On Top™

IFR Proficiency Simulator

Pilot's Operating Handbook

an **ASA Interactive** product

On Top IFR Proficiency Simulator
Pilot's Operating Handbook

Fourth Printing

Aviation Supplies & Academics, Inc.
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About On Top

The On Top IFR Proficiency Simulator was developed in 1993 to give instrument-rated pilots a "virtual arena." With On Top, pilots could fly approaches, holds, cross-country flights, and even arrivals and departures at the airports and airspace they actually flew in their aircraft. They could modify dozens of weather parameters, creating the conditions they expected the next day or even next winter, including shearing winds and disorienting turbulence. They could set up instruments or entire systems to fail at a given time, or randomly within a range of time. This realism was built into On Top to create the realm of instrument flying, which isn't really airspace above a point on the ground as much as a world of vectors, angles, and positions in the pilot's head that can be dynamically converted into a visual picture of unfolding events.

Like riding a bicycle, fundamental flying skills are rarely forgotten or lost. Pilots might get rusty on the smooth and simultaneous application of power and back-pressure needed to initiate a climb from cruise, but they rarely forget how to do it. A few minutes in the cockpit generally returns their old fluidity to them.

But instrument flying is a different matter. With just a little time off you can lose the edge from your scan, get "behind" the airplane, and find yourself not knowing where you are, where you're going or how to get there. On Top keeps that from happening by putting a professional quality IFR training simulator at every pilot's disposal, allowing them to regain the sharpness of their scan, review approaches before flying them, and learn again how to "think ahead of the airplane."

Each new On Top release continues the tradition of refining and improving the program that first appeared in 1993. The ideas for improvements implemented since then, such as PCATD capabilities for loggable primary instrument training, came from users like you. We depend on your feedback, input and advice to help make On Top the most capable and advanced PC-based IFR simulator on the market. If you like a feature or element of On Top or even if you dislike one, let us know. ASA needs your input to keep improving and perfecting one of aviation's best proficiency and training tools for instrument pilots—On Top.

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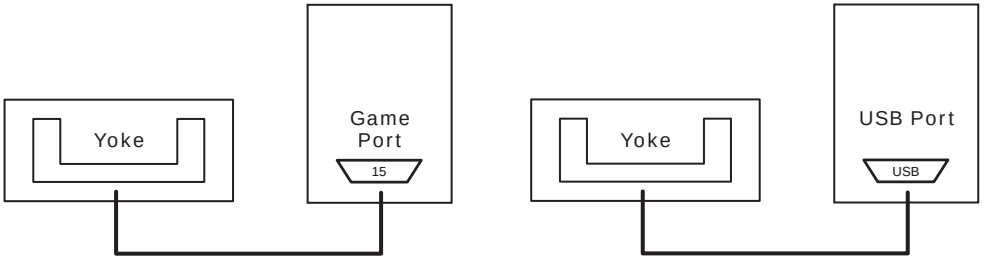
Connecting Your Flight Controls

On Top supports a variety of commercially-available joysticks or yokes, as well as custom-made flight controls such as consoles and avionics panels. Before installing On Top, connect the flight controls you will be using for your IFR flight simulation.

Use the following diagrams to connect your flight controls. Find the heading below that best describes the controls you have, and follow the accompanying instructions and diagrams.

Yoke or Joystick

1. Connect your yoke or joystick to the gameport on your computer using the 15-pin cable.
2. Follow manufacturers' instructions for setting up drivers for your specific controls.
3. For USB hardware, plug yoke into an available computer USB port.



PFC Cirrus Yoke (gameport)

1. Connect your yoke to the gameport on your computer using the 15-pin cable.
2. Install the drivers for the yoke as described below.

Installing drivers for PFC's Cirrus Yoke

Win98/98SE/ME:

1. From the "Start" menu go to *Settings*, then *Control Panel.*
2. Click on *Gaming Options* or *Game Controllers*.
3. Remove any existing drivers for controllers that are NOT physically attached to your computer by removing the controller listing shown under the column labeled "Controller" (highlight and click *Remove*). After the controller and its associated drivers have been removed, click *Add*.
4. Scroll through the listed drivers and click on *4-button flight yoke w/throttle*. If you do not use other gameport devices, most commonly rudder pedals, click on *OK*. Skip to Step #6.
5. If you do use rudder pedals, make sure "Rudders/Pedals" is checked if you are connecting the yoke through your rudder pedals, and that the rudder pedals are connected to your computer's gameport; then click on *OK*. If you use PFC's throttle quadrant, and have the rudder pedals connected to your throttle quadrant, leave the "rudder pedals" option *unchecked;* On Top will see the pedals through the rudder pedal connection within the throttle quadrant. When using PFC's throttle quadrant with the rudder pedals connected to it, we recommend you connect the yoke directly to the computer's gameport.
6. The controller status should show as "OK." Click on *Properties* to verify its proper operation in Windows, and calibrate the controllers, if desired.

Note: Calibration in Windows is optional; On Top requires its own calibration routine. We have found it advisable to perform a complete calibration in Windows. If you choose not to calibrate at this time and have a problem calibrating your controllers within On Top, then calibrate in Windows to ensure that your controllers are being seen properly.

Win2000/XP:

1. Follow Steps #1–3 above. For Windows XP users using XP's standard desktop view, select *Start/Control Panel/Printers and Other Hardware/Game Controllers*. If you have Windows XP set to "Windows Classic," then go to *Start/Settings/Control Panel/Game Controllers*.
2. Scroll through the listed drivers and click on *6-button flight yoke w/two POVs and throttle*. Click on *OK*.
3. Follow Steps #5–6 above.

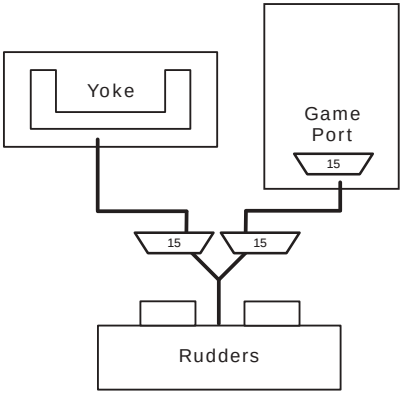
Note: For Win98/98SE/ME users, if you are using PFC's newer 6-button yoke, in the Game Controllers "Properties" box, you will notice that there are only four buttons

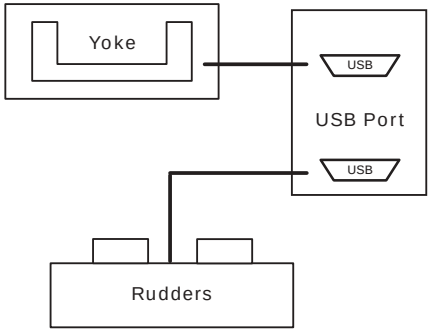
listed, even though your yoke might have six buttons or switches (as on the newer PFC yoke). This is called "multiplexing." When you press one of the switches, several buttons light up on the screen. The user must tell On Top that the switches are multiplexed. To do so, start On Top and go to the Calibration screen (calibration details start on Page 18 of this manual). To select the multiplexed option in On Top, go to the Calibration screen (CAL from the main menu) and select Flight Controls. There are two columns of buttons on the right side of the page. Select the rightmost of the two buttons on the line listing the "4-button flight yoke w/throttle." A box will appear with radio buttons, labeled Normal, Multiplexed, 'CH pro'. Select Multiplexed. (If the button will not "change," press Reset Calibration and try the same procedure again.) Now select the leftmost box and configure as detailed in the Calibrating Your Flight Controls section.

Yoke or Joystick With Rudders

1. Connect your yoke or joystick to the Y connector on the pedals.
2. Connect the cable from the pedals to the gameport on your computer using the 15-pin cable.
3. For USB Hardware, plug yoke and rudders into separate computer USB ports. If your computer has only one available USB port, you will need to purchase a separate USB hub. Connect this hub to your available USB port. Connect the yoke and rudder pedals to the USB hub.

   If you use a USB hub, you must ensure that the yoke is shown as device #1, and the rudder pedals are displayed as device #2, within "game contollers" found in Windows Control Panel.

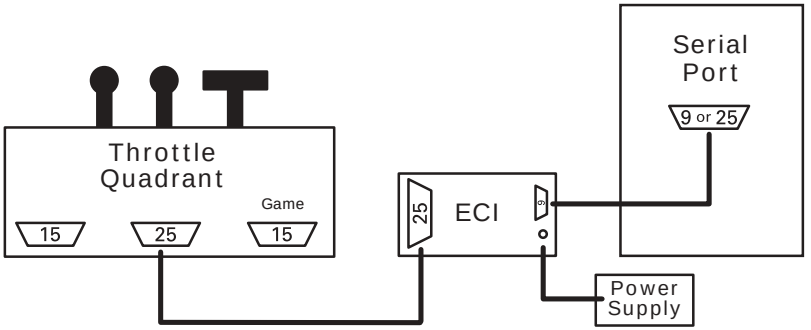




Adding the PFC Cirrus Throttle Quadrant

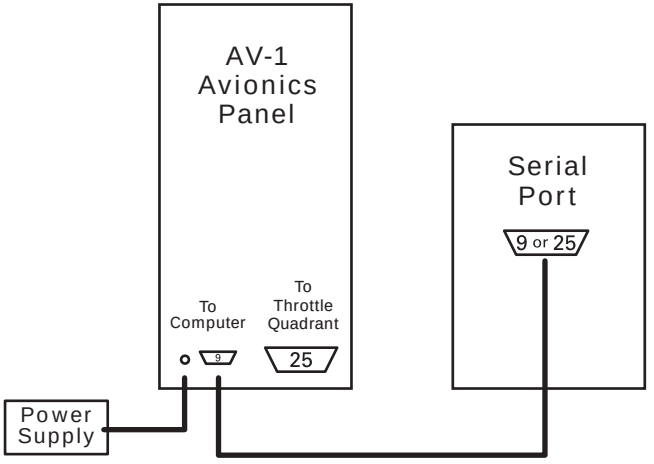
1. Connect the throttle quadrant to the ECI using the 25-pin cable.
2. Connect the ECI to the serial port on your computer using the 9-pin cable.

Note: If you do not have a 9-pin serial port, use the 9-to-25 pin adapter supplied with your ECI.



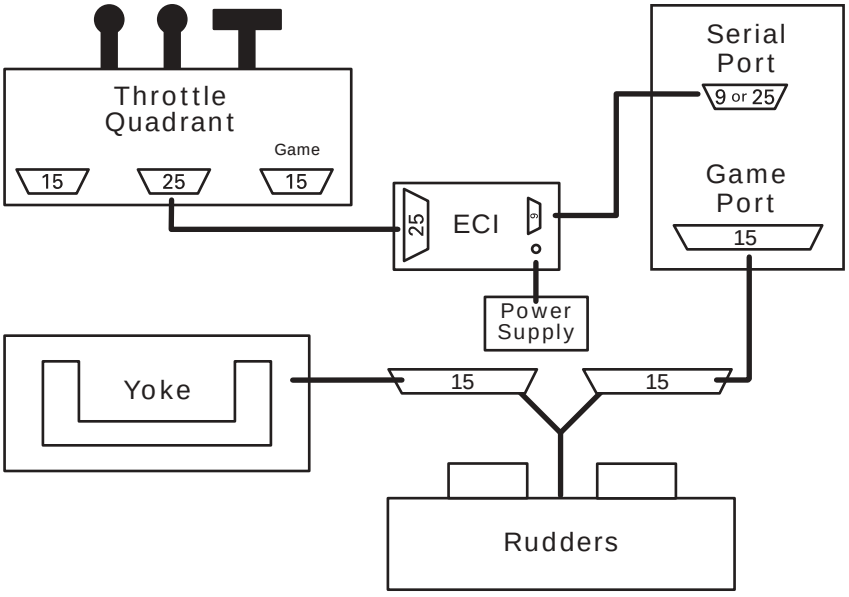
AV-1 Avionics Panel

1. Connect the AV-1 (using the port labeled “computer”) to the serial port on your computer using the 9-pin cable.
2. Connect the power supply to the AV-1 with the 16-mm jack plug. Plug adapter into wall outlet. Ensure red light on the AV-1 is illuminated.



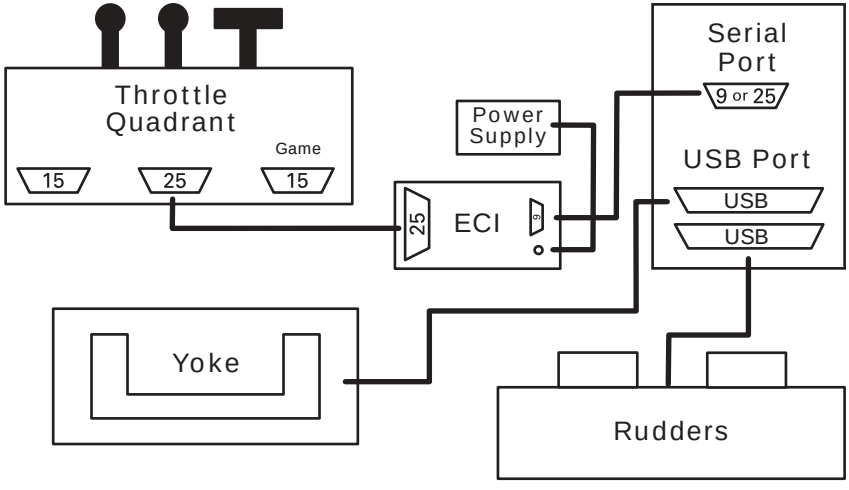
Yoke or Joystick, Rudders and Throttle Quadrant

1. Connect your yoke or joystick to the Y-connector on the pedals.
2. Connect the cable from the pedals to the gameport on your computer.



3. Connect the throttle quadrant to the ECI using the 25-pin cable.
4. Connect the ECI to the serial port on your computer using the 9-pin cable.
5. Connect power supply to ECI with 16-mm jack. Connect power supply to wall outlet.
6. For USB Hardware, plug yoke and rudders into separate computer USB ports (see figure below). Or use USB hub (see details on Page 10).

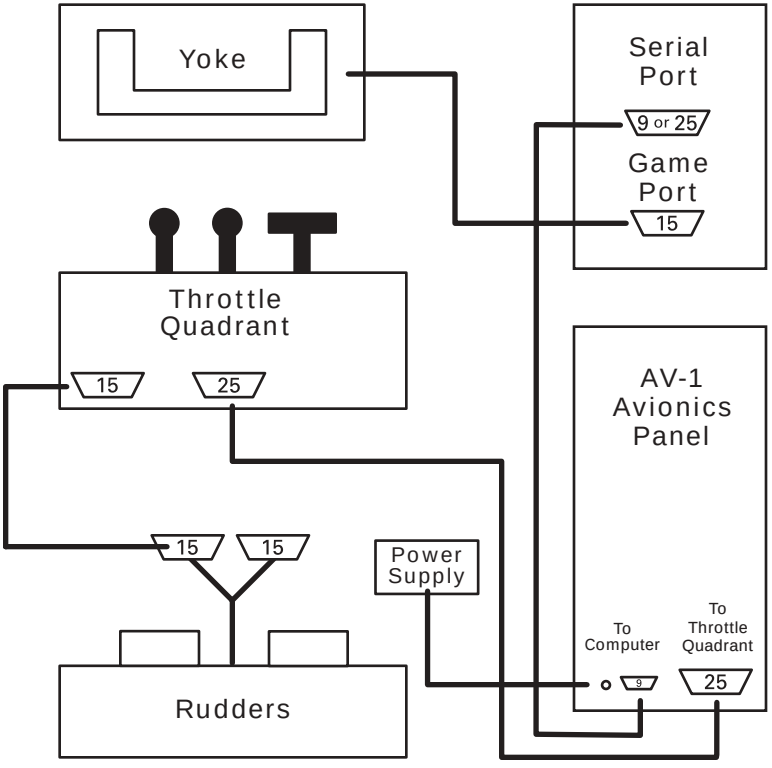
Note: If you do not have a 9-pin serial port, use the 9-to-25 pin adapter supplied with your ECI.



Yoke or Joystick, Rudders, Throttle Quadrant and AV-1 Avionics Panel

1. Connect your yoke to your computer's gameport using the 15-pin cable.
2. Refer to **PFC Cirrus Yoke** for instructions on loading drivers. (See page 9)
3. Connect the rudder pedals to the throttle quadrant port labeled "rudders" using the 15-pin cable.
4. Connect the throttle quadrant to the AV-1 using the 25-pin cable. Use right-hand port labeled "to throttle quadrant."
5. Connect the AV-1 (using port labeled "to computer") to your computer serial port using the 9-pin cable. If you do not have a 9-pin serial port, use the 9-to-25 pin adapter.
6. Connect the 16mm connector that came with your Avionics Panel into the 16mm jack on the back of the AV-1. Plug the power supply into an available wall outlet. Make sure that the red light on the AV-1's front panel illuminates.

Note: When you are finished flying and would like to power down the system, unplug the power adapter from the wall outlet to remove power from the AV-1. Do not simply unplug the power supply jack from the AV-1. This is a hot lead, and should not be left disconnected. Power should not be restored in this manner either.

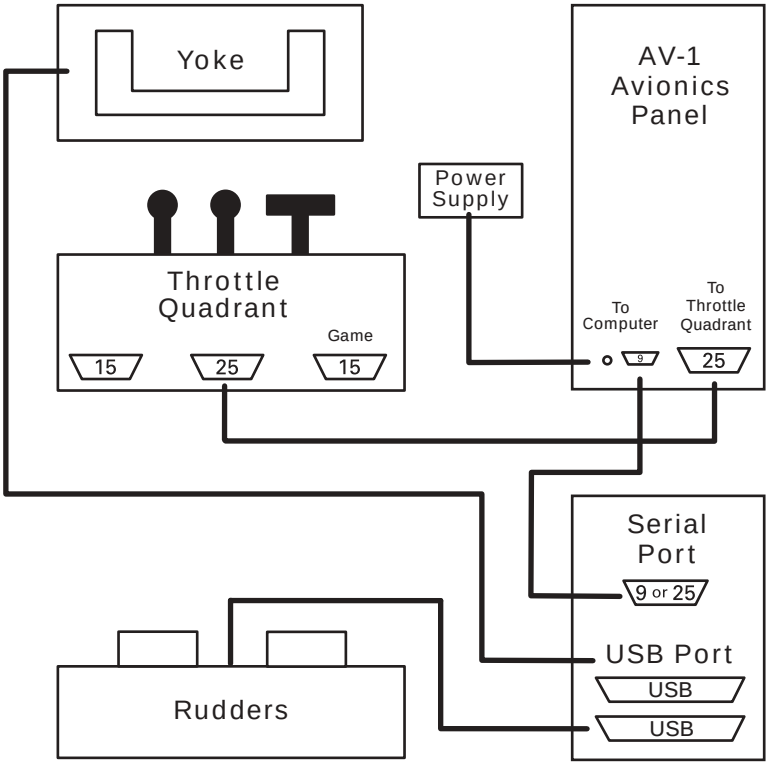


Gameport PCATD Wiring Diagram

PCATD Connections

1. Connect your yoke to one of your computer's USB ports.
2. Connect your rudders to a second USB port (see figure below). Or use a USB hub (see details on page 10).
3. Connect the throttle quadrant to the AV-1 using the 25-pin cable. Use right-hand port labeled "to throttle quadrant" on the back of the AV-1.
4. Connect the AV-1 (using port labeled "to computer") to your computer serial port using the 9-pin cable. If you do not have a 9-pin serial port, use the 9-to-25 pin adapter.
5. Connect the 16mm connector that came with your Avionics Panel into the 16mm jack on the back of the AV-1. Plug the power supply into an available wall outlet. Make sure that the red light on the AV-1's front panel illuminates.

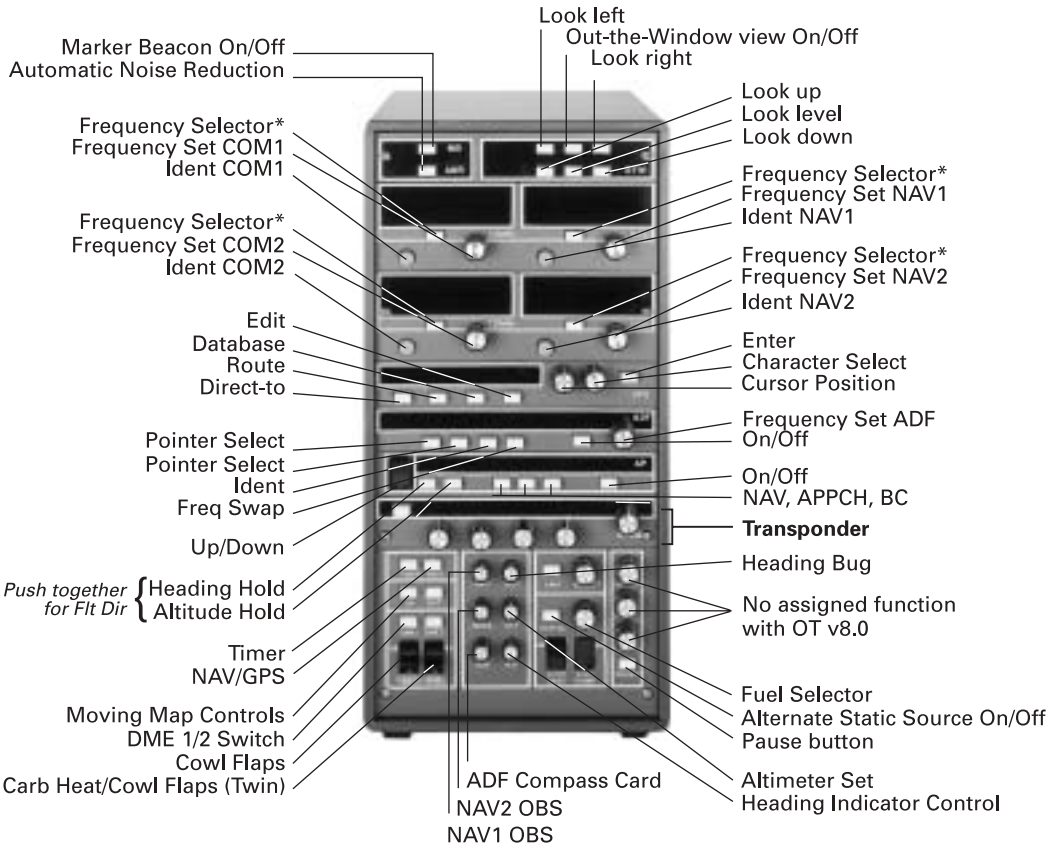
Note: When you are finished flying and would like to power down the system, unplug the power adapter from the wall outlet to remove power from the AV-1. Do not simply unplug the power supply jack from the AV-1. This is a hot lead, and should not be left disconnected. Power should not be restored in this manner either.



USB PCATD Wiring Diagram

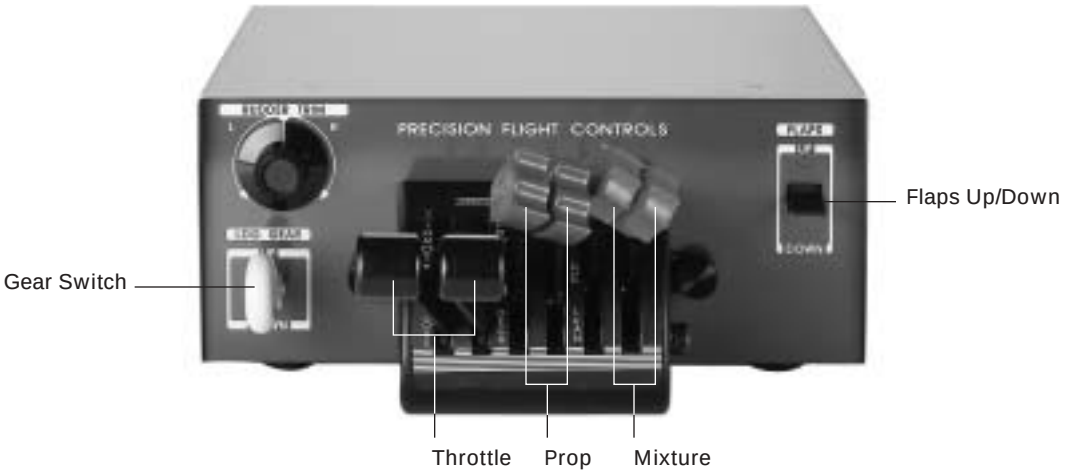
Flight Control Hardware for On Top

These pages detail some of the hardware options that can be used with On Top. Refer back to these pages to see photographs of the actual controls discussed throughout this handbook.



*Moves active frequency to standby, or activates the standby frequency.

AV-1 Avionics Panel



PFC 3- and 6-Lever Throttle Quadrant

PFC Cirrus Yoke

Installing and Running On Top

Minimum Requirements

Before installing On Top, make sure your computer system conforms to the basic minimum requirements needed for smooth and steady flight simulation at all times.

1. Pentium-class processor, 166 MHz or faster (Win98), 200 MHz or faster (WinME), 300 MHz or faster (Win2000/XP)
2. Windows 98, ME, XP, or 2000 operating system
3. 64 MB (WIN98/ME), or 128 MB (XP)
4. 20 MB available hard drive space for a Compact installation; 34 MB for a Complete installation
5. CD-ROM drive (4x or faster)

6. 800x600 SVGA video adapter and monitor
7. Windows DirectX-compatible sound card and speakers
8. DirectX 8.1 or newer
9. Mouse
10. Joystick or yoke

When you install On Top with the "typical" installation option, at first you will have four program executables loaded onto your computer. The differences are that one version uses a 32-bit color mode, one a 16-bit color mode, one a 15-bit color mode, and another an 8-bit color mode. The differences between these modes are primarily in On Top's Out-the-Window views, with the 8-bit version providing a more traditional cloud base and visibility image. However, if your computer supports the 16- or 32-bit versions, you will see terrain texturing, enhanced haze modeling, and more realistic cloud base and visibility graphics.

If the program detects that your system does not support HiColor, a "compact" installation is done. "Compact" includes only the 8-bit graphics executable and graphics library file; therefore it requires one-third less space. When you run On Top for the first time, it will automatically detect which of the versions your computer and video adapter can support and will run that version. You may not know until starting the program whether you've got 8-, 16-, or 32-bit color. To detect which On Top version you are running:

1. Right-click on the On Top shortcut.
2. Select "Properties."
3. Look at the command line on the "target" line. This is where you can edit the program executable if necessary.

Note: There are a total of 4 .exe files that can be used to start the program: 8-, 15-, 16-, and 32-bit. Each higher number designates a higher graphic capability.

Installation

1. Be certain your computer meets the minimum system requirements.
2. Connect the hardware components (yoke, joystick, etc.) you will be using with the simulation.
3. Place the On Top CD-ROM in your computer's CD-ROM drive.
4. The installation process will begin automatically. If it does not, then click on your "Start" button. Select "Run." In this box, enter your CD-ROM drive letter followed by "setup.exe"; i.e., "D:\setup.exe". Or, select "Browse" to locate the file and your CD-ROM. Then select "setup.exe."
5. Select "OK" in the "Run" box.

6. The On Top installer will prompt you through the rest of the installation process.
7. The default drive for installation is "C," but you may change the drive and path.
8. After installation, a new group will appear in your START menu called "ASA Interactive." Click Start, select ASA Interactive, and then On Top to run the program. Or simply double-click the On Top icon which has been placed on your desktop.

Upgrading From Previous On Top Versions

If a previous version of On Top is installed, installing a new version of On Top will create a new "ontop" directory on your hard drive of choice. You can keep the old On Top installation, or delete it at any time after your new version is installed.

Calibrating Your Flight Controls

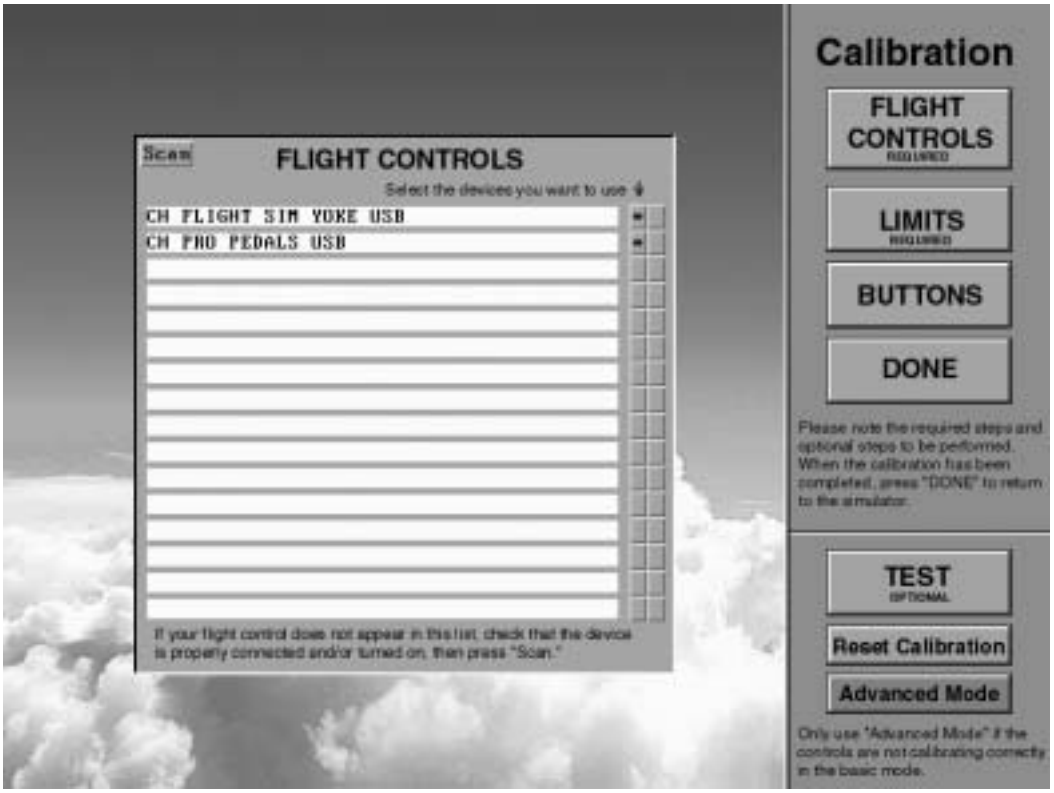
When starting On Top for the first time, you are automatically taken to the Calibration menu. This is where On Top evaluates the input of your flight controls, and where you tell the program what kind of physical control equipment (i.e., yoke, rudder pedals, throttle quadrant, etc.) you have attached.

After using On Top for some time, or if you experience erratic control response in later flight, you might want to return to the Calibration menu. Similar to readjusting your heading indicator to match your compass reading, returning to the Calibration menu ensures that any changes on your physical controls, such as loosening springs or manually altered trim settings, can be compensated for by the program. To return to the calibration screen from the On Top cockpit, click **CAL** at the bottom of the cockpit screen.

The Calibration menu consists of several different screens:

1. FLIGHT CONTROLS, where you identify the flight controls you wish to use with On Top.
2. LIMITS, which evaluates and adjusts the complete range of motion for the control axes.
3. BUTTONS, which allows a range of cockpit functions to be assigned to the joystick or yoke.
4. DONE, which saves the settings and returns the user to the On Top cockpit.
5. TEST, which permits you to verify the action/reaction of the flight controls to ensure functionality.
6. RESET CALIBRATION, which erases the data file storing the settings and clears the control settings.
7. ADVANCED MODE, which is for experienced users to permit the use of non-standard controls.

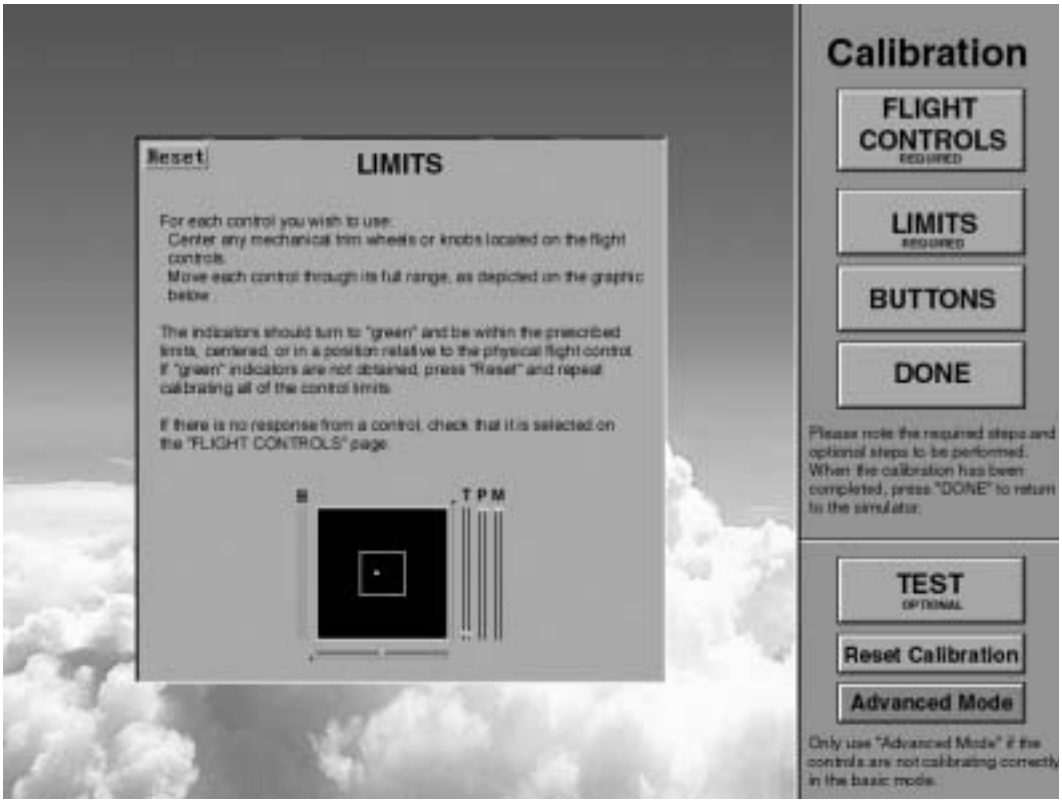
When first entering the Calibration screen, you find a column of buttons from which the calibration sequence begins.



Flight Controls

The first required calibration screen to select is the Flight Controls screen. It is important for On Top to know what kinds of flight controls are being used, and this list allows you to select them. By selecting the FLIGHT CONTROLS button from the main calibration screen, you will have the opportunity to perform a "quick calibration." In the Flight Controls menu, a list is displayed of the flight controls that your computer "sees." (If your screen does not list the controls you have physically connected, check to ensure that they are connected, and the manufacturer's drivers are installed. Then press the "Scan" button in the upper left portion of the screen or Reset Calibration from the column of buttons on the right side of the screen.) Choose the flight controls you wish to activate by using the mouse to click on the leftmost of the two small boxes on the right side of the screen until an asterisk appears in the box.

Note: In the Flight Controls screen, two columns of buttons appear to the right of the listed flight controls. If you noticed in Windows' Properties when calibrating the flight controls that there were only four buttons listed, even though your yoke or stick might have six buttons or switches, the buttons are "multiplexed." When you press one of the switches, several buttons light up on the screen (this will also be noticeable in the Buttons section below). The user must tell On Top that the



switches are multiplexed, so they may be correctly programmed. To select the multiplexed option in On Top, press the rightmost of the two button boxes on the line listing the yoke or stick you wish to use. A box will appear with radio buttons, labeled Normal, Multiplexed, 'CH pro'. Select Multiplexed. (If the button will not "change," press Reset Calibration and try the same procedure again.) Now select the leftmost box and configure as explained below.

Limits

After selecting the flight controls to be used with On Top, click the LIMITS button to proceed with the calibration process. On this screen you will need to fully cycle all the flight controls you wish to use—yoke, rudders, and throttle quadrant, as applicable—through their full range of motion. It is important for On Top to know how much travel is available in the physical controls. If the yoke or joystick has manual trim control wheels or levers, center them before continuing. The limits must be set every time you enter the LIMITS menu.

Cycling the Controls

Move your selected yoke or joystick full forward, full aft, full left and full right. Release it, and verify that the dot representing the center position is within the central green box. It need not be in the exact center of the box, just within it.

Verify that the dot has turned from red to green. *Note:* You must move the controls in both the pitch and roll axis before the dot will turn green.

If attached, apply full left and full right rudder pedal deflection. Verify that the dot representing rudder position is near the center of the horizontal rudder scale bar at the bottom of the display, and the dot is green.

If you have an external throttle quadrant or built-in throttle on your yoke or joystick (and you wish to use it), cycle the levers full forward and full aft. Verify that the levers show full deflection, and the green dot has traveled to the full top and full bottom of the vertical scale. If this is not the case, reset the limits and cycle your controls again.

Note that the first controls you actuate will be the controls that are calibrated. For example, if you have a throttle on the yoke, as well as a throttle quadrant, the first throttle selected will be the one that is calibrated. Should you choose incorrectly, you may reset the limits and start again by pressing Test, then pressing Limits again. When each control is fully articulated, the red dot will turn to green to indicate satisfactory calibration. (If the controls are not calibrating properly, an Advanced Mode calibration might be required.)

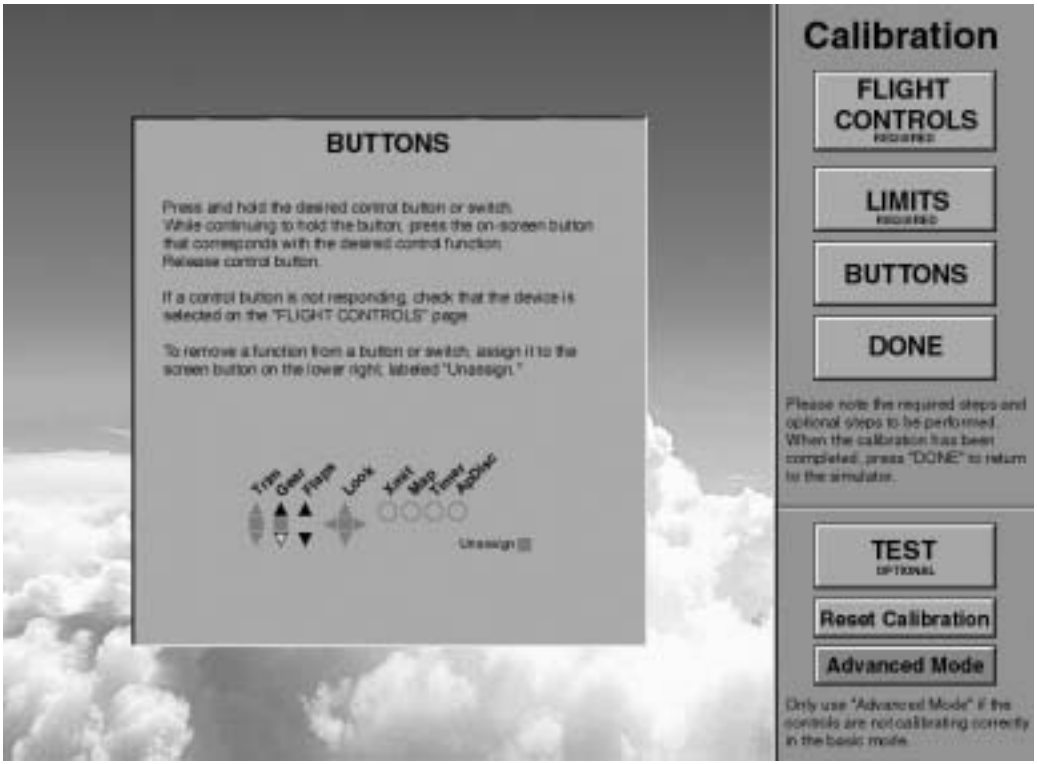
Note: Should you decide not to use the throttle on your yoke or joystick, do not cycle the throttle control, thereby leaving the throttle dot red, and the mouse will actuate the throttle lever.

Considerations for Configuring the Flight Controls

While it might seem you would want every physical control option to be used, consider the throttle function of the mouse or the yoke/joystick. For example, if you wish to attempt engine-out maneuvers in the Beech Baron, but are using your joystick or yoke's built-in, single-lever throttle, you might not want to use this feature. Using the joystick or yoke's throttle "welds" the left and right throttles together, making it impossible to advance one and decrease the other. An engine-out emergency in this flight control configuration ends up being a poor choice for accurate simulation of the event.

The Precision Flight Controls (PFC) throttle quadrants shipped from ASA are typically 6-lever quadrants. These allow you to use the leftmost throttle, propeller, or mixture lever to control the single-engine aircraft, while fully advancing or retarding the rightmost levers to keep them out of your way. You may also keep the levers together when simulating single-engine aircraft, and treat the pair as single levers.

PCATD users: always calibrate your system with the 6-lever quadrant attached. You will be able to replace the 6-lever attachment with the 3-lever attachment at any time without re-calibrating your controls. But if the 3-lever is used for the calibration process, On Top will not allow you to fly the twin-engine aircraft without undergoing another calibration process.



Buttons

On Top lets you assign functions to the buttons and knobs that appear on your joystick or yoke, making the simulation easier and more realistic, because you can perform cockpit functions without ever taking your hand off the control. Gear can be extended or retracted; flaps can be lowered or raised; the timer, an all-important tool in precision and nonprecision approaches, can be stopped or started without ever reaching for the mouse. All this is accomplished through the Buttons screen in a simple and straightforward one-time setup.

When finished with the limits, press the box marked BUTTONS.

1. On the buttons screen you will see the labels and symbols of the cockpit functions that can be assigned to joystick or yoke buttons (trim, gear, flaps, look, transmit, map, timer, autopilot disconnect). To assign one of the buttons a cockpit task or duty, press and hold the desired flight control button, the mouse arrow will turn into a “crosshair” shape. While continuing to press the desired button, left click the mouse over the area on the screen you wish to assign the function to. When correctly assigned, the triangle, square or circle associated with the function will turn from gray to black with green filling the symbol when the control button is depressed.

2. If you wish to change button assignments, depress the button on the control and at the same time left-click the mouse pointer in the “Unassign” square in the lower right area of the screen. Then reassign the button as desired. You may also repeat the process in step 1 above, and the new assignment will override the previous one.
3. If you press a button on the yoke or joystick and multiple switches light on the Buttons screen, the switches are “multiplexed.” To correct this condition so the buttons may be correctly assigned, return to the Flight Controls screen and change the selection from “Normal” to “Multiplexed.” Detailed directions for this procedure are listed on Page 19 of this manual.

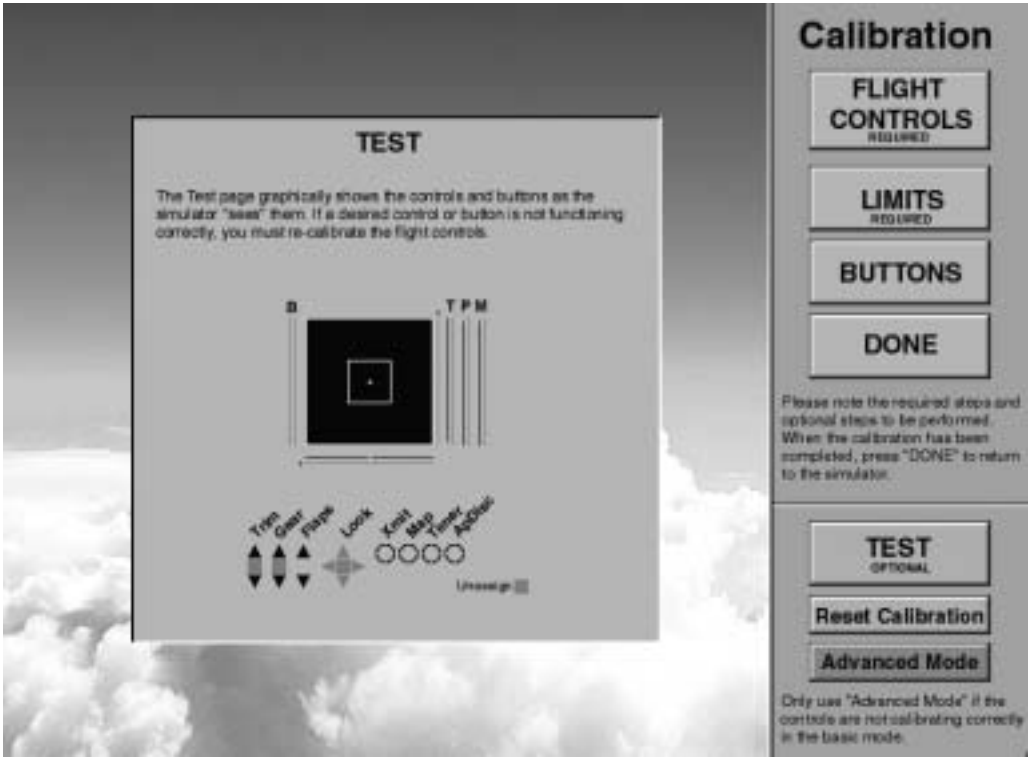
Note that while the Buttons are optional in the Personal Use mode, mandatory components are required in the PCATD mode.

Done

When you are satisfied with the button assignments, press the DONE button and return to the On Top cockpit to fly the simulator.

Test

The test page appears as a graphic compilation of the Limits and Buttons screens. When the flight axes, throttle or buttons are actuated, the respective green dot or symbol will appear.



Reset Calibration

At any time in the calibration routine, you may choose to press the Reset Calibration button to start the calibration routine over. You would start by selecting the Flight Controls and proceed as outlined in the previous steps.

Advanced Mode

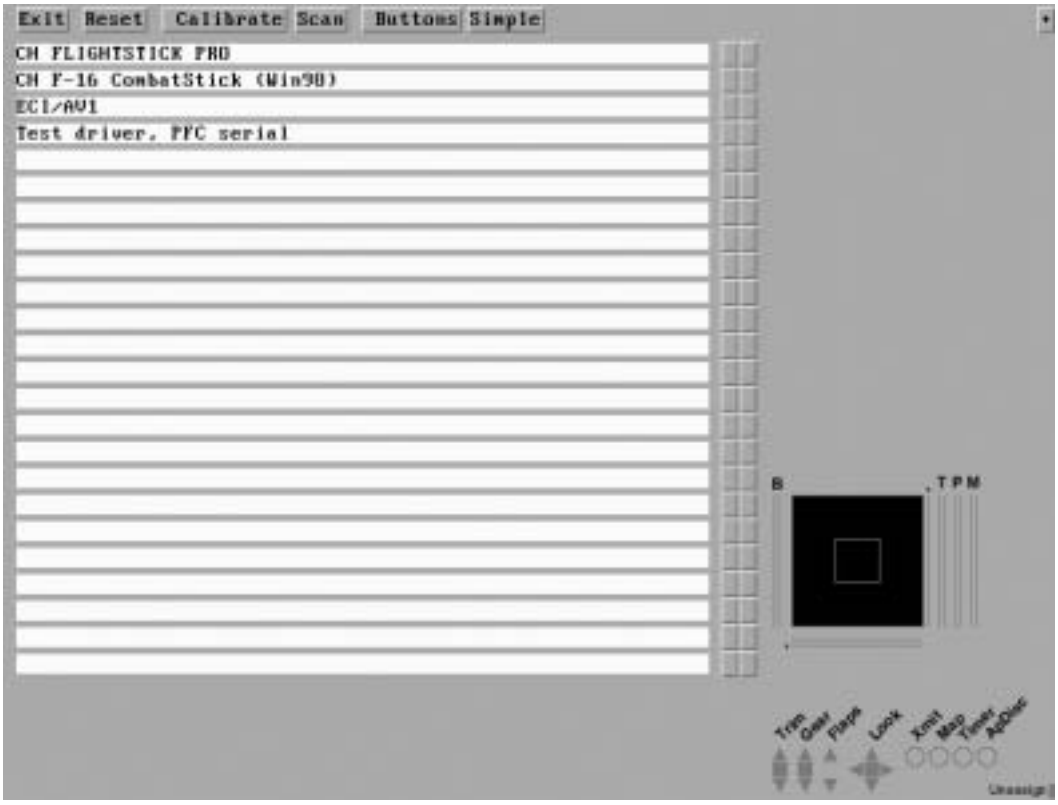
If you are unable to properly calibrate the flight controls in the basic calibration, and you are an experienced computer user, you might use the Advanced Mode. The Advanced Mode is more powerful, and therefore, requires a more detailed understanding of the calibration process. Unless you are confident of your abilities, we recommend that you call ASA (800-ASA-2FLY) or check for support updates at www.asa2fly.com.

The calibration interface model has been developed to permit new flight control devices to work in conjunction with On Top. When fully implemented, ASA will produce DLLs as new flight control hardware is developed for the simulation market. For the present, flight controls that have been successfully used in the past will work without requiring special accommodation. However, flight controls previously not used, or incompatible, with On Top will require either the use of the Advanced Mode calibration or development of the new drivers.

When you enter the Advanced Mode, you have command of the majority of calibration settings. Across the top of the Advanced Mode screen, you will find buttons labeled, Exit, Reset, Calibrate, Scan, Buttons and Simple.

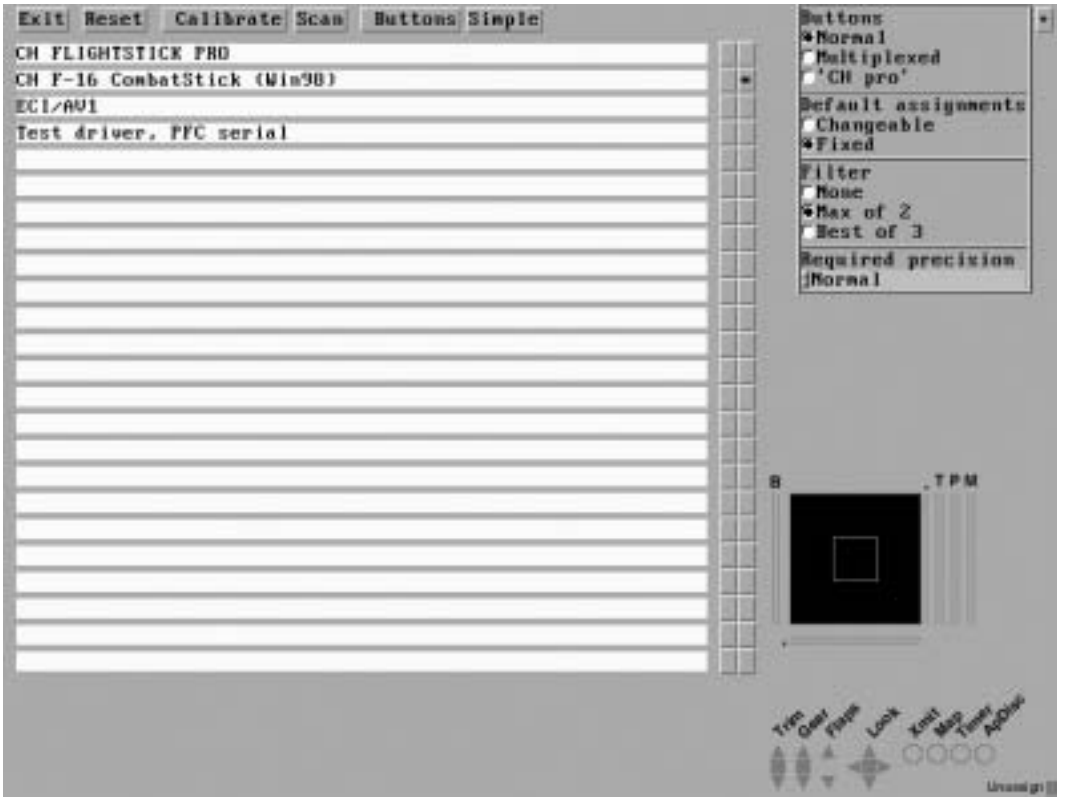
The top row buttons function as follows:

1. The “Exit” button returns the user to the On Top cockpit and saves the current settings.
2. The “Reset” button functions in the same manner as the “Reset Calibration” button in the basic calibration mode, which erases the data file storing the settings and clears the calibration data.
3. The “Calibrate” button performs a quick calibration on the enabled devices asterisked on the list (functions similarly to the basic calibration mode). When the calibration is in progress, an asterisk is visible in the Calibrate button box at the top of the screen.
4. The “Scan” button forces a poll of the devices attached to serial, game and USB ports.
5. The “Buttons” box permits buttons to be assigned as in the basic calibration. When the Buttons box is pressed, an asterisk appears to indicate that assignments may be made or changed.
6. “Simple” returns the user to the basic calibration screen.



The main portion of the screen displays a listing of the Human Interface Devices (HIDs) reported by Windows, as well as specific DLLs written for known flight controls that interface with On Top (e.g., the PCATD approved devices). HID is Microsoft Corporation's term for their built-in USB drivers that vendors such as CH Products use to activate the yokes/joysticks in Windows. A listed item is therefore either automatically detected or the program is "told" (by a DLL) that the device is present. At the lower right portion of the screen is a graphic depiction of how the simulator "sees" the inputs (Controls As Seen by the Simulator or CASS), similar to the Limits and Test screens in the basic calibration.

To the right of the list are pairs of box buttons. When asterisked, the leftmost button on each line indicates that the device listed on the line is enabled (i.e., the simulator is actively using the device). The rightmost button has two possible functions depending upon whether the left box is asterisked. If the right box is selected when the left box is not enabled, a device configuration window appears. If the left box is asterisked, or enabled, and the right box is also selected, an individual calibration box appears for the flight control listed.



Device Configuration Window

The configuration window varies by type of device. Most yokes and joysticks will have a configuration box with four sections shown: Buttons, Default assignments, Filter and Required precision.

In the Buttons section, there are three "radio-button" choices. "Normal" indicates that it is a HID device using the typical default settings. "Multiplexed" indicates that the device has up to 15 buttons, which are encoded into a standard four-button sequence. If a device uses this setting, and is set to Normal, a button pressed on the physical control, will cause two or more buttons appear to be pressed on the screen. By selecting Multiplexed, On Top will be able to interpret the signal so that each of the 15 control buttons may be individually assigned. "CH Pro" is the name given to the older multi-button flight controls that used the standard six-button and two 4-way switch protocols. Examples of such controls are the CH FlightStick Pro and the CH Virtual Pilot Pro yoke. The default setting is Normal.

The Default assignments section permits changeable or fixed channel assignments. "Fixed" assignments are the default channel assignments predicated on the intended usage being known. For example, the hardware and software would read the

gear switch on the throttle quadrant as fixed. Reassignment of this function is not allowed in the calibration window. However, if "Changeable" is selected, the default assignments would again be used, but reassignment of the function would be permitted. The default setting is Fixed.

The Filter reads the signal being transmitted from the flight control, as the On Top software recognizes it. Since the signal from USB devices is strong, a setting of None will often suffice. Max of 2 indicates that a minimum of two, software reads will occur to sample the signal (many errors are caused by dust on a resistor, causing a momentary 'open circuit' condition, which will produce an artificially high reading). The Best of 3 selection will poll the device and discard the poorest reading while averaging the remaining two. The default setting is Max of 2.

The Required Precision section allows for controls of lower resolution quality to function with the simulator. If flight control is not capable of turning the red dot to green, it could be due to inadequate resolution. There are three choices for gauging the precision, Normal, Low and Very Low; these variables are self-explanatory. The default precision setting is Normal.

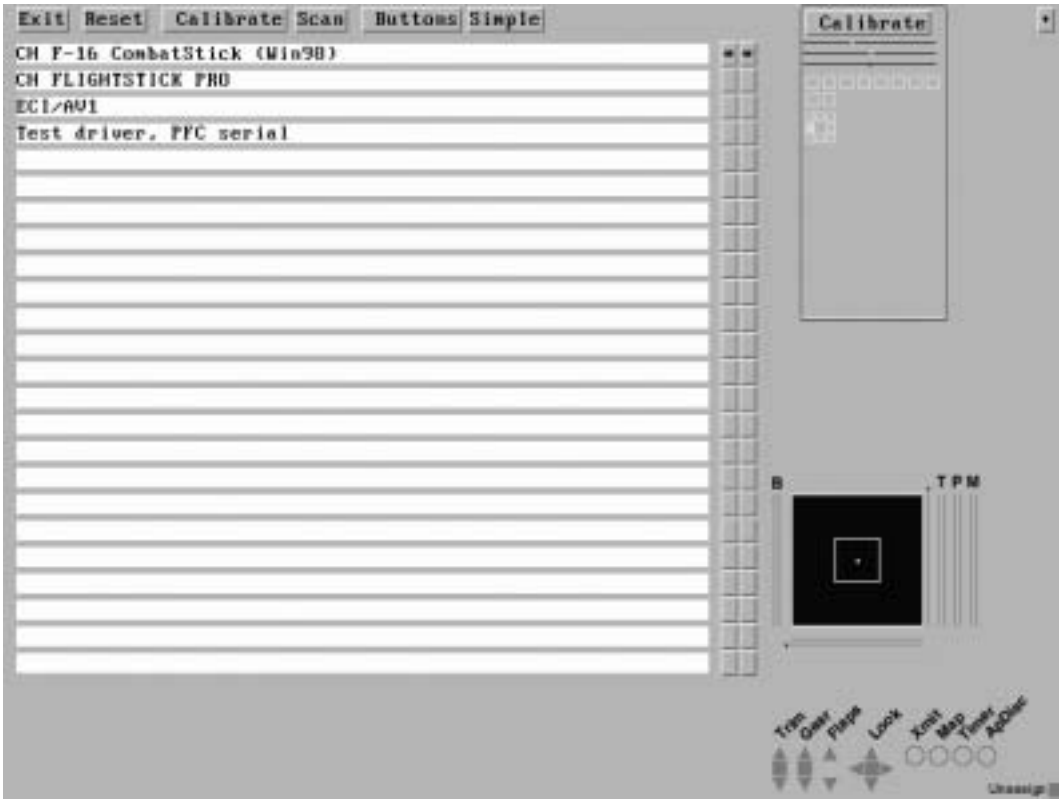
Individual Device Calibration Windows

The individual calibration window is potentially different for each device. It has been designed so that future development in flight controls may be adopted to make the simulation more realistic.

With both boxes associated with a single flight control asterisked, the individual calibration window will appear. At the top of the box is a Calibrate button. When pressed, the button will display an asterisk to indicate the listed flight control is ready to be calibrated. A series of horizontal lines and boxes will appear within the box. Before Calibrate is pressed, the CASS area will first display orange highlights to indicate the anticipated functions to be calibrated. When Calibrate is actuated, the orange will disappear and other color combinations will come into play (see below for color-coding explanation).

You may now proceed to calibrate the controls as you normally would. Fully deflect and articulate the controls, until the lines are black and the dots are green. Then configure the buttons by simultaneously holding down a flight control button or switch, and pressing the left mouse button with the arrow on either a box in the calibrate window or a button symbol at the bottom of the screen. The crosshair will appear, and the highlighted corresponding button (in either the calibrate window or the button symbol) may now be pressed to complete the assignment. The order does not matter, but the button must be "linked" from one part of the screen to the other to complete the assignment.

Calibrate each flight control device separately (by placing an asterisk and removing it after calibration), and when completed, asterisk the left box of the flight controls being used. To resolve conflicts, you may alternately asterisk the right boxes of the



controls to determine which functions are double-assigned (see the color-coded section below).

For the present, the calibration is depicted by lines with dots that move within the limits of the line. A line may represent any control input. For example, on a typical control yoke, the lines represent pitch, bank and throttle axes. The calibration box is active when both the left and right buttons associated with a flight control are asterisked.

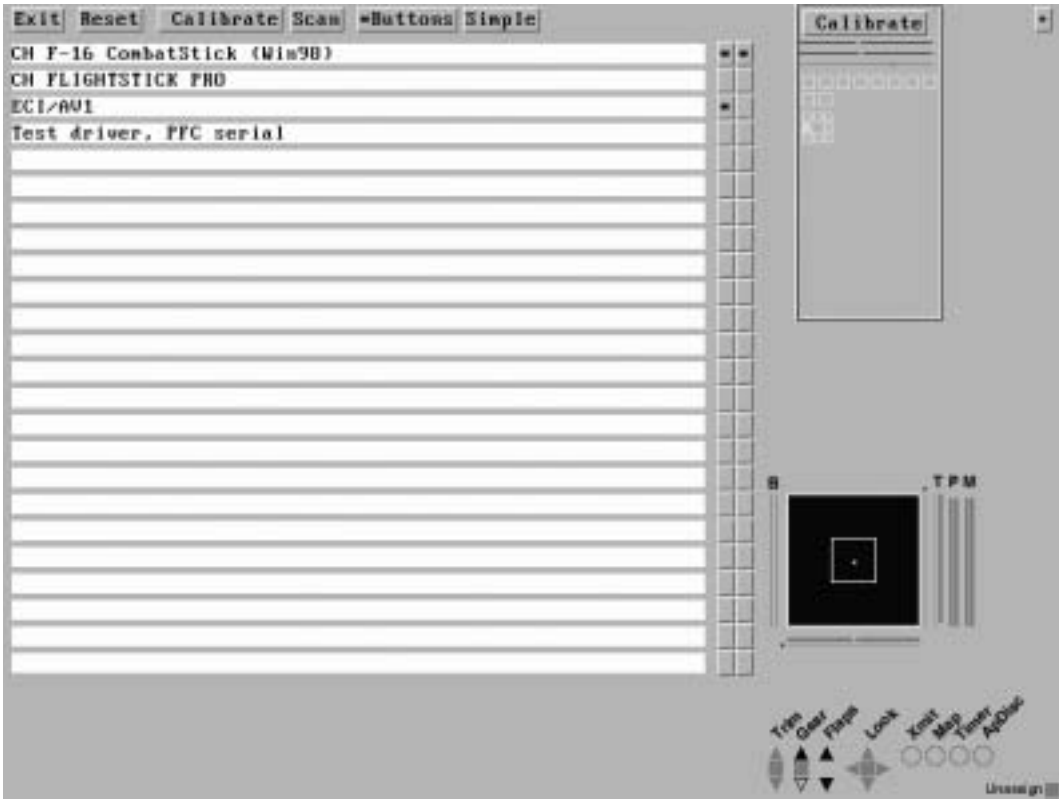
All of the calibration modes are color-coded:

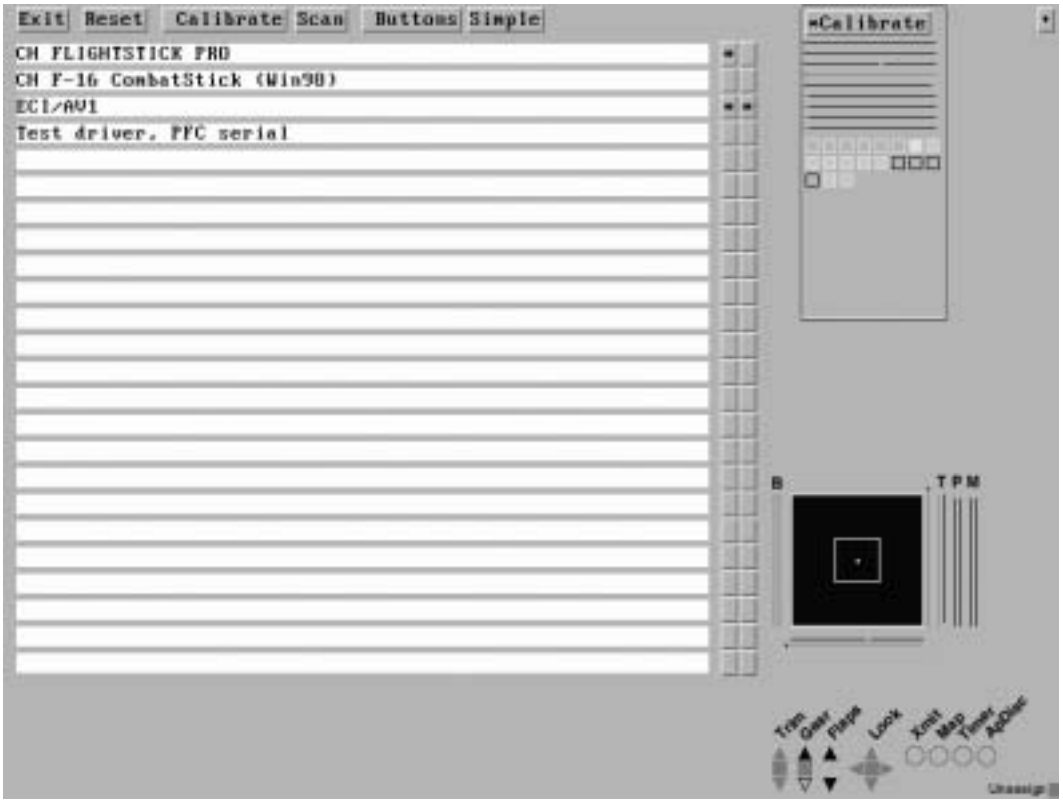
- A black line with a green dot indicates the line is active, assigned, and has “good” data. If the dot remains red, “bad” data would be indicated and the input would not be reliable (for yokes and joysticks both the pitch and bank axes must be calibrated before either will turn green in the CASS area).
- A gray line indicates that the line has not been assigned, and no dot will appear on the line. A gray line with a yellow dot indicates the input has a fixed assignment and is presently disabled.

- If the line is red, more than one function has been assigned. For example, a throttle that is assigned from a yoke as well as a throttle quadrant will show a red line in two calibration windows. For On Top to function correctly, one of the assignments would have to be unassigned.
- In the lower right corner of the screen is the control box that depicts how the simulator "sees" the controls (CASS). When a control is selected for calibration, orange lines depict which functions the simulator expects to calibrate.
- Dark gray indicates that the channel has a fixed assignment, but is presently disabled.
- Cyan indicates that an assignment has not been made, but the function is "assignable." Cyan can appear as a dot on a line or filler for a button symbol and might appear on a white, gray or black background, depending on its status.

Altering Channel Assignments

A channel is assigned during a calibration routine. Once calibrated, you may assign a control function, or remove the assignment, as you wish. To do so, place the mouse pointer on the line or button and click the left mouse button. For example, if the throttle on the yoke and the throttle on the quadrant are both assigned, first





bring up the Calibrate window associated with the flight control function to be removed (in this case, the yoke/joystick). Move the mouse pointer to the line that is red, depicting the throttle, and click on it. The line will turn gray with a yellow dot. (It is assumed in this example that you would want to use the throttle quadrant.)

Button States

A button can indicate four states:

1. **Inactive** — If a button is inactive, control hardware has not been assigned to this function. The button or symbol would indicate a gray outline (circle) or solid gray (square or triangle).
2. **Off** — The hardware has been assigned but is not actuated at this time. The button or symbol would indicate a black outline (circle) or solid black (square or triangle).
3. **On** — The hardware has been assigned and the flight control button is actuated. The button or symbol would indicate a black outline, filled with solid green.
4. **Error** — More than one button has been assigned. The button or symbol would indicate a red outline and/or red fill.

Calibration Data Files

On Top creates two files that determine the control settings. The plugins.dat file is a machine-readable-only file, which automatically saves the calibration settings. It was developed so that ASA might better support complex configurations. The user cannot alter or modify this file.

The other file is one that the user generates, called a plugins.txt file. In the Advanced Mode, the small plus sign in the upper right portion of the screen generates this text file. This file can be viewed with a text viewer, and will also be used to troubleshoot calibration routines. ASA technical support may request that one or both of the files be transmitted to help determine the most effective manner in which to resolve unusual control configurations.

(Please note that adjustment of the flight controls in the Advanced Mode may not be approved for use with PCATD configurations.)

Starting On Top: Personal and PCATD Use

Each time you start On Top, you will see the Title Screen. You may expedite the introductory scenes by clicking the left button on your mouse, anywhere on the screen after the ASA wings appear. You must choose Personal Use or PCATD (personal computer aviation training device) mode before the simulation will begin.

The distinction between On Top's two modes is important. Selecting **Personal Use** allows you to run On Top with virtually any yoke, joystick or rudder commercially available. You will have use of external radio stacks and throttle quadrants (options that are required in the PCATD mode), but the system won't test for their control response and presence.

When **PCATD** is selected, On Top searches for the hardware required by the FAA to qualify as a PCATD. After verifying the presence of these external flight controls, On Top runs a self-test in which it gauges the response of the controls and establishes they are within the allowable limits. Only then does the PCATD mode launch and allow you to fly On Top.

Do not select PCATD mode unless you have purchased your simulation package for that specific task. Even if you have all the required hardware to qualify your simulator setup as a PCATD, it might still be the case that you are not allowed to use your unit as a PCATD, and may be in violation of Federal Aviation Regulations if you do. Among other requirements, a PCATD must be used "in an integrated ground and flight training curriculum," it must be used in an instructor's presence, and it must be used jointly with "instructional material for flight lessons."

If you purchased your system as a PCATD, then you have copies of the requisite approval letters and registration documentation. For more details and information regarding On Top's PCATD mode, see the section of this handbook titled "PCATD Mode" on Page 91.

The On Top Cockpit

Once you have calibrated your flight controls, you are sent to the On Top cockpit. If you look at the cockpit controls, switches and knobs, and think of them as belonging to a real aircraft, you might not even need to read further. In other words, while every knob, switch or toggle has a function, the switch gear acts just as it does in the aircraft.

Generally speaking, every on-screen switch, lever, and knob can be "grabbed" by the mouse (which acts as an extension of your hand), and applied just as in the aircraft. Place the mouse cursor on the gear handle, left-click and hold down the button while sliding the mouse down to extend the gear, just as you would in a real cockpit. Click the left or right side of a knob to rotate it. Many of On Top's mouse-activated controls can be replaced with physical controls such as external throttle quadrants, flight consoles, and an avionics panel.

The Control Menus

There are a series of buttons at the bottom center of the cockpit screen. The buttons provide a gateway in and out of the cockpit environment:

Map: Takes you to the On Top Map screen (see Page 72).

Setup: Takes you to the Setup Main Menu, where position, aircraft type, failures, weather, and more can be defined (see Page 53).

Reset: Returns you to your "Default Startup" position (see Page 70).

Cal: Takes you to the Calibration screen (see Page 18).

Info: Provides details about your version of On Top.

Quit: Ends On Top, returns you to the Windows desktop.

Pause: If you need to momentarily "freeze" the simulation, press the "pause" button. Press it again to resume flight. (You can also pause the simulation with the AV-1 avionics panel by pressing the button in the lower right corner.)

Out-the-Window Views

Changing the Out-the-Window view is handy for circle-to-land approaches, and when you want to look somewhere, other than straight ahead, to find the runway or airport lights. There are two ways to adjust the Out-the-Window view: mouse control or using the avionics panel controls.

1. Mouse

   By left-clicking in the Out-the-Window area (above the cockpit) with the mouse button, and then holding the button in and slowly sliding the mouse from left to right, you can view the area on three sides of your airplane. If you move the mouse slightly up or down at the same time, you can also see slightly below or slightly above the horizon. When you release the mouse button, you return to a level, straight-ahead view.

2. Avionics Panel

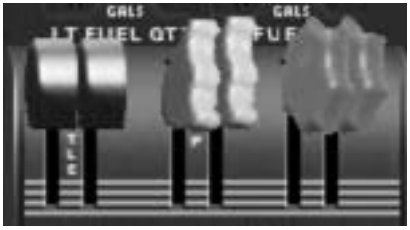
   The buttons located at the top of the avionics panel adjust the Out-the-Window view.

   a. The top left and right buttons slew the view.

   b. The top center button activates and deactivates the new view.

   c. The lower buttons, from left to right, angle the view down, level the view, or angle the view up.

Throttle, Prop, and Mixture



There are three ways to adjust power settings in On Top: a built-in throttle on the yoke or joystick, mouse control, or by using an external throttle quadrant. In the first two cases, the methods are often combined to handle all of the 3 or 6 levers of high-performance singles and the twins.

1. Yoke or Joystick Built-In Throttle

   If you calibrated your game controller's throttle, it will be used to move On Top's on-screen throttle. Sliding it forward will increase the throttle, and aft will decrease the throttle. If you are flying a twin-engine aircraft, the two throttles are "welded" together, making engine-out work difficult at best, and not recommended for proper multi-engine proficiency. We recommend the Cirrus 6-lever throttle quadrant.

2. Mouse

   On Top's cockpit display shows the throttle and prop mixture levers at all times. To use the mouse to control these, simply left click on the desired lever and slide the mouse forward and aft — that's all there is to it. If you previously assigned your joystick or yoke to control throttle, this mode won't work for you.

   There are six levers in the Beech Baron (as well as the Beech 1900*) cockpit. Each of these can be moved independently, as described above, or together by

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** (For a complete description of power management as well as other operating considerations, see the Beech 1900 Basic Procedures section, Page 86.)*

TIP! *If you are deep into a particular flight with the wind blowing you off-course and the turbulence bouncing you against your seat straps, you might not want to have to reach out, grab the mouse, place it on the on-screen throttle lever and move it backward or forward. You might not have time. In this case, simply click the right mouse button anywhere on the screen and move it back and forth. It immediately grabs and activates the throttle lever (and only the throttle lever) so you won't have to take your eyes off the primary flight instruments.*

clicking between the lever pairs and sliding the mouse forward and aft. Additionally, you can "synch" the engines or props by clicking between the levers and slowly "twisting" the mouse left or right. This separates the levers enough to synch the throttles or props if necessary, but doesn't provide enough difference between the two lever positions for engine-out practice. You can also grab the left or right controls independently with the mouse by clicking in the center of the control you want to adjust.

3. External Throttle Quadrants

   The external throttle quadrants are the simplest to use and the most realistic-feeling. The levers move and feel just like those in the aircraft you fly. See Page 10 for details on connecting and calibrating external throttle quadrants. Only those external throttle quadrants or flight consoles listed and detailed in the section, "Connecting Your Flight Controls" beginning on Page 8, are certified for use with On Top in PCATD mode.

Carburetor Heat and Cowl Flaps

Each On Top aircraft has the appropriate carburetor heat, alternate air or cowl flap controls, and these show on the cockpit display on-screen. To move these levers in the PCATD mode you must use the controls on the AV-1 panel. The changes to controls will be reflected in the engine gauges on-screen, and the on-screen indicator will show the relative position of the control.

In the lower left section of the AV-1 panel are two "rocker-type" switches labeled CF and CF/CH, for carburetor heat and cowl flaps. Applying continuous pressure to either or both of these rockers makes the on-screen carburetor heat or cowl flap handle move, and selects the proper range. When flying the Beech Baron, both rockers control cowl flaps, one for each engine.

Pitch Trim

Maintaining a constant pitch trim is arguably the most important flight task in instrument flight. On Top gives you three methods to adjust pitch trim, but we will first discuss the one wrong way.

Many yokes and joysticks include pitch and bank trim controls on their bases or sides. These controls may increase or reduce the amount of travel the mechanical controller can use, but they have no affect on the aerodynamics of the simulator. It would be like holding forward pressure as your real aircraft gradually increases speed, until you are using all your arm strength just to maintain straight-and-level flight. Not only would your arms get tired, but the amount of available elevator travel is so limited that your aircraft becomes dynamically unstable in pitch. In the three correct methods for adjusting pitch trim, On Top simulates the forces acting on an elevator trim tab to more accurately mimic real flight.

1. Yoke or Joystick Buttons

   If your joystick or yoke has at least two buttons, use these to control nose-up and nose-down trim. Under "Buttons" on Page 22 you'll find instructions on how to assign nose-up and nose-down trim to these buttons for the simplest control of pitch trim. Once this is done, a quick, short click on the appropriate button activates nose-down or nose-up trim, which you can verify by watching the on-screen trim indicator on the cockpit display. Use small adjustments to trim, gradually testing for the amount that will allow you to fly hands-free for an extended period with only occasional control inputs.

2. On-Screen Trim Wheel

   The On Top cockpit display includes a trim wheel. By left-clicking the wheel and slowly moving the mouse up or down on the desktop, you will not only see the wheel move, but "feel" the immediate changes in aerodynamics. This method is not as precise as using your yoke or joystick's pre-assigned buttons to control trim, but it is the fastest way to stabilize trim.

3. Auto-Trim

   Near the on-screen trim wheel is a button marked AUTO. This is the auto-trim switch, and when pressed it immediately trims your control surfaces to obtain the indicated pitch attitude.

   a. Establish a stabilized airspeed; since airspeed is a function of pitch and power, adjust the pitch/power setting as desired. Wait for desired/expected airspeed to stabilize.

   b. Mouse-click on the auto-trim switch, and hold down the mouse button.

   c. Release your joystick or yoke, allowing it to center while the AUTO button is being held down.

   d. Release the AUTO switch by letting go of your mouse button.

Note: Trimming a simulator yoke or joystick is counter-intuitive to a pilot. In the aircraft, the yoke is correctly positioned, and the trim is actuated to relieve the pressure. In a simulator, pitch is established, trim is set, and the yoke is released until a neutral or centered position is achieved. Thus the sequence is pitch, trim, release, and pitch, trim, release until hands-off, level flight can be achieved.

Gear and Flaps

As with pitch trim, there are a number of ways to set gear and flaps in On Top.

1. Mouse

   One way to control gear and flaps is to reach out with the mouse pointer, left-click and hold the gear or flap handle, and drag it to your desired position. Both gear and flaps show the appropriate delay in transiting, so wait for a few seconds after setting the levers, until you see the indicators reflecting the desired setting, before moving them again.

2. Yoke or Joystick Buttons

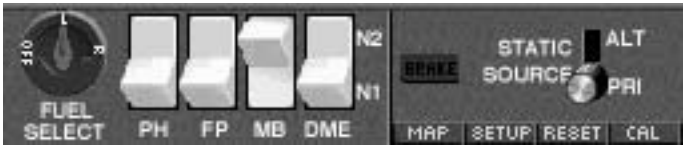
   You can also use your yoke or joystick buttons to control gear and flaps by assigning these tasks in the Calibration screen. See Page 21 for details.

3. External Throttle Quadrants

   If you have a throttle quadrant and the required external controls interface (ECI) or avionics panel, you can use the gear and flap levers built into these devices. See Page 8 “Connecting Your Flight Controls” for details.

Alternate Static Source, Fuel Selector, Fuel Pump and Pitot Heat

Each of the Alt Static Source control, Fuel Selector, Pitot Heat (PH), and Fuel Pump (FP) switches can be toggled on or off, or moved into another position, by clicking with your mouse on the appropriate knob or switch.



Using the Avionics Panel

The picture and text on Page 15 show the location of these control switches on the AV-1 panel.

NAV/COM Radios

Two COM radios and two NAV radios occupy the upper half of the on-screen radio stack, with the same dual knobs and other features you would expect to see in real aircraft.

To tune these knobs, left-click the left or right side of the inner or outer knob, and watch the frequencies ascend or descend in the display area of the radio. The frequency is tuned in the Standby window, or right half of the display, and activated by clicking the “flip-flop” button with the double-headed arrow between the frequencies.

To identify a particular NAVAID, click the Ident knob labeled **VOL** on the NAV radio face. The audible Morse identifier for that station can be heard through your computer speakers.

Suppose you don't know the frequency of a particular NAVAID, or your chart is in your airplane — On Top allows you to Auto-tune VORs, NDBs and localizers from the map screen.

1. From the cockpit screen, click **MAP**.
2. Your current position is shown, along with NAVAID symbols. If you can't see the NAVAID you are trying to tune, use the **IN** and **OUT** buttons below the four directional arrows (not below "Profile") to change the map scale.
3. Click on the NAVAID you want to tune.
4. In the ID box that comes up, you will see "Tune Nav 1" or "Tune Nav 2," or in the case of an NDB, simply "Tune."
5. Click your choice of radio to tune and that frequency will be set in the cockpit.
6. Click **RE-FLY** or **RESUME** to return to the cockpit.

Note: While the Map screen gives you this great tool to help you tune radios effortlessly, tuning in this manner does not save the frequencies in a saved scenario. See Page 57, "Cockpit Options," for setting frequencies in saved scenarios.

Using the AV-1 Avionics Panel

The frequency displays are shown on the simulated on-screen cockpit display, not on the AV-1 panel. Each radio (COM1, COM2, NAV1, and NAV2) has a knob and two buttons.

1. To change frequencies, turn the knob left or right to change whole digits; press in and turn left or right to change numbers to the right of the decimal.
2. The white button (with double-headed arrow) acts as a Standby flip-flop to swap frequencies from inactive to active.
3. The round gray button is the ident controller. Press it to hear the audible Morse code identifier from the selected station.

OBS and CDI Indicators

As with the frequency set knobs on the NAV/COM radios, all omni-bearing selectors, course deviation indicators, and heading bugs in On Top can be set by clicking the left or right side of the appropriate button.

You can rotate the desired function continually, with no need for repeated clicks, by holding these buttons in. Simply hold the mouse button down until your heading or course is under the indices. If you go too far, click the opposite side to realign it.


CDI


HDG Bug


OBS

Using the Avionics Panel

The heading, OBS, and CDI controls are in the lower center of the Avionics Panel.

1. NAV1 controls the OBS or HSI selection of the NAV1 indicator.
2. HDG controls the heading bug.
3. NAV2 controls the OBS of the NAV2 indicator.
4. ADF rotates the compass card when RMI is selected.

Aligning Your DG

Repeatedly check that the heading under your Directional Gyro (DG) matches that displayed by On Top's "wet" compass mounted above the radio stack. Prior to starting a flight, and several times in-flight, rotate the DG alignment knob by clicking the left or right side with your mouse, until the heading matches the one displayed by the compass. As the compass incorporates turning, acceleration and deceleration errors, make sure you are flying straight and level in unaccelerated flight when you adjust the DG.

Attitude Indicators

On Top's Attitude Indicator can be adjusted by clicking left or right of the round knob below the AI on the on-screen panel. As on the model it emulates, there is no Attitude Indicator adjustment for the Flight Director attitude indicator.

Activating Runway Lights at Night

You may want to activate the runway lights on an approach down to minimums at night. On Top does not automatically turn these lights on, but relies on its own unique type of Pilot Controlled Lighting (PCL).

To activate runway lights at night, ensure that the NAV1 OBS is tuned to within 10 degrees of the runway heading that you are the most closely aligned with.

For most precision approaches, the runway lights are always lit on the landing runway since the localizer or ILS points to the runway approach end, and therefore the OBS is set within the requisite 10 degrees. But on an NDB approach, your OBS may be set to the initial missed approach heading. Or you may have flown a nonprecision VOR approach on a final course of 70 degrees to Runway 5. In either case, prior to landing or on reaching the MAP, remember to rotate your NAV1 OBS to within 10 degrees of the runway heading.

RMI and ADF

On Top's in-cockpit ADF unit controls either the ADF indicator or RMI head, as selected in the Aircraft Setup screen and your Panel options (see Page 55).

On the face of the radio are single- and double-barreled pointer buttons. Clicking each button rotates through the choices of what can drive that pointer: A for ADF, N1 for the NAV1 radio and N2 for the NAV2 radio. In this way either the single or double pointer can be tuned to VORs or NDBs.

To tune the NDB on this radio, click the left or right side of the outer knob to set the first NDB digit, and the inner knob to control the second and third frequency digit. To tune 388 on the ADF or RMI, you would use the outer knob to set 3, and rotate the inner knob until 88 is shown on the display. Clicking the **IDT** button audibly identifies the selected signal.

Using the Avionics Panel

The ADF controls, from left to right, are:

1. Single-needle NAVAID or station select.
2. Double-needle NAVAID or station select.
3. Frequency ident.
4. Frequency swap, standby to active.
5. Off, on, or standby switch.
6. The frequency set knobs. Turn left or right to control "hundreds" digit, press in and turn left or right to control tens and singles.

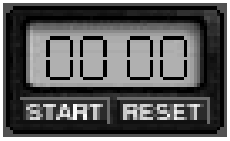
Transponder

Transponder squawk codes are set using the four round knobs under the face of the transponder. Click left or right of the knobs to rotate them through the available digits.

Using the Avionics Panel

The four round knobs on the transponder (found below the ADF) represent the four digits available for tuning a given squawk code. The leftmost white button controls Ident, and the rightmost round knob controls the Off, Standby and Alt functions of the transponder. Squawk codes set here are read from the transponder display on the on-screen instrument panel.

Timer



On Top's timer is located on the bottom center of the cockpit. Clicking **START** starts the timer. Clicking **START** again stops the time. Clicking **RESET** resets the timer to zero.

Using the Avionics Panel

The TIMER switch on the left side of the panel below the transponder starts the timer. Press the switch again to stop and reset the timer. Press it a third time to restart the timer at zero and begin counting again.

Marker Beacons

The marker beacon receiver audio selector is a rocker switch marked MB in the bottom left corner of the display. Press this switch in by clicking on it, when marker beacon audio is desired.

Marker beacon indicators, located in the upper left-hand corner of the DG or HSI, show the appropriate colors for outer, middle, and inner markers in the square as the airplane crosses each beacon. They provide the audible signal only when within the range published on the appropriate approach chart.

Engine Sound

The automatic noise reduction (ANR) button is located in the upper right corner of the glareshield. ANR simply cuts the background engine noise to help the pilot discern the marker beacon tones.

Using the Avionics Panel

The upper left buttons, marked MB and ANR, control the corresponding functions.

Brakes

Once on the ground, press forward on the yoke or joystick to apply the brakes. Gradually apply braking pressure so that you do not put excessive pressure on the nosewheel. To activate the parking brake, hold the yoke or joystick fully forward for 5 seconds, until the Brake light comes on. The light will flash yellow, with forward yoke pressure, then turn red when this brake is set. To release the brake, hold the yoke or joystick fully aft for 5 seconds, until the light goes off.

Autopilot

On Top's cockpit includes a 2-axis autopilot with flight director, approach, back course and navigation modes. It is located above or below the Heading and Attitude Indicator cluster.

1. To turn the autopilot on, click the **AP** button.
2. To hold an altitude, establish that altitude, then click the **ALT** button.
3. To climb or descend from a set altitude, click and hold the **DN** or **UP** button and the aircraft will descend at 500 feet per minute until the button is released. Upon reaching the desired altitude, release the **UP** or **DN** button.
4. To hold a heading, rotate the heading bug on the DG or HSI to the desired heading by clicking the left or right side of the heading bug knob. Click **HDG**.
5. To track direct to the station tuned in on NAV1, click **NAV**.
6. To track a localizer or ILS approach, navigate to within 30 degrees of the final approach course and click the **APP** button. The autopilot might "hunt" for some time depending on the intercept angle, but will eventually settle to the localizer heading. If intercepted below glideslope, when the glideslope indication reaches the center of NAV1 (or the HSI) the autopilot will control pitch trim to establish a descent angle. Use power, gear, and flaps to further adjust speed and pitch.
7. To track a localizer back course, intercept the course within 30 degrees and click the black button.
8. If the Flight Director is selected as an option in Aircraft Setup (see Pages 48–49), an **FD** button will turn the command bars on or off.

Using the Avionics Panel

The autopilot controls occupy the space below the DG/HSI. The buttons on the face of the panel mimic those on-screen:

1. The left rocker switch controls the **UP** and **DN** functions of the autopilot.
2. The two leftmost buttons control (from left to right) **HDG** and **ALT** functions.
3. The three center buttons control (from left to right) **NAV**, **APP** and **BC** modes.
4. The rightmost button is autopilot ON/OFF, or **AP**.
5. When the Flight Director is installed in the cockpit using Aircraft Setup, simultaneously pressing **HDG** and **ALT** turns the command bars on or off.

DME

The DME readout is below the DG or HSI and above the autopilot. Clicking N1 selects the distance from NAV1, N2 selects the distance from NAV2 (this rocker switch is in the bottom left part of the cockpit). If the tuned NAV1 or NAV2 frequency does not have distance measuring equipment built into the station, no readout is available.

The On Top DME measures "slant-range" distance, just as DMEs do in real life. At an altitude of 5,200 feet above the station, your DME readout will show one mile on station passage. After passage, the distance will increase. When associated with an ILS, DME distance originates at the localizer transmitter location. Thus, the DME will display the distance to the localizer transmitter when over the runway threshold; e.g., approximately 1 mile with a 5,000-foot runway.

Using the Avionics Panel

The N1 and N2 DME controls are located in the lower left side of the avionics panel, above the "Cowl Flaps/Carb Heat" levers. Pushing the buttons selects the respective NAVAID just as clicking N1 or N2 in the cockpit does.

GPS

On Top's GPS-1000 is a VFR GPS with a complete database of On Top's airports, NAVAIDs, and intersections or fixes. It functions as a point-to-point navigational aid and can store, edit, and fly pre-programmed routes. When actively flying a Route or Direct-to navigation, the GPS-1000 can be slaved to either NAV1 or the HSI, whichever is currently being used.

The GPS-1000 uses 4 primary control switches, two Control Knobs (left and right) and one **ENT**, or Enter, button.

1. **D>** is the Direct-to button, for flying direct to a desired waypoint.
2. **RTE** is the Route button, and opens the Route Selection page.
3. **DB** opens the Database page.

4. **EDT** is the Edit function, used with the Route and Database functions.
5. The left control knob controls cursor position in the Direct-to, Route and Database pages. Rotate the knob clockwise to move your cursor right, counterclockwise to move it to the left.
6. The right control knob controls the alphanumeric characters used in these pages. Alpha characters are followed by numbers 0 through 9 and an "empty" character, before starting again with the "A" character.

When the GPS is not actively running a route or Direct-to navigation, the display provides a readout of ground speed and current latitude/longitude, along with a "Not in Use" message. The lat/long is accurate to the real world: overflying a NAVAID or airport reveals the actual lat/long of that point.

When running a Route, or in Direct-to mode, the display shows:

1. The next waypoint identifier.
2. CDI needle.
3. To/From arrow on CDI needle.
4. DTK, the desired track to the next waypoint.
5. TRK, the actual track to the next waypoint.
6. GS, the actual ground speed relative to the selected waypoint.
7. TTWP, time to waypoint in an hours:minutes format.
8. NTRK, when it appears, means next track in a route, the heading to the next waypoint that will appear on the GPS.

Direct-To Navigation

On Top's GPS-1000 allows Direct-to navigation to the airports, NAVAIDs, and intersections contained in the program's database. When selecting one of these destinations for Direct-to usage or creating Routes (as explored later), remember that each airport, NAVAID, or intersection must be preceded by the appropriate identifier:

- K goes before airports, as in KORD for Chicago O'Hare.
- V precedes VORs, so the OED VORTAC (Medford, Oregon) is entered as VOED.
- N precedes NDBs, so the Prahl NDB (PLV) in Aurora, Oregon, is entered as NPLV.
- F precedes intersections (fixes), so the MERMA intersection is entered as FMERMA.

(*Note:* When using international database features, the ICAO country code must be included in the identifier.)

To navigate Direct-to a NAVAID:

1. Click the **D>** button on the GPS.
2. Use the right control knob to select K, V, N or F for the waypoint identifier.
3. Use the left control knob to move the cursor to the second display position, by clicking the right side of the knob once.
4. Rotate the right control knob to select the first character of the desired airport or NAVAID; for example, “O” in OED.
5. Use the left control knob to move the cursor to the next position.
6. Rotate the right control knob to select the second character of the desired airport or NAVAID; “E” in OED.
7. Use the left control knob again, to move the cursor to the third position
8. Rotate the right control knob to select the third character in the identifier; “D” in OED.
9. When the desired waypoint identifier (K, V, N or F) and waypoint is displayed, as in VOED, click **ENT**.
10. When you return to the CDI display you will see the identifier, the CDI showing the direction to turn towards the course, TRK, DTK, Groundspeed, and TTWP.
11. If you make a mistake while entering a NAVAID identifier, use the left control knob to reposition the cursor over the error, and use the right control knob to re-enter the letter or number.

The cursor now shows the bearing to your selected waypoint. It always shows the bearing from the time you selected **ENT**, not from your current position. If you delay in turning to the correct heading, the deflection angle may be too great to compensate. To get a new bearing, click **D>** again, and press **ENT**. Since your NAVAID is already selected, the GPS-1000 will recalculate the bearing and show you a new CDI deflection from your now-present position.

Important: The GPS may be slaved to your primary navigation unit, whether HSI or CDI. In either case, it is now showing the displacement between your course and the desired course, but it is not aligned with the GPS DTK heading. Rotate the OBS until the heading shown in DTK on the GPS is under the index on your HSI or VOR head.

Creating a Route

Follow the steps below to learn how to create, store, and fly a route from Portland-Troutdale Airport (KTTD), to the Prahl NDB near Aurora, OR (NPLV), to the Eugene VORTAC (VEUG), to the Rogue Valley VOR (VOED), to our final destination, KSIY, Siskiyou County Airport in Northern California. For the purposes of this example, the aircraft may be in flight, however, you might wish to position it on the ground so you can devote your attention to the task at hand. If you want to position yourself at Portland-Troutdale for immediate takeoff when the programming is complete, refer to "Position" on Page 59. Make sure altitude is set to the field elevation and airspeed is set to zero, and the gear, if applicable, is in the down position.

1. Click the **RTE** button to see the Select Route page. Routes are numbered 0 through 9, and when in use an active route is labeled A.
2. Under the Select Route page, rotate the left control knob to select 1, which will be the Route Number for our new route.
3. Click **EDT** to open the Edit Route page.
4. If "Insert" is showing on the screen, there will also be an "up" arrow on the screen that shows where the waypoint will appear in the route. START and END in the route are always the first and last waypoint, respectively. Your departure airport (or first NAVAID) should be placed after START and your destination before END. Click **ENT** if "Insert" is on the screen with the "up" arrow following START.
5. If "Insert" is not on the display, click the clockwise side of the right control knob until "Insert" appears after START. Click **ENT**.
6. You can now enter your identifier. Click the left control knob to move the cursor to the second position (since K is already selected in position 1, for Airport).
7. Using the same combination of left control knob and right control knob as in Direct-to navigation, set KTTD (the display will read "Portland Troutdale" for verification). When finished with the identifier, proceed to the next step without clicking **ENT**.
8. Rotate the left control knob clockwise to move the cursor right, until the "Insert" notification appears. Click **ENT**.
9. Now you can enter your second waypoint. This is NPLV, so you must change the first character from "K" to "N" before preceding. Use the left and right control knobs as before.

10. When NPLV is entered, rotate the left control knob to move the cursor right until "Insert" appears again. You now have a route consisting of "TTD to PLV," and you will enter another waypoint. When "Insert" appears, click **ENT**.
11. Using the left and right control knobs, select VEUG.
12. Rotate the left control knob until "Insert" appears, then press **ENT**.
13. Enter the fourth waypoint, VOED.
14. Rotate the left control knob until "Insert" appears, and press **ENT**.
15. Enter the destination airport, KSIY. Press **ENT**.

After this you are returned to the CDI page, and may fly the route.

Note: The route is not yet saved.

Saving and Storing a Route

1. From where you left off in the previous example, click the **DB** button.
2. Rotate the left control knob to select Route 1 (or the route number desired).
3. Rotate the right control knob until "Store" is displayed.
4. Click **ENT** and the route is stored as Route 1 (or the selected route number).
5. Other options on the DB page are erasing a stored route, or activating a route.

Flying a Stored Route

You have created a route, saved it as Route 1, and now are prepared to fly it. If you continue from the previous examples, you can just begin to fly—but first, suppose you have left this route and need to recall it.

1. Click the **RTE** button to see the saved routes.
2. Rotate the left control knob to select Route 1. The route notations may show as "5 → 5" on this display, which is shorthand referring to the route that the GPS uses.
3. Click **ENT** to confirm this route and return to the CDI display.
4. If you want to view this route to review and verify the waypoints, click **EDT** and use the left control knob to scroll through the route and read the waypoints. When satisfied, make sure neither "Insert" nor "Delete" is showing on the display (if so, move the cursor one click to the right or left with the left control knob) and click **ENT** again.

From this point, you can be anywhere in the world and still fly the route. The GPS will simply give you a track and time to get to the first waypoint, KTTD. However, if you are across the country and didn't position yourself at Portland-Troutdale, the time remaining may show something like "23 hours:28 minutes." In the interest of

time, reposition yourself at KTTD for departure on Runway 25, airspeed zero and altitude 125 feet. (See “Position,” Page 59.)

On the ground on Runway 25 at Portland-Troutdale, advance the throttles and the CDI display comes alive. It shows KTTD as your waypoint (it won't proceed to the PLV NDB until you reach the center of the runway on takeoff), and it shows your time to next waypoint and ground speed. It displays the current track under TTK and the desired track under DTK. The CDI indicates the direction to turn to achieve the desired track.

Editing a Route

You might want to change the route you're flying by either adding or deleting a waypoint. After programming a route, you can edit the route in flight to accomplish this.

1. With the route running, click **EDT** to select the route.
2. Use the left control knob to select A, the “Active” route. *Warning:* If you select Route 1, the currently running route, this deletion or addition of waypoints will be permanent.
3. To delete the second waypoint, the PLV NDB, use the left control knob to move the cursor through the route description until it rests just before the NPLV identifier.
4. Rotate the right control knob until “Insert” changes to “Delete,” and click **ENT**.
5. Now the Active Route proceeds directly from Portland-Troutdale airport to the Eugene VOR. Route 1, however, still contains NPLV.
6. Rotate the left control knob one click either direction. This moves the cursor away from the waypoint “Insert/Delete” position. Click **ENT** to return to the CDI display and the revised route.
7. Adding waypoints to active routes is performed the same way, using the left control knob to determine entry position, and the right control knob to select “Insert” rather than “Delete.”

GPS Approaches

The GPS-1000 can be used to monitor approaches as well as gain an operational understanding of how an IFR GPS approach works. The GPS-1000 simulates a VFR GPS; this method was chosen because each GPS is different in the way they select their airports, runways, and approaches, and warn of an approach outside GPS approach limits. Each one has, to an extent, its own rules. Alternately, the GPS-1000 can be programmed to fly GPS approaches that are generic in terms of how they are loaded or created, yet point you through the route just as specified on GPS approach plates.

Creating and flying GPS approaches in On Top is no replacement for achieving a thorough and complete understanding of how the certified IFR GPS in your airplane operates, loads and flies approaches.

However, as an example, use the GPS Runway 15 Approach into Renton Municipal, near Seattle. To create the GPS Approach, follow these steps:

1. Click **RTE** to select an available route. Route positions are numbered 0 through 9, and a previously-stored route will contain numbers or one of the identifier names.
2. When an empty route location is selected, click **EDT** to begin editing the route.
3. If "Insert" is already selected, click **ENT** to enter the first waypoint on the approach. If not, rotate the right control knob until "Insert" appears and click **ENT**.
4. Looking at the plate reproduced on Page 51, one of the initial approach fixes in the approach is the waypoint Havho. Using the left control knob for cursor position and the right control knob for character, enter FHAVHO.
5. Turn the left control knob until "Insert" appears and click **ENT**.
6. Enter the second waypoint, Lutsy, as FLUTSY (the preceding F stands for "fix"). Click **ENT**.
7. Turn the left control knob until "Insert" appears and click **ENT**.
8. Enter the third waypoint, Bleir, as FBLEIR.
9. Turn the left control knob until "Insert" appears, and click **ENT**.
10. Enter the fourth waypoint, Enedy intersection, which is also the Missed Approach Point, as FENEDY.
11. Enter the final waypoint, Blako, which is also the missed Approach Holding Point, as FBLAKO.
12. Click **ENT**. You've returned to the CDI page; click DB to bring up the Database page.
13. Select 4 (Route number 4, or whatever route you initially chose to edit to make this approach) with the left control knob, select STORE with the right control knob, and press **ENT**. The screen indication changes to "DONE" and you have saved the route that makes up the Renton GPS Runway 15 Approach.

Note: As you pass the final waypoint that was programmed, On Top's GPS receiver returns to the "NOT IN USE" screen. If you plan to fly the missed approach procedure, you may either program Blako into your route multiple times (i.e., each time that you anticipate crossing the fix) or press the Direct To button on the GPS receiver, which will suggest the last programmed waypoint, in this case, Blako.

If you now position your aircraft at 2,000 feet east of Havho, (explained in detail in the section "Position," Page 59), and wish to fly the approach, click **RTE** to choose a

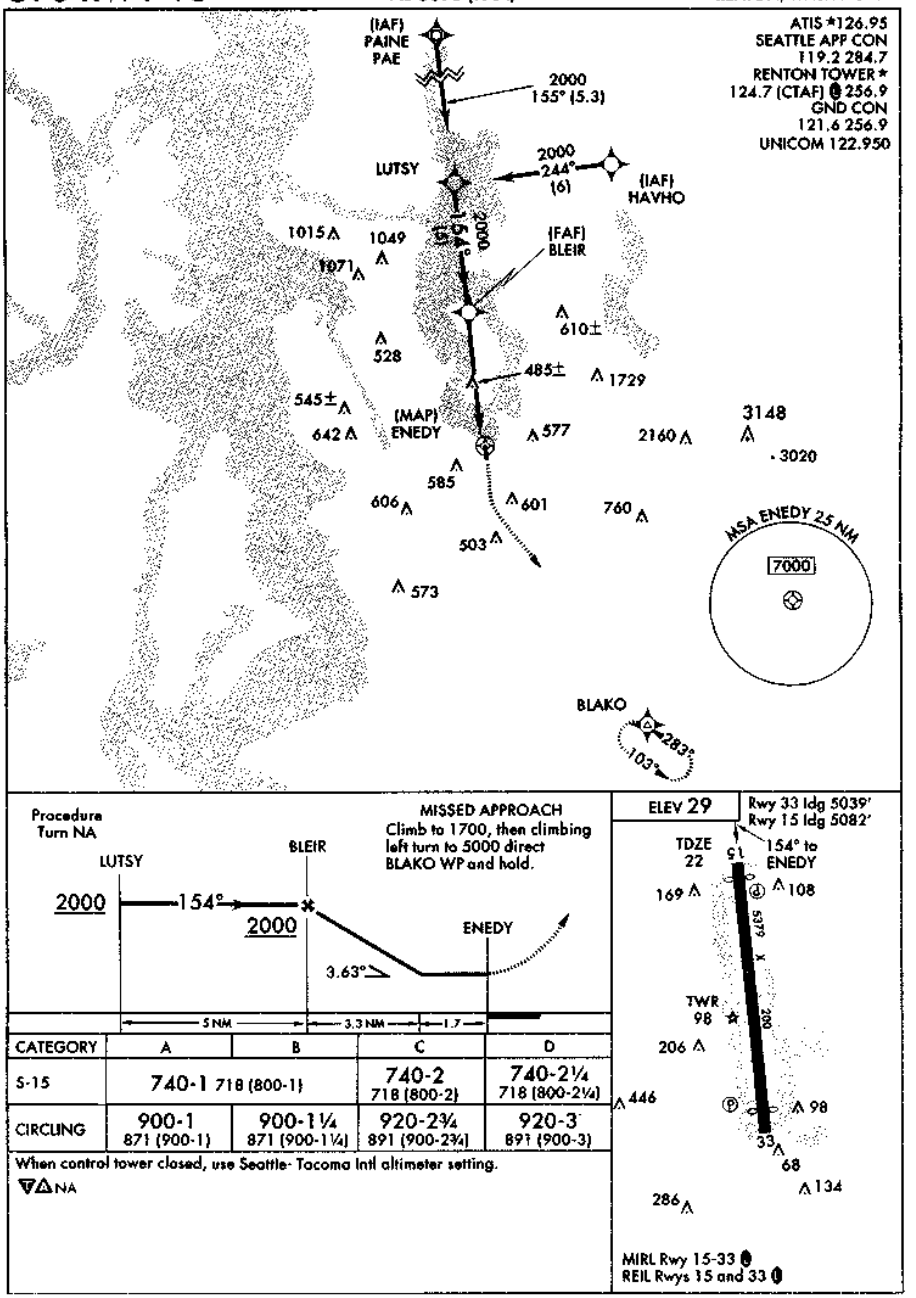
Orig-A 01053

GPS RWY 15

AL-5396 (FAA)

RENTON MUNI (RNT)

RENTON, WASHINGTON



CATEGORY	A	B	C	D
S-15	740-1 718 (800-1)		740-2 718 (800-2)	740-2¼ 718 (800-2¼)
CIRCLING	900-1 871 (900-1)	900-1¼ 871 (900-1¼)	920-2¾ 891 (900-2¾)	920-3 891 (900-3)

When control tower closed, use Seattle-Tacoma Intl altimeter setting.

▽△NA

NOT TO BE USED FOR NAVIGATION

route, dial in the selected route number with the left control knob, and click **ENT**. The GPS will give you an immediate vector to Havho and start the approach.

The GPS can be slaved to the NAV1 or the HSI (unless you are using the direct-to function), and you will want to manually change the OBS to match the indicated desired track, or DTK, shown on the GPS. Additionally, keep close watch on the GPS readout. When the indication shows NTRK, next track, station passage is imminent. Rotate your OBS to the heading indicated under NTRK, but continue to fly your current course until station passage is confirmed by the change in waypoint identifier on the GPS. The distance to the waypoint is only accurate when less than 100 NM.

This method for programming and flying GPS approaches does not guarantee proficiency with your IFR-certified GPS. However, by programming and flying GPS approaches in On Top you can become comfortable with the system before encountering these approaches for the first time in the air.

Using the Avionics Panel

The AV-1 panel has controls for the GPS-1000, located below the NAV/COM controls. Four white buttons represent (from left to right) the **D>**, **RTE**, **DB**, and **EDT** buttons that appear on-screen. The two round knobs represent the on-screen left and right control knobs. The far right button represents the **ENT** button. All programming remains the same, with the CDI, Route and Database pages appearing on-screen.

Moving Map

A basic Moving Map display is included as a panel setup option in the On Top cockpit. Page 55 gives details on selecting panel options, under "Aircraft" in the Panel section. When the Moving Map is selected, IN and OUT buttons appear below it on your cockpit display. Clicking IN zooms-in your map view, clicking OUT zooms-out the display to show more area.

Using the Avionics Panel

The AV-1 panel includes IN and OUT buttons that correspond to the on-screen Moving Map controls. These are located below the Timer controls in the lower left quadrant of the AV-1 panel.

Flying On Top

Once you know how all the controls work, and have an understanding of the cockpit layout, you are ready to start flying. Until you change the STARTUP sequence, each On Top aircraft will start on the runway with the engines running.

Aircraft, cockpit, position, weather, and failure setups are called "scenarios." A scenario is not only the position of your aircraft prior to an approach, cross-country flight or departure procedure (DP), but the environment as well. What is the weather? How will it change in the next hour? What are the chances that a system or instrument will fail? This section will detail different ways you can use On Top's "Setup" screens to create realistic, challenging flight scenarios.

Setup Screens

From the On Top cockpit, select **Setup** to enter any of On Top's Setup Options: Aircraft, Cockpit, Position, Weather, or Failures.

When you select **Setup**, all values of position, failure status, weather, RPM and throttle setting, even aircraft attitude, are brought into the Setup area. Anything or everything can be changed; it's all up to you. All current conditions are brought with you. In other words, if you have just crashed at a 90-degree nose-down pitch and with 25 degrees of bank, and go to **Setup** to change your heading, altitude, position, or even your aircraft type, but fail to change your aircraft pitch and bank, you will start your new scenario 90 degrees nose down and 25 degrees on your side. See the instructions on using the **Set** and **Reset Setup** buttons for more details.

Click the **Setup** Button to reveal the following Setup screen choices:

1. **Aircraft.** Choose the aircraft you will be flying, and configure its weight, fuel load and cockpit instrumentation.
2. **Cockpit.** Determine the configuration of all the cockpit controls for your flight, and preset navigation and communication frequencies. These controls include your airspeed, RPM and manifold pressure settings, gear, flap, carburetor heat, and a host of other cockpit settings.
3. **Position.** Allows you to select the starting point of your scenario, along with aircraft altitude and heading.
4. **Weather.** Determine cloud tops, bases, winds, turbulence and more.
5. **Failures.** Select which instrument(s) or system(s) will specifically or randomly fail, over what time period.

Below the buttons that select which Setup screen you'd like to work with are the Setup Menu's control buttons. From left to right:

6. **Load Startup** and **Save Startup.** Allows you to recall and modify your start-up position (Load Startup), or create a new default starting position for every time you begin On Top (Save Startup).
7. **Load Setup** and **Save Setup.** Allows you to bring up a saved scenario (Load), or save the current scenario for future use (Save Setup). All changes to Aircraft, Cockpit, Position, etc. will be saved.
8. **Reset Setup.** Returns all the values in the Setup fields to what they were when you entered Setup. Returns aircraft to the original location and conditions to original settings.
9. **Set.** Sets the options you've just selected and returns you to the On Top cockpit. This is different from Reset Setup in that Set also lets you make changes in mid-flight without resetting or reloading the entire scenario. Changes made to any Setup screen affect the course of the flight currently being flown, but when you return to the cockpit you will be in the same geographic position from which you entered the Setup Menu unless you changed the aircraft position.
10. **Cancel.** Voids all changes you've made to the Setup Screens and returns you to the cockpit.

Each of these options remains visible at the bottom of your screen as you go from Setup Screen to Setup Screen within the program. This allows you to set two areas, such as Aircraft and Failures, yet leave all other options untouched.

More on Reset: If you've set up the perfect scenario, but want to now try it with gusting, 30-knot winds blowing at right angles to the runway, simply go into Setup, change Weather, and return to your cockpit by clicking Reset Setup. You will return to the beginning of your last scenario, in terms of position, aircraft, etc., but with all-new weather. If you want to try it in another aircraft, make sure you adjust the settings for engine and configuration when setting cockpit options (Page 57).

More on Set: You can change settings in mid-flight without having to re-fly an entire route, by changing one option such as cloud bases, and clicking **Set**. This returns you to where you entered Setup from, but with only your last changes activated. You won't have to re-fly everything leading up to the time you entered Setup.

Entering Your Data

Next to every field in the Setup screens are UP or DOWN arrows for scrolling through numbers 0 through 9 until the one you want is selected. You may also click in any field, and use the backspace key on the keyboard to clear the field. Then type in the desired number, and press Enter to set the desired number in that field.

Aircraft

Click "Aircraft" to go to On Top's Aircraft Selection screen. On the left side of the screen are your aircraft choices. Click any of the aircraft, and the right side of your screen will display (if your computer supports 16-bit graphics) an image of your selected aircraft. Below the aircraft image are buttons labeled Panel and Weight.

Panel

To select the cockpit instruments for your flight.

1. The cockpit image has several positions, representing available instrument locations. Below each is a column representing the positions, and following horizontally to the right, options available for that position. Click one instrument for each position.

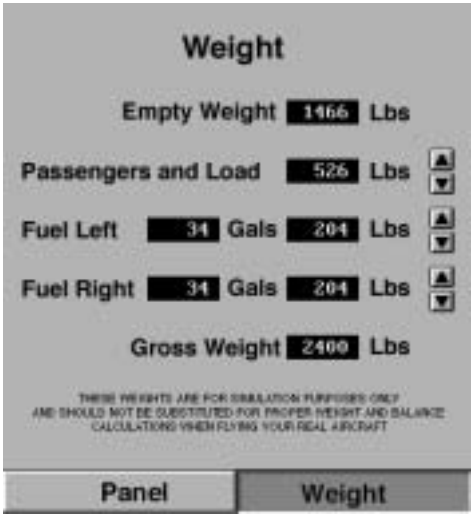
2. When clicked, each instrument name is highlighted to show you which instrument will be in what position when you return to your cockpit.
3. In some aircraft panels, instruments will be shown in the on-screen avionics stack in the cockpit.

Note: The FD option allows you to use a Flight Director with your autopilot.

PCATD and Personal Use modes have different choices regarding Panel setup, as dictated by FAA Advisory Circular 61-126 which governs PCATDs and their usage. The above description is used in Personal Use mode only. See the section "Personal vs. PCATD Use" on Page 92 for a description of the distinct choices in the two separate modes.

Weight

Click "Weight" to reveal the weight and loading options for the selected aircraft.



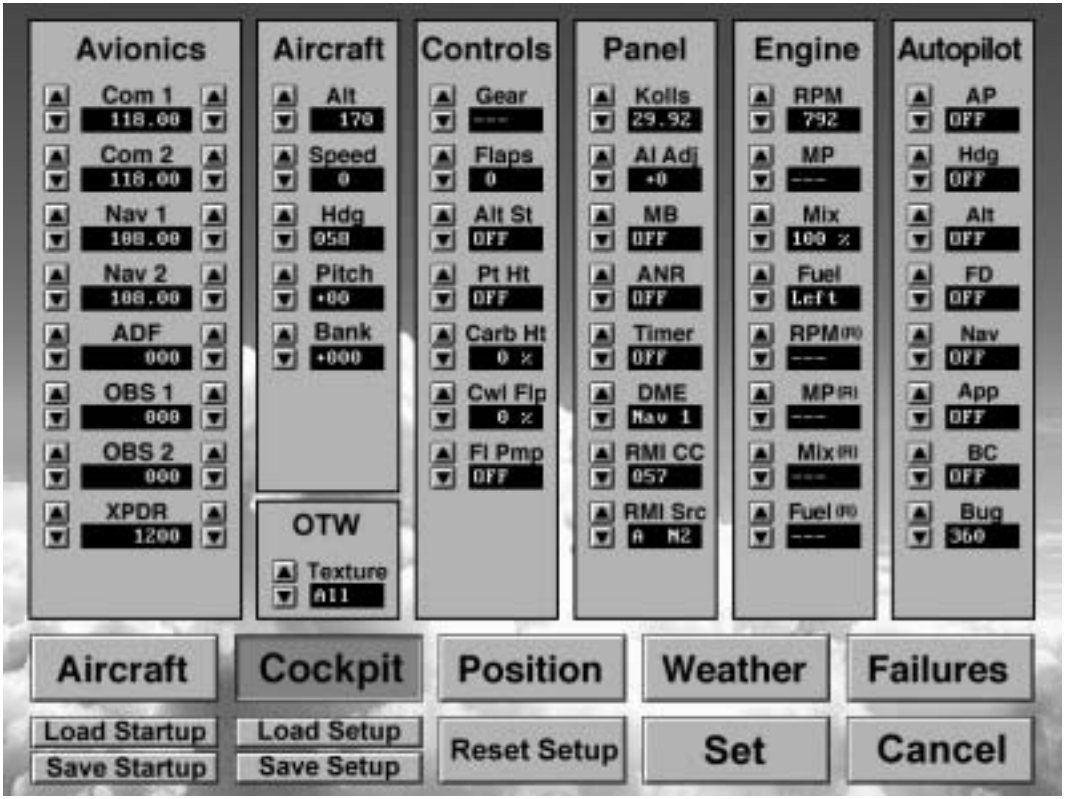
1. The aircraft's empty weight is shown at the top, and is not adjustable.
2. The weight of passengers and payload can be modified by clicking the UP or DOWN arrows next to the weight shown.
3. Fuel Left shows the gallons and weight (in pounds) of the fuel in the left tank. You can modify this by clicking the UP or DOWN arrows next to this amount.
4. Fuel Right shows the gallons and weight (in pounds) of the fuel in the right tank. You can modify this by clicking the UP or DOWN arrows next to this amount.
5. Gross Weight is the total weight of all the aircraft options selected above, and is shown in yellow if the weight is below the published gross takeoff weight for that aircraft, or in red if the weight is above this value.

Important: The weight affects the aircraft's flight dynamics and handling qualities. While the program will let you fly at over-gross weight, do not be surprised if the performance numbers are inaccurate, and the aircraft handles poorly.

When you finish selecting your aircraft, weight, and panel options, click **Set** to return to your last position with only a new aircraft selected and all other variables the same; or, click **Cockpit**, **Position**, **Weather** or **Failures** to continue with other Setup options.

Cockpit Options

The Cockpit Setup screen is where your aircraft conditions are set prior to the flight. What are the radios tuned to? What are the aircraft's altitude, airspeed and heading? How are your flight controls set? The Cockpit Setup screen determines these factors.



Avionics

COM1, COM2, NAV1, NAV2, ADF, OBS1, OBS2 and Transponder (XPDR) are set in the Avionics column. You can preset all of the avionics frequencies and settings here. If you don't know a particular frequency, see "Setting Your Radios From the Position Setup Screen" on Page 62.

Aircraft

Set your aircraft Altitude, Airspeed, Heading, Pitch Angle, and Bank Angles where you want them to be when the simulation begins.

Note: Settings made to Altitude and Heading fields also appear in Position Setup, and setting values in either screen changes them in the other.

OTW

This setting changes the resolution and detail of your Out-the-Window (OTW) view, with the following values: All, for ground texturing everywhere you fly; Airport, for ground texturing around airports only; Runway, to have photo-realistic runways but no texturing beyond them; and None. There are different settings because slower processors tend to "bog down" on the higher graphic content of the All and Airport settings. If your computer pauses to redraw the OTW graphics too often, try a lower setting.

More about graphic modes: On Top will allow you to select only All, Runway or Airport if you are running in the 16- or 32-bit graphic modes. If you are running On Top in 8-bit graphics, the fixed option in this window will be N/A. When you use On Top in PCATD mode, the self-test automatically determines what texturing level your system can support; you will not be able to adjust the texturing to a higher setting in this field.

Controls

Determine your Gear, Flaps, Alternate Static Source, Pitot Heat, Carburetor Heat, Cowl Flap and Fuel Pump settings here.

Panel

Altimeter setting (Kolls), Attitude Indicator adjustment, Marker Beacons on or off, Automatic Noise Reduction (ANR) settings, Timer, DME, RMI Compass Card, and RMI Source are all set from this column.

Engine

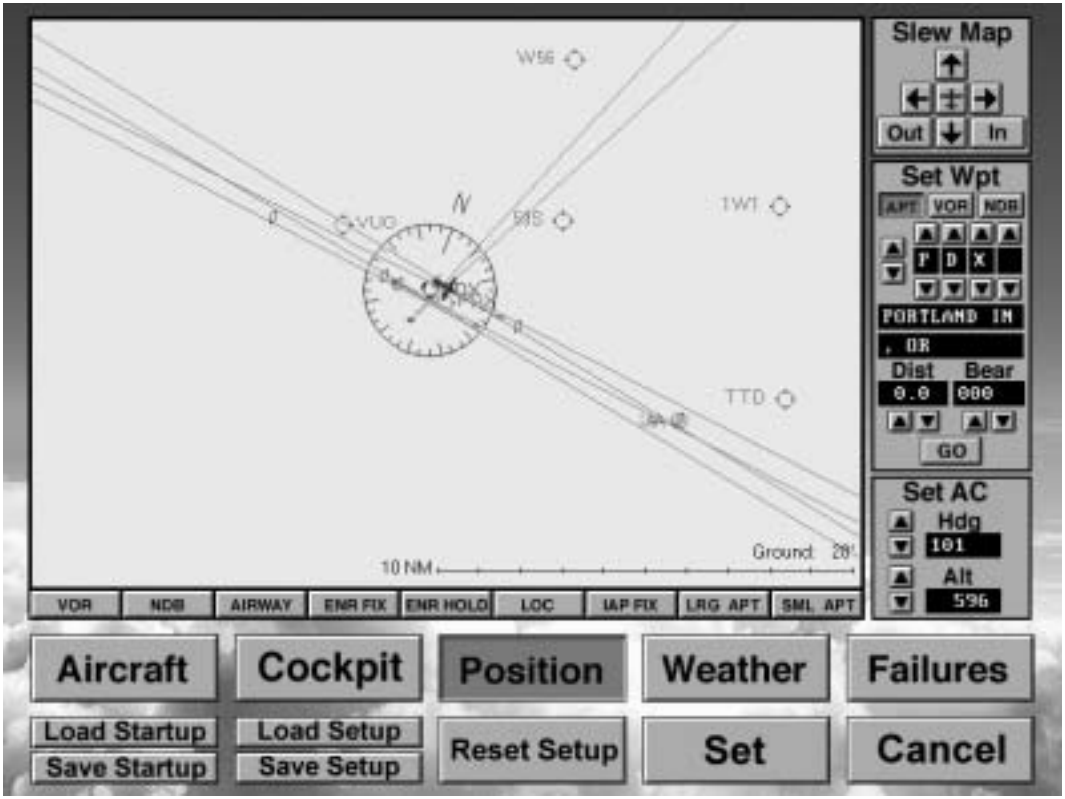
RPM settings, Manifold Pressure settings, Mixture, and Fuel Tank Selected are determined in these fields. The lower fields are for the right engine in the twin-engine aircraft. If you switch from one aircraft to another in mid-flight, and are going to use the Set button to continue, ensure that you have the proper settings for that aircraft in this Engine column.

Autopilot

Select what autopilot functions you want on or off in this column, and remember to set the heading bug (Bug), if heading (Hdg) will be run by the autopilot at simulation start.

Position

Position Setup is detailed and flexible, with a multitude of options available to the user.



The Map Display

The Map occupies the majority of the Position Setup screen. This is centered on the aircraft in its current position. Along with the aircraft's position, this map displays airports, VORs, NDBs, Locator Outer Markers (LOMs), Localizers, Victor Airways, and intersections or fixes.

Any of these display symbols can be turned on or off to unclutter your Map view. Arranged along the bottom are buttons labeled: VOR, NDB, AIRWAY, ENR FIX, ENR HOLD, LOC, IAP FIX, LRG APT, and SML APT. For more details on the functions and uses of these buttons, see "Review Your Flights" on Page 72.

Click on any of the items in the map display to reveal an information box. This box may contain elevations and communication frequencies, as with airports, or it may contain idents and navigation frequencies as with VORs and NDBs. The amount of area the Map display shows, and the area itself, can be controlled by the "Slew Map" controls.

The box called "Slew Map" lets you move the area that the map displays using the up, down, left and right arrows. Clicking the aircraft symbol between these arrows automatically centers the map on the aircraft. Clicking the In or Out buttons will zoom the map display in or out.

The Set Wpt Controls

The Map shows a limited geographic area. To go to another area, use the "Set Wpt" controls. You can go to an Airport, VOR or NDB by clicking on that button and entering the identifier in the adjacent box.

There are four spaces for alphanumeric characters below the Airport/VOR/NDB selection. Each box has an UP or DOWN arrow above and below it, and clicking these sets the appropriate character in the box. Some small airports use four characters, such as WA71, Woodland State Airport in southwest Washington; so the fourth box is used for that purpose. Usually, you use the first three positions to select an airport, VOR, or NDB. Unlike the GPS, you don't need to precede an identifier with a "type" character, such as "K" for airports. The APT, VOR and NDB buttons do this for you.

On Top includes a comprehensive U.S. database (data supplied by the FAA), as well as an extensive international database (data supplied by the Department of Defense*).

To select a U.S. airport or NAVAID, dial in the 3-letter identifier (leave off the "K"). For Bradley, CT (3-letter identifier is BDL) from the Position screen in the Set Wpt box, select the APT button, enter BDL and hit GO at the bottom of the box.

To select an airport or NAVAID outside the U.S., enter the country code in the first box. Then enter the 3-letter identifier for your airport. For example, for Vancouver, Canada (country code is "C," 3-letter identifier is YVR) from the Position screen in the Set Wpt box, select the APT button, enter CYVR and hit GO at the bottom of the box.

** The international database was developed using DAFIF, a product of the National Imagery and Mapping Agency:*

1. *Under 10 U.S.C. 456, no civil action may be brought against the United States on the basis of the content of a navigational aid prepared or disseminated by either the former Defense Mapping Agency (DMA) or the National Imagery and Mapping Agency (NIMA).*
2. *The DAFIF product is provided "as is," and no warranty, express or implied, including, but not limited to the implied warranties of merchantability and fitness for particular purpose or arising by statute or otherwise in law or from a course of dealing or usage in trade, is made by NIMA as to the accuracy and functioning of the product.*
3. *Neither NIMA nor its personnel will be liable for any claims, losses, or damages arising from or connected with the use of this product. The user agrees to hold harmless the United States National Imagery and Mapping Agency. The user's sole and exclusive remedy is to stop using the DAFIF product.*

For U.S. airports, if you know only the first two characters in the identifier or have forgotten it, you can scroll through available airports by using the UP and DOWN arrows to the left of the identifier box. If you entered only "AB" for the first two letters of the identifier, the DOWN arrow scrolls through Lehigh Valley International (ABE) in Pennsylvania, and Abilene Regional (ABI) in Texas. In this manner you can scroll up or down to find the NAVAID or airport. For non-U.S. airports, you must first enter the country code, followed by the known 3-letter identifiers.

To go to a position, you:

1. Select the APT, VOR or NDB in the left column.
2. Dial the identifier of that waypoint using the character boxes.
3. Click the GO button to take the aircraft to that waypoint and redraw the Map screen, centered on that point.

Additionally, you can define your starting position at a certain distance and bearing from the NAVAID or airport selected. Before clicking **GO**:

1. Use the UP and DOWN arrows adjacent to DIST to create a distance from the selected NAVAID or airport.
2. Use the UP and DOWN arrows adjacent to BEAR to create the bearing from that NAVAID or airport.
3. Click **GO**. You are now a specified Distance and Bearing from the selected airport or NAVAID.

Fine-Tuning the Aircraft Position

The previous step places you in an exact spot on the map, but before you define the aircraft altitude, heading and other factors, you may want to adjust the aircraft with greater position. The Map screen allows you to click and drag the aircraft to another location within the frame of the map screen. Simply click the airplane symbol on the map, and while holding the left mouse button down, slide the aircraft to your new position.

At the bottom right of the map display is a scale in nautical miles. You can use this scale to determine roughly how far your aircraft is from a selected point after clicking and dragging.

The Aircraft Configuration Controls

Once the aircraft is in position, it must be configured. The bottom right of the Position Setup screen shows Heading (Hdg) and Altitude (Alt) controls. These affect the setup exactly like the Heading and Altitude control in the Aircraft Column in the Cockpit Setup screen. A change made in this screen puts the same values in the corresponding screen.

Setting Your Radios from Position Setup Screen

You can also set the NAV frequencies from Position Setup.

1. Click a VOR symbol to reveal the "Tune" box, where you have the option of tuning NAV1 or NAV2 to the frequency indicated.
2. Click an NDB symbol to bring up another box, then click the Tune button to automatically set your in-cockpit ADF receiver to the frequency indicated.
3. Localizer stations are shown in On Top as blue dots on the opposite end of the landing runway. Using the slew button, zoom in a click or two to bring the blue dots in view. Clicking the blue dot will bring up the localizer frequencies and allow you to tune either NAV1 or NAV2. If a glideslope transmitter is also available on that frequency, it too is tuned.

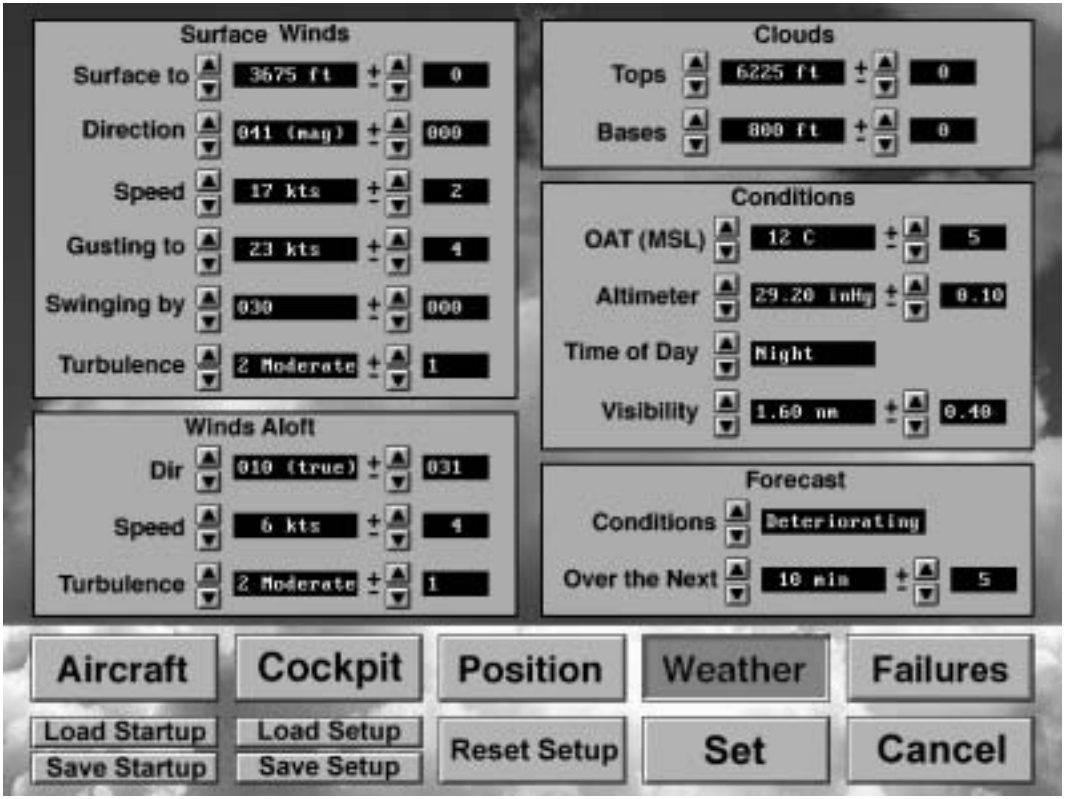
   On Localizers: Some runways have a localizer transmitter positioned at each end. Very often they are the same frequency, but tuning the wrong one from Position Setup will treat the localizer as a back course. Always tune the localizer dot on the far end of your landing runway. This is where a runway's localizer transmitter is usually placed. When a localizer is tuned in this manner, the OBS is set to the inbound heading.

When Position Setup is Complete

To continue setting up On Top scenario options, click **Weather** or **Failures** at the bottom of your screen. To return to the cockpit with your aircraft in your newly-selected position, click **Set**. To cancel your position setup and return to the cockpit on your original starting position, click **Cancel**.

Weather

One of the most important aspects of instrument flying is the weather. Minimums, visibility and cloud heights not only determine what you can do, but actually define IFR weather. In On Top you can have complete control of what your enroute or destination weather will be, or you can let the program decide what it will be, within a certain set of defined variables. Surface Winds, Winds Aloft, Clouds, Conditions and Forecast are the groups that make up the Weather Setup screen. But the key to On Top's weather is the same key we often use in making real-life IFR decisions: Variability.



Variability

Next to each user-definable weather option in the Weather Setup screen is a column with a +/- value. This is the variability factor. Using the UP and DOWN arrow next to each variable window, you can set a value that represents how far off from forecast that condition might be. You may determine that surface wind direction is 270 degrees, but use the variability column to ask On Top to vary that wind direction by, for example, 30 degrees left or right of 270 degrees at the surface. Not until the beginning of the simulation does On Top determine what the actual value will be. With the given variable of 30 degrees, surface wind direction might be anywhere from 240

degrees to 300 degrees. Depending on the strength of the wind, this might make for a radically different approach. This variability factor is the key to the way On Top helps you refine an instrument pilot's greatest skill: decision-making in the IFR environment.

Surface Winds

Surface winds cover not only wind speed and direction, but a host of other values as well. Like any setting in Weather setup, each of these values can be assigned a +/- variable using the column on the far right.

Surface to: This is an MSL altitude that defines to what height your settings in the Surface winds will have an effect. Above the altitude you specify here, Winds Aloft values take over.

Direction: The magnetic direction of the surface winds.

Speed: The speed in knots of surface winds.

Gusting to: The peak value of wind gusts at the surface.

Swinging by: The amount of degrees that surface winds can swing away from the selected magnetic direction.

Turbulence: The level of turbulence encountered up to the surface/winds aloft boundary you defined under "Surface to."

Winds Aloft

Winds Aloft can be set for values entirely independent of Surface Winds. This not only can create a more challenging approach in general, but simulate potentially dangerous situations. What happens when your headwind shears to a tailwind? Set the "Surface to" value for a point right above the missed approach point (MAP), and see how well you react.

How well do you respond to a gentle 5-knot wind that changes to a 23-knot wind 90 degrees off the runway heading? Creating values for Direction, Speed and Turbulence in the Winds Aloft area that are different from those in Surface Winds can give you some of your most challenging scenarios.

Clouds

Cloud Tops and Bases are defined independently in the Weather Setup. Not only can you fly "on top" and descend into the murk on your approach, but using the variability buttons you can effectively make the program decide whether or not you will have to fly the missed approach.

By setting the Bases at the Decision Altitude of an approach, and then using a larger variable of, for example, plus or minus 300 feet, you won't know whether or not you will need to fly the missed until you reach your Decision Altitude or MAP.

Conditions

OAT: Determines the Outside Air Temperature at sea level when the simulation begins; expressed in degrees Celsius, with a default setting of 15 degrees standard temperature.

Altimeter: The sea level pressure outside the aircraft, prior to simulation start.

Time of Day: Select for either day or night flights.

Visibility: Another key to determining whether or not you will have to fly the missed approach. Set visibility for any value between unlimited and one-quarter mile. For more of a challenge, use the Variability column to allow On Top to decide the distance you can see when you are no longer in the clouds.

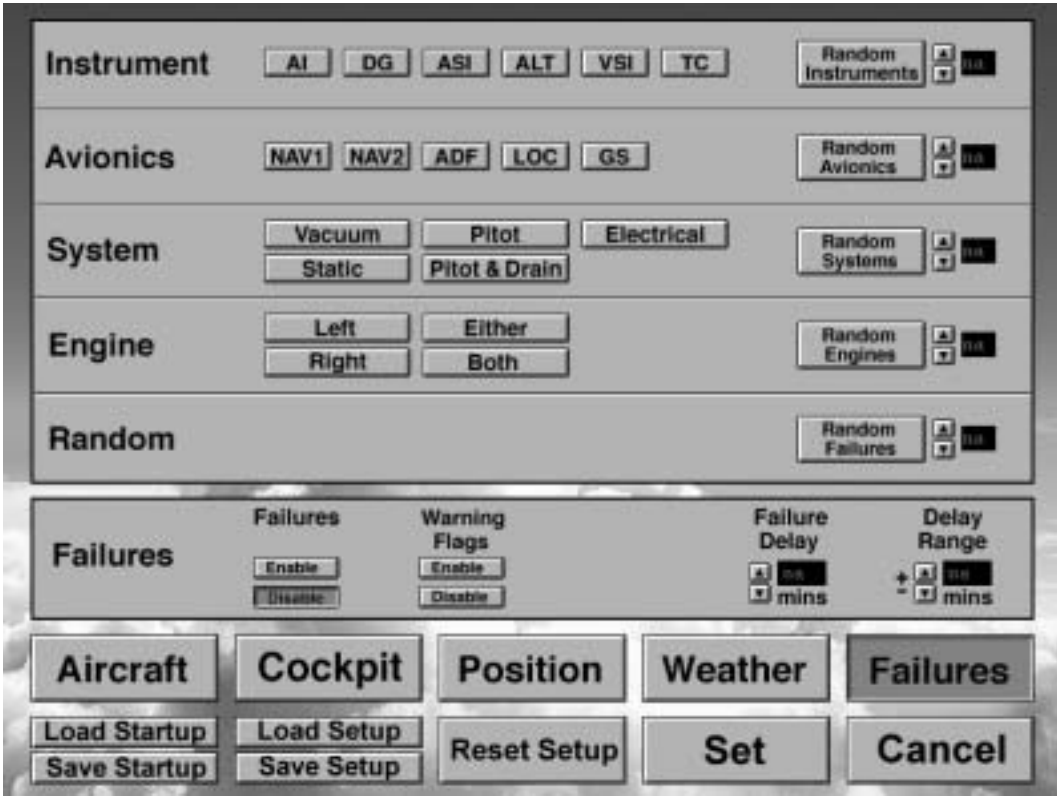
Forecast

On Top can modify your weather as the flight progresses through use of the Forecast settings. In the "Conditions" box, choose whether you want your weather to remain Constant, Improve, Deteriorate, or just randomly Change by clicking the UP or DOWN arrows to select one of these options.

In the "Over the next" box, choose a time frame within which the weather change will take place, from 5 minutes to 240 minutes. You can also use the variability window to attach a plus or minus value to your selected time.

Instrument and System Failures

On Top is about more than just shooting approaches wherever you like—it's about challenging yourself. The most effective place to do this is in the Failures setup screen. The Failures screen is divided into five areas of possible failures: Instrument, Avionics, System, Engine, and Random. The Failures controller is where the failures are Enabled or Disabled, Warning Flags are opted for, and failure Time Delay and Delay Range are set.



Activating Failures Options

Before you can select which instruments, system, or random failures you experience, you must activate the Failures modes. On the bottom portion of the Failures Setup screen is the Failures box. Click Enable to select which instrument, system, or random failure will occur. You will return to this box for final adjustment of your selected failures.

Selecting Failures

In the five failure areas, select an instrument or system to fail by clicking the button for that instrument or system. Your choices are:

1. Instrument: From left to right, Attitude Indicator, Directional Gyro, Airspeed Indicator, Altimeter, Vertical Speed Indicator, and Turn Coordinator. Random Instruments lets you select from 1 to 6 of these instruments to be failed randomly by the program.
2. Avionics: You can fail NAV1, NAV2, ADF, Localizer receiver or Glideslope by clicking the appropriate button. Random Avionics lets you choose from 1 to 3 of these radios to be failed randomly by the program.
3. System: Vacuum, Pitot, Static, Pitot and Drain, or Electrical systems can be failed by clicking the appropriate button. Random System lets you select from 1 to 4 systems to be failed randomly by the program.
4. Engine: Allows Left, Right, Both or Either (random) engines to fail during the simulation. Designed for use with the simulated twins, these failures still work when flying the single-engine aircraft. Random Engines lets the computer select which of these Engine Failure options will be enabled.

Setting Your Failure Delay, and Enabling or Disabling Failures

Once you select your Failures options, return to the bottom section called Failures. Here you choose whether you want Warning Flags to be displayed for failed instruments or systems.

You also select Failure Delay in this section — the time from zero to 99 minutes within which you want the failure to occur; and Delay Range, the variable for that time from zero to 99 minutes. With a Failure Delay of 15 minutes, and a Delay Range of plus or minus 15 minutes, you know that your selected or random failure event will happen from zero to 30 minutes into your simulation.

You can also select a broader range for more variability. If you select a Vacuum System failure, but set your Failure Delay for zero minutes and your Delay Range for 99 minutes and then proceed to fly a full NDB approach, you are truly in the dark as to when the failure event might take place. If you can complete your approach and landing before the 99 minutes are up, it may never take place. But cross-checking your gauges and waiting for something to appear out-of-synch in that time range is about the most realistic (and gut-wrenching) Failures practice that you can experience on the ground.

Recognizing Failures

On Top's Realistic Instrument Failures are designed to work just like failures in actual aircraft. The following is a list of some, but not all, of the instrument and system failures you can experience, and how to interpret them.

Altimeter Failure

Altimeter sticks in position
Altimeter falls to zero

Airspeed Indicator Failure

ASI sticks in position
ASI falls to zero
ASI acts like an altimeter

VSI

VSI sticks in position
VSI acts as reverse altimeter

Attitude Indicator Failure

AI increasingly insensitive, ultimately reading zero
AI indicates increasing errors in pitch and bank
AI too sensitive
AI sticks in position
AI experiences full precession

Directional Gyro Failure

DG face spins increasingly faster in either direction
DG indicates an unvarying heading

HSI Failure

HSI gyro face spins increasingly faster in either direction
HSI gyro face indicates unvarying heading

Turn Coordinator Failure

Turn coordinator increasingly insensitive, ultimately reading zero
Turn coordinator displays exaggerated readings
Turn coordinator reads wings-level at all times

Vacuum Pump Failure

Increasing precession of both the AI and DG. Verify suction gauge at zero or below optimum.

Blocked Pitot Tube

Airspeed falls to zero

Blocked Pitot Tube and Drain

ASI acts like an altimeter
Current indicated airspeed is current altitude
Indicated airspeed will increase with altitude
Indicated airspeed will decrease with decreased altitude

Blocked Static Port

Stuck airspeed indicator
Stuck altimeter
VSI is reverse altimeter

Engine Failure

Fuel flow to zero
Manifold pressure displays barometric pressure
RPMs drop to approximately 500

Correcting Failures

You can correct many of On Top's failures in flight, just as you would if you encountered them in the air. Recognizing the onset or failure itself is one thing, but the object is to recognize it and maintain a safe flight attitude. Here are some examples of failures and possible courses of corrective action.

Iced-Over Pitot Tube: Sometimes a failed pitot tube or drain is caused by accumulated ice that blocks the ports. Once you recognize the symptoms for the failures, click on the Pitot Heat switch and see if this clears up the problem.

Blocked Static Port: Click the Alt Static button to open the alternate static source.

Failed Engine Fuel Pump: Engine failure is sometimes caused by the failure of the engine-driven fuel pump. In aircraft equipped with electric fuel pumps, select Fuel Pump to start the electric fuel pump.

Empty Gasoline Tank: Oftentimes engine failure is simply fuel exhaustion. To restart, select the other fuel tank, and activate the electrical fuel pump to try for an in-flight engine restart.

Covering Failed Instruments

Once you've set up a failure, flown your aircraft to the point of failure, recognized it and adjusted your scan to compensate, you may want to block the offending gauge from view. In the cockpit, simply click the center of the failed instrument to cover that instrument, just as if you had used a soap dish cover in flight training. Click the instrument face again to remove the cover.

Identifying Failures

Perhaps you've set up the computer to randomly generate a failure in 5 minutes, but after flying for 10 minutes you can't determine which instrument failed. In this case, it is probably better to find out and verify the failure, than to continue flying along blissfully unaware that something has gone wrong.

From the On Top cockpit, enter squawk code 7700 in your transponder. You will see a message in the out-the-window display area verifying the instrument or system On Top chose to randomly fail.

Your Scenario

Once you've chosen the Aircraft you're going to fly, the Cockpit set up with control positions and radio frequencies, the starting Position with heading and altitude, and Weather and Failures options, you can start flying the scenario.

Click **Set** at the bottom of any Setup screen to save all of your selections and return to the On Top cockpit. If you make a mistake in your setup, and want to start all over from scratch, click Reset Setup to erase all the changes you've made to the Setup screens.

Setting Only the New Changes

The Set function also allows you to fly a previously set up or saved scenario, and at any time during your flight return to the Setup screens, to change one aspect of the scenario and leave the others unchanged.

You may have set up and begun an NDB approach to minimums and realize that you've mistakenly set your cloud bases to 880 feet, when the minimum is 1,180 feet. Rather than fly the missed approach or bust your minimums (your only choices at that moment), you might want to re-enter Setup and raise the bases, without having to re-fly the 20-minute flight to your Initial Approach Fix.

From the cockpit, click **Setup**. Choose the Setup screen you want to make changes in, such as Weather in this case, and when your changes are complete click Set. You will be returned to the cockpit with only those changes in place, and not returned to a starting point that could be 10 minutes flying time back.

Resetting a Scenario

The **Reset Setup** button returns your aircraft, flight and environment values to what they were at the beginning of your last scenario. Unlike **Set**, which can affect just your current changes and return you to the cockpit mid-scenario, **Reset Setup** takes you back to where you were when you entered Setup. This is useful if you want to modify more than one or two parameters and try the entire approach, terminal departure, or cross-country over again.

Saving a Scenario

You may want to fly some flights and approaches over and over again. In this case, you may create and then save a scenario by using the **Save Setup** button.

First, ensure that all your Setup options for aircraft, position, weather, etc., are set as you wish. Pay particular attention to the section entitled "Setting Your Radios from the Position Setup Screen" (Page 62), if you don't want to have to re-tune your radios every time you fly the scenario. Once this is complete, click **Save Setup**.

You'll see the Save File screen, with a File Name box, a file list, and OK, Cancel or Delete buttons. Click the mouse in the file name field and type in the new file name. It must be 8 characters or less in length. If you click in the field and another previous name appears, delete or overtype that name. You are not deleting a previously saved scenario by doing this, you're merely typing in new name for your new scenario. When the file name is complete, click OK.

Loading a Saved Scenario

To re-fly a scenario you've previously saved, click **Load Setup** from the Setup menu. You will see the Load File screen and be able to click on your saved file to open it and fly it. If you want to make an adjustment to the scenario after you've recalled your file, make the change and then click the **Set** button.

Setting and Changing Your Default Scenario

On Top's default startup has the Beech Bonanza V35B on the ground at Boeing Field (BFI) in Washington ready for takeoff. You may want On Top to start a little closer to home every time, even if you're going to create new scenarios each time you fly.

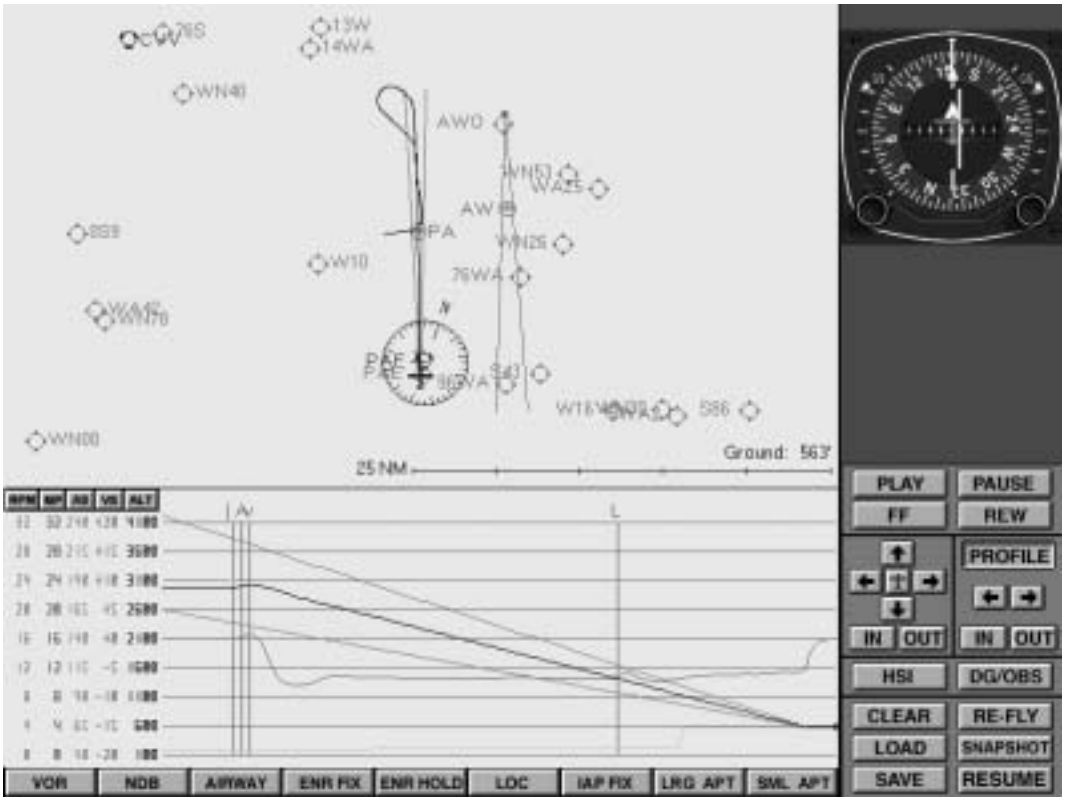
If you want to create your own default starting position, aircraft, and weather, make the changes as described in this section and then select the **Save Startup** button. On Top will now begin with your selected airport, runway, aircraft, panel, weather, and failures in place, every time the program is started.

If you want to make changes to your Startup position, click the **Load Startup** button. This will load all the parameters for your default startup position so you can make minor changes to weather, position, cockpit or aircraft position without having to define everything again from scratch. Once you've completed these changes, click the **Save Startup** button again to save your new default startup position.

Review Your Flights

Attaining and maintaining instrument proficiency is more than flying approach after approach. You need to be able to review and evaluate what you've done, and critique your performance. On Top allows you to do so through a comprehensive Map function that can even let you save complete flights for later evaluation.

To go to the Map screen from the On Top cockpit, select **Map**. On Top uses the same map display that you used to set up your flights, in terms of the NAVAIDs, airports and airways shown. The Map screen is divided into five areas: Display, Playback, Map Controls, HSI or DG controls, and Load/Save/Re-fly.



The Overhead View Display

Central to On Top's Map screen is the overhead view of your recently-flown track. This map shows not only your course, but all the airport, NAVAID, and route symbols in the geographic area your flight took place.

In some instances, this may be too much detail, cluttering up your screen and limiting your view of your flight. Arrayed across the bottom of the screen are On and

Off controls for these symbols: VOR, NDB, AIRWAY, ENR FIX, ENR HOLD, LOC, IAP FIX, LRG APT, and SML APT. The buttons are colored yellow when that map display option is selected, and gray when disabled. Simply click any of these buttons to turn that particular map feature On or Off.

The Profile View

Click the Profile button on the right side of your screen to replace the lower half of your overhead view with a vertical view that shows your elevation at all times during the flight. Along with the aircraft height in MSL figures (ALT), information is provided for RPM settings, manifold pressure settings, airspeed, and vertical speed. These color-coded lines represent your value for each item, allowing you to judge how well you maintained constant airspeed, or rate of descent, or how well you managed your prop settings. Did you go to "prop full increase" prior to reaching Decision Altitude or MAP? This scale can tell you that.

As with the overhead view, sometimes this is too much information to view all at once. The RPM, MP, AS, VS and ALT buttons arrayed across the top left of your profile view are On or Off controls for these graphs, allowing you to unclutter the profile display.

Localizer and Glideslope Limits

Full-scale CDI or glideslope deflection dictates a go-around in the real world of IFR flight, but it is sometimes hard to tell when this deflection occurs. On Top's map shows these limits on both the overhead and profile displays as gray lines converging with the primary course line. If you see your track touch the gray lines either laterally or vertically, you've hit the extreme limit of the localizer and/or glideslope, and should have executed a missed approach.

Flight Highlights

As you follow along the path of your vertical display, you'll see notations in numbers or characters, with straight lines beneath them going from the top to bottom of your vertical display. These lines mark Highlights of your flight, and provide you with valuable information:

"A" or "L" show the points at which you applied Approach flaps or Landing flaps. In aircraft with more than two flap settings, your flap application is marked with 1, 2 or 3.

"I" represents the point at which you extended your landing gear. "V" indicates gear down and "^" indicates gear up.

"O" is the point at which you passed over the Locator Outer Marker, "I" is the passage of the Inner Marker.

Between the gray lines representing your altitude you'll see, at some point, another solitary gray line that is spaced differently than the others. Perhaps your most

important reference in the profile display, this line shows the point where the cloud bases were in your approach. Depending on the variability that you set in Weather setup, this could be pretty far off from where you told On Top to put it. Comparing the position of this gray line with your approach Decision Altitude or MAP can tell you whether or not you busted minimums, and help you manage this critical flight phase in real-world approaches.

A red dot on the glideslope, when clicked, shows what failures have occurred.

Playback Controls

On the top right side of the Map screen are Play, Fast Forward, Pause and Rewind controls. These allow you to playback a flight. On the horizontal and vertical displays the solid black lines represent your aircraft's track. A black dot on these lines represents your aircraft's current position.

- Click Play to return the black dot to the beginning of the recorded track, and play the track in real time.
- Click FF to fast-forward the replay, while you hold in the FF button. When you release the FF button, normal-play speed resumes.
- Pause stops the track playback.
- Click and hold Rew to rewind the track to any point along its course.

Map Controls

Directly beneath the Playback controls on the left side of the Map screen are the Map controls. These adjust what and how much you view on both the Horizontal and Profile displays.

Overhead Controls

There are four arrows pointing Up, Down, Left and Right. Clicking any of these slews your overhead view in the desired direction, allowing you to see a part of the track that may be hidden. Clicking the airplane symbol re-centers the map on the position of your aircraft.

To show more or less of your overhead view, click the In or Out buttons. The scale at the bottom of the overhead display changes as the In or Out buttons are clicked, showing the distance in nautical miles from the map's right edge to its center. Using this scale, you can judge distance on the Overhead display.

Profile Controls

Profile also has In and Out zoom controls, but only two arrows: these slide the view of your profile to the left or right, depending on the arrow you click. By using the arrows, you can view the entire course of your flight in the profile display.

HSI and DG Controls

On the upper right corner of the Map screen is the Directional Gyro or Horizontal Situation Indicator from your flight track. This shows what your DG or HSI was doing during playback of your flight.

Clicking either the DG or HSI buttons below the Map controls changes to that instrument, so student pilots can see the difference in these two instruments before they fly a real HSI.

Note: Do not select HSI unless one was in the cockpit of the aircraft making the flight, as determined by the Panel option in Aircraft setup.

Saving, Loading, or Re-Flying a Flight

At the bottom of the Map screen are the Load/Save and Re-Fly controls.

1. **Clear** removes your current track from the display. The track can be recreated using the Play or Fast Forward controls.
2. **Save** stores the record of a flight. If you want to review your approach later, or are particularly proud of an NDB approach in gusting winds, level 3 turbulence and carrying a failed airspeed indicator, click Save to bring up the Save Map screen. You will see the Save File screen, with a File Name box, a file list, and OK, Cancel or Delete buttons. Click your mouse in the file name field and type in your new file name. It must be 8 characters or less in length.
3. **Load** brings up a saved Map screen. All track and route information can be replayed and shown again.
4. **Re-Fly** puts you back in the On Top cockpit at the point where the aircraft is in the playback. If you completely miss the glideslope intercept and want to try again, rewind to a point prior to the intercept, and click Re-Fly.
5. **Setup** takes you to the Main Setup screen to modify your scenario.
6. **Resume** cancels your map view and returns you to the cockpit. Unlike Re-fly, which lets you fly from the cursor position you display on the maps, Resume puts you back in the cockpit at the point at which you entered the map screen.

Printing the Map Display

Clicking the Snapshot button creates a ".pcx" file in your On Top directory (usually C:\ASA\pts\ontop). Titled "Snap00xx.pcx," this file is an image of what you see on your Map Display screen.

By using the My Computer icon to open the ASA directory, then the On Top folder, and double-clicking the "Snap00xx.pcx" file, your default graphics program will open and display your map image. From there you can print this screen image on paper using that program's Print commands.

Flight Instruction Using Saved Flights

When you save a flight from the Map screen your files are stored in the On Top directory with ".flt" extensions, like "PDXILS28.flt" for the approach to "Portland International Runway 28 ILS." You can copy these files to disk and take them to your student's or instructor's PC if they also have On Top. By copying the file into their On Top directory, you can open, replay and review a previously-saved flight on another machine. This allows instructors to critique the performance of a maneuver or procedure with all the data from that flight at their disposal.

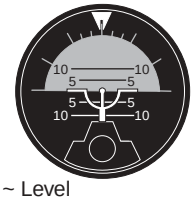
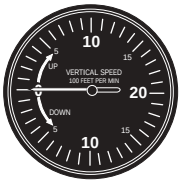
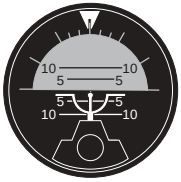
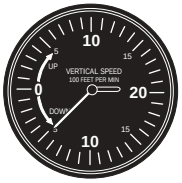
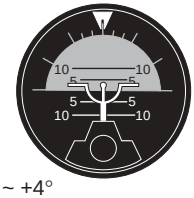
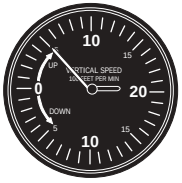
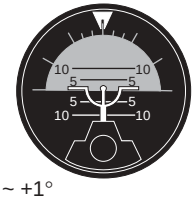
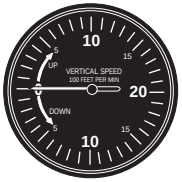
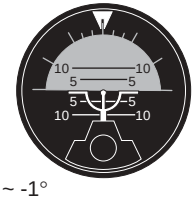
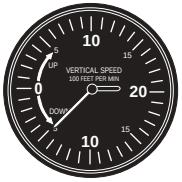
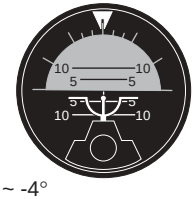
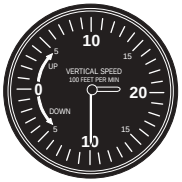
The On Top Aircraft

"Flying by the numbers" has become as much a part of instrument flight as filing a flight plan and getting a good weather briefing. On Top's aircraft flight dynamics were designed with this thought in mind, and deliver predictable, accurate performance with the appropriate power settings and flight configurations in different phases of flight.

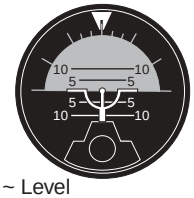
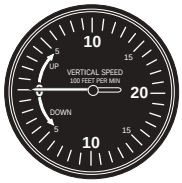
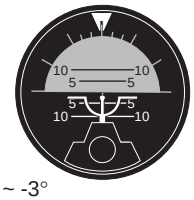
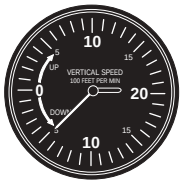
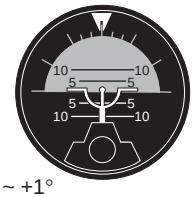
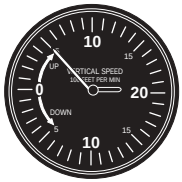
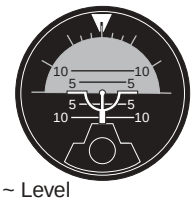
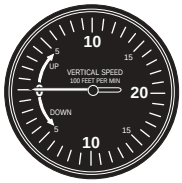
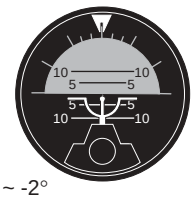
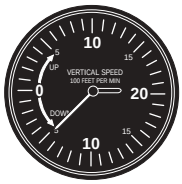
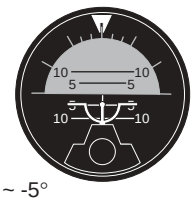
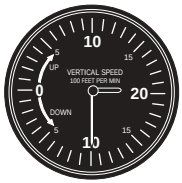
Performance Tables

Since not all pilots will have experience in every aircraft used in On Top, the following basic tables (Pages 77–85) lead you through the correct performance numbers for instrument flight. Not only is every aircraft type different, but every airframe as well. Your Cessna 172 may not have precisely the numbers of On Top's Cessna 172P, due to age, drag, weight and power output. However, these performance numbers will keep you within a narrow envelope and give you the expected results in On Top. Each of these values represents a no-wind, max gross weight situation. For precision and nonprecision descent numbers, either approach flaps or 10 degrees of flaps is assumed.

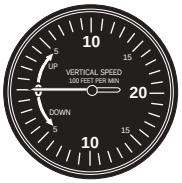
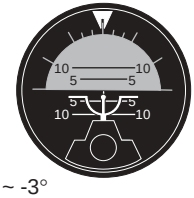
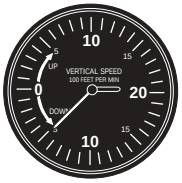
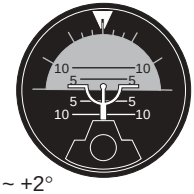
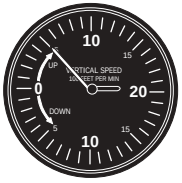
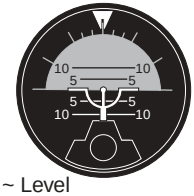
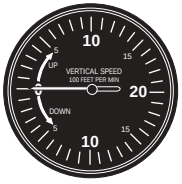
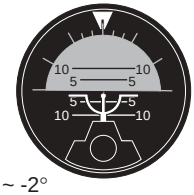
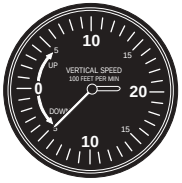
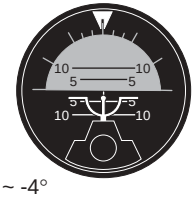
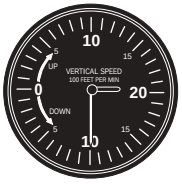
Cessna 172P Skyhawk

	Attitude	MP	Gear	RPM	KTS	VSI
Cruise	 ~ Level	NA	NA	2400	100	
Cruise descent	 ~ -2°	NA	NA	2100	110	
Cruise climb	 ~ +4°	NA	NA	2400	90	
Approach level	 ~ +1°	NA	NA	2100	90	
Precision descent	 ~ -1°	NA	NA	1500	90	
Non-Precision desc	 ~ -4°	NA	NA	1300	90	

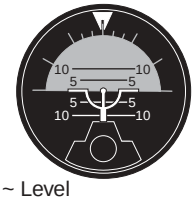
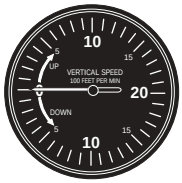
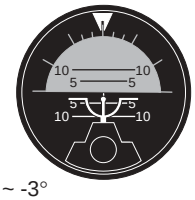
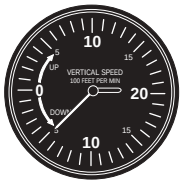
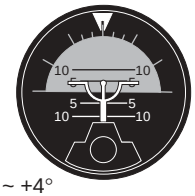
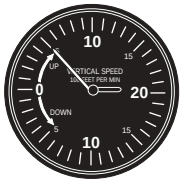
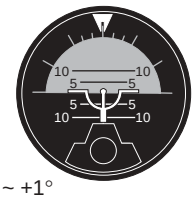
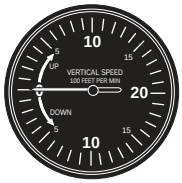
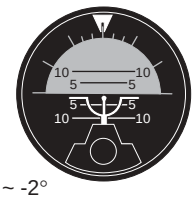
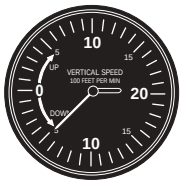
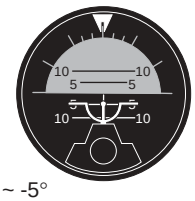
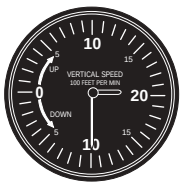
Cessna 182R Skylane

	Attitude	MP	Gear	RPM	KTS	VSI
Cruise	 ~ Level	23"	NA	2300	135	
Cruise descent	 ~ -3°	18"	NA	2300	130	
Cruise climb	 ~ +1°	23"	NA	2300	115	
Approach level	 ~ Level	15"	NA	2300	110	
Precision descent	 ~ -2°	13"	NA	2300	110	
Non-Precision desc	 ~ -5°	10"	NA	2300	110	

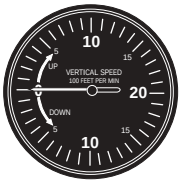
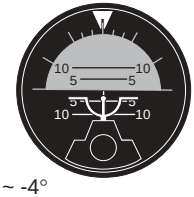
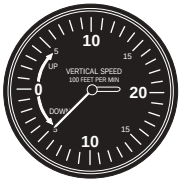
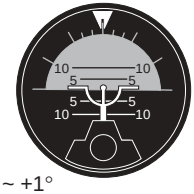
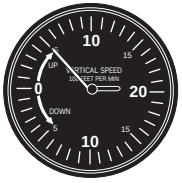
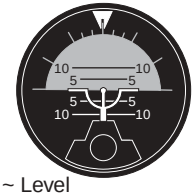
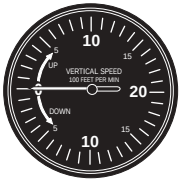
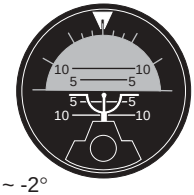
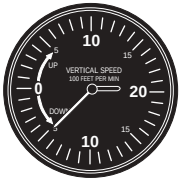
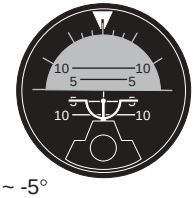
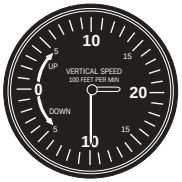
Cessna 182R Skylane RG

	Attitude	MP	Gear	RPM	KTS	VSI
Cruise	 ~ Level	23"	Up	2300	135	
Cruise descent	 ~ -3°	18"	Up	2300	130	
Cruise climb	 ~ +2°	23"	Up	2300	115	
Approach level	 ~ Level	15"	Up	2300	105	
Precision descent	 ~ -2°	15"	Down	2300	110	
Non-Precision desc	 ~ -4°	12"	Down	2300	110	

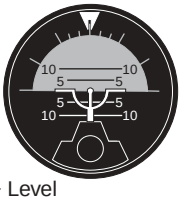
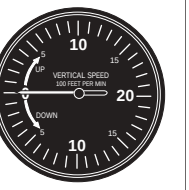
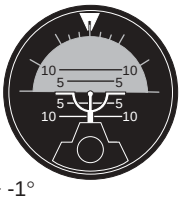
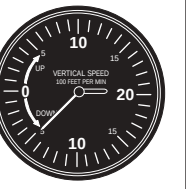
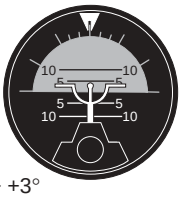
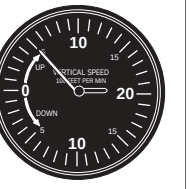
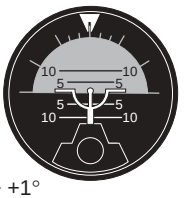
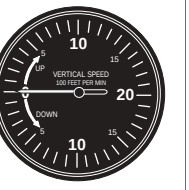
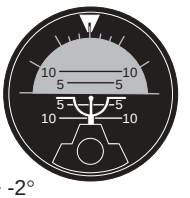
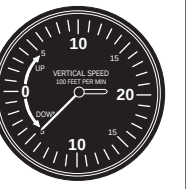
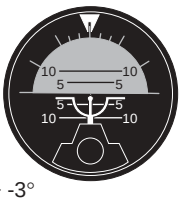
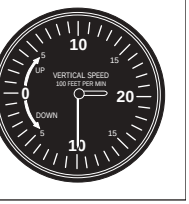
Piper PA-28-161 Warrior II

	Attitude	MP	Gear	RPM	KTS	VSI
Cruise	 ~ Level	NA	NA	2400	105	
Cruise descent	 ~ -3°	NA	NA	2000	105	
Cruise climb	 ~ +4°	NA	NA	2400	90	
Approach level	 ~ +1°	NA	NA	2000	90	
Precision descent	 ~ -2°	NA	NA	1500	90	
Non-Precision desc	 ~ -5°	NA	NA	1400	90	

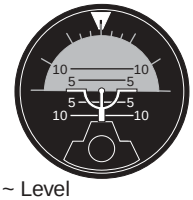
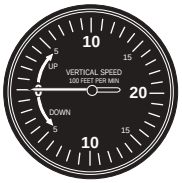
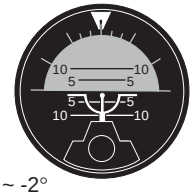
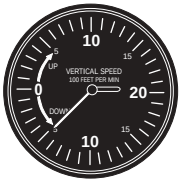
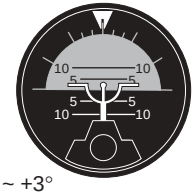
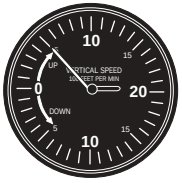
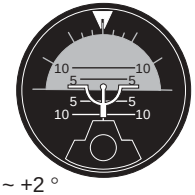
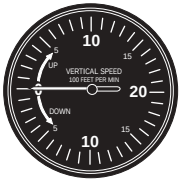
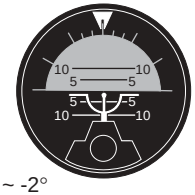
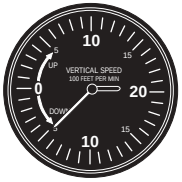
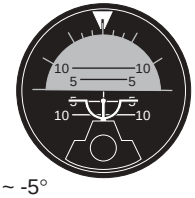
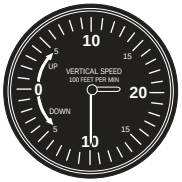
Piper PA-28R-201 Arrow IV

	Attitude	MP	Gear	RPM	KTS	VSI
Cruise	 ~ Level	23"	Up	2300	130	
Cruise descent	 ~ -4°	15"	Up	2300	130	
Cruise climb	 ~ +1°	20"	Up	2300	110	
Approach level	 ~ Level	15"	Up	2300	110	
Precision descent	 ~ -2°	15"	Down	2300	100	
Non-Precision desc	 ~ -5°	12"	Down	2300	100	

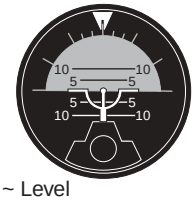
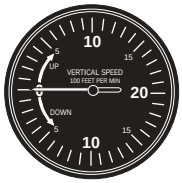
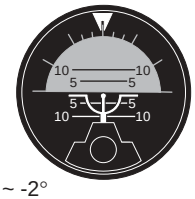
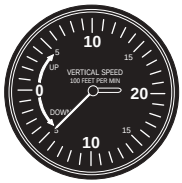
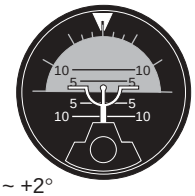
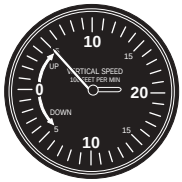
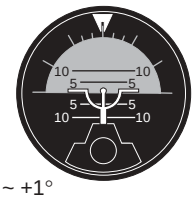
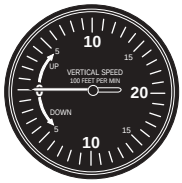
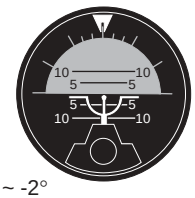
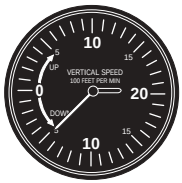
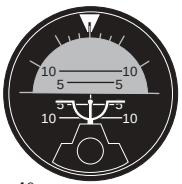
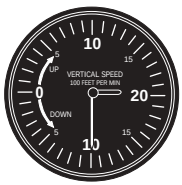
Mooney MSE

	Attitude	MP	Gear	RPM	KTS	VSI
Cruise	 ~ Level	23"	Up	2400	160	
Cruise descent	 ~ -1°	18"	Up	2400	160	
Cruise climb	 ~ +3°	23"	Up	2400	130	
Approach level	 ~ +1°	18"	Up	2400	120	
Precision descent	 ~ -2°	18"	Down	2400	120	
Non-Precision desc	 ~ -3°	15"	Down	2400	120	

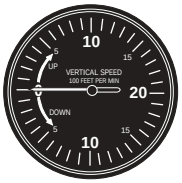
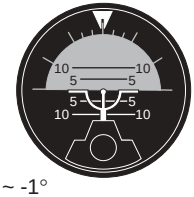
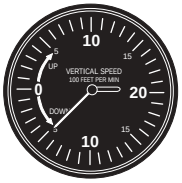
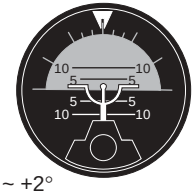
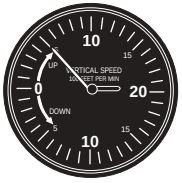
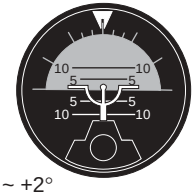
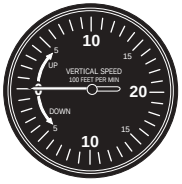
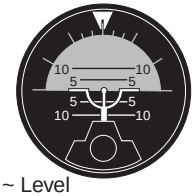
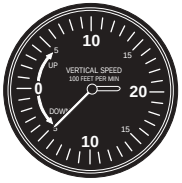
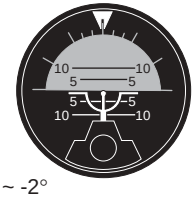
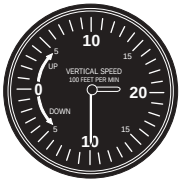
Lancair Columbia 300

	Attitude	MP	Gear	RPM	KTS	VSI
Cruise	 ~ Level	23"	N/A	2400	160	
Cruise descent	 ~ -2°	18"	N/A	2400	155	
Cruise climb	 ~ +3°	23"	N/A	2400	135	
Approach level	 ~ +2 °	15"	N/A	2400	120	
Precision descent	 ~ -2°	14"	N/A	2400	120	
Non-Precision desc	 ~ -5°	11"	N/A	2400	120	

Beechcraft V-35B Bonanza

	Attitude	MP	Gear	RPM	KTS	VSI
Cruise	 ~ Level	23"	Up	2400	150	
Cruise descent	 ~ -2°	15"	Up	2400	150	
Cruise climb	 ~ +2°	20"	Up	2400	130	
Approach level	 ~ +1°	15"	Up	2400	120	
Precision descent	 ~ -2°	17"	Down	2400	120	
Non-Precision desc	 ~ -4°	13"	Down	2400	120	

Beechcraft BE-58 Baron

	Attitude	MP	Gear	RPM	KTS	VSI
Cruise	 ~ Level	23"	Up	2400	170	
Cruise descent	 ~ -1°	17"	Up	2400	160	
Cruise climb	 ~ +2°	23"	Up	2400	150	
Approach level	 ~ +2°	15"	Up	2400	130	
Precision descent	 ~ Level	17"	Down	2400	120	
Non-Precision desc	 ~ -2°	15"	Down	2400	120	

Beech 1900 Basic Procedures

The following details are for the pilot who may not have experience operating a twin-engine, turbine aircraft. The procedures used are much different than single or multi-engine piston aircraft. The limitations data is taken from the FAA-approved flight manual, and the recommended procedures are taken from different operators' flight manuals.

Airspeed Limitations

SPEED	KCAS	KIAS	REMARKS
Maneuvering Speed (V_A) (16,950 lbs/7,688kg)	180	178	Do not make full or abrupt control movements above this speed.
Maximum Flap Extension/Extended Speed (V_{FE}) Flaps 17 Flaps 35 (UE-1 thru UE-78) Flaps 35 (UE-79 and after)	 190 145 155	 188 143 154	Do not extend flaps or operate with flaps in prescribed position above these speeds.
Maximum Landing Gear Operating Speed (V_{LO}) Extension Retraction	 182 182	 180 180	Do not extend or retract landing gear above the speeds given.
Maximum Landing Gear Extended speed (V_{LE})	182	180	Do not exceed this speed with landing gear extended.
Air Minimum Control Speed (V_{MCA}) Flaps 0 Flaps 17	 95 93	 92 92	These are the lowest airspeeds at which the airplane is directionally controllable with one engine inoperative and the aircraft is in takeoff configuration.
Maximum Operating Speed (V_{MO}) Sea Level to 13,200 ft 13,200 ft to 25,000 ft	 250 250-197*	 248 248-195*	These speeds may not be deliberately exceeded in any flight regime. Red & White Hash-Marked Pointer Reflects V_{MO} Limit. *.48 MACH

Airspeed Indicator Markings

MARKING OR RANGE	KIAS VALUE OR RANGE	SIGNIFICANCE
White Arc	84-154	Full-flap operating range. Lower limit is the stalling speed (V_{SO}) at maximum weight with flaps in the landing configuration, and with idle power.
No reference on the On Top airspeed indicator. Sea level to 13,200 feet 13,200 to 25,000 feet	 248 248-195	Maximum operating speed. These speeds may not be deliberately exceeded in any flight regime.

Engine Operating Limits

OPERATING CONDITION	SHP	TORQUE FT-LBS (1)	MAX ITT° C	GAS GEN RPM %N1	PROP RPM N2	OIL PRESS. PSI (2)	OIL TEMP C° (3) (4)
Starting	-	-	1000 (5)	-	-	0 to 200	-40 (min)
Idle	-	-	750	65 (min)	950 (min)	60 (min)	-40 to 110
Takeoff (8)	1279	3950	800	104	1700	90 to 135	10 to 110
Max Continuous	1214	3750	780	104	1700	90 to 135	90 to 105
Cruise Climb And Max Cruise	1106	3750 (6)	760	104	1700	90 to 135	10 to 105
Max Reverse	900	-	760	-	1650	90 to 135	10 to 105
Transient	-	5000 (7)	870 (7)	104	1870 (7)	40 to 200	-40 to 110

Footnotes:

1. Torque limit applies within a range of 1,000-1,700 propeller RPM (N2). Below 1,000 RPM, torque is limited to 2,000 ft-lbs.
2. Normal oil pressure is 90 to 135 psi at gas generator speeds above 72%. With engine torque below 3,000 ft-lbs, minimum oil pressure is 85 psi at normal oil temperature (60 to 70°C). Oil pressure under 90 psi is undesirable; it should be tolerated only for the completion of the flight, and then only at a reduced power setting not exceeding 2,000 ft-lbs torque. Oil pressure below 60 psi is unsafe; it requires that either the engine be shut down, or that a landing be made at the nearest suitable airport, using the minimum power required to sustain flight. Fluctuations of plus or minus 10 psi are acceptable.

3. A minimum oil temperature of 55°C is recommended for fuel heater operation at takeoff power.
4. Oil temperature limits are -40°C to 105°C. However, temperatures of up to 110°C are permitted for a maximum time of 10 minutes.
5. These values are time limited 5 seconds.
6. Cruise torque values vary with altitude and temperature.
7. These values are time limited to 20 seconds.
8. Takeoff power is time limited to 5 minutes.

To Start Engines

This procedure is used for the On Top BE1900 only—the procedure used in the actual aircraft is an automated sequence. Start the engines one at a time; it is not possible to start them concurrently.

1. Reduce both fuel levers to idle cutoff.
2. Advance one of the fuel pump switches (found adjacent to the fuel quantity indicators) to the UP position using either the fuel pump switch, found on the AV-1 avionics panel, or by using your mouse.*
3. Advance the corresponding fuel lever to the full forward position. The engine will start to crank and spool-up. It will take 30–35 seconds for it to reach idle position.
4. Repeat for the other engine.
5. Turn fuel pump(s) off.

*AV-1 will turn both pumps on/off; for individual fuel pump management use your computer's mouse to independently toggle fuel pump switches.

Taxi

Safe taxi speed is 15 knots; max speed is 25 knots; maneuvering speed, i.e., gate operations is 10 knots max.

Takeoff

Flaps 20° = 110 Knots
Distance = 4,100 feet

Normal takeoff should be performed with 20° of flaps and full throttle. Rotate by applying and holding back pressure at 105 KIAS until the aircraft transitions to full flight. Retract gear once positive climb rate is established. Retract flaps one notch at 1,000 feet above departure airport elevation and fully at 2,000 feet above departure airport elevation. This aircraft is capable of F-16-like initial climb characteristics. Forward yoke pressure and/or trim adjustment recommended to maintain climb rate of no greater than 2,500 fpm.

Climb

Initial 2,500 ft/min
Average 1,800 ft/min (Average climb rate from sea level to FL200)

If using autopilot for ascent, shortly after takeoff, throttle back slightly to a setting of 98% turbo, 95% fan/RPMs, 839 temp/EGT to avoid overspeed. This setting will carry you without further adjustment to FL200 (20,000 feet) with an airspeed of around 220 KIAS. Apply maximum power after FL200 to climb higher.

Cruise

At cruise altitude, reduce throttle to 92% turbo, 81% fan/RPMs, and between 700-715 Temp/EGT. Do not exceed these settings, as overspeed will occur. For maximum fuel efficiency, a Temp/EGT setting of between 670–700 is recommended. Maximum airspeeds are altitude dependent. The previously mentioned Temp/EGT settings apply to ALL altitudes. Typical Mach: .43 to .45

Descent

Autopilot On: 1,600 ft./min.
DO NOT EXCEED speeds:
FL300 = 213 KIAS
FL250 = 233 KIAS
FL200 = 257 KIAS
FL150 = 282 KIAS
FL100 = 308 KIAS

If using autopilot for descent, dial in new altitude and reduce throttle to 70% turbo, 44% fan/RPMs, and 492 Temp/EGT. This will ensure safe descent airspeeds at all altitudes without overspeed problems. To cover more ground during autopilot descent, it is possible to go with a slightly "hotter" throttle but you will have to closely monitor airspeed to be certain overspeed does not occur, particularly at the higher altitudes. Maximum descent speeds are altitude-dependent.

To calculate Top Of Descent point (the point at which you begin your descent to reach the desired altitude at the desired time): Use 4.4 miles per minute as the basis. If you are cruising at 25,000 ft and wish to descend to 5,000 ft at the next waypoint, at a descent rate of 1,800 ft/min, figure the time to descend 20,000 ft (25,000 – 5,000). Divide 20,000 ft by 1,800 ft/min to find 11.12 minutes. At 4.4 miles per minute, you must begin your descent at 48.89 miles from the next waypoint (11.12 minutes multiplied by 4.4 miles per minute). This is a "No Wind" calculation. If you have a tailwind, the miles per minute will be greater; if you have a head-wind, the miles per minute will be lower.

Final Approach

120 to 115 KIAS (Full Flaps, Gear Down)
7NM from airport — 190 to 200 KIAS — deploy TO flaps

At outer marker: Lower landing gear and deploy flaps fully (deploy flaps using two additional increments; do not deploy flaps directly from TO to LDG flaps).
In the vicinity of the arrival airport, the aircraft should be at or below 160 KIAS. Begin to slow aircraft by no later than 8 miles out.

Note: With autopilot engaged, flaps fully retracted, and a power setting of 70% turbo and 43% fan/RPMs, this aircraft will cruise at about 155 KIAS. On approach, feed flaps as follows: 10 miles out — TO flaps, 6 miles out — APR flaps, 3 miles out — LDG flaps. Lower gear 3 to 5 miles out. Final approach should be flown at 115–120 KIAS to provide appropriate control.

Landing

Minimum Runway Length = 3,000 ft
Average Landing Distance = 3,300 ft
Target Landing Airspeed = 100–115 KIAS

Check flaps full and gear down at 500 ft above airport altitude. Landing should be at an airspeed of between 115 to 100 KIAS. Once gear are on the ground, apply brakes, speed brakes, reverse thrusters (or any combination), and exit runway at or below 30 KIAS.

Note: If you are landing and you cannot get airspeed below 125 KIAS, initiate a go-around (follow checklist) and fly a closed pattern for another approach. If you are below 125 KIAS but above 110, flare and hold a level flight attitude or use speed brake to bleed off airspeed until you settle on the runway. Do not over-flare as you will "float" in with a nose-high attitude and settle on the runway too hard. Always go around if a safe landing cannot be performed.

Engage reverse thrust by retarding throttles to the full aft position. Apply brakes by pushing forward on the yoke. Disengage Reverse Thrust at (approximately) 30 knots; or as needed for conditions. Exit runway at 15 knots or less (unless high speed turnoffs are available; if so maximum exit speed is 25 knots).

Stall Speeds

Power ON, "Clean" Configuration (Flaps fully retracted, gear up): 92 knots
Power ON, "Dirty" Configuration (Full flaps, gear down): 85 knots
Power OFF, "Clean" Configuration (Flaps fully retracted, gear up): 100 knots
Power OFF, "Dirty" Configuration (Full flaps, gear down): 90 knots

Note: Stalls can occur at any speed and configuration. Turns and high pitch angles can lead to stalls. Be aware of your airspeed (and speed brake) and configuration. Adding flaps at airspeeds below 145 KIAS will help maintain controllable flight.

Operating NOTAMs

The Beechcraft 1900D will lose altitude at bank angles greater than those used by the autopilot. To prevent loss of altitude, apply slight back pressure as needed to maintain altitude.

The Beechcraft 1900D needs only small and smooth control inputs. If large or abrupt inputs are used, the aircraft will react abruptly. Use elevator trim to hold desired body angles on approach and landing.

Fuel Loading Formula

Range = 900 NM
Max. Takeoff Weight = 15,544 pounds
Aircraft + Payload (minus fuel) Weight = 14,139 pounds
Max. Fuel Load Weight = 1,405 pounds (212 gallons)
Fuel Burn Rate Factor = 0.0437956
Fuel Base Amount = 172 gallons (this is the basic fuel load per flight and includes fuel for taxi, climb, descent and reserves)

Fuel Loading Formula:
((Fuel Base Amount)+(Trip Distance · Fuel Burn Rate Factor))/2 = Fuel Load Per Tank

Example: 300 NM Trip Distance
((172 gallons)+(300NM · 0.0437956))/2 = 92.5 Gallons Per Tank. This is the amount that needs to be loaded for this flight.

To load fuel, select the Beech 1900D from the aircraft list (from the cockpit display, select AIRCRAFT, then the BE1900). Press the Weight button on the right side of the screen; enter 92.5 gallons in this window.

PCATD Mode

When used as part of an approved Personal Computer-based Aviation Training Device (PCATD), some of On Top's operating functions and some of the user's choices are different than described elsewhere in this handbook. This section of the handbook details those distinctions, and is designed to accompany the "PCATD Use and Instructional Guide" that comes with every On Top PCATD.

Selecting Your Operating Mode

The On Top title screen lists two choices when the program opens. Only select PCATD if your system, as well as your usage of the On Top PCATD, meets the requirements stated in the section "PCATD Usage Guidelines," later in this handbook.

Personal vs. PCATD Use

The primary difference in the two modes of On Top is that in the PCATD, all controls are physical controls, rather than the "mouse-driven" option of the Personal Use modes. Every radio frequency knob, carb heat lever, and more must have a "physical" counterpart in PCATD mode. Also, the On Top PCATD runs a self-test to check for the presence and functionality of these required physical controls.

PCATD Calibration and Self-Test

Upon launching the PCATD mode for the first time you will be presented with the Calibration screen as described in "Calibrating Your Flight Controls" (Page 18). Set everything following those instructions, and verify the following:

1. In "Buttons," Trim Down and Trim Up need to be set for the left forward and left back positions, respectively, on your Cirrus Yoke or Flight Console.
2. The right rocker switch on your yoke needs to be set for Transmit in "Buttons." With the later releases of PFC Cirrus yokes, which have two buttons (one on each side of the yoke), we recommend you assign the push-to-talk function to the button on the left. This is the most common location for a push-to-talk switch.

3. Calibration, and especially Limits tests, should only take place with the 6-lever attachment on your PFC Throttle Quadrant. Change to the 3-lever after calibration, if you intend to fly any of On Top's single-engine aircraft.

If the PCATD Self-Test fails, you will receive a message detailing the hardware missing or computer system parameter that does not meet the requirements. From here you have an option to Retry, Quit, or start in Personal Use mode. If you purchased the system as a PCATD, have made all the required connections, and you still receive this message, call ASA.

If the PCATD Self-Test passes, you'll see a "Test in Progress" screen and end up at the airplane's cockpit, ready to fly (*see* Page 33 for graphic).

The PCATD Cockpit

In the Aircraft setup screen, under the Panel options, there are noticeable differences. You will not have as much freedom to choose and place instrumentation, due to the requirements of Advisory Circular (AC) 61-126. For example, you won't be able to display a DG, NAV1, NAV2 and ADF simultaneously. You will be able to have DG, NAV1 and ADF, or some other variable; the AC requires that at least these are available during flight. With HSI selected (NAV1 indicated), you can display NAV2 and the ADF concurrently.

An important note: Regarding the absence of some of the options that instructors may wish to have available for student instruction, please remember that the PCATD mode of On Top is required only if time will be logged as simulation time on the system. According to 14 CFR §141.55, the Personal Use mode of On Top (where these options are available) can and should be used extensively in the context of ground training.

PCATD Usage Guidelines

The following guidelines detail the manner and method in which the On Top PCATD can be used, in accordance with Advisory Circular 61-126.

The Approved Package Checklist

A qualified and approved On Top PCATD Package will contain ALL of these items. Absence of any of these items will deny use of the On Top PCATD as a qualified device.

1. The approved On Top software.
2. The AV-1 Avionics Panel from ASA and Precision Training Software; with 9-volt power supply, 6-foot 9-pin male-to-male connector cable.

3. The following items from Precision Flight Controls:
   a. Cirrus Yoke and six foot USB A to B cable
   b. Throttle Quadrant Box and 25-pin male-to-male cable
   c. 3-Lever Throttle Quadrant attachment
   d. 6-Lever Throttle Quadrant attachment
   e. Cirrus Rudder Pedals, with six foot USB A to B cable
4. A compatible computer system, as described in the "FAA Approval Letters and System Documentation" section of the On Top PCATD Guide.
5. The On Top PCATD Integrated Flight and Ground Training Syllabus (contained in the On Top PCATD Guide).

As new flight controls are approved for PCATD use, ASA will publish the approvals on the ASA website (www.asa2fly.com).

Logging Hours

The On Top PCATD, like any such approved and qualified device, is acceptable for logging the following hours ONLY when performed under the close supervision of a qualified flight instructor who endorses the training given. The following guidelines apply:

1. For Part 61 operations conducting instrument training,
   a. 10 of the 20 hours which can be logged on a simulator in the course of instrument training.
2. For Part 141 operations conducting instrument training,
   a. 10 of the 15 hours which can be logged on a simulator in the course of instrument training.
3. For either program: Any training time must be endorsed by an instructor qualified to provide the level of training given.
4. The flight instruction must consist of the procedural tasks listed in AC 61-126, and must be presented with study materials that support these tasks.
5. The system must be approved by the FAA in accordance with AC 61-126.
6. The system must be used in an integrated ground and flight training curriculum.
7. AC 61-126 does not allow PCATDs to be used to meet the instrument currency requirements for instrument-rated pilots. However, instrument-rated pilots can use PCATDs to maintain proficiency and then meet the FAA requirements within the minimums specified in the regulations in an airplane.

Per 14 CFR §141.55, the PCATD may be used as courseware and can be logged within the contents of a ground training curriculum. Instructors are encouraged to reference the Instructor's Guide portion of their "PCATD Use and Instructional Guide" for lessons appropriate to ground training.

Grants of Approval

Acceptability of PCATDs is covered separately under Parts 61 and 141. ASA has proven the On Top PCATD's acceptability in general terms, but each operation is responsible for meeting the following conditions:

1. For Part 61: Must be used in a curriculum which will provide for
   a. A scope and content which should be in general compliance with Part 141 training;
   b. Instructional material for flight events;
   c. An outline of stage (phase) checks and criterion levels of performance.
2. For Part 141: Local Flight Standards District Offices may approve qualified PCATDs during the overall Part 141 approval and certification process.
   a. The principle operations inspector for the school is responsible for approving how the PCATD is to be used in the certificate holder's Part 141 curriculum. Individual PCATD qualification is not required from the jurisdictional FSDO.

On Top Instructor Station

The On Top Instructor Station (IS) enables an instructor or second pilot to monitor and adjust in-flight weather and failure conditions. With the addition of a second monitor and video graphics card, On Top can provide an even more realistic, and easily modified, real-time proficiency environment.

The Instructor Station is of value even without a CFII in attendance. Much like a pilot friend who flies along as a safety pilot while you are under the hood, On Top can now be used to simulate a lowering ceiling, reduced visibility or wind shear in a dynamic environment, without alerting the primary pilot. The safety pilot will find it a useful learning tool as well by understanding the reaction of the pilot to changing conditions and the onset of failures, as well as the heightened situational awareness achieved by viewing the flight as it unfolds.

Configuring the Instructor Station

To run On Top with the added benefit of a second monitor and Instructor Station capability, the computer must first be configured to run Windows dual monitor, extended desktop setup. You must be using Windows 98, ME, 2000 or XP, and a video card that is capable of dual-mode video resolution or two separate video cards. Using two video cards will require two I/O slots; either an AGP and PCI slot or two PCI slots. For general Windows support, see http://support.microsoft.com/. For a listing of chip sets that Microsoft deems compatible, see http://support.microsoft.com/default.aspx?scid=KB;EN-US;q182708&. Set up the configuration so it runs in Windows according to the dual monitor setup directions (see Windows database for configuration http://support.microsoft.com/default.aspx?scid=kb;en-us;Q179602).

To configure the PC hardware:

1. To install a second video card in your PC, turn your PC off and disconnect its power supply.
2. Touch a metallic part of your computer before you touch any internal computer component. This reduces the risk of static electricity, which could permanently damage your hardware. Make sure the power cord is plugged in. This ensures the computer case is grounded.
3. Find an open PCI slot (or AGP if it's not already in use) and insert the new card. ISA video cards are not recommended.
4. Connect your second monitor to the new card.
5. Install the configuration software and drivers that came with your new card.
6. Reboot your PC as directed in the video card installation instructions.
7. When you first boot up with dual monitor capability, you will receive a message during the system's Power On Self-Test (POST) that the PC has "seen" a second monitor and may be configured from the desktop.

To set up Windows software for dual monitors:

1. To begin configuring Windows for dual monitor support, EITHER right click in the desktop background and select Properties OR left-click the Start Menu, scroll over Settings and left-click the Control Panel, when the Control Panel opens, double-click the Display Properties icon.
2. When the Display Properties dialog box appears, click the Settings tab.
3. On the Settings tab, change the Display pull-down menu to the new card you just installed.
4. Check the box marked "Extend my Windows desktop onto this monitor."
5. Press the Apply button, and you will have the Windows extended desktop.

The mouse will move to the second screen by moving to the left or right farthest point depending on how the monitors are arranged. In the extended desktop, you may move windows to the other screen to make more room on your desktop. Some programs will work in conjunction with the dual monitor setup; however, others will not (see the individual program's documentation for compatibility with this feature). Should you find that Windows does not function correctly with the extended desktop, you must disable the second monitor. Before you can use the Instructor Station feature in On Top, your PC must be configured so the basic Windows extended desktop option performs normally.

Using the On Top Instructor Station

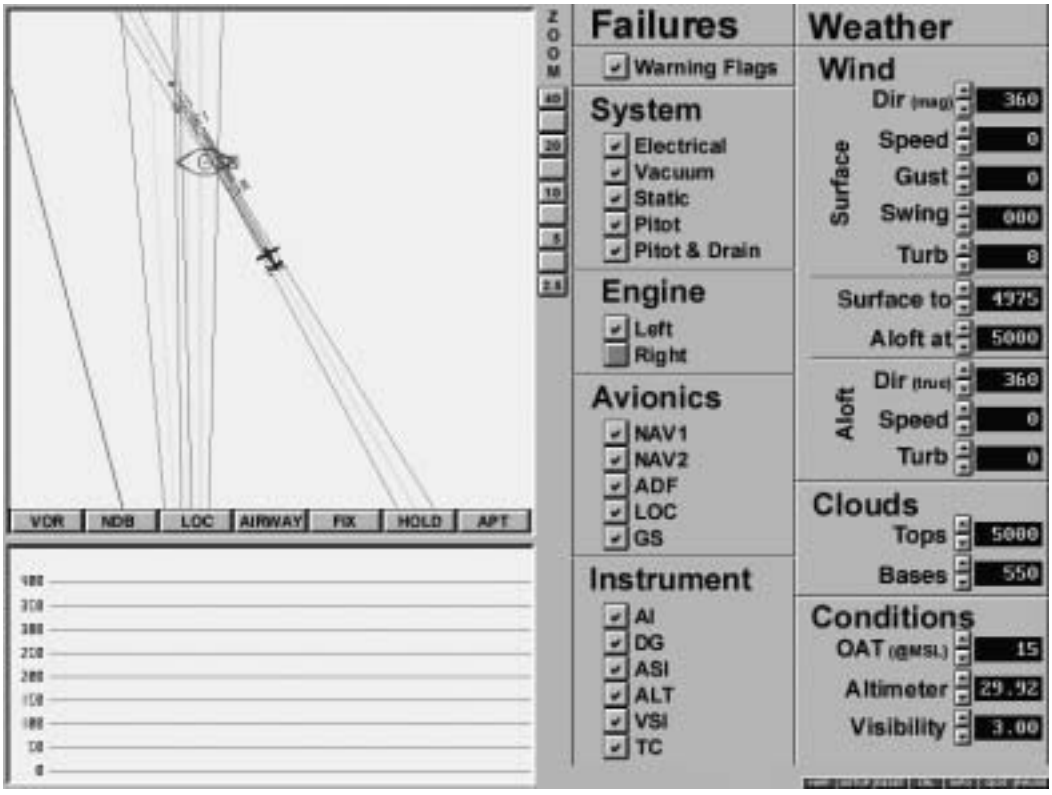
To use the dual monitor configuration with On Top, select the second monitor in the Windows extended desktop option as described above. A statement, or in computer terms, a "switch" must be added to the On Top command line so the Instructor Station monitor is recognized. While placing the mouse cursor on the desktop icon for On Top, or, if using the shortcut found in the "ASA Interactive" folder found via "Start/Programs," right-click on the shortcut or the desktop icon. From the pop-up menu that results, select "Properties." A "Properties" window will now appear. In the "Target:" line, and after the quotation marks, add the statement (without the brackets), [/is=yes]. The entire statement should read (if the directory containing On Top has not been modified from the default setup): "C:\ASA\PTS\ONTOP\ONTOP.EXE" /is=yes

On Top Shortcut or Icon Properties window with Instructor Station option

Click on the OK button and return to the desktop.

When you double-click the On Top icon, the program will launch and you will see the On Top cockpit in the primary monitor and the Instructor Station in the secondary monitor. This assumes Flight Controllers have been calibrated. Upon initial installation or if you change controllers, you will be initially taken directly to the main calibration page. Once a successful calibration has been accomplished, subsequent startups will display the cockpit on the primary monitor, and the Instructor Station on the secondary monitor. To move the mouse pointer from screen to screen, type "1" to move to the primary screen (i.e., the On Top cockpit) or "2" to move the pointer to the secondary screen (i.e., the Instructor's Station). These are the only keyboard commands that will be required for navigating between the cockpit and Instructor Station. The remaining features are controlled by On Top's easy to use point and click interface.

Note: When using the Instructor Station configuration, the Setup screen will be visible on the instructor's monitor.



On Top Instructor Station screen

The first step to getting the most out of the Instructor Station, whether you are using it as an individual or as part of formal instruction, is setting up the simulator as you would normally (see Pages 53–67).

The major difference between the "Weather" and "Failures" function in Setup and the operation of "Weather" and "Failures" in the Instructor Station is that the Instructor Station is dynamic while the Setup is static. In other words, after establishing a Setup and pressing the Set button, the program is configured according to the Setup settings. While in the Instructor Station, adjusting a setting, such as changing the cloud bases, happens immediately and overrides the Setup settings. For example, if configuring Setup to include changing, variable cloud bases, you will note on the instructor screen the cloud bases changing every few seconds. If the cloud bases are then adjusted on the Instructor Station screen, the bases will remain as last set by the "instructor." Only by returning to Setup and pressing the Set button will the Setup factors be in effect.

The Failures screen functions in a similar manner. After setting a failure mode in the Setup screen and returning to On Top by pressing Set, the failure(s) will be evident on the instructor screen by the respective button(s) turning to yellow. When the failure occurs, the yellow pending-failure button will turn red. After resetting the button in the Instructor Station, the button will turn green and the Setup mode Failures will be overridden until the Setup configuration is reset.

For a relatively modest investment in additional equipment, we have developed new uses for On Top with the Instructor Station configuration, enhancing the pilot's ability to maximize their IFR training experience. It is now possible to simultaneously review the aircraft's flight path, vectoring and holding patterns. The immediate cause and effect of failures can be determined. At the push of a button, variable ceilings may be configured without leaving the cockpit to make more realistic circle-to-land approaches and missed approach procedures. This feature brings On Top one step closer to creating an unparalleled training environment.

Troubleshooting and Technical Support

ASA offers a variety of support options to help you get the most from On Top. If you have a question about your ASA product:

1. Look in the printed product documentation.
2. Review the FAQs on ASA's website. Additionally, the website features a technical support link where you may ask questions.
3. If you cannot find the answer, contact ASA Product Support.

Visit the ASA website often — this is our way of keeping you informed of updates to the program. As with all products, we appreciate your feedback. Let us know what features you like, what features you'd like to see in future versions, and what we can improve upon to better meet your needs. Write, fax, or email:

Fax: 425-235-0128
Email: support@asa2fly.com
Mail: ASA, Inc. • 7005 132nd Place SE • Newcastle, WA 98059-3153

ASA Product Support is available through the ASA web site: www.asa2fly.com or email Support@asa2fly.com.

ASA Product Support is available between 8:00 a.m. and 5:00 p.m. Pacific Time, Monday through Friday. For assistance with ASA's On Top, dial (425) 235-1500 or email Support@asa2fly.com.

If you need warranty work or service on Precision Flight Controls hardware products, you can reach PFC at (916) 638-1310 or visit their website at www.flypfc.com.

Before you call ASA Product Support, be at your computer and have the product documentation and current software CD or disks at hand. Be prepared to give the following information:

- The version of ASA On Top you are using
- A description of the computer system (processor speed, memory, video card, etc.) you are using to run On Top
- The type of hardware (flight controls) you are using
- The operating environment you are using
- The exact wording of any messages that appeared on your screen
- A description of what happened and what you were doing when the problem occurred
- How you tried to solve the problem

Product Support is subject to ASA prices, terms, and conditions in effect at the time the service is used.

ASA materials are used and sold by schools and retail locations worldwide. For information about the location nearest you and a free copy of the ASA catalog call:

ASA Sales
and Service: (425) 235-1500
ASA Fax: (425) 235-0128
ASA Website: www.asa2fly.com

Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059-3153

Frequently Asked Questions (FAQs)

These are some of the most common operating, support, and hookup questions we encounter. Before calling ASA Technical Support, check to see if your question is answered here.

Q: My airspeed keeps rising even though I'm climbing out from takeoff. It continues through 200 knots!
A: Whenever you have odd or out-of-place instrument response, check your Failures Setup screen. In this case, the pilot left random failures enabled, and On Top reacted with "Blocked pitot tube and drain." The failure did exactly what it was supposed to do.

Q: My local airport just had an ILS approach activated, and On Top doesn't have it.
A: The On Top database is updated annually. If the database is missing information for your local airport, please send ASA an email with the information (support@asa2fly.com) and we will notify the FAA so it can be incorporated into future databases. For an interim solution, use the Database Editor to modify your data. See Appendix beginning on Page 108.

Q: I can't get the On Top aircraft to stall, spin or loop properly.
A: On Top's aircraft flight equations are accurate to a high degree—in the instrument flight envelope. From top-end speeds right down to the stall, weight, thrust, drag, and lift are delicately balanced. But below the stall, all the equations the flight dynamics are quite different. On Top's purpose is to be an instrument rather than aerobatics simulator. No one teaches 90-degree steep turns or negative-G pushovers in the instrument environment.

Q: I've done a particular NDB approach over and over at night, and never make it in to land because the runways aren't lighted.
A: The NAV1 OBS must be tuned to within +/-10 degrees of runway heading for those lights to come on. See Page 40.

Q: The frequencies never show up in my AV-1 Panel.
A: They never will. The AV-1 provides a relatively low-cost means of replacing on-screen controls with physical controls, but the frequencies remain on-screen, on your monitor.

Q: When I drag the aircraft off the map to reposition it, On Top fails and dumps me back to Windows.
A: That's called a "page fault," and happens because the screen redraws too fast to keep up with processor speed and available memory. Use the arrow keys to reposition the map. You can drag the airplane symbol and the map will slew automatically, but without high processing and video memory, page faults will happen.

Q: In the Limits area of the Calibration screen the throttle controls are green, but they're stuck at the top and unable to move.
A: Click the Limits button again to reset this calibration, and the indicators will turn red. Then cycle them normally.

Q: The landing gear switch on my PFC Throttle Quadrant is hard to move.
A: This gear switch is designed like the safety switches in real aircraft. To move it, first pull it out towards you, and then up or down.

Q: On Top occasionally freezes for a few seconds, then runs again. It happens twice or three times in a row, then disappears for a long while.
A: As simplistic as it sounds, your computer is "doing something." There are usually many TSR (Terminated and Stay Resident) programs running on newer computers, occasionally checking ports, checking for email, scanning for viruses. Some of these programs access the same memory registers On Top is using, and On Top has to step aside and wait. From your Windows desktop, press the CTRL, ALT and DEL keys simultaneously to bring up the "Close Program" box. Close some of these resident programs, and see how On Top responds. Chances are you'll find the culprit. It may be necessary to disable that program prior to starting On Top each time. To do this, select "Start/Run." In the "Run" box enter "msconfig." Select "OK." In this configuration window, select the "start-up" tab. Uncheck any undesired "start-up" program(s). NOTE: If you are unsure of what you can check and uncheck please call ASA before doing anything. When you have completed unchecking the undesired Start-up programs close this configuration utility. You will be prompted to Restart. Upon restarting the unchecked programs will not be running. This procedure only applies to Win 98/ME. For Win 2000/XP, use the above keystrokes to bring up Task Manager to end desired applications and/or processes. Rebooting is not required.

For Win 95 select CTRL, ALT and DEL to "end-task" desired running programs. Again, if you are not sure what to "end-task" please call ASA.

Q: I inadvertently decreased my mixture control to idle cutoff (or ran out of fuel) and the engine quit. I now need to start the engine, but see no starter switch. How do I start the engine in On Top?
A: Follow these steps—

1. Decrease the mixture control or fuel lever to idle-cutoff/full aft.
2. Turn the fuel pump on. *Note:* Multi-engine aircraft's engines must be started one at a time. For multi-engine aircraft, select the appropriate fuel pump for the engine you wish to start. If you are using a yoke, such as CH Products Flt Sim yoke, you will need to temporarily disable the throttle function of the yoke. This is due to the fact that the yoke only has one set of engine controls, which under normal flight conditions, operates both engines together and does not allow individual engine management. To manage engines individually you must temporarily disable the throttle quadrant features of your yoke. To do this go to the main page within On Top's calibration utility and say "no" to your throttle, and save these settings (*Note:* Within On Top, it will say "yoke/throttle"). After saving and being returned to the cockpit, use the computer mouse to manage individual engine controls. Once both engines are running, you can reactivate the throttle function of the yoke by returning to the main calibration screen and saying "Yes" to the "yoke/throttle."
3. Advance the mixture control or fuel lever to full rich/full forward. The engine will start to crank immediately, and will then start (assuming you have fuel and "no failures" set). *Note:* The BE 1900 is equipped with turbine engines, and have to "spool" up. Expect the engines to reach an idle setting approximately 30–40 seconds after beginning the startup procedure.
4. Turn off fuel pump(s), or leave on per your aircraft's procedure for takeoff.
5. For the multi-engine aircraft, repeat steps 1–4 for the other engine.

Q: Every time I try to take off, my aircraft dies and stops. I can't even get in the air, even though the program seems to run.
A: Believe it or not, this really happened. One particular On Top pilot created a new startup at his home airport, but in modifying aircraft weights he reduced fuel to zero. He never had any gas, and never looked at the gauges. He had enough to idle, but on throttle increase it was all gone. Check "Fuel Loaded" in Aircraft Setup.

Q: I can't get the marker beacon lights or sound when overflying the markers.
A: Only one thing to do—turn the beacon receiver on. See Page 42.

Q: I can't get the aircraft trimmed for level flight.
A: Use the Autopilot to verify the software. If you can turn the AP on, click ALT, let go of the stick and see On Top trim itself, the program is working correctly internally. If you continue to have trouble trimming the aircraft, try using the auto-trim

button located next to the trim wheel on the panel. As you are putting pressure on the yoke, wait for your speed to stabilize. Click and hold the auto-trim button with the mouse (or assign a button on your yoke or joystick); while holding the button, let the pressure off your yoke until it is in the center position. Release the auto-trim button.

Q: The Baron has too much asymmetrical thrust in engine-out configurations.
A: Prop drag was built into the simulation to force immediate recognition, and stimulate the "identify, verify, feather" process. You need to feather the failed engine's prop much faster in On Top than in real life, especially with high output on the good engine, to stabilize the rate of descent and turning tendency. This serves to make you sharper and more on-the-ball in real life. The Baron has one of the highest power/weight ratios for light twins.

Q: I can't get smooth simulation no matter what I select for levels of ground texturing in Cockpit Setup's "OTW" field.
A: Some video cards are poor performers in On Top's 16-bit video modes. Call ASA technical support, and we have an option for running an 8-bit video version on your machine, which should make it run smoother. Or if you would like try changing video modes, use the following procedure:

1. Left click on "Start"
2. Select "Programs"
3. Select "ASA Interactive"
4. Right-click on the On Top 8 shortcut. Or you can use the desktop icon. If you use your desktop icon begin with Step 5 (after clicking on the desktop shortcut).
5. Select "Properties"
6. In the target window, you will see the command line, which starts the program. By default, the On Top Installer most commonly will use the 16-bit "exe" file. In this case you will see "C:\asa\pts\ontop\ot16.exe". To run the program in a lower graphic resolution, rename and replace the "ot16.exe" file with "ot08.exe". To do this simply erase the "16" in "ot16" with "08." The result will be "C:\asa\pts\ontop\ot08.exe". Select "apply" and then "OK" and the properties box will close. Restart On Top and the program will now run in it's lowest graphic format. If the program does not run using the "ot08.exe" file, your video card is not compatible. Feel free to call us for more information.

Q: Why can't I see photo-realistic runways, cloud haze and an airplane picture in Aircraft Setup?
A: Your computer's video adapter was not detected as supporting 16-bit graphics in DOS mode, so On Top is running the 8-bit version.

Q: Why does my PCATD need to be re-calibrated and have the buttons reselected every time I start it?
A: The FAA requires calibration and verification of flight controls every time you wish to use the PCATD mode for the logging of training hours. It's not required, however, that you reset your buttons every time. If your PCATD is connected per the diagram and instructions under "PCATD Connections" on Page 14, with all hardware running through your computer's serial port, On Top will automatically set the Cirrus Yoke left rocker switch for trim up and down, and the right rocker for transmit (or the "PTT" button on the newer Cirrus yoke).

Q: When I use the throttle on my joystick, the on-screen throttle bounces to the next position on my joystick.
A: Some of the digital joysticks have a limited number of throttle positions, and On Top is designed to use more than what the joystick offers. In the Calibration screen, reset the Limits and DO NOT set the throttle limit.

Q: When I click the On Top icon to start the program the screen goes black then returns to the Windows desktop and/or I see the any of the following messages:

- "Set display mode failed"
- "Couldn't find a compatible display mode"

A: Some video cards are incapable of running higher graphic versions that the software is capable of. To run the program in a lower graphic version, use the following steps:

1. Right-click on the On Top shortcut used to start the program.
2. Select "Properties".
3. In the "Target" window, change On Top's executable. For example, you will see one of the following lines.
    - C:\asa\pts\ontop\ot15.exe
    - C:\asa\pts\ontop\ot16.exe
    - C:\asa\pts\ontop\ot32.exe
4. Change the executable, i.e. "ot15.exe", "ot16.exe", or "ot32.exe", as applicable, to "ot08.exe".

Note: If you are running one of the higher graphic versions, i.e. "ot16.exe" or "ot32.exe", you can try a lower graphic version before trying the lowest graphic version, i.e. "ot08.exe".

Q: My joystick/yoke doesn't respond properly. After calibrating in On Top, I start flying and find the controls/throttles are erratic or too sensitive.
A: Go through the On Top calibration process again. If you continue to experience problems, calibrate your game controller in Windows:

1. From the Start menu, go to Settings/Control Panel.
2. Click Game Controllers or Gaming Options as applicable.
3. Remove any existing controllers listed under "game controllers" (highlight, click remove, then add).
4. Scroll through the list until you see your device. Highlight and click OK.
5. The controller will come up with status OK. Click on Properties and follow calibration instructions.

The above procedure applies to gameport-based joysticks/yokes. For USB joysticks/yokes, disconnect/reconnect and varify that the controller's "status" is "OK." USB periphierals are "plug and play"; when you disconnect, you should see the controller disappear. When you reconnect you should see the controller reappear and it's "status" should be "OK." If this does not occur, you may have a problem with either your controller or your USB hardware. If this is the case, please contact your controller or USB hardware vendor to get your hardware working properly before calling ASA.

Q: No matter how many times I calibrate my controls I get the message "you must set limits first."
A: This simply means the calibration is incomplete. In order to move on, the program must see all the red blips turn green. If you have a throttle and rudders you must see three green dots—cycle all the controls you have. When setting x/y limits, the blip must end up in the center box to stay green. If it remains outside the center box, continue moving the controls in the direction of the blip's displacement until it centers.

Q: I'm in the cockpit ready to go, but the airplane won't respond to throttle input. Gyros are slowly tumbling.
A: The engines have been shut down and need to be restarted. In all the aircraft, the restart procedure is the same:

1. Reduce mixtures to idle cut-off.
2. Switch fuel pumps on (up). (BE1900 fuel pump switches are located above the power levers on either side of the fuel gauges.)
3. Advance mixtures/fuel levers to full rich.

Q: The ADF is on and identing but the needle only points to a 90 degree relative bearing no matter what my heading is.
A: You need to assign the single barrel pointer to "A" on your ADF receiver (the first readout on the ADF receiver display).

Q: I can't get the Beech 1900 to slow down on approach. Thrust goes into beta below 1500 ft/lbs Torque.
A: In order to reduce power below 1500 ft/lbs the mixture levers have to be reduced to a lower Setting. In the Beech 1900, the mixture controls are condition levers, but in the simulation they act as both. To get to the lower range of thrust output, the condition levers must be retarded until the two yellow indicator lights come on.

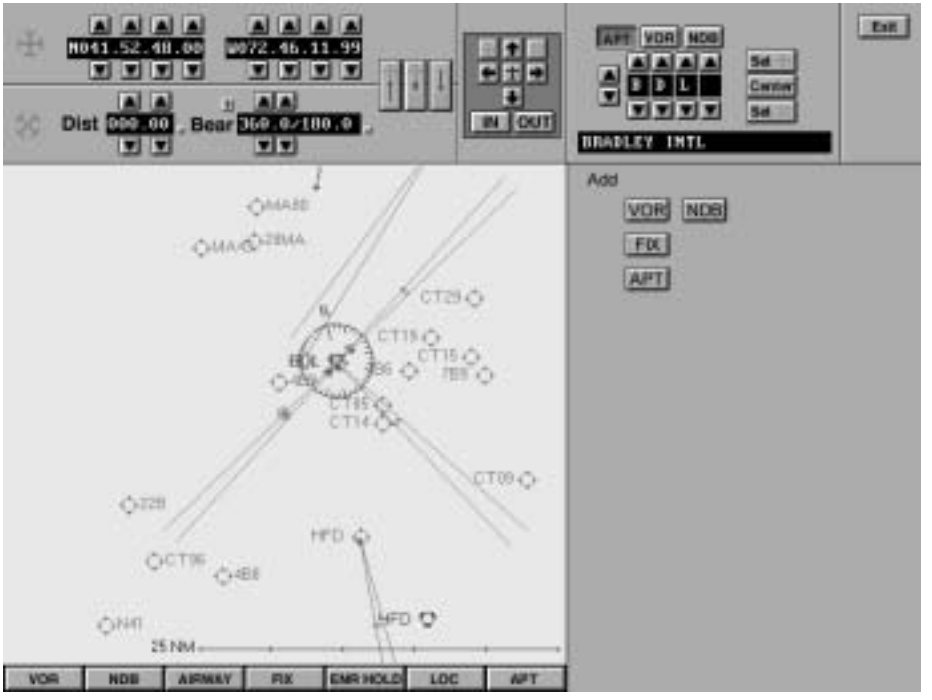
Appendix: Using the Airspace Database Editor

The On Top airspace database originates from the FAA and the Department of Defense. Great care is taken to ensure the data is current, accurate, and comprehensive. However, database changes are released every 56 days — more frequently than the On Top database. On Top offers the opportunity to become familiar with the airspace, but the database is not designed to be used for navigation purposes. As in the real world, your current charts and approach plates are the final authority for orientation to the airspace.

If you've followed the instructions outlined in the Position setup (see Page 59) and have found an error in the data or cannot find an airport or NAVAID, you may use the Airspace Database Editor included with the On Top CD-ROM to add, delete, or edit your data.

The Airspace Database Editor is a separate program from On Top and is by default, installed when you install On Top, using the "Typical" installation. Close On Top before working with the Editor. Then run the Editor:

1. Left-click the "Start" button.
2. Select "Programs."
3. Select the "ASA Interactive" folder.
4. Select the "Airspace Editor" shortcut.



The Database Editor Tools

1. Gray background (as opposed to black) indicates the field you are currently in.
2. White text indicates edits will not be allowed in that field. Try clicking in the field to change the text from white to yellow.
3. Yellow text indicates edits will be accepted.
4. Green text indicates the text within the field is "locked." The small square boxes beside the field are your key to locking and unlocking the field. This feature may be used if you are trying to identify an exact position. For example, "lock" the bearing, and you will only be able to adjust the distance.
5. The red maltese cross symbol is used to identify a reference point. For example, you may position the maltese cross at an existing airport, NAVAID, or intersection as a reference for creating or editing another point.
6. The red plus symbol is used to compute a position. The plus symbol indicates where the data will be added, deleted, or edited within the context of the Map display.
7. Use your backspace key to clear a field before entering new data. You may also use the up and down keys to increase or decrease the existing data.
8. Fill in all known data when modifying a record. The default U.S. specs will be used unless you specifically change it (for example, the glideslope angle will be 3 degrees, etc.).
9. Press the SAVE button in the upper right corner of the screen to apply all your changes to the On Top database.
10. Press the CANCEL button to ignore any changes you've made to the database.
11. Press EXIT to leave this program. Any changes you SAVED will be incorporated into On Top the next time you start the program.

Defining the Position

The first step in editing your data is to position the red plus symbol where you will be adding, deleting, or editing the data. Occupying the majority of the Airspace Database Editor is the Map. The map displays airports, VORs, NDBs, Locator Outer Markers (LOMs), Localizers, Victor Airways and intersections or fixes. Like the map used in On Top, any of the display symbols can be turned on or off to unclutter your view using the buttons along the bottom of the screen.

Use the upper right corner of the screen to dial in an identifier for your reference point (use an existing airport or NAVAID to take the map to that part of the world so you can then add, edit, or delete). To go to a Position:

1. Select APT, VOR or NDB.
2. Dial the identifier of that waypoint using the character boxes.
3. Click the Center button to take the aircraft there and redraw the Map screen, centered on that point.

Additionally, you can define your starting position at a certain distance and bearing from the NAVAID or airport selected. Before clicking Center:

1. Use the UP and DOWN arrows adjacent to DIST to create a distance from the selected NAVAID or airport.
2. Use the UP and DOWN arrows adjacent to BEAR to create the bearing from that NAVAID or airport.
3. Click Center. You are now a specified Distance and Bearing from the selected airport or NAVAID.

The Map screen also allows you to click and drag either the maltese or plus symbol to another location within the frame of the map screen. Simply click the symbol on the map, and while holding the mouse button in, slide the symbol to your new position.

Once you've positioned either the reference (maltese) or calculated (plus) symbol, you can automatically reposition the other symbol by clicking the "cross to plus" or "plus to cross" buttons.

The data boxes above the map allow you to type in any known information. If you know the latitude/longitude for the area you are editing, type this in and the red plus symbol will go there. If you know the distance and/or bearing from an existing airport or NAVAID, type this in next to the red maltese symbol and use this area for your reference point. Notice the small gray box next to the bearing information box; clicking it will change the data from True to Magnetic. Be sure to select the correct letter, based on the information you're working from.

Clicking on any of the items in the map display reveals an information box. You can use these information boxes to position your reference point (maltese cross), edit the information, or position your calculated point (plus symbol).

The amount of area the Map display shows, and the area itself, can be controlled by the "Slew Map" controls, just as in the Map display within On Top. You should zoom the map to 0.5 NM scale if you are making modifications to a runway. Slew can also be done with the right mouse button. With the pointer over the map, click and drag. Zoom can be done with the "-" and "=" (plus when shifted) keys. These also work in the On Top map screen and setup Position screen.

Edit Data

Once you've positioned the map to the area where you want to modify the airspace, you can add, edit, or delete the data:

1. To Edit, click on the NAVAID or airport symbol and select the EDIT button. The data fields will fill with the current data, which you can then modify.
   a. To edit an ILS, click on the airport symbol on the map, click EDIT, then EDIT for the runway that has the ILS, then EDIT for that particular ILS.
   b. To change the angle of the localizer, single click on MOVE.

2. To delete, click on the NAVAID or airport symbol, select the EDIT button, then select the DELETE button.
3. To add, position your red plus symbol to the exact position, and then choose the VOR, NDB, FIX, or APT button, depending on the type of airport or NAVAID you would like to add.

Note: If the runway does not have a current ILS and you wish to add one, select "New."

Examples

To Edit an ILS:

1. Find the airport on the map.
2. Click the airport symbol.
3. Click EDIT within the popup.
4. Click EDIT for the runway.
5. Click EDIT for the ILS.
6. Make changes as needed.

The editor will always set the bearing of the ILS to intersect the centerline at the threshold. If an error in the source data has caused the beam to be elsewhere, you can fix it by making sure the bearing is unlocked, then click on MOVE. This will usually correct the error; if not, then use the mouse to click on and drag the localizer transmitter to the correct position. If you need to know the distance from either end of the runway, use the B->X or R->X buttons to position the reference marker, and then read the distance in the upper left section of the screen.

If you become confused in the editing process, you can also delete the ILS using the delete button on the runway edit screen, and add it again. Remember that marker beacons are part of the ILS, and will need to be added again as well.

To Add a Glideslope to an ILS:

1. Find the airport on the map.
2. Click the airport symbol.
3. Click EDIT within the popup.
4. Click EDIT for the runway.
5. Click EDIT for the ILS.
6. Click the GS button.
7. Change the default data to match the approach plate (default is 55 feet TCH, 3.00 degrees, TDZE same as runway end elevation).

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