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Introduction To Air Warrior

Air Warrior is the ultimate challenge for lovers of air combat simulations. First and foremost, Air Warrior features the most informed, detailed, and advanced flight models available on a home computer. Each aircraft's behavior is based on extensive flight test data and, as in real life, each plane's performance and handling characteristics are unique and authentic. In the course of playing the game, you will learn the historic strengths and weaknesses of many legendary warbirds, and how to employ these distinctive traits to your advantage.

Of course, you need more than excellent flight modeling to make a great air combat simulator — you need other pilots. Air Warrior's ultimate challenge is online, over large and extensive computer networks, where the finest simulator pilots from around the world fly in the same arena at the same time.

Online Air Warrior features open arena play, with over 100 other live pilots, from across North America, England, Australia, and Japan, at one time. If your tastes run toward turn-and-burn dogfighting, there are Relaxed Realism arenas. If you want to experience scrupulously accurate flight modeling, you can choose a real-time, full realism arena.

Online players may participate as individuals, or as part of a squadron made up of other online pilots. In addition to flying as fighter pilots, players may also serve as a bomber pilot, bombardier, or bomber gunner, or as a crew member on a ground-based tank or flak gun.

Air transports are available for delivering cargoes of fuel and ammunition, and paratroops may be dropped to assist in the capture of enemy airfields. For the individualist, Air Warrior offers a dueling mode, which enables players to challenge other individuals or groups to airborne duels, which occur apart from normal arena play.

In short, no air combat simulation offers you more possibilities than Air Warrior.

Air Warrior Features

Multiple Resolution: 1024 x 768, 800 x 600 and 640 x 480 resolutions are supported, in 256 colors.

Real-time multipilot network play: You can play Air Warrior with over 100 people from all over North America, Great Britain, Japan, and Australia at the same time.

Choice: Fly 21 different World War II era fighters and bombers from 5 nations.

Advanced, adjustable levels of realism: Air Warrior's dynamic flight model offers realism never before available on a personal computer, including accelerated stalls, G effects, red-outs, blackouts, and uncontrolled spins.

High resolution cockpit artwork: You'll find cockpit art with up to 16 separate cockpit views for every aircraft and armored vehicle.

The most comprehensive viewing system of any air combat simulator: Air Warrior does not send you hunting for your function keys just to have a look around your airplane. There are no frame rate devouring gimmick view schemes. In Air Warrior, you have access to 15 cockpit views right from your keypad or keyboard, or 9 views directly from the ThrustMaster FCS Castle switch.

Multichannel, digital sound from authentic sound samples: Air Warrior employs sound samples from actual World War II aircraft and weapons.

ThrustMaster, CH, SunCom, Gravis, and rudder pedal support: Air Warrior fully supports the CH line of joysticks , ThrustMaster Weapons Control and Flight Control features, SunCom Talon and Eagle, as well as most makes of rudder pedals.

Minimum Requirements

- IBM compatible 486DX computer operating at 66 MHz or faster, with local bus video
- 8 megabytes of RAM
- Windows 3.1 or later
- A hard disk drive with at least 30 megabytes free
- A video card and monitor capable of 640 x 480 resolution and 256 colors with 512K of video memory on the card
- A mouse and a joystick (though a plane can be flown with just the mouse)

Recommended Equipment:

- P5/75 MHz PCI
- 16mb of RAM
- SoundBlaster compatible Sound Card
- Dedicated game port
- Throttle and rudder controls
- Multi-function Joystick , such as ThrustMaster FCS, CH Pro, Wingman Extreme, etc.
- 14.4K BPS or faster modem (14.4K BPS is the minimum required for online play)

Installing Air Warrior

If you are running Windows 3.1 (or WFW 3.11), you will need to install both WinG and Win32s to run Air Warrior (r). If you're running Windows95 you need only install WinG.

Unpack the self-extracting Air Warrior software archive into a clean directory. Then, go to that directory using the Windows File Manager.

Double-click the file SETUP.EXE (or execute this file by "RUNning" it from the FILE menu).

Within the SETUP program, accept the default installation directory or type the directory that you want Air Warrior installed into.

Choose either a Typical or Custom install. If you choose Custom, you will need to check the options you want installed.

After the installation is complete, do not run Air Warrior from the setup program unless you just want to play "off-line". If you are interested in playing Air Warrior with other players ("on-line"), then you must run Air Warrior from an online service that offers a connection to the game.

Joystick Installation Notes:

Although Air Warrior (r) may be executed with only a mouse, a joystick is recommended to fly Air Warrior (r). However, to use a joystick you'll have to install a joystick driver

Multiplayer Air Warrior

Online Play

Air Warrior online arenas offer a true multiplayer air combat simulator where people from all over the world compete nightly in World War II era aircraft. Although it employs rigorously accurate flight models taken from actual test flight data, Air Warrior is not primarily a World War II simulation. The battle being waged in Air Warrior is happening now. You, as a player and a pilot, are not following in the path of a hero in a long ago air struggle; rather, you are the hero of your own adventure and a participant in the adventures of many people here and now.

Connecting to the Air Warrior Host

Air Warrior can be launched from a web browser if the Air Warrior software has been installed correctly on your computer, and your online service offers the game. All you need to do is to go to the Air Warrior web site, or launch area on your service and click the appropriate icon.

The first time you launch Air Warrior from your browser it will prompt you if you wish to configure a viewer. Say yes, select browse, and find the program KLAUNCH.EXE in your Air Warrior subdirectory. Click OK and Air Warrior will load on your computer.

When the main menu - an airfield with several buildings and aircraft - appears, click on the flight of planes overhead. This will initiate a connection to the Air Warrior host computer, and present you with an online arena selection.

Arena Selection

This screen show you a list of the active online arenas, how many players are there, whether an arena featues relaxed or full realism, and what terrain and plane set (Europe, Pacific, WWI) is active there. If you're trying to meet up with someone, you can use the Find User button at the bottom of the Arena Selection screen.

Find User

Available from the screen online, clicking the Find User button brings up a dialog. Enter the Custom Player ID (CPID) of the player you're looking for. If he'is online, you will be told where he's located.

Navigating the Air Warrior Interface

Air Warrior offers two fundamental methods of navigating its interface: single left mouse button clicks on available hotspots, and right mouse button menus.

Hotspots

A hotspot is an active area of the screen that you can click on with your left mouse button to perform a function. In most interface screens, when your mouse cursor passes over a hotspot it will change from an arrow to an airplane.

Tooltips

When you first run the program, all hotspots will also be labeled with brief descriptions of their function, known as tooltips. You can turn these tooltips off, or set them to appear only when your mouse pointer lingers over a hotspot. To see all the tooltips for an interface screen, hit the Alt key.

Right Mouse Button Menus

From any interface screen, if you click your right mouse button, you'll see a menu of pertinent options. These options vary from room to room, but certain ones are always available from the right button menu:

- Setup - this provides you access to the complete array of setup options: flight controls, cockpit view options, and user preferences.
- Tooltips - this allows you to turn tooltips on or off.
- Show Guide - this turns on/off a screen-by-screen walk through of the Air Warrior program.
- Help - this opens the comprehensive help file.
- About - brings up the version number of your Air Warrior software.
- Exit Air Warrior - as you might expect, this allows you to exit the program.

As noted above, there are additional functions available from the right mouse button menu, depending on the room you're in. For example, in the ready rooms there is a right button option for adjusting your fuel and bomb load. This option would not be particularly useful anywhere else other than a ready room, just prior to flight. Similarly, other right button options will be available in other rooms, depending on their pertinence.

Quick Start

After the initial startup screens are displayed, you will be presented with main airfield screen . If you move you mouse around slowly, you will get "tooltips" which indicate the hotspots you may press to get you into the game. Hitting the Ctrl key will show you all the tooltips on any screen. You may disable these "tooltips" in the future by going into SETUP->User Preferences.

You should first go into SETUP and configure your controls. This is done by clicking on the SETUP hangar and then clicking on the mechanic's clipboard. To check to see that your sound card is working with the program, click on the loudspeaker on the upper right-hand side of the setup hangar. Here you can set the volume and test it.

After configuring your controls, you may either fly "Solo" or "Multiplayer". At the main airfield screen, the three planes at the top represent multiplayer mode. The Solo hangar represents solo mode. Note that if you came through the Web and are connected to our service, you will not be allowed to play Solo mode (off-line). If you have not launched the Air Warrior program from the Web, and are not connected to our service, then you cannot fly in multiplayer mode.

If you go into Multiplayer mode, you first must choose an arena. This will take you to an Officers Club (OC). Once in the Officers Club, you can talk to other players , go to Headquarters (HQ), etc.

To fly, you have to select an airfield. You can do this either by clicking on the Spitfire at the OC, or the map on the table in HQ. Either action brings up the Situation Map , centered in your country. Select an airfield by double clicking on it. This will only work with airfields your country owns. Avoid the airfields in yellow, as they are damaged. Selecting an airfield takes you to its Ready Room . Here you can click on the aircraft ID silhouette on the wall to select a plane. To fly it, click on the Airfield door on the left-hand side of the ready room.

Once in the cockpit, hit "8" to start your engines, upper case "C" to throttle up, and off you go! To raise your landing gear, hit the semicolon key. To engage war emergency power, hit the 7 key. To return to full military power, hit the 7 key again. To throttle back, hit the v key, and to apply wheel brakes hit your spacebar. To fire your guns, use either the f key, or button 1 on your joystick.

Main Menu

The airfield you see, after the title and credits screens have displayed, is the Air Warrior main menu. Hotspots in the scene represent menu items. When your mouse cursor is over a hotspot, it will turn from an arrow to an aircraft. A single click of your left mouse button over a hotspot will activate the menu item. Here is the list of hotspots, from left to right on the screen:

- Sheep: brings up the version number of your Air Warrior software.
- Jeep: by sheer coincidence, rhymes with sheep. Click on this to exit the program.
- Setup Hangar : takes you the setup screen where you can configure your flight controls, cockpit display, user preferences, and sound.
- Fly Online: this is represented by the three aircraft flying overhead. You must launch the program from an online service that offers Air Warrior for this item to be active.
- Solo: allows you to fly offline checkrides in Air Warrior aircraft and vehicles
- Film: select and playback gun camera films.

About Box

This tells you the version of the Air Warrior software you have running. It's available by clicking on the sheep in the main menu , or from any of the pop-up right mouse button menus.

Setup Hangar

In the setup hangar you can do the following:

- Select and calibrate your flight controls.
- Select your cockpit view options.
- Setup and test Sound .
- Set your user preferences.

Mechanic's Clipboard

Airspeed

The choices here are indicated or true airspeed. Despite the reassuring ring to the term, true airspeed, you'll probably want to use indicated airspeed. Air becomes thinner with increased altitude, and the maneuvers you could perform easily at 200 knots at 1000 feet might become impossible at 10,000 feet. Indicated airspeed adjusts for altitude and reports speed based on the airflow over the wings. Most pilots prefer to use indicated airspeed and this is the default setting.

Cockpit Display

This gives you several options governing how Air Warrior looks from your cockpit.

Difficulty Level

This governs offline, solo flight only. At the Cadet level, flight proceeds at half normal speed (although your airspeed indicator reflects full speed) and accelerated stalls, uncontrolled spins, blackout, red-outs, and stall buffeting is disabled. Veteran level is the same except flight proceeds in realtime. Ace level has all the realism features enabled.

Realism Settings

Realism options are set automatically, by the Air Warrior host, in online arenas. Full realism has the entire suite of realism featues, detailed below, enabled. Relaxed realism has only Real-Time enabled; all the realism features listed below are disabled. There may also be a Half-Time arena enabled for players who do not have sufficiently snappy online connections for Real-Time play.

Even with no extra realism settings active, there are realistic limits to Air Warrior flight. Plane performance will very with altitude, planes create drag during normal flight (parasitic drag), and extra drag (induced drag) when maneuvering.

Difficulty Level settings on the Mechanic's Clipboard apply only to offline solo play. At the Cadet level, flight proceeds at half normal speed (although your airspeed indicator reflects full speed) and accelerated stalls, uncontrolled spins, blackout, red-outs, and stall buffeting is disabled. Veteran level is the same except flight proceeds in realtime. Ace level has all the realism features enabled.

Real-time

To improve network performance and playability on GEnie, Air Warrior, until recently, calculated action at half speed, although your airspeed indicator reflects real-time full speed. For offline or head-to-head modem play, however, you can select the real-time option and the action will occur at full speed. Real time is also featured online in certain arenas. Online play is covered thoroughly later in this manual.

Buffeting

In actual flight, maneuvers fight against the atmosphere and create turbulence. If you select the Buffeting realism option, you will see visible effects of maneuvering induced turbulence. You screen display will shake if you pull more than 3Gs in a maneuver.

Stalls

This option enables *accelerated* stalls. Unlike low speed stalls, where airspeed is too low for flight sustaining airflow over the wings, an *accelerated* stall happens at if the wing's angle of attack is severe enough to disrupt airflow.

Spins

In a low speed stall, if the plane was maneuvering, one wing may stall before the other and the aircraft will spin. Selecting this option enables this possibility if you stall.

Lethality

If you turn this option off, overall lethality is reduced and ammunition loads are tripled from what they'd be on the actual aircraft. Selecting this option gives you the realistic lethality; your gunfire will do more damage but you will have the smaller, realistic ammo load. Gunnery and lethality are explained in greater detail later in this manual.

G Effects

The human body is accustomed to 1 G: the normal force of the earth's gravity. Dramatic

maneuvers fight inertia and create G forces that can be many times the force of gravity. If you pull more than 5 positive Gs, you draw blood away from your brain and this can lead to a blackout. Negative Gs do the opposite, forcing blood into your head. This can cause a red-out if the negative G-force is severe. Selecting this option enables a realistic accumulation of these effects.

While G effects, buffeting, and real-time options work the same on all planes, accelerated stalls, spins, and lethality are individualized based on the actual characteristics of a given aircraft. Some carried more lethal armaments than others, and each type of fighter behaved differently as it was pushed to its limits.

SURVIVING FULL REALISM

The nature of air combat in World War II was often dictated by the limitations of the aircraft. When you select realism options in Air Warrior, you encounter many of the foibles of piston engine fighters, and you have to take the same measures the actual pilots did to recover when you push a plane beyond its limits.

Recovering From a Spin

The problem here is that airflow over the wings and control surfaces is insufficient to support sustainable, controlled flight. Push the stick forward and try to work the plane into a dive to regain airspeed and airflow. At the same time, apply rudder in a direction opposite that of the spin. Also, it may be essential to cut throttle, because the engine's torque can drive the spin. When the plane stops spinning, center the rudder. As airflow over the wings returns, ease back on the stick and increase throttle. A quick way to determine the proper direction to apply rudder, opposite the direction of the spin, is to look at your compass; move your rudder in the direction the compass is spinning.

Since recent changes in rudder control were implemented, many pilots prefer to recover from spins using opposite aileron (rolling the plane in the direction opposite the spin) control alone.

Recovering From an Accelerated Stall

Again, you must restore lift sustaining airflow over the wings in order to restore control over your aircraft. Try to pitch the nose forward in order to reduce the angle of attack of the wings. As your aircraft begins to recover, be extremely gentle in your stick movements until you've regained full control.

Dealing With Red-Outs and Blackouts

Here too you lose control over your aircraft, but with red-outs and blackouts the pilot, not the plane, has been pushed beyond tolerance. You must wait until you regain consciousness before you can recover stick and rudder control.

Flight Controls - Selecting

Air Warrior supports a wide array of Joysticks ,Rudder Pedals , and Throttles .

If you do not have a joystick, you can use your mouse as your primary flight controller. You cannot, however, use your keyboard in this role. You can use your keyboard as your secondary controller - throttle, flaps, landing gear, rudders, etc.

From the setup hangar, click on the mechanic's clipboard. Then choose Controls. You'll then get a screen where you can select your joystick, throttle, and rudder pedals. Just click on the text window below each control screen and select the device you have installed on your computer. A picture of the selected device will appear.

If you use the right mouse button menu, select Setup and you'll go directly to the Controls screen.

After you've selected your controls, click the Test and Calibrate button.

Note: If you use a joystick and/or rudder pedals, you will need to install a Joystick Driver to support it.

Flight Controls - Configuring

Configuring Your Controls

You can setup your joystick and other flight controls anywhere in the Air Warrior program, except inflight. The most obvious route is through the Setup Hangar on the Main Menu . Setup is also available from the right mouse button menu.

NOTE: If you do not have a joystick, you can use your mouse as your primary flight controller. You cannot, however, use your keyboard in this role. You can use your keyboard as your secondary controller - throttle, flaps, landing gear, rudders, etc.

From the setup hangar, click on the mechanic's clipboard. Then choose Controls. You'll then get a screen where you can select your joystick , throttle , and rudder pedals . Just click on the text window below each control screen and select the device you have installed on your computer. A picture of the selected device will appear.

If you use the right mouse button menu, select Setup and you'll go directly to the Controls screen.

Once you've selected your controls, click on the Test and calibrate button. Select the appropriate calibration routines and go through them. After you've calibrated your stick, you should see a green cross in the center of the black test screen. If you've calibrated rudders, you will see a green line in the rudder test box - a narrow, rectangular black area below the joystick test box.

Setting the Deadband

If the green cross or green line move when you're applying no control input to your rudder or stick, move the deadband slider for the appropriate device to the right. Deadband controls are in the upper right hand side of the calibration dialog box. Increase deadband until the green cross or line is still.

As a final check, if you have a stick with a hat switch, find the small black box with the green square in the center, to the upper right of the joystick test box. Move the hat around. The green square should turn into a line, pointed in the direction you've moved the hat. Also, check the green line for the rudder when you move the hat. If it moves, then increase rudder deadband still further.

Damping

Whereas the deadband reduces control sensitivity over the initial portion of a device's movement range, the damping slider reduces control input sensitivity over the entire range of device movement. Some control devices generate "noise" meaning that they can generate unintended or exaggerated inputs. Increasing your damping can help minimize these effects.

Calibrating Your Throttle

There are two fundamental types of throttles used in computer flight sims: a wheel or lever located on the joystick or control yoke, and dedicated, multifunction throttle devices such as the ThrustMaster Weapons Control System. The former type can be calibrated in the Air Warrior program - just click Calibrate Throttle and go through the routine. However, the latter type must

be calibrated using software that comes with the device. When you select a throttle that requires separate calibration software, the Calibrate Throttle button in Air Warrior is unavailable.

Joystick Scaling - Scale Stick Inputs Button

Whereas the deadband controls joystick sensitivity over the initial portion of its range of travel, and damping adjusts sensitivity uniformly over the entire range of the stick, joystick scaling allows you to control stick sensitivity over specific portions of the stick's travel.

You can change sensitivity on the pitch axis of your joystick. Your roll axis is lateral movement of the stick; the pitch axis is forward/backward stick movement. Players want roll response to be as crisp as possible, thus there is no sensitivity option on this stick axis. Reducing pitch sensitivity, however, helps many pilots control the G forces created during high speed maneuvers. If you don't intend to fly under full realism, you'll probably want to use the default sensitivity settings.

To reduce stick sensitivity, you can either move the realism slider to the right, or you can custom tailor your sensitivity range. To do so, click on the upper line corresponding to the portion of the stick's range you want to change. The line is divided into ten segments, each representing 10% of the stick's total range of movement. Thus, the portion of the upper line to the far left represents the first 10% of your joystick's movement. By holding down the left mouse button and dragging the line down, you reduce the stick's sensitivity over that portion of the sticks range of travel.

Joysticks and Sound

There is a strong interdependency between the joystick and sound in Air Warrior. In particular, sound makes a significant impact on joystick calibration on most systems. It may be necessary to calibrate your joystick in Air Warrior even though you have already calibrated it in the Control Panel. This is usually just fine tuning, but it's always recommended.

If you calibrate with sound enabled, the joystick may go out of calibration in flight if you subsequently elect to disable sound. Likewise, if you calibrate with sound disabled, you will need to recalibrate if you later enable sound. Recognizing this problem, sound is playing in the joystick calibration screens, albeit at the lowest possible level, unless you've decided beforehand to disable sound. Players who have boosted the input gain on their sound cards will hear an aircraft engine running when they go to calibrate their controls. This is not a bug; it's not a feature either; rather, it's an odd necessity.

Joystick Drivers

Although Air Warrior may be executed with only a mouse, a joystick is recommended to fly Air Warrior. To use a joystick in Windows, you need to install a joystick driver.

We have tested joysticks under Windows 3.X using the IBMJOY driver, available for download from a link to our web page (http://www.kesmai.com). For Windows 95, you will need the VJOYD driver, which is distributed with Windows 95.

Joystick Driver Installation for Windows 3.1x.

The procedure for installation and setup of IBMJOY is as follows:

- Download IBMJOY.ZIP, and unzip it into a directory.
- From the Control Panel, select Drivers.
- Select Unlisted or updated driver
- On the OEM Driver dialog, enter the driver directory path and click OK.
- In the list of OEM drivers dialog, select "Driver for Joystick", and click OK.

It can be setup to support either 2-axis or 3-axis logical devices. If set-up for 2-axis, it will support up to two devices, or a total of 4-axis.

How to set-up your driver:

If you have a joystick and rudder pedals (with or without the throttle), you have two, 2-axis devices.

If you have a joystick and a throttle (or a ThrustMaster FCS or a Wingman Extreme), you have one, 3-axis device.

If you have only a joystick, you have one 2-axis device.

Joystick device inputs are divided into three types: resistance, button, and keyboard. The resistance inputs are the two axis of the joystick, the rudder, the throttle, and sometimes the view switch (see ThrustMaster FCS). In the simplest case, the button inputs exactly match the buttons on the joystick. In some cases, such as CH joysticks, the button inputs may be encoded such that more than the usual four can be supported. On some joysticks, and most throttles, some or all the buttons are actually sent as key inputs or macros. These will have a separate keyboard connector.

LIMITATIONS

The IBM PC joystick driver associates two buttons with the first joystick device and two buttons with the second joystick device. This means that if you do not have rudder pedals, you may not be able to read all the buttons on your joystick. This affects any typical 4-button joystick, and is a particular problem for those CH Pro joysticks which use coded button inputs for the view switch.

In some cases, if you do not have a throttle, the driver will not recognize the rudder pedals. In particular, in a combination of a ThrustMaster RCS with a ThrustMaster FLCS or a SunCom Eagle, the RCS will not work.

Windows 95

The required Windows 95 joystick driver, VJOYD, is provided with Windows 95, and will be installed when your sound card is auto-detected. Users of separate game cards may have to perform the installation manually.

How to Setup Your Driver

The Windows 95 joystick setup is much more intuitive than in earlier versions of Windows. Go to the Control Panel and find the joystick applet. Normally you just select the option that most closely matches your hardware. One exception is the ThrustMaster FCS, and compatible sticks, which sometimes work better with the hat as a third axis, rather than as a POV switch.

It is important that you calibrate and test your joystick in the Control Panel. If it does not work there it probably will not work correctly in Air Warrior. If you are treating your FCS hat as a third axis, be sure to move it to all possible positions when it asks you to calibrate your throttle, odd as that sounds.

If you have a joystick, a throttle (or a ThrustMaster FCS or a Wingman Extreme), and rudder pedals, you have two 2-axis devices. Set-up joystick 1 and joystick 2 as 2-axis, 2-button joysticks.

If you have a joystick and a throttle (or a ThrustMaster FCS or a Wingman Extreme), you have one 3-axis device. Set-up joystick 1 as a 3-axis, 4-button joystick.

If you have only a joystick, you have one 2-axis device. Set-up joystick 1 as a 2-axis, 4-button joystick.

Do not use the ThrustMaster Flight Control System option. If you do, your hat switch will not work.

Do not check the rudder option. If you do this, rather than following the instructions above, your rudder will not work.

LIMITATION

There is no joystick driver option which is compatible with Windows 3.x that will support a 2-axis joystick with rudder pedals. If you do not have a throttle (or a ThrustMaster FCS or a Wingman Extreme), you will not be able to use your rudder pedals, odd as that sounds.

NOTE - This assumes running our Windows 3.1 compatible version on Windows 95. A future Windows 95 version will greatly simplify joystick setup and resolve the limitations.

Joysticks and Sound

There is a strong interdependency between the joystick and sound in Air Warrior. In particular, sound makes a significant impact on joystick calibration on most systems. It may be necessary to calibrate your joystick in Air Warrior even though you have already calibrated it in the Control Panel. This is usually just fine tuning, but it's always recommended.

If you calibrate with sound enabled, the joystick may go out of calibration in flight if you subsequently elect to disable sound. Likewise, if you calibrate with sound disabled, you will need to recalibrate if you later enable sound. Recognizing this problem, sound is playing in the joystick calibration screens, albeit at the lowest possible level, unless you've decided beforehand to disable sound. Players who have boosted the input gain on their sound cards will hear an

aircraft engine running when they go to calibrate their controls. This is not a bug; it's not a feature either; rather, it's an odd necessity.

Game Ports

Most joystick vendors now recommend the use of a dedicated speed-controlled game card on fast PCs, such as Pentiums. If you use the game port on most typical sound cards, you may not be satisfied with the results. Common problems include excessive noise or an inability to sense part of the right or back movement of the joystick. The Air Warrior controls calibration attempts to compensate for such problems, but the best solution is to use the best hardware.

Dedicated Game Ports in Windows 95

Windows 95 often has problems with auto-detecting game cards. The usual symptom is the joystick buttons work but the joystick does not. One solution is to uninstall the driver for the game port on your sound card and manually install the driver for your game card using Add New Hardware.

Both ThrustMaster and CH Products have additional help on their web sites.

Joystick Information and Support on the Internet

ThrustMaster

http://www.thrustmaster.com

CH Products

http://www.chproducts.com

SunCom

http://www.xnet.com/~reno/suncom/suncom.html

Joysticks

Generic 2-Button Joystick

The Generic 2-Button Joystick can be any standard joystick device with at least2 buttons that are not programmed to send keyboard commands. Any other buttons or switches which are programmable will work normally; any other buttons or switches which are not programmable will be ignored.

ThrustMaster XL

The XL is functionally equivalent to the FCS. See below.

ThrustMaster Flight Control Stick (FCS) or Pro Flight Control Stick (PFCS)

Castle Switch

The Castle Switch controls views. There are two sets of views, toggled from one set to the other by the pinkie switch.

Set 1 Forward: up/forward view

Left: left view Right: look right

Back: back view

Set 2 Forward: up view

Left: left/back view Right: right/back view

Back: back/up view

Thumb Buttons

The upper thumb button, near the castle switch, is your bomb release switch. The middle thumb button deploys dive brakes on planes equipped with them (P-38 Lightning, F4U Corsair, F-86, and MiG-15).

Trigger Button

The trigger button, as you might imagine, fires your guns.

The TM FCS in Windows 95

In Windows 95, the FCS hat may be treated as either a POV switch or as a third analog axis. Although the POV switch may seem to be the more obvious choice, you may find that it works better in Air Warrior as a third axis. Try this if you find that some of the views will not work.

CH FlightStick Pro

The FlightStick Pro has a trigger, 3 buttons, and a 4-way castle switch. It is not a programmable joystick.

The FlightStick also has a rotary throttle control. Select the Generic Throttle Control to use it.

Due to limitations of the standard Windows joystick driver, the castle switch and two of the buttons on the FlightStick Pro will be unusable under versions of Windows prior to Windows 95, unless you have rudder pedals, or a CH Pro Throttle.

CH Combat Stick

The Combat Stick has 2, 4-way switches, 5 buttons, and a trigger. It is not a programmable joystick. Air Warrior currently supports only 4 buttons (including the trigger) and one 4-way switch. The trigger and any 3 buttons may be used when calibrating the 4 button functions. The top 4-way switch is normally used for view control, but you may choose either.

Used in conjunction with the CH Pro Throttle, this becomes a programmable joystick and all buttons and switches become available.

The Combat Stick also has a rotary throttle control. Select the Generic Throttle option to use it.

Due to limitations of the standard Windows joystick driver, the 4-way switch and two of the buttons on the Combat Stick will be unusable under versions of Windows prior to Windows 95, unless you have rudder pedals, or a CH Pro Throttle.

CH Fighter Stick

The Fighter Stick has 4, 4-way switches, a trigger, and three buttons. The 4-way switches are programmable using the CH utilities.

The Fighter Stick also has a rotary throttle control. Select the Generic Throttle Control option to use it.

Due to limitations of the standard Windows joystick driver, two of the buttons on the Fighter Stick will be unusable under versions of Windows prior to Windows 95, unless you have rudder pedals, or a CH Pro Throttle.

Gravis Firebird/Phoenix

The Phoenix is a fully programmable control system with a joystick, throttle, and rudder, two triggers, and 22 buttons. We recommend that you start with the programming in airwar.phx .

Air Warrior assumes that two controls are programmed as joystick buttons 1 and 2. Out of the box, the Phoenix has the lower and upper trigger programmed as joystick buttons 1 and 2, respectively. All other buttons should be programmed to keyboard commands.

The throttle may be programmed to be analog or key mapped. Out of the box the throttle will be analog. Select the Generic Throttle Control to use the analog throttle.

The rudder may be programmed to be analog or key mapped. Out of the box the rudder will be analog. Select the Generic Rudder Control to use the analog rudder.

SunCom Raptor

This stick will operate with Air Warrior much the way the CH Pro does.

SunCom Talon

This joystick has 4 buttons, a 4-way castle switch, and a 4-way hat switch. The buttons may be treated as joystick buttons or mapped to the keyboard. The 4-position switches are strictly

mapped to the keyboard.

Air Warrior assumes that the buttons are mapped to the keyboard (not joystick mode). You should use the key mapping test rather than the button test to verify their operation.

Follow the directions in the SunCom manual to program the Talon. If you prefer to use the buttons in joystick mode, select the Generic Joystick option.

The SunCom joysticks are not fully compatible with the ThrustMaster WCS-II or RCS.

SunCom Eagle

The Eagle is similar to the Talon but has expanded programmability. Use the SunCom utilities to program the Eagle.

Logitech Wingman Extreme

The Wingman Extreme has 4 buttons and a 4-way hat switch. It is not programmable. Functionally, it is a clone of the ThrustMaster FCS and is compatible with the WCS-II and RCS.

Microsoft Sidewinder Pro

The SideWinder 3D Pro is a multi-functional controller with a joystick, view switch, throttle, rudder, eight buttons. The twist axis of the stick is the rudder control. It is not programmable. It supports three mode of operation: ThrustMaster emulation, CH FlightStick Pro emulation, and digital.

When used in ThrustMaster emulation mode, select an FCS and RCS. The throttle slider and four base buttons will not function. The view switch is a 4-way 4-position hat switch.

When used in CH FlightStick Pro emulation mode, select a CH FlightStick Pro, Throttle, and Pedals. The four base buttons will not function. The view switch is a 4-way switch.

The digital mode is only available for Windows 95 and is only supported by the Window 95 joystick DLL. When used in digital mode, select a Microsoft SideWinder 3D Pro, generic throttle control, and generic rudder control. Up to four of the eight buttons are currently supported by Air Warrior. Air Warrior currently treats the 8-way view switch as a 4-way switch.

Joystick Information and Support on the Internet

ThrustMaster

http://www.thrustmaster.com

CH Products

http://www.chproducts.com

SunCom

http://www.xnet.com/~reno/suncom/suncom.html

Throttles

Keyboard/mouse

The keyboard and mouse are the default throttle control. Moving the mouse forward and back with the right button depressed will move the throttle, as will the C and V keys.

Generic Throttle Control

The Generic Throttle Control is any standard throttle input device. This could be a wheel or slider attached to the joystick, or a stand-alone device not discussed below.

ThrustMaster WCS-I (Weapon Control System Mark I)

The WCS-I is throttle designed especially for use with the FCS. This is purely a keyboard emulator and is not connected to the game port. This is not a programmable device.

Since the WCS-I is not connected to the joystick or rudders, there should be no compatibility problems.

ThrustMaster WCS-II (Weapon Control System Mark II)

The WCS-II is a throttle designed especially for use with the FCS. It has 6 buttons and 1 rocker switch, all of which are programmable. Use the ThrustMaster utilities and the AW20WIN.ADV file distributed with Air Warrior to program your WCS-II.

If the WCS-II is used with the FCS, red throttle rocker switch should be set to digital and the black hat rocker switch should be set to analog. When properly programmed, throttle movement will send keyboard commands and hat movement will be passed through normally. In this configuration the WCS-II will not show up as an analog throttle on the test and calibrate dialog, but you should see the key inputs.

The WCS may also be used with the FLCS. The WCS-II may also be used as a normal analog throttle. In this case, set the red throttle rocker to analog and the black hat rocker to digital. If you joystick is an FCS, you will have to create a new WCS-II programming file to program key commands for the hat. In this case you should select one of the generic stick types, rather than FCS, and you will not see the hat switch on the calibrate and test dialog.

The WCS-II makes up to three joystick buttons programmable. The trigger will be passed through normally but the other buttons will be programmed with key commands. Only the trigger will show up as a digital input on the calibrate and test dialog.

Some users prefer to cable their WCS-II to a second game port and the keyboard, so that it functions as a keymapped device but does not affect the operation of their stick and/or rudder pedals. This may be recommended if the other devices are not ThrustMaster products and may not be compatible with the throttle. In this case, you should select "keyboard/mouse" as your throttle option and program the WCS-II as you would for use with the FCS.

The WCS-II is not fully compatible with the CH Pro joystick. If the CH Pro is connected to the joystick input on the WCS-II, the buttons and 4-way switch will not function correctly. The WCS-II may be used with the CH Pro only if it is used as a purely kemapped device, as described above.

WCS MkII Default Key Assignments

The following are the WCS assignments. You can, of course, edit these if you wish by using the Thrustware that comes with the WCS.

Three Position Switch

Forward: radar view Middle: normal cockpit view Back: text buffer

Buttons 1-6

Button 1: start/stop engine Button 4: raise flaps one notch

Button 2: autopilot Button 5: lower flaps one notch

Button 3: raise landing gear Button 6: gun camera on/off

ThrustMaster TQS (Throttle Quadrant System)

The TQS is a throttle designed exclusively for use with the FLCS. It has buttons, switches, and a track ball, all of which are programmable. Use the ThrustMaster utilities to program your TQS and FLCS.

The TQS can only be used with the FLCS, and requires an FLCS to function.

CH Throttle

The CH Throttle has a 4-position switch, a rocker switch, and 6 push buttons, all programmable. Use the CH utilities to program the Throttle.

CH Pro Throttle

The CH Pro Throttle has 4, 4-way switches and 4 buttons, all programmable. In addition, it makes the buttons on any CH Product joystick programmable. Use the CH utilities to program the Pro Throttle.

Rudder Pedals

Keyboard

The default rudder control device is the keyboard.

Generic Rudder Control

The Generic Rudder Control is any standard rudder input device. This could be a wheel or slider attached to a joystick, or a stand-alone device not discussed below.

ThrustMaster RCS (Rudder Control System)

The RCS is a rudder pedal system designed for use with the ThrustMaster joysticks and throttles.

CH Pedals

The Pedals are designed for use with the CH joysticks and throttles.

CH Pro Pedals

The Pro Pedals differ from the standard pedals in that they have toe brakes. Air Warrior does not, at the moment, support the toe brake function of most CH pedals, mostly because the game allows you to steer on the ground with your rudder pedals rather than with differential braking.

Cockpit Display

This governs several in-cockpit viewing options.

Instruments

An artificial horizon shows your orientation in relation to the ground. The stick box indicates movement of your flight control device. You can choose one or the other.

View

This controls how much cockpit is displayed. Full shows all cockpit view details; partial removes canopy obstructions from your forward/up, up, and back/up views.

Distant Planes as Ts

Normally, Air Warrior renders distant planes as dots. For people having a difficult time seeing these dots, this option will show distant planes as T shaped icons.

Track

This option governs how your tracking icons are rendered. When an aircraft is within 5000 yards of you, an icon representing it will appear above the screen to show its relative position, and a matching icon will appear on one side of your screen next to a read out of the plane's distance from you.

Icon

This renders icons as graphic symbols.

Numbers

Icons will be rendered as numbers.

Invert

This will place icons or numbers in a small colored box and render them in reverse video.

Gunsight

Lead Computing Optical Sight (LCOS)

Selecting this option enables your Lead Computing Sight (LCS). See the Gunnery section for an explanation of how the LCS works. The color you select for your LCS, no matter if you use the sight or not, will also be the color of your CCIP dive bombing sight (see Dive bombing section).

Fixed

This draws a fixed diamond for your gunsight.

Boresight

The Boresight is a fixed centerpoint in your gunsight.

Detail Level

This determines how much world detail the Air Warrior program will draw inflight. The lower your detail setting, the higher your frame rate. You can also choose to go to a lower detail level inflight by using the view mode keys (numbers 1-4 on your keyboard).

If you wish to pick and choose your detail options, select Custom and you'll get a list of all your detail choices.

Custom Detail

To improve frame rate in Air Warrior, you may wish to reduce the amount of detail the program draws inflight. From the Mechanic's Clipboard in the setup hangar , off of the main menu (opening airfield screen) , choose cockpit display . Then, under Detail, you can choose low, medium or high. If you'd prefer to select detail options individually, choose Custom. These are your options.

- Mountain face textures - they give you a better sense of how close you are to a mountain.
- Terrain shadows - the shadows cast by terrain objects and features.
- Plane shadows - the shadows cast by aircraft.
- Runway markings - the while lines on runways.
- Horizon shading - the gradient white-to-blue shading along the horizon. Of all the detail features, this one consumes the most video horsepower.
- Plane shapes - the complex aircraft shapes you see when you're close to another aircraft or vehicle.
- Plane markings - insignia (e.g. German crosses on Messerschmitts) on aircraft.
- Ground texture - the patchwork texture on the ground.
- Damage effects - pieces/parts breaking off of aircraft receiving damage.

Sound

You can adjust your sound in the Setup Hangar by clicking on the loudspeaker, or though the right mouse button menu. Options here are to turn sounds on or off, or to select specific sounds - Custom - to turn on or off. You can also adjust the overall volume and test the sound level.

Custom Sound

This option allows you to turn on/off specific inflight sounds. If you're having problems with the sound in Air Warrior cutting out, or causing WAIL32.DLL errors, you may want to disable some of the sounds effects from the rather lengthy list.

- Gear - landing gear up/down sound
- Flaps - raising/lowering flaps
- Guns - rather obvious
- Stall - the stall horn, when your airspeed does not support your angle of attack
- Oil - warning sound when your oil pressure is too low
- Explosions - aircraft exploding, bombs landing
- Crash - played when nearby aircraft crash
- Bombs - the whistling sound when you drop bombs
- Bail - a series of sounds that play when you bail out of your aircraft
- Hits - played when your aircraft is hit by gunfire
- Engine - your aircraft's engine
- Wind - background sound of the relative wind as you fly
- G-stress - currently disabled in the game, it will one day play when you stress your airframe
- Buffet - not a collection of entres, but the shaking of your aircraft as it approaches a stall; it too is currently disabled

Preferences

A broad variety of user options are lumped into the Preferences category.

Directories

This lays out the directory structure of the program - where your root directory sound files, cockpit art, films, and temporary subdirectories are located. The default structure is created by the installation program, but some users may wish to modify these.

Resolution

This determines the resolution of your flight window. If you run Air Warrior, for example, in 1024x768, the interface and conference room screens will be displayed in that resolution, but the resolution of the inflight window will be what you set here. You cannot set an inflight resolution higher than the resolution of your interface and conference room screens. In short, you setup your overall Air Warrior resolution in Windows, but choose your inflight resolution here.

Tooltips

Tooltips are those brief text boxes that tell you what an interface hotspot does. You can have them appear when your cursor is over a hotspot (an you can specify how long your cursor must be over a hotspot before the tooltip appears), appear all the time for all hotspots, or shut them off.

Guide

Guide are a series of text messages that talk you through the Air Warrior interface. You can turn them on or off here. You can also turn them on at any time, except inflight, using the right mouse button menu.

Clear Text Between Rooms

This will clear your text buffer online, when you move from one conference room to another.

Tooltips

Tooltips are those brief text boxes that tell you what an interface hotspot does. You can have them appear when your cursor is over a hotspot (an you can specify how long your cursor must be over a hotspot before the tooltip appears), appear all the time for all hotspots, or shut them off altogether. To see all tooltips on any screen, press the <ALT> key.

Directory Options

This lays out the directory structure of the program - where your root directory sound files, cockpit art, films, and temporary subdirectories are located. The default structure is created by the installation program, but some users may wish to modify these.

Resolution - Inflight

Resolution

This option under preferences determines the resolution of your flight window. If you run Air Warrior, for example, in 1024x768, the interface and conference room screens will be displayed in that resolution, but the resolution of the inflight window will be what you set here. You cannot set an inflight resolution higher than the resolution of your interface and conference room screens. In short, you setup your overall Air Warrior resolution in Windows, but choose your inflight resolution here.

Solo (Offline) Flight

Solo Flight - Solo Hangar on Main Airfield

Solo, or Checkride, provides you a way to become familiar with the aircraft of Air Warrior offline. You can also practice your bombing in this mode.

Selecting a Plane or Vehicle

One left mouse button click on the Solo hangar brings up four silhouettes representing World War II, World War I, Jets, and Vehicle selection categories. Click on one and you'll get the silhouettes for that group of aircraft or vehicle choices. You can hit <esc> at any time to exit these selection screens and return to the main airfield.

Selecting an Airfield, Fuel Load, and Bomb Load

Once you've made your selection, you will see a dialog that allows you to set your airfield, fuel load, bomb load, and type of bomb delivery. If you simply wish to take off in a plane and fly it around, the default country and airfield settings should be fine.

Bomb Delivery Mode

Options here are Fast, Accurate, or None. Fast allows you to deliver bombs without floating point calculations - a requirement if your computer does not have an FPU (Floating Point Unit, also known as your math coprocessor). 486/SX computers didn't have FPUs. 486/DX computers, as well as all Pentium processors, have FPUs built into the main processor. Accurate delivery mode employs your computer's FPU. None, of course, means that no bombs will be loading on your aircraft.

Continuous Flight

If you check this box, you will return to your original takeoff point, in your original plane with the fuel and bombs you had selected when you began your checkride, if you crash your airplane. This is useful if you want to test an aircraft's envelope, or practice divebombing at extreme dive angles, without having to go through all the initial checkride selections again after you crash.

Cockpit Artwork

Cockpit artwork is the interior art of the aircraft you're flying. Your cockpit instruments are generic so that you know where to find each gauge readily, no matter what aircraft you are flying. Cockpit artwork, however is very specific - it is based on photographs taken in existing examples of the actual fighters and bombers featured in the game.

If you downloaded Air Warrior, and have the minimum download package, you have cockpit art for the P-51 Mustang, and the A-26 Invader in 640x480 resolution. Cockpit art for other planes, including several high resolution examples, is available for download from online services that offer Air Warrior. You can also download cockpit art from our web site at http://www.kesmai.com.

Choosing the Use Generic Art option, when you select an aircraft for which you don't have specific cockpit art, will substitute artwork for the Mustang, if you've chosen a fighter, or the A-26, if you've selected a bomber.

If you have an Air Warrior for Windows CD ROM and you're getting the generic artwork message, you may not have installed the artwork on your hard disk. If you didn't perform a full installation, double check to make sure Air Warrior is looking for art on your CD. To see how your directories are setup, go to preferences, either in the setup hangar, or via the pop-up mouse button menu.

Not all the aircraft in the game have cockpit art in the higher resolutions (800x600, 1024x768). High res art for all the planes is in production now.

Aircraft or Vehicle Selection - Online

Aircraft selection, online, can only take place in an airfields's ready room . On the right wall you'll see a poster with an aircraft identification, 3-view silhouette. This shows you your last aircraft selection or the default selection (P-51 Mustang). One left mouse button click on the silhouette will bring up a complete list of the 3-views of planes available at that field. Click on one and you'll get the silhouettes for that group of aircraft or vehicle choices. You can hit <esc> at any time to exit these selection screens and return to the main airfield.

Selecting an Airfield, Fuel Load, and Bomb Load

Once you've made your selection, you will see a dialog that allows you to set your airfield, fuel load, bomb load, and type of bomb delivery. If you simply wish to take off in a plane and fly it around, the default country and airfield settings should be fine. If you've selected a multi-engine bomber, you can also broadcast a bomber crew request .

Vehicle Selection

To select a vehicle instead of an aircraft, click the folder on the situation map table nearest the 3-view poster. This will bring up the 3-views of available vehicles. Once you select one, you can specify your fuel load or whether you wish to recruit a crew to join you.

Film Playback

Film Room

Playback and review of gun camera films is usually done off-line. From the Main Menu, click on the Film sign just beneath the control tower. This will bring up the Film Playback Window. Select the film you want to view, and click on the "Play" button to begin playback. Once the film is running, you may enter any of the following keyboard commands:

Commands During Viewing:

p	Pause film
n	External view mode
F1	Help
F3	Rewind to the last break
F4	Fast-forward to the next film break
F5	Decrease film speed
F6	Increase film speed
F7	Target Selector
F8	Enter the film
F9	Show position of the original camera plane
F10	Radar/Map display
ESC	End film playback
[and]	Zoom in/zoom out

External View Mode

Pressing the <n> key during a film allows you to view the action from outside your plane. You can use the normal in-flight view keys or your joystick or mouse to examine the action from various angles, and the bracket keys ([and]) to zoom in or out.

Target Selector

One problem most new players have is keeping track of an intended victim in a target-rich environment. The film Target Selector allows you to highlight a plane so that you can more easily follow its movements during a fight.

Hitting the <F7> key during playback activates the Target Selector. The first visible target is surrounded by a red box and its tracking information is displayed in reverse video. Pressing <F7> again selects the next visible target, and hitting <F7> twice in quick succession turns the Target Selector off.

Entering Films

You can enter the film and gain control of your plane by hitting the <F8> key. You will be able to shoot at aircraft in the film, but the recorded participants will follow their destined flight paths and the film will end when it did originally. Also, if there are breaks in the film - moments when you stopped and restarted the film while you recorded it - you will be returned to conventional playback. Press <F8> again if you wish to resume flying within the film.

If you enter a film but want to keep track of your original flight path when you recorded it, press <F9>. This will create a camera plane that follows your original route and maneuvers . It will have an icon labeled CAM.

Adjusting the Speed of Film Playback

The Air Warrior film viewer can accelerate playback by up to ten times, or slow down playback to as little as one tenth original speed. The <F6> key speeds up playback; <F5> slows it down. The degree of acceleration or slow motion depends on how many times you press the <F5> or <F6> keys.

Saving Films

When you complete a flight in which you've made a gun camera film, Air Warrior prompts you to enter a name for a film. If you don't enter a name, a default one is assigned, beginning with FILM0000.CAM, and subsequent films during a game session receive sequential numbers (FILM0001.CAM, FILM0002.CAM, etc.). When you exit the program, the next time you run Air Warrior and start the gun camera, the first film will be recorded as FILM0000.CAM, overwriting any previous film by that name. Thus, if you wish to save a film, and you did not elect to rename it during the game session during which it was made, be sure to rename it before you start up the program again.

Online Arena Selection Screen

Online Arenas

Air Warrior offers you two types of arenas - relaxed or full realism - and three types of theaters - Europe, Pacific, and World War I. If you've launched Air Warrior from an online service that features the game, clicking on any of the three aircraft at the top of the Main Menu Screen will bring you to the Arena Selection Screen. There you will see a list of available arenas and the number of players currently in each arena.

Find User

This allows you to see if a player you know is online in an Air Warrior arena, and where you can find him. Click on the Find User button, and enter the Custom Player ID (CPID) of the player you wish to find.

Go to Arena

Click on this button to go to the arena you've highlighted on the arena list.

Return to Main Airfield

Clicking this button takes you back to the main menu and logs you off of the Air Warrior host.

Relaxed Versus Full Realism

Relaxed realism arenas have several realism features disabled, such as blackouts, red-outs, accelerated stalls, and spins. This mode does, however, have realistic limits. Planes are subject to induced drag, changes in performance with altitude, limits on G loading, and so forth. Also, aircraft are not allowed to pull enough G's at low speed that would result in an accelerated stall.

Many players prefer relaxed realism because they want more game and less of a simulation. As one player put it, summarizing this matter of taste, "Realism is exciting but I'm not sure that it's fun." For the more hard-core simulation fan, however, full realism adds immensely to the veracity of the simulation.

Right Mouse Button Menu in the Arena Selection Screen

- Refresh - this updates the information on the screen, useful if you want to see changes to an arena's player count.
- Reset column widths - this allows you to move the grid lines and format the screen to your tastes and system fonts.
- Setup - this provides you access to the complete array of setup options: flight controls, cockpit view options, and user preferences.
- Tooltips - this allows you to turn tooltips on or off.
- Show Guide - this turns on/off a screen-by-screen walk through of the Air Warrior program.
- Help - this opens the comprehensive help file.
- About - brings up the version number of your Air Warrior software.
- Return to main airfield - this logs you off the host and brings you back to the Air Warrior main menu.

- Exit Air Warrior - this allows you to exit the program.

Player List

Conversing in the Air Warrior Environment

Flexible conversations are a mainstay of the Air Warrior environment. Upon entering any room, you are immediately placed in communication with all present, and you can see who's there by looking at the player list on the right side of the screen. "Talk" to other players by composing your message in the outgoing message area, at the bottom of the screen, and then press <ENTER> to make yourself heard.

Your message will appear in the incoming message area of all the other players in the room, identified by your handle. For example:

Blue Baron to All: *So, what's it to ya?*

In a room with only two or three other players, this mode of conversation is fine. Remember, talking to the ALL group is the same as talking out loud to everyone in the room. If the room gets crowded, you may, however, want to "keep your voice down" and converse privately with just a few people at a time.

Private Conversations

Rather that speak to everyone in a room, you can send messages that will be seen only by designated individuals or groups.

To speak privately to a player in the room, click on his entry on the player list with your left mouse button. Then, using the right mouse button menu, select Group Ops, and then Create Group. Or you can select him with your left mouse button, hold the button down, and drag his entry to the Group List below. Either way, his entry on the private list will be automatically highlighted. Any messages you type and send, while his entry is highlighted, will go only to him.

To resume conversation with everyone on the room, simply click on All. If you wish to resume your private conversation, highlight the entry on the Group List of the player you wish to communicate covertly with, and you can send your messages to only him once again.

Private Groups

To create a group of players you wish to talk with privately, hold down your Ctrl key and click on all of the entries on the player list you wish to add to the group. Then, using your right mouse button, select Group Ops, and Create Group. Or, after selecting the players you wish to have in your private group, you can simply hold your left mouse button down and drag them all to the private list. You'll then see a new entry in the private group area of the player list: Group 1. To speak to everybody in that group, click on it. All messages you send while the group is highlighted will go only to them.

As you create several private groups or individuals, a scroll tool will appear in the Group List if the number of groups exceeds the display area.

Whenever you're sending a private message, be it to a designated group or individual, your message will be formatted like this:

Blue Baron [private]: *So, what's it to ya?*

Temporary Private Groups

By default any private group you create is temporary, meaning that the group designation disappears once you leave the room.

Permanent Private Groups

You may wish to create permanent groups, particularly if you belong to a squadron. That way, you always have the option of speaking privately with only the members of your squadron who are in the room with you, even if you're in a public area, such as the Officers Club.

To make a private group permanent, highlight the group with your left mouse button. Then click your right mouse button. You'll see the menu item, Temporary Group, with a check mark in front of it. Select it, and the check mark disappears, thus making the highlighted group permanent. Also, if the Temporary Group option is turned off, all subsequent groups you create will be permanent as well.

Deleting Groups

To delete a group, highlight it with your left mouse button, select Group Ops from the right mouse button menu, and click Delete group.

Adding/Removing Players to Existing Private Groups

To add a player to an existing private group, click on the group you wish to add players to. Then, holding down your Ctrl key, click on the player(s) you wish to add.

You can also click on a private group, and bring up the right mouse button menu. Select Group Info, click Add, and enter the Custom Player IDs (CPIDs) of the player(s) you wish to add to your private group. Using this method also allows you to add players to your private group who may not be online at the time. You can also remove players from private groups using the Group Info feature.

Uploading/Capturing Text

If you wish to capture the text of conference room conversations, or upload text (prepared mission orders, for example), click on the incoming text buffer with your *right* mouse button. This brings up the upload or capture text menu options.

If you're capturing text, you'll be prompted for a file name for the capture file. If you're uploading text, you'll be prompted for the name of the text file you wish to send. The text will then appear on the screen as if you had typed each line.

NOTE: Uploaded text file can be a *maximum* of 2k in length (2000 bytes). The text will appear to the players in the room you were setup to talk to when you initiated the upload. For instance, if you're setup to talk to All, the uploaded text will go to all; if you have a private group highlighted when you upload text it will go to them. This may seem all too obvious, but there are certain to be cases where someone sends mission orders to All that were intended for a private squadron group.

Right Mouse Button Menu from the Player List

- Player info - this tells you the players Internet or online service email address.
- Player score - brings up a score summary for the player.
- Group Ops - this allows you to create discrete groups that you can communicate with privately.
- Sort - you can sort the player list by handle, ID, or country.
- Setup - this provides you access to the complete array of setup options: flight controls, cockpit view options, and user preferences.
- Tooltips - this allows you to turn tooltips on or off.
- Show Guide - this turns on/off a screen-by-screen walk through of the Air Warrior program.
- Help - this opens the comprehensive help file.
- About - brings up the version number of your Air Warrior software.
- Exit Arena - this brings you back to the arena selection screen.
- Exit Air Warrior - allows you to exit the program.

Right Mouse Button Menu from the Group List

- Group info - tells you who is in the group, and allows you to add or delete group members.
- Delete group - allows you to delete a highlighted group.
- Temporary Group - when this option is checked, all private groups you designate, while this option is checked, will disappear when you leave the room.
- Setup - this provides you access to the complete array of setup options: flight controls, cockpit view options, and user preferences.
- Tooltips - this allows you to turn tooltips on or off.
- Show Guide - this turns on/off a screen-by-screen walk through of the Air Warrior program.
- Help - this opens the comprehensive help file.
- About - brings up the version number of your Air Warrior software.
- Exit Arena - this brings you back to the arena selection screen.
- Exit Air Warrior - allows you to exit the program.

Roster

Player Rosters are present in the Officers Club , Headquarters and Ready Room ; each Roster Board is a listing of who is present in that entire arena environment, along with pertinent information about the player (handle, Player ID, etc.). All Rosters show player information for all players present in the arena. Players are grouped by their country affiliation.

Right Mouse Button Menu in the Roster Screen

- Refresh - this updates the information on the screen.
- Reset column widths - this allows you to move the grid lines and format the screen to your tastes and system fonts.
- Setup - this provides you access to the complete array of setup options: flight controls, cockpit view options, and user preferences.
- Tooltips - this allows you to turn tooltips on or off.
- Show Guide - this turns on/off a screen-by-screen walk through of the Air Warrior program.
- Help - this opens the comprehensive help file.
- About - brings up the version number of your Air Warrior software.
- Exit Arena - this brings you back to the arena selection screen.
- Exit Air Warrior - as you might expect, this allows you to exit the program.

Situation Map

This shows you a map of the active arena. The map has a grid overlay designating sectors, 12 nautical miles across. Your country's airfields appear in your country's color. Damaged airfields in your country are yellow. Enemy airfields appear in the color of the country that owns them. Capturable airfields that are not owned by your country are red. Double clicking on an airfield, with the left mouse button, takes you to that airfield's Ready Room . A single, left mouse click gives you a comprehensive status report on the field. To get a complete list of airfields and their status, use the right mouse button menu.

You can move the map around using the triangles on each side of the map. Use the magnifying glasses on the lower left to zoom in and out.

Counters

You can gauge the relative strength of friendly and enemy forces in a given area, by observing the counters on the situation map. A small red square in the upper left hand corner means that an enemy plane is in that sector, though it does not give the position of the hostile plane. Yellow squares signify friendly planes. Larger color squares signify 10 enemy planes. Thus, if you want to find the action, take off from an airfield in the midst, or near, a sector with many counters, or high value counters, in it. If you care to survive the experience, make sure there are friendly counters there too.

Strategic Summary

This gives you two summaries, actually: a comprehensive list of all countries total sorties, victories, losses, and bombing strikes for the entire evening's action, and a summary of your country's strategic facilities and their status.

Right Mouse Button Menu in the Situation Map

- Display airfield list - this gives you a listing of all airfields in your country, along with their status.
- Toggle text window size - this will replace the artwork in the OC with a text buffer; quite useful if you have, for example, been away from your computer for a bit, and you want to catch up on the conversation.
- Setup - this provides you access to the complete array of setup options: flight controls, cockpit view options, and user preferences.
- Tooltips - this allows you to turn tooltips on or off.
- Show Guide - this turns on/off a screen-by-screen walk through of the Air Warrior program.
- Help - this opens the comprehensive help file.
- About - brings up the version number of your Air Warrior software.
- Exit Arena - this brings you back to the arena selection screen.
- Exit Air Warrior - this allows you to exit the program.

Airfield List

If you would prefer to simply have a listing of airfields, rather the graphical selection of the situation map , use the pop-up right mouse button menu from the situation map screen. This brings up a list box of airfields, along with the status of each.

Strategic Summary

This gives you two summaries, actually: a comprehensive list of all countries total sorties, victories, losses, and bombing strikes for the entire evening's action, and a summary of your country's strategic facilities and their status.

Radio Room

In the Radio Room, you may tune the airfield's radio and make radio announcements to, and communicate with, players in your country's aircraft and vehicles, and in other airfield Radio Rooms. You may also make radio announcements to, and communicate with, any players in the arena (regardless of country) whose radios are tuned to Channel 1. To get to the Radio Room, click on the radio in either a Ready Room or in Headquarters. When you enter the Radio Room you are tuned to channel 1. To tune to a different frequency, click on the radio and enter a different channel. Leaving the Radio Room - click on the Exit sign - returns you to the conference room you entered it from.

Officers Club

You will always go to the Officers Club when entering an arena. This is a general "conference area" for the arena, where players from all three countries can meet, talk, exchange ideas and gather information about each other, and about activities elsewhere in the arena. You can view the Player Roster and change countries here, too. Eight adjoining Officers Club rooms are available from Officers Club #1, for "private conferences."

Spy (change country)

There are three countries in Air Warrior: Country A, B, and C. When you play Air Warrior online for the first time, you are assigned a country randomly. If you wish to change countries, click on the Spy, standing at the bar at the Officers Club. You can only change countries once every 24 hours.

Flight jacket (set handle/callsign and CPID)

You have two things that set you apart from all the other pilots in the game: your handle (also known as your callsign), and your Custom Player ID (CPID). The former can be anything you'd like - so long as it's not obscene - but the latter must be a unique combination of up to 5 characters (either letters, numbers, or a bit of both). The host automatically assigns you a CPID but until you specify a handle, you show up as New User on the player list. To set your handle and changed your CPID, click on the flight jacket in the foreground of the Officers Club.

When you enter a CPID, the host checks to see if it's unique in the player database. If it's not, the host will inform you and you can try again. The combinations you have tried will appear in this dialog box.

Right Mouse Button Menu in the Officers Club

- Toggle text window size - this will replace the artwork in the OC with a text buffer; quite useful if you have, for example, been away from your computer for a bit, and you want to catch up on the conversation.
- Setup - this provides you access to the complete array of setup options: flight controls, cockpit view options, and user preferences.
- Tooltips - this allows you to turn tooltips on or off.
- Show Guide - this turns on/off a screen-by-screen walk through of the Air Warrior program.
- Help - this opens the comprehensive help file.
- About - brings up the version number of your Air Warrior software.
- Exit Arena - this brings you back to the arena selection screen.
- Exit Air Warrior - as you might expect, this allows you to exit the program.

Headquarters

Each country has its own Headquarters Room, which is accessed from theOfficers Club ; here, countrymen can discuss strategies, plan combat air patrols, and form squadrons. Players can check the Roster for their own score, the scores of their countrymen, and the cumulative scores of squadrons; both fighter and bomber information is posted. Each HQ also contains a Situation Map , which displays the current wartime situation, and allows players to select an airfield from which to fly. You also have access here to the Killboard where you can view player and team scores .

Right Mouse Button Menu in Headquarters

- Toggle text window size - this will replace the artwork in the OC with a text buffer; quite useful if you have, for example, been away from your computer for a bit, and you want to catch up on the conversation.
- Setup - this provides you access to the complete array of setup options: flight controls, cockpit view options, and user preferences.
- Tooltips - this allows you to turn tooltips on or off.
- Show Guide - this turns on/off a screen-by-screen walk through of the Air Warrior program.
- Help - this opens the comprehensive help file.
- About - brings up the version number of your Air Warrior software.
- Exit Arena - this brings you back to the arena selection screen.
- Exit Air Warrior - as you might expect, this allows you to exit the program.

Killboard

The killboard gives you information on scoring. The Air Warrior host assigns Scores for accomplishments in fighter combat and bombing, on an individual, squadron, and country basis. Scores are tabulated in the main arena and are reset every three weeks.

Scoring

Individual Scoring

You can examine the current scores for the online arena you're in, by going to Headquarters and bringing up the Killboard . Scoring is weighted to reward pilots who survive their missions. If you land after shooting down another aircraft, for example, you will receive full credit for the kill. If you get shot down, you will get only 25% of the points you would have earned had you survived.

Bailing out over friendly territory is worth one third credit, and ditching your plane (landing on something other than the runway) in friendly territory is worth half credit. Also, you'll get more points per kill if you survived your previous mission. This bonus grows as the number of missions you survive increases.

Finally, you gain more points for kills over enemy territory because usually they're more difficult than those made close to home.

Bomber scoring follows the same pattern of credit based on how your mission ends, but the survival streak bonus does not apply to bombing. Bombing, by its very nature, happens over enemy territory and, thus, there is no bonus for strikes over hostile lands.

Scores are tabulated and reset every three weeks.

Squadron and Country Scores

A squadron's score is simply the cumulative score of all members of a squadron. Similarly, the score for a country is the sum of all its pilots' scores.

Squadron Ops\Squadron Info

These file cabinets represent features that will be added at a later date. Air Warrior supports squadrons and these cabinets will assist players with squad nights and with gathering information on other squadrons.

Ready Room

Selecting an airfield on the Situation Map at Headquarters places you in the Ready Room for that airfield. In the Ready Room, you may confer with other players in the Ready Room, choose an aircraft or other combat vehicle and begin combat, assemble a bomber or vehicle crew , or return to HQ. The Ready Room, like HQ, has a Roster and Situation Map available. Each Ready Room has an adjoining Radio Room .

Aircraft Selection

Click on the 3-view, aircraft ID silhouette on the wall of the ready room to select an aircraft. You'll be presented with 3-views of all the aircraft available at that airfield. Move your mouse pointer over the silhouette you want - selected 3-views are presented in reverse video - and click on it to select it. You'll then see a fuel load and bomb load selection dialog. Enter the values you want and click Ok.

Vehicle Selection

Click on the appropriate folder on the table in front of the 3-view silhouette poster to choose a vehicle. One folder is for planes; one is for vehicles. As with aircraft selection, you'll then get a selection of vehicles that are available at your airfield. Click on the silhouette of the vehicle you want.

Right Mouse Button Menu in the Ready Room

- Toggle text window size - this will replace the artwork in the OC with a text buffer; quite useful if you have, for example, been away from your computer for a bit, and you want to catch up on the conversation.
- Change fuel/bomb load - this allows you to change your fuel or bomb load without having to reselect your aircraft.
- Setup - this provides you access to the complete array of setup options: flight controls, cockpit view options, and user preferences.
- Tooltips - this allows you to turn tooltips on or off.
- Show Guide - this turns on/off a screen-by-screen walk through of the Air Warrior program.
- Help - this opens the comprehensive help file.
- About - brings up the version number of your Air Warrior software.
- Exit Arena - this brings you back to the arena selection screen.
- Exit Air Warrior - as you might expect, this allows you to exit the program.

Keyboard Controls

Inflight Keyboard Controls

These controls work strictly from the keyboard, not the keypad:

8	Start/stop engine
7	War Emergency Power (WEP)
Semicolon (;)	Raise/lower landing gear (raise/lower dive brakes on the F4U Corsair - see spacebar for P-38 and jets)
Right bracket ( ])	Decrease LCOS range 100 yards
	Increase the level bombing bombsight magnification
Left bracket ([ )	Increase LCOS range 100 yards
	Decrease the level bombing bombsight magnification
c	Increase throttle by 7%
SHIFT + c	Full throttle
v	Decrease throttle by 7%
SHIFT + v	Minimum throttle
9	Turn gun camera on/off
f	Fire guns
b	Bomb release
Spacebar	Wheel brakes (dive brakes on the P-38 and jets)
1	Full view range (all objects visible)
2	Medium view range (default view - all but the most distant objects visible)
3	Short view range (only objects within a few miles can be seen)
4	Combat range (only immediate objects will appear, and horizon shading disabled)
5	Abridged range (no terrain detail whatsoever)

Keypad - Flaps and Rudder

*	Center the rudder
7 (home)	One notch of left rudder
9 (pg up)	One notch of right rudder
1 (end)	Raise flaps one position
3 (pg dn)	Lower flaps one position

Keyboard - Flaps and Rudder

s	Center the rudder
a	One notch of left rudder
d	One notch of right rudder
<	Raise flaps one position
>	Lower flaps one position

Function Keys - In-flight

F1	Help Screen

F2	Replace view with text buffer
F10	Turn radar screen/map view on/off

Radar Map Display

These apply only when viewing the radar map display:

Right bracket ( ])	Zoom out
Left bracket ([ )	Zoom in

Escape Key Commands

For these commands, press the following keys, followed by <ENTER> :

ESC + a	Arm bombs
ESC + e	Exit the plane (when online, you must be on the ground and stopped for this to work).
ESC + p	Parachute from your airplane. You must hit <ESC + p> again to pull the ripcord.
ESC + sd	Switch on the CCIP dive bombing sight.
ESC + sg	Switch to gunsight.
ESC + z	Switch to level bombing sight (medium and heavy bombers only).
ESC + oj	Toggle flight control between joystick and mouse.
ESC + t[channel]	Tune your radio to the specified channel (online play only - see the Radio Procedures section).
ESC + j[position]	Move to another position on bombers, or crewed vehicles. Available positions depend on the bomber or vehicle selected: <T>ail <U>pper <L>ower <C>hin <B>all <LW> Left Waist <RW> Right Waist <G>un (jeep, tank or flakpanzer) <D>river (to go from gun back to driver's position) <H>ull (hull gun in tanks or flakpanzers)

Views

Many keyboard controls can be used right from the keypad.

Keypad - Views

	8 (up arrow) - Look forward	
4 (left arrow) - Look left	5 - Straight up view	6 (right arrow) - Look right
	2 (down arrow) - Rear (mirror) view	

0 (ins key) - Look down, but only into the cockpit

Combination Views - Keypad

You can combine two or more keys to acquire various angle views. For example:

8+5	Forward/up view
0+6+2	Down/right/back
4+0	Down/left

Dozens of combinations are possible. Experiment while flying to find your favorites. Note: Some of the more esoteric view combinations do not have artwork, and will show your plane as a gray outline.

Keyboard View Keys

	G - Look forward	
H - Look left	K - Straight up view	L - Look right
	J - Look down	
	M - Rear (mirror) view	

The two and three key combinations (as on the keypad) are available here too.

Macros

Air Warrior supports recorded keystroke combinations (Macros) while in-flight or during film playback. Macros come in two forms: 'Timed', and 'Fast' playback. The first will execute at the rate it was recorded, while the second executes as fast as possible.

To record a macro, you MUST be in-flight, either online or off-line.

a) To Record a macro, press <CTRL+ALT+F19>. Follow the instructions displayed in the message window.

b) You first have to select the key or key combination that will trigger the macro. You may use any combination of keys including <CONTROL>, <ALT>, or <SHIFT>. The only combinations not allowed are <CTRL+ALT+F9> or <CTRL+ALT+F10>.

The macro program is ready to record as soon as you release all the keys. If you are recording a timed macro, the timer will not start until you press the first key.

c) Press <CTRL+ALT+F9> again to end recording.

If the key combination is already attached to an existing macro, the new sequence will replace the old one. If the new macro contains no key presses, then the old macro (if any) is erased.

d) If you run into major problems, delete the macro file (AIRWAR.MAC) and start again. If you can reproduce a bug, please send it to us!

Caveats

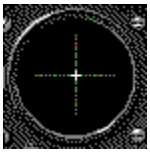
Pressing any key that initiates a macro while another macro is playing will terminate the running macro. You must hit the macro key a second time to start the new macro. Pressing keys while a macro is running can produce unusual results. This is due to interaction between the keys being "pressed" by the macro program, and those pressed by the user.

Be careful when assigning macro trigger keys. If possible, choose key positions that are not near an existing command key; for example, assigning a macro to the keyboard <9> key, which is adjacent the "start/stop engines" key <8>. Hitting the wrong key could have unpleasant results

Aircraft Instrumentation

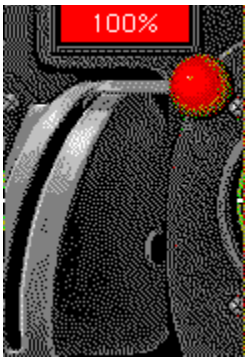
This is the main cockpit instrument panel for World War II fighters and bombers. For those of you familiar with aircraft cockpits, most of these gauges and controls will require little explanation. However, as with all simulations, some of these instruments are unique to Air Warrior or may be employed in a manner unfamiliar to you.

The instrument panel for a WWII aircraft.



The stick box reflects how much stick control you are applying. It's particularly useful in gauging pilot control movements when you're watching films.

When you enable the **artificial horizon**, it replaces the stick box.



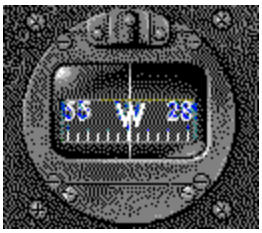
The **throttle lever** - shown here at full throttle.

This is your **altimeter** and it indicates how far above the ground you're flying. The "second," "minute," and "hour" hands show tens, hundreds, and thousands of feet, respectively.

The **warning indicator** lights are out in normal flight.

Your engine is suffering **oil starvation** due to negative Gs or inverted flight. Apply positive Gs to restore oil pressure. Oil pressure may be lost permanently due to battle damage.

Airflow over the wings is insufficient to sustain flight. Try to lower the nose to build speed and create better airflow. If the **stall** results in an uncontrolled spin, push the stick forward, apply rudder in a direction opposite the spin, and cut throttle.

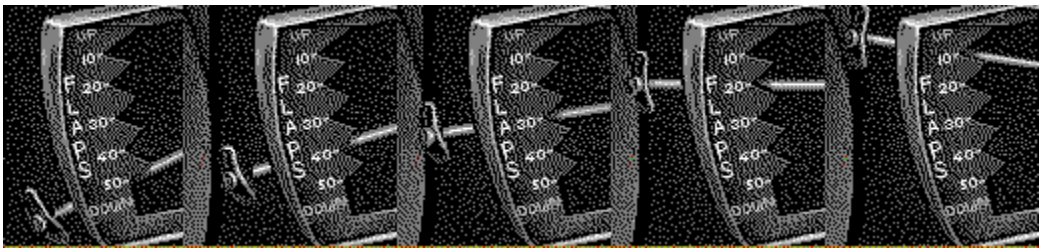


Your **compass** shows the direction you're flying.

This gauge shows your **climb or dive rate** in thousands of feet per minute.

This is your **airspeed indicator**. It gives readings in knots (1 knot = 1.14 miles per hour). You may select indicated airspeed (speed of air past your plane), or true airspeed (with respect to the ground). Jets have a digital display mach meter in their airspeed indicators as well.

Your **accelerometer, or G-Meter,** indicates how many positive or negative Gs you are pulling. In normal flight it will read 1 G.



Your **flaps indicator** shows whether your flaps are deployed and how many degrees they are deployed.

This indicates how much **rudder** control you are applying. Neutral rudder is shown here.

Air Warrior Geography

Countries

There are three countries in Air Warrior, named, simply enough, Country A, Country B, and Country C. In the theaters, each country has an equal number of airfields and facilities, and roughly equal territory. Each country has access to the same airplane types, and no country represents a nation that fought in the Second World War. As noted earlier, Air Warrior is a game that employs World War II era aircraft; it is not, in the main, a simulation of World War II. Players are assigned a country affiliation at random the first time they play Air Warrior; thereafter, country affiliation can be changed in the Officers Club. You must maintain a country affiliation for a minimum of 24 hours.

Airfields

Although you will find the same airfields in the main arena as are available during off-line Solo Flights, there are additional distinctions between the fields that apply only during online play.

Main Fields - Europe

There is little meaningful distinction in between main and secondary airfields, except that main airfields are farthest from the action and are more heavily protected by anti-aircraft batteries. These are the A:81, B:81 and C:81 fields.

Sovereign Fields

These are owned by a country and cannot be captured, but they can be damaged or knocked out of action due to bombing. In Half-Time Europe these are the X:2, X:3, and X:21 airfields, where X = the affiliated country.

In Real-Time Europe, relaxed and full realism, these are the X:78-79, and X:82-85 fields

Capturable Airfields

There is one group of airfields in each theater than can be captured by any country. These are the N:86-88 fields in Europe.

Whereas each country has its main airfield and a group of sovereign airfields, there is no such duplication among capturable fields. For example, there are three number 2 airfields in Relaxed Realism Europe - one for each country - but only one number 4 field.

Vehicle Garages

Europe has no sovereign vehicle garages. It does, however, have three capturable garages: N:89-91.

Airfields - Pacific

As with Europe, there are main fields, secondary fields and capturable fields. Unlike Europe, Pacific theaters have aircraft carriers. There are no specific vehicle garages, however, though you can take vehicles from any of the airfields or aircraft carriers (odd as that may sound). The numbering breakdown is as follows: X:61 main fields, X:62 and 63 secondary fields, X:67-69

are aircraft carriers, N:64-66, and N:70- 72 are capturable island airfields.

Scenario Terrain - Terra Fencer

Terra Fencer is a vast, sprawling terrain for real-time special events. As scenario play usually involves two countries, Terra Fencer has a large Country A and B, with a small Country C in the center.

Fencer Pacifica

Termed "Oceana" by many players, the Pacific scenario terrain makes Terra Fencer seem like an island - it is 20x20 sectors, fields X:41-55. In this terrain, there are 3 main landmasses, one for each country, carrier groups in between, and a vast assortment of capturable island chains. Although originally designed as a scenario terrain, Oceania may see use as a production terrain that can be used by much larger numbers of simultaneous players than the regular theaters.

Radio Procedures

"Radio" communications are an important aspect of play in Air Warrior. Actual voice communications are not supported, but full communications capability is provided via your keyboard. You may radio from ground to air, air to ground, or from plane to plane. In addition, bombers and other crew vehicles may communicate in a similar manner over a non-broadcast intercom.

Using the radio may seem confusing at first because there are several ways to broadcast. Three sets of radio channels are defined in Air Warrior, enabling players to communicate with everyone in their online environment, with everyone aligned with their country (A, B or C), or with selected countrymen on semi-private channels. These are defined as follows:

Channel 1

This is the one open channel all countries can hear. Your radio is automatically tuned to Channel 1 when you begin your mission. Although Channel 1 is an open channel, you can only pick it up if your radio is tuned to it.

Channel 2

This is the open channel for a country. Each country has its own separate Channel 2 and members of a country will receive radio traffic on this channel regardless of what channel they're tuned to.

Channels 3-999

Each country has these channels available and, like Channel 2, radio traffic on these channels can only be exchanged by members of a country. Unlike Channel 2, you have to be tuned to one of these channels to receive it. For instance, if a C-land pilot is broadcasting on Channel 175, only C-land pilots tuned to Channel 175 can hear him. If he broadcasts a message on Channel 2, every fighter pilot in C-land will hear his message no matter what channel their radios are tuned to. If he broadcasts a message on Channel 1, it will be broadcast to all players whose radios are tuned to Channel 1.

The purpose of Channels 3 - 999 is to allow groups within a country, such as a squadron on a coordinated mission, to communicate privately

Prior to flight departure, pilots should coordinate frequency assignments with both ground and flight personnel. Should a pilot take off without coordinating specific frequencies, contact can be made by calling the pilot on Channel 2.

As mentioned above, this call will be received by *all* of your country's Channel 2 radios in the arena. Receiving a "Blue Goose, please phone home" message could be a distraction to pilots involved in combat, so be sure to coordinate communications beforehand.

Broadcasting on the Radio

I don't know about everybody else, but I find it pretty hard to use the radio when I'm doing realtime. Stuff just happens too fast. If I do try to send a lot of messages, I usually end up daid because I'm spending too much time typing and not enough time watching for boogers.

Broken Arrow

The human brain still works faster than you can type (with a few exceptions I could name, of course). If'n ya know what ya should do, ain't much reason to type.

DoKtOr GoNzO

Tuning the Radio

In-flight, you tune your radio by entering the following keyboard command:

<ESC> + t + [channel #] (followed by <ENTER>

There will be a brief delay while the channel changes. To broadcast a message on the channel your radio is tuned to, begin the message with a slash (/). Yyou can broadcast on Channel 2, no matter what channel your radio is tuned to, by beginning your message with an apostrophe (‘). After typing any radio message, you send it by pressing the <ENTER> key.

Bombers and Vehicles

Bombers and vehicles operate a bit differently if they have crew members onboard. In a crewed bomber or vehicle, you have an intercom, which only broadcasts to crew members inside. To use it, preceed your message with a backwards apostrophe - the ` key (usually the key to the left of the keyboard number 1).

Radio Rooms

From Headquarters or an airfield Ready Room, you can go into the Radio Room, by clicking on the radio, and communicate with pilots in the air. Once in the Radio Room, you are automatically tuned to channel 1. To tune to a different frequency, click on the radio and enter a different channel, or you can type "/tune [radio channel]"; and press <ENTER> to tune to your desired channel.

Identifying Radio Transmissions

In-flight radio communication is formatted, to a limited extent, to let you know its origin. Channel 2 communication is preceded by an asterisk (*) and the sender's Player Custom Player ID (CPID); intercom messages from crew members are formatted with parentheses surrounding the player's CPID; messages from players on the ground show their full handle prior to the message.

Formatting, however, fails to differentiate between the open Channel 1, and country specific traffic on Channels 3-999. Both contain the sender's plane number, followed by his message, with no added identifying cues. Still, this is not as confusing as you may think. You cannot hear messages on Channels 3-999 unless you're tuned to one of those channels, and if you're tuned to a channel other than 1, you cannot hear Channel 1. Thus, if you're tuned, say, to your country's Channel 69, you know that all radio messages beginning with just the player number and the message were also broadcast on Channel 69.

For example, a message from a friendly pilot on Channel 2 would look like this:

```
*MUSKE: Is that you in the 109, Bluie?
```

If he were broadcasting over the intercom on a bomber, it would look like this.

```
(MUSKE): How did I get here?
```

If he were broadcasting on a country's channel other than 2, it would take this form:

MUSKE: What are you doing back in A-land?

Over Channel 1, it would look the same as if he were broadcasting on any other tuned channel other than 2.

MUSKE: FEED ME!

And if he were broadcasting from a Radio Room, here's what his message would look like (if his "handle" was Stiletto):

-)-STILETTO══: Goodnight all!

Because people cannot identify what channel a Radio Room message is broadcast on, it's a good idea to provide that information when you use the radio from the ground.

-)-STILETTO══: (on 2) Poof!

Colored Radio Messages

Often you'll see radio messages that appear in the country color of the player sending them. This means that the player is within the maximum radar range of your position. This does not mean that the player will also appear on radar. Rather, if max radar range is set, for example, to 17,000 yards, then all the colored radio messages you receive have been broadcast within a radius of 17,000 yards of your position.

Summary of Important Radio and Intercom Commands

Type these commands in your outgoing message area, and press <ENTER> to execute:

/tune [radio channel]	Tune to a radio channel from a conference or briefing room.
ESC + t [radio channel]	Tune to a radio channel in-flight.
/ [radio message]	Broadcast on the radio channel you're tuned to.
' [radio message]	Broadcast on your country's main radio channel.
` [radio message]	Broadcast over your bomber or vehicle intercom to crew members onboard.

Air Warrior Radar

Air Warrior does not have radar resembling the equipment World War II day pilots had in their aircraft. During most of the Second World War, pilots received radar information over the radio from radar stations on the ground. In the interest of game play, however, each pilot in Air Warrior is given a combination radar and map display showing the terrain being flown over and what the pilot's home country's ground-based radar is receiving. Understanding how radar works in the game is an essential skill.

The Range of Radar

Radar is based at each individual airfield's radar tower and covers whatever range the arena is set to - usually around 17,000 yards. Planes flying below 200 feet cannot be detected by radar at ranges over 5,000 yards.

Radar Map and Grid

When you bring up the radar/map display you see a map of the nearby terrain on a grid representing sectors 12.5 miles wide. These sectors are charted and fixed. As you fly and move across sectors, the grid moves; it's not a static overlay. Airfields are labeled on this map, and the cross in the center is your plane. No matter which direction you fly in, the top of the screen is always north. The cross representing your plane is centered in the screen by default. You can zoom in or out of the map by using your keyboard's bracket keys ([or]).

Radar Counters

When you're flying Air Warrior online, you will see colored boxes in the upper left hand portions of sectors that have air traffic. These are your plane counters and they tell you how many enemy and friendly aircraft are in a sector.

Tracking Icons

If an aircraft is within range of your country's radar and is also within 17,000 yards of your plane, it will appear as a tracking icon (in full realism play, radar range may be shortened somewhat). The tracking icon will appear on both the tactical display surrounding your radar screen, and on the screen itself as a short line, colored to reflect its nationality . The former reports its existence and distance from you, and the latter reports its position. If your country's radar has been destroyed or you are flying out of radar range, tracking icons will not appear. Planes can be shown as icons or as numbers, in normal or reverse video, depending on the selections made in Pre-Flight Setup. See Section 2 of this manual.

Radar View Range

In a target rich environment, plane counters become less important than simply being able to follow the flow of the action nearby. Shortening the radar's view range helps you cut down the clutter. By hitting the bracket keys ([and]) you can zoom in and out - very useful in putting hostile skies choked with airplanes into a manageable focus.

Biased View Modes

You can track a maximum of 12 airplanes on radar. Biased view modes allow you to choose which sorts of aircraft you want among those 12.

The default "unbiased mode" will show you the 12 aircraft closest to you, no matter if they're

friendly or enemy planes. Normally, this setting will work fine.

If you select "enemy biased mode", and there are more than 12 nearby planes, enemy planes will receive first priority for display. Likewise, if you choose "friendly biased mode," the display priority shifts toward showing you nearby aircraft from your country. "Bomber biased mode" will give display priority to bombers (both friendly and enemy).

For example, let's say there are 16 planes within range of your radar: eight enemy and eight from your country. In unbiased view mode, the nearest 12 aircraft will show up on your radar, regardless of nationality.

If you set your radar to enemy biased mode, your radar will track all eight enemies, plus the nearest four friendlies. On friendly biased mode, all eight friendly planes will appear on your radar screen, along with the nearest four enemy aircraft.

Bomber biased mode is useful when flying cover for a bombing raid, or when intercepting incoming enemy bombers. In bomber biased mode, if 16 planes are in radar range, and eight of them are bombers (either friendly or enemy), the radar display will show all of the bombers, plus the four nearest non-bomber aircraft, regardless of nationality.

Setting Radar Bias Modes

Setting biased view modes is much like sending a radio message. You type a slash (/) followed by an asterisk (*) and the mode: ru (radar unbiased), re (radar enemy), rb (bomber biased), or rf (radar friendly).

If you find this confusing, keep in mind that most Air Warrior pilots never change their radar from the unbiased default mode.

Important Radar Commands

Keyboard commands:

F10	Turn radar screen on/off
[	Zoom in
]	Zoom out

Command Lines (follow with <ENTER>):

/*ru	Unbiased radar/icon mode (default)
/*re	Enemy biased mode
/*rf	Friendly biased mode
/*rb	Bomber biased mode

Gun Camera Films

As in real combat, you can activate in-flight gun cameras to make films for review later. Gun camera films are reviewed by clicking on the Film sign on the Main Menu. Several sample gun camera films are provided with Air Warrior for your review. Note: For reasons of economy, reviewing gun camera films is usually done off-line.

Recording Films

To activate the gun camera during flight, press the <9> key on the keyboard; press the <9> key again to stop your gun camera. You can start and stop your camera several times in a mission if you only want to capture the choice moments. Filming your missions and replaying them is a great way to learn what you're doing right or wrong in combat.

Saving Films

Air Warrior records film as a temporary file, beginning with FILM0000.CAM, and will save each subsequent film in a session under sequential numbers (FILM0001.CAM, FILM0002.CAM, etc.). However, once you exit the program, the next time you run Air Warrior and start the gun camera, the first film will be recorded as FILM0000.CAM again, overwriting any previous film by that name. Thus before you exit Air Warrior you should use the film renaming feature on the Film Playback Window to save films you want to keep under a new name. Note: Films will take up space on your hard disk; be sure to delete old films when you are through with them.

Film Playback

Playback and review of gun camera films is usually done off-line. From the Main Menu, click on the Film sign just beneath the control tower. This will bring up the Film Playback Window. Select the film you want to view, and click on the "Play" button to begin playback. See Film Room topic for special film playback commands.

Dueling

Other Air Warrior players may be challenged to a duel using the following Command Lines (followed by <ENTER>). These commands are valid on the ground only:

/duel [CPID]	Ask a player to duel
/accept [CPID]	Accept the invitation
/deny [CPID]	Decline the challenge

You can challenge any player to a duel by issuing the dueling command. They will only receive the invitation if they are not in flight. When offering to duel another player, it's best to do so from an Officers Club so that your opponent can meet with you and arrange the terms of the duel. Duels are not limited to just two players; any number can join in as long as they've all accepted the dueling invitation from the same person.

Dueling mode shares the same arena with the regular players and you will hear Channel 1 radio traffic from the arena while you're dueling. The difference is, you won't see the regular players and they won't see the duelists. Also, duelists are not limited to the same theater and airplanes as the main arena players.

Thus, for example, Zeros can duel Spitfires although both normally don't fly in the same theater. Damage inflicted on facilities in the main arena does apply to dueling mode, however. If A:3 has bad fuel in the regular game, it will have bad fuel in dueling mode as well.

Radio communication works differently in dueling mode. When you use the apostrophe to communicate over Channel 2, your duel opponent will hear it, as well as what you say over Channel 1. Duelists, unlike regular arena players, generally don't have a country to communicate with.

If you fly a duel with several players and need to communicate with the pilots on your side without your opponents overhearing, you'll have to tune your radio to a channel other than 1 or 2, and have your other comrades tune to the same channel.

When you land and exit your airplane, crash, bail out, or get shot down, you leave dueling mode. If you wish to continue the duel, you have to go through the invitation/acceptance process from the beginning. The results of duels apply to your arena score, and the rules for country defection also apply to duels. In other words, if you defected as part of your duel, you may not return to your original country affiliation for 24 hours.

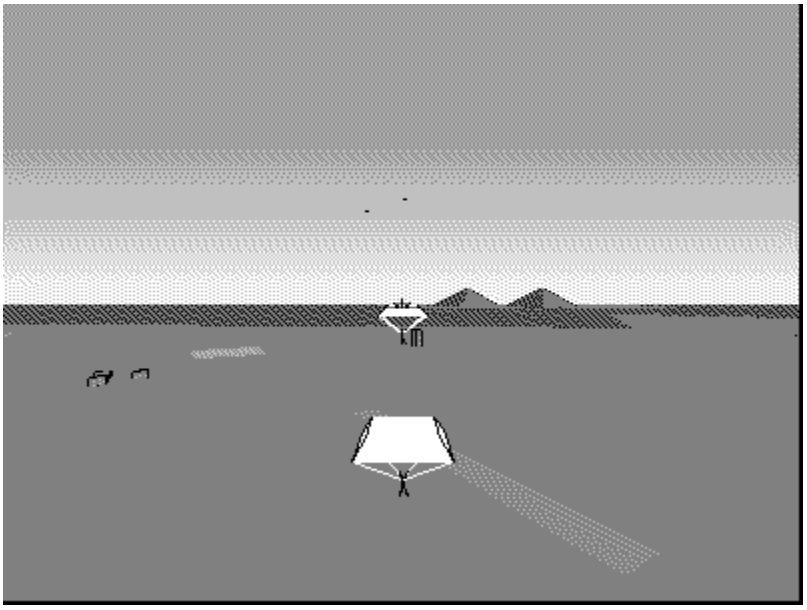
If you receive an unexpected invitation to duel, check the Roster and find out where the player issuing the challenge is located. Usually it's a good idea to meet up with your prospective dueling partner in an Officers Club before accepting the duel. Sometimes people issue dueling invitations just to get your attention, or you may find that the sort of duel the challenger wants does not appeal to you.

If you've accepted an invitation to duel, and then decide not to, you must remember to land and exit your plane before returning to arena play; otherwise, you will remain in dueling mode, and everyone else will be invisible to you (and you to them).

NOTE: You cannot fly a bomber in a duel.

Capturing Airfields

In Air Warrior, neutral airfields may be captured and placed into operation under the capturing country's control. In order for a capture to take place, the field must be prepared for capture, and eight paratroops must be successfully placed at the airfield. "Virtual troopers" are provided by the host computer - actual players do not sign up for paratroop duty.



Field Preparation

Known in Air Warrior jargon as, “prepping the field,” this consists of destroying the control tower and ack batteries (usually only one) at the airfield. Once destroyed, the tower and ack will return after 30 minutes. Acks can be destroyed with one bomb; some can be strafed and killed. Towers can take anywhere from one to four bombs to destroy.

Delivering Paratroopers

Transporting paratroops begins in the Ready Room with the choice of the C-47 from the Aircraft Selection poster or folder. The paratroops are automatically loaded onto the plane when you select the C-47. Use the dialog box to specify fuel load. C-47's carry no weapons, so it’s best to coordinate with fighter cover.

After an airfield has been prepped, troops have to arrive within 30 minutes. Dropping troops requires at least 500 feet of altitude (they refuse to jump otherwise).

You, as pilot, specify when each of the paratroops is to jump. In effect, you use the radio to order each of your troops to hit the silk. The command key sequence is an apostrophe, followed by an asterisk and the command "go" followed by <ENTER>:

'*go + ENTER	Causes one paratrooper to leave the plane (non-functional below 500 feet)

Repeat this command until all eight troops have jumped. You must drop your paratroops within approximately one-half mile of the airfield for them to be able to seize it.

Bomber Basics

Piloting Medium and Heavy Bombers

Flying a bomber is much like flying a fighter except that bombers are slower and less maneuverable. With medium and heavy bombers, bombs are loaded onto your plane automatically when you select it with the Aircraft Selection Folder at the airfield Ready Room.

There are two fundamental mistakes new pilots often make when they fly a bomber for the first time. First, you have to remember to turn on all of your engines; it's surprising how many people forget to do this at first, accustomed as they are to single-engine fighters.

Second, they use the apostrophe (') preceding a radio message, believing this sends an intercom message to crew members on their aircraft. It will, but it will also broadcast the message to everyone in your country. You should use the reverse apostrophe (`) to chat with crew members alone.

The most important tool of a good bomber pilot is a comprehensive map. Maps can be downloaded from network software libraries, and will soon be available in hard copy form for sale.

The most important skill of a good bomber pilot is the ability to navigate to the target in a manner that provides a good approach for a bomb run. Approaching an east/west oriented rectangular target, such as a factory, from the north or south is not a winning strategy. Your bombs don't drop all at once; rather, they fall sequentially and land in a spread. Thus the approach is crucial.

You might want to fly to various targets off-line to get the hang of bombing and the use of your bombsight. As with any skill mastered in Air Warrior, proficiency comes with a lot of practice; and while off-line bombing practice may not be especially exciting, it is inexpensive.

Bomber Defense

"With fighters you are looking for a fight. With bombers you are looking to avoid fights because if you get in one you will probably die."

- Da Sloth

There are five basic methods of defending bombers in Air Warrior.

Stealth - Radar Evasion

They can't kill you if they don't see you. If you fly below 200 feet, you will not show up on radar. You will, however, show up as a tracking icon if you get within 5000 yards of an enemy plane. Thus, the stealth approach works best if you also pick a flight route that avoids enemy planes.

Fighter Escort

Fighter escort can be arranged from the very beginning of a mission, but usually it's organized on the fly. After you've taken off, get on Channel 2, tell your countrymen what you intend to do, and ask if anyone is available to escort you.

Friendly fighters can also serve as escort without their even knowing it. If you see that your side has achieved numerical superiority in a sector, you might want to capitalize on that and fly

your bomber through while your fighters have the enemy tied up.

Gunners

Before you take off you can enlist players to fly as gunners on your bomber. Bomber gunners receive a lethality bonus and can be effective against enemy fighters, just so long as there are not too many.

High Altitude Defense

Flying at 20,000 feet or more not only keeps you above most enemy fighters, it also gives you a method of escape by enabling you to dive and build up speed. There are two major drawbacks to high altitude bombing, however. First, bombers do not have outstanding rates of climb, and just getting to 20,000 feet is expensive. Second, as your altitude increases, so does the difficulty of hitting your target.

Low Altitude Defense

SEVERAL feet?? I get nosebleeds at several feet. I like to stay at about 5ft or so up. Of course, that's the altitude of my cockpit..... Not only do less experienced pilots go SMACK, but experienced ones do it every once in awhile. Going that low gives your gunner an even better chance to kill enemies (with an assist from a nearby planet ;) and gives the gunner a better chance to see somebody to shoot at in the first place.

- Da Sloth

This is largely a desperation tactic if your attempt at stealth by flying under radar fails. If you are at low altitude and are attacked by enemy fighters, drop your bomber down to extremely low altitude - 10 feet or less above the ground. Often, an enemy fighter will crash trying to kill you, though many Air Warrior pilots are wise to this tactic.

Crewing a Bomber

Air Warrior bombers all accommodate multiplayer crews, consisting, primarily, of gunner positions. Gunners sign onto a bomber in the ready room prior to flight and take off in the bomber when the pilot decides to take off. In the bomber, the pilot and all crew members can communicate over the intercom by preceding their typed transmissions with a reverse apostrophe (`).

Players who wish to sign aboard your bomber can ask to join up as crew members by clicking on your player list entry and using their right mouse button menu. They will then see a list of available positions and can click on the one they want. This sends a request to you that you can accept or decline. As the positions are filled you will see a list of who occupies which position. Click on the Begin Mission button, and you, and your crew, will be loaded into your chosen vehicle in the combat environment.

Broadcasting a Request for a Crew

When you select a bomber you are offered the option of broadcasting a crew request to everyone in the ready room or everyone in your country who is not inflight. Your player list entry in the ready room will then have a bomb icon next to it, indicating that you're the pilot of the bomber.

NOTE: You can move to another ready room after you've signed on crew members. However, only those crew members who are the ready room with you when you decide to enter flight will

be loaded into your bomber.

Moving Around a Bomber

Crew members can jump to other positions on the bomber, so long as someone does not already occupy that spot. This can also be useful if you've run out of ammunition at a gunner position. The pilot, however, cannot jump to another position. Use the following command keys (followed by <ENTER>):

B-17 Flying Fortress

ESC + jt	Jump to tail gunner position.
ESC + ju	Jump to upper turret.
ESC + jn	Jump to navigator position (not often used)
ESC + jlw	Jump to left waist gunner position
ESC + jrw	Jump to right waist
ESC + jb	Jump to ball turret.
ESC + jch	Jump to chin position.

B-25 Mitchell

ESC + jt	Jump to tail gunner position.
ESC + ju	Jump to upper turret.
ESC + jco	Jump to copilot position (not often used)
ESC + jlw	Jump to left waist gunner position
ESC + jrw	Jump to right waist
ESC + jn	Jump to nose gunner.

A-26 Invader

ESC + ju	Jump to upper turret.
ESC + jlo	Jump to lower gunner position

Junkers Ju-88

ESC + ju	Jump to upper turret.
ESC + jn	Jump to nose gunner.
ESC + jlo	Jump to lower gunner position

G4M Betty

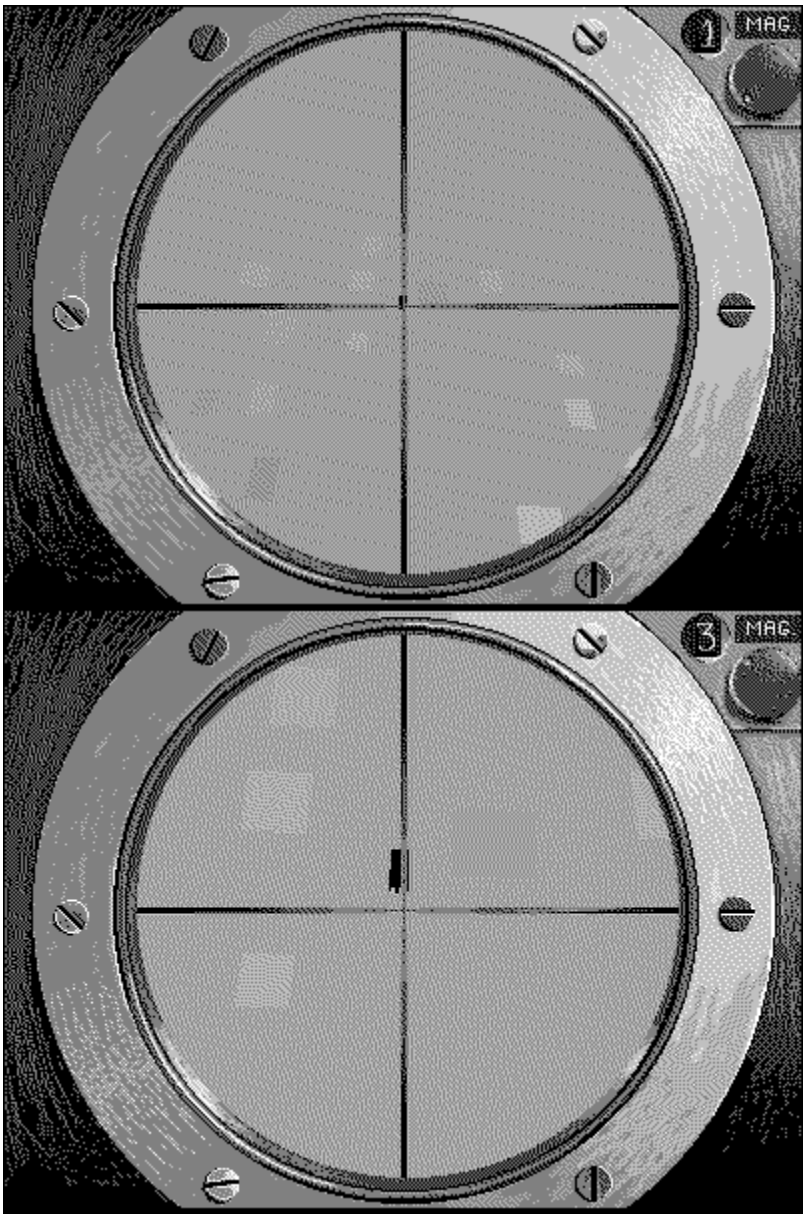
ESC + jt	Jump to tail gunner position.
ESC + ju	Jump to upper turret.
ESC + jn	Jump to navigator position (not often used)
ESC + jlw	Jump to left waist gunner position
ESC + jrw	Jump to right waist
ESC + jc	Jump to chin position.

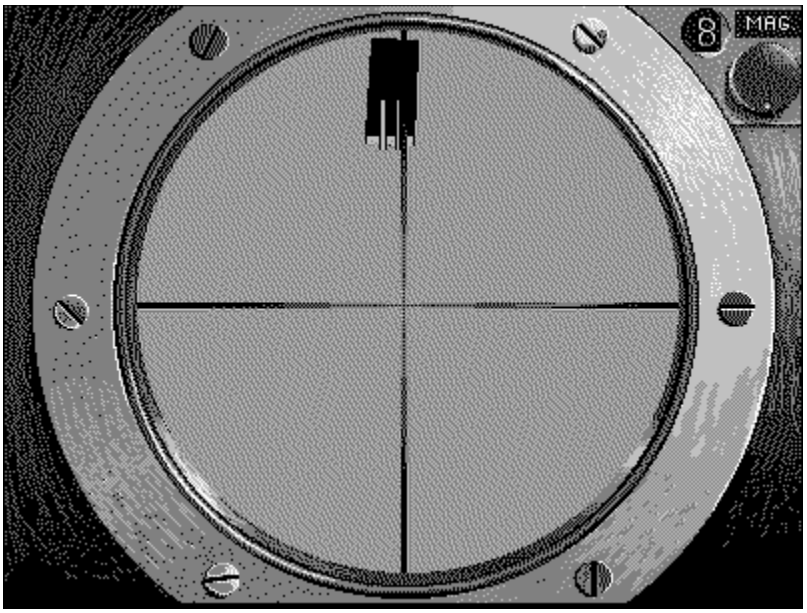
Using the Bombsight - Medium and Heavy Bombers

Air Warrior's level bombsight is patterned after the famous Norden Bombsight from World War II. It allows the bombardier to control the plane during a bomb run and it computes the likely

place your bombs will land, given your altitude and velocity. You don't have to lead the target with this sight; just drop your bombs when the crosshairs are on it. When bombing from medium to high altitudes, you will probably need to adjust magnification (<[> and <]> keys) to see your target and line it up. You also might want to slow down to near stall speed when you drop on a target from high altitude and, thus, reduce bomb spread.

In the example below, a factory seems to be lined up in the crosshairs. However, using 3x and then 8x magnification, you can see that this is not the case.





Moving from the pilot's cockpit to the bombardier's position (<ESC + z>, followed by <ENTER>) switches on the autopilot. You can switch it off if you choose, by hitting the <x> key, but generally you only want to make slight adjustments to your course when you're on a bomb run. If you've set yourself on a good bomb run angle before switching to the bombsight, you should only need to apply rudder controls to line up your target.

Be sure to open the bomb bay doors (using the command <ESC + a>, followed by <ENTER>) before attempting to drop your bombs, and remember to close them afterward; open bomb bay doors create considerable drag.

Dive bombing

Choosing a Fighter Bomber

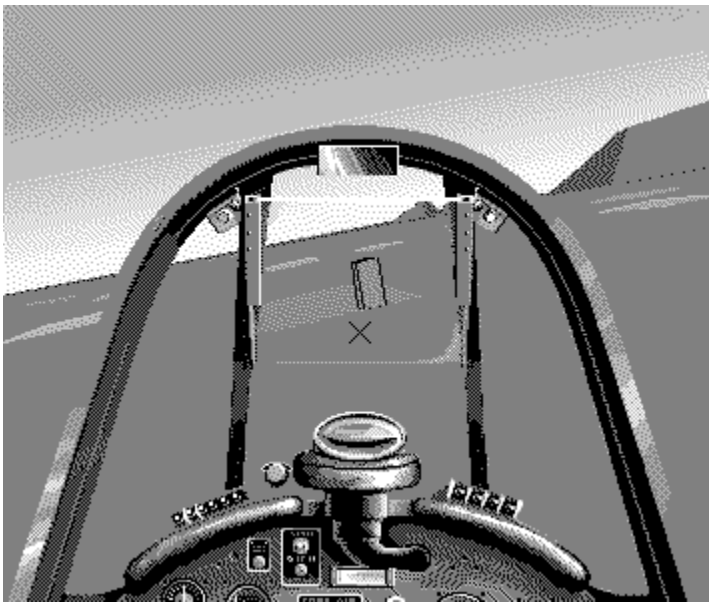
All fighters can carry at least one bomb; the Mustang, Lightning, Thunderbolt, Hellcat, and Corsair can carry two. No fighter carries bombs unless you load them before you head out on the runway. You can load bombs on your plane with the dialog box in the Aircraft Selection Folder in the Ready Room, or you can type /bomb at the airfield Ready Room before you take off. You cannot load bombs once you are in the airplane.

The plane you choose as a fighter bomber is generally a matter of experience and personal preference. Keep in mind that you'll probably be flying it as a fighter at some point in the mission and, even if you don't, dive bombing usually pushes an aircraft to its performance and maneuverability limits. Therefore you should probably avoid choosing a plane you've never flown before, simply because it carries two bombs.

Dive Bombsight

Air Warrior employs a bit of post World War II technology for dive bombing: the Continually Computing Impact Point (CCIP). This sight appears as an illusive X where your pilot's gunsight would normally be, and it's the same color as the one you chose for your LCS gunsight. Like any bombsight, it shows you where your bombs would land if released. However, if you enable

the CCIP you will rarely see the magic X. Why? Because in most flight situations if you drop a bomb, its impact point will be below you. Thus, to use the CCIP you have to be flying at an angle or at a speed that will place your bomb's impact point in front of you.



Arming bombs

In a dive bomber, you have to arm your bombs (<ESC + a>, followed by <ENTER>) before you can drop them.

High Angle Dive Bombing

If you dive at a steep angle the CCIP's X will appear. You want to maneuver your plane in order to put the X on your target and then hit the <b> key to release a bomb. The hazard here is that you may not be able to pull your plane out of the dive before you too become an impact point on the ground. Start high angle dive bombing runs from at least 7,000 feet (10,000 feet in the Realism arena). Also, you can improve an airplane's handling in a dive if you reduce throttle, or lower flaps before you enter a steep dive. On the F4U Corsair, P-38 Lightning, F-86, or MiG-15 you can deploy dive brakes as well.

Low Angle Dive Bombing

I like a shallow, very fast delivery myself, approx. 350-375 ias. Level at 300-400 ft (the dive sight will just register). When the sight is where you want the bomb to hit, pickle it off and get outta Dodge.

Gray Eagle

This is often referred to as strafe bombing because you approach your target as if you were strafing it.

You begin a low angle dive bomb run from a greater distance away from your target than you would for a high angle strike. As you get close to the ground at high speed the CCIP will appear. Maneuver your plane until the X is on your target and release your bomb. The primary hazard with this approach is getting blown up by your own bomb. Make sure you're at least 300 feet above the explosion.

Important Note for All Forms of Dive Bombing: Remember that it takes a full second after you've hit the <b> key for your bomb to actually release. Thus, if you immediately yank the stick after hitting the <b> key, your bomb may be pulled off target.

"Bombing the ceiling is not allowed!"

This peculiarly phrased error message means that you have attempted to release a bomb under negative G's - a common occurrence if you push forward on the stick to make a last second flight adjustment just as you're dropping your bomb. You must release bombs under positive G's.

Weight and Drag from Bombs

Each bomb adds 550 pounds to your fighter. Not only will the added weight and drag reduce your aircraft's climb rate and speed, it will impair its maneuvering ability as well.

Dropping Bombs Over Friendly Territory

If you get jumped by enemy fighters and you want to ditch your bombs over friendly territory, do not fear; your bombs will do no damage to your own country's ground facilities or in-flight aircraft, though they will destroy friendly aircraft on the ground. Be careful that you don't destroy yourself by jettisoning your bombs while you're too close to the ground (usually less than 300 feet).

Dive Brakes

In Air Warrior, four fighters are equipped with dive brakes: F4U Corsair, P-38 Lightning, F-86, and MiG-15. On all, except the Corsair, you deploy them by pressing the <Spacebar> and holding it down. The dive brakes stay deployed until you release the <Spacebar>. The 38's dive brakes are actually a specialized flap designed to modify the airflow over the wings and restore pilot control at speeds above 375 knots.

Corsairs used their landing gear doors as dive brakes. Hitting the semicolon key (<;>) opens them and hitting it again retracts them.

Crewing a Bomber or Vehicle

Air Warrior bombers all accommodate multiplayer crews, consisting, primarily, of gunner positions. Gunners sign onto a bomber in the ready room prior to flight and take off in the bomber when the pilot decides to take off. In the bomber, the pilot and all crew members can communicate over the intercom by preceding their typed transmissions with a reverse apostrophe (`).

Players who wish to sign aboard your bomber can ask to join up as crew members by clicking on your player list entry and using their right mouse button menu. They will then see a list of available positions and can click on the one they want. This sends a request to you that you can accept or decline. As the positions are filled you will see a list of who occupies which position. Click on the Fly button, and you, and your crew, will be loaded into your chosen vehicle in the combat environment.

Broadcasting a Request for a Crew

When you select a bomber you are offered the option of broadcasting a crew request to everyone in the ready room or everyone in your country who is not inflight. Your player list entry in the ready room will then have a bomb icon next to it, indicating that you're the pilot of the bomber.

NOTE: You can move to another ready room after you've signed on crew members. However, only those crew members who are the ready room with you when you decide to enter flight will be loaded into your bomber.

Moving Around a Bomber or Vehicle

Crew members can jump to other positions on the bomber, so long as someone does not already occupy that spot. This can also be useful if you've run out of ammunition at a gunner position. The pilot, however, cannot jump to another position. Use the following command keys (followed by <ENTER>):

B-17 Flying Fortress

ESC + jt	Jump to tail gunner position.
ESC + ju	Jump to upper turret.
ESC + jn	Jump to navigator position (not often used)
ESC + jlw	Jump to left waist gunner position
ESC + jrw	Jump to right waist
ESC + jb	Jump to ball turret.
ESC + jch	Jump to chin position.

B-25 Mitchell

ESC + jt	Jump to tail gunner position.
ESC + ju	Jump to upper turret.
ESC + jco	Jump to copilot position (not often used)
ESC + jlw	Jump to left waist gunner position
ESC + jrw	Jump to right waist

ESC + jn Jump to nose gunner.

A-26 Invader

ESC + ju Jump to upper turret.
ESC + jlo Jump to lower gunner position

Junkers Ju-88

ESC + ju Jump to upper turret.
ESC + jn Jump to nose gunner.
ESC + jlo Jump to lower gunner position

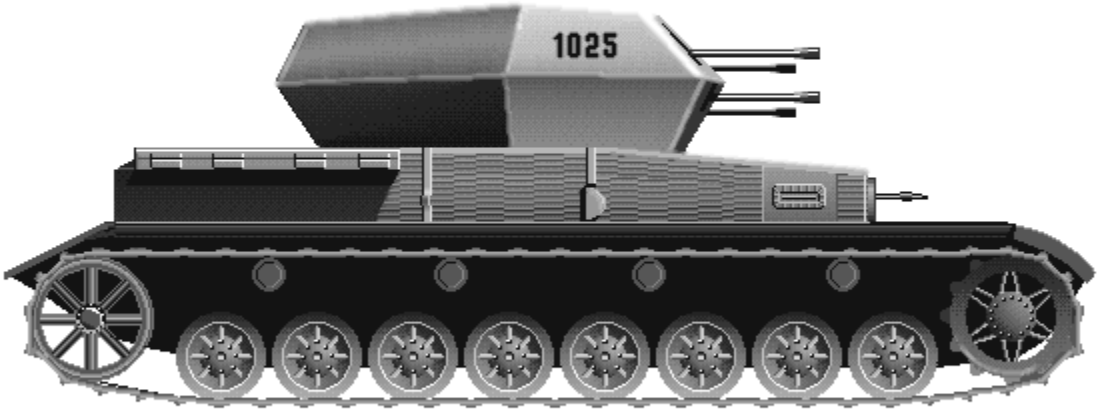
G4M Betty

ESC + jt Jump to tail gunner position.
ESC + ju Jump to upper turret.
ESC + jn Jump to navigator position (not often used)
ESC + jlw Jump to left waist gunner position
ESC + jrw Jump to right waist
ESC + jc Jump to chin position.

T-34 Tank

ESC + jg Jump to tank gun position.
ESC + ju Jump to upper machine gunner position
ESC + jh Jump to hull machine gunner position.
ESC + jd Return to driver position.

Flakpanzer IV



ESC + jg Jump to anti-aircraft gun position.
ESC + ju Jump to upper machine gunner position
ESC + jd Return to driver position.

Jeep

ESC + jg Jump to machine gun position
ESC + jd Return to driver position.

Vehicle Operations

In addition to aircraft, Air Warrior contains the following vehicles, which may be used by any player:

T-34 Tank

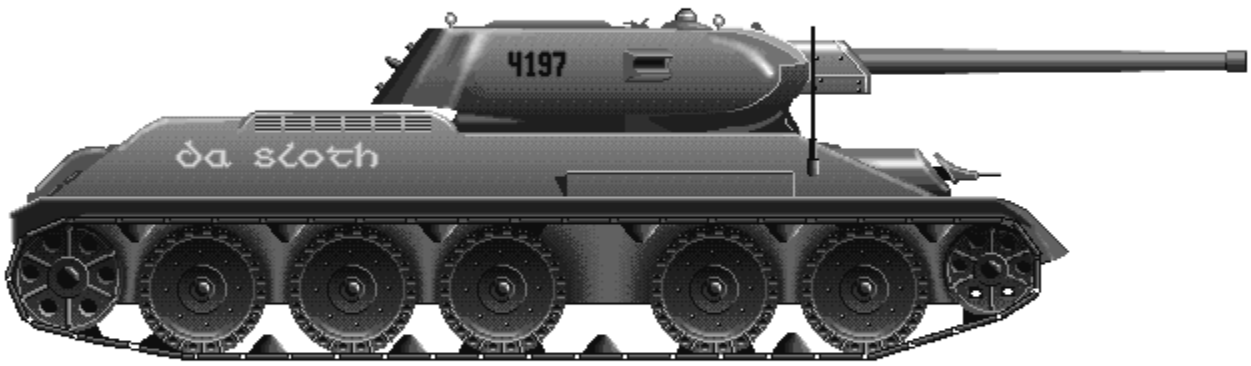
Flakpanzer IV Whirlwind Anti-Aircraft Weapon

Willys Jeep

Supply Truck

All are equipped with various armaments, except the supply truck. Players will find that many of the command keys are similar to those in aircraft, such as using the <8> key to start/stop the engine.

Crewing a Vehicle



The T-34, Flakpanzer and Jeep all accomodate multiplayer crews , consisting of a driver and gunners for any available weapons. It is possible for one player to operate a crewed vehicle, but you will probably want to leave the vehicle in a stationary position when firing a weapon, as you can't drive and fire at the same time. Vehicle crews are assembled in the Ready Room of an airfield, and loading of fuel, ammo and supplies is accomplished at the same time, using the Vehicle Selection Folder.

Moving Around a Vehicle

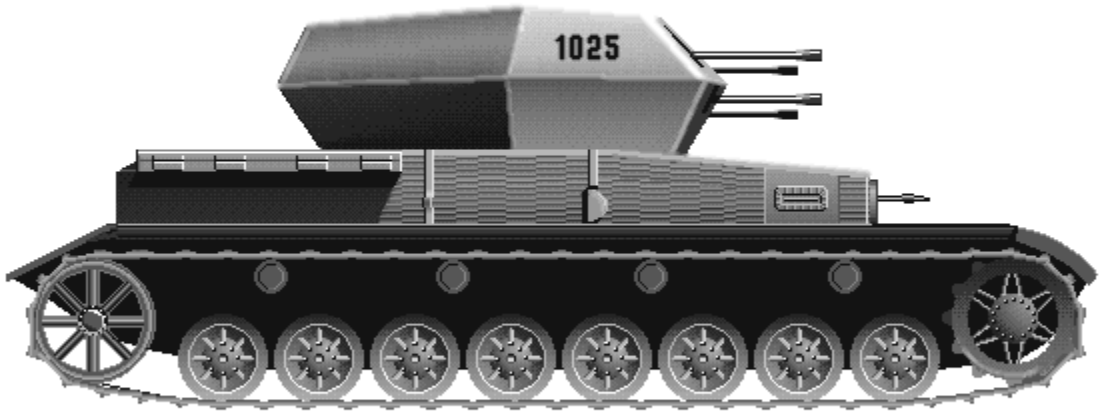
The driver or crew members can jump to other positions on the vehicle, so long as someone does

not already occupy that spot. This can also be useful if you've run out of ammunition at a gunner position. Use the following command keys (followed by <ENTER>):

T-34 Tank

ESC + jg Jump to tank gun position.
ESC + ju Jump to upper machine gunner position
ESC + jh Jump to hull machine gunner position.
ESC + jd Return to driver position.

Flakpanzer IV



ESC + jg Jump to anti-aircraft gun position.
ESC + ju Jump to upper machine gunner position
ESC + jd Return to driver position.

Jeep

ESC + jg Jump to machine gun position
ESC + jd Return to driver position.

Driving a Vehicle

Vehicles are driven with key commands, and the joystick or mouse. In most instances, the mouse will provide better control. You must be in the vehicle's driver position to steer, shift gears, etc.

Steering

A small steering wheel is indicated on the control surface, and it will rotate when steering with the mouse or joystick. A compass is available for specific directional information. Switch between mouse and joystick control with the command keys:

ESC + oj Toggle control between joystick and mouse (followed by <ENTER>)

Shifting

Air Warrior vehicles feature three-speed transmissions with a reverse gear. The engine and transmission behave as in real life - to move a vehicle, you will have to achieve the correct engine RPM when shifting, or the engine will stall. No clutch action is needed. Shift gears in a vehicle with the following command keys:

Keypad:

9 Upshift one gear

7 Downshift one gear

* Shift to neutral from forward or reverse gear; shift to reverse from neutral

Keyboard:

d Upshift one gear

a Downshift one gear

s Shift to neutral from forward or reverse gear; shift to reverse from neutral

Throttle

Throttle use is the same as on Air Warrior aircraft. Avoid extended periods of operation with the RPM indicator in the red zone.

c	Increase throttle by 7%
SHIFT + c	Full throttle
v	Decrease throttle by 7%
SHIFT + v	Minimum throttle

Using the Intercom and Radio

Your vehicle radio works the same as those in aircraft. However, you also have an intercom to talk to people who are in your vehicle with you. To broadcast on the intercom, use the reverse apostrophe (`) that's usually found to the left of a keyboard's number 1.

Vehicle Gun Sighting

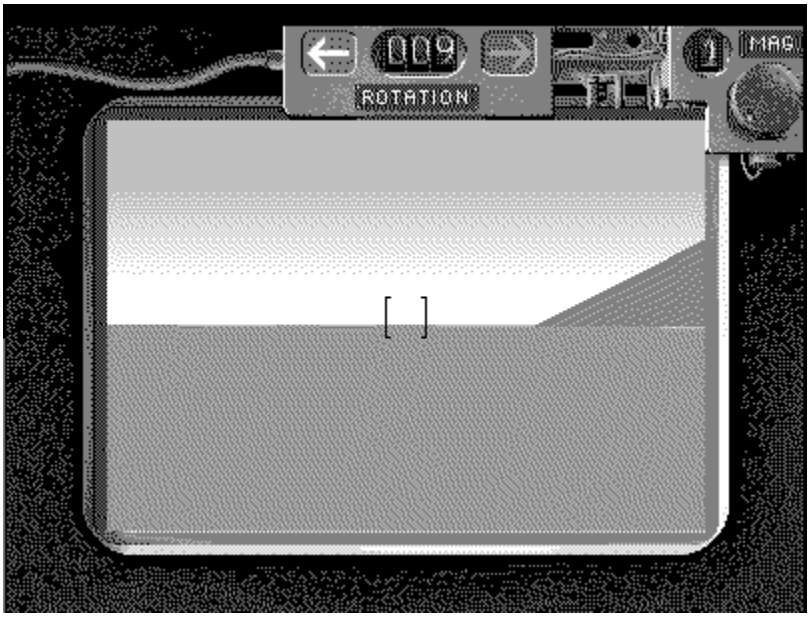
Vehicles equipped with guns and/or cannon feature gunner positions, from which a player can track and fire the weapon. Ammo load is specified prior to departure in the Ready Room, using the Vehicle Selection Folder.

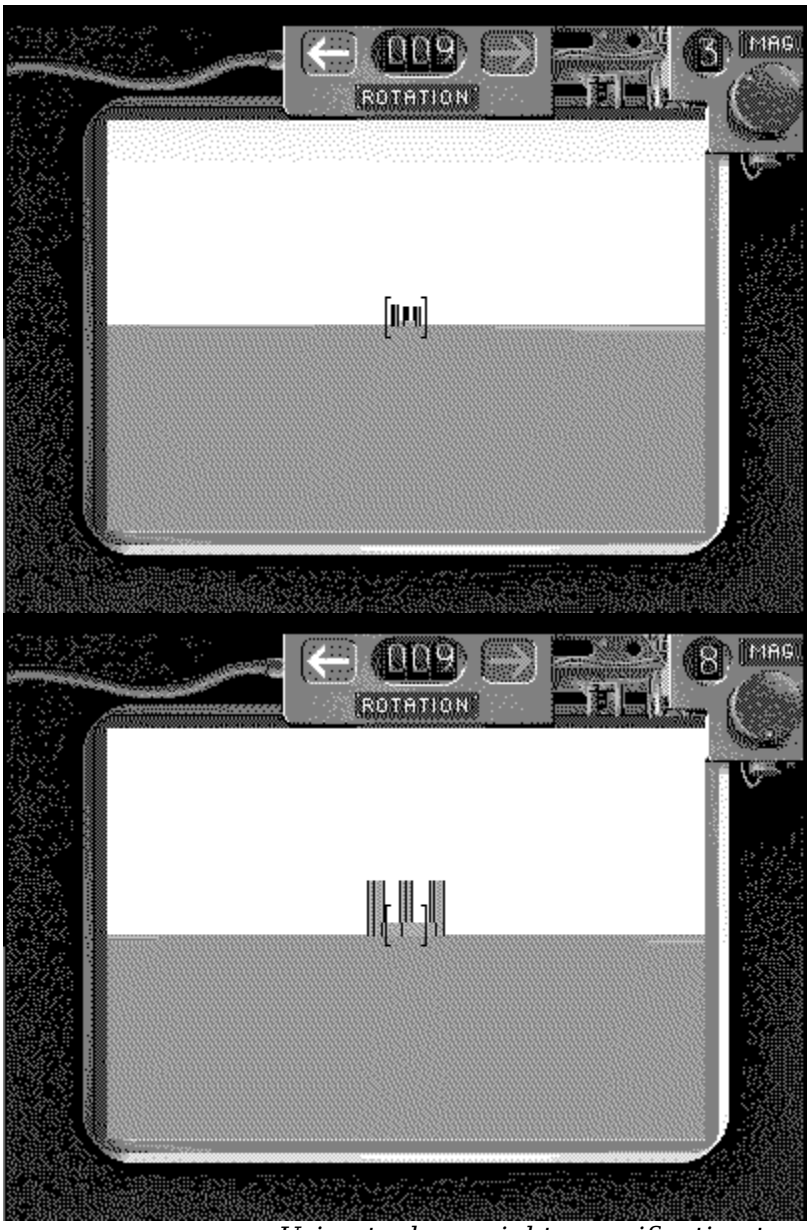
T-34 Tank

To operate the T-34's main cannon, you must be in the tank gun position (<ESC + jg>). The following command keys and controls apply:

raise gun	Joystick or mouse movement
lower gun	Joystick or mouse movement
a	Rotate turret left
d	Rotate turret right
f	Fire one round (or use joystick button or right mouse button)
Rt bracket ( ])	Decrease sight magnification 1X
Lt bracket ([ )	Increase sight magnification 1X (maximum 8X)

The T-34 tank's cannon has a range of 9000 yards, but its range is reduced as you increase the gunsight magnification. When you first try tanking, it's best to shoot at targets considerably short of maximum range. You can judge if the explosion is in front of or behind your target, and can adjust the elevation of the gun to compensate. For this sort of adjustment, the mouse offers much finer control than a joystick (fire with the right mouse button). Press <ESC + oj> (followed by <ENTER>) to toggle between joystick and mouse control.





Using tank gunsight magnification to zero in on a target

Players may also move to and use the T-34's hull-mounted machine gun, or the single upper machine gun mounted on top of the turret. These guns are directed with the joystick or mouse (fire with the right mouse button). The <f> key will also fire the gun.

Flakpanzer IV Whirlwind

To operate the Flakpanzer's main cannon, you must be in the main gun position (ESC + jg>). The following command keys and controls apply:

a	Rotate turret left.
d	Rotate turret right

f	Fire one round (or use joystick button or right mouse button)
e	Raise guns
c	Lower guns

The main gunner position of a Flakpanzer puts you behind the Flak's battery of four 20mm cannon. The Flakpanzer is primarily an anti-aircraft weapon with a maximum range of only 600-700 yards and, thus, does not have the elaborate gunsight of the tank.

The Flakpanzer's cannon can be effective against tanks and other Flaks as well as paratroopers. Players can also move to the single top-mounted 7.92 mm machine gun. This gun is directed and fired with the joystick or mouse (fire with the right mouse button). The <f> key will also fire the gun.

Note: When you take a Flakpanzer, be sure you drive at least a short distance from the takeoff point, or you might inflict inintentional friendly fire on players in your country.

Jeep

The jeep is equipped with one .50 calibre machine gun. The gun is aimed and fired using the joystick or the mouse (fire with right mouse button). You must move to the gun position to direct and fire the gun (<ESC + jg>).

Other Vehicle Functions

As in aircraft, the following functions are available:

9	Turn gun camera on/off
Spacebar	Wheel brakes
1	Full view range (all objects visible)
2	Medium view range (the default view - all but most distant objects visible)
3	Short view range (only objects within a few miles can be seen)
4	Combat range (only immediate objects will appear, and horizon shading is disabled)
5	Abridged range (no terrain detail whatsoever)
F1	Help key
F10	Radar screen
ESC + t[channel]	Tune your radio to the specified channel (followed by <ENTER>) (online play only - see the Radio Procedures section)
ESC + os	Turn sounds on/off (followed by <ENTER>)

Views

The following views are available in some vehicle positions; not all views are available in all positions. Combinations views are not supported in vehicles.

Keypad - Views

8 (up arrow) - Look forward

4 (left arrow) - Look left 5 - Straight up view 6 (right arrow) - Look right

2 (down arrow) - Rear (mirror) view

Keyboard View Keys

G - Look forward

H - Look left K - Straight up view L - Look right

M - Rear (mirror) view

Exiting a Vehicle

You may exit a vehicle at any time with the command keys <ESC + e> (followed by <ENTER>). You will return to the Ready Room of the airfield you are operating from any time you exit the vehicle, or if you are killed as a result of hostile action.

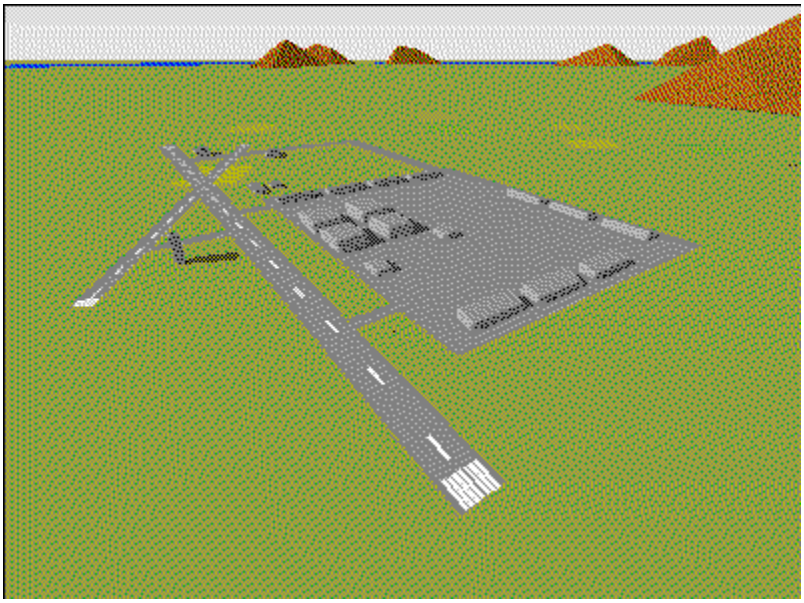
Tactical and Strategic Bombing

Europe

Newcomers to Air Warrior will find both strategic and tactical bombing being employed on a regular basis. Strategic bombing is usually carried out by medium and heavy bombers, and is aimed at infrastructure and support facilities such as refineries and factories, with the strategy of reducing the enemy's ability to carry on the fight. Strategic bombing strikes are planned and coordinated to destroy multiple, related targets in a short period of time, for maximum effect on the enemy.

Tactical bombing is more immediate in scope, and is generally carried out by fighter bombers in support of an immediate mission. Tactical bombing missions are generally aimed at the suppression of enemy offense or defense capability, such as anti-aircraft installations, ground troops or airfield runways.

Airfields



In Relaxed Realism arenas, you can knock a secondary airfield out of action for 30 minutes by dropping eight bombs on the runway. All eight must land within five minutes of each other. Thus if you miss and land fewer than eight, chances are you will fail to take out the field unless you are flying with other friendly bombers. Main airfields in Relaxed Realism are much harder targets, requiring at least 32 bombs to destroy. In real-time, destroying an airfield is done quite differently. Instead of bombing the runways, you must destroy the field's local facilities: its hangar, ammo dump, and all three fuel tanks. Successful destruction of an airfield forces the enemy to take off elsewhere. Sometimes, it can be more useful to impair an airfield’s facilities rather than take out the field altogether.

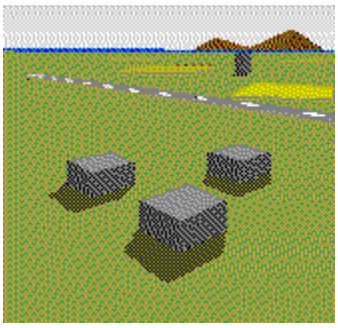
Anti-Aircraft Artillery (AAA or Ack)

Killing the ack at an airfield will leave planes taking off from the field far more vulnerable to attack. The ack is the smallest and hardest to hit of all bombing targets, but they take only one

bomb, or a good strafing run, to kill.

When you destroy an ack online, the host broadcasts a message that the ack has been shot down and a kill has been recorded. These look similar to the messages you see when a player has been shot down; the difference is that ack "player" IDs begin with a lower case "z."

Fuel



Every airfield has a group of three gasoline storage tanks clustered together. Each tank takes two bombs to destroy, yet the explosion of one may take adjacent tanks with it. When an airfield's fuel supply is damaged, the quality of the gas available at the field diminishes. The standard 100 octane fuel may become 85 or even 70 octane, affecting the performance of aircraft that subsequently take off there.

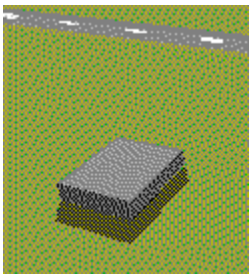
Damage to an airfield's fuel usually results in host efforts to resupply it. A drone C-47 transport plane is dispatched from an affected country's nearby airfield bound for the injured field. When the C-47 arrives, the field's fuel is restored to full potency.

Oil Refineries

A country needs its oil refinery to replenish its stores of gasoline at airfield gas storage facilities that have been destroyed by bombing. If you destroy the enemy's "refer" you make fuel resupply impossible until the host can rebuild the refinery (about 30 minutes). However, if an airfield's fuel is damaged BEFORE the refinery is, then resupply planes and trucks will already be enroute to the damaged field.

Each country has one refinery and it consists of four buildings next to three cracking towers. The towers are the important structures here, and each one requires two bomb hits to destroy it.

Ammo Dumps



These solitary structures contain ammunition for the airfield, and are tough targets. They are

short buildings, sitting by themselves, one at each airfield. You need to hit one with four bombs to destroy it. Destruction of an ammo dump reduces the ammo load - usually cannon shells - of airplanes taking off from the affected field.

Ammo Factories

Each country has one of these as well. Destroying it takes four to six bombs. As is the case with a refinery, if a country's ammunition factory is gone, and one of its airfield's ammo dumps is destroyed shortly thereafter, resupply cannot begin for at least 30 minutes while the host rebuilds the factory.

Radar

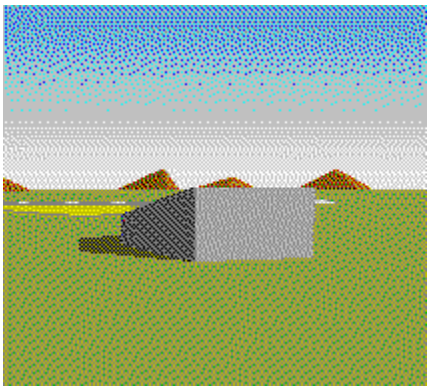
Nothing annoys the enemy quite the way losing his radar does. He can keep on fighting effectively - veteran pilots know how to operate very well indeed without radar - but with a distinct inconvenience.

Radar is locally based in each airfield's control tower. Generally, it takes between one and four bombs to kill a control tower, though there is a random element to all bomb damage. Once destroyed, a control tower stays out of action for 30 minutes.

Radar can be a tough target to hit. The tower will call out to friendly aircraft, warning them of an enemy attack, as you approach. Further, main airfields are protected by three anti-aircraft batteries that can chew any attacking aircraft to pieces in a matter of moments.

You'll have to fly at an altitude of at least 5280 feet (1 mile) to avoid the "ack," although many of them - particularly those protecting main fields - possess a range up to 20,000 feet. Problem is that the higher you fly, the tougher it will be to drop your bombs accurately on a target as small as a control tower.

Aircraft Hangars



Aircraft hangars are the buildings with sloped roofs at airfields. It takes three bombs to destroy one, and its destruction reduces the ability of the airfield to maintain its planes properly.

There is one airplane hangar at each airfield. You can readily identify one by its sloped roof.

Once an aircraft hangar is gone, airplanes taking off from that field have poor maintenance, reduced durability, and may even be leaking gas or oil on takeoff.

Spare Parts Factories

Yes, this works the same way the ammo factory or refinery does. When it's destroyed, resupply of airfields with bombed out hangers is retarded. And, like other factories, it takes four to six bomb hits to destroy and 30 minutes to rebuild.

Aircraft Factories

Each country has an aircraft factory producing one type of aircraft - either Spitfires or Focke Wulfs - and if it is blown up, then all airfields lose their supply of that aircraft type. There is a loophole to this rule however. If your country loses its Spitfire factory and you land your Spit at an airfield, you can rearm and refuel, and take off again in the same plane.

Pacific

Given that airfields in the Pacific tend to be more spread out, support facilities are associated with the shipping just offshore of each airfield. There is, however, a central aircraft factory that can be hit, knocking out a specified aircraft type for that country if it's destroyed.

Oceania - Campaign Pacific

Each major landmass (one for each country) has a set of factories similar to Europe - an ammo factory, refinery, spare parts factory, and aircraft works. Supply to island fields following the Pacific model; supplies are based in offshore shipping.

Player Resupply

You can resupply a damaged airfield yourself by flying a C47 transport plane, loaded with the cargo you need, from an undamaged field to the wounded one. Upon landing there, the damaged commodity will be restored to 100%. To repair bad fuel, load fuel, for bad ammunition, load ammo, and for poor maintenance, load supplies.

Cargo Commands

When you choose a C-47 Gooney Bird, you get the option to load paratroopers or cargo. You can also load cargo manually from the Ready Room, after you've selected the C-47.

/cargo <type> Loads a C47 transport with <f>uel, <a>mmo, or <s>upplies.

Friendly Fire

Your bullets can damage friendly aircraft. If you shoot down two friendly planes within 24 hours your country will no longer allow you to carry live ammunition. Your status is reduced to persona non grata (PNG). You can either defect to another country or return after 24 hours and your PNG status will be reset.

Note: One of the easiest ways to unintentionally kill friendly aircraft is by taking a Flakpanzer anti-aircraft vehicle, and begin firing before you drive away from the takeoff point. Friendly planes, subsequently taking off from that airfield will be literally sitting on top of you, but you won't be able to see them. When you fire, you will destroy them. Thus, when taking a Flakpanzer, always drive at least a short distance from the takeoff point before you go to your guns.

> *In the last Pac campaign, I'm coming in to 19 with three kills. My Ki is smoking and I'm on fumes. Gear down, speed 100kts and I'm 100ft off of the threshold. "Bonk!" I check rear view and there is a Bz 38 hosing me.*
>
> *I died, checked my score and popped back out at 14 to hunt one of my own countrymen. I asked him why he shot me and I get the message XXXX crashed.*
>
> *I popped back into HQ and asked him why the hell he shot me down????*
>
> *He apologized 5 or six times the first minute. It seems that he had just switched countries, and when he saw the "red Ki" fill his sights ... it was reflex. He said he would make it up to me etc, and told me that he augered when he realized what he did.*
>
> *We both had a good laugh about it.....cause.....it can happen to anybody!*
>
> *- Specter Rear View*

Network Delay Effects

When many pilots are flying simultaneously, the online network has to distribute copious quantities of data over the phone lines. This can delay the communications between your computer and the host.

One result is a phenomenon known as "warping," where planes seem to change positions suddenly. Hitting warping targets is difficult and you will have to apply, to a greater degree than normal, the principles of deflection shooting.

When your target begins to freeze and then warp to another position, keep in mind that the target itself is still flying normally, even though it appears erratic to you. Try to visualize the target's true flight path and anticipate its position when it stops warping.

To evaluate the status of your network connection while flying, type <ESC + d> (followed by <ENTER>). If the delay is 2 or greater, chances are that you will be seeing warps.

Distance Distortion

I'm adding a message to my rear view - WARNING: Objects in mirror are closer than they appear.

- Ironman

Due to the nature of network play, distance information in your rear view is not always accurate.

Depending upon the speed your aircraft and a pursuing aircraft are traveling, the reported distance will be longer than it really is. So, at high speed, you should subtract 400-800 yards from the distance you're seeing on your computer.

Air Combat Maneuvers

Basic Air Combat Maneuvers

Energy is the most important concept in Air Combat Maneuvers (ACM). It's best understood as a dynamic combination of airspeed and altitude. Airspeed is a measure of an aircraft's instantaneous ability to maneuver; altitude is a measure of an aircraft's potential ability to gain speed quickly by diving.

Together, they comprise a plane's energy state. Think of airspeed as cash in your pocket, and altitude as money in the bank. Climbing reduces your airspeed but increases your stored, potential speed; diving withdraws speed from your account to be spent maneuvering your airplane.

> *Higher [altitude] does not mean better e state, lower and faster can be a better position sometimes. Keep yer speed, gain e as your enemy slowly loses it, and then he'll be ripe for the up and wack lead turn, or he'll run away.*
>
> *- Holmes*
>
> *E-fighting is the art of maintaining your plane in a favorable energy state. "Favorable" is in the mind of the beholder. If you're in a FW it means enough E to extend past gun range for another pass. If you mean in a 38 it means maintain enough E to get over the top quickly, use flaps effectively and hit the "sweet spot" on the corner for a P-38. When I hang myself out to dry or spin I have made a mistake and don't have E anymore.*
>
> *Don't confuse E fighting with speed or altitude. They are related but not the same thing. E relates to managing your options and position.*
>
> *- DeadDuck*
>
> *Equating BnZ with a "runaway" tactic assumes that the initial target of the attack is the only focus. When dealing with a broader front, and multiple incoming enema groups, BnZ allows one to engage more target groups than would otherwise be possible. What this requires is control - control over Greed. It is very tempting after a run where you see hits to go back and try to finish it off. But if you do - if you burn up the zoom and extension - you can't go after the next wave.*
>
> *Remember - there's _always_ something stoopider up in the air you can go kill.*
>
> *- DoK GoNzO*
>
> *E fighting (to me anyway) can do anything because you are maintaining the correct amount of E for the _proper_ situation. That can range from anything to extending in a spit to taking a 51 and looping with a spit long enough to kill it. Know the enema's E, maintain yours.. and use whatever plane you have to its advantage.*
>
> *-HardRock*

The Energy Market of Air Combat

Maneuvering is the process of exchanging energy for position. Classic ACM are proven moves, perfected over decades, designed to gain you the most maneuverability for the least cost in energy.

Air combat is perhaps the only contest where it's both honorable and desirable to shoot someone in the back. This is the goal of ACM - to spend your energy to gain a tail shot. There are three good reasons for this:

1. The enemy's guns will not be pointing at you.

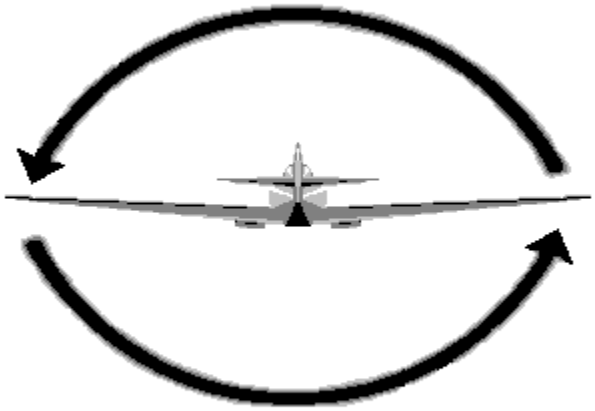
2. With tail shots you do not need to lead the target as much when shooting.

3. The tail offers the best position from which to adjust to a target's evasive moves.

Classic Air Combat Maneuvers

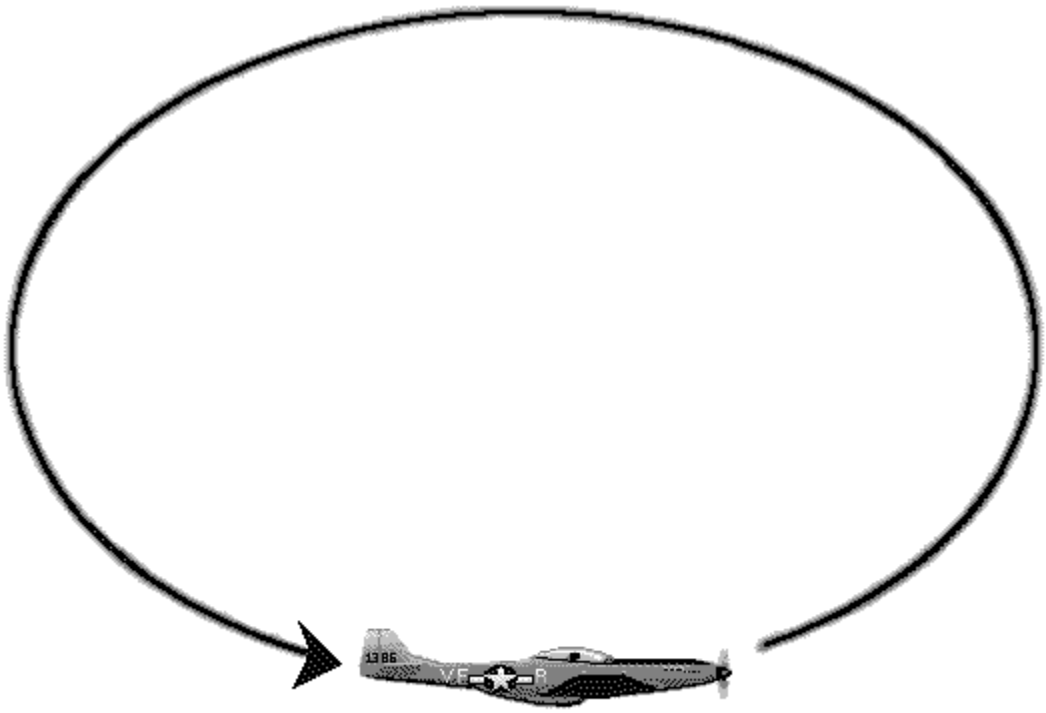
Many air combat simulations cite classic air combat maneuvers (ACM) to create an atmosphere of realism. Knowing authentic ACM in Air Warrior, however, is not a quaint touch; rather, it is an essential skill you will need to become successful in the game.

Simple Aileron Roll



Sideways movement of the stick causes your plane to roll. The aileron roll is a basic component of every air combat maneuver.

Loop

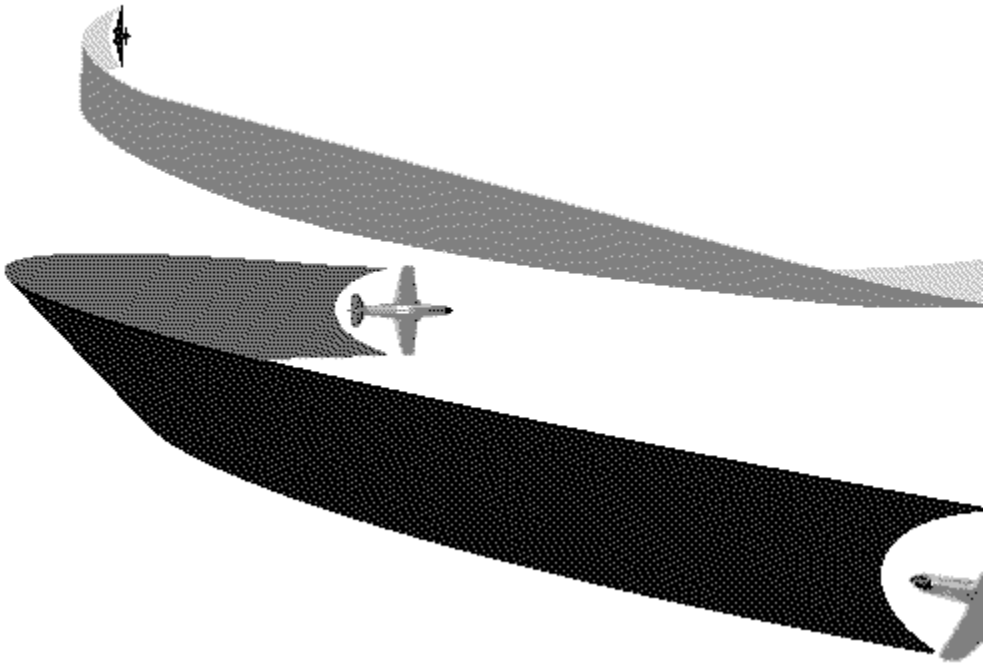


This is a full loop and is more an air show maneuver than an air combat maneuver. The loop is most effective against very slow targets, such as heavy bombers, or against fighters that are just taking off from an airfield.

Break Turn

Frankly, any pilot whose first move is a flat turn should be as good as dead within 2 minutes.

- DoK GoNzO



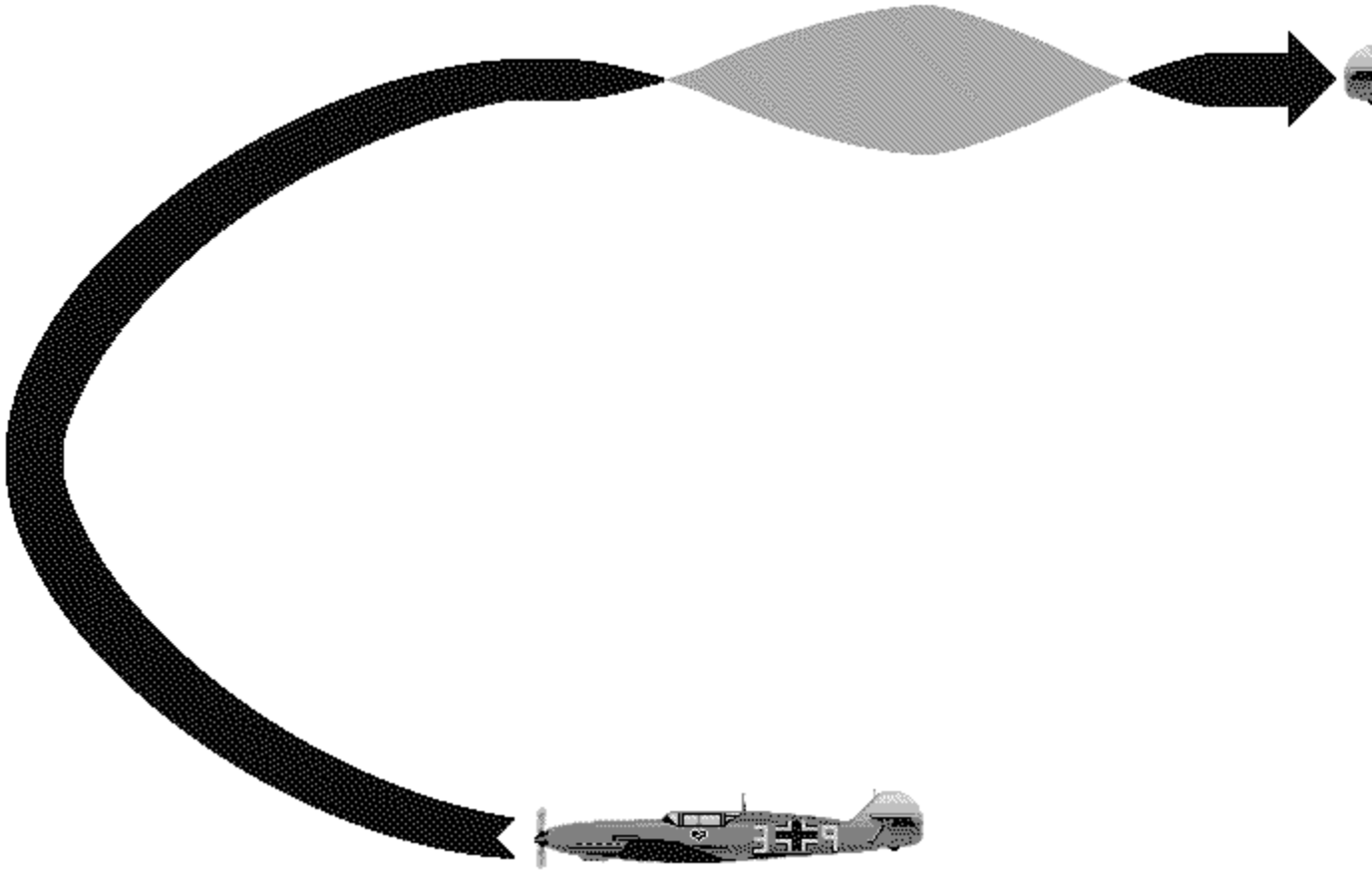
The break turn is a hard, flat turn of last resort when you're under attack, and it depletes your energy rapidly. It's an aileron roll followed by sharp, backward pressure on the stick. The idea is to get out of the way of an attacker's bullets as quickly as possible. Usually pilots employ the break turn when caught by surprise, and it's a short-term solution at best.

In this illustration, defender B uses the break turn against attacker A. If you use this maneuver, make sure you turn INTO the attack, if possible. Breaking away from an attack presents your tail to the enemy.

Immelmann Turn (Half Loop)

I've found it dangerous to begin a half-loop in the same direction as your entry. When I blow through a furball, and begin my zoom, I always do it with a slight turn. This loses you more energy than a pure half-loop, but saves you from being tracked easily as you egress.

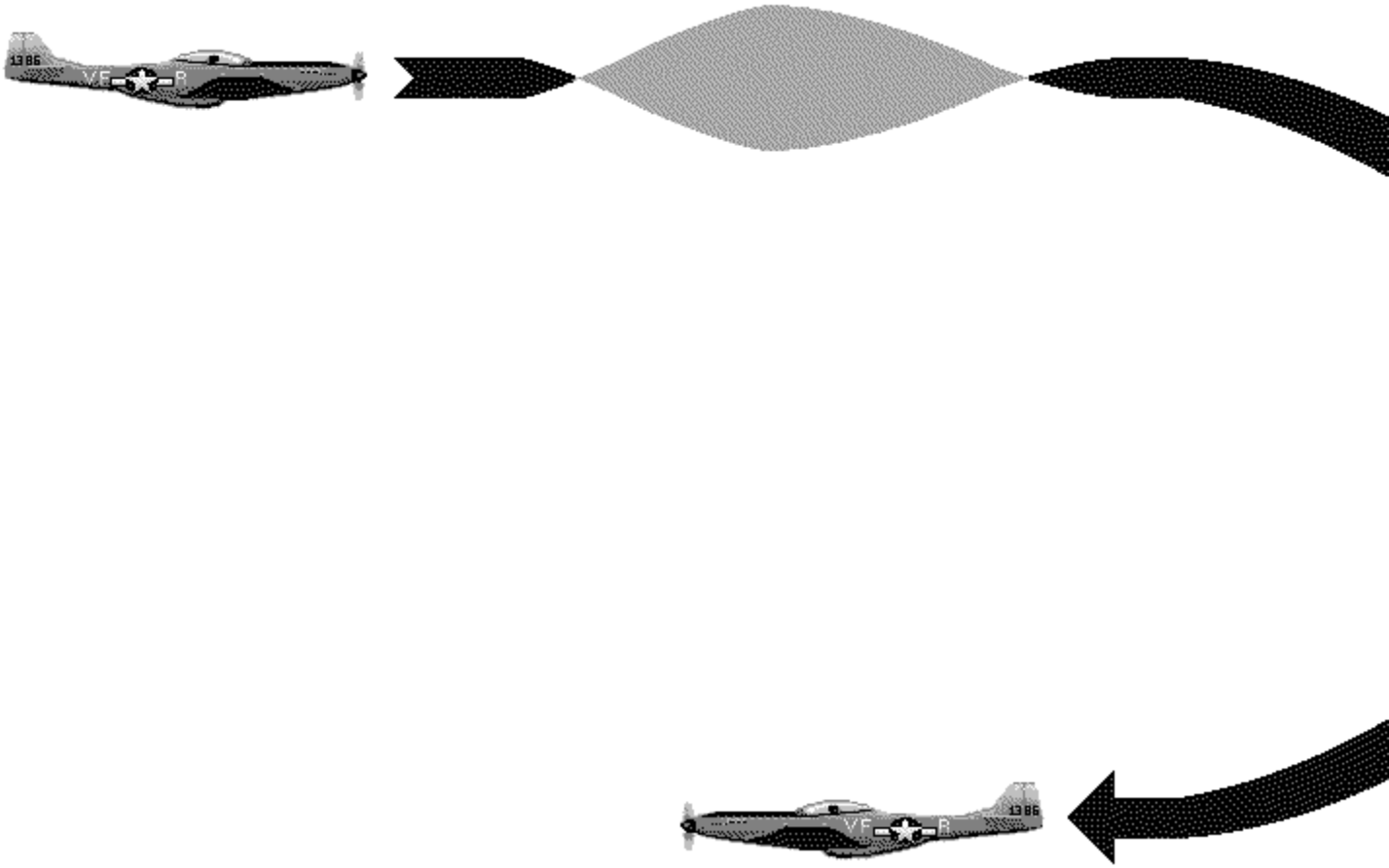
- Vossman



An energy-efficient method of reversing your course, usually to set up a subsequent shot after making a high speed firing pass, is the Immelmann turn. This is a half loop - a vertical 180 degree turn - with an aileron roll at the top.

While it may preserve your energy, it can make your plane an easy target. Generally, you should avoid using this maneuver when enemies are within gun range.

Split - S



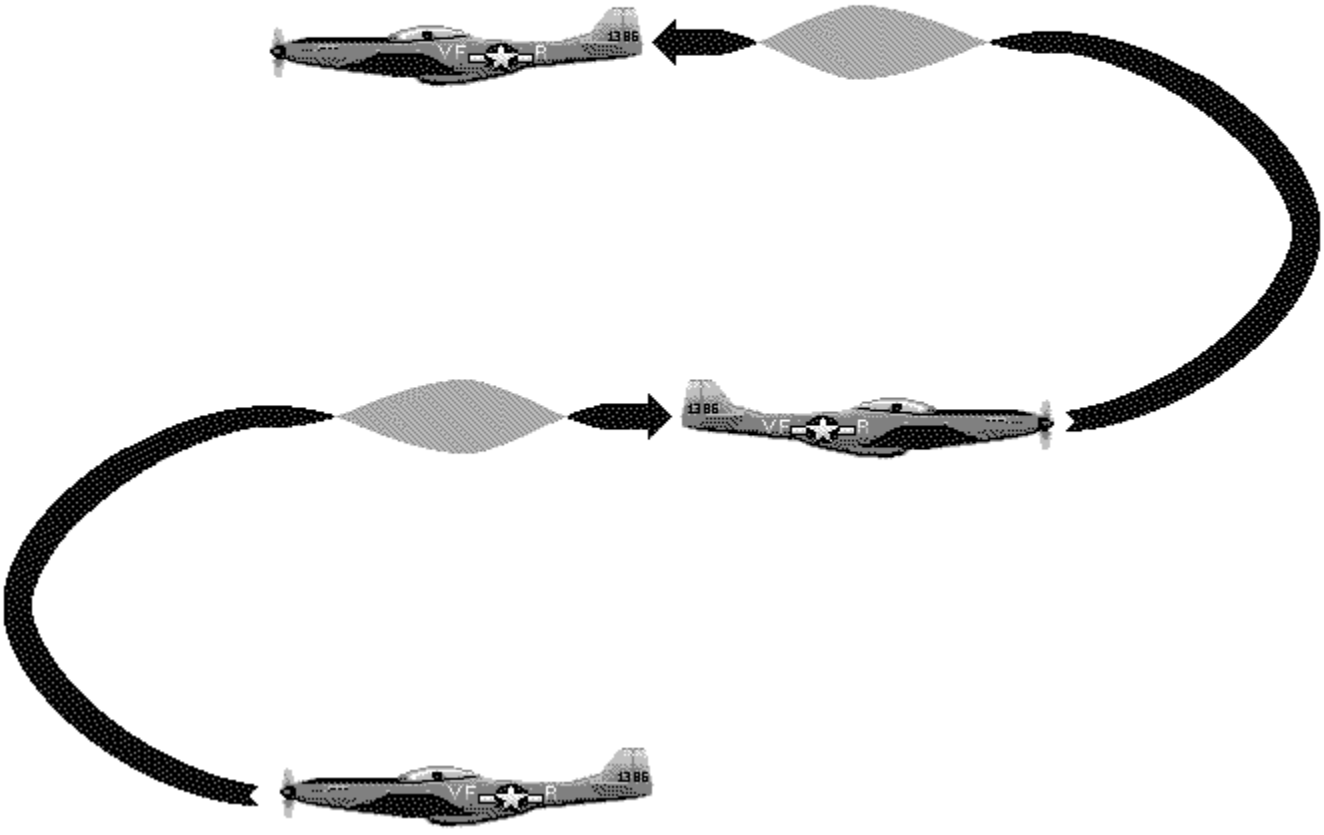
Called the Split Arse by the British, due to how the maneuver feels to the pilot, it is a half loop in reverse. You use it to attack a target below you and you need a fair amount of altitude to execute it. Roll the plane inverted, then pull back on the stick until level.

New players often dive right at lower targets head-on. Not only is this a bad angle from which to hit the target, it also affords the target an equal opportunity to hit you. With the split-s, you allow the bandit to pass below you and then you dive onto his tail. This requires timing, but it's an effective move.

Vertical 8

One technique I like a lot is to get the enemy to follow me into vertical maneuvers when I have more speed than he does. This can be a bit tricky to judge and if you are incorrect, you get a tail full of lead. When it works, though, it is really fun. The enemy follows you up, probably firing the whole way when you are just out of gun range, then stalls out. When he does, you pull into a dive and hammer him as he is floundering at low speed.

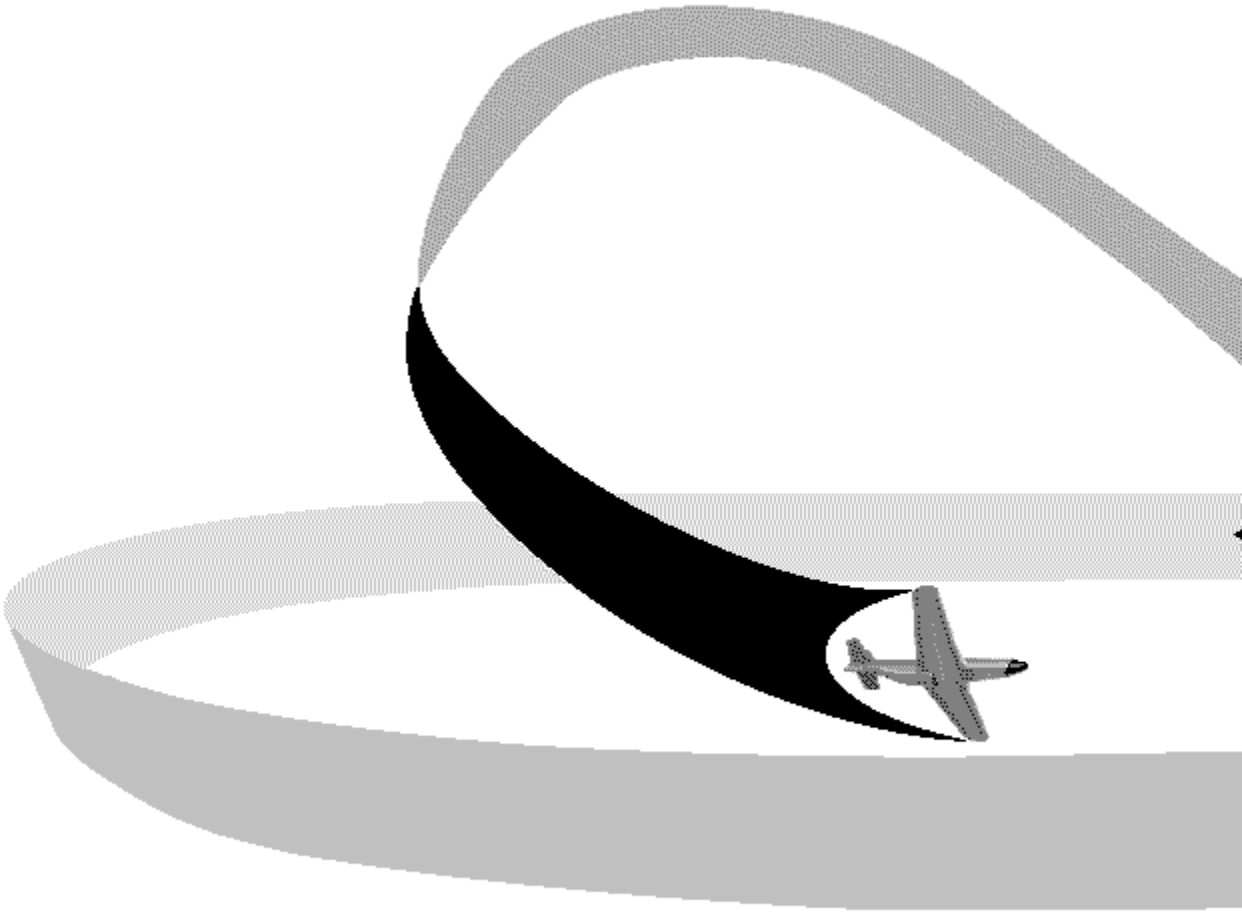
- Brooke



The Vertical 8 is two half loops performed one right after the other. You can accomplish this only if your airspeed is very high. If a slower bandit tries to follow you, and he isn't watching his airspeed closely, he will stall below you, giving you an excellent opportunity to attack him.

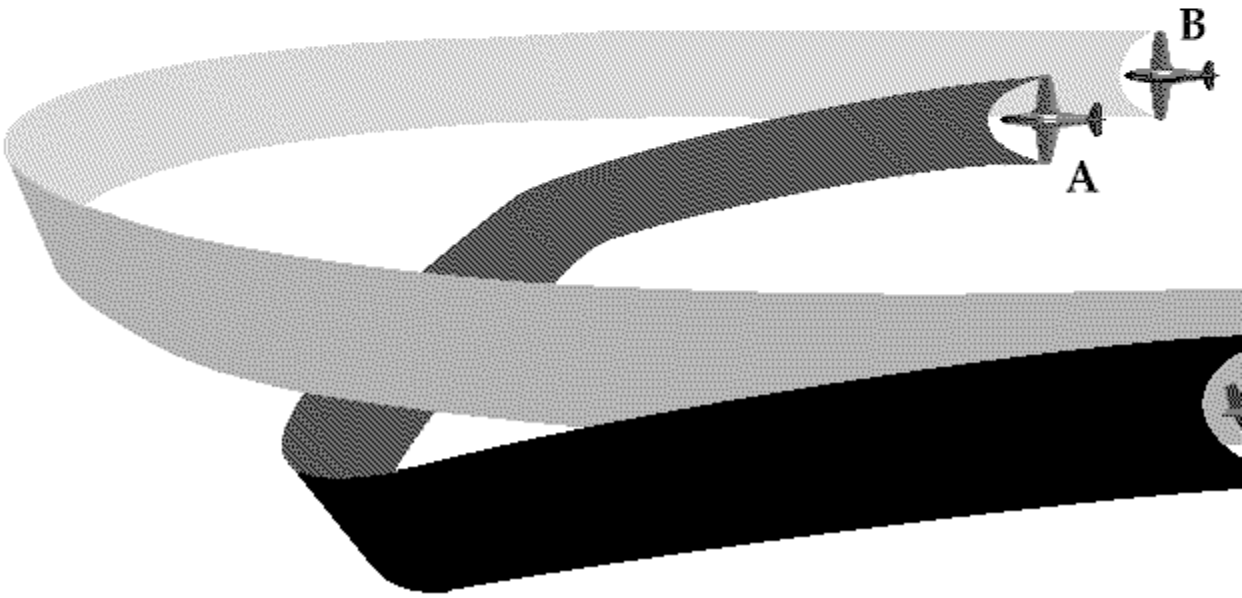
Many players use this principle far more simply. They pull into a zoom climb after they've drawn the interest of a slower bandit. If the latter is not paying attention, he'll stall and become a helpless target. In Air Warrior this is called the rope-a-dope.

High Yo Yo



This is perhaps the most difficult maneuver for new players to understand and use. Attacker A makes a high speed pass on slower defender B who attempts to evade with a break turn. The attacker converts his speed into altitude by pulling his fighter into the vertical. While he does this he rolls his plane so that his cockpit points in the direction his quarry fled. By pulling back on the stick as he rolls, he steers his vertical momentum toward the attacker, allowing him to dive onto the defender's tail.

Low Yo Yo



Here, attacker A is moving slower than defender B. The attacker closes on his target by diving to convert altitude into airspeed to cut inside the defender's turn. This uses the same principle as the high yo yo, but in an opposite fashion.

With the high yo yo, the attacker converts speed to altitude in order to reduce his closure rate; in the low yo yo, the attacker converts altitude to speed to increase his rate of closure.

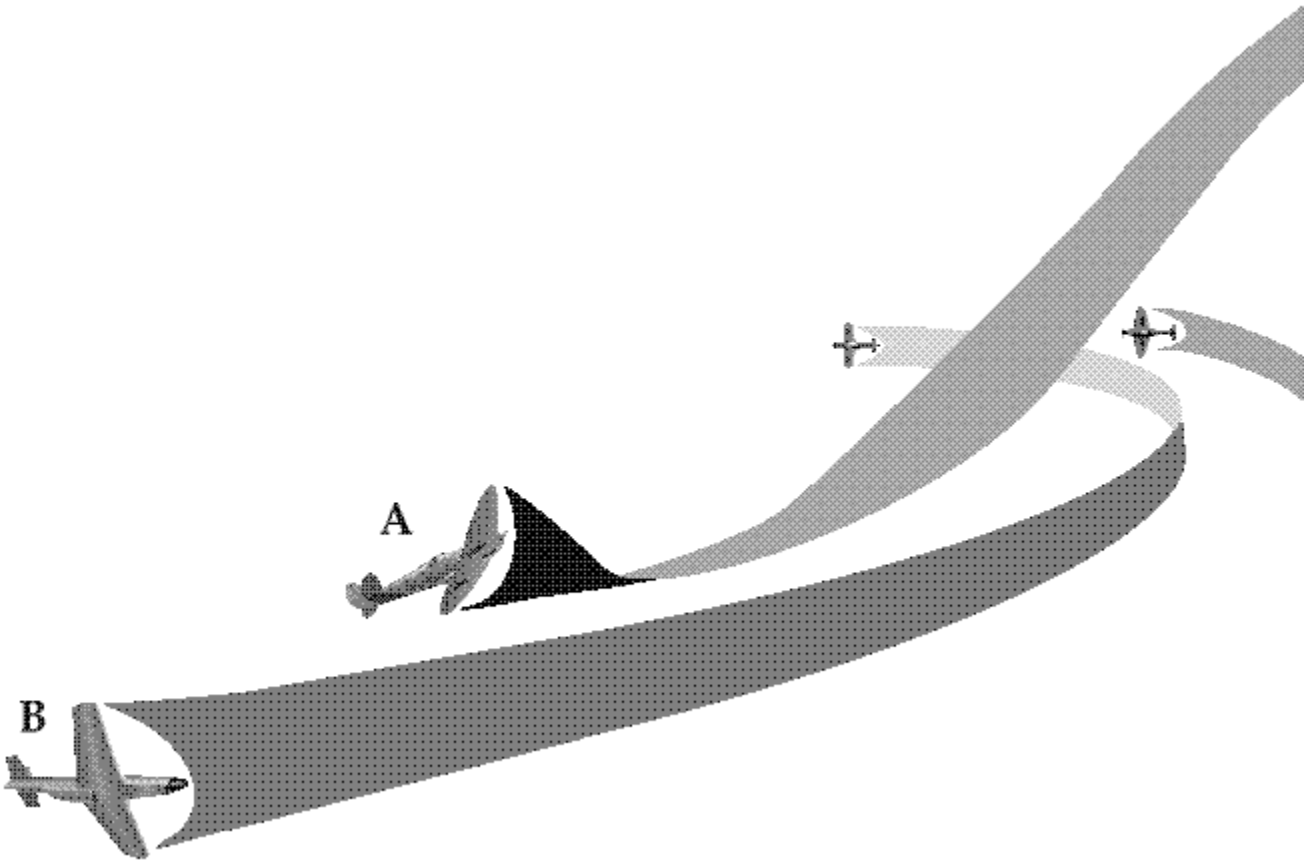
Barrel Roll

I know two definitions for barrel roll. One is an aerobatic maneuver where you pull the stick back and to the side. Viewed from behind, the plane travels in a circle (up and down) with the canopy toward the middle. Heading doesn't change. That's only occasionally useful in combat.

There's also a combat maneuver going by the name of barrel roll which is in the same family as lag rolls and

high yo yos. Establish lead, pull up, float over the target, roll toward him, and pull down in behind him, rolling to lead him. You need speed for that.

- Warlock



Similar in principle to the High Yo-Yo, the barrel roll attack is a climbing turn designed to prevent overshoot, and reacquire an evading, lower energy target.

Fighter Reference

Fighter Reference

Fighters of Legend versus The Fighters of Air Warrior

The reason 'our' Jug stinks is that the real Jug would have stunk if it had had to perform in our arenas. The 'virtues' of some of our favorites disappear in the small world of AW.

- Eyeballs

Many new Air Warrior players are disappointed to discover that their favorite planes from history are not always the top performers in the Air Warrior simulation. For example, the P-51 Mustang is often depicted, quite rightly, as the fighter that won the air war in Europe. Yet, most new players find themselves hopelessly outclassed if they fly a Mustang in the Air Warrior arenas. One reason for this sort of discrepancy with the historical record is that in the actual war, with some extremely rare exceptions involving captured aircraft, Mustangs never fought Spitfires, Lightnings never fought Hellcats, Focke Wulfs never tangled with Me109's.

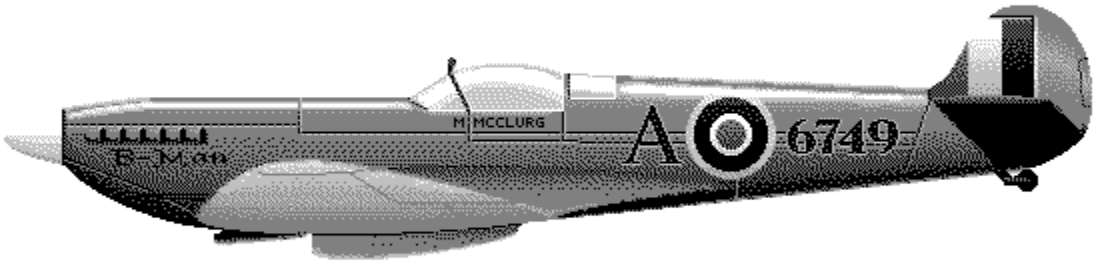
In arena play, Air Warrior fighters are not facing their historic adversaries. Second, and perhaps more importantly, Air Warrior fighters are not filling their historical roles in the arena. The Mustang made its mark as a high altitude escort fighter capable of flying to Berlin and back. In Air Warrior arena play, people are paying for their time online. Thus they're not climbing very high, and they're looking to get to the fight fast. Performance alone does not make an aircraft valuable in war - its ability to serve a needed role well does. The vast majority of the time we only look to one role for fighters in AW - low altitude dogfighting.

Finally, in actual World War II air combat, the vast majority of kills were achieved against opponents who never saw what hit them. Few WWII aces got their kills by dogfighting. Rather, they were masters of seeing the enemy before they were seen, positioning themselves so that they were difficult to see (diving out of the sun, for example), or attacking enemy aircraft that were otherwise occupied, such as the Mustang's primary target - bomber interceptors.

If you get a bunch of 47s up above 30K
and see some 109s diving on buffs at 25K
and you get on their 6 before they see you
and then the 109s try to dive away to safety,
THEN you will see how wonderful the 47 was!

-Eyeballs

Spitfire MK IX



Every player has his or her own plane which they endorse but the Spitfire is the best all around fighter.

-Grog

The Spitfire MK IX has the best qualities in just about all the areas needed to win.

-Ghost Rider

If you fly the spit you are fly'n the badest ride in the game, and eventually you should be able to turn the tables in your favor. About the only thing the Fw has on the spit <performance wise> is its top speed and dive speed; other than that, the spit wins hands down in all other categories.

- Vortex

Aside from a light ammo load, the fundamental reason an Air Warrior pilot would hate the Spitfire is because it's too good an opponent. The Spit is fast, extremely maneuverable, and cannon equipped, making it the most popular plane in the European Theater.

History

Reginald Mitchell designed the Spitfire based upon his seaplane - the Supermarine S6 - that set speed records and won the Schneider Trophy in 1931. Unfortunately, he died in 1937 before his remarkable creation ever saw combat. Mitchell hated the name, Spitfire; he preferred "Shrew." Though his fighter would have been just as deadly no matter what it was called, perhaps the Luftwaffe should be grateful than their pilots never had to report that they had been attacked by a flight of Shrews.

The Spitfire in Air Warrior - Relaxed Realism Arena

The Spitfire dominates the European Theater of Air Warrior. Traditional weaknesses of the Spitfire, such as its limited range and narrow track landing gear, are not a factor in the game. One historic drawback of the plane is relevant; the Spit carries a light ammo load and loses more than 80% of its lethality once half its ammo is gone.

In every aspect of air combat the Spitfire excels. It has a high roll rate, excellent maneuverability, rapid climb rate, good speed, and guns second only to the Focke Wulf for sheer lethality. Although the Spit holds onto energy very well, most pilots use it for turn-and-burn dogfighting - what many Air Warrior players refer to as stallfighting.

The Spitfire Under Full Realism

Virtues

The Spitfire holds energy better than any fighter in Air Warrior - realism or no realism. It suffers less induced drag than any fighter in Europe, and can boom and zoom brilliantly, though, given its superb dogfighting abilities even under full realism, few pilots choose to do so. This is one sweet plane to fly. It handles extraordinarily well and can half-loop at speeds as low as 150 knots.

Unlike earlier marks of the Spitfire, the Spit IX has a decent sized fuel tank. It's also a good fighter at very high altitudes - better, in fact, than the Mustang.

Vices

Only one thing prevents the Spitfire from being the most popular full realism fighter in Europe: ammo load. It's not simply that the Spit has a short clip. Rather, it's the enormous plunge in lethality the Spit suffers after half of its ammo - its cannon shells - is gone. This is why many pilots refer to the Spitfire as the one kill wonder. Also, many pilots have trouble with blackouts in a Spitfire, owing to its ability to pull high G's at low speed. Finally, as its speed gets higher, its controls get stiffer until you lose virtually all control over the plane around 450 knots. This tendency toward control stiffness at high speed puts it at surprising disadvantage against its traditional opponent, the Focke Wulf 190.

Tips

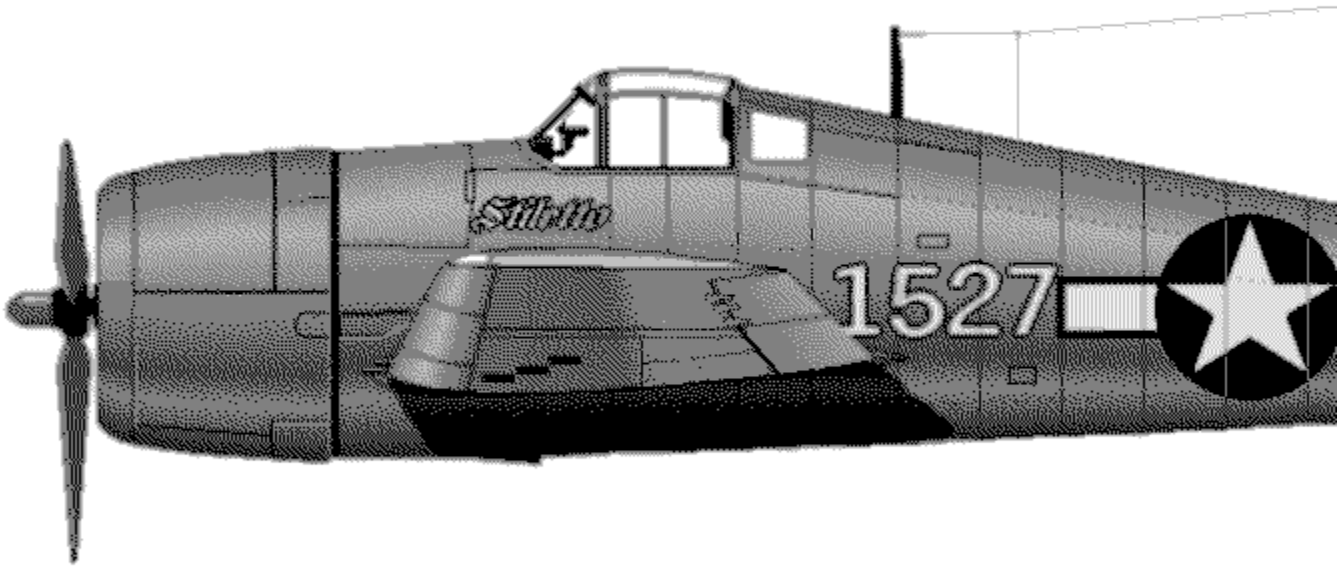
Given the oft mentioned light ammo load, the Spit works best for pilots who are good shots. Although the Spit has a small supply of ammo, its guns are potent, rewarding the sniper rather than the sprayer.

Stay off of the flaps when flying a Spit, except to get over the top on low speed vertical maneuvers. The Spitfire has no maneuvering flap setting, and its flaps down position is intended to create increased drag for landing.

Armament: two, .50 cal. machine guns; two, 20 mm cannon. Ammo Load: 500 machine gun rounds; 240 cannon shells.

Payload: One, 550 lb. bomb.

F6F-3 Hellcat



Ya gotta love the F6... will feel nary a bit of trepidation when finding 38s, F4s, or Kis at co-alt & E.

- Kato

F6 has a decent ammo load and takes a decent amount of damage plus two eggs and handles real nice, one of the more forgiving planes to fly. Low speed turning, it's competitive with the Ki and 38, prolly fuel and ammo load and pilot skill would determine the outcome. It also handles well at higher speeds.

In other words, I LIKE it <G>

-Spellbound

History

Descended from the Wildcat, the Hellcat, like several other American designs, owed much of its success to its engine - the Pratt & Whitney R-2800 Double Wasp. In contemporary terms, the F6F is a Wildcat on steroids, with nearly twice the horsepower to go with its power plant's legendary durability.

Though many people consider the F4U Corsair the epitome of American WWII naval air power in the Pacific, the Hellcat was, far and away, the Navy's most successful fighter of the war, accounting for over 6000 air-to-air kills. It was this homely work horse that stole air superiority away from the sleeker, more nimble Japanese Zero.

The Hellcat in Air Warrior

The F6F is the best example of the phrase, "the whole is greater than the sum of its parts." The Cat is not fast; only the Zero is slower. Both the Ki-84 and the Zeke can out-turn it. The Corsair and the Lightning can out-climb it. Nonetheless, the Hellcat is a popular selection for fighting against these planes because of it combination of attributes - though great at nothing, it does everything well. It has a good climb rate, turns beautifully - particularly at high speeds - is very durable, and possesses, along with the Corsair, the largest ammo load of any fighter.

The F6F-3 Under Full Realism

One historical aspect of the Hellcat comes sharply into play under full realism - it is extremely forgiving. Unlike many fighters, you can really horse the Cat around. While it is capable of some rather determined spins, it will accept much mishandling before it enters one.

Virtues

Aside from its easygoing departure characteristics, the Hellcat dives well and has a remarkable ability to turn at high speeds. It can absorb a lot of punishment, and has a plentiful supply of ammunition.

Vices

Although many players stallfight in the Cat, it can be easily out-turned at low speed by Franks and Zekes. It also bleeds energy relative to the Corsair, Mustang, and Lightning. Finally, despite its reluctance to depart, the F6F can get into nasty spins if pushed beyond its generous limits.

The Hellcat Against Other Allied Planes

The Cat has two important strengths: range, and as already noted, ammo load. It lacks, however, good high altitude performance. The Corsair, Mustang, and Thunderbolt are all better performers above 35,000 feet.

Tips

If'n I'n in that Zeke, and some dweeb in a Cat tries to turn with me...that puppy is DEAD! DO NOT stalfite with ZEKES, the other pilot may NOT be a dweeb and let you go for the head-ons. If you don't get the head-ons, you're a toasted cat.

The cat does do nicely with most other stuff, tho...although the Ki seems to out turn it by a hair. Keep the speed up to 225 and you'll keel like crazy in it.

-Shaky Stick

Keep the Cat fast. It achieves its best turning performance at speeds between 225 and 250 knots. Even if it gets slow, however, it's not as helpless as a 'Stang, Jug, or Hog at low speed.

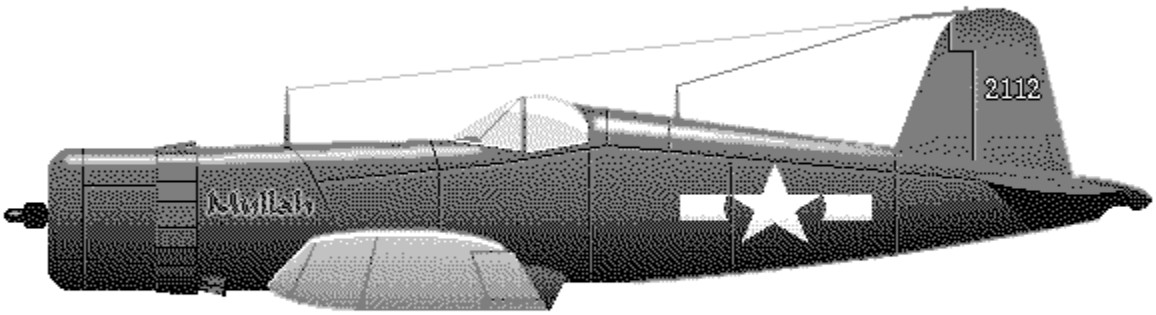
You can devour those fighters in a stallfight, but be easy meat for a Zeke, or Ki.

Stay off the flaps. The Hellcat has two position flaps - full up or full down - and the down position is for increased drag for landing, not for maneuvering.

Armament: six, .50 cal. machine guns. Ammo Load: 2350 rounds.

Payload: two, 550 lb. bombs.

Chance-Vought F4U-1 Corsair "Hog"



I love this plane because:
A) It's blue
B) It's BIG
C) It's fast
D) It's ammo load is incredible
E) It's ammo is better than the Ki and P-38 after they lose cannon
F) It's blue
G) It can disengage pretty quickly because it's fast, big, and blue.

-Buckaroo

Wow dept: I spent friday evening in a F4U, I had read somewhere the night before that, "If you like the FW, you will love the Hawg." I believe it was a quote from Killer. Anyway, I took the Hawg up around 10 times and had like 13 kills. This is by far my best F/K ratio night ever. The only plane that gave my F4 much of a problem was the KI, but I could normally B/Z them. Had to keep that speed up over 250 and didn't engage a KI unless I had alt.

The F4 is alot like the FW in terms of fire power and armor, but the F4 climbs and holds E better than the FW, I love the F4 now. I suppose this is nothing new to most of you kids, I just felt like sharing my new excitement. :)

-Gunner

History

The Corsair embodies the American approach to fighters in World War II: build an enormous aircraft and load it with an abundance of horsepower, armor, and ammunition. Part of the Corsair's greatness is the result of a fortunate accident. The need to shorten its landing gear, due to the weight of the plane and its intended role as a carrier-based fighter, was complicated by the enormous size of its propeller. The unconventional yet adopted solution was to bend the Corsair's wings into their now classic gull-wing shape. This also put the wing roots at exact right angles to the fuselage - a configuration later discovered to be ideal for reducing drag. The Corsair's sheer power was no accident. It's notoriously durable Pratt & Whitney Double Wasp radial engine produced over 2000 horsepower - one of the most potent aircraft power plants of the war.

The Corsair in Air Warrior

Though a few F4Us served in Europe, the Corsair is only available in Air Warrior's Pacific Theater. As in the actual war, the Hog in Air Warrior faces many aircraft that can easily out-turn it at slow speed, yet it's faster than its more nimble opponents, except perhaps the Ki 84. Thus, the Corsair must stay fast and avoid turning fights against all the Pacific fighters, save the Mustang. Only at high speeds does the Hog handle well. The F4U is an exceptional dive bomber and its advantages over the other two-bomb fighter bombers - the Mustang and the P-38 - are durability and ammo load. In fact, the Corsair is the most durable fighter in Air Warrior and possesses the most ammunition of any fighter in the game.

The Corsair Under Full Realism

In a full realism environment where planes cannot endlessly execute high G maneuvers, the Corsair is an even better fighter. Speed and durability, though important in any Air Warrior battle, become much more crucial when the going gets real. In fact, with the possible exception of the Me109, no fighter in Air Warrior benefits more from full realism than the Corsair. Many Air Warrior pilots believe that the F4U is clearly the finest full realism fighter in the game. Those who hold this belief, however, are among the most experienced of players. The Hog is only effective for pilots who know its secrets.

Virtues

Fast, and a good climber, the Corsair is also extremely durable; only the P-47 can take more punishment than the F4U. The Corsair dives better than the P-38, is faster than the Hellcat, and is more maneuverable in the vertical plane than the Mustang. Further, with its powerful engine and low drag gull wings, the Hog may be the best energy fighter of all. Also it has, along with the Hellcat, the most plentiful ammo load of any fighter in Air Warrior.

Vices

The Corsair's departure behavior is nothing short of horrendous; it takes both experience and skill to readily recover from spins in the F4U. The Hog turns poorly in low speed, flat turns, and is easy meat when it gets slow.

Tips

You can sharply improve the Hog's turning performance at low to medium speeds (160-200 knots) by employing one notch of flaps, though this will avail you little against Hellcats, Franks and Zekes. Use throttle adjustments in nose down turns to cut your turning radius, especially in a looping fight.

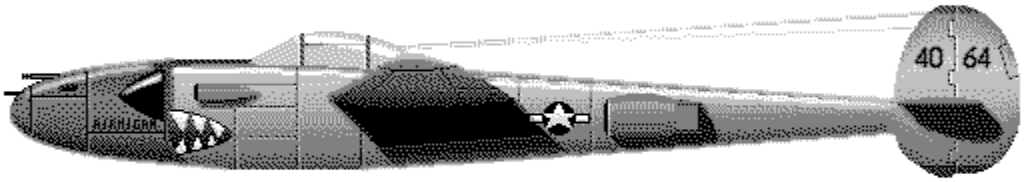
Against Zekes, employ the F4U's tremendous advantage in horsepower and climb rate to stay above your quarry. Against high Zekes, use the Hog's advantage in high speed maneuvering to make the Zeke bleed off its energy relative to you.

Against pursuing Franks at co-alt, you cannot outrun them, but you can climb out on them using a 3k/min climb rate and WEP if you begin this tactic from top level speed.

Armament: six, .50 cal. machine guns. Ammo Load: 2350 rounds.

Payload: two, 550 lb. bombs.

Lockheed P-38J Lightning



In the Pacific, the P-38 makes the most sense because it has a lot more lethal ammunition than the Ki and, even though it has the roll rate of a 747, it's the most accomplished Zeke killer.

-Stiletto

The P-38 may be the best all-around airplane in Air Warrior, and it's a good choice for new players.

History

Referred to as the "Fork-tailed Devil" by the Luftwaffe, the P-38 was the only truly successful twin engine fighter of World War II. Relegated to primarily a ground attack role in Europe, the Lightning's greatest success as a fighter came in the Pacific against lightly armed and armored

Japanese fighters. Dick Bong, America's most prolific ace, scored all of his 40 kills in a P-38.

The P-38 in Air Warrior - Relaxed Realism Arenas

Although not the best in any single aspect of performance, the Lightning provides perhaps the best combination of speed, climb rate, lethality, ammo load, pay load, maneuverability, and durability of any fighter in Air Warrior. Also, the 38 is the only American fighter equipped with a cannon, giving it a distinct, added punch.

The P-38 is the most maneuverable American plane in the game, but it's best used as an energy fighter. Be sure to watch your airspeed, however. Just like the actual aircraft it's modeled after, the Lightning suffers a loss of pilot control at speeds above 375 knots. Use your dive brake (<Spacebar>) to regain control or to improve the plane's handling in steep dives.

While the 38 has astonishing instantaneous turning ability, avoid prolonged turning fights against Spitfires and Zeros because both of these planes have far better sustained turning rates. Also, the 38 has the lowest roll rate of all the Air Warrior fighters. Get in the habit of using your rudder to help it out in a roll.

Its great range and ample ammo load can keep it effective over a long mission, plus it can completely dominate a Zeke or Ki in every department above 30k. Against German fighters it's a different story. While the 38 can outperform the Focke Wulf - particularly at high altitude - it will find itself overmatched in a high altitude dogfight with a Me109.

The Lightning Under Full Realism

Virtues

Even under full realism, the P-38 retains the best combination of firepower, ammo load, speed, climb rate, durability, and maneuverability of any fighter in Europe, and is a match for any fighter in the Pacific. It can maintain the vertical at astonishingly slow speeds as well, in part due to its flaps which, unlike most fighter flaps, add lift as well as drag.

Vices

Whereas the 38 is a great choice for new players in Relaxed Realism, relaxed realism, it is strictly an expert's plane under realism. Its lateral maneuverability is diminished, its sluggish roll rate really needs strong rudder authority, and its departure behavior can be vicious if the pilot fails to take corrective action instantly. Further, the Lightning's legendary problems with compressibility in a dive become even more noticeable in real-time. Two heavy engines out on the wings create severe problems for a P-38 entering an uncontrolled spin. In short order, an uncontrolled spin becomes an unrecoverable flat spin. You must take immediate corrective action because if you find yourself in a flat spin, the only choice you have left is bailing out of the aircraft.

Finally, the 38 suffers in the tough, high-lethality realism gunnery environment because it's such a large target.

Tips

Basically, two things help the 38 in a loop fight -

** It has a really insane zoom ability (try a high-angle zoom from 300kts sometime)*
** Flaps are really effective over the top and for the bottom half of loops The 38 can stallfight anything in the game using a nose-down profile for the fight and some flaps. It CANNOT repeat CANNOT fight a 109 in a nose-up turning situation. DO NOT COMMIT to a nose high turn. Rather loop over or under, try to rudder at the bottom/top of the loop and gain angles there.*

-Twist

Use the 38's maneuvering flap setting (one "notch" of flaps) at medium speed and its fabulous instantaneous turn performance to cut inside of your opponent. As noted above, the 38's flaps add lift as well as drag, so you will pay a price, but you can finish opponents faster in the realism arena.

Employing full flaps will give the Lightning a very low stall speed, which is very useful in getting over the top on a low speed half loop. While you can't flat turn very well at 150 knots, you can, however, go vertical. Be careful to keep your wings parallel to the horizon as you approach a stall or else the 38 will spin with determination.

Against co-alt Zeros, use the horsepower and climbing ability of the 38 to get above your opponent. A zoom climb, followed by a climbing spiral can be a very effective tactic here.

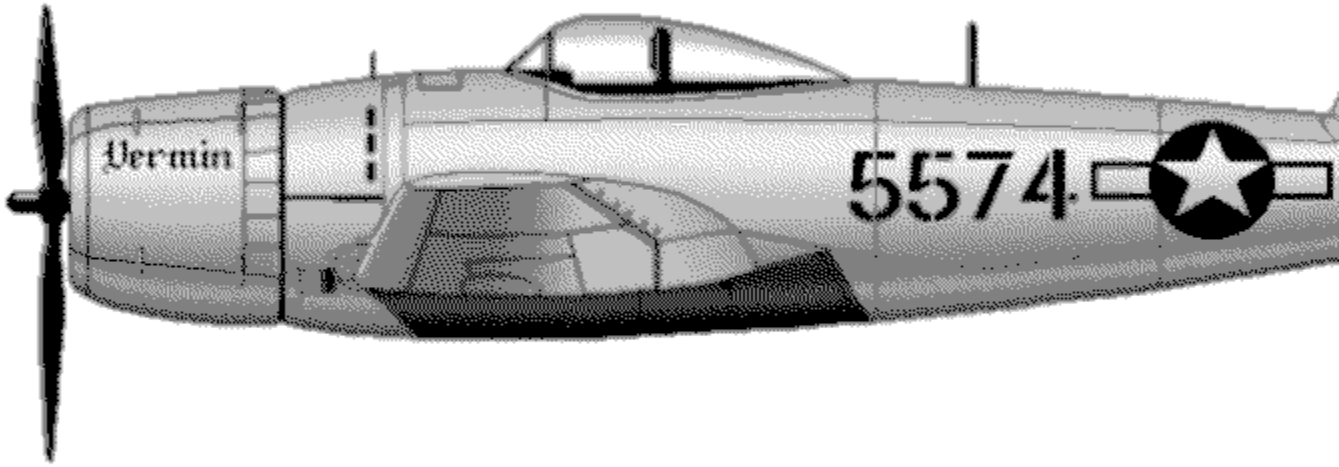
Don't be afraid to use the dive flaps (the <Spacebar> key) to keep your Lightning under control at very high speeds. Apply them for brief periods - only a second or two at a time - to maintain control at or above 375 knots. You can also use these specialized flaps as an effective dive brake for dive bombing, cutting your turn radius, or even as a method of slowing down in a hurry for a quick landing.

Finally, as mentioned earlier, make liberal use of the rudder to increase your roll rate. If you fly the 38 a lot, you'd probably appreciate a good set of rudder pedals.

Armament: Four, .50 cal. machine guns; One, 20 mm cannon. Ammo load: 1600 machine gun rounds; 150 cannon shells.

Payload: Two, 550 lb. bombs.

P-47D Thunderbolt "Jug"



The only redeeming qualities of the P47 seems to have in AW are... 1. It IS tough, at least as durable as an F4, maybe even more so. 2. It accelerates very quickly in a dive. 3. Initial lethality from the 8 .50s seems good. 4. It carries two eggs. In every other category, it either stinks or is mediocre at best.

- Spellbound

The P-47 is a force to be fearful of while up high because of it's speed and firepower and the fact that nothing turns very well above 30ks. - Drum If you're gonna go hunt down a Jug, better get up _really_ high. Then when you think you're high enough, go climb another 10k. Then, if you didn't fly a Jug but thought a Pony would do the trick for you, think again. That jug is fast up there.

- Bingo

I have read a few books on how the pilots fell in love with the 47. Well, the fact is no matter what you flew, it's only natural to love it. You'd better, your life was in its' hands. There was always something about that type you could love. The 47 is fast at high altitude. It is heavily armored and it does have good hitting power right down to the last BB. But get it slow, or fly by yourself or try fighting in the weeds with it and your dead.

- JJ Flash

Like the Yak 9, the Thunderbolt is more an aircraft of historical significance than a viable choice

in the arena. Also, like the Yak, its primary role is in history-based scenarios.

History

The P-47's nickname, the Jug, is a commentary about its bloated, pug nosed appearance. The British thought Jug was actually short for Juggernaut.

Although all fighters are designed with their power plants in mind, the Jug is a case of a fighter designed completely around an engine - the Pratt & Whitney Double Wasp R-2800, the most important American aircraft engine of the war. Although its dimensions precluded sleek, low drag configurations for the aircraft that employed it, it overcame this deficiency with sheer muscle: 2300 horsepower on WEP in P-47D.

The Thunderbolt was the largest single engine fighter of World War II, and its appearance led many - particularly in the RAF - to dismiss the design as ungainly and ill-suited for a fighter role against nimble Luftwaffe aircraft, such as the Me109 and FW 190. What the Jug had, however, that the RAF fighters lacked at the time was range. It served as an able bomber escort until late '43 when the Merlin-powered Mustangs arrived.

Though the Jug had been displaced in its original role by the Mustang, it later surpassed its successor in the job the P-51 initially performed: ground attack. Whereas the Mustang's inline engine had made it vulnerable to ground fire, Jugs could absorb significantly more damage, and deliver a far more potent payload.

The Thunderbolt in Air Warrior

By the late 1944 era modeled in Air Warrior, the P-47 is obsolete as an air superiority fighter. As ground attack is limited in AW, the Jug has few uses in the arena beyond whimsy. It is supreme, however, in two aspects: it dives well, and can absorb the most punishment of any AW fighter. Also, it can carry two bombs, and its eight .50 caliber machine guns are potent, if you can bring them to bear.

The P-47 Under Full Realism

Unfortunately, the Thunderbolt benefits little from realism.

Virtues

Apart from its already-noted firepower, diving ability, and durability, the Jug is probably the most reluctant of Air Warrior fighters to enter a spin. It's an extremely stable aircraft. The P-47 is the fastest of all AW piston engine fighters above 30,000 feet, and it has the range for really long missions.

Vices

The P-47's stability comes at a price - this aircraft hates to maneuver. Turning ability is an oxymoron with the Thunderbolt, and half loops are an adventure, even if you begin the maneuver at 300 knots. Finally, despite its formidable guns, the Jug has a small ammo load for an American fighter. You'd get the same 8 machine guns, much more ammo, and better maneuverability flying an A26 bomber, not to mention 6 extra bombs.

The P-47 in Scenarios

If the Thunderbolt has a role in Air Warrior, it is in scenarios. Here, one of the Jug's noted attributes comes into play: high altitude performance. The P-47 is the fastest of all AW piston engine fighters above 30,000 feet. It also has the range to stay airborne over long, scenario missions.

Tips

With the Jug, you're going to compress in dives _right_ at 300 M.P.H. You need to be pulling two G's to avoid compressing over 300. Pulling two G's on and off's ok, but don't wait longer then the two seconds between pulls. If you're diving at more then 45^ below 15ks in a compressed state, good bloody luck, and O yea; I'll tell your woman you said you loved her! <g> If you compress, throttling back is the only hope you have until your indicated speed reaches 300 again, or until your bird's angle of attack is above a 45^ nose down setting. This is no joke, sorry, but I've tried all kinds of maneuvers in the Jug, and you're looking at compressing the bird at an even 300 for sure if the nose is pointing 45^ down or more. (give or take a handful of these ^)

Try using one notch of flaps in your dives, you can stretch the Jug's unfriendly trait of compressing until 400 indicated speed, however from there it acts just like the 45^ down, 300 compress bugger again. You'll need an indicated speed of 160 or less to deploy your flaps tho, so think ahead.

*The higher you are, the worse this compress problem will be, but one good point to know is when you find yourself in a steep dive while locked into a compressing wing-shaker; you will be able to recover at lower alts where the air is thicker should you deem it unsafe for throttling back. Just hope to h*ll your not within gunnery range while locked into that compressed dive, or some German Luftwaffe bastage will be singing his song. HORRIDO! So throttle work (speed control) is to be considered more important then simply firewalling the throttle because of a "faster's better" type of thinking. If you use that mentality with the Jug you'll be over-shooting your targets and more then likely finding yourself diving out below the bandit many, many hundreds of feet too low.*

Not the spot for a Jug to be, you might live, but you're no longer a threat to the enemy fighter because it'll be days before you can regain any alt advantage on him. In short, if you get _one_ shot; don't bloody blow it by over diving the pig. (your choice as to who or what the so called _pig_ is to discibe;) Most success I've enjoyed with the Jug has come from diving in on the bandit and setting up a flat, (co-alt) or slightly below shot. This allows me to stabilize my speed and then zoom climb out just after the attack. If the bandit breaks; you've the speed to climb out of harms way. If the bandit loops; you can follow him up with a good tracking shot, plus continue your zoom straight up as the bandit frantically finishes his loop diving out.

Last point; you can't pull more then three G's while turning at high alt (20+ks) or you'll notice the Jug will freeze! The elevator's will acted like airbrakes, and you'll slow into stall speed faster then you can say; this Jug's sucks! You must fully center the stick then gently pull into the three G's again, no more tho. When looking for a target, pick one off your wingman's six first, for there will be many to choose from should he screw up.

- Drum

Don't fly this plane in the arena unless you have a sense of humor.

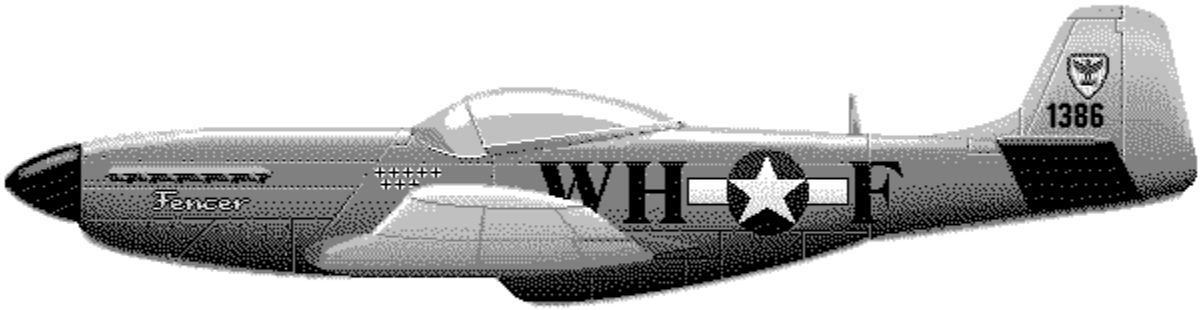
If you do, work with a wingman and employ the Jug as a vulture magnet. Enemy pilots flock to P-47s and you and your wingie can be effective with a goodly amount of separation, and good communication. The 47's speed, diving ability, and durability make it perhaps the perfect choice for bait-and-drag tactics - the art of getting enemy planes fixated on one target while setting up a wingman for a shot.

On boom and zoom attacks, it's best to use the Split-S to reverse on subsequent passes, rather than tempt fate by trying to half loop this winged leviathan. If you get into trouble, point that ample nose down; the Jug dives like a wrecking ball, takes more damage than a T-34 tank, and you can often get away from even determined foes.

Armament: eight, .50 cal. machine guns. Ammo Load: 1600 rounds.

Payload: two, 550 lb. bombs.

North American P-51D Mustang



The P51D cannot out turn a Spit MkIX. The P51D doesn't have the cannon of a FW190A8. The P51D doesn't have the durability of a P47D. The P51D doesn't have the twin engines of the P38L. Lastly the P51D is neither big or blue. The P-51D Mustang is simply the best all around fighter plane in Air Warrior. Granted it is not for everyone. It does require skill and thinking to be flown well and survive. Remember though that as long as you fly it within its envelope, high speed passes and turning to kill, the plane is very deadly.

Be watching your six for Mustangs.
Because nothing else can catch you.

- Fencer

When I fly a P51 its usually because I feel the need for speed. That one quality the P51 excels at, if used properly, leaves you with complete control of your situation in almost any hostile environment."

-Killer

Probably the best known World War II fighter in the United States, the Mustang's name comes up all over the world when experts discuss which propeller-driven fighter was the best of the war. The aircraft's most remarkable attributes, however, do not always come into play in the Air Warrior game.

History

Though developed in 1940, the P-51 did not come into its own until late 1942 when the British, for whom the plane was originally built, decided to replace its standard Allison engine with the more powerful Merlin engine. Still, it would take American military leaders nearly a year more before they understood the virtues and importance of the Mustang as the long-range strike and

escort fighter that would eventually change the course of the air war in Europe.

The Mustang in Air Warrior

Very often new players, familiar with the Mustang of legend, are dismayed when they fly the plane in Air Warrior.

Many of the Mustang's fundamental qualities, such as its splendid high altitude performance and enormous range, do not come into play in the main Air Warrior arena. Fights above 20,000 feet, where the 'Stang is at its best, are rare and players fly, at most, tens of miles to get to a fight, not hundreds. Further the game's lethality model favors cannon-equipped planes; the P-51 has machine guns only.

Nonetheless, the Mustang's assets can be employed effectively by pilots who know how to put them to use. It's the fastest prop fighter in the game at most altitudes, one of the most durable, and while its guns are not especially lethal, the 51 carries a lot of ammunition and holds onto its maximum lethality through 70% of its ammo load. Its speed also makes the 'Stang an unstoppable dive bomber.

Fly the Mustang with patience and use it strictly as a boom and zoom energy fighter. It was in this sort of fighting the Mustang earned the legendary reputation it so thoroughly deserves.

Flying the Mustang Under Full Realism

Perhaps more than any aircraft modeled in Air Warrior, the Mustang represents the difference between an essential fighter in war, and a useful aircraft in a simulation. The P-51's best attributes are seldom brought into play in Air Warrior, even under full realism.

Virtues

The Mustang possesses a superb combination of speed, acceleration, and smooth high speed handling, plus it holds onto energy extremely well. Unlike other fighters that suffer progressive control stiffness at high speeds, the Mustang's roll rate actually improves with speed. It is also a durable fighter with decent guns and a good ammo supply.

Vices

This is an aircraft that must stay fast to be effective. The 51 has vicious departure behavior, difficult spin recovery, and a terrible low speed turn rate. The Stang also resists half loops at speeds below 225 knots. Mustangs have a nasty tendency to enter accelerated stalls and uncontrolled spins with little warning. In addition to the standard stick forward/opposite rudder technique to recover from an uncontrolled spin, you'll also have to reduce throttle sharply.

The P-51 has long legs, handles well at high altitude, and has enough ammo to get the job done. Against Japanese fighters, the 51 can eat them alive above 30k. Against German fighters, it's vulnerable to Me109s at high altitude, but it can handle Focke Wulfs with ease at almost any height.

Tips

The P-51 is the premier B&Z plane, but with speed comes blackouts. So here is an exercise that you will learn to avoid blackouts during a high G turn.

Climb above 10,000 feet, then start a nose low bank turn. You will want to keep your airspeed around 180. At this speed, try to pull as many g's as possible (should be around 4 g's sustained). Now, put your flaps down 1 position, and see how many G's you can sustain - should be around 6. Now hold that turn close as you can to 6 g's, all the way to the ground.

Keep practicing this until you can do it without blacking out. You should also try to change directions of your turn, and keeping G's high during the directional change.

Once you train your eye's to watch the G-meter, staying awake will be much easier. :)

-Rash

The 51 performs best above 155ias. Keep your eyes peeled for when the speedometer pegs out below that magical 155 number. As you start dropping to 155-150ias in a combat situation (and you should only if you're turning or looping) you should either be thinking "time to nose down a bit to build my IAS" or "time to deploy 1/4 flaps to keep me from stalling". Now, either of these situations are not good in combat. It means you're starting to blow it. But we'll talk more about fighting your Pony later. When you do get slow in the 51 it is extremely important to lay off the rudder. The 51 spins fairly easily at low speeds (below 155ias). When you are approaching stall you must be very careful with your control movements. Dump 1/4 flaps to help you turn around 150ias then start a low nose slice (low yoyo). Retract your flaps as you go low to build your air speed up quicker.

As you accelerate think about your energy state and expenditure of it. As in the previous example, potential energy is always better to have than kinetic. The more you nose down the more you spend. You could be doing something better like climbing and storing extra energy. So, as you regain better control of the 51 think about starting to go into the vertical again. Generally, in the 51 hard turns are a no no.

Turns in the horizontal are extremely wasteful of energy and given the fact that 95% of the planes in Air Warrior turn better at low speeds than the 51 this is a grave error to be making. You must constantly be thinking energy management in the 51. The 51 performs atrociously at best with anything more than 1/4 flaps. It doesn't possess the ability to flip over gracefully at low speeds with full flaps as the F4U does at the top of a loop.

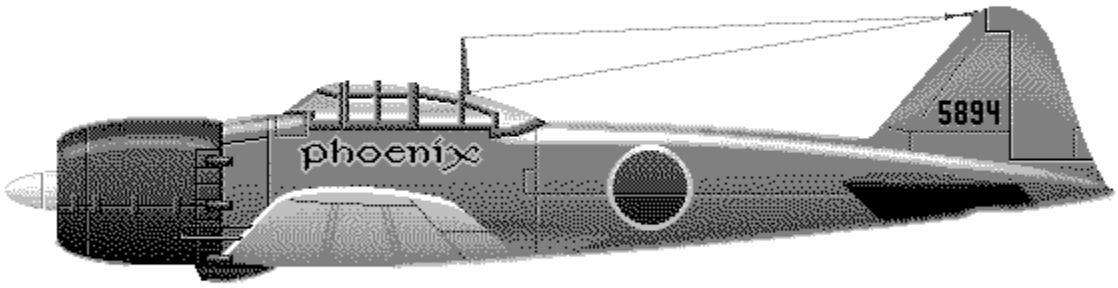
If you ever find that you're deploying more than 1/4 flaps you may need to rethink your tactics. Spinning the 51 can be a trying experience at best. I've had times where I'm on the edge at 15k and just barely spin. I planted myself 30 seconds later in the dirt. I corrected one spin just to whack myself into a reverse direction spin over and over. Remember, lay off the rudder at low speeds.

- Bingo

Armament: 6, .50 cal machine guns. Ammo load: 1880 rounds.

Payload: up to 2, 550 lb. bombs

Mitsubishi A6M5 Zero "Zeke"



This sucker turns on a dime and, in the hands of a master, is a very awesome plane. Ghost Rider I have a LOT of fun with the Zeke. Trick is NEVER go to full flaps. You WILL outturn all others (except another Zeke) without full flaps. I LOVE outturning a 38 with one click of flaps, and moving at 120mph.

- Buckaroo

The Zeke is Air Warrior's pure dogfighter. Nothing turns as well and at such low speeds as the Zero, but nothing blows up as quickly if you make a mistake.

History

Although the Zero had been used by the Japanese for 18 months prior to Pearl Harbor, it came as a total surprise to the U.S. air forces. American fighters, such as the P-40 Warhawk and P-39 Airacobra, were ponderous, under-powered, outdated machines compared to the astonishingly maneuverable Zeke. America did find an answer to the Zeke's dominance but not through making a more nimble airplane. Instead they built faster, more durable, and heavier armed fighters, and avoided turning with the Zeke altogether.

The Zeke in Air Warrior

The Zeke's deficiencies are many. It has the least durable piston engine in Air Warrior, the smallest ammo load, and is clearly the slowest of the fighters. It climbs poorly, bleeds energy quickly, and has sharply limited turning ability at high speeds.

Nonetheless the Zero is one of the most popular planes in the Pacific due to its phenomenal turning ability at low speeds. The Zeke is perfect for the sort of fighting most common in the Pacific: low speed dogfighting in tightly clustered, multiplane engagements - the so-called furball. It can do an Immelmann turn at under 120 knots and an alert Zeke pilot can get out of the way of most Boom & Zoom (B&Z) high speed attacks even if his airspeed is very low.

The Zeke is fun to fly, but if your idea of fun is surviving and landing your missions, then you'd best choose another fighter.

The Zeke Under Full Realism

Virtues

Even under full realism, the Zero is the sweetest handling plane in the game. You can still make those dramatic "bat turns" even at low speed. Its departure characteristics are docile as well.

Vices

As with the actual Zero, the Air Warrior Zeke is so slow, it seems like it's flying in Relaxed Realism, particularly when it's facing American fighters. It's also, as noted, the most fragile prop fighter, and its positively anemic ammo load seems all the more paltry in realism. Further, the Zeke hates speed; its controls nearly seize up at speeds over 300 knots, and its wings rip off at very high speed. The Zeke also has distinct structural limitations that severely limit the number of G's you can pull at high speeds. In short, if you pull more than 7 G's at speeds above 250 knots, your flight will end abruptly.

A lack of horsepower really handicaps the Zero, especially at high altitudes. The Zeke's maneuvering advantage vanishes entirely above 25,000 feet. Its strong suit is range.

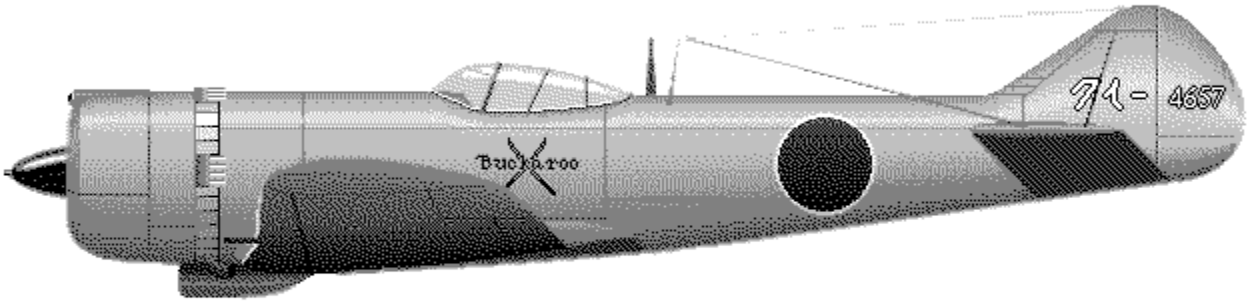
Tips

Deflection or long range shots are a complete waste of time in a Zero. For this fighter to be effective, it must use its maneuvering advantage to acquire short range, "in the saddle" shots. You can compensate to some extent for the Zeke's slow speed by employing bold lead turns, but if you get too bold you will present your opponent with a shot and, as noted, Zekes do not take damage well.

Armament: two, 7.7 mm machine guns; two, 20 mm cannon. Ammo Load: 250 machine gun rounds; 250 cannon shells.

Payload: none.

Nakajima Ki-84 Hayate "Frank"



This is my personal favorite. I LOVE this plane! Packs a good punch and has good maneuverability too!

- Ghost Rider

The Ki-84 is a fighter with few flaws; it's fast, maneuverable, and lethal.

History

Late in the war, after taking a pounding at the hands of powerful, heavily armed, and durable American aircraft, the Japanese Army wanted a fighter that could compete with heavy U.S. airborne iron on its own terms. In design at least, they certainly succeeded with the Ki-84. Japan's badly decimated aircraft industry, however, was not up to the task of producing the plane. Had the Frank not suffered from appalling manufacturing deficiencies, it certainly would have been one of the greatest prop fighters of the Second World War.

The Ki-84 in Air Warrior

Fortunately for Air Warrior Frank pilots, the game does not model the failures of material and workmanship the actual Ki suffered. The Frank has a 1900 horsepower Homare engine in an airframe more than one ton lighter than the Corsair. This gives the Frank excellent speed - faster than even the Mustang at low altitudes - along with an excellent climb rate. The Frank can out-turn every plane in the Pacific except the Zero, at low speeds, and the P-38 at high speeds.

The Ki is lethal, sporting two 20 mm cannon in addition to two machine guns, but its lethality drops sharply after 35% of its ammunition is gone. Nonetheless, the total ammo load on a Frank is substantial.

Most planes in Air Warrior come with distinct assets and limitations that dictate the way you

should fight when flying them. The Ki, however, is so versatile that it appeals to energy fighters and turn-and-burn dogfighters alike. It's main deficiency against American planes is durability, but that is perhaps its only drawback.

The Frank Under Full Realism

Opinions vary widely over the values and vices of the Frank in full realism. Some call it, "the Focke Wulf of the Pacific," due to its mixture of great guns and speed, combined with its nasty departure characteristics.

The Ki's fundamental structural limitations, compared to American fighters, become more of an issue in full realism. Whereas an American fighter can pull as many as 8 or 9 G's briefly at high speed, a similar stress to the Frank's airframe would rip its wings off.

Virtues

The Ki-84 is extremely fast - the fastest fighter in the Pacific at the low to medium altitudes where most battles take place in the online, network arena.

In addition, the Frank is extremely maneuverable, particularly at speeds between 150-250 knots. At these speeds, only a Zeke can outturn it. Lastly, the Ki has good guns, an ample ammo load, and excellent range.

Vices

The Frank is not a sturdy aircraft. At high speeds you constantly run the risk of ripping its wings off in maneuvers, and its controls turn to mush above 350 knots.

Also, the Ki will depart into violent spins if pushed beyond its low speed limits. Stalling this airplane when its wings are not parallel to the horizon is almost certain to induce a nasty spin.

Finally, with its radial engine and high parasitic drag, the Ki accelerates poorly, and bleeds energy badly - especially in straight, boom and zoom maneuvers.

Initially, most pilots would regard the Frank as an ideal fighter due to its range, guns, ammo load, speed, and maneuverability. While it indeed possesses these attributes, the Ki is absolutely terrible at the extreme altitudes typical in scenario play. It can barely maintain level flight at 35,000 feet - a common height for combat air patrols in the better high altitude fighters.

Tips

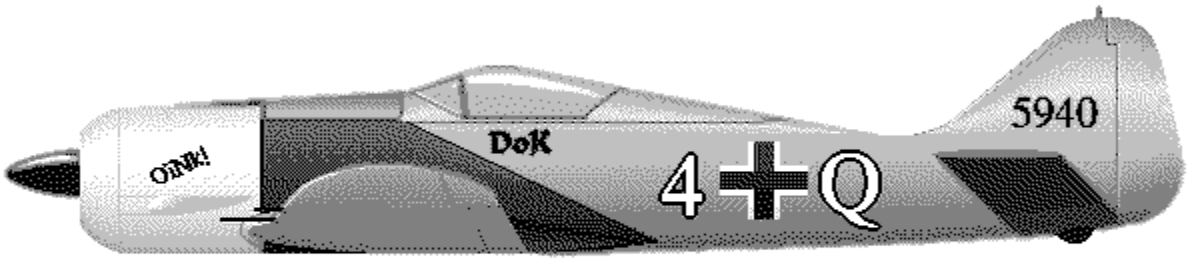
Throttle back in nose-down turns, especially if you're entering the turn at high speed. Many novice Ki pilots tend to enter compressibility, over-control the plane to compensate, and then rip the wings off when they regain control of the aircraft.

Watch your airspeed in high speed tail chases, especially against American fighters. Again, compressibility is the enemy here; you will lose control over your plane before the pilot in the American fighter will. If you throttle back, or make constant, though slight, flight adjustments as you reach speeds of 375 knots and above, you can often stave off or delay the onset of compressibility.

Armament: two, 20 mm cannon; two, 12.7 mm machine guns. Ammo load: 700 machine gun rounds; 240 cannon shells.

Payload: One, 550 lb. bomb.

Focke Wulf 190A-8



I like the Focke Wulf for its sheer lethality, it can kill any plane with one good firing pass. The FW can do some very good high speed maneuvering, but it cannot maintain maneuvering speed very long and takes a complete mastery of ACM skills and intimate knowledge of the aircraft to compete in a close in knife fight. All others would do better using it in the Boom and Zoom role. In short, the FW is the most lethal plane in the skies. In the hands of a master, its a killing machine. For the less experienced, a coffin on wings.

- Killer

The Focke Wulf can pull away from the Spit in just about every instance, unless the FW pilot is compromised by other planes/bad SA/etc. I don't know how many times I've tugged some dweeb in a Spit along in either a FW, P51, or P47. You'd think they'd get a clue when we are in level flight and the range starts growing, but no, they usually hang back there until they are solidly planted somewhere, at which point I have radio'd their position to everyone under the sun, including alt, speed, and probably fuel they have. Duh.

- Twist

History

British Spitfire Mk V pilots were holding their own against the Luftwaffe's front line fighter, the Me109, in the late spring of 1941. Then the sudden appearance of the Focke Wulf 190 nearly threw the RAF into panic. Faster, more maneuverable, and possessing the most devastating armament yet seen in a fighter, the Focke Wulf was to become Germany's most impressive mass-produced prop fighter of World War II.

Its emergence resulted in the rapid development of the Spitfire Mk IX. Until then, the RAF attempted to console its anxious pilots by telling them that the Spitfire could outturn the Focke Wulf. One RAF pilot is reported to have stood up during such a briefing and shouted, "But turning does not win dogfights!"

The Focke Wulf 190A-8 in the Relaxed Realism Arena

Turning ability does dictate the winner of many dogfights in the Air Warrior Relaxed Realism arena, but the turn fight is not the Focke Wulf's forte. Although it has the highest roll rate of any plane in the game, the 190 has a poor sustained turn performance, particularly when it's slow. The plane also lacks the sort of war emergency power other fighters enjoy. Its GM1 nitrous injection is strictly to enhance the Focke Wulf's high altitude performance, and it is not as effective at low altitude as WEP is on other fighters.

The Focke Wulf's assets are strictly speed and firepower; of the European theater prop fighters, only the Mustang is faster, and the 190's guns are the most lethal in Air Warrior. Despite this, the Focke Wulf pilot must choose his engagements wisely and avoid Spitfires at equal and higher altitude.

In short, the 190 is not a good choice for the new player. Focke Wulf fliers must be very savvy in their engagements, and that requires a goodly amount of Air Warrior experience.

The Focke Wulf Under Full Realism

Virtues

All of the Focke Wulf's previously noted qualities - speed, firepower, durability, and ammo load - also work to its advantage in full realism. Its high speed handling is particularly handy in real-time as well. When presented with its historical role - that of a bomber interceptor - the Focke Wulf is a terrifying beast. It can blow through close escort and deliver kills so quickly that often the first hint the enemy has of its presence is the destruction of one of its bombers. Also, the 190 has enormous range, and can stay airborne throughout the longest missions.

Vices

Relative to the Me109, Spitfire, Mustang, and P-38, the Focke Wulf bleeds energy terribly. Its radial engine configuration presents much parasitic drag.

Not only does the Focke Wulf turn poorly, and struggle in the vertical, it also has mean-spirited departure behavior. It will produce vicious spins if pushed beyond its tender flight envelope. As a dogfighter, particularly at high altitudes, the Focke Wulf is completely out of its element.

Tips

As with most pure energy fighters, the Focke Wulf is most effective as a member of a team, or as an opportunist. Whereas the 109 or Spitfire must saddle up on the tail of an opponent to achieve multiple kill missions, a 190 driver has the guns and the ammunition to kill several planes without extensive maneuvering; the target need only pass through the gunsight for a short period.

Where the Focke Wulf truly excels is as a member of a mixed pair - flying with an angles fighter such as a Spit or 109. The more agile plane usually draws the most attention, thereby setting up the 190 for shots. If the 190 is attacked, the angles fighter can defend it. Although not well suited to dogfighting, the Focke Wulf can stay defensive for a long period of time by employing its superior roll rate, thereby giving a wingman ample time to dispatch threatening aircraft.

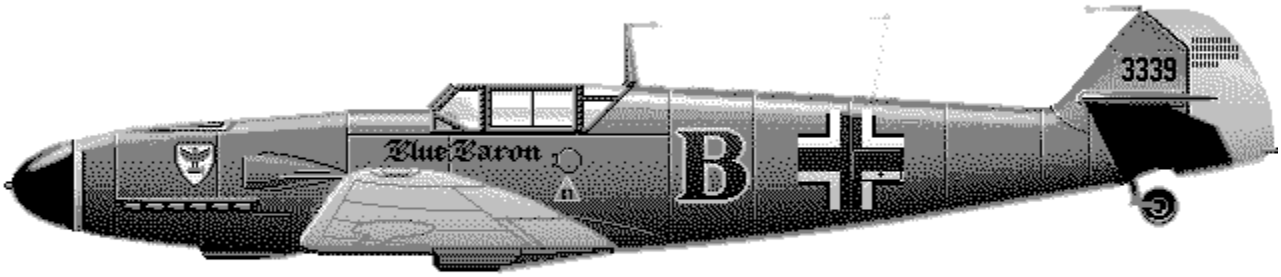
However, if you are like most Air Warriors, and want to furball without regard to coordinating

with a wingie, this calls for a change in strategy. If you boom and zoom the furball at ludicrous speed, chances are you won't find much to shoot at. Rather, enter the scrum at max level speed, pass on through, and measure your extension based on how much attention you've attracted. When your 6 is clear, zoom but don't come over the top - you don't want to risk triggering the FW's nastier traits. Instead, roll inverted and Split-S back toward the furball. You can maintain this see-saw for a prolonged period of time, while maintaining enough energy to extend completely away from the battle if need be.

Armament: two, 13 mm machine guns; four, 20 mm cannon. Ammo load: 950 machine gun rounds; 780 cannon shells.

Payload: one, 550 lb. bomb.

Messerschmitt Me109F-4 "Franz"



Fill'er up with regular, shove the throttle to the wall, and climb like a scalded monkey. I like the Willy cuz it has the power to perch. The speed and climb rate are top notch, allowing you to quickly grab, and hold, a position of advantage. It gets me where I want to be while I still want to be there. Looks cool too and it's the closest I'll ever get to having a real Mercedes.

- Holmes

Previously modeled in Air Warrior as the 109G-6 "Gustav," this legendary German fighter was no match for other available fighters, except perhaps for the Russian Yak-9. Recently, however, the Gustav has been replaced in the game by the earlier F-4 "Franz" variant that many Luftwaffe pilots praised as the finest 109 of all.

History

Late in 1940, based upon lessons learned in the Battle of Britain, Willy Messerschmitt's

Augsburg design team reworked their notorious Me109[1]. Previously, it had been the finest fighter in the world, but its supremacy was seriously challenged by the British Spitfire. The result was the F series: aerodynamically streamlined, making it faster, and far more maneuverable than the previous E, or "Emil" series. The Franz variant was short lived, however, as the need for more heavily armed bomber interceptors grew.

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[1] Though most people, including the pilots who flew her, referred to this plane as the ME109, latter day purists often insist on calling it the Bf 109. Bf stands for the company that originally manufactured the aircraft - the Bayerische Flugzeugwerke (Bavarian Flying Works).

The Me109 in Air Warrior - Relaxed Realism Arena

Like all German aircraft, the 109 is only available in Europe. When the Franz version was introduced to Air Warrior, its role changed from a sentimental or even comic plane choice, to one of the game's outstanding fighter aircraft.

The Franz remains lightly armed with a limited supply of ammunition, although its lethality holds up over most of its ammo load. It's not a particularly durable plane, and you will have to take a larger percentage of a full fuel load in the 109 due to its small gas tank.

Still, the Franz has the highest climb rate of any prop fighter in Air Warrior and it's faster than either the Focke Wulf or the Spitfire at medium altitudes. Its water-injected War Emergency Power boost lasts 20 minutes compared to the 10 minutes of WEP most fighters possess. Also, the Franz is capable of full performance on reduced octane fuel; you don't have to check the gas quality at an airfield when you fly the 109.

The Me109F-4 Under Full Realism

No aircraft in Air Warrior has benefited from full realism more than the Me109.

Virtues

The 109 has exceptionally manageable departure characteristics. It is reluctant to spin, it recovers easily, and it can turn well at low speeds. Its ammunition, while not in large supply, holds its full lethality over nearly its entire load. This plane climbs like a rocket, particularly on WEP. Also, its low thrust-to-weight ratio gives it the best level acceleration of any AW piston engine fighter.

Vices

The Franz's ease in spin recovery diminishes sharply with a full fuel tank, which you often need, given the 109's reduced fuel capacity - the smallest of all the AW aircraft (see page 2.3 in this manual). Also, the 109 lacks the sheer speed of a Focke Wulf or Mustang and, like the Spitfire, it suffers progressive control stiffness above 300 knots. Its short range, limited ammo load, and control problems in a dive - especially from very high altitudes - require a lot more from the pilot than most of the AW fighters.

Tips

As noted earlier, you have to be more tender with the 109 when she has a full fuel tank. In

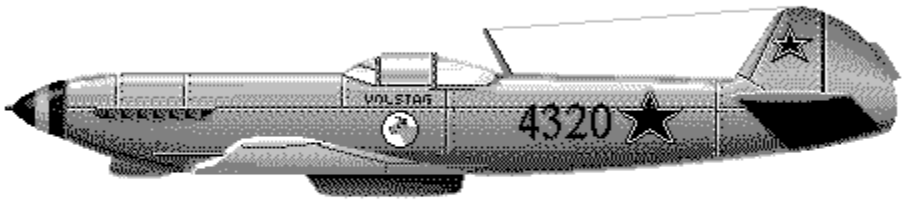
arena play, don't be afraid to climb out on WEP; you've got double the WEP of other European fighters, and you can use it to gain altitude fast.

Only use the 109's maneuvering flap setting to help you get over the top of a low speed half-loop. Far from being helpful in flat turns, it actually performs more like an air brake.

Armament: two, 13 mm machine guns; one, 20 mm cannon. Ammo Load: 600 machine gun rounds; 200 cannon shells.

Payload: one, 550 lb. bomb.

Yakovlev Yak-9D



In the end the Yak is a real challenge to fly effectively, & that's why I find it so appealing. Kills don't come as often in it, but when you get one you know you've earned it.

- Vortex

I am the Yakman, and you all know it!

- Volstag

"Yakmen" in Air Warrior generally choose to fly the Yak as a joke. The Yak-9 is the weakest fighter in the game: slow, sluggish, weakly armed, and fragile.

History

The Yak-9 embodied the Soviet approach to fighter design in the Second World War. Innovation and elegance were discarded entirely in favor of dependability and ease of production, as Russia was forced into compensating through sheer numbers what she lacked in first-rate materials and experienced pilots. Nonetheless, the Yak-9 was a formidable fighter, and gave its chief Luftwaffe opponent - the Messerschmitt Me109 - a good deal of trouble, especially at low

altitudes.

The Yak-9 in Air Warrior - Relaxed Realism Arena

Yak attacks are rare in Air Warrior and seldom conducted with the level of seriousness typical of most missions. The best reason to fly the Yak is for an odd sort of fun; if you kill an opponent with your Yak, you have embarrassed him, but if he kills you he has not accomplished anything to boast about. If you're new to Air Warrior, avoid this plane entirely.

If you fly the Yak and have any aspiration to survive the experience, choose opponents at far lower altitudes than yourself. The Yak will turn capably for short periods of time, but it bleeds energy quickly. Thus, even against a lower or slower foe, if you make a mistake you will likely die.

The Yak-9 Under Full Realism

Use standard stall and spin recovery procedures when flying in a real arena in a Yak. Data on the Yak's distinctive low and high speed qualities are scarce, and the plane's behavior is less individualized than it is for many of the other Air Warrior fighters. The Yak has short legs, is terrible above 25,000 feet, and has an unspectacular ammo load.

Tips

Overall, there isn't a plane in the game that has as much going against it as the Yak. It's painfully slow, has an extremely light ammo load that carries a lethality rating falling somewhere between a spitball and a spud gun. It bleeds E at an amazing rate, refuses to maneuver in a high speed dive, barely carries enough fuel to make it to the end of the runway, and blows up if you look at it the wrong way. If all that wasn't enough, it has some very nasty spin characteristics...do not force this plane around or it will get most upset with you. If you like a challenge, this is the plane you want to fly.

Things aren't all bad with the Yak though. At least initially, it has a very tight turn radius and does handle quite well at slow speeds. As well, one of the things I find quite intriguing about the plane is that its most glaring weakness (its dramatic E-bleed), if exploited properly, can be its most formidable weapon. The plane is like a big air brake, and a Spit, 38, or 109 will have to really work the throttle/brakes/flaps to keep from overshooting you in a stallfight. A timely Low Yo Yo or chopping of the throttle will often place you right on the badguys 6 as he's fighting to slow down and maintain position on you...nows the time to open up with the spud guns.

Bottom line, you will be forced to learn good E-management in a Yak. More so than any plane its crucial to your survival. If at all possible allow yourself some alt to work with, 5-10k is usually plenty. Low Yo Yo's, Split S's, and nose low turns can keep you in the fight for a long time. And definitely do not get in the habit of spraying your ammo all over creation or taking long range shots. You don't have enough bullets and the ones you do have don't hit that hard. Hold your fire until your nice and close with a good tail or deflection shot. And by all means, if there's badguys about keep manuevering. You can't afford to take many hits, so stay active and make yourself as difficult a target as possible.

- Vortex

Armament: two, 13 mm machine guns; one, 20 mm cannon. Ammo Load: 600 machine gun rounds; 400 cannon shells.

Payload: one, 550 lb. bomb.

Messerschmitt ME 262A Sturmvogel (Stormbird

The ME 262 is not normally available in the main Air Warrior arena except on occasional jet nights and in certain historical scenarios.

History

Without question, the ME 262 was the most formidable fighter aircraft of World War II, largely because it possessed technology a generation ahead of propeller driven airplanes. What's surprising is that Willy Messerschmitt began development of this jet fighter before the Second World War began.

Fortunately for the Allies, technical delays in the development of the Jumbo jet engine, along with inexplicable misjudgments on the part of German leadership, kept the 262 out of action until the war was all but lost for Germany.

The ME262 in Air Warrior - Relaxed Realism Arena

The Sturmvogel is seldom made avaialble in Air Warrior, because it tends to disrupt the normal balance of the game.

Nonetheless, when the ME262 is available, players are often surprised that they do so poorly while flying it. The 262 is an unstoppable fighter just so long as you don't try to dogfight in it. Not only does it lack the low speed maneuverability of a propeller-driven fighter, it also can't withstand the amount of combat damage the prop planes can. Jet aircraft consume far more fuel than piston engine planes, and the Sturmvogel is a flying gas can. It blows up with the least amount of damage of any fighter in Air Warrior.

Flown properly, nothing can boom and zoom like the ME262. It's 50 knots faster than any other plane in the game, and it's capable of 15,000 foot zoom climbs that leave pursuing piston engine

fighters hanging on their props. More than any other Air Warrior aircraft, the 262 requires patience.

The Sturmvogel Under Full Realism

Virtues

In Relaxed Realism, it was readily possible to lead turn a 262 in a prop fighter; in real time, such maneuvers are nearly impossible. As with the actual Me262, this is practically an unstoppable plane in the hands of someone who knows what he's doing, owing to its sheer speed and near flawless high speed handling. In addition, the 262's already withering armaments become all the more devastating with realistic lethality.

It can also cover ground in a hurry, avoid advance escort completely, and deliver a lethal punch before gunners and close escort can react. The 262 can be most effective as an escort killer, particularly when escorts sharply outnumber interceptors. In these situations, escorts tend to not check their 6 as frequently as they should, because their mindset is as hunters, not prey.

Vices

The 262 is more vulnerable than a Gooney Bird when it's slow. It accelerates poorly and takes a long time to build up its energy state. It's also as fragile as a Zeke when it comes to taking hits - a distinct problem with high lethality. You have to exercise extreme care when maneuvering the ME262 at high speeds because it will pull an enormous number of G's with just a little bit of stick deflection. Aside from blacking out, you can easily rip the wings off the aircraft if you pull back abruptly on the stick. Landings are difficult, too, because it's hard to slow the 262 down; it doesn't have a propeller to create extra drag at low throttle.

You would think the 262 would be even more frightening than the Focke Wulf as a bomber interceptor, and it is dangerous in this role. It lacks the ammo load of the 190; however, its high closure rate against buffs makes gunnery difficult, and it will blow up if it takes a couple of hits from bomber gunners. It also lacks range, and it can't mix it up in a dogfight.

Tips

Stay fast, avoid head-on shots, and nothing can touch you. You will have a tough time killing agile fighters who know enough to get out of your way, but you will find your self boresighting many victims before they know you are there. Be extremely careful in nose down turns because the turning radius and speed of the 262 tends to fool pilots with little experience in the plane. This is a polite way of saying that folks tend to auger a lot when they first try the 262.

The range of the 262 can be extended significantly by reducing throttle. At full throttle, the 262 only has 35 minutes of fuel; yet it can stay airborne for upwards of 80 minutes at 50% throttle at high altitude, while maintaining sufficient speed to run away from any piston engine fighter.

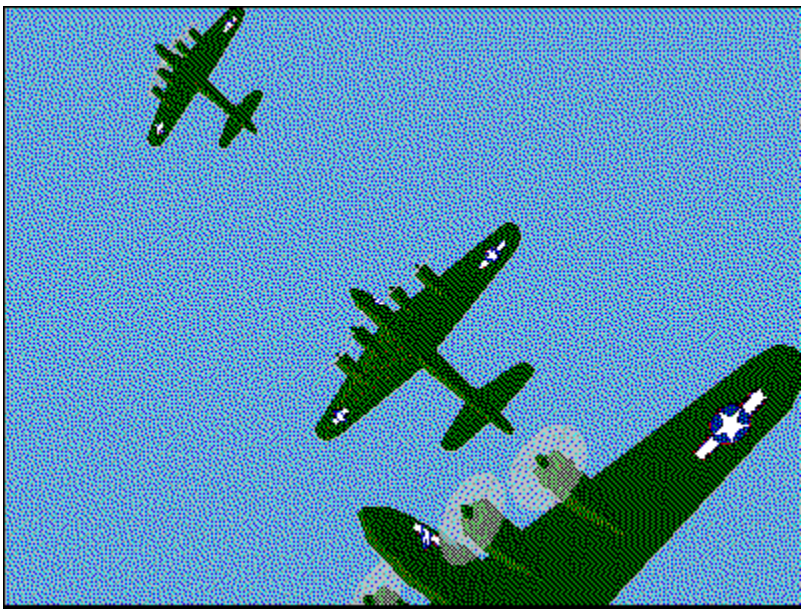
The 262 has no remarkable spin characteristics. If you go into an uncontrolled spin, normal recovery procedures will be effective.

Armament: four, 30 mm cannon. Ammo Load: 720 cannon shells.

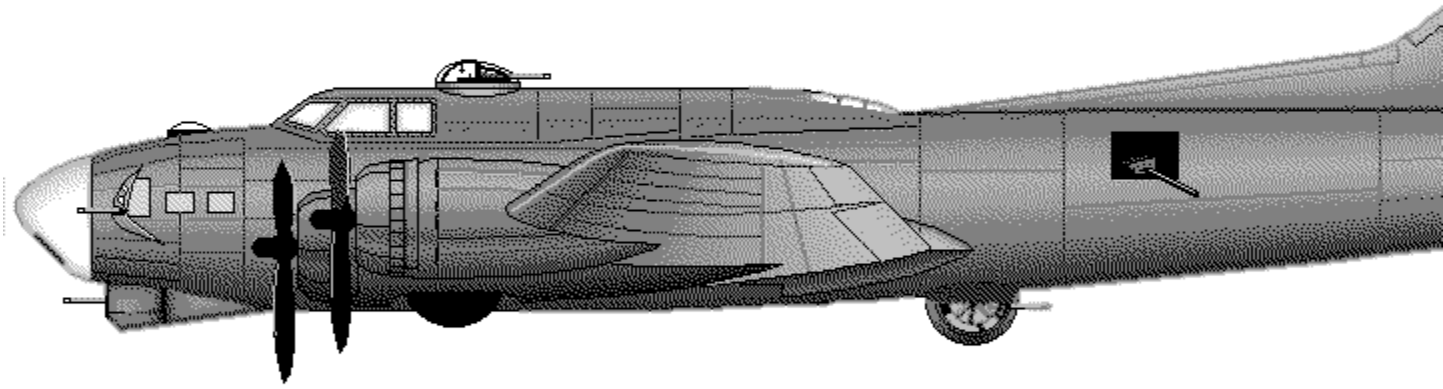
Payload: one 550 lb. bomb.

Bomber Reference

THE BOMBERS OF AIR WARRIOR

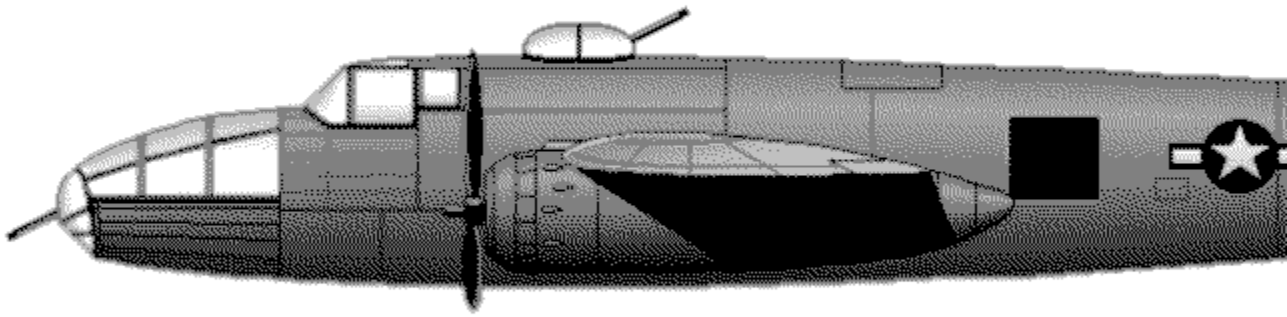


Boeing B-17 Flying Fortress



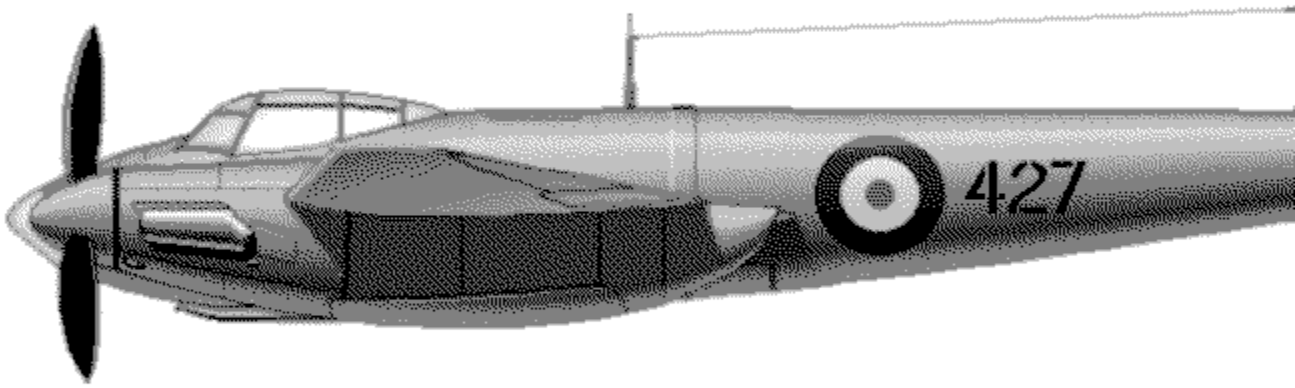
This is the airplane that comes most readily to mind when people think of the heavy bombers of World War II. It is the most durable aircraft in Air Warrior, carries the biggest payload (12 bombs), and has six gunner positions. If you want to crew up a bomber and strike more than one target, this is the aircraft to choose.

North American B-25J Mitchell



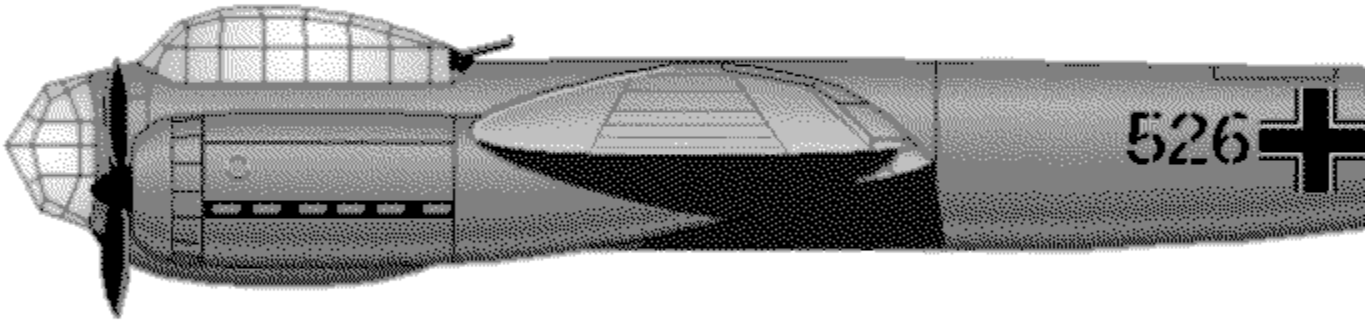
Although the most significant American medium bomber of the Second World War, the B-25 in Air Warrior is seldom used except for historical scenarios. What it comes down to, in game play, is that what ever the B-25 can do, the A26 can do better. The Mitchell carries six bombs, eight .50 caliber guns in the nose, and five gunner positions.

De Havilland Mosquito MKXVI



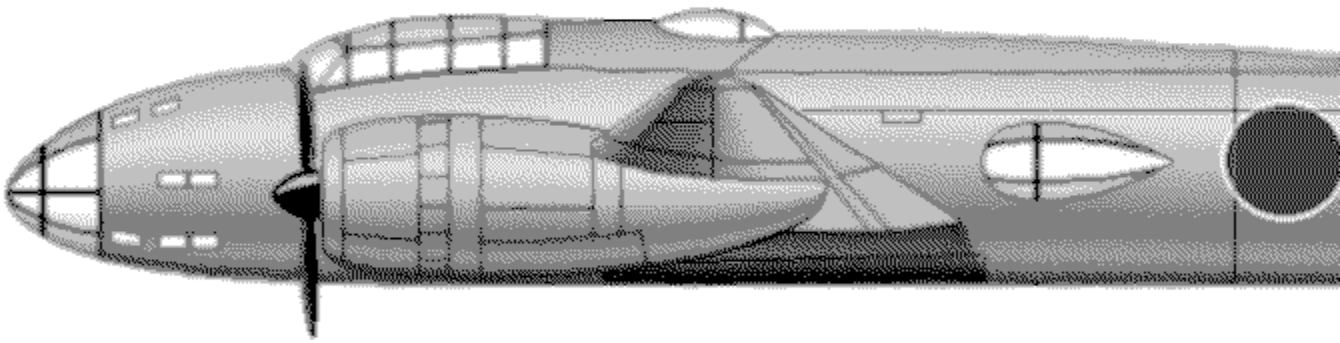
The “Mossie” has speed (is nearly as fast as a P-51 Mustang) and plenty of forward, pilot controlled firepower. It can’t turn worth a damn, however. As the Mosquito can only carry four bombs, it’s a special purpose bomber in Air Warrior. Many players use it on missions against enemy radar, and in historical scenarios.

Junkers JU88A4



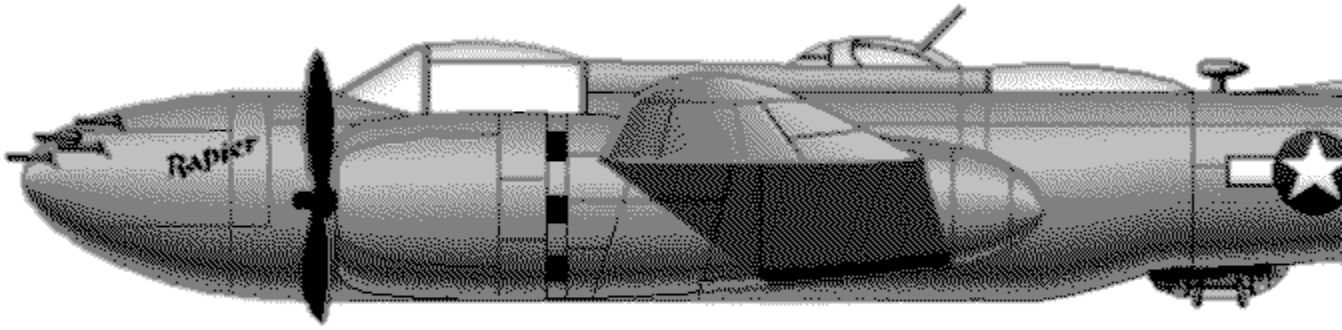
The Junkers 88 was perhaps the most versatile of all Luftwaffe aircraft. At various times in the Second World War, the JU88 served as a level bomber, dive bomber, ground attack aircraft, and radar equipped night fighter. In Air Warrior, however, this bomber is little used apart from historical scenarios. It carries four bombs, has one pilot operated machine gun, and three gunner positions.

Mitsubishi G4M Betty



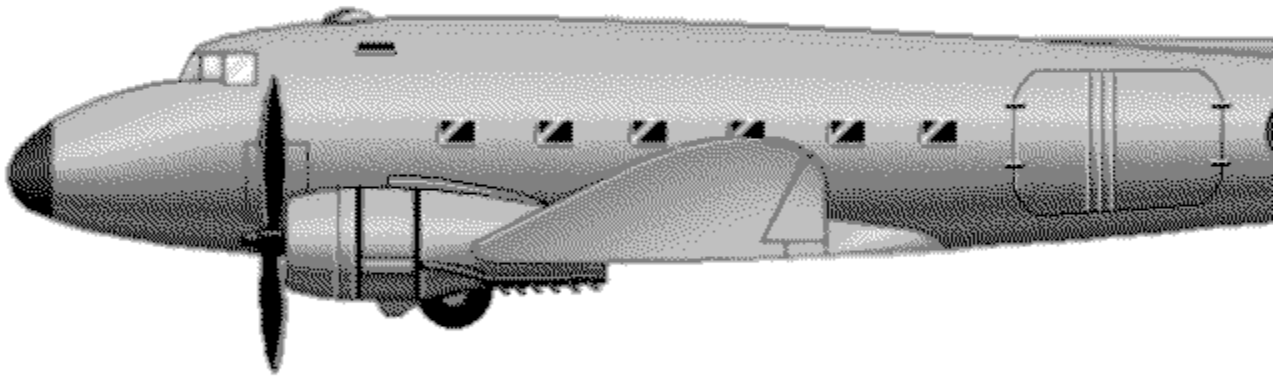
The Betty was the front line Japanese medium bomber of World War II. Its asset was extreme range, but it was distinctly under powered and had no armor or self-sealing fuel tanks. American pilots were often astonished at how quickly the Betty burst into flames when attacked. The Betty carries six bombs and has five gunner positions.

Douglas A26B Invader



The Invader in Air Warrior is the fastest medium bomber, with the exception of the Mosquito. Unlike the Mosquito, the A26 has formidable armament: eight, .50 caliber machine guns in the nose, plus two gunner positions. The A26 also can carry eight bombs, making it ideal for striking at enemy airfields.

Douglas C-47 Skytrain "Gooney Bird"



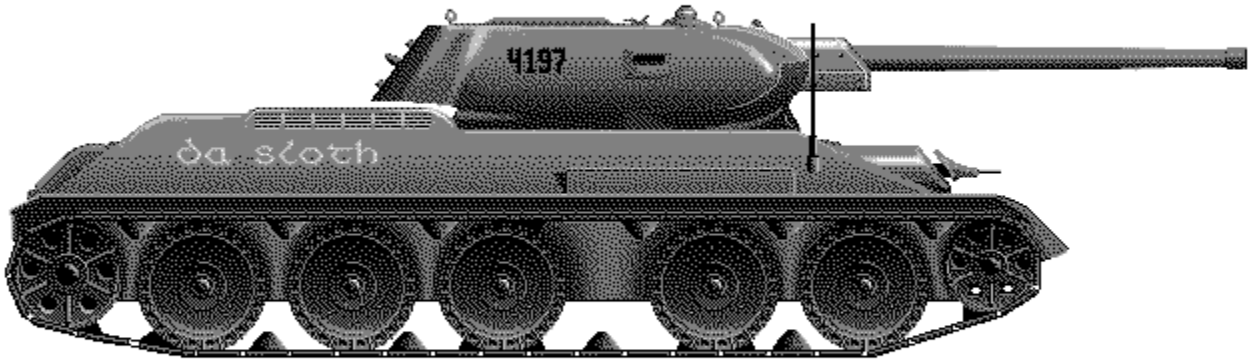
Developed from the DC-3 passenger plane, the rugged, dependable C-47 made a crucial contribution to the Allied war effort during World War II, serving as a transport for troops, supplies, and wounded soldiers.

While not an exciting plane to fly in Air Warrior, the C-47 serves an unique role: it provides the only means available to carry paratroopers for airfield capture. You can also employ the Gooney Bird as a cargo transport to resupply damaged airfields.

Vehicle Reference

THE VEHICLES OF AIR WARRIOR

Soviet T-34 Tank



History

A total surprise to the German invaders in the summer of 1941, the T-34 completely outclassed contemporary German armor. The T-34 was fast, dependable, extremely rugged, and its 76mm main gun packed enormous firepower. Subsequent, and now famous, German tanks, such as the Panther and Tiger, were developed specifically to improve upon the T-34.

The T-34 in Air Warrior

Few people employ the tank in Air Warrior but for those with the patience and skill necessary to master its 76mm cannon, it can be a devastating weapon. Its big gun has a range of 9000 yards and it carries 55 shells, each with a third the power of the standard 550lb bomb issued to airplanes in the game. This means that it can do more damage than most bombers, although its speed, glacial in comparison to airplanes, limits its usefulness.

You can use a tank to destroy most targets that are vulnerable to bombs: anti aircraft batteries (acks), towers, hangers, fuel storage tanks, ammo dumps, even planes on a runway. You cannot destroy an aircraft carrier with a tank, however.

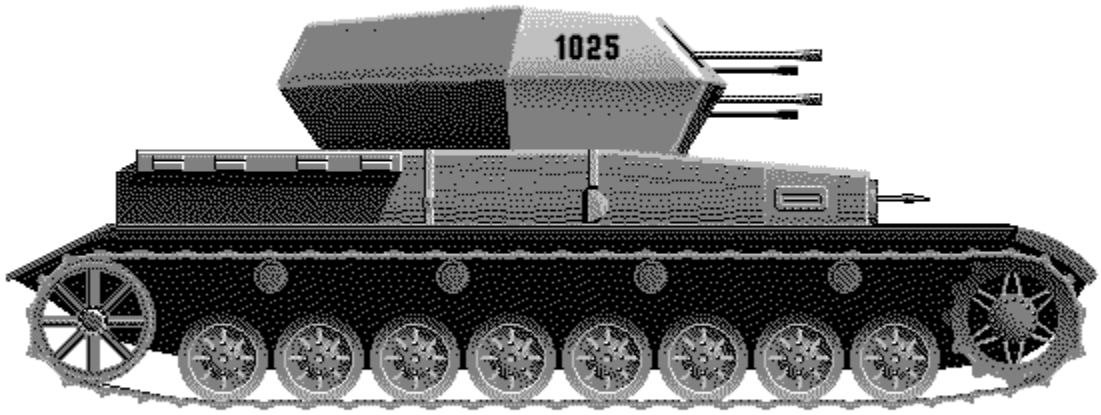
The T-34 can take on a crew of three, in addition to the driver: a main gunner, a hull machine gunner, and an external machine gunner on top of the turret. Crewed tank mission can be a great deal of fun, particularly for new players, because it's very difficult to kill a tank before it

inflicts damage to the enemy. A moving tank is practically indestructible, and even a stationary tank can absorb a lot of punishment before it dies.

An enemy tank's appearance at an airfield most always draws a lot of attention. Often the flustered enemy will mount an extensive effort, occupying several pilots, to rid itself of the tank. Thus, tanking can be a useful strategy if your country is significantly outnumbered.

Pitched tank battles are rare in Air Warrior. The game is, after all, about air combat, not armored warfare. Still, the T-34 tank provides a powerful and entertaining alternative to the battle in the virtual skies.

Flakpanzer IV Whirlwind



The Flakpanzer is an armored anti aircraft vehicle available at all airfields and vehicle garages in both Europe and, oddly, the Pacific.

History

Consisting of a turret battery of four, 20mm anti aircraft guns, mounted on obsolete German tank chassis that had been returned from the front for overhaul, the Flakpanzer was truly a makeshift armored vehicle. It was only produced for a few months in the latter half of 1944, and was replaced with a model that employed larger, more effective guns.

The Flakpanzer in Air Warrior

The Flakpanzer provides the only player controlled anti aircraft weapon in the game, and it can be thoroughly lethal in the right hands. Its four 20mm cannon deliver a punch comparable to the Focke Wulf and it has over four times the Focke Wulf's supply of cannon ammunition.

In addition to airfield defense against enemy planes, the Flak is an effective weapon against

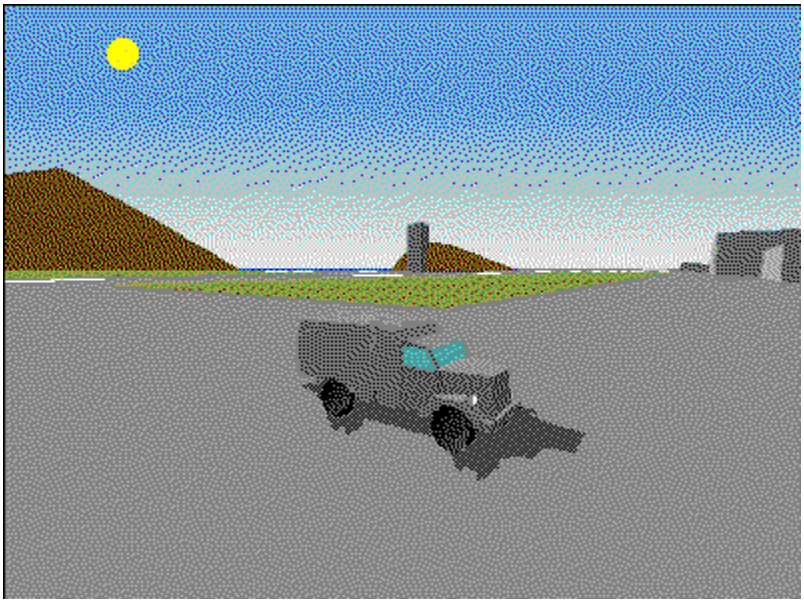
paratroops during airfield capture attempts. It is also an effective anti-tank weapon at short range, but its guns will not damage structural facilities such as aircraft hangers, and fuel tanks.

Mostly, the Flak is useful for immediate airfield defense when you can't take off safely from an embattled field, and there isn't time to take a fighter from another airfield to help out. In those situations there is no reason to drive the Flakpanzer. Just jump to the gunner position and start shooting at the nearest enemy plane. Although your effective range is only 600 yards, you can begin firing when incoming targets reach 700 or 800 yards away. There is little need to practice ammo conservation in a Flakpanzer.

Armament: four, 20mm cannon; one, 7.92mm machine gun. Ammo load: 3200 cannon shells; 1600 machine gun rounds

Other Vehicles

Air Warrior also has the Wiley's Jeep and a cargo transport truck. The jeep has a single, .50 caliber machine gun; the truck has no armaments whatsoever. Neither is used by Air Warrior players very often, although some pilots use jeeps to pop out onto airfields to check for nearby bandits; then, if they find an enemy strafing or bombing the field, it won't go against them in the scores as a death in a fighter.



Air Warrior Jargon

There is a language to air combat. Given that people using the radio in Air Warrior are typing and flying at the same time, most terms are abbreviated or become acronyms, and some are creations of the game entirely.

AAA Anti-aircraft artillery.

Ack same as AAA.

AFK away from the keyboard.

Alt Altitude.

Angels Another term for altitude, in thousands of feet (i.e.: “Angels 10” means 10,000 feet).

Auger Crash landing.

B4 Before.

BRB Be right back. This means you’ll be away from your computer for a moment. It’s followed by “back” when you return.

Bandit Enemy plane.

Bingo Used if you’re out of or short on something, followed by the item you lack (i.e.: “Bingo ammo”)

Bogey Unidentified aircraft.

Buff Bomber.

Bug To run away.

B&Z Boom and zoom; a style of fighter attack.

Cat jumped on my keyboard.....No abbreviation or acronym for this common excuse has yet been devised.

CC I understand.

Con Short for icon, meaning you are close enough to pick up a local tracking icon (i.e.: “Con C Spit!”).

CR Climb Rate. When flying formation it’s useful to let people know what your climb rate is or to conform to theirs (i.e.: “CR=4” means your climb rate is 4,000 feet per minute).

Deadstick...Flying without the aid of engine power.

DeathStar...Heavily gunned bomber on the full realism page.

Dien Dying.

Ditch To land safely somewhere other than a runway.

Drone A computer controlled aircraft/player.

Dump You were disconnected from Air Warrior against your will.

Dweeb An unskilled player.

E Energy.

Efighter A type of fighter aircraft suited to high speed attack, but not dogfighting (i.e.: “Grab an efighter”), or a pilot who practices boom and zoom energy tactics (i.e.: “He’s a pure efighter”)

Egg Bomb. Sometimes this is used as a verb meaning to bomb (i.e.: “I egged him on the runway”).

Fiter Fighter.

Frog Auger ..When you crash, sometimes it takes the host a few moments to process your virtual demise. From your cockpit it appears, for a second or two, that you’ve hopped off the ground, hence the term.

Furball A thickly populated dogfight.

<g,d,r>Grinning, ducking, and running.

Glider Same as deadstick.

hehe Laughter.

Hdg Heading, usually followed by what heading it is (i.e.: “Hdg 090”).

Icon Same as Con above.

IMHO In my humble opinion, yet rarely is there much humility involved with this acronym’s use.

In Means you are engaging the enemy. This is often said with a bit more enthusiasm, such as “In In In!”

Jabo German term for fighter bomber (Jagdbomber). Although it is seldom used in the game, the manual author likes the sound of it when used as a verb (i.e.: “I jaboed the sucker!”).

K One thousand (i.e.: “Bogey at 5k”)

Kts Airspeed in knots.

L8r Later, meaning see you later.

No Joy You don’t see the plane that someone has pointed out to you.

Off You are disengaging.

OiNk.....I remembered this time, DoK ;)

One hit [system].....Means that a single hit from gunfire has taken out a critical

system (i.e.: “One hit engine!”)

OTW On the way.

Out Same as “Off” except sometimes “Out” is followed by your exit heading (i.e.: “Out 245”). Out can also refer to how far away you are from something you’re trying to reach (i.e.: “Hang on! 5k out”)

OTOH On the other hand.

Ping Feedback, on your end, of a hit you’ve suffered. For example, a ping-less death means that you’ve been shot down without hearing bullets hit your plane.

Poof Tells people that you are logging off immediately; a last good-bye before exiting the game.

Prep To prepare an airfield for capture.

Refer Refinery.

Rgr Roger, same as CC.

ROFL Rolling on floor laughing. It means you think something is very funny. This has many variations, from LOL (laughing out loud) to ROFLASTC (Rolling on floor laughing and scaring the cat).

RTB Return to base. Sometimes this is followed by the number of the field where you plan to land (i.e.: “Rtb 19”).

SBL Surrounded by Lostness. A confused player.

Smoke Generally used as a verb in Air Warrior, it means to leak oil or fuel due to hits from gunfire or to cause the same to happen to someone else (i.e.: “I smoked him!”).

Stallfight A dogfight occurring near stall speed.

Vis I see (i.e.: “Vis C Stang”). This is similar to “Con” except it includes more distant planes that you may have identified with your radar. Generally, “Vis” is less urgent than “Con.”

Vulch From the noun, vulture, in Air Warrior it becomes a verb, meaning to prey upon a nearly or completely defenseless victim. “Nice vulch!” it is not entirely a compliment.

Warp Network delays causing planes to appear as if they’re jumping around, rather than flying around.

:) A sideways happy face.

You will see many, many variations on this. Here are a few:

:-) this one has a nose

8-) this one is wearing glasses

;-) this one is winking

:^) tongue in cheek

:(A sideways, unhappy face. Usually, with this one, you are spared the variations.

There are communications customs that don't contain words. Many pilots count out their kills over the radio. Some pilots, when they urgently need assistance, will issue three blank radio messages to signify a distress call.

Forming a Squadron

AIR WARRIOR SQUADRONS

For many Air Warrior players, squadrons are an essential part of the game. In some cases they define a theme and a style of play for a group of pilots, but generally an Air Warrior squadron is just a loose collection of people who enjoy flying together. Most squadrons fly together one night of the week. This works well for people who want to budget their playing time, and it ensures that they will have people to fly with when they play.

There are no easily defined rules for joining squadrons, because each squad has its own attitude toward recruitment. Some will recruit anyone and everyone while others are quite selective in whom they'll allow in. One thing is certain: you cannot play Air Warrior for very long without receiving an invitation from at least one squadron.

Graphical squadron recruitment is not yet supported in Windows Air Warrior. For the time being, you will have to employ the following text commands. Squadron Command lines given in the following sections must be followed by <ENTER> to execute the command.

Forming a Squadron

Any player in Air Warrior who is not currently enrolled in a squadron may form a squadron of his own; when you form a squadron, you become the squadron leader by default. To form a squadron, you must issue an invitation to another player in the form:

/invite [CPID]	Ask a player to join your squadron

Both players must be in the same room when the invitation is issued, and, of course, both players must be affiliated with the same country. The invited player may respond with:

/accept [CPID]	Accept an invitation to join from player [CPID]
/deny [CPID]	Decline an invitation to join from player [CPID]

If the invitation is accepted, a message will appear on your incoming message screen stating that you have just formed a squadron, and with a reminder to name your squadron. You may name your squadron with the Command Line:

/rename [new name]	Enter or change squadron name

Other players may ask to join your squadron with this Command Line:

/ask [CPID]	Request to join squadron of squadron leader [CPID]

As squadron leader, you may accept or decline the request using the Command Lines:

/accept [CPID]	Accept a request to join from player [CPID]
/deny [CPID]	Decline a request to join from player [CPID]

Other squadron Command Lines that are available in Air Warrior are:

/team [CPID]	List Roster for squadron led by player [CPID]
/withdraw	Leave your current squadron

The following Command Lines are reserved for squadron leaders only:

/rename [new name]	Enter or change squadron name
/expel [CPID]	Drop player [CPID] from your squadron
/accept [CPID]	Accept an invitation to join from player [CPID]

/disband	Disband a squadron (all members must be expelled first)
/transfer [CPID]	Transfer squadron leadership to squadron member [CPID]

Troubleshooting Tips

The most common problems involve frame rate, sound, and joysticks.

Frame Rate

If you have the minimum recommended machine, yet experience extremely low frame rates, chances are the Air Warrior program is employing Windows virtual memory - otherwise known as a swap file. This is an area of your hard disk configured to emulate comuter memory (RAM). Regular computer memory operates at a sharply higher speed than can be achieved through a hard disk. Unfortunately, real and virtual memory cannot be distinguished by programs operating under Windows. The answer is to free up as much memory as possible to prevent virtual memory from coming into play.

Make sure no other programs are active, other than your web browser, before you launch from the web. To check hit <CTRL> <ESC> at the same time - this will bring up a list of programs that are active in Windows at the moment. If you're running Windows 3.1, you'll need to have your winsock program (typically Trumpet) and your web browser active, but nothing else.

Second - and usually most likely - culprit is disk caching. Disk cache programs speed up access time to a hard disk, but the consume system memory. From your File menu in Windows, select Run, and enter the program SYSEDIT.EXE and Ok. This will bring up your system's configuration files. In the AUTOEXEC.BAT window, look for a line like this:

C:\WINDOWS\SMARTDRV.EXE 2048 1024

The first number is your disk cache size under DOS; the second is your disk cache size under Windows. Deleting the second figure frees up the memory it consumes.

Another potential problem could be the Windows drivers for you video card. Air Warrior employs the graphics capabilities of Windows in ways few programs have. Thus, you may encounter problems with Air Warrior that you've never experienced in Windows before. In many cases the answer is to get newer versions of your Windows drivers.

Diamond Stealth 64

If you have earlier versions of their Win3.1 Windows drivers (versions 1.x to 2.0) you may experience screen graphics breaking up on the screen. Earlier versions of Diamond's Win95 drivers simply perform more slowly than subsequent versions. You can get Diamond's latest drivers from the web at http://www.diamondmm.com.

Sound

Several beta testers have reported sounds cutting out, or WAIL32.DLL errors. Best strategy here is reducing the total number of sounds played in the program, but going into sound setup (right mouse button menu or setup hangar), choosing custom .

Joystick

Chief problem here involves setting up your joystick drivers . Jump to this topic for tips on setting up your joystick driver, and circumventing certain known problems under Win95.

Contacting Us

If you are experiencing problems, send us email at awsupport@kesmai.com.

Keymap

Note: Keymap is a program best left to advanced users.

Background

KEYMAP is a utility that comes with your Air Warrior for Windows software. It resides in the same directory as AIRWAR.EXE itself and is a DOS only, command line driven program.

The purpose of KEYMAP is to change the way your Air Warrior program processes keyboard input. Like most programs, Air Warrior has certain functionality associated with certain keys when flying - for instance, the ";" key raises or lowers your landing gear - but unlike many games, Air Warrior allows you to change which keys perform which commands. So if you were accidentally hitting the ";" key too often and lowering your landing gear at awkward times, you could use the KEYMAP utility to move the raise/lower gear function to the "Q" key, or really anywhere on the keyboard.

Using Keymap - The Help Function

KEYMAP actually understands only three commands - help, extract, and compile. Help is activated by typing KEYMAP /H at the command line. Keymap will respond with an on-line help file.

Using Keymap - The Extract Function

To use either the extract or the compile commands, KEYMAP works with special files that contain definitions of all the keys (both on the keyboard and on Joysticks or devices like the WCS) called "maps", which confusingly enough end in the extension KEY.

You can find out which map file you need to use by entering Air Warrior, clicking on the SingleUser button, then clicking on the Options menu, then the Aircraft button. In the top left hand corner of the screen displayed after clicking Aircraft will be a grey button which shows which control setup you are currently using. In addition, if you have selected either of the buttons below for Thrustmaster Weapons Control System that will affect your control type. The AW control types and the corresponding KEYMAP.KEY files which will affect them are noted below.

Mouse	DEFAULT.KEY	Not a good way to fly Air Warrior
Joystick	JOYSTICK.KEY	For regular joystick users
TM FCS	THRUSTFCS.KEY	Thrustmaster FCS or PFCS
CHPRO	CHPRO.KEY	CH Products Flight Stick Pro
WCS I	WCSMKI.KEY	Thrustmaster stick plus WCS Mark I
WCS II	WCSMKII.KEY	Thrustmaster stick plus WCS Mark II

You may not have these .KEY files available if you have never run KEYMAP before. To obtain them, use the KEYMAP extract command by typing "KEMAP /E" and hitting return. You will get output that looks like this:

```
SVGA KEYMAP for version 1.5 Copyright (c) 1993-1994 Kesmai Corporation
default.bnd -> default.key ... done.
joystick.bnd -> joystick.key ... done.
thrustfcs.bnd -> thrustfcs.key ... done.
chpro.bnd -> chpro.key ... done.
wcsmki.bnd -> wcsi.key ... done.
wcsmkii.bnd -> wcsii.key ... done.
```

It is also possible to extract the particular file you are going to be using only instead of all of the files (the only benefit is a few less files in your Air Warrior directory however, and the map files are very small). To do this use the extract command with a particular map specified - for instance, if you owned a CH Products joystick and had selected CHPRO as your controller type in AW, you might type KEYMAP /ECHPRO (NOTE: There is NO SPACE between the /E and the CHPRO - type it all as one word, and you should NOT supply the .KEY extension yourself - the program will provide it).

What to do with these .KEY files is explained in the section below, "Editing the KEYMAP map". The Compile command covered directly below would be used AFTER editing the map.

Using Keymap - the Compile Function

The compile function is the opposite of the extract function - it takes a KEMAP .KEY file and incorporates it into the AW game by translating it into a "BND" file. The .BND files are basically equivalent to the .KEY files; but they are in a non-readable form which the AW program understands directly.

To compile a .KEY file that you have modified, simply make sure it is in the same directory as your Air Warrior program files and type "KEYMAP /C". KEYMAP will compile all of the .KEY files available in that directory. You can compile a particular map by supplying the map name after the /C. For instance, if you were editing the map for the CHPRO products you would type "KEYMAP /CCHPRO". As with extracting, DO NOT put a space between the /C and the map file name.

If there are no errors reported you should now be able to start the Air Warrior program and use the new command keys you created.

Editing the Keymap File

To actually change command keys in the game, you use a text editor on the .KEY file created with the extract command from KEYMAP and then reintegrate it into the game using the compile feature.

KEYMAP isn't used for the editing; you can use any text based editor such as EDIT (supplied with DOS 6.0 and above), Windows NOTEPAD, or anything else which is DOS text compatible. As an example, DOS 6.0 or greater users can edit the mapping for the CHPRO products by typing "EDIT CHPRO.KEY" from the DOS prompt.

The file displayed have data in two columns and will begin something like this:

```
Version b  ; WARNING: DO NOT DELETE THIS LINE!

ESC        COMMAND_MODE

1          PIC_RANGE_1
```

```
2           PIC_RANGE_2
3           PIC_RANGE_3
```

Please head the warning in the first line; if you delete that line KEYMAP will become confused and won't allow you to recompile your .KEY file after editing. The format here is simple, the left column is the key that is pressed in the Air Warrior program and the right column is the effect it produces. The spacing does not have to be precise but there needs to be at least one space between the left column and the right.

To change which key causes a command to be executed, you simply find the command you are interested in and change the left hand column to the key you want to execute that command. For instance, if you wanted to change the raise/lower gear key to "Q", so you don't accidentally lower your gear when hitting Enter, you would change the following part of the CHPRO.KEY file:

```
SEMI              GEAR_UP_DN
```

to read like this:

```
Q                 GEAR_UP_DN
```

and then recompile the .KEY file using the KEYMAP /CCHPRO command described in "USING KEYMAP - THE COMPILE FUNCTION". From then on when you flew in Air Warrior to raise your gear you would use the "Q" key instead of the semicolon.

Strange Keys and Stranger Commands

As you look through the .KEY file you will find some entries in the left and right columns that don't look exactly as they should. There are certain keys that can't be shown directly in the left hand column, so abbreviations are used instead. Equally there are certain command that are actually combinations of commands, so they are listed as multi-part words in the right hand column. Here's some keywords you'll see in the left hand column and what they mean:

LBRACKET, RBRACKET	The [and] keys (to the upper left of Enter)
QUOTE	The ' key
SEMI	The ; key
SLASH	The / key
UP,DOWN,LEFT,RIGHT	The arrow keys, usually on the numeric keypad for most keyboards and sometimes also in a separate location
PAD5,PADMINUS,PADPLUS	Other keys on the numeric keypad (the + key on the keypad is NOT the same thing as the general keyboard + key, at least not to Air Warrior)
SHIFT+,CTRL+,ALT+	Combination keys - SHIFT+A means to execute that command you would have to hold down the shift key and then hit A.
JOYSTICKA1	These are "keys" on the joystick - really the joystick buttons

HATCENTER	If your joystick has a "hat" key, Air Warrior will use HATXXXXX to describe the various positions it can be in.
VIEWSHIFT+	Special indicator to indicate the key after VIEWSHIFT has two commands; one for normal operation and one which is activated when the "alternate view" command key has been pressed. The VIEWSHIFT+ modifier shows which command should be executed when the alternate view key has already been pressed.
#46	When you see a # followed directly by a set of digits, it's a special signal for Air Warrior to look for the "scancode" for that key. You shouldn't change these values.

The rest of the keys in the left hand column are fairly self explanatory. You can also find a summary of them in the KEYMAP on-line help by using the KEYMAP /H command.

For the right hand column; if you are unsure of what a particular command does, BEFORE you change it's key value in the left hand column look it up in the Air Warrior manual by finding the key. Keep in mind that many commands only take effect when you are in film mode.

The +HOLDDOWN modifier to command deserves some explanation. Basically this means that when the key in the left hand column is pressed AND HELD DOWN, execute the command that precedes the +HOLDDOWN modifier. In the line:

```
LEFT              LOOK_LEFT+HOLDDOWN
```

Air Warrior interprets this to say "when the user presses the left arrow, show the left view from the aircraft, and keep that command as long as the key is held down".

Some confusion results when the +HOLDDOWN modifier is removed, because the program doesn't behave as you might expect. If in the above example +HOLDDOWN was removed and the user then pressed the left arrow, you might expect the left view to be flashed briefly on the screen. In fact, nothing happens - until you hit enter, at which point the left view is displayed and stays there. WITHOUT A HOLDDOWN COMMAND THE ENTER KEY IS REQUIRED TO CAUSE A VIEW TO BE DISPLAYED. This can actually be used to your advantage by creating views in a "building block" fashion and then activating them with enter.

Let's say you've removed the +HOLDDOWN modifiers for the keyboard views but left the joystick ones as they are. If you now hit H (left view) and hit ENTER you'll get the left view and it will stay there until you use another view sequence. But if you hit H, then K, then M, and then hit ENTER it will show you the left, up, and back views combined - your rear quarter diagonal left view. Since this is a simple keyboard sequence it can be programmed into devices like the Thrustmaster WCSII or similar keyboard controllers so you can have views that aren't available with your joystick through other means.

Caveats

Keep in mind that KEYMAP is a fairly simple utility that doesn't do much automatic checking to see if you've made mistakes. If you create a command list that is missing a vital command like engine start, KEYMAP won't really notice. It WILL tell you if you've used an incorrect keyword in the columns, but it won't give you much help on what was wrong about it.

With this in mind, keep backup copies of your modified .KEY files if you intend to make subsequent changes to them. And if you're .KEY file becomes hopelessly mangled, use the KEYMAP /E command (with no control set specified) to re-extract the default maps from the Air Warrior program, and start again.

Also, KEYMAP cannot be used to create keyboard macros - sequences of multiple commands associated with a single keystroke. KEYMAP can only process one command (and possibly a modifier) for each key. If you want to have one key perform multiple command, use the macro function built into the Air Warrior program itself, triggered with the CTRL-ALT-F9 key.

Custom Player IDs

Flight jacket (set handle/callsign and CPID)

You have two things that set you apart from all the other pilots in the game: your handle (also known as your callsign), and your Custom Player ID (CPID). The former can be anything you'd like - so long as it's not obscene - but the latter must be a unique combination of up to 5 characters (either letters, numbers, or a bit of both). The host automatically assigns you a CPID but until you specify a handle, you show up as New User on the player list. To set your handle and changed your CPID, click on the flight jacket in the foreground of the Officers Club.

When you enter a CPID, the host checks to see if it's unique in the player database. If it's not, the host will inform you and you can try again. The combinations you have tried will appear in this dialog box.

Exiting the Game

From the Officers Club, click the exit sign to leave an arena, or type /exit and hit enter. From the arena selection menu, click the button for main airfield. Then click the jeep on the left-hand side of the screen. Or you can use the right mouse button to exit Air Warrior from anywhere in the game, except inflight.