

iPanzer '44

Manual



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1 Introduction

iPanzer '44 lets you take command of an American M4A3 “Sherman,” a German PzKw V “Panther,” or a Russian T-34-85 medium tank. In this simulation, you can command from inside or outside the tank, or from a map of the battlefield. Inside any of these tanks, you can slip into the driver’s seat, use the gunner’s sights to range and hit targets, or open the commander’s hatch for a view. If you’re busy with an external view or are looking at the map, computer crewmen take over and follow your latest orders.

In addition to directing your own tank, you also lead a platoon of three to five tanks. You can move from tank to tank within the platoon, taking control of the tank most critical to your mission. On an even higher level, you command the entire Company battlegroup, which can include other tanks, tank destroyers, assault guns, armored cars, infantry, anti-tank guns, and sometimes even artillery support.

The three different tanks portrayed in this simulation were the standard medium tanks of 1944. They were the most numerous and most important tanks fielded by each army during that year, and they participated in every aspect of every major battle and campaign. Unlike more specialized vehicles, medium tanks were used for everything and anything. They were the workhorses of the armored forces.

Unlike certain modern tanks (notably the M1A2 Abrams), no World War II medium tank was invincible. This simulation accurately models the weaponry, armor, maneuverability, and survivability of each vehicle. You can form your own opinions about each vehicle. Do you agree that the Panther was the best and the Sherman was the worst?

Moreover, *iPanzer '44* goes beyond operating a tank—it challenges your ability as a leader and commander in the most realistic and accurate simulation of WWII tank warfare available for your PC.

Installation

The following configuration is required to run this simulation:

- IBM-compatible 133+ MHz Pentium PC (200+ MHz recommended).
- 16 MB of RAM (32 MB recommended)
- SVGA video with 640x480 resolution with 65,000 (16-bit) colors
- 4x CD-ROM
- Microsoft Windows 95
- Windows 95-compatible mouse with at least two buttons
- Sound card recommended but not required
- Joystick recommended but not required

3D Accelerators & Direct 3D: This game supports selected 3D accelerator hardware, provided that the hardware is compatible with Microsoft's Direct3D standard (which is part of DirectX) *and* that the hardware has sufficient capability to actually accelerate the game. Due to the peculiar requirements of tank warfare, not all 3D hardware actually helps—sometimes, the software system in this simulation yields better results *without* hardware assistance.

In general, sufficient hardware means a 3D accelerator including one of the following chips:

- 3dfx Voodoo
- Rendition Verite v2100 or later
- NVIDIA Riva 128

Other chipsets *may* work if they and their drivers have alpha-blending, bilinear filtering, and z-buffering.

In addition, the hardware accelerator must have at least 4 MB of video RAM to handle the wide variety of vehicle and terrain texture-mapping used by this simulation.

If your 3D hardware has all these features but the game does not run correctly, see ["3D Accelerator Drivers & Direct3D" on page 4](#).

Windows 95 Installation

To install *iPanzer '44*, open the CD-ROM drive, insert the CD-ROM, then close the drive and wait. On most systems, the CD-ROM options window is displayed in a few seconds. Select the *Install iPanzer* button. An installation wizard automatically loads and guides you through the installation process.

Some computers do not have Windows 95 AutoPlay enabled, so inserting the CD does not automatically bring up an options window. If no window is displayed within a minute after inserting the CD, follow these steps:

1. Select the Windows 95 *Start* button, then *Settings*, then *Control Panel*.
2. In the Control Panel window, double-click the *Add/Remove Programs* icon.
3. Select the *Install* button.
4. Make sure the CD is in the drive, then select *Next*.
5. Select the *Finish* button. This loads the installation wizard, which guides you through the installation process.

Indeo and DirectX Drivers: *iPanzer '44* (and many other games) requires these special system drivers to operate correctly. If you select the default choices where appropriate during installation, the drivers are automatically installed. You may be prompted to replace other drivers or to restart your machine after setup. These are normal operations for driver installation. Proceed as instructed to ensure your PC's full functionality with *iPanzer '44*.

Joystick Calibration: If you have a joystick, run the Windows 95 joystick program (or the specific program for your joystick, if you have one).

To run the Windows 95 joystick program, double-click *My Computer*, then *Control Panel*, then *Joystick*, and then *Calibrate*. To prevent peculiar behavior in some versions of the joystick program, select *OK* immediately after finishing the calibration—do not select *Test*. If you want to test your calibration, you can select *Joystick* again after you select *OK*, and then select *Test*.

It is vital that you use the very latest driver software for your joystick. We recommend that you visit the website of your joystick maker. Download and install the latest driver for your joystick. Sometimes, old drivers conflict with the latest features in the Microsoft operating system (such as DirectX), resulting in very unusual problems, including some that appear unrelated to the joystick.

ReadMe: The ReadME.TXT file on the CD-ROM may have additional current information about installation options and other issues. Use Windows Explorer to find ReadME.TXT on the CD-ROM, then double-click it to read its contents. After you install the game, you will also find a copy of this file in the game directory.

3D Accelerator Drivers & Direct3D

3D Hardware Drivers: 3D accelerator hardware can dramatically improve the appearance of this and many other games. However, as of early 1998, there are difficulties associated with this technology.

Your 3D hardware accelerators almost certainly came with driver software that Windows 95 installed, typically when you first installed your 3D accelerator board.

Unfortunately for game developers, publishers, and players, both 3D hardware and their drivers are constantly changing. Furthermore, there are two entirely different types of drivers available for a given 3D accelerator: the reference driver and the manufacturer driver. Some games work best with the latest reference driver; others with the latest manufacturer driver.

Reference drivers are created by the company that makes the central 3D processor (such as the 3dfx, Rendition, or NVIDIA). As problems or limitations are discovered in that chip or its current driver, a new reference driver is created. However, these reference drivers are sometimes experimental and buggy, and in rare cases, a board manufacturer arranged the chip in such a peculiar way that the reference driver does not work.

Manufacturer drivers are provided by the company that makes the actual 3D hardware board. The manufacturer's driver is based on the reference driver, but each board may have special features and options that require additions or adjustments to the reference driver. This takes time, so manufacturer drivers can lag behind reference drivers in core technology.

Experience has shown a driver can run one game perfectly but produce nothing but game crashes or scrambled screens for another. If a game doesn't work with your 3D hardware, and you feel comfortable switching drivers, we recommend you visit the website of your board manufacturer, download the latest driver, and install that. If the game *still* doesn't work, try installing the reference driver instead. As of spring 1998, the web sites for the three most noted 3D processors are:

- Rendition Verite V2X00—<http://www.rendition.com>
- NVIDIA Riva 128—<http://www.nvidia.com>
- 3dfx Voodoo—<http://www.3dfx.com>

Currently, Windows 95 does not permit multiple drivers for a single piece of hardware. Instead, when you install a new driver, the old one disappears. Therefore, we suggest you keep separate, pre-install copies

of any driver you acquire. If you need to reinstall, you can browse to your driver storage area and select the appropriate one. Some gamers change drivers so often, they note which driver works with which game in its manual.

CAUTION: Installing drivers in Windows 95 system puts you deep within the operating system. If you are at all hesitant anytime during a process, *don't do it*. You can render your computer inoperable with the wrong choices.

To reach the driver installation level of Windows 95, follow these steps:

1. Select *Start*, then *Settings*, then *Control Panel*, and double-click *System*.
2. Select the *Device Manager* tab, find the 3D accelerator entry within the list of your system's hardware, and select it.
3. Select the *Properties* button, then the *Driver* tab. The driver page should include an install or update button that guides you through the actual installation process.

Direct3D: In addition to the driver software associated with your hardware, game software that uses hardware accelerators also invokes a 3D application programming interface (API), which is designed to work with *any* hardware. This game uses Microsoft's Direct3D API, which is part of DirectX. This game includes a sufficiently current version of DirectX and Direct3D as part of the installation procedure.

Unlike with drivers, Windows 95 allows any number of APIs, so Direct3D should not interfere with OpenGL, Glide, RRedline, or any other API also on your system.

Starting Your Simulation

After you install the simulation, insert the CD-ROM, wait until the iPanzer '44 screen is displayed, and then click the *Play iPanzer* button. It may take some computers up to a minute after the CD is inserted before the iPanzer 44 screen appears.

If this doesn't work, leave the CD in the drive, select the *Start* button, then *Programs*, then *I-Magic*, and then *iPanzer*.

2 Quickstart

Quickstart Battles

iPanzer '44 has three different quickstart options: commanding an American M-4 Sherman, a German PzKw V Panther, or a Russian T-34-85. Select the tank model of your choice to start the battle.

We suggest the German PzKw V Panther (the gray model in the middle) for your first battle. It's got the best gun and armor of the three.



Quickstart models on the bookcase

A Quick Overview

In each case, you begin the battle inside the turret of your chosen tank. Enemies are directly ahead, and more are on the way. Use the cursor

keys (or click the mouse within the gunsight area) to aim, press the space bar to confirm the target and range, then press *Enter* to fire.

You can shift positions within the tank using the function keys *F1* (in the open turret hatch), *F2* (inside the turret), and *F3* (inside the hull). Experiment with the mouse and cursor keys to move the view or the entire tank. Function keys *F4*, *F10*, *F11*, and *F12* provide other views and information.

Even in the quickstart battle, you're commanding a platoon of tanks. Move the mouse to the bottom of the screen to see menus of options, orders, and other commands. To shift viewpoint from your #11 command tank to another vehicle in your platoon, use the *Units* menu.

More About Controls

Mouse & Keyboard: The mouse cursor changes shape when you place it in particular regions, and labels may appear in the lower left corner of the screen. Watch for clues about game operation. Almost all controls are accessible either through a mouse click or via the keyboard.

Menu Bar: During battle, the menu bar is hidden, but it is available at the bottom of the screen. To display it, move your mouse to the bottom of the screen, or press the *Alt* key. Many menu options can be activated directly from the keyboard; these keyboard shortcuts are listed on the menus, in this manual, and in the *Quick Reference Guide*.

System Menu: *Pause*, *Exit*, and other choices are in the *System* menu. Select *Exit* (or press *Ctrl+X*) to return to the main menu. To exit the entire game, click on the light switch to the right of the bookcase.

Status/Message Buffer: When the menu bar is not displayed, the bottom part of the screen has a status/message area. To enlarge this area and display the last few messages, select the small button on the bottom right of the screen.

Leading Your Platoon

When the battle starts, your first job is to evaluate the situation. Move the mouse to the bottom of the screen to open the menu choices, select *Views*, and then select *Tactical Map*. Each icon represents a unit (Battery, Platoon, or Section) of troops. Click the map icons to see more information about each unit, including details on vehicles and movement path. Experiment with other map controls to learn more about the current situation and the status of your army.

For more information about the map, see [page 61](#).

You can give orders on the map, but it's more exciting to watch things happen. Select the *Views* menu, then select *External*. Now you can see your tanks on the battlefield. Select the *Orders* menu and then *Advance Fast* to get your tanks moving.

Finally, select the *Orders* menu, then *Fire at Will*. This instructs the tanks in your platoon to fire whenever they have targets. Your forces always start the battle with *Cease Fire* orders. Even if fired upon, your forces will not fire back until you select *Fire at Will* or *Group Fire*.

You can change checkpoints on the map to adjust the movement path for your Platoon. Alternately, you can use the *Orders* menu to control movement of your Platoon.

Operating a Tank

You can view the battle from inside your tank by selecting the *Views* menu and then one of the following choices:

- **Unbuttoned** puts you in an open hatch, looking out over the top of the turret, using either normal eyesight or binoculars. See [page 44](#) for details.
- **Turret** puts you inside the tank turret. You can see out using the cupola and gunsight. You can operate the turret, main gun, and coaxial machine gun. See [page 45](#).
- **Hull** puts you inside the hull front. You can see out using the driver's viewport. You can drive the tank and operate the bow machine gun. See [page 48](#).

Other Tanks: Initially, you are in tank #11, the Platoon Leader's tank. If you halt the tank, drive in a new direction, or change formation, the rest of the Platoon follows. The *Units* menu allows you to move into any of the tanks in the Platoon (tank #11, #12, or #13; sometimes #14 or #15 in larger platoons). Each tank has exactly the same crew positions. However, the other tanks are not Platoon leaders. If you turn or drive one of them in a new direction, they travel alone, while the other tanks follow the Platoon leader.

Other Units: You can select the other choices on the *Units* menu to move through all the vehicles and units present. Going to a vehicle other than an M4A3/76, Panther, or T-34-85 automatically switches you to the external view. You can control any vehicle on your side.

The *Company* menu lets you issue some important, general-purpose orders to all units at once. Use the *Company* menu choices to start or stop movement or firing for everyone at once.

The Fine Points

When you become comfortable with the basics of the simulation, try out the following features in the order listed:

Formations: Units have different formations (see [page 33](#)). The *Units* menu lets you select formations and other options for the unit (see [page 32](#)). You can also split off and rejoin vehicles with their unit (see [page 27](#)).

Gunnery: Firing a tank gun accurately is somewhat more complicated than an arcade game. See [page 46](#) for details.

Scrapbook: Before trying a single mission or campaign, you must create a persona scrapbook for yourself. This is your alter ego for missions and campaigns. See [page 14](#) for a full explanation.

Single Missions: After you're comfortable with Quickstart, we suggest you select single missions. You'll probably find it easiest to join the 116th Panzer Division on the Western Front during the Battle of the Bulge.

Configuration: There are numerous configuration options available. Some affect the complexity of on-screen graphics, and some affect game difficulty. See [page 17](#) for details.

Victory: There are many different measures of victory, and some might conflict with others. See [page 81](#) for information about ending battles, achieving victory, getting a high point score, and how to receive decorations for valor.

Campaigns: Eventually, you'll be ready for a campaign. Again, you'll probably find it easiest to try a campaign as a German, and hardest to be an American. See [page 133](#) for more information.

3 Initial Options

The bookcase of an old war veteran provides easy access to configuration controls, persona management and medals, quick battles, missions, campaigns, multiplayer games, and more. Once you begin a mission or are on campaign, the prebattle clipboard screens allow you to select your mission, forces, and so on.



The Bookcase

The Bookcase

All configuration and scenario controls, game options, and player records are available through the bookcase.

As you move the mouse over active items, labels appear in the lower left corner of the screen. You can always use the *Esc* key to back up.

Quickstart

Select one of the three tank models to begin a quickstart battle in that tank: the American M4A3/76 Sherman, the German PzKw V Panther, or the Russian T-34-85.

Quickstart battles have their own special configuration that helps newcomers experiment with the game. No persona is needed for quickstart battles, and therefore no records are kept.

Missions & Campaigns

Persona Required: You must select a persona for the appropriate unit before you begin a single mission or a campaign. You can use one of the default personas or create your own. See ["Your Persona"](#) below for details.

The Shelf of Books

Vehicle Data

Select the appropriate book to see more information about the various vehicles and weapons in the simulation. The first click opens the book to an index; click again on the name of vehicle or weapon to see more detailed information. You can also click on the upper edges of the pages (right and left) to move forward and backward through the book.

War Heroes

Click this book to see the most successful leaders in the war—so far, that is. Listed here are personas with the highest scores in battle and those most successful in their campaigns.

Your Persona

You must use a persona to fight a single battle mission or a complete campaign. You can use one of the default personas, or you can create a new one by clicking the volume labeled *New Book*.



The Shelf

Officer Assignment

NAME	Heinz Guderian		
PLATOON	Frost Group		
UNIT NAME	Lion Group		
DIVISION			
RANK: CAPTAIN			
☒			
STATUS			

☒	Pz V Plt	Pz4w V Panther Platoon	100	4
	Pz V Plt	Pz4w V Panther Platoon	100	4
	Pz IV Plt	Pz4w IV J Tank Platoon	68	4
	Nashorn Bty	On 111/IV Nashorn ID Battery	64	4
	PzSpw Sec	PzSpw Armored Car Section	18	2
	PzSpw Sec	PzSpw Armored Car Section	18	2
	FO Wt	Forward Observer in Wt	4	1
	FO Wt	Forward Observer in Wt	4	1
	PzG Sqd	Infantry Team	12	0
	PzG Sqd	Infantry Team	12	0
	Wt Sec	Infantry Team	12	0
	CONFIRMED TOTAL		100	4

Persona Form

You must create a persona for a specific front (Western or Eastern) and nationality (American, German, or Russian). These choices determine your campaign and where you can fight single mission battles.

All Western Front battles occur in the snow-covered Ardennes in December, during the famous Battle of the Bulge. All Eastern Front battles occur in White Russia (Belorussia, now Belarus) in July, during the “Operation Bagration,” better known as the destruction of Army Group Center.

Persona Data & Core Forces: On the new persona form, you can change your name, the platoon nickname, and the company nickname. Beneath that is a list of units can be part of your core force for the entire campaign. Select a unit by clicking in the box to the left of the unit name. Deselect it by clicking again in the same box.

Each unit has a value (first number) and element count (second number). Your overall core force cannot exceed a value of 200. In addition, other units may join you for specific missions and battles.

When you’re satisfied with all your choices, click *Save* to create and permanently store this new persona.

Campaign Scrapbook

New Scrapbook: When a new persona is saved, a new scrapbook is created, and the page changes to the first page of that scrapbook. To open a book, click on it. To flip through a book, click on the upper right and left corners of the pages.

To begin a campaign, flip the scrapbook pages until you reach a page with one or more small photos of potential battlefields. Select the small photo to begin that battle.

When the battle is finished, new scrapbook pages appear with information about battle results, followed by a new page of battlefield choices with one or more new photos. This continues until you win or lose the entire campaign. Each persona can only fight a campaign once —if you want to try again, create another persona.

If the index of battles in the scrapbook exceeds the space on the page, click above or below the list to scroll it up or down.

Rewinding a Campaign: You can “rewind” a campaign and replay any earlier battle. Move to the appropriate page and select the battle.

If you choose to replay that battle, all future events in the campaign scrapbook are erased, and a revised history begins from that battle.

If you choose to replay a copy of that battle, a new copy of the scrapbook is created with just your history up to that battle. This option also means that the original book is preserved.

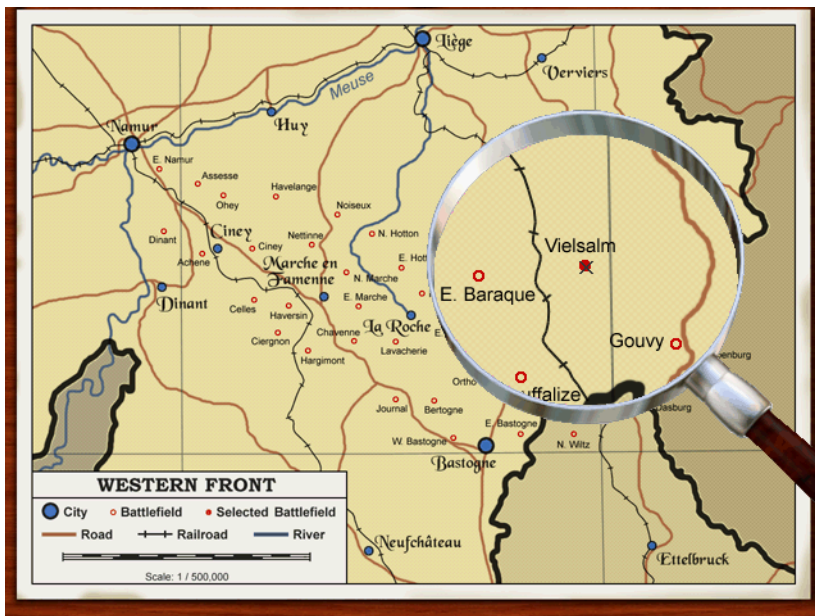
Copying a Scrapbook: Right-click on the spine of the scrapbook (on the shelf), then select *Copy*.

Deleting a Scrapbook: Right-click on the spine of the scrapbook (on the shelf), then select *Delete*. This completely erases that scrapbook and the associated persona.

Default Personas: There are four default personas (one for each front and nationality) that cannot be deleted, but you can reset them to their initial state by right-clicking on the spines.

Single Missions

To begin a single mission with a new persona, exit from the scrapbook, then click on a bookend to leave the shelf of books and return to the main bookcase. Select the appropriate map (Eastern or Western Front), then use the magnifying glass to click on a specific battlefield to begin a battle at that location.



Map

A Western Front persona cannot fight on the Eastern Front, and vice versa. Your core force in the campaign does not participate in single mission battles, just your own tank platoon. You have a completely fresh choice of supporting forces for every single mission battle.

Instant Resume (Campaign Only)

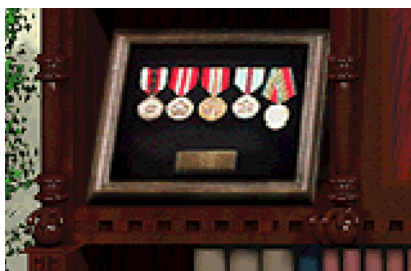
This allows you to resume the most recent *campaign*. You'll immediately go to the progress report page for that persona. Click the upper right corner of the page to see which battles are next.



Snapshot for Instant Resume

Medals and Decorations

Click here to examine the medals and decorations of whichever persona you select. Press *Esc* or click anywhere to leave.



Medals & Decorations

Configuration Controls

Use this screen to adjust the game to your preferences. Click on the left or right side of the knobs to turn them.

The top knob changes bands (pages) as well as functions if advanced configuration is on (see the next paragraph). The lower knobs move the pointer up and down, the selections left and right, or exits. The arrow keys and *PgUp* and *PgDn* keys also work. To exit, press the *Esc* key.



Configuration Controls

Basic vs. Advanced Configuration: All the basic configuration controls are on the initial page. Advanced configuration items are only available if the Config. Type option is set to Advanced. If it is, additional configuration pages with detailed, advanced settings become available.

Performance (P): Some options will affect the performance of your system. Higher performance options mean greater speed demands on your computer.

Difficulty (D): These options affect the difficulty of the simulation. The higher these go, the more challenging it is to win.

Score (S): These options affect your score. The higher you turn these options, the higher your score can go. Unless otherwise indicated, a score setting doesn't affect your score by more than ten percent.

Basic Configuration

Screen Type selects the software display system. **DIB** (Device Independent Bitmap) is available in case you have trouble with DirectDraw. However, it is considerably slower than DirectDraw, so if DirectDraw does work, use that instead. **DirectDraw** is the standard display system and is recommended for any user. DirectDraw displays all 3D graphics using software—no hardware acceleration is used. **Direct3D** uses any compatible hardware accelerators to speed up the 3D part of your game. If your hardware accelerator lacks features needed for *iPanzer '44*, you may be informed of this. In some cases, hardware acceleration actually improves appearance, *not* speed.

Audio Effects turns sound effects on or off. **Speech** turns intercom and radio sounds on or off. **Music** turns background music on or off. We suggest you turn all on unless you're trying to diagnose operating problems.

Video Clips turns on or off the historical video footage. On some machines, turning this off may solve random crashes caused by video player conflicts.

Gamma Correction brightens (high number) or darkens (lower number) the 3D display. The standard for most machines is 1.0. If you find your screen too light or too dark, select a different value.

Facing Icon makes available or hides this element on the game screen. We recommend that you always leave this on for full situational awareness.

Game Play (D) (S) resets advanced configuration items to produce challenge levels from beginner to expert. **Custom** means that a special selection of advanced configurations are in effect.

Machine Settings (P) resets numerous advanced configuration items to match the computational ability of your computer. We suggest you try the game at various settings to see which pleases you. Of course, selecting the very fast option with the slowest acceptable machine (a 133 MHz Pentium) is not wise. If your machine has a compatible 3D hardware accelerator, you might use a slightly higher machine setting. **Custom** means that a special selection of advanced configurations is in effect.

Config. Type determines whether the advanced configuration pages (bands) are available. **Basic** means only this page (band) is available. **Advanced** allows you to customize your configuration.

Advanced Configuration

Arcade Mode (D)(S): When this is on, realistic damage effects are ignored on all vehicles except yours. Instead, a penetrating hit on any other vehicle causes an immediate and dramatic explosion. When arcade mode is off, damage occurs realistically, including the possibility that a vehicle might be disabled or immobilized without exploding and burning.

Friendly Forces (D)(S): This determines the quality of your vehicle crews, infantry, and guns. The quality order (highest to lowest) is elite, veteran, regular, and green. Higher quality troops, men, and vehicles react faster, aim more accurately, recover from suppressive fire ("pinning") faster, and sometimes have access to better equipment.

The effect on your score can be significant, especially if there is a large disparity between the friendly and enemy troop quality. For example, you receive a significant scoring bonus for leading green troops against elite enemies, and the greatest scoring penalties for leading elite forces against green enemies.

Enemy Forces (D)(S): This determines the quality of enemy vehicle crews, infantry, and guns. Higher quality troops, men and vehicles react faster, aim more accurately, recover from suppressive fire faster, and sometimes have access to better equipment.

Perfect Intelligence (D)(S) determines how much information you have about enemy forces before the start of the battle. When this is on, you know the exact enemy objectives and forces in each battle, and you can even adjust them to suit your taste. When this is off, you have only general intelligence reports about enemy forces and intentions, and you cannot adjust them. We recommend that beginners make sure this feature is on.

Object Viewing (D)(S) indicates the limits of the external view system. **All** means you can use the external view from all friendly and enemy vehicles. When on, this option reduces your score because it allows you to inspect enemy dispositions. **Friendly** means you can use the external view from all friendly vehicles but not from enemies. We recommend *All* for beginners, then shift to *Friendly* once you understand the game.

Automatic ID (D) determines whether the ranging system displays the type of target. We recommend you leave this on until you are able to identify the various vehicle types without aid.

Invulnerability (D)(S) means your platoon command tank (#11) and the tank you're currently inside (which might be another tank in the Platoon) cannot be hurt by any weapons fire. Using this option reduces your score enormously, but is highly recommended for beginning players.

Unlimited Ammo (D)(S) means your tanks never run out of ammunition, but your score is about 20% less. This option is highly recommended for beginning players.

Ranging (D) determines how easy or realistic it is to adjust your gun for different firing ranges. **Arcade** means that whenever you fire, the range is automatically computed, superelevation added, and target motion lead set. All you need to do is place the gunsight on the target and fire. **Automatic** means that when you press the space bar, range is automatically computed and displayed, the target type is displayed if Automatic ID is on (see above), and superelevation is automatically set. You are ready to fire, but firing is a separate action. **Realistic** means that pressing the space bar only reports the range (and type if Automatic ID is on). You must operate the superelevation manually and then fire.

Stabilization means that the main gunsight doesn't bounce up and down as you move, even if the tank is pitching up and down while moving across hills or rough ground. We recommend you turn this off because leaving it on is totally unrealistic for WWII fighting. In fact, the lack of stabilization is built into all computer-operated vehicles, which must stop to shoot.

Hardware & Software Configurations

Joystick turns joystick support on and off. If you have the joystick on, be sure you calibrated your joystick correctly in Windows before starting the simulation. After you first turn on the joystick, you should select the *System* menu and then *Re-center* in the next battle (see [page 39](#)).

Optional Objects (P): This setting turns on or off various small, static objects on the battlefield. This includes individual trees (but not entire forests), telegraph or telephone poles, and items whose effect is almost entirely visual. If you have a Pentium class computer (rather than a Pentium-Pro or Pentium II), you probably want to turn these off for best performance.

Optional Collisions (P): This setting turns on or off movement and shellfire collisions with the optional objects above. We *strongly* recommend that you turn this off because determining possible collisions for each vehicle, man, shell, or bullet in addition to thousands of objects will slow down even the fastest computer.

Model Detail (P) controls the detail in the appearance of vehicles, buildings, trees, and other objects on the ground.

Animating Vehicles (P) adds limited animation effect to vehicles (for example, moving tracks when armored vehicles move).

Smooth Shade (on objects) (P) smooths out the lighting effects on objects for even more realism. A few people may find vehicles harder to identify. Turning off this option produces a very minor performance increase.

Perspective Textures (P) improves visual realism of vehicles and other objects, regardless of the viewing angle.

Incidental Effects (P): Turning on this option improves the appearance of explosions, smoke, and other special graphic effects. Of course, it also slows down your computer.

Field of View (P): We recommend **Wide** field of view for most uses. However, this produces an unrealistically wide viewpoint in the gun-sight. The **Narrow** field of view provides a more faithful and realistic gunsight as well as a modest performance increase.

Horizon Distance (P)(D) controls how far out into the 3D world you can see (except on the map):

- The **2.0** setting limits visibility to 2 kilometers and places the least demands on your computer.
- The **2.5** setting, which limits visibility to 2.5 kilometers, is a good choice for faster computers without 3D hardware acceleration.
- The **3.0** setting extends visibility to 3.0 kilometers and is appropriate for very fast computers without 3D hardware acceleration.
- The **3.x** setting extends maximum-detail terrain to the 3.0 kilometer horizon. It reduces distant visual simplifications that may otherwise cause peculiar visual effects, including floating and sinking problems (for details see [Chapter 14, "Designer's Notes"](#)). However, we know of no PC machine able to handle this setting without 3D hardware acceleration. We recommend this setting only if you have compatible 3D accelerator hardware *and* a Pentium II class computer.

Distance Hazing (P) adds a haze effect as ground terrain and objects get further and further away.

Terrain Textures (P) turns on or off the terrain textures for the ground. When textures are off, the ground appears as solid-colored triangles. Turning off textures can result in a significant performance increase.

Smooth Shade (on terrain) (P) turns on or off a smooth shading effect across each polygon or terrain texture. Turning off smooth shading only gives a minor performance increase.

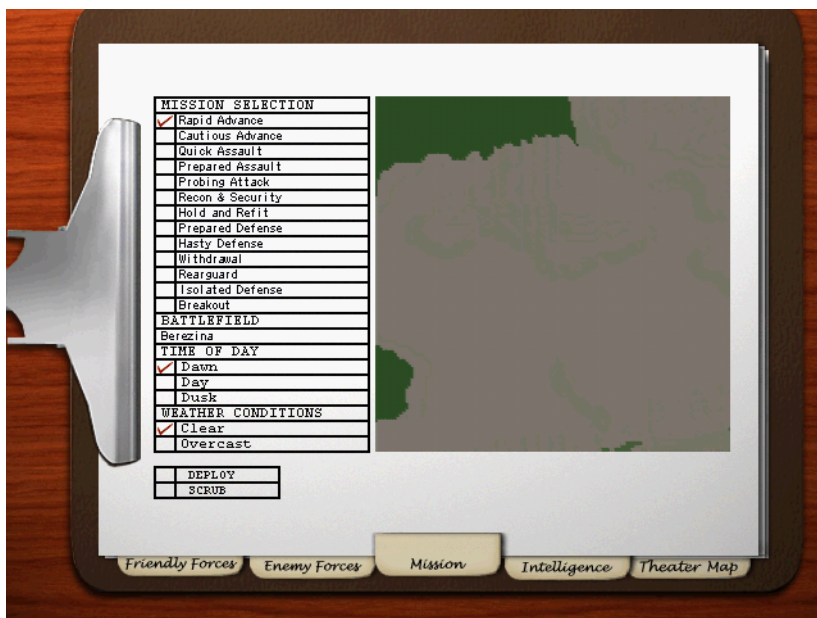
Prebattle Options

Single mission and campaign battles have a clipboard full of options that provide you with information and choices to start each battle. To change pages, click the appropriate tab across the bottom.

As with other screens outside of battle, you can always use the *Esc* key to back up.

Mission Selection

Mission Selection: One or more missions are listed here. If more than one is available, you can change the default by clicking in front of the



mission you prefer. To see more about that mission, select the *Intelligence* tab at the bottom.

Battlefield: This lists the name of the current battlefield. A simplified overview map of the battlefield appears to the right.

Time of Day: This indicates when the battle occurs during the day. In some cases, you can choose a different time by clicking to the left of the time you prefer.

Weather Conditions: This indicates the current weather. Clear weather means better visibility, while overcast may mean light rain or snow. In single mission battles, you can select the weather by clicking to the left of the weather you prefer.

Friendly Forces

Checkmarks show the forces available to your side in the battle. A default selection is provided, but you can uncheck some items and check others, provided your force does not exceed the limits for that mission.

In campaign battles, your core force appears at the top and is always selected. In single mission battles, your platoon appears at the top and is always selected.



To select a unit, check the check box at the left side of its line.

To deselect a unit, uncheck the check box.

Force choices have value and quantity limitations. The lower right corner indicates the total allowed in value (the first number) and quantity of vehicles or vehicle-equivalents (the second number).

The exact forces available to a mission vary. Even if you select the same battlefield and mission, you may not have the same forces available next time.

Enemy Forces

This displays information about enemy forces, insofar as they are known. In single missions, you also can select which enemy units you will face.

[illegible]

Enemy Forces

Campaign Battles: Your configuration options (see [page 17](#)) determine how much information about enemy forces is available. Depending on these options, you may or may not see a list of specific enemy units.

Single Mission Battles: Advanced configuration options (see [page 19](#)) may allow you to adjust enemy missions, units in a battle, or both. To select or deselect a unit, select the box at the left end of the line.

The most challenging battle uses the maximum possible enemy force. To reduce the level of challenge, select fewer forces. Bear in mind that scoring takes relative forces into account. If you select a very strong force, and adjust the enemy to be a very weak force, your best possible score is reduced (see [page 85](#)).

Intelligence Reports

This sheet provides an overview of the battle situation, describes your mission, and briefs you on the enemy's situation and likely intentions.

Pay close attention to your orders. The only way to end the battle without suffering a defeat is to successfully fulfill these orders. Even if you destroy the enemy, you still may need to fulfill other requirements before the mission is a success!

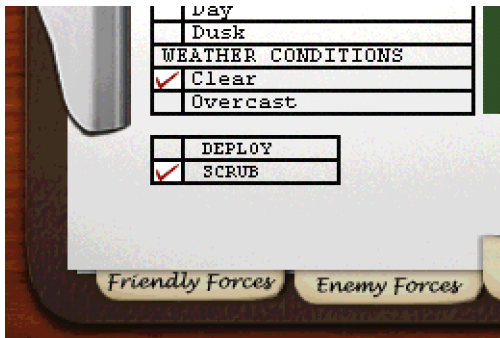
The Theater Map

This provides a general reference of the general region. It has no direct effect on the battle.

Deploy or Scrub

The **Deploy/Scrub** option is available on a number of sheets:

- To begin the battle, select the *Deploy* box.
- To cancel and back up, select the *Scrub* box.



Deploy/Scrub

4 Standard Controls & Orders

This chapter explains the basics of controlling a tank in *iPanzer* '44.

Critical Concepts: Elements, Units & Viewpoint

In this manual, the following terms are defined as follows:

Element: This is any single vehicle, infantryman, or anti-tank gun.

Unit: This is a group of elements that moves and fights together as a unit. The actual number and type of elements in each unit is historically realistic, so the specific military designation varies. For example, most infantry units are teams, most anti-tank guns or artillery units are a section or battery, and most vehicles are grouped into platoons.

Unit Leaders & Detachments: Each unit has an element that leads it, while all other elements follow in formation. If an element leaves a formation and goes elsewhere, it automatically becomes an independent detachment. It operates as a new, one-element unit until it reforms with its original unit. A detached element cannot reform with any other unit.

Element and Unit Identification Numbers: All elements have a two-digit identification number. The first digit indicates the platoon number; the second digit shows the element number. For example, a German player will find that his unit (tank platoon #1) has tanks #11, #12, #13, and #14. Tank #11 is the platoon leader's personal tank. If the next

unit in the German force was also a tank platoon, it would have tanks #21, #22, #23, #24, and so on.

Viewpoint: Your viewpoint may be within a specific tank. As an American, you can only be inside M4A3/76 Sherman tanks; as a German, only PzKw V Panther tanks; as a Russian, only T-34-85 tanks.

Your viewpoint can also be external (that is, outside the vehicle). External views of any friendly vehicle are always available. With the appropriate configuration option set, you can also “cheat” and see external views of enemy vehicles, too.

Viewpoint & Control: Your viewpoint determines which element or unit receives orders. For example, if your viewpoint is currently external to element #11, which is the leader of unit #1, any orders you give will apply to all of unit #1. However, if you shift to a nonleader in the unit, say element #13, any orders would only go to that element. If the orders included any change in movement instructions, #13 would automatically detach itself because it could no longer travel in formation with the rest of the unit!

If you shift your viewpoint to another unit, your orders are obeyed only by that unit. For example, if you move from tank #11 to tank #31, your orders now apply to the unit #3 and *not* to unit #1. To make your orders apply to unit #1 again, you must shift back to an element in that unit (normally #11).

The tactical map (see [page 61](#)) provides a superb overview of the battlefield, your units, and enemies in sight. Any unit you select (by clicking on it) becomes your temporary viewpoint. However, when you leave the tactical map, you return to your regular viewpoint, unless you deliberately changed it on the tactical map using the *Views* menu ([page 30](#)), *Units* menu ([page 32](#)), or the *Jump* menu choice from the *Quick* menu (see [page 69](#)).

Company Orders allow you to issue orders to your entire force, regardless of your current viewpoint.

Menus

To display the menu bar during battle, move the mouse to the bottom of the screen or press the *Alt* key. The menu options apply to the vehicle you occupy, the entire unit, or your entire force, depending on the menu in use.

Menu options are white on gray when available, and the currently selected option is black on off-white.

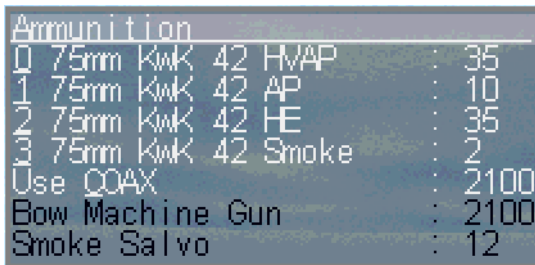
Keyboard shortcuts are shown in brackets after each command. In keeping with Microsoft Windows 95 conventions, these shortcuts are available anytime the menu is *not* active. When the menu is active, you must either use the mouse or use *Alt* keystrokes (see below).

Keyboard shortcuts are indicated in brackets [] below.

Alt keys provide a standard way to access almost any menu option using the keyboard. First, press the *Alt* key to display the menu. To select a specific menu, press the underlined letter in the menu name. To select a specific menu option, then press the underlined letter in the option name. For example, *Formation* menu, *Column* option, can be selected as *Alt+F C*.

Ammo Menu

Click on the *Ammo* part of the menu bar, press the *A* key, or press *Alt+A* to see this menu. This menu only applies when you are in a M4A3/76, Panther, or T-34-85 tank.



Ammo Menu

Ammo Numbers: For easy use in shortcuts, the *Ammo* menu gives each type a number, followed by its name and the amount of rounds remaining. Each nationality has different ammunition types available:

American	German	Russian
HVAP	HVAP	APDS
APC	AP	APHE
APHE	HE	HE
HE	Smoke	(none)
Smoke	(none)	(none)

The smoke ammunition available to American or German main guns is entirely different from the defensive smoke launcher also available to those tanks. Both these vehicles have two different ways to lay smoke.

Use the menu to specify which ammunition your gunner will shoot next. If another type is already loaded, the shell is unloaded, and the new type is loaded.

The type of ammunition available varies with from one element (vehicle) to another. The number of rounds available for each type also is displayed on the menu. For more information about ammunition types, see [page 107](#).

Use Coax selects the coaxial machine gun beside the main gun. The gunner aims and fires this machine gun instead of the main gun, which remains loaded with its current ammunition.

Smoke Salvo fires a shot from the vehicle's smoke screen system. Each tank had a slightly different system.

The American and German tanks used a gun/mortar that fired a small smoke bomb in whatever direction the turret faced (that is, the direction viewed by the turret gunsight). In each case, the tank carried 12 shots, and reloading was rather slow.

Russian tanks dropped a larger smoke canister from the rear, so the smoke appears to the rear of the tank's hull. The tank carried only two shots, one on each rear fender, so there was no reloading delay.

Bow MG indicates the ammunition available to the hull machine gun. This is not a selectable option. For details about bow MG controls, see [page 50](#).

Views Menu

Click on the *Views* part of the menu bar, press the *V* key, or press *Alt+V* to see this menu.

This menu lets you access any view inside or outside the tank. You also can align any view with any other view.

Inside the Tank Views

Unbuttoned (TC) [F1] moves you to the tank commander's view from the open turret hatch.

Turret (Gunner) [F2] moves you inside the turret combining the commander's cupola (across the top) with the gunner's sight (in the center), and various turret controls.

Hull (Driver) [F3] moves you to the crew position in the hull. This combines includes the driver's view, driving controls, and the bow machine gun.

Vehicle Status [F4] displays a diagram of the vehicle and its crew, showing damage and casualties. This only applies if you are inside an M4A3/76, Panther, or T-34-85.

Outside the Tank Views

External View [F10] shows an outside view of the currently selected element (vehicle). You can toggle between view and driving controls.

Map [F11] [M] displays the tactical map.

Vehicle Info [F12] displays a clipboard with information about the vehicle you occupy or just viewed.

Facing Realignments

Face all to Unbuttoned (TC) [F5]^{*†} rotates the turret and hull to the direction the TC is facing.

Face all to Turret (Gunner) [F6]^{*} rotates the TC view and the hull to the direction the turret gunsight is facing.

Face all to Hull (Driver) [F7][†] rotates the TC view and turret to the direction the hull is facing.

Face Turret to Unbuttoned (TC) [F8][†] rotates the turret to the direction the TC faces. Neither the TC nor the hull changes facing.

Face Turret to Hull [F9][†] rotates the turret to the direction the TC faces. Neither the TC nor the hull changes facing.

Face Hull to Unbuttoned (TC) [Ctrl+F5]^{*} rotates the hull to the direction the TC faces. Neither the TC nor the turret changes facing.

Face Hull to Turret [Ctrl+F6]^{*} rotates the hull to the direction the turret faces. Neither the TC nor the turret changes facing.

Face Unbuttoned (TC) to Turret [Shift+F6] rotates the TC view to the direction the turret faces. Neither the turret nor the hull changes facing.

Face Unbuttoned (TC) to Hull [Shift+F7] rotates the TC view to the direction the hull faces. Neither the turret nor the hull change facing.

NOTES:

^{*} If the unit is moving when this occurs, any movement toward pre-planned checkpoint(s) ends. Instead, the unit or element turns and continues moving in the new direction.

[†] These orders end computer-controlled firing. Once this facing change occurs, you'll have to either fire yourself, or issue appropriate orders to begin firing. See ["Human vs. Computer Crewmen" on page 73](#) for details.

Units Menu

Click on the *Units* part of the menu bar, press the *U* key, or press *Alt+U* to see this menu.

This menu moves your viewpoint from tank to tank within your platoon. It also allows viewpoint shifts on a more general scale, from one unit to another, or to any element in any unit.

If you are currently inside a tank, move your viewpoint to an element other than a M4A3/76, Panther, or T-34-85 (depending on your nationality); your viewpoint automatically shifts to an external view of that element (vehicle or equivalent).

Tank moves your viewpoint to the appropriate tank in the unit. The specific options and keyboard controls are:

- 11 Tank [*Shift+1*]
- 12 Tank [*Shift+2*]
- 13 Tank [*Shift+3*]
- 14 Tank [*Shift+4*] (Germans and Americans only)
- 15 Tank [*Shift+5*] (Americans only)

Next Unit Element [Tab], **Previous Unit Element [Shift+Tab]** moves your viewpoint to the next or previous element (vehicle) within the current unit. For example, if you're in tank #12, *Next Unit Element* moves you to #13, while *Previous Unit Element* moves you to tank #11.

NOTE: This option does not allow you to move to another unit. In addition, on the tactical map, the *Tab* and *Shift+Tab* keys only move your viewpoint between elements at maximum zoom. In all wider viewpoints, these keys shift your viewpoint from unit to unit, exactly like the *Next Unit*, *Previous Unit* controls below (for details, see [page 66](#)).

Next Unit [J], **Previous Unit [I]** moves your viewpoint to the unit (platoon) leader of the next unit (platoon). For example, if you are currently in the #11 tank (first tank of the first platoon), *Next Unit* moves you to #21 (first tank in the second platoon).

Support units are not included. To see them, you must use the tactical map (see ["Artillery" on page 65](#)).

Next Element (Ctrl+J), **Previous Element (Ctrl+I)** moves your viewpoint to the next element (vehicle) within the entire force. If the option to see all enemies has been selected, you can use this control to see external views of every enemy element as well.

Off-map artillery units are not included because they can't be seen. To access them, you must use the tactical map (see [page 65](#)).

Formation Menu

Click on the *Formation* part of the menu bar, press the *F* key, or press *Alt+F* to see this menu.

Unit Formations

This menu controls the formation of one unit (platoon). When a formation order is given, all elements in the unit will move to the new formation *only when the unit begins moving*. As long as the unit is stationary, the elements of the unit will not move, not even to change formation.

If a formation order is given to an element within a unit, it still applies to the entire unit. However, if the element is detached, the order applies just to that element, and is effectively meaningless.

There are six different formations:

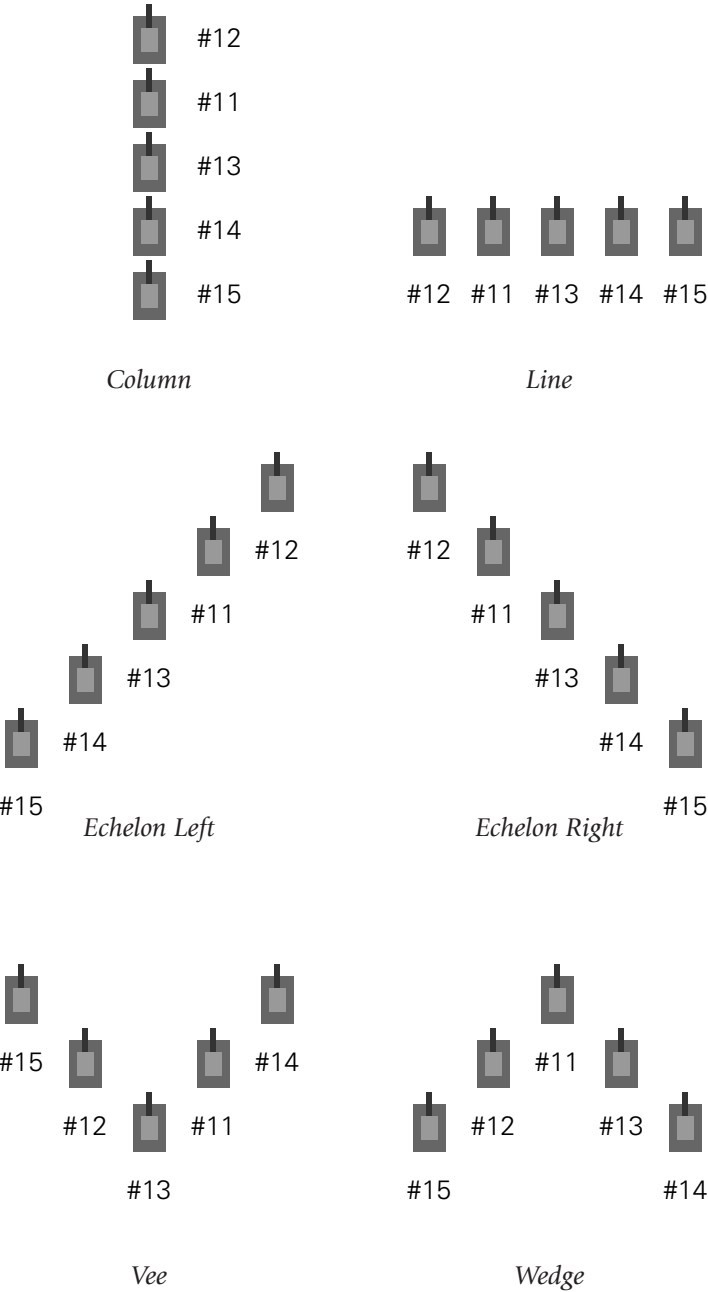
- Column
- Line
- Echelon Right
- Echelon Left
- Wedge
- Vee

The #1 vehicle is always the unit leader (platoon commander). Additional vehicles fill in additional numbered positions. For example, a three-tank platoon would have vehicles #1, #2, and #3 present.

Unit Coordination

This menu also controls formation spacing, detachments, and reattachments. Default spacing for vehicles is about 20 meters; for infantry, about 3–4 meters.

Close Up reduces space between elements (vehicles) in the unit (platoon).



Open Up increases space between elements (vehicles) in the unit (platoon).

Reform Formation instructs all elements in the formation to rejoin around the unit leader as soon as possible.

This order is useful when an element leaves a formation because you gave it separate movement orders or took over driving. In either case, the element was detached and becomes a separate unit until this order is issued to either the element or its previous unit leader.

Immobilized elements automatically detach from a unit when they become immobilized. They cannot reattach or reform the formation.

NOTE: Elements trying to rejoin a unit or reach an old checkpoint may have difficulty finding their way across large areas. It's best to get separate vehicles or wayward units close to the goal yourself, and then issue the appropriate order.

Orders Menu

Click on the *Orders* part of the menu bar, press the *O* key, or press *Alt+O* to see this menu.

Orders give instructions to one element (vehicle). If the element is a unit leader, the order applies to the whole unit.

If you are in the lead element of a unit (for example, the #11 tank of your platoon), the order applies to the unit as a whole because the other elements follow the unit leader.

If your viewpoint is some other element in the unit, movement orders apply just to that element. Other orders (such as cease fire or fire at will) still apply to the entire unit. Individualized movement orders almost always cause the element to detach from the rest of the unit. It can be reattached using the *Reform Formation* choice from the *Formation* menu (see [“Open Up increases space between elements \(vehicles\) in the unit \(platoon\).”](#) above).

Movement Orders

Anti-tank guns ignore most movement orders because they are immobile within the scope and timespan of the battle. However, they can turn in place.

Units or elements that can move often have their paths described by checkpoints. Checkpoints and movement paths can be seen on the tactical map (see [page 69](#)).

Advance Top Speed: The element (unit) moves forward at full maximum speed to the next checkpoint if one exists; otherwise, it moves straight ahead.

Advance Fast: The element (unit) moves forward at 75% of maximum possible speed to the next checkpoint if one exists; otherwise, it moves straight ahead.

Advance Slow: The element (unit) moves forward at 25% of maximum possible speed to the next checkpoint if one exists; otherwise, it moves straight ahead.

Halt: The element (unit) stops moving.

Backup: The element (unit) moves in reverse at best possible speed.

Turn Right: The element (unit) starts a right turn (or rotation if stationary). The turn (rotation) continues until this order is toggled off.

Turn Left: The element (unit) starts a left turn (or rotation if stationary). The turn (rotation) continues until this order is toggled off.

Firing Orders

Fire at Will orders the unit to open fire whenever the element is halted and a reasonable target is available. The element decides which targets are reasonable and how fast to fire.

Group Fire applies to the entire unit and instructs the unit to use volley fire. That is, nobody in the unit fires until all units are loaded and ready to fire. Then every unit with a target fires together in one big volley. This order is ideal for ambush situations, but it reduces your rate of fire to the slowest element in the unit.

Rolling Fire is the same as *Fire at Will*, except the unit fires even while moving. Accuracy is reduced significantly when firing on the move, and the penalty escalates as you move faster and faster.

Cease Fire instructs the unit to stop firing. If the element is a unit leader, the entire unit stops firing. Computer-operated vehicles in the unit will not fire again until a *Fire at Will*, *Group Fire*, or *Rolling Fire* order is received.

Personal Override: If you enter the turret of a vehicle, you temporarily override any of these orders because you are now operating the gun. However, this does not permanently override any orders (including *Cease Fire*). When you leave the turret, that element returns to the unit's current firing orders.

Tactical Orders

Resume Orders: The unit resumes its original (default) map orders, which were issued at the start of the battle. If the element is a unit leader, the entire unit resumes its original orders. Any subsequent orders are forgotten, including new map orders and checkpoints.

Breakthrough orders the unit to adopt a new movement path straight toward the phase line deepest in enemy territory. If the element is a unit leader, the entire unit adopts this order.

This order allows the unit to pass through the commitment area and leave the battlefield. This is the *only* way a unit can move forward off the battlefield into the enemy's rear areas. For details, see ["Phase Lines" on page 77](#).

Withdraw gives the unit a special movement path that goes straight to the phase line furthest back in friendly territory. A unit with this order can pass through the commitment area and retreat off the battlefield. This is the *only* way a unit can withdraw from the battlefield to a friendly rear area.

Cancel Tactics cancels any attack, engage, or defend target and tactics for the unit (or element). The unit (element) then resumes any existing movement orders (that is, continues to its next checkpoint if it has one). For a more detailed discussion of new tactics, selectable on the tactical map, see [page 70](#). For more information about default tactics used by computer-run units, see ["Standard Battleplans" on page 78](#).

Company Orders Menu

All orders selected from this menu apply to your entire force on the battlefield—all elements and units obey instantly.

Click on the *Company* part of the menu bar, or press *Alt+C* to see this menu.

Company Movement Orders

Company movement orders are strongly affected by whether a movement path with checkpoints exists. To see if a unit has a planned path with checkpoints, consult the tactical map ([page 61](#)).

Advance Top Speed orders all elements (units) *with checkpoints* to move forward at top speed to the next checkpoint. Elements (units) without checkpoints remain stationary.

Advance Fast orders all units to move forward at 75% of maximum possible speed to the next checkpoint if one exists; otherwise, straight ahead.

Advance Slow orders all units to move forward at 25% of maximum possible speed to the next checkpoint if one exists; otherwise, straight ahead.

Halt orders all units to stop moving.

Company Firing Orders

Fire at Will orders all units to fire whenever they are halted and a reasonable target is available. The element decides which targets are reasonable and how fast to fire. If you are currently in the turret, this order has no effect until you leave because your presence temporarily overrides the computer-controlled gunner.

On the other hand, if you're in any other position and issue this order, don't be surprised if your element (vehicle, and so on) begins shooting at the most threatening target in sight.

Group Fire gives the group fire order to each unit in your entire force. Basically, no element in a unit fires until all elements of that unit are ready to fire. See [“Firing Orders” on page 36](#) for details.

Rolling Fire is the same as *Fire at Will*, except all units and elements may fire while moving. Accuracy is reduced significantly when firing on the move, and the penalty escalates as you move faster and faster.

Cease Fire orders every unit and element to stop firing. Computer-operated vehicles in the unit will not fire again until a *Fire at Will*, *Group Fire*, or *Rolling Fire* order is received. However, you can still go into the turret of any appropriate tank and fire off one or more shots. However, this does not permanently override the cease fire order. You must issue a new order (such as *Fire at Will*) to keep the tank firing after you leave.

Company Tactical Orders

Resume Orders: Every unit and element resumes its original (default) map orders, which were issued at the start of the battle. Any subsequent orders are forgotten, including new map orders and checkpoints.

Breakthrough: Every unit and element adopts a new movement path straight toward the phase line deepest in enemy territory. This order also allows the element (or unit) to pass through the commitment area and leave the battlefield. This is the *only* way a unit can move forward

off the battlefield into the enemy's rear areas. For details see [“Phase Lines” on page 77](#).

Withdraw: Every unit and element adopts a special movement path that goes straight to the phase line furthest back in friendly territory. An element (or unit) with this order can pass through the commitment area and retreat off the battlefield. This is the *only* way a unit can withdraw from the battlefield to a friendly rear area.

System Menu

Click on the *System* part of the menu bar, or press *Alt+S* to see this menu. This menu lets you pause, leave, or reconfigure the simulation software to suit your needs.

Normal Time [Ctrl+hyphen] sets the simulation to a normal time rate, or “real time.”

Accelerate Time [Ctrl+plus sign] increases the rate at which time passes. Time passage doubles with each key press, from normal to 2x, then 4x, and finally 8x, which is maximum accelerated time. Another press then returns you to normal time, or you can select the *Normal Time* menu option.

NOTE: Internal logic attempts to restore normal time whenever a new enemy is spotted. However, if you accelerate time again, you may find that a critical battle is over in a split second. We recommend that you do *not* accelerate time whenever any enemies are visible on the tactical map.

Re-center Joystick [Ctrl+J] recenters the joystick. Use this if your joystick tends to drift out of alignment. Also, make sure that you have the latest joystick drivers and that they have been properly initialized for your operating system.

Pause [Ctrl+P] temporarily halts the simulation, allowing you time to think and consider your actions.

Exit Battle [Ctrl+X] immediately ends the battle. Early in a battle, any exit results in an aborted mission and a major defeat. To complete the game and ensure that normal calculation of results, wait for a message saying that the mission is complete and that you can exit.

Help Menu

Click on the *Help* part of the menu bar, or press *Alt+H* to see this menu.

Glossary [Ctrl+G]: This displays definitions of important terms.

Help [Ctrl+H]: This displays a summary of common game functions and their keyboard equivalents.

Views & Positions

The function keys and the *Views* menu let you control your viewpoint during battle.

Inside the Tank

Americans can be inside any M4A3/76 Sherman. Germans can be inside any PzKw V Panther. Russians can be inside any T-34-85.

Use the *Views* menu or the following function keys to move around inside a tank:

[F1] Unbuttoned (TC): The tank commander's view—standing in the open turret hatch, looking out over the top of the tank.

[F2] Turret: The crew positions inside the turret, combining the commander's cupola (across the top), the gunner's sight, and various turret controls.

[F3] Hull: The crew positions in the hull, combining the driver's view and controls with the bow machine gun of the radioman beside him.

[F4] Vehicle Status: A diagram of the vehicle and its crew showing damage and casualties.

Outside the Tank

Use the *Views* menu or the following function keys for viewpoints outside your tank:

[F10] External View: An outside view of the currently selected element (vehicle). You can toggle between view and driving controls.

[F11] or [M] Map: The tactical map, where you can see the positions of both friendly and enemy forces as well as the plan movements for your platoon or the entire force.

[F12] Vehicle Information: A clipboard with information and a picture showing the element (vehicle) currently occupied or being viewed.

Switching Tanks

You can move your viewpoint into any tank in your platoon, provided it is not destroyed. Use the *Units* menu or the shift-number keys to move from one tank to another in your platoon. Use the number keys across the top of the keyboard, not those on the keypad to the right.

Shift+1: Move into tank #11 (the platoon commander's tank).

Shift+2: Move into tank #12 (second tank in the platoon).

Shift+3: Move into tank #13 (third tank in the platoon).

Shift+4: Move into tank #14 (fourth tank in the platoon); this option is not available to Russians.

Shift+5: Move into tank #15 (fifth tank in the platoon); this option is only available to Americans.

Tab and **Shift+Tab** keys move your viewpoint from one *element* to another within a unit.

] and **[** keys move your viewpoint to the next (or previous) unit within your whole force.

Ctrl+] and **Ctrl+[** keys move your viewpoint to the next (or previous) element within your whole force.

NOTE: If the Object Viewing advanced configuration option is set to All (see [page 19](#)), then **Ctrl+]** and **Ctrl+[** move your viewpoint through the next or previous element on the battlefield, both friendly and enemy.

Facing Icon

Orienting yourself within a tank can be confusing because the hull could face in one direction, the turret with its gunsight in a second, and the tank commander's cupola/unbuttoned position in a third.

The facing icon shows all three viewpoints on a diagram oriented like a compass: north (0°) is straight up, east (90°) is to the right, south (180°) is straight down, and west (270°) is to the left.



Facing Icon

TC View Arc shows the normal eyesight arc of the tank commander (TC). You see this in the unbuttoned view or through the cupola inside the turret.

Turret Facing shows the direction of the turret and its weapons face. You see this through the turret gunsight. The main gun and coaxial machine gun fire in this direction.

Hull Facing shows the direction the hull crewmen face. The two dark lines on the hull indicate that side is the front. The hull view looks in this direction, the tank moves in this direction, and its bow machine gun fires within this arc.

Communications

During battle, all incoming messages appear at the bottom of the screen.

Radio Log [Ctrl+R]: Select the button at the bottom right corner or press *Ctrl+R* to display a log of recent radio messages. Perform the same action again to return to the normal view.

5 Tank Views and Controls

When your viewpoint is inside a tank, you can use any combination of mouse, keyboard, and joystick controls. You can also issue orders or change your viewpoint using menus that pop up from the bottom of the screen (see [“Views Menu” on page 30](#)), or on the tactical map (see information on the *Jump to (Selected)* option on [page 70](#)).

Standard View Controls

All viewpoints in this simulation use the same keyboard, mouse, and joystick system for shifting your view.

Keyboard: Keys have the following functions:

- Arrow keys—Move view left, right, up, and down
- *Shift*+arrow key—Move view faster
- *Ctrl*+arrow key—Move view slower
- *Home*—Recenter view horizontally
- *End*—Recenter view to main gun

NOTE: *Home* has no effect while driving the tank.

Mouse: The left mouse button has the following movements associated with it:

- Left mouse button—Move view left, right, up, and down
- *Shift*+left mouse button—Move view faster
- *Ctrl*+left mouse button—Move view slower

NOTE: Clicking up or down in the hull (driver) view has no effect on tank speed. You must use the joystick or keyboard throttle controls to adjust your speed.

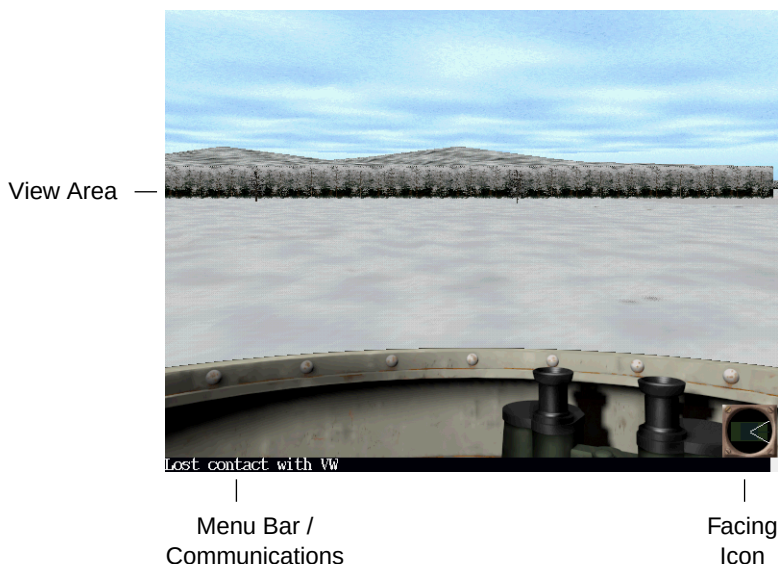
Joystick: Joystick movements are associated with the following functions:

- Joystick—Move view left, right, up, and down
- *Shift*+joystick—Move view faster
- *Ctrl*+joystick—Move view slower
- #1 Button—Same as *Enter* (fire weapon)
- #2 Button—Same as *Backspace* (change mode or magnification)
- #3 Button:—Same as space bar (special function)
- #4 Button:—Same as *End* (align view to main gun facing)

NOTE: In the Unbuttoned (TC) position, #1 Button (*Enter*) does not actually fire a weapon. Instead, it designates a target area for the gunner.

Unbuttoned (TC) Position

The Unbuttoned (TC) position allows you to survey the battlefield with maximum visibility from the tank commander's (TC's) hatch in the top of the turret. Binoculars are available to magnify your view.



American M4A3/76 Unbuttoned (TC) Position

View Controls are described on [page 43](#). The TC's view here becomes the cupola view from inside the turret (see ["Turret View" on page 45](#)).

Binoculars [Backspace] [#2 Joystick Button] toggles your 7x binoculars on and off, allowing you to zoom in on distant objects and terrain.

Recenter Horizontally [End] [#4 Joystick Button]: This rotates your view until it lines up with the main gun in the turret.

Recenter Vertically [Home] levels your view, making it horizontal again. Actually, the view is leveled with respect to the tank you occupy, so if the tank is on sloped ground, your view is sloped to an equal degree.

Designate Target [Enter] [#1 Joystick Button]: Instead of firing a weapon, this instructs your gunner to open fire at enemies in the center of your view. You cannot designate a specific target. The gunner will choose a target in that general area.

The Facing Icon is described on [page 41](#), the menu bar [Alt] on [page 28](#), and communications on [page 42](#).

Turret View

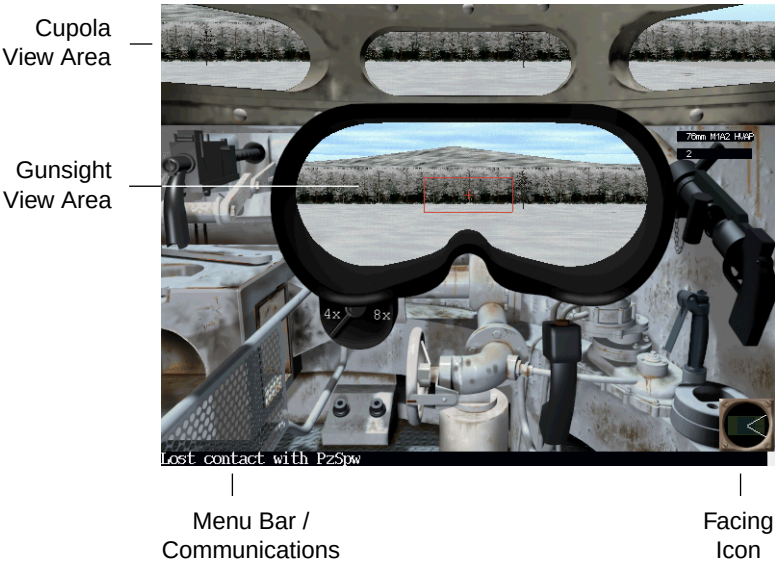
The Turret position provides you with both the Tank Commander's cupola and the gunner's gunsight, with turret, main gun, and smoke system controls. Equipment layout within the turret varies with nationality.

Cupola view represents what the TC sees (and therefore faces) in the same direction as the Unbuttoned (TC) view, and vice versa. The cupola can rotate independently of the turret. To align the cupola with the gunsight and turret, press the *End* key or use the *Views* menu (see [page 30](#)).

Rotate Cupola Left or Right: Hold the mouse button down in the left or right part of the view area. Hold down *Shift* as well to speed view rotation, or use *Ctrl* to slow down rotation. You can also use the following keys:

- <—Move cupola view left
- **Shift**+<—Move cupola view left quickly
- **Ctrl**+<—Move cupola view left slowly
- >—Move cupola view right
- **Shift**+>—Move cupola view right quickly
- **Ctrl**+>—Move cupola view right slowly
- **End**—Align cupola view with gunsight

Main Gunsight: The main gunsight shows the terrain in front of the turret. The gun is aimed using the standard View Controls, described on [page 43](#). Different tanks have different turret rotation speeds, which can significantly affect on your ability to aim the gun.



American M4A3/76 Turret

Ammo [A] is selected by using the keyboard, using the menu bar, or using one of the following keys:

Keyboard	American	German	Russian
1	HVAP	HVAP	APDS
2	APC	AP	APHE
3	APHE	HE	HE
4	HE	Smoke	(none)
5	Smoke	(none)	(none)
C	Coax	Coax	Coax

The Smoke ammunition available to American or German main guns is entirely different from the defensive smoke launcher also available. In effect, these vehicles have two different ways to lay smoke.

Coax ammunition means the coaxial machine gun is fired instead of the main gun. For more information about ammunition types, see [page 107](#).

Main Gunsight Magnification [Backspace] [#2 Joystick Button]:

Select the magnification switch to toggle the gunsight between low and high magnification. You must switch to high magnification to see ranging marks and the superelevation scale.

Ranging [Space Bar] [#3 Joystick Button]: Your choice among the following auto ranging options determines this function (for details on configuration, see [page 20](#)):

- **Arcade Ranging:** You don't need to worry about ranging when this option is set; it happens automatically whenever you fire. If you press the space bar anyway, you'll see the range to the target (and its type, if Automatic ID is configured to be on). If you don't see any range, your aim is off, and there is no enemy target at your aiming point.
- **Automatic Ranging:** Pressing the space bar indicates the range to target and automatically superelevates the gun to that range. All you have to do is fire. If the Automatic ID configuration is on (see [page 20](#)), the target type appears in the gunsight.
- **Realistic Ranging:** Pressing the space bar reports the range to target, and nothing more. You must manually adjust the superelevation (see information on Main Gun Superelevation below). If the Automatic ID configuration is on, the target type appears in the gunsight.

NOTE: True devotees of historical accuracy should avoid using this control—actual WWII tank commanders were obliged to guess and estimate range using vehicle size and the mil marks on their gunsights (for details, see [page 56](#)).

Main Gun Superelevation [PgUp/PgDn] [Shift+PgUp/Shift+PgDn] [Ctrl+PgUp/Ctrl+PgDn]: You must be using the magnified gunsight to see superelevation scales and to use the superelevation controls. Regardless of the tank, you move the control until it is set to the proper range to target. *PgUp* increases the range setting; *PgDn* decreases it. *Shift* makes the changes larger, while *Ctrl* makes them smaller.

Cancel Superelevation [Home]: This control removes all superelevation, resetting its range to zero (0).

Short Halt [H]: This instructs your tank to stop moving until the main gun or coax machine gun fires. Then it automatically resumes moving. Short halt is useful because it's almost impossible to aim and hit targets from a moving tank (unless you selected Arcade ranging, which is described above).

Fire [Enter] [#1 Joystick Button] fires the main tank gun. If the gun is not yet loaded, it will not fire. If coax ammunition is selected, the button fires a burst from the coaxial machine gun instead.

Smoke Salvo [S]: This fires a shot from the vehicle's smoke screen system. Each tank has a slightly different system.

American and German tanks use a gun/mortar that fires a small smoke bomb in whatever direction the turret faced (that is, the direction viewed by the turret gunsight). In each case, the tank carries 12 shots, and reloading is rather slow.

Russian tanks drop a larger smoke canister from the rear, so the smoke appears to the rear of the tank's hull. The tank only carries two shots, one on each rear fender, so there is no delay for reloading.

The Facing Icon is described on [page 41](#), the menu bar [Alt] on [page 28](#), and communications on [page 42](#).

Hull View

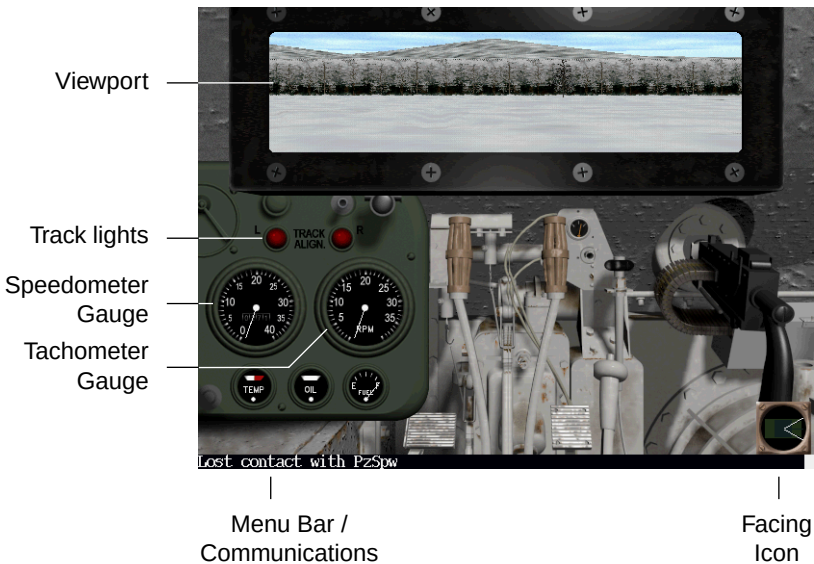
The Hull view allows you to drive the tank or operate the bow machine gun. The *Backspace* key [#2 joystick button] switches between driver and machine gunner operation. Hull layouts vary by nationality, but keyboard controls are standard, regardless of nationality.

Drive-MG Mode Switch [Backspace][#2 Joystick Button]: This switches you between driving and bow machine gun mode. The machine gun mode has moving cross hairs in the view area, indicating the current aiming point for the bow machine gun.

NOTE: Controls marked with an asterisk (*) in the two following sections function in both driving and MG modes.

Driving

Gauges are relatively standard for all tanks. The **speedometer** shows current speed in either miles or kilometers per hour. The **tachometer** shows the engine RPM. The **track lights** indicate if one or both tracks have been damaged.



American M4A3/76 Hull

Viewport: This area displays the terrain in front of the tank. The driver uses the standard View Controls (see [page 43](#)) to turn, accelerate, and decelerate the tank. However, you cannot accelerate or decelerate the tank by using the mouse (it makes turning too difficult); you must use the joystick or keyboard. Furthermore, *Shift* and *Ctrl* keys operate differently when driving.

Shift has no effect while driving. Normal controls yield maximum turn, acceleration, and speed for your tank.

Creep Control [Ctrl]: The *Ctrl* key has a unique affect on acceleration/deceleration. If you press *Ctrl* and press a key or move the joystick and then release the key or joystick with the *Ctrl* key still down, the tank engine immediately shuts down, and the vehicle stops. This allows you to creep forward or backward by holding down *Ctrl* and then making short taps on the keyboard or short flicks on the joystick.

However, if you release *Ctrl* before you release the key or joystick, the engine remains running at the last speed, even after you release *Ctrl*. In this case, *Ctrl* works best with arrow keys or the joystick to better fine-tune your current speed.

***End** automatically turns the tank hull to match the turret facing.

***Set Throttle [1]...[9]:** This sets the throttle to a specific level and keeps it there. The higher the throttle setting, the faster the tank moves.

***Throttle Off [0]:** This takes your foot off the gas, so your tank coasts to a stop.

***Throttle Off & Brake [Space Bar][#3 Joystick Button]:** This turns off the throttle *and* applies maximum braking as long as the key or button is held down. This is the fastest way to stop the tank.

Bow Machine Gun (MG)

Except for common controls marked by an asterisk (*), these controls apply only if you are in MG mode [*Backspace*] [#2 Joystick Button].

Viewport: You can move the machine gun cross hairs in the view area using the standard view controls (see [page 43](#)). *Shift* and *Ctrl* function normally. The machine gun cross hairs also follow your mouse cursor in the viewport; click to fire a burst in the desired direction.

Re-center Bow Machine Gun [Home]: This recenters the bow machine gun cross hairs to the center of the view area.

***Fire Bow Machine Gun [Enter] [#1 Joystick Button]:** This fires a burst from the bow machine gun.

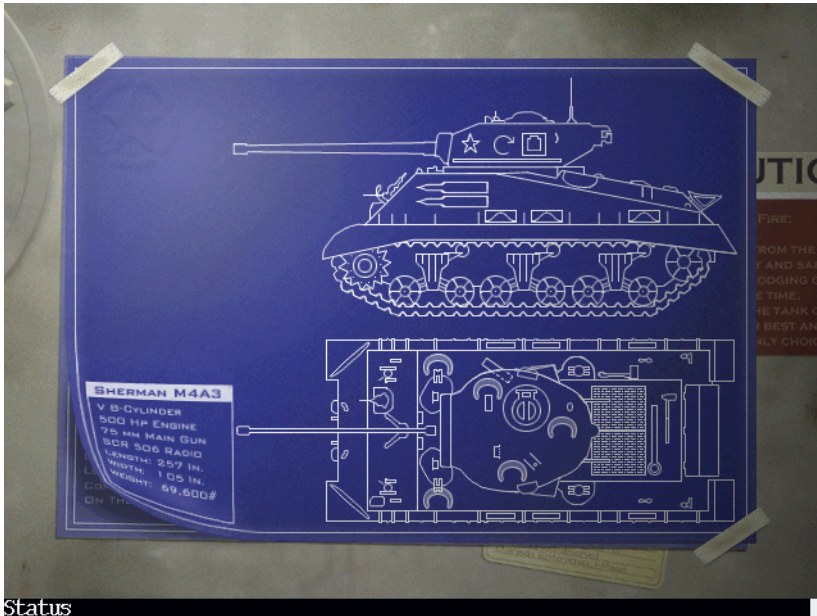
Other Controls

The Facing Icon is described on [page 41](#), the menu bar [*Alt*] on [page 28](#), and communications on [page 42](#).

Vehicle Status View

The Vehicle Status view is available only for the American M4/76 Sherman, the German Panther, and the Russian T-34-85. It provides detailed information about the status of each man and system in the tank, including ammunition supply.

Systems shown in green are functional or normal, those in yellow are disabled or depleted (that is, out of ammunition), and those in red are damaged or destroyed.



Vehicle Status View

External Views

The external view positions you outside the vehicle—you view it from above. You can view the vehicle and its surroundings (the default mode), or you can switch to a driving mode that gives you limited movement control. There are *no* external views for off-battlefield artillery.

View-Drive Mode Control [Backspace] {#2 Joystick Button}: Click on the word *View* or *Drive* (in the lower left part of the screen) to switch modes.

External View Mode

Viewport: The View Controls, described on [page 43](#), are slightly modified in this view.

Left and right controls (via arrow keys, mouse, or joystick) swing your viewpoint left or right around the vehicle.

Up and down controls (via arrow keys, mouse, or joystick) move your viewpoint up or down in relation to the vehicle.



External View

Zoom in by holding down *Shift* or *Ctrl* and either click on the upper part of the screen or push forward on the joystick. The *Z* and *+* keys also zoom in your view.

Zoom out by holding down *Shift* or *Ctrl* and either click on the lower part of the screen or pull back on the joystick. The *X* and *-* keys also zoom out your view.

Special Views [1]...[8] are a series of preprogrammed external view-points. The first four [1–4] are close-up views; the second four [5–8] are more distant views:

- 1 Chase (rear) view
- 2 Front view
- 3 Left side view
- 4 Right side view
- 5 High rear view
- 6 High front view
- 7 High left side view
- 8 High right side view

Changing Vehicle Viewpoints: You can shift external viewpoints using the *Units* menu or its keyboard equivalents, or by using the *Jump to (Selected)* option on the *Quick* menu on the tactical map (see [page 70](#)). Depending on your configuration option, you may or may not be allowed viewpoints from enemy vehicles. Viewing the battle from enemy vehicles is a useful learning aid, although unrealistic. Conversely, those who prefer a strictly realistic approach should never use the external view and minimize their use of the map.

External Driving Mode

Viewport: The viewport controls in driving mode function exactly like driving in the Hull view (see [page 48](#))—the driver uses the standard View Controls to turn, accelerate, and decelerate the tank. *Shift* has no effect, and the *Ctrl* key provides precise turns, or forward and reverse creeps. *End* automatically turns the tank hull to match the turret facing.

Throttle controls also work exactly like driving in the Hull view. The number keys set the throttle, from no power (0 key) to maximum power (9 key). The space bar applies brakes and turns off the power (zero throttle).

Other Controls

The Facing Icon is described on [page 41](#), the menu bar [*Alt*] on [page 28](#), and communications on [page 42](#).

6 Tank Gunnery

Compared to modern tank gunnery with laser rangefinders, barrel and wind sensors, and ballistic computers, World War II tank gunnery involved a great deal of estimation, guesswork, luck, and sometimes a little prayer. This simulation models as many or as few of those difficulties as you want.

There are three basic tasks required to successfully fire a tank gun at a target. First, the turret must traverse to a correct aiming point. Second, the range to the target must be determined. Third, the correct superelevation must be added to the gun barrel's normal elevation.

WWII tank guns were not as accurate as modern weapons, and even with the best weapon, minor differences like the residue of previous shots in the barrel or small wind shifts can subtly change a shell's course. Therefore, even if a shot is aimed perfectly, it still could miss the target. This can happen in *iPanzer '44*, just as it did in real life.

Turret Traverse onto Target

Tanks in WWII had no useful stabilization. The large amount of bouncing and jolting inside a moving tank made it nearly impossible to aim a gun through a high-magnification gunsight. Therefore, virtually all WWII tanks stopped to shoot, sometimes only for a short halt.

Traversing the turret to target means moving the gunsight (and the turret) left or right until the target is in the center of the sight, then elevating or depressing the sight (and the gun) until the sight's aiming point is directly on the target. If the tank is on flat ground, this is all that's necessary.

However, if the tank is on sloping ground, some small adjustments must be made. If the ground slopes toward or away from the target, no special compensation is necessary. As the ground tilts sideways to the target and the horizon appears to slant diagonally across the gunsight, any shell leaving the gun will tilt away toward the lower end of the horizon. At long ranges (over 1,000 m), this effect becomes pronounced, and some adjustment is needed. Rotate the turret a tiny amount toward the “high end” of the horizon (as it appears in your sight), and raise the sighting point a little.

Range to Target

Arcade Configuration: If your Ranging configuration setting is Arcade, you don’t need to range to target; it occurs automatically.

Automatic/Realistic Configuration: If your Ranging configuration is set to Automatic or Realistic, pressing the space bar automatically reports the range to the target. You’ll also see the target type (if the Automatic ID configuration option was set).

Historical Option: To operate like a real tanker in WWII, don’t use the space bar to get range to target. Instead, use the markings on the gunsight to determine range.

Tank gunners used mil marks on their gunsight to calculate range to target. Mil marks are etched onto the gunsight glass and represent a 1:1000 ratio. That is, when a post one meter high is viewed through a gunsight 1,000 m (1 kilometer) away, it appears as one mil high in the gunsight. If the post were only 500 meters away, it would appear 2 mils in size, and so on.

Specifically, to determine range to a target, use the following formula:

$$\text{range} = (\text{size} * 1000) / \text{mils}$$

For example, an M4A3/76 is about 3 m wide and 3 m tall. If the vehicle appears 4 mils tall in the gunsight, it is about $3 * 1000 / 4$, or 750 meters away. If it appears 5 mils wide in the gunsight, it is $3 * 1000 / 5$, or 600 m away.

Although height often is the easiest value to use for mil measurement, WWII gunsights were based on horizontal measurement. This is fine if you are looking directly at the front or side of a vehicle, but if you’re viewing it at an angle, the width as it appears in the sight will be somewhere between the vehicle’s real width and length. You must estimate the actual width and width in mils on the sight. Needless to say, the potential for error is large. In fact, this is the primary reason why many

WWII tanks missed with their first shot, adjusted their aim, and hit with the second.

A moving target presents a special challenge because you must “lead” it by a certain distance—aim the gun to a position in front of the enemy and hope that the shell and the enemy tank will each reach the same spot at the same time. This is not required in Arcade ranging configuration, where lead is automatically built into the gunsight (like the M1A2 Abrams).

Specific Vehicle Gunsights

PzKw V Panther: In magnified mode, this gunsight has a radial super-elevation display in the upper right corner of the screen. The series of triangles in the middle of the display are mil marks. The base of each triangle is 2 mils across, and each triangle is 1 mil high. The distance from the top tip of one triangle to the top tip of the next is 4 mils. The tip of the central triangle is the target (boresight) point.

T-34-85: This gunsight has a series of hash marks (vertical lines) across the bottom of the sight. Each mark is 5 mils apart. Every second mark has a chevron, and these are 10 mils apart.

M4A3/76: The horizontal stadia appear every 5 mils in this sight. The cross in the center is the target (boresight) point.

Superelevation

Tank guns can be aimed up or down to hit a target above or below the firer. Superelevation is *additional* elevation, above and beyond the normal, to compensate for the force of gravity on the shell’s flight through the air.

As ranges get longer, the gravity pulls the shell downward faster. This leads to a curving or arcing flight path. To compensate for this, the gun barrel is raised an extra amount. The greater the range, the more superelevation is needed. Furthermore, different ammunition flies at different speeds, so superelevation varies with shell type.

Computing superelevation requires calculus, but WWII tankers didn’t actually calculate superelevation angles. Instead, superelevation for each type of ammo at any given range was precalculated. A scale was printed on the gunsight, and there was a small knob or control. The gunner dialed in the appropriate range for the particular ammunition to get the correct amount of superelevation.

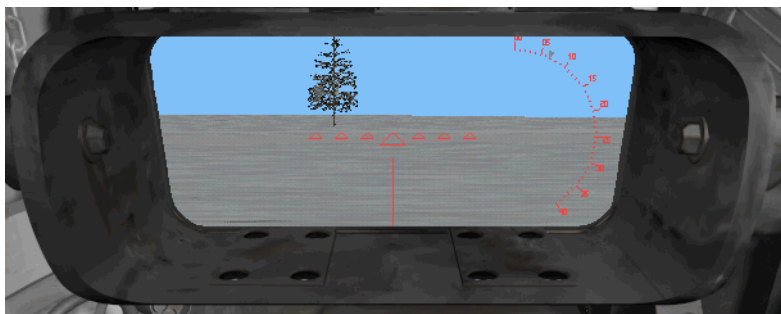
Arcade: When this configuration is set, superelevation is automatically added to each shot when you press *Enter* or joystick button #1.

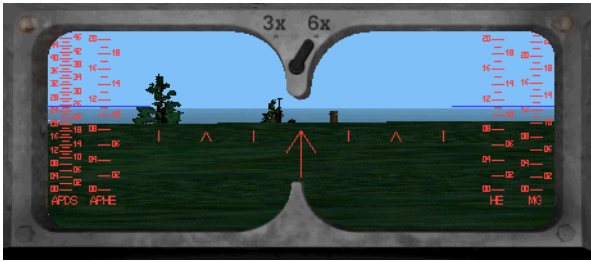
Automatic: When this configuration is set, superelevation is automatically added whenever you press the space bar or joystick button #2. Then you can press *Enter* or joystick button #1 to fire. Any superelevation added will remain in place until a new range and superelevation is computed or you manually adjust the superelevation.

Realistic: In this configuration, pressing the space bar reveals the range, but you must enter all superelevation values manually. Those who prefer total historical accuracy should not use the space bar for ranging data. Use mil marks instead (see [page 56](#)).

Specific Vehicle Superelevation Scales

You must switch to full magnification to see the superelevation scales. These scales are modeled after those in the actual vehicles, so they vary for each.





Russian T-34-85 Gunsight

T-34-85: This tank has separate scales for each ammunition type, and the scales are spread out to the left and right on the sight. This leaves the center area clear for aiming. The ruler marks on each column represent 100 m. The superelevation controls move a horizontal line up and down to select the proper range for that ammunition.



American M4A3/76 Sherman Gunsight

M4A3/76 Sherman: This tank's "ranging tree" has horizontal lines every 400 m and labeled lines every 800 m. The superelevation controls move the entire ranging tree up or down in relation to the target (boresight) cross hairs. Move the ranging tree until the horizontal line in the central cross hairs points at the correct range on the tree.

Ammunition Changes

Whenever you switch to a new ammunition type, you may need to reset the superelevation. As ranges exceed 500 m, it becomes more and

more important to do this. If you selected the Arcade or Automatic configuration, superelevation changes occur automatically.

Historical Notes

Historically, the actual superelevation process was often more complex. Most superelevation controls only adjusted the gunsight (rather than the gun itself). The sight adjustment caused the view to drop downward, so the gunner readjusted the gun's elevation to restore the aiming point, thereby elevating the barrel at the same time.

In combat, this system was so cumbersome that most tank commanders set up a standard superelevation and then tried to engage the enemy at that range. The most popular choice was a 500 m “battlesight” range because superelevation was largely unnecessary at that range. If the target was further away, the gunner estimated the elevation needed, elevated the barrel an appropriate amount, fired a shot that almost always missed, observed how far he missed, and adjusted the barrel up or down. Good, experienced gunners frequently hit with their second shot.

Except for very high velocity, very accurate guns (like the German 88mm), the various uncertainties and inaccuracies made it very hard to hit beyond 1,500 m, and most tank battles occurred well within 1,000 m range.

In this simulation, you may find setting superelevation to 500 m is wise for close-range, fast-moving battles—a situation Shermans and T-34s frequently prefer. As long as the enemy remains within that range or so, you can aim and fire very quickly. Similarly, if you have found the range to one element of an enemy unit, you can shift fire to the next enemy element with little or no elevation adjustment.

Historically, the Sherman's ranging tree was only calibrated for standard ammunition with a muzzle velocity of 792 m/sec, and it had nothing for the HVAP that fired at 1036 m/sec because Shermans weren't supposed to have HVAP ammo. In reality, Sherman gunners used HVAP and simply estimated what kind of change to make. In this simulation, we assume that an appropriate sight is always fitted for whatever ammunition the Sherman is using. Unlike your real-world counterparts, you do *not* need to make additional corrections when using HVAP ammunition.

7 Tactical Map

The tactical map is accessible from any position in the tank. It provides a detailed, zoomable view of the entire battlefield, all your forces, and all known enemy forces. You can control your entire force from this map, including artillery support.

Map Display & Controls

The tactical map includes three areas: the map display itself, the map key, and the unit data clipboard.

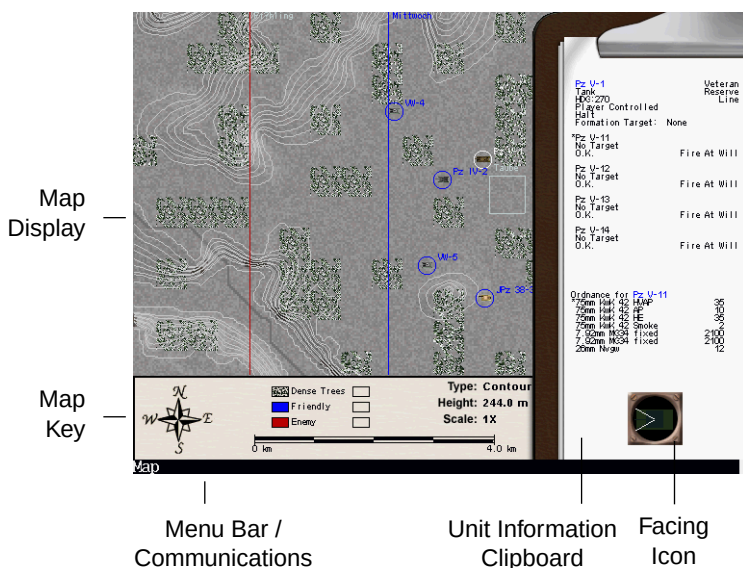
Use the tactical map as follows:

- Click a unit to see information about it on the data clipboard.
- Drag a unit to give it a simple movement path (or a new facing for anti-tank guns).
- Right-click on the map for a menu of map display options.
- Right-click a friendly unit to see information and get a *Quick* menu to give it orders.

You can right-click the map itself to adjust its display. If you apply maximum zoom to the map, the unit icons expand to individual icons for each element, showing the location of each.

Map Display

The map display shows the battlefield, all friendly units, all known enemy units, phase lines, and the objective area.



Tactical Map (Zoomed Out)

Right-click the map for the *Map* menu of context sensitive controls, (see [page 63](#)). This includes the zoom in/out option and the various view toggles. In addition, the following general keys apply to the map:

Center on Selected [End]: This centers the map around the currently selected (highlighted) unit (or element) if the map is at maximum zoom.

Map Scroll [arrow keys]: Use the arrow keys to scroll the map. Even when zoomed out to the maximum, the map is larger than the viewing area, so scroll around to get a good overview of the situation.

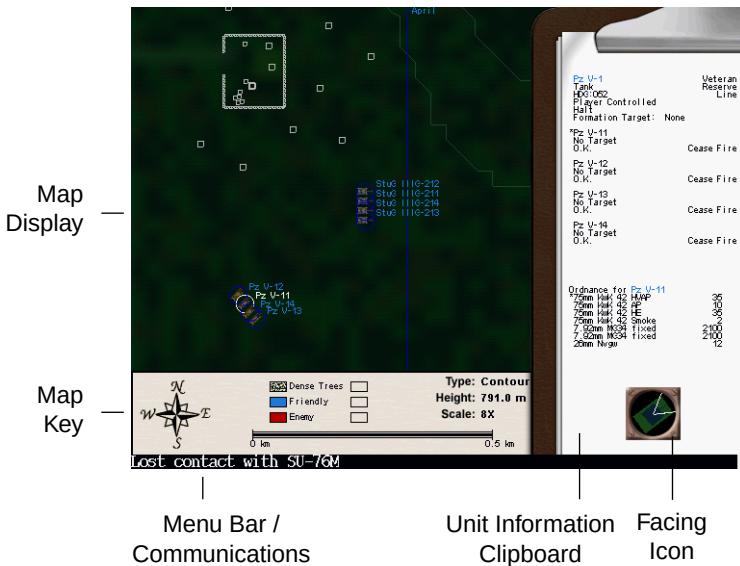
Map Key

The map key changes dynamically with the map display.

Height Display: Whenever the mouse cursor lingers on the map, the current elevation (height) at that point appears on the map key. The height changes as you move the mouse over the map.

This height information is very helpful when interpreting map contours. Another useful tool is the *Line of Sight* on the *Map* menu.

Map Scale: The current level of zoom appears in the map scale as "Scale: .x," and the meter scale across the bottom changes as well.



Tactical Map (Zoomed In)

Map Menu

The *Map* menu appears when you right-click anywhere on the map *other* than a friendly unit.

Zoom In [Z or +] zooms the map in. At maximum zoom, unit symbols are replaced by arrowheads showing each individual element.

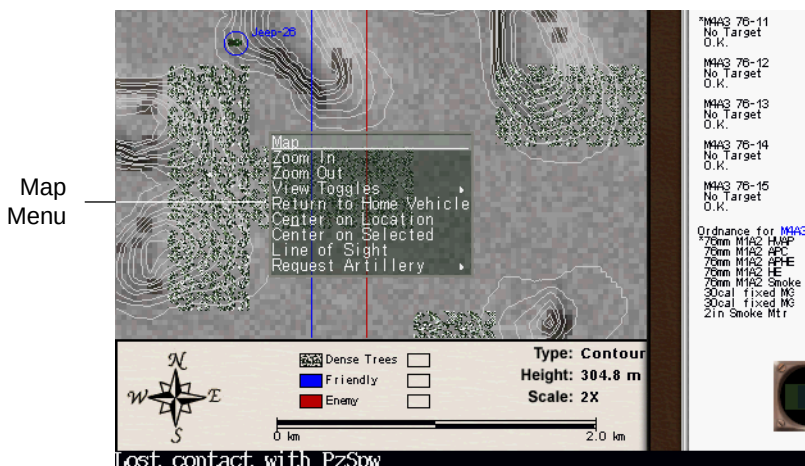
Zoom Out [X or -] zooms the map out. Even at maximum zoom, the map is larger than the display area, so you'll need to scroll around (using the arrow keys).

View Toggles: This submenu is described in ["View Toggles"](#) below.

Home Vehicle [Home] changes the viewpoint and highlights tank #11, which is your personal tank.

Center on Location centers the map around the spot where you right-clicked to see the *Map* menu.

Center on Selected centers the map around the currently selected unit (or element, if at maximum zoom).



Map Menu

Line of Sight activates the line-of-sight tool from the spot where you right-clicked to see the *Map* menu. A line appears, controlled by your mouse. The bright portion of the line indicates a clear line of sight, while the dark portion indicates terrain not visible to you.

Artillery: See ["Artillery" on page 65](#).

View Toggles

Vehicle Tags Both/Tags/Circles/Off [1]: This displays or hides text labels (tags) and the nationality circles. There are four possible states: both tags and circles, just tags, just circles, and neither.

Checkpoints Display All/Selected/Off [2]: This displays or hides checkpoint movement paths. **All** shows the paths of all friendly units. **Selected** shows just the path of the currently selected friendly unit. **Off** does not show any movement paths.

Movement paths are created by establishing checkpoints. Computer-controlled units move from checkpoint to checkpoint, and they stop at the last one.

Objects Display On/Off [3]: This displays or hides minor map objects such as individual trees, fences, poles, buildings, and so on.

Movement Info On/Off [4]: This displays or hides color-coded movement information. This includes areas that slow movement and areas that are completely impassable.

1km Grid Display On/Off [5]: This displays or hides the map's one-kilometer overlay grid.

Contour Display On/Off [6]: This displays or hides the map's contour lines.

Terrain Display On/Off [7]: This displays or hides terrain features such as forests, water, and so on.

Artillery

This submenu allows you to use indirect-fire artillery units. These units fire from off the battlefield. If forward observers can see the target point, their fire is considerably more accurate. For simplicity, all jeeps and VW Kubelwagens carry forward observers.

To fire artillery, follow these steps:

1. Right-click on the map to select target and see the *Map* menu.
2. Select the *Artillery* menu choice.
3. Select your choice of unit in the *Support Artillery* submenu.
4. Select your choice of ammunition in the *Ammo* submenu.

Target Point: Your initial right-click on the map, in addition to displaying the *Map* menu, also designates where the artillery barrage will land. Choose your location carefully!

Support Artillery Submenu: This submenu lists all artillery units available to you. Some units may be busy with other tasks and temporarily unavailable, while others could be out of ammunition and unavailable for the rest of the battle.

After each use, an artillery unit is unavailable for a period of time. After a number of uses, support artillery becomes unavailable for the rest of the battle.

Ammo Submenu: This submenu lists all ammunition types still available to the artillery unit you selected:

- **HE (High Explosive)** ammunition is very effective at killing infantry, anti-tank guns, and unarmored vehicles, but ineffective against armored vehicles.
- **Smoke** ammunition does no damage, but creates a temporary smoke screen that blocks both line of sight and line of fire. Smoke screens created by smoke shells gradually disperse.

Artillery Effects: Artillery fire is *much* more accurate if the target location is within the line of sight (LOS) of a forward observer (FO).

American and Russian observers use Jeeps; German observers use VW Kubelwagens.

Artillery fire can take a few minutes to “range in” on a target and begin fire-for-effect. Do not expect instant response from your artillery. Once begun, a bombardment lasts for a number of minutes. Individual shells may wander, so don’t bombard a spot too close to your own troops.

Unit Information & Orders

The tactical map provides data on all friendly units and on all enemies in sight. It also gives you access to a wide selection of orders, which you can give to any units or elements in your force:

- **Click a unit** (or element, at maximum zoom) to select it and see all available information about it on the data clipboard. Any orders you issue on the map screen apply to that selected (highlighted) unit or element.
- **Drag a unit** (or element, at maximum zoom) to set a movement path with one checkpoint. This automatically erases any prior movement path. Anti-tank guns cannot be moved, but dragging will change their facing.
- **Right-click a friendly unit** (or element at maximum zoom) to see information and immediately access the *Quick* menu of orders options.

Next Unit Element [Tab], **Previous Unit Element [Shift+Tab]** moves your viewpoint to the next or previous element (vehicle) within the current unit. For example, if you’re in tank #12, *Next Unit Element* moves you to #13, while *Previous Unit Element* moves you to tank #11.

Unit Data Clipboard

You can also change your viewpoint and the selected unit using the *Units* menu (see [page 32](#)). The unit data clipboard changes accordingly. Finally, you can use the *Jump to (Selected)* command in the *Quick* menu (see [page 70](#)) to shift your viewpoint into the selected unit. Because the unit was already selected, the unit data clipboard does not change.

Unit Data: The first paragraph on the clipboard provides summary data about the entire unit:

Unit Name	M4A3 76-1	Regular	Unit Quality
Unit Type	Tank	Reserve	Unit Role
Unit Heading	Hdg:090	Line	Unit Formation
Unit Control	Player Controlled		
Unit Movement	Halt		
Unit Target	Formation Target: None		
	M4A3 76-11		
	No Target		
	O.K.	Cease Fire	
	M4A3 76-12		
	No Target		
	O.K.	Cease Fire	
	M4A3 76-13		
	No Target		
	O.K.	Cease Fire	Firing Orders
	M4A3 76-14		
	No Target		
	O.K.	Cease Fire	
Element Name	M4A3 76-15		
Element Target	No Target		
Damage	O.K.	Cease Fire	
	Ordnance for M4A3 76-11		
	76mm M1A2 HAP	2	
	76mm M1A2 APC	15	
	76mm M1A2 APHE	39	
	76mm M1A2 HE	10	
	76mm M1A2 Smoke	5	
	30cal fixed MG	3125	
	30cal fixed MG	3125	
	2in Smoke Mtr	12	

Unit Data Clipboard

- **Unit Name** indicates the full name of the unit, with the last number being the platoon number. For example, M4A3/76-1 is your #1 platoon with M4A3/76 Sherman tanks.
- **Unit Quality** describes the tank crew, which can be elite, veteran, regular, or green.
- **Unit Type/Role:** This indicates the type of unit (tanks, infantry, and so on), and its battleplan role. For more information about battleplan roles, see [page 78](#).

- **Unit Heading** indicates the direction the unit faces. North is heading 0, east is 90, south is 180, and west is 270.
- **Unit Formation** indicates the current formation of the unit, which can be changed using the *Formation* menu (see [page 33](#)).
- **Unit Control** indicates whether the unit is operating under computer (AI) control or player (your) control.
- **Unit Movement** indicates its current movement speed.
- **Unit Target** indicates which target the unit is firing upon, if any.

Element Data: The next paragraphs on the clipboard specify information about each element in the unit. You can change which element is selected on the map and in the ordnance data by clicking its name in the Element Data list.

- **Element Name:** This is the official designation of the element, plus a two-digit identification number. For example, M4A3/76-12 is the #2 tank in the #1 platoon (tank #12). Your tank is always #11.
- **Element Organization Status** is blank unless the element is detached. An asterisk (*) indicates the element is the unit leader (platoon leader).
- **Element Target:** This indicates the exact target. If battleplan role and firing orders permit, the element will fire on the target as quickly as possible.
- **Element Damage:** The first entry indicates what type of damage, if any, has been sustained:
 - **OK:** No damage.
 - **Light:** Minor damage, usually external.
 - **Crippled:** Significant damage that affects weapon accuracy, rate of fire, or both.
 - **Disabled:** Main weapons cannot fire; observers cannot contact support artillery.
 - **Immobilized:** Cannot move.
 - **Destroyed:** Completely and totally out of action.
 - **No Ammo:** No ammunition for any of the main weapons.
- **Element Firing Orders:** Indicates the firing orders currently in effect. These include *Fire at Will*, *Group Fire*, *Rolling Fire*, or *Cease Fire*, described in detail for the *Orders* menu on [page 36](#).

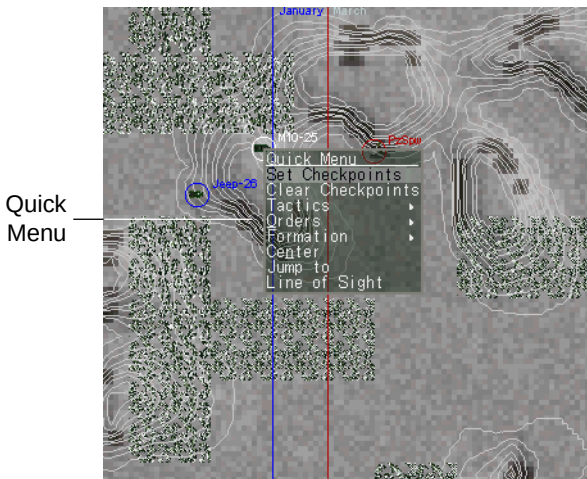
Element Ordnance Data: This indicates all the ammunition carried by the selected vehicle. If you selected an entire unit, the default ordnance

list is for the #1 vehicle. Click on a different element (in the data list above) to see its remaining ammunition.

To change ammunition, use the *Ammo* menu (see [page 29](#)).

Quick Menu

Right-click on any friendly unit (or element at maximum zoom) for a context-sensitive *Quick* menu of unit (element) controls. This menu includes unique tactics and checkpoint orders.



Quick Menu

Set Checkpoints: This creates a new movement path for the selected unit (or element at maximum zoom). From your unit, a movement path line appears. This line is controlled by your mouse. Click to set a checkpoint, which creates a movement path to that point. Click again to set another checkpoint and extend the movement path. Right-click when you're done.

Clear Checkpoints [Del]: This erases all existing checkpoints for the selected unit (or element at maximum zoom).

Tactics: This submenu is described on [page 70](#).

Orders: This invokes the *Orders* menu as a submenu. This menu is described on [page 35](#). New orders apply to the selected unit (without changing your viewpoint to that unit).

Formation: This invokes the *Formation* menu as a submenu. This menu is described on [page 33](#). You can select a formation for a unit (without changing your viewpoint to that unit).

Center [End]: This centers the map around the currently highlighted unit (or element if zoomed in).

Jump to (Selected) [J]: This changes your viewpoint to the selected unit (or element if at maximum zoom). When you leave the tactical map, you go to that unit or element (inside the vehicle if possible; otherwise, an external view).

Line of Sight activates the line-of-sight tool from the selected unit. A line appears from that spot to your current mouse location. The bright portion of the line indicates ground visibility from the viewpoint, while dark portions of the line indicate ground that is hidden.

Tactics

There are special tactical instructions that units may use to deal with particular situations. Each force's initial battleplan includes default tactics for all units (for details, see "[Standard Battleplans](#)" on [page 78](#)). The *Tactics* menu allows you to change tactics and/or clear (erase) all special tactics for a unit.

Battle Tactics: Three battle tactics (attack, engage, or defend) require you to specify a target *after* you select the tactic. In general, to give a tactics order to a unit (or element if at maximum zoom), follow these steps:

1. Right-click on the unit (or element).
2. Select *Tactics* from the *Quick* menu.
3. Select *Attack*, *Engage*, or *Defend* from the submenu.
4. Click on the target.

If the target is an enemy unit and it is destroyed or disappears, your unit reverts to its original battleplan (see [page 78](#)) if under computer control, or it awaits new orders if under your (overview) control.

Attack (an enemy unit): The unit (or element) attempts to move within killing range of the selected enemy unit.

Killing range is defined as the range in which the vehicle's weapon can penetrate the enemy's armor. If no killing range exists, the vehicle moves to firing range and opens fire, hoping to achieve at least some damage.

Engage (an enemy unit): The unit (or element) fires upon that enemy unit. Your unit will not move toward the target. Therefore, if it's unable to hit the target, it may select an alternate target instead.

Defend (a location): The unit (or element) moves to the target position you specify, then it opens fire on any available enemy targets. The unit remains in place, firing as necessary, until it receives new orders.

NOTE: The unit's original checkpoints (if any) are retained, so a normal movement order will cancel this tactic and invoke movement to the next checkpoint.

Resume Orders: The unit (or element) resumes its original (default) map orders issued at the start of the battle. This includes its original (default) tactics. For details, see [page 37](#).

Breakthrough gives the unit (or element) orders to adopt a new movement path straight toward the phase line deepest in enemy territory. For details, see [page 37](#).

Withdraw gives the unit (or element) a special movement path that goes straight to the phase line furthest back in friendly territory. For details, see [page 37](#).

Cancel Tactics cancels any attack, engage, or defend target for the unit (or element). The unit (element) then resumes any normal movement orders (that is, continues to its next checkpoint, if it has one).

8 Special Considerations

In addition to basic operating controls, this simulation has features that may interest more advanced players.

Elements & Units

For an explanation of elements and units, see [page 27](#).

Fire Discipline & Group Fire

Units will concentrate their fire at one target vehicle until it is destroyed, then another, and then another. Typically, the vehicles at the ends of the formation are targeted first, then vehicles in the middle.

In individual fire (*Fire at Will*), each vehicle fires as fast as it can. In group fire, vehicles wait until everyone in the unit is loaded and ready to fire. Then the entire unit fires a simultaneous volley. Group fire is excellent for ambushes, but it is less effective than individual fire in most battles.

Rolling fire allows vehicles to fire on the move against available targets. Be warned that the faster the vehicles move, the more inaccurate their fire. If you must use this order, we suggest you reduce speed considerably, perhaps to 20% throttle or “advance slow.”

Human vs. Computer Crewmen

At various points, you will want to take control of a tank. At other times, you want the computer crewmen to resume control of the tank.

It's useful to understand how to get control and how to pass it back again.

The most common problem novices encounter is selecting a facing from the *View* menu. This instruction changes the facing of the hull, turret, or both. Changing the hull facing means you've taken over driving control, while changing the turret facing means you've taken over gunnery control. Computer-controlled drivers and gunners aren't smart enough to read your mind—they can't understand why you wanted to face in that direction and what should be done next.

Unless a computer-controlled gunner has cease fire or rolling fire orders, his vehicle does a short halt whenever he wants to shoot. If you want a unit to rush without pausing to fire, give it cease fire orders. If you want a unit to fire on the move, use rolling fire orders. However, in World War II, the most effective combination of movement and fire normally was fast or top speed with short halts.

Driving Controls

If you deliberately change the direction or speed of the tank, you set a new movement path for that tank. You might do this in the *View* or *Orders* menu, or while in the hull driving the tank.

If you take control of the lead tank, all movement paths and checkpoints for the entire unit disappear. The unit now travels at the speed and in the direction you set.

If you took control of another (nonleader) tank in the formation, that tank leaves the formation. It detaches from the unit, travels independently at the speed and in the direction you set, and effectively becomes an independent unit. You can have it rejoin by moving close to its original leader and then selecting *Reform* orders (see [page 35](#)).

If you give a unit a new movement path on the map, the computer-controlled driver is re-enabled. Select a speed on the *Orders* menu to send him on his way.

Gunner Controls

If you enter the gunner's position or instruct the tank turret to face a specific direction, you're taking control from the computer-operated gunner. This means the gunner ceases finding, tracking, and shooting at targets. You are now responsible for finding targets and firing at them from that vehicle.

You can give control back to the computer-operated gunner by leaving the position and issuing either *Fire at Will* ([page 36](#)) or *Group Fire* ([page 36](#)) order. You also give back control if you leave the vehicle entirely and go to another vehicle.

Visibility

Maximum visibility varies depending on the position you occupy and the magnification you're using. You can see much further if you use binoculars or the main gun sight. Visibility with the naked eye is significantly poorer. The best overview is actually on the map because it shows all enemies seen by all units out to their maximum visibility.

Maximum visibility is also a configuration option because computers with high-powered hardware can comfortably display terrain at greater distances. For details, see the information about the Horizon Distance advanced configuration option on [page 21](#).

Damage & Casualties

Soft Targets

Soft targets include dismounted infantry and their heavy weapons, anti-tank guns, trucks, and jeeps (including the VW Kubelwagen).

These targets are very vulnerable to high explosive (HE) ammunition and infantry weapons such as rifles, submachine guns, machine guns, and light auto-cannon. Large caliber HE shells (from artillery) are especially devastating.

Infantry and anti-tank guns are the most resistant soft targets because each man in the group must be wounded or killed. Trucks and jeeps are solitary and much more vulnerable. For this reason, high-velocity shells with little or no explosive, such as APDS, HVAP, AP, APC, or APCBC have virtually no effect against infantry, but they are moderately effective against vehicles.

Pinning Fire: Any infantry or anti-tank gun element that comes under fire may become "pinned." When an element is pinned, it cannot move or fire for a short period of time. If the element is not fired upon, it will soon recover. However, if the element remains under fire, it may well remain pinned.

Hard Targets

Armored vehicles, including tanks, tank destroyers, assault guns, armored cars, and half-tracks, are all hard targets. The armor protecting these vehicles varies. Depending on the armor penetration and armor thickness, the hit may or may not penetrate.

Some vehicles have an open top, open rear, or both. This makes them vulnerable to any overhead fire (including all artillery fire) as well as any firer on a significantly higher elevation. All these hits automatically penetrate, often with devastating results.

Nonpenetrating Hits: Many nonpenetrating hits simply bounce off without causing damage. However, some may hit some external feature that does affect the vehicle.

Nonpenetrating hits can damage a wheel or track, effectively immobilizing the vehicle. External fuel tanks may catch fire. A turret ring hit will jam the turret in place. The equipment on an assault gun is a gun mantle hit that jams the gun in place. If the vehicle commander is unbuttoned, a turret hit could make him a casualty.

Penetrating Hits: If a shell penetrates a vehicle, internal damage usually results. As a general rule, the more the penetration power exceeds the armor, the greater the internal damage. If the shell just barely penetrates the armor, it may not cause significant damage.

Hits that penetrate the turret may destroy the main gun or the coaxial machine gun. If some or all of the ammo explodes, the vehicle is destroyed. A turret hit that kills one crewman slows down reloading time. The second crew hit in the turret disables the gunner position, while the third eliminates the turret crew, the turret view, and the unbuttoned view. If this occurs in tank #11, you are dead (see [page 87](#)).

Hits that penetrate the hull vary depending on the direction. Front hull hits can wound or kill the crew and hit part of the track system, either of which immobilizes the vehicle. Side and rear hits can also hit the tracks or the engine itself, immobilizing the tank. Internal fuel tanks or spare ammo storage can also be hit—they cause dramatic fires and explosions.

Even if nothing else is damaged internally, a fire may start that completely incapacitates the vehicle.

Unit Commanders & Casualties

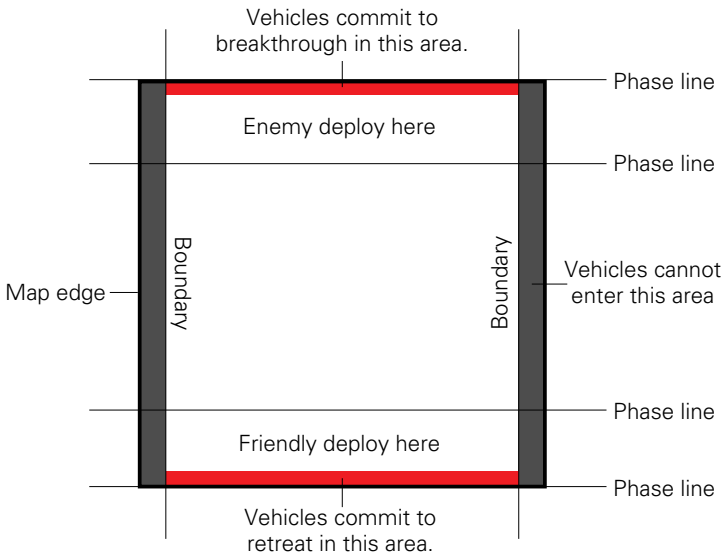
If the #1 vehicle in the unit (the unit commander) is disabled or destroyed, the #4 vehicle becomes the unit commander if present.

If there is no #4 vehicle, or if it is also disabled or destroyed, the lowest numbered vehicle still functioning becomes the commander.

Phase Lines & Objectives

Phase Lines

Breakthrough & Retreat Lines: Each battlefield has four phase lines on it: two closer to your side of the battlefield, and two nearer the enemy side. The phase lines closer to the battlefield edge represent breakthrough and retreat boundaries. Units can only cross these boundaries if they have breakthrough or withdraw orders (see [page 38](#)). Once a vehicle crosses the boundary, it cannot be recalled—instead, it automatically continues off the battlefield.



Phase Lines

Front Lines: The two phase lines closer to the center of the field represent each side's front line at the start of the battle. The phase line nearer your edge indicates your forward-most pickets—no units start beyond this line. Similarly, the phase line nearer the enemy edge indicates where you could start encountering enemy forces. Of course, until you spot them, you don't know exactly *where* the enemy lurks.

Battlefield Boundaries

Side Boundaries: The area shown on the battlefield map is slightly larger than your active theater of operations. On each side of the battle area are boundaries about 500 m from the edge of the map. Units cannot cross these boundaries—instead, they turn and move along the edge.

Commitment Areas: Similarly, within about 500 m of each side's rear-most phase line is a commitment area. A unit must have breakthrough orders to enter the commitment area near the enemy's deepest phase line. A unit must have withdraw orders to enter the commitment area near their own rearmost phase line. All other units cannot enter a commitment area.

Breakthrough & Withdrawal: If a unit enters the commitment area with breakthrough or retreat orders, it becomes committed to breakthrough or retreat, as appropriate. It automatically continues moving until it leaves the battle area. Once committed, vehicles cannot be recalled, nor can they participate further in the battle.

The Objective

Each battlefield has one objective on it. The defender starts in control of the objective. Sometimes, the objective is a hilltop or other commanding position, but sometimes it's just a patch of open ground of no obvious value. Normally, it's your job to capture or defend the objective, no matter how unimportant or worthless it may seem. In a few special cases, victory does not depend on capturing or holding the objective, such as rear guard or withdraw missions.

Standard Battleplans

At the start of battle, your force starts with a default battleplan. This section explains the general principles used in those plans, which you can then exploit to your advantage. In both offensive and defensive plans, each unit is assigned a general role in the plan. There are four roles: Lead, Support, Forward Observer, and a special role. In offensive plans, the special role is Recon; in defensive plans the special role is Reserve.

The Offensive Battleplan

On the offensive, tanks are typically assigned the lead role, while most other armored, infantry, and anti-tank units are support. However, a shortage of tanks can cause tank destroyers and assault guns to act as

lead, while an excess of tanks may mean some become support. Armored cars are normally assigned as recon, but if they aren't available, other armored vehicles, possibly even tanks, may be used. Forward observers are always in Jeeps or VW Kubelwagens.

An attacking force uses a combination of bounds and fast-moving waves. Initially, recon units move to their first checkpoint. Once the recon arrives, the lead and support units move up behind them to their first checkpoint, while forward observer units follow along behind, calling artillery fire as needed. Once everyone has reached the first checkpoint, the recon units start again by moving to their second checkpoint.

At some point, the recon will detect enemy defenders. When this occurs, the recon attacks those defenders when appropriate. For example, if tanks, assault guns, or tank destroyers function as recon, they would be quick to attack most enemies. However, armored cars and other weaker recon will not attack. Instead, they'll call for help. Nearby lead and support units move and open fire if they can do damage from their current positions. If not, they will adopt "attack" tactical doctrine against the enemy unit discovered by the recon unit. Once this enemy has been destroyed or disappears, the battleplan resumes with the recon moving forward, then lead and support, followed by forward observers.

Most attacks are delivered by a closely grouped formation of lead and support units. If the recon discovers the enemy, typically the entire group comes up to engage. In less common cases, some of the attack may be a flanking movement or diversionary movement by one or more units.

Support units and forward observers operate in conjunction with lead units. If you give new orders to lead units, the others may note this change in plan, halt, and wait for new orders. You'll either have to give them new orders as well, or issue *Resume Orders* to all units, including your lead units.

The Defensive Battleplan

On the defensive, lead and support units form a front line that is spread across part or all of the area you defend. Support units are usually behind the lead units, but they may be more exposed in some cases, especially if they occupy commanding positions. Reserve and forward observer units often adopt more rearward positions, although

sometimes they may find a commanding position that makes them more exposed to quick detection.

It is not uncommon to discover holes or weaknesses in the initial defensive deployment. You'll want to deal with these as quickly as possible—before the enemy attack overwhelms you or discovers the weakness.

When the enemy does appear, your units will open fire. Note carefully the differences between engage and defend tactics. Units with defend tactics *may* move forward to achieve a better shot against oncoming attackers. If you don't want a unit to leave its position to engage the enemy, issue a halt order, or give the unit engage tactics.

Eventually, if your units undergo a heavy attack or suffer heavy losses, reserve units will move up and help the front line units fend off the attack.

If your force suffers high losses, a fallback to secondary positions will occur. All surviving units immediately follow their original, preplanned movement paths to their final checkpoint. Normally, these are around the objective. However, in rearguard and withdrawal missions, the battleplan is arranged so the troops use withdraw orders to move back over their rearmost phase line (for details, see [“Phase Lines & Objectives” on page 77](#)).

9 Victory and Defeat

Battlefield Considerations

Morale

When casualties rise, the morale of the troops may break. Higher quality troops can withstand heavier casualties before their morale cracks.

When morale does break, individual units ignore orders and withdraw from the battle. Typically, this happens element by element, unit by unit—not all at once. Eventually, though, almost every unit will withdraw. In military terms, this is a rout, and there's nothing you can do to stop it. The wise commander avoids it by keeping casualties low.

Conversely, by inflicting heavy casualties on the enemy, many of the surviving enemy forces may withdraw from the battle.

Ending the Battle

If one side has nothing but disabled, immobilized, and destroyed vehicles left on the battlefield, the battle is over. If the attacker has seized the objective or appears to be unable to seize it, you receive a message to this effect and have the option of ending the battle at any time thereafter.

Exiting: The *Exit* option on the *System* menu always ends the battle. However, if used too early, you will abort the mission and automatically suffer a major defeat. Once you receive a message that you can end the battle, exiting no longer inflicts this penalty. If you exit, battle results are computed normally.

Capturing the Objective: To capture the objective, the attacker must have functional armored vehicles in or within a few hundred meters of the objective. In addition, there can be no functional defenders within at least 500 m of the objective. Immobilized or disabled defenders do *not* count as functional for either the attacker or defender. Isolated infantry also do not count as defenders (historically armored attacks that overran infantry often let troops following “clean up” the survivors).

Once the attacker captures the objective, he must prevent any defenders from returning to the area. If any defenders do return, the attacker may lose possession of the objective.

Save Status

Your persona’s records and information are automatically saved in the scrapbook after each battle. If you exit the simulation during a battle, you are reset to the start of that battle when you return. You cannot save your status and situation during a battle.

Battle Debriefing

This screen displays the results of the battle. The debriefing lists the number of vehicles operational, disabled (including immobilized), and destroyed for each side at the end of the battle. It also shows the kill score (see [page 85](#)) and mission results for each side.

Continue means you accept the battle results. If you’re in a campaign, you can continue that campaign.

Retry restarts the battle. Unlike many campaigns, you need not win a battle to advance to the next. Sometimes you can have a draw or even lose a battle, but you can still continue the campaign, perhaps to a victorious conclusion.

Exit means you accept the battle results and return to the bookcase.

Victory & Defeat

There are thirteen different mission types, and each evaluates victory differently. If you seek a realistic experience, use the mission briefing text to guide your strategy and tactics. For those seeking an optimal score, the exact scoring methodology is noted below.

Victory Evaluation Methodology: If you end the battle prematurely, you automatically receive a major defeat. If you end the battle anytime

after being prompted, a victory points scoring method is used. There are six scoring categories, and you receive the points indicated if you fulfill the goal of that category:

Mission	Award Category					
	Hold Objective	Control Field	Good Ratio	Great Ratio	Break-through	Withdraw
Rapid Advance	1	1	1	1	2	0
Cautious Advance	2	1	1	1	1	0
Quick Assault	3	1	1	1	0	0
Prepared Assault	4	1	0	1	0	0
Probing Attack	2	1	2	1	0	0
Breakout	0	2	1	1	3	0
Recon & Security	1	1	3	1	0	0
Hold & Refit	3	1	1	1	0	0
Prepared Defense	4	1	0	0	0	0
Hasty Defense	3	1	1	1	0	0
Withdrawal	2	1	2	1	0	2
Rearguard	2	1	2	1	0	1
Isolated Defense	4	0	1	1	0	0

Award Category Definitions: *Hold Objective* means the side must have an intact vehicle or bunker within 500 m of the center of the objective area. In addition, an attacker holds it only if no intact defender is within 2,000 m. *Control Field* means no intact enemy vehicles remain on the battlefield. *Good Ratio* means that your kill score is at least 1.5 times the enemy's kill score. *Great Ratio* means your kill score is many times better than the enemy's score. *Breakthrough* means at least 25% of your vehicles moved past the further enemy phase line and off the

battlefield. *Withdraw* means at least 40% of your vehicles moved back off your rearward phase line.

Victory Levels: The points scored in each category are totaled, and that total determines the level of victory or defeat:

- 4+ victory points—Major Victory
- 3 victory points—Minor Victory
- 1–2 victory points—Minor Defeat
- 0 victory points—Major Defeat

For example, if a prepared assault captures its objective, 4 victory points are scored, an automatic major victory for that side. However, if a probing attack captures the objective but accomplishes nothing else, only 2 victory points are scored, a minor defeat.

Draws: If both sides have exactly the same victory points score, the battle becomes a draw. For example, if both sides score exactly 3 victory points, each side receives a draw instead of a minor victory.

Campaigns

Your force is just a small part of vastly larger campaigns involving hundreds of thousands of men, ranging across a vast landscape. Your movements and battles follow the standard military tradition of using the name of the nearest major town or geographic feature. In most cases, the actual battlefield is not in the town or at the feature, but someplace nearby.

Changing Operations and Army Posture

Your army may be retreating, moving forward, or in a static situation at the beginning of a campaign. The current overall status of your side is its posture. Every time you're told of a new operation being started by your army, the posture of your army may be changing. The army posture in turn affects the kind of missions you'll be receiving. For example, if the army begins an offensive operation, you tend to receive attack missions, but if the army is conducting a mainly defensive operation, you'll primarily see defensive missions.

Your success or failure will affect army posture and inspire new operations. However, it almost always requires a series of victories before the army's position improves sufficiently to permit a new operation.

Campaign Duration, Victory & Defeat

In each campaign, each side has a location they must defend and a location they must capture. If you force the enemy to retreat from the location they must defend, you win the campaign. If you are defeated and retreat from the location you must defend, the campaign ends in your defeat.

Campaigns normally continue until one side or the other achieves victory.

Scoring

Your performance in battles or campaigns is measured by a score. Separate scoring data is maintained for individual battles and whole campaigns. Your challenge is to see how high you can elevate both your battle and campaign scores. Can you earn a permanent position in the Hall of Fame?

Kill Score

This is a numerical grade that shows the effectiveness of each side in inflicting casualties on the other. This rating factors in unit quality, damage inflicted, and your configuration settings.

A kill score of 50 does not always mean 50% of the enemy force has been destroyed. All other factors being equal, it means 50% of the enemy's *point value* was destroyed. If just one unit formed 50% of the enemy force's value, destroying that unit would yield a 50% score.

Kill score is also modified based on the relative strength of two sides. For example, if one side outnumbered the other by 3-2, the 50% score is divided by 3/2 for a real score of 33%. The score is also adjusted for configuration options that affect scoring.

Battle Score

You receive an overall score in each battle. This is calculated by combining the kill score of both sides and factoring in the mission result (victory points awards). The score is graded on a 0-100 scale, although exceptional accomplishments can produce a score above 100.

Campaign Score

The campaign score averages your battle scores with your overall mission accomplishment. As a result, a good score requires that you have

consistently high battle scores. You can win a campaign but have a low campaign score because a few defeats hurt your average. It's not uncommon for campaign scores to be about half the value of battle scores, so don't be too distressed by the difference. Consider trying the campaign again. Of course, if you are defeated in the campaign, expect a poor score. The worst possible score is zero.

Records, Medals, & Experience

Medals & Decorations

You earn medals based on how consistently you win victories. In the American and Russian armies, your first medals are easily received, and then you receive more as you score further major victories. However, you are also awarded medals for truly outstanding performance in a single battle.

The German army used a more structured system. Regardless of whether it was successive major victories or superlative performance in a single battle, whenever there was a reason to award a medal, the officer got the next medal in sequence. Once an officer received the Knight's Cross of the Iron Cross, further awards were very rare indeed.

Death Medals: Each time your persona dies and is resurrected (see ["Death" on page 87](#)), an American receives the Purple Heart, a Russian the Order of Bogdan Khmel'nitsky, and a German the Gold Wound Badge.

Experience & Improvement

Elements and units that stay with you throughout a campaign may improve slightly due to battle experience. An element can only accumulate experience if it survived, its unit leader survived, and it was part of a victory (not a draw or defeat). Exceptionally high kill scores may earn additional experience. Your unit gains extra experience whenever you are awarded a medal.

On the other hand, very low kill scores reduce experience gains. Losing the entire element eliminates all accumulated experience.

NOTE: Aside from the medal award bonus, mission success or failure has no effect on experience. Experience awards depend purely on avoiding casualties, achieving a high kill score, and getting a nice medal.

Death

If your #11 tank turret crew is killed or the tank is completely destroyed, you are killed. You then have a choice of resurrecting yourself or accepting death. If you select resurrection, you automatically get the Purple Heart (American), the Order of Bogdan Khmelnytsky (Russian), or a Gold Wound Badge (German).

If you have the invulnerability configuration option on, you'll never die. However, achieving exceptional scores becomes far more difficult, which in turn prevents you from receiving certain medals. You must choose between immortality in action, or immortality in score—you can't have both.

10 Equipment & Units

In the early days of World War II, the German army overran Poland in three weeks and France in six. Well-organized panzers could run over and through any army lacking tanks. Opposing armies quickly learned to develop their own armored forces and ultimately to defeat the Germans.

However, tanks almost never fought alone. An army was most effective on either the attack or the defensive when it combined armor, infantry, and artillery as a team.

Armor

Armor in the major WWII armies included light, medium, and heavy tanks as well as assault guns and tank destroyers. It also encompassed armored cars, half-tracks, and other tracked and armored carriers.

The core striking force of US or British Armored Divisions, German Panzer Divisions, or Russian Tank Corps was invariably the medium tank. These units had two to six battalions of tanks, each with 30 to 50 tanks. Medium tanks provided the ideal combination of maneuverability, firepower, armor, speed, range, and reliability.

Heavy tanks, although more glamorous, were invariably organized into special support units, committed only in special operations, or used as part of a few elite units (such as the German SS Panzer Divisions). Even then, heavy tank units would fall behind because of their slower speed and their tendency to suffer more mechanical breakdowns. In more than one battle, heavy tanks were useless because they were late or broke down on the road.

Tank destroyers and assault guns were less capable than normal tanks, and these limitations were most obvious on the attack. Lightly armored tank destroyers were easily spotted and knocked out, while the more heavily armored assault guns had to stop and rotate the entire vehicle to engage threats on either side. On the defensive, good positioning could minimize these weaknesses. Therefore, when given the choice, commanders preferred to use these vehicles defensively.

Light tanks and armored cars were small and fast, but they were under-armed and underarmored. These vehicles were suited only for battle-field reconnaissance. Very few of them could even attempt to fight anything larger than another reconnaissance vehicle. The utility of such vehicles became increasingly questionable, and this class of vehicle gradually disappeared from regular armored units after WWII.

Infantry

Infantry is often termed “Queen of the Battlefield” (armor enthusiasts are quick to point out that tanks, therefore, are king). When stationary and entrenched, infantry is hard to find and even harder to kill. Artillery and tank fire may inflict some casualties, but killing every man is a slow, difficult process.

However, when infantry moves, it becomes far more vulnerable. For this reason, infantry cannot carry the offensive, as World War I proved quite conclusively.

In 1944, infantry’s main weapon against tanks were short-ranged rockets such as the American bazooka or the German Panzerfaust. However, these weapons had to be within 100 to 200 meters of a tank to pose a true threat.

Artillery

Artillery in WWII was the nemesis of infantry but was no real threat to tanks. Artillery had sufficient range so that it does not need to appear on the front-line battlefield. It fired from rear areas using well-placed forward observers (FOs) to direct the fire. In this simulation, FOs travel in jeeps (or the German equivalent). Although more specialized observer vehicles existed, their numbers were very small compared to the ubiquitous “man in a jeep.”

The killing power of artillery came from the shrapnel fragments of each shell explosion. This shrapnel sprayed out for meters in all directions and was quite deadly to infantry. However, shrapnel fragments could

not penetrate even the lightest armor. Armored vehicles were vulnerable only to direct hits by shells, which were much less likely. For example, a 150mm shell's shrapnel covered an area hundreds of times larger than the size of the shell itself.

Air Support

Air support in WWII was a far less coordinated affair than today. Aircraft and ground forces used entirely different radios and frequencies, making it impossible for ground troops and aircraft to communicate. Even the Germans, pioneers in close-support aircraft, could only coordinate ground and air operations at a headquarters, using maps and a "plan for the day." As a result, the troops up at the front could hope or pray for air support, but they had no way to request it at a specific time or place, much less designate a specific target. In effect, from the front-line viewpoint, aircraft were wandering monsters that could turn friendly or hostile, depending on circumstances.

Vehicles

Literally hundreds of different front-line vehicle types were created and used by the major powers during WWII. This simulation includes the prevalent types for the units that fought in White Russia during the summer of 1944 and in the Ardennes during the winter of 1944–45. These vehicles provide an excellent snapshot of the ordinary equipment soldiers used in typical battlefield action, and they nicely represent the general strengths and weaknesses of each army's equipment.

Terminology

The tables in this chapter contain the following information:

Name and Nickname is the full designation of the vehicle.

Type indicates its designed role.

Weight is in *metric* tons (one metric ton is 2,200 pounds).

Engine specifies horsepower and fuel: diesels (d) were more fuel-efficient and far less flammable than gasoline (g), but they had poorer acceleration.

Road Speed and **XC** (cross country) **Speed** are in kilometers per hour; multiply by 0.61 for miles per hour.

The **Power/Wgt** ratio is given in horsepower per metric ton. More power means more acceleration, especially on slopes, in mud, and so on.

Grnd Press (Ground Pressure) is given in kilograms per square centimeter. Lower ground pressure means the vehicle accelerates faster and can handle softer ground or snow before it bogs down and must be towed out.

Turning radius is given in meters, and provides a relative measure of maneuverability.

Main Weapon lists the main gun.

Main Ammo lists the typical quantity and types of shells carried.

Machine Guns indicates the mounting. Coaxial ("coax") is mounted beside the main gun in the turret and is fired by the gunner. Bow is mounted in the hull front, roof is mounted on the roof of the vehicle, and pintle is mounted on an open, rotating post or ring that also clears the top of the vehicle.

MG Ammo indicates the total number of machine gun rounds carried.

Gun Elevation indicates how high the main gun can be elevated (+) or depressed (-) in degrees.

Gun Traverse indicates how many degrees left (L) or right (R) a casemate gun can be moved without turning the vehicle. Turret-mounted weapons can be aimed in any direction.

Trav. Speed indicates how fast the turret traverses (rotates), in degrees per second. For further details about weapons and ammunition, see [page 107](#).

Armor values are in millimeters (mm) and are biased for slope. That means the value includes the effective extra thickness provided by sloped armors. The only exception is top armor, which is unbiased. An armor value of "0" indicates no armor is present—that side of the vehicle is open.

The "t" indicates turret armor, "h" indicates hull armor.

The turret armor values given for assault guns, casemate tank destroyers, half-tracks, and so on, apply to the upper superstructure or casemate.

Game Value indicates the relative valuation placed on the vehicle for game purposes. Consult the `readme.txt` file for any last-minute changes in valuation.

German Tanks, Assault Guns & Tank Destroyers

<i>Name and Nickname</i>	PzKw V G Panther	PzKw IV J	StuG III G Sturmgeschutz	JagdPz 38(t) Hetzer
<i>Type</i>	Medium tank	Medium tank	Assault gun	Tank destroyer
<i>Weight (mt)</i>	44.8	25.0	23.9	16.0
<i>Crew</i>	5	5	4	4
<i>Height (m)</i>	3.00	2.68	2.15	2.10
<i>Width (m)</i>	3.43	3.29	2.96	2.63
<i>Length (m)</i>	6.88	5.89	5.59	4.87
<i>Engine HP</i>	700 (d)	300 (d)	300 (d)	150 (d)
<i>Road Speed</i>	46	46	40	40
<i>XC Speed</i>	20	15	14	13
<i>Power/Wgt</i>	15.6	12.0	12.6	9.4
<i>Grnd Press</i>	0.88	0.89	1.04	0.85
<i>Turning Radius</i>	10.0	5.9	5.8	4.5
<i>Main Weapon</i>	75mm L/70 KwK 42	75mm L/48 KwK 40	75mm L/48 StuK 40	75mm L/48 StuK 40
<i>Main Ammo</i>	35 HVAP, 10 AP, 35 HE, 2 Smoke	36 APCBC, 18 APHE, 30 HE, 3 Smoke	2 HEAT, 4 APCBC, 10 APHE, 16 HE, 4 Smoke	2 HEAT, 23 APCBC, 12 HE, 3 Smoke
<i>Machine Guns</i>	7.92mm Coax, 7.92mm Bow	7.92mm Coax, 7.92mm Bow	7.92mm Roof	7.92mm Roof
<i>MG Ammo</i>	4,200	3,150	600	600
<i>Gun Elevation</i>	+20, -4	+20, -10	+20, -6	+12, -6
<i>Gun Traverse</i>	Turret	Turret	10 L, 10 R	5 L, 11 R
<i>Trav. Speed</i>	12	16	16	16
<i>Front Armor</i>	135 t, 140 h	80 t, 82 h	80 t, 65 h	130 t, 130 h
<i>Side Armor</i>	55 t, 60 h	35 t, 30 h	40 t, 30 h	26 t, 26 h
<i>Rear Armor</i>	54 t, 40 h	31 t, 30 h	30 t, 20 h	23 t, 21 h
<i>Top Armor</i>	15 t, 40 h	16 t, 30 h	20 t, 20 h	8 t, 8 h
<i>Game Value</i>	25	17	15	15

The StuG III was based on the PzKw III medium tank chassis, while the Hetzer used the Czech 38(t) tank chassis.

German Tank Destroyers & Armored Cars

<i>Name and Nickname</i>	Jagdpanzer IV L/70	Marder III M	88 Gw III/IV Nashorn	SdKfz 222 B PzSpw
<i>Type</i>	Tank destroyer	Tank destroyer	Tank destroyer	Armored Car
<i>Weight (mt)</i>	25.8	10.5	24.0	4.8
<i>Crew</i>	4	4	5	3
<i>Height (m)</i>	1.85	2.10	2.65	2.06
<i>Width (m)</i>	3.18	2.63	2.95	2.00
<i>Length (m)</i>	6.02	4.87	5.80	4.72
<i>Engine HP</i>	300 (d)	150 (d)	300 (d)	75 (g)
<i>Road Speed</i>	35	40	40	72
<i>XC Speed</i>	15	13	17	15
<i>Power/Wgt</i>	11.6	9.4	12.5	15.6
<i>Grnd Press</i>	0.90	0.85	0.85	wheeled
<i>Turning Radius</i>	5.9	4.5	5.9	5.6
<i>Main Weapon</i>	75mm L/70 StuK 42	75mm L/48 StuK 40	88mm L/71 PaK 43	20mm L/55 KwK 30
<i>Main Ammo</i>	20 HVAP, 10 AP, 23 HE, 2 Smoke	18 APCBC, 10 APHE, 8 HE, 2 Smoke	14 HVAP, 16 APCBC, 8 HE, 2 Smoke	90 APC, 90 HE
<i>Machine Guns</i>	none	none	none	7.92mm Coax
<i>MG Ammo</i>	none	none	none	1100
<i>Gun Elevation</i>	+15, -5	+25, -10	+20, -5	+87, -4
<i>Gun Traverse</i>	10 L, 10 R	30 L, 30 R	15 L, 15 R	Turret
<i>Trav. Speed</i>	16	18	16	24
<i>Front Armor</i>	130 t, 113 h	18 t, 35 h	12 t, 31 h	14 t, 17 h
<i>Side Armor</i>	46 t, 30 h	15 t, 15 h	11 t, 20 h	14 t, 8 h
<i>Rear Armor</i>	31 t, 21 h	0 t, 15 h	10 t, 20 h	14 t, 8 t
<i>Top Armor</i>	20 t, 10 h	0 t, 8 h	0 t, 8 h	0 t, 6 h
<i>Game Value</i>	18	14	16	9

The JPz IV used a PzKw IV chassis, and the Marder a modified Czech 38(t) chassis. The Nashorn's composite III/IV chassis was in common use by German self-propelled artillery.

German Transport

<i>Name and Nickname</i>	SdKfz 251/1 SPW	Opel 4x4 Blitz	VW 2x4 Kubelwagen
<i>Type</i>	Half-track	Truck	Jeep
<i>Weight (mt)</i>	11.0	4.5	1.1
<i>Crew</i>	2 + 11	1 + 13	1 + 4
<i>Height (m)</i>	1.75		
<i>Width (m)</i>	2.10		
<i>Length (m)</i>	5.80		
<i>Engine HP</i>	120 (g)	68 (g)	25 (g)
<i>Road Speed</i>	50	100	80
<i>XC Speed</i>	20	12	13
<i>Power/Wgt</i>	10.9	15.1	22.7
<i>Grnd Press</i>	halftrack	wheeled	wheeled
<i>Turning Radius</i>	13.5	10.0	5.0
<i>Main Weapon</i>	—	—	—
<i>Main Ammo</i>	—	—	—
<i>Machine Guns</i>	2x 7.92mm	—	—
<i>MG Ammo</i>	varies	—	—
<i>Gun Elevation</i>	—	—	—
<i>Gun Traverse</i>	—	—	—
<i>Trav. Speed</i>	—	—	—
<i>Front Armor</i>	15 t, 13 h	—	—
<i>Side Armor</i>	7 t, 7 h	—	—
<i>Rear Armor</i>	7 t, 7 h	—	—
<i>Top Armor</i>	0 t, 7 h	—	—
<i>Game Value</i>	8	3	4 (with FO)

All German transport was based on civilian chassis, with considerable modification for the SPW. The distinctive Kubelwagen was based on the famous, inexpensive civilian "Volkswagen" chassis and engine with a very different body.

American Tanks

<i>Name and Nickname</i>	M4A3(76)W Sherman	M4A3(75)W Sherman	M24 Chaffee
<i>Type</i>	Medium tank	Medium tank	Light tank
<i>Weight (mt)</i>	31.0	30.3	18.4
<i>Crew</i>	5	5	5
<i>Height (m)</i>	2.97	2.94	2.48
<i>Width (m)</i>	3.00	2.67	2.95
<i>Length (m)</i>	6.27	6.27	4.98
<i>Engine HP</i>	500 (g)	500 (g)	220 (g)
<i>Road Speed</i>	42	42	48
<i>XC Speed</i>	24	19	18
<i>Power/Wgt</i>	16.1	16.5	12.0
<i>Grnd Press</i>	0.76	0.99	0.76
<i>Turning Radius</i>	9.4	9.4	8.8
<i>Main Weapon</i>	76mm L/53 M1A2	75mm L/39 M3	75mm L/39 M3
<i>Main Ammo</i>	2 HVAP, 15 APC, 39 APHE, 10 HE, 5 Smoke	1 HVAP, 20 APC, 30 APHE, 45 HE, 8 Smoke	1 HVAP, 10 APC, 10 APHE, 20 HE, 7 Smoke
<i>Machine Guns</i>	.30cal Coax, .30cal Bow	.30cal Coax, .30cal Bow	.30cal Coax, .30cal Bow
<i>MG Ammo</i>	6,250	6,250	4,125
<i>Gun Elevation</i>	+25, -10	+25, -10	+20, -10
<i>Gun Traverse</i>	Turret	Turret	Turret
<i>Trav. Speed</i>	24	24	24
<i>Front Armor</i>	89 t, 120 h	89 t, 120 h	44 t, 51 h
<i>Side Armor</i>	65 t, 38 h	51 t, 38 h	26 t, 26 h
<i>Rear Armor</i>	63 t, 40 h	51 t, 41 h	25 t, 19 h
<i>Top Armor</i>	25 t, 19 h	25 t, 25 h	13 t, 13 h
<i>Game Value</i>	18	16	15

Many other Sherman variants existed, not to mention unofficial modifications. The Chaffee was brand new in late 1944.

American Tank Destroyers & Armored Cars

<i>Name and Nickname</i>	M10 Wolverine	M18 Hellcat	M8 Greyhound
<i>Type</i>	Tank Destroyer	Tank Destroyer	Armored Car
<i>Weight (mt)</i>	29.6	18.2	7.5
<i>Crew</i>	5	5	4
<i>Height (m)</i>	2.90	2.57	2.29
<i>Width (m)</i>	3.05	2.87	2.54
<i>Length (m)</i>	5.97	5.44	4.78
<i>Engine HP</i>	410 (g)	400 (g)	110 (g)
<i>Road Speed</i>	40	90	90
<i>XC Speed</i>	17	30	17
<i>Power/Wgt</i>	13.9	22.0	14.7
<i>Grnd Press</i>	0.93	0.83	wheeled
<i>Turning Radius</i>	9.4	8.8	8.5
<i>Main Weapon</i>	76mm L/53 M7	76mm L/53 M7	37mm L/53 M6
<i>Main Ammo</i>	5 HVAP, 21 APC, 9 APHE, 14 HE, 5 Smoke	5 HVAP, 20 APC, 5 APHE, 10 HE, 5 Smoke	2 Canister, 30 HVAP, 10 AP, 38 HE
<i>Machine Guns</i>	.50cal Roof	.50cal Roof	.30cal Coax, .50cal Roof
<i>MG Ammo</i>	1,000	840	1,995
<i>Gun Elevation</i>	+30, -10	+20, -10	+20, -10
<i>Gun Traverse</i>	Turret	Turret	Turret
<i>Trav Speed</i>	24	24	30
<i>Front Armor</i>	81 t, 90 h	25 t, 25 h	22 t, 30 h
<i>Side Armor</i>	26 t, 35 h	14 t, 14 h	20 t, 11 h
<i>Rear Armor</i>	25 t, 35 h	13 t, 13 h	20 t, 10 h
<i>Top Armor</i>	0 t, 19 h	0 t, 8 h	0 t, 8 h
<i>Game Value</i>	15	13	10

The M10 used the M4 Sherman hull, which accounts for its extraordinarily high profile and superior frontal armor.

American Transport

<i>Name and Nickname</i>	M3 Half-track	GMC2 1/2 ton 6x6 Truck	Willis 1/4 ton 4x4 Jeep
<i>Type</i>	Half-track	Truck	Jeep
<i>Weight (mt)</i>	7.5	6.8	1.5
<i>Crew</i>	1 + 11	1 + 12	1 + 4
<i>Height (m)</i>	2.26	2.31	1.32
<i>Width (m)</i>	2.24	2.18	1.57
<i>Length (m)</i>	6.17	6.71	3.35
<i>Engine HP</i>	147 (g)	104 (g)	60 (g)
<i>Road Speed</i>	72	72	105
<i>XC Speed</i>	18	12	16
<i>Power/Wgt</i>	13.2	15.3	40.0
<i>Grnd Press</i>	halftracked	wheeled	wheeled
<i>Turning Radius</i>	9.1	10.7	5.5
<i>Main Weapon</i>	—	—	—
<i>Main Ammo</i>	—	—	—
<i>Machine Guns</i>	.30cal Roof	—	(.50cal Pintle)
<i>MG Ammo</i>	varies	—	(varies)
<i>Gun Elevation</i>	—	—	—
<i>Gun Traverse</i>	—	—	—
<i>Trav. Speed</i>	—	—	—
<i>Front Armor</i>	22 t, 30 h	—	—
<i>Side Armor</i>	20 t, 11 h	—	—
<i>Rear Armor</i>	20 t, 10 h	—	—
<i>Top Armor</i>	0 t, 8 h	—	—
<i>Game Value</i>	8	3	4 (with FO)

Like the German army, American transport was based on civilian vehicles with one exception. The famous “jeep” was designed exclusively for military work, and only later found civilian application.

Russian Tanks & Tank Destroyers

<i>Name and Nickname</i>	T-34-85	T-34-76 m1943	SU-85
<i>Type</i>	Medium tank	Medium tank	Tank destroyer
<i>Weight (mt)</i>	28.6	28.0	26.9
<i>Crew</i>	5	4	4
<i>Height (m)</i>	2.38	2.44	2.24
<i>Width (m)</i>	2.99	2.99	2.99
<i>Length (m)</i>	6.00	6.10	6.10
<i>Engine HP</i>	500 (d)	500 (d)	500 (d)
<i>Road Speed</i>	50	50	50
<i>XC Speed</i>	25	28	24
<i>Power/Wgt</i>	17.5	17.9	18.6
<i>Grnd Press</i>	0.78	0.71	0.70
<i>Turning Radius</i>	7.6	7.6	7.6
<i>Main Weapon</i>	85mm L/54 ZiS S-53	76mm L/42 F-34	85mm L/55 D5
<i>Main Ammo</i>	17 APDS, 18 APHE, 20 HE	24 APDS, 24 APHE, 27 HE	16 APDS, 16 APHE, 16 HE
<i>Machine Guns</i>	7.62mm Coax, 7.62mm Bow	7.62mm Coax, 7.62mm Bow	—
<i>MG Ammo</i>	2,400	2,400	—
<i>Gun Elevation</i>	+36, -3	+20, -5	+20, -5
<i>Gun Traverse</i>	Turret	Turret	10 L, 10 R
<i>Trav. Speed</i>	17	36	12
<i>Front Armor</i>	104 t, 94 h	70 t, 94 h	117 t, 95 h
<i>Side Armor</i>	80 t, 98 h	55 t, 78 h	65 t, 65 h
<i>Rear Armor</i>	76 t, 61 h	55 t, 73 h	46 t, 46 h
<i>Top Armor</i>	20 t, 15 h	20 t, 20 h	20 t, 20 h
<i>Game Value</i>	19	17	18

The SU-85 used the hull of the T-34 but with a slightly bulkier gun than the T-34-85. It was designed in tandem with the T-34-85 because its completion and success were considered quite speculative.

Russian Assault Guns & Transport

<i>Name and Nickname</i>	SU-76M	Studebaker 6x4 Truck	Willis 4x4 Jeep
<i>Type</i>	Assault gun	Truck	Jeep
<i>Weight (mt)</i>	11.1	8.9	1.5
<i>Crew</i>	4	1 + 12	1 + 4
<i>Height (m)</i>	2.11	2.69	1.32
<i>Width (m)</i>	2.69	2.18	1.57
<i>Length (m)</i>	4.93	6.73	3.35
<i>Engine HP</i>	170 (d)	87 (g)	60 (g)
<i>Road Speed</i>	45	72	105
<i>XC Speed</i>	23	12	16
<i>Power/Wgt</i>	15.5	9.8	40.0
<i>Grnd Press</i>	0.56	wheeled	wheeled
<i>Turning Radius</i>	12.5	10.7	5.5
<i>Main Weapon</i>	76mm L/42 ZiS-3	—	—
<i>Main Ammo</i>	3 HEAT, 14 APDS, 14 APHE, 25 HE, 4 Smoke	—	—
<i>Machine Guns</i>	—	—	(.50cal Pintle)
<i>MG Ammo</i>	—	—	(varies)
<i>Gun Elevation</i>	+25, -3	—	—
<i>Gun Traverse</i>	15 L, 15 R	—	—
<i>Trav. Speed</i>	12	—	—
<i>Front Armor</i>	25 t, 39 h	—	—
<i>Side Armor</i>	15 t, 15 h	—	—
<i>Rear Armor</i>	0 t, 10 h	—	—
<i>Top Armor</i>	0 t, 10 h	—	—
<i>Game Value</i>	11	3	4 (with FO)

The SU-76 was based on the T-70 light tank, which was small, light, and gasoline-powered. The most common trucks and jeeps in the Russian army were American lend-lease vehicles.

Vehicle notes

The cross-country speeds used in this simulation were derived from combat reports, horsepower/weight ratio, ground pressure, and evaluations of the suspension systems. The Panther was especially noted for dramatic improvements in suspension systems, compared to the PzKw IV or the American M4. The suspension of the T-34 was the “Christie” design, pioneered in America. The Russians gained a full understanding of its strengths and weaknesses in their BT series during the 1930s. This superior design, as much as a powerful engine and wide tracks, gave the T-34 its extraordinary mobility. American suspension lagged behind, perhaps due to the less-than-gifted abilities of the American ordnance bureau in the late 1930s and early 1940s.

German vehicles concentrated most of their hull and turret armor on the front. The Russians and Americans tended to spread the armor more evenly across the front and sides. As the gun-vehicle matchups show, this gave the Germans an advantage in head-to-head fighting. However, it also meant German vehicles were vulnerable to longer-ranged flank attacks. The superiority of the armor on German and Russian vehicles versus that on American vehicles can be attributed to two factors. First, the Americans sloped only the front hull of the Sherman, while the T-34 and Panther sloped the front and sides of both the turret and the hull. Secondly, the T-34 was an especially compact design with less surface area, which meant that an equivalent weight of armor translated into greater thickness.

While German and Russian armored vehicles normally used diesel engines, American vehicles were gasoline powered. Wartime experience proved diesel to be the better of the two—gasoline systems were extremely flammable and explosive. For example, the Russian gas-powered SU-76 was extremely unpopular with its crews, while the diesel T-34s were much beloved, despite balky transmissions that made driving them virtually a strength-based sport. The flammability of the Sherman was such that the Germans nicknamed it the “Tommy Cooker.”

Unit Sizes: German tank platoons in 1944 normally had four tanks, as did their tank destroyer and assault gun units. SS Panzer units had larger units, but none appear in this simulation. American tank platoons had five tanks (an organization they retained until the 1980s), while tank destroyers were in four-vehicle platoons. Russian tank platoons had three tanks, but their assault guns and tank destroyers used five-vehicle batteries.

Anti-Tank Guns

Anti-tank (AT) guns had unique characteristics that made them formidable weapons during WWII. A well-designed gun, sited in a good position, was much smaller and harder to spot than any vehicle. If the gun came under heavy fire, the crew could go prone or duck into cover, becoming just as hard to kill as infantrymen. When crew members were manning the gun, their reload times were faster than armored vehicles, whose limited crew was crammed into a very small space. As a result, anti-tank guns fired first *and* fired faster.

One of the German tactical innovations in the early war was the “PaK Front,” a line of anti-tank guns all covering the same area of ground. German tanks lured enemy armor into this ground and then let the anti-tank guns tear them apart. The Russians quickly adopted this tactic as well, and by late in the war, many armies used AT nests as strong points around which their tanks maneuvered.

The disadvantage of an anti-tank gun was that it was virtually immobile during a battle—limbering the gun to a truck and then packing up the ammunition and crew took much too long, especially under fire. Another problem was that anti-tank gun crewmen were vulnerable to suppressive fire, just like infantry. If a crew took cover from bombardment or bullet fire, they couldn’t fire the gun! Not surprisingly, the best counter to a PaK Front or AT nest was a well-coordinated artillery barrage.

German 88mm L/71 PaK 43 anti-tank gun: Firing HVAP, APCBC, HE, and smoke ammo, this weapon was Germany’s finest anti-tank gun. Inspired by the success of the 88mm L/56 AA gun as a tank killer in 1941, an improved L/71 anti-tank weapon was introduced in late 1943. Gun production outpaced the manufacturing of its innovative but expensive and low-slung cruciform mounting. This led to various stop-gap carriages and a somewhat varied appearance beyond its distinctively long barrel. The only disadvantage of this weapon was that, like most German artillery, the gun relied on very exact tolerances. For example, once the barrel became worn, alternative AP and HE shells were used to maintain penetrating power and accuracy.

German 75mm L/48 PaK 40 anti-tank gun: Firing APCBC, APHE, HE, and smoke shells, this weapon was the most common anti-tank gun in the late-war German army. The 75mm PaK 40s began replacing the increasingly ineffective 50mm weapons in 1942, and they remained in service through the end of the war. The gun itself had the traditional virtues of an anti-tank gun: it was small, hard to find, and hard to hit,

but it packed a respectable punch. Its only drawback was a relatively high weight, making it unusually difficult to manhandle.

American 76mm L/53 M5 anti-tank gun: This gun was the heaviest regularly fielded by the US Army during WWII. It fired HVAP, APC, APHE, HE, and smoke ammunition. In 1942, the American Army realized that the existing 57mm anti-tank gun would soon be outmoded. The 3-inch (76mm) M5 was quickly developed from existing components: a gun tube removed from an outmoded anti-aircraft gun was married to a 105mm howitzer breech, recoil system, and carriage. The resulting weapon was large and cumbersome but reasonably effective and popular. Unfortunately, in 1944–45, the heavy frontal armor of many German tanks resisted all but HVAP at short range. Despite this, the 76mm M5 remained an effective weapon against fortifications and enemy infantry, and it could do great destruction from ambush against the side or rear armor of any German tank.

American 57mm L/50 M1 anti-tank gun: This weapon fired APDS, AP, or HE ammunition. Developed in 1941 from the British six-pounder anti-tank gun, the 57mm was rushed into production to replace the outmoded 37mm M3A1 anti-tank gun. The rushed design was not especially successful because the gun was oversized and very heavy for its caliber. Although gradually replaced by the 76mm M5, some units still used the 57mm in 1944. The sabot (APDS) round later developed gave the gun a slightly better punch, but it was outclassed by the thick frontal armor of late-war German AFVs such as the Panther.

Russian 85mm L/55 D-44 anti-tank gun: This weapon fired APDS, APHE, and HE ammunition. Although termed a field gun, the 85mm D5-S85A was really designed to be an anti-tank gun. The gun tube began life as an anti-aircraft weapon in 1939, but it proved far more useful on an anti-tank gun carriage or inside the SU-85. The anti-tank gun's recoil and carriage had an especially low silhouette, making it especially hard to spot. The sabot (APDS) round was very innovative for its time and provided formidable penetration out to 2,000 m. The fame of this weapon was only overshadowed by the even more powerful 100mm gun that appeared at the end of 1944.

Infantry

German

German infantry squads included a light machine gun (LMG) team, a rifle team, and an anti-tank team. The four-man rifle team was armed

originally with nothing but Kar 98K bolt-action rifles, but by 1944, as many as half were carrying MP40 submachine guns. The three-man LMG team included the potent MG42 machine gun, a loader who carried spare ammunition, and an infantryman with a rifle or submachine gun. The two-man anti-tank team typically used Panzerfausts, although some units had other anti-tank rocket weapons. They also carried rifles or submachine guns for regular infantry combat.

German infantry companies included a heavy weapons section with additional MG42 machine guns that had heavy-duty tripods for longer-ranged fire. These weapons were equally useful supporting attacks or providing the centerpiece of an infantry defense.

The belt-fed MG42 was the finest in-squad support weapon of the war, and it contributed much the local success of German infantry against their opponents. The Panzerfaust was undoubtedly the simplest, most easily carried and commonly used anti-tank weapon of the war. With these two weapons, years of combat experience, and a tradition of delegated authority, German infantry often worked wonders on the battlefield.

A 1944 German Panzer Division had four panzergrenadier (armored infantry) battalions, but only one was equipped with half-tracks—the rest had trucks. Because the trucks were so vulnerable, infantry typically dismounted behind the front line and moved ahead on foot, cooperating with tanks from one of the Division's two panzer battalions.

American

American infantry squads had two fireteams and a bazooka team. Officially, a 12-man squad had one BAR, one sniper rifle, and ten M1 semi-automatic rifles. In reality, the squad typically divided into two five-man fireteams and a two-man anti-tank team. The fireteams normally had a BAR for automatic fire support, three riflemen with M1s, and a team leader with a submachine gun, typically the M3 "grease gun." The anti-tank team consisted of a bazooka gunner (with the bazooka itself) and a loader (who carried and loaded the rocket ammunition).

The great weakness of the American infantry was no good base-of-fire weapon. The BAR was completely inadequate in that role, given its small clip and tendency to jam. Although the M1 was superior to German or Russian rifles, riflemen couldn't fire bullets fast enough to suppress an area. This meant the American infantry were obliged to press forward without adequate suppressive fire. It's little wonder that such attacks frequently stalled until armor, artillery, or air support became available.

A partial solution to this problem lay in the weapons platoon of each rifle company. Among other things, this unit included a machine gun squad with two .30 caliber machine guns on heavy-duty tripod mounts. These useful and reliable weapons could provide suppressive fire to support attacks, or they could generate large "beaten areas" to enhance a defense.

Russian

Russian infantry had two organizations: a traditional rifle-armed infantry and a special submachine gun infantry organized to cooperate with tanks. The traditional infantry squad had a four-man LMG team, a four-man rifle team, and a two-man anti-tank team. The LMG team had one DP1928 light machine gunner, one loader, and two infantrymen with either rifles or submachine guns. The rifle team had three men with M1891/30 rifles and a leader who often carried a PPSH submachine gun. The anti-tank team included two infantrymen with VPGS rifle grenades or similar anti-tank weapons. Unfortunately, the VPGS was so ineffective that, aside from captured Panzerfausts, the main Russian infantry anti-tank weapons were clamp-on magnetic mines!

The DP1928 was somewhat superior to the American BAR but nowhere near as effective as the German MG42. The biggest problem with the DP was that any mishandling dented the ammo drums. Even the smallest dent invariably caused the drum to jam, rendering the gun temporarily useless.

A "tank descent" squad had two four-man fireteams, each with four submachine gunners. It also included a two-man anti-tank team with ineffective VPGS rifle grenades.

Like the Germans and Americans, the Russians had a heavy weapons platoon in each company, with PM1910 machine guns. Although good weapons, they were crippled by their extraordinarily weighty design and heavy wheeled carriages that had to be dragged by their unlucky crews.

11 Weapons Data

Ordnance & Ammunition

Armor Piercing (AP) ammunition in WWII was a shell with a solid, armored nose and a modest explosive charge in the rear. In principle, the solid nose penetrated the armor, and the charge in the rear exploded inside the target. In practice, the nose often deformed so badly during the penetration stage that the charge exploded prematurely or not at all. Fortunately, the very act of penetration yielded sufficient fragments of metal to cause injury to the interior crew and heavy damage to equipment.

Armor Piercing High Explosive (APHE) was similar to AP but had a larger proportion of high explosive. This made it slightly more suitable against a wider array of lightly armored targets, but it still had all the drawbacks of AP.

Armor Piercing Capped (APC) was invented when wartime experience showed that normal armor piercing shells tended to break up when hitting stronger armor. Adding an especially hard noscap produced a slight improvement in penetration.

Armor Piercing Capped, Ballistic Cap (APCBC) was a further refinement of APC that elongated and carefully shaped the noscap to reduce air resistance. This meant the shell retained greater velocity, which improved its penetration still further.

Hyper-Velocity Armor Piercing (HVAP) was inspired by wartime experience and was a partial step toward the “sabot” concept (see the next paragraph). Although HVAP appeared similar to a normal AP shell, the case was actually very lightweight metal. The armor piercing core inside

was narrower than the shell itself, with little or no explosive charge at the back. When the shell hit the target, the lighter case would deform and fragment away, so the majority of the shell's force was concentrated in the narrower central core for better penetration.

Armor Piercing, Discarding Sabot (APDS) was the final refinement of the HVAP concept. With this round, the shell casing was nothing but a few metal pieces (sabots, or "boots") lightly wrapped around a very narrow, solid core, often termed the "bolt" or "penetrator." The sabots existed purely to get the shell spinning down the rifled gun barrel. Once the shell left the muzzle, the sabots fell away, and only the core flew onward to the target.

As a result, the entire force of the broad-diameter shell was communicated to a very narrow bolt for maximum penetration. Special hardening techniques or alloys were used to ensure the bolt's ability to penetrate.

The main problem with APDS was that bolts proved less stable in flight than traditional shells. This loss of stability affected both accuracy and penetration power. Therefore, sabot was most effective at closer ranges (under 1,000–1,500 m) and was very poor at long range shooting.

High Explosive, Anti-Tank (HEAT) has a "shaped charge" warhead that concentrates the entire explosive power of the shell forward against armor plate. The shell can literally burn through armor plate to a depth proportional to the warhead's diameter and the warhead's design. HEAT warheads were pioneered during WWII and had many drawbacks. Among them was spin — the penetration power of a spinning HEAT warhead was significantly less than a nonspinning warhead. Anti-tank rockets like the Panzerfaust or the bazooka were fin-stabilized (i.e., used fins instead of spin to achieve stable flight), which enhanced their effectiveness. Muzzle velocity is irrelevant to HEAT penetration.

High Explosive (HE) explodes on contact. Its armor penetration ability is due entirely to the explosion's ability to fracture, fragment, or even burn through the armor plate. Larger and heavier shells destroy thicker armor.

Smoke shells are designed to produce a lingering cloud of smoke that blocks vision. Typically, the chemical contents of smoke shells take at least a minute or two before they are exhausted and the smoke dissipates.

NOTES: After WWII, HEAT warheads quickly found favor in many roles, especially missile warheads, leading to the anti-tank guided

missile (ATGM), a fixture on modern battlefields. Then, in the early 1960s, the Russians (often leaders in AFV design) began using smoothbore tank guns that didn't "spin" their shells. Instead, the shells had pop-out fins. The gun barrels wore out very rapidly (in 1973, Russian-built Syrian tanks went into action with spare gun barrels strapped to their tread guards), but their armor piercing fin-stabilized discarding sabot (APFSDS) and HEAT fin-stabilized (HEAT-FS) rounds were far more effective than equivalent shells from rifled cannon. Today, almost all cannons on main battle tanks are smoothbores, and the two most common ammunition types are sabot and HEAT.

The Ordnance Tables

The ordnance tables that follow provide basic data for all the major weapons used by troops in this simulation:

Names of weapons are based on their bore diameter, in millimeters. For example, an 88mm gun has an interior bore diameter of 3.46 in. (88mm). The **L/00** suffix indicates the gun barrel's length in calibers (defined as the barrel length divided by the bore diameter). Longer guns normally developed higher muzzle velocities and greater long-range accuracy.

Ammo Type indicates the type of shell. **Muzzle Velocity** is given in meters per second, which affects range, accuracy, and penetrating power. **Max. Range** is given in meters, and represents maximum *effective* range, usually no more than 2,500 m (2.5 km). Although guns could fire their shells further, accuracy was so poor that serious damage required more ammunition than most vehicles or guns had available.

Pen at 0–2500 m values indicate the millimeters of armor the shell could penetrate at that range. **Soft Kill Value** is a relative measure of the shell's ability to kill infantry or anti-tank gun crewmen. For automatic weapons, soft kill is the overall power of one burst (typically of five to ten shots) rather than each individual shell or bullet.

German Ordnance

German High-Velocity Guns

<i>Name</i>	88mm L/71 PaK 43			
<i>Typical Use</i>	Nashorn or PaK 43/1 AT gun			
<i>Ammo Type</i>	HVAP	APCBC	HE	Smoke
<i>Muzzle Velocity</i>	1130	1000	750	750
<i>Max. Range</i>	3000	3000	3000	3000
<i>Pen at 0 m</i>	225	185	13	0
<i>Pen at 500 m</i>	207	180	13	0
<i>Pen at 1,000 m</i>	190	174	13	0
<i>Pen at 1,500 m</i>	174	169	13	0
<i>Pen at 2,000 m</i>	159	164	13	0
<i>Pen at 2,500 m</i>	145	156	13	0
<i>Soft Kill Value</i>	1	1	60	0

In this simulation, the 88mm gun is limited to 2500 m maximum range.

<i>Name</i>	75mm L/70 KwK 42 or StuK 42			
<i>Typical Use</i>	Panther or Jagdpanzer IV/70			
<i>Ammo Type</i>	HVAP	AP	HE	Smoke
<i>Muzzle Velocity</i>	1120	925	925	925
<i>Max. Range</i>	2500	2500	2500	2500
<i>Pen at 0 m</i>	208	165	10	0
<i>Pen at 500 m</i>	169	141	10	0
<i>Pen at 1,000 m</i>	138	121	10	0
<i>Pen at 1,500 m</i>	111	104	10	0
<i>Pen at 2,000 m</i>	89	90	10	0
<i>Pen at 2,500 m</i>	71	79	10	0
<i>Soft Kill Value</i>	1	1	40	0

<i>Name</i>	75mm L/48 KwK 40, StuK 40 or PaK 40				
<i>Typical Use</i>	PzKw IV, StuG III, Marder, Hetzer, PaK 40 AT gun				
<i>Ammo Type</i>	APCBC	APHE	HEAT	HE	Smoke
<i>Muzzle Velocity</i>	920	740	450	550	550
<i>Max. Range</i>	2500	2200	1700	1800	1800
<i>Pen at 0 m</i>	165	124	75	10	0
<i>Pen at 500 m</i>	133	111	75	10	0
<i>Pen at 1,000 m</i>	106	98	75	10	0
<i>Pen at 1,500 m</i>	83	85	75	10	0
<i>Pen at 2,000 m</i>	66	74	75	10	0
<i>Pen at 2,500 m</i>	55	65	—	—	—
<i>Soft Kill Value</i>	1	13	20	40	0

<i>Name</i>	20mm L/55 KwK 30		
<i>Typical Use</i>	PzSpw armored car		
<i>Ammo Type</i>	HVAP	APC	HE
<i>Muzzle Velocity</i>	900	800	800
<i>Max. Range</i>	1500	1500	1500
<i>Pen at 0 m</i>	40	25	2
<i>Pen at 500 m</i>	35	23	2
<i>Pen at 1,000 m</i>	30	22	2
<i>Pen at 1,500 m</i>	25	11	2
<i>Pen at 2,000 m</i>	—	—	—
<i>Pen at 2,500 m</i>	—	—	—
<i>Soft Kill Value</i>	5	5	40

This 20mm auto-cannon fires a five-round burst in about one second. The ammunition is loaded in 10-round clips.

German Infantry Weapons

<i>Name</i>	7.92mm MG34 or MG42	7.92mm Kar 98K	9mm MP40	150mm Panzerfaust 100
<i>Typical Use</i>	Machine gun	Rifle	Submachine gun	Anti-tank rocket
<i>Ammo Type</i>	Bullet	Bullet	Bullet	HEAT
<i>Muzzle Velocity</i>	785-800	755	400	45
<i>Max. Range</i>	varies	500	250	100
<i>Pen at 0 m</i>	8	6	4	230
<i>Pen at 500 m</i>	4	3	2	230
<i>Pen at 1,000 m</i>	1	—	—	—
<i>Pen at 1,500 m</i>	—	—	—	—
<i>Pen at 2,000 m</i>	—	—	—	—
<i>Pen at 2,500 m</i>	—	—	—	—
<i>Soft Kill Value</i>	20 /burst	3	8 /burst	38

The essential characteristics for the MG34 and MG42 are very similar. Coaxial or tripod mounts allow firing to 1,000 m, while bipods and other mounts do well to hit at 500 m. The Panzerfaust is a one-shot disposable weapon.

German Artillery

<i>Name</i>	105mm leFH 18 field howitzer	150mm sFH 18 heavy howitzer
<i>Ammo Type</i>	HE	HE
<i>Muzzle Velocity</i>	470	520
<i>Max. Range</i>	13,325	12,325
<i>Pen at 0 m</i>	16	21
<i>Pen at 500 m</i>	16	21
<i>Pen at 1,000 m</i>	16	21
<i>Pen at 1,500 m</i>	16	21
<i>Pen at 2,000 m</i>	16	21
<i>Pen at 2,500 m</i>	16	21
<i>Soft Kill Value</i>	90	140

All these weapons also have smoke ammunition.

American Ordnance

American High-Velocity Guns

<i>Name</i>	76mm L/53 M1A2, M7 or M5				
<i>Typical Use</i>	M4A3/76, M10, M18 or M5 Anti-tank gun				
<i>Ammo Type</i>	HVAP	APC	APHE	HE	Smoke
<i>Muzzle Velocity</i>	1036	792	792	823	274
<i>Max. Range</i>	2500	2500	2500	2500	2500
<i>Pen at 0 m</i>	181	140	106	10	0
<i>Pen at 500 m</i>	156	122	101	10	0
<i>Pen at 1,000 m</i>	134	105	95	10	0
<i>Pen at 1,500 m</i>	113	88	87	10	0
<i>Pen at 2,000 m</i>	93	72	77	10	0
<i>Pen at 2,500 m</i>	74	57	65	10	0
<i>Soft Kill Value</i>	1	1	14	41	0

<i>Name</i>	75mm L/39 M3				
<i>Typical Use</i>	M4A3/75 or M24				
<i>Ammo Type</i>	HVAP	APC	APHE	HE	Smoke
<i>Muzzle Velocity</i>	869	619	619	463	259
<i>Max. Range</i>	2500	2500	2500	2500	2500
<i>Pen at 0 m</i>	160	90	82	10	0
<i>Pen at 500 m</i>	135	70	74	10	0
<i>Pen at 1,000 m</i>	112	53	67	10	0
<i>Pen at 1,500 m</i>	91	40	60	10	0
<i>Pen at 2,000 m</i>	74	29	54	10	0
<i>Pen at 2,500 m</i>	63	20	49	10	0
<i>Soft Kill Value</i>	1	1	13	40	0

Longer ranges sometimes quoted for American 75mm and 76mm guns relate to their use as artillery, a practice with so little accuracy or effectiveness that it was eventually abandoned.

<i>Name</i>	57mm L/50 M1		
<i>Typical Use</i>	M1 anti-tank gun		
<i>Ammo Type</i>	APDS	AP	HE
<i>Muzzle Velocity</i>	1075	823	800
<i>Max. Range</i>	2000	2000	2000
<i>Pen at 0 m</i>	110	86	6
<i>Pen at 500 m</i>	100	79	6
<i>Pen at 1,000 m</i>	85	73	6
<i>Pen at 1,500 m</i>	65	65	6
<i>Pen at 2,000 m</i>	40	58	6
<i>Pen at 2,500 m</i>	—	—	—
<i>Soft Kill Value</i>	1	1	20

<i>Name</i>	37mm L/53 M6			
<i>Typical Use</i>	M8 armored car			
<i>Ammo Type</i>	HVAP	AP	HE	Canister
<i>Muzzle Velocity</i>	884	800	792	500
<i>Max. Range</i>	1500	1500	1500	100
<i>Pen at 0 m</i>	83	65	4	1
<i>Pen at 500 m</i>	55	44	4	—
<i>Pen at 1,000 m</i>	29	26	4	—
<i>Pen at 1,500 m</i>	5	11	4	—
<i>Pen at 2,000 m</i>	—	—	—	—
<i>Pen at 2,500 m</i>	—	—	—	—
<i>Soft Kill Value</i>	1	1	10	50

American Infantry Weapons

<i>Name</i>	.50cal HB M2	.30cal M1919	.30cal M1919 BAR
<i>Typical Use</i>	Heavy machine gun	Machine gun	Automatic rifle
<i>Ammo Type</i>	Bullet	Bullet	Bullet
<i>Muzzle Velocity</i>	890	850	855
<i>Max. Range</i>	varies	varies	600
<i>Pen at 0 m</i>	15	8	6
<i>Pen at 500 m</i>	11	4	3
<i>Pen at 1,000 m</i>	7	1	1
<i>Pen at 1,500 m</i>	3	—	—
<i>Pen at 2,000 m</i>	—	—	—
<i>Pen at 2,500 m</i>	—	—	—
<i>Soft Kill Value</i>	24 /burst	20 /burst	10 /burst

The BAR is limited to 8-round clips. Machine gun range varies with the mounting. Coaxial or tripod machine gun mounts allow firing to 1,000 m, while bipods and other mounts do well to hit at 500 m.

<i>Name</i>	.30cal M1 Garand	.30cal M1 Carbine	9mm M3A1	2.36" M1 Bazooka
<i>Typical Use</i>	Rifle	Carbine	Submachine gun	Anti-Tank rocket lnchr.
<i>Ammo Type</i>	Bullet	Bullet	Bullet	HEAT
<i>Muzzle Velocity</i>	855	600	280	82
<i>Max. Range</i>	500	300	200	250
<i>Pen at 0 m</i>	6	6	4	118
<i>Pen at 500 m</i>	3	3	2	118
<i>Pen at 1,000 m</i>	1	1	—	—
<i>Pen at 1,500 m</i>	—	—	—	—
<i>Pen at 2,000 m</i>	—	—	—	—
<i>Pen at 2,500 m</i>	—	—	—	—
<i>Soft Kill Value</i>	3	2	10 /burst	20

The M1 Garand was the only standard-issue semiautomatic rifle in WWII. All other rifles were reloaded by a manual bolt mechanism. The M3A1 “grease gun” was cheaply made and extremely common.

American Artillery

<i>Name</i>	105mm M2A1 howit- zer	155mm M1 howitzer	203mm M1 howitzer
<i>Ammo Type</i>	HE	HE	HE
<i>Muzzle Velocity</i>	473	564	595
<i>Max. Range</i>	11,438	14,640	16,937
<i>Pen at 0 m</i>	16	21	31
<i>Pen at 500 m</i>	16	21	31
<i>Pen at 1,000 m</i>	16	21	31
<i>Pen at 1,500 m</i>	16	21	31
<i>Pen at 2,000 m</i>	16	21	31
<i>Pen at 2,500 m</i>	16	21	31
<i>Soft Kill Value</i>	90	140	250

All these weapons also have smoke ammunition.

Russian Ordnance

Russian High-Velocity Guns

<i>Name</i>	85mm L/54 ZiS S-53			
<i>Typical Use</i>	T-34-85			
<i>Ammo Type</i>	APDS	APHE	HE	Smoke
<i>Muzzle Velocity</i>	1200	792	792	792
<i>Max. Range</i>	2000	2500	2500	2500
<i>Pen at 0 m</i>	181	121	11	0
<i>Pen at 500 m</i>	138	111	11	0
<i>Pen at 1,000 m</i>	100	102	11	0
<i>Pen at 1,500 m</i>	67	93	11	0
<i>Pen at 2,000 m</i>	39	85	11	0
<i>Pen at 2,500 m</i>	—	77	11	0
<i>Soft Kill Value</i>	1	16	48	0

This 85mm was chosen for the T-34-85 because the D5 (below) could not fit inside the tank's turret.

<i>Name</i>	85mm L/55 D5			
<i>Typical Use</i>	SU-85 or D-44 anti-tank gun			
<i>Ammo Type</i>	APDS	APHE	HE	Smoke
<i>Muzzle Velocity</i>	1200	792	792	792
<i>Max. Range</i>	2000	2500	2500	2500
<i>Pen at 0 m</i>	185	123	11	0
<i>Pen at 500 m</i>	141	113	11	0
<i>Pen at 1,000 m</i>	102	104	11	0
<i>Pen at 1,500 m</i>	68	95	11	0
<i>Pen at 2,000 m</i>	40	87	11	0
<i>Pen at 2,500 m</i>	—	79	11	0
<i>Soft Kill Value</i>	1	16	48	0

<i>Name</i>	76mm L/42 F-34 or ZiS-3				
<i>Typical Use</i>	T-34-76, SU-76 or ZiS-3 anti-tank gun				
<i>Ammo Type</i>	APDS	APHE	HEAT	HE	Smoke
<i>Muzzle Velocity</i>	965	655	325	680	680
<i>Max. Range</i>	1900	2000	1500	2000	2000
<i>Pen at 0 m</i>	130	78	75	10	0
<i>Pen at 500 m</i>	92	69	75	10	0
<i>Pen at 1,000 m</i>	61	61	75	10	0
<i>Pen at 1,500 m</i>	36	54	75	10	0
<i>Pen at 2,000 m</i>	16	48	—	10	0
<i>Pen at 2,500 m</i>	—	—	—	—	—
<i>Soft Kill Value</i>	1	13	20	40	0

Russian Infantry Weapons

<i>Name</i>	PM1910	DT1929	DP1928
<i>Typical Use</i>	Medium machine gun	Tank machine gun	Light machine gun
<i>Ammo Type</i>	Bullet	Bullet	Bullet
<i>Muzzle Velocity</i>	844	839	863
<i>Max. Range</i>	800	varies	600
<i>Pen at 0 m</i>	8	8	8
<i>Pen at 500 m</i>	4	4	4
<i>Pen at 1,000 m</i>	1	1	1
<i>Pen at 1,500 m</i>	—	—	—
<i>Pen at 2,000 m</i>	—	—	—
<i>Pen at 2,500 m</i>	—	—	—
<i>Soft Kill Value</i>	20 /burst	20 /burst	20 /burst

The PM was belt-fed, but the DP used a fragile 47-round magazine. The DT had a slightly improved 60-round drum. DT range was over 800 m in a coaxial mount, but 500 m or less in a bow mount.

<i>Name</i>	7.62mm M1891/30	7.62mm PPSh 1941	61mm VPGS 1941
<i>Typical Use</i>	Rifle	Submachine gun	Anti-Tank rifle grenade
<i>Ammo Type</i>	Bullet	Bullet	HEAT
<i>Muzzle Velocity</i>	853	500	50
<i>Max. Range</i>	500	200	60
<i>Pen at 0 m</i>	6	4	30
<i>Pen at 500 m</i>	3	2	30
<i>Pen at 1,000 m</i>	1	1	—
<i>Pen at 1,500 m</i>	—	—	—
<i>Pen at 2,000 m</i>	—	—	—
<i>Pen at 2,500 m</i>	—	—	—
<i>Soft Kill Value</i>	3	15 /burst	5

The famous PPSH used a 71-round drum magazine, while the bolt-action M1891/30 had 5-round clips. Being a rifle grenade, the VPGS was fired from the M1891/30 rifle.

Russian Mortars & Artillery

<i>Name</i>	120mm HM38 mortar	122mm m1938 howitzer	152mm M-10 howitzer
<i>Ammo Type</i>	HE	HE	HE
<i>Muzzle Velocity</i>	272	515	432
<i>Max. Range</i>	6,000	11,800	12,400
<i>Pen at 0 m</i>	15	17	21
<i>Pen at 500 m</i>	15	17	21
<i>Pen at 1,000 m</i>	15	17	21
<i>Pen at 1,500 m</i>	15	17	21
<i>Pen at 2,000 m</i>	15	17	21
<i>Pen at 2,500 m</i>	15	17	21
<i>Soft Kill Value</i>	75	100	140

All these weapons also have smoke ammunition.

12 Tactics

Fighting Armored Vehicles

Concepts

In World War II, reliable destruction of enemy armored vehicles depended on penetrating their armor with enough explosive or residual power to cause significant damage. Therefore, central to any armored combat were two questions: “When can my weapon penetrate the enemy’s armor?” and “When will my armor be penetrated by the enemy’s weapon?”

Penetration data helps you understand the best engagement range for your vehicle. If you have the penetration range advantage (that is, you penetrate at a longer range), you want to engage within that range but beyond the enemy’s ability to penetrate you. If you have the range disadvantage, you want to close to a range where you, too, can penetrate.

In some cases, a vehicle’s frontal armor is impervious while the vehicle’s side and/or rear armor is vulnerable. In such cases, the firer seeks to maneuver around a flank to achieve a position for penetrating hits. In this simulation, the front and rear armor arcs for a vehicle are 60° each, while the side armor arcs are 120° each.

Of course, an enemy aware of a side armor weakness will counter such maneuvers by rotating to face the new attack. One solution was a double attack from separate directions. If the target turned to face one attacker, it exposed its flank to the other. Another solution was a “dog-fight” of close-range combat during which you break into the target’s formation to get side or rear shots. This tactic was best performed with

Shermans or T-34-76s, whose high speed and fast turret rotation were especially useful.

Retreating from battle in a tank is a difficult proposition. Without exception, a tank's weakest armor is on its rear. Therefore, it is often safer to back away from the enemy, rather than turning around and running.

Normally impenetrable targets can be hit by top attacks against their thin top armor. If you have a significant elevation advantage, some of your shells will plunge through the enemy's top armor, often with devastating effect.

Nonpenetrating hits are also useful. Shells that fail to penetrate can damage or destroy tracks, damage sights and gun barrels, jam turrets, or even start fires. In WWII, American Shermans, unable to penetrate German front armor, fired anyway. Even if the German armored vehicle was not destroyed, eventually enough nonpenetrating hits could disable or immobilize it.

Penetration Tables

The following tables indicate the range (in meters) where a specific shell first penetrates a specific armor location on a target. Cross-reference the target type and armor on the left with the firing weapon and its ammo across the top.

The table gives the maximum range (in meters) at which the shell penetrates that armor. However, at this range a shell consumes all its energy breaking through the armor, which means interior damage is modest to nonexistent. As the range gets closer, the shell penetrates with greater residual power, causing more internal damage.

Table results in ***bold italic*** indicate a penetration with power to spare—there can be considerable damage even at the listed range.

German► American Penetration Ranges

Target is...	Target Location	Armor in mm	Ordnance Firing:			
			Nashorn or PaK 43 AT Gun		PzKw V Panther or JagdPz IV/70	
			88mm L/71		75mm L/70	
			HVAP	APCBC	HVAP	AP
M4A3/76	Front T	89	2500	2500	2000	2050
Sherman	Front H	120	2500	2500	1330	1030
	Side T	65	2500	2500	2500	2500
	Side H	38	2500	2500	2500	2500
	Rear T	63	2500	2500	2500	2500
	Rear H	40	2500	2500	2500	2500
M4A3/75	Front T	89	2500	2500	2000	2050
Sherman	Front H	120	2500	2500	1330	1030
	Side T	51	2500	2500	2500	2500
	Side H	38	2500	2500	2500	2500
	Rear T	51	2500	2500	2500	2500
	Rear H	41	2500	2500	2500	2500
M24	Front T	44	2500	2500	2500	2500
Chaffee	Front H	51	2500	2500	2500	2500
	Side T	28	2500	2500	2500	2500
	Side H	26	2500	2500	2500	2500
	Rear T	25	2500	2500	2500	2500
	Rear H	19	2500	2500	2500	2500
M10	Front T	81	2500	2500	2220	2410
Wolverine	Front H	90	2500	2500	1980	2000
	Side T	26	2500	2500	2500	2500
	Side H	35	2500	2500	2500	2500
	Rear T	25	2500	2500	2500	2500
	Rear H	35	2500	2500	2500	2500
M18	Front T	25	2500	2500	2500	2500
Hellcat	Front H	25	2500	2500	2500	2500
	Side T	14	2500	2500	2500	2500
	Side H	14	2500	2500	2500	2500
	Rear T	13	2500	2500	2500	2500
	Rear H	13	2500	2500	2500	2500

			Ordnance Firing:		
			Pz IV, StuG III, JPz 38, Marder, PaK 40 AT Gun		
			75mm L/48		
Target is...	Target Location	Armor in mm	APCBC	APHE	HEAT
M4A3/76 Sherman	Front T	89	1370	1350	none
	Front H	120	740	150	none
	Side T	65	2050	2500	2500
	Side H	38	2500	2500	2500
	Rear T	63	2140	2500	2500
	Rear H	40	2500	2500	2500
M4A3/75 Sherman	Front T	89	1370	1350	none
	Front H	120	740	150	none
	Side T	51	2500	2500	2500
	Side H	38	2500	2500	2500
	Rear T	51	2500	2500	2500
	Rear H	41	2500	2500	2500
M24 Chaffee	Front T	44	2500	2500	2500
	Front H	51	2500	2500	2500
	Side T	28	2500	2500	2500
	Side H	26	2500	2500	2500
	Rear T	25	2500	2500	2500
	Rear H	19	2500	2500	2500
M10 Wolverine	Front T	81	1560	1680	none
	Front H	90	1350	1310	none
	Side T	26	2500	2500	2500
	Side H	35	2500	2500	2500
	Rear T	25	2500	2500	2500
	Rear H	35	2500	2500	2500
M18 Hellcat	Front T	25	2500	2500	2500
	Front H	25	2500	2500	2500
	Side T	14	2500	2500	2500
	Side H	14	2500	2500	2500
	Rear T	13	2500	2500	2500
	Rear H	13	2500	2500	2500

American► German Penetration Ranges

Target is...	Target Location	Armor in mm	Ordnance Firing:		
			M4A3/76, M10, M18, or M5 AT Gun		
			76mm L/53		
			HVAP	APC	APHE
PzKw V	Front T	135	980	140	none
Panther	Front H	140	860	none	none
	Side T	55	2500	2500	2500
	Side H	60	2500	2400	2500
	Rear T	54	2500	2500	2500
	Rear H	46	2500	2500	2500
PzKw IV	Front T	80	2340	1750	1850
	Front H	82	2290	1690	1750
	Side T	35	2500	2500	2500
	Side H	30	2500	2500	2500
	Rear T	31	2500	2500	2500
	Rear H	30	2500	2500	2500
StuG III	Front T	80	2340	1750	1850
	Front H	65	2500	2230	2500
	Side T	40	2500	2500	2500
	Side H	30	2500	2500	2500
	Rear T	30	2500	2500	2500
	Rear H	20	2500	2500	2500
JagdPz 38(t) Hetzer	Front T	130	1100	280	none
	Front H	130	1100	280	none
	Side T	26	2500	2500	2500
	Side H	26	2500	2500	2500
	Rear T	23	2500	2500	2500
	Rear H	21	2500	2500	2500
JagdPz IV/70	Front T	130	1100	280	none
	Front H	113	1500	760	none
	Side T	46	2500	2500	2500
	Side H	30	2500	2500	2500
	Rear T	31	2500	2500	2500
	Rear H	21	2500	2500	2500
Marder III M	Front T	18	2500	2500	2500
	Front H	35	2500	2500	2500
	Side T	15	2500	2500	2500
	Side H	15	2500	2500	2500
	Rear T	0	2500	2500	2500
	Rear H	15	2500	2500	2500

Target is...	Target Location	Armor in mm	Ordnance Firing:		
			M4A3/75		
			75mm L/39		
			HVAP	APC	APHE
PzKw V	Front T	135	500	none	none
Panther	Front H	140	400	none	none
	Side T	55	2500	940	1920
	Side H	60	2500	790	1500
	Rear T	54	2500	970	2000
	Rear H	46	2500	1270	2500
PzKw IV	Front T	80	1820	250	130
	Front H	82	1760	200	none
	Side T	35	2500	1730	2500
	Side H	30	2500	1950	2500
	Rear T	31	2500	1910	2500
	Rear H	30	2500	1950	2500
StuG III	Front T	80	1820	250	130
	Front H	65	2410	650	1140
	Side T	40	2500	1500	2500
	Side H	30	2500	1950	2500
	Rear T	30	2500	1950	2500
	Rear H	20	2500	2500	2500
JagdPz 38(t) Hetzer	Front T	130	610	none	none
	Front H	130	610	none	none
	Side T	26	2500	2170	2500
	Side H	26	2500	2170	2500
	Rear T	23	2500	2330	2500
	Rear H	21	2500	2440	2500
JagdPz IV/70	Front T	130	610	none	none
	Front H	113	980	none	none
	Side T	46	2500	1270	2500
	Side H	30	2500	1950	2500
	Rear T	31	2500	1910	2500
	Rear H	21	2500	2440	2500
Marder III M	Front T	18	2500	2500	2500
	Front H	35	2500	1730	2500
	Side T	15	2500	2500	2500
	Side H	15	2500	2500	2500
	Rear T	0	2500	2500	2500
	Rear H	15	2500	2500	2500

German► Russian Penetration Ranges

Target is...	Target Location	Armor in mm	Ordnance Firing:			
			Nashorn or PaK 43 AT Gun 88mm L/71		PzKw V Panther or JagdPz IV/70 75mm L/70	
			HVAP	APCBC	HVAP	AP
T-34-85	Front T	104	2500	2500	1660	1500
	Front H	94	2500	2500	1890	1860
	Side T	80	2500	2500	2250	2450
	Side H	98	2500	2500	1800	1710
	Rear T	76	2500	2500	2360	2500
	Rear H	61	2500	2500	2500	2500
T-34-76	Front T	70	2500	2500	2500	2500
	Front H	94	2500	2500	1890	1860
	Side T	55	2500	2500	2500	2500
	Side H	78	2500	2500	2310	2500
	Rear T	55	2500	2500	2500	2500
	Rear H	73	2500	2500	2440	2500
SU-85	Front T	117	2500	2500	1390	1120
	Front H	95	2500	2500	1860	1820
	Side T	65	2500	2500	2500	2500
	Side H	65	2500	2500	2500	2500
	Rear T	46	2500	2500	2500	2500
	Rear H	46	2500	2500	2500	2500
SU-76M	Front T	25	2500	2500	2500	2500
	Front H	39	2500	2500	2500	2500
	Side T	15	2500	2500	2500	2500
	Side H	15	2500	2500	2500	2500
	Rear T	0	2500	2500	2500	2500
	Rear H	10	2500	2500	2500	2500

Target is...	Target Location	Armor in mm	Ordnance Firing:		
			Pz IV, StuG III, JPz 38, Marder, PaK 40 AT Gun		
			75mm L/48		
			APCBC	APHE	HEAT
T-34-85	Front T	104	1040	770	none
	Front H	94	1260	1150	none
	Side T	80	1590	1730	none
	Side H	98	1170	1000	none
	Rear T	76	1710	1910	none
	Rear H	61	2230	2500	2500
T-34-76	Front T	70	1880	2220	2500
	Front H	94	1260	1150	none
	Side T	55	2500	2500	2500
	Side H	78	1650	1820	none
	Rear T	55	2500	2500	2500
	Rear H	73	1790	2060	2500
SU-85	Front T	117	800	270	none
	Front H	95	1240	1120	none
	Side T	65	2050	2500	2500
	Side H	65	2050	2500	2500
	Rear T	46	2500	2500	2500
	Rear H	46	2500	2500	2500
SU-76M	Front T	25	2500	2500	2500
	Front H	39	2500	2500	2500
	Side T	15	2500	2500	2500
	Side H	15	2500	2500	2500
	Rear T	0	2500	2500	2500
	Rear H	10	2500	2500	2500

Russian► German Penetration Ranges

Target is...	Target Location	Armor in mm	Ordnance Firing:			
			T-34-85		SU-85 or D-44 AT Gun	
			85mm L/54		85mm L/55	
			APDS	APHE	APDS	APHE
PzKw V	Front T	135	540	none	580	none
Panther	Front H	140	480	none	510	none
	Side T	55	1710	2500	1730	2500
	Side H	60	1630	2500	1640	2500
	Rear T	54	1540	2500	1750	2500
	Rear H	46	1880	2500	1890	2500
PzKw IV	Front T	80	1300	2310	1320	2440
	Front H	82	1270	2190	1290	2310
	Side T	35	2000	2500	2000	2500
	Side H	30	2000	2500	2000	2500
	Rear T	31	2000	2500	2000	2500
	Rear H	30	2000	2500	2000	2500
StuG III	Front T	80	1300	2310	1320	2440
	Front H	65	1540	2500	1550	2500
	Side T	40	2000	2500	2000	2500
	Side H	30	2000	2500	2000	2500
	Rear T	30	2000	2500	2000	2500
	Rear H	20	2000	2500	2000	2500
JagdPz 38(t)	Front T	130	610	none	640	none
Hetzer	Front H	130	610	none	640	none
	Side T	26	2000	2500	2000	2500
	Side H	26	2000	2500	2000	2500
	Rear T	23	2000	2500	2000	2500
	Rear H	21	2000	2500	2000	2500
Nashorn	Front T	12	2000	2500	2000	2500
	Front H	31	2000	2500	2000	2500
	Side T	11	2000	2500	2000	2500
	Side H	20	2000	2500	2000	2500
	Rear T	10	2000	2500	2000	2500
	Rear H	20	2000	2500	2000	2500

Target is...	Target Location	Armor in mm	Ordnance Firing:		
			T-34-76, SU-76M, or ZiS-3 AT Gun		
			76mm L/42		
			APDS	APHE	HEAT
PzKw V Panther	Front T	135	none	none	none
	Front H	140	none	none	none
	Side T	55	1120	1430	1500
	Side H	60	1020	1070	1500
	Rear T	54	1140	1500	1500
	Rear H	46	1300	2000	1500
PzKw IV	Front T	80	690	none	none
	Front H	82	660	none	none
	Side T	35	1530	2000	1500
	Side H	30	1650	2000	1500
	Rear T	31	1630	2000	1500
	Rear H	30	1650	2000	1500
StuG III	Front T	80	690	none	none
	Front H	65	940	750	1500
	Side T	40	1420	2000	1500
	Side H	30	1650	2000	1500
	Rear T	30	1650	2000	1500
	Rear H	20	1900	2000	1500
JagdPz 38(t) Hetzer	Front T	130	none	none	none
	Front H	130	none	none	none
	Side T	26	1750	2000	1500
	Side H	26	1750	2000	1500
	Rear T	23	1830	2000	1500
	Rear H	21	1880	2000	1500
Nashorn	Front T	12	2000	2000	1500
	Front H	31	1630	2000	1500
	Side T	11	2000	2000	1500
	Side H	20	1900	2000	1500
	Rear T	10	2000	2000	1500
	Rear H	20	1900	2000	1500

Fighting Infantry and Anti-Tank Guns

Infantry and anti-tank guns are dangerous opponents because they are extremely hard to spot. As tanks move forward, anti-tank guns on a distant flank (not to mention those directly ahead) can prove quite deadly. Most infantry is no threat to tanks, but the occasional anti-tank team with rockets or rifle grenades can be an unpleasant surprise.

Unlike armored vehicles, infantry and the crewmen of anti-tank guns are very susceptible to suppressive fire. This means firing bullets and shells *at* the men, regardless of whether the gunfire hits them. With a sufficient volume of fire, the infantry or crewmen “hit the dirt” and devote full attention to personal protection rather than shooting back. When the fire slackens, they recover and begin to shoot once more.

The ease with which men are suppressed and the speed with which they recover are based on their experience. Green troops are easily suppressed and slow to recover, while elite troops are difficult to suppress and recover quickly.

Remember that infantry and crewmen are vulnerable only to HE shells and bullet weapons. Shooting nonexplosive armor piercing at them is a waste of time and ammunition (for more exact information, see [“The Ordnance Tables” on page 109](#)). Typically, artillery is the most effective killer and suppressor of infantry and crewmen, followed by machine guns, then by tanks guns, and finally by infantry weapons such as sub-machine guns and rifles.

If your vehicles are only vulnerable to attack for part of their route, suppressing enemy infantry or guns may be sufficient to ensure safe passage. If the enemy commands much of the route or is guarding the objective, you need to attack and destroy them.

The classic method of attack is to begin with an artillery bombardment. Whatever men aren’t killed are likely to be suppressed. Meanwhile, split your attacking force into two parts and advance. One part, the “support” group, moves within effective range and opens fire as soon as the artillery barrage stops. Their goal is to keep the enemy suppressed, with special attention to any enemies that attempt to open fire or move. The other part of your force, the “assault” group, moves as close as possible during the barrage, then rushes the target. The assault group seeks to achieve point-blank range against each target, kill it with concentrated firepower, then move on to the next target. If the assault group takes excessive losses, it could become the support group, while the original support group moves up and takes over the assault role.

A wise commander also retains part of his force as a reserve behind the support group. If new enemy forces arrive, these reserves can deal with them without interrupting the assault/support process.

13 Campaign Scenarios

Eastern Front—Belorussia (Summer 1944)

Background and History

Prior to the summer of 1943, the Wehrmacht had enjoyed great success on the Eastern Front. This changed with the decisive failure and repulsion of Operation Citadel, the Kursk-Orel offensive. From that point on, the Soviet offensives seized the initiative, pushing German forces back over the same battlefields that had seen those great Wehrmacht successes. Numerous previous Soviet offensives had resulted in tremendous gains throughout the entire theater. These gains were halted in April 1944 when the spring rains and mud as well as Red Army exhaustion provided the Germans with an all too brief respite. OKH (the German high command) knew a new offensive would begin when summer came. The question was where this new offensive would strike.

The decision by STAVKA (the Soviet high command) to launch an offensive in Belorussia was based on two concepts. The chief consideration lay in the strategic pressure a victory would exert on Germany's Army Group North and Army Group North Ukraine. The second consideration was that Soviet units in the Ukraine were badly depleted and in need of re-equipping after the fierce spring battles. There is no clear evidence that STAVKA was aware of German Intelligence assessments, but an additional consideration might have been that the Germans expected no offensive from the Soviets any place but the North Ukraine. STAVKA's plan was named Operation Bagration for the

Russian prince who died trying to halt Napoleon's invasion of Russia during the Battle of Borodino.

To prevent German reinforcement of Army Group Center, the Soviets implemented a massive *maskirovka* (deception) campaign aimed at strengthening the German impression that North Ukraine would be the location of the new offensive. To this end, communications were confined to undetectable telephone and telegraph land lines. Meanwhile, bogus movement information was "secretly" broadcast suggesting troop movements to the south. The largest deception was in moving armor and infantry formations from other fronts under the cover of darkness and then camouflaging them on arrival at their staging areas. The bulk of the force was moved into place without being detected by German intelligence. Delays caused by railway congestion moving Soviet resources into the Belorussian staging areas pushed Operation Bagration's start date to June 22, 1944, the third anniversary of Germany's invasion of the Soviet Union.

OKH and German Intelligence perceived Army Group Center to be invincible. In the previous months, this force withstood vicious onslaughts and made the Red Army pay dearly for every inch of ground. When the spring offensives targeted the Ukraine, OKH believed STAVKA would discontinue offensive attempts in Belorussia. German defenses along the entire front were weakened by minor Soviet Partisan activity, and the Army Group Center also suffered because precious resources were mobilized away from their front to bolster Army Group North Ukraine or contend with the Allies on the western front. Initially, the Belorussian offensive was viewed by OKH as a distraction—they quite mistakenly believed the true summer offensive would restart in the Ukraine for two reasons. First, North Ukraine seemed to be of greater strategic value than any other area of the eastern front, confirmed by constant Soviet pressure there for the last 18 months. That region provided a path to Germany's oil reserves in Romania and to Berlin itself. Second was the German opinion of their superiority over the Russians: there was a persistently held belief that Russia would make a militarily bad decision. Specifically, a Russian attack into Ukraine would present Germany with a counterstrike opportunity that could pinch off and destroy a large part of the Red Army. This would mean a significant reversal of Soviet fortunes in Germany's favor. Wishful thinking lulled OKH to assess their intelligence incorrectly.

Terrain in Belorussia varies from rolling country to flatlands and some lowlands influenced by the Pripyat Marshes to the south. Swampy, marshy, and muddy areas greatly restricted the movement of armor

formations, though the expanses of open terrain permitted rapid maneuvering with limited amounts of cover available.

Soviet Objectives for the 5th Guards Tank Army

The 5th Guards Tank Army was deployed south of Vitebsk completely undetected by German Intelligence. This unit was tasked with advancing across the Dneper and securing the north side of the Moscow-Minsk highway. The primary objective was to reach Minsk, though objectives would be revised as necessary, depending on the nature of German resistance in the area. This resistance was expected to be unprepared and discouraged. While the initial advance would be brisk, stiffening defenses closer to the objective would slow progress. Driving through and smashing Army Group Center would open several avenues that would severely cripple the German war effort. Failure would cause the stalemate to remain on Russian soil.

German Objectives for the 5th Panzer Division

Advance elements of the 5th Panzer Division began detraining in Borisov within days of the Soviet assault. The objective was simple: break the Russian advance, smash their resolve, and restore the line at the Dneper. German High Command believed that this attack was diversionary. Resources initially were slim as the division was moved, haphazardly detrained, and thrust into combat without proper staging. The 5th Panzer Division would be holding or falling back against more numerous and more confident troops. Its responsibility was to ensure that Minsk remained under German control. Losing Minsk would be a significant blow, and recovering from such a defeat would be difficult. Providing time for shattered and retreating German units to recompose at Minsk would be necessary to reverse the losing trend and restore the front at the Dneper.

Historical Outcome

When the Soviet summer offensive began, it was apparent to STAVKA that the months of preparation and deception had worked better than expected. Original plans had called for the offensive to reach and secure Minsk. The Soviet surprise at the early success and speedy arrival at Minsk prompted redirection of all Soviet forces. The 5th Guards, after securing Minsk, were directed towards Vilnius, Kaunas, and ultimately Riga, isolating Army Group North.

The 5th Panzer Division was diverted to Minsk as quickly as possible, but it was unable to stem the tide. Minsk, true to the German pattern from 1943 onward, was designated a *Fester Platz*, or Strong Point, by OKH. Minsk was to be held “whatever the cost.” The 5th Panzer, deployed piecemeal, was ordered to fight a holding action that permitted the eventual evacuation of Minsk before its ultimate collapse.

Within five weeks of launching Operation Bagration, the Russian Army had annihilated Army Group Center. Though the significance and importance of this offensive is overshadowed in western accounts by the Normandy landings and Allied advances, this was the most disastrous defeat to befall the Wehrmacht.

Western Front—Ardennes (Winter 1944)

Background and History

The Allied advances from Normandy in August of 1944 had recaptured most of France before they suddenly ground to a halt, having outpaced their supply and support structure. The German had suffered huge losses in Normandy and at Falaise as well as an even more disastrous defeat in Belorussia on the Eastern Front. Largely unnoticed were cases where the defending Germans mounted small, local, and successful counterattacks.

While reviewing these battles, OKH came to a stunning conclusion. A major offensive through the Ardennes to Antwerp could drive a wedge between the American and British forces. Hitler hoped a major victory might allow Germany to negotiate a peace settlement with one or more of the western Allies. This would allow Germany to concentrate on its war with Russia.

The decision to target Antwerp was based on many considerations, including assessments of American fighting capability, Allied logistic bottlenecks and Allied morale. OKH chose to attack the Americans because of their shoddy performance in Tunisia during 1942–1943. Additionally, intelligence reports indicated that certain stretches of the Western Front were lightly defended by American infantry formations. The Allied logistics network depended heavily on additional reinforcements and supplies arriving at major ports, and Antwerp was *the* major port serving much of the front. Furthermore, its loss would separate the bulk of the British-Canadian 21st Army Group from the rest of the Allied armies, which might promote disharmony among the Allies.

Finally, the Germans believed that the Allied effort and morale had suffered from personality conflicts among the Allied commanders. Americans seemed unwilling to serve under British commanders, while the British apparently had a low regard for American military ability. The Germans believed these conflicts were a weakness that made an offensive through the Ardennes an attractive operation. Furthermore, a victorious offensive that took Antwerp would improve German morale at least as much as Germany's military position.

The operation was code-named *Wacht am Rhein* (Watch on the Rhine) to sound deceptively defensive and permit the careful hoarding of resources. The detailed plan was named *Herbstnebel* (Autumn Mist) and included three German Armies across a 96 kilometer front. The initial drive involved the 5th Panzer Army, including the 116th Panzer Division. Its objective was to reach and secure Namur and then protect the southern flank of the offensive. Meanwhile, other forces would continue the drive northwards to Antwerp and the coast.

The Ardennes was (and is) predominantly a rugged, heavily forested area. Wooded hillsides are frequently quite steep, while small and large forests blocked lines of sight and fields of fire. Often, the available open country was commanded by a nearby height. Winter weather was an additional problem, with patches of boggy, muddy ground slowing all types of movement. Maneuvering armored formations in such dense terrain was a challenge, while the lack of vast open spaces often caused close-range slugfests. Thick cover benefited infantry and anti-tank guns, making it imperative that tanks have infantry support. In this region, good tactical use of cover was vital to the success of both attackers and defenders.

German Objectives for the 116th Panzer Division

As part of the 5th Panzer Army, the 116th Panzer Division, nicknamed "Greyhounds," was deployed southeast of Grosskampenberg. Their objective was to smash across the American line and then advance through Houffalize toward the Meuse River crossings around Namur. Once Namur was captured and other geographical objectives of the 5th Panzer Army were achieved, the army would go on the defensive and protect the southern flank of the drive toward Antwerp.

Given the paucity of resources and the critical timetable of this operation, the Greyhounds were instructed to side-slip strong points as necessary and continue forward to Namur as fast as possible. It was important to strike quickly before too many Allied reinforcements

arrived. True to the philosophy of *blitzkrieg*, only after reaching the objective would the Division take defensive measures to contain the inevitable Allied reaction.

American Objectives for the 2nd Armored Division

The 2nd Armored “Hell on Wheels” Division had been part of the offensive drives across France, halted by stiffening German resistance and a temporary lack of supplies. As early as November, intelligence gathering and reconnaissance data indicated a German buildup in the Ardennes forest. Despite this, the American command remained complacent and overconfident. When the German offensive began in mid-December, the Americans were caught off-guard and initially suffered heavy losses. Thus began the Battle of the Bulge.

On December 20th, 1944, in response to continued German advances, the 2nd Armored Division was ordered into the northern Ardennes to deploy as quickly as possible against the German spearhead. Having bivouacked and rested for weeks prior to the attack, the veteran 2nd Division quickly moved from its staging areas around Liege to the vicinity of Ciney. The overall Allied objective was halt the German advance and then restore the line to its original position. It was expected that as the Germans were forced back, their lines would contract and their supply lines shorten, causing a steady increase in resistance. Nevertheless, eliminating the “Bulge” was deemed necessary before a new Allied offensive could begin against Germany.

Historical Outcome

After initially stumbling against stubborn American defenses, the 116th side-slipped to Dasburg. Exploiting the element of surprise, it advanced easily through Allied infantry who didn’t believe a German attack was possible. Though slowed by shortages of fuel and ammunition as well as by pockets of solid American defense, the 116th pushed forward to take Houffalize, LaRoche, and Marche within a week. Then it ran into stouter American resistance at Verdenne, exhausted its available supplies, and was forced into a defensive battle for survival along with many other German units.

After a rapid deployment, the 2nd Armored Division first engaged the enemy east of Ciney on December 21, 1944. The Division’s first attacks aimed at containing the enemy and preventing a catastrophic German breakthrough.

By Christmas 1944, the German offensive had stalled because resources were too thin and Allied resolve too strong. The staunch defense of Bastogne, St. Vith, and similar positions seriously impeded and ultimately hamstrung the extremely optimistic and ambitious German plan. Vital resources had to be diverted to assault these strong points. This meant forward units like the 116th Panzer were forced to stretch further and further to cover the gaps, involving them against more and more American counterattacks. Now that the Wehrmacht spearhead was blunted, the Americans began the laborious task of pushing the exhausted and overextended Germans back over the same territory they had just captured.

The conditions that had once made the operation so attractive to OKH were incorrectly assessed and proved devastating to the German cause. The American Army had learned from their failures in 1942 and 1943. By 1944, it was a vastly improved organization with many veteran units. Despite the histrionics of certain Allied commanders, and contrary to German hopes, Allied command and resolve was not divided. The timely strategic responses that countered Germany's last offensive in the west denied the Wehrmacht of the slim hope for a chance once imagined.

14 Designer's Notes

Project History

Development of *iPanzer '44*, the World War II tank simulation, began even before *iM1A2 Abrams* was complete. A great deal of the work done for *iM1A2* formed the foundation upon which *iPanzer '44* would be built.

The initial team had Charybdis President Tim Little as the project's Director and Producer. Sean Gallagher was hired as Lead Programmer, James Flores was brought in as Lead Designer, and Justin Owens and Charles Walker came aboard for the mountain of art-related tasks.

Development began in the shadow of *iM1A2* as research was started, features were planned, and tasks were designated. Sean was diverted to help with various tasks on *iM1A2* and ultimately stayed with it through its completion. As that project neared completion, additional fire-fighting tasks called for the rest of the team to also step more into support roles. *iPanzer's* progress slowed to a crawl. After the completion of *iM1A2*, the team received a couple of shake-ups. The core remained the same as *iPanzer '44* geared back up and added Paul Masters, an additional programmer, to the team.

As the project progressed, additions to the team became necessary. Christy Higdon joined the design group, handling the selection and population of battlefields. Artist Nate Denney blocked out, coordinated, and scripted the period footage. Designer Chris Cayce wrote and detailed the text and scripts. Programmer Dan Higdon modified the various AIs and developed the various gunnery systems. Programmer Keith Stauffer set the foundation for the implementation of our forests.

Meanwhile, at Interactive Magic, Craig Taylor assisted with additional historical research, and Arnold Hendrick used his knowledge of the game data formats to double-check and input the final vehicle and weaponry information. Commendations must be given to Interactive Magic's well-organized staff of playtesters for their hours of patience.

Praise and thanks must be given to all our family and friends. Their love and support allowed us to work through even the tough times and for that we are grateful.

Two tank museums were very instrumental in this product. Chaffee Associates in Virginia has a T-34-85 in working order. They kindly allowed us to crawl around in it, through it, photograph it, and operate it. Special thanks goes to the personnel of the Camp Mabry Texas Military Forces Museum. Throughout this project, they have made their displays, library, and, most importantly, their vehicles—including an M4 Sherman—available to us. In addition to the tremendous amount of actual data, we acquired less tangible benefits, including the awe, terror, and respect owed to the memory of these tanks and their crews.

Design Decisions

From the project's inception, the entire team was involved in making and rethinking all of the decisions that went into the finished product. The following is a list of some of the larger issues and the decisions we made about them as a team.

A lot of thought and work went into creating a totally immersive environment for the game. Thoughtful consideration was given to all aspects of the player's interface to keep a 'You are there' flavor to the project. The music, period video footage, and the graphics environment are a tribute to the past as well as a game about it.

We considered many alternative campaigns, and there will no doubt be discussion regarding the selections made. We wanted to include American, German, and Russian vehicles, and we also felt it was necessary to keep the two campaigns as close as possible to each other in time. In addition, we wanted campaigns where both sides were involved in mobile fighting with armored units. Many campaign alternatives were either one-sided, or there was no significant and interesting role for armored units. The Ardennes Offensive, or Battle of the Bulge, was an easy and logical choice for the west given Germany's attempt to return to the days of *blitzkrieg*. In the east, Operation Bagration, also known as the destruction of Army Group Center, included both sweeping Russian tank movements and counterthrusts by German Panzer Divisions. The

summer weather and gentle terrain in Belorussia was a nice contrast to the snowy, rugged ground of the Ardennes.

One of the more controversial decisions was to not include heavy tanks, notably the German Tigers. The decision was made early in the development cycle that *iPanzer's* primary focus would be on medium tanks of the era and that this focus would be from both sides of the conflict. Unfortunately, the Americans, already at a disadvantage in the Sherman-Panther matchup, did not receive a heavy tank (the Pershing) until the war was virtually over in 1945. Russian heavy tanks participated in Bagration but were quickly left behind. In fact, even if heavy tanks moved fast enough and kept running long enough to reach the battlefield, they were slow on the field and often had to avoid terrain passable to medium tanks. This meant heavies often were left out because they couldn't get to the right location in time to affect the outcome. We believed that the far more numerous, general-purpose medium tanks would provide more variety, more enjoyment, and more understanding of what average tankers faced in 1944.

This simulation uses an advanced version of the 3D display system pioneered in our earlier product *iM1A2 Abrams*. Most significantly, *iPanzer '44* supports up to 65,000 colors, while *Abrams* only supported 256. We hope that the subtler shading provides a better sense of contour and depth, addressing one of the largest problems suffered by users of that earlier technology. Still, both simulations have stressed realism over "eye candy." Many games achieve more attractive terrain and vehicles but are obliged to limit your eyesight to a mere 500 to 1,000 meters. While this may be an appropriate range for tanks that prefer close-in fighting (like the M4 Sherman), you really need to see at least 2–3 kilometers to appreciate the tactical variety and richness possible in this era. For example, proper use of the Nashorn involves "shoot and scoot" tactics at the longest possible range. If you're in the middle of a 500 meter dogfight, a Nashorn is probably worse than a Marder!

Supporting realistic and tactically meaningful visibility ranges also puts great stress on the 3D display system. To maintain reasonable speed on current PCs, a software-based display system *must* simplify ground terrain details at longer ranges. However, objects such as tanks or smoke screens remain in their correct locations, which can cause some to appear floating above or sunken below the simplified ground. Using a high-capability 3D hardware accelerator, selecting 3.x visibility in advanced configurations eliminates this simplification. Be warned, however, that this also places a serious load on the computer itself, so

even with hardware acceleration the 3.x option may not be the best choice for everyone.

Data research was another challenging aspect of this project. Very few sources agree about anything beyond the most rudimentary facts. The information here represents judicious use of multiple sources and various personal libraries. One example is armor penetration. Some books list penetration at a 30 degree angle (where the shell is 71% effective, at best), while others use a perpendicular angle. Even actual tests conflict because barrel wear, ammunition quality, and weather conditions, not to mention human error by the testers, all affect the results.

Finally, we decided to recreate tank combat and tactics without consideration for the politics of the era. Rhetoric goes out the window when shots are fired, and in the case of armored combat, this was especially true given the teamwork needed to make a tank function smoothly. While we had no intention of white-washing any history, many people still feel strongly about the philosophies espoused by the various nations involved in the war. *iPanzer '44* focuses on what it took to be a tanker in the era and tries to reflect the mentality that surrounded American, German, or Russian soldiers at the time. There is no intent to promote or support any political viewpoint or interpretation.

With this in mind, we used a historical context as the foundation upon which we've built this simulation. The campaigns are drawn from the actual events and divisional movements of the time. With a bit of luck, you can accurately restage the actual sequence of events, or make your own decisions and see what happens. As in real war, however, no one campaign wins or loses an entire war, and that is a part of our simulation as well.

In the end, it is our hope that we have captured this spirit and accurately conveyed the sense of awe inspired in us by World War II and the era's tanks. We had a tremendous amount of fun creating this simulation and hope you enjoy it.

James "jafo" Flores
February, 1998

15 Credits

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<i>MythOS™ 3D Engine</i>	Dan Higdon, Tim Little, Paul Masters, Chuck Walbourn

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Joining the WarBirds Community

"BREAK LEFT!" Your wingman's voice comes through your radio just as enemy slugs tear through your right wing.

You yank your Corsair into a steep, climbing turn. A glance over your left shoulder, and you see an enemy KI-84.

"OK, Frank," you mutter to yourself, "let's dance."

Welcome to WarBirds! Since being created in early 1995, WarBirds has received praise from editors around the world and strong support from a growing community of players from more than 70 countries. As *PC Gamer Magazine USA* recently noted, "WarBirds is the biggest, baddest online flight sim ever."

iMagic Online has a full-time tech support staff and dozens of trainers/players that are eager to welcome you to the WarBirds community. If you ever have questions about WarBirds or iMagic Online, please call (817) 424-5638. See ["Training & Tech Support Is Available" on page W-2](#) for information about our tech support and training staff.

The Ultimate Flight Simulation Experience

You may have tried flight sims, but have you ever flown against *real* opponents? Hundreds of them? From all over the world? That's what WarBirds is all about. Hundreds of pilots simultaneously battling it out over the Internet. No artificial intelligence.

No saved games. No cheat keys. Nothing but human-against-human competition.

Sound intense? You bet. If you're up to the challenge, you owe it to yourself to find out why *PC Games* magazine has named WarBirds the best online game for two straight years.

Training & Tech Support Is Available

WarBirds has its own training staff. If you're new to flight sims or a vet who simply wants to polish up some skills, log into the training arena while the trainers are online. Check out our website (www.imagiconline.com) for our training schedule (or send email to trainers@imagiconline.com).

You can also identify trainers when they are flying because they have equal signs ("=") in their handles. Always feel free to ask them questions if you catch them online.

Tech support: If you visit our website, you will see a listing of frequently asked questions (FAQs) that cover most of the basics in the game. At our tech support page, there is an easy-to-use email form for sending tech support questions to our staff. Remember, you can always call us at (817) 424-5638.

Getting More Information

This brief summary only scratches the surface about WarBirds. More complete information can be found in our online help file, which is accessible from within the WarBirds game.

The Web, however, is probably the best source of information about WarBirds. There is plenty of information about WarBirds on our website (www.imagiconline.com), and there are hundreds of other websites dedicated to WarBirds. You'll find links to many of them at iMagic Online.

Getting Started: Installing WarBirds

The WarBirds software is on the CD-ROM for the Interactive Magic game you just bought. Put the CD in your computer and select the **Online Games and iMagic Web** button. Next, select **Online Games**, and then select **Install WarBirds**. After WarBirds is installed, select the **iMagic Online Gateway** button.

Hardware Requirements

- Microsoft Windows 95
- Pentium 120 MHz or faster (some players have reported acceptable results with a Pentium 90)
- 16 MB RAM
- Joystick
- Sound card
- Modem (for online play)
- Internet connection (for online play; Internet software may also be included on your CD-ROM)
- Microphone (required only for voice communication during online play)

Check Ride (Flying Offline)

Joystick Setup

WarBirds uses the standard Windows 95 joystick routines. If you've already set up a joystick in Windows 95, you're ready to go. If you haven't set up your joystick, consult the documentation that came with your joystick.

Practice Makes Perfect

An iMagic Online folder was created when you installed WarBirds. This folder is accessible from the **Start** button in Windows 95. Go to the WarBirds submenu inside the iMagic Online folder and select the **WarBirds** icon. Press the space bar to skip the credits. A new menu is displayed. Select the **Offline** button.

Selecting the Flight Mode

WarBirds has two flight modes, easy and full realism. In easy mode, you won't experience spins or blackouts. However, your plane will not be as responsive as it would be in the full realism setting. To select your flight mode, select the **Setup** button and then choose the **Flight** tab. You'll be flying in easy mode if the **Easy Flight** box is checked; otherwise, you'll be in full realism mode. Close this window before advancing to the next step.

Selecting Your Plane

Select the **Select** button and choose the **Plane** tab. As you can see, there is a wide variety of planes to choose from. Some planes are much more difficult to fly than others. Spitfires and P-38s are all relatively forgiving and excellent planes for new pilots.

Take to the Skies

Let's start off on a runway. Select the **Setup** button and choose the **Flight** tab. Go to the **Starting Altitude** field and make sure it shows "0."

HINT: In offline mode, you can start in the air by changing the number in the **Starting Altitude** field.

Select the **Fly** button. This should put you on a tarmac. Start your engine by pressing the **e** key. If this is your first flight, press the **F12** key. This sets the Windows 95 joystick information with the WarBirds software. You only need to do this after you've recalibrated your joystick or installed a new joystick.

Taking Off (Easy Mode)

After starting your engine, you can throttle up by hitting the **=** key.

HINT: The number **0** key automatically takes you to full throttle. When you hit 120–150 mph, pull back on the stick, and you're off. Pull up your gear (**g** key), or your plane will fly with all of the grace and maneuverability of a barn.

Taking Off (Full Realism Mode)

Your plane should be sitting in a revetment or hangar. Start the engine (**e** key) if it isn't already running. You'll need to taxi out to the runway. Throttle up slightly using the **=** key. Steer the plane with the rudder controls (**a** key turns the rudder left, **d** key turns the rudder right, and **s** key centers the rudder). If you've selected a single-engine fighter, you'll notice in most cases that the plane pulls to the left. This is because engine torque is modeled. When you reach the runway, throttle up to full power and use the rudder to keep centered on the runway (you'll notice that the torque effects are reduced as you gain speed). When you hit 120–150 mph, pull back the stick, and you're off.

Practice

Fly around. Get used to the flight model. Try some different planes. You'll notice that they all feel different, especially in full realism mode.

You'll notice that there is a plane flying above each of the fields. These are target drones. You can't shoot them down, but you will see sparks when you hit them. This allows you to practice your gunnery. You can also strafe the buildings and other ground targets. They will blow up!

Landing

Line up with the runway. Throttle down to an airspeed of about 120 mph. If you're flying faster than that, you'll come in too fast for a safe landing; less than that, and you may stall and fall out of the sky before reaching the runway. Lower the landing gear by pressing the **g** key. Lower your flaps by pressing **Shift+q**. As you approach the beginning of the runway, throttle all the way back. Just before touchdown, gently pull back on the joystick, raising the nose of the plane just enough for you to see the horizon below your gun sight. When your tires screech on the tarmac, press the space bar to engage the wheel brakes. After you come to a complete stop, select the **Exit Plane** button.

The Show (Going Online)

WarBirds And Flying Over the Internet

WarBirds uses communication tools in Windows 95 to connect to the Internet. If you've got a connection to the Internet, fire it up, and you're ready to roll.

Join iMagic Online

In order to play WarBirds on the iMagic Online MEGApayer™ server, you must have an iMagic Online account. As you are installing the iMagic Online gateway/launcher, follow the easy instructions to join.

If you'd rather create an account over the phone, call our offices at (817) 424-5638 between 10:00 a.m. and midnight (Eastern) on weekdays.

Connecting to the WarBirds Server

After connecting to the Internet, fire up your web browser and go to the iMagic Online web site. After going to the WarBirds page, select the **Play** button, and you can then jump into a WarBirds arena.

NOTE: You can also connect to the server directly from the WarBirds software. After you've connected to the Internet, start the WarBirds software and select the **Online** button. You'll be connected to our server. Many people visit the WarBirds web pages regularly to learn about upcoming events and new WarBirds features.

Choosing an Arena

Once you've connected to our server, you'll see a menu of available arenas. As a new player, you'll probably want to select the Relaxed Realism arena (easy mode only) or one of the Main arenas. The other arenas are generally used for special events.

Selecting a Country

There are four countries in the WarBirds universe: red, green, gold, and purple. When you are in the Tower, you can choose which country you want to fly for by selecting the **Select** button and choosing the **Field** tab. If you don't choose a country, the iMagic Online server will choose one for you. You can change countries once every 24 hours (sometimes you can change more frequently).

Finding Your Friends (And Foes)

Assuming the enemy has not knocked it out, your airfield has rudimentary radar. While in the tower, you can look at the map (select the **Select** button, then the **Field** tab) to see nearby air-planes. Dots of your country's color are friendly; other colors are enemies. If you want to start near a fight, select a field (it must be your color) near a high concentration of dots. Radar will not be available to you in flight.

While flying, you'll need to know who your enemies and friends are. When you see a plane in flight, it will have an icon and numbers above it. The color of the icon is the player's country color.

NOTE: If you forget what country you're flying for, look at your gun sight. It's drawn in your country's color.

The icon above a friendly plane is the player's handle. The icon above an enemy plane tells you the type of plane you're up against. The numbers under the icon tell you the distance to the other plane in hundreds of yards. Thus, if the number is 10, the plane is 1,000 yards away.

NOTE: Your guns have a maximum effective range of 1,000 yards. Never shoot at a plane that is farther away. You're better off waiting to fire until the plane is 500 yards away, or less.

Shoot only enemy planes. If you shoot a friendly plane, the damage will actually occur to your own plane.

Communicating

Communicating with other WarBirds pilots is one of the best parts of the game. There is a text buffer (place for printed text) inside the WarBirds game. The text buffer, or radio, is the primary means of communication. The radio provides information from the game server and allows players to talk to each other.

The radio is a very powerful and flexible tool, but in this quick introduction to WarBirds, we'll focus on communicating with players in your own country.

First, you want to tune your radio to your country's frequency. Bring up the radio control box by selecting the **Radio** button. At the right side of the control box, there are four smaller boxes (these are your radio presets). Let's tune preset 1 to your country's frequency. There should be a 3-digit number in the box; this is the frequency number. The frequencies for the different countries are:

- Red—101
- Green—102
- Gold—103
- Purple—104

If the preset is already tuned to the right frequency, you're ready to go. If it's not, select the box and type in the proper number. If you have forgotten what country you're flying for, look at your gun sight, which is in your country's color.

To broadcast a message to all players, bring up the radio control box (it's already open if you've been following along with these instructions). Make sure preset 1 is selected. Next, click within the text box to the left (so the cursor is highlighted), type a message, and press **Enter**.

Your message should appear in the text buffer.

HINT: You can quickly open the radio box and select preset 1 by pressing the / key.

If it didn't, make sure you have preset 1 tuned to your country channel.

Voice communication with up to three other players is also available in WarBirds. For more information on voice communication and for a complete explanation of the radio functions, see the WarBirds help file inside the game.

Netiquette

Going online for the first time is a lot like being the new kid in school. You don't know anyone, you don't know the rules, and you feel a bit intimidated. That's natural. You're playing with real people, and that's something very few of us have done when it comes to computer games. Here are a few tips.

First and foremost, it's OK to be clueless. Every person that's ever played WarBirds was a "newbie" at one time. Despite the fact that most WarBirders are intent on destroying each other, they're a rather congenial lot. If you have a question, ask. You'll be surprised by the number of players that are willing to lend a helping hand.

Human nature being what it is, you may sometimes encounter people who gloat over your defeats, brag about their prowess, or broadcast insulting remarks. The technical term for such an individual is "jerk." The player community usually handles the occasional miscreant; however, if a person is truly abusive, let us know about it. We want to make sure that the WarBirds world is a fun place to visit.