A Companion to: Microsoft Flight Simulator as a Training Aid: A Guide for Pilots, Instructors, and Virtual Aviators
The following information applies to Microsoft® Flight Simulator X and Flight Simulator 2004
Contents

- Useful Sources of Information
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Useful Sources of Information

As you fly, remember that Flight Simulator includes many useful sources of information. Don’t worry about memorizing commands or features. Help is always just a click or key press away.

Flight Simulator 2004

Flight Simulator X
Useful Sources of Information

The **Learning Center** is the on-board Help for Flight Simulator. It’s like a Web site on your computer that includes videos, pictures, procedures, and reference text.

*Flight Simulator 2004*

*Flight Simulator X*
The Learning Center includes a set of Key Topics, a Site Map that guides you to all available topics, and an Index to make it easy to find specific information.

To see the main pages of the Learning Center, click the Key Topics, Site Map, or Index tab labels.

The topics in the Learning Center include text, pictures, and videos to help you learn how to use all the features in Flight Simulator.

To visit the Learning Center, press the ALT key to display the Flight Simulator menu bar and then click Learning Center on the Help menu.

To see more information in the Learning Center window, use the vertical scroll bar.
The Learning Center includes a set of Key Topics, a Site Map that guides you to all available topics, and an Index to make it easy to find specific information.

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Topics in the Learning Center include links to detailed information, just like a Web page.

Using the GPS
A guide to global positioning system receivers in Flight Simulator

What is GPS?

GPS, or global positioning system, is a network of satellites that transmit coded data that receivers on the ground can use to determine their position on earth. GPS receivers determine location by comparing the angular relationships between the receiver and orbiting satellites. In this way, GPS is really quite similar to celestial navigation, which early pilots used to determine their whereabouts. The difference is that a GPS receiver uses a computer to compute position, while a pilot navigating with the stars had to operate a sextant and use complex tables.

The computer on board an aviation GPS receiver does much more than just tell a pilot where he is. It can also tell him where any other point on the planet is, and how to get there. GPS receivers are amazing pieces of technology, and are getting more sophisticated every year. Learning how to use one is fun, and the payoff for a bit of study and practice is huge. Fly with...
The Kneeboard

The Kneeboard is a handy pop-up reference that you can use as you fly.
To display or hide the Kneeboard, press the F10 key or click the Kneeboard icon (✓) on the instrument panel.
Although you can create an elaborate virtual cockpit, you can use Flight Simulator effectively with just a basic setup: joystick or yoke and mouse.
**Typical Joystick Controls**

- **Throttle**
- **Rudder (twist)**
- **Switches for trim, view, etc.**
- **Buttons for flaps, landing gear, etc.**

**Roll mouse wheel to tune radios, adjust power, etc.**
Using the Mouse Wheel

- Think of the mouse as an electronic extension of your hand.
- To operate many of the controls in the cockpit, use the mouse to point at a knob, button, or control, and:
  - Roll the mouse wheel slowly forward or backward
  - Click a button
  - Drag the mouse

Roll mouse wheel to tune radios, adjust power, etc.
Controlling the Airplane with the Mouse

❖ You can use the mouse to:

- Operate the throttle, propeller, mixture controls
- Change heading (when the autopilot is ON and in HDG mode)
- Extend and retract the flaps
- Adjust elevator, rudder, and aileron trim
- Change altitude and rate of climb or descent with the autopilot controls (when the autopilot is ON and ALT mode is selected)
- Tune communication and navigation radios
- Select courses on the VOR/ILS indicators and HSI
- Turn lights on and off
- Display and hide the Avionics panel, Kneeboard, Map View, GPS, and aircraft control sub-panels
Cockpit Orientation

- The following slides point out controls that you can operate by using the mouse as an electronic extension of your hand.
- In most cases, you can operate important controls much as you would in an airplane. Instead of pushing buttons and twisting knobs, however, point to an item and click the left mouse button or roll the mouse wheel forward and backward.
- The positions of some controls vary in different aircraft, just as they do in real cockpits, but the same basic actions apply regardless of which aircraft you’re flying.
This is the normal (2D) Cockpit view for the Cessna 172S in FS2004. All aircraft have similar 2D cockpit views.

All 2D cockpits include a row of special icons. This row is in a different location on each aircraft’s instrument panel.

Click the appropriate icon to display/hide the Kneeboard, ATC window, Map view, Avionics Stack, GPS, or Compass pop-up windows.

You can operate electrical switches with the mouse.

You can also operate the throttle, mixture, flaps, etc. with the mouse.
This is the normal (2D) Cockpit view for the Cessna 172S in Flight Simulator X.

All 2D cockpits include a row of special icons. This row is in a different location on each aircraft’s instrument panel.

Click the appropriate icon to display/hide the Kneeboard, ATC window, the Map, GPS, etc.

You can operate electrical switches with the mouse.

You can also operate the throttle, mixture, flaps, trim, and avionics with the mouse wheel.
With the autopilot ON and in HDG mode, you can change heading with the mouse. Point here and roll the mouse wheel forward or backward to move the heading bug on the heading indicator.

With the autopilot ON and in ALT mode, you can change altitude with the mouse. Point to the digits in the altitude window and roll the mouse wheel forward or backward.

Change the rate of climb/descent by pointing to the digits in the VS window and rolling the mouse wheel.

To increase or reduce power, point at the throttle and roll the mouse wheel forward or backward.

This screen shows a special IFR Training Panel in Flight Simulator 2004. IFR Training Panels are available for the C172S, C182S, and Mooney Bravo. These IFR panels reduce the space devoted to the outside view so that the flight instruments, avionics stack, and other important controls are all visible in the main window.
With the autopilot ON and in HDG mode, you can change heading with the mouse. Point here and roll the mouse wheel forward or backward to move the heading bug on the heading indicator.

With the autopilot ON and in ALT mode, you can change altitude with the mouse. Point to the digits in the altitude window and roll the mouse wheel forward or backward. Change the rate of climb/descent by pointing to the digits in the VS window and rolling the mouse wheel.

To increase or reduce power, point at the throttle and roll the mouse wheel forward or backward.

The Cessna 172S in Flight Simulator X includes the avionics stack in the main window. You can use the mouse to operate controls just as in Flight Simulator 2004.
To adjust the elevator trim with the mouse, point to the trim wheel and roll the mouse wheel forward or backward.

To extend or retract the flaps, point at the flap lever and roll the mouse wheel forward or backward.

To select a course on a VOR or ILS indicator, point to the appropriate OBS knob and roll the mouse wheel backward or forward.
To activate a frequency, click the appropriate flip-flop (STBY) button with the left mouse button.

To change a communications or navigation frequency, point to the digits in the appropriate standby frequency window and roll the mouse wheel backward or forward. Point separately at the digits to the left (MHz) and right (KHz) of the decimal point.

Change the ADF frequency and transponder squawk code much as you change communication and navigation frequencies. Point separately at each digit in the ADF and transponder displays and roll the mouse wheel.
To adjust the wings of the airplane in the attitude indicator, point to the adjustment knob and roll the mouse button forward or backward.

To select the DME source, point to the selector button and click next to R1 or R2.

To monitor the Morse Code ID for a navigation radio or marker beacon, point to the appropriate button on the audio panel and click the left mouse button. Or click the Pull Ident button on the appropriate radio.
To display the Kneeboard (which includes the Flight Briefing, keyboard shortcuts, and other information), click this icon.

To display the GPS window, click this icon.

To select the navigation source that drives the NAV1 indicator or HSI, click the NAV/GPS switch.
To turn the autopilot on and off and to select autopilot functions, click the appropriate button(s) on the autopilot panel.

To turn the master switches, lights, Pitot heat, etc. on and off, click the appropriate switches.
Note the location of several key items in the Cessna cockpit in Flight Simulator X.

- NAV/GPS switch, which drives the number 1 nav indicator
- Control panel icons
- Autopilot ON/OFF
This is the normal cockpit view for the Baron. You can operate the main controls just as you do in any Flight Simulator cockpit, by pointing with the mouse and rolling the wheel forward or backward, dragging the mouse, or clicking the left mouse button.

You can adjust the pitch, aileron, and rudder trim by pointing to the appropriate trim wheel and rolling the mouse wheel forward or backward.

You can extend and retract the landing gear and flaps by pointing to the appropriate control and rolling the mouse wheel forward or backward.

To display the Kneeboard, engine controls, map, avionics stack, GPS, and other information, click one of the icons in this row.
To display the avionics stack while in normal cockpit view, click the Avionics icon on the instrument panel. The avionics stack appears in a pop-up window.

To hide the avionics stack, click the Avionics icon again.

You can change frequencies, control the autopilot, identify nav aids, etc. with the mouse. Point to the item you want to change, and roll the mouse wheel forward or backward. Or click a button or control.
To display the GPS in any aircraft, click the GPS icon on the instrument panel. The GPS appears in a pop-up window.

To hide the GPS, click the GPS icon again.

You can operate the GPS with the mouse by pointing and clicking buttons on the GPS.

You can use the mouse to drag the GPS window anywhere on the screen.

To learn more about how to use the GPS in Flight Simulator, see the GPS topics in the Learning Center.
Some aircraft, like the Baron, have a separate pop-up window for engine controls.

You can drag the pop-up window anywhere on the screen.

If you prefer not to display the engine controls, you can use the throttle on the joystick or keyboard shortcuts to increase and decrease power and adjust RPM.

To increase power incrementally, press the F3 key. To decrease power, press the F2 key.

To adjust RPM, press CTRL+F3 (increase) or CTRL+F2 (decrease).

To display or hide the engine controls, click the Engine Controls icon.

You can operate the engine controls in the pop-up window with the mouse by pointing at the appropriate control and dragging the mouse pointer up and down.

To use the fuel selector, point to the position you want to select (not the lever itself) and click.
To display the Flight Simulator menu bar, press the ALT key.

Use the mouse or the left and right arrow keys (← and →) to highlight a top-level command and the mouse or the up and down arrow keys (↑ and ↓) to select commands on the drop-down menus, just as you do in any Windows application.

For more information about all of the menus in Flight Simulator, see the slides later in this presentation.
Using the Practice Flights

⇒ The following screens show how to choose and start the Practice Flights provided with Microsoft Flight Simulator as a Training Aid, published by ASA.
⇒ For more information about the book, visit the ASA Website and www.BruceAir.com.
Copying the Practice Flights

To use the Practice Flights, copy the contents of the appropriate folder from the CD that accompanies the book to the correct folder on your hard drive.

For more information, see InstallingPracticeFlights.pdf on the CD that accompanies the book.
When you start Flight Simulator 2004, this dialog box appears. To start one of the Practice Flights, click Select a Flight in the left column.

To start one of the Practice Flights, click Select a Flight.
In the Select a Flight dialog box, click My Saved Flights. The BruceAir Practice Flights appear in the list under Choose a Flight. A detailed description of the selected Flight appears in this box.

The titles of the Practice Flights appear in this list. Click the one you want to fly.

When you're ready to begin, click Fly Now.

A detailed description of the selected Flight appears in this box.
To start a Practice Flight in Flight Simulator X, click Free Flight.

Click Free Flight.

And then click Load.
When the Load Flight dialog box appears, click the title of the Practice Flight that you want to fly. A description of the selected Practice Flight appears in the box.

When you’re ready to fly, click Fly Now!
## Key Flight Simulator Views

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<td>Spot Plane</td>
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<tr>
<td>Maximize (W)</td>
<td><img src="image4.png" alt="Maximize (W)" /></td>
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</tbody>
</table>
This is the normal (2D) Cockpit view for the Cessna 172S in Flight Simulator 2004. All aircraft have similar 2D cockpit views.

All of the basic controls you need to fly the airplane are available in this view, except the avionics stack, which pops up in a small window when you click the Avionics icon. Some aircraft also have pop-up windows for engine controls and sub-panels.

The GPS also appears in a pop-up window when you click GPS icon.

You can return to this view by pressing the large black Button 2 on the top of the joystick to cycle through the views until this cockpit appears.

While in Cockpit view, you can use the mouse to move the heading bug, set courses with the OBS knobs, tune radios, and operate the autopilot, flaps, throttle, mixture, lights, and other controls.
In Virtual Cockpit (3D) view, you see more of the outside view while keeping the instrument panel in view.

To switch to Virtual Cockpit view, press the large black Button 2 on the top of the joystick until the Virtual Cockpit view appears. To switch back to normal cockpit view, press Button 2 until the normal cockpit cycles back into view.

While in the Virtual Cockpit, you can zoom in and out by pressing the + and – keys on the keyboard.

To look around as if you were moving your head while in Virtual Cockpit view, move the silver “hat” switch at the top of the joystick in the direction that you want to look. Moving the “hat” switch pans (moves the view smoothly) in the direction you choose.

While in Virtual Cockpit view, you can use the mouse to move the heading bug, tune radios, and operate the autopilot, flaps, throttle, mixture, and other controls just as you do in normal Cockpit view.
In exterior, or Spot Plane view, you see your airplane as if you were flying in formation.

To switch to Spot Plane view, press the large black Button 2 on the top of the joystick until the Spot Plane view appears. Note that you may have to cycle through the Tower view, which shows your airplane from the perspective of the control tower or airport reference point at the last airport you visited.

If you don’t appear to be in close formation as you switch views, press joystick Button 2 again to continue cycling views to Spot Plane view.

To switch back to normal cockpit view, press Button 2 until that the normal cockpit cycles back into view.

While in Spot Plane view, you can zoom in and out by pressing the + and – keys on the keyboard.

To look around as if your chase plane were changing its position in formation, move the silver “hat” switch at the top of the joystick in the direction that you want the chase plane to move. You can move around, above, and below your airplane.
Maximum, or “W” view, de-clutters the main screen. In Maximum view, you see only a set of basic flight and navigation instruments along the bottom of the screen. The instruments you see depend on the type of aircraft you’re flying.

Maximum view is particularly useful during the last stages of an instrument approach or landing. Think of it as “taking a peek” over the instrument panel—just as you do in real flying—as you approach the decision altitude or MDA or transition into the flare prior to touchdown.

This view is available only when you are flying in the main 2D Cockpit view.

To switch to and from Maximum view, press the W key on the keyboard (this view is not available by pressing a button on the joystick).

Pressing the W key once displays the view you see here. Pressing the W key again removes the instruments at the bottom of the screen. Pressing the W key once more cycles back to the 2D Cockpit view.
Most of the views in Flight Simulator X work just like those in Flight Simulator 2004.

The following slides point out a few key differences. For more information about the new views in Flight Simulator X, see the topic “Using Views and Windows” in the Learning Center.
In Flight Simulator X, the Views menu includes commands to display the new Landing View and IFR Panels, where appropriate.

In some aircraft, you can also click icons to switch to Landing View or the IFR Panel.
Flight Simulator X introduces the Right Seat view, which puts you in the copilot position.
Right Seat view is especially useful when flying together with another pilot in a Shared Cockpit.
Map View

Flight Simulator includes a Map view that shows the location of your airplane and other information—e.g., airports and navaids.

You can also use the Map view to reposition your aircraft and to view a trail of your flight path.
In Flight Simulator 2004, to display the Map, click this icon.

In Flight Simulator X, to display the Map, click this icon.
In Map view, you can see your aircraft's position, the location of airports and navaids, airspace boundaries, etc. A red trail also marks your flight path.

You can change your aircraft's altitude, heading, speed and LAT/LONG by clicking in these boxes and typing.

Click these buttons to change the map scale and to hide/display map elements such as airports, VORs, NDBs, intersections, and airways.

The black aircraft icon shows your position. You can use the mouse to drag the airplane icon to a new position.

To return to the cockpit, click OK.
In Map view, you can see your aircraft’s position, the location of airports and navaids, airspace boundaries, etc.

A red trail also marks your flight path, and a magenta line shows the GPS course to your next waypoint.

Click these buttons to change the map scale and to hide/display map elements such as airports, VORs, NDBs, intersections, airways, and weather.

You can change your aircraft’s altitude, heading, speed and LAT/LONG by clicking in these boxes and typing.

The black aircraft icon shows your position.
You can use the mouse to drag the airplane icon to a new position.

To return to the cockpit, click OK.
Flight Analysis

- Flight Simulator includes Flight Analysis so you can review a flight. Flight Analysis works like a basic flight data recorder ("black box").
- The Flight Analysis screen looks like the Map view, but you can use controls like those on TV remote to replay a flight on top of the map and to review heading, airspeed, altitude readouts.
To view the Flight Analysis screen, in either Flight Simulator 2004 or Flight Simulator X, press the ALT key to display the menu bar, and then, on the Options menu, click Flight Analysis.
You can see your flight track on the map and your vertical profile below.

Click these buttons to control the playback of your flight.

Drag the slider along this bar to set the starting point for the review of your flight.

Click these buttons to zoom in and out and control what appears on the map.

Flight Simulator 2004
You can see your flight track on the map and your vertical profile below.

Click these buttons to zoom in and out and control what appears on the map.

You can see your flight track on the map and your vertical profile below.

Click these buttons to control the playback of your flight.

Drag the slider along this bar to set the starting point for the review of your flight.
Using Slew Mode

➔ If you want to move your airplane rapidly to a new location without using the Map view, you can use Slew mode.

➔ While in Slew mode you can use the joystick to “zoom” the airplane in any direction—left, right, forward, or backward. You can also use keyboard shortcuts to change altitude rapidly.
Keyboard Shortcuts for Slew Mode

➢ To switch in and out of Slew mode, press the Y key on the keyboard.

➢ While you are in Slew mode, the word **Slew** appears in red in the lower-right corner of the screen.

➢ To increase altitude while in Slew mode, press and hold the Q key.

➢ To decrease altitude while in Slew mode, press and hold the A key.
Controlling Direction in Slew Mode

- While in Slew mode, use the joystick to move your aircraft.
- Push the joystick in the direction you want to travel (forward, left, right, or backward). To stop, center the joystick.
- To change heading (rotate the aircraft about its vertical axis), twist the joystick left or right.
To change heading (i.e., rotate about the vertical axis) in Slew mode, twist the stick left or right.

To move the aircraft left or right, move the joystick in the direction you want to travel.

To move the aircraft forward or backward, move the joystick in the direction you want to travel.
Pausing a Flight

You can pause the simulation at any time to review the situation, look up information, or review any points of confusion.

- To pause a flight at any time, press the \textbf{P} key.
- To resume flying, press the \textbf{P} key again.
Resetting a Flight

You can reset the current flight to start flying again from the beginning of the situation.

- To reset (restart) a flight, press `CTRL+;` (semicolon), or
- Press the `ALT` key to display the Flight Simulator menu bar and on the `Flights` menu, choose `Reset Flight`.
To reset (restart) a flight, press the ALT key to display the Flight Simulator menu bar, and then on the Flights menu, choose Reset Flight or Reset.

Or press CTRL+; (semicolon).
To exit Flight Simulator, on the Flights menu, choose Exit, or press CTRL+C.
Flight Simulator Menus

✈ The following screens show the menus first in Flight Simulator 2004 and then in Flight Simulator X.

✈ The menus give you an idea of the depth of features (e.g., realism settings, system failures, etc.) available in Flight Simulator.

✈ To learn about these features, see the articles in the Learning Center, which is available on the Help menu.

✈ To display the menu bar, press the ALT key (just as in any Windows application), and then use the arrow keys (→ ↑ ← ↓) or the mouse to choose commands.
The commands on the Flights menu help you start a new flight, reset a flight, use the Flight Planner, end a flight, and exit Flight Simulator.
On the Aircraft menu, you can choose commands to select a new aircraft, display the Kneeboard, change the fuel and payload, adjust realism settings, and set up system, instrument, and engine failures.
The World menu includes commands to change the time of day and season of the year and commands for repositioning your aircraft at a new airport, displaying the Map, and changing the weather.
With the commands on the Options menu, you can pause a flight, change the simulation rate, replay a flight, and so forth.
The Views menu includes commands to change the display and to control ATC features.
The commands on the Flights menu help you start a new flight, reset a flight, use the Flight Planner, end a flight, and exit Flight Simulator.
On the Aircraft menu, you can choose commands to select a new aircraft, display the Kneeboard, display a visual flight path, change the fuel and payload, adjust realism settings, and set up system, instrument, and engine failures.
The World menu includes commands to change the time of day and season of the year and commands for repositioning your aircraft at a new airport, displaying the Map, and changing the weather.
With the commands on the Options menu, you can pause a flight, change the simulation rate, replay a flight, view Flight Analysis, and so forth.
The Views menu includes commands to change the display and to control ATC features.
In Flight Simulator X, the Views menu includes commands to display the new Landing View and IFR Panels, where appropriate.

In some aircraft, you can also click icons to switch to Landing View or the IFR Panel.
More Sources of Information

- For more information about Microsoft Flight Simulator, visit the official Web site at www.fsinsider.com.

- You can also find more information about Flight Simulator and Microsoft Flight Simulator as a Training Aid at www.BruceAir.com.