and ".bmp": specified in *Setup/Options/Miscellaneous*).

Nearly all the images in this document were captured using Condor's *Screenshot* function.

## Task Helpers

The keyboard letter "J" is the *Task Helper* toggle. Pressing "J" allows you to see *Task Points*, *Penalty Zones*, and the *Aerobatic Box*.

By default, *Task Helpers* are off, i.e., you won't see *Task Points*, *Penalty Zones*, or the *Aerobatic Box*.

In order to see *Task Points* and *Penalty Zones*, the value specified by "*Turnpoint Helpers Range*", located in the *Flight Planner / NOTAM / Realism* section, must be greater than zero. This setting does not affect range at which the *Aerobatic Box* is visible.

Interestingly, when the *Aerobatic Box* is enabled, "J" will not make visible either *Turn Points* or *Penalty Zones*.

**Thermals**

The *Thermals* graphic is a great way to introduce students to the basics of thermal lift, cloud base calculations, and blue day conditions.

For instructional purposes, thermals can be made available as the syllabus calls for them.

Conditions can be set (e.g., abundant, closely-spaced, strong, wide) to help ensure the student’s first experience with thermals is a satisfying one. As the student gains experience, thermal behavior can be set to mimic normal local conditions. For example:

- a good day in Wisconsin has cloud bases at around 5000 feet AGL with 300-500 foot per minute lift.
- weak conditions can be simulated that require a lot of scratching around and a lot of patience.
- conditions can be set to those one might experience in the western United States.

And, all those conditions can be simulated within the span of an hour’s lesson. To acquire the same level of experience in the real world could easily take months, years, or even a lifetime.

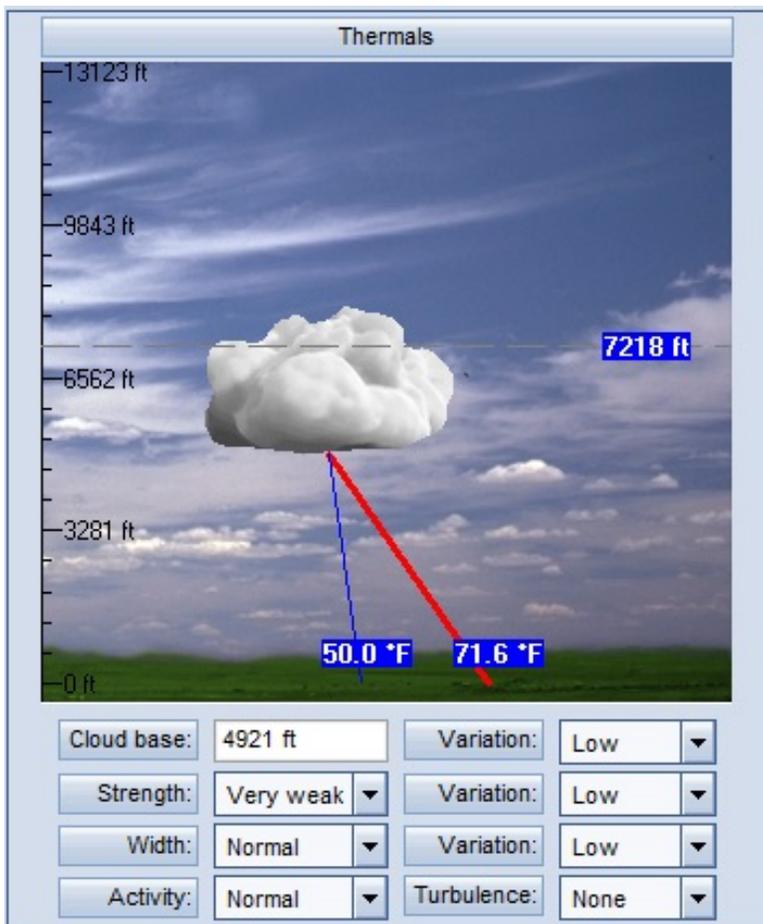
The real kicker, however, is that you can “see” thermals in Condor.

Being able visualize what a thermal might look like helps the student better understand this fundamental aspect of soaring. The objective, of course, is to eventually wean the student off displaying Condor’s rising columns of colored bubbles and instead have her use cloud markers, cloud shape and definition, cloud base shape and color, and the visual and auditory outputs of the variometer, all of which are very well simulated in Condor.

The thermal visualization toggle in Condor is the letter “H” on the keyboard (default).

*Tip/Trick*

*In order for the “H” key to work properly, the “Thermal Helper Range” located in the Flight Planner / NOTAM / Realism section must be set to a value greater than zero nautical miles (the default).*



## Pause

Condor's *Pause* feature enables the pilot to put the application on hold without exiting out of a session. The default keyboard assignment for *Pause* is the letter "P", and acts as a toggle, pausing and resuming the action.

*Pause* has any number of interesting uses, e.g., allowing the pilot to take a bio-break or answer a phone call in the middle of a flight. *Pause* can also buy you time to think, a luxury we could all afford in real life.

For instructional purposes, the *Pause* feature is worth its weight in gold. The ability to stop the action, have a calm, undistracted conversation about the flight situation, and plan the next steps is invaluable to the learning process.

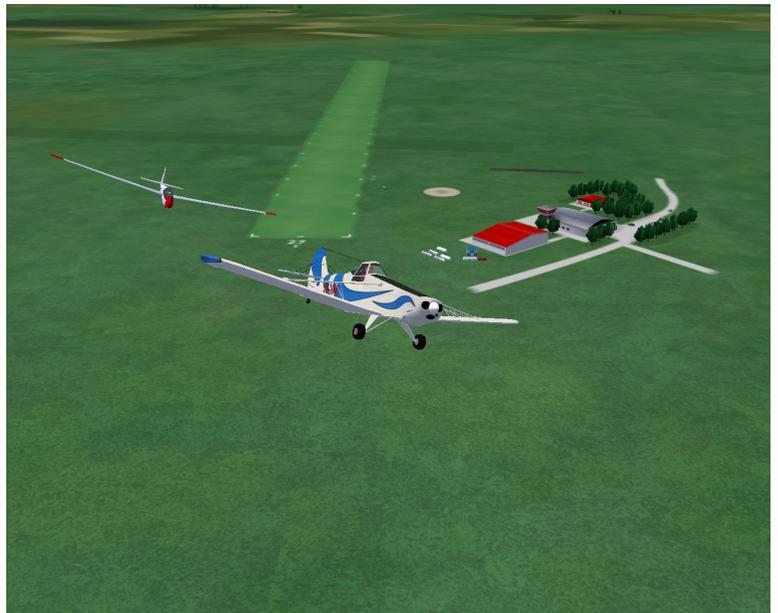
All of Condor's other viewing functions are available while in *Pause* mode.

## Controlling the Tow Plane

Folks often ask me whether there is a way to control the tow plane in Condor. The answer is "yes" and "no". You have no direct control over what the tug does, but once you understand what it has been programmed to do, you have a fair amount of control over how things play out.

Here is my understanding of Condor's tow plane behavior.

Condor was designed to simulate competition soaring. Real world competitions are hosted at gliding sites, so every Condor session begins at an airport. In the real world, each day's competition is based on a "task" comprising a start, a series of turn-points, and a finish. The role of the tow plane at these events is to transport each competitor into the air in the vicinity of the start gate, and ideally, into a source of lift. In any case, the competitor is expected to release at some specified maximum altitude.



To simulate its role at a contest event, Condor's tow plane:

1. takes off from the selected airport.  
You initiate the aero-tow by pressing the "Esc" (*Escape*) key to display the *Game Menu*, and then click on "Ready for Takeoff". The tug starts its engine and taxis onto the runway in front of you. The towrope is attached (suddenly appears between the tug and glider), an invisible ground crew person levels the glider's wings, and the ground roll begins.
2. climbs straight ahead to an altitude of 300 feet AGL.
3. proceeds directly to the *Task Start*.  
The tug will turn from the runway heading as required.

**Controlling the Tow Plane (cont.)**

## 4. searches for lift.

If the tug arrives at the *Start* gate before reaching its assigned release altitude (*Aerotow Height*), it turns as required and proceeds directly to the nearest thermal. If the glider pilot does not release into the first thermal, the tug again turns as required and proceeds to the next nearest thermal. This process continues until the glider pilot releases or the tug arrives at the specified release altitude.

## 5. doesn't care about cloud base.

If the assigned release altitude is above cloud base, the Condor tug "will" tow you into the clouds.

## 6. signals you to release.

At the assigned release altitude, the tug levels out for a few seconds and waits for you to release.

If you fail to release in relatively short order, the tug issues the "immediate release" signal; it rocks it wings.

## 7. unilaterally releases you under certain circumstances.

If you persist in hanging on after being signaled to release, the tug sets you free. It then proceeds to mock you by displaying a text message on the screen that reads:

***"(Your name here) does not care if the tow plane rocks its wings."***

The tug will also release you if you get too far out of position, adding insult to injury by displaying:

***"(Your name here) has trouble following the tow plane."***

## 8. makes a beeline back to the airport.

Upon release, the tug will turn to whatever heading provides the most expedient return to the airport. Unlike the real world (at least the U.S.), that turn is "not" always to the left.

All the Condor tugs fly at airspeeds between 60 and 70 knots, depending on whether the glider being towed is carrying water ballast. The tug's airspeed seems to be based on how full the glider's ballast tanks are, since a fully loaded standard class ASW-28 weighing in at 1157 pounds is towed at the same 70 knots as a fully ballasted ASW-22BL at its 1653-pound maximum gross weight. If the glider pilot begins dumping water while on tow, the tug will correspondingly reduce its airspeed, gradually and precisely returning to 60 knots just as the glider's ballast tanks go dry. So, you can actually use your airspeed indicator as a water meter while on tow. If the tug is flying faster than 60 knots while towing a ballasted ship, it will reduce its airspeed back to 60 knots after the glider releases.

If the assigned *Aerotow Height* is above 300 AGL, the tug will, upon release, return to the vicinity of the airport by the most direct route, fly the most expedient traffic pattern possible, land on the far right side of the active runway so as to clear any gliders staged on the left side, exit the active runway, taxi back to the launch area, and shutdown.

Oddly enough, if the assigned *Aerotow Height* is anything less than 300 feet AGL (164 feet AGL is the absolute minimum), upon release, the tug continues to fly straight out, on the runway heading, at the assigned release altitude, indefinitely, presumably until it runs out of fuel. I think this might be a programming oversight.

### Controlling the Tow Plane (cont.)

Now that you know more than you ever thought possible about the behavior of Condor's tugs, you can begin to "control" that behavior using some clever combinations of the following two settings:

1. The tow release altitude (*Aerotow Height*).
2. The location of the *Task Start* relative to the airport.

#### To specify the tow release altitude:

1. Click the "Free Flight" button located on the Condor main menu.
2. Select the "NOTAM" tab on the *Flight Planner* page.
3. Select "Aerotow" from the *Start-type* drop-down menu.
4. Specify the release altitude (AGL) using the "Aerotow Height" slide bar.

#### To locate the *Start* relative to the selected airport:

Move the cursor over the *Start* task point until the cursor displays as crossed double arrows. Left click/drag the *Start* to a new location. Release the left mouse button.

Here are some examples of how to use the "tow release altitude" and "start gate location", in combination, to "control" the behavior of Condor's tow planes.

#### 1) If you want the tug to take off and tow straight out without turning:

Place the *Start* directly off the departure end of the runway, at a distance that ensures the tug arrives at its release altitude before it reaches the *Start*.

Placing the *Start* slightly to the left of the runway extended centerline ensures the tug will turn left when the glider releases, since a left turn provides the most expedient return to the airport.

#### 2) If you want the tug to turn left/right after reaching 300 feet AGL, and upon glider release:

Place the *Start* anywhere to the left/right of the extended runway centerline.

#### 3) If you want to be towed onto a downwind leg:

Place the *Start* on the downwind leg, or somewhere along the extended downwind, on the traffic pattern side of the airport.

Set the *Aerotow Height* at pattern altitude (AGL).

#### 4) If you want the tug to take you back over the airport:

Place the *Start* on the airport.



### Controlling the Tow Plane (cont.)

**5) If you want the tug to make a bunch of seemingly random turns:**

Place the *Start* near the airport and assign an *Aerotow Height* that ensures the tug will reach the *Start* well before reaching release altitude. Upon arriving at the *Start*, the tug will begin flying around looking for lift, making turns as needed to intercept a series of nearby thermals.

The thermals generated by a specific *Flight Plan* are always in the same geographic locations, so each time you execute that *Flight Plan*, the thermals will be the same places. To vary the location of the thermals on subsequent aero-tows, and thereby vary where the tug makes its turns, change the start “*Time*” of the flight by 30 minutes.

**6) If you want to simulate premature terminations of the tow:**

Assign the *Aerotow Height* and placement of the *Start* as needed. The tug will signal an immediate release at the selected release height.

The image at the right shows the glider reacting to a tug power failure shortly after takeoff.



### Flying the Aerotow in Condor

At least initially, almost everyone struggles with flying aero-tow launches in Condor. Unfortunately, the Condor installation's default *Flight Plan* uses an aero-tow, so new users of the software are immediately subjected to this issue.

Flying aero-tow in Condor is more difficult than flying real-life aero-tows for a couple of reasons:

1. Condor uses a 100-foot towrope vs. the 200-foot towropes used in most U.S. towing operations. With a shorter rope, everything happens faster. Any deviation from the desired position becomes exaggerated. The pilot has less time to recognize the deviation and correct it.
2. The limited field of view in Condor makes it more difficult for the pilot to sense positional deviations.

There is however an upside. If you can learn to fly aero-tow in Condor, flying aero-tows in an actual glider will be relatively easy. Learning to fly aero-tow in Condor trains you to a higher standard of performance.

The following list of suggestions should help improve your aero-towing in Condor.

#### 1) *There is a natural human tendency to over-control something you are unfamiliar with.*

Try to remember your first attempts at riding a bicycle or driving a car. Your control inputs were probably exaggerated and excessive. With experience, you learned to make more appropriate control inputs. In the same way, you need to acclimate yourself to Condor's control inputs.

I recommend using Condor's *Airborne* start capability (no tow required) until you become comfortable with the simulation's control feel.

#### 2) *Your huge arm muscles are a poor match for the resistance in the joystick.*

I recommend and use a Logitech Extreme 3D Pro joystick. The 3D Pro is not a force feedback stick. It uses small springs to provide control input resistance (feel). If you grip the joystick as designed, you will naturally be using your relatively large arm muscles in opposition to some relatively small springs in the joystick. As such, you will "feel" almost no resistance and will naturally over-control.

I recommend resting the side of your hand on the base of the joystick and using your thumb and ring, index, and middle fingers to move the joystick. Your relatively small finger muscles are much more sensitive to the small control input pressures required, and are a much better match for the joystick resistance.



The images above show the normal (left) and recommended joystick grips.

### Flying the Aerotow in Condor (cont.)

#### 3) *Use your peripheral vision to sense your position relative to the tow plane.*

If you look directly at the tow plane, you are using your sharp focus vision. Your sharp focus vision, however, is not optimized to sense motion. It is your peripheral vision that is highly sensitive to motion.

While on tow in Condor (and in the real world for that matter), the trick is to focus on something other than the tow-plane. My recommendation is to focus on the horizon and then simply be aware of the tow plane's position in your periphery. By using your peripheral vision, you will almost immediately sense any relative motion of your glider and the tow plane. The sooner you recognize a positional deviation, the more quickly you can react to it, and the smaller the corrective action required.

Using your peripheral vision as primary is going to take some disciplined practice. Do not look directly at the tow plane.

#### 4) *Fix a deviation incrementally.*

If you get out of position, please do not panic. To the best of my knowledge, no one has ever been killed or seriously injured by getting out of tow position in Condor.

##### Step 1: Stop the deviation.

For example, if you are moving to the right of the tow plane, it is because you are banked more to the right than is the tow plane. Slowly bank left until your movement to the right stops. Do not attempt to immediately get back into position behind the tug. Just stop the deviation.

##### Step 2: Slowly apply the control inputs that move you back into position.

For left/right deviations, once you have stopped the deviation, quite often your best bet is to do almost nothing. The side pull on the towrope has a tendency to bring you back in toward the tug.

As the glider moves back toward the tug, keep in mind your aircraft has momentum. You need to anticipate taking corrective action to slow and halt your transition back to center. If you overshoot, you're not yet thinking far enough ahead. 'No big deal. Return to **Step 1** above.

This same technique works to correct vertical excursions.



## Flying the Aerotow in Condor (cont.)

### 5) *If things get ugly – RELEASE*

If you start oscillating back and forth, off to one side of the tow plane, then the other (especially if the oscillations are getting larger), stop trying to recover.

Release, restart the flight, and try it again.

If you lose sight of the tow plane for any reason (too high, too low, off the edge of the monitor left or right), your reaction in Condor should be the same as it would be in actual flight: **RELEASE IMMEDIATELY**.

By the way, the tow plane pilot in Condor has her limits (as you may have already discovered). She is not going to let you kill her. If you get too far out of position, the Condor tug pilot will release you in a heartbeat, and you will be mocked with a message in the lower left-hand corner of your monitor:

*(Your Name Here) has trouble following the tow plane*

### 6) *Set Pitch Trim for a 60-knot towing speed.*

By default, Condor sets each glider's pitch trim to a neutral setting, corresponding to hands-off flight at the glider's best glide speed. However, the Condor tug's default tow speed is 60 knots, faster than the best glide speed of every glider available in Condor except the *MDM-1 Fox* aerobatic glider.

So, unless you properly set the pitch trim prior to takeoff, every glider in Condor will want to kite on the tug during the tow, and will require constant forward stick pressure to maintain a proper vertical position relative to the tug. The instant the pilot gets distracted with some other aspect of the tow, he/she will subconsciously relax the forward stick pressure and the tug will likely disappear under the glider.

The *School Class ASK-13* is the only glider in Condor (at least in the basic installation) lacking sufficient nose-down trim authority to fly hands-off at 60 knots. Even with full nose-down trim, the *ASK-13* will want to kite on the tow plane. This actually makes it a good simulation of the ubiquitous *SGS 2-33*, which more often than not exhibits the same behavior.

So, you may want to make your first aero-tows in a glider other than the *ASK-13*. Being able to properly trim the glider for the tow plane's 60-knot airspeed will result in one less thing to manage on tow.

### How to Get the Same Tow Plane on Every Flight

Condor comes with 5 different, and rather diverse, tow planes:

**Cmelak** a large, powerful, turbine-powered aircraft with a higher rate of climb than the other tugs

**Dynamic** an LSA (light sport aircraft) with a Rotax engine

**Pawnee**

**Super Cub**

**Zlin Z226** A Czech tail-dragger flown from the back seat.

By default, Condor randomly selects one of the five tugs on each new aero-tow flight. It also randomly selects from a number of aircraft paint schemes, i.e., the Pawnee is not always black/yellow/white.

To control which tow plane(s) get selected to make an aero-tow:

1. Create a folder on your desktop. I call mine “Condor Tugs”.
2. Open the “*Condor\Planes*” directory in Windows. Inside the *Planes* folder is a separate folder for each of Condor’s gliders and tow planes.
3. For each tow plane you do “not” want selected for aero-tow, move that tow plane’s folder from “*Condor\Planes*” to your “Condor Tugs” desktop folder.

This effectively removes that tow plane from Condor’s selection process, but retains the tug in a safe place.

In my example, I moved the Cmelak, Dynamic, Super Cub, and Zlin (Z226) to the Condor Tugs folder on my desktop.

Now, when Condor goes to make its “random” tow plane selection, it only finds the tow plane(s) that remain in *Condor\Planes*. In my example, the only remaining tow plane is the Pawnee, so I get a Pawnee on every aero-tow.



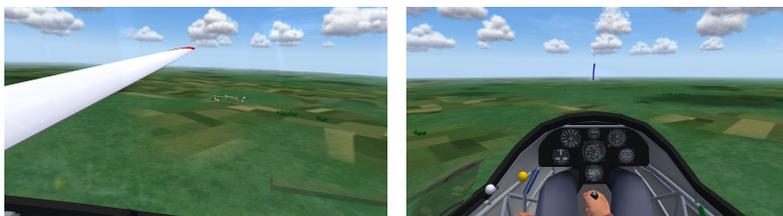
### Wing Tip as a Bank Attitude Indicator

A very useful skill in Condor is the ability to control the glider's bank angle using the visual relationship between the glider's wing tip and the horizon. In concept, this is similar to using the relationship of some forward part of the aircraft to the horizon to control the glider's pitch attitude.

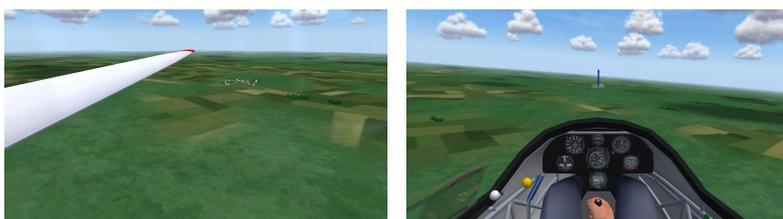
Using the wing tip's relationship to the horizon as a bank angle indicator allows the pilot to fly wings level or make constant-rate turns without having to be looking straight ahead. The technique enables the pilot to maintain situational awareness and to be clearing the airspace in advance of all turns.

The two images at the right each show a wings-level flight attitude.

Holding the wing tip in this position, relative to horizon, will maintain a wings-level flight attitude without having to look forward.



Lowering the wing tip to the horizon results in a very shallow left turn of approximately 10 degrees bank angle. As the glider turns, the wing tip appears to move backward along the horizon and objects on the ground appear to move as they would in a shallow left turn.



Lowering the wing tip slightly below the horizon increases the bank angle and thereby the rate of turn. The bank angle shown, in the two images at the right, is approximately 20 degrees.



The lower two images at the right show the wing tip and cockpit views resulting from an approximately 30-degree bank.



Logically, turns to the right would be done using a view of the right wing tip.

While making turns using this technique, it is important to have the glider trimmed for the desired airspeed and to roll the aircraft very slowly using aileron inputs only. The slow roll rate produces almost no adverse yaw and allows the glider to gradually make the pitch (airspeed) changes that result when turning the aircraft (modulating the load factor) at a constant angle of attack.

A demonstration *Replay* and "how to" self-study guide for this technique are available on the "[Condor/Orientation](#)" page at my website [gliderCFI.com](http://gliderCFI.com).

### View Replay

During any *Free Flight* session, Condor is continuously recording a number of flight parameters, including latitude, longitude, altitude, airspeed, descent rate, current *View*, etc. When the session ends, you have the option of saving the complete set of parameter records as a *Replay* file.

When played back through the *View Replay* function, Condor uses the *Replay* file to generate what appears to be a movie of your flight, exactly as you recorded it. You also have the ability to reposition the playback at any point, and to *PAUSE* the action.

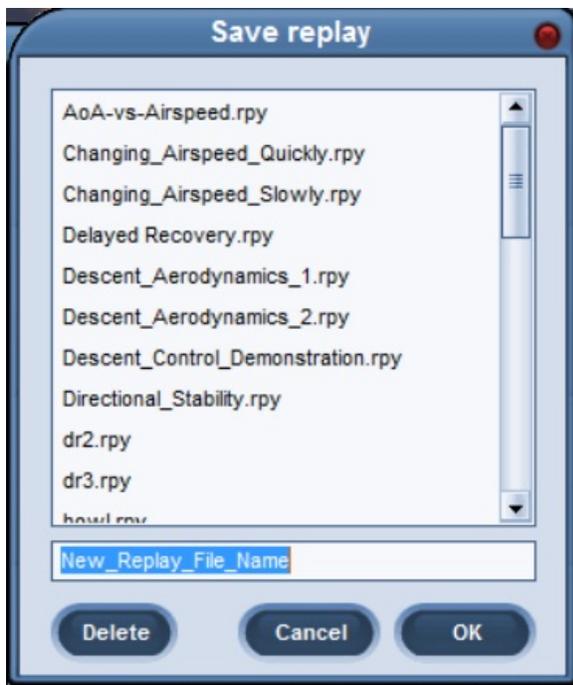
Even better, because a *Replay* file is a parameter file, not an actual video file, the flight can be played back using any of Condor’s available “*View*” functions, not just those used to record the flight.

### Creating a Replay file

Upon exiting a *Free Flight* session, Condor presents the *Debriefing* panel.

1. Select the *Save Replay* button.
2. On the *Save Replay* panel, enter a name for the new *Replay* file and press the “*OK*” button.
3. Condor confirms the *Replay* has been saved by displaying an “*Information*” panel over the *Debriefing* panel.

Replay files are saved in the *Condor\Replays* sub-directory using a “.rpy” file extension.



## Viewing/Deleting a Replay

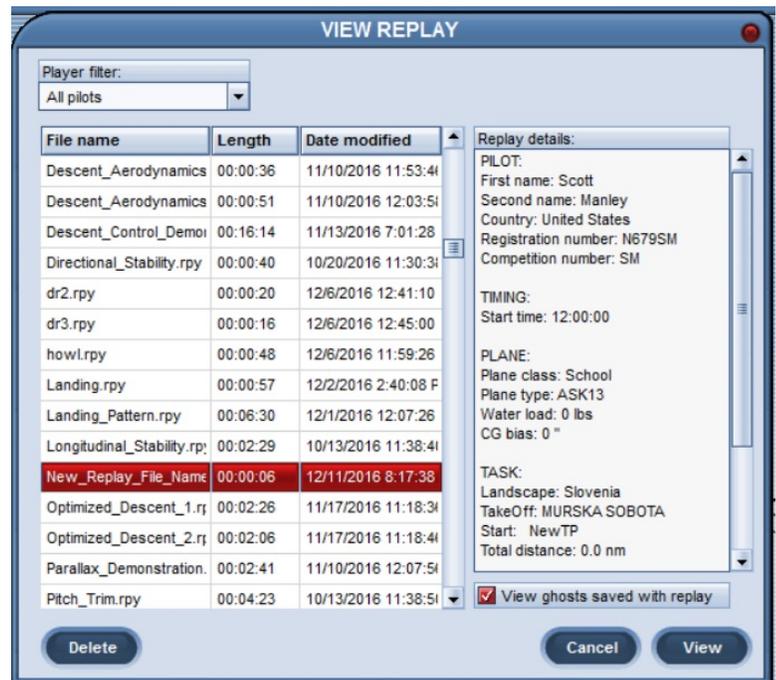
To view a Replay,

1. Select “*View Replay*” from Condor’s main page. Condor will display the “*View Replay*” panel.

2. Select a *Replay* from the “*File Name*” list.

If multiple pilots are sharing a Condor installation, the *Replay* file list can be filtered using the “*Player Filter*”. By default, *Replay* files are displayed for all pilots.

3. Press the “*View*” button to initiate the *Replay* session.
4. Press the “*Delete*” button to delete the selected (highlighted) *Replay* file from the *Condor\Replays* sub-directory.



The “*Cancel*” button returns you to Condor’s main page.

## Replay Control

A *Replay* file contains the same setup information as the *Flight Plan* used to create it. As the *Replay* session is initiated, Condor uses the embedded *Flight Plan* to build the flight environment. As such, a *Replay* session initiation looks just like a *Free Flight* session starting up.

With the initialization completed, the *Replay* begins playing back immediately.

The obvious difference between a *Free Flight* session and a *Replay* session is the presence of the “*Replay Control*” panel at the bottom of the screen. The control panel is comprised of a progress indicator and several sets of function controls.



### Progress Bar

The *Progress Bar* is the horizontal stripe that extends the width of the control panel just below the words “*Replay Control*”. It incorporates a *Position Indicator* (small maroon block) showing where the *Replay* is in terms of percentage complete (about 20% in the image above).

### Playback Control

The playback process can be controlled in a number of ways.

#### 1. Playback Control Icons

- |<< Positions the *Replay* at the beginning and places it in *PAUSE* mode.
- ||> PAUSE/PLAY toggle.
- >>| Positions the *Replay* at the end and places it in *PAUSE* mode.

#### 2. Progress Indicator & Mouse

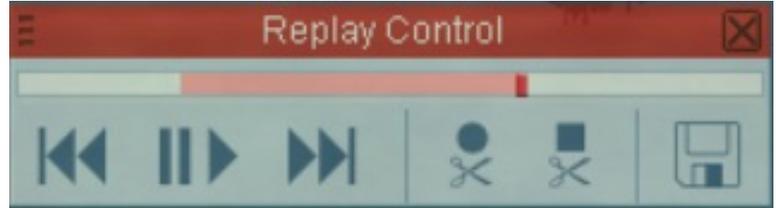
- a) Using the mouse to click/drag the *Position Indicator* repositions the playback and places the *Replay* in *PAUSE* mode.
- b) Placing the mouse cursor on the *Progress Bar* and doing a click of the left mouse button moves the *Position Indicator* to the cursor’s position and places the *Replay* in *PAUSE* mode.

#### 3. PAUSE key

The *PAUSE* key (“P” by default) can also be used as a PAUSE/PLAY toggle, i.e., it has the same effect as clicking the “||>” icon.

## Replay Segments

The *Replay Control* panel can be used to create a segment of a full *Replay*. *Replay Segments*, saved as independent *Replay* files, are the fundamental components of *Flight School* lessons, in particular scenario-based training sessions that initiate *Free Flight-like* sessions from points other than directly on/above the approach end of the active runway, e.g., starting the flight already on final approach for the purpose of conducting repeated landings.



### 1. Snipping Tools

- *Scissors-under-Ball* establishes the *Replay Segment* start-point based on the *Position Indicator*.
- *Scissors-under-Square* establishes the *Replay Segment* end-point based on the *Position Indicator*.

Using either *Snipping Tool* will place the *Replay* in *PAUSE* mode.

Even with a *Replay Segment* defined, the entire *Replay* is still available for viewing. The “|<< “ *Playback Control* places the *Position Indicator* at the nearest start point (either segment start or full *Replay* start), “>>|” at the nearest stop point. The *Position Indicator* can also be manually placed anywhere on the *Progress Bar* by clicking/dragging it with the mouse.

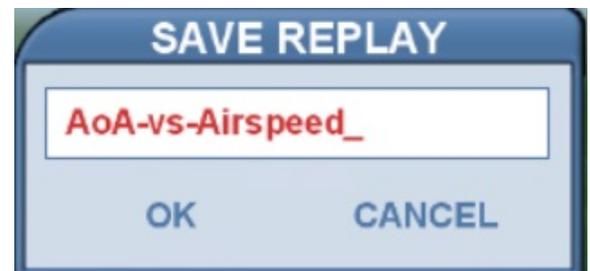
Creating a *Segment*, while in *Replay* mode, has no effect on the original *Replay* file stored in the *Condor\Replays* subdirectory.

### 2. Saving a Replay Segment

Selecting the *Disk Icon*, in the lower right corner of the *Replay Control* panel, opens a special-purpose “*Save Replay*” window.

By default, Condor assumes you want to replace the original *Replay* file with the new *Replay Segment* and displays the original *Replay* file name.

- To “replace” the original *Replay* file with the new *Replay Segment*, simply click “*OK*”.
- To retain the original *Replay* file, and also save the *Replay Segment* as a new *Replay* file, enter a new file name for the *Replay Segment*; then click “*OK*”.



Condor issues a “*Replay Saved*” message at the top of the monitor and returns the *Replay* to “*PLAY*” mode.

## Replay Camera

By default, a *Replay* session plays back exactly as it was recorded. Any viewing features invoked during the originating *Free Flight* session will be repeated in the *Replay* session. In this default playback mode, Condor's *Replay Camera* is considered to be "ON".

However, as mentioned earlier, because a *Replay* file is a parameter file, not a video file, a *Replay* session can be played back using any of Condor's available "View" functions, not just those used to record the flight. This is accomplished by turning Condor's *Replay Camera* "OFF" using the *Replay Camera Toggle* (default "F9" key).

Whenever the *Replay Camera* mode is changed, Condor displays the *Camera's* status in the lower right corner of the monitor, for example, "*Replay Camera OFF*" or "*Replay Camera ON*".

With the *Replay Camera OFF*, you have a majority of the viewing capabilities available to you in *Free Flight*, including all the *Views*, *Zoom*, *Panel Zoom*, *Heads-Up-Display*, *Panning*, *Screen Messaging*, *Screen-shots*, and *PAUSE*. The exceptions are *Smoke*, *Thermals*, and *Turn-Point* visibility, over which you have no direct control within *Replay* mode. In fact, the relationship between these three visual effects and the *Replay Camera* status gets a little more complicated.

With the *Replay Camera ON*, *Smoke*, *Thermals*, and *Turn-Points* will be visible at the same points in time they were visible during the originating *Free Flight*. However, if any of these three visual effects is being displayed when the *Replay Camera* is turned *OFF*, that effect will continue to be displayed until the *Replay Camera* is turned back *ON*. Likewise, any hidden visual effect remains hidden until the *Replay Camera* is turned back *ON*. Once the *Replay Camera* is back *ON*, the status of *Smoke*, *Thermals*, and *Turn-Points* reverts back to that of the originating *Free Flight*.

This behavior of the *Replay Camera* with respect to *Smoke*, *Thermals*, and *Turn-Points* can be confusing. The three effects sometimes seem to be visible when they should be hidden, and hidden when they should be visible. When in doubt, turn the *Replay Camera* back *ON*.

## Uses for Replay Mode

For instructional purposes, *Replay* mode is invaluable. I use it to create the "demonstration" phase of a lesson. Being able to see a flight maneuver from multiple perspectives helps the student reach the understanding level of learning. It is also easier to teach in *Replay* mode, as the instructor is able to focus on the discussion, rather than having to fly and teach at the same time. Also, producing a *Replay* that demonstrates the "perfect" maneuver sets the standard and does away with the instructor having to explain why the live demonstration wasn't quite what it should have been.

*Replay* is also an excellent tool for critique and evaluation. Being able to watch the entire flight, from multiple perspectives, and being able to stop at various points and discuss the current situation, are capabilities far superior to real-life, post-flight critique. *Replays* allow the student to self-critique. The entire Go-Pro industry was originally based on this concept. *Replays* also enable remote critique. Students can send their *Replays* to remote instructors who, at their convenience, can load the file to their Condor installation, watch the student's performance, and provide guidance via some remote communication medium. Skype screen sharing enables remote critique to be done live.

The possibilities are limited only by our imaginations.

### Embedded Messages

Condor's *Send Message* feature is normally used in *Multi-Player* mode to simulate radio communication, and is implemented using text messaging. A more detailed description of the *Send Message* feature is available in the **Other Multi-Player Features and Issues** section of this document.

The *Send Message* feature is also implemented in *Free Flight* and *View Replay* modes for the purpose of embedding short text messages into a *Replay* file. Most of the *Flight School* lessons that come with Condor use embedded text messages in the *View Lesson* function.

Messages embedded in a *Replay* have tremendous potential from an instructional perspective, however Condor's implementation of the feature fails to deliver on that potential. The embedded messages only remain on-screen for about 6 seconds before fading out, even if Condor is put in *PAUSE* mode; not enough time to be very useful.

Messages can be embedded in a *Replay* in one of two ways:

1. Any message sent during a *Free Flight* session will appear in a *Replay* of that session.
2. A message can be embedded in a *Replay* by sending message during the *Replay* and then re-saving the *Replay* before exiting *Replay* mode.

To generate a message in either *Free Flight* or *Replay* mode:

- Press the *Return* key to initiate a message

Condor enters *PAUSE* mode and displays the current radio frequency in the lower left corner of the monitor, followed by a cursor.

If the radio frequency is Condor's default (123.50), the frequency will appear in yellow text. All other frequencies will be displayed in red text.

- Enter your text message
- Press *Return* to enter your message

Condor displays your text message at the top / center of the monitor in red text.



## Flight Analysis

During any *Free Flight* session, Condor is continuously recording a specific set of flight parameters, including latitude, longitude, altitude, airspeed, descent rate, etc. It is essentially performing the functions of a real-world flight data recorder.

When played back through the *Flight Analysis* function, the flight data is used to graphically generate and display a ground track (horizontal plot), and/or a barograph (vertical) plot of your flight.

*Flight Analysis* is Condor's equivalent of real-world flight analysis software, such as [SeeYou](#).

The *Flight Analysis* function can be initiated from Condor's main page or from the *Debriefing* panel displayed as you *Exit* a *Free Flight* session. The differences between these two entry points are:

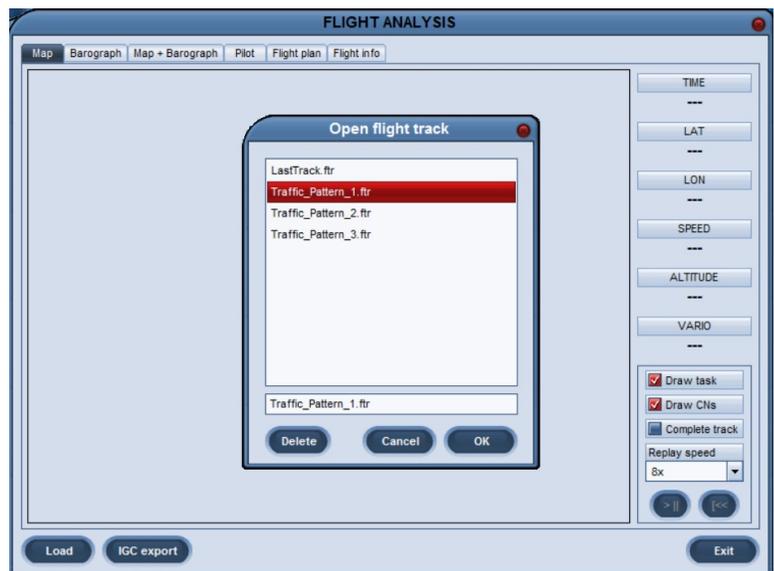
1. Condor's main page calls the function "*Flight Analysis*". The *Debriefing* panel calls the function "*Analyse Flight*".
2. When initiating *Flight Analysis* from Condor's main page, you need to specify (*Load*) an existing *Flight Track* file. When initiating the *Flight Analysis* function from the *Debriefing* panel, Condor assumes you want to analyze the flight you just completed, and will already have the "LastTrack.ftr" file loaded.

The image at the right shows the *Flight Analysis* panel opened from Condor's main page.

The "*Load*" button has already been pressed to display the "*Open Flight Track*" sub-panel, and a *Flight Track* file has been selected.

Click "*OK*" to *Load/Open* the selected *Flight Track* file.

Note: The *Open Flight Track* panel can also be used to delete *Flight Track* files stored in the *Condor\Flight Tracks* sub-directory.



## IGC Export

Condor *Flight Track* files can be exported in IGC format. Pressing the *IGC Export* button opens the "*Export flight track to IGC*" sub-panel. Providing a file name and pressing OK stores the IGC file in the *Condor\FlightTracks* subdirectory and displays an "Information" panel to that effect. Click OK on the Information panel to confirm.

Note: The *Export flight track to IGC* panel can also be used to delete *IGC* files stored in the *Condor\Flight Tracks* sub-directory.



**Flight Analysis Panel**

The display subpanel takes up most of the real estate on the *Flight Analysis* panel. Selecting one of the following display tabs determines the contents of the display subpanel.

**Map** is the default display. It shows the ground (horizontal) track for the flight.

**Draw Task** determines whether the *Flight Plan Task* (blue line) is displayed. By default, this box is checked and the task is displayed

**Draw CN** determines whether the glider's competition number (ID) is displayed. By default, this box is checked.

**Complete Track** determines whether the ground track for the entire flight is displayed at all times. By default, this box is unchecked. The entire ground track is displayed when the flight track is initially loaded, but once the analysis begins, the ground track is displayed only for the completed portion of the flight.

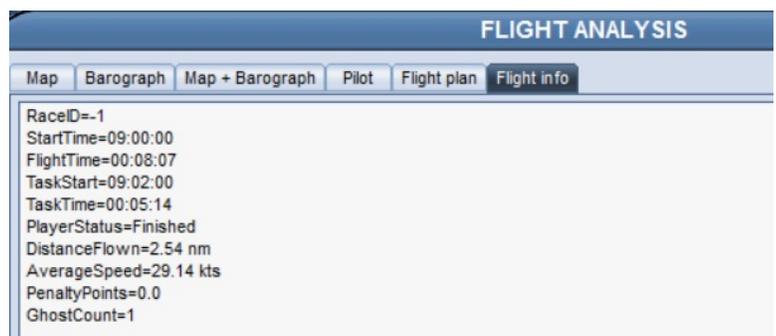
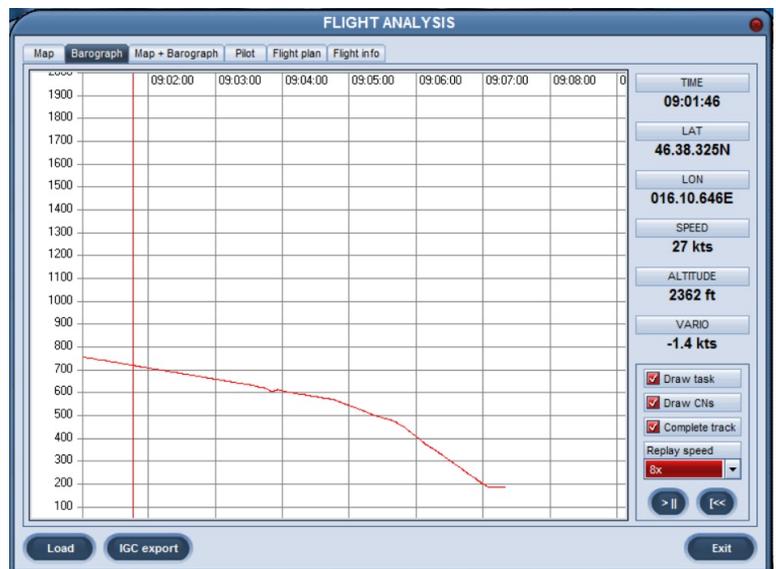
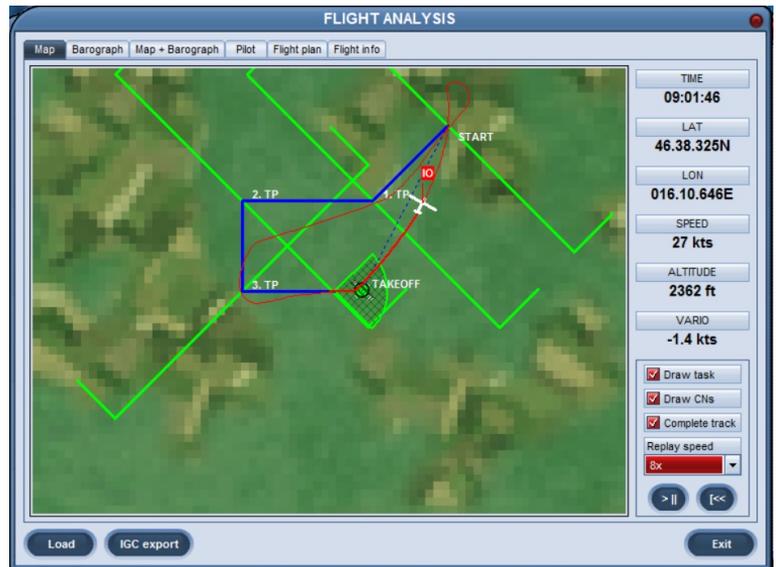
**Barograph** displays the vertical (altitude) track of the flight as a line chart. The chart's vertical axis shows altitude in meters; time of day is displayed on the horizontal axis.

**Map + Barograph** splits the display subpanel, showing the ground track above the barograph (altitude) readout.

**Pilot** lists the pilot's first name, second (last) name, country, registration number and competition number (ID).

**Flight Plan** displays the detailed text document comprising the *Flight Plan* associated with the completed flight.

**Flight Info** lists summary and status information about the completed.



## Flight Track Parameters

### Time

Condor generates a *Flight Track* file record once each second. The *Time* parameter uniquely defines each record and corresponds to the time of day the record was generated.

### Lat/Lon

The Latitude and Longitude of the aircraft at the recorded time.

### Speed

Ground speed

### Altitude

MSL

### Vario

The aircraft's rate of climb (+) or descent (-) at the recorded time.

TIME	09:01:46
LAT	46.38.325N
LON	016.10.646E
SPEED	27 kts
ALTITUDE	2362 ft
VARIO	-1.4 kts

## Flight Analysis Replay Control

Using the *Replay Speed* drop-down menu, the pace at which the flight analysis progresses can be set to 1X, 2X, 4X, 8X, 16X, 32X, or 64X the recorded time frame of one set of parameters per second. When you enter *Flight Analysis* for the first time after starting Condor, the *Replay Speed* is blank, but will run at a default speed of 8X if no other value is specified.

The “>||” button is the Play/Pause toggle.

The “[<<” button sets the replay to the beginning of the *Flight Track*.



Three other replay control functions are available in the *Flight Analysis* context window invoked by performing a right mouse click on the display sub-panel.

**Jump Here** places the glider icon at the point on the flight path closest to the position of the cursor when the context window is opened.

**View** opens a secondary context window enabling **Zoom-In** (magnify), **Zoom-Out** (shrink), and **Rest View** functions.

**Replay Speed** opens a secondary context window comprised of two options:

1. *Faster* - increases the replay speed to the next higher value.
2. *Slower* - decreases the replay speed to the next lower value.

For example, if the *Replay Speed* were set to 8X, *Faster* would set the speed to 16X, *Slower* to 4X.

## Flight School

When I first started investigating Condor and its instructional value as a realistic glider flight simulation, I was initially excited to see a main-page function called “*Flight School*”. While I was not particularly impressed with the instructional content, the features and capabilities of *Flight School* held real potential as instructional aids. The “*Custom*” tab on the *Flight School* panel suggested the developers had at least envisioned the possibility of Condor users creating their own *Flight School* lessons, however the Condor manual makes no mention of custom lesson development or how it might be done.

By dissecting the *Flight School* lessons that came with Condor, I was able to create a “*Custom*” lesson called “*Stretching a Glide*”. It was a pretty good example of Scenario-based Training (SBT) before the concept became all the rage.

While some aspects of the custom development process were relatively easy, others were painstakingly clumsy and time-consuming. I eventually gave up on Condor *Flight School* and focused my instructional development efforts on the features and functions available in *Free Flight*, *View Replay*, and *Analyze Flight*.

Accessed from Condor’s main page, *Flight School* is divided into five training levels (*Basic*, *Intermediate*, *Advanced*, *Acro*, *Custom*) via corresponding tabs.

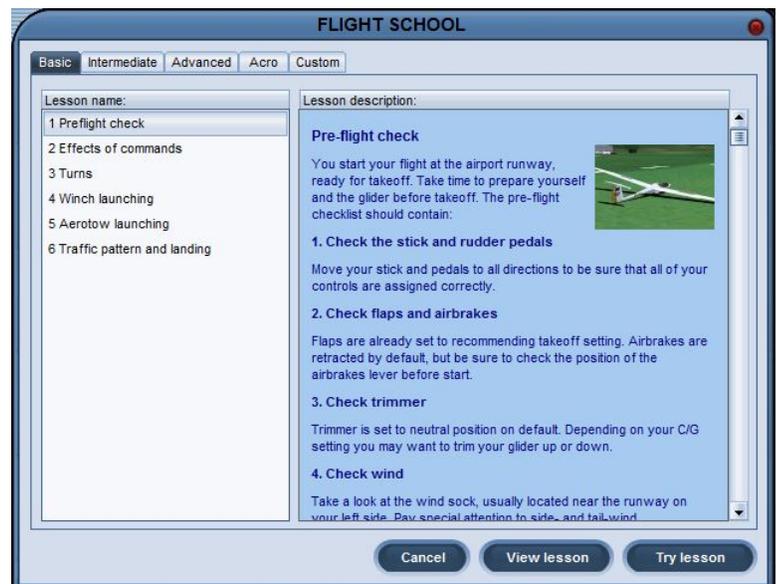
Each training level contains one or more lessons listed in the *Lesson Name* section. The first lesson in each level is selected by default and its corresponding *Lesson Description* is displayed on the right side of the panel.

Below the *Lesson Description* are three functions:

*Cancel* exits *Flight School* back to the Condor main menu.

*View Lesson* initiates a *View Replay*-like session (demonstration) containing embedded instructional text messages that appear at the top of the screen. The instructional text stays on the screen for about 5-7 seconds before fading away. When the “*End of Lesson*” message appears, hitting the ESC key, clicking “*Exit Lesson*” and selecting “*OK*” take you back to the *Flight School* panel at the selected training level (e.g., *Basic*).

*Try Lesson* is nearly identical to Condor’s *Free Flight* function.



Unlike Condor's *Free Flight* function, where every flight must begin on, or directly above, the approach end of an airport runway, *Flight School* lets you begin the demonstration (*View Lesson*) and free flight (*Try Lesson*) components at any 3-D point (latitude, longitude, altitude) in the *Landscape*. This is an incredibly powerful instructional feature with exciting implications for basic, advanced, and scenario-based training.

For example, using this "start anywhere" feature of *Flight School*, the demonstration/free flight session can begin

- on final approach, so as to repeatedly practice, the final descent and landing.
- at the IP, primed to practice entering and flying the traffic pattern.
- out in the middle of nowhere, where the pilot must select a suitable landing area and execute a safe landing in unfamiliar terrain.
- at an unfamiliar airport, where the pilot must enter and fly the traffic pattern using angular references rather than any familiar landmarks or known altitudes.
- on base leg, too low and too slow to safely make the turn to final.
- within sight of the airport, but too low to get back.
- at various positions and altitudes around the airport, requiring selection and execution of a non-standard landing pattern.
- approaching a well-developed cumulus cloud, anxious to practice entering and centering a thermal.
- on the lee side of a ridge.
- low over terrain unsuitable for landing.



The possibilities are limited only by the scenario developer's imagination.

### Flight School vs. Free Flight/View Replay

The *View Lesson* and *Try Lesson* functions in *Flight School* do not have all the features of the *View Replay* and *Free Flight* functions on Condor's main page. Like *View Replay*, *View Lesson* lets you can PAUSE and toggle (F9) the *replay camera* on/off for full view control. Unlike *View Replay*, however, *View Lesson* provides no control over your position within the demonstration, other than to restart at the beginning. You can't back up and repeat a sequence or position the demonstration at a specific point. There is no *Replay Control Panel* in *View Lesson*.

*Ghosts* appear in *View Lesson* but not in *Try Lesson*.

Condor *Ghosts* are *Flight Track* files (.ftr). When incorporated into a *Replay* or *Free Flight* session, *Ghosts* simulate the presence of other gliders in your airspace, making possible some very meaningful and important SBT experiences. For example:

- Joining, sharing, exiting a thermal with other gliders
- Learning to see and avoid other aircraft
- Learning to negotiate the traffic pattern and available runway real estate with other landing gliders
- Practicing ridge flying etiquette

While working to create a *Flight School* lesson on thermal sharing, I was delighted to discover that *Ghosts* did in fact appear in the *View Lesson* demonstration, just as they do in *View Replay*. Unfortunately, *Ghosts* do not appear when *Try Lesson* is invoked.

*Try Lesson* does not allow saving the flight as a *Replay* file. *Replay* files are very useful for critique. So, without them, it is impossible, after the fact, to evaluate a flight done in *Try Lesson*.

### Creating a Training Scenario with a Start Point other than a Condor Airport

- 1) From Condor's main menu, select *Free Flight*.
- 2) Use the *Flight Planner* to create the environment for the SBT (*Task, Weather, Plane, NOTAM*). The takeoff airport should be the one closest to your intended SBT start point.
- 3) Select *Start Flight* and fly the glider out to the start point of your SBT, placing it on the desired heading, altitude, and attitude, and at the best glide speed of the selected glider.

Note: Condor begins all flights with the glider trimmed to its best glide speed. If your SBT begins at any other speed, the glider will initially pitch up/down as it attempts to stabilize on the trimmed speed.

Once at your intended start point, PAUSE and note the time on the instrument panel chronometer. You will need this in Step 11 below.

- 4) If your SBT is to include a demonstration beyond the start point, hit PAUSE again to continue flying your *Free Flight* to its conclusion. Otherwise, simply continue the *Free Flight* for another 10-15 seconds.
- 5) Press ESC to end *Free Flight*, click on *Exit Flight*, and click on *OK*.
- 6) From the *Debriefing* window, select *Save Replay*.

- 7) On the *Save Replay* window, give your SBT *Replay* file a meaningful name and click *OK*. An *Information* panel appears telling you where Condor intends to store your *Replay* file.  
  
Click *OK* to complete the save operation.
- 8) From the *Debriefing* window, select *Done*.
- 9) From Condor's main menu, select *View Replay*.
- 10) From the *View Replay* panel, select your SBT *Replay* (it will highlight in red) and click the *View* button at the lower right of the panel. The *Replay* file will load and begin playing automatically.
- 11) Place your cursor on the salmon-colored progress bar on the *Replay Control* panel displayed at the bottom of the screen. Clicking on the progress bar positions the *Replay* at a given point in the flight. Use this feature and the *PAUSE* key to position the *Replay* at the desired start point of your SBT (the chronometer time noted in Step 3).
- 12) Click on the *Ball-over-Scissor* icon to snip off the front end of the *Replay*. The progress bar to the left of your current position will turn white.
- 13) Use the cursor position and *PAUSE* functions to specify the ending position of your SBT. This is optional if the end of the original *Replay* is where you want to end the SBT.
- 14) Click on the *Square-over-Scissors* icon to snip off the back end of the original *Replay* and establish a new end point. This will turn the right side of the progress bar white.
- 15) Click on the *Disk* icon in the lower right of the *Replay Control* panel.
- 16) The *Save Replay* window displays the name of the original *Replay* file. If you want to over-write the original *Replay*, simply click *OK* and Condor will replace the original file with your SBT *Replay* segment. To retain the original *Replay*, give the SBT segment a different name before clicking *OK*. As the new *Replay* segment is saved, the original *Replay* will resume and run to its conclusion. Hit *ESC* at any point and click on "*Exit Replay*".
- 17) From the *View Replay* window, select *Cancel* to return to Condor's main page.
- 18) Using Windows operating system file handling capabilities (find, search, copy/paste, move, etc.), navigate to your installation's "Condor/Replays" folder. Copy or move your SBT *Replay* segment to the "Condor/Flight School/Custom" folder. (You may have to first create a folder called "*Custom*" and place it the *Flight School* folder along with *Basic*, *Intermediate*, *Advanced*, and *Acro*).
- 19) From Condor's main page, select *Flight School*.
- 20) From the *Flight School* page, select the *Custom* tab. Your SBT lesson should appear in the *Lesson Name* section. The *Lesson Description* section will be blank. Click the SBT file name to select it. Select *View Lesson* to watch the flight segment as you recorded it. Select *Try Lesson* to begin a *Free Flight* session at your SBT start point.

## Multi-Player

Condor was designed to simulate the world of glider competition flying. By networking Condor installations together, locally and/or via the Internet, participants anywhere in the world are able to simulate racing their gliders against each other.

This ability to simulate flying with other piloted gliders, in real-time, also has a number of valuable instructional applications.

## Networking

Multiple Condor installations can be connected to each other via a local area network (LAN), e.g., your home WIFI or hard-wired router, and/or via the Internet. As such, you could be flying with one or more persons across the table from you (LAN) and/or a number of participants anywhere in the world.

## Hosting

One of the networked Condor installations plays the role of “*Host*” for the *Multi-Player* session, i.e., act as the session “*Server*”.

In addition to providing each participating installation with the session *Flight Plan*, the server continuously collects the individual session parameters from each participating installation, and distributes the collective set of individual session parameters out to each participating installation. Each installation then uses the collective set of session parameters to locally generate the graphic images of all the other gliders in the session.

To begin hosting a *Multiplayer* session, select *MultiPlayer* from the Condor main page, and then select the “*Host*” tab.

### Server Name

The *Server Name* will appear in the *Server List* on Condor’s website and in *LAN Server List* on the *MultiPlayer Join* page of each non-Host client session.

### Port

This is a networking parameter. Condor uses a default port number of 56278. See **Internet Router Considerations** later in this section.

### Password

You can password-protect your *Multi-Player* session. Without a password, anyone on the Internet is able to join your session.

### Max(imum) Players

The maximum number of participants is limited to 32. Keep in mind, the greater the number of participants, the more network bandwidth is required to collect and distribute all the individual session parameters. I usually set (limit) this value to the number of known participants.

### Max(imum) Ping

This is another networking parameter. The Condor manual describes it as a way to limit participants from employing a tactic called “warping.” ([https://en.wikipedia.org/wiki/Warp\\_\(gaming\)](https://en.wikipedia.org/wiki/Warp_(gaming))). I use the Condor default.

### Join Time Limit

This is the amount of time participants have to connect to the hosted session after the session server has been started.

### Advertise on the Web

Checking this box (the default) causes the *Session Name* to appear in the *Servers List* on Condor’s homepage at CondorSoaring.com.

### Advertise Manual IP

If for some reason, the *Server (Host)* IP address is not correctly propagated to the *Condor Server List*, you can manually enter the *Host* IP address. I have never had to do this.

### Allow Clients to Save Flight Plan

Checking this box (the default) allows session participants to locally store the *Flight Plan* distributed by the *Multi-Player* session server.

### Control Buttons (see diagram on previous page)

#### Defaults

This button sets the *Host* panel parameters to their default values.

#### Cancel

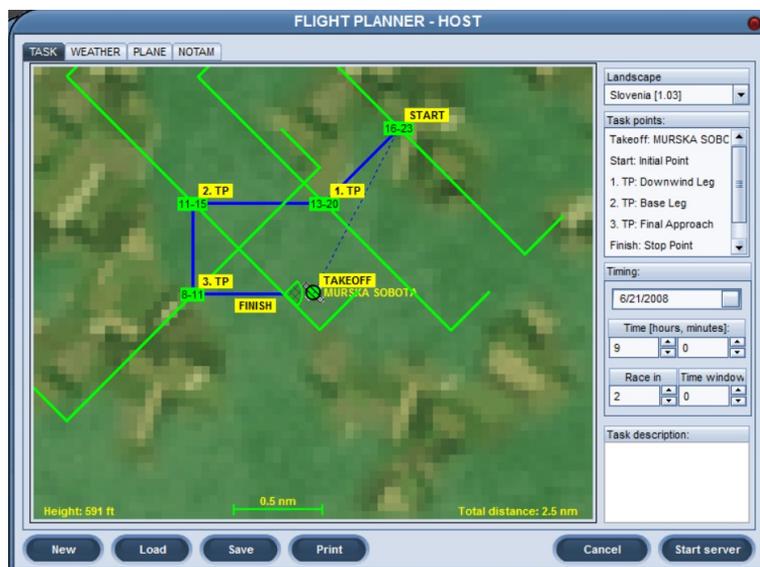
This button returns Condor to the main page, ending the *Multi-Player* function.

#### Host

This button opens the *Flight Planner – Host* panel. The session host uses this panel to create or load the *Multi-Player* session’s *Flight Plan* and to initiate the session using the **Start Server** button.

For the session host, **Start Server** also functions like the *Start Flight* function in *Free Flight*, in that it initiates the *Flight Plan* on the host machine.

Initiating the session optionally posts it to the *Servers List* at CondorSoaring.com, enabling Internet-based participants to connect the session. It also makes the session available for listing on the *LAN Server List*, used by locally networked Condor installations to identify and connect to *Multi-Player* sessions.



**Joining**

The method used to connect to a hosted Condor *Multiplayer* session depends on whether you will be connecting via a LAN or the Internet.

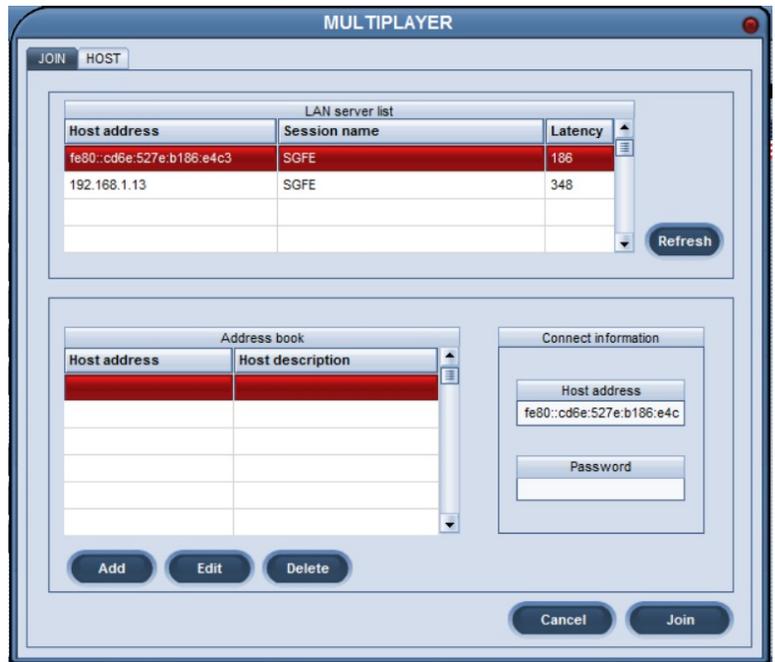
**LAN Connection**

To join a *MultiPlayer* session being hosted on your LAN, select *MultiPlayer* from Condor’s main page. By default, the *MultiPlayer* page is displayed with the *Join* tab active.

**LAN Server List**

If your Condor installation is connected to a local area network (LAN), each *Multi-Player* session currently being hosted on the LAN can be listed in this subpanel. You will likely need to select the **Refresh** button to cause the locally hosted session(s) to display.

In the example at the right, for reasons I don’t understand, the LAN session being hosted (SGFE) appears twice, once using the computer’s MAC address, and again using the LAN IP address of the host computer.



Selecting the listing using the IP Host address makes a connection. Selecting the listing using the MAC address results in a “**Host not found**” message.

**Address Book**

This subpanel allows you to **Add**, **Edit**, and **Delete** the addresses of both LAN and Internet servers you connect to frequently.

**Connection Information**

**Host Address** displays the selected LAN session.

If your host specified password protection, you would need to enter the session **Password** here.

**Function Buttons**

Press the **Join** button to connect to the session.

Press the **Cancel** key to exit the *Multiplayer* function and return you to Condor’s main page.

**Internet Connection**

To join a *MultiPlayer* session via the Internet, you first need to completely exit the Condor application on your local computer, and then use a web browser to connect to Condor’s webpage at “*CondorSoaring.com.*”

From the link list at the upper left of the homepage, select “*Servers List*”.



On the *Servers List* page, click on the host session *Server* name, in this example, “*SGFE*”.

The *Servers List* is in alphabetical order by name.

**Servers List:**

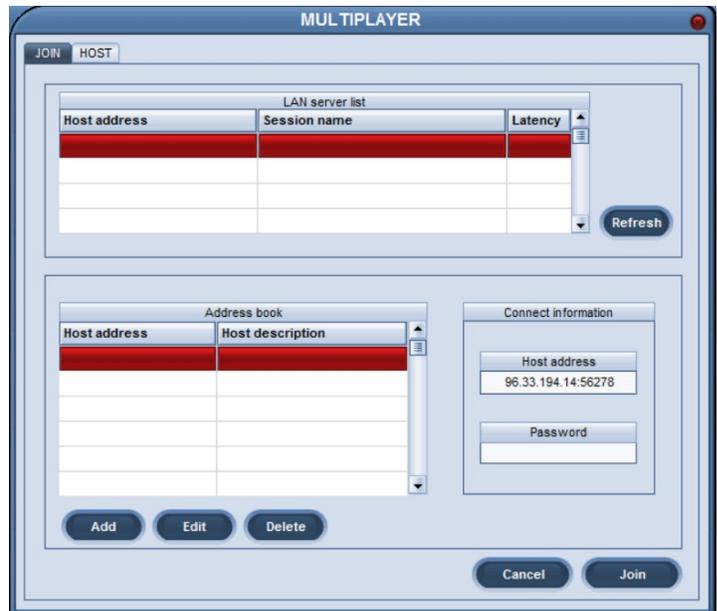
Here is the public servers list of active\* Condor servers to which you can join for online flying.  
 \*(list is automatically refreshed every 2 minutes)

Server	Scenery - ver.	Status	Players	Private	Server Uptime	Task Length	Distance Flown	Current Leader
AKPD - Aigen Austria open	Austria2 - 2.0	Joining Enabled	0/32	No	3min	182km	0km	-
AKPD - cloud battle 2 ws	West_swiss - 1.02	Joining Enabled	0/32	No	3min	157km	0km	-
AKPD - Franz Josef Omarama 15m	Omarama_NZ - 1.0	Joining Enabled	0/32	No	1min	175km	0km	-
AKPD - Himalaya 183 km	Himalaya - 1.0	Joining Enabled	0/32	No	4min	183km	0km	-
AKPD - Innsbruck 163km	AA - 1.0	Race In Progress	2/32	No	30min	163km	14km	I.BSSEN
AKPD - LZPE-LZNI-LZRU	Czechoslovakia - 3.0	Joining Enabled	0/32	No	2min	248km	0km	-
AKPD - Meiringen WS 18m	West_swiss - 1.02	Joining Enabled	0/32	No	1min	179km	0km	-
AKPD - Tatry windows 2	Slovak rep - 1.0	Joining Enabled	0/32	No	2min	33km	0km	-
Alpencondor by pwa	AA - 1.0	Race In Progress	7/20	No	53min	303km	106km	M.deBeaulieu
EGC 2017 A	South_UK_V2 - 2	Race In Progress	6/32	No	43min	145km	38km	M.Drexel
Eurobattle.condor-danmark.dk (A)	AA - 1.0	Joining Enabled	0/32	No	3min	277km	0km	-
Eurobattle.condor-danmark.dk (B)	AA - 1.0	Joining Enabled	0/32	No	4min	277km	0km	-
Eurobattle.condor-danmark.dk (C)	AA - 1.0	Joining Enabled	0/32	No	1min	277km	0km	-
freedomswings.org daily	AA - 1.0	Joining Enabled	0/32	No	14min	603km	0km	-
http://aussiebattle.coolpage.biz	Austria2 - 2.0	Joining Enabled	2/32	No	19min	223km	0km	-
http://zadmalck.fr/CondorNav	alps_XL - 1.0	Race In Progress	1/11	No	78min	183km	119km	A.Wuertz
SGFE	Slovenia - 1.03	Joining Enabled	0/4	Yes	0min	5km	0km	-
TT Interaction	Menua1_0 - Unknown	Joining Enabled	0/32	Yes	1min	24km	0km	-
UWE_Indexed_Task05	AA - 1.0	Race In Progress	1/32	No	26min	150km	33km	C.SUMSI
WAGA_Battle	AA - 1.0	Joining Enabled	0/32	No	1min	182km	0km	-

Your browser then opens the Condor application to the *Multiplayer / Join* page with the *Host (IP) Address:Port* displayed in the *Connection Information* subpanel.

If required, enter the session *Password*.

Press the **Join** button to connect to the session.



Your Condor installation then connects to the *Host* computer (session server), retrieves a copy of the session *Flight Plan*, and displays it in the *Flight Planner – Join* function.

You can review the *Flight Plan* parameter settings, but may only modify the *Plane* parameters.

Note: the additional “Chat” tab lists the other participants currently connected to the session.

Press **Join Fight** to enter the *Multi-player Free Flight* environment.



### Session Control and Related Messages

The *Host* of a *Multi-Player* session is usually one of the participants, and as such, the *Host* computer is really serving two functions:

1. providing *Server* functions to the networked session as a whole.
2. providing client functions to the *Host*, i.e., allowing the *Host* to fly as one of the participants.

As the *Host* starts the session server,

1. He/she receives a series of messages in quick succession.

**“Starting server”**

**“Connecting to local host”**

**“Received server data”**

2. The session *Flight Plan* is loaded on the *Host’s* computer and initiated (*Free Flight started*).

3. The *Join Timer* starts counting down with the remaining join time displayed in the upper right corner of the *Host’s* monitor as:

**“STOP JOIN IN: hh:mm:ss.**

4. For *Flight Plans* having a *start type* of *Aerotow* or *Winch*, the following message is displayed in the lower left corner of the *Host’s* monitor:

**“Host Pilot Name (e.g., S. Manley) entered the game”**

If the *start type* is *Airborne*, this message is not displayed until the flight is actually started.



Multi-Player Airborne Start

As each new participant connects to the *Multi-Player* session, either via a LAN connection or over the Internet, all current participants receive the following message in the lower left corner of their monitors:

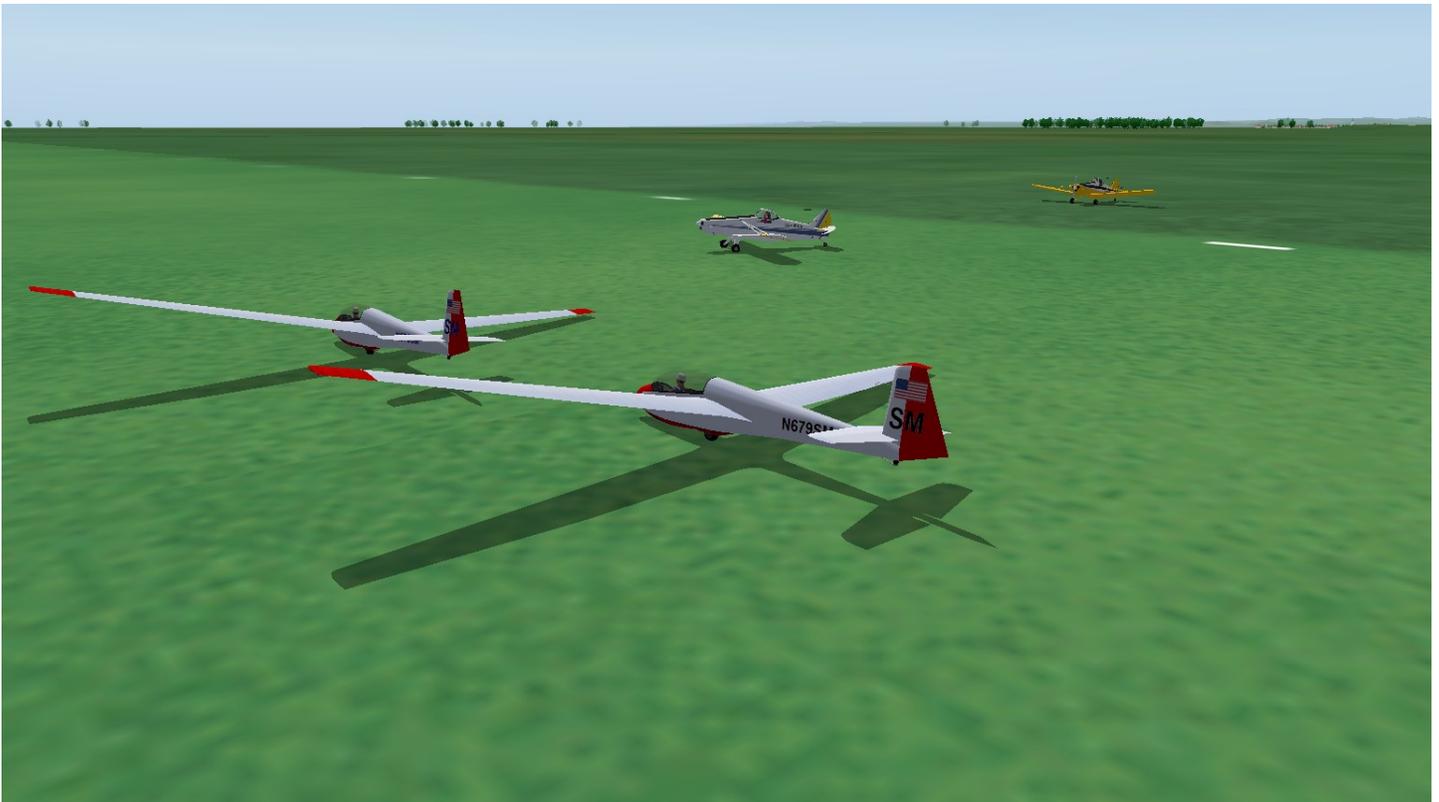
For *Flight Plans* having a start type of *Aerotow* or *Winch*,

**“Player Name (e.g., S. Manley) connected”**

If the *start type* is *Airborne*, this message is not displayed until the flight is started.

As each new participant joins the flight,

1. The session *Flight Plan* is initiated (*Free Flight started*) on the local computer.
2. The remaining join time is displayed in the upper left
3. corner of the participant’s monitor as:  
**“STOP JOIN IN: hh:mm:ss”.**
4. For *Flight Plans* having a *start type* of *Aerotow* or *Winch*, all current participants receive the following message in the lower left corner of their monitors:  
**“Pilot Name (e.g., S. Manley) entered the game.”**  
If the *start type* is *Airborne*, this message is not displayed.



Multi-Player Aerotow Launch

The actual flight portion of the session begins in one of two ways:

1. The *Host* manually starts the flight by pressing the “ESC” key and selecting “***Start Flight***”, “***Start Tow***”, or “***Start Winch***” from the *Game Menu*, depending on the *Flight Plan*’s *start type*.

All current participants receive one of the following corresponding messages:

***“Host started flight”*** (*Start Type* = “*Airborne*”)

***“Host started aerotow launching procedure”***

***“Host started winch launching procedure”***

or

2. The flight/launch begins automatically when the *Join Time* expires.

As the *Join Time* expires,

- If the start type is “*Airborne*”, each participant receives the following messages:
  - “Flight started”***
  - “Race starts in # minutes”*** (RACE IN countdown replaces STOP JOIN IN count down)
  - “Pilot Name entered the game”*** (one message for each participant)
  - “The Flight will start in 3 seconds”*** (displayed at top center of the monitor in red text)
- If the start type is “*Aerotow*”, each participant receives the following messages:
  - “Aerotow launching procedure started”***
  - “Race starts in # minutes”***
- If the start type is “*Winch*” launch, each participant receives the following messages:
  - “Winch launching procedure started”***
  - “Winch will start in 3 seconds”*** (displayed at top center of the monitor in red text)
  - “Race starts in # minutes”***



Multi-Player Winch Launch

If the flight / launching procedure is initiated manually, i.e., prior to the expiration of the Join Time, participants can continue to join the flight, even though it is in progress, until the *Join Time* expires. Once the *Join Time* expires, the session will no longer accept new participants.

Any participant can exit the *Multi-Player* session by pressing “*ESC*” and selecting “*Exit Flight*”. With each flight exit, the remaining participants receive the message

**“*Player Name disconnected.*”**

If the *Host* exits the session, the remaining participants get these messages:

**“*Player Name disconnected*”** (indicating the host’s client session has disconnected)

**“*Host disconnected*”** (indicates the session server has shut down)

**“*Disconnected*”** (indicates the participant’s session is no longer connected to a server)

However, because each participant is running the session *Flight Plan* locally (independently), he/she can continue flying the *Flight Plan*, but will no longer receive server functions, including seeing other gliders, score keeping, and radio communications (Chat).

## Other Multi-Player Features and Issues

### Autopilot

There is no *Pause* function in a *Multi-Player* session. Instead, Condor has implemented an *Autopilot* function, activated by using the same key assignment as *Pause* (keyboard letter “P” by default).

When activated, the *Autopilot* function will pitch the glider to a safe angle of attack, level the wings, and fly the aircraft at a speed about 8 knots above its trimmed airspeed. The word “AUTOPILOT” is displayed in yellow text at the top center of the monitor to let you know it is engaged.



*Autopilot* controls pitch and roll only. While *Autopilot* is engaged, other control functions, e.g., pitch trim, yaw, spoiler/dive brake, view controls, etc., remain effective.

To disengage *Autopilot*, press the *Autopilot (Pause)* key and move the control stick. As the *Autopilot* disengages, the glider will pitch as it attempts to return to its trimmed airspeed.

### Send Message

The *Send Message* feature in *Multi-Player* functions like the communication radio in an aircraft. Participants can broadcast a message that will be received (displayed as text) by all the other participants.

Condor’s default radio frequency is 123.50. Higher frequencies can be selected by pressing the *Radio Frequency Up (BACKSLASH)* key. Lower frequencies are selected using the *Radio Frequency Down (APOSTROPHE)* key.

As expected, a transmission made on a given frequency is only received by participants with radios tuned to that same frequency (e.g., 123.75). Interestingly, any transmission made on the default frequency of 123.50 is received on all frequencies.

To broadcast a message

1. Press the *Return* key.  
The current radio frequency appears in the lower left corner of the monitor followed by cursor. The default frequency of 123.50 appears in yellow text, all other frequencies appear in red text.
2. Type your message.
3. Press the *Return* key again.

Your message is displayed in white text in the lower left corner of all session monitors, preceded by your *Pilot Name*, and accompanied by an attention-getting audio tone.



Received messages remain on-screen for about 15 seconds before fading out, and are queued vertically (oldest messages on top).

**Classification (Score)**

If allowed by the session setting (*NOTAM / Realism / Allow real-time scoring*), the keyboard *Tab* key will display a status panel showing each participant's current relative ranking in the task (race).

**Midair Collision**

Unlike flying with *Ghosts* in a *Free Flight* session, mid-air collisions with other gliders in *Multi-Player* mode will result in parts coming off your aircraft. Mercifully, in the event of a mid-air collision, Condor switches the view of all effected aircraft to an outside view so their pilots can imagine watching some other poor souls spiraling to the ground.

If allowed by the *Flight Plan (NOTAM / Realism / Allow mid-air collision recovery)*, the *Miracle* key "Q" (default) can be used to reassemble your aircraft, in flight, and allow you to continue the task.

**Restart**

If, after starting the flight (airborne) or launching (aerotow, winch), you are unable to remain airborne, e.g., can't find sufficient lift, and you are able to land safely back at the airport, a *Multi-Player* session will allow you to *Restart* the flight, i.e., re-launch as many as 3 times.

**MultiPlayer-specific Viewing Options**

1. ***Padlock View*** (default key F7) directs your cockpit view directly to the nearest participating glider and automatically adjusts the view to keep that glider in sight. Another press of F7 directs your view to the next nearest glider and tracks it. The toggle eventually cycles back to the nearest glider.
2. ***Net Player View*** (default key F8) provides an exterior view (F2 equivalent, including view panning) of the other gliders in the session, again toggling between them starting with the closest glider.

**Licensing Issues**

For *Multi-Player* mode to work properly, each networked Condor installation must have a unique *Competition ID*. A *Competition ID* is unique to a Condor license. You can see the *Competition ID* for your installation (license) on the *Pilot* panel. Condor's *Competition ID* is not the 1-3 character combination that appears on the vertical stabilizer of the glider; Condor refers to this set of characters as the *Competition Number*.

It is possible, and allowed by your license agreement, to install Condor on any computer you own, using the same license key. However, if you try networking multiple installations that share the same license key, *Multi-Player* mode will teasingly appear to be working, but in fact the gliders having identical *Competition IDs* (license keys) will exhibit odd behaviors, e.g., a rapid and uncontrollable rate of descent, which effectively makes it impossible for those gliders to "compete".

### Internet Router Considerations

A **port** is an endpoint to a logical connection and the way a client program (e.g., Condor.exe) identifies a specific server program (e.g., CondorServer.exe) on a computer in a network. The firewall on your home network router is designed to protect your local network from invasion by things coming at it via the larger Internet. Most home routers are preconfigured to:

1. allow common network programs, e.g., websites and email, to send messages through your firewall
2. keep everything else out, e.g., Condor.

In order for Internet-based Condor clients (those outside your local network (LAN)) to connect to a Condor server running on a computer on your local network, your local network router needs to be configured with something called a “Port Forward”. A Port Forward specification tells your router to allow messages, appended with a specific Port Number, and originating outside your local network, to pass through your router’s firewall, and be directed to a specific computer on your local network. By default, Condor uses Port Number 56278. It can be configured to use other port numbers, but Condor recommends you stick with 56278.

LAN-based *Multi-Player* sessions do not require setting up a port forward on your local network router.

If your network router has not been configured with a Condor-specific port forward, Internet-based Condor clients will get a “**Host not found**” message when attempting to connect to the *Condor Server* running behind your local network router’s firewall.

### Instructional Uses for Multi-Player

Any scenario that would benefit from the real-time interaction of two or more gliders is a candidate for a *Multi-Player* mode session.

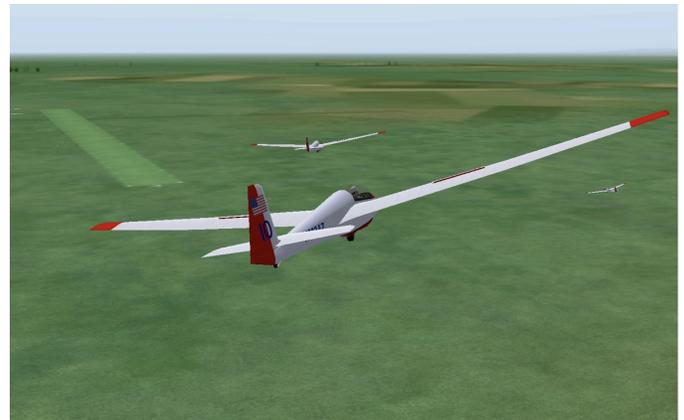
One of my favorite applications is flying my glider into the same traffic pattern my students are flying. Over the span of a hour or so, I can place my students in more diverse and complicated traffic pattern situations than they are likely to experience in lifetime, including:

- following a slower glider into the landing pattern.
- following a higher-performance glider (doing a mini-cross country) into the landing pattern.
- being cut off by another glider on various legs of the pattern.
- meeting another glider on the opposite base leg head-on.
- dealing with a glider that landed short, or mid-field, in front of you.
- dealing with a glider landing in the opposite direction.

By the time I finish throwing traffic pattern scenarios at students, there is pretty much nothing I can do to faze them.

Other scenarios that benefit from real-time interaction include:

- learning the right-of-way rules and best practices for sharing a ridge with other gliders.
- learning proper techniques for entering, sharing, and exiting a thermal with other gliders.
- using the “follow the leader” technique to teach cross-country skills.
- learning and practicing collision avoidance skills.



## Setup

Condor's *Setup* function is used to:

- optimize Condor's video, audio, and data outputs based on your computer system capabilities.
- establish a number of instrumentation-related and miscellaneous preferences.
- assign flight control inputs, and various control system function commands, to your computer system peripheral devices (keyboard, mouse, joystick, rudder pedals, etc.).

The Condor application *Manual* does a pretty good job of describing the *Setup* parameters, so with a few exceptions, this document won't do that.

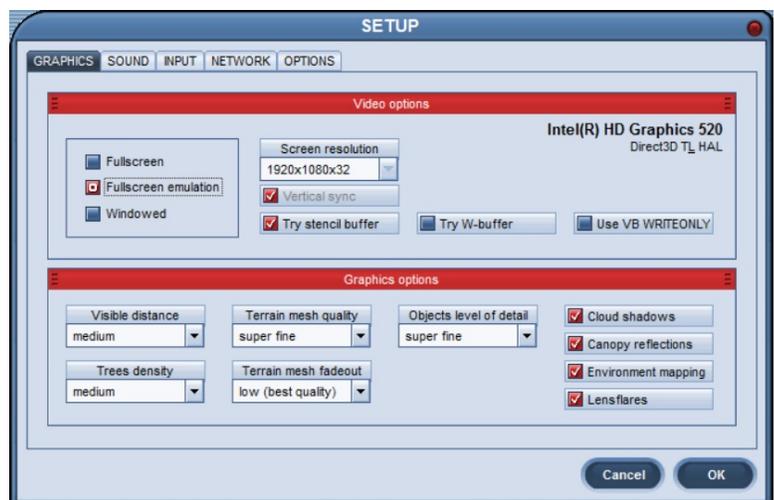
The purpose of this section is to provide an example setup (the one I use), the reasons I set things up the way I do, and some things I have learned mostly by accident or trial and error.

## Graphics Panel

Condor seems able to recognize the graphics card installed on your computer and lists it in the upper right corner of the *Video Options* subpanel.

For the most part, I use Condor's defaults on the *Graphics* panel.

There is, however, a trick to setting the screen resolution to a value other than Condor's default of 800 x 600 x 32. In the *Video Options* (top) subpanel, Condor defaults to running in *Fullscreen Emulation* mode. With this display mode selected, the drop-down menu for *Screen Resolution* is greyed out, i.e., unavailable.



To change the screen resolution, temporarily select one of the other display mode options, either *Fullscreen* or *Windowed*. Doing so activates the *Screen Resolution* drop-down menu and enables selection of an appropriate screen resolution.

For what it is worth, I have never been able to make sense of Condor's *Windowed* mode. The Condor window does not behave like other windows in Windows. I can't figure out how to do any of the normal Window's functions, e.g., resize, minimize, etc., with a Condor window.

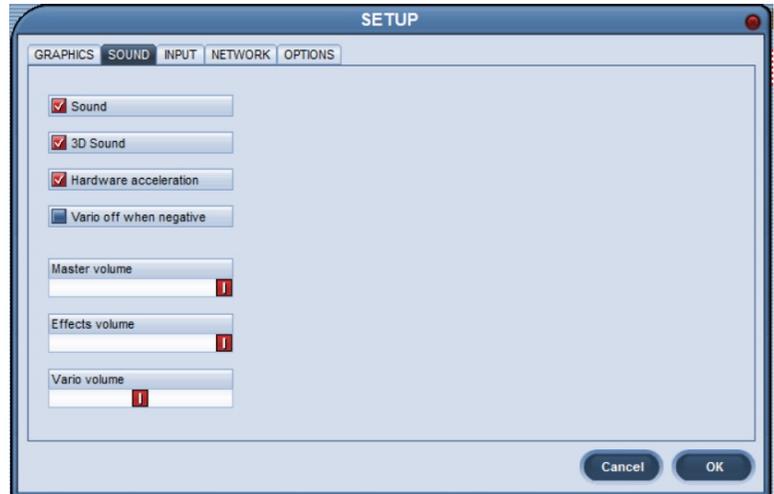
I run in *Fullscreen Emulation* mode because it uses the entire screen, but still allows access to the Windows task bar for application switching.

## Sound Panel

I just go with Condor's defaults.

If you don't want Condor's variometers to emit an audio tone while you are descending, you can check "*Vario off when negative*".

"*Vario volume*" can be adjusted in flight, so I am not sure why you would want to set it here, other than perhaps as an initial value on start up.



## Input Panel

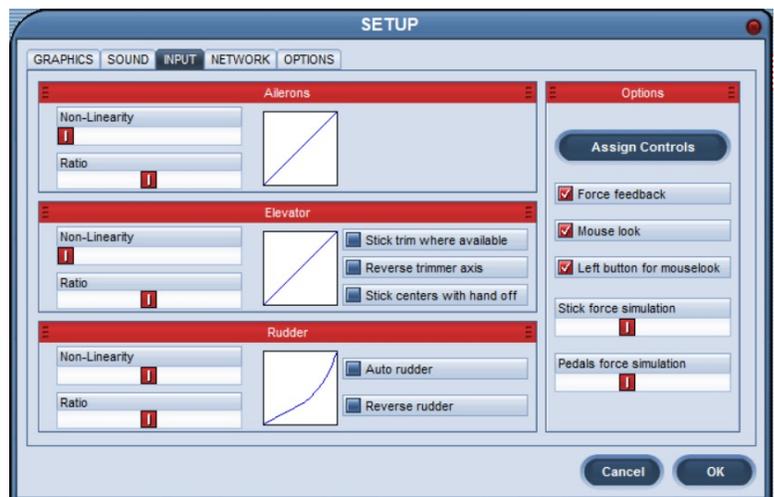
### Ailerons

I use *Non-Linearity* and *Ratio* defaults.

### Elevator

I use *Non-Linearity* and *Ratio* defaults.

It took me a while to figure out "*Stick trim where available*". I believe this option is selected by default, but in my opinion both its description here and in the Condor Manual are misleading. In order to get the pitch trim system to work as expected, this box needs to be "unchecked."



"*Stick centers with hand off*" probably applies to Force-Feedback sticks. I use a Logitech Extreme 3D Pro with internal springs that automatically center the stick when no control inputs are being applied. So, for my 3D Pro, it probably doesn't matter how this parameter is set, but I turn it off (uncheck the box).

### Rudder

I find my CH Pro Pedals too sensitive in the early part of their travel, so I set the *Rudder Non-Linearity* as shown above.

"*Auto Rudder*" will automatically coordinate your turns, but won't let you slip the aircraft. If I am doing serious flight instruction, or any flying that requires cross-controlled inputs, I disable (uncheck) this option. However, if I am introducing someone to soaring flight, I enable *Auto Rudder*, thereby removing the complexity associated with this control input.

## Options

I use the default values set in this subpanel.

## Input Panel (cont.)

### Assign Controls

This section describes the assignment of flight and function controls to the peripheral devices (joystick, rudder pedals, keypad, mouse) on my Condor installation. A quick reference card, [Control / Function Assignments](#), showing these same settings, is available for download under [Condor/Orientation](#) on my website [gliderCFI.com](http://gliderCFI.com).

My original inclination was to assign as many functions as possible to the joystick. After all, it came with all those extra buttons. The problem was I could never remember which buttons did what. My current control / function assignments are designed to be easier to remember and to act, as much as possible, like the control movements in a real glider. The reasons for my control assignments are described adjacent to the images below.

If Condor senses the presence of a joystick, it automatically reassigns *Bank* and *Pitch* to the joystick, overriding the default keyboard assignments that use the left/right (*Bank*) and up/down (*Pitch*) arrow keys respectively.

If the joystick (e.g., Logitech Extreme 3D Pro) has a twist grip, Condor reassigns the *Rudder* (yaw) function to the joystick, even if you have a separate set of rudder pedals connected. If you are using a separate rudder pedal device (e.g., CH Pro Pedals), you will need to manually reassign the *Rudder* function to the proper axis on the pedals device.

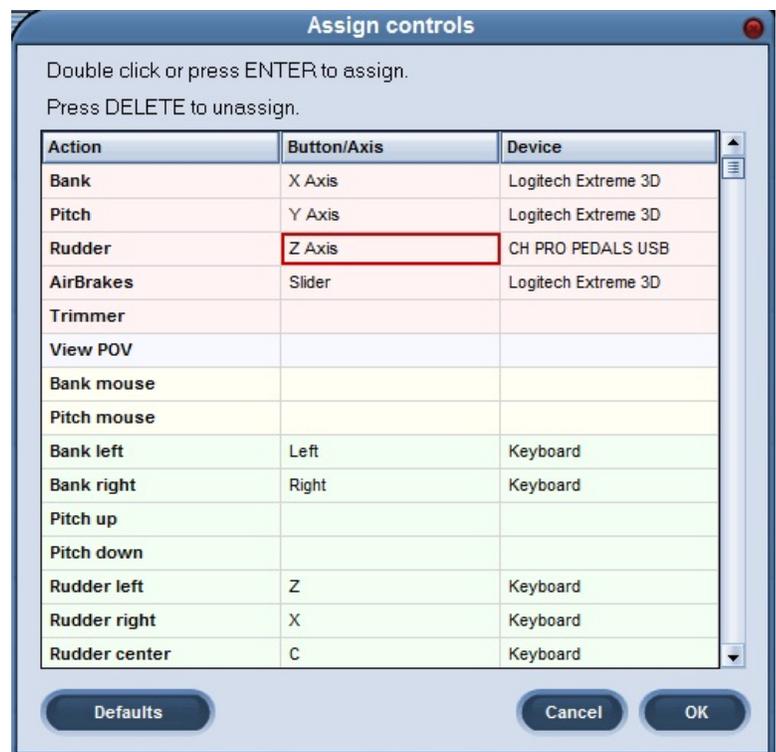
If the joystick has a “slider” control, Condor automatically reassigns the *Airbrakes*, i.e., spoilers/dive-brakes, function to the “slider.” Because the joystick slider is an analog control, its physical operation is similar to the spoiler control in a real glider, and is therefore a logical match.

Another logical control match to the joystick slider would be the pitch trim function, pitch trim being controlled in many gliders with an analog lever. However, most joysticks have only one slider control, so you may need to decide which analog function to assign to the joystick slider. I assigned the *Airbrakes* (spoiler) control to the slider.

### Control Reassignment

To reassign a control function:

1. Place the cursor inside the “*Button/Axis*” box adjacent to the “*Action*”, e.g., “*Rudder*”.
2. Double click. Condor displays “*Move a joystick axis*” (a somewhat confusing message).
3. Within 5 seconds (after which Condor defaults back to the current setting), move the appropriate device control or press the desired key on the keyboard. Condor reassigns the function.

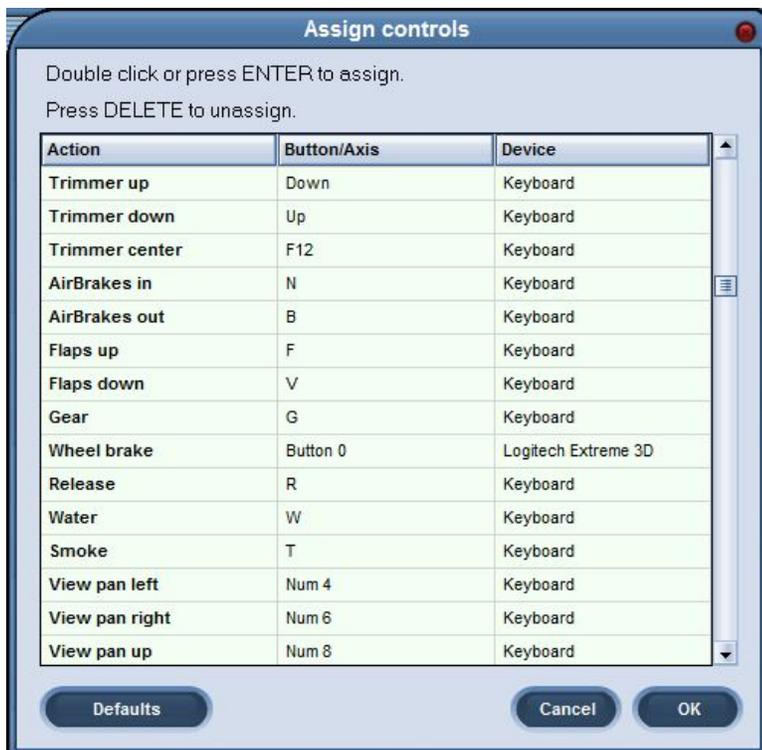


### Pitch Trim

Having assigned my only analog control (slider) to the *Airbrakes* (spoiler) function, I needed to assign the pitch trim function to a pair of buttons/keys. For the following reasons, I decided to use the “UP” and “DOWN” arrow keys on the keyboard.

The UP and DOWN keys don’t really point up and down as they rest on the keyboard; they point forward and backward, the same directions I would move the trim lever in a real glider.

While it appears contradictory looking at the control assignments in the panel at the right, “*Trimmer Up*” is Condor speak for nose-up trim, which is implemented by moving a real glider’s trim lever “backward”, as indicated by the “DOWN” (backward-pointing) arrow key. Likewise, “*Trimmer Down*” is nose down pitch trim in a real glider and is applied by moving the glider’s trim lever forward, which corresponds to the “UP” (forward-pointing) arrow key.



It looks wrong in *Assign Controls*, but makes sense when using the arrow keys in Condor. In fact, you can see the control stick in the Condor pilot’s lap moving forward and backward as you apply the corresponding pitch trim control inputs.

### Gear (landing)

Condor defaults this control to the letter “G” on the keyboard. I use Condor’s default for two reasons:

1. **Gear** starts with the letter “G”, making its key assignment easy to remember.
2. In many gliders, e.g., my personal glider, the landing gear is operated using a lever on the left side of the cockpit. With my right hand on the joystick in Condor, raising/lowering the gear, using my left hand/arm to reach for and depress the letter “G” on the keyboard, is physically similar to the actions required to raise/lower the gear in my real glider.

### Wheel Brake

On most modern gliders, the main wheel brake is activated using the spoiler handle. In Condor, the “slider” control does not have a second potentiometer in the aft portion of its travel, so the brake is applied (all or nothing) by pressing/holding an assigned key (by default, the punctuation period). You can modulate the brake by repeatedly pressing and releasing the assigned key/button.

The closest match I could make between an available Condor control and an actual glider wheel brake control was the gun trigger (*Button 0*) on the Logitech 3D Pro joystick. Pulling the trigger on the joystick is similar to squeezing the bicycle-type hand brake located on the control stick of some older gliders.

**View Reset**

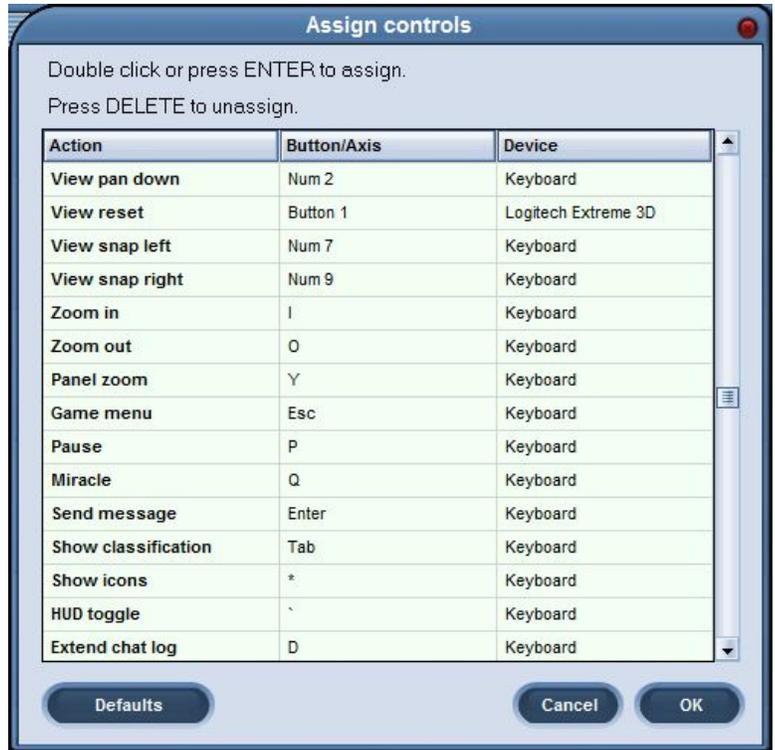
Before I discovered the undocumented feature that *Cockpit View (F1)* could be re-centered using a simultaneous press of the right + left mouse buttons, I assigned the very useful *View Reset* (view centering) function to *Button 1*, the oval button on the upper left side of the Logitech 3D Extreme Pro joystick.

Now, I normally use the mouse to control all viewing functions, including *View Reset*.

**Zoom In / Out**

Condor defaults these view functions to the “+” (add) and “-“ (subtract) keys on the numeric keypad incorporated into most full-sized keyboards.

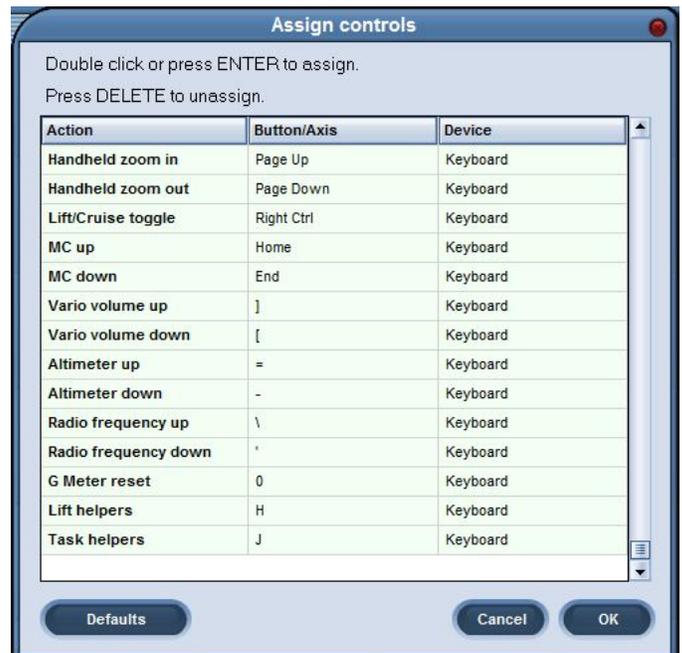
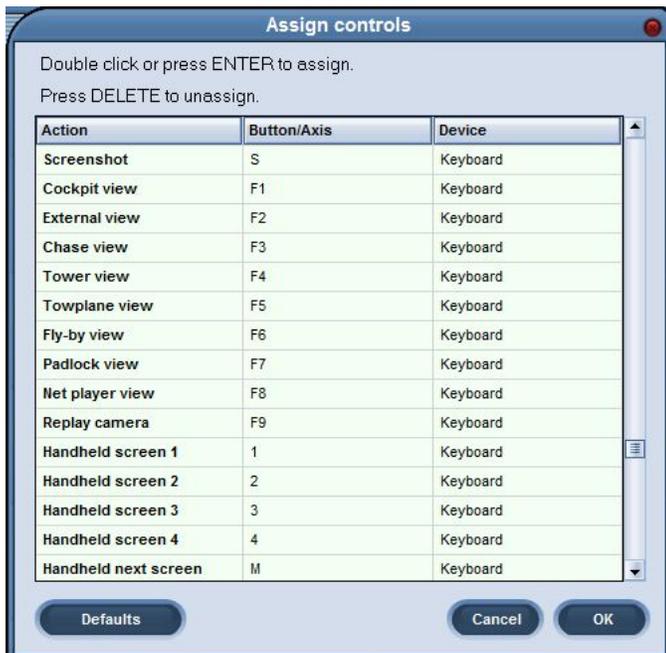
My laptop computer did not have a full-size keyboard, and therefore no add/subtract keys, not to be confused with the positive (+) and negative (-) keys at the far right of the number key row.



As such, I needed to reassign the zoom functions, and for the following reasons elected to use the keyboard letters “I” and “O” for *Zoom In* and *Zoom Out* respectively:

1. The key assignments are easy to remember.
2. The letters I and O were not already assigned, and appear on all keyboards.

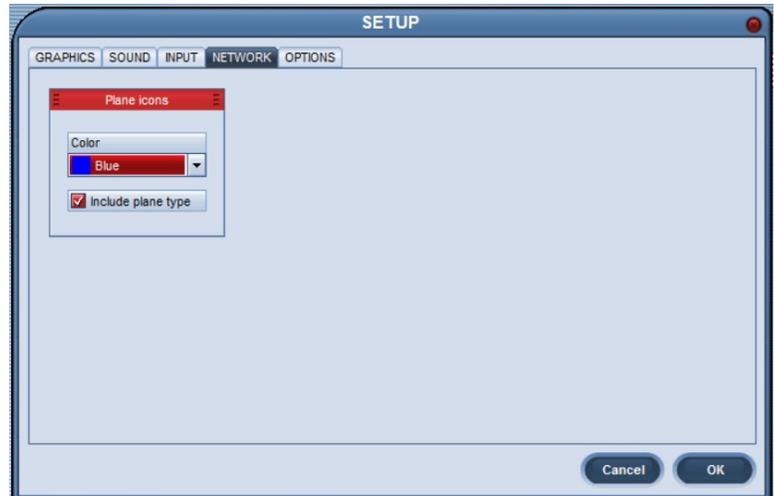
The images below show the remaining control assignment options in Condor. I use all the default values.



### Network Panel

I am not sure why these two parameters needed their own panel.

I believe “*Include plane type*” is not enabled by default. I like having the information displayed, so I turn it on (check the box).



### Options Panel

Not to be confused with the *Options* subpanel on the *Input* tab.

#### Instruments

My only deviation from Condor’s defaults is setting “*Units*” to “*Imperial*”. This results in the airspeed indicator and variometer reading in knots and the altimeter in feet.

#### Miscellaneous

- do not mess around with the *Language* setting unless you read/understand that language.
- The Condor Manual describes “*Auto view panning*” as a very useful feature. In my experience, however, even with the maximum setting, I can’t get Condor to pan my view in the direction of the aircraft’s movement. Too bad.
- Condor’s default image format for “*Screenshot type*” is BMP (IBM’s default). I changed this value to “*JPG*” to store images in the more ubiquitous and manageable JPEG format.

#### NMEA Output

Condor can output its navigation data to external devices, for example your actual glider navigation system. This is a great way to learn to use your real-life navigation system in a safe, comfortable environment as opposed to being completely distracted by it during actual flight.

Unfortunately, Microsoft operating systems starting with Windows 8 no longer support Serial port connections; another good reason to hang on to the those Windows 7 and XP disks.

