Flight Unlimited II

Help

LOOKING GLASS STUDIOS

Legal Stuff

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Warranty Claims: To make a warranty claim under this limited warranty, please return the product to the point of purchase, accompanied by proof of purchase, your name, your return address, and a statement of the defect. Or, send the disc to us at the address below within 90 days of purchase. Include a copy of the dated purchase receipt, your name, your return address, and a statement of the defect. Looking Glass will, at our option, repair or replace the product and return it to you (postage prepaid) or issue you a credit equal to the purchase price.

To replace defective media after the 90-day warranty period has expired, send the original disc to the address below. Enclose a statement of the defect, your name, your return address, and a check or money order for $10.00 to Looking Glass Studios. The foregoing states the purchaser's sole and exclusive remedy for any breach of warranty with respect to the software product.

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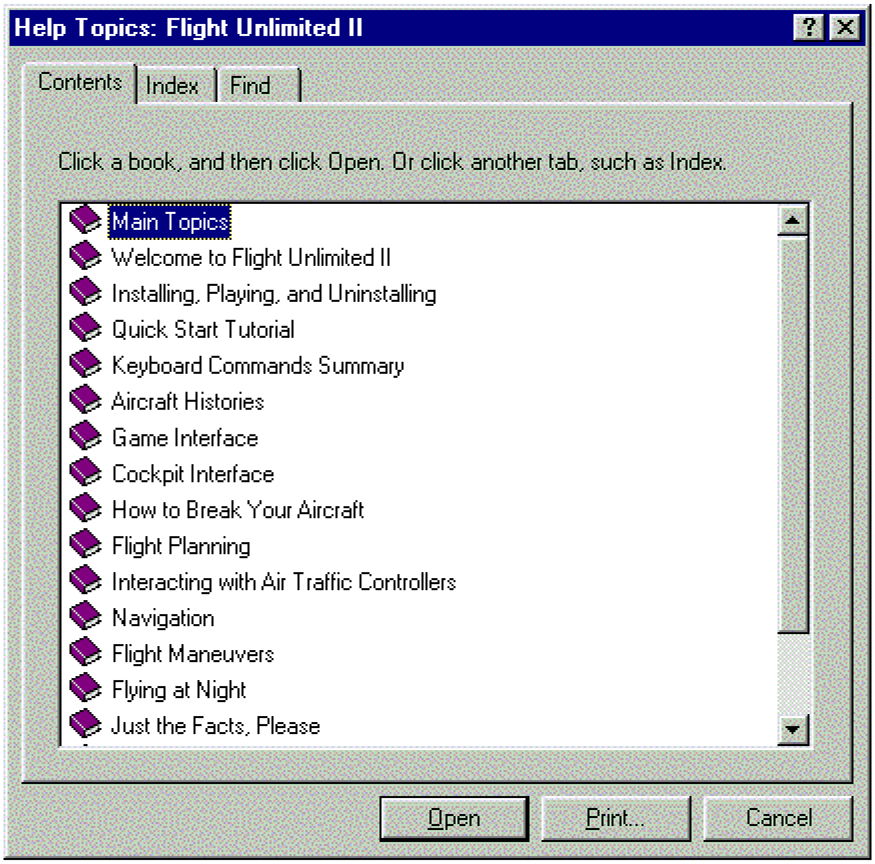
PLEASE NOTE:

This is an entertainment product. Although *Flight Unlimited II* is an excellent simulation of the true experience of flying private aircraft, it is in no way a substitute for flight and ground training from an authorized instructor.

Welcome to Flight Unlimited II!

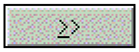
Welcome to the *Flight Unlimited II* Online Manual!

The purpose of this manual is to help you, the player, understand how to get the most out of this challenging flight simulation.

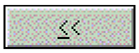


This **Help** document is arranged through a detailed **Table of Contents** panel which you can view and navigate at any time by clicking on the **Help Topics** button, located in the upper left-hand corner of any page. Double-click on a topic's name to bring up that topic's page. You may also click on the **Index** tab along the top of the Table of Contents itself to locate specific items of interest by typing in a word or phrase in the box provided or the **Find** tab if you prefer a truly detailed search.

Clicking on the **Back** button located at the top of this page will return you to our *Main Topics* screen where you can click to easily jump to major pages of interest. On other pages, this button takes you to the page you were just on (irrespective of the browse sequence), which is especially useful when jumping across entire sections of the Help file.

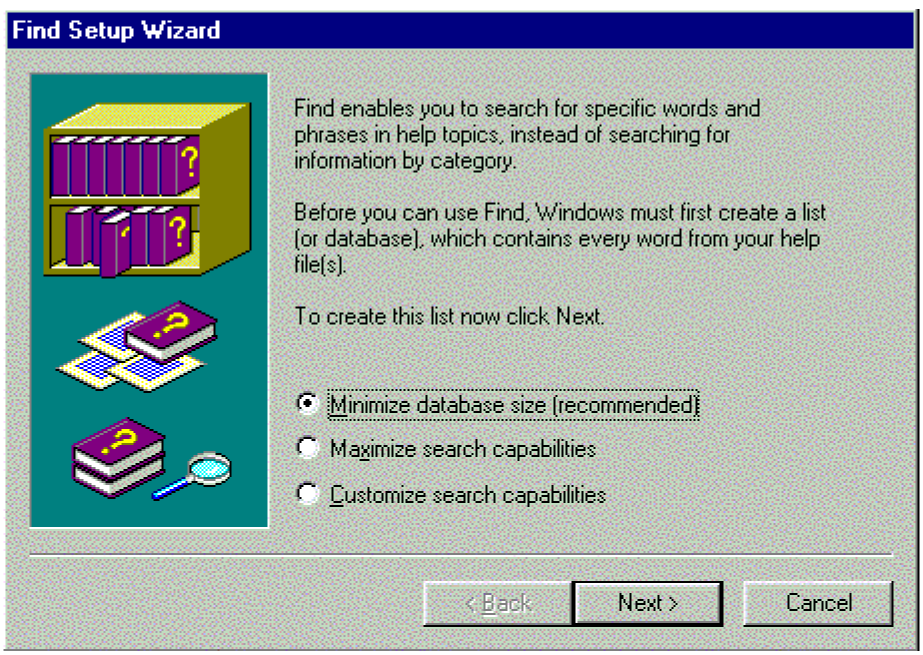


Clicking on the **NEXT (>>)** button will cycle forward one topic page in the browse sequence



Clicking on the **PREVIOUS (<<)** button will cycle back one topic page in the browse sequence.

Clicking on the **Find** button will take you to the **Find Setup Wizard** panel:



Here, as it says, *you may search for specific words and phrases in help topics, instead of searching for information by category*.

Clicking on the **Print** button will allow you to print the selected Help Topic page.

Clicking on the **Options** button will open up the advanced help file system features that allow you to annotate, print selected topics, etc.

THE VAST MAJORITY OF GRAPHICS IN THIS HELP DOCUMENT FEATURE CLICKABLE ITEMS. When your cursor moves over a given graphic and changes to the image of a hand, you can click on an item to do one of two things:

1) **Jump to the relevant Help Topic page.**
2) **Pop up a window with information pertaining to the chosen topic.**

Example:

We recommend you pass your cursor over every graphic on a given page so you don't miss a cool pop-up or jump!

Words highlighted in **dark green** with a single underline indicate a pop-up to a given topic, while those highlighted in **dark green** with a double underline indicate a jump to a given topic.

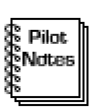
Lastly, the ideal way to view this Help document is to set your desktop display resolution to as high as possible (at least 800 x 600). You should also set the *Active Window* in the **Appearance** tab in your **Display Properties** panel to **White** (so that the white backgrounds of certain graphics will not become overly pronounced).

May this Help File answer all of your questions.

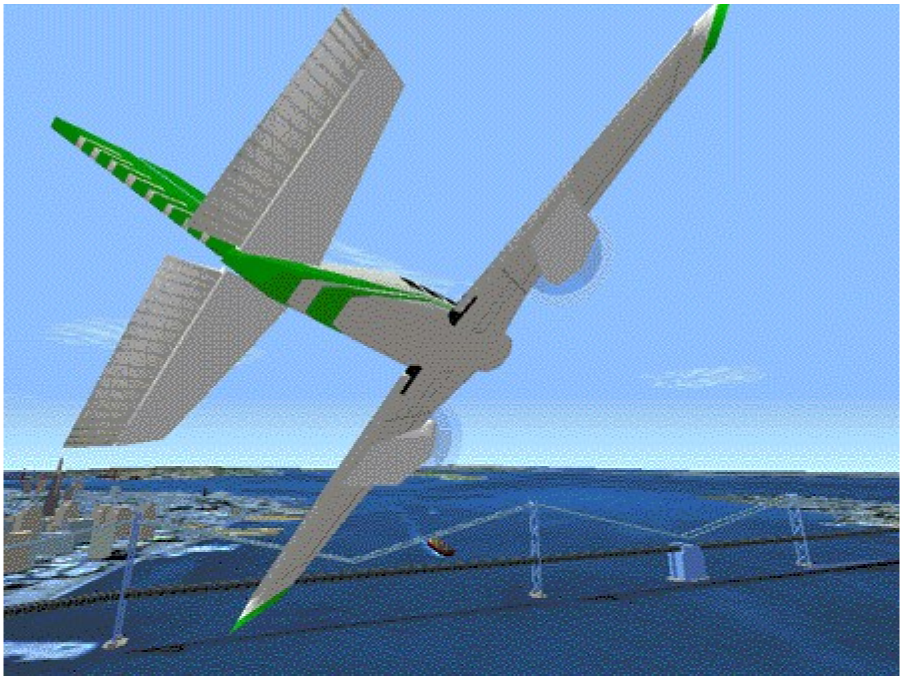
Enjoy the game!

PILOT NOTES:

Sprinkled throughout the Help File are 132 Pilot Note icons. Left-click on an icon to view intriguing snippets of information pertaining to the subject matter of the given Help Topic page.



Introduction



Welcome to *Flight Unlimited II*, the next installment of *Looking Glass's* award-winning flight simulation line. From the very start of this project, we've focused on providing our players with the experience of being a private pilot. Interacting with air traffic controllers, flying in foul weather, day/night flying, and cross-country flying are just some of the experiences you can look forward to with *Flight Unlimited II*.

Most of all, though, we wanted to make the game fun. Our motto has been "make it real, but make it fun." To this end, we worked very closely with many flight sim enthusiasts and pilots, including a few of our own here at *Looking Glass*. We also solicited input from the people who purchased the original *Flight Unlimited*. The number of responses we received was overwhelming, and many of the features that people clamored for have been incorporated into *Flight Unlimited II*. Everyone here at *Looking Glass* believes that, in *Flight Unlimited II*, we've created the definitive civilian flight simulation.

But we're not stopping here. Even as you read this, we're continuing to develop other products in the *Flight Unlimited* line, including more civilian aviation sims and a combat sim. Also, look for add-on packs with new planes, new terrain, and new adventures.

We're committed to making the *Flight Unlimited* product line the best it can be, but we can only do that with your feedback. So please continue to send us your comments and suggestions. All of us on the flight team make it a point to read and respond to our mail (both e-mail and snail mail), and since we are all flight sim fanatics at heart, you can also often find us lurking on the newsgroups and making our own brand of incisive and witty commentary.

Thank you for purchasing *Flight Unlimited II*. We all hope you have as much fun playing it as we had making it.

Now go play the game, and fly in the face of the FAA…

Constantine Hantzopoulos
Project Director, *Flight Unlimited II*

What was that Screen?

CLICK ON THE NAME TO VIEW POP-UP OR CLICK ON THE IMAGE TO JUMP:

Main Menu


Quick Flight


Quick Flight Map


Modified Quick Flight


Large FBO


Small FBO


Airport Selector Map

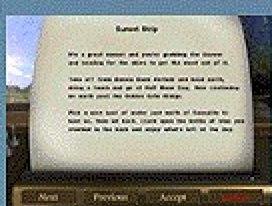

Key Rack


Pilot Info (Logbook)


Load/Save (Logbook)


Flight Info (Logbook)


Object Viewer


Adventures

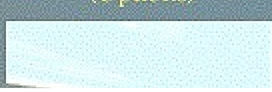

Game Options


Sound Settings (Options)


Game Settings (Options)


Graphic Settings (Options)


Arrow (VFR Cockpit)



What was that Gauge?

CLICK ON THE NAME TO VIEW POP-UP OR CLICK ON THE IMAGE TO JUMP:


Accelerometer
Airspeed Indicator
Altimeter
Attitude Indicator
Carburetor Heat
Clock
COM Radio
Directional Gyro
Distance Measuring Equipment (DME)
Elevator Trim Indicator
Flaps Indicator
Fuel Gauges
Fuel Tank Switch
ILS Marker Beacon Lights
ILS NAV/COM Radio
ILS Receiver
Landing Gear Controls
Magnetic Compass
Manifold Pressure Gauge
Mixture Control
NAV Radio
NAV Lights Switch
Oil Pressure Gauge
Oil Temperature Gauge
Propeller Control
Propeller RPM Indicator
Rudder Trim Indicator
Selected Engine Indicator
Throttle Control
Transponder (XPNDR)
Turn/Slip
Vertical Speed Indicator

What was that Graphic?

Did you forget what that icon or that button was supposed to do?

- **The FBO's**
- **Quick Flight**
- **The Flight Planner**

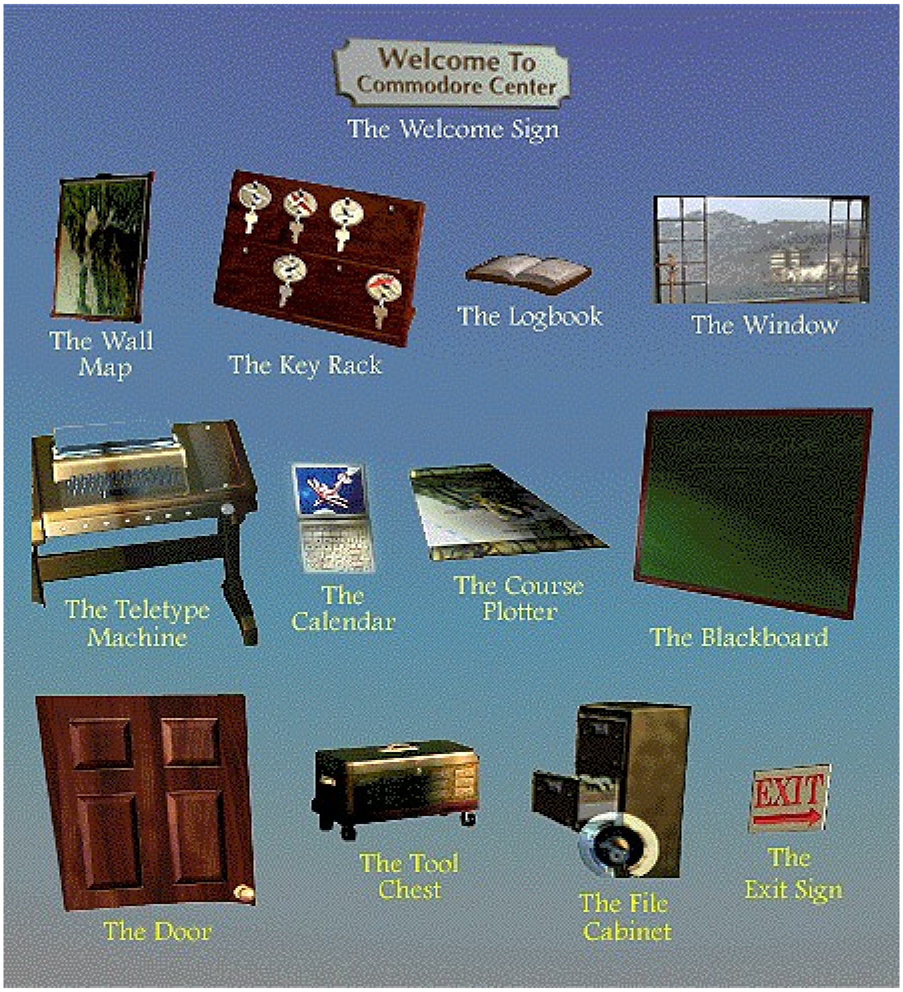
FBO Icons

LARGE FBO

CLICK ON THE NAME TO VIEW POP-UP OR CLICK ON THE IMAGE TO JUMP:

SMALL FBO

CLICK ON THE NAME TO VIEW POP-UP OR CLICK ON THE IMAGE TO JUMP:


Welcome To
Commodore Center
The Welcome Sign
The Wall
Map
The Key Rack
The Logbook
The Window
The Teletype
Machine
The
Calendar
The Course
Plotter
The Blackboard
The Door
The Tool
Chest
The File
Cabinet
EXIT
The
Exit Sign

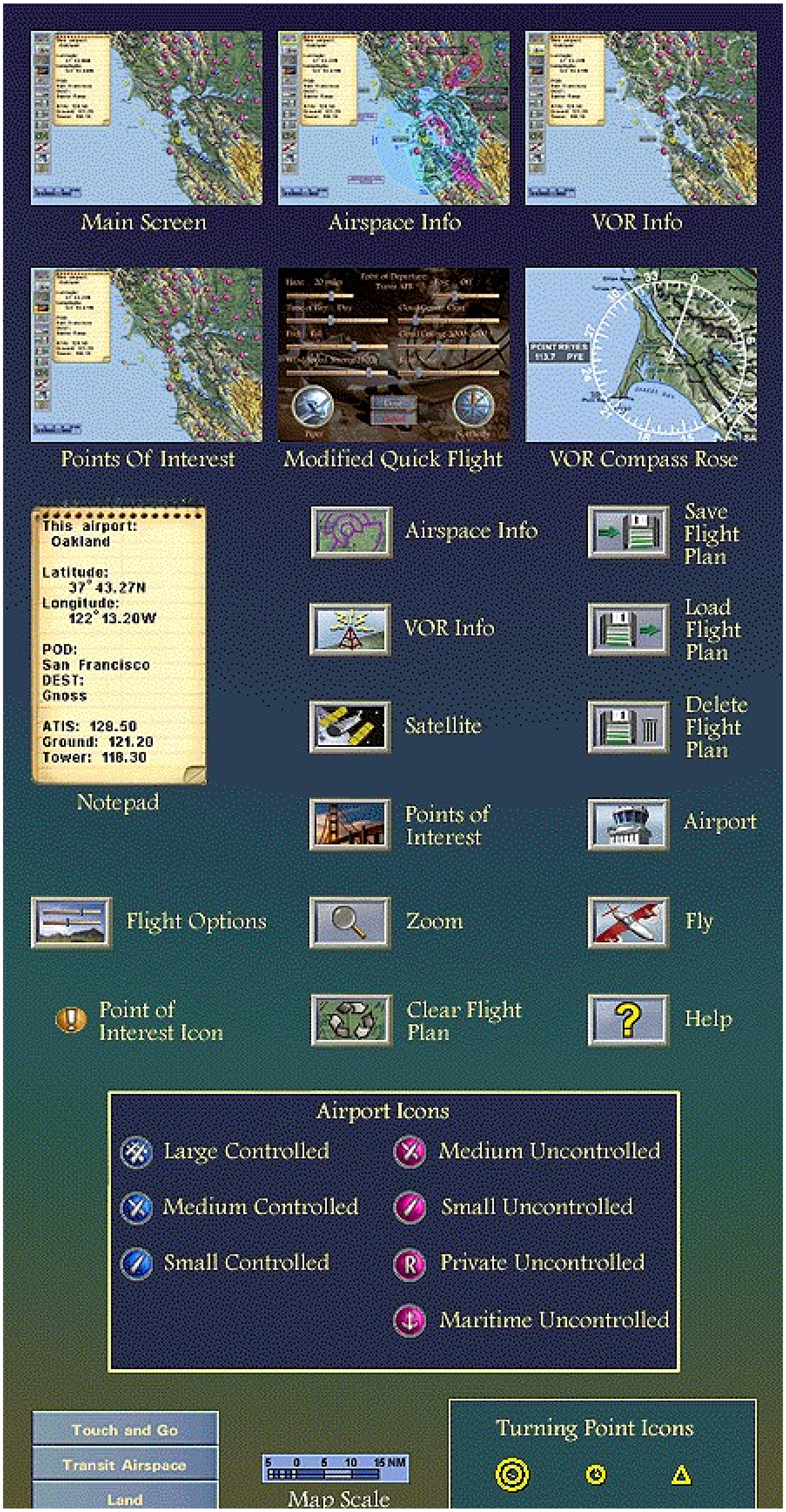
Quick Flight Screens, Buttons, and Icons

CLICK ON THE IMAGE TO JUMP:

Quick Flight
Quick Flight Icon
Quick Flight
San Francisco
Go to Map
Haze: 20 miles
Fog: Off
Time of day: Day
Cloud Cover: Clear
Baron
Aircraft Selector Icon
Fuel: Full
Cloud Ceiling: 3,000-5,000 f
Wind Speed: Calm(0-4)
Rain: None
Northerly
Wind Direction Indicator
Fly
Reset
Random
Cancel
Quick Flight Buttons
Quick Flight Map
This airport:
Oakland
Latitude:
37° 43.27N
Longitude:
122° 13.20W
POD:
San Francisco
ATIS: 120.50
Ground: 121.20
Tower: 118.30
Notepad
5 0 5 10 15 NM
Map Scale
Points of Interest
Zoom
Parking Ramp
Parking Ramp Button
Point of Interest Icon
Airport
Takeoff: Runway 10R
Takeoff Button
Airport Icons
Large Controlled
Medium Uncontrolled
Medium Controlled
Small Uncontrolled
Small Controlled
Private Uncontrolled
Maritime Uncontrolled
Final: Runway 01R
Final Button
Parking Ramp
Takeoff: Runway 32
Takeoff: Runway 14
Takeoff: Runway 01
Takeoff: Runway 19
Final: Runway 32
Final: Runway 14
Final: Runway 01
Airport Pop-Up Menu
500 feet
1000 feet
3000 feet
5000 feet

Flight Planner Screens, Buttons, and Icons

CLICK ON THE IMAGE TO JUMP:


Main Screen
Airspace Info
VOR Info
Points Of Interest
Modified Quick Flight
VOR Compass Rose
This airport:
Oakland
Latitude:
37° 43.27N
Longitude:
122° 13.20W
POD:
San Francisco
DEST:
Gnoss
ATIS: 128.50
Ground: 121.20
Tower: 118.30
Notepad
Airspace Info
Save Flight Plan
VOR Info
Load Flight Plan
Satellite
Delete Flight Plan
Points of Interest
Airport
Flight Options
Zoom
Fly
Point of Interest Icon
Clear Flight Plan
Help
Airport Icons
Large Controlled
Medium Uncontrolled
Medium Controlled
Small Uncontrolled
Small Controlled
Private Uncontrolled
Maritime Uncontrolled
Touch and Go
Transit Airspace
Land
5 0 5 10 15 NM
Map Scale
Turning Point Icons

Installing Flight II

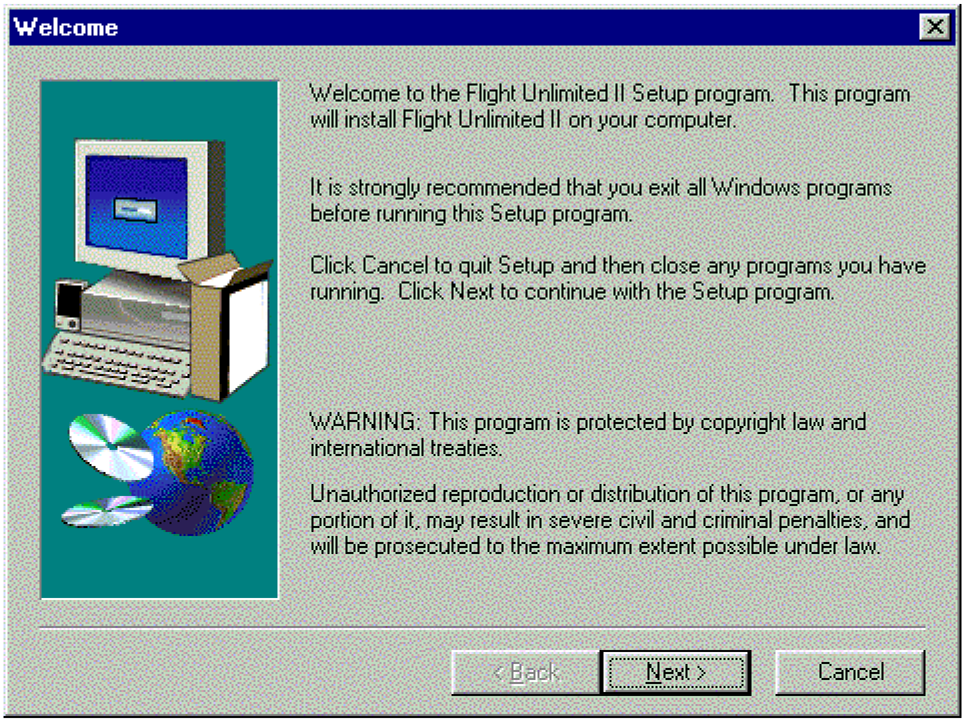
Installing *Flight II* is a snap. Simply insert the first CD (labeled **Disk 1: Install Disk**) into your CD-ROM drive. After a few seconds, the **Launch** panel will appear:

NOTE*:*
In the event the Launch Panel does not appear when you insert the first CD:

Double-click on the **My Computer** *icon, then double-click on the* **CD-ROM** *icon, and lastly double-click on the* **SETUP.EXE** *file to bring up the launch panel OR:*

1) *Click on the* **START** *button.*
2) *Choose* **Run** *from the ensuing pop-up menu.*
3) *Type* **d:\setup** *in the box provided (where* ***d:*** *designates your CD-ROM drive letter).*
4) *Click on the* **OK** *button to begin the install program.*

Click on the **Install** button to begin the installer. The **Welcome** panel will then appear:

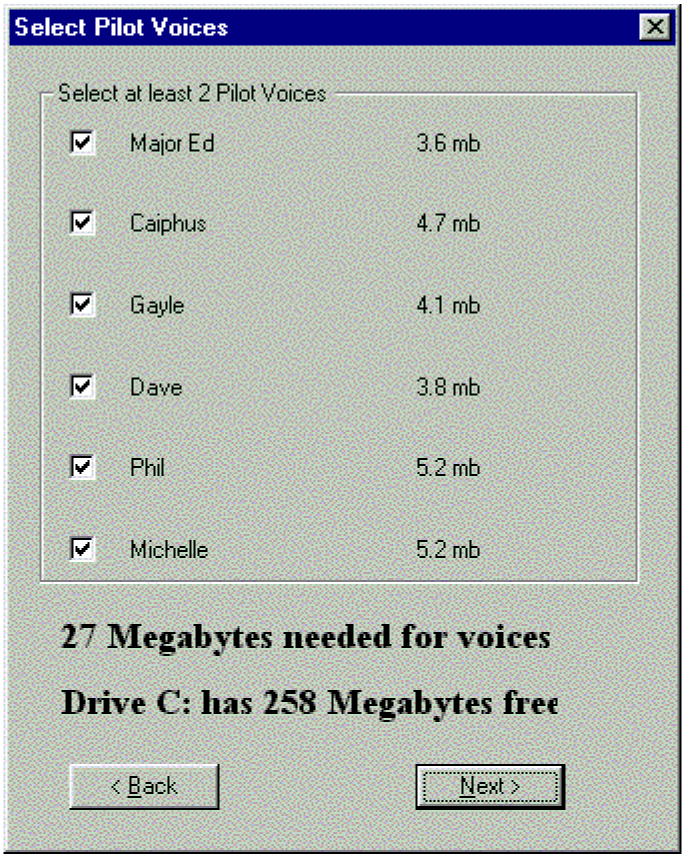


Click on the **Next** button to proceed with the installation. The program will guide you through the remaining process via onscreen prompts.

You will initially be prompted to select the path and directory to which you wish to install the game on your hard drive:

The default is **C:\Program Files\flight2**. Click on the **Next** button to accept the default destination, or click on the **Browse** button to type in a new location in the box provided.

After choosing your location, you will next be asked to select the number of **pilot voices** you would like the game to install via the following panel:



The minimum is **two** (representing your pilot's voice and the voices of tertiary aircraft). These voices will not only affect the install size, but will be the *only* pilot voices present in the game. Check the boxes pertaining to the number of voices you would like installed, then click on the **Next** button to continue with the installation. The space that each will take up on your hard drive is listed adjacent to each voice. (There is also a running count of the cummulate size present at the bottom of the panel.) For maximum listening enjoyment, we recommend installing all six of the voices.

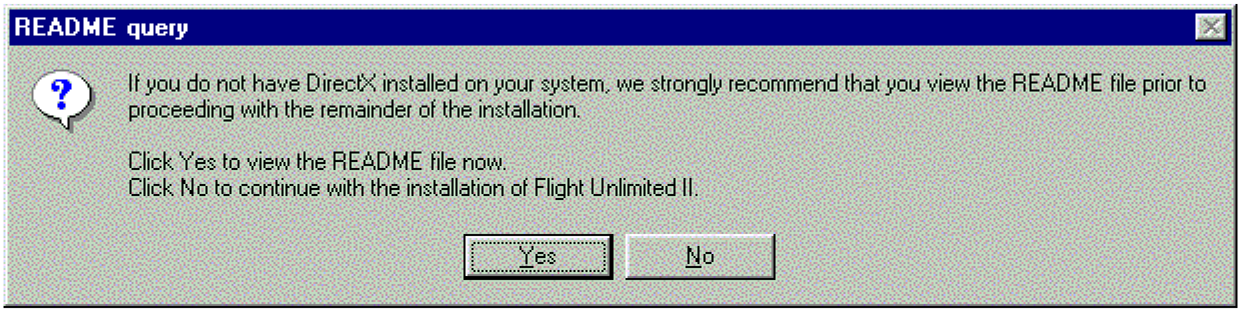
Next, you will choose whether or not you would like to install the *Flight Unlimited II* Help File:

A checkbox is provided. (The Help File takes up roughly **16** MB of additional space.) You now have the option to either continue with the installation or go back and reconfigure voices.

You will next be queried to confirm proceeding with the installation:

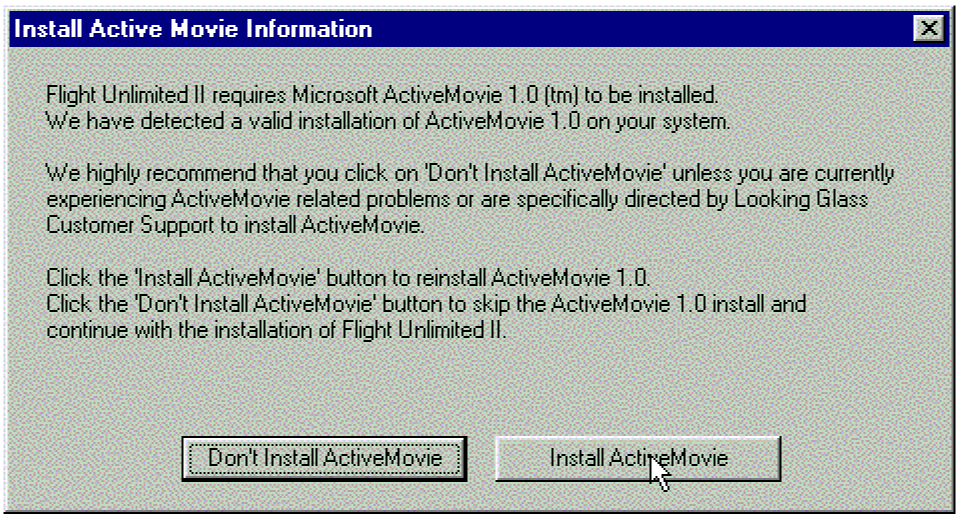
Click on the **Yes, I am ready to install** button. The installation will commence.

Once the installation has finished, you will then be prompted to view the README file for last minute information:



We strongly suggest that you click on the **Yes** button at this time.

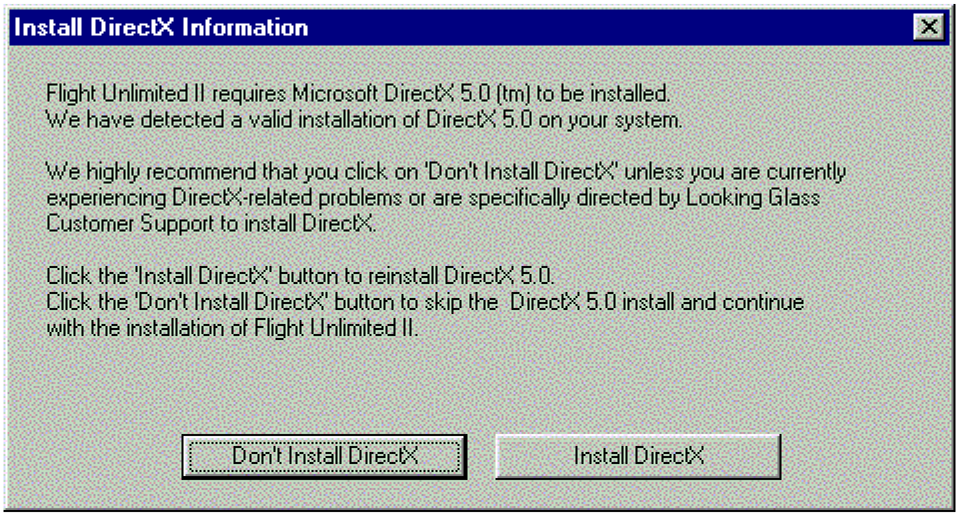
Next, the **Install Active Movie Information** panel will appear:



Click on the **Install ActiveMovie** button to proceed with the installation.

For further information regarding *ActiveMovie*, click **here**.

Lastly, the **Install DirectX Information** panel will appear:



Please read the onscreen information before selecting an option. You may either choose to install or not install at this time. If the *Flight II* installer detects an active version of *DirectX 5.0* on your system, we encourage you to **not** reinstall DirectX. If the installer does not detect DirectX 5.0, you must install it before you are able to play *Flight Unlimited II*. Click on the **Install DirectX** button to proceed.

If you choose to install DirectX 5.0, the installer will start the DirectX 5.0 install program. A menu will pop-up on the screen. Click on the **Install DirectX** button to begin installing the files on your system (if you have an existing version of DirectX already installed on your system, this button will instead read **Reinstall DirectX**). Follow the onscreen prompts provided to you by the DirectX 5.0 installer. Please note that a reboot will be necessary before DirectX will be utilized.

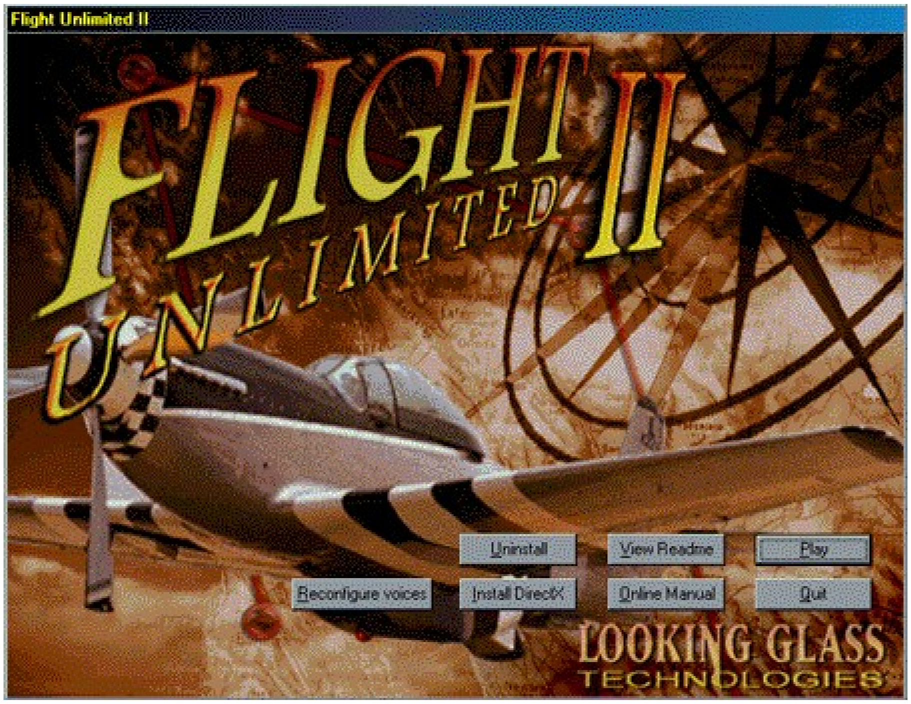
For further information regarding DirectX 5.0, click **here**.

If you are experiencing difficulties installing *Flight Unlimited II*, please consult the **Troubleshooting and Performance Issues** section of this Online Manual, or, for any last minute information:

{button Click HERE to View the README!,EF(`readme.wri',`42',1)}

Starting or Playing Flight II

Once the installation process is complete, the ***Flight Unlimited II*** **Launch Panel** will appear:



Click on the **Play** button to begin the game.

You may also:

- Click on the **Reconfigure voices** button to change the pilot voice selection for the game.
- Click on the **Uninstall** button to **uninstall** the game.
- Click on the **Install DirectX** button to **install Microsoft's DirectX**.
- Click on the **View Readme** button to view the README file (a *WordPad* document).
- Click on the **Online Manual** button to view this Help file.
- Click on the **Quit** button to exit the Launch panel.

NOTE:

In the event the Launch Panel does NOT appear:

Re-insert the first CD (labeled **Disk 1: Install Disk***) into the CD-ROM drive at any time to enable the AutoPlay feature and bring up the Launch Panel.*

You may additionally click on the **My Computer** *icon and then click on the* **CD-ROM** *symbol* *to bring up the Launch Panel OR:*

1) *Click on the* **START** *button.*
2) *Choose* **Programs** *from the pop-up menu.*
3) *Drag your mouse to the right and click on* **Flight Unlimited II** *from the list.*
4) *Click on* **Flight Unlimited II** *from the ensuing pop-up menu.*

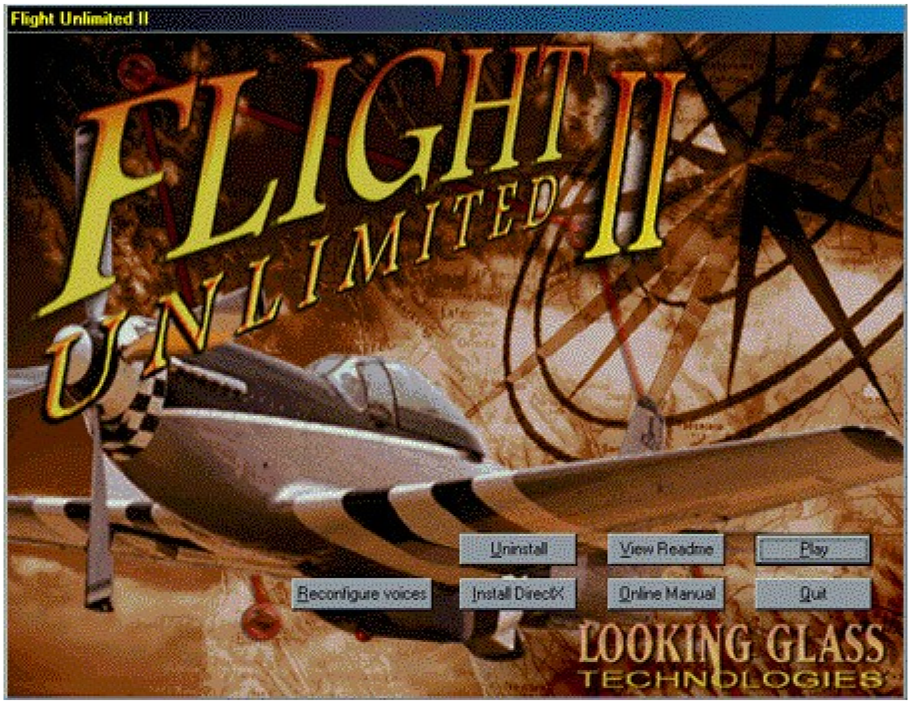
If you are experiencing difficulties running *Flight Unlimited II*, please consult the **Troubleshooting and Performance Issues** section of this Online Manual, or, for any last minute information:

{button Click HERE to View the README!,EF(`readme.wri',`42',1)}

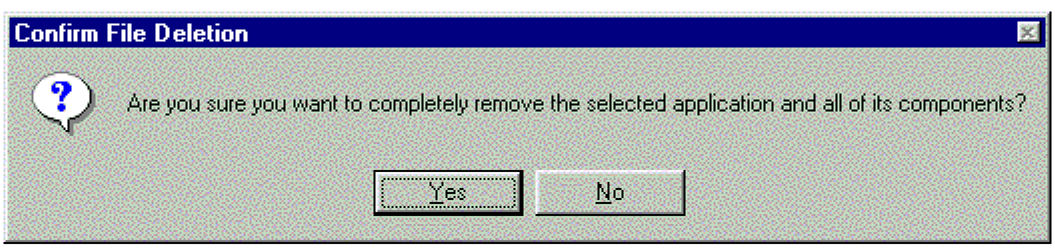
Uninstalling Flight II

If you need to uninstall *Flight Unlimited II*, you may do any of the following three things:

1) Insert the *Flight Unlimited II* CD (labeled **Disk 1: Install Disk**) into the CD-ROM drive to activate the AutoPlay feature. This will bring up the **Launch Panel**:



Click on the **Uninstall** button. The following panel will appear:



Click on the **Yes** button to uninstall the program.

2)

- Click on the **START** button from the Windows 95 taskbar.
- Choose *Programs* from the pop-up menu.
- Drag your mouse to the right and click on **Flight Unlimited II** from the list.

- Click on **UnInstallShield** from the ensuing pop-up menu and follow the onscreen instructions.

3)

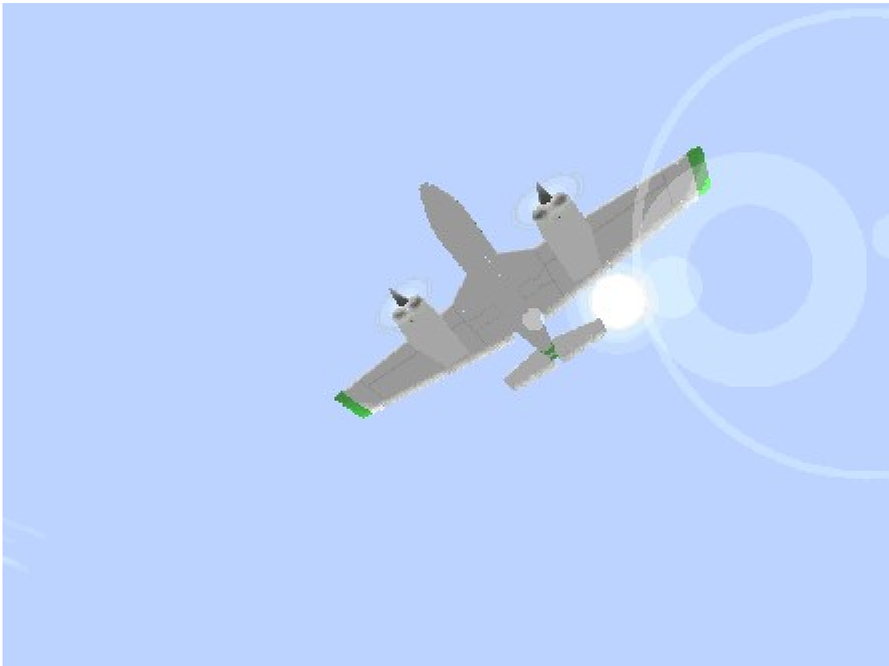
Go to the CONTROL PANEL and choose **ADD/REMOVE PROGRAMS** to bring up the following panel:

Click on *Flight Unlimited II*, select the **Add/Remove** button, and follow the onscreen prompts.

If you are experiencing difficulties uninstalling *Flight Unlimited II*, please consult the **Troubleshooting and Performance Issues** section of this Online Manual, or, for any last minute information:

{button Click HERE to View the README!,EF(`readme.wri',`42',1)}

Quick Start Tutorial

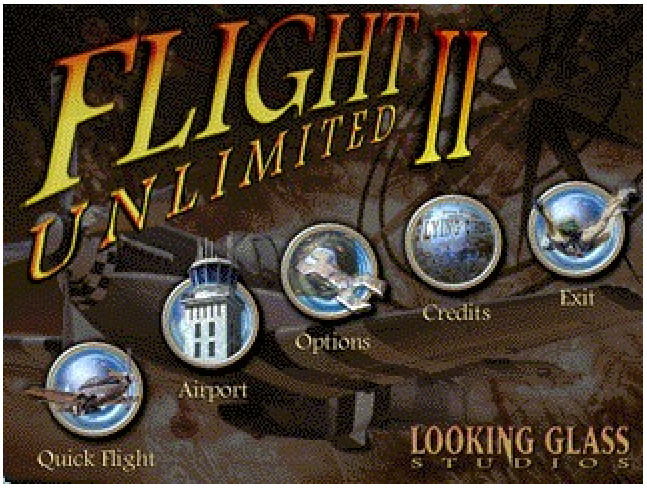


This Quick Start Tutorial section is designed to help you takeoff and buzz the skyscrapers of San Francisco in no time. Let's get started…

QUICK START CHECKLIST

Takeoff

When the game has finished loading, you will be taken directly to the *Main Menu* screen:



From the *Main Menu*, click on the **Quick Flight** icon to proceed to the *Quick Flight* screen:

In *Quick Flight*, you will start with a default aircraft with which to fly for the very first time. For the moment, please retain the **default** *Quick Flight* selections for the purposes of this Quick Start Tutorial (a *Trainer* aircraft with beautiful weather).

Click on the **FLY** button to continue this Quick Start Tutorial. Following a brief loading screen, you will be flying high above the clear skies of San Francisco in your brand new *Trainer*.

For users with a joystick-supported throttle wheel, make sure your throttle is currently set to at least the middle position.

In The Air

The default cockpit view you'll see is called the **IFR Cockpit View**:

You'll initially be in level flight. Bank the aircraft to the left by moving your joystick to the left. After a few seconds, level off and bank to the right by moving the joystick to the right. (If you don't have a joystick, use the **LEFT** and **RIGHT ARROW** keys to do the same.)

Press the **F1** key to access the **Full Screen View**. Check out beautiful San Francisco, below.

Use the throttle wheel on your joystick to increase your speed (or **KEYPAD +** to do the same).

Have fun!

(Press the **ESC** key at any time to quit flying.)

Please refer to the **Flight and Mechanical Control Hot Keys** section to learn the control scheme for your aircraft.

Keyboard Commands Summary

Tired of clicking that mouse?
Did you forget to buy that joystick when you rushed out to pick-up *Flight II*?

Have no fear—we've got you covered:

- **Global User Interface Hot Keys**
- **Flight and Mechanical Control Hot Keys**
- **Camera View System Hot Keys**
- **Communication System Hot Keys**
- **Navigation System Hot Keys**
- **Flight Planner Hot Keys**

Aircraft Histories

The five civilian aircraft featured in *Flight II* represent a diverse blend of aviation, old and new. From the classic *P-51D Mustang* to the seaworthy *de Havilland Beaver* to the tried and true *Beech Baron*, each presents a unique flying experience born of colorful backgrounds.

- **Piper Arrow PA-28R-200**
- **DHC-2 De Havilland Beaver (Canada)**
- **Raytheon Aircraft Beech Baron 58 (United States)**
- **North American P-51D Mustang (United States)**
- **Trainer (United States)**

Piper Arrow PA-28R-200 (United States)

In 1967, *Piper* introduced the *PA-28R Arrow*™, a streamlined, single-engine aircraft destined for success. A direct descendant of the *Cherokee 180*, this aircraft used the then-new "T-throttle" power quadrant, and a modernized instrument panel. The addition of retractable landing gear gave the *Arrow* the ability to move as a contender into the light retractable aircraft market.

Since its introduction, the *Arrow* has gone through many incarnations, including the *Arrow II* (1972) built with a five inch-longer fuselage, the *Arrow III* (1977) with the *Piper Warrior ™* tapered wing, and the new *Turbo Arrow ™* (1988, previously known as the *Turbo Arrow III)*, with an improved instrument panel and a standard backup electric vacuum pump.

The *Arrow* is one of three trainer aircraft currently made by *New Piper Aircraft*. Built with a 200 horsepower *Lycoming* engine, this plane has a cruising speed of 131 knots, and a cruising range of 750 nautical miles. New pilots are advised to try this aircraft as a step up from the *Trainer*, as the *Arrow* is somewhat faster.

DHC-2 de Havilland Beaver (Canada)

Created in the 1940's for use in the Canadian bush, the *DHC-2 de Havilland™ Beaver* is a durable aircraft well suited for exploration. A six-seater, it has the capacity for fairly heavy loads. The *Beaver* was originally developed with a radial *Pratt & Whitney R-98* engine, producing a maximum of 400 horsepower. Later, the design was upgraded to a 450 horsepower engine. The first *Beaver* flight took place in 1947, making 1997 the *Beaver's* fiftieth anniversary. In the years following this aircraft's maiden flight, 986 were purchased by the United States Army and Air Force. The Beaver's all-metal construction, high-lift wing, and versatile flap system have made it a successful and rugged flying machine. Its capacity for short takeoffs and landings is unmatched in its class. Although often fitted with floats or skis, it is equally at home on wheels.

Pilots new to the *Beaver* are advised to keep a watchful eye on airspeed and bank angles during climb as the aircraft in *Flight II* is equipped solely with floats. The resulting additional vertical surface can cause some directional instability.

Raytheon Aircraft Beech Baron 58 (United States)

The prototype for this twin-engine aircraft first flew in 1960, and was a descendant of the *Beech Bonanza*. The *Raytheon Aircraft Beech Baron 58®* boasts impressive power, derived from two 300 horsepower *Teledyne Continental IO-550-C* engines. It has an excellent reputation for all-weather capability. Originally a four-seat cabin monoplane, the *Baron* is now a four-to six-seater.

Although more focused towards business users than either the *Trainer* or *Arrow*, the *Baron* can be an excellent private aircraft. In 1965, the Model *95-B55* was selected as a twin-engine instrument trainer for the United States Army. By 1978, 2,188 *Barons* had been delivered to the civilian and military sectors. Today, the majority of the recently made *Barons*, and the one represented in *Flight II*, are the Model *58's,* although Model *55's* can still be found.

The *Baron* is manufactured by the *Beech Division* of *Raytheon Aircraft*, one of the three major manufacturers of light aircraft in the United States, and a subsidiary of the *Raytheon Corporation*.

North American P-51D Mustang (United States)

Possibly the best known combat aircraft of World War II, the *P-51D Mustang* is considered one of the most versatile fighters ever made. Designed and built in record time (under 120 days), the *P-51* was truly an impressive feat of engineering.

Although its airframe is somewhat heavier in construction than its contemporaries, the *P-51* was known for its extreme power combined with its reliability and maneuverability. Originally fitted with an *Allison V-12*, the *P-51* was eventually given a *Rolls Royce Merlin* two-speed, two-stage supercharger engine to counter the weight of its solid airframe.

Best remembered as an escort fighter during the US Eighth Air Force's daylight bombing offensive against Germany, the *P-51D* became the mainstay of the US Army Air Force during the last year of the war. Post WWII, the aircraft was adapted for racing and sport, with its production resuming in the 1950's as it came to be used during the Korean War. Today, the venerable *P-51* is still cherished and in high demand; approximately 100 highly-modified *P-51's* are privately owned and flown.

Despite its reputation for being stable and fairly easy to fly, the *P-51D Mustang* can be trouble if its pilot is unfamiliar with the aircraft's limitations. A light touch, and some judicious use of rudder, are initially suggested for the inexperienced pilot.

Trainer (United States)

The first *Trainer* was built in 1955, but the model is still being manufactured today. It has always enjoyed great popularity, and has been evolving and improving since its creation. Although its origin and main area of production is in the United States, a smaller number are manufactured in France.

This lightweight, single-engine piston aircraft is often used for training new pilots, both civilian and military. Its large, electronic flaps make maneuvering surprisingly easy, although misuse of them on the ground in strong winds can sometimes result in difficulties. A four-seater, it is also commonly used as a recreational aircraft. Using a *Textron Lycoming* fuel-injected engine, this small plane produces 160 horsepower, at 2,400 RPM.

Game Interface

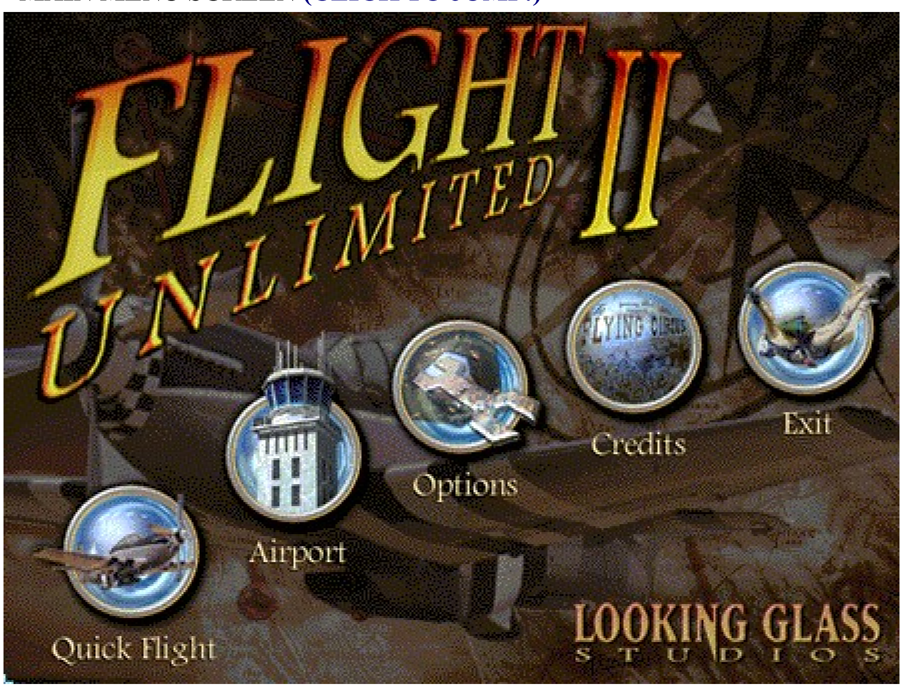
We've taken great pains to make the game interface for *Flight II* as accessible and as intuitive as possible. There are three major areas present, and it all starts with the *Main Menu*...

- **The Main Menu**
- **Quick Flight**
- **The FBO**

The Main Menu

MAIN MENU SCREEN (CLICK TO VIEW POP-UPS:)

MAIN MENU SCREEN (CLICK TO JUMP:)



This is the screen to which you'll always proceed once *Flight II* has finished loading.

Click on one of the five available icons to select its function:

- QUICK FLIGHT
- AIRPORT
- OPTIONS
- CREDITS
- EXIT

Quick Flight

From the **Main Menu**, click on the following icon:

This will take you to the **QUICK FLIGHT SCREEN**:

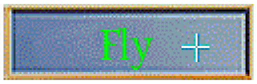
CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

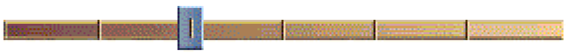
In *Quick Flight*, you will be given a default aircraft and setup the very first time *Flight II* loads. Thereafter, feel free to alter any settings as you see fit.

Your selection options here are varied, with choices ranging from your starting location on the map, to the airplane that will carry you, to the conditions in which you will fly:

Quick Flight Interface



For a **button** or **icon**, move the cursor over it to highlight it, and then click to select its feature.

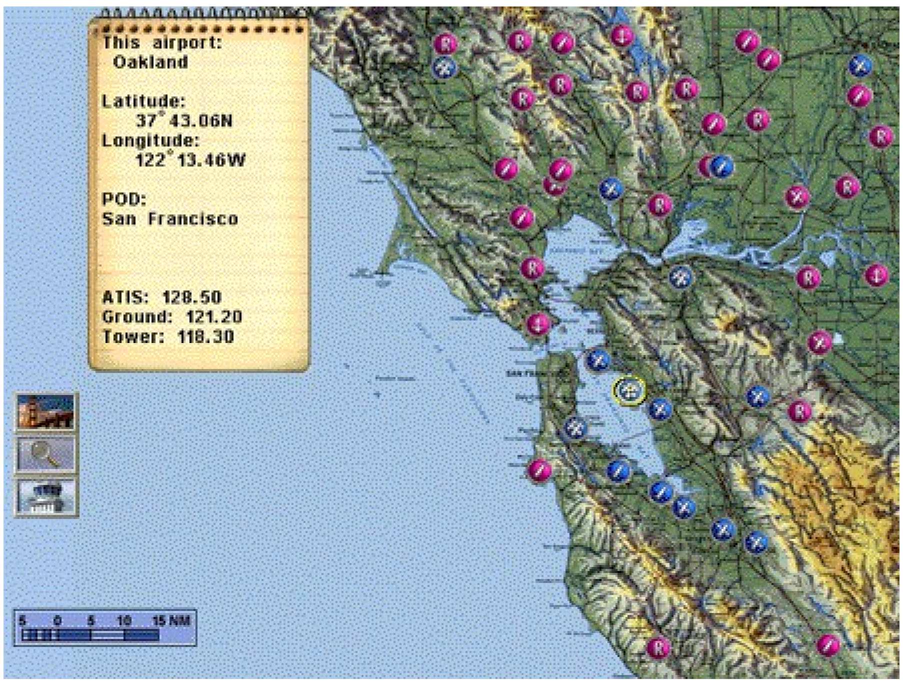


For **slider bars**, click, and while holding, drag the gray slider along the length of the bar to adjust the level of a particular option.

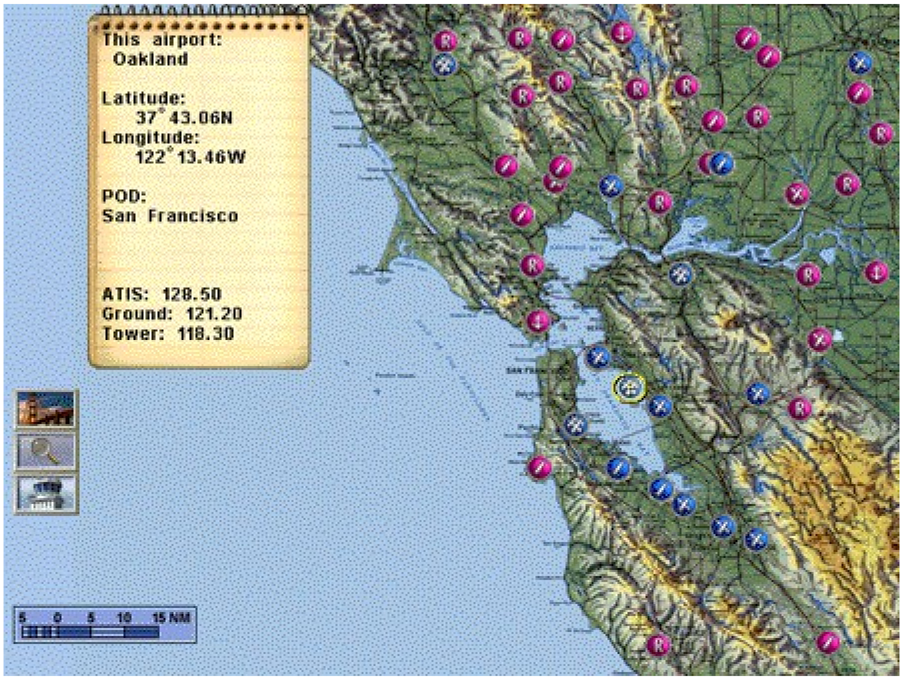
Select a Starting Location: The Quick Flight Map

Click on this button at the top of the **Quick Flight Screen** to bring up the **QUICK FLIGHT MAP**:

CLICK TO VIEW POP-UPS:



CLICK TO JUMP:



Use this relief map—identical to an actual sectional map of the San Francisco Bay Area—to choose the starting location for your aircraft.

You have two choices with which to begin your *Quick Flight*:

1) **On the ground at a selected airport.**
2) **In the air.**

Let's take a closer look at the features and functions of the map…

- **Airport Icons**
- **Points of Interest Feature**
- **Placing Your Aircraft at an Airport**
- **Placing Your Aircraft Anywhere Else**
- **Zoom Control**
- **Map Scale**
- **Quick Flight Notepad**
- **Exiting the Map**

Airport Icons

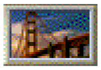
Notice the colored icons sprinkled about the map. These are the *Airport Icons*, representing **15** *Controlled Airports* and **31** *Uncontrolled Airports* (including **15** *Private Airfields* and **3** *Maritime Airports*), for a total of **46** FBO's or *Fixed Base of Operation* buildings. (*For additional details on the distinction, please refer to* **Uncontrolled vs Controlled Airports**.)

These icons are present on the **Quick Flight Map**, **Airport Selector Map**, **Flight Planner Map**, and **In-Flight Map**.

Blue denotes controlled airports and **magenta** denotes uncontrolled airports.

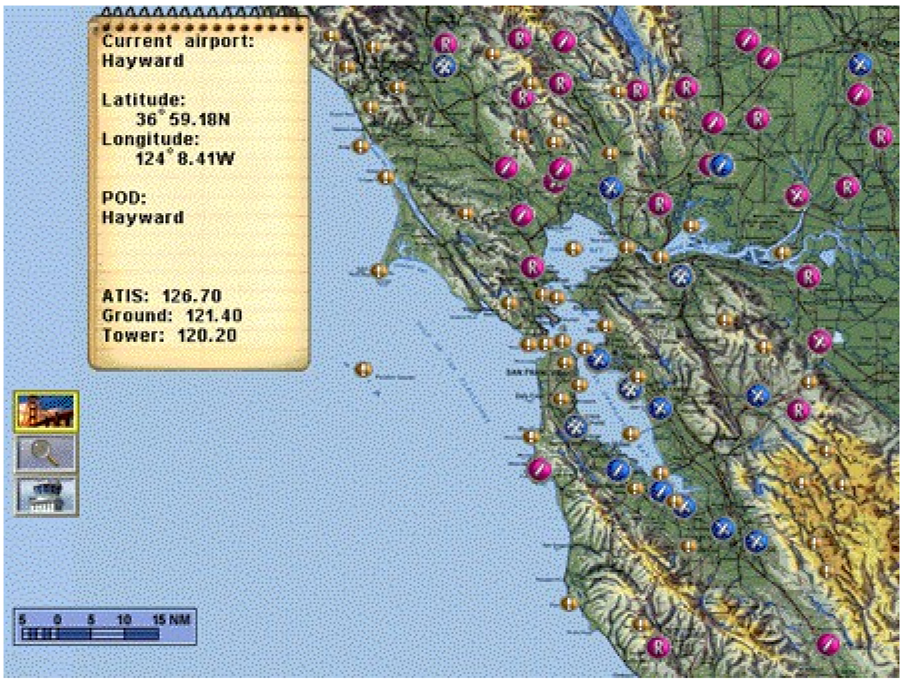
Each airport icon is displayed by type, size, and control status:

Points of Interest Feature

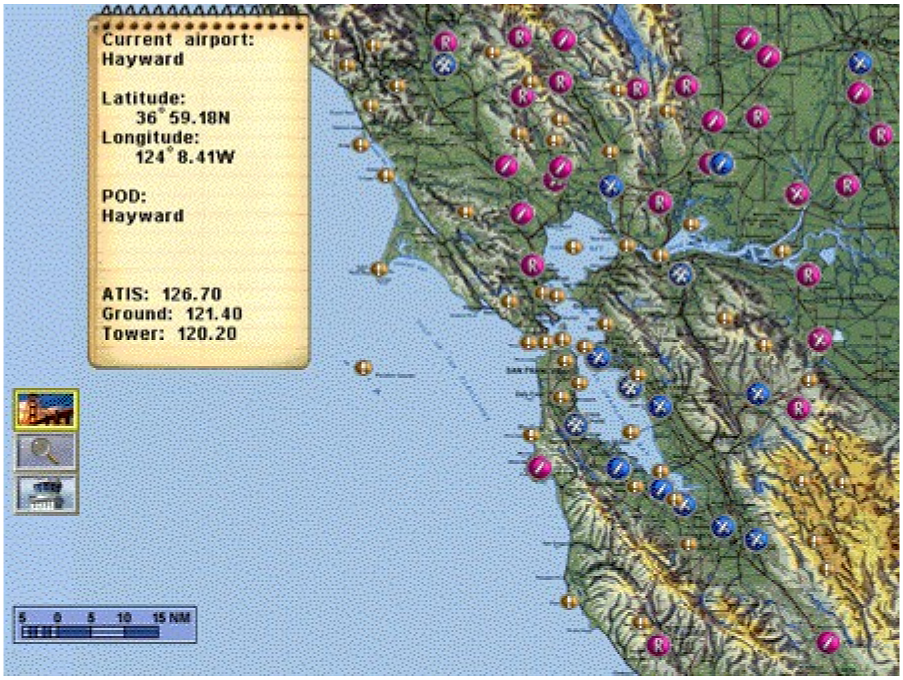


Click on this button at the **Quick Flight Map** to toggle the points of interest map layer on and off:

QUICK FLIGHT MAP WITH POINTS OF INTEREST (CLICK TO VIEW POP-UPS:)



QUICK FLIGHT MAP WITH POINTS OF INTEREST (CLICK TO VIEW POP-UPS:)



The *Points of Interest* layer shows you many of the major landmarks in the San Francisco Bay Area, useful for VFR navigating and planning sightseeing tours.

 Gold icons with exclamation marks illustrate the specific locations of each major landmark. Pass the mouse cursor over one of the icons to bring up the name of the landmark under the **Points of Interest** heading on the first page of the **Quick Flight Notepad**.

Placing Your Aircraft at an Airport

To select an airport on the **Quick Flight Map**, simply move the yellow cursor over one of the airport icons. The icon will become highlighted, and its name will appear in the **Quick Flight Notepad**. Either left or right-click to have the following pop-up menu appear:

This is the **QUICK FLIGHT AIRPORT POP-UP MENU**, which allows you to choose a starting position either on the ground or lined-up for a final approach at the *Quick Flight* map.

There are three types of buttons from which to make your selection:

- **PARKING RAMP**
- **TAKEOFF: RUNWAY [DESIGNATION]**
- **FINAL: RUNWAY [DESIGNATION]**

Parking Ramp Button

Click on the **PARKING RAMP** button from the **QUICK FLIGHT AIRPORT POP-UP MENU** to begin your flight stationed outside of the *Looking Glass Aviation* hangar. From here, you'll taxi out to the runway.

Once finished selecting your location, you'll immediately return to the **Quick Flight Map**. (*Note that some airports have multiple runways, so you may need to scroll down the menu via the scroll buttons.*)

Takeoff: Runway [Designation] Button

Click on the **TAKEOFF: RUNWAY [DESIGNATION]** button **QUICK FLIGHT AIRPORT POP-UP MENU** to begin your flight stationed at the end of the designated runway.

Once finished selecting your location, you'll immediately return to the **Quick Flight Map**. (*Note that some airports have multiple runways, so you may need to scroll down the menu via the scroll buttons.*)

Final: Runway [Designation] Button

Click on the **FINAL: RUNWAY [DESIGNATION]** button **QUICK FLIGHT AIRPORT POP-UP MENU** to begin your flight stationed two miles out and lined up for a perfect final approach to the designated runway.

Once finished selecting your location, you'll immediately return to the **Quick Flight Map**. (*Note that some airports have multiple runways, so you may need to scroll down the menu via the scroll buttons.*)

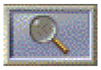
Placing Your Aircraft Anywhere Else

Clicking anywhere on the **Quick Flight Map** *except* an airport icon brings up the following pop-up menu:

This is the **ALTITUDE POP-UP MENU**. Click on a button to indicate the altitude (in feet) at which you'd like the aircraft to be positioned at the selected location. You have five possible choices: *500 feet*, *1,000 feet*, *3,000 feet*, *5,000 feet*, and *10,000 feet*.

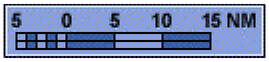
Once finished selecting your altitude, you'll immediately return to the **Quick Flight Map**.

Zoom Control



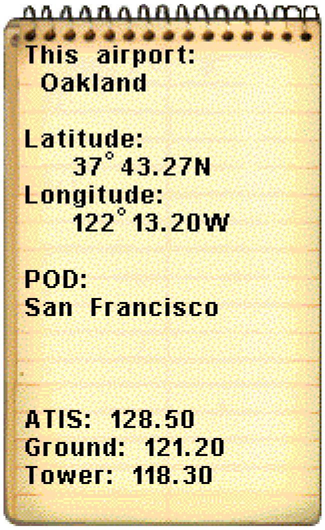
If you need to see greater detail in order to place your aircraft at a specific spot on the **Quick Flight Map**, **Airport Selector Map**, **Flight Planner Map**, or **In-Flight Map**, click on the **ZOOM CONTROL** button located along the left-hand side of the respective map to bring up a **black** constraining box on the map. Place the box where you want and *left-click* to zoom in. Once zoomed in, left-click on the button again to zoom in again or *right-click* on the same button to zoom out. There are two zoom levels below the default to aid in the precise placement of your aircraft or to adjust the level of viewing detail.

Map Scale



All of the maps in *Flight II* (**Quick Flight**, **Airport Selector**, **Flight Planner**, and **In-Flight**) feature a map scale, read in nautical miles (NM), which automatically resizes as the **zoom level** of the given map is adjusted.

Quick Flight Notepad



The *Quick Flight Notepad*, shown in the upper left-hand corner of the **Quick Flight Map**, displays a single page with the following information:

This airport:
If the mouse cursor is located *over* an **airport icon**, this displays the name of that airport. If the cursor is *not* located over *any* airport icon, then this heading will instead read **Current Airport:** followed by the name of the *active* airport (i.e., the airport at which you are presently based). If the cursor is located over a **Points of Interest** icon, then this heading will read **Point of Interest**, followed by the name of the chosen landmark (e.g., *Golden Gate Bridge*).

Latitude/Longitude:
This displays positional information for the cursor, which is continuously updated as the cursor is moved about the map.

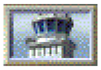
POD:
This displays your **Point of Departure**, referring to the airport out of which you're currently slated to fly.

The associated radio frequency for **This Airport** (if the cursor is located over an airport icon) or the **Current Airport** (if the cursor is not located over any airport icon) is always displayed at the bottom of the page, depending on the **airport type**:
ATIS: [frequency #]
Ground: [frequency #]
Tower: [frequency #]

UNICOM: [frequency #]

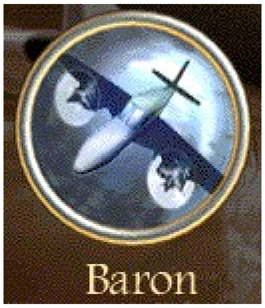
If it's a **Private Airfield**, then the following is displayed:
Private Field
No Radio

Exiting the Quick Flight Map



If you wish to leave the **Quick Flight Map** at any time, click on the **AIRPORT** button located in the lower left-hand corner of the map to return to the **Quick Flight Screen**, or press the **ESC** key.

Choose Your Aircraft



Click on the *Aircraft Selector* icon at either the **Quick Flight Screen** or **Modified Quick Flight Screen** to cycle through the five flyable aircraft featured in *Flight II*:

- **Trainer**
- **Piper Arrow**
- **de Havilland Beaver**
- **Beech Baron**
- **P-51D Mustang**

The default aircraft is the **Trainer**.

Select Fuel Load

Use this slider bar at the **Quick Flight Screen** or **Modified Quick Flight Screen** to adjust the level of fuel with which to take off. There are five available settings: *¼ Full*, *½ Full*, *¾ Full*, *Full*, and *Unlimited*.

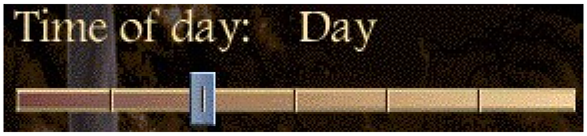
The default fuel load is **Full**.

Choose Weather Conditions

Use the listed slider bars and icons at the **Quick Flight Screen** or **Modified Quick Flight Screen** to change the following weather-related variables:

- **Time of Day**
- **Wind Speed**
- **Wind Direction Indicator**
- **Cloud Cover**
- **Cloud Ceiling**
- **Rain**
- **Fog**
- **Haze**

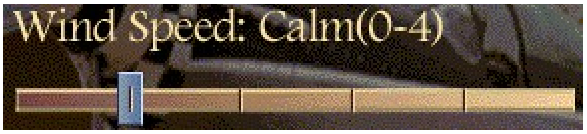
Time of Day



Use this slider bar at the **Quick Flight Screen** or **Modified Quick Flight Screen** to adjust the time of day.

There are six available settings: *Dawn*, *Sunrise*, *Day*, *Sunset*, *Twilight*, and *Night*. The default is **Day**.

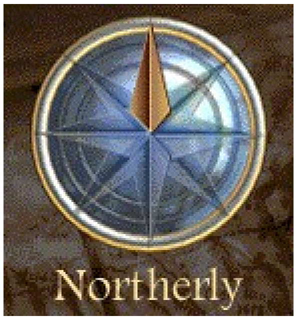
Wind Speed



Use this slider bar at the **Quick Flight Screen** or **Modified Quick Flight Screen** to adjust the speed of the wind.

There are four available settings (indicated in *knots*): *Calm* (0-4*), Light* (5-9), *Moderate* (10-20), and *Strong* (21-35). The default wind speed is **Calm (0-4)**.

Wind Direction Indicator



Use this circular wheel at the **Quick Flight Screen** or **Modified Quick Flight Screen** to change the direction of the wind in set increments.

Each click of the wheel rotates the direction indicator clockwise. There are eight cardinal positions available: *Northerly (340 to 020)*, *Northeasterly (030 to 060)*, *Easterly (070 to 110)*, *Southeasterly (120 to 150)*, *Southerly (160 to 200)*, *Southwesterly (210 to 240)*, *Westerly (250 to 290)*, and *Northwesterly (300 to 330)*. The default wind direction is **Northerly**.

(*For additional details regarding the wind model implemented for Flight II, refer to* **A Note on the Weather System: Winds** .)

Cloud Cover

Use this slider bar at the **Quick Flight Screen** or **Modified Quick Flight Screen** to adjust the type of cloud cover. There are five available settings: *Clear*, *Few*, *Scattered*, *Broken*, and *Overcast*. The default cover is **Clear**.

Cloud Ceiling

Use this slider bar at the **Quick Flight Screen** or **Modified Quick Flight Screen** to adjust the top/bottom ceiling height for the clouds. There are four available settings (indicated in *feet*): *1,000-3,000f*, *3,000-5,000f*, *5,000-10,000f,* and *10,000-20,000f*. The default ceiling is **3,000-5,000f**.

The **Cloud Ceiling** slider bar is useless if the **Cloud Cover** slider bar is set to *Clear*.

Rain

Use this slider bar at the **Quick Flight Screen** or **Modified Quick Flight Screen** to adjust the rain and thunder frequency.

There are four available settings: *None*, *Light*, *Moderate*, and *Heavy*. Thunder and lightning frequency will increase as the player cranks-up the scale. The default is **None**.

Both the **Rain** and **Cloud Cover** slider bars are tied to one another, so selecting *Light Rain*, for example, will automatically set the cloud cover to *Overcast*. After all, you can't have rain without clouds!

Fog

Use this slider bar at the **Quick Flight Screen** or **Modified Quick Flight Screen** to turn the fog effects on and off.

The default is **Off**.

Haze

Use this slider bar at the **Quick Flight Screen** or **Modified Quick Flight Screen** to set the level of hazing.

There are five increments (indicated in *miles*): *30 miles*, *20 miles*, *10 miles*, *5 miles*, and *1 mile*. The default is **20 miles**.

A Note on the Weather System: Winds

The local wind, at any given point, is comprised of three factors:

- **Prevailing Winds**
- **Updrafts/Downdrafts**
- **Turbulence**

Each of these, in turn, has several contributing factors. Given that weather settings in *Flight II* are global, local weather systems are not modeled. However, when a **rain** level is specified at the **Quick Flight Screen**, conditions for the inside, leading edge of the storm are extended globally.

Prevailing Winds

The prevailing winds reflect the user-specified wind speed and direction at the given **FBO's** (*Fixed Base of Operation*) altitude from the **Quick Flight Screen**. The speed (but not direction) of this wind varies with altitude, increasing at elevations greater than the FBO's, and decreasing at lower elevations. There is a maximum prevailing wind speed of 35 knots.

Updrafts/Downdrafts

The strength and direction of updrafts and downdrafts are derived from the presence of stormy conditions, the time of day, the type of terrain you're currently flying over (i.e., water, city, etc.), and the topography of the terrain (i.e., flat or mountainous).

When a **rain** level is specified at the **Quick Flight Screen**, storm conditions are activated which calculate the winds as if the player were flying within the leading edge of the storm. This means updrafts increase in intensity with altitude, until the upper cloud layer altitude is exceeded, at which point there's a slight downdraft. Eventually, the downdraft tapers off with altitude.

At night, urban areas and water, being warmer than the surrounding land, will generate updrafts. During the day, water, which is cooler than the surrounding terrain, will generate downdrafts, which, once again, dissipate with altitude.

Mountainous terrain will generate both updrafts and downdrafts proportional to the slope of the terrain, and the velocity of the prevailing winds at altitude. The windward side of the mountain (i.e., that side facing the wind) will generate updrafts, while the other (leeward) side will generate downdrafts. These updrafts/downdrafts dissipate with altitude.

Turbulence

Turbulence, much like **updrafts/downdrafts**, is affected by the presence of a cloud deck, the time of day, the type of terrain, and the terrain topology.

Turbulence is strongest at the cloud deck altitude. If it is a clear day, then there is turbulence due to uneven ground heating. This is affected by altitude.

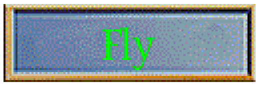
There is always turbulence over water, except during dawn, when the ground heating is most even. At night, there is also turbulence over urban terrain.

Turbulence additionally exists on the windward side of a mountain, with its strength proportional to the speed of the prevailing wind, and the slope of the mountain.

Lastly, turbulence exists in the form of *jet wash* emanating in the wake of large jet aircraft.

Get Going

When you've finished tweaking all of the available options at the **Quick Flight Screen**, click on the following buttons located at the bottom of the screen to:



Takeoff with the currently selected options

Reset the original Quick Flight defaults

Create a random scenario using all options

Return to the Main Menu

All *Quick Flight* variables are remembered between flying sessions (i.e., the same settings will be present when you return). Furthermore, note that *Quick Flights* are *not* tracked in the **Logbook**.

The FBO

The FBO (or *Fixed Base of Operation* building) serves as your home base and control room at each airport. The FBO is where you go before and after flying, to access your logbook and make new choices in the game. When you first start *Flight II*, you will be based out of **San Francisco International Airport**.

- **FBO Screens**
- **Selecting an Airport**
- **Selecting an Aircraft**
- **Using the Logbook**
- **Accessing the Lessons**
- **Using the Object Viewer**
- **Accessing the Flight Planner**
- **Choosing a Mission**
- **Game Options**
- **Accessing the Online Manual**
- **Taking Off**
- **Exiting the FBO**

FBO Screens

There are two sizes of FBO's present in *Flight II*, represented by different artwork schemes:

- **Large (*Corporate* scheme)**
- **Small (*Mom and Pop* scheme)**

Large FBO's

SAN FRANCISCO FBO (CLICK TO VIEW POP-UPS:)

SAN FRANCISCO FBO (CLICK TO JUMP:)

Both large and small airports have similarly-themed FBO's and hotspot icons which enable various features in the game.

The name of the airport at which you are currently situated is indicated on the welcome sign above the door.

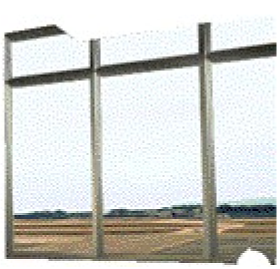
An icon will become highlighted once the mouse cursor is positioned over it. Simply click on the icon when you wish to select it to proceed to the relevant screen. Use the **ESC** key to cycle back to the **FBO** from these screens.

The following twelve icons are available:

The Wall Map

The Key Rack

The Logbook



The Window

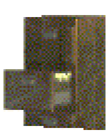
[The Blackboard]

[The Calendar]

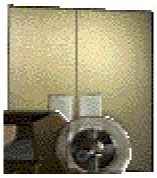
[The Course Plotter]

[The Teletype Machine]

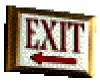
[The Tool Chest]



[The File Cabinet]



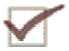
The Door



The Exit Sign

Small FBO's

COMMODORE CENTER (CLICK TO VIEW POP-UPS:)



COMMODORE CENTER (CLICK TO JUMP:)

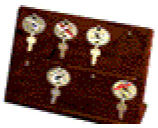
Both large and small airports have similarly-themed FBO’s and hotspot icons which enable various features in the game.

The name of the airport at which you are currently situated is indicated on the welcome sign above the door.

An icon will become highlighted once the mouse cursor is positioned over it. Simply click on the icon when you wish to select it to proceed to the relevant screen. Use the **ESC** key to cycle back to the **FBO** from these screens.

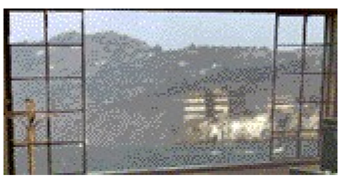
The following twelve icons are available:

The Wall Map

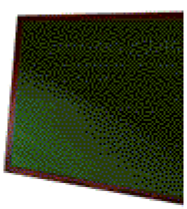


The Key Rack

The Logbook



The Window



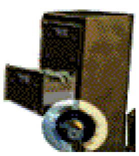
The Blackboard

The Calendar

The Course Plotter

The Teletype Machine

The Tool Chest



The File Cabinet

The Door

The Exit Sign

Selecting an Airport: The Airport Selector Map

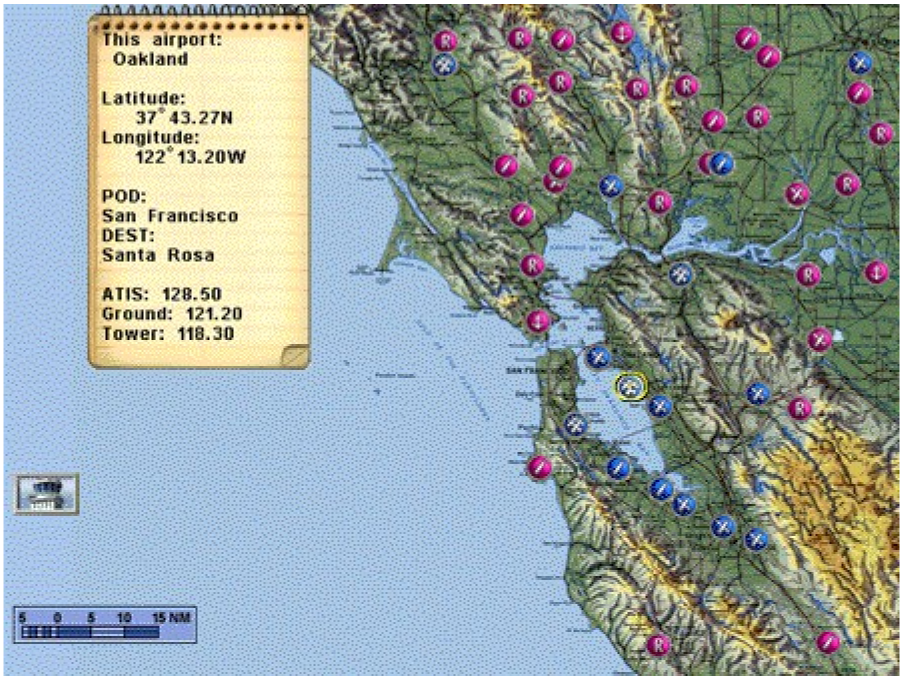
The name of the airport at which you are currently situated is indicated on the welcome sign above the door in each **FBO**.

To choose a new airport to fly out of, simply click on the *Wall Map* icon from the **FBO**.

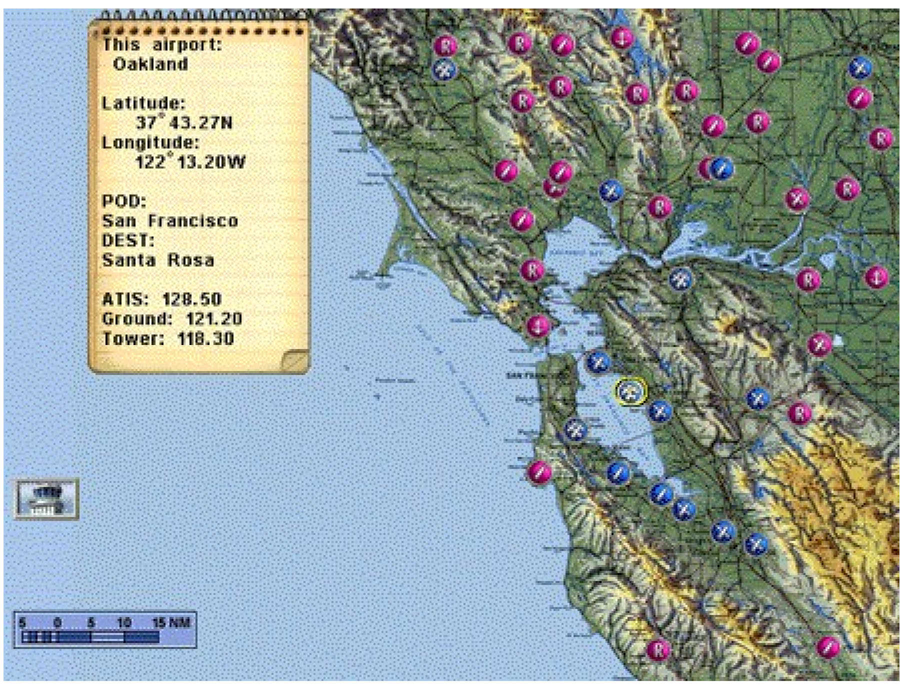
You may also click on the following icon from the **Main Menu**:

Both selections will bring you to the **AIRPORT SELECTOR MAP**:

CLICK TO VIEW POP-UPS:



CLICK TO JUMP:



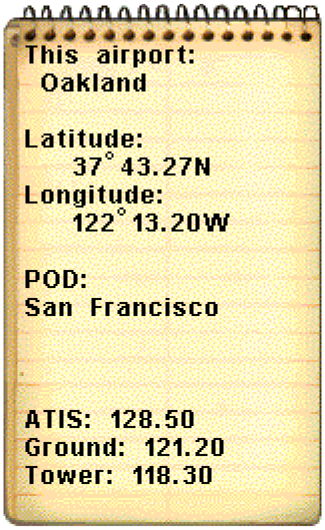
Use this relief map—identical to an actual sectional map of the San Francisco Bay Area–to quickly switch between the various FBO's.

Let's take a closer look at the features and functions of the map…

- **Airport Icons**
- **Airport Selector Notepad**
- **Map Scale**
- **Exiting the Map**

To select an airport, simply move the mouse cursor over one of the airport icons. The icon will become highlighted, and its name will appear in the **Notepad**. Left-click to proceed directly to the FBO for the new airport.

Airport Selector Notepad



The *Airport Selector Notepad*, residing by default in the upper left-hand corner of the **Airport Selector Map**, displays a single page indicating the following:

This airport:
If the mouse cursor is located *over* an **airport icon**, this displays the name of that airport. If the cursor is *not* located over *any* airport icon, then this heading will instead read **Current Airport:** followed by the name of the *active* airport (i.e., the airport at which you are presently based).

Latitude/Longitude:
This displays positional information for the cursor, which is continuously updated as the cursor is moved about the map.

POD:
This displays your **Point of Departure**, referring to the airport out of which you're currently slated to fly.

The associated radio frequency for **This Airport** (if the cursor is located over an airport icon) or the **Current Airport** (if the cursor is not located over any airport icon) is always displayed at the bottom of the page, depending on the **airport type**:
ATIS: [frequency #]
Ground: [frequency #]
Tower: [frequency #]
UNICOM: [frequency #]

If it's a **Private Airfield**, then the following is displayed:
Private Field
No Radio

Exiting the Airport Selector Map

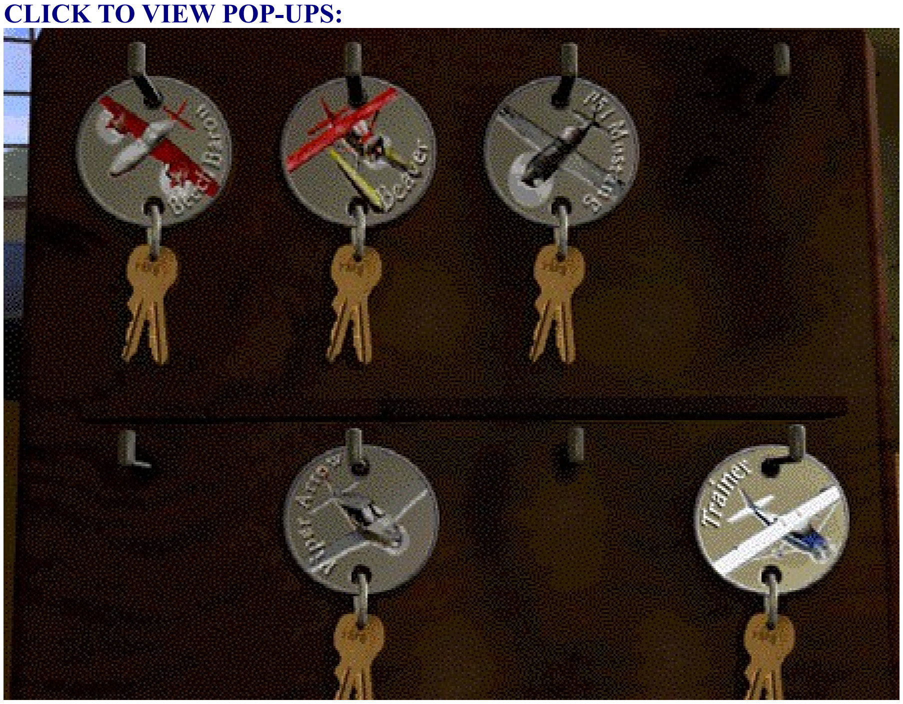
If you'd rather stay put instead of going to a different **FBO**, click on the **AIRPORT** button located in the lower left-hand corner of the **Airport Selector Map** to return to the current FBO, or press the **ESC** key.

Selecting an Aircraft: The Key Rack

Click on the *Key Rack* icon from the **FBO** to choose which aircraft you'd like to jump into.

The **KEY RACK SCREEN** will then appear:

CLICK TO VIEW POP-UPS:



CLICK TO JUMP:

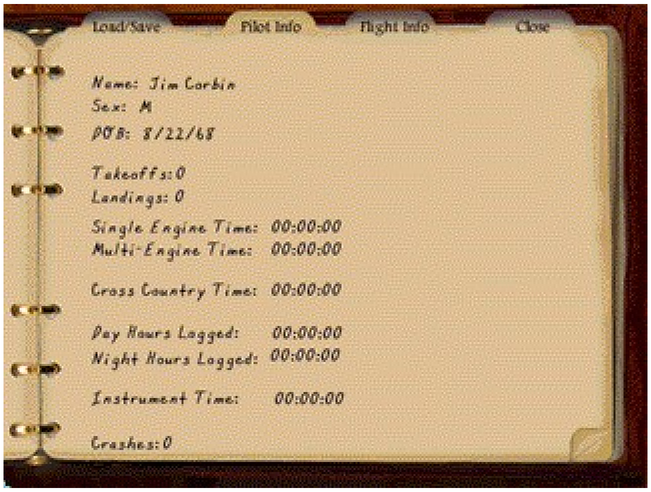
Move the mouse cursor over one of the aircraft key chains and left-click to choose that aircraft from one of the five flyable aircraft featured in *Flight II*:

- **Trainer**
- **Piper Arrow**
- **De Havilland Beaver**
- **Beech Baron**
- **P-51D Mustang**

The selected key chain will become highlighted and you will automatically return to the FBO. If you later come back to this screen, the currently selected key chain will remain highlighted, while the chains for the other aircraft will be grayed-out.

Click on the **ESC** key to return to the current **FBO**.

Using the Logbook



Like any pilot, you begin your flying career by starting a flight *logbook* (or log). In *Flight II*, the first thing you'll do when you begin a new log is to enter your name, sex, height, and date of birth in the spaces provided on the second "page."

Let's take a closer look at the various features and functions…

- **What it is?**
- **Accessing the Logbook**
- **Logbook Interface**
- **Viewing Pilot Information**
- **Loading, Creating, and Deleting Logbooks**
- **Viewing Flight Information**
- **Exiting the Logbook**

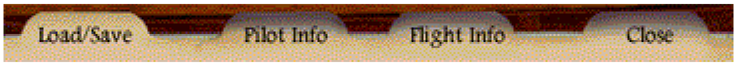
What is it?

The **logbook** or "pilot's log," as it's commonly referred, keeps a record of your flying experiences. Every time you fly, *Flight II* will automatically enter information about your flying session into the log. Each **entry** in your log displays which aircraft you flew and where, and for how long you flew (among other details). You may also add personal comments regarding individual flight sessions.

Accessing the Logbook

The **logbook** is accessed by clicking on the *Logbook* icon from the **FBO**. This will open your active logbook to the default **Load/Save Page**.

Logbook Interface



When you open the **logbook**, a screen displaying the interior of the book will appear, with four tabs running along the top. Three of the tabs illustrate "sections" of the logbook, where the various features of the log are accessed. The fourth basically serves as a button.

In order, they are:

Load/Save: This tab takes you to the **Load/Save page** where you may *Load* an existing logbook, *Create* and automatically *Save* a new logbook, or *Delete* an old logbook.
Pilot Info: This tab takes you to the **Pilot Info page** where you may view biographical and flight information on the selected pilot.
Flight Info: This tab takes you to the **Flight Info page** where you may view information on specific flights that the chosen pilot has already flown.
Close: This tab automatically *saves* the active logbook and returns you to the current **FBO**.

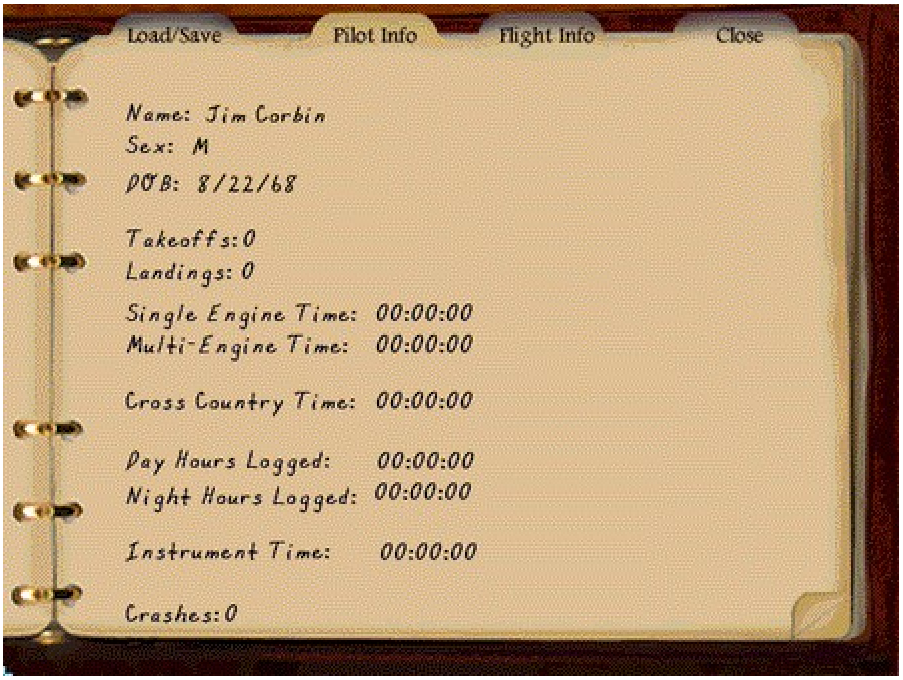
Click on a tab to "turn" to the first page of the selected section.

Once a section has been opened, if multiple pages within the section exist, a "dog-ear" crease will be present in the lower right-hand corner of the screen. (If only a single page of information exists, no crease will be present.) Click on it to cycle through one page at a time−left-click to advance forward and right-click to go back.

Viewing Pilot Information

Click on the ***Pilot Info*** tab at the **logbook** to turn to the *Pilot Info* page:

LOGBOOK (PILOT INFO PAGE) CLICK TO VIEW POP-UPS:



LOGBOOK (PILOT INFO PAGE) CLICK TO JUMP:

Here, you will enter biographical information and view flight data for the pilot maintaining the active log (if this information is not already present). Left-click on a given field to bring up the cursor, then type in your *name*, *sex*, and *date of birth* in the spaces provided. When you're finished typing on one line, use the **ENTER** key to cycle to the next. You may go back and change this information later at any time by clicking on a field and typing over the existing information.

Other flight-specific information presented here includes:

Takeoffs: The total number of times you've successfully taken off.
Landings: The total number of times you've successfully landed.
Single-Engine Time: The total number of flight hours logged in single-engine aircraft.
Multi-Engine Time: The total number of flight hours logged in multi-engine aircraft.
Cross Country Time: The cumulative number of flight hours logged in all aircraft.
Day Hours Logged: The total number of flight hours logged during the daytime.
Night Hours Logged: The total number of flight hours logged during the nighttime.
Instrument Time: The total number of flight hours spent in adverse weather conditions (e.g., cloudy or rainy conditions).
Crashes: The total number of times an aircraft you've flown has bitten the big one.

The information presented on this page is automatically tracked and updated for all subsequent flights for the given pilot. To view information regarding other pilots in the game, proceed to the **Load Save page** and load that pilot's logbook.

Loading, Creating, and Deleting Logbooks

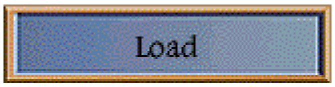
Click on the ***Load/Save*** tab at the **logbook** to turn to the *Load/Save* page:

LOGBOOK (LOAD/SAVE PAGE) CLICK TO VIEW POP-UPS:

LOGBOOK (LOAD/SAVE PAGE) CLICK TO JUMP:

This is the page to which you are initially taken when the logbook is opened in the **FBO**. A series of logbook names will appear in the space provided, representing saved sessions. You may maintain as many logbooks as your available hard drive space will allow.

The four buttons located at the bottom of the screen are used to access the following functions:



Load an existing logbook

To open an existing logbook, click on the **LOAD** button and then select the name of a logbook from the list. This will instantly become the active logbook.

Start a new logbook

Click on the **CREATE** button to bring up a text box that allows you to enter a unique name for the log. Type in what you want and press the **ENTER** key to accept the name of the new logbook. If you make a mistake or change your mind, click on the **ESC** key to cancel. Once the name of the new logbook has been selected, you will be taken immediately to the **Pilot Info page** to input your biographical information.

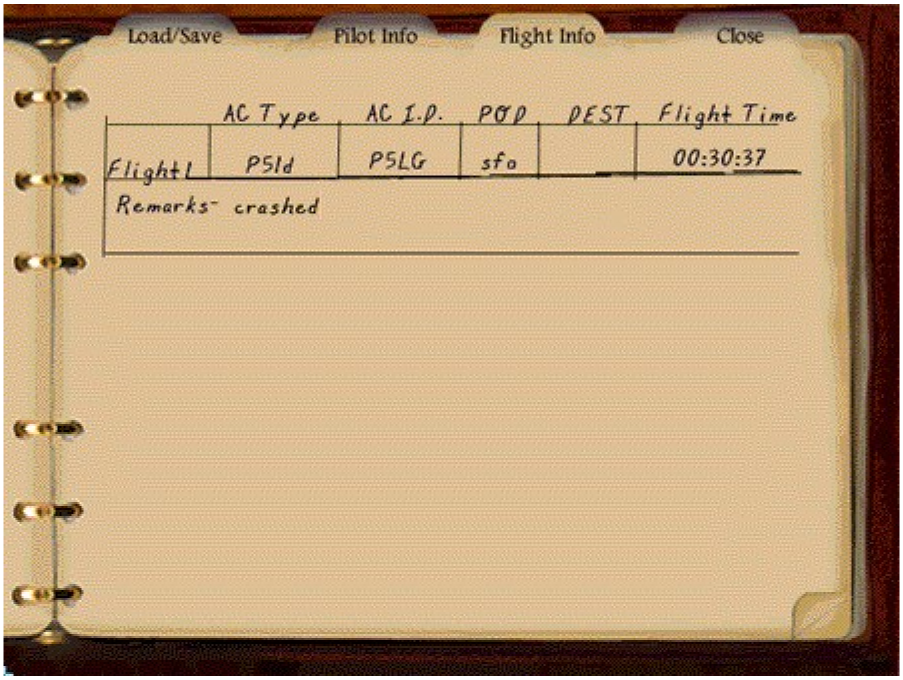
Delete an old logbook

Click on the **DELETE** button, move the cursor over the name of the logbook to highlight it, then left-click to remove that logbook from the list. If you make a mistake or change your mind, click on the **ESC** key to cancel.

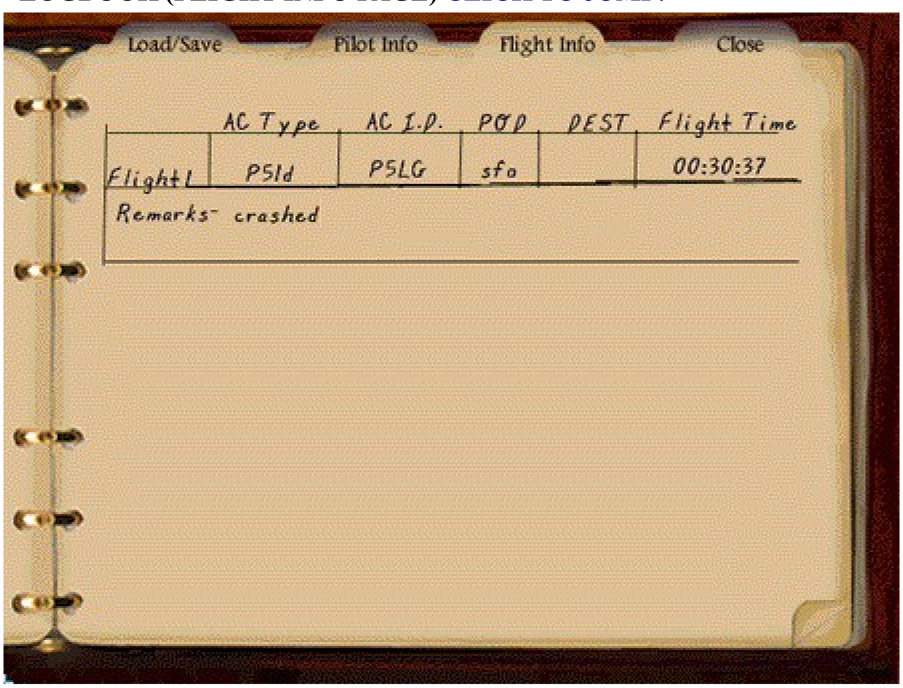
Viewing Flight Information

Click on the ***Flight Info*** tab at the **logbook** to turn to the *Flight Info* page:

LOGBOOK (FLIGHT INFO PAGE) CLICK TO VIEW POP-UPS:



LOGBOOK (FLIGHT INFO PAGE) CLICK TO JUMP:



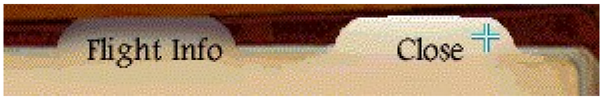
Each time you exit following a flying session or adventure, the *Flight Info* page of the logbook will automatically appear. This page displays data on the flight you just took. Subsequent flights are also available for perusal by clicking on the dog-ear crease in the lower right-hand corner of the screen. Left-click to advance a page and right-click to go back one.

The information provided here includes the following:

AC Type: This is the type of aircraft flown.
AC I.D.: This is the aircraft's identification number, which depends on the aircraft type (e.g., *Baron* = *B4LG*).
POD: This is the aircraft's point of departure.
DEST: This is the aircraft's destination airport.
Flight Time: This is the total time the flight took (recorded in hours, minutes, and seconds).

You may insert any comments regarding this particular flight into the field labeled ***Remarks***. Left-click within the box to bring up the cursor and type in up to two lines of text. When finished, use the **ENTER** key or left-click anywhere outside of the box, and the comments are instantly saved. You may go back and change this information later by clicking on the field and typing over the existing information.

Exiting the Logbook

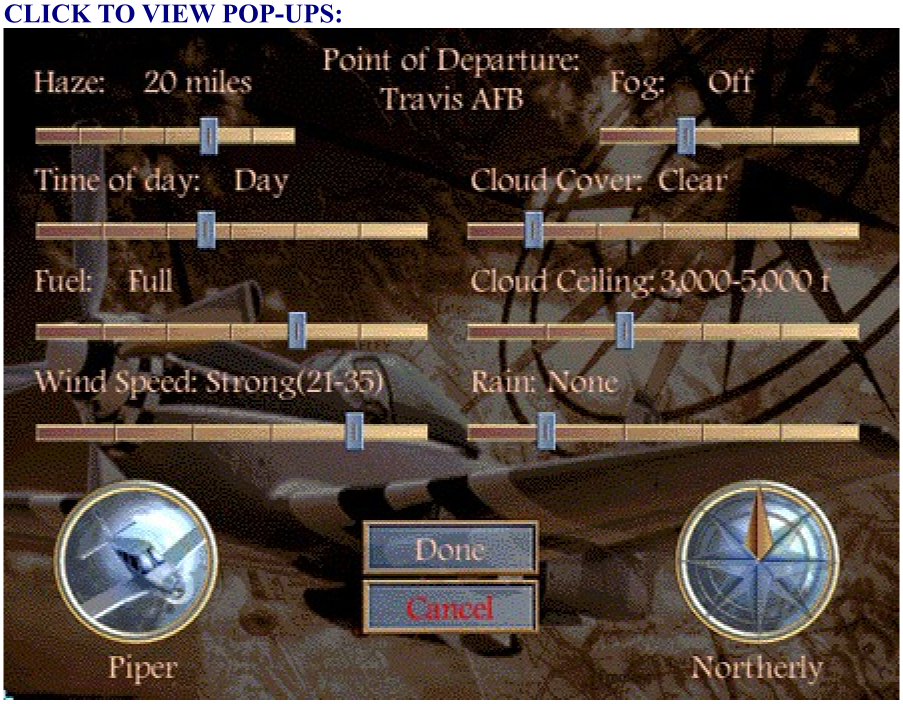


To exit the **logbook** at any time, click on the ***Close*** tab at the top of the screen, or press the **ESC** key. This will automatically save the active logbook and return you to the current **FBO**.

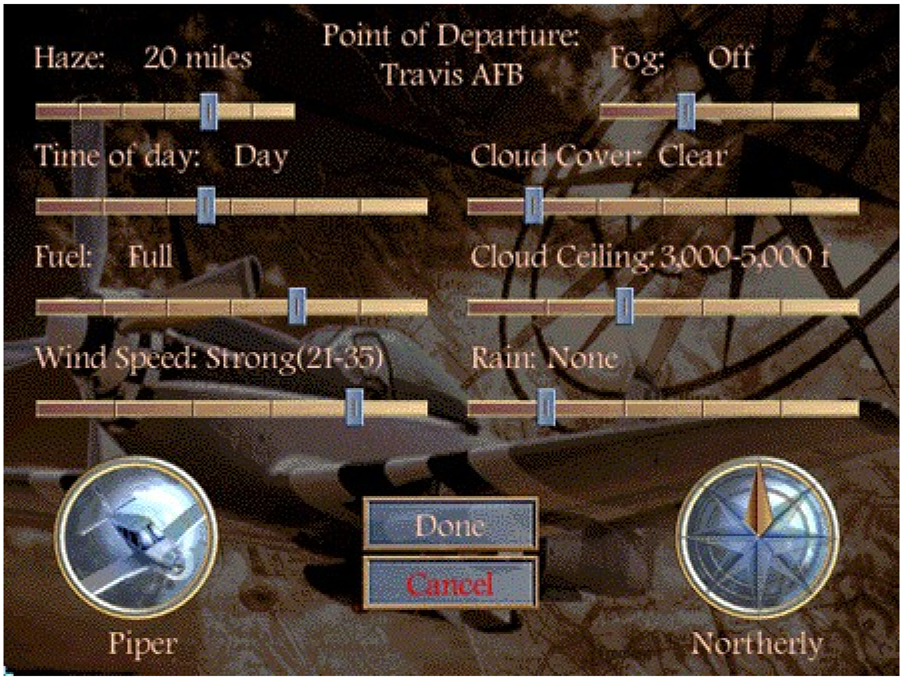
Changing Weather Options: The Modified Quick Flight Screen

Click on the *Window* icon from the **FBO** to access the **MODIFIED QUICK FLIGHT SCREEN**:

CLICK TO VIEW POP-UPS:



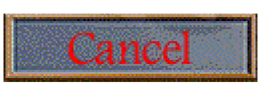
CLICK TO JUMP:



The *Modified Quick Flight* screen, which is also accesible from the **Flight Planner**, is ideal for quickly changing weather options without having to return to the **Main Menu** in order to access the standard *Quick Flight* options.

This screen contains settings which are identical to the regular **Quick Flight** screen. A **Point of Departure** heading at the top of the screen, indicating the active *P.O.D.*, replaces the normally present button to proceed to the **Quick Flight Map**. The icon in the lower left-hand corner allows you to select one of *Flight II's* five featured flyable aircraft.

Click on the **DONE** button to return to the active FBO after having entered your desired settings.

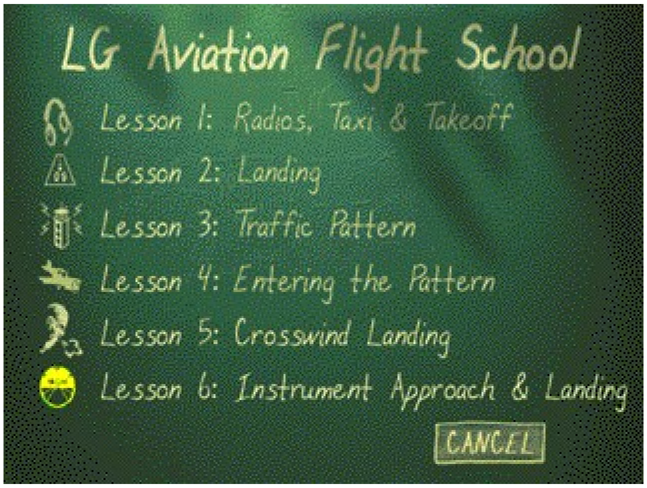


Click on the **CANCEL** button to return to the FBO or **Flight Planner Map** without accepting the current settings.

(*For additional details regarding the remaining selections on this screen, refer to* **Quick Flight**.)

Accessing the Lessons

Click on the *Blackboard* icon from the **FBO** to access the **BLACKBOARD LESSONS SCREEN**:



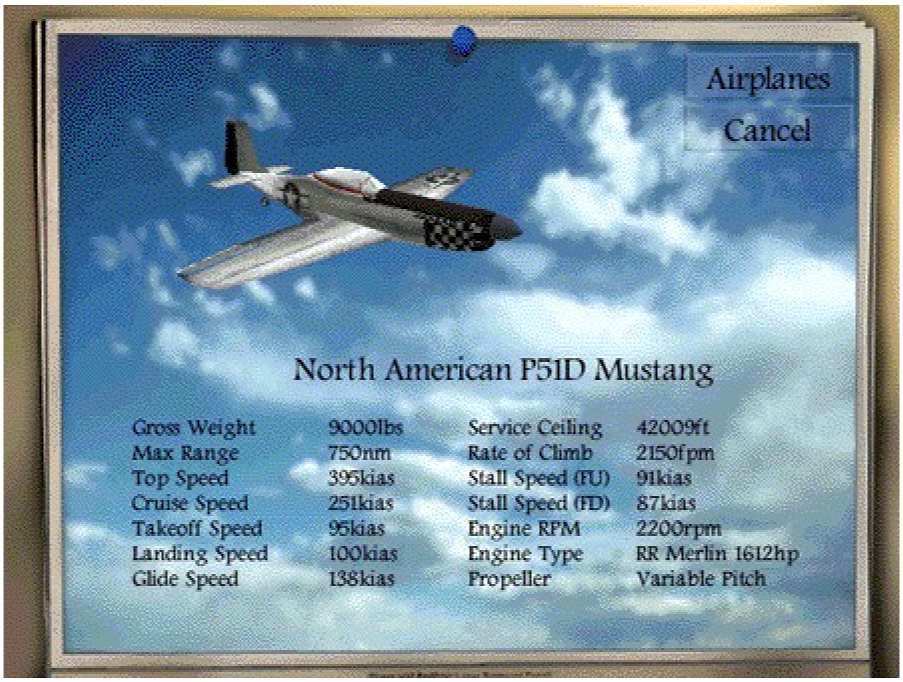
There are a total of six lessons available in *Flight II* which illustrate the fundamentals of civilian aviation and allow you to practice both basic and advanced flight maneuvers.

(*For additional details, refer to* **The Flight Lessons**.)

Using the Object Viewer

Click on the *Calendar* icon from the **FBO** to access the **OBJECT VIEWER SCREEN**:

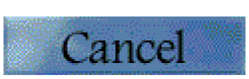
CLICK TO VIEW POP-UPS:



This screen consists of a 3-D object viewer where you may pitch and rotate (via mouse) both the flyable and tertiary aircraft featured in *Flight II*. The top half of the screen contains the image of the chosen aircraft. The bottom half of the screen contains a brief historical description, including specification details (where applicable) such as wingspan, weight, range, maximum speed, etc.

Note the pair of buttons residing in the upper right-hand corner of the screen:

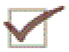
Left-click on this button to bring up a drop-down menu where you may left-click again to select an aircraft to view. Right-clicking on the menu will cycle to the next available object (top to bottom).



Left click on this button to return to the current **FBO**. You may also press the **ESC** key to do the same.

Once an object is displayed, use the mouse to maneuver it. Left-click on the area where the model is located and drag the mouse in the intended direction of rotation. Left-clicking and holding down the **ALT** key while simultaneously dragging the mouse forward and back will zoom the image in and out accordingly.

Accessing the Flight Planner

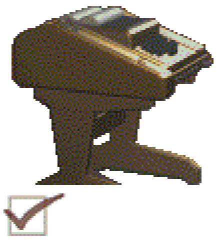


Click on the *Course Plotter* icon from the **FBO** to access the **FLIGHT PLANNER**:

Here, you may plot course settings for an upcoming flight on an explicit relief map.

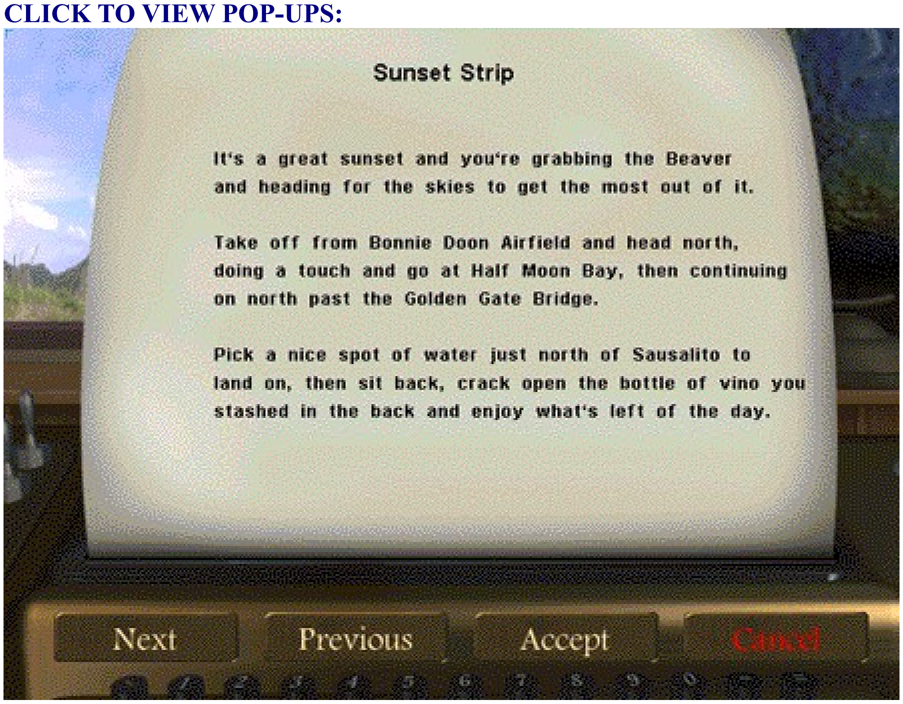
(*For additional details regarding use of the Flight Planner, refer to* **Flight Planning**.)

Choosing a Mission: The Adventures Screen



Click on the *Teletype* icon from the **FBO** to access the 25 pre-scripted flight plans called "adventures." The **ADVENTURES SCREEN** will appear:

CLICK TO VIEW POP-UPS:



The first mission is displayed on the opening page, along with a text description. When you're finished reading the description, click on the following buttons to:

Cycle to the ensuing page to view the next mission.

Cycle to the preceding page to view the previous mission.

Load the active mission. You will automatically return to the current **FBO** where you may go to the **Flight Planner** to view course details, **Key Rack** to view the selected aircraft, etc. When you're ready to actually fly the mission, click on the **Door** icon.

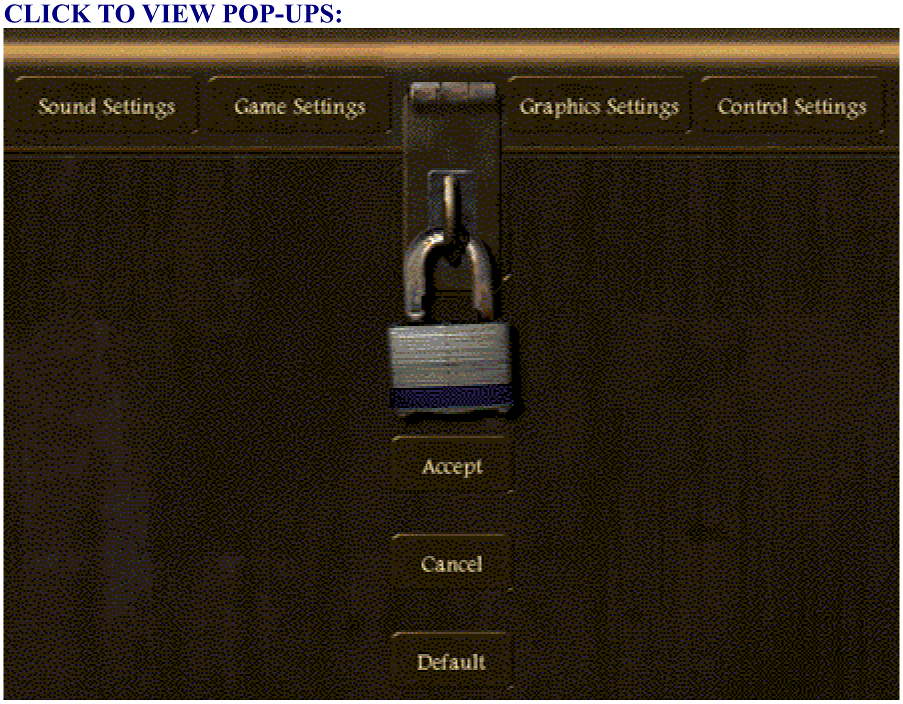
Return to the current **FBO** without accepting the mission.

Game Options: The Options Screen

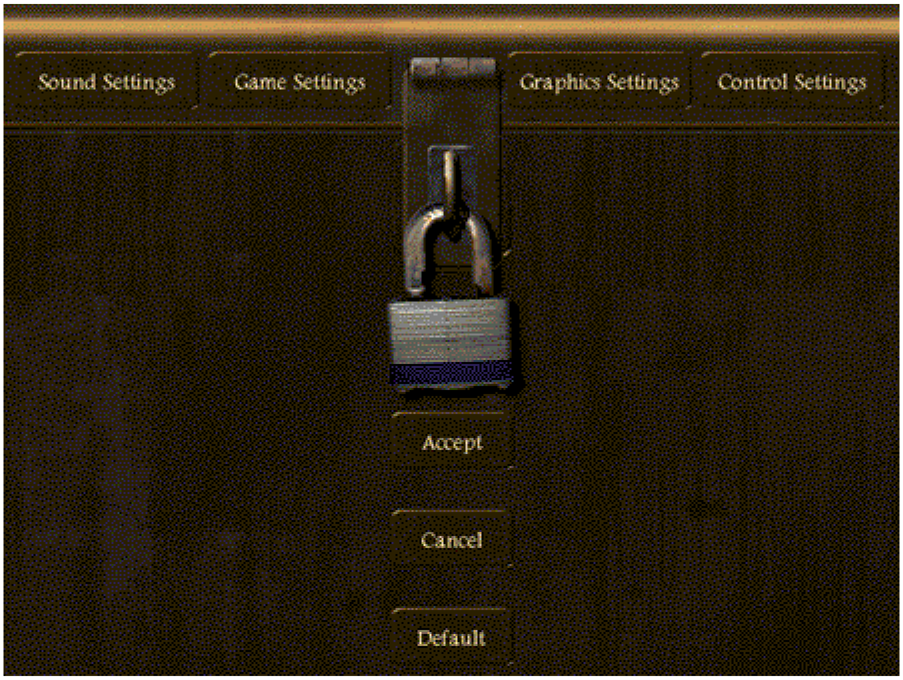
To change game options in *Flight II*, click on the *Tool Chest* icon from the **FBO** or click on the following icon from the **Main Menu**:

Both selections will bring you to the **OPTIONS SCREEN**:

CLICK TO VIEW POP-UPS:



CLICK TO JUMP:



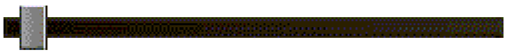
Use this screen to adjust various settings to suit both your hardware needs and personal preferences in four categories: **Sound**, **Gameplay**, **Graphics**, and **Control**. Left-click on one of the highlighted setting buttons running along the top of the tool chest "lid" to open up a panel beneath, displaying additional buttons and/or slider bars pertaining to that setting's category.

Let's take a closer look at the features offered…

- **Interface**
- **Sound Settings**
- **Game Settings**
- **Graphics Settings**
- **Control Settings**

Options Screen Interface

From the **Options Screen**, move the cursor over a given button to highlight it, and then left-click to select the button's feature.



Left-click and, while holding, drag the gray slider along the length of the bar to adjust the intensity level of a particular option. Settings range from *Low* (i.e., *minimum* intensity—all the way to the left of the bar) to *High* (i.e., *maximum* intensity—all the way to the right of the bar).

Click on the **ACCEPT** button when you're satisfied with the current settings. Any new option changes will be instantly saved, and you will return to either the current **FBO** or the **Main Menu**.

Click on the **CANCEL** button if you make a mistake at any time or choose not to change any settings. You will return to either the current **FBO** or the **Main Menu** with the original settings intact.

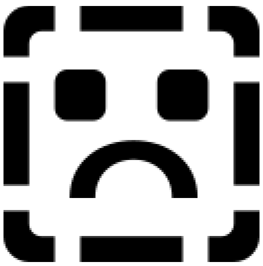
You may also click on the **ESC** key to exit the **Options Screen**.

Click on the **DEFAULT** button to restore all of the original settings to the *Options* screen.

Sound Settings

To adjust various options related to sound (i.e., what you are able to hear in *Flight II*), click on this button from the **Options Screen** to bring up the **SOUND SETTINGS SCREEN**:

CLICK TO VIEW POP-UPS:



CLICK TO JUMP:

The following options are available:

MASTER VOLUME

This slider bar adjusts the overall volume control in the game.

STEREO REVERSE

This button toggles between *Normal* and *Reverse* stereo operation, with the latter switching channels from right to left, and vice-versa (i.e., what you used to hear coming out of your *left* speaker will now emerge from your *right* speaker). The default is **Normal**.

SOUND EFFECTS

This slider bar adjusts the volume level of in-cockpit sound effects such as the sound of the landing gear during touchdown, the stress on the aircraft during high-g maneuvers, the sound of parts of the aircraft breaking off during a collision, etc.

ENGINE VOLUME

This slider bar adjusts the volume level of the engine.

PILOT VOICE

This button toggles between the six available male and female pilot voices (representing *your* voice when you initiate communication with air traffic controllers). The default is **Major Ed**.

AMBIENT SOUND

This button toggles *On* or *Off* external sound effects such as wind, rain, thunder, tertiary aircraft, etc. The default is **On**.

RADIO

This slider bar adjusts the volume level of **COM Radio** chatter.

CLOSED CAPTION

This button will toggle *On* or *Off* text appearing on the screen during COM radio operation for hearing impaired players. The default is **Off**.

Game Settings

To adjust various options related to gameplay (i.e., *Flight II*'s level of realism), click on this button from the **Options Screen** to bring up the **GAME SETTINGS SCREEN**:

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

The following options are available:

INVULNERABLE

This button toggles *On* or *Off* an option to make your aircraft invulnerable to all damage. The default is **Off**.

PROPELLER

This button toggles between *Manual* operation, where you have to use a control input to adjust propeller speed, and *Automatic* operation, which allows *Flight II* to automatically handle this feature. The default is **Automatic**.

ENGINE TORQUE

This button toggles *On* or *Off* engine torque, which is the tendency for the aircraft to want to roll to the left, an opposite reaction created by the effect of the right-rotating *crankshaft*, as the engine is increasing power upon takeoff. The default is **Off**.

AIRCRAFT TRAFFIC DENSITY

This slider adjusts the amount of air traffic buzzing about the San Francisco Bay Area. Selections include *None, Light* (roughly 100 aircraft)*, Medium* (roughly 200-300 aircraft), and *Heavy* (roughly 500-600 aircraft). The default is **Medium**.

ELECTRICAL FAILURE

This button toggles *On* or *Off* the possibility that your aircraft's electrical and/or communications systems will randomly fail. The default is **Off**.

ENGINE FAILURE

This button toggles *On* or *Off* the possibility that your aircraft's engine[s] will fail through either operational mishandling or random chance. The default is On. (*For additional details on how engine failures can occur, refer to* **Engine Failures**.)

AIR TURBULENCE

This button toggles *On* or *Off* the effects of air turbulence which, when encountered, cause your aircraft's frame to vibrate, making for a bumpy ride. The default is **On**. (*For additional details on the effects of air turbulence and how it's modeled in Flight II, refer to* **Turbulence**.)

COLLISIONS

This button toggles *On* or *Off* the possibility that your aircraft will collide with other aircraft or objects. The default is **On**.

COORDINATED RUDDER

This button toggles *On* or *Off* the auto-coordination feature for the rudder. The default is **On**.

GEAR DAMAGE

This button toggles *On* or *Off* the possibility that your aircraft's landing gear will receive any damage due to poor landings. The default is **Off**.

Graphics Settings

To adjust various options related to graphics (i.e., what you are able to see in *Flight II*), click on this button from the **Options Screen** to bring up the **GRAPHICS SETTINGS SCREEN**:

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

The following options are available:

SUN/MOON GLARE
This button toggles *On* or *Off* the lens flare created by looking at the sun through the canopy during the daytime as well as the glare of the moon at night. The default is **On**.

PERSPECTIVE CORRECTION
This button toggles perspective correction for the camera views (*On*, *Off*, and *Perfect*). The default is **On**.

CIRRUS CLOUDS
This button toggles *On* or *Off* the presence of cirrus clouds. The default is **On**.

DISTANCE CLIPPING/VISIBILITY
This slider bar adjusts how far off into the horizon the level of graphic detail is displayed.

3D ACCELERATION
Displays a list of *Microsoft® Direct 3D*-supported accelerator cards from which to choose.

TERRAIN DETAIL
This slider bar adjusts the level of graphic detail displayed in the terrain.

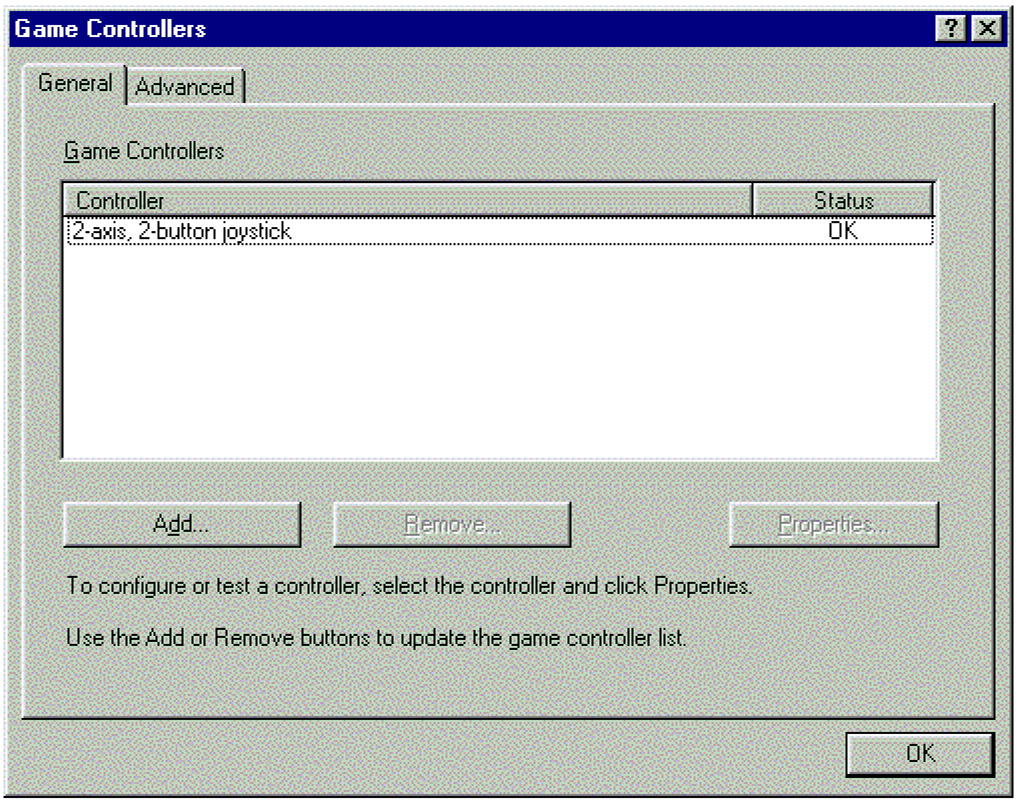
VIDEO RESOLUTION
This button lets you choose from among *Flight II*'s five supported levels of resolution: *512 x 384 (minimum)*, *640 x 400*, *640 x 480*, *800 x 600*, and *1,024 x 768 (maximum)*. The default is **640 x 480**. *Choose a lesser resolution if frame rates are sluggish on slower computers*. Use the **ALT M** key combination while in-flight to change resolutions on the fly.

GAMMA CORRECTION
This slider bar adjusts the brightness level of the game. This is a useful device for darker monitors and/or poorly-lit rooms.

LIGHTNING EFFECTS
This button toggles *On* or *Off* lightning effects, providing the **Rain** option is enabled in the **Quick Flight Screen**. The default is **On**.

Control Settings

Click on this button from the **Options Screen** to proceed to **Game Controllers** panel at the Windows 95 desktop:



Here, you will set up Windows 95 and *Flight II* to operate with your particular joystick. Once you've finished selecting and calibrating your joystick, close the appropriate panel and click on the minimized **FLIGHT 2** button running along the Windows 95 taskbar. You will then return to the *Options* screen where you last left the game.

If you are experiencing difficulties either setting up or calibrating your joystick, click **here**.

Accessing the Online Manual

Click on the *File Cabinet* icon from the **FBO** to access the **Flight Unlimited II Online Manual** which you are currently viewing. *Flight II* will temporarily minimize to the desktop while you view this Help File. To return to the game at any time, click on the X button located in the upper right-hand corner of the Help panel to close the file, then click on the **FLIGHT 2** button on the Windows 95 taskbar. You will return to where you last left the game.

Taking Off

Click on the *Door* icon from the **FBO** to head out to your aircraft. You will proceed directly to the player parking spot at the given airport following a brief loading screen.

Exiting the FBO

Click on the *Exit Sign* icon from the **FBO** (located above the blackboard) to return to the **Main Menu**. Pressing the **ESC** key while in the FBO will do the same.

Exiting Flight II

To leave *Flight II*, click on the following icon from the **Main Menu**:

You will immediately exit the game with no prompts.

You may also press the **ALT F4** key combination to exit the game from *anywhere* at *anytime*.

Global User Interface Hot Keys

The following Hot Keys may be accessed from most screens:

ESC -Exit Screen/Pop-Up

- Back out of the current game screen to the previous game screen (and/or return to the FBO).
- Quit flying and return to the FBO.
- Remove pop-up menu from the screen.

ALT F4 -Exit Flight II

Exit the game from anywhere.

(*To see a listing of all of the keyboard commands available in Flight II, please refer to* **Keyboard Commands Summary**.)

Cockpit Interface

When you first climb into the cockpit of one of the aircraft, you will be confronted will myriad gauges and indicators and levers, some of which you may manipulate, others you may only admire. We're going to make understanding all 33 modeled instruments as simple as A-B-C.

The Cockpit Views

- **VFR Cockpit View**
- **IFR Cockpit View**
- **Virtual Cockpit View**
- **Full Screen View**

POV Cockpits

There are three types of "Point of View" (P.O.V.) cockpit viewing systems implemented in *Flight II*:

1) **System 1**, known as the **VFR Cockpit View**, is a visual flying system that is tuned to navigating via landmark identification, unique to *Flight II*.
2) **System 2**, the **IFR Cockpit View**, is tuned to the seasoned pilot and hard-core player interested in instrument flying, particularly in poor weather conditions.
3) **System 3** is the **Virtual Cockpit View**, which is used for eye point camera slewing and tracking.

(*For the distinction between VFR or Visual Flight Rules and IFR or Instrument Flight Rules, refer to* **VFR vs IFR Navigation**.)

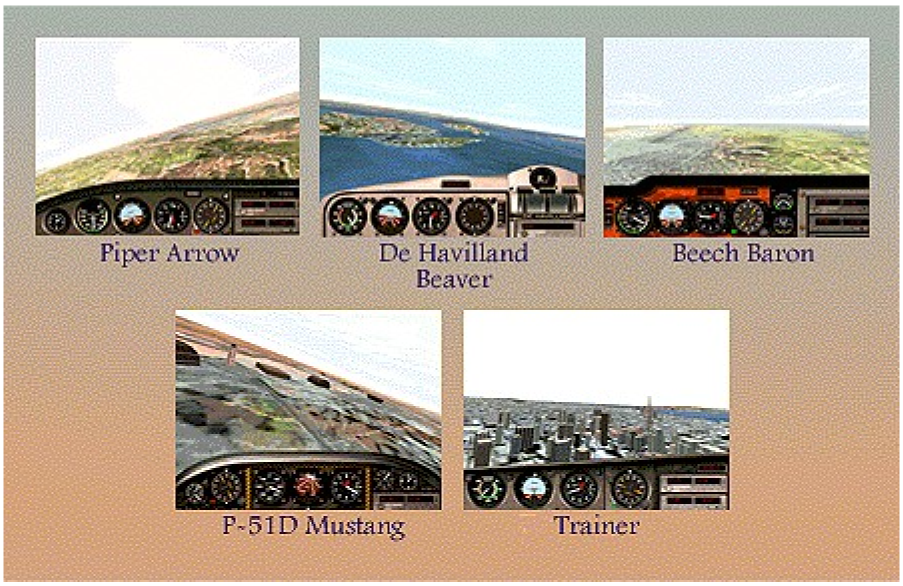
For maximum viewing enjoyment, a **Full Screen View**, devoid of all instrumentation, is also available.

VFR Cockpit View

The VFR Cockpit View (VFR SCAN Mode)

This ¼ screen view features the basic cockpit T-SCAN panel and **Radio Stack**, generally consisting of the **Airspeed Indicator**, **Attitude Indicator**, **Altimeter**, **Directional Gyro** and/or **VOR Indicator**, **Clock**, and the **Radio/NAV Instrument Panel**. This combination allows you to monitor the instruments while affording the best view of *Flight II'*s terrain. The **Tape Strip Indicator** is also available for those who want flight information by toggling the **F12** key.

CLICK TO JUMP:

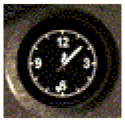


- **Piper Arrow VFR Cockpit**
- **De Havilland Beaver VFR Cockpit**
- **Beech Baron VFR Cockpit**
- **P-51D Mustang VFR Cockpit**
- **Trainer VFR Cockpit**

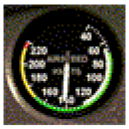
Piper Arrow VFR Cockpit

CLICK TO VIEW POP-UPS:

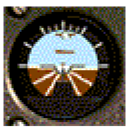
CLICK TO JUMP:



[Clock](#)



[Airspeed Indicator (ASI)](#)



[Attitude Indicator (AI)](#)

[Altimeter](#)

[Landing Gear Transit Light](#)

[Directional Gyro (DG)](#)

[VOR Indicator](#)

[ILS Marker Beacon Lights]

[COM Radio]

[ILS Radio]

[Navigation (NAV) Radio]

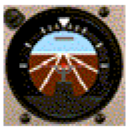
[Distance Measuring Equipment (DME)]

De Havilland Beaver VFR Cockpit

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

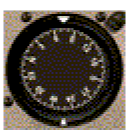
Airspeed Indicator (ASI)



Attitude Indicator (AI)

Altimeter

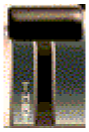
Clock



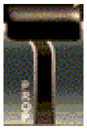
Directional Gyro (DG)

Flaps Indicator

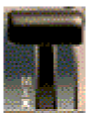
Magnetic Compass



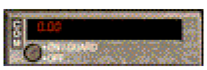
Throttle Control Lever



Propeller Control Lever



Mixture Control Lever



COM Radio

Beech Baron VFR Cockpit

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

Flaps Indicator

Airspeed Indicator (ASI)

Attitude Indicator (AI)

Clock

Altimeter

ILS Marker Beacon Lights

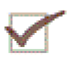
Directional Gyro (DG)

VOR Indicator

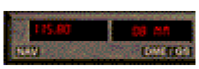
Manifold Pressure Gauge (Split)

Fuel Gauge (Split)

COM Radio



ILS Radio



Navigation (NAV) Radio

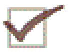
Distance Measuring Equipment (DME)

P-51D Mustang VFR Cockpit

CLICK TO VIEW POP-UPS:

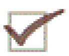
CLICK TO JUMP:

Oil Temperature Gauge (Dual)



Oil Pressure Gauge (Dual)

Directional Gyro (DG)



VOR Indicator

Airspeed Indicator (ASI)

Attitude Indicator (AI)

Altimeter

Accelerometer

Clock

ILS Marker Beacon Lights

COM Radio

ILS Radio

Trainer VFR Cockpit

CLICK TO VIEW POP-UPS:

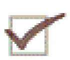
CLICK TO JUMP:

[Airspeed Indicator (ASI)]

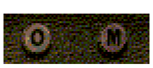
Attitude Indicator (AI)

Altimeter

Directional Gyro (DG)



VOR Indicator

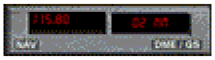


ILS Marker Beacon Lights

Clock

COM Radio

[ILS Radio](#)



[Navigation (NAV) Radio](#)

[Distance Measuring Equipment (DME)](#)

IFR Cockpit View

The IFR Cockpit View (T-SCAN Mode)

This cockpit mode is a ½ screen view consisting of all of the instruments, with the *Standard Instrument Cluster/T-SCAN Panel* set off to the left, and the *Radio/Nav Instrument Panel* set off to the right. The **Tape Strip Indicator** is also available for those who want flight information by toggling the **F12** key.

CLICK TO JUMP:

- **Piper Arrow IFR Cockpit**
- **De Havilland Beaver IFR Cockpit**
- **Beech Baron IFR Cockpit**
- **P-51D Mustang IFR Cockpit**
- **Trainer IFR Cockpit**

The specific functions of each instrument will be described in detail throughout the remainder of this section of the Online Manual.

Piper Arrow IFR Cockpit

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

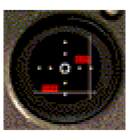
Clock

Airspeed Indicator (ASI)

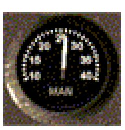
Attitude Indicator (AI)

Altimeter

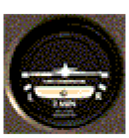
Landing Gear Transit Light



Instrument Landing System (ILS) Receiver

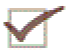


Manifold Pressure Gauge



Turn/Slip Indicator

Directional Gyro (DG)

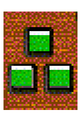


VOR Indicator

Vertical Speed Indicator (VSI)

Propeller RPM Indicator

Landing Gear Handle



Landing Gear Position Lights

Left Fuel Gauge

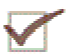
Right Fuel Gauge

[Fuel Tank Switch]

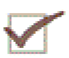
[Oil Temperature Gauge]

[Oil Pressure Gauge]

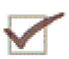
[Navigation Lights Switch]



[ILS Marker Beacon Lights]



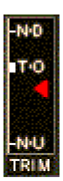
[COM Radio]



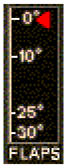
[ILS Radio]

[Navigation (NAV) Radio]

[Distance Measuring Equipment (DME)]

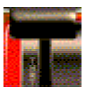


[Elevator Trim Indicator]

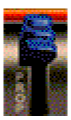


Flaps Indicator

Transponder (XPNDR)



Throttle Control Lever



Propeller Control Lever

Mixture Control Lever

De Havilland Beaver IFR Cockpit

CLICK TO VIEW POP-UPS:

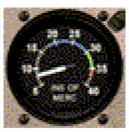
CLICK TO JUMP:

Airspeed Indicator (ASI)

Attitude Indicator (AI)

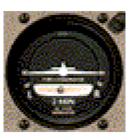
Altimeter

Clock



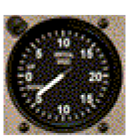
Manifold Pressure Gauge

Flaps Indicator

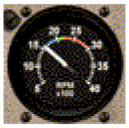


Turn/Slip Indicator

Directional Gyro (DG)



Vertical Speed Indicator (VSI)



Propeller RPM Indicator

Elevator Trim Indicator

Magnetic Compass

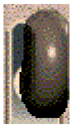
Propeller Control Lever

Throttle Control Lever

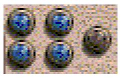
Mixture Control Lever

COM Radio

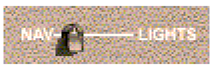
Transponder (XPNDR)



Landing Gear Handle



Landing Gear Position Lights



Navigation Lights Switch

Fuel Gauge

Oil Temperature Gauge

Oil Pressure Gauge

Beech Baron IFR Cockpit

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

Flaps Indicator

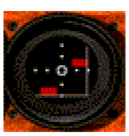
Airspeed Indicator (ASI)

Attitude Indicator (AI)

Clock

Altimeter

ILS Marker Beacon Lights



Instrument Landing System (ILS) Receiver

Elevator Trim Indicator

[Turn/Slip Indicator]

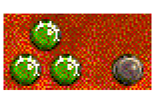
[Directional Gyro (DG)]

[VOR Indicator]

[Vertical Speed Indicator (VSI)]

[Propeller RPM Indicator]

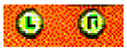
[Landing Gear Handle]



[Landing Gear Position Lights]

[Rudder Trim Indicator]

[Navigation Lights Switch]



[Selected Engine Indicator]

[Manifold Pressure Gauge (Split)]

[Fuel Gauge (Split)]

[Oil Pressure Gauge (Split)]

[Oil Temperature Gauge (Split)]

[COM Radio]

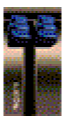
[ILS Radio]

[Navigation (NAV) Radio]

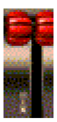
Distance Measuring Equipment (DME)

Transponder (XPNDR)

Throttle Control Levers



Propeller Control Levers



Mixture Control Levers

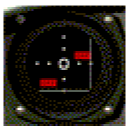
P-51D Mustang IFR Cockpit

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

Oil Temperature Gauge (Dual)

Oil Pressure Gauge (Dual)



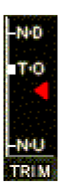
Instrument Landing System (ILS) Receiver

Airspeed Indicator (ASI)

Attitude Indicator (AI)

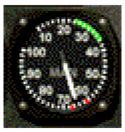
Altimeter

Flaps Indicator



Elevator Trim Indicator

[Propeller RPM Indicator]



[Manifold Pressure Gauge]

[Landing Gear Handle]

[Landing Gear Position Lights]

[Rudder Trim Indicator]

[Navigation Lights Switch]

[Turn/Slip Indicator]

[Directional Gyro (DG)]

VOR Indicator

Vertical Speed Indicator (VSI)

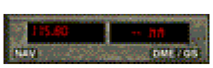
Accelerometer

Clock

ILS Marker Beacon Lights

COM Radio

ILS Radio



Navigation (NAV) Radio

Distance Measuring Equipment (DME)

Transponder (XPNDR)

Fuel Gauge

Trainer IFR Cockpit

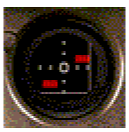
CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

[Airspeed Indicator (ASI)]

[Attitude Indicator (AI)]

[Altimeter]



[Instrument Landing System (ILS) Receiver]

[Turn/Slip Indicator]

[Directional Gyro (DG)]

[VOR Indicator]

[Vertical Speed Indicator (VSI)]

Propeller RPM Indicator

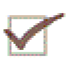
Left Fuel Gauge

Right Fuel Gauge

Oil Temperature Gauge

Oil Pressure Gauge

Navigation Lights Switch

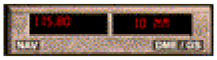


ILS Marker Beacon Lights

Clock

COM Radio

ILS Radio



Navigation (NAV) Radio

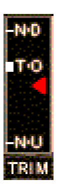
Distance Measuring Equipment (DME)

Transponder (XPNDR)

Carburetor Heat

Throttle Control Knob

Mixture Control Knob



Elevator Trim Indicator

Flaps Indicator

Virtual Cockpit View

The Virtual Cockpit View

The *Virtual Cockpit View* does not contain any active instrumentation. In this mode, you'll be looking out the windows, not at the instruments, fluidly tracking various aircraft while slewing your view or glancing to either side via joystick or keyboard. The **Tape Strip Indicator** is also available for those who want flight information by toggling the **F12** key.

CLICK TO JUMP:

- **Piper Arrow Virtual Cockpit**
- **De Havilland Beaver Virtual Cockpit**
- **Beech Baron Virtual Cockpit**
- **P-51D Mustang Virtual Cockpit**
- **Trainer Virtual Cockpit**

Piper Arrow Virtual Cockpit

De Havilland Beaver Virtual Cockpit

Beech Baron Virtual Cockpit

P-51D Mustang Virtual Cockpit

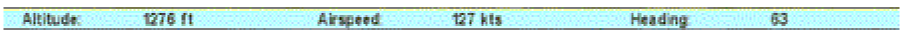
Trainer Virtual Cockpit

Full Screen View and Tape Strip Indicator

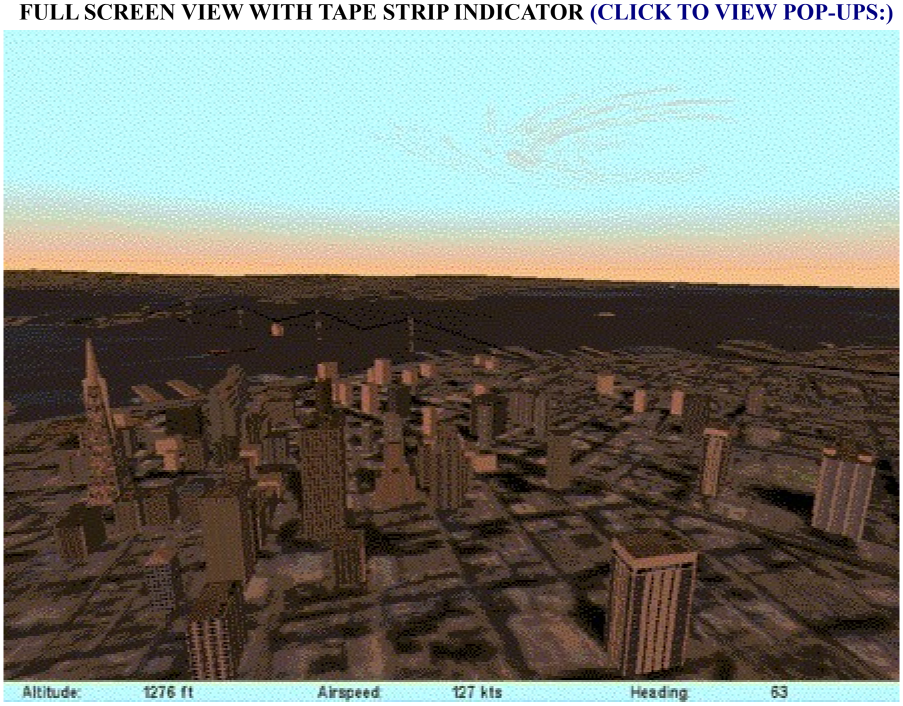
The Full Screen View and Tape Strip Indicator

The *Full Screen View* is precisely what the name implies—an unimpeded view of the area surrounding the aircraft as if you were looking out the window.

The *Tape Strip Indicator* is a digital strip readout that can appear across the bottom of the screen in the *any* view. It can be toggled on and off with the **F12** key. This strip displays, in real- time, the following flight information for your aircraft (in order from left to right): *Altitude* (in feet), *Airspeed* (in knots), and *Heading* (in degrees).



FULL SCREEN VIEW WITH TAPE STRIP INDICATOR (CLICK TO VIEW POP-UPS:)



The Cockpit Instruments

In *Flight II*, all five cockpits of the featured flyable aircraft are modeled from the real thing. Everything from manifold pressure to fuel consumption has been meticulously recreated for your flying experience. Some instruments are statically read while others are interactive via mouse and/or keyboard commands. (*Refer to the* **Keyboard Commands Summary** *for a complete listing of all functions.*)

The indicated dial representations are similar for the *Trainer, Piper Arrow*, *De Havilland Beaver*, and *Beech Baron*, as these are all pretty much modern day aircraft. The *P-51D*, being a tad older, has its own unique cockpit look and feel.

(*Refer to* **Aircraft Instrument and Systems Tables** *for a listing of the specific instruments and systems for each aircraft for both VFR/IFR Cockpit modes.*)

- **Individual (Alphabetized)**
- **By Type**
- **By Aircraft**
- **By View**

The Cockpit Instruments: Individual (Alphabetized)

The following is an alphabetical listing of **all** of the cockpit instruments featured in *Flight II*:

Accelerometer (P-51)

Airspeed Indicator (ASI)

Altimeter

Attitude Indicator (AI)

Carburetor Heat (Trainer)

Clock

COM Radio

Directional Gyro (DG)

Distance Measuring Equipment (DME)

Elevator Trim Indicator

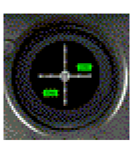
Flaps Indicator

Fuel Gauges

Fuel Tank Switch (Arrow)

ILS Marker Beacon Lights

ILS NAV/COM Radio



Instrument Landing System (ILS) Receiver

Landing Gear Controls

Magnetic Compass (Beaver)

Manifold Pressure Gauge

Mixture Control Lever

Navigation (NAV) Radio

Navigation Lights Switch

Oil Pressure Gauge

Oil Temperature Gauge

Propeller Control Lever

Propeller RPM Indicator

- Rudder Trim Indicator (Baron)
- Selected Engine Indicator (Baron)
- Throttle Control Lever
- Transponder (XPNDR)
- Turn/Slip Indicator
- Vertical Speed Indicator (VSI)
- VOR Indicator

Accelerometer

→What does it do?

This instrument, found only on the **P-51** in *Flight II*, displays the acceleration of gravity acting on the given aircraft.

→What is the displayed measurement?

The *accelerometer* measures the acceleration of gravity in **G**'s. A 'G**'** is strictly defined as a unit of force equal to the gravity exerted on a body at rest. G's may be further defined as either *positive* or *negative*, depending on the direction of the force of acceleration.

→What is the indicated range?

The indicated range is between **-4** and **+10** G's.

→When is this instrument best used?

When you think you may be in danger of overstressing the aircraft during a difficult maneuver. It additionally gives you a visual indication of **blackout** and **redout**, two G-induced conditions modeled in *Flight II*.

→How is the instrument read?

The accelerometer, featuring a **white needle** rotating about a series of tick marks, displays both positive and negative G's, with major markings at two-G increments. The positive values are arrayed between **0** and **10** G's, while the negative values are arrayed between **0** and **-4**. For example, '1G' indicates that the lift on the aircraft is equal to the aircraft's weight. '5G' indicates that the lift on the aircraft is five times the aircraft's weight.

Airspeed Indicator (ASI)

ARROW **BEAVER** **BARON**

P-51 **TRAINER**

→What does it do?

This instrument displays your *indicated airspeed* by measuring air flowing into the *pitot tube* located on the underside of the wing. Put simply, indicated airspeed is the speed at which the aircraft is traveling through the air.

→What is the displayed measurement?

Indicated airspeed is generally measured in *knots*. A knot equals one nautical mile per hour (or 1.15 statute mph). *Knots Indicated Airspeed* (KIAS) is the term pilots often use to officially describe the reading generated by the ASI.

→What is the indicated range?

The indicated range is listed anywhere from **20** to **240** knots (depending on the aircraft), or **0** to **700** MPH (in the case of the **P-51**).

→When is this instrument best used?

The ASI, aside from telling you how fast the aircraft is traveling, is best used to deliver information regarding *airspeed limitations* through the presence of color-coded arcs (*see below for details*).

→How is the instrument read?

The airspeed indicator has a **white needle** rotating about four distinct colored arcs. These arcs display the following details regarding the aircraft's various airspeed limitations:

1) The **white arc** displays the *flap airspeed operating range*. The beginning or bottom of the white arc indicates the *flaps down power-off stalling airspeed*. This is the speed at which the aircraft will stall if the flaps are in their fully extended positions. The end or top of the white arc indicates the *maximum flaps operating airspeed*. This is the maximum speed at which the aircraft may be reliably flown with the flaps extended. Flying above the white arc with the flaps down may cause damage to both the flaps and the wing due to high air loads.

2) The **green arc** displays the *normal operating airspeed range*. The beginning or bottom of the green arc indicates the *flaps-up power-off stalling airspeed*. This is the speed at which the aircraft is likely to stall if the flaps are in the full-up position. The top of the green arc indicates the *maximum structural cruising airspeed*. Flying above this speed, particularly in bumpy air, may cause damage to the aircraft.

3) The **yellow arc** displays the *caution range*. Abrupt flight control movements while flying in this airspeed range may cause structural damage to the aircraft or possible failure.

4) The **red arc** displays the *never exceed speed range*. Prolonged periods spent at or above this speed will almost certainly result in control surface flutter and possible catastrophic failure. Any positive or negative-G maneuvers applied at this range may decrease the time to structural failure.

Altimeter

ARROW **BEAVER** **BARON**

P-51 **TRAINER**

→What does it do?

This instrument displays the aircraft's altitude by measuring changes in atmospheric (a.k.a. barometric) pressure.

→What is the displayed measurement?

The altimeter measures altitude in *feet* above **mean sea level** (MSL), not the height **above ground level** (AGL). It does this by subtracting the difference in barometric pressure at the aircraft's current altitude from the pressure at sea level, a global constant. *Flight II* models a *standard day*, which means that the local barometric pressure reading displayed on the altimeter will always be **29.92** inches of mercury.

→What is the indicated range?

The indicated range is listed anywhere from **0** to **100,000** feet for all aircraft.

→How is the instrument read?

The altimeter has two colored needles and an arrow pointer:

1) The **large white needle** indicates *hundreds* of feet.
2) The **small red needle** indicates *thousands* of feet.
3) The **small white arrow pointer** indicates *tens of thousands* of feet.

The easiest way to read the altimeter is to ignore the small tick marks running about the circumference of the dial and instead pay attention to the numbers **0** through **9**. Always start with the large white needle and work your way down, adding as you go. In the example screenshot, the altimeter is showing an altitude of **100** (for the large needle) **+ 6,000** (for the red needle) for a total of **6,100 feet**. Note the small pointer was not referenced since it is located *before* the number **1** on the dial. Were it located *between* the numbers **1** and **2**, then you would need to *add* 10,000 feet (so the new total would then be **16,100 feet**).

Attitude Indicator (AI)

ARROW BEAVER BARON

P-51 TRAINER

→What does it do?

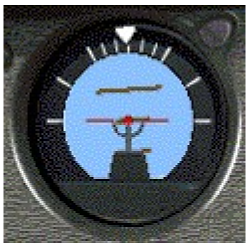
This instrument displays the aircraft's orientation, both pitch and roll, to an artificial horizon.

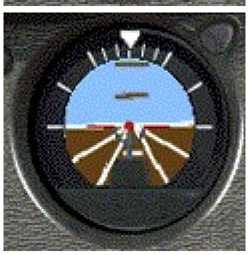
→When is this instrument best used?

The AI is the primary instrument used during **IFR Conditions**. This is the instrument the pilot turns to when flying through clouds, on hazy days, at night, or periods of otherwise low visibility at which time, due to atmospheric conditions, there is no discernible natural horizon. Whenever you become disoriented, you can rely on this instrument to regain attitude control of your aircraft.

→How is the instrument read?

The AI primarily displays the *pitch* of the aircraft. This is the degree to which the aircraft is deviating up or down from the level horizon. It specifically tells you whether the aircraft is in a *nose-high attitude* (i.e., climbing), in a *nose-low attitude* (i.e., descending), or in *level flight*. The **blue section** of the instrument indicates nose-high attitudes while the **brown section** indicates nose-low:





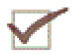
CLIMBING **DESCENDING** **LEVEL FLIGHT**

The horizontal markings cutting through the center of the dial, known as the *Pitch Ladder*, show positive and negative pitch attitudes. The **short horizontal markings** are measured in five-degree increments while the **long horizontal markings** indicate ten-degree increments. Positive pitch is illustrated as solid lines and negative pitch as dashed lines.

The AI also displays the *bank angle* of the aircraft. This is the degree to which the aircraft is turning in either direction along the horizon. The markings on the outside of the instrument show **10**, **20**, **30**, **60**, and **90** degree bank angles to the left and right. A small **white arrow pointer**, known as the *Bank Point Indicator*, points to the markings to display the roll degree:

30° BANK ANGLE **60° BANK ANGLE** **90° BANK ANGLE**

Carburetor Heat



→What does it do?

This is a knob that is specific to the **Trainer** in *Flight II*. It allows heated air from the exhaust manifold to warm the carburetor.

→When is this instrument best used?

To prevent ice build-up in the carburetor inlet, which can result in engine failure. Carburetor icing may occur in humid air generally between 20 and 70 degrees Fahrenheit.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard. Simply left-click on the button to toggle on/off, or press the **H** key.

Clock

ARROW **BEAVER** **BARON**

P-51 **TRAINER**

→What does it do?

The in-cockpit clock does the same thing as the one sitting in your living room. There are no special features present (*except per below*).

→When is this instrument best used?

The clock is, in fact, used as a primary means of navigation, particularly during **VFR Conditions**. The clock has a "hack" feature to set the time of day which allows you to keep a running time of your flight to maintain positional awareness.

→How is the instrument read?

All aircraft clocks in *Flight II* feature a digital readout (except the **P-51D Mustang** and the **Piper Arrow**). Each clock starts at **00:00:00** (or **12 o'clock**) when the flight begins.

→Mouse/Keyboard functionality?

Interactive via mouse. Zero the clock by left-clicking on the readout with your mouse.

COM Radio

→What does it do?

The COM radio, present on the **Radio Stack**, is used to communicate with **air traffic controllers**, to receive advisories from **UNICOM** and **ATIS**, and to listen in to pilot chatter. This is accomplished by dialing in the appropriate frequency to "talk" to the controller, followed by interaction through a menu-based system where you are presented with response choices.

→What is the displayed measurement?

The COM radio displays its VHF frequencies in *megahertz* (MHz).

→What is the maximum reception range?

You may dial in *any* tower, ground, radar, UNICOM, and ATIS frequency from *anywhere* on the map (encompassing all 8,500 square miles of *Flight II's* terrain area).

→When is this instrument best used?

To communicate with tower, ground, and radar controllers when receiving approach and departure information from controlled airports; to receive UNICOM information from uncontrolled airports; and to receive advisory updates from ATIS.

→How is the instrument read?

As a digital readout, once the desired five-digit frequency is set.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard. The COM radio, first of all, must be turned *on* to work. This is done by ensuring the knob underneath the readout is in the **ON/GUARD** position. If it is in the **OFF** position, simply left-click on the knob to "switch" it. Once enabled, locate the desired tower, ground, radar, UNICOM, or ATIS frequency from the listings found **here**. Now left-click on the COM radio readout to highlight the display and then type in the appropriate five-digit frequency. For *controlled airports* ***only***, you may additionally use the **ALT F** key combination to cycle through all appropriate frequencies (ground, tower, ATIS, and approach radar) for that respective airport. When finished, press the **ENTER** key.

The ensuing menu-based system of communication responses is simple to use: To select a message, press the **SPACEBAR** to "key the mike." Then, using the number keys, select a relevant menu choice (usually **1-9**) from those provided in a screen overlay. Keep choosing until you have "built" your response. To transmit the message over the radio, press the appropriate menu number. Pressing the **SPACEBAR** again while in the midst of creating a radio call will cancel the call, allowing you to start anew.

Directional Gyro (DG)

ARROW **BEAVER** **BARON**

P-51 **TRAINER**

→What does it do?

This instrument, which shares duties with the **VOR Indicator**, is your heading system. It provides the current *magnetic heading* of the aircraft.

→What is the displayed measurement?

The DG measures the heading information in *degrees*, displayed as a 360 degree rotating compass rose.

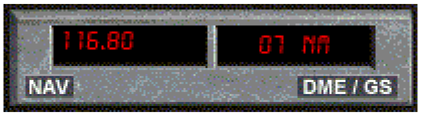
→When is this instrument best used?

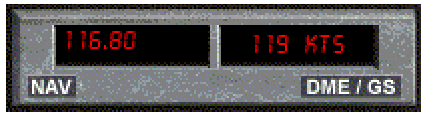
The DG is best used to show the aircraft's present heading. The DG is a key element in the instrument scan during **IFR flight**. It is also used, in conjunction with the *VOR indicator*, to determine your bearing from a selected *VOR station* when you become lost or are simply seeking updated navigational information.

→How is the instrument read?

There are **360** degrees displayed in a circle about the outer edge of the dial, tick-marked in ten-degree increments. The *cardinal headings* are illustrated by **N**, **S**, **E**, and **W**. The current aircraft heading is read under the **white inverted triangular pointer** situated at the top of the instrument. A second **white pointer** located at the bottom of the instrument indicates the aircraft's 6 o'clock position.

Distance Measuring Equipment (DME)





DISTANCE READOUT **SPEED READOUT**

→What does it do?

This instrument, which shares space on the **Radio Stack** with the **NAV Radio**, shows you how far away the aircraft is presently located from a selected VOR station and the aircraft's speed relative to that station.

→What is the displayed measurement?

The DME displays its distance information in *nautical miles* (1 nautical mile = 1.15 statute miles) and its speed information in *knots* (1 knot = 1 nautical MPH or 1.15 statue MPH).

→What is the maximum reception range?

The maximum reception range is fixed at **35** nautical miles (NM). If the aircraft is outside of the VOR station's 35 NM signal radius, the readout will display a pair of **red** dash marks.

→When is this instrument best used?

In conjunction with the VOR indicator and NAV radio, to determine your bearing from a selected VOR station when you are either lost or simply seeking updated navigational information.

→How is the instrument read?

Once the frequency for the VOR station is inputted into the NAV radio, the DME will "snap on" with distance information displayed as **NM** for nautical miles. Speed information, when switched over (*see next*), is displayed as **KT** for knots.

→Mouse/Keyboard functionality?

Interactive via mouse. Once the DME is receiving its information through the NAV radio, the DME display can then be toggled between *distance* and *speed* by simply left-clicking on the readout itself with the mouse.

Elevator Trim Indicator

→What does it do?

The *elevator trim indicator* displays the position of the aircraft *elevator trim tabs*.

→What is the displayed measurement?

Trim position is displayed incrementally by *positional status abbreviation*.

→When is this instrument best used?

Whenever you need to correct for level flight.

→How is the instrument read?

The display is the same across all aircraft. A **red arrow pointer** indicates the position of the trim tabs forward or aft of neutral, with three increments:

N*D = Nose Down. Pushes the nose of the aircraft *down*.

T*O = Neutral. Takeoff trim position, as indicated by a small **white box** adjacent to the letters.

N*U = Nose Up. Pushes the nose of the aircraft *up*.

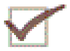
→Mouse/Keyboard functionality?

Interactive via keyboard-only. Two modes of elevator trim are available in-flight:

1) *Auto Trim***,** activated by pressing the **BACKSPACE** key, which follows the player's joystick movement of the aircraft and automatically adjusts to match said movement.

2) *Manual Trim*, where you must manually trim the aircraft. Adjust the trim settings by using the **LEFT BRACKET** key to move the pointer up (i.e., increase the level of elevator trim) and the **RIGHT BRACKET** key to move the pointer down (i.e., decrease the level of elevator trim).

Flaps Indicator



→What does it do?

The *flaps indicator* displays the position of the *wing flaps*. These are hinged, trailing edge wing surfaces, which act together to increase the lift characteristics of the wing.

→What is the displayed measurement?

Flap position is displayed incrementally by either *degrees* or *positional status abbreviation* (depending on the aircraft).

→What is the indicated range?

From **0** degrees (fully retracted) to a maximum of **30-50** degrees (fully extended), depending on the aircraft.

→When is this instrument best used?

Whenever you takeoff (to generate extra *lift*, which helps the aircraft off the ground), land (in order to generate extra *drag*, which helps the aircraft slow down), or cruise at slow speeds (by generating *loft*).

→How is the instrument read?

The **red arrow pointer** indicates the position of the flaps, with anywhere from four to six increments displayed along the left-hand side of each indicator:

For the **Trainer**:

0° = Flaps fully retracted (*takeoff position*)
10° = Flaps partially extended (*approach position*)
20° = Flaps partially extended (*approach position*)
30° = Flaps fully extended (*landing position*)

For the **Arrow**:

0° = Flaps fully retracted (*takeoff position*)
10° = Flaps partially extended (*cruise/climb or takeoff position*)
25° = Flaps partially extended (*approach position*)
30° = Flaps fully extended (*landing position*)

For the **Beaver**:

CR = **0°** = Flaps fully retracted (*cruise position)*
CL = **10°** = Flaps partially extended (*takeoff/climb position*)
TO = **20°** = Flaps partially extended (*takeoff position*)
LD = **30°** = Flaps partially extended (*approach/landing position*)

FF = **40°** = Flaps fully extended (*landing position*)

For the **Baron**:

UP = **0°** = Flaps fully retracted (*takeoff position*)
APH = **15°** = Flaps partially extended (*approach position*)
DN = **30°** = Flaps fully extended (*landing position*)

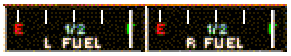
For the ***P-51*:**

0° = Flaps fully retracted (*takeoff position*)
10° = Flaps partially retracted (*climbing position*)
20° = Flaps partially extended (*approach position*)
30° = Flaps partially extended *(approach position*)
40° = Flaps partially extended (*approach position*)
50° = Flaps fully extended (*landing position*)

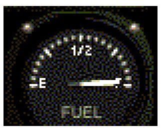
→Mouse/Keyboard functionality?

Interactive via keyboard-only. Adjust the flap settings for both wings by clicking on the **F** key to move the pointer up (i.e., raise the flaps in set increments) and the **SHIFT F** key combination to move the pointer down (i.e., lower the flaps in set increments).

Fuel Gauges



BARON **ARROW** **BEAVER**



P-51 **TRAINER**

→What do they do?

Indicates fuel levels in respective wing tanks, or total fuel (as appropriate).

→How is the instrument read?

Shown as either a horizontal indicator or dial (depending on the aircraft). The gauge measures fuel as a percentage of the entire tank, just like your car, and is read in the same manner.

Fuel Tank Switch

→What does it do?

This instrument, carried only by the **Arrow** in *Flight II*, allows you to manually switch fuel tanks.

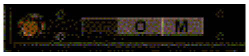
→When is this instrument best used?

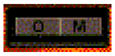
When you notice that the aircraft is dipping and requiring unnecessary control overcompensation. Look at the fuel gauges—if one of them is considerably lower than the other, it's time to switch tanks.

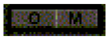
→Mouse/Keyboard functionality?

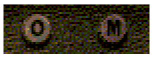
Interactive via mouse-only. Simply left-click on the switch to change between the **LEFT TANK** and the **RIGHT TANK.**

ILS Marker Beacon Lights









ARROW **BARON** **P-51** **TRAINER**

→What do they do?/How are they read?

These are a pair of indicators which, as part of the **Instrument Landing System**, display **purple** and **amber** lights for both the *outer* and *middle ILS marker beacons* found at ILS-equipped runways. When the ILS is active during a landing sequence, and the **ILS Receiver** is acquiring signals from the transmitter at the runway, these lights will flash for several seconds as the aircraft passes over the relevant beacon (i.e., reached a certain position coinciding with the **ILS Approach Plate** for that runway). You will also hear a corresponding tone for each.

Instrument Landing System NAV/COM Radio

→What does it do?

This instrument, part of the **Instrument Landing System** and essentially a radio transmitter which shares space on the **Radio Stack** with the COM radio, is used to "dial-up" ILS transmitter frequencies to assist in landing your aircraft during IMC (*Instrument Meteorological Conditions—see below for details*).

→What is the displayed measurement?

The ILS radio displays its VHF frequencies in *megahertz* (MHz).

→When is this instrument best used?

In conjunction with the **ILS Receiver**, during periods of adverse weather, at night, or in conditions of otherwise low visibility (i.e., IMC), when you cannot see the landing runway from a safe enough distance to begin a carefully planned approach.

→How is the instrument read?

As a digital readout, once the desired five-digit frequency is set.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard. Locate the desired ILS-equipped runway from the set of **Airfield Diagrams**. Locate the corresponding **ILS frequency** for the runway from the same diagram or click **here**. Now left-click on the **ILS Radio** readout to highlight the display and then type in the appropriate five-digit frequency. When finished, press the **ENTER** key.

Instrument Landing System (ILS) Receiver



ARROW BARON P-51

TRAINER

→What does it do?

This instrument is a receiver that is part of the **Instrument Landing System**, a guidance system pilots use to perform precise approaches and landings during IMC (*Instrument Meteorological Conditions—see below for details*). The ILS receiver acquires course and glideslope guidance information from an **ILS Transmitter**, a navigational radio beacon located adjacent to an equipped runway at a given airport. The transmitter sends both horizontal and vertical frequency signals which are picked up by the receiver aboard the aircraft. The signals cannot be acquired by the ILS receiver until the appropriate frequency has been set in the **ILS NAV/COM Radio**. Once you are receiving signals from the ILS transmitter through your ILS radio, you may then use the ILS receiver to “ride” the beam down.

→What is the maximum reception range?

Course information sent out by the ILS transmitter from the desired landing runway is reliable to **10** degrees from either side of the runway centerline and extends out to a range of no more than **18** miles.

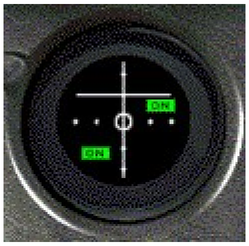
→When is this instrument best used?

During periods of adverse weather, at night, or in conditions of otherwise low visibility (i.e., IMC), when you cannot see the landing runway from a safe enough distance to begin a carefully planned approach.

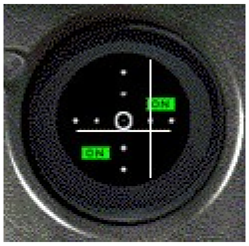
→How is the instrument read?

The ILS receiver consists of two **white needles**: a vertical needle, called the *localizer*, tells you how far to the left or right of the runway's centerline the aircraft is presently located. The horizontal needle, called the *glideslope*, tells you how high or low the aircraft is relative to the desired approach path to the runway. Two window indicators read **OFF** (colored **red**) when either the aircraft is outside the range of the ILS transmission or a frequency has yet to be inputted into the **ILS Radio**. The indicators are **ON** (colored **green**) when the converse is true. The ideal landing approach is to have both needles converge in the center of the instrument as in the example screenshot below:

INACTIVE **RIGHT ON!** **TOO HIGH!**



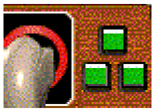
TOO LOW!



TOO HIGH AND TO THE LEFT OF THE RUNWAY!

TOO LOW AND TO THE RIGHT OF THE RUNWAY!

Landing Gear Controls



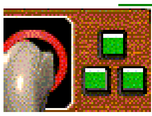
→What do they do?

The *landing gear controls* are used to raise and lower the landing gear on all aircraft except the **Trainer** (which possesses a fixed tricycle gear system), and to indicate its current status.

→How is the instrument read?

The primary display consists of a *landing gear handle* and a group of adjacent *position/hydraulic lights* located to the immediate right. (On the **P-51**, this is just a pair of *position/transit lights*.) On the **Arrow**, there is a secondary display which consists of a single transit light. The position lights tell you whether or not the gear is down and locked or up and stowed. The hydraulic/transit lights tell you when the gear is in motion. The lights indicate the position of the gear as follows:

For the **Arrow**:

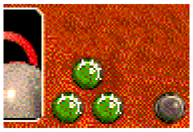


GREEN (Gear Lights) = Gear is down and locked.
RED (Transit Light) = Gear is in transit.
GRAY (Gear Lights) = Gear is up and stowed.
GRAY (Transit Light) = Gear is up and stowed or down and locked .

For the **Beaver**:

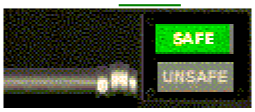
GREEN (Gear Lights) = Gear is down and locked.
RED (Hydraulic Light) = Gear is in transit
BLUE (Gear Lights) = Gear is up and stowed.
GRAY (Gear Lights) = Gear is in transit.
GRAY (Hydraulic Light) = Gear is up and stowed or down and locked.

For the **Baron**:



GREEN (Gear Lights) = Gear is down and locked.
RED (Hydraulic Light) = Gear is in transit.
GRAY (Gear Lights) = Gear is in transit or up and stowed
GRAY (Hydraulic Light) = Gear is up and stowed or down and locked.

For the **P-51**:



GREEN (SAFE Gear Light) = Gear is down and locked .
RED (UNSAFE Transit Light) = Gear is in transit.
GRAY (SAFE Gear Light) = Gear is in transit or up and stowed.
GRAY (UNSAFE Transit Light) = Gear is up and stowed or down and locked.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard. To raise or lower the gear, either left-click on the landing gear handle, or press the **G** key.

Magnetic Compass

→Abbreviation or alternate naming?

The *"Whiskey" Compass*.

→What does it do?

This is the classic instrument used for determining geographic direction, with a *magnetic needle* suspended in the center of a standard ball in fluid and free to pivot until aligned with the earth's magnetic field. In *Flight II*, this instrument is only found on the **Beaver**.

→What is the displayed measurement?

The magnetic compass measures the heading information in *degrees*.

→When is this instrument best used?

The magnetic compass is considered a back-up heading system for pilots and thus is indispensable should the **Directional Gyro** fail.

→How is the instrument read?

The heading is displayed by a standard ball in fluid. The cardinal headings are illustrated by **white N**, **S**, **E**, and **W** lettering. The compass pivots as the aircraft's current heading is changed through maneuvering.

Manifold Pressure Gauge

BEAVER ARROW BARON

P-51

→What does it do?

The *manifold pressure gauge* basically tells you how much power the engine is producing by measuring the atmospheric (barometric) pressure of the air being forced into the engine's induction system.

→What is the displayed measurement?

The gauge measures this barometric pressure in *inches of mercury* (displayed on the gauge as **INS OF MERC**).

→What is the indicated range?

The indicated range is between **5** and as many as **100 inches**, depending on the aircraft.

→When is this instrument best used?

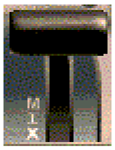
Think of this gauge as a measure of engine performance. Colored power settings are incorporated to display operating ranges (*see next*).

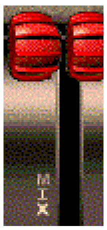
→How is the instrument read?

The manifold pressure gauge has a **white needle** rotating about 1-3 distinct colored arcs. These arcs display the following:

1) The **white arc** displays the *normal operating range*.
2) The **green arc** displays the *cruise range*.
3) The **red arc** displays the *never exceed range*. Continued operation at this range can be detrimental to the aircraft.

Mixture Control Lever





ARROW BEAVER BARON TRAINER

→What does it do?

The *mixture control lever* is used to regulate the *fuel-to-air ratio* entering the engine by specifically restricting the level of fuel leaving the *carburetor*. Moving the lever forward (i.e., *enriching the mixture*) increases the amount of fuel, which aids in keeping the engine cool during takeoff and climb power settings. Pulling the lever aft (i.e., *leaning the mixture*) decreases the amount of fuel, which increases fuel economy.

→When is this instrument best used?

The mixture should be **leaned** in order to shut off the motor. The mixture should be **enriched** whenever the aircraft takes off.

→What is the displayed measurement?

None visually indicated, though it should be noted that pushing the lever all the way forward maintains what's known as the *full rich setting* (i.e., **100%**−MAX fuel mixture) while pulling the lever all the way back maintains the *full lean setting* (i.e., **0%**−MIN fuel mixture).

→How is the instrument read?

The **Trainer** possesses a mixture control *knob* instead of a lever, with the full name appearing underneath. The **Arrow**, **Beaver**, and **Baron** have the abbreviation **MIX** appearing adjacent to the lever. The *Baron* additionally features split (i.e., independently-controlled) mixture control levers, one per engine. The **P-51** supports mixture control, but has no lever present. In fact, the *P-51*, for space constraint reasons, has *no* flight control levers appearing in the cockpit. They are supported only through **keyboard** and **joystick** interaction.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard. For the *Trainer*, left-click on the mixture control knob and, while holding, drag the knob up (i.e., push in) to increase the fuel mixture or down (i.e., pull out) to decrease. For all other aircraft, left-click on the lever with the mouse and, while holding, drag the lever up (i.e., move forward) or down (i.e., move aft) to do the same. You may also use the **CTRL KEYPAD PLUS** key combination to increase mixture and the **CTRL KEYPAD MINUS** key combination to decrease mixture.

Navigation (NAV) Radio

→What does it do?

This instrument, essentially a radio transmitter which shares space on the **Radio Stack** with the **DME**, is used to “dial up” VOR station frequencies to assist in general navigation procedures.

→What is the displayed measurement?

The NAV radio displays its VHF frequencies in *megahertz* (MHz).

→When is this instrument best used?

In conjunction with the **VOR Indicator** and DME, to determine your bearing from a selected VOR station when you are either lost or simply seeking updated navigational information.

→How is the instrument read?

As a digital readout, once the desired five-digit frequency is set.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard. Locate the desired VOR station from the **In-Flight Map** by clicking on the **VOR INFORMATION** button to bring up the VOR station overlay. Zoom in to the highest level and find the name of the selected station along with its associated frequency in an adjacent **gray** box (a list of available ILS runway frequencies can be found **here**). Now left-click on the NAV radio readout to highlight the display and then type in the appropriate five-digit frequency. When finished, press the **ENTER** key.

Navigation Lights Switch

BEAVER **P-51** **TRAINER**

→What does it do?

This is the switch used to turn on the *navigation lights* for each of the aircraft, which consist of the **Position Lights** and **Anti-Collision Beacon**.

→How is the instrument read?

NAV stands for navigation lights.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard only. Either left-click on the switch to toggle it on/off, or use the **SHIFT L** key combination.

Oil Pressure Gauge

ARROW **BEAVER** **BARON** **P-51** **TRAINER**

→What does it do?

This gauge measures the pressure of the oil coursing through the engine.

→What is the displayed measurement?

The gauge measures pressure in PSI or *pounds per square inch*.

→What is the indicated range?

The indicated range is between **0** and **200 PSI** (depending on the aircraft).

→When is this instrument best used?

When you suspect you are pushing the engine too hard.

→How is the instrument read?

Shown as either a horizontal indicator or dial (depending on the aircraft). Normal operating ranges are indicated by an elongated **green line**. The **yellow line** indicates a caution range. A thin **red line** indicates the *never exceed pressure* threshold. Continued operation at or above the red line may result in engine failure.

Oil Temperature Gauge

ARROW **BEAVER** **BARON** **P-51** **TRAINER**

→What does it do?

This gauge measures the temperature of the oil coursing through the engine.

→What is the displayed measurement?

The gauge measures temperature in *degrees Fahrenheit* (°F).

→What is the indicated range?

The indicated range is between **0** and **250**° (depending on the aircraft).

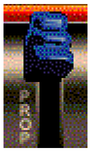
→When is this instrument best used?

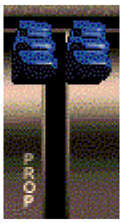
When you suspect you are pushing the engine too hard.

→How is the instrument read?

Shown as either a horizontal indicator or dial (depending on the aircraft). Normal operating ranges are indicated by an elongated **green line**. A thin **red line** indicates the *never exceed temperature* threshold. Continued operation at or above the red line may result in engine failure.

Propeller Control Lever





ARROW **BEAVER** **BARON**

→What does it do?

The *propeller control lever* is used to regulate the speed of the *propeller*. There are two types of propellers: *fixed pitch* and *constant speed*. Fixed pitch propellers are those in which a single control lever—the throttle controller−regulates both the power output of the engine *and* the speed of the propeller. Constant speed propellers are those in which separate control levers are used to regulate engine power and propeller RPM (*revolutions per minute*). In *Flight II*, only the **Trainer** features a fixed pitch propeller—the rest of the aircraft sport constant speed propellers.

→What is the displayed measurement?

None visually indicated, though it should be noted that pushing the lever all the way forward maintains what's known as the *full prop setting* (i.e., **100%**−MAX RPM) while pulling the lever all the way back maintains the *minimum prop setting* (i.e., **0%**−MIN RPM).

→How is the instrument read?

The *Trainer* possesses no separate propeller control lever in the cockpit because it incorporates the aforementioned fixed pitch design. The **Arrow**, **Beaver**, and **Baron** have the abbreviation **PROP** appearing adjacent to the lever. The *Baron* additionally features split (i.e., independently-controlled) propeller control levers, one per engine. The **P-51** supports propeller control, but has no lever present. In fact, the *P-51*, for space constraint reasons, has *no* flight control levers appearing in the cockpit. They are supported only through **keyboard** and **joystick** interaction.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard. For the *Trainer*, left-click on the throttle control knob. It will become highlighted. Now, while holding, drag the knob up (i.e., push in) to increase throttle and thus propeller RPM, or down (i.e., pull out) to decrease. For all other aircraft, left-click on the lever to highlight and, while holding, drag the lever up (i.e., move forward) or down (i.e., move aft). You may also use the **SHIFT KEYPAD + [PLUS]** key combination to increase prop speed and the **SHIFT KEYPAD - [MINUS]** key combination to decrease prop speed.

Propeller RPM Indicator

ARROW **BEAVER** **BARON**

TRAINER **P-51**

→What does it do?

The *RPM Indicator* is a gauge which measures how fast the propeller is spinning and, consequently, the speed of the engine.

→What is the displayed measurement?

The gauge measures this speed in RPM's or *revolutions per minute*, which is the total number of times the propeller rotates a full 360 degrees in 60 seconds at the current propeller or throttle settings, for constant speed and fixed pitch propeller systems, respectively.

→What is the indicated range?

The indicated range is between **0** and either **45** or **4,500 RPM's**, depending on the aircraft.

→When is this instrument best used?

Think of this gauge as a measure of engine efficiency. Colored power settings are incorporated to display operating ranges (*see next*).

→How is the instrument read?

The RPM Indicator has a **white needle** rotating about 1-4 distinct colored arcs. These arcs display the following:

1) The **white arc** displays the *normal operating range*. This is the correct RPM range for guidance during the landing phase of flight.

2) The **green arc** displays the *cruise range*.

3) The **red arc** displays the *never exceed range*. Continued operation at this range can be detrimental to the aircraft.

Rudder Trim Indicator

→What does it do?

The *rudder trim indicator* is similar to the elevator trim indicator except that this controls the position of the *rudder trim tab* instead of the elevator trim tabs.

→What is the displayed measurement?

Trim position is displayed incrementally by *positional status abbreviation*.

→When is this instrument best used?

Whenever you need to correct for level flight, or whenever the engine is out on the *Baron*, specifically, to compensate for adverse yaw and torque conditions.

→How is the instrument read?

Similarly to the elevator trim, except that the rudder trim yaws the aircraft left and right instead of up and down.

→Mouse/Keyboard functionality?

Interactive via keyboard-only. Two modes of rudder trim are available in-flight:

1) *Auto Trim***,** activated by pressing the **BACKSPACE** key, which follows the player's joystick movement of the aircraft and automatically adjusts to match said movement.

2) *Manual Trim*, where you must manually trim the aircraft. Adjust the trim settings by clicking the **SHIFT . [PERIOD]** key combination to move the pointer to the right (i.e., apply right rudder trim) and the **SHIFT , [COMMA]** key combination to move the pointer to the left (i.e., apply left rudder trim).

Selected Engine Indicator

→What does it do?

The *selected engine indicator*, unique to the **Beech Baron**, displays which of the twin engines (or both) are selected for throttle manipulation.

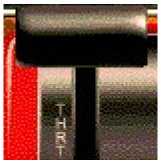
→How is the instrument read?

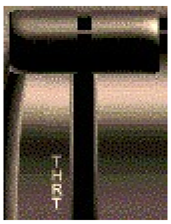
The engines are marked with a pair of lights: **L** for **Left** and **R** for **Right**. A **green** light indicates that the engine is selected. When a light is **gray**, the engine is not selected.

→Mouse/Keyboard functionality?

Interactive via keyboard-only. When both engines are selected, this allows you to gang the controls. Use the **SHIFT E** key combination to select from among the **left** engine, **right** engine, and **both**.

Throttle Control Lever





ARROW **BEAVER** **BARON** **TRAINER**

→What does it do?

The *throttle lever* is used to regulate the mixture of fuel and air flowing to the engine, effectively controlling the power output of the engine. When the throttle is moved forward, a *throttle valve* in the *carburetor* connected directly to the lever opens, increasing the level of fuel and air making its way to the engine, and thus its overall power. When the throttle is moved aft, this same valve closes, thereby reducing engine power.

→What is the displayed measurement?

None visually indicated, though it should be noted that pushing the lever all the way forward maintains what's known as the *full throttle setting* (i.e., **100%**−MAX throttle) while pulling the lever all the way back maintains the *minimum throttle setting* (i.e., **0%**−MIN throttle).

→How is the instrument read?

The **Trainer** possesses a throttle control *knob* instead of a lever, with the full name appearing underneath. The **Arrow**, **Beaver**, and **Baron** have the abbreviation **THRT** appearing adjacent to the lever. The *Baron* also features split (i.e., independently-controlled) propeller control levers, one per engine. The **P-51** supports throttle control, but has no lever present. In fact, the *P-51*, for space constraint reasons, has *no* flight control levers appearing in the cockpit. They are supported only through **keyboard** and **joystick** interaction.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard. For the *Trainer*, left-click on the control knob. It will become highlighted. Now, while holding, drag the knob up (i.e., push in) to increase throttle or drag down (i.e., pull out) to decrease throttle. For all other aircraft, left-click on the lever to highlight and, while holding, drag the lever up (i.e., move forward) or down (i.e., move aft) to do the same. You may also use the **KEYPAD +** key to throttle up and the **KEYPAD -** key to throttle down.

Transponder (XPNDR)

→What does it do?

The *transponder* is a beacon which allows an aircraft's position to be exactly identified on an **radar approach controller's** radar display. The transponder receives radio signals from radar controllers on the ground and "squawks" back a reply pulse so that these controllers have all of the necessary identification information on the aircraft they are tracking.

→What is the displayed measurement?

The transponder displays a four digit *squawk code*.

→What is the maximum reception range?

In *Flight II*, the transponder broadcasts over the entire map.

→When is this instrument best used?

Whenever you enter radar-controlled airspace.

→How is the instrument read?

As a digital readout, once the desired four-digit frequency is set.

→Mouse/Keyboard functionality?

Interactive via mouse/keyboard. The transponder must be turned *on* to work. This is done by ensuring the knob underneath the readout is in the **ALT/ON** position. If it is in the **OFF** position, simply left-click on the knob to "switch" it. Once enabled, initiate contact with the radar approach controller prior to entering the airspace under that controller's jurisdiction. Use the menu-based communication system (*refer to* **COM Radio**). The approach controller will verbally transmit to you a **four digit** squawk code identification. Left-click on the transponder's readout to clear the display and then type in this number. When finished, press the **ENTER** key. To transmit the code, left-click on the **REPLY** button located in the lower right-hand corner of the instrument.

Turn/Slip Indicator

ARROW BEAVER BARON

P-51 TRAINER

→What does it do?

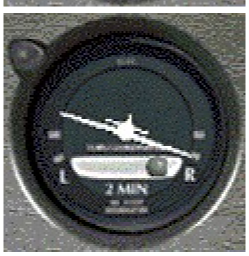
This instrument displays the aircraft's direction and rate of roll.

→When is this instrument best used?

When you need a visual reference in order to trim the aircraft for level flight. The turn/slip indicator is also the only reliable instrument used to determine the direction of a spin, and it can aid the pilot in spin recovery.

→How is the instrument read?

A **white aircraft silhouette** dominates the center of the dial. Twin tick marks located on either side of the wings of the silhouette, **L** for *left* and **R** for *right*, indicate level flight. Two additional tick marks located just below these show where the wings must align to make what's known as a *standard rate turn*—a 360 degree turn in a two minute time span in either direction (which translates into 3 degrees per second). The *ball inclinometer,* residing beneath the center of the silhouette, indicates the condition of a turn and tells you essentially whether or not your turn is *coordinated*. A coordinated turn is one in which the ball stays centered. The ball additionally reacts to gravity and/or centrifugal force to indicate the need for rudder trim. In a *skid*, the rate of turn is too great for the angle of bank, so the ball deflects to the *outside* of the turn. To correct to coordinated flight, either increase bank or decrease the rate of the turn. In a *slip*, the rate of turn is too slow for the angle of bank, and so the ball deflects to the *inside* of the turn. To correct to coordinated flight, decrease the bank or increase the rate of turn. (*For additional details, refer to* **Turning the Aircraft**.)



SKID **SLIP** **COORDINATED TURN**

Vertical Speed Indicator (VSI)

ARROW **BEAVER** **BARON**

P-51 **TRAINER**

→What does it do?

This instrument indicates the rate at which the aircraft is climbing or descending.

→What is the displayed measurement?

The VSI registers rate of climb/descent in hundreds of *feet per minute* (FPM).

→What is the indicated range?

The indicated range is between **0** and **2,000** FPM.

→When is this instrument best used?

The VSI is best used to confirm climb and descent rates during descents to and ascents from airports.

→How is the instrument read?

The VSI is displayed as two hemispheres with a **white needle** rotating about a series of tick marks. **UP** (i.e., indicating a climb) comprises the top portion of the dial and **DOWN** (i.e., indicating a descent) comprises the lower portion. Each shows a reading from **0** to **20** FPM, signifying a climb or descent of up to **2,000** FPM, measured in increments of **100** FPM per tick mark. Thus, if the needle is pointing at **0**, the aircraft is neither climbing nor descending. If the needle is pointing **up** at **10**, then the aircraft is *climbing* at **1,000** FPM.

Very High Frequency Omni-Directional Range (VOR) Indicator

ARROW **BARON** **P-51**

TRAINER

→What does it do?

This complicated-sounding instrument, sharing duties with the **Directional Gyro**, is essentially a receiver that acquires signals from a navigational radio beacon on the ground called a *VOR station* (also known as a *Navigational Aid* or NAVAID). The VOR station, one of **9** navigational aids sprinkled about the terrain area featured in *Flight II*, emits a **360 degree electronic radio signal** which you may "tune" into by setting the appropriate frequency in your **NAV Radio**. Once you are receiving signals from the VOR station through your NAV radio, you may then use the *VOR indicator* to display course guidance to or from the selected station. This course guidance allows you to discover the correct heading to the VOR station.

→What is the displayed measurement?

The VOR indicator uses the shared DG display to relay basic heading information. This is measured in degrees and is displayed as a 360 degree rotating compass rose.

→What is the maximum reception range?

The low-altitude VOR stations present in *Flight II* have a line-of-sight range of approximately **35** nautical miles (NM). Each VOR station emits a signal in a 360 degree *azimuth* (also known as a *radial*) out to said distance, to or from which you may track on your VOR.

→When is this instrument best used?

In conjunction with the DG, **DME**, and **NAV Radio**, to determine your bearing from a selected VOR station when you are either lost or simply seeking updated navigational information.

→How is the instrument read?

The VOR is the most elaborate of the cockpit instruments, consisting of the following **four** elements:

1) As part of the DG, there are **360** degrees displayed in a circle about the outer edge of the VOR dial, tick-marked in ten-degree increments. The cardinal headings are illustrated by **N**, **S**, **E**, and **W**. The current aircraft heading is read under the **white inverted triangular pointer** situated at the top of the instrument. A second **white pointer** located at the bottom of the instrument indicates the aircraft's 6 o'clock position.

2) Cutting through the center of the dial is the *Course Deviation Indicator* (CDI). This **yellow needle**, with a large arrow at one end and a tail at the other, swings right or left to illustrate the direction of the selected course heading to the VOR station. A free-floating **yellow** *Course Deviation Bar* (CDB), located within, displays the level of actual deviation. When the CDB lined up in the middle of the CDI, you are right on the money.

3) Located in the lower left-hand corner of the dial is the *TO/FROM Indicator* (also known as the *Ambiguity Indicator*). This readout tells whether you are traveling *to* or *from* the selected VOR on your present course, indicated by **green TO** and **FR** designations.

4) The small **gray** knob located in the lower right-hand corner of the instrument, known as the *Omni Bearing Selector* (OBS) or *Course Selector*, is a knob used to rotate the VOR indicator in order to line up the CDB with the CDI.

→Mouse/Keyboard functionality?

Interactive via mouse. The VOR indicator is always aligned with *magnetic north*, just like a compass. To obtain the magnetic heading that will allow you to fly directly *to* the VOR station, spin the CDI needle by click-and-dragging the OBS knob. Drag the mouse either left or right horizontally across the screen until the CDB is centered in the middle of the CDI, and the **TO/FROM** indicator displays "TO." The **front** of the CDI arrow indicates the heading to fly directly *to* the station in a no-wind situation. To determine the aircraft's current radial *from* the VOR station, spin the CDI needle until the CDB is centered in the middle of the CDI and the **TO/FROM** indicator displays "FR." The **tail** of the arrow indicates the aircraft's current radial from the VOR station.

The Cockpit Instruments: By Type

The following is a breakdown of all of the cockpit instruments featured in *Flight II* by type:

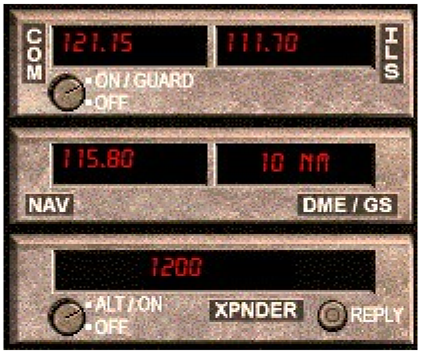
Flight Instruments

The following instruments, including *Pitot static* and *gyroscopic*, are used to assist you with flying your aircraft:

- **Airspeed Indicator (ASI)**
- **Altimeter**
- **Attitude Indicator (AI)**
- **Directional Gyro (DG)**
- **Vertical Speed Indicator (VSI)**
- **Turn/Slip Indicator**
- **Accelerometer (*P-51*)**
- **Magnetic Compass (*Beaver*)**

Navigation Instruments

THE RADIO STACK



The following instruments are used to assist you with navigating your aircraft:

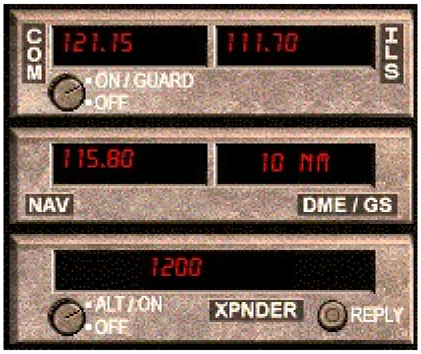
- **VOR Indicator**
- **Distance Measuring Equipment (DME)**
- **Navigation (NAV) Radio**
- **Instrument Landing System (ILS) Receiver**
- **ILS NAV/COM Radio**
- **ILS Marker Beacon Lights**

Clock

(*For additional details regarding the individual uses of the instruments discussed in this section, refer to* **Navigation**.)

Communication Instruments

THE RADIO STACK



The following instruments are used to communicate with **Air Traffic Controllers** and to listen in to what these controllers and other pilots have to say:

- **COM Radio**
- **Transponder (XPNDR)**

Flight Controls and Lighting System

The following instruments are used to assist you with controlling and illuminating your aircraft:

Throttle Control Lever

Propeller Control Lever

Mixture Control Lever

Flaps Indicator

Elevator Trim Indicator

Rudder Trim Indicator (*Baron*)

Landing Gear Controls

Selected Engine Indicator (*Baron*)

Navigation Lights Switch

Engine Instruments

The following engine instruments show the operating conditions of your engine, as well as fuel status:

Propeller RPM Indicator

Manifold Pressure Gauge

Oil Temperature Gauge

Oil Pressure Gauge

Carburetor Heat (Trainer)

Fuel Gauges

Fuel Tank Switch (Arrow)

The Cockpit Instruments: By Aircraft

The following is a breakdown of all of the cockpit instruments featured in *Flight II* by aircraft:

CLICK TO JUMP:

Piper Arrow Instruments

ARROW IFR COCKPIT VIEW (CLICK TO VIEW POP-UPS:)

ARROW IFR COCKPIT VIEW (CLICK TO JUMP:)

Clock

Airspeed Indicator (ASI)

Attitude Indicator (AI)

Altimeter

Landing Gear Transit Light

Instrument Landing System (ILS) Receiver

Manifold Pressure Gauge

Turn/Slip Indicator

Directional Gyro (DG)

VOR Indicator

Vertical Speed Indicator (VSI)

Propeller RPM Indicator

Landing Gear Handle

Landing Gear Position Lights

Left Fuel Gauge

Right Fuel Gauge

Fuel Tank Switch

Oil Temperature Gauge

Oil Pressure Gauge

Navigation Lights Switch

ILS Marker Beacon Lights

COM Radio

ILS Radio

Navigation (NAV) Radio

Distance Measuring Equipment (DME)

Elevator Trim Indicator

Flaps Indicator

Transponder (XPNDR)

Throttle Control Lever

Propeller Control Lever

Mixture Control Lever

De Havilland Beaver Instruments

BEAVER IFR COCKPIT VIEW (CLICK TO VIEW POP-UPS:)

BEAVER IFR COCKPIT VIEW (CLICK TO JUMP:)

Airspeed Indicator (ASI)

Attitude Indicator (AI)

Altimeter

Clock

Manifold Pressure Gauge

Flaps Indicator

Turn/Slip Indicator

Directional Gyro (DG)

Vertical Speed Indicator (VSI)

Propeller RPM Indicator

Elevator Trim Indicator

Magnetic Compass

Propeller Control Lever

Throttle Control Lever

Mixture Control Lever

COM Radio

Transponder (XPNDR)

- Landing Gear Handle
- Landing Gear Position Lights
- Navigation Lights Switch
- Fuel Gauge
- Oil Temperature Gauge
- Oil Pressure Gauge

Beech Baron Instruments

BARON IFR COCKPIT VIEW (CLICK TO VIEW POP-UPS:)

BARON IFR COCKPIT VIEW (CLICK TO JUMP:)

Flaps Indicator

Airspeed Indicator (ASI)

Attitude Indicator (AI)

Clock

Altimeter

ILS Marker Beacon Lights

Instrument Landing System (ILS) Receiver

Elevator Trim Indicator

Turn/Slip Indicator

Directional Gyro (DG)

VOR Indicator

Vertical Speed Indicator (VSI)

Propeller RPM Indicator

Landing Gear Handle

Landing Gear Position Lights

Rudder Trim Indicator

Navigation Lights Switch

Selected Engine Indicator

Manifold Pressure Gauge (Split)

Fuel Gauge (Split)

Oil Pressure Gauge (Split)

Oil Temperature Gauge (Split)

COM Radio

ILS Radio

Navigation (NAV) Radio

Distance Measuring Equipment (DME)

Transponder (XPNDR)

Throttle Control Lever

Propeller Control Lever

Mixture Control Lever

P-51D Mustang Instruments

P-51 IFR COCKPIT VIEW (CLICK TO VIEW POP-UPS:)

P-51 IFR COCKPIT VIEW (CLICK TO JUMP:)

Oil Temperature Gauge (Dual)

Oil Pressure Gauge (Dual)

Instrument Landing System (ILS) Receiver

Airspeed Indicator (ASI)

Attitude Indicator (AI)

Altimeter

Flaps Indicator

Elevator Trim Indicator

Propeller RPM Indicator

Manifold Pressure Gauge

Landing Gear Handle

Landing Gear Position Lights

Rudder Trim Indicator

Navigation Lights Switch

Turn/Slip Indicator

Directional Gyro (DG)

VOR Indicator

Vertical Speed Indicator (VSI)

Accelerometer

Clock

ILS Marker Beacon Lights

COM Radio

ILS Radio

Navigation (NAV) Radio

Distance Measuring Equipment (DME)

Transponder (XPNDR)

Fuel Gauge

Trainer Instruments

TRAINER IFR COCKPIT VIEW (CLICK TO VIEW POP-UPS:)

TRAINER IFR COCKPIT VIEW (CLICK TO JUMP:)

Airspeed Indicator (ASI)

Attitude Indicator (AI)

Altimeter

Instrument Landing System (ILS) Receiver

Turn/Slip Indicator

Directional Gyro (DG)

VOR Indicator

Vertical Speed Indicator (VSI)

Propeller RPM Indicator

Left Fuel Gauge

Right Fuel Gauge

Oil Temperature Gauge

Oil Pressure Gauge

Navigation Lights Switch

ILS Marker Beacon Lights

Clock

COM Radio

- ILS Radio
- Navigation (NAV) Radio
- Distance Measuring Equipment (DME)
- Transponder (XPNDR)
- Carburetor Heat
- Throttle Control Knob
- Mixture Control Knob
- Elevator Trim Indicator
- Flaps Indicator

The Cockpit Instruments: By View

The following is a breakdown of all of the cockpit instruments featured in *Flight II* by view:

- **VFR Cockpit View**
- **IFR Cockpit View**

Camera View System Hot Keys

Below is a summary of the internal and external cockpit camera views available to the player in *Flight II*, along with the associated keystroke.

- **Joystick Viewing Controls**
- **Enter Cockpit**
- **Internal and External Panning**
- **Internal Cockpit Views**
- **Padlock Views**
- **Virtual Passenger Views**
- **External Movable Views**
- **External Fixed Views**
- **Miscellaneous View Controls**

(*To see a listing of all of the keyboard commands available in Flight II, please refer to* **Keyboard Commands Summary**.)

Joystick Viewing Controls

2 Button Joystick
Trigger (Button 1) -Pan
Pan the camera view by holding down the button and moving the joystick.
Button 2 -Zoom In/Out
Zoom the camera view in/out by holding down the button and moving the joystick.

4 Button with Hat (*CH Flightstick*, *Thrustmaster*)
Hat
(Refer to **A Word on Panning***.)*
Trigger (Button 1) -Pan
Pan the camera view by holding down the button and moving the joystick.
Button 2 -Zoom In/Out
Zoom the camera view in/out by holding down the button and moving the joystick.

4 Button with Hat and Throttle (*CH Flightstick Pro*, MS *Sidewinder*)
Hat
(Refer to **A Word on Panning***.)*
Trigger (Button 1) -Pan
Pan the camera view by holding down the button and moving the joystick.
Button 2 -Zoom In/Out
Zoom the camera view in/out by holding down the button and moving the joystick.

MS Sidewinder Pro
Hat
(Refer to **A Word on Panning***.)*
Trigger (Button 1) -Pan
Pan the camera view by holding down the button and moving the joystick.
Button 2 -Zoom In/Out
Zoom the camera view in/out by holding down the button and moving the joystick.

Enter Cockpit

KEYPAD ENTER -Get Me Back in my Plane Now!
Always returns you to the last 2D cockpit mode you were in. Additionally cycles through the four available cockpit modes (*Full Screen*, *VFR*, *IFR* and *Virtual Cockpit Views*).

Internal and External Panning

A Word on Panning:

With the **Joystick Hat Switch (Left, Right, Up** and **Down)** or

Key Pad 2, **4**, **8**, **6**, and **5**, you will be able to pan your head around to check out the scenery in both internal and external views.

KEYPAD 4 -Look/Pan Left

- In *VFR*, *IFR* and *Full Screen* cockpit modes, press to look over left wing. (**KEYPAD 5** centers/returns to forward view.)
- In *Virtual Cockpit* and *External Views*, pans left.

KEYPAD 6 -Look/Pan Right

- In *VFR*, *IFR* and *Full Screen* cockpit modes, press to look over right wing. (**KEYPAD 5** centers/returns to forward view.)
- In *Virtual Cockpit* and *External Views*, pans right.

KEYPAD 8 -Look Forward/Pan Up

- In *VFR*, *IFR* and *Full Screen* cockpit modes, press to look forward.
- In *Virtual Cockpit* and *External Views*, pans up.

KEYPAD 2 -Look Back/Pan Down

- In *VFR*, *IFR* and *Full Screen* cockpit modes, press to look behind, also known as “Checking Six.” (**KEYPAD 5** centers/returns to forward view.)
- In *Virtual Cockpit* and *External Views*, pans down.

KEYPAD 7 -Glance Left

Press (and hold) to look left 90 degrees in *Full Screen*, *VFR*, *IFR* and *Virtual Cockpit Views*. Release to snap back to center.

KEYPAD 9 -Glance Right

Press (and hold) to look right 90 degrees in *Full Screen*, *VFR*, *IFR* and *Virtual Cockpit Views*. Release to snap back to center.

KEYPAD 5 -Snap to Center

Snaps the view back to the center of the screen (i.e., looks forward).

Internal Cockpit Views

F1 -Full Screen View

Enables *Full Screen* view. This is a static 2D view, with no cockpit displayed when looking forward. Pan in 90 degree increments. Zoom is not supported.

F2 -VFR Internal View

Enables the *VFR Cockpit* view. This is a static 2D view, with VFR cockpit displayed when looking forward. Pan in 90 degree increments.

F3 -IFR Internal View

Enables the *IFR Cockpit* view. This is a static 2D view, with IFR cockpit displayed when looking forward. Pan in 90 degree increments.

F4 -Virtual Cockpit View

Enables the *Virtual Cockpit* view. Variable view from inside cockpit. Panning is fully supported. Players may **Padlock** other aircraft and ground objects.

Padlock Views

P -Target AI Plane

Lock and "eyeball" track another aircraft ***within 10 miles***.

Repeatedly pressing **P** cycles through all aircraft within range, from nearest to furthest.

O -Target Ground Object

Lock and "eyeball" track a ground object ***within 3 miles***.

Repeatedly pressing **O** cycles through all ground objects within range, from nearest to furthest.

C -Target Communicator

Targets the last nearby plane ***within 10 miles*** which has been heard on the radio.

I -Target Me

Padlock your aircraft from the current object view or breaks lock on your aircraft.

T -Target Tower

Targets the nearest Control Tower.

Virtual Passenger Views

SHIFT P -Teleport me to that aircraft
Padlock first (*per above*) then use key combination to go inside the cockpit of that aircraft.

SHIFT O - Teleport me to that object
Padlock first (*per above*) then use key combination to view the world from that object's perspective.

SHIFT C - Teleport to that last radio call
Padlock first (*per above*) then use key combination to go inside the cockpit of that aircraft.

SHIFT I - Teleport me back to my own aircraft
Padlock first (*per above*) then use key combination to return to the cockpit of your aircraft.

SHIFT T - Teleport to that Control Tower
Padlock first (*per above*) then press **F4** to go inside that building.

External Movable Views

F5 -Movable External

Pan and zoom are supported. Padlock is supported. Camera and zoom position is saved between views.

ALT F5 -Inverse Tactical

View from the padlocked object to you.

F6 -Chase Plane Lag View

Follows the plane at a slight distance (50 feet) with a slight lag delay. Zoom is supported. The more zoom out, the more lag.

F7 -Rotating Camera View

Slow rotating view around object of interest. Zoom and pan are supported.

ALT F7 -Above View

A fixed view looking down 500 ft from above the aircraft. Zoom is supported.

F8 -Taxi Camera

A view of 45 degrees above the aircraft which follows the aircraft. Zoom is supported. Best used in conjunction with the **Taxiway Path** view (**ALT F12** key combination).

External Fixed Views

F9 -Fly-Past Camera
View which constantly jumps to keep up with the source, looking at the source.
F10 -Drop Camera
Radio-controlled (R/C) style camera.
F11 -Fixed External Camera
View in which the camera remains fixed in space. Zoom, panning, and padlock are supported.

Miscellaneous View Controls

F12 -Tape Strip Indicator

Toggle On/Off the *Tape Strip Indicator* across the bottom of the screen in *any* view.

ALT F12 -Taxiway Path

Displays the ground controller instruction path *to* the active runway *from* the parking ramp while taxiing to takeoff and *from* the active runway *to* the parking ramp following landings. Best used in conjunction with the **Taxi Camera** view.

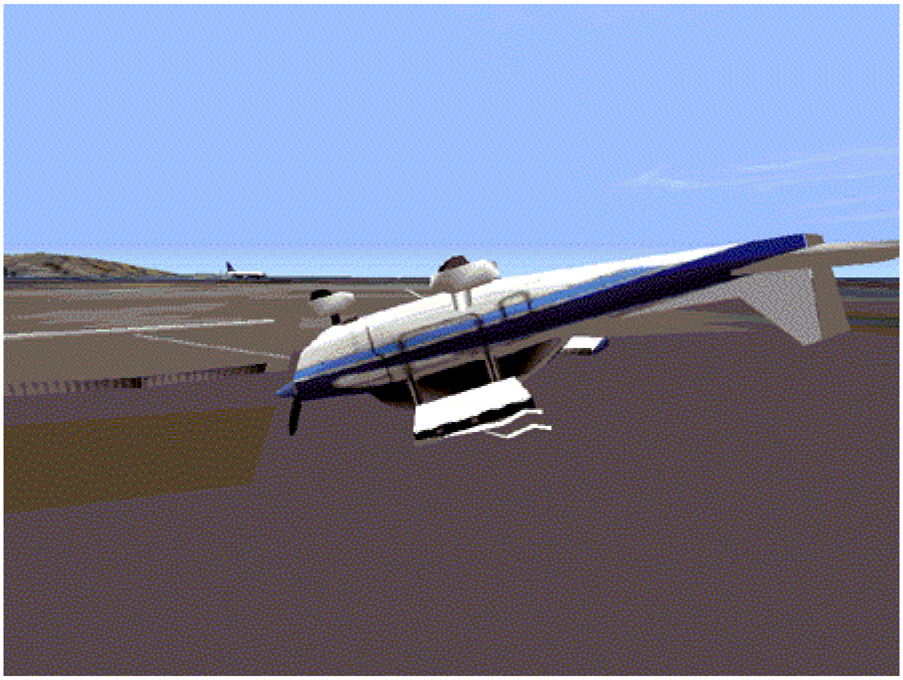
Z -Zoom In

Zooms in view.

X -Zoom Out

Zooms out view.

How to Break Your Aircraft (Operating Limitations)



This section of the Online Manual is devoted to teaching the aviator the myriad unfortunate "incidents" that can occur in flight. They can happen either if the aircraft is abused in specific ways, or if the pilot experiences a nasty case of bad luck. We'll begin with a global discussion and then get into details regarding the individual aircraft.

- **Operational Mishandling vs Random Failures**
- **Global System Failures**
- **Aircraft-Specific Failures**

Operational Mishandling vs Random Failures

In the real world, every once in a great while, aircraft systems just plain fail. Some of the time, these failures are due to operational mishandling by overzealous pilots. Most of the time, however, they are due to random, oftentimes inexplicable system failures—oil line ruptures, electrical system shut downs, etc. These latter failures, while impossible to avoid with certainty, are best combated through proper and persistent aircraft maintenance. In *Flight II*, you are not responsible for aircraft maintenance, so random failures, though present (provided the relevant toggles are enabled in the **Options Screen**), are less frequent. However, failures due to the *improper handling* of the aircraft are modeled on a consistent basis. As such, there are some simple precautions that you, the *Flight II* pilot, can take to avoid them, and it is these precautions that we will focus on here.

Global System Failures

A general rule of thumb is to know and understand the *operating limitations* of your aircraft. How hard you push your aircraft, and knowing when you've reached its limits, are the keys. Operational mishandling can affect the following five global aircraft systems in *Flight II*: the *engine*, *flaps*, *landing gear*, *electrical system*, and *airframe*.

- **The Engine**
- **Flaps**
- **Landing Gear**
- **Electrical System**
- **The Airframe**

Engine Failures

Aircraft engines need two things in regulated amounts in order to operate at peak efficiency: *fuel* and *air*. A mixture of fuel and air is burned by the engine which produces its power. Oil, another vital component, courses throughout the engine to keep it running cool by minimizing the friction caused by moving engine parts. If the passage of fuel, air, or oil is in some manner restricted, the engine will eventually malfunction.

Random engine failures due to ruptured fuel lines, blown air intake valves, ruptured oil lines, etc., can be enabled by setting the **Engine Failure** button to *On* at the **Options Screen**. When this option is enabled, and the aircraft is struck by one of these unusual misfortunes, the engine will typically seize. You'll probably hear a loud bang and see smoke emanating from the cowling. We highly recommend that you make an immediate emergency landing at the nearest airport when you experience this type of catastrophic engine failure.

Regardless of the settings in the *Options* screen, you can also *overstress* the engine by pushing it too hard through high-speed maneuvering, especially high-speed dives. Various caution ranges exist on the **Propeller RPM Indicator**, **Manifold Pressure Gauge**, **Oil Temperature Gauge**, and **Oil Pressure Gauge** to graphically illustrate when you are entering dangerous ground. Generally, **yellow** ranges indicate *caution areas* in which you should not spend a great deal of time. **Red** ranges indicate *never-exceed areas*–continued operation at or above these levels will almost certainly ensure you'll have a bad flight.

Abnormal engine indications in any of these gauges could be signs of imminent failure. A total loss of oil pressure, in particular, followed by a rise in engine oil temperature, are indications that an engine failure is impending. Always attempt to land the aircraft as soon as possible.

Flap Failures

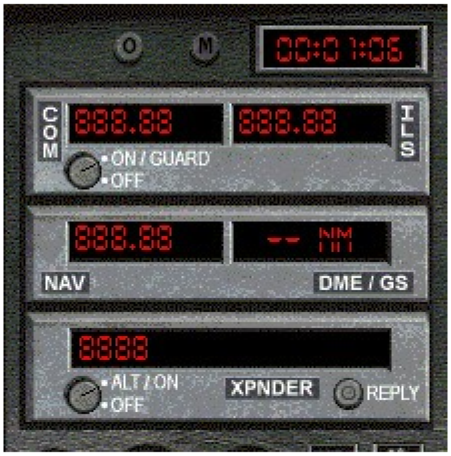
Wing flaps are the hinged, trailing edge wing surfaces which act together to increase the lift characteristics of the wing. Flaps are extended and retracted with the **Flaps Indicator**. If you exceed certain speeds, particularly while the flaps are in the fully extended position, you could seriously damage them. Damaged flaps will adversely affect the handling characteristics of the aircraft.

Landing Gear Failures

The landing gear may be damaged on all aircraft through hard landings. Coming down on the runway at too great a rate of speed may rupture a tire or even collapse the gear altogether.

(*For additional details on how to execute a proper landing, refer to* **Landing**.)

Electrical System Failures



This is a case where some or all radio and/or navigation equipment simply stops working. You'll know it when the numbers on the Radio Stack start spinning and blinking wildly. Random electrical system failures can be enabled by setting the **Electrical Failure** button to *On* at the **Options Screen**.

Imagine the panic of being at 5,000 feet at night in the middle of a thunderstorm and having the lights go out and your radio go dead! Needless to say, you should immediately try to land at the nearest airport—hopefully one that's well-lit.

NOTE:

Flight II also incorporates a very useful feature in the event of an airborne emergency: the **MAYDAY** *signal. Simply press the* **ALT G** *key combination to send out a standard* MAYDAY *emergency signal, indicating that your aircraft is in serious trouble. If you are not communicating with a tower or radar approach controller at the time the signal is sent, this transmission will go out over the* **121.50** *emergency Guard frequency. A radar approach controller will respond with vectors direct information to the nearest airport. (For additional details, refer to* **Obtaining Vectors Direct***.)*

Structural Failures

This one is pretty simple: All of the aircraft featured in *Flight II* are constructed primarily of a combination of fiberglass and aluminum. These structural alloys are used because they are durable, lightweight, and cost-efficient.

Under normal operating circumstances, your aircraft will perform as anticipated, sustaining reasonable G-loads (especially the **P-51**). But if you purposefully overstress the aircraft by engaging in **high-speed dives**, or maneuvers designed specifically for *aerobatic-aircraft*, which are constructed to withstand the rigors of aerobatic flying, you can and probably will *damage the airframe* of your aircraft. Your aircraft may, indeed, literally come apart at the seams if you fly it beyond its intended specifications. So fans of the original *Flight Unlimited* beware—these are not designed as aerobatic aircraft and should not be treated as such.

Attempt *knife-edge flight* at your own peril!

Aircraft-Specific Failures

In addition to **global system failures**, there are aircraft-specific problems that can arise if you do not follow certain procedures.

- **Piper Arrow**
- **De Havilland Beaver**
- **Beech Baron**
- **P-51D Mustang**
- **Trainer**

Piper Arrow Operating Limitations

The **Arrow** is the only aircraft in *Flight II* to come equipped with a **Fuel Tank Switch** in the cockpit. Fuel is fed to the engine via the fuel pump from each respective tank, depending on which tank is selected. In the *Arrow*, you should remember to switch tanks every **75** minutes of flight time to keep the wings balanced. This technique will also prevent flaming out the engine with one full wing tank.

De Havilland Beaver Operating Limitations

The **Beaver** is unique in *Flight II* in that it is the only aircraft capable of landing on water. The landing gear apparatus for the *Beaver*, consequently, has two configurations: the **land** mode and the **sea** mode. In the sea mode, the landing gear handle must be in the *up and stowed* position prior to initiating a waterborne landing. Landing on water with the gear handle in the land mode or *down and locked* position will eventually fill the pontoons with water and sink the aircraft.

(*For additional details, refer to* **Landing Gear Controls**.)

Oil drips into the exhaust manifold when the aircraft is parked, which is why a large bang is heard and a puff of smoke appears during engine start.

Beech Baron Operating Limitations

If an engine failure occurs in the **Baron**, immediately “feather” the propeller by cutting the throttle to idle, propeller control full aft, and mixture full lean, thereby reducing drag from the dead engine. Control the *asymmetric thrust* produced by the good engine with rudder trim, and maintain a slight bank—all turns should be made *into* the good engine. Do not allow the airspeed to decay below the minimum speed where full rudder will no longer control the aircraft yawing. The minimum controllable airspeed for a single engine is **84 KIAS**, indicated by the first **red** radial appearing on the **Airspeed Indicator**.

P-51D Mustang Operating Limitations

The engine in the **P-51** has so much power, it is entirely possible to go fast enough to literally rip the wings off the aircraft, so *watch your speed*. High-speed dives in particular can overspeed the engine, and physically bend and damage the propeller, at the very least. Always try to avoid them.

Do not raise the **landing gear lever** when the aircraft is on the ground. There is no safety downlock on a *P-51*, and the gear will retract as soon as you start taxiing!

Trainer Operating Limitations

If heated air from the exhaust manifold is not allowed to warm the carburetor in the **Trainer**, ice can build-up in the carburetor inlet, which will, if left unchecked, result in engine failure. Carburetor icing may occur in humid air generally between 20 and 70 degrees Fahrenheit. Use the **Carb Heat Knob** intermittently to prevent this from occurring.

Flight Planning

In real life, pilots file what's known as a *flight plan* prior to jumping into their aircraft. A flight plan essentially allows the pilot to plot a navigational course between a departure airport and a destination airport.

Flight planning involves detailed information management. Many variables are taken into consideration—everything from analyzing predicted weather conditions, to calculating the length of the flight, to reviewing safety considerations for the airplane and the passengers, to projecting fuel consumption rates.

In *Flight II*, while you are not actually required to "file" a flight plan, you will still have access to your own *flight planner*. You can select departure/destination airports and turning points, along with specific flying conditions, to create a "virtual" flight plan.

Flight planning is an important facet of **pilotage** −point-to-point navigating via ground references. Having a flight plan allows you to combine your visual observations (through landmark recognition) with information from the map you've "marked" while creating your flight route, in order to locate your position at any time. Your flight plan can be accessed through an **In-Flight Map** while you're in the air. Without this vital navigational information, life would be considerably harsher, especially if your instruments were ever to go dead!

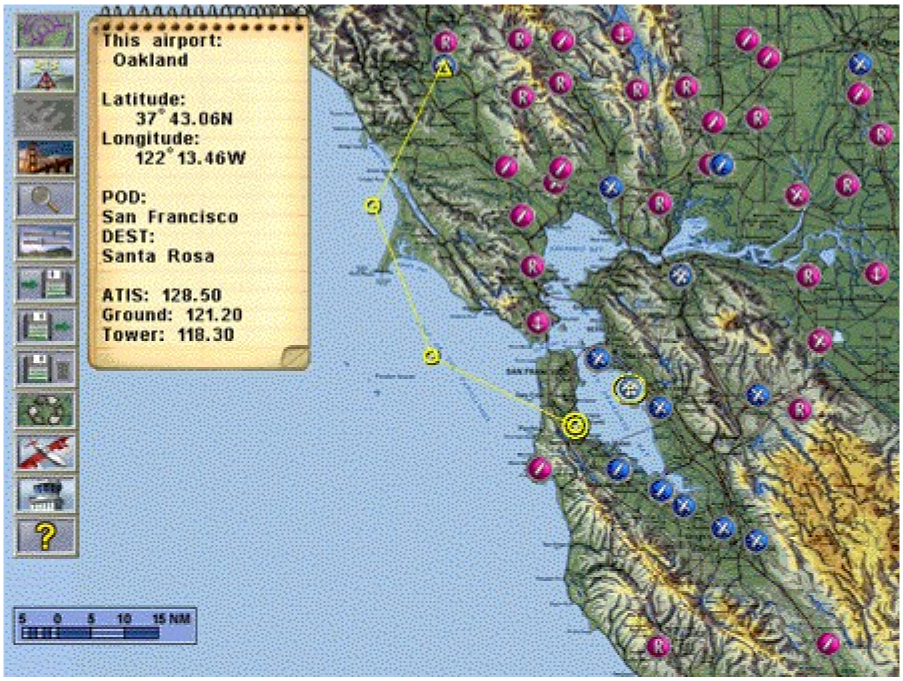
(*For further discourse on general navigating procedures and the role of the In-Flight map, refer to* **Navigation**.)

- **Map Familiarization**
- **Creating A Flight Plan**
- **Saving, Loading, and Deleting Flight Plans**
- **Taking Off/Aborting**
- **Mini-Tutorial**
- **Flight Planner Hot Keys**

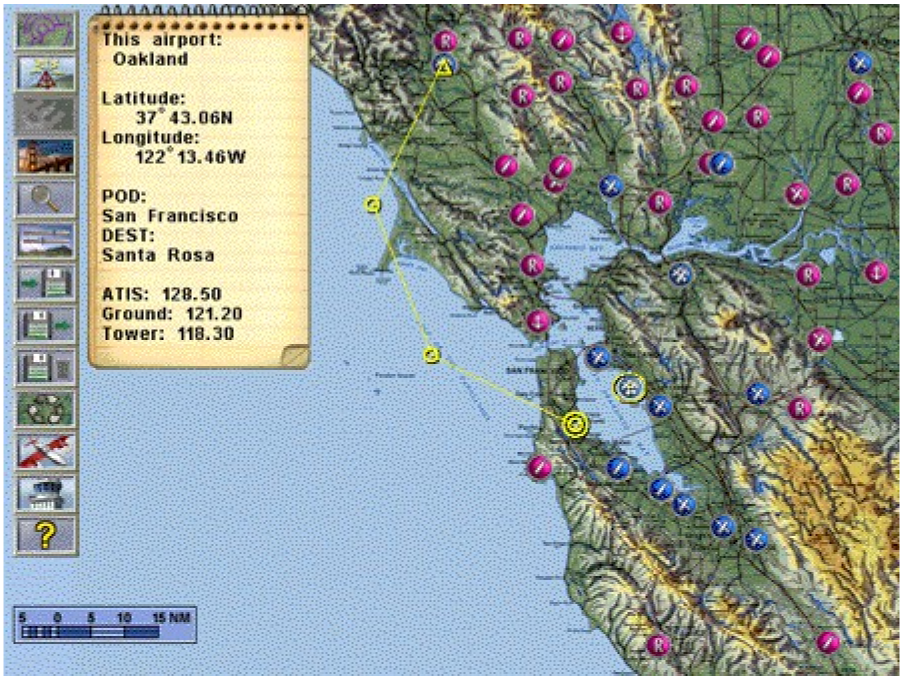
Flight Planner Map Familiarization

Click on the *Course Plotter* FBO icon from any the **FBO** to access the **FLIGHT PLANNER**:

CLICK TO VIEW POP-UPS:



CLICK TO JUMP:

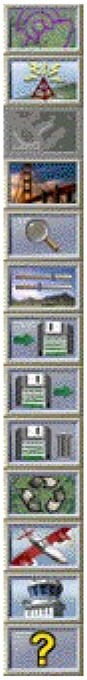


The *Flight Planner* map is a relief map, identical to an actual sectional map of the San Francisco Bay Area.

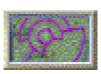
Let's take a closer look at the features offered…

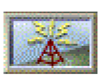
- **Airport Icons**
- **Flight Planner Toolbar**
- **Flight Planner Notepad**
- **Turning Point Icons**
- **Map Scale**

Flight Planner Toolbar



Note the row of buttons running along the left-hand side of the **Flight Planner Map**. This is the *Flight Planner Toolbar*, and is used to activate the following features (via left-mouse click):

 **Airspace Information**
This button toggles the *Airspace Information* map layer on and off.

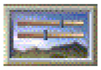
 **VOR Information**
This button toggles the *VOR Stations* map layer on and off.

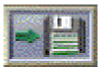
 **Satellite View**
This button toggles the position of your aircraft on the map on and off. The *Satellite* button may only be accessed from the *In-Flight* map. It is present, but always grayed-out when in the *Flight Planner*. (*For additional details regarding its use, refer to* **Using the In-Flight Map**.)

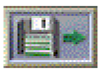
Points of Interest
This button toggles the *Points of Interest* (landmarks, etc.) map layer on and off.

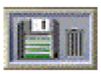
Zoom Control

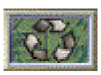
This button toggles the viewing level of the map. Left-click to zoom in and right-click to zoom out. There are two zoom levels below the default.

 **Flight Options**
This button takes you to the *Modified Quick Flight* screen which allows you to set your weather, time of day, and flight options.

 **Save Flight Plan**
This button saves the current flight plan as either a new or existing filename.

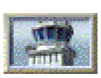
 **Load Flight Plan**
This button loads a previously saved flight plan.

 **Delete Flight Plan**
This button deletes a previously saved flight plan.

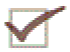
 **Clear Flight Plan**
This button clears the current flight plan.

 **Fly**
This button accepts the currently chosen flight plan and begins your flight.

 **Help**
Left or right-click on this button to toggle on/off an adjacent text box which names all of the buttons on the *Flight Planner Toolbar*.

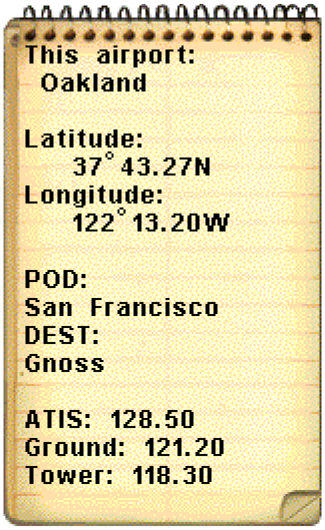
 **Airport**
This button returns you to the current **FBO**.

Flight Planner Help



Click on this button from the **Flight Planner Toolbar** to toggle on/off an adjacent text box which names all of the buttons:

Flight Planner Notepad



The *Flight Planner Notepad*, located in the upper left-hand corner of the screen, displays information pertinent to the current flight plan, including general airport, positional, departure, destination, and flight route data.

(*For additional details regarding its specific use, refer to* **Using the Notepad**.)

Turning Point Icons

There are three types of turning point icons, used to mark events along the current flight plan:

 **Point of Departure (P.O.D.)**
Indicates the airport from which you will be departing.

 **General Turning Point**
Indicates any turning point between your P.O.D. up to and including your destination airport.

 **Destination Airport**
Indicates the airport at which you will be landing.

Creating a Flight Plan

Creating a flight plan in *Flight II* is a **6** step process:

- **Choose your flight conditions and aircraft**
- **Locate your point of departure (P.O.D.)**
- **Use the Flight Planner map to analyze your route**
- **Plot turning points along your intended flight route**
- **Use the Notepad to keep track of your flight plan**
- **Select an airport for your destination**

Choosing Flying Conditions and Your Aircraft

The first thing you should do when you reach the *Flight Planner* is locate and click on the *Flight Options* button from the **Flight Planner Toolbar**. This will take you to the **MODIFIED QUICK FLIGHT SCREEN** where you will choose both the flying conditions and the aircraft for the planned flight:

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

This screen, which is also accesible from any **FBO**, contains settings which are identical to the regular **Quick Flight** screen. A **Point of Departure** heading at the top of the screen, indicating the active *Flight Planner P.O.D.*, replaces the normally present button to proceed to the **Quick Flight Map**. The icon in the lower left-hand corner allows you to **select** one of *Flight II's* five featured flyable **aircraft**.

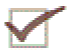
Click on the **DONE** button to return to the **Flight Planner Map** after having input your desired settings.

Click on the **CANCEL** button to return to the map without accepting the current settings.

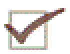
(*For additional details regarding the remaining selections on this screen, refer to* **Quick Flight**.)

Locating Your P.O.D.

Once you've picked your flying conditions and chosen an aircraft, the next thing you should do is scan the map in order to locate the airport out of which you are going to fly. Look for the following **yellow**, hollow, double-circle icon:



This icon represents your *Point of Departure* or P.O.D. It is always the airport at which you are currently situated.



The name of the airport is also located in the **Flight Planner Notepad** under the **Current Airport** heading, along with its latitudinal and longitudinal positional information.

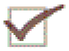
Analyzing Your Route

Once you've recognized your departure airport, you should next decide where you want to actually fly. The best thing to do is eyeball a destination airport on the map and then select a route to plot. Before you start plotting turning points, you'll want to think about whether you want to shoot for a scenic route, setting as many turning points as you wish (up to the allowed maximum of 20), or perhaps opt for a more direct approach to the destination airport.

There are four buttons devoted to showing you the various levels of detail on the map that will assist you with choosing your flight route: *Airspace Information*, *VOR Information*, *Points of Interest*, and *Zoom Control*. The first three buttons toggle overlays onto the base layer of the **Flight Planner Map**, which is always shown. These overlays may be enabled simultaneously.

- **Airspace Information**
- **VOR Information**
- **Points of Interest**
- **Zoom Control**

Airspace Information



Click on this button from the **Flight Planner Toolbar** to toggle the *Airspace Information* map layer on and off:

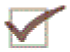
FLIGHT PLANNER MAP WITH AIRSPACE INFO LAYER (CLICK TO VIEW POP-UPS:)

FLIGHT PLANNER MAP WITH AIRSPACE INFO LAYER (CLICK TO JUMP:)

The *Airspace Information* layer indicates the controlled airspace surrounding *San Francisco Airport* (SFO) and the various controlled airports dotting the San Francisco Bay Area featured in *Flight II*. Shaded areas indicate the various levels of control: **bluish-green** for *Class B airspace*, **magenta** for *Class C airspace*, and **sky-blue** for *Class D airspace*. Essentially, the higher volume of traffic the airport services, the higher classification designation is given to the airspace. *Class B*, therefore, is generally more congested than *Class C*; likewise, *Class C* is generally more congested than *Class D*.

If you are going to enter any controlled airspace, you must first receive clearance from the relevant controller. If you fail to receive clearance, you will receive a radio call to contact the controller on a specific radio frequency to state your intentions. (*For additional details, refer to* **Interacting with Air Traffic Controllers**.)

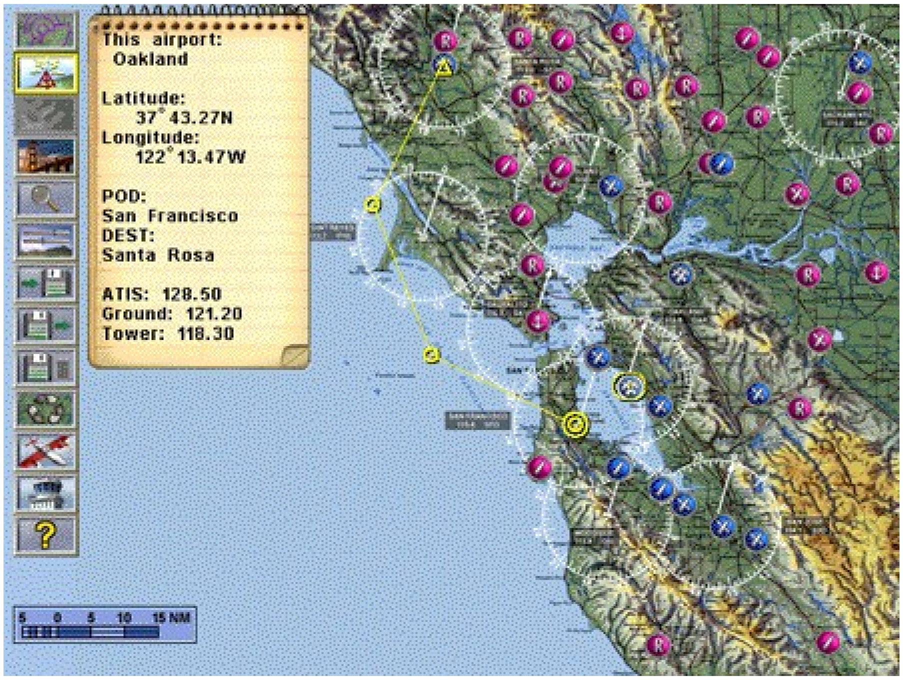
VOR Information



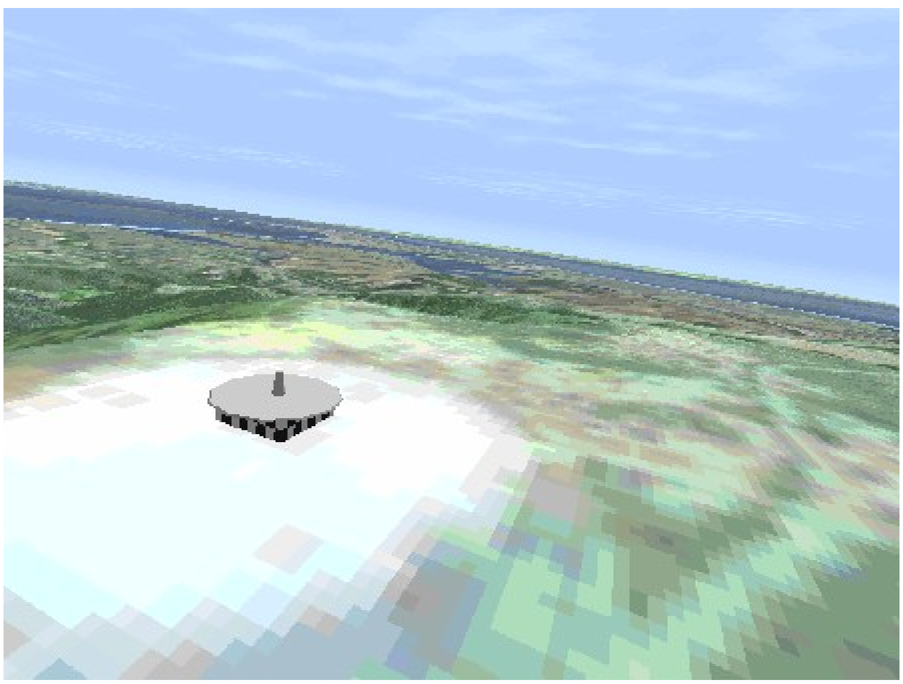
Click on this button from the **Flight Planner Toolbar** to toggle the VOR stations on and off:

FLIGHT PLANNER MAP WITH VOR STATION LAYER (CLICK TO VIEW POP-UPS:)

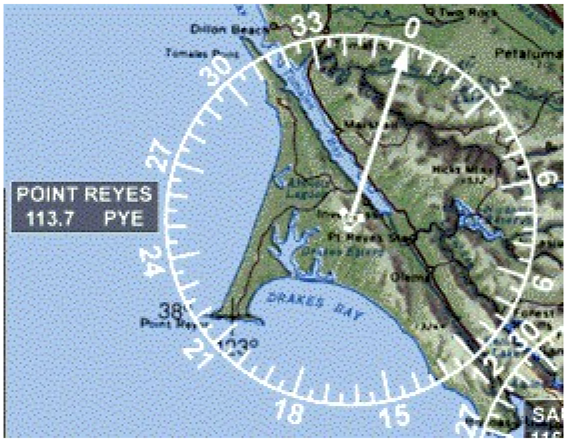
FLIGHT PLANNER MAP WITH VOR STATION LAYER (CLICK TO JUMP:)



The *VOR* or *NAVAID Station* layer illustrates where the **nine** VOR navigation aides exist in *Flight II's* terrain area. These are basically radar beacons that are used to assist pilots with navigating under **IFR conditions**:

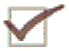


Around each VOR station is a **white** compass rose with a **white** arrow indicating *magnetic* *north*. The name of the VOR station, along with its associated radio frequency and three-letter identification, resides in an adjacent **gray** box.



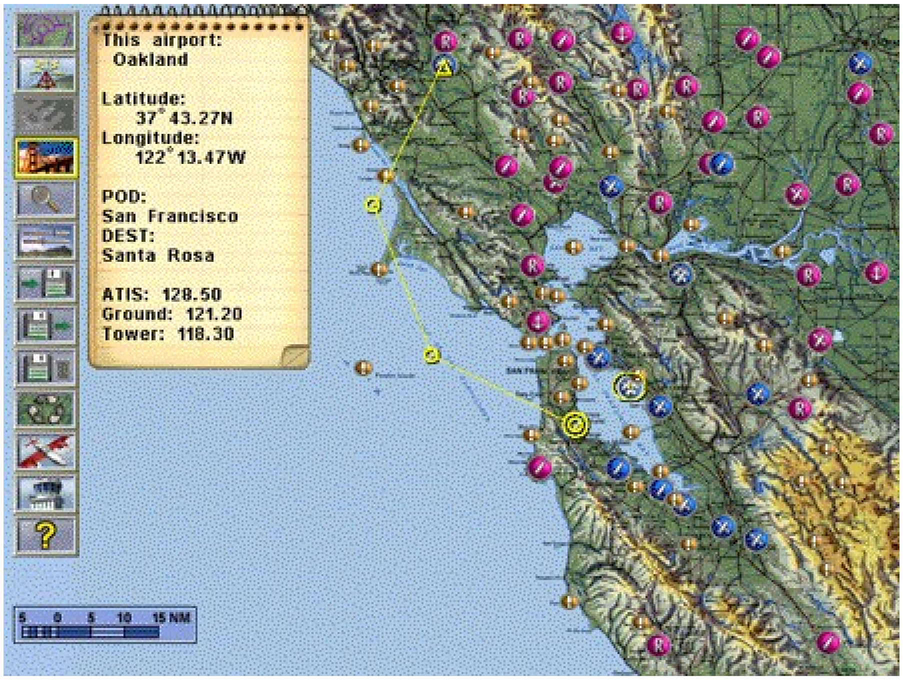
(*For additional details regarding how to use this information, refer to* **IFR Navigation**.)

Points of Interest

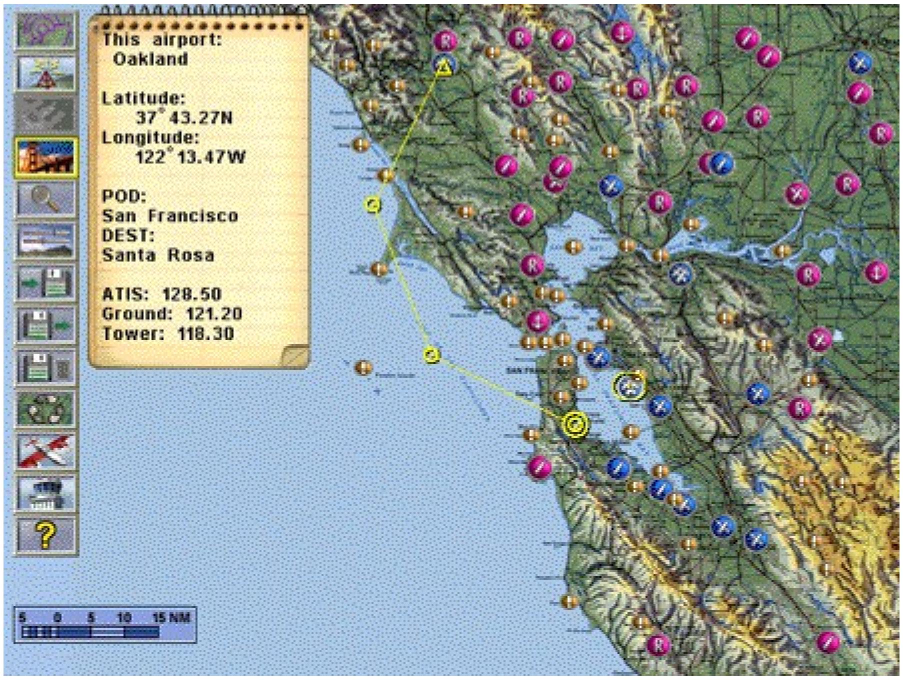


Click on this button from the **Flight Planner Toolbar** to toggle the points of interest on the map on and off:

FLIGHT PLANNER MAP WITH POINTS OF INTEREST LAYER (CLICK TO VIEW POP-UPS:)



FLIGHT PLANNER MAP WITH POINTS OF INTEREST LAYER (CLICK TO JUMP:)



The *Points of Interest* layer shows you many of the major landmarks in the San Francisco Bay Area, useful for VFR navigating and planning sightseeing tours.

Gold icons with exclamation marks illustrate the specific locations of each major landmark. Pass the mouse cursor over one of the icons to bring up the name of the landmark under the **Points of Interest** heading on the first page of the **Flight Planner Notepad**.

Turning Points

Once you know where you want to land and have a good idea of roughly how you want to get there, you should begin plotting *Turning Points*. Turning points are essentially waypoints used to navigate between your **P.O.D.** and the **destination** airport.

Let’s examine their placement and function:

- **Adding Turning Points**
- **The Flight Planner Airport Pop-Up Menu**
- **Moving Turning Points**
- **Deleting Turning Points**

Adding Turning Points

Your **P.O.D.** (*Point of Departure*) is always your first turning point, so there is no need to manually select it again. To select a *second* turning point, simply left-click on a spot anywhere on the map, preferably a short distance away from your P.O.D., and the following **yellow** bulls-eye icon will appear:

A **yellow** route line will be automatically drawn from the starting airport to the first turning point to begin the flight path. The first turning point will be marked **TP 1** on the **Flight Planner Notepad**. This is the first "leg" of your route.

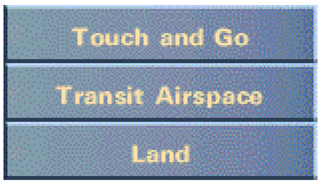
At the highest zoom level, **yellow** tick marks that each represent 2 minutes of travel time are displayed across the route line. This is based on the *average cruise speed* of the individual aircraft with no wind. This gives you, the pilot, an estimate of how long it's going to take to get to a specific turning point, which is important to **VFR Navigating**.

Tick marks will have different spacing for all aircraft, depending on the speed of travel for each.

Left-click again to plot another turning point, this time labeled **TP 2** on the **Notepad**. Another route line will appear, marking the second leg of your route.

Flight Planner Airport Pop-Up Menu

If you decide to click on an airport icon to choose it as your next turning point, or simply left-click on an existing turning point located over an airport icon, the following pop-up menu will appear:



This is the *Flight Planner Airport Pop-Up Menu* which allows you to choose what you'd like to do at the selected airport. Left-click on one of the provided buttons to enable its feature as follows:

Touch and Go

Click on this button to enter the pattern and practice single or multiple landings at a cleared runway.

Transit Airspace

Click on this button to enter the pattern and buzz the selected airport (i.e., do a flyover—do not touch down).

Land

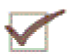
Click on this button to enter the pattern and land at the cleared runway. A new icon will appear overlaid onto the airport icon. (*For additional details, refer to* **Selecting a Destination Airport**.)

The specific runway for **landings** and **touch-and-go's** will be determined by wind conditions at the time of your landing. You will need to contact the **tower controller** at the appropriate time for landing instructions. For **transiting airspace**, you will also need to contact the tower for height approach instructions.

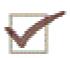
Moving Turning Points

To move a turning point, place the mouse cursor over it so that the icon highlights **green**. Now left-click to "grab" and drag it about the screen. Once satisfied, simply drop it into the new position on the **Flight Planner Map**. The relevant information on the **Notepad** will automatically change to reflect the new location.

When a turning point is moved to an airport icon, the **Flight Planner Airport Pop-Up Menu** will appear:



If the **LAND** button is chosen, all turning points that were previously selected beyond the landing site will be automatically deleted, a new icon will appear overlaid onto the airport icon, and both the map and **Notepad** will update accordingly.



Deleting Turning Points

If you make a mistake and wish to delete a turning point at any time, left-click on a given turning point icon on the **Flight Planner Map** so that it highlights **green** and press the **DELETE** key or, while holding the button down, simply right-mouse click. The turning point will disappear, and the flight plan as displayed on the map will be automatically updated to reflect the change (in addition to the **Notepad**).

Using the Flight Planner Notepad

The *Flight Planner Notepad* provides you with detailed information regarding the current flight plan.

Left-clicking on the dog-ear crease in the lower right-hand corner will cycle forward one page at a time. Right-clicking will cycle back.

Let's have a closer look:

- **The First Page**
- **Ensuing Pages**

The First Page

The first page of the **Flight Planner Notepad** illustrates the following information:

This Airport:
If the mouse cursor is located *over* an **airport icon**, this displays the name of that airport. If the cursor is *not* located over *any* airport icon, then this heading will instead read **Current Airport:** followed by the name of the *active* airport (i.e., the airport at which you are presently based). If the cursor is located over a **Points of Interest** icon, then this heading will read **Point of Interest**, followed by the name of the chosen landmark (e.g., *Golden Gate Bridge*).

Latitude/Longitude:
This displays positional information for the mouse cursor, which is continuously updated as the cursor is moved about the map.

POD
The full name of the airport from which you will be departing is displayed under this heading.

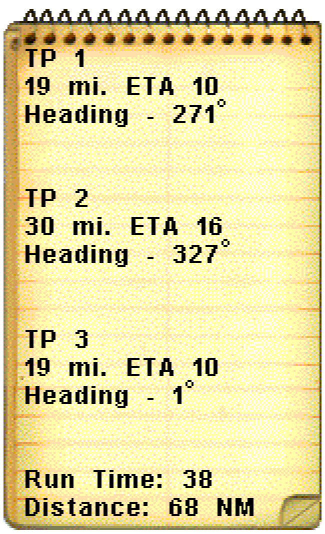
DEST
The full name of the airport at which you will be landing is displayed under this heading (providing you've actually chosen a destination airport).

The associated radio frequency for **This Airport** (if the cursor is located over an airport icon) or the **Current Airport** (if the cursor is not located over any airport icon) is always displayed at the bottom of the page, depending on the **airport type**:
ATIS: [frequency #]
Ground: [frequency #]
Tower: [frequency #]
UNICOM: [frequency #]

If it's a **Private Airfield**, then the following is displayed:
Private Field
No Radio

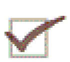
Ensuing Pages

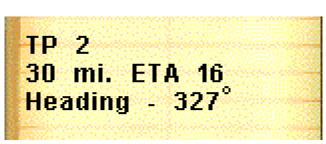
The second page of the **Flight Planner Notepad** (and beyond) provides navigational data pertaining to the remainder of the flight plan, and is only available for viewing after you've plotted the first turning point. The moment a turning point is added on the map, a new "page" in the *Notepad* is automatically created. Left-click on the dog-ear crease in the lower right-hand corner to cycle forward to the second page. You will see a page resembling the following:



TP 1 indicates your first selected turning point.

TP 2 indicates your second selected turning point (and so on…).





Beneath each turning point exists a *turning point summary*, which contains the following information:

[#] mi. is distance information, referring to the range between either your **P.O.D.** (if you're viewing the initial turning point) or *last* turning point plotted, and is measured in *nautical* *miles* (**NM**).

ETA [#] indicates the time it will take to proceed to this turning point from the turning point (or P.O.D.) immediately preceding it, and is measured in *minutes*.

Heading indicates the magnetic heading of the given turning point, and is measured in *degrees*.

[*Optional*] Touch and Go, followed by the name of the airport, tells you that the turning point is located at an airport and that this action is slated to be carried out there once reached. This heading only appears if the **TOUCH AND GO** button is specifically selected from the **Flight Planner Airport Pop-Up Menu**.

[*Optional*] Fly over, followed by the name of the airport, tells you that the turning point is located at an airport and that this action is slated to be carried out there once reached. This heading only appears if the **TRANSIT AIRSPACE** button is specifically selected from the **Flight Planner Airport Pop-Up Menu** (*see previous*).

The following cumulative figures sit on the *last* page of the *Notepad*:

Run Time refers to the total anticipated time the flight will take based on the current flight plan (minus wind and based on the *average cruise speed* of the aircraft), and is measured in *minutes*.

Distance refers to the total range the flight will cover, and is measured in **nautical miles** (**NM**).

Selecting a Destination Airport

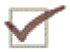
When you feel you've selected enough turning points to get you where you want to go, it's time to select a landing airport. To do so, left-click on one of the airport icons to have the **Flight Planner Airport Pop-Up Menu** appear:

Click on the **LAND** button.

A **yellow**, hollow triangular-shaped icon will appear overlaid onto the airport icon, denoting this airport as the flight's destination:

The *Notepad's* **DEST** heading will be updated to reflect the name of the new destination airport. This will also mark your *final* turning point, immediately preceding the **Run Time** and **Distance** cumulative information.

Clearing the Flight Plan



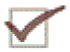
If you suddenly change your mind at any time and wish to clear the current flight plan, click on this button from the **Flight Planner Toolbar** to erase all turning points but the original P.O.D. Any map overlays you've enabled will additionally disappear. This will return the **Flight Planner Map** to the state in which it was first entered for the current flight session.

Saving, Loading, and Deleting Flight Plans

The following functions are accessed from the **Flight Planner Toolbar**:

- **Save Flight Plan**
- **Load Flight Plan**
- **Delete Flight Plan**

Save Flight Plan

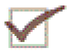


Click on this button from the **Flight Planner Toolbar** to save the current flight plan. A pop-up menu will appear that will allow you to either save the flight plan as an existing filename or enter a new one:

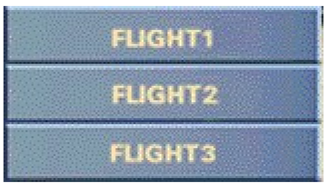
Click on a named flight plan to save over an existing filename. Click on the **NEW FILE** button to bring up a new pop-up box that will let you save the current flight plan under a new name, as an existing name, or cancel out of the SAVE routine altogether:

Left-click anywhere in the **black** save box. A cursor will appear. Type in the name of the new flight plan to be saved (you have an **8** character limit). Now click on the **SAVE** button to save the current flight plan. If you make a mistake at any time, simply click on the **CANCEL** button.

Load Flight Plan

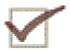


Click on this button from the **Flight Planner Toolbar** to load an existing flight plan from a pop-up menu displaying all currently saved flight plans (similar to the following):

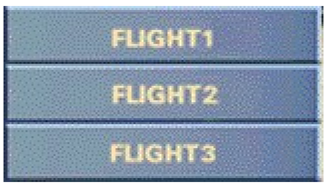


No more than **10** saved files may be seen at once; if there are more, click on the provided scroll arrows above or beneath to move up and down the list. Simply locate the flight plan file you'd like to load and left-click on the associated button. The new flight plan will momentarily appear on the map. To cancel the operation, press the **ESC** key.

Delete Flight Plan



Click on this button from the **Flight Planner Toolbar** to delete a previously saved flight plan from a pop-up menu displaying all currently saved flight plans (similar to the following):



No more than **10** saved files may be seen at once; if there are more, click on the provided scroll arrows above or beneath to move up and down the list.

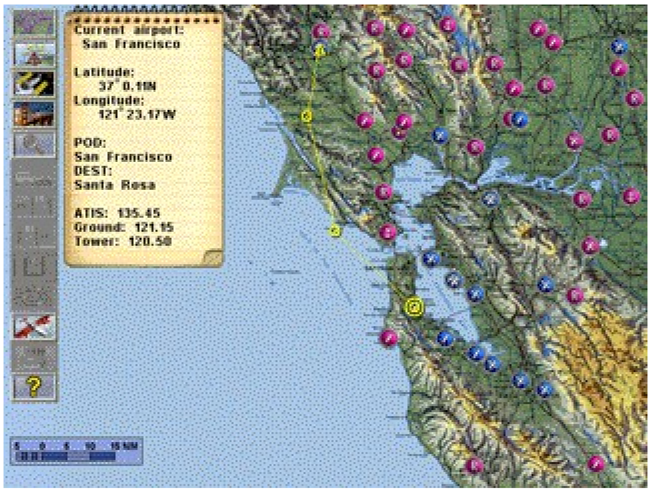
Simply locate the flight plan file you'd like to load and left-click on the associated button. To cancel the operation, press the **ESC** key.

Taking Off/Aborting

The following functions are accessed from the **Flight Planner Toolbar**:

Fly

Click on this button to accept the currently chosen flight plan and begin your flight. Once you're airborne, click on the **M** key to access the **In-Flight Map**.



This map, which is essentially a scaled-down version of the **Flight Planner Map**, will serve as your navigational chart for the flight and will contain all of the information you just placed into the *Flight Planner*. Use it to follow carefully the route you've set.

(*For additional details regarding the specific use of the In-Flight map, refer to* **Using the In-Flight Map**.)

Airport

Click on this button to return to the current **FBO**. Remember that the active flight plan will *not* be automatically saved once you return to the FBO after selecting the **AIRPORT** button. You must manually **save** the flight plan before exiting.

Flight Planner Mini-Tutorial

Confused? Don't worry—we've got you covered…

Let's say you want to takeoff from *San Jose*, buzz the tower at *Hayward*, and land at *San Francisco*. The following checklist will walk you through it:

Assuming you are currently located at *San Jose*, when you get to the *Flight Planner* map, click on the **FLIGHT OPTIONS** button on the *toolbar* to go to the **Modified Quick Flight** screen.

Left-click on the **aircraft selector** icon. Stop when the picture of the *Arrow* appears.

Adjust the slider bars to tailor your weather and aircraft options (make sure the **FUEL** slider bar reads **Full**, the **TIME OF DAY** reads **Day**, and the **CLOUD COVER** reads **Clear**).

Click on the **DONE** button to return to the **Flight Planner**.

Carefully scan the *Flight Planner* map, and you'll see the bulls-eye icon located at *San Jose* airport to denote your **point of departure** (the **P.O.D.** heading on the *Notepad* will read *San Jose*).

Point the cursor to a half-way point between *San Jose* and *Hayward* and left-click to plot your **first turning point**.

Go to the **Notepad** and left-click on the crease to cycle forward one page and you will see the summary for **TP 1**.

Click on the *Hayward* airport icon to plot your **second turning point**.

When the **airport pop-up menu** appears, click on the **TRANSIT AIRSPACE** button. This will allow you to fly over the airport without actually landing. (Don't forget to put fear into the eyes of the *Hayward* tower controller!) The second turning point will automatically appear over the *Hayward* airport icon, the route line will be drawn between the turning points, and the summary for **TP 2** will emerge on the second page of the **Notepad** with the adjoining heading **Transit** to indicate your planned intentions once you reach *Hayward*.

Left-click on a point directly between *Hayward* and *San Francisco* to plot your **third turning point**. Let's pretend for a moment that you placed your third turning point in the wrong place. To **move** the third turning point, left-click on its icon to grab it and, while holding, drag it to the new location and release the button to drop it.

Click on the *San Francisco* airport icon to bring up the **airport pop-up menu** again.

Click on the **LAND** button. The triangular-shaped icon will appear over *San Francisco* to mark this location on the map as your destination point (the **Notepad** will reflect this under the **DEST** heading).

Left-click on the crease to cycle to the last page of the **Notepad** to view the flight's **Run Time** and **Distance** information.

Click on the button on the **toolbar** with the arrow pointing towards the floppy disk to save your flight plan. A pop-up menu will appear.

Click on the **NEW FILE** button from the pop-up menu. A new pop-up box will appear.

Type in the name of the new file into the box provided—remember you have an **8** character limit.

Click on the **SAVE** button to save the current flight plan.

Click on the button on the **toolbar** with the symbol of the aircraft on it to accept the current flight plan and take off.

You're finished!

Flight Planner Hot Keys

Try these hot keys to conduct the following functions while in the **Flight Planner**:

O -Flight Options
Go to the **Modified Quick Flight** screen to set miscellaneous realism variables for the planned flight.
A -Airspace Information Overlay
Toggle On/Off the **Airspace Information** map overlay.
V -VOR Overlay
Toggle On/Off the **VOR Station** map overlay.
I -Points of Interest Overlay
Toggle On/Off the **Points of Interest** map overlay.
Z -Zoom In Map
Increase the view by one level.
X -Zoom Out Map
Decrease the view by one level.
B -Toolbar Buttons On/Off
Toggle On/Off the **Toolbar** (useful at the highest zoom level).
N -Notepad On/Off
Toggle On/Off the **Notepad** (useful at the highest zoom level).
DELETE -Delete Turning Point
Removes a selected (i.e., highlighted) turning point from the map.
ALT N -Clear Flight Plan
Clears the map and makes way for a new flight plan.
ALT S -Save
Save the current flight plan as either a new or existing file.
ALT L -Load
Load a previously saved flight plan.
ALT D -Delete
Delete a previously saved flight plan.
ALT F -Fly
Accept the current flight plan and take off.
ESC -Exit Map
Exit the *Flight Planner* and return to the current **FBO** without accepting the active flight plan.

(*To see a listing of all of the keyboard commands available in Flight II, please refer to* **Keyboard Commands Summary**.)

Interacting with Air Traffic Controllers

Flight II implements the first fully interactive, real-time Air Traffic Control (ATC) system found in a PC flight simulator. This section of the Online Manual will provide you with a basic understanding of the informational services afforded the pilot while operating at both uncontrolled and controlled airports. It will introduce you to the different types of air traffic controllers present in the game, specify what each air traffic controller's responsibilities entail, describe services provided by the various controllers to the pilot, and explain how you interact with them.

ATC Overview

- [Uncontrolled vs Controlled Airports]
- [Information Services]
- [Air Traffic Controllers]

Uncontrolled vs Controlled Airports

Airports in *Flight II* come in two different flavors: *uncontrolled* and *controlled*.

Uncontrolled Airports

These are airports, usually smaller in size, that do not have enough traffic passing through them to warrant the installation of a *Control Tower*. Uncontrolled airports are divided into two sub-categories: those that feature **UNICOM** access and those that do not. There are **3** *maritime airports* and **15** *private airfields* represented in *Flight II's* terrain area which do *not* have UNICOM access. The remaining **13** uncontrolled airports *do* feature UNICOM access. Airports with access have a technician present at the airfield; those without do not, though you will be able to freely fly in, land, and fly out of them.

Controlled Airports

These are airports, usually larger in size, which must have a Control Tower installed due to the volume level of air traffic to and from the airfield. Towers contain controllers whose job is to manage the aircraft coming in and out of their airspace, in order to ensure safe operation at the airport. Controlled airports, depending on their size, are serviced by anywhere from two to four different types of air traffic controllers.

(*For an individual breakdown of the airports by control status and type, please refer to* **Airport Listings and Types**.)

Information Services

There are two types of flight/traffic information (advisory) services available to the pilot in *Flight II*: UNICOM and ATIS.

UNICOM

→Location:

UNICOM is a service provided at some *uncontrolled airports*.

→Service Provided:

UNICOM delivers an *airport advisory* containing basic information on what is occurring at that airfield.

→Pilot Interaction:

Pilots are never required to listen to UNICOM, though it is considered proper aviation protocol to do so.

(*For additional details, refer to* **Interacting with UNICOM: The Airport Advisory**.)

ATIS

→Location:

ATIS is a service provided at most *controlled airports*.

→Service Provided:

Delivers recorded and routinely updated radio messages regarding weather and airport conditions at that airfield.

→Pilot Interaction:

Pilots are normally required to listen to ATIS as part of their obligation to know current weather and airport information when they fly.

(*For additional details, refer to* **ATIS (Automatic Terminal Information Service)**.)

Air Traffic Controllers

Air Traffic Controllers provide an invaluable service at controlled airports. They help aircraft avoid each other during the taxi, departure, en route, and approach-to-landing phases of flight. Air traffic controllers come in three flavors: *ground*, *tower*, and *radar*.

- **Ground**
- **Tower**
- **Radar**

Ground Controllers

→Location:

Ground controllers are found at all *tower-controlled airports*.

→Principal Responsibilities:

As the name implies, the ground controller is responsible for safe movement of all aircraft and vehicles on the ground, while ensuring that aircraft taxiing around don't accidentally cross the active runway. The main job of a ground controller is to see that aircraft don't run into each other and do not impede one another's progress during the taxi phase.

→Pilot Interaction:

You are required to notify the ground controller when you are ready to taxi to the active runway. When sitting on the tarmac, you should also first monitor the ATIS frequency to obtain the current airport weather conditions, and to learn the active runway prior to contacting the ground controller for taxiing instructions.

(*For additional details, refer to* **Interacting with Ground Control**.)

Tower Controllers

→Location:

Tower controllers are found at all *tower-controlled airports*.

→Principal Responsibilities:

The number one responsibility of a tower controller is to assist pilots in making sure that their aircraft do not collide with one another, either in the air or on the runway. Tower controllers are also responsible for issuing landing, takeoff, and transit clearances, as well as traffic advisories.

→Pilot Interaction:

You are required to speak to a tower controller on two occasions:

1) Prior to entering the active runway for takeoff.

2) Prior to entering tower-controlled airspace.

(*For additional details, refer to* **Interacting with Tower Control**.)

Radar Controllers

→Location:

Radar controllers are found only at large (*Class B* and *C*) *tower-controlled airports*. In *Flight II*, they are specifically located at three such airports: *San Francisco*, *Travis*, and *Sacramento*.

→Principal Responsibilities:

A radar controller's principal responsibility is to give directions to aircraft. This is most relevant when pilots become lost and require traffic advisories, or request navigational information to and from both controlled and uncontrolled airports. They are also responsible for maintaining aircraft separation and managing the flow of air traffic into and out of the airports under their jurisdiction.

→Pilot Interaction:

You are only required to speak to a *radar approach controller* when entering or departing radar-controlled airspace.

(*For additional details, refer to* **Interacting with Radar Control**.)

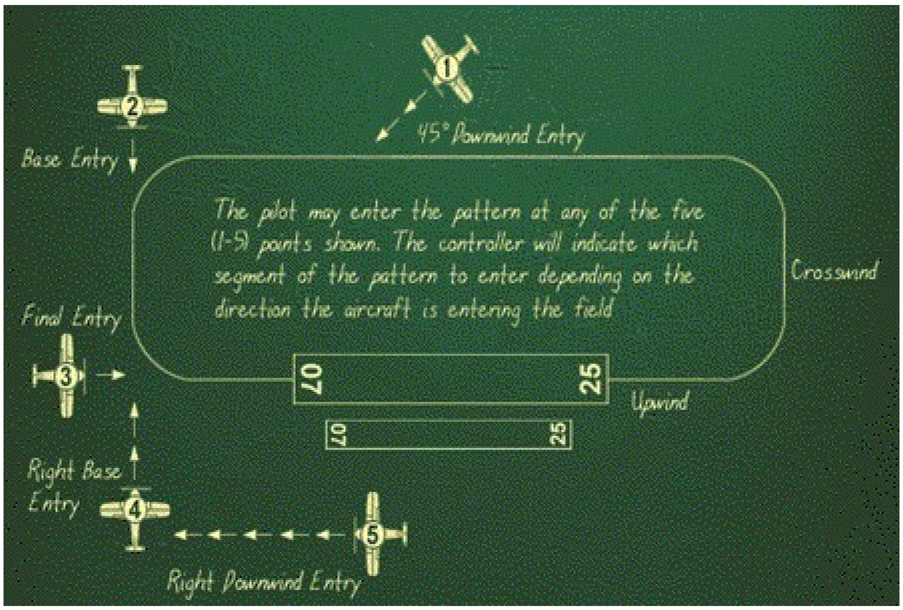
Operating at an Uncontrolled Airport

This section of the Online Manual describes how to fly to and communicate with an *uncontrolled airport*. There are **33** **airports** within *Flight II's* terrain area which are "uncontrolled" (including **3** maritime airports and **14** private airfields). Uncontrolled airports, by definition, have no control tower installed at the field. We'll begin with the procedures and services offered by uncontrolled airports and finish with a scenario walk-through.

The Position Report

Pilots are expected to make *position reports* around the traffic pattern at uncontrolled airports to let other aircraft know where to visually look for them and to assist the tower in maintaining *aircraft separation*. Even when you can't see the aircraft making the position report, you will always have an idea where they are in the pattern and can determine if they are a factor to you by simply monitoring radio communications.

SAMPLE RIGHT-HAND TRAFFIC PATTERN



DEFINITIONS:

Traffic pattern - This is a rectangular racetrack pattern flown by all aircraft at all airports. The function of the traffic pattern is to easily sequence air traffic to the appropriate runway for landing. The pattern is broken down into the following five distinct segments:

***Upwind leg* -** This is the flight path parallel to the landing runway in the direction of landing.

***Crosswind leg* -** This is the flight path perpendicular to the upwind leg at the takeoff end of the runway.

***Downwind leg* -** This is the flight path parallel and opposite to the direction of the landing runway. Aircraft entering the traffic pattern at an uncontrolled airport should always enter *mid-field* on the downwind leg.

***Base leg* -** This is the flight path perpendicular to the approach end of the landing runway.

***Final Approach* -** This is the flight path in the direction of landing along the extended runway centerline from the base leg to the runway.

Aircraft will begin each position report with the name of the airport servicing the traffic, followed by their callsign, their position in the pattern, the landing runway, and finally, the name of the airport. For example, a correct position report over the **COM Radio** for an inbound flight would sound something like this:

>PILOT: ***"Byron Traffic // Arrow Two Lima Golf // left downwind // Runway Three Zero // Byron."***

The pilot is:

1) Identifying the aircraft to other aircraft in the traffic pattern (***Byron Traffic // Arrow Two Lima Golf…***) at *Byron Airport*.

2) Indicating where the aircraft is located in the pattern (***…left downwind***).

3) Acknowledging the active runway (***…Runway Three Zero // Byron***).

Interacting with UNICOM: The Airport Advisory

UNICOM is a *service*—not a controller—provided *only at uncontrolled airports* in which a person located on the ground delivers what's known as an *airport advisory*. An airport advisory provides basic information on what is occurring at that field. In *Flight II*, UNICOM will provide you with data upon request via the COM radio, specifically regarding the *active runway*, *traffic pattern course* or *direction*, and the *number of aircraft* currently operating in the traffic pattern at the field (if applicable).

In the real world, each uncontrolled airport has what's known as a *Common Traffic Advisory Frequency* (CTAF) which is shared with other uncontrolled airports. This allows pilots to tune into a given frequency and hear what's going on at various uncontrolled airports in the area. *Flight II* also utilizes a CTAF, but we deviate from reality in the fact that you will **always** hear UNICOM transmissions over the same frequency. In reality, there are often weather interference effects and line-of-site considerations due to topography which may result in your not hearing them at all.

Flight II does model the fact that some uncontrolled airports have an associated UNICOM service while others do not:

Uncontrolled Airport Type	**UNICOM service?**
Maritime Airport	NO
Private Airfield	NO
All other uncontrolled airports	YES [1]

[1] Weather-permitting (see *Pilot Note*).

Both separate and shared UNICOM radio frequencies exist for **16** of the **33** uncontrolled airports featured in this game. (*For additional details*, r*efer to* **COM Radio Control Frequencies**.)

When you dial in a UNICOM frequency (say **122.80** for *Half Moon Bay*), you will often hear transmissions by other aircraft or UNICOM at another airport which happens to share the same frequency. The moral is simple: listen *carefully* to know who is talking to you at any given time.

Let’s take a closer look at a sample scenario:

- **Entering the Traffic Pattern**

Scenario 1: Entering the Traffic Pattern

In this scenario, you're attempting to come in and land at Half Moon Bay, an uncontrolled airport. Your aircraft is a Piper Arrow. You are north of the airport.

- **Contacting UNICOM and Relaying Your Intentions**
- **Requesting and Receiving an Airport Advisory**
- **Entering the Pattern and Delivering Your Position Reports**
- **Summary**

NOTE: The Air Traffic Control System modeled in *Flight II* **occurs in real-time**, which means that no two games played will ever be exactly alike. Because of this, the scenarios presented throughout this section of the Online Manual may not proceed precisely as displayed on these pages due to the presence of other aircraft. Always keep this fact in the back of your mind should you discover occasional differences between what appears in these help topic pages and what you see and hear in the actual game.

Contacting UNICOM and Relaying Your Intentions

The first thing you should do as you approach *Half Moon Bay* is enter the proper UNICOM frequency into the COM radio for that airport (in our example, **122.80** for *Half Moon Bay Airport*). You accomplish this by clicking on the COM radio readout, typing in the five-digit frequency, then pressing the **ENTER** key to finish.

(*Refer to the relevant* **Airfield Diagram** *or* **COM Radio Control Frequencies** *for a listing of available UNICOM radio frequencies*.)

Once the frequency is set, press the **SPACEBAR**. A menu will appear overlaid onto the cockpit screen, displaying all the UNICOM services available in the San Francisco Bay Area using this particular shared frequency (listed by airport):

1. **University UNICOM…**
2. **Sonoma Skypark UNICOM…**
3. **Half Moon Bay UNICOM…**
4. **Kingdon UNICOM…**
5. **Gnoss UNICOM…**
6. **Rio Vista UNICOM…**
7. **Tracy UNICOM...**

In this case, since you are approaching *Half Moon Bay*, you should choose menu selection **3** (press the **3** key) for *Half Moon Bay UNICOM*. The following text will shortly appear on the screen with a new menu, displaying the four cardinal heading directions:

Half Moon Bay UNICOM, Arrow Two Lima Golf,…

1. **…North of the airport.**
2. **…East of the airport.**
3. **…South of the airport.**
4. **…West of the airport.**

Next, you should choose the **direction** from which you plan to enter the pattern. Since you are *north* of the airport, you should choose menu selection **1** (press the **1** key). The sentence is now complete.

Requesting and Receiving an Airport Advisory

The full message is displayed on the screen as follows:

Half Moon Bay UNICOM, Arrow Two Lima Golf, north of the airport, request airport advisory.

1. **< SEND MESSAGE >**

The last phrase, "***…request airport advisory***," is automatically tacked on since, as was previously mentioned, you are attempting to receive information about the status of traffic at that airport before approaching.

You always have a single highlighted option—**<SEND MESSAGE >**—whenever you have finished building a sentence and are prepared to transmit. Press the **1** key (or the **ENTER** key) when you're ready to actually send the message over the radio.

The first thing you will hear is your own pilot's voice delivering the actual message you just built verbatim to UNICOM:

>PILOT: ***"Half Moon Bay UNICOM // Arrow Two Lima Golf // north of the airport // request airport advisory."***

Shortly thereafter, you will hear the following reply from UNICOM at *Half Moon Bay*:

>UNICOM: ***"Aircraft calling UNICOM // Half Moon Bay is landing Runway Three Zero // right traffic // be advised the pattern is empty."***

UNICOM is:

1) Identifying your aircraft/acknowledging your presence (***Aircraft calling Half Moon Bay UNICOM…***).
2) Identifying which runway is the active runway for landing or touch and go procedures (***… Half Moon Bay is landing Runway Three Zero***).
3) Telling you in which direction the traffic pattern is heading (***…right traffic***).
4) Indicating how congested the traffic pattern is (***…be advised the pattern is empty***).

Entering the Pattern and Delivering Your Position Reports

Because you are flying into an uncontrolled airport, you should enter the traffic pattern at *Half Moon Bay* on a **45** degree heading to downwind and make a *position report* immediately upon completing the turn to downwind (*refer to the diagram for details*).

The delivery of your initial position report is begun by pressing the **SPACEBAR**. This will, once again, display a listing of the airports sharing the UNICOM frequency set in your radio. However, since you previously contacted *Half Moon Bay* for an airport advisory and you are directly notifying aircraft in the traffic pattern of your entry on downwind, the third option, **Half Moon Bay Traffic** (no longer **Half Moon Bay UNICOM**) will be your selection. The remaining airport menu choices are there only if you decide to dial up a different airport which shares the same frequency:

1. **University UNICOM**
2. **Sonoma Skypark UNICOM**
3. **Half Moon Bay Traffic**
4. **Kingdon UNICOM**
5. **Gnoss UNICOM**
6. **Rio Vista UNICOM**
7. **Tracy UNICOM**

In this case, choose menu selection **3** (press the **3** key) and the following text and menu will appear together on the screen:

Half Moon Bay Traffic, Arrow Two Lima Golf,…

1. **…left downwind.**
2. **…left base.**
3. ***…right downwind.***
4. **…right base.**
5. **…final.**

Press the **ENTER** key to notify traffic at that airport that you are at the *right downwind* position in the pattern. The following text and menu will appear:

Half Moon Bay Traffic, Arrow Two Lima Golf, right downwind,…

1. **…Runway One Two.**
2. **…Runway Three Zero.**

There are two active runways at *Half Moon Bay* at which you may presently land. In this case, choose **2** (press the **2** key) to display the following message:

Half Moon Bay Traffic, Arrow Two Lima Golf, right downwind, Runway Three Zero, Half Moon Bay."

1. **< SEND MESSAGE >**

Press the **ENTER** key to complete the sentence and transmit the message over the radio:

>PILOT: ***"Half Moon Bay Traffic // Arrow Two Lima Golf // right downwind // Runway Three Zero // Half Moon Bay."***

Referring to the diagram, the next position call after *right downwind* would be *right base*. Pressing the **SPACEBAR** will display the following text and menu:

Half Moon Bay Traffic, Arrow Two Lima Golf,…

1. **left downwind…**
2. **left base…**
3. **right downwind…**
4. ***right base…***
5. **final…**

Press the **ENTER** key to accept the default selection and the following text and menu will appear:

Half Moon Bay Traffic, Arrow Two Lima Golf, right base,…

1. **…Runway One Two.**
2. ***…Runway Three Zero.***

Press the **ENTER** key again to finish the position call and display the following message:

Half Moon Bay Traffic, Arrow Two Lima Golf, right base, Runway Three Zero, Half Moon Bay."

1. **< SEND MESSAGE >**

Press the **ENTER** key to complete the sentence and transmit the message over the radio. You will once again hear your pilot's voice:

>PILOT: ***"Half Moon Bay Traffic // Arrow Two Lima Golf // right base // Runway Three Zero // Half Moon Bay."***

The pilot is:

1) Transmitting the aircraft's callsign and relaying intentions to any pilots listening in on the frequency (***Half Moon Bay Traffic // Arrow Two Lima Golf…***)

2) Relaying the aircraft's position in the pattern (***…right base***).

3) Acknowledging the active runway (***…Runway Three Zero // Half Moon Bay***).

And so the interface will continue until you either make a full-stop landing or depart the pattern.

Scenario 1: Entering the Traffic Pattern (Summary)

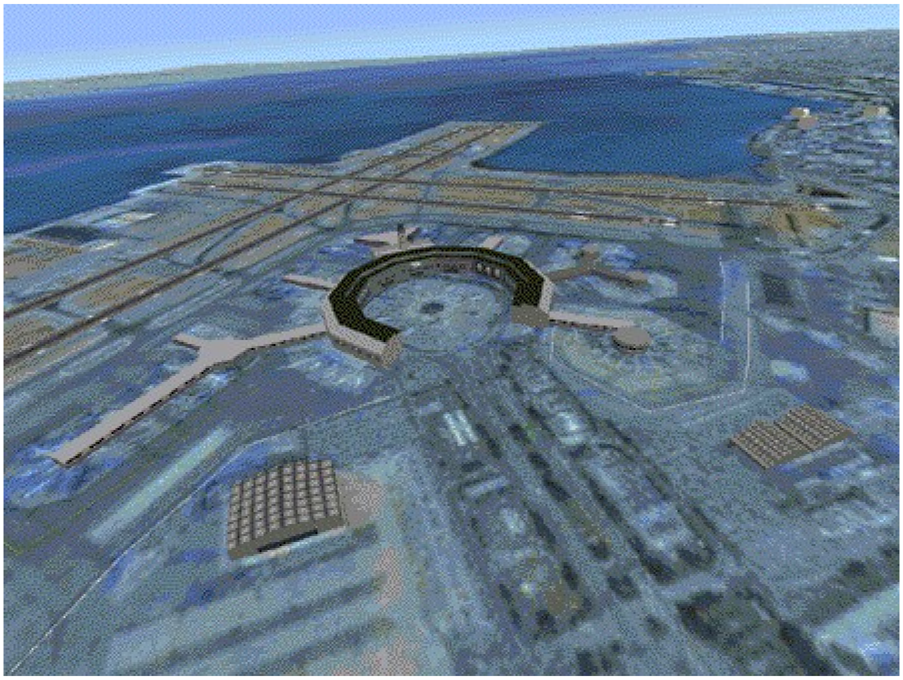
1) Contact UNICOM at the desired airport by dialing up the appropriate frequency on your COM radio.
2) Identify your aircraft to UNICOM and other aircraft in the pattern.
3) Identify the direction from which you plan to enter the pattern.
4) Request an *airport advisory* from UNICOM.
5) Receive the advisory over the COM radio.
6) Enter the pattern and deliver your initial *position report*.
7) Deliver subsequent position reports as you proceed around the pattern and complete your intended maneuvers.

Addenda

End notes for operating at an uncontrolled airport:

- Players should always make separate **position reports** immediately upon rolling out on *downwind*, *base*, and *final* during each pattern, and also before taxiing to or entering an active runway.
- One important point regarding **departing an uncontrolled airport**: Although other aircraft in the pattern are supposed to report final, you should always *visually* check that final is actually clear of traffic prior to taking the runway for departure. This will help to avoid potentially deadly accidents.
- If you'd like to see illustrations in the game detailing the manner in which one enters an uncontrolled airfield, or if you'd like to practice entering an uncontrolled airfield, go to **Lesson Four** of the **Flight Lessons** by clicking on the *Blackboard* icon from any FBO. (*For additional details, refer to* **Entering the Traffic Pattern**.)

Operating at a Controlled Airport



This section of the Online Manual describes how to fly to and communicate with a *controlled airport*. We have **15 airports** within *Flight II's* terrain area which are "controlled."

When an airport becomes congested with traffic on a frequent enough basis, an air traffic control system is installed to ensure safe operation. Once a control tower is erected, the following services are made available to the pilot:

1) **ATIS**
2) **Ground Controller**
3) **Tower Controller**

Unlike an uncontrolled airport, where a pilot can simply fly in and land without saying a word on the radio, a controlled airport requires pilots to obtain specific *clearances* prior to operating an aircraft within the airport's boundaries. In *Flight II*, just as in the real world, all aircraft must first obtain clearance from the tower controller prior to departing a tower-controlled airfield or upon entering tower-controlled airspace.

The immediate airspace surrounding a tower-controlled airport is called *Class D* airspace. This is the region generally extending from the surface of the airport up to and including **2,500 feet AGL** (*Above Ground Level*) out to a radius of **5 statute miles**. Any aircraft approaching this region of airspace must report to the tower controller in order to receive clearance to enter.

(*For additional details, refer to* **Airspace Information Explained**.)

We'll begin with the procedures and services offered by controlled airports and finish with three scenario walk-throughs.

- **Controller Tasks**
- **ATIS (Automatic Terminal Information Service)**
- **Interacting with Ground Control**
- **Interacting with Tower Control**
- **Interacting with Radar Control**
- **The Radar Approach Controller**

Controller Tasks

Controlled airports, depending on their individual sizes, are generally serviced by anywhere from one to four different types of air traffic controllers, each of which "hands off" its services to the next once its principal tasks have been completed.

The progression is strictly a linear one:

CONTROLLER	PRINCIPAL TASKS	*(DEPARTING AIRCRAFT)* HANDS OFF TO:	*(ARRIVING AIRCRAFT)* HANDS OFF TO:
Ground Controller	**1)** Issues taxi instructions. **2)** Controls traffic on the ground and ensures aircraft do not collide with one another.	**Tower Controller** (*before* reaching the active runway)	
Tower Controller	**1)** Gives final clearance to all departing and arriving aircraft. **2)** Ensures aircraft do not collide with one another (i.e., maintains proper aircraft separation in the pattern).	**[Optional] Radar Approach Controller or Other Tower Controllers** (when airborne, while departing controlled airspace)	**Ground Controller** (after touchdown)
Radar Approach Controller	**1)** Delivers navigational information to aircraft requesting vectors (i.e., directions) to a given airport. **2)** Delivers traffic advisories while airborne for the immediate area. **3)** Maintains aircraft separation to help avoid collisions, particularly during IFR conditions.	**[Optional] Other Radar Approach Controllers** (if you cross into other airspace)	**Tower Controller** (as you approach your destination)

ATIS (Automatic Terminal Information Service)

ATIS is a service in which weather and active runway information for each controlled airport is continuously broadcast. In *Flight II*, ATIS will provide you with valuable information over the **COM Radio** specifically regarding *cloud ceiling heights*, *visibility conditions*, *wind direction*, *wind velocity*, the *time* of the recording, and the *active runway*. A sample ATIS broadcast, with the ATIS *identifier*, would sound like the following:

>ATIS: ***"Hayward Tower // ATIS information Juliet // Time: 2400 Zulu // Weather −Winds: Calm // Visibility: Better than five miles // Sky Conditions: Clear // Temperature: Two Six // Dew point: Seven // Altimeter: Two Niner Niner Two // Landing and Departing Runway: Two Eight Right // Advise on initial contact, you have information Juliet.***

Once the frequency is dialed into the radio, the ATIS information is read in a steady, monotonous stream. It will continue looping until the pilot either decides to change frequencies or turns off the radio.

A separate ATIS radio frequency exists for each of the **15** controlled airports featured in this game. (*For additional details, refer to the relevant* **Airfield Diagram** *or* **COM Radio Control Frequencies** *for a listing of available ATIS radio frequencies*.) A given ATIS frequency may be dialed up from *anywhere* on the map.

Each broadcast is updated during every hour of game time and given a callsign from the *Aviation Alphabet* (e.g., *Foxtrot*). The purpose of the designation is twofold:

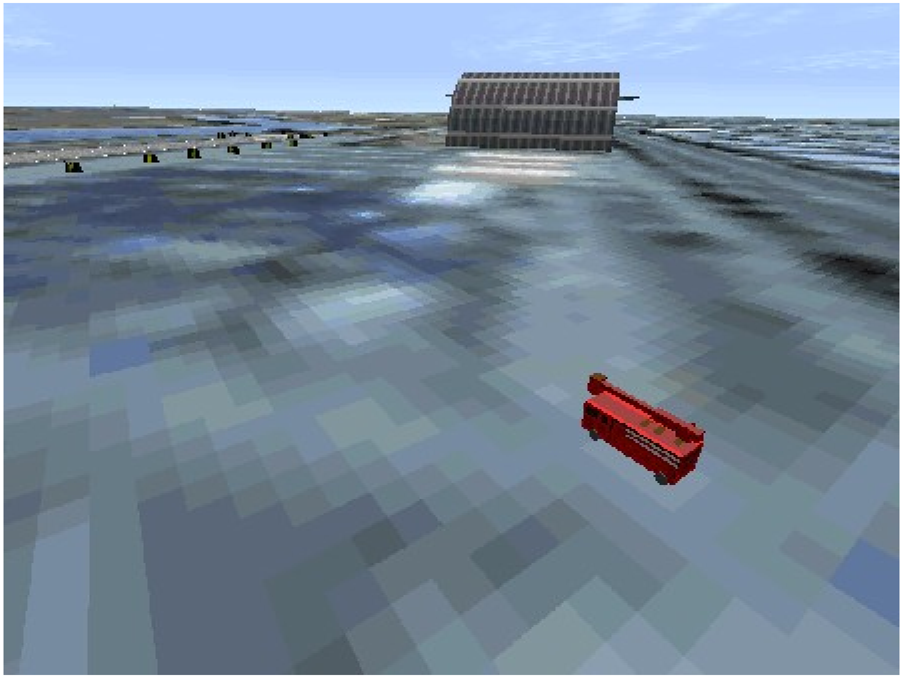
1) It tells you, the pilot, how old the information you are receiving is regarding this particular airport.

2) It gives air traffic controllers peace of mind to know that you have the latest information regarding their controlled airfield, without them having to update you. In this regard, ATIS represents as a distinct time-saving service for them.

(*For the Aviation Alphabet listing, click* **here**.)

Let's continue with a discussion of how a pilot goes about interacting with the **ground controller**.

Interacting with Ground Control



The ground controller's principal responsibility is to ensure that pilots know where they are supposed to go when they are on the ground at a controlled airport. This controller must make certain that aircraft don't have any sudden "meetings" with other aircraft and don't encroach onto active runways used by other departing and/or arriving flights. The ground controller does this by issuing what's known as a *taxi clearance* to the awaiting aircraft followed by precise taxiing instructions. In *Flight II*, just as in the real world, all aircraft must first obtain this clearance from the ground controller in either of two situations:

1) Prior to taxiing to the active runway for departure.

2) While taxiing to the parking ramp/hangar from the runway following arrival.

Let's examine the following two scenarios:

- **Obtaining Clearance and Taxiing for Takeoff**
- **After You Land**

Scenario 1: Obtaining Clearance and Taxiing for Takeoff

In this scenario, you will depart Reid-Hillview, a tower-controlled airport, and you must first obtain taxi clearance from the ground controller prior to contacting the tower for takeoff clearance. Your Arrow aircraft is currently sitting on the tarmac outside of the Looking Glass Aviation terminal.

- **Contacting ATIS**
- **Contacting Ground Control and Requesting Taxi Clearance**
- **Receiving Taxi Instructions**
- **Response Failure Sequence**
- **Cleared to Contact Tower Control**
- **Summary**

Contacting ATIS

The first thing you should do is tune the ATIS frequency (in this example, **125.20** for *Reid-Hillview Airport*) into the COM radio to obtain the current ATIS information. Click on the COM radio readout, type in the five-digit frequency, and then press the **ENTER** key to finish.

(*Refer to the relevant* **Airfield Diagram** *or* **COM Radio Control Frequencies** *for a listing of available ATIS radio frequencies*.)

Once the frequency is set, press the **SPACEBAR**. The ATIS information will spew forth in a steady stream.

(*For additional details regarding what you are hearing, refer to* **ATIS (Automatic Terminal Information Service)**.)

Contacting Ground Control and Requesting Taxi Clearance

Once you have received the ATIS information, the next thing you should do is contact the ground controller at that airport. Each controlled airport has its own ground control frequency. Enter the appropriate frequency into the radio (in our example, **121.80** for *Reid-Hillview Airport*). Once again, click on the COM radio readout, type in the five-digit frequency, then press the **ENTER** key to finish.

(*Refer to the relevant* **Airfield Diagram** *or* **COM Radio Control Frequencies** *for a listing of available Ground Control radio frequencies*.)

Once the frequency is set, press the **SPACEBAR**. The following text will appear overlaid onto the cockpit screen:

Reid-Hillview Ground, Arrow Two Lima Golf, taxi from Looking Glass Aviation, with Foxtrot.

1. **< SEND MESSAGE >**

You are requesting taxi clearance from the *Reid-Hillview* ground controller to the departure runway from the *Looking Glass Aviation* terminal. A similar message will automatically appear on the screen any time you initiate a request for taxi clearance, with the precise wording identifying the name of the ground control, the name of the soliciting aircraft, and the location from which said aircraft wishes to taxi (in that order). The notification that you have listened to the latest ATIS information is displayed in the form of the sample identifier phrase "***…with Foxtrot***" tacked on to the end of the sentence.

Press the **1** key (or the **ENTER** key) to complete the sentence and transmit the message over the radio. You will then hear your pilot's voice:

>PILOT: ***"Reid-Hillview Ground // Arrow Two Lima Golf // taxi from Looking Glass Aviation // with Foxtrot."***

Receiving Taxi Instructions

Soon thereafter, you will receive an audible reply from the ground controller similar to the following:

>GROUND CONROLLER: ***"Arrow Two Lima Golf // Taxi Runway One Three via Echo."***

The ground controller is:

1) Identifying your aircraft/acknowledging your presence (***Arrow Two Lima Golf…***).
2) Identifying the name of the runway to which you are cleared to proceed and depart (***…Taxi Runway One Three***).
3) Identifying the name of the taxiway you are expected to traverse (***…via Echo***).

You must now acknowledge the controller. The following will appear on the screen:

Arrow Two Lima Golf, Wilco.

1. **< SEND MESSAGE >**

Press the **ENTER** key to complete the sentence and transmit the message over the radio. You will then hear your pilot's voice:

>PILOT: ***"Arrow Two Lima Golf // Wilco."***

NOTE:

If you didn't hear what the controller said, press the ***ENTER*** *key (make sure there is no menu present on the screen). You will hear your pilot's voice say something like* ***"Arrow Two Lima Golf // Please repeat the last clearance."*** *The controller will then respond by repeating the last clearance message. This feature is applicable to all controllers in the game—ground, tower, and radar.*

Response Failure Sequence

If you do not respond to *any* of the air traffic controllers in *Flight II*, after a short period of time, the controller will attempt to verify that you heard the last clearance. For example, if you had waited several seconds in the previous example, the ground controller would eventually ask either ***"Arrow Two Lima Golf // Do you copy?"*** or ***"Arrow Two Lima Golf // Please acknowledge."***

If you were to press the **SPACEBAR** at this point, the standard choices would appear:

1. **…Copy.**
2. **…Negative.**

Repeated failure to acknowledge such messages will ultimately result in a response from the controller similar to the following:

PILOT: ***"Attention all aircraft // We have a disoriented Arrow taxiing on the aerodrome // Give way."***

The controller will always give you a few chances to respond, but if you stay silent for long enough, the controller will no longer speak to you and will issue a warning to all other aircraft in the vicinity. You will then be branded a "rogue" aircraft.

You are now cleared to taxi. Use the **Airfield Diagrams** in conjunction with the **Taxi Camera View** (the **F 8** key) to maneuver the *Arrow* into position.

The ground controller may also issue two possible commands in response to other traffic as you are taxiing *to* the active runway, while departing, or as you are taxiing *from* the active runway following landing: "***Hold short***" or "***Give way***."

The "***Hold short***" command indicates the need for you to stop just before the entrance to a given runway, in order to allow another aircraft in front of you to pass. This usually occurs while you are approaching your departing runway, and you have to cross another runway that is currently in use.

The "***Give way***" command indicates the need for you to yield at an intersection for traffic (just as you would do in your car). When you and another aircraft are approaching the same intersection at the same time, the ground controller will ask one of you to give way to the other. The ground controller will clear you to cross as soon as it is safe to do so.

Cleared to Contact Tower Control

Shortly before you actually reach the departure runway, while you are taxiing, the ground controller will relay a message to you over the radio similar to the following:

>GROUND CONROLLER: ***"Arrow Two Lima Golf // Contact tower on 119.80."***

The ground controller, now that the job of taxiing is nearing completion, will "hand you off" to the *Reid-Hillview* tower controller.

The tower controller may then clear you to enter the active runway depending on the traffic situation. You will now depart at the discretion of the tower controller. (*For additional departure details, refer to* **Scenario 1: Taking Off and Remaining in the Traffic Pattern**.)

Scenario 1: Obtaining Clearance and Taxiing for Takeoff (Summary)

1) Contact ATIS at that airport by dialing up the appropriate frequency on your COM radio.
2) Contact the ground controller at the same airport by dialing up the appropriate frequency.
3) Identify your aircraft to the ground controller and request taxi clearance.
4) Receive taxi clearance from the ground controller
5) Receive taxi instructions from the ground controller.
6) Taxi out to the departure runway.
7) Receive instructions to contact tower control.

Scenario 2: After You Land

Landing and interacting with the **ground controller** is the reverse of the process indicated in the previous scenario. Immediately after you touch down, the tower controller will call you over the **COM Radio** and clear you to contact the ground controller at that airport. You'll hear a message similar to the following:

>TOWER CONROLLER: ***"Arrow Two Lima Golf // Contact Ground on 121.80."***

Once the ground controller is contacted, you will then be able to ask for and receive taxiing instructions back to the *Looking Glass Aviation* terminal.

Let's continue with a discussion of how a pilot goes about interacting with the **tower controller**.

Interacting with Tower Control

In this section of the Online Manual, we will feature two scenarios describing how you will be expected to interact with the tower controller. The first scenario covers how to take off and remain in the traffic pattern for landing practice. The second scenario covers how to enter a tower-controlled field from outside tower-controlled airspace.

- **Taking Off and Remaining in the Traffic Pattern**
- **Entering a Tower-Controlled Airport**

Scenario 1: Taking Off and Remaining in the Traffic Pattern

In this scenario, you have already listened to ATIS, received clearance from ground, and taxied to the active runway (28R) at Hayward Airport in an Arrow. You're now stopped on the active runway ready for takeoff. Once airborne, you plan to remain in the pattern in order to practice touch and go landings.

- **Contacting Tower Control and Relaying Your Intentions**
- **Receiving Tower Instructions**
- **Entering the Pattern and Delivering Your Position Reports**
- **Identifying Traffic**
- **Summary**

Contacting Tower Control and Relaying Your Intentions

Having already received the ATIS and ground control information, you should next contact tower control at that airport. Each controlled airport has its own tower control frequency. Enter the proper frequency into the radio (in our example, **120.20** for *Hayward Airport*) by clicking on the COM radio readout, typing in the five-digit frequency, and pressing the **ENTER** key to finish.

(*Refer to the relevant* **Airfield Diagram** *or* **COM Radio Control Frequencies** *for a listing of available Tower Control radio frequencies*.)

Once the frequency is set, press the **SPACEBAR**. The following menu and text will appear overlaid onto the cockpit screen:

Hayward Tower, Arrow Two Lima Golf, ready for takeoff, Runway Two Eight Right,…

1. **…remaining in the pattern.**
2. **departing...**

"Runway Two Eight Right" indicates the runway from which you are currently slated to leave. Since your intention is to remain in the pattern once you've taken off, you'll now choose menu selection **1** (press the **1** key). The following text will appear:

Hayward Tower, Arrow Two Lima Golf, ready for takeoff Runway Two Eight Right, remaining in the pattern.

1. **< SEND MESSAGE >**

NOTE:
If you had selected ***2*** *instead, the following text and menu would have appeared, allowing you to choose a departing direction:*

Hayward Tower, Arrow Two Lima Golf, ready for takeoff, Runway Two Eight Right, departing…

1. **…north.**
2. **…east.**
3. **…south.**
4. **…west.**

When you're ready to actually make the call to the tower, press the **ENTER** key to complete the message and transmit it over the radio. You will hear your pilot's voice:

>PILOT: ***"Hayward Tower // Arrow Two Lima Golf // ready for takeoff // Runway Two Eight Right // remaining in the pattern."***

Receiving Tower Instructions

Soon thereafter, the tower will instruct you on what you should do next. The tower's response will be based on the level of air traffic currently operating on the ground and in the air (i.e., how busy the airport is). The tower controller will offer one of three possible commands at this time:

1) Tell you that you are *"cleared for takeoff."*

This indicates that there are no aircraft on the departing runway in front of you. You are cleared to enter the runway, point your aircraft in the correct direction, and take off.

2) Tell you to *"taxi into position and hold."*

This indicates that there is another aircraft on the active runway in front of you actually in the process of taking off or landing. You are cleared to enter the runway, point your aircraft in the correct direction, but you *cannot* takeoff just yet. Once the takeoff position is assumed, you must wait for the controller's next command.

3) Tell you to *"hold short."*

This indicates that there is another aircraft on the active runway in front of you preparing for takeoff. You are not cleared to enter the runway; you must stop at the **Runway-Hold** markings and wait for the controller's next command.

The *actual* tower reply will resemble one of the following:

>TOWER: ***"Arrow Two Lima Golf…"***

- **A)** ***"…hold short // departing traffic."***
- **B)** ***"…hold short // landing traffic."***
- **C)** ***"…taxi into position and hold."***
- **D)** ***"…winds zero one zero at five // cleared for immediate takeoff // Runway Two Eight Right // make right traffic // report downwind // Be advised traffic pattern altitude is one one zero zero."***
- **E)** ***"…cleared for takeoff // landing traffic on base."***

There are many more possible tower controller instructions. For this example, let's assume you have just received reply **D):**

>TOWER: ***"Arrow Two Lima Golf // winds 010 at 5 // cleared for takeoff // Runway Two Eight // make right traffic // report downwind // be advised traffic pattern altitude is 1000."***

The tower controller is:

1) Identifying your aircraft/acknowledging your presence (***Arrow Two Lima Golf…***).
2) Telling you that the winds are coming out of the northeast at five knots (***…winds zero one zero at five***).
3) Giving you immediate takeoff clearance (***…cleared for takeoff***).

4) Identifying the number of the runway (28R) from which you are cleared to depart (***…Runway Two Eight Right***).
5) Telling you in which direction the traffic pattern is heading (***…right traffic***).
6) Asking you to deliver a position report once you reach downwind in the pattern (***…report downwind***).
7) Indicating the altitude (1,000 feet MSL) above the airport at which the pattern is circulating (***…be advised traffic pattern altitude is 1000***).

You must now acknowledge this message by pressing the **SPACEBAR** to bring up the following text and menu overlay:

Arrow Two Lima Golf, cleared for takeoff, copy right traffic.

1. < SEND MESSAGE >

Press the **ENTER** key. The radio message is transmitted and you will hear your pilot's voice:

>PILOT: ***"Arrow Two Lima Golf // cleared for takeoff // copy right traffic."***

Entering the Pattern and Delivering Your Position Reports

Referring to the diagram, the tower has requested you make *right traffic* and *report downwind*

When you "roll out" on downwind, press the **SPACEBAR**. The following text and menu will appear:

Arrow Two Lima Golf, right downwind, Runway Two Eight Right,…

1. **…full stop.**
2. **…touch and go.**
3. **touch and go, departing…**

The last phrase, "***…Runway Two Eight Right***," is automatically tacked on since this was previously established by the tower controller as the active runway. Press the **2** key to relay your wish to stay in the pattern and practice landings at this airport. The following text will appear:

Arrow Two Lima Golf, right downwind, Runway Two Eight Right, touch and go.

1. **< SEND MESSAGE >**

Press the **ENTER** key to transmit the message to tower over the radio:

>PILOT: ***"Arrow Two Lima Golf, right downwind, Runway Two Eight Right, touch and go."***

Identifying Traffic

Once you are buzzing around the pattern, the tower controller will "sequence" you, as necessary, by calling out the aircraft which is just in front of you for landing. A possible tower reply at this time might be:

>TOWER: ***"Arrow Two Lima Golf // number two // traffic to follow is a Beaver on left downwind // report base."***

The tower controller is:

1) Identifying your aircraft/acknowledging your presence (***Arrow Two Lima Golf…***).
2) Identifying which number in the pattern you are (***…number two***).

3) Calling out the aircraft in the pattern you should land behind (***…traffic to follow is a Beaver on left downwind***).
4) Requesting you deliver a position report at this time (***…report base***).

When ready, press the **SPACEBAR** to reply to the tower:

Arrow Two Lima Golf,…

1. **…traffic in sight.**
2. **…looking for traffic.**

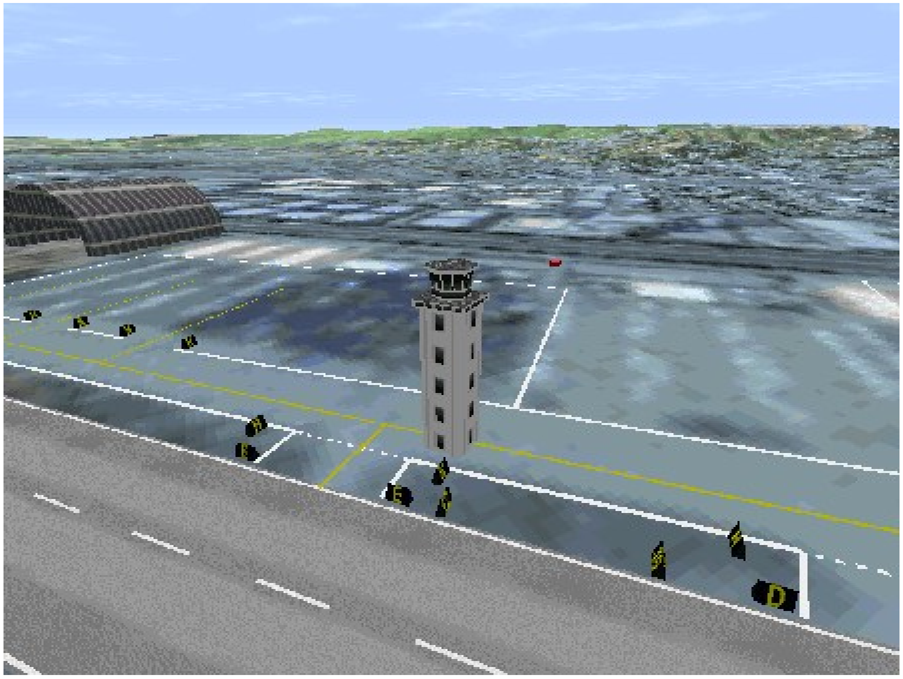
If you choose menu selection **1: traffic in sight**, the controller will assume that you have sighted the aircraft considered a factor to you that was just called out. If, by chance, you make a position report and are number one to land, you will receive landing or a *touch and go clearance* message at that time. Tower may also direct you to *extend downwind*, or do a *360 degree turn*, or *go around* in order to maintain the "spacing" of other aircraft currently in the traffic pattern.

If you choose menu selection **2: looking for traffic**, you are telling the controller that you cannot visually locate the aircraft that was just called out to you.

Scenario 1: Taking Off and Remaining in the Traffic Pattern (Summary)

1) Contact the tower controller at the airport by dialing up the appropriate frequency and transmitting your aircraft's identification and intentions.
2) Receive instructions from the tower concerning conditions in the pattern.
3) Takeoff and enter the pattern.
4) Once airborne, deliver your initial *position report*.
5) Allow the tower controller to identify traffic in the pattern for you (if any).
6) Deliver subsequent position reports.
7) Receive subsequent acknowledgments from the tower controller over the radio.

Scenario 2: Entering a Tower-Controlled Airport



In this scenario, you're outside of Livermore Airport's airspace and you decide to practice touch and go landings there. You're flying an Arrow and are currently seven miles north of the airport (with clear weather conditions).

Contacting ATIS

The first thing you should do is tune the ATIS frequency (in this example, **119.65** for *Livermore Airport*) into the COM radio. To obtain the current ATIS information at the airport, click on the COM radio readout, type in the five-digit frequency, and press the **ENTER** key to finish.

(*Refer to the relevant* **Airfield Diagram** *or* **COM Radio Control Frequencies** *for a listing of available ATIS radio frequencies*.)

Once the frequency is set, press the **SPACEBAR**. The ATIS information will spew forth in a steady stream. For this scenario, ATIS information *Foxtrot* is current.

(*For additional details regarding what you are hearing, refer to* **ATIS (Automatic Terminal Information Service)**.)

Contacting Tower Control and Relaying Your Intentions

Once you have heard enough of the ATIS information, contact the tower next by tuning the COM radio to the *Livermore Tower* frequency (**118.10**).

(*Refer to the relevant* **Airfield Diagram** *at the back of this manual or* **COM Radio Control Frequencies** *for a listing of available Tower Control radio frequencies*.)

If you fail to contact tower control before entering tower-controlled airspace, the controller at that airfield will call you on guard frequency and ask you to state your intentions. (*For additional details, refer to* **Airspace Information Explained**.)

Once the frequency is set, press the **SPACEBAR**. The following text and menu will appear overlaid onto the cockpit screen:

Livermore Tower, Arrow Two Lima Golf,...

1. **…North of the airport.**
2. **…East of the airport.**
3. **…South of the airport.**
4. **…West of the airport.**

You want to tell the tower the *direction* from which you plan to enter the pattern at *Livermore*. In this example, you are **northeast** of the airport so you'll choose menu selection **1** (press the **1** key) to relay the positional information. The following text and menu will then appear:

Livermore Tower, Arrow Two Lima Golf, north of the airport,...

1. **…for landing.**
2. **…for touch and go's.**
3. **…for touch and go, departing…**
4. **…request to transit your airspace.**

Now the tower wants to know what you plan on doing when you reach the airport. Since you're going to practice *touch and go's*, you'll choose **2** (press the **2** key). The radio call is now considered complete and is fully displayed on the screen as a single option:

Livermore Tower, Arrow Two Lima Golf, north of the airport, for touch and go's, with

Foxtrot.

1. **< SEND MESSAGE >**

Press the **1** key (or the **ENTER** key) to send the message to the controller.

Note the word *Foxtrot* which is automatically tacked on to the end of the message indicating that you've received the latest ATIS information.

When you're ready to transmit the request, press the **1** key. You'll hear your pilot's voice:

>PILOT: ***"Livermore Tower, Arrow Two Lima Golf, north of the airport, for touch and go's, with Foxtrot."***

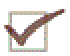
Receiving Tower Instructions

Soon thereafter, you will hear the tower offer an audible reply:

>TOWER: ***"Arrow Two Lima Golf // report right downwind // Runway Two Five Right."***

The tower controller is:

1) Identifying your aircraft/acknowledging your presence (***Arrow Two Lima Golf…***).
2) Asking you to deliver a position report once you reach right downwind in the pattern (***… report right downwind***).
3) Identifying the number of the runway (25R) at which you are presently cleared to practice your touch and go landings (***…Runway Two Five Right***).



Press the **SPACEBAR** to acknowledge. The following text appears:

Arrow Two Lima Golf, Wilco.

1. **< SEND MESSAGE >**

Press the **ENTER** key. The radio message is transmitted and you will hear your pilot's voice:

>PILOT: ***"Arrow Two Lima Golf // Wilco."***

Entering the Pattern and Delivering Your Position Reports

Now fly your aircraft so as to align yourself for a **45** degree entry to a *right downwind* to Runway **25R** (*see diagram*).

After completing your turn to downwind, make your downwind position call, as requested by tower, by pressing the **SPACEBAR** and selecting the appropriate menu option:

Arrow Two Lima Golf, right downwind, Runway Two Five Right,...

1. **…full stop.**
2. **…touch and go.**
3. **…touch and go, departing.**

Press the **2** key again to relay your wish to practice landings to the tower. The following text appears:

Arrow Two Lima Golf, right downwind, Runway Two Five Right, touch and go.

1. **< SEND MESSAGE >**

Finally, press the **ENTER** key to transmit the message:

>PILOT: ***"Arrow Two Lima Golf // right downwind // Runway Two Five Right// touch and go."***

Now, depending on the level of local air traffic, the tower may ask you to make subsequent position reports.

Identifying Traffic

From this point on, everything is the same as was described in the first scenario of this section (**Scenario 1: Taking Off and Remaining in the Traffic Pattern**). The tower will assign you a number in sequence to land and, if appropriate, will call out either traffic to follow, or traffic to avoid.

Refer to **Lesson One** and **Lesson Four** of the **Flight Lessons** to view example illustrations and to practice operating your aircraft at a tower-controlled airport.

Scenario 2: Entering a Tower-Controlled Airport (Summary)

1) Contact ATIS at that airport by dialing up the appropriate frequency on your COM radio.
2) Contact the tower controller at the same airport by dialing up the appropriate frequency and transmitting your aircraft's identification, location, and intentions.
3) Receive instructions from the tower controller regarding the manner in which you should enter the pattern.
4) Enter the pattern and deliver your initial *position report*.
5) Allow the tower controller to identify traffic in the pattern for you (if any).
6) Deliver subsequent position reports.
7) Receive subsequent acknowledgments from the tower controller over the radio.

Interacting with Radar Control

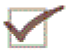
Radar controllers are present at **Class C and Class B** controlled airports to help guide aircraft with navigational information when pilots become lost. While this is their most important function, they also deliver local traffic advisories to maintain aircraft separation when transiting through airspace under their jurisdiction, and assist in “handing off” the aircraft to other controllers. The **radar approach controller** is the only type of radar controller present in *Flight II* (*radar departure is not simulated*). These radar controllers are required only at large controlled airports which have many inbound and outbound aircraft, but their services are often available at other nearby airports.

Each radar controller is assigned a **class** of airspace over which they must monitor. In highly-congested areas, multiple controllers are often assigned to handle the same airspace.

Let’s examine the functions of the radar controllers in detail:

- **Airspace Information Explained**
- **Contacting the Radar Controllers**
- **The Radar Approach Controller**
- **Mayday!**

Airspace Information Explained



Click on this button from either of the *toolbars* located in both the **Flight Planner** and **In-Flight** maps to toggle the *Airspace Information* layer on and off:

IN-FLIGHT MAP WITH AIRSPACE INFO LAYER (CLICK TO VIEW POP-UPS:)

The *Airspace Information* layer indicates the controlled airspace surrounding *San Francisco Airport* (SFO) and the fifteen controlled airports dotting the section of California featured in *Flight II*. Each shaded area denotes the following:

Sky Blue (Dashed Line)

Class D airspace, also known as *tower-controlled airspace*. This is the area generally extending from the surface of the airport to **2,500 feet (AGL)** and out to a **5 statute mile** radius. It is governed by the tower controller at that airport. There are **15** airports in *Flight II* which have an associated *Class D* airspace. (*Click* **here** *for the complete individual listings*.)

Magenta

This is *Class C airspace*, controlled by radar approach and tower. *Oakland* and *San Jose* are the only *Class C* airports in the area.

NOTE:

While Oakland and San Jose have their own special airspace jurisdictions, both airports are actually controlled from the ground by Bay Approach (based in San Francisco). There are no individual radar controllers present at either of these airports, so do not be confused by the map. (For additional details, refer to **Contacting the Radar Controllers***.)*

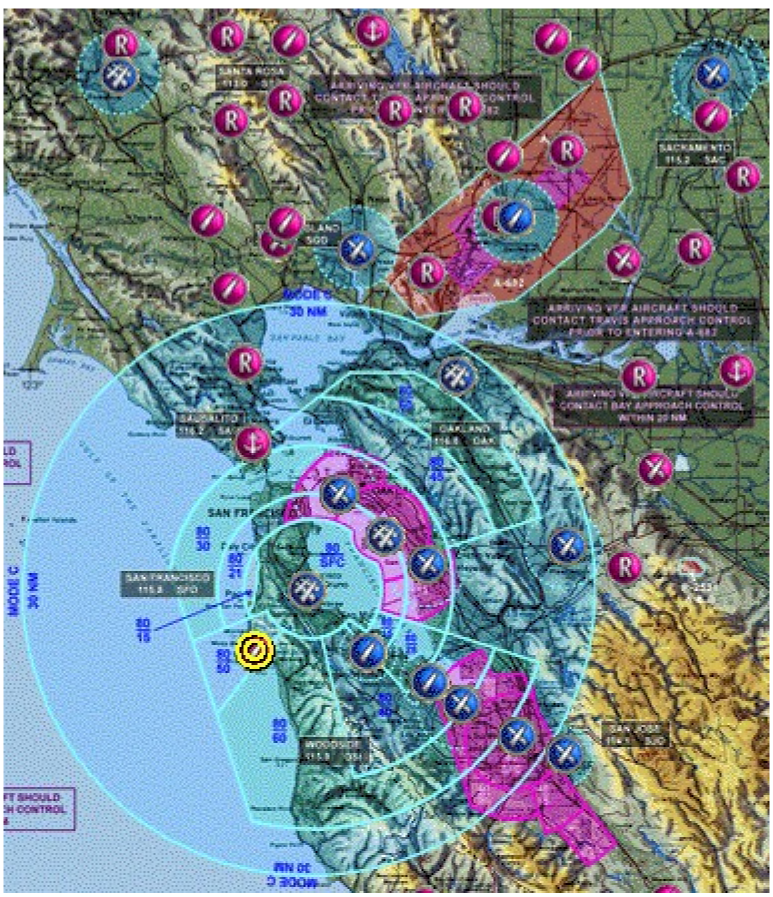
Bluish-Green

This is *Class B airspace*, controlled by radar (known as *Bay Approach*). *San Francisco* is the only *Class B* airport in the area.

Red

This is *restricted military airspace* surrounding *Travis Air Force Base*. Let's just say that bad things can happen when you travel into restricted airspace without prior clearance…

CLICK TO VIEW POP-UPS:



Essentially, the higher volume of traffic the airport services, the higher classification designation is given to the airspace. *Class B*, therefore, is generally more congested than *Class C*, and *Class C* generally more so than *Class D*.

For all controlled airspace, **you must have clearance to transit!** If you enter a given controlled airspace without first obtaining clearance, the controller whose jurisdiction under which said airspace falls (**tower** or **radar**) will contact you and ask you to ***"state your intentions."*** This contact will only occur providing your COM radio is set to ON/GUARD. Furthermore, when you enter either *Class B* or *C* radar-controlled airspace, the controllers will give you a four digit code to dial into your *transponder*, so that they will be able to identify you on their radars.

(*For additional details, refer to* **Transponder (XPNDR)** *and the checklists for approach control later in this section.*)

Altitude Limits

The altitude limits of each colored circular segment are depicted by numbers displayed within each segment. For example, **60** over **40** (**60/40**) inside a specific segment indicates that the controlled airspace begins at **4,000 feet MSL** (*Mean Sea Level*) and terminates at **6,000 feet MSL**. If you begin at the center of SFO, you will notice on the map that the controlled airspace begins at the surface (marked **SFC**) and extends upward to 8,000 feet MSL. As you move away from the center of the airport, the controlled airspace varies by individually marked regions.

The "Upside-Down Wedding Cake"

You can visualize the entire airspace system surrounding the immediate Bay Area as an "upside-down wedding cake." The further away you get from *San Francisco Airport* (SFO), which represents the base of the cake, the higher you can fly before falling under the jurisdiction of *Bay Approach*. This controls several subdivided regions, which represent smaller layers of the cake. It is possible in these latter areas to take off from one airport and fall under the radar jurisdiction of another as you gain a certain altitude or reach a certain proximity.

In summary:

Airspace	**Who controls?/ Clearance required from?**	**Altitude Limits/Radii**	**Transponder use required in *Flight II*?**
Class D	*Tower*	Generally from the surface to 2,500ft AGL and out to 5 statute miles	No
Class C	*Radar Approach*	Variable (listed on the map)	Yes
Class B (Mode C Veil)	*None*	30 mile radius around SFO at all altitudes	No
Class B	*Bay Approach*	Variable (listed on the map)	Yes
Restricted	*Military Radar*	Variable (listed on the map)	Yes

Contacting the Radar Controllers

The radar controllers in *Flight II* are present at the following three locations:

Location	Approach Frequency
Bay (*San Francisco International Airport—SFO*)	134.50 **(Bay Approach)**
Travis (*Travis Air Force Base—SUU*)	126.60 **(Travis Approach)**
Sacramento (*Sacramento Airport*)	125.25 **(Sacramento Approach)**

- You will be required to contact *Bay Approach* only if you intend to enter the *Class B* or *Class C airspace* regions under its jurisdiction (including *San Francisco*, *Oakland*, or *San Jose*). A single approach frequency exists at **134.50** which handles the entire Bay Area.

- You will be required to contact *Travis Approach* only when you enter the *restricted military airspace* under its jurisdiction.
- You are *never* required to contact *Sacramento Approach*. Only do so when you require navigational or traffic information.

The Radar Approach Controller

The job of the *radar approach controller* in *Flight II*, in addition to the primary responsibility of maintaining separation between **IFR aircraft**, is twofold:

NOTE:
Each time you depart a radar-controlled airport, you will always be instructed by the tower controller to turn on your transponder before becoming airborne. (For additional details regarding its specific use, refer to **Transponder (XPNDR)***.)*

1) Deliver Vectors Direct: If your aircraft is lost or is simply seeking navigational information, you can dial-up an approach controller on the COM radio and request directions to *any* airport on the map. Once you select the airport from the alphabetical menu presented, the controller will issue instructions (i.e., "vectors") on how you should go about getting there.

2) Deliver Traffic Advisories Direct: The approach controller will monitor your flight and advise you of any other aircraft as they approach your course.

If you are receiving *Vectors Direct*, the radar controller considers you to be operating under **IFR** or *Instrument Flight Rules*. While you are under radar control, the controller will keep you away from all other IFR traffic.

Obtaining Vectors Direct

Whenever you are lost or are in need of directions to any airport on the map, you may call up one of the three available radar approach controllers in the game and receive *vectors direct* information in order to find your way back to any airport.

Here's how it's done:

- Dial up any one of the radar approach frequencies into the **COM Radio**.
- Press the **SPACEBAR** when you're ready to transmit.
- Select **Vectors Direct** from the menu that appears overlaid onto the screen.
- Select the group of airports from the alphabetical list provided corresponding to the first letter of the airport to which you wish to proceed.
- Select the individual airport from the new list.

- The approach controller will soon thereafter give you a four digit code to input into your transponder. Turn on your transponder, type the four digit frequency into the readout, then click on the **REPLY** button.

- The approach controller will then give you an initial altitude and heading with which to proceed to the airport. A sample report en route to *San Francisco* would sound like this:

>RADAR: ***"Arrow Two Lima Golf // fly heading zero seven zero // maintain 4000 // Vectors Direct // San Francisco."***

The radar controller is:

1) Identifying your aircraft/acknowledging your presence (***Arrow Two Lima Golf…***).
2) Telling you in which direction (070) to point your **Directional Gyro** (***…fly heading zero seven zero***).
3) Telling you how many feet your **Altimeter** should be reading (***…maintain 4000***).
4) Confirming the type of service being provided to you (***…Vectors Direct***).
5) Confirming your destination (***…San Francisco***).

- The approach controller may follow up with additional altitude and heading information as you get closer to the airport.
- As you approach the airport, you will eventually be handed off to contact either the **tower controller** at that airport or **UNICOM** (whichever is appropriate).

Obtaining Traffic Advisories Direct

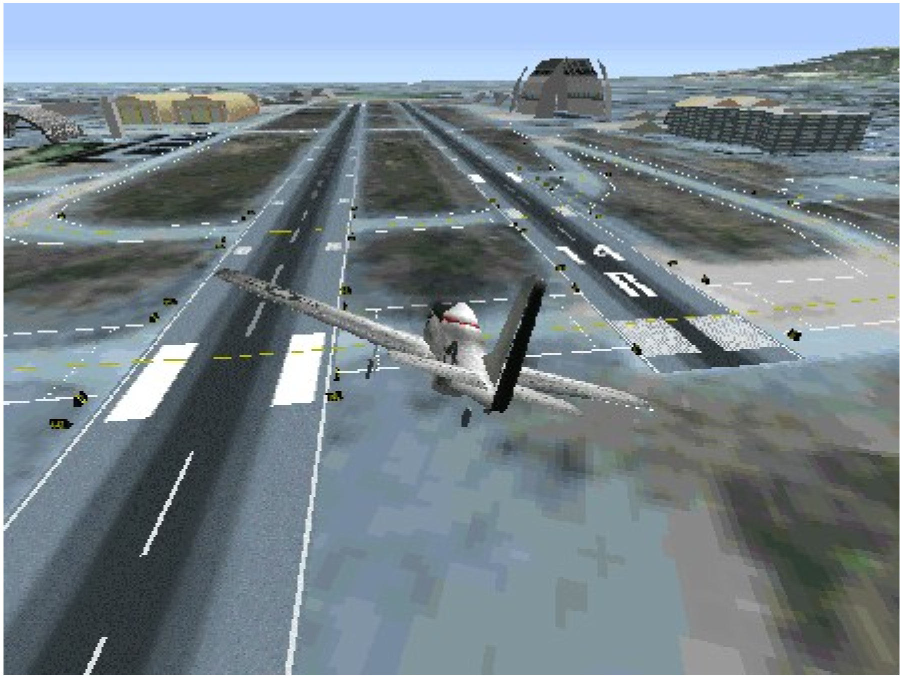
This is also known as “flight following” information. Similar to a **UNICOM controller**, the approach controller will deliver a local traffic advisory to you.

Here’s how it’s done:

- Dial up any one of the radar approach frequencies into the **COM Radio**.
- Press the **SPACEBAR** when you’re ready to transmit.
- Select **Traffic Advisories Direct** from the menu that appears overlaid onto the screen.

- The approach controller will soon thereafter give you a four digit code to input into your **transponder**. Turn on your transponder, type the four digit frequency into the readout, then click on the **REPLY** button.
- You will not be given altitude and course heading information as you were with the two other types of requests. Instead, the approach controller will issue a confirmation of the service being provided.
- The approach controller will then call out *all* traffic in your vicinity, including aircraft both under and not under that controller’s supervision.

Mayday!



Flight II also incorporates a very useful feature in the event of an airborne emergency: the **MAYDAY** signal. Simply press the **ALT G** key combination to send out a standard MAYDAY emergency signal, indicating that your aircraft is in serious trouble. If you are not communicating with a **tower** or **radar approach controller** at the time the signal is sent, this transmission will go out over the **121.50** emergency *Guard* frequency. A radar approach controller will respond with *vectors direct* information to the nearest airport. (*For additional details, refer to* **Obtaining Vectors Direct**.)

Radio Step Summary

These are the communication procedures we recommend for the following situations:

Uncontrolled Airports

Taking Off

- Report your position to local traffic before you taxi and before you enter the active runway.

Entering the Traffic Pattern and Landing

- Contact **UNICOM** at that airport for traffic and basic weather advisory information.
- Report your position when you enter downwind, base and final.
- Once on the ground, use the **Airfield Diagrams** to find your way back to the *Looking Glass Aviation Terminal*.

Controlled Airports

Taking Off

- Contact **ATIS** for basic weather information.
- Contact **Ground Control** at that airport for taxiing instructions.
- Contact **Tower Control** at that airport for runway takeoff clearance and traffic advisory information.
- Contact **Radar Approach** if entering or passing through *Class B* or *Class C* controlled airspace.

Entering the Traffic Pattern and Landing

- Contact **ATIS** for basic weather information.
- Contact **Radar Approach** if entering *San Francisco*, *Oakland*, *San Jose*, or *Travis*.
- Contact **Tower Control** for runway landing clearance and traffic advisory information.
- Once on the ground, contact **Ground Control** for taxiing instructions.

Communication System Hot Keys

The following Hot Keys govern the game's communication (**COM Radio**) interface:

SPACEBAR -Enable COM Radio Menu Interface

- Turn on the radio menu interface (overlaid on the screen) used to communicate with air traffic controllers, and listen to **ATIS** and **UNICOM**.
- Press once to remove menu text from the screen.
- Press twice to return to the starting menu.

1-9 -Menu Selection Options

Press the relevant number of the communication command displayed on the screen to transmit the radio message to an air traffic controller.

ENTER -Select a Default Menu Option or Transmit Option or Repeat Message

- Select a highlighted menu option displayed on the screen.
- Transmit a single communication command.
- Ask to have the **Ground**, **Tower**, or **Radar** controller *repeat* the last clearance message. (May only be accessed when there is no menu present on the screen.)

ALT-F -Cycle COM Radio Frequencies

Cycle through ground, tower, ATIS, and radar frequencies at individual **controlled airports** only.

ALT-G -Mayday!

Sends out an emergency signal to a radar approach controller over the COM radio during a declared emergency situation.

(*To see a listing of all of the keyboard commands available in Flight II, please refer to* **Keyboard Commands Summary**.)

Navigation

Navigation is one of the most difficult tasks for a student learning to become a pilot. General aviation pilots primarily navigate by a method known as **Dead Reckoning**. Dead Reckoning is strictly a visual method of using known references on the ground, and comparing what is seen out of the windscreen to what is on the pilot's map to confirm their location. Flight simulator terrain has never been rendered at high enough detail to allow someone to practice this procedure—until now. With *Flight II's* advanced, photo-accurate, high-resolution terrain modeling, you can identify actual landmarks that real-life pilots use in real life to visually navigate. While flying an aircraft using outside visual references, you are *flying VFR*.

- **VFR vs IFR Navigation**
- **Using the In-Flight Map**
- **VFR Navigation**
- **IFR Navigation**
- **The Instrument Landing System (ILS)**
- **Navigation System Hot Keys**

VFR vs IFR Navigation

VFR stands for **Visual Flight Rules** and **IFR** stands for **Instrument Flight Rules**. As the names imply, VFR refers to navigation and aircraft control via visual reference to the ground and the natural horizon, while IFR uses only instrument navigation from within the cockpit to navigate and fly the aircraft. Specific weather parameters set by the *Federal Aviation Administration* (FAA) solely determine whether or not a pilot is cleared to fly VFR or IFR for that day for that flight. As an example, to fly into *San Francisco Airport* (classified by the FAA as *Class B airspace*) through VFR means you must remain clear of the clouds and have at least **3** miles of in-flight visibility. If weather conditions are worse than this, you must obtain an IFR clearance from the radar controller to enter this airspace. VFR weather criteria is more restrictive at *Oakland* and *San Jose* (*Class C* airports), tower-controlled airports (*Class D airspace*), and uncontrolled airports (*Class E airspace*). According to the FAA, the pilot must remain **500** feet below the base of the clouds, **1,000** feet above the tops of the clouds, or **2,000** feet horizontally from the clouds. The pilot must also have visibility of at least **3** miles to be legally flying under VFR. If these conditions are not met, then the pilot must rely on the cockpit instrumentation through IFR means.

(*For additional details regarding IFR navigating procedures, refer to* **IFR Navigation (VOR/DME Instrument Procedures)**. *To learn more about airspace classification, click* **here**.)

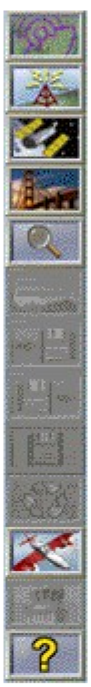
Using The In-Flight Map

While you're in the cockpit of any aircraft, pressing the **M** key will activate the **IN-FLIGHT MAP**:

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

The *In-Flight* map should look extremely familiar to you by now. It is essentially a scaled-down version of the **Flight Planner** relief map—mimicking an actual sectional map of the San Francisco Bay Area—with a toolbar running along the upper left-hand side of the screen and the *In-Flight Notepad* sitting adjacent to the toolbar. All functions here are similar to the use of the *Flight Planner* with the following three exceptions:



1) Six of the buttons in the *In-Flight Toolbar*, normally active in the *Flight Planner*, are now grayed-out. You cannot **save**, **load**, **delete**, or *clear* the existing flight plan, nor can you proceed to the **Modified Quick Flight** screen or **FBO** (you are up in the air, after all, so there's no turning back until you land).

2) The *Satellite* button, normally inactive in the **Flight Planner**, now functions in the *In-Flight* map (*see* **Activating the Satellite View** *for details*).

3) You cannot add, move, or delete any of the **turning points** displayed on the map for your active flight plan.

The use of the *In-Flight Notepad* is identical to the use of the **Flight Planner Notepad**, except that no updating can occur since, as was mentioned, you cannot add or alter any of the turning points.

(*For additional details on the use of the various features present, refer to* **Flight Planning**.)

Let's take a closer look at the various features of the map:

- **What Does it Show?**
- **Viewing the Flight Plan**
- **Viewing Map Overlay Information**
- **Activating the Satellite View**
- **Exiting the Map**

What Does it Show?

The **In-Flight Map** displays the following three things:

1) **The flight plan for the current flight.** This allows you to see where you are supposed to be traveling based on the course you plotted before you took off.

(If you did not create a flight plan, then the map will be blank, save for the indication of your **Point of Departure** airport, denoted by the presence of a **yellow**, hollow, double circle icon.)

2) **The airspace, navigational information, and points of interest for the local area.** This allows you to see where the **controlled airspace** lies, the **location of major landmarks**, and the **disposition of local VOR stations**.

3) **The real-time location and flight path of your aircraft via the Satellite View.**

And, as with all of the maps, in *Flight II*, a **scale** (indicating nautical miles) is present in the lower left-hand corner of the map.

A **HELP** button, similar to the **Flight Planner**, is also available.

Viewing the Flight Plan

Providing you actually **created a flight plan** prior to taking off, your plotted **Point of Departure** (the airport from which you departed) **turning points** (course waypoints), and **destination airport** (the airport at which you intend to land) are all present on the **In Flight Map**. You will also see all of the relevant information for each, in addition to cumulative information for the planned flight indicated on the *In-Flight Notepad*.

(*For additional details, refer to* **Flight Planning**.)

The *In-Flight Notepad* and the *two minute tick marks* at the highest zoom level are both used to conduct specific navigating procedures (*For additional details, refer to* **VFR Navigation (Dead Reckoning)**.)

Viewing Airspace, Navigation, and Landmark Information

The three overlays present in the **Flight Planner Map** are also available for the **In-Flight Map**:

- **Airspace Information**
- **VOR Information**
- **Points of Interest**

Airspace Information

Airspace Information

Clicking on this button from the **In-Flight Toolbar** toggles the *Airspace Information* map layer on and off.

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

This **In-Flight Map** overlay displays where the controlled airspace lies in the area. (Controlled airspace is that which is either tower or radar-controlled and requires a special radio clearance from the relevant controller to enter.) This overlay is especially useful in conjunction with the **Satellite View** when determining where and when you are about to enter controlled airspace.

(*For additional details regarding airspace classification and its role in the Air Traffic Control System, refer to* **Airspace Information Explained**.)

VOR Information

VOR Information

Clicking on this button from the **In-Flight Toolbar** toggles the *VOR Stations* map layer on and off:

CLICK TO VIEW POP-UPS:

CLICK TO JUMP:

This **In-Flight Map** overlay displays where the **nine** navigational beacons are located in the area. These assist you in confirming your current position on the map, whenever you get lost or require updated navigational information. This overlay is especially useful in conjunction with the **VOR Indicator** and **DME** navigational instruments during IFR navigating procedures.

(*For additional details regarding VOR information and its role in IFR navigating procedures, refer to* **IFR Navigation (VOR/DME Instrument Procedures)**.)

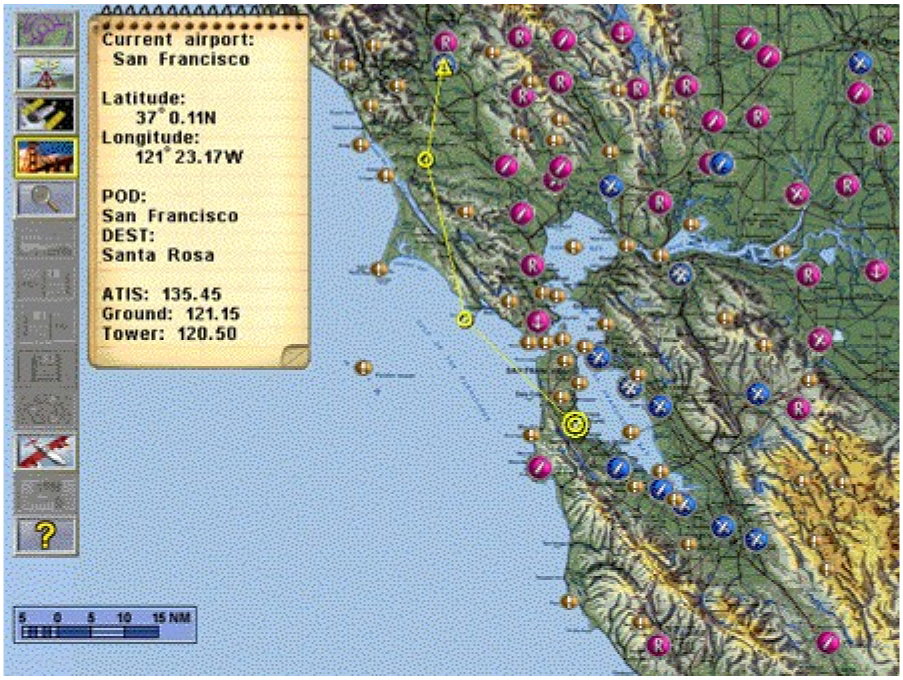
Points of Interest

Points of Interest

Clicking on this button from the **In-Flight Toolbar** toggles the *Points of Interest* map layer on and off, revealing the location of popular landmarks:

CLICK TO VIEW POP-UPS:

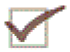
CLICK TO JUMP:



Gold icons with exclamation marks illustrate the specific locations of each major landmark. Pass the mouse cursor over one of the icons to bring up the name of the landmark under the **Points of Interest** heading on the first page of the *In-Flight Notepad*. This overlay can come in handy during the landmark recognition phase of **VFR flying**.

(*For additional details regarding landmark recognition and its role in general navigating procedures, refer to* **VFR Navigation (Dead Reckoning)**.)

Activating the Satellite View



Clicking on this button from the **In-Flight Toolbar** toggles the position of your aircraft on the map on and off:

The *Satellite View* is an orbital telecommunications-based navigation aid. It relays via satellite the current latitudinal/longitudinal location of the aircraft to an on-board receiver. In *Flight II*, this system, a scaled-down down version of the real world GPS or *Global Positioning System*, pops-up an icon onto the *In-Flight* map showing your moving aircraft. The flight path of the aircraft, colored **red**, is also shown, indicating where you've been since your flight began.

NOTE:
Pilot freshmen who find themselves just plain lost or who can't handle the intricacies of VOR/DME navigation (and the like) will find the Satellite View a welcome feature. With it, you'll be able to locate your aircraft on the In-Flight map at all times, day or night. For those hardier pilots smitten with old-fashioned realism, we invite you to check out **VFR Navigation (Dead Reckoning)**.

Exiting the In-Flight Map

To exit the **In-Flight Map** at any time, press the **ESC** key, or click on the **FLY** button from the **In-Flight Toolbar**.

VFR Navigation (Dead Reckoning: The Art of Pilotage)

VFR flying involves the use of known ground references, in conjunction with your **In-Flight Map** and compass, to visually navigate between points on a plotted course. *Dead Reckoning*, synonymous with *pilotage*, is a means of navigation by which one calculates and deals with the effects of the wind. In this section of the Online Manual, we'll examine how you will go about applying Dead Reckoning to **VFR navigation** under windy conditions.

- **Setting up a VFR Scenario**
- **Taking Off**
- **Reading the In-Flight Map**
- **Clock to Map to Ground**
- **The Remainder of the Scenario**

Setting Up a VFR Scenario

Beginning at *Livermore*, you'll setup a flight plan which will take you over the *Oakland Coliseum* and the *Golden Gate Bridge* en route to *San Francisco International Airport* (SFO). Let's get started…

(*Refer to* **Game Interface** *if you are stumped by the following setup process*.)

- After *Flight II* has finished loading, click on the **Airport Icon** from the **Main Menu** to proceed to the default **FBO**.
- At the FBO, click on the *Wall Map* icon to go to the **Airport Selector Map**.
- Click on the *Livermore* airport icon to go to that airport's FBO.
- Click on the *Flight Planner* FBO icon (located atop the desk).
- At the **Flight Planner Map**, click on the **FLIGHT OPTIONS** button on the toolbar to go to the **Modified Quick Flight** screen.
- Left-click on the **Aircraft Selector** icon. Stop when the picture of the *Trainer* appears.
- **Important:** Left-click on the **Wind Direction Indicator** until it reads **Northerly** (i.e., the wind is blowing from the north towards the south).
- **Important:** Click on the **Wind Speed** slider bar until it reads **Strong** (21-35 knots).
- Adjust the remaining slider bars to tailor your weather and aircraft options (make sure the **FUEL** slider bar reads **Full**, the **TIME OF DAY** reads **Day**, and the **CLOUD COVER** reads **Clear**—good conditions for VFR navigation).
- Click on the **DONE** button to return to the *Flight Planner*.
- At the **Flight Planner Map**, click on the **POINTS OF INTEREST** button to bring up an overlay featuring all of the major landmarks in the area. Locate the individual icons for the *Oakland Coliseum* (just to the northeast of *Oakland International Airport*) and the *Golden Gate Bridge* (to the northwest of *San Francisco*).
- Find your **Point of Departure** (POD) icon on the map at *Livermore* and create **two** **turning points** —one directly over the *Oakland Coliseum* (**TP1**) and the other directly over the *Golden Gate Bridge* (**TP2**).
- Now click on the SFO airport and choose the **LAND** button from the ensuing pop-up menu to create a **third** and final turning point (**TP3**). This represents your destination airport. The plotted course should resemble the following:

CLICK TO VIEW POP-UPS:

(*For additional details regarding how to create a flight plan, refer to* **Flight Planning**.)

You have now created **three "**legs" for this journey:

Leg 1 is located between the **POD** at *Livermore* and **TP 1** at the *Oakland Coliseum*.
Leg 2 is located between **TP 1** and **TP 2** at the *Golden Gate Bridge*.
Leg 3 is located between **TP 2** and **TP 3**, the latter of which becomes your destination airport at SFO.

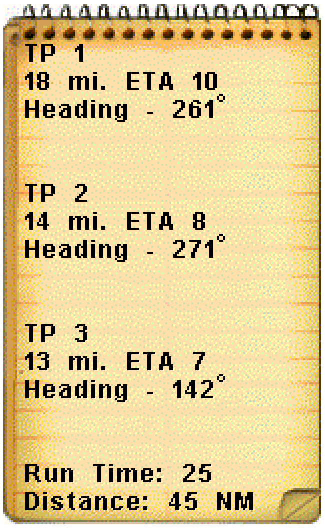
If you look closely at the plotted course on the map (go to the highest zoom level), you will notice the presence of **yellow** *two minute tick marks* cutting through each leg of the route line. The distance between each mark represents two minutes of travel time for the aircraft selected for the upcoming flight—in this case, the *Trainer.* The spacing of these marks is based on the *average cruise speed* of the chosen aircraft (with the *Trainer* rated at **109 KIAS**), minus wind. This gives you, the pilot, an estimate of how long it will take to reach a given turning point from a specified location.

If you maintain an average cruise speed of **131 KIAS**, and you do not deviate from the specific course headings for each leg, the following will be true:

Leg 1 has just over **5** tick marks so it should take approximately **10** minutes to fly from *Livermore* to the *Oakland Coliseum* at **TP 1**.

Leg 2 has **4** tick marks (**3** visible and the fourth hidden beneath the second turning point) so it should take approximately **8** minutes to fly from the *Oakland Coliseum* to the *Golden Gate Bridge* at **TP 2**.

Leg 2 also has **4** tick marks (**3** visible and the fourth hidden beneath the third and final turning point) so it should take approximately **8** minutes to fly from the *Golden Gate Bridge* to SFO at **TP 3**.



An estimated time of arrival for each turning point can be found by clicking on the **Flight Planner Notepad** dog-ear crease and "flipping" to the second page. There, you will see three turning point summaries for **TP 1**, **TP 2**, and **TP 3**. Note the **ETA** headings under each, marked **10**, **8**, and **7** [minutes], respectively, based on the aforementioned information. Also note the distance and **heading** information for each—you will be using this later after you take off.

Let's go flying…

Getting off the Ground

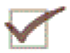
- Click on the button from the **Flight Planner Toolbar** with the symbol of the aircraft to take off.
- You will begin your flight at *Livermore* on the player parking ramp in front of the *Looking Glass* aviation terminal.

(*At this time*, *since you are departing Livermore, which is a controlled airport, refer to* **Taking Off and Remaining in the Traffic Pattern** *for further takeoff instructions*.)

- Once you are airborne, and you have finished your immediate radio interaction with the *Livermore* tower controller, switch to the **VFR Cockpit View** by pressing the **F2** key. This view contains the four primary instruments used for VFR navigating: the *Airspeed Indicator*, *Attitude Indicator*, *Altimeter*, and *Directional Gyro*
- Now you will "hack the clock" by left-clicking on the clock's digital display so that it reads **00:00:00**.
- Immediately adjust your throttle setting so that the **Airspeed Indicator** matches the average cruise speed of the aircraft (it should read **109 KIAS**).
- Use your **Attitude Indicator** in conjunction with your **Altimeter** to verify that you are neither climbing nor descending as you proceed.

Reading the In-Flight Map

- Now press the **M** key to access the **In-Flight Map**.
- Notice your intact flight plan, just as it was plotted back at the *Livermore* FBO prior to takeoff.
- Zoom in to the highest level so that your **POD** and **TP 1** are in the middle of the screen.



- Flip to the second page of the *Notepad* to review your turning point summary information for the first leg. It should resemble the following:

  TP 1
  18mi. ETA 10
  Heading - 261°

- You need to hold a heading of **261°** in order to fly to the first turning point.
- Return to the cockpit, locate the directional gyro, and turn your aircraft until the **white** heading indicator at the top of the instrument displays the correct heading. (You may alternately press the **F12** key to toggle on the **Tape Strip Indicator** at the bottom of the screen. This will display a readout of the heading information.)
- Now, try your best to hold a heading of **261°** and maintain a speed of **109** KIAS. According to the flight plan, you should be over the *Oakland Coliseum* at the first turning point **18** nautical miles away in approximately **10** minutes (the digital clock should read **00:10:00** at that time).

Clock to Map to Ground

At precisely **00:10:00**, you look out the window and discover, much to your dismay, that the *Oakland Coliseum* is about a **mile and a half** off to your right! What happened?

Remember that strong northerly headwind/crosswind component you set at the *Modified Quick Flight* screen just prior to taking off? Well, ***it blew your fragile aircraft off course to the southwest by some 15 degrees without your paying attention!*** What should you have done?

The keys to successful VFR navigation, using the principals of dead reckoning to defeat the effects of wind, are as follows:

- **Understanding the Map**
- **Landmark Referencing**
- **Reading the Clock**
- **Flight Control Compensation**

The routine is commonly referred to by pilots as "*clock to map to ground*" navigating.

Understanding the Map

Always remember that the information provided on the **Notepad** concerning the turning points you plotted **does not take into account wind speed or direction!** Both the *tick marks* and the *estimated times of arrival* for each in the *turning point summaries* are based on the **average cruise speed of the aircraft in a no-wind situation**. This is where Dead Reckoning comes into play, and this is where the map assists you in determining where you should *ideally* be along your intended flight route. Because of weather effects, you will rarely match the information you've "planned" for the upcoming flight, but at least you'll know when you've veered off course.

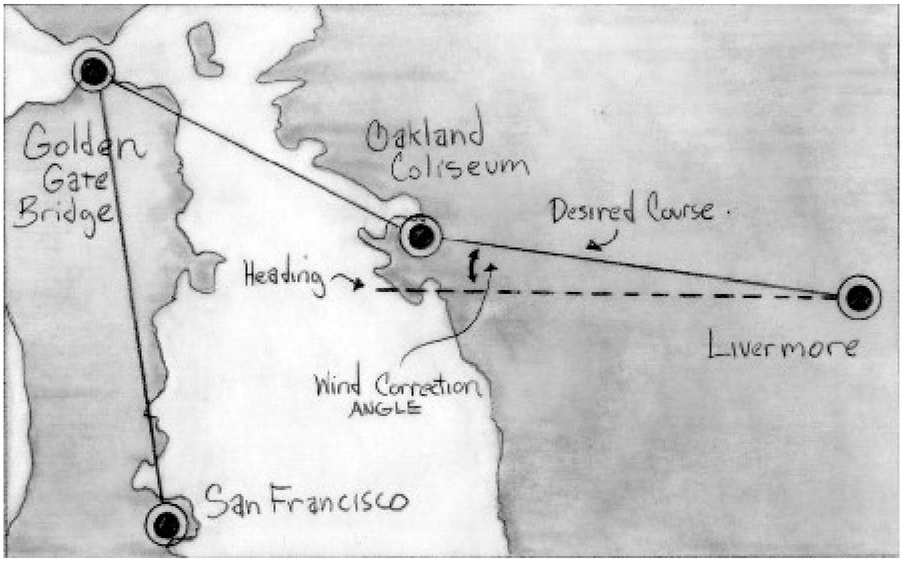
Landmark Referencing

LOOK OUT THE WINDOW! This is the single most important facet of VFR navigation. It is especially important to choose prominent landmarks which will be easily identifiable. When you plan a flight, try to choose one or two points along each navigation leg. Use these to keep situationally aware of your position along your entire flight route. If you've been maintaining a constant heading and ground speed, you can use visual referencing to determine what the wind is doing to you. Thus, if you're to the left or right of the landmark, or arrive at the landmark sooner or later than expected, then you'll known that the wind is blowing you off course, and you should apply heading and airspeed corrections as necessary. You should constantly apply Dead Reckoning every few minutes to verify a known position on the ground. Don't look at something on the ground and make it look like something on the map. If you go from ground to map, you'll soon be lost.

Reading the Clock

The purpose of "hacking" or zeroing the clock at takeoff and each time you reach a turning point is simple: The clock acts as a *timer*. If the listed **ETA** on the **Notepad** for a given turning point is, as in our example, **10** minutes away, zeroing the clock gives you a running countdown of how close you should be to that turning point. (This assumes you maintain the proper course heading and correct for wind.) Thus, if you are supposed to reach the turning point 10 minutes from now and in 10 minutes the landmark you've selected is either off to the side of the aircraft or, even worse, nowhere to be found, you know you've messed up somewhere. This is where the clock, in conjunction with the information on the **In-Flight Map**, will let you know when you've made a mistake.

Flight Control Compensation



During windy conditions, pilots will need to compensate for heading and speed, as the wind direction may cause drift, and the wind speed may either slow down or quicken the progress of the aircraft. You need to correct for a strong headwind or crosswind component by applying the appropriate compensatory controls. The first rule of thumb is **pay attention to your instruments!** If your **Directional Gyro** is drifting slightly or your AI is barely banked upward or your KIAS is nudging upward—even slight variances such as these can take you off course.

The remainder of the scenario…

The Remainder of the Scenario

…we will leave for you to figure out with a couple of hints:

1) The **second leg**, between the *Oakland Coliseum* and the *Golden Gate Bridge*, is heading in a similar (northwesterly) direction as the first leg. Use the advice **previously given** to ensure that you don't arrive at the second turning point with the *Golden Gate Bridge* well off to your right.

2) The **third leg**, between the *Golden Gate Bridge* and SFO, is interesting in that the headwind/crosswind component will turn into a tailwind as you turn towards the south to make your way home. This means that you will probably reach San Francisco in advance of schedule unless you correct for wind by **decreasing your airspeed**.

Good luck, and enjoy the rest of your flight!

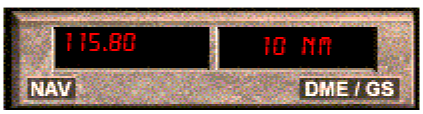
IFR Navigation (VOR/DME Instrument Procedures)

IFR flying in *Flight II* becomes paramount during IMC or *Instrument Meteorological Conditions*. IMC occurs during periods of adverse weather, at night, or any other time of low visibility. It involves measured instrument awareness. Instruments normally used as a secondary means of navigation during VFR conditions, become the primary means during IFR navigation. In this section of the Online Manual, we will walk you through a bad-weather scenario, where you cannot see the ground, and are simply trying to discover the precise location of your aircraft.

The IFR Components

The VOR/DME navigation system consists of three interlocking components:

The VOR



The NAV Radio

The DME

I'm Lost!

Let's say you're having a *really* bad day. You took off from *San Jose* at 12:00 PM en route to *Buchanan*. It's now 12:30, and you're completely lost. Not only are you lost, but you accidentally set some atrocious weather conditions at the **Quick Flight** screen prior to taking off. It's **raining**. It's **foggy**. The **cloud ceiling** is at 1,000 feet. The **wind** is blowing like crazy from the North. Visibility is extremely poor.

Not only is the weather awful, but radar approach is mysteriously not responding to your calls which means you can't receive **Vectors Direct** information from a controller. Can it get any worse?

DON'T PANIC AND DON'T PRESS THAT **ESC** KEY JUST YET!

We're going to show you…

The Way Home

Getting back on track is an **8** step process:

1) **Locate the nearest VOR station on the In-Flight map.**
2) **Dial the appropriate frequency into the NAV Radio.**
3) **Check the DME.**
4) **Manipulate the VOR to discover your aircraft's position relative to the VOR station.**
5) **Use the In-Flight map to draw an imaginary line from the VOR to your aircraft.**
6) **Select a second VOR station.**
7) **Repeat steps 2-5.**
8) **Plot the intersection of the two lines.**

Selecting an Initial VOR Station

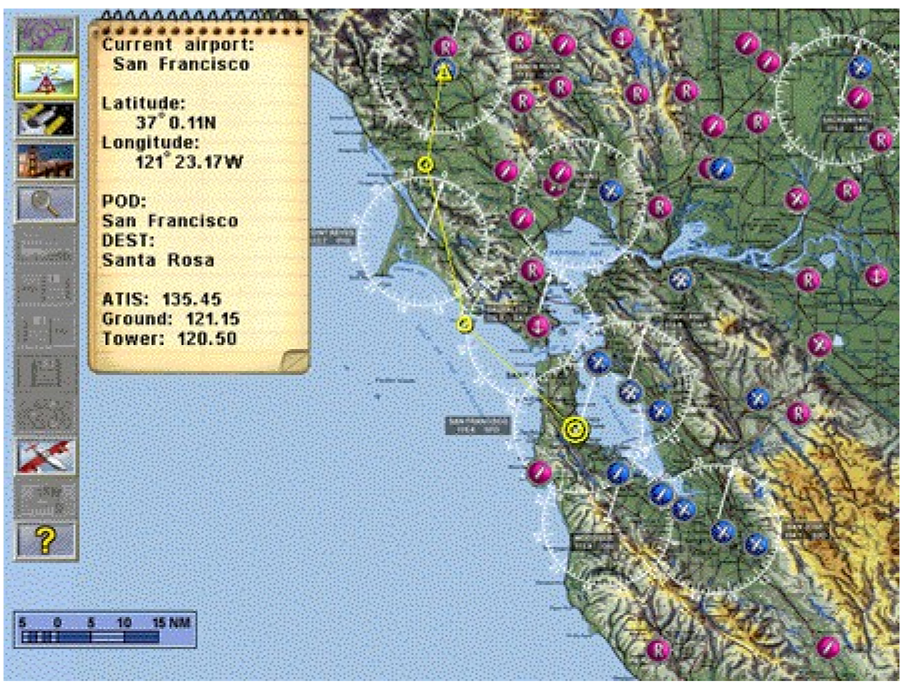
The first thing you need to do is find the location of the nearest *VOR station*. The VOR station, one of **nine** navigational aids sprinkled about the terrain area featured in *Flight II*, emits a 360 degree electronic radio signal which you may "tune" into by setting the appropriate frequency in your **NAV Radio**. Once you are receiving signals from the VOR station through your NAV radio, you may then use the **VOR Indicator** to display course guidance, either to or from the selected station. This course guidance allows you to discover the correct heading to the VOR station, and to use this information to discover your aircraft's location in relation to it.

Follow along:

- Press the **M** key to open the **In-Flight Map**.

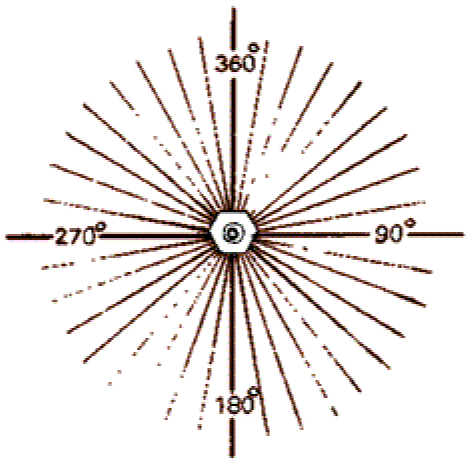
- Locate the button from the toolbar with the picture of the radio beacon on it and left-click. This will enable the VOR station layer:

IN-FLIGHT MAP WITH VOR STATION LAYER



Around each VOR station is a **white** compass rose with a **white** arrow indicating *magnetic north*. Each VOR station in *Flight II* has a line-of-sight range of approximately **35** nautical miles (NM).

A radio signal is emitted in a 360 degree *azimuth* (also known as a *radial*) out to said distance, to or from which you may track on your VOR indicator. Picture it as a bicycle spoke:

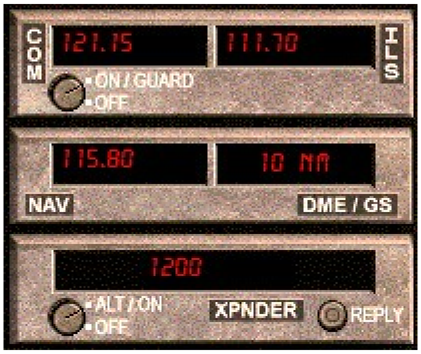


The idea is to tune into the VOR in order to determine which radial you are currently on. Since you plotted a fairly direct course between *San Jose* and *Buchanan*, and you've only been flying for 30 minutes, chances are you are not too far away from the intended course. Let's pick the *Oakland* VOR station off to the west of your planned flight route:

Adjacent to the *Oakland* compass rose, you'll find a box containing the name of the station along with its associated radio frequency and three-letter identification. (*There is also a listing of available VOR frequencies found* **here**.)

Dialing in the Frequency

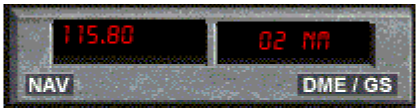
RADIO STACK



- Locate the **NAV Radio** on the Radio Stack.

- Left-click on the NAV radio readout to highlight the display and then type in the appropriate five-digit frequency—in this case, **116.80**.
- When finished, press the **ENTER** key.

Scanning the DME



Once the NAV radio has a fix on the VOR station, the **DME** unit will begin receiving its information. The DME display can be toggled between *distance* and *speed* by simply left-clicking on the readout itself with the mouse:

DISTANCE READOUT **SPEED READOUT**

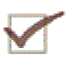
The *distance information*, registered in **nautical miles**, indicates how far away the aircraft is presently located from the selected station. As you get closer to the station, this number will shrink (and vice-versa).

The *speed information*, registered in **knots**, indicates the aircraft's groundspeed.

Manipulating the VOR

The **VOR Indicator** is always aligned with *magnetic north*, just like a compass. To obtain the magnetic heading that will allow you to fly directly *to* the *Oakland* VOR station, spin the CDI needle by click-and-dragging the OBS knob. Drag the mouse either left or right horizontally across the screen until the *course deviation bar* is centered in the middle of the CDI, and the **TO/FROM** indicator displays "TO." The **front** of the CDI arrow indicates the heading to fly directly *to* the station in a no-wind situation. Now turn the aircraft so that the CDI and the **white** pointer at the top of the gauge match (indicating your aircraft is heading directly towards the VOR).

In this instance, you discover that the aircraft is on the **110°** radial inbound to the *Oakland* VOR station. (Your heading is actually **290°** in a no-wind condition as you proceed towards the VOR, indicated in the screenshot below.)



Go to the **In-Flight Map** and draw an imaginary line across the **110°** compass rose radial marking and the center of the VOR.

At this point, the **DME** is telling you that you are roughly **7 NM** away from the VOR station along this line. To discover the exact location of your aircraft along this trajectory you will need another intersecting line. (Recall your geometry?) For this, you need to find **another VOR station**.

Selecting a Second VOR Station

Once again, at the **In-Flight Map**, pull up the VOR station overlay and look for a second VOR station in the area. The one at *San Francisco* looks good:

Now follow the previous routine…

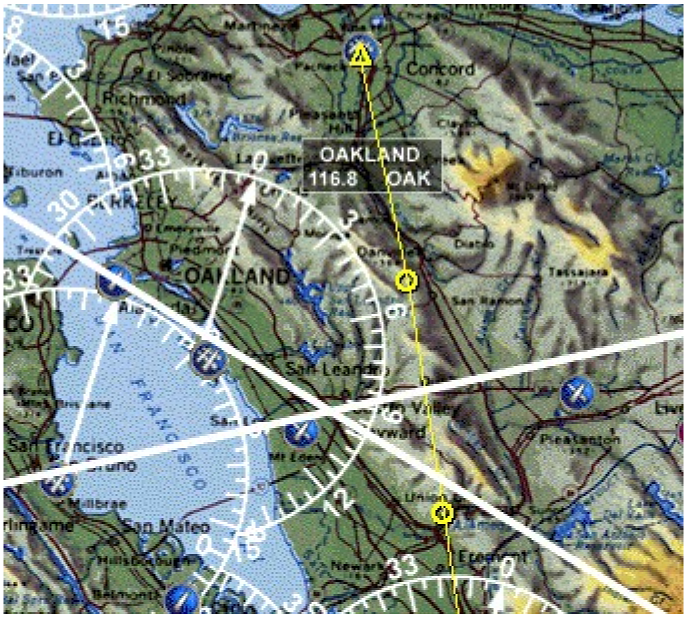
Discovering Your Precise Location

- Left-click on the **NAV Radio** readout to highlight the display and then type in the appropriate five-digit frequency—in this case, **115.80**.

- When finished, press the **ENTER** key.
- Manipulating the **VOR Indicator** in the same fashion as before, you discover that the aircraft is on the **060˚** radial inbound to the *San Francisco* VOR station. (Your heading is actually **240˚** in a no-wind condition as you proceed towards the VOR, indicated in the screenshot below.)

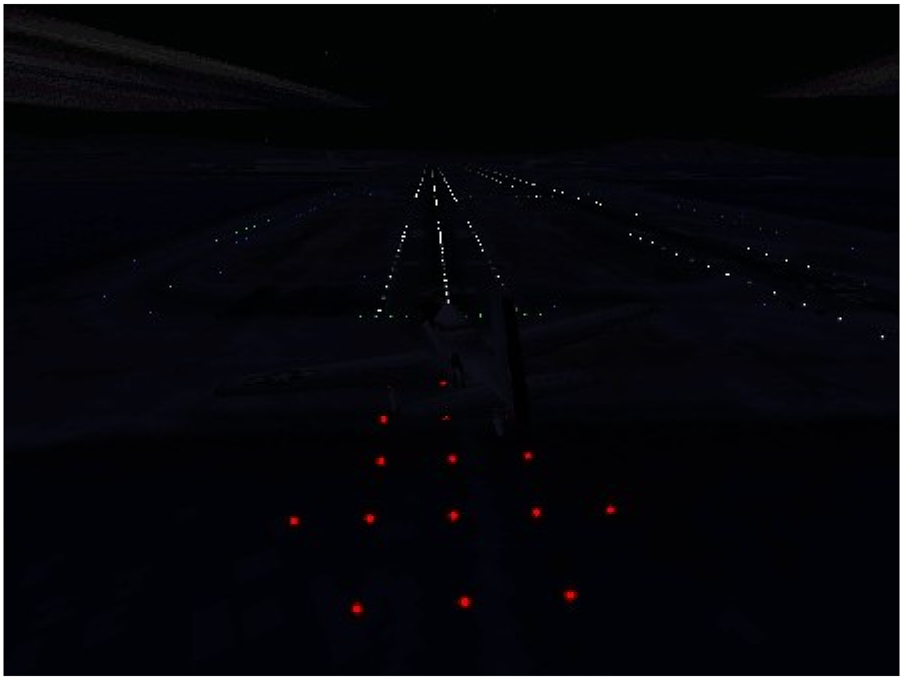
- Draw the imaginary line across the **060˚** compass rose radial marking and the center of the VOR at the **In-Flight Map**:

- Now gauge the intersection of this line with the first to "triangulate" on your aircraft's precise location:



Guess what—you’re no longer lost! Congratulations.

The Instrument Landing System (ILS)



The *Instrument Landing System* or ILS is a guidance system pilots use to perform precise approaches and landings during IMC or *Instrument Meteorological Conditions*. IMC occurs during periods of adverse weather, at night, or conditions of otherwise low visibility. The ILS comes into play when you cannot see the landing runway from a safe enough distance to begin a carefully planned approach.

Let’s take a closer look at the system:

- **The Components**
- **System Basics**
- **Using the ILS**
- **Reading the ILS Receiver**

The Components

The Instrument Landing System consists of four interlocking components:

- **The Transmitter**
- **The Receiver**
- **The NAV/COM**
- **The Marker Beacon Lights**

(*For detailed descriptions of each of these instruments, refer to* **The Cockpit Instruments** *prior to reading the remainder of this section of the Online Manual.*)

System Basics

The *ILS Transmitter* is a navigational radio beacon located adjacent to an ILS-equipped runway at a given airport. The transmitter sends both horizontal and vertical frequency signals (*course* and *glideslope* guidance information) which are picked up by the **ILS Receiver** aboard a properly equipped aircraft. Information sent out by the ILS transmitter from the desired landing runway is reliable to **ten** degrees from either side of the runway centerline and generally extends out to a range of no more than **18** miles.

INACTIVE ILS RECEIVER

The signals cannot be picked up by the ILS receiver until the appropriate five digit frequency has been set in the **ILS NAV/COM Radio**. Once you are receiving signals from the ILS transmitter through your ILS radio, you may then use the ILS receiver to “ride” the beam down.

NAV/COM Radio

Marker Beacon Lights in the cockpit apprise you of when you have reached certain points on the ILS approach path, shown on the respective **ILS Diagram**.

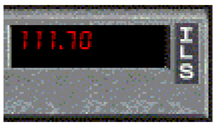
Marker Beacon Lights

Localizer or vertical guidance (indicated on the ILS receiver by the vertical *localizer needle*) is specifically provided from **18** nautical miles to ½ mile from the approach end of the runway. *Glideslope* or horizontal guidance (indicated on the ILS instrument by the horizontal *glideslope needle*) is provided from **10** nautical miles to **100** feet above the runway elevation. ILS approaches are flown down to the minimum altitude, at which point if the runway is not visible, the pilot will normally execute the published missed-approach procedure, and either attempt another approach or proceed to an alternate airport.

Using the ILS

Flying an ILS approach is a lot simpler than you might expect:

- Locate the **ILS-equipped runway** from the group of **Instrument Approach Plates**.
- Locate the corresponding **ILS frequency** for the runway from the relevant diagram (there is also a listing of available ILS runway frequencies found **here**).
- Type the five digit ILS frequency into the ILS NAV/COM readout on the Radio Stack.



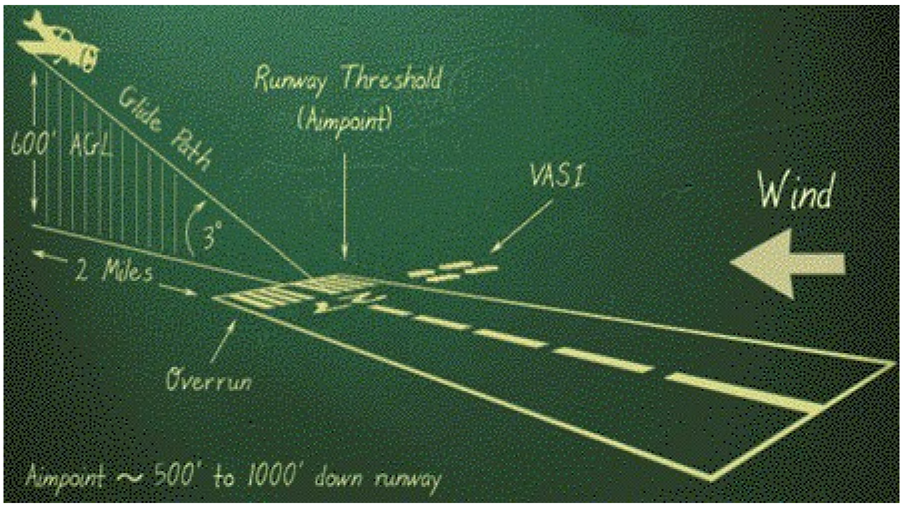
- Turn to the corresponding **ILS Approach Plate**.
- Locate the **ILS Receiver**. The two window indicators should be **ON**, providing the aircraft is in range of the runway (if not, they will read **OFF**, and you will need to maneuver closer).
- Try to get both floating **white** needles to converge in the center of the receiver while applying necessary flight controls during the approach to landing. The easiest way to keep the vertical (localizer) needle centered is by using the rudder pedals. Center the horizontal (glideslope) needle by using the elevator trim.

- The *Outer Marker* (indicated on the Approach Plate for a runway) is the initial point of descent during the approach. (This is also known as the IAF or *Initial Approach Fix*). When you reach this Outer Marker, a **purple** **marker beacon light** in the cockpit (labeled **O**) will begin flashing. You will also hear a corresponding tone.

- The *Middle Marker* (indicated on the *Approach Plate* for a runway) is the final point of descent during the approach. When you reach the Middle Marker, an **amber** **marker**

beacon light in the cockpit (labeled **M**) will begin flashing. You will also hear a corresponding tone.

- The **Decision Height** (DH) is the height near the runway preceding the *Middle Marker Beacon*, where the pilot determines whether to continue the ILS approach and land, or to execute a *missed approach* and try again. This is usually **200 feet AGL**. If you've flown the approach incorrectly, you should decide to execute a missed approach prior to hitting the 200 foot barrier. The missed approach is the procedure a pilot flies if an instrument approach can't be completed due to poor ceilings, visibility, or pilot error, and is indicated near the bottom of each ILS diagram.



- Ride the beam perfectly, and you should be greeted by a nice, soft landing.

Reading the ILS Receiver

Think of the **vertical (localizer) needle** as the *center* of the runway. If your aircraft deviates to the left of the runway, the needle will move towards the left of the center of the receiver (and vice-versa).

Think of the **horizontal (glideslope) needle** as the *end* of the runway. If your aircraft is approaching at too high an angle, the needle will move towards the top of the receiver (and vice-versa).

INACTIVE **RIGHT ON!** **TOO HIGH!**

TOO LOW! **TOO HIGH AND TO THE** **TOO LOW AND TO THE**

LEFT OF THE RUNWAY! **RIGHT OF THE RUNWAY!**

The approach procedures and frequencies for each of the tower-controlled airports are provided to you **here**. You should carefully study the approach "plate" or chart before you go and try to shoot an ILS. (*Refer to the Approach Plate for* **San Francisco Runway 19L** *for a detailed summary on the manner in which they are read.*)

Flying an instrument approach and landing is one of the most satisfying tasks in aviation. You will be extremely challenged during every ILS approach you perform.

(*To practice an ILS approach, refer to* **Lesson Six** *of the* **Flight Lessons**.)

Navigation System Hot Keys

The following Hot Keys may only be accessed from the **In-Flight Map**:

M -In-Flight Map
Toggle On/Off the *In-Flight* map.
ALT-F -Exit the In-Flight Map
Leave the map.
S -Satellite View (with Flight Path)
Activates the *Satellite View*, showing both your aircraft's current location and *flight path* while at the *In-Flight* map.

(*To see a listing of all of the keyboard commands available in Flight II, please refer to* **Keyboard Commands Summary**.)

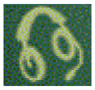
Flight Maneuvers

This section of the Online Manual describes the essentials of flight for novice users, and is based around the six blackboard lessons included with *Flight II*. You will be taught everything from the fundamentals of aerodynamics, granting a basic understanding of the manner in which a plane flies, to carrying out elementary maneuvers, to the challenge of flying an instrument landing approach. The lessons discussed here should give the budding aviator a firm foundation with which to take to the skies and experienced pilots a refresher course in the basics of civilian aviation.

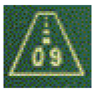
Let’s get started by taking a look at the **Flight Lessons**.

The Flight Lessons

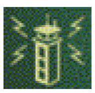
Flight II features six lessons designed to illustrate, through blackboard art and practice sessions, the basics of civilian aviation. In order, they are:



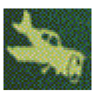
Lesson 1: Radios, Taxi, and Takeoff



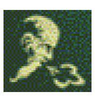
Lesson 2: Landing



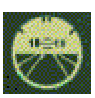
Lesson 3: Traffic Pattern



Lesson 4: Entering the Pattern

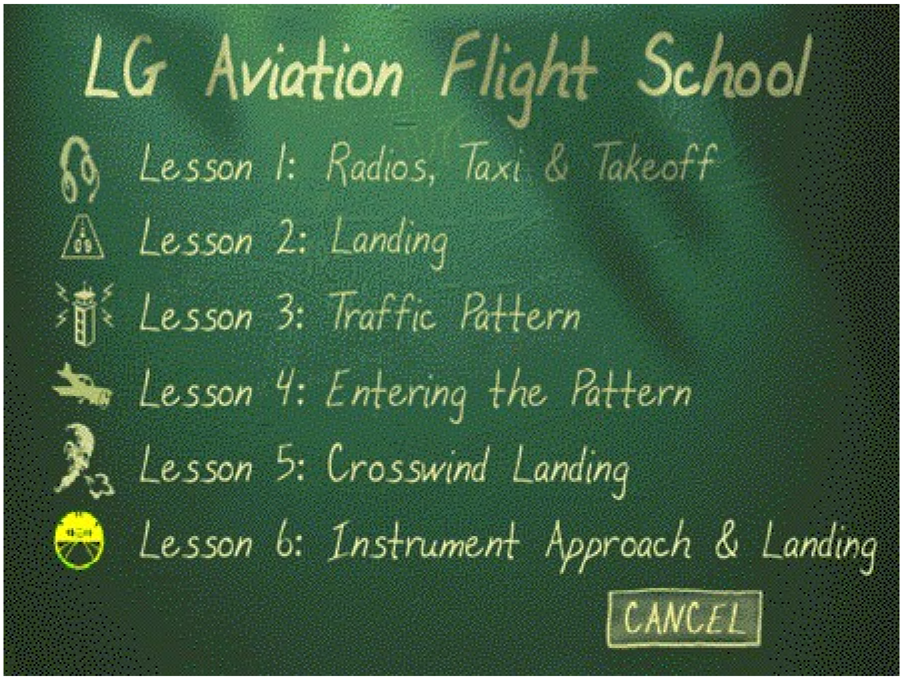


Lesson 5: Crosswind Landing



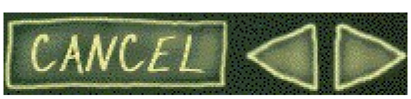
Lesson 6: Instrument Approach and Landing

BLACKBOARD LESSONS SCREEN



The lessons are accessed by clicking on the *Blackboard* icon in the **FBO**. This will take you to the *Blackboard Lessons* screen where you may select one of the six available lessons by highlighting and clicking on an icon.

The idea is to view the illustrations while reading through the relevant sections of this chapter (and elsewhere in the manual) to garner an understanding of the concepts and then, when you're ready, go out and practice the lesson yourself.



Use the **LEFT** and **RIGHT ARROW** buttons to cycle through the blackboards of each lesson. Use the **CANCEL** button to return to either the *Blackboard Lessons* screen or current FBO.

When you feel you're ready to tackle the lessons as depicted on the boards, click on the **STUDENT PRACTICE** button located at the final screen of each lesson (the *Student Practice* screen).

Once finished with a given lesson, you will return to the *Student Practice* screen.

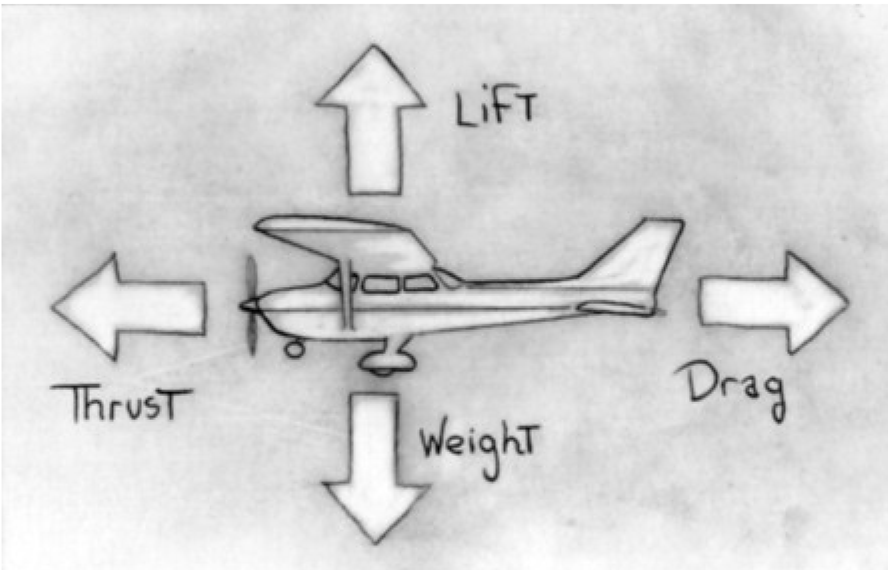
The remainder of this chapter will cover the particulars of each lesson, in addition to the following four fundamentals not illustrated in the game:

- **Basic Flight Concepts and Aerodynamics**
- **Crosswind Takeoff**
- **Straight and Level Flight**
- **Turning the Aircraft**

NOTE:
For additional detailed descriptions regarding the myriad cockpit instruments and terminology discussed in this chapter, refer to **The Cockpit Instruments**.

Basic Flight Concepts and Aerodynamics

There are four fundamental and related principals that make an aircraft fly: **Lift**, **Weight**, **Thrust**, and **Drag**.



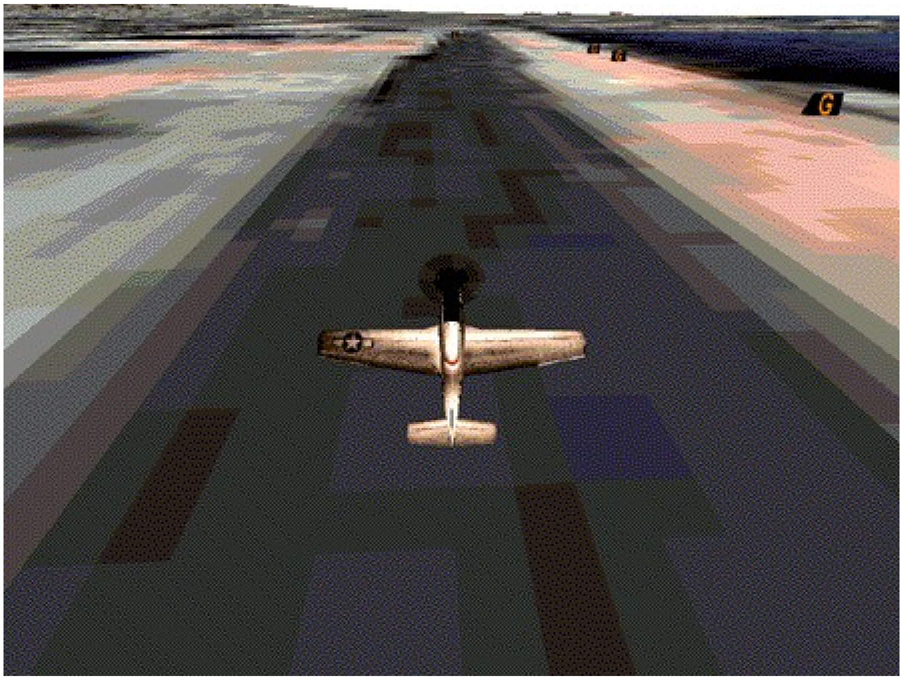
Lift is the main force that makes an aircraft fly. Lift is produced by an airfoil anytime it is moving through the air. As the aircraft moves, air flowing over the top of the wing travels faster than the air flowing over the bottom of it. The faster airflow on top creates a lower pressure than the slower airflow underneath. This pressure differential makes the wing fly. The principal of lift was discovered by *Daniel Bernouli*, a Swiss physicist.

Weight is the force that opposes lift. Weight is also referred to as gravity. When lift and weight are equal, your aircraft is in straight and level flight. If lift is greater than weight, your aircraft will climb. If the converse is true, your aircraft will descend.

Thrust is the force created by the propeller to move the aircraft through the air. The faster the prop turns, the more thrust it provides.

Drag is the force that opposes thrust. Thrust has to overcome drag to accelerate through the air. If thrust and drag are equal, the aircraft is in what's commonly referred to as "steady state" flight—neither accelerating nor decelerating. When all of these forces are equal, the aircraft is said to be in *straight and level unaccelerated* flight. The four forces described here are in their most basic form, but they will provide you with a good foundation upon which to build your knowledge of what essentially makes an aircraft fly.

Taxiing (Lesson 1)

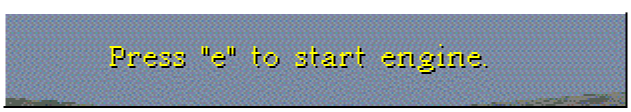


Taxiing the aircraft on the ground, and performing a normal takeoff from a controlled airport, is illustrated in **Lesson One** of the **Flight Lessons**.

Before taxiing, you'll need to do the following two things:

START THE ENGINE

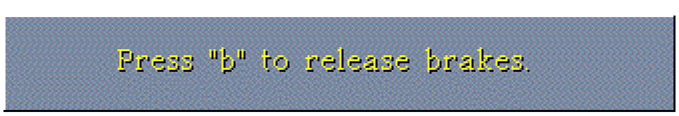
The following pop-up will appear when you are sitting either on the player parking spot, preparing to taxi, or on the runway, preparing for takeoff:



Do what it says: press the **E** key to start the engine.

RELEASE THE PARKING BRAKES

Once the engine is started, a new pop-up will appear:



Do what it says: press the **B** key to release the parking brakes (you're not going anywhere if you don't).

Depending on the aircraft, taxiing can be an interesting and even challenging task. Consider the following advice:

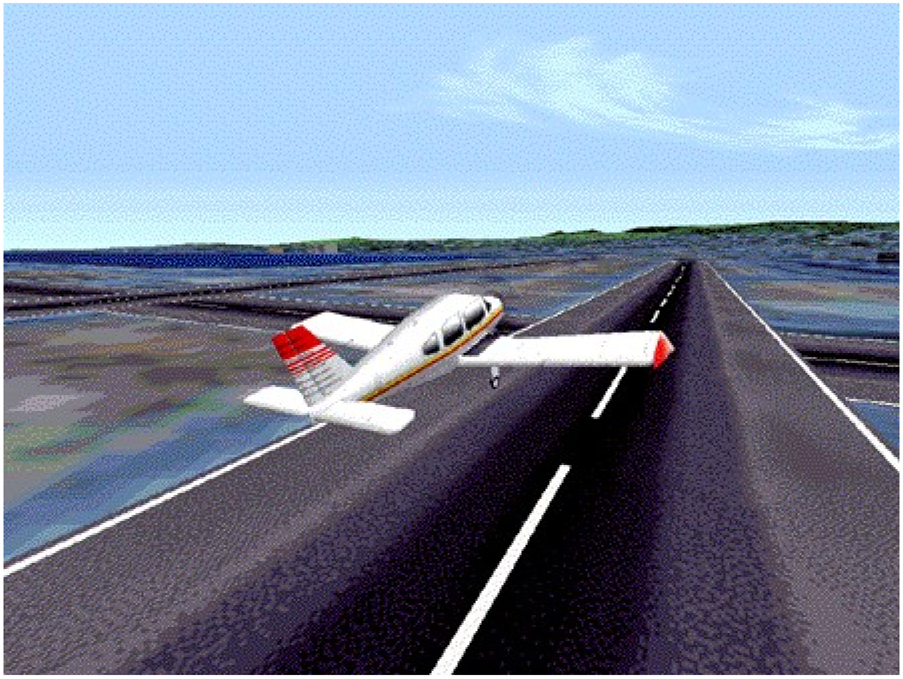
- The **Trainer**, **Arrow**, and **Baron** each have *nose wheel steering* which allows the nose wheel to turn in the direction that the rudder pedals are deflected. You can assist a turn by adding light braking in the direction of the turn.
- The **P-51** is very difficult to taxi because you cannot see over the nose of the aircraft. Steer a zigzag course down a given taxiway to obtain an unobstructed view. Taxi with the stick slightly aft to prevent excessive loads on the tail wheel which could potentially result in it locking. If the tail wheel does lock, it may be turned left or right up to six degrees with the rudder pedals.
- The **Beaver** has two steering systems—one for land and one for water. On the ground, there are four wheels. The front wheels are on castors, and you steer by using *differential braking* (i.e., the ability to use the left brake independently of the right, and vice-versa) and rudder. On the water, the rudder pedals are connected to fins (attached to the pontoons) which act as a rudder.

NOTE:
The easiest method of taxiing, particularly for novice pilots, is to switch to the **Taxi Camera View** *using the* **F8** *key while referring to the relevant* **Airfield Diagram**.

When you're ready to practice taxiing, click on the **Lesson One STUDENT PRACTICE** button and you'll begin in your *Trainer* at the player parking spot in front of the Looking Glass Aviation terminal at *Livermore Airport*.

(*For additional details regarding taxiing at a controlled airport, refer to* **Interacting with Ground Control**.)

Takeoff (Lesson 1)



If there is no crosswind, the takeoff is actually very simple. Follow the Takeoff Checklist provided below and you'll find yourself safely in the air before you know it.

TAKEOFF CHECKLIST:

- **Wing Flaps** - Set for takeoff (aircraft-specific; usually **0 - 10** degrees)
- **Take-Off Trim** - Set for takeoff (indicated by the **T*O** marker on the **Elevator Trim Indicator**)
- **Transponder** - On (optional)
- **Carburetor Heat** - Off (*Trainer*-only)
- **Power** - Full throttle

When you've picked up enough speed rolling down the runway, smoothly pull back on the stick. Establish a pitch attitude of approximately **3** to **5 degrees** on the **Attitude Indicator**, which will allow normal acceleration to lift-off speed. As the aircraft accelerates to *best rate-of-climb airspeed* (the speed which produces the most gain in altitude per unit of time), increase the pitch angle to maintain your climb.

***Trainer* Example:**

Accelerate to **60** KIAS on the **Airspeed Indicator**, lift-off at **65** KIAS, accelerate to **80** KIAS, and climb out at **80** to **90** KIAS until reaching your desired altitude.

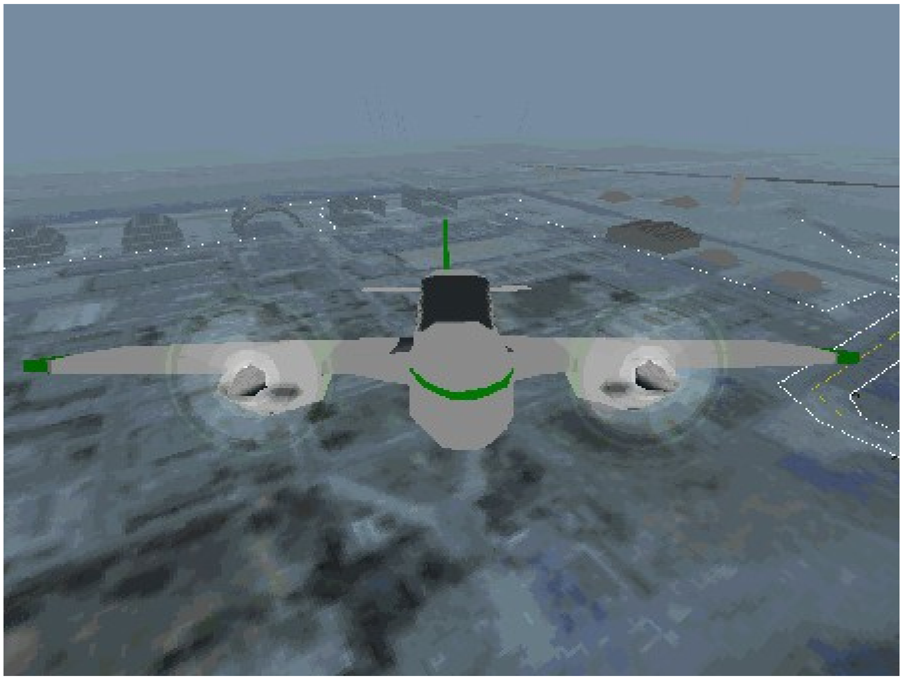
When you're ready to practice taking off, click on the **Lesson One** **STUDENT PRACTICE** button and you'll begin in your *Trainer* at the player parking spot in front of the Looking Glass Aviation terminal at *Livermore Airport*.

Crosswind Takeoff

Normally, you'll want to takeoff *into* the wind, as discussed in the previous lesson (**Takeoff**). However, for those times when you are operating from an airport with a single runway and the wind is blowing *across* the runway, the following advice will hopefully prevent you from drifting off the runway, into the grass, and possibly "ground-looping" the aircraft on takeoff:

- Set trim slightly nose-low to help keep the aircraft on the runway longer than normal.
- Push the stick *into* the direction of the wind (e.g., if the wind were blowing from right to left across the runway, you would push the stick slightly to the right).
- Add full power smoothly.
- As speed increases, reduce the amount of stick movement required to prevent any rolling tendency.
- Apply rudder, as necessary, to maintain directional control, keeping the nose of the aircraft on the centerline of the runway. The level of required rudder maneuvering will gradually drop-off as airspeed increases.
- When the aircraft reaches approximately **10** knots above normal takeoff speed, apply back stick pressure and pitch to takeoff attitude.
- Maintain the current stick and rudder inputs until safely airborne to prevent drifting across the runway, and then slowly climb into the wind.

Straight and Level Flight



Attitude flying is the basis on which all aircraft are flown. While flying **VFR** (*Visual Flight Rules*), the aircraft is placed in straight and level flight by referencing the horizon. During flight in clouds or other poor visibility conditions requiring **IFR** (*Instrument Flight Rules*), the aircraft is placed in level flight using the **Attitude Indicator**, also known as the *Artificial Horizon*.

The process by which level flight is achieved is rather simple: First, set the power for cruise flight at approximately **2,500 RPM** for the *Trainer*. For the remaining aircraft featuring variable pitch propellers, set the manifold pressure at **25 inches** and then reduce the propeller to **2,500 RPM**. Next, adjust pitch attitude so the horizon appears slightly above the instrument panel (in **Full Screen View**, accessed by the **F1** key, your screen will appear to be cut in half by the horizon, displaying half ground and half sky, providing you maintain a reasonable altitude).

The aircraft will begin to accelerate, the wings will produce more lift, and you'll need to push forward slightly on the stick to maintain level flight. From the **Chase Plane Lag** view (**F6** key), you'll notice the wing tips will be equidistant above or below the horizon, depending on whether you are flying a high-wing aircraft (like the *Trainer*) or low wing aircraft (like the *Arrow*).

Once established in straight and level flight, cross-check your outside visual reference with your cockpit flight instruments.

After achieving level flight, trim off the control stick pressures using either your joystick's trim wheel or keyboard equivalent for **Elevator Trim** (**[[LEFT BRAKET]** for *Nose Trim Up* and **] [RIGHT BRAKET]** for *Nose Trim Down*). If you need to hold the stick forward to maintain level flight, nose down until you can release the control stick and the aircraft maintains a level flight attitude on its own. Once established in straight and level cruise flight, any subsequent power changes will require an adjustment in your trim setting to maintain hands-off level flight (i.e., reducing power will require nose-up trim, and adding power will require nose-down trim).

Landing (Lesson 2)

Landing the aircraft is illustrated in **Lesson Two** of the **Flight Lessons**.

Click on the **STUDENT PRACTICE** button and your *Trainer* aircraft will be initialized two miles from the approach end of **Runway 07 Right** at *Livermore*, 600 feet above the ground, where you will be able to attempt a landing in a no-wind situation.

The *Trainer approach speed* with flaps full down is **65** KIAS. There is generally insufficient altitude during the final portion of the approach to recover the aircraft from a stall; therefore, it is very important not to go below this speed until you are over the runway and beginning the *flare* to touch down (i.e., that point where you raise the nose of the aircraft to slow down). There are two things you should be constantly checking during the final approach and landing phase:

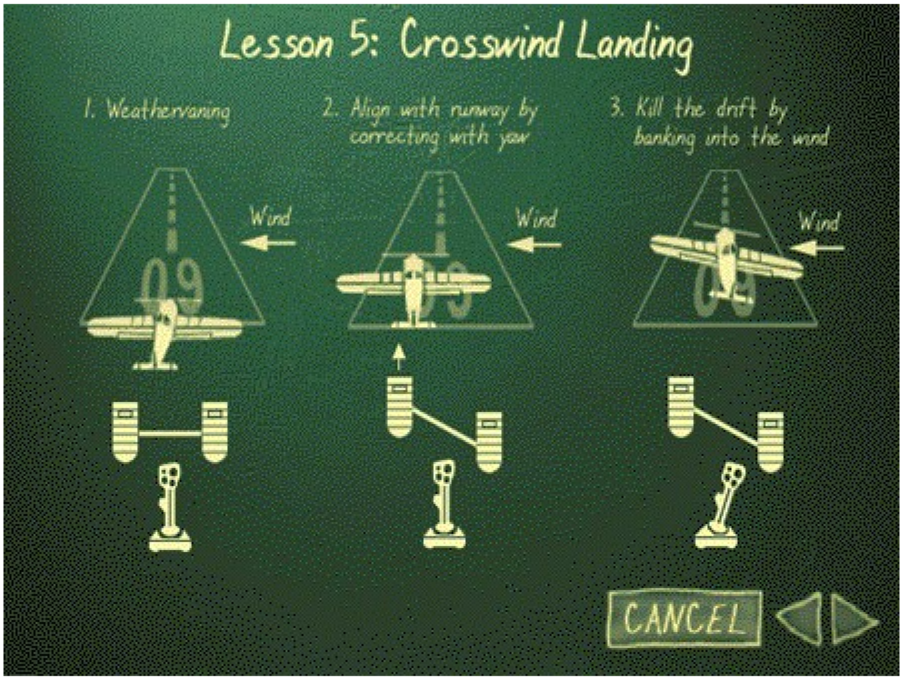
1) AIMPOINT

This is the point where the aircraft will meet the ground with the current pitch and power settings. The *aimpoint* is found by lowering the nose of the aircraft and establishing a desired *glide path* (usually **3** degrees). Next, look out at the front of the aircraft and find a point on the ground which is remaining constant on the windscreen. For example, if you choose the runway numbers at the approach end of the runway as your aimpoint, these numbers should not move up or down on the windscreen. If the point on the runway at which you plan to touchdown begins to disappear under the nose of the aircraft, you are going to land *beyond* your intended aimpoint. If the point begins to move up on the windscreen, you are going to land *short* of your intended aimpoint. Adjust the pitch, as necessary, until the desired aimpoint remains constant.

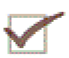
2) AIRSPEED

Secondly, check the **Airspeed Indicator** to ensure you are not going slower than **65 KIAS**. Once you have intercepted a three degree glide path to the runway, set your power at roughly **1,300** to **1,400 RPM** and lower the nose of the aircraft approximately **3** degrees to maintain 65 KIAS. Set your aimpoint as per above, and confirm it is close to the approach end of the runway. Constantly cross-check your airspeed and aimpoint during your descent to landing. If you're too high or too low on the approach, control your altitude by adjusting engine power. Add power to level-off or reduce power to increase your descent rate. Additionally, adjust pitch as necessary to maintain 65 KIAS, and either lower the nose to increase airspeed, or raise the nose to decrease airspeed. As you cross the threshold of the runway, reduce power to full idle, and begin the *round out* by smoothly pulling back on the stick, flaring the aircraft to touchdown.

Crosswind Landing (Lesson 5)

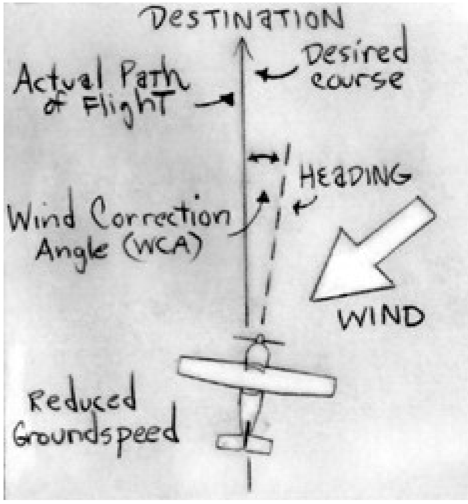


Crosswind landings are illustrated in **Lesson Five** of the **Flight Lessons**.



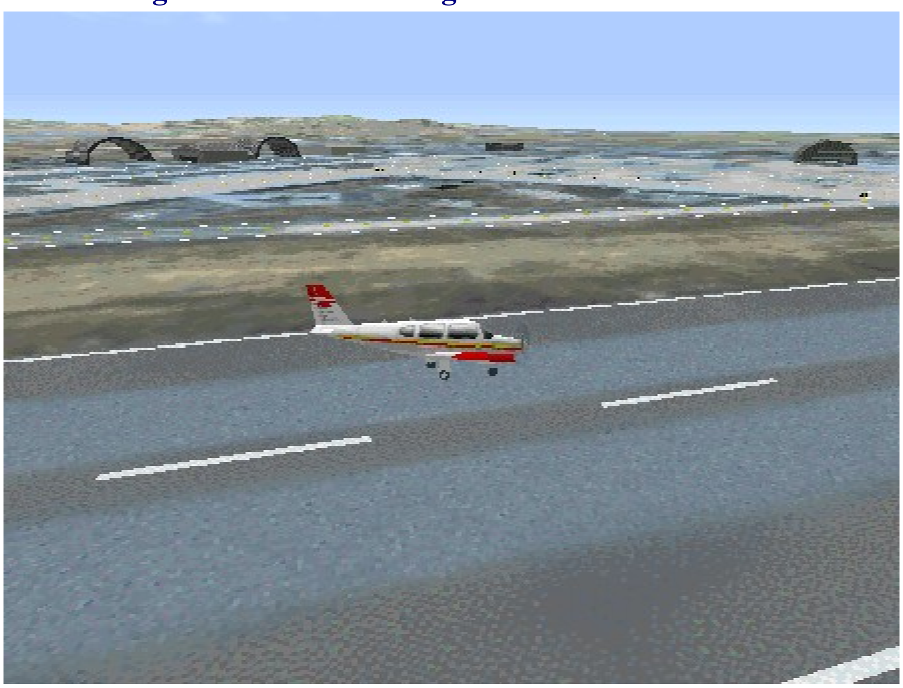
Click on the **STUDENT PRACTICE** button and your *Trainer* aircraft will be initialized two miles from the approach end of **Runway 07 Right** at *Livermore*, 600 feet above the ground, where you will be able to attempt a crosswind landing.

The aircraft flies within a mass of air which is itself in motion. In order to maintain a straight path over the ground, (to keep the aircraft tracking in a line down the runway), the pilot must fly a *wind correction angle* (WCA). The WCA is the angle of difference between the heading of the aircraft and the intended course. The closer the wind is to being perpendicular to the runway, the greater the amount of WCA required to maintain the desired heading to the runway. Also, decreased airspeed will require a larger WCA.



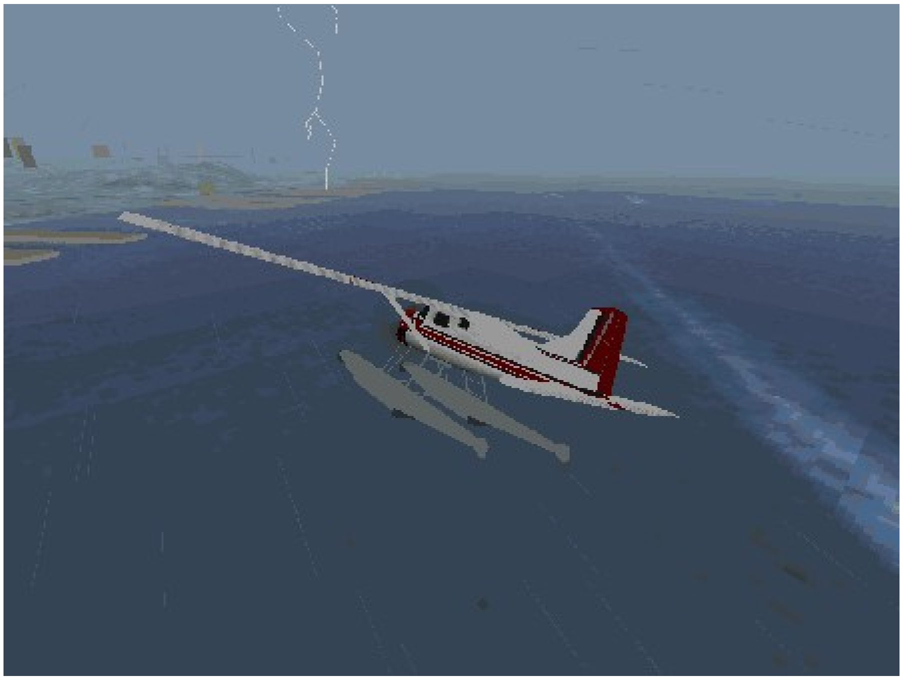
While the aircraft may be tracking straight down the runway with the correct WCA, nasty things can happen if the aircraft either touches down misaligned with the runway, or drifts across the ground sideways.

Correcting for Drift on Landing



There are a few techniques used to land an aircraft in a strong crosswind. The one most frequently implemented by pilots is called the *slip method* (also known as the *wing low method*). This method requires the pilot to use stick movements to bank into the direction of the wind, and rudder to keep the nose of the aircraft aligned with the runway. Aircraft exhibit a natural tendency to “weathervane” under these conditions, so move the stick into the wind to kill the drift, and use rudder to keep the nose of the aircraft on your aimpoint (*discussed under* **Landing** *previously*). During strong crosswinds, the pilot will touch down on the upwind wheel first. Immediately after touchdown, position the stick full into the wind, and apply rudder for directional control.

Turning the Aircraft



Turns are classified into the following **3** categories:

1) Shallow (**0 - 20** degrees of bank).
2) Medium (**20 - 45** degrees of bank).
3) Steep (> **45** degrees of bank).

Bank angle markings for 10, 20, 30, 45, and 60 degrees of bank are displayed on your **Attitude Indicator**:

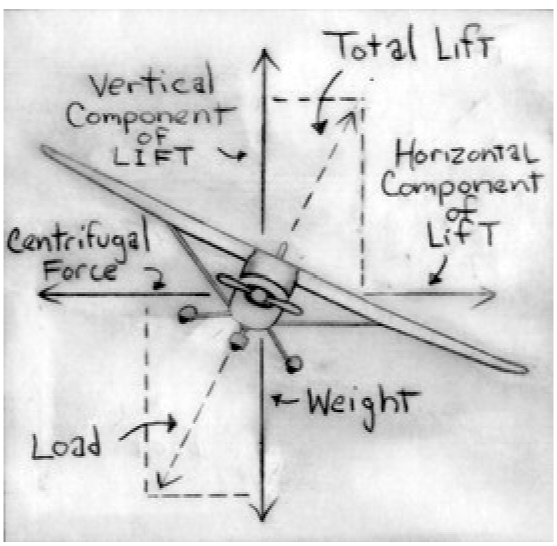
CLIMBING **DESCENDING** **LEVEL FLIGHT**

The horizontal markings cutting through the center of the dial, known as the *Pitch Ladder*, show positive and negative pitch attitudes. The **short horizontal markings** are measured in five-degree increments while the **long horizontal markings** indicate ten-degree increments. Positive pitch is illustrated as solid lines and negative pitch as dashed lines.

The AI also displays the *bank angle* of the aircraft. This is the degree to which the aircraft is turning in either direction along the horizon. The markings on the outside of the instrument show **10**, **20**, **30**, **60**, and **90** degree bank angles to the left and right. A small **white arrow pointer**, known as the *Bank Point Indicator*, points to the markings to display the roll degree:

30˚ BANK ANGLE **60˚ BANK ANGLE** **90˚ BANK ANGLE**

The *lift vector* is always perpendicular to the surface of the wing and, in straight and level flight, is a single vector opposing gravity. When the pilot moves the stick left or right, the aircraft begins to roll. When the desired bank angle is achieved, the pilot returns the stick to a neutral position to stop the aircraft roll. When turning, the lift vector is still perpendicular to the wings, but it is now broken into two vectors: a smaller *vertical vector*, and a *horizontal vector*. It is the horizontal component of lift which turns the aircraft. Because the vertical component is smaller, the pilot must compensate for this by either increasing the “angle of attack” (utilizing back stick pressure) or adding power to increase lift, maintaining a constant altitude during the turn. The steeper the bank angle, the larger back stick pressure or greater increase in power required to maintain a constant altitude.

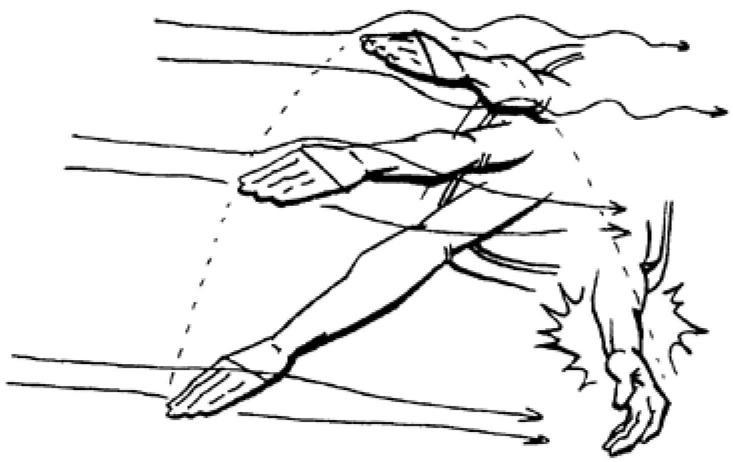


Upon rolling out of the turn, return the power back to the original setting, and/or reduce back stick pressure to maintain your desired altitude.

Stalls

When a lifting surface increases its angle of attack past a certain point (known as the *critical angle of attack*), its lift no longer increases, drag now exceeds lift, and the result is a **stall**.

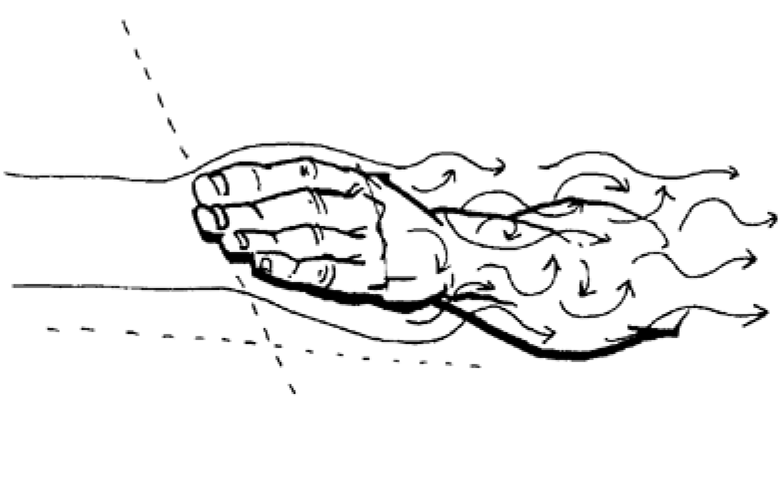
How do stalls work? Well, imagine holding your hand out of a speeding car window, letting its own lift support it in the air.



Gradually, you angle your hand closer and closer to the vertical. You can feel lift and drag on your hand increase. The air is flowing smoothly over your hand, lifting it up and back. But when your hand reaches the critical angle of attack, it stops generating lift altogether, and drag increases massively. Your hand drops, whacking painfully on the car door.

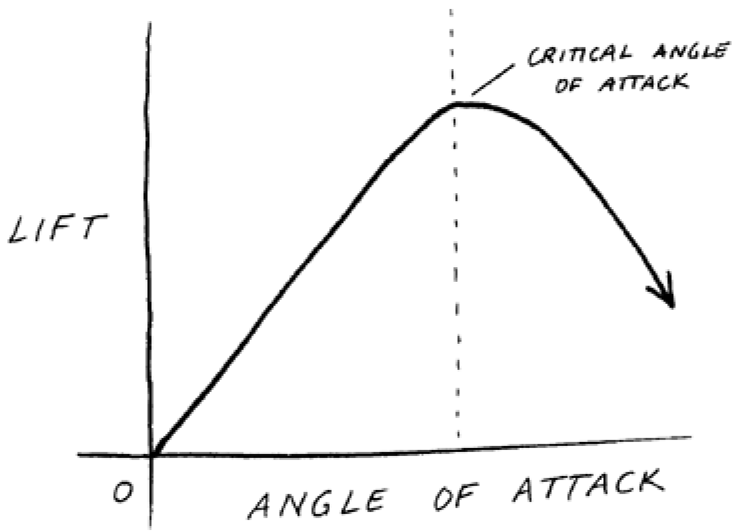
What’s happening?

The air now flows too much into the underside of your hand. Instead of a low pressure zone forming behind your hand, there is turbulent air, providing no lift at all.



So when you're flying, how do you get out of a stall? Cut power, push the stick forward to lower the angle of attack and get the air flowing smoothly over the wing.

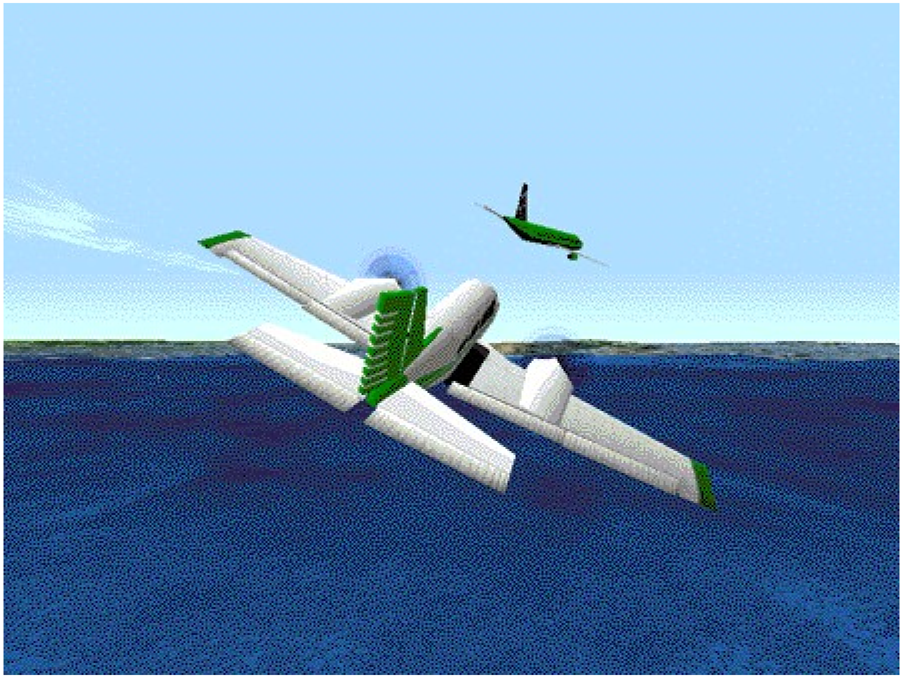
To sum up—a surface can stall if its angle of attack increases beyond a certain point. A diagram of lift vs. angle of attack resembles the
following :



Lift only increases to the critical angle of attack, after which itdrops off drastically.

<u>NOTE</u>:
In Flight II, you will hear an audible stall warning tone when your aircraft is in danger of stalling.

The Traffic Pattern (Lesson 3)



Flying a traffic pattern at an uncontrolled airfield is illustrated in **Lesson Three** of the **Flight Lessons**.

Click on the **STUDENT PRACTICE** button to begin this lesson in your *Trainer* on **Runway 30** at *Half Moon Bay*, primed for takeoff.

You can think of the traffic pattern as a rectangular racetrack around the runway:

Once airborne, at certain points in the pattern, you will make position reports to let other aircraft know where to visually look for you and to assist the **controller**, if present, in maintaining *aircraft separation*.

A typical position report would sound as follows:

>PILOT: ***"Half Moon Bay Traffic // Trainer Five Lima Golf // right downwind // Runway***

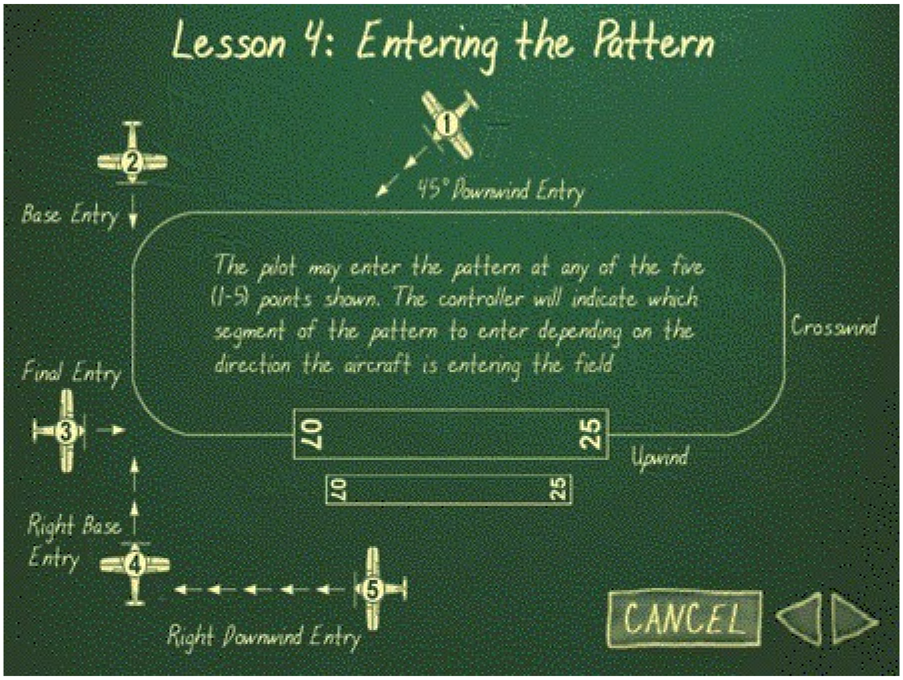
Three Zero // Half Moon Bay."

Upon takeoff, when appropriate, make a right turn to downwind, deliver your initial position report, level off at 1,000 feet, turn right to base, right to final, and execute a touch and go landing.

Have fun practicing a trip around the pattern…

(*For additional details regarding the manner in which to deliver position reports and fly the pattern, refer to* **Operating at an Uncontrolled Airport**.)

Entering the Traffic Pattern (Lesson 4)



This lesson illustrates the manner in which one requests clearance and enters a tower-controlled airfield. A tower controller owns the **Class D Airspace** within approximately **five** statute miles of the airport, and from the surface to **2,500 feet** above the airport's elevation. You will need approval from the tower controller prior to entering this airspace. A typical clearance command from the controller, once you've requested to land or do a touch and go, would sound as follows:

>TOWER: ***"Trainer Five Lima Golf // report left downwind // Runway Two Seven."***

At this point, it will require some situational awareness on your behalf to fly your aircraft to the *left downwind* position for the landing runway. A simple technique is to look at your heading and determine which direction you are coming into the airport. For this example, assume that a northerly heading will take you directly to the airport. The controller has told you that *Runway 27* is the landing runway. Since the runway numbers are always marked to indicate not only the direction of the runway, but the heading required to land at that runway (e.g., **Runway 27** = **270** degrees), this is the heading you will be flying as you line-up on final approach to land. This means heading **090** (**270** - **180** degrees = **90**) is the *downwind heading*. At this point, you glance at your **Directional Gyro** (DG), find the numbers **27** and **09**, and imagine a line connecting them. This line is the runway oriented to your current aircraft heading. For this example, you should expect to see the runway perpendicular to your aircraft's heading as you approach the airport.

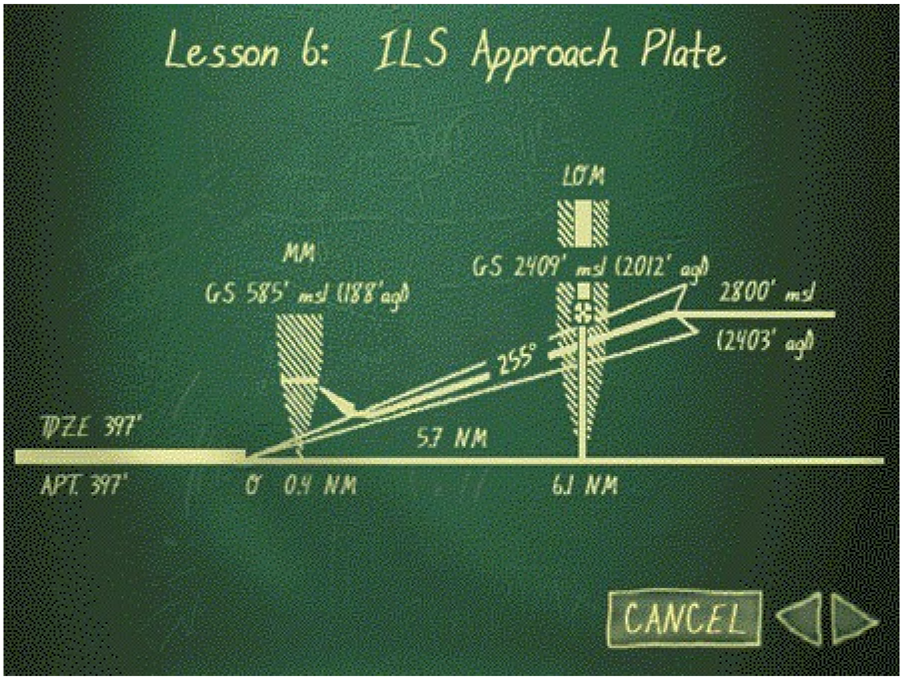
The controller instructed you to *report left downwind* to Runway 27. When the airport appears at your twelve o'clock position, you'll begin a right turn to downwind and make your initial position report to the tower controller.

When you're ready to practice entering the pattern, click on the **Lesson Four STUDENT PRACTICE** button and you'll begin in your *Trainer* stationed 8 miles to the south of *Livermore Airport* at an altitude of 2,000 feet.

Have fun practicing…

(*For additional details regarding the manner in which to interact with the tower controller and enter the pattern, refer to* **Entering a Tower-Controlled Airport**.)

Flying an ILS Approach (Lesson 6)



Landing your aircraft using the *Instrument Landing System* is illustrated in **Lesson Six** of the **Flight Lessons**.

When you're ready to practice an ILS landing, click on the **Lesson Six STUDENT PRACTICE** button and your *Trainer* aircraft will begin two miles out from the approach to **Runway 25 Right** at *Livermore* in lousy weather.

(*For a thorough explanation regarding the specific use of the ILS, refer to* **The Instrument Landing System (ILS)**.)

Flight and Mechanical Control Hot Keys

The following joystick and keyboard commands are used to govern the various control functions of the aircraft:

- **Joystick Controls**
- **Keyboard Controls**

(*To see a listing of all of the keyboard commands available in Flight II, please refer to* **Keyboard Commands Summary**.)

Joystick Flight Controls

The following joystick commands govern the various control functions of the aircraft:

4 Button with Hat (***CH Flightstick*, *Thrustmaster***)

Button 3 -Fuel Mixture

Hold down and move stick up/down to control mixture.

Button 4 -Propeller Speed

Hold down and move stick up/down to control prop speed.

4 Button with Hat and Throttle (***CH Flightstick Pro*, MS *Sidewinder***)

Button 3 -Fuel Mixture

Hold down and move stick up/down to control mixture.

Button 4 -Propeller Speed

Hold down and move stick up/down to control prop speed.

Throttle Wheel -Throttle

Move throttle wheel up/down to adjust throttle.

MS Sidewinder Pro

Button 3 -Fuel Mixture

Hold down and move stick up/down to control mixture.

Button 4 -Propeller Speed

Hold down and move stick up/down to control prop speed.

Button 5 -Trim Up

Adjust elevator trim up.

Button 6 -Landing Gear

Raise/Lower the landing gear.

Button 7 -Parking Brake

Enable the parking brake.

Button 8 -Trim Down

Adjust elevator trim down.

Throttle Wheel -Throttle

Move throttle wheel up/down to adjust throttle.

Force Feedback Joysticks

The **1.03** Immersion driver set is supported. Make sure you have the correct stick selected in the control panel.

Keyboard Flight Controls

The following keyboard commands govern the various control functions of the aircraft:

- **Flight Controls**
- **Engine Controls**
- **Trim Controls**
- **Miscellaneous Controls**
- **Cheats**

Flight Controls

DOWN ARROW -Pitch Up
Raise the nose of the aircraft.
UP ARROW -Pitch Down
Lower the nose of the aircraft.
LEFT ARROW -Roll Left
Bank the aircraft to the left.
RIGHT ARROW -Roll Right
Bank the aircraft to the right.
, [COMMA] -Left Rudder
Apply left rudder to turn the aircraft to the left.
. [PERIOD] -Right Rudder
Apply right rudder to turn the aircraft to the right.
F -Flaps Down
Cycle down through the aircraft-specific flap operating positions in degree increments.
SHIFT F -Flaps Up
Cycle up through the aircraft-specific flap operating positions in degree increments.
KEYPAD INS -Left Brake
Apply left wheel brake.
KEYPAD DEL -Right Brake
Apply right wheel brake.
B -Parking Brakes
Apply parking brakes to landing gear (only active on the ground).

Engine Controls

E -Start Engine

Start the engine (*mixture* will be automatically set to the full-rich position).

KEYPAD + [PLUS] -Throttle Up

Increase engine throttle. You may also click on the *throttle control lever/knob* in the cockpit and push up or in.

KEYPAD - [MINUS] -Throttle Down

Decrease engine throttle. You may also click on the *throttle control lever/knob* in the cockpit and pull down or out.

SHIFT KEYPAD + [PLUS] -Increase Prop Speed

Increase engine propeller speed. You may also click on the *propeller control lever* in the cockpit and push up or in.

SHIFT KEYPAD - [MINUS] -Decrease Prop Speed

Decrease engine propeller speed. You may also click on the *propeller control lever* in the cockpit and pull down.

CTRL KEYPAD + [PLUS] -Increase Mixture

Increase fuel mixture. You may also click on the *mixture control lever/knob* in the cockpit and push up or in.

CTRL + KEYPAD - [MINUS] -Decrease Mixture

Decrease fuel mixture. You may also click on the *mixture control lever/knob* in the cockpit and pull down or out.

H -Toggle Carburetor Heat (*Trainer* only)

Turn On/Off the carburetor heat.

SHIFT E -Select Engine (*Baron* only)

Cycle between the left engine, right engine, or both.

Trim Controls

[[LEFT BRACKET] -Nose Trim Up

Apply upward elevator trim to adjust the attitude of the aircraft if nose low.

[[RIGHT BRACKET] -Nose Trim Down

Apply downward elevator trim to adjust the attitude of the aircraft if nose high.

\ [BACKSLASH] -Center Nose Trim

Apply center trim to adjust the attitude of the aircraft if either nose low or nose high.

SHIFT . [PERIOD] -Right Rudder Trim

Apply right rudder trim to turn the aircraft.

SHIFT , [COMMA] -Left Rudder Trim

Apply left rudder trim to turn the aircraft.

SHIFT / [FORWARD SLASH] -Center Rudder Trim

Apply center trim.

BACKSPACE -Auto Trim

Let *Flight II* automatically adjust the nose and rudder trim of the aircraft for you.

Miscellaneous In-Flight Controls

G -Landing Gear

Raise or lower the landing gear.

SHIFT L -Navigation Lights

Toggle On/Off your aircraft's exterior lighting system.

L - PCL System

Toggle On/Off the *Pilot Control Lighting* system.

CTRL P -Pause Game

Pause the current flight.

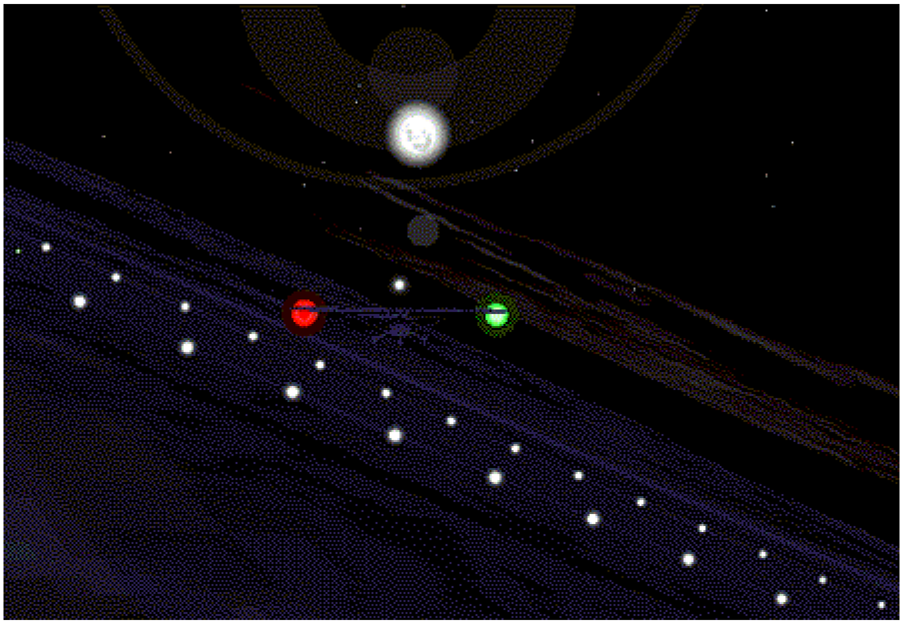
ALT M -Video Resolution

Toggle video resolution on the fly between the five available modes: *512 x 384*, *640 x 400*, *640 x 480*, *800 x 600*, and *1,024 x 768*.

Cheats

PAGE UP -Miracle Up
Have the aircraft miraculously rise up by 1,000 ft increments.
PAGE DOWN -Miracle Down
Have the aircraft miraculously fall by 1,000 ft increments.

Flying at Night



Welcome to the wonderful world of flying at night. If you thought flying during the day in *Flight II* was fun, wait until you see what we have to illuminate for you after dark…

- **Who Turned Out the Lights?**
- **Aircraft Lighting Systems**
- **Airport Lighting Systems**
- **Miscellaneous Lighting Systems**

Who Turned Out the Lights?

The global lighting system in *Flight II*—that is, everything but the **aircraft navigation lights** —is enabled by setting the **Time of Day** slider bar to any setting *except* **Day** at either the **Quick Flight** or **Modified Quick Flight** screens.

Flight II models the following five lighting systems:

- **Aircraft** (including *cockpit* and *navigation lights*)
- **Runway**
- **Visual Glideslope Indicators**
- **Taxiway**
- **Pilot-Controlled Lighting (PCL)**

Each system is designed to maximize visibility for pilots by illuminating aircraft or structures during conditions of darkness or otherwise low visibility.

Aircraft Lighting Systems

Your private aircraft contains two basic lighting systems, an *interior* (cockpit) lighting system and an *exterior* (navigation) lighting system, the latter of which consists of two subsystems: the *Position Lights* and the *Anti-Collision Beacon*.

- Interior (Cockpit)
- Exterior (Navigation)

Interior (Cockpit) Lighting System

The interior of the cockpit is aglow with softly-lit dials. Every gauge and indicator in each of the five flyable aircraft is illuminated in *Flight II*, making for quick and easy instrument scanning. The cockpit lights, unlike the **NAV lights** cannot be toggled off.

Click below to view the **NIGHT GALLERY** (you might want to turn off the lights first):

VFR Cockpits (Click to jump:)

IFR Cockpits (Click to jump:)

The Night Gallery: VFR Cockpits

ARROW

BEAVER

BARON

P-51

TRAINER


122.80
115.80
07 NM

The Night Gallery: IFR Cockpits

ARROW

BEAVER

BARON

P-51

TRAINER

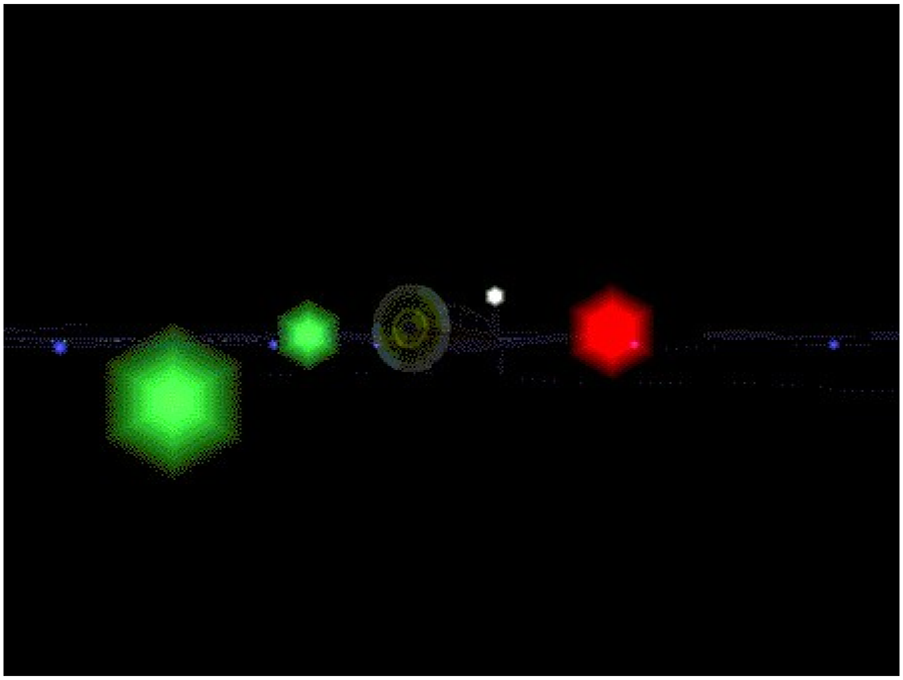

122.80
111.70
115.80
0.7 NM
1200
NAV
DME / GS
XPNDR
THROTTLE
MIXTURE

Exterior (Navigation) Lighting System

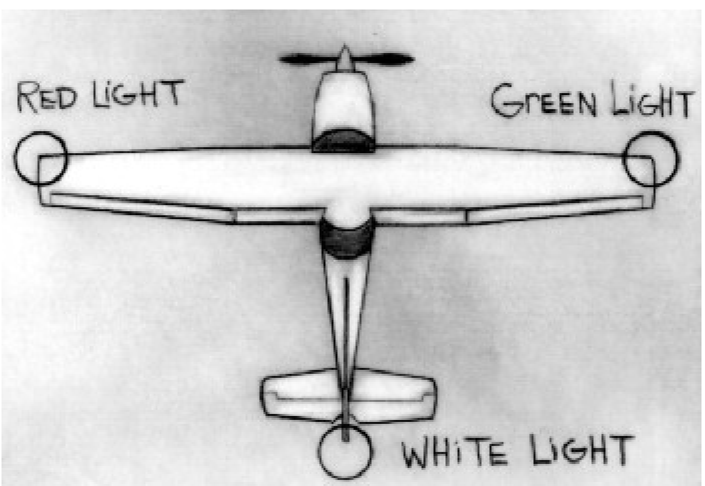
All external lighting systems in *Flight II* are enabled either by left-clicking on the **Navigation Lights Switch** in the cockpit or by using the **SHIFT L** key combination. This switch is a toggle which, as a group, turns on and off the *Position Lights* and *Anti-Collision Beacon*.

- **Position Lights**
- **Anti-Collision Beacon**

Position Lights

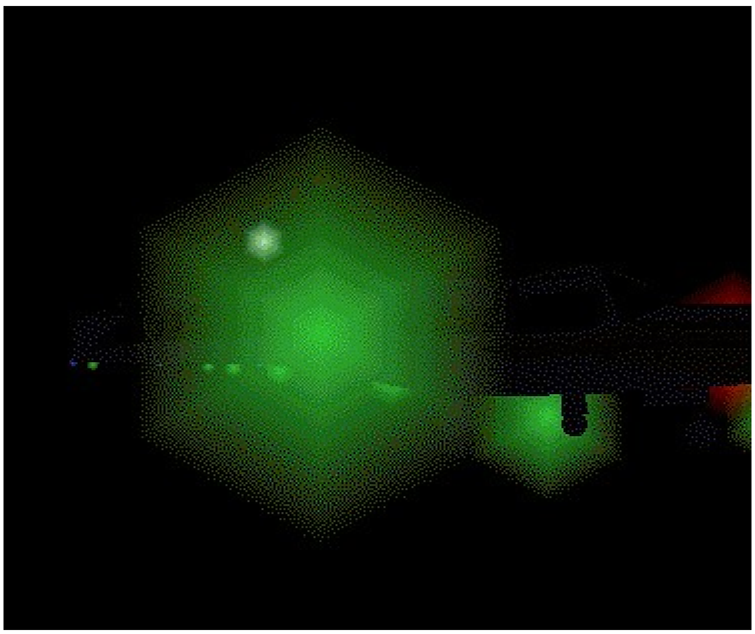


Each of the private aircraft in *Flight II* possesses the following three colored position lights: a **red** light on the *left* or *port* wing tip, a **green** light on the *right* or *starboard* wing tip, and a **white** light on the tail:



Why this particular arrangement? Envision a lighted aircraft traveling at your 12 o'clock in the dead of night. How do you know which *direction* the aircraft is traveling if you can't see the air frame? Based on the position of the wing tip lights alone, you may safely deduce the following four things:

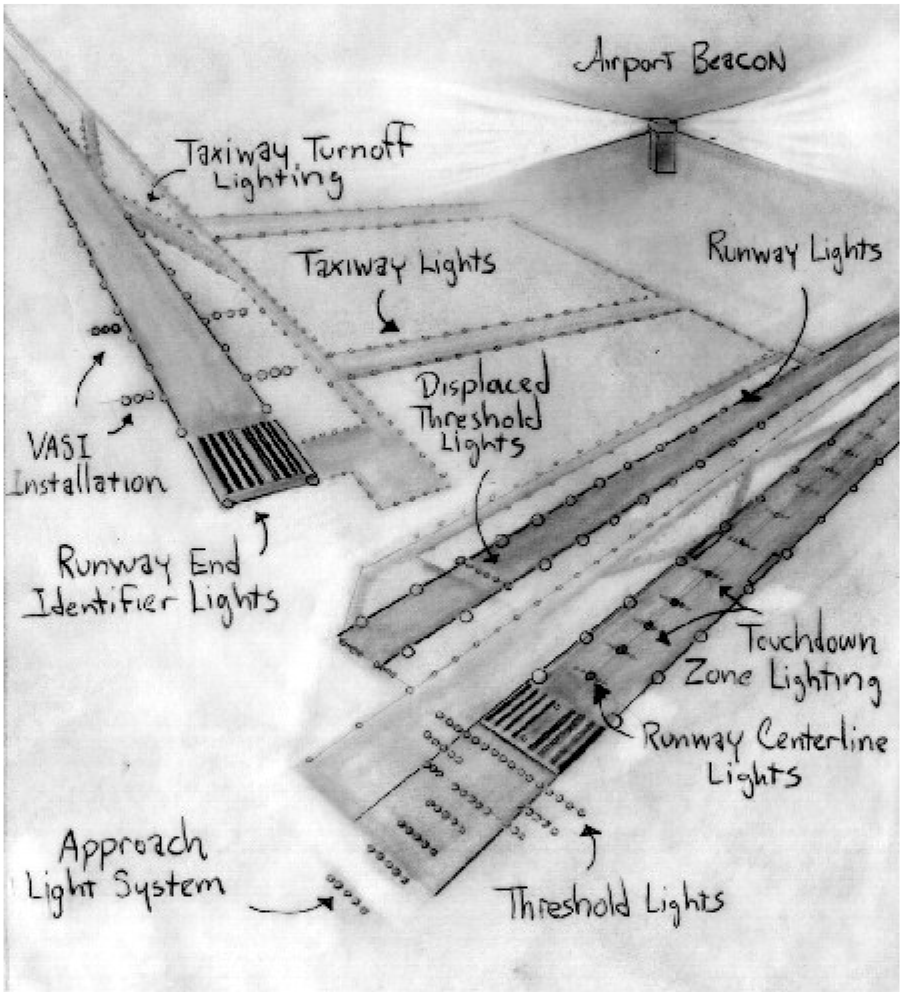
1) If you see only a **green light**, then you may assume that the other aircraft is moving from your *left* to *right*.
2) If you see only a **red light**, then you may assume that the aircraft is moving from your *right* to *left*.
3) If you see a **red light** on the **right** and a **green light** on the **left**, then you may assume that the aircraft is heading *towards* you—perhaps even on a collision course.
4) If you see a **red light** on the **left** and a **green light** on the **right**, then you may assume that the aircraft is heading *away* from you.



Anti-Collision Beacon

The *Anti-Collision Beacon* is a **white strobe light**, resting directly atop the tail of the aircraf. Its function is to serve as a back-up to the position lights. If another aircraft fails to see your position lights, they should, at the very least, notice the anti-collision beacon, which flashes on and off at short, regular intervals.

Airport Lighting Systems



Airports can contain sophisticated lighting systems designed for pilots taking off and landing during low visibility conditions and, of course, at night. Airport lighting systems in *Flight II* are present at **all** controlled and UNICOM-serviced, uncontrolled airports (*click* **here** *to see the list arranged by airport type*). Each uses a similar lighting system which in real life is set by the FAA (including FAA-approved colors) in order to maintain a level of continuity between airports.

Systems are broken down into the following **seven** categories:

- **Approach Lighting**
- **Visual Glideslope Indicators**
- **Runway Edge Lighting**
- **In-Runway Lighting**
- **Taxiway Lighting**
- **Pilot-Controlled Lighting (PCL)**
- **Airport Beacons**

Approach Lighting

Approach lighting systems are a configuration of signal lights starting at the runway threshold and extending into the approach area. They are used to provide a visual indication of precisely where the landing threshold lies. They also furnish the necessary shift for the pilot between instrument flying and visual recognition during the landing phase at night.

Flight II incorporates a fairly simplified approach lighting scheme, modeling only *non-precision instrument runways*. This consists of a combination of the real world ODALS (*Omnidirectional Approach Lighting System*) and SSALS (*Simplified Short Approach Lighting System*) which includes the following:

- **Sequenced Flashing Lights (SFL)**
- **Runway End Identifier Lights (REIL)**
- **Runway Threshold Lights**

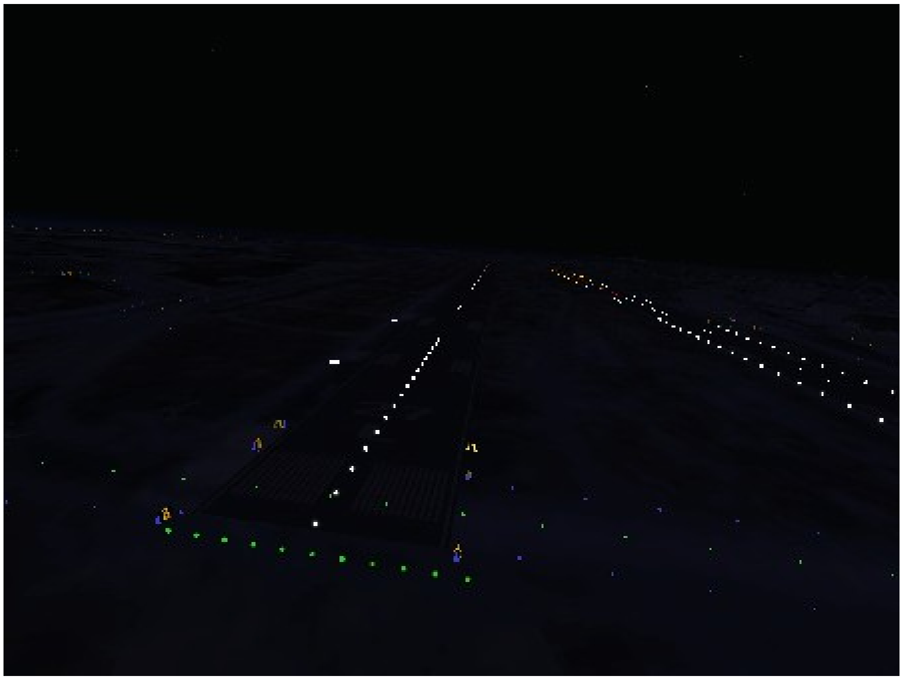
Sequenced Flashing Lights (SFL)

These lights, also referred to as *Runway Alignment Indicator Lights* (RAIL), consist of two rows of **white** flashing strobe lights, spaced some 200 feet or so apart, beginning at the runway landing threshold and extending into the immediate approach area for approximately 1,400 feet. They resemble twin spheres of light repeatedly traveling towards the runway at accelerated speed, essentially pointing the pilot towards the runway. SFL can be seen from a good distance away, depending on visibility conditions.

Runway End Identifier Lights (REIL)

This system consists of a pair of small, omnidirectional, synchronized **white** flashing lights located laterally on either side of the runway landing threshold. REIL simply help to identify the start of the approach end of a particular runway. This is especially useful during conditions of low visibility, when there is a significant amount of other area lighting.

Runway Threshold Lights

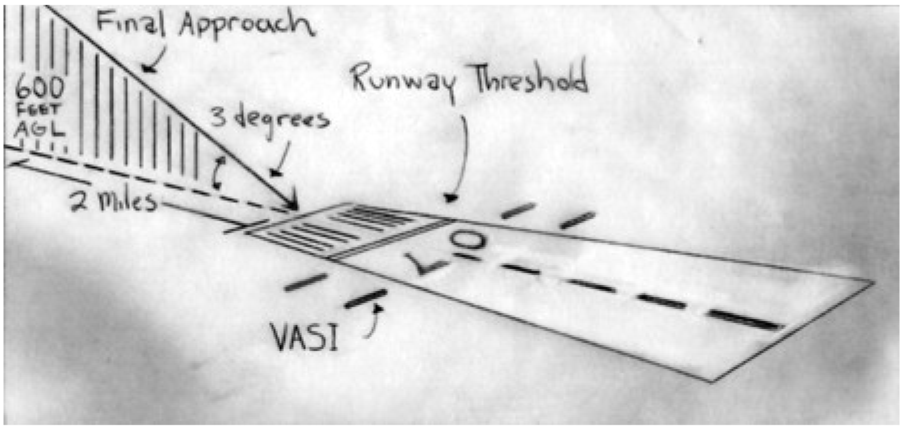


If you missed the REIL, and you still don't know where the runway begins, then you can't miss these lights. Also known as *Runway End Lights*, this is a single row of **8 green** lights spaced 25 feet apart, positioned along the immediate edge of the runway threshold, indicating its precise location. These two-sided lights appear **green** when landing to mark the *beginning* of the runway and **red** from the other side for departing aircraft to mark the *end* of the runway. For displaced thresholds, **4 green** lights appear on each side of the threshold line.

Visual Glideslope Indicators

Visual Glideslope Indicators are lighting systems used to assist the pilot in determining the proper *glidepath* for the final approach. The glidepath is basically the angle at which the aircraft approaches the runway. Note the following diagram depicting a typical two mile final approach:

GLIDEPATH APPROACH DIAGRAM

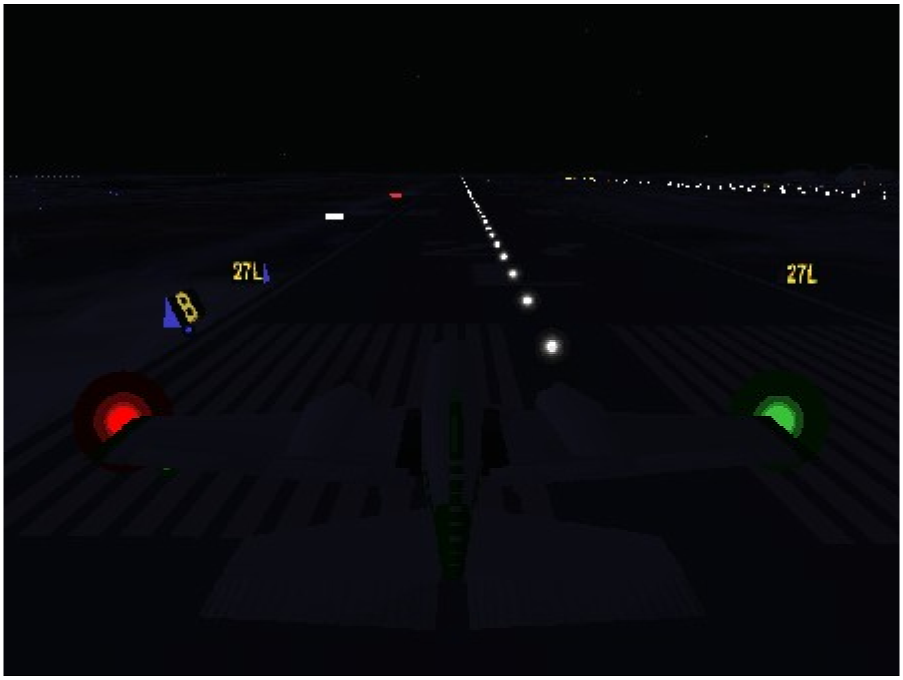


Too **high** a glidepath on the approach may result in the aircraft overshooting the proper landing zone (a.k.a. *touchdown zone*). Too **low** a glidepath on the approach may result in a mangling of the aircraft and perhaps its inhabitant[s], as well.

Flight II implements the following lighting systems used to interpret the aircraft's glidepath:

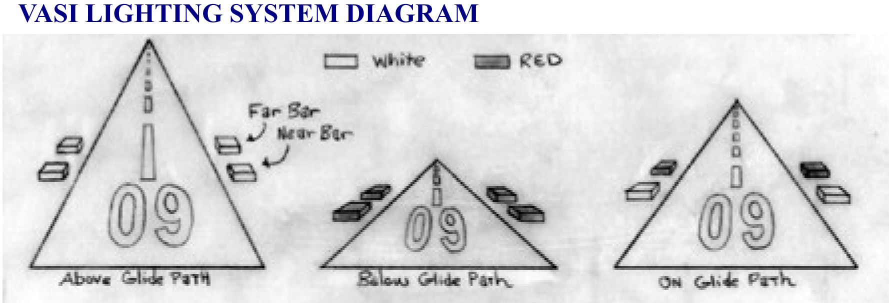
- **VASI (Visual Approach Slope Indicator)**
- **PAPI (Precision Approach Path Indicator)**

VASI (Visual Approach Slope Indicator)



Flight II incorporates a *2-Bar* VASI system which consists of a pair of single light bars, one FAR and one NEAR, each 60 feet in length. These are positioned either on opposite sides or just the left-hand side of the approach end of the runway. The first bar rests 200 meters behind the immediate threshold, after the *touchdown zone*, with the second 400 meters behind. These bars, which can be viewed up to five nautical miles away depending on visibility conditions, contain a series of lights which may be either illuminated **red** or **white**. The individual color depends solely on the glidepath of the landing aircraft. Note the following diagram:

VASI LIGHTING SYSTEM DIAGRAM



The VASI bar coloration indicates one of *three* possible conditions:

1) If the **FAR Bar** is colored **red** and the **NEAR Bar** is colored **red**, you're too far *below* the proper **glidepath**. You'll need to raise the nose of the aircraft to achieve the correct approach angle or you may find yourself smacking into the ground or water prior to reaching the runway.

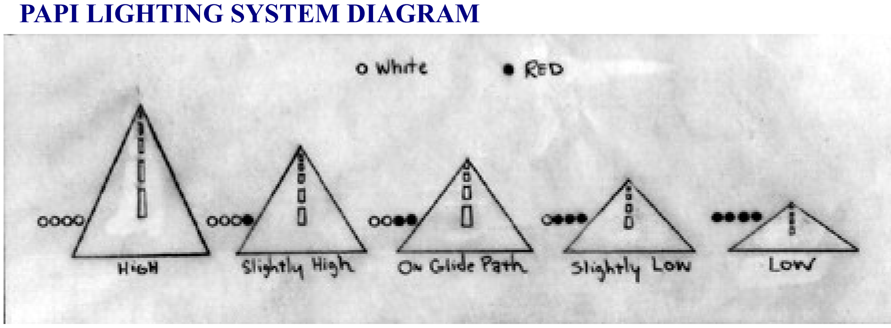
2) If the **FAR Bar** is colored **red** and the **NEAR Bar** is colored **white**, you're on the proper glidepath. Your aircraft's approach angle is perfect; don't make any attitude corrections.

3) If the **FAR Bar** is colored **white** and the **NEAR Bar** is colored **white**, you're *above* the proper glidepath. You'll need to lower the nose of the aircraft to achieve the correct approach angle or you may find yourself overshooting the touchdown zone or even the runway itself.

PAPI (Precision Approach Path Indicator)

The PAPI system is slightly more sophisticated than its **VASI** counterpart (hence the name). *Flight II* incorporates a PAPI system which consists of **four** high-intensity lamps installed in a single row to the left of the equipped runway. These lights, which can be viewed up to five nautical miles away depending on visibility conditions, may be either illuminated **red** or **white**. The color sequence with which the row is specifically lit depends solely on the glidepath of the landing aircraft. Note the following diagram:

PAPI LIGHTING SYSTEM DIAGRAM



The PAPI system lighting sequence indicates one of *five* possible conditions:

1) If **all four** lights are **red**, you're *well below* the proper **glidepath**. You'll need to raise the nose of the aircraft a good deal to achieve the correct approach angle.

2) If the light on the far left is **white** and the three remaining lights are **red**, you're *slightly below* the proper glidepath. You'll need to raise the nose of the aircraft a small amount to achieve the correct approach angle.

3) If the lights are evenly split (**two red** and **two white**), you're on the proper glidepath. Your aircraft's approach angle is perfect; don't make any attitude corrections.

4) If the light on the far right is **white** and the three remaining lights are **red**, you're *slightly* above the proper glidepath. You'll need to lower the nose of the aircraft a small amount to achieve the correct approach angle.

5) If **all four** lights are **white**, you're *well above* the proper glidepath. You'll need to lower the nose of the aircraft a good deal to achieve the correct approach angle.

Runway Edge Lighting

Two systems are implemented to mark the boundaries of runways:

- **Runway Edge Lights**
- **Runway Remaining Lights**

Runway Edge Lights

These are **white** lights spaced at 75 foot intervals which are used to define the boundaries of the runway, assisting with runway identification and aircraft alignment during the approach. They stretch almost the entire length of the runway, from threshold to threshold.

Runway Remaining Lights

Some **Runway Edge Lights** include *Runway Remaining Lights* which are **yellow** lights that replace the original white on either the last 2,000 feet of the runway *or* the last half of the runway length (whichever is less). These lights, also spaced at 75 foot intervals, indicate a *caution zone*, informing the pilot that less runway is ahead than behind the aircraft. They are also two-sided, appearing **white** when viewed from the opposite end of the runway for departing aircraft.

In-Runway Lighting

Three systems are implemented in *Flight II* to mark the interior portions of runways:

- **Touchdown Zone Lighting (TDZL)**
- **Runway Centerline Lighting (RCLS)**
- **Taxiway Turnoff Lights**

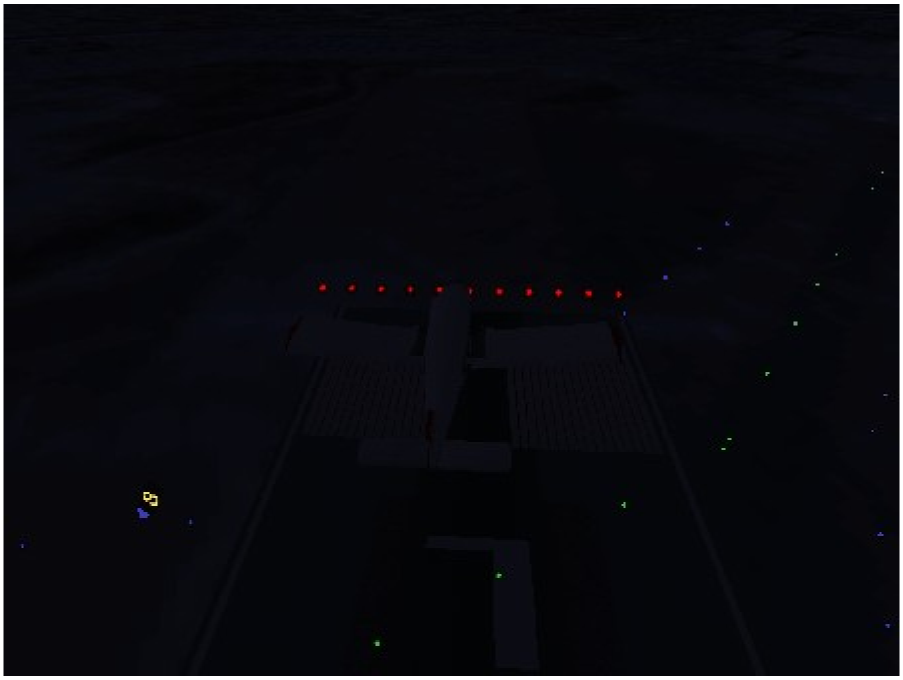
Touchdown Zone Lighting (TDZL)

These are two rows of **white** flush-mounted lights, located on either side of the runway centerline in the runway touchdown zone. The rows extend down the runway, starting 100 feet from the landing threshold in front of the touchdown zone and extending to either 3,000 feet or the midpoint of the runway (whichever is less). These lights help the pilot know where the aircraft should meet the runway during an ideal approach.

Runway Centerline Lighting (RCLS)

This is a single row of flush-mounted lights spaced at 50 foot intervals, starting 75 feet from the approach threshold, and stretching the length of the runway to within 75 feet of the opposing threshold. The row consists of **white** lights until the last 3,000 feet of the runway, where they alternate **red** and **white** until 1,000 feet from the end of the runway. Similar to the **Runway Remaining Lights**, they indicate a *caution zone*, informing the pilot that less runway is ahead than behind the aircraft. The final 1,000 feet of lights are **red** only, apprising you that you are fast running out of real estate. Prepare for a go-around if you let the landing go this far.

Taxiway Turnoff Lights



These are **green** flush-mounted lights spaced at 50 foot intervals. They define the path of the aircraft travel from the runway centerline to a fixed starting point beyond the intersection of the runway and adjoining taxiway.

Taxiway Lighting

Taxiways are used to transit to and from active runways and parking spots in front of terminals and hangars. All taxiways at major airports (all controlled airports in *Flight II*) are lit at night. Taxiways at minor airports (small uncontrolled airports in *Flight II*) may or may not be lit, depending on the individual airfield.

Two systems are implemented in *Flight II* to mark taxiways:

- **Taxiway Edge Lights**
- **Taxiway Centerline Lights**

Taxiway Edge Lights

These are **blue** omnidirectional lights running along the edge of the taxiways *and* parking ramps, outlining their paths. They are spaced at 75 foot intervals, and are used to guide your aircraft during the taxiing phase.

Taxiway Centerline Lights

These are **green**, flush-mounted, omnidirectional lights spanning the center of the taxiways. They are spaced at 75 foot intervals, and are used to guide your aircraft while in the taxiing phase during very low visibility conditions.

Pilot-Controlled Lighting (PCL)

At **controlled airports**, the **tower** is responsible for turning on, maintaining, and turning off the lighting system during the hours of sunset and dawn, and during periods of restricted visibility. At uncontrolled airports, however, there is no controller present, and the lights are almost always on a timer. For this reason, pilots need to be able to take *manual* control of the lighting system at the appropriate times from within their aircraft. This is where *Pilot-Controlled Lighting* (PCL) comes into play.

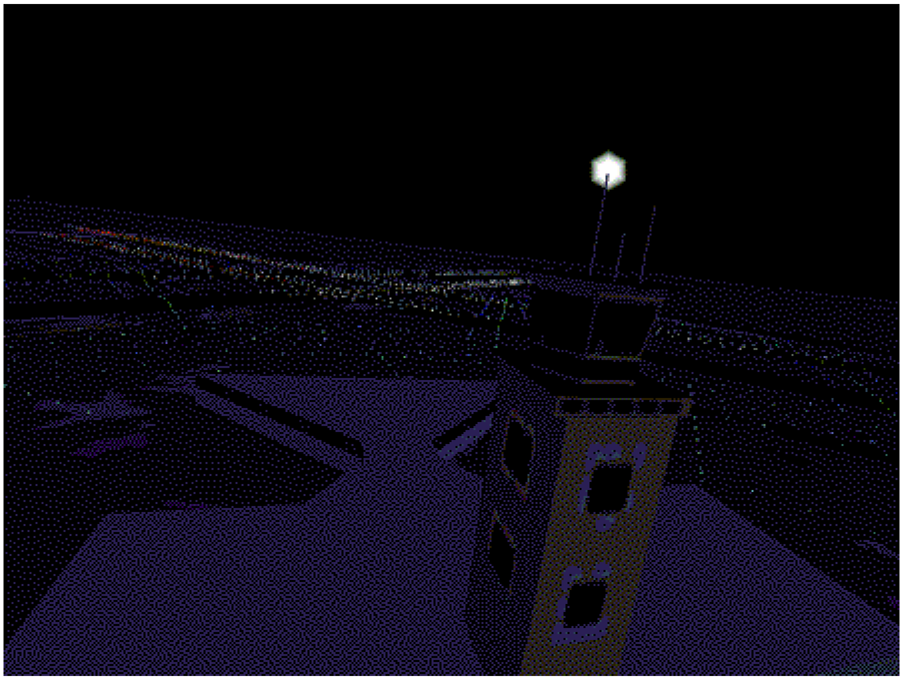
In *Flight II*, the pilot may turn on *all* runway lighting at an available uncontrolled airport by first dialing in that airport's **UNICOM** frequency into the **COM Radio**. Left-click on the readout and insert the five-digit UNICOM frequency for the uncontrolled airport you are approaching whose lights are currently off. (*Refer to the relevant* **Airfield Diagram** *or* **COM Radio Control Frequencies** *for a listing of available UNICOM radio frequencies*.)

Once the frequency is set, press the **L** key **once** to turn on all of the lights at that airport to their **lowest intensity** level. Upon activation, the light intensity cannot be decreased, but it *can* be increased. Press the **L** key a **second** time to increase the lighting level to **medium intensity** and a **third** time to increase the level to **maximum intensity**.

Once the lights are first turned on or their intensity level is increased, the timer will stay on for **15** minutes, after which time the lights will go out and you'll have to turn them on again.

In *Flight II*, all **13** UNICOM-serviced, uncontrolled airports are PCL capable. The remaining **15** private airfields and **3** maritime airports do *not* support PCL! (*Click* **here** *for the individual airport listings*.)

Airport Beacons



Airport beacons consist of a combination of **white**, **green**, or **yellow** high-intensity lights that flash **12-30** times per minute. A beacon sits on top of the control tower, like a lighthouse, and is used to guide pilots to both military and civilian airports. It can be seen up to several miles away, depending on the visibility conditions. This should be the first visual indication of the airport for the pilot.

The color of the lights indicates the **airport type**: A combination of **white** and **green** lights signifies a *lighted land-based airport*, **white** alone signifies an *unlighted land-based airport*, and **white** and **yellow** signifies a *lighted maritime airport*.

Civilian land-based airports flash alternating white and green lights. *Military airports*, on the other hand, are differentiated by flashing white twice which then alternates with a single green flash.

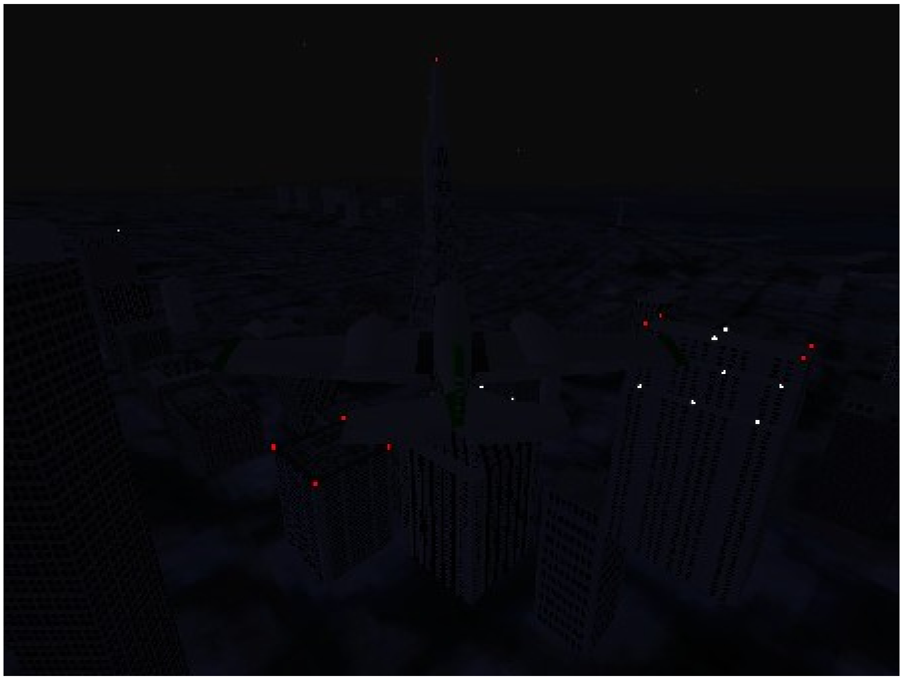
If an airport beacon is turned on during the day, this indicates visibility conditions of less than **3 miles** and a cloud ceiling of less than **1,000 feet**, usually below the minimum visibility requirements for **VFR navigation**.

Miscellaneous Lighting Systems

After all of those lights, what's left?

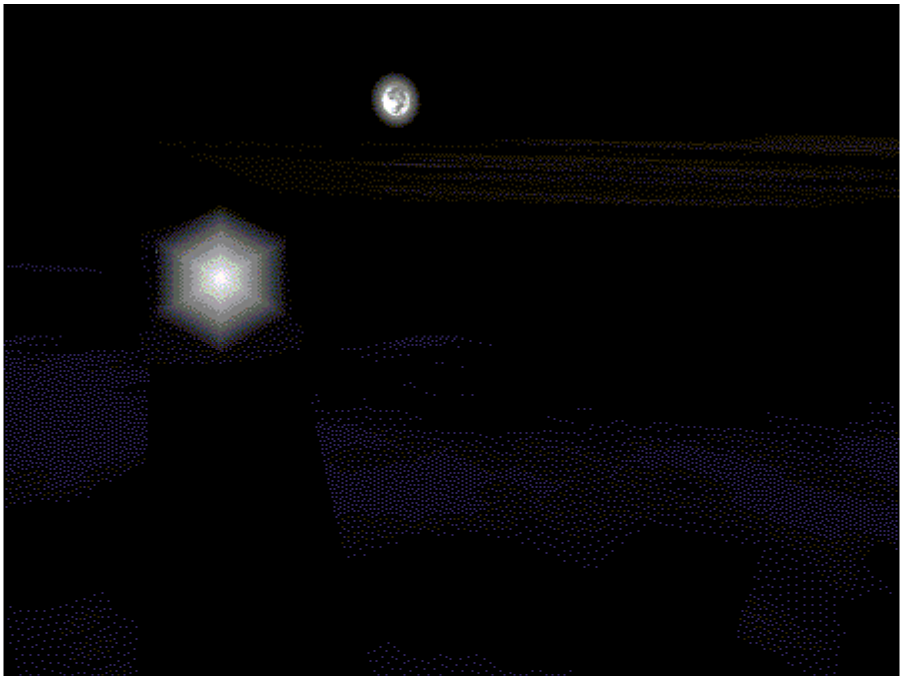
- **Red Flashers**
- **Lighthouses**

Red Flashers



You've seen them a million times, especially in urban areas—driving down the road, looking out the window, or while taking off on a commercial flight. There are blinking lights everywhere. Every large structure is required by the FAA to have a **red** flasher positioned at the structure's highest point. This is a slow-flashing light used to indicate the height of the potential obstruction to low-flying aircraft. In *Flight II*, every skyscraper modeled carries at least one and as many as four red flashers. You'll be glad one is adorning the top of the *Transamerica Tower* in downtown San Francisco when your *Baron* gets caught in that thick fog bank and the building is at your 12 o'clock!

Lighthouses



Do the same thing as real lighthouses. Not particularly useful unless you happen to be in a boat, but with the *Beaver*, you never know…

Just the Facts, Please

- Airport Listings and Types
- Airfield Diagrams and Instrument Approach Plates
- Radio Frequency Listings
- Learning the Aviation Alphabet
- Flyable Aircraft Specifications and Callsigns
- Aircraft Instrument and Systems Tables
- Helpography

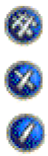
Airport Listings and Types

This section lists all of the airports in *Flight II* by control status, along with their alphanumeric FAA designations.

- Controlled Airports
- Uncontrolled Airports
- Airport Summary

Controlled Airports

These are large, medium, and small **tower-controlled** airports, with associated Class B, Class C, or Class D **airspace**. There are a total of **15** in the game, and they are represented by the **large FBO** scheme. **ATIS**, **ground control**, and **tower control** information is available for each.



They are depicted as **blue** regular airport icons in all of the maps.

- **Alameda NAS -** NGZ
- **Concord Buchanan -** CCR
- **Hayward -** HWD
- **Livermore -** LVK
- **Moffett Federal -** NUQ
- **Napa County -** APC
- **Oakland International -** OAK
- **Palo Alto -** PAO
- **Reid-Hillview -** RHV
- **Sacramento Executive -** SAC
- **San Carlos -** SQL
- **San Francisco International -** SFO
- **San Jose International -** SJC
- **Santa Rosa -** STS
- **Travis AFB -** SUU

Uncontrolled Airports

These are airports which are not **tower-controlled**. There are a total of **31** in the game, broken down into the following three classes:

- **UNICOM-Serviced**
- **Private Airfields**
- **Maritime Airports**

UNICOM-Serviced

These are **uncontrolled airports** which support **UNICOM**. There are a total of **13** in the game, and they are represented by the **small FBO** scheme.


They are depicted as **magenta** regular airport icons in all of the maps.

- **Borges-Clarksburg -** C14
- **Byron -** C83
- **Davis Woodland Winters -** 2Q3
- **Gnoss -** O56
- **Half Moon Bay -** HAF
- **Nut Tree -** O45
- **Parrett -** 2O3
- **Petaluma -** O69
- **Rio Vista -** O88
- **Sonoma Skypark -** 0Q9
- **Sonoma Valley -** 0Q3
- **South County -** Q99
- **University -** 0O5

Private Airfields

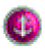
These are **uncontrolled airports** which do not support **UNICOM**. There are a total of **15** in the game, and are represented by the **small FBO** scheme.

They are depicted as **magenta** private airfield icons in all of the maps.

- **Allan Ranch -** CL36
- **Blake -** CA57
- **Bonny Doon -** CL77
- **Calistoga -** O58
- **Delta -** P01
- **Flying B -** 8Q6
- **Garibaldi -** 6Q2
- **Graywood -** CA39
- **Inglenook -** O44
- **Maine Praire -** Q33
- **Marin -** CA35
- **Meadowlark -** 23Q
- **Moskowite -** 41Q
- **Spezia -** 2Q2
- **Travis AFB Aero Club -** 8Q0

Maritime Airports

These are **uncontrolled airports** which do not support **UNICOM**. There are a total of **3** in the game, and are represented by the maritime FBO scheme.



They are depicted as **magenta** maritime airport icons in all of the maps.

- **Commodore Center -** 0Q2
- **Lake Berryessa -** Q86
- **Lost Isle -** Q87

Airport Summary

Airport Type	Number	Airport Icon	Control Status	Services Offered	Airspace Classification	Entry Rules
CONTROLLED	**15**	**Blue** *Small, Medium, and Large Regular Icons*	*Tower*	*ATIS Ground Tower*	*Class B, C, or D*	*Must contact tower controller before entering airspace.*
UNCONTROLLED	**31**	**Magenta**				
UNICOM-Serviced	**13**	*Medium and Small Regular Icons*	*None*	*UNICOM*	*None*	*UNICOM contact optional.*
Private	**15**	*Small Private (**R** symbol) Icons*	*None*	*None*	*None*	*May fly in and out of with no restrictions.*
Maritime	**3**	*Small Maritime Icons*	*None*	*None*	*None*	*May fly in and out of with no restrictions.*

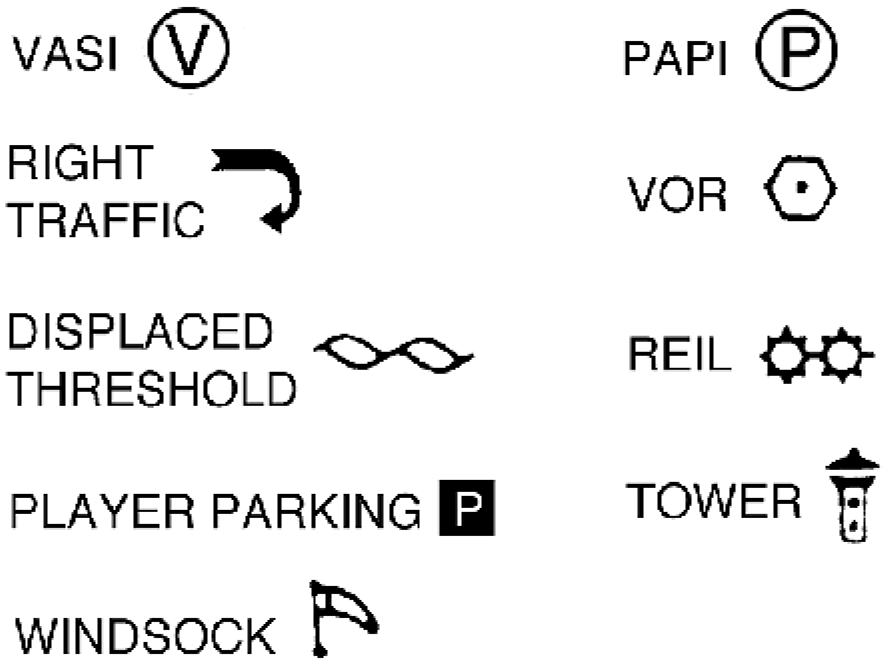
Airfield Diagrams and Instrument Approach Plates

This section of the Online Manual lists the **28** Airfield Diagrams and **14** Instrument Approach Plates.

- **What do the Diagrams Illustrate?**
- **Airports with Instrument Approach Plates**
- **Airports without Instrument Approach Plates**

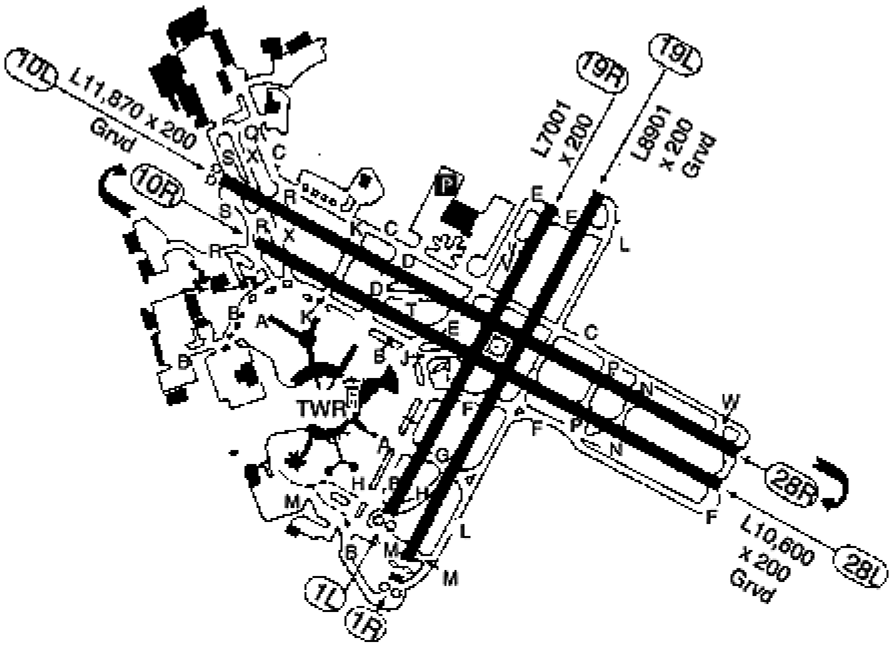
What do the Diagrams Illustrate?

AIRFIELD DIAGRAM LEGEND

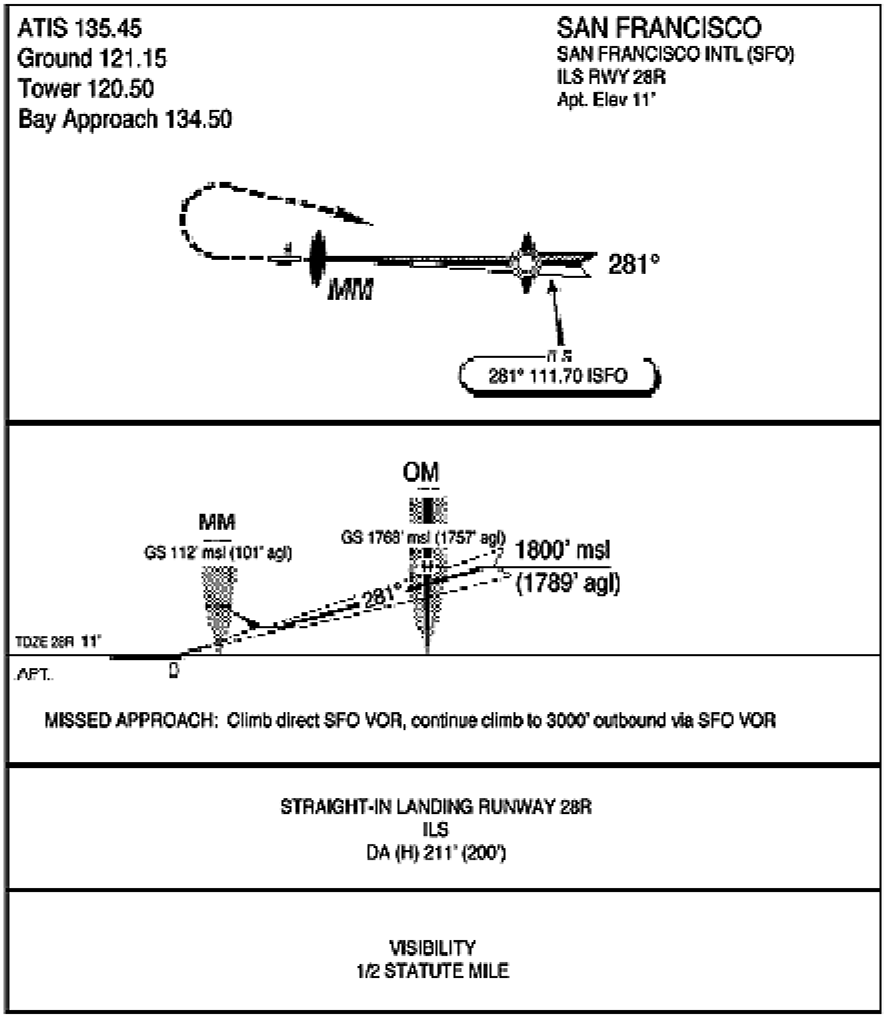


Click on the diagrams below to view informational pop-ups in selected locations:

ATIS- 135.45
GROUND FREQ- 121.15
TOWER FREQ- 120.50
APPROACH- 134.5



An **Instrument Approach Plate** is used to lend a visual representation of the necessary **glidepath** to an ILS-equipped runway, along with various informational markers occuring along the approach path.



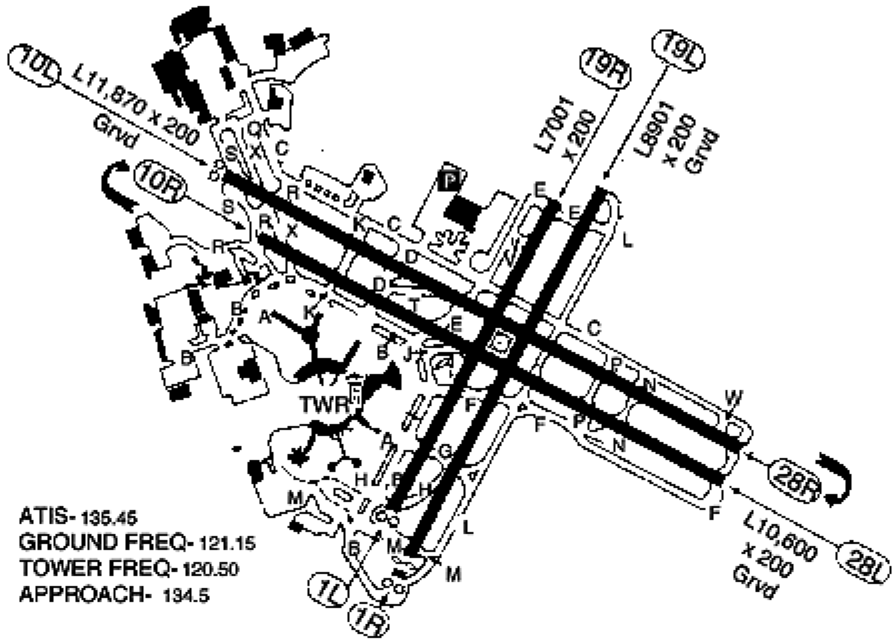
SAN FRANCISCO INTL (SFO) ILS RWY 28R

Airports with Instrument Approach Plates

The following is an alphabetical listing of the airports in *Flight II* which feature ILS-equipped runways:

- San Francisco International (SFO)
- San Francisco International ILS Runway 28R
- San Francisco International ILS Runway 28L
- San Francisco International ILS Runway 19L
- Metro Oakland International (OAK)
- Metro Oakland International ILS Runway 29
- Metro Oakland International ILS Runway 27R
- Metro Oakland International ILS Runway 11
- San Jose International (SJC)
- San Jose International ILS Runway 12R
- San Jose International ILS Runway 30L
- Travis Air Force Base (SUU)
- Travis Air Force Base ILS Runway 21L
- Travis Air Force Base ILS Runway 3L
- Livermore (LVK)
- Livermore ILS Runway 25R
- Santa Rosa
- Santa Rosa ILS Runway 32
- Sacramento Executive (SAC)
- Sacramento Executive ILS Runway 2
- Moffett-Federal (NUQ)
- Moffett-Federal ILS Runway 32R

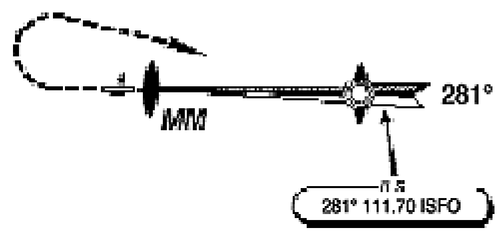
San Francisco International (SFO)

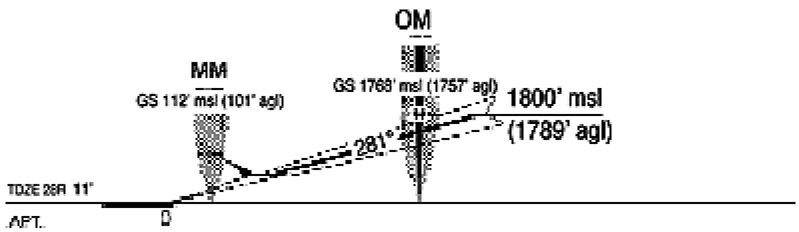


San Francisco International ILS Runway 28R

ATIS 135.45
Ground 121.15
Tower 120.50
Bay Approach 134.50

SAN FRANCISCO
SAN FRANCISCO INTL (SFO)
ILS RWY 28R
Apt. Elev 11'





MISSED APPROACH: Climb direct SFO VOR, continue climb to 3000' outbound via SFO VOR

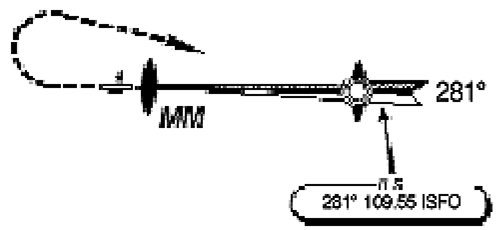
STRAIGHT-IN LANDING RUNWAY 28R
ILS
DA (H) 211' (200')

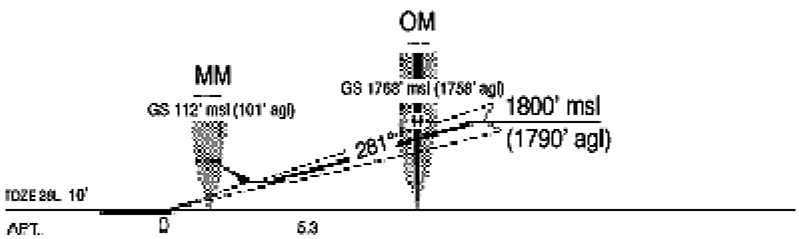
VISIBILITY
1/2 STATUTE MILE

San Francisco International ILS Runway 28L

ATIS 135.45
Ground 121.15
Tower 120.50
Bay Approach 134.50

SAN FRANCISCO
SAN FRANCISCO INTL (SFO)
ILS RWY 28L
Apt. Elev 11'





MISSED APPROACH: Climb direct SFO VOR, continue climb to 3000' outbound via SFO VOR

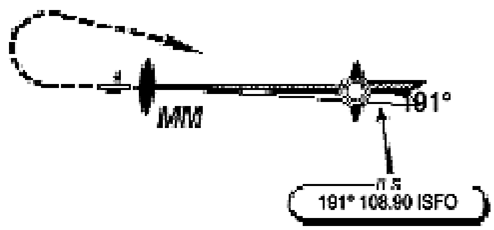
STRAIGHT-IN LANDING RUNWAY 28L
ILS
DA (H) 210' (200')

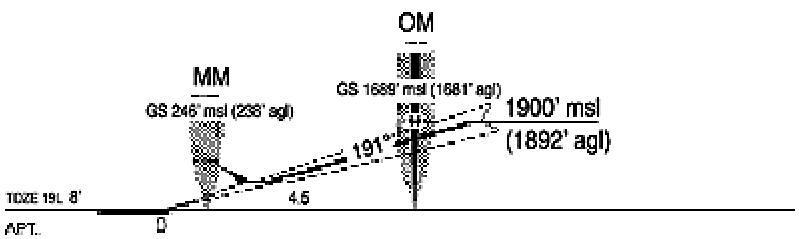
VISIBILITY
1/2 STATUTE MILE

San Francisco International ILS Runway 19L

ATIS 135.45
Ground 121.15
Tower 120.50
Bay Approach 134.50

SAN FRANCISCO
SAN FRANCISCO INTL (SFO)
ILS RWY 19L
Apt. Elev 11'



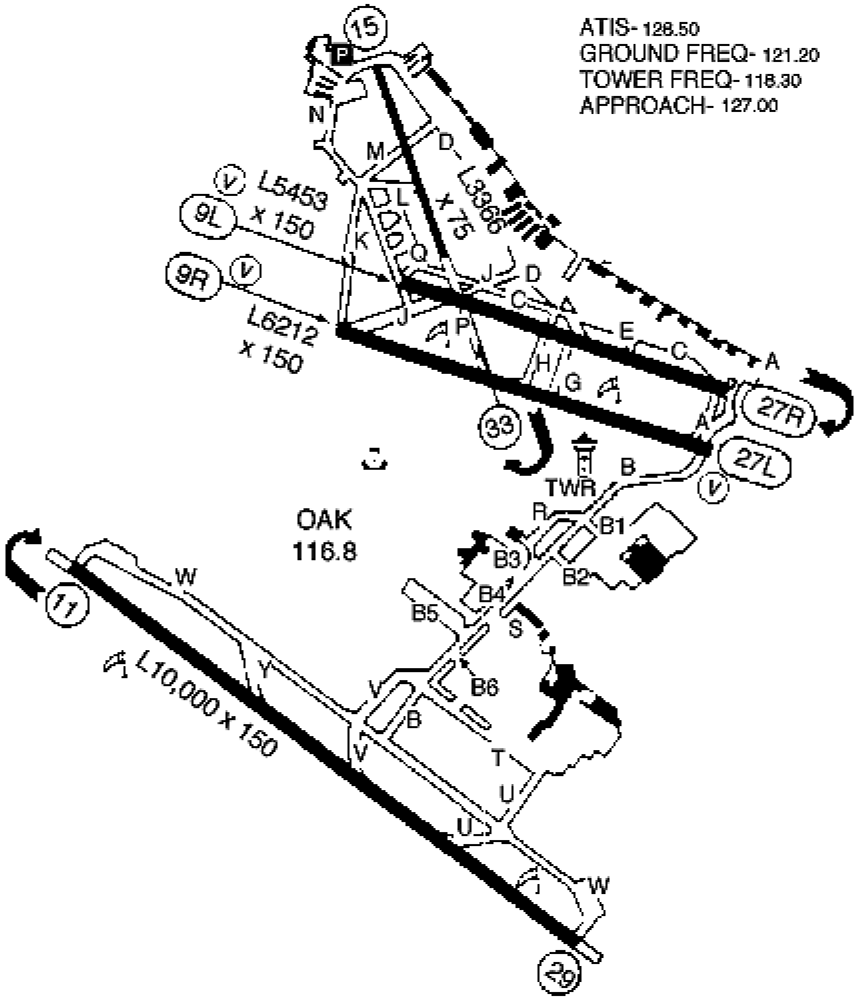


MISSED APPROACH: Climb to 420' then climbing LEFT turn to 2000' outbound via SFO VOR R-101.

STRAIGHT-IN LANDING RUNWAY 19L
ILS
DA (H) 208' (200')

VISIBILITY
1/2 STATUTE MILE

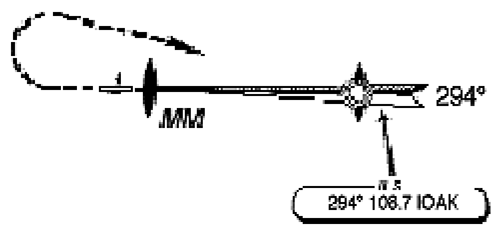
Metro Oakland International (OAK)

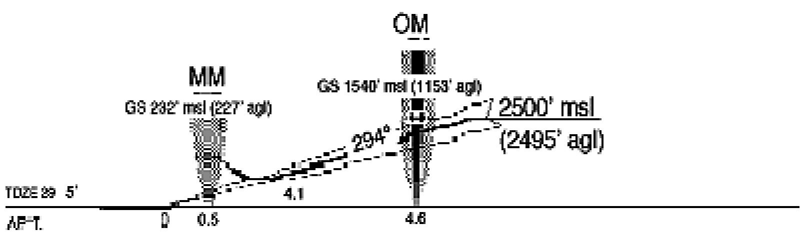


Metro Oakland International ILS Runway 29

ATIS 128.50
Ground 121.20
Tower 118.30
Bay Approach 127.00

OAKLAND
METRO OAKLAND INTL (OAK)
ILS RWY 29
Apt. Elev 6'





MISSED APPROACH: Climb 500' then climbing LEFT turn to 4000' via 260° heading and outbound on SAU VOR R-110 .

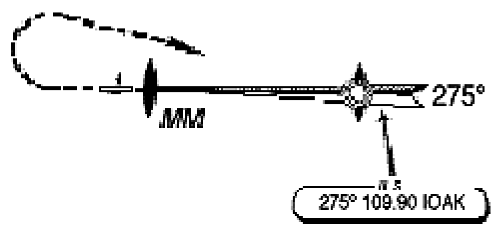
STRAIGHT-IN LANDING RUNWAY 29
ILS
DA (H) 205' (200')

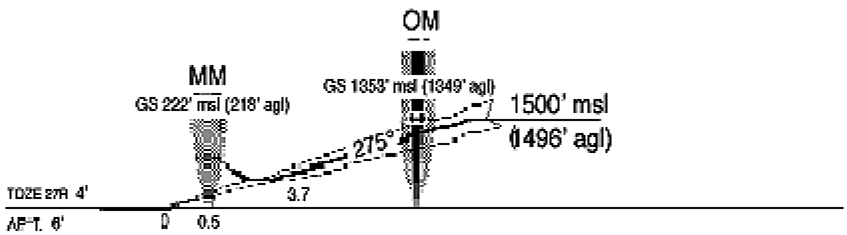
VISIBILITY
1/2 STATUTE MILE

Metro Oakland International ILS Runway 27R

ATIS 128.50
Ground 121.20
Tower 118.30
Bay Approach 127.00

OAKLAND
METRO OAKLAND INTL (OAK)
ILS RWY 27R
Apt. Elev 6'





MISSED APPROACH: Climb 500' then climbing RIGHT turn to 3000' outbound via OAK VOR R-313.

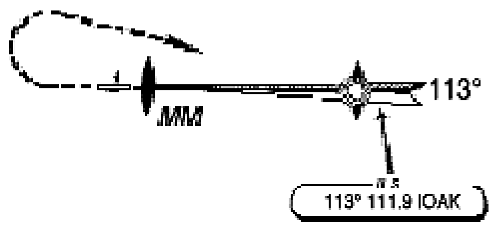
STRAIGHT-IN LANDING RUNWAY 27R
ILS
DA (H) 254' (250')

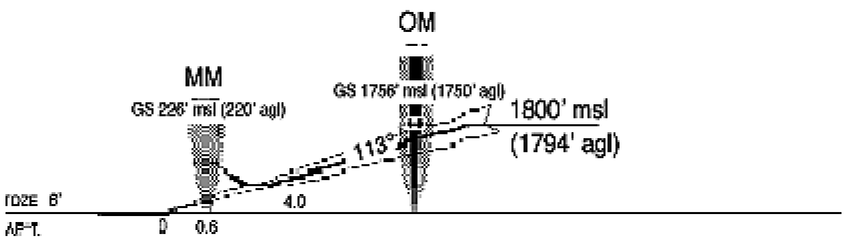
VISIBILITY
1/2 STATUTE MILE

Metro Oakland International ILS Runway 11

ATIS 128.50
Ground 121.20
Tower 118.30
Bay Approach 127.00

OAKLAND
METRO OAKLAND INTL (OAK)
ILS RWY 11
Apt. Elev 6'



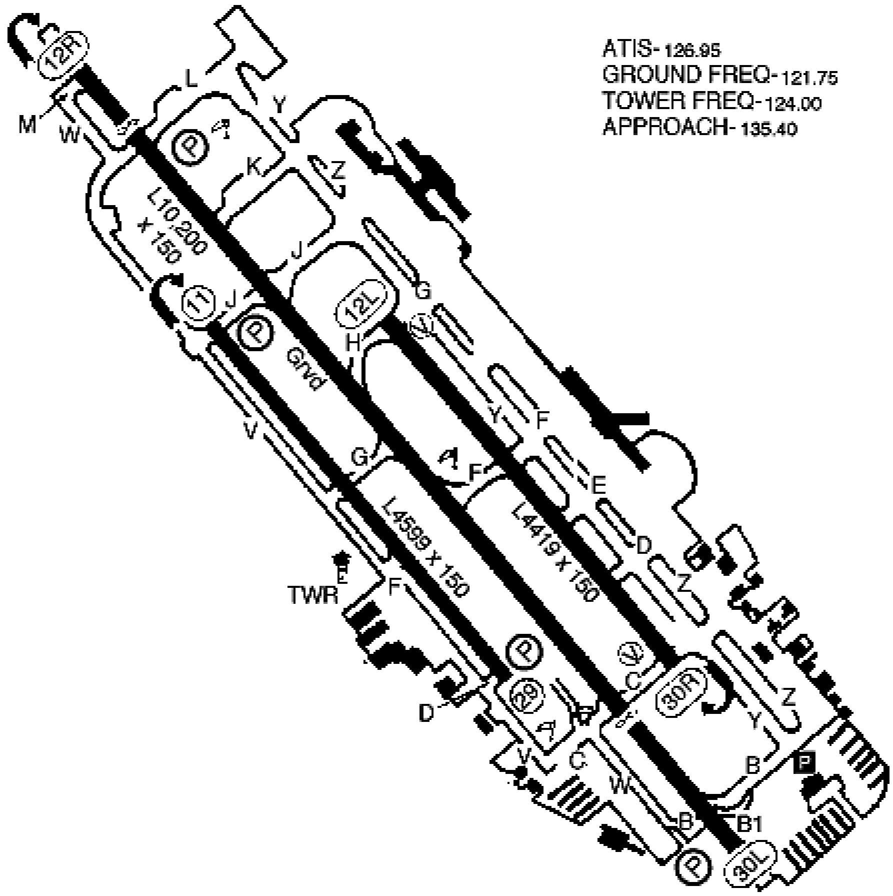


MISSED APPROACH: Climb 500' then climbing LEFT turn to 3500' via 090° heading and outbound on OAK VOR R-114 .

STRAIGHT-IN LANDING RUNWAY 11
ILS
DA (H) 206' (200')

VISIBILITY
1/2 STATUTE MILE

San Jose International (SJC)

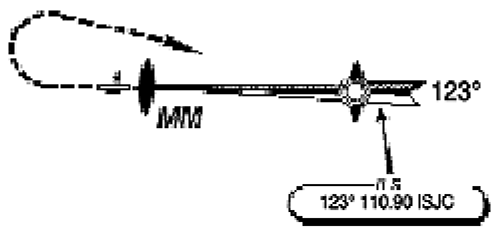


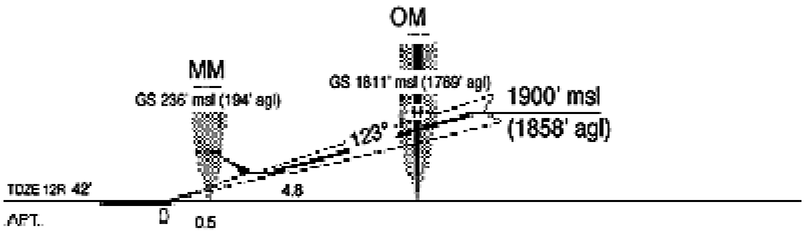
ATIS- 126.95
GROUND FREQ- 121.75
TOWER FREQ- 124.00
APPROACH- 135.40

San Jose International ILS Runway 12R

ATIS 126.95
Ground 121.75
Tower 124.00
Bay Approach 135.40

SAN JOSE
SAN JOSE INTL (SJC)
ILS RWY 12R
Apt. Elev 58'





MISSED APPROACH: Climb 900' then climbing LEFT turn to 1900' direct SJC VOR and outbound on SJC VOR R-303 .

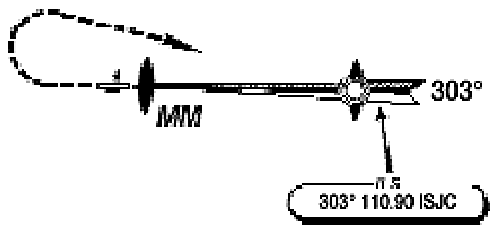
STRAIGHT-IN LANDING RUNWAY 12R
ILS
DA (H) 242' (200')

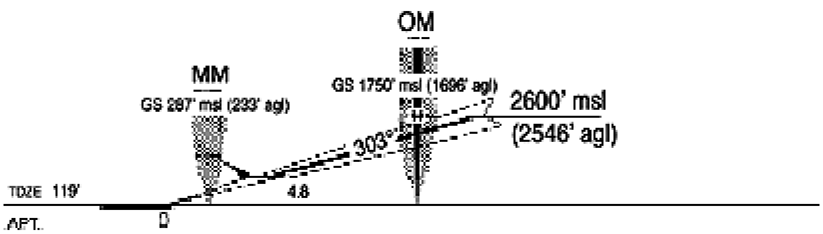
VISIBILITY
1/2 STATUTE MILE

San Jose International ILS Runway 30L

ATIS 126.95
Ground 121.75
Tower 124.00
Bay Approach 135.40

SAN JOSE
SAN JOSE INTL (SJC)
ILS RWY 30L
Apt. Elev 58'



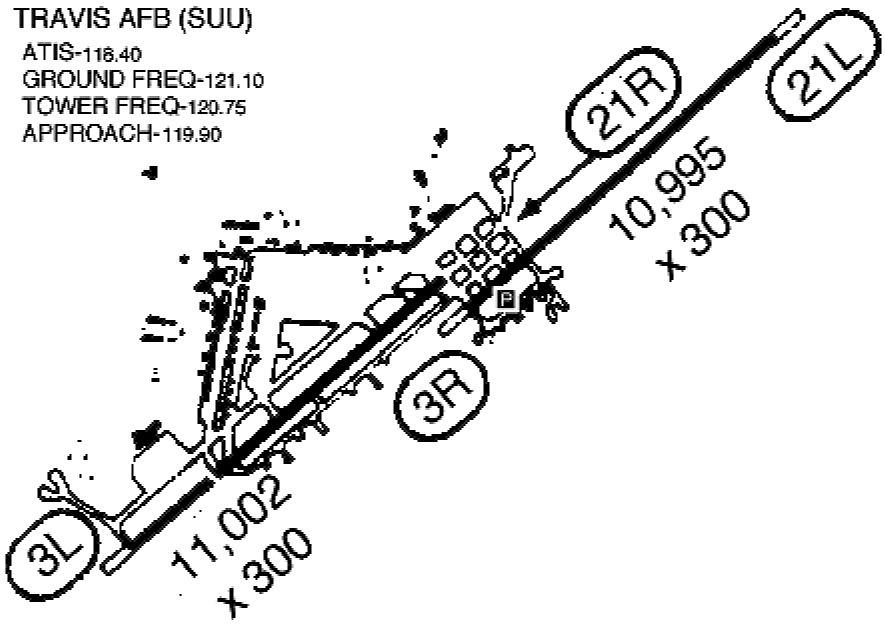


MISSED APPROACH: Climb to 1900' outbound via SJC VOR R-303.

STRAIGHT-IN LANDING RUNWAY 30L
ILS
DA (H) 254' (200')

VISIBILITY
1/2 STATUTE MILE

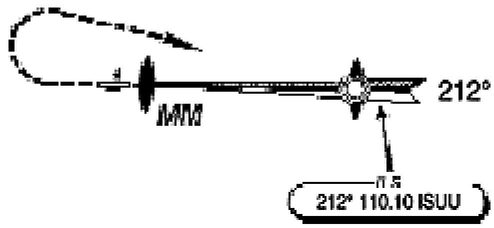
Travis Air Force Base (SUU)

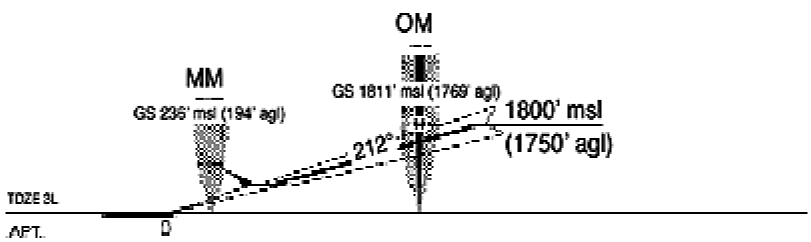


Travis Air Force Base ILS Runway 21L

ATIS 118.40
Ground 121.10
Tower 120.75
Travis Approach 119.90

FAIRFIELD
TRAVIS AFB (SUU)
ILS RWY 21L
Apt. Elev 62'





MISSED APPROACH: Left climbing turn to 3000 to TZZ VOR.

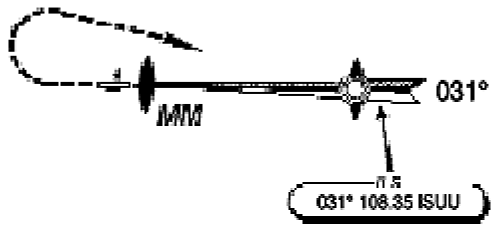
STRAIGHT-IN LANDING RUNWAY 21L
ILS
DA (H) 258' (200')

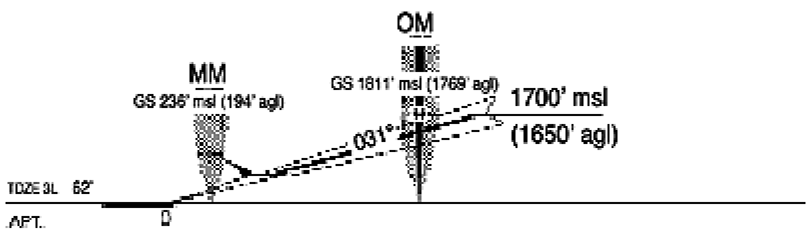
VISIBILITY
1/2 STATUTE MILE

Travis Air Force Base ILS Runway 3L

ATIS 118.40
Ground 121.10
Tower 120.75
Travis Approach 119.90

FAIRFIELD
TRAVIS AFB (SUU)
ILS RWY 3L
Apt. Elev 62'



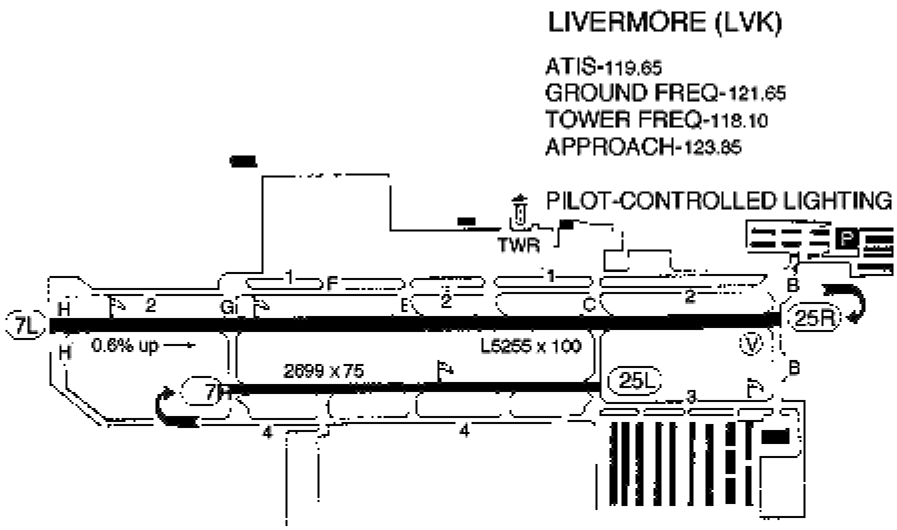


MISSED APPROACH: Climb to 2000 tooTZZ VOR and hold.

STRAIGHT-IN LANDING RUNWAY 3L
ILS
DA (H) 480' (200')

VISIBILITY
1/2 STATUTE MILE

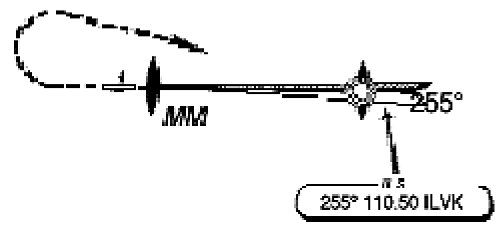
Livermore (LVK)

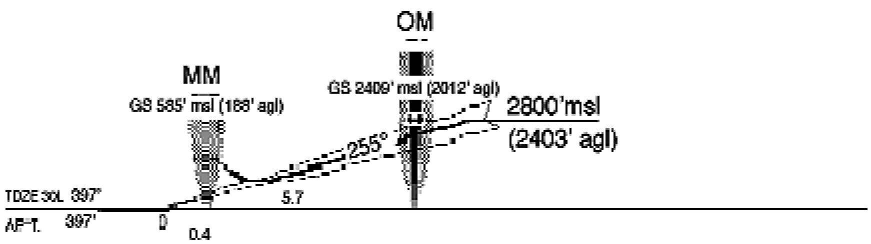


Livermore ILS Runway 25R

ATIS 119.65
Ground 121.65
Tower 118.10
Stockton Approach 123.85

LIVERMORE
LIVERMORE (LVK)
ILS RWY 25R
Apt. Elev 397'



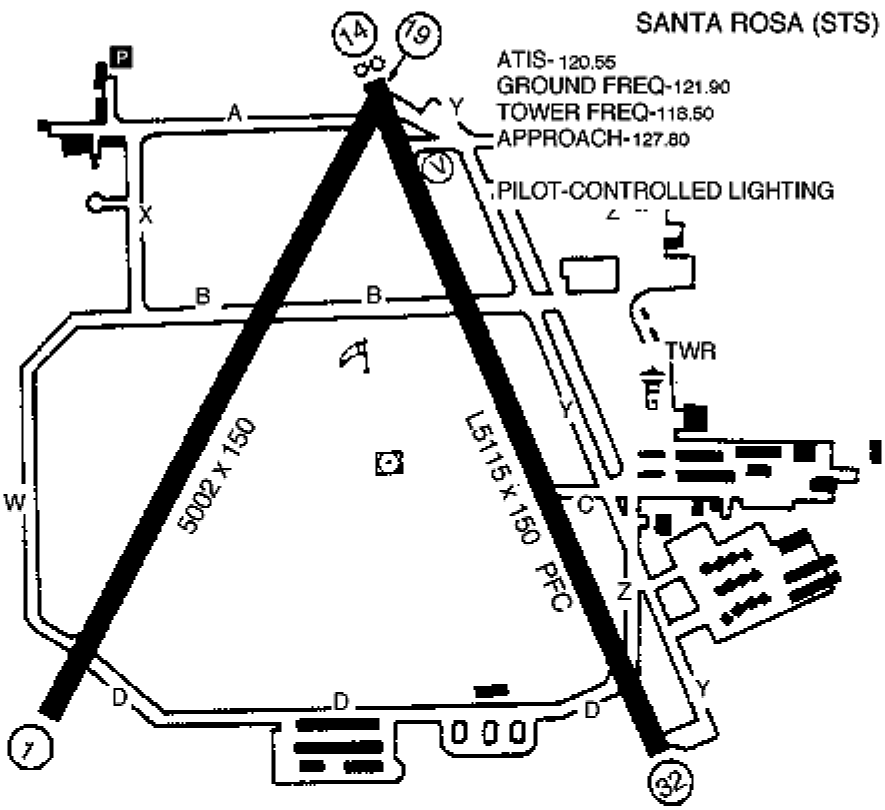


MISSED APPROACH: Climb to 1100', then climbing RIGHT turn to 3000' heading 060.

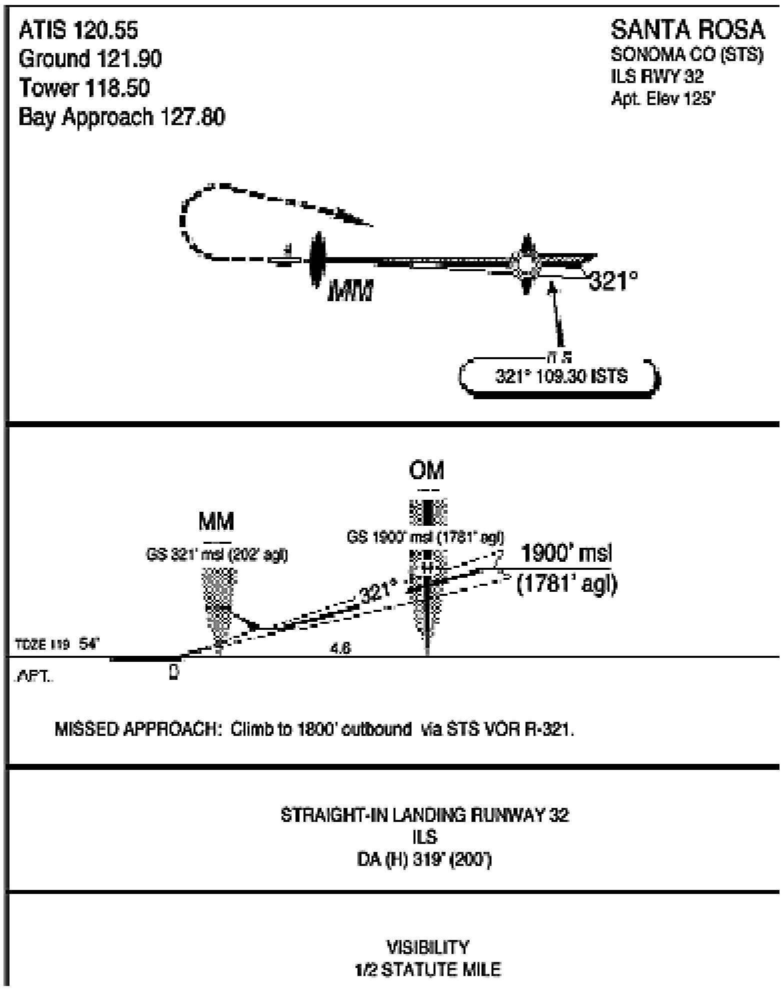
STRAIGHT-IN LANDING RUNWAY 25R
ILS
DA (H) 579' (200')

VISIBILITY
1/2 STATUTE MILE

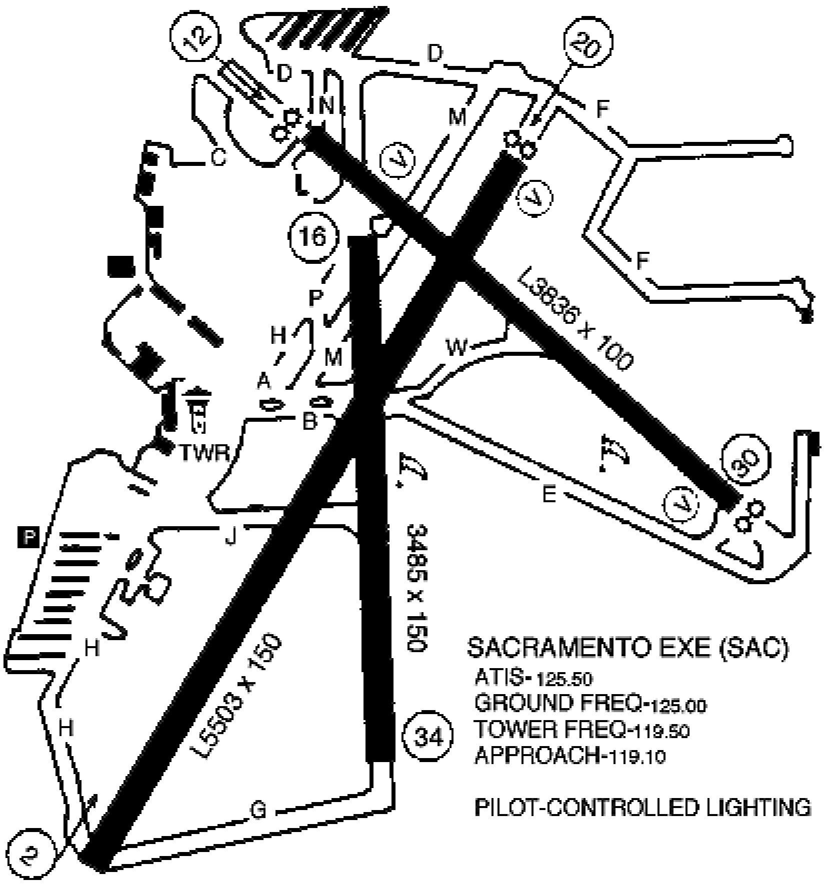
Santa Rosa


SANTA ROSA (STS)
ATIS- 120.55
GROUND FREQ-121.90
TOWER FREQ-118.50
APPROACH-127.80
PILOT-CONTROLLED LIGHTING
14
19
1
32
A
B
B
X
W
D
D
D
C
Y
Y
Y
Z
V
TWR
5002 x 150
L5115 x 150 PFC

Santa Rosa ILS Runway 32



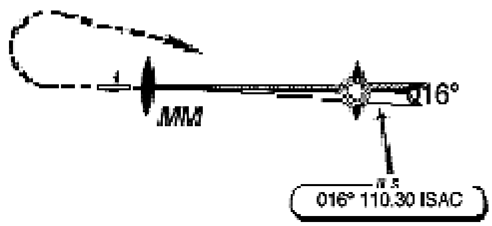
Sacramento Executive (SAC)

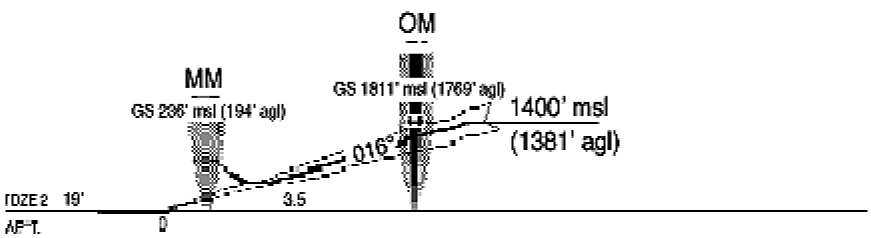


Sacramento Executive ILS Runway 2

ATIS 125.50
Ground 125.00
Tower 119.50
Bay Approach 119.10

SACRAMENTO
SACRAMENTO EXE(SAC)
ILS RWY 2
Apt. Elev 21'



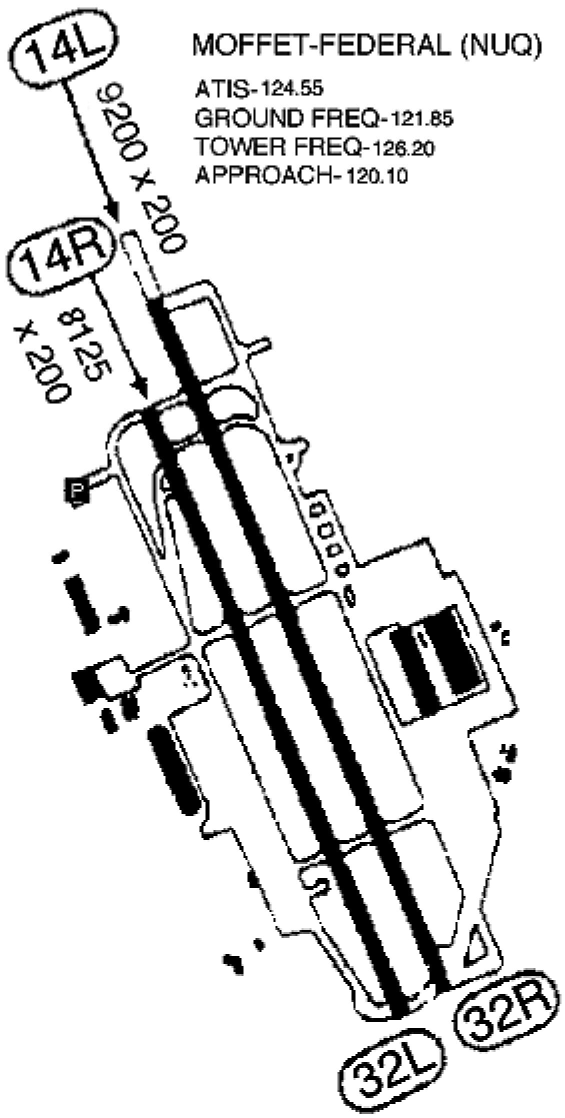


MISSED APPROACH: Climb to 500' then climbing LEFT turn to 1400" on 240° heading.

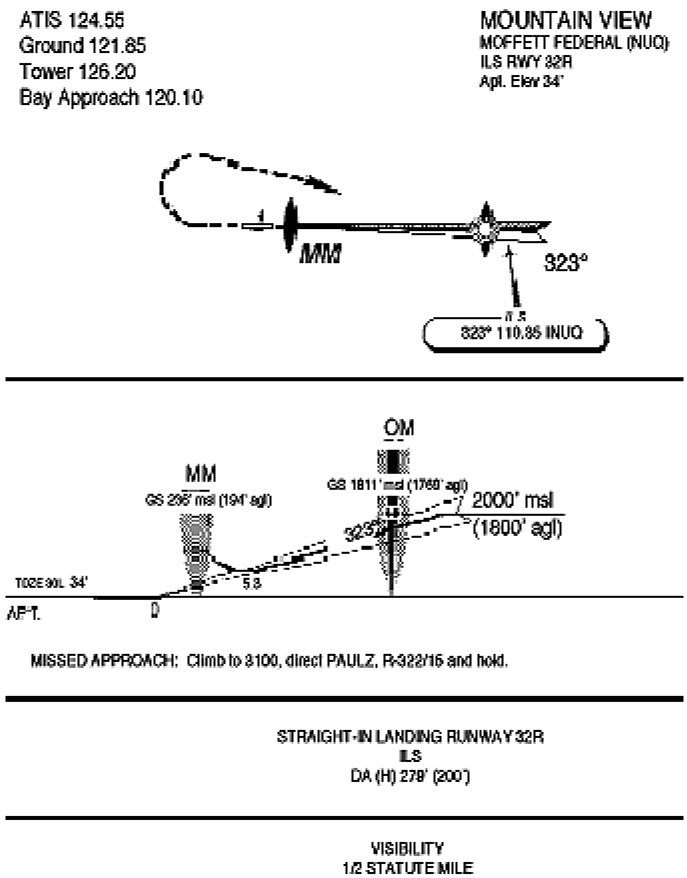
STRAIGHT-IN LANDING RUNWAY 2
ILS
DA (H) 219' (200')

VISIBILITY
1/2 STATUTE MILE

Moffett-Federal (NUQ)



Moffett-Federal ILS Runway 32R

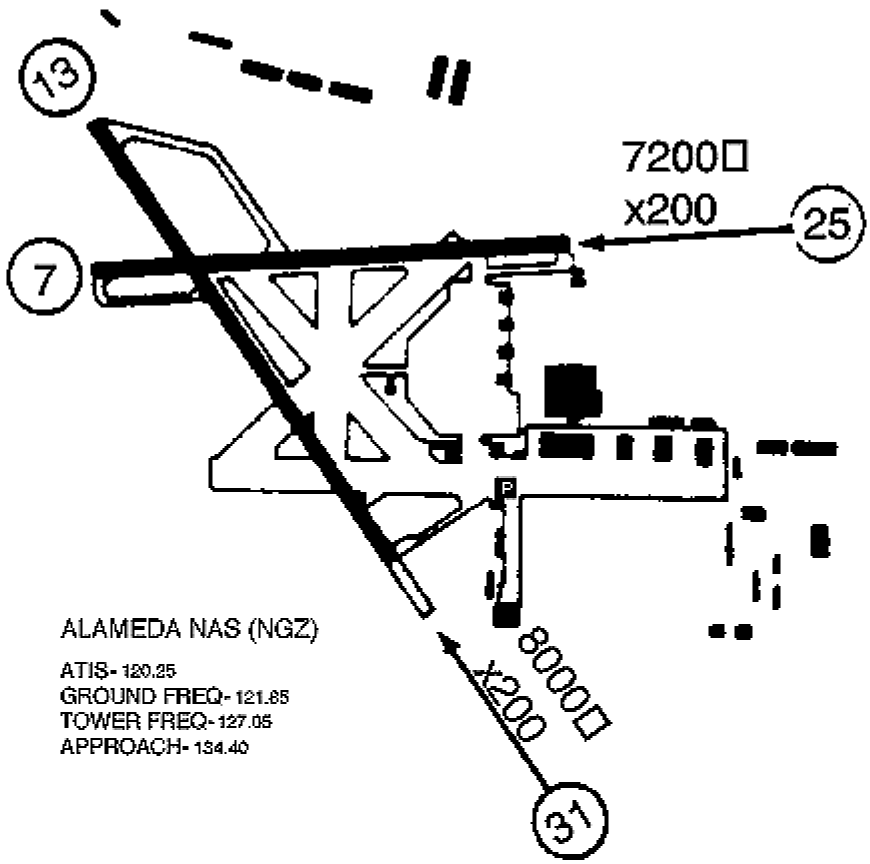


Airports without Instrument Approach Plates

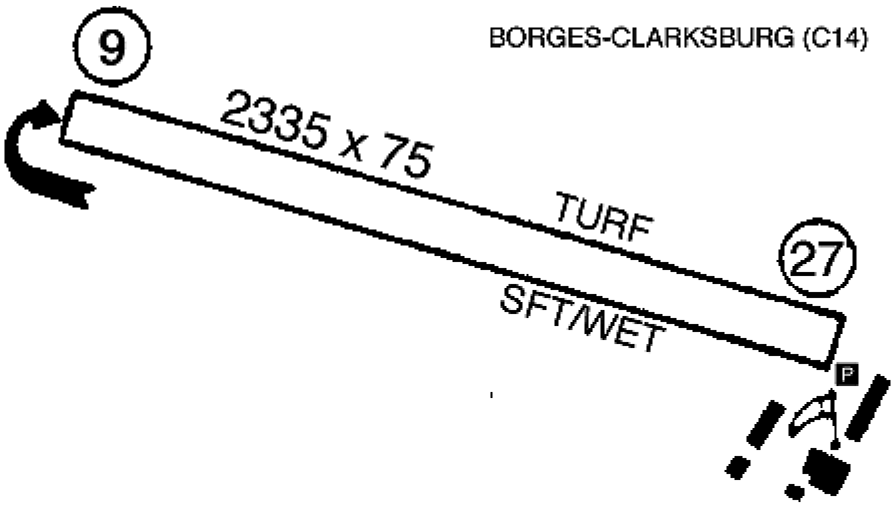
The following is an alphabetical listing of the airports in *Flight II* which do not feature ILS-equipped runways:

- **Alameda NAS (NGZ)**
- **Borges-Clarksburg (C14)**
- **Byron (C83)**
- **Concord Buchanan (CCR)**
- **Davis Woodland Winters (2Q3)**
- **Gnoss (O56)**
- **Half Moon Bay (HAF)**
- **Hayward (HWD)**
- **Napa County (APC)**
- **Nut Tree (O45)**
- **Palo Alto (PAO)**
- **Parrett (2O3)**
- **Petaluma (O69)**
- **Reid-Hillview (RHV)**
- **Rio Vista (O88)**
- **San Carlos (SQL)**
- **Sonoma Skypark (0Q9)**
- **Sonoma Valley (0Q3)**
- **South County (Q99)**
- **University (0O5)**

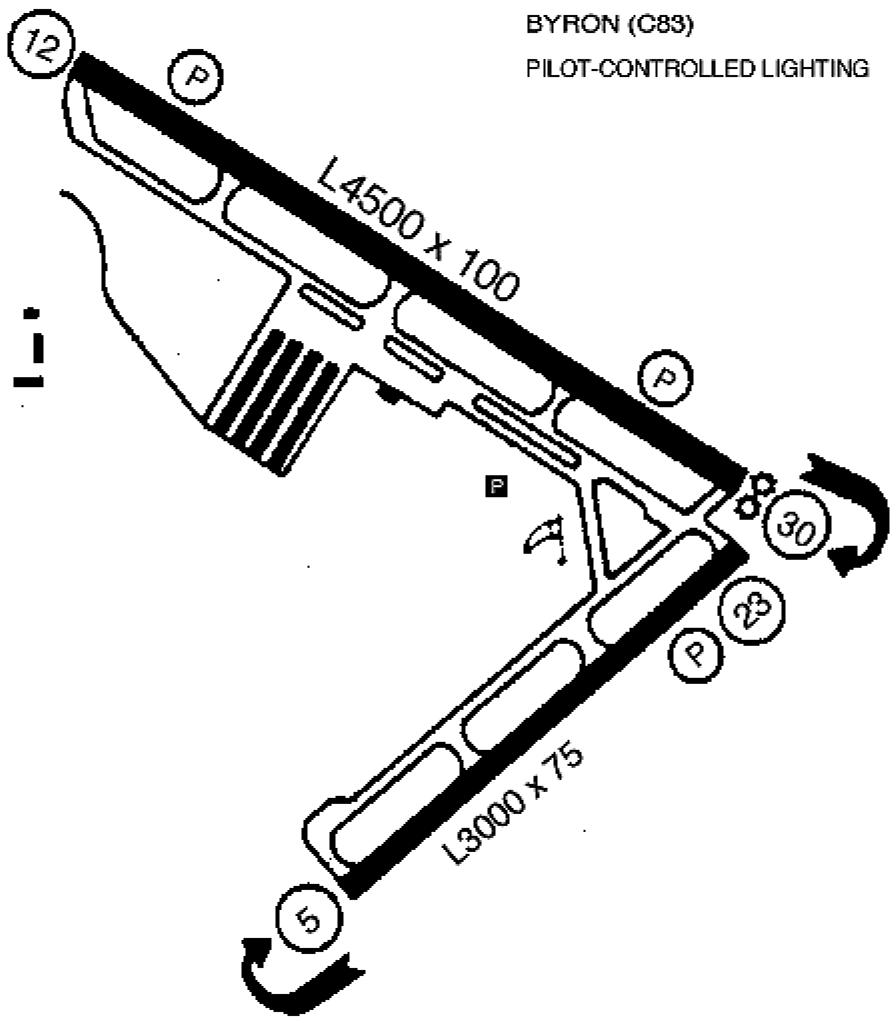
Alameda NAS (NGZ)



Borges-Clarksburg (C14)

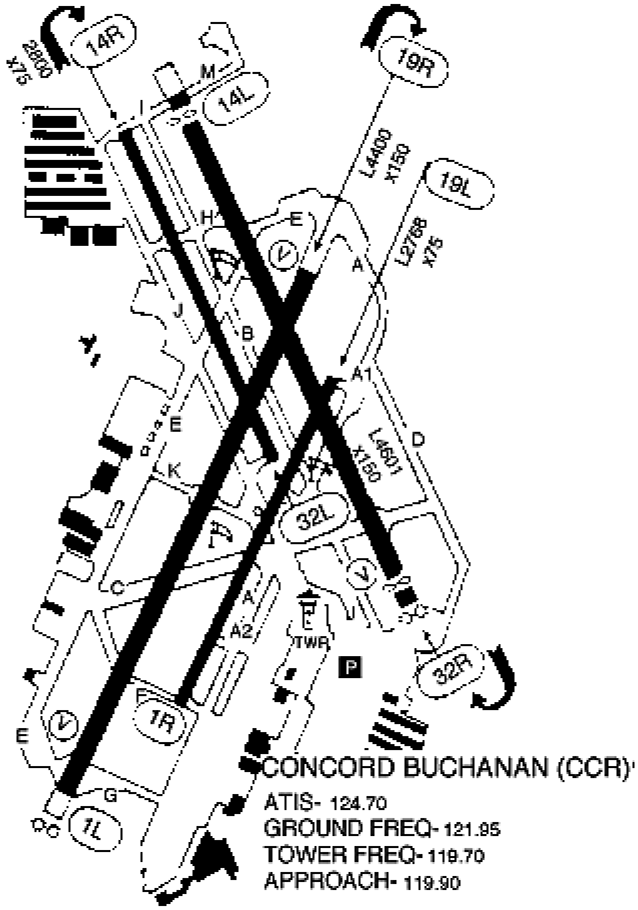


Byron (C83)

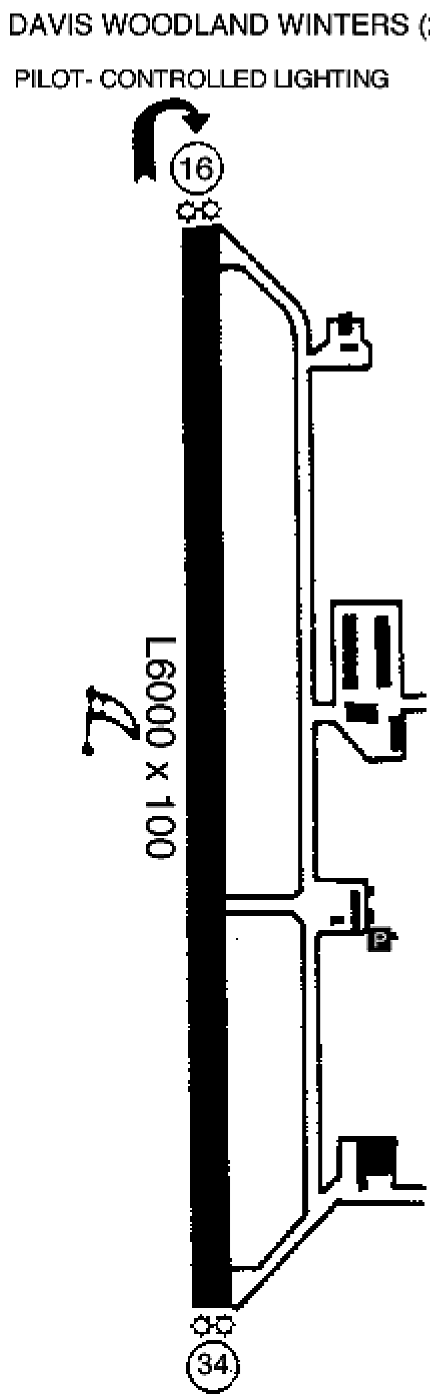


BYRON (C83)
PILOT-CONTROLLED LIGHTING
12
P
L4500 x 100
P
30
23
P
L3000 x 75
5
P

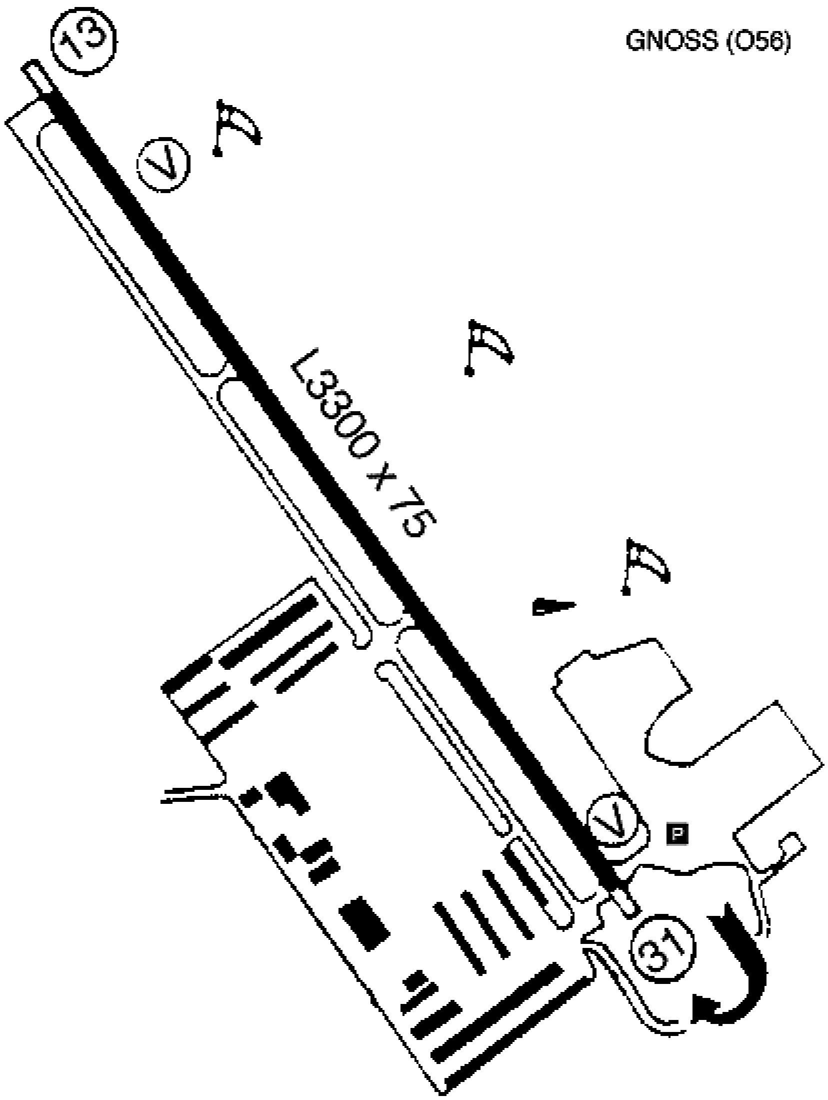
Concord Buchanan (CCR)



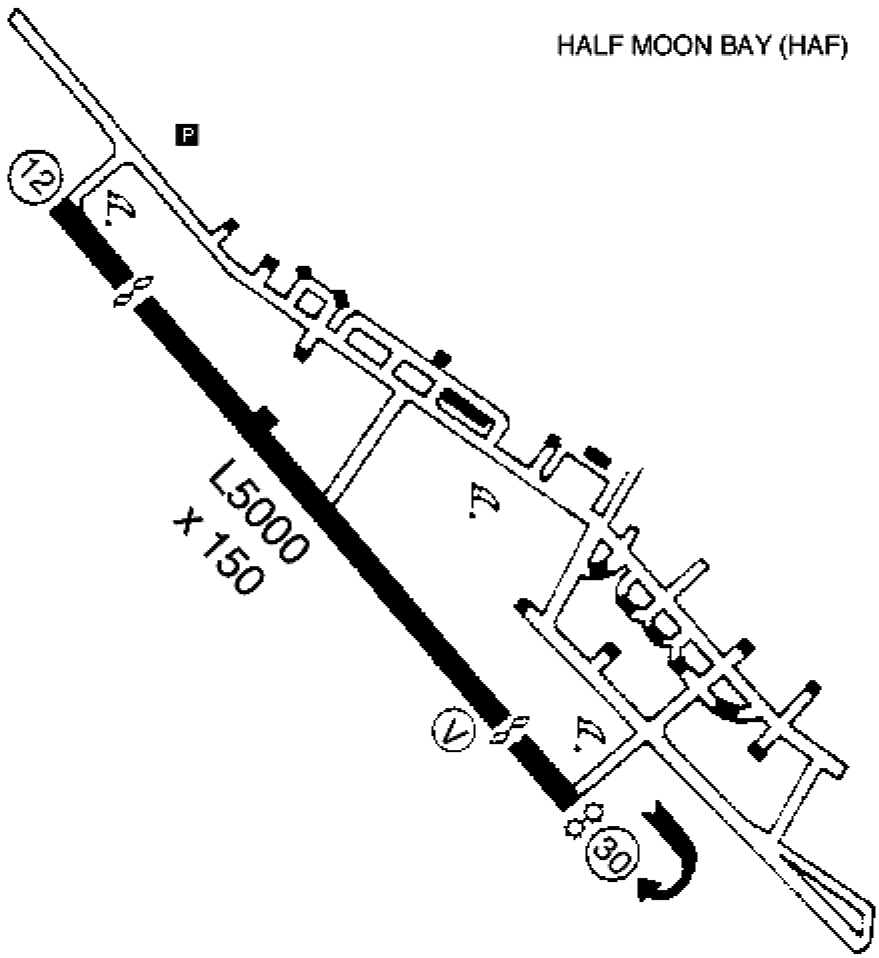
Davis Woodland Winters (2Q3)



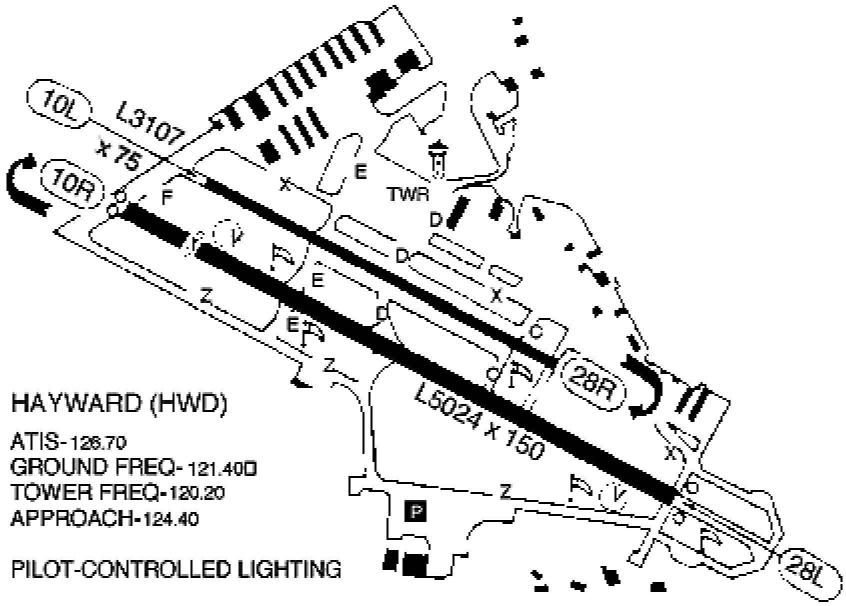
Gnoss (O56)



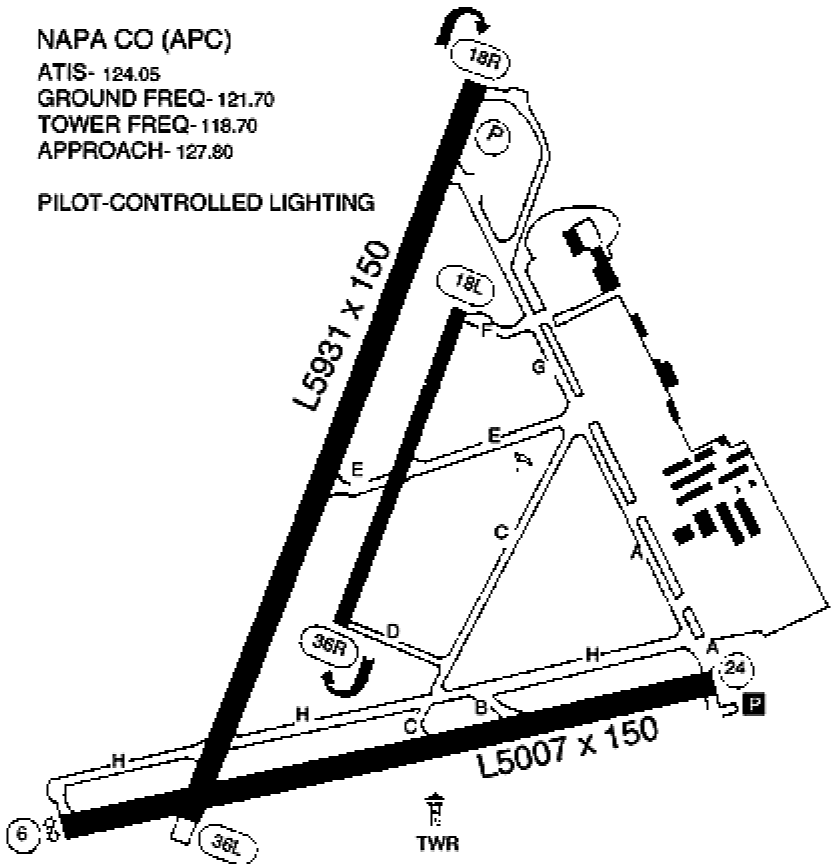
Half Moon Bay (HAF)



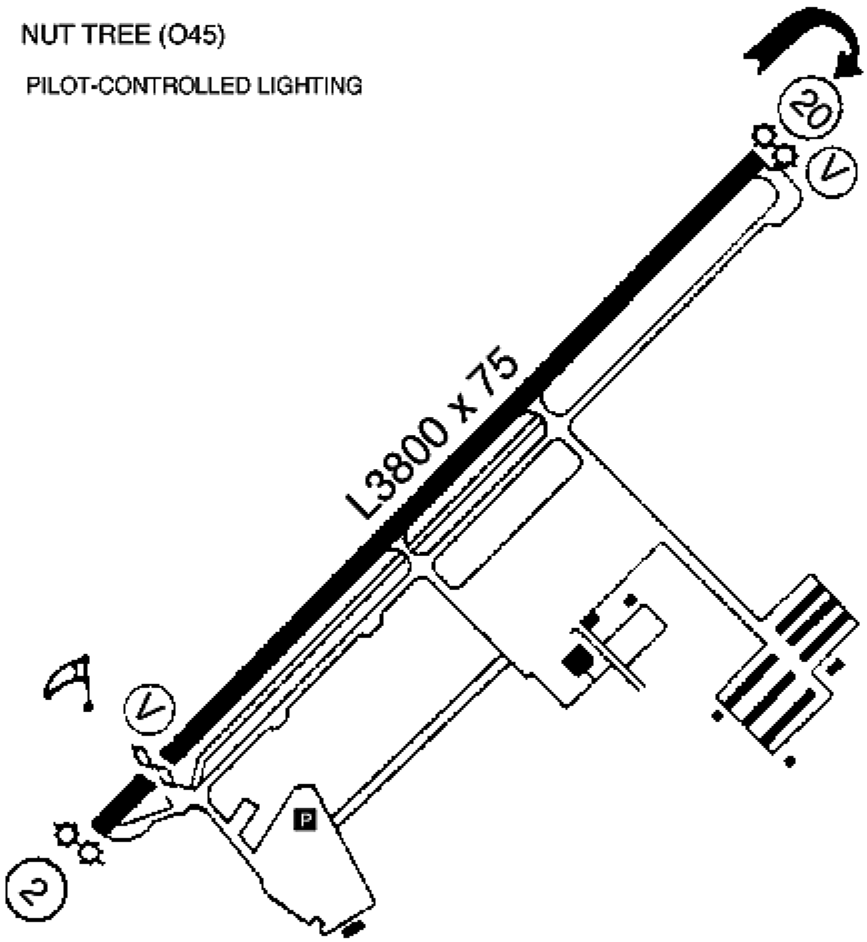
Hayward (HWD)


10L
L3107
x 75
10R
F
E
TWR
D
X
V
E
D
Z
C
28R
L5024 x 150
X
HAYWARD (HWD)
ATIS-126.70
GROUND FREQ-121.40
TOWER FREQ-120.20
APPROACH-124.40
PILOT-CONTROLLED LIGHTING
P
28L

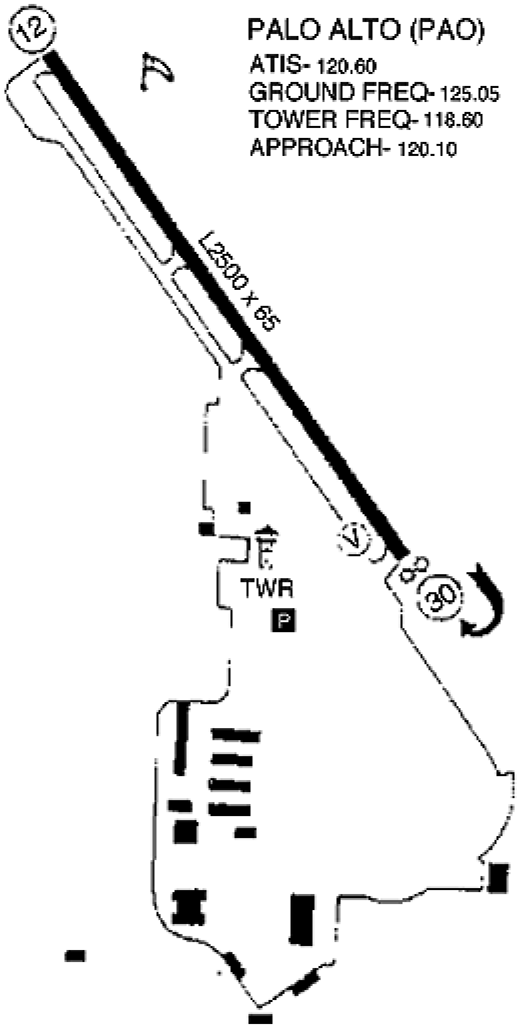
Napa County (APC)



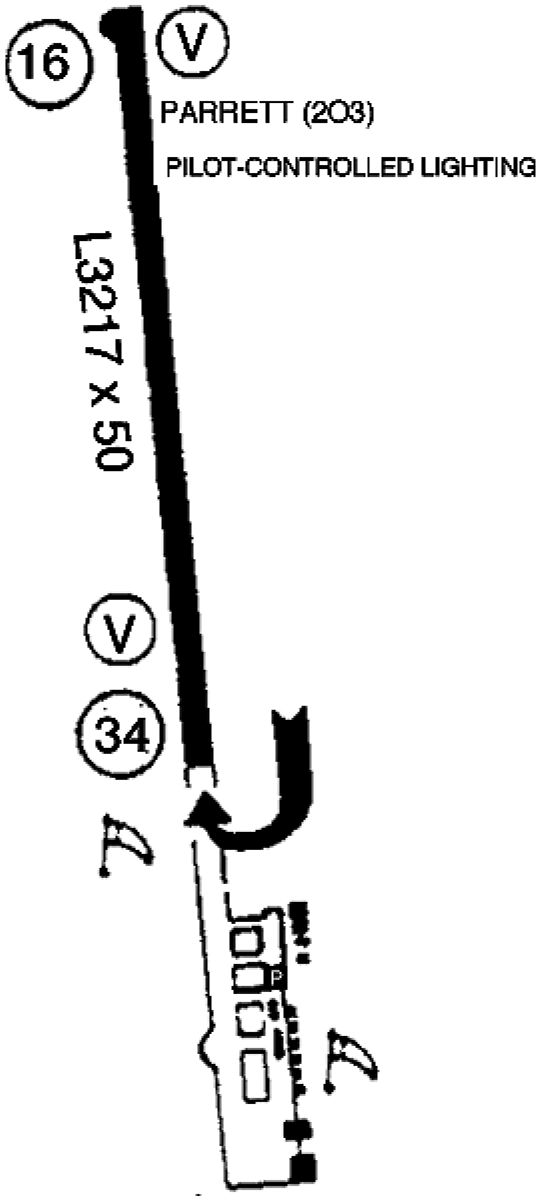
Nut Tree (O45)



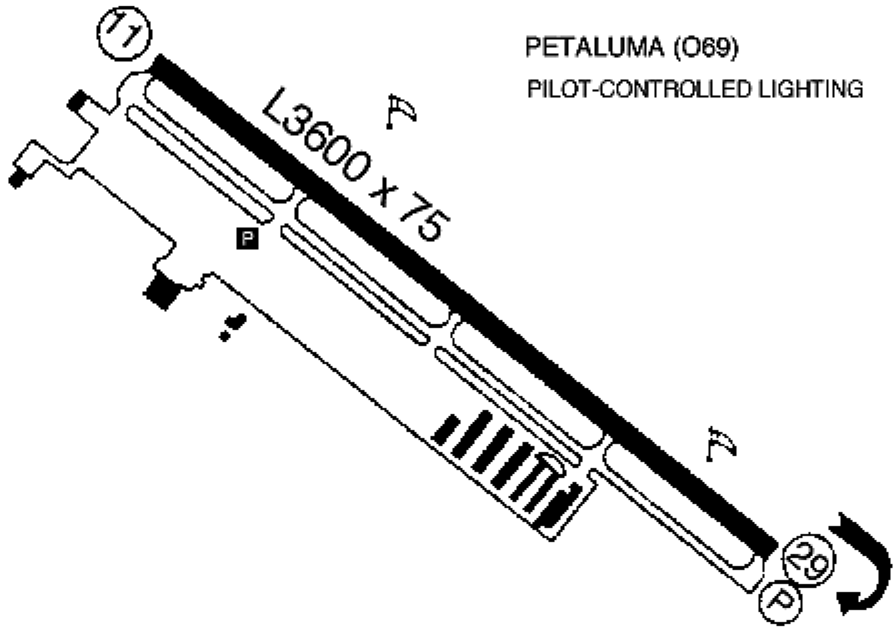
Palo Alto (PAO)



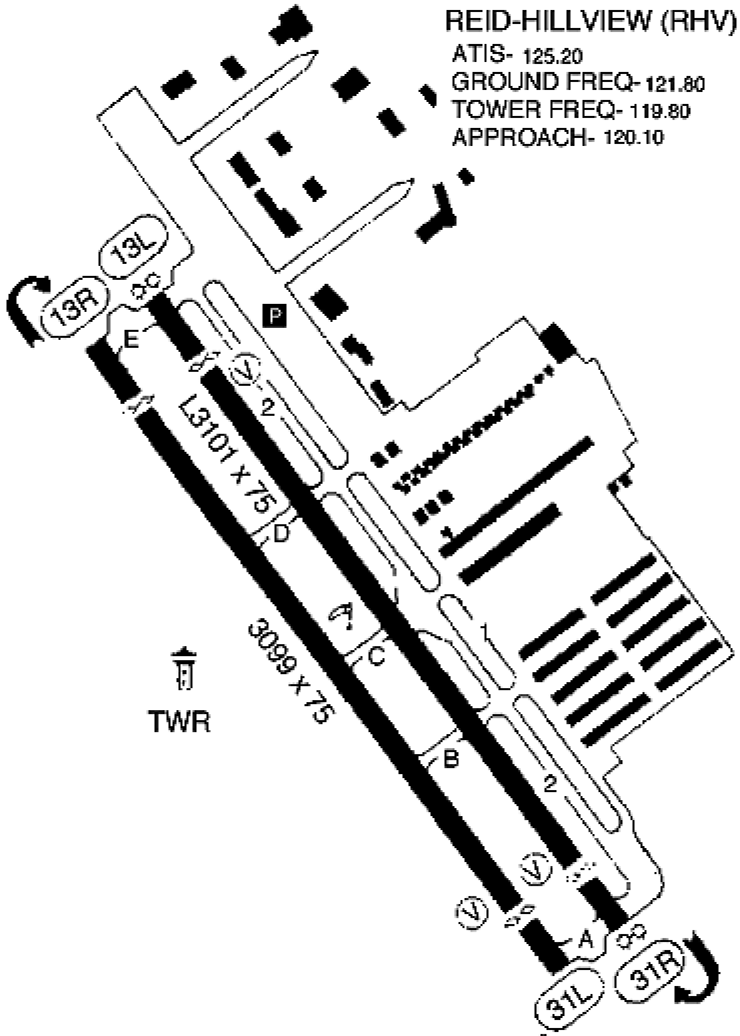
Parrett (2O3)



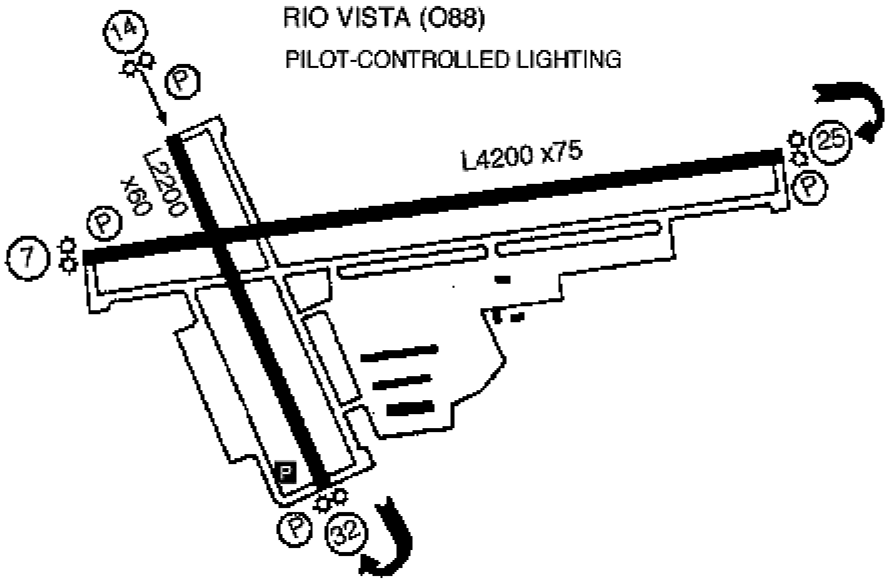
Petaluma (O69)



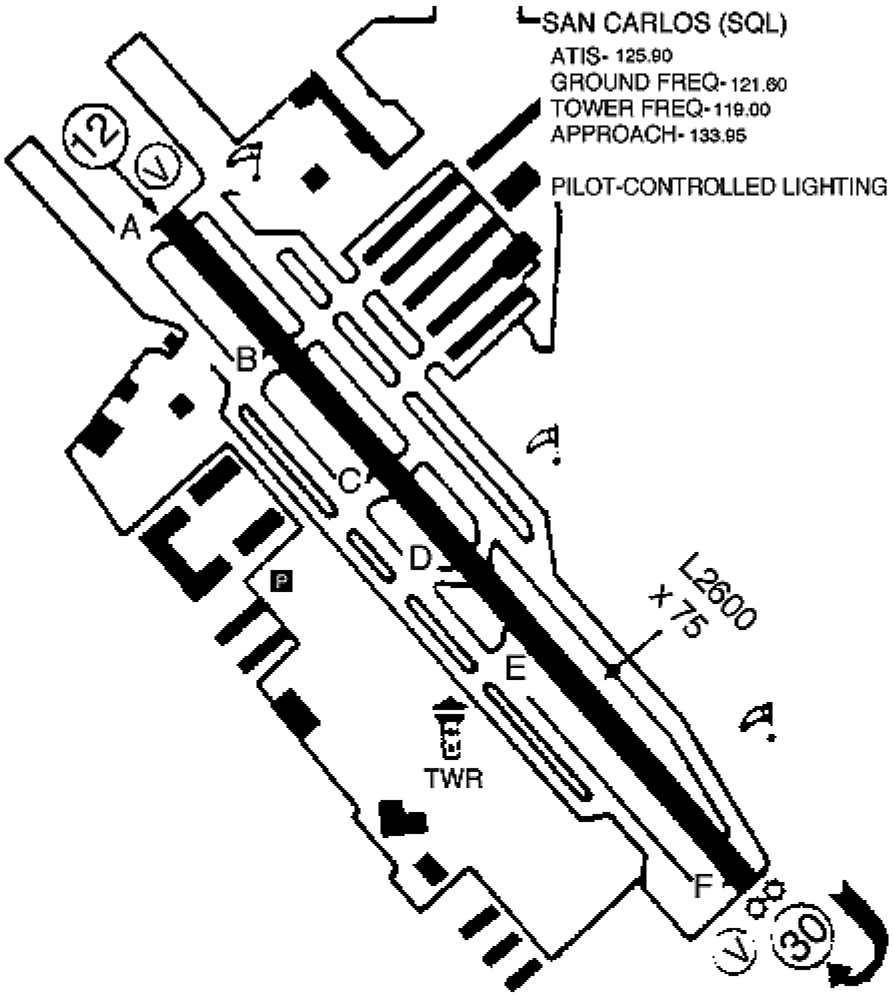
Reid-Hillview (RHV)



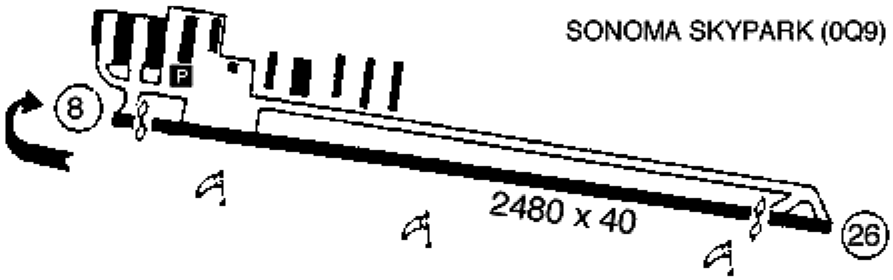
Rio Vista (O88)



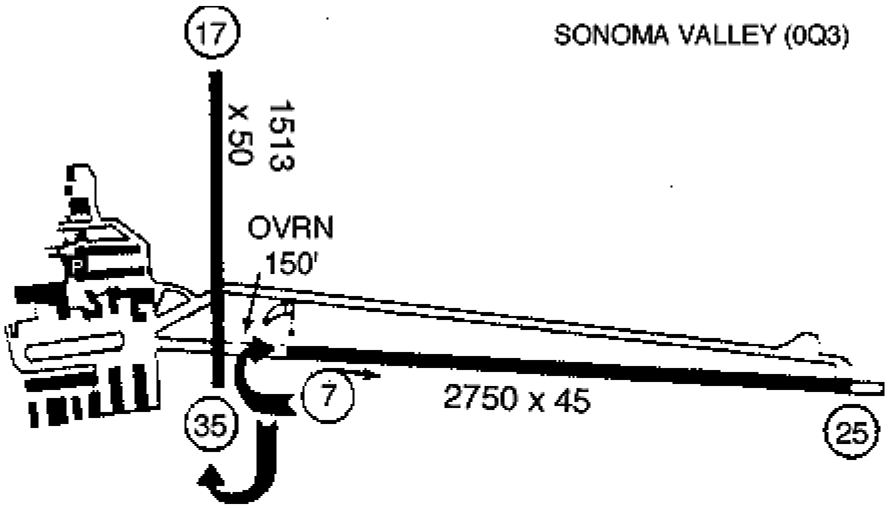
San Carlos (SQL)



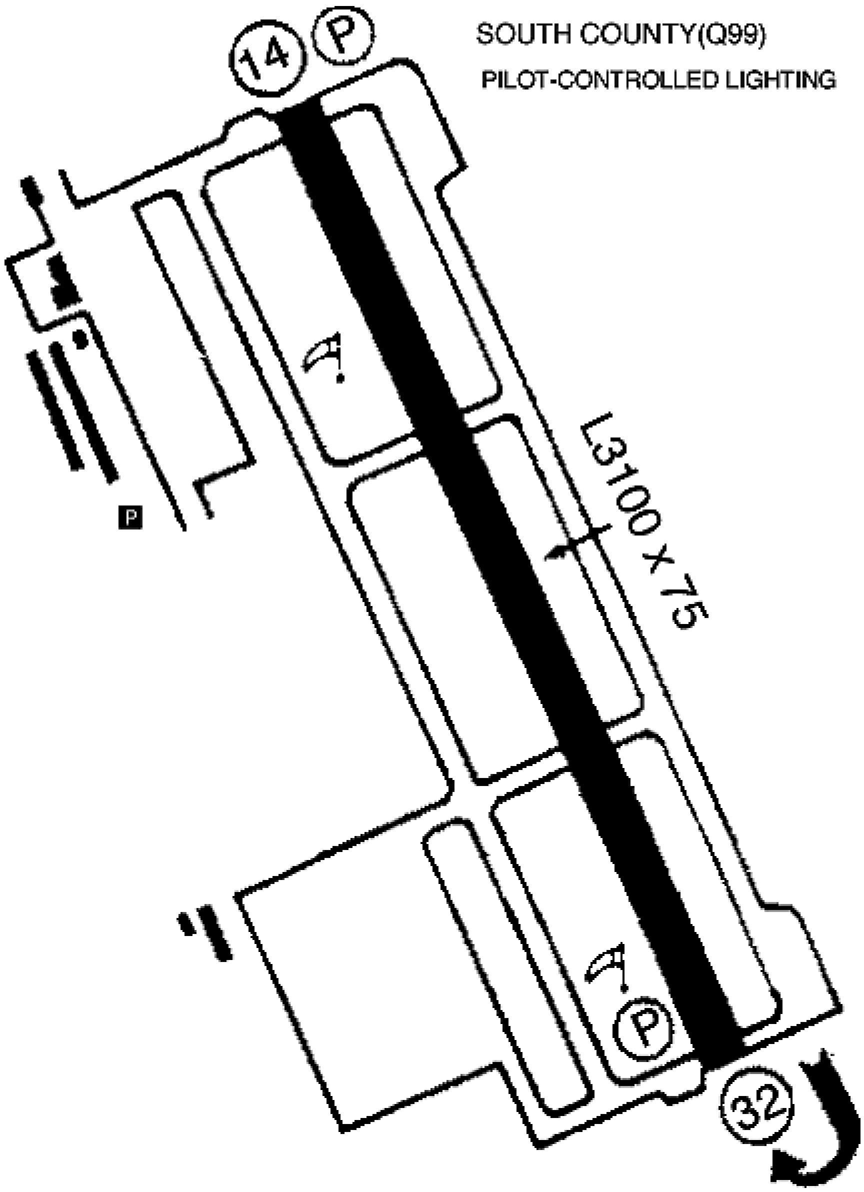
Sonoma Skypark (0Q9)



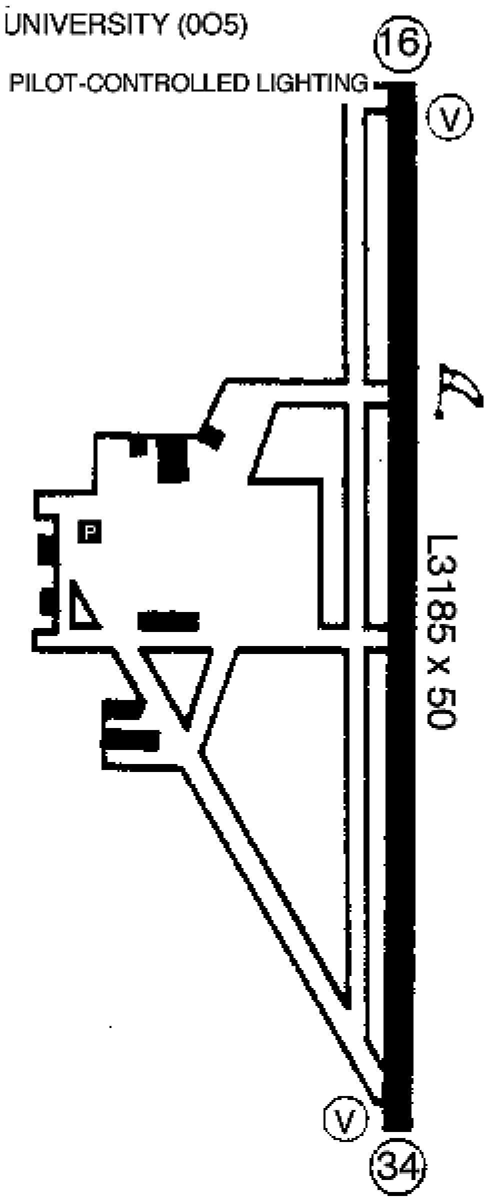
Sonoma Valley (0Q3)



South County (Q99)



University (0O5)



Radio Frequency Listings

The following are the frequencies used to listen to **ATIS** and **UNICOM**, to communicate with **ground**, **tower**, and **radar** controllers, to receive information from transmitters during **Instrument Landing Approaches**, and **dial up VOR Stations**. These frequencies are entered into the appropriate equipment located on the Radio Stack:

- **COM Radio Control Frequencies**
- **ILS NAV/COM Runway Frequencies**
- **VOR/DME Frequencies**

COM Radio Control Frequencies

These frequencies, used to listen to **ATIS** and **UNICOM**, and to communicate with **ground**, **tower**, and **radar** controllers, are entered into the **COM Radio**:

ATIS, UNICOM, GROUND, AND TOWER CONTROL FREQUENCIES

Airport FBO	*ATIS*	*Ground Control*	*Tower Control*
CONTROLLED			
Alameda NAS **(NGZ)**	**120.25**	**121.30**	**127.05**
Concord Buchanan **(CCR)**	**124.70**	**121.95**	**119.70**
Hayward **(HWD)**	**126.70**	**121.40**	**120.20**
Livermore **(LVK)**	**119.65**	**121.65**	**118.10**
Moffett Federal **(NUQ)**	**124.55**	**121.85**	**126.20**
Napa County **(APC)**	**124.05**	**121.70**	**118.70**
Oakland International **(OAK)**	**128.50**	**121.20**	**118.30**
Palo Alto **(PAO)**	**120.60**	**125.05**	**118.60**
Reid-Hillview **(RHV)**	**125.20**	**121.80**	**119.80**
Sacramento Executive **(SAC)**	**125.50**	**125.00**	**119.50**
San Carlos **(SQL)**	**125.90**	**121.60**	**119.00**
San Francisco International **(SFO)**	**135.45**	**121.15**	**120.50**
San Jose International **(SJC)**	**126.95**	**121.75**	**124.00**
Santa Rosa **(STS)**	**120.55**	**121.90**	**118.50**
Travis AFB **(SUU)**	**118.40**	**121.10**	**120.75**

Airport FBO	*UNICOM*	*Ground Control*	*Tower Control*
UNCONTROLLED			
Borges-Clarksburg **(C14)**	**122.90**	N/A	N/A
Byron **(C83)**	**123.05**		
Davis Woodland Winters **(2Q3)**	**123.00**		
Gnoss **(O56)**	**122.80**		
Half Moon Bay **(HAF)**	**122.80**		
Nut Tree **(O45)**	**122.70**		
Parrett **(2O3)**	**123.00**		
Petaluma **(O69)**	**122.70**		
Rio Vista **(O88)**	**122.80**		
Sonoma Skypark **(OQ9)**	**122.80**		
Sonoma Valley **(OQ3)**	**122.90**		
South County **(Q99)**	**122.70**		
University **(0O5)**	**122.80**		

RADAR CONTROL FREQUENCIES

Location	**Approach Frequency**
Bay (*San Francisco Airport—SFO*)	**134.50** **(Bay Approach)**
Travis (*Travis Air Force*	**126.60** **(Travis**
Base—SUU)	**Approach)**
Sacramento (*Sacramento Airport*)	**125.25** **(Sacramento Approach)**

ILS NAV/COM Runway Frequencies

These frequencies, used to dial-up the 14 ILS-equipped runways featured in *Flight II* during **instrument landing approaches**, are entered into the **ILS NAV/COM Radio**:

Airport	Runway Number	ILS Frequency
Livermore **(LVK)**	**7L**	**110.50**
Moffett Federal **(NUQ)**	**32R**	**110.35**
Oakland International **(OAK)**	**11**	**111.90**
Oakland International **(OAK)**	**27R**	**109.90**
Oakland International **(OAK)**	**29**	**108.70**
Sacramento Executive **(SAC)**	**2**	**110.30**
San Francisco International **(SFO)**	**19L**	**108.90**
San Francisco International **(SFO)**	**28R**	**111.70**
San Francisco International **(SFO)**	**28L**	**109.55**
San Jose International **(SJC)**	**12R**	**110.90**
San Jose International **(SJC)**	**30L**	**110.90**
Santa Rosa **(OQ9)**	**32**	**109.30**
Travis AFB **(SUU)**	**3L**	**108.35**
Travis AFB **(SUU)**	**21L**	**110.10**

VOR/DME Frequencies

These frequencies, used to receive broadcast signal information for the **9** VOR stations available in *Flight II*, are entered into the **NAV Radio**:

VOR Station	Identification	Location	Frequency
Oakland	**OAK**	37°43.6N - 122°13.4W	**116.80**
Point Reyes	**PYE**	38°04.8N - 122°52.1W	**113.70**
Sacramento	**SAC**	38°26.6N - 121°33.1W	**115.20**
San Francisco	**SFO**	37°37.2N - 122.24.4W	**115.80**
San Jose	**SJC**	37°22.5N - 121°56.7W	**114.10**
Santa Rosa	**STS**	38°30.5N - 122°48.6W	**113.00**
Sausalito	**SAU**	37°51.3N - 122°31.4W	**116.20**
Scaggs Island	**SGD**	38°10.8N - 122°22.4W	**112.10**
Woodside	**OSI**	37°23.5N - 122°16.9W	**113.90**

Learning the Aviation Alphabet

The aviation or phonetic alphabet is used for radio identification of aircraft and **ATIS** advisories. It prevents like-sounding letters (like 'C' and 'D') from being misheard and allows for unconstrained listening particularly during less than favorable communication conditions.

Alpha	**(AL-FAH)**
Bravo	**(BRAH-VOH)**
Charlie	**(CHAR-LEE)**
Delta	**(DELL-TAH)**
Echo	**(ECK-OH)**
Foxtrot	**(FOKS-TROT)**
Golf	**(GOLF)**
Hotel	**(HOH-TEL)**
India	**(IN-DEE-AH)**
Juliet	**(JEW-LEE-ETT)**
Kilo	**(KEY-LOH)**
Lima	**(LEE-MAH)**
Mike	**(MIKE)**
November	**(NO-VEM-BERR)**
Oscar	**(OS-CAR)**
Papa	**(PAH-PAH)**
Quebec	**(KEH-BECK)**
Romeo	**(ROW-ME-OH)**
Sierra	**(SEE-AIR-RAH)**
Tango	**(TANG-GO)**
Uniform	**(YOU-NEE-FORM)**
Victor	**(VIK-TAR)**
Whiskey	**(WISS-KEY)**
X-Ray	**(ECKS-RAY)**
Yankee	**(YANG-KEY)**
Zulu	**(ZOO-LOO)**

1 One	**(WUN)**
2 Two	**(TOO)**
3 Three	**(TREE)**
4 Four	**(FOW-ER)**
5 Five	**(FIVE)**
6 Six	**(SIX)**
7 Seven	**(SEVEN)**
8 Eight	**(AIT)**
9 Nine	**(NIN-ER)**
0 Zero	**(ZEE-RO)**

Flyable Aircraft Specifications and Callsigns

Piper Arrow (*Arrow Two Lima Golf*)

Gross Weight…...……2,600 lbs	*Service Ceiling*..…………......16,000 ft
Max Range....……..…....930 NM	*Rate of Climb*....………........910 FPM
Top Speed.......……........151 KIAS	*Stall Speed (FU)*….………......60 KIAS
Cruise Speed..……….....143 KIAS	*Stall Speed (FD)*….…….…......55 KIAS
Takeoff Speed……….......56 KIAS	*Engine RPM*.......……….......2,700 RPM
Landing Speed.……….....66 KIAS	*Engine Type*………...Lycoming 200 hp
Glide Speed...…………......85 KIAS	*Propeller*.....……………......Variable Pitch

De Havilland Beaver (*Beaver Three Lima Golf*)

Gross Weight……...…...5,090 lbs	*Service Ceiling*……………......15,750 ft
Max Range...……….....…...405 NM	*Rate of Climb*....……………....740 FPM
Top Speed....……..........124 KIAS	*Stall Speed (FU)*……......…....52 KIAS
Cruise Speed..……….......106 KIAS	*Stall Speed (FD)*……......…....39 KIAS
Takeoff Speed…....…….55 KIAS	*Engine RPM*......……………...2,200 RPM
Landing Speed.……........65 KIAS	*Engine Type*……………...P&W 450 hp
Glide Speed.....………....80 KIAS	*Propeller*……....……......Variable Pitch

Beechcraft Baron (*Baron Four Lima Golf*)

Gross Weight....……….4,886 lbs	*Service Ceiling*...…...……….20,688 ft
Max Range....…….……..1,050 NM	*Rate of Climb*......…...……...2,000 FPM
Top Speed......………....188 KIAS	*Stall Speed (FU)*....………......80 KIAS
Cruise Speed...……...….170 KIAS	*Stall Speed (FD)*...……....…..71 KIAS
Takeoff Speed……….....…85 KIAS	*Engine RPM*.........………......2,700 RPM
Landing Speed..…....….. 90 KIAS	*Engine Type*…...……....Teledyne 300 hp
Glide Speed.....……….115 KIAS	*Propeller*......………….…Variable Pitch

P-51D Mustang (*Mustang One Lima Golf*)

Gross Weight....………...9,000 lbs	*Service Ceiling*...……………...42,009 ft
Max Range...……………...907 NM	*Rate of Climb*...……....…...2,400 FPM
Top Speed.....……........395 MPH	*Stall Speed (FU)*………….......93 MPH
Cruise Speed..……….......292 MPH	*Stall Speed (FD)*………….......86 MPH
Takeoff Speed..………......110 MPH	*Engine RPM*......……………....3,300 RPM
Landing Speed.……......115 MPH	*Engine Type*.……...RR Merlin 1,612 hp
Glide Speed.....……….....175 MPH	*Propeller*....…………….Variable Pitch

Trainer (*Trainer Five Lima Golf*)

Gross Weight....……...…...2300 lbs	*Service Ceiling*......……...……14,200 ft
Max Range........……………..692 NM	*Rate of Climb*.........…………….645 FPM
Top Speed..........……......115 KIAS	*Stall Speed (FU)*......…………47 KIAS
Cruise Speed.....……….109 KIAS	*Stall Speed (FD)*......………....41 KIAS
Takeoff Speed....…………..55 KIAS	*Engine RPM*..........……….....2,700 RPM
Landing Speed..………….65 KIAS	*Engine Type*..………......Lycoming 150 hp
Glide Speed.......……...…69 KIAS	*Propeller*.....…….…...…Constant Pitch

Aircraft Instrument and Systems Tables

These tables indicate which **cockpit instruments** can and cannot be found on the cockpit panels of each of the five flyable aircraft featured in *Flight II*:

- **VFR Cockpit View**
- **IFR Cockpit View**

VFR Instrument and Systems Table

*A **check** mark indicates the instrument or system can be found on the cockpit panel of the given aircraft:*

	Trainer	*Piper Arrow*	*P-51D*	*Beaver*	*Beech Baron*
Flight Instruments					
Accelerometer			✔		
Airspeed Indicator (ASI)	✔	✔	✔	✔	✔
Altimeter	✔	✔	✔	✔	✔
Attitude Indicator (AI)	✔	✔	✔	✔	✔
Directional Gyro (DG)	✔	✔	✔	✔	✔
Turn/Slip Indicator					
Vertical Speed Indicator (VSI)					
Navigation Instruments					
Clock	✔	✔	✔	✔	✔
Distance Measuring Equipment (DME)	✔	✔			✔
ILS Marker Beacon Lights	✔	✔	✔		✔
ILS Radio	✔	✔	✔		✔
ILS Receiver					
NAV Radio	✔	✔			✔
VOR Indicator	✔	✔	✔		✔
Communication Instruments					
COM Radio	✔	✔	✔	✔	✔
Transponder (XPNDR)					
Flight Controls and Lighting System					
Elevator Trim Indicator					
Flaps Indicator					

Landing Gear Controls					
Mixture Control					
NAV Lights Switch					
Propeller Control					
Rudder Trim Indicator					
Selected Engine Indicator					
Throttle Control					
Elevator Trim Indicator					
Engine Instruments					
Carburetor Heat					
Fuel Gauge[s]					
Fuel Tank Switch					
Manifold Pressure Gauge					
Oil Temperature Gauge					
Oil Pressure Gauge					
Propeller RPM Indicator					

IFR Instrument and Systems Table

*A **check** mark indicates the instrument or system can be found on the cockpit panel of the given aircraft:*

	Trainer	*Piper Arrow*	*P-51D*	*Beaver*	*Beech Baron*
Flight Instruments					
Accelerometer			✔		
Airspeed Indicator (ASI)	✔	✔	✔	✔	✔
Altimeter	✔	✔	✔	✔	✔
Attitude Indicator (AI)	✔	✔	✔	✔	✔
Directional Gyro (DG)	✔	✔	✔	✔	✔
Turn/Slip Indicator	✔	✔	✔	✔	✔
Vertical Speed Indicator (VSI)	✔	✔	✔	✔	✔
Navigation Instruments					
Clock	✔	✔	✔	✔	✔
Distance Measuring Equipment (DME)	✔	✔	✔		✔
ILS Marker Beacon Lights	✔	✔	✔		✔
ILS Radio	✔	✔	✔		✔
ILS Receiver	✔	✔	✔		✔
NAV Radio	✔	✔	✔		✔
VOR Indicator	✔	✔	✔		✔
Communication Instruments					
COM Radio	✔	✔	✔	✔	✔
Transponder (XPNDR)	✔	✔	✔	✔	✔
Flight Controls and Lighting System					
Elevator Trim Indicator	✔	✔	✔	✔	✔
Flaps Indicator	✔	✔	✔	✔	✔

Landing Gear Controls		✔	✔	✔	✔
Mixture Control	✔	✔		✔	✔
NAV Lights Switch	✔	✔	✔	✔	✔
Propeller Control		✔		✔	✔
Rudder Trim Indicator			✔		✔
Selected Engine Indicator					✔
Throttle Control	✔	✔		✔	✔
Elevator Trim Indicator	✔	✔	✔	✔	✔
Engine Instruments					
Carburetor Heat	✔				
Fuel Gauge[s]	✔	✔	✔	✔	✔ **(Dual)**
Fuel Tank Switch		✔			
Manifold Pressure Gauge		✔	✔	✔	✔ **(Dual)**
Oil Temperature Gauge	✔	✔	✔	✔	✔ **(Dual)**
Oil Pressure Gauge	✔	✔	✔	✔	✔ **(Dual)**
Propeller RPM Indicator	✔	✔	✔	✔	✔ **(Dual)**

Helpography

The following books were indispensible in the creation of this Online Manual:

Boyer, Phil, **AOPA's Aviation USA (1996 Edition)**. Aircraft Owners and Pilots Association, Frederick, Maryland (1995).

DHC-2 Beaver Flight Manual (Revision 10). The de Havilland Aircraft of Canada, Limited, Downsview, Ontario (1985).

Gleim, Irvin N. **Pilot Handbook (Fifth Edition)**. Gleim Publications, Inc., Gainesville, Florida (1995).

Gleim, Irvin N. **Private Pilot: Flight Maneuvers (Second Edition)**. Gleim Publications, Inc., Gainesville, Florida (1992).

Machado, Rod. **Instrument Pilot's Survival Manual**. The Aviation Speakers Bureau, San Clemente, California (1991).

Machado, Rod. **Private Pilot Handbook**. The Aviation Speakers Bureau, San Clemente, California (1996).

Petersen, George A. **Pilot Training Manual for the Mustang (Reprinted)**, National Capital Historical Sales, Inc., Springfield, Virginia (1945).

Piper Cherokee Arrow 200 Owner's Handbook. Publications Department, Piper Aircraft Corporation, Vero Beach, Florida (1987).

Private Pilot Manual. Jeppesen Sanderson, Englewood, Colorado (1996).

Raytheon Aircraft Beechcraft Baron 58 Pilot's Operating Handbook (A4 Revision). Commercial Publications Beech Aircraft Corporation, Wichita, Kansas (1994).

Spence, Charles F. **AIM/FAR 1997 Aeronautical Information Manual/Federal Aviation Regulations**. McGraw-Hill, New York City, New York (1997).

Aviation Glossary

Absolute Ceiling
Accelerometer
Active Runway
Adverse Yaw
AGL
Ailerons
Airport Advisory
Airport Elevation
Airport Rotating Beacon
Airspeed Indicator
Air Traffic Control (ATC)
Altimeter
Attitude Indicator (AI)
ATIS (Automatic Terminal Information Service)
Aviation Alphabet
Bearing to a VOR station
Blackout or G-induced Loss Of Consciousness (GLOC)
Carburetor Heat Control
Class B Airspace
Class C Airspace
Closed Traffic Approach
Cloud Deck
Common Traffic Advisory Frequency (CTAF)
Compass Rose
Control Surfaces
Controlled Airport
Controlled Airspace
Copy
Course
Course Deviation Indicator (CDI)
Crosswind
Dead Reckoning
Decision Height (DH)
Departure Control
Directional Gyro (DG)
Distance Measuring Equipment (DME)
Military Operations Area (MOA)
Minimum Controllable Airspeed
MSL (Mean Sea Level)
Nautical Mile (NM)
Navigational Aid (NAVAID)
NAV Radio
Oil Pressure Gauge
Oil Temperature Gauge
Outer Marker (OM)
P-Factor
Pilotage
Pilot-Controlled Lighting (PCL)
Pitch
Pitot Tube
Position Report
Precision Approach Path Indicator (PAPI)
Propeller RPM Indicator
Radar Contact
Radar Flight Following
Radial
Ramp
Redline
Redout
Restricted Airspace
Roger
Roll
Rudder
Rudder Trim Indicator
Runway Alignment Indicator Lights (RAIL)
Runway End Identifier Lights (REIL)
Runway Heading
Runway Edge Lights
Sectional Map
Selected Engine Indicator
Sequenced Flashing Lights (SFL)
Spin

Drag
Elevator
Engine RPM Indicator (Tachometer)
FBO or Fixed Base Operation
Feathered Propeller
Fixed Pitch Propeller
Flaps
Flaps Indicator
Flight Plan
Glidepath
Glideslope Indicator
Go Around
Grayout
Groundspeed
Guard Frequency
Horizontal Stabilizer
IFR Conditions
Instrument Flight Rules (IFR)
Instrument Landing System (ILS)
KIAS
Knot
Landing Gear Lever
Level Flight
Lift
Logbook
Low Approach
Magnetic Compass
Magnetic Heading
Manifold Pressure
Manifold Pressure Gauge
Mayday
Middle Marker (MM)
Squawk
Stall
Standard Rate Turn
Stick
Straight-In-Approach VFR
Tailwind
Taxiway
Taxiway Lighting
Thermal
Throttle
Touch and Go
Traffic Pattern
Transponder (XPNDR)
Trim
Trim Indicator
Turbulence
Turning Point
Turn/Slip Indicator
Uncontrolled Airport
UNICOM
Vector
Vertical Speed Indicator (VSI)
Vertical Stabilizer
Very High Frequency (VHF)
Visual Approach Slope Indicator (VASI)
Visual Flight Rules (VFR)
VOR Station (NAVAID)
VOR Indicator
Wilco
Windshear
Yaw
Yoke

Troubleshooting and Performance Issues

Check Out the README!

Please refer to the accompanying README file for last minute information and updates not covered in the *Flight Unlimited II* Online Manual:

{button Click HERE to View the README!,EF(`readme.wri',`42',1)}

Preparing Your Hard Drive

To ensure that your installation is trouble free, you should check to see that your hard drive and file system are both tuned for optimum performance. Windows 95 comes with two utility programs that find and fix any errors and optimize your hard drive's performance:

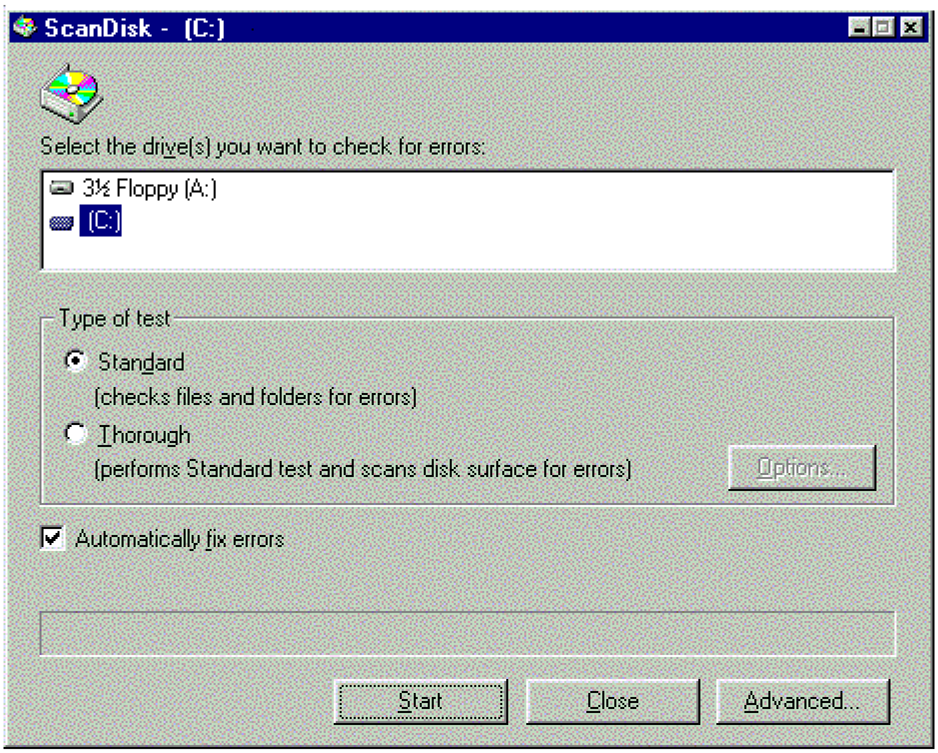
- **ScanDisk**
- **Defrag**

ScanDisk

Run the **ScanDisk** utility that comes with Windows 95 (or similar 3rd party file-checking utility) to ensure that the files on your system are not corrupted. This is especially important if the game is mysteriously crashing on a frequent basis.

You do this as follows:

1) From the Windows 95 desktop, select the **START** button, followed by PROGRAMS, then ACCESSORIES, then SYSTEM TOOLS.
2) Locate **ScanDisk** from the drop-down menu and click on it. This will bring up the **ScanDisk** panel:



3) Highlight the drive where *Flight Unlimited II* was installed by clicking on it.
4) **OPTIONAL:** Leave the **Automatically fix errors** box unchecked (which is disabled by default) so that you will be prompted when errors are discovered and allowed to fix problems on an individual basis.
5) Now click on the **Start** button. Follow the onscreen prompts to complete the process.

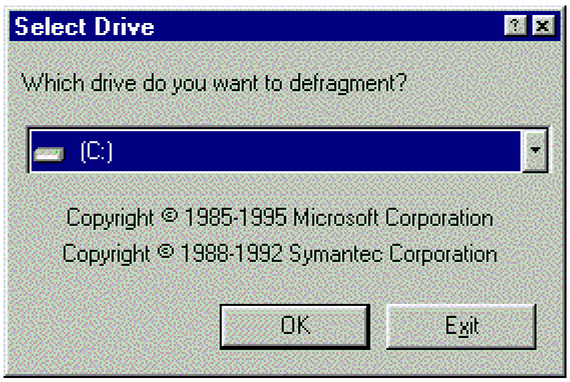
This process is normally directly followed by **Defragmenting** (also known as “defragging”) your hard drive.

Defrag

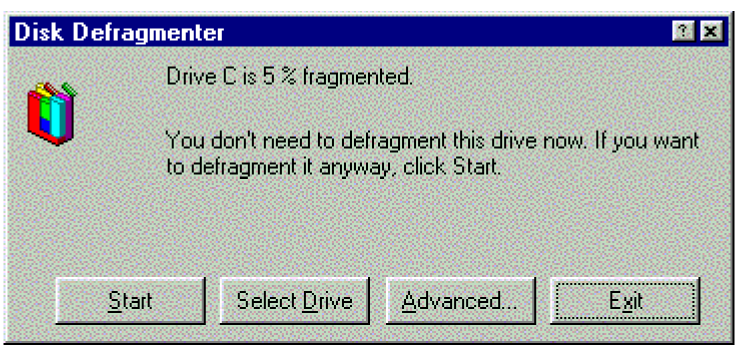
Run **Disk Defragmenter** for Windows 95 (or similar file-checking utility) to ensure that the files on your system are not corrupted.

You do this as follows:

1) From the Windows 95 desktop, select the **START** button, followed by PROGRAMS, then ACCESSORIES, then SYSTEM TOOLS.
2) Locate the **Disk Defragmenter** from the drop-down menu and click on it. This will bring up the **Select Drive** panel:



3) Select on the drive where *Flight Unlimited II* was installed (you may have to click on the arrow to the right of the box to open the drop-down menu).
4) Click on the **OK** button to bring up the **Disk Defragmenter** panel:



5) Click on the **Start** button to begin the process. (***Note** that defragmentation can take anywhere from a few minutes to upwards of one hour depending on both the size of the hard drive and the severity of the fragmentation, so please be patient.*)

This process is normally directly preceded by **File-Checking (e.g. scanning)** your hard drive.

Joystick Setup and Calibration Issues

- Joystick Not Working
- Joystick Driver Installation
- Joystick Calibration

Joystick Not Working

If your joystick is not working with *Flight II*, there are two likely reasons:

A) You need DirectX compatible drivers.

B) It is not setup properly in Windows 95.

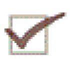
Let's check:

1. Double-click on the **MY COMPUTER** icon on your Windows 95 Desktop. One of the icons in this panel should read **CONTROL PANEL**.

2. Double click on **CONTROL PANEL**. Within this panel, you should see an icon the reads **GAME CONTROLLERS**.

NOTE: The **GAME CONTROLLERS** icon used to be labeled **JOYSTICKS**, however, DirectX 5.0 has changed the way joysticks are handled in Windows 95. Both the icon and interface are now different. If the icon in your control panel still reads **JOYSTICKS**, then DirectX 5.0 may not be installed correctly, or not at all.

3. Double-click on the **GAME CONTROLLERS** icon to bring up the **GAME CONTROLLERS PANEL**:



4. Click on the **ADD** button from the **GAME CONTROLLERS PANEL**. Scroll down this list and look for the brand and make of your joystick. In some instances, you will not find your joystick in the list Windows gives you. In this case, you should find a setup that best describes your controller's abilities. You should also check to see whether or not your joystick/controller has new drivers available for it. You can find these drivers on the relevant manufacturer's web site.

5. If your joystick does not appear on this list and has a throttle, configure it as a THREE axis, TWO (or four) button joystick.

6. If you are using rudders, make sure you put a check mark in the **RUDDER** box before calibrating the joystick. (To access, click on the **PROPERTIES** button on the **GAME CONTROLLERS PANEL**.)

7. If you do not check off rudders here, *Flight II* will not recognize them.

8. Now **calibrate** and test your joystick.

Joystick Driver Installation

What if my joystick is not listed in the GAME CONTROLLERS panel, but I have the driver for it on a disk?

1. Double-click on the **MY COMPUTER** icon on your Windows 95 Desktop. One of the icons in this panel should read **CONTROL PANEL**.

2. Double click on **CONTROL PANEL**. Within this panel, you should see an icon the reads **GAME CONTROLLERS**.

NOTE: The **GAME CONTROLLERS** icon used to be labeled **JOYSTICKS**, however, DirectX 5.0 has changed the way joysticks are handled in Windows 95. Both the icon and interface are now different. If the icon in your control panel still reads **JOYSTICKS**, then DirectX 5.0 may not be installed correctly, or not at all.

3. Double-click on the **GAME CONTROLLERS** icon to bring up the **GAME CONTROLLERS PANEL**.

4. Click on the **ADD** button from the **GAME CONTROLLERS PANEL**, followed by the **ADD OTHER** button.

5. This should bring you to a screen that has a list of manufacturers on the left and models on the right. Below this list, you should see a button marked **HAVE DISK**. Click on this button.

6. This screen will prompt you to put the disk into drive A: and click **OK**. A list should appear that has your controller's name and model on it. Highlight your controller and click **OK**. Windows should take care of the rest.

NOTE: Have your Windows 95 CD or floppies handy, since you may be prompted to insert them during your controller's installation.

7. Go back and choose your joystick from the list (it should be there now). Just follow the joystick setup and calibration procedures above, and you should be all set.

Joystick Calibration

My joystick is acting wacky! The planes are uncontrollable. What can I do?

You need to **calibrate your joystick**.   Here's how:

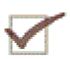
A) Calibrating from Windows 95:

1. Double-click on the **MY COMPUTER** icon on your Windows 95 Desktop. One of the icons in this panel should read **CONTROL PANEL**.

2. Double click on **CONTROL PANEL**. Within this panel, you should see an icon the reads **GAME CONTROLLERS**.

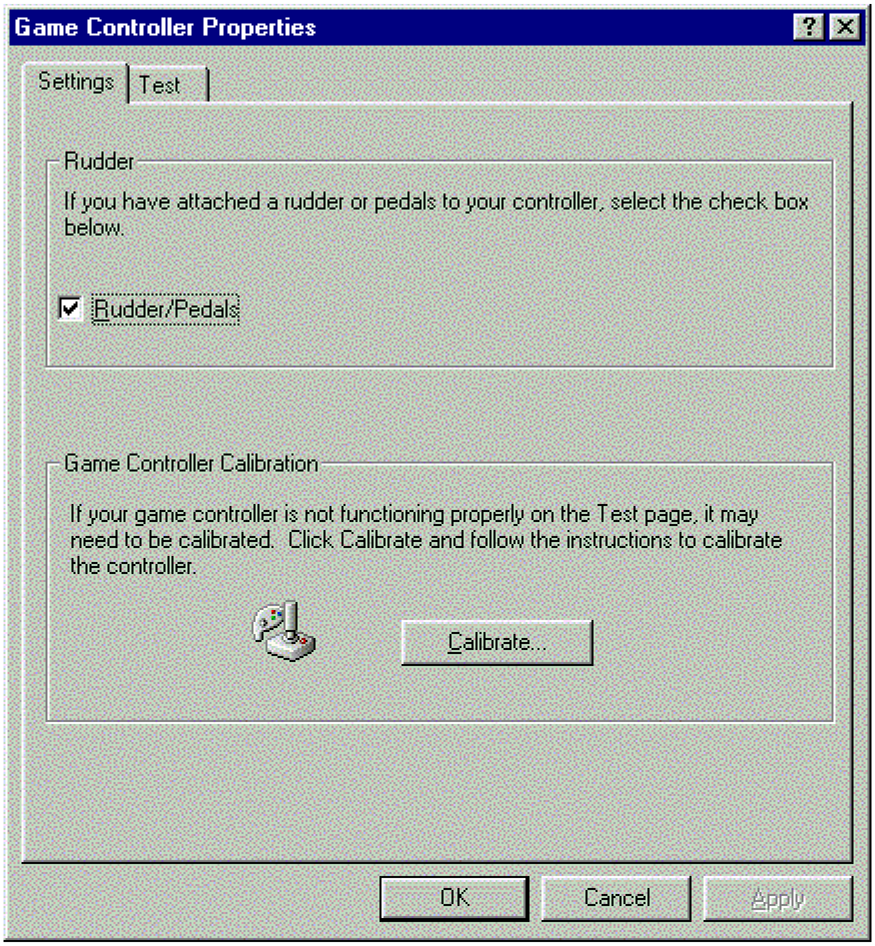
NOTE: The **GAME CONTROLLERS** icon used to be labeled **JOYSTICKS**, however, DirectX 5.0 has changed the way joysticks are handled in Windows 95. Both the icon and interface are now different. If the icon in your control panel still reads **JOYSTICKS**, then DirectX 5.0 may not be installed correctly, or not at all.

3. Double-click on the **GAME CONTROLLERS** icon to bring up the **GAME CONTROLLERS PANEL**.



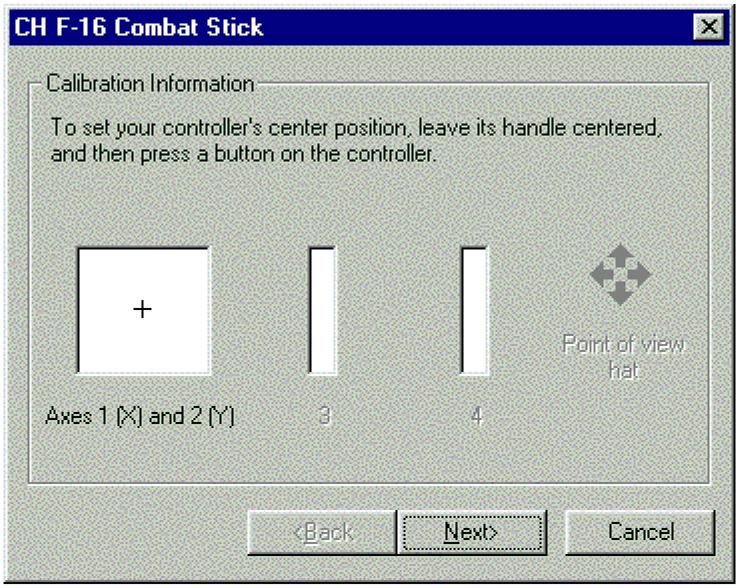
4. Once there you should see a button that reads **PROPERTIES**. Click on this button.

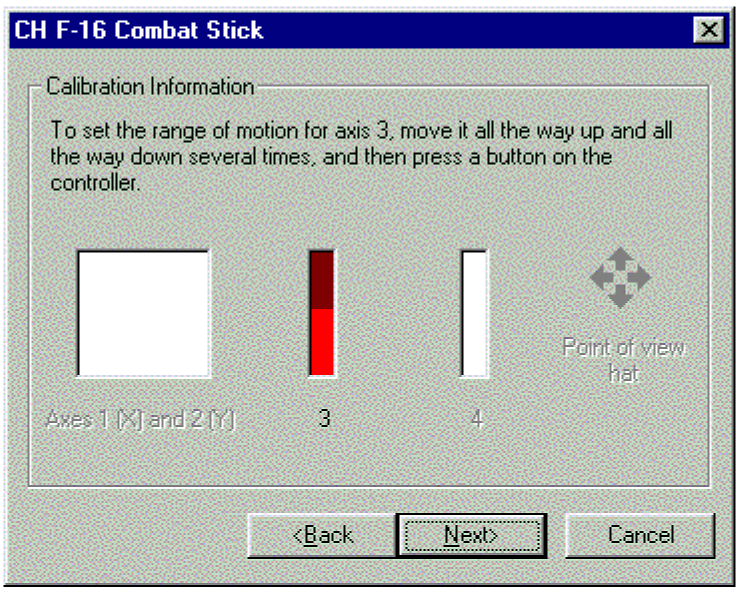
5. Next, you should see a button on the lower half of this screen labeled **CALIBRATE**.

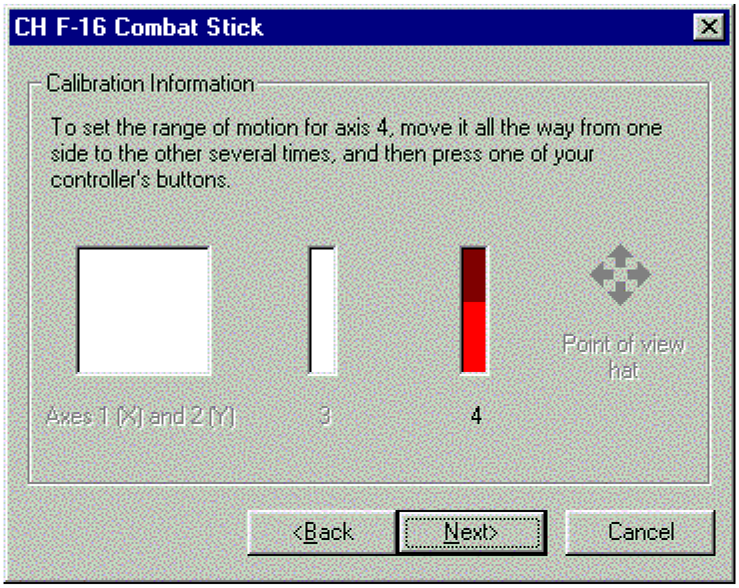


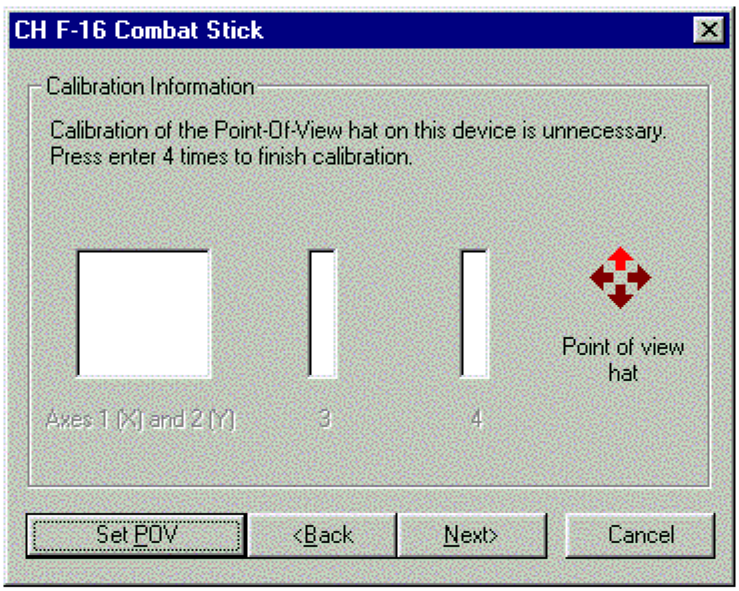
6. If you are using rudders, make sure you put a check mark in the **RUDDER** box before calibrating the joystick. (To access, click on the **PROPERTIES** button on the **GAME CONTROLLERS PANEL**.)

7. Just follow the onscreen directions:

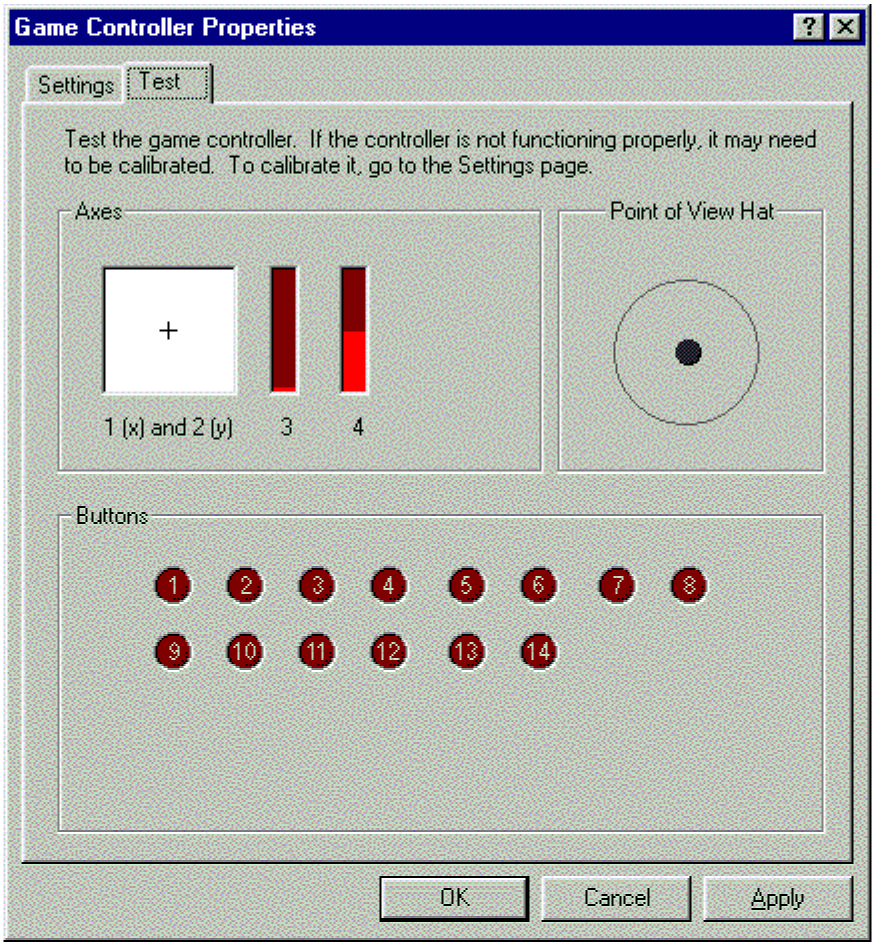

CH F-16 Combat Stick
Calibration Information
To set your controller's center position, leave its handle centered, and then press a button on the controller.
Point of view hat
Axes 1 (X) and 2 (Y)
3
4
<Back
Next>
Cancel


CH F-16 Combat Stick
Calibration Information
To set the range of motion for axis 3, move it all the way up and all the way down several times, and then press a button on the controller.
Point of view hat
Axes 1 (X) and 2 (Y)
3
4
<Back
Next>
Cancel





When ready, test your new settings:

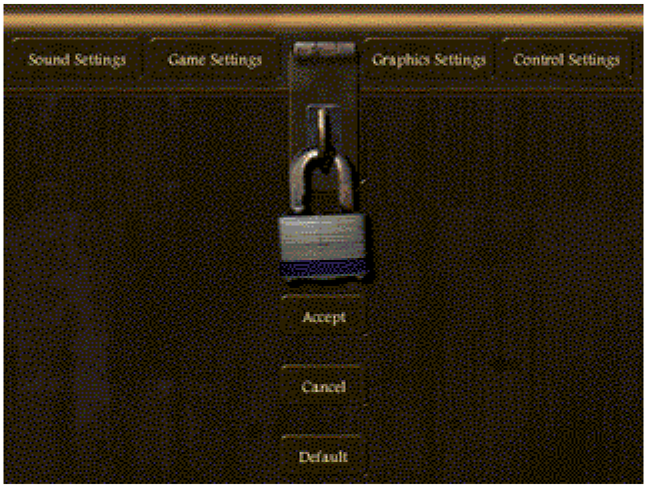


Then click on the **APPLY** button.

NOTE: When it prompts you to "**Set the range of motion for Axis 3**," it is referring to your throttle; axis 4 is your rudders.

B) Calibrating from within Flight Unlimited II:

1. From the *Main Menu*, click on the **OPTIONS** icon (you may also click on the *Toolbox* icon from any FBO) to proceed to the *Options* screen:



2. Next click on the **CONTROL SETTINGS** button in the upper right-hand corner of the screen to proceed to the **GAME CONTROLLERS PANEL** screen.

3. Once there, you should see a button that reads **PROPERTIES**. Click on this button.

5. Next, you should see a button on the lower half of this screen labeled **CALIBRATE**.

6. If you are using rudders, make sure you put a check mark in the **RUDDER** box before calibrating the joystick. (To access, click on the **PROPERTIES** button on the **GAME CONTROLLERS PANEL**.)

7. Just follow the onscreen directions. Then click the **FINISH** button, followed by **APPLY**.

NOTE: When it prompts you to "**Set the range of motion for Axis 3**," it is referring to your throttle; axis 4 is your rudders.

Here are the URL's for some of the major Joystick manufacturers. Check with them for new drivers for your control devices.

CH Products **www.chproducts.com**
Thrustmaster **www.thrustmaster.com**
Gravis **www.gravis.com**
Microsoft **www.microsoft.com/kb/**
Logitech **www.logitech.com**

Install/Setup Issues

- What are the system requirements?
- Why doesn’t the AUTOPLAY feature come up when I insert the FlightUnlimited II CD into the CD-ROM drive?
- Will Flight Unlimited II run on my Windows NT computer?

System Requirements

What are the system requirements for *Flight Unlimited II*?

The **minimum** system requirements are as follows:

COMPUTER:
IBM PC or 100% compatible
OPERATING SYSTEM:
Microsoft Windows 95
CPU:
Pentium 120 MHz
RAM:
16 Mb
GRAPHICS:
1 Mb SVGA video card (100% DirectX 5.0-compatible)
SOUND:
Windows 95-compatible sound card (100% DirectX 5.0-compatible)
CD-ROM:
Quad-speed (4x) CD-ROM drive
HARD DRIVE:
190 Mb free disk space
INPUT DEVICES:
100% Windows 95 compatible mouse, keyboard, and all major joysticks supported

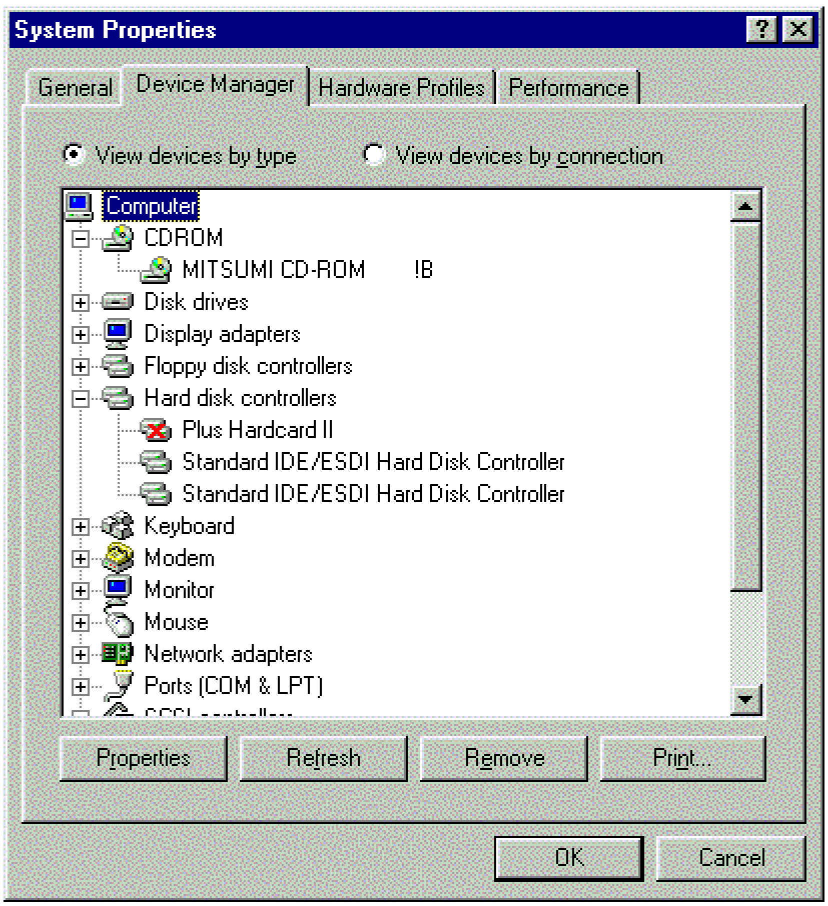
The **recommended** system specs are as follows:
CPU:
Pentium 200 MHz (or greater)
RAM:
32 Mb
GRAPHICS:
2 Mb SVGA video card (100% DirectX 5.0-compatible)
CD-ROM:
Six-speed (6x) CD-ROM drive
HARD DRIVE:
225 Mb free disk space (with Help file and all pilot voices)
INPUT DEVICES:
DirectX 5.0-compatible programmable joystick

Autoplay

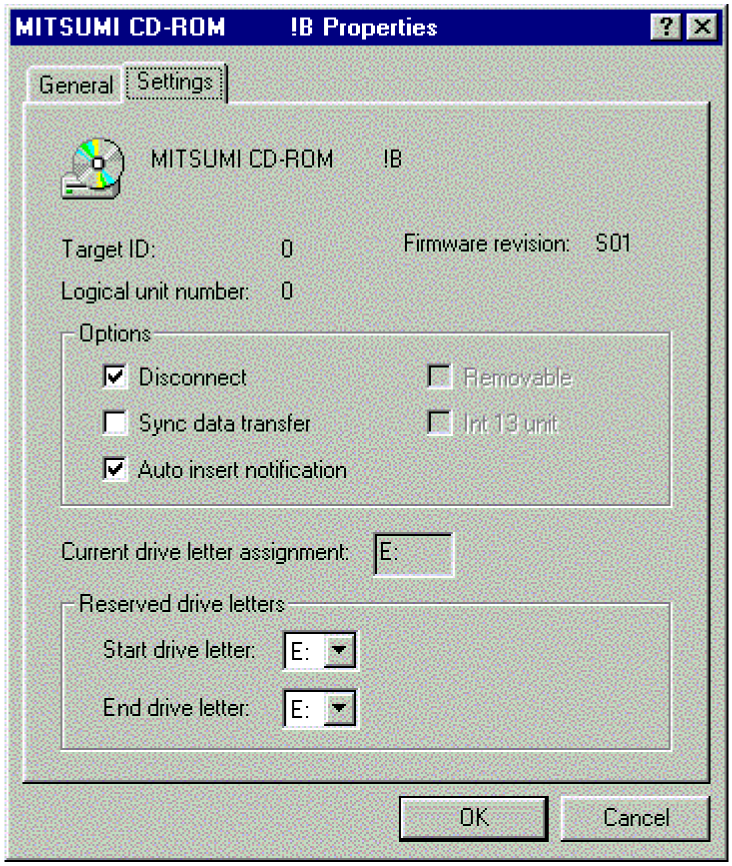
Why doesn't the AUTOPLAY feature come up when I insert the *Flight Unlimited II* CD (Disk 1) into the CD-ROM drive?

This is usually a configuration issue. There are many different ways to enable the AUTOPLAY functions of Windows 95. The standard method is described below:

1) Enter the Windows 95 **CONTROL PANEL** from the desktop by clicking on the **START** button, SETTINGS and then **CONTROL PANEL**.
2) Double-click the icon labeled **SYSTEM**, usually located alphabetically towards the bottom of the **CONTROL PANEL** window, to bring up the **System Properties** panel:



3) Click on the tab at the top labeled **Device Manager** and when the new panel appears, locate the section labeled **CD-ROM** and click on the **PLUS (+)** sign in front of it. (If there is a minus sign in front, <u>don't</u> click it.)
4) Now double-click on the CD-ROM drive that is revealed and the **CD-ROM Properties** panel will appear:



5) Click on the **Settings** tab at the top.
6) Towards the middle of the panel, you should see a few checkboxes within the **Options** section. At the bottom of that section, you should see a checkbox labeled **Auto insert notification**.
7) Make sure there is a check mark in the box provided. Then click on the **OK** button to complete the process.

Windows NT

Will *Flight Unlimited II* run on my Windows NT computer?

Flight Unlimited II will NOT run under Windows NT. This program was designed exclusively for the Windows 95 operating system.

DirectX-Related Questions

- What is DirectX and do I need it to run Flight Unlimited II?
- How do I install DirectX?
- How do I know which version of DirectX I have? Will it run with an older version? And if I do, indeed, have an older version of DirectX, where can I get the latest one?
- How do I manually install the DirectX drivers?
- Help! Flight Unlimited II has hosed my system, and I suspect that DirectX is the culprit. How can I restore my original drivers?
- Ahh! I cannot use DirectX on my computer! Is there any other way to run Flight Unlimited II?
- Direct 3D Support

What is DirectX?

What is DirectX and do I need it to run *Flight Unlimited II*?

DirectX is a *Microsoft* product that allows software and hardware developers to utilize Windows 95 to its best potential. It is still a fairly new technology and as such has some compatibility issues. Video card and sound card manufacturers need to develop special drivers for their cards that work directly with it. Many already have and most are currently writing them. Unfortunately, this takes time.

Flight Unlimited II, in part, uses DirectDraw, a component of DirectX. If you have older DirectDraw drivers installed on your system, or if you installed the DirectX 5.0 drivers that came with our program and they are incompatible with your video card, you should contact either the vendor of your system or the manufacturer of the video card for their most recent drivers. Video card manufacturers, in particular, generally update their drivers every 2-3 months or so. Depending on the card you have and who makes it, there is a good chance there will be new drivers available. If you do not already have Internet access, we highly recommend you get it because most driver updates are easily accessible on the home pages of the various hardware manufacturers.

Flight Unlimited II, in part, also uses DirectSound, another component of DirectX. This means further driver issues involving your sound card. Once again, we recommend contacting the manufacturer of the card for the latest 100% Windows 95 DirectX 5.0-compatible drivers to ensure optimum performance.

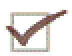
DirectX Installation

How do I install DirectX?

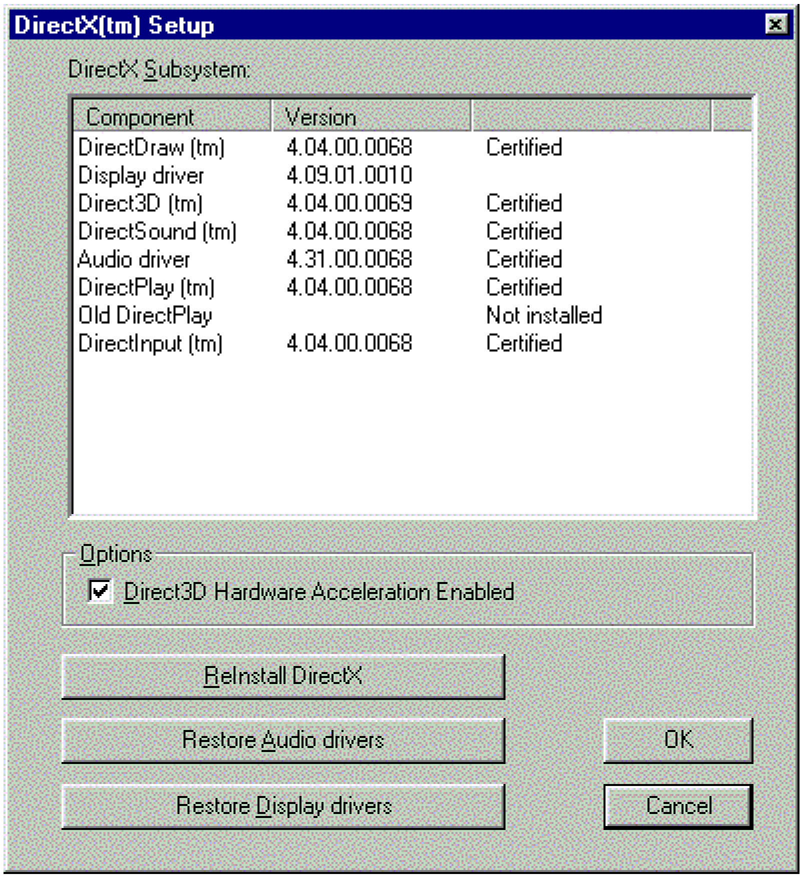
Microsoft's DirectX 5.0 is included with the *Flight Unlimited II* installer. You will be given the option to install it through a pop-up panel:

Click on the **Install DirectX** button to begin:.

1) If you forget, you may install it at a later time through the **Launch** panel (brought up by simply inserting the *Flight Unlimited II* **Disk 1** CD into the CD-ROM drive):



2) Click on the button labeled **Install DirectX** to bring up the aforementioned **Install DirectX Information** panel, then click on the Install DirectX button to bring up the **DirectX Setup** panel:



Note the following before you proceed:

- If a given *Component* listing says **Certified**, then this component IS 100% *Microsoft* DirectX 5.0 compatible and should run well with *Flight Unlimited II*.
- If a given *Component* listing is **blank**, then this component is NOT DirectX 5.0 certified. This probably means that you have updated drivers on your system which were not available when this version of DirectX was released. This means that the driver[s] may OR may not run well with our program.
- If a given *Component* listing says **NO HARDWARE SUPPORT**, then this component is NOT supported by DirectX at all. You will have to update the relevant hardware driver to eliminate this message or you will, in all likelihood, experience problems running *Flight Unlimited II*. If necessary, contact your system vendor for further details and please make sure your new drivers are DirectX 5.0 compliant.
- You may safely disregard the **Not Installed** message for *Old DirectPlay*.

3) Click on the **ReInstall DirectX** button. The setup process will now commence. If the following message appears:

"*Setup has detected display drivers that have not been tested with DirectX. To get the best game performance, setup can replace your existing drivers. Do you want setup to replace* *the drivers?*"

Make sure you select the **NO** button, so you do not overwrite or potentially corrupt your native display drivers. (***Note****, however, that if problems persist after the installation, you may want to repeat steps 1 through 3 and select* **YES** *to this option instead. Remember: you have the option to* **restore your original drivers** *later if things go awry.*)

4) You will finally be asked to reboot your machine. Select the **YES** button to restart and initialize the new drivers.

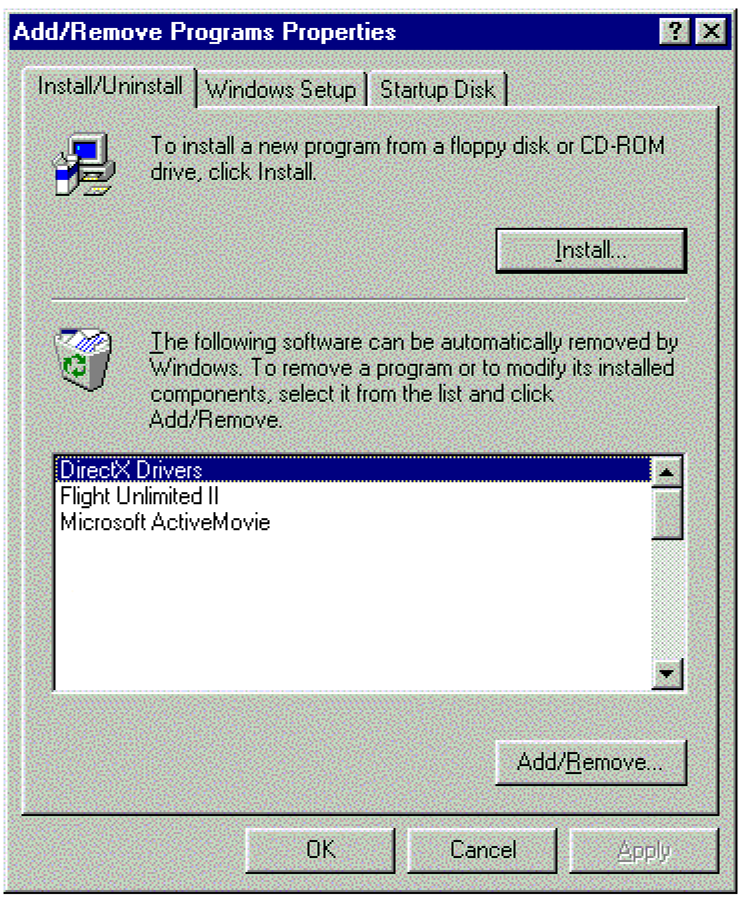
DirectX Version

How do I know which version of DirectX I have? Will it run with an older version? And if I do, indeed, have an older version of DirectX, where can I get the latest one?

The *Flight Unlimited II* installer will do its best to autodetect which version of DirectX currently resides on your system, and then prompt you for any necessary changes. **DirectX 5.0** is the latest version of DirectX. This is the version that ships with *Flight Unlimited II* and was thoroughly tested with it. It is highly recommended that you have DirectX 5.0 either installed by *Flight Unlimited II* or previously installed for optimum performance.

There are currently a few different versions of DirectX in general circulation. With the release of DirectX 5.0 in the Summer of 1997, *Microsoft* has been generous enough to include a listing for these drivers in the ADD/REMOVE PROGRAM section of the Windows 95 ***CONTROL PANEL***.

To get there, click on the **START** button, go up to SETTINGS, and over to the **CONTROL PANEL**. Within the **CONTROL PANEL** window, you should see an icon towards the top labeled ADD/REMOVE PROGRAMS. Double-click that icon and the **Add/Remove Programs Properties** panel will appear:



If you do NOT see a listing for "**DirectX Drivers**," DirectX 5.0 hasn't been fully installed on your system. If this listing is present, to determine specifically which version is installed (either 1.0, 2.0 or 3.0), you will need to check the date next to the **DDRAW.DLL** file located in your C:\WINDOWS\SYSTEM or C:\WIN95\SYSTEM directory in *Windows Explorer*:

- If the date adjacent to this file reads **9/27/95**, you have DirectX Version **1.0** installed on your system.
- If the date adjacent to this file reads **5/29/96**, then you have DirectX Version **2.0** installed on your system.
- If the date adjacent to this file reads **9/13/96**, you have DirectX Version **3.0** installed on your system.
- If the date adjacent to this file reads **7/14/97**, you have DirectX vVersion **5.0** installed on your system.

We have found that the newer versions of DirectX (specifically 3.0 and 5.0) have shown to be more stable across a wider variety of video chipsets and additionally include support for a wider variety of non-standard video resolutions (like 320 x 400 and 1024x 768). So if you have a previous version of DirectX (either 1.0, 2.0, or 3.0), you should install DirectX 5.0 from the *Flight Unlimited II* **Launch** panel by clicking on the **Install DirectX** button:

DirectX Manual Installation

How do I manually install the DirectX drivers?

If at any time, you want to manually install *Microsoft's* DirectX 5.0 drivers, follow the steps listed below:

1) Go to *Windows Explorer* (click on the **START** button then select PROGRAMS and then **WINDOWS EXPLORER** at the bottom of the menu).

2) Place the *Flight Unlimited II* CD (labeled **Disk 1: Install Disk)** into your CD-ROM drive (if the AUTORUN feature comes up, simply select the **QUIT** button to return to *Windows Explorer*).

3) Open up your CD-ROM drive (generally **D:**\) and locate the **REDIST** folder.

4) Click on this folder to reveal the **DIRECTX** folder underneath.

5) Click on the **SYSTEM** folder and scan down the list of contents in the right-hand column (under CONTENTS OF D:\REDIST\DIRECTX).

6) Locate the **DXSETUP.EXE** file and double-click on it to begin the DirectX manual installation.

7) A panel will eventually appear (it may take a few seconds) in the upper left-hand corner of the screen labeled **DirectX Setup**:

Note the following before you proceed:

- If a given *Component* listing says **Certified**, then this component IS 100% *Microsoft* DirectX 5.0 compatible and should run well with *Flight Unlimited II*.
- If a given *Component* listing is **blank**, then this component is NOT DirectX 5.0 certified. This probably means that you have updated drivers on your system which were not available when this version of DirectX was released. This means that the driver[s] may OR may not run well with our program.
- If a given *Component* listing says **NO HARDWARE SUPPORT**, then this component is NOT supported by DirectX at all. You will have to update the relevant hardware driver to eliminate this message or you will, in all likelihood, experience problems running *Flight Unlimited II*. If necessary, contact your system vendor for further details and please make sure your new drivers are DirectX 5.0 compliant.
- You may safely disregard the **Not Installed** message for *Old DirectPlay*.

8) Click on the **ReInstall DirectX** button. The setup process will now commence. If the following message appears:

"*Setup has detected display drivers that have not been tested with DirectX. To get the best* *game performance, setup can replace your existing drivers. Do you want setup to replace the drivers?*"

Make sure you select the **NO** button, so you do not overwrite or potentially corrupt your native display drivers. (***Note****, however, that if problems persist after the installation, you may want to repeat steps 1 through 7 and select* **YES** *to this option instead. Remember: you have the option to restore your original drivers later if things go awry.*)

9) You will finally be asked to reboot your machine. Select the **YES** button to restart and initialize the new drivers.

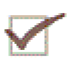
Unhosing Your System

Help! *Flight Unlimited II* has hosed my system, and I suspect that DirectX is the culprit. How can I restore my original drivers?

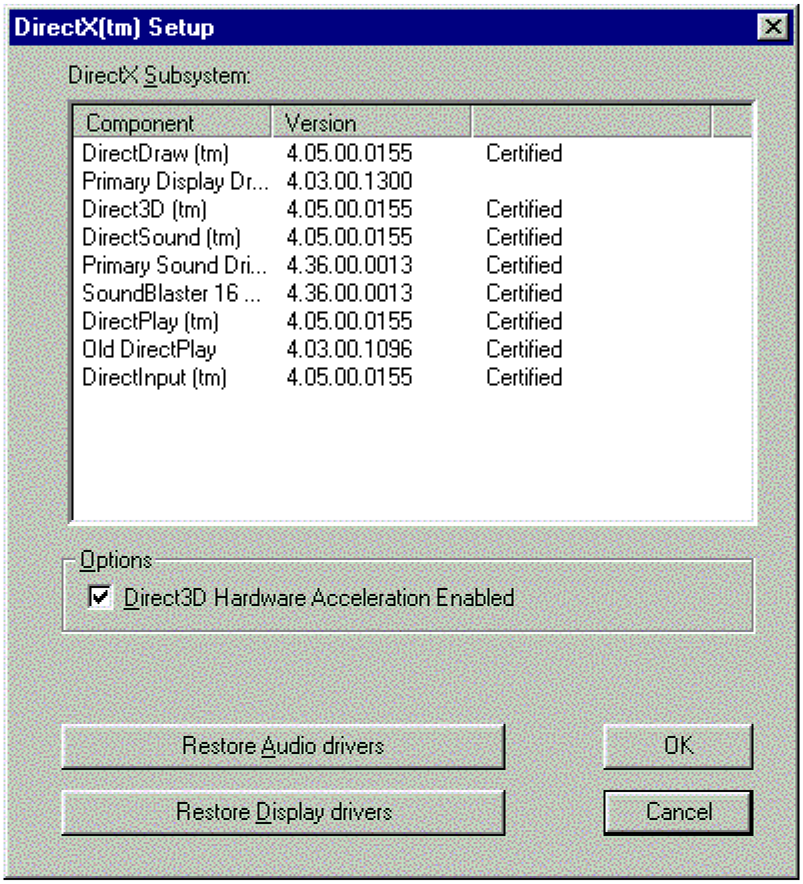
DirectX is sure to become the new standard in Windows 95 application development. Nearly all high-performance software will be geared around this technology, so we do not normally recommend that customers attempt to alter its installation on their system. Unfortunately, there are those systems or hardware devices that just don't work with DirectX yet, and installing DirectX on these systems might cause driver-related problems. **YOU CANNOT REMOVE DIRECTX FROM YOUR SYSTEM**, but you can restore the **original audio and video drivers** which the installation of DirectX will have replaced.

If you currently have DirectX 5.0 either installed by our program or previously installed, you should be able to restore the original drivers by going to the ADD/REMOVE PROGRAMS section in the Windows 95 **CONTROL PANEL** (please refer to the section entitled **DirectX Version** for instructions on how to get there).

If you enter the Windows 95 **CONTROL PANEL** and click on the ADD/REMOVE PROGRAMS icon, you should see a list of all of the programs that are registered with Windows 95 in the **Add/Remove Programs Properties** panel:



If you see a listing for "*DirectX Drivers*", double-click it to open the **DirectX Setup** panel:



At the bottom of this panel, there should be a button labeled **Restore Display Drivers**. Clicking on this button should *restore the original video drivers*. After that, click on the other button labeled **Restore Audio drivers**. This should *restore the original audio drivers*. Once again, please note that while this will restore the older drivers that were replaced by DirectX, **it will NOT remove DirectX** nor will it automatically cure problems you may have been experiencing either installing or running *Flight Unlimited II*. Though DirectX will remain on your system, the restoration of the older drivers *may* then allow you to run the program. If not, you may want to consider contacting your system vendor for 100% DirectX-compatible drivers for your video and/or sound cards OR visit the web site of the respective hardware manufacturer[s].

Run Without DirectX?

Ahh! I cannot use DirectX on my computer! Is there any other way to run *Flight Unlimited II*?

No, we're afraid not. (Sorry!) *Microsoft's* DirectX is a requirement. If you have thoroughly digested the various suggestions offered by this README document and you are still experiencing problems running *Flight Unlimited II*, please contact your system vendor to discover why your computer is having difficulty operating DirectX applications.

Direct3D Support

Flight Unlimited II supports the 3Dfx™ and ATI Rage Pro™-based video cards. Check out the Looking Glass web site at **www.lglass.com/f2** for the latest information on support for other 3D cards for *Flight Unlimited II* through subsequent patches.

ActiveMovie-Related Questions

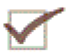
- What is Microsoft's ActiveMovie and why do I need it to run Flight Unlimited II?
- I think the installation of ActiveMovie is causing my system problems. How do I remove it?

ActiveMovie

What is *Microsoft's ActiveMovie* and why do I need it to run *Flight Unlimited II*?

ActiveMovie™ is a *Microsoft* product which is utilized for playing movies on your PC.

Towards the end of the *Flight Unlimited II* installer, you will be prompted to install *ActiveMovie* via the following panel:



Click on the default **Install ActiveMovie** button.

If you choose NOT to install *ActiveMovie 1.0*, the game will run normally, but you will NOT be able to view the supplied demos that come with the game. You will need to go back and reinstall *Flight Unlimited II*. When the dialog box prompting you to install *ActiveMovie* appears towards the end of the installation, click on the **Install ActiveMovie** button to install *ActiveMovie 1.0*.

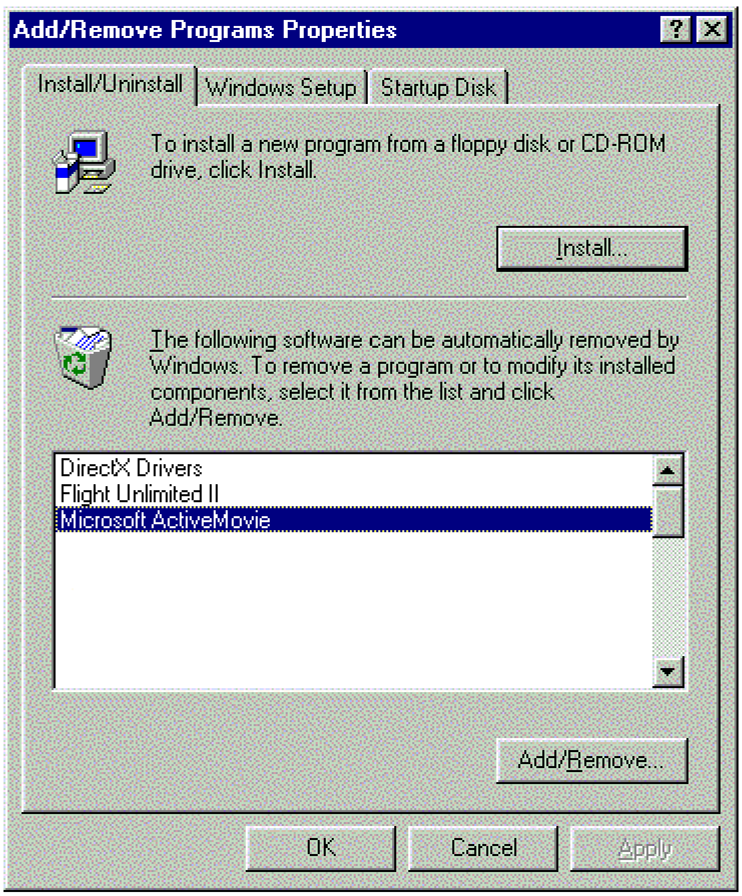
Removing ActiveMovie

I think the installation of *ActiveMovie* is causing my system problems. How do I remove it?

If you suspect your system is experiencing difficulty running Microsoft's *ActiveMovie*, and you wish to remove it from your system:

You should be able to remove the software by going to the ADD/REMOVE PROGRAMS section in the Windows 95 **CONTROL PANEL**.

1) If you enter the Windows 95 **CONTROL PANEL** and click on the ADD/REMOVE PROGRAMS icon, you should see a list of all of the programs that are registered with Windows 95 in the **Add/Remove Programs Properties** panel resembling the following:



2) If you see a listing for "**Microsoft ActiveMovie**", double-click on it to open the **ActiveMovie Uninstall** panel:

Click in the **OK** button to remove *ActiveMovie* from your system.
Click on the **CANCEL** button to quit without uninstalling *ActiveMovie*.

Crash-Related Questions

- **When I start Flight Unlimited II, my mouse cursor disappears and my computer locks-up.**
- **The Installer keeps stopping when a certain percentage is complete, so I cannot use Flight Unlimited II. What is wrong?**
- **The game is mysteriously crashing to the desktop with no error messages. What do I do? And what precautions can I take to avoid them in the future?**
- **I am running a Virus scanning program (e.g., Norton's™ A/V) and the game periodically crashes.**

Computer Freezes

When I start *Flight Unlimited II*, my mouse cursor disappears and my computer locks-up.

Chances are your installed audio card drivers are compatible with DirectX. The only solution is to get the latest DirectX 5.0-compatible driver from your audio card manufacturer.

Installer Stopping

The Installer keeps stopping when a certain percentage is complete, so I cannot use *Flight Unlimited II*. What is wrong?

This can be due to one of **six** possible reasons:

1) You may have run out of disk space (in which case the installer failed to accurately read the available space on your hard drive and prompt you prior to installation). **SOLUTION:** Please remove unwanted programs to free up additional space for the game, and then reinstall.

2) Files are being copied to a corrupted area of the hard drive. **SOLUTION:** Run **ScanDisk** and use the **Thorough** selection to scan the disk surface itself for problems.

3) The hard drive is write-protected. **SOLUTION:** Remove write protection.

4) An error message apprising you that there is a file that is write-protected or otherwise cannot be deleted appears. **SOLUTION:** This is a glitch. Reboot your computer and try reinstalling again. Occasionally, Windows 95 erroneously believes a critical program file may be write-protected until the computer is restarted.

5) The last major cause is dirt or fingerprints on the CD-ROM disc itself. Examine the bottom of the disc; if you see any fingerprints or dirt, carefully clean the disc using a clean, soft, lint-free cloth by wiping from the center of the disc (near the hole) towards the outer edge in a straight line.

6) The *InstallShield* program, in very rare circumstances, will not work correctly under certain system configurations. It will hang on a certain file (or even different files) during the actual installation process. There is currently no solution from the developers of *InstallShield* forthcoming (unless they release a new version of the Installer), and their primary suggestion is to make sure that the C:\WINDOWS\TEMP or C:\WIN95\TEMP directory (where the files are briefly stored prior to being copied from the *Flight Unlimited II* CD to the specified install directory on the hard drive) is first cleaned out prior to installing the program. *Stirling Technologies, Inc.*™, the developers of *InstallShield*, have a **Developer's FAQ** which you can view for further troubleshooting suggestions. It is located on the web at the following address:

www.kb.installshield.com

Mysterious Crashing

The game is mysteriously crashing to the desktop with no error messages. What do I do? And what precautions can I take to avoid them in the future?

Try the following suggestions:

1) Make sure the CD-ROM is clean (check for both scratches and smudges on the reading surface of both CD's).
2) Make sure the game has been **installed** properly.
3) Make sure **DirectX 5.0** has been installed properly.
4) Make sure you have the latest Windows 95 drivers for your **video card** and that they're 100% DirectX-compatible.
5) Make sure you have the latest Windows 95 drivers for your **sound card** and that they're 100% DirectX-compatible.
6) Make sure **Virtual Memory** is enabled on your system.
7) Run **ScanDisk**.
8) Run **Disk Defragmenter**.
9) Clean out old **temp (.tmp) files** from the C:\WINDOWS|TEMP or C:\WIN95\TEMP folder on your hard drive (from *Windows Explorer*).
10) Make sure you are not running any **Anti-Virus** utilities (like **Norton's™ A/V**) resident prior to running *Flight Unlimited II*.
11) Make sure you are not running any 3rd party Windows 95 memory management utilities (like **QuarterDeck's QEMM 8.0 for Windows 95**) resident prior to running *Flight Unlimited II*.
12) Make sure you are not running any 3rd party Windows 95 disk caching utilities resident prior to running *Flight Unlimited II*.
13) Make sure you are not running **Norton's™ Crash Protector** resident prior to running *Flight Unlimited II*.
14) Try **uninstalling** and then reinstalling the game.
15) Try turning down the **Hardware acceleration** slider bar in the **Advanced Graphics Settings** control panel from FULL to NONE.
16) Try exiting the game, rebooting your machine, and re-entering the game.

Virus Scanning Programs

I am running a Virus scanning program (e.g., Norton's™ A/V) and the game periodically crashes.

Please disable all resident virus scanning programs prior to starting *Flight Unlimited II*. The game is unfortunately prone to occasional fits with anti-virus software running in the background.

Graphics-Related Questions

- **I’ve just installed Flight Unlimited II and now I can't get into Windows 95!! (My screen is visually trashed OR whenever I reboot my machine, I am constantly being thrown into Windows 95 Safe Mode.) What gives?**
- **I am encountering graphic anomalies when running the program.**
- **Sometimes when I exit Flight Unlimited II, the colors on my desktop are all messed-up.**

Windows 95 Won't Start Properly

I've just installed Flight Unlimited II and now I can't get into Windows 95!! (My screen is visually trashed OR whenever I reboot my machine, I am constantly being thrown into Windows 95 Safe Mode.) What gives?

First and foremost: DON'T PANIC!. The most probable cause of your problems was the installation of *Microsoft's* DirectX. After *Flight Unlimited II* is installed, your system is queried as to which version of DirectX is present, and a panel then emerges to give you the option to install DirectX 5.0:

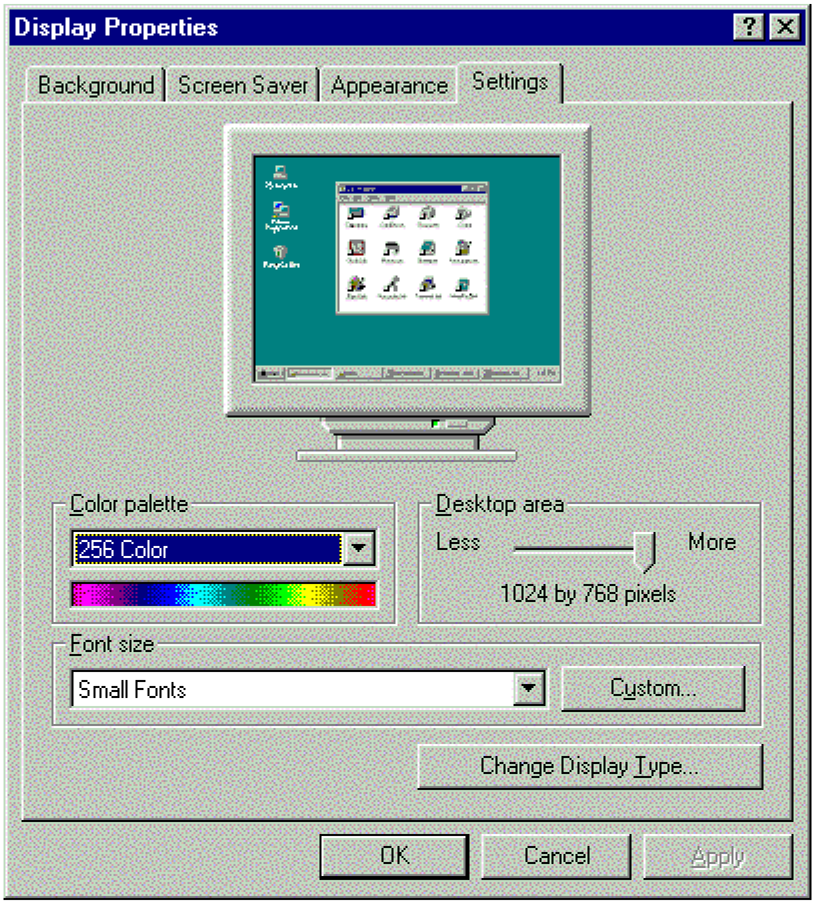
Once you click on the **Install DirectX** button and the DirectX 5.0 installation commences, your current video card drivers or sound card drivers can, in certain instances, be overwritten by newer drivers. Usually, the software asks you if you would like to replace the existing drivers, but there have been instances where users were never prompted. In either case, if your display is corrupted, it shouldn't be too hard to correct.

Try the following steps:

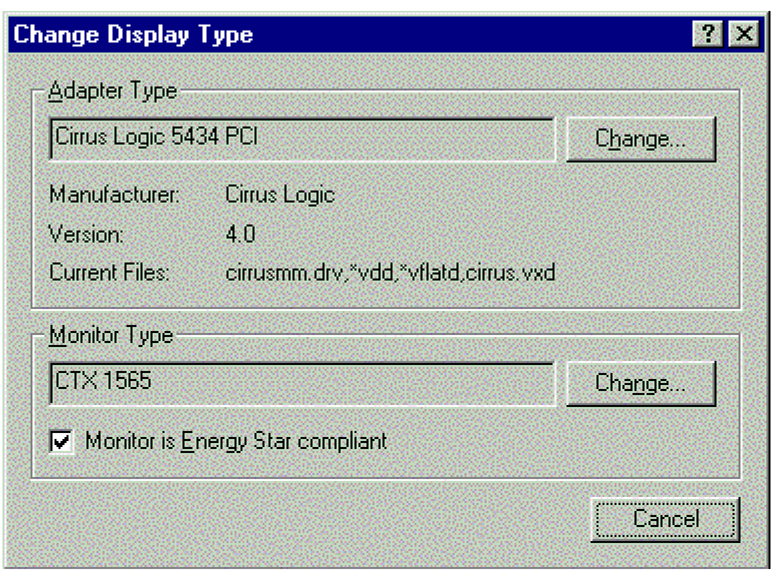
1) Enter the Windows 95 Safe Mode (if you are not already there). This can be done by rebooting your system and hitting the **F8** function key as soon as the screen says "**Starting Windows 95**" at the top. A menu should appear with an option to enter Safe Mode. Please select it.

2) After your system enters Safe Mode (this, incidentally, takes longer than the usual boot), position the mouse pointer over any unused area of the Windows 95 desktop and right-click (click the right mouse button) once. A small gray panel will pop up:

3) Left-click on the selection at the bottom of the panel that says **Properties**. This will bring up another panel labeled **Display Properties**:



4) Click on the tab at the top of the panel labeled **Settings**. In the lower right-hand corner of the panel, click on the button labeled **Change Display Type**. This will bring up yet another panel conveniently labeled **Change Display Type**:

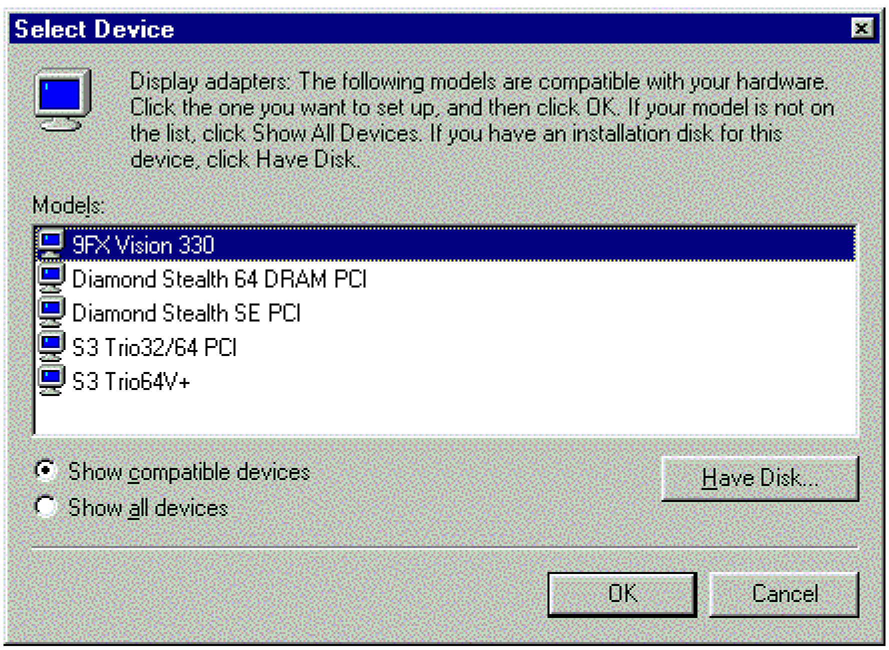


5) Locate the **Adapter Type** box. Note the current video card selection. If the correct video card is currently listed in this box, then the only thing you can do is contact the video card manufacturer for the latest drivers and further assistance. For a list of popular hardware vendors, check out our web site at:

www.lglass.com/cs/hardware.html.

Else, continue reading...

6) Click on the **Change...** button located directly to the right of the **Adapter Type** box. The **Select Device** panel should pop up: (***Note*** *that Windows 95 may have to actually build and then search its driver information database first, so it can take several seconds for the panel to eventually appear*.)



7) Make sure the **Show compatible devices** bullet is checked at the bottom of the screen.

8) Now scan the list of compatible drivers and locate the native driver for your particular video board which contains the proprietary DirectX drivers (e.g., *9FX Motion 771* for the *#9 Motion 771*).

9) Double left-mouse click on the name of this driver. Since the driver is already loaded in your system, you should be brought immediately back to the **Change Display Type** panel.

10) Locate and click on the **CLOSE** button in the lower right-hand corner of the panel. This will bring you back to the **Display Properties** panel.

11) Now click on the **APPLY** button in the lower right-hand corner of this panel. This will close the previous panel and bring up the **System Settings** panel which will prompt you with the following message:

> "*You must restart your computer before the new settings will take effect. Do you want to restart your computer now?*"

12) Select the **YES** button and let your computer reboot.

13) Once you are returned to the Windows 95 Desktop, the original native driver will be restored. Insert the *Flight Unlimited II* CD into the CD-ROM drive and select the **PLAY** button from the Launch panel to begin the game.

Graphic Anomalies

I am encountering graphic anomalies when running the program.

1) Try changing the relevant graphic settings in the **Graphics Settings** penel (e.g., lower the **Video Resolution** or drop the **Terrain Detail**).
2) Update your video card's Windows 95 drivers and make sure they are 100% DirectX 5.0-compatible. Contact your vendor for assistance or visit the manufacturer's web site.
3) Try turning down the **Hardware acceleration** slider bar in the **Advanced Graphics Settings** control panel from FULL to NONE.

Desktop Colors

Sometimes when I exit Flight Unlimited II, the colors on my desktop are all messed-up.

1) Try switching your color depth and/or resolution in the **Display Properties** panel.
2) Update your video card's Windows 95 drivers and make sure they are 100% DirectX-compatible. Contact your vendor for assistance or visit the manufacturer's web site.

Sound-Related Questions

- **Whenever I go to run Flight Unlimited II, I do not hear any sound. What gives?**
- **I know DirectX was installed, but I am nonetheless getting strange crackling sounds when in the game. Occasionally, the sound drops out and then returns.**

No Sound At All

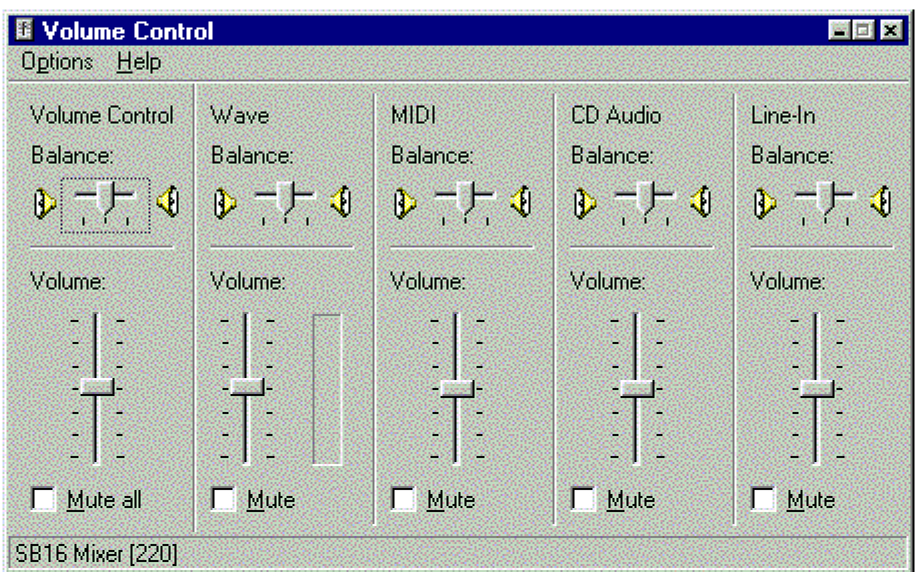
Whenever I go to run Flight Unlimited II, I do not hear any sound. What gives?

Assuming you have the sound volume turned on in the **Sound Settings** screen AND you have tried exiting the game and rebooting your machine:

First, try the following:

Click on the **VOLUME CONTROL** icon located in the lower right hand corner of the task bar on the Windows 95 desktop (adjacent to the time) which resembles a speaker:

This will cause the **Volume Control** panel to appear:



Make sure the settings for each of the individual vertical slider bars are at least one- third of the way to the maximum (i.e., towards the top). Also ensure that none of the **Mute** buttons is checked; if it is, please uncheck it. This should restore sound to the movies.

If problems persist even after deleting and reinstalling the program as a last resort, consult your hardware vendor for updated Windows 95 drivers for your sound card which should be 100% DirectX 5.0-compatible.

If the above didn't work:

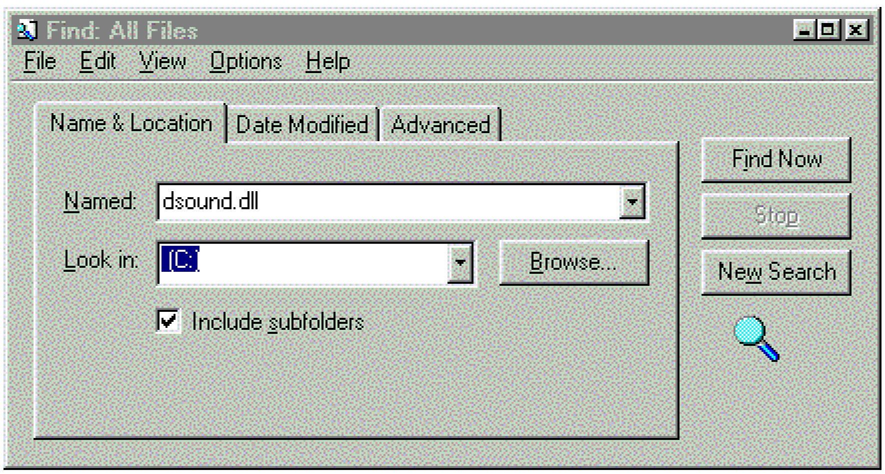
Flight Unlimited II uses *Microsoft's* DirectX (and specifically DirectSound) when dealing with sound. This discussion assumes that your system's sound card is working fine in Windows 95, but not in *FLIGHT II*. If this is the case, we need to find out why. The first thing to do is to check and see if the sound portion of DirectX has been actually installed on your system. To do this, use *Windows Explorer*. From the Windows 95 desktop, click on the **START** button, select **PROGRAMS** from the menu, and then **WINDOWS EXPLORER**.

There are two important files that should reside in the C:\WINDOWS\SYSTEM or C:\WIN95\SYSTEM folder. Using *Windows Explorer*, see if you find the following files:

DSOUND.DLL

DSOUND.VXD

TIP! From the Windows 95 desktop, you can also go to **START**, then click on FIND, followed by FILES OR FOLDERS to bring up the **Find: All Files** panel:



Type in the name of the file you're looking for in the box labeled **Named** and click on the **Find Now** button to have Windows 95 look for your files for you. You will be prompted if and when the file has been located.

A. If the files are NOT present, you will need to manually reinstall the DirectX drivers off the *Flight Unlimited II* CD, using the following instructions (assuming you are already in *Windows Explorer*):

1) Place the *Flight Unlimited II* CD into your CD-ROM drive (if the AUTORUN feature comes up, simply select the **QUIT** button to return to *Windows Explorer*).

2) Open up your CD-ROM drive folder (generally D:\) and locate the REDIST folder. Double-click this folder to reveal the DIRECTX folder inside. Double-click this folder as well.

3) Scan down the list of contents in the right-hand column, and locate the file called **DXSETUP.EXE** (is might just read DXSETUP). Double-click on this file to begin the DirectX installation. A new panel, labeled **DirectX Setup** will appear on the screen:

4) This panel displays each of the DirectX sub-systems (components) and tells you which ones are currently install and are certified. Quickly check to see if the **DirectSound (tm)** component listing reads *Certified*.

Note the following before you proceed:

- If a given *Component* listing says **Certified**, then this component IS 100% *Microsoft* DirectX 5.0 compatible and should run well with *Flight Unlimited II*.
- If a given *Component* listing is **blank**, then this component is NOT DirectX 5.0 certified. This probably means that you have updated drivers on your system which were not available when this version of DirectX was released. This means that the drivers may OR may not run well with our program.
- If a given **Component** listing says **NO HARDWARE SUPPORT** then this component is NOT supported by DirectX at all. You will have to update the relevant hardware driver to eliminate this message or you will, in all likelihood, experience problems running *Flight Unlimited II*. If necessary, contact your system vendor for further details and please make sure your new drivers are DirectX 5.0 compliant.

5) Click on the button labeled **Reinstall DirectX**.

6) If the following message appears:

> "*Setup has detected display drivers that have not been tested with DirectX. To get the best game performance, setup can replace your existing drivers. Do you want setup to replace the drivers?*"

Make sure you select the **NO** button so you do not overwrite or potentially corrupt your native display drivers. (***Note****, however, that if problems persist after the installation, you may want to repeat steps 1 through 5 and actually select* **YES** *to this option instead. Remember—you have the option to* **restore your original drivers** *later if things go awry.*)

7) You will finally be asked to reboot your machine. Select the **YES** button to restart and initialize the new drivers.

B. If the two .DLL files ARE present, check with your sound card vendor (or system vendor) to ensure that you have the latest Windows 95 100% compatible DirectX drivers for your sound card.

Crackling Sound

I know DirectX was installed, but I am nonetheless getting strange crackling sounds when in the game. Occasionally, the sound drops out and then returns.

Verify with your sound card vendor (or system vendor) that you are in possession of the latest Windows 95 drivers for your particular sound card. And never EVER assume just because you recently purchased your computer system that you have the latest drivers installed (some vendors unfortunately knowingly ship products with older drivers).

Flight Unlimited II uses DirectSound, a sub-system of DirectX. If you have older sound drivers installed on your system, or if you installed the drivers that came with our program and they are incompatible with your system, you should contact either the vendor of your system or the manufacturer of the sound card for the most recent 100% DirectX-compatible drivers. You may additionally **restore the original drivers** at any time.

Specific Error Messages

- **I receive a "xxxxxx.xxx not found" error message when installing or running Flight Unlimited II.**
- **When I start Flight Unlimited II, I receive the following error message: "The application flt2.exe referenced memory at address xxxx:xxxx that can't be read from."**
- **ERROR Reading CD-ROM in Drive D: Please insert CD-ROM in Drive.**
- **ERROR: Can't Set Screen Mode 20 (640 x 480).**
- **ERROR: Out of Scan Range.**
- **ERROR STARTING PROGRAM: A required .DLL file, DSOUND.DLL, was not found.**
- **ERROR: This program has performed an illegal operation and will be shut down.**
- **ERROR: Sorry, there is not enough memory to run. Please close any other application and check your virtual memory settings.**
- **ERROR: An invalid state was detected. Application error. Program encountered a problem at address [xxxxx].**

Not Found

I receive a "xxxxxx.xxx not found" error message when installing or running Flight Unlimited II.

This error message is usually the result of your computer using MS-DOS (16 bit) drivers instead of Windows 95 (32 bit) drivers for your CD-ROM drive. You can easily check to see if this is causing problems by opening the **Control Panel** (either click on the "My Computer" icon or click on the **START** button followed by "Settings," then "Control Panel"). In the Control Panel window, double-click on the "System" icon then click on the "Performance" tab. You should now see a summary of the performance status of your computer. One of the lines should say "**File System: 32-bit**" and the last line should say "**Your system is configured for optimal performance**." If you see a message saying "**Drive X is using MS-DOS compatibility mode**," then you will need to contact your system vendor to obtain and install 32-bit drivers for your CD-ROM drive.

Memory Can't Be Read

When I start Flight Unlimited II, I receive an error message similar to the following: “The application flt2.exe referenced memory at address xxxx:xxxx that can’t be read from.”

Chances are your installed video card drivers are not compatible with DirectX. The only solution is to get the latest DirectX 5.0-compatible driver from your video card manufacturer.

Error Reading CD-ROM

ERROR Reading CD-ROM in Drive D: Please insert CD-ROM in Drive.

If a blue [full] screen suddenly appears on your desktop while you're in the midst of loading and/or running the game with the following error message:

Error Reading CD-ROM in Drive 'x':
Please Insert CD-ROM Flight 2'xxxx' With Serial Number xxxx-xxxx in Drive 'x':
If the CD-ROM is still in the drive, it may require cleaning.
Press ENTER for OK or ESC to Cancel.

This is a Windows 95-generated error message which can occur due to the following conditions:

1) You go to install *Flight Unlimited II* and your 3 year-old son comes up and switches CD's while you're not looking (from **Disk 1** to **Disk 2**). To remedy the problem, simply remove **Disk 2** from the CD-ROM drive, insert **Disk 1** and press the **ENTER** key.
2) The CD currently in the CD-ROM drive is actually dirty and may require cleaning (as the message indicates).

Screen Mode 20

ERROR: Can't set Screen Mode 20 (640 x 480)

This type of behavior is usually the result of having outdated hardware drivers or an old version of *Microsoft's* DirectX. Updating to newer drivers should correct this problem.

We first recommend that you update to the latest version of DirectX (specifically Version 5.0 which comes with *Flight Unlimited II*). If that doesn't help, you must update your Windows 95 video card drivers for your system to be DirectX 5.0-compatible.

Remember, although you may have just purchased your system or video card, the package may have been shipped with older drivers. Sometimes new computers sit on shelves or in warehouses for a month or so prior to being purchased. That leaves plenty of time for the manufacturers to update drivers.

For information links to computer and peripheral manufacturers, check out our web site at **www.lglass.com/cs/hardware.html**. Check with the makers to see if there are newer drivers available for your system.

Out of Scan Range

ERROR: Out of Scan Range

This type of behavior is usually the result of having outdated hardware drivers or an old version of *Microsoft's* DirectX. Updating to newer drivers should correct this problem.

We first recommend that you update to the latest version of DirectX (version 5.0 comes with *Flight Unlimited II*). If that doesn't help, you must update your Windows 95 video card drivers for your system to be DirectX 5.0-compatible.

Remember, although you may have just purchased your system or video card, the package may have been shipped with older drivers. Sometimes new computers sit on shelves or in warehouses for a month or so prior to being purchased. That leaves plenty of time for the manufacturers to update drivers.

For information links to computer and peripheral manufacturers, check out our web site at **www.lglass.com/cs/hardware.html**. Check with the makers to see if there are newer drivers available for your system.

DSOUND.DLL Not Found

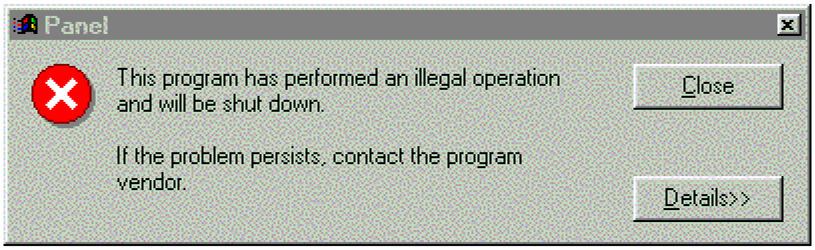
ERROR STARTING PROGRAM: A required .DLL file, DSOUND.DLL, was not found

This error message will only be generated if specific portions of *Microsoft's* DirectX are not found on your system. DirectX is required to operate *Flight Unlimited II*, so the best step to take would be to **reinstall DirectX 5.0** (which comes with the program).

If the automatic installation of DirectX is failing, click **here**.

Illegal Operation

ERROR: This program has performed an illegal operation and will be shut down.



This error message is a completely random one that unfortunately manifests itself on a small percentage of systems.

The only solution we can suggest is to please ensure you have the latest version of *Microsoft's* DirectX (Version 5.0) fully **installed** on your system. If this do not work, then it is entirely possible that the problem is tied to a system configuration issue. Contact **Technical Support** for further suggestions.

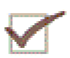
Not Enough Memory

ERROR: Sorry, there is not enough memory to run. Please close any other application and check your virtual memory settings

Flight Unlimited II requires that your system have at least **16** megabytes of Virtual Memory enabled. That means you need to have Virtual memory turned on at the appropriate location and that at least **16 MB of free hard disk space** is available whenever you run the program.

A. To free up additional space on the hard drive, go to *Windows Explorer* and remove older programs you no longer use:

To get there, click on the **START** button, go up to SETTINGS, and over to the **CONTROL PANEL**. Within the **CONTROL PANEL** window, you should see an icon towards the top labeled ADD/REMOVE PROGRAMS. Double-click that icon and the **Add/Remove Programs Properties** panel will appear:

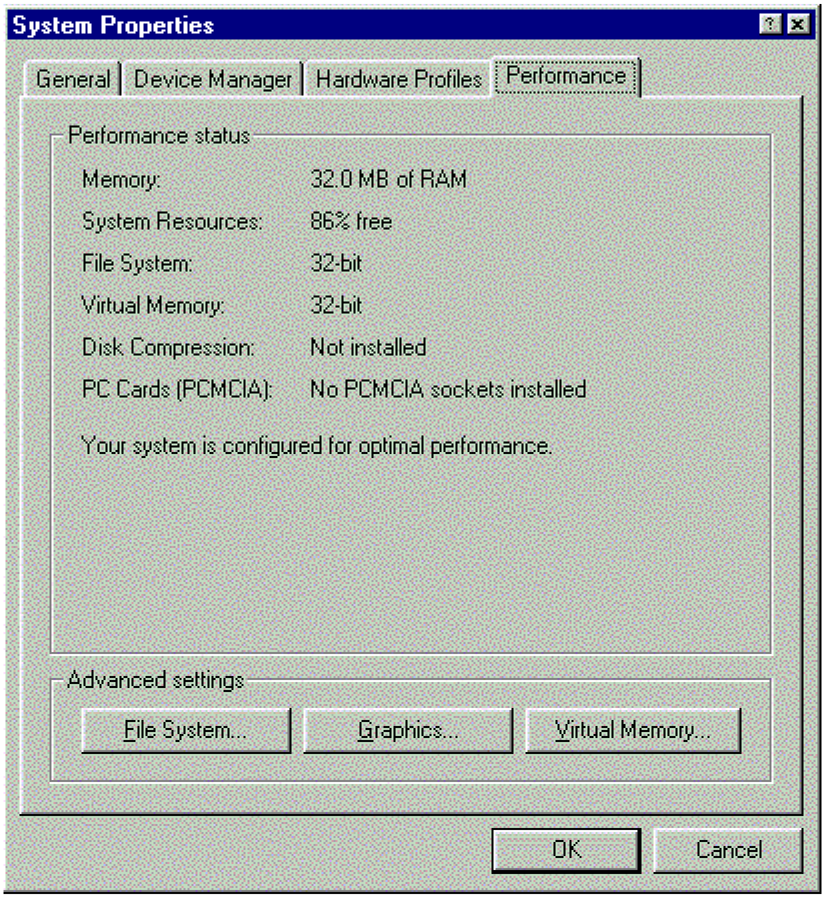


Click on the application you wish to remove so that it becomes highlighted in blue and then click on the **Add/Remove** button to remove the selected program from your hard drive (there will be further prompts).

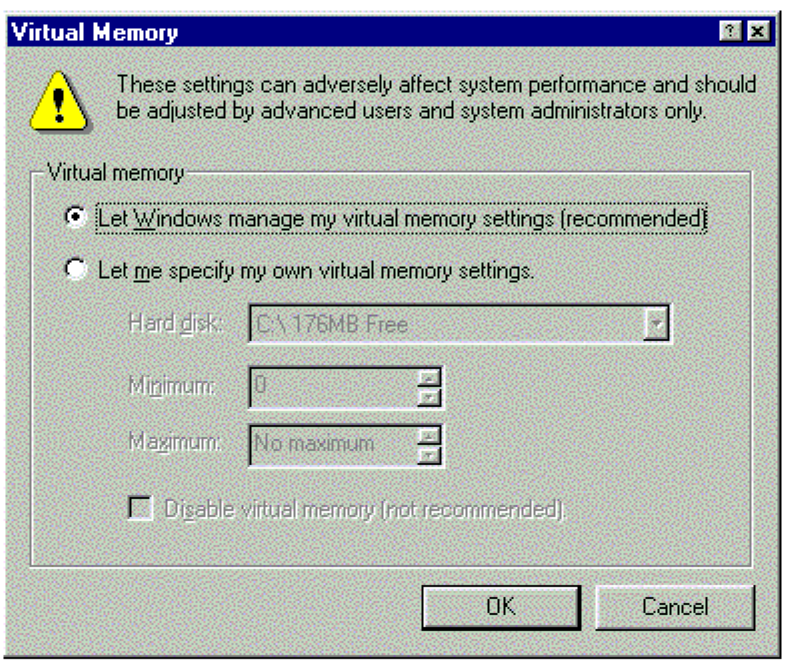
B. Follow the instructions below to ensure that Windows 95 is dynamically managing your virtual memory settings:

1) Go to MY COMPUTER and open up the **CONTROL PANEL** folder.

2) Double-click on the SYSTEM icon to bring up the **System Properties** panel:



3) Click on the **Performance** tab and then click on the button labeled **Virtual Memory**. This will open up the **Virtual Memory** panel.



4) Make sure the selection which says "*Let Windows manage my virtual memory settings (recommended)*" is **checked** (regardless of how much memory you actually have on your system). Also make sure you are not running any type of DISK COMPRESSION utilities, RAM DOUBLING utilities, or 3rd party disk-caching utilities (*Flight Unlimited II* may not compatible with any of these.)

You should additionally ensure that *Flight Unlimited II* the only application running on your system at the time. **MAKE SURE YOU CLOSE ALL OTHER APPLICATIONS PRIOR RUNNING OUR PROGRAM!**

Click on the **OK** button to continue.

An Invalid State

ERROR: An invalid state was detected. Application error. Program encountered a problem at address [‘xxxx’].

Virtual Memory is disabled on your system. Please turn it on as per the instructions for enabling **Virtual Memory**.

Hardware-Specific Information

IN GENERAL, MAKE SURE YOU HAVE THE ABSOLUTE LATEST DRIVERS FOR BOTH YOUR VIDEO CARD AND SOUND CARD. THESE DRIVERS NEED TO BE 100% WINDOWS '95 AND 100% DIRECTX 5.0-COMPATIBLE TO ENSURE PROPER PERFORMANCE WITH FLIGHT UNLIMITED II!

VIDEO CARDS

- ATI Mach 32
- ATI PRO TURBO Mach 64
- Diamond Stealth 3D
- Diamond Stealth 64 DRAM (2001 series)
- Diamond Stealth 64 VRAM (3200 series)
- Diamond Viper
- Matrox Millenium and Mystique
- NeoMagic video adapter for laptop computers
- Number Nine FX Motion 771
- Number Nine Imagine 128
- Number Nine Vision 330
- Number Nine Vision GXE 64 Trio
- Positron NeoGraphics VideoSmoker 128
- Screamin' 3D and Pure 3D
- STB Lightspeed 128
- STB Powergraph 64
- Trident

SOUND CARDS

- AMD
- Aztech Sound Galaxy
- Ensoniq Soundscape
- MWave
- SoundBlaster AWE32

MULTIMEDIA CARDS

- **Diamond TeleCommander**

COMPUTERS

- **Digital Starion**

OTHER PERIPHERALS

- **Hitachi CD-ROM Drives**

THOSE OF YOU WITH INTERNET ACCESS!

For a complete list of links to various PC and peripheral manufacturers, contact our *Looking Glass Tech Support* **Hardware Manufacturer Links** page on the web at:

www.lglass.com/cs/hardware.html

ATI Mach 32

ATI Mach 32 video cards

When one of our previous products was introduced last summer (*Flight Unlimited for Windows 95*), ATI informed us that the *Mach 32* series video cards did not support *Microsoft's* DirectX whatsoever (due to their age) and that they have no plans to update the drivers for this series of video cards. Since then, newer versions of DirectX have been released (including version 5.0 which comes with *Flight Unlimited II*) and there is a possibility that some of the *Mach 32* cards may actually work.

Unfortunately, we have no definitive information on this particular piece of hardware, and the best people to talk to would be ATI Technologies. If you are interested in pursuing more information, you can visit their web site for the latest scoop:

www.atitech.com

ATI PRO TURBO Mach 64

ATI PRO TURBO Mach 64 video cards

If you have older drivers for this video card, the screen will appear to be shrunk and the vertical edges will become warped when you go to run *Flight Unlimited II.* You will need to secure the latest 100% DirectX-compatible Windows 95 drivers from ATI Technologies to remedy the problem. Visit their web site at:

www.atitech.com

Diamond Stealth 3D

Diamond Stealth 3D video cards

Download the latest Windows 95 drivers from Diamond Multimedia's web site if you are experiencing problems with this card:

www.diamondmm.com

Diamond Stealth 64 DRAM (2001 series)

Diamond Stealth 64 DRAM (2001 series) video cards

Generally, the Diamond *2001* series works fine with DirectX applications, but under some circumstances, odd behavior has been witnessed. If you experience any trouble switching video modes or receive visual trashing of the screen, we recommend that you update your video card drivers and your version of DirectX. Please note, we have had some trouble getting these cards to work 100% correctly with DirectX, so if updating drivers doesn't help, you may have to wait until the next release of those drivers for a possible fix. Contact Diamond Multimedia for information on if and when updated drivers will be made available.

As of 03/12/97, the most recent Diamond GT driver for the *2001* series video card is version 4.02.268 and is currently available for download from their web site. There is a newer beta driver available on their FTP site, version 4.02.325b. If you are interested in obtaining this driver, we recommend that you contact Diamond for information on how to get it. Because it is a beta driver, it may not work on all systems.

Diamond has also released new drivers specifically written for the Diamond *Stealth Video 2001* video card. Contact Diamond Multimedia for details:

www.diamondmm.com

Diamond Stealth 64 VRAM (3200 series)

Diamond Stealth 64 VRAM (3200 series) video cards

As of August 15, 1996, the Diamond *Stealth* 3200 VRAM video card was not compatible with *Microsoft's* DirectX technology. Since then, both Diamond and *Microsoft* have released new drivers to correct these problems.

The newest Diamond drivers appear to be 4.02.325. You can download the latest Diamond video drivers from their web site:

www.diamondmm.com

Diamond Viper

Diamond Viper video cards

Earlier last year, this card did not support *Microsoft's* DirectX, and it appeared as though Diamond was not going to pursue updating the drivers. We recommend that you contact Diamond Multimedia for the latest information on this card and the drivers that are available:

www.diamondmm.com

Matrox Millenium and Mystique

Matrox Millenium and Mystique video cards

Download the latest Windows 95 drivers AND latest flashable BIOS updates from the Matrox web site if you are experiencing DirectX-related problems with either of these cards:

www.matrox.com

NeoMagic Video Adapter

NeoMagic video adapters (for laptop computers)

Our technical support staff has had quite a few calls regarding incompatibility issues with the NeoMagic video cards when used with *Microsoft's* DirectX. This has been a fairly popular laptop video adapter as of late, so we can almost assume that if the cards do not already support DirectX, there will be support shortly.

While NeoMagic Corporation manufacturers the actual video card chips, they have stated that they cannot provide the end user with updated drivers because their drivers may be customized by notebook manufacturers, or may be keyed to specific BIOS revisions and thus may not function on your specific notebook.

You should contact your system manufacturer for the latest revision of your video card drivers and make sure you have DirectX 5.0 fully installed by our program.

Number Nine FX Motion 771

Number Nine FX Motion 771 video cards

If you own this card and experience any problems related to palette-trashing (i.e., weird colors appearing on the screen) or error messages like the following:

ERROR: Out of Scan Range

The version **2.05D** drivers for the *Motion 771* experience known multiple conflicts with *Microsoft's* DirectX (particularly, video palette-trashing). If you have this video card, there are a few things you can try. Install the latest version of DirectX (Version 5.0, supplied with our program) and when these new drivers are being installed by the *Flight Unlimited II* installer, you will be prompted to overwrite the existing *Hawkeye* drivers. You must select the **YES** button to said prompt so that the updated, but more generic, **S3 968 PCI** driver is used instead of the defective *Hawkeye* driver. After the installation is complete, you should reboot your system and give *Flight Unlimited II* a try. Hopefully, everything will be fine.

Until new drivers are available, you should probably not go back to the *Hawkeye* driver because the same problem[s] will more than likely occur.

As of March 12, 1997, Number Nine has posted new beta drivers on their web site, version 2.11. We recommend that you contact Number Nine for information on exactly what these new drivers fix and to see if these drivers are necessary for you:

www.nine.com

Number Nine Vision 330

Number Nine Vision 330 video cards

Months ago, the native Number Nine *Hawkeye* driver for this card was not 100% DirectX-compatible. Number Nine promised to correct the problem with updated *Hawkeye* drivers, but at the time, users could only get certain DirectX programs to run if they used the generic display drivers for the **S3 Trio 32/64 PCI** with the latest version of DirectX (Version 5.0).

As of March 12, 1997, Number Nine has made available *Hawkeye* driver version 2.06 and beta driver version 2.11 for the *Vision 330*. Both can be downloaded from their web site. Contact Number Nine for the latest details on these drivers:

www.nine.com

Number Nine Vision GXE 64 Trio

Number Nine Vision GXE 64 Trio video cards

Without the latest Number Nine *Hawkeye* driver, this card is not DirectX compatible. As of August 7, 1996, Number Nine released a new driver version 2.06. While we have not tested this driver, it is assumed that it corrects all problems encountered earlier.

Contact Number Nine or visit their web site for the latest *Hawkeye* drivers.

www.nine.com

If you have this latest drivers and you are still experiencing problems, make sure you have the latest version of *Microsoft's* DirectX installed on your system (Version 5.0, supplied with our game).

Number Nine Imagine 128

Number Nine Imagine 128 video cards

The original Imagine 128 (Series I) will not run with *Flight Unlimited II* because this video card does not currently support *Microsoft's* DirectX. If you have this card and are experiencing problems, you should contact Number Nine for the latest information regarding this card. The Imagine *128* (Series II) video card DOES support DirectX with the latest Number Nine *Hawkeye* drivers.

Claims of a working Beta version of DirectDraw drivers for the Imagine *128* (Series I) located on the Number Nine FTP site on the Internet have yet to be substantiated. Again, contact Number Nine for the latest information, because they may be worth a look:

www.nine.com

Positron NeoGraphics VideoSmoker 128

Positron NeoGraphics VideoSmoker 128 video cards

We have received quite a few reports from customers via our technical support staff that this particular card is not 100% DirectX-compatible, as some DirectX applications will cause the user's system to malfunction. Depending on the version of DirectX you are running, irreparable damage may occur, **and if the program is not stopped, the computer's processor will be placed in an nth-complexity infinite binary loop which can severely damage the processor if left running that way for too long a period of time**. We recommend that you contact the manufacturer for the latest information on the drivers for this card.

As a result of Positron's dedication to their customers, they have just released DirectX-compatible drivers for the ISA version of this card. Both VLB and PCI versions should follow before the end of 1999 (*no, this is not a typo*).

Screamin' 3D and Pure 3D

Screamin' 3D and Pure 3D video cards (Canopus)

There are known problems with older BIOS for these video cards running DirectX-enabled applications. Garnering the latest BIOS for the respective card from Canopus should fix the problem.

www.canopuscorp.com

STB Lightspeed 128

STB Lightspeed 128 video cards

If you have just installed *Flight Unlimited II* and DirectX, and when you reboot your computer the following error message appears:

> "*Not configured to support STB Vision 95 feature set. The STB Vision 95 meta driver is not loaded*."

OR

ASSERTION FAILED:

An invalid state was detected - wdisp.ccp Line 329

Don't panic. This is usually the result of your original video card drivers being overwritten by *Microsoft's* DirectX. Commonly, the program just configured your system with a different video driver.

We recommend that you reinstall the drivers that came with the STB video card and if you don't have them, contact STB for the latest version of those drivers (currently **1281246.zip** posted as of 12/30/96):

www.stb.com

After you reinstall the new video drivers, the error message should disappear.

STB Powergraph 64

STB Powergraph 64 video cards

If you have older drivers for this video card, you will NOT be able to run *Flight Unlimited II* effectively. You will need to secure the latest 100% DirectX-compatible Windows 95 drivers from STB to remedy the problem. Visit their web site at:

www.stb.com

Trident

Trident video cards

There have been some reports of the Trident video cards (9320, 9440, and 9660 series) not working with DirectX 2.0. If you are having any problems with *Flight Unlimited II*, and you have one of these cards, we recommend that you ensure you have the latest version of DirectX (Version 5.0, which comes with our program) installed. The latest version should work fine. The only problem of which we're aware is palette-trashing (i.e., weird colors appearing on the screen).

www.tridentmicro.com

AMD Sound Cards

AMD sound cards

These sound cards, usually found on high-end *Compaq Presario* machines, have known problems running games which support DirectX, manifested by scratchy sounds playing in the background (similar to static interference). There are reputedly new Windows 95 drivers available which are currently awaiting DirectX certification. For further information, check out Compaq's web site:

www.compaq.com

Aztech Sound Galaxy

Aztech Sound Galaxy sound cards (Packard Bell)

Static, static, and more static when you go to run *Flight Unlimited II* with this brand of sound card? Grab the latest Windows 95 drivers from the Aztech's web site to solve these problems:

www.aztechca.com

Ensoniq Soundscape

Ensoniq Soundscape sound cards

Either no sound, scratchiness, hissing, or crackling are the symptoms for problems with this brand of sound card and *Flight Unlimited II*. Download the latest Windows 95 drivers from the Ensoniq web site to solve these problems:

www.ensoniq.com

MWave Sound Card

MWave sound cards

If you are experiencing a HANG problem within *Flight Unlimited II*, and you have an IBM APTIVA-based desktop, ACER desktop, OR laptop computer equipped with this type of sound card:

It appears as though DirectX has some incompatibilities with certain sound cards drivers, and in particular, the *MWave* sound card. You may notice that if you run the DirectX (Version 5.0) installer, it may report your system's Audio Driver as having "*No hardware support*" in the **DirectX Setup** panel. Because of this, some DirectX applications may not perform properly. *Flight Unlimited II* uses standard functions of DirectX that are not supported by your current sound card's drivers. While we don't recommend it, we have had to occasionally remove the *MWave* sound card from the Windows 95 registry. This has disabled sound in both *FLIGHT II* and Windows, but the program then no longer crashes. This result also clearly points to the sound card drivers causing the conflict.

At this point, the only thing we can recommend is to make sure you have the most recent version of *Microsoft's* DirectX (Version 5.0, which ships with *Flight Unlimited II*) properly installed.

Please contact the respective web site for the latest information on the status of this problem:

IBM………………. **www.pc.ibm.com**

ACER……………. **www.acer.com**

OR

contact **Technical Support**.

SoundBlaster AWE32

SoundBlaster AWE32 sound cards

Either no sound, scratchiness, hissing, or crackling are the symptoms for problems with this popular series of sound cards and *Flight Unlimited II*. Download the latest Windows 95 drivers from the Creative Labs web site to solve these problems:

www.creaf.com

Diamond TeleCommander

Diamond TeleCommander multimedia cards

Unfortunately, the Diamond *TeleCommander 2500XL* and *3500XL* do not work with *Flight Unlimited II* because they do not support *Microsoft's* DirectX. As a matter of fact, the last time we checked, this card didn't even have dedicated Windows 95 drivers—period!

Contact Diamond Multimedia for information regarding if and when these drivers will be made available. Please note that their web site does not currently have any driver updates for this device due to licensing restrictions:

www.diamondmm.com

Digital Starion

Digital Starion computers

Some of the early Digital *Starion* computers come with built-in proprietary video adapters, and they didn't initially support *Microsoft's* DirectX, or there was very poor support.

If you are in possession of a Digital *Starion* computer and are experiencing problems with DirectX 5.0 and *Flight Unlimited II*, we recommend that you contact Digital for the latest scoop on your video card and its drivers for Windows 95:

www.digital.com

Hitachi CD-ROM Drives

Hitachi CD-ROM drives

If you have this type of drive and are experiencing inexplicable periods of slowdown in *Flight Unlimited II* after leaving your computer for extended periods of time:

Newer Hitachi drives (4x, 6x and 8x) apparently have a power-saving feature that is activated after a certain length of time whereby the CD-ROM drive cycles down to a significantly lower RPM state. This can impede game performance. As far as we know, this feature cannot be disabled.

Our suggestion is an obvious one: If you have one of these drives, and you appear to be having problems manifested by sudden periods of very sluggish game performance, don't leave your computer for any great lengths of time. (Bathroom-breaks are OK).

www.hitachipc.com/support

Performance Issues and Tips

With its photorealistic graphics, complex artificial intelligence, and a host of other features, *Flight Unlimited II* is a “big” game which essentially runs better on faster machines with more memory. Here is our best and brightest suggestion for how to get the most out of the game:

ALWAYS MAKE SURE YOU HAVE SHUT DOWN ALL OTHER APPLICATIONS PRIOR TO RUNNING FLIGHT UNLIMITED II! (We obviously can’t stress this point enough.)

…along with possible answers to the most frequently-asked question for high-end flight simulators:

Flight Unlimited II runs too slowly on my system. How can I speed things up?

Too Slow

PROBLEM: ***Flight Unlimited II*** **runs too slowly on my system. How can I speed things up?**

SOLUTION:

1) Invest in a faster processor.
2) Invest in more RAM.
3) Tweak the settings at the **Options Screen**.
4) **ScanDisk** your hard drive.
5) **Defrag** your hard drive.
6) Clean out old **temp (.tmp) files** from the C:\WINDOWS|TEMP or C:\WIN95\TEMP folder on your hard drive (from *Windows Explorer*).

There are also a bevy of options you can check and set from the Windows 95 ***CONTROL PANEL*** to ensure that your system is setup to run at peak efficiency. To get to where you need to go:

1) Go to MY COMPUTER and open up the **CONTROL PANEL** folder.
2) Double-click on the SYSTEM icon to bring up the **System Properties** panel:

Under **Performance status** section, both the *File System* and *Virtual Memory* settings should say **32-bit** and beneath this paragraph, should read:

Your system is configured for optimal performance.

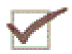
If these do not, then you are running in what's known as "**MS-DOS compatibility mode**" (i.e., 16-bit mode of operation) and your system is resultantly being somewhat hampered. Contact your system vendor to correct the problem (usually through updated hardware drivers).

From this panel, you can now check the following options:

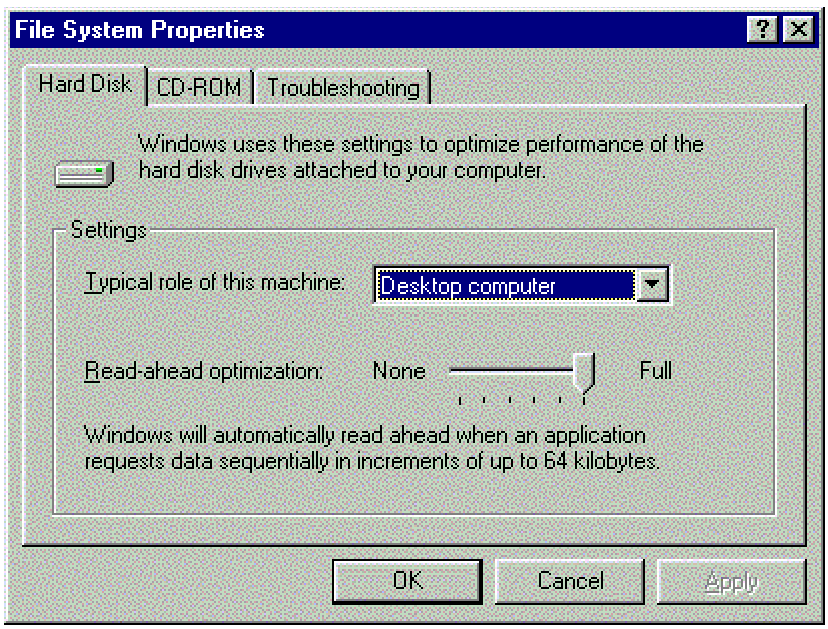
- **File System Performance**
- **Graphics Performance**
- **Virtual Memory**

File System Performance

1) From the **System Properties** panel:

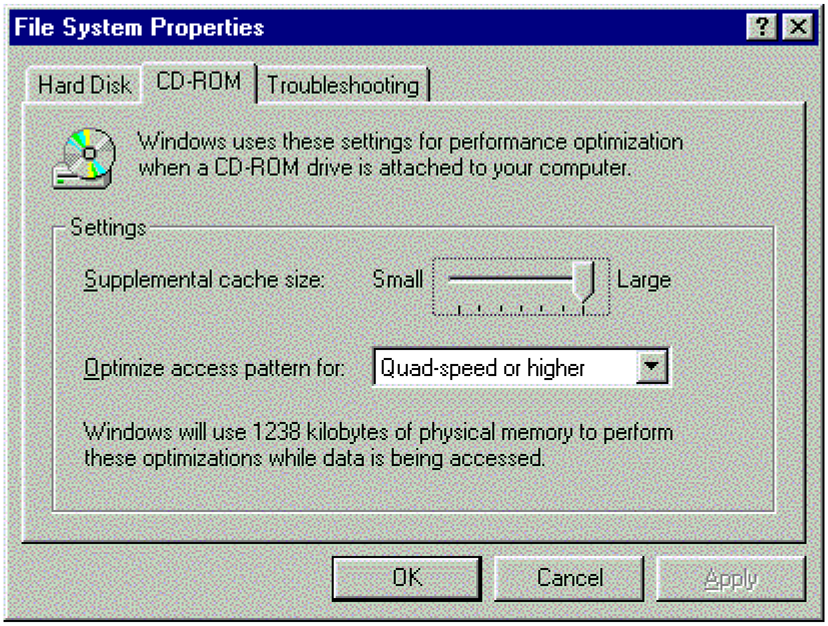


2) Click on the **Performance** tab and then click on the button labeled **File System**. This will open up the **File System Properties** panel, with the default **Hard Disk** properties tab selected:



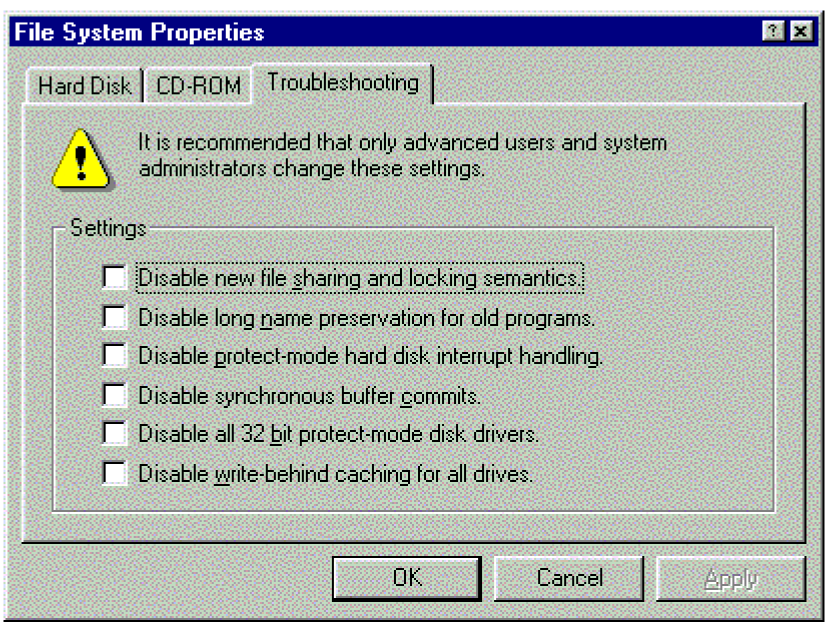
3) Within the **Settings** box, the *Typical role of this machine* should be set to **Desktop computer** while the *Read-ahead optimization* slider bar should be set to **Full** (i.e., all the way to the right). Click on the **OK** button to continue.

4) Now click on the **CD-ROM** properties tab to bring up the **CD-ROM** settings sub-panel:



5) Within the **Settings** box, the *Supplemental cache size* slider bar should be set to **Large** (i.e., all the way to the right) while the *Optimize access pattern for* should be set to **Quad-speed or higher** (providing you have a 4X or greater CD-ROM drive as most do nowadays). Click on the **OK** button to continue.

6) Lastly, click on the **Troubleshooting** properties tab to bring up the **Troubleshooting** settings sub-panel:

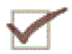


Ideally, all of the boxes should be unchecked.

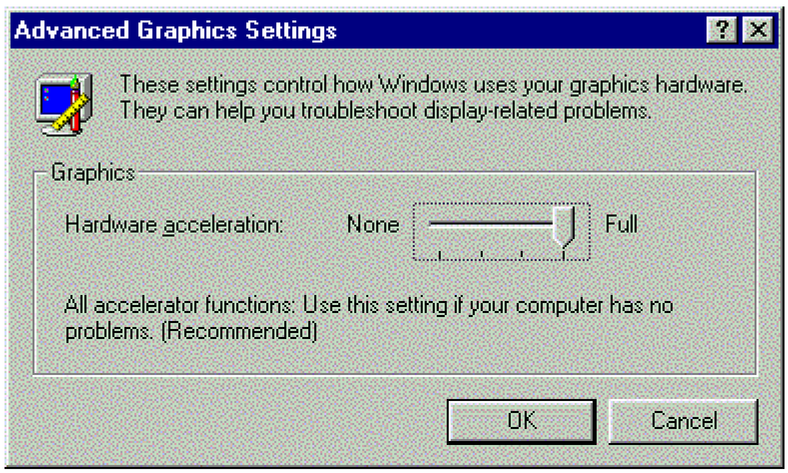
Click on the **OK** button to continue.

Graphics Performance

1) From the **System Properties** panel:



2) Click on the **Performance** tab and then click on the button labeled **Graphics**. This will open up the **Advanced Graphics Settings** panel:



In the **Graphics** section, the *Hardware acceleration* slider bar should be set to **Full** (i.e., all the way to the right).

Click on the **OK** button to continue.

Virtual Memory

1) From the **System Properties** panel:

2) Click on the **Performance** tab and then click on the button labeled **Virtual Memory**. This will open up the **Virtual Memory** panel:

3) Make sure the selection which says "**Let Windows manage my virtual memory settings (recommended)**" is **checked** (regardless of how much memory you actually have on your system).

You should additionally ensure that *Flight Unlimited II* the only application running on your system at the time. **MAKE SURE YOU CLOSE ALL OTHER APPLICATIONS PRIOR RUNNING OUR PROGRAM!**

Click on the **OK** button to continue.

Common Questions and Problems

Currently, the list is rather short:

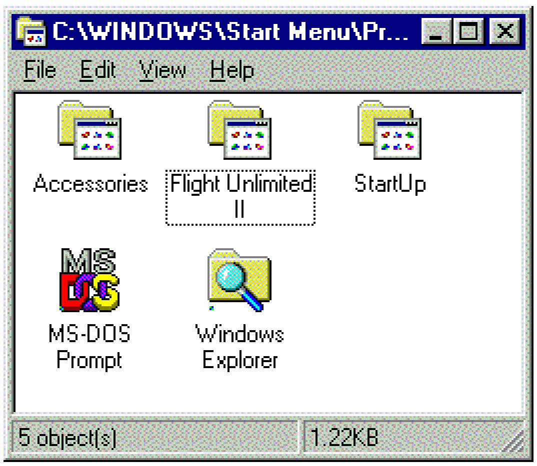
Q: I want to create a shortcut on my desktop to this fine game. How do I go about doing this?

Creating a Shortcut

Question: I want to create a shortcut on my desktop to this fine game. How do I go about doing this?

Answer:

The easiest way is as follows: From the Windows 95 desktop, right-click on the **START** button, then OPEN from the panel which appears, followed by PROGRAMS. This will bring up a panel resembling the following (in *Large Icons* mode):



Double click on the folder labeled **Flight Unlimited II**. Another panel will appear (in *Large Icons* mode):

Now right-mouse click on the icon labeled **Flight Unlimited II** and simply drag it onto the desktop. When you let go, you will be prompted to **Create Shortcut(s) Here**. Click on this option to create your new shortcut to the game.

Contacting Technical Support

To check to see if there is a patch already available for *Flight Unlimited II* which may address your particular problem, or may even add features which were not available in the shipping version of the game, we invite you to contact the flight experts at the following locations:

For Customer Service please call **415-547-1244**. Customer and technical service is available from 9 AM to 5 PM Pacific Standard Time. You can also e-mail your questions to **techsupp@eidos.com**.

For the latest FAQ, please check out the *Looking Glass* web site at **www.lglass.com/f2**.

For hints, tips and strategies, please go to your local computer retailer or bookstore to purchase the official *Flight Unlimited II Strategy Guide* by Player Media, or call 1-800-778-0035 (United States inquiries) or 1-815-734-1132 (Canadian or International inquires) to directly purchase the strategy guide.

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George Watson, *Computer Pilot Magazine*
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Spumador

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The Hantzopoulos Clan (*mom, dad and sisters*)
Andrea Hanneman
Nancy and Jay Gilby
The Fleming and Unnewisse Clans
Dianne Glynn.
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Traci Lords

The Flight Unlimited II Online Manual
Version 1.3

The Main Menu Screen

This is the screen to which you are taken immediately after *Flight II* has finished loading.

The Quick Flight Screen

This is where you choose your starting location on the map, aircraft, and weather conditions to get up in the air with a minimum of fuss.

The Quick Flight Map

This is the map where you select the starting location for your *Quick Flight*.

The Modified Quick Flight Screen

This is where you may quickly choose weather options and your aircraft from any FBO or the *Flight Planner*.

The Large FBO

The FBO or *Fixed Base of Operation* building is where you conduct all game activity (where you go before and after flying, where you access your logbook and plan flights, etc.).

The Small FBO

The FBO or *Fixed Base of Operation* building is where you conduct all game activity (where you go before and after flying, where you access your logbook and plan flights, etc.).

The Airport Selector Map

This is where you select your active airport.

The Key Rack Screen

This is where you choose the airplane you will fly.

The Pilot Info Page

This is the page of the logbook where you enter your biographical information, and where the game keeps track of your logged flight hours.

The Load/Save Page

This is the page of the logbook where pilot logs are stored and retrieved.

The Flight Info Page

This is the page of the logbook where the game records data on the various flights you’ve taken.

The Object Viewer

This is where you go to view models and specification figures for all of the aircraft featured in *Flight II* (both flyable and tertiary).

The Adventures Screen

This is where you go to select one of the 25 available missions.

The Game Options Screen

This is where you go to change game options (sound, game settings, graphics, and controls).

The Sound Settings Screen

This is where you go to set the game's sound options.

The Game Settings Screen

This is where you go to set *Flight II's* level of realism.

The Graphics Settings Screen

This is where you go to set the game's level of graphic detail.

The VFR Cockpit View

This is the cockpit view used to fly by *Visual Flight Rules* during good to fair weather conditions.

The IFR Cockpit View

This is the cockpit view used to fly by *Instrument Flight Rules* during poor weather or conditions of otherwise low visibility.

The Virtual Cockpit View

This is the cockpit view used to give the player the greatest sense of actually flying an aircraft.

The Full Screen View

This is the cockpit view used to enjoy *Flight II's* majestic scenery.

The Flight Planner Map

This is where you go to create a flight plan on an explicit relief map of the area.

The Airspace Information Map Overlay

This is the overlay available in both the *Flight Planner* and *In-Flight* maps where air traffic control coverage is displayed.

The VOR Information Map Overlay

This is the overlay available in both the *Flight Planner* and *In-Flight* maps where the nine area VOR stations are displayed.

The Points of Interest Map Overlay

This is the overlay available in the *Quick Flight*, *Flight Planner*, and *In-Flight* maps where popular local landmarks are displayed as **gold** icons.

The In-Flight Map

This is the in-flight map similar to an actual pilot's sectional map. It is used to display the flight plan for the current flight and to assist with general navigating procedures.

The Blackboard Lessons Screen

This is where you go to view illustrations on and practice general flight maneuvers.

The Lesson 1 Screen

This lesson allows you to practice taxiing and takeoff procedures at a controlled airport.

The Lesson 2 Screen

This lesson allows you to practice landing at a controlled airport.

The Lesson 3 Screen

This lesson allows you to practice taking off and entering the pattern at an uncontrolled airfield.

The Lesson 4 Screen

This lesson allows you to practice entering the traffic pattern at a tower-controlled airfield.

The Lesson 5 Screen

This lesson allows you to practice crosswind landings at a tower-controlled airfield.

The Lesson 6 Screen

This lesson allows you to practice ILS landings at a tower-controlled airfield in foul weather.

Quick Flight Icon

Click on this icon to go to the *Quick Flight* screen where you may set flight variables and quickly take to the skies.

Airport Icon

Click on this icon to proceed to the default *San Francisco International Airport FBO* screen. Most game activity will take place directly from this screen. *Note that subsequent start-ups of Flight II will always take you to the airport where you last left the game.*

Options Icon

Click on this icon to go to the *Options* screen, where you may adjust game options such as sound volume, graphic detail levels, joystick calibration, etc. *Note that the Options screen is also accessible from any Airport FBO screen.*

Credits Icon

Click on this icon to go to the *Credits* screen where you may view the “flight crew.”

Exit Icon

Click on this icon to leave this game (you will immediately exit with no prompts). You may also press the **ALT-F4** key combination to exit.

Quick Flight Map Button

Click on this button to go to the *Quick Flight* map and select a starting location for the upcoming flight.

Aircraft Selector

Click on this button to choose your aircraft for the current flight.

Fuel Slider

Click on this slider to adjust the level of fuel with which to takeoff.

Time of Day Slider

Click on this slider to set the time of day.

Wind Speed Slider

Click on this slider to adjust the speed of the wind.

Wind Direction

Click on this indicator wheel to change the direction of the wind.

Cloud Cover Slider

Click on this slider to adjust the type of cloud cover.

Cloud Ceiling Slider

Click on this slider to adjust the ceiling height for the clouds.

Rain Slider

Click on this slider to adjust the rain intensity and thunder frequency.

Fog Slider

Click on this slider to turn on/off the fog effects.

Haze Slider

Click on this slider to adjust the level of hazing.

Fly Button

Click on this button to takeoff with the selected options.

Reset Button

Click on this button to reset the original *Quick Flight* defaults.

Random Button

Click on this button to create a random *Quick Flight* scenario using all options.

Cancel Button

Click on this button to return to the *Main Menu*.

Notepad

This electronic notepad allows you to view location, starting position, cursor, and departure information.

Main Map Area

This is the central area of the relief map where the 46 featured airports are situated.

Zoom Control Button

Click on this button to adjust the viewing level of the map.

Airport Button

Click on this button to exit the map.

The Welcome Sign

This sign tells you the name of the airport at which you are presently situated.

The Wall Map

Click on this icon to choose an airport to fly out of at the *Airport Selector* map.

The Key Rack

Click on this icon to grab the keys for the aircraft you wish to fly at the *Key Rack*.

The Logbook

Click on this icon to view your pilot's log at the *Logbook*.

The Blackboard

Click on this icon to view illustrations and practice lessons at the *Blackboard Lessons* screen.

The Calendar

Click on this icon to view flyable and tertiary aircraft at the *Object Viewer*.

The Course Plotter

Click on this icon to plot a course for an upcoming flight at the *Flight Planner*.

The Teletype Machine

Click on this icon to fly one of the 25 pre-planned missions at the *Adventure* screen.

The Tool Chest

Click on this icon to adjust myriad sound, video, and related options at the *Game Options* screen.

The File Cabinet

Click on this icon to access this *Online Manual*.

The Door

Click on this icon to head on out to your aircraft and take off.

The Exit Sign

Click on this icon to leave the FBO and go to the *Main Menu*.

Notepad

This electronic notepad allows you to view location, starting position, cursor, and departure information.

Baron Key Chain

Click here to select the key chain for the *Beech Baron*.

Beaver Key Chain

Click here to select the key chain for the *De Havilland Beaver*.

Trainer Key Chain

Click here to select the key chain for the *Trainer*.

P-51 Key Chain

Click here to select the key chain for the *P-51D Mustang*.

Arrow Key Chain

Click here to select the key chain for the *Piper Arrow*.

Load/Save Tab

Click on this tab to go to the *Load/Save* page of the logbook where you may load, create (save), and delete logbooks.

Pilot Info Tab

Click on this tab to go to the *Pilot Info* page of the logbook where you may view statistics for the active pilot.

Flight Info Tab

Click on this tab to go to the *Flight Info* page of the logbook where you may view statistics for the current or previous flights.

Close Tab

Click on this tab to exit the logbook and return to the current FBO.

Dog-Ear Crease

Click on this crease to cycle to the next page (left-click advances forward and right-click turns back).

Pilot Information

View all kinds of juicy information on the active pilot on this portion of the page.

Flight Information

View all kinds of juicy information on this or other flights you’ve taken on this portion of the page.

Logbook Listing

View active logbooks on this portion of the page.

Load Logbook Button

Click on this button to load an existing logbook.

Create Logbook Button

Click on this button to create and automatically save a new logbook.

Delete Logbook Button

Click on this button to delete a previously saved logbook.

Object Viewer

View, zoom, and rotate selected 3-D objects here.

Object Information

View statistics and text-based information on the selected object here.

Airplanes Button

Click on this button to view statistics for the five featured flyable aircraft and all of the tertiary aircraft.

Cancel Button

Click on this button to leave the *Adventures* screen and return to the current FBO.

Mission Selection

Read all about the selected mission in this portion of the screen.

Next Button

Click on this button to cycle to the next page of missions.

Previous Button

Click on this button to cycle to the previous page of missions.

Accept Button

Click on this button to fly the selected adventure

Cancel Button

Click on this button to leave the *Adventures* screen and return to the current FBO.

Sound Settings Button

Click on this button to go to the *Sound Settings* panel where you may change what you hear in *Flight II*.

Game Settings Button

Click on this button to go to the *Game Settings* panel where you may change *Flight II*'s level of realism.

Graphics Settings Button

Click on this button to go to the *Graphics Settings* panel where you may change what you see in *Flight II*.

Control Settings Button

Click on this button to go to proceed to either the **Game Controllers** panel at the Windows 95 desktop where you may setup and calibrate your game controllers.

Accept Button

Click on this button to accept the current settings and return to the active FBO.

Cancel Button

Click on this button to return to the current FBO without accepting settings.

Default Button

Click on this button to restore the original settings to the *Options* screen.

The Accelerometer

This instrument displays the acceleration of gravity acting on the aircraft.

The Airspeed Indicator

This instrument tells you how fast the aircraft is moving through the air.

The Altimeter

This instrument displays the aircraft's altitude by measuring changes in barometric pressure.

The Attitude Indicator

This instrument displays the aircraft's orientation, both pitch and roll, to an artificial horizon.

The Carburetor Heat Knob

Click on this knob to allow heated air from the exhaust manifold to warm the carburetor.

The Clock

This instrument does the same thing as the one sitting in your living room, in addition to acting as a timer.

The COM Radio

This instrument is used to communicate with air traffic controllers, to receive updates from ATIS, and to listen to pilot chatter.

The Directional Gyro

This instrument provides the current *magnetic heading* of the aircraft.

The DME

This instrument, known as *Distance Measuring Equipment*, shows you how far away the aircraft is presently located from a selected VOR station and the aircraft's speed relative to said station.

The Elevator Trim Indicator

This instrument displays the position of the *elevator trim tabs*.

The Flaps Indicator

This instrument displays the position of the *wing flaps*.

The Fuel Gauge

This instrument tells you how much fuel is left in the respective wing tank, or total fuel level (as appropriate).

The Fuel Tank Switch

This instrument allows you to manually switch fuel tanks in the *Arrow*.

The Outer Marker Beacon Light

This instrument flashes when the aircraft passes over the *outer marker beacon* during an approach to an ILS-equipped runway.

The Middle Marker Beacon Light

This instrument flashes when the aircraft passes over the *middle marker beacon* during an approach to an ILS-equipped runway.

The ILS NAV/COM Radio

This instrument is used to dial up ILS transmitter frequencies at properly equipped runways to assist in landing your aircraft at night or during periods or low visibility.

The ILS Receiver

This instrument receives course and glideslope information from an ILS transmitter at a properly equipped runway to assist in landing your aircraft at night or during periods or low visibility.

The Landing Gear Handle

Click on this handle/lever to raise and lower the landing gear.

The Landing Gear Position Lights

These lights illustrate, through color illumination, the positional status of the landing gear.

The Landing Gear Transit Light

This light illustrates, through color illumination, the transit status of the landing gear.

The Magnetic Compass

This is the classic instrument used for determining geographic direction through alignment with the earth's magnetic field.

The Manifold Pressure Gauge

This instrument basically tells you how much power the engine is producing.

The Mixture Control Lever

This lever is used to regulate the fuel-to-air ratio entering the engine.

The Mixture Control Knob

This knob is used to regulate the fuel-to-air ratio entering the engine.

The NAV Radio

This instrument is used to dial up VOR station frequencies to assist in general navigating procedures.

The Navigation Lights Switch

This instrument is used to turn on/off the exterior navigation lights on the aircraft.

The Oil Pressure Gauge

This instrument measures the pressure of the oil coursing through the engine.

The Oil Temperature Gauge

This instrument measures the temperature of the oil coursing through the engine.

The Propeller Control Lever

This lever is used to regulate the speed of the propeller.

The Propeller RPM Indicator

This instrument measures how fast the propeller is spinning and, in so doing, measures the speed of the engine.

The Rudder Trim Indicator

This instrument is used to control the position of the *rudder trim tab* in the *Baron* and *P-51*.

The Selected Engine Indicator

This instrument displays which of the twin engines (or both) are selected for throttle manipulation on the *Baron*.

The Throttle Control Lever

This instrument is used to regulate the mixture of fuel and air flowing to the engine, effectively controlling the power output of the engine.

The Throttle Control Knob

This instrument is used to regulate the mixture of fuel and air flowing to the engine, effectively controlling the power output of the engine. On the *Trainer*, it also regulates the speed of the propeller.

The Transponder

This instrument is a beacon that allows an aircraft’s position to be exactly identified on an air traffic controller’s radar display.

The Turn/Slip Indicator

This instrument displays the aircraft’s direction and rate of roll.

The Vertical Speed Indicator

This instrument indicates the rate at which the aircraft is climbing or descending.

The VOR Indicator

This instrument receives signals from a ground-based VOR station and is used to assist the pilot in general navigation procedures, especially when lost or in poor weather.

Airspace Information Button

Click on this button to toggle the *Airspace Information* map layer on and off.

VOR Information Button

Click on this button to toggle the *VOR Stations* map layer on and off.

Satellite View Button

Click on this button to toggle the position of your aircraft on the map and its flight path on and off.

Points of Interest Button

Click on this button to toggle the *Points of Interest* (landmarks, etc.) map layer on and off.

Flight Options Button

Click on this button to go to the *Modified Quick Flight* screen where you may set your options for the current flight including weather, time of day, and aircraft selection.

Save Flight Plan Button

Click on this button to save the current flight plan as either a new or existing filename.

Load Flight Plan Button

Click on this button to load a previously saved flight plan.

Delete Flight Plan Button

Click on this button to to delete a previously saved flight plan.

Clear Flight Plan Button

Click on this button to to clear the current flight plan.

Fly Button

Click on this button to accept the currently chosen flight plan and begin your flight.

Help Button

Left or right-click on this button to to toggle on/off an adjacent text box which names all of the buttons on the toolbar.

The Map Scale

This scale, present on all of the maps in *Flight II*, automatically resizes as the zoom level of the given map is adjusted.

The Flight Planner Notepad

This notepad displays information pertinent to the current flight plan, including general airport, positional, departure, destination and flight route data. Toggle on/off with the **N** key.

Destination

This turning point icon on the *Flight Planner* map marks your destination airport (i.e., that airport at which you are presently slated to land).

Turning Point

This is a general turning point icon, found on the *Flight Planner* map between your P.O.D. (*Point of Departure*) airport and your destination airport.

Point of Departure

This turning point icon on the *Flight Planner* map marks your departing airport (i.e., that airport from which you are presently slated to take off).

Class B Airspace

This is the **bluish-green** airspace ring which is controlled by *Bay Approach* radar. *San Francisco* is the only *Class B* airport in the area.

Class B (Mode C) Airspace

This is the **sky-blue** airspace ring extending for a 30 mile radius about SFO which in non-radar controlled in *Flight II*.

Class C Airspace

This is the **magenta** airspace which is controlled by radar approach and tower. *Oakland* and *San Jose* are the only *Class C* airports in the area.

Class D Airspace

This is the **sky-blue (dashed)** airspace, also known as *tower-controlled airspace*, generally extending from the surface of the airport to 2,500 feet (AGL) and out to a radius of five statute miles. It is governed by the tower controller.

Restricted (Military) Airspace

This is the **red** airspace surrounding *Travis Air Force Base* and is restricted to aircraft without obtaining prior clearance from the radar controller.

Radar Control Altitude Limit Markings

These are numbers which display the altitude limits of each of the colored circular segments under control of radar approach (e.g., **80/15** = range of control of 1,500 to 8,000 feet).

VOR Station Compass Roses

These are the **white** compass roses extending around each of the nine VOR stations (a.k.a. NAVAIDS) featured in the terrain area, with a white arrow indicating magnetic north. The name of the station along with its identification and associated radio frequency also resides in an adjecent gray box.

Point of Interest Icon

These are **gold** icons displaying the position of popular local landmarks when the *Points of Interest* overlay has been enabled on the relevant map. The name of the indivdual landmark appears in the *Notepad*.

The Airport Icons

These are the *Airport Icons*, located on all four of the maps featured in *Flight II*, representing **15** *Controlled Airports* and **31** *Uncontrolled Airports* (including **15** *Private Airfields* and **3** *Maritime Airports*), for a total of **46** FBO's or *Fixed Base of Operation* buildings.

The Flight Planner Airport Pop-Up Menu

This is the menu which appears on the *Flight Planner* map when you left-click on any aircraft icon.

The First Save Menu

This is the menu which appears on the *Flight Planner* map when you click on the **SAVE** button.

The Second Save Menu

This is the menu which appears on the *Flight Planner* map when you click on the **SAVE** button AND you have at least one flight plan previously saved.

The Turning Point Icons

These are the icons that appear on the *Flight Planner* map when you click to lay waypoints for the current flight plan.

Livermore

This is your destination airport.

Two Minute Tick Marks

These are the two minute tick marks, representing two minutes of travel time for the selected aircraft. The spacing of these marks is based on the plane's *average cruise speed*.

Leg 1

This is the first leg of the journey.

Oakland Coliseum

This is the landmark chosen as the first turning point **(TP1)** for this flight plan.

Oakland

This is the *Metro Oakland International Airport*.

Leg 2

This is the second leg of the journey.

Golden Gate Bridge

This is the landmark chosen as the second turning point **(TP2)** for this flight plan.

Leg 3

This is the third leg of the journey.

SFO

This is *San Francisco International Airport*.

VOR Station

Also known as a NAVAID, this is the VOR station, representing the center of the spoke.

180 Degree Azimuth Radial

This is one radial out of a total of 360.

Pilot Note

Left-click on this icon to read further information pertaining to the selected topic.

Pilot Note

Unless otherwise indicated, a reference to “click” on an item in this Online Manual means that you should specifically *left* mouse-click.

Pilot Note

View the *Quick Flight* screen as—literally—a quick and easy way to get up in the air and have fun with as little fuss as possible (especially if detailed flight planning is not your cup of tea). With the ability to place your aircraft anywhere on the map and begin flight in the air, *Quick Flight* is particularly useful for touring urban areas and individual airports.

Pilot Note

If you accidentally bring up any selection menu and don't want to make a choice, simply press the **ESC** key to back out of it.

Pilot Note

Every airport in *Flight II* features a *Looking Glass Aviation* hangar. Your aircraft is always parked outside of this hangar at the *player parking spot* whenever you select the option to start on the parking ramp.

Pilot Note

The altitude heights displayed are always registered as **AGL** (*Above Ground Level*), not **MSL** (*Mean Sea Level*). Furthermore, your aircraft, once placed, always begins by facing in a **northerly** direction.

Pilot Note

The *Quick Flight Notepad* is a moveable object. If you left-click and hold the mouse down, you can drag it around the screen and place it where you want.

Pilot Note

The **Wind Direction Indicator** displays the direction *from which* the wind is arriving, not the direction *to which* it is proceeding. For example, if you set it to read *Northerly*, the wind is actually blowing towards the *south*, *not* in a northerly direction!

Pilot Note

The *Airport Selector Notepad* is a moveable object. If you left-click and hold the mouse down, you can drag it around the screen and place it where you want.

Pilot Note

When *Flight II* loads for the very first time, this is the page to which you are initially taken. Subsequent start-ups of *Flight II* will always take you directly to the *Main Menu*, bypassing the logbook entirely. This is also the page to which you proceed when new logbooks are created.

Pilot Note

Note that logbooks are automatically saved every time an entry is created (hence, no **SAVE** button).

Pilot Note

The logbook is persistent throughout game sessions. Every time you start *Flight II*, the last logbook used is the default start-up. No loading is required. This is always the current logbook until a new one is specifically loaded. Also note that *Quick Flight* sessions are never tracked in the logbook.

Pilot Note

Some aircraft have a variable pitch propeller. In these aircraft, oil from the oil system is used to turn the propeller at a variable speed, therefore, pressure going to the prop must be regulated to prevent an overspeed, and subsequent damage.

Pilot Note

Air Traffic Density figures will be proportionally lower at night and in bad weather, just as in the real skies.

Pilot Note

If your selected aircraft isn’t seaworthy (i.e., a *Beaver*), maritime airports will **not** be displayed on either the *Quick Flight* map or *Airport Selector* map.

Pilot Note

If your selected aircraft is seaworthy (i.e., a *Beaver*), clicking on a **maritime** airport icon displays no pop-up menu (your aircraft will be automatically placed in the *player parking spot*).

Pilot Note

If frame rates are sluggish, try reducing the appropriate options in the *Graphics Settings* panel.

Pilot Note

Please note that the rendered cockpits are *not* available in 1,024 x 768 mode. You will default to *Full Screen View* every time you select this resolution and go fly.

Pilot Note

The **VFR Cockpit View** is principally used to navigate via *Visual Flight Rules*, where constant instrument awareness takes a back seat to flying using landmark recognition.

Pilot Note

The reason why this cockpit mode is known as the **T-Scan** is due to the fact that the main instrument gauges form the letter "T" in the actual cockpit. The standard display has the *Airspeed Indicator* on the left, the *Attitude Indicator* (AI) in the center, the *Altimeter* on the right, and the *HSI* underneath the AI to form the letter T. The "T" pattern was developed in the early 1970's to make IFR flying easier.

Pilot Note

The **IFR Cockpit View** is principally used to navigate via *Instrument Flight Rules*, used when adverse weather conditions or periods of low visibility require constant instrument awareness.

Pilot Note

The **Virtual Cockpit View** is, by far, the best view in *Flight II* for giving you that “you-are-there” feeling. This view is meant to make you believe you are sitting in the actual cockpit of the chosen aircraft.

Pilot Note

The *Airspeed Indicator* on the *P-51 Mustang* is measured in miles per hour (MPH) instead of knots.

Pilot Note

Barometric pressure is ***not*** modeled in *Flight II*, so there is no way to calibrate the altimeter for a "true" altitude "fix." You'll notice **'29.92'** is always displayed in the *Kollsman Window* since the setting is fixed in the instrument. So if you're stuck in a fog bank and a mountain is looming before you, remember that the altimeter is displaying the altitude above the sea and not the altitude above the ground directly beneath!

Pilot Note

If your selected airport is a **maritime airport** and your current aircraft is a *Beaver*, you will not be able to select a different aircraft with the *Aircraft Selector* icon.

Pilot Note

Wind Socks are installed at all **46** airports to visually indicated both the direction from which the wind is arriving and its intensity. Don't forget to check them out before you takeoff.

Pilot Note

If your selected airport is a **maritime** airport, the only aircraft keys present on the *Key Rack* will be for the seaplane (i.e., the *Beaver*).

Pilot Note

In the real world, you *can't* dial up a frequency from anywhere you wish. For example, you could not communicate with a ground controller in *San Francisco* while sitting on the runway in *Sacramento* because of the purposeful weakness of the broadcast signal.

Pilot Note

The knob for the COM radio only turns on/off the COM radio—it does not enable/disable any of the remaining instruments on the *Radio Stack*. If you just feel like flying around without having to listen to radio chatter or deal with air traffic controllers, simply turn off the radio!

Pilot Note

You should get in the habit of leaving the COM radio turned **ON** at all times. If your aircraft invades either Class D tower-controlled or Class B/C radar-controlled airspace without first contacting the appropriate controller, that controller will call your aircraft on the GUARD frequency, give you their contact frequency, and politely ask you to call them back and "***state your intentions***."

Pilot Note

The combination of the *directional gyro* and the *VOR indicator* is commonly referred to as the **HSI** or **Horizontal Situation Indicator**.

Pilot Note

In real life, the *directional gyro* is known to "precess" or drift due to aircraft maneuvers. In *Flight II*, precession or *gyroscopic drift* is not modeled, therefore, your DG *always* reflects the correct magnetic heading of the aircraft.

Pilot Note

The *Beaver* contains no navigational equipment aside from the *directional gyro*, and so does not carry a DME unit.

Pilot Note

If you're lost, you can tune in to a VOR station, find the *radial* you are on from it, read the distance indicated in the DME, and "plot" the information on your *In-Flight Map*. You may then visually find something on the ground to confirm your position on the map. You're no longer lost!

Pilot Note

The *Beaver* contains no navigational equipment aside from the *directional gyro*, and so does not carry *ILS Marker Beacon Lights*.

Pilot Note

The *Beaver* contains no navigational equipment aside from the *directional gyro*, and so does not carry an *ILS NAV/COM Radio*.

Pilot Note

The *Beaver* contains no navigational equipment aside from the *directional gyro*, and so does not carry an *ILS receiver*.

Pilot Note

The *magnetic compass* is not reliable unless the aircraft is in level flight; not in turns, during acceleration, deceleration, severe weather, or near metal objects. In real life, a nearby metal wrist watch can even affect its reliability!

Pilot Note

The *Trainer* is the only aircraft in *Flight II* to not carry a *manifold pressure gauge*.

Pilot Note

The *Baron* features a split *manifold pressure gauge*, representing each of its twin engines.

Pilot Note

When you press the **E** key to start the engine prior to takeoff, the mixture control setting is automatically set to the full rich position for all aircraft—no manual adjustments are required.

Pilot Note

The *Beaver* contains no navigational equipment aside from the *directional gyro*, and so does not carry a *NAV Radio*.

Pilot Note

The *Baron* features a split oil pressure gauge representing each of its twin engines, while the *P-51* features a dual oil pressure/oil temperature gauge.

Pilot Note

The *Baron* features a split oil temperature gauge, representing each of its twin engines, while the *P-51* features a dual oil temperature/oil pressure gauge.

Pilot Note

When you press the **E** key to start the engine prior to takeoff, the propeller control setting is automatically set to maximum—no manual adjustments are required.

Pilot Note

The *Baron* features a split *RPM indicator*, representing each of its twin engines.

Pilot Note

In *Flight II*, the *rudder trim indicator* is only carried by the *Baron* and *P-51*. Although there is no indicator present on the *Arrow*, you may use the hot keys to access rudder trim with this aircraft, as well.

Pilot Note

The throttle knob also regulates the speed of the propeller in the *Trainer* (*see* **Propeller Control Lever** *for details*).

Pilot Note

The *Beech Baron* is unique in *Flight II* in that it features a *twin engine throttle* configuration. Each of the engines must be manually selected for individual throttle manipulation by pressing the **SHIFT E** key combination. (*For additional details, refer to* **Selected Engine Indicator**.)

Pilot Notes

As long as the transponder is left on with the correct "squawk" frequency, a given radar approach controller will be able to continuously track your aircraft. If you accidentally turn it off while remaining in the controller's airspace, the controller will let you know about it over the radio.

Pilot Note

Even though the VSI only reads up to 2,000 feet per minute, severe nose-low, high-speed dives can achieve sink rates that exceed 10,000 feet per minute. Also bear in mind that the needle doesn't instantaneously deliver the correct reading—oftentimes, particularly during challenging maneuvers, the needle will take a few seconds to "catch up."

Pilot Note

The combination of the *VOR Indicator* and the *Directional Gyro* is commonly referred to as the **HSI** or **Horizontal Situation Indicator**. Also note that the *Beaver* contains no navigational equipment aside from the *directional gyro*, and so does not carry a *VOR indicator*.

Pilot Note

If you aren't receiving a signal from the VOR station, the **TO/FROM indicator light** will be dark, which means that you have the wrong frequency set in the NAV radio, you're out of the VOR station's range, or there's a mountain or large structure between you and the station.

Pilot Note

The *Beaver* contains no navigational equipment aside from the *Directional Gyro*. Because we modeled the aircraft after the “real” 1948 *Beaver*, we opted to leave out modern day navigation equipment, creating a more authentic flying experience for this singular aircraft.

Pilot Note

The single best way to learn about how to interact with the various air traffic controllers in the game is to use the **SHIFT P** key combination to jump into the cockpit of another aircraft and listen to how that pilot interacts with them. You'll be surprised by how much you can learn in relatively little time.

Pilot Note

The *Taxi Camera* view is for taxiing only and should *not* be used while the aircraft is airborne!

Pilot Note

If flaps are damaged while extended, they will be nearly impossible to fully retract.

Pilot Note

If you damage the landing gear on a *touch and go*, for example, anticipate a possible crash landing the next time you attempt to land.

Pilot Note

In real life, a radial engine will accumulate oil in the bottom cylinders due to gravity. Before starting the *Beaver's* radial engine, the pilot must turn the propeller by hand at least a dozen times to distribute the oil evenly among the cylinders. Failure to adhere to this procedure usually results in damage to the engine. Of course, you don't have to turn the propeller by hand in our simulator!

Pilot Note

Flight plans are additionally filed with the FAA (*Federal Aviation Administration*) so that the proper authorities know where to find you in the event of a mishap!

Pilot Note

To change your P.O.D., you will need to exit the *Flight Planner*, go to the *Airport Selector* map in the current FBO, select a new airport, and then return to the *Flight Planner* from the new FBO.

Pilot Note

To operate VFR in the *San Francisco Bay Area*, remain outside of the *Class B airspace* ring indicated on the map. Depending on your realism settings and radio activation, don't go sightseeing near SFO unless you're prepared to deal with a fair amount of air traffic and listen and respond to a good deal of radio chatter!

Pilot Note

During windy conditions, pilots need to compensate for heading and speed, as the wind direction can cause drift and wind speed can either slow down or speed up the aircraft.

Pilot Note

The height of a turning point is always a default value of **1,500** feet AGL (*Above Ground Level*).

Pilot Note

A maximum of **20** turning points may be set for any single flight plan.

Pilot Note

If you click on a **maritime** airport icon at the map and your currently selected aircraft is not seaworthy (i.e. a *Beaver*), no pop-up menu will appear; you will automatically create a new **Flyover** (i.e., transit airspace) turning point.

Pilot Note

Once either the **TOUCH AND GO** or **TRANSIT AIRSPACE** button is clicked, the same bulls-eye icon as the other turning points will appear overlaid onto the airport icon, and the *Notepad* will be amended to reflect the action at that airport. You may then continue to choose additional turning points.

Pilot Note

You can’t grab and move a turning point which is located over a airport icon (i.e., your destination airport).

Pilot Note

The *Flight Planner Notepad* is a moveable object. If you left-click and hold the mouse down, you can drag it around the screen and place it where you want.

Pilot Note

Turning points are always numbered in sequential order, from top to bottom. Additional pages will be automatically created if sufficient numbers of turning points are placed on the map.

Pilot Note

A single page in the *Flight Planner Notepad* contains no more than three turning point summaries.

Pilot Note

Run Time and **Distance** are automatically updated when each new turning point is added.

Pilot Note

You are allowed as many saved flight plans as will fit on your hard drive.

Pilot Note

Be careful here—clicking on the **DELETE FLIGHT PLAN** button will erase the old flight plan for good!

Pilot Note

Let's assume you were in a big rush and you wished to ***delete*** the first turning point so that you could fly directly to *Hayward* instead. Maneuver the cursor over the icon of the first turning point so that it highlights and simply press the **DELETE** key. Both the map and the *Flight Planner Notepad* will update to reflect the change.

Pilot Note

The *Tape Strip Indicator* changes colors to reflect the time of day. This is not a graphic glitch!

Pilot Note

The single best way to learn about how to interact with the various air traffic controllers in the game is to use the **SHIFT P** key combination to jump into the cockpit of another aircraft and listen to how *that* pilot interacts with them. You'll be surprised by how much you can learn in relatively little time.

Pilot Note

You are required to maintain two-way radio communication with the tower controller when you enter the airspace under that controller's jurisdiction.

Pilot Note

Although contacting UNICOM is always **optional** (i.e., you can fly into an uncontrolled airport without saying a word), it is considered proper aviation protocol to do so upon approach, typically within a **5-7** mile radius, depending on visibility conditions.

Pilot Note

Although a given UNICOM frequency may be dialed up from *anywhere* on the map, there may be instances in *Flight II* where you may try to contact UNICOM and receive no information at all. This is *not* a bug! Moderate to severe weather conditions (e.g., winds in excess of 30 knots or very low cloud ceilings) can close UNICOM service to an uncontrolled airport, and *Flight II does* model this.

Pilot Note

Notice how you are gradually “building” a prepared response to send to UNICOM and any interested traffic. This is how the menu selection process for the ATC interface works—by compiling phrases relevant to the situation you are in, one by one, in order to prepare a sentence which, when completed, will be transmitted over the COM radio to any attentive listeners.

Pilot Note

If you make a mistake during the menu selection process, or change your mind and decide to fly to a different airfield, pressing the **SPACEBAR** *once* will remove the current menu from the screen. Pressing the **SPACEBAR** a *second* time will bring you *back* to the *starting menu*. In *Flight II*, you must start the sentence-building process from scratch whenever you make a mistake or change your mind. (Don't worry—the air traffic controller will talk to you over and over again, if necessary!)

Pilot Note

Remember—you may also receive position report calls from *other* aircraft using the *same* frequency, so listen carefully to the responses you receive. A UNICOM radio call will always be addressed as such at the beginning of the transmission while a radio call from another aircraft will always be addressed by the callsign identification of the aircraft making the transmission.

Pilot Note

For ease of use, once you have made your contact with UNICOM, all subsequent logical position reports “next in line” in the pattern will be automatically highlighted in the menu and can be selected by simply pressing the **ENTER** key.

Pilot Note

Because several airports can share the same UNICOM frequency, the radio can quickly become saturated. It is very important that you pay attention to other aircraft making position reports at the field to and from which you are flying, and be careful not to interrupt other pilots relaying their reports. ***Transmit your radio call only when the frequency is clear!***

Pilot Note

ATIS**,** unlike UNICOM**,** is a service provided only at *controlled airports*. While contacting ATIS is always **optional**, strictly-speaking, it is *highly* recommended for the important information it provides. In fact, if you do not contact ATIS prior to interacting with any of the three types of air traffic controllers present in *Flight II*, they will ask you to do so the *first* time you speak to them. After this initial contact, they will simply assume you have already listened to ATIS and received the relevant identifier.

Pilot Note

If you contact the ground controller *before* obtaining the ATIS information, the controller will instead request that you receive the latest advisory and call back afterward.

Pilot Note

You may also click on the **ALT F** key combination to toggle through all available frequencies at that airport (*controlled* airports only).

Pilot Note

A ground controller may be dialed up from *anywhere* on the map, a minor departure from reality since you ordinarily could not contact one in *San Francisco* while sitting on the runway in *Sacramento*.

Pilot Note

If you find yourself in military airspace while ignoring the controller…

Pilot Note

Both numerical runway and alphabetical taxiway markings will be indicated on the respective *Airfield Diagram*. There will also be signs in the game appearing along the side of the taxiways indicating the individual route names. For example, ***Echo*** for **Taxiway E** will be marked by the letter **'E'**, ***Foxtrot*** for **Taxiway F** will be marked by the letter **'F'** (and so on).

Pilot Note

When given a ***"Hold Short"*** or ***"Give Way"*** command from the ground controller at the intersection of a runway and taxiway, a pair of **dashed white lines** and a pair of **solid white lines** appearing on the taxiway just before the entrance to the runway, known as the **Runway-Hold** markings, indicates the point beyond which you are not to proceed until given clearance to do so by the controller.

Pilot Note

If the tower controller instructs you to make ***"left traffic,"*** you are expected to make left turns around the pattern; likewise, ***"right traffic"*** means that you are expected to make right turns around the pattern.

Pilot Note

Whenever you enter the pattern and there are other aircraft present, the tower controller will assign you a *landing sequence number*. This is done, as part of the controller's responsibility to maintain proper aircraft separation, to ensure that you and the others understand one another's place in line. When you are on final and given clearance to land, you are then considered ***"number one to land."***

Pilot Note

Whenever tower has identified traffic to you, the controller will be expecting one of two possible replies from you: *traffic in sight* or *looking for traffic*. Always give yourself a few seconds to visually locate the traffic before acknowledging.

Pilot Note

If you contact the tower controller *before* obtaining the ATIS information, the controller will instead request that you receive the latest ATIS information and call back afterward.

Pilot Note

The ATIS identifier appears at the end of the request only if you have actually previously contacted ATIS.

Pilot Note

The tower controller may also say something like ***"Be advised. Traffic pattern altitude is 1,000."*** This lends you an indication of what altitude you need to be at when you traverse the pattern.

Pilot Note

In *Flight II*, you may receive radar service from anywhere in the region. Ordinarily, this service is restricted by the inherent limited range of radar and by intervening terrain such as mountains which can obstruct radar signals.

Pilot Note

There is also a **30** mile umbrella of **Sky blue (Solid Line)** *Class B* airspace surrounding San Francisco marked **Mode C** on the map, known as the “30 mile veil.” In real life, aircraft operating in this region are required to use an altitude-encoding “Mode C” transponder. In *Flight II*, *all* aircraft are equipped with this type of transponder, but nothing bad will happen if you forget to turn it on while entering this region.

Pilot Note

The most important thing to bear in mind is that controllers can *hand you off* to any other controller before your aircraft flies into an airspace that is not under their jurisdiction. You should expect to be handed off to various controllers, especially when flying into congested areas like San Francisco.

Pilot Note

Even though the airspace is restricted around *Travis*, in *Flight II*, you can still begin your flight there (just tell them you know the base commander). Once airborne, as soon as you exit the airspace, the same rules apply for reentry—no clearance, no way.

Pilot Note

Sacramento International Airport (do not confuse with *Sacramento Exec* (SAC)) does **not** fall within *Flight II*'s terrain area (it's actually located off the map to the northeast). The controller is, nonetheless, present, providing the exact same services as the controllers for the other two locations. The only difference is there is no airspace to violate without clearance!

Pilot Note

In the real world, multiple frequencies exist for *Bay Approach* and are individually accessed depending on the direction from which the aircraft is arriving.

Pilot Note

Approach frequencies may be dialed up from *anywhere* on the map. For example, you could be flying up near *Sacramento Executive Airport* in the northeastern-most corner of the map and still be able to contact a *Bay Approach* controller.

Pilot Note

In the absence of a *radar departure controller*, the tower controller will hand you off to the nearest available radar approach controller (or other tower controller, depending on the circumstance) at some point while departing radar-controlled airspace. Thus, when leaving SFO, for example, you will hear a call similar to ***"Arrow Five Lima Golf // Contact Bay Approach on 134.50."***

Pilot Note

If you mistype the digits into the transponder or forget to turn it on, the radar controller will not be able to locate you on the display. The controller will then relay a message to you similar to the following: ***"Arrow Two Lima Golf // Negative radar contact // Check transponder // Squawk Four Seven Zero Seven."***

Pilot Note

While you are obtaining vectors, you may also receive traffic advisories pertaining to other aircraft flying in your vicinity which are **not** under the supervision of that controller (i.e., the controller is not giving *them* directions, too).

Pilot Note

While you are receiving vectors from an approach controller, the controller will issue a warning, followed by course information, if your aircraft deviates either in altitude (by at least 300 feet) or heading. This is done regardless of the presence of other aircraft in your vicinity, as part of the controller's duty to maintain *aircraft separation*.

Pilot Note

Flight following service may not always be available, depending on the airspace through which your aircraft is transiting. You will always be able to ask for it from a radar approach controller, but if you’re in a *Class B* or *C* controlled airspace, the controller will instead give you vectors. This is *not* a bug!

Pilot Note

Although you will not be required to follow strict FAA guidelines in determining whether to fly VFR or IFR in the actual game, it is interesting to note the fine points real pilots must contend with when determining a flight plan.

Pilot Note

In the real world, pilots take a *Navigational* or *Sectional Chart* with them whenever they fly. This map of the local area shows the pilot where the airports and navigational aids are located, in addition to providing topographical and airspace information. The *In-Flight* map in *Flight II* serves the same purpose, though is not quite as detailed.

Pilot Note

If you’re playing along while reading, please bear in mind that the figures you receive may not be exactly as those presented in this section, since they depend on the placement of the turning points at precise locations.

Pilot Note

Radio navigation aides such as your *VOR Indicator* or the *Satellite View* should always be considered a back-up to Dead Reckoning. If your navigation equipment breaks or malfunctions, or the aircraft experiences electrical failure, Dead Reckoning will be the only means to find your way home!

Pilot Note

In the real world, the DME groundspeed reading is not entirely accurate unless you are traveling either directly towards or away from the VOR station. Further, the groundspeed does not change from a positive value to negative value as you travel over and then away from the VOR station. The value will “flip” and continue indicating groundspeed information regardless whether the aircraft is proceeding away or towards it.

Pilot Note

To determine the aircraft's current radial *from* the VOR station, spin the CDI needle until the course deviation bar is centered in the middle of the CDI, and the **TO/FROM** indicator displays "FR." The **tail** of the arrow indicates the aircraft's current radial from the VOR station.

Pilot Note

You may also determine what radial and distance your desired destination is from a single VOR by drawing an imaginary line from the station to your destination at the *In-Flight* map. Notice where the line intersects the compass rose. This is the radial you will need to fly outbound from the VOR. Next, extrapolate the distance in nautical miles from the VOR station to the destination. This is the distance that must appear on the DME. Now, simply fly towards the VOR station, intercept that radial outbound from the VOR until the DME reads the distance you measured, and—voila—you will have arrived at your destination.

Pilot Note

A propeller blade is also shaped like a wing. The force of it spinning through the air provides lift in a forward direction.

Pilot Note

During takeoff, apply light rudder inputs via the rudder pedals, as necessary, to keep the aircraft aligned with the runway centerline. And always try to takeoff *into* the wind when possible.

Pilot Note

WARNING! Do not exceed the recommended crosswind component for your aircraft. For example, above a **17** knot direct crosswind, a *Trainer* does not have enough rudder authority to maintain directional control.

Pilot Note

Special attention should always be directed to keeping your aircraft’s nose pointing straight down the runway, while using proper stick inputs to negate side drift.

Pilot Note

On windy days, you'll need to apply a wind-corrected heading to each leg in the pattern in order to fly a rectangle around the runway.

Pilot Note

Only seven cockpit instruments are required by the FAA (*Federal Aviation Administration*) to be present and lit during night flight: the *Airspeed Indicator*, *Altimeter*, *Compass*, *Oil Pressure Gauge*, *Oil Temperature Gauge*, *Fuel Gauge[s]*, and *Landing Gear Position Indicator*.

Pilot Note

All of the tertiary aircraft in *Flight II* are lit at night, as well. After all, what good is it if they can see your aircraft but you can't see theirs?

Pilot Note

In the real world, aircraft equipped with an anti-collision beacon must always have this light turned on, not just at night, unless the pilot deems its operation unsafe to other aircraft (such as in hazy conditions).

Pilot Note

Private airfields contain no lighting systems in *Flight II*. As for maritime airports…let's just say water and electricity are not a good mix!

Pilot Note

In the real word, the level of sophistication of the approach lighting system for a given runway is based entirely on its operational demands.

Pilot Note

Airports equipped with SFL runways whose landing thresholds border waterways (like *Runway 28R* at SFO) actually have these lights mounted on top of pillars which extend out into the body of water (in this example, San Francisco Bay).

Pilot Note

Visual Glideslope Indicators are not present at all runways. Generally, they can be found at busy, controlled airports.

Pilot Note

Pilots have a little saying regarding the VASI system to remember its function: "*white over white—high as a kite*; *red over white—you're all right*; *red over red—you're dead*."

Pilot Note

The VASI system is turned on 24 hours a day, seven days a week, not just at night or in bad weather.

Pilot Note

The PAPI system, like the VASI, is turned on 24 hours a day, seven days a week, not just at night or in bad weather.

Pilot Note

Just to be on the safe side, it is highly recommended you press the **L** key once to reinitialize the PCL lighting timer when your aircraft is on final approach to the runway. Imagine the lights going off by surprise just as you are approaching the threshold!

Absolute Ceiling

The altitude at which a particular aircraft’s climb rate reaches zero.

Accelerometer

The cockpit instrument which displays the force of acceleration on the plane, measured in G’s. It additionally records the maximum and the minimum G’s sustained during a flight.

Active Runway

The runway, designated by the tower controller, which is being used for takeoffs and landings.

Adverse Yaw

The yaw (or veering action) from an intended flight path, generated when the ailerons are used. The lifting wing generates more drag, causing the plane to yaw toward it.

AGL

The abbreviation for *Above Ground Level*, used to denote the distance from an aircraft to a point on the ground directly beneath it.

Ailerons

Hinged portions of the trailing edges of a wing. They are used to change the wing’s lifting properties.

Airport Advisory

An airport advisory is requested by the pilot when landing at an uncontrolled airport. A person at the airport will transmit the active runway and other information to the requesting pilot.

Airport Elevation

The altitude of a given airport above mean sea level (MSL).

Airport Rotating Beacon

A light found on top of an airport's Control Tower. Alternating white and green flashes indicate a civilian airport. Two white flashes followed by a green flash indicate a military airport.

Airspeed Indicator

The cockpit instrument which registers velocity, in nautical miles per hour or knots indicated air speed (KIAS).

Air Traffic Control (ATC)

A radar and communications system designed to assist pilots with flight operations in very congested areas.

Altimeter

The cockpit instrument which displays altitude above mean sea level (MSL).

Attitude Indicator (AI)

The cockpit instrument which displays an artificial horizon. It gives information on the pitch and roll of the aircraft, and is primarily used when flying in adverse weather conditions.

ATIS (Automatic Terminal Information Service)

A recorded message heard over the COM Radio regarding the current weather conditions at a given airport. ATIS is updated hourly or when significant weather occurs.

Aviation Alphabet

The phonetic word designations for each letter of the alphabet used to make speaking over the radio clearer, especially during difficult communication conditions.

Bearing to a VOR Station

The magnetic heading on the VOR indicator which, if you fly towards it, will take you directly to a selected VOR station.

Blackout or G-induced Loss Of Consciousness (GLOC)

A loss of consciousness due to lack of blood flowing to the brain, which can occur during continuous high G loading on an aircraft. The pilot will first experience a *grayout* just prior to a blackout.

Carburetor Heat Control

In some piston-engined aircraft (like the *Trainer*), a *Carburetor Heat* control knob is installed to provide warm air to the carburetor to prevent icing.

Class B Airspace

Airspace which regularly experiences a high volume of aircraft traffic. Flying a light aircraft into this airport requires a clearance from the radar controller. The aircraft must also be equipped with a transponder with Mode C (altitude) capability. Pilots may operate VFR in Class B airspace provided that in-flight visibility is at least three miles, and the pilot remains clear of any clouds. In *Flight II,* the only Class B airspace is around the San Francisco International Airport.

Class C Airspace

Airspace which regularly experiences a moderate amount of aircraft traffic (though not as much as Class B airspace). The requirements for operating an aircraft in Class C airspace are the same as for Class B. In order to operate VFR in Class C airspace, there must be three miles of visibility. Also, the pilot must remain 500 feet below the cloud base, 1,000 feet above the tops of the clouds, or 2,000 feet horizontally clear of the clouds.

Closed Traffic Approach

The term used to describe the completion of a low approach, at which time the aircraft performs an immediate pitch to downwind.

Cloud Deck

Term used to describe the current cloud conditions with subsets as follows:

-Few: Less than 1/8 of the sky has clouds.

-Scattered: 1/8 to 3/8's of the sky has clouds.

-Broken: 4/8's to 6/8's of the sky has clouds.

-Overcast: Greater than 7/8's of the sky has clouds.

Common Traffic Advisory Frequency (CTAF)

For tower-controlled airports, this is the frequency used for all air traffic operations. For uncontrolled airports, this is the frequency used to make advisory requests and position reports at the given airport.

Compass Rose

A symbol found on sectional charts around VOR stations which indicates magnetic north. (In the game, you may pull up an overlay on both the *Flight Planner* and *In-Flight* maps.)

Controlled Airport

Any airport which has an Air Traffic Control system installed (i.e., possesses a tower).

Controlled Airspace

Airspace which requires a clearance from the tower controller in order to operate an aircraft.

Control Surfaces

The moving, pilot-controllable portions of the airframe, including flaps, ailerons, rudders, and elevators.

Copy

The radio term use to acknowledge having heard the instructions issued to you by the tower controller.

Course

An intended direction of flight in the horizontal plane, measured from degrees north.

Course Deviation Indicator (CDI)

The needle present on the *VOR Indicator* showing position in relation to selected course.

Crosswind

The wind component which is perpendicular to the landing runway.

Dead Reckoning

A primary means of navigation using a clock, a map, and visual ground references.

Decision Height (DH)

The lowest altitude to which the pilot may descend during the approach, before he must make the decision either to land the aircraft if he sees the runway, or to go for a missed approach. This term is associated with an *Instrument Landing System* (ILS) approach. If you refer to an approach plate, you'll notice a decision height published at the bottom of the plate.

Departure Control

A radar controller who handles both aircraft departing from airports on an IFR clearance, and aircraft who will be entering controlled airspace.

Directional Gyro (DG)

The cockpit instrument which serves as a heading system indicator, displaying a given aircraft's heading from 010 to 360 degrees.

Distance Measuring Equipment (DME)

A display that shows an aircraft's distance from a selected VOR station in nautical miles. The DME can also display the aircraft's groundspeed, which is important for *Dead Reckoning*.

Drag

The force created by an airfoil moving through the atmosphere, opposite to the direction of motion. As a plane moves faster through the air mass, any antennas or landing gear protruding out into the wind stream will increase the amount of drag.

Elevator

The hinged portion of the horizontal stabilizer, which adds or subtracts lift from the tail, changing the pitch attitude of the aircraft.

Engine RPM Indicator

The cockpit instrument which displays the power output of the engine, in hundreds of revolutions per minute.

FBO or Fixed Base Operation

The small but important building located near the ramp and runways of minor airports, from which airport activity is coordinated. In *Flight II*, this is your home base and the place from which you make choices in the game.

Feathered Propeller

A condition in which the *propeller control lever* is positioned full aft, thereby producing the least amount of drag on the aircraft. This is important if your engine fails because feathering the prop will allow you to glide a further distance.

Fixed Pitch Propeller

A type of propeller system in which power output of the engine is controlled by the throttle, and the resulting speed of the propeller is dependent upon this throttle setting.

Flaps

Hinged portions of the wing that act together to increase the lift characteristics of the wing. Flaps are most often used to allow slower landings and shorter takeoffs.

Flaps Indicator

The cockpit instrument used to raise and lower the flaps in precise increments.

Flight Plan

A pre-planned flight route which is registered with the *Flight Service Station*. If you crash your aircraft, air traffic controllers will know where to look for you if you've filed a flight plan.

Glidepath

The desired slope angle during descent to the runway, displayed on the ILS indicator in the cockpit. Instrument Landing Systems (ILS) and Visual Approach Slope Indicators (VASI) provide a 3 degree slope angle to the runway.

Glideslope Indicator

The horizontal bar, commonly referred to as the "glide," located on the ILS indicator, which shows how high or low you are on approach to the runway during an ILS-enabled landing.

Go Around

A directive call by the tower controller to deny landing clearance to an aircraft on final.

Grayout

Grayout occurs when gravitational stresses impair the flow of blood to your brain. Loss of vision, and eventually consciousness, can occur when you pull heavy G’s.

Groundspeed

This is the speed of the aircraft while on the ground during takeoffs or landings.

Guard Frequency

An emergency radio frequency used to transmit urgent information to a specific aircraft. The player monitors guard frequency at all times.

Horizontal Stabilizer

The horizontal section of the tail which provides downward lift to balance the weight of the nose.

IFR Conditions

The term used to describe weather/visibility conditions which are poor enough to warrant instrument-aided flight. This usually results from cloud decks which are broken and overcast and are less than 1,000 feet AGL, and/or visibility is less than 2 miles.

Instrument Flight Rules (IFR)

A set of piloting conventions whereby a pilot flies by instruments alone. When weather conditions deteriorate to the point where the pilot can no longer operate his aircraft in visual meteorological conditions (VMC), the pilot must contact a radar controller and obtain an IFR clearance. The controller will assign an altitude and heading for the pilot to fly. As the pilot begins to lose ground references, he or she must transition to the cockpit instruments to maintain aircraft control. The radar controller will assist you in continuing on to your desired destination. To fly into weather, the pilot must be instrument qualified.

Instrument Landing System (ILS)

A precision approach which provides the pilot with course and glide path guidance to the runway. The localizer frequency displayed on the approach plate must be set in the navigational radio in order to receiver the information on the ILS indicator in the cockpit. You can request vectors from the radar controller to intercept the localizer and execute an ILS approach at certain airports.

KIAS

Abbreviation for *Knots Indicated Air Speed*, a measure of airspeed in nautical miles per hour.

Knot

A unit of speed—one nautical mile per hour—
which is approximately 1.15 statute miles per hour.

Landing Gear Lever

The control for raising and lowering the landing gear.

Level Flight

The state in which an aircraft is level with the horizon, and not turning, climbing, or descending.

Lift

The force created by an airfoil moving through atmosphere, perpendicular to the direction of motion.

Logbook

A pilot's record of his/her flying achievements, including flight time, takeoffs, landings, and maneuvers mastered.

Low Approach

An approach in which an aircraft descends as low as desired over the runway, but does not touchdown.

Magnetic Compass

The cockpit instrument that displays the magnetic heading of the aircraft. It is also known as a *Whiskey Compass*.

Magnetic Heading

The direction of the aircraft relative to magnetic north. Due to magnetic variations around the world, absolute north is not always a 360 degree heading. You'll notice the compass roses displayed on the *In-Flight* map do not indicate north as straight up and down. This is due to the magnetic variation in the San Francisco Bay area.

Manifold Pressure

The air pressure indicated at the intake manifold of the engine.

Manifold Pressure Gauge

A gauage that displays manifold pressure, in inches of mercury.

Mayday

The word used by pilots to indicate that their aircraft is in distress.

Middle Marker (MM)

A beacon which transmits an audible tone to the pilot. It indicates that the aircraft has reached the missed approach point on the instrument approach plate. Middle Markers are located approximately one half mile from the approach end of the runway. In the cockpit, an amber light will flash as the aircraft passes over the marker beacon.

Military Operations Area (MOA)

Airspace where a high volume of military training is conducted. Pilots flying VFR are allowed to transit this airspace only with proper clearance.

Minimum Controllable Airspeed

The speed below which a pilot of a two-engine plane will lose control of the aircraft, if one engine is out and the other is operating at maximum thrust. In this situation, the good engine induces yaw, and is offset by the pilot applying rudder into that engine. If the pilot's airspeed falls below the minimum controllable airspeed, he or she will not have enough rudder authority to overcome the yaw induced by the good engine.

MSL (Mean Sea Level)

This is the altitude registered above sea level. Airport elevations are indicated in feet above sea level.

Nautical Mile (NM)

6,000 feet (a statute mile is 5,280 feet).

Navigational Aid (NAVAID)

Transmissions which can provide pilots with information to help them navigate. VOR’s, Localizers, TACAN’s, VORDME’s, ADF’s and NDB’s are all types of NAVAIDS. The pilot must have the proper equipment installed to use the desired NAVAID.

NAV Radio

The radio control which is connected to the navigation instruments in the cockpit.

Oil Pressure Gauge

The cockpit instrument which indicates oil pressure, in pounds per square inch.

Oil Temperature Gauge

The cockpit instrument which indicates how hard the engine is working, and displays oil temperature in degrees fahrenheit.

Outer Marker (OM)

A beacon which transmits an audible tone to the pilot, indicating that the aircraft has reached the final approach fix (FAF) on the instrument approach procedure. Outer Markers are located approximately four to seven miles from the approach end of the runway. In the cockpit, a purple light will flash as the aircraft passes over the outer marker beacon.

P-Factor

A tendency for a plane to yaw left at high throttle settings. It is caused by the rotation of the propeller, which produces more lift during the downward segment of the blade's rotation, and less lift during the upward segment.

Pilotage

Navigation using visual reference to landmarks.

Pilot-Controlled Lighting (PCL)

Runway lights at uncontrolled airfields, which a pilot can activate remotely. In *Flight II,* you can activate PCL by dialing in the traffic pattern frequency and pressing the **L** key an appropriate number of times. The lights will remain on for fifteen minutes.

Pitch

The angle of a plane’s nose-to-tail axis relative to horizontal.

Pitot Tube

The tube which protrudes from under the left wing and measures the airspeed of the aircraft.

Position Report

Reports made by pilots in the traffic pattern, which signal to other pilots where they are in relation to the landing runway. A typical position report would sound like this: ***Half Moon Bay Traffic, Trainer 5 Lima Golf, downwind, Runway 16, Half Moon Bay***.

Precision Approach Path Indicator (PAPI)

A lighting system at the approach end of runways which provides glide path indications to the pilot. PAPI’s additionally provide obstacle clearance out to four nautical miles from the approach end of the runway.

Propeller RPM Indicator

A gauge which displays the propeller rotation in hundreds of revolutions per minute.

Radar Contact

A confirmation given by a radar controller (literally the words "***Radar Contact***") when that controller verifies your transponder code on the radar display.

Radar Flight Following

Information which a pilot requests from a Radar Controller, regarding traffic advisories en route to a specific destination. The pilot must request Flight Following information (a.k.a. Vectors Direct) and receive a transponder code so that the controller can establish radar contact. Note that the Radar Controller will only provide this information when his or her workload permits.

Radial

A “spoke” that protrudes from a VOR station. There are 360 spokes on every VOR, with the VOR being at the center of the wheel. The pilot can determine which radial he or she is currently on by tuning in the desired VOR and turning the VOR indicator OBS switch until the Course Deviation Bar (CDB) is centered and the TO/FROM indicator indicates “from.”

Ramp

An airport parking lot for aircraft.

Redline

The airspeed above which it is unsafe to fly a given airplane. “Redlining” the plane may overstress or even damage structural elements in relatively brief periods of time.

Redout

Pulling negative-G's during steep dives, for example, can cause the pilot’s vision to *redout*, as blood rushes towards the brain.

Restricted Airspace

Airspace into which a pilot cannot fly without prior clearance.

Roger

Acknowledgement by the pilot that he or she has heard the controller’s instructions.

Roll

The angle of the plane’s wings relative to horizontal. Also, any maneuver in which the aircraft attains every roll attitude.

Rudder

A hinged, movable section of the vertical stabilizer, used to control the aircraft's yaw. Also used as a verb, meaning to angle the rudder in a particular direction.

Rudder Trim Indicator

A display that indicates an amount of rudder trim, in degrees to the left or right of center, desired by the pilot.

Runway Alignment Indicator Lights (RAIL)

Extended centerline lighting used by pilots as a visual reference to align the aircraft with the landing runway.

Runway End Identifier Lights (REIL)

A pair of flashing lights located laterally on each side of the runway threshold. They provide pilots with a rapid method of identifying the approach end of the landing runway.

Runway Heading

This is the magnetic heading of a given runway indicated by the number of the runway, minus a zero ‘0’ (e.g., Runway 25 = 25**0** degrees, or a heading of roughly south southwest). A controller may issue clearance to pilots to fly or maintain this heading, particularly during the landing or climbout phase of flight. A pilot should always fly the magnetic heading of the departure runway until given further clearance by the controller.

Runway Edge Lights

Lights which help a pilot identify the edges of the runway during night and poor weather conditions. The edge lights are normally white. On instrument runways, amber replaces the last 2,000 feet to form a caution zone to pilots, apprising them of an approach to the end of the runway.

Sectional Map

A unique map which is used by pilots to navigate cross country. A sectional map contains class airspace boundries, NAVAID radio frequencies, airport locations and frequencies, obstructions, and displays landmarks which may be used by pilots to identify their position.

Selected Engine Indicator

A display that indicates which of the engines is currently being monitored in the *Baron* multi-engine aircraft.

Sequenced Flashing Lights (SFL)

A single row of lights which appears to the pilot as a ball of light traveling toward the runway at high speed. The sequence flashers flash at a rate of twice per second.

Spin

Any maneuver in which one wing is stalled and one is not.

Squawk

A four digit code which is issued by the radar controller to the pilot. The pilot must set this code in the transponder in order for the radar controller to establish positive radar contact.

Stall

A state in which the wing is no longer producing sufficient lift to control the aircraft. This can occur when the pilot exceeds the *critical angle of attack*.

Standard Rate Turn

A turn which covers 360 degrees in exactly two minutes. The Turn Slip Indicator provides standard-rate and half-standard- rate turn markers. The required bank angle to achieve a standard rate turn varies depending on the aircraft's true airspeed.

Stick

The cockpit control which moves the elevators (forward/back axis) and the ailerons (left/right axis).

Straight-In-Approach VFR

An approach during which the plane is aligned with the landing runway. In good weather, the controller may elect to clear an aircraft on a visual straight-in to the active runway. Pilots are expected to be aligned with the landing runway by five miles so as not to be in conflict with other aircraft operating at the airport.

Tachometer/Engine RPM Indicator

An onboard instrument which gauges engine speed (measured in rotations per minute).

Tailwind

Wind that is blowing from behind the aircraft. A tailwind is bad for takeoffs, since a plane will to need to reach a faster groundspeed before it can become airborne. It is also bad for landings, as more runway will be required to come to a stop.

Taxiway

A road leading from the airplane parking area to the runway. It is always marked with yellow lines.

Taxiway Lighting

The lighting of the both the edges and the centerlines of taxiways at most major airports and some minor airports.

Thermal

Air rising or falling due to temperature and pressure differentials. Useful in soaring.

Throttle

The control in the cockpit which controls engine output.

Touch and Go

A request by the pilot to land on the runway and then take off again. Clearance to execute a touch and go will be provided by the tower controller when conditions permit.

Traffic Pattern

A rectangular flow of traffic around the active runway, for aircraft practicing landings at the airport. The pattern could be left turns, or right turns. Standard patterns are right-hand turns.

Transponder (XPNDR)

The radio in the cockpit into which you must enter the four digit squawk code issued by the radar controller.

Trim

The secondary control surfaces on the elevator and the ailerons. Their primary purpose is to reduce control stick forces and make flying the aircraft easier.

Trim Indicator

A gauge that indicates the number of units of nose-up or nose-down trim the pilot has desired.

Turbulence

An atmospheric effect primarily produced by uneven heating of the earth's surface. Flying through turbulence will cause a plane to shake. Pilots will experience turbulence around cities, large bodies of water, and near rapidly moving cold fronts.

Turning Point

Designated points along a desired route of flight to the pilot's destination, marked during the flight plan.

Turn/Slip Indicator

The primary instrument used to identify if an aircraft is in a spin. The needle will indicate the direction of the spin, and the ball will be pinned to one side of the indicator. To spin an aircraft, you must first stall the aircraft, and then induce a yaw.

Uncontrolled Airport

An airport which is not serviced by a tower controller. Due to the low volume of traffic operating at an uncontrolled airfield, a safe operation can be maintained by pilots making position reports in the traffic pattern. To operate VFR at an uncontrolled airfield, the clouds must be at an altitude of at least 1,500 feet, and visibility not less than 3 miles.

UNICOM

The common traffic advisory frequency used by pilots operating at a specific uncontrolled airfield.

Vector

A specific heading issued to the pilot by the controller. The pilot is expected to maintain this heading until a further clearance is issued.

Vertical Speed Indicator (VSI)

An onboard instrument which gauges the rate of climb or descent (measured in feet per minute).

Vertical Stabilizer

The vertical section of the tail which helps keep the airplane aligned with its direction of motion.

Very High Frequency (VHF)

The established frequency band used for radio communications.

Visual Approach Slope Indicator (VASI)

A system of lights arranged to provide visual descent guidance information to the pilot during the approach to the runway. VASI’s provide obstacle clearance ten degrees to either side of runway centerline, out to four miles from the runway threshold. Descent using the VASI system should not be initiated until the aircraft is aligned with the runway, and the VASI’s indicate red over white.

Visual Flight Rules (VFR)

A set of piloting conventions whereby a pilot flies by looking out of the plane. VFR weather requirements vary depending on the class airspace in which you are operating. In *Flight II*, the minimum weather to operate VFR in controlled airspace is 1,500 feet and three miles visibility. The minimum weather to operate an aircraft VFR in uncontrolled airspace is 1,000 feet with two miles of visibility.

VOR Station (NAVAID)

A station which provides back-up radio navigation to pilotage. When you become lost, you can find your position by dialing a specific VOR frequency into your NAV radio, and determining what radial from the NAVAID you are currently on.

VOR Indicator

The cockpit instrument used to indicate what radial or bearing you are from a desired VOR station.

Wilco

Acknowledgement by the pilot that he or she heard the controller and will comply with the controller's instructions (similar to the *Roger* reply).

Windshear

A rapid change in wind direction and velocity over a short period. Windshear is usually encountered around mountains or rapidly moving cold fronts. Windshear can be vertical as well as horizontal.

Yaw

The angle of the plane’s nose-to-tail axis relative to its direction of motion.

Yoke

The control wheel in the cockpit, used to moved the primary flight control surfaces.

Airport Information

This tells you the airport at which this ILS-equipped runway is located, along with the runway number and the airport's elevation (in feet).

COM Radio Frequencies

These are the frequencies you type into the COM radio when you wish to speak with the relevant controller. (*Note that Approach frequencies may not be available at all airports*.)

Inbound Course

This indicates the heading you need to fly in order to intercept the *glideslope* and begin the approach run.

ILS Frequency

This is the five-digit frequency for this particular runway. Type the figure into the ILS radio to have the ILS receiver begin acquiring *glideslope* and *localizer* information prior to initiating the approach.

Glideslope

This is the ideal approach path to the runway, typically at a **3** degree angle from the runway. It is obtained by keeping the vertical and horizontal needles perfectly aligned in the center of the ILS receiver.

Minimum Altitude

This is the minimum altitude (indicated in feet) allowed prior to reaching the point at which you intercept the *glideslope* and begin your approach to the runway. Always maintain this altitude until intercepting the *glideslope* beam.

Final Approach Fix (FAF)

This is the point where the final approach to the runway officially commences, and is always at the location of the *Outer Marker Beacon*.

Outer Marker Beacon

This is the position of the ground-based transmitter which causes the **purple**-colored beacon light (marked **O**) in the cockpit to flash, and an associated tone to be heard when the aircraft passes over it. The height of the approach path (in both MSL and AGL) at which the aircraft will be alerted is indicated directly underneath the marker.

Middle Marker Beacon

This is the position of the ground-based transmitter which causes the **amber**-colored beacon light (marked **M**) in the cockpit to flash, and an associated tone to be heard when the aircraft passes over it. The height of the approach path (in both MSL and AGL) at which the aircraft will be alerted is indicated directly underneath the marker.

Missed Approach Instructions

These are directions for you when you've passed the *Decision Height* (*see next*) and have chosen not to land for whatever reason.

Decision Height (DH)

This is the height near the runway, preceding the *Middle Marker Beacon*, at which a decision is made whether or not to continue with the ILS approach and land, or execute a missed approach and try again. This height, barring airfield-specific obstructions, is always **200** feet AGL (with the MSL figure additionally listed).

IFR Approach Visibility Figure

This figure, always indicated in statute miles, tells you what the minimum IFR approach requirements are to execute the ILS approach to this particular runway. If the visibility at the indicated distance from the runway (usually ½ statute mile or roughly 2,600 feet) is not sufficient to land due to a low cloud deck, ground fog, or whatever, then it is suggested you either find another runway or wait for the visibility to improve prior to landing.

Runway Numbers

These are the alphanumeric designations for the runways (e.g., **19L = Runway 19 Left**).

Player Parking Spot

This is where you begin your flight if you choose to start at a given airport, but not on the runway. The ramp is located in front of the *Looking Glass Aviation Terminal*.

Taxiway Designations

These are the phonetic alphabet designations for the taxiways (e.g, **L = Taxiway Lima**).

Control Tower Location

This is the location of the control tower, present at all 15 controlled airports (only) in the game.

Runway Length and Width

This is the length and width of the runway (always measured in feet).

Piper Arrow Specifications

Gross Weight……...……2,600 lbs	*Service Ceiling*..……….......16,000 ft
Max Range....…….…....930 NM	*Rate of Climb*....………......910 FPM
Top Speed.......….........151 KIAS	*Stall Speed (FU)*….……......60 KIAS
Cruise Speed..……….....143 KIAS	*Stall Speed (FD)*….……….....55 KIAS
Takeoff Speed……….....56 KIAS	*Engine RPM*.......……......2,700 RPM
Landing Speed.……….....66 KIAS	*Engine Type*………...Lycoming 200 hp
Glide Speed....………........85 KIAS	*Propeller*.....………......Variable Pitch

De Havilland Beaver Specifications

Gross Weight……..…...5,090 lbs	*Service Ceiling*………….....15,750 ft
Max Range...……....…..405 NM	*Rate of Climb*....…………....740 FPM
Top Speed....……........124 KIAS	*Stall Speed (FU)*……....…....52 KIAS
Cruise Speed..……......106 KIAS	*Stall Speed (FD)*……....…....39 KIAS
Takeoff Speed…....……55 KIAS	*Engine RPM*......……..…...2,200 RPM
Landing Speed.……......65 KIAS	*Engine Type*…………..…..P&W 450 hp
Glide Speed.....………...80 KIAS	*Propeller*……...……....Variable Pitch

Beechcraft Baron Specifications

Gross Weight....……….4,886 lbs	*Service Ceiling*...…..……….20,688 ft
Max Range....…..……..1,050 NM	*Rate of Climb*......…..……..2,000 FPM
Top Speed......……….…..188 KIAS	*Stall Speed (FU)*...………....80 KIAS
Cruise Speed...………170 KIAS	*Stall Speed (FD)*...……...…..71 KIAS
Takeoff Speed……....…85 KIAS	*Engine RPM*.........………....2,700 RPM
Landing Speed..…...….. 90 KIAS	*Engine Type*…..…....Teledyne 300 hp
Glide Speed.....……….115 KIAS	*Propeller*......……….…Variable Pitch

P-51D Mustang Specifications

Gross Weight....………..9,000 lbs	*Service Ceiling*...…………..…...42,009 ft
Max Range...…………..…...907 NM	*Rate of Climb*...……….....…...2,400 FPM
Top Speed.....…..……........395 MPH	*Stall Speed (FU)*………….......93 MPH
Cruise Speed..……..…......292 MPH	*Stall Speed (FD)*………….......86 MPH
Takeoff Speed..…..……......110 MPH	*Engine RPM*.......…..……......3,300 RPM
Landing Speed.……….....115 MPH	*Engine Type*…..…..RR Merlin 1,612 hp
Glide Speed......………....175 MPH	*Propeller*....………………Variable Pitch

Trainer Specifications

Gross Weight	2300 lbs	*Service Ceiling*	14,200 ft
Max Range	692 NM	*Rate of Climb*	645 FPM
Top Speed	115 KIAS	*Stall Speed (FU)*	47 KIAS
Cruise Speed	109 KIAS	*Stall Speed (FD)*	41 KIAS
Takeoff Speed	55 KIAS	*Engine RPM*	2,700 RPM
Landing Speed	65 KIAS	*Engine Type*	Lycoming 150 hp
Glide Speed	69 KIAS	*Propeller*	Constant Pitch

The ILS Marker Beacon Lights

These are lights used to apprise the pilot when passing over the relevant ILS beacons.

The Landing Gear Controls

These are the controls used to raise/lower the landing gear, and apprise the pilot of the gear’s positional status.

The Tape Strip Indicator

This is the Tape Strip Indicator here, at the bottom of the screen. All information is updated in real-time.

The Kollsman Window

This indicator on the Altimeter is called the *Kollsman Window*. It shows current barometric pressure (set to 29.92 inches of mercury).

The Bank Point Indicator

This pointer on the Attitude Indicator is called the *Bank Point Indicator*. It displays the aircraft's current bank angle, or degree of roll.

Current Aircraft Heading

This pointer displays the aircraft's current heading (i.e. the direction in which the aircraft is proceeding).

Six O'Clock Position

This pointer displays the aircraft’s 6 o’clock position = heading + 180 degrees.

TO/FROM Indicator

This readout, also known as the *Ambiguity Indicator*, tells whether you are traveling to or from the selected VOT station on your present course, indicated by green **TO** and **FR** designations.

Course Deviation Indicator (CDI)

This yellow needles swings right or left to illustrate the direction of the selected course heading to the VOR station.

Course Deviation Bar (CDB)

This the free-floating yellow needle within the Course Deviation Indicator (CDI) which displays the level of course deviation from the selected VOR station. When the CDB is lined-up with the CDI, you're right on the money.

OBS Knob

The Omni Bearing Selector is the knob used to rotate the VOR indicator in order to line up the CDB with the CDI.

Frequency Readout

This is the portion of the instrument which displays the five digit radio frequency.

Nautical Mile and Groundspeed Readout

This is the area of the DME you may click on to either display distance information from the selected VOR station or relative groundspeed.

Two Minute Left Turn

This is the tick mark used to display where the left wing of the aircraft must align to complete a 360 degree left turn in a two minute time span.

Two Minute Right Turn

This is the tick mark used to display where the right wing of the aircraft must align to complete a 360 degree right turn in a two minute time span.

The Ball Inclinometer

This the ball used to indicate the condition of the turn and tell you whether or not your turn is *coordinated*.

Glideslope Needle

The horizontal needle on the ILS receiver which tells you how high or low the aircraft is presently located relative to the desired approach path to the runway during an ILS-enabled landing.

Localizer Needle

The vertical needle on the ILS receiver which tells you how far to the left or right of the riunway's centerline the aircraft is presently located during an ILS-enabled landing.

ON/OFF Switch

This is the knob used to turn the instrument on and off.

Hydraulic Light

This is the light which tells you when the gear is in motion.

The Airport Pop-Up Menu

This is the pop-up menu that appears when you click on an airport icon either at the *Quick Flight* map or the *Flight Planner* map.

The Parking Ramp Button

This is the button you click on from the *Quick Flight Airport Pop-Up Menu* to begin your flight stationed outside of the *Looking Glass Aviation* terminal.

The Takeoff [Runway] Button

This is the button you click on from the *Quick Flight Airport Pop-Up Menu* to begin your flight positioned on the active runway ready for takeoff.

The Final [Runway] Button

This is the button you click on from the *Quick Flight Airport Pop-Up Menu* to begin your flight positioned two miles out from the landing runway on final approach.

The Window

Click on this graphic to proceed to the *Modified Quick Flight* screen where you may set miscellaneous weather and flight variables prior to taking off.

The Load/Delete Menu

This is the pop-up menu that appears when you click on either the **LOAD FLIGHT PLAN** button or **DELETE FLIGHT PLAN** button from the *Flight Planner Toolbar*.

The Quick Flight Buttons

These are the buttons used to takeoff with the selected options, reset the original defaults, create a random scenario, amd return to the *Main Menu*.

The Altitude Pop-Up Menu

This is the pop-up menu that appears when you click on anywhere but an aircraft icon on the *Quick Flight* map. It allows you to begin your *Quick Flight* at one of a handful of pre-selected altitudes.

The Done Button

Click on this button to accept the currently chosen options and exit the *Modified Quick Flight* screen.

The Point of Departure Heading

This is the heading that appears at the top of the *Modified Quicik Flight* screen which displays your point of departure (i.e., that airport out of which you are currently slated to fly).

Rate of Descent/Ascent

This white needle on the VSI indicates the aircraft's current rate of descent/ascent in thousands of feet per minute (FPM).

The Flight Plan

If you created a flight plan prior to taking off, it will appear here on the *In-Flight* map.

The In-Flight Notepad

This is the *Notepad* which displays the information from your flight plan. If you didn’t create a flight plan, then it will only display a single page indicating your POD, destination airport, etc.

Fly Button (In-Flight Map)

Click on this button to exit the *In-Flight* map and return to the cockpit.

Inactive Toolbar Buttons (Flight Planner)

This button does not function in the *Flight Planner*; only in the *In-Flight* map.

Inactive Toolbar Buttons (In-Flight)

These buttons do not function in the *In-Flight* map; only in the *Flight Planner*.

Hi, Sweetie!

I couldn’t have done it without you!

-JC

MASTER VOLUME

This slider bar adjusts the overall volume control in the game.

STEREO REVERSE

This button toggles between *Normal* and *Reverse* stereo operation, with the latter switching channels from right to left, and vice-versa (i.e., what you used to hear coming out of your *left* speaker will now emerge from your *right* speaker). The default is **Normal**.

SOUND EFFECTS

This slider bar adjusts the volume level of in-cockpit sound effects such as the sound of the landing gear during touchdown, the stress on the aircraft during high-g maneuvers, the sound of parts of the aircraft breaking off during a collision, etc.

ENGINE VOLUME

This slider bar adjusts the volume level of the engine.

PILOT VOICE

This button toggles between the six available male and female pilot voices (representing *your* voice when you initiate communication with air traffic controllers). The default is **Major Ed**.

AMBIENT SOUND

This button toggles *On* or *Off* external sound effects such as wind, rain, thunder, tertiary aircraft, etc. The default is **On**.

RADIO

This slider bar adjusts the volume level of COM radio chatter.

CLOSED CAPTION

This button will toggle *On* or *Off* text appearing on the screen during COM radio operation for hearing impaired players. The default is **Off**.

INVULNERABLE

This button toggles *On* or *Off* an option to make your aircraft invulnerable to all damage. The default is **Off**.

PROPELLER

This button toggles between *Manual* operation, where you have to use a control input to adjust propeller speed, and *Automatic* operation, which allows *Flight II* to automatically handle this feature. The default is **Automatic**.

ENGINE TORQUE

This button toggles *On* or *Off* engine torque, which is the tendency for the aircraft to want to roll to the left, an opposite reaction created by the effect of the right-rotating *crankshaft*, as the engine is increasing power upon takeoff. The default is **Off**.

AIRCRAFT TRAFFIC DENSITY

This slider adjusts the amount of air traffic buzzing about the San Francisco Bay Area. Selections include *None, Light* (roughly 100 aircraft)*,* *Medium* (roughly 200-300 aircraft), and *Heavy* (roughly 500-600 aircraft). The default is **Medium**.

ELECTRICAL FAILURE

This button toggles *On* or *Off* the possibility that your aircraft's electrical and/or communications systems will randomly fail. The default is **Off**.

ENGINE FAILURE

This button toggles *On* or *Off* the possibility that your aircraft's engine[s] will fail through either operational mishandling or random chance. The default is On.

AIR TURBULENCE

This button toggles *On* or *Off* the effects of air turbulence which, when encountered, cause your aircraft's frame to vibrate, making for a bumpy ride. The default is **On**.

COLLISIONS

This button toggles *On* or *Off* the possibility that your aircraft will collide with other aircraft or objects. The default is **On**.

COORDINATED RUDDER

This button toggles *On* or *Off* the auto-coordination feature for the rudder. The default is **On**.

GEAR DAMAGE

This button toggles *On* or *Off* the possibility that your aircraft's landing gear will receive any damage due to poor landings. The default is **Off**.

SUN/MOON GLARE

This button toggles *On* or *Off* the lens flare created by looking at the sun through the canopy during the daytime as well as the glare of the moon at night. The default is **On**.

PERSPECTIVE CORRECTION

This button toggles perspective correction for the camera views (*On*, *Off*, and *Perfect*). The default is **On**.

CIRRUS CLOUDS

This button toggles *On* or *Off* the presence of cirrus clouds. The default is **On**.

DISTANCE CLIPPING/VISIBILITY

This slider bar adjusts how far off into the horizon the level of graphic detail is displayed.

3D ACCELERATION

Displays a list of *Microsoft® Direct 3D*-supported accelerator cards from which to choose.

TERRAIN DETAIL

This slider bar adjusts the level of graphic detail displayed in the terrain.

VIDEO RESOLUTION

This button lets you choose from among *Flight II*'s five supported levels of resolution: *512 x 384 (minimum)*, *640 x 400*, *640 x 480*, *800 x 600*, and *1,024 x 768 (maximum)*. The default is **640 x 480**. *Choose a lesser resolution if frame rates are sluggish on slower computers*. Use the **ALT M** key combination while in-flight to change resolutions on the fly.

GAMMA CORRECTION

This slider bar adjusts the brightness level of the game. This is a useful device for darker monitors and/or poorly-lit rooms.

LIGHTNING EFFECTS

This button toggles *On* or *Off* lightning effects, providing the **Rain** option is enabled at the *Quick Flight* screen. The default is **On**.

Reply Button

Click on this button to “squawk” your transponder code to the radar controllers.

Transponder Code

This readout displays your four-digit transponder frequency, given to you by the relevant radar approach controller.