IP Trainer

Pilot's Operating Handbook

Version 7

IP Trainer
Pilot's Operating Handbook

Third Printing

Aviation Supplies & Academics, Inc.
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IP Trainer Overview

Overview

Your new IP Trainer software contains 133 lessons divided into four "Blocks" of learning: **Instrument Flying, Radio Navigation, Instrument Approaches** and **Enroute Procedures**. A fifth Block, **Checkride**, is one long lesson that simulates your Instrument Rating practical test, and sums up all you've learned in the previous lessons. A sixth Block, called **Free Flight**, allows you to leave the instructional environment and fly on your own, with no guidance or prompts.

Each Block is subdivided into six topics, and each topic contains from one to ten lessons.

There are many correct ways to teach any given instrument procedure, and IP Trainer can teach only one of these. IP Trainer's purpose is not to teach you the correct way to execute a given procedure, but to teach one correct way, as a solid foundation to your instrument flight training. Rely on IP Trainer to teach you the procedures, and your individual flight instructor to teach you the technique.

Taking the Course

In order to receive the maximum training value from your investment in IP Trainer, you'll want to use it with a serious, professional attitude.

IP Trainer is organized around a "building block" approach, in which each new lesson teaches a single new skill. That is, each lesson teaches a new instrument skill by combining new material with previously taught skills. When teaching a new skill, therefore, IP Trainer assumes that you can correctly execute all of the skills in the previous lessons. Consequently, you'll train with the least frustration and most ease if you take each lesson in order.

Finally, you'll want to use IP Trainer as often as possible, ideally every day. Frequent sessions allow you to spend less time reviewing earlier material, and more time focusing on new skills.

If You Make Consistent Errors

If you notice you are making consistent errors, or are having difficulty with lesson tests, then your concentration on the new procedure may be interfering with your execution of a previously-taught (and passed!) procedure.

Since you've already learned the previous procedures, you can generally execute them during the learning of a new procedure with a great deal of success. However, if too much time elapses in between, then your instrument knowledge may be deteriorating—as it does for all pilots. Conversely, if you are proceeding through the course too rapidly, then you may not have mastered certain procedures as well as you had thought. What do you do?

If you notice you are making consistent errors or are having difficulty passing the lesson tests, you may want to improve you overall study and training methods in four ways:

1. Take lessons more frequently, and more steadily. If several days have passed since your last lesson, be prepared to review previous lessons listed in the briefing under Skills Assumed.

2. Increase your focus as you study each lesson. Make sure you have fully mastered the procedure and can pass the test before moving on to the next lesson.
3. Watch! Use all of IP Trainer's available resources, especially the Explain and Prompt modes in each lesson. If you keep failing a particular lesson, sit back and watch the instructor do it in Explain, just as you would in actual flight training. Chances are you'll pick up on something you've been missing.
4. Take a break. If a lesson is particularly frustrating, walk away. Come back the next day, and look at the entire lesson from a fresh perspective.

Get Ready for a Challenge

The IP Trainer is probably the most demanding and challenging software you'll ever run on your computer. But then, instrument flying is like that. With thousands of instrument students listed in the registry of IP Trainer users, we've heard many times that nothing has been tougher than completing this course.

IP Trainer is difficult because the Instrument Rating Practical Test Standards are difficult. This is the foundation from which IP Trainer's built-in CFII judges you, and that's why it is so successful. You will learn to keep your aircraft within a narrow band of tolerances that have been set forth by the Federal Aviation Administration. Just like your real flight instructor, IP Trainer knows how the procedure should be flown, and compares your execution with this knowledge. The difference is that your real instructor might sometimes say, "That's OK that we lost three hundred feet, let's just get back up to our altitude," and your IP Trainer won't.

Only by stopping you every time you stray outside these parameters can a computer program do what an instructor can do, and be sure that you're learning what you need to learn. So don't get frustrated—the CFII in IP Trainer is only doing what the FAA has mandated, when it fails you during a lesson test. And unlike your actual CFII, who may be limited by time, money, airspace or weather, IP Trainer will let you do it as many times as it takes to get it right.

The Secret to Success

There is a secret to getting the maximum training value from IP Trainer. If you learn this secret, and apply it, you'll finish each lesson with a well-deserved sense of accomplishment as you make steady, measurable progress toward your instrument rating. The secret is this:

Instrument flight requires maintaining precise control of aircraft attitude at all times.

Precise control of aircraft attitude requires using the attitude indicator to maintain exact, deliberately chosen angles of pitch and bank at all times. Therefore, you must read the attitude indicator at least once every two or three seconds, no matter what else you are doing, and immediately correct any deviations from your chosen pitch and bank angles.

Why is this a secret? Well, it isn't really, but failing to remember and apply it causes approximately 50% of all instrument procedure errors. This means that by learning and applying this secret, you can avoid 50% of the potential errors—and train more effectively and enjoyably while you do it.

Make sure you take advantage of the latest developments in this program. IP Trainer warns you of mistakes in red streaming text that appears above the glare shield. In the Prompt mode, the program will count 15 warning occurrences before stopping you (7 in Practice, and 3 in Test). So, if you can correct the error before the warnings expire, you

may continue flying the program without having to start the lesson over from the beginning. If the program stops you after repeated warnings, you have the option to Backup or Continue with the lesson. Bear in mind that if you ignore accumulated warnings, there will come a point at which the Continue option will become inoperative. Corrections must be made to be able to continue.

IP Trainer includes context-sensitive CFII Tips accessible from within each lesson. Also available from within the lessons are the Briefings, so you may review the objectives and exercises expected of you.

So as you proceed through the course, remember this: Positive, precise control of aircraft attitude through frequent scan of the attitude indicator is the secret to successful instrument flight.

Quick Start Guide

If you are familiar with Windows-based flight simulation programs and want to start using IP Trainer as quickly as possible, the following will assist you to get up and running.

Before running the installation routine, please ensure that the flight controls you plan to use with the program are attached to the computer and the current drivers from the manufacturer are installed (do not use manufacturer's configuration utilities). The lessons require a yoke or joystick only.

NOTE: The throttle control will function normally but no prop or mixture controls (such as with the CH Flight Sim yoke) will be seen. Rudder controls can be calibrated but will not be used in the lessons but can be used in Free Flight mode.

You may install IP Trainer in a subdirectory of your own choosing. A message will appear in the installation routine suggesting a path and permitting change. The default location is C:\ASA\IPT7.0.

After starting the program and going through the introduction (you may skip this introduction by pressing your left mouse button), first-time users will be prompted, "Flight controls require calibration. Press CALIBRATE."

Once in the main Calibration screen, you will have the opportunity to perform a "simple calibration." Select the FLIGHT CONTROLS button. In the Flight Controls menu, you should see your controls on the list. Choose the flight controls you wish to activate by putting an asterisk in the leftmost box of the two boxes on the right side of the screen next to where your flight controls are listed.

Once you have selected the flight controls to be used with the program, press the LIMITS button and perform a simple calibration by fully articulating the pitch, roll, throttle and yaw axes. Please note that the first controls you actuate will be the controls calibrated. For example, if you have a throttle on the yoke as well as a separate throttle quadrant, the first throttle selected will be the one that is calibrated. If you choose incorrectly, you may reset the limits by re-selecting the Flight Controls button followed by the limits button.

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

When a buttons on yoke or joystick the flight controls is depressed, the mouse pointer will change shape to become a "cross hair". To assign buttons, press and hold the flight control button you wish to assign (e.g., the trim up). Simultaneously click the left mouse button with the mouse "cross hair" over the on-screen "up trim" triangle.

When correctly assigned, the triangle will turn green when the "trim up" button is depressed. Assign all desired button functions in the same way. When finished, press the DONE button and enjoy flying IP Trainer.

If you cannot calibrate the flight controls in the quick calibration, you may have to use the Advanced Mode, which requires a more detailed understanding of the calibration routine as explained in the **Calibrating Your Flight Controls** section of this manual (Page 20). If you still have difficulty with your flight controls, ASA has many resources available, including online and telephone technical support.

Desktop Simulators 101

If you are an old pro at instrument flying, but relatively new to "flying" simulators, get ready for an extraordinary experience. While not exactly like flying the real thing, simulators afford the opportunity to tax your flying skills at a low "per-flight-hour" cost without safety concerns.

To get the most out of IP Trainer, we recommend you practice in the Free Flight mode until you feel comfortable with how the simulator "handles." This is like transitioning to a complex aircraft or establishing the instrument configuration numbers for your aircraft.

In the same manner, we suggest a flight "around the patch" in Free Flight to get the feel of the IP Trainer Cessna 172. Take off from the initial starting point of Boeing Field (BFI) and climb to 2,000 feet. Fly the ADF needle to the outer marker, which is already tuned, and after passing the marker, make a left turn to 270. After rolling out of the turn, start the panel timer and head out for one minute. After the time elapses, make a right turn to 90 degrees and transition to approach level (about 2000 RPM and 90 KIAS). You will now be on an inbound heading to intercept the final approach course for BFI ILS Runway 13. Select the MAP button and check it out. The radios are all tuned and ready for you to slide down the glide slope (simply practice flying the airplane down to the runway).

If you find the above exercise to be a piece of cake, you are ready to jump in and start the challenging IPT course. On the other hand, if you are like many new to this kind of "flying," be sure to start at the beginning of the course to understand how the instructor wishes you to fly in this environment while learning the differences associated with flying the simulator versus your airplane.

Suggested Road Map

Take the following steps:

1. Calibrate your yoke or joystick; it is helpful to program one of your buttons to PROCEED. Other recommended functions to assign are Push to Talk (PTT) and Timer.
2. Select NEW LESSON; press BRIEFING; read the lesson briefing and study the appropriate charts and diagrams.
3. Select the EXPLAIN Mode and study the IPT's simulated CFII executing the procedure. Make sure you understand each step.
4. Select the PROMPT Mode and have the IPT-CFII prompt you through the procedure until you think you can execute it without prompts.
5. Select the PRACTICE Mode and practice the procedure without prompts until you can complete the procedure without making errors.
6. Select the TEST Mode and take the test with little margin for error. When you can pass the test, you are ready to proceed to the next lesson. If you have successfully completed the PROMPT or PRACTICE mode and are satisfied with your performance, you may proceed to the next lesson from that point. Take a look at the EVALUATION and if you feel you have performed to your satisfaction, and the errors are more related to the computer program than your flying skills, go on to the next lesson.
7. Press MENU to select a New Lesson, Evaluate, or Quit the program and return to your desktop.

If you notice you are making consistent errors, or are having difficulty with lesson modes, then your concentration on the new procedure may be interfering with your execution of a previously taught procedure. Since you've already learned the previous procedures, you can generally execute them during the learning of a new procedure with a great deal of success. However, if too much time elapses between computer sessions, then your instrument knowledge may deteriorate—as it can for all pilots who don't fly as frequently as they'd like. Conversely, if you are proceeding through the course too rapidly, then you may not have mastered certain procedural elements as well as you had thought. What do you do?

First, relax. It is only a simulator, and you are in the privacy of your own home—no TFRs here to worry about. Remember, the computer program is without intuition or a sense of humor. Because of this, instead try to decipher what it is the simulator is responding to. The best and easiest way to discover IPT's expectation is to watch the Explain mode carefully. What sequence is used? Does Stan, the built-in instructor, Time, Turn and Talk or Turn, Time and Talk? In real flying, as long as you accomplish the tasks smoothly and completely, it makes little difference. But to Stan, who only understands, 0's and 1's, it's "my way or the skyway."

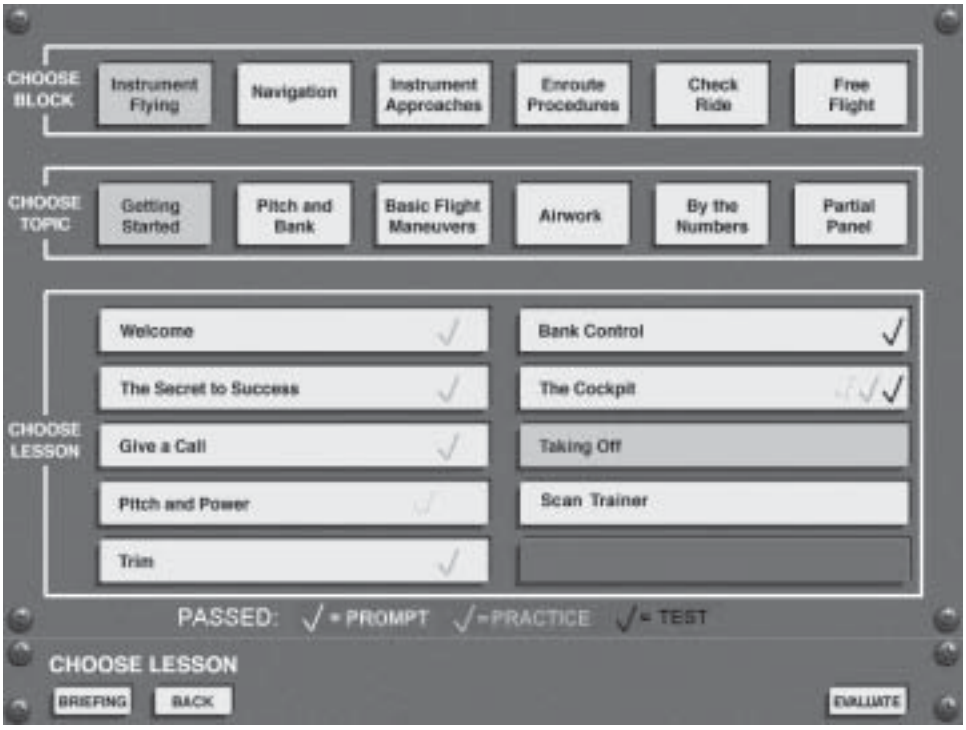
An example of a common problem concerns the panel timer. You might find yourself crisply rolling out of a perfect standard rate turn and hitting the panel timer exactly as the wings roll level. Well, in actual flying, that would work fine, but IP Trainer might warn or stop you. Why? The reason is logical for the computer. It is waiting for you to roll the wings level. Wait one second to establish the criterion has been met, and then start the panel timer. If you press the timer button too early, the program believes you have not completed a step.

If you are having difficulty, the idea is to try to think like the computer. One tip may help you master a procedure: as you execute the procedure in question, constantly ask yourself: what are the next three things the program expects me to do? If you are unsure, consult the built-in CFII Tips. Just as in flying your aircraft, you want to stay "ahead of the PC aircraft."

A series of streaming, on-screen warning messages are signaling that you made an error in a procedure. Depending on the mode, after a number of warnings, IPT might stop you. At this juncture, you may press the Continue button or the Backup button. Press the Continue button if you feel you can quickly rectify the problem and continue on from your present position and the lesson will resume. Note that if you have deviated too far from the simulator's lesson plan, you will be stopped again. Press the MENU button at the lower right portion of the screen and the CFII TIPS button to learn more about the lesson parameters and possible reasons for the repeated stops. If you press Backup, IPT might "back you up" to a previous part of the lesson, so you can try again. You will be given the choice of backing up to a spot near to where the error occurred, or to a spot further back. Choose the former if you know what your error was and are confident you can correct it easily, and choose the spot further back if you'd like a little more time to correct the error.

Occasionally, after a series of repeated "back ups," you might find the program stopping you before you can correct the error. In the event this situation occurs, your best bet might be to repeat the lesson in Explain mode, noting precisely the sequence of events and checking the CFII Tips. You may never encounter such a situation, but if you do, we apologize. Such "unrecoverable states" are presently an unavoidable consequence of the ability to generate warning messages and back up.

When you complete a Prompt, Practice or Test lesson mode, a color-coded check mark is inserted into the Main Menu for the lesson. The color code legend is printed at the bottom of the screen. A green check mark indicates you have completed the Prompt mode, a blue check mark indicates a Practice mode completion, and a black check mark, a Test mode.



Performance Evaluation

Your performance on a procedure is evaluated with respect to standards set by our CFII staff members in accordance with the FAA Practical Test Standards. The EVALUATE button on the panel may be pressed at any time to display the Performance Evaluation for the current lesson. The "?" button next to each performance category gives more information on that category. At the most detailed level, the standards for a category are shown.

Free Flight

When you're not taking a lesson, you can use Free Flight to practice instrument procedures on your own. You may either fly the trainer from its initial location, or click SETUP to change the trainer's location, configuration and the current weather conditions. The Free Flight database provides worldwide coverage and may be edited to move NAVAIDS, change frequencies or add other database components.

Several of IP Trainer's instrument approaches are included in the Free Flight mode. In this phase, you may practice the approaches without the CFII's comments or warnings.

You are setup at the initial point of flight and on your own to practice the approaches. You may also use the built-in Scan Trainer to hone your scan in various flight regimens.

In the Free Flight, Fly Anywhere mode, you have the option of covering up the faces of the flight instruments. To practice partial panel, for example, you may cover the attitude indicator and the heading indicator by placing the mouse pointer on their face and clicking. The instruments can be uncovered by clicking on the face again.

If you want to look left and right in the out-the-window display, press and hold the mouse button on the screen area above the cockpit, and slide the mouse left or right and up or down to change the direction of the view. When you release the mouse button, the view returns to the straight-ahead view.

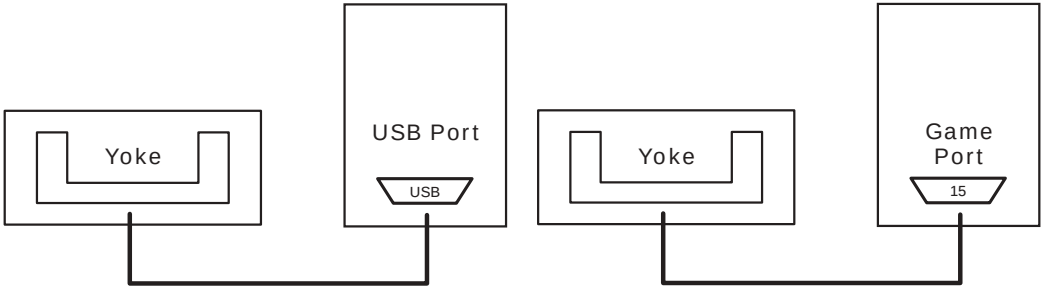
Connecting Your Flight Controls

IP Trainer supports a variety of commercially available joysticks or yokes, as well as custom-made flight controls such as consoles and avionics panels. Before installing IP Trainer, 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.

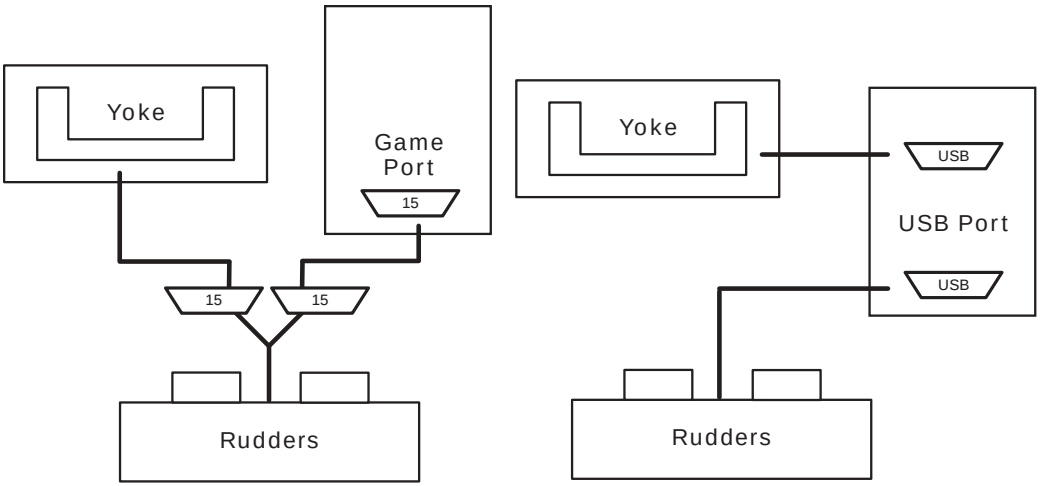
Gameport Yokes or Joysticks

1. Connect your yoke to the gameport on your computer using the 15-pin cable.
2. Follow the manufacturer's instructions for setting up drivers for your specific controls.



Installing drivers for PFC's Cirrus Gameport 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 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.

   NOTE: If you use PFC's throttle quadrant, and have the rudder pedals connected to your throttle quadrant, leave the "rudder pedals" option unchecked; IPT 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: IPT requires its own calibration routine. However, 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 IPT, calibrate your flight controls in the Game Controllers/Gaming Options Utility in the Windows Control Panel 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/Control Panel/Settings(W2K only)/Game Controllers.
2. Scroll through the listed drivers and click on 6-button flight yoke w/two POVs and throttle. Click OK.
3. Follow Steps #5–6 above.

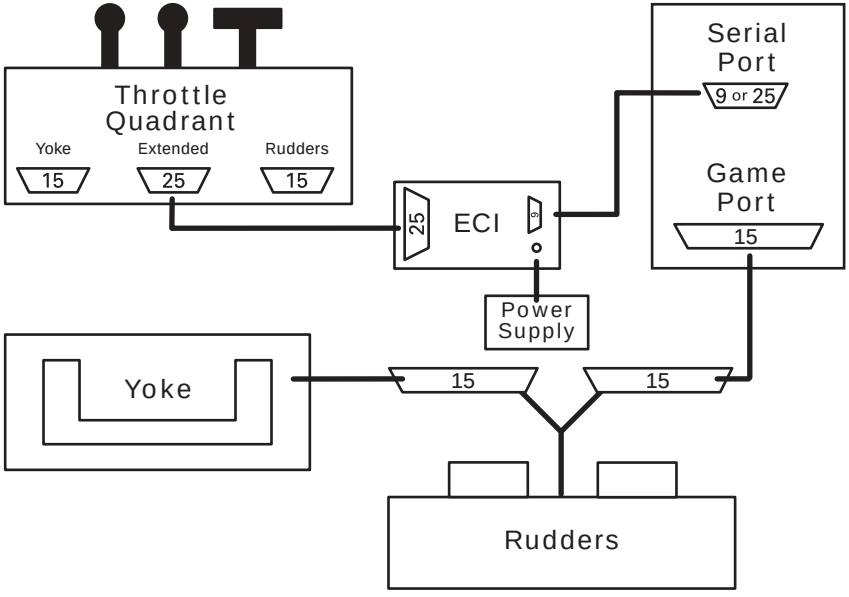
   Note: For Win98/98SE/ME users, if you are using PFC's newer 6-button gameport yoke, in the Game Controllers "Properties" box, you will notice there are only four buttons listed, even though your yoke might have six buttons or switches. When you press one of the switches, several buttons light up on the screen. This is called multiplexing. The user must tell IPT that the switches are multiplexed. To do so, start IPT and go to the Calibration screen (calibration details start on Page 20 of this manual). To select

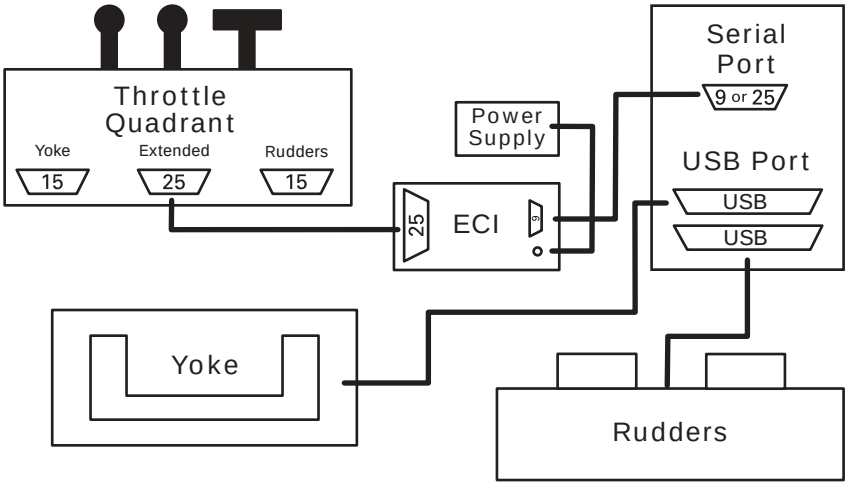
the multiplexed option in IPT, go to the Calibration screen (CAL from the main menu) and select Flight Controls. There are two columns of buttons on the right side of the page. Select the rightmost of the two buttons on the line listing the "4-button flight yoke w/throttle." A box will appear with radio 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.

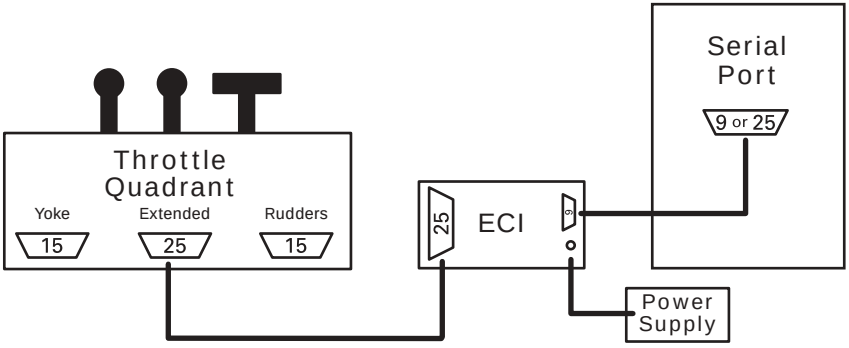
Please Note: When using USB type flight controls with Win98/98SE/ME or 2000, you must ensure the yoke is shown as device #1, and the rudder pedals are displayed as device #2, within "game controllers" found in Windows Control Panel. For XP users, click the "Advanced" button. In "Advanced Settings," verify that the "Preferred Device" is the yoke.





Adding the PFC Cirrus Throttle Quadrant

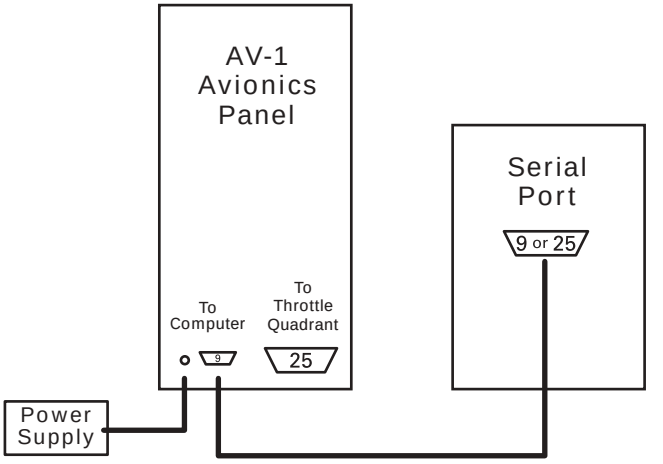
1. Connect the throttle quadrant to the ECI using the 25-pin cable.
2. Connect the ECI to the serial port on your computer using the 9-pin cable.
3. Connect the power supply to the ECI with the 16-mm jack plug and plug the adapter into the wall outlet.



AV-1 Avionics Panel

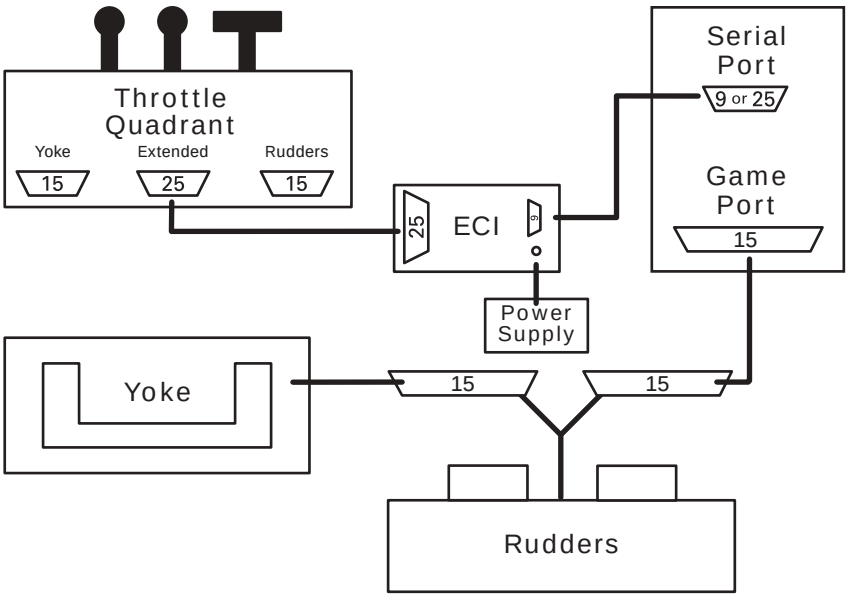
1. Connect the AV-1 (using the port labeled “computer”) to the serial port on your computer using the 9-pin cable.
2. Connect the power supply to the AV-1 with the 16-mm jack plug. Plug adapter into wall outlet. Ensure red light on the AV-1 is illuminated.

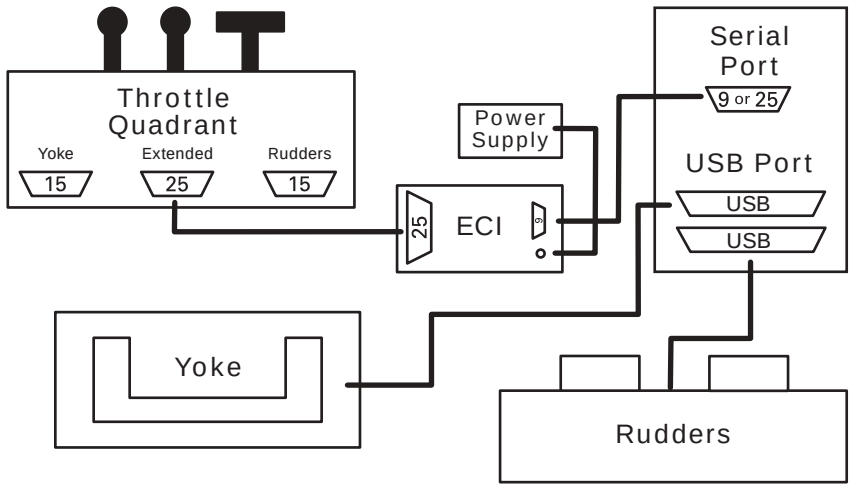
NOTE: When you are finished flying and would like to power down the system or if you need to move/remove the AV-1, unplug the power adapter from the wall outlet to remove power from the AV-1. Do not simply unplug the power supply jack from the AV-1. This is a hot lead, and should not be left disconnected.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



Yoke or Joystick, Rudders and Throttle Quadrant

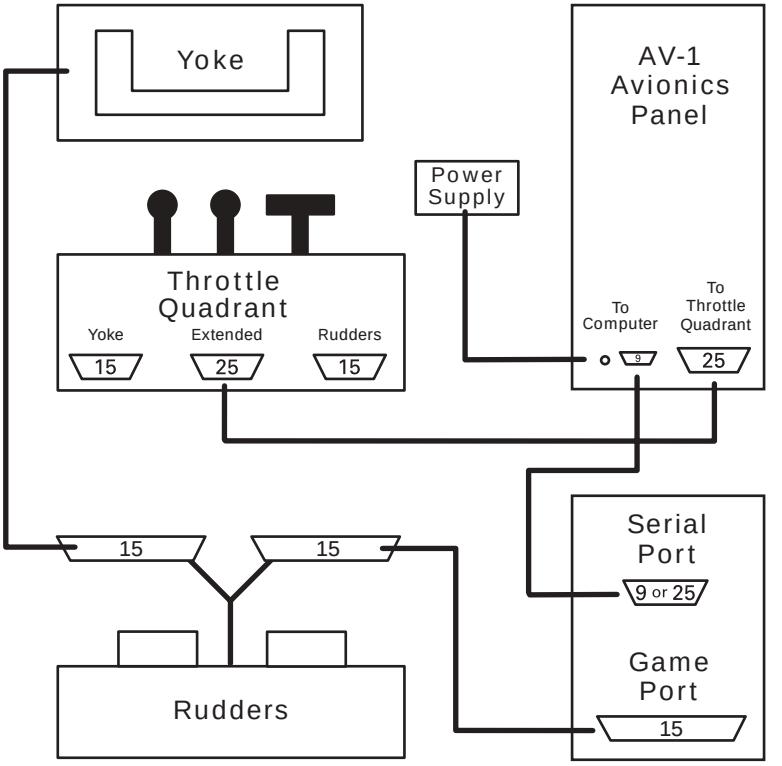
1. Connect your yoke or joystick to the Y-connector on the pedals.
2. Connect the cable from the pedals to the gameport on your computer.
3. Connect the throttle quadrant to the ECI using the 25-pin cable.
4. Connect the ECI to the serial port on your computer using the 9-pin cable.
5. Connect power 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 14).





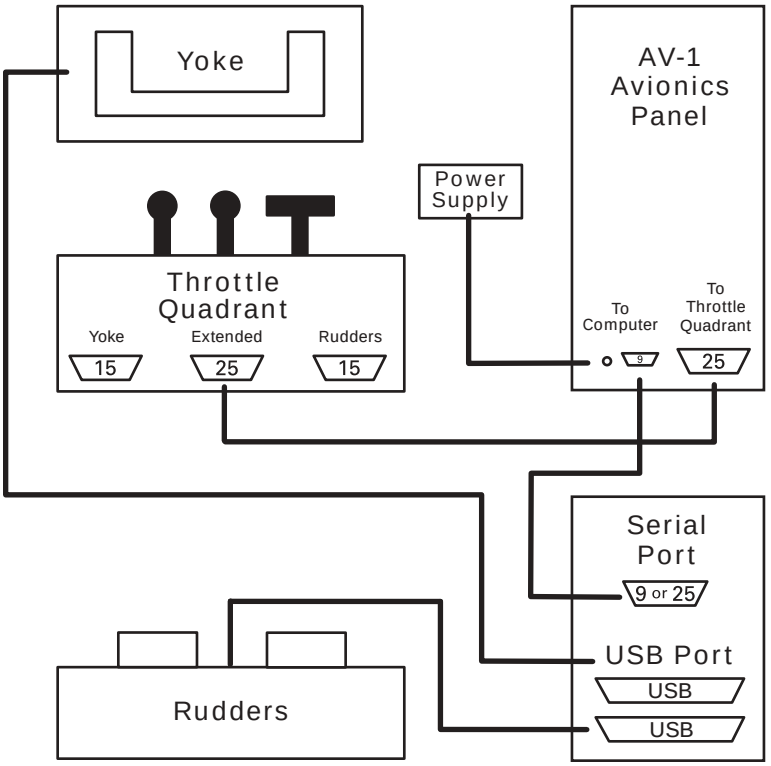
Gameport Yoke or Joystick, Rudders, Throttle Quadrant and AV-1 Avionics Panel

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 12)
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" on the back of the AV-1.
5. Connect the AV-1 (using port labeled "to computer") to your computer serial port using the 9-pin cable.
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.



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

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 14).
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.
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.



Installing and Running IP Trainer

Minimum Requirements for Version 7.0

Before installing IPT, 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, 200 MHz or faster (Win98/ME), 300 MHz or faster (Win2000/XP)
2. Windows 98, 98SE, Millennium, 2000, XP
3. 64 MB RAM (Win98/ME), or 128 MB RAM (Win2000/XP)
4. 120 MB available hard drive space
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 later
9. Mouse
10. Joystick or yoke

When you install IP Trainer with the "typical" installation option, you will have four program executables loaded onto your computer. These are the .exe files that are be used to start the program: 8-, 15-, 16-, and 32-bit. Each higher number designates a higher graphic capability, one version uses a 32-bit color mode, one a 16-bit color mode, one a 15-bit color mode, and one an 8-bit color mode. The differences between these modes are primarily in IP Trainer's out-the-window views, with the 8-bit version providing a basic, low detail cloud base and visibility image. However, if your computer supports the 15-, 16- or 32-bit versions, you will see terrain texturing, enhanced haze modeling, and more realistic cloud base and visibility graphics.

When you install IP Trainer, the installation routine will attempt to automatically detect which of the versions your computer and video adapter can support and will use that version in the shortcut/icon installed on the desktop and on the Windows Program's list.

To determine which color mode that IP Trainer is using:

1. Right-click the IP Trainer desktop icon shortcut or the Program's List shortcut.
2. Select Properties.
3. The highlighted command line listed on the "Target" line is where you can edit the program executable if necessary.

Installation

1. Verify your computer meets the minimum system requirements for IP Trainer v7 (see page 20).
2. Connect the hardware components (yoke or joystick, etc.) you will be using with the simulation.
3. Place the IP Trainer CD-ROM in your computer's CD-ROM drive.
4. The installation process will begin automatically and will launch IP Trainer's CD browser. From there, either select to install IP Trainer or browse the CD-ROM.

Note: If the installation CD does not begin automatically, click on the main Windows START button and Select RUN. In the RUN box, on the OPEN line, type in your computer's CD-ROM drive letter followed by ":\setup.exe" (for example: D:\setup.exe) and click OK. This will launch IP Trainer's installation program. Or, to launch CD browser manually, in the RUN box, on the OPEN line enter your CD-ROM drive letter followed by ":\ip7instl.exe" (for example: D:\ip7instl.exe).

5. The IP Trainer installer will prompt you through the rest of the installation process.
6. The default drive for installation is "C," but you can change this by typing-in your chosen drive letter.
7. After installation, a new group will appear in your START menu called "ASA Interactive." Click Start, select ASA Interactive, and then IP Trainer to run the program. Or simply double-click the IP Trainer icon which has been placed on your desktop.

Upgrading From Previous IP Trainer Versions

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

Calibrating Your Flight Controls

When starting IPT for the first time, you will see a prompt in the lower right-hand corner of the screen stating that your controls must be calibrated. Click on the "Calibrate" button. This will take you to the main calibration page. This is where IPT evaluates the input of your flight controls, and where you tell the program what kind of physical control equipment you have attached (i.e., yoke, rudder pedals, throttle quadrant, etc.).

After using IPT 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 IP Trainer cockpit, click MENU and then CALIBRATE at the bottom right corner of the cockpit screen.

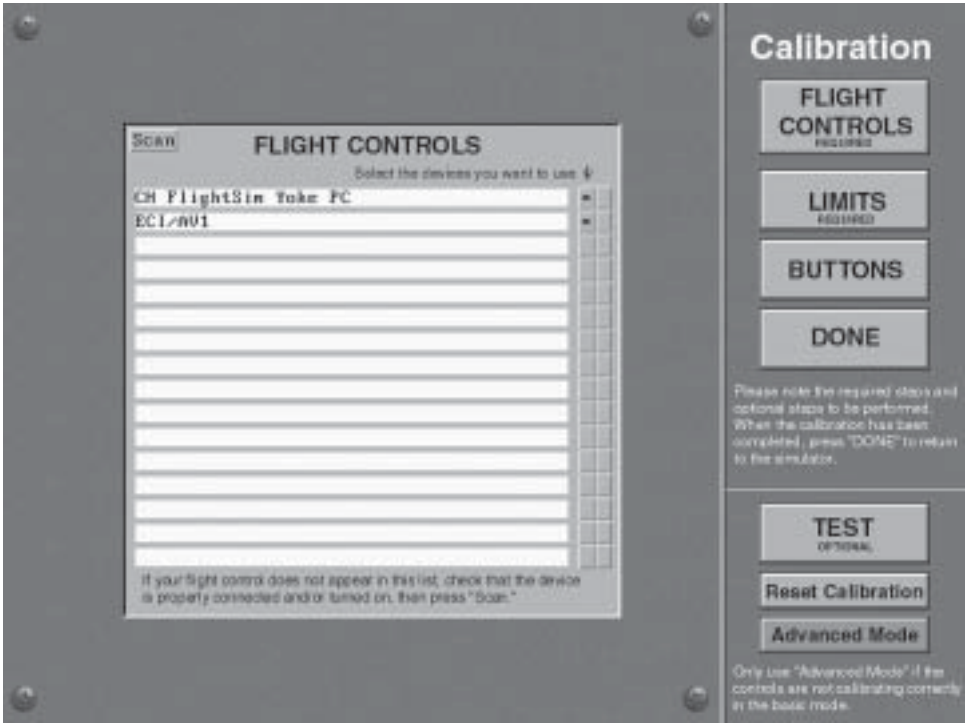
Note: Any time you press LIMITS, you must calibrate the controls before returning to the cockpit. The remainder of the calibration process (assigning BUTTONs, etc.) will remain intact, but LIMITS must be established each time.

The Calibration menu consists of several different screens:

1. FLIGHT CONTROLS, where you identify the flight controls you wish to use with IPT.
2. LIMITS, which evaluates and adjusts the complete range of motion for the control axes.
3. BUTTONS, which allows you to assign a range of cockpit functions to the joystick or yoke.
4. DONE, which saves the settings and returns you to the IP Trainer 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.

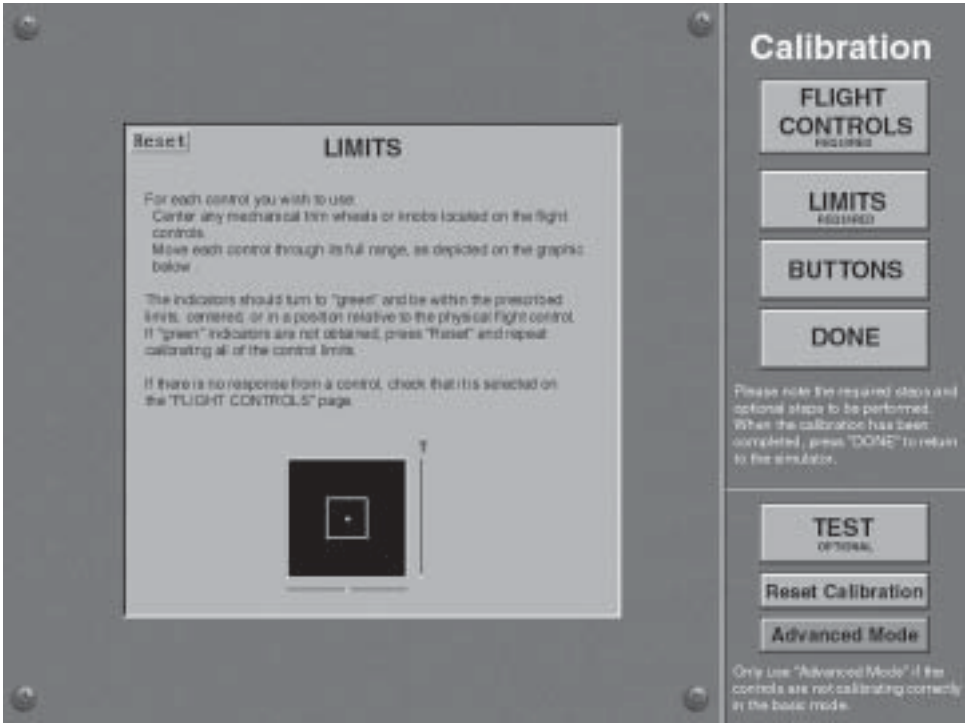
When first entering the Calibration screen, you find a column of buttons from which the calibration sequence begins.



Flight Controls

The first required calibration screen to select is the Flight Controls screen. It is important for IPT 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. Additionally, ensure that you have only the control manufacturer's drivers installed, but no other utilities (for example, CH Control Manager). 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 IPT that the switches are multiplexed, so they may be correctly programmed. To select the multiplexed option in IPT, 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. Please note that USB controllers do not support multiplexing, so the above will only apply to some gameport flight controls.



Limits

After selecting the flight controls to be used with IPT, 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 IPT 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 the yoke handle, and verify that the dot representing the yoke's pitch and roll axes is within the central 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. If you choose incorrectly, you may reset the limits and start again by pressing Reset, 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. Leave the throttle dot red, and the mouse will actuate the throttle lever.

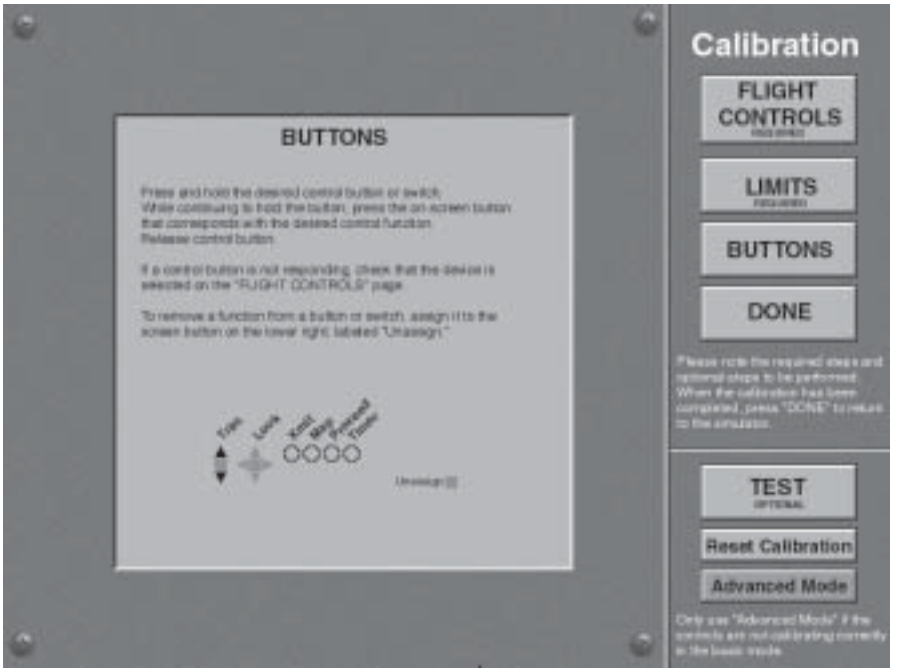
Considerations for Configuring the Flight Controls

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. If the throttle is calibrated on the joystick, the mouse-controlling features of the throttle are not available.

The Precision Flight Controls (PFC) throttle quadrants shipped from ASA are typically 6-lever quadrants. If you own this unit, it will function in a limited manner with IPT. Only the leftmost throttle lever will be a usable control in IPT. You may fully advance or retard the remaining levers to keep them out of your way.

Buttons

IPT lets you assign functions to the buttons and knobs that appear on your joystick or yoke, making the simulation easier and more realistic. You can then perform cockpit functions without ever taking your hand off the control. The trim can be actuated; the proceed button pressed, the map toggled; the timer, an all-important tool in precision and non-precision approaches, can be started without ever reaching for the mouse. All this is accomplished through the Buttons screen in a simple and straightforward one-time setup.

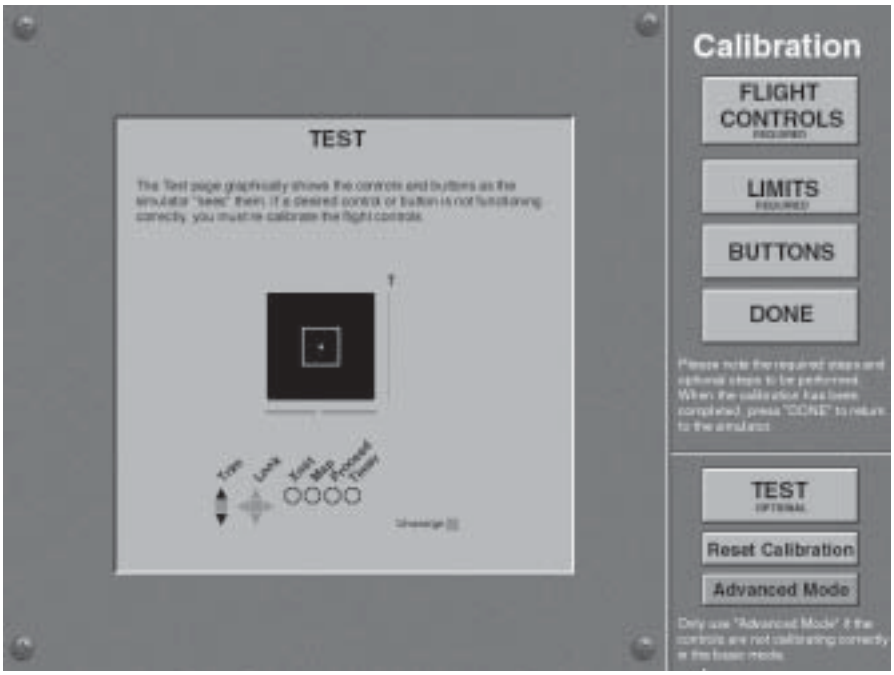


When finished with the limits, press the box marked BUTTONS.

1. On the Buttons screen you'll see the labels and symbols of the cockpit functions that can be assigned to joystick or yoke buttons (trim, look, transmit, map, proceed, timer). To assign one of the buttons a cockpit task or duty, press and hold the desired flight control button while simultaneously clicking the left mouse button on the desired function shown on the Buttons page. When a button is depressed on the flight control, the mouse pointer will turn into a "crosshair." Release the button on your controller and the function has now been assigned. 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 flight 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.
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 12 and Page 18 of this manual.

Done

When you are satisfied with the button assignments, press the DONE button and return to the IP Trainer 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 choose to use the Advanced Mode. The Advanced Mode is more powerful and requires a more detailed understanding of the calibration process. First, check to ensure that a flight control utility such as CH Control Manager is not installed. Additionally, if no dot appears, red or otherwise, when a flight control is configured, the flight control is likely not being “seen” by the simulator. This condition cannot be rectified through the use of the advanced mode. Unless you are confident of your abilities, we recommend you call ASA (800-272-2359) 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 IPT. When fully implemented, ASA will produce “calibration updates” 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 IPT will require the use of the Advanced Mode calibration.

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.

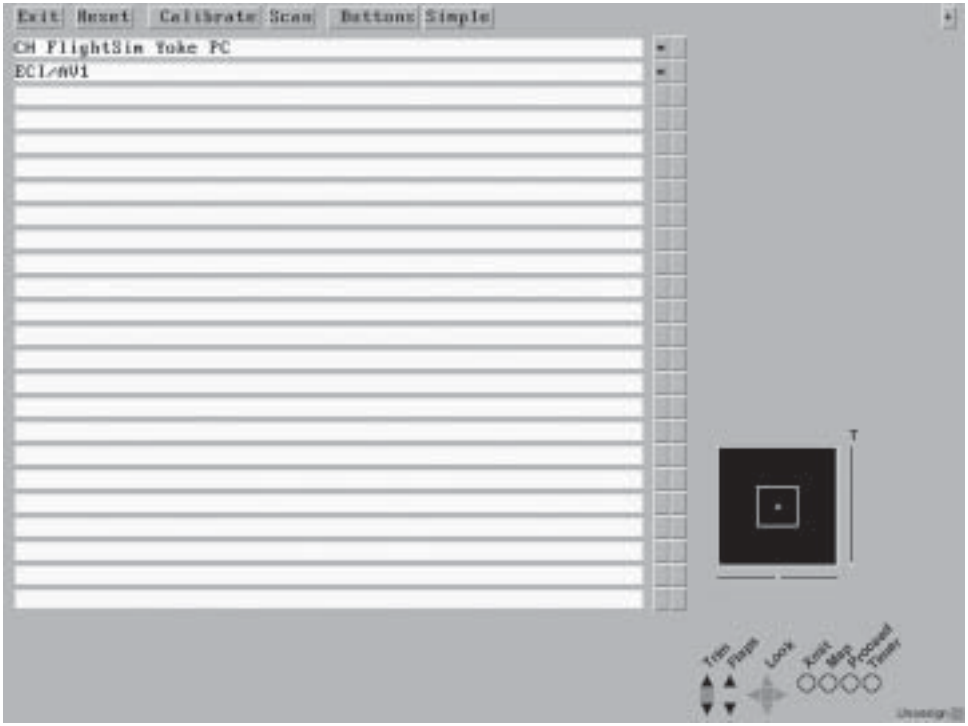
The top row buttons function as follows:

1. The "Exit" button returns the user to the IP Trainer cockpit and saves the current settings.
2. The "Reset" button functions in the same manner as the "Reset Calibration" button in the simple 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 simple 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. "Buttons" permits the assignment of button functions as in the simple calibration mode. When "Buttons" is pressed, an asterisk appears to indicate that assignments may be made or changed.
6. The "Simple" button returns the user to the simple calibration screen.

The main portion of the screen displays a listing of the Human Interface Devices (USB device drivers) reported by Windows. These will be the same as what is listed in the Game Controller/Gaming Options Utility in the Windows Control Panel. Also listed here will be any specific drivers written for gameport flight controls that have been assigned by the user. An example of such controls would be the gameport version PFC Cirrus yoke.

A listed item is therefore either automatically detected by Windows (USB) or manually assigned by the user (15 pin gameport) thus informing IPT 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 simple 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 (such as, 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

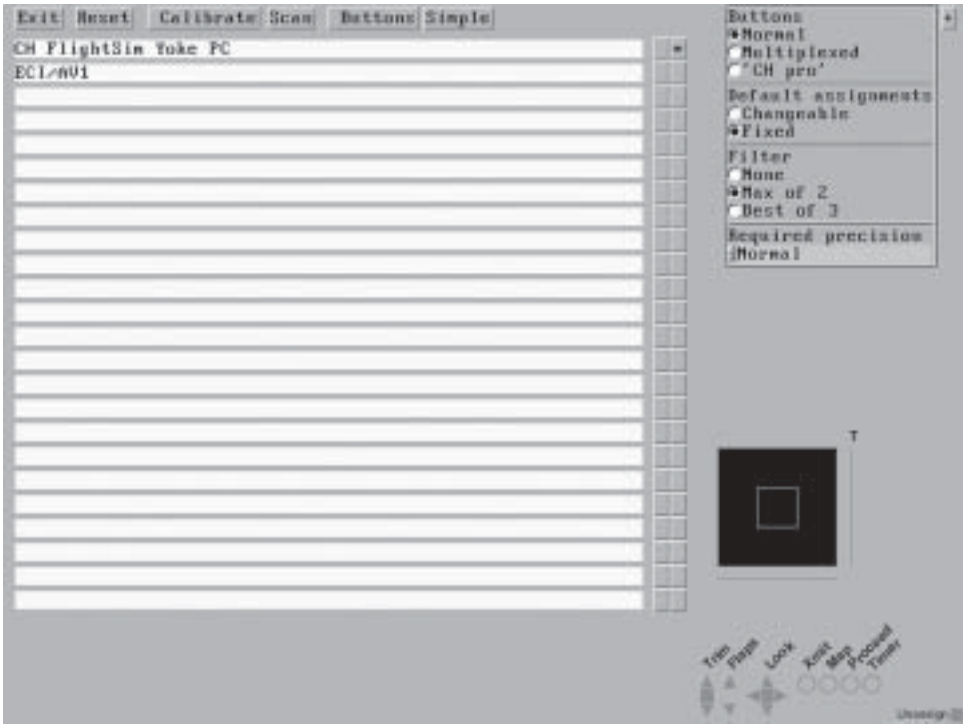
The configuration window varies by type of device. Most yokes and joysticks will have a configuration box with four sections shown: Buttons, Default assignments, Filter and Required precision.

In the Buttons section, there are three “radio-button” choices. “Normal” indicates it is a HID device using the typical default settings. “Multiplexed” indicates the device is a gameport device and could have 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 to appear to be pressed on the screen. By selecting Multiplexed, IPT will be able to interpret the signal so each of the 15 control buttons may be individually assigned. “CH Pro” is the name given to the older multi-button gameport flight controls that use 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 based on the intended use 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. By clicking the mouse pointer first on the flight control axis line then on the CASS, you can change the channel assignments. The default setting is Fixed.

The Filter reads the signal being transmitted from the flight control, as the IP Trainer 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 a 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 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.

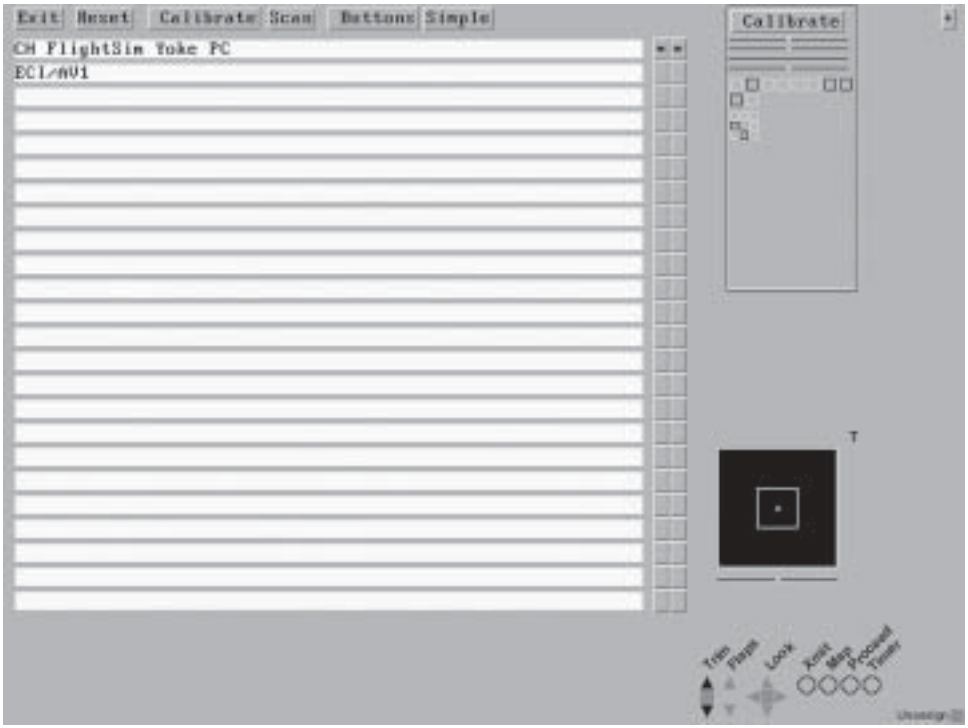
Calibrate each flight control device separately (by placing an asterisk and removing it after calibration), and when completed, asterisk the left box of the flight controls to be used. To resolve conflicts, you may alternately asterisk the right boxes of the controls to determine which functions are double assigned (see the color-coded section below).

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 first (top) line represent Bank axis, the second (middle) line represents Pitch axis, and the third (bottom) line represents the throttle axis. 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 is indicated and the input is not 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 an integral throttle on a yoke as well as a separate throttle quadrant will show a red line in two calibration windows. For IPT to function correctly, one of the assignments would have to be unassigned or disabled.
- 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 separate throttle 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 (typically the third line), 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 separate 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 function has been assigned to a button. The button or symbol would indicate a red outline and/or red fill.

Calibration Data Files

IPT creates two files that determine the control settings. The plugins.dat file is a machine-readable-only file, which automatically saves the settings when a calibration is completed. It was developed so ASA might better support complex configurations. The user cannot alter or modify this file. In some instances in which the user cannot successfully complete calibration, this file can be deleted. If the plugins.dat file is deleted the program will read basic configuration information from the second calibration file called, plugins.txt (see below). This will force a fresh calibration when the simulator is launched.

By default IPT will install a second configuration file called plugins.txt. This file contains information about a variety of different flight controls and may contain preset calibration data about the flight controls you have. The plugins.txt file can be viewed with a text editor, like Notepad, and can be used to troubleshoot calibration routines. In the Advanced Mode, clicking on the small "plus" symbol in the upper right portion of the screen overwrites the default values in the plugins.txt file. This will enter the current data for the completed calibration of your flight controls. It would be advisable to backup or copy and save the original plugins.txt file before making any changes in this area.

As new controls become available, ASA will post plugins.txt files on the website (www.asa2fly.com).

Flying IP Trainer

Flying Tips

As you become more accustomed to flying IP Trainer, you'll become more comfortable with it. But the first thing you'll notice is that the simulator is really not, after all is said and done, an airplane.

There are no inner ear sensations... There are no seat-of-the-pants G-forces... Your flight controls probably don't feel exactly like the ones in your aircraft. But all of this is exactly as it should be. By removing the inner-ear sensations and the "feelings" of flight, IP Trainer will make you rely on your instruments, force you to separate the feelings from the procedures, and turn you into an instrument pilot.

Keep concentrating on the attitude indicator in the early lessons, and as lessons become more complex, incorporate other instruments into your scan pattern. Soon you'll find that the instrument behavior is exactly like that experienced in actual flight, and you'll be far ahead of the learning curve.

Adjusting Power

Power in the IP Trainer simulator can be controlled by the mouse or by a joystick or yoke with a built-in throttle. See the "Calibrating Your Flight Controls" section (page 20) to learn more about setting your system for mouse or joystick control of throttle.

When using a mouse to control power, simply click on the throttle handle image on your simulated instrument panel. Hold the left mouse button in, and move the mouse slowly up or down across your mouse pad or desktop. The throttle will be "grabbed" by the mouse, and move up and down with your mouse.

There is another, even easier method of mouse control—click the **RIGHT** mouse button anywhere on the IP Trainer cockpit screen, and the throttle will be actuated. Move the mouse up and down, and the throttle will be cycled in and out. This method is easier because you don't have to look for the throttle to grab it—it activates the throttle from anywhere your mouse cursor rests on the screen.

When using a joystick to control power, simply slide the lever or knob on your joystick (or yoke) forward and back—or up and down, depending on the device. You'll see the on-screen throttle move in relation to the movement of your physical control. **When using a joystick for throttle control, mouse control of the throttle is inoperative.**

NOTE: In IP Trainer's Free Flight mode, controlling throttle with the method described above for a joystick is very straightforward and simple. But in the actual course itself, each lesson must begin with a pre-set throttle condition, or RPM setting.

At the beginning of each lesson, you'll see a yellow circle overlying the throttle, representing the position your throttle needs to be in at the start of the lesson. At simulation start, you must overlay the yellow circle image with the actual on-screen throttle by moving your physical throttle control. When the two overlap and the yellow circle disappears, you've caged the throttle and can click **Proceed** to continue your lesson. If you've chosen to disable the joystick throttle and use the mouse for throttle control, you will not see the yellow circle overlay.

Adjusting Pitch Trim

There are four correct ways to control pitch trim in IP Trainer, and one absolutely wrong way.

The first way: When established at the pitch attitude and airspeed you want, click on the on-screen trim wheel and slowly slide your mouse forward or back. Any excessive control forces you've been exerting on your joystick will seem to disappear, as the simulated aircraft enters a trimmed condition. Think of it as extending a trim tab into the relative wind—that's exactly how the software sees it.

The second way: Use the "Fast Trim" button below the trim wheel.

1. Establish and hold the pitch attitude and airspeed you're looking for;
2. CLICK AND HOLD the "Fast Trim" button down;
3. While holding the button down with your mouse, release the pressure you've been holding on your yoke or joystick;
4. Release the "Fast Trim" switch, and the simulator will have automatically trimmed itself for the new flight condition.

The third way is to program, from the Calibration screen, two of your controller's buttons to act as "trim up" and "trim down." When this switch is activated on your controller, you'll see the on-screen trim wheel move, and "feel" the control forces needed to establish your configuration disappear. See pages 20-32 "Calibrating Your Flight Controls" for more detail.

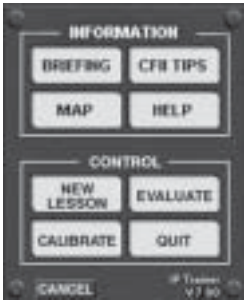
The fourth way is to program one of your joystick buttons to engage the "Fast Trim" function. See "Buttons" on page 24.

The WRONG way is to use the elevator and aileron trim sliders or knobs on the side or back of your joystick or yoke. As far as the software is concerned, using these controls does not extend that "virtual trim tab" into the relative wind. The program will seem to fly OK, but your actual control response will be severely limited, just as it would be if you were in an aircraft and refused to use the trim controls. Not only would your arms get tired, but when you need full deflection of elevator or aileron, it wouldn't be there—you're using too much of the deflection to maintain your pitch attitude and airspeed.

Using the Control Menu

In the IP Trainer cockpit, the Control Menu occupies the lower right part of the panel. Clicking the Menu button MENU brings up the Control Menu.

The Control Menu has two areas: **Information**, which is covered in the "Taking IP Trainer's Lessons" (page 38), and Control.



Control will let you go to any of these areas or functions from within the IP Trainer cockpit.

New Lesson: Choose any new lesson or enter Free Flight mode.

Evaluate: See the IP Trainer CFI's evaluation of your lesson.

Calibrate: Return to IP Trainer's Calibration Screen.

Quit: Exit IP Trainer and return to Windows.

Tuning and Identifying the Radios

Each on-screen radio knob has an inner and outer ring. Clicking either the left or right side of either ring will rotate the knob in the chosen direction, with the digits being displayed in the frequency windows on-screen. Click once, and the digits move one integer. Hold your mouse button down, and the knob will rotate through all appropriate frequencies.

To **identify** a station, left-click that radio's rotating **IDENT** knob. To transmit on the COMM radio, click the **XMT** button.

Setting the DG, OBS and ADF Cards

To rotate any of these cards, click the left or right side of that function's on-screen adjustment knob. Holding the mouse button down will rapidly rotate the selected card through 360 degrees.

Setting the Timer

The timer is located at the lower left of the instrument panel. Click Start to begin the timer function, and click Reset to reset the timer.

Marker Beacons

The marker beacon receiver indicator lights are found in the instrument panel's upper right corner above the radio stack. To turn the beacon receiver on or off, click the MB button.

Engine Sounds

A button next to the marker beacon on/off switch is marked ANR, and stands for "automatic noise reduction." Clicking this button turns off engine sounds (don't worry, it doesn't kill the engine itself!) and turns them back on again.

IFR Configurations

Power Settings and Speeds

Early in IP Trainer's lessons you'll be taught several aircraft configurations, or specific settings of pitch, power and bank that result in specific airspeeds and rates of climb or decent. For reference, those configurations are supplied here.

Cruise Level:

- 0 degrees pitch
- 2400 RPM
- 100 KIAS

Cruise Climb:

- 2 degrees nose up
- Full power
- 90 KIAS
- 500 FPM

Approach Level:

- 1 degree nose up
- 2000 RPM
- 105 KIAS

Cruise Descent:

- 1 degree nose down
- 2000 RPM
- 90 KIAS
- -500 FPM

Precision Descent:

- 0 degree nose down
- 1500 RPM
- 90 KIAS
- -500 FPM

Nonprecision Descent:

- 2-3 degrees nose down
- 1200 RPM
- 90 KIAS
- -1000 FPM

Missed Approach Climb:

- 5 degrees nose up
- Full power
- 75 KIAS
- 800 FPM

Taking Lessons from IP Trainer

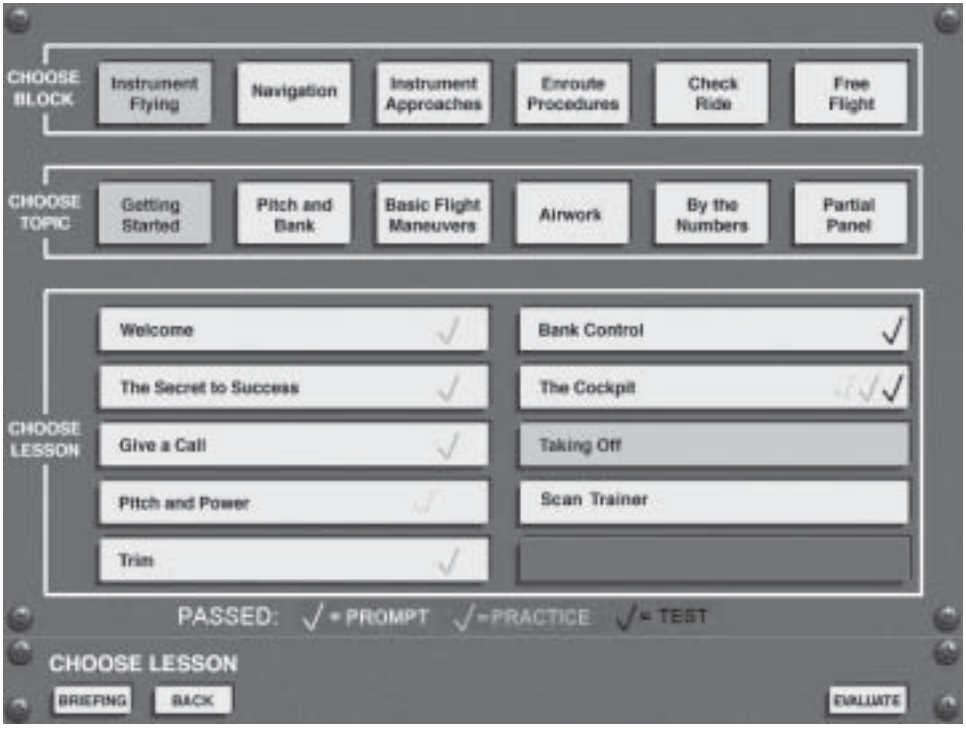
The IP Trainer Cockpit

The starting point for IP Trainer is the cockpit. Click **Menu** to bring up the Information and Control Menus. Click **New Lesson** to choose a Lesson or to enter Free Flight mode.

The Lesson Menu

At the top of the Lesson Menu you'll see an array of Lesson Blocks, along with the Checkride Block and Free Flight selection. Free Flight instructions are covered in their own section (see page 43).

Clicking any of the **Blocks** will bring up the Topics associated with that block. Clicking a **Topic** will bring up the individual lessons in that topic, and clicking one of these **Lesson** buttons will select that particular lesson.



When you complete a Prompt, Practice or Test lesson mode, a color-coded checkmark is inserted into the Main Menu for the lesson. The color code legend is printed at the bottom of the screen. A green checkmark indicates you have completed the Prompt mode, a blue checkmark indicates a Practice mode completion, and a black checkmark, a Test mode.

Click **Briefing** in the lower left corner to go to the selected lesson's briefing screen, or **Back** to return to the IP Trainer cockpit without selecting a new lesson.

Always take IP Trainer's lessons in the order in which they appear. You'll have a much more effective, and less frustrating, training experience that way.

The Briefing Screen

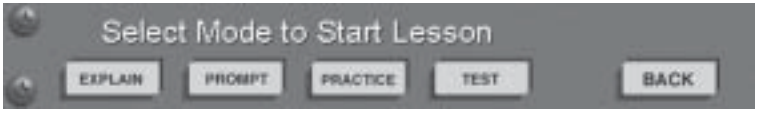
This screen will cover in detail what you can expect—and what is expected of you—in the selected lesson.

Clicking the **Up** or **Down** buttons will scroll the text. The relevant pages of text that you'll need to study, from either Instrument Flying or this book, will be listed here.

Also listed are the lessons that IP Trainer assumes you've completed in preparation for this lesson. IP Trainer assumes you have acquired certain skills based on these previous lessons, but if you're unsure, go back to the lesson described and check the briefing, or even fly the lesson again.

The Lesson Mode Buttons

Explain, Prompt, Practice and Test are the different Modes IP Trainer uses to demonstrate, teach, and test you on a lesson. In general, you'll want to **Prompt** until you know it, **Practice** until it's perfect, **Test** when you've practiced perfectly, and **Explain** if you're confused.



Explain

The IP Trainer CFII will fly the selected lesson, explaining his actions to you as the lesson progresses. This is like watching your actual CFII perform a maneuver or procedure in your training aircraft.

Prompt

In this mode, you get to fly the lesson. The IP Trainer CFII gives you voice prompts as you fly, instructing you on the next step throughout the procedure. If you make a mistake, the CFII stops the simulation and explains the error.

Practice

This mode lets you prepare for a test. The lesson objective is the same as the previous two modes, but there is no voice prompting from your IP Trainer CFII. In Practice, you can go back a step if you perform a part of the lesson inadequately, without having to re-fly the entire lesson.

Test

Finally, it's all up to you. The Test mode has no "do-overs:" you must complete the entire lesson from start to finish, within IP Trainer's defined tolerances.

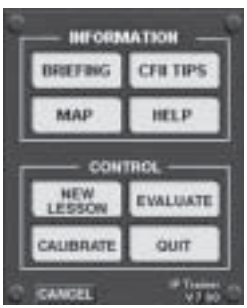
NOTE: You must select the Lesson Mode at the bottom of the Briefing screen to proceed to the lessons.

The Cockpit Screen

At the start of each lesson, you are in the IP Trainer cockpit, ready to fly. Your altitude, heading, airspeed, and intent is exactly what was specified in the previous briefing. You may need to adjust the throttle position on your flight control device to align with the yellow ghost circle on the screen. When properly aligned, the lesson will begin automatically.

The Evaluation Screen

Once you've completed a lesson—whether it's a practice session or a test—you'll be asked to look at your Evaluation for that lesson. Click Evaluate in the Control Menu to proceed.

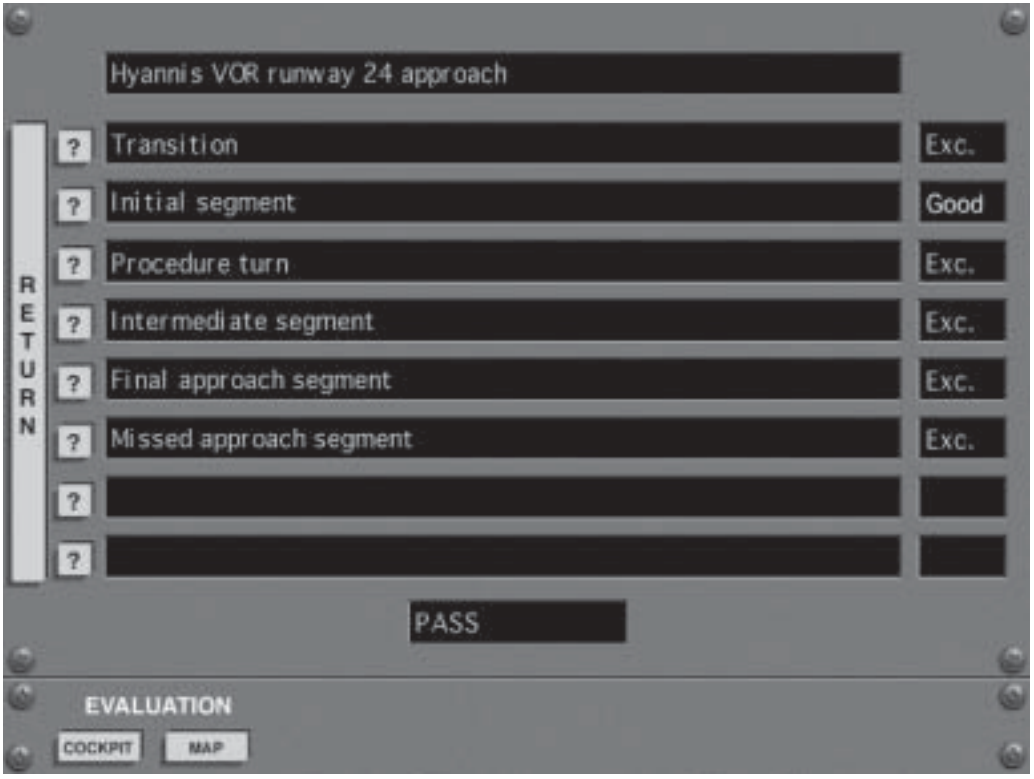


There are several "layers" to any lesson. Each instruction you've received from the IP Trainer CFII is listed here.

Clicking any of the ? buttons next to this task list goes to the second layer of elements. Where the first list might have said "Climb to 4,000," this second list breaks that task down into its separate elements: Increase power, increase pitch attitude, maintain constant rate of ascent, etc.

Clicking any of the ? buttons next to these elements reveals the third layer—the Practical Test Standards that you must comply with. In the example above, a scale will show how long it took you to increase power, how stable your pitch change

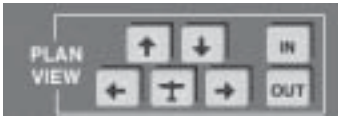
was, what your average feet-per-minute number was during execution of the task. These are the numbers IP Trainer uses to determine, in the Test mode, whether your lesson was unsatisfactory or a success.



Using the Map Option in the Evaluation Screen

Clicking **Map** will take you to the IP Trainer Map Screen.

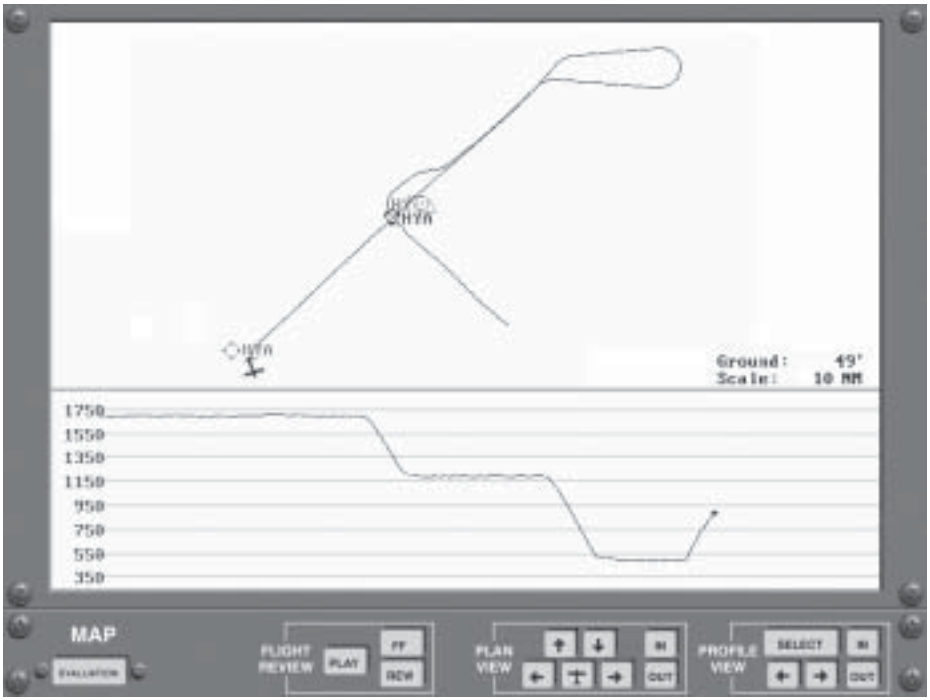
Flight Review acts like a VCR, letting you Play, Fast Forward, or Rewind your flight.



Plan View adjusts your overhead view by moving North, South, East or West with the **Arrows,** or zooming **In** or **Out** to increase or decrease the area the Map review covers. Clicking the **Airplane** symbol centers your map on the IP Trainer aircraft.

Profile View. Turn on or off the vertical view of your flight with the **Select** button, and use the **Arrows** and **In** or **Out** just as you do in the Plan View.

Click Back to return to the Evaluation Screen.

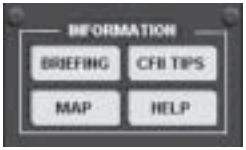


Returning to the Cockpit

From the Evaluation screen you can click **Cockpit** to return to your starting point. From there you can change your Lesson Mode, choose a New Lesson or Select one of the Information buttons.

CFII Tips

Here you will find lesson tips from the CFII. If you are having problems completing the lesson, in CFII Tips you will find a list of what the CFII expects you to accomplish in the lesson and the order in which items must be completed.



Help

The Help button contains the Program Quick Start Guide (see page 8 in this manual) as well as a IP Trainer overview.

Free Flight in IP Trainer

Free Flight

Free Flight is an area in IP Trainer that allows you to take what you've learned from the Lessons and practice in your home airspace.

Taking Lessons from IP Trainer: Free Flight in IP Trainer

Free Flight has two kinds of simulation experiences. The first is the Fly Anywhere mode, which allows you to take what you've learned from the Lessons and practice in your home airspace. The other Free Flight mode includes the instrument approach scenarios used in the lessons, but without the built-in instruction. The Preset Free Flight lesson scenarios also include the Scan Trainer option (see page 49 for more information about using Scan Trainer).

Getting to Free Flight Fly Anywhere

To get to Free Flight, click the **Free Flight** button 

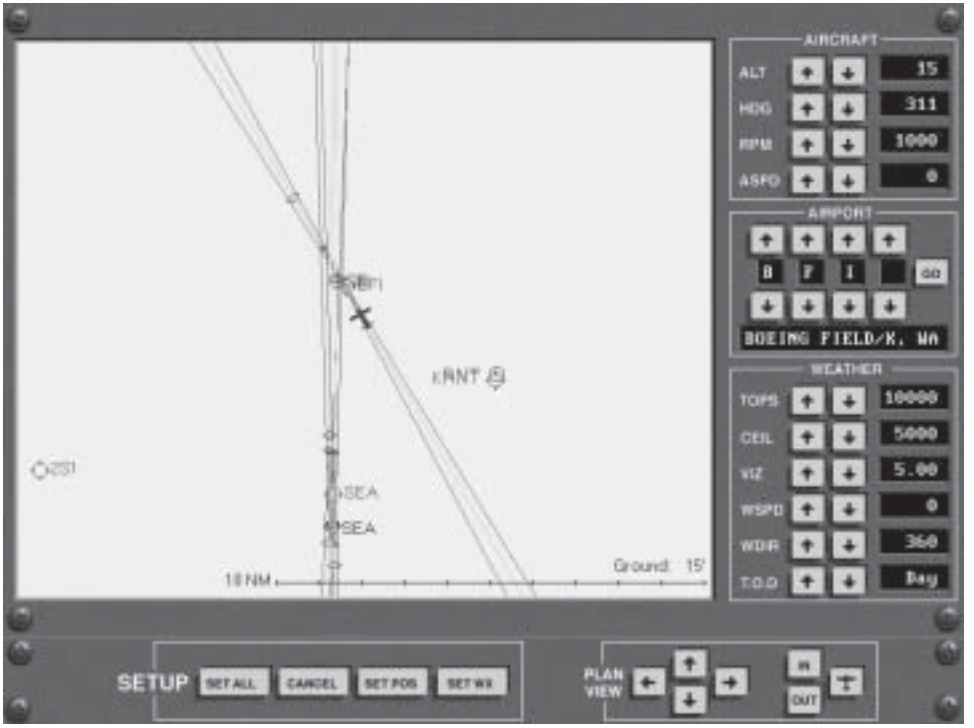
located on the upper right corner of the Lesson Menu, then click the Fly Anywhere button, followed by the Briefing button. You can select any airport you desire; the default airport/runway will be Boeing Field (BFI), Runway 31L in Seattle, Washington.

The Free Flight Fly Anywhere Cockpit

The Free Flight cockpit looks just like the cockpit used in the Lesson Modes, until you click the **Menu** button.

The Free Flight Fly Anywhere Menus

As in Lesson Modes, there are two areas in the Free Flight Menu: **Free Flight**, where you set up the parameters of your upcoming flight, and **Control** in which you may go to a **NEW LESSON**, view the **MAP**, **CALIBRATE** your flight controls or **QUIT** the program.



Setting Up Your Fly Anywhere Scenario

Every Free Flight excursion should begin at the Setup Screen. Here, you tell IP Trainer where you want to start off, at what altitude, heading and airspeed, and what the weather conditions will be like. In the Free Flight Menu, click the Setup button.

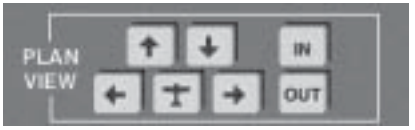
The **Cancel** button allows you to remove any changes you've made and return to the cockpit in your original configuration.

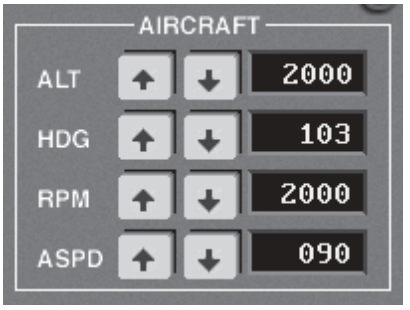
Select Your Airport Area

Using the controls in the box marked **Airport**, insert the 3-letter identifier for your starting point. The up/down arrows will cycle through numbers zero through nine, as well as the alphabet, allowing you to input the starting airport identifier. Click Go to move the IP Trainer aircraft to your selected airport.

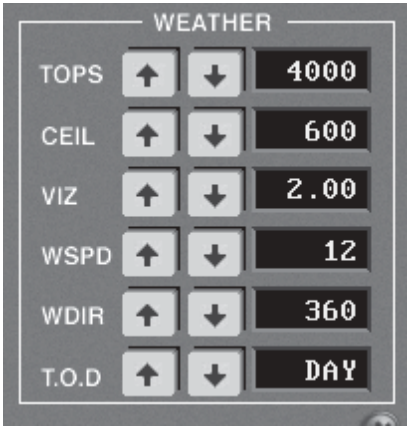
Position Your Aircraft

After clicking **Go**, the aircraft is positioned at the selected airport, and you need to refine your position, click and hold the aircraft symbol and drag it to the place you want it to be. For example, this can be on the numbers ready for takeoff, or outside the airport area at an en route or approach fix, in preparation for an approach. If you can't see enough of the area outside the airport, use the **Plan View** controls in the lower right corner of the screen. The **Arrows** will move the map view in any direction, and **In or Out** will zoom the overall view scale. Clicking the **Airplane** symbol will center your map view on your aircraft.





Now use the **Aircraft** controls to fine-tune that position. As you used the up/down arrows for dialing in your airport ID, use the up/down arrows under Aircraft to preset heading, altitude, RPM setting and airspeed. These values can include the airport elevation, for starting off on the ground, or anything up to the maximum limits of the aircraft.



Setting the Weather

In the **Weather** box, use the up/down arrows to preset conditions for your flight.

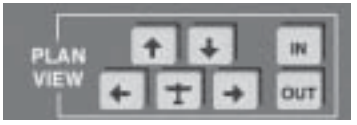
Setting Your Selections

Once your airport, position and weather has been set, you need to click in the Setup box to start flying. **Set All** will set position and weather for your flight. **Set Pos** will set your airport and aircraft position but leave the weather as it was previously set up. **Set Wx** will allow you to change the weather parameters of a setup without changing your position. **Cancel** will take you back to the cockpit without changes.

Reviewing Your Flight

Review your flight by using the **Map** button on the Free Flight Control Menu.

Flight Review acts like a VCR, letting you Play, Fast Forward, or Rewind your flight.



Plan View adjusts your overhead view, by moving North, South, East or West with the **Arrows**, or zooming **In or Out** to increase or decrease the area the Map review covers. Clicking the **Airplane** symbol centers your map on the IP Trainer aircraft.

Profile View. Turn on or off the vertical view of your flight with the **Select** button, and use the **Arrows** and **In or Out** just as you do in the Plan View.

Click **Back** to return to the IP Trainer cockpit.

Free Flight Lesson Scenarios

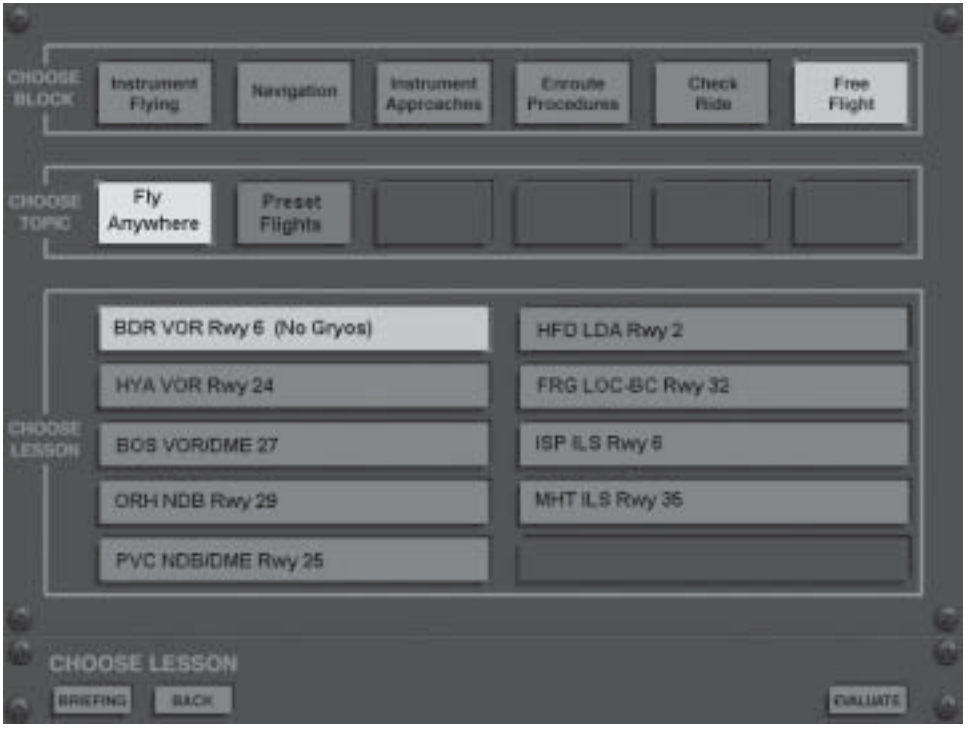
Free Flight includes nine preset scenarios, which situate the simulated aircraft in the same positions as when starting the Instrument Approaches lessons. In Free Flight, you may fly the approaches without guidance, stopping or evaluation. In this way, you have the opportunity to quickly practice the canned approaches on your own.

Scan Trainer is built into these preset Free Flight Lesson Scenarios as well and can be used to help train the eye to focus on the primary instruments during each phase of flight. By lighting the bezel ring around each instrument in a sequential pattern, Scan Trainer helps instrument pilots refresh and sharpen their scan.

To use Scan Trainer, press numbers 1 through 0 or the Shift key + 1 through 0 on the computer keyboard to start and stop the scan patterns. See Page 50 of this manual, or press the "S" key at any time in the running program for all the Scan Trainer commands.

Exiting Free Flight

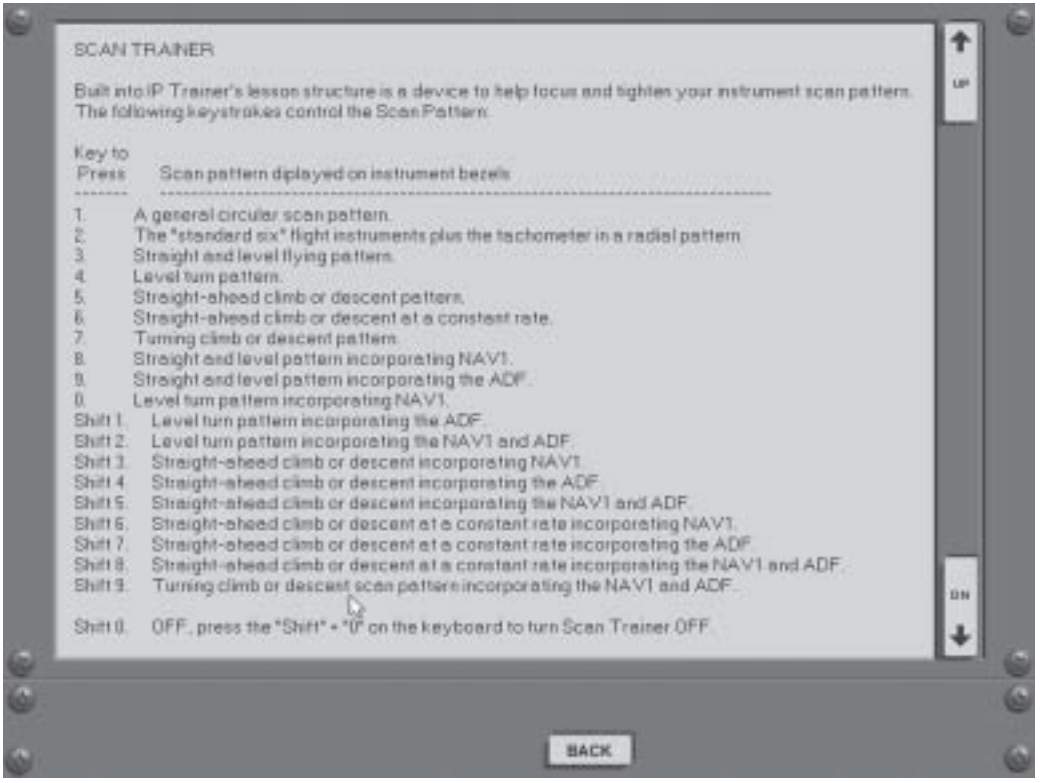
Now that you're flying, you need to know how to get out of Free Flight. In the lower right of your screen is Free Flight's Control Menu, with options to return to the Lesson Menu through New Lesson, or Calibrate. Clicking New Lesson will take you out of Free Flight, or clicking Quit will close the program take you back to your operating system.



Scan Trainer

Built into IP Trainer's lesson structure is a device to help focus and tighten your instrument scan pattern. Scan Trainer is a unique system that helps to train the eye to focus on the primary instruments during each phase of flight. By lighting the bezel ring around each instrument in a sequential pattern, Scan Trainer helps pilots refresh and sharpen their instrument scan.

Note: You may access this help screen during your lessons by pressing 'S' (for Scan Trainer) on your keyboard.



When pressing one of the numbers, or "Shift" plus number combinations, listed below, Scan Trainer will display a brief description of the selected scan pattern in the glare shield, as well as start the pattern on the instrument bezels. The scan pattern will continue until switched to another pattern, or switched off by using the "Shift" and "0" keys in combination.

SPEED: Once activated, the Scan Trainer's speed may be adjusted to your liking using the '+' or '-' keys on your keyboard to speed up, or slow down the trainer.

To activate Scan Trainer, press numbers 1 through 0, or Shift and 1 through 9 on the computer keyboard to start the scan patterns. To Stop the Scan Trainer, press the Shift plus the 0 key on the computer keyboard. All Scan combinations are listed below:

Key to Press	Scan Pattern Displayed on Instrument Bezels
1	A general circular scan pattern.
2	The "standard six" flight instruments plus the tachometer in a radial pattern.
3	Straight and level flying pattern.
4	Level turn pattern.
5	Straight-ahead climb or descent pattern.
6	Straight-ahead climb or descent at a constant rate.
7	Turning climb or descent pattern.
8	Straight and level pattern incorporating NAV1.
9	Straight and level pattern incorporating the ADF.
0	Level turn pattern incorporating NAV1.
Shift 1	Level turn pattern incorporating the ADF.
Shift 2	Level turn pattern incorporating the NAV1 and ADF.
Shift 3	Straight-ahead climb or descent incorporating NAV1.
Shift 4	Straight-ahead climb or descent incorporating the ADF.
Shift 5	Straight-ahead climb or descent incorporating the NAV1 and ADF.
Shift 6	Straight-ahead climb or descent at a constant rate incorporating NAV1.
Shift 7	Straight-ahead climb or descent at a constant rate incorporating the ADF.
Shift 8	Straight-ahead climb or descent at a constant rate incorporating the NAV1 and ADF.
Shift 9	Turning climb or descent scan pattern incorporating the NAV1 and ADF.
Shift 0	OFF, press the "Shift" + "0" on the keyboard to turn Scan Trainer OFF.

On Screen Warning Messages

When in lesson mode, IP Trainer will monitor your actions. If you deviate from the prescribed procedure, the program will first warn you by noting the deficiency in a streaming message across the windshield portion of the screen. The Prompt mode provides the longest warning period, with progressively shorter warnings in the Practice and Test modes.

If no corrective action is taken, and the warning period has expired, IP Trainer will stop you and give you the opportunity of backing up or continuing.

Occasionally, a warning message will show a brief message, such as “Caution:” or “IPT-CFII:” We have made every attempt for the program to provide descriptive warning message information. In cases such as this, you likely have not completed the last actions indicated in the Prompt mode, such as a response to ATC or a direction by the IPT-CFII. If you cannot understand the nature of the warning, go to Prompt and note the commands given for a fuller explanation of the missing action (many commands are not included in the Practice and Test modes since you are trying to complete the lesson on your own).

Repeat Key

IP Trainer now incorporates the feature of repeating the last line of instructional text and displaying the command on the screen. If you press the ‘R’ key on the keyboard, the instructor’s or ATC’s last command will be displayed. You may press the key repeatedly until the next instruction is given, when the text will be updated.

Appendix 1: Lesson Tips

Meet the IP Trainer Instructor: Stan the CFI Man

I want to thank you for agreeing to fly with me. I am known as a tough instructor, but I have been teaching for 35 years with great success. I have a system, like the military, and each student follows that system. Some have said, "it is Stan's way or the skyway." Probably a lot of truth there, but I get consistently good results.

ASA asked me to guide this Instrument Pilot Trainer, and I agreed. ASA asked me to make it easier so students could feel better about their skills and accomplishments. I said, "I don't think so!" I teach the way I teach and make no excuses about it; I get results. I turn out quality students, good sticks.

Thanks for flying with me. I hope I can provide you with the confidence to demonstrate proficiency in the instrument procedures.

At ASA, we want to make the simulation experience as effective as possible for you.

Bear in mind there are many acceptable methods to comply with FAA regulations and procedures. Stan teaches one perfectly acceptable method, which may vary from what

you were taught or how you currently fly. If you are completely comfortable with the procedural aspect of flying IFR, and you are simply looking for a platform to practice, you might want to just watch the Explain mode. Then, go into Free Flight and perform the maneuver without restriction or guidance. Only you can be the judge of what is acceptable to you and your instructor.

However, if you are looking for instruction on how to master the procedures used in instrument flight, performed in the privacy of your home, this program was designed for you. Stan is a strict instructor—we make no qualms about that. If you find yourself fighting "the system" and consistently failing a lesson, reference the "cheat sheet" within each lesson (by pressing the CFII Tips button) to help you get the most out of your virtual flying experience. Use these tips to understand what Stan is looking for. We hope these refined skills will translate well to the cockpit when it comes time to take your real instrument rating checkride.

General Tips

Stan has some general pet peeves that recur throughout the program. We will discuss some general methodologies here. If you continue to experience difficulties while flying a lesson, press the Menu button, then the CFII Tips button for additional insights into Stan's methodology.

Tools: The nice thing about a simulator is that you can stop, take a breath and see where you are. Press the "Menu" button to stop the action or program the "Map" function as one of your flight control commands. Then, every time you want to stop and think about the lesson (or review these Tips), you can check your position on the map. Press the Menu button a second time to start the lesson back up again, continuing from where you paused. Another helpful tool included in the program is the Scan Trainer. The built-in scan patterns can help you stay ahead of the aircraft in turns, climbs, descents and straight and level flight by suggesting a route for your eyes to follow. The scan patterns may be found at the bottom of every lesson briefing as well as by pressing the CFII Tips button during a lesson.

Turns: One of Stan's most consistent gripes is making standard rate turns at a stabilized rate and rolling the wings level at the completion of the turn. He insists on standard rate turns, within a needle width or so of the turn coordinator bars, and no rocking of the wings in the turn. When rolling out of the turn, there should be no evidence of turning prior to taking the next action. If you are within five degrees of the desired heading, when you initially roll out, keep the wings level for a moment before taking the next action, which might be to start the panel timer or fine-tune the heading.

Airspeed: Another issue concerns airspeed control. Stan is adamant about maintaining airspeed on approach between 80 and 100 knots, ideally about 90 knots indicated. This means if you are at approach level at about 2,000 RPM, you need to add some power in the turn to keep your airspeed from decaying below 80.

Sequence: If there is a sequence of events, that sequence must be followed precisely. While it may be perfectly acceptable to perform the tasks in a different sequence, Stan believes that if you practice the same sequence over and over, the chance of missing a step is decreased. So, while you are flying with him, he wants you to do it as he prescribes.

An example of following Stan's sequence would include the five T's: Turn, Time, Twist, Throttle, Talk. So, in a procedure, you would make the turn to the specified heading, roll the wings level, stabilize, start the panel timer, twist to adjust the radios and NAVAIDs, adjust the throttle to the proper setting for the configuration and talk to ATC. Stan is expecting you to perform the events in that sequence, every time.

Note that in the Explain and Prompt modes, Stan will explain what you are to do every step of the way. Wait until you are prompted and notice the routine he expects you to follow when you try the Practice and Test modes.

Communications: Differentiate between ATC and CFII voice commands. When Stan is speaking to you, the banner across the top of the screen will indicate, "IPT-CFII." You need to respond to ATC by pressing the "XMIT" button.

Configuration: As in any IFR scenario, it is important the pilot be aware of the proper aircraft configuration settings for approach level, precision and non-precision descents, etc. Stan wants to see the configuration settings by the book. For example, when a non-precision descent is called for, Stan expects a 2–3 degree pitch down, power to 1,200 RPM and a descent rate of 1,000 FPM. Refer to the chart at the bottom center of the instrument panel view for details on each configuration.

Approach Altitudes: When demonstrating an approach in Explain, Stan likes to go right down to the Minimum Descent Altitude (MDA). When he learned, it was acceptable to have a bit of a plus or minus on the approach minimums. However, today the PTS states, "-0 feet descent below the minimums." You may want to add a cushion of 20–40 feet to your minimum descent altitude when flying the simulator yourself, so that you will never bust minimums in actual flight. Your instructor will appreciate your understanding of the regulations and procedure.

Failures: If you are confident in the procedure and don't want to repeat that portion of the lesson, hit the "Continue" button if stopped. You still need to correct the situation, but this option will let you continue the lesson without backing up and repeating any portion of it. Remember, this is a program designed to help you sharpen your skills. If you over-bank to capture a VOR radial, but are within safe limits, don't fret if the program says you didn't do a standard rate turn properly. But be certain you are not making a

procedural error in doing so. What is important is that you competently perform the procedure. If you stay "ahead" of the computer, you will likely be ahead of the aircraft the next time you fly. If so, your checkride will be effortless—which is what this program is really all about.

Top 12 Tips for IP Trainer Success

1. Make small trim changes after changing pitch or power settings.
2. Smoothly roll into bank and hold bank steady. Do not waggle. Stan is demanding about holding your turn at standard rate.
3. Roll out on headings smoothly, about 8 degrees before the heading. Also hold the roll-out heading for a second or two before making a heading correction.
4. When setting the OBS use the digital readout to select the radial.
5. Use the attitude indicator to stabilize descents. Do not chase the VSI.
6. Know the numbers Stan wants you to use for flight configurations: ie approach level, precision descent, non-precision descent.
7. When turning to a new heading hold the wings level for a few seconds before starting the timer or correcting for wind. If you don't allow this delay the software will not know you were established on any particular heading.
8. When in doubt watch Stan in the EXPLAIN mode.
9. Before trying in TEST mode make sure the lesson can be flown in PRACTICE mode without failing.
10. Be sure to run through the five Ts in the right order when reaching a fix, starting a turn, descending etc.
11. When reaching a fix and flying outbound for a procedure turn wait about 30 seconds before correcting for any wind.
12. When ATC talks to you be sure to respond by clicking the xmit button.

Appendix 2: Terminal Procedures

INOP COMPONENTS

INOPERATIVE COMPONENTS OR VISUAL AIDS TABLE

Landing minimums published on instrument approach procedure charts are based upon full operation of all components and visual aids associated with the particular instrument approach chart being used. Higher minimums are required with inoperative components or visual aids as indicated below. If more than one component is inoperative, each minimum is raised to the highest minimum required by any single component that is inoperative. ILS glide slope inoperative minimums are published on the instrument approach charts as localizer minimums. This table may be amended by notes on the approach chart. Such notes apply only to the particular approach category(ies) as stated. See legend page for description of components indicated below.

(1) ILS, MLS, and PAR

Inoperative Component or Aid	Approach Category	Increase Visibility
ALSF 1 & 2, MALSR, & SSALR	ABCD	1/4 mile

(2) ILS with visibility minimum of 1,800 RVR

ALSF 1 & 2, MALSR, & SSALR	ABCD	To 4000 RVR
TDZL RCLS	ABCD	To 2400 RVR
RVR	ABCD	To 1/2 mile

(3) VOR,VOR/DME, VORTAC, VOR (TAC), VOR/DME (TAC), LOC, LOC/DME, LDA, LDA/DME, SDF, SDF/DME, GPS, RNAV,and ASR

Inoperative Visual Aid	Approach Category	Increase Visibility
ALSF 1 & 2, MALSR, & SSALR	ABCD	1/2 mile
SSALS,MALS, & ODALS	ABC	1/4 mile

(4) NDB

ALSF 1 & 2, MALSR, & SSALR	C	1/2 mile
	ABD	1/4 mile
MALS, SSALS, ODALS	ABC	1/4 mile

CORRECTIONS, COMMENTS AND/OR PROCUREMENT

FOR CHARTING ERRORS CONTACT:
National Aeronautical Charting Office, FAA
N/ACC1, SSMC-4, Sta. #2335
1305 East-West Highway
Silver Spring, MD 20910-3281
Telephone Toll-Free (800) 626-3677
Internet/E-Mail: Aerochart@NOAA.GOV

FOR CHANGES, ADDITIONS, OR RECOMMENDATIONS ON PROCEDURAL ASPECTS:
Contact Federal Aviation Administration, ATA 110
800 Independence Avenue, SW
Washington, DC 20591
Telephone Toll Free (800) 457-6656

TO PURCHASE CHARTS CONTACT:
National Aeronautical Charting Office
FAA, N/ACC3
Distribution Division
Riverdale, MD 20737
Telephone Toll Free (800) 638-8972

Requests for the creation or revisions to Airport Diagrams should be in accordance with FAA Order 7910.4B.

IFR LANDING MINIMA

The United States Standard for Terminal Instrument Procedures (TERPS) is the approved criteria for formulating instrument approach procedures. Landing minima are established for six aircraft approach categories (ABCDE and COPTER).
In the absence of COPTER MINIMA, helicopters may use the CAT A minimums of other procedures.
The standard format for RNAV minima and landing minima portrayal follows:

RNAV MINIMA

CATEGORY	A	B	C	D
GLS PA DA	1382/24 200 (200-½)			
LNAV/ DA VNAV	1500/24 318 (400-½)			1500/40 318 (400-¾)
LNAV MDA	1700/24 518 (600-½)		1700/50 518 (600-1)	1700/60 518 (600-1 ¼)
CIRCLING	1760-1 578 (600-1)		1760-1½ 578 (600-1½)	1760-2 578 (600-2)

RNAV minimums are dependent on navigation equipment capability, as stated in the applicable AFM or AFMS and as outlined below.

GLS (GLobal Navigation System (GNSS) Landing System)

Must have WAAS (Wide Area Augmentation System) equipment approved for precise approach.
Note: "PA" indicates that the runway environment, i.e., runway markings, runway lights, parallel taxiway, etc., meets precision approach requirements. If the GLS minimums line does not contain "PA", then the runway environment does not support precision requirements.

LNAV/VNAV (Lateral Navigation/Vertical Navigation)

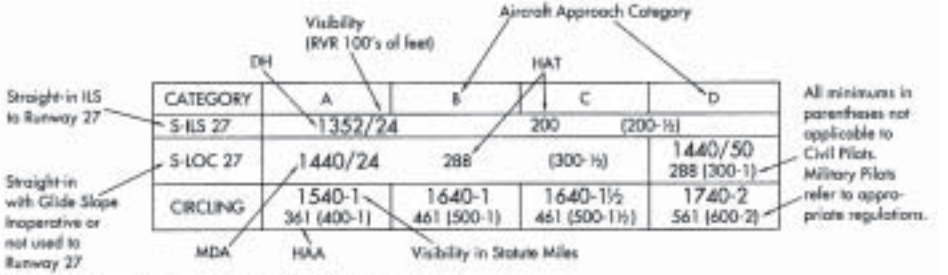
Must have WAAS equipment approved for precision approach, or RNP-0.3 system based on GPS or DME/DME, with an IFR approach approved Baro-VNAV system. Other RNAV approach systems require special approval.
Use of Baro-VNAV systems is limited by temperature, i.e., "Baro-VNAV NA below -20 C[-4 F]".
(Not applicable if chart is annotated "Baro-VNAV NA".)
NOTE: DME/DME based RNP-0.3 systems may be used only when a chart note indicates DME/DME availability, for example, "DME/DME RNP-0.3 Authorized." Specific DME facilities may be required, for example: "DME/DME RNP-0.3 Authorized. ABC, XYZ required."

LNAV (Lateral Navigation)

Must have IFR approach approved WAAS, GPS, GPS based FMS systems, or RNP-0.3 systems based on GPS or DME/DME. Other RNAV approach systems require special approval.
NOTE: DME/DME based RNP-0.3 systems may be used only when a chart note indicates DME/DME availability, for example, "DME/DME RNP-0.3 Authorized." Specific DME facilities may be required, for example: "DME/DME RNP-0.3 Authorized. ABC, XYZ required."

LANDING MINIMA FORMAT

In this example airport elevation is 1179, and runway touchdown zone elevation is 1152.



TERMS/LANDING MINIMA DATA

TERMS/LANDING MINIMA DATA

COPTER MINIMA ONLY

CATEGORY	COPTER
H-176*	680-½ 363 (400-½)

Copter Approach Direction

Height of MDA/DH Above Landing Area (HAL)

No circling minimums are provided

RADAR MINIMA

									Visibility (RVR 100's of feet)		
PAR (c)	10	2.5°/42/1000	ABCDE	**195**/16	100	(100-¼)					
(d)	28	2.5°/48/1068	ABCDE	**187**/16	100	(100-¼)					
ASR	10		ABC	**560**/40	463	(500-¼)	D	**560**/50	463	(500-1)
			E	**580**/60	463	(500-1¼)				
	28		AB	**600**/50	513	(600-1)	C	**600**/60	513	(600-1¼)
			DE	**600**-1½	513	(600-1½)				
CIR (b)	10		AB	**560**-1¼	463	(500-1¼)	C	**560**-1½	463	(500-1½)
	28		AB	**600**-1¼	503	(600-1¼)	C	**600**-1½	503	(600-1½)
	10, 28		DE	**660**-2	563	(600-2)				

Visibility in Statute Miles

All minimums in parentheses not applicable to Civil Pilots. Military Pilots refer to appropriate regulations.

Radar Minima:

1. Minima shown are the lowest permitted by established criteria. Pilots should consult applicable directives for their category of aircraft.
2. The circling MDA and weather minima to be used are those for the runway to which the final approach is flown - not the landing runway. In the above RADAR MINIMA example, a category C aircraft flying a radar approach to runway 10, circling to land on runway 28, must use an MDA of 560 feet with weather minima of 500-1½ .

⚠ Alternate Minimums not standard. Civil users refer to tabulation. USA/USN/USAF pilots refer to appropriate regulations.

⚠ NA Alternate minimums are Not Authorized due to unmonitored facility or absence of weather reporting service.

▼ Take-off Minimums not standard and/or Departure Procedures are published. Refer to tabulation.

AIRCRAFT APPROACH CATEGORIES

Speeds are based on 1.3 times the stall speed in the landing configuration of maximum gross landing weight. An aircraft shall fit in only one category. If it is necessary to maneuver at speeds in excess of the upper limit of a speed range for a category, the minimums for the next higher category should be used. For example, an aircraft which falls in Category A, but is circling to land at a speed in excess of 91 knots, should use the approach Category B minimums when circling to land. See following category limits:

MANEUVERING TABLE

Approach Category	A	B	C	D	E
Speed (Knots)	0-90	91-120	121-140	141-165	Abv 165

RVR/ Meteorological Visibility Comparable Values

The following table shall be used for converting RVR to meteorological visibility when RVR is not reported for the runway of intended operation. Adjustments of landing minima may be required - see Inoperative Components Table.

RVR (feet)	Visibility (statute miles)
1600	¼
2000	⅜
2400	½
3200	⅝
4000	¾
4500	⅞
5000	1
6000	1¼

TERMS/LANDING MINIMA DATA

GENERAL INFORMATION

This publication includes Instrument Approach Procedures (IAPs), Departure Procedures (DPs), and Standard Terminal Arrivals (STARs) for use by both civil and military aviation and is issued every 56 days.

STANDARD TERMINAL ARRIVALS AND DEPARTURE PROCEDURES

The use of the associated codified STAR/DP and transition identifiers are requested of users when filing flight plans via teletype and are required for users filing flight plans via computer interface. It must be noted that when filing a STAR/DP with a transition, the first three coded characters of the STAR and the last three coded characters of the DP are replaced by the transition code. Examples: ACTON SIX ARRIVAL, file (AQN.AQN6); ACTON SIX ARRIVAL, EDNAS TRANSITION, file (EDNAS.AQN6). FREEHOLD THREE DEPARTURE, file (FREH3.RBV), FREEHOLD THREE DEPARTURE, ELWOOD CITY TRANSITION, file (FREH3.EWC).

PILOT CONTROLLED AIRPORT LIGHTING SYSTEMS

Available pilot controlled lighting (PCL) systems are indicated as follows:

1. Approach lighting systems that bear a system identification are symbolized using negative symbology, e.g., ⓐ, ⓑ, ⓒ
2. Approach lighting systems that do not bear a system identification are indicated with a negative "ⓘ" besides the name.

A star (*) indicates non-standard PCL, consult Directory/Supplement, e.g., ⓘ*

To activate lights use frequency indicated in the communication section of the chart with a ⓘ or the appropriate lighting system identification e.g., UNICOM 122.8 ⓘ, ⓐ, ⓑ

KEY MIKE	FUNCTION
7 times within 5 seconds	Highest intensity available
5 times within 5 seconds	Medium or lower intensity (Lower REIL or REIL-off)
3 times within 5 seconds	Lowest intensity available (Lower REIL or REIL-off)

CHART CURRENCY INFORMATION

FAA procedure amendment number → Amdt 11A 99365 → Date of latest change
Orig 00365

The Chart Date identifies the Julian date the chart was added to the volume or last revised for any reason. The first two digits indicate the year, the last three digits indicate the day of the year (001 to 365/6) in which the latest addition or change was first published.

The Procedure Amendment Number precedes the Chart Date, and changes any time instrument information (e.g., DH, MDA, approach routing, etc.) changes. Procedure changes also cause the Chart Date to change.

MISCELLANEOUS

* Indicates a non-continuously operating facility, see A/FD or flight supplement.
# Indicates control tower temporarily closed UFN.

"Radar required" on the chart indicates that radar vectoring is required for the approach.

Distances in nautical miles (except visibility in statute miles and Runway Visual Range in hundreds of feet). Runway Dimensions in feet. Elevations in feet. Mean Sea Level (MSL). Ceilings in feet above airport elevation. Radials/bearings/headings/courses are magnetic. Horizontal Datum: Unless otherwise noted on the chart, all coordinates are referenced to North American Datum 1983 (NAD 83), which for charting purposes is considered equivalent to World Geodetic System 1984 (WGS 84).

ABBREVIATIONS

ADF	Automatic Direction Finder
ALS	Approach Light System
ALSF	Approach Light System with Sequenced Flashing Lights
APP CON	Approach Control
ARR	Arrival
ASOS	Automated Surface Observing System
ASR/PAR	Published Radar Minimums at this Airport
ATIS	Automatic Terminal Information Service
AWOS	Automated Weather Observing System
AZ	Azimuth
BC	Back Course
C	Circling
CAT	Category
CCW	Counter Clockwise
Chan	Channel
CLNC DEL	Clearance Delivery
CNF	Computer Navigation Fix
CTAF	Common Traffic Advisory Frequency
CW	Clockwise
DH	Decision Height
DME	Distance Measuring Equipment
DR	Dead Reckoning
ELEV	Elevation
FAF	Final Approach Fix
FM	Fan Marker
FMS	Flight Management System
GCO	Ground Communications Outlet
GPI	Ground Point of Interception
GPS	Global Positioning System
GS	Glide Slope
HAA	Height above Airport
HAL	Height above Landing
HAT	Height above Touchdown
HIRL	High Intensity Runway Lights
IAF	Initial Approach Fix
ICAO	International Civil Aviation Organization
IM	Inner Marker
Intcp	Intercept
INT	Intersection
LDA	Localizer Type Directional Aid
Ldg	Landing
LDIN	Lead in Light System
LIRL	Low Intensity Runway Lights
LOC	Localizer
LR	Lead Radial. Provides at least 2 NM (Copter 1 NM) of lead to assist in turning onto the intermediate/final course.
MALS	Medium Intensity Approach Light System
MALSR	Medium Intensity Approach Light System with RAIL
MAP	Missed Approach Point
MDA	Minimum Descent Altitude
MIRL	Medium Intensity Runway Lights
MLS	Microwave Landing System
MM	Middle Marker
N/A	Not Applicable
NA	Not Authorized
NDB	Non-directional Radio Beacon
NM	Nautical Mile
NoPT	No Procedure Turn Required (Procedure Turn shall not be executed without ATC clearance)
ODALS	Omnidirectional Approach Light System
OM	Outer Marker
R	Radial
RA	Radio Altimeter setting height
RAIL	Runway Alignment Indicator Lights
RBn	Radio Beacon
RCLS	Runway Centerline Light System
REIL	Runway End Identifier Lights
RNAV	Area Navigation
RNP	Required Navigation Performance
RPI	Runway Point of Intercept(ion)
RRL	Runway Remaining Lights
Rwy	Runway
RVR	Runway Visual Range
S	Straight-in
SALS	Short Approach Light System
SSALR	Simplified Short Approach Light System with RAIL
SDF	Simplified Directional Facility
TA	Transition Altitude
TAA	Terminal Arrival Area
TAC	TACAN
TCH	Threshold Crossing Height (height in feet Above Ground level)
TDZ	Touchdown Zone
TDZE	Touchdown Zone Elevation
TDZ/CL	Touchdown Zone and Runway Centerline Lighting
TDZL	Touchdown Zone Lights
TLv	Transition Level
VASI	Visual Approach Slope Indicator
VDP	Visual Descent Point
VGSI	Visual Glide Slope Indicator
WP/WPT	Waypoint (RNAV)
X	Radar Only Frequency

LEGEND

INSTRUMENT APPROACH PROCEDURES (CHARTS)

PLANVIEW SYMBOLS

TERMINAL ROUTES

Procedure Track

Missed Approach

Visual Flight Path

Procedure Turn (Type degree and point of turn optional)

3100 NoPT 5.6 NM to GS Intcpt

045°

(14.2 to LOM)

Minimum Altitude — 2000

155°

Feeder Route

Mileage — (15.1)

Penetrates Special Use Airspace

HOLDING PATTERNS

In lieu of Procedure Turn — 270° / 090°

Missed Approach — 360° / 180°

Arrival — 360° / 180°

Holding pattern with max. restricted airspeed:
"175K" applies to all altitudes.
"210K" applies to altitudes above 6000' to and including 14000'.

Limits will only be specified when they deviate from the standard. DME fixes may be shown.

REPORTING POINT/FIXES

Reporting Point
▲ Name (Compulsory)
△ Name (Non-Compulsory)

Fix or intersection

COMPUTER NAVIGATION FIX (CNF)

x (NAME) ("x" omitted when it conflicts with runway pattern)

(15) DME Distance — From Facility — ARC/DME/RNAV Fix

R-198 — Radial line and value

LR-198 — Lead Radial

LB-198 — Lead Bearing

MINIMUM SAFE ALTITUDE (MSA)

Facility Identifier — MSA CRW 25 NM

180° — 1500 — 2200 — 090° — 270° — 4500 — 2500 — 360°

(arrows on distance circle identify sectors)

OBSTACLES

• Spot Elevation
Λ Obstacle
Λ Highest Obstacle
• Highest Spot Elevation
ΛΛ Group of Obstacles
± Doubtful accuracy

SPECIAL USE AIRSPACE

R-352

R-Restricted W-Warning
P-Prohibited A-Alert

RADIO AIDS TO NAVIGATION

110.1 Underline indicates No Voice transmitted on this frequency

VOR · VOR/DME · TACAN · VORTAC

NDB · NDB/DME · WAYPOINT

MAP WP · FLYOVER WAYPOINT · WAYPOINT COLLOCATED WITH NAVAID

LOM/LMM (Compass locator at Outer Marker/Middle Marker)

Marker Beacon

Localizer (LOC/LDA) Course
Right side shading: Front course; Left side shading: Back Course

SDF Course

180° — MLS Approach Azimuth

MLS Identifier — MICROWAVE Chan 514 — M-VDZ — Glidepath 6.20° — DME 111.5 Chan 48(Y)

(Y) TACAN must be in "Y" mode to receive distance information.

LOC/DME

LOC/LDA/SDF/MLS Transmitter (shown when installation is offset from its normal position off the end of the runway.)

Waypoint Data

Coordinates — PRAYS — Waypoint Name

N38°58.30' W89°51.50'

Frequency — 112.7 CAP 187.1° 56.2

Identifier — 590 — Reference Facility Elevation — Radial Distance (Facility to Waypoint)

Primary Navaid with Coordinate Values

LIMA
114.5 LIM
Chan 92
51 2°00.80'
W77°07.00'

Secondary Navaid

LMM
LIMA
248 NT

MISCELLANEOUS

VOR Changeover Point

RWY 15 — 512°00.52' W77°06.91' — End of Rwy Coordinates (DOD only)

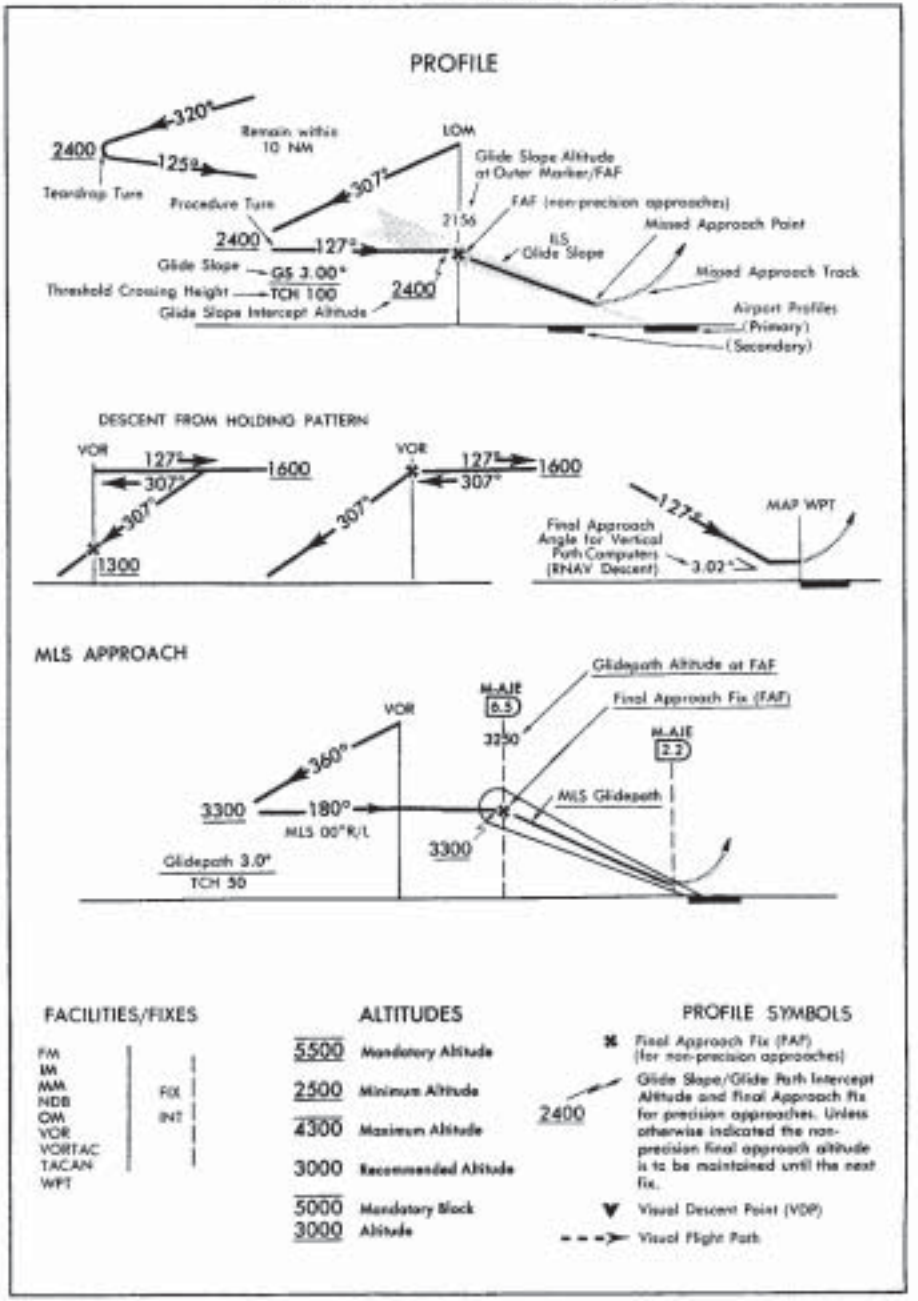
Distance not to scale

International Boundary

LEGEND

LEGEND

INSTRUMENT APPROACH PROCEDURES (CHARTS)



LEGEND

LEGEND

STANDARD TERMINAL ARRIVAL (STAR) CHARTS
DEPARTURE PROCEDURE (DP) CHARTS

RADIO AIDS TO NAVIGATION

VOR
VOR/DME
VORTAC
WAYPOINT
FLYOVER WAYPOINT
NDB (Non-directional Radio Beacon)
LMM, LOM (Compass locator)
Marker Beacon
Localizer Course
SDF Course
TACAN
NDB/DME
LOC/DME
LOC

(T) indicates frequency protection range
Identifier
(Y) TACAN must be placed in "Y" mode to receive distance information
Frequency
ORLANDO
112.25 (T) ORL
Chan 59 (Y)
N28°32.56' W81°20.10'
Geographic Position
Underline indicates no voice transmitted on this frequency
L-19, H-5
Enroute Chart Reference
DME or TACAN Channel

Coordinates
FRAYS
N38°58.30' W89°51.50'
Waypoint Name
Frequency
112.7 CAP 187.1 56.2
590
Identifier
Reference Facility Elevation
Radial-Distance (Facility to Waypoint)

Reporting Points
N00° 00.00'
W00° 00.00'
▲ Name (Compulsory)
△ Name (Non-Compulsory)
75 DME Mileage (when not obvious)
Distance not to scale
DME fix
X Mileage Breakdown/ Computer Navigation Fix (CNF)
N00° 00.00'
W00° 00.00'

ROUTES

4500 MEA-Minimum Enroute Altitude
*3500 MOCA-Minimum Obstruction Clearance Altitude
270° Departure Route - Arrival Route
(65) Mileage between Radio Aids, Reporting Points, and Route Breaks
Transition Route
R-275 Radial line and value
Lost Communications Track
V12 J80 Airway/Jet Route Identification
Holding Pattern
Changeover Point
Holding patterns with max. restricted airspeed
175K applies to all altitudes
210K applies to altitudes above 6000' to and including 14000'

SPECIAL USE AIRSPACE

R-352
R-Restricted W-Warning
P Prohibited A-Alert

ALTITUDES

5500 Mandatory Altitude
2300 Minimum Altitude
4800 Maximum Altitude
2200 Recommended Altitude
MCA (Minimum Crossing Altitude)
Altitude change at other than Radio Aids

AIRPORTS

Civil
Military
Joint Civil Military

NOTES

All mileages are nautical.
▼ Indicates control tower temporarily closed IFR
* Indicates a non-continuously operating facility, see A/FD or flight supplement.
All radials, bearings are magnetic.
All altitudes/elevations are in feet-MSL
MRA- Minimum Reception Altitude.
MAA- Maximum Authorized Altitude.
(NAME2.NAME) - Example of DP flight plan Computer Code.
(NAME.NAME2) - Example of STAR flight plan Computer Code.
SL-0000 (FAA) - Example of a chart reference number.
▼ Take-Off Minimums not standard and/or Departure Procedures are published.

LEGEND

AIRPORT DIAGRAM/AIRPORT SKETCH

Runways

Hard Surface | Other Than Hard Surface | Stopways, Taxiways, Parking Areas | Displaced Threshold

Closed Runway | Closed Taxiway | Under Construction | Metal Surface | Runway Centerline Lighting

ARRESTING GEAR: Specific arresting gear systems; e.g., BAK-12, MA-1A etc., shown on airport diagrams, not applicable to Civil Pilots. Military Pilots Refer to Appropriate DOD Publications.

uni-directional | bi-directional | Jet Barrier

REFERENCE FEATURES

Buildings

Tanks

Obstruction

Airport Beacon #

Runway Radar Reflectors

Control Tower #

When Control Tower and Rotating Beacon are co-located, Beacon symbol will be used and further identified as TWR.

Runway length depicted is the physical length of the runway (end-to-end, including displaced thresholds if any) but excluding areas designated as stopways. Where a displaced threshold is shown and/or part of the runway is otherwise not available for landing, an annotation is added to indicate the landing length of the runway; e.g., RWY 13 ldg 5000'.

Helicopter Alighting Areas

Negative Symbols used to identify Copter Procedures

landing point

Runway TDZ elevation.....TDZE 123

—0.3% DOWN

Runway Slope.....0.8% UP—

(shown when runway slope exceeds 0.3%)

NOTE:
Runway Slope measured to midpoint on runways 8000 feet or longer.

U.S. Navy Optical Landing System (OLS) "OLS" location is shown because of its height of approximately 7 feet and proximity to edge of runway may create an obstruction for some types of aircraft.

Approach light symbols are shown in the Flight Information Handbook.

Airport diagram scales are variable.

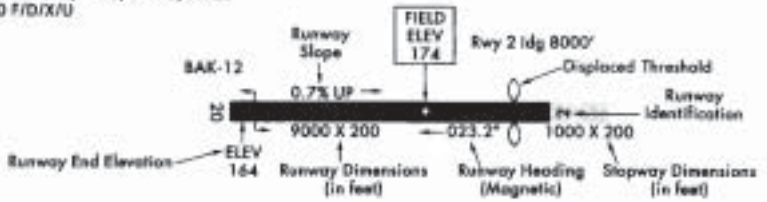
True/magnetic North orientation may vary from diagram to diagram.

Coordinate values are shown in 1 or ½ minute increments. They are further broken down into 6 second ticks, within each 1 minute increment.

Positional accuracy within ±600 feet unless otherwise noted on the chart.

NOTE:
All new and revised airport diagrams are shown referenced to the World Geodetic System (WGS) (noted on appropriate diagram), and may not be compatible with local coordinates published in FLIP. (Foreign Only)

Runway Weight Bearing Capacity/or PCN Pavement Classification Number is shown as a codified expression.
Refer to the appropriate Supplement/Directory for applicable codes, e.g.,
RWY 14-32 S75, T185, ST175, TT325
PCN 80 F/D/X/U



SCOPE

Airport diagrams are specifically designed to assist in the movement of ground traffic at locations with complex runway/taxiway configurations and provide information for updating Computer Based Navigation Systems (I.E., INS, GPS) aboard aircraft. Airport diagrams are not intended to be used for approach and landing or departure operations. For revisions to Airport Diagrams: Consult FAA Order 7910.4B.

LEGEND

INSTRUMENT APPROACH PROCEDURES (CHARTS)

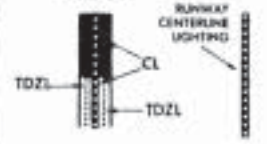
APPROACH LIGHTING SYSTEM — UNITED STATES

Each approach lighting system indicated on Airport Diagrams will bear a system identification indicated in legend.

A dot " • " portrayed with approach lighting letter identifier indicates sequenced flashing lights (F) installed with the approach lighting system e.g., (A1). Negative symbology, e.g., (A1). ● indicates Pilot Controlled Lighting (PCL).

RUNWAY TOUCHDOWN ZONE AND CENTERLINE LIGHTING SYSTEMS

TDZ/CL



AVAILABILITY of TDZ/CL will be shown by NOTE in SKETCH e.g. "TDZ/CL Rwy 15"

APPROACH LIGHTING SYSTEM

(A) **ALSF-2**

(High Intensity)

LENGTH 2400/3000 FEET

APPROACH LIGHTING SYSTEM

(A1) **ALSF-1**

(High Intensity)

LENGTH 2400/3000 FEET

SHORT APPROACH LIGHTING SYSTEM

(A2) **SALS/SALSF**

(High Intensity)

SAME AS INNER 1500' OF ALSF-1

SIMPLIFIED SHORT APPROACH LIGHTING SYSTEM

with Runway Alignment Indicator Lights

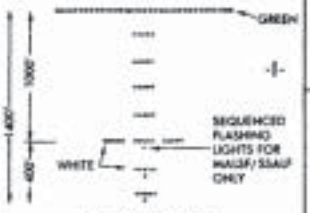
(A3) **SSALR**

(High Intensity)

LENGTH 2400/3000 FEET

MEDIUM INTENSITY (MALS and MALSF) OR SIMPLIFIED SHORT (SSALS and SSALF) APPROACH LIGHTING SYSTEMS

(A2)



LENGTH 1400 FEET

MEDIUM INTENSITY APPROACH LIGHTING SYSTEM

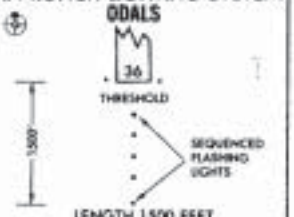
with Runway Alignment Indicator Lights

(A3) **MALSR**

SAME LIGHT CONFIGURATION AS SSALR.

OMNIDIRECTIONAL APPROACH LIGHTING SYSTEM

ODALS



LENGTH 1500 FEET

VISUAL APPROACH SLOPE INDICATOR

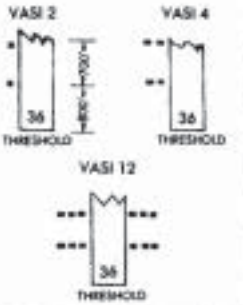
(S) **VASI**

VISUAL APPROACH SLOPE INDICATOR WITH STANDARD THRESHOLD CLEARANCE PROVIDED.

ALL LIGHTS WHITE — TOO HIGH

FAR LIGHTS RED / NEAR LIGHTS WHITE — ON GLIDE SLOPE

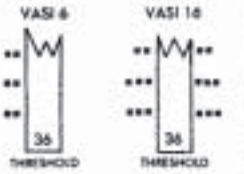
ALL LIGHTS RED — TOO LOW



VISUAL APPROACH SLOPE INDICATOR

(V3) **VASI**

VISUAL APPROACH SLOPE INDICATOR WITH A THRESHOLD CROSSING HEIGHT TO ACCOMODATE LONG BODIED OR JUMBO AIRCRAFT.



LEGEND

LEGEND

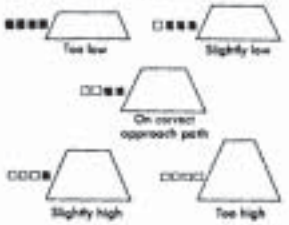
INSTRUMENT APPROACH PROCEDURES (CHARTS)
APPROACH LIGHTING SYSTEM — UNITED STATES

Each approach lighting system indicated on Airport Diagrams will bear a system identification indicated in legend.

A dot " • " portrayed with approach lighting letter identifier indicates sequenced flashing lights (P) installed with the approach lighting system e.g., (A•1) Negative symbology, e.g., (A•1). (V) indicates Pilot Controlled Lighting (PCL).

(P) PRECISION APPROACH PATH INDICATOR

PAPI



Legend: □White ■Red

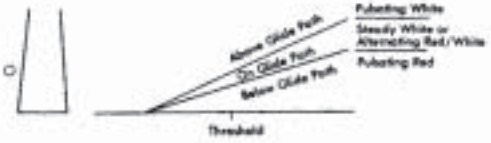
(V1) "T"-VISUAL APPROACH SLOPE INDICATOR

"T"-VASI

"T" ON BOTH SIDES OF RWY
ALL LIGHTS VARIABLE WHITE.
CORRECT APPROACH SLOPE-
ONLY CROSS BAR VISIBLE.
UPRIGHT "T" - FLY UP
INVERTED "T" - FLY DOWN
RED "T" - GROSS UNDERSHOOT.

(V2) PULSATING VISUAL APPROACH SLOPE INDICATOR

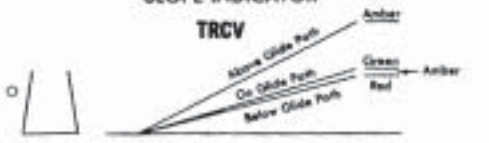
PVASI



CAUTION: When viewing the pulsating visual approach slope indicators in the pulsating white or pulsating red sectors, it is possible to mistake this lighting aid for another aircraft or a ground vehicle. Pilots should exercise caution when using this type of system.

(V4) TRI-COLOR VISUAL APPROACH SLOPE INDICATOR

TRCV

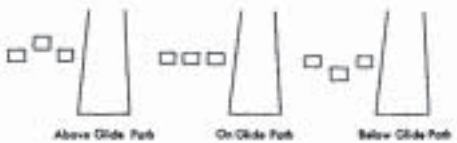


CAUTION: When the aircraft descends from green to red, the pilot may see a dark amber color during the transition from green to red.

(V5)

ALIGNMENT OF ELEMENTS SYSTEMS

APAP



Painted panels which may be lighted at night.
To use the system the pilot positions the aircraft so the elements are in alignment.

LEGEND

INSTRUMENT APPROACH PROCEDURE CHARTS

IFR TAKE-OFF MINIMUMS AND DEPARTURE PROCEDURES

BRIDGEPORT, CT
IGOR SIKORSKY MEMORIAL
TAKE-OFF MINIMUMS: **Rwy 11**, 300-1. **Rwy 29**, 500-1

BOSTON, MA
GENERAL EDWARD LAWRENCE LOGAN INTL
TAKE-OFF MINIMUMS: **Rwy 4L**, 300-1 or std. with min. climb of 340' per NM to 300'. **Rwy 4R**, 300-1 or std. with min. climb of 320 per NM to 300'. **Rwy 9**, 300-1 or std. with min. climb of 230 per NM to 300'. **Rwy 22L**, 300-1 or std. when tower reports no tall vessels in departure area. **Rwy 22R**, 300-1 or std. with min. climb of 220 per NM to 300'. **Rwy 27**, 900-1. **Rwy 33L**, 900-1 or std. with min climb of 250 per NM to 500'.

DANBURY, CT
DANBURY MUNI
TAKE-OFF MINIMUMS: **All Rwys**, 700-1 1/2

FARMINGDALE, NY
REPUBLIC
TAKE-OFF MINIMUMS: **Rwy 1**, 200-1
DEPARTURE PROCEDURE: **Rwy 1**, climb runway heading to 600 before proceeding on course. **Rwy 32**, climb runway heading to 600 before proceeding on course.

GLENS FALLS, NY
WARREN COUNTY
TAKE-OFF MINIMUMS: **Rwys 1, 12, 19, 30**, 300-1.
DEPARTURE PROCEDURE: **Rwys 1, 12, 30**, right turn, **Rwy 19**, left turn and climb to 1300 in GFL VOR holding pattern, 027 inbound prior to departing north or west bound.

GREAT BARRINGTON, MA
GREAT BARRINGTON
TAKE-OFF MINIMUMS: **Rwy 11**, 1100-2. **Rwy 29**, 800-2 or std. with a min. climb of 280 per NM to 1900'.

GROTON (NEW LONDON), CT
GROTON-NEW LONDON
TAKE OFF MINIMUMS: **Rwy 15**, 300-1. **Rwy 5**, 300-2 or std. with min. climb of 240' per NM to 400. **Rwy 33**, 1500-3 or std. with min. climb of 280' per NM to 1900'.

HARTFORD, CT
HARTFORD-BRAINARD
TAKE-OFF MINIMUMS: **Rwys 2, 11, 20**, 300-1.
DEPARTURE PROCEDURE: **Rwy 2**, climb to 800 via runway heading before turning westbound. **Rwy 20**, climb to 1900 via runway heading before turning westbound. **Rwy 11**, climb to 600 via runway heading before proceeding westbound. **Rwy 29**, climbing left turn to 2100 direct HFD VORTAC before proceeding west or northwest bound.

HYANNIS, MA
BARNSTABLE MUNI-BOARDMAN/ POLANDO FIELD
TAKE-OFF MINIMUMS: **Rwy 33**, 300-1 or std. with min. climb of 240' per NM to 300.

KEENE, NH
DILLANT-HOPKINS
TAKE-OFF MINIMUMS: **Rwy 2**, 700-2 or std. with min. climb of 500' per NM to 1300. **Rwy 32**, 700-3 or std. withmin. climb of 380' per NM to 1300. **Rwy 14**, 800-3 or std. with min. climb of 640' per NM to 1400. **Rwy 20**, 300-1 or std. with min. climb of 300' per NM to 600.
DEPARTURE PROCEDURE: **Rwys 2, 32**, climb on heading 360 to 2100. **Rwys 14, 20**, climb to 2000 direct EEN VOR before proceeding on course.

ISLIP, NY
LONG ISLAND MACARTHUR
TAKE-OFF MINIMUMS: **Rwy 33R**, 300-1
DEPARTURE PROCEDURE: **Rwy 33L**, climb runway heading to 500 feet before turning.

LAWRENCE, MA
LAWRENCE MUNI
TAKE-OFF MINIMUMS: **Rwy 14**, 300-1. **Rwy 5**, 900-1 or std. with min. climb of 280' per NM to 900.
DEPARTURE PROCEDURE: **Rwy 5**, climb runway heading to 900 before turning left.

MANCHESTER, NH
MANCHESTER
TAKE-OFF MINIMUMS: **Rwy 6**, 300-1. **Rwy 17**, 300-1 or std. with a min. climb of 255' per NM to 500'. **Rwy 24**, 400-1 or std. with a min. climb of 300' per NM to 600. **Rwy 35**, 300-1 or std. with min. climb of 225' per NM to 500.
DEPARTURE PROCEDURE: **Rwy 35**, climb to 1000 on runway heading before turning westbound.

MARSHFIELD, MA
MARSHFIELD
TAKE-OFF MINIMUMS: **Rwys 6, 24**, 500-1 or std. with min. climb of 300' per NM to 500.

NEW BEDFORD, MA
NEW BEDFORD MUNI
DEPARTURE PROCEDURE: **Rwy 14**, climb runway heading to 600 before turning southbound.

NEW YORK, NY
JOHN F. KENNEDY INTL
TAKE-OFF MINIMUMS: **Rwy 13R**, 300-1 or std. with min. climb of 280' per NM to 300.

NORWOOD, MA
NORWOOD MEMORIAL
TAKE-OFF MINIMUMS: **Rwy 17**, 900-1 or std. with min. climb of 350' per NM to 900. **Rwy 10**, 900-1. **Rwy 28**, 300-1. **Rwy 35**, 1400-1 or std. with min. climb of 270' per NM to 1400.

OXFORD, CT
WATERBURY-OXFORD
TAKE-OFF MINIMUMS: **Rwy 13**, 300-1. **Rwy 36**, 900-1 or std. with min. climb of 300' per NM to 1000.
DEPARTURE PROCEDURE: **Rwy 13**, climb runway heading to 1400 before turning eastbound.

PAWTUCKET, RI
NORTH CENTRAL STATE
TAKE-OFF MINIMUMS: **Rwys 15, 33**, 300-1.

PITTSFIELD, MA
PITTSFIELD MUNI
TAKE-OFF MINIMUMS: **Rwys 8, 14, 26, 32**, 700-1.
DEPARTURE PROCEDURE: Climb visually over airport to 1900 then direct DXT NDB to cross at 3000 or above before proceeding on course.
CAUTION: 2204 terrain 1.5 NM SSW of airport.

PLYMOUTH, MA
PLYMOUTH MUNI
DEPARTURE PROCEDURE: **Rwy 6**, climb runway heading to 800 before turning northbound.

POUGHKEEPSIE, NY
DUTCHESS COUNTY
TAKE-OFF MINIMUMS: **Rwy 6**, 500-1.
Rwys 15, 33, 400-1.
DEPARTURE PROCEDURE: **Rwy 6**, climb direct IGN VORTAC, then via IGN R-070 to 2000 before proceeding on course. **Rwy 15**, climb to 600 then climbing left turn to 1000 direct IGN VORTAC before proceeding on course. **Rwy 24**, climb to 2000 via IGN R-250 before proceeding on course. **Rwy 33**, climb to 600 the climbing right turn to 1000 direct IGN VORTAC before proceeding on course.

PROVIDENCE, RI
THEODORE FRANCIS GREEN STATE
TAKE-OFF MINIMUMS: **Rwys 5L, 34**, 300-1 or std. with min. climb of 400' per NM to 300'.

SCHENECTADY, NY
SCHENECTADY COUNTY
TAKE-OFF MINIMUMS: **Rwy 4**, 300-1 or std. with min. climb of 250' per NM to 600.
Rwy 28, 1200-2 or std. with min. climb of 250' per NM to 1500.

SPRINGFIELD, VT
HARTNESS STATE (SPRINGFIELD)
TAKE-OFF MINIMUMS: **Rwys 5, 11, 29**, Categories A, B aircraft 800-1, Categories C, D aircraft 1000-2. **Rwy 23**, Categories A, B aircraft, 800-1. Categories C, D 1000-2 or all Categories std. with 325' per NM climb to 1500.
DEPARTURE PROCEDURE: **Rwys 5, 11, 23, 29**, climb visually over airport to 1300, then climb direct to SXD NDB, crossing the NDB at 2200 or above, continue climb in holding pattern to MEA. **Rwy 23 only**: With min. climb of 325' per NM to 1500 climb direct to SXD NDB, cross the NDB at 2200 or above and climb in holding pattern to MEA.

TETERBORO, NJ
TETERBORO
TAKE-OFF MINIMUMS: **Rwy 6**, 300-1 or std. with min. climb of 200' per NM to 1500. **Rwy 24**, 300-1. **Rwy 1**, 700-1. **Rwy 19**, 500-1.
DEPARTURE PROCEDURE: **Rwy 1**, turn right. **Rwy 6**, turn left. Climb on 040 heading to 1500 then climbing left turn heading 300 before proceeding as directed. **Rwy 19**, climb runway heading to 800 then climbing right turn heading 300 before proceeding as directed. **Rwy 24**, climb runway heading to 1500 before proceeding on course.

WHITE PLAINS, NY
WESTCHESTER COUNTY
TAKE-OFF MINIMUMS: **Rwys 11, 29**, 900-1.
Rwy 16, 300-1 or std. with min. climb of 273' per NM to 600.

WILLIMANTIC, CT
WINDHAM
TAKE-OFF MINIMUMS: **Rwys 18, 27, 36**, 300-1.
Rwy 9, 700-1.
DEPARTURE PROCEDURE: **Rwy 18**, climb runway heading to 1000' before turning westbound. **Rwy 27**, climb runway heading to 1000 before turning southbound.

WINDSOR LOCKS, CT
BRADLEY INTL
TAKE-OFF MINIMUMS: **Rwy 15**, 300-1 or std. with a min. climb of 360' per NM to 300. **Rwy 33**, 700-1 or std. with a min. climb of 300' per NM to 1000.
DEPARTURE PROCEDURE: **Rwy 1**, climb to 1000 via runway heading before turning westbound.

WORCESTER, MA
WORCESTER MUNI
TAKE-OFF MINIMUMS: **Rwy 29**, 300-1 or std. with min. climb of 240' per NM to 1400. **Rwy 33**, 700-1.
DEPARTURE PROCEDURE: **Rwy 29**, climb runway heading to 1400 before turning.

RATE OF CLIMB TABLE

A rate of climb table is provided for use in planning and executing takeoff procedures under known or approximate ground speed conditions.

(ft. per min.)

REQUIRED CLIMB RATE (ft. per NM)	GROUND SPEED (KNOTS)						
	30	60	80	90	100	120	140
200	100	200	267	300	333	400	467
250	125	250	333	375	417	500	583
300	150	300	400	450	500	600	700
350	175	350	467	525	583	700	816
400	200	400	533	600	667	800	933
450	225	450	600	675	750	900	1050
500	250	500	667	750	833	1000	1167
550	275	550	733	825	917	1100	1283
600	300	600	800	900	1000	1200	1400
650	325	650	867	975	1083	1300	1516
700	350	700	933	1050	1167	1400	1633

REQUIRED CLIMB RATE (ft. per NM)	GROUND SPEED (KNOTS)					
	150	180	210	240	270	300
200	500	600	700	800	900	1000
250	625	750	875	1000	1125	1250
300	750	900	1050	1200	1350	1500
350	875	1050	1225	1400	1575	1750
400	1000	1200	1400	1600	1700	2000
450	1125	1350	1575	1800	2025	2250
500	1250	1500	1750	2000	2250	2500
550	1375	1650	1925	2200	2475	2750
600	1500	1800	2100	2400	2700	3000
650	1625	1950	2275	2600	2925	3250
700	1750	2100	2450	2800	3150	3500

DESCENT TABLE

RATE OF DESCENT TABLE

A rate of descent table is provided for use in planning and executing precision descents under known or approximate ground speed conditions. It will be especially useful for approaches when the localizer only is used for course guidance. A best speed, power, altitude combination can be programmed which will result in a stable glide rate and altitude favorable for executing a landing if minimums exist upon breakout. Care should always be exercised so that the minimum descent altitude and missed approach point are not exceeded.

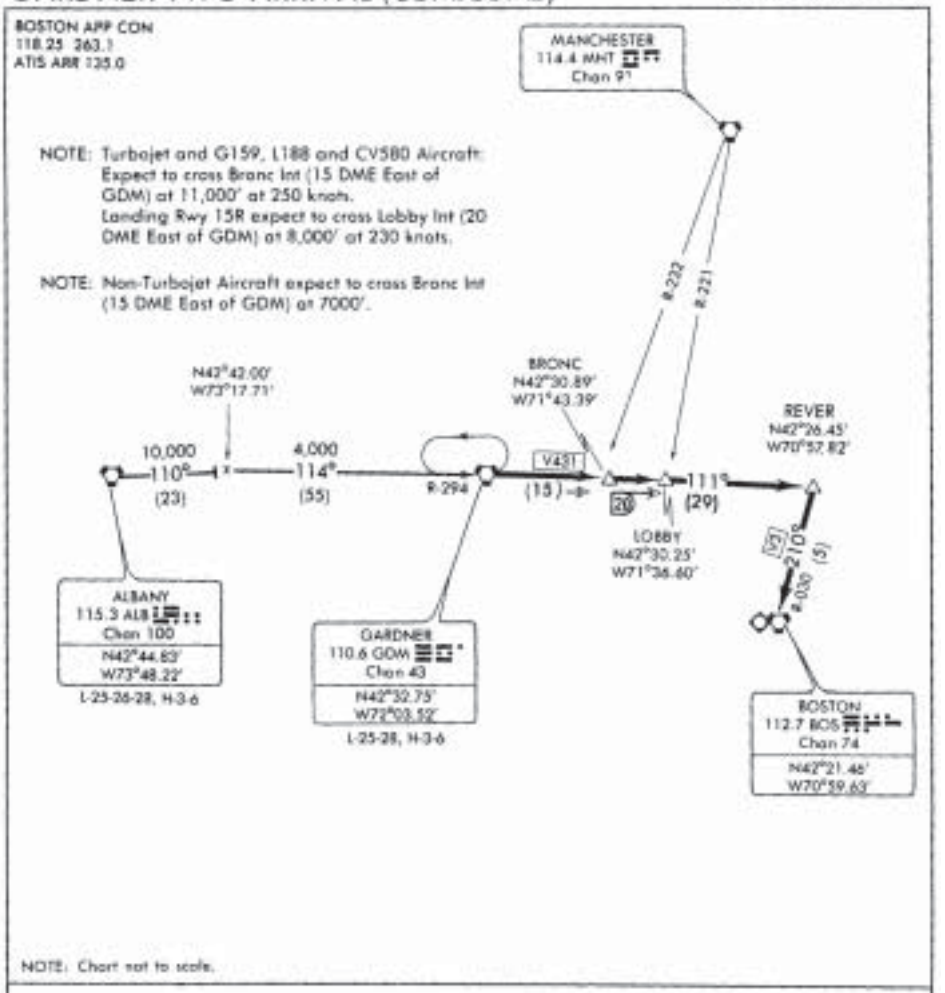
(ft. per min.)

ANGLE OF DESCENT (degrees and tenths)	GROUND SPEED (knots)										
	30	45	60	75	90	105	120	135	150	165	180
2.0	105	160	210	265	320	370	425	475	530	585	635
2.5	130	200	265	330	395	465	530	595	665	730	795
3.0	160	240	320	395	480	555	635	715	795	875	955
3.5	185	280	370	465	555	650	740	835	925	1020	1110
4.0	210	315	425	530	635	740	845	955	1060	1165	1270
4.5	240	355	475	595	715	835	955	1075	1190	1310	1430
5.0	265	395	530	660	795	925	1060	1190	1325	1455	1590
5.5	290	435	580	730	875	1020	1165	1310	1455	1600	1745
6.0	315	475	635	795	955	1110	1270	1430	1590	1745	1950
6.5	345	515	690	860	1030	1205	1375	1550	1720	1890	2065
7.0	370	555	740	925	1110	1295	1480	1665	1850	2035	2220
7.5	395	595	795	990	1190	1390	1585	1785	1985	2180	2380
8.0	425	635	845	1055	1270	1480	1690	1905	2115	2325	2540
8.5	450	675	900	1120	1345	1570	1795	2020	2245	2470	2695
9.0	475	715	950	1190	1425	1665	1900	2140	2375	2615	2855
9.5	500	750	1005	1255	1505	1755	2005	2255	2510	2760	3010
10.0	530	790	1055	1320	1585	1845	2110	2375	2640	2900	3165
10.5	555	830	1105	1385	1660	1940	2215	2490	2770	3045	3320
11.0	580	870	1160	1450	1740	2030	2320	2610	2900	3190	3480
11.5	605	910	1210	1515	1820	2120	2425	2725	3030	3335	3635
12.0	630	945	1260	1575	1890	2205	2520	2835	3150	3465	3780

DESCENT TABLE

GENERAL EDWARD LAWRENCE LOGAN INTL
BOSTON, MASSACHUSETTS

GARDNER TWO ARRIVAL (GDM.GDM2)



NOTE: Chart not to scale.

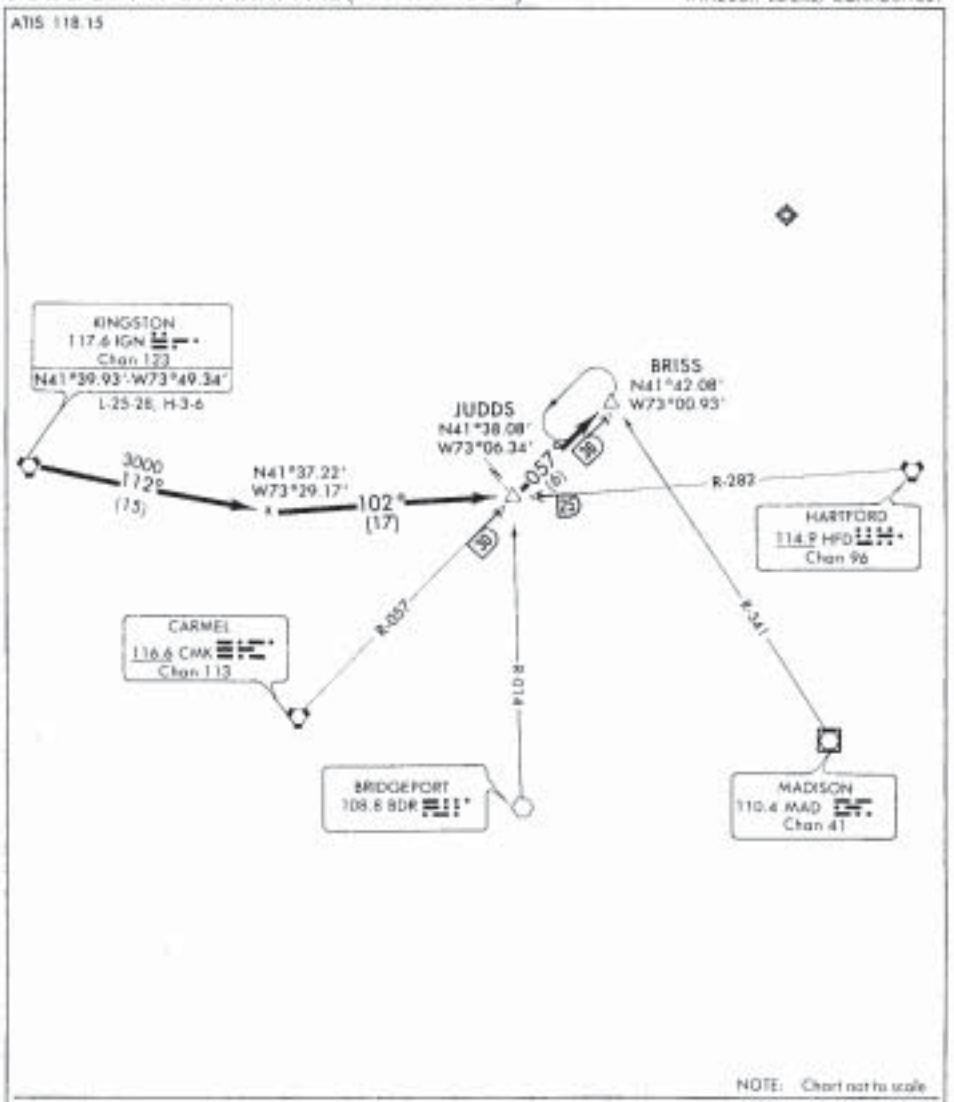
ALBANY TRANSITION (ALB.GDM2): From over ALB VORTAC via ALB R-110 and GDM R-294 to GDM VORTAC. Thence . . . .

. . . . From over GDM VORTAC via GDM R-111 (V431) to BOS R-030 (V3) to BOS VORTAC. Expect vectors to the final approach course.

GARDNER TWO ARRIVAL (GDM.GDM2)
BOSTON, MASSACHUSETTS
GENERAL EDWARD LAWRENCE LOGAN INTL

JUDDS TWO ARRIVAL (IGN.JUDDS2)

BRADLEY INTERNATIONAL
WINDSOR LOCKS, CONNECTICUT

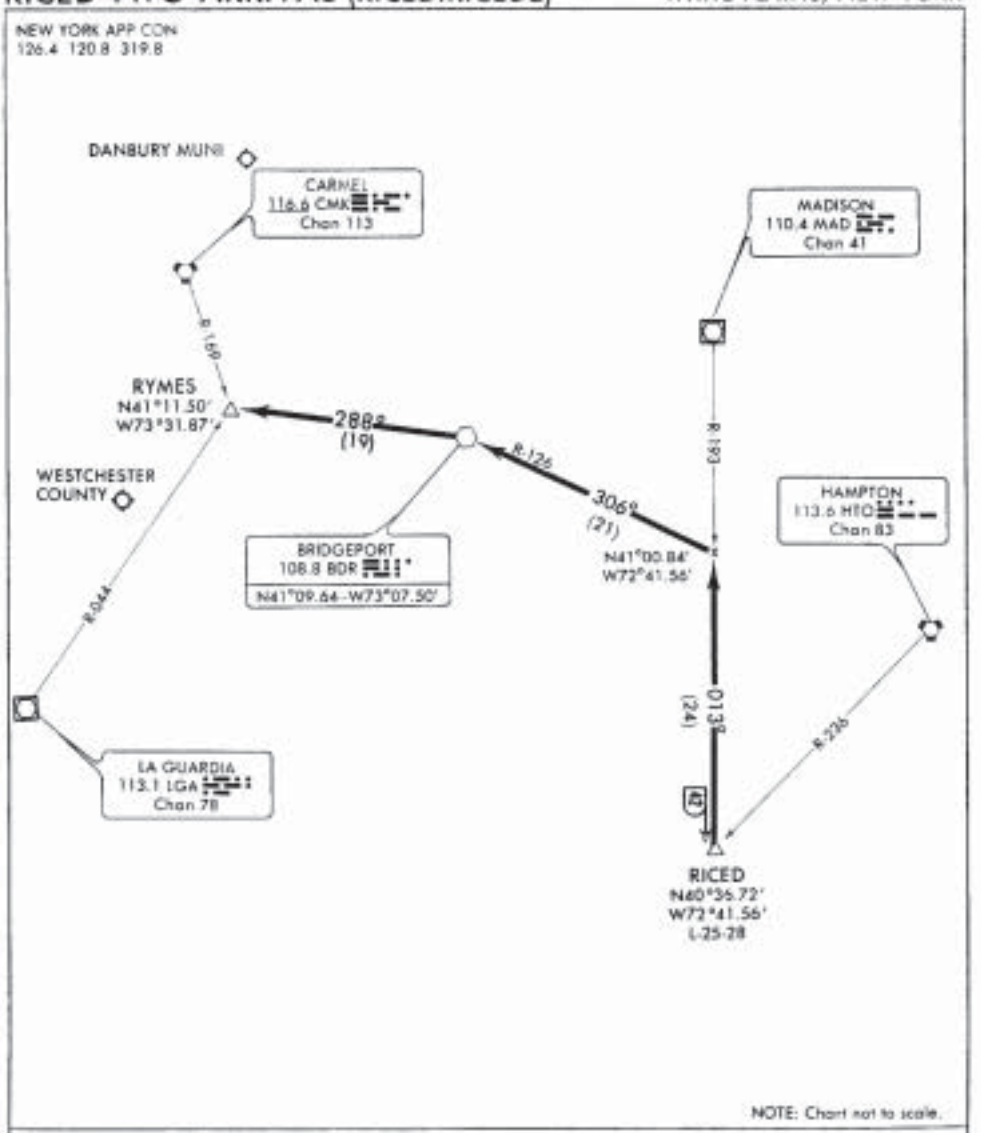


From over IGN VORTAC via R-112 and HFD R-282 to JUDDS INT; then via CMK R-057 to BRISS INT. Expect radar vectors to final approach course.

JUDDS TWO ARRIVAL (IGN.JUDDS2)

WINDSOR LOCKS, CONNECTICUT
BRADLEY INTERNATIONAL

RICED TWO ARRIVAL (RICED.RICED2) WHITE PLAINS, NEW YORK

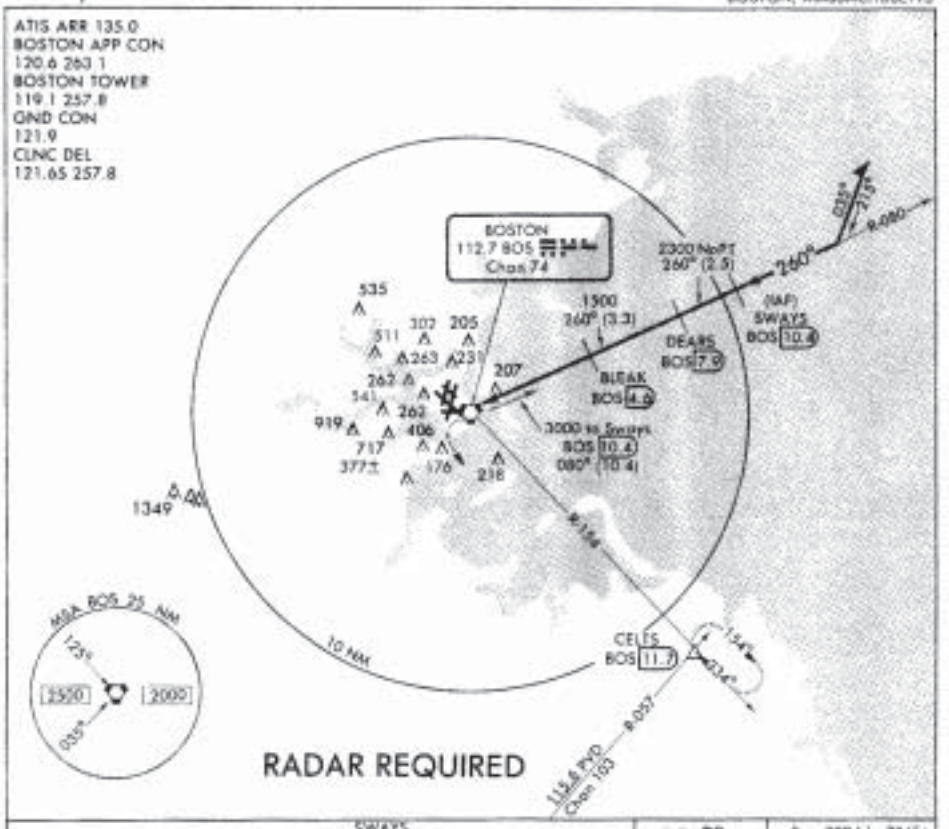


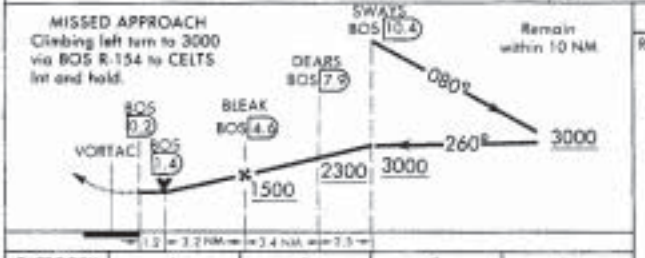
From over RICED INT via MAD R-193 to intercept BDR R-126 to BDR VOR; then via BDR R-288 to RYMES INT. Expect radar vectors to final approach in use.

RICED TWO ARRIVAL (RICED.RICED2) WHITE PLAINS, NEW YORK

VOR/DME RWY 27

BOSTON/GENERAL EDWARD LAWRENCE LOGAN INTL (BOS)
BOSTON, MASSACHUSETTS

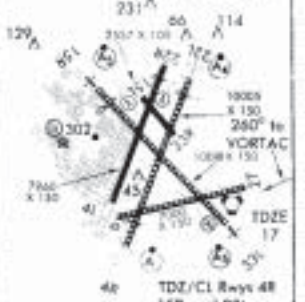




CATEGORY	A	B	C	D
S-27	460/50 443 (500-1)		460/60 443 (500-1¼)	460/1½ 443 (500-1½)
CIRCLING	620-1 600 (600-1)		620-1½ 600 (600-1½)	620-2 600 (600-2)

Cat C and D circling not authorized Rwy 4L clockwise to Rwy 15R.

ELEV 20
Rwy 22R ldg 7045'
Rwy 4R ldg 8850'
Rwy 22L ldg 8806'
Rwy 15R ldg 9201'



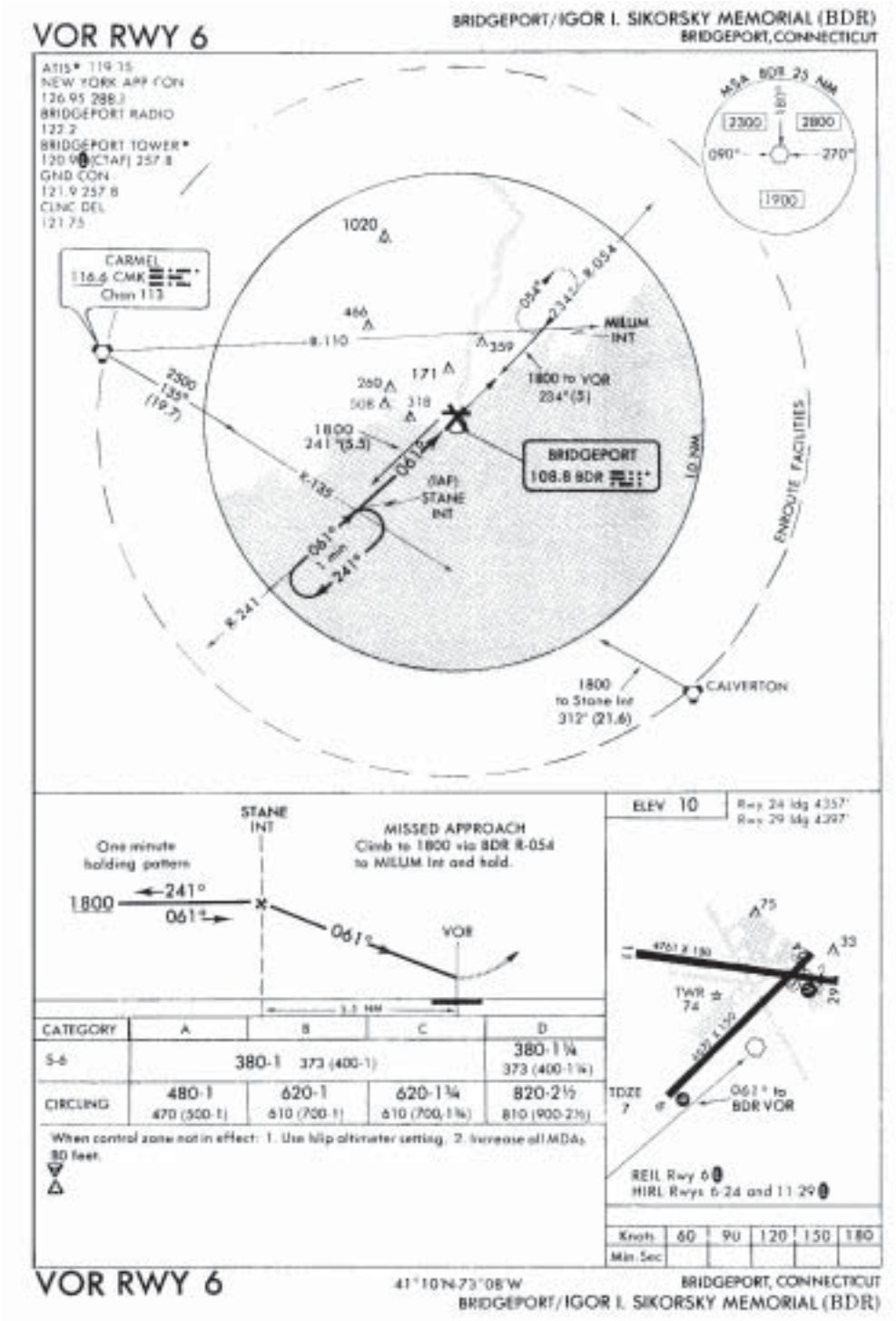
FAF to MAP 4.4 NM.

Knots	60	90	120	150	180
Min:Sec	4:24	2:56	2:12	1:46	1:28

VOR/DME RWY 27

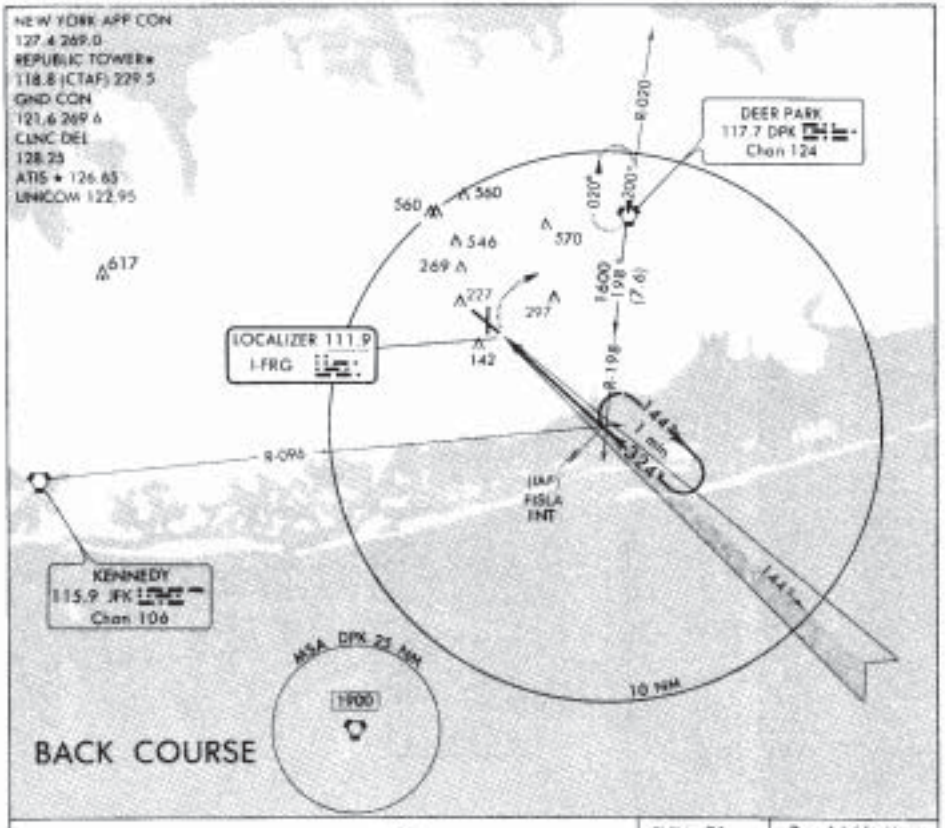
42°22'N–71°00'W

BOSTON, MASSACHUSETTS
BOSTON/GENERAL EDWARD LAWRENCE LOGAN INTL (BOS)

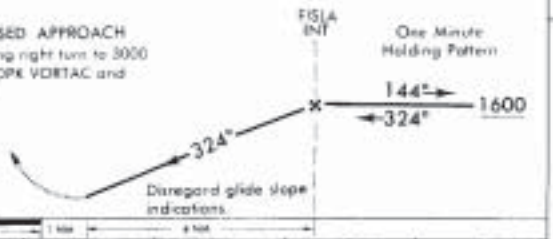

VOR RWY 6
BRIDGEPORT/IGOR I. SIKORSKY MEMORIAL (BDR)
BRIDGEPORT, CONNECTICUT
ATIS* 119.15
NEW YORK APP CON
126.95 288.3
BRIDGEPORT RADIO
122.2
BRIDGEPORT TOWER*
120.9 (CTAF) 257.8
GND CON
121.9 257.8
CLNC DEL
121.75
MSA BDR 25 NM
2300
2800
090°
270°
1900
CARMEL
116.6 CMK
Chan 113
1020
466
359
171
260
308
318
MILLM INT
BRIDGEPORT
108.8 BDR
(IAF) STANE INT
1800 to VOR
234° (5)
1800
241° (5.5)
061°
241°
1 min
R-135
R-241
10 NM
ENROUTE FACILITIES
1800
to Stane Int
312° (21.6)
CALVERTON
STANE INT
One minute holding pattern
1800
241°
061°
MISSED APPROACH
Climb to 1800 via BDR R-054
to MILLM Int and hold.
061°
VOR
3.3 NM
ELEV 10
Rwy 24 ldg 4357'
Rwy 29 ldg 4397'
TWR 74
TDZE 7
061° to BDR VOR
REIL Rwy 6
HIRL Rwys 6-24 and 11-29
CATEGORY
A
B
C
D
S-6
380-1 373 (400-1)
380-1¼ 373 (400-1¼)
CIRCLING
480-1 470 (500-1)
620-1 610 (700-1)
620-1¼ 610 (700-1¼)
820-2½ 810 (900-2½)
When control zone not in effect: 1. Use blip altimeter setting. 2. Increase all MDAs 80 feet.
Knots 60 90 120 150 180
Min:Sec
VOR RWY 6
41°10'N-73°08'W
BRIDGEPORT, CONNECTICUT
BRIDGEPORT/IGOR I. SIKORSKY MEMORIAL (BDR)

LOC BC RWY 32

FARMINGDALE/REPUBLIC (FRG)
FARMINGDALE, NEW YORK



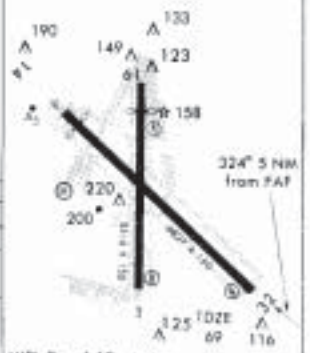
MISSED APPROACH
Climbing right turn to 3000 direct DPK VORTAC and hold.



CATEGORY	A	B	C	D
S-32	400-1¼ 331 (400-1¼)			
CIRCLING	540-1¼ 459 (500-1¼)	600-1¼ 519 (600-1¼)	600-1½ 519 (600-1½)	640-2 559 (600-2)

Back course unusable inbound from 1 mile to threshold.
When control zone not in effect: 1. Use John F. Kennedy Intl altimeter setting. 2. Increase all MDAs 60 feet. 3. Alternate minimums not authorized.

ELEV 81
Rwy 14 ldg 6167'
Rwy 19 ldg 4727'



FAF to MAP 4 NM.					
Knots	60	90	120	150	180
Min:Sec	4:00	2:40	2:00	1:36	1:20

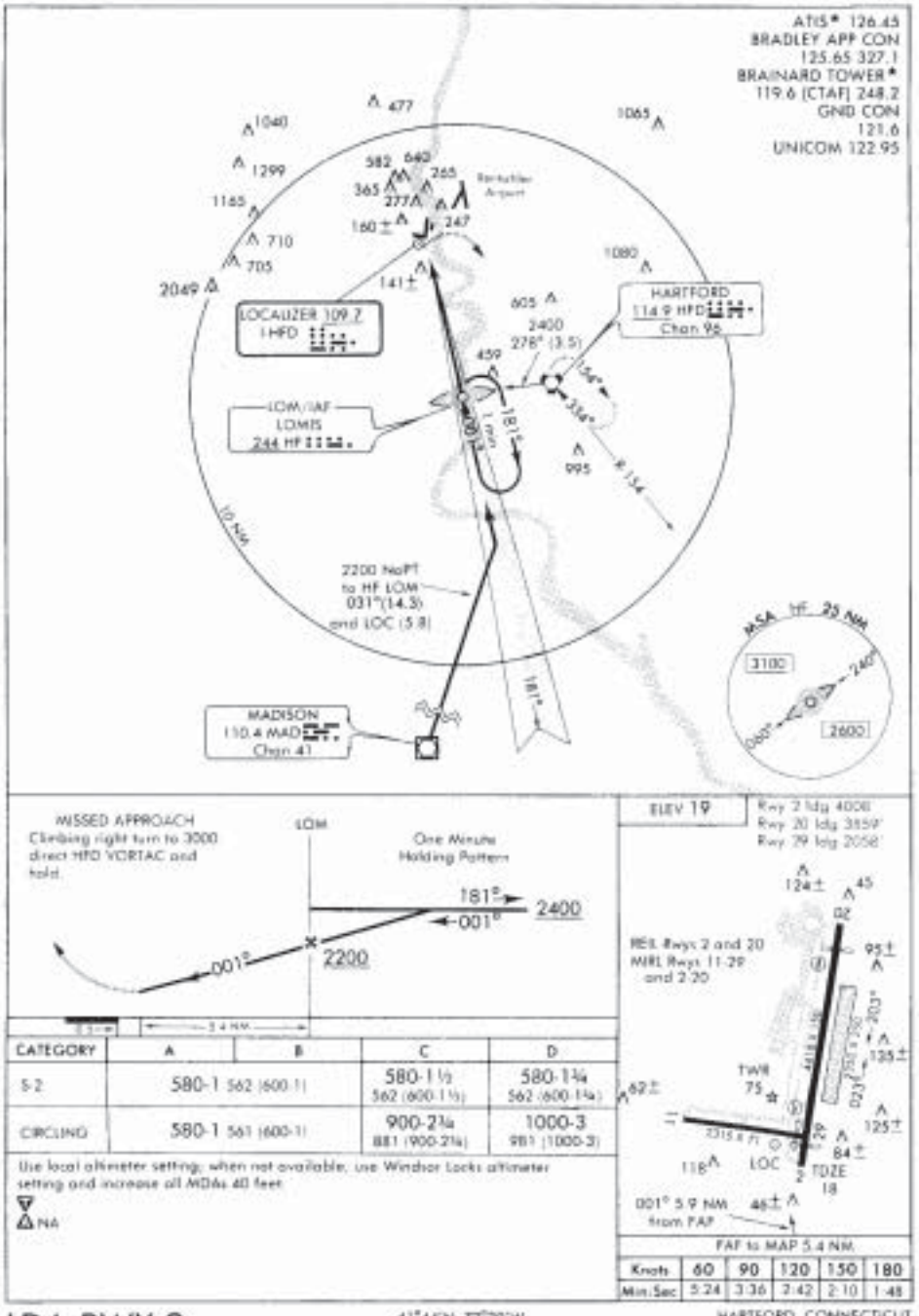
LOC BC RWY 32

40°44'N-73°25'W

FARMINGDALE, NEW YORK
FARMINGDALE/REPUBLIC (FRG)

LDA RWY 2

HARTFORD-BRAINARD (HFD)
HARTFORD, CONNECTICUT



CATEGORY	A	B	C	D
S-2	580-1 562 (600-1)		580-1½ 562 (600-1½)	580-1¾ 562 (600-1¾)
CIRCLING	580-1 561 (600-1)		900-2¾ 881 (900-2¾)	1000-3 981 (1000-3)

Use local altimeter setting; when not available, use Windsor Locks altimeter setting and increase all MDAs 40 feet.

NA

Knots	60	90	120	150	180
Min:Sec	5:24	3:36	2:42	2:10	1:48

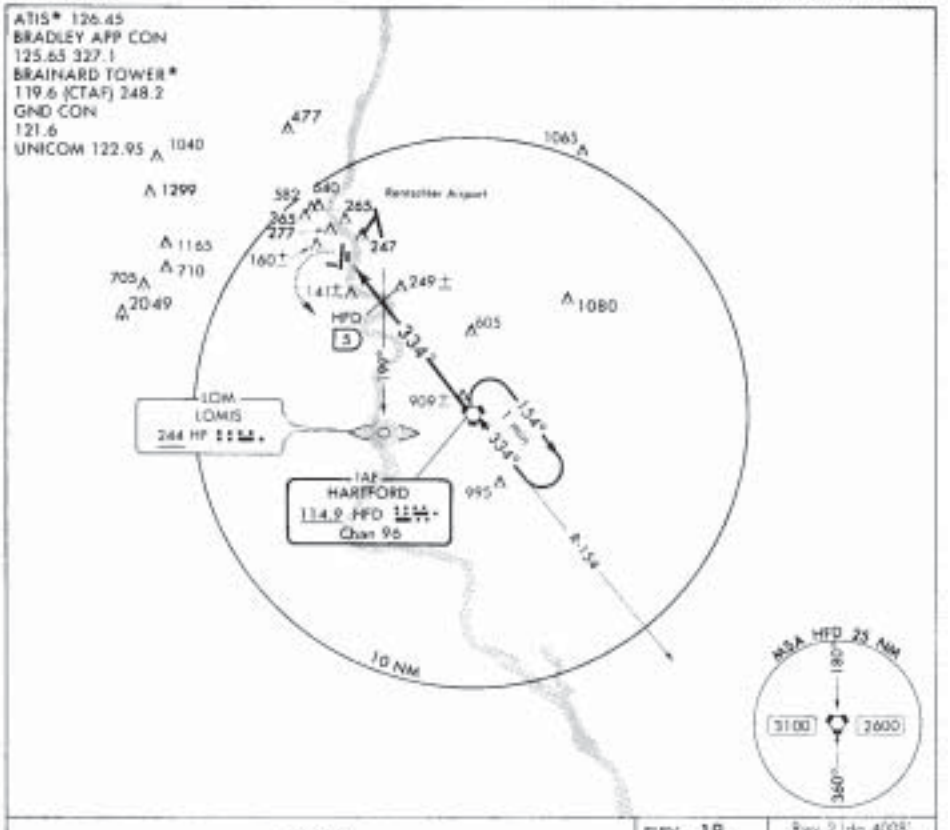
LDA RWY 2

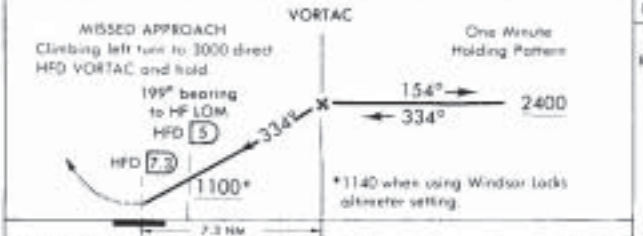
41°44'N-72°39'W

HARTFORD, CONNECTICUT
HARTFORD-BRAINARD (HFD)

VOR-A

HARTFORD-BRAINARD (HFD)
HARTFORD, CONNECTICUT





CATEGORY	A	B	C	D
CIRCLING	1100-1 ½ 1081 (1100-1 ½)	1100-1 ½ 1081 (1100-1 ½)	1100-3 1081 (1100-3)	
LOM or OME MINIMUMS				
CIRCLING	620-1 601 (700-1)		900-2 ¾ 881 (900-2 ¾)	1000-3 981 (1000-3)

Use local altimeter setting; when not available, use Windsor Locks altimeter setting and increase all MDAs 40 feet.

▽
△ NA

ELEV 19

Rwy 21 dg 4008'
Rwy 20 ldg 3859'
Rwy 29 ldg 3058'

REIL Rwys 2 and 20

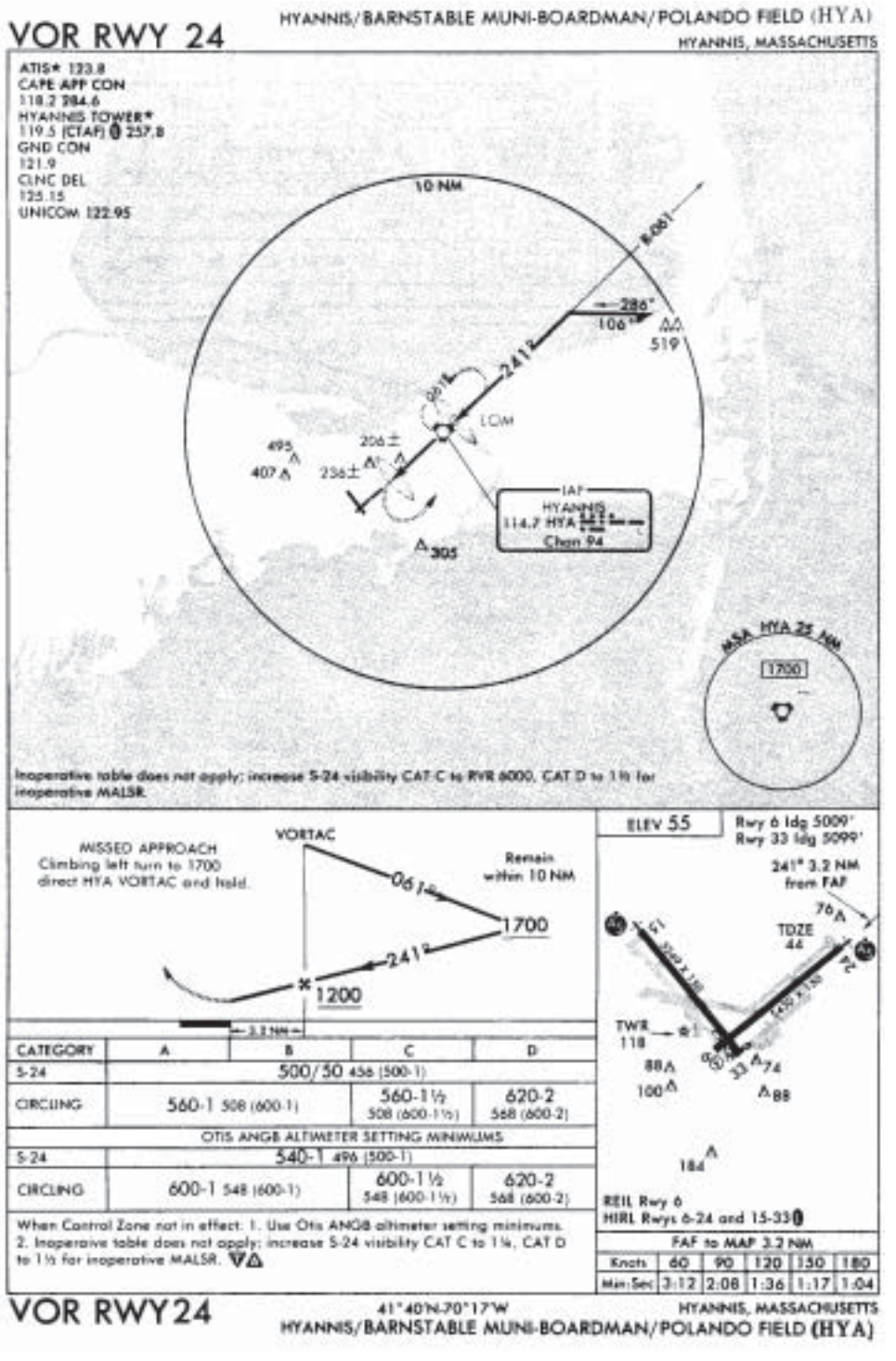
MIRL Rwys 11-29 and 2-20

FAF to MAP 7.3 NM					
Knots	60	90	120	150	180
Min-Sec	7:18	4:52	3:39	2:55	2:26

VOR-A

41° 44'N-72° 39'W

HARTFORD, CONNECTICUT
HARTFORD-BRAINARD (HFD)

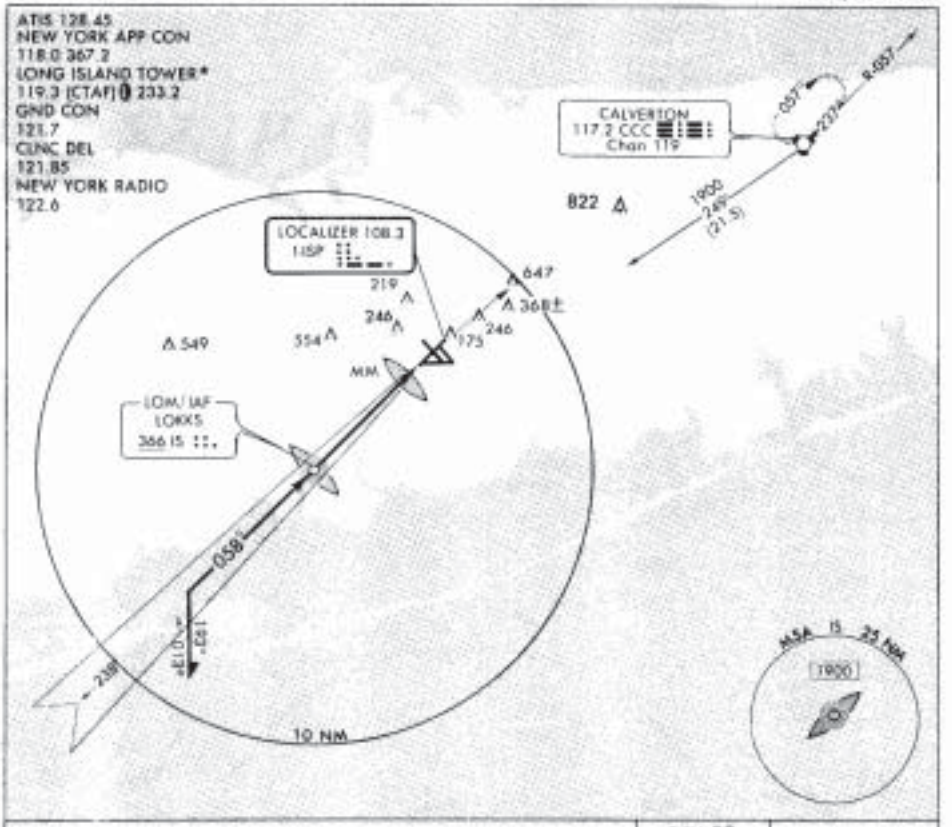


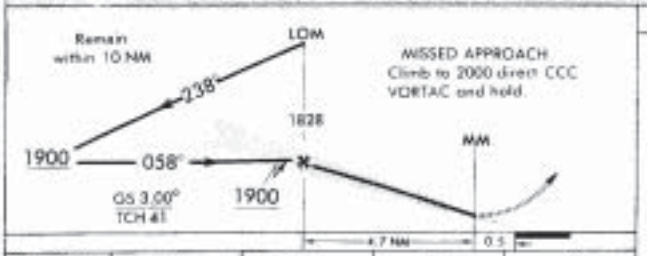
CATEGORY	A	B	C	D
S-24	500/50 456 (500-1)			
CIRCLING	560-1 508 (600-1)		560-1½ 508 (600-1½)	620-2 568 (600-2)
OTIS ANGB ALTIMETER SETTING MINIMUMS				
S-24	540-1 496 (500-1)			
CIRCLING	600-1 548 (600-1)		600-1½ 548 (600-1½)	620-2 568 (600-2)

When Control Zone not in effect: 1. Use Otis ANGB altimeter setting minimums. 2. Inoperative table does not apply; increase S-24 visibility CAT C to 1¼, CAT D to 1½ for inoperative MALSR. ▽△

ILS RWY 6

ISLIP/LONG ISLAND MAC ARTHUR (ISP)
ISLIP, NEW YORK





CATEGORY	A	B	C	D
S-ILS 6	293-½ 200 (200-½)			
S-LOC 6	420-½ 327 (400-½)			420-¾ 327 (400-¾)
CIRCLING	580-1 481 (500-1)		580-1½ 481 (500-1½)	660-2 561 (600-2)

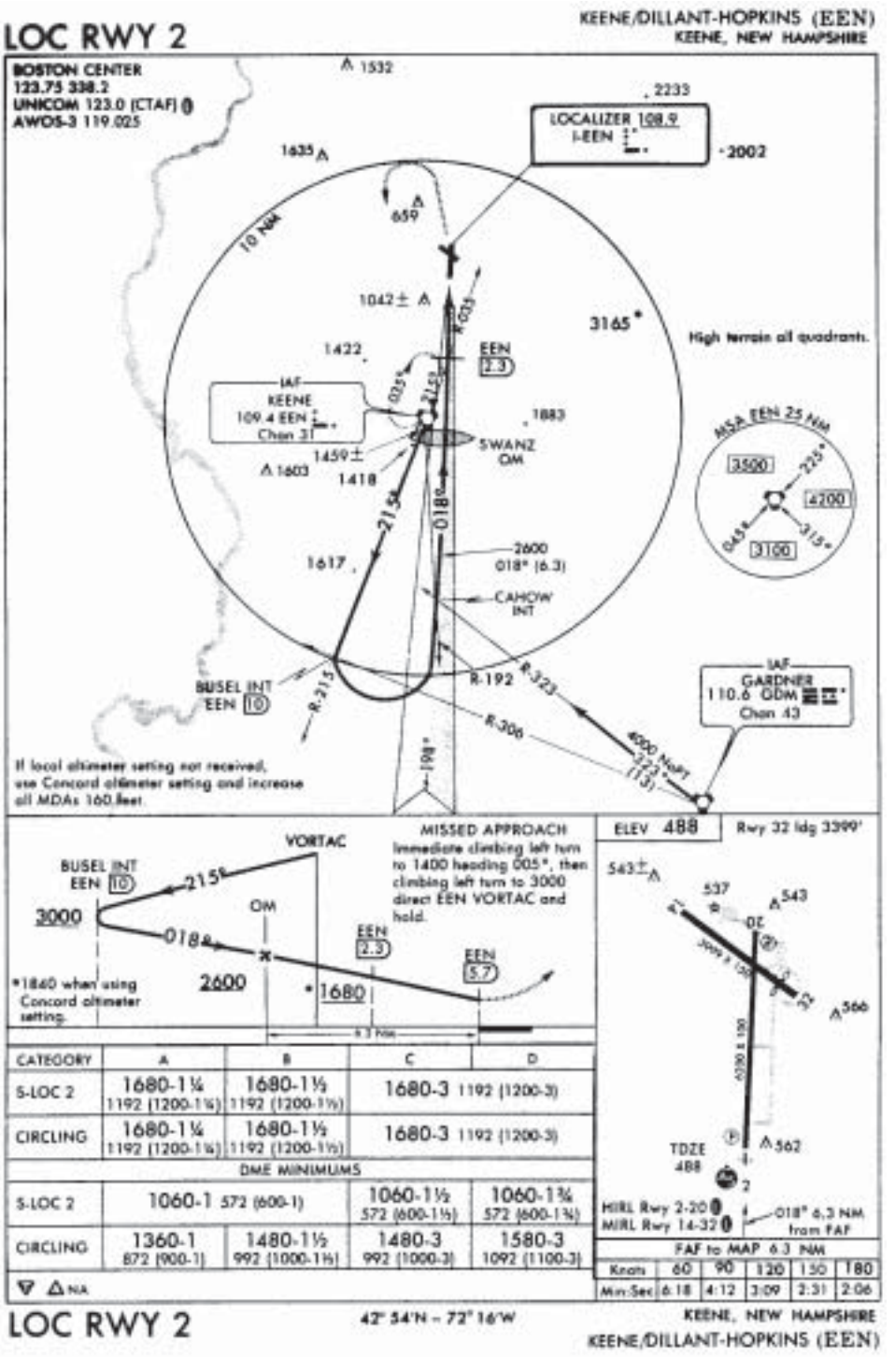
Cat. D S-LOC 6 visibility increased ¼ mile for inoperative MALSR.

FAF to MAP 5.2 NM					
Knots	60	90	120	150	180
Min:Sec	5:12	3:28	2:36	2:05	1:44

ILS RWY 6

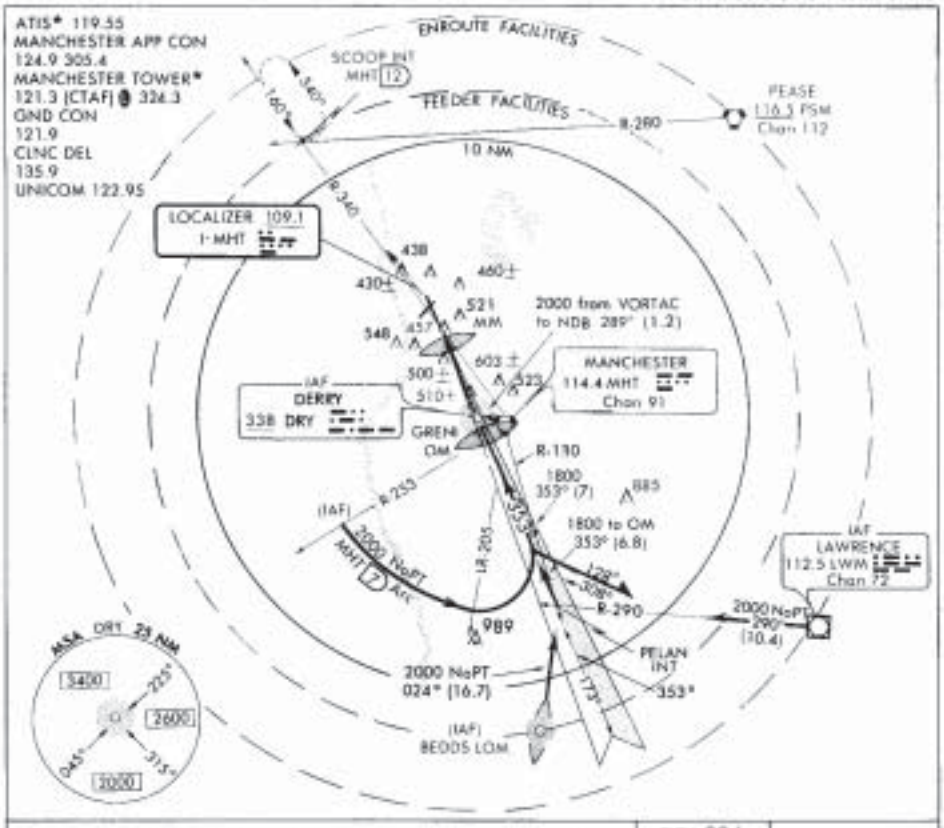
40°48'N-73°06'W

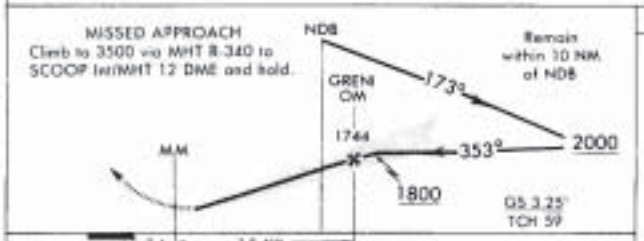
ISLIP, NEW YORK
ISLIP/LONG ISLAND MAC ARTHUR (ISP)

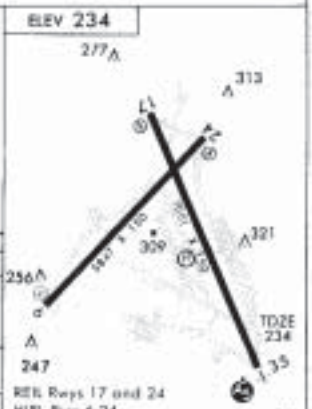

LOC RWY 2
KEENE/DILLANT-HOPKINS (EEN)
KEENE, NEW HAMPSHIRE
BOSTON CENTER
123.75 338.2
UNICOM 123.0 (CTAF)
AWOS-3 119.025
LOCALIZER 108.9
I-EEN
10 NM
1042±
3165°
High terrain all quadrants.
1422
EEN
2.3
IAF
KEENE
109.4 EEN
Chan 37
1459±
1603
1418
SWANZ
OM
1883
2600
018° (6.3)
CAHOW
INT
1617
MSA EEN 25 NM
3500
4200
3100
225°
315°
045°
BUSEL INT
EEN 10
R-215
R-192
R-323
R-306
IAF
GARDNER
110.6 GDM
Chan 43
4000 MaPT
(113)
If local altimeter setting not received,
use Concord altimeter setting and increase
all MDAs 160 feet.
VORTAC
BUSEL INT
EEN 10
215°
018°
3000
OM
EEN
2.3
EEN
5.7
2600
*1680
*1840 when using
Concord altimeter
setting.
MISSED APPROACH
Immediate climbing left turn
to 1400 heading 005°, then
climbing left turn to 3000
direct EEN VORTAC and
hold.
ELEV 488
Rwy 32 ldg 3399'
543±
537
543
566
562
TDZE
488
HIRL Rwy 2-20
MIRL Rwy 14-32
018° 6.3 NM
from FAF
FAF to MAP 6.3 NM
Knots 60 90 120 150 180
Min:Sec 6:18 4:12 3:09 2:31 2:06
CATEGORY A B C D
S-LOC 2 1680-1¼ 1192 (1200-1¼) 1680-1½ 1192 (1200-1½) 1680-3 1192 (1200-3)
CIRCLING 1680-1¼ 1192 (1200-1¼) 1680-1½ 1192 (1200-1½) 1680-3 1192 (1200-3)
DME MINIMUMS
S-LOC 2 1060-1 572 (600-1) 1060-1½ 572 (600-1½) 1060-1¾ 572 (600-1¾)
CIRCLING 1360-1 872 (900-1) 1480-1½ 992 (1000-1½) 1480-3 992 (1000-3) 1580-3 1092 (1100-3)
▽ △ NA
LOC RWY 2
42° 54'N – 72° 16'W
KEENE, NEW HAMPSHIRE
KEENE/DILLANT-HOPKINS (EEN)

ILS RWY 35

MANCHESTER (MHT)
MANCHESTER, NEW HAMPSHIRE







CATEGORY	A	B	C	D
S- ILS 35	434-¼ 200 (200-½)			
S- LOC 35	760-¾ 526 (600-½)		760-1 526 (600-1)	760-1¼ 526 (600-1¼)
CIRCLING	840-1 606 (700-1)	860-1 626 (700-1)	860-1¼ 626 (700-1¼)	860-2 626 (700-2)

When control zone not in effect, use Concord altimeter setting and increase all DH/MDAs 60 feet.
S-ILS inoperative tables does not apply to MALSR.
S-LOC Cats A and B increase visibility ¼ mile for inoperative MALSR.

FAF to MAP 4.2 NM

Knots	60	90	120	150	180
Min:Sec	4:12	2:48	2:06	1:41	1:24

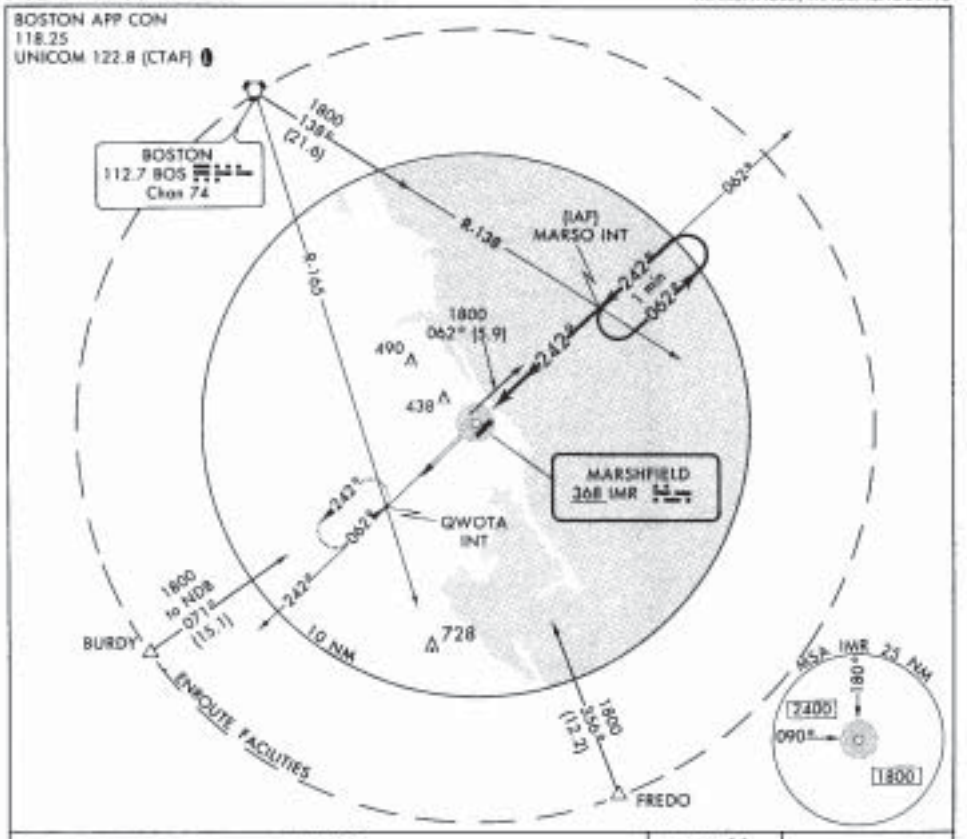
ILS RWY 35

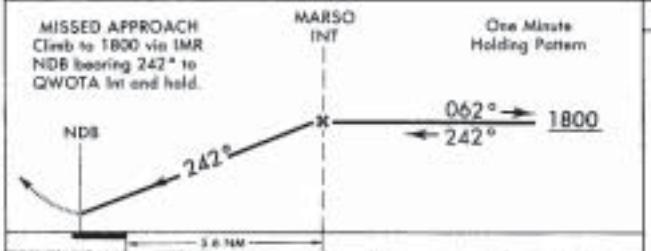
42°56'N – 71°26'W

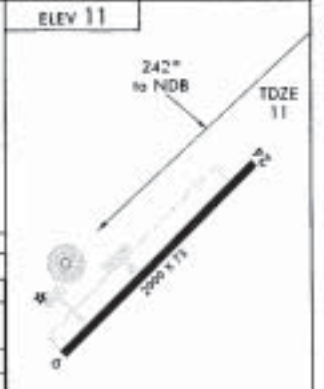
MANCHESTER, NEW HAMPSHIRE
MANCHESTER (MHT)

NDB RWY 24

MARSHFIELD (3B2)
MARSHFIELD, MASSACHUSETTS







CATEGORY	A	B	C	D
S-24	500-1 489 (500-1)		NA	
CIRCLING	500-1 489 (500-1)	580-1 569 (600-1)	NA	
BOSTON ALTIMETER SETTING MINIMUMS				
S-24	600-1 589 (600-1)		NA	
CIRCLING	600-1 589 (600-1)	660-1 649 (700-1)	NA	

Obtain local altimeter setting on CTAF; when not received, use Boston altimeter setting.

NA

REIL Rwy 6
MIRL Rwy 6-24

Knots	60	90	120	150	180
Min:Sec					

NDB RWY 24

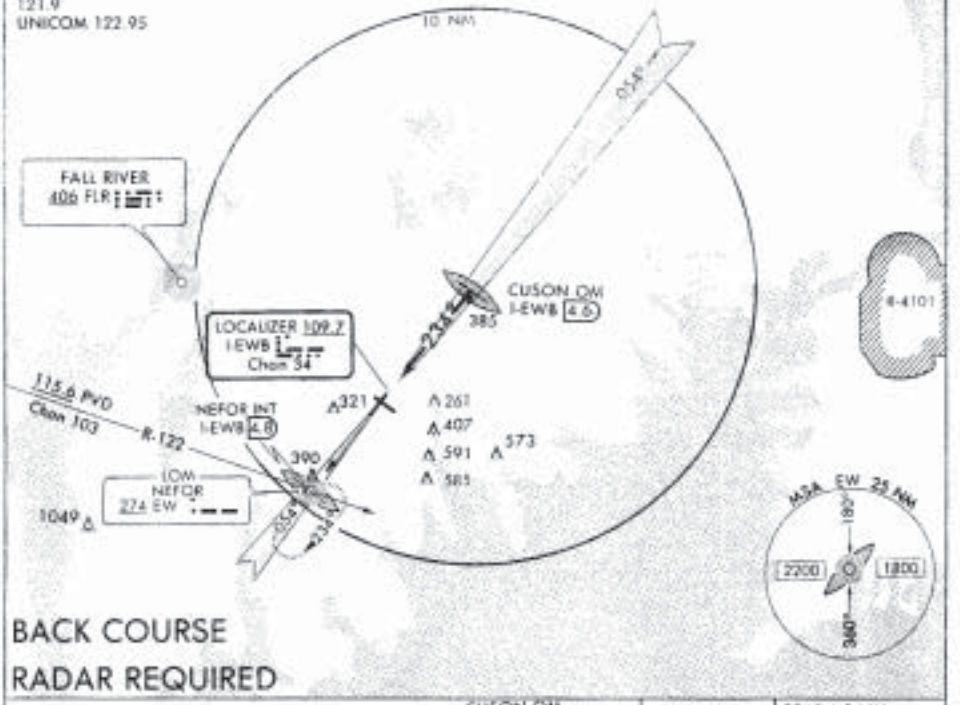
42°06'N-70°40'W

MARSHFIELD, MASSACHUSETTS
MARSHFIELD (3B2)

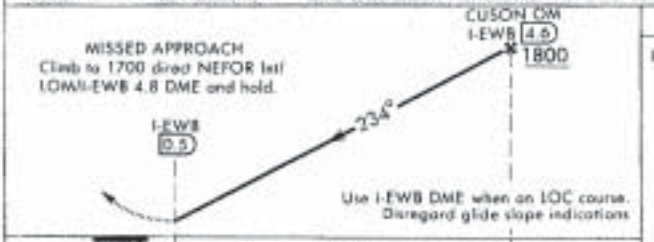
LOC BC RWY 23

NEW BEDFORD MUNI (EWB)
NEW BEDFORD, MASSACHUSETTS

ATIS* 126.85
PROVIDENCE APP CON
128.7 385.6
NEW BEDFORD TOWER*
118.1 (CTAF) 239.0
GND CON
121.9
UNICOM 122.95



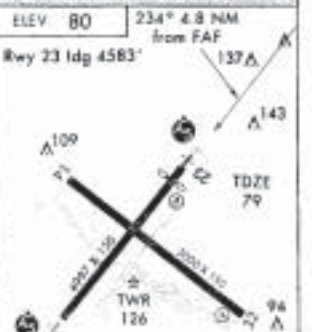
BACK COURSE
RADAR REQUIRED



CATEGORY	A	B	C	D
S-23	460-1 381 (400-1)			
CIRCLING	600-1 520 (600-1)		620-1½ 540 (600-1½)	640-2 560 (600-2)
PROVIDENCE ALTIMETER SETTING MINIMUMS				
S-23	560-1 481 (500-1)			
CIRCLING	700-1 620 (700-1)		720-1¾ 640 (700-1¾)	720-2 640 (700-2)

When local altimeter setting not received, use Providence altimeter setting minimums.
Inoperative table does not apply to CATS. A, B, and C.
For inoperative MALSR, increase S-23 CAT D visibility ¼ mile and Providence altimeter setting minimums S-23 CAT C visibility ¼ mile. ▽△

ELEV 80
234° 4.8 NM from FAF
Rwy 23 ldg 4583'



MIRL Rwy 14-32
HIRL Rwy 5-23
REIL Rwys 23 and 32

FAF to MAP 4.1 NM

Knots	60	90	120	150	180
Min:Sec	4:06	2:44	2:03	1:38	1:22

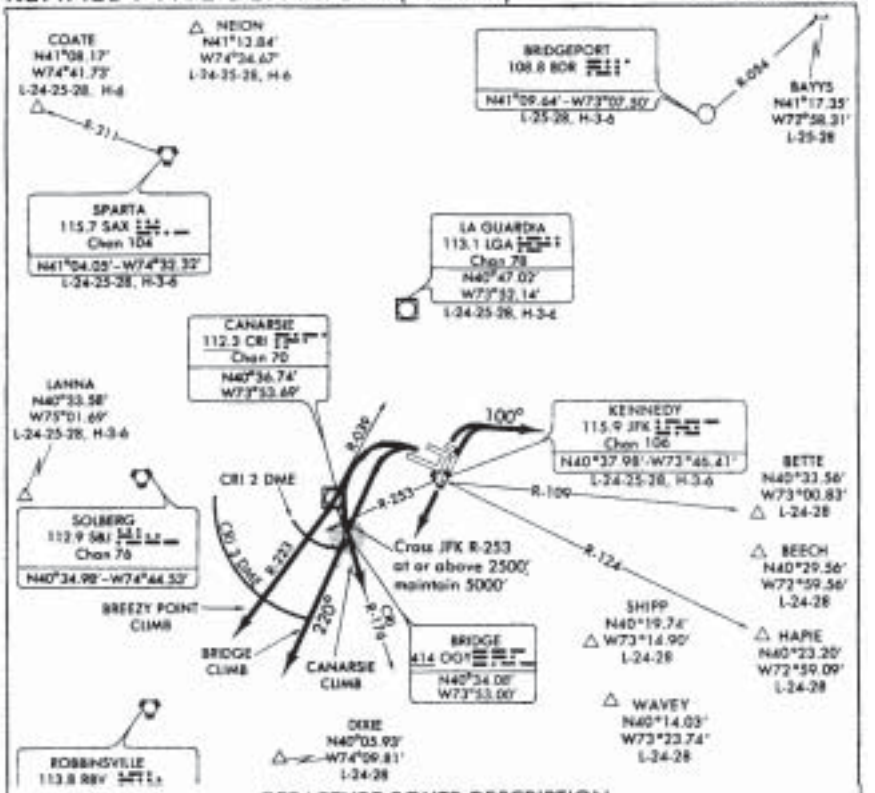
LOC BC RWY 23

41°41'N-70°57'W

NEW BEDFORD, MASSACHUSETTS
NEW BEDFORD MUNI (EWB)

KENNEDY FIVE DEPARTURE (VECTOR)

NEW YORK/JOHN F. KENNEDY INTL
NEW YORK, NEW YORK



DEPARTURE ROUTE DESCRIPTION
(Continued)

TAKE-OFF RUNWAYS 4L/R: Turn right climb on heading 100°, maintain 5,000 feet. Thence . . . .

TAKE-OFF RUNWAYS 13L/R: Climb on assigned departure heading, maintain 5,000 feet. Thence . . . .

TAKE-OFF RUNWAYS 22L/R: Climb on runway heading, maintain 5,000 feet. Thence . . . .

TAKE-OFF RUNWAYS 31L/R:

BREEZY POINT CLIMB: Turn left proceed direct CRI VOR/DME. Make turn east of CRI R-039 then via CRI R-223. Cross CRI 3 NM DME or JFK R-253 at or above 2,500 feet, maintain 5,000 feet. Thence . . . .

BRIDGE CLIMB: Turn left proceed direct OGY NDB, then fly heading 220° after OGY NDB. Make turn east of CRI R-039. Cross JFK R-253 at or above 2,500 feet, maintain 5,000 feet. Thence . . . .

CANARSIE CLIMB: Turn left proceed direct CRI VOR/DME. Make turn east of CRI R-039, then via CRI R-176. Cross CRI 2 NM DME or JFK R-253 at or above 2,500 feet, maintain 5,000 feet. Thence . . . .

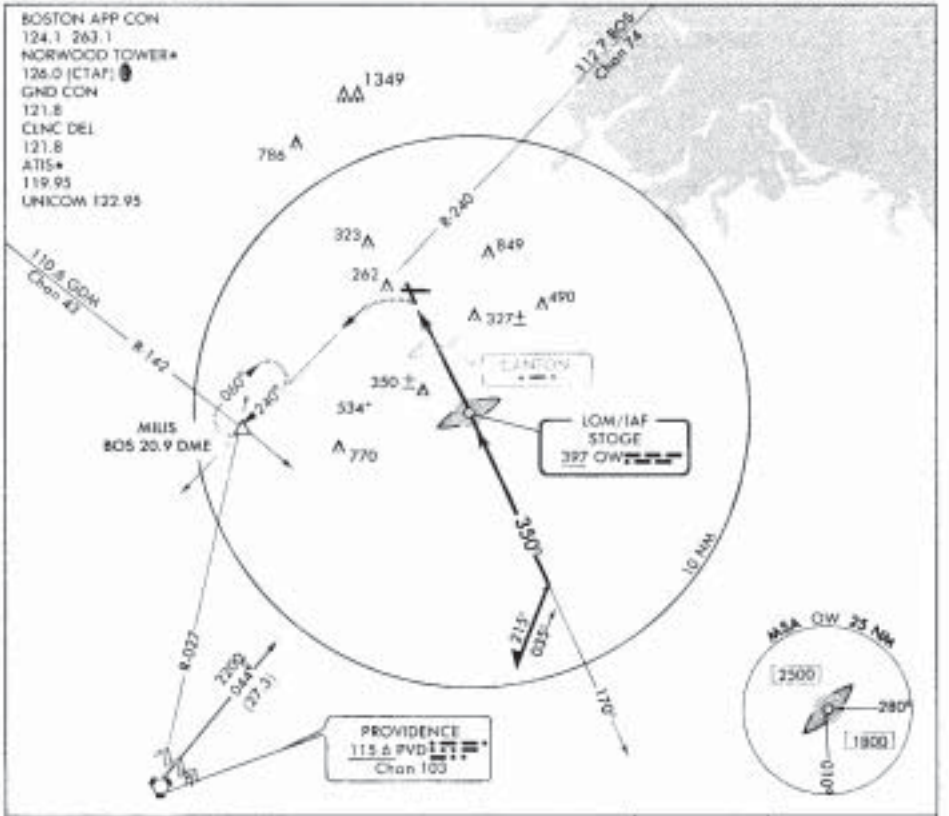
. . . . Via vectors to assigned route/fix. Expect clearance to filed altitude/flight level ten minutes after departure.

KENNEDY FIVE DEPARTURE (VECTOR)

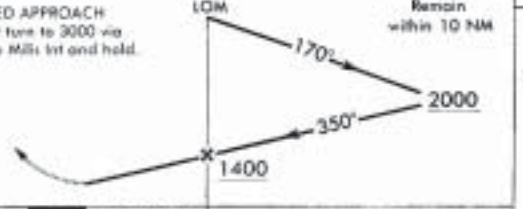
NEW YORK, NEW YORK
NEW YORK/JOHN F. KENNEDY INTL

NDB RWY 35

NORWOOD MEMORIAL (OWD)
NORWOOD, MASSACHUSETTS



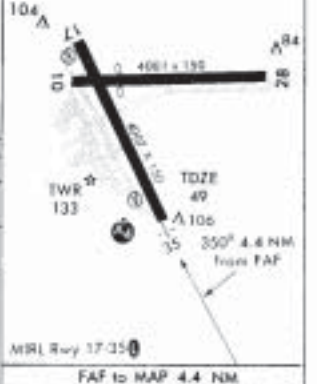
MISSED APPROACH
Climbing left turn to 3000 via BOS R-240 to Mills Int and hold.



CATEGORY	A	B	C	D
S-35	660-1 611 (700-1)		660-1¾ 611 (700-1¾)	660-2 611 (700-2)
CIRCLING	660-1 610 (700-1)	680-1 630 (700-1)	680-1¼ 630 (700-1¼)	760-2¼ 710 (800-2¼)

When control zone not in effect, use Boston altimeter setting and increase all MDAs 40 feet.
Inoperative table does not apply.

ELEV 50
Rwy 10 Idg 3014'



FAF to MAP 4.4 NM					
Knots	60	90	120	150	180
Min:Sec	4:24	2:56	2:12	1:46	1:28

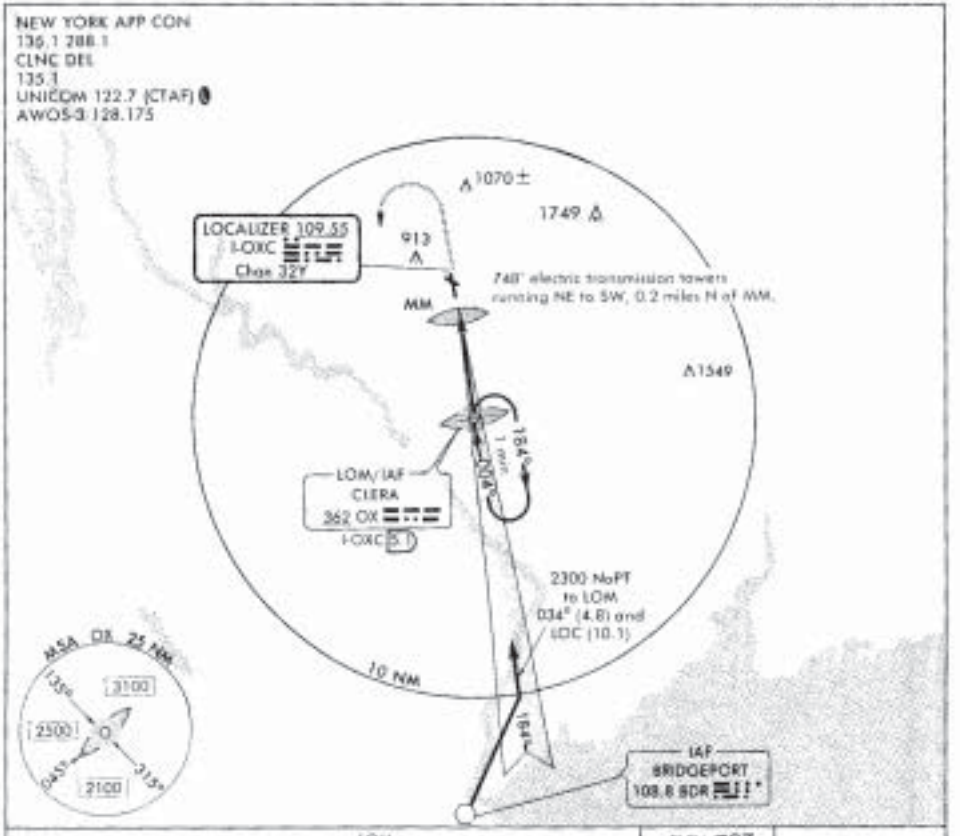
NDB RWY 35

42°11'N – 71°10'W

NORWOOD, MASSACHUSETTS
NORWOOD MEMORIAL (OWD)

ILS RWY 36

OXFORD/WATERBURY-OXFORD (OXC)
OXFORD, CONNECTICUT



CATEGORY	A	B	C	D
S-ILS 36	971-1 250 (300-1)			
S-LOC 36	1100-1 379 (400-1)			1100-1¾ 379 (400-1¾)
CIRCLING	1300-1 573 (600-1)		1300-1½ 573 (600-1½)	1320-2 593 (600-2)

When local altimeter not received, use White Plains altimeter setting and increase all DH/MDAs 160 feet.
Inoperative table does not apply to MM.
ADF required.
▽
△ NA

FAF to MAP 4.2 NM					
Knots	60	90	120	150	180
Min:Sec	4:12	2:48	2:06	1:41	1:24

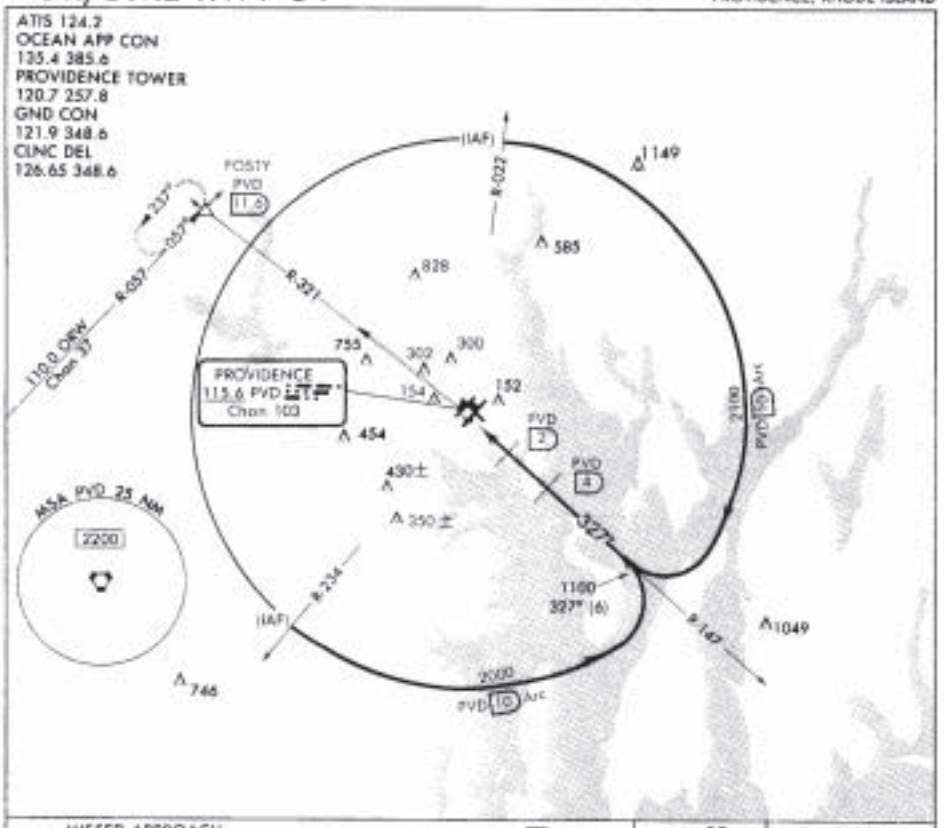
ILS RWY 36

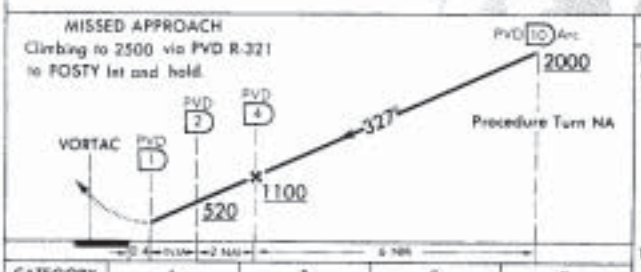
41°29'N – 73°08'W

OXFORD, CONNECTICUT
OXFORD/WATERBURY-OXFORD (OXC)

VOR/DME RWY 34

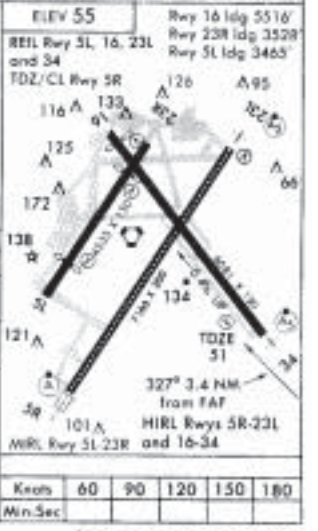
PROVIDENCE/THEODORE FRANCIS GREEN STATE (PVD)
PROVIDENCE, RHODE ISLAND





CATEGORY	A	B	C	D
S-34	420-¾ 369 (400-¾)			420-1 369 (400-1)
CIRCLING	620-1 564 (600-1)		620-1½ 564 (600-1½)	620-2 564 (600-2)

S-34 visibility increased ½ mile all categories for inoperative MALSR.



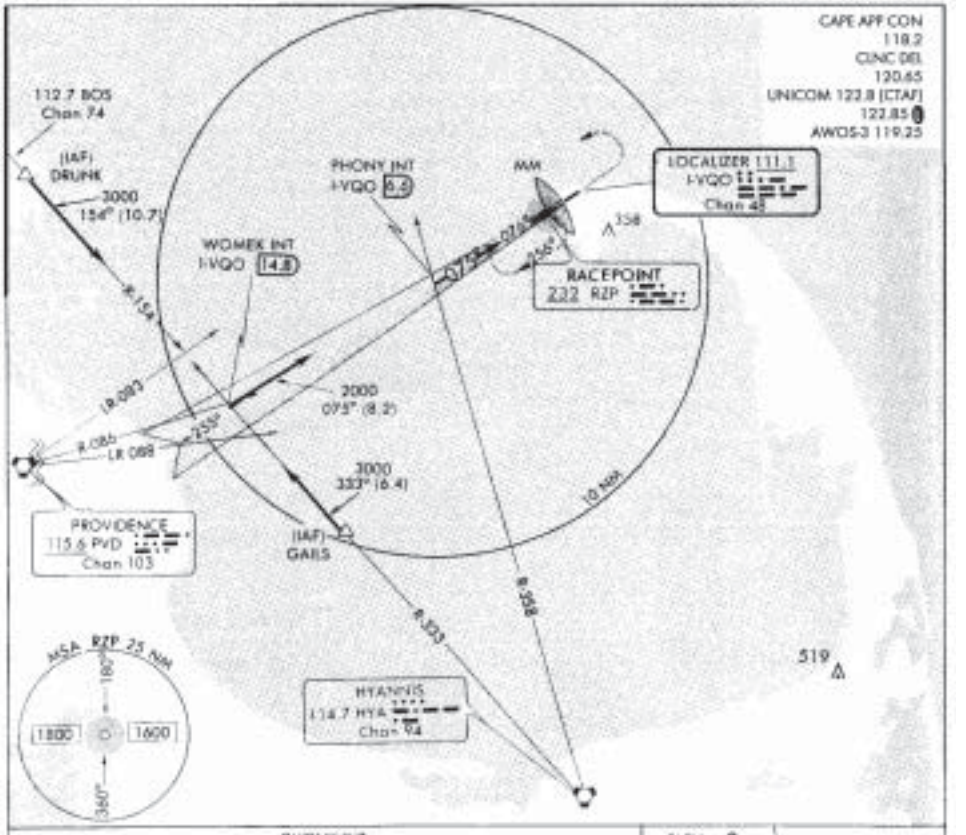
VOR/DME RWY 34

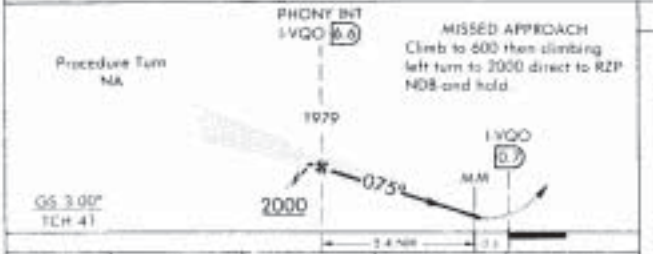
41°44'N-71°26'W

PROVIDENCE, RHODE ISLAND
PROVIDENCE/THEODORE FRANCIS GREEN STATE (PVD)

ILS RWY 7

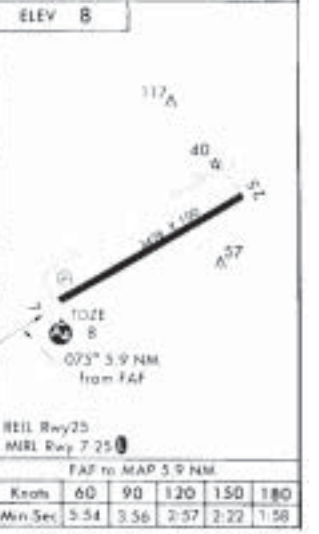
PROVINCETOWN MUNI (PVC)
PROVINCETOWN, MASSACHUSETTS





CATEGORY	A	B	C	D
S-ILS 7	208-½	200 (200-½)	NA	
S-LOC 7	340-¼	332 (400-¼)	NA	
CIRCLING	480-1	472 (500-1)	NA	

Radar/DME Required.
If local altimeter setting not received, use Otis ANGB altimeter setting and increase all DH/MDAs 120 feet.
ADF required.
△ NA

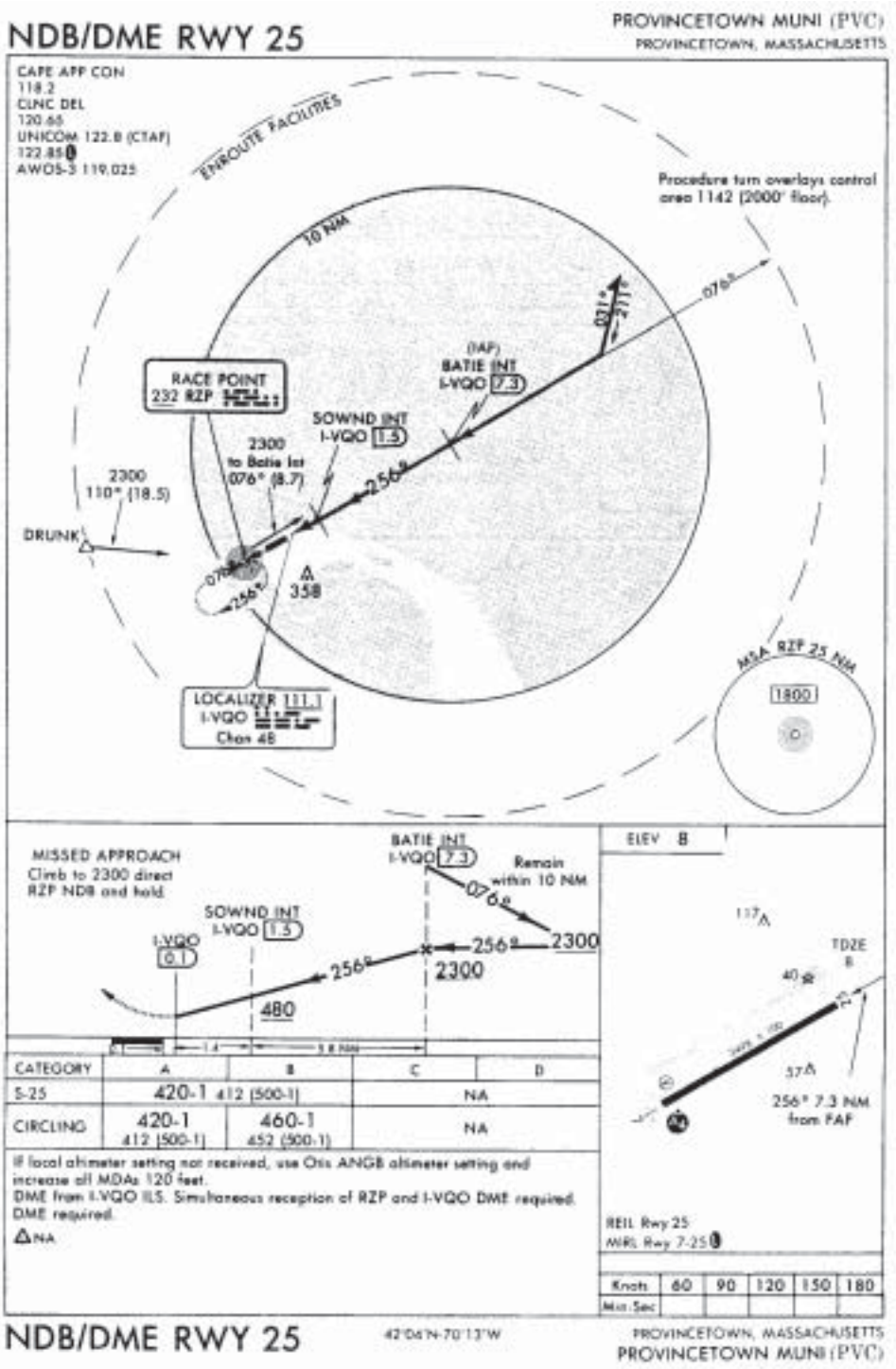


FAF to MAP 5.9 NM.					
Knots	60	90	120	150	180
Min:Sec	5:54	3:56	2:57	2:22	1:58

ILS RWY 7

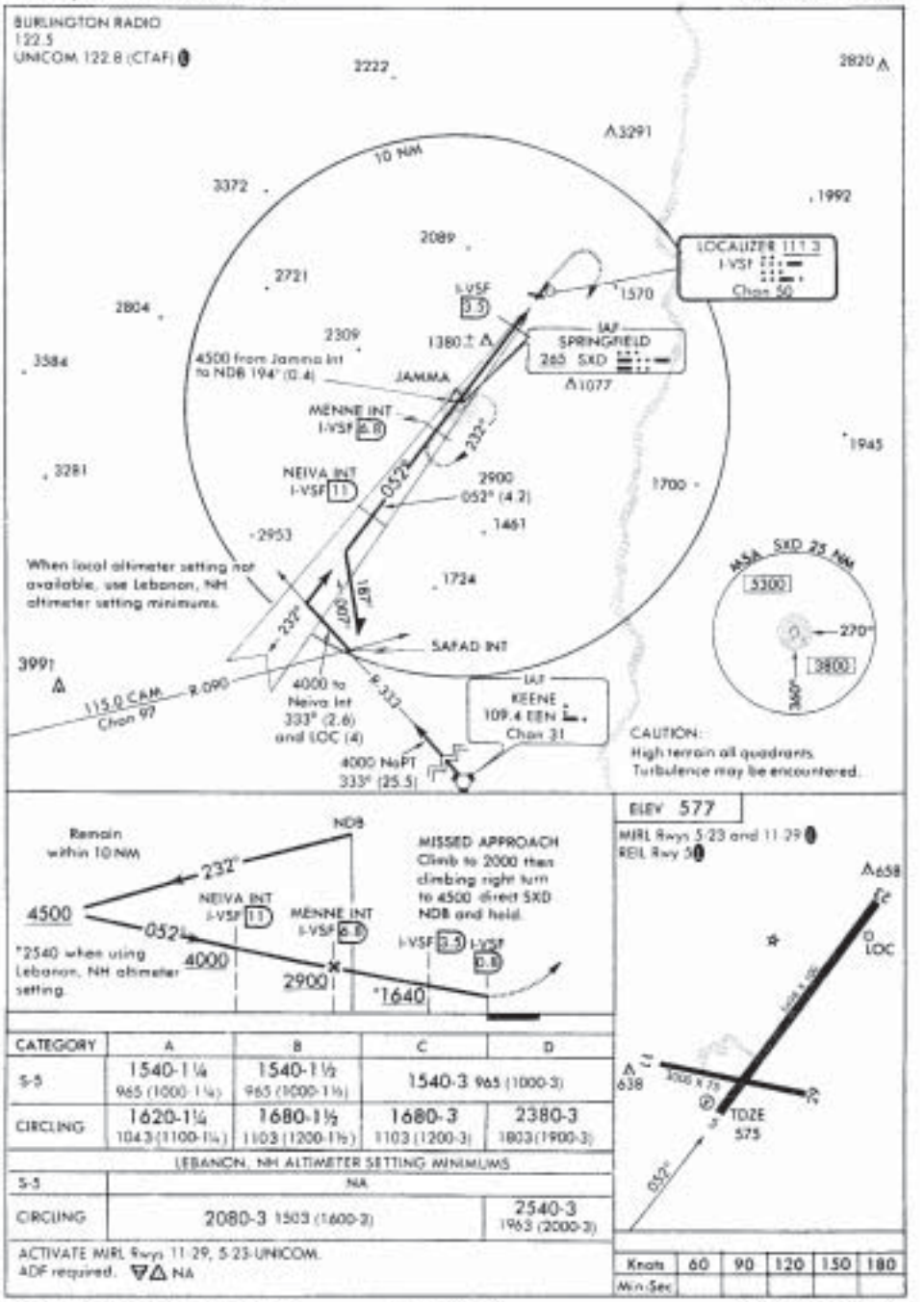
42°04'N-70°13'W

PROVINCETOWN, MASSACHUSETTS
PROVINCETOWN MUNI (PVC)


NDB/DME RWY 25
PROVINCETOWN MUNI (PVC)
PROVINCETOWN, MASSACHUSETTS
CAPE APP CON
118.2
CLNC DEL
120.65
UNICOM 122.8 (CTAF)
122.85
AWOS-3 119.025
ENROUTE FACILITIES
Procedure turn overlays control area 1142 (2000' floor).
10 NM
RACE POINT
232 RZP
(IAF)
BATIE INT
I-VQO 7.3
SOWND INT
I-VQO 1.5
2300
to Batie Int
076° (8.7)
2300
110° (18.5)
DRUNK
256°
076°
358
LOCALIZER 111.1
I-VQO
Chan 48
MSA RZP 25 NM
1800
MISSED APPROACH
Climb to 2300 direct
RZP NDB and hold.
BATIE INT
I-VQO 7.3
Remain
within 10 NM
076°
SOWND INT
I-VQO 1.5
I-VQO
0.1
256°
2300
2300
480
1.4
5.8 NM
ELEV 8
137
TDZE
8
40
57
256° 7.3 NM
from FAF
REIL Rwy 25
MIRL Rwy 7-25
Knots 60 90 120 150 180
Min:Sec
CATEGORY A B C D
S-25 420-1 412 (500-1) NA
CIRCLING 420-1 412 (500-1) 460-1 452 (500-1) NA
If local altimeter setting not received, use Otis ANGB altimeter setting and increase all MDAs 120 feet.
DME from I-VQO ILS. Simultaneous reception of RZP and I-VQO DME required.
DME required.
NA
NDB/DME RWY 25
42°04'N-70°13'W
PROVINCETOWN, MASSACHUSETTS
PROVINCETOWN MUNI (PVC)

LOC/DME RWY 5

SPRINGFIELD/HARTNESS STATE (SPRINGFIELD) (VSF)
SPRINGFIELD, VERMONT



CATEGORY	A	B	C	D
S-5	1540-1¼ 965 (1000-1¼)	1540-1½ 965 (1000-1½)	1540-3 965 (1000-3)	
CIRCLING	1620-1¼ 1043 (1100-1¼)	1680-1½ 1103 (1200-1½)	1680-3 1103 (1200-3)	2380-3 1803 (1900-3)

LEBANON, NH ALTIMETER SETTING MINIMUMS

S-5	NA	
CIRCLING	2080-3 1503 (1600-3)	2540-3 1963 (2000-3)

ACTIVATE MIRL Rwys 11-29, 5-23-UNICOM.
ADF required. ▽△ NA

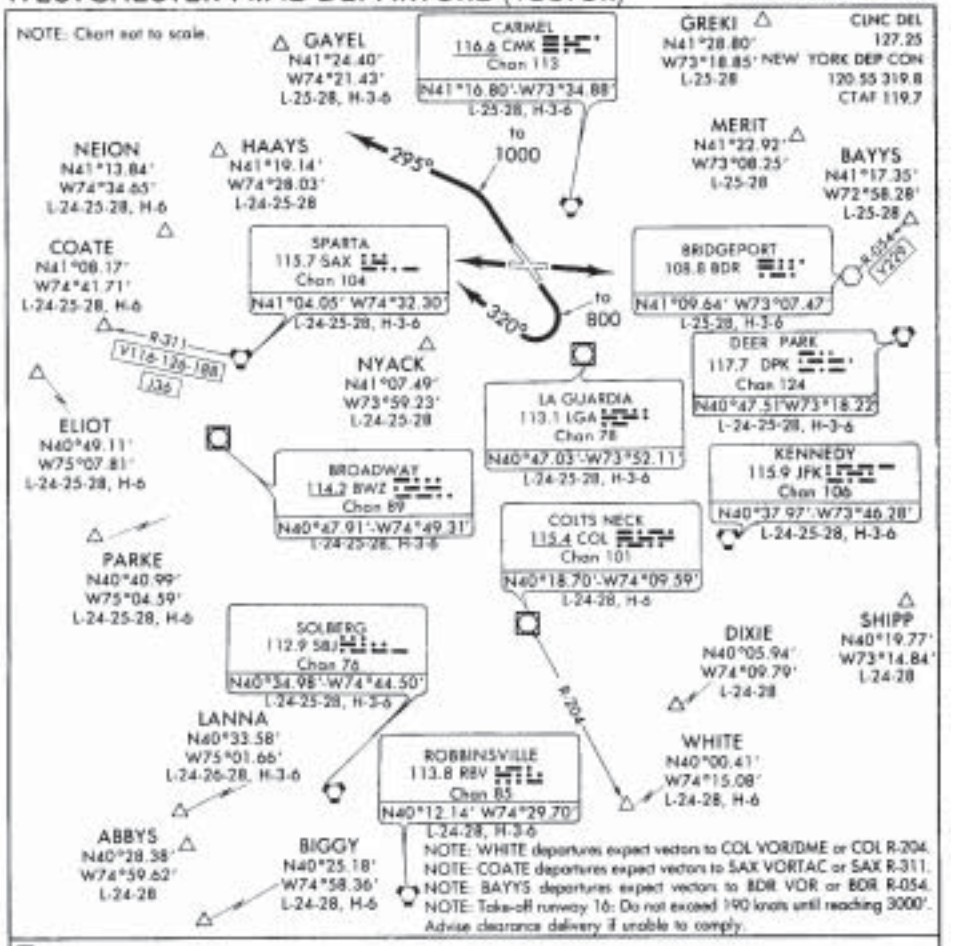
Knots	60	90	120	150	180
Min:Sec					

LOC/DME RWY 5

42°20'N-72°31'W

SPRINGFIELD, VERMONT
SPRINGFIELD/HARTNESS STATE (SPRINGFIELD) (VSF)

WESTCHESTER NINE DEPARTURE (VECTOR)



DEPARTURE ROUTE DESCRIPTION

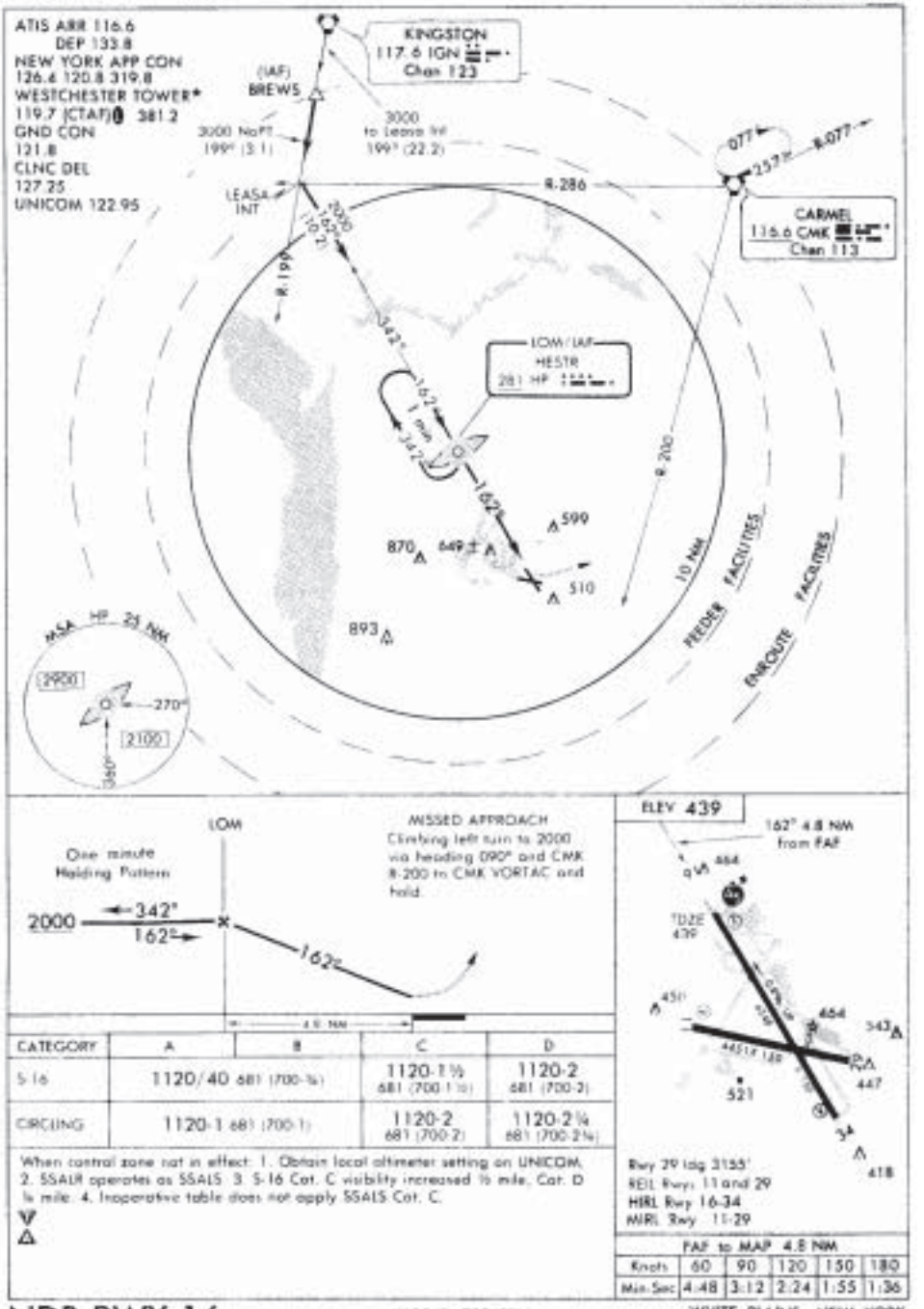
TAKE-OFF RUNWAY 16: Maintain runway heading to 800 feet then turn right heading 320°. Maintain 3000 feet. Thence . . . .

TAKE-OFF RUNWAYS 11/29: Maintain runway heading, maintain 3000 feet. Thence via vectors to assigned route/fix.

TAKE-OFF RUNWAY 34: Maintain runway heading to 1000 feet then turn left heading 295°, maintain 3000 feet. Thence . . . .

. . . . Expect clearance to filed altitude/flight level 10 minutes after departure.

NDB RWY 16



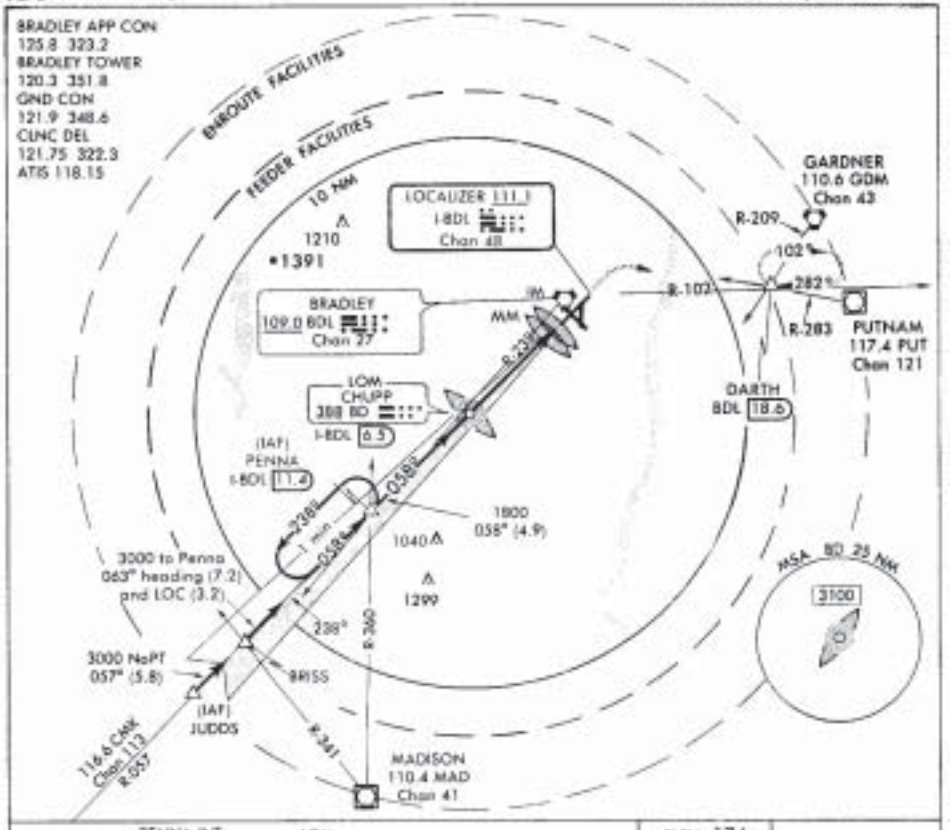
CATEGORY	A	B	C	D
S-16	1120/40 681 (700-¾)		1120-1½ 681 (700-1 ½)	1120-2 681 (700-2)
CIRCLING	1120-1 681 (700-1)		1120-2 681 (700-2)	1120-2¼ 681 (700-2¼)

When control zone not in effect: 1. Obtain local altimeter setting on UNICOM. 2. SSALR operates as SSALS. 3. S-16 Cat. C visibility increased ½ mile, Cat. D ¼ mile. 4. Inoperative table does not apply SSALS Cat. C.

FAF to MAP 4.8 NM					
Knots	60	90	120	150	180
Min:Sec	4:48	3:12	2:24	1:55	1:36

ILS RWY 6

WINDSOR LOCKS/BRADLEY INTL (BDL)
WINDSOR LOCKS, CONNECTICUT



CATEGORY	A	B	C	D
S-ILS 6	374/18 200 (200-½)			
S-LOC 6	760/24 586 (600-½)		760/50 586 (600-1)	760/60 586 (600-1¼)
CIRCLING	760-1 586 (600-1)		760-1½ 586 (600-1½)	1060-3 886 (900-3)

TDZ/CL Rwy 6
HIRL Rwys 6-24 and 15-33
MIRL Rwy 1-19
REIL Rwy 15

FAF to MAP 4.5 NM					
Knots	60	90	120	150	180
Min:Sec	4:30	3:00	2:15	1:48	1:30

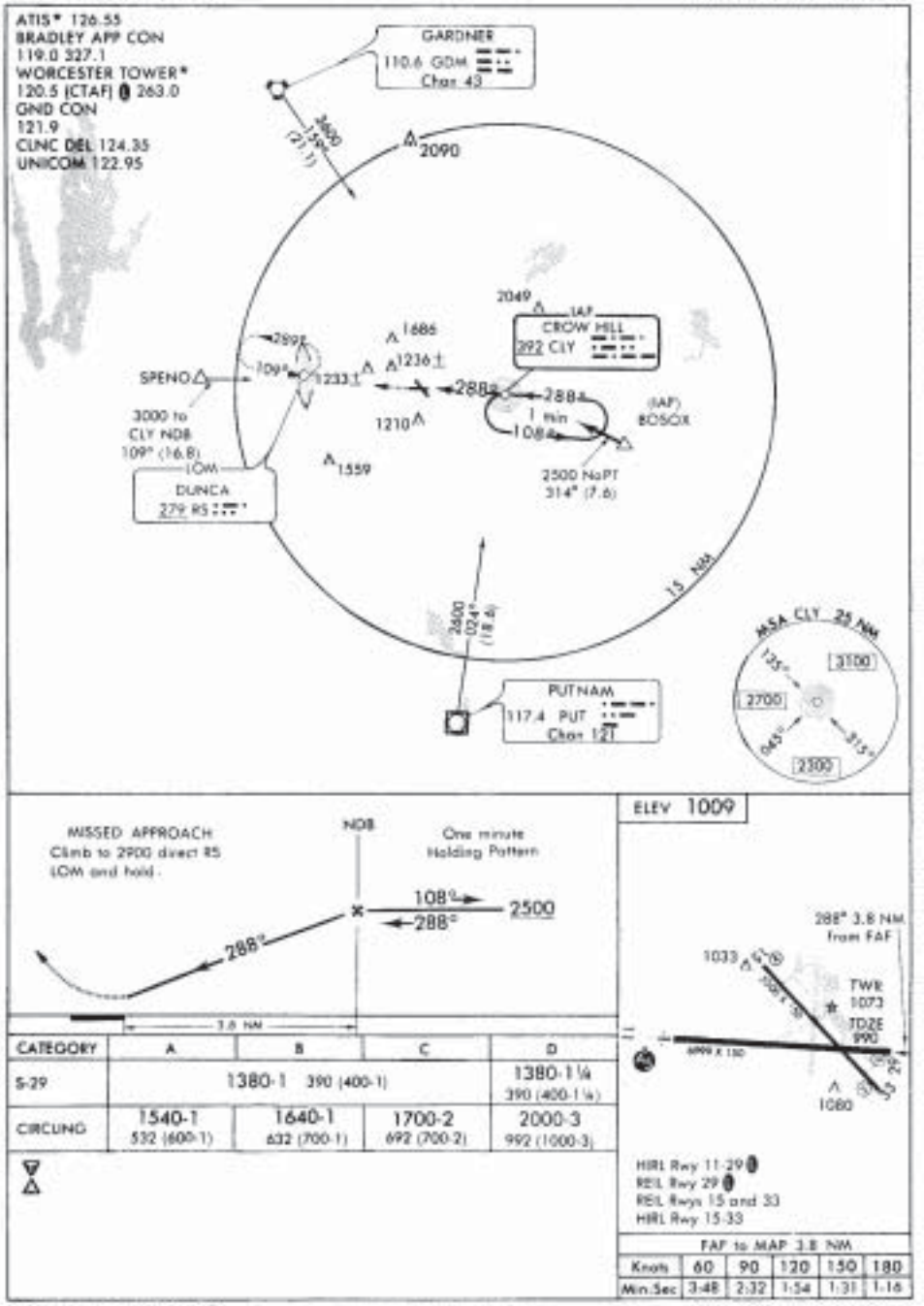
ILS RWY 6

41°56'N-72°41'W

WINDSOR LOCKS, CONNECTICUT
WINDSOR LOCKS/BRADLEY INTL (BDL)

NDB RWY 29

WORCESTER MUNI (ORH)
WORCESTER, MASSACHUSETTS



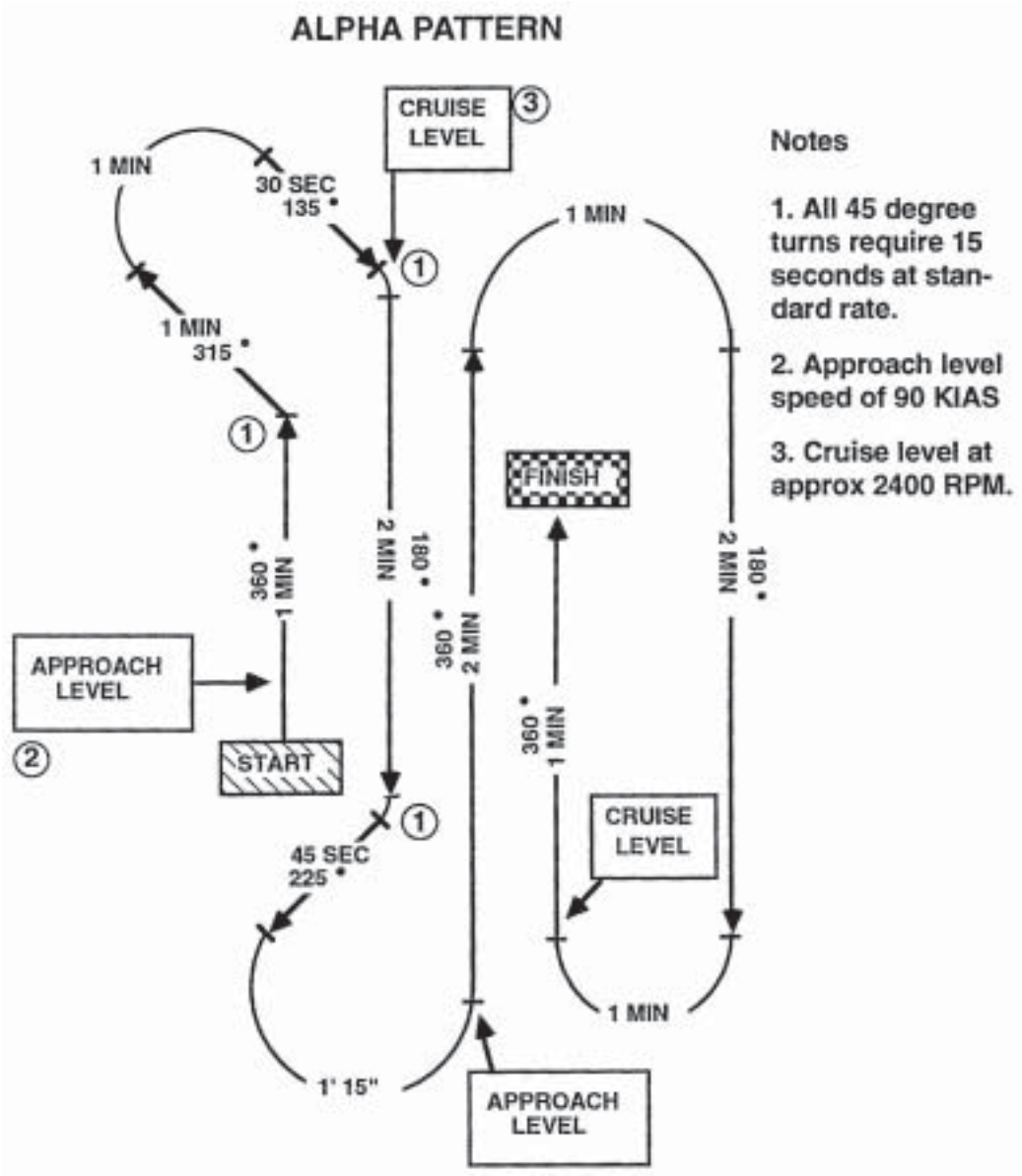
CATEGORY	A	B	C	D
S-29	1380-1 390 (400-1)			1380-1¼ 390 (400-1¼)
CIRCLING	1540-1 532 (600-1)	1640-1 632 (700-1)	1700-2 692 (700-2)	2000-3 992 (1000-3)

FAF to MAP 3.8 NM					
Knots	60	90	120	150	180
Min:Sec	3:48	2:32	1:54	1:31	1:16

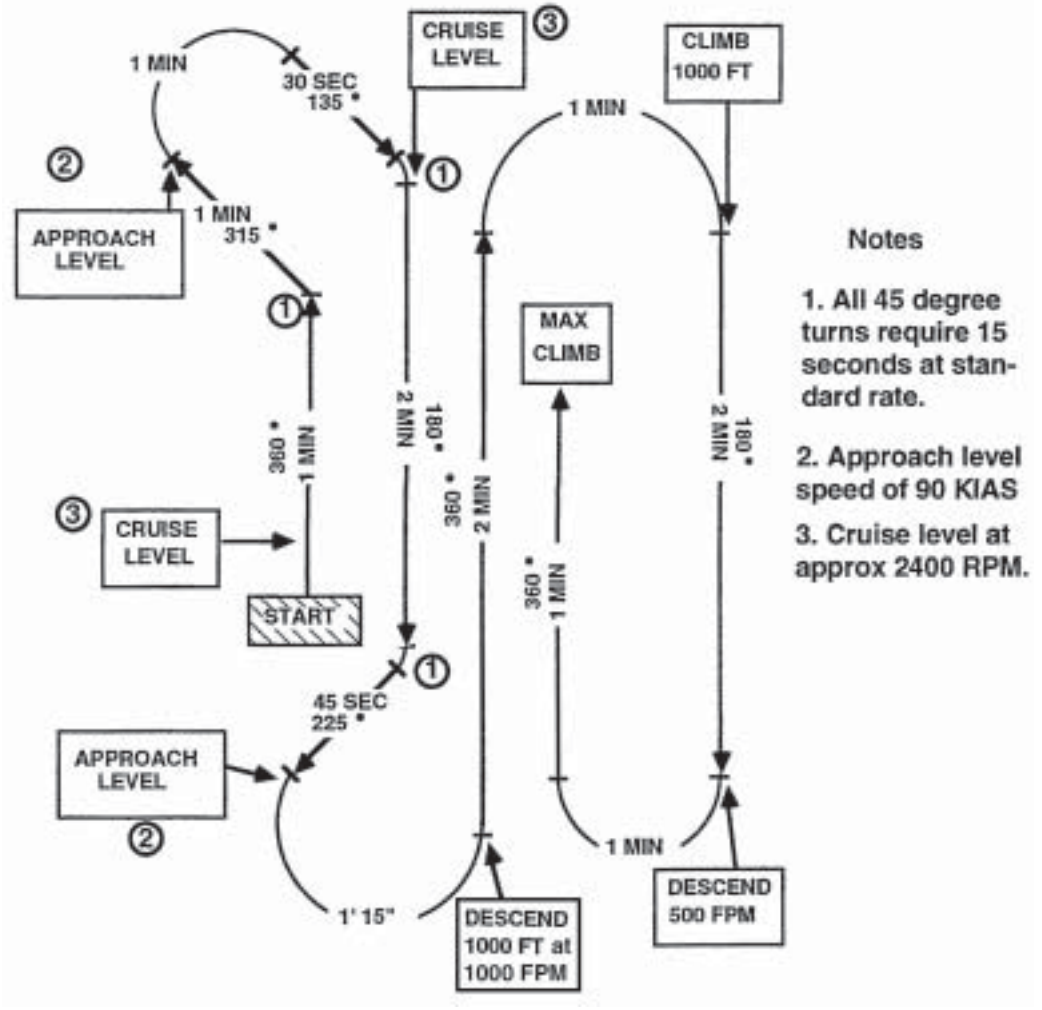
NDB RWY 29

42°16'N – 71°53'W

WORCESTER, MASSACHUSETTS
WORCESTER MUNI (ORH)


ALPHA PATTERN
CRUISE LEVEL
3
1 MIN
30 SEC
135 °
1
1 MIN
315 °
1
360 °
1 MIN
APPROACH LEVEL
2
START
2 MIN
180 °
45 SEC
225 °
1' 15"
360 °
2 MIN
1 MIN
FINISH
360 °
1 MIN
CRUISE LEVEL
1 MIN
2 MIN
180 °
APPROACH LEVEL
Notes
1. All 45 degree turns require 15 seconds at standard rate.
2. Approach level speed of 90 KIAS
3. Cruise level at approx 2400 RPM.

BRAVO PATTERN



Notes

1. All 45 degree turns require 15 seconds at standard rate.
2. Approach level speed of 90 KIAS
3. Cruise level at approx 2400 RPM.

Appendix 3: Troubleshooting

Troubleshooting IP Trainer

The controls are too sensitive.

Some customers have reported a reduction of flight control sensitivity when a special file called plugins.dat is deleted. This file contains calibration settings and a history of previous calibrations. Deleting this file will force a fresh calibration of your flight controls. The default installation location for the folder that contains this file is C:\ASA\IPT7.0\PROGRAM.

To delete this file locate the ASA folder on your "C" drive. If you have a preferred method of browsing your hard drive, use it. Otherwise, right-click on the START button and select Explore. This will open the Start Menu window. Browse the folder tree on the left side of this window. Locate the ASA folder. Expand the ASA folder by clicking the (+) to the left of the folder. Then expand the IPT7.0 folder and click on the PROGRAM folder to display its contents in the right side window.

In the contents of the program folder there will be two files named plugins. One will be a .dat file the other will be .txt file. Select the plugins.dat file, right-click and select Delete. Deleting this file will force a totally fresh calibration the next time the IP Trainer program is started. NOTE: **Do Not** delete the plugins.txt file.

In addition to the above, to minimize the sensitivity issues between the input devices, yoke, rudder pedals, mouse etc., always make small incremental changes. An example of this is when using the trim wheel. Always make small adjustments, even though you might be seeing large swings in the Vertical Speed indicator. You will see those oscillation cycles dampen out if you make gradual changes to the Trim setting.

Remember to be patient; the controls are meant to be sensitive and exacting to help you to become a better pilot by making you concentrate on the instruments. With a little time you will find that you have a high degree of control over the program's movements.

The cockpit display doesn't fit on the screen.

Adjust the screen size on your monitor's controls to get the display to fit your screen. In most cases, Windows will automatically re-size your screen to accept IP Trainer's 800x600 graphics mode.

IP Trainer Frequently Asked Questions

Can I log time using this program?

No, the program is not a PCATD (Personal Computer Aviation Training Device). However, the program will shave hours off the time you would have to spend working with an instructor towards obtaining your instrument rating. Statistics show IP Trainer users save 30 hours of flight time and more than $1,000, when supplementing their flight training by using this program. Although the regulations dictate you need 35-40 hours of dual time towards an instrument rating, the national average is much higher. Using this program diligently will give you the tools to earn the rating in the minimum time set by the regulations.

Why can't I use rudder pedals during my lessons?

The simple answer is that most of the commercially-available rudder controllers on the market aren't precise enough to allow a student to use them and continually pass the lesson tests. In lab tests where different rudders were used with the software, a very low pass rate was experienced. It was decided that it would be better to have IP Trainer auto-coordinate the turns by always keeping the ball centered, and allow students to concentrate on pitch and bank. The rudder option is available in Free Flight mode, where no lesson or completion parameters exist.

Why aren't there flaps in the IP Trainer aircraft model?

As with rudders, testing revealed that too many students had a hard time coordinating power settings, pitch attitude and airspeed when dealing with the added pressure of flap extension and retraction. IP Trainer assumes that anyone using the program has already obtained—or is about to obtain—his or her Private Pilot certificate, and knows how to use the flaps on his or her aircraft. Bear in mind that IP Trainer teaches its students instrument procedures, not primary flying skills.

Why is IP Trainer so demanding?

Simply put, IP Trainer is demanding because the Instrument Practical Test Standards are.

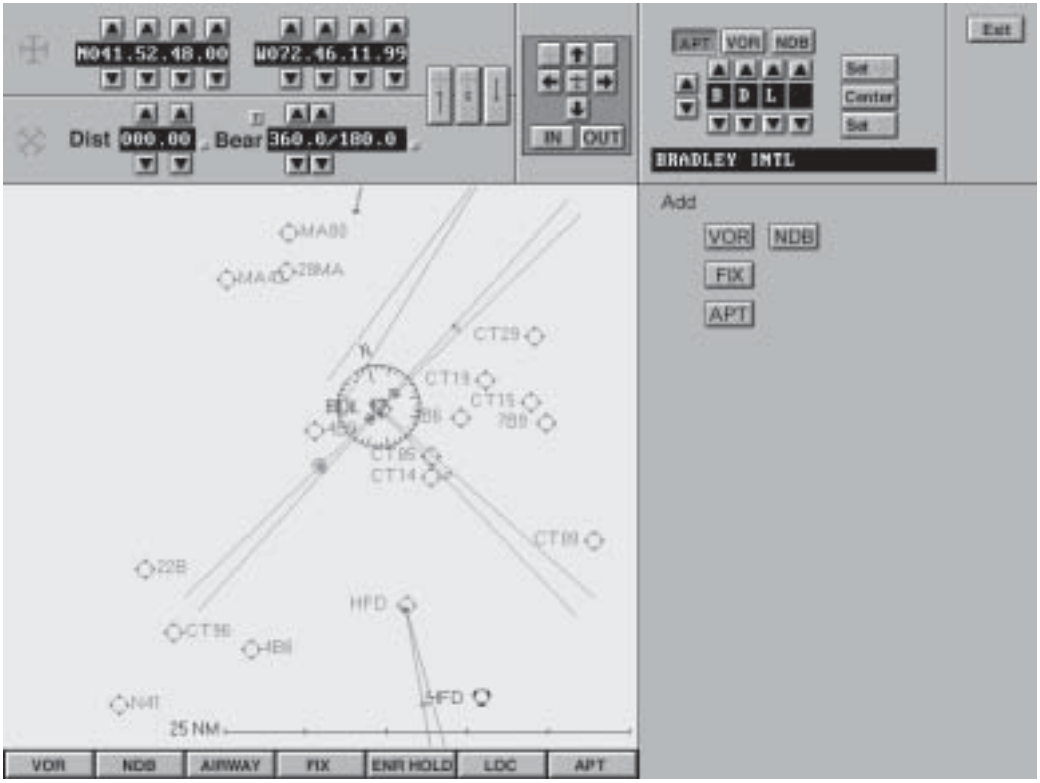
Appendix 4: Using the Airspace Database Editor

The IP Trainer 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 IP Trainer database. IP Trainer 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 46) and have found an error in the airspace data or the airspace database does not list an airport or NAVAID, you may use the Airspace Database Editor to add, delete, or edit your data.

The Airspace Database Editor is a separate program from IP Trainer and is by default, installed when you install IP Trainer, using the "Typical" installation. Close IP Trainer 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 IPT 7.0" 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 IP Trainer 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 IP Trainer 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 IP Trainer, any of the display symbols can be turned on or off for an uncluttered 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 can be controlled by the "In /Out" buttons, just as the "Slew Map" controls do on the Map display within IP Trainer. You should zoom the map to the 0.5 NM scale if you are making modifications to a runway. Slewing can also be done with the right mouse button. With the mouse pointer over the map, right-click and drag it to where you want it. Zoom can be done with the "-" and "=" (or "+" and "_" when shifted) keys. These also work in the IP Trainer 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 on the right side of the screen 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).

You must save your changes before you exit the editor for the changes to take effect in the IP Trainer simulator. For example, if you have added an ILS to a runway, select the Back button to return one level to the Runway level and then select the Back button again to return to the Airport level. There you can either Save or Cancel the changes you have made.

Care should be taken at this point. Changes made will become a permanent part of the airspace database that the IP Trainer program uses. If you select Delete at the Airport level you will delete that airport from the airspace database.

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