



 **REALFLIGHT**[®]
R/C SIMULATOR
WITH **USB INTERLINK**[™]
CONTROLLER

 **GENERATION 2**
GP
LITE[™]

*Includes instructions for
RealFlight Generation 2 Lite with USB InterLink Controller.*

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CHAPTER 1. AN INTRODUCTION TO REALFLIGHT® G2 LITE

INTRODUCTION

Welcome to the RealFlight Generation 2 Lite R/C Simulator. RealFlight G2 Lite 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 Lite is the ideal way to learn to fly, practice maneuvers, or just have an incredible amount of fun.

RealFlight G2 Lite 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 the 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 RealFlight G2 Lite.

WHAT'S NEW IN REALFLIGHT LITE WITH USB INTERLINK™ CONTROLLER

This section briefly outlines some of the features included in RealFlight G2 Lite with the USB InterLink controller. RealFlight G2 Lite 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 this material in complete detail.

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 Lite.
- A built-in interface for (optionally) using your own R/C transmitter for controlling RealFlight G2 Lite (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 Lite).
- Higher speed response to control inputs.
- Digitally precise inputs for unmatched control precision.

MENU-DRIVEN INTERFACE

Upon starting G2 Lite, the first thing that you are likely to notice is the user interface. RealFlight G2 Lite 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 Lite 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 Lite menus.)

ADDITIONAL FEATURES

- Incredibly realistic airplane and scenery graphics, using detailed, 24-bit textures.
- RealFlight G2 Lite’s Virtual Flight Instructor™ feature gives you personal flying lessons from two R/C experts. These pros will help you learn and perfect maneuvers.
- On-screen **Gadgets** let you view continuously updated aircraft data, with a simple click of the mouse.
- Full collision detection. If you hit a building, your aircraft crashes.
- Aircraft have visible exhaust.
- All aircraft feature moving control surfaces and retracts that visibly move (if applicable).
- G2 Lite’s 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 features in G2 Lite. 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 G2 Lite, 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 Lite should be installed. Meeting the minimum requirements will allow you to still enjoy the simulator; however, in order to take complete advantage of the many features and functions offered by RealFlight G2 Lite, you should have a computer at, or above, 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) or higher 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

VIDEO AND SOUND CARDS

In order to achieve optimum performance and the ultimate satisfaction from RealFlight G2 Lite, there are two important components of your computer that deserve special attention: the video and sound cards.

While RealFlight G2 Lite 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 G2 Lite. Aside from increasing your satisfaction with G2 Lite, a new video card will also work with many other games, simulators, or other such applications, improving their performance as well.

While not as important as a video card, upgrading your sound card may also improve your satisfaction with RealFlight G2 Lite. 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 G2 LITE

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 G2 Lite 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 Lite, describes the basics in running the program, and will introduce you to some of RealFlight G2 Lite's most often used features.

The first section, *Installing RealFlight G2 Lite*, offers a step-by-step approach to the installation procedure for both the program software and the controller.

The second section, *Exploring RealFlight G2 Lite*, offers a brief tour of the RealFlight G2 Lite 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, and using RealFlight G2 Lite's Virtual Flight Instructor™ feature.

This chapter only touches on some of RealFlight G2 Lite'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 LITE

RealFlight G2 Lite 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 Lite. Alternatively, it has a built-in interface that lets you use your own R/C transmitter to control RealFlight G2 Lite.



The USB InterLink controller

To install RealFlight G2 Lite 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 G2 Lite, you should first follow the instructions in “*Program Installation*” on page 6.

If you will be using your own R/C transmitter to control RealFlight G2 Lite (using the InterLink controller’s built-in adapter), follow the installation instructions in “*Using Your Own R/C Radio to Control RealFlight (Optional)*” on page 8. If you do not plan on using your own R/C radio to control RealFlight G2 Lite, you can skip that section.

PROGRAM INSTALLATION

This section will explain how to install the RealFlight G2 Lite 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 Lite. To do this, you will first need to follow the instructions in this section. *Then, follow the directions in the section entitled “Using Your Own R/C Radio to Control RealFlight (Optional)” on page 8.*

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 G2 Lite, 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.gpssoftware.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 Lite. First, turn your computer "on" and close any applications you are running. Next, insert the RealFlight G2 Lite CD-ROM into the CD-ROM drive. If auto-play is active, the RealFlight G2 Lite Control Panel will appear. Click the **Install RealFlight G2 Lite 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 G2 Lite 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. When entering the serial numbers, please make sure that you include all dashes, letters, etc. as found on the product serial numbers. Failure to enter the serial numbers correctly will not allow you to proceed to the next step.

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



Please note, 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 G2 LITE

To complete the installation and start the program, click on the RealFlight G2 Lite icon located on the desktop. RealFlight G2 Lite 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 Lite, 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 Lite*” on page 9, which will walk you through the basics of using the RealFlight G2 Lite 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 Lite. 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 6.

CONNECT YOUR TRANSMITTER

You can use your R/C transmitter to control RealFlight G2 Lite by connecting it to the InterLink controller, “buddy box” style (see diagrams). RealFlight G2 Lite 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 Lite (see left panel of the diagram above).
- Some radios (e.g., Airtronics®) require an optional adapter cable, which is not included with RealFlight G2 Lite. This optional adapter cable is available wherever you purchased RealFlight G2 Lite.

SETUP

After you have connected your transmitter, you will need to perform a setup procedure before you can proceed. *For more details, see "The InterLink Controller (Interface Mode)" on page 29.*

Once you have a controller set up (either the InterLink mockup controller or your own transmitter), you're ready to start using RealFlight Lite. *You can now proceed to "Exploring RealFlight G2 Lite" on page 9, which will walk you through the basics of using RealFlight G2 Lite.*

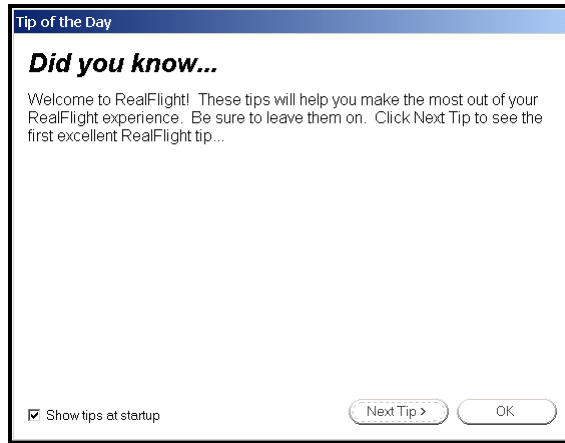
EXPLORING REALFLIGHT G2 LITE

Now that you've installed G2 Lite, it's time to begin exploring the program. The following sections will take you on a quick tour of RealFlight G2 Lite's most popular features, such as selecting an aircraft to fly, changing flying fields, using RealFlight Lite's Virtual Flight Instructor™, etc. Along the way, we'll show you where to go for help, or how to obtain additional information.

START THE PROGRAM

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

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 G2 Lite that will enhance your enjoyment of the program.



Normally, you will see a new tip each time you start RealFlight G2 Lite. 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 Lite’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 G2 Lite 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 G2 LITE MAIN DISPLAY

When you first run RealFlight G2 Lite, 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 Lite main window just as you would any other application.

You interact with G2 Lite using the menus in the main window's menu bar:

- **Airport**
- **Aircraft**
- **Options**
- **View**
- **Help**

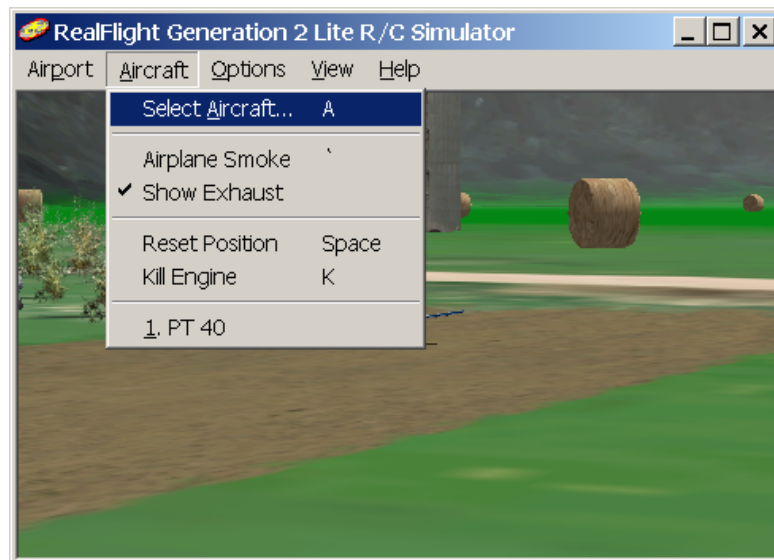
If RealFlight G2 Lite has started, but you don't see any window borders or menus, you may be running in **full screen mode**. "**Full screen mode**" means that the RealFlight G2 Lite main display will take up your entire monitor screen. If this is the case, you can access the menus by hitting your keyboard's "ALT" key or, alternatively, the "ESC" key. *For additional information about **window mode** and **full screen mode**, see "Run in Window" on page 54.*

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 G2 Lite user interface:

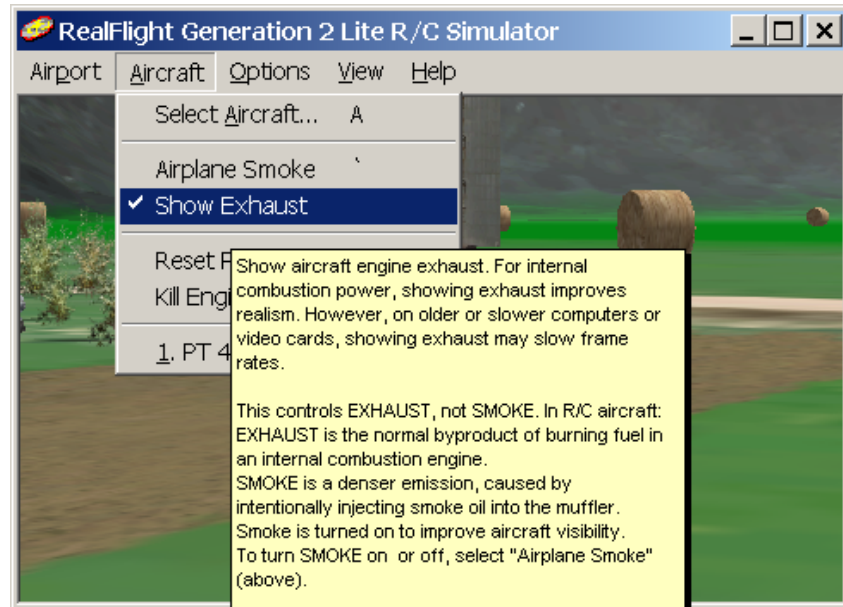
- How to navigate the menus and find out what the different commands do; and
- How to perform some of the most common tasks-- selecting aircraft and flying field, etc.

Menus, Tooltips, and Diagrams

Menus allow you to access RealFlight G2 Lite 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 **Show Exhaust...** item in the **Aircraft** menu, this is what you would see:



Dialog Tool Tips

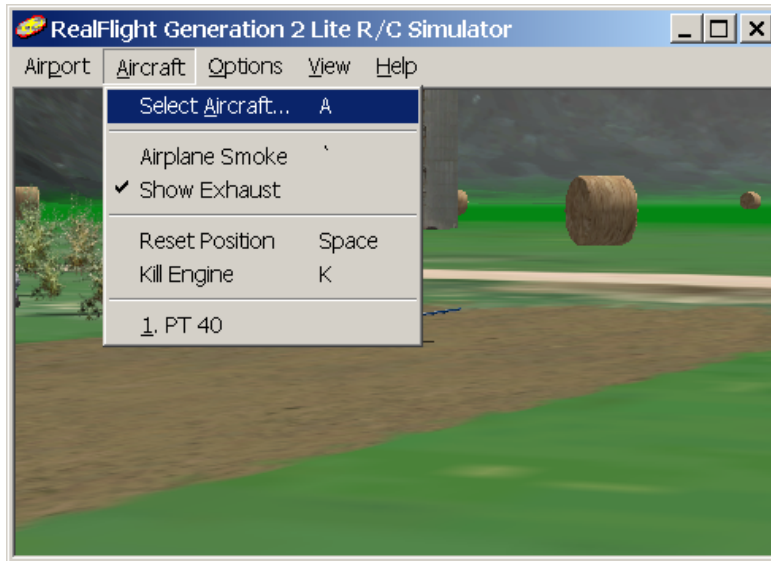
Tooltips also work for RealFlight G2 Lite dialogs as well. If you see a RealFlight G2 Lite dialog, and want to know what a control (button, checkbox, etc.) in that dialog does, simply place the mouse cursor over the item until a tooltip window appears. For example:

When to use the Interface Wizard, and when to use the Software Radio or Servo page

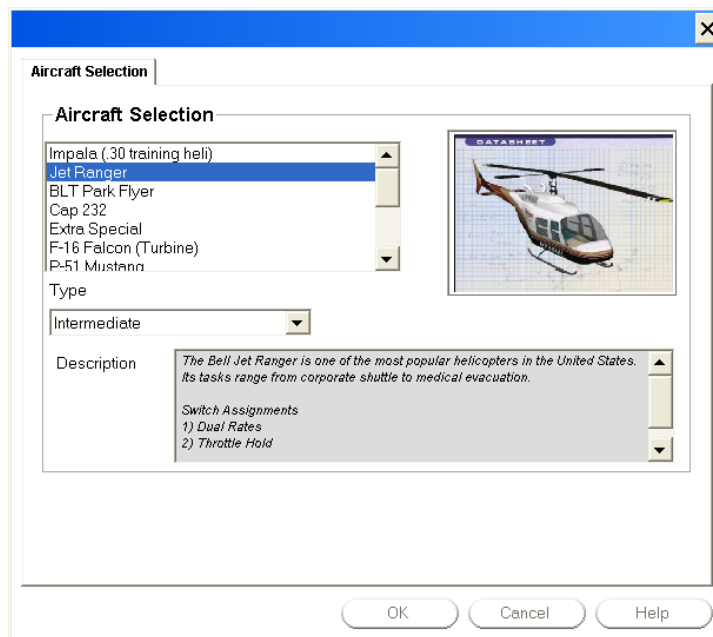
CHOOSING YOUR AIRCRAFT

When you first start RealFlight G2 Lite, 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 a Jet Ranger, scroll the list to find the Jet Ranger, and select it by clicking on the listing.

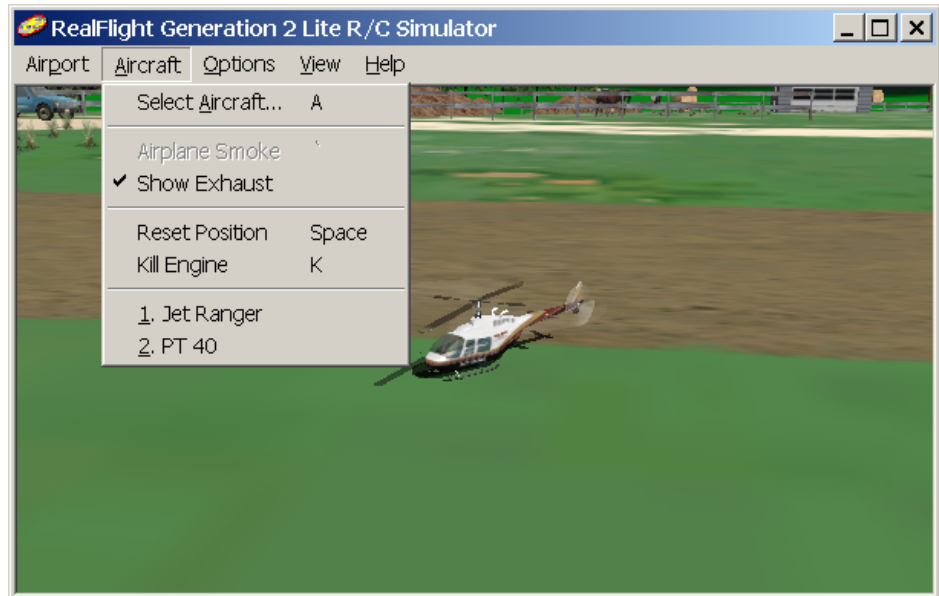
The list contains every plane and helicopter available to you. Whenever you select an aircraft, a picture of that aircraft appears in the preview panel to the right.

This dialog will also allow you to select a skill level that will affect how responsive the aircraft is during flight. Furthermore, the **Beginner** setting will graphically scale the aircraft to make it easier to see.

After you have finished selecting a new aircraft and skill level, click “OK.” The **Aircraft Selection** dialog will disappear, and you will return to the RealFlight G2 Lite main window, with your new aircraft loaded.

Most Recently Used Lists

RealFlight G2 Lite has two 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 (Jet Ranger) 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:

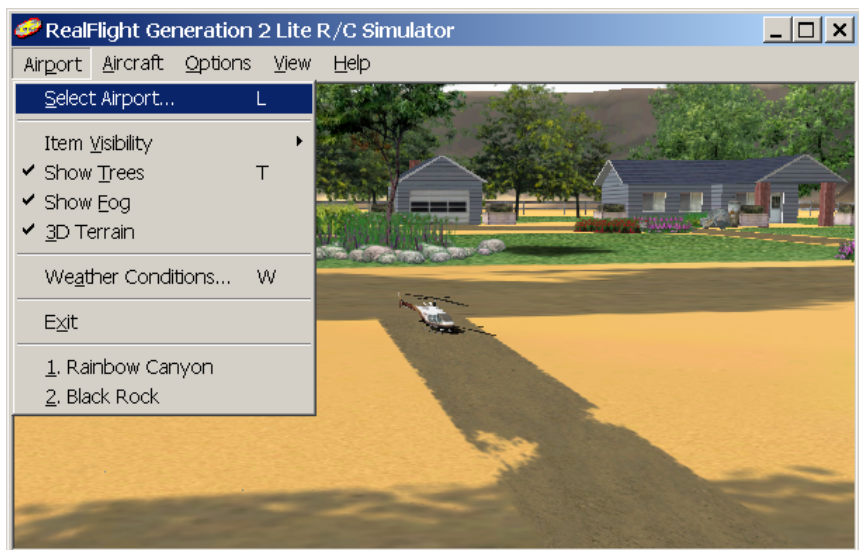


Select the airport you want from the list at the top of the box. For example, to switch from **Black Rock** to **Rainbow Canyon**:

- Select **Rainbow Canyon** from the list; and
- Click **OK**

RealFlight G2 Lite 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 Black Rock, 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.

THE 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.

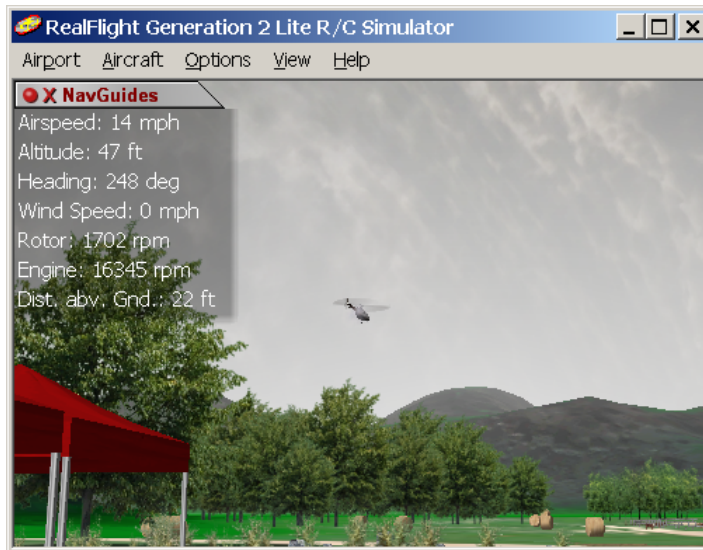


USING GADGETS

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 G2 Lite'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:



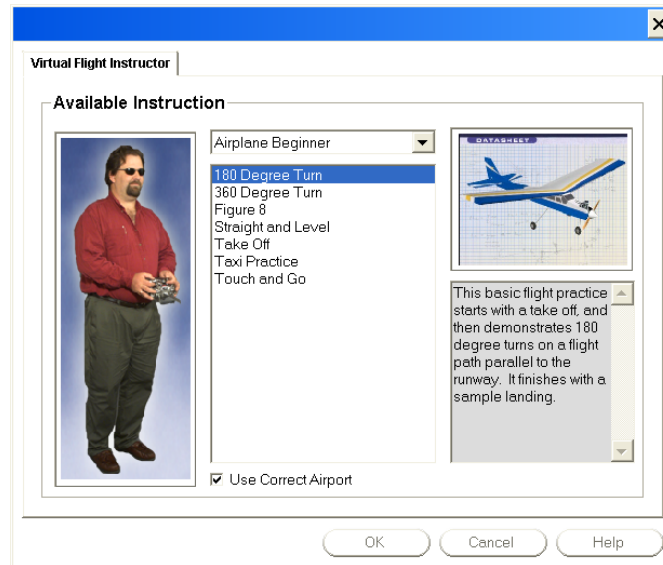
Like viewports, it is possible to:

- close the gadget by clicking the red "X" on the gadget's title tab;
- move the gadget by dragging its title tab;

VIRTUAL FLIGHT INSTRUCTOR™

RealFlight G2 Lite'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 G2 Lite 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 aircraft next to the instructor’s! This allows you to mimic the inputs and aircraft reaction simultaneously.

To watch the instructor fly, close the binocular view if it is open, prior to starting the lesson. Close a viewport by clicking the red “X” in the viewport title tab. The main window will show the instructor’s aircraft. The onscreen radio will show the instructor’s 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.

WHERE TO GO FROM HERE

The examples in this chapter only scratch the surface of RealFlight G2 Lite’s capabilities. We encourage you to explore RealFlight G2 Lite 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 G2 Lite 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 G2 Lite to do something, but can't find an appropriate command, check this manual's index.
- Use the Help facilities in RealFlight G2 Lite's **Help** menu.
- Talk to other RealFlight G2 Lite users. When you visit <http://www.knifeedge.com>, check out our chat room and discussion board.

CHAPTER 4. USING REALFLIGHT G2 LITE

INTRODUCTION

Chapter 3 took you on a brief tour of some of RealFlight G2 Lite's most popular features. This chapter will provide you with a broad overview of all RealFlight G2 Lite features, and advise you how and where to find detailed information about the features that most interest you.

PROGRAM FEATURES

SUMMARY OF FEATURES

- **Graphics technology** – RealFlight G2 Lite takes complete advantage of today's state-of-the-art 3D accelerated video cards, providing the smoothest and most realistic flight experience possible. RealFlight G2 Lite 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 G2 Lite includes numerous CD-quality soundtracks in a variety of musical styles and original compositions.
- **RotoSonic™** 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 G2 Lite's RealPhysics™ technology performs hundreds of

thousands of floating point operations each second. RealPhysics delivering sizzling real time flight performance and accuracy.

- **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 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.
- **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**- Options range from altitude and airspeed, to engine rpm. While you can't do this with a real R/C aircraft, this feature improves your ability to "see" what is going on in your virtual world.
- **Binocular View**- You can open up a picture-in-picture display that displays the unaltered orientation of the aircraft.
- **Control Panel**-- RealFlight G2 Lite'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.
- **Extensive Help materials**-- RealFlight G2 Lite 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 Lite 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.

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 G2 Lite 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-- 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.
- RotoSonic 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.

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

AIRCRAFT SKILL LEVELS

- Three skill levels for every aircraft. This allows you to select entry-level aircraft when you first starting off, and then progress to more advanced skill levels as your R/C abilities improve.
- RealFlight G2 Lite’s skill level settings mimic the actual performance of the aircraft for that respective skill level. For example, an entry-level airplane would be more docile and forgiving for a given set of stick inputs. An advanced airplane, however, will fly faster and respond more rapidly and aggressively to controller input.

CONTROLLER FEATURES

All versions of RealFlight G2 Lite 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 Lite. 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 G2 Lite, 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 your PC.

GRAPHICS AND SOUND QUALITY

The makers of RealFlight G2 Lite continually work to bring you the most realistic graphics and sound possible, since we feel that these are also 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 Lite 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 G2 Lite 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 G2 Lite 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® Lite Performance” on page 99.*

GRAPHICS QUALITY

RealFlight G2 Lite is capable of many different levels of graphics quality, some of which are entirely dependent upon the video hardware and monitor used. RealFlight G2 Lite 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 G2 Lite, the sound card must support Microsoft’s DirectSound. Many sound cards accelerate the mixing of multiple sounds. RealFlight G2 Lite 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 Lite users might encounter.

We provide a wide variety of sources for information, help and advice about installing, using, and resolving problems with RealFlight G2 Lite (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 Lite, you can access any of these sources, many with a click of the mouse or telephone call.

To learn more about RealFlight G2 Lite’s many support options, please see “Appendix C. If You Experience Difficulties With RealFlight G2 Lite...” (page 95).

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. This controller features two two-position switches, one three-position switch and a rotary knob, plus 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 G2 Lite, 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 G2 Lite, 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 Lite. *If you want to use the InterLink as a mockup controller, see “The InterLink Controller (Joystick Mode)” on page 28. If you want to use your own R/C transmitter with RealFlight G2 Lite, you’ll want to read “The InterLink Controller (Interface Mode)” on page 29.*

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 32*).

START FLYING!

When you start RealFlight G2 Lite 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 Lite, 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 28.*

You can also use your own transmitter to control RealFlight G2 Lite. This is called **“Interface Mode”**. *Read more about this on page 29.*

JOYSTICK VS. INTERFACE MODE

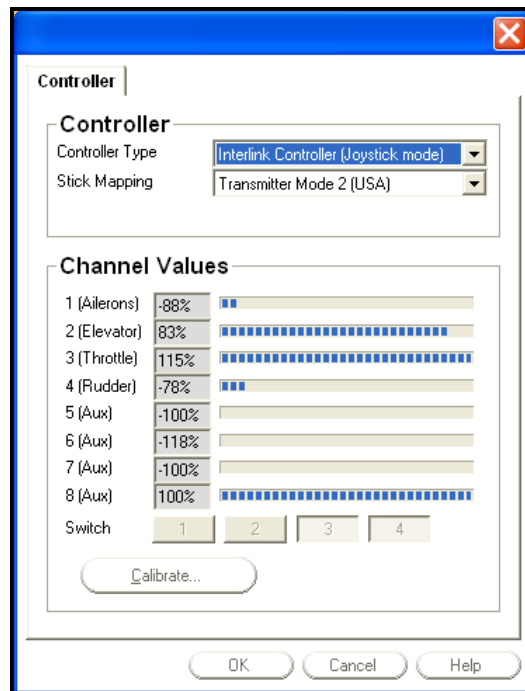
RealFlight allows you to quickly and easily change the method in which you control the action of the simulation. RealFlight G2Lite offers two control modes:

- **Joystick Mode.** Using the InterLink in Joystick Mode, RealFlight G2 Lite accepts control from the sticks, switches and knob on the InterLink controller. This is the default mode when you install RealFlight G2

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

The RealFlight G2 Lite 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 G2 Lite uses the InterLink's **Joystick Mode**, the mixing is done by the RealFlight G2 Lite software itself, not by the InterLink Controller.

Each aircraft in RealFlight Lite 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 G2 Lite 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**).

INTERFACE MODE FEATURES AND TERMINOLOGY

The **Interface Mode** can also be referred to as the “**Joystick Emulation Interface**” for purposes this description (*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
Radio used to Fly	InterLink Controller	Your own R/C radio

Ease of Configuration	Very Easy/Pre-calibrated	Medium. Must calibrate and setup radio once
Fly Stock aircraft without Modification	Yes	Yes
Gives you the feel of your own radio	No	Yes
Puts “wear and tear” on your own transmitter	No	Yes
Allows you to perform mixing in your own radio	No	No
R/C transmitter required	No	Required: 4-8 channels. Computer radio not required
Additional Information	Page 28	Page 30

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 G2 Lite with raw stick inputs. This enables RealFlight G2 Lite 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.

CALIBRATION VS. INTERFACE WIZARD

Interface Wizard

The “**Interface Wizard**” is a multiple-step process that helps the RealFlight G2 Lite software to determine which channel on your radio will be controlling which channel in RealFlight G2 Lite. This is necessary for the **Joystick Emulation** Interface to function properly.

When you calibrate

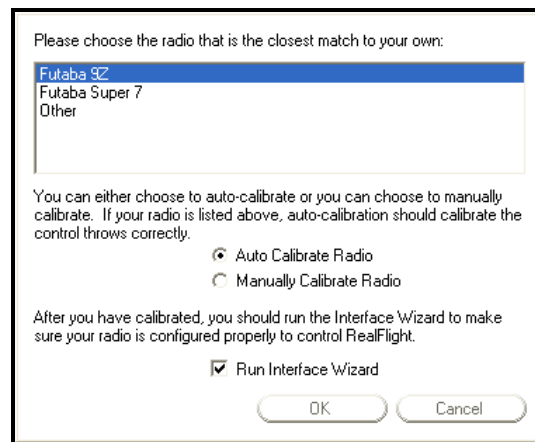
Because R/C transmitters vary by manufacturer, model, and setup, you must provide some information about your transmitter. This will allow RealFlight G2 Lite to function properly. Consequently, when you first activate **Interface Mode**, RealFlight

G2 Lite 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 Lite will lead you through the necessary steps (see below).

INTERFACE CALIBRATION

When you calibrate your R/C transmitter with RealFlight G2 Lite, you are, in essence, telling RealFlight G2 Lite 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 G2 Lite will **auto-calibrate** it for you.

When you first activate the Interface mode, RealFlight G2 Lite will prompt you with the following dialog:



RealFlight G2 Lite 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 G2 Lite 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 G2 Lite will then display a "wizard" that guides you through the calibration process.

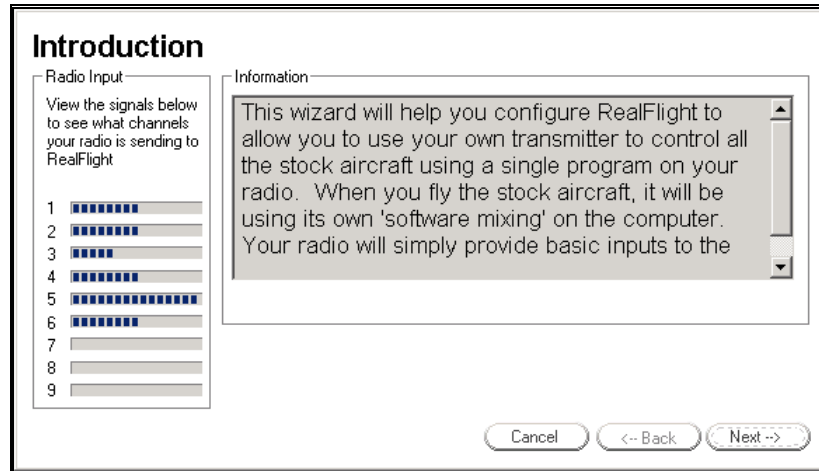
You can also get to this dialog by clicking on the **Calibrate** button in the **Controllers Dialog (Options menu/Calibrate Controller)**.

In any case, if this is the first time you are using your transmitter to control RealFlight G2 Lite, 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 Lite. 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 G2 Lite 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 G2 Lite instead. This is because a change in this “RFJOY” program will affect every RealFlight G2 Lite aircraft flown with this transmitter. Changes to the **Software Radio** only affect the aircraft whose radio you have edited.

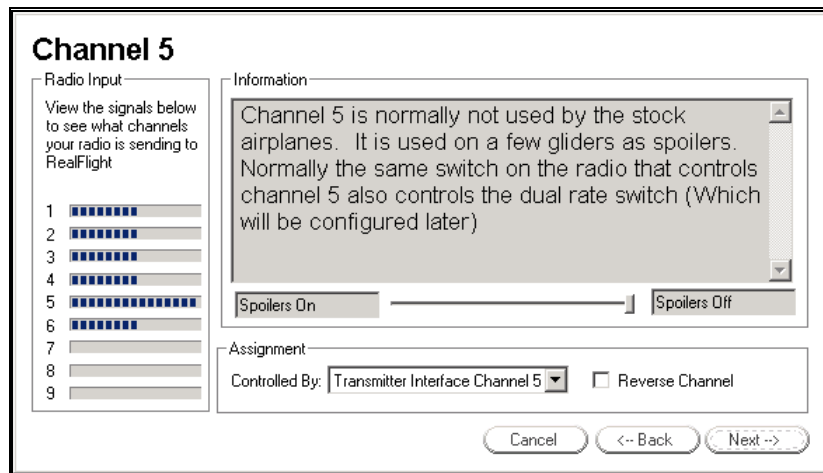
To fly any of the stock aircraft, simply switch your radio to the “RFJOY” program.

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 G2 Lite. RealFlight G2 Lite 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 G2 Lite 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 G2 Lite **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.

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:



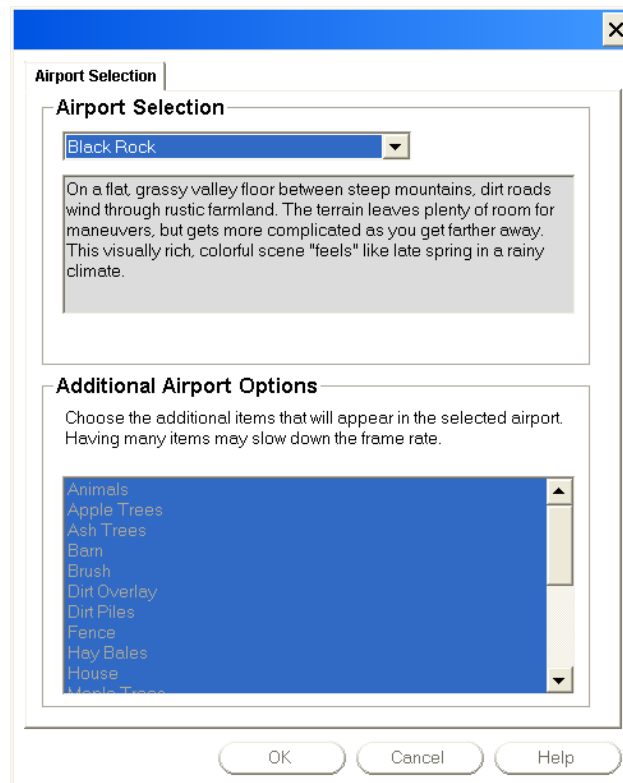
The items in this menu are:

- Select Airport...
- Item Visibility
- Show Trees
- Show Fog
- 3D Terrain
- 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 “Black Rock.”)

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.

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.

The items on the submenu list are *groups*, not individual objects. Groups are collections of airport objects (buildings, trees, roads, fences, etc.).

SHOW TREES

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

SHOW FOG

Select this item to toggle “on/off” the Fog options for RealFlight G2 Lite. This option may also be toggled “on/off” with the keyboard “F”. Not all video cards will support the fog option.

3D TERRAIN

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

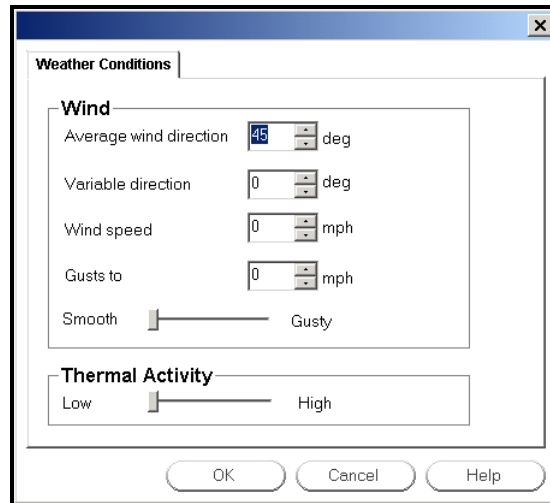
PhotoField displays the flying sites using photographic-quality panoramic views on a flat-style terrain. A PhotoField flying site does not require as powerful a computer as does the 3D style terrain and may assist in increasing the frame rate of your simulation.

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.

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 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 G2 Lite 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

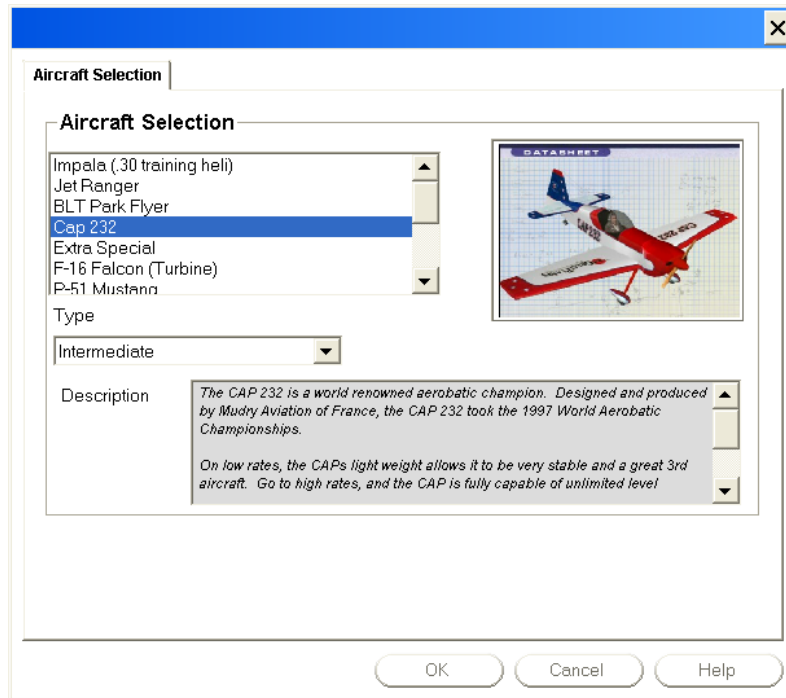
This menu accesses all aircraft related features and options. When you open the **Aircraft** menu, your display will be similar to the following:



The items in this menu are:

- Select Aircraft...
- Aircraft Smoke
- Show Exhaust
- Reset Position
- Kill Engine

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 skill level.

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 Spirit™ glider. Or, choose a heart-stopping CAP 232, or a sizzling-hot turbine fan-powered jet. 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.

SKILL LEVEL (TYPE)

Choose from three skill levels for every aircraft. Each respective skill level selection will cause the airplane or helicopter to fly and respond accordingly. Select **Beginner** and the aircraft will respond sluggishly (as well as appear larger on the screen). If you select **Intermediate** or **Advanced**, however, the aircraft will fly faster and respond to the stick input more aggressively.

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.

AIRCRAFT SMOKE

Selecting this check box will display the smoke from your aircraft.

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.

SHOW EXHAUST

Click on this item to show the airplane exhaust trails.

If you want to turn off the airplane exhaust, click on this box to remove the check mark.

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".

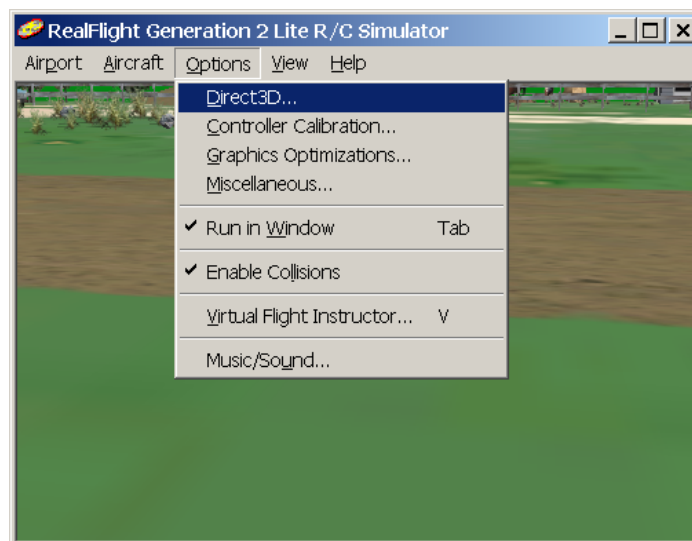
AIRCRAFT MRU

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.

CHAPTER 8. THE OPTIONS MENU

OPTIONS MENU OVERVIEW

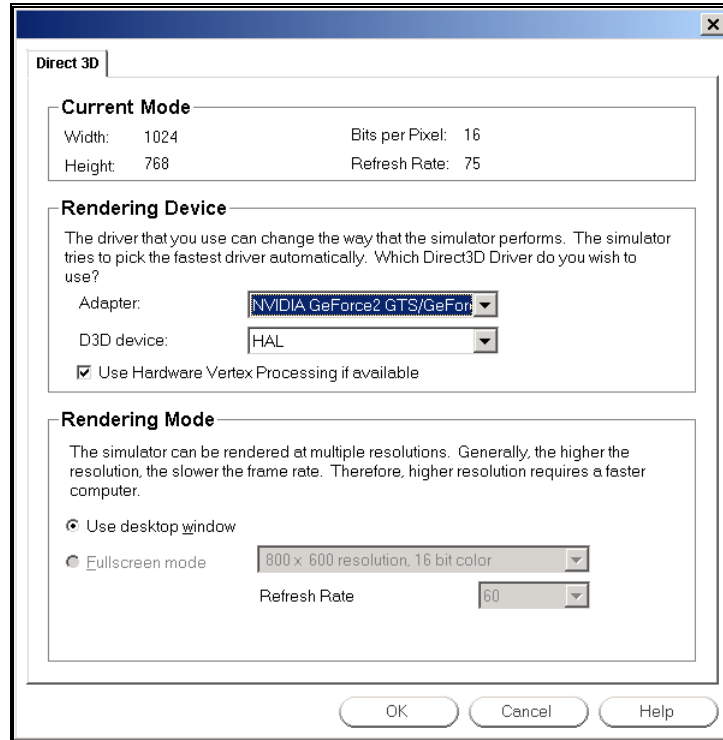
The **Options** menu controls several RealFlight G2 Lite program features. Items in this menu include:



- Direct 3D...
- Controller Calibration...
- Graphics Optimizations...
- Miscellaneous...
- Run in Window
- Enable Collisions
- Virtual Flight Instructor...
- Music/Sound...

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 51 to see if your card supports Hardware Vertex Processing).

RENDERING MODE

RealFlight G2 Lite 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 **Window Mode**, the RealFlight G2 Lite 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 G2 Lite to use the entire monitor screen. If you are running in **Full Screen Mode**, the RealFlight G2 Lite 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 G2 Lite 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 G2 Lite options are activated.

Use this control to set the refresh rate for Full Screen Mode. If RealFlight G2 Lite 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.

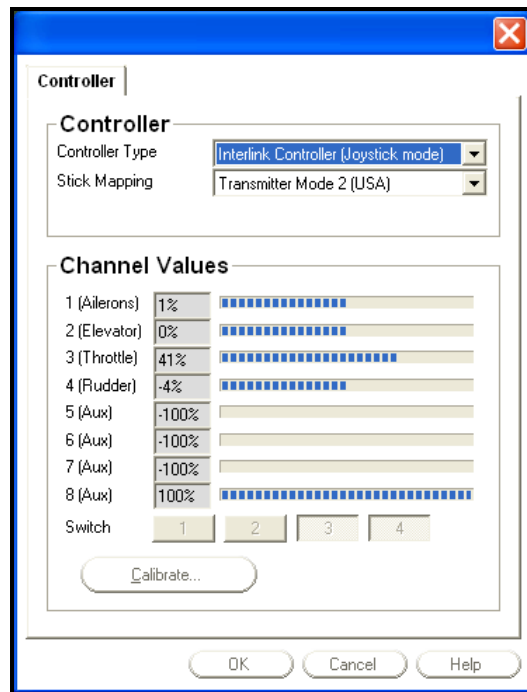
For suggestions on increasing RealFlight G2 Lite's frame rate, see "Improving RealFlight® Lite Performance" on page 99.

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

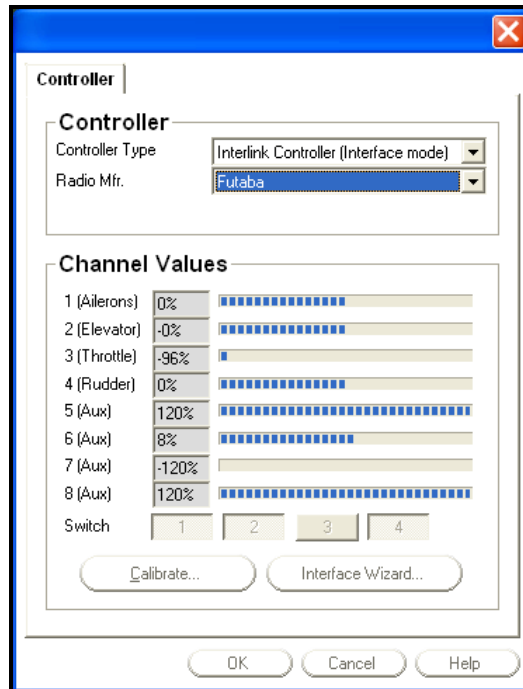
CONTROLLER CALIBRATION

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 G2 Lite, 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 G2 Lite, you may need to calibrate it if RealFlight G2 Lite 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 G2 Lite accepts input from the InterLink controller box. In **Interface Mode**, RealFlight G2 Lite 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 27.*

STICK MAPPING (JOYSTICK MODE ONLY)

This indicates the mode or type of joystick that you will be using for RealFlight G2 Lite. 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 G2 Lite 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 26.*

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 G2 Lite. Click on the **Calibrate** button to initiate the calibration sequence. Follow the onscreen instructions. *For more information about calibration, see “Interface Calibration” on page 31.*

INTERFACE WIZARD (INTERFACE MODE ONLY)

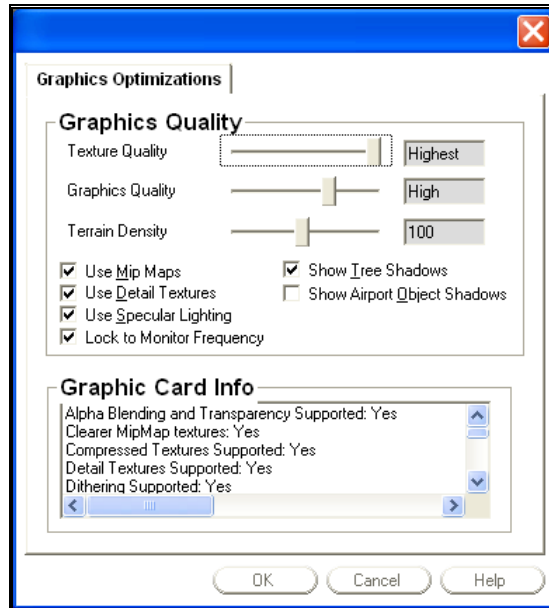
When you use your own R/C transmitter to control RealFlight G2 Lite, you will need to assign its input channels. The **Interface Wizard** is a sequence of dialogs that helps you to do so.

This process is included as part of the calibration procedure the first time you use your own R/C transmitter to control RealFlight G2 Lite. 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 30.

GRAPHICS OPTIMIZATIONS

Select this item to access the **Graphics Optimizations** dialog:



This dialog controls a wide variety of the graphics performance options for RealFlight G2 Lite.

RealFlight G2 Lite 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 G2 Lite. 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 G2 Lite 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

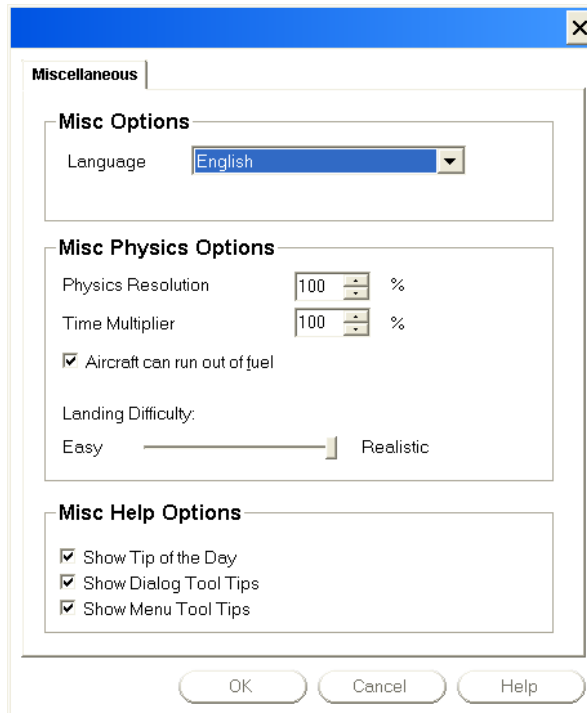
Click this check box to show the shadows that are cast by the trees. Using the feature improves realism, but may slow down the frame rate.

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 G2 Lite will use in all of its dialogs. The language that appears here will reflect the language that was selected during the installation process.

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 G2 Lite'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 G2 Lite Tip of the Day. These tips are a sequence of helpful hints and tips on using RealFlight G2 Lite. These tips often call attention to overlooked, yet important, features and options. *See also “Tip of the Day” on page 70.*

SHOW DIALOG TOOL TIPS

Click on this check box to turn “on/off” the tooltips in RealFlight G2 Lite. 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 G2 Lite. 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 G2 Lite will run in the Window Mode or in Full Screen Mode. If checked, RealFlight G2 Lite 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 G2 Lite’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.

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:

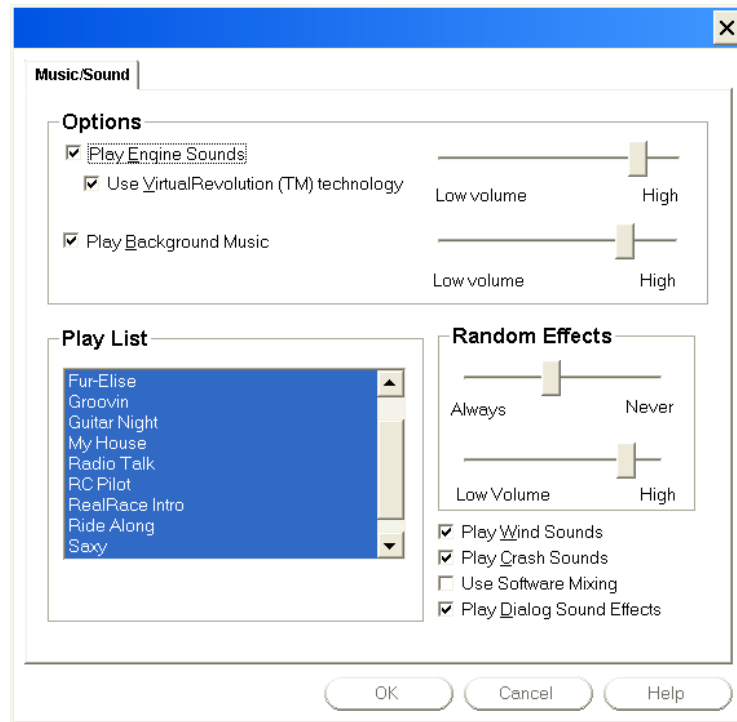


Select the maneuver that you wish to learn, and then click **OK**. RealFlight G2 Lite will show you a recording of an aircraft, piloted by the instructor (Mike or Dwight), performing the maneuver. During the maneuver you'll hear the instructor's voice instructing you how to do the maneuver. You can simultaneously 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.

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.

PLAY LIST

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

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

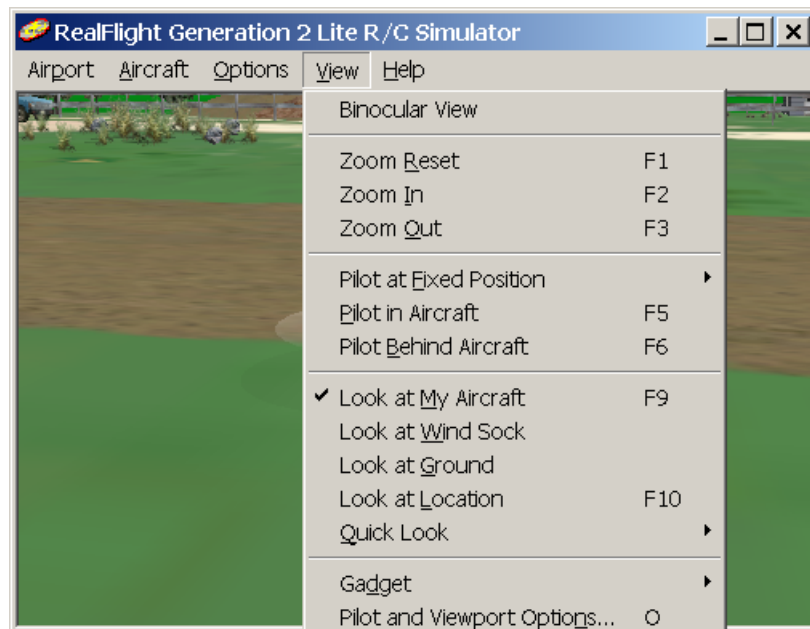
This box indicates whether to use the CPU or the Sound Card to mix the audio. By turning on Software Mixing, you force the CPU to do the mixing which may be a little slower, but also might sound a little better.

CHAPTER 9. THE VIEW MENU

VIEW MENU OVERVIEW

The **View** menu controls all options and settings for *views*. In this manual, we use the word “View” to describe two things: *what you are looking at*, and *where you are looking from*.

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



- Binocular View
- Zoom Reset
- Zoom In

- Zoom Out
- Pilot at Fixed Position
- Pilot in Aircraft
- Pilot Behind Aircraft
- Look at My Aircraft
- Look at Wind Sock
- Look at Ground
- Quick Look
- Gadget
- Pilot and Viewport Options...

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.

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. 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 G2 Lite 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 G2 Lite. 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 place the aircraft was located at the moment you selected the **Set to Current Aircraft Position** option.

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 62, or “Pilot Behind Aircraft” on page 63).

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

SET WITH OVERHEAD VIEW

When you select this option, RealFlight G2 Lite 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 G2 Lite 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 G2 Lite 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.

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.

QUICK LOOK

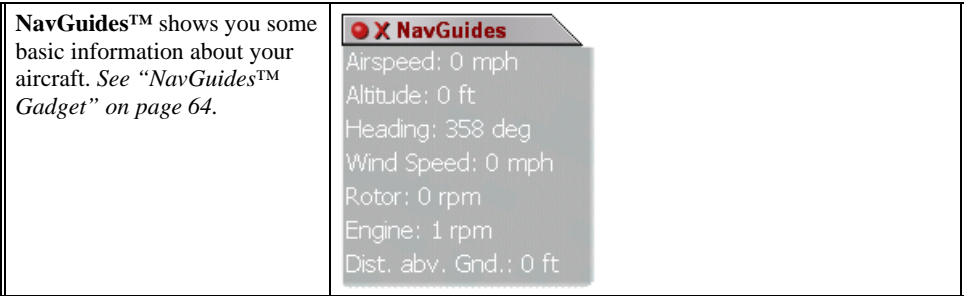
Select this option to quickly glance at either the ground or the windsock (if applicable).

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

GADGET

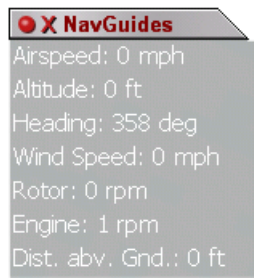
Select this option to bring up the **Gadget** options and to choose the NavGuides.

Gadget	Preview
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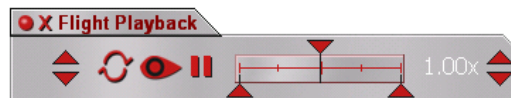
NAVGUIDES™ GADGET

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



FLIGHT PLAYBACK GADGET (ONLY AVAILABLE WITH THE VIRTUAL FLIGHT INSTRUCTOR)

RealFlight G2 Lite’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 the playback, and to speed up or slow down playback speed, etc.



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.

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.

RADIO GADGET (ONLY AVAILABLE WITH THE VIRTUAL FLIGHT INSTRUCTOR)

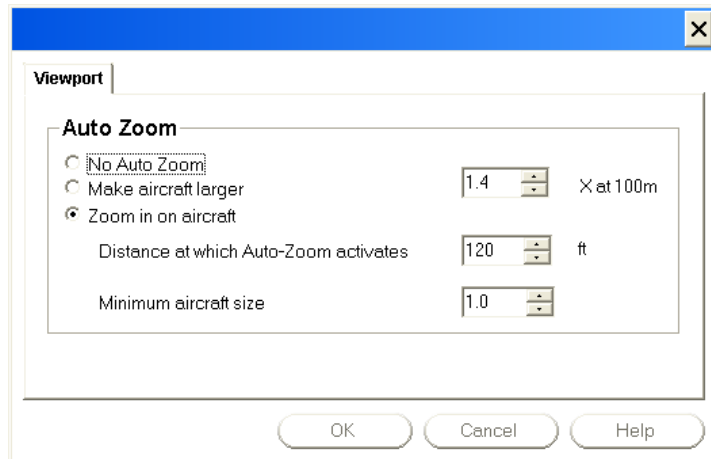
This transmitter offers a digital recreation of the transmitter onscreen. This digital transmitter mimics the stick input in real-time. This serves as a visual aid in the training process and an onscreen reminder for the proper stick inputs.



PILOT AND VIEWPORT OPTIONS

VIEWPORT PAGE

These options are used to adjust a variety of features for the viewports.



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 100 meters. The size of the aircraft is determined in the dialog box to the right of the check box.

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.

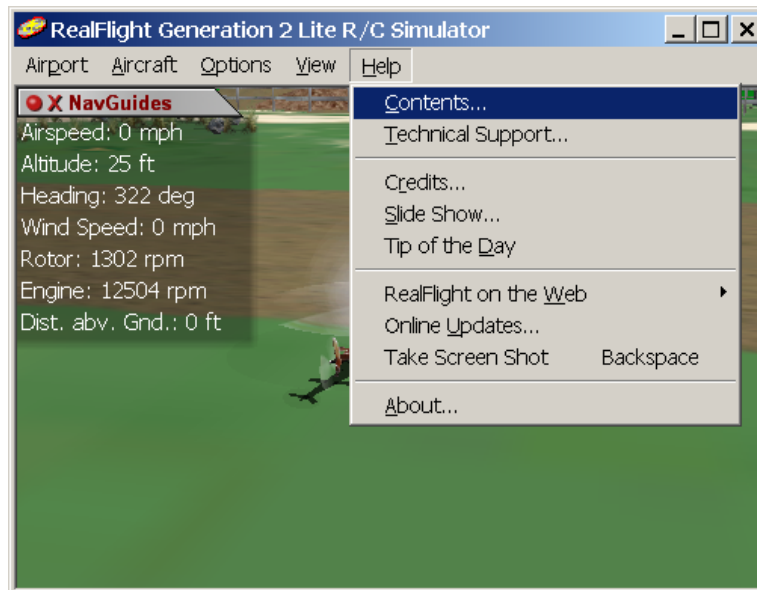
MINIMUM AIRCRAFT SIZE

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.

CHAPTER 10. THE HELP MENU

HELP MENU OVERVIEW

Should you experience any difficulties (or just want to find out more about RealFlight G2 Lite 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 G2 Lite's help files. The help files contain information similar to this manual.

TECHNICAL SUPPORT

If you should have any difficulties running RealFlight G2 Lite, consult this item. You can access online troubleshooting information, or contact RealFlight G2 Lite technical support.

CREDITS

Select this item to see the names of some of the people who contributed to RealFlight G2 Lite.

SLIDE SHOW

Slide Show gives you a brief preview of many of RealFlight G2 Lite'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 Lite. You can set tips to appear each time you run RealFlight G2 Lite, or read all the tips in one sitting. Tip of the Day will introduce you to many great RealFlight G2 Lite features you may not have noticed.

REALFLIGHT ON THE WEB REALFLIGHT WEB SITE

This is the main web site for RealFlight G2 Lite.

See it now: <http://www.realflight.com>

GREAT PLANES WEB SITE

This is the web site for Great Planes, the publishers of RealFlight G2 Lite

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 Lite.

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 Lite. 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.gpssoftware.com>

ONLINE UPDATES

This menu launches the RealFlight G2 Lite Control Panel. See “Appendix B. RealFlight G2 Lite Control Panel” on page 83.

SCREEN SHOT

Create a screen shot of RealFlight G2 Lite’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 G2 Lite, it will erase any previously saved screen shots (unless you move your old screen shots to a different directory).

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 G2 Lite has several tools to help you stay on top of things during approach and landing. See “Landings” below for some ideas.

AIRPLANE FLIGHT

RealFlight G2 Lite simulates how R/C aircraft really fly. This allows you to practice R/C flying without worrying about expensive crashes. Additionally, RealFlight G2 Lite 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 retractable gear, 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 G2 Lite 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.

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

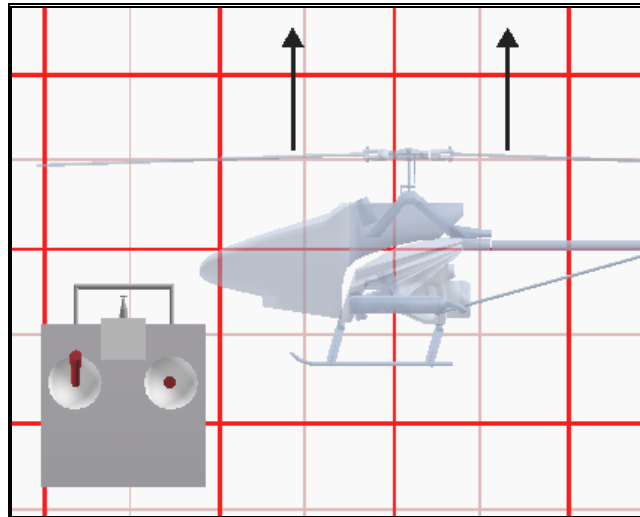
A model helicopter is a very complicated machine, which operates on the same aerodynamic principles as its full-scale counterpart. These principles are quite complicated to explain and understand. However, it is not necessary to understand all the underlying aerodynamics in order to successfully fly a model helicopter (or a computer simulation).

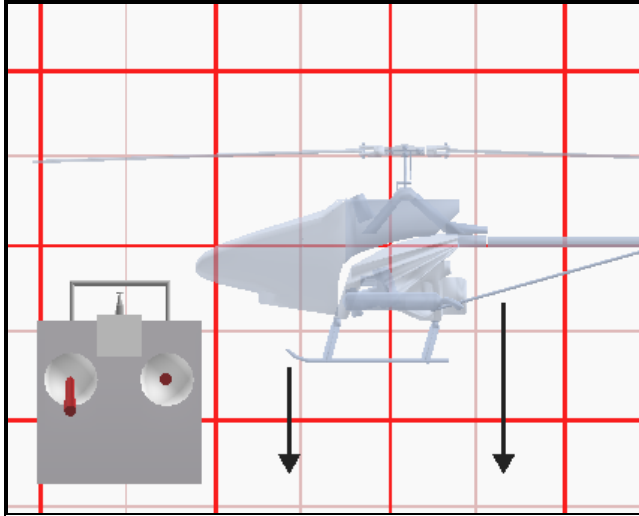
The following will help you to better understand the basics of helicopter flight, and the relationship between control stick movements and the actions of the machine. Refer to these instructions often as you become more proficient.

Note: The inputs below are shown using a Mode 2 transmitter.

COLLECTIVE (LEFT STICK - VERTICAL MOVEMENT)

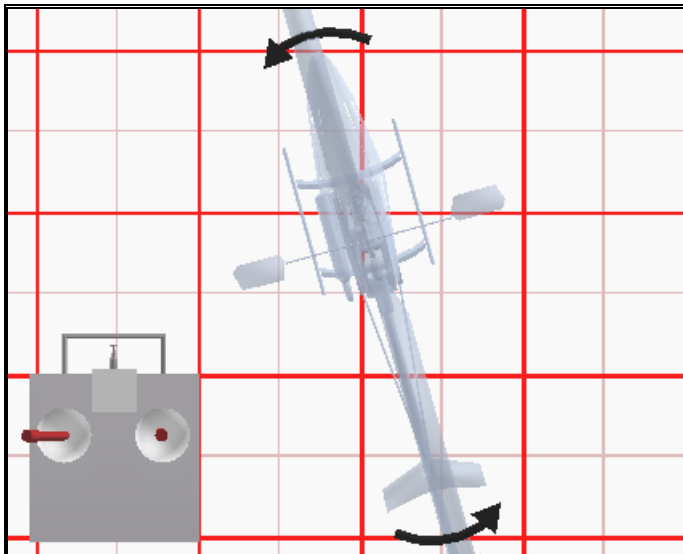
The helicopter is lifted into the air by the spinning rotor blades, which act like rotating wings. Changing the pitch (angle of attack) and speed of the blades, using the “collective” and throttle controls the vertical rise and descent of the helicopter. Adjusting “collective” increases and decreases 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.

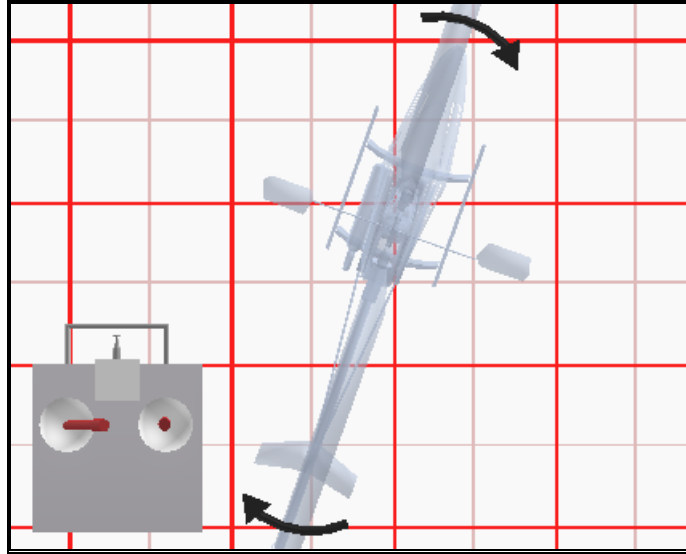




RUDDER (LEFT STICK - HORIZONTAL MOVEMENT)

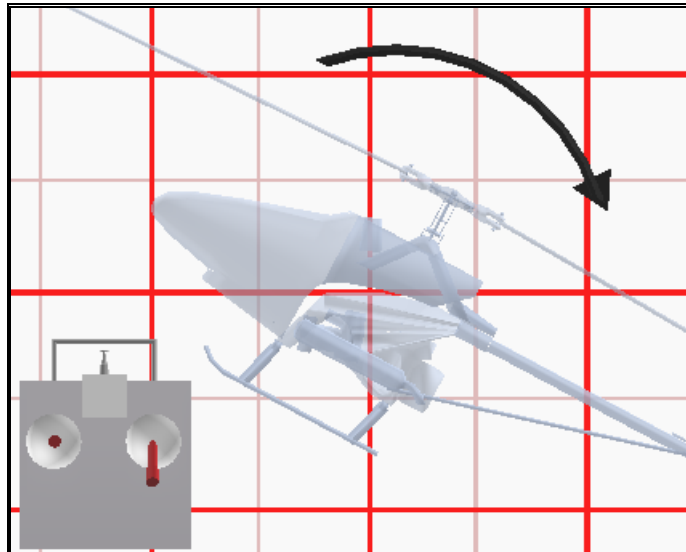
To turn the nose of the helicopter left or right, change the tail rotor pitch (by using the “rudder” control). Changes in collective stick movement will require changes in the amount of rudder input to maintain heading.

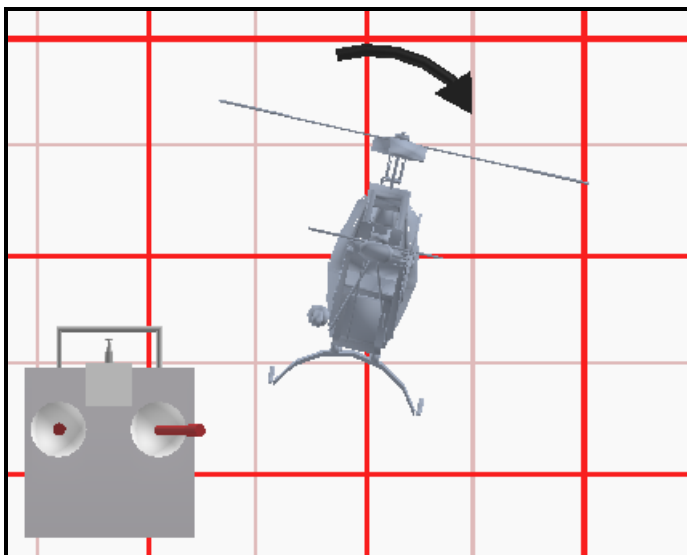
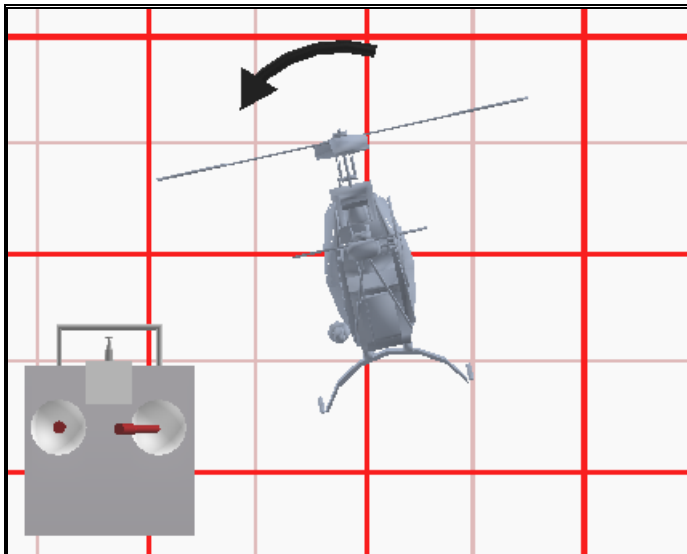
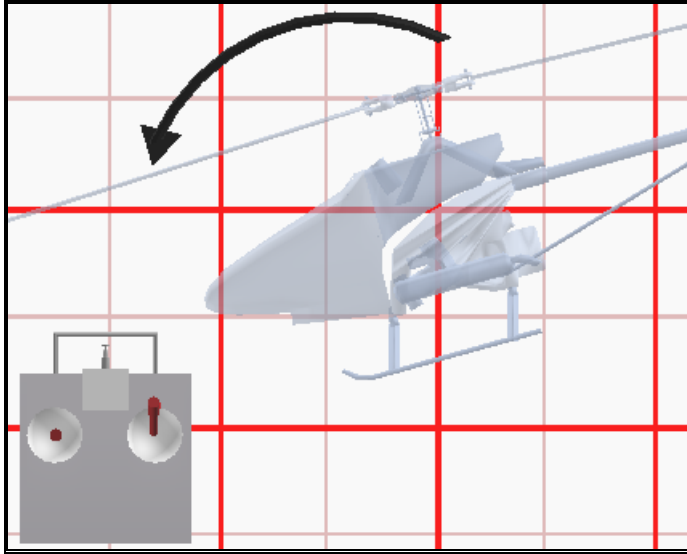




CYCLIC STICK (RIGHT STICK)

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.

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 G2 LITE CONTROL PANEL

REALFLIGHT G2 LITE CONTROL PANEL

The **RealFlight G2 Lite** Control Panel is a separate application that is designed to work in conjunction with **RealFlight G2 Lite**.



RUNNING THE CONTROL PANEL

There are three ways to run the RealFlight G2 Lite Control Panel.

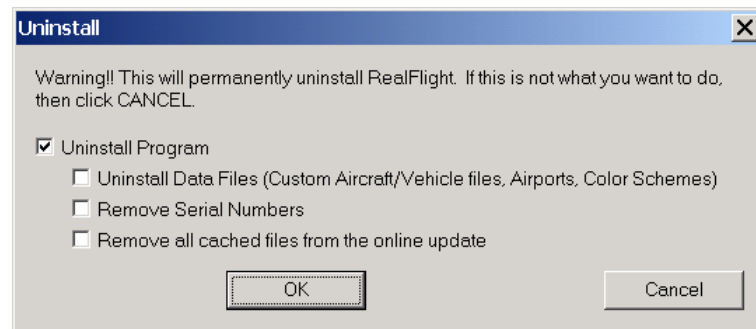
- Insert the CD into the drive. If Auto-Play is active, then the RealFlight G2 Lite Control Panel will start on its own.
- If RealFlight G2 Lite is already installed, click the “Start” button in the Windows Task Bar. In the Start menu, select Programs/RealFlight/Control Panel.
- If RealFlight G2 Lite is already running, choose **Online Updates...** from the Help menu.

RUNNING REALFLIGHT LITE

To start running RealFlight G2 Lite, press the **Run RealFlight G2 Lite** button on the Control Panel. (Note: if RealFlight G2 Lite is already running, the Control Panel will not let you start up a second RealFlight G2 Lite window.)

UNINSTALLING REALFLIGHT LITE

To Uninstall RealFlight G2 Lite, 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 Lite. Doing so through the RealFlight G2 Lite control panel will ensure that all necessary RealFlight G2 Lite files are removed.

UNINSTALL PROGRAM

Choose this option to uninstall only the RealFlight G2 Lite 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 G2 Lite serial numbers from your system.

REMOVE CACHED FILES

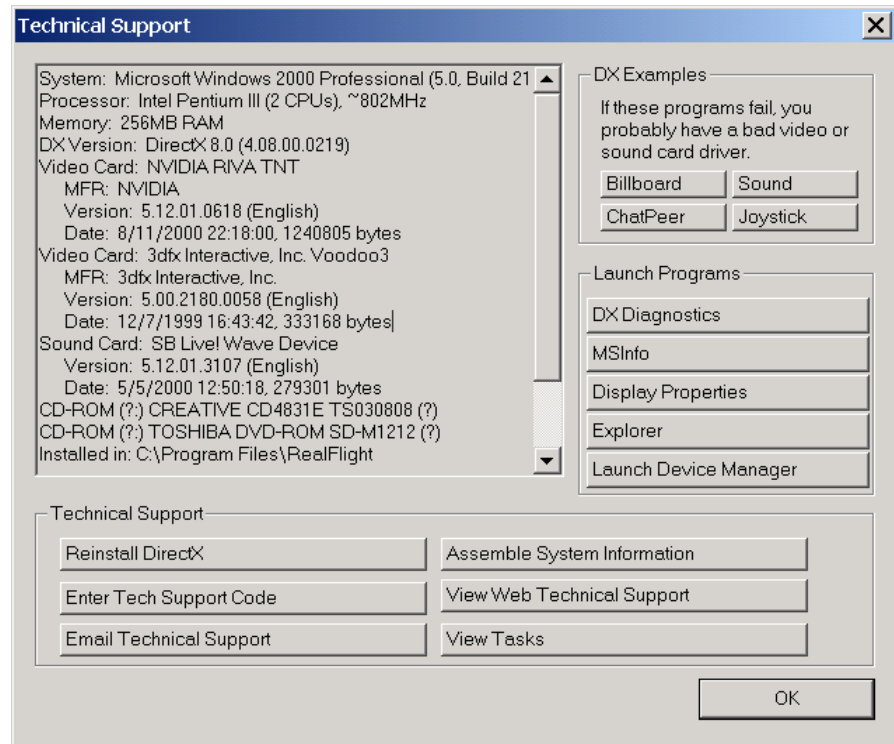
Choose this to option to remove all cached download files from your system. If you uninstall these files, future downloads may take a little longer.

READ HELP FILE

Press the **Read Help File** button to bring up the help file for RealFlight G2 Lite.

TECHNICAL SUPPORT

Press the **Technical Support** button to bring up technical support information about your system. If you encounter any problems with RealFlight G2 Lite, 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 G2 Lite. Even if you just bought a new computer system there may be a new, updated driver available for download.

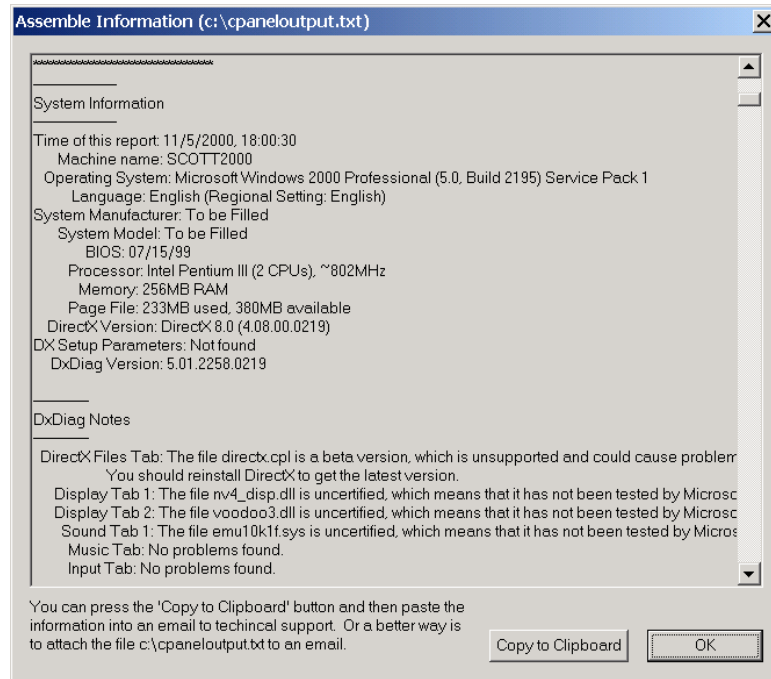
If you are sure you have the latest drivers, you may need to reinstall DirectX, or update your version.

REINSTALL DIRECTX

Choose this option to reinstall DirectX. Occasionally this will fix corrupted installations.

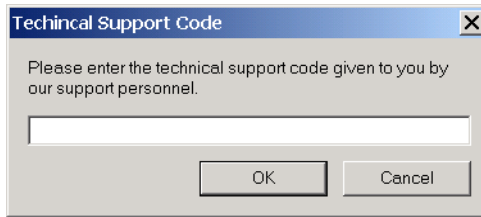
ASSEMBLE SYSTEM INFORMATION

Choose this option to collect critical information about your system, and about your RealFlight G2 Lite 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 G2 Lite, 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 G2 Lite, 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 Lite.

EMAIL TECHNICAL SUPPORT

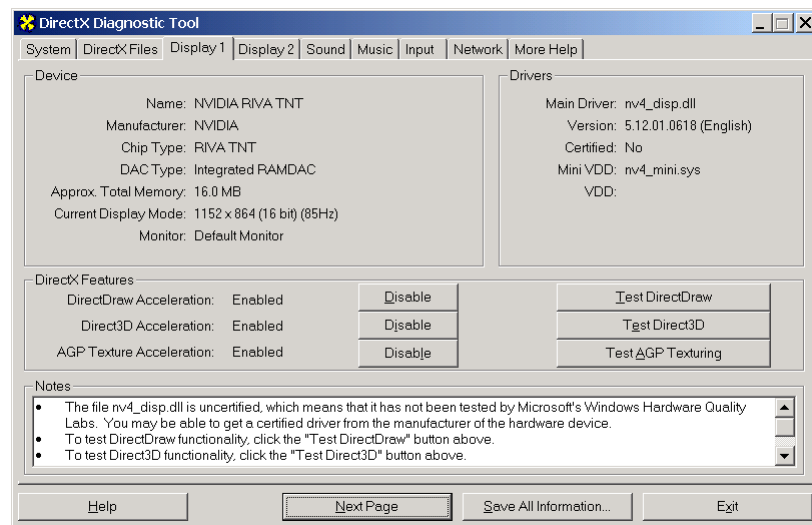
This gives you the email address rfsupport@greatplanes.com to which you can email your problems. If you do email us, please be sure to attach the **Assemble System Information** output to your email.

VIEW TASKS

This shows you a list of all tasks that are running. Some tasks can interfere with RealFlight G2 Lite and may need to be closed. Our Technical Support team will be glad to help you close problem tasks.

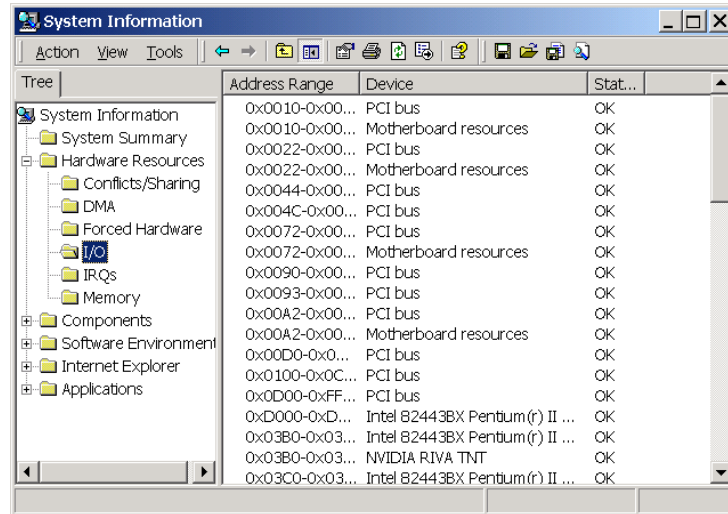
DX DIAGNOSTICS

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.)



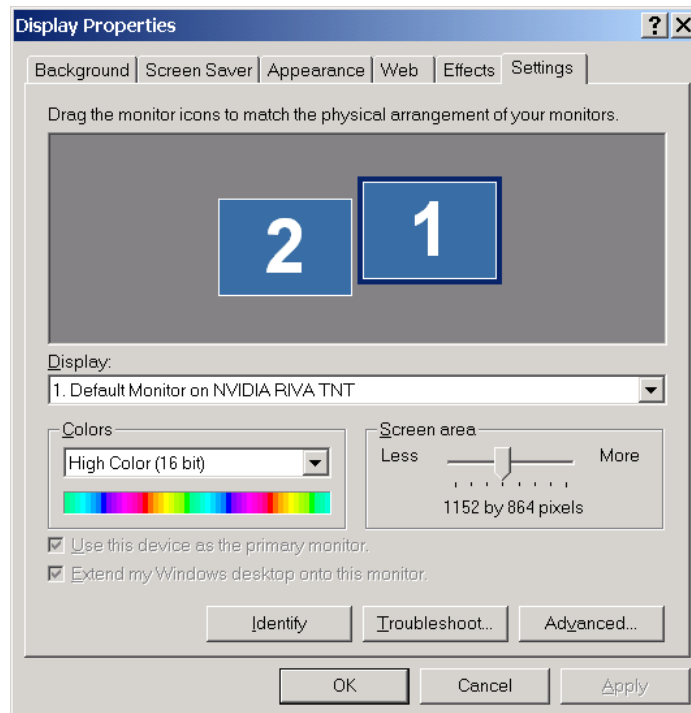
MSINFO

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®.



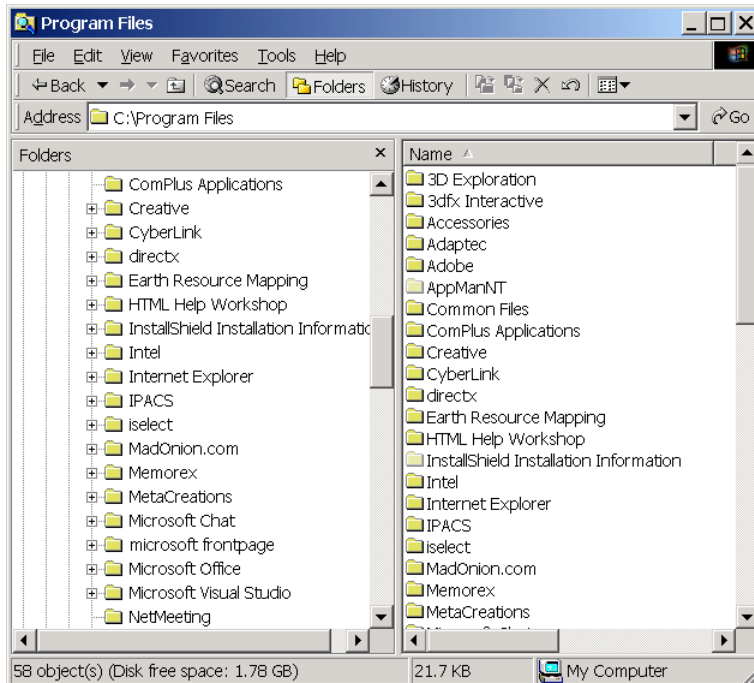
DISPLAY PROPERTIES

This brings up your monitor's display properties. You can use this page to change the resolution of your desktop.



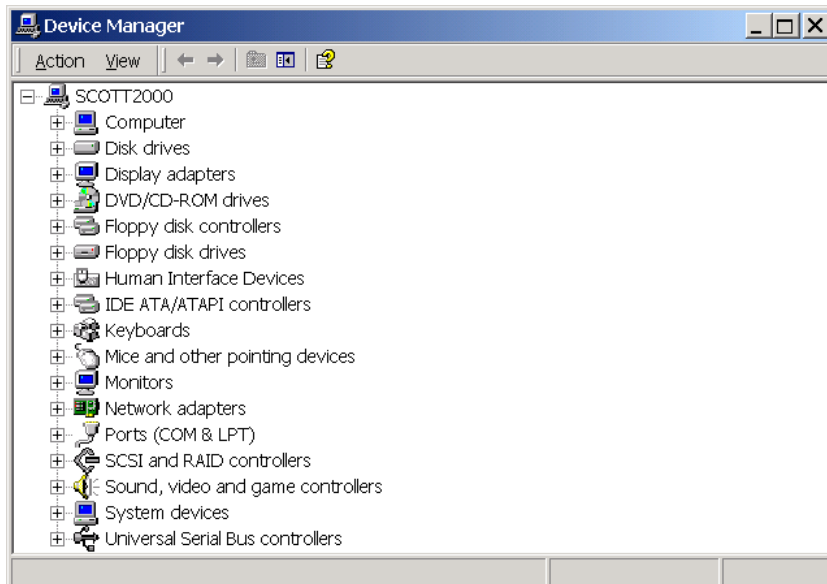
EXPLORER

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.

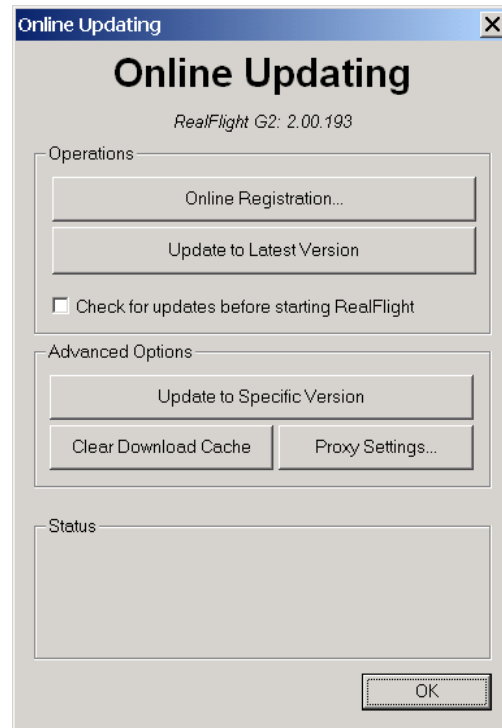


VIEWING DOCUMENTS

This lets you view important documents that come with RealFlight G2 Lite.

ONLINE UPDATES

We are proud to bring you a cutting edge way to keep your RealFlight G2 Lite 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.

Registration Information

Registration Information
This information will be sent via the internet and must be completed prior to calling technical support or receiving program updates.

First Name: John Middle Initial: M
 Last Name: Doe
 Email: myemail@mail.com
 Address 1: 12345 First Street
 Address 2:
 City: Mytown
 State/Province: AK Zip (Postal Code): 99999
 Country: USA
 Phone Number: 555-555-5555

Password
Please enter a password that will prevent other people from registering this serial number. Write it down for future reference.

Password: [] Enter Again: []

Options

Yes, I want to receive the RealFlight newsletter via email
 Send Hardware Information

Privacy Statement Send Information Cancel

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 G2 Lite 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 G2 Lite will not send us any information about your system. Or, you can view exactly what information RealFlight G2 Lite will send us before you decide. To view this information, click the **Technical Support** button on the RealFlight G2 Lite 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.

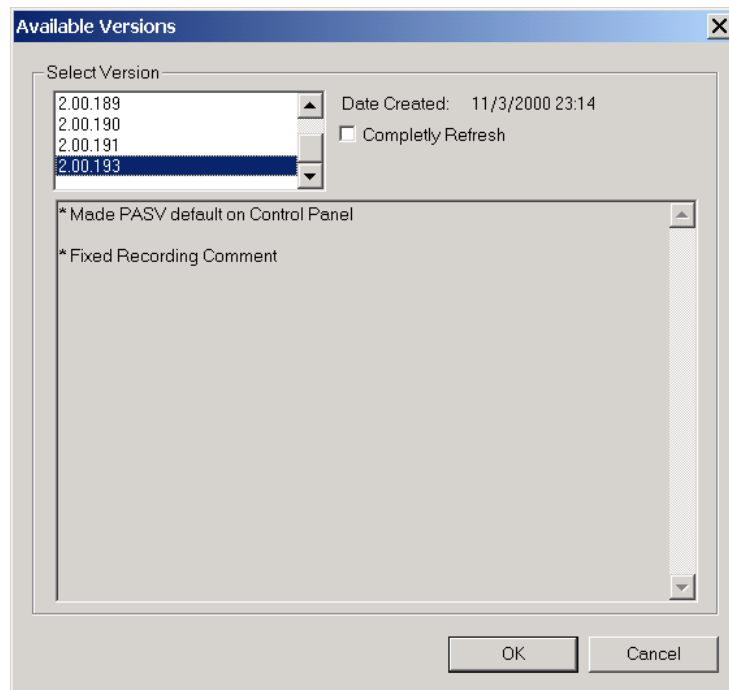
CHECK FOR LATEST UPDATES BEFORE RUNNING REALFLIGHT G2 LITE

If you check this box, then every time you run the RealFlight G2 Lite Control Panel, the panel will check to see if there is a newer version of RealFlight G2 Lite 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

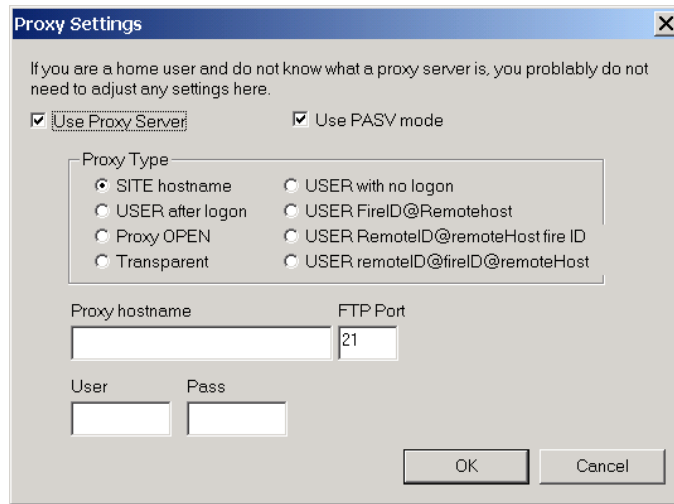
If you are having problems with a version you just downloaded, you can actually *go backwards* and retrieve a previous version. If the previous version fixes your problem, please contact our technical support team at rfsupport@greatplanes.com and let them know about the problem encountered.



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



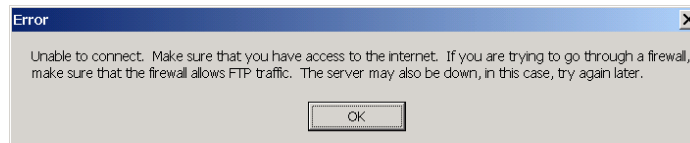
If you are behind a firewall that restricts FTP access, you may need to change the proxy settings in order for RealFlight G2 Lite to get the latest updates. *Most home users will keep the Proxy Server OFF.*

If you do need to use the proxy server, contact your network administrator to determine which settings to use.

PROBLEMS UPDATING?

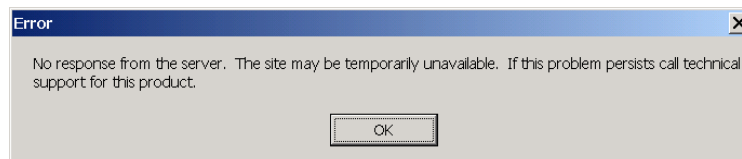
Here are some possible problems that might occur when updating.

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 LITE...

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 Lite users might encounter.

This section starts with a summary of the various sources of RealFlight G2 Lite 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 Lite 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 Lite 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 G2 Lite problems by following the instructions in later sections of this chapter. Additionally, other manual chapters explain RealFlight G2 Lite's features in greater detail.
- **Online Help.** You can access all of this manual's material directly from RealFlight G2 Lite's Help menu. This help file is indexed and searchable.
- Visit our product **Knowledge Base** at <http://www.gpssoftware.com>. This great resource is an indexed, searchable collection of articles that

described solutions to almost every known problem with RealFlight G2 Lite, 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, RealFlight G2, RealFlight G2 Lite, 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 Lite.

- Visit the home page of Knife Edge Software, the makers of RealFlight, RealFlight G2 Lite, 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 Lite, 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 G2 Lite, 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 Lite.
- 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 G2 Lite 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 G2 Lite 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 Lite. 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 Lite

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 G2 Lite, you should update to the latest version.

To update, use the control panel (see Appendix B. RealFlight G2 Lite Control Panel on page 83.

Run the DirectX Test Programs

If you have updated your drivers and RealFlight® Lite to the latest versions, and your problem persists, you should try to run the DirectX samples that come with RealFlight® Lite.

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® Lite 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® Lite (including RealFlight® Lite “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® Lite for a long time, make sure to run **Billboard** for a comparable length of time.

If your RealFlight® Lite problem also occurs in **Billboard**, the problem lies with your video driver, not RealFlight® Lite. 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® Lite, 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.gpssoftware.com>. This is an easy to use, searchable, browsable database of known problems and solutions for RealFlight®, RealFlight® Lite, 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®, RealFlight® Lite, 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® Lite Control Panel (from RealFlight® Lite, 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® Lite users have experienced.

Remember that we can never provide a complete list of problems and solutions in a program manual. That's because RealFlight® Lite --and the computers, cards and drivers it uses--are constantly evolving. As such, we maintain a detailed Knowledge Base at <http://www.gpssoftware.com>. By keeping our Knowledge Base online, we can provide you with the latest information about resolving problems that RealFlight® Lite 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 G2 LITE, 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® Lite “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® Lite, test DirectX) and are still having difficulty with your computer locking up while running RealFlight® Lite, please contact Great Planes Technical Support.

IMPROVING REALFLIGHT® LITE PERFORMANCE

During installation, RealFlight® Lite analyzes your computer’s hardware specifications. RealFlight® Lite 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® Lite’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® Lite. 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® Lite 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 51)
- 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 51)
- Eliminate the **Airport Objects Shadow** using the **Graphics Optimizations** page (See “Graphics Optimizations” on page 51)
- Eliminate the **Detail Textures** using the **Graphics Optimizations** page (See “Graphics Optimizations” on page 51)
- Reduce the number of open Gadgets.

- 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 37)
- 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 54)

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 G2 Lite. RealFlight G2 Lite 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*.

AFR

Advanced Flight Recorder. A feature of RealFlight G2 Lite that allows the pilot to view pre-recorded VFI maneuvers. 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.

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.

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.

Bilinear Textures

Smooths textured pixels together. This can cause a blurry appearance but can also improve the overall appearance.

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.

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 Lite 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 Lite *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 G2 Lite Control Panel" on page 83.

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 Lite. Currently, all new versions of RealFlight G2 Lite 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 G2 Lite. Previous versions of RealFlight G2 Lite 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 G2 Lite.

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.

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).

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.

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 *Flaps* 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.

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 G2 Lite 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 G2 Lite 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.

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 Lite.

Gadget

An onscreen display that shows you continuously updated information about your aircraft, or lets you control RealFlight G2 Lite 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.

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 G2 Lite’s software and the hardware of the PC.

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 Lite 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 Lite. Conversely, in Joystick Mode RealFlight G2 Lite 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 G2 Lite, you must tell RealFlight G2 Lite 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 Lite. 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 G2 Lite.

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.

Joystick

A device that connects to your computer, and is used to control the simulated aircraft. The InterLink controller that comes with RealFlight G2 Lite is considered a *Joystick*.

Joystick Mode

With RealFlight G2 Lite set to this mode, RealFlight G2 Lite 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 Lite.

Low Rates

A switch on the radio that causes the servos move to much smaller extremes, thus making the model respond more slowly.

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 Lite 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.

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".)

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 Lite

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.

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).

Stall

This is what happens when an airplane's angle of attack is too great to generate lift, regardless of airspeed. During a *Stall*, 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 Lite menu item or dialog item. The text in the *Tooltip* window describes the item's function.

Trees

Some elements of a RealFlight G2 Lite 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.

Virtual Flight Instructor

This RealFlight G2 Lite 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 Lite. 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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