Epilepsy Warning

Please read before using this video game system or allowing your children to use it. Some people are susceptible to epileptic seizures or loss of consciousness when exposed to certain flashing lights or light patterns in everyday life. Such people may have a seizure while watching certain television images or playing certain video games. This may happen even if the person has no medical history of epilepsy or has never had any epileptic seizures. If you or anyone in your family has ever had symptoms related to epilepsy (seizures or loss of consciousness) when exposed to flashing lights, consult your doctor prior to playing. We advise that parents should monitor the use of video games by their children. If you or your child experience any of the following symptoms: dizziness, blurred vision, eye or muscle twitches, loss of consciousness, disorientation, any involuntary movement or convulsion, while playing a video game, IMMEDIATELY discontinue use and consult your doctor.

Precautions To Take During Use

- Do not stand too close to the screen. Sit a good distance away from the television screen, as far away as the length of the cable allows.
- Preferably play the game on a small television screen.
- Avoid playing if you are tired or have not had much sleep.
- Make sure that the room in which you are playing is well lit.
- Rest for at least 10 to 15 minutes per hour while playing a video game.
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Welcome to the world of Flight Unlimited II! This guide contains basic installation, quick start, and troubleshooting information to help get you up and flying as soon as possible.

**OPERATING CHECKLIST**

**Preflight**

**SYSTEM REQUIREMENTS**
The minimum system requirements for Flight Unlimited II are as follows:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPUTER:</td>
<td>IBM PC or 100% compatible</td>
</tr>
<tr>
<td>OPERATING SYSTEM:</td>
<td>Microsoft® Windows 95</td>
</tr>
<tr>
<td>CPU:</td>
<td>Pentium 120 MHz</td>
</tr>
<tr>
<td>RAM:</td>
<td>16 MB</td>
</tr>
<tr>
<td>GRAPHICS:</td>
<td>1 MB SVGA video card (100% DirectX 5.0-compatible)</td>
</tr>
</tbody>
</table>

The recommended system specs are as follows:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU:</td>
<td>Pentium 200 MHz (or greater)</td>
</tr>
<tr>
<td>RAM:</td>
<td>32 MB</td>
</tr>
<tr>
<td>GRAPHICS:</td>
<td>2 MB SVGA video card (100% DirectX 5.0-compatible)</td>
</tr>
<tr>
<td>CD-ROM:</td>
<td>Six-speed (6x) CD-ROM drive</td>
</tr>
<tr>
<td>HARD DRIVE:</td>
<td>219 MB free disk space (with Help File and all pilot voices)</td>
</tr>
<tr>
<td>INPUT DEVICES:</td>
<td>DirectX 5.0-compatible programmable joystick</td>
</tr>
</tbody>
</table>
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 optimise your hard drive’s performance. The first of these programs is called ScanDisk. ScanDisk will check your hard drive for problems and can fix any that it finds. You can run ScanDisk by clicking on the START button from the Windows 95 taskbar, followed by “Programs,” then “Accessories,” then “System Tools,” and finally “ScanDisk.”

Once ScanDisk has finished running, you should next optimise your hard drive’s performance by running a program called Disk Defragmenter. You can run Disk Defragmenter by clicking on the START button from the Windows 95 taskbar, followed by “Programs,” then “Accessories,” then “System Tools,” and finally “Disk Defragmenter.”

Joystick Calibration

Under Windows 95, locate and double-click on the MY COMPUTER icon, then double-click on the CONTROL PANEL icon, followed by the GAME CONTROLLERS icon.

Next, locate and click on the PREFERENCES button. Click on the CALIBRATE button from the ensuing panel. Follow the onscreen calibration instructions.

**NOTE:**

If you cannot get the joystick or rudders to calibrate properly in the Windows 95 GAME CONTROLLERS panel, then you may want to contact the manufacturer of the joystick for further assistance because Windows 95 has to recognise the device before any Windows 95 applications can use them.
Starting Your Engine

**INSTALLING FLIGHT II**

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

Once the Launch Panel has opened, click the Install button to run the installer. This program will guide you through the remaining process via onscreen prompts.

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

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

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.

After choosing the location for the install, you will next be asked to select the number of pilot voices you would like the game to install. The minimum is two (representing your pilot's voice and the voice 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. 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 sizes of the individual voices present at the bottom of the panel.) For maximum listening enjoyment, we recommend installing all 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 15 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 proceed 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 do so).

Next, the Microsoft DirectX 5.0 install prompt 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 (please refer to the next section of this guide before proceeding).

**DirectX 5.0**

Flight Unlimited II uses Microsoft’s DirectX 5.0 for Windows 95. DirectX not only lets games run faster under Windows 95 by allowing quicker access to your computer’s hardware, but it also adds support for the latest advances in 3D graphics and audio cards, force feedback joysticks, and other cool stuff.

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 Reinstall DirectX button to begin installing the files on your system. Follow the prompts provided to you by the DirectX 5.0 installer. Please note that a reboot will be necessary before DirectX will be utilised.

If you encounter problems after installing DirectX: DirectX 5.0 is a very new program and it is possible that you will need to update the drivers that your video and audio cards use, and possibly the drivers for your joystick as well. We highly encourage you to visit the web pages of your hardware manufacturers or contact them by phone to obtain and install the latest drivers for your hardware.
Warm-Up/Ground Check

Starting/Loading Flight II

Once the install has finished, the Launch Panel will appear on the screen. Simply click on the Play button and away you go.

You may additionally:
· Click on the Reconfigure Voices button to reinitialise the pilot voice installation feature which allows you to then add or remove selected voices.
· Click on the Uninstall button to uninstall the game.
· Click on the Install DirectX button to install or reinstall Microsoft’s DirectX 5.0.
· Click on the View Readme button to view the README file.
· Click on the Online Manual button to view the Help file.
· Click on the Quit button to exit the Launch Panel.

If you are going to play the game at a later time and you previously selected the Typical install size, insert the second CD (labelled Disk 2: Game Disk) into the CD-ROM drive (the first CD is only used to install the game or reconfigure the voices). After a few seconds, the Flight II Launch Panel should appear on the screen via the AutoPlay feature. Now click on the Play button to start the game. There is also a button present to Quit.

In the event the AutoPlay feature does not work, you may click on the My Computer icon and then click on the CD-ROM icon 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.
QUICK START CHECKLIST

Takeoff

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...

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

Main Menu

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

Quick Flight

In Quick Flight, you will start with a default aircraft you can use 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. After the loading screen appears, 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 (which contains all of the instruments). 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.

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 escape key at any time to quit flying.)

Please refer to the accompanying KEYBOARD COMMANDS REFERENCE CARD to learn the control scheme for your aircraft.
Ground Maintenance

UNINSTALLING FLIGHT II

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

Insert the Flight Unlimited II CD (labelled 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, then click on the Yes button from the ensuing pop-up panel to uninstall the program.

OR

· Click on the START button.
· 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.

OR

Go to the CONTROL PANEL and choose ADD/REMOVE PROGRAMS. Click on Flight Unlimited II from the pop-up panel to follow, select the Add/Remove button, and follow the onscreen prompts.
EMERGENCY PROCEDURES

CD-ROM Problems

Flight II requires at least a Quad-Speed CD-ROM drive with 32-bit Windows 95 drivers.

I receive a “xxxxxxx.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.

Crashes and Lock-Ups

When I start Flight Unlimited II, my mouse cursor disappears and my computer locks-up.

Chances are your installed audio card drivers are not compatible with DirectX. The only solution is to get a DirectX 5.0-compatible driver from your audio card manufacturer.

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.”

Chances are your installed video card drivers are not compatible with DirectX. The only solution is to get a DirectX 5.0-compatible driver from your video card manufacturer.

The Installer keeps stopping when a certain percentage is complete, so I can’t install Flight II.

There are three likely causes:

1) You may have run out of free space on your hard drive. Please remove unwanted programs to free up additional space for the game, and then reinstall Flight Unlimited II.
2) Files are possibly being copied to a corrupted area of your hard drive. If this is so, you'll need to run the ScanDisk program and make sure to use the Thorough option (see previous). After ScanDisk has finished running and has informed you that your drive is free of errors, try to re-install.

3) 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 centre of the disc (near the hole) towards the outer edge in a straight line.

Flight Unlimited II is crashing to the desktop with no error messages.

This problem can be caused by several different things. Here's a list of the most common culprits associated with these crashes:

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 DirectX 5.0-compatible.
5) Make sure you have the latest Windows 95 drivers for your sound card and that they're DirectX 5.0-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 directory on your hard drive (from Windows Explorer).
10) Make sure you do not have any Anti-Virus utilities (like Norton's AntiVirus) running resident prior to playing Flight II.
11) Make sure you do not have any 3rd party Windows 95 memory management utilities (like QuarterDeck’s QEMM 8.0 for Windows 95) running resident prior to playing Flight II.
12) Make sure you do not have any 3rd party Windows 95 disk caching utilities running resident prior to playing Flight II.

13) Make sure you do not have Norton’s Crash Protector running resident prior to playing Flight 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.

Direct 3D 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.
II. 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, each presents a unique flying experience born of colourful backgrounds.
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 modernised 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 172, as the Arrow is somewhat faster.
Created in the 1940's for use in the Canadian bush, the 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.
The prototype for this twin-engine aircraft first flew in 1960, and was a descendant of the Beech Bonanza. The Raytheon Aircraft Beech Baron® boasts impressive power, derived from two 300 horsepower Teledyne Continental IO-550-C. 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 172 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.
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 manoeuvrability. 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-51 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.
The first Trainer 172 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 manoeuvering 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.
III. OPERATING DETAILS

This chapter is devoted to teaching you the details of the game’s interface. Let’s begin with the Main Menu. This is the screen to which you’ll always proceed once Flight II has finished loading.
THE MAIN MENU

All of the game’s functions can be accessed from the Main Menu.

Select from the following five icons:

- QUICK FLIGHT
- AIRPORT
- OPTIONS
- CREDITS
- EXIT
Clicking on a given icon will perform the following actions:

QUICK FLIGHT
Click on this icon to go to the Quick Flight screen where you may set flight variables and take to the skies. (For additional details, refer to Quick Flight on page 29.)

AIRPORT
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. (For additional details, refer to The FBO Interface on page 37.)

OPTIONS
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. (For additional details, refer to Game Options on page 46.)

CREDITS
Click on this icon to go to the Credits screen where you may view the “flight crew.”

EXIT
Click on this icon to leave this game (you will immediately exit with no prompts). You may also press the \[Alt\] key combination to exit Flight II from anywhere at anytime.

Pilot Notes:

Unless otherwise indicated, a reference to "click" on an item in this manual means that you should specifically left mouse-click.

Subsequent start-ups of Flight II will always take you to the airport where you last left the game.

The Options screen is also accessible from any Airport FBO. (For additional details, refer to The FBO Interface on page 37.)
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.

The interface is simple to use:

лась вагона, и я увидел, как он поднялся наверх и исчез вдалеке.

Пассажир сидел в углу купе, закутанный в куртку.

Он вышел из вагона и уселся в угол купе.

— Ваш багаж, месье? — спросил кондуктор.

— Нет, я ничего несу, — ответил пассажир.

И он уселся в угол купе, и я увидел, как он закутился в куртку.

Проходили минуты, и я увидел, как он вышел из вагона и уселся в угол купе.

— Ваш багаж, месье? — спросил кондуктор.

— Нет, я ничего несу, — ответил пассажир.

И он уселся в угол купе, и я увидел, как он закутился в куртку.
**Interface**

For a button or icon, move the cursor over it to highlight it, 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**

Click on this button at the top of the screen to bring up the Quick Flight map:

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 map...

**Pilot Notes:**

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.
Airport Icons
Notice the coloured icons sprinkled about the Quick Flight map. These are the Airport Icons, representing 15 Controlled Airports, 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, refer to Controlled vs Uncontrolled Airports in Chapter VII.) Blue denotes controlled airports and magenta denotes uncontrolled airports.

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

- Large Controlled (Blue)
- Medium Controlled (Blue)
- Small Controlled (Blue)
- Medium Uncontrolled (Magenta)
- Small Uncontrolled (Magenta)
- Private Uncontrolled (Magenta)
- Maritime Uncontrolled (Magenta)

Placing Your Aircraft at an Airport
To select an airport, simply move the cursor over one of the airport icons. The icon will become highlighted, and its name will appear in the Quick Flight Notepad (see Quick Flight Notepad on page 32). Either left or right-click to have the adjacent 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. There are three types of buttons from which to make your selection:

- Click on the PARKING RAMP button to begin your flight stationed outside of the Looking Glass Aviation terminal. From here, you’ll taxi out to the runway.
- Click on the TAKEOFF: RUNWAY [DESIGNATION] button to begin your flight stationed at the end of the designated runway.

Pilot Notes:
The airport icons are persistent and serve the same function throughout all four of the game maps.

If your selected aircraft isn’t seaworthy (i.e., a Beaver), maritime airports will not be displayed on the Quick Flight map.

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.
Click on the FINAL: RUNWAY [DESIGNATION] button 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 map except an airport icon brings up the adjacent pop-up menu. This is the Altitude Pop-Up Menu. Click on the 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.

If you need to see greater detail in order to place your aircraft at a specific spot, click on the ZOOM CONTROL button to bring up a black constraining box on the Quick Flight 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.

**Points of Interest Button**

Click on this button at the Quick Flight map to toggle the Points of Interest map layer on and off, indicating the location of popular landmarks.

(For additional details, refer to Points of Interest in Chapter VI.)

**Quick Flight Notepad**

The Quick Flight Notepad, shown in the upper left-hand corner of the 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).

**Pilot Notes:**

*Every airport in Flight II features a Looking Glass Aviation terminal.* Your aircraft is always parked outside of this terminal at the player parking spot whenever you select the option to start on the parking ramp.

*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).*
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 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 Map
If you wish to leave the Quick Flight map, click on the AIRPORT button to return to the Quick Flight screen, or press the V key.

Choose Your Aircraft
Click on this icon to cycle through the five flyable aircraft featured in Flight II: the Trainer 172, Piper Arrow, de Havilland Beaver, Beech Baron, and the P-51D Mustang. The default aircraft is the Trainer.

Select Fuel Load
Use this slider to adjust the level of fuel with which to take off. There are five available settings: 1/4 Full, 1/2 Full, 3/4 Full, Full, and Unlimited. The default fuel load is Full.

Pilot Notes:
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.

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.

The altitude heights displayed via the Altitude Pop-Up Menu 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.

Operating Details
Choose Weather Conditions

Use the remaining slider bars and icons to change the following variables:

**Time of Day**
Use this slider to set 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 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 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 on page 35.)

**Cloud Cover**
Use this slider 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 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.

**Rain**
Use this slider 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.

**Fog**
Use this slider to turn the fog effects on and off. The default is Off.

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**Pilot Notes:**

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!

Wind Socks are installed at all 46 airports to visually indicate both the direction from which the wind is arriving and its intensity. Don't forget to check them out before you take off.
Haze
Use this slider to set the level of hazing in five increments (indicated in miles): 30 miles, 20 miles, 10 miles, 5 miles, and 1 mile. The default is 20 miles.

Get Going
When you’ve finished tweaking all of the available options, click on the following buttons located at the bottom of the Quick Flight 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

A Note on the Weather System: Winds
The local wind, at any given point, is comprised of three factors: prevailing wind, updrafts/downdrafts, and turbulence. Each of these, in turn, has several contributing factors (outlined next). Given that weather settings in Flight II are global, local weather systems are not modelled. 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).

Pilot Notes:
- 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!
- 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!
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.
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. Let’s have a look around…
Both large and small airports are represented in Flight II, each with similarly-themed FBO’s and hotspot icons which enable various features in the game. 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 $V$ key to cycle back to the FBO from these screens.

**Selecting an Airport**

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 FBO icon. This will bring up the Airport Selector map:

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 map...

**Airport Icons**

There are 15 Controlled Airports and 31 Uncontrolled Airports (including 15 Private Airfields and 3 Maritime Airports) for a total of 46 FBO’s. Blue denotes controlled airports and magenta denotes uncontrolled airports.
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 (see next). Left-click to proceed directly to the FBO for the new airport.

**Airport Selector Notepad**

The Airport Selector Notepad, residing in the upper left-hand corner of the screen, 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 mouse 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.

**Exiting the Map**
If you’d rather stay put instead of going to a different FBO, click on the AIRPORT button to return to the current FBO, or press the `Esc` key.

**Selecting an Aircraft**
Click on the Key Rack FBO icon to choose which aircraft you’d like to jump into. The Key Rack screen will then appear:

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**Pilot Notes:**

If your selected aircraft isn’t seaworthy (i.e., a Beaver), maritime airports will not be displayed on the Airport Selector map.

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.

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**Operating Details**
Move the mouse cursor over one of the aircraft key chains and left-click to choose that aircraft. 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 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.”

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 from the FBO by clicking on the Logbook FBO icon. This will open your active logbook to the default Load/Save page. (For additional details, refer to Viewing Pilot Information on page 41.)

Pilot Notes:
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).
Interface

When you open the logbook, a screen displaying the “cover” 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 lets you Load an existing logbook, Create and automatically Save a new logbook, or Delete an old logbook.

**Pilot Info:**
This tab lets you view biographical and flight information regarding the selected pilot.

**Flight Info:**
This tab lets you 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 to turn to the Pilot Info page:

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**Operating Details** 41
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 ] 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.

Crashes: The total number of times an aircraft you’ve flown has bitten the big one.

Loading, Creating, and Deleting Logbooks
Click on the Load/Save tab to turn to the Load/Save page:

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

Pilot Notes:
The information presented on the Pilot Info 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.
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 (see previous section).

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
Each time you exit following a flying session or adventure, the Flight Info page of the logbook will automatically appear (or, alternately, click on the Flight Info tab):

This page displays data on the flight you just took. Flights subsequent to this 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.

Pilot Notes:

Use the Ctrl and Shift keys to scroll up and down the list of logbook files to view more than eight logbooks at a time.

Logbooks are automatically saved every time an entry is created (hence, no SAVE button).

Operating Details
The information provided here includes the following:

**AC Type:** The type of aircraft flown.

**AC I.D.:** The aircraft’s identification number, which depends on the aircraft type (e.g., Baron = B4LG).

**POD:** The aircraft’s point of departure.

**DEST:** The aircraft’s destination airport.

**Flight Time:** The total time the flight took (in hours, minutes, and seconds).

You may insert any comments regarding this particular flight into the field labelled 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.

**Accessing the Lessons**
Click on the Blackboard FBO icon to access the Blackboard Lessons screen. There are a total of six lessons available in Flight II which illustrate the fundamentals of civilian aviation. (For additional details, refer to Chapter IX: Flight Maneuuvres.)

**Using the Object Viewer**
Click on the Calendar FBO icon to access the Object Viewer screen:

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**Pilot Notes:**

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.

Quick Flight sessions are never tracked in the logbook.
This screen consists of a 3-D object viewer where you may pitch and rotate (via mouse) the flyable and secondary planes 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 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).
Return to the current FBO. You may also press the V key to do the same.

Once an object is displayed, use the mouse to manoeuvre 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 D 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 FBO icon to access the Flight Planner where 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 Chapter VI: Flight Planning.)

Choosing a Mission
Click on the Teletype FBO icon to access the pre-scripted flight plans called “adventures.” The Adventures screen will appear:
The first mission is displayed on the opening, 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**

Click on the Tool Chest FBO icon to access the Options screen:

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.

**Interface**

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.

**Pilot Notes:**

The Options screen is also accessible from the Main Menu. (For additional details, refer to The Main Menu on page 27.)
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 additionally click on the key to exit the Options screen.

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

**Sound Settings**

Click on this button to bring up the Sound Settings panel, where you may adjust various options related to sound (i.e., what you are able to hear in Flight II):

**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 manoeuvres, 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's 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, secondary 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
Click on this button to bring up the Game Settings panel, where you may adjust various options related to gameplay (i.e., Flight II’s level of realism):

**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 slider 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.

**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 Off. [For additional details on how engine failure can occur, refer to Chapter V: Operating Limitations.]

**Electrical Failure**
This button toggles On or Off the ability of your aircraft’s electrical and/or NAV systems to randomly fail. The default is Off.

**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 modelled in Flight II, refer to Turbulence on page 36.]

Pilot Notes:
- Air Traffic Density figures will be proportionally lower at night and in bad weather.
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 or due to exceeding specified airspeeds with the gear down in applicable aircraft. The default is Off.

Graphics Settings
Click on this button to bring up the Graphics Settings panel, where you may adjust various options related to graphics (i.e., what you are able to see in Flight II):

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 On, Off, and Perfect perspective correction for the camera views. 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.

D3D 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 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 proceed to either the Joystick Properties or 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 minimised Flight 2 button running along the Windows '95 Toolbar. You will then return to the Options screen where you last left the game.

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

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

**Viewing the Online Manual**
Click on the File Cabinet FBO icon to access the Flight Unlimited II Online Manual, which is essentially an electronic version of the manual you are currently reading (with some nifty additional features not found here, as well). Flight II will temporarily minimise to the desktop while you view this Help file. To return to the game at any time, click on the Flight 2 button on the Windows '95 toolbar. The Help file will automatically close, and you will return to where you last left the game.

**Pilot Notes:**
Please refer to the accompanying Flight Unlimited II Installation, Quick Start, and Troubleshooting Guide for further details on configuring your joystick.
IV. INTO THE COCKPIT

When you first climb into the cockpit of one of the aircraft, you will be confronted with a myriad of gauges, indicators, and levers. We’re going to make understanding all 33 modeled instruments as simple as A-B-C.
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 maximum viewing enjoyment, a Full Screen View, devoid of all instrumentation, is also available.

**Tape Strip Indicator and Full Screen View**

The Tape Strip Indicator is a digital strip readout that can appear across the bottom of the screen in any view. It can be toggled on and off with the `i` 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).
The VFR Cockpit View (VFR SCAN Mode)

This 1/4 screen view features the basic cockpit T-SCAN panel and Radio Stack, generally consisting of the Airspeed Indicator, Attitude Indicator, Altimeter, Directional Gyro/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.
Piper Arrow VFR Cockpit
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. (For additional details, refer to Chapter VIII: Navigation.)
Clock
Altimeter
Attitude Indicator
Airspeed Indicator
Flaps Indicator
Directional Gyro/VOR Indicator (HSI)
Manifold Pressure Gauge
Fuel Gauge
ILS Radio
COM Radio
NAV Radio
DME
The IFR Cockpit View (T-SCAN Mode)
This cockpit mode is a $\frac{1}{2}$ 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.
Beaver IFR Cockpit

- Airspeed Indicator
- Attitude Indicator
- Altimeter
- Clock
- Manifold Pressure Gauge
- Flaps Indicator
- Propeller Control Lever
- Magnetic Compass
- Throttle Control Lever
- Fuel Mixture Control Lever
- COM Radio
- Transponder
- NAV Lights
- Oil Gauges
- Landing Gear Position Lights
- Fuel Gauge
- Landing Gear Handle
- Trim Indicator
- Propeller RPM Indicator
- Turn/Slip Indicator
- Vertical Speed Indicator
- Directional Gyro

*Note: The image contains a cockpit diagram with various instruments labeled.*
The specific functions of each instrument will be described in detail throughout the remainder of this section.

**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 $i$ key.

**Pilot Notes:**

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.
In Flight II, all five cockpits of the featured flyable aircraft are modelled 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, and are indicated as such below. (Refer to the accompanying KEYBOARD COMMANDS REFERENCE CARD for a complete listing of all functions.) The following dial representations are similar for the Trainer 172, Piper Arrow, De Havilland Beaver, and Beechcraft 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.

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

**Airspeed Indicator (ASI)**

**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 travelling through the air.

**What is the displayed measurement?**
Indicated airspeed is generally measured in knots, except in the case of the P-51 where it is measured in MPH. 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 travelling, is best used to deliver information regarding airspeed limitations through the presence of colour-coded arcs (see next for details).

**How is the instrument read?**
The airspeed indicator has a white needle rotating about four distinct coloured arcs on all aircraft except the P-51. 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 manoeuvres applied at this range may decrease the time to structural failure.

Altimeter
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 coloured 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.

Pilot Notes:
Refer to Appendix F: Aircraft Instrument and Systems Tables for a listing of the specific instruments and systems for each aircraft for both VFR/IFR Cockpit modes.

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!
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 on the previous page, 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)**

**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 (see adjacent screenshots).

The horizontal markings cutting through the centre 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 brown solid lines and negative pitch as white solid 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.
**Directional Gyro (DG)**

**What does it do?**
This instrument, which shares duties with the VOR indicator (refer to Very High Frequency Omni-Directional Range Indicator on page 70 for details), 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.

**Vertical Speed Indicator (VSI)**

**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.

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**Pilot Notes:**
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.
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.

**Turn/Slip Indicator**
*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 centre 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 centre 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 centred. 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 in Chapter IX.)

**Pilot Notes:**
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.”
Accelerometer
What does it do?
This instrument 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 manoeuvre. It additionally gives you a visual indication of blackout and redout, two G-induced conditions modelled 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.

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 centre 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.

Pilot Notes:
In Flight II, the accelerometer is only found on the P-51D Mustang.
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!
When is the 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 manoeuvring.

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

RADIO STACK

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

Very High Frequency Omni-Directional Range (VOR) Indicator

Pilot Notes:
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.
What does it do?
This complicated-sounding instrument, sharing duties with the DG (refer to Directional Gyro on page 67 for details), 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 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 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 centre 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.

Pilot Notes:
The combination of the VOR and the DG is commonly referred to as the Horizontal Situation Indicator or HSI.

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.
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 is 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 travelling 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 centred 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 centred 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.

Distance Measuring Equipment (DME)

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 statute 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.

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 can also be found at the back of this manual in Appendix C.) 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 key.

Instrument Landing System (ILS) Receiver
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 centreline 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 localiser, tells you how far to the left or right of the runway’s centreline 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 (coloured 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 (coloured green) when the converse is true. The ideal landing
approach is to have both needles converge in the centre of the instrument as in the example
screenshot (see previous page).

**Instrument Landing System NAV/COM Radio**

What does it do?
This instrument, 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 found in Appendix B at the back of this manual. Locate the corresponding ILS frequency
for the runway from the relevant diagram (there is also a listing of available ILS runway frequencies
found in Appendix C). 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.

**ILS Marker Beacon Lights**

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. (Refer to Appendix C for additional details regarding these diagrams.)

Clock

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.

Communication Instruments

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:
**RADIO STACK**

(For additional details regarding the individual uses of the instruments discussed in this section, refer to Chapter VII: Interacting with Air Traffic Controllers.)

**COM RADIO**

What does it do?
The COM radio 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 dialling 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 11,000 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.

**Pilot Notes:**

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! 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.

**Cockpit**
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 at the back of this manual in Appendix C. 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 \[ \text{D}\] key combination to cycle through all appropriate frequencies (ground, tower, ATIS, and approach radar) for that respective airport. When finished, press the \[ \text{E}\] 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 (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.

Transponder (XPNDR)

What does it do?
The Transponder is a beacon which allows an aircraft’s position to be exactly identified on an air traffic 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.

Pilot Notes:
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.”
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 (outlined in the COM Radio section on page 77). 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.

Flight Controls and Lighting System
The following instruments are used to assist you with controlling and illuminating your aircraft:

Throttle Control Lever
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 carburettor 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).

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.
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 additionally features split (i.e., independently-controlled) propeller control levers, one per engine.

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 [up] key to throttle up and the KEYPAD [down] key to throttle down.

Propeller Control Lever
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 also features split (i.e., independently-controlled) propeller control levers, one per engine. The P-51 supports propeller control, but has no lever present.
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 `=` key combination to increase prop speed and the `Shift` + KEYPAD `-` key combination to decrease prop speed.

Mixture Control Lever
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 carburettor. 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 (see previous Pilot Note).

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 \( Y + \) KEYPAD \( Y \) key combination to increase mixture and the \( Y + \) KEYPAD \( Y \) key combination to
decrease mixture.

**NOTE:**
When you press the \( E \) key to start the engine prior to takeoff, both the mixture and control
settings are automatically set to maximum—no manual adjustments are required.

---

**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 extended (*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 key to move the pointer down (i.e., raise the flaps in set increments) and the key combination to move the pointer up (i.e., lower the flaps in set increments).

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 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 key to move the pointer up (i.e., increase the level of elevator trim) and the key to move the pointer down (i.e., decrease the level of elevator trim).
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?
Identical 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 \( \text{key, which follows the player's joystick movement of the aircraft and automatically adjusts to match said movement.} \)

2) Manual Trim, where you must manually trim the aircraft. Adjust the trim settings by clicking the \( \text{Shift} \) key combination to move the pointer to the right (i.e., apply right rudder trim) and the \( \text{Shift} \) key combination to move the pointer to the left (i.e., apply left rudder trim).

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:

Pilot Notes:
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 referenced hot keys to access rudder trim with this aircraft, as well.

Into the Cockpit 85
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 key.

**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: Left and Right. A red 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 key combination to select from among the left engine, right engine, and both.

**Navigation Lights Switch**
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 key combination.

**Engine Instruments**
The engine instruments show the operating conditions of your engine, as well as fuel status:
**Propeller RPM Indicator**

**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. Coloured 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 coloured 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.

**Manifold Pressure Gauge**

**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.

---

**Pilot Notes:**

*The Baron features a split RPM indicator, representing each of its twin engines.*

*The Baron features a split manifold pressure gauge, representing each of its twin engines.*
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. Coloured 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 coloured 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.

Oil Temperature Gauge
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.

**Oil Pressure Gauge**
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. A thin red line indicates the never exceed pressure threshold. Continued operation at or above the red line may result in engine failure.

**Carburettor 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 carburettor.

When is this instrument best used?
To prevent ice build-up in the carburettor inlet, which can result in engine failure. Carburettor 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.
Fuel Gauge

What does it 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?
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.
Below is a summary of the internal and external cockpit camera views available to the player in Flight II, along with the associated keystrokes. (Refer to the accompanying KEYBOARD COMMANDS REFERENCE CARD for a comprehensive listing.)

**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 below.)

**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 below.)
**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 below.)*

**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 [ ] 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**

**KEYPAD [4] Look/Pan Left**
In VFR, IFR and Full Screen cockpit modes, press to look over left wing. 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. 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.” 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 centre.

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 centre.

KEYPAD 5 Snap to Centre
Snaps the view back to the centre of the screen (i.e., looks forward).

INTERNAL COCKPIT VIEWS

1. 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.

2. 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.

3. 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.

A Word on Panning:
With the Joystick Hat Switch (Left, Right, Up and Down) or Keypad 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.
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

F Target AI Plane
Lock and “eyeball” track another aircraft within 10 miles. Repeatedly pressing F 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.

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

J 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.

Pilot Notes:
The single best way to learn about how to interact with the various air traffic controllers in the game is to use the 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.
**Teleport to that last radio call**
Padlock first (per above) then use key combination to go inside the cockpit of that aircraft.

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

**Teleport to that Control Tower**
Padlock first (per above), then press `c` to go inside that building.

### EXTERNAL MOVABLE VIEWS

<table>
<thead>
<tr>
<th>Key组合</th>
<th>View Type</th>
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</thead>
<tbody>
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<td><code>J</code></td>
<td>Inverse Tactical</td>
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<tr>
<td><code>E</code></td>
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<tr>
<td><code>T</code></td>
<td>Taxi Camera</td>
</tr>
</tbody>
</table>

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

**Pilot Notes:**

The Taxi camera view is for taxiing only and should not be used while the aircraft is airborne!

A view of 45 degrees above the aircraft which follows the aircraft. Zoom is supported. Best used in conjunction with the Taxiway Path view (`T + [>]` key combination).
EXTERNAL FIXED VIEWS

- **Fly-Past Camera**
  View which constantly jumps to keep up with the source, looking at the source.

- **Drop Camera**
  Radio-controlled (R/C) style camera.

- **Fixed External Camera**
  View in which the camera remains fixed in space. Zoom, panning, and padlock are supported.

MISCELLANEOUS VIEW CONTROLS

- **Tape Strip Indicator**
  Toggle On/Off the Tape Strip Indicator in any view.

- **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.

- **Zoom In**
  Zooms in view.

- **Zoom Out**
  Zooms out view.
V. OPERATING LIMITATIONS

This chapter is devoted to teaching the aviator the myriad unfortunate “incidents” that can occur in flight. We’ll begin with a global discussion and then get into details regarding the individual aircraft.
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
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. (For additional details, refer to Game Options on page 46.) 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 you'll definitely see smoke emanating from the front fuselage. 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. (For additional details, refer to the individual instruments in Chapter IV: Into the Cockpit.)

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.

**Flaps**

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. (For additional details, refer to Flaps Indicator on page 82.)

**Landing Gear**

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 in Chapter IX.)

**Electrical System**

This is a case where some or all radio and/or navigation equipment simply stops working. Random electrical system failures can be enabled by setting the ELECTRICAL FAILURE button to On at the Options screen. (For additional details, refer to Game Options on page 46.)

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**Pilot Notes:**

If flaps are damaged while extended, they will be nearly impossible to fully retract.

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.
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.

**The Airframe**

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!

**NOTE:**

Flight II also incorporates a very useful feature in the event of an airborne emergency: the MAYDAY signal. Simply press the **DG** 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 in Chapter VII.)
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.

The Airframe
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!

NOTE: Flight II also incorporates a very useful feature in the event of an airborne emergency: the MAYDAY signal. Simply press the `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 in Chapter VII.)
In addition to the aforementioned global failures, there are aircraft-specific problems that can arise if you do not follow certain procedures.

**Piper Arrow**

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 must 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**

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 on page 86.)

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
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
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 handle 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 172
If heated air from the exhaust manifold is not allowed to warm the carburetor in the Trainer 172, 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. (For additional details, refer to Carburetor Heat on page 90.)
VI. 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 analysing 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. 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 Chapter VIII: Navigation.)
The Flight Planner map is a relief map, identical to an actual sectional map of the San Francisco Bay Area.

**Airport Icons**

There are 15 Controlled Airports and 31 Uncontrolled Airports, (including 15 Private Airfields and 3 Maritime Airports) for a total of 46 FBO's. Blue denotes controlled airports and magenta denotes uncontrolled airports.

**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.

- **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, TOD, 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 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 on page 114.)

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.

Pilot Notes:
Flight plans are filed with the FAA (Federal Aviation Administration) so that the proper authorities know where to find you in the event of a mishap!

The Satellite View button may only be accessed from the In-Flight map. It is present, but always greyed-out when in the Flight Planner. (For additional details regarding its use, refer to Using the In-Flight Map in Chapter VIII.)
Creating a flight plan in Flight II is a 6 step process:

1) Choose your flight conditions and aircraft.
2) Locate your point of departure (P.O.D.).
3) Use the Flight Planner map to analyse your route.
4) Plot turning points along your intended flight route.
5) Use the Notepad to keep track of your flight plan.
6) 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 in 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:
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 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 on page 29.)

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.

Analysing Your Route

Now that you’ve recognised 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.

Pilot Notes:

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

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 Chapter VII: Interacting with Air Traffic Controllers.)

VOR Information
Click on this button in the Flight Planner Toolbar to toggle the VOR stations on and off:

Pilot Notes:
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!
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 in Chapter VIII.

Points of Interest
Click on this button in the Flight Planner Toolbar to toggle the points of interest on the map on and off:
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. (For additional details, refer to Using the Notepad on page 114.)

**Zoom Control**
Click on this button in the Flight Planner Toolbar to adjust the viewing level of the map.

If you are experiencing difficulty reading the map and would like to take a closer look at the details of the terrain and information layers provided, click on the ZOOM CONTROL button. A black constraining box with a spyglass icon will appear overlaid onto the Flight Planner map. Use the mouse to position the box over an area of the map of which you wish to adjust the viewing level and simply left-click to zoom in. To zoom out, right-click on the ZOOM CONTROL button, and the map will automatically zoom out. There are two zoom levels below the default.

You may additionally move a portion of the constraining box off-screen in order to access unseen portions of the map, however, the edge is constrained by the spyglass icon.

**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.

**Adding Turning Points**
As was previously discussed, your P.O.D. 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 bullseye icon will appear:

---

**Pilot Notes:**
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 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. (For additional details, refer to Using the Notepad on page 114.) 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 (see Chapter VIII: Navigation for details).

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 labelled TP 2 on the Notepad. Another route line will appear, marking the second leg of your route.

The 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:

- Touch and Go
- Transit Airspace
- Land

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 on page 116.)

**Pilot Notes:**

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.

The height of a turning point is always a default value of 1,500 feet AGL (Above Ground Level).

A maximum of 20 turning points may be set for any single flight plan.
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 additional details, refer to Chapter X: Interacting with Air Traffic Controllers.)

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 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 same pop-up menu described in the
previous section will appear. If the LANDING 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 so that it highlights green and press the P 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 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.

The First Page
The first page of the 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).

Pilot Notes:
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.

You can't grab
and move a
turning point
which is located
over an airport
icon (i.e., your
destination
airport).
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 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 Flight Planner 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).
E.T.A. [#] 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.

Pilot Notes:
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.

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.
[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 Airport Pop-Up Menu. (For additional details, refer to The Airport Pop-Up Menu on page 113.)

[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 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 in the Flight Planner Toolbar to erase all turning points but the original P.O.D. Any map overlays you've enabled will also disappear. This will return the Flight Planner to the state in which it was first entered for the current flight session.

**Pilot Notes:**

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.

A single page contains no more than three turning point summaries.

Run Time and Distance are automatically updated when each new turning point is added.
SAVING, LOADING AND DELETING FLIGHT PLANS

The following functions are accessed from the Flight Planner Toolbar:

Save Flight Plan
Click on this button 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 (marked with .PLN extensions) 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.

Load Flight Plan
Click on this button 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 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.

Pilot Notes:
You are allowed as many saved flight plans as will fit on your hard drive.
Be careful here—the old flight plan will be erased for good when you select the DELETE FLIGHT PLAN button!
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 in Chapter VIII.)

**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 (see previous).

**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!

Pilot Notes:

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
key. Both the map and the Notepad will update to reflect the change.
<table>
<thead>
<tr>
<th>Hot Key</th>
<th>Function Description</th>
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<td>O</td>
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<td>A</td>
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</tr>
<tr>
<td>L</td>
<td>Delete Turning Point</td>
</tr>
</tbody>
</table>

Tired of using the mouse? Then try these hot keys to conduct the following functions:

- **Flight Options**: Go to the Modified Quick Flight screen to set miscellaneous realism variables for the planned flight.
- **Airspace Information Overlay**: Toggle On/Off the Airspace Information map overlay.
- **VOR Overlay**: Toggle On/Off the VOR Station map overlay.
- **Points of Interest Overlay**: Toggle On/Off the Points of Interest map overlay.
- **Zoom In Map**: Increase the view by one level.
- **Zoom Out Map**: Decrease the view by one level.
- **Toolbar Buttons On/Off**: Toggle On/Off the Toolbar (useful at the highest zoom level).
- **Notepad On/Off**: Toggle On/Off the Notepad (useful at the highest zoom level).
- **Delete Turning Point**: Removes a selected (i.e., highlighted) turning point from the map.
<table>
<thead>
<tr>
<th>Key</th>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Clear Flight Plan</td>
<td>CLEARS THE MAP AND MAKES WAY FOR A NEW FLIGHT PLAN.</td>
</tr>
<tr>
<td>S</td>
<td>Save</td>
<td>SAVE THE CURRENT FLIGHT PLAN AS EITHER A NEW OR EXISTING FILE.</td>
</tr>
<tr>
<td>L</td>
<td>Load</td>
<td>LOAD A PREVIOUSLY SAVED FLIGHT PLAN.</td>
</tr>
<tr>
<td>D</td>
<td>Delete</td>
<td>DELETE A PREVIOUSLY SAVED FLIGHT PLAN.</td>
</tr>
<tr>
<td>F</td>
<td>Fly</td>
<td>FLY THE CURRENT FLIGHT PLAN AND TAKE OFF.</td>
</tr>
<tr>
<td>E</td>
<td>Exit Map</td>
<td>EXIT THE FLIGHT PLANNER AND RETURN TO THE CURRENT FBO WITHOUT ACCEPTING THE ACTIVE FLIGHT PLAN.</td>
</tr>
</tbody>
</table>
VII.
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 chapter 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.
Uncontrolled vs Controlled Airports
Airports in Flight II come in two different flavours: 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 subcategories: 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 fly freely 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, refer to Appendix A.)

Information Services
There are two types of flight/traffic 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 on page 128.)

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) on page 136.)

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 flavours: ground, tower, and 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 on page 137.)

**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 on page 142.)

**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 on page 150.)

**Pilot Notes:**

You are required to maintain two-way radio communication with the tower controller when you enter the airspace under that controller’s jurisdiction.

The single best way to learn about how to interact with the various air traffic controllers in the game is to use the [T3] key combination to jump into the cockpit of another aircraft and listen to how that pilot interacts. You’ll be surprised by how much you can learn in relatively little time.
This section describes how to fly to and communicate with an uncontrolled airport. There are 31 airports within Flight II’s terrain area which are “uncontrolled” (including 3 maritime airports and 15 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 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.

**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 centreline 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:

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 utilises 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:

<table>
<thead>
<tr>
<th>Uncontrolled Airport Type</th>
<th>UNICOM service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maritime Airport</td>
<td>NO</td>
</tr>
<tr>
<td>Private Airfield</td>
<td>NO</td>
</tr>
<tr>
<td>All other uncontrolled airports</td>
<td>YES1</td>
</tr>
</tbody>
</table>

1Weather-permitting (see Pilot Note P119).

Both separate and shared UNICOM radio frequencies exist for 13 of the 31 uncontrolled airports featured in this game. (For additional details, refer to COM Radio Control Frequencies in Appendix C.)

Pilot Notes:
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.
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.

**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**

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 key to finish.

(Refer to the relevant Airfield Diagram at the back of this manual or COM Radio Control Frequencies in Appendix C 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:

**Pilot Notes:**

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.
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 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 key (or the 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.”

Pilot Notes:

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.
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 on page 127 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 key) and the following text and menu will appear together on the screen:

Half Moon Bay Traffic, Arrow Two Lima Golf,...

Pilot Notes:
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.
1. ...left downwind.
2. ...left base.
3. ...right downwind.
4. ...right base.
5. ...final.

Press the \[3\] 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 \[INFO\] key to complete the sentence and transmit the message over the radio:


Referring to the diagram on page 127, 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

**Pilot Notes:**

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.
Press the 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 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 key to complete the sentence and transmit the message over the radio. You will, once again, hear your pilot’s voice:


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.

**Summary:**
1) Contact UNICOM at the desired airport by dialling 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.

---

**Pilot Notes:**

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 key.
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 manoeuvres.

Addendum

- Players should always make separate position reports immediately upon rolling out on downwind, base, and final during each pattern, and also before taxiing 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 on page 198.)

Pilot Notes:
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!

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 chapter may not proceed precisely as printed on these pages due to the presence of other aircraft. If you’re reading through this chapter while playing the game, always keep this fact in the back of your mind should you discover occasional differences between what appears on the page and what you see and hear in the game.
This section 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 on page 151.)

We’ll begin with the procedures and services offered by controlled airports and finish with two scenario walk-throughs.

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:
**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:

<table>
<thead>
<tr>
<th>Controller</th>
<th>Principal Tasks</th>
<th>(Departing Aircraft) Hands off to:</th>
<th>(Arriving Aircraft) Hands off to:</th>
</tr>
</thead>
</table>
| 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) | N/A                               |
| 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) |
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 at the back of this manual or COM Radio Control Frequencies in Appendix C 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.

(To see a listing of the Aviation Alphabet, refer to Appendix D.)

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:

---

_Pilot Notes:_

ATIS, unlike UNICOM, is a service provided only at controlled airports. While contacting ATIS is always optional, 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 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.
1) Prior to taxiing to the active runway for departure.
2) While taxiing to the parking ramp/hangar from the runway following arrival.

**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**

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 at the airport. 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 at the back of this manual or COM Radio Control Frequencies in Appendix C 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) on page 149.)

**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 at the back of this manual or COM Radio Control Frequencies in Appendix C 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 key (or the 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 CONTROLLER: “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 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.”

Pilot Notes:

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.

Interacting with Air Traffic Controllers
NOTE:
If you didn’t hear what the controller said, press the 📀 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 found at the back of this manual (refer to Appendix B) in conjunction with the Taxi Camera View (the 📀 key) to manoeuvre 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.

Pilot Notes:
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).
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 then 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 CONTROLLER: “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 on page 142.)

Summary:
1) Contact ATIS at that airport by dialling up the appropriate frequency on your COM radio.
2) Contact the ground controller at the same airport by dialling 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.

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:

Pilot Notes:
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.
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, 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.

**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**

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 key to finish. (Refer to the relevant Airfield Diagram at the back of this manual or COM Radio Control Frequencies in Appendix C 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 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 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 Right // 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).

Pilot Notes:

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.
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 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 on page 127, 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 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 key to transmit the message to tower over the radio:

>PILOT: “Arrow Two Lima Golf, right downwind, Runway Two Eight Right, touch and go.”

Pilot Notes:

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.”

Interacting with Air Traffic Controllers
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 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.

Summary:

1) Contact the tower controller at the airport by dialling 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.

Pilot Notes:

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.
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 key to finish. (Refer to the relevant Airfield Diagram at the back of this manual or COM Radio Control Frequencies in Appendix C 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) on page 136.)

**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 in Appendix C for a listing of available Tower Control radio frequencies.)

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.

**Pilot Notes:**

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.
You want to tell the tower the direction from which you plan to enter the pattern at Livermore. In this example, you are north 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.

Press the 1 key (or the 123 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).

Pilot Notes:

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 on page 157.)

The ATIS identifier (e.g., Foxtrot) appears at the end of the request only if you have actually previously contacted ATIS.
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 on page 127 for details).

After completing your turn to downwind, make your downwind position call, as requested by the 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  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 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.

**Pilot Notes:**

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.
Identifying Traffic
From this point on, everything is the same as was described in the first scenario of this section. 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.

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.

Pilot Notes:
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.
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.

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. (Refer to Appendix A for the complete individual listing.)

**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.

**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.

Pilot Notes:
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 on page 154.)

Interacting with Air Traffic Controllers
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...

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 if 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) on page 79 and the checklists for approach control later in this chapter.)

Altitude Limits
The altitude limits of each coloured 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 centre 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 centre of the airport, the controlled airspace varies by individually-marked regions.

The “Upside-Down Wedding Cake”
You can visualise 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.

Pilot Notes:
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.
In summary:

### Pilot Notes:
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.

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.
Contacting the Radar Controllers

The radar controllers in Flight II are present at the following three locations:

<table>
<thead>
<tr>
<th>Location</th>
<th>Approach Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay (San Francisco Intl.</td>
<td>134.50 (Bay Approach)</td>
</tr>
<tr>
<td>Airport—SFO)</td>
<td></td>
</tr>
<tr>
<td>Travis (Travis Air Force</td>
<td>126.60 (Travis Approach)</td>
</tr>
<tr>
<td>Base—SUU)</td>
<td></td>
</tr>
<tr>
<td>Sacramento (Sacramento Airport)</td>
<td>125.25 (Sacramento Approach)</td>
</tr>
</tbody>
</table>

For APPROACH CONTROL:

- 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. In the real world, multiple frequencies exist for Bay Approach and are individually accessed depending on the direction from which the aircraft is arriving.
- 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 addition to the primary responsibility of maintaining separation between IFR aircraft, is threefold:

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.

Pilot Notes:

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!
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 Vectors ILS: This is identical to requesting Vectors Direct except that the controller will issue instructions to line you up for a final approach at an active ILS-equipped runway.

3) 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 either Vectors Direct or Vectors ILS, 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.

**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) on page 78.)*

### 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.**
- **From the alphabetical list provided, select the group of airports 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, and 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:**

**Pilot Notes:**

Approach frequencies may be dialed up from anywhere on the map. For example, you could be flying up near Sacramento Executive Airport in the north eastern-most corner of the map and still be able to contact a Bay Approach controller.

Requesting vectors ILS is only applicable to controlled airports equipped with an Instrument Landing System (refer to Appendix C).
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 Vectors ILS
This is similar to obtaining Vectors Direct information except that the radar approach controller will instead take you close in to an ILS-equipped 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 ILS from the menu that appears overlaid onto the screen.
- From the alphabetical list provided, select the group of airports 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, and click on the REPLY button.
- The approach controller will then give you an initial altitude and heading with which to proceed to the airport. For example:

Pilot Notes:
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”
The radar controller is:

1) Identifying your aircraft/acknowledging your presence (Arrow Two Lima Golf...).
2) Telling you in which direction 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 ILS).
5) Confirming your destination (...Runway Two Eight Right // San Francisco).

- The approach controller may follow up with additional altitude and heading information as you get closer to the airport.
- When you’re within landing phase distance of the target airport, the controller will issue a message similar to the following, providing you’ve done a good job following the instructions:

  >RADAR: “Arrow Two Lima Golf // Cleared for the approach // Contact Tower on 118.10.”

- You are now cleared to start “riding the ILS beam” down to the designated runway.
- Click on the ILS radio and input the relevant runway frequency from either the ILS Approach Plate or the list in Appendix C (both found at the back of this manual). The ILS receiver will then “snap-on.”
- The approach controller will have positioned your aircraft so that you are receiving the ILS beam and are approaching the centre of the localiser.
- The approach controller will monitor your aircraft until within five miles of the airport and issue missed approach instructions should the player fly an unsafe approach. (For additional details regarding how to use the ILS to land your aircraft, refer to The Instrument Landing System on page 180.)

When you are handed over to the tower controller for final landing instructions, there will be a final clearance from the radar approach controller.

Pilot Notes:

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.”

While you are obtaining vectors, you may also receive traffic advisories pertaining to other aircraft flying in your vicinity which are not under the
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 give you a four digit code to input into your transponder. Turn on your transponder, type the four digit frequency into the readout, and 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.

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!

Mayday!
Flight II also incorporates a very useful feature in the event of an airborne emergency: the MAYDAY signal. Simply press the D* key combination to send out a standard MAYDAY emergency signal, indicating that your aircraft is in serious trouble. If you are not communicating with the 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 on page 155.)
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 at the back of the manual 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**

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPACEBAR</td>
<td>Enable COM Radio Menu Interface</td>
</tr>
<tr>
<td></td>
<td>• Turn on the radio menu interface (overlaid on the screen) used to communicate with air traffic controllers, and listen to ATIS and UNICOM.</td>
</tr>
<tr>
<td></td>
<td>• Press once to remove menu text from the screen.</td>
</tr>
<tr>
<td></td>
<td>• Press twice to return to the starting menu.</td>
</tr>
<tr>
<td>1 - 9</td>
<td>Menu Selection Options</td>
</tr>
<tr>
<td></td>
<td>Press the relevant number of the communication command displayed on the screen to transmit the radio message to an air traffic controller.</td>
</tr>
<tr>
<td>ESC</td>
<td>Select a Default Menu Option or Transmit Option or Repeat Message</td>
</tr>
<tr>
<td></td>
<td>• Select a highlighted menu option displayed on the screen.</td>
</tr>
<tr>
<td></td>
<td>• Transmit a single communication command.</td>
</tr>
<tr>
<td></td>
<td>• 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).</td>
</tr>
<tr>
<td>↔</td>
<td>Cycle COM Radio Frequencies</td>
</tr>
<tr>
<td></td>
<td>Cycle through ground, tower, ATIS, and radar frequencies at individual controlled airports only.</td>
</tr>
<tr>
<td>☢️</td>
<td>Mayday!</td>
</tr>
<tr>
<td></td>
<td>Sends out an emergency signal to a radar approach controller during a declared emergency situation.</td>
</tr>
</tbody>
</table>
VIII. 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 to visually navigate. While flying an aircraft using outside visual references, you are flying VFR.
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) on page 173.)

Using The In-Flight Map
While you’re in the cockpit of any of the aircraft, pressing the M key will activate the In-Flight map:

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 on page 166 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 Chapter VI: Flight Planning.)

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.

Viewing the Flight Plan
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. You will also see all of the relevant information for each, in addition to cumulative information for the planned flight indicated on the Notepad. (For additional details, refer to Chapter VI: 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) on page 167).

Pilot Notes:
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.
Viewing Airspace, Navigation, and Landmark Information

Airspace Information
Clicking on this button in the In-Flight Toolbar toggles the Airspace Information map layer on and off. 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 (see next section) 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 on page 151.)

VOR Information
Clicking on this button in the In-Flight Toolbar toggles the VOR Stations map layer on and off. 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) on page 173.)

Points of Interest
Clicking on this button in the In-Flight Toolbar toggles the Points of Interest map layer on and off, revealing the location of popular landmarks. 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) on page 167.)

Pilot Notes:
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.
Activating the Satellite View
Clicking on this button in 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) below.

Exiting the In-Flight Map
To exit the In-Flight map at any time, press the \( \text{Alt} \) key again, or click on the indicated button in 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, we’ll examine how you will go about applying Dead Reckoning to VFR navigation under windy conditions.

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 Chapter III: Operating Details 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:

(For additional details regarding how to create a flight plan, refer to Chapter VI: 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 3 has just under 4 tick marks (3 visible and the fourth hidden beneath the third and final turning point) so it should take approximately 7 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...

**Taking Off**

- Click on the button 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 Scenario 1: Taking Off and Remaining in the Traffic Pattern on page 142 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 `h` 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.

*Pilot Notes:*

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.
• 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
  18 mi. ETA 10
  Heading - 261º

• You need to hold a heading of 261º 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 i 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 261º 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:

1) Understanding the map.
2) Landmark referencing.
3) Reading the clock.
4) 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.

Pilot Notes:
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!
**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 DG 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...**

...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 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, 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 Components
The VOR/DME navigation system consists of three interlocking components:

1) The VOR.
2) The NAV Radio.
3) The DME.

(For detailed descriptions of each of these instruments, first refer to Chapter IV: Into the Cockpit prior to reading the remainder of this section.)

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 ➔ 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 0 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:

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 (see adjacent diagram).

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 gray 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 at the back of this manual in Appendix C.)

**Dialing in the Frequency**
- 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.

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 grabbing the OBS knob and, while holding, dragging 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/FRÔM 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 above.)

Pilot Notes:

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.
Go to the In-Flight map (or use the color Sectional Map that came with the game) 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...

Pilot Notes:

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.
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 following screenshot.)

• 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.

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 (use the nautical mileage scale on the map). 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.
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.

The Components
The ILS consists of four interlocking components:
1) The Transmitter.
2) The Indicator/Receiver.
3) The NAV/COM.
4) The Marker Beacon Lights.
(For detailed descriptions of each of these instruments, refer to Chapter IV: Into the Cockpit prior to reading the remainder of this section.)

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.

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. 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.

Localizer or vertical guidance (indicated on the ILS receiver by the vertical localizer needle) is specifically provided from 18 nautical miles to 1/2 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.

In Flight II, you may contact a radar controller and request vectors for an ILS approach to an airport that provides this service. The radar controller will provide headings and altitudes for you to intercept the localizer and subsequently clear you to execute the ILS approach. (For additional details, refer to Obtaining Vectors ILS on page 156.)
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—the diagrams found in Appendix B at the back of this manual.
- Locate the corresponding ILS frequency for the runway from the relevant diagram (there is also a listing of available ILS runway frequencies found in Appendix C).
- 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. Centre 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 centre 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).
Too Low and to the Right of the Runway! Too High and to the Left of the Runway!

The approach procedures and frequencies for each of the tower-controlled airports are provided to you in Appendix B at the back of this manual. 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 in Appendix B 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

[A] In-Flight Map
Toggle On/Off the In-Flight map.

[Ctrl] 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.
IX.
FLIGHT MANOEUVRES
This chapter 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.
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

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

(For additional detailed descriptions regarding the myriad cockpit instruments and terminology discussed in this chapter, refer to Chapter IV: Into the Cockpit.)

**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 produces an upward force. The principal of lift was discovered by Daniel Bernoulli, 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.

Pilot Notes:

A propeller blade is also shaped like a wing. The force of it spinning through the air provides lift in a forward direction.
**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. 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.

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 on page 137)

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 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 172 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.

Pilot Notes:
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.
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 172. 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 \( \text{F} \) 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 (\( \text{L} \) 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 (\( \text{U} \) for Nose Trim Up and \( \text{D} \) 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).

Pilot Notes:

WARNING! Do not exceed the recommended crosswind component for your aircraft. For example, above a 17 knot direct crosswind, a Trainer 172 does not have enough rudder authority to maintain directional control.
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 172 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:

Pilot Notes:
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.
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.

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 larger 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” (utilising 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 it drops off drastically.

Pilot Notes:

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.

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 (note the diagram on page 127). 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:

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 on page 127.)

**Entering the Traffic Pattern (Lesson 4)**

This lesson teaches 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 Scenario 2: Entering a Tower-Controlled Airport on page 147).

---

**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 07 Left at Livermore in lousy weather.

(For a thorough explanation regarding the specific use of the ILS, please refer to The Instrument Landing System (ILS) on page 180.)
The following joystick and keyboard commands govern the various control functions of the aircraft:

### Joystick

<table>
<thead>
<tr>
<th>4 BUTTON WITH HAT (CH Flightstick, Thrustmaster)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Button 3-Fuel Mixture</strong></td>
</tr>
<tr>
<td>Hold down and move stick up/down to control mixture.</td>
</tr>
<tr>
<td><strong>Button 4-Propeller Speed</strong></td>
</tr>
<tr>
<td>Hold down and move stick up/down to control prop speed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4 BUTTON WITH HAT AND THROTTLE (CH Flightstick Pro, MS Sidewinder)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Button 3-Fuel Mixture</strong></td>
</tr>
<tr>
<td>Hold down and move stick up/down to control mixture.</td>
</tr>
<tr>
<td><strong>Button 4-Propeller Speed</strong></td>
</tr>
<tr>
<td>Hold down and move stick up/down to control prop speed.</td>
</tr>
<tr>
<td><strong>Throttle Wheel-Throttle</strong></td>
</tr>
<tr>
<td>Move throttle wheel up/down to adjust throttle.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MS Sidewinder Pro</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Button 3-Fuel Mixture</strong></td>
</tr>
<tr>
<td>Hold down and move stick up/down to control mixture.</td>
</tr>
<tr>
<td><strong>Button 4-Propeller Speed</strong></td>
</tr>
<tr>
<td>Hold down and move stick up/down to control prop speed.</td>
</tr>
<tr>
<td><strong>Button 5-Trim up</strong></td>
</tr>
<tr>
<td>Adjust elevator trim up.</td>
</tr>
</tbody>
</table>
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.

Keyboard

FLIGHT CONTROLS

 pitches up
Raise the nose of the aircraft.

 pitches down
Lower the nose of the aircraft.

 rolls left
Bank the aircraft to the left.

 rolls right
Bank the aircraft to the right.

 left rudder
Apply left rudder to turn the aircraft to the left.

 right rudder
Apply right rudder to turn the aircraft to the right.

 flaps down
Cycle down through the aircraft-specific flap operating positions in degree increments.
**Flaps Up**
Cycle up through the aircraft-specific flap operating positions in degree increments.

**KEYPAD Left Brake**
Apply left wheel brake.

**KEYPAD Right Brake**
Apply right wheel brake.

**Parking Brakes**
Apply parking brakes to landing gear (only active on the ground).

**ENGINE CONTROLS**

**Start Motor**
Start the engine (mixture will be automatically set to the full-rich position).

**KEYPAD Throttle Up**
Increase engine throttle. You may also click on the throttle control lever/knob in the cockpit and push up or in.

**KEYPAD Throttle Down**
Decrease engine throttle. You may also click on the throttle control lever/knob in the cockpit and pull down or out.

**Increase Prop Speed**
Increase engine propeller speed. You may also click on the propeller control lever in the cockpit and push up or in.

**Decrease Prop Speed**
Decrease engine propeller speed. You may also click on the propeller control lever in the cockpit and pull down.

**Increase Mixture**
Increase fuel mixture. You may also click on the mixture control lever/knob in the cockpit and push up or in.
+ KEYPAD Decrease Mixture
Decrease fuel mixture. You may also click on the mixture control lever/knob in the cockpit and pull down or out.

Toggle Carburetor Heat (Trainer 172 only)
Turn On/Off the carburetor heat.

Select Engine (Baron only)
Cycle between the left engine, right engine, or both.

TRIM CONTROLS

Nose Trim Up
Apply upward elevator trim to adjust the attitude of the aircraft if nose low.

Nose Trim Down
Apply downward elevator trim to adjust the attitude of the aircraft if nose high.

Centre Nose Trim
Apply center trim to adjust the attitude of the aircraft if either nose low or nose high.

Right Rudder Trim
Apply right rudder trim to turn the aircraft.

Left Rudder Trim
Apply left rudder trim to turn the aircraft.

Centre Rudder Trim
Apply centre trim.

Auto Trim
Let Flight II automatically adjust the nose and rudder trim of the aircraft for you.
### MISCELLANEOUS CONTROLS

<table>
<thead>
<tr>
<th>Key Combination</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L</strong></td>
<td>Landing Gear &lt;br&gt;Raise or lower the landing gear.</td>
</tr>
<tr>
<td><strong>SHIFT L</strong></td>
<td>Navigation Lights &lt;br&gt;Toggle On/Off your aircraft's exterior lighting system.</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>PCL System &lt;br&gt;Toggle On/Off the Pilot-Controlled Lighting system.</td>
</tr>
<tr>
<td><strong>ESC O</strong></td>
<td>Game Options &lt;br&gt;Activates the <em>Game Options</em> screen while in-flight.</td>
</tr>
<tr>
<td><strong>ESC P</strong></td>
<td>Pause Game &lt;br&gt;Pause the current flight.</td>
</tr>
<tr>
<td><strong>ESC M</strong></td>
<td>Video Resolution &lt;br&gt;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.</td>
</tr>
</tbody>
</table>

### CHEATS

<table>
<thead>
<tr>
<th>Key Combination</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESC 3</strong></td>
<td>Miracle Up &lt;br&gt;Have the aircraft miraculously rise up by 1,000 ft increments.</td>
</tr>
<tr>
<td><strong>ESC 4</strong></td>
<td>Miracle Down &lt;br&gt;Have the aircraft miraculously fall by 1,000 ft increments.</td>
</tr>
</tbody>
</table>
Welcome to the wonderful world of flying at night. If you thought flying during the day was fun, wait until you see what we have to illuminate for you after dark...
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 screen (see page 14 for additional details) or Modified Quick Flight screen (see page 108 for additional details).

Flight II models the following five lighting systems:

1) Aircraft (including cockpit and navigation lights)
2) Taxiway
3) Runway
4) Visual Glideslope Indicators
5) 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.
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 the following two subsystems:

1) Position Lights.
2) Anti-Collision Beacon.

**Interior (Cockpit)**

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 (see next) cannot be toggled off.

**Exterior (Navigation)**

All external lighting systems in Flight II are enabled either by left-clicking on the NAV LIGHTS switch in the cockpit, or by using the T/ key combination.

This switch is a toggle which, as a group, turns on and off the Position Lights and Anti-Collision Beacon.

**Position Lights**

Each of the private aircraft in Flight II possesses the following 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 (see illustration above). 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, 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 aircraft (see illustration on previous page). 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.

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 Notes:**

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.

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?
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. Each uses a similar lighting system which, in real life, is set by the FAA (including FAA-approved colours) in order to maintain a level of continuity between airports. Systems are broken down into the following seven categories:

1) Approach Lighting
2) Visual Glideslope Indicators
3) Runway Edge Lighting
4) In-Runway Lighting
5) Taxiway Lighting
6) Pilot-Controlled Lighting (PCL)
7) 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:
1) Sequenced Flashing Lights (SFL)
2) Runway End Identifier Lights (REIL)
3) 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 glidespath for the final approach. The glidespath is basically the angle at which the aircraft approaches the runway. Note the following diagram depicting a typical two mile final approach:

Pilot Notes:
In the real world, the level of sophistication of the approach lighting system for a given runway is based entirely on its operational demands.

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).
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:

1) VASI (Visual Approach Slope Indicator)  
2) 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 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:

Pilot Notes:
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!

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.”
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.

**Pilot Notes:**

The VASI system is turned on 24 hours a day, seven days a week, not just at night or in bad weather.

Visual Glideslope Indicators are not present at all runways. Generally, they can be found at busy, controlled airports.
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:

1) Runway Edge Lights
2) 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.

Pilot Notes:
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.

Flying at Night
In-Runway Lighting

Three systems are implemented in Flight II to mark runways:

1) Touchdown Zone Lighting (TDZL)
2) Runway Centerline Lighting (RCLS)
3) 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:

1) Taxiway Edge Lights
2) 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 at the back of this manual or COM Radio Control Frequencies in Appendix C for a listing of available UNICOM radio frequencies.)

Once the frequency is set, press the `U` 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 `U` key a second time to increase the lighting level to medium intensity and a third time to increase the level to maximum intensity.

Pilot Notes:
Just to be on the safe side, it is highly recommended you press the `U` key once to reinitalize 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!

Flying at Night
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! (Refer to Appendix A 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 colour 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.
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...
This section lists all of the airports in Flight II by control status, along with their alphanumeric FAA designations.

### 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:

1) UNICOM-Serviced
2) Private Airfields
3) 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 - 056
- Half Moon Bay - HAF
- Nut Tree - 045
- Parrett - 203
- Petaluma - 069
- Rio Vista - 088
- Sonoma Skypark - 0Q9
- Sonoma Valley - 0Q3
- South County - Q99
- University - 005
Private Airfields
These are uncontrolled airports which do not support UNICOM. There are a total of 15 in the game, and they 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 Prairie - 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 they 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

<table>
<thead>
<tr>
<th>Airport Type</th>
<th>Number</th>
<th>Airport Icon</th>
<th>Control Status</th>
<th>Services Offered</th>
<th>Airspace Classification</th>
<th>Entry Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROLLED</td>
<td>15</td>
<td>Blue</td>
<td>Tower</td>
<td>ATIS</td>
<td>Class B, C, or D</td>
<td>Must contact tower controller before entering airspace</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNCONTROLLED</td>
<td>31</td>
<td>Magenta</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNICOM-SERVICED</td>
<td>13</td>
<td>Medium and Small Regular Icons</td>
<td>None</td>
<td>UNICOM</td>
<td>None</td>
<td>UNICOM contact optional</td>
</tr>
<tr>
<td>Private</td>
<td>15</td>
<td>Small Private (R Symbol) Icons</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>May fly in and out of with no restrictions</td>
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<tr>
<td>Maritime</td>
<td>3</td>
<td>Small Maritime Icons</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>May fly in and out of with no restrictions</td>
</tr>
</tbody>
</table>

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APPENDIX B: AIRFIELD DIAGRAMS AND INSTRUMENT APPROACH PLATES

Sample Airfield Diagram

San Francisco International (SFO)

Legend

- VASI
- Right Traffic
- Displaced Threshold
- Player Parking
- Windsock
- PAPI
- VOR
- Tower

San Francisco International (SFO)

- ATIS-135.45
- GROUND FREQ.-121.15
- TOWER FREQ.-120.50
- APPROACH-134.5

- COM radio control frequencies for this airport

- Runway Numbers (e.g., 19L = Runway 19 Left)

- Player Parking Spot (Looking Glass Aviation Terminal)

- Taxiway Designations (e.g., L = Taxiway Lima)

- Control Tower Location

- Runway Length and Width (in feet)
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'

GS 112' msl (101' agl)
GS 1768' msl (1757' agl)

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
Understanding the ILS Approach Chart

What a mess! Actually, it’s not as daunting as it looks. Let’s take the items one at a time...

**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 Control 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 (see below) 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 1/2 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.
San Francisco Intl (SFO) ILS RWY 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'

WASHINGTON
WASHINGTON NAV (WASH)
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 Intl. (SFO) ILS RWY 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'

WASHINGTON
WASHINGTON NAV (WASH)
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 Intl (OAK) ILS RWY 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'

ILS DA (H) 205' (200')
VISIBILITY 1/2 STATUTE MILE

MISSSED 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 JD 50' (200')

VISIBILITY 1/2 STATUTE MILE

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**Metro Oakland Intl (OAK) ILS RWY 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’**

- **275**
- **$275**
- **109.90 IOAK**

**GS 222’ msl (218’ agl)**

**GS 1353’ msl (1349’ agl)**

**OM**

**275**

**$1500’ msl (1496’ agl)**

**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 Intl (OAK) ILS RWY 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’**

- **113**
- **$113**
- **111.9 IOAK**

**GS 226’ msl (220’ agl)**

**GS 1756’ msl (1750’ agl)**

**OM**

**113**

**$1800’ msl (1794’ agl)**

**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 Intl (SJC) ILS RWY 12R

- ATIS 126.95
- Ground 121.75
- Tower 124.00
- Bay Approach 135.40

San Jose
SAN JOSE
SAN JOSE INTL (SJC)
ILS RWY 12R
Apt. Elev 58'

Appendices
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'

GS 287' msl (233' agl)
GS 1750' msl (1696' agl)

MISSED APPROACH: Climb to 1900' outbound via SJC VOR R-303.

STRAIGHT-IN LANDING RUNWAY 30L
ILS
DA 100' 504' (301)

VISIBILITY
1/2 STATUTE MILE
Travis AFB (SUU) ILS RWY21L

ATIS 118.40
Ground 121.10
Tower 120.75
Travis Approach 119.90

FAIRFIELD
TRAVIS AFB (SUU)
ILS RWY 21L
Apt. Elev 62'

TRAVIS AFB (SUU) ILS RWY3L

ATIS 118.40
Ground 121.10
Tower 120.75
Travis Approach 119.90

FAIRFIELD
TRAVIS AFB (SUU)
ILS RWY 3L
Apt. Elev 62'

Appendices
Livermore (LVK)

ATIS 119.65
GROUND FREQ. 121.65
TOWER FREQ. 118.10
APPROACH - 123.85

PILOT-CONTROLLED LIGHTING

LIVERMORE
Livermore (LVK) ILS RWY 25R

APPROACH

STRAIGHT-IN LANDING RUNWAY 25R
ILS

VISIBILITY
1/2 STATUTE MILE
ATIS 120.55
GROUND FREQ. 121.90
TOWER FREQ. 118.50
APPROACH 127.80

PILOT-CONTROLLED LIGHTING

Santa Rosa

Santa Rosa (STS) ILS RWY 32

ATIS 120.55
Ground 121.90
Tower 118.50
Bay Approach 127.80

SANTA ROSA
SONOMA CO (STS)
ILS RWY 32
Ap. 321° 319'

MISSED APPROACH: Climb to 1800' outbound via STS VOR R-321.

STRAIGHT-IN LANDING RUNWAY 32
ILS
DA 1900' MSL (1781' AGL)

VISIBILITY
1/2 STATUTE MILE

Appendices 233
Sacramento EXE (SAC)

ATIS 125.50
Ground 125.00
Tower Freq 119.50
Approach 119.10

Pilot-controlled lighting

Sacramento Executive (SAC) ILS RWY 2

ATIS 125.50
Ground 125.00
Tower 119.50
Bay Approach 119.10

SACRAMENTO
SACRAMENTO EXEC (SAC)
ILS RWY 2
Apt. Bv 2T

STRAIGHT-IN LANDING RUNWAY 2
ILS
D 4-0 29' (200')

MISSED APPROACH: Climb to 500' then climbing LEFT turn to 1400' on 240º heading.

VISIBILITY
1/2 STATUTE MILE
ATIS 124.55
Ground 121.85
Tower 126.20
Bay Approach 120.10

Moffett-Federal (NUQ) ILS RWY 32R

MOUNTAIN VIEW
Moffett Federal (NUQ)
ILS RWY 32R
Ap. Elev 34

STRAIGHT-LANDING RUNWAY 32R
ILS
DA 190' 322' (200')

VISIBILITY
1/2 STATUTE MILE

Appendices 235
Byron (C83)

PILOT-CONTROLLED LIGHTING

Concord Buchanan (CCR)

ATIS-124.70
GROUND FREQ-115.65
TOWER FREQ-190.70
APPROACH-190.80

Appendices 237
PILOT-CONTROLLED LIGHTING

Davis Woodland Winters (2Q3)

Gnoss (056)

L3300 x 75
Palo Alto (PAO)

ATIS - 120.60
GROUND FREQ - 125.05
TOWER FREQ - 124.60
APPROACH - 120.10

Parret (203)

PILOT-CONTROLLED LIGHTING

Appendices 241
Petaluma (069)

PILOT-CONTROLLED LIGHTING

Reid-Hillview (RHV)

ATIS 125.50
GROUND FREQ 121.80
TOWER FREQ 120.10
APPRO ACN 120.10
**APPENDIX C: RADIO FREQUENCY LISTINGS**

**COM Radio Control Frequencies**
The following are the frequencies used to listen to ATIS and UNICOM, and to communicate with ground, tower and radar controllers in Flight II. These frequencies are entered into the COM radio.

### ATIS, GROUND, AND TOWER CONTROL FREQUENCIES

<table>
<thead>
<tr>
<th>Airport FBO</th>
<th>ATIS</th>
<th>Ground Control</th>
<th>Tower Control</th>
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<td></td>
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<tr>
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<td>120.25</td>
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<td>127.05</td>
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<td>119.70</td>
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<td>120.20</td>
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<td>121.65</td>
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<tr>
<td>Napa County (APC)</td>
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<tr>
<td>Oakland International (OAK)</td>
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<td>118.30</td>
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<td>Palo Alto (PAO)</td>
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<td>125.05</td>
<td>118.60</td>
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<tr>
<td>Reid-Hillview (RHV)</td>
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<td>119.80</td>
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<tr>
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<td>125.00</td>
<td>119.50</td>
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<tr>
<td>San Carlos (SCL)</td>
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<tr>
<td>San Francisco International (SFO)</td>
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<td>San Jose International (SJC)</td>
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<td>121.75</td>
<td>124.00</td>
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<tr>
<td>Santa Rosa (STS)</td>
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<tr>
<td>Travis AFB (SUU)</td>
<td>118.40</td>
<td>121.10</td>
<td>120.75</td>
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### RADAR CONTROL FREQUENCIES

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<thead>
<tr>
<th>LOCATION</th>
<th>APPROACH FREQUENCY</th>
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</thead>
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<tr>
<td>Bay (San Francisco Airport-SFO)</td>
<td>134.50 (Bay Approach)</td>
</tr>
<tr>
<td>Travis (Travis Air Force Base-SUU)</td>
<td>126.60 (Travis Approach)</td>
</tr>
<tr>
<td>Sacramento (Sacramento Airport)</td>
<td>125.25 (Sacramento Approach)</td>
</tr>
</tbody>
</table>

### UNICOM FREQUENCIES

<table>
<thead>
<tr>
<th>Airport FBO</th>
<th>UNICOM</th>
<th>Ground Control</th>
<th>Tower Control</th>
</tr>
</thead>
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<tr>
<td><strong>UNCONTROLLED</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borges-Clarksburg (C14)</td>
<td>122.90</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Byron (C83)</td>
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<td></td>
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<tr>
<td>Davis Woodland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winters (2Q3)</td>
<td>123.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gnoss (O56)</td>
<td>122.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half Moon Bay (HAF)</td>
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<td></td>
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<tr>
<td>Nut Tree (045)</td>
<td>122.70</td>
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<tr>
<td>Parrett (203)</td>
<td>123.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petaluma (069)</td>
<td>122.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rio Vista (088)</td>
<td>122.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sonoma Skypark (0Q9)</td>
<td>122.80</td>
<td></td>
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<tr>
<td>Sonoma Valley (0Q3)</td>
<td>122.90</td>
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<tr>
<td>South County (0Q9)</td>
<td>122.70</td>
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<tr>
<td>University (005)</td>
<td>122.80</td>
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</tbody>
</table>
**ILS NAV/COM Runway Frequencies**

The following are the frequencies used to dial-up the 14 ILS-equipped runways featured in Flight II during instrument landing approaches. These frequencies are entered into the ILS NAV/COM radio.

<table>
<thead>
<tr>
<th>AIRPORT</th>
<th>RUNWAY NUMBER</th>
<th>ILS FREQUENCY</th>
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<tr>
<td>Livermore (LVK)</td>
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<td>Moffett Federal (NUQ)</td>
<td>32R</td>
<td>110.35</td>
</tr>
<tr>
<td>Oakland International (OAK)</td>
<td>11</td>
<td>111.90</td>
</tr>
<tr>
<td>Oakland International (OAK)</td>
<td>2R</td>
<td>109.90</td>
</tr>
<tr>
<td>Oakland International (OAK)</td>
<td>29</td>
<td>108.70</td>
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<tr>
<td>Sacramento Executive (SAC)</td>
<td>2</td>
<td>110.30</td>
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<tr>
<td>San Francisco International (SFO)</td>
<td>9L</td>
<td>108.90</td>
</tr>
<tr>
<td>San Francisco International (SFO)</td>
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<td>109.55</td>
</tr>
<tr>
<td>San Jose International (SJC)</td>
<td>12R</td>
<td>110.90</td>
</tr>
<tr>
<td>San Jose International (SJC)</td>
<td>30L</td>
<td>110.90</td>
</tr>
<tr>
<td>Sonoma County (OQ9)</td>
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<td>109.30</td>
</tr>
<tr>
<td>Travis AFB (SUU)</td>
<td>3L</td>
<td>108.35</td>
</tr>
<tr>
<td>Travis AFB (SUU)</td>
<td>21L</td>
<td>110.10</td>
</tr>
</tbody>
</table>

**VOR/DME Frequencies**

The following are the frequencies and positions for the 9 VOR stations available in Flight II. These frequencies are entered into the NAV radio.

<table>
<thead>
<tr>
<th>VOR STATION</th>
<th>IDENTIFICATION</th>
<th>LOCATION</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oakland</td>
<td>OAK</td>
<td>37°43.6N - 122°13.4W</td>
<td>116.80</td>
</tr>
<tr>
<td>Point Reyes</td>
<td>PYE</td>
<td>38°04.8N - 122°52.1W</td>
<td>113.70</td>
</tr>
<tr>
<td>Sacramento</td>
<td>SAC</td>
<td>38°26.6N - 121°33.1W</td>
<td>115.40</td>
</tr>
<tr>
<td>San Francisco</td>
<td>SFO</td>
<td>37°37.2N - 122°24.4W</td>
<td>115.80</td>
</tr>
<tr>
<td>San Jose</td>
<td>SJC</td>
<td>37°22.5N - 121°56.7W</td>
<td>114.10</td>
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<tr>
<td>Santa Rosa</td>
<td>STS</td>
<td>38°30.5N - 122°48.6W</td>
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<tr>
<td>Sausalito</td>
<td>SAU</td>
<td>37°51.3N - 122°31.4W</td>
<td>112.00</td>
</tr>
<tr>
<td>Scaggs Island</td>
<td>SGD</td>
<td>38°10.8N - 122°22.4W</td>
<td>112.10</td>
</tr>
<tr>
<td>Woodside</td>
<td>OSI</td>
<td>37°23.5N - 122°16.9W</td>
<td>113.90</td>
</tr>
</tbody>
</table>
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.

### APPENDIX D: LEARNING THE AVIATION ALPHABET

| Letter | Phonetic
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
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<td>Alpha</td>
<td>AL-FAH</td>
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<tr>
<td>Bravo</td>
<td>BRAH-VOH</td>
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<tr>
<td>Delta</td>
<td>DEL-TAH</td>
</tr>
<tr>
<td>Echo</td>
<td>ECK-OH</td>
</tr>
<tr>
<td>Foxtrot</td>
<td>FOKS-TROT</td>
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<tr>
<td>Golf</td>
<td>GOLF</td>
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<tr>
<td>Hotel</td>
<td>HOH-TEL</td>
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<tr>
<td>India</td>
<td>IN-DEE-AH</td>
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<td>Juliet</td>
<td>JEW-LEE-ETT</td>
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<tr>
<td>Kilo</td>
<td>KEY-LOH</td>
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<tr>
<td>Lima</td>
<td>LEE-MAH</td>
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<tr>
<td>Mike</td>
<td>MIKE</td>
</tr>
<tr>
<td>November</td>
<td>NO-VEM-BERR</td>
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<tr>
<td>Oscar</td>
<td>OS-CAR</td>
</tr>
<tr>
<td>Papa</td>
<td>PAH-PAH</td>
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<tr>
<td>Quebec</td>
<td>KEH-BECK</td>
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<tr>
<td>Romeo</td>
<td>ROW-ME-OH</td>
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<td>Sierra</td>
<td>SEE-AIR-RAH</td>
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<tr>
<td>Tango</td>
<td>TANG-GO</td>
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<tr>
<td>Uniform</td>
<td>YOU-NEE-FORM</td>
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<td>Victor</td>
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<td>Whiskey</td>
<td>WISS-KEY</td>
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<td>X-Ray</td>
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<td>Yankee</td>
<td>YANG-KEY</td>
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<tr>
<td>Zulu</td>
<td>ZOO-LOO</td>
</tr>
</tbody>
</table>

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)
APPENDIX E: FLYABLE AIRCRAFT SPECIFICATIONS AND CALLSIGNS

**Piper Arrow (Arrow Two Lima Golf)**
- Gross Weight: 2,600 lbs
- Max Range: 930 NM
- Top Speed: 151 KIAS
- Cruise Speed: 143 KIAS
- Takeoff Speed: 56 KIAS
- Landing Speed: 66 KIAS
- Glide Speed: 85 KIAS
- Engine: Lycoming 200 hp
- Cruise Speed: 170 KIAS
- Takeoff Speed: 85 KIAS
- Landing Speed: 90 KIAS
- Engine Type: Teledyne

**De Havilland Beaver (Beaver Three Lima Golf)**
- Gross Weight: 5,090 lbs
- Max Range: 405 NM
- Top Speed: 124 KIAS
- Cruise Speed: 106 KIAS
- Takeoff Speed: 55 KIAS
- Landing Speed: 65 KIAS
- Glide Speed: 80 KIAS
- Engine: P&W 450 hp
- Cruise Speed: 170 KIAS
- Takeoff Speed: 85 KIAS
- Landing Speed: 90 KIAS
- Engine Type: RR Merlin 1,612 hp

**Beechcraft Baron (Baron Four Lima Golf)**
- Gross Weight: 4,886 lbs
- Max Range: 1,050 NM
- Top Speed: 188 KIAS
- Cruise Speed: 170 KIAS
- Takeoff Speed: 85 KIAS
- Landing Speed: 90 KIAS
- Glide Speed: 69 KIAS
- Engine: Lycoming 150 hp

**P-51D Mustang (Mustang One Lima Golf)**
- Gross Weight: 9,000 lbs
- Max Range: 907 NM
- Top Speed: 395 MPH
- Cruise Speed: 292 MPH
- Takeoff Speed: 110 MPH
- Landing Speed: 115 MPH
- Engine: RR Merlin 1,612 hp

**Trainer 172 (Trainer Five Lima Golf)**
- Gross Weight: 2,300 lbs
- Max Range: 692 NM
- Top Speed: 115 KIAS
- Cruise Speed: 109 KIAS
- Takeoff Speed: 55 KIAS
- Landing Speed: 65 KIAS
- Glide Speed: 69 KIAS
- Engine: Lycoming 150 hp

Appendices
### APPENDIX F: AIRCRAFT INSTRUMENT AND SYSTEMS TABLES

**Note:** A ✓ mark indicates the instrument or system can be found on the cockpit panel of the given aircraft.

#### VFR Aircraft Instrument and Systems Table

<table>
<thead>
<tr>
<th>Flight Instruments</th>
<th>Trainer 172</th>
<th>Piper Arrow</th>
<th>P-51D</th>
<th>Beaver</th>
<th>Beech Baron</th>
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<tbody>
<tr>
<td>Accelerometer</td>
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<tr>
<td><strong>Navigation Instruments</strong></td>
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*continued...*
### VFR Aircraft Instrument and Systems Table, continued

<table>
<thead>
<tr>
<th>Communication Instruments</th>
<th>Trainer 172</th>
<th>Piper Arrow</th>
<th>P-51D</th>
<th>Beaver</th>
<th>Beech Baron</th>
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#### Flight Controls and Lighting System

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#### Engine Instruments

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<td>Fuel Tank Switch</td>
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# IFR Aircraft Instrument and Systems Table

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*continued...*
## IFR Aircraft Instrument and Systems Table, continued

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Brian Bruning
Darlene Kindler
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Foley, Hoag and Elliot
Intel Corp.
Al Calamari

Credits 257
Thrustmaster Corp.
Steve Carter

CH Products
Rick Salvador

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Marsh Carter
Gene Lamos
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Tony Tomc
Seamus Blackley
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George Watson
Computer Pilot Magazine

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Andrea Hanneman
Nancy and Jay Gilby
The Fleming and Unnewisse Clans
Kate Jenkins
Martha and Ray Nadeau
Ursula Nadeau
Elisabeth (+ one in the oven!) Patel
Ralph Budington
Greg LoPiccolo
Nancy, Matthew and Kevin McElhatton
Ellen Markovich
Lisa (+ one in the oven!) Streit
Meral Dabcovich
Dianne Glynn
Margaret and Rachel Wasserman
Simon and Velia Amarasingham
Traci Lords

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Marketing Manager
David Burton
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