GREAT PLANES
MODEL MANUFACTURING COMPANY

REALFLIGHT® G2 GENERATION 2™
R/C SIMULATOR
WITH USB INTERLINK™ CONTROLLER

Includes instructions for
RealFlight Generation 2 with USB InterLink Controller.

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CHAPTER 1. INTRODUCTION

INTRODUCTION

Welcome to the RealFlight® Generation 2 R/C Simulator, the most advanced R/C aircraft simulation available. RealFlight G2 is so realistic, you'll hardly believe it's a simulation. Whether you're a seasoned modeling veteran, or an entry-level R/C-er, RealFlight G2 is the ideal way to learn to fly, practice maneuvers, feel the effects of design modifications, or just have an incredible amount of fun.

Adventurous modelers will enjoy RealFlight's incredible versatility--create custom trim schemes, design a flying site, or alter any of more than 500 adjustable aircraft parameters. If, however, you don't wish to do so, that's fine too. We've included 31 models that look and fly like the real thing, plus five different flying sites--each with its own characteristics.

More importantly, RealFlight G2 offers an amazing array of tools to help you understand how to use the program, and how to improve your R/C piloting skills. From extensive tooltips that explain every feature and option as you use it, to our Virtual Flight Instructor™ feature, to our extensive manual and technical support, *no other R/C simulator goes further to enrich your R/C experience*.

The following section briefly outlines some of the new features in Generation 2 (G2). This is especially helpful if you're upgrading from a previous version of RealFlight. If you don't wish to read the new feature summary, you can skip the following section and proceed to *"Chapter 2. Before You Begin" on page 5*. Subsequent chapters will describe all RealFlight features (new and old) in complete detail.

WHAT'S NEW IN GENERATION 2 WITH USB INTERLINK™ CONTROLLER

This section briefly outlines some of the new features included in RealFlight G2 with the USB InterLink Controller. You may want to read this section if you are upgrading from an older version of RealFlight, RealFlight Deluxe, or from a version of RealFlight G2 that did not include the USB InterLink Controller. RealFlight G2 and the InterLink Controller incorporate a significant number of enhancements and improvements over the previous RealFlight systems. If you are new to RealFlight, or

just don't want to read this section, you can proceed to the next chapter. Subsequent chapters will cover all of this material in complete detail.

First of all, we'd like to thank you for purchasing RealFlight G2. We think you will be enormously pleased with G2, which incorporates many of the features our users have most frequently requested over the years (plus a few others that we thought of ourselves!).

USB INTERLINK CONTROLLER

All RealFlight versions now come equipped with Great Planes®'s USB InterLink Controller by Futaba®. This revolutionary device brings you:

- A high quality, USB compatible, plug and play controller for RealFlight G2.

- A built-in interface for (optionally) using your own R/C transmitter for controlling RealFlight G2 (should you so desire).

- The InterLink Controller is fully *hot pluggable*—you can connect/disconnect the InterLink, or your own transmitter, without rebooting your computer (or even shutting down RealFlight G2).

- Higher speed response to control inputs.

- Digitally precise inputs for unmatched control precision.

MENU-DRIVEN INTERFACE

Upon starting G2, the first thing that you are likely to notice is the completely redesigned user interface. RealFlight now runs in a window (assuming your video card supports this option), and the interface is completely menu-driven. If, however, you like the full-screen look, you can recover this in G2 by removing the check mark from the "Run in Window" item in the Options menu. (In full-screen mode, press "ALT" or "ESC" to access the RealFlight menus.)

ADDITIONAL NEW FEATURES

- Incredibly realistic airplane and scenery graphics, using detailed, 24-bit textures.

- Fully editable airports. You can add, remove, move, resize, and reorient buildings and other scenery objects. You can add, remove, size, or seasonally color incredibly realistic trees and foliage. You can position, size and reorient runways (even over non-flat terrain)…and much, much more.

- You can now create and edit custom paint/decal schemes for your aircraft. (To create and edit color schemes, you must use a third-party software capable of editing ".tga" [Targa] files.)

- Multiplayer support. You can now fly with up to seven other RealFlight G2 users over the Internet, or over your Local Area Network (LAN).

- RealFlight now features five events: Limbo, Spot Landing, Pylon Racing, Autorotation and Freestyle. Each event features three distinct skill levels to challenge your flying capabilities. You can fly an event

alone, or against up to seven additional pilots using the multiplayer feature.

- RealFlight's new Virtual Flight Instructor feature gives you personal flying lessons from two R/C experts. These pros will help you learn and perfect maneuvers, regardless of your skill level.

- You can now create multiple, independent picture-in-picture viewports within the RealFlight display. You can size and reposition viewports using your mouse. Also, each viewport is completely independent and fully adjustable to suit your personal taste.

- Using RealFlight's new Advanced Flight Recorder™ (AFR) feature, you can record your flights to play back later. A recorded flight plays back as an animated plane in your airport. You can also share recordings with other RealFlight G2 users.

- On-screen "Gadgets" let you view continuously updated aircraft/radio data, or access RealFlight controls with a simple click of the mouse.

- Full collision detection. If you hit a building, your plane crashes. You can even collide with multiplayer or recorded aircraft.

- G2 has a wealth of new view options. For example, you can look at your aircraft, a fixed location, or at someone else's aircraft. You can easily adjust your viewpoint using your mouse. You can even store viewpoints and return to them later.

- If you so choose, RealFlight G2 can even simulate common types of flight failures (radio interference problems, stuck servos, etc.).

- Airplanes now have visible smoke and exhaust.

- All aircraft now feature moving control surfaces and retracts that visibly move (if applicable).

- G2's new Control Panel allows for easy, one-click updating and simplified technical support should the need arise.

We hope you enjoy these, as well as the various other new features, in G2. Keeping the "Tip of the Day" feature active serves as a great reminder about these new features.

And please, keep the suggestions coming! Great Planes and Knife Edge Software are continually enhancing RealFlight, striving to provide you with the most accurate R/C Simulator ever created.

CHAPTER 2. BEFORE YOU BEGIN

SYSTEM REQUIREMENTS

The system requirements below are what we consider to be the minimum PC configuration in which RealFlight G2 should be installed. Meeting the minimum requirements will allow you to still enjoy G2; however, in order to take complete advantage of the many features and functions offered by G2, you should have a computer at, or near, the specifications as listed under the optimum system requirements.

MINIMUM SYSTEM REQUIREMENTS

- Windows® XP*, 2000*, ME or 98

  * Local administrator access required for Windows XP or 2000

- Intel® Pentium® 300 or equivalent processor

- 64 MB RAM

- DirectX® 8.1 (or above) compatible video card with at least 8MB of RAM (Note that Voodoo I and Voodoo II cards are not supported because they do not allow you to run in a window or view a menu while full screen)

- DirectX 8.1 (or above) compatible sound card

- 500 MB hard drive space

- 4x CD-ROM drive

- Super VGA monitor

- USB port

SUGGESTIONS FOR OPTIMUM PERFORMANCE

In addition to the requirements above:

- Intel Pentium III 600 (or equivalent) and above processor

- Microsoft® Direct 3D compatible high performance 3D accelerated video card with 16 MB (or more) video RAM

- 16x CD-ROM drive

- 128 MB RAM

MULTIPLAYER REQUIREMENTS-

- Intel Pentium 450 or above

- LAN:IPX/SPX or TCP/IP protocol

- Internet: TCP/IP connection requires an Internet account and 28.8 kbps (or faster) modem

- 128 MB RAM

VIDEO AND SOUND CARDS

In order to achieve optimum performance and the ultimate satisfaction from RealFlight, there are two important components of your computer that deserve special attention: the video and sound cards.

While RealFlight will work well on a wide variety of hardware configurations, it offers many features that are designed to take particular advantage of the latest video technology. If you have an older computer, or a newer computer with a lower-end video card, you may want to consider purchasing a new video card to take advantage of these features. This moderately priced upgrade can vastly enhance your enjoyment of RealFlight. Aside from increasing your satisfaction with G2, a new video card will also work with many other games or simulators, improving their performance as well.

While not as important as a video card, upgrading your sound card may also improve your satisfaction with RealFlight. This is especially true if your computer uses an on-board sound card (that is, a sound card affixed to the motherboard.)

GETTING THE MOST OUT OF REALFLIGHT

We think you'll agree that for both beginners and experienced pilots, RealFlight offers the finest set of instructions and practice tools of *any* R/C simulator. Great Planes and Knife Edge Software are committed to the continual improvement of our products. When using the software, there are two things you should keep in mind.

First of all, similar to other pursuits, what you get out of RealFlight depends upon what you put in. Mastering radio control requires a great deal of patience and practice. If you crash an aircraft in the simulation, take it very seriously. Crashing an actual R/C aircraft can cost you a lot of time and money. Try to examine what you did incorrectly, using the experience to avoid making the same mistake again.

Secondly, while the simulator is quite realistic and will assist you in learning many of the skills necessary to become a proficient pilot, there is no substitution for actual

stick time. No simulator, no matter how realistic, can completely replace a qualified, experienced, human flight instructor. A simulation can be a wonderful practice tool. However, if you're new to R/C, you should never attempt to fly a real aircraft without the supervision of a qualified instructor, no matter how well accomplished you are on the simulator.

CHAPTER 3. GETTING STARTED

OVERVIEW

This chapter covers the installation procedure for RealFlight G2, describes the basics in running the program, and will introduce you to some of RealFlight's most often used features.

The first section, *Installing RealFlight Generation 2*, offers a step-by-step approach to the installation procedure for both the program software and the controller.

The second section, *Exploring RealFlight G2*, offers a brief tour of the RealFlight G2 program. You'll learn how to perform some basic functions, such as selecting the aircraft you wish to fly, performing simple edits to the flying field, manipulating viewports, and using the RealFlight's new Virtual Flight Instructor feature.

This chapter only touches on some of RealFlight G2's features. While reading the chapter is enough to get you acclimated to the program, you'll more than likely want to refer to subsequent chapters, which describe the various features in comprehensive detail.

INSTALLING REALFLIGHT G2

RealFlight G2 now comes equipped with Great Planes's RealFlight USB InterLink Controller by Futaba. The InterLink has two modes. By itself, it serves as a realistic "standalone" controller for RealFlight G2. Alternatively, it has a built-in interface that lets you use your own R/C transmitter to control RealFlight G2.

The USB InterLink Controller

To install RealFlight G2 using the InterLink Controller, follow the instructions in this chapter.

Whether you plan to use the InterLink Controller by itself, or with your own R/C radio to control RealFlight, you should first follow the instructions in *"Program Installation" on page 10.*

If you will be using your own R/C transmitter to control RealFlight (using InterLink Controller's built-in adapter), follow the installation instructions in *"Using Your Own R/C Radio to Control RealFlight (Optional) " on page 12.* If you do not plan on using your own R/C radio to control RealFlight, you can skip that section.

PROGRAM INSTALLATION

This section will explain how to install the RealFlight G2 program and the RealFlight USB InterLink Controller. When you finish this section, you should be able to fly aircraft, using the InterLink to control aircraft.

The InterLink's built-in transmitter interface also allows you to use your own R/C transmitter to control RealFlight G2. To do this, you will first need to follow the instructions in this section. Then, follow the directions in *"Using Your Own R/C Radio to Control RealFlight (Optional) " on page 12.*

UPDATE DRIVERS

Before you begin installation, we strongly suggest that you update the drivers for both the sound and video cards. A *driver* is a software program that your computer uses to control hardware devices. Each card has its own respective driver. Most problems with installing and using RealFlight, as well as many other programs that use DirectX, arise from outdated video and/or sound card drivers.

If you're not sure how to update your drivers, you can find instructions in article *Q01-1038, How to Update Drivers*, at http://www.gpsoftware.com/kb/q01-1038.htm.

That article will take you through the process step-by-step, and has links to driver download sites for most manufacturers.

START INSTALLATION PROGRAM

Once you've installed the new drivers, you're ready to install RealFlight G2. First, turn your computer "on" and close any applications you are running. Next, insert the RealFlight G2 CD-ROM into the CD-ROM drive. If auto-play is active, the RealFlight Control Panel will appear. Click the "Install RealFlight G2 CD" button located at the top of the Control Panel to begin the installation process.

If auto-play is not active, you will need to locate and run the program "SETUP.EXE" from the root directory of the CD-ROM. To do this, click the "Start" button on the Windows Taskbar, then select "Run" from the Start menu. In the "Run" window, type "d:\setup" and press [Enter] or click "OK" (assuming "d:\" is the designation for the CD-ROM drive). This should start the setup program.

RUN INSTALLATION PROGRAM

Follow the onscreen instructions, filling in information when queried by the setup program. When the setup program asks for your program serial number, use the RealFlight serial number as it appears on the rear side of the CD-ROM jewel case. When it asks for the InterLink serial number, use the serial number located on the rear side of the InterLink controller. These numbers must be entered exactly as they appear in order to proceed to the next phase of the installation process.

INSTALL DIRECTX

After the program has finished copying the necessary files, it will ask you if you want to install DirectX. If you do not meet the minimum DirectX version requirement as queried by the RealFlight program, click "Yes" to install this updated version of DirectX. It will not harm your computer to install DirectX more than once. Therefore, if you are unsure as to the status of this program we suggest that you install it at this time. When DirectX has been installed, click "Finish" to complete the Setup.

CONNECT THE INTERLINK CONTROLLER

Finally, plug the RealFlight G2 InterLink controller into a USB port on your computer (see diagram). On most computers, the USB ports are clearly labeled.

Note that the InterLink controller is *hot pluggable* or *hot swappable*. In other words, you can normally plug/unplug the controller without turning your computer off or rebooting.

While your InterLink Controller is plugged in, and your computer is turned "on", you should see a small amber light on your controller flash "on" and "off". This light, labeled "USB", indicates that the InterLink controller is connected and working.

RUN REALFLIGHT

To complete the installation and start the program, click on the RealFlight icon located on the desktop. RealFlight will guide you through the final installation steps, as well as the calibration of your controller.

You are now set up to run RealFlight G2, using the InterLink as a dummy transmitter. If you would like to use your own R/C transmitter as a controller, please read the following section, *"Using Your Own R/C Radio to Control RealFlight (Optional)"*. If not, you're ready to start using RealFlight. Proceed to *"Exploring RealFlight G2" on page 13*, which will walk you through the basics of using the RealFlight program.

USING YOUR OWN R/C RADIO TO CONTROL REALFLIGHT (OPTIONAL)

Follow these instructions if you intend to use your own R/C transmitter to control RealFlight G2. If you don't want to use your own transmitter, skip this section. Before reading this section, you should first follow the instructions in *"Program Installation" on page 10*.

CONNECT YOUR TRANSMITTER

You can use your R/C transmitter to control RealFlight G2 by connecting it to the InterLink controller, "buddy box" style (see diagrams). RealFlight G2 includes a cable and adapter for making this connection to many popular R/C transmitters.

First, locate the cable input port on the rear of the InterLink Controller. Plug one end of the included connector cable into this port. Next, the other end of the adapter cable must be plugged into the buddy box port (a.k.a. trainer jack) of your transmitter. The procedure for doing so depends on your transmitter:

- If your transmitter's buddy box port directly accepts the 1/8" stereo plug on the other end of the connector cable, plug this in. This works for JR® radios.

- If your radio takes a 6-pin DIN plug (like Futaba radios), use the short extra 1/8" stereo to 6-pin DIN adapter cable included with RealFlight G2 (see left panel of the diagram above).

- Some radios (*e.g.*, Airtronics®) require an optional adapter cable, which is not included with RealFlight. This optional adapter cable is available wherever you purchase RealFlight G2.

SETUP

After you have connected your transmitter, you will need to perform a setup procedure before you can proceed. The exact procedure depends on how you want to use your controller. *For more details, see "The InterLink Controller (Interface Mode)" on page 40.*

Once you have a controller set up (either the InterLink mockup controller or your own transmitter), you're ready to start using RealFlight. *You can now proceed to "Exploring RealFlight G2" on page 13,* which will walk you through the basics of using RealFlight.

EXPLORING REALFLIGHT G2

Now that you've installed RealFlight, it's time to begin exploring the program. The following sections will take you on a quick tour of RealFlight's most popular features, such as selecting an aircraft to fly, changing flying fields, customizing your flying field, using RealFlight's Virtual Flight Instructor, etc. Along the way, we'll show you where to go for help, or how to obtain additional information.

You'll want to read this section even if you are upgrading from a previous version of RealFlight. Most of the features described here are either new, or have been completely re-engineered for Generation 2 with InterLink Controller.

START THE PROGRAM

After installation, you should see a RealFlight G2 icon on your computer's desktop. First, close all open programs and windows (RealFlight performs best when it is the only program running, *i.e.*, not sharing resources with any other programs or applications.) Next, start RealFlight by double-clicking the RealFlight icon.

The first time you access or run RealFlight, you may be asked to calibrate your controller (follow the instructions as provided by RealFlight). Also, you will see a **"Tip of the Day"**. The **Tip of the Day** feature is a sequence of helpful tips, hints and facts about RealFlight that will enhance your enjoyment of the program.
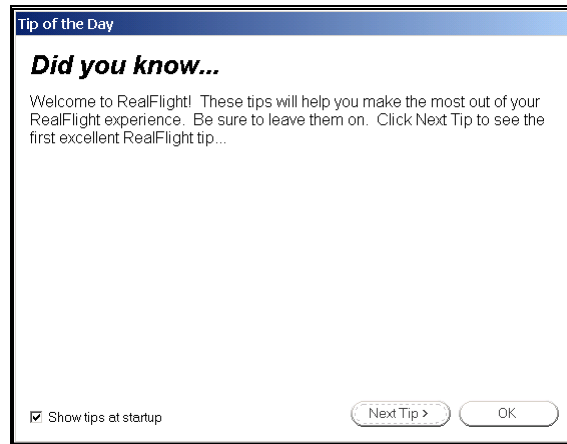
Normally, you will see a new tip each time you start RealFlight. If you wish, you can deactivate this feature by removing the check mark from the "Show tips at startup" box. If you turn **Tip of the Day** "off", you can turn it "on" again using RealFlight's **Help** menu.

We suggest leaving **Tip of the Day** active until you are better acclimated with the software and all that it has to offer. The tips will point out many great RealFlight features that you may not have noticed. For now, just click "OK" to close the Tip of the Day window and start flying.

THE REALFLIGHT MAIN DISPLAY

When you first run RealFlight, you should see a window like the one below (assuming your video card supports DirectX Window mode, most cards do).

You can move, resize, minimize, maximize and restore the RealFlight G2 main window just as you would any other application.

You interact with RealFlight using the **menus** in the main window's menu bar:

- **Airport**
- **Aircraft**

- **Events**

- **Options**

- **View**

- **Multiplayer**

- **Help**

If RealFlight has started up, but you don't see any window borders or menus, you may be running in **full screen mode**. **"Full screen mode"** means that the RealFlight main display will take up your entire monitor screen. If this is the case, you can access the menus by hitting your keyboard's "ALT" key or, alternatively, the "ESC" key. *For additional information about **window mode** and **full screen mode**, see* "Run in Window*" on page 106.*

Later in this manual, you'll find a separate chapter for each menu. These later chapters will describe, in detail, every single menu item and option. For now, though, we want to show you two aspects of the RealFlight user interface:

- How to navigate the menus and find out what the different commands do; and

- How to perform some of the most common tasks-- selecting aircraft and flying field, etc.

Menus, Tooltips, and Diagrams

Menus allow you to access RealFlight commands. To open a menu, click on its title (*e.g.*, **Aircraft**):

Menu Tool Tips

If you ever want to know what a menu item does, hold the mouse cursor over the item for several seconds. You will see a yellow popup window (called a **tooltip window**) that explains the item's function. For example, if you put the mouse cursor over the **Smoke Parameters…** item in the **Aircraft** menu, this is what you would see:
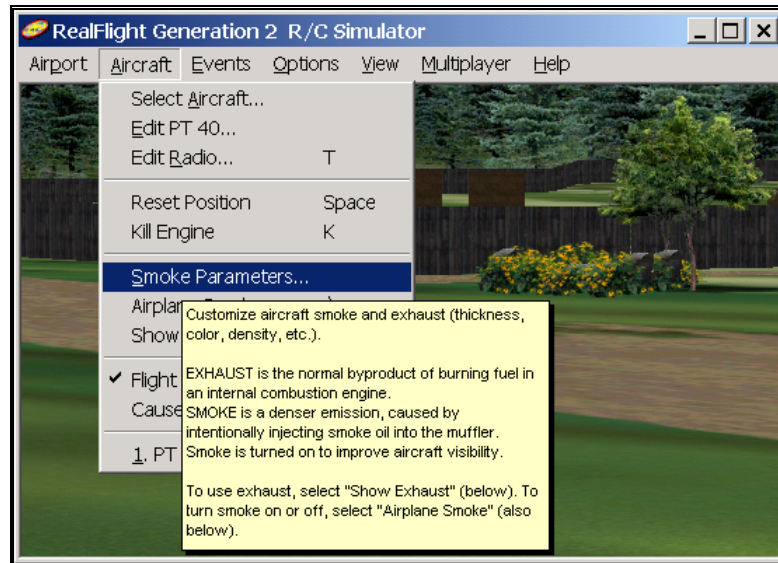
Dialog Tool Tips

Tooltips also work for RealFlight dialogs as well. If you see a RealFlight dialog, and want to know what a control (button, checkbox, etc.) in that dialog does, simply place the mouse cursor over the item until a tooltip window appears. For example:
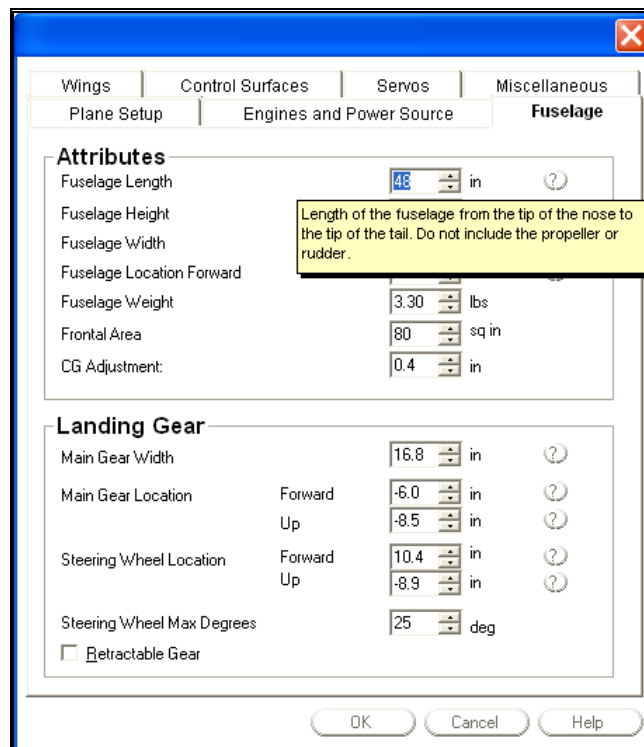
Diagram Tool Tips

In some dialogs, you will see buttons labeled with a question mark ("?"). For example, in the above dialog the **Fuselage Length** field has a "?" button.

When you press a "?" button, RealFlight will show you a diagram that will help you further understand what the item is for. For example, if you hit the "?" button next to **Fuselage Length**, you would see the following diagram:
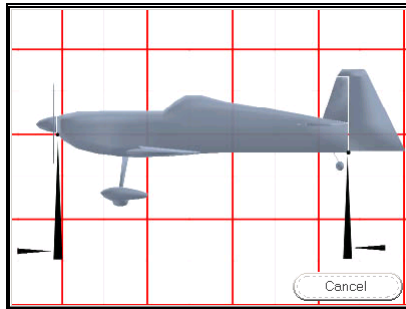
Now that you're familiar with the basics of the RealFlight user interface, let's perform some common RealFlight tasks.

CHOOSING YOUR AIRCRAFT

When you first open RealFlight, you will be flying a default aircraft. In the examples below, the default plane is a PT-40 trainer.

To change your aircraft, choose the "Select Aircraft…" menu item in the Aircraft menu:
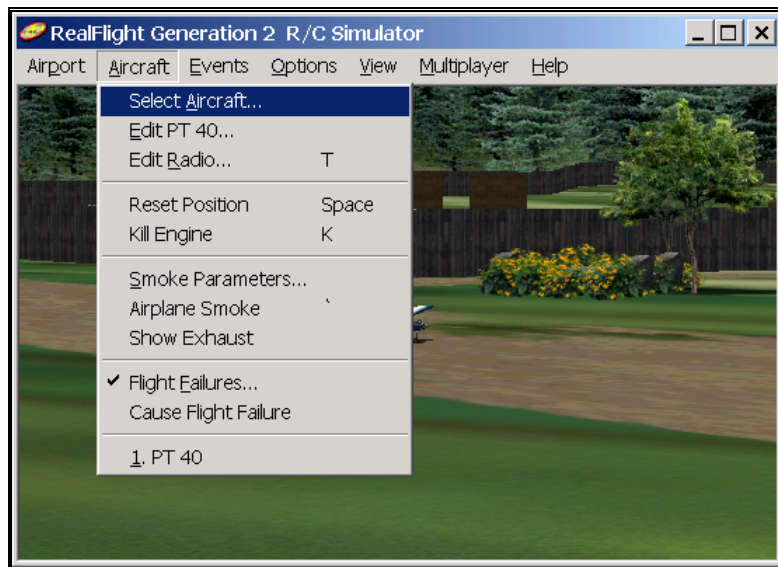
You will see a dialog that looks like this:
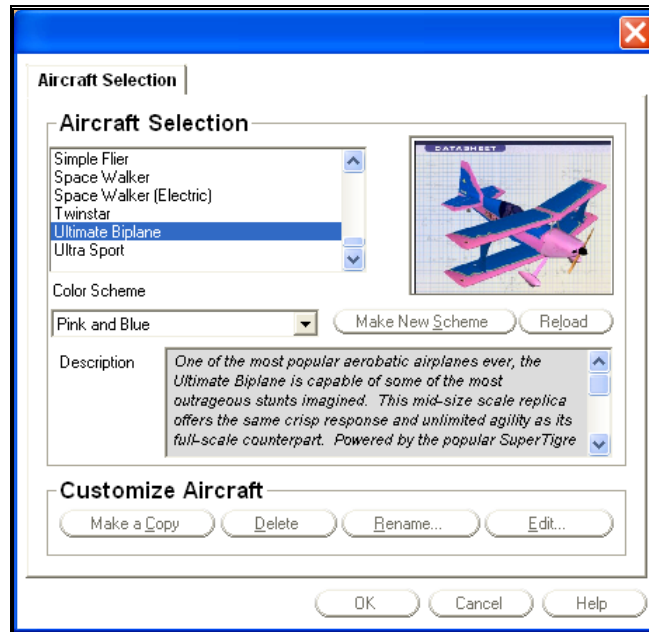
Pick the aircraft you want from the list in the upper left corner of the dialog (under "Aircraft Selection"). For example, to fly an Ultimate Biplane, scroll the list to find the Ultimate, and select it by clicking on the listing.

The list contains every plane and helicopter available to you. Whenever you select an aircraft, a picture of that aircraft appears in the preview panel to the right.

This list will also include any custom aircraft that you have created for a previous version of RealFlight.

This dialog also allows you to select a paint/decal scheme for your aircraft (or even create and edit a new scheme). See "Creating A Custom Color Scheme" on page 73.

When you have finished selecting a new aircraft, click "OK." The "Aircraft Selection" dialog will disappear, and you will return to the RealFlight main window, with your new aircraft loaded.

Most Recently Used Lists

RealFlight has several Most Recently Used lists (MRUs). These lists show you the recently used aircraft and airports. The various MRUs operate similarly. To see the Aircraft MRU, open the "Aircraft" menu again, and look at the last two items:
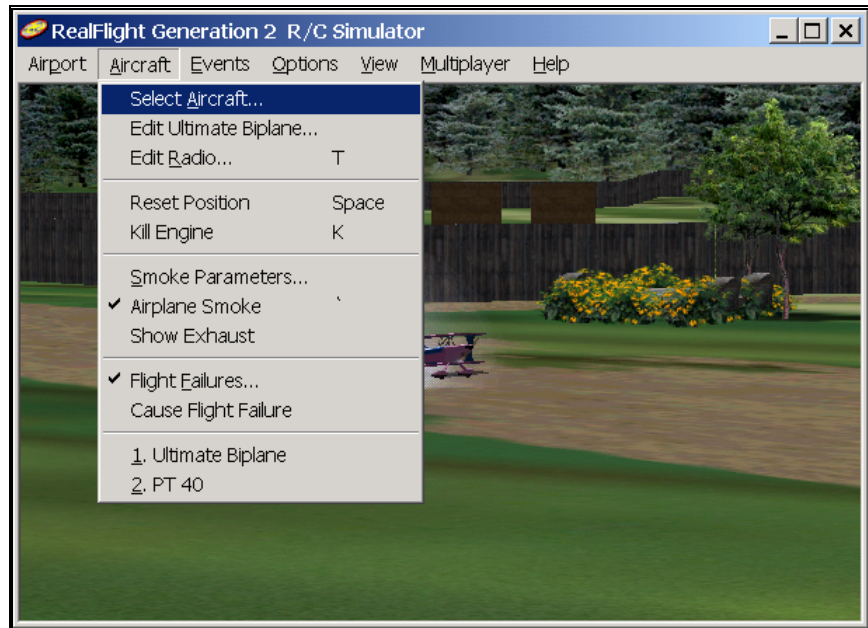
Your current aircraft (Ultimate Biplane) is now the next-to-last item in the menu, and your previous aircraft (the PT-40) is now the last item. If you want to return to flying the PT-40, you can use the "Select Aircraft…" item, or you can just select "2. PT-40" from the Aircraft menu.

The Aircraft menu will list your four most recently used aircraft. To reload a previously flown aircraft, simply select it from the list.

CHANGING AIRPORT

To change airports, click on the **Select Airport…** item in the **Airport** menu. You will see the following dialog:

Select the airport you want from the list at the top of the box. For example, to switch from "Green Valley" to "Rainbow Canyon":

- Select "Rainbow Canyon" from the list; and

- Click "OK."

RealFlight will load the new airport.

The **Airport** menu will display your most recently used airports, in the same way the **Aircraft** menu displayed the most recently used aircraft:
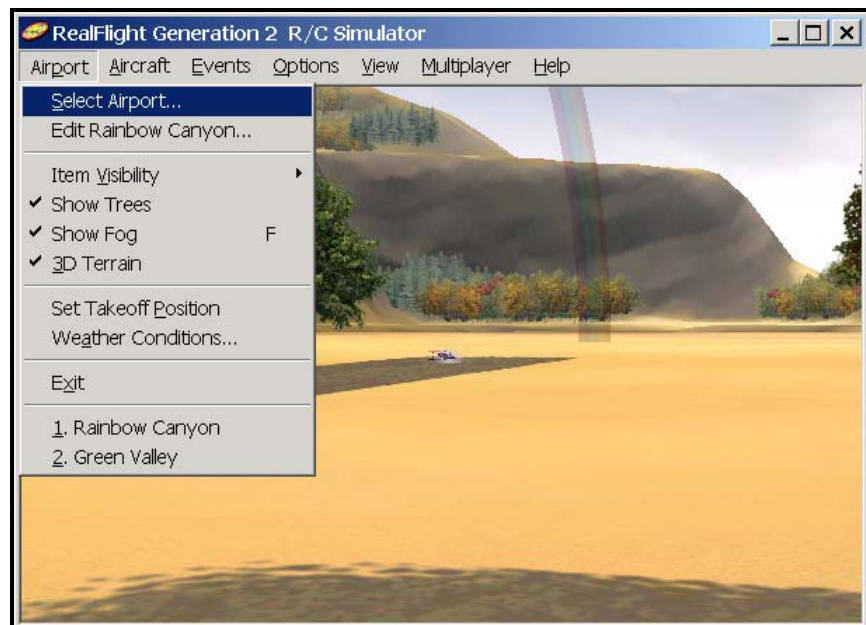
If you want to return to Green Valley, just select it from the list at the bottom of the menu.

SOME COMMON TASKS

- To reset your aircraft to its original takeoff position, select "Reset Position" under the "Aircraft" menu. Alternatively, you can also press your keyboard's space bar.

- To turn airplane smoke "on" or "off", select "Airplane Smoke" from the "Aircraft" menu. Alternatively, you can hit your keyboard's "`"(accent) key.

- To zoom in on an aircraft, select "Zoom in" in the "View" menu. Alternatively, press your keyboard's F2 key. Repeat to increase the zoom level further. Use F3 to zoom back out; use F1 to reset to the default zoom level.

- To set your viewpoint using the mouse, select "Pilot in Fixed Position" in the "View" menu. When a submenu appears, select "Set with Mouse." Then, move your viewpoint towards or away from your aircraft by sliding the mouse forward or back. Circle around the aircraft by moving the mouse sideways. Move your viewpoint up or down using the mouse wheel. Alternatively, if you don't have a mouse wheel, hold the right button down and slide the mouse forward or back.

CREATING A VIEWPORT

RealFlight allows you to create multiple, independent, picture-in-picture viewports.

For example, suppose you wish to create a viewport that has a cockpit, pilot-in-aircraft view. Under the **View** menu, select **Create New View**. A new viewport will appear in the RealFlight main window. Click on the new viewport to select it, then, under the **View** menu, select **Pilot in Aircraft**. You should see something like this:

The inset view now shows the view from the plane's cockpit.

You can add as many viewport windows as you wish. You can adjust the viewpoint, zoom level, view direction, etc. of each viewport completely independent of the others. (Please note, adding more windows requires additional computer power Consequently, there will be a practical limit to the number of windows you can add without negatively impacting your computer's performance while using RealFlight.)

- To move a viewport around the RealFlight main window, drag the viewport's title bar.

- To resize a viewport, drag the viewport's border.

- To remove a viewport, click the small red "X" on the viewport's title bar.

- To set options for a viewport, click the small red circle on the viewport's title bar.

USING GADGETS

RealFlight G2 comes with several **Gadgets** that you can display in your main window. A *Gadget* is an onscreen display that provides helpful information, or allows you to control RealFlight features using a mouse click.

For example, the NavGuides™ Gadget displays continuously updated information about your aircraft's altitude, distance above ground, speed, heading, etc. To display the NavGuides Gadget,

- Open RealFlight's **View** menu.

- Select **Gadget**.

- When a submenu appears, select **NavGuides.**

When you select NavGuides, you should see the NavGuides Gadget appear on your screen:

Like viewports, it is possible to:

- close any gadget by clicking the red "X" on the gadget's title tab;

- move any gadget by dragging its title tab;

- edit a gadget's properties by clicking the red circle on the title tab; or

- resize some gadgets by dragging the edge of the gadget.

To display any of the gadgets select them from the **View: Gadgets** submenu.

VIRTUAL FLIGHT INSTRUCTOR

RealFlight G2's Virtual Flight Instructor provides you with private flying lessons from an industry professional.

To start a lesson, select **Virtual Flight Instructor** located in the **Options** menu. When a dialog appears, select the lesson you want to view.
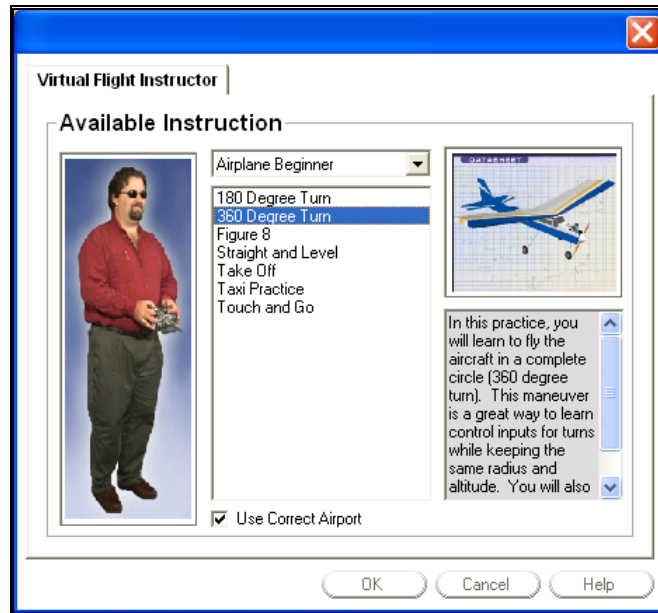
Click "OK", and RealFlight does the rest. You will see the instructor's aircraft fly the maneuver. You'll hear the instructor's voice, explaining how it's done. You can watch the instructor's actual stick movements using an onscreen, digitized R/C radio.

You can even fly your own plane next to the instructor's! This allows you to mimic the inputs and aircraft reaction simultaneously.

To watch the instructor fly, close all your viewports before you begin the lesson. Close a viewport by clicking the red "X" in the viewport title tab. The main window will show the instructor's plane. The onscreen radio will show the instructor's stick movements.

To simultaneously watch your aircraft and the instructors, leave one viewport window open when you start the lesson. The viewport will show the lesson and the main view will show your aircraft. If you click on the viewport, the onscreen radio will show the instructor's stick movements. If you click on the main window, the onscreen radio will show your stick movements.

If the instructor's aircraft seems to disappear under or behind hills, buildings, etc., then the instructor "taped" the lesson at a different airport than the one you are flying at. Try changing to an airport with flat terrain and relatively few obstructions. We suggest "Rainbow Canyon" as it works well for this purpose.

AIRPORT EDITING

RealFlight G2 allows you to completely customize your flying fields. You can add, remove, orient, or resize scenery items (buildings, fences, etc.) You can position and orient ground objects (such as runways) that "wrap" to the terrain—you can even have a runway running up a hill! You can add, remove, size, or position trees and foliage. It's even possible to control lighting, terrain, clouds, fog/haze, and much more. You have almost unlimited freedom to create the flying environment you want. And when you've created an airport, you can share it with other RealFlight users.

If you want to learn more about airport editing in RealFlight G2, please read "Edit (Current Airport)..." on page 51. For now, this section will get you started by

walking you through a simple airport edit. The following example will show you how to add a barn to the "Green Valley" airport.

Step 1. Open the Airport Editor

If your airport is not currently set to "Green Valley," please select "Green Valley" now.

In the **Airport** menu, select **Edit Green Valley…**. (You can only edit the current airport, so the name of this item changes when you change the current airport.)
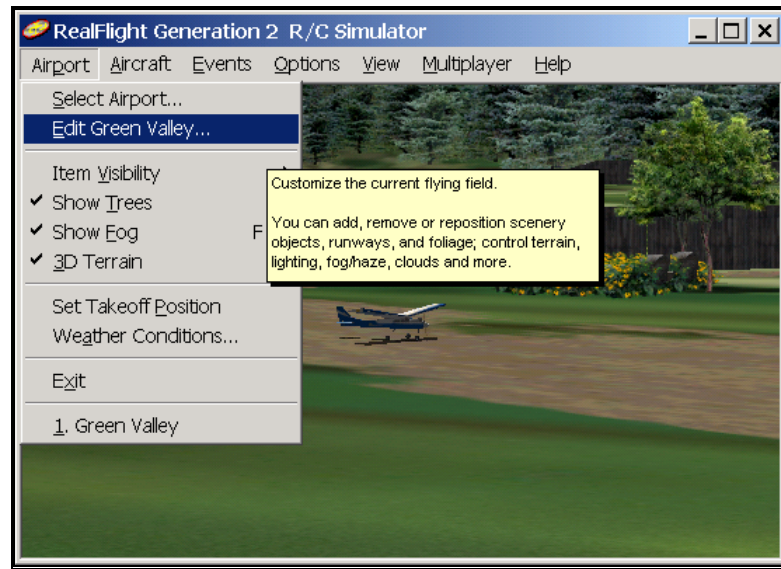
When a dialog appears, select the **Airport Editor** page. You should see the following dialog:
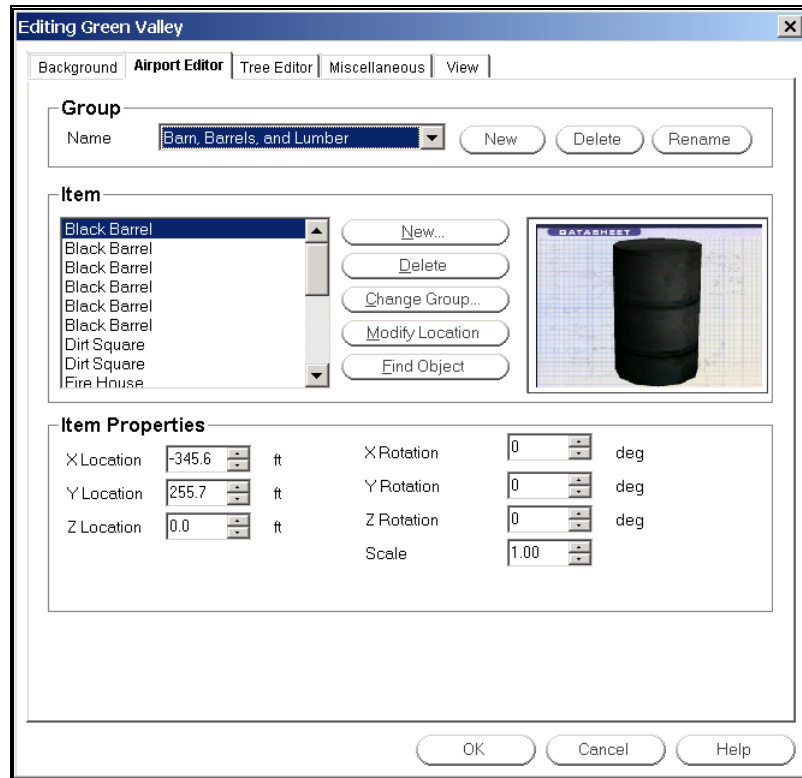
Step 2. Select a Group

RealFlight G2 places every scenery object into a **group**. You don't *see* groups in your airport; you only see scenery objects. A group is simply a means of sorting scenery objects into various categories, to make it easier to edit an airport with many objects. You may have many different groups in your airport, or just one group if you prefer.

To add a scenery object such as a barn, you first must pick a group to place it in. In this example we will add a barn to the group titled **"Barn Barrels and Lumber."**

First, select the group **Barn Barrels and Lumber** from the list at the top of the dialog. This is the list in the **Group** category at the very top of the dialog (see diagram above).

Step 3. Add an Object

Now it's time to add the barn. Click the **New** button in the **Item** category (see diagram above). (Don't confuse this with the **New** button in the **Group** category, which creates a new group.)

When you click **New**, you should see this dialog:
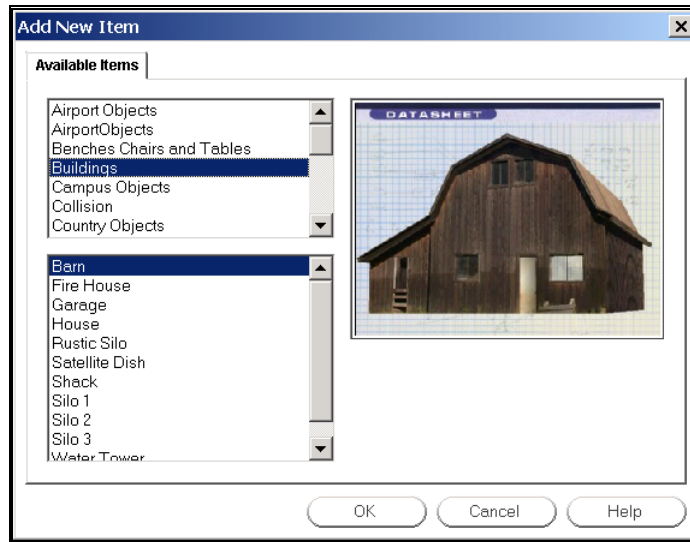
The top list has categories of objects you can add. Select **Buildings** from this upper list. Then, select **Barn** from the lower list. (Please note: "Green Valley" already has a barn; you will be adding a second barn to the landscape.).

Click **OK** to add the barn.

Step 4. Position the Object

When you click **OK**, you will temporarily return to the RealFlight main window. You should see the new barn, highlighted by bright yellow markers.

Move your mouse back and forth to position the barn accordingly. When the barn is located in the place you want, click the left mouse button to "lock" the barn into that position. When you do this, RealFlight will return you to the **Airport Editor** page.

At that time, you can "tweak" the barn's position, orientation, size, etc. by using the **Item Properties** controls at the bottom of the Airport Editor page (**X Location**, **Y Location**, **Scale,** etc.). The best way to determine the function of these controls is to experiment with each one.

To edit any other scenery object, select it from the list of items (on the left side of the **Item** panel in the **Airport Editor** page). Then, use the respective buttons (**New**, **Delete**, **Change Group**, etc.). For example, to move an object, select it on the list and click **Modify Location**. You will temporarily return to the RealFlight main window, where you can position the object using your mouse.

When you have finished editing airport objects, click **OK** in the **Airport Editor** to finish and return to flying.

Step 5. (Optional) Copy Your Airport

In the previous sections, you edited an airport (Green Valley) that comes on the RealFlight CD. In fact, RealFlight will allow you to edit any airport on the program or Add-On CDs. You can undo any of your editing (that is, revert back to the original version of the airport) by clicking the **Revert** button in the **Airport Selection** page (**Airport** menu, **Select Airport…**).

Directly editing the default airports is fine if you are only making minor changes (like adding a barn). If, however, you plan on extensive airport editing, and especially if you plan on sharing airports with other RealFlight users, you will

probably find that you want to create new airport files to edit. In RealFlight, you create a new airport by copying an existing one.

Let's make a copy of Green Valley. First, open the **Airport Selection** page (in the **Airport** menu, click on **Select Airport…**). When the page appears, select "Green Valley" from the list at the top of the dialog. Then, click the **Make a Copy** button:

When you click **Make a Copy**, you will be prompted for the name of your new airport. You can use any name you like, as long as you don't currently have another airport with the same name. In this example, you may want to call your new airport "Green Valley copy 1":
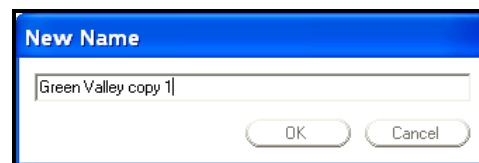
When you have named your new airport, click "OK" to return to the **Airport Selection** dialog.

It's that simple—you have now created a new airport. To use or edit the new airport, you must *select your new airport ("Green Valley copy 1") from the list at the top of the Airport Selection dialog*. This makes "Green Valley copy 1" your current airport.

Finally, click **OK** to return to the RealFlight main window.

You can now edit "Green Valley copy 1" any way you want. In fact, it might end up looking vastly different from the original Green Valley. Since you are keeping your new airport and the original Green Valley in separate files, you can fly either airport whenever you want.

WHERE TO GO FROM HERE

The examples in this chapter only scratch the surface of RealFlight G2's capabilities. You can fly with others over the Internet, try your hand at Limbo, customize your aircraft's parameters, and much, much more. We encourage you to explore RealFlight using some of the methods below.

- You may want to browse the menus, pausing the mouse cursor over each item to read the tooltips. This gives you a good overview of the RealFlight commands.

- Keep the 'Tip of the Day' feature active until you have read through all the tips at least once. Tip of the Day describes many features that you may have missed.

- If you'd like to learn more about a particular menu or item, look it up in this manual's table of contents.

- If you'd like RealFlight to do something, but can't find an appropriate command, check this manual's index.

- Use the Help facilities in RealFlight's "Help" menu.

- Talk to other RealFlight users. When you visit http://www.knifeedge.com, check out our chat room and discussion board.

CHAPTER 4. USING REALFLIGHT G2

INTRODUCTION

Chapter 3 took you on a brief tour of some of RealFlight's most popular features. This chapter will provide you with a broad overview of all RealFlight features, and advise you how and where to find detailed information about the features that most interest you.

PROGRAM FEATURES

SUMMARY OF FEATURES

- **Generation 2 (G2) graphics technology** – RealFlight G2 takes complete advantage of today's state-of-the-art 3D accelerated video cards, providing the smoothest and most realistic flight experience possible. RealFlight uses incredibly detailed, 24-bit textures on aircraft, trees, buildings and landscape to add to the authenticity.

- Uses **VirtualRevolution™** sound technology-- Doppler-correct stereo sounds heighten the realistic effect with true sound recordings of 2-stroke, 4-stroke, turbine, electric, ducted fan and gasoline engines. And as the aircraft crosses the field, the engine sound follows, just like its R/C counterpart. Aside from the various ambient noises such as other pilots conversing and birds chirping, RealFlight includes numerous CD-quality soundtracks in a variety of musical styles and original compositions.

- **RotoSonics™** technology-- recreating distinctive engine/blade sounds with startling accuracy. Sounds so lifelike, you'll swear you are at the field!

- Uses **RealPhysics™** technology-- True to the physics of flight, RealFlight's exclusive RealPhysics technology performs hundreds of thousands of floating point operations each second. RealPhysics delivering sizzling real time flight performance and accuracy. And, with over 200 editable airplane parameters and 300+ heli parameters,

RealFlight enables you to alter almost any physical characteristic of the aircraft, and immediately view the effects on flight characteristics.

- **VFI (Virtual Flight Instructor) --** VFI gives you personal flight lessons from two of the R/C industry's leading experts. Using VFI, you can select a maneuver (i.e. loop, roll, etc.) from an extensive list. VFI then demonstrates the maneuver onscreen, performed by an expert. While you watch, the voice of the pilot/instructor will explain how to perform the maneuver. You can even watch your instructor's control stick movements in real time to determine proper stick input! If you want, you can fly your own aircraft right alongside the instructor's aircraft, mimicking the instructor's control inputs.

- **AFR (Advanced Flight Recorder) --** This feature allows the pilot to not only view prerecorded maneuvers, but also to record maneuvers of his/her own as well. Much like a VCR, this feature also allows you to: pause, speed up, slow down, and loop the performance. You can also play multiple recordings at the same time. The pilot has the option to activate the digitized transmitter display so that he/she can view the radio input while flying.

- **ATE (Advanced Terrain Editor)™ --** Design your virtual flying field, in any manner that you wish. Position the runway, add more trees, a house, and a garage, intersperse trees and foliage, add benches and tables, etc. Each of the objects may be located wherever the pilot sees fit. You can re-create your own flying field, or create the field of your dreams. And, you can share your airports with other RealFlight G2 users.

- **Collision Detection--** G2 allows you to activate collision detection for all scenery objects in your airfield. When you activate collision detection, your aircraft will crash when it "bumps" any of the objects.

- **NavGuides and Advanced NavGuides--** Using the NavGuides, you can display any of almost 100 heads-up onscreen informational displays. Options range from altitude and airspeed, to control surface deflection and engine rpm, and virtually everything in between. While you can't do this with a real R/C aircraft, this feature improves you ability to "see" what is going on in your virtual world.

- **Viewports-** You can open up multiple picture-in-picture displays (number is only limited by the capability of your CPU). These can be used for viewing other pilots, multiple viewpoint perspectives on their aircraft, looking at the runway, and more. Each viewport is treated as an independent "window on the world"; each viewport's vantage point, zoom level, direction of view, etc. can be individually adjusted.

- **Multiplayer—**You can fly with up to seven additional RealFlight G2 owners in competitions, or just for the thrill of flying with one another. This feature can also be used to learn new maneuvers from pilots across the street or around the world.

- **Events-** Compete solo, or fly with up to seven additional RealFlight G2 owners in a variety of events such as: Limbo, Spot Landing, Freestyle, Auto-rotation and Pylon Racing.

- **Control Panel--** RealFlight G2's Control Panel allows for easy one-click program upgrading, online registration, and technical support.

- **Animated control surfaces and retracts—** Control surfaces, retracts, propellers, and rotor blades move for added realism.

- **Aircraft exhaust/smoke—**You can control the color, density, "hang time", etc. of airplane and helicopter smoke and exhaust.

- **Flight Failures--** RealFlight can simulate many common flight failures (radio interference, stuck servos, engine failures, etc.). Use this feature to prepare for emergencies at the field.

- **Slow/fast motion effects—**You can adjust RealFlight to run in slow or fast motion.

- **Fully editable aircraft paint/decal schemes—**Customize trim schemes for your aircraft so that they look the way you want. (To design your own paint scheme, you must use a third-party program that edits ".tga" files.)

- **Fully editable keyboard mapping—**You can set almost any key on your computer keyboard to execute almost any RealFlight command.

- **Extensive Help materials--** RealFlight G2 features extensive online tooltips and diagrams, a detailed manual, and technical support to enhance your enjoyment of the program.

WINDOWS XP, 2000, ME AND 98 COMPATIBLE

RealFlight G2 is a native 32-bit program, designed for Windows XP/2000/ME/98. It uses Microsoft's DirectX 8.1 to provide cutting-edge graphics realism.

CUSTOMIZABLE AIRPORTS

RealFlight G2 offers you unprecedented freedom in designing your own airports. And with our new G2 graphics, your airports look more realistic than ever before. *Your imagination is the only limit.*

- Select scenery objects buildings, telephone poles, fences, etc. from a large collection of high-quality, textured models.

- You have complete freedom to insert, remove, move, rotate and size scenery objects.

- You can insert, remove, move, resize and seasonally color incredibly realistic trees and other foliage.

- You can set lighting to midday or late afternoon, adjust fog from light haze to pea soup, color clouds, etc.

- Use as many runways as you want, positioned and oriented the way you want. You can put a runway *anywhere*—even up the side of a hill!

GRAPHICS

- Supports Gouraud shading, bilinear textures, and dithering.

- High quality 3D objects that you can situate anywhere you wish.

- Realistic shading on all objects, including the airplanes and helis.

- Transparency. RealFlight uses transparency to model the rotor blades of the helicopter, the airplane propellers, exhaust and smoke from the aircraft, aircraft canopies, and atmospheric effects such as rainbows.

- High-resolution graphics, including visible panel lines and moving control surfaces, for added realism and authenticity.

- Optimization-- G2's Graphics Optimization sliders allow the user to customize the resolution of the textures, the graphics, and the terrain independently to achieve the most realistic look and "feel" for the simulation. The controls also allow the user to tailor the program to optimize the performance to his/her PC.

- Airplanes feature moveable control surfaces such as: ailerons, elevators, rudders, etc., as well as movable props, rotors and retracts. These add to the authenticity.

SOUND

- Employs Doppler-correct VirtualRevolution sound technology, heightening the realistic effect with true recordings of a variety of power plants throughout their RPM range. The recorded power plants include everything from 2-stroke and 4-stroke engines to actual turbines.

- RotoSonics creates realistic helicopter sounds, accurately modeling the sounds of auto-rotations as well as other aggressive maneuvers.

- CD-quality soundtrack features a variety of musical styles and original compositions; includes ambient sounds typically heard at flying sites.

- Doppler-correct stereo effects. As the aircraft crosses the field, the engine sounds follow; just like its R/C counterpart.

- RealFlight G2 even allows the user to import MP3 music files of your choice into the program. Not only does this allow the user to listen to music of his/her own choosing, it also enables him/her to practice synchronized maneuvers if desired. This is perfect for practicing freestyle maneuvers, such as those often found in competitions.

PHYSICS

- The exclusive RealPhysics technology calculates hundreds of thousands of floating point operations each second, delivering sizzling real time flight performance and unmatched accuracy.

- RealFlight's physics have undergone countless of hours of testing and revisions to ensure that the models not only have a lifelike appearance but also perform just like their r/c counterparts as well.

- RealFlight G2 features detailed collision detection. Fly your heli around inside the barn, but don't touch the walls!

CUSTOMIZABLE AIRCRAFT

- Create and save your own aircraft descriptions and parameters.

- Simple "point-and-click" menus for modifying parameters; eliminates the need for difficult calculations. Extensive tooltips and diagrams to guide your customization.

- Radio editing supports almost unlimited mixing possibilities.

- Select either metric or SAE measurements.

- Over 200 editable parameters for the airplanes and over 300 editable parameters for the helicopters.

- Create customized trim schemes using third-party bitmap editors. (Third-party software must be capable of editing Targa ["·tga"] files.)

CONTROLLER FEATURES

All versions of RealFlight G2 come with Great Planes's USB InterLink Controller by Futaba. This revolutionary controller brings you:

- Full USB compatibility. The InterLink Controller plugs directly into your computer's USB port with little, if any, additional setup required.

- Use the controller by itself as a high quality "mockup" R/C radio for controlling RealFlight G2. Realistic transmitter features include a three-position switch, rotary knob and adjustable stick length.

- Or, use your own FM or FM compatible, 4-10 channel R/C radio transmitter to control RealFlight, using the InterLink Controller's built-in interface.

- High-speed data transfer ensures rapid, digitally precise response to your control input.

- Hot pluggable—connect/disconnect your InterLink controller without shutting down or rebooting.

GRAPHICS AND SOUND QUALITY

The makers of RealFlight continually work to bring you the most realistic graphics and sound possible, since we feel that these are important contributions to your simulation experience. To do so, we take full advantage of modern video and sound hardware. However, we still provide you with extensive, detailed control over graphics and sound quality, so that you can usefully run RealFlight G2 on computers with widely varying speed, power and performance.

FRAME RATE

Frame rate is usually described as how fast the computer can compute and display a new "snapshot". In other words, it is the rate at which **frames** (the individual pictures that are shown in sequence to create the illusion of motion) are displayed in a film or video. Frame rate is measured in frames per second (fps). Like a movie picture, when stills are quickly flashed by, RealFlight creates a sequence of frames that provide the illusion of motion. Television is flickering the pictures at 30 times

per second (30FPS). A typical movie theater displays about 24/48FPS. RealFlight can produce output ranging from 2FPS to over 150FPS.

Frame rate is a function of many things and cannot be "set" by the end user. It is a combination of:

- Computer Speed

- Video card speed

- Sound card speed

- How many optional airport items are selected

- 3D technology selected

- Aircraft selection

In order for the simulator to work best, you should run at a high enough frame rate so that you do not notice the picture moving from one frame to the next. Rather, it should appear as a smooth, fluid motion. If you observe any "stop-and-go" motions from the simulation, there are several things that may improve the frame rate. *For more information, please see "*Improving RealFlight G2 Performance*" on page 275.*

GRAPHICS QUALITY

RealFlight is capable of many different levels of graphics quality, some of which are entirely dependent upon the video hardware and monitor used. RealFlight Generation 2 allows you to control a multitude of graphics variables in order to configure the simulation to attain the highest possible performance. You can control these variables using either the "Graphics Optimizations" or "Direct3D" items in the Options menu.

SOUND QUALITY

In order to use your sound card with RealFlight, the sound card must support Microsoft's DirectSound. Many sound cards accelerate the mixing of multiple sounds. RealFlight will take advantage of any acceleration that the card supports. This acceleration will free up your CPU, thereby increasing your frame rate.

TECHNICAL SUPPORT

Besides providing the best R/C simulator, we sincerely feel that we provide the most extensive product support for any R/C simulator. Since cards, drivers, operating systems, etc. are always changing, we work hard to keep our support up to date on the latest issues and problems RealFlight G2 users might encounter.

We provide a wide variety of sources for information, help and advice about installing, using, and resolving problems with RealFlight G2 (as well as our other software products). These sources range from a detailed, publicly accessible product knowledge base, to live technical support, to peer chat and message boards. Should you encounter any problems with RealFlight G2, you can access any of these sources, many with a click of the mouse or telephone call.

To learn more about RealFlight G2's many support options, please see "Appendix C. If You Experience Difficulties With RealFlight G2…" (page 271).

CHAPTER 5. THE INTERLINK CONTROLLER

THE INTERLINK CONTROLLER—DESIGNED FOR R/C

By definition, the R/C transmitter is a key component in all types of R/C flying. This unique method of control is part of what separates R/C from every other type of aviation. Consequently, a realistically simulated transmitter is an important key to an authentic simulation of the R/C experience.

With this in mind, we at Great Planes are proud to offer our revolutionary USB InterLink Controller, made by Futaba. All versions of RealFlight now come with this state-of-the-art control system. We've designed the InterLink from the ground up to meet the needs of the R/C purist. We believe that no other R/C simulator control method goes farther to enrich your R/C simulator experience.

The controller is so unique that it is Patent-Pending.

The InterLink Controller

Features of the InterLink Controller:

- **USB compatibility and convenience**. The InterLink offers the "plug and play" convenience, "hot pluggable" installation and removal, as well as the high-speed digital performance made possible by Universal Serial Bus (USB) technology.

- **High quality "mockup" transmitter**. Use the InterLink Controller by itself as a pseudo R/C transmitter, with the controls you expect in a standard FM 8-channel radio. The mockup transmitter features two two-positions switches, one three-position switch and a rotary knob, knurled control sticks with adjustable length.

- **Built-in Transmitter interface**. If you so choose, you can use your own FM or FM-compatible R/C transmitter to control RealFlight, using the InterLink Controller's built-in interface. You can even switch back and forth between the pseudo controller and your own transmitter!

- **Easy setup and use**. In most cases you don't even have to calibrate the InterLink Controller, unlike other computer joysticks. Simply plug it in and go!

- **Simulate sophisticated computer radios**. The InterLink, used in conjunction with RealFlight, allows you to simulate the programmability (mixing, exponential, etc.) of sophisticated computer radios.

The following sections describe how to set up and use the InterLink controller with RealFlight G2. *If you want to use the InterLink as a mockup controller, see "The InterLink* Controller (Joystick Mode)*" on page 40. If you want to use your own R/C transmitter with RealFlight, you'll want to read "The InterLink* Controller (Interface Mode)*" on page 40.*

Finally, this chapter concludes with a collection of pointers and advice that will help you get the most out of your InterLink Controller *("InterLink Controller Hints and Tips" on page 46).*

START FLYING!

When you start RealFlight for the first time, it will automatically calibrate the InterLink Controller. Simply add throttle and start flying right away. Sample the different aircraft; if you like, experiment with the switches and knobs to determine their functions.

RealFlight, by default, starts out in **"Joystick Mode"**, which gives you this plug-and-play capability. That is, **Joystick Mode** allows the InterLink to control all functions associated with the flight of your aircraft. *Read more about this on page 40.*

You can also use your own transmitter to control RealFlight. This is called **"Interface Mode"**. *Read more about this on page 40.*

JOYSTICK VS. INTERFACE MODE

RealFlight allows you to quickly and easily change the method in which you control the action of the simulation. RealFlight G2 offers two control modes:

- **Joystick Mode.** Using the InterLink in Joystick Mode, RealFlight G2 accepts control from the sticks, switches and knob on the InterLink controller. This is the default mode when you install RealFlight, and we've pre-calibrated this mode for you. Consequently, it's ready to fly "out of the box"-- set up or adjustment is unnecessary.

- **Interface Mode.** Using the InterLink in Interface Mode, RealFlight G2 accepts commands from your own transmitter. To use this mode, your transmitter must be connected to the InterLink Controller via the InterLink's built-in interface. This is an optional use of the InterLink. Using Interface Mode takes slightly more setup, and understanding of your radio, than Joystick Mode.

To toggle between modes, run RealFlight G2. Make sure that your radio is connected and turned "on" (some transmitters will automatically power up when you insert the interface cord; other transmitters will require that you turn them "on"). Next, select "Controller Calibration…" from RealFlight G2's **Options** menu. The following dialog will appear:
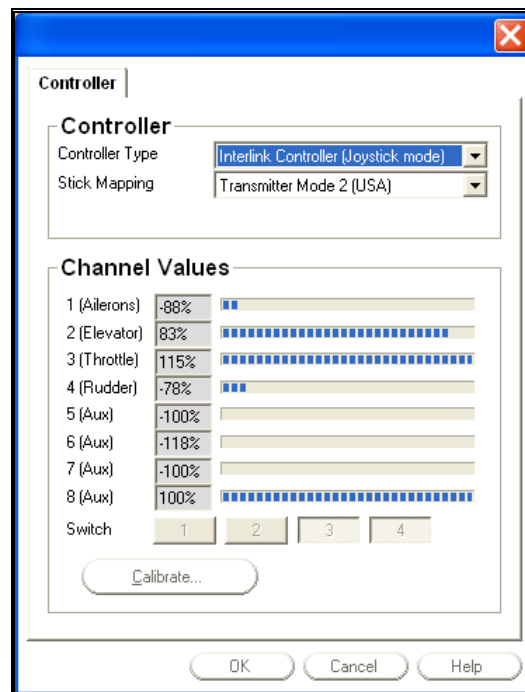
Under "Controller Type", select "Interlink Controller" (Interface mode)." This will transfer control to your actual transmitter. Later on, you will be able to toggle between the InterLink dummy control box and your transmitter by selecting **Joystick** or **Interface** mode from this dialog.

THE INTERLINK CONTROLLER (JOYSTICK MODE)

In **Joystick Mode**, RealFlight G2 accepts control from the sticks, switches and rotary knob on the InterLink controller. This is the default mode when you install RealFlight and is pre-calibrated for you.

The RealFlight software actually does all the radio processing to measure the raw stick/switch inputs from the InterLink Controller, and processes them to produce the servo outputs that are used to control the aircraft.

For example, helicopters ordinarily use a great deal of mixing; this mixing normally occurs on your computer radio. When RealFlight uses the InterLink's **Joystick Mode**, the mixing is done by the RealFlight software itself, not by the InterLink Controller. You can change the mixing of the radio by selecting the **Edit Radio…** item in the **Aircraft** menu. *(This is also called the "Software Radio" because the radio functions are actually emulated in the RealFlight software)*

Each aircraft in RealFlight has its own unique **Software Radio Program** that maps the raw stick inputs from the InterLink Controller into the correct servos for that particular aircraft.
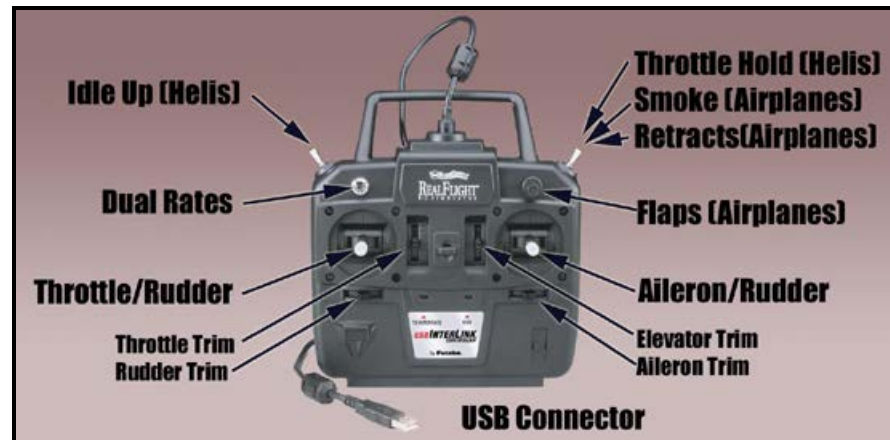
THE INTERLINK CONTROLLER (INTERFACE MODE)

This exciting feature allows you to plug your own R/C transmitter into the back of the InterLink Controller. You can then use your transmitter to control RealFlight aircraft. With Universal Serial Bus (USB) connectivity, the InterLink Controller offers high resolution, rapid data transfer from your transmitter to the PC, and rapid response from the simulated aircraft.

Using your own radio adds some complexity and initial configuration setup (when compared to **Joystick Mode**).

TWO WAYS TO USE INTERFACE MODE

There are two ways to use **Interface Mode**. They are called **"Direct Control Interface"** and **"Joystick Emulation Interface"** *(not to be confused with "Joystick*

Mode" in the previous section). Here is a quick chart that will help you decide which mode to use.

	InterLink **Joystick Mode**	InterLink **Interface Mode**: Joystick Emulation Interface	InterLink **Interface Mode**: Direct Control Interface
Radio used to Fly	InterLink Controller	Your own R/C radio	Your own R/C radio
Ease of Configuration	Very Easy/Pre-calibrated	Medium. Must calibrate and setup radio once	Harder. Must separately calibrate and set up radio for each aircraft
Fly Stock aircraft without Modification	Yes	Yes	No
Gives you the feel of your own radio	No	Yes	Yes
Puts "wear and tear" on your own transmitter	No	Yes	Yes
Allows you to perform mixing in your own radio	No	No	Yes
R/C transmitter required	No	Required: 4-8 channels. Computer radio not required	Required: computer radio with multiple model memory. Recommended: radio with 7-8 channels.
Additional Information	Page 40	Page 41	Page 44

INTERFACE MODE: JOYSTICK EMULATION INTERFACE

The purpose of the **Joystick Emulation Interface** is to create a program on your own R/C transmitter to provide RealFlight with raw stick inputs. This enables RealFlight to use its own "software radio" to control all of the stock aircraft.

This allows you to use a single model memory, or program, on your R/C transmitter to control, without modification, all of the stock aircraft in RealFlight. To do this, RealFlight walks you through an **"Interface Wizard"** that helps you to properly set up your transmitter to "talk" with RealFlight.

Even if you plan on using the **Direct Control Interface**, we still recommend that you complete this wizard. The benefits of using the wizard will become apparent later.

CALIBRATION VS. INTERFACE WIZARD

Interface Wizard

The **"Interface Wizard"** is a multiple-step process that helps the RealFlight software to determine which channel on your radio will be controlling which channel in RealFlight. This is necessary for the **Joystick Emulation** Interface to function properly.

When you calibrate

Because R/C transmitters vary by manufacturer, model, and setup, you must provide some information about your transmitter so that RealFlight G2 will function properly. Consequently, when you first activate **Interface Mode**, RealFlight G2 will prompt you to **calibrate** your controller and **assign input channels**. Unless you switch transmitters, or want to change something in the future, you'll only have to do this once. RealFlight G2 will lead you through the necessary steps (see below).

INTERFACE CALIBRATION

When you calibrate your R/C transmitter with RealFlight, you are, in essence, telling RealFlight what the maximum, minimum, and center values are for each channel on your particular radio. There are a number of pre-defined radios listed in the dialog. If your radio is amongst these selections, RealFlight will **auto-calibrate** it for you.

When you first activate the Interface mode, RealFlight G2 will prompt you with the following dialog:
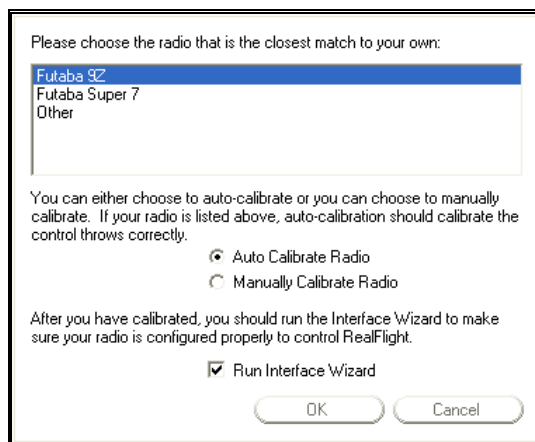
RealFlight is capable of automatically calibrating itself to many popular manufacturers and models of R/C transmitters. If your transmitter appears on the list, please select it and click "OK". RealFlight will automatically complete the calibration.

If you can't find your radio on the list, you will have to complete the calibration manually. Check the **Manually Calibrate Radio** box and click "OK". RealFlight will then display a "wizard" that guides you through the calibration process.

You can also get to this dialog by clicking on the **Calibrate** button in the **Controllers Dialog** (**Options** menu/**Calibrate Controller**).

In any case, if this is the first time you are using your transmitter to control RealFlight, make sure that you leave the "Run Interface Wizard" box checked.

Once calibrated, you will not have to re-calibrate your transmitter again (Unless you use a different transmitter in the future)

INTERFACE WIZARD

This is a multiple step process that determines which channel on your transmitter will control which channel in RealFlight. This is necessary for the **Joystick Emulation Interface** to work properly.
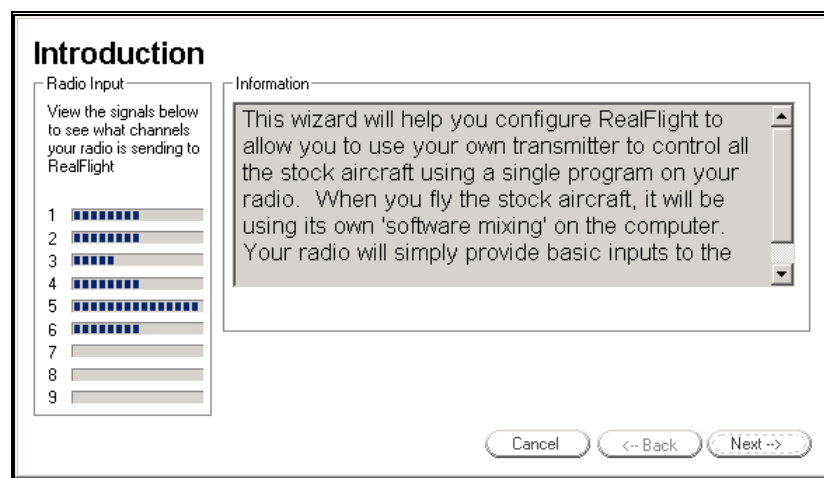

Before using the wizard, you will need to create a new program or model memory on your R/C transmitter. Call it "**RFJOY**" or something similar. Additionally, please *MAKE SURE THAT THIS NEW PROGRAM:*

- Is an "airplane" program--you don't want a heli program with all of its mixing (since all the mixing will be performed by the RealFlight software);

- Has all mixing turned "off";

- Has trims centered;

- Has ATVs set to 100%;

- Has Dual Rates and expo turned "off" (these can both be emulated in the RealFlight Software Radio).

To start this wizard, make sure the Interface mode is selected (**Options** menu/**Calibrate Controller**) and then click the **Interface Wizard** button. Follow the instructions in the wizard, making sure that you read all the instructions in each step. Note: you may have to use the scroll bar to read an entire instruction.

Once you have finished this wizard, it is best if you never modify the "RFJOY" radio program again. If you want to modify a particular aircraft, then edit the **Software Radio** in RealFlight instead. This is because a change in this "RFJOY" program will

affect every RealFlight aircraft flown with this transmitter. Changes to the **Software Radio** only affect the aircraft whose radio you have edited.

To fly any of the stock aircraft, simply switch your radio to the "RFJOY" program.

INTERFACE MODE: DIRECT CONTROL INTERFACE

This is the most advanced method for controlling the RealFlight aircraft. It provides total control of an aircraft from your own radio, using all of your radio's mixing functionality. All values received by RealFlight are passed directly to the aircraft without modification from the RealFlight software. The disadvantage of using this mode is that you usually have to create a new radio program (model memory) on your R/C transmitter for **each** aircraft you want to fly with this mode. You must also set up your radio, mixes, trims, dual rates, etc. on the transmitter for **each** aircraft you want to fly with this mode.

The advantage of this mode is that if you are mainly flying one or two aircraft on RealFlight, you can make you own radio program for these aircraft and have complete control over them. It also is a very good tool for learning how to use your own R/C radio as it forces you to set up the transmitter the same way you would have to set it up if your were going to control an actual R/C aircraft.

BEFORE YOU USE THE DIRECT CONTROL INTERFACE

IMPORTANT! Make sure that you follow the calibration AND the Interface Wizard in the previous sections BEFORE attempting to use the Direct Control Interface.

SETTING THE DIRECT CONTROL INTERFACE

To choose to use the Direct Control Interface, go to **Aircraft** menu/**Select Aircraft** and create a copy of the aircraft that you wish to control. After you have made a copy, click on the **Edit Aircraft** button and change the radio from **Software Radio** to **My Own Radio.**

MAPPING CHANNELS TO SERVOS

You may find that some channels are mapped to the wrong functions on the aircraft. To correct this, edit the aircraft (**Aircraft** menu/**Edit (aircraft name)…)** and go to the **Servos** page. The appearance of this page depends on whether you are using an airplane or heli.

Airplane Servos Page

Helicopter Servos Page

These pages allow you to change the channels on the page as well as reverse the servo throws, if necessary.

IMPORTANT! Do not change the servo mapping using the Interface Wizard. This will change it for ALL Stock aircraft. Instead, simply change the servo mapping using the **Servos** page above for a single aircraft.

SWAPPING AIRCRAFT THAT USE DIRECT CONTROL INTERFACE

In most cases, when you make a custom aircraft that uses the **Direct Control Interface** (**My Radio**) option, you will not be able to provide that aircraft to your friends or submit it to the RealFlight Model Swap Page. This is because the RealFlight program has no idea how to handle the radio input, other than to blindly pass it on to the servos in the aircraft. Consequently, you would have to provide other RealFlight users with all of your R/C radio's settings for that particular plane. Moreover, they would have to have the exact same R/C transmitter in order for them to use the aircraft.

INTERLINK CONTROLLER HINTS AND TIPS

WHAT IF MY TRANSMITTER HAS FEWER THAN EIGHT CHANNELS?

This issue arises when you use your own transmitter to control RealFlight.

RealFlight supports up to eight controller channels. Many simulated aircraft use all eight channels. If, however, your transmitter has fewer than eight channels, you can still fully control RealFlight aircraft. The way to do is to map some of the channels to keys on your computer keyboard.

First, open the **Calibration** dialog by selecting **Controller Calibration…** from the RealFlight **Options** menu. Next, ensure that you are set to **Interface Mode**. Click the **Interface Wizard** button, and then step through the wizard until you come to the page that controls the missing channel.

Your controller may not have a channel available for some functions.

Under "Controlled By:" select the key that you want to control this channel.

Repeat this for every "missing" channel until all channels are functioning properly.

WHEN TO USE THE INTERFACE WIZARD, AND WHEN TO USE THE SOFTWARE RADIO OR SERVO PAGE

This issue arises only if you use your own transmitter to control RealFlight G2. (When you use the InterLink Controller as a mockup transmitter, you cannot alter the input channel mapping.)

Remember that the **Interface Wizard** (*see page 42*) is used to set the input channels for your transmitter. This means that you are setting the channels used to monitor physical movements or positions of your transmitter's sticks/switches/knobs. Unless you change transmitters, you should only need to set this once. *Only use the Interface Wizard to tell RealFlight which channel your controller is using for each stick/knob/switch input, not what control function you want that stick/knob/switch to perform.*

The **Software Radio** (*see "Chapter 13. Setting up the Airplane Radio" on page 151 or "Chapter 14. Setting up the Helicopter Radio" on page 155)* controls mixing, exponential, and other channel processing that a computer radio would normally perform. The Software Radio determines the control function you want each stick/knob/switch setting to perform. You will often want to set this differently for different aircraft. For example, the mixing on your glider will probably not be very useful on your helicopter.

The **Servo** page (*see page 44*) is used to edit the servo properties (*e.g.*, servo speed) as well as adjusting the input channels in the same way as the Interface Wizard. However, changes made using the **Servos** page apply only to the aircraft you are editing. *Use the **Servos** page only when you want to edit a specific servo property (like servo speed) or if for some reason you need to reassign an input channel for one aircraft only.* In most cases you should not need to do the latter. Instead, you should normally use the software radio to configure control outputs.

A good rule of thumb is: *if a setting will not be the same for every aircraft, you should **not** try to implement the setting by using the Interface Wizard.* Instead, adjust the software radio.

WHAT ABOUT PREVIOUS VERSIONS OF REALFLIGHT?

The instructions in this chapter refer only to versions of RealFlight that use the InterLink Controller. If you are reading this manual from your RealFlight program CD-ROM, your RealFlight version uses this controller.

Previous versions of RealFlight came with a gameport Futaba controller, or with a parallel-port Transmitter Interface Adapter. If you own an earlier version of RealFlight that used one of these controllers, and need instructions for setting up your controller, please refer to the manual that came on your program CD-ROM.

In many cases, operation of the InterLink Controller in Joystick Mode is similar to operation of the Futaba game port controller in older versions of RealFlight. Similarly, operation of the InterLink Controller in Interface Mode is similar in most ways to the operation of the Transmitter Interface Adapter. However, in both cases there are substantial differences between the InterLink operation and the older control methods. If you are using the InterLink Controller, you should refer to the instructions in this manual.

If you have a previous version of RealFlight, and wish to use the InterLink Controller, an upgrade program may be available. Please contact your RealFlight dealer for details.

Futaba Gameport Controller

Transmitter Interface Adapter

New versions of RealFlight no longer use these control systems.

CHAPTER 6. THE AIRPORT MENU

AIRPORT MENU OVERVIEW

The **Airport** menu allows you to access all airport-related features and options. When you open up the pull-down menu, you will see something like this:

The items in this menu are:

- Select Airport…
- Edit (Current Airport)…
- Item Visibility
- Show Trees
- Show Fog
- 3D Terrain
- Set Takeoff Position
- Weather Conditions…
- Exit
- Airport MRU

The following sections describe the function or purpose of each of these items.

SELECT AIRPORT…

When you click on **Select Airport…** the following dialog appears:

This dialog lets you choose the flying site and airport options that you wish to use for your flight. Each airport offers its own unique characteristics and challenges.

The list at the top of the dialog list displays all of the flying sites available. (In the example above, the user has selected an airport named "Green Valley.") If you have created any flying sites, those sites will also be visible here. Highlight the airport that you wish to select.

MAKE A COPY

By clicking this button, you create a copy of the current airport (the airport selected in the list at the top of the dialog). RealFlight will prompt you for a name for the new airport.

What is the purpose of copying an airport? The Copy command allows you to create a new airport. RealFlight does allow you to edit the airports on the RealFlight or Add-On CDs. If you directly edit an airport from a CD, however, you won't be able to revert to the original, unedited CD version of the airport without losing all your edits. The solution is to make a copy of the CD airport, and then edit the copy. That way, you will be able to retain both the original airport from the CD, and your own edited airport.

To make your own airport, follow these steps:

- Select an existing airport.

- Use the "Make a Copy" button to copy the airport.

- When prompted, supply a name for your new airport.

- Edit your new airport (*see "Edit (Current Airport)…" on page 51*) as you see fit.

RENAME

Rename the selected airport. Please note: you can only rename airports that you (or another RealFlight user) have created.

DELETE

Delete the selected airport. If you inadvertently delete one of the default flying sites, don't worry. The next time that the program is run, the default flying site will be restored.

REVERT

If you have edited one of the airports from the RealFlight or Add-On CDs, you can "Undo" all your edits (restore the original, unedited version from the CD) by selecting the airport and pressing "Revert". Note: this only works on airports from the CDs.

ADDITIONAL AIRPORT OPTIONS

Select the additional airport items that you wish to appear at your flying site. This list may contain scenery items (buildings, runways, etc.) or foliage (trees, shrubs, etc.). The more objects that appear on the flying site the more realistic it may appear. However, additional objects may slow down the rendering, as they require more time and computer power to process.

When you select items in this list, you are deciding whether or not to show or hide objects that are already in this flying field. You can add additional objects by editing the field (*see "Edit (Current Airport)…" on page 51*).

EDIT (CURRENT AIRPORT)…

RealFlight G2 gives you unparalleled freedom to design your own airports. Add or remove scenery items, move, rotate, or even resize existing scenery items. You can also control atmospheric or lighting conditions. Additionally, you can add, remove, reposition, or even seasonally color the foliage.

The "Edit (Current Airport)…" menu item is the starting place if you wish to modify the selected airport. When you select this item, the following dialog appears:
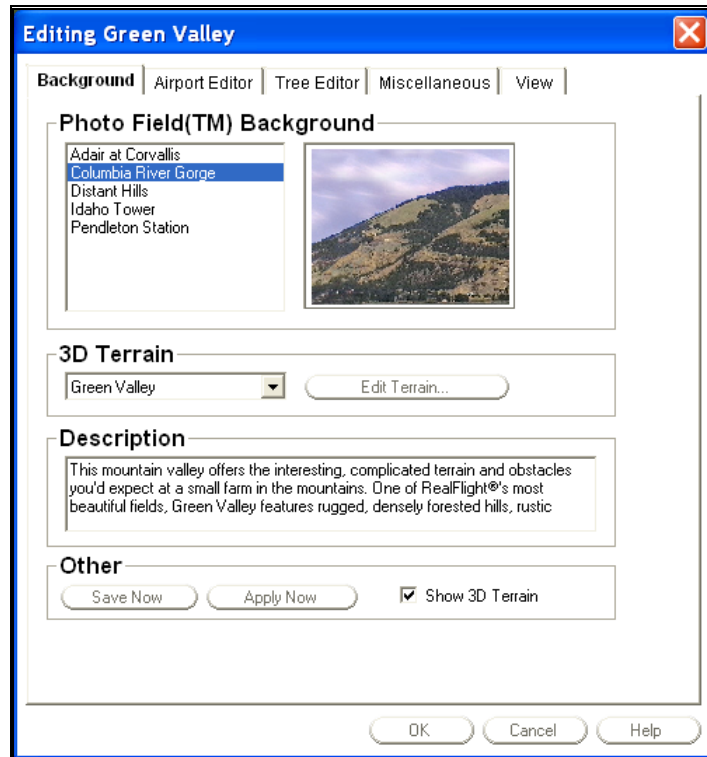
Notice that the top of the dialog has five tabs:

- Background

- Airport Editor

- Tree Editor

- Miscellaneous

- View

Clicking on one of the tabs above will bring up a subdialog, called a "page." Each page edits a different property of the current airport. The sections below describe each page in detail.

BACKGROUND PAGE

The Background page (see diagram above) allows you to edit the overall look of the terrain and environment.

PHOTOFIELD™ OR 3D TERRAIN

To understand many of the options on this page, you'll need to understand the *display styles* offered by RealFlight G2. G2 allows you to view any of the airports using one of two styles: Photofield or 3D Terrain.

You select which style to use by checking or unchecking the box marked "Show 3D Terrain." If the box is checked, RealFlight will use 3D Terrain. If the box is not checked, RealFlight will use the Photofield backgrounds.

There are distinct differences in the background styles. Photofield uses panoramic photographs as backdrops for your flying fields. These backdrops surround a flat

terrain. If you opt to view your airport using Photofield, you can choose from five different backgrounds.

The 3D Terrains feature true three-dimensional topography. That is, by selecting 3D Terrains you get true hills and valleys in your airport. If you opt to display your airport using 3D Terrains, there are five different 3D Terrain styles to choose from.

There are advantages and disadvantages to both 3D Terrains and the Photofield styles. The 3D Terrains offer greater realism and airport design possibilities; however, they require additional processing power to render properly. The Photofield option is faster on older/slower computers and video cards; however, it doesn't offer the same level of realism as the 3D Terrains. Some RealFlight users prefer Photofield's simpler look. Experiment with both options to see which one you prefer.

Should you decide to create and edit airports, and distribute them to other RealFlight users, remember that anyone using your airport has the option of displaying it using either Photofield or 3D Terrains. So, you may wish to view your airport's appearance using both styles. This allows you to ensure that the layout; colors, terrain settings, etc. look good regardless of what style the user chooses.

PHOTOFIELD BACKGROUNDS

Select a Photofield background to use for this airport. This choice will only affect the airport's appearance if you are using Photofield ("Show 3D Terrain" box is unchecked). The panel on the right shows a preview of the selected background.

SAVE NOW

This button saves any changes to the airport, without closing the "Background" page.

APPLY NOW

Clicking on this button does two things: 1) it updates the main RealFlight window to reflect any changes to the airport; and 2) it keeps the **Background** page open. This lets you see the results of your changes while an editing session is in progress. For example, click **Edit Terrain** and change the color applied to the sky. Exit the **Terrain Editor** and click on the **Apply Now** button. You will immediately notice the new sky color appear in the background of the flying site.

SHOW 3D TERRAIN

This checkbox controls whether or not the flying site will use 3D Terrain. If checked, RealFlight will use 3D Terrains for the flying sites. If the checkmark does not appear in this box, then RealFlight will use the Photofield display style for the simulation.

3D TERRAIN

Select a terrain for the current flying site. This choice only affects the airport's appearance if the "Show 3D Terrains" box is checked. If the "Show 3D Terrains" box is not checked then **RealFlight** will use the Photofield selection instead.

TERRAIN EDITOR (EDIT TERRAIN)

If you use a 3D Terrain flying site, RealFlight will allow you to modify the terrain to suit your personal taste. When you click the "Edit Terrain…" button, the following dialog appears:
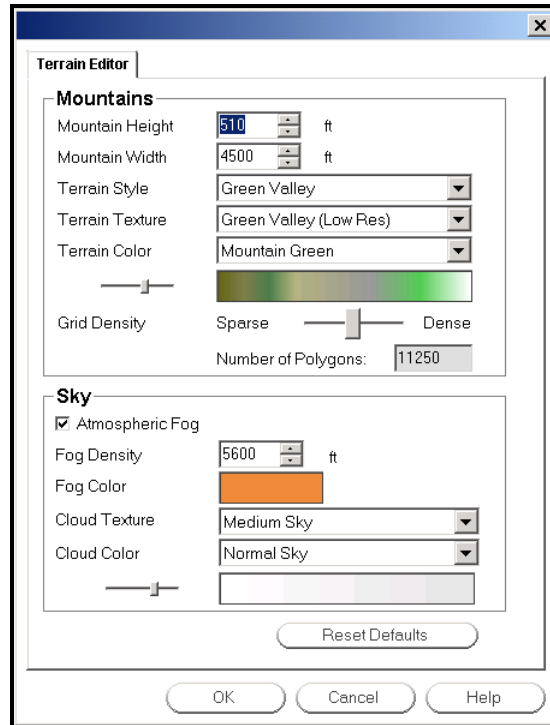
RealFlight generates, or creates, mountains and valleys during flight. You can actually fly down the valleys and amongst the mountains. This page lets you customize the appearance of your surroundings.

RealFlight is capable of creating some fantastic landscapes, limited only by your PC and video card. If you have a fast computer with a powerful video card, increase the Mountain Width and the Grid Density to experience the complete richness of the landscape. However, if you have a slower machine, you may have to settle for a coarser grid that does not extend as far. Increasing the Mountain Width and the Grid Density will slow the frame rate, since the computer will be busy rendering additional polygons.

MOUNTAIN HEIGHT

Adjusts the height of the tallest mountain in the terrain.

MOUNTAIN WIDTH

Adjusts the width of the terrain. Higher values will let you fly farther (i.e. increase the size of the virtual "world") through unique terrain, but may slow down the frame rate somewhat. Smaller values will increase the frame rate but will reduce the size of the "world".

TERRAIN STYLE

Choose the layout of the mountains. Each style presents different mountain ranges with different layouts of valleys and hills.

TERRAIN TEXTURE

Choose the texture that is overlaid on the mountains. Some terrains take up more texture memory than others. If you select a high-resolution terrain and the simulation slows down as a result, select a lower resolution texture to resolve this situation.

TERRAIN COLOR

RealFlight can color mountains so that different elevations have different colors. That is, the base of each mountain will have a certain tint; this tint will vary continuously as you move to the top of the mountain. The Terrain Color control lets you pick a style of tint variation with elevation. The style you select from this list will appear in the panel below. The color on the left side of the panel indicates the color of the mountain base. The color on the right side of the panel indicates the color of the mountain peaks. You can adjust the contrast of this color scheme using the slider control (see below).

TERRAIN LIGHT SLIDER (UNLABELED)

The Terrain Color control (above) lets you pick a scheme for varying mountain color with elevation. This slider lets you control the "strength", or contrast, of the elevation coloring scheme you have chosen. The preview panel (to the right of the slider) shows the actual coloring that will be applied.

TERRAIN COLOR PREVIEW (UNLABELED)

This display provides a preview of the elevation colors that are applied to the mountains. The left hand side of the preview shows the colors for the lower elevation of the mountains; the right hand side shows the colors for the higher elevations.

GRID DENSITY SLIDER

This slider adjusts the polygon density of the terrain. A sparse density will create mountains with a jagged appearance, as there are fewer polygons that comprise the terrain. A dense setting will create smooth mountains, however, it may slow down the rendering speed slightly.

NUMBER OF POLYGONS

This field displays the number of polygons that will be used in the landscape. This is directly related to the mountain width and terrain density. While increasing the density will improve the appearance, the additional polygons may slow down your frame rate.

ATMOSPHERIC FOG

Select whether or not to use fog in the scene. Distant objects will fade to the specified fog color. *IMPORTANT:* Not all 3D cards support fog.

FOG DENSITY

Indicates the distance at which all items are completely hidden by fog.

FOG COLOR

Specifies the fog color. Normally, this is white but you can use colored backgrounds to create special effects such as sunsets.

CLOUD TEXTURE

Select the cloud pattern for the current flying site. There are a variety of cloud patterns available.

CLOUD COLOR

RealFlight can color the clouds so that clouds near the horizon have a different color than clouds near the zenith (straight up). Use this control to select a style of color variation. The style you choose from this list appears in the preview panel directly beneath this control.

CLOUD COLOR SLIDER (UNLABELED)

Adjust the strength, or contrast, of the cloud color variation style that you selected in "Cloud Color." The preview panel (to the right of this slider) shows you the actual coloring that will be applied to the clouds.

CLOUD COLOR PREVIEW (UNLABELED)

This is the preview of the Cloud Color scheme selected in the "Cloud Color" control (above). The left hand side of the preview shows the colors for clouds nearer the horizon; the right hand side shows the colors for clouds near the zenith (straight up).

RESET DEFAULTS

Clicking on this button will reset all "Terrain Editor" options to their default settings for this airport.

DESCRIPTION

Enter a text description of the airport. The information entered into this field will be stored until the airport is deleted, and can be viewed by anyone using the airport. You can edit the description at any time. The airport description is particularly useful for keeping track of any modifications, etc. that have been made to a particular flying site.

AIRPORT EDITING SHORTCUTS

The Airport Editor Page, Tree Editor Page, and View Page will switch into "Edit Mode" on certain actions. This means the dialog will temporarily disappear and you can interact with environment using the mouse and the keyboard. While in this mode, you can use several keyboard and mouse shortcuts to help you navigate.

Action	Description	Add Tree	Modify Tree	Add Object	Modify Object	Change View
Slew Mode	Move the mouse to the left, right, top or bottom of the screen to move the camera.	X	X	X	X	X
Pan Mode	Hold the CONTROL Key and move the mouse to the left, right, top or bottom of the screen to rotate the camera.	X	X	X	X	X
Zoom Level	Hold the ALT Key and move the mouse to the top or bottom of the screen to change the zoom Level.	X	X	X	X	X
Altitude Change	Hold down the RIGHT mouse button and move the mouse to the top or bottom of the screen to change the altitude of the camera.					X
Object Height	Hold down the LEFT mouse button and move the mouse to the top or bottom of the screen to change the height of the selected object.	X	X	X	X	
Duplicate Object	Hold down the CONTROL Key and click with the left mouse button to make a copy of the selected object.	X	X	X	X	
Rotate Object	Hold down the SHIFT key and move the mouse left and right to rotate the selected object.			X	X	
Cluster Size	Use the ',' and '.' Keys to change the number of trees in the cluster.	X	X			
Object Size	Use the "K" and "L" keys to change the size of the selected object.	X	X	X	X	
Snap to Ground	Use the "S" key to snap the object to the ground.	X	X	X	X	
End Action	Press ESCAPE to end the current action	X	X	X	X	X

AIRPORT EDITOR PAGE

The Airport Editor Page allows you to add, remove, or modify **scenery objects** in the current airport.

A **scenery object** is a building, wall, pylon, etc. that is located in the flying field. For purposes of this manual, the term "scenery object" does not include trees or other foliage. Trees have different properties and have their own edit page [*see "Tree Editor" on page 62*]).

Some scenery objects are actually composed from multiple objects. For example, you construct a fence by joining together many short fence segments. Roads and paths are another example. The advantage of using smaller elements to create a larger structure is the greater freedom you have in creating original landscape designs. When you want to create a custom field, it's more practical to reposition several smaller "building blocks" than to work with a set of large, "complete" objects. For example, it's difficult run a fence along a long road or airstrip, when the only fences available are meant to surround houses.

Having said that, let's turn to the Airport Editor page:
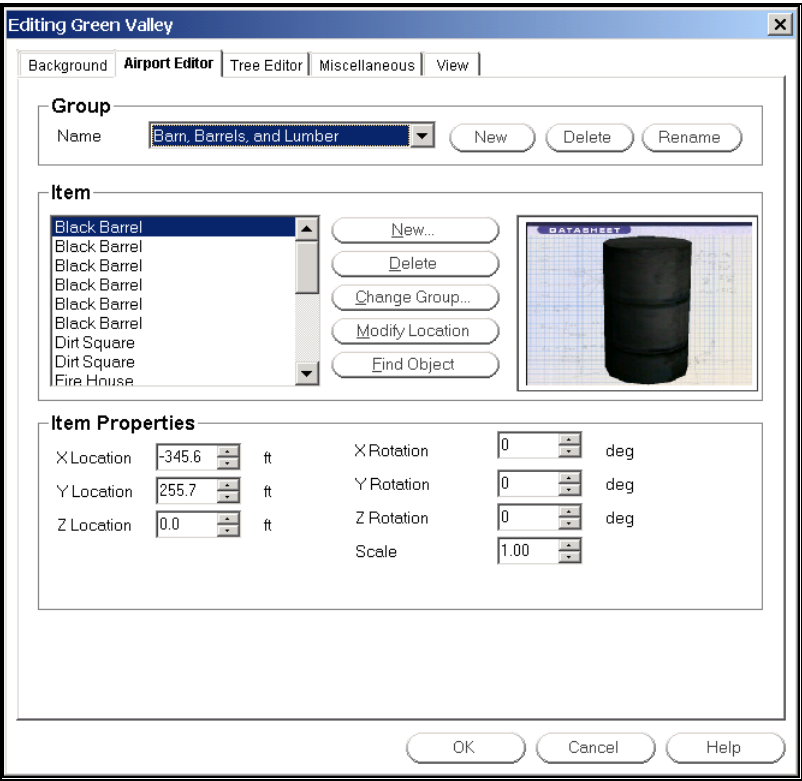
GROUP

Each airport scenery object (building, wall, runway, pylon, etc.) belongs to a *group*. You don't *see* the actual groups in your airport; you only see the scenery objects. Groups are just a convenient way to collect related objects together for easier editing.

You can place all your scenery objects in a single group, or have many groups, each corresponding to a category of object. You can have groups with no objects in them.

When you're editing an airport with hundreds of objects, grouping your objects make it easier to organize your objects.

The controls in the "Group" segment of the Airport Editor page help you to manage groups.

NAME

This box displays the name of the current group. Any changes that you make will apply only to the objects in this group. If you want to edit objects in a different group, select the group you want to edit from the pull-down list.

NEW

This button will create a new group for this airport. You will be able to put objects into the new group. When you click this button, RealFlight will prompt you for a new group name. To add items (scenery objects) to the newly created group, click on the "New" button in the "Item" controls below.

DELETE

This button will delete the selected group and all of that group's contents. If there is only one Group active at the flying site, RealFlight will not allow it to be deleted. Every airport must have at least one group.

RENAME

This button will allow you to rename the selected Group.

ITEM

The controls in the "Item" segment of the Airport Editor let you edit the contents of the current group. The box on the left-hand side of the "Item" segment lists every scenery object in the group. To see a preview of an object, select it from the list. The buttons (New, Delete, Change Group, etc.) let you edit the contents of the group.

ADD NEW ITEM

This button will bring up the "Add New Items" page, which has a list of scenery items that can be added to this airport.
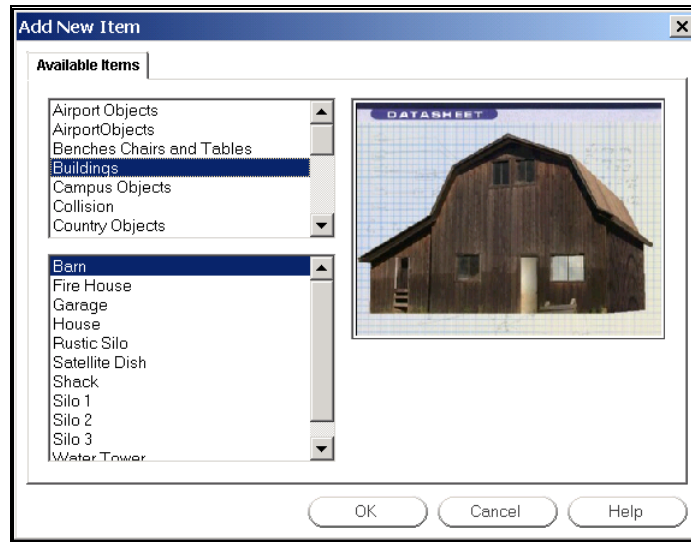
The top list contains *categories* of scenery objects. The bottom list contains all scenery objects that fall into the current category. When you change the category selection in the top list, the list of objects will change correspondingly.

For example, clicking on the "Country Objects" category will bring up the "hay bale" and the "telephone pole" objects in the scenery objects listings.

To add a particular scenery object to the current group:

- Select the scenery object's category in the top list (e.g., "Buildings").

- Select the scenery object from the bottom list (e.g., "barn").

- Click OK. (Or, click Cancel to return to the **Airport Editor** without adding a new object.)

- After you click "OK", RealFlight will temporarily return you to the main view. You will see the new scenery object, highlighted in bright yellow, in your landscape. Move your mouse to position the scenery object where you want, then click the left mouse button to "lock" the object's position. *See "Airport Editing Shortcuts" on page 56 for shortcuts when adding a new object.*

- When you "lock" the position of the new object, RealFlight will return to the **Airport Editor** page.

If you want to change the location further, either edit the coordinates of the new object using the X, Y and Z position fields (*see "Item Properties" on page 61*), or use the **Modify Location** button.

DELETE

Click this button to remove the selected item from this group. The object will no longer appear in the airport. If you want to restore the item later, you will have to add a new item, and reposition, resize and reorient the new item to match the old.

CHANGE GROUP

This button is used to move the selected item to a new Group. When you click "Change Group," RealFlight will prompt you to pick a new group for this item:
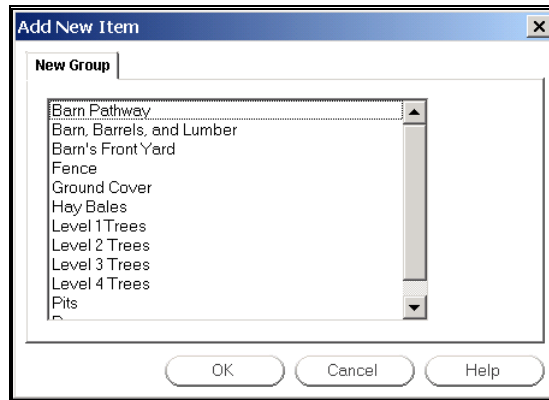
Click **OK** to move the item to the new group, or **Cancel** to return to the **Airport Editor** without changing groups.

MODIFY LOCATION

This button is used to move the physical location of the selected item. To do so, select the item that you wish to move and click on the **Modify Location** button. RealFlight will temporarily return you to the main view, where you will see the selected item highlighted. Using the mouse, move the object to the desired location. When it is positioned to suit your preference, click the mouse to "lock in" the new position. Then, the Airport Editor page will reappear.

Using **Modify Location** to move objects may not work well if you want to make precise "tweaks" to object locations. You can also move objects by directly specifying the X, Y and Z coordinates of their locations. *See "Item Properties" on page 61.*

*See "*Airport Editing Shortcuts*" on page 56 for shortcuts when adding a new object.*

FIND OBJECT

Use this button to help you find an item in the airport. Click on the **Find Object** button and then the window will temporarily disappear. Click on the object that you are interested in. The dialog will then reappear with that object selected in the list.

ITEM PROPERTIES

These controls let you directly edit the position, size, and orientation of every scenery object.

The X, Y and Z location controls are helpful for "tweaking" object positions. For doing a rough layout of object positions, you may find it more useful to set object positions using the mouse (**Modify Location** button, *see "Item" on page 59*).

X LOCATION

Use this to set the actual X coordinate of the object's location, assuming that the ground forms an X-Y plane. Changing this value will move the object parallel to the ground.

Y LOCATION

Use this to set the actual Y coordinate of the object's location, assuming that the ground forms an X-Y plane. Changing this value will move the object parallel to the ground, in a different direction from X. You can move the object to any location by combining X and Y movements.

Z LOCATION

Use this to set the height of the object above (or below) ground. Increasing this value will move the object up (away from the ground). Decreasing this value will lower the object towards the ground. If you want, you can even partially "sink" objects into the ground.

The Rotation controls set the orientation of each object. To achieve exactly the rotation you want, you may need to combine X, Y and Z rotations. This process may seem counterintuitive when you begin, but with a little practice it becomes easier.

X ROTATION

By changing this value, you will rotate your object around an axis parallel to the ground. That is, your object will rotate like a car wheel or plane prop, not like an upright top or heli main rotor. Try changing the X rotation on a sample object to see what this does.

Y ROTATION

Like X rotation, changing Y rotation will also rotate your object around an axis parallel to the ground. However, the rotation axis is different. Again, try changing the Y Rotation on a sample object to view the functionality.

Z ROTATION

Changing the Z rotation angle will rotate your object around the up/down axis. That is, your object will turn like an upright top, or heli main rotor, not like a car wheel or plane prop.

SCALE

This parameter controls the physical size, or scale, of the selected object. Increasing the scale will cause the object to grow in size. Conversely, decreasing the scale will cause the object to decrease in size.

TREE EDITOR PAGE

The **Tree Editor** Page allows you to edit, or modify the trees, foliage, people*,* and other "2D" objects in the current airport. The tree editor is similar to the **Airport Editor** (*see "*Airport Editor*" on page 58*), but has a few differences.

As with scenery objects, each of the tree items belongs to a "group" and each "group" can be modified separately.

In fact, you can put trees in the same group with other scenery objects. For example, you can have a tree and a building in the same group. That way, when you turn that group on or off, the building and the trees will toggle together.

Let's now take a look at the **Tree Editor** page:
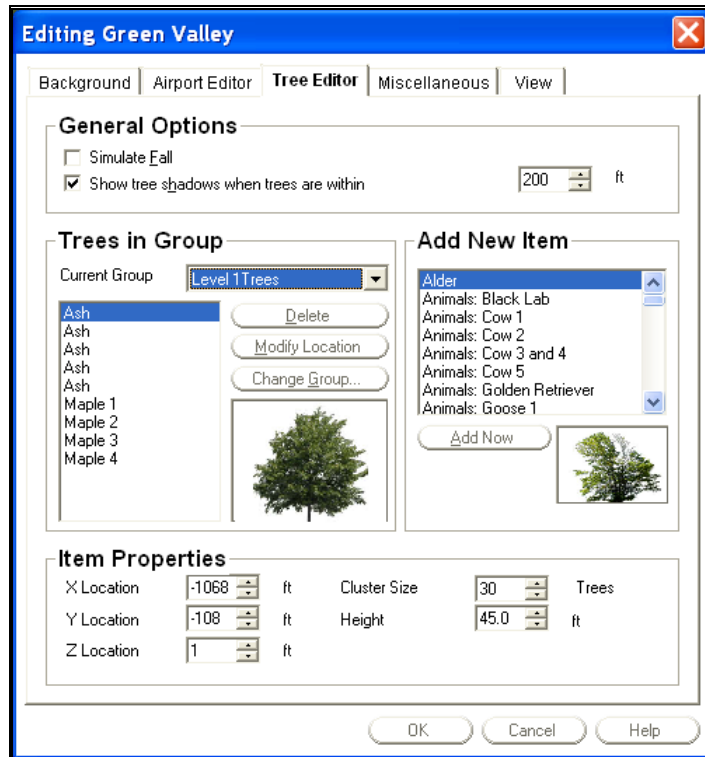
SIMULATE FALL

Click this checkbox if you would like the trees and foliage to assume an autumn-like appearance. If the box is checked, the trees will assume fall coloring, and the leaves will turn from green to various shades of red, brown and gold.

SHOW TREE SHADOWS WHEN TREES ARE WITHIN "X" FEET

Check this box if you would like the trees to cast shadows. If the box is not checked, the trees will not cast any shadows. Activating tree shadows improves realism. However, it will add more objects for the computer to render, which may slow down the processor slightly.

We suggest that you try the simulation with the shadows activated to see if it has any effect on your frame rate. If tree shadows slow your frame rate, reduce the distance in the data field. If reducing the distance does not appreciably improve your frame rate, try turning tree shadows completely "off", and check the frame rate once again.

CURRENT GROUP

Like the scenery objects, all trees/foliage belong to a "Group". Select the tree group that you wish to edit.

When you select a group, the box to the lower left displays a list of the trees in the group. You can select a tree from the group to edit.

DELETE

Removes the selected tree or foliage from the current airport.

MODIFY LOCATION

This button is used to move the physical location of the selected item. Select the item that you wish to move and click on the **Modify Location** button. RealFlight will temporarily return you to the main view, where you will see the selected object (tree, bush, etc.) highlighted in yellow. Using the mouse, move the object to the desired location. When you have positioned the item, click the mouse button to "lock in" the new position. RealFlight will then return you to the **Tree Editor** page.

See "Airport Editing Shortcuts" on page 56 for shortcuts when adding a new object.

CHANGE GROUP

This button is used to move the selected item to a new group. When you click **Change Group**, RealFlight will prompt you to pick a new group for this item:
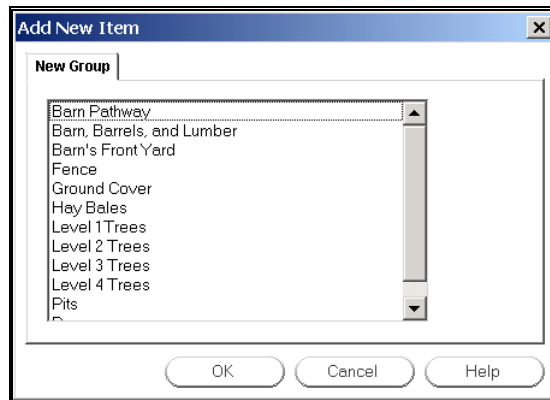
Click **OK** to move the item to the new group, or **Cancel** to return to the **Tree Editor** without changing groups.

ADD NEW ITEM

This displays a complete list of the trees and plants that may be added to the airport. Selecting an item on the list will bring up a graphic representation of the respective item.

ADD NOW

Click on this button to add the selected item to the airport. When you click this button, RealFlight will temporarily return you to the main view, where you will see the new item highlighted in yellow. Move your mouse to position the item. When you are finished, click the mouse to "lock in" the new position. RealFlight will then return you to the **Tree Editor**.

See "Airport Editing Shortcuts" on page 56 for shortcuts when adding a new object.

ITEM PROPERTIES

These controls let you directly edit the position, size, orientation and height of trees, foliage, etc.

The X, Y and Z location controls are helpful for "tweaking" object positions. For doing a rough layout of object positions, you may find it more useful to set object positions using the mouse.

X LOCATION

Use this to set the actual X coordinate of the tree's location, assuming that the ground forms an X-Y plane. Changing this value will move the tree parallel to the ground.

Y LOCATION

Use this to set the actual Y coordinate of the tree's location, assuming that the ground forms an X-Y plane. Changing this value will move the tree parallel to the ground, in a different direction from X. You can move the tree to any location by combining X and Y movements.

Z LOCATION

Use this to set the height of the tree above (or below) ground. Increasing this value will move the tree up off the ground. Decreasing this value will move the tree down towards ground. If you want, you can even partially "sink" trees into the ground.

CLUSTER SIZE

Trees can be organized into "clusters", or groves that you can add/move/delete as a unit. This control adjusts the number of trees in the cluster.
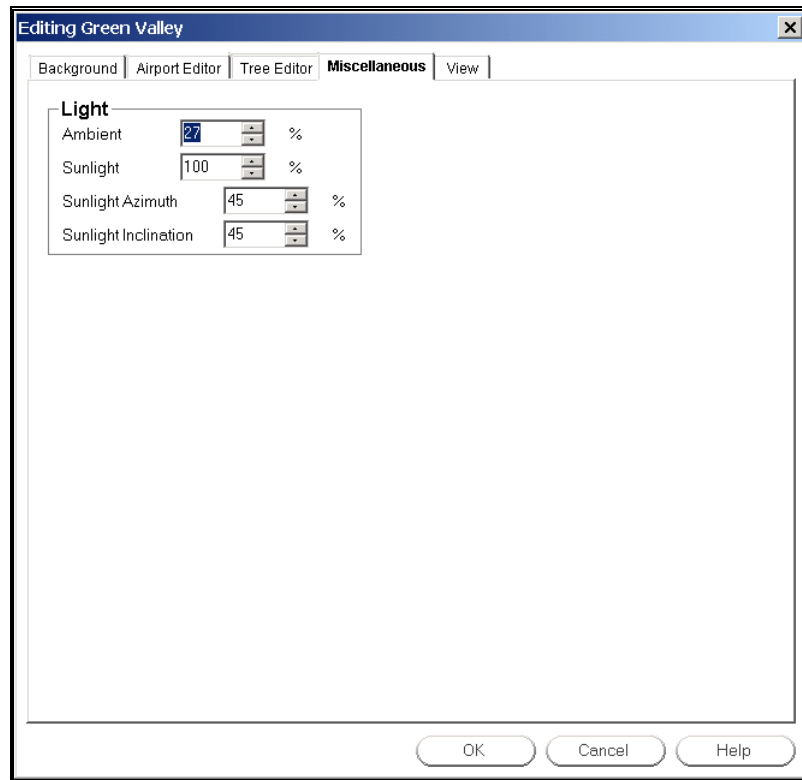
HEIGHT

Indicates how tall the tree is.

MISCELLANEOUS PAGE

This page is used to adjust the lighting at the flying site. You can adjust the lighting that reflects from the aircraft, and the terrain as well.

LIGHT

AMBIENT

Use this field to adjust the ambient lighting that is present. "Ambient" lighting is diffuse lighting that does not cast a shadow. Decreasing the value will make the contrast between light and dark much greater. Increasing the value will make the dark areas of the objects brighter and decrease contrast.

SUNLIGHT

Use this field to adjust the amount of sunlight at the flying site. Higher values mean that there is increased light at the site.

SUNLIGHT AZIMUTH

This parameter controls the location of the sun along the horizon. By changing this value, you can move the sun from north, to east, to south, etc.

SUNLIGHT INCLINATION

This parameter controls the height of the sun above the horizon. Higher values mean the sun is higher in the sky. You can simulate mid-day lighting by using a high inclination. A low inclination simulates early morning or late afternoon.

VIEW PAGE

This tab provides information on adjusting the view.
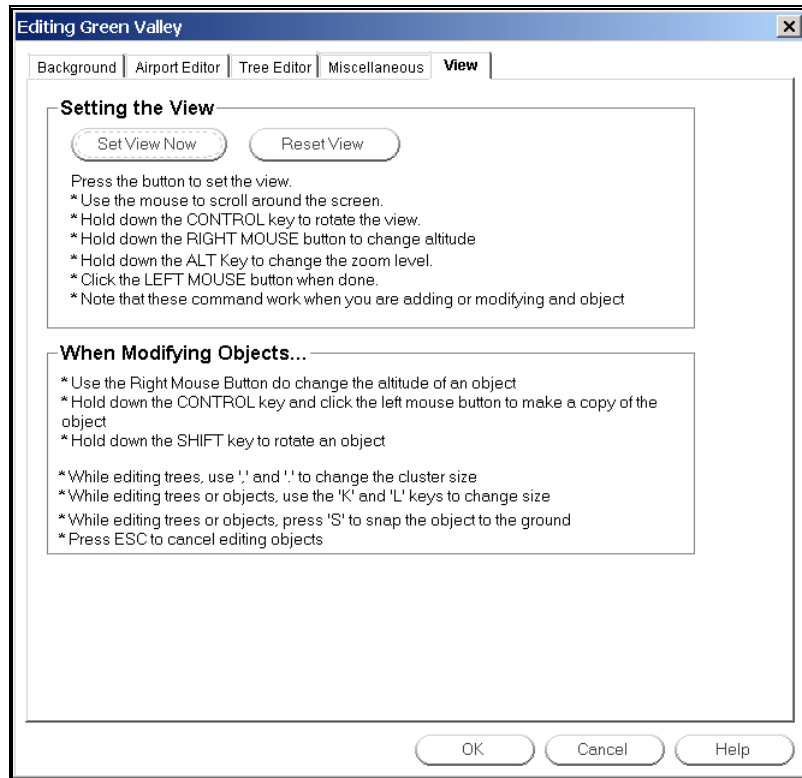
SET VIEW NOW

Click on this button to set the vantage point for the main window. *See "Airport Editing Shortcuts" on page 56 for shortcuts when changing the view.*

RESET VIEW

Click on this button to return to the default view.

ITEM VISIBILITY

Use this item to determine whether to show or hide scenery objects in the airport. Selecting this item creates a submenu with a list of items you can show (make visible) or hide (remove from visibility). To show items, select them (check them in the submenu). Conversely, to hide items uncheck them.

There are two important concepts that will help you use this command effectively.

First, the items on the submenu list are *groups*, not individual objects. Groups are collections of airport objects (buildings, trees, roads, fences, etc.) that you can create and modify when you edit an airport (*see "Terrain Editor" on page 54, "Tree Editor" on page 62*). So, when you edit an airport, you may want to try to organize your scenery objects into groups that make sense to show or hide as a unit. For example, if you plan on sharing your airports with other RealFlight users, and you

have a large number of objects in an airport, some users may want to turn off some objects and leave others active.

Second, this item only controls the visibility of objects that are already in the current airport. It does not add or delete any objects from the airport. You can add or delete scenery objects by editing the airport (*see "Edit (Current Airport)..." on page 51*).

SHOW TREES

This item lets you determine whether or not the trees/foliage will be visible. This is the universal controller of all the trees/foliage. If this item is checked, then the trees/foliage will be visible.

If you wish to modify the trees or foliage, select **Edit (Current Airport)…** and click the **Tree Editor** tab (*see "Tree Editor" on page 62*).

SHOW FOG

Select this item to toggle "on/off" the Fog options for RealFlight. This option may also be toggled on/off with the keyboard "F". Not all video cards will support the fog option.

If you wish to adjust the fog properties, select **Edit (current airport)** from the **Airport** menu. Click the **Background** tab, and then click on the **Edit Terrain** button to bring up the **Terrain Editor** dialog. The Fog options are located at the bottom of the page. *For more information on the Fog, see "Terrain Editor" on page 54.*

3D TERRAIN

Select this item to choose whether or not the current airport will be rendered in the 3D terrain style or PhotoField.

PhotoField displays the flying sites using photographic-quality panoramic views on a flat-style terrain. A PhotoField flying site does not require as powerful a computer as does the 3D style terrain and may assist in increasing the frame rate of your simulation.

The **3D Terrains** offer actual three-dimensional topography. The 3D terrains offer greater realism and design flexibility, however, they do require a stronger computer in order to maintain an acceptable frame rate.

Additionally, some users actually prefer the look of the PhotoField sites to the 3D style terrains. We suggest that you experiment with both to determine your personal preference. *For more information on Photofield and 3D Terrain, see "Background" on page 52).*

SET TAKEOFF POSITION

Select this item to adjust the takeoff position for the aircraft. This will also be used as the default position that the aircraft will return to each time you either crash, or hit the spacebar to reset.

To adjust the takeoff position, click on the **Set Takeoff Position** item. This will bring up an overhead view of the flying site. Using the mouse, position the pointer to the desired takeoff position and click one time. This will set the actual position for the takeoff. To adjust the takeoff heading, or direction, move the mouse left or right to rotate the aircraft accordingly. When satisfied with the heading, click the mouse once again. This will "lock" in the heading (takeoff direction) of the aircraft.

WEATHER CONDITIONS

Select this item to adjust the weather conditions such as wind speed, gust strength, wind direction and thermal activity.
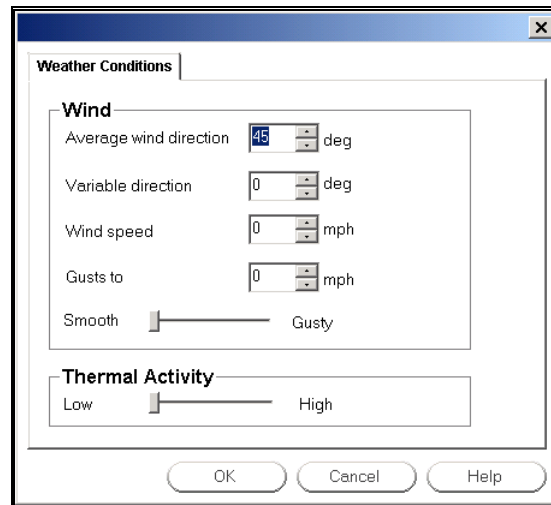
AVERAGE WIND DIRECTION

This indicates the prevailing direction of the wind. "0" degrees is North, "90" degrees is East, "180" degrees is South and "270" degrees is West. The prevailing direction may be adjusted anywhere between "0" degrees and "360" degrees.

VARIABLE DIRECTION

This indicates, in degrees, how the wind direction will vary. If this field reads "0" degrees, the wind direction will remain steady. However, if the field indicates "360" degrees, then the wind may vary through all directions.

WIND SPEED

This field indicates the prevailing wind speed. This is the constant wind speed.

GUSTS TO

This indicates the wind gust speed. The wind speed will intermittently increase to this speed. The Gust slider setting controls the frequency of the wind gusts.

GUST SLIDER

This slider is used to adjust the strength of the wind gusts. If the slider is set to smooth, the simulation will provide an unrealistically smooth flight. Gusty, on the

other hand, will provide a simulation that will challenge even the most skilled of pilots.

THERMAL ACTIVITY

This slider indicates the current thermal activity. If the slider is adjusted to the "higher" side of the settings, there are stronger thermal currents. This is useful in flying thermal gliders. The thermals appear in random locations and will have random strengths. Over time, they will move from one place to another. You can tell when your plane has entered a thermal by watching the plane carefully. When the plane starts to rise quickly, then you have found a thermal. Quickly turn around and try to stay in that thermal to gain altitude.

EXIT

Exit the program entirely.

AIRPORT MRU

The last items on the **Airport** menu (**1 Previous Field**, **2 Previous Field**, etc.) are names of airports you have previously used. In the graphic below, the user is currently flying at an airport named "Green Valley," and has previously flown at "Rainbow Canyon":

If you select one of these airports, RealFlight will reload that airport. This is a shortcut that lets you rapidly switch between airports without using the **Select Airport…** item.

CHAPTER 7. THE AIRCRAFT MENU

AIRCRAFT MENU OVERVIEW

This menu accesses all aircraft related features and options. When you open the **Aircraft** menu, your display will be similar to the following:
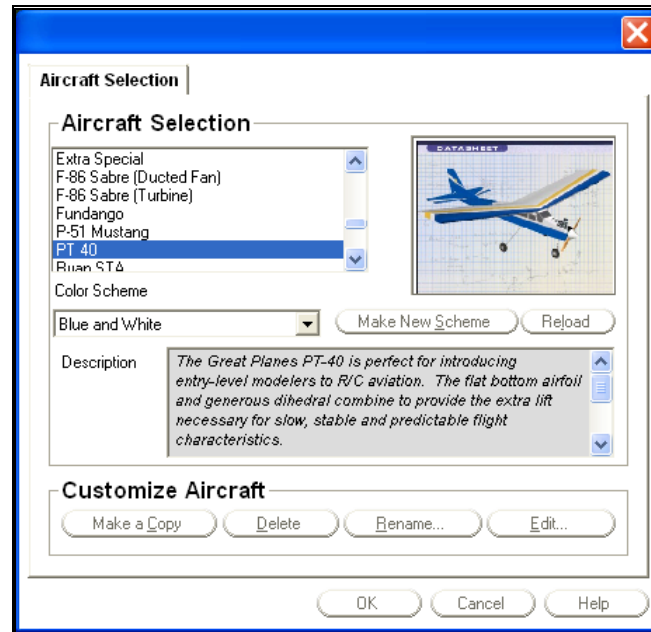

The items in this menu are:

- Select Aircraft…
- Edit (Current Aircraft)…
- Edit Radio…
- Reset Position
- Smoke Parameters…
- Aircraft Smoke
- Show Exhaust
- Flight Failures…
- Cause Flight Failure

AIRCRAFT SELECTION…

When you select **Aircraft Selection…,** the following dialog appears:

The main purpose of this dialog is to help you select the aircraft you wish to fly. This dialog also enables you to choose a paint/decal scheme for your aircraft as well.

AIRCRAFT SELECTION

From the list in the upper left side of the dialog, select the aircraft that you want to fly. Options include everything from a gentle PT-40 Trainer to a relaxing park flyer. Or, choose a heart-stopping Ultimate Biplane, or a sizzling-hot turbine fan-powered jet. Heli pilots will enjoy the 12 lifelike heli selections, ranging from a .049 heli, to a scale jet ranger, to the awesome .60-size competition heli for brushing up on your F3C routines. Every aircraft has its own unique flying characteristics as well as special functions.

The panel in the upper right side shows a graphic representation of the selected aircraft.

COLOR SCHEME

From this list, select a trim scheme, if applicable, for the aircraft that you have selected. You may also create your own trim scheme using a third-party bitmap editor, as long as your editor supports a Targa (".tga") format. *For more information on creating your own trim scheme, see "Creating A Custom Color Scheme" on page 73.*

MAKE NEW SCHEME

This button is used to add a new trim scheme for the selected aircraft.

RELOAD

This button is used to apply the created trim scheme to the selected aircraft. This is mainly used when testing your color scheme to see how it looks on the aircraft. You can save the file using the image editor, then switch to RealFlight and click Reload. The color scheme will then be reloaded into RealFlight.

DESCRIPTION

This box describes the model and any special features it may have. Consult this box to determine the switch layout of the selected aircraft, miscellaneous flight characteristics, etc.

MAKE A COPY OF AIRCRAFT

RealFlight will not allow you to change any of the default or standard aircraft on the RealFlight or Add-On CDs. You can, however, make a copy of an aircraft from the CD, and edit the copy. Use this button to copy the selected aircraft. RealFlight will prompt you for a name of the new aircraft; you can use any name that is not already in use by another aircraft.

DELETE AIRCRAFT

Delete the selected aircraft. You can only delete models that you (or another RealFlight user) have created. You cannot delete an aircraft on the RealFlight or Add-On CD.

RENAME AIRCRAFT

Rename the selected model. You can only rename the aircraft that you or another RealFlight user have created.

EDIT AIRCRAFT

Edit the selected aircraft. You can only edit the aircraft that you (or another RealFlight user) have created. You cannot edit any aircraft on the RealFlight or Add-On CDs. If you want to edit an aircraft from a CD, make a copy of the model first.

RealFlight offers you unparalleled aircraft editing capabilities. You can adjust almost any physical characteristic of your aircraft, and instantly see the results of your changes in the aircraft's flight performance. You have so many choices, we needed two separate chapters to describe them all. *See "Chapter 16. Customizing Your Airplane" on page 169, or "Chapter 17. Customizing your Helicopter" on page 203.*

Note that you can make your plane "Read Only" by using Windows Explorer. RealFlight will not allow you to edit any aircraft that has this flag set.

CREATING A CUSTOM COLOR SCHEME

RealFlight allows you to create a custom paint/decal scheme for your aircraft. The color schemes you create are limited only by your imagination.

However, only individuals that own, and know how to use, a third-party bitmap editing program such as Adobe® Photoshop®, should attempt to create a custom color scheme. Your editor must be able to read and edit Targa (".tga") files.

To create a custom color scheme, click on the "Make New Scheme" button. Next, designate a new name for the custom color scheme. RealFlight will then advise you as to the storage location of the file that will be used to create the new trim scheme.

To access the file that contains the custom color scheme, open Windows Explorer and then the RealFlight folder followed by the "Color Schemes". This will bring up all of the color schemes that have been stored in RealFlight. The name of the aircraft will precede the name that you have selected for your custom color scheme. Click on the file for which you wish to modify the trim scheme.

DO NOT ALTER THE NAME OF THIS FILE AS REALFLIGHT MAY NOT BE ABLE TO CORRELATE THE COLOR SCHEME WITH THE AIRCRAFT.

TIPS FOR COLOR SCHEMES

- A quick and easy way to change a color scheme is to replace one color with another. Photoshop has a command that can easily do this called "Replace Color".

- Make sure you save the file as 32 bit TGA files so that the Alpha Channels are preserved (See below).

- You are only allowed a single Alpha Channel.

- Do NOT change the resolution of the image.

- Other formats (JPG, BMP, etc) are not allowed.

ALPHA CHANNELS

Almost all of the color schemes for the aircrafts incorporate an Alpha Channel, which defines what areas of the color scheme are opaque and what areas are transparent. White portions of the alpha channel will be 100% opaque and Black portions of the alpha channel will be 100% transparent. Shades in-between will be partially transparent.

Consult your manual for the image editor you are using to determine how to use Alpha Channels.

Note: RealFlight uses TGA files instead of the more common BMP format since BMP formats do not support alpha channels.

EDIT (CURRENT AIRCRAFT)…

Click this item to customize the selected aircraft. This will bring up the same menu as the **Edit Aircraft** section in the **Select Aircraft** item; however, this is a faster way to access the Aircraft Editing dialogs.

You can only edit the aircraft that you have created. To edit aircraft from the RealFlight or Add-Ons CDs, you must first make a copy of the aircraft.

RealFlight offers you unparalleled aircraft editing capabilities. You can adjust almost any physical characteristic of your aircraft, and instantly see the results of your

changes in the aircraft's flight performance. There are so many choices, we needed two separate chapters to describe them all.

See "Chapter 16. Customizing Your Airplane" on page 169, or "Chapter 17. Customizing your Helicopter" on page 203.

Note that you can make your plane "Read Only" by using Windows Explorer. RealFlight will not allow you to edit any aircraft that has been set as Read Only.

EDIT RADIO...

Select this item to set up the radio you use to control RealFlight. Note that you can only edit the radio for aircraft that you have created. RealFlight will not allow you to set up the radio for any aircraft from either the RealFlight or Add-Ons CDs.

Alternatively, you can access the Radio Setup page by pressing the keyboard "T". The radio setup page that appears depends on whether or not you have selected an airplane or helicopter in the Aircraft Selection menu.

RealFlight offers you extensive radio setup options. These are described in two separate chapters (one for planes, one for helis).

See "Chapter 13. Setting up the Airplane Radio" on page 151, or "Chapter 14. Setting up the Helicopter Radio" on page 155.

RESET POSITION

Click on this item to reset the aircraft to the takeoff point. You can accomplish the same task by pressing the keyboard's space bar.

If you want to change initial position, select "Set Takeoff Position" in the "Airport" menu.

KILL ENGINE

Click on this item to stop the motor from running. This is useful in practicing dead-stick landings in airplanes and in practicing auto-rotations for helicopters. Alternatively, you may also press the keyboard "K".

SMOKE PARAMETERS

This item allows you to customize the aircraft smoke and exhaust.

Smoke and exhaust are treated as different subjects in RealFlight. Exhaust is the normal byproduct of burning fuel through an internal combustion engine. Smoke is a denser emission caused by intentionally injecting smoke oil into the muffler.

To use exhaust, click on the **Show Exhaust** item. To activate the smoke option, click on the **Airplane Smoke** item.

Smoke and exhaust are automatically scaled to take into account the different engine displacements and types.

SMOKE/EXHAUST OPTIONS

This dialog displays all of the available smoke and exhaust options. RealFlight will automatically apply these settings to all of the airplanes and helicopters.
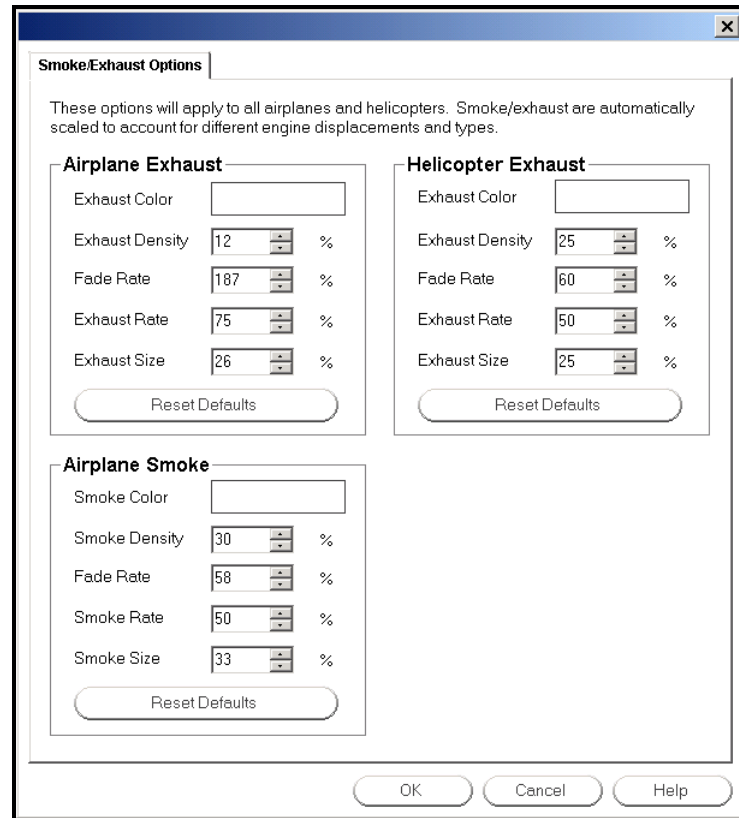
COLOR

You can set the smoke/exhaust color using the rectangular panel to the right of the "Exhaust Color" label. The panel displays the current exhaust color; clicking on the panel brings up a color palette. If you want to change color, select a new color and click **OK**. The new color will appear in the panel.

DENSITY

This displays the thickness or opacity of the smoke/exhaust. Increasing the value will increase the thickness of the exhaust, thereby making it more difficult to see through. Please note thicker smoke may slow down the frame rate, since thicker smoke requires additional rendering power from your computer.

FADE RATE

This indicates the speed at which the smoke/exhaust dissipates. Lower values mean that the exhaust dissipates more slowly, so the exhaust will take longer to disappear from the screen. Please note lower percentages may slow down the frame rate, since persistent exhaust requires additional rendering power from your computer.

RATE

This refers to the rate at which the smoke is produced. The higher the value, the more rapidly smoke is produced. Higher values may slow down the frame rate, since more smoke requires additional rendering power.

SIZE

This is the actual size of the smoke/exhaust. Larger values will increase the physical size of the exhaust, however, they may also slow down the frame rate as well due to the need for additional rendering power.

RESET DEFAULTS

Click on this button to return to the default smoke/exhaust settings.

FLIGHT FAILURES

RealFlight has the ability to simulate common failures for your models. This feature can help teach you how to remain calm, and how to recover, when an actual failure occurs at the real flying field.

When you select the **Flight Failures** menu item, the following dialog will appear:
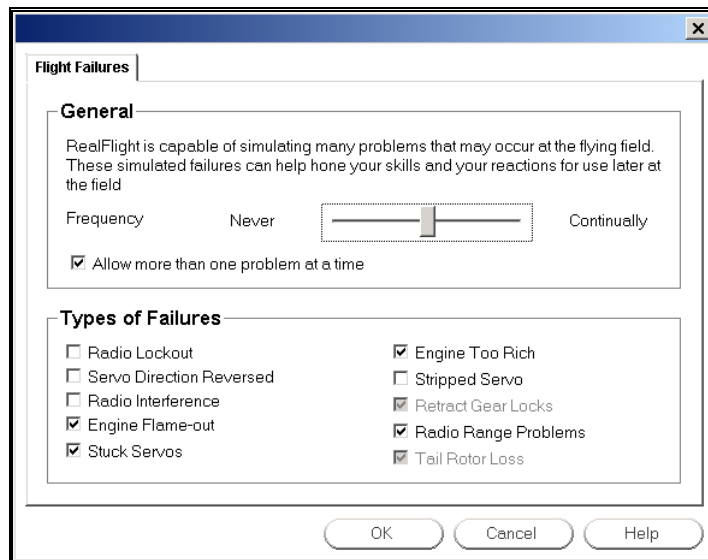
The following paragraphs describe each of the controls.

FREQUENCY SLIDER

RealFlight causes simulated flight failures at random time intervals. You can adjust the average time between failures.

This slider is used to adjust how often a flight failure will occur. Adjusting the slider indicator to the right will cause the events to happen more frequently. Adjusting the slider to the left will cause the events to occur less frequently.

If you clear, or remove the check mark, from this box, RealFlight will only simulate one type of failure at a time. For example, you will never experience radio lockout and stuck servos at the same time.

If you check this box, however, RealFlight may simulate two or more independent failures simultaneously.

TYPES OF FAILURES

These check boxes are used to select which type of difficulties you wish to experience. The options are:

Failure Type	Caused By	Detect By	Solution
Radio Lockout: your aircraft receiver may experience intermittent radio dropouts during which your aircraft will be unresponsive to radio inputs.	Problems with the radio, problems with the receiver, interference from vibrating parts on the aircraft, poor antennae placement, another radio on the same frequency.	Noticing the aircraft does not respond to your radio inputs.	When you detect this is happening, cut power and attempt to land.
Servo Direction Reversed: one of your servos may be reversed before the aircraft takes off.	Poor servo installation, servo direction reversed on radio.	Noticing that a control surface moves backwards.	Before take off, check to make sure the control surfaces move in the correct direction. If not, kill the engine and resolve the problem. If you fail to detect the problem in pre-flight, try to determine which servo is reversed and land as soon as possible.
Radio Interference: your aircraft receiver may experience intermittent radio interference during which your aircraft servos will behave erratically.	Problems with the radio, problems with the receiver, interference from vibrating parts on the aircraft, poor antennae placement.	Your aircraft will "twitch" and make unwanted movements.	When you detect this is happening, cut power and attempt to land.
Engine Flameout: one of your aircraft engines may quit during flight.	Engine not broken in, engine too lean or rich, idle set incorrectly, or you have run out of fuel.	Noticing your engine has no power or you can't hear your engine.	If possible, turn back into the runway and land; if not possible, land the aircraft off the runway.
Stuck Servos: one of the aircraft servos may get stuck in a certain position.	Binding control surface, stripped gears on servo, servo comes unplugged.	Noticing that a control surface is unresponsive.	Stay in the air and figure out which servo is locked. If it is the engine, then fly the aircraft until it runs out of fuel, then land. If it is a control surface, then quickly

			learn to how to control the aircraft and then land.
Engine Too Rich: one of your aircraft engines may run rich before the aircraft takes off.	Incorrect needle valve setting on the engine.	Notice the engine is not generating enough power and that the throttle response is poor.	Land the aircraft and adjust the needle valve.
Stripped Servo: one of your aircraft servos may stick in the neutral position.	Stripped servo gears, control linkage unhooked, servo unplugged.	Noticing that a control surface is unresponsive.	Stay in the air and figure out which servo is locked, if it is the engine, and then fly the aircraft until it runs out of fuel, then land. If it is a control surface, then quickly learn to how to control the aircraft and then land.
Retract Gear Locks: your landing gear may lock in a certain position	Failed landing gear, landing gear servo disconnected, out of compressed air.	Noticing the landing gear is in the wrong position.	If the landing gear is locked up, approach the runway and on final, kill the engine and land.
Radio Range Problems: your aircraft's receiver will experience interference proportional to the distance to the aircraft.	Radio Antennae is collapsed, receiver receiving too much noise.	Noticing the farther the aircraft goes away, the worse the interference gets.	Quickly turn around for a landing.
Tail Rotor Loss: your helicopter may suddenly lose tail rotor power.	Mechanical problem with tail rotor	Noticing a sudden yaw motion or pirouettes from the helicopter.	Immediately enter "Throttle Hold" mode and auto-rotate the helicopter to a landing.

CAUSE FLIGHT FAILURE

When you select this item, RealFlight will immediately simulate a flight failure. Selecting this will not change any settings in the **Flight Failures** dialog.

AIRCRAFT MRU

The final items in the **Aircraft** menu indicate the most recently used aircraft. The first item is the aircraft you are currently flying; successive items are aircraft you have previously flown. You can load an aircraft by selecting it from this list. This is a shortcut that allows you to switch between favorite aircraft without using the Select Aircraft… menu item above (*see "*Aircraft Selection…*" on page 72*).

CHAPTER 8. THE EVENT MENU

EVENT MENU OVERVIEW

An **event** is an organized flying contest, with a set of rules. RealFlight G2 currently supports five types of events: Limbo, Pylon Racing, Spot Landing, Freestyle, and Autorotation. You can play any of these events alone, or with other RealFlight G2 users over the Internet.

To participate in an event alone, all you have to do is start the event. RealFlight's software will do the rest.

If you want to compete with additional RealFlight G2 users, you must first start a multiplayer session *(see "Chapter 11. The Multiplayer Menu" on page 137)*. When everyone has joined the session, the session host will start the event. This enrolls every member of the multiplayer session in the event. If any multiplayer session members want to leave the event, they can do so while remaining a part of the multiplayer session.

Events use the position of the first runway it finds in order to locate the event objects (like pylons), if you have all runways turned off, then the event objects will be placed in a random position.

You can only run one event at a time. This applies to multiplayer sessions as well.

The Event menu accesses all events, and event-related options. When you open the menu, the items are:

- Start Event

- End Current Event

- Leave Current Event

- Forfeit Turn

Some of these items will be "grayed out" if they do not apply to the current situation. For example, you cannot end the current event unless there is already an event running; consequently the **End Current Event** will be grayed out.

START EVENT

Use this to select the event you wish to run. Your choices are:

- Limbo

- Pylon Racing

- Spot Landing

- Freestyle

- Auto-rotation/Deadstick

The following sections describe each event in detail.

LIMBO

Limbo is a contest of piloting skill and courage. Players attempt to maneuver their aircraft under a horizontal bar suspended across two vertical bars. With each successive pass, the bar will be lowered. The event continues until only one pilot remains.

When you select Limbo, you will see the following dialog:

YOUR NAME FOR THE EVENT

This field allows you to select an identifier for this contest. If you have any multiplayer partners, this is the name they will see. You can choose any name or nickname you like.

DIFFICULTY

You can select from three challenge levels: beginner, intermediate and advanced. As you might expect, the event is more difficult at the intermediate level than it is at the beginner level.

TIME TO COMPLETE EACH PASS

This indicates the time allotted to successfully complete each pass beneath the limbo bar. The time is shortened as the skill level is increased.

COMMITMENT LINE DISTANCE

This indicates the distance from the commitment line to the limbo bar. This line is used to detect an attempted pass at the limbo bar. As the skill level increases, the commitment line is placed farther away from the limbo bar.

NUMBER OF ATTEMPTS PER HEIGHT

This indicates the number of attempts, per pilot, that are allowed at any given height of the limbo bar before he/she is eliminated.

STARTING BAR HEIGHT

As the name suggests, this is the height at which the bar will start for the event. As the skill level increases, the starting bar height will decrease.

ENDING BAR HEIGHT

This is the lowest height that the bar will reach during competition.

DISTANCE BETWEEN BARS

This indicates the distance between the two vertical bars that support the limbo bar. As the skill level increases, the distance between the bars will decrease.

AFTER SUCCESS, MOVE THE BAR BY

When a participant successfully passes under the limbo bar, on his/her next attempt the bar will be lowered by this amount.

CRASHES ELIMINATE PLAYERS

This check box indicates whether or not players will be eliminated if they crash their aircraft. Please note this elimination is for this particular event only.

EVENT INSTRUCTION

This check box provides information regarding the selected event.

STARTING A LIMBO EVENT

A limbo competition can be run in either a single player or multiplayer environment. *For instructions on how to start, leave, or end an event, see "Limbo" on page 82.*

The person who starts the event can pick a difficulty level, and set some of the rules. For example, you can set:

- How much time each player gets per turn;

- Whether players are disqualified when their aircraft crash;

- The physical dimensions of the limbo apparatus.

RealFlight automatically applies the rules you choose, and keeps track of scores. During the event, an announcer's voice will guide you through each phase of the competition.

RULES

The limbo course consists of a limbo pole, and two *attempt lines* (also called *commitment lines*), one on each side of the limbo pole:
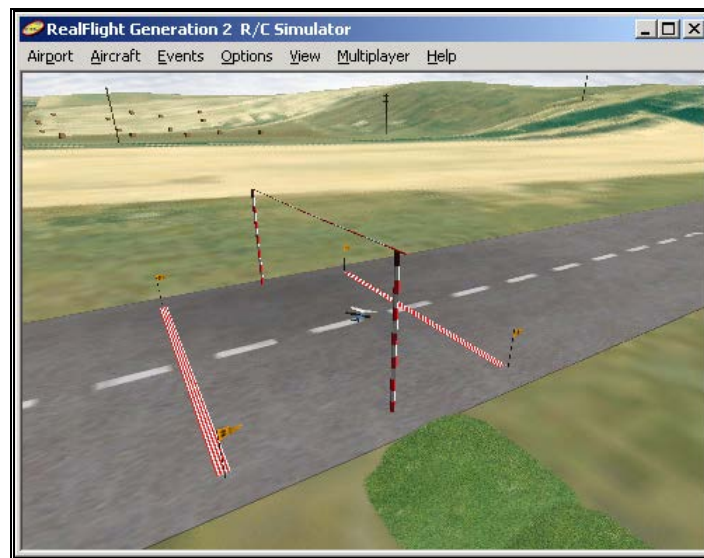
The object of limbo is to fly an aircraft past an **attempt line**, then under the limbo bar, in the time allowed. Players take turns making attempts to fly under the bar. When your turn comes, you will normally take off, circle back towards the limbo pole, then pass across the attempt line and under the bar, then land. If you successfully fly under the bar, the bar height will be lowered during your next turn.

An "attempt" means you have crossed the attempt line, approaching the limbo bar. You can make multiple attempts, if necessary, during a turn.

There are two time limits imposed on limbo contests:

- *Time allowed per turn.* You have 1-2 minutes between the moment you first lift off and the moment you successfully pass under the bar. If you

don't make it under the bar in time, you lose your turn. (Before the event begins, the host decides the exact time limit.)

- *Time allowed per attempt.* After you commit to an attempt by crossing an attempt line, you have ten seconds to make it under the bar. If you don't make it in time, you have to circle around and cross the attempt line again. (You don't lose your turn.) This usually occurs when you miss the limbo apparatus completely.

 You can approach the limbo bar from either direction (i.e., you can cross either attempt line). For an attempt to count, you must be approaching the limbo bar when you cross an attempt line. Your aircraft must be airborne when it crosses the attempt line *and* when it passes under the bar (i.e., if you taxi, your attempt will not count).

The event continues until each player has made it under the lowest bar height, or has been disqualified (usually by crashing), or has left the event.

The player with the highest score wins. Your score for each turn is:

(time between first liftoff and successful pass)

X (height cleared) / 100

or zero if you didn't make it under the bar. So, you get the highest score by passing under the bar as soon as possible after takeoff.

PYLON RACING

In Pylon Racing, pilots race their planes around a closed course. Either two or three pylons mark the course perimeter.

This event challenges the pilot's nerves and skill as he/she attempts to round the pylons, avoid mid-air collisions, and finish first, without cutting any pylons.

YOUR NAME FOR THE EVENT

Select an identifier for this contest. You can choose any name or nickname you like.

THREE PYLON RACING

Click this box to choose three-pylon style racing. The pylons will form a triangle, with your vantage point between two pylons.

PYLON 2 AND 3 OFFSET

This indicates the distance to the left and right from the beginning of the runway that the number two and number three pylons are placed. Increasing the value will place the pylons farther apart.

PYLON 1 OFFSET

Enter the distance from the end of the runway (where your point of view is) to the first pylon.

TWO PYLON RACING

Click this box to choose two-pylon style racing.

DISTANCE BETWEEN

Enter the distance between the two pylons. Increasing the value will increase the distance between the pylons.

THRESHOLD RACING

If threshold racing is enabled, then you don't actually have to go around the pylon, rather you only need to break the plane of the pylon.

EVENT INSTRUCTION

This check box provides information regarding the selected event.

PYLON RACING INSTRUCTIONS

STARTING A SPOT LANDING EVENT

A pylon race can be run in either a single player or multiplayer environment. *For instructions on how to start, leave, or end an event, see "Pylon Racing" on page 85.*

The person who starts the event can set some of the rules. For example, you can set:

- How many pylons mark the course (two or three);
- Regular or Threshold style racing (two-pylon races only);
- The number of laps in the race;
- The distances between pylons.

RealFlight automatically applies the rules you choose, and keeps track of scores. During the event, an announcer's voice will guide you through each phase of the competition.

RULES

The pylon racing course consists of two or three *pylons*. Here is an example of a three-pylon course:

For both two- and three-pylon style, the object is to take off, then circle the pylons (without "cutting") in the shortest amount of time. Racers will usually have multiple laps. All racers start together. The race continues until each player has finished, or has been disqualified (usually by cutting or crashing).

All players start at the same point on the runway. When you hear the word "GO!" take off and start the race.

In pylon racing, you always circle the pylons *counterclockwise* viewed from above—that is, when you come to a pylon you always turn *left*. As you approach each pylon, you will hear a voice telling you when to start your turn. When you have made a successful turn, you will hear a brief tone.

"Cutting" is illegal. The first time you cut during a race, you are penalized one lap. The second time you cut, you are disqualified. To avoid being called for a cut, your entire aircraft must go completely around each pylon. (***Exception***: in a two-pylon style course, you can choose to use ***threshold racing*** rules. In threshold racing, your aircraft only has to "break the plane" of the pylon to get credit for a legal turn. This allows pilots to find independent race lines, which may reduce collisions during a race. Before the race begins, the host chooses whether the race will follow regular or threshold rules.)

The pilot who finishes the required number of laps first wins the race.

SPOT LANDING

In a Spot Landing event, pilots take turns trying to touch their aircraft down within marked zones. Different zones have different point values; zones with higher values are tougher to target.

When the event ends, the pilot with the highest number of points wins.

YOUR NAME FOR THE EVENT

Select an identifier for this contest. You can choose any name or nickname you like.

RULE BASE

Select from three challenge levels: beginner, intermediate and advanced. The level you select will determine landing zone sizes, zone point levels, etc. As you might expect, the event is more difficult at the intermediate level than it is at the beginner level.

NUMBER OF TURNS PER PLAYER

Choose the number of turns that each player is allotted.

NUMBER OF ATTEMPTS PER TURN

Choose the number of attempts that are allotted per player, *per turn*. Each time a player gets a turn, they may make multiple attempts to land on the marker. If a player uses up his attempts without making a landing, his/her turn expires. Allowing fewer attempts per turn makes the event more difficult.

ALLOWED TIME PER ATTEMPT

This indicates the time that will be allowed per each attempt. Allowing more time per attempt makes the event less difficult.

ZONE POINT VALUES

The spot landing zones are divided into five segments. Each segment has a different point value assigned to it. The center is the main objective. Therefore, it offers the highest point value. Zone B, which surrounds the center, offers the second highest points, followed by Zone C, D and E. The segments are as follows:

- Center
- Zone B
- Zone C
- Zone D
- Zone E

EVENT INSTRUCTION

This check box provides information regarding the selected event.

SPOT LANDING INSTRUCTIONS

STARTING A SPOT LANDING EVENT

A spot landing competition can be run in either a single player or multiplayer environment. *For instructions on how to start, leave, or end an event, see "Spot Landing" on page 88.*

The person who starts the event can pick a difficulty level, and set some of the rules. For example, you can set:

- How much time each player gets per turn;
- How many turns each player gets;
- How many attempts each player gets per turn,
- The physical dimensions of the landing target;
- Whether a player who crashes is automatically disqualified;
- Point values of the different zones within the landing target.

RealFlight automatically applies the rules you choose, and keeps track of scores. During the event, an announcer's voice will guide you through each phase of the competition.

RULES

The spot landing course consists of a *target*, and two *attempt lines* (also called *commitment lines*), one on each side of the target:
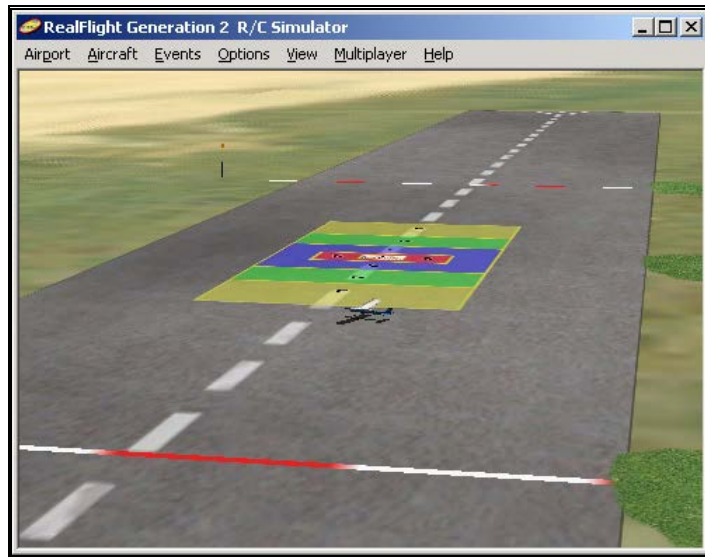
The object of spot landing is to fly an aircraft over an attempt line, then touch down as close as possible to the center of the target. Players take turns making landing attempts. When your turn comes, you will normally take off, circle back towards the target, then pass over the attempt line and touch down.

A "touch down" occurs when **any** part of your aircraft touches the ground. An "attempt" means you have crossed an attempt line while approaching the target. You can make multiple landing attempts, if necessary, during a turn.

There are two time limits imposed on the spot landing event:

- *Time allowed per turn.* You have 1-2 minutes between the moment you first lift off and the moment you successfully touch down. If you don't touch down in time, you lose your turn. (Before the event begins, the host decides the exact time limit.)

- *Time allowed per attempt.* After you commit to a landing attempt by crossing an attempt line, you have ten seconds to touch down. If you don't make it in time, you have to circle around and cross an attempt line again. (You do not forfeit your turn.) This usually happens when you pull up, and have to circle around for another pass.

You also have a limit on how many landing attempts you can make during your turn. The host sets this limit at the start of the event.

You can approach the target from either direction (i.e., you can cross either attempt line). For an attempt to count, you must be approaching the target when you cross an attempt line. Your aircraft must be airborne when it crosses the attempt line (i.e., if you taxi, your attempt will not count).

You can only touch down once per turn, so if it looks like you'll miss the target, pull up, circle around, and try again.

The points you receive during a turn depend upon where you touch down. Within the target, each colored zone has a different point value. Normally, the closer to the center you land, the more points you are awarded. Your touch down point is the point on the ground directly below the center of your aircraft, no matter what part of your aircraft touches first. When you touch down, you will see an "X" appear on the ground at the place you touched down.

The event continues until each player has completed all of his or her turns, or has been disqualified (usually by crashing), or has left the event.

The player with the highest total score wins.

FREESTYLE

RealFlight's Freestyle event lets you make the rules. When you start a Freestyle event, RealFlight will allot every player a set of turns. Each player's turn ends when that player's time expires (or if the player crashes). When this occurs, the next player's turn begins. What players do during their respective turns is completely up to the participants. We've included some possible freestyle examples below.

Whatever activity you pick, RealFlight will see that each player receives a timed turn. You can use freestyle with any aircraft (airplanes or helis).
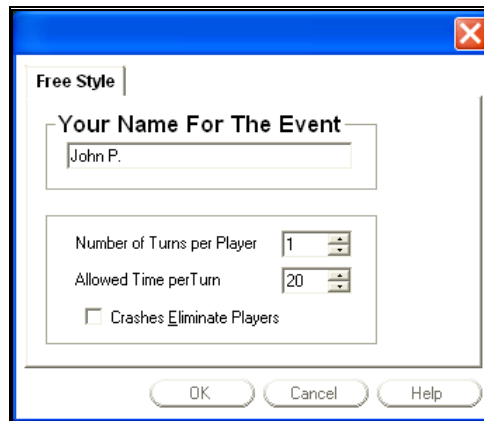
YOUR NAME FOR THE EVENT

Select an identifier for this contest. You can choose any name or nickname you like.

NUMBER OF TURNS PER PLAYER

Choose the number of turns that each player is allotted.

ALLOWED TIME PER TURN

Choose the amount of time for each player's turn. You will want to adjust this up or down depending on the activity you pick for the event.

CRASHES ELIMINATE PLAYERS

If the host checks this box, players who crash will not get any further turns. If the box is unchecked, a crash will immediately end a turn but not disqualify the player.

FREESTYLE INSTRUCTIONS

STARTING A FREESTYLE EVENT

You will usually want to use the Freestyle event in a multiplayer environment, but it works in single player mode as well. *For instructions on how to start, leave, or end an event, see "Freestyle" on page 91.*

Before you start a freestyle event, you will ordinarily decide what the participants must do. You may just want to use the event to give everyone an equal chance to showcase some aerobatics; in this case you don't have to worry about scoring. However, if you want to have a competition, we suggest that before you begin the event:

- Everyone should agree what the rules are.

- The host may need to edit the airport to add any equipment (pylons, runways, fences, barriers, limbo poles, etc.) you will need for the event.

- Everyone should agree how the event will be judged. You could appoint one player to decide on a score for every other player, or have everyone in your session vote on the best stunt, etc.

The person who starts the event (multiplayer session host) can pick:

- How much time each player is allotted per turn;

- How many turns each player receives; and

- Whether a player who crashes is automatically disqualified.

We emphasize, *the only limit on the freestyle event is your imagination*. A few examples of what you might wish to do:

- Touch and Go. Appoint one partner to count touches, contestant with the most touches in a turn wins.

- Stunts. Players use their turns to perform any stunt they want. At the end, everyone votes on the best stunt.

- Obstacle course. Set up a long obstacle (table, etc.) close to the ground and take turns flying under it; land or take off from ramps, circle around pylons, etc.

- It doesn't have to be a contest. You might all just want to take an equal turn at using the runway (take off, land on alternate turns).

AUTOROTATION/DEADSTICK

The Autorotation/Deadstick event is similar to Spot Landing, but requires that you land a helicopter using autorotation.

Pilots take turns trying to autorotate their heli into the marked zones. You can set RealFlight to automatically "kill" the active player's engine when he passes below a particular altitude. Different landing zones have different point values; zones with higher values are tougher to target.

When the event ends, the pilot with the highest number of points wins.

YOUR NAME FOR THE EVENT

Select an identifier for this contest. You can choose any name or nickname you like.

RULE BASE

Select from three challenge levels: beginner, intermediate and advanced. The level you select will determine landing zone sizes, zone point levels, etc. As you might expect, the event is more difficult at the intermediate level than it is at the beginner level.

NUMBER OF TURNS PER PLAYER

Choose the number of turns that each player is allotted.

MIN ALTITUDE TO STOP ENGINE

Players must kill their engine when they pass below this altitude. The multiplayer host has the ability to have each active player's engine automatically killed at a specified altitude. For additional information, please see the "Automatically Stop the Engine at Altitude" section below.

ALLOWED TIME PER TURN

Use this to determine how much time each player gets to complete an autorotation landing per turn. Allowing more time per attempt makes the event less difficult.

CRASHES ELIMINATE PLAYERS

If the host checks this box, any players who crash their helis will be disqualified. They may continue to watch the event but they will not get another turn. Uncheck the box to allow a crashed player to continue to take turns.

AUTOMATICALLY STOP THE ENGINE AT ALTITUDE

If the host checks this box, the current player's engine will be killed (shut off) when the player passes below the minimum altitude (see above). If the box is unchecked, it is the player's responsibility to kill the heli engine before passing below the minimum altitude.

ZONE SCALE

Use this control to change the size and shape of the target area.

ZONE POINT VALUES

The landing zones are divided into five segments. Each segment has a different point value assigned to it. The center is the main objective. Therefore, it offers the highest point value. Zone B, which surrounds the center, offers the second highest points, followed by Zone C, D and E. The segments are as follows:

- Center
- Zone B
- Zone C
- Zone D
- Zone E

EVENT INSTRUCTION

This check box provides information regarding the selected event.

AUTOROTATION/DEADSTICK INSTRUCTIONS

STARTING AN AUTOROTATION/DEADSTICK EVENT

An autorotation competition can be run in either a single player or multiplayer environment. *For instructions on how to start, leave, or end an event, see "Autorotation/Deadstick" on page 92.*

The person who starts the event can pick a difficulty level, and set some of the rules. For example, you can set:

- How much time each player is allotted per turn;
- How many turns each player receives;
- Whether a player's engine is automatically or manually killed during a turn;
- The altitude at which an engine must be killed;
- The physical dimensions of the landing target;
- Whether a player who crashes is automatically disqualified;
- Point values of the different zones within the landing target.

RealFlight automatically applies the rules you choose, and keeps track of scores. During the event, an announcer's voice will guide you through each phase of the competition.

RULES

The Autorotation/Deadstick course consists of a *target*:
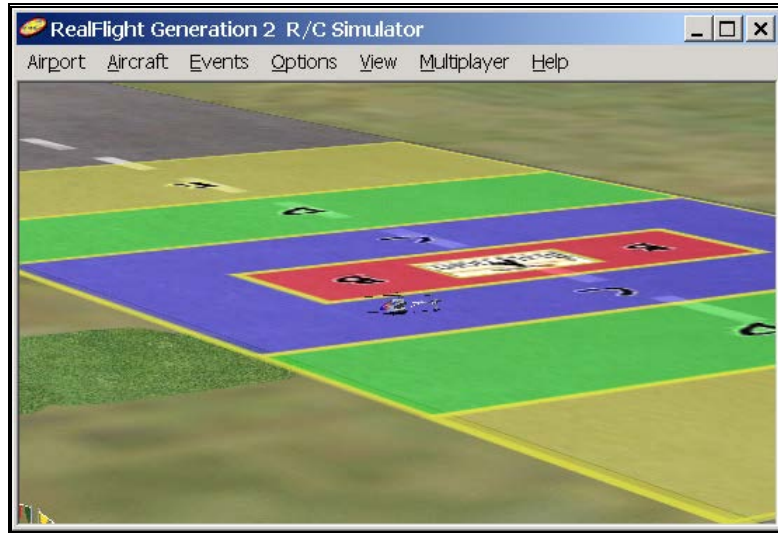
The object of autorotation is to fly a heli over the target, kill the engine, then touch down as close as possible to the center of the target. Players take turns making landing attempts. When your turn comes, you will normally take off, gain altitude until you are above the minimum "engine kill" altitude, fly towards the target, and then kill your engine and autorotate to the ground.

If the host so decides, you must kill your engine before dropping below the minimum altitude to kill engine. Or, the host can decide that your engine will automatically shut off when you pass below this altitude. The host must also decide on the minimum "engine kill" altitude.

A "touch down" occurs when **any** part of your heli touches ground. An "attempt" means you have passed below the minimum altitude to kill your engine. Once your engine is killed, you cannot reactivate it until your turn expires, and you must land successfully (without crashing the heli) to receive any points for your attempt.

You must also complete your landing before your turn time expires. If you don't touch down in time, you lose your turn.

The points you receive during a turn are dependent upon where you touch down. Within the target, each colored zone has a different point value. Normally, the closer to the center you land, the more points you get. Your touch down point is the point on the ground directly below the center of your aircraft, no matter what part of your aircraft touches first.

The event continues until each player has completed all of his or her turns, or has been disqualified (usually by crashing), or has left the event.

The player with the highest total score wins.

END CURRENT EVENT

Select this item to end the current event.

This option will be "grayed out" if there are no events taking place, or if you are not allowed to end the event. (Only the person who starts the event is allowed to end it.)

LEAVE CURRENT EVENT

Select this item to leave an event that you *did not* start.

You can select this item if you are part of a multiplayer event, and you are not the host. This item is grayed out if:

- You are the host of a multiplayer event (you can only exit by selecting "End Current Event", which ends the event for everyone); or
- You are the only participant in this event.

If you leave the event, you will remain part of the multiplayer session. You will be able to fly, and you can watch the event continue, but you cannot re-enter the event.

FORFEIT TURN

Select this item to sit out for one turn. All the other pilots will take their turns before you can participate again.

This item is grayed out if you are playing an event where players do not take turns (e.g. Pylon Racing).

CHAPTER 9. THE OPTIONS MENU

OPTIONS MENU OVERVIEW

The **Options** menu controls several RealFlight program features. Items in this menu include:

- Direct 3D…

- Controller Calibration…

- Graphics Optimizations…

- Miscellaneous…

- Run in Window

- Enable Collisions

- Virtual Flight Instructor…

- Recordings…

- Start/Stop Recording

- Music/Sound…

- Keyboard Mappings…

DIRECT3D

Select this item to control settings for your 3D video card.
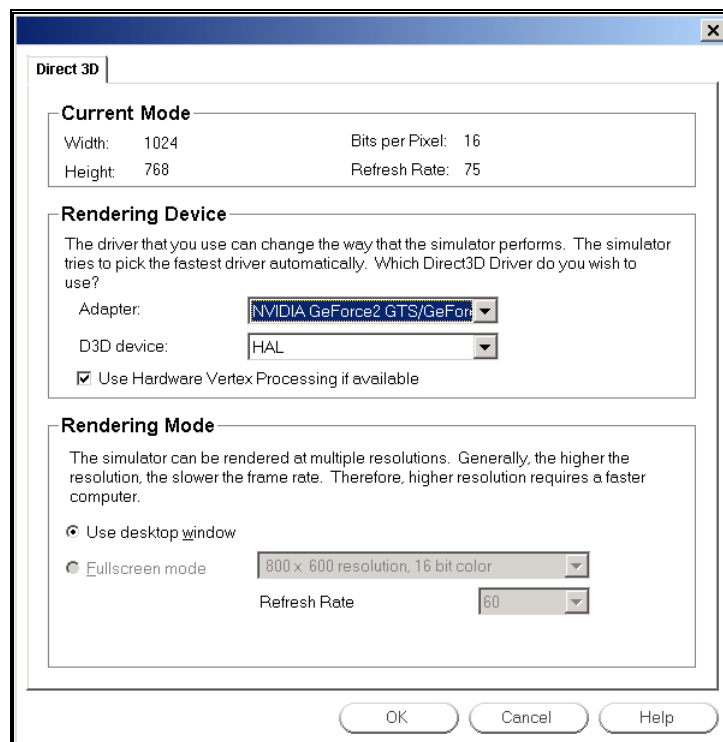
CURRENT MODE

This displays the current screen width, the height and the bits per pixel. Additionally, if your monitor's current refresh rate is known, it will also be displayed.

ADAPTER

If you have more than one Direct3D compatible video card, they will both be listed here. Please choose the card you wish to use.

RENDERING DEVICE

Each card can have different devices, although most cards will only offer the HAL interface.

USE HARDWARE VERTEX PROCESSING IF AVAILABLE

Check this box if you wish to use the hardware vertex processing. Most of the time you want this option enabled. If you experience difficulties with the graphics, try disabling this option. If disabling this option fixes your problem, then contact your video card manufacture and notify them of this difficulty.

You can look in the **Graphics Optimizations** dialog (*See "Graphics Optimizations" on page 103 to see if your card supports Hardware Vertex Processing*).

RENDERING MODE

RealFlight Generation can be run in Window mode, or in Full Screen Mode.

WINDOW MODE

The Window mode screen size is dictated by the settings that you have selected in the Display Properties for your monitor. If run in the Window Mode, the RealFlight menus will always appear at the top of the screen for easy access. You can at any time change the resolution of the desktop by going to Start Menu/Settings/ControlPanel/Display.

Please note: if you are using a 32 Color Bit display mode for your desktop, it will not render as quickly as choosing a 16 Color Bit display mode.

FULL SCREEN MODE

Selecting this option will allow RealFlight to use the entire monitor screen. If you are running in Full Screen Mode, the RealFlight menus will not appear on the screen. To access the menu, press either the ESCape key or the ALT key on the keyboard.

RESOLUTION

In full screen mode only, you can use this control to adjust the screen resolution and color depth. If your frame rate is unacceptably low, you can improve it by reducing the resolution or color depth. This will reduce some of the rendering required of your video card.

Resolution determines both the sharpness of the picture and how many colors will be used to render the picture. To illustrate resolution, here is the same image of a plane at two different resolutions.

640 x 400 Resolution   *1600 x 1200 Resolution*

Notice how much clearer the higher resolution picture is. The problem with high resolutions is that on some computers, it makes the program run much slower. Selecting the ideal resolution for your computer requires a delicate balance between quality and speed.

REFRESH RATE

Adjust the refresh rate of you monitor (Full Screen Mode only).

This controls only the *refresh* rate, not the *frame* rate.

Refresh rate is the number of times per second that your monitor retraces its video display. Your video hardware (monitor and graphics card) dictates what refresh rates you can use.

Frame rate is the number of times per second that RealFlight creates a different picture to display on your monitor. Frame rate is determined by the speed of your CPU and graphics card, and how many RealFlight options are activated.

Use this control to set the refresh rate for Full Screen Mode. If RealFlight is unable to determine what refresh rates your card supports, this control will display "0." Higher refresh rates have less "flicker" and usually cause less eye strain.

*For suggestions on increasing RealFlight's frame rate, see "*Improving RealFlight G2 Performance*" on page 275.*

We suggest that you test a variety of resolutions and color options to achieve the optimum performance and setup for your system.

CONTROLLER CALIBRATION

This page lets you set up your controller, and verify that your controller is operating correctly. This is an important dialog. If you use your own transmitter to control RealFlight, and it is not set up correctly, your aircraft will fly erratically.

If you are using the InterLink Controller as a standalone mockup transmitter, you should not normally need to calibrate it. If you are using your own transmitter to control RealFlight, you may need to calibrate it if RealFlight does not have a pre-calibrated setting for your transmitter's manufacturer and model.
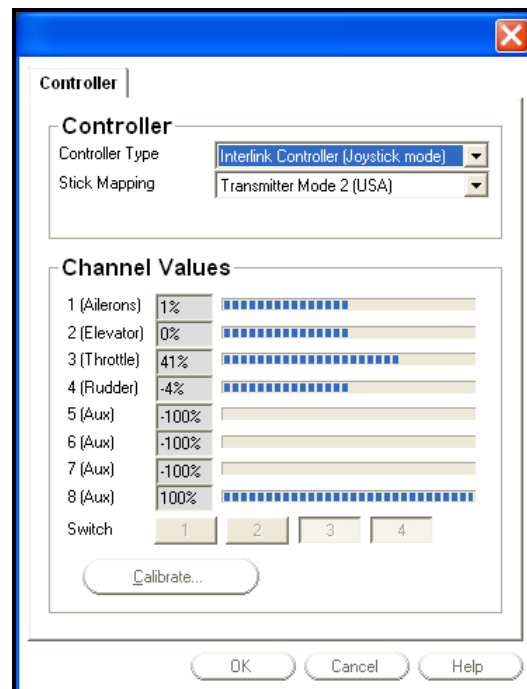
Appearance of the Controller Calibration dialog in Joystick mode
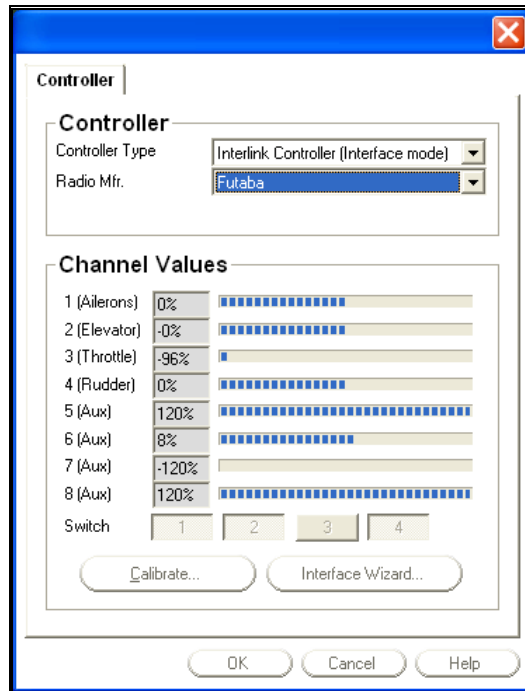
Appearance of the Controller Calibration dialog in Interface mode

CONTROLLER TYPE

Select the controller type that you wish to use. In **Joystick Mode,** RealFlight accepts input from the InterLink Controller box. In Interface Mode, RealFlight accepts control from your R/C transmitter (assuming it is connected to the InterLink Controller's "buddy box" interface).

When you change between Joystick and Interface mode, some of the controls in this dialog will change (see diagrams above). *For more details, see "Joystick vs. Interface Mode" on page 39.*

STICK MAPPING (JOYSTICK MODE ONLY)

This indicates the mode or type of joystick that you will be using for RealFlight. Select the controller mode that you wish to use. A description of the various modes follows.

- **Transmitter Mode 1 (Europe, Asia) -** Select this option to use the controller for the joystick. This requires the joystick to have four distinct axes. Use this option if you have purchased the Futaba controller Mode 1 version of this software, or if you have converted your controller to mode 1. *Mode 1 transmitters have aileron and throttle on the right stick, and rudder and elevator on the left stick.*

- **Transmitter Mode 2 (USA) -** Select this option to use a mode 2 controller for the joystick. This requires the joystick to have four distinct axes. Use this option if you have purchased the Futaba mode 2 controller version of this software. *Mode 2 transmitters have aileron and elevator on the right stick; rudder and throttle on the left stick.*

- **Transmitter Mode 3 -** Select this option to use the controller for the joystick. This requires the joystick to have four distinct axes. In order

to use Mode 3, you will need to have purchased the "**Mode 2**" version of the controller. *Mode 3 transmitters have rudder and elevator on the right stick; aileron and throttle on the left stick.*

- **Transmitter Mode 4 -** Select this option to use the controller for the joystick. This requires the joystick to have four distinct axes. In order to use Mode 4, you will need to have converted a "**Mode 1**" version of the controller. *Mode 4 transmitters have rudder and throttle on the right stick, and aileron and elevator on the left stick.*

- **Custom -** Choose this if you have a custom joystick. This setting may also be used if you want to change the way the controller sticks are mapped.

RADIO MANUFACTURER (INTERFACE MODE ONLY)

Use this setting to select the company that manufactures your R/C transmitter.

CHANNEL VALUES

This preview window shows you the input channels as they are read in real time from your controller or joystick. If you move the physical sticks on the controller and the meters on the screen do not move, then your joystick is not set up correctly. If your sticks move in the wrong direction or do not move all the way to the extremes, then you may not have calibrated the joystick correctly or you may have to perform additional calibration using the **Interface Wizard** (interface mode only).

There is also a preview of the switches as well. When a switch is "on" RealFlight will highlight the respective button. *For more information on the switch/knob layout of the InterLink Controller, see "Chapter 5. The InterLink Controller" on page 37.*

CALIBRATE

You can, but should not normally need to calibrate the InterLink Controller when you use it as a standalone mockup transmitter. You may need to calibrate your own transmitter the first time you use it to control RealFlight. Click on the "Calibrate" button to initiate the calibration sequence. Follow the onscreen instructions. *For more information about calibration, see "Interface Calibration" on page 42.*

INTERFACE WIZARD (INTERFACE MODE ONLY)

When you use your own R/C transmitter to control RealFlight, you will need to assign its input channels. The Interface Wizard is a sequence of dialogs that helps you to do so.

This process is included as part of the calibration procedure the first time you use your own R/C transmitter to control RealFlight. You normally only need to do this once, but you can click the button to enter the wizard if, for some reason, you want to change something.

For more information about the Interface Wizard, see "Interface Wizard" on page 42.

GRAPHICS OPTIMIZATIONS

Select this item to access the Graphics Optimizations dialog:
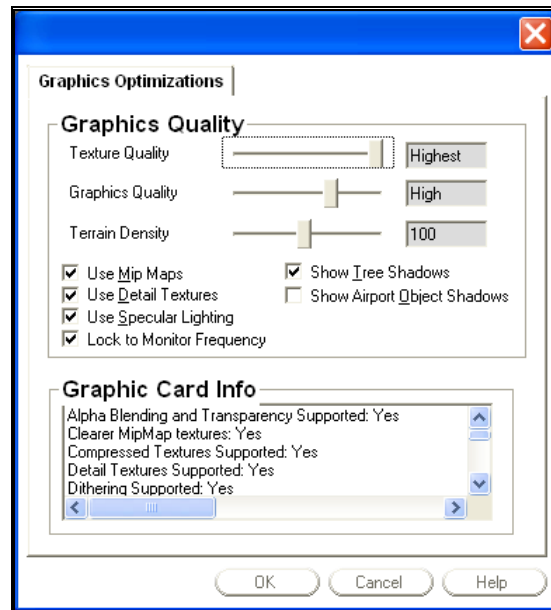
This dialog controls a wide variety of the graphics performance options for RealFlight.

RealFlight Generation 2 attempts to optimize your system's performance, however, these controls will enable you to further fine-tune the simulation to suit your personal taste.

TEXTURE QUALITY SLIDER

This slider controls the texture quality of RealFlight. Moving the slider to the right will increase the texture resolution. Higher resolutions will improve the realistic appearance, however, they may also slow down the frame rate as well.

GRAPHICS QUALITY SLIDER

This slider controls several graphics aspects of the RealFlight simulation (for example, shadow quality), allowing you to tweak the simulation for optimum performance. Higher graphics quality will improve the realism, however, it may also slow down the frame rate as well.

TERRAIN DENSITY SLIDER

Increasing the values of the Terrain Density will increase the resolution of the terrain thereby giving it a more life-like appearance. Higher resolution will improve the realism, however, it may also slow down the frame rate as well.

USE MIPMAPS

Click this check box to activate the MipMaps feature. Turning this feature "off" may cause unwanted "sparkling" on distant objects, or on object surfaces that are viewed

at large angles. Using MipMaps improves realism, but may slow down your computer's frame rate.

USE DETAIL TEXTURES

Click this check box to use detailed textures at your flying site. This increases the detail and sharpness on surfaces (the ground in particular). Using the detailed textures feature improves realism, but may slow down your computer's frame rate.

USE SPECULAR HIGHLIGHTING

Click this check box to use the Specular Highlighting feature. This feature makes smooth objects appear shiny in reflected light. Using the Specular Highlighting feature improves realism, but may slow down the frame rate.

SHOW AIRPORT OBJECTS SHADOWS

Click this check box to show the shadows that are cast by the airport objects such as buildings, walls, etc. Using the feature improves realism, but may slow down the frame rate.

SHOW TREE SHADOWS

Click this check box to show the shadows that are cast by the trees. Using the feature improves realism, but may slow down the frame rate.

GRAPHICS CARD INFO

This panel displays information pertaining to your graphics card. This is an easy way to determine whether or not your current graphics card will support a certain feature or function.

MISCELLANEOUS

Select this item to access the **Miscellaneous** options dialog:
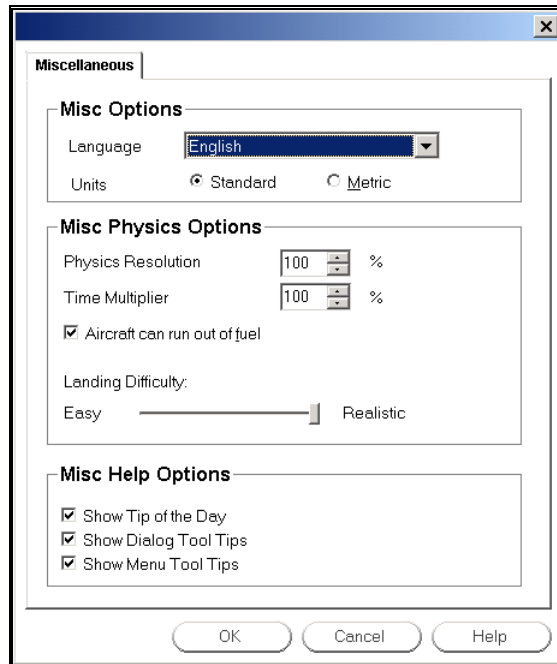
This dialog allows you to adjust miscellaneous options such as language, units of measure, adjust the landing difficulty, etc.

LANGUAGE

This indicates the language that RealFlight will use in all of its dialogs. The language that appears here will reflect the language that was selected during the installation process.

UNITS

This will determine how the units of measure for editing aircraft will be displayed. This setting does not affect the units of measure as displayed in the NavGuides. You can set NavGuides units using the **Edit Gadget** page. (To edit Gadgets, select **Edit Gadgets** from the **Gadget** submenu in RealFlight's **View** menu.)

PHYSICS RESOLUTION

Adjusts how fast the physics are calculated. The higher the percentage, the smoother the aircraft responds to aerodynamic and ground forces.

Setting this parameter higher requires more computing power; 100% will work fine on most computers. However, on slower systems you may need to lower this value below 100% to maintain a normal frame rate.

There is usually no need to exceed 100%. Setting the percentage above 100% may slow down frame rate.

TIME MULTIPLIER

Indicates the percentage to adjust RealFlight's visual time base. Reducing this value allows you to create a "slow-motion" effect. This slow-motion effect is useful when learning new skills or maneuvers, as you can slow the aircraft's reaction time.

AIRCRAFT CAN RUN OUT OF FUEL

Check this box to allow your aircraft to run out of fuel. If left unchecked, the model will be able to run indefinitely. To adjust the size of the fuel tank, or battery power, access the aircraft editing dialogs. To do so, choose the **Select Aircraft** item in the **Aircraft** menu.

LANDING DIFFICULTY SLIDER

This slider adjusts the difficulty of landing the respective aircraft. Entry-level pilots may wish to adjust the slider to the "easy" settings. These settings are more forgiving and will allow the aircraft to survive mistakes that would normally crash an actual R/C aircraft. The realistic settings, however, are not as forgiving and more closely mimic the response of an actual R/C aircraft.

SHOW TIP OF THE DAY

Click on this check box to turn "on/off" the RealFlight Tip of the Day. These tips are a sequence of helpful hints and tips on using RealFlight. These tips often call attention to overlooked, yet important, features and options. *See also "Tip of the Day" on page 148.*

SHOW DIALOG TOOL TIPS

Click on this check box to turn "on/off" the tooltips in RealFlight. The tooltips are the yellow popup windows that appear when you place the mouse arrow over a dialog item or control.

SHOW MENU TOOL TIPS

Click on this check box to turn "on/off" the tooltips in RealFlight. The tooltips are the yellow popup windows that appear when you place the mouse arrow over a menu item.

RUN IN WINDOW

Select this item to determine whether RealFlight Generation 2 will run in the Window Mode or in Full Screen Mode. If checked, RealFlight will run in the Window Mode. If unchecked, the program will run in Full Screen Mode.

Please note, not all video cards support Full Screen or Windows Modes. You may only use modes that your video card is capable of supporting.

ENABLE COLLISIONS

Select this item to determine whether or not RealFlight Generation 2's Collision Detection feature is enabled. G2 is capable of simulating collisions between aircraft, scenery objects, multiplayer aircraft and recorded aircraft. Turning this feature "on" will add to the realism, however, on some computers it may slow down the frame rates. If active, a check mark will appear to the left side of this selection.

VIRTUAL FLIGHT INSTRUCTOR

Would you like to learn how to do a maneuver? With G2's **Virtual Flight Instructor** feature, you'll receive a personal flying lesson from a pro. There are three skill levels from which to choose: beginner, intermediate and advanced.

Mike Cross, an airplane designer and two-time IMAC freestyle champion, will take you through the fixed wing maneuvers. Dwight Shilling, a three-time United States F3C world qualifier and currently ranked third in the United States in F3C, heli maneuvers will serve as your instructor for the helicopter instructions.

When you select this item, the following dialog will appear:

Select the maneuver that you wish to learn, and then click **OK**. RealFlight will show you a recording of an aircraft, piloted by the instructor (Mike or Dwight), performing the maneuver. During the maneuver you'll hear the instructor's voice instructing you how to do the maneuver. You can simultaneously watch the instructor's stick movements on the onscreen radio gadget. Best of all, you can even fly your own aircraft alongside the instructor's!

When you are done, you can end the instruction by closing the Playback Gadget.

RECORDINGS

Select this item to bring up a list of available recordings. RealFlight lets you record your flights for later playback. You can play back flights that you have recorded or from flights that your friends or associates have recorded. You can even select from a vast array of pre-recorded maneuvers from industry experts to teach you new and exciting maneuvers and skills. *For more information on accessing pre-recorded maneuvers, see "Virtual Flight Instructor" on page 107.*
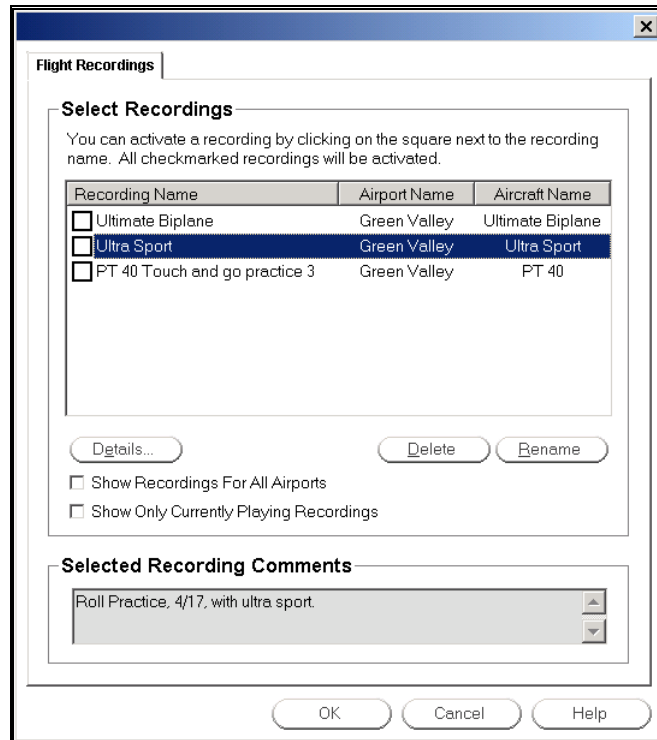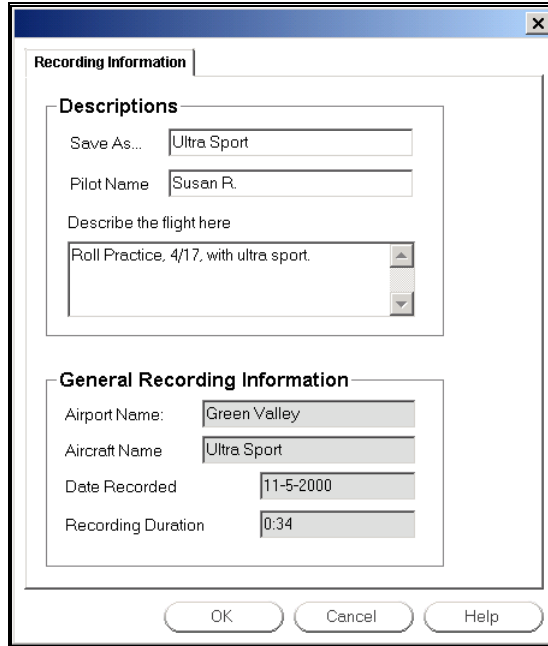
This AFR (Advanced Flight Recorder) feature allows pilots to not only view prerecorded maneuvers, but also to record their own maneuvers as well. During the playback of maneuvers, the pilot has the ability to select from a number of different options such as fast forwarding, rewinding, looping, speeding up and slowing down the recordings. These recordings may also be sent to others via the Internet. Additionally, the pilot can also activate the **Radio Gadget** *(see "Gadget" on page 122)* to watch the stick inputs for each maneuver. To activate the onscreen transmitter, go to **Gadget** in the **View** menu. Next, select **Radio** to activate the onscreen digitized transmitter.

SELECT RECORDINGS

Click on the check box next to the recording that you wish to activate. To stop the recording, simply remove the check mark from the respective box. Please note, it is possible to activate multiple recordings simultaneously.

DETAILS

Click on this button to bring up complete information regarding the selected flight recording.

SAVE AS

This will serve as the name of the recording. When you view the Recording Information from the Recordings page, you cannot edit this information. You can only edit the recording name when the recording is first made (see "Start/Stop Recording" on page 110).

PILOT NAME

This allows you to designate the name of the pilot. This is useful when sharing recordings with other RealFlight users. When you view the Recording Information from the Recordings page, you cannot edit this information. You can only edit the Pilot name when the recording is created (see "Start/Stop Recording" on page 110).

DESCRIBE THE FLIGHT

This enables you to input comments regarding the recorded flight. When you view the Recording Information from the Recordings page, you cannot edit this information. You can only edit the recording description when the recording is created (see "Start/Stop Recording" on page 110).

GENERAL RECORDING INFORMATION

RealFlight automatically inserts the information contained in these boxes.

AIRPORT

This box indicates the airport at which the recording occurred.

AIRCRAFT

This box indicates the aircraft that was used in the recording.

DATE

This box indicates the date on which the recording occurred.

RECORDING DURATION

This is the length, or duration of the recording.

DELETE

Click on this button to permanently delete the selected recording.

RENAME

Click on this button to rename the selected recording.

SHOW RECORDINGS FOR ALL AIRPORTS

Click on this check box to display a list of recordings for all airports. Please note: if you choose to play a recording at an airport other than the airport where the recording was made, the recording may appear to behave strangely. This is because the recorded flying site is laid out differently than the site where you are playing the recording back.

SHOW CURRENTLY PLAYING RECORDINGS

Select this option if you only want to select from the recordings that are currently running. This is useful if you wish to stop some recordings, yet leave others active.

SELECTED RECORDING COMMENTS

This box will display information regarding the selected recording.

START/STOP RECORDING

Select this item, or press the "R" key on the keyboard, to create a recording of your current flight. To cease recording at any time, either select this option once again, or press the "R" key one more time.

Alternatively, you can also start or stop the recordings at any time with an onscreen control (called the "**Recording Gadget**"). To display the **Recording Gadget**, go to **Gadget** in the **View** menu. When the **Gadget** submenu appears, select the **Recording** item. When the Recording Gadget appears on the screen, click the larger start circle located next to "ELAPSED". The flight recording will begin immediately. To stop the recording, click the same circle once again.

Please note, the **Stop Recording** selection will be grayed out unless you have begun to record a flight.

When the recording has been stopped, the Recording Information screen will appear.

RECORDING INFORMATION

This field allows you to input data regarding the flight recording.

SAVE AS

This allows you to name the recording.

PILOT NAME

This allows you to enter the pilot's name. This is useful when sharing recordings with other RealFlight users.

DESCRIBE THE FLIGHT

This enables you to input comments regarding the recorded flight.

GENERAL RECORDING INFORMATION

RealFlight automatically inserts the information contained in these boxes.

AIRPORT

This indicates the airport at which the recording occurred.

AIRCRAFT

This indicates the aircraft that was used in the recording.

DATE

This indicates the date on which the recording was made.

RECORDING DURATION

This is the length, or duration, of the recording.

MUSIC/SOUND

Music and sound effects add another dimension to your simulation experience. You can choose to fly to background music or you can listen to the ambient sounds of a local flying field. If you want some random "jeering," then turn on the random effects. If you have a slow sound card or a slow machine, you may not be able to turn "on" all of the sound effect options.
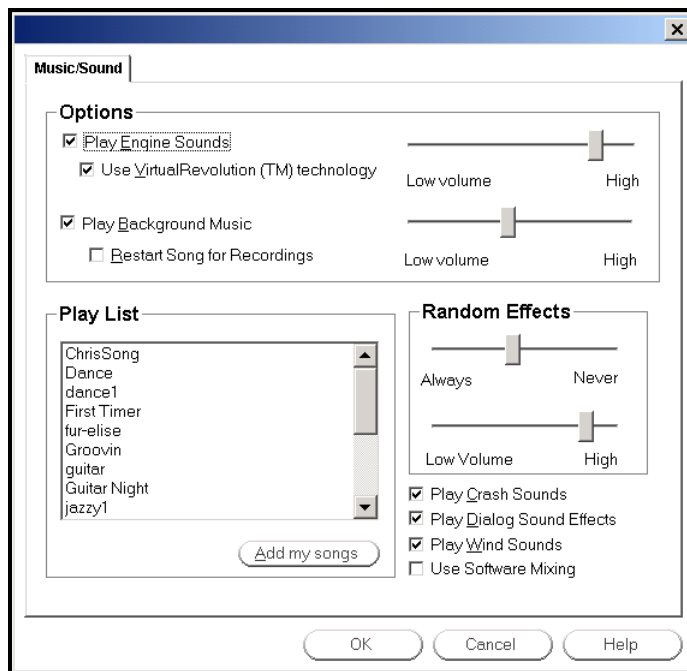
PLAY ENGINE SOUNDS

Select whether or not to play the engine sounds. Engine sounds are an important part of the simulation; they give you an audible indication of aircraft speed and distance.

You will appreciate the Doppler- correct engine sounds as your aircraft goes screaming by you!

ENGINE SOUNDS VOLUME SLIDER

Use this slider to adjust the sound levels of the engines in the simulation.

USE VIRTUALREVOLUTION TECHNOLOGY

VirtualRevolution engine technology makes the engine sound correct at both idle and full power and everywhere in between. This sounds the best, but can require more memory and will slow down the frame rate on slower computers.

PLAY BACKGROUND MUSIC

Select whether or not to play the CD-quality background music. This can slow down the rendering speed. Use this option only if you have a fast computer.

MUSIC VOLUME SLIDER

This slider is used to adjust the sound levels of the background music in the simulation.

RESTART SONGS FOR RECORDINGS

Click on this check box to begin the music simultaneously with the aircraft recording. This option allows you to synchronize the audio and the video.

PLAY LIST

Select which songs and ambient background tracks to play. Highlight songs on the play list to turn them "on".

ADD MY SONGS

RealFlight Generation 2 even allows you to add your own music to the simulation. To do so, copy the desired MP3 file to the "**C:\PROGRAM FILES\REALFLIGHT\Songs**" directory and then restart the program. The song should appear on the play list.

RANDOM EFFECTS SLIDER

This slider displays the frequency of the "random" sound effects. Adjust the slider to make them occur as in/frequently as you would like.

RANDOM EFFECTS VOLUME SLIDER

This slider displays the volume of the Random Effects.

PLAY CRASH SOUNDS

Select whether or not to play the crash sounds when the aircraft crashes.

PLAY DIALOG SOUND EFFECTS

Select whether or not to play the sound effects while navigating the dialogs.

PLAY WIND SOUNDS

Select whether or not to play the wind sounds when wind is enabled.

USE SOFTWARE MIXING

This box indicates whether to use the CPU or the Sound Card to mix the audio. By turning on Software Mixing, you force the CPU to do the mixing which may be a little slower, but also might sound a little better.

KEYBOARD MAPPINGS

RealFlight allows you to access menu and other commands from your computer's keyboard. A key that invokes a command is called a "quick key" or "hot key". These keys provide a quicker way of accessing functions or features.

For example, pressing the "F2" key incrementally zooms your view towards the aircraft. This is exactly the same result that arises if you select "Zoom In" from the RealFlight View menu. Consequently, we say that "F2" is a hot key for the Zoom In command.

RealFlight G2 comes with a default set of hot keys. You can use these defaults, or re-map the hot keys however you want. Almost every key on your keyboard can be assigned to control a function of RealFlight G2. You can access this feature by selecting this menu item.

When you select "Keyboard Mappings…" the following dialog will appear:
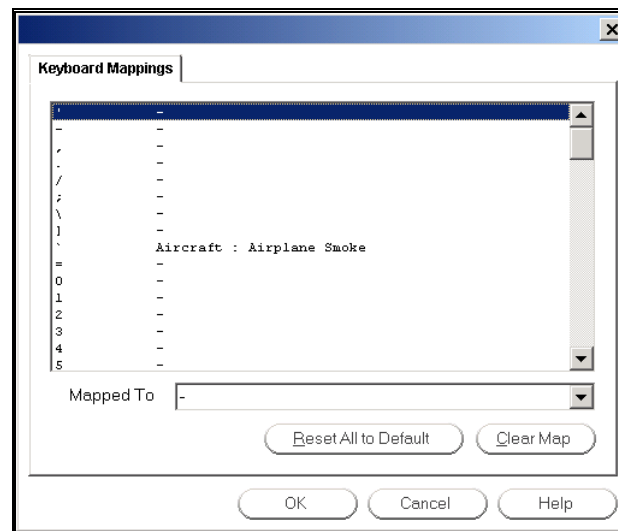
To map a key, simply select from the list the key you want to map. Then, use the "Mapped To" pull-down list to select the command you want the key to perform.

RESET ALL TO DEFAULT

This button will reset all keyboard mappings to their default settings. This will eliminate any custom settings that you have created. *See "Default Keyboard Map" on page 165 for a list of the default key mappings.*

CLEAR MAP

This button removes any assignments that you have given to the selected key, etc. Unlike the "Reset All to Default" button, this selection only effects one selection at a time.

CHAPTER 10. THE VIEW MENU

VIEW MENU OVERVIEW

The **View** menu controls all options and settings for *views*. **Views** describe two things: *what you are looking at*, and *where you are looking from.*

RealFlight G2 allows you to create and modify multiple views. The main RealFlight window is called the **main view**. Picture-in-picture windows (see graphic below) are called **viewports**. You can create multiple viewports, each with independent view locations, directions and styles; you can resize and reposition viewports.

To create or modify views, access the **View** menu. When you open the pull-down menu, you will see the following items:
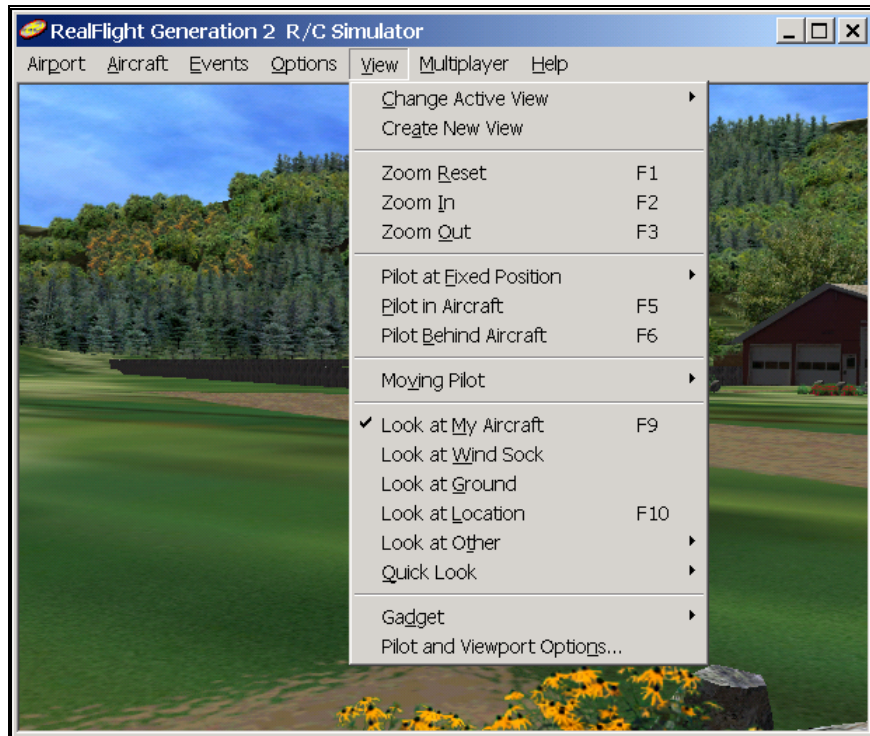
- Change Active View

- Create New View

- Zoom Reset

- Zoom In

- Zoom Out

- Pilot at Fixed Position

- Pilot in Aircraft

- Pilot Behind Aircraft

- Moving Pilot

- Look at My Aircraft

- Look at Wind Sock

- Look at Ground

- Look at Other

- Quick Look

- Gadget

- Pilot and Viewport Options…

CHANGE ACTIVE VIEW

Select this item to change the active view.

The *active view* is the view (main window or viewport) that will be affected when you use a view menu command (zoom, viewpoint location change, etc.). Only one view at a time is active.

The submenu displays a list of all currently open views. The current active view is checked. You can change the active view by selecting a different (unchecked) view from the list.

Alternatively, you can select the active view by moving your pointer to the desired view and clicking the mouse. When a viewport becomes active, its border will change colors.

If you want to create additional views, use the **Create New View** item (below).

CREATE NEW VIEW

Select this item to create a new viewport.

Once you create a new viewport, you can resize or reposition it by dragging with your mouse. You can also fully adjust all the viewport's properties (zoom level, vantage point options, etc.), independent of any properties of the main window or other viewports. You can create as many independent viewport windows as your video card and processor will allow (creating extra viewports does require additional computing power).

MOVE A VIEWPORT

To relocate a viewport, position the mouse pointer on the viewport's title tab. Press and hold down the left button and drag the viewport to the desired location.

SIZE A VIEWPORT

To resize the viewport, position the pointer along one of the inside edges of the viewport. Click and hold the left button of the mouse, and drag with the mouse to enlarge or shrink the viewport. The size is fully adjustable to suit your personal taste.

VANTAGE POINTS

To change the vantage point options and features, use the commands in the **View** menu (or their keyboard equivalents). Before you run any view menu commands, make sure the viewport is active by clicking on it or using the **Change Active View** command. *See "Change Active View" on page 116 for more information.*

CLOSE VIEWPORT

To close a viewport, click on the red "X" in the viewport's title tab.

VIEWPORT OPTIONS

To bring up the **Pilot and Viewport** options, click on the red circle in the viewport's title tab. Alternatively, you can select the "Pilot and Viewport Options" item in the **View** menu. You can find out more about viewport properties in "Pilot and Viewport Options" on page 132.

ZOOM RESET

This selection resets the zoom magnification level. This is useful if you are zoomed way in or way out and want to return quickly to the default level of magnification (set in Pilot and Viewport Options). To set this, select **Pilot and Viewport Options** from the **View** menu; when a dialog appears press the "Viewport" tab. Set the value using **minimum aircraft size** in the Auto Zoom section.

You can also reset the zoom level by pressing F1.

ZOOM IN

This selection will zoom in on the aircraft. Alternatively, the F2 key has the same effect. RealFlight will incrementally zoom in on the aircraft each time the function key: F2 is pressed or Zoom In is selected.

ZOOM OUT

This selection will zoom out from the aircraft incrementally. Alternatively, each time the F3 key is pressed the program will zoom out, incrementally, from the aircraft, thus giving a larger perspective of the area surrounding your airplane or helicopter.

PILOT AT FIXED POSITION

This selection will bring up all of the available options for the pilot at the fixed position. There are a number of available selections:

- Set to Pit Area

- Set to Current Aircraft Position

- Set with Overhead View

- Set to Last Fixed Position

- Set with Mouse

- Set Current position as Pit Area

- Named Positions

SET TO PIT AREA

This selection will return the viewpoint to the default position for RealFlight. The default position is the pit area. Alternatively, you may also press the F4 key to **Set to Pit Area** as well.

If however, you wish to change the location of the pit area, choose the **Set Current Position as Pit Area** selection.

SET TO CURRENT AIRCRAFT POSITION

This selection will move your vantage point to the current aircraft position. The aircraft will continue its flight, however, your viewpoint will remain fixed at the former aircraft location.

If you would like your vantage point to follow along with the aircraft, select the **Pilot in Aircraft** view or **Pilot Behind Aircraft** view (*see "Pilot in Aircraft" on page 120, or "Pilot Behind Aircraft" on page 120*).

Alternatively, you can press the F11 key to **Set to Current Aircraft Position**.

SET WITH OVERHEAD VIEW

When you select this option, RealFlight will bring up an overhead view of the flying site. Move the mouse pointer to the desired vantage point and click. This will set your vantage point.

Alternatively, you can use the F7 key to **Set with Overhead View**.

SET TO LAST FIXED POSITION

This selection will undo the most recent vantage point modification. In other words, RealFlight will reset your viewpoint to its previous position.

SET WITH MOUSE

This selection allows you to fully adjust the vantage point using your mouse. You may also press the function: F8 key to do so.

After selecting this option, or pressing F8, you may move the mouse forward and backward to move towards or away, respectively, from your aircraft. Moving the mouse left or right will cause the viewpoint to circle around the aircraft. You may also adjust the viewpoint up or down using the wheel on the mouse. If your mouse doesn't have a wheel, simply hold down the right mouse button while you move the mouse forward and back.

When you are satisfied with your vantage point, click the button to "lock" this position.

SET CURRENT POSITION AS PIT AREA

Select this option to set the current position as the pit area. The pit area is the default viewpoint position.

NAMED POSITIONS

RealFlight lets you store vantage points for future use. Select this option to store a position, or to bring up a list of the stored positions. The stored positions are only available for the flying sites in which they were stored. In other words, the list of Named Positions is unique for each flying site.

NAMED POSITIONS

This indicates any positions that are stored for the currently selected flying site.

SAVE NEW POSITION

Click this button to save the new position. This will bring up the New Name dialog box. Insert a name for the position in this box.

MODIFY POSITION

Saves the position to an already named position.

DELETE POSITION

This button will delete the selected position from the list of named positions.

PILOT IN AIRCRAFT

Select this item to place the vantage point inside the aircraft, as if you are actually piloting the aircraft.

Alternatively, you can set Pilot in Aircraft by pressing the function: F5 key.

PILOT BEHIND AIRCRAFT

Select this option to bring up the chase view. This viewpoint will always remain behind the aircraft being flown.

Alternatively, you can set **Pilot Behind Aircraft** by pressing the function: F6 key.

MOVING PILOT

Selecting this item brings up the moving pilot options. Unless you select the **No Movement** option, the **Moving Pilot** causes your viewpoint to move as if you were walking towards, or around, the aircraft. The moving pilot options are:

- No Movement
- Circle Around Aircraft
- Walks Toward Aircraft

NO MOVEMENT

Selecting this option halts pilot movement, if active. This returns you to a fixed view.

CIRCLE AROUND AIRCRAFT

Selecting this option will cause the pilot to circle around the aircraft. The pilot options for the walking movements, etc. may be found in the **Pilot and Viewport Options** section of this manual.

This will move the pilot towards the aircraft. The walking speed, and other pilot options may be found in the **Pilot and Viewport Options** section of this manual.

LOOK AT MY AIRCRAFT

Select this option to look at the aircraft that you are piloting. Alternatively, you may press the function: F9 key as well.

LOOK AT WIND SOCK

Select this option to look at the windsock, if applicable. Please note: this selection will not have any effect if a windsock is not present at the flying site.

LOOK AT GROUND

Select this option to look at the ground beneath the viewpoint option. This selection will always retain the ground in the vantage point. This is helpful in altitude orientation.

LOOK AT LOCATION

Select this option to look at a specific location. Alternatively, you may press the function: F10 key as well. When selected, move the mouse to choose the location that you wish to view. Once you are satisfied with the location, click on the mouse to set this position. We find that this option is quite useful in locating the runway. It assists in the orientation for landing approaches. We suggest that you open a viewport and select the runway as the location.

LOOK AT OTHER

Select this option to look at another object (aircraft) at the flying site, if applicable. If there are no other aircraft present selecting this option will not reveal a list of "others" to view. However, if there are 'others' to view, please select the appropriate aircraft from the list.
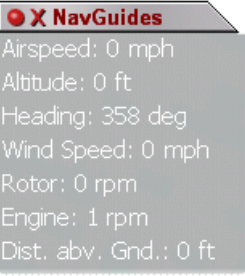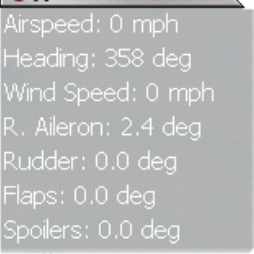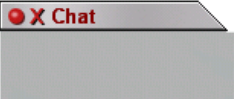
QUICK LOOK

Select this option to quickly glance at either the ground or the windsock (if applicable).

This option will momentarily look at the selected item and then return to the vantage point selected for the active viewport.

GADGET

Select this option to bring up the Gadget options. The list of gadget items is as follows:

Gadget	Preview
Flight Recording Gadget lets you record your flights for later playback. *See "Flight Recording" on page 132.*	● ✗ Flight Recording ●
Flight Playback Gadget lets you control playback of a previous recording or a Virtual Flight Instruction. *See "Flight Playback Gadget" on page 130*	● ✗ Flight Playback ◆ ↻ ● ▌▌ 1.00x ◆
NavGuides shows you some basic information about your aircraft. *See "NavGuides Gadget" on page 124.*	● ✗ NavGuides Airspeed: 0 mph Altitude: 0 ft Heading: 358 deg Wind Speed: 0 mph Rotor: 0 rpm Engine: 1 rpm Dist. abv. Gnd.: 0 ft
Advanced NavGuides shows you even more information than the NavGuides and is extremely customizable. *See "Advanced NavGuides Gadget" on page 126.*	● ✗ Adv. NavGuides Airspeed: 0 mph Heading: 358 deg Wind Speed: 0 mph R. Aileron: 2.4 deg Rudder: 0.0 deg Flaps: 0.0 deg Spoilers: 0.0 deg
Chat Gadget lets you communicate with other players in a multiplayer session. *See "Chat " on page 132.*	● ✗ Chat
Radio Gadget lets you view the stick movements of your own radio or the radio of a recording or remote multiplayer. *See "Radio" on page 132.*	● ✗ Radio FLAPS SPOIL GEAR AER

EDIT GADGETS

Select this option to customize the properties of the gadgets. This will also allow you to select which Gadgets are visible. A Gadget is an onscreen display that provides useful information and RealFlight features.
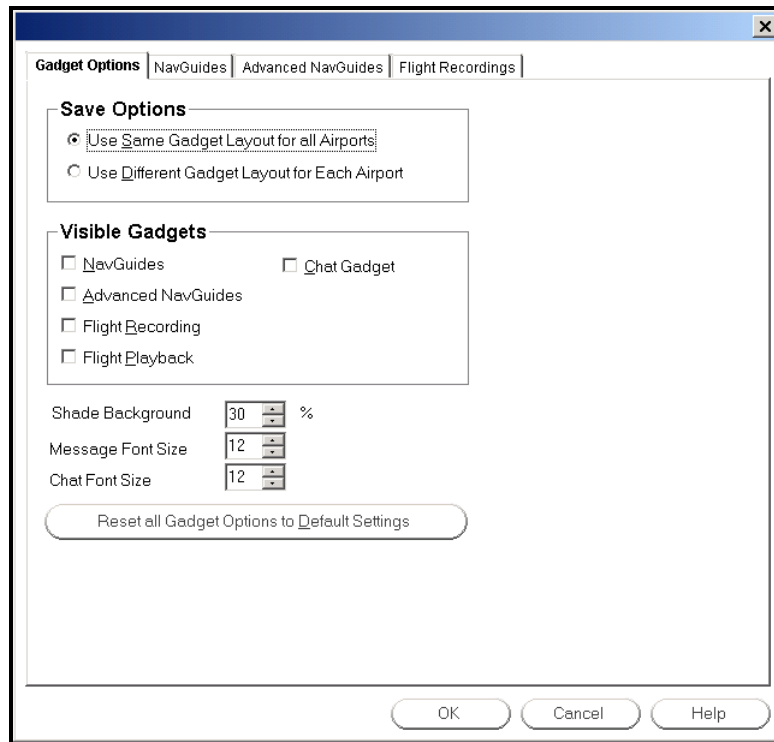
SAVE OPTIONS

These options allow you to use the same Gadget options for all airports, or to customize each airport's Gadget options individually.

USE SAME GADGET LAYOUT FOR ALL AIRPORTS

Select this option if you wish to use the same gadget layout for all airports. The layout that you customize for this respective airport will then be used for all airports.

USE DIFFERENT GADGET LAYOUT FOR EACH AIRPORT

Any Gadget modifications that are introduced to this respective airport are only applicable to this airport. Each airport is independently adjustable and may be customized to suit your personal taste.

VISIBLE GADGETS

These options allow you to select which Gadgets will be visible. Any of the items that are left un-checked, will not be visible.

NAVGUIDES

Click this check box to display the basic NavGuides information.

ADVANCED NAVGUIDES

Click this check box to display the Advanced NavGuides information.

FLIGHT RECORDING

Click on this check box to display the onscreen flight recording controller. *For more information, see "Recordings" on page 107 and "Start/Stop Recording" on page 110.*

FLIGHT PLAYBACK

Click on this check box to display the onscreen flight playback controller. *For more information, see "Recordings" on page 107 and "Start/Stop Recording" on page 110.*

SHADE BACKGROUND

This field allows you to adjust the shaded backgrounds of the Gadgets. The higher the value, the more opaque the background will appear. In other words, higher percentages will result in backgrounds that are more difficult to see through.

RESET ALL GADGET OPTIONS TO DEFAULT SETTINGS

This button restores all Gadget options to their default settings. If you have modified any of the Gadgets, the program will not retain this information.

HIDE ALL GADGETS

This selection chooses whether or not to display the selected Gadgets on the screen. While the Gadgets will still remain active, they will not be visible when this selection is checked. Alternatively, you may press the "H" key on the keyboard to select this option.

NAVGUIDES GADGET

This Gadget allows you to view some basic information about your aircraft.
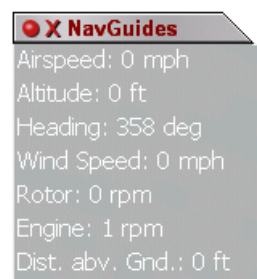
NavGuides Properties

Click on the Red Circle to bring up properties for this gadget. Select this page to adjust the "basic" on-screen options that will appear during flight. Click on the respective check box for any items that you wish to appear onscreen during flight. If an item is left un-checked, it will not appear in the simulation.
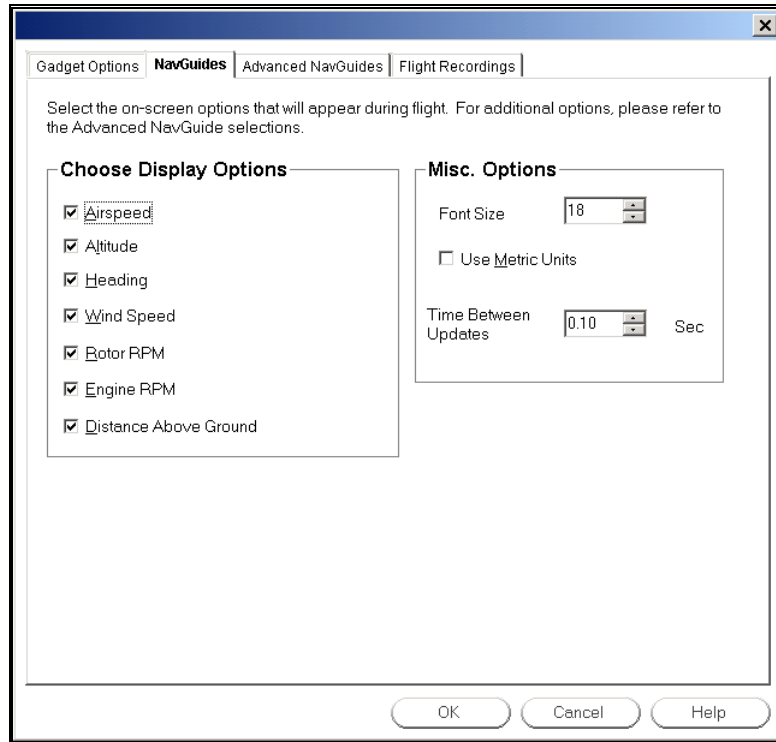
There are additional options available in the Advanced NavGuides. For more information on the Advanced NavGuides, please refer to the Advanced NavGuides section of this manual that follows.

Please note, in order for the NavGuides displays to appear on screen, it is necessary to select NavGuides under the Gadget submenu. If the check mark does not appear next to NavGuides, then the NavGuides will not be displayed.

Airspeed

This option will display the airspeed for the respective aircraft.

Altitude

This option displays the altitude for the respective aircraft. The altitude readings are a direct display of the aircraft height above the terrain directly beneath it. Therefore, if you fly across the top of a canyon, your altitude will increase dramatically as the floor of the canyon is many feet below your flying position. Once you have crossed the canyon, however, your altitude reading may drop drastically as the terrain is once again directly beneath the aircraft.

HEADING

This option displays the heading of the aircraft. This heading is displayed in degrees, as they would appear on a compass. "0" degrees is North, "90" degrees is East, "180" degrees is South and "270" degrees is West.

WIND SPEED

This option will display the wind speed at the flying site.

ROTOR RPM

This will display the rotor RPM for your helicopter.

DISTANCE ABOVE GROUND

This display indicates the distance of the aircraft above the ground, taking into account the elevation of the terrain.

FONT SIZE

This is used to display and modify the font size for the items that appear in the NavGuides displays.

USE METRIC UNITS

If checked, the NavGuides displays will use SI (metric) units (meters, grams, etc.). If unchecked, the NavGuides displays will use SAE measurements (feet, pounds, etc.).

This applies to NavGuides only. It does not affect the display units of any RealFlight dialogs. To set display units for the RealFlight dialogs (e.g. Aircraft Editor dialogs), select **Miscellaneous** in the **Options** menu.

TIME BETWEEN UPDATES

This is the time, in seconds, between refreshes of information in the NavGuides. Smaller values mean that the NavGuides will be updated more frequently. Larger values mean that there will be a longer delay between the updates.

ADVANCED NAVGUIDES GADGET

This Gadget displays advanced information about your aircraft.

Adv. NavGuides
Airspeed: 0 mph
Heading: 358 deg
Wind Speed: 0 mph
R. Aileron: 2.4 deg
Rudder: 0.0 deg
Flaps: 0.0 deg
Spoilers: 0.0 deg
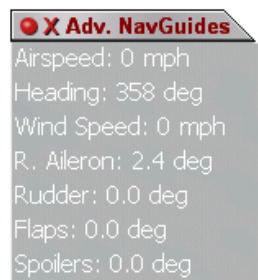
ADVANCED NAVGUIDES PROPERTIES

Click on the Red Circle to bring up properties for this gadget. First, from the list at the top of the dialog, decide which items you want to appear in the Advanced NavGuides. Check an item to include it in the onscreen display.
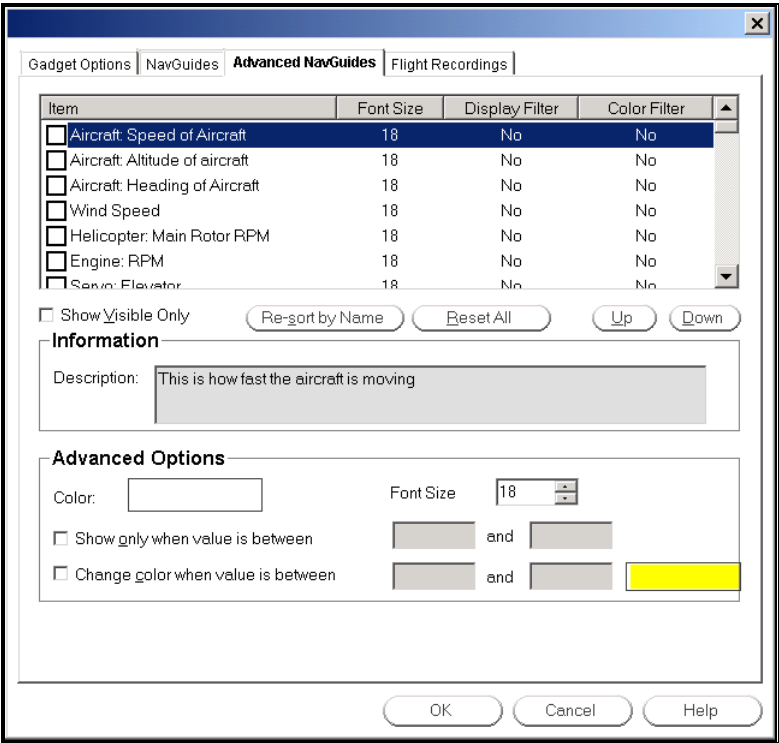
COLOR

Sets the color for the selected item. Click on the color box to change the color.

FONT SIZE

Sets the font size for the selected item

SHOW ONLY WHEN…

If checked, the item is only displayed if the value falls between the two values.

CHANGE COLOR WHEN…

If checked, then the color changes to a new color when the value is between the two values.

AVAILABLE OPTIONS

Option	Description
Aircraft: Speed Of Aircraft	Check this item to display the speed of the aircraft.
Aircraft: Altitude of Aircraft	Check this item to display the current altitude of the aircraft.
Aircraft: Heading of Aircraft	Check this item to display the current heading of the

	aircraft. This heading is displayed in degrees, as they would appear on a compass. "0" degrees is North, "90" degrees is East, "180" degrees is South and "270" degrees is West.
Wind Speed	Check this item to display the current velocity of the wind.
Helicopter: Main Rotor RPM	Check this item to display the current main rotor RPM of the helicopter.
Engine: RPM	Check this item to display the RPM of the engine prior to any gear reduction that may be applicable.
Servo: Elevator	Check this item to display the current position of the elevator servo.
Servo: Left Aileron	Check this item to display the current position of the left aileron servo.
Servo: Rudder	Check this item to display the current position of the rudder servo.
Servo: Throttle	Check this item to display the current position of the throttle servo.
Servo: Flap	Check this item to display the current position of the flap servo.
Servo: Spoiler	Check this item to display the current position of the spoiler servo.
Deflection: Left Aileron	Check this item to display the degrees of deflection for the left aileron.
Deflection: Right Aileron	Check this item to display the degrees of deflection for the right aileron.
Deflection: Elevator	Check this item to display the degrees of deflection for the elevator.
Deflection: Rudder	Check this item to display the degrees of deflection for the rudder.
Deflection: Flap	Check this item to display the degrees of deflection for the flap.
Deflection: Spoiler	Check this item to display the degrees of deflection for the spoiler.
Deflection: Landing Gear Angle	Check this item to display the degrees of deflection for the steering (nose) wheel.
Servo: Right Aileron	Check this item to display the position of the right aileron servo.
Servo: Retracts	Check this item to display the position of the retract servo.
Servo: Cyclic Roll	Check this item to display the position of the cyclic roll servo as it relates to the helicopter.
Servo: Cyclic Pitch	Check this item to display the position of the cyclic pitch servo as it relates to the helicopter.
Servo: Collective	Check this item to display the position of the collective servo on a helicopter.
Servo: Tail Rotor	Check this item to display the position of the tail rotor servo on a helicopter.
Servo: Gyro Gain	Check this item to display the position of the gyro gain on a helicopter.
Servo: Head-Speed Selection	Check this item to display the position of the head-speed

	channel on a helicopter.
Transmitter: Elevator	Check this item to display the elevator channel output from the transmitter.
Transmitter: Left Aileron	Check this item to display the left aileron channel output from the transmitter.
Transmitter: Right Aileron	Check this item to display the right aileron channel output from the transmitter.
Transmitter: Rudder	Check this item to display the rudder channel output from the transmitter.
Transmitter: Throttle	Check this item to display the throttle channel output from the transmitter.
Transmitter: Flap	Check this item to display the flap channel output from the transmitter.
Transmitter: Spoiler	Check this item to display the spoiler channel output from the transmitter.
Transmitter: Retracts	Check this item to display the retract channel output from the transmitter.
Transmitter: Cyclic Roll	Check this item to display the cyclic roll channel output from the transmitter.
Transmitter: Cyclic Pitch	Check this item to display the cyclic pitch channel output from the transmitter.
Transmitter: Collective	Check this item to display the collective channel output from the transmitter.
Transmitter: Tail Rotor	Check this item to display the tail rotor channel output from the transmitter.
Transmitter: Gyro Gain	Check this item to display the gyro gain channel output from the transmitter.
Transmitter: Head-Speed Selection	Check this item to display the head-speed channel output from the transmitter.
Deflection: Cyclic Roll Angle	Check this item to display the amount of deflection in the main blades as the result of an input command from the cyclic roll servo.
Deflection: Cyclic Pitch Angle	Check this item to display the amount of deflection in the main blades as the result of an input command from the cyclic pitch servo.
Deflection: Collective Angle	Check this item to display the amount of deflection in the main blades as the result of an input command from the collective servo.
Deflection: Tail Rotor Angle	Check this item to display the amount of deflection in the tail rotor blades.
Deflection: Paddle Roll Angle	Check this item to display the amount of deflection in the flybar paddles induced by the cyclic roll command.
Deflection: Paddle Pitch Angle	Check this item to display the amount of deflection in the flybar paddles induced by the pitch roll command.
Deflection: Main Blade Rear	Shows the amount of deflection in the main blades when the blade reaches the rear of the helicopter
Deflection: Main Blade Right	Shows the amount of deflection in the main blades when the blade reaches the right of the helicopter
Deflection: Main Blade Front	Shows the amount of deflection in the main blades when the blade reaches the front of the helicopter
Deflection: Main Blade Left	Shows the amount of deflection in the main blades when

	the blade reaches the left of the helicopter
Engine: Fuel Remaining	Check this item to display the amount of fuel remaining.
Engine: Battery Remaining	Check this item to display the capacity remaining in the battery.
Engine: Current Draw	Check this item to display the amount of current hat the motor is drawing.
Engine: Voltage	Check this item to display the electric potential (measured in Volts) across the electric motor.
Aircraft: Ground Speed	Check this item to display the current ground speed of the aircraft.
Pilot: Distance to Aircraft	Check this item to display the distance between the pilot and the aircraft.
Wind Direction	Check this item to display direction that the wind is blowing. This is displayed in degrees, as they would appear on a compass. Whereas "0" degrees is North, "90" degrees is East, "180" degrees is South and "270" degrees is West.
Wind Updraft	Check this item to display the velocity, if any, of an updraft.
Pilot: Look Direction	Check this item to display the direction that the pilot is looking. This is displayed in degrees, as they would appear on a compass. Whereas "0" degrees is North, "90" degrees is East, "180" degrees is South and "270" degrees is West.
Pilot: Height Above Ground	Check this item to display the height of the pilot above the terrain.
System: Frames Per Second	This is the number of frames displayed per second (fps) that are displayed on your monitor.
Helicopter: Tail Rotor RPM	Check this item to display the RPM of the tail rotor blades.
Pilot: Field of View	Check this item to display the field of view angle for the main viewport.
Pilot: Zoom Magnification	Check this item to display the amount of magnification that is used for RealFlight.
Aircraft: X Position of Aircraft	Check this item to display the physical location of the aircraft in regards to the X-axis of the flying site.
Aircraft: Y Position of Aircraft	Check this item to display the physical location of the aircraft in regards to the Y-axis of the flying site.
Aircraft: Distance Above Ground	Check this item to display the vertical distance between the aircraft and the terrain.

FLIGHT PLAYBACK GADGET

RealFlight's highly versatile Flight Playback gadget lets you easily control playback of flight recordings using simple mouse clicks. It features VCR-like controls that start or pause playback, speed up or slow down playback speed, etc.
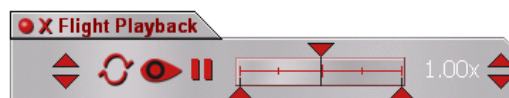
You may playback your own recordings, recordings from the RealFlight CD-ROM and even flights from other RealFlight G2 users! The Playback feature even allows you to play back multiple recordings simultaneously while you're flying.

SELECT RECORDING

The controls on the Flight Playback gadget apply to only one recording at a time. If you are running more than one recording, select the recording you wish to control by clicking on the gadget's up or down arrows. The number on the gadget will increase or decrease; this number indicates the list number of the recording the gadget is currently controlling.

Once you have selected the recording you want to control, click on the gadget's buttons to control the recording.

LOOP PLAY

The arrows that form a circle are used to loop the recording (i.e., continuous play).

LOOK AT RECORDING

Click on the "eye" to start the playback. Clicking on the "eye" will cause it to illuminate. As long as the eye is illuminated, you will continue to view the current recording. If you have multiple recordings playing simultaneously, and wish to look at a different recording, click the up/down arrow while this "eye" is illuminated.

PAUSE

The "II" button pauses playback if the recording is playing. After you have paused, click this button once again to play the recording. This button will be illuminated when the pause feature has been activated.

POSITION OF RECORDING

Use the slider control to choose the portion of the recording you wish to view. In other words, you can have the recording playback start in mid-recording, or end in mid-recording. Drag the lower arrow to set the playback start point, and the right arrow to set the playback end point. As you play the recording, the top arrow tracks to show you what playback time segment you are currently viewing. You can set to a different playback segment by dragging the top arrow.

PLAYBACK SPEED

The number on the far right side is the speed at which the playback will occur. You can adjust the playback speed by clicking on the up/down arrows next to the number. To increase playback speed, click on the up arrow. To reduce playback speed, click on the down arrow. You can use this when you're learning a maneuver from a recording—adjust the playback speed to watch the maneuver in slow motion.

FLIGHT RECORDING GADGET

If this selection is checked, the Recording Gadget will appear in the onscreen display. The Recording Gadget enables you to start/stop the recording by clicking the onscreen controls with the mouse.

Click on the large red circle to start and stop the recording.

CHAT GADGET

If this selection is checked, a chat window will appear on the screen. The chat window enables you to exchange messages with other RealFlight users during a multiplayer session. *For more information, see "Send Chat Message" on page 146.*
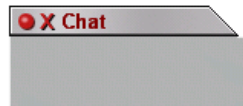
RADIO GADGET

If this selection is checked, the onscreen transmitter will appear. This transmitter offers a digital recreation of the transmitter onscreen. This digital transmitter mimics the stick input in real-time. This serves as a visual aid in the training process and an onscreen reminder for the proper stick inputs.

The radio gadget always shows the stick inputs for whatever aircraft the "active view" (*See "Change Active View" on page 116*) is looking at. The radio gadget can show you the stick movements for Recordings, Multiplayer, or your own stick input.

Note: If you are using your own transmitter to control RealFlight, and the model you are flying is set to "My Own Radio", then RealFlight can only take an educated guess at the stick positions. This is because in "My Own Radio" mode, all RealFlight receives from the radio are servo positions.

PILOT AND VIEWPORT OPTIONS

This selection will allow you to customize the various properties of the active viewpoint. These options are also available by clicking on the small red circle in the viewport's title tab.

PILOT OPTIONS PAGE

This page is used to modify a variety of options regarding the "pilot".
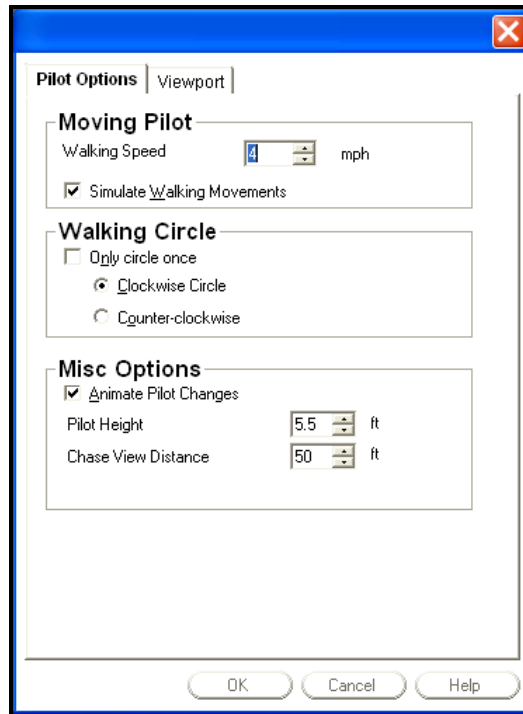
WALKING SPEED

This is used to adjust the walking speed of RealFlight's optional "Moving Pilot" feature (see "Moving Pilot" on page 120).

SIMULATE WALKING MOVEMENTS

This check box determines whether or not you would like to simulate actual walking movements. If you check this box, the view will "bob" up and down slightly as if you were truly walking.

WALKING CIRCLE

This is used to adjust the motion of the circling pilot.

ONLY CIRCLE ONCE

If checked, the pilot will only circle the aircraft one time (in the direction specified by the clockwise/counterclockwise buttons). If unchecked, the pilot viewpoint will continuously circle the aircraft.

CLOCKWISE CIRCLE

Click this option if you want the pilot to circle the aircraft in a clockwise direction.

COUNTER-CLOCKWISE CIRCLE

Click this option if you want the pilot to circle the aircraft in a counterclockwise direction.

ANIMATE PILOT CHANGES

Click this option to animate changes in pilot positions. If unchecked, the the pilot will instantly change from one viewport to another.

PILOT HEIGHT

This is used to adjust the height of the pilot's vantage point above the terrain.

CHASE VIEW DISTANCE

This determines the distance at which the aircraft is viewed from behind. This is active if in the chase plane mode (F6).

VIEWPORT PAGE

These options are used to adjust a variety of features for the viewports. Note: some of these features are not applicable to the Main View. If you have not created at least one viewport, most of these options will be grayed out.
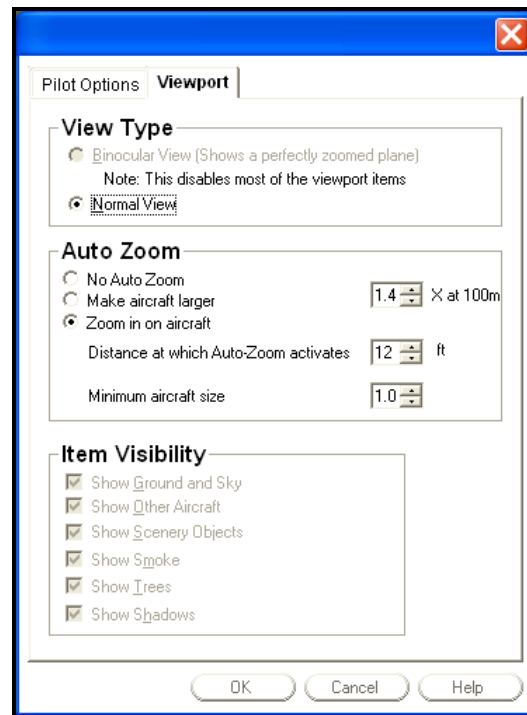
VIEW TYPE

Select a view type for this viewport. Note: **Binocular View** is only available for viewports, not for the RealFlight main window.

BINOCULAR VIEW

The **Binocular View** option will show a perfectly zoomed aircraft. You will see the aircraft as if you were looking through a pair of binoculars. In **Binocular View**, the background of the viewport box becomes transparent. This is a visual indicator so that you are aware that this viewport is using "binocular vision".

Binocular View is a great way to see the control surfaces on an aircraft that is too far away to see in the Main View. Although not realistic, it does help to see the control input.

NO AUTO ZOOM

Clicking this check box will disable the Auto Zoom features.

MAKE AIRCRAFT LARGER

Clicking this check box will make the aircraft appear larger at a distance of 100meters. The size of the aircraft is determined in the dialog box to the right of the check box.

AUTO ZOOM

Clicking this check box will activate RealFlight's Auto-zoom feature. The Auto-zoom, as the name suggests, will automatically increase the magnification on the aircraft as it flies farther away from the pilot. This will assist you in preventing the aircraft from becoming too small to see.

If this box is not checked, RealFlight will maintain the same zoom level. Therefore, the aircraft will actually become smaller as they fly farther away.

ZOOM IN ON AIRCRAFT

Clicking on this check box will cause the Auto Zoom feature to become active when the aircraft goes beyond a determined distance. For more information, please see the "Distance at Which Auto Zoom Activates" below.

DISTANCE AT WHICH AUTO ZOOM ACTIVATES

This indicates the distance at which the Auto-Zoom feature will be activated. If the aircraft is closer than the specified distance, the Auto-Zoom feature will not be disabled.

MINIMUM AIRCRAFT SIZE

This indicates the minimum aircraft size of the aircraft when using the Auto-Zoom feature. To return an aircraft to this default size, press the function: F1 key.

ITEM VISIBILITY

Selecting these check boxes will show the respective items in the viewport. Please note: these options will not be available if you have selected **Binocular View**. The additional item visibility increases the realism of the viewport, however, it may also slow down the frame rate, since it requires additional processing.

SHOW GROUND AND SKY

Selecting this check box will cause the sky and ground to be visible in the viewport.

SHOW OTHER AIRCRAFT

Selecting this check box will make other aircraft (including recordings and multiplayer aircraft) visible in the viewport.

SHOW SCENERY OBJECTS

Selecting this check box will display the scenery items (buildings, poles, etc.) in the viewport.

SHOW SMOKE

Selecting this check box will display the smoke/exhaust from your aircraft.

SHOW TREES

Selecting this check box will display the trees/foliage in the viewport.

SHOW SHADOWS

Selecting this check box will display the shadows of objects and the aircraft.

CHAPTER 11. THE MULTIPLAYER MENU

MULTIPLAYER MENU OVERVIEW

As the name suggests, the Multiplayer feature provides you with the option to fly with others—in fact, you can have up to seven additional pilots in a multiplayer session. The other pilots can be across the street, around the block, or around the world.

You can link up with multiplayer partners over a LAN (Local Area Network), or over the Internet. You will need a TCP/IP connection, either through your LAN or an ISP (Internet Service Provider).

Every multiplayer session requires one member to serve as **host**. The host initiates the multiplayer session, and is the only one who can terminate it. When the host starts a session, the other players join in.

You access multiplayer features using the Multiplayer menu. When you open the menu, you will see several options:

- Search…

- Host …

- Publish Hosting Information…

- Join…

- Disconnect

- Send Chat Message

- Player Summary…

- View Port for Each Player…

Options are grayed out if they do not currently apply. For example, you can't disconnect from a multiplayer session if you haven't joined one yet.

When you participate in multiplayer sessions, the menu commands you will access depend on whether you are the host or a joiner, and if you are a joiner, whether or not you already know about a specific session you want to join.

Depending on what options you and your partners use, you can have a **private session** that is only open to players who know the host's IP address. (A computer's **IP** address is its Internet "postal code"—it tells other computers on the Internet how to contact that computer. Following sections will explain more about IP addresses when necessary.)

Alternatively, you can have a **public session** using our **list server**. The list server is a publicly available list of open RealFlight sessions. We are currently providing this service to all RealFlight G2 owners, free of charge. Using the list server, any other RealFlight G2 user, anywhere in the world, can find out about your session and join.

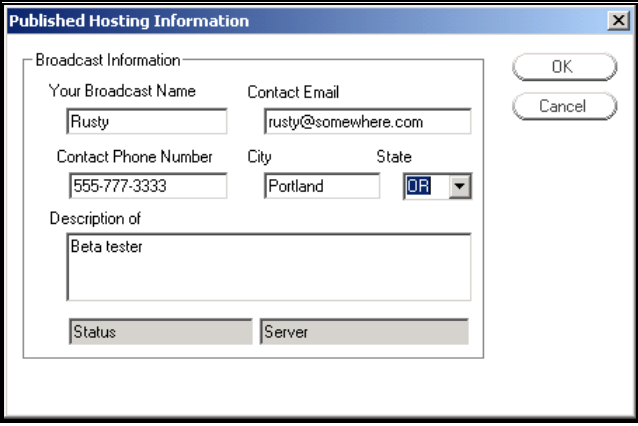*IMPORTANT INFORMATION ABOUT THE LIST SERVER*: **At the time of this writing we are providing the list server service on a trial basis. This service may be modified, interrupted or cancelled at any time without notice. In particular, we make no warrantee about the reliability of this service. To use this service you must register your product and may need to obtain product updates. Inclusion of this manual on your RealFlight CD does not imply that this service will be available at the time you purchase this product. Moreover, we reserve the right to bar any individual user, or all users at individual IP addresses or domains, from using the list server. We may do this in the case of abusive behavior.**

For hosting, use the Error! Reference source not found. command.

If you want to join a specific multiplayer session and know the IP address of the host, use the Error! Reference source not found. command.

If you want to search for open sessions on the Internet, use the Error! Reference source not found. command.

SEARCH

Use this command to search the Internet for open RealFlight multiplayer sessions. This option is great if you're just looking for new flying partners, or if a friend is hosting a session but you don't know his IP address.

Note that when you use this command, you will only see sessions that have been registered on our list server.

When you select **Search…** from the **Multiplayer** menu, you will see the following dialog:

The list of available sessions will initially be empty. To search for sessions, click **Search**. After searching, the dialog will display a list of sessions:

To join a session, click on the session listing to select (highlight) it, and then click **Use Selection**. If none of the sessions interest you (or if the list is empty, meaning that there are no open sessions now), click **Cancel** to return to flying.

If you click Use Selection, the following dialog will appear:
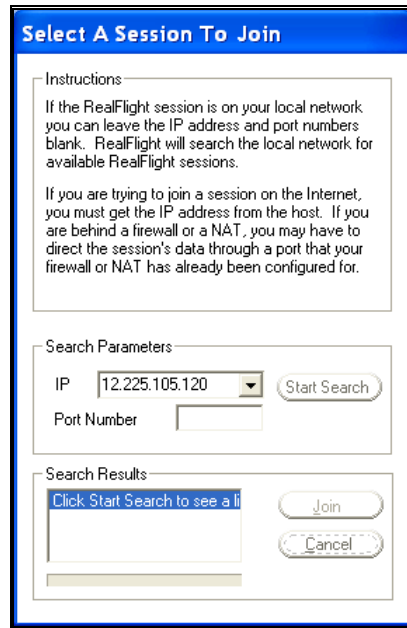
In the **Search Parameters** panel, the IP box contains the IP address of the session host's computer. You don't need to change this; RealFlight automatically fills in the IP address for you. Now, click **Start Search**. When you see the session you want to join appear in the **Search Results**, click **Stop Search**, select the session in the **Search Results**, and click **Join**. At this point, RealFlight should connect you to the session. Your airport (and other settings) may change to conform to that used by the host.

Note that when you connect to a public session, you must do two separate searches. The first, from the **Search for Unknown Host** page, searches our list server for registered sessions. The second search, from the Select a Session to Join page, searches the host's IP address for open sessions. This second search verifies that the session is still running. It also makes sure you are getting the right session (since there may be two or more sessions running at the same IP address).

Please exercise courtesy when you join a public session. For example, if the session description says "Planes only please," please don't join to fly a heli.

Finally, please note that at the time of this writing, we are providing the list server on a trial basis only. This service may be modified, interrupted or discontinued at any time without notice. *Please see the important information on the list server at the end of "Multiplayer Menu* Overview*".*

HOST

Every multiplayer session requires one participant to serve as host. If you are the host, you will be the one who starts the session; when you leave the session it will end for everyone. You will also be the one who starts and ends events (Limbo, Pylon Racing, etc.).

Once you start the session, other players can join it.

You have the option of making your session **public** or **private**.

- Public: you can "broadcast" your session to our **list server**. This publicly announces your session to other RealFlight users around the world. Anyone can then join your session (assuming you haven't exceeded the maximum number of session members).

- Private: you can keep your session off the list server, and privately tell your partners that you are starting a session. Then, only the people you invite will know about your session.

The choice is completely up to you. The procedures for starting public and private sessions are very similar.

Whichever option you select, in order to join your session, your partners will need to know the IP (Internet Protocol) address of your computer. (Exception: if you are holding the session over a LAN, the other players don't need to know your IP address.) For a public session, your partners can get your IP from the list server. For a private session, you must provide the IP address directly to your partners. (You can find out your IP when you start the session. RealFlight will display your IP in the main view.

SELECT PROVIDER

To start a session, first make sure that you are connected to the network you will use (LAN or Internet). Then, select the **Host…** item. The following dialog will appear:
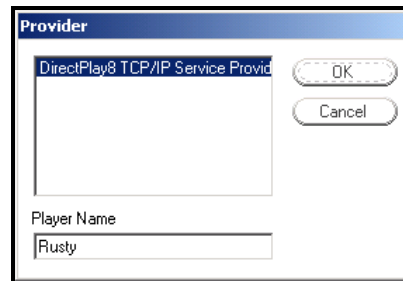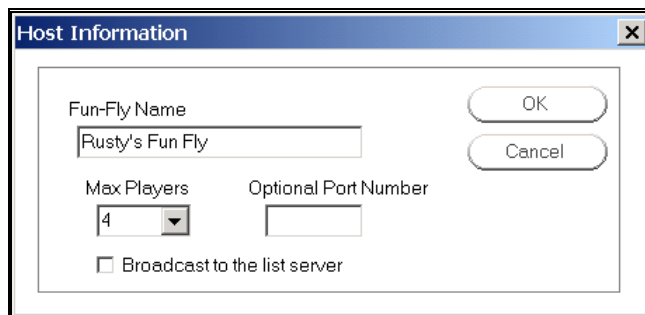
PROVIDER

First, choose the provider you want to use to make the connection. Most users will select TCP/IP, which means to connect means to connect via the Internet. RealFlight will then display your IP number.

PLAYER NAME

Finally, enter a name (your name, or a nickname) into the Player Name field.

Then, click **OK**. This will bring up the **Host Information** screen.

HOST INFORMATION

FUN-FLY NAME

In this field, enter a name for the session that you will be hosting. (Note that this is the name of your session, not necessarily your personal name. You might find it useful to use a descriptive name such as "Helis at Green Valley".)

MAX PLAYERS

Set the maximum number of players you want in your session. Currently, no RealFlight G2 multiplayer session can have more than eight members. You may want to set this to a lower number if you are using a slower computer, or just want to limit your session to a few friends.

OPTIONAL PORT NUMBER

For some users that are behind firewalls, you may want to use a port other than the default port (which is **6073**). Most users should leave this field blank.

BROADCAST TO THE LIST SERVER

If you check this box, your session will be posted on our list server. This means that other RealFlight G2 users can find out about your session and IP address, and join. This might be a good option if you are looking for new partners to fly with. If you check this box, you will be prompted for session information (see next section).

If you leave this box unchecked, your session will not be posted on our list server. You will have to directly provide your IP address to your multiplayer partners (through phone, email, chat room, or whatever means you wish). This may be a good option if you want to limit your session to a private group of friends.

If you don't want to broadcast your session information now, you can do so after the start of the session (see next section).

Finally, please note that at the time of this writing, we are providing the list server on a trial basis only. This service may be modified, interrupted or discontinued at any time without notice. *Please see the important information on the list server at the end of "Multiplayer Menu Overview".*

*For more information about broadcasting, see "**Error! Reference source not found.**" on page **Error! Bookmark not defined.**.*

PUBLISH HOST INFORMATION

You can make your session public (placed on the list server) when you first start the session (*see "Host Information" on page 142*). Alternatively, you can do this while the session is in progress by selecting this menu item.

Whenever you broadcast your session to the list server, RealFlight G2 will prompt you for session information:

The information you provide will be visible to other RealFlight G2 users who have access to the list server. *CAUTION!!!* Most of the information you provide here is optional, and is meant to let other users know about your session. We suggest you exercise common sense in deciding what information to give out. In particular, we strongly suggest that you exercise caution so as NOT to release sensitive information about yourself (home address, unlisted phone number, RealFlight serial number, etc.).

When you click **OK** your session information will be posted on the list server.

Finally, please note that at the time of this writing, we are providing the list server on a trial basis only. This service may be modified, interrupted or discontinued at any time without notice. *Please see the important information on the list server at the end of "Multiplayer Menu Overview".*

JOIN

Select this option to 'join' a Multiplayer event.

Before you can join a session, you need two things:

- A network connection (*see "Error! Reference source not found." on page Error! Bookmark not defined.*); and
- The IP address of the session host (unless the session is taking place over a LAN [Local Area Network]).

You get an IP address either from the host directly (for a private session), or from our list server (for a public session, *see "Error! Reference source not found." on*

*page **Error! Bookmark not defined.**). When you're ready to join, select "Join…"
This will open the following dialog:*

SELECT PROVIDER

To start a session, first make sure that you are connected to the network you will use (LAN or Internet). Then, select the "Host…" item. The following dialog will appear:
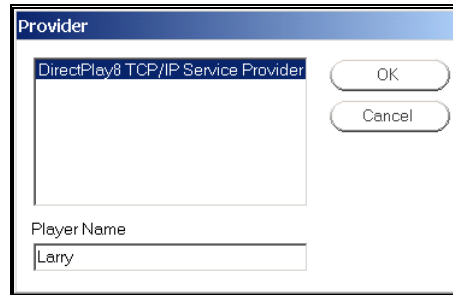
PROVIDER

First, choose the provider you want to use to make the connection. Most users will select TCP/IP, which means to connect means to connect via the Internet.

PLAYER NAME

Finally, enter a name (your name, or a nickname) into the Player Name field. Then, click **OK**.

FIND A SESSION

After you have chosen a provider, the following dialog appears.
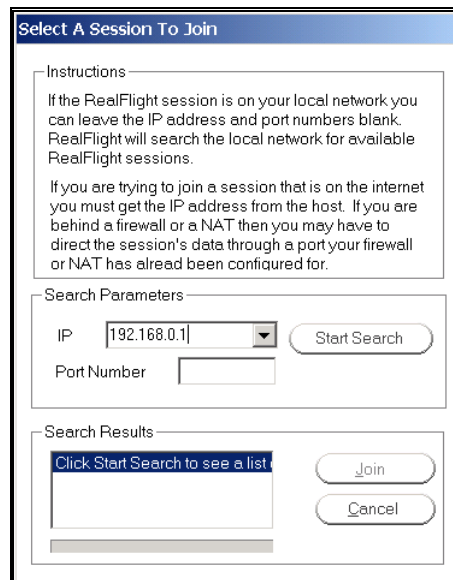
IP NUMBER

This box needs to have the IP address of the host computer. How this number gets in the box depends on how you found out about the session.

- If you are connecting to the host over a LAN, you don't need to fill in the IP address here.

- If you found out about a public session from the list server, the RealFlight will automatically fill in the IP address for you here. *For more information about the list server see "**Error! Reference source not found.**" on page **Error! Bookmark not defined.**.*

- If you found out about a session some other way, the host must provide you with the IP address, and you must manually enter it here. This is the usual procedure for a private session.

So, you only need to enter an IP here if you are having a private session over the Internet.

Are you connecting using a modem, and don't have a second line to call your friends with your IP number? No problem. Just have all your partners visit http://www.knifeedge.com. Knife Edge Software maintains a chat room for RealFlight users. You can log on and pass on your IP number there.

If you have an IP address that never changes (e.g., many cable modem users) you can just give out your IP address once. However, if you dial up to an ISP, in most cases you will get a different IP number every time you log on. You will have to pass the new number on to your friends.

PORT NUMBER

Input the port number if you are attempting to participate in a Multiplayer event and your computer is behind a firewall or NAT. The Port Number will route your computer's data through the firewall. *This port needs to match the port that the host is using.*

START SEARCH

Click this button to start searching for a host computer (if running RealFlight G2 on a LAN connection).

SEARCH RESULTS

This will display the results of your search.

JOIN

Select the Multiplayer group that you wish to join and click here to do so.

DISCONNECT

Select this item to disconnect, or exit, the Multiplayer event.

SEND CHAT MESSAGE

This item enables you to chat with other participants. Alternatively, you can also bring up the chat window by pressing the "Enter" key on the keyboard. In either case, a transparent pane appears with the word "Chat" in its title tab. Type in the message you wish to send and press "Enter" once again. Please note: all messages are displayed for all participants. There are no "private" chats.

PLAYER SUMMARY

Select this option to bring up the Multiplayer summary. This summary will display information about the other participants at the event.
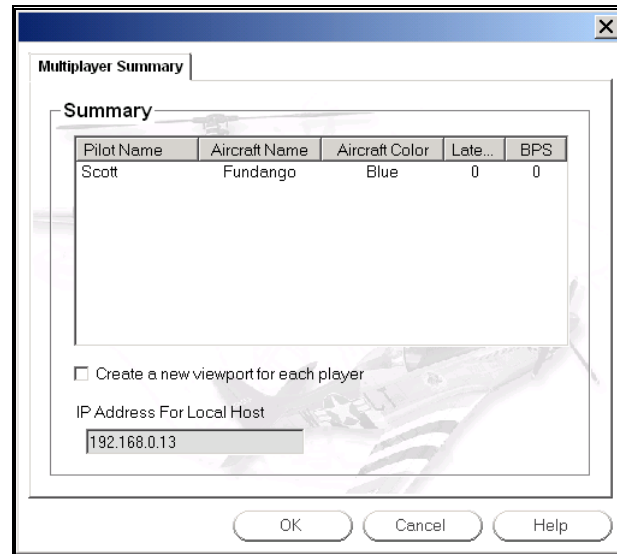
VIEW PORT FOR EACH PLAYER

If you select this item, RealFlight will open viewports that look at each of your multiplayer partners. You will get one viewport per partner. Any open viewports you currently have will be unaffected.

CHAPTER 12. THE HELP MENU

HELP MENU OVERVIEW

Should you experience any difficulties (or just want to find out more about RealFlight G2 and its features), the **Help** menu has several resources to assist you. When you open the pull-down menu, you will see several options:
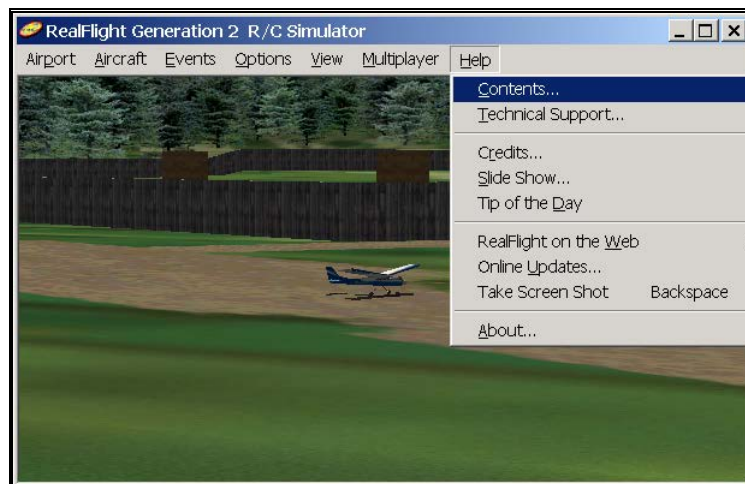
- Contents…
- Technical Support…
- Credits…
- Slide Show…
- Tip Of the Day
- RealFlight on the Web
- Online Updates…
- Take Screen Shot
- About…

CONTENTS

This opens up RealFlight's help files. The help files contain information similar to this manual.

TECHNICAL SUPPORT

If you should have any difficulties running RealFlight, consult this item. You can access online troubleshooting information, or contact RealFlight technical support.

CREDITS

Select this item to see the names of some of the people who contributed to RealFlight G2.

SLIDE SHOW

Slide Show gives you a brief preview of many of RealFlight's aircraft and airports using still images.

TIP OF THE DAY

Tip of the Day is a sequence of helpful tips and hints about using RealFlight G2. You can set tips to appear each time you run RealFlight, or read all the tips in one sitting. Tip of the Day will introduce you to many great RealFlight features you may not have noticed.

REALFLIGHT ON THE WEB REALFLIGHT MODEL SWAP

This web page is the place to go when you want to swap models, recordings, airports, and color schemes. Visit it often, as there is sure to be plenty of new content.

See it now: http://www.realflight.com/swap

REALFLIGHT WEB SITE

This is the main web site for RealFlight G2.

See it now: http://www.realflight.com

GREAT PLANES WEB SITE

This is the web site for Great Planes, the publishers of RealFlight G2

See it now: http://www.greatplanes.com

KNIFE EDGE SOFTWARE WEB SITE

This is the web site for Knife Edge Software, the developers of RealFlight G2.

See it now: http://www.knifeedge.com

CHAT WITH OTHER REALFLIGHT USERS

Go here to chat with other RealFlight users and to hook up for some great Multiplayer Action.

See it now: http://www.knifeedge.com/chat.htm

GP SOFTWARE SITE

Visit this site for information about our software products, including RealFlight G2. The site includes our online product Knowledge Base. This is the same problem-solving database our product support staff uses to help RealFlight owners resolve problems.

See it now: http://www.gpsoftware.com

ONLINE UPDATES

This menu launches the RealFlight Control Panel. *See "Appendix B. RealFlight Control Panel" on page 259.*

SCREEN SHOT

Create a screen shot of RealFlight's current display.

You can take more than one screen shot while you're flying. The screen shot files are saved to c:\program files\realflight.

When you start RealFlight, it will erase any previously saved screen shots (unless you move your old screen shots to a different directory).

CHAPTER 13. SETTING UP THE AIRPLANE RADIO

INTRODUCTION

REALFLIGHT SOFTWARE RADIO

RealFlight G2 lets you simulate many of the features of computer radios (channel mixing, exponential, etc.). This feature is called the RealFlight **Software Radio**. The software radio works the same whether you choose to use the InterLink Controller as a dummy transmitter, or use your own R/C transmitter to control RealFlight.

This chapter will show you how to set up the software radio for airplanes. *(To set up the RealFlight InterLink Controller for helis, see "Chapter 14. Setting up the Helicopter Radio" on page 155.)*

Before you begin, make sure you have installed, and are able to run, the RealFlight program. *If you are using your own transmitter to control RealFlight, you may want to read "Interface Mode:* Joystick Emulation Interface*" on page 41 before starting this chapter.*

ACCESSING THE SOFTWARE RADIO

To access the software radio feature, open your aircraft for editing (in RealFlight's **Aircraft** menu, select **Edit (aircraft name)…**). (Note that you cannot edit any aircraft that came on the RealFlight or Add-Ons CDs; to edit a stock aircraft you must first make a copy, then edit the copy.)

In the Setup page, find the "Radio Type" control, and click "Software Radio". (Click "My Own Radio" to bypass the software radio feature and use a mixing program on your own transmitter. However, this latter option only makes sense when you are using your own transmitter to control RealFlight.)

To edit the software radio, select **Software Radio** and click **Edit Now….** This brings up the **Radio Setup** page.

RADIO SETUP PAGE

The **"Radio Setup"** page provides you with the means to configure your controller to your personal preferences for control of your radio-controlled aircraft. It takes a little time to understand how the process works, but once you do, you will have virtually unlimited mixing and control capabilities.
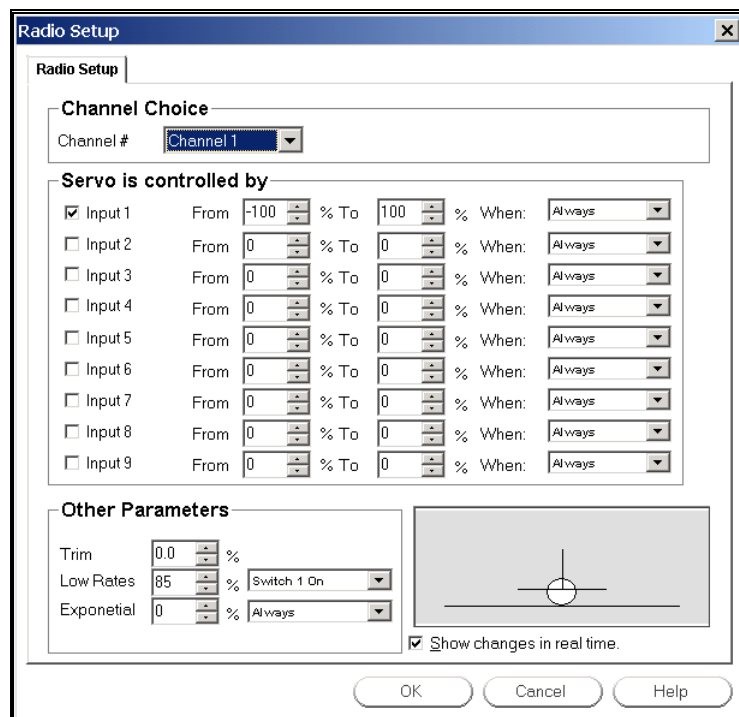
BASICS OF RADIO OPERATIONS

Here is how the stick movement from your controller eventually operates a control surface on your airplane. We will look at the process in reverse, as it is a little easier to understand that way.

Let's start with the elevator. To determine what the deflection of the elevator is:

1. Determine which channel is controlling the elevator. This is defined on the "**Servo Assignments**" tab in the **Edit Airplane** dialog. You can also go through the channels and look at the text to the right of the channel. In most cases, this will be **Channel 2**.

2. Now that we know which channel is controlling the horizontal stabilizer, we go to the radio page to find out which inputs are controlling the channel. At the top, you need to select **Channel 2**. The entire dialog will now display all of the parameters for **Channel 2**. In most cases, input 2 will be controlling Channel 2, but sometimes you might have another input mixed to control Channel 2 as well. For instance, input 6 might be flaps and might be mixed in to control the change in pitch when the flaps are deployed.

3. Now that we know that input 2 and possibly input 6 are controlling Channel 2, we go to the "Radio Setup" tab to determine what physical controls are attached to input 2 and input 6. In most cases (unless you have changed this), this will be the right hand stick on your controller (up/down) and Switch 2.

4. The current positions of the sticks and switches are captured and mixed according to the From/To percentage listed in the **"Radio Setup"** tab. This produces an initial value for the channel.

5. Exponential, Low Rates, and Trim are then applied to the channel to create new channel characteristics.

6. The channel characteristics operate in conjunction with the amount of travel of the control surface to produce a control surface position.

DIALOG ITEMS

Here is a list of items in this dialog.

CHANNEL

Selects the servo to edit. Usually, the servos are assigned as follows:

- Channel 1 – Controls Ailerons
- Channel 2 - Controls Elevator
- Channel 3 – Controls Throttle
- Channel 4 – Controls Rudder

SERVO IS CONTROLLED BY

Each channel can be controlled by any combination of inputs. Each input is either turned "on" or "off" for this channel. If it is "on", then the percentage "To" and "From" is used to determine the channel position at the minimum and maximum input values. The optional "When" feature enables the mixing to be turned "on" or "off" conditionally.

INPUT

Whether this input contributes to the channel indicated in the Channel Choice box. To find out what is controlling this input, hold the mouse over the checkbox for several seconds. This will bring up a tooltip window with this information. See what usually controls the channels at their respected functions. This may change if you altered the channel assignments in the "**Advanced Setup**".

FROM

Amount that this input will contribute to the channel when this input is in the minimum position.

TO

Amount that this input will contribute to the channel when this input is in the maximum position.

WHEN

Indicates when this input should contribute to the channel. The channel can be affected always, when a switch is "on", or when a key is pressed.

TRIM

Expressed as a percentage, this is the amount of trim applied to the respective channel.

LOW RATES

The scale amount of output of this channel when low rates are active.

LOW RATES SWITCH

Indicates when the low rates will be in effect for a particular channel. The channel can be affected always, when a switch is "on", or when a key is pressed.

EXPONENTIAL

Amount of exponential to apply to the channel selected. More exponential will soften the response when the sticks are around the center position.

EXPONENTIAL SWITCH

Indicates when the exponential should be applied to this channel. The servo can be affected always, when a switch is "on", or when a key is pressed.

SHOW CHANGES IN REAL TIME

Turn this option "Off" if you have a slower computer and are experiencing delays while trying to set the options on this page. Once you have set your options, you can re-activate this feature for verification.

CHAPTER 14. SETTING UP THE HELICOPTER RADIO

INTRODUCTION

REALFLIGHT SOFTWARE RADIO

RealFlight G2 lets you simulate many of the features of computer radios (channel mixing, exponential, etc.). This feature is called the RealFlight **Software Radio**. The software radio works the same whether you choose to use the InterLink Controller as a dummy transmitter, or use your own R/C transmitter to control RealFlight.

This chapter will show you how to set up the software radio for helicopters. *(To set up the RealFlight InterLink Controller for airplanes, see "Chapter 13. Setting up the Airplane Radio" on page 151.)*

Before you begin, make sure you have installed, and are able to run, the RealFlight software. *If you are using your own transmitter to control RealFlight, you may want to read "Interface Mode:* Joystick Emulation Interface*" on page 41.*

ACCESSING THE SOFTWARE RADIO

To access the software radio feature, open your aircraft for editing (in RealFlight's Aircraft menu, select "Edit (aircraft name)…"). Please note that you cannot edit any aircraft that came on the RealFlight or Add-Ons CDs; to edit a stock aircraft you must first make a copy, then edit the copy.

In the Setup page, find the **Radio Type** control, and click **Software Radio**. Click **My Own Radio** to bypass the software radio feature and use a mixing program on your own transmitter. However, this latter option only makes sense when you are using your own transmitter to control RealFlight.

To edit the software radio, select **Software Radio** and click **Edit Now….** This brings up the **Radio Setup** page.

SETTING UP THE REALFLIGHT CONTROLLER FOR HELICOPTERS

RealFlight Generation 2's helicopter software programming has been designed to allow the pilot maximum flexibility using the standard Futaba controller. It is generally simpler to use than a computerized radio, and good for learning the basic concepts of helicopter flight.

You can bring up the **Radio Setup** options using any of the following methods:

- Press the "T" key on your keyboard.

- Select **Edit Radio…** in the Aircraft menu.

- In the **Heli Setup** page (**Aircraft** menu, **Edit (current aircraft)…**) click the **Edit Now** button under **Radio Type**.

In each case, you must have a heli selected as the current aircraft.

MODES PAGE

The **Modes** page allows you to select active modes and the condition in which they will be activated.
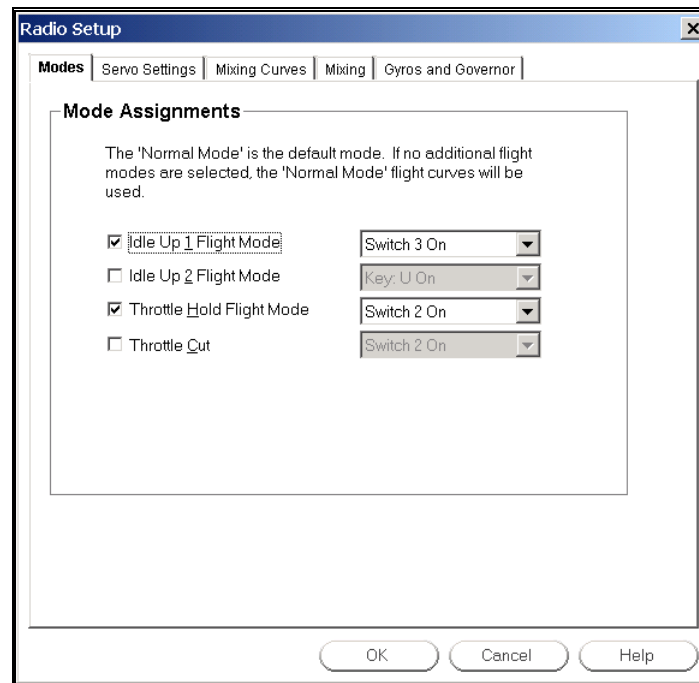
IDLE UP 1 FLIGHT MODE

Click on the box to enable the Idle Up 1 Flight Mode. Click on the down arrow to select the switch or keyboard command that will activate the flight mode and its respective settings. Switch 3 is the default setting.

IDLE UP 2 FLIGHT MODE

Click on the box to enable the Idle Up 2 Flight Mode. Click on the down arrow to select the switch or keyboard command that will activate the flight mode and its respective settings

THROTTLE HOLD FLIGHT MODE

Click on the box to enable the Throttle Hold Flight Mode.   Click on the down arrow to select the switch or keyboard command that will activate the throttle hold flight mode and its respective settings. Switch 2 is the default setting.

THROTTLE CUT

Click on the box to enable the Throttle Cut Mode. Click on the down arrow to select the switch or keyboard command that will activate the Throttle Cut Mode and its respective settings

SERVO SETTINGS PAGE

The **Servo Settings** page adjusts the outputs to each servo.
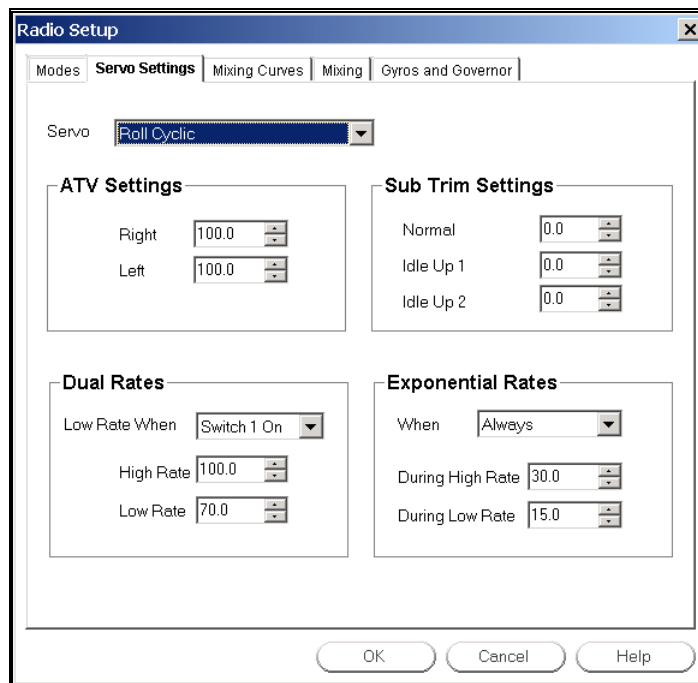
SERVO

Indicates the servo currently being edited. The options that will appear are dependent upon the servo that is selected. The servos available for selection are:

- Roll Cyclic
- Pitch Cyclic
- Throttle
- Tail Rotor
- Gyro
- Collective
- Head Speed Governor

RIGHT ATV SETTINGS

The maximum allowable travel volume to the right side of center for the selected servo.

LEFT ATV SETTINGS

The maximum allowable travel volume to the left side of center for the selected servo.

NORMAL SUB TRIM SETTINGS

A value used to offset the centering of the servo. This trim is used only while in the Normal Flight Mode.

IDLE UP 1 SUB TRIM SETTINGS

A value used to offset the centering of the servo. This trim is used only while in the Idle Up 1 Flight Mode.

IDLE UP 2 SUB TRIM SETTINGS

A value used to offset the centering of the servo. This trim is used only while in the Idle Up 2 Flight Mode.

LOW RATE WHEN

Indicates when the low rates will be activated.

HIGH RATE

The ATV, or travel volume, modifier when using the high rates. A value of 100% will result in the full range as set within the ATV value. A value of 50% will result in only 50% of the full range as dictated by the ATV.

LOW RATE

The ATV, or travel volume, modifier while using low rates. A value of 100% will result in the full range as set within the ATV value. A value of 50% will result in only 50% of the full range as dictated by the ATV.

EXPONENTIAL RATES WHEN

Indicates when the exponential rates will be activated. Switch "on/off" the exponential rates using this condition. Exponential settings may be used to change the response curve of the servos to make flying appear smoother or more fluid. You can make the servo movement less or more sensitive around neutral. Negative exponential makes the servo movement around the stick neutral less sensitive and positive makes the servo movement more sensitive.

DURING HIGH RATE

The amount of exponential applied while in the high rate mode.

DURING LOW RATE

The amount of exponential applied while in the low rate mode.

MIXING CURVES PAGE

The **Mixing Curves** page allows you to create and fine-tune the response curves for each of the Flight Modes. This enables you to customize the helicopter's flight characteristics to suit your personal taste.
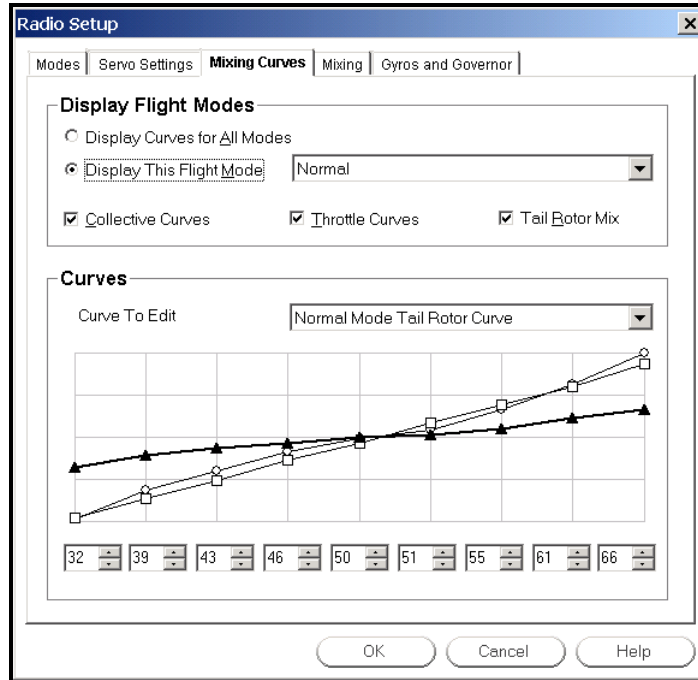
DISPLAY CURVES FOR ALL MODES

Display and edit multiple Flight Mode curves simultaneously.

DISPLAY THIS FLIGHT MODE

Display only the currently selected mode's curves. The available options are: Normal, Idle Up 1 and Throttle Hold. Click on this option to edit each Flight Mode curve independently.

COLLECTIVE CURVES

Click on this checkbox to display and edit only the collective pitch curve.

THROTTLE CURVES

Click on this checkbox to display and edit only the throttle curve.

TAIL ROTOR MIX

Click on this checkbox to display and edit only the tail rotor mixing curve.

CURVE TO EDIT

This displays the curve that will be adjusted. The curves that may be adjusted are:

- Normal Mode Collective Curve

- Normal Mode Throttle Curve

- Normal Mode Tail Rotor Curve

- Idle 1 Mode Collective Curve

- Idle 1 Mode Throttle Curve

- Throttle Hold Mode Collective Curve

- Throttle Hold Mode Throttle Curve

- Throttle Hold Mode Tail Rotor Curve

EDITING WINDOW

There are two methods that may be used to adjust the curves or tail rotor mix. Probably the easiest, is to use the mouse to "drag and drop" the desired point. To do so, simply place the pointer in the desired location along the curve and click on the left button. The curve should change accordingly. There are nine points along the curve that may be adjusted independently to achieve the proper curve or mixing that is desired.

The second method is to edit the "Y" coordinate of each point in the graph, using the data entry fields under each data point. You can enter a value directly into each box, or use the up/down arrows to raise/lower the value.

Please note the curve that is being adjusted is the one that is indicated in bold on the graph.

MIXING PAGE

The **Mixing** page allows you to create and apply mixes to improve flight performance.
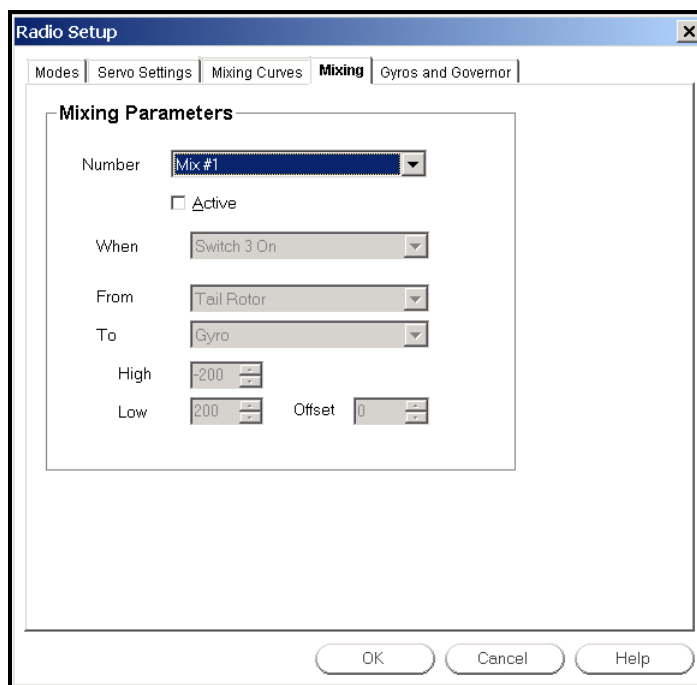
NUMBER

Indicates the mix to be adjusted. RealFlight G2 offers three mixes you can edit.

ACTIVE

Turn "on/off" the selected mix. If the mix is not activated, then the remainder of the items will be grayed out, as they are not available for adjustment.

WHEN

Indicates when the mix will become active. That is, the action that will cause the mix to occur. The respective mix may always or never be activated. Additionally, it may be activated by a switch or keyboard input as well.

FROM

In the simplest terms, this is the input channel. It is often thought of as the "Controlling" channel. The available "From" channels are:

- Roll Cyclic
- Pitch Cyclic
- Throttle
- Tail Rotor

- Gyro

- Collective

- Head Speed Governor

- Offset (position)

TO

The channel that the mix will modify. This may be thought of as the "Controlled" or receiving channel. The channels available for the modification are:

- Roll Cyclic

- Pitch Cyclic

- Throttle

- Tail Rotor

- Gyro

- Collective

- Head Speed Governor

HIGH

The percent of the "From" channel to apply to the "To" channel when the "From" channel is above 0.

LOW

The percent of the "From" channel to apply to the "To" channel when the "From" channel is below 0.

OFFSET

This offset value is added to the result of the mix. If the mix is designated as an "offset" type, then this value is used exclusively.

GYROS AND GOVERNOR
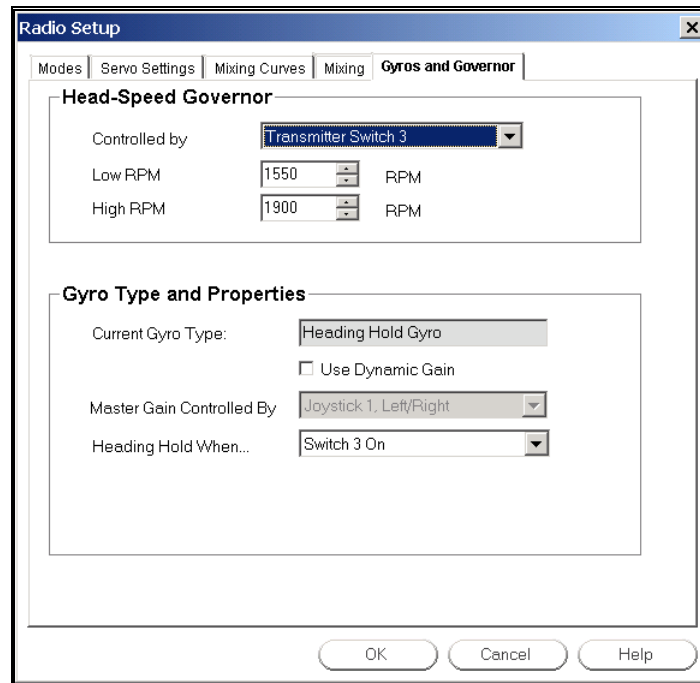
HEAD-SPEED GOVERNOR

These controls are used to adjust the settings of the head-speed governor.

CONTROLLED BY

This is the channel that controls the gain for the governor.

LOW RPM

This is the lowest RPM that the governor will maintain.

HIGH RPM

This is the highest RPM that the governor will maintain.

GYRO TYPE AND PROPERTIES

These controls adjust the gyro settings.

CURRENT GYRO TYPE

Indicates the type of gyro currently selected in the gyro page. *For information on changing the gyro type, see "*Gyro Page*" on page 236.*

USE DYNAMIC GAIN

Click on this check box to allow the gyro gain to be controlled by an input from the radio, a switch or from the keyboard.

MASTER GAIN CONTROLLED BY

This indicates the channel that controls the gain of the gyro. The master gain may be controlled by an input from the radio, a switch or from the keyboard. The options are:

- Joystick 1, left/right

- Joystick 1, up/down

- Joystick 2, left/right

- Joystick 2, up/down

- Mouse, left right

- Mouse, up/down

- Numeric keys (1-9)

- Keyboard keys Q-W-E-R-T

- Keyboard keys A-S-D-F-G

- Keyboard keys Z-X-C-V-B

- Keyboard key H

- Keyboard key J

- Keyboard key K

- Keyboard key L

- Transmitter Switch 1

- Transmitter Switch 2

- Transmitter Switch 3

- Transmitter Switch 4

- Transmitter Rotary Knob

HEADING HOLD

This field will only appear if you have selected a heading hold gyro. This is used to adjust the condition that activates the heading hold gyro. The gyro may be controlled by an input from the radio, a switch or from the keyboard.

CHAPTER 15. USING THE KEYBOARD TO ACCESS REALFLIGHT COMMANDS

KEYBOARD MAPPING (HOT KEYS)

RealFlight allows you to access menu and other commands from your computer's keyboard. A key that invokes a command is called a **quick key** or **hot key**. These keys provide a quicker way of accessing functions or features.

For example, pressing the "F2" key incrementally zooms your view towards the aircraft. This is exactly the same result that arises if you select **Zoom In** from the RealFlight **View** menu. Consequently, we say that "F2" is a hot key for the Zoom In command.

RealFlight G2 comes with a default set of hot keys. You can use these defaults, or re-map the hot keys however you want. Almost every key on your keyboard can be assigned to control a function of RealFlight G2.

Please note when a particular menu has a hot key, it will appear to the right of the menu selection.

DEFAULT KEYBOARD MAP

The table below contains a list of every key that can be assigned to a RealFlight command. Alongside, you can find the default mapping for this key.

Assignable Keys	Default Mappings	Where to find information on this command
` (accent)	Aircraft: Smoke	"Smoke Parameters" on page 75
-	Chat Window	"Chat " on page 132
'	N/A	
.	N/A	
/	N/A	
;	N/A	
\	N/A	
]	N/A	
[	N/A	
=	Radio Gadget	"Radio" on page 132

0	Advanced NavGuides	"Advanced NavGuides " on page 126
1	Look At Other 1	"Look at Other" on page 121
2	Look At Other 2	"Look at Other" on page 121
3	Look At Other 3	"Look at Other" on page 121
4	Look At Other 4	"Look at Other" on page 121
5	N/A	
6	N/A	
7	Playback Gadget	
8	Recording Gadget	"Flight Recording" on page 132
9	NavGuides	"NavGuides Gadget" on page 124
A	Select Aircraft	"Aircraft Selection…" on page 72
B	N/A	
C	N/A	
D	Edit Airport	"Edit (Current Airport)…" on page 51
E	Edit Aircraft	"Edit (Current Aircraft)…" on page 74
F	Flight Failure	"Cause Flight Failure" on page 79
G	N/A	
H	View: Gadget: Hide All Gadgets	"Hide All Gadgets" on page 124
I	N/A	
J	N/A	
K	Aircraft: Kill Engine	"Kill Engine" on page 75
L	Select Airport	
M	N/A	
N	Create New View	
O	Pilot and Viewport Options	
P	N/A	
Q	N/A	
R	Options: Start (Stop) Recording	"Start/Stop Recording" on page 110
S	N/A	
T	Show Trees	"Show Trees" on page 68
U	N/A	
V	Virtual Flight Instructor	"Virtual Flight Instructor" on page 107
W	Weather Conditions	
X	N/A	
Y	N/A	
Z	N/A	
Backspace	Help: Take screen shot	"Screen Shot" on page 149
Delete	N/A	
End	N/A	
Enter	Multiplayer: Send Chat Message	"Send Chat Message" on page 146
F1	View: Zoom Reset	"Zoom Reset" on page 118
F2	View: Zoom In	"Zoom In" on page 118
F3	View: Zoom Out	"Zoom Out" on page 118
F4	View: Pilot at Fixed Position: Set to Pit Area	"Set To Pit Area" on page 118
F5	View: Pilot in Aircraft	"Pilot in Aircraft" on page 120
F6	View: Pilot behind Aircraft	"Pilot Behind Aircraft" on page 120

F7	View: Pilot at Fixed Position: Set with Overhead View	"Set with Overhead View" on page 119
F8	View: Pilot at Fixed Position: Set with Mouse	"Set with Mouse" on page 119
F9	View: Look at my Plane	"Look at My Aircraft" on page 121
F10	View: Look at Location	"Look at Location" on page 121
F11	View: Pilot at Fixed Position: Set to Current Aircraft	"Set to Current Aircraft Position" on page 119
F12	View: Pilot at Fixed Position: Named Positions	"Named Positions" on page 119
Home	N/A	
Insert	Edit Radio	"Edit Radio…" on page 75
Num pad -	N/A	
Num pad *	N/A	
Num pad .	N/A	
Num pad /	N/A	
Num pad +	N/A	
Num pad 1	N/A	
Num pad 2	N/A	
Num pad 3	N/A	
Num pad 4	N/A	
Num pad 5	N/A	
Num pad 6	N/A	
Num pad 7	N/A	
Num pad 8	N/A	
Num pad 9	N/A	
Page down	N/A	
Page up	N/A	
Up arrow	N/A	
Down arrow	View: Quick Look: Ground	"Quick Look" on page 121
Right arrow	N/A	
Left arrow	View: Quick Look: Wind Sock	"Quick Look" on page 121
Space bar	Aircraft: Reset Position	"Reset Position" on page 75
Tab	Run in Window	

Keys marked "N/A" (Not Assigned) have no default mapping.

CUSTOMIZING THE KEYBOARD MAP

You can customize the keyboard map by selecting **Keyboard Mappings**… from the RealFlight G2 **Options** menu. *For more information about using this command, please see "*Keyboard Mappings*" on page 114.*

CHAPTER 16. CUSTOMIZING YOUR AIRPLANE

INTRODUCTION

RealFlight allows you to create and modify your own airplanes. Using its exclusive RealPhysics technology, RealFlight takes the actual physical description of the plane and models the physics using that information. There are many variables that can affect a plane's performance. For instance, adjusting the wingspan of a plane can change the roll rate, the lift generated, the drag generated, pitching moments and other aerodynamic characteristics.

*** Please be aware that disassembling your plane for measurement purposes might cause damage to your plane if done incorrectly. Knife Edge Software and Great Planes will **NOT** be responsible for any damages caused by your plane or to your plane as a result of taking these measurements. If you don't want to risk damaging your plane, then do not physically measure its attributes.*

*** The point at which all measurements are taken from is illustrated below. This is the Center of Gravity for the whole plane. If you were to lift the plane from this single point, it would not rotate or dip in any direction. The front to back measurement is usually the center of gravity measurement listed on the building plans.*
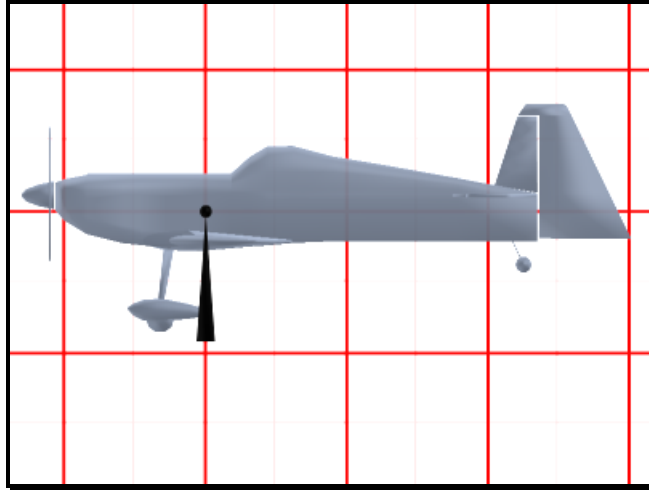
AIRPLANE SETUP

You can begin an airplane editing session using either of two methods:

- Select the airplane you want to edit as the current aircraft, and then click **Edit (current aircraft)…** in the **Aircraft** menu.

- Click on **Select Aircraft…** in the **Aircraft** menu. When you see the **Aircraft Selection** page, select the aircraft you want to edit, and then click the **Edit** button.

Regardless of which method you use, follow the on-screen instructions when you start an editing session and you will see the Plane Setup page. This page contains basic information about your aircraft.

Note: RealFlight will not let you directly edit any standard or default aircraft on the RealFlight or Add-On CDs. To edit one of these "default" aircraft, you must first make a copy of the aircraft, then edit the copy. You can copy an aircraft in the **Aircraft Selection** page (**Aircraft** menu, **Select Aircraft**…). *See "Aircraft Selection…" on page 72.*
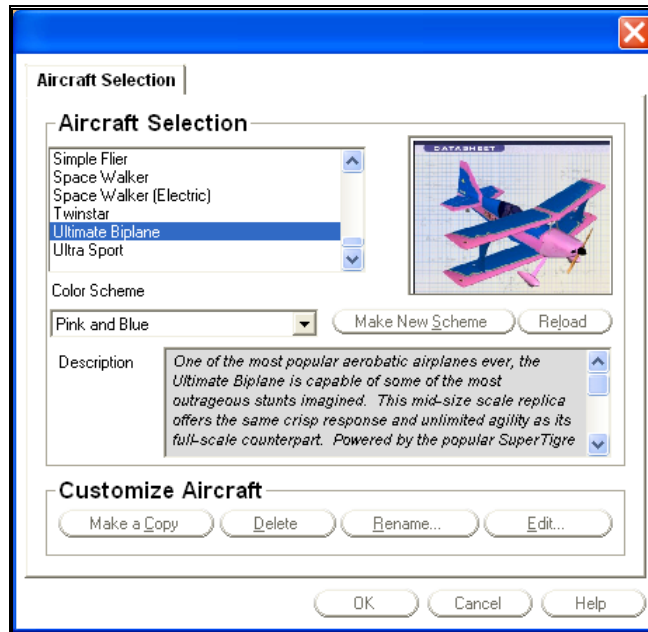
PLANE NAME

This is the name you have designated for the copied aircraft. We strongly suggest that you rename each aircraft that you modify. This will prevent you from confusing like aircraft.

DESCRIPTION

In this field, you can enter any comments that describe or document the plane you are creating. This is ideal for modelers having several different setups with the same visual appearance.

VISUAL SCALE

Adjusts the visual scale of the airplane. This only affects the appearance of the airplane; it does not influence the way that the plane flies.

RADIO TYPE

This dialog box allows you to choose the radio type that will control this airplane. If **Software Radio** is selected, the RealFlight program will emulate the features of a computer radio. It will perform any necessary mixing or other channel processing. If you use your own transmitter to control RealFlight, by selecting **My Own Transmitter** you can direct RealFlight to use "raw" output from your radio. Choose this option when you want your transmitter to perform the mixing and other channel processing.

 Note that the "My Own Transmitter" option is not useful when you use the InterLink Controller as a mockup transmitter to control RealFlight. This is because the InterLink does not have any programmable mixing. To use mixing with the InterLink in Joystick mode, select "Software Radio."

ENGINES AND POWER SOURCE PAGE

This page allows you to specify the type of power source that will power your aircraft, and the properties of the motor or engine. You can easily and quickly choose a different engine for your model. If so desired, you can edit and create your own engines as well.

Clicking any of the "?" buttons gives a helpful diagram. (Many of the diagrams for this page are reproduced in this manual section.)

ENGINE TO EDIT

Determines which engine on the airplane to edit. This is useful as RealFlight G2 can support multi-engine models.

THIS ENGINE

ENGINE LOCATION

The location point is the location of the center of the propeller.

Right - Location of the engine on the plane from the fixed center point of the plane. A negative value moves the engine to the left side of the plane. A positive value moves the engine to the right side of the plane.
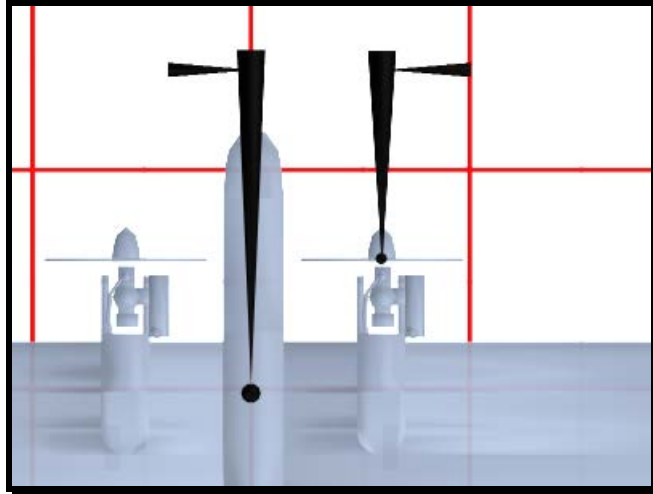
Forward - Location of the engine on the plane from the fixed center point of the plane. A negative value moves the engine to the back of the plane. A positive value moves the engine to the front of the plane.
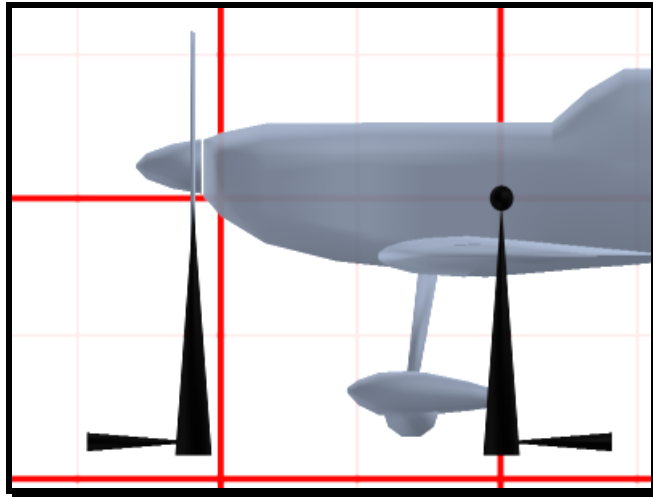
Up - Location of the engine on the plane from the fixed center point of the plane. A negative value moves the engine below the plane. A positive value moves the engine above the plane.
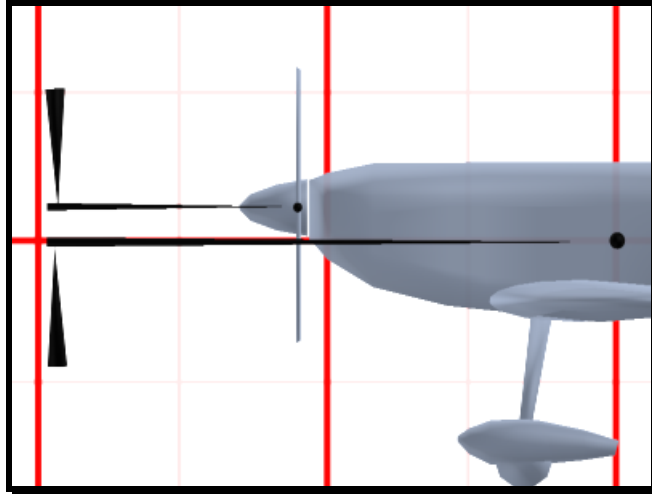
RIGHT THRUST

The amount of right thrust for the selected engine. For left thrust, use a negative value. Right thrust is generally used to counteract the torque of the engine.
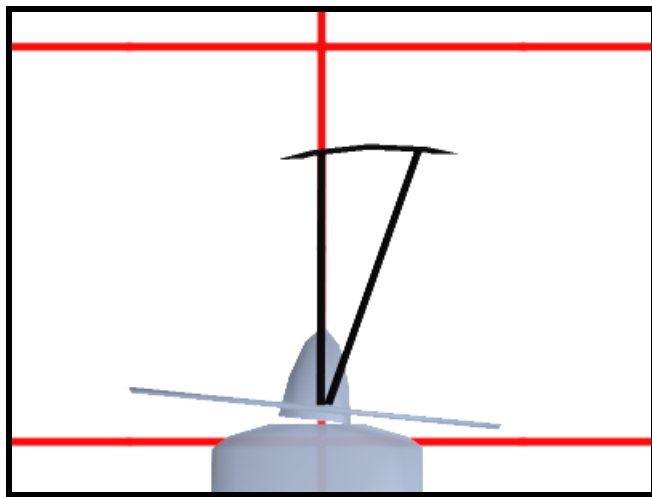
DOWN THRUST

Amount of down thrust for this engine. For up thrust, use a negative value. Down thrust is used to counteract any ballooning effect a plane might have when flying at high speeds.
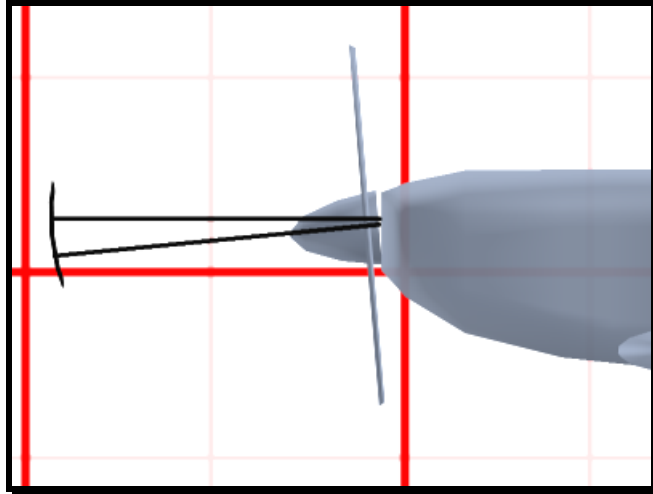
ENGINE TYPE

TYPE

Choose the type of engine you want attached to the plane. Changing this engine will change the power, prop, sound and other power properties of the plane.

COPY

Make a copy of the selected engine and all of its parameters. You must do so prior to modifying this engine. You are not allowed to change default engines. Therefore, you must make a copy of the engine and then modify that copy.

DELETE

Delete the active engine. You can only delete engines that you have created.

RENAME

Rename the active engine. You can only rename engines that you have created.

EDIT ENGINE

Edit the active engine. You can only edit engines that you have created. Be aware that any changes that you make to this engine will affect all planes that use the engine. If you would like the changes to only affect this aircraft, please make a copy of the engine and rename it accordingly. *For further information, see "Engine Set* up (Internal Combustion *and* Ducted Fan)*" on page 177, or "Engine* Setup (Electric and Electric Ducted Fan)*" on page 178.*

GENERAL

POWER PLANT

Choose the power plant type for this plane.

- Internal Combustion Engine - This is a piston-powered engine with a standard propeller.

- Ducted Fan - These power plants are normally used on jet aircraft. It is a piston-powered engine with a fan and impeller unit rather than a propeller.

- Electric Motor - This allows you to use an electric motor with a standard propeller.

- Electric Ducted Fan - This allows you to use an electric motor with a ducted fan unit.

- Turbine - This allows you to use a miniature turbine engine.

FUEL TANK SIZE

The volume of the fuel tank. All engines feed from this tank. More fuel will add more weight to the plane. This option is only available if you are using an Internal Combustion Engine, Ducted Fan, or Turbine Engine.

IF THE POWER PLANT IS AN ELECTRIC MOTOR:

 # CELLS

The number of cells in the flight pack. Using more cells provides greater electric potential (Volts), and greater power from the battery pack. However, using more cells also increases the total weight, which may decrease the time that a charge lasts. Consequently, selecting the number of cells is a tradeoff between power and flight duration.

CELL TYPE

Choose the type of batteries you want to power the aircraft. The cell type selected will affect the duration of the flight time as well as the overall aircraft weight. If your aircraft has multiple engines, the engines are configured in 'serial' to a single battery pack.

ENGINE SET UP (INTERNAL COMBUSTION AND DUCTED FAN)

TORQUE CURVE

An engine's **torque curve** is a graph that describes how much torque the engine delivers as a function of its engine speed (measured in RPM). Choose the torque curve that you think most closely matches the engine you are using.

TORQUE PERCENT

Use this control to "tune" the engine's overall torque curve up or down. For example, turn up the torque to simulate a high nitro content in the fuel, or a tuned pipe.

PROPELLER DIAMETER

The diameter of the propeller. Larger props spin slower and usually limit the top speed. Smaller props generally allow for high speeds but are less efficient at lower RPMs.

PROPELLER PITCH

Describes how far the propeller would theoretically move after rotating one entire revolution. Larger pitch props are generally for fast planes and smaller pitch props generally give better aerodynamic and climb performance.

ENGINE WEIGHT

Weight of the engine and the muffler. This will be added to the total weight of the plane.

PROPELLER WEIGHT

Weight of the prop. Heavier props take longer to reach a given RPM, but hold that RPM much better. This will be added to the total weight of the plane.

BLADES

Number of blades on the propeller.

FUEL CONSUMPTION

Rate (volume per unit time) at which this engine consumes fuel.

PROP AIRFOIL

Airfoil of the prop blades.

SOUND PROFILE

Which pre-recorded sound profile to use for the selected engine.

ENGINE SETUP (ELECTRIC AND ELECTRIC DUCTED FAN)

TYPE

Select the type of motor you wish to use, making sure the motor is matched with the propeller and the number of cells. Using the wrong motor in a real R/C plane can result in an inefficient system at best and an overheating one at worst. Consider using a third-party program such as ElectriCalc or MotoCalc to help you decide the best motor-prop combination.

COPY TYPE

Make a copy of the selected motor type and all of its parameters. You must do so prior to modifying a predefined motor. You are not allowed to edit default motors. Therefore, you must make a copy of the motor and then modify that copy.

DELETE

Delete the active motor. You can only delete motors that you have created.

RENAME

Rename the active motor. You can only rename motors that you have created.

EDIT ENGINE

Edit the active motor. You can only edit motors that you have created. Be aware that any changes that you make to this motor will affect all planes that use this particular engine.

GEAR REDUCTION

Choose the gear reduction for this motor. When you change the "Type" to a gear reduced version of a particular electric motor, RealFlight will default this value with that reduction ratio. You can override this value by typing in a new value.

PROPELLER DIAMETER

Diameter of the propeller. Larger props spin slower and usually limit the top speed. Smaller props generally allow for high speeds but are less efficient at lower RPMs.

PROPELLER PITCH

Describes how far the propeller would theoretically move after rotating one entire revolution. Larger pitch props are generally for fast planes and smaller pitch props generally give better aerodynamic and climb performance.

MOTOR WEIGHT

Weight of the engine and the muffler. This will be added to the total weight of the plane.

PROPELLER WEIGHT

Weight of the prop. Heavier props take longer to reach a given RPM, but hold that RPM much better. This will be added to the total weight of the plane.

BLADES

Number of blades on the propeller.

PROP AIRFOIL

Airfoil of the prop blades.

SOUND PROFILE

Which pre-recorded sound profile to use for the selected engine.

ELECTRIC MOTOR TYPE

This dialog enables you to enter parameters for an electric motor. The parameters describe the amount of torque the motor can generate under various conditions.
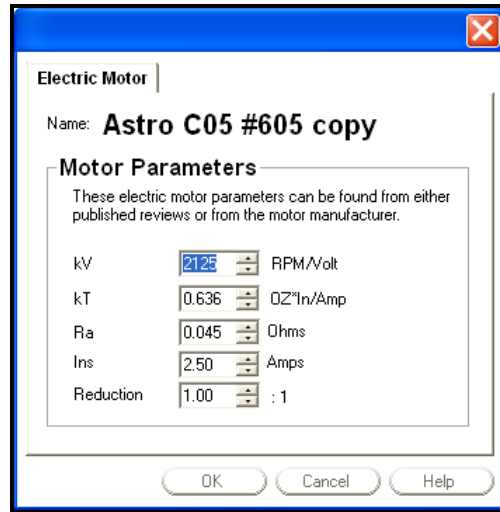
NAME

Displays the name of the motor.

κV

Voltage constant for this motor. This indicates the RPMs of the motor at a given applied electric potential (measured in Volts). Generally, the motor manufacturer publishes this information.

κT

Torque constant for this motor. This indicates the amount of torque a motor will generate at a specific current (measured in Amperes). Generally, the motor manufacturer publishes this information.

RA

Terminal resistance of the motor. Generally, the motor manufacturer publishes this information.
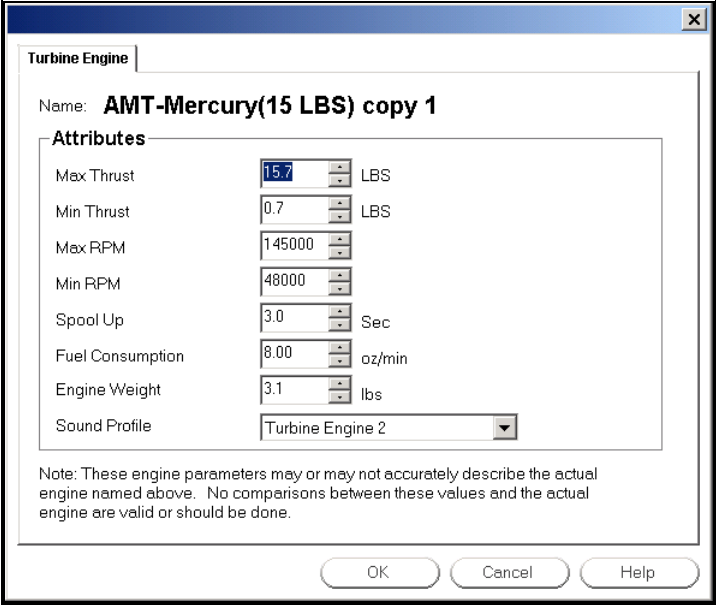
INS

No Load Current of the motor. Generally, the motor manufacturer publishes this information.

REDUCTION

Gear reduction ratio of the motor. This is used to generate the gear reduction value on the previous page as default value when this motor type is selected. *Changing this value will not change any of the gearing motors that use this motor type.*

ENGINE SETUP (TURBINE)

MAX THRUST

Thrust of the turbine at full power. The turbine manufacturer usually publishes this value.

MIN THRUST

Thrust of the turbine at idle. The turbine manufacturer usually publishes this value.

MAX RPM

RPM of the turbine at full power. The turbine manufacturer usually publishes this value.

MIN RPM

RPM of the turbine at idle. The turbine manufacturer usually publishes this value.

SPOOL UP TIME

The time it takes to go from idle to full power. The turbine manufacturer usually publishes this value.

ENGINE WEIGHT

Weight of the engine and the muffler. This will be added to the total weight of the plane.

FUEL CONSUMPTION

Rate (volume per unit time) at which the engine consumes fuel.

SOUND PROFILE

Determines the pre-recorded sound profile to use for the selected engine.

FUSELAGE PAGE

This page adjusts the properties of the fuselage. You can click on any "?" button to see a helpful diagram (many of these diagrams are reproduced in this manual section).

FUSELAGE LENGTH

The length of the fuselage from the tip of the nose to the tip of the tail- excluding the vertical stabilizer and the spinner (if applicable).
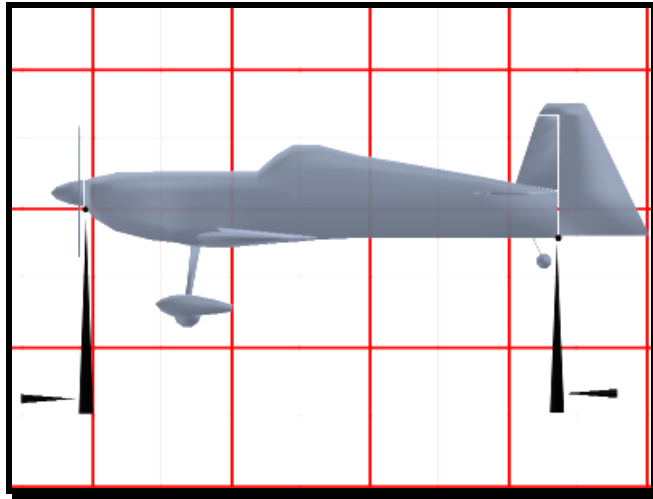
FUSELAGE HEIGHT

Average height of the fuselage not including the landing gear or the vertical stabilizer.
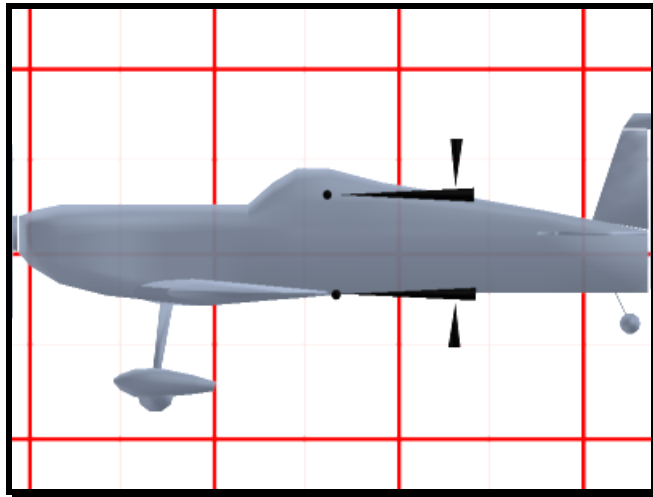
FUSELAGE WIDTH

Average width of the fuselage excluding the landing gear.
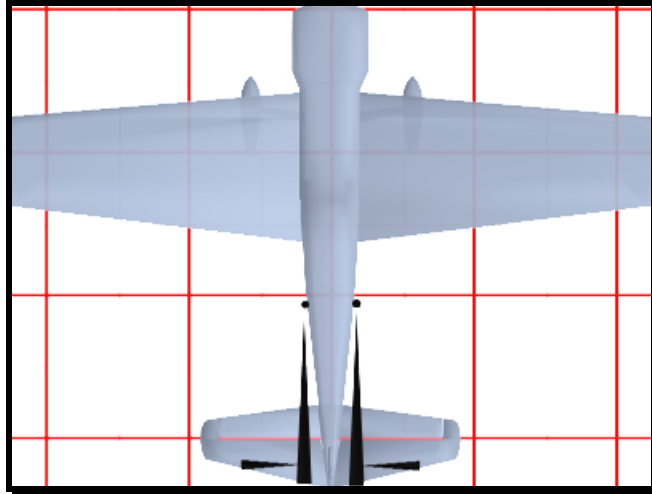
FUSELAGE Y LOCATION

Location of the front tip of the fuselage as measured from the fixed center point of the plane.
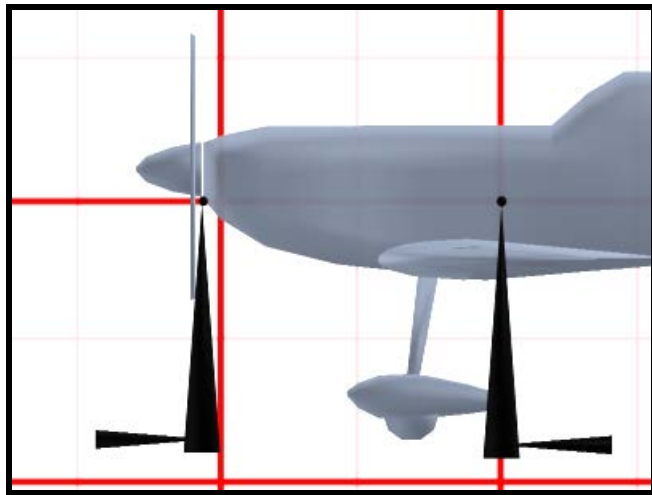
FUSELAGE WEIGHT

Weight of the fuselage. Heavier planes are more stable but have higher wing loading and are more prone to stalling. This parameter includes the weight of the engine as well.

FRONTAL AREA (INCLUDES WINGS)

Area of the fuselage, viewed from the front of the plane, looking towards the tail. The more frontal area that is exposed, the more drag the fuselage will have causing the airplane to slow down more rapidly.

SIDE AREA

Area of the fuselage, looking at the fuselage from the side. The more side area, the more sensitive the plane will be to crosswinds and side gusts. The vertical stabilizer is not included in this calculation.

CG ADJUSTMENT

Adjust the Center of Gravity fore or aft. Positive numbers will make the plane more nose heavy while negative numbers will make the plane more tail heavy.

MAIN GEAR'S WIDTH

Distance between the two main wheels.
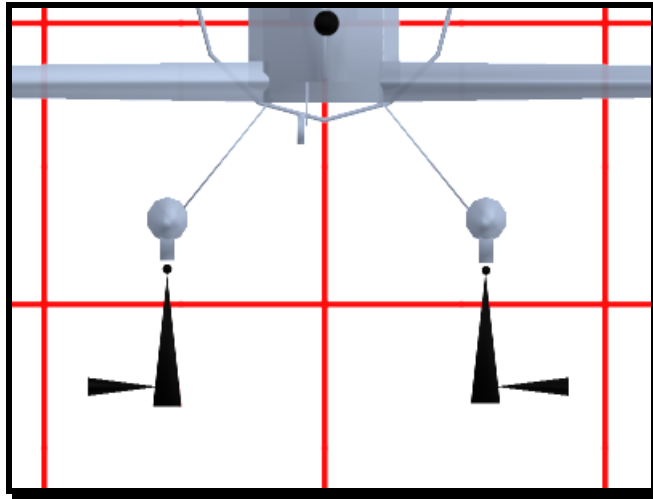
MAIN GEAR'S LOCATION

Forward - Location of the center of the main gear. A negative value moves the main gear to the back of the plane. A positive value moves the main gear to the front of the plane.
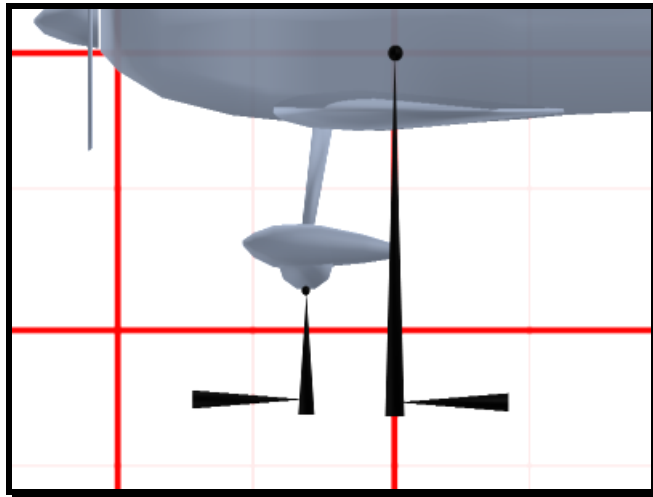
Up - Location of the bottom of the main wheels. A negative value moves the main gear below the plane. A positive value moves the main gear above the plane.
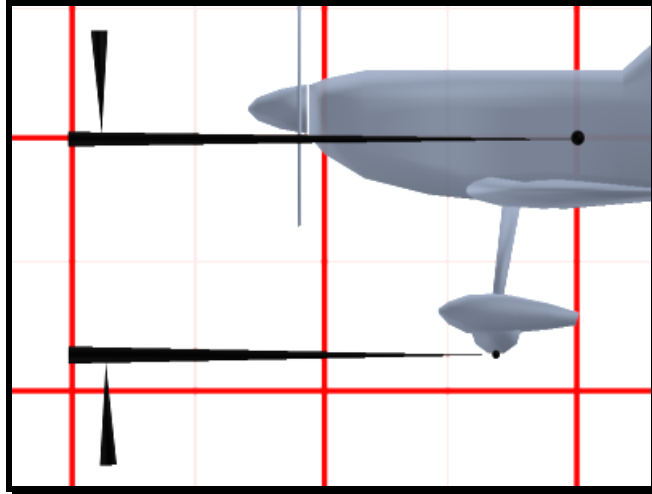
STEERING WHEEL'S LOCATION

Forward - Location of the center of the steering wheel. A negative value moves the steering wheel to the back of the plane. A positive value moves the steering wheel to the front of the plane.
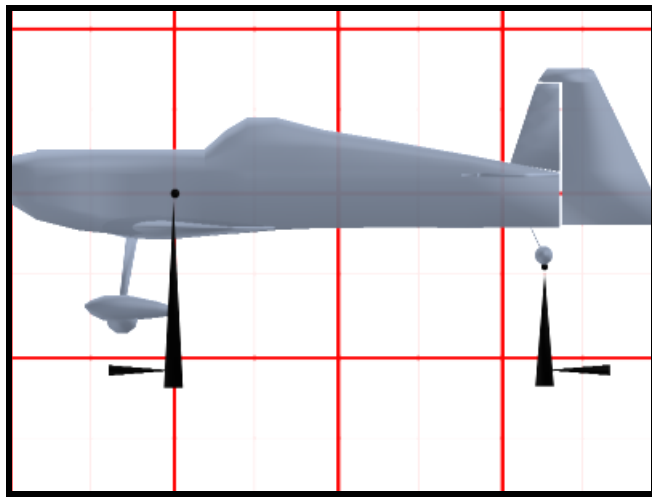
Up - Location of the bottom of the steering wheel.   A negative value moves the steering wheel below the plane. A positive value moves the steering wheel above the plane.
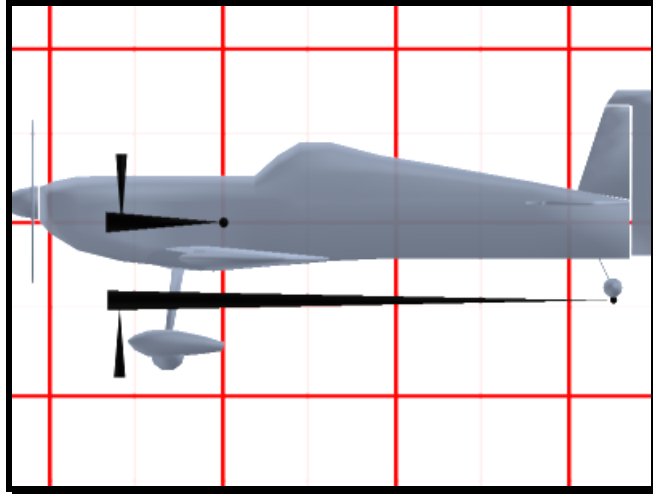
STEERING WHEEL SERVO

Select which servo operates the steering wheel.   You can later choose which channel controls this servo in the "Radio Setup" page.

STEERING WHEEL MAX DEGREES

How far the steering wheel will travel at the servo's maximum deflection.

RETRACTABLE GEAR

Choose whether this plane has retractable landing gear or not. The plane must visually support retracts in order for you to "see" this option when flying. RealFlight G2 includes aircraft that visually support retracts. Also, several aircraft included on the Add-Ons disks support retractable landing gear.

RETRACT SERVO

Choose which servo operates the landing gear.   You can later choose which channel controls this servo in the "Radio Setup" page.

WINGS PAGE

Wings provide the aircraft with lift and enable it to become airborne. RealFlight allows you to adjust many different parameters for each wing. This includes the vertical tail and horizontal tail as well as the main wing(s).

You can adjust wing parameters on the Wing page. When you see a "?" button on the wing page, click the button to see a helpful diagram (many of those diagrams are reproduced in this manual section).
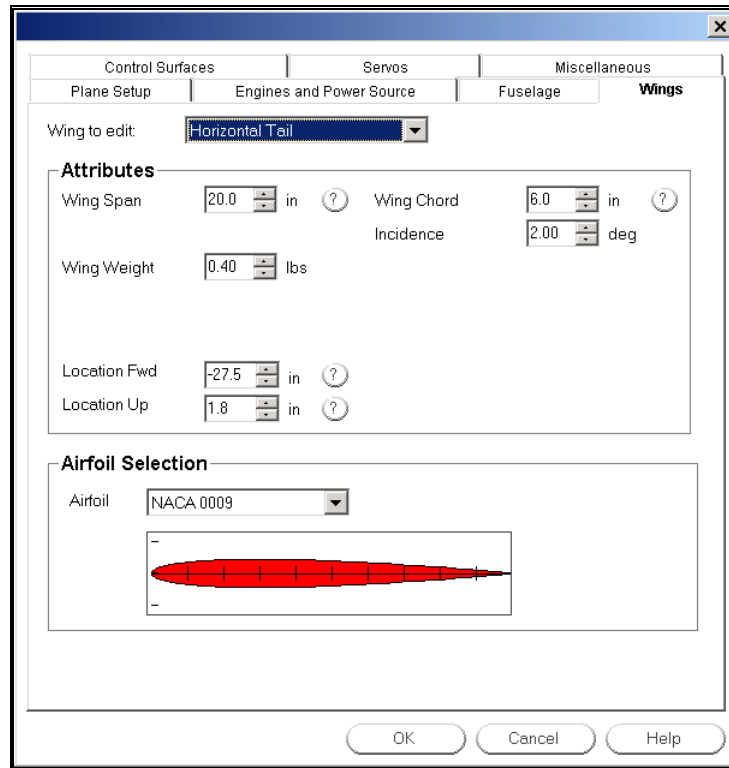
WING TO EDIT

Select the wing you wish to modify.

- Main Wing- This is the main lifting surface of an airplane. The main wing may include *ailerons* (hinged control surfaces located on the trailing edge of the wing, one on each side, which provide control of the airplane about the roll axis). The aileron control direction is often confusing to first time modelers. For a right roll or turn, the right hand aileron is moved upward and the left hand aileron downward, and vice versa for a left roll or turn.

- Vertical Wing- Hinged control surface located at the trailing edge of the vertical stabilizer, which provides control of the airplane about the Yaw axis, and causes the airplane to Yaw left or right. Left rudder movement causes the airplane to Yaw left, and right rudder movement causes it to Yaw right.

- Horizontal Wing- Hinged control surface located at the trailing edge of the horizontal stabilizer, which provides control of the airplane about the pitch axis and causes the airplane to climb or dive. The correct direction of control is to pull the transmitter elevator control stick back, toward the bottom of the transmitter, to move the elevator upward, which causes the airplane to climb, and vice versa to dive.

WING SPAN

Wing span of the wing. Longer wings generate more lift and are more efficient, but slow down the roll rate of the plane.
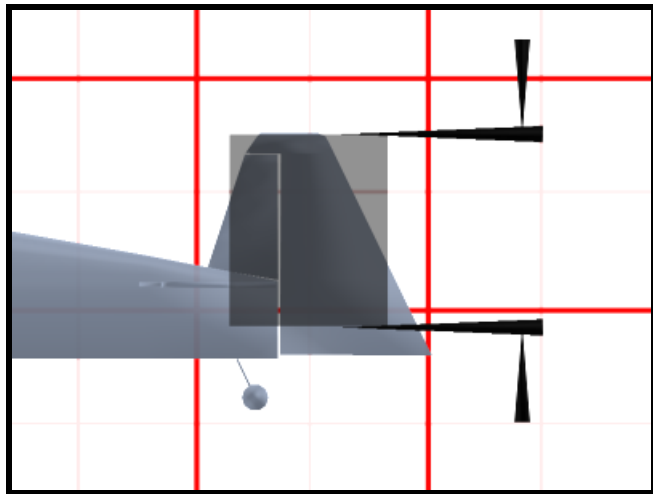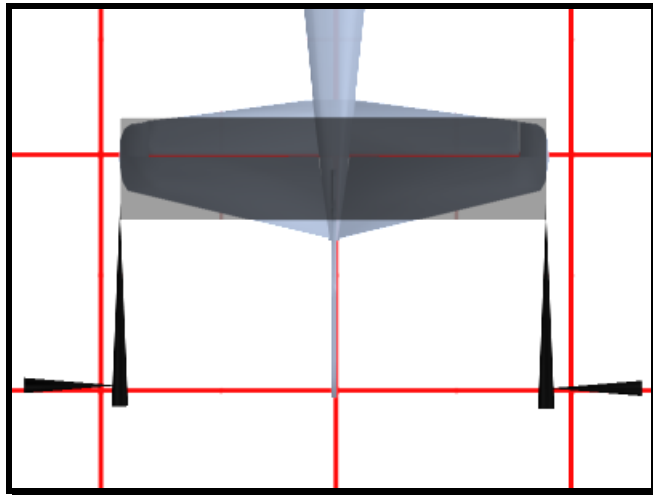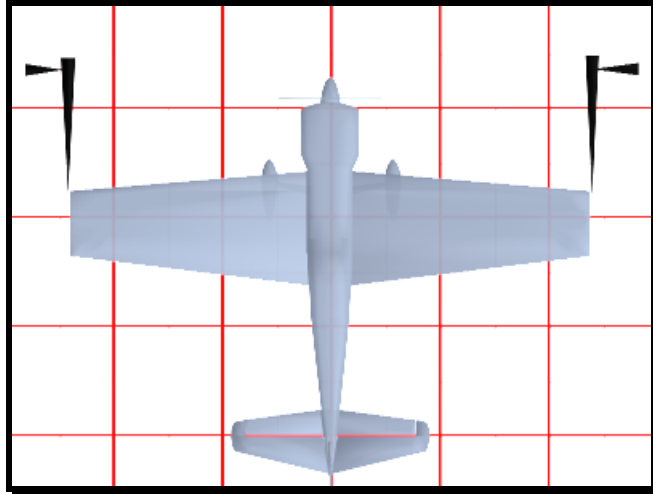
WING CHORD

The width of the wing. Wider chords increase lift, but generate more drag and slow down the roll rate of the plane.
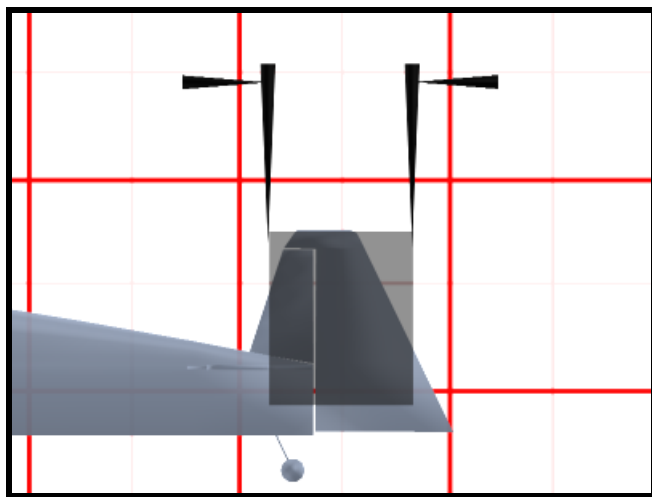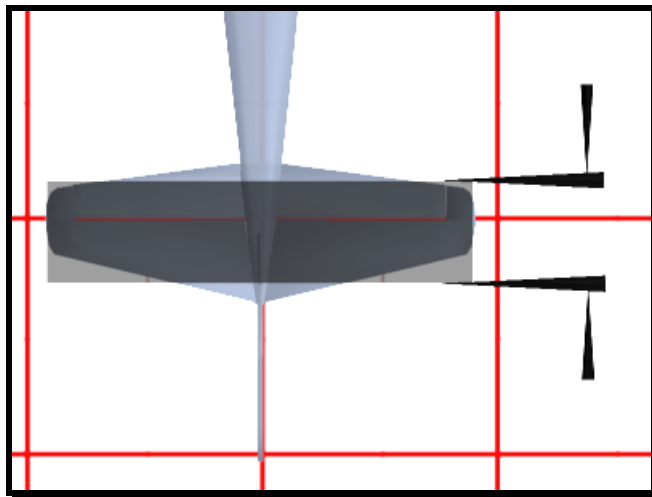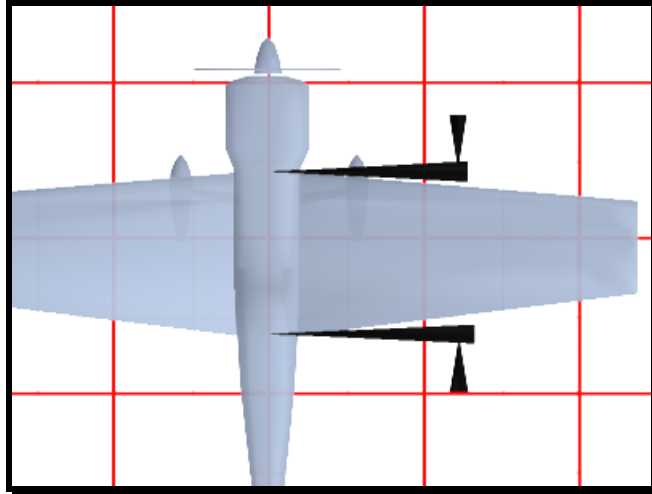
DIHEDRAL

Degrees of dihedral in the wing. *Dihedral* is a V-shaped bend in the wing, when viewed from the front of the plane. Typically, more dihedral causes more

aerodynamic stability in an airplane, and causes the rudder to control both the roll and yaw axis. This is why some trainers and sailplanes require only 3 channels of radio control (i.e. have no ailerons). Dihedral increases the stability of the airplane at the expense of smooth aerobatics.

INCIDENCE

Incidence of the wing. This is the fixed angle of attack when the plane is at 0 degrees angle of attack.

WING WEIGHT

Weight of the wing. The wing should be weighed separately and the value entered here. Heavier wings make for a more stable airplane, but add weight to the plane and will decrease the roll acceleration.

WASHOUT

Adjusts the amount of "washout" or wing twist in the wing. *Washout* is an intentional twist in the wing, causing the wing tips to have a lower angle of attack than the wing root. In other words, the trailing edge is higher than the leading edge at the wing tips. Washout helps prevent tip stalls.

Positive washout is helpful to reduce tip stalls. Negative washout is usually disastrous!

LE SWEEP BACK

Angle of the Leading Edge (LE) edge as it moves towards the tip. An angle of "0" will make a straight leading edge. An angle of "30" degrees will give a swept back leading edge much like an F-16.
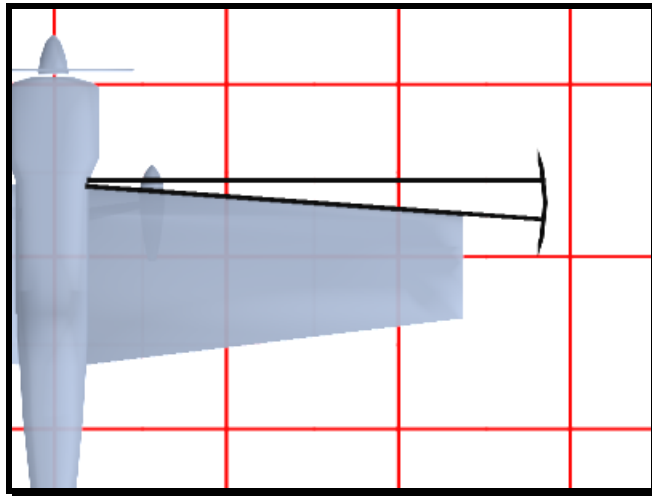
TE SWEEP BACK

Angle of the Trailing Edge (TE) as it moves towards the tip. An angle of "0" will make a straight trailing edge. An angle of "10" degrees will give a swept back trailing edge much like an Ultimate. An angle of "-10" degrees will give a swept forward trailing edge much like an Extra.
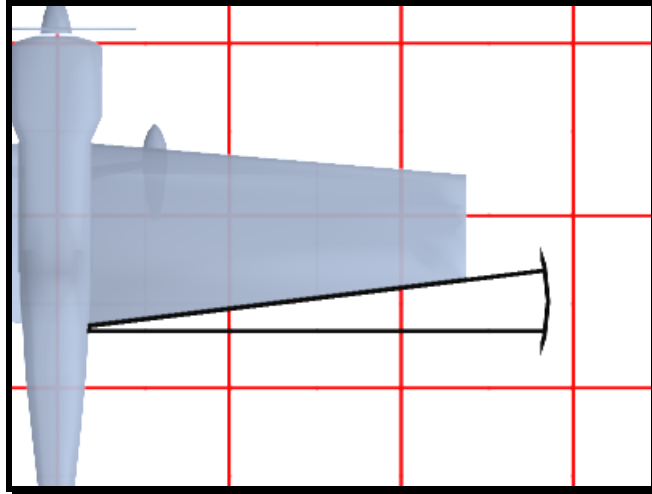
LOCATION

Right - Location of the wing on the plane from the fixed center point of the plane. A negative value moves the wing to the left side of the plane. A positive value moves the wing to the right side of the plane.

Forward - Location of the wing on the plane from the fixed center point of the plane. A negative value moves the wing to the back of the plane. A positive value moves the wing to the front of the plane.
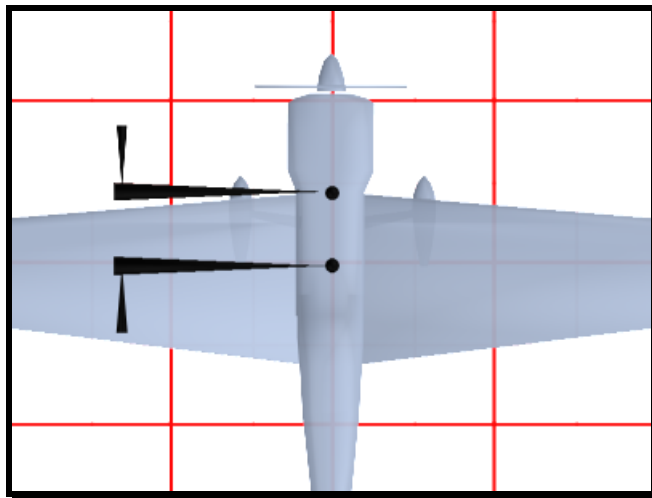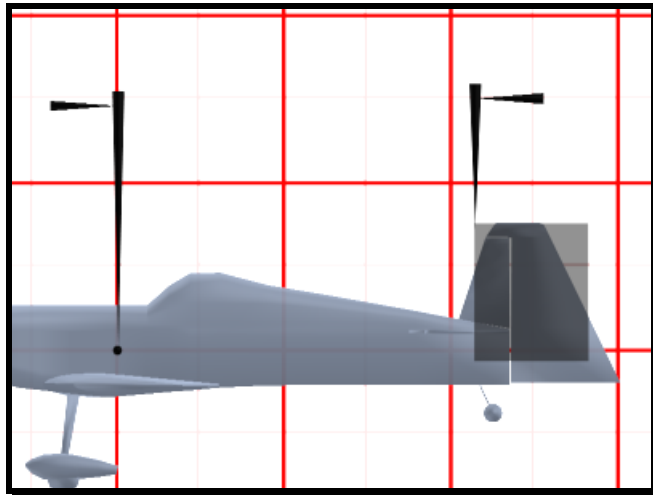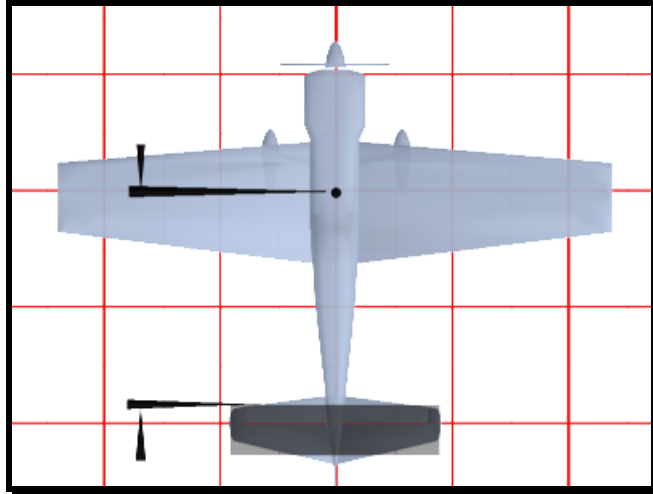
Up - Location of the wing on the plane from the fixed center point of the plane. A negative value moves the wing below the plane. A positive value moves the wing above the plane.
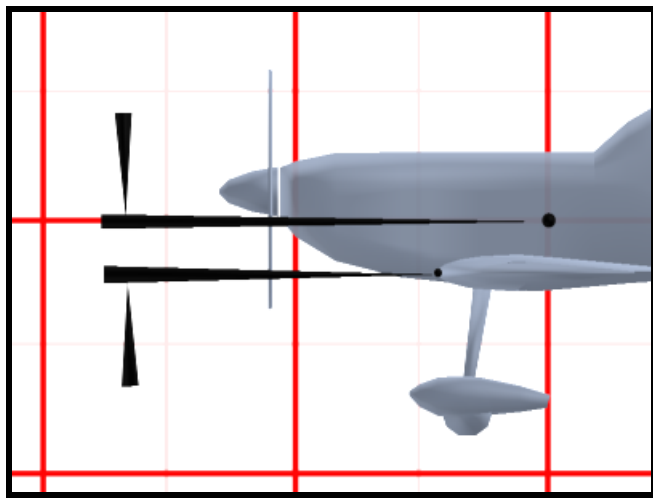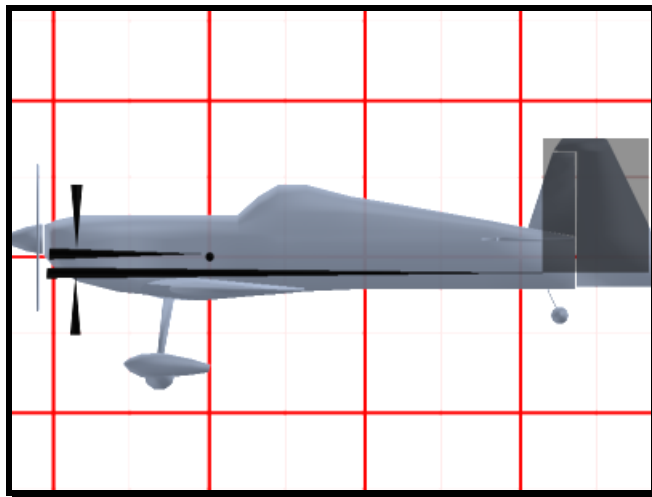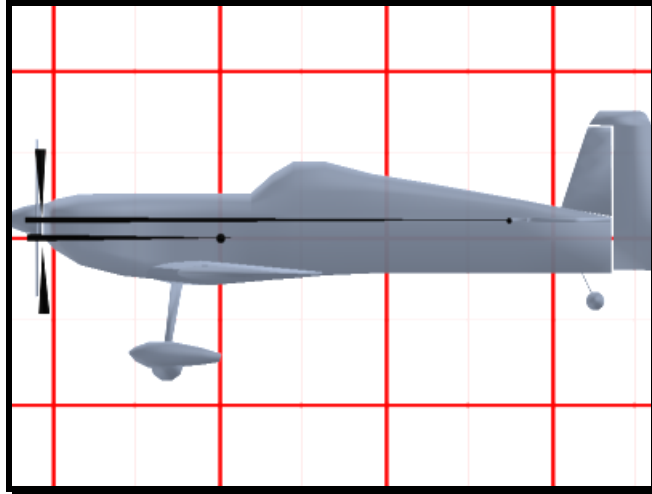
AIRFOIL

Choose the airfoil profile that describes this wing. Each airfoil will have different flight characteristics.

CONTROL SURFACES PAGE

Control surfaces are the ailerons, flaps, elevator, and rudder for your airplane. They are what make the airplane turn, climb, and dive. Using the **Control Surfaces** page, you can edit the control surfaces for each wing on the airplane.

If you see a "?" button on the Control Surfaces page, you can click the button to see a helpful diagram. (Many of the diagrams are reproduced in this section of the manual.)

WING TO EDIT

This field indicates which wing will be edited.

DISTANCE TO TIP

Distance measured from the end of the wing to the end of the control surface. If the control surface is near the end of the wing, this value will be small.
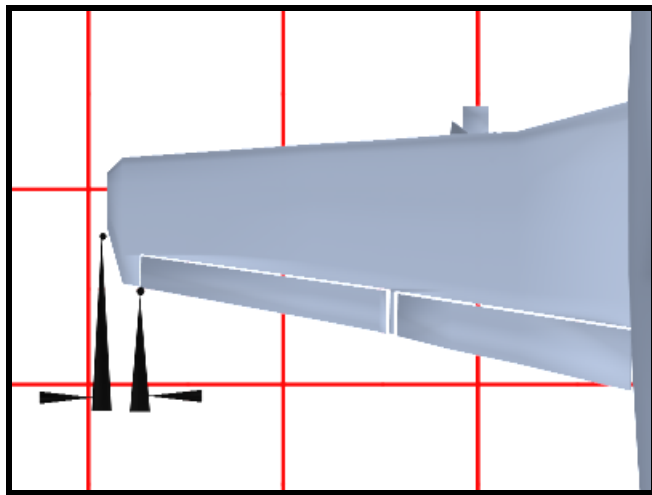
LENGTH

Length of the control surface. Usually the "long" part of the control surface.
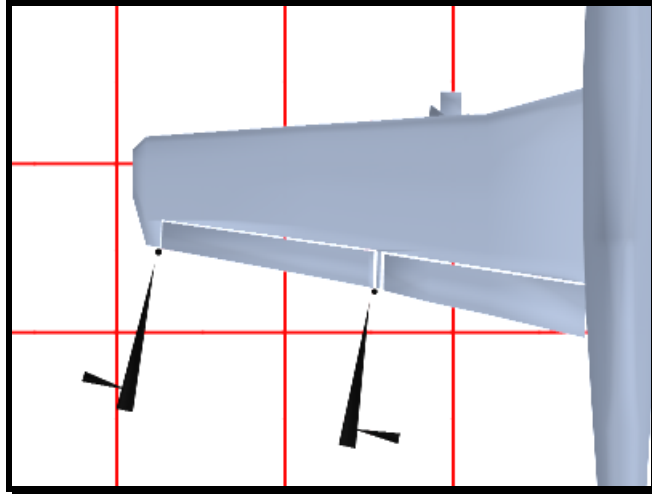
% OF CHORD

Describes how large the control surface is compared to the chord width. Larger control surfaces make a plane more responsive but can cause power-on stalls if too big.

DEFLECTION UP

Control surface deflection when the servo reaches its maximum travel upward. More deflection will make a plane more responsive but can cause power-on stalls if too great.

DEFLECTION DOWN

Control surface deflection when the servo reaches its maximum travel downward. More deflection will make a plane more responsive but can cause power-on stalls if too great.

LEFT SERVO REVERSE

Check to reverse the servo direction on the control surface.

LEFT SERVO

Choose which servo operates the respective control surface. You can later choose which channel controls this servo in the "Radio Setup" page.

RIGHT SERVO REVERSE

Check to reverse the servo direction on the control surface.

RIGHT SERVO

Choose which servo activates the control surface. You can later choose which channel controls this servo in the "Radio Setup" page.

FLAPS/SPOILERS HAS FLAPS

Choose whether or not the wing has flaps. Flaps are great to increase lift and decrease speed for landing, but add complexity and cost to the actual model.

DISTANCE TO TIP

Distance measured from the end of the wing to the end of the flap. If the flap is near the end of the wing, this value will be small.

LENGTH

Length of the flap. Usually the "long" part of the flap.

% OF CHORD

Describes how large the flap is compared to the chord width of the wing.

DEFLECTION

This is the amount of deflection of the flaps, expressed in degrees, when the flap servo reaches its maximum travel.

SERVO

Choose which servo controls the flaps. You can later choose which channel controls this servo in the "Radio Setup" page.

HAS SPOILERS

Choose whether the wing has spoilers. Spoilers are great for increasing drag so you can remain in that thermal, but add complexity and cost to the actual model.

DISTANCE TO TIP

Distance measured from the end of the wing to the end of the spoiler. If the spoiler is near the end of the wing, this value will be small.

LENGTH

Length of the spoiler. Usually the "long" part of the spoiler.

% OF CHORD

Describes how large the spoiler is, compared to the chord width of the wing.

DEFLECTION

This is the amount of deflection of the spoilers, expressed in degrees, when the spoiler servo reaches its maximum travel.

SERVO

Choose which servo controls the spoilers. You can later choose which channel controls this servo in the "Radio Setup" page.

SERVOS PAGE

This page allows you to change the servo characteristics of the plane, and choose what receiver channel each servo is plugged into.
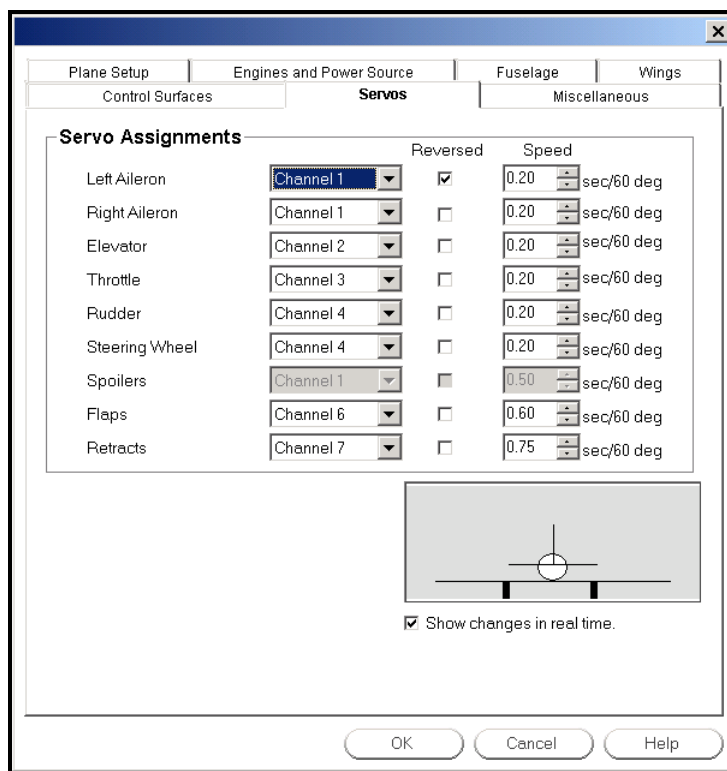
SERVO ASSIGNMENTS

Choose the input channels for this servo. If you are using your own transmitter to control RealFlight, these assignments will depend on what channels the transmitter is sending. If you are using the InterLink controller as a mockup transmitter, then the sending channels are controlled by the software radio in the **Setup** page.

This is analogous to plugging in a servo into a "channel" on the receiver. Note that you can plug more than one servo into the same channel in the receiver. This would be similar to using a Y-harness in the aircraft.

REVERSED

Select whether or not to reverse this servo. You should look at the stick drawing to see if the control surfaces operate in the proper direction. If not, click the reverse button.

This is the operational speed of the servo. Faster servo speeds mean faster response from the plane. Generally speaking, the standard servo speed is .28 seconds/60 degrees.

SHOW CHANGES IN REAL TIME

Turn this option "off" if you have a slower computer and are experiencing delays while trying to set the options on this page. Once you have set your options, you can re-activate this feature for verification.

MISCELLANEOUS PAGE

This page controls miscellaneous parameters for the plane.

SETTING THE INERTIA

Inertia is the amount that an object resists changes in its rotation speed. If an object has a high inertia, it is difficult to get the object to start rotating. Once the object is rotating, it is difficult to stop the rotation.

RealFlight pre-computes a pitch, roll and yaw inertia for every aircraft. However, your aircraft may roll, pitch or yaw a little more or less easily than the default aircraft in RealFlight.

Use these controls to "tweak" your plane's inertia up or down. Set the values to 100% to use the pre-computed inertia values. Use values less than (greater than) 100% to set inertia smaller than (greater than) the pre-computed values.

PITCH INERTIA

Adjusts the inertia for the pitch axis. 100% leaves it at the pre-calculated value for this plane. Increasing the value to 120% makes it harder for your plane to pitch; 80% makes it easier for your plane to pitch.

ROLL INERTIA

Adjusts the inertia for the roll axis. 100% leaves it at the pre-calculated value for this plane. Increasing the value to 120% makes it harder for your plane to roll; 80% makes it easier for your plane to roll.

YAW INERTIA

Adjusts the inertia for the yaw axis. 100% leaves it at the pre-calculated value for this plane. Increasing the value to 120% makes it harder for your plane to yaw; 80% makes it easier for your plane to yaw.

PERFORMANCE

This section displays some basic performance information about the plane.

WEIGHT INFORMATION

Displays the weight of the total airplane. The "Wet" version of the weight and wing loading includes the weight of the fuel in the calculation.

WING AREA

Displays the two-dimensional "area" of the wing. This is the area taken up by the main wings if you were to look down onto the top of the airplane. Fuselage and tail wings are not included in this measurement.

WING LOADING

Wing loading is the amount of weight per square foot that has to be overcome to provide lift. It is normally expressed in ounces per square foot. This specification can be easily calculated as follows: If you know the square inches of the wing, simply divide by 144 to obtain square feet. Divide the total weight (in ounces) of the airplane by the wing area (in square feet).

This information is valuable when deciding on which airplane to build next. Planes with high wing loading numbers must fly faster to stay in the air. These are generally "performance" airplanes. Conversely, planes with lower numbers do not need as much air   flowing around the wing to keep it flying. Gliders and trainer airplanes fall into this category because slow, efficient flight is desirable.

- Gliders usually have the lightest wing loading (less than 10oz per Sq Ft)

- Your average sport plane has around 10-20 oz per Sq ft to support.

- Warbirds are usually heavy for their wing area with wing loading between 30-50 oz/Sq ft.

- Jets demand the most out of their wings and can have wing loading around 30-70 oz/Sq ft. This is why they "fall out of the air" at low airspeeds.

ALLOW RADIO TO CONTROL SMOKE

Click this check box to allow the optional smoke to be controlled from your transmitter. If checked, the smoke will be turned "on/off" from your controller.

CHAPTER 17. CUSTOMIZING YOUR HELICOPTER

INTRODUCTION

RealFlight G2 allows you to create and modify your own helicopters. Using its exclusive RealPhysics technology, RealFlight takes the actual physical description of the helicopter and models the physics using that information. There are many variables that can affect a helicopter's performance. For instance, adjusting the tail rotor's airfoil can change the yaw rate of the helicopter, the amount of weather vane, and other aerodynamic characteristics.

*** Please be aware that disassembling your helicopter for measurement purposes might cause damage to your helicopter if done incorrectly. Knife Edge Software and Great Planes will **NOT** be responsible for any damages caused by your helicopter or to your helicopter as a result of taking these measurements. If you don't want to risk damaging your helicopter, then do not physically measure its attributes.*

* * The point at which all measurements are taken from is illustrated below. This is the absolute Center of Gravity for the entire helicopter. If you were to lift the helicopter from this single point, it would not rotate or dip in any direction. A widely used method for discovering the Center of Gravity is illustrated and described below.
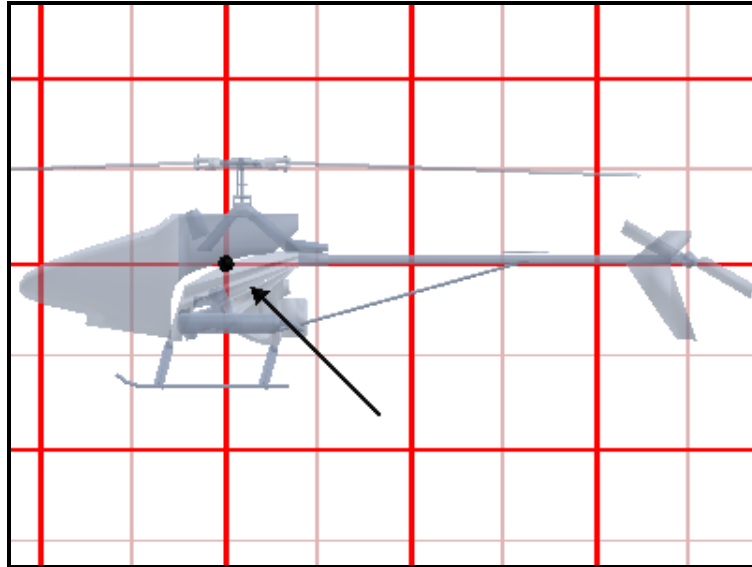
FINDING THE CENTER OF GRAVITY

To find the center of gravity for your helicopter you will need two long strings, and a weight. Take one end of the first string, and tie it securely to the end of the tail boom. Tie the other end of the string securely to the nose. You will need to lift the helicopter by this string, so make sure that the string is secure enough to support the heli.

Next, tie a weight to the end of the second string. We will call the second string the **plumb string**, because you will use this to dangle the weight, creating a straight up-down line for you to measure against.

Now, gently lift the helicopter with the first string, forming a triangle (heli nose, heli tail, and the place you are holding the string). Dangle the plumb string from the apex of the triangle (place you are holding the heli string). You can accomplish this by using the same hand to hold both strings.

The idea is to use the plumb string to create two imaginary reference "lines" by changing the shape of the triangle formed by the heli supporting string. It is at the intersection of these two lines where the center of gravity lies.

Each "line" is created by changing the place at which you are holding the heli supporting string, then moving the plumb string to the same place. For example, if you lifted the helicopter by holding the center of the supporting string, your first reference line is probably going to be close to vertical with respect to the helicopter.

The best way to mark the line is to tape a piece of paper on the side of the helicopter, suspend the helicopter (or have a second person hold it) and mark the dotted line (see below) on the side of the paper.

STEP #1

Hold the helicopter, preferably with the nose tilted down. Mark the dotted line on your paper that is taped to the helicopter.
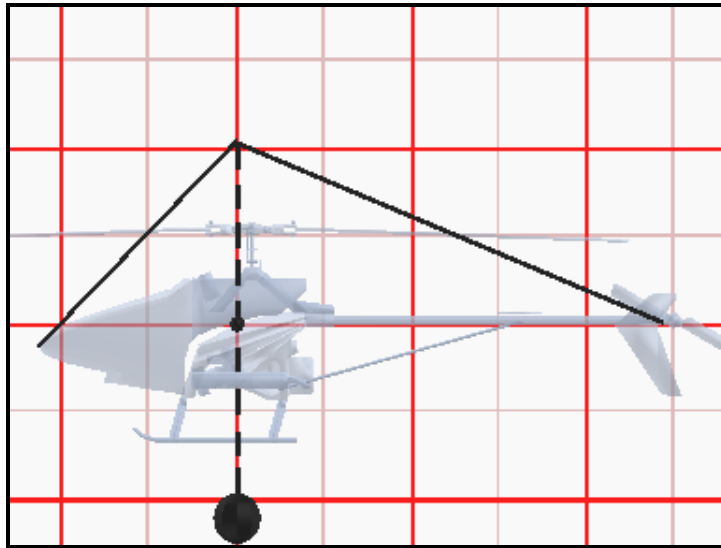
STEP #2

Hold the helicopter at a forward point on the string; this should make the helicopter tilt up. Mark the dotted line on your paper that is taped to the helicopter.
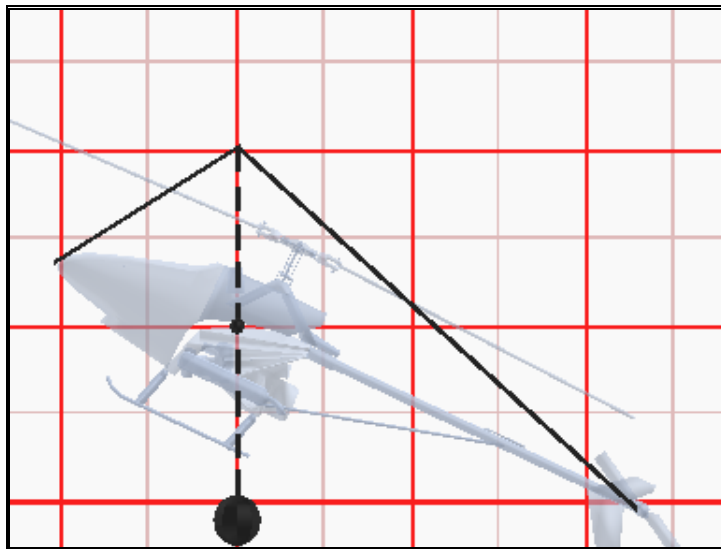
STEP #3

The intersection of the two lines you made is the CG of the helicopter. Make a dot at this intersection. Look through the paper and make a mental note of where the dot is on your heli. Take the paper off and make a temporary mark where the dot was on the heli. This is from the point you will use to take all the location measurements.
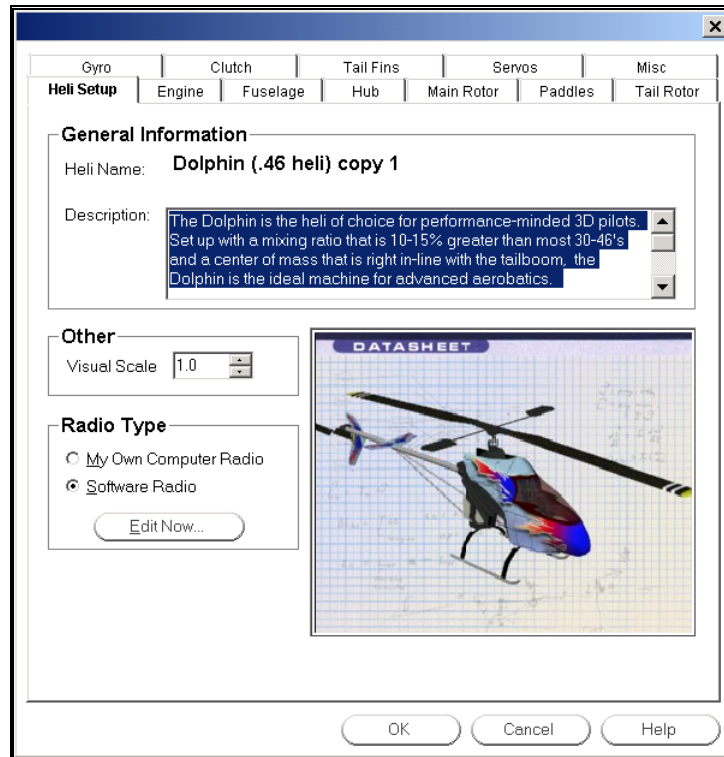
Note: the helicopter might want to turn upside down when you lift the string. If so, take all of measurements with the heli upside down.

HELI SETUP PAGE

To customize a heli, select it as the current aircraft, and then select **Edit (current aircraft)…** in the **Aircraft** menu. Alternatively, you can click the **Edit** button in the **Select Aircraft** dialog (**Aircraft** menu, **Select Aircraft…**").

You cannot edit a helicopter directly from the RealFlight or Add-On CDs. If you want to edit parameters for one of these default helis, you must first make a copy.

When you begin your editing session, you will see the Heli Setup Page:

HELICOPTER NAME

This name reflects the name you have chosen in the previous dialog.

DESCRIPTION

You can put your own comments here if you wish to describe or document the helicopters you are creating. This is ideal if you have several different heli setups with the same visual appearance.

VISUAL SCALE

Adjusts the visual scale of the helicopter. This only affects the appearance of the helicopter; it does not influence the way that the helicopter flies.

RADIO TYPE

Choose whether you want RealFlight to emulate the features of a computer radio, or whether you want to completely control the aircraft with your own transmitter. (The latter option only makes sense when you are using your own transmitter to control RealFlight.)

EDIT NOW

Click on this button to edit the RealFlight radio. *See "Chapter 14. Setting up the Helicopter Radio" on page 155*

ENGINE PAGE

This determines the engine that you select to power your helicopter. This dialog is designed so that you can easily and quickly choose a different engine for your helicopter. If so desired, you can edit and create your own engines.

The **Engine** page's appearance changes depending on the type of power plant (internal combustion, electric, etc.) you choose.

POWER PLANT

Choose the power plant type you wish to use to for your helicopter. You can choose between the standard internal combustion engines, or you can select an electric motor. Each type has its own "fuel" supply parameters that you can modify.

FUEL TANK SIZE (COMBUSTION ONLY)

Select the size of your fuel tank. The larger the fuel tank the longer you can fly, but the more your helicopter will weigh at take off.

FUEL CONSUMPTION (COMBUSTION ONLY)

Select the rate at which the helicopter will consume the fuel.

#CELLS (ELECTRIC ONLY)

Select the number and type of battery cells used to power your helicopter.

TYPE OF CELL

Select the type of cell that will be used.

SOUND PROFILE

Choose the pre-recorded sound profile to use for the selected engine.

HEAD SPEED GOVERNOR

To install a head speed governor, turn "On" this checkbox. Rotor RPM is then controlled by channel 7 on the radio.

HEAD SPEED GOVERNOR GAIN

The amount of gain for the head speed governor. Values that are too large can cause "hunting". Too small a value can allow too much variation in the head speed.

ENGINE: MAIN ROTOR RATIO

How many times the engine's clutch bell turns for every complete turn of the main rotor blades.

FAN DIAMETER

The diameter of the fan attached to the engine assembly.

TORQUE CURVE (COMBUSTION ONLY)

Select the torque curve for your engine.

TORQUE PERCENT (COMBUSTION ONLY)

There may not be a default torque curve that exactly matches your engine. Use this parameter to adjust the torque curve in order to match your engine.

TYPE (ELECTRIC ONLY)

Choose the type of motor you wish to use. Make sure the motor is correctly matched with the main rotor blades and the number of cells. Using the wrong motor in a real R/C helicopter can result in an inefficient system at best and one that overheats at worst.

Make a copy of the selected motor type and all of its parameters. You must do so prior to modifying a pre-defined motor. You are not allowed to edit default motors. Therefore, you must make a copy of the motor and then modify that copy.

DELETE

Delete the active motor. You can only delete motors that you have created.

RENAME

Rename the active motor. You can only rename motors that you have created.

EDIT

Edit the active motor. You can only edit motors that you have created. Be aware that any changes that you make to this motor will affect all helicopters that use the same motor profile.

FUSELAGE PAGE

This page adjusts the properties of the fuselage.

When you see a "?" button in this page, click the button to see a helpful diagram. (Many of these diagrams are reproduced in this manual section.)
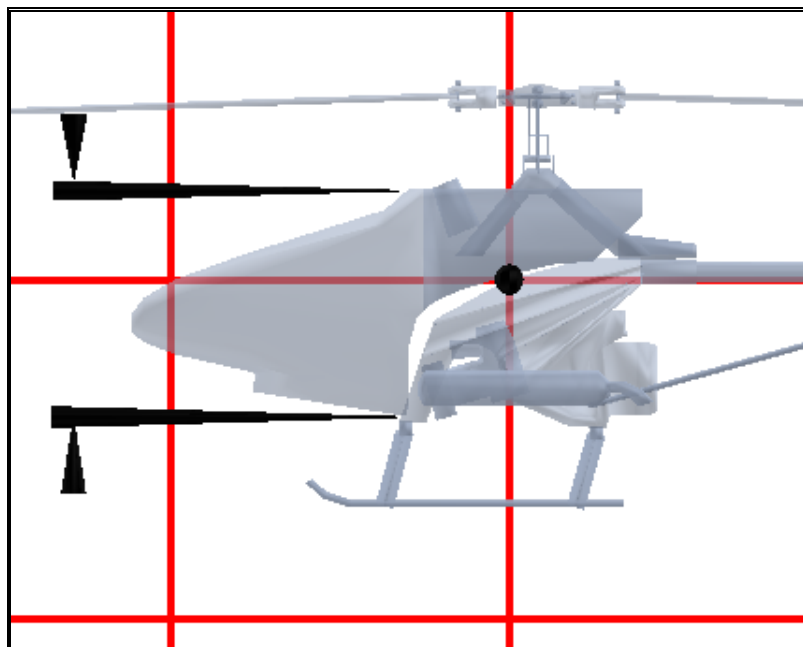
FUSELAGE LENGTH

Length of the fuselage from the tip of the nose to the most rearward piece on the cowl. This is normally where the tail boom exits the helicopter.
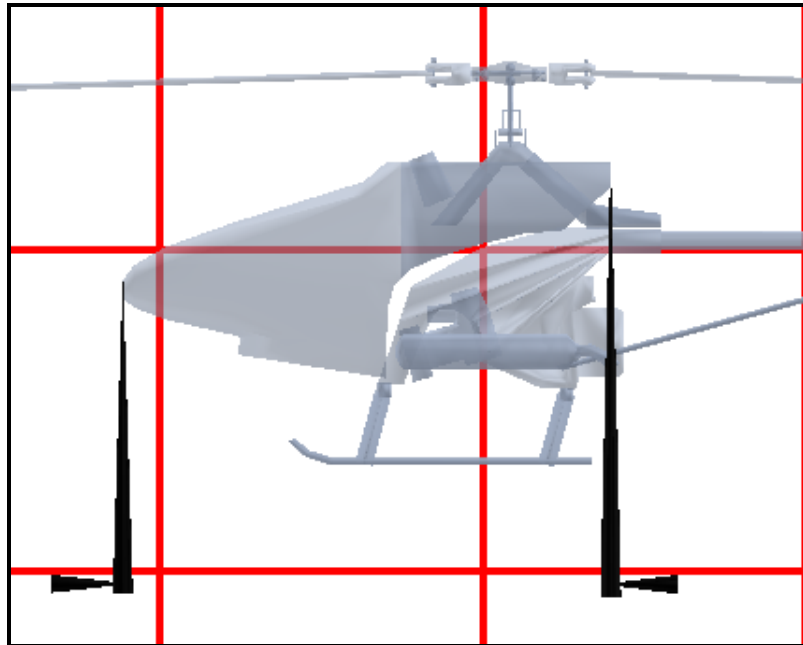
FUSELAGE HEIGHT

The height of the fuselage.

FUSELAGE WIDTH

The average width of the fuselage.

FUSELAGE WEIGHT

The dry weight of the helicopter before fuel is added. Do, however; include the weight of paddles (if any), and main blades.

FRONT DRAG COEFFICIENT

Adjust the amount of frontal drag generated from the fuselage. Streamlined helicopters will generate less frontal drag. Helicopters with more frontal area will generate increased frontal drag thereby, decreasing wind penetration. Something like a Jet Ranger or a sleek Pod-and-Boom helicopter might have a drag coefficient like .65, while something with many non-streamlined parts like a Schweizer, might have a frontal drag of 1.1.

SIDE DRAG COEFFICIENT

Adjust the amount of side drag generated from the fuselage. Streamlined helicopters generate less side drag. A streamlined scale fuse like a Jet Ranger might have a drag of .8, while a Pod-and-Boom helicopter might have a drag of 1.0.

ADJUSTMENT TO CG UP

Move the CG up or down depending on your flying preference. This should not normally be changed from 0 unless you find that the CG from your helicopter was measured incorrectly, then rather than adjust all of the measurements, you can make an adjustment to this one spot. A positive value will raise the CG; a negative value will lower it.
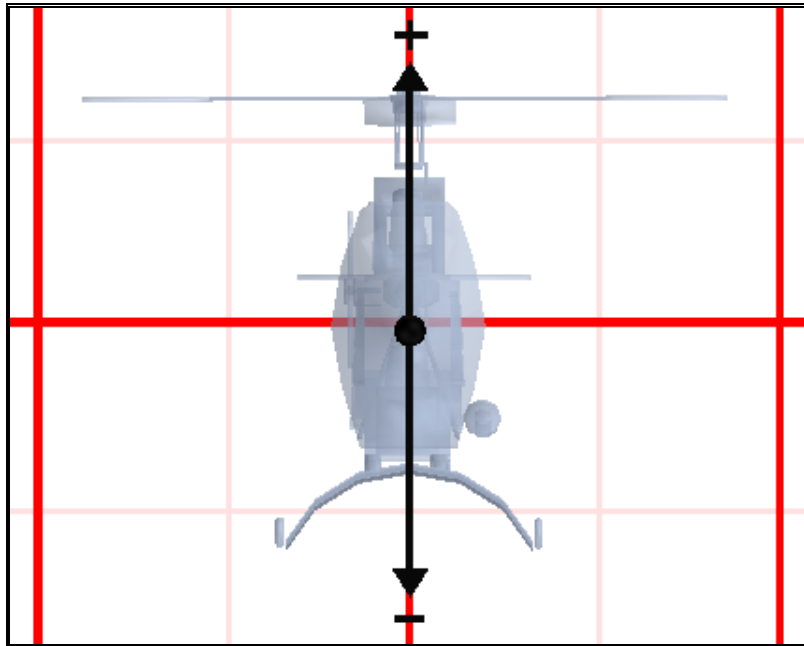
ADJUSTMENT TO CG FORWARD

Move the CG forward or backward depending on your flying preference. This should not normally be changed from 0 unless you find that the CG from your helicopter was measured incorrectly, then rather than adjust all of the measurements, you can

make an adjustment to this one spot. Positive values will move the CG farther forward; negative values will move the CG towards the rear.
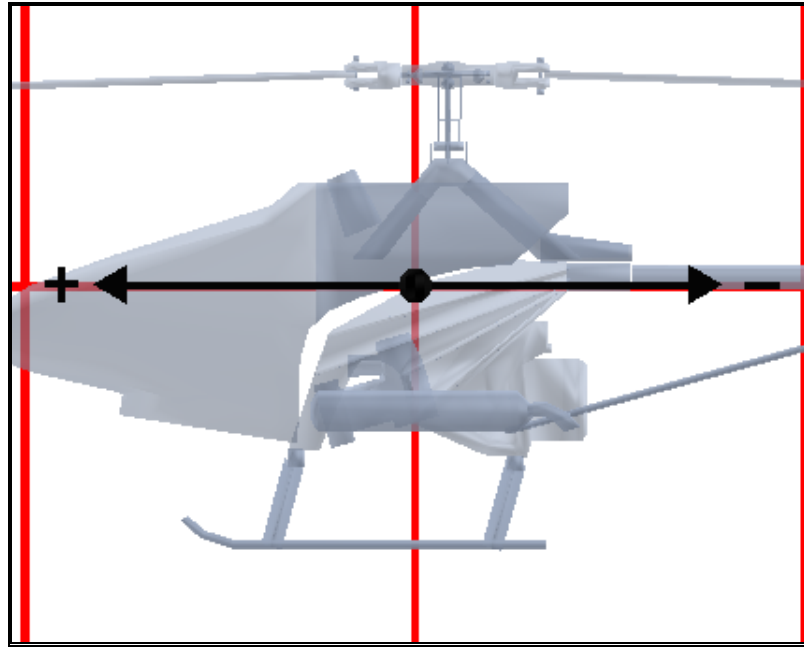
### *FUSELAGE LOCATION:*

Fuselage Location Up

This is the vertical distance from the CG to the center of the fuselage. To accurately represent this measurement, it will be necessary to find the actual CG of your helicopter and the center of the fuselage as well. Positive values will place the fuselage above the CG; negative values will place the fuselage below the CG.

Fuselage Location Forward

This is the location of the fuselage center forward of the CG. To accurately represent this measurement, it will be necessary to find the actual CG of your helicopter and the center of the fuselage as well. Next, measure the longitudinal distance from the CG to the center of the fuselage. Positive values will place the fuselage in front of the CG; negative values will place the fuselage in back of the CG.
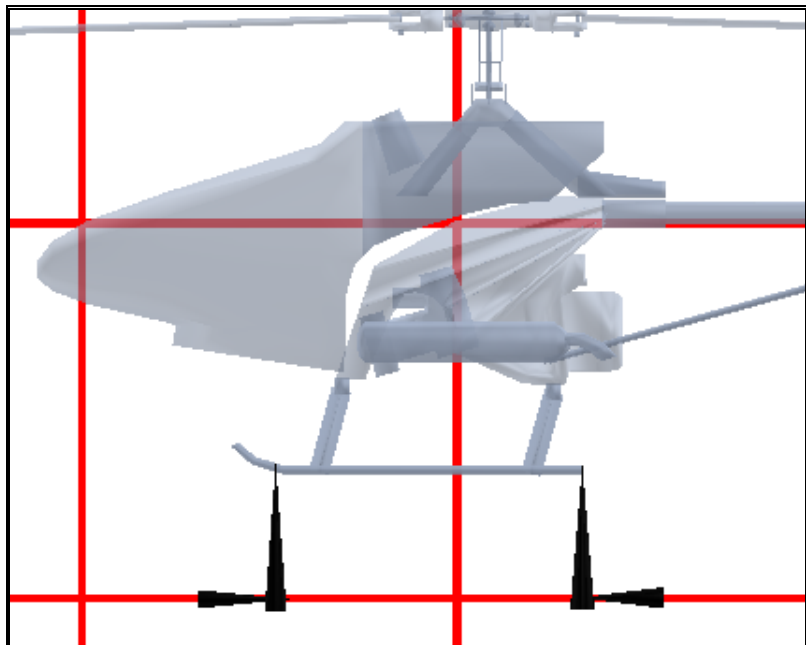
SKID DIMENSIONS WIDTH

This indicates the measurement of the distance between the skids.
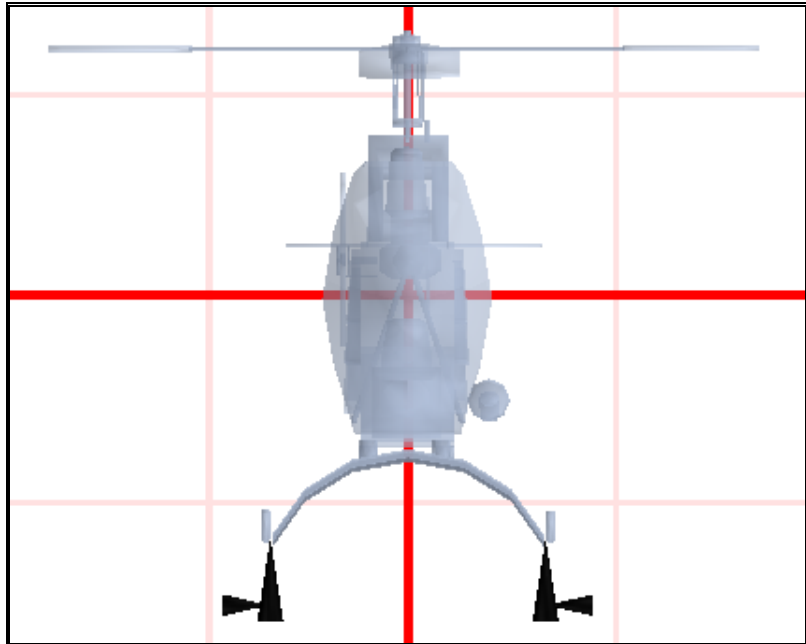
SKID DIMENSIONS LENGTH

The overall length of a single skid. Note this measurement only includes the portion of the skid that is in contact with the ground. This length will be used for both skids.
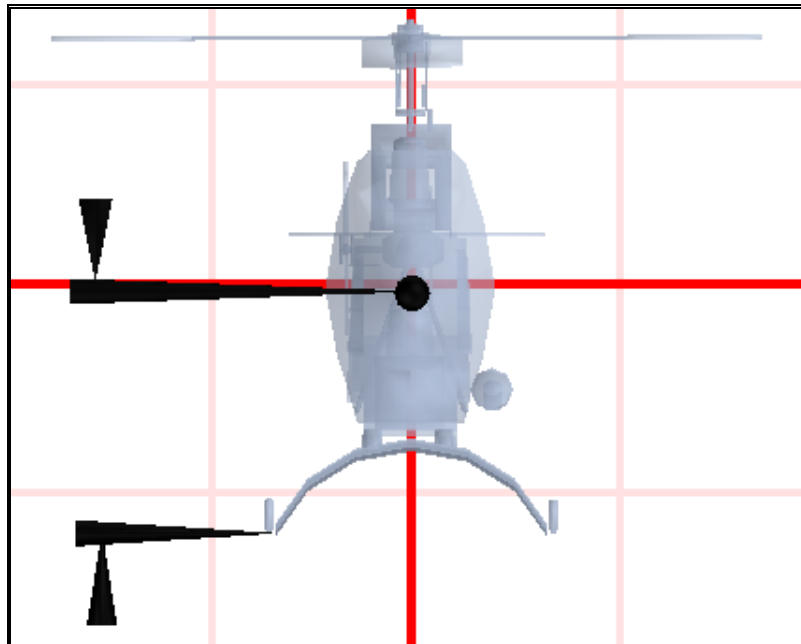
SKID LOCATION FORWARD

The forward location of the skid center as measured from the CG. Positive values will place the skid center in front of the CG while negative values will place the skid center behind the CG.
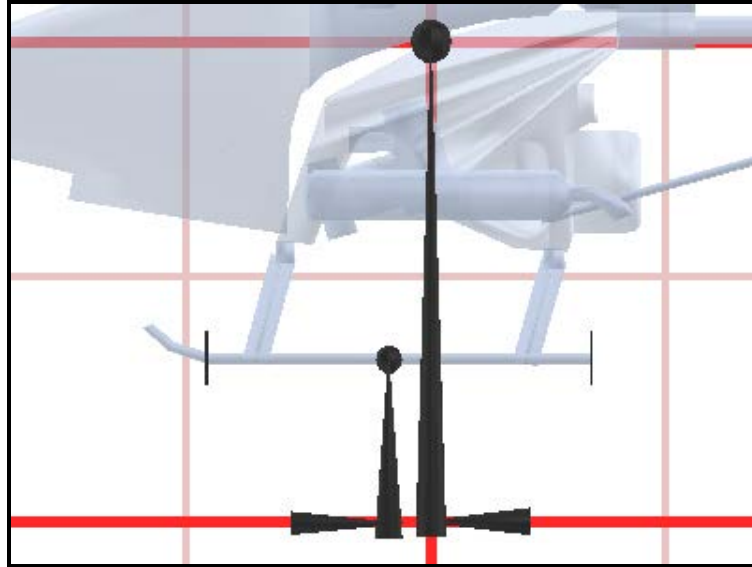
SKID LOCATION UP

The location up of the skid center as measured from the CG. This value will usually be negative, indicating the skid center is below the CG.

HUB PAGE

This dialog lets you adjust parameters that control the behavior of the hub. When you see a "?" button in the Hub page, click the button to see a helpful diagram (some of those diagrams are reproduced in this section).

HUB TYPE

Select the hub type of the helicopter. A teetering, or seesaw hub has a fixed cone angle and the blades act on each other directly. The articulated hub allows all blades to flap independently.

FLAP HINGE TO HINGE DIAMETER

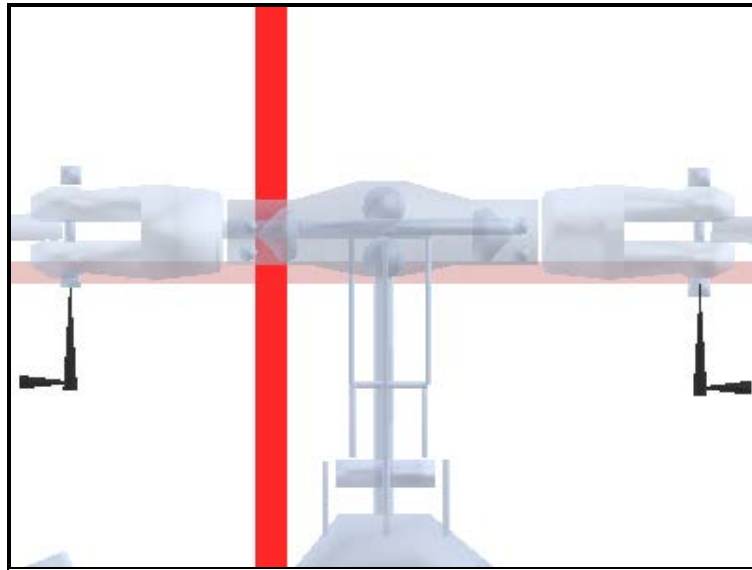The measurement of the distance between the hinges. That is, the distance from one flapping hinge to the other. This is only valid for an articulating hub.
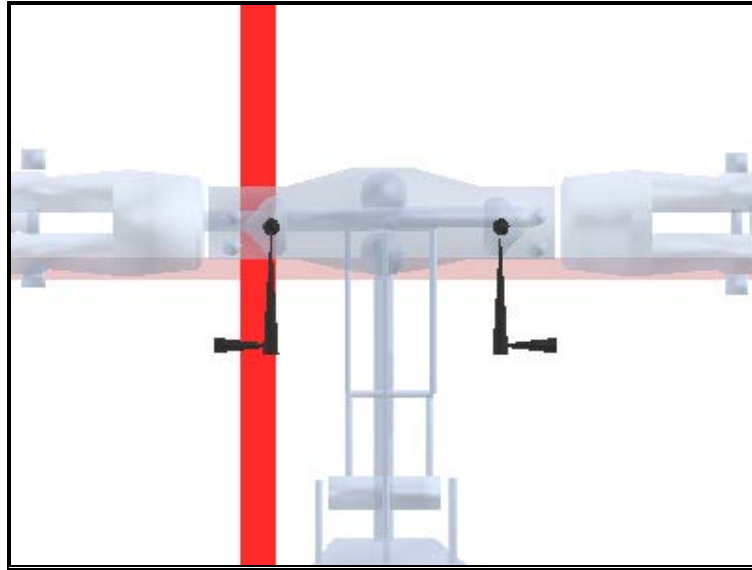
LEAD LAG TO LEAD LAG DIAMETER

The distance between the hub's lead lag hinges. (Center to center)


HUB LOCATION LATERAL

The location of the hub to the right of the CG. This value also determines the placement of the main rotor and paddles. Positive values will place the hub center to the right of the CG while negative values will place the hub center to the left of the CG. Normally, most helicopters will have this value set to 0.

HUB LOCATION FORWARD

This is the location of the hub center forward with respect to the CG. This value also determines the placement of the main rotor shaft and paddles. Positive values will place the hub center in front of the CG while negative values will place the hub center behind the CG.
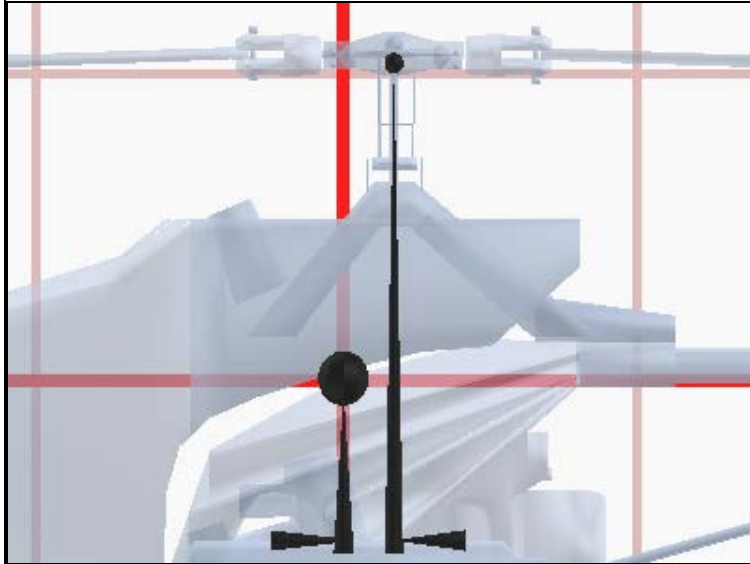
STATIC CONING ANGLE

This is the built-in coning angle of the hub. For a non-damped flapping head, this will be 0. For a damped flapping or a solid axle hub, this will probably be around 1-2 degrees.
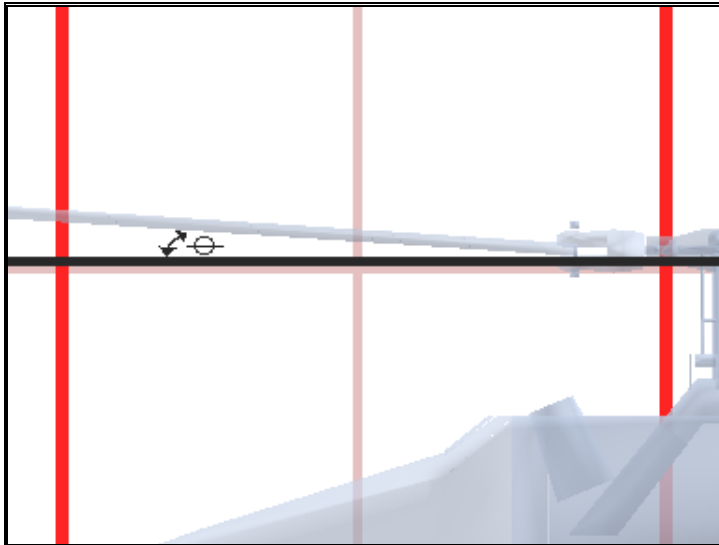
DELTA OFFSET (FLAP INDUCED AOA OFFSET)

When the blade flaps up and down the angle of attack may change due to the mechanical linkages between the hub and the rotor blade itself. To find this value, measure the angle (with a pitch gauge) at full minimum flap and then measure again

at full maximum flap. Then divide by the total number of degrees of flap of the blade.

MAX FLAP ANGLE

The maximum angle the blades will be allowed to freely flap. For example, a value of "5" will let the blade flap up by 5 degrees and down by -5 degrees. For a damped flap, this will normally be 0 degrees, as it meets with resistance almost immediately.

DAMPED FLAP

The amount of restoring torque applied to the blade when it has flapped past its free flapping range of motion. Note that even a head that freely flaps will have a restoring torque once the blade has reached the maximum point. This is due to the inherent flexing of the plastic and/or the bending of the metal.

RealFlight G2 will calculate the Damped Flap information for you. To do so:

1. Place an object on the outer tip of one rotor blade to cause the blade to flex. Insert the weight of this object into the w**eight** field.

2. **Deflection-** This is the vertical movement of the blade when the object has been placed on it.

3. **Arm-** This is the horizontal distance from the point of the hub's rotation to the center of the weight as placed on the blade tip.

RealFlight G2 now has all of the information required to properly calculate the Damped Flap.

Note: Do not use excessive weight as damage to the rotor blade might occur. Neither Great Planes nor Knife Edge Software are responsible for any damages to the rotor blade or other such consequential damages.

If you wish to do so manually, please follow the procedure below.

There are two ways to measure this:

For Articulating Hubs

1. First you need to measure the blade flex. For instructions, see "Blade Flex" under "Blades" on page 222.

2. Put the helicopter on a flat, hard surface. Position the blades so they are in the front and back of the helicopter.

3. Measure the distance from the tip of the front blade to the ground.

4. Now put an equal mass on both blade tips (around 100-200 grams, enough to get a good reading, but not enough to break anything!). Make sure the helicopter does not move or tilt when you do this. Also make sure you use the same mass that you used when you measured the blade flex.

5. Again measure the distance from the tip of the front blade to the ground.

6. Enter this value into the "**weight**" category.

7. Take the total distance traveled, subtract the distance traveled by the blade, and enter that value into the "**deflection**" category. This cancels out any deflection caused by the bending of the blade.

8. Take the distance from the weight to the flapping hinge and enter it into the "**arm**" category.

For Solid Axle Hubs

1. Remove the blades from the hub.

2. Put the helicopter on a flat, hard surface. Position the rotor head so that the hub blanks are in the front and back of the helicopter.

3. Measure the distance from the tip of the hub to the ground.

4. While holding the helicopter perfectly still, take a spring scale and pull the tip of the hub down.

5. While holding the hub in this position, measure the distance from the tip of the front hub to the ground.

6. Take the reading on the spring scale and enter that value into the Weight category.

7. Take the total distance traveled and enter that into the deflection category.

8. Take the distance from where the weight was attached to the center of the hub and enter it into the Arm category.
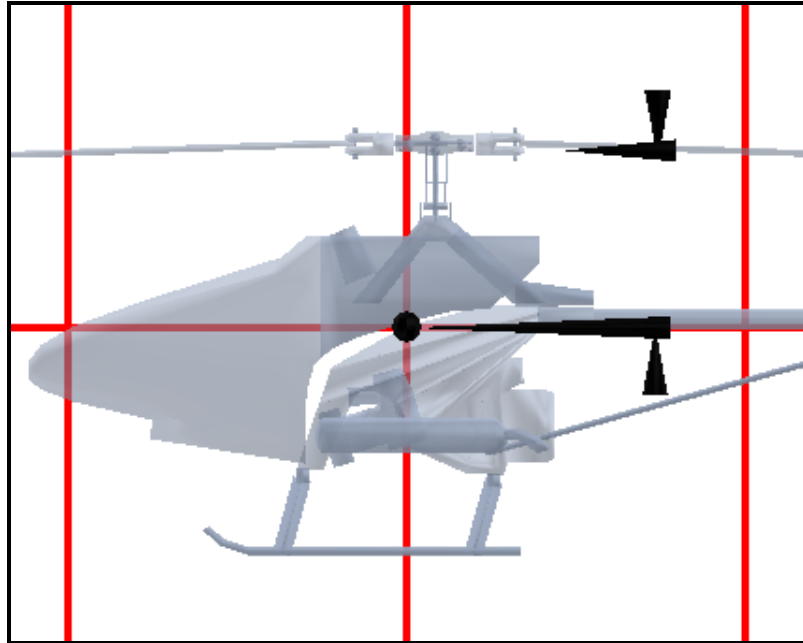
MAIN ROTOR PAGE

This dialog lets you adjust parameters for the main rotor.

HEIGHT

This is the location "up" of the main rotor. This value is usually positive, indicating a location above the CG.

CYCLIC ROLL DEFLECTION

The amount of blade deflection that a 100% roll cyclic input will cause. For example, a value of "2" will cause the blades to deflect 2 degrees positive and 2 degrees negative, assuming 100% servo travel in both directions.

CYCLIC PITCH DEFLECTION

This is the amount of blade deflection that a 100% pitch cyclic input will cause. For example, a value of "2" will cause the blades to deflect 2 degrees positive and 2 degrees negative, assuming 100% servo travel in both directions.

MAX COLLECTIVE DEFLECTION

This is the amount of blade deflection that a 100% collective input will cause. For example, a value of "10" will cause the blades to deflect 10 degrees positive, assuming 100% servo travel. If the blade design incorporates washout, then deflection should be measured at the root.

MIN COLLECTIVE DEFLECTION

The amount of blade deflection that a -100% collective input will cause. For example, a value of "-8" will cause the blades to deflect 8 degrees negative, given -100% servo travel. If the blade has washout, then the deflection needs to be measured at the root.

Note: to simulate a fixed pitch helicopter, set the minimum and the maximum collective to the same value.

BLADE TYPE

Choose a rotor blade. Different rotor blades will affect helicopter performance.

BLADE SOUND

Select the sound profile of the main rotor blades.

BLADE SOUND SLIDER

This slider enables you to alter the blade to engine sound ratio to more closely mimic your actual R/C helicopter. Moving the slider to the left will increase the volume of the engine sounds in comparison to the blade sounds. Conversely, moving the slider to the right will increase the volume of the blade sounds in comparison to the engine sounds.

COPY

Copy the current blade parameters to a new blade profile.

DELETE

Delete the blade configuration. Note: you can only delete blades that you have created. You cannot delete default blade settings.

RENAME

Rename the current blade selected. Note: you can only rename blades that you have created. You cannot rename default blade settings.

EDIT

Edit the currently selected blade. Note you can only edit blades that you have created. You cannot edit default blade settings.

BLADES

This dialog lets you adjust the blade configuration parameters. When you see a "?" button in this dialog, click the button to see a helpful diagram (many of those diagrams are reproduced in this manual section). **Note:** In order to access the **Edit Blade** dialog, you must make a copy of the blade first.

BLADE LENGTH

This is the length of a single rotor blade. This value should be measured from the tip of the blade to the lead-lag hinge.
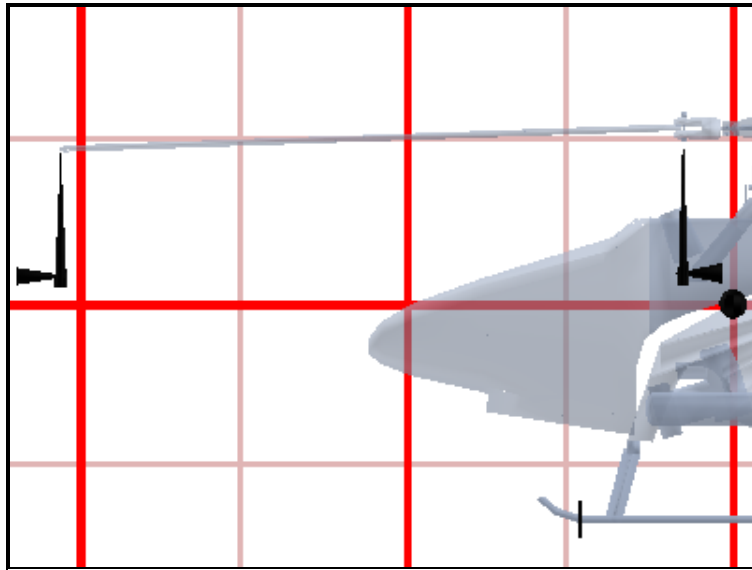
BLADE TIP CHORD

The width of the rotor blade chord as measured at the tip of the blade.
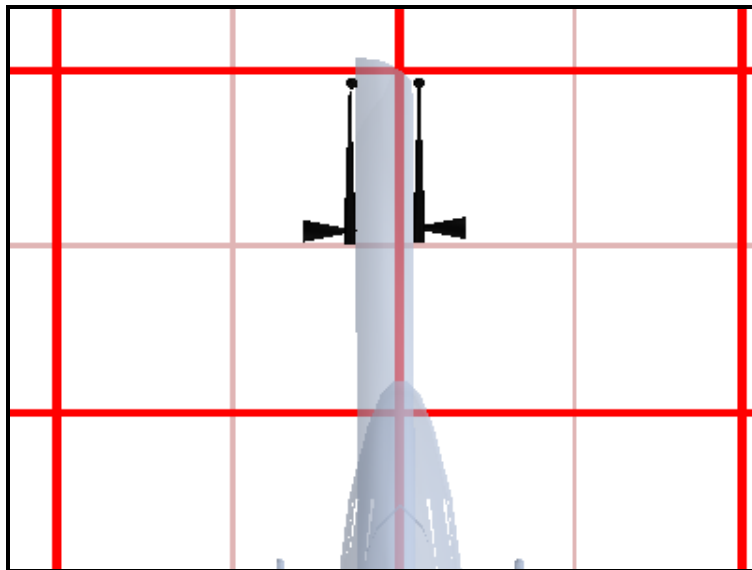
BLADE ROOT CHORD

The width of the rotor blade chord as measured at the root of the blade.
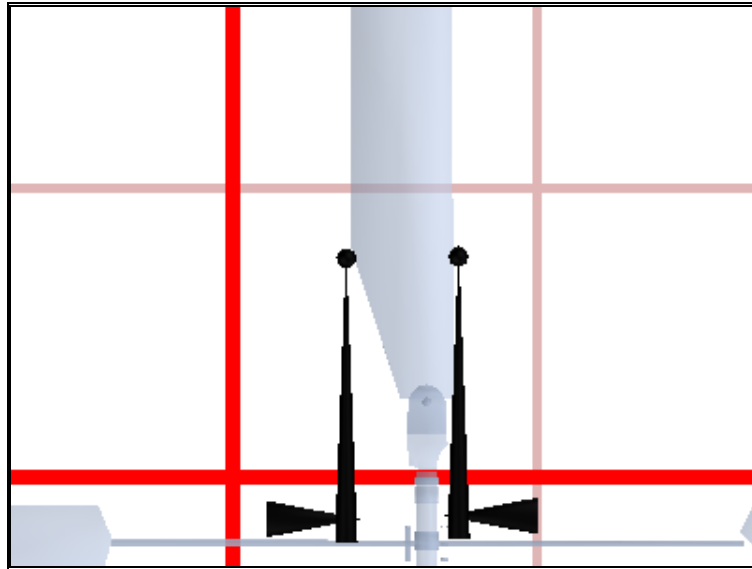
WEIGHT OF BLADE

This is the weight of the individual rotor blade including the lead weight, if applicable.

LEAD WEIGHT

This is the weight of the lead ballast present in the blade. If you do not have weighted blades, put in "0". If you have a cylindrical piece of lead, you can calculate its weight by using the following equation: weight = 20.52 * (radius inches)* (radius inches) * (length inches). Alternatively, if you are using metric (SI) units, weight = 35.5 * (radius cm)* (radius cm) * (length cm). If the ballast is not cylindrical, then you will have to weigh it yourself.

TIP TO LEAD WEIGHT

This is the distance from the outer tip of the blade to the closest tip of the lead weight present in the blade.
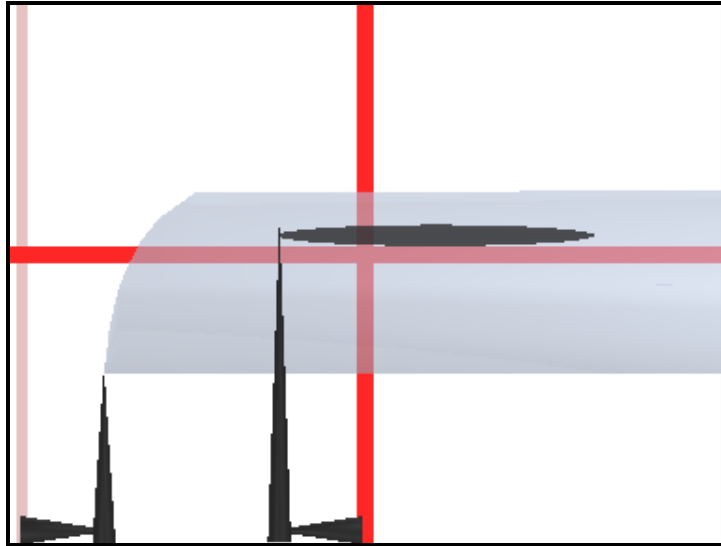
LEAD WEIGHT LENGTH

This is the actual length of the lead weight present in the blade.
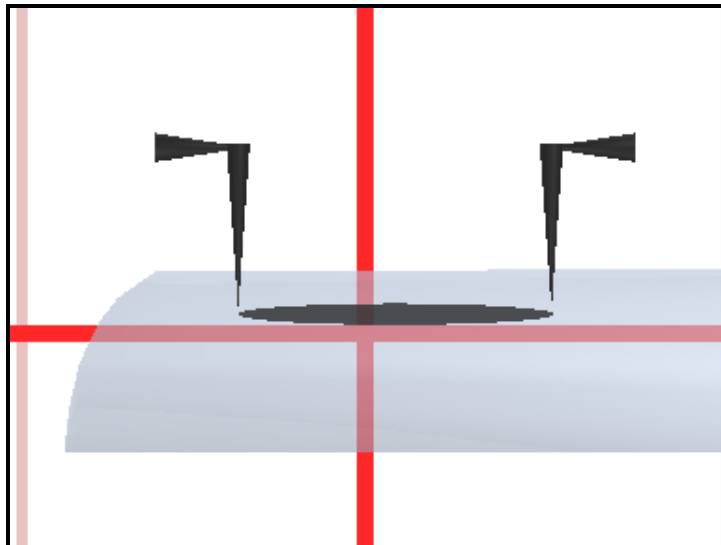
WASH OUT ANGLE

Represents the change in angle of attack from the root of the blade to the tip. This value is usually positive (or zero), indicating "wash out" rather than "wash in".

DAMPED FLAP

This is the amount of resisting force your hub will exert against the flapping motion of your blades. This is calculated automatically when the proper data has been entered into the weight, deflection and Arm fields.

1. Place an object on the outer tip of one rotor blade to cause the blade to flex. Enter the weight of this object into the **weight** field.

2. **Deflection-** This is the vertical movement of the blade when the object has been placed on it.

3. **Arm-** This is the horizontal distance from the point of the hub's rotation to the center of the weight as placed on the blade tip.

RealFlight G2 now has all of the information required to properly calculate the Damped Flap.

Measuring blade flex:

1. Remove one of the rotor blades from the helicopter.

2. Clamp the end of the blade that attaches to the hub to the end of the table. Use a soft clamp or one with rubber ends to prevent from damaging your blades. Only use enough clamping force to hold the blade in place. Approximately 95% of the blade should hang over the edge of the table.

3. Measure the distance from the tip of the blade to the ground.

4. Add mass to the blade tip (around 100-200 grams, enough to get a good reading, but not enough to break anything!).

5. Again, measure the distance from the tip of the blade to the ground.

6. Enter the mass used in the **weight** category.

7. Take the total distance traveled and enter this value into the **deflection** category.

8. Take the distance from the weight to the clamp and enter it into the **arm** category.

AIRFOIL

Select an airfoil for your rotor blade. Many of the airfoils have a number in them that indicate their "percent", for instance a "NACA 0009" is a 9% and a "NACA 2412" is a 12%. You can measure the percent of your airfoil by taking the height (thickness) of your blades' cross section and dividing by the chord (width of the blade).

BLADE PAINT

This control allows you to select the "look" of your rotor blades. If you are using graphite blades on your actual R/C helicopter, select "graphite" to more closely represent your helicopter.

PADDLES

This dialog lets you control attributes for the paddles. If you see a "?" button on this dialog, you can click the button to see a helpful diagram (many of those diagrams are reproduced in this manual section).
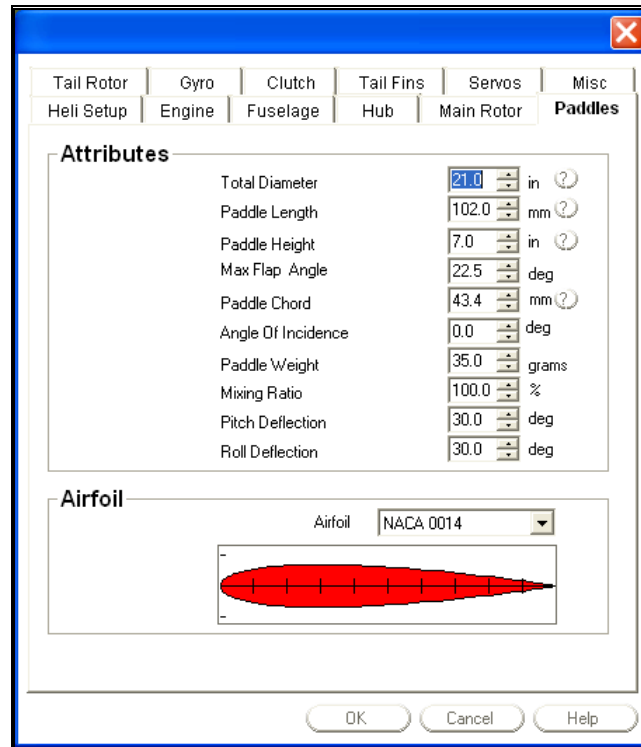
TOTAL DIAMETER

This is the overall or "tip-to-tip" diameter of the paddles or flybar.
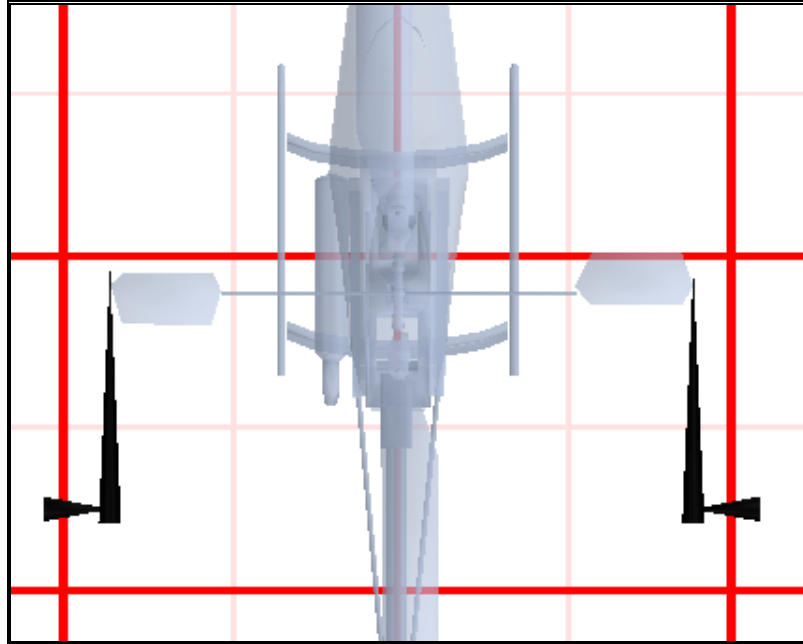
ANGLE OF INCIDENCE

Indicates the amount of built-in pitch of the paddles. Most helicopters will have "0" degrees incidence, although there are a few with a slight amount of positive incidence.

PADDLE LENGTH

This is the length of the actual paddle or fly-bar weight. This does not include the bar itself, only the portion that is the airfoil or weight.
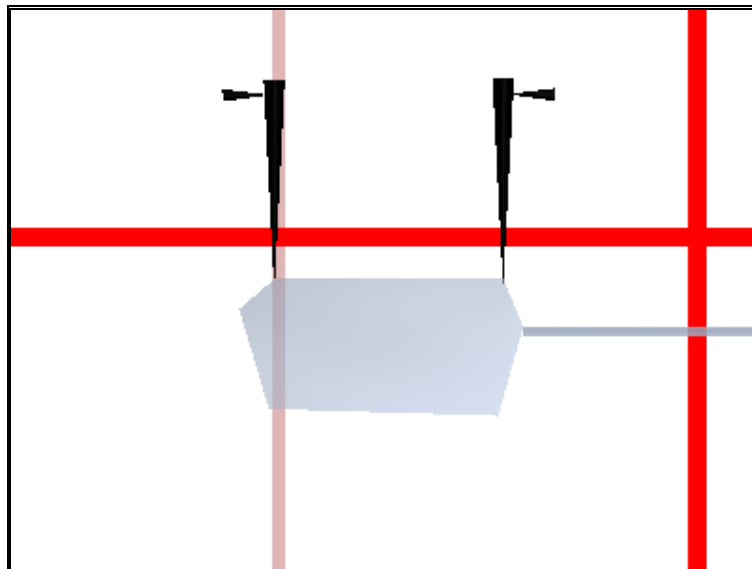
Paddle Chord

This is the width of the paddle's airfoil. In the case of a fly-bar weight use the diameter.
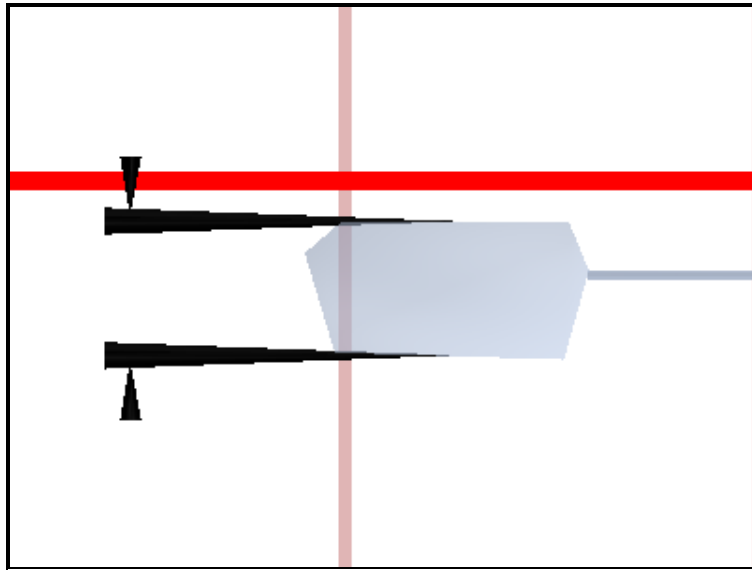
Paddle Height

This is the vertical location of the paddles. This value is usually positive, indicating a location above the CG.
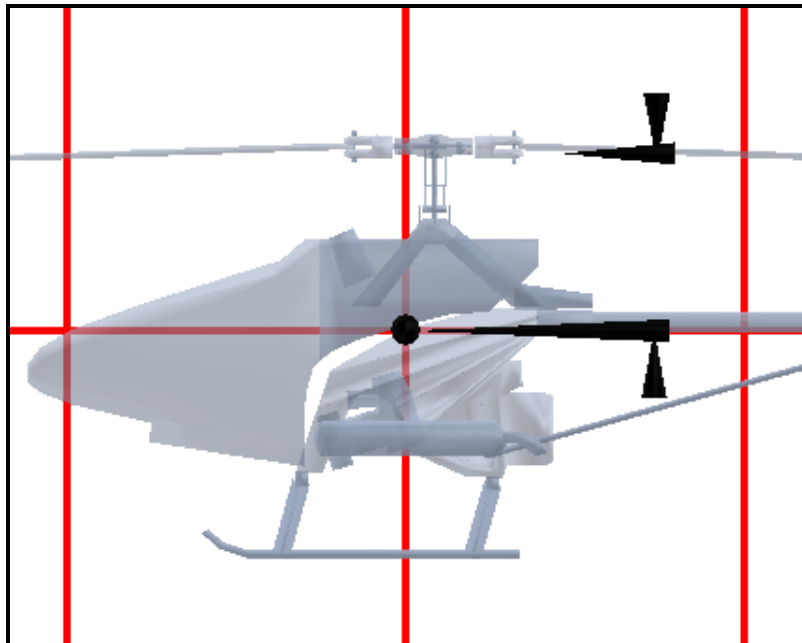
Paddle Weight

This is the weight of a single paddle.

MAX FLAPPING ANGLE

The maximum angle the teetering paddle will be allowed to flap. This value will be used for both the maximum positive and negative flapping angles. For instance, a value of "10" will let the paddles flap up to 10 degrees and down to -10 degrees.

MIXING RATIO

This is the ratio of mixing between the main rotor and the paddles or fly-bar.   For instance, if you tilt the paddles 10 degrees and it causes the main blades to pitch by 6 degrees, then you have a 60% mix.

ROLL DEFLECTION

The amount of paddle deflection that a 100% roll cyclic input will cause. For example, a value of "2" will cause the blades to deflect 2 degrees positive and 2 degrees negative, assuming 100% servo travel in both directions.

PITCH DEFLECTION

This is the amount of paddle deflection that a 100% pitch cyclic input will cause. For example, a value of "2" will cause the blades to deflect 2 degrees positive and 2 degrees negative, assuming 100% servo travel in both directions.

A protractor or the ATAN method is a good method to measure this value since the deflection will surely be beyond the capacity of most pitch measuring devices. *For an example of measuring a pitch angle using ATAN, see "Measuring the amount of tail rotor* pitch*" on page 231.*

AIRFOIL

Select an airfoil for your paddles. Many of the airfoils have a number in them that indicate their "percent", for instance a "NACA 0009" indicates an airfoil of 9%. Likewise, a "NACA 2412" is a 12% airfoil. To measure the percent of your airfoil take the height (thickness) of your blade's cross section and divide by the chord (width of the blade).

TAIL ROTOR PAGE

This page lets you control attributes for the tail rotor. When you see a "?" button on the Tail Rotor page, you can click the button to see a helpful diagram (many of these diagrams are reproduced in this section of the manual).
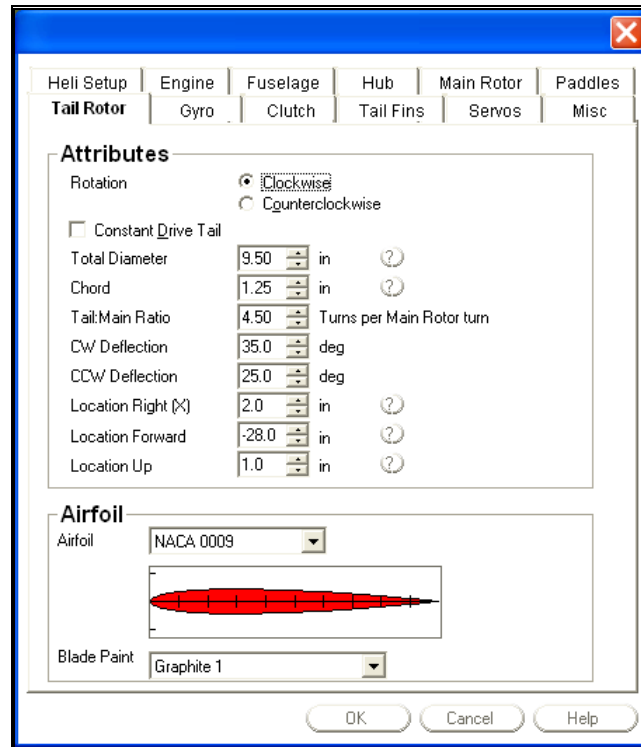
MEASURING THE AMOUNT OF TAIL ROTOR PITCH

One method for measuring the range of pitch for the tail rotor blade is to measure the angle between the maximum points of deflection. First adjust the pitch to its maximum deflection. Second situate a piece of paper such that you will be able to draw a line along the chord of the blade. You will need to draw a line on the paper that represents the chord-line. Next, while keeping the paper in place, change the pitch on the blade to be parallel with the tail boom. Hopefully you haven't moved the piece of paper because now we need to draw another line representing the chord-line of the other extreme.

Tail Boom
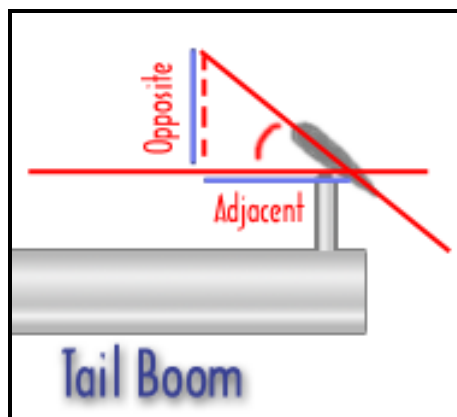
With the two lines drawn you should now have what should look like two sides of a right triangle, so go ahead and draw the last side of the triangle. By measuring the first line drawn (opposite) and the bottom line of the triangle (adjacent) you can use the following formula to calculate the total deflection:

Angle = ATAN((length of opposite side) / (length of adjacent side)).

You will need a calculator to compute this formula. "ATAN" means "arc tangent", on your calculator ATAN may also be called "arctan" or "inv tan". If you don't see a key with any of these names, look for a key called "INV" and another key called "TAN", and hit them in sequence.

To use the calculator that comes with Windows, click the "Start" button on the windows taskbar, and then select Programs/Accessories/Calculator. When the calculator appears on your screen, go to its "View" menu (the Calculator's view menu, not RealFlight's view menu) and select "Scientific." Then:

- Enter the length of the opposite side.

- Hit the "/" key ("divide").

- Enter the length of the adjacent side.

- Hit "=".

- Check the box marked "Inv."

- Hit the "tan" key.

.

ROTATION CLOCKWISE

If this button is selected, the tail rotor will operate in a clockwise rotation. The direction of operation is determined by facing the left side of the helicopter.

ROTATION COUNTER CLOCKWISE

If this button is selected, the tail rotor will operate in a counterclockwise rotation. The direction of operation is determined by facing the left side of the helicopter.

CONSTANT DRIVE TAIL

This indicates whether or not the tail rotor turns continually with the main rotor. Typically when the engine is shut down the tail rotor will stop spinning and you will lose yawing control. By turning this option "on" the tail rotor will continue to turn along with the main rotor.

TOTAL DIAMETER

This indicates the diameter of the tail rotor including the hub.
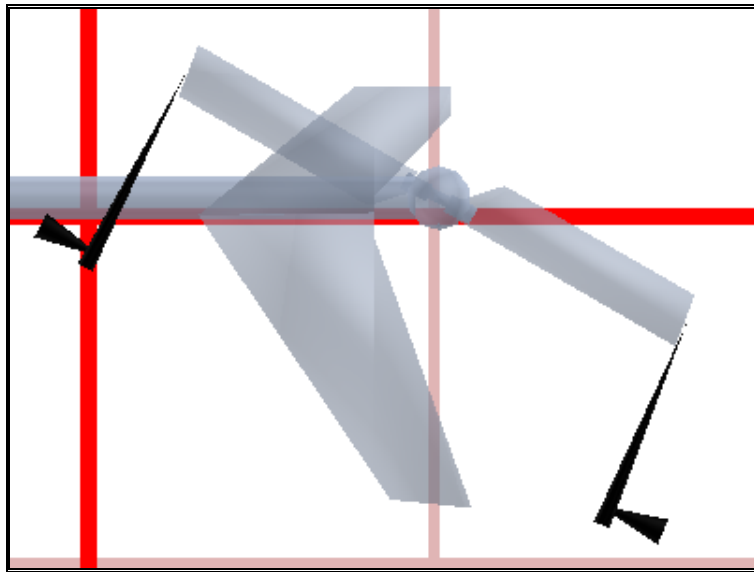
CHORD

This indicates the average width for the tail rotor airfoil.
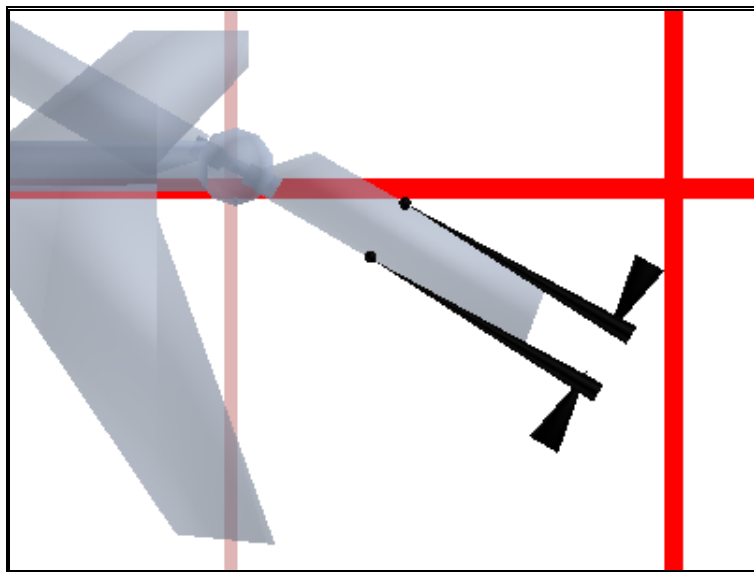
TAIL:MAIN RATIO

The ratio of the tail rotor revolutions in comparison to that of the main rotor blades. For example, a ratio of 9.6:1 would indicate that the tail rotor blades would rotate 9.6 times for every one time the main blades would rotate completely.

CW DEFLECTION

This is the amount of deflection that causes the helicopter to rotate in the clockwise direction. This value is always positive.

CCW DEFLECTION

This is the amount of deflection that causes the helicopter to rotate in the counter-clockwise direction. This value is always positive.

LOCATION RIGHT

This is the physical location of the tail rotor blades to the right of the CG in comparison to the location of the tail rotor.
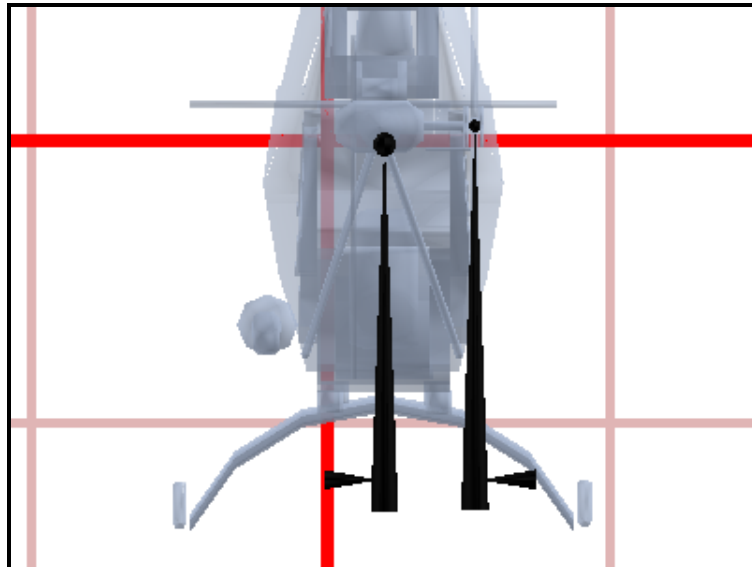
LOCATION FORWARD

The physical location forward of the CG where the tail rotor hub is located. This value is usually negative to indicate that it is to the rear of the CG.
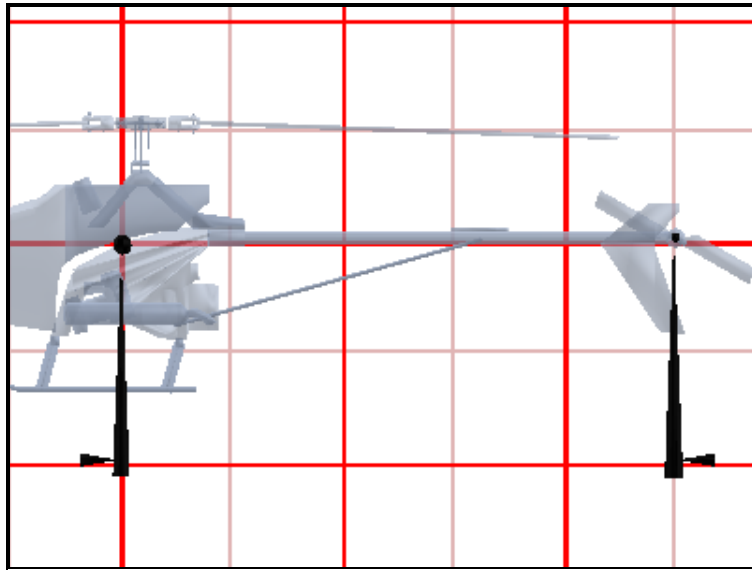
LOCATION UP

This is the physical location above the CG where the tail rotor hub is located.
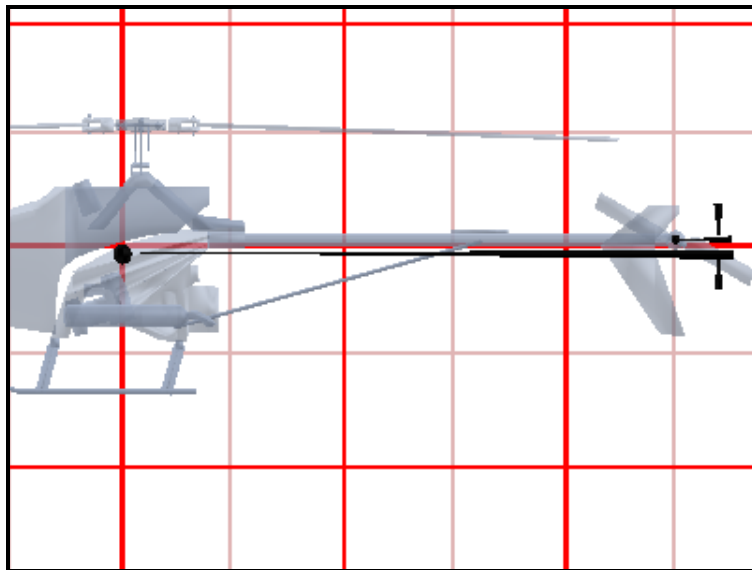
AIRFOIL

Select an airfoil for your tail rotor blade. Many of the airfoils have a number in them that indicate their "percent", for instance a "NACA 0009" is a 9% and a "NACA 2412" is a 12%. You can measure the percent of your airfoil by taking the height of your blade's cross section and dividing by the chord.

GYRO PAGE

The gyro page allows you to select a gyro for your helicopter and modify settings dependent upon which gyro has been selected.
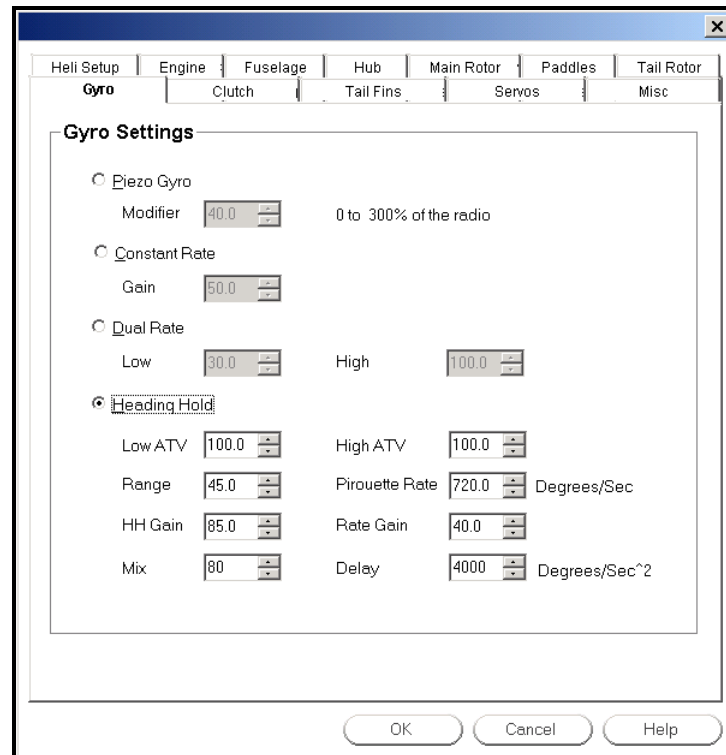
PIEZO GYRO

Activates the piezo gyro.   This gyro behaves similarly to the constant rate gyro, but uses an electronic crystal to detect changes in the yaw axis. It is popular because it allows you to adjust the gain from your radio.

PIEZO GYRO MODIFIER

This value is usually 100% indicating to use the gain supplied by the radio. If you want more gain than the radio allows, increase this value.

CONSTANT RATE

Activates the constant rate gyro. This uses a mechanical gyro to detect changes in yaw. Its gain is not adjustable during flight, but is much less expensive than a piezo gyro.

CONSTANT RATE GAIN

Gain value for the constant rate gyro.

DUAL RATE

Activates the dual rate gyro.   This is an improvement on the constant rate gyro, allowing you the ability to switch between two pre-set gains during flight.

DUAL RATE LOW

This is the low rate setting of the gyro. This is used when the gain channel (usually channel 5) is below 0.

DUAL RATE HIGH

This is the high rate setting of the gyro. This is used when the gain channel (usually channel 5) is above 0.

HEADING HOLD

Activates the heading hold gyro. This gyro functions as either a piezo gyro or a heading hold gyro. While in heading hold, the gyro will keep the tail pointed in the same direction until you input a different direction.

LOW ATV

The minimum ATV for the heading hold gyro. This is the amount of allowable physical tail rotor deflection the gyro can provide for clockwise helicopter yawing.

HIGH ATV

The minimum ATV for the heading hold gyro. This is the amount of allowable physical tail rotor deflection the gyro can provide for counter clockwise helicopter yawing.

RANGE

The amount of yaw the gyro will allow before re-setting the position it is trying to maintain. Using a smaller amount (like 10 degrees) will cause the helicopter to weather vane in forward flight.

PIROUETTE RATE

This is the maximum rate at which the helicopter will pirouette.

HH GAIN

The amount of gain for the heading hold portion of the gyro. This will not change the maximum yaw rate, as determined by the rudder channel, but rather determines how quickly it changes the tail rotor's pitch. Too much gain results in a "hunting" effect, too little gain slows the helicopter's response.

RATE GAIN

This is the amount of gain for the normal "rate" portion of the gyro. Higher values will slow down the maximum yaw rate and eliminate unwanted accelerations.

MIX
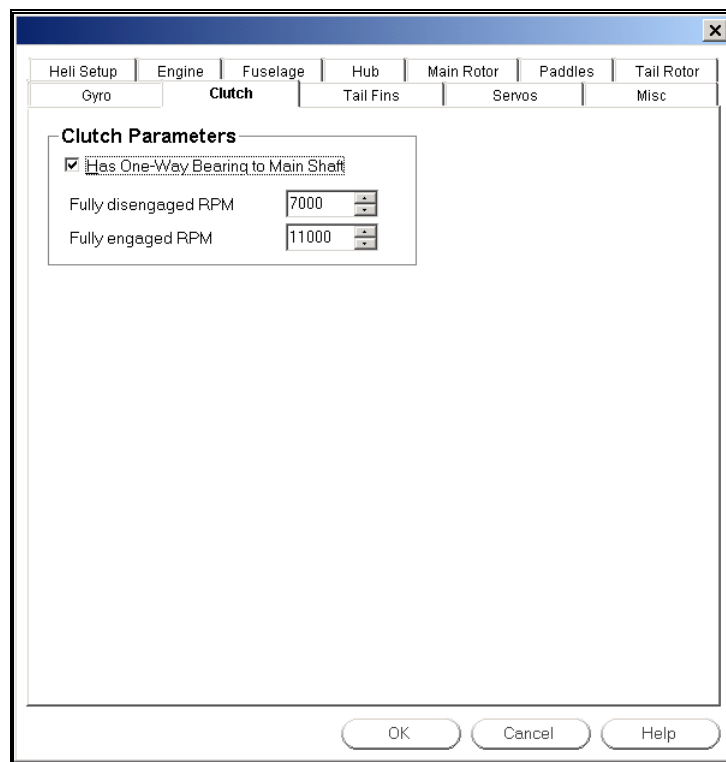
The mix between the heading hold gyro and the constant rate. This value is the percent of heading hold.

DELAY

The maximum angular acceleration used for heading hold corrections. Large values cause the helicopter to respond faster. Lower values make the helicopter "smoother" in flight.

CLUTCH PAGE

Most R/C helis use a centrifugal clutch, which engages when the engine spins up fast enough. The Clutch page lets you set the engine RPM at which the clutch begins to engage (starts delivering torque to the rotor blades), and the RPM at which the clutch fully engages (no longer slips).

HAS ONE WAY BEARING TO MAIN SHAFT

A one way bearing is necessary for auto-rotations. By turning this option "on", if the engine fails or goes below a certain RPM the main rotor will turn freely from the engine.

FULLY DISENGAGED RPM

An engine RPM less than this amount will not engage the clutch.

FULLY ENGAGED RPM

An engine RPM greater than this amount will fully engage the clutch.

TAIL FINS PAGE

This page allows you to modify tail fin attributes. When you see a "?" button on this page, click the button to see a helpful diagram.
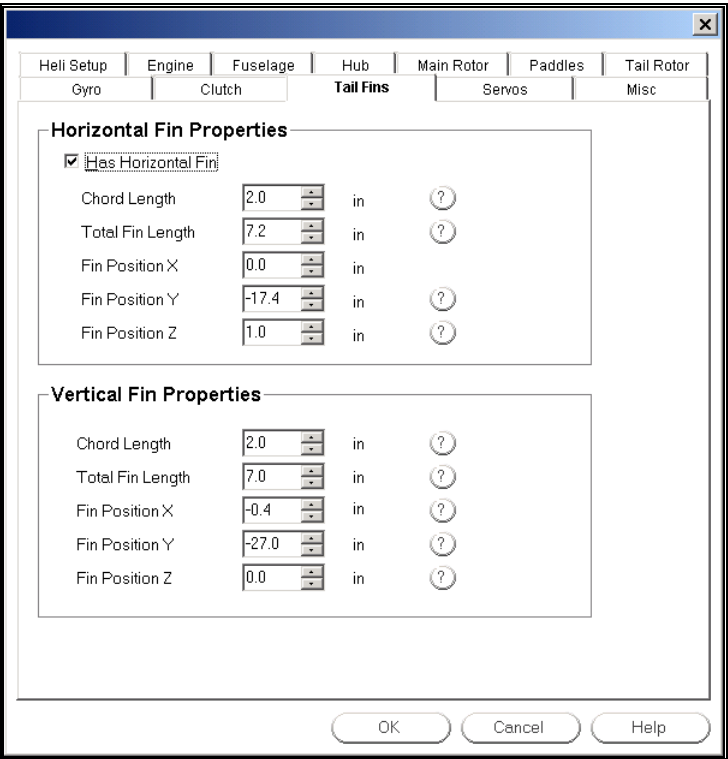
HAS HORIZONTAL FIN

Used to determine if there is a horizontal fin on the helicopter.

CHORD LENGTH (HORIZONTAL FIN)

This is the width of the horizontal fin's *average* chord.
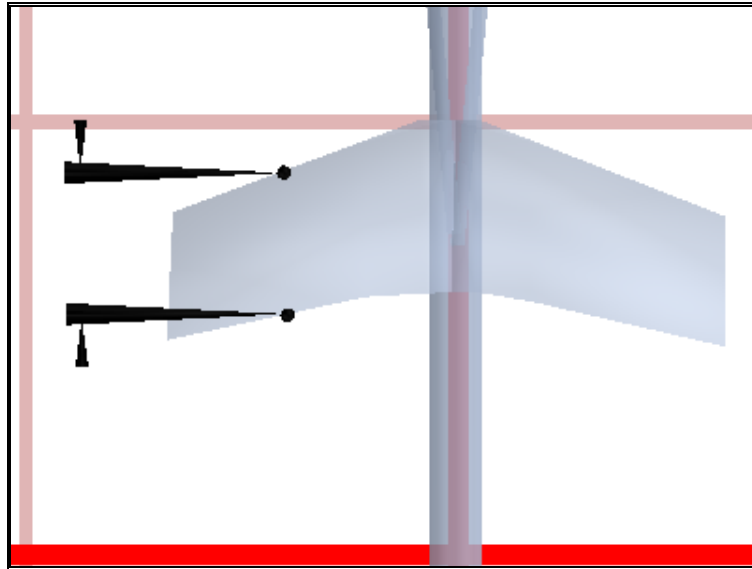
TOTAL FIN LENGTH (HORIZONTAL FIN)

This is the overall or total length of the horizontal fin.
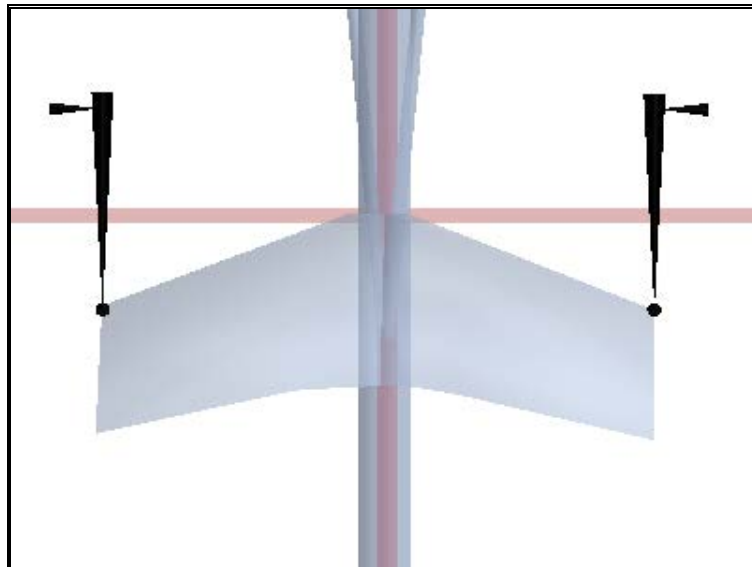
FIN POSITION X (HORIZONTAL FIN)

The rightward location of the fin center as measured from the CG. This will usually be "0".

FIN POSITION Y (HORIZONTAL FIN)

The rearward location of the fin center as measured from the CG. This will usually be negative indicating a position behind the CG.
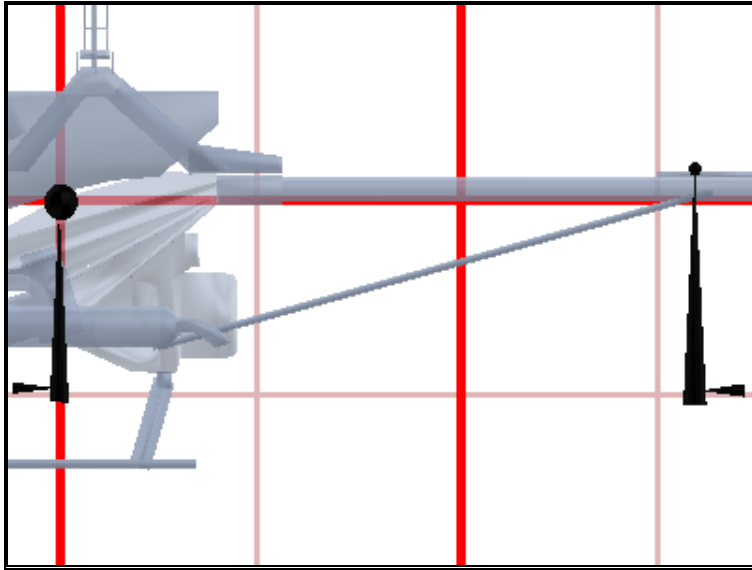
FIN POSITION Z (HORIZONTAL FIN)

The upward location of the fin center as measured from the CG. A positive value will place the fin above the CG.
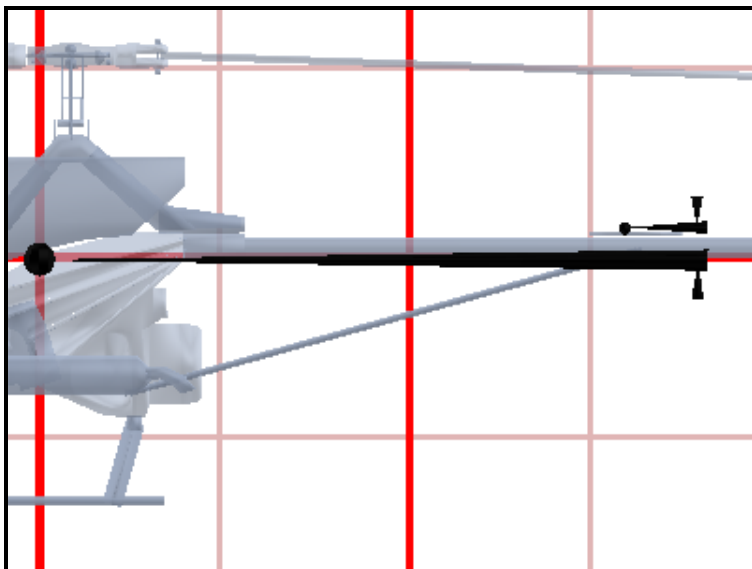
CHORD LENGTH (VERTICAL FIN)

This is the width of the vertical fin's *average* chord.
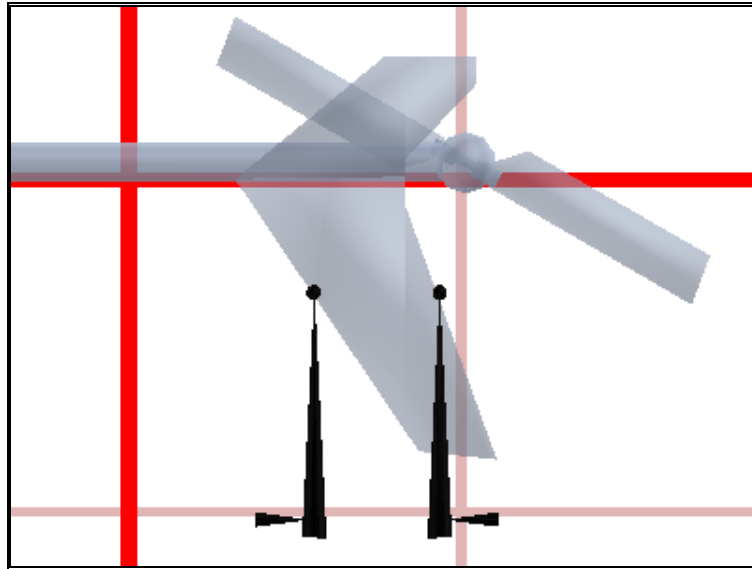
TOTAL FIN LENGTH (VERTICAL FIN)

This is the overall or total length of the vertical fin.
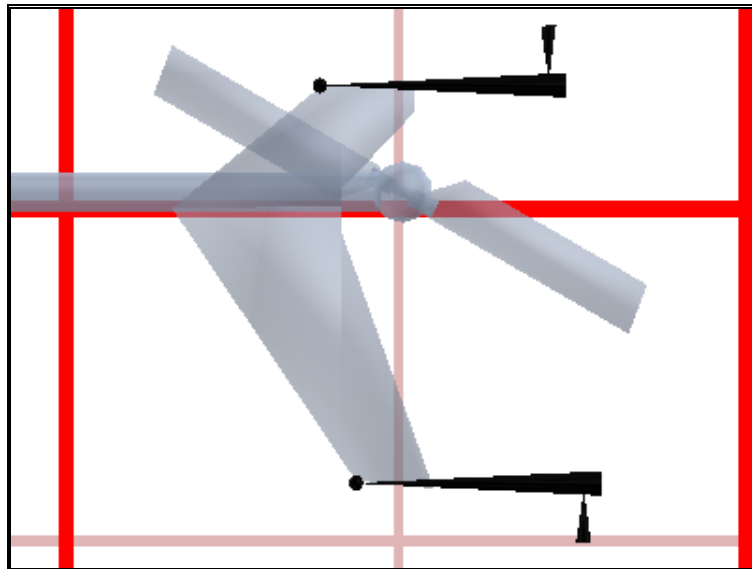
FIN POSITION X (VERTICAL FIN)

The rightward location of the vertical fin's center as measured from the CG. Positive values will put the fin to the right of the CG while negative values will position the fin to the left of the CG.
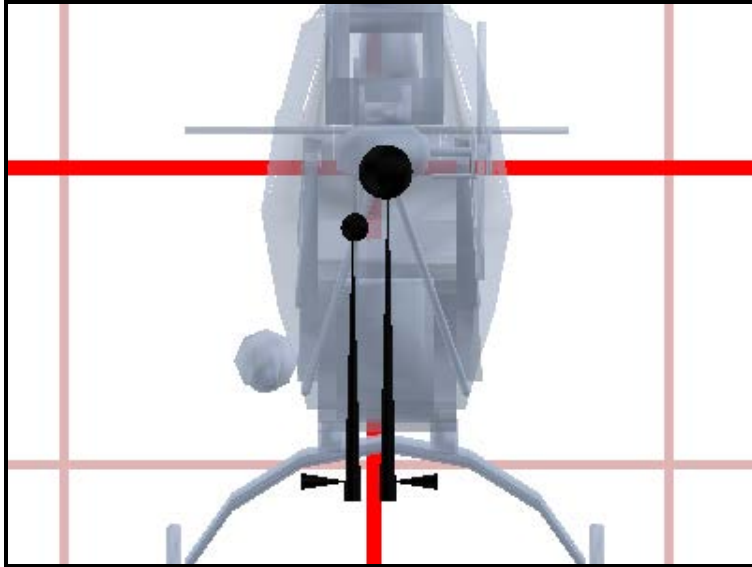
FIN POSITION Y (VERTICAL FIN)

The rearward location of the fin center as measured from the CG. This will usually be negative indicating a position behind the CG.
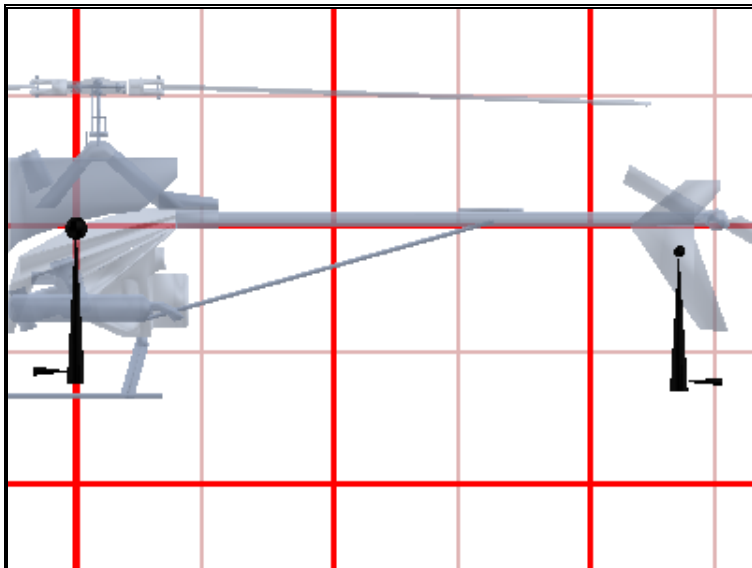
FIN POSITION Z (VERTICAL FIN)

The upward location of the fin center as measured from the CG. A positive value will place the fin above the CG.
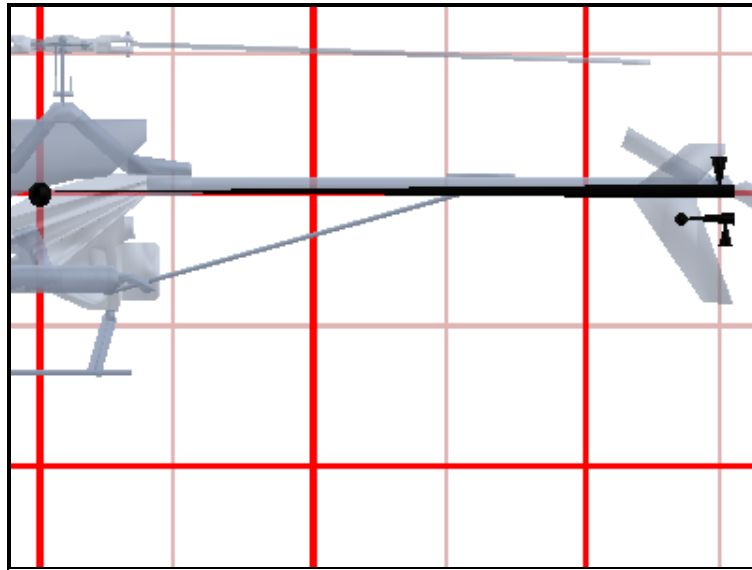
SERVOS PAGE

The **Servos** page lets you modify and configure servo assignments when you are using your own transmitter to control RealFlight.
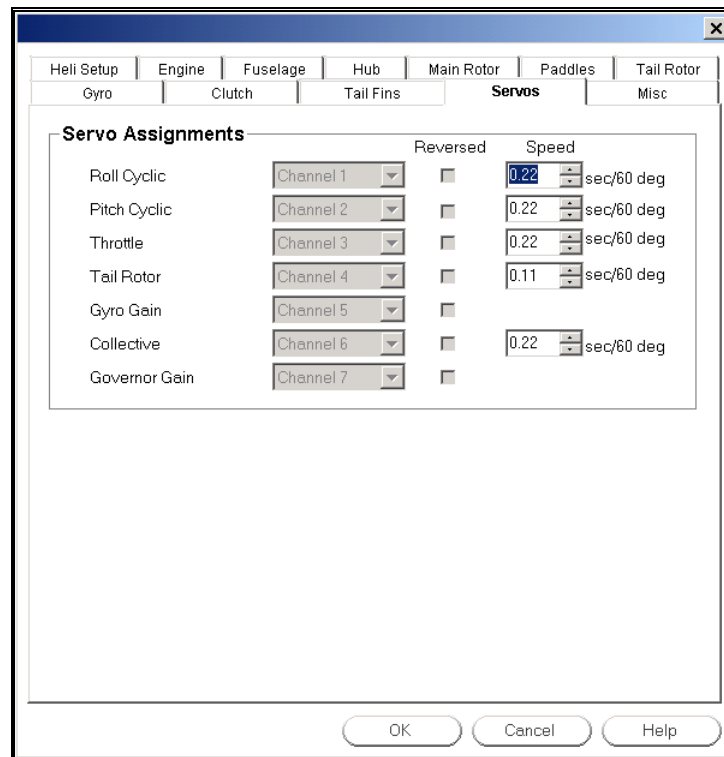
SERVO ASSIGNMENTS

Assign the functions to specific "receiver" channels. These options are only enabled if you are using your own transmitter to control RealFlight.

REVERSED

You can reverse any of the channels to match the output of your radio.

SERVO SPEED

Adjust the speed of the servos that are attached to your aircraft.

MISC.

This page lets you modify some miscellaneous heli parameters.

SETTING THE INERTIA

Inertia is the amount that an object resists changes in its rotation speed. If an object has a high inertia, it is difficult to get the object to start rotating. Once the object is rotating, it is difficult to stop the rotation.

RealFlight pre-computes a pitch, roll and yaw inertia for every aircraft. However, your aircraft may roll, pitch or yaw a little more or less easily than the default helis in RealFlight.

Use these controls to "tweak" your heli's inertia up or down. Set the values to 100% to use the pre-computed inertia values. Use values less than (greater than) 100% to set inertia smaller than (greater than) the pre-computed values.

PITCH INERTIA

Adjusts the inertia for the pitch axis. 100% leaves it at the pre-calculated value for this helicopter. Increasing the value to 120% makes it harder for your heli to pitch; 80% makes it easier for your heli to pitch.

ROLL INERTIA

Adjusts the inertia for the roll axis. 100% leaves it at the pre-calculated value for this helicopter. Increasing the value to 120% makes it harder for your heli to roll; 80% makes it easier for your heli to roll.

Yaw Inertia

Adjusts the inertia for the yaw axis. 100% leaves it at the pre-calculated value for this helicopter. Increasing the value to 120% makes it harder for your heli to yaw; 80% makes it easier for your heli to yaw.

APPENDIX A. FLYING THE AIRCRAFT

AIRPLANE BASICS

SWITCHES

Before you fly the plane, make sure all the switches are in their "off" (or low rates) positions. The switches may be assigned to different items depending on how you have configured your controller and which aircraft you are flying. Check the description of the aircraft to determine the default switch settings. If you are using your own transmitter to control RealFlight, please consult your transmitter owner's manual for more information.

CENTERING

Trim tabs are the small slider controls on the controller (two per controller stick). They "trim" the aircraft so that it flies straight and level. For example, if an airplane has a tendency to veer slightly downward, you may need to add a slight "up" nudge to the elevator. You can do this by sliding the elevator trim, a click or two at a time, towards the bottom of the controller.

CRASHING

"While takeoffs are optional, landings are mandatory." For any type of aircraft or flying, successfully landing an aircraft is a crucial skill to master.

The key to a perfect landing is undivided concentration. Pay close attention to the altitude of the aircraft as well as its orientation to the runway. Use each crash as a learning experience to perfect your approach and the landing.

RealFlight has several tools to help you stay on top of things during approach and landing. See "Landings" below for some ideas.

AIRPLANE FLIGHT

RealFlight simulates how R/C aircraft really fly. This allows you to practice R/C flying without worrying about expensive crashes. Additionally, RealFlight is ideal for practicing new maneuvers and experimenting with various parameter adjustments. It is important to remember, however, that a simulator will only help you learn to fly if you let it. Otherwise, it is just a game. Learning to fly R/C aircraft requires a commitment. One doesn't just grab the sticks and start dazzling the crowds. A methodical, patient approach will help you get the most out of this simulator.

This section is not designed to teach you how to fly. Rather, it will help you enhance your experience with the simulator.

TAKEOFFS

When you are taking off, start with the throttle in low position and slowly increase throttle by pushing the throttle stick away from you towards the top of the transmitter until you are at about half speed. Stay in the middle of the runway (you can steer the plane using the rudder). When you have built up enough speed, you can climb off the runway by gradually pulling back on the elevator. If the plane is tracking well, apply the rest of the power more quickly, climbing out and gaining altitude.

Be careful not to veer off the runway. In a real plane, chances are you would crash (or get stopped on the grass). Usually this means a bent landing gear and broken prop; if your plane has retracts, they could even get ripped out of the wing.

LANDINGS

It is very important to land on the runway, rather than veering off, or touching down before you reach the runway. Either of the latter usually produces a moderately expensive crash. If you "cartwheel" (wing tip hits the ground first), the wing can break, resulting in lengthy down time.

Start by aligning your plane with the runway. Fly the approach normally, using your throttle to control the rate of descent. Try to land at the slowest speed possible. If your plane has flaps, use them to kill speed (but be careful; with flaps down your plane will try to pitch up and climb). If your plane has retractable landing gear, lower them, and as you touch down, keep your nose up!

RealFlight has several tools to help you practice landings.

- Before you try to land yourself, you may want to get a lesson from a pro. Under the "Options" menu, select Virtual Flight Instructor; when a dialog appears, select the "Touch and Go" lesson.

- As you land, use the NavGuides ("View/Gadget" menu item) to keep track of your speed, altitude, and distance above ground.

- If you lose sight of the ground, you can orient yourself using the "Quick Look" feature. In the menus, select "View/Quick Look/Ground". Your view will briefly pan from the plane to ground, then back to the plane.

- You can also activate the Look At Ground feature. In the "View" menu, select "Look at Ground." This option will cause the active view to always look toward the ground, regardless of aircraft location.

AEROBATICS

When you practice aerobatics, the three important steps are:

- Start the plane *straight and level*, in a controlled situation

- Perform the maneuver

- Get back into a straight, controlled situation

Anyone can give it full throttle, jam the sticks in all directions and watch the plane tumble and roll. But this is *not* what you will do out in the field. Do this and you won't have control of the airplane!

By getting set up properly, performing the maneuver, and then finishing, your experience will be more rewarding as well as more realistic.

Concentrate on making the maneuvers "clean." If you are doing a roll, try to keep the plane on a straight line as you roll. If you are doing a loop, try to make a perfectly round circle.

If you want to practice aerobatics using RealFlight, try the new Virtual Flight Instructor feature (in the **View** menu). Virtual Flight Instructor provides a series of personal lessons from a pro. *For more information on Virtual Flight Instructor, see "Virtual Flight Instructor" on page 107.*

THROTTLE MANAGEMENT

Avoid the temptation of giving the plane full throttle and keeping it there for hours at a time. This teaches you bad habits and makes even a good flier look like a rookie out at the field.

Many of the maneuvers require proper throttle management in order to make a maneuver look good. Loops, stalls, torque rolls, touch-and-goes are just a few examples. Try doing various maneuvers at differing speeds. Try performing a slow roll at medium throttle and keeping a perfectly straight line. This is very hard and will earn you more praise at the field than doing a full speed, full stick roll.

RUDDER MANAGEMENT

Planes can, more or less, effectively be flown with just the elevator and ailerons. But, good pilots will tell you that rudder is just as important. Many aerobatic maneuvers require excellent rudder usage.

Rudder control is especially important when landing in a crosswind. Pilots that cannot use the rudder usually land in the tall grass (embarrassing!). Pilots that do use the rudder can land on the numbers almost every time.

TAKE CRASHES SERIOUSLY

Out at the field a crash might result in one or more of the following:

- Bruise your ego

- End flying for the day

- Cost you money

- Cost you time to rebuild

- Even win you a nice "best crash trophy!"

Of course, when you crash on the simulator, there is really no harm done. None, that is, except the bad habits you can learn. Take the crashes seriously. Learn from each one and you will be a better pilot out at the field.

HELICOPTER BASICS

A model helicopter is a very complicated machine, which operates on the same aerodynamic principles as its full-scale counterpart. These principles are quite complicated to explain and understand. However, it is not necessary to understand all the underlying aerodynamics in order to successfully fly a model helicopter (or a computer simulation).

The following will help you to better understand the basics of helicopter flight, and the relationship between control stick movements and the actions of the machine. Refer to these instructions often as you become more proficient.

Note: The inputs below are shown using a Mode 2 transmitter.

COLLECTIVE (LEFT STICK - VERTICAL MOVEMENT)

The helicopter is lifted into the air by the spinning rotor blades, which act like rotating wings. Changing the pitch (angle of attack) and speed of the blades, using the "collective" and throttle controls the vertical rise and descent of the helicopter. Adjusting "collective" increases and decreases the blade pitch. The "throttle" control increases and decreases engine RPM. On a model helicopter, the collective and throttle controls are mixed electronically, and controlled by the throttle stick on the transmitter or controller.
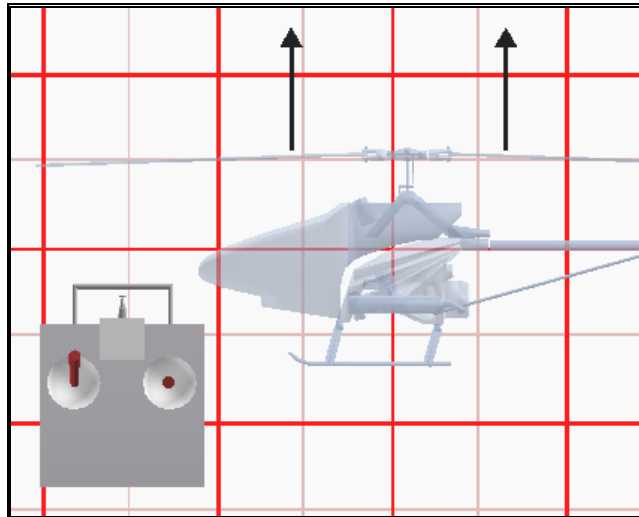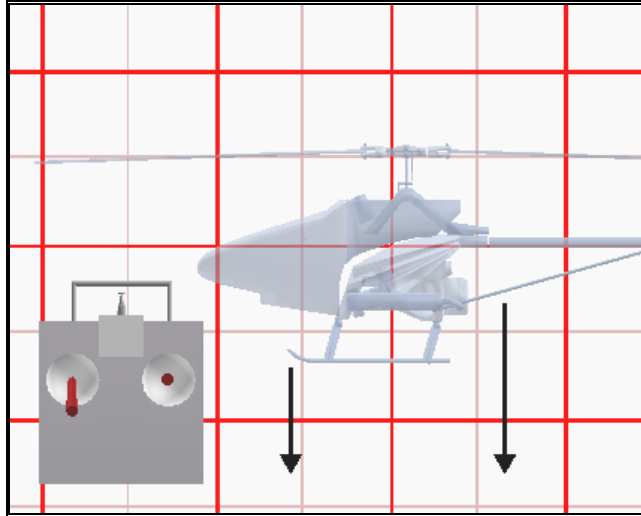
RUDDER (LEFT STICK - HORIZONTAL MOVEMENT)

To turn the nose of the helicopter left or right, change the tail rotor pitch (by using the "rudder" control). Changes in collective stick movement will require changes in the amount of rudder input to maintain heading.
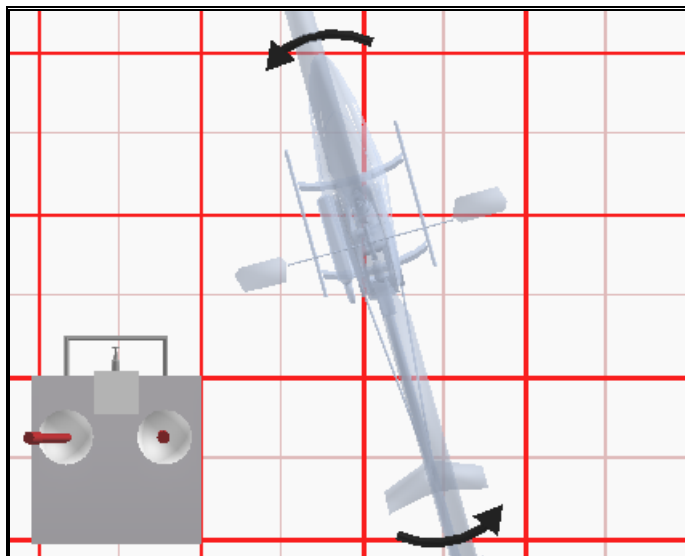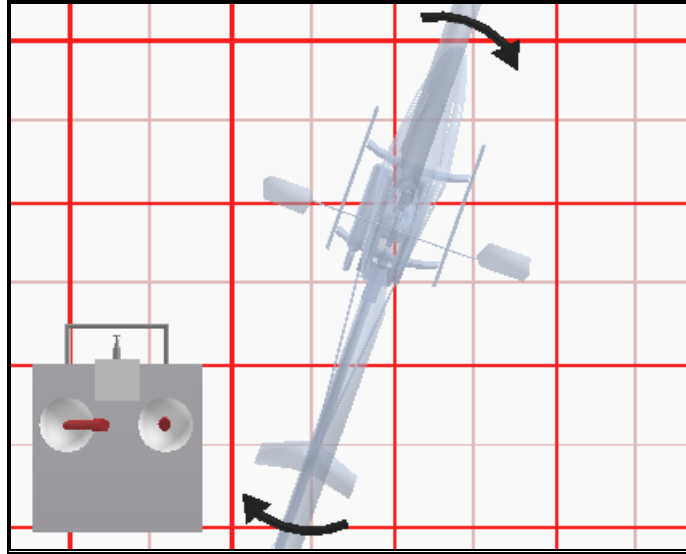
CYCLIC STICK (RIGHT STICK)

The cyclic stick replaces the "aileron" and "elevator" controls found on a fixed-wing aircraft. "Cyclic" is the term given to the control of the main rotor that allows the helicopter to fly forward, backward, left and right. Forward cyclic stick movement causes the helicopter to pitch forward, left cyclic cause the helicopter to tilt sideways to the left, on so on. You move the helicopter forward or sideways using a *coordinated* movement of both the cyclic and collective control sticks. Moving the cyclic stick to the right, while simultaneously increasing collective, will cause the heli to move sideways to the right. "Rudder" control is used to maintain heading.
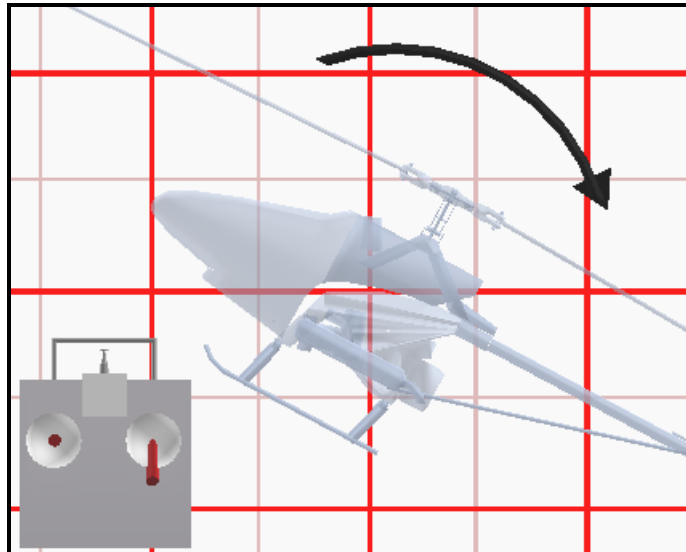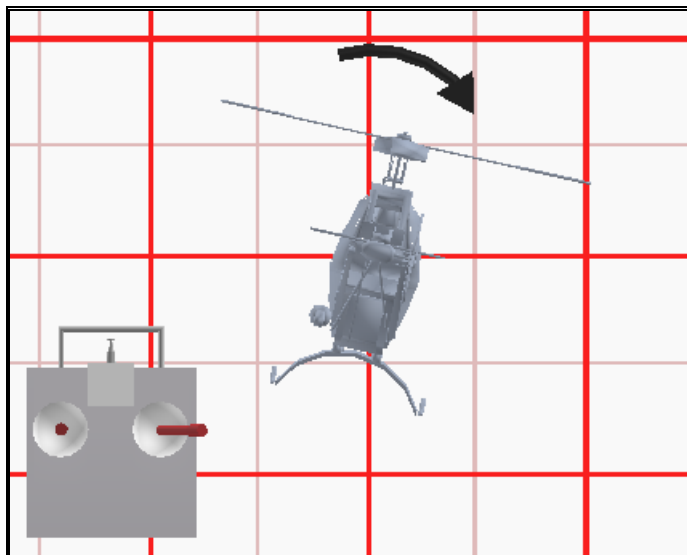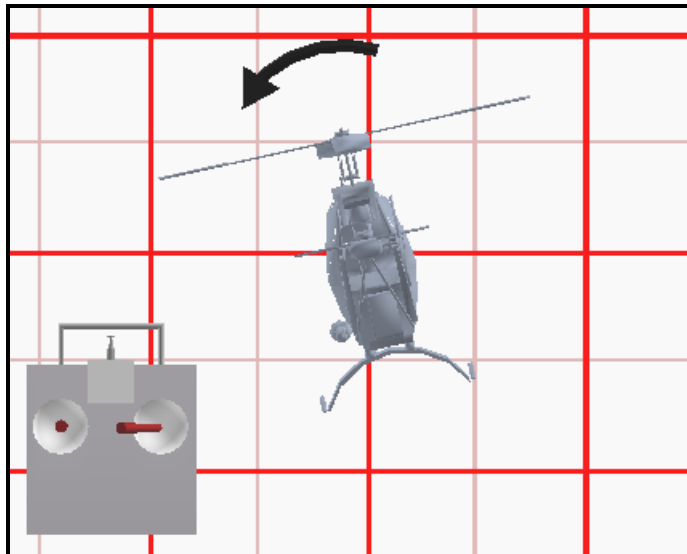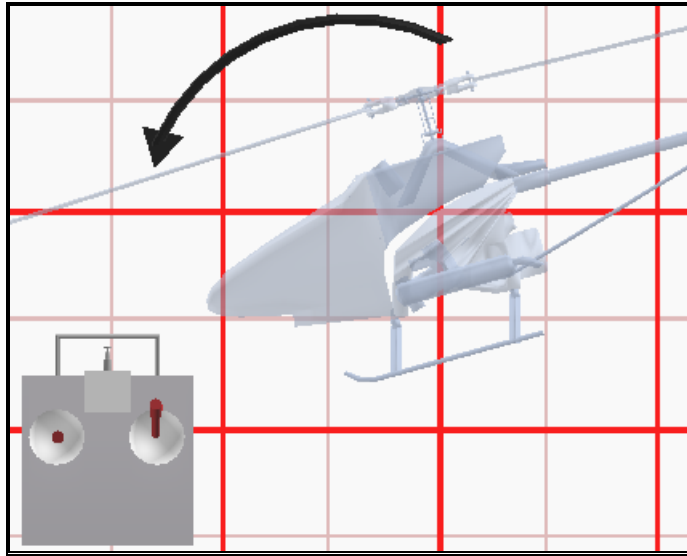
IDLE-UP

A switch on the controller actuates a special function, known as "idle-up." Idle-up offers an alternate throttle and pitch curve, different from the curves used for hovering. Idle-up is usually used for aerobatics, when the pilot wants engine power *added* when pitch is subtracted. (For example, inverted hovering positive throttle and negative pitch, so pulling the collective stick back provides positive throttle AND increased pitch together).

THROTTLE HOLD

Another special function is known as the "throttle hold". When activated, this switch sets your throttle to idle but allows the collective to function normally. This allows you to practice auto-rotations without shutting the engine off.

GYRO

Any sudden change to the torque of the main rotor, such as a quick change in RPM or a wind gust, can cause the helicopter to turn unintentionally to an unwanted direction. An electronic device known as a gyroscope (gyro) is used to "monitor" and correct for this by giving commands to the rudder control to help stabilize the machine.

Gyros come in a variety of types, each with different features. A *normal* gyro will not return the heli to its former heading; it will only stop the unwanted sudden movement. We recommend you start by using the *heading hold* gyro instead; it will keep the nose of the helicopter pointed in the desired direction regardless of outside forces.

HELICOPTER FLIGHT

HOVERING

The machine hovers by adjusting the collective control to maintain altitude, the rudder to maintain heading, and minute adjustments to the cyclic controls to maintain location. Hovering is the most important aspect of heli flight to master, since every other movement of the machine starts and stops with a hover.

FORWARD FLIGHT

The heli moves forward by increasing cyclic (moving the cyclic control forward). This causes the helicopter to tilt forward, resulting in a forward thrust. As the cyclic increases, the collective must also be increased to maintain the desired flight path. As forward speed increases, the collective can be reduced slightly.

BACKWARD FLIGHT

Backward flight is accomplished by moving the cyclic control aft, which causes the helicopter to tilt backward. As the cyclic is moved aft, the collective must also be

increased to maintain desired flight path. As backward speed increase, the collective can be reduced slightly.

SIDEWAYS FLIGHT

Moving the cyclic control left will cause the helicopter to tilt left. Add collective and right rudder to cause the heli to "slide" sideways to the left. As speed increases, it will require progressively more rudder to maintain heading.

To move right, simply follow the same procedure, but reverse the cyclic and rudder movements (move cyclic right, apply left rudder).

TURNING:

FROM FORWARD FLIGHT-

Moving the cyclic control left, while applying a small amount of aft cyclic and feeding in left "rudder", will cause the helicopter to make a coordinated turn to the left. Right movement of the cyclic and rudder sticks will cause the heli to turn to the right.

FROM A HOVER-

Use the rudder to rotate the nose of the heli in the direction you want.

Learning to fly a model helicopter is more difficult and challenging than any other radio control models, but is also the most rewarding as you master the techniques required for sustained hover and forward flight. Computer simulation of model helicopter flight is an excellent tool for learning the basics and dramatically reducing the learning curve when you move on to the actual model itself.

APPENDIX B. REALFLIGHT CONTROL PANEL

REALFLIGHT CONTROL PANEL

The RealFlight Control Panel is a separate application that is designed to work in conjunction with RealFlight G2.
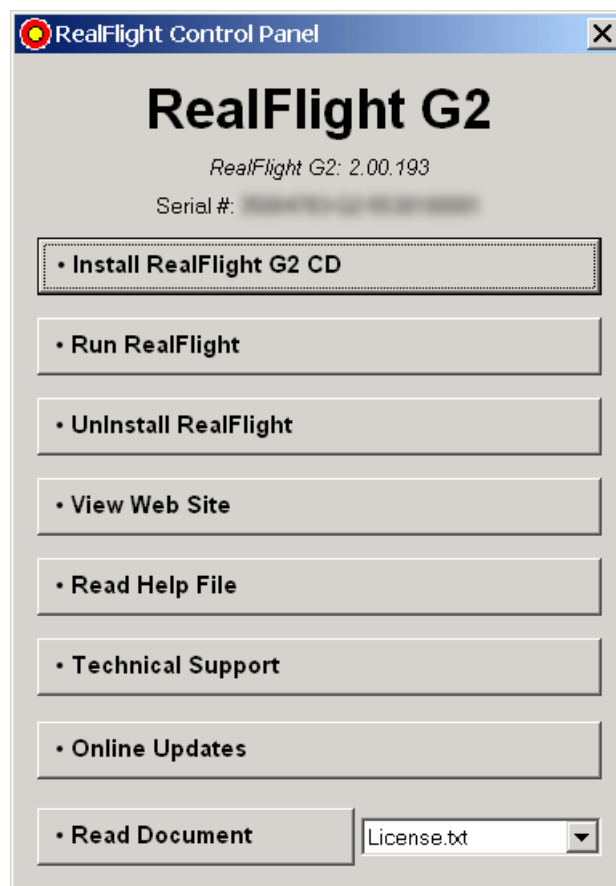
RUNNING THE CONTROL PANEL

There are three ways to run the RealFlight Control Panel.

- Insert the CD into the drive. If Auto-Play is active, then the RealFlight Control Panel will start on its own.

- If RealFlight is already installed, click the "Start" button in the Windows Task Bar. In the Start menu, select Programs/RealFlight/Control Panel.

- If RealFlight is already running, choose "Online Updates…" from the Help menu.

RUNNING REALFLIGHT

To start running RealFlight, press the **Run RealFlight** button on the Control Panel. (Note: if RealFlight is already running, the Control Panel will not let you start up a second RealFlight window.)

UNINSTALLING REALFLIGHT

To Uninstall RealFlight G2, press the **Uninstall Program** Button. The following dialog will appear:
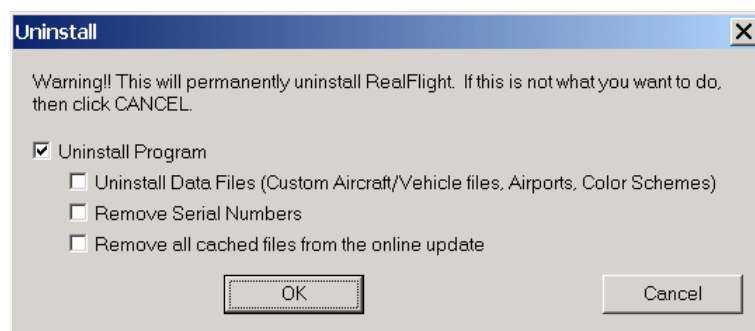
We suggest that you use this method, *not* the "Add/Remove Programs" feature in Windows, to uninstall RealFlight G2. Doing so through the RealFlight control panel will ensure that all necessary RealFlight files are removed.

UNINSTALL PROGRAM

Choose this option to uninstall only the RealFlight program itself.

UNINSTALL DATA FILES

Choose this option to uninstall any user files such as your created airports, customized aircraft, color schemes, songs etc. *Be careful with this option!* You could lose a lot of your work by inadvertently uninstalling these files.

REMOVE SERIAL NUMBERS

Choose this option to remove all RealFlight serial numbers from your system.

REMOVE CACHED FILES

Choose this to option to remove all cached download files from your system. If you uninstall these files, future downloads may take a little longer.

READ HELP FILE

Press the **Read Help File** button to bring up the help file for RealFlight G2.

TECHNICAL SUPPORT

Press the **Technical Support** button to bring up technical support information about your system. If you encounter any problems with RealFlight, this information can help you to resolve it on your own, or can help Great Planes' Support Staff to diagnose the problem.
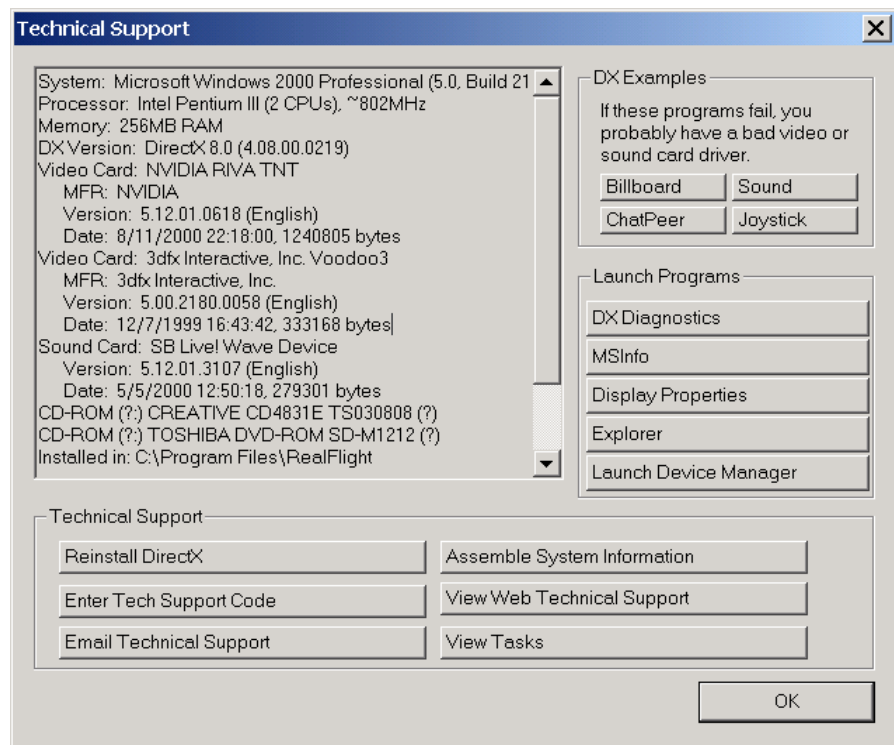
SYSTEM INFORMATION

This displays a list of the critical system information. Before you email technical support, or report a bug with the software, *please* be sure to cut and paste this information into your email. This will be of great assistance to them in diagnosing the difficulty.

DX EXAMPLES

Press these buttons to run example DirectX programs written by Microsoft. They are very basic programs that test your DirectX installation and hardware. If these

samples don't run correctly, then your problem lies either with your DirectX installation, or with your hardware drivers (usually video or sound).

To resolve these problems you should first contact your video/sound card manufacture for updated drivers. *This is very important*. Card manufacturers frequently update their drivers to fix problems that arise when used with programs like RealFlight. Even if you just bought a new computer system there may be a new, updated driver available for download.

If you are sure you have the latest drivers, you may need to reinstall DirectX, or update your version.

REINSTALL DIRECTX

Choose this option to reinstall DirectX. Occasionally this will fix corrupted installations.

ASSEMBLE SYSTEM INFORMATION

Choose this option to collect critical information about your system, and about your RealFlight settings. You may find this information useful if you try to troubleshoot problems on your own. Moreover, if needed you can cut and paste this information into an email to Great Planes Technical Support. When you use the online registration to register RealFlight, this is the hardware information that is sent to Great Planes.
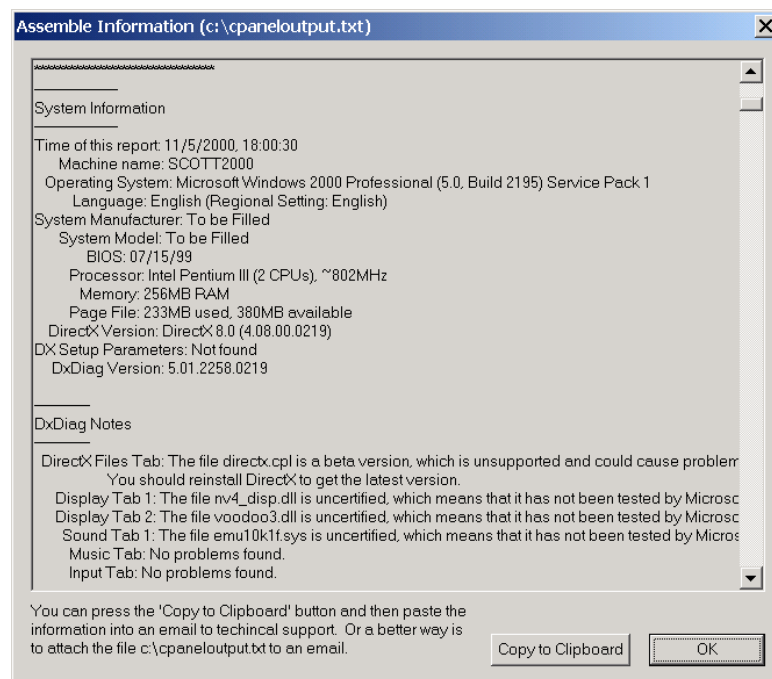
ENTER TECHNICAL SUPPORT CODE

Choose this option to enter a technical support code. If you do encounter problems running RealFlight, our Technical Support team may supply you with a code to input here. Entering this code will help them diagnose or resolve your problem.
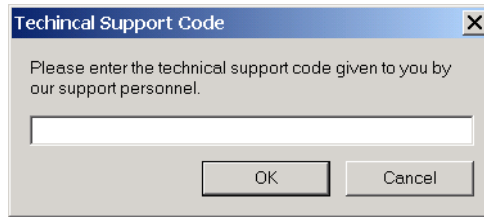
VIEW WEB TECHNICAL SUPPORT

Choosing this option will open a browser window, and take you to a web site that contains the most up-to-date technical support information for RealFlight G2.

EMAIL TECHNICAL SUPPORT

This gives you the email address **rfsupport@greatplanes.com** to which you can email your problems. If you do email us, please be sure to attach the **Assemble System Information** output to your email.

VIEW TASKS

This shows you a list of all tasks that are running. Some tasks can interfere with RealFlight and may need to be closed. Our Technical Support team will be glad to help you close problem tasks.

DX DIAGNOSTICS

This brings up Microsoft's DXDIAG utility. Using this utility can further help diagnose your system. (Important: if you send us information about your system to help us diagnose a problem, please *do not* use DXDIAG to generate that information. Instead, please use the "Assemble System Information" feature [see above]. The "Assemble System Information" output file contains more information than the DXDIAG output.)
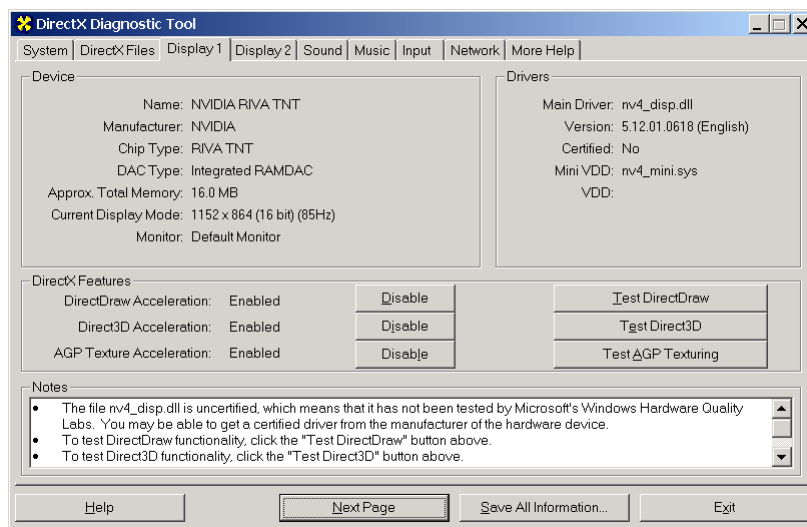
MSINFO

This option will run MSInfo. This will give you even more information about your system. This program is not always installed on your computer, but normally comes with programs such as Microsoft Office®.
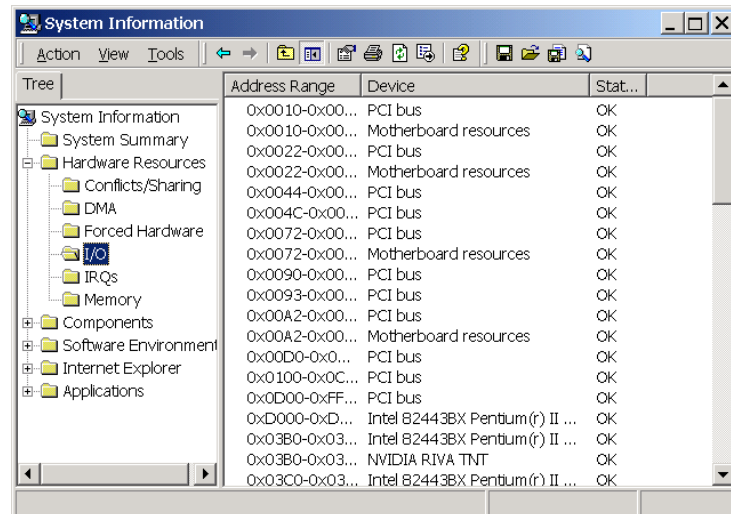
DISPLAY PROPERTIES

This brings up your monitor's display properties. You can use this page to change the resolution of your desktop.
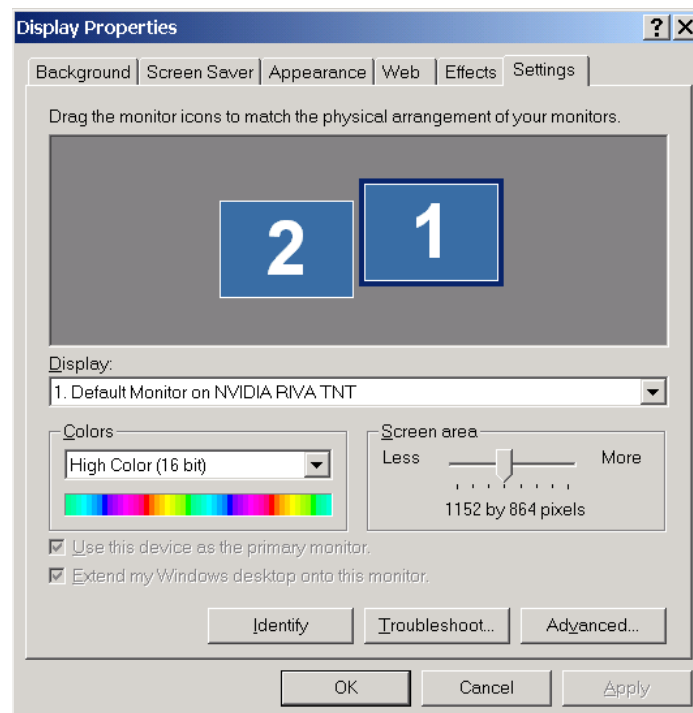
EXPLORER

This button launches Windows Explorer. This Microsoft Windows utility can help you locate, move and backup your files.
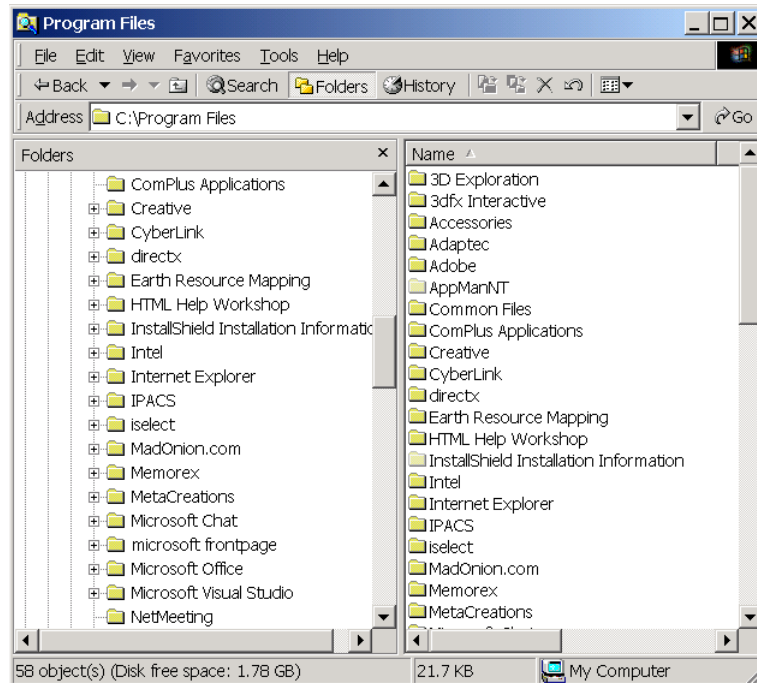
LAUNCH DEVICE MANAGER

This button launches the Device Manager. This Microsoft Windows utility will help you determine driver dates, as well as installing and updating video and sound card drivers.
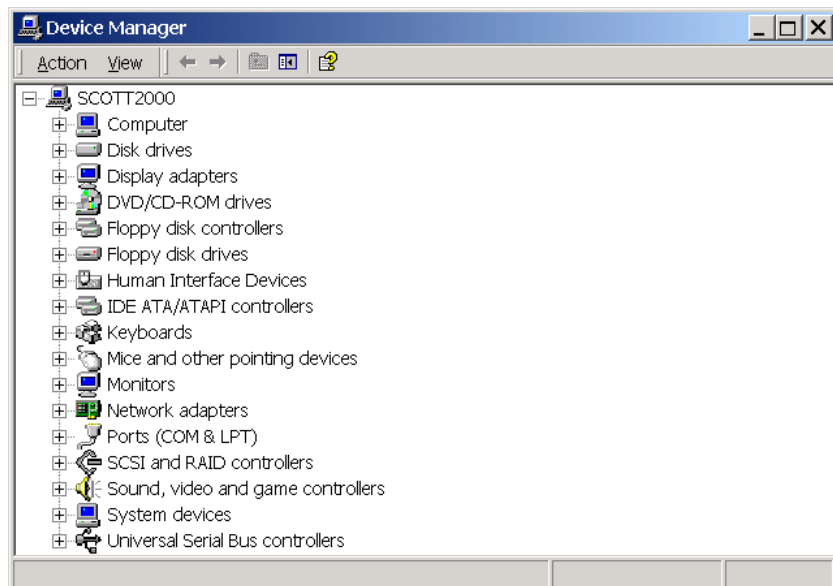
VIEWING DOCUMENTS

This lets you view important documents that come with RealFlight.
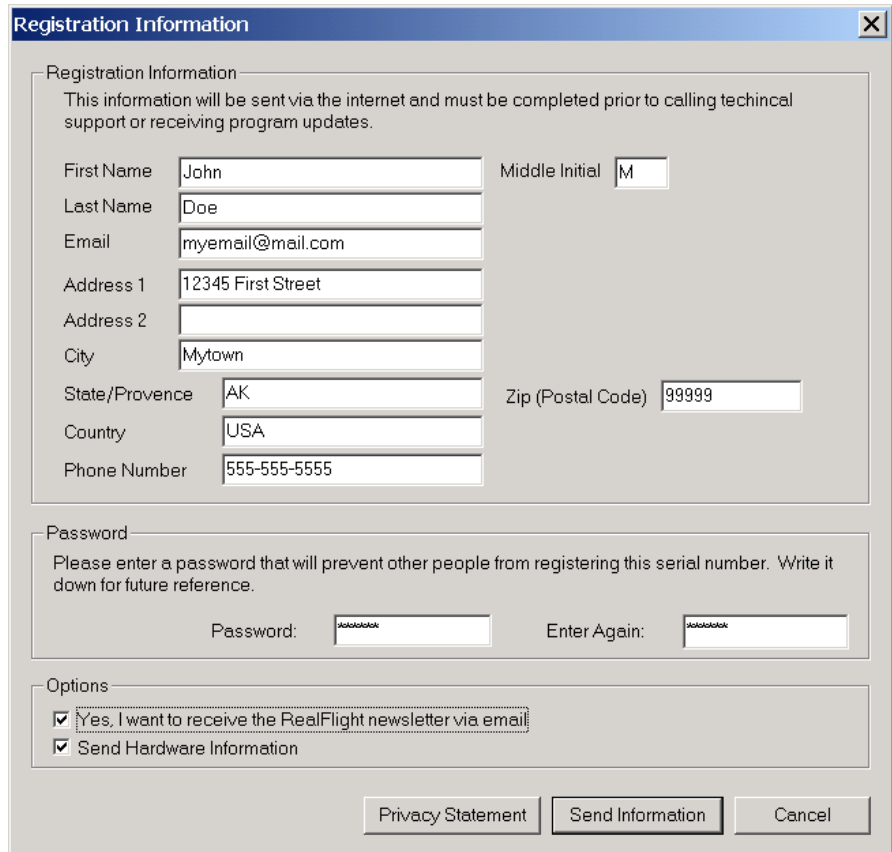
ONLINE UPDATES

We are proud to bring you a cutting edge way to keep your RealFlight G2 program updated to the latest version. Gone are the days of self-extracting EXEs, lost files, or cumbersome web sites. Just a single button click will download the latest version and install it correctly.
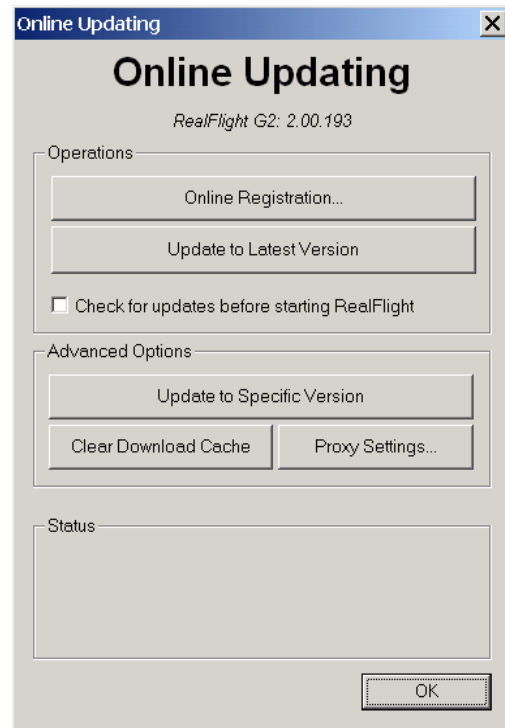
REGISTRATION

The first thing you must do before you can use any of the online functions is to register the program with Great Planes.

Please enter in all the correct registration. If you forget your password, contact Great Planes Support. To do so, email them at rfsupport@greatplanes.com or telephone them at 217-398-8970 (option #1). They will confirm your identity, and issue you a new password.

HARDWARE INFORMATION

RealFlight offers you the option of automatically sending us information pertaining to your system hardware and settings when you register. It will do so if you leave the "Send Hardware Information" box checked when you register.

This information will assist us more rapidly in diagnosing any problems you may encounter later, should you need to contact Technical Support. Consequently, we suggest that you leave this box checked when registering.

This feature is entirely optional. If you uncheck the box, RealFlight will not send us any information about your system. Or, you can view exactly what information RealFlight will send us before you decide. To view this information, click the **Technical Support** button on the RealFlight Control Panel. When the **Technical Support** page appears, click **Assemble System Information**.

UPDATING TO THE LATEST VERSION

After registering (you only need to register once), you can update to the latest version. This will download all necessary files and correctly install the upgrade.

CHECK FOR LATEST UPDATES BEFORE RUNNING REALFLIGHT

If you check this box, then every time you run the RealFlight Control Panel, the panel will check to see if there is a newer version of RealFlight available. If so, the Control Panel will then ask you if you want to download and install it. Note: Your PC must be connected to the Internet in order to do so.

ADVANCED OPTIONS

UPDATE TO SPECIFIC VERSION
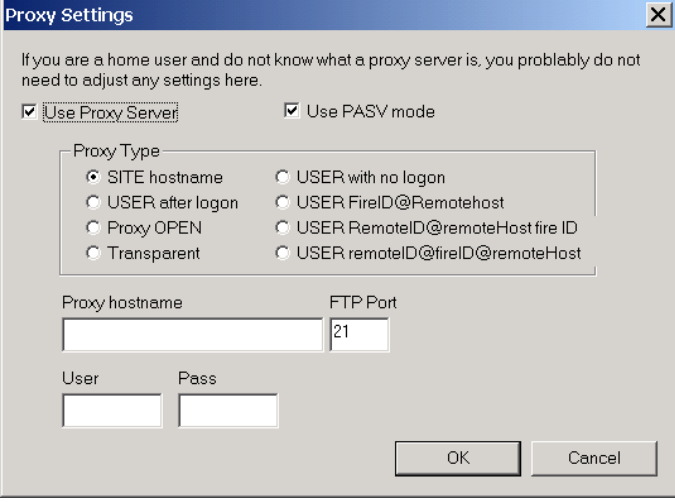
If you are having problems with a version you just downloaded, you can actually *go backwards* and retrieve a previous version. If the previous version fixes your problem, please contact our technical support team at **rfsupport@greatplanes.com** and let them know about the problem encountered.
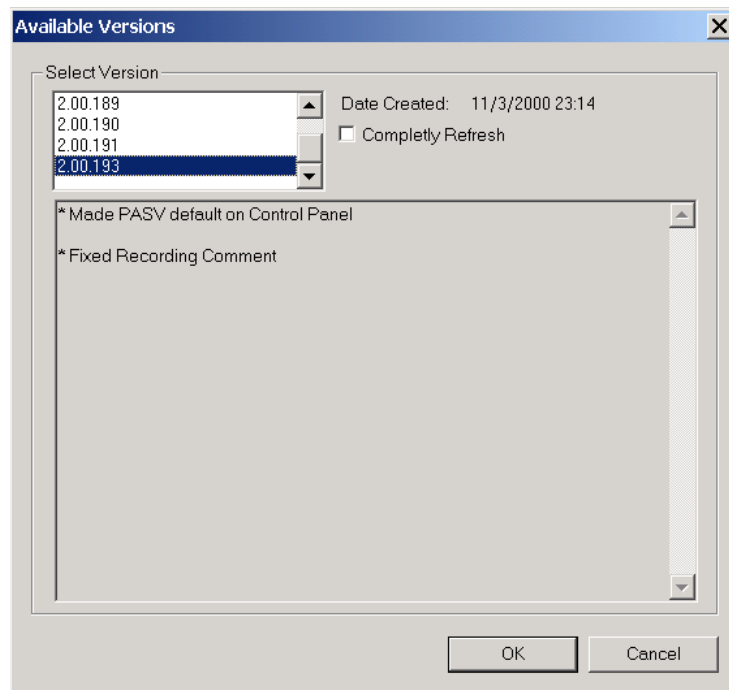
CLEAR DOWNLOAD CACHE

Some times files can become corrupted on download. If you are having problems with the Online Upgrades, try removing all cached files using this option, then choosing **Update to Specific Version** and select the **Completely Refresh** option.

PROXY SETTINGS

If you are behind a firewall that restricts FTP access, you may need to change the proxy settings in order for **RealFlight** to get the latest updates. *Most home users will keep the Proxy Server OFF.*

If you do need to use the proxy server, contact your network administrator to determine which settings to use.

PROBLEMS UPDATING?

Here are some possible problems that might occur when updating.

BAD INTERNET CONNECTION
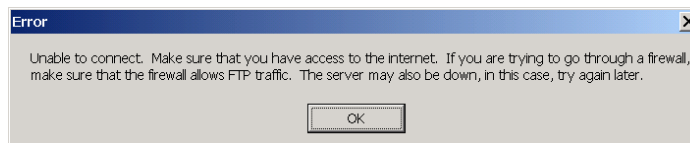
You either don't have access to the Internet (You can double check this with your browser), or the FTP server is unavailable. Try reaching the Internet with your browser. If you are behind a proxy server, then adjust the proxy settings.

SERVER UNAVAILABLE
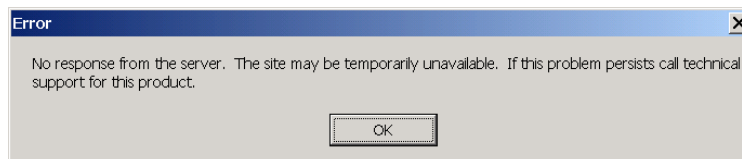
The server may be down or may be overloaded. Please try again later. If this problem persists, contact technical support and explain your problem.

APPENDIX C. IF YOU EXPERIENCE DIFFICULTIES WITH REALFLIGHT G2…

IN GENERAL

This simulator is on the cutting edge of technology, and runs using advanced hardware. Consequently, there is always the possibility you may experience some difficulties. Should the need arise, we provide extensive resources to help.

Besides providing the best R/C simulator, we sincerely feel that we provide the best, most extensive product support for any R/C simulator. Since cards, drivers, operating systems, etc. are always changing, we work hard to keep our support up to date on the latest issues and problems RealFlight G2 users might encounter.

This section starts with a summary of the various sources of RealFlight G2 information, support, and problem solving help that you can access. Then, we'll show you some **simple but powerful steps** that can resolve or prevent most RealFlight G2 problems. Finally, if these steps don't solve your problem, we'll show you the most effective ways to acquire additional assistance.

HOW TO GET HELP AND INFORMATION

As a RealFlight G2 user, you have access to an incredible amount of information about this product. Much of this information can help you resolve problems, or correctly access and use program features. Here's where you can find it:

- **The manual**. You can solve most common RealFlight problems by following the instructions in later sections of this chapter. Additionally, other manual chapters explain RealFlight G2's features in greater detail.

- **Online Help**. You can access all of this manual's material directly from RealFlight G2's Help menu. This help file is indexed and searchable.

- Visit our product **Knowledge Base** at http://www.gpsoftware.com. This great resource is an indexed, searchable collection of articles that described solutions to almost every known problem with RealFlight, RealRace®, and all our other software products. This is the very same

information database that our product support technicians refer to when assisting customers.

- Visit the Knife Edge Software **Message Boards** at http://www.knifeedge.infopop.net. This is a place where owners of RealFlight, RealRace, and other Knife Edge products post questions, comments and responses. Sometimes our product support technicians, and product developers from Knife Edge, post replies and announcements as well. You may find a thread that discusses the same difficulties that you are experiencing.

- Contact our **Product Support** department by email at mailto:rfsupport@greatplanes.com, by phone or postal mail at:

  RealFlight Product Support
  1610 Interstate Drive
  Champaign, IL 61822
  Voice phone: (217) 398-8970
  FAX phone: (217) 398-7721

  They are specially trained, and have a lot of resources, to help you resolve problems with RealFlight G2.

- Visit the home page of Knife Edge Software, the makers of RealFlight, RealRace and other R/C simulation products, at http://www.knifeedge.com. On this page, you can link to the **Knife Edge Chat Room**, where you can chat live with other RealFlight or RealRace users. Sometimes product developers from Knife Edge hang out here as well. (Please note, however, that due to time, staffing and other constraints we usually cannot provide problem troubleshooting assistance in the chat room.)

BEFORE YOU DO ANYTHING ELSE…

If you are experiencing any difficulties with RealFlight G2, you should always try the steps below first. These steps really do cure most problems our users experience. Even if you aren't having a problem, these same steps often help make RealFlight, and your computer, work better.

Here are the steps you should take (instructions for each step follow):

- Update your video and sound card drivers (see instructions below).

- Update to the latest version of RealFlight G2.

- If the problem persists, run the DirectX test programs.

- If these steps don't work, read on to the next section.

Update Your Drivers

Before you do anything else, you should make sure you have updated your video and sound drivers. A large number of problems encountered by RealFlight users can be cured by updating drivers.

A **driver** is a software program that controls your video or sound card. Each card manufacturer provides drivers for its own cards. To work correctly, RealFlight relies on your video and sound card drivers.

It is very important to use the latest available driver for your card. Card manufacturers *frequently* release updated drivers to fix problems that occur when the driver is used with programs such as RealFlight G2. The driver that came with your new computer, or on your Windows CD, or on a CD included with the new card you bought, may not be the latest version.

If you don't know how to update drivers, you can find instructions in our Knowledge Base article *Q01-1038, How to Update Drivers*, at http://www.gpsoftware.com/kb/q01-1038.htm. This page will take you through the process step-by-step, and has links to driver download sites for most manufacturers.

Update to the Latest Version of RealFlight G2

As we regularly release program updates, the difficulty that you are seeing may already be fixed in an update. Even if you just bought RealFlight, you should update to the latest version.

To update, use the RealFlight control panel (see Appendix B. RealFlight Control Panel *on page 259.*

Run the DirectX Test Programs

If you have updated your drivers and RealFlight to the latest versions, and your problem persists, you should try to run the DirectX samples that come with RealFlight.

The DirectX samples (**Billboard**, **Sound**, etc.) are test programs written by Microsoft. These samples ship with DirectX, and are designed to check whether your DirectX installation, video/sound cards and drivers, etc., are working correctly. They should work on any DirectX 8 compliant driver.

You can run the samples using the RealFlight Control Panel. Open the Control Panel, click "Technical Support," and then look for the "DX Examples" box. Click a button to run a sample program.

The most important sample is **Billboard**, which tests your video card and driver. If you are having *any* graphics difficulty in RealFlight G2 (including RealFlight G2 "freezing" your system so that you have to reboot), look for the same problem in Billboard. If the problem occurs only after you have run RealFlight G2 for a long time, make sure to run **Billboard** for a comparable length of time.

If your RealFlight G2 problem also occurs in **Billboard**, the problem lies with your video driver, not RealFlight G2. To resolve the problem, try finding updated drivers for your card (see above). If the problem still occurs with the latest drivers, you will need to report this problem to the card manufacturer. Be sure to tell them that you tested the card by using **Billboard**. Please note: in rare cases, a newer video driver may have more problems than a previous version. After exhausting all other options, you might try obtaining an older driver from the manufacturer to eliminate this possible cause as well.

If These Steps Don't Work…

If the steps above don't work, please read on to the next section.

IF YOU NEED ADDITIONAL ASSISTANCE…

You've updated drivers, updated RealFlight G2, and your system successfully runs the DirectX sample programs, and you are still having problems. What next?

As a first step, we suggest checking our knowledge base at http://www.gpsoftware.com. This is an easy to use, searchable, browsable database of known problems and solutions for RealFlight, RealRace, and our other software products. This is the same database that our Product Support technicians use when helping customers. So, we are constantly updating the knowledge base to address new problems as we discover them. In many cases you will be able to find an article that gives clear, concise instructions for resolving your difficulty.

You may also want to check the Knife Edge Message Boards at http://www.knifeedge.infopop.net. This is a place where owners of RealFlight, RealRace, and other Knife Edge products post questions, comments and responses about problems. You may find a discussion thread about the problem you are experiencing.

You can also contact Product Support at Great Planes via email at: rfsupport@greatplanes.com

IMPORTANT. If you do contact Product Support, you can help us enormously by providing detailed information about your computer system. Since your problem may only occur on a particular video or sound card, particular driver version, etc., we may need this information to help us diagnose your problem. To get your system information, use the RealFlight Control Panel (from RealFlight G2, select "Online Updates" from the **Help** menu). In the control panel, click the **Technical Support** button, followed by the **Assemble System Information** button. This will create a file called "c:\cpaneloutput.txt", which contains your system information. You can attach this file to an email.

EXAMPLES OF COMMON PROBLEMS AND SOLUTIONS

IF YOU DON'T SEE YOUR PROBLEM IN THIS CHAPTER…

This chapter contains a few examples of common problems and concerns that RealFlight users have experienced.

Remember that we can never provide a complete list of problems and solutions in a program manual. That's because RealFlight--and the computers, cards and drivers it uses--are constantly evolving. As such, we maintain a detailed Knowledge Base at http://www.gpsoftware.com. By keeping our Knowledge Base online, we can provide you with the latest information about resolving problems that RealFlight users are currently experiencing. So, if you don't see your difficulty described in this chapter, please check the Knowledge Base.

In this chapter, we've simply tried to pick a very short list of the most asked about issues.

MY COMPUTER "FREEZES" WHEN I RUN REALFLIGHT, AND I NEED TO REBOOT TO REGAIN CONTROL.

Sometimes, you may also notice sound skipping or repeating, or a computer reboot while flying. To resolve this type of problem, you must update the drivers for your video and sound cards. *This is very important*. Card manufacturers *regularly* update

their drivers to fix this type of problem. Even the driver that came with your new computer may not be the most recent.

Sometimes a card manufacturer will offer a choice between a "recommended" driver, and another driver (variously called "special purpose", "alternate", or "beta" driver). If RealFlight G2 "freezes" with the "recommended" driver, try using the alternate driver instead.

If you are sure you are using the latest drivers, and have followed all the other steps in the previous section (update RealFlight G2, test DirectX) and are still having difficulty with your computer locking up while running RealFlight, please contact Great Planes Technical Support.

IMPROVING REALFLIGHT G2 PERFORMANCE

During installation, RealFlight G2 analyzes your computer's hardware specifications. RealFlight G2 then tries to optimize its configuration to best take advantage of that hardware, and achieve the best possible performance.

However, if the performance is less than you'd expect, you can adjust some of RealFlight G2's settings to improve the simulation speed and frame rate:

- Ensure that the drivers for the video and sound cards are up-to-date.

- Turn off all other programs, especially virus checkers and network applications (such as Instant Messengers) while running RealFlight G2. Use CTRL-ALT-DELETE to ensure that nothing else is running in the background.

- Run the simulation in **Full Screen** Mode (in the **Options** menu, uncheck the **Run in Window** option). Alternatively, if you are running in Window Mode (**Run in Window** option is checked), alter the screen resolution from 32-bit to 16-bit color. Also, decrease the size of the RealFlight window.

- Reduce the texture quality. This can have a profound effect on cards that do not have a high texture memory. You can adjust texture quality on the Graphics Optimization page (*See "Graphics Optimizations" on page 103*)

- Use Photofield rather than the 3D Terrain option. In the **Airport** menu, uncheck the **3D Terrains** item (if the item is not checked, you are already using Photofield). Or, if you don't want to use Photofield, decrease the terrain density using the **Graphics Optimizations** page (*See "Graphics Optimizations" on page 103*)

- Eliminate the **Airport Objects Shadow** using the **Graphics Optimizations** page (*See "Graphics Optimizations" on page 103*)

- Eliminate the **Detail Textures** using the **Graphics Optimizations** page (*See "Graphics Optimizations" on page 103*)

- Reduce the number of open Gadgets. Click the "X" on each Gadget that you wish to close.

- Eliminate the Smoke/Exhaust options. Press the '`' (Accent) key on the keyboard.

- Disable the trees. In the **Airport** menu, uncheck the **Show Trees** option (this will make all trees and foliage disappear from your flying field). *(See "Show Trees" on page 68)*

- Reduce the number of recordings that are currently in use.

- Eliminate collisions. Uncheck **Enable Collisions** in the **Options** menu. (If the **Enable Collisions** item is not checked, collisions were not previously active.) *(See "Enable Collisions" on page 106)*

MY AIRCRAFT SINKS INTO THE GROUND WHEN I LAND.

This problem is generally a result of increasing the visual scale of your aircraft, without making similar changes to the physics parameters (such as the landing gear position). The landing gear is still set for a normal (scale 1.0) size airplane.

You can resolve this issue adjusting the landing gear (or skid) position yourself, to correspond to the new aircraft size. In the **Aircraft** menu, select **Edit (aircraft name)...** to open the editor. Then (for planes) click on the **Fuselage** tab. Then, input new landing gear positions/dimensions. You may have to experiment to get just the right position. On the various pages of the plane editor, you can also adjust other physics parameters (wingspan, fuselage length, etc.) to more closely match the flight characteristics of a larger scale model.

If you are using helis, there are similar adjustments for the skid positions.

OTHER COMMON PROBLEMS

Here are some other things you may want to keep an eye out for.

- Check the CD for scratches or blemishes. Even minor scratches or fingerprints can cause random problems that appear to be program bugs.

- Make sure your hard drive has at least 30MB of space available. To check this:

  1. Double click on the "My Computer" icon on your desktop;

  2. Right click on your main hard drive (usually drive "C:");

  3. When a popup menu appears, select "Properties";

  4. In the dialog that appears, view the amount of space available on the drive.

  If you need additional space, try emptying the Recycle Bin.

- Ensure that all other programs are closed prior to starting RealFlight. RealFlight works best when it is the only program running.

- If all else fails, try rebooting your computer. Occasionally, Windows (particularly 98 and ME) may become unstable after continuous use. A simple reboot may clear up any difficulties.

- Ensure that your computer is running in at least 16-bit color resolution. You can verify this by right clicking on the Windows desktop and selecting "Properties". Then, click on the "Settings" tab and check the color palette box.

GLOSSARY OF TERMS

3D Acceleration

3D operations require huge amounts of calculations. Modern video cards offload many of these calculations to the card, rather than performing the calculations directly on your computer's CPU. This speeds up the simulation and allows for faster frame rates, thereby increasing the realism of the simulation.

Active View

The *Active View* is the view that all commands in the View menu act on. Only one view at a time is active. You can make a view active by clicking on it with the mouse. When you want to control a view's properties, you must first make it the *Active View*.

Advanced NavGuides

A gadget that displays continuously updated information about your aircraft. The *Advanced NavGuides* gadget is more customizable than the NavGuides gadget.

AFR

Advanced Flight Recorder. A feature of RealFlight G2 that allows the pilot to not only view prerecorded maneuvers, but also to record their own maneuvers as well. During the playback of maneuvers, the pilot has the ability to select from a number of different options such as fast forwarding, rewinding, looping, speeding up and slowing down the recordings. These recordings may also be sent to others via the Internet. The pilot can also activate an onscreen transmitter to watch the stick inputs for each prerecorded maneuver.

Aileron

Hinged control surfaces located on the trailing edge of the wing, one on each side, which provide control of the airplane about the roll axis. The control direction is often confusing to first time modelers. For a right roll or turn, the right hand aileron is moved upward and the left hand *aileron* downward, and vice versa for a left roll or turn.

Airfoil

This is the cross-section shape of a surface (e.g., wing) that produces lift. *Airfoils* usually have some sort of a "tear drop" shape.

Arm

This is defined as the distance from the point of attachment to the weight.

ATE

ATE is the abbreviation for the term *Advanced Terrain Editor*. The ability to adjust the flying site in virtually any manner desired. The pilot can add trees, selecting the type, size and color; add, move, size and orient buildings, walls and other scenery objects; position and orient the runway; even choose the amount and type of lighting at the flying site.

Auto-Play

Automatically detects when a CD-ROM is inserted and runs the specific program on the CD-ROM.

Autorotation

A maneuver in which the heli is landed without power. The momentum of the blades is enough to slow the heli prior to landing.

Autorotation Event

An event where players attempt to autorotate into a target (similar to Spot Landing). Each player takes a turn. Players collect different point amounts based on landing location. The *Autorotation Event* (also called a Deadstick Landing event) works for helicopters only.

Bilinear Textures

Smoothes textured pixels together. This can cause a blurry appearance but can also improve the overall appearance.

CG

CG is the abbreviation for the phrase *Center Of Gravity*. This is the point at which the airplane balances fore to aft, and side-to-side. The location of this point is crucial to how the airplane reacts in the air. A tail-heavy plane will be very snappy, but generally unstable and susceptible to more frequent stalls. Conversely, a nose-heavy airplane will tend to track better and be less sensitive to control inputs, but will generally drop its nose when the throttle is reduced to idle. This makes the plane more difficult to land, since it takes more effort to hold the nose up. A nose heavy airplane will have to come in faster to land safely.

Collective

A mechanism on a helicopter that changes the pitch of the main blades, thereby allowing the helicopter to ascend or descend accordingly. This is the control that adjusts the pitch of the rotor blades.

Collision Detection

RealFlight G2 allows the pilot to activate *Collision Detection* for all of the objects. If activated, collision detection senses when an aircraft "bumps" into an object, and causes a crash.

Coning

When a helicopter hovers, the blades form a slight "cone" when viewed from the side. The *Coning* effect is caused by the balance between lift and centrifugal forces on the blades.

Control Panel

The RealFlight G2 *Control Panel* is useful for many aspects of the G2 program. For details on the purpose and functionality of the *Control Panel*, *See "*Appendix B. RealFlight Control Panel*" on page 259.*

Control Surface

Generally defined as the portion of the wing that moves. This is usually the ailerons, elevator, rudder, flaps or spoilers.

Controller

A device used to control an aircraft in RealFlight G2. Currently, all new versions of RealFlight G2 ship with Great Planes's USB InterLink Controller by Futaba. This device can either be used as a standalone controller, or as an interface to use your own R/C transmitter to control RealFlight. Previous versions of RealFlight shipped with either a Futaba game port controller, or a Transmitter Adapter Interface. For information on the latter two controllers, please see the manuals that came on the program CD with those versions of RealFlight.

Cyclic

Refers to the changing of a main rotor blade's pitch as the rotor head rotates. Pitch is added while the blade is pointing in one direction (e.g. while the blade is over the canopy), and removed while the blade is pointing the the opposite direction (e.g. while the blade is over the tail boom). This causes the helicopter to pitch and roll.

Deadstick Landing Event

See Autorotation Event.

Dihedral

The V-shaped bend in the wing. Typically, more *Dihedral* causes more aerodynamic stability in an airplane, and causes the rudder to control both the roll and yaw axis. This is why some trainers and sailplanes require only 3 channels of radio control (i.e., have no ailerons).

Direct Control Interface

This is using your own radio to completely control the aircraft. This usually means you have a separate radio program on your radio for each aircraft that you want to fly with this method. All mixing and radio functions are performed on your radio and RealFlight simply passes the values directly to the aircraft servos. This is in contrast to the Joystick Emulation Interface.

Direct3D Technology

Used to render the 3D image when you have an accelerated graphics card. It works best on faster computers.

DirectX

A technology created by Microsoft that controls graphics and sound operations.

Dithering

Blends the pixels together to produce a smoother image. This can also simulate colors that may not be available to you.

Down Thrust

This is the downward angle of the engine in relationship to the centerline of the airplane. *Down Thrust* helps overcome the normal climbing tendency of flat bottom wings.

Driver

A software program that controls a card (e.g., video or sound card) in your computer. The card's manufacturer usually provides its *Driver* as well. Manufacturers frequently update their *Drivers* to fix bugs, or make their cards compatible with new software and hardware. You can often find an updated driver for your video or sound card by visiting the web site of the card's manufacturer, and following links to "Drivers," "Support," "Downloads", or "Upgrades."

Elevator

Hinged control surface located at the trailing edge of the horizontal stabilizer, which provides control of the airplane about the pitch axis and causes the airplane to climb or dive. The correct direction of control is to pull the transmitter *Elevator* control stick back, toward the bottom of the transmitter, to move the *Elevator* upward, which causes the airplane to climb, and vice versa to dive.

Event

An organized flying contest with a set of rules. RealFlight Generation 2 currently supports five types of *Events*: Limbo, Spot Landing, Pylon Racing, Autorotation/Deadstick and Freestyle. You can play *Events* by yourself or with other RealFlight users over the Internet. You can start an *Event* using the "*Event*" menu.

Exponential

A feature commonly found on computer radios that desensitizes the servo when the sticks are close to the neutral position. The further the stick movement, the faster the controls.

Flap

For Airplanes: Hinged control surface located at the trailing edge of the wing inboard of the ailerons. The *Flap*s are lowered to produce more aerodynamic lift from the wing, allowing a slower takeoff and landing speed. *Flaps* are often found on scale models, but usually not on basic trainers.

For Helicopters: Flapping is an up-and-down motion of the main rotor blade's tip. With a "dual-damped" head (as used in the Kyosho Concept helicopters, for example) both blades are able to *Flap* independently. With "solid axle" heads (as used in the Hirobo Shuttle helicopters, among others), moving one blade up causes the other to move down.

Flapping Head

This describes a type of rotor head in which the two blades are not connected directly. Each blade is independent of the other, usually resulting in a helicopter with smoother performance.

Flight Playback Gadget

A gadget that lets you control playback of flight recordings using mouse actions.

Flight Recording Gadget

A gadget that lets you make flight recordings using mouse actions.

Flybar Paddles

These are the short blades on the end of the flybar. Available in a variety of weights and airfoils, these paddles assist the main blades.

Frame Rate

Frame Rate is the number of times per second that RealFlight creates a different picture to display on your monitor. *Frame rate* is determined by the speed of your CPU and graphics card, and how many RealFlight options you turn on. This is not the same as refresh rate, which is the number of times per second that your monitor retraces an image on its screen.

Freestyle Event

An event where players decide on the rules. RealFlight G2 sees that each player gets a turn; it is the players' responsibility to judge the competition. Use this event when you have devised a group activity that requires every player to take a turn.

Fuselage

This is the main part of the airplane that holds the wings and engine. Often thought of as the "body" of the airplane. This term is also used to refer to a "body" that might be used on helicopters.

Futaba

Maker of quality R/C products, including the USB InterLink controller that is shipped with RealFlight G2.

Gadget

An onscreen display that shows you continuously updated information about your aircraft, or lets you control RealFlight features using mouse clicks.

Governor

This is a device that is used to maintain a constant RPM (head speed). Generally used in helicopters rather than airplanes.

Group

A collection of scenery objects or foliage objects in your airport. Every object in the airfield must belong to one *Group*. You can place all your airport's scenery objects in a single *Group*, or create multiple *Groups* to place objects in categories with related objects.

Gyro

A device, most commonly used in helicopters, that aids in controlling the yawing action of the helicopter by automatically adjusting the deflection of the tail rotor blades.

HAL Device

A hardware-accelerated 3D video card driver. "*HAL*" is an abbreviation for the phrase "Hardware Abstraction Layer" that uses software drivers to communicate between RealFlight's software and the hardware of the PC.

Host

In RealFlight G2, every multiplayer session requires one player to serve as Host. The *Host* starts the session, and then the other players join. Other players can leave the session whenever they want, but only the host can terminate the entire session. The

host must start any multiplayer event (Limbo, Spot Landing, Pylon Racing, Autorotation, Freestyle).

Hot Pluggable/Hot Swappable

A device is said to be *Hot Pluggable* or *Hot Swappable* when you can safely connect or disconnect it without turning off your computer or rebooting.

Hub

The centralized mechanical device used to attach the main rotor blades and paddles.

Interface Mode

With RealFlight G2 set to *Interface Mode*, you are using the InterLink controller as an interface to your own R/C radio. In *Interface Mode* your own radio controls RealFlight G2. Conversely, in Joystick Mode RealFlight G2 is controlled by the InterLink Controller used as a mockup of a R/C transmitter.

Interface Wizard

When you use your own transmitter to control RealFlight, you must tell RealFlight which channels your transmitter uses for various control functions. The *Interface Wizard* is a sequence of dialogs that guides you through this process.

InterLink Controller

Great Planes's USB *InterLink Controller* by Futaba is a USB device shipped with all new versions of RealFlight G2. The *InterLink Controller* can either be used as a standalone "mockup" R/C controller, or as an interface for using your own R/C transmitter to control RealFlight.

IP Address

Whenever your computer is connected to the Internet, it has an *IP* address. This number is a string of digits and periods, and looks something like "123.43.6.78". The *IP* address is like an Internet "zip code" that tells other computers where to look for your computer. Depending on your Internet connection, your *IP* address may always be the same, or may change each time you connect to the Internet. For other RealFlight G2 users to join your Multiplayer session, they must obtain your *IP* address. You can either provide it to them directly, or post it through the RealFlight list server.

Joystick

A device that connects to your computer, and is used to control the simulated aircraft. The InterLink Controller that comes with RealFlight G2 is considered a *Joystick*.

Joystick Emulation Interface

This is using your own radio to emulate the Interlink Joystick. This allows you to use your own radio to fly any of the stock aircraft in RealFlight. Actual radio functions such as mixing and ATVs are performed in the RealFlight software, not on your radio. This is in contrast to the Direct Control Interface.

Joystick Mode

With RealFlight G2 set to this mode, RealFlight G2 is controlled by the InterLink Controller used as a mockup of a R/C transmitter. Conversely, Interface Mode means that you are using the InterLink controller as an interface to your own R/C radio. In interface mode your own radio controls RealFlight G2.

Lead Lag

The hinge point where the blade attaches to the hub. This allows the blade to move forward and backward at certain times during the blades rotation.

Limbo

An event (flying competition) in which pilots take turns flying their aircraft under a *Limbo* bar.

List Server

A publicly available list of open RealFlight(r) multiplayer sessions. We currently offer a free, public list server for use by RealFlight(r) owners. This service may be modified or discontinued without notice.

List Server

RealFlight G2's Multiplayer function lets you publicly "post" your session, so that any RealFlight G2 user, anywhere in the world, can find out about your session and join you (assuming you have not reached the enrollment limit of your session). The place where you post is called a *List Server*. Use of the *List Server* is completely optional. You can preserve privacy by not posting your session, and privately communicating your IP address to your selected multiplayer partners.

Low Rates

A switch on the radio that causes the servos move to much smaller extremes, thus making the model respond more slowly.

Multiplayer

A feature of Microsoft's DirectX technology that allows you to connect with other RealFlight G2 users over a network.

Multiplayer Session

A network connection between RealFlight G2 users that allows each user to fly in the same "virtual world," and allows all participants to see and interact with each other's aircraft.

NavGuides

A gadget that displays basic, continuously updated, information about your aircraft.

Photofield

A technology that creates a flying field by using a panoramic photograph as a background for a flat terrain. RealFlight G2 offers you a choice of two display styles for airports: *Photofield* or 3D Terrains. 3D Terrains are more realistic, but *Photofield* may render more quickly if you have an older, slower computer or graphics card.

Pirouette

The yawing action of a helicopter that looks much like an ice skater. One *Pirouette* is equal to one 360-degree rotation.

Pitch Axis

The airplane axis controlled by the elevator. Pitch is illustrated by holding the airplane at each wingtip. Raising or lowering the nose is the pitch movement. This is how the climb or dive is controlled.

Plumb String

When you measure your aircraft for RealFlight, some measurements require that you have a reference line running straight up and down. To make such a line, we tie a weight to the free end of a string, and let the weight dangle. Because the string is then "plumb" (oriented straight up and down), we call it a "*Plumb String*". A Plumb String is particularly useful in measuring an aircraft's center of gravity.

Private Session

A multiplayer session that is not published on our list server. For a private session, the host must distribute his/her IP address to each participant, who must manually enter this information to join.

Propeller

Props are generally designated by two numbers (for instance, "10 – 6"). The first number is the prop's length (10" in the example). The second number is the pitch or angle of the blades. (In the example, "6" represents the distance the *Propeller* will move forward in one revolution, in this case 6".)

Public Session

A multiplayer session that is published on a list server.

Pylon Racing

An event (flying competition) in which pilots take turns flying their aircraft around a closed course. Pylons mark the course perimeter. The pilot that finishes the course first wins.

RAM

Random Access Memory

RAMP

A software-only rendering technology that is usually faster than RGB. Please note: although it renders faster, it does so at the expense of quality.

RealFlight G2

This is the next generation R/C Flight Simulator produced by Great Planes.

RealPhysics

This is RealFlight's exclusive physics modeling technology. *RealPhysics* authentically replicates the actual physics of model aircraft by calculating hundreds of thousands of floating point operations each second while delivering sizzling real time performance.

Refresh Rate

The number of times per second that your monitor retraces an image on its screen. This is different from the Frame Rate.

Resolution

When used in the context of screen *Resolution*, this term describes the picture quality of the screen. Lower *Resolutions* will produce an image that is not as sharp as higher *Resolutions*.

Roll Axis

The airplane axis controlled by the ailerons. Roll is illustrated by holding the airplane by the nose and tail. Dropping either wingtip is the roll movement. Roll is used to bank or turn the airplane. In most airplanes, the ailerons control roll. However, when the main wing has dihedral, the plane can be banked using the rudder only. Consequently, many planes with wing dihedral do not have ailerons, and the rudder controls both roll and yaw. This is one reason why most trainer aircraft have a large amount of dihedral—a plane with large dihedral can be controlled using fewer input channels.

Rudder

Hinged control surface located at the trailing edge of the vertical stabilizer, which provides control of the airplane about the Yaw axis (causes the airplane to Yaw left

or right). Left *Rudder* movement causes the airplane to Yaw left, and right *Rudder* movement causes it to Yaw right.

Servo

The electromechanical device that moves the control surfaces or throttle of the airplane according to commands from the receiver. This device does the physical work inside the aircraft.

Session

See "Multiplayer Session."

Sound Card

A card inside your computer that controls audio (what you hear over your computer speakers). Most sound cards plug into your computer's motherboard. You can upgrade your sound card (or the software driver that controls it) without getting a new computer.

Specular Highlights

A graphics rendering technique that makes surfaces (e.g., MonoKote™) appear reflective, or "shiny", in direct light (e.g., sunlight).

Spot Landing

An event (flying competition) in which pilots take turns trying to touch their aircraft down within a small, marked landing area. Each pilot receives a score based on touch down location. The pilot with the highest score wins the event.

Stall

This is what happens when an airplane's angle of attack is too great to generate lift, regardless of airspeed. During a S*tall*, the plane will dive and rapidly lose altitude. Every airfoil has an angle of attack at which it generates maximum lift. The airfoil will *Stall* beyond this angle.

Swash Plate

The mechanism in a helicopter rotor that turns non-rotating control movements into rotating control movements.

Throttle Hold

This is used to keep the throttle at a set position, yet allows input to the collective of the helicopter. Generally it is used to practice autorotation.

Tooltip

A yellow popup window that appears when you hold the mouse cursor over a RealFlight G2 menu item or dialog item. The text in the *Tooltip* window describes the item's function.

Trees

Some elements of a RealFlight G2 landscape are inserted and removed using the Tree editor page of the Advanced Terrain Editor. These include trees, bushes, people and animals.

USB

USB, or *Universal Serial Bus*, is a connection protocol for computer peripheral devices (like Great Planes's *USB* InterLink Controller by Futaba). *USB* technology allows you to connect multiple devices to your computer, and supports high data transfer rates and hot swappable. *USB* devices have a special connector that only fits into a *USB* port. Most modern personal computers have *USB* ports, which are usually clearly labeled.

Video Card

A card inside your computer that produces the images on your video monitor. Most modern 3D video cards have accelerated 3D operations—that is, they perform numerical calculations for rendering a 3D scene, to free up your computer's CPU to perform other tasks. The video card plugs into your computer's motherboard. You can upgrade your video card (or the software driver that controls it) without replacing your computer.

Viewport

A picture-in-picture display inset within the RealFlight main display. Each *Viewport* is independently adjustable and serves as its own unique "window on the world". The number of *Viewports* that may be created are totally dependent upon the power of your processor.

Virtual Flight Instructor

This RealFlight G2 feature lets you choose from a variety of prerecorded maneuver training lessons. The maneuver is then demonstrated on screen, along with the instructor's voice and control stick movements. You can speed up, slow down and even loop the maneuver playback for training purposes.

VirtualRevolution

This is the exclusive sound technology used by RealFlight G2. As with the original RealFlight programs, the sounds are Doppler-correct, however, if the user's sound card supports it, surround sound is also available.

Washout

An intentional twist in the wing, causing the wing tips to have a lower angle of attack than the wing root. In other words, the trailing edge is higher than the leading edge at the wing tips. *Washout* helps prevent tip stalls.

Wing Loading

This is the amount of weight per square foot that has to be overcome to provide lift. It is normally expressed in ounces per square foot. This specification can be easily calculated as follows: If you know the square inches of the wing, simply divide by 144 to obtain square feet. Divide the total weight (in ounces) of the airplane by the wing area (in square feet). This information is valuable when deciding on which airplane to build next. Planes with high wing loading numbers must fly faster to stay in the air. These are generally "performance" airplanes. Conversely, planes with lower numbers do not need as much air flowing around the wing to keep it flying. Gliders and trainer airplanes fall into this category because slow, efficient flight is desirable.

Yaw Axis

The airplane axis controlled by the rudder. Yaw is illustrated by hanging the airplane level by a wire located at the center of gravity. Left or right movement of the nose is the Yaw movement.

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