aerofly 5

Manual

Version 5.7.1.9

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1. Introduction

With the *aerofly5* you have chosen a modern and future-proof product. Based on the proven technology of our award-winning AeroFly Professional Deluxe, we have fully re-developed the *aerofly5* over a period of 4 years. Thanks to this new development, the *aerofly5* can now efficiently utilize modern graphics cards and multi-core processors and thus provide you with an unbelievably realistic experience and outstanding graphic quality. In addition to the photo-sceneries and multi-pano sceneries with improved model graphics, the *aerofly5* provides new 4D landscapes with unrivaled details, e.g. animated windsocks and trees, freely settable weather conditions and times of the day, animated water surfaces and freely configurable clouds.

The new physics of flight behind simulation are the heart of the *aerofly5*. They enable more radical maneuvers for 3D aerobatics and offer extremely detailed behavior on the ground so that the starting and landing behavior of the models is simulated as true-to-life as possible. The dynamic wind field simulation now enables dynamic soaring on suitable slopes, takes upwind and downwind on slopes into account and simulates not only turbulence's but also thermals depending on the landscape. The simulation of the helicopter was completely revised, likewise the simulation of the animated winch start and air-tow.

Thank you for buying the *aerofly5*. We hope you enjoy flying the helicopters and aircraft's and exploring new landscapes.

2. System requirements

Before installing the *aerofly5*, please check that your PC meets the minimum system requirements listed below, otherwise trouble-free simulation cannot be guaranteed. During simulation, you can call up the frames per second display at any time by pressing the key combination **Shift+I**. This figure should always be over 33 FPS to ensure realistic simulation.

2.1 Computers running Microsoft Windows

Minimum system requirements

- 100% Intel Pentium 4 or AMD Athlon64 compatible CPU with 2.4 GHz

- 1 GB RAM

- 14 GB free hard disk storage

- DVD-ROM drive

- OpenGL 2.1 compatible 3D graphics card with min. 256 MB (at least as fast as NVIDIA 7600GT or ATI HD3650)

- Windows XP / Windows Vista / Windows 7

- A free USB port for connecting the USB interface / USB-GameCommander

Note: With a system that only fulfils the minimum requirements, the performance depends to a great extent on the loaded model and the landscapes. 4D landscapes require the following recommended system requirements to ensure smooth operation.

Recommended system requirements

- Intel Core 2 Duo or AMD Athlon64 X2

- OpenGL Version 3.1 compatible 3D NVIDIA or ATI graphics card with 512 MB. (At least as fast as NVIDIA GeForce 8800 or ATI Radeon HD4850)

- 2 GB RAM

2.2 Apple Mac OS X computer

Minimum system requirements

- Intel based Apple Mac computer with Mac OS X 10.6 / 10.7 (Snow Leopard, Lion)

- 1 GB RAM

- 14 GB free hard disk storage

- DVD-ROM drive

- OpenGL Version 2.1 compatible 3D-graphics card from NVIDIA or ATI with 256MB (at least as fast as NVIDIA 8600, 9400 or ATI Radeon HD 2400)

- A free USB port for connecting the USB interface / USB-GameCommander

Note: With a system that only fulfills the minimum requirements, the performance depends to a great extent

on the loaded model and the landscapes. 4D landscapes require the following recommended system requirements to ensure smooth operation.

Recommended system requirements

- 2 GB RAM
- OpenGL Version 2.1 compatible 3D-graphics card from NVIDIA or ATI with 512MB (at least as fast as NVIDIA 9600 or ATI Radeon HD 4850)

What is OpenGL?

aerofly5 uses the programming interface OpenGL, Version 2.1 upwards to display the 3D graphics. Contrary to Direct3D (DirectX), OpenGL also operates under systems that are not Microsoft Windows-based systems, e.g. Apple Mac OS X and Linux. **We urgently recommend installing the current 3D drivers for your 3D graphics card before installing *aerofly5*.** For this purpose, visit the website of the manufacturer of your graphics card (**www.nvidia.com** or **www.ati.com**). Current NVIDA and ATI drivers in particular support OpenGL Version 3.1. on up-to-date 3D graphics cards so that *aerofly5* not only operates faster but also looks better.
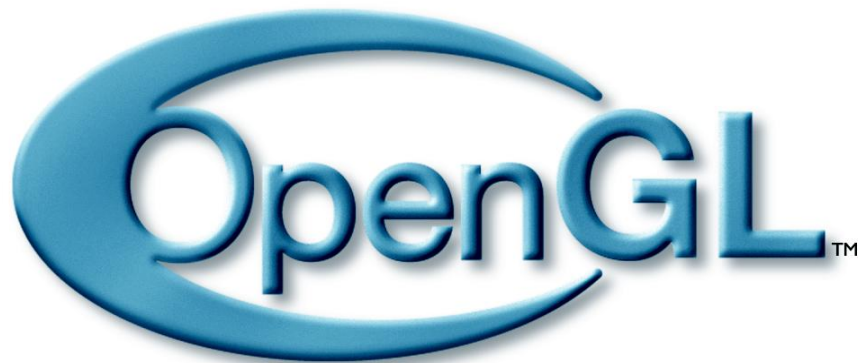
For more information on OpenGL, visit **www.opengl.org**.

3. Installation (Microsoft Windows)

Insert the *aerofly5* DVD into your DVD-ROM drive. This DVD also contains your 20-digit product key that you will require later for activation purposes.

aerofly5 uses the auto-start mechanism of Windows to start the installation software automatically. Installation starts automatically and the set-up program start screen of the installation program appears. Select the desired language for installing *aerofly5*. Follow the further instructions of the installation program.

If you have deactivated the auto-start feature in Windows Setup or if you have already installed an *aerofly5* version, then installation will not start automatically. In this case, the installation program Setup.exe, which can be found in the main directory of the DVD-ROM, must be started manually. Click My Computer in the Windows Desktop and then the symbol for your DVD-ROM drive (the small Extra 330 aircraft symbol) with the right mouse button. A short menu appears. Choose the menu item "Open" and a window appears with the contents of the main directory for the *aerofly5* DVD. Click the program Setup.exe to start installation.

Important information for users of Windows Vista and Windows 7

The installation program installs *aerofly5* on systems with Windows Vista and Windows 7 not as usual in the program directory *„C:\Program Files\"* but in the Application folder of the current User. This is necessary, as *aerofly5* requires write access in this directory. If you do not want this, simply choose another directory in which you have write access as user, e.g. *„C:\aerofly5\"*.

4. Installation (Apple Mac OS X)

Insert the *aerofly5* DVD into your DVD-ROM drive. This DVD also contains your 20-digit Product-Key that you will require later for activation purposes.

1. Insert the *aerofly5* DVD into your DVD drive.

2. Double click on the Disc image file „*aerofly5.dmg*" on the DVD to open it.

3. After a while, a new window will open. Do not start *aerofly5* direct from within this window!
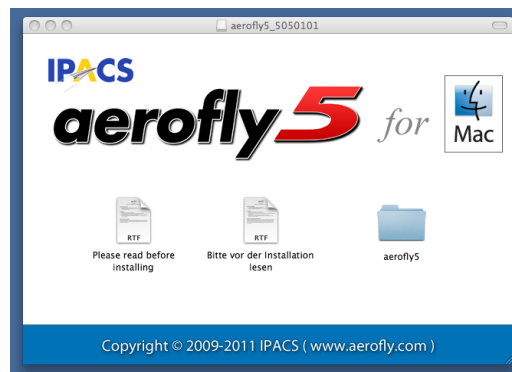
4. Drag the folder *aerofly5* from this window to your Desktop. This will take its time since more than 14 GB of data has to be copied.

5. Now go into the folder *aerofly5* on your Desktop and double click on the *aerofly5* symbol to start *aerofly5*.

Note for advanced users

The default folder for Mac OS X applications is the Applications folder (located in /Applications on your hard drive). You may of course install *aerofly5* here as well. Please note however that you need administrator rights to install and run *aerofly5* from this location. To be able to run *aerofly5* from this folder as a normal user (with no administrator rights) you need to give this user write access to the folder *aerofly5*. This can be done using the Mac OS Finder.

5. Calibrate transmitter or GameCommander

When starting the program for the first time, you must calibrate and set up your transmitter or GameCommander. *aerofly5* will automatically assist you in Easy Setup. (The same applies if you wish to connect a new controller at a later stage and assign it to a player or model.). Easy Setup comprises 5 simple steps:

Step 1

Identification of control ranges of your transmitter/controller. Please ensure that all available switches, knobs and sliders are moved to their full extent of travel.
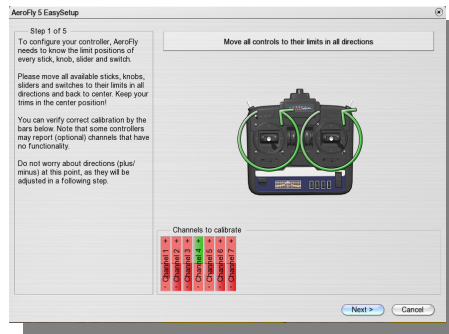
Step 2

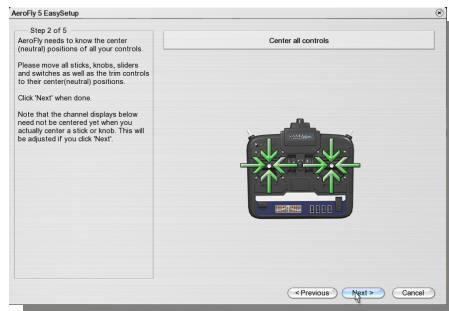Identification of zero positions of all sticks, switches, knobs and sliders.

Step 3

aerofly5 operates with transmitters of different manufacturers. As there is a significant variation between the manufacturers, *aerofly5* cannot automatically identify the exact channel to which your special controller transmits the individual stick signals.

This can be easily determined by moving the joystick in the 4 directions indicated by the arrow. Your control sticks are then clearly identified.
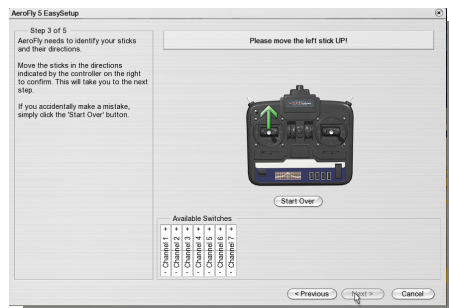
Note: If you are using a joystick, that does not have two sticks as is the case with a game-pad, move an axis that you wish to define as throttle for 'left stick up', and 'left stick right' an axis for the aileron. For the right stick you then move the joystick up and to the right.

Step 4

Determine the assignment and function of the joysticks.

If you are flying for the first time, it is advisable to leave the settings at „Mode 2". You then control the throttle with the left joystick and the direction (aileron and elevator) with the right joystick.

Should this setting not appeal to you, choose a different mode. The labeling on the bars will change accordingly so that you can check directly that every stick is moving exactly as you wish.
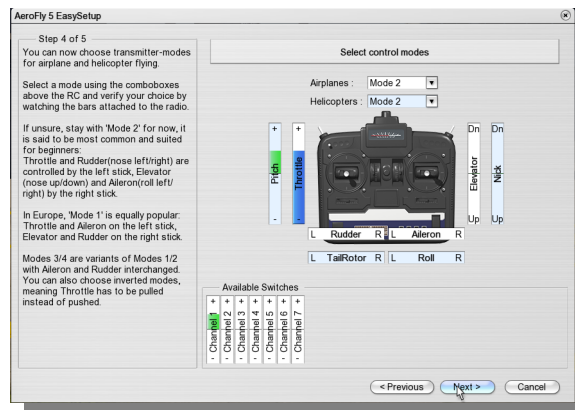
If you are a professional and want to make your own assignments, select „*Advanced Channel Setup*" in the controller menu on completion of the Easy Setup.

Step 5

Assign keys of your keyboard or controller of your transmitter to the most frequently used model functions.

A default setting already exists. If you wish to change this, simply use automatic assignment: Click the horizontal bar of a function and move the desired slider when prompted or press the desired key or knob on the joystick. Please note that only the keys 0..9 can be used on the main or numerical keyboard.
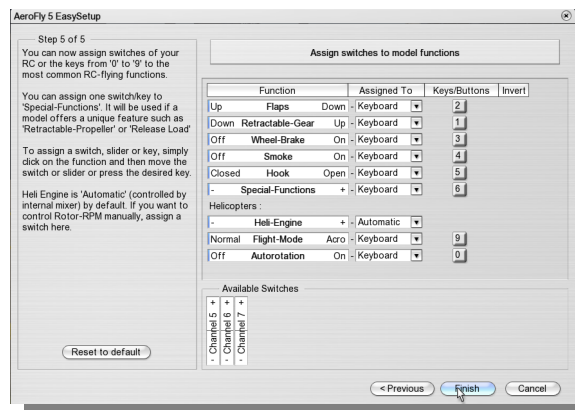
Check that all functions have been assigned as required by moving the individual sliders. The direction of a slider can be reversed by marking the box in the column „*Invert*".

For further details on how to set up the functions, see Chapter <u>12. Menu „Controller"</u> below.

6. Activate *aerofly5*

After successfully calibrating, *aerofly5* must be activated so that all models and sceneries can be used. Activation is restricted to your USB interface and/or the USB GameCommander and not to a specific PC so that *aerofly5* can be installed and used on different computers. Activation is anonymous and is only required once. Only the serial number of your USB interface and/or USB GameCommander and the product key that are on the installation DVD 1, are transmitted. The product key is sub-divided into 5 blocks of 4 characters. Shortly after starting the program and after your transmitter and/or GameCommander is calibrated, the activation window appears.
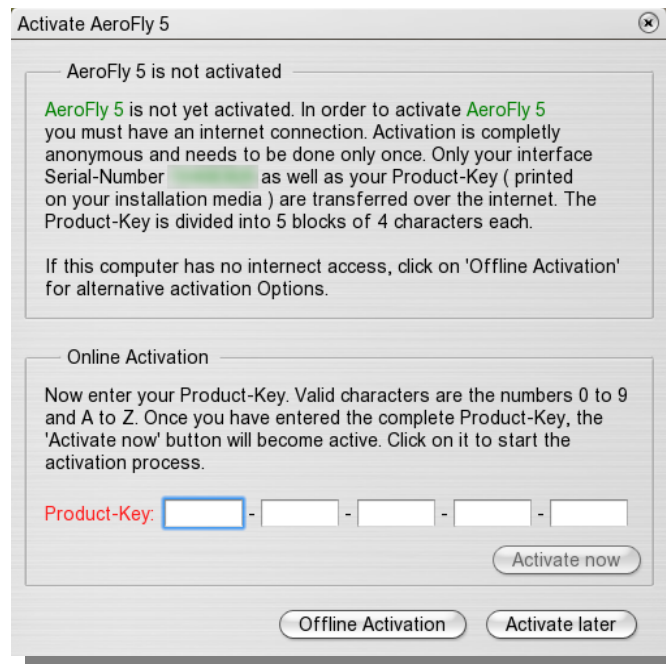
The fastest way to activate is directly in *aerofly5*. Should the PC on which you have installed *aerofly5*, have no Internet connection, please click„*Offline Activation*“ for alternative activation possibilities.

7. Load aircraft model

Load an aircraft model by clicking „*Model*" and then „*Load Aircraft*" in the main menu of **aerofly5**.
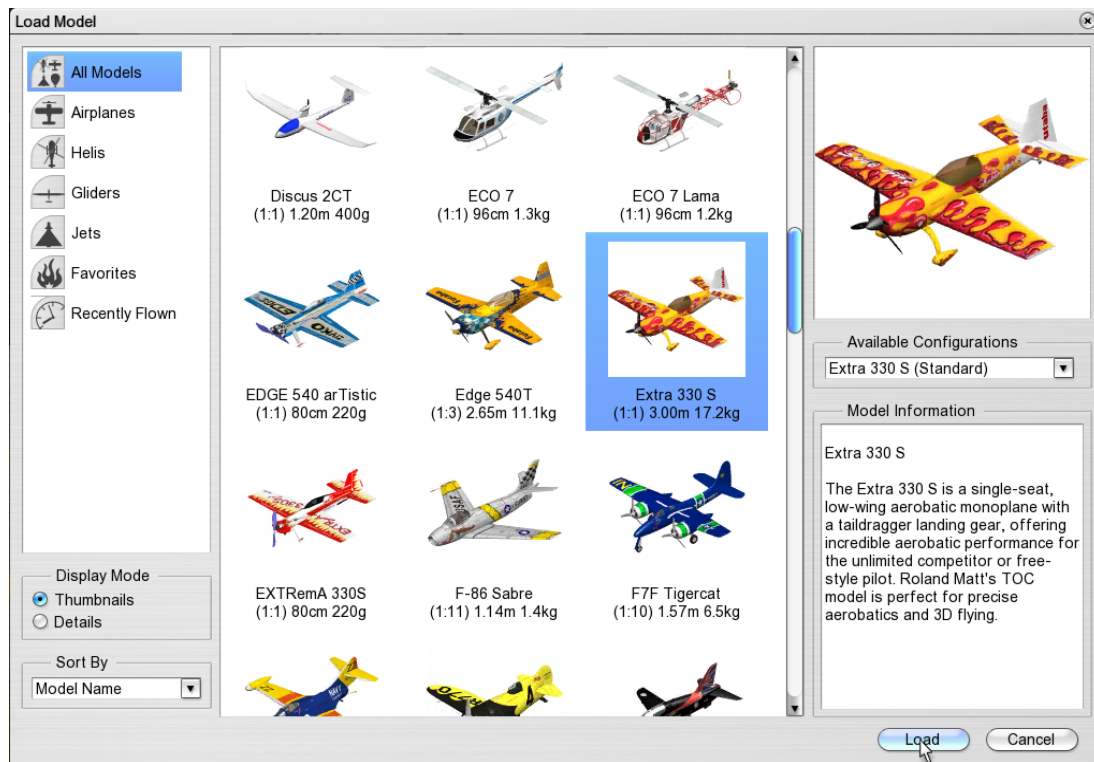
Folder list/filtering (top left)

Set medium range aircraft type to be displayed.

You can compile the file „*Favorites*" yourself by right-clicking your favorite model and then choosing „*Add to Favorites*" in the context menu that appears.

The file „*Recently Flown*" automatically contains a list of the 9 models that you flew last.

Display mode (bottom left)

Switch between thumbnail and detailed text display of the available models.

Sort by (bottom left)

Sort models by name, size or other criteria.

Preview and model information (right)

At the top right you can see a preview of the chosen model, underneath a detailed description.

Available configurations (in the middle on the right)

The default setting is inactive. Only after creating additional configurations of a model with the aid of the model editor (or after having received same by downloading), can you determine which configuration requires loading.

8. Load scenery

Load a scenery by clicking „*Scenery*" and then „*Load Scenery*" in the main menu of **aerofly5**.
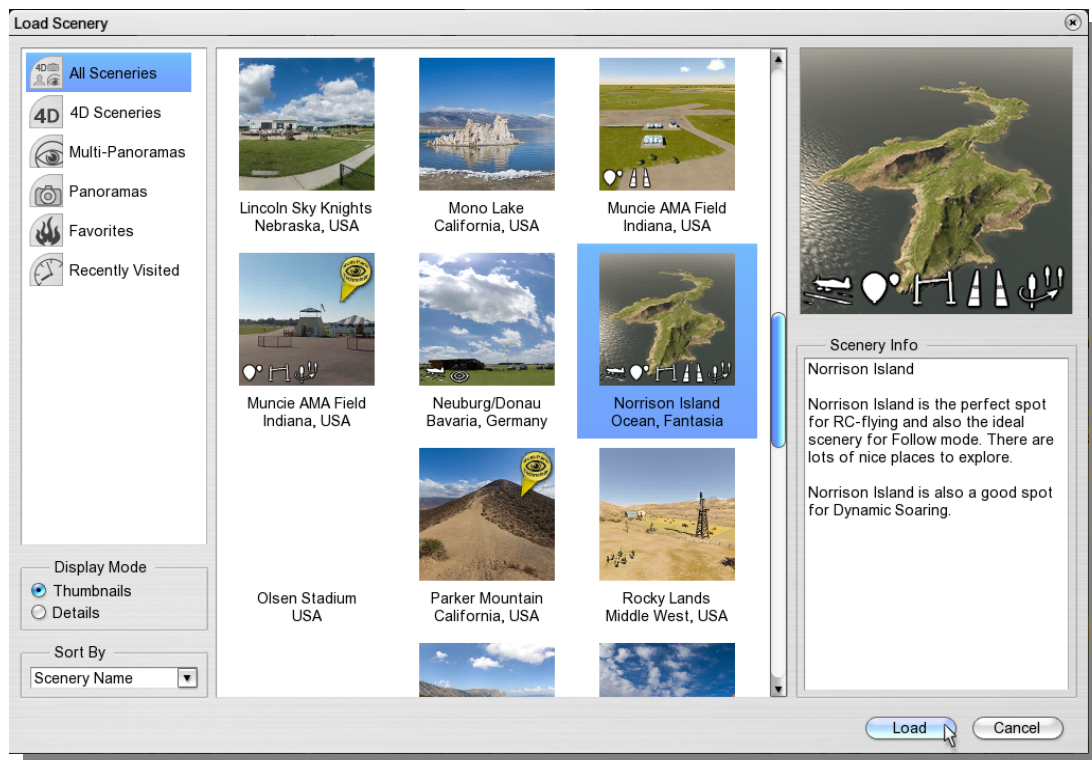
Refer to the points described in Load aircraft for loading sceneries.

Available contests

The thumbnails contain a number of small white symbols. These symbols show directly what contests are available in a scenery. In detail view, the contest symbols are replaced by letters.

Symbol	Contest	Abbreviation (Detail view)
	Balloon Pop	B
	Limbo	L
	Pylon Race	P
	Air-Race	A
	Landing Contest	S
	Autorotation landing	R

9. Quick launch menu

Use the right mouse button for quick access to the most frequently used functions:

Click any part of the screen with the right mouse button whilst no other window is open. The ring-shaped quick launch menu appears.
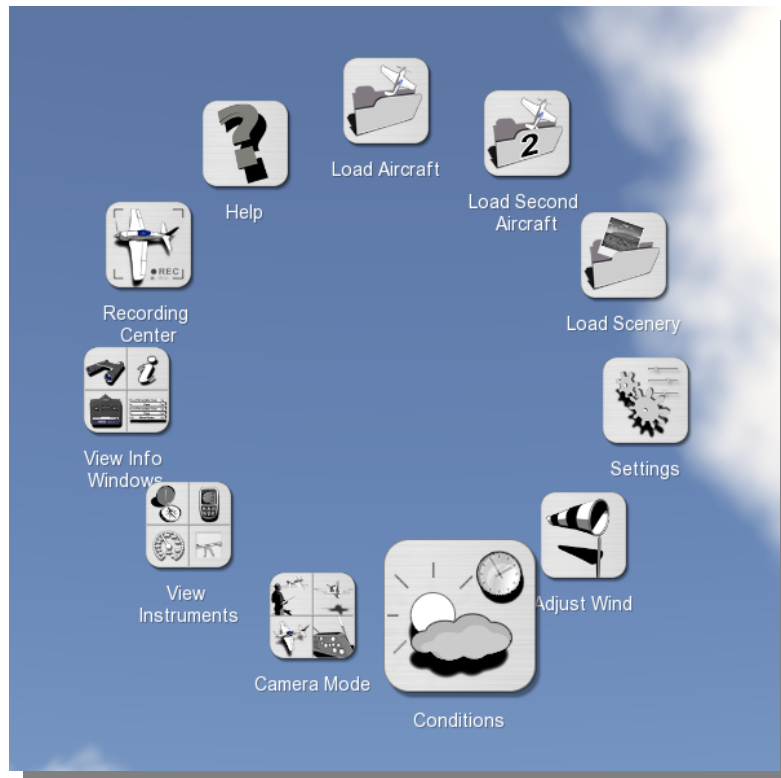
Select the desired function in the usual manner using the left mouse button.

Sub menus

The options *„Information Window"*, *„Instruments"* and *„Camera mode"* are sub-divided into four sections, each of which controls a different function. Click the desired sub-item with the mouse.

Note: If you are in a photo scenery or are connected to the network, you do not have as many options. In these sceneries, you do not have the choice of camera modes or flight conditions (time of day, clouds, fog). In multiplayer mode you cannot change the scenery.

Note: The *aerofly5* main menu still provides access to *all* functions. It appears automatically at the top of the screen when the mouse is moved.

10. Instruments and Information Window

You can activate the following instruments and information in the form of small transparent windows in the menu *„View"* or alternatively using the Quick launch menu:

Information:

- Binoculars
- Flight information
- Transmitter
- Model functions
- Console

Instruments:

- Compass/Wind
- Variometer
- Tachometer
- Landing aid

Note: The windows appear at the default positions. However, you can assign them as you require. Move the mouse to a window and keep the left mouse button pressed to move it. The arrangement of the windows remains the same even if you exit *aerofly5* and re-start it later. Some of the instruments and/or information windows are described below.

10.1 Variometer

This instrument that is vital to the glider indicates energy-compensated climb and descent rates in the round vario scale. The following parameters are also displayed as text:

- **Vz:**   The absolute climb/descent rate
- **ASL:**   Altitude above sea level(NN)
- **AGL:**   Altitude above ground
- **dH:**   Difference in height to last starting point
- **Time:** Flight time since the last start

With gliders that are equipped accordingly (e.g. 'Intention"), the loudspeaker symbol enables you to receive and emit an acoustical signal or to suppress same.

10.2 Model functions

This window lists the special functions of the current model and their assignments. Standard functions, e.g. throttle, elevator, etc. do not appear here. A button is located under the bar. Click this to set up the functions should you wish to change the current assignment.

Please note that some models have *no* special functions. The window remains hidden as long as you do not touch it with the mouse.

This window indicates which signals your model is currently receiving. The most frequent channels are as
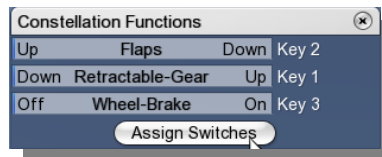
follows:

Aircrafts: Landing gear, wheel-brake, flaps, towing hook, smoke, special functions

Helicopters: Helicopter motor, flight mode and autorotation

Note: Beginners often ask the question „Why isn't my helicopter flying?" or „Why isn't my model moving?". Consult this information window for answers to these questions.

Note: Take into account that autorotation is deactivated in helicopters in flight mode 'N' (Normal), as long as you have not activated the corresponding slider or the assigned key. For 3D or return flight, switch to flight mode 'A' (Acro).

Note: To facilitate operation, the *aerofly5* is equipped with an automatic mechanism for landing gear, wheel-brake and towing hook functions: When the model is reset (e.g.   press the space bar, 'B' or 'D'), these functions are reset to their default value.

The landing gear is then (irrespective of the slider position) automatically extended. Only when the landing gear switch is moved again in direction 'Retract', is this automatic mechanism deactivated.

After re-positioning the model, all hooks are also closed and the wheel-brake open so that you can now start.

10.3 Landing assist

This landing assist that was specially developed for the *aerofly5* is intended to facilitate the correct approach and landing in photo sceneries after brief practice.
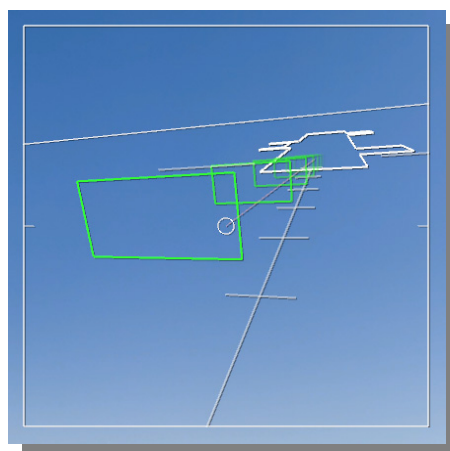
The landing assist window shows a schematic diagram of **the view** of the runway **from the cockpit** of the model.

The green squares mark the appropriate landing corridor. In the background you can see the horizon, a schematic diagram of the actual runway and a centre line with subdivisions on the ground.

To land proceed as follows:

- At a suitable distance, try to align your model parallel to the center line on the ground. Focus *almost entirely* on the landing assist window, as your model is far away from the view position.

- Control the height and descent rate so that you fly as far as possible through the center of the green squares in succession. In doing so observe *only* the landing assist.

- During the last seconds (on reaching the last green square) keep your eyes on the model to touch down smoothly. Congratulations on your successful landing!

10.4 Console

The bottom left section of the ***aerofly5*** window or full screen is reserved for console outputs. This *„Window"* is always visible and cannot be deleted.
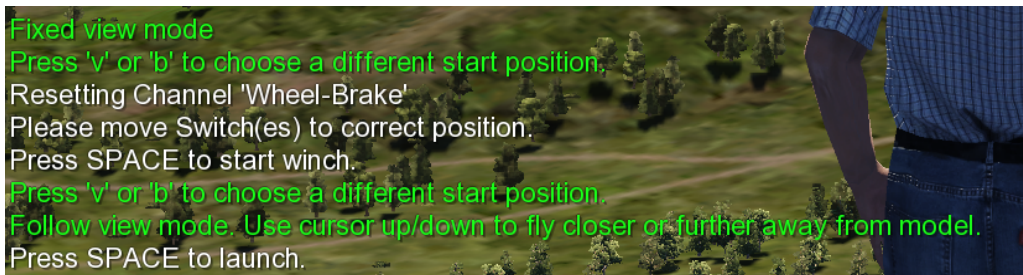
It contains not only information on the currently chosen camera mode but also on the next steps. Pay attention to these outputs during training and contests.

11. Various camera modes

aerofly5 offers 4 different camera modes for observing the models. Activate these camera modes using the F-keys F5 to F8 or optionally via the menu „*View*".

Note: Only the camera mode „*Fixed View Mode*" is available in the photo sceneries.

11.1 Setting the field of vision

In all camera modes, you can minimize and maximize the field of vision of the camera using the keys 'A' and 'Y'. Key 'A' minimizes your field of vision, i.e. the model is easier to see whereas you see less of the landscape, as if you are looking through a telephoto lens. Key 'Y' enlarges your field of vision so that you can see more of the landscape although the model is smaller. Depending on the distance and size of your screen, simply experiment until you have found your optimal setting.

11.2 Choosing the start position

Every landscape offers various start positions for the models. In 4D landscapes additional positions are possible for the viewer. Use the keys 'V' and 'B' to switch to these different positions. If you have found a suitable position, press the space bar to continually restart the model from this position.

In order to achieve the different viewer positions in the multi-pano sceneries, press the Page Up/Down keys. The keys 'V' and 'B' are only for switching between the different model positions.

The different modes are described as follows:

11.3 Fixed view mode (Key F5)

This is the standard mode for all model aircraft. The camera is in a fixed position and focuses on the model. In this mode, the following keys are available in the 4D sceneries for further setups:

- **Arrow key left / right:** To move around the actual position of the model.
- **Arrow key up / down:** To move towards and away from the model.
- **Page up / down:** To change the height of the viewing position (higher/lower).

11.4 Follow mode (Key F6)

In Follow mode, you fly behind the model. Just imagine that you are connected to the model by a rubber band.

- **Arrow key up / down:** Arrow key up / down: The virtual band that connects the camera to the model becomes shorter and/or longer, so that you are either flying closer to the model or further away from it.
- **Key Pos1 / Exit:** The camera flies as close as possible behind the model and/or far behind the model.

11.5 Model camera (Key F7)

In this mode, the camera is located at a freely settable position round the model and moves together with the center of gravity of the model. This mode is highly suitable for viewing the model in flight. The camera does not completely turn with the model on its longitudinal and transverse axis. Starting and landing is somewhat tricky in this mode. The following keys are available in this mode:

- **Arrow key left / right:** To rotate around the model.

- **Arrow key up / down:** To turn towards the model and/or away from the model. You can achieve a distance of max. 4 model radii away from the model.

- **Page up / down:** The viewer is positioned higher or lower. You are looking down or up at the model.

- **Key Pos1 / Exit:** The viewer is positioned directly in front of and/or directly behind the model.

11.6 Cockpit mode (Key F8)

In this camera mode you are situated directly in the model, i.e. the camera completes exactly the same movements as the model. The cockpit mode is divided into further sub-modes. To activate the different positions, press Key F8 repeatedly.

1. The first cockpit mode (first pressing of Key F8) sets the viewer at a position that is relative to the model and you are always focused on the center of gravity of the model. You rotate around the model using the arrow keys left / right / up / down and the page up / down keys.

2. The second cockpit mode sets the viewer at a fixed position and looks in the direction of flight. Your own model is not displayed in this mode.

3. Some models have additional fixed cockpit positions (option) with a fixed viewing direction. You can change the viewing direction in these modes using the arrow keys left / right / up / down and the page up / down keys.

11.7 Influence of the camera settings on flight behavior

The different camera modes have additional parameters. Select „Camera Setup“ in the menu „View“. A point that is often underestimated, is the influence of the camera settings in the simulator on the *subjective* flight behavior. Depending on the field of vision and delayed camera in the Fixed Viewer Mode, the flight behavior of a model can change somewhat dramatically, although the *objective* flight behavior has not changed at all.
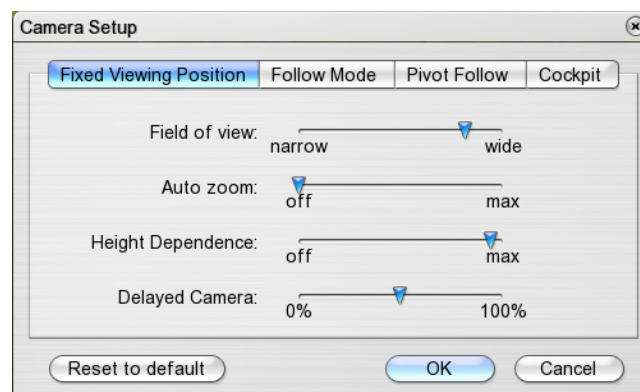
Field of view: The further to the right the slider is moved (> Wide), the more you can see of the surroundings, simultaneously however, the model will quickly appear small at greater distances. How does this parameter influence the subjective flight behavior? The more you can see of the surroundings, i.e. the

slide control is positioned at Wide, the more noticeable are the changes of direction of the model and in comparison to a narrow field of view, the model appears considerably more agile. In reality the field of vision is of course considerably wider and the movements of the model can be spotted sooner. If the slider is at *Narrow,* even steep heights or changes in direction are hardly noticeable, however the model can be seen considerably better at greater distances.

Auto zoom: If the Auto Zoom is activated, the field of vision of the viewer adapts automatically to the distance at which the aircraft is flying. If the model is close to the viewer, the Auto Zoom sets the field of view at Wide so that you can see more of the surroundings and prepare for landing or avoid obstacles. If the model flies further off into the distance, the field of view becomes automatically smaller so that the model can still be seen. This automatic mechanism however, can also influence the subjective flight behavior decisively.

Height dependence: Due to the restricted field of view, it is sometimes difficult to identify the height of the model in relation to the viewer. If Height Dependence is activated, the model is displaced upwards or downwards depending on the position of the model in relation to the height of the viewer. Without realizing, many pilots fly directly overhead in the simulator due to the restricted field of view. If Height Dependence is activated, the model is then at the upper edge of the screen.

Camera delay: The parameter camera delay was actually introduced to compensate the influence of the small field of vision on the monitor and to introduce a greater degree of dynamism than it would have in reality with a wide field of vision. Camera delay ensures that the camera does not instantaneously follow the accelerations of the model so that changes in the altitude of the model can be recognized sooner. This is extremely important for landings and the smooth performance of aerobatics. Simultaneously, however in the case of an extreme 3D helicopter flight, the model may appear to move because the camera is not always focused on the model. Simply set the parameters to suit your personal preferences and flying style.

If you are still not satisfied with the actual flight behavior, the next step is deflection control.

12. Moving the camera and model

Simply use the mouse to move the camera and the model e.g. into the desired starting position.

Note: The following functions are only available in the mode „*Fixed View Mode*" (Key F5) or in Walk Mode (Taste W).

Moving the camera

Press the left mouse button anywhere in the window. The pointer becomes a symbolic eye with arrows. Keep the left mouse button depressed and move the mouse to swivel the camera. Press F5 to focus again on the model.

Position model
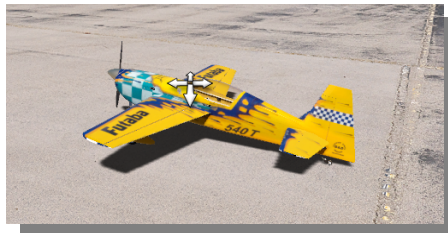
Move the mouse to the middle of the model. The pointer now becomes the four-way arrow. Keep the left mouse button depressed and move the mouse to drag the model to the required position. Up and down movements move the model further away or bring it closer.

Turn model

Move the mouse to the edge of the model. The pointer now becomes a symbol of rotating arrows. Keep the left mouse button depressed and move the mouse to turn the model.

Lift/lower model

Position the mouse above or below the model. The pointer now becomes a symbol of arrows, that point up and down. Keep the left mouse button depressed and move the mouse up and/or down to lift or lower the model. You can simultaneously move it to both the right and left.

13. Menu „Controller"

All set-ups that relate to your transmitter, GameCommander or game pad/joystick, can be found in the menu *„Controller"*:
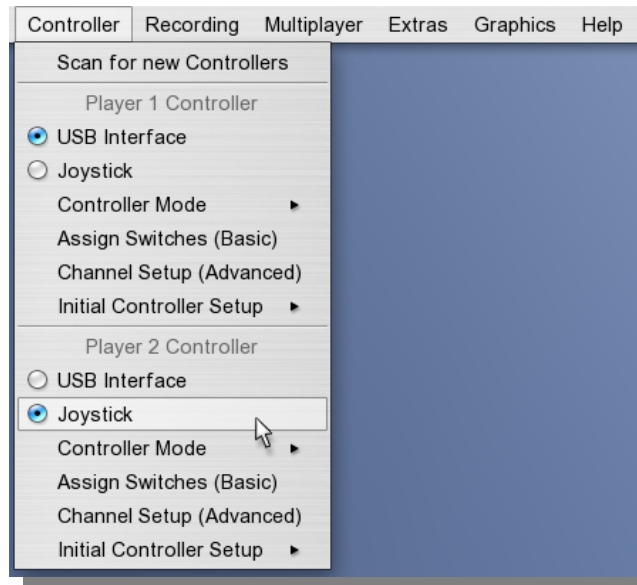
Scan for new controllers

Choose this menu item if you wish to connect a new controller for yourself or for a second player. After scanning, controllers are displayed in the menu and can be selected as required. See following point.

Assign controllers

In the menu under 'Controller Player 1' and 'Controller Player 2' you can directly assign a controller to a player. All the identified controllers are displayed for selection (in this case a transmitter at the interface cable and a joystick).

Controller mode

Assign the sticks to each individual player.

Assign sliders

Opens the relevant window from the Easy Setup mode in which you can assign the sliders or keys to the most common model functions. See Step 5 in Paragraph 4. Calibrating Transmitter or GameCommander.

Advanced channel setups

This menu contains the advanced setups in which the professionals have access to all possible model functions. You can also make more customized setups.

Initial controller setup

Here you can return to the various easy function setups of the Easy Setup mode.
Compare Paragraph 4. Calibrate transmitter or GameCommander above.

|	
Calibrate and Configure:	Re-start complete Easy Setup.
Calibrate only:	If one/several channels are incorrectly calibrated, you can recalibrate here. (Steps 1 and 2 of the Easy Setup mode)
Mode selection:	Reopens Step 4 of the Easy Setup mode, in which you can choose the transmitter modes for aircraft's and helicopters and see which stick controls which function.

13.1 Advanced channel setups

aerofly5 offers you complete freedom over the setup of all functions in 'Advanced Channel Setups':
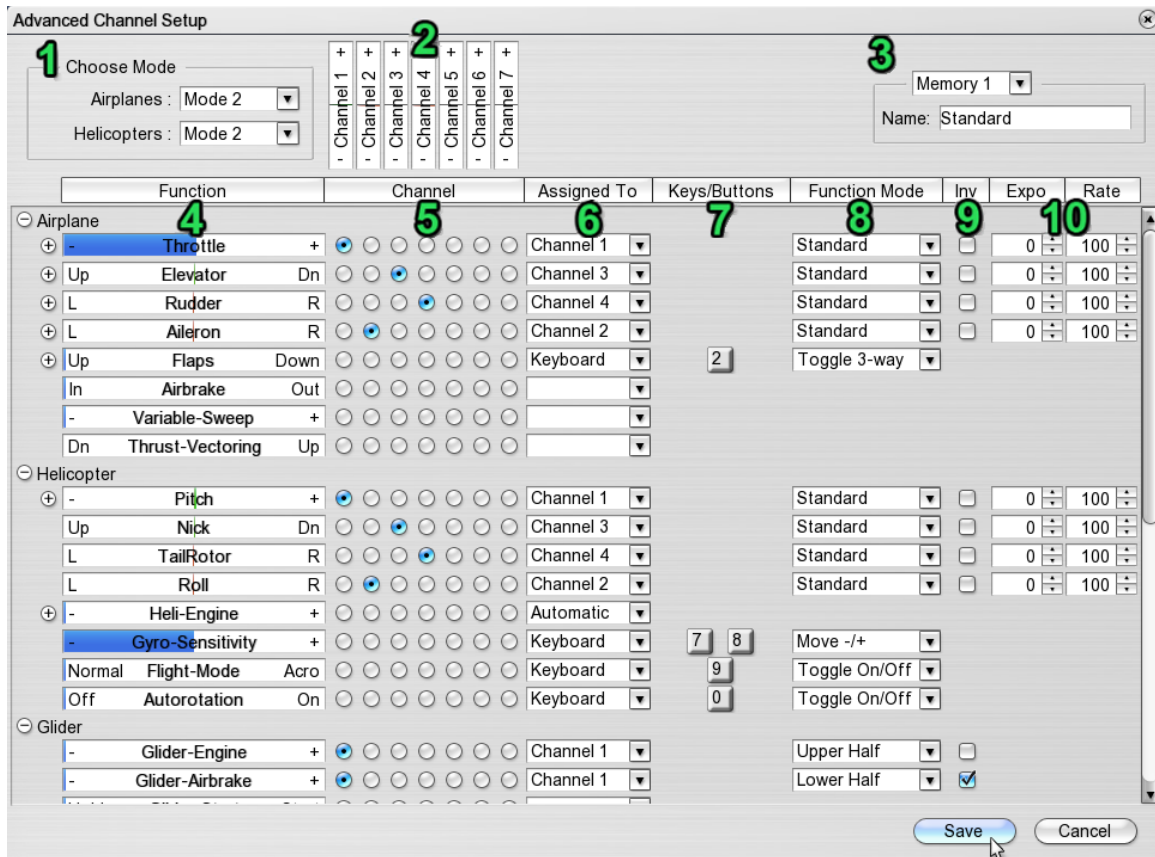
Select mode (1):

At the top left you can once again select a transmitter mode for both aircraft's and helicopters. Select the mode first that best meets your requirements and then assign your individual channels.

Channel display (2):

Displays the channels that your transmitter/GameCommander supports. Move a stick to display the assigned channel.

Note: In the case of joysticks, only the analog axes are displayed and not the digital buttons. See below for assigning buttons.

Disk space (3):

Here you have the possibility to define and subsequently call up four different default settings for your controller. Set up 'Memory 1' first and enter a name. If you wish to define a further configuration, select 'Memory 2', enter a new name, make the necessary changes and click 'Save'.

Function bars (4):

This is the list of the model functions available in *aerofly5*. They are sorted into aircrafts, helicopters, gliders, etc. You can display/hide parts of the list using the small plus and minus symbols. (Under throttle, e.g. you will find 4 further sub-functions - throttle-1 to throttle-4. However these only apply to special models).

Automatic assignment: **Click a function bar. A small window opens. Move the stick, slider, switch or**

press a key 0..9 or button on the joystick to assign the function.

Channel assignment (5):

You can also use the mouse to assign a channel (in the tradition of Aerofly Pro Deluxe).

Assignment (6):

The selected channel is displayed once again as a text. This column is only significant if you want to assign a function to the keyboard or a button. For this purpose, select either 'Keyboard' or 'Button'. A few functions, e.g. 'Helicopter Engine' also has an 'Automatic' function. Choose this to automatically control (internal mixer) the engine. See 12.2 Set up Engine Controller for Helicopter.

Keys/buttons (7):

In this column you have an overview of which keys/buttons are assigned to which function. If a channel is assigned to the function, there is no entry in this column.

Automatic assignment: **Click a key/button symbol and a small information window opens. Press a key 0..9 or a button on the joystick to assign the function.**

Function mode (8):

Here are two possibilities:

- Analog mode (if a channel is assigned to the function)

  Standard: The complete channel is used to control the function.
  Upper half: Only the upper half of the channel is used.
  Lower half: Only the lower half of the channel is used

  Example: To be able to control *two different* functions A and B with a knob or 3-step switch, assign the corresponding channel to both functions and select the upper half for function A and the lower half for function B.

- Digital mode (if keys/buttons are assigned to the function)

  On/off switch: Press the key to switch between On and Off.
  3-way switch: Press the key to switch between -100, 0, +100, etc.
  Hold = On: The function only advances to +100 when the key is depressed
  Step '+/-':   The left key moves the function *step-by-step* to the left (-),
                      the right key to the right (+)
  Move '+/-':   The left key moves the function *steplessly* to the left (-),
                      the right key to the right (+)
  Virtual analog: Simulates an analog channel with the aid of one or two keys.
                      The longer the key is depressed, the greater the deflection.
                      Release the key and the deflection is reduced.
                      A greater/smaller deflection is achieved and maintained by quickly/slowly
                      pressing the key.

  Examples:
  The flaps or variable sweep can be retracted or extended steplessly using 'Move +/-' and by assigning two keys. Alternatively, using the '3-way switch' three positions are possible with just one key.
  A towing hook is logically defined as 'Hold = On', so that it is only opened briefly when the corresponding key is pressed.
  A wheel-brake can be defined as 'Virtual analog'. The longer the key is depressed, the greater the braking effect. To brake slightly, just press and release the key alternately.

Inv (9):

For analog channels the direction of movement can be reversed (inverted) by ticking.

Expo/Rate (10):

Expo can be selected between 0 and 100 so that the neutral position can be more precisely controlled whilst still allowing the full extent of travel on the controls.

Expo = 0:   No change– stick travel = servo travel
Expo = 100:   Fine adjustment of small servo travels (with long stick travel)
Recommendable are settings up to approx. Expo = 50. Higher settings are only recommended in extreme cases.

Rate can be selected between 20 and 150 and defines the full extent of travel of the function. Rate = 40 means e.g., that the servo travel will only be 40% of the normal travel when the stick is at its full extent of travel.

Dual-Rate (11):

Using Dual-Rate you may switch between two different Expo and Rate settings during flight.

Note: Most modern computer transmitters already offer the Dual-Rate functionality internally. If you want, you can use your own transmitter for setting up Dual-Rate. If you are however using a GameCommander or if you don't want to set up your own transmitter, you may use *aerofly5* to simulate Dual-Rate.

Assign this function as usual by clicking on the 'D-R' bar and moving the desired channel, switch or key you would like to use. Alternatively you may choose a channel direct from the list.

If you now move the assigned channel or switch, all values for Expo and Rate will switch between the default setting (black) and Dual-Rate setting (blue).

Now adjust for both settings your desired values for Exo and Rate for each model function.

13.2   Set up engine controller for helicopter

A standard feature of the *aerofly5* is an automatic setting for controlling the engines of all helicopters.
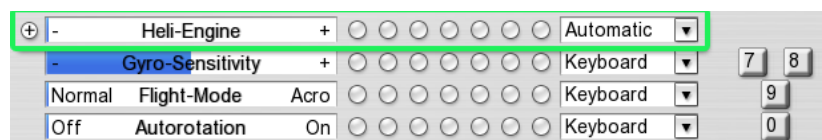
Helicopter engine 'Automatic' (Standard):

'Automatic' means: Depending on the model and flight mode, the engine revs up automatically and is controlled automatically according to the pitch channel.

'Normal' flight mode:
Positive pitch means more throttle, negative pitch less throttle. (linear rising throttle curve).
This mode is used for starting the engine and hovering.

Flight mode 'Acro' (Idle Up):
Both positive pitch and negative pitch mean more throttle (V-shaped throttle curve).
This mode is suitable for inverted flying and aerobatics.

Autorotation:
The rotor is not connected to the engine and does not react to throttle.

Manual setup for helicopter engine:

If you wish to control the speed manually or use the helicopter throttle curves of your transmitter, assign the

channel of your transmitter on which the engine signal is transmitted to the function 'Helicopter Engine'.
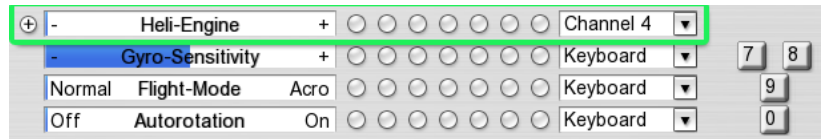
The function 'Flight mode' is then insignificant, as you control the engine directly. Autorotation functions as usual and separates the main rotor from the engine.

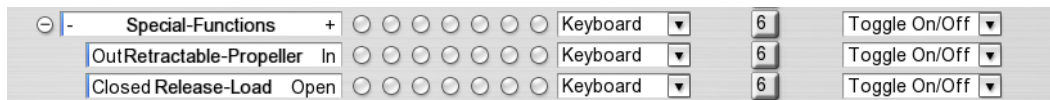## 13.3 Set up engine controller for glider (engine)

The default standard is as follows:

Throttle stick from the central position upwards: Engine control (if the glider has an engine)

Throttle stick from the central position downwards: Glider airbrake (or 'Butterfly')
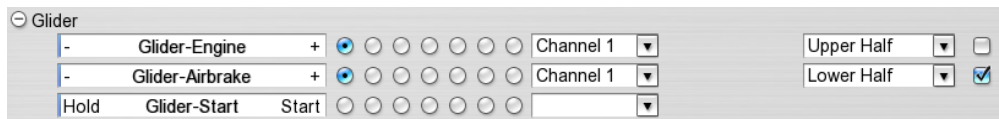
Key '6': Retract/extend retractable propeller

You will find the function of the retractable propeller further down in the list underneath 'Special functions'.

Manual setup for glider ('Advanced channel setups'):

Pilots with a transmitter that has sufficient free switches, will prefer the following setup, that can be selected manually in the window 'Advanced channel setups':

The auxiliary engine control is assigned to a free switch or knob of the transmitter (in this case channel 7). The glider airbrake can now be assigned to *Full Stick Travel*. (Set function mode from 'Lower half' to 'Default'. Tick 'Invert', if you want to pull the stick to brake.

Extending and retracting the retractable propeller can be assigned as required to the same channel that controls the engine or another channel can be used for this purpose.

14. 2-player mode

Describes how to set up a controller for the second player. The 2-player mode requires at least one PC that meets the recommended standard requirements.

14.1 Connect second controller

1. Connect a second controller. This can be either a further transmitter with interface cable, a GameCommander, joystick or game pad

2. Select the first item „*Scan for new controllers*" in the menu *'Controller".*
   A list of available devices then appears.
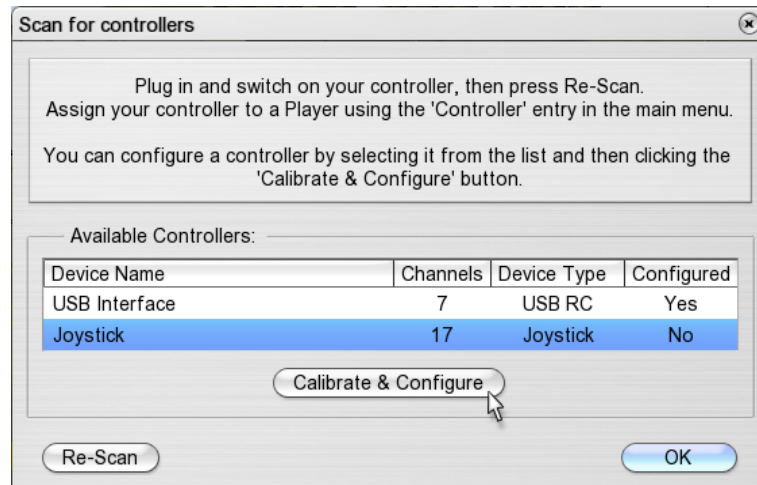
   Select the new device and click 'Calibrate and configure' to go through the Easy setup for the new device. (4. Calibrate transmitter or GameCommander)

3. Load a second model by selecting the item „*Load Second Aircraft*" in the menu „*Model*". (Compare also 6. Load flight model)

4. Assign the new controller to the second model by selecting the new device underneath „*Controller Player 2*" in the menu „*Controllers*".

14.2 Split-screen

In the default setting, the screen is split vertically when a second model is loaded. The left half is for Player 1, the right half for Player 2. Split the screen *horizontally* (upper/lower image) return to the single image by pressing the 'S' key or via the menu „*View*" under „*Split-screen*".

14.3 Glider tow

To tow a glider, see 14.6 Glider tow.

15. Contests and flight training modes

The flight training and contests that are available in a scenery and that are possible with the current model are displayed in the menu *„Extras"*. The remaining options are grayed-out (deactivated) with the corresponding remark.
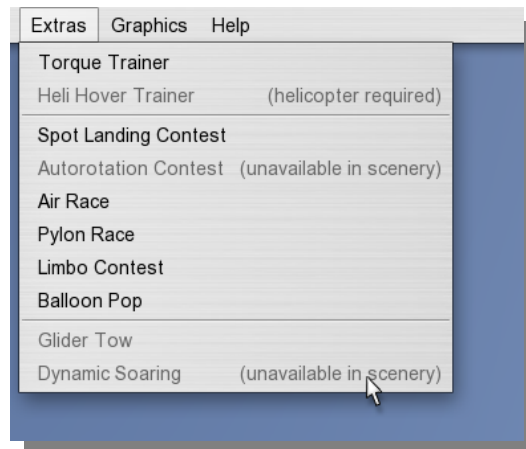
Select your desired training or desired contest to open the corresponding window where you will find further information and assistance.

15.1 Torque trainer

Load an appropriate aircraft. Select the menu item *„Torque Trainer"*. Click the start button or press the space bar to move the model into position and activate the trainer.

The default setting enables you to influence the elevator and the rudder. The trainer balances the model again when you let go of the stick. You can purposely create a state of imbalance just to see how the trainer reacts.

Now practice controlling *one* function (e.g. elevator) more and more by yourself by moving the slider into the neutral position or further to the left. If you can cope with the elevator, try the rudder next and then the throttle separately. Once you have mastered this, you can manually control two functions in the next step.

The aileron plays a special role. When controlled by the trainer, the latter will always attempt to position the model so that you can see it from above. If you want to allow rolling, move the slider for the 'Aileron' to 'manual'.

Whenever you set up the slider controllers, the trainer takes over completely for three seconds so that you have time to re-position your hands on the stick.

15.2 Spot landing

Load an aircraft and a scenery the offers a spot landing contest. Select the menu item „*Contest Spot Landing*". A target appears on the runway and the model is automatically positioned at the target point.

Start the plane and try to make as many landings as possible on the target line within the given time. The scores you have achieved will be totaled.

15.3 Pylon race

Load the appropriate model and a scenery that has a pylon race. Select the menu item„*Pylon Race*". A course comprising 2 or 3 pylons is set up and your model moved into a start position.

In a 4D scenery, you will receive an overview of the course. Click the check box „*Help*" to display or hide the course.

Press„Start" in the contest window or the space bar to start the race.

Penalties: In order to make the race more interesting, a player who misses one or more pylons will not be disqualified immediately. As a penalty the player *will not be allowed any throttle for the duration of the penalty*.

15.4 Air race

Load an appropriate model and a 4D scenery that has an air race. Select the menu item„*Pylon Race*". A course comprising several air-gates will be setup and your model moved into a start position.

You will now see an overview of the course. Click the check-box „*Help*" to display or fadeout the course.

Press „Start" in the contest window or the space bar to start the race.

Penalties: In order to make the race more interesting, a player who misses one or more pylons will not be disqualified immediately but *will not be allowed any throttle for the duration of the penalty*.

15.5 Dynamic soaring

Load an appropriate glider model (e.g. Intention) and a scenery that enables dynamic soaring (Creek Island, Norrison Island, Parker Mountain).

Select *„Dynamic Soaring"* in the menu *„Extras"*. The glider is moved to a predefined start position and the wind adjusted automatically to achieve dynamic soaring. Select this menu item several times to try out all possible dynamic soaring positions.

Note: Dynamic soaring is performed on the leeward side (backside) of the ridge (to the left of the picture). The start positions are selected so that the model is launched into the updraft of the oncoming wind (windward side) (to the right in the picture). (The glider could otherwise run out of energy on the leeward side). Gain altitude by flying with the updraft, turn and dive down on the leeward side and climb back up again to fly back below the boundary layer (on the leeward side of the ridge). Cross the boundary layer again from below close to the ridge, turn and dive down again on the leeward side, etc.

15.6 Glider tow

Load a glider model (e.g. Intention) and tow plane (e.g. Wilga)

Select the menu item *„Glider Tow"* in the menu *„Extras"*, or press Key 'F', to move the models automatically into position for connecting to a tow rope. The tow plane must taxi slowly until the tow rope is taught before accelerating.

Note: If glider towing positions are not provided in a particular scenery, the models will remain at their current positions and will be connected to the tow rope should they be on the ground and positioned sufficiently close to one another.

15.7 Winch launch and helper

For glider models, *aerofly5* has two further innovations: The winch launch and the helper, who launches the model. Load an appropriate model (glider), go through all the possible start positions in the usual manner using Key 'V' or 'B'. Once you have found the desired position, press the space bar to start. To restart, simply press the space bar again.
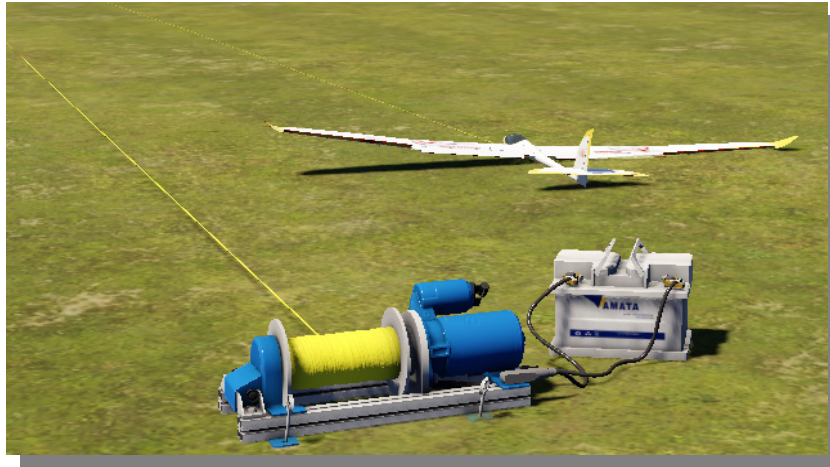

Note: Should winch starts and start positions with helpers not be provided in a scenery, you still have the possibility to lift the model manually 2m or 50m and launch it using Key 'J' or 'H'.

16. Adjust wind

aerofly5 has a complex simulated wind model that is fully influenced by the underlying terrain (up-wnds, down-winds, deflection, slipstreams and eddies on the leeward side) plus statistically fluctuating wind forces and directions, turbulence's and a dynamic thermal simulation (emergence, growth, rise and dispersal of thermal hoses).

The wind simulation offers the following options so that you can adjust the wind to meet your requirements:
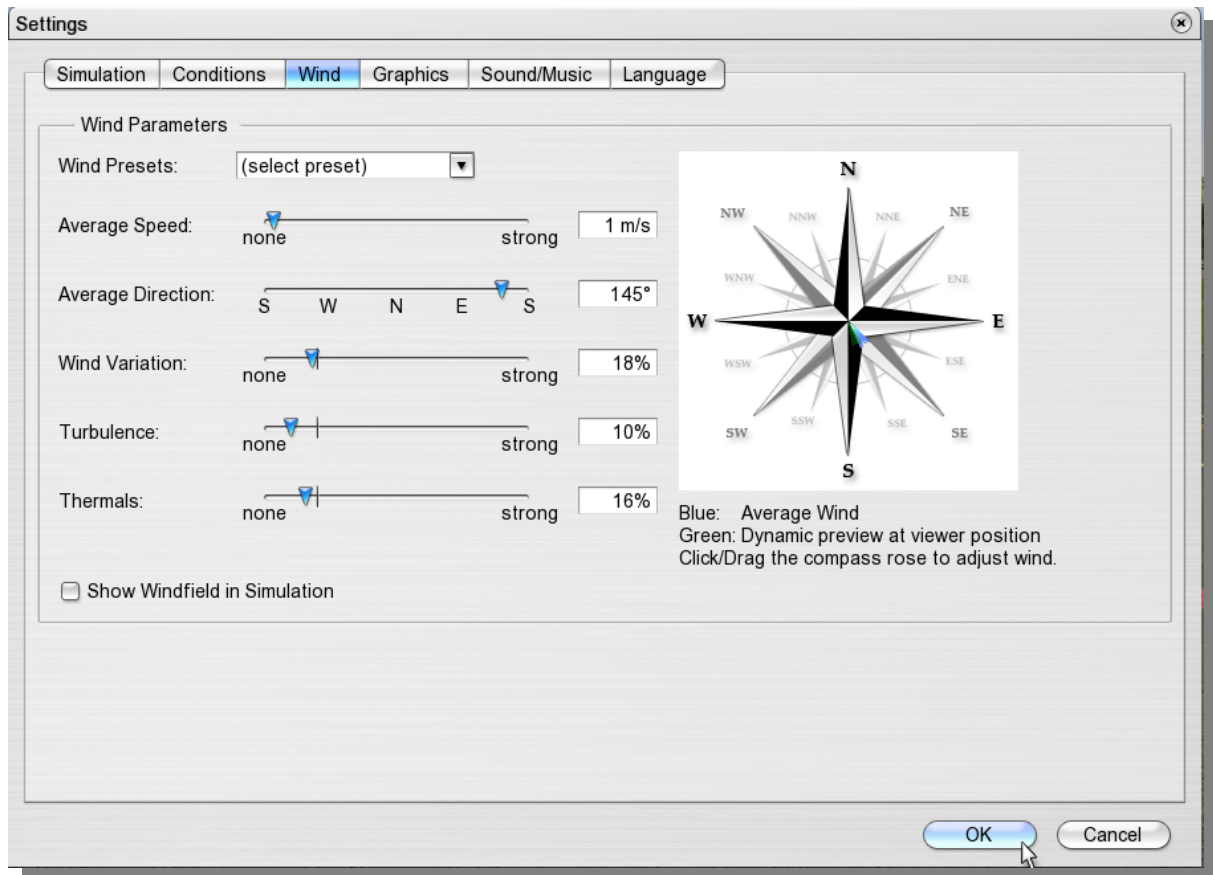
|	
Wind default settings:	Select one of the default settings for a scenery.
Average speed:	Select the wind speed. Please note that this is an average value. Depending on the variations of wind (see below) and the terrain, completely different wind conditions may arise at your current position.
Mean direction:	Define the direction of the wind. (Compare also variations)
Wind variation:	Defines how the wind will vary both in the direction and force, over a longer period of time. 0% is equivalent to a extremely constant wind (e.g. sea wind) 100% is equivalent to an extreme fluctuating wind. 20% is the default value.
Turbulence:	Influences short-term fluctuations in the wind. 0% is equivalent to a completely interference-free laminar airflow. 100% is equivalent to extreme fluctuations. 20% is the default value. Please note turbulence increases when the wind force increases. Turbulence's of 50% with an extremely weak wind force are hardly noticeable, however a strong wind with the same setting can be felt very clearly.

Thermals:	To control the force of the thermal up-winds.
	Take into consideration that thermals also depend on the sunlight, terrain and wind force. Sunny 'southern slopes' therefore, obviously have better up-winds than shaded terrain. A strong wind suppresses thermal circulation.
Show wind field:	Tick this box to display, arrows and thermal hoses that show the current wind conditions during simulation. The green arrows signalize up-winds, the glider pilot should avoid red arrows.

Note: Click the compass (right) to adjust the direction and force of the mean wind. Simultaneously, you can assess in the dynamic preview (green arrow) how strong the wind will be at the current camera position and how it will vary.

17. Set flight conditions

aerofly5 with its 4D sceneries offers the unique possibility of freely setting the time and weather. Simply click the mouse to switch from a sunny morning to a clouding evening, night and fog.
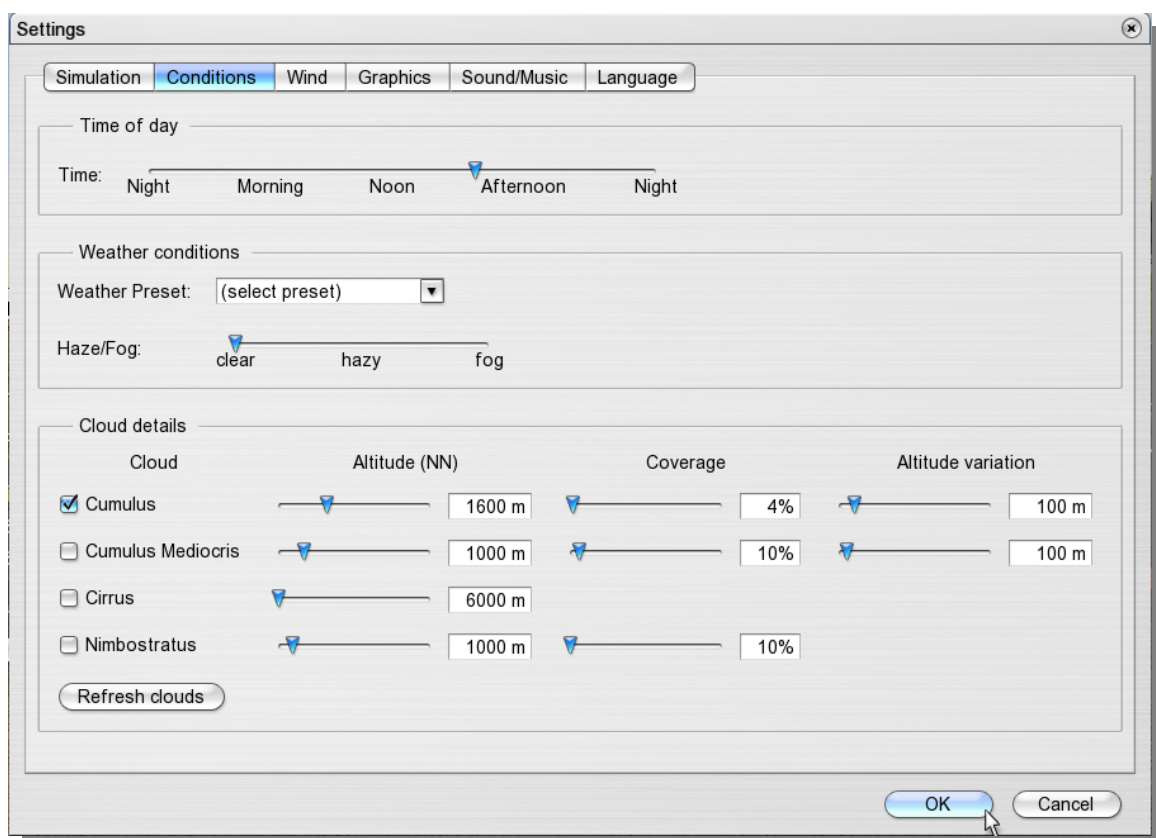
Daytime:	Select the time of day (position of sun) with this slider.
Weather presetting:	Select one of the default settings for a scenery.
Haze/Fog:	Set the density of the haze and in turn the visibility.
	Values to the right of the average setting are equivalent to fog that is becoming more dense.
Clouds:	You can activate/deactivate any type of cloud (available in the scenery) separately and influence its parameters.

Note: Settings with a high cloud density place high demands on the hardware and have a dramatic effect on the simulation (particularly older computers).

18. Record and play back flights

With *aerofly5* you can easily record and play back your flights. You can also provide other *aerofly5* users with your recorded and stored flights. To record, select „*Recording Window*" in the menu „*Recording*" and the following window will appear with the following options:

File name	Enter a name for filing your recording.
Description	Enter the text to describe your recording. (optional)
Rec	Starts a new recording
Play	Plays back a recording.
Pause	Interrupts the playback.
Stop	Stops the recording or the playback.
Load	Reloads a saved recording. Please note that only recordings that were made in the current scenery can be loaded.
Save	Saves the current recording under the file name and description entered above.
Cancel	Closes the recording window and stops the current recording.
Look at recording	The camera follows the recorded model and not the actual model of the player as is normally the case
Hide my model	The current player model is hidden, only the recording is visible.

Note: Press the 'R' key to control a recording more straightforwardly: Simply press 'R' to start a new recording. Press 'R' again to stop it.

18.1   Exchange flights with other users

If you wish to exchange recorded flights with other *aerofly5* users, simply copy the files in the „*Recordings*" directory of the *aerofly5* installation and then copy these files into the „*Recordings*" directory of the other user.

19. Multiplayer mode

With the *aerofly5* multiplayer mode, you can fly simultaneously with up to 16 pilots on different PCs. The computers should ideally be interconnected via TCPIP and LAN cable. A connection via the Internet is also possible, however a DSL-2000 connection at least or a faster one is required.

19.1 Voice Chat support

Starting with version 5.5 *aerofly5* offers Voice Chat support during multiplayer sessions. This means you can talk to other pilots while also flying online. This feature makes it a lot easier to synchronize your actions while flying with many people. In order to use Voice Chat all you need is a microphone.

For best quality and to minimize echo effects we recommend to use a head-set. This way the model engine sounds are not mixed with your voice commands. You may adjust the sensitivity of your microphone within *aerofly5* or using the Microsoft Windows control panel.

19.2 Log in into a multiplayer session

To join a running multiplayer session, click on „*Join*" in the Multiplayer pull-down menu. You will see the following window:

aerofly5 uses a central server that is permanently running in the Internet. This server constantly checks and maintains a list of all running sessions. When you now want to join a session, by clicking on „*Search Internet*", *aerofly5* contacts the *aerofly5* central server. The central server will then send a list of all running sessions.

Important note: In order for *aerofly5* to contact the central server, you have to open the UDP ports 7000 to 7020. If you have an active firewall or your internet router is set up to block those ports, please open these ports for incoming and outgoing traffic in the range from 7000 to 7020.

If you want to join a session in your local network (LAN) simply click on „*Search Local Network*".

Connection Speed: Under connection speed you can choose between Internet or LAN. If you want to play over the Internet, please choose Internet here as well. This setting adjusts the amount of data being sent during a session. Your local network is typically a lot faster so more data can be transmitted. You will notice the difference if doing some radical 3D flying. During normal operation you won't see much of a difference.

19.3   Multiplayer-Info Window

For a better overview of all connected pilots you can use the Multiplayer-Info window. By default this window opens up once you are connected to a session. This window shows you a list of all active players, their current model, distance, altitude as well as speed.
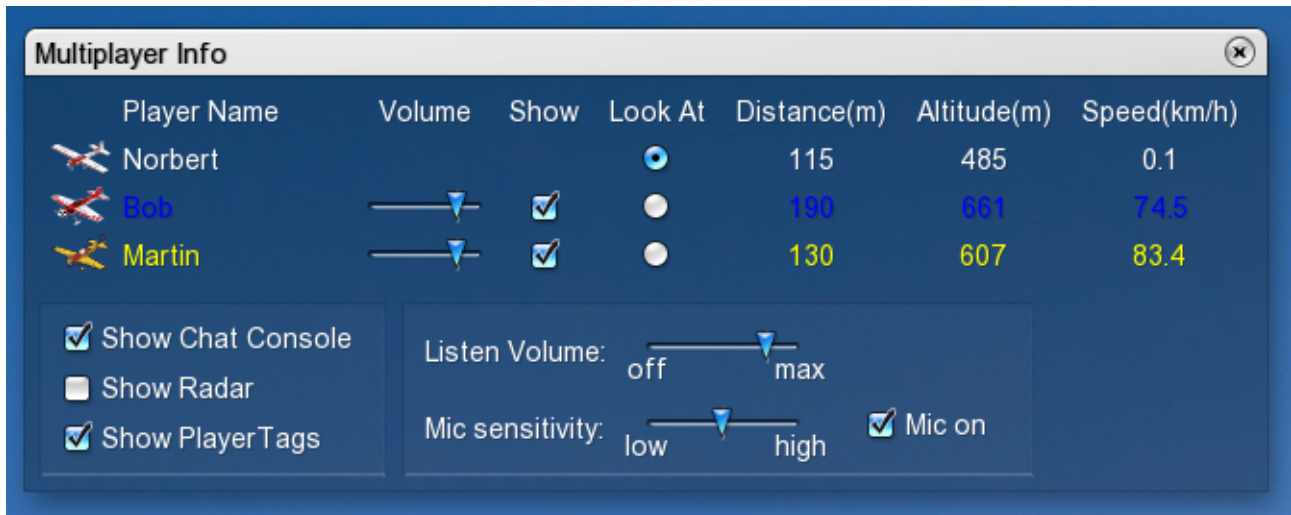
The different entries are explained next:

- **Player Name:** This is the name of the player. Next to it is a small icon of the current model the user is flying.

- **Volume:** If the multiplayer session supports Voice Chat you can adjust the speech volume of each player individually using the sliders.

- **Show:** Here you can show or hide players individually. If you deactivate the check box you won't see and hear this player. This is sometimes useful if a player has joined a session but is not actually flying around.

- **Look At:** Click on the *"Look At"* radio button when you want to permanently look at a given player.

- **Distance:** The distance of the player model with respect to your current viewing position.

- **Altitude:** The height above ground of the player model.

- **Speed:** The speed of the player model.

Besides the settings for each player you can also adjust the Voice Chat volume globally for all players.

Using *"Mic sensitivity"* you adjust the level when your microphone will detect your voice. If you don't want anybody to hear you, simply remove the check on *"Mic on"*.

Besides the Multiplayer-Info you can also open the "Radar window". Using this window you can see the position of other users with respect to your own model. This window is helpful as an aid to do formation flight or to better locate other pilots.

19.4 Allowed settings and changes during a multiplayer session

If you are connected to a multiplayer session, you won't have access to all settings any more *aerofly5* is offering you. The first user that connects or creates a multiplayer session is the so called Master. The Master may change settings like wind, time of day or other environmental settings. Other users will automatically receive these changes. A change of the scenery however is not possible.

Each user may change his or her model at any time. Please do not change you model too often since this has a notable effect on the performance for other players!

19.5 Setting up a multiplayer server

In order to set up your own multiplayer session, the *aerofly5* server application must run on a PC. This can be realized either directly in the *aerofly5* or (preferably) via the independent application „aerofly5 Server". Simply start the *aerofly5* server by clicking „*aerofly5* multiplayer Server" in the *aerofly5* program group and a window appears that will remain open. Alternatively, click *„Host"* in the Multiplayer pull-down menu and the following window appears:

- **Name of Session:** Enter the name of the multiplayer session. Other players then see this name when they are looking for an *aerofly5* server.

- **Your player name:** Enter your name under which you are visible for the other players.

- **Max. number of players:** The multiplayer session can be limited to a specific number of players. The default setting is 8. The higher the number of players, the faster your Internet connection should be to allow for smooth and realistic simulation. A LAN connection normally suffices for up to 16 players playing simultaneously.

- **Port Number:** The port number is significant if you wish to play *aerofly5* via the Internet. Certain Internet providers may block some port numbers. If this is the case, just enter another port number. Be sure to open this port on your computer or router for outgoing and incoming traffic.

- **Connection speed:** Select between LAN or Internet. If you wish to operate via the Internet, then select *Internet*, so that the data volume that requires transmitting is reduced compared to the LAN connection.

- **Password (optional):** You may specify an optional password for this session so only users that know this password may join this session.

- **Voicechat:** If you want to have Voice Chat support in your multiplayer session make a check here. Voice Chat is using the Port Number you have chosen plus 1. So if you want your session to use Port number 8000, Voice Chat is using port 8001. So be sure to open this port as well on your computer or in your internet router.

Other players can log in as soon as an *aerofly5* server is running.

20. Model editor

Modify a model and adapt it to your requirements.

Note: Due to the numerous adjustment possibilities and parameters, it is extremely easy to over-adjust a model so that smooth flying is no longer possible. Should this occur, you can return to the default settings at all times (see 19.4).

20.1 Open model editor

Select the menu item *„Edit Aircraft"* in the menu *„Model"* and the following window appears:
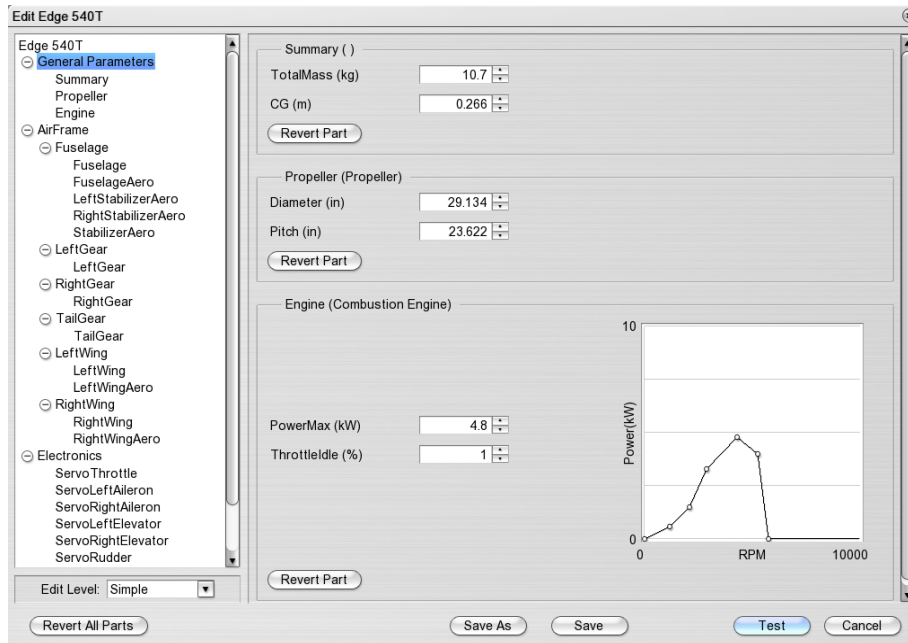
20.2 General information

All available components are displayed on left side of the window in a folder structure. Click a component or a component assembly and it will appear on the right side for editing.

|	
Revert All Parts	Reset all changes since opening the editor window.
Save as	Save the model and enter a new name and description. If necessary, clear existing settings.
Save	Save the model under the current name
Test	Close editor and test changes at the model
Cancel	Close editor and cancel all changes
Revert Part	*Reset changes to a part*

Note: You cannot overwrite the supplied *aerofly5* Standard models. A new name (e.g. **Edge 540T (edited)**) is automatically created when you select *„Save"*.

20.3 Save and delete changed models

Select *„Save As"* in the model editor or *„Save Aircraft As"* in the menu *„Model"* to open a dialog where you can save your current settings or delete configurations that you no longer require after setting.
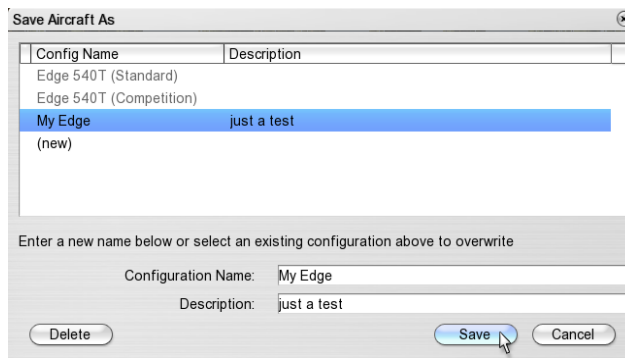
The list displays all existing model configurations. The **aerofly5** default configurations are displayed in gray and cannot be changed or deleted.

Click on an existing configuration, then *Save* to overwrite it.

(new)   Click here to create a new configuration, then enter a name and description.

Save   Enter a name and a short description of the set configuration and press „*Save*".

Delete   Click the desired configuration in the list which is then highlighted in blue and „*Delete*" to remove the configuration.

20.4 Load changed models

Your changed and stored models appear in the dialog window (see Load aircraft) under „*Available Configurations*". Select the configuration that you wish to load.
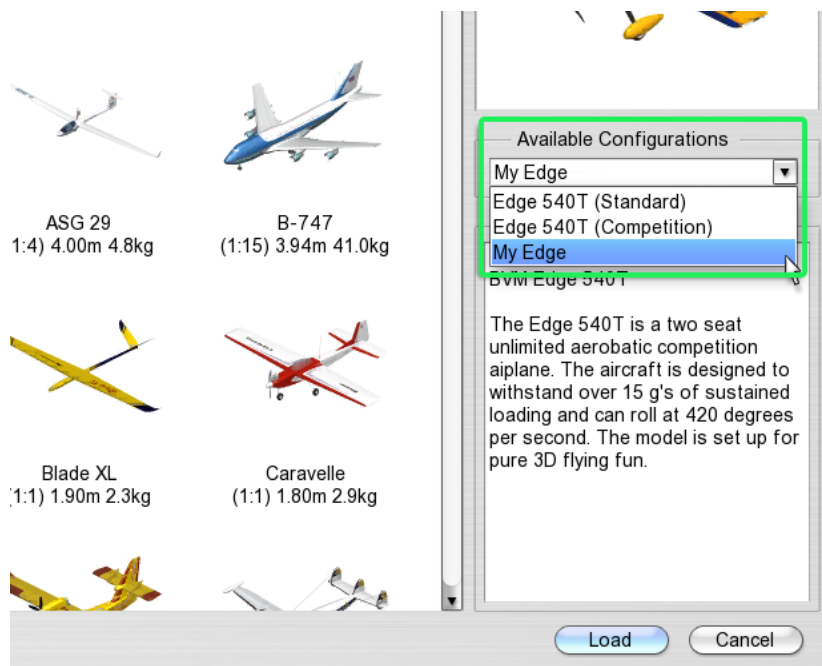
20.5 Example: Edit aircraft

In this example, the weight, center of gravity, propeller, engine power and rudder deflections of the Edge 540T need changing. Load the Edge 540T (Standard) and select the menu item „*Edit Model*" in the menu „*Model*" to open the model editor:
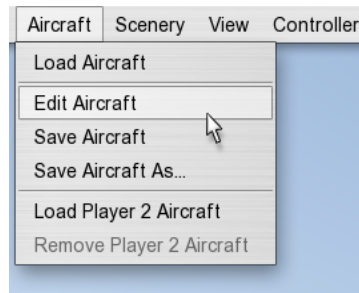

On the left side select„*General Parameters*"*.* The total mass and the center of gravity (measured from the front edge of the surface) is displayed at the right.
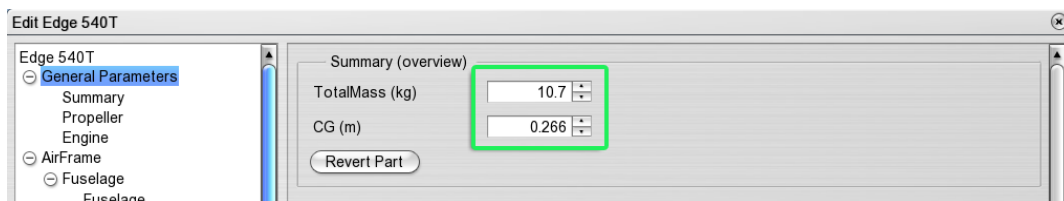
Enter 12 kg for the *Total Mass* and move the *Center of Gravity* (CG) slightly forward and enter 0.22.
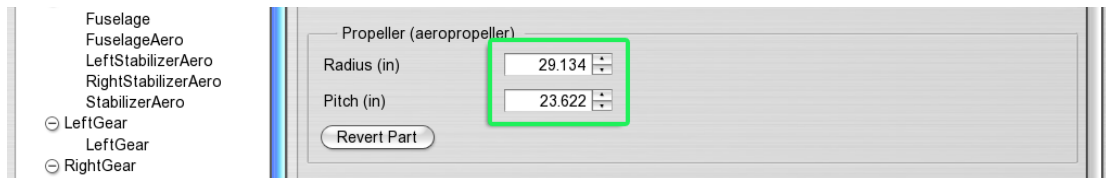
Change the propeller by entering the values for *Diameter* and *Pitch*. Please note that these values are usually entered in inches and must therefore be entered in inches in the model editor.
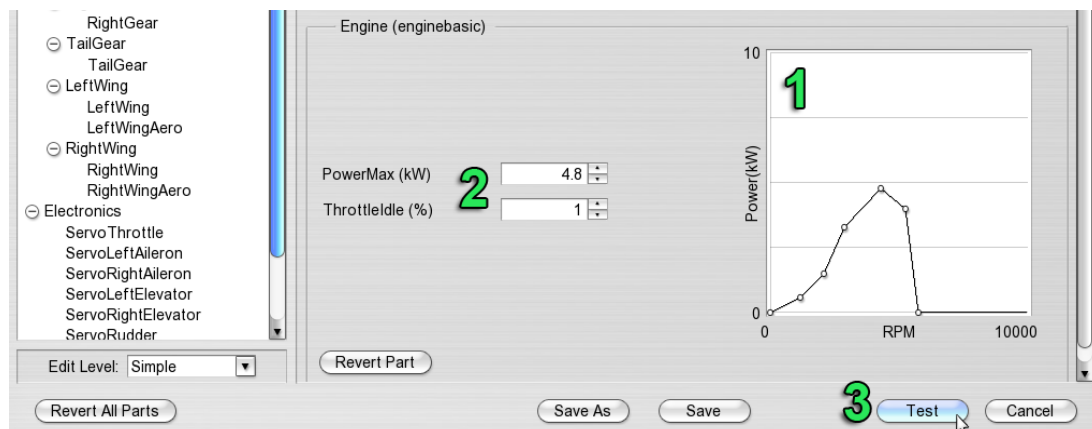

Before testing the settings, change the engine power: The power curve of the engine can be edited by shifting **(1)** the individual control points of the curve in the diagram using the mouse. Click a line between the control points and a new control point will appear automatically.

If you just wish to change the maximum power, enter the desired value directly under *Power* **(2)**, the control points of the power curve are then adapted automatically.

Click „*Test*" **(3)** to fly the model in the simulator with the changed settings. Please note that although the changed settings affect the flight behavior, they are not yet saved and are lost when you load a new model (this can also be used for resetting purposes). Simply reload the default configuration of the model.

Before saving the model, the rudder deflections must be adjusted. Open the model editor again and select *Servo Rudder* on the left side under *Electronics*:
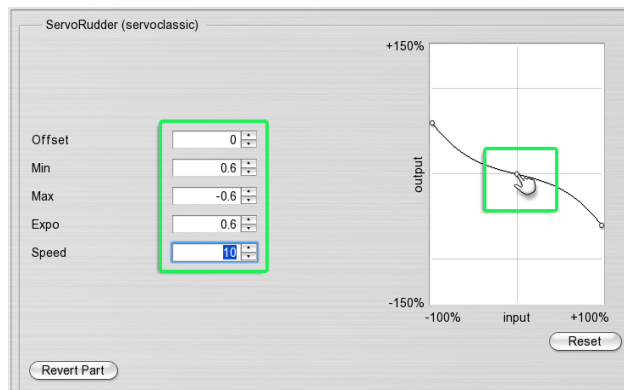
The control curve of the servo is displayed on the right side. For every stick position (*input*) the corresponding servo position (*output*) is displayed. Depending on the installation position of the servo, the curve either rises or falls until the correct control direction is reached as shown in the example.

You can change the curve by moving the control points on the curve using the mouse or by directly entering the corresponding values. With the Expo setting you can influence the shape of the curve to achieve a more sensitive control reaction (around the neutral position) while still allowing the full extent of travel.

The model that has now become heavier, still rolls too far when landing, so that the rolling friction coefficient at the ground still needs increasing. Select *Expert* at the left under *Edit Level* to display further parameters of the model:
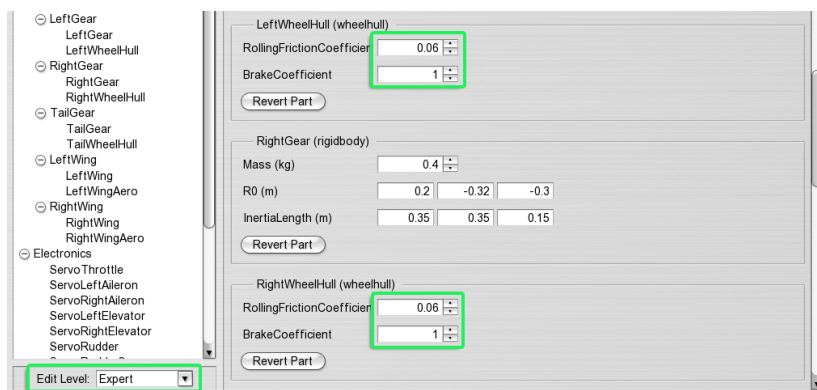
Select both *Left Wheel* and *Right Wheel* under *Aerodynamics* and set the rolling friction coefficient at 0.1 for each wheel.

Click „*Save As*" to save the model with the changed settings:
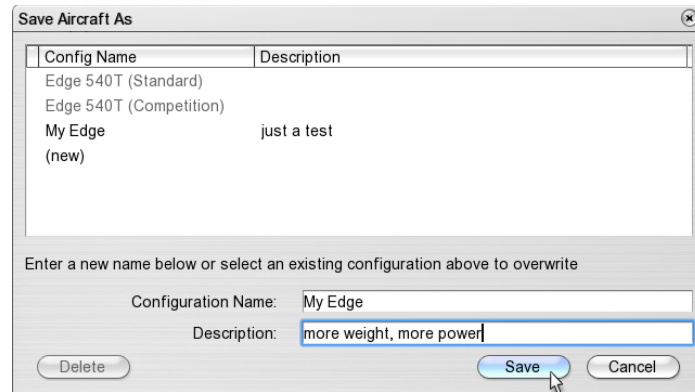
Enter the configuration name and the description that will be displayed in the dialog window for these settings. Click „*Save*" to save the settings and to return to simulation.

20.6 Example: Edit helicopter

In this example, the weight, pitch, control curves and the gyro sensitivity of Vision 90 are changed. Load the model Vision 90 and open the model editor.
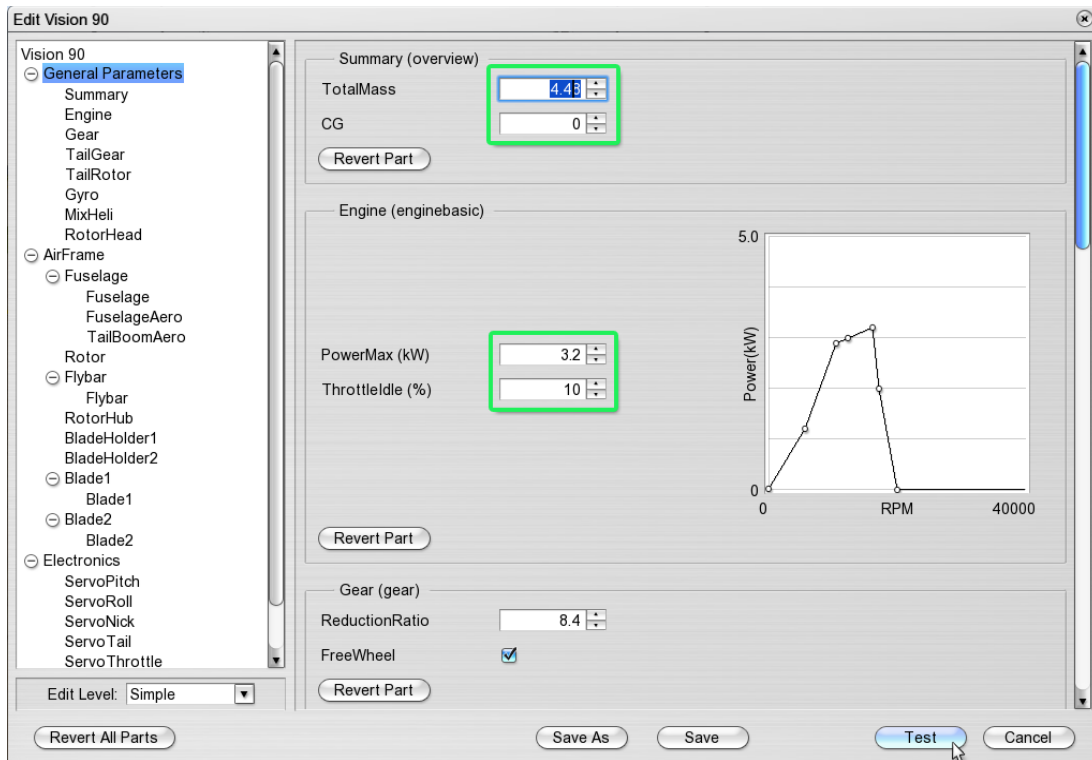
Select *General Parameters* and set the new values for the *Total Mass* and *Engine Power*. Set the *Edit Level* at *Expert* and select the parameter *Rotor Head*:
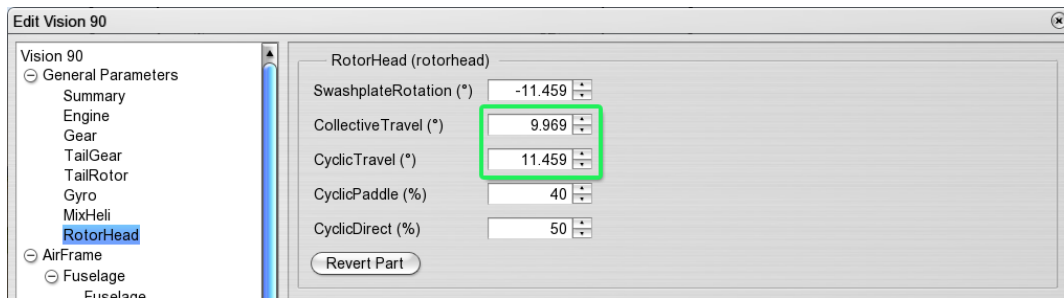
Here you can set all the entire control paths that are available for the collective and cyclical pitch. These are maximum values, that can be reduced by the pitch curve settings depending on the flight phases. Select *Mix Helicopter* in the parameter list:
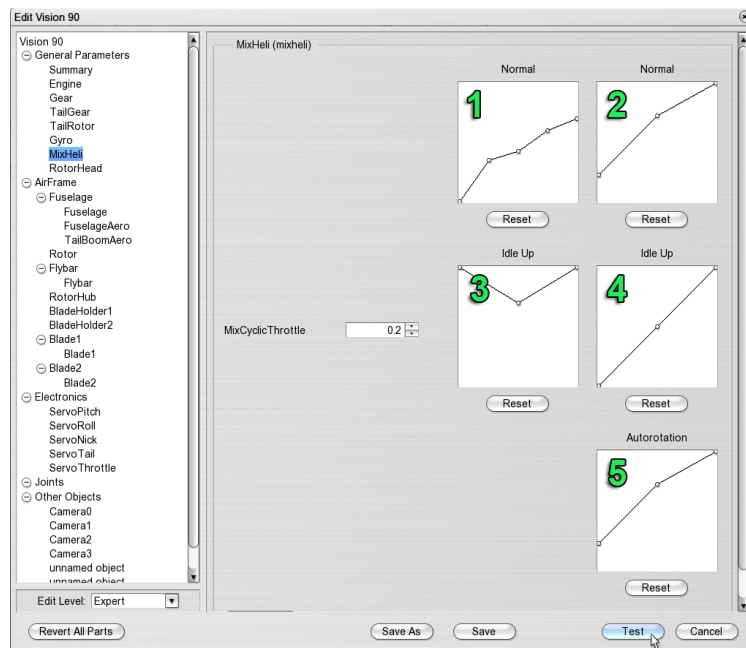
With this parameter you can set the pitch and throttle curves for the three flight phases *Normal*, *Idle Up (Acrobatic)* and *Autorotation*. Please note that the throttle curve is only used when the channel *Helicopter Engine* is set at *Automatic*, otherwise the engine will be controlled by the throttle channel of your remote control (Compare Paragraph 12.2).

The examples on the left contain the throttle curves for the flight phases *Normal* **(1)** and *Idle Up* **(3)**. The throttle values can be set between Idle (down) and Full Throttle (up) for every position of the pitch stick (horizontal position in the graph). In the flight phase Autorotation, the engine is always in idle or switched off.

The examples on the right are the settings of the pitch curves for the flight phases *Normal* **(2)**, *Idle Up* **(4)** and *Autorotation* **(5)**. The horizontal position in the graph corresponds again with the position of the pitch stick, the vertical position with the pitch values predetermined by the rotor head. In this example the predetermined pitch travel for the rotor head is +-12°, so that the top point in the graph is therefore equivalent to +12° pitch and the lowest point -12°.

Select Gyro in the parameter list on the left:
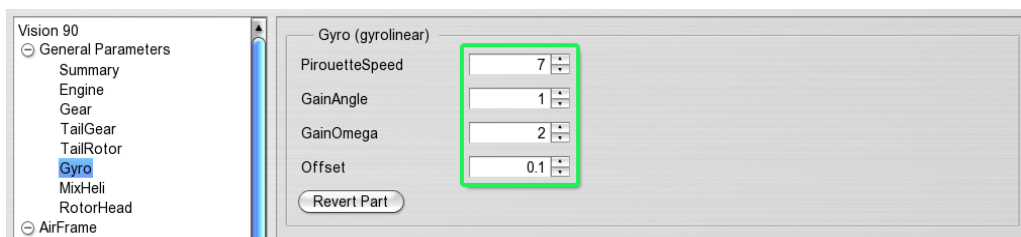
Enter the pirouette speed that the gyro should reach when the stick is at the full extent of travel in the *Speed* box.

The *GainAngle* shows how the gyro reacts to deviations from the set position and how the tail reacts. Enter zero to deactivate the Heading Hold function.

The *GainOmega* determines the extent of the reaction to rotations. Set this value so that the tail is adequately controlled yet vibrations do not occur.

Click Test, Save or Save as to save the settings and to return to simulation.

20.7 Part parameters

The following describes the parameters of the individual parts. Depending on the model, some parts are either not provided or more than one part is provided (e.g. engines for multi-engine machines). Select the individual parts in the model editor on the left side in the file structure and the corresponding parameters appear on the right.
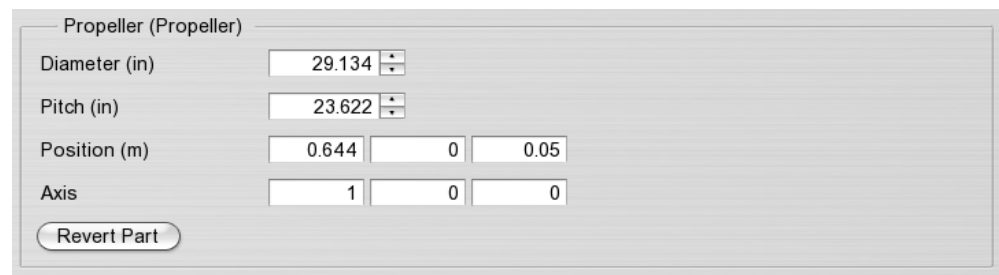
Summary

Total mass	Enter the desired total mass of your model.
CG (Center of gravity)	Airplanes: Set the position of the center of gravity – measured from the leading edge of the wing *to the back*.
	Helicopter: The values refer to the rotor axis. Enter positive values to move the center of gravity *forward*.

Propeller

| Diameter	Propeller diameter in inches
Pitch	Propeller pitch in inches
Position	The centre of the propeller. The first value refers to the position along the longitudinal axis of the aircraft (positive front - negative back), the second value refers to the position along the transverse axis (positive left - negative right) and the third value along the vertical axis (positive up - negative down).
Axis	Alignment of the propeller axis along the longitudinal, transverse and vertical axis.

Turbine

Maximum Thrust	Maximum thrust in Newton
RotationInertia	Inertia of the turbine is approximately equivalent to the time that the engine requires to accelerate from idle to maximum speed.

Combustion engine
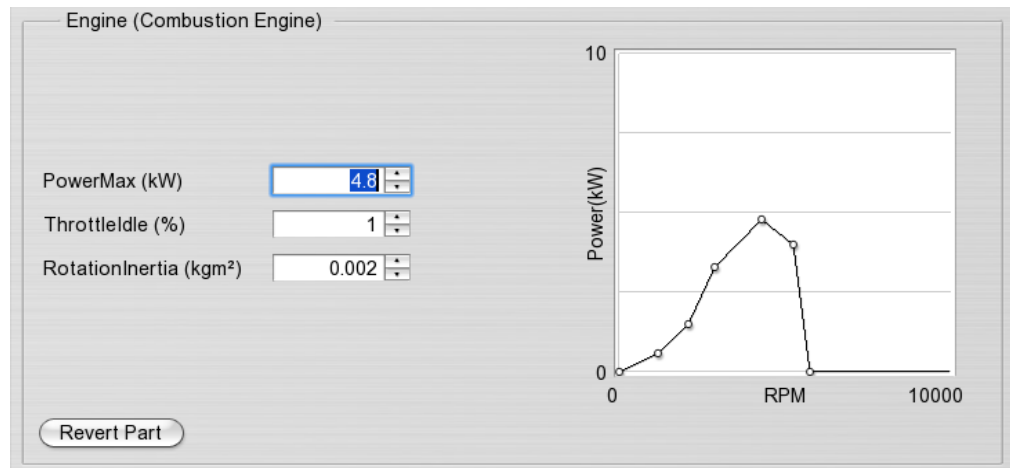
Throttle curve	In the case of a combustion engine, you can set up the throttle curve with the aid of a graph to meet your specific requirements (e.g. according to the data sheet of a real engine). The speed dependent power (RPM) is displayed. The torque curve is automatically generated as a consequence of the power curve.
	Click the control point in the graph and keep the left mouse button depressed to move it. Click on a free area of the curve to insert a new control point.
PowerMax	Maximum engine power in kW. The values of the power curve are automatically scaled if this value is changed.
ThrottleIdle	Idle setting
RotationInertia	Moment of inertia of the engine in kg m². The higher the values the slower the response of the engine.

Engine (Electric)

| Idle current	Idle current of the engine in ampere
Battery voltage	Battery voltage in volt
Specific RPM	RPM per volt
Resistance	Internal electric resistance
Brake	If this option is activated, the engine is short-circuited by the controller and brakes hard when the throttle is released. If the brake is not activated, the engine/propeller can continue to rotate driven by the force of the air stream and the braking impact on the model is increased.

Servo
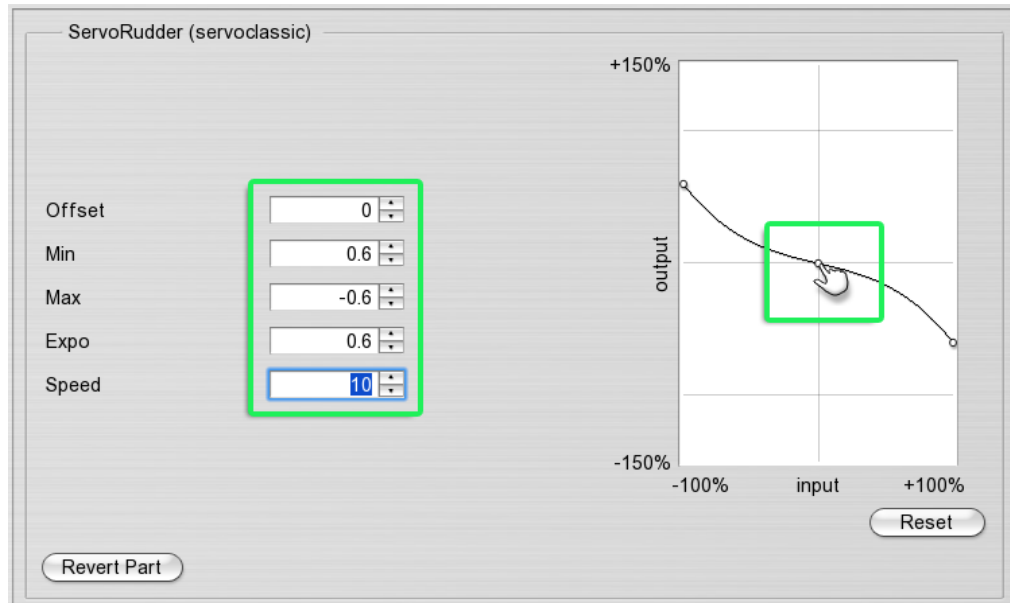
Offset   Sets zero offset

Min / Max   Maximum negative/positive deflection

Expo   Sensitivity round the neutral position.
                    Expo > 0 improves the controllability of smaller deflections
                    while maintaining the full extent of deflection.

Speed   The entire servo position is controlled in 1/speed seconds . Speed 10 therefore
                    means 0.1 second delay.

                    Simply set up the servo with the aid of the curve and move the
                    control points to the desired positions.

Note: Please note that output values from -150% to +150% are displayed. Normally, however only values up to +-100% should be used. In other words, a value of more than 100% throttle with a servo-motor is pointless.

Parts (Rigid Bodies)

In the case of simulation, the models comprise individual parts / rigid bodies. The weight, span and the position of the parts can be changed separately, if for example you wish to test the influence of the different weights of the wings on flight behavior. If you only want to change the total mass or the center of gravity of the model, refer to *„General Parameters" | „Overview"*.
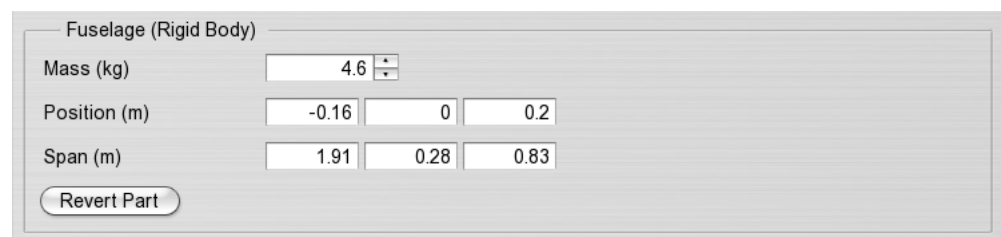
Weight   Weight of the individual part in kg. Please note that the settings only refer to
                    a single part. If you want to reduce the weight of the wings, you must change
                    the values for both wing elements.

Position   Centre of the component. The first value indicates the position along

the aircraft axis (positive front - negative back), the second value, the position along the transverse axis (positive left – negative right) and the third
value along the vertical axis (positive up – negative down).

Span   Span of the component along the longitudinal, transverse and vertical axis. This is used to determine inertia of the body wrt. rotations

Joints (only Edit Level Experts)

The individual parts are connected in the simulation by so-called spring-damper elements (Joints). You can set the stability and vibration damping of these connections under *Joints*. Normally, no changes are necessary unless you wish to soften e.g. the wing or the retractable gear characteristics.

The following applies to all parameters: The higher the set values, the more rigid a joint becomes and the more it is dampened. The values with the index 'x' refer to movements/ rotations along the longitudinal axes (front-back), those with the index 'y' and/or 'z' to movements / rotations around the transverse or vertical axis.

Note: The settings in this window can lead to numerical instability in the simulation and make the model unsuitable for use in particular, if the values are too high. In this case, reload the model with the default settings, (compare Paragraph 19.4).

JointFuselageLeftWing (Joint)	
Force x (N/m)	50000
Force y (N/m)	50000
Force z (N/m)	50000
Damping x (N/m/s)	200
Damping y (N/m/s)	200
Damping z (N/m/s)	200
Torque x (N/rad)	10000
Torque y (N/rad)	10000
Torque z (N/rad)	10000
Rot. Damping x (N/rad/s)	2
Rot. Damping y (N/rad/s)	2
Rot. Damping z (N/rad/s)	2
Revert Part	

Force   Spring force constant to prevent relative movement of parts

Damping   Damping of movement

Torque   Torsion constant to prevent relative rotation of parts

Rot. Damping   Damping of relative rotations

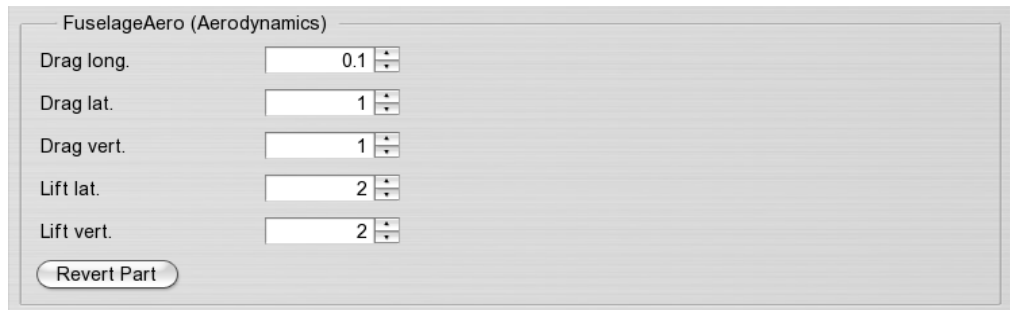## Wings / tail unit aerodynamics

StabilizerAero (Aerodynamics)

Span (m)	0.505
Area (m²)	0.169
PropwashPercentage (%	100

Revert Part

Span	Semi-span of each wing
Area	Area of each wing / each tail unit
PropwashPercentage	Influence of the propeller wind (wake/down-wash) on the area of the stabilizer :
	100% completely in the propeller wake
	0 % no influence of the propeller / outside propeller wake

Fuselage aerodynamics

FuselageAero (Aerodynamics)

Drag long.	0.1
Drag lat.	1
Drag vert.	1
Lift lat.	2
Lift vert.	2

Revert Part

Longitudinal drag	Drag coefficient (cd-value) in direction of flight
Lateral drag	Drag coefficient for lateral (left/right) air resistance
Vertical drag	Drag coefficient for air resistance from above or underneath
Lateral lift	Lift coefficient for lateral air resistance (e.g. knife-edge maneuver)
Vertical lift	Lift coefficient for air resistance from above or below

Wheel

FrontWheelHull (Wheel)

RollingFrictionCoefficien	0.02
BrakeCoefficient	1

Revert Part

RollingFrictionCoefficient	Rolling friction coefficient on smooth surfaces. Greater values reduce the models ability to move smoothly.
BrakeCoefficient	Force of the brake, only when the model is equipped with wheel brakes, otherwise this parameter has no effect.

Gear

Gear (Gear)
ReductionRatio   12.5
Efficiency (%)   100
FreeWheel   ☑
Revert Part

ReductionRatio	Reduction ratio of the gear '1 : this value'
FreeWheel	The gear is equipped with a free wheel function if checked
Efficiency	Efficiency coefficient of gear as a percentage

Rotor head

RotorHead (Rotorhead)
SwashplateRotation (°)   -0
CollectiveTravel (°)   12.032
CyclicTravel (°)   11.459
CyclicPaddle (%)   40
CyclicDirect (%)   50
Revert Part

Swash plate rotation	Virtual swash plate rotation
Collective	Maximum possible pitch travel, can be reduced by pitch curves in the helicopter mixer depending on the flight phases
Cyclic	Maximum cyclic pitch adjustment
CyclicPaddle	Cyclic pitch control by paddle(flybar) as a percentage
CyclicDirect	Cyclic pitch control by swash plate as a percentage

Gyro

Gyro (Gyro)
PirouetteSpeed   10
GainAngle   1
GainOmega   2
Offset   0.1
Revert Part

| Pirouette Speed | Pirouette speed. A value of 10 is equivalent to approx. 600°/ second. |
| GainAngle | Extent of reaction of the gyro to deviations from the set position and corresponding reaction of tail. If you enter zero, the heading hold function is deactivated. |
| GainOmega | Determines the force of the reaction to rotations. Set this value so that the tail |

	is not subject to vibrations.
Offset	Control value without corrections to the gyro. Ideally this value should be set so that the tail is kept stable when hovering without control inputs when both values for *Heading Hold Force* and *Damping* are set at zero. In this constellation, the gyro operates best.

Helicopter mixer

This is used to set the pitch and throttle curves for the three flight phases *Normal*, *Acrobatic* / *Idle Up* and *Autorotation*. Please note that the throttle curve is only used when the channel *Helicopter Engine* is set at *Automatic*, otherwise the engine will be controlled by the throttle channel of your remote control (compare Paragraph 12.2).
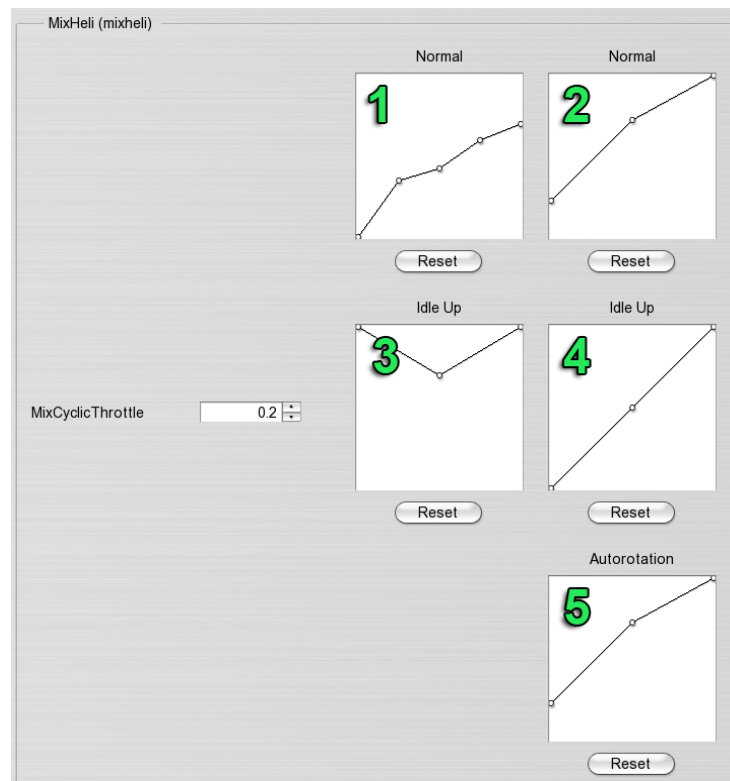
Throttle curve **(1)**	Throttle curve for the flight phase *Normal*
Pitch curve **(2)**	Pitch curve for the flight phase *Normal*
Throttle curve **(3**	Throttle curve for the flight phase *Idle Up*
Pitch curve **(4)**	Pitch curve for the flight phase *Idle Up*
Pitch curve **(5)**	Pitch curve for the flight phase *Autorotation*
Mix throttle cyclic	Mix throttle for cyclic deflections to compensate for the higher energy requirements

The horizontal position in the graphs is equivalent to the position of the pitch stick, the vertical position to the throttle values between 0% and 100% and/or the pitch values determined by the rotor head. If, for example, a +-12 ° pitch travel is defined for the rotor head, the top point in the graph is equivalent to +12 ° pitch and the lowest point is equivalent to -12 °.

21. Contact and Support

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For updates, patches and new models,

please visit our site

www.aerofly.com

There you will also find a discussion forum,
where you can contact other *aerofly5* users.