Combat Mission
AFRIKA KORPS
Game Manual

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"In Africa, for the first time I saw the loneliest and most ominous of all landscapes, a battlefield."
- Major-General Matthew B. Ridgway

The Basics

Combat Mission: Afrika Korps is a tactical WWII combat simulation set in a true 3D environment. Players issue orders in turns and then see the action executed in real-time. It simulates battles in the Mediterranean theater of operations, including North Africa, Italy and Crete, between 1940 and 1945. From the sweeping deserts of Libya to the mountainous Gothic Line in Northern Italy to the islands of Crete and Sicily, CMAK allows you to recreate some of the most fierce ground battles of World War Two.

Combat Mission: Afrika Korps (CMAK for short) allows the player to lead the soldiers of ten nationalities (USA, Germany, Italy, Britain, Canada, Australia, New Zealand, South Africa, Poland, and France) into battle, using historical Tables of Equipment and Organization (TO&E), surroundings, and combat results. Combat Mission is not a video game. It requires thoughtful strategy and tactical skill to overcome the enemy while preserving one's own forces and achieving the mission objectives.

Playing the Game

The basic game engine is simple. Both players issue their orders in the Orders Phase. The game is paused and players can take as much time as they like to plan their actions and issue orders.

After giving orders to their units, players click the GO! button. The computer calculates the Action Phase, 60 seconds of real-time combat, based on both players' orders. After the calculation (usually between a few seconds for small engagements up to a minute or more in extremely large battles), the Action Replay begins and the simultaneous action in real time plays out on the screen. Players have no influence at this stage on the results of the orders they have given, but the player is not just a spectator. Instead, the player can move around the battlefield while the action unfolds using the virtual camera to zoom, pan, and move up and down. Doing this is an important part of the game, as it reveals a lot about the actions of the enemy and is vital for future planning.

The Action Replay can be reviewed an unlimited number of times to make sure no important event is missed. After the Action Replay is ended, by clicking on the DONE button, one game turn is completed and the next turn begins with a new Orders Phase.

The game ends when the turn limit for the given scenario has been reached, or a mutual cease-fire is agreed to, or one side has surrendered (sometimes forcibly, when casualties are extreme).

The "We go" Principle

Combat Mission's game principle is based on simultaneous execution, or simply "we go", a hybrid system of turns and real time. Players issue their orders during the paused Orders Phase simultaneously, and then watch the unfolding action. Players are not allowed to interact with their forces during the real-time Action Phases to prevent micromanagement of one's own troops and simulate the unpredictability and chaos of combat. In other words, players cannot change orders while they are being carried out. The player can, however, click on units to obtain detailed information about their status, change the camera positions and replay the action as often as they like.

Since both players are forced to issue orders to all of their units before they see the outcome of any unit's actions, most "gamey" aspects of "I go, you go" turn-based systems disappear. Real world

military concepts like coordination and concentration of forces, bases of fire, overwatch - just to name a few - can now be translated right into the game, with the same results, risks, and problems as in the real world. In fact, you will be forced to use them if you want to defeat the enemy.

Combat Mission is therefore not a "turn based" game in the classical sense. Instead, it might be considered true "real-time", as 1 second of Action in the game equals 1 second in the real world, unlike many other games which use "continuous time". The difference is that the action in CMAK is paused to allow for player input. We chose this arrangement because we feel it is conducive to players' development of thoughtful and realistic strategies, rather than the "click fest" that some fully "real time" games can become, where all the orders and action occur simultaneously. It is our opinion that pure "continuous time" works (very well) only at a very small scale, where there are perhaps just a few soldiers under a player's command. It does not work well at the scale of a full company or battalion, which is the level simulated by Combat Mission.

The Big Difference and some Words of Caution

In many respects, Combat Mission is just different from wargames you have played before; in others, it is groundbreaking. The introduction of a real 3D environment into a wargame has introduced elements of a true simulation, eliminating many "crutches" known from the days of classic hex-based "I go, you go" wargames. The best way to approach Combat Mission: Afrika Korps is with an open mind, not holding on too tightly to old habits you may have picked up playing other wargames.

Apply common sense and intuition and don't expect "gamey" tactics to work - no matter how successful they were in other games. Because CMAK uses real-time Action Phases, you won't be able to observe the results of the action of one unit before having to order another one to do something. You will be forced to plan ahead, use timing, suppression fire, feints and flanking attacks to survive, let alone to win. When planning your moves, think about what would work in the real world, not what would work in "game".

Getting Started

How to Install the Game

Computers Running Windows

1. Insert CD-ROM into your computer's CD-ROM drive
2. Double-click "Setup.exe" (sometimes just listed as "Setup")
3. Follow the on-screen instructions

Computers Running MacOS

1. Insert CD-ROM into your computer's CD-ROM drive.
2. Double-click "Install Combat Mission"
3. Follow the on-screen instructions

Starting Up the Game

Computers Running Windows

1. Make sure your Combat Mission CD-ROM is in your drive
2. Click on the Start Menu
3. Select "Programs"
4. Go to CMAK directory
5. Select CMAK program

Computers Running MacOS

1. Make sure your Combat Mission CD-ROM is in your drive
2. Locate the CMAK folder (installed, by default, in the same place as your System Folder)
3. Double click on the CMAK application

Starting Options

Play Game - Allows you to start a new battle (including a randomly-generated Quick Battle) or operation and to load a saved game

Join Multiplayer - Allows you to load a PBEM file from your opponent or play via TCP/IP

Scenario Editor - Opens the scenario editor, in which you can create your own maps, battles and operations

Exit - The Exit button brings you back to your Desktop. You'll hardly ever use this one!

The following section will explain, briefly, all the needed steps to start a game, for those impatient readers – chances are, that means YOU!

Play Game

Select a battle, saved game, or operation you want to play from the Load Window or start a new randomly generated Quick Battle Scenario with a few mouseclicks.

The Load screen shows you all available battle and operation files in the "Scenarios" folder of the Combat Mission directory.

In the upper right corner of the screen, you can toggle the display to Battles or Operations. Battles are the standard Combat Mission scenario type. Operations are a series of Battles spanning a couple of hours or even a few days of simulated time (some people might call them "short campaigns").

The top entry in the window is Quick Battle, which allows you to randomly generate a Do-It-Yourself scenario. Below that, you will

find entries for any previously saved games (none if this is the first time you enter this screen).

Following that you will notice all the scenarios available, including those that come with the game CD as well as any that you might have downloaded or created yourself.

Note: you will have to copy downloaded scenarios and operations into the "Scenarios" folder of your Combat Mission directory to make them appear on this screen.

For each battle and operation, the following information is displayed:
- name
- length (number of turns for battles, and number of battles for operations)
- size (tiny, small, medium, large, and huge), depending on the number of units in the game
- a short description of the engagement
- two icons representing the two main opposing forces (in scenarios with a mixed force the icon shows the bigger force)


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1    2    3    4   5    6   7    8   9   10  11   12  13   14  15   16
```

The nation and force symbols in CMAK - from left to right:

1. Wehrmacht, 2. German Mountain "Gebirgsjäger", 3. SS, 4. Luftwaffe Airborne, 5. German Ski, 6. Italian, 7. US, 8. US Airborne, 9. British, 10. British Airborne, 11. Canadian, 12. Australian, 13. New Zealand, 14. South African, 15. Polish, 16. Free French

GO BACK allows you to return to the main game screen, while PLAY SCENARIO opens up the GENERAL BRIEFING screen to give you a more detailed description of the selected engagement.

Scenario Briefing

Describes the battle/operation background and gives an idea what the battle/operation is all about.

Down Arrow - Scrolls the text down (if longer than one window length)

Up Arrow - Scrolls the text back up

Cancel - If you don't like what you read, click on cancel to go back to the main screen.

Continue - Click on it when finished reading to play the battle/operation.

Choose Side & Game Options

This screen allows you to select which side you want to play - Allied or Axis - by clicking on the appropriate button. Besides that, you can also set a number of options to customize the scenario.

Fog Of War

None - enemy units are visible all the time and detailed information is available for all of them.

Partial - enemy units are spotted only when one of your friendly units has actually spotted them. However, the enemy unit positions and details are always identified correctly and revealed to the player immediately.

Full - enemy units are spotted only when one of your friendly units has actually spotted them. Detailed information about the spotted enemy will be revealed only after it becomes available, such as after the enemy has closed to within a certain distance of your forces and has been under observation for some time.

Extreme – same as full, but it is a lot more difficult (more realistically so) to properly identify enemy units, and there is generally less information available than in Full mode.

Computer Player Setup

Free to place units - the computer can place its defending forces as a human player would, within the restrictions of the setup zones predefined by the scenario designer.

Stick to scenario default - the computer player can not move its forces during setup and will instead leave them as preset by the scenario designer.

Computer Experience Bonus

For an added challenge the Experience level of the computer player's troops can be increased up to 3 levels above the scenario designer's settings. For example, if the computer player has one Green and two Regular platoons a "+1" setting would change that to one Regular and two Veteran platoons.

Play Balance

Play Balance lets you set a handicap for battles (not available for Operations) by assigning extra units to one side. Choices range from "No change" to "+200% troops". The percentage value determines how many extra troops are added to a given side. If the scenario allocates 1000 points to a side and the handicap is set to +100%, then that side will start the game with 2000 points. The computer automatically adds extra troops, of the same types that are already included in the battle, to the side selected to receive them. This means that if a scenario only has Panzer III tanks, no other tanks other than Panzer III are added - if any. When several types of units are in scenario, the game randomly chooses which ones to add.

After selecting the side you wish to play and the options, you can choose which type of game you want to play.

Choose Game Type

Make your selection and click on OK to proceed. The two screens that come next allow you to choose the following options

Single Player - Play a single player game against the computer.

Hotseat - Two players can play on the same computer in hotseat mode.

EMAIL - Start a Play-By-Email-Game (PBEM)

TCP/IP - Host a game over the Internet

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Command Briefings - Gives you a detailed description of your forces, mission and objectives. This screen is specific to the Axis or Allied side which you've chosen.

Down Arrow - Scrolls the text down (if longer than one window length)

Up Arrow - Scrolls the text back up

Continue - Click on it when finished reading to play the battle/ operation.

Password (Hotseat, EMAIL and TCP/IP PLAY ONLY) - When playing against another human opponent, the game will now ask you for a password. Enter the password and click on OK. This brings you to the 3D battlefield map.

"Didn't we meet at Cassino?"

The Interface

Understanding how to navigate around the 3D battlefield of Combat Mission: Afrika Korps is essential for playing, enjoying and winning the game. The following sections give an overview of how the "game interface" of Combat Mission: Afrika Korps is structured, and how it can be used to obtain information, and navigate and interact with units, terrain and game elements.

The main goal when designing the interface was to keep all information at the player's fingertips, without cluttering the screen. Obviously, with a tactical wargame of the scope of Combat Mission, with sometimes hundreds of units on the map at one time and the terrain being depicted in 3D, understanding the interface is essential. We have tried to keep the interface as intuitive as possible, while providing as much detail as a player would want (and – to be honest – far more than any real life commander during WWII ever had at his disposal).

Information

The main part of the interface is the 3D battlemap, where players can watch and interact with their units. The main info panel is located at the bottom of the screen, and it displays various information depending on what the player has clicked on the battlemap. With no unit selected, the "global info panel" shows general information about the battle in progress.

Global info panel

The default display for the main info panel is the global information about the current battle, as shown above.

1 – This part of the global info panel shows the two main nations pitted against each other with flags, as well as a symbolic display of who is attacking (arrow) and defending (box with shield). In meeting engagements, both nations display an arrow.
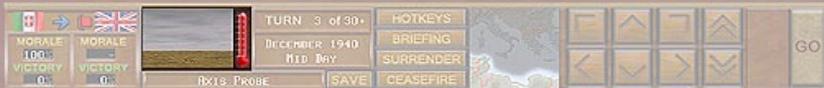
2 – The environmental screen shows a visual depiction of the weather and ground conditions as well as temperature. Moving the mouse cursor over this screen displays the exact settings including wind.

3 – The "timer", indicates the duration of the battle in minutes and how many have already been played. A "+" following the duration number indicates a variable ending to the battle, ie. the battle can take a variable number of minutes longer than the number

indicated, depending on whether victory flags change hands late in the game.
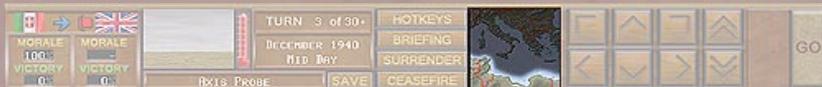
4 – This map shows the Mediterranean theater of operations and, highlighted, the geographical region where the current battle is taking place.
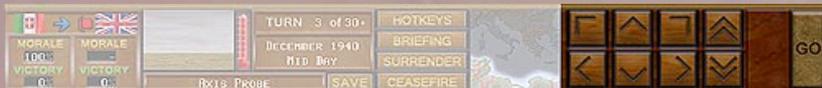
5 – The camera control buttons are used for navigating around the battlefield, and are explained in the next chapter - "Navigation".
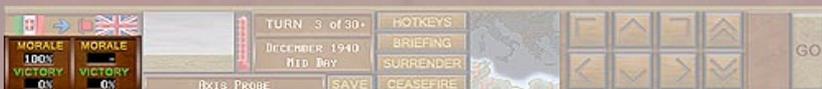
6 – The "Global Morale" screen shows the cohesion of your forces. Your units start out with 100% most of the time, and the global morale deteriorates as your units take losses, panic and rout. The lower this number, the higher the chance that your units will surrender to the enemy.

7 – The "Victory" indicator gives you a general idea of how you are progressing in the battle. It is by no means exact (and can be quite deceiving sometimes), as it is based only on what you "see", and unspotted enemy units are not taken into account.
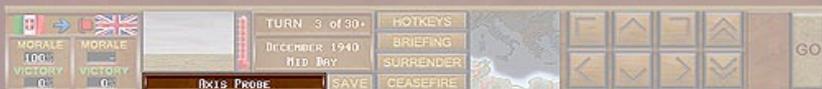
8 – The name of the current battle. For Quick Battles, the type of battle is shown here.

9 - The time and date of the current battle.

10 – These buttons let you quickly access some important game features, like the hotkey list and your briefings for the current battle. You can also save an ongoing game, surrender to the enemy or offer a ceasefire by clicking on the appropriate button.

Unit info panel

The global info panel is visible at all times when you have not selected any unit on the battlemap. As soon as you do, the info panel reverts to the "unit info panel" as displayed above. The layout and information contained here are different from the global info panel and give you general information about the selected unit.

1 – Unit portrait, changes depending on nation and unit type.

2 – Headcount, shows active unit members (beside the helmet) and inactive casualties (beside the red cross)

3 – Shows the rank, name, ID and type of the selected unit.

Every unit on the map has its own unique ID tag. CMAK uses a fairly straightforward system, similar to common military classifications, to help players identify their units.

All independent teams (i.e. specialists like tank hunters, flamethrowers, machinegunners, but also anti-tank guns and the like

not attached to a specific platoon or company) are numbered, starting with "team 1, ind.", then "team 2, ind." and so on.

All independent vehicles (i.e. not attached to a vehicle/tank platoon) are numbered, starting with "vehicle 1, ind.", then "veh. 2, ind." and so on.

Vehicle and tank platoons have one tank/vehicle serving as the HQ/command tank. These are numbered "HQ, 1 Plt.", then "HQ, 2 Plt." and so on, with each vehicle in the formation being numbered "1 Veh. 1 Plt.", then "2 Veh. 1 Plt." or "1 Veh. 2 Plt." and so on.

Battalion HQs are always shown as "HQ, ind." and are not numbered (although their respective companies are, i.e. the first company of the second battalion would be, for example, "E company", not "A company".)

Company HQs are numbered, starting with "HQ, A Co.", then "HQ, B Co." and so on. If more than 26 companies are on the map, they will be numbered "27 Co.", then "28 Co." and so on.

Platoon HQs are numbered depending on the company they belong to as "HQ, 1 Plt. A Co.", then "HQ, 2 Plt. A Co." or "HQ, 1 Plt. B Co." and so on.

Squads are numbered, depending on the company and platoon they belong to, as "1 Sqd. 1 Plt. A Co.", then "2 Sqd. 1 Plt. A Co." or "1 Sqd. 2 Plt. A Co." or "1 Sqd. 1 Plt. B Co." and so on.

4 – Info field, is used to show various (re-)actions of the selected unit. These include:

Reloading - some weapons take a relatively long time to reload. While a unit is reloading, be it a Gun or Tank, it cannot fire its main gun, although secondary weapons (e.g. bow-machineguns for tanks) can be fired.

Taking Cover - the unit is facing heavy incoming fire and is making use of suitable cover near its current position.

Bogged - vehicles can bog down in unfavorable ground conditions like mud, snow or soft ground. Vehicles with high ground-pressure ratings are more likely to bog down. Bogged vehicles might be able to free themselves, but also can become permanently immobilized.

Immobilized - not able to move or rotate. This can happen to tanks that take a hit in the tracks or engine or that throw a track due to bogging. Heavy weapons teams which do not have enough men left to move their gun and ammo can also become immobilized.

Shocked - vehicle crews may become shocked when one of their crew members is hit (e.g. the tank commander is shot in an open hatch). Shocked vehicles do not respond to orders for a while and are also less likely to spot enemies while they're shocked.

Eliminated - when the last man of an infantry unit becomes a casualty, the "eliminated" tag is displayed and a soldier's body is shown at the location where the last man fell.

Abandoned - a gun or vehicle may be abandoned either because the crew routed or has been wiped out, or because it has sustained progressive heavy damage (like a tank losing its main gun and being immobilized). Abandoned vehicles may be recovered and repaired during operations, but are considered knocked out for game play purposes during the course of a single battle.

Knocked Out - a vehicle which has suffered major internal damage, and is now combat-useless, forcing the crew to bail out.

Setup - after a Gun has been moved (or transported), it might need to deploy first before being able to engage targets. This status will be displayed here, together with an estimate of how long it will take to prepare the weapon for firing. Some weapons take so long to dismount and setup (an hour and more), that they cannot be moved in CMAK once deployed during the setup phase.

Time - only applicable to artillery spotters, this gives the estimated time that it will take before an artillery strike arrives on the specified target. "Time" is also shown between each "wave" of an ongoing artillery barrage, showing the time it takes between each

volley to reload (and/or readjust) the guns of a battery. Depending on caliber and type (e.g. rockets can take a long time to reload between volleys), this can be a few seconds to several minutes.

5 – The terrain picture shows the current unit location and "stance" (eg. Running, advancing, sneaking). Embarked units show no terrain picture. Buttoned units (ie. armoured vehicles and tanks) display "buttoned" in this window. Ski units also indicate use of skis here.

6 – The camera control buttons and the GO button are explained in the next chapter.

7 – The command section shows if a unit is in command (green light) or out of command (red light). For HQ units, which never can be out of command, the leadership abilities (when better than 0) are shown here: Heart symbol – Morale, Star symbol – Command, Lightning bolt – combat; Question mark – stealth. Framed symbols indicate a +2 (exceptional) rating.

8 – The fitness indictor shows the overall physical condition of a unit. Vehicles do not have this indicator.

9 – The experience indicator lists the experience of the selected unit, ranging from Conscript to Elite.

10 – The ammo indicator lists the available ammo for a unit (measured in "bursts" for small arms or individual rounds for ordnance). For small arms ammo, a small bar on the right gives a quick indication of how much ammo a unit has used from the original allotment as the green bar decreases. For heavy weapons like tank guns or howitzers, each type of round available is listed with a short abbreviation. These are:

he - High Explosive (HE)
ap - Armor Piercing (AP)
hc - Hollow Charge or Shaped Charge (HEAT)
c - Canister
t - Tungsten core (HVAP, APCR, APDS, SVDS, or PzGr40)
s - Smoke
Multi-gun vehicles only:
h7 - High Explosive (HE) for the 75mm gun (for example)
a7 - Armor Piercing (AP) for the 75mm gun (for example)

11 – The suppression indicator changes when a unit comes under fire and becomes shaken, pinned, or broken. Once broken, a red light on the right of the indicator shows that the unit has been permanently "rattled", and will tend to panic more quickly for the remainder of the battle.

12 – This screen shows any special equipment an infantry unit might have. Each icon represents one "round", except for handgrenades with are depicted at a ratio of 1 to 5 (1 icon equals 5 handgrenades). For heavy weapons and vehicles, a picture of the weapons or vehicle is shown, together with (if applicable) the caliber of the main gun and a graphical representation of the armor protection.

The various bars represent front armor for (from right to left, top to bottom)

Front superstructure/turret, upper hull, lower hull

Side superstructure/turret (above the tank graphic), upper hull, lower hull

Rear superstructure/turret, upper hull, lower hull

If a unit has no armor on a particular spot, the bar is black. Otherwise the armor protection is color coded ranging from dark blue (best protection) through green (good protection) to yellow (medium protection) and red (weak protection). The armor protection takes into consideration thickness, slope and even features like curved armor, face-hardened armor etc., and enables the player to quickly judge the strong and weak points of his armor.

13 – The weapon slots show the various weapons a unit has at its disposal, including rifles, machineguns, main guns, pistols and more. The number beside the picture of the weapon indicates how many of each weapon are possessed by the unit (for infantry small-arms units), and how many rounds of ammo each weapon has available (for heavy weapons and vehicles).

More detailed information about each unit can be further accessed by selecting a unit and pressing the ENTER button. This opens the "detailed unit info window" within the battlemap area. The detailed unit info window is described in THE UNITS section of this manual.

Navigation

The Navigation Buttons

The main user interface at the bottom of the screen has a number of buttons on the right hand side. The arrows on these

buttons indicate the direction - right, left, forward, and backward - in which the camera moves when you click on them. You can also rotate the camera left or right using the curved arrow buttons. Finally, using the up and down arrows you can adjust the camera's height in nine steps (or view levels), from a "ground view" (level 1) to a "birds eye" top-down view (level 9).

The Mouse

You can also use the mouse to navigate. If you move the cursor to the top of the screen, the camera will automatically move forward. If you move it to the lower edge of the screen, the camera will move backward.

The UPPER RIGHT and UPPER LEFT edges ROTATE the camera right and left respectively, while the LOWER RIGHT and LOWER LEFT edges MOVE the camera left and right. Holding down the SHIFT key and moving the cursor to the right or left edges will MOVE the camera left or right also (instead of rotating).

Moving your mouse cursor into the UPPER left and right CORNERS of the screen will rotate the view to the right and left, respectively, while moving FORWARD. Moving your mouse cursor into the LOWER left or right CORNERS of the screen will MOVE the camera back and to the right or left, respectively.

Viewing levels (height), however, cannot be changed with the mouse in this manner (you need to click on the navigation buttons to do that, or use the keyboard).

The Number Pad

The number pad mimics the main user interface buttons.

7 - rotate left
8 - move forward
9 - rotate right

4 - move left
2 or 5 - move back
6 - move right

The + and - keys on the number pad change the view levels up or down, respectively.

View Levels

The view levels (the "camera" positions) can also be accessed through hotkeys. The numbers 1 to 9 on the keyboard (not the number pad) switch to the respective view level, with 1 being ground view and 9 being the highest top-down view.

Map "Jumps"

If you want to "jump" quickly from one point on the map to another, simply hold the CTRL-key and left-click on the map location you want to move to. Your viewpoint (the "camera") moves immediately to the new location. This is a great feature especially for large maps if you need to jump quickly from one edge to another.

If you hold CTRL and left click on a unit instead of a map location, the map view will automatically jump to that unit AND "lock" the view behind it - see "locking the view".

Fine-Tuning Camera

The four arrow keys on the keyboard can be used to fine-tune movements forward, backward, left or right. They move the camera much more slowly than the navigation choices described above. The , and . keys can be used for fine rotation left and right, respectively.

"Locking" The View

You can also "lock" the camera behind a particular unit and follow it as it moves on the battlefield. Simply select a unit (by left clicking on it) and press the TAB key. The camera now moves and rotates along with the unit. Holding CTRL while left-clicking on a unit works the same way as using the TAB key.

You can switch view levels while the camera is locked, from a "shoulder shot" to a top-down view. You can also rotate the camera while staying "locked". This allows for some great screenshots and action playbacks, especially with moving and firing vehicles.

You can also deselect a unit after the camera has been "locked" to it by clicking anywhere on the map. This does NOT break the lock. You can even select other units without breaking the "lock", as long as you don't press the TAB key, or move the camera. As mentioned, ROTATING does not break the lock.

Zoom

The [and] keys toggle zoom, much like a telephoto lens. Five settings are available: 1x, 2x, 4x, 8x, and 16x. Note that this distorts the perspective of scale to some degree the higher the magnification. Also note that at 16x zoom it is NOT possible to select units by left-clicking on them!

Scaling Units

A feature especially useful for trying to get a quick overview of the battlefield is CM's scaling option. It allows the graphical enlargement of friendly and enemy units to make them more easily viewable from greater distances. Scaling has no effect on the game's internal calculations no matter how big or small a unit looks on the screen. This is merely a visual aid for the player.

Scaling can be toggled by the hotkey combination SHIFT-C. Scaling is dynamic, i.e. units further away are scaled more than units closer by.

Action Replay

During the Action Phase replay, the player has the ability to rewind and replay the action as often as he likes. The playback controls are located in the lower part of the screen, on the right side of the main user interface and the navigation buttons.

The playback controls work just like the controls of your VCR. There are buttons for PLAY (to start the replay), FULL REWIND (to reset the movie to the beginning), REWIND (10 seconds), and FORWARD (10 seconds). To rewind or forward the action move in 2 second intervals (instead of 10), hold the SHIFT key while clicking the respective buttons. Additionally, once you hit the PLAY button it changes into a PAUSE button, allowing you to stop the replay at any time.

Once the action plays back completely the first time, the DONE button appears under the VCR controls and starts blinking. You can still rewind and watch the action as many times as you want (exception: see TCP/IP play and "timer" function). Once you're finished, click the DONE button. This ends the Action Phase and brings you to the beginning of the next turn's planning phase.

Interaction

Selecting Units

Click

A unit can be selected in three ways, the easiest being to left-click on it. A yellow frame then forms around the unit and its details are displayed in the main user interface at the bottom of the screen.

Scroll

Alternatively, you can also use the + and - keys on the keyboard (not the number pad) to jump back and forth between your friendly units. The units are selected in order of their ID numbers.

Order Line

You can select units (once they have been ordered to move) by clicking on their movement order line (does not work with fire orders). This is great when you quickly want to adjust the final destination of a unit's movement order, as you don't have to first go back to that unit and click on it to select it.

Group Select

When a lot of units are on the map you can speed up issuing orders, or quickly move formations around during the Setup Phase, using the group-move function. There are two ways to enter group mode:

Click and drag

Simply left-click and drag a square box around the units you wish to select. The units within this box will appear highlighted in blue, indicating that they are in "group" mode.

Formation select

By double-clicking on a platoon HQ, all of its subordinate units become highlighted. For infantry HQs, this includes any infantry teams currently within the command range of the HQ (as shown by the brown command line extending from the HQ to the unit).

If you want to add another unit to the selected group, or if you want to deselect a unit already in the group, simply left-click once on it while holding the SHIFT key. Selecting a currently unselected unit without holding the SHIFT key cancels "group" mode, and selects that new unit instead. Clicking on one of the selected units of a group without holding the SHIFT key will make this unit the "base" of your group order, i.e. all waypoints for the other units will be placed in relation to the waypoint for that unit. You will see which unit is the "base" of the group because it will be highlighted by a yellow rectangle while the other units are boxed by blue rectangles.

In group mode, members of the group can be issued the same order with a couple of mouse clicks or one hotkey. Right-clicking on any of these units brings up the group orders menu. These are the available orders for the group. However, they do not include some special orders which can be used only by some units. These orders need to be issued to such units individually (you have to deselect the group first).

The order you give for the selected unit is copied automatically for all other units within the selected group, provided they are eligible to receive that kind of order. If you give a FAST command to a group which contains units with heavy loads that cannot run, for example, they will MOVE instead. If the destination for a unit happens to be illegal (e.g. water for any unit other than an assault boat) that unit receives no order at all.

After giving a group order, the order for each individual unit can be changed, cancelled or modified. Simply deselect the group, select the individual unit, and issue orders normally.

Situation

Once in the heat of battle, keeping track of how your units are doing, where the hot spots are and which areas need your attention is important, and CMAK assists you in obtaining some of that information by providing various hotkeys which can quickly show you additional information on the battlemap.

Finding your units

Some maps in CMAK can be fairly large, and can have dozens of units on each side. In order to make sure you don't "lose" any units in the heat of battle, there are several hotkey combinations which allow you to scan the whole map quickly.

Unit (visual) scale - Shift-C

You can enlarge the visual representation of all units in the game from 0 (realistic) to +4. The default setting is +2. Units further away are enlarged more than units closer by. With this key combination, it is possible to oversee all of your units even from a distance.

Tree coverage - Shift-T

Toggles visual tree coverage on the map, from "none" to "extreme". Besides improving game performance on slower computers, toggling tree display off has the nice side effect of allowing you to spot any units in forests quickly.

Unit bases - Shift-B

Toggles display if a color "base" under each unit in bright neon colors, making it possible to spot your units from far away, even at realistic scale settings.

Weather/fog - Shift-W

Playing in dense fog on large maps can quickly cause you to lose overview. Using this hotkey you can toggle fog (and rain) "off", and get to see a nice clear map. This is a visual aid only – the fog of course remains in effect for game play purposes.

Show vehicles - Shift-V

Units embarked on vehicles can sometimes be hard to make out. By toggling vehicles off, you will be able to see any passengers riding on or in vehicles quickly. This hotkey also toggles display of pillboxes and bunkers.

Note: The key here is to combine the hotkeys in a way to achieve the result that you want. With a little practice, this will become second nature to you. For example, when you're playing on a large and heavily forested map, use Shift-T and Shift-C to quickly scan the map for your

units. When you're playing at night, Shift-B might work best (the unit bases tend to stand out due to their bright colors in the dark surrounding of the night). Finally, the + and – keys are useful for moving through your units one at a time. Quickly, you will find your most favored hotkey combinations and will be able to get the information you want when you need it.

What's going on?

If you need to know at a glance what the current battlefield situation is without having to scroll through your entire force, there are also a number of hotkeys which come in handy.

Labels - Shift-G

One of the most useful features in the game when you quickly want to know the state of your force. This option, when on, displays a "label" above each unit in anything but perfect state. You will see units running low on ammo, growing exhausted, panicking, or immobile. This will quickly give you a feel for the state of your forces, and, maybe even more importantly, "problem areas" like ambushes that require your immediate attention.

Show all moves/targets - Shift-P

This toggles four display options – all movement paths & targets OFF/ all movement paths ON / all targets ON / all movement paths & targets ON.

With "all movement paths & targets OFF", you will only see the orders for the currently selected unit. Otherwise, the movement paths and/or current target orders for ALL friendly units on the map are shown. If you want to check your "killing zones", use "all targets ON". If you want to get a total overview of what your units are supposed to be doing during the next turn, choose "all paths & targets ON" – and so on.

Show covered arcs - Shift-X

Similar to the above "paths/targets" hotkey, this toggles display of covered arcs and vehicle arcs currently set for your units. When OFF, only the arc set for the currently selected unit will be shown.

Note: the above is just a selection of the most important hotkeys available in the game to aid you in game play. More information about other hotkeys can be found in Appendix B.

"Must be a tough objective. Th' ol' man says we're gonna have th' honor of liberatin' it."

The Mission

The "goal" in Combat Mission: Afrika Korps is to beat your opponent, be it the computer artificial intelligence (AI) or another human, in tactical battle. Just like in real war, there are endless challenges that a field commander – that would be you, the player – has to face. CMAK allows you to recreate and fight an unlimited variety of battles, engagements, firefights and operations. From breaching of the heavily fortified German lines in the Italian Alps in 40 minutes of fierce action to the merciless combat in the Tunisian desert for days in extreme heat and without supply – the various settings and battle types can be tailored to reflect the required victory conditions and "flow" of battle.

This chapter describes how to start, play and win the various battles and operations in CMAK, and also shows the differences between the various types of engagements offered.

Setting up

When entering the 3D battlefield for the first time to play a game (regardless which type), you are first tasked with setting up your units for battle. This is the Setup Phase.

Setup Zones

You should immediately notice a number of colored setup zones on the map. There are up to three setup zones available for each side:

Red, White and Blue for Allies
Green, Black and Yellow for Axis

Units within such setup zones can only be moved **within the same zone** or to **another zone of the same color**. Notice that the base beneath a unit displays the same color as the setup zone it is located in. There are two exceptions:

Units with Gray Bases

Units with grey bases are located in the so-called neutral setup zone and cannot be moved at all, except into a friendly setup zone of **any** color. (Exception: Target Reference Points can be moved freely all over the map, unless "padlocked" - see below)

Units with Orange Bases

The units are "padlocked" (by the scenario designer, or sometimes automatically in between the battles of an Operation) and cannot be moved at all.
The layout of the setup zones and which units are padlocked or not, is determined by the scenario designer – or automatically by the computer for QuickBattles.

Fallback positions and digging in

Defending units usually start "dug-in" by default, ie. in foxholes. But by using the DIG IN order the status can be toggled. A foxhole texture appears under the unit when toggled on, and disappears when toggled off. The scenario designer or the type of Quick Battle played determine if units can dig in or not (units cannot begin dug-in during "meeting engagements" for example).

Vehicles can also be dug in when allowed by the scenario designer. They start off NOT dug-in, and need to be ordered to do so first during the setup phase. However, keep in mind that dug-in vehicles remain immobile for the remainder of the whole game!

Depending on the parameters set by the scenario designer or the type of Quick Battle played, the defender may be allowed to place a number of empty foxholes on the map as secondary fallback positions for his units. This is achieved by pressing the key combination Alt-F during the setup phase (which enters "foxhole mode"), then left-clicking on a desired location on the map. Clicking on an already-placed foxhole removes it from the map (and it becomes available to be placed again elsewhere).

The number of foxholes that can be placed in this way is limited to the number of non-heavy-ordnance infantry units in the game. The current number of foxholes currently available for placement is shown on the top of the screen.

Pressing Alt-F toggles "foxhole mode" on and off.

Orders for Setup Phase

During the Setup Phase, every unit (including most fortifications, like bunkers, mines, trenches or barbed wire) has a slightly different set of allowable orders than during subsequent turns. The unit-specific order menu can be accessed by right-clicking on the unit or by left-clicking and pressing SPACE. The available orders are:

Move

Move the unit within its setup zone or to another zone of the same color. After moving the unit, the Rotate order is executed automatically, which allows the player to choose a facing for the unit. By moving units onto a vehicle, the unit can embark.

Place

Same as Move, except that the facing of the unit stays the same. By placing units onto a vehicle, units can embark.

Rotate

Choose a facing for the selected unit.

Hide

Allows the player to start a unit hidden.

Line Of Sight

Line of Sight tool, which enables the player to check lines of sight from the unit's current position.

Dig In

Units can start a game "dug-in" (ie. in foxholes) or not. See also "Fallback positions and digging in" above.

Button Up

Allows tanks and other vehicles to button up (i.e. close their protective hatches) prior to game start.

Split

Allows the player to split a squad into two teams (i.e. half-squads).

Important note: to rejoin the half-squads during the setup phase, simply place one adjacent to the other within 10 m and they will automatically combine.

Activate Flag

Available only for the attacker when playing on a map with dynamic non-random flags. After choosing this order (available only to the highest HQ on the map!), you will be prompted to click near one of the dynamic flags. This will activate the flag as "real", while the other flags will be shown as "bogus". Your opponent will not know which flag is real and which not - this is visible only to the attacking side.

Cover Arc / Cover Armor

Allows the unit to set up a firing arc before the first turn.

Note: With the exception of ACTIVATE FLAG and DIG IN, all other orders are also available throughout the rest of the game and are discussed in the "THE COMBAT" section in detail.

Battles

Battle scenarios in Combat Mission: Afrika Korps represent anything from a few minutes up to two hours (120 turns) of fierce combat action on the front lines. This is the essence of "battles" or "engagements" or "firefights" that you will find described in books on military history. Reconnaissance has been done, both sides know that the enemy is out there somewhere and contact is imminent. All other questions about supplies, reinforcements and artillery allocation have been solved beforehand. Also, large-scale preparatory artillery strikes or air raids have been completed prior to the start of a Battle. In other words, CM is a TACTICAL game and does not simulate strategic, large scale military actions.

Therefore, units in single battles do not get resupplied and cannot gain experience (e.g. "rise" from regular to veteran troops), as CMs timeframe is simply too narrow for this to happen realistically. Also, do not be confused about casualty levels - CM simulates front line combat only, and casualties within heavily-engaged frontline rifle companies are MUCH higher than those for whole divisions (which is generally what casualty statistics in books represent). During WWII whole companies and even battalions were often almost totally annihilated within an hour of fierce combat, and this is exactly what you might see in CM.

Tip: Keep an eye on ammo levels, especially for longer battles. Even fully-equipped, front line units rarely carried ammo for more then 20 minutes of continuous firing, so ammo preservation (ensuring its most effective use) is an important point in this type of engagement. Close range combat, particularly under 50 meters or so, greatly increases the expenditure of ammo.

Battle types

Each Battle, custom made or computer generated, can be one of four types –

Assault – large scale assault on fortified enemy positions. The attacker usually has a clear superiority in force, but needs to overcome stiffer resistance from a heavily fortified defender

Attack – hasty attack on a dug-in but less heavily fortified enemy. The attacker usually has more forces than the defender.

Probe – both sides are nearly equal in strength, and the defender is not dug-in.

Meeting Engagement – both sides are advancing and need to take positions usually near the middle of the map.

The Battle type predetermines several important factors about a battle. For computer generated Quick Battles this spans from victory conditions, to relative force strength, to the availability of certain types of units (fortifications are not available in meeting engagements for example). For authored battles, these factors are less important (the author determines victory locations, point strengths and availability of units), but the battle type still is important for the end-game victory calculations, as it determines the "Force Readiness" feature discussed below.

Victory flags

The key to winning battles in Combat Mission are the "Victory Flags". They represent the "objectives" that both sides need to take and hold, or defend. Each flag is worth a certain number of "victory points" which are awarded to the player who controls the flag at the end of the battle.

However, unlike classic boardgames, you don't need to sit directly on top of the flag in order to control it. Instead, each flag has an invisible area of control associated with it which extends all around the flag. This "area of control" is dynamic and depends on whether the unit is able to see the flag (in which case it's about an 80 meter radius) or not (in which case it's 50m).

The further a unit is inside this circle, the more control it exerts over the flag.

The "stronger" your unit is, the more control it exerts. Strength is roughly equal to that unit's purchase cost.

In order to exert control, a certain threshold needs to be reached. A heavily depleted squad alone will not be able to revert a flag to that side's control. A full strength squad is usually enough, or a tank.

Control is NOT relative. If one side has just one strong unit in the vicinity (strong enough to reach the threshold), the other side can have 10, 20, 30 or more units in the area, but will not be able to claim control of the flag! Instead, the flag will remain contested until that one enemy unit has been decimated or eliminated.

Prisoners, ex-prisoners, forward observers, and unarmed vehicles exert no control over flags. Crews do, but you need several to reach the threshold.

Flag types

There are several types of victory flags available for Combat Mission. They differ in point values as well as in how they are placed and how victory is determined.

Small and large flags

Large flags are worth 300 victory points for the side controlling them at the end of the battle, and as such represent "primary objectives". Small flags are worth less in points than large flags (100 points), so they represent "secondary objectives", the taking of which is less important (and less valuable) than large flags. These point values are fixed for static flags.

Static and dynamic flags

There are two major types of flags in the game, static flags and dynamic flags. In Quick Battles, only static flags are employed. But in custom-made scanrios, a scenario designer can also assign dynamic flags as victory locations.

Static flags

These flags are placed by the scenario designer or, for Quick Battles, by the computer randomly, the amount and placement of which depends on the battle type. Each side is tasked with taking and controlling all the flags at the game's end. Each flag, when controlled by one side, delivers victory points to that player's forces.

Dynamic flags

This type of flag can only be found in custom-made scenarios. At least two (but often more) flags are placed by the designer on the map, but only ONE of them is a valid victory location! Which one is NOT known to the defending player, only to the attacking force. The "fake" victory flags are visible (to the attacker only!) as "bogus" flags. This represents the need for the defender to protect ALL the flags, whereas the attacker is only required to take a specific one to gain points from it.

There are two methods, chosen by the scenario designer, for deciding which flags are real, and which are "bogus".

Random – the computer choses the valid flag randomly. This increases replayability for the same battle, as the attacker will be

tasked with a different objective every time the game starts.

Chosen – the attacker is able to determine himself which objective he wants to go for. This is done by selecting the highest HQ unit on the map from the attacking force, and selecting the "Activate flag" order from the order menu during the setup phase. By clicking on or near a valid flag, that flag will become "real", and the other flags are "bogus" flags for that battle.

A valid dynamic flag is always considered a large flag (primary objective), and unlike static flags, the actual point value can be assigned by the scenario designer. The default is 900 victory points, but this can be more or less, as the value can be adjusted in the scenario editor to balance the battle.

End game

There are several ways a battle can end in Combat Mission: Afrika Korps.

Turn Limit

A game ends when the turn limit has been reached. When the turn limit has been set to "variable" in the parameters, and one or more victory flags changes hands near the end of the battle, the battle may be extended several more turns, out to a maximum of ten extra turns or a 25% increase in the original battle's length, whichever is less. Essentially this means that a battle won't stop short while active fighting is still going on, within limits.

Ceasefire

A game can end by mutual agreement of both players. Use the ALT-C keyboard command to opt for a Ceasefire, or left-click on the „Ceasefire" button on the Main game interface. The Ceasefire request is NOT revealed to the other player, i.e. the other player does not know if you have decided to opt for a cease-fire, until he does so himself. When he does, the game ends immediately with both sides remaining in position, and victory levels calculated from there.

The Ceasefire request can be withdrawn at anytime, by either using the ALT-C hotkey again, or clicking on the "Ceasefire" button. The button sticks when clicked on, and indicates that a Ceasefire request is active (by a depressed button) or inactive.

During multiplayer games (network or PBEM), both human players can of course communicate with each other and agree on a ceasefire. But playing against the AI means that a ceasefire can only be reached when the AI independently decides to do so. However, the AI is intentionally forgiving on this score, to maximize freedom of play for the human player. Just don't abuse the privilege!

Surrender

You can surrender at any time by using the ALT-U keyboard command. This will end the game immediately. You will concede all of the victory locations on the map to the opponent and those soldiers that have not exited the map prior to surrendering will be captured. The computer opponent will also decide to surrender when the situation becomes hopeless.

Auto Surrender

When one's Global Morale rating falls below 25%, it's the equivalent of making a standing ceasefire request (as above). When one side's Global Morale rating falls below 15% or less, AND the other side's is at least four times as high, the game will automatically end even if the losing side wishes to continue the fight. Auto Surrender will never happen if the losing side still has reinforcements on the way. Suffice it to say that Auto Surrendering only comes into play when one side has totally crushed the other.

Force Readiness

At a certain point, when your troops run very low on ammunition, it has the same effect as you offering a cease fire. This represents troops not necessarily wanting to fire off their very last bullet because even if they eliminate the current enemy, in real life another one might come along very soon (beyond the scope of the game, but important to simulate nonetheless). The level to which troops will expend their ammo depends on the Battle Type. Defenders generally will risk using up more than attackers, except in Assaults where both sides are willing to use almost everything. In Probes, the Attacker is more cautious and will trigger this feature earlier, meaning battles will typically end sooner. Attacks and Meeting Engagements are in between. Note that if only one side has triggered this due to low ammo, the game will not end unless the other side also triggers, or *voluntarily* offers cease fire. This feature is NOT active during Operations.

Designer's Note: Rarely did a force ever fight to the last man, but that is often the way other wargames end their battles. This can lead to turn after turn spent hunting down and eliminating the last scraps of the other side's force, when realistically the battle would have simply ended. Anybody who has played through a few games like this knows EXACTLY why this feature was put into Combat Mission: Afrika Korps. There are few things as frustrating as an opponent with only a mauled squad or two running around trying to secure an undefended Victory Location when it is VERY clear that the battle is over.

Exit Zones

If part of the scenario objective is to exit some or all troops off a particular map edge, an exit zone marker appears on the 3D battlefield at the appropriate map edge. You can exit your troops by simply plotting a movement order beyond the map edge. They will automatically leave the map upon reaching the edge of the map.

Not all units may be eligible for exiting the map for points. You can find out which are by accessing the detailed unit window (by pressing ENTER). The phrase "should exit for points" is displayed if the unit is eligible. Exiting such troops yields extra points, while failing to do so – for whatever reason, ie. if the unit has been killed before exiting - gains EXTRA points for the opposing player! Therefore, the defending player in a scenario with exit zones has a high interest in preventing your troops from exiting. Problem is – he usually won't know which of your units are eligible for exit!

Note: You can exit any troops off any map edge at any time, however you win points only for troops that are eligible for exit. Use discretion when moving troops off the map during an operation, as they will not be available to you for future battles!

After Action Reports (Battles)

After a Battle ends, the After Action Report (AAR) is displayed. This report is a score card of sorts, designed to show how well each side did in a simple, easy to understand way. After viewing the results, you can either LOOK AT MAP, to see the area fought over without Fog of War, or click RETURN TO MAIN and return to the main screen.

BATTLE: the type of battle just fought

OUTCOME: why the game ended and who won. The victory level is displayed here also. It depends on the point totals for each

side. Example: if one side has between 2.5 to 5 times more points at the end of the battle than the other, it wins a major victory. The possible outcomes and their respective base calculations are:

    < 1.25 to 1 = draw
    < 1.75 to 1 = minor victory
    < 2.50 to 1 = tactical victory
    < 5.00 to 1 = major victory
    = 5.00 to 1 = total victory
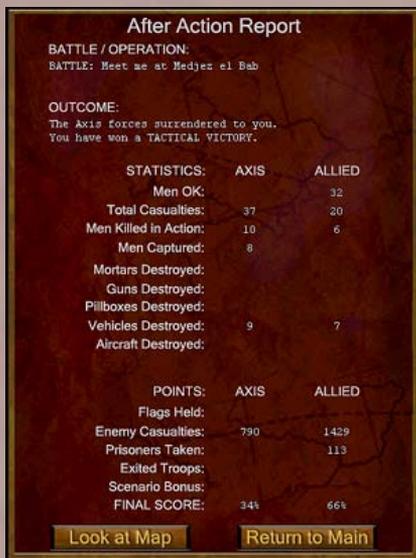
STATISTICS

Men OK – how many men survived the battle without significant harm
Total Casualties – total number of soldiers put out of action
Men Killed in Action – how many men of the above total were killed. The others are considered more or less heavily wounded.
Men Captured – how many soldiers surrendered to the enemy
Mortars, Guns, Pillboxes, Vehicles and Aircraft Destroyed – gives totals for lost equipment

POINTS

Victory points are awarded for the following:
Flags held - Control of victory flags.
Enemy Casualties - Casualties caused to the enemy.

Prisoners Taken - Captured enemy (counts double that of casualties).

Exited Troops - Exited units, generally worth 2-3 times the unit's purchase value (note: units eligible for exit that do not exit score points for the enemy).

Scenario bonus - Any "bonus" set by the scenario designer.

FINAL SCORE

Expressed as percentage of total points gained by both sides.

Operations

Operations allow players to fight a connected series of battles over a large map, usually using only a portion of the map at a time (wherever the front line is), with the front line dynamically moving back and forth depending on the results of previous fighting. Operations can stretch over several days, so – unlike with Battles - certain "strategic" elements are introduced.

Supply & Repair

In operations units are resupplied between battles, replenishing ammunition and even receiving fresh replacements for casualties. The supply level is preset by the operation designer, and can range from SEVERE (for basically cut-off or surrounded troops) to AMPLE (eg. at the beginning of a large scale offensive). Additionally, ineffective units (crewmembers from knocked out tanks and guns, almost completely wiped out or routed squads etc.) are generally removed from the front lines (and disappear off the map).

Resupply also includes the recovery and replacement of damaged, bogged down, or abandoned armored vehicles. Such vehicles disappear off the map between battles (usually overnight) and might return fully fit for fighting later on, depending on the parameter settings for Recovery&Repair for each side. But do not expect miracles - it often took days for a tank to return to the front line, so you will most likely not see this for operations spanning only one or two days, unless recovery&repair capabilities of a side have been set to Very Good or better. Be aware that a vehicle can only be repaired if its crew escapes from the battle map (or if they're killed/captured, but then there is additional delay before the repaired tank will return) so don't keep tank crews around to fight like infantry.

Note: Armored vehicles that catch fire ("brew up") are not repairable. Combat Mission: Afrika Korps allows ordnance to shoot at armored vehicles which are already knocked out, for the specific purpose of setting them on fire and prohibiting repair.

The Next Battle

After the first battle of an operation is over, the next one will start with a new Setup Phase for both sides. All units can now be moved freely within the setup zone, except fortifications (bunkers, pillboxes, roadblocks, mines, wire, trenches and foxholes), and padlocked units in no man's land (only in static and assault type operations).

In order to be able to move heavy guns (with a transport class of 7 or higher) during the setup phase of a new battle, at least one transport vehicle with sufficient transport class has to be on the map during the setup phase. One vehicle is enough to move any number of heavy guns within their setup zone(s).

Front lines are calculated anew in between battles, and depending on the progress made during the last battle - and the type of operation played - can move forward, backward or remain unchanged. Depending on the parameter settings for the operation, a strip of "no man's land" is placed on the map between both side's forces. In Assault and Static ops, isolated units ending the last turn of the previous battle in this zone are "trapped" and can not be moved back into the rear areas (they are padlocked). Such units also do not get re-supplied in between battles! In Advance type operations, such units are simply moved back to their own force's setup zone.

Note: in Assault and Static operations, it might be smart to withdraw the most forward units before a battle of an operation ends, to enable them to receive supply and/or relocate them to a different position on the map!

While up to three setup zones for each side for the first battle can be set by the designer, subsequent battles will feature only one zone per side across the whole map (the "rear" area) and a strip of "no man's land" (the "front" area), in which units will be padlocked.

Units have to be spotted again when a new battle begins, even when they stayed in place (after all, they COULD have moved). However, fixed emplacements which cannot be relocated in between

battles (like pillboxes, trenches,foxholes and mines) are automatically re-spotted during the Orders Phase of turn 1 – provided that their location was known at the end of the last battle.

Note: Keep in mind that you MIGHT start the next game immediately within view of enemy units. Choosing starting locations in cover and/or not immediately at the edge of your setup zone might help your units (especially tanks) to survive the first turn.

Reinforcements

If scheduled to do so, reinforcements arrive during the Setup Phase of a new battle and simply appear in the middle of the setup zone (the "rear area") in no particular formation. A pop-up screen announces the arrival of reinforcements, and the player is then allowed to incorporate the fresh forces into his front line as he likes by moving them within the setup zone.

Tip: Units that exit the map during an operation will not return for the next battle.

The scenario designer is able to assign various types of reinforcements to each side. Reinforcements can be scheduled to always enter at the beginning of a specific battle, or randomly with a certain chance to appear on-map from a certain battle onward. Reinforcements can also be assigned "reserve" status, in which case they will be released when the forces already on map have surpassed a certain casualty level. Another type of reinforcements (not available for static ops, obviously) are those that are linked to a specific map location. When the front line reaches a certain position on the overall operational map, reinforcements will be released automatically for the new battle. The players will not know the specific parameters of when and how reinforcements are scheduled to arrive, at least not more than the scenario designer is willing to reveal in the operation's briefings.

Note: in CMAK, fixed emplacements like pillboxes and mines can also "enter" as "reinforcements". It is up to the discretion of the scenario designer to make sure this doesn't lead to unrealistic results. See EDITOR section for more details.

Night Combat

When night falls during an operation, a few special rules come into play. The Setup Phase of the night battle allows you to reposition your forces (including any reinforcements) as usual.

However, actual combat can only take place during the night if one or both sides' preferences have been set to "May initiate night combat: Yes" by the designer of the operation scenario. If so, once the Setup Phase is finished, a screen will appear asking - "Attempt to skip night combat?" If both players decide to skip it, or are not allowed to initiate night combat in the first place, then no night combat takes place and the next battle (at dawn or during the day) starts with another Setup Phase. You are still always able to reposition your forces during the night, and the next battle will start with your units in those new positions – and the front line recalculated accordingly.

Game end (Operations)

Operations can end for any of the same reasons as battles, but there are a few additional features. Automatic endings may happen during Advance or Assault type operations when:

• The end of the map has been reached by the attacker.
• The attacker has been pushed back against his own starting map edge.

After Action Report (Operations)

After each individual battle of an Operation ends, you receive a summary of your own force, but without revealing any information about the enemy. Besides displaying friendly casualties, there is a line displaying how many battles in the given operation have been fought and how many more remain. Additionally, you will be told how many battles are left before the next night battle. Since the success or failure of an Operation is decided based on your total results, there are no Victory Points or Victory Levels awarded for an individual battle.

At the end of an entire operation a summary AAR for all the battles of an operation appears. Just like the battle AAR, it lists friendly and enemy casualties, knocked out equipment and vehicles and captured soldiers. No points are awarded, but instead a victory level is displayed for the complete operation. How victory levels are computed depends on the type of the operation played:

Advance / Assault - speed is essential. The faster the attacker reaches the opposite end of the map (the full operations map, not the single battle map), the higher the victory level. The game ends automatically when the end of the map has been reached.

Static – the possession of victory flags at the end of the operation as well as both side's casualties determine the victory level. The designer of the operation sets an "Attacker Casualty Point Factor", which determines how many victory points are awarded to the defender for destroying attacking units. 100% is the standard setting. If set high, the attacker has to be very careful about losing men, as the defender will gain more than the usual amount of victory points. Set it low, and taking ground (flags) is paramount, and losing casualties is not a big deal. It's therefore a measure of how "expendable" the attacking units are, and how aggressively the attacker can afford (or has) to be.

"Remember that warm, soft mud last summer?"

The Environment

Many things can influence the outcome of wars, but among these the environment where a battle takes place – be it the weather, the lay of the land, the ground conditions and even the time of day – is generally regarded as the most influential in a military sense. The beginning of the mud season, the near standstill of combat in the winter, the unreliability of equipment in the hot and dusty desert – were all deciding factors in the outcome of the struggle in the Mediterranean, at both the strategic and tactical levels.

Combat Mission: Afrika Korps simulates many different environmental conditions, from the seasons to the time of day, to the weather, temperature and ground conditions. Each mix can be a unique challenge. From fighting in a foggy night in deep snow, to struggling through deep mud on a rainy day in spring, to sweating in extreme heat in Africa – the possibility for scenario designers and armchair generals are manifold. The following chapter explains the various settings and their effect on gameplay.

Terrain

There are many different terrain types in the game. Each one has an impact on lines of sight, cover, concealment, and movement. What you need to understand to play the game is that what you see in the game is merely a visual representation of the underlying mathematical 3D battlefield and some abstractions are necessary to keep the game (dis)playable.

Trees are one such abstraction. Although you see individual trees on the map, their actual placement plays no role for the game as such, as can be seen by the fact that tree density can be toggled by the user to fit hardware performance ability. What counts is the "woods" terrain "tile", as seen by the different kind of ground beneath and around trees. Same applies to – for example - brush terrain, and "graveyards".

"Open ground", although seemingly "empty", is not. Bushes, small dips, high grass and other random features are all taken into account, and so the LOS cannot be traced endlessly even across open ground. More importantly, weapons accuracy decreases dynamically with range, not only because it is harder to hit something farther away, but also because it is harder to see the target at all.

The LOS tool is a very useful aid to understand the terrain on the map better, as it shows what kind of terrain is used for the in-game calculations. You can pinpoint the exact end of woods, the exact corner of a building, the exact point where a wall or hedge starts, etc. Most of the time such things are clear from looking at the map (and your judgement will become better with playing experience), but when in doubt, the LOS tool provides the answer.

Terrain also changes with the different seasons. For example, depending on the scenario's time and date trees can be dense and thick (summer) or leafless (winter). Grain fields also change dramatically with the seasons and weather. This has a direct impact on the concealment and cover provided by such terrain.

Buildings

There are various types of buildings in the game: shacks (considered extremely light buildings), small houses (both light and heavy), a tall light building (2 levels) with and without surrounding pavement, a big blockhouse (2 levels, heavy), a church (basically a

special type of the big blockhouse, i.e. 2-level heavy building). Even though buildings look differently in each theater, each type of building shares the same features. Buildings have an impact on concealment and cover, with heavy buildings being more protective than light ones. Light buildings also tend to be reduced to rubble much more quickly than heavy buildings, with a few high-explosive rounds of 75mm caliber or higher being enough to achieve this (one such round is often enough to destroy a shack). Any unit inside a 2-level building which collapses will usually suffer serious casualties.

Lines of sight can be a bit tricky around buildings at first, but most answers are easy when you think about it. In order to be able to look outside of a building without restrictions, a unit needs to be within a few meters of the outside wall (i.e. to peer through windows or other openings). If it is further away than about 5 meters, it can still "see" a few meters into or out of the house, but not far beyond that.

When a building or a unit in a building is fired at, regardless if it is direct fire or indirect fire (from mortars for example), most of the fire hits the outer walls of the building. Units hiding within can still be hurt by the blast from flying stones, glass, shrapnel or even just the blast. However, some rounds can also make it into the building and explode within, e.g. through holes in the outer walls or roof, blasted doors or windows. Such shots can cause severe damage. There is even a very small chance that a round can make it into and THROUGH a building, exploding on the other side!

The interiors of buildings are abstracted and included into combat resolution calculations. Although you can trace an LOS within a building without restrictions (though with limited range) the chance of enemy units hiding within the same building and remaining unspotted is relatively high (imagine them hiding in another room), but drops dramatically the more time your units spend inside.

There are also two different height levels for buildings. Level one, the ground level, simulates houses that are one to two stories high. Level two simulates houses three to four stories high. These are the only available levels for Combat Mission: Afrika Korps. You cannot place units in church towers.

One thing to keep in mind with buildings is that they are a confined space and can contain only so many soldiers at a time. The general rule of thumb is one squad per corner of a building. But if you try to put a whole platoon into a small farmhouse, don't be surprised to find that one squad has to leave and wait outside.

Watch out when you want to fire weapons with backblast (like bazookas and Panzerfausts) within buildings - this often suppresses the firing unit and there is a good risk that the building will catch fire from the backblast. Vehicles and guns are not allowed to enter buildings. Mortars can enter a building, but cannot fire from it.

Building Damage

Buildings and bridges display "damaged" or "heavily damaged" labels according to how much damage they have received, and the "Warning Labels" option is on. Additionally, they're listed with a '*' attached, like "light building*", or a '**' for heavy damage. The building will begin to show damage visually after 40% of the structure is damaged.

Rubble

These are the leftovers after a building has collapsed. Vehicles may not enter rubble. It provides excellent cover and concealment for infantry. LOS is heavily restricted across rubble, but only to a certain height (which is naturally much lower than the building previously was). There are two forms of rubble in the game – rubble as it originates from a collapsed building, with parts of exterior walls still standing, and "flat" rubble, which can simulate debris piled up on roads for example. The difference is visual only, as both types of rubble behave the same and cannot be, for example, entered or crossed by vehicles.

Scattered Trees

These are single trees with little or no brush, standing in loose groups together or along a road. Orchards fall into this terrain type as well. They provide only light cover and concealment, but are certainly better than open ground. Do not expect miracles, especially in winter when even a single squad has trouble hiding in scattered trees.

Note: Scattered trees can also be used to simulate narrow paths in forests, allowing tanks

and other vehicles to pass at a slow rate and considerable risk of bogging down.

Woods

This is the "usual" woods terrain, which includes mixed types of trees, and fairly thick underbrush and bushes. Woods provide good cover and concealment. No vehicles are allowed to enter woods in Combat Mission: Afrika Korps.

Tall Pines

"Tall pines" represents dense woods terrain, but with only little underbrush and bushes, and provide cover and concealment similar to "Woods", except that the pines are taller and so are more likely to block elevated lines of sight from tall buildings or hilltops. Movement through tall pines is faster than through woods, and LOS can be traced further due to less underbrush.

Palm Trees

In the desert, "Tall Pines" are replaced with palm trees. Depending on region, there are many types of palms, and CMAK treats all palms as providing good cover and concealment, and as impassable for all types of vehicles.

Hedges

This is the common type of hedge and is about one meter high, planted or naturally grown, and is passable for tracked vehicles and infantry (with some impact on speed, however). It provides decent concealment for prone units, but little cover.

Tall Hedges

Dense, about 2 meters tall and usually naturally grown hedges, difficult (and often painful!) to move through, and impassable for all types of vehicles.

Stone Wall

A man-made stone wall, about 1 meter high, and thick enough to block even a direct hit from a tank main round. Walls are passable

for tracked vehicles and infantry, albeit at a lower speed. Vehicles behind stone walls can achieve hull-down status, unless the enemy is on a higher elevation. Stone walls provide good cover and concealment, especially for prone units behind it, but not when the attacker is at a higher elevation or attacking from the sides or rear.

Wooden fence

A man-made fence, usually to separate fields, but also very often found in Italian villages around each house. This is only a small obstacle to vehicles and infantry, and can be crossed by all unit types with a small delay. It provides nearly no cover and very little concealment.

Brush

Brush can be used to simulate several things types of terrain such as bushes, wild fields or low trees. It provides good concealment and restricts LOS, but offers little cover. It tends to catch and spread fire quickly.

Grain Fields

Grain fields are just that. The concealment and cover they provide vary with the seasons. Basically considered open ground in winter with not much to hide behind, they can provide decent concealment in summer and less so in fall or spring. Cover, however, is almost nonexistent. Grain fields also increase the chance of vehicles bogging down in them, even with otherwise dry ground conditions. This type of terrain tends to catch and spread fire quickly.

Vineyards

A common sight in Italy, vineyards are planted rows of vines, usually growing on more or less steep slopes or terraced fields.

Marsh

Marsh is swampy open ground, providing little more cover than some bushes and grass. It is difficult to walk on even for infantry, and cannot be entered or crossed by vehicles or heavy support weapons of any type.

Soft ground

This can be a muddy field, a shallow
marsh or a small stream, or - in the desert -
very fine sand not unlike quicksand, and
although - in theory - passable to all units, dramatically increases the
danger of vehicles bogging down as well as slows down all
movement. It provides no extra cover or concealment.

Rough

Rough represents heavily broken or rocky terrain, impossible for
vehicles to cross and accessible only by infantry. It provides good
cover and concealment.

Rocky

Similar to "rough" terrain but more easily
passable - with usually a number of large rocks or debris to provide
decent cover and concealment, but also enough open space for
vehicles to pass through.

Roads

Roads come as two types: dirt and paved.
Dirt roads are the main type of road
encountered in the Med outside of the big cities. There is no cover
or concealment on a road, but movement is fast.

Paved roads have gravel or hard concrete surfaces and are
relatively easy to drive on even during muddy ground conditions or
snow. However, besides some few main highways and city streets,
paved roads are not encountered very often in the Med.

Bridges

There are three types of bridges - wooden
bridges, often encountered across small
streams or creeks and two elevations high;
stone bridges, spanning small rivers at two elevations high; and tall
stone bridges, across major rivers or valleys, four elevation levels in
height which allow vehicles and troops to pass under them.

Railroad Tracks

These offer little concealment and almost no cover, and troops
do not gain much speed advantage on them (in fact, wheeled

vehicles are slowed down, and chances of
bogging increase due to the rough surface).

Water

Water tiles are used to simulate rivers or lakes, and cannot be
entered by any units except infantry embarked in assault boats.
Regardless if there is snow on the ground or not, when temperature
is set to freezing and below, water becomes
frozen - vehicles and guns are not allowed to
enter, but infantry is able to cross ice.

Fords

CMAK features two types of fords, which allow crossing rivers on
foot or with vehicles. Shallow fords can be crossed (slowly) by all
units, although the chances for bogging down are high – especially
for non-tracked vehicles. Deep fords can only be used by infantry
units.

Slopes

These are inclines steep enough to
prohibit vehicular travel. Infantry can still climb
them, albeit slowly.

Cliffs

Cliffs are elevation changes of more than 3 elevation levels
from one terrain tile to another. No unit is allowed to traverse a cliff.

Sandbags

Sandbags represent prepared fighting and
firing positions, which can be used by infantry,
guns and vehicles alike. As hasty defensive
positions (piling up sandbags is done quicker than digging trench
systems) or whenever rocky ground prevented digging, these were
encountered often in Africa and Italy. Being terrain tiles, sandbags
can only be placed by the scenario/map designer, and cannot be
moved.

Fortifications

Fortifications include bunkers, pillboxes, wire, and mines. They
are granted to a side by the scenario designer or can (and in the
case of Assault type battles MUST) be bought for Quick Battles.

During the Setup Phase of a battle, you are free to move and place them within the constraints of the setup zones, but they cannot be moved during the battle itself.

All forms of fortifications (including mines) may be placed only within a valid setup zone. A minefield is 20m x 20m in size (except for daisy-chain mines, which represent hasty laid mines not dug into the earth, and which are slightly smaller than 20m in diameter), with the mine marker placed in its center. The defender can place minefields next to each other, thereby creating larger minefields, but for game purposes CM treats these as separate 20m x 20m elements. Once a minefield has been spotted, the TacAI will try to move units around it during the Action Phase, or simply refuse to enter minefields and stop a distance away from them. You can not force units to enter minefields, as the movement line will turn red trying to do so, until these have been cleared by engineers using demo charges.

Fortified Firing Positions

Bunkers and pillboxes have a firing arc inside which they can engage targets through a frontal firing slit. Outside of this arc, they are basically impotent. The rear of a bunker or pillbox is its weak point - since this is where the exit doors are located - and can be penetrated even by light ordnance. From close range, however, a bunker/pillbox is always vulnerable to infantry, which can throw grenades through firing ports. Flamethrowers are especially useful for knocking out bunkers/pillboxes, as well as grenade bundles, demo charges and molotov cocktails. Additionally, ordnance can occasionally score a lucky hit to a pillbox's frontal firing slit, possibly knocking out the pillbox in the process. But this is generally only possible at close range (within a few hundred meters).

Note: AT gun Pillboxes receive an accuracy bonus, vs. a normal AT gun, because such fortifications have already "ranged in" the area within their firing arc. Range determination is one of the greatest contributors to aiming accuracy, so predetermined and reliable range information greatly increases accuracy (all else being equal).

Barbed Wire & Roadblocks

Wire can be crossed by infantry or fully-tracked vehicles, but only at a much slower pace. Roadblocks can be crossed by infantry (at a slower pace) but are impassable to vehicles. Roadblocks and wire cannot be placed on water and marsh terrain, as well as not inside buildings. There must be sufficient space to place wire and

roadblocks, so when two houses are too close together it might be not possible to do so (or you will have to rotate the wire or roadblock marker to fit in between).

Trenches and foxholes

Each *defending* infantry unit in an eligible location (i.e. not on paved surfaces, in marsh or water or other unsuitable terrain) can dig in at the beginning of a battle, creating a foxhole underneath. The foxhole remains on the map for the duration of the battle (or operation), and can be used by other units (including the enemy) to gain its defensive benefits (mainly cover). Digging in occurs automatically but the player can toggle it on or off with the "Dig In" command.

Also, depending on the parameters of a battle or operation, the defending player can create additional fallback positions using the ALT-F hotkeys during the setup phase of a battle. These additional foxholes can be created anywhere within a valid setup zone on the map by left-clicking on the map while in ALT-F mode, and the number of available foxholes is equal to the number of non-heavy infantry units on the map. Left-clicking on an already existing foxhole makes it disappear and return to the "foxhole pool". Hitting ALT-F again exits the foxhole placement mode.

Note that in Quick Battles which are Meeting Engagements or Probes, neither side is allowed to dig foxholes. And Assaults are the only Quick Battles in which the defender may dig fall-back foxholes.

In regular scenarios, neither side may dig in during Meeting Engagements. Otherwise, the ability of the defender to dig in is determined by the scenario author.

Trenches are similar to foxholes except they are much larger and provide considerably more cover and concealment for their occupants. Further, they may be placed and rotated during the setup phase like any other unit. In addition, they can be used by infantry to move from one location to another while staying inside the trench, thereby benefiting from its defensive bonus on the way. In fact, it is possible to place a whole trench system on the map by simply linking trenches together (placing them adjacent to one another). Trenches can be rotated like any other unit in any direction desired. Trenches cannot be placed on unsuitable terrain (marsh,

water, fords and in buildings), and remain on the map for the duration of the battle (or operation).

Only fully-tracked vehicles are allowed to enter or cross trenches, but do so very slowly and at great risk of bogging.

Mines

There are three types of mines in the game.

Antipersonnel Mines

Lethal to infantry and can cause several casualties within seconds when stumbled upon. Casualties are higher for infantry units moving quickly through a mined area than when crawling or moving slowly. Once spotted, a mine marker appears in the area. Infantry will refuse to enter such a minefield even when ordered to. They may, however, enter it when in panic or rout. Since mines are dug into the earth, they cannot be placed on paved surfaces or in buildings, in water or marsh or rough terrain.
Sneak (crawl) is always less likely to set off a mine.

Mines are also much less likely to go off if they're *known* (i.e. one already went off, and your men are now assumed to be paying more attention and doing things like moving in a single line (or a couple of lines) to minimize further explosions).

So the least mine explosions happen in a known minefield to crawling units.

Note: Dug in mines are never spotted unless one actually explodes!

Antitank Mines

Dangerous to tanks and all vehicles, and although not always lethal, can at least immobilize them. Antitank mines are harmless to infantry because infantry is not heavy enough to detonate them. Since mines are dug into the earth, they cannot be placed on paved surfaces or in buildings, in water or marsh or rough terrain.

Daisy-Chain Mines

Hastily-placed anti-vehicle mines that are easily spotted by the enemy because they are above ground. They do not generally cause direct harm, but rather deny the enemy certain approaches, generally across road surfaces. Their real life advantage is that they

can be placed MUCH faster than normal minefields and hence were used often in hasty retreats. Daisy-Chain Mines cannot be placed on water or marsh, and not in buildings.

Clearing Mines

Engineers and Pioneers with demolition charges are able to clear gaps through minefields. Simply move them within 25 meters of the minefield and wait. It takes a few minutes (turns) to clear a gap through the mines. You can of course also target the minefield marker manually.

Additionally, engineers can clear Daisy-chain mines without the use of demolition charges. The number of engineers and their experience affect their speed in clearing mines. Generally a near full squad is needed to accomplish clearing a particular mined area.

Minefields can be reduced or eliminated by shellfire (though this will not be explicitly shown - you just have to judge roughly by how many craters you see, and hope).

Weather

It is common military knowledge that weather can in fact dictate the outcome of wars. At the tactical level, bad weather means troops tire more quickly and vehicles get stuck more easily. Movement is generally slower during periods of rain or snow, and visibility can be seriously impaired as well. Simply changing a battle's weather settings can fundamentally alter the way the battle plays out.

Time of Day

There are four daylight conditions simulated in CM: dawn, mid-day, dusk, and night. Visibility is reduced during dawn and dusk and heavily restricted during night.

Nighttime fighting also creates a risk of misidentifying one's own troops as enemy and friendly fire can result. Keep this in mind when separating your forces and/or moving close to enemy positions, and occasionally check your unit's target orders to make sure they have not by mistake decided to fire on their own troops.

Atmospheric Weather

Clear - a nice sunny day with few or no clouds, offering good visibility across long distances. This is the only weather type that allows airplanes to operate in the game.

Overcast - the sky is full with dark, low hanging clouds. Visibility is somewhat reduced.

Rain - Visibility is reduced substantially. Noises are muffled and sound contacts are considerably more difficult to obtain.

Fog - a light mist (or in Africa, fine sand dust) covers the battlefield and visibility as well as noise are reduced.

Fog and Rain - a mix (or more like an addition) of the two above. Visibility and noise are heavily reduced.

Thick Fog - you almost can't see your own hand if you stretch it out in front of your face. Visibility is reduced to a mere few meters and the fog reduces the chance for sound contacts.

Snow - reduces visibility and has a slightly lesser impact on sound contacts than rain.

Blizzard - very heavy snowfall reduces visibility and noise substantially.

Ground Types

There are three main ground types available in CMAK, specifying the type of soil predominant on the battlefield. There is no restriction with regard to which type of ground can be selected for which theater (Italy, Crete, Africa).

Dirt - fertile soil, usually covered by grass or other vegetation.
Arid rocks- very dry barren soil, hardly any humidity or vegetation, very dusty.
Sand- a layer of fine sand on a usually rocky surface, very little vegetation.

Ground Conditions

All theaters:

Very Dry - very dry ground conditions increase the chance of fires substantially. Dust is being kicked up, regardless of ground type, by moving vehicles, shell impacts and muzzle blast.

Dry - same as above, lower chance of fire.

Damp - early in the morning or after several days of overcast weather or fog, ground conditions are often damp. This raises the chance for vehicles bogging down when off dirt or paved roads.

Wet - after rain showers you tend to have wet ground. The chance of bogging down when off roads is substantially increased, and even the dirt roads pose some danger of bogging.

Mud - when it has been raining for a few days, wet ground will turn into mud. Vehicles tend to get stuck in muddy ground (even on dirt roads) quickly and mud also greatly reduces the speed of vehicles and infantry.

Italy only:

Deep Mud - after long periods of rain or melting snow, the ground can become a quagmire. Vehicles should stick to roads (paved if possible) and even infantry will find the going slow and tiring through such ground conditions.

Light Snow - a few inches of snow. The chance for bogging is increased slightly and the snow affects movement speed a bit, but most vehicles can handle it well. Soft ground remains uncovered by snow during this condition.

Snow - roughly 8 inches of snow. Wheeled vehicles will get stuck frequently and even tracked vehicles will find the going tougher. Infantry moves more slowly.

Deep Snow - 12 inches or more. Most vehicles will get bogged eventually and infantry movement is slowed down substantially.

Fire, Smoke & Dust

If there is anything to be found on a WWII battlefield more often than casualties, it is smoke, fire, and dust, from burning terrain or vehicles, from smoke rounds used to cover the attacker's approaches or defender's line of retreat, or from dirt and dust being kicked up by high-explosive shells.

Dust

Dust is a major new addition to the CM engine, and does affect battlefield tactics in no small way. Dust can both provide temporary cover, or give away your position when kicked up by an otherwise unseen armored column.

Dust is generated by three events:
- moving vehicles
- muzzle blast
- shell impacts

Ground type, ground conditions, the actual terrain type, and the size and type of the vehicle, shell or gun affect if and how much smoke is generated.

Arid rocks is the "dustiest" type of ground, then sand, then dirt. Dirt roads are, likewise, the dustiest type of terrain, then rocks, then brush. As conditions become somewhat less than "maximally" dusty, you'll see vehicles no longer kick up dust when not on a dirt road, but gunfire and explosions will still create dust.

One step less dusty and vehicles won't make dust even on a dirt road. Gunfire and explosions still will.

One step less dusty (or one more wet, whichever) and now gunfire doesn't kick up dust, either, but explosions do a little bit.

One final step, and there's no dust at all.

Designer's Note: Dust is always seen anywhere on the map - with or without LOS to the unit(s) causing it - during dawn, dusk, and mid-day light conditions, and is never seen (even if it should be kicked up in theory) during night conditions. This is a necessary engine abstraction to prevent unrealistic spotting distances during the night.

Smoke

Smoke in varying sizes comes from burning buildings, fields, woods, vehicles, and smoke rounds from tanks, guns, or artillery. Small smoke shells or small burning vehicles (e.g. Kübelwagen) degrade, but do not always block, LOS through them.

Designer's Note: Infantry smoke grenades, a source of smoke commonly found in other WWII games is not available in CMAK. Our research shows little credible evidence that this type of smoke was used regularly at the squad level in WWII for tactical purposes. Instead, it appears to have been used for signalling mostly, and we have therefore decided to exclude it from CMAK to prevent its potential unrealistic overuse.

Fire

The chance of a piece of terrain catching fire depends largely on ground conditions and weather. You will see fewer terrain fires during rain or with wet or snowy ground. On the other hand, very dry ground increases the chances for fires, and sometimes even tracer ammunition from an MG can be enough to spark a blaze.

Terrain fires often start off "small", and at this stage have no effect on the game except for some smoke. But small fires have the chance to grow and spread depending on overall conditions. If a fire becomes "big" (the whole terrain "tile" (20m by 20m) is burning) units located in that tile are forced to exit the area immediately. If for some reason a unit cannot do this (say it is immobilized), the unit will be destroyed by the fire and any remaining crew will abandon the vehicle/gun immediately and run to safety. Units will also refuse to enter terrain burning with a "large" fire.

Burning terrain and vehicles remain burning for the duration of a battle (and can, in fact, cause adjacent terrain to catch fire eventually). Fires and smoke will cease, and burned buildings will collapse to rubble between the battles of an operation.

Fog of War

Unless you choose to play with "Fog of War: none" (in the Options menu at scenario startup), only friendly forces will be visible on the map initially. Enemies must be spotted by one of your units before they appear on the map. Combat Mission: Afrika Korps uses a complex spotting model to simulate the limited knowledge of a battlefield commander and what is generally known as Fog of War.

Enemy units can be displayed on the map according to five "spotting levels":

No Contact - Level 0

No enemy unit is displayed. It's still out there, but you can't see it, because none of your units are able to see or hear it. Keep in mind, though, that the enemy might see you! If you're walking down a quiet road and the enemy is hiding behind some hedges, he might have identified all your units before you even catch a glimpse of him. In fact, your units might be dead before they see where the fire is coming from in such a situation.

Sound Contact - Level 1

Most wargames allow spotting only when a line of sight exists between the spotter and the target. In Combat Mission: Afrika Korps, sound also plays an important role. If you are close enough, or if the target is loud enough (e.g. a tank racing down a road at full speed or an infantry squad firing its weapons), you can "spot" a unit even when no line of sight exists. Such units are displayed as generic gray icons, and clicking on them reveals SOUND CONTACT in the unit info window. The general type of the unit is displayed as well, e.g. infantry? or tank?, but do not rely too much on this. Additionally, the enemy unit is shown at a location which may be somewhat incorrect (your soldiers are making their best guess by listening), so don't be surprised if the enemy unit seems to move through impassable terrain (or even off-map), and then suddenly "moves" into line of sight in a different (but nearby) location.

First Contact - Level 2

The enemy unit has moved into line of sight and one of your friendly units has caught a glimpse of it or the enemy has opened fire at you and you see the muzzle flashes. At this point only sketchy details are available. When you click on such a unit, a general unit type is given (Infantry? or Tank?), but not much more than that. Enemy infantry units are always displayed using one soldier figure, regardless of the actual type. Enemy vehicles and guns are always displayed with a generic grey model.

Contact - Level 3

If the enemy is close enough, is exposed, or has been firing at you for a while, more information becomes available. Enemy infantry units now are classified as squads or teams (e.g. mortar teams, anti-tank teams) and weapons can be spotted, too. Vehicle types - tanks or tank destroyers or assault-guns - are usually identifiable at this stage.

Infantry is displayed with the corresponding number of figures based on unit strength and vehicles are displayed as a common model of vehicle for the identified vehicle type and the given month and year.

Take careful note of the fact that sometimes your troops - especially the inexperienced ones - can incorrectly identify enemy vehicles, usually as something bigger and scarier than they really are. However, once the spotting reaches level 4 (see below) any

"mistakes" are corrected and the true identity of the vehicle is displayed.

Identified- Level 4

If the unit is sufficiently close or exposed, one of your units will identify it fully. This means that the number of soldiers in a squad or team are displayed in the unit window, as well as the correct model of vehicle, experience of the unit, and more. This is as much information as you will ever get about the enemy.

Lost Contact - Generic Unit Marker

After a unit has been spotted, it is possible to lose contact with it. The "lost" unit will be graphically replaced by a generic unit marker (each nationality has its own unique marker type- stars for US, crosses for Germans, etc.), showing the last known position of the enemy unit. Clicking on such a marker will display the last available information about the unit.

These markers stay on the map until the same unit has been spotted again (even if in a completely different location) or if you approach near enough to the marker to verify that the previously spotted unit is no longer there. In such a case the marker disappears, regardless of whether the enemy has been spotted elsewhere.

Option - Extreme Fog of War

With the option set to "Fog of War: extreme" it will take a lot longer before your units are able to fully identify enemy units, i.e. reach spotting level 4. Enemy units must come into very close contact with your troops before headcount, experience and armament become "visible" to you, and many units in cover or far away will never be fully identified for the duration of a battle. In fact, reaching identification level 4 and even 3 will be a rare occurrence in most situations. While more realistic, this option requires more attention from the player, and is therefore not set as default. Otherwise, this option works the same as "Full Fog of War", which is the default setting explained above.

Option - Partial Fog of War

With the options set to "Fog of War: partial", enemy units must still be spotted, but every spotted enemy is automatically fully

identified from this point on. This is a good way for less-experienced players to get used to the game system.

Option - No Fog of War

With the setting "Fog of War: none", all enemy units on the map will be shown and fully identified, regardless if they are spotted or not. This is a great way for beginners to get a feel for the game, but also for scenario designers who wish to test a battle they made. Mind you though, this works both ways, your opponent is able to see all of your units also when this setting is in effect, even the computer player!

SPOTTING

Units spot best when stationary. Movement, especially running, means that a unit's field of vision is generally restricted to the direction in which the unit is moving. The same is true for vehicles, as the driver and tank commander are (at least partly) focused on getting to their objective without colliding with obstacles or bogging down. Hiding units also spot worse, as their main task is to keep their heads down, not watch for the enemy.

Spotting is always worst to the rear of a unit, and panicked or broken units relay almost no useful spotting information to the player.

Vehicles are generally much poorer spotters than infantry, especially when buttoned up. In fact, most tanks have large blind spots within a certain distance around the tank when buttoned up due to the heavily restricted field of view. In CMAK, this has been abstracted into a general rule: Buttoned vehicles have a blind spot for infantry (which is NOT currently targeting the vehicle) within 15m provided the infantry is not in the front 60-degree arc centered on the turret facing.

So don't be surprised when one of your tanks with closed hatches suddenly runs into an anti-tank team hiding just a few meters away from it. Also don't be surprised when YOU (as the player hovering above the battlefield) can see a target that your tank simply will not engage. What you can see is not necessarily what the tank can see!

It's often tactically wise to keep some units stationary on overwatch duty while others advance. Unfortunately, one cannot always afford the luxury of being cautious.

Designer's Note: In order to prevent the abuse of bailed out crews as disposable scouts, we drastically reduced their ability to spot enemy units. Be warned that if you go moving your crews off into enemy territory the first unit they spot might be their last!

"Know any good Moslem prayers? I don't wanna miss any bets."

The Combat

Combat in Combat Mission: Afrika Korps is conducted by instructing the units on the battlefield to perform various actions, like movement and firing of weapons, to gain a tactical edge over the opponent and, usually, capture and hold an objective.

Every unit in CMAK has its own set of orders which it can perform. The available orders at any given moment depend on unit type (vehicle, infantry, gun, mortar, etc.) but also on its current status (immobilized, bogged, stunned, panicked etc.). Panicked units, for example, cannot be ordered to do anything – they simply won't listen, as they're busy saving their own skins, and the player will have to wait until such units rally before issuing them any orders.

By right-clicking on a unit, the unit's Orders menu opens. It always shows the currently available set of orders for that unit or units. Alternately, you can press the SPACE key after selecting a unit to bring up its orders menu. Then, you can simply point the

cursor over the order you want it to perform and left-click to select it OR you can use one of the shortcut "hotkeys" displayed next to the order name to select it. (You can also use these hotkeys without first bringing up the menu - just select a unit and press a hotkey).

In some instances, simply selecting an order from the order menu is all you need to do (e.g. if you want to order the unit to HIDE), and the order is executed immediately at the start of the next Action Phase. In most instances, however, you need to specify a target point or waypoint(s) for the order.

In that case, a line will extend from the selected unit towards the mouse cursor. Point the cursor to the intended target and left-click. This completes the order (the only exception to this is "Shoot&Scoot" which is a "two-legged order" and explained later). You can of course navigate around the map and change view levels as you like, and as long as you don't click anywhere on the map the order target selection stays live.

The order lines are color-coded, depending on which type of order you issue. Additionally, the given order is displayed above each waypoint.

There are several basic types of orders with their own special features discussed on the following pages.

Move

Movement orders are used to tell your units to move from one place to another during the Action Phase. They can do it as fast as possible, while paying little attention to incoming fire, or as carefully as possible, taking maximum cover in the available terrain.

Units can also become immobilized and thus unable to receive movement orders. This is true not only for vehicles which have been hit or simply bogged down hopelessly, but also for heavy weapons teams which have suffered enough casualties that the remaining men cannot carry all their heavy equipment. Some weapons are so heavy that they cannot be moved on their own at all (the German 88 Flak for example), and can only be moved by embarking on a transport vehicle.

Pinned units (see THE COMMAND) can be ordered to move, but will usually refuse to follow that order until they rally again.

Movement – Infantry

Available movement orders for infantry units (this includes guns, mortars and other heavy infantry support weapons) are:

Move to Contact – orders the unit to advance cautiously and keep eyes open for enemy contacts. Will stop as soon as enemy comes into LOS or unit is fired upon. Units moving to contact that have a "cover arc" active will only stop when enemy units appear within that arc. Units ordered to Move to Contact AND Hide will hide at the end of their movement, even if the movement stops prematurely due to enemy contact.
Order not available to: immobile units.
Shortkey: E

Move – walking speed. Units won't stop when enemy is spotted, but will break off movement (and usually look for cover) when under heavy fire or an enemy unit is suddenly spotted very close by.
Order not available to: immobile units.
Shortkey: M

Run – orders the unit to move as fast as possible. Will not stop to engage targets and suffers from heavily reduced spotting ability as well as greatly increased exposure.
Order not available to: immobile units, heavy weapons like towed anti-tank guns, tired units
Shortkey: F

Advance – tactical move when advancing under fire in view of the enemy. This assumes dashing from cover to cover, using covering and suppressive fire and movement by bounds.
Order not available to: immobile units, heavy weapons and support weapons like mortars or anti-tank rifles, all conscripts, out-of-command green units, exhausted units
Shortkey: A

Assault – similar to Advance, but especially useful for covering those last 10 or 20 meters into an enemy position. Increases morale slightly while allowing units to return suppressive fire, but too tiring to be used over longer stretches.
Order not available to: immobile units, heavy weapons and support weapons, all conscripts, out-of-command green units, tired units, units which have previously panicked (i.e. "rattled")
Shortkey: U

Sneak – Tells a unit to hug the ground and crawl and use stealth. Will open fire in self-defense only. (This command combines the "crawl" and "sneak" commands of CMBO).

Order not available to: immobile units and heavy weapons
Shortkey: S

Rotate – changes the facing of a unit. How fast a unit is able to rotate depends on the type of vehicle or gun. For the latter, rotation speed drops after casualties are taken. Lighter-armed infantry units are able to rotate much faster, usually, though even they require some time, simulating the effort to get a clear line of fire towards the new direction.

Order not available to: immobile vehicles (note that turretless Assault Guns have to rotate the whole vehicle to rotate their guns more than a few degrees). Other immobile units (e.g. super-heavy anti-tank guns like the German 88 Pak) can rotate their guns, even though they can't move.
Shortkey: O

Withdraw – emergency order, tells infantry units to "get the heck out of there". This order has NO command delay, but it substantially increases the chance that the unit will panic while retreating.

Order not available to: immobile units and heavy weapons, tired units
Shortkey: W

Pause – increases the command delay for a unit at the beginning of a turn (and only at the beginning of a turn) in increments of 10 seconds. Works up to 60 seconds, then resets back to 0 additional delay. Allows players to somewhat time movements of units within a turn.

Order not available to: immobile units.
Shortkey: P

Halt – cancels any current movement order and all waypoints for a unit.

Shortkey: None (The Backspace Shortkey cancels the last waypoint only, whereas this order cancels the entire movement path including ALL waypoints)

Follow vehicle – not an order as such, but whenever you plot a movement order with the waypoint placed on an enemy vehicle, and the distance from the unit ordered to move to the vehicle is not more than 50 meters, the unit which has been issued this order will be automatically try to follow and assault the enemy vehicle, even if the

vehicle moves from its current location. The words "follow vehicle" will be displayed above the cursor, and the order line will be colored "white". "Follow vehicle" orders cannot have more than 1 waypoint, which must be the target vehicle. The order is automatically cancelled when the target vehicle moves further away from the assaulting unit than 50 meters.

Movement - Vehicles

Available movement orders for vehicles are:

Move – unit drives at walking speed, ie. at the speed of moving infantry. Usually will not stop when an enemy is spotted.
Shortkey: M

Move to Contact: works like the infantry command (previous page). Vehicle will stop upon spotting any kind of enemy target Units ordered to Move to Contact AND Hide will hide at the end of their movement, even if the movement stops prematurely due to enemy contact.
Shortkey: E

Fast – orders the unit to drive at maximum speed. These are different for the various types and models of vehicles and tanks, as well as adjusted for ground conditions. Will not stop to engage targets and suffers from heavily reduced spotting capability. For vehicles, moving fast additionally increases the chance of bogging, especially on muddy ground or snow, but it does throw off the aim of the enemy and decreases the chance of being hit. Fast move also instructs the vehicle to ignore threats as much as possible, decreasing the likelihood that the vehicle's crew will abandon the order and seek cover if presented with a serious enemy threat.
Shortkey: F

Reverse – similar to the Move command, but the vehicle moves in the direction opposite to its facing
Shortkey: R

Hunt – available to armoured fighting vehicles (AFV) only. Tells the vehicle to advance at medium speed and look for armoured targets and antitank guns. When armoured enemythese targets come into line of sight, the vehicle will stop and engage if it has a decent chance of causing damage to them, resuming on its

movement path after all valid targets have been killed or moved out of sight.
Shortkey: U

Shoot & Scoot – available only to AFVs. This is a two-leg order requiring placement of two waypoints. The first waypoint (Shoot) tell the unit to advance to that position and scout for targets. After several seconds, the unit is supposed to withdraw in reverse (Scoot) to the second waypoint (which – usually – is somewhere out of sight of the enemy).
Shortkey: Q

Seek Hull-down – orders unit to move forward toward the waypoint and, on that path, stop as soon as a position is found which will result in the vehicle being hull-down relative to a possible enemy in the waypoint's location. If no such position is found, the vehicle will move all the way to the waypoint.
Shortkey: D

Rotate – changes the unit's facing.
Shortkey: O

Pause – same as for infantry.
Shortkey: P

Impassable Terrain

Some units, especially vehicles, cannot enter certain types of terrain. Contrary to popular belief, tanks are not able to smash through thick forests in combat situations at will. As tough as tanks are, a single branch in the tracks can immobilize the vehicle and trees over a certain diameter (depending on the weight of the vehicle) cannot be pushed over easily. Crossing forests might be possible given ample time and caution and proper support by engineering units, but certainly does not work within the timeframe and pressure of an average battle in CM, and therefore the possibility for vehicles to traverse any woods heavier than "scattered trees" has been excluded for the sake of realism.

Vehicles Cannot Enter

Marsh, woods, tall pines, palm trees, rough, water, deep fords, slopes, cliffs, ice, buildings, roadblocks, rubble, tall hedges

Wheeled vehicles additionally cannot enter

Stone walls, hedges (exception: some more-rugged wheeled vehicles can cross hedges), barbed wire (halftracks also cannot enter barbed wire), trenches

Infantry (including mortars and other light support weapons) cannot enter

Cliffs, water

Infantry Guns and Anti-Tank Guns additionally cannot enter

buildings, roadblocks, barbed wire, deep and shallow fords, hedges, fences, walls, marsh, sandbags

If you try to issue a movement order to an impassable terrain feature, the movement order line turns red and disappears after left-clicking to indicate that movement to this objective is not possible. However, for the sake of convenience, it is possible to plot movement *across* impassable terrain. In such a case, when the unit approaches the obstacle, the AI will re-plot its movement path to allow the unit to move around the obstacle automatically. If this is not possible, the unit will cancel the movement order automatically.

Keep in mind that in such situations, the AI might not plot the movement quite as you had imagined it. If you require precision, you should use waypoints to lead the unit around an obstacle yourself.

Also keep in mind that despite being able to enter and move through a certain terrain feature, some vehicles have a much higher chance of bogging down than others while passing through difficult terrain. Usually, fully-tracked vehicles have the best cross-country performance.

Waypoints

It is possible to issue more than one movement order during an Orders Phase. In fact, there is (almost) no limit to how many orders you can issue. You could, for example, tell an infantry squad to run across a field to a patch of trees, then crawl through the trees, then walk down a road to a house. This is accomplished through the use of waypoints. After you issue the first movement order to a unit, you can then issue a second order. The second order automatically "starts" where the previous order ended (the only exception is the PAUSE order, which is ALWAYS used at the very beginning of a

turn). The end-point of the last order becomes the starting point for the new order.

If you know that you want to issue more than one movement order to a unit, you can right-click instead of left-clicking after each order. This keeps the order menu open and the selected unit active, and speeds up the whole process. Right-click to place waypoints, and then left-click to place the destination.

However, each additional order adds to a unit's "command delay", i.e. the more waypoints are added, the longer it will take for the unit to actually start moving at the beginning of the next action phase. This simulates that complicated orders take much longer to be communicated from a unit's parent HQ down to the unit supposed to execute the order. So it might be possible that extensive use of waypoints leads to a delay of even more than one minute before the unit starts carrying out its movement orders (and therefore the unit would spend the next whole turn in place). It is able to fire all its weapons and spot without restrictions meanwhile, however.

Some orders are "stand-alone", ie. they have to be the only order given for the turn and cannot be combined with other orders. "Assault", "Withdraw" and "Human Wave" are examples.

Editing Waypoints

Combat Mission: Afrika Korps lets you change and edit most (though not all) orders issued without having to redo them from scratch. Simply select a waypoint by left-clicking on it then move it around by holding the right mouse button. The waypoint follows the mouse, and when the mouse button is released, remains positioned at the last location pointed to.

If the waypoint was set in a previous turn (as can be noticed by the red color of the waypoint "cube") there is a limit to how far you can move it. The distance you can move it depends mainly on the unit's experience level and whether it is in command or not. Veteran units can have their waypoints edited to a much larger degree than green ones. Conscripts have to stick pretty much to the previously given orders with only little room to maneuver. Waypoints placed in the same Orders Phase as you are trying to edit them (colored white) can be moved without restriction.

You can also change the movement order for a waypoint by clicking on the waypoint and using a hotkey for the order you want to

change it to, or by pressing SPACE to bring up an abbreviated Orders menu of alternatives. Like this, you could change a MOVE order to a RUN order without having to redo everything from scratch. Changing the order type does not add command delays and is possible without restrictions regardless of a unit's experience or command state.

Of course, the option to delete orders is always available to you in addition to moving them. However, the big advantage of changing orders and waypoints (as described above) instead of deleting them and issuing new ones, is that the unit does not suffer an additional command delay. Waypoints placed in a previous Order Phase (red) can only be deleted in reverse sequence as they were issued (last to first) by simply hitting the BACKSPACE key, while waypoints placed in the same Order Phase (white) can be deleted in any order (including mid-way waypoints) by clicking on the specific waypoint "cube" and hitting the BACKSPACE key.

Pausing

The "pause" order tells a unit to remain in place at the start of a turn for longer than the usual command delay, before executing subsequent movement orders. This can be used to coordinate movements between units (e.g. have two tanks crest a hill at roughly the same time or have one column of vehicles start moving when another one is expected to have reached its target).

Pauses are allowed only at the beginning of a turn, and you cannot order additional pauses in between waypoints or at a later time in a turn. This, again, would allow for too much micromanagement, more than any company or even platoon commander would ever have.

For more details, see the description of the "Pause" order above.

Speed

How fast a unit is able to move depends largely on how much heavy equipment it is carrying, but also on the fatigue level of that unit and the terrain and ground conditions (for infantry); or on the maximum speed as well as terrain and ground conditions (for vehicles). A MOVE order is slower through a patch of dense woods than down a paved road. Keep this in mind when trying to keep your platoons in formation.

Exhausted infantry units are not allowed to run, sneak, or assault, even if they could do so while rested. Unlike in CMBO, however, even units with fairly heavy loads are allowed to run for short stretches, but will tire quickly while doing that. See also THE COMMAND for a description of the effects of fatigue on movement.

When you look at the detailed unit info screen (by selecting a unit and pressing ENTER), you can see an entry for "speed class" (for infantry) and the actual maximum speed in miles or kilometres per hour (for vehicles).

Infantry units with "speed class: very slow" are not allowed to run and sneak (and obviously immobile units are not allowed to move at all). All other units can use the RUN and SNEAK commands, but SLOW and MEDIUM SPEED units will tire very quickly.

Designer's Note: Try doing a 100-yard dash while carrying an MG42 with tripod and a couple hundred rounds of ammo and see how tired you feel!

Guns and heavy equipment also cannot use "combat-style" orders like Advance and Assault, largely because they lack the speed and stealth to use such tactical movements in any meaningful way.

Transporting units

Certain vehicles, like trucks, halftracks and even tanks, are capable of transporting units by towing them (guns), carrying them within the vehicle (infantry teams), or sometimes even allowing them to ride on top of the hull. Not all vehicles can transport all types of infantry. While a two-man artillery spotter team might fit into a jeep, it would be really hard to fit a 12-man squad into it! Which vehicles can transport which units is discussed in more detail in the Unit section.

In order to embark a unit into or onto a vehicle, you issue a movement order with the vehicle to be entered as its destination. When your cursor with an active movement order touches a vehicle eligible to transport the moving unit, the line color will turn white and the word EMBARK will be displayed.

When trying to embark units, keep in mind that it's difficult to do so while the vehicle is moving. Issue a PAUSE command for the vehicle in question or - even better - do not order it to move for the current turn. However, if the vehicle to be embarked is far away, you

can, of course, order it to move closer. The infantry unit will wait until the vehicle comes closer before it starts moving.

Use the same procedure to disembark from a vehicle. Simply select the unit you want to move off the vehicle, and give it a movement order somewhere on the map. However, just as with embarking, keep in mind that it's difficult (and dangerous) to jump off a vehicle while it's moving. Keep in mind the command delay of the infantry unit and make sure that the pause order for the transporting vehicle is longer than that.

Sometimes when the vehicle slows down to take a sharp turn, it might become so slow that the infantry will jump off without a pause order. Additionally, embarked units might decide to debark even if not ordered to, and even while the vehicle is moving - mainly when they are shot at. It depends on how heavy the incoming fire is and if the unit is protected while embarked, e.g. units in halftracks will usually stay there even if fired on, but units riding on the exposed back of a tank will jump off and search for cover quickly.

Note: embarked units are not able to use their weapons, and embarked Artillery Spotters cannot call artillery while riding in or on a vehicle.

Fire

Units on the battlefield constantly look for their own targets, and engage them based on many variables including exposure of the enemy, distance, cover, probability to hit, ability to cause damage, facing, available ammo, etc.

Most of the time the player does not need to worry about targeting - in fact, it is a good idea NOT to issue firing orders to your units most of the time. The reason is that units without player-issued firing orders usually react very quickly to new threats, whereas units with firing orders try to stick to them for as long as possible and override them only when another threat becomes disproportionately serious.

However, there are occasions when you want to make sure that a unit targets a particular enemy. There are several firing orders you can issue, but only one can be issued per unit per turn. Your units try to execute your orders and regard them as high priority, but they can and will retarget if they think it is wise to do so.

The following section looks at how to order your units to fire. The effects of fire, including a detailed look at armor penetrations and artillery procedures, is described in the next chapter, THE MEN AND MACHINES.

Available Firing Orders

Each unit that is allowed to target (isn't panicked, gun is working, etc.) has a number of targeting orders available to it.

Target

Shortkey: T
General purpose "shoot at this unit" order. If you click on a piece of terrain, the order automatically changes into an "Area Fire" order. The difference between "target" and "area fire" is that one targets a specific unit while the other targets any unit in that general area. The area covered by "area fire" is also larger than the one covered by the "target" order, and "area fire" is also more likely to cause suppression to adjacent troops.

Next Target

Shortkey: N (only available for direct firing units)
Automatically targets the "next" enemy unit in sight. This is a great way to scan quickly through all available targets for the selected unit, and also allows a quick check of which enemy units are actually visible. It will not work if the firing unit is not capable of firing, though, or if a unit is within line of sight, but outside of the maximum range of that unit's weapons.

Cancel Target

Shortkey: X
Cancels the currently selected target.

Smoke

Shortkey: K
Some units (guns and armoured fighting vehicles as well as some artillery) are capable of firing a special type of ammunition which, within a few seconds of impact, creates a smoke screen for a limited amount of time. Firing smoke ammunition can be ordered using this command. Infantry squads are not capable of placing smoke in CMAK.

Note: units CAN use smoke ammunition automatically without being specifically ordered to do so, for example when they have no other ammunition capable of hurting an enemy, or when they retreat.

Target Wide

Shortkey: I (for Artillery spotters only)
Artillery spotters can instruct the firing battery to spread out its shells rather than aim at a pinpoint target. This is a good way to suppress large, dispersed formations of enemy troops.

Add Time

Shortkey: Q (for Artillery spotters only)
Adds a delay to a prep-bombardment in increments of 1 minute. Only available during the first order phase of a battle.

Reset Target

Shortkey: R (for Artillery spotters only)
Resets the fire order for an artillery spotter to what it was at the end of the last action phase. Useful since altering an artillery spotter's orders usually results in large time delays, and this order allows you to reset any changes you have made without adding extra time delays.

Targeting Feedback

When you move the cursor over an enemy unit after selecting a target order, some additional data is displayed about the target. Which data is displayed depends on the firing unit as well as target.

Unit Type: the unit type is displayed on top, to the degree it has been identified at least. A "?" after the unit type means that it has not been fully identified yet, and the information you see displayed could, in fact, be plain wrong.

Distance: the distance between the firing unit and the target is shown in meters

Exposure (Infantry/non-Armored Vehicles): a percentage value, stating how much of the target is vulnerable based on an abstract maximum (100%)

Firepower (Infantry/non-Armored Vehicles): the amount of firepower that the firing unit (i.e. the one you're giving orders to) can bring to bear on the unit pointed to by the cursor.

Hit Chance (Armored Vehicles): a rough chance to hit the target - rough, because it changes constantly during the course of an Action Phase.

Note that when a unit ended the last Action turn as "moving", the hit chance displayed will be based on that movement status. When you order the vehicle to HALT, the hit chance will be higher than shown during the Order Phase.

Kill Chance (Armored Vehicles): an approximate chance the firing unit has to destroy the target. This can be Excellent, Very Good, Good, OK, Fair, Low, Very Low, Rare, None, depending on a lot of factors which change constantly during an Action Phase. For example, the kill chance is related to the current facing of the target unit, so a tank that shows a low chance of kill to its thickly-armored front might actually be easier to kill from its flanks or rear. Even with an extremely small kill chance (e.g. "None"), it is possible to damage a tank (hit the tracks, gun, or cause internal armor "flaking", killing crew members) or even destroy it by a lucky hit on a weak spot. Weak spots can be hatches, MG mounts, vision blocks, or even poorly-manufactured armor plate.

Out of range: when the target is out of effective range of the firing weapon (too far or too close), this is displayed in yellow text. (Note: you can find the minimum or maximum range of a weapon in the Detailed Unit Info screen)

Out of sight: if the enemy unit is not within sight of the selected unit checking its line of sight, the "out of LOS" message is displayed. Additionally, no hit or kill chances are shown.

Hull down (Vehicles): both the firing unit as well as the target can be hull down (i.e. only the turret/superstructure are visible and therefore exposed to fire). If the target is hull down, this is displayed above the target unit. If the shooter is hull down, this is displayed above the firing unit. Sometimes an additional "bow MG blocked" message will appear, indicating that while the main gun can engage a target, the machinegun (or in some cases the flamethrower) mounted in the hull bow cannot.

Boresighted: when targeting an enemy unit located close to a Target Reference Point (TRP), the word "boresighted" will appear,

provided that the firing unit has not moved from its original setup position. This indicates that the target area has been pre-registered, and that hit probability is increased. Pre-registering a target usually means that the distance to the target has been previously measured, maybe even including several test shots prior to combat, and that the needed gun elevation and direction have been noted on so called "target registration cards", allowing the firing unit to acquire the target quickly and with high accuracy. All this is moot, of course, when your unit moves, since the registered data is only useful relative to a certain position.

In some instances, no additional information besides the unit type and distance is displayed. This usually indicates that the firing unit is not capable of damaging the target (e.g. firing pistols at a tank).

Direct Fire and Area Fire

The target of a fire order does not always need to be an enemy unit. You can order your troops to fire at anything such as houses, woods, even open fields. The term used for this type of fire is "Area fire". Area fire can cause casualties to units within the target area, and although less lethal than aimed direct fire, it can suppress adjacent units over a larger area than aimed direct fire. Also, area fire is the only option if you wish to fire upon suspected enemy positions before the enemy has actually been spotted.

Area fire usually lasts until the order is cancelled by the player. However, area fire automatically stops if a friendly unit enters the targeted zone OR - on rare occasions - when the firing unit has decided to engage another target on its own. Direct fire lasts for only as long as the target is within line-of-sight (LOS) and is automatically cancelled a few seconds after it goes out of sight or is destroyed.

Hint: Units which go prone often disappear out of sight of the firing unit (e.g. behind a stone wall), so "area fire" is usually the better choice when the aim is to suppress an enemy generally, because it is kept up even after the target is not visible. In such instances, it is often better to select an area close to the enemy you intend to suppress, not the enemy unit itself.

On some occasions, you might see generic unit markers (a star for US units for example) which seem to be within LOS of your units. However, the fact that a generic marker rather than the actual unit is displayed indicates that the unit in fact is completely out of sight

(e.g. prone in a foxhole, behind a hedge, or has retreated away), even though the area is within LOS. In such cases you are only allowed to target the area, not the particular unit.

Note: the blast from high explosive rounds can hurt units out of LOS of the shooter.

It is also possible for the player to issue a Direct fire target order even if the enemy unit is out of LOS during the Orders Phase, but might come into LOS during the following Action Phase. The firing unit tracks the designated target for a few seconds and engages it should it come within LOS. If it doesn't, then the firing unit cancels its order and looks for other targets. However, it retains a tendency to retarget the original enemy should it appear later on. This way you could, for example, stop behind a house, issue a movement order forward and at the same time target an enemy tank which might come into view during the Action Phase. This usually ensures that your tank will engage this enemy (unless a much more significant threat suddenly appears).

Some units, like artillery spotters and (in certain cases) mortars, can be issued indirect fire orders against units or areas out of LOS. In such cases the units start firing immediately, without waiting to obtain a line of sight.

Hint: If, in the middle of issuing a targeting order you change your mind, you can press the SPACE bar and the new order will be canceled, preserving the previous targeting order.

Firing Arcs

Vehicles without a turret (e.g. assault guns which have the main gun fixed to the main hull) can only engage targets within a limited arc in front of the unit without having to rotate the whole vehicle or gun. This is called a "firing arc". How wide it is (in degrees) depends on the particular vehicle model. Should you issue a target order to such units and point outside of its firing arc, the firing unit has to rotate first in order to aim and fire. Not only does this cost time and usually mean worse accuracy for the first shot, it is also especially bad news if the firing unit is immobilized! If your turretless vehicle is moving and you select a target outside its firing arc, the targeting line will be colored maroon, indicating that the target cannot be aimed at while moving in the direction ordered, and can only be engaged when your vehicle stops moving.

Cover, Concealment, Firing on the Move

When issuing the order to fire at an enemy, there are various interface aids to help the player quickly judge the potential effect the fire will have. "Exposure" and "hit chance" allow you to see quickly if the target is clearly visible and easy to hit, "kill chance" indicates a rough estimate of the chances to destroy an armored vehicle and so on. What the interface does not show are the game mechanics these chances and estimates are based on. Three things specifically need to be kept in mind:

Firing on the Move

Most vehicles are able to move and fire their main guns at the same time. But the fact that it's possible doesn't necessarily mean that it's very effective. You will notice quickly that the accuracy of moving vehicles drops drastically. Next time you play with armor, select a vehicle with an active movement order at the beginning of an orders phase. Select the Target order from the order menu and point at any visible enemy target. You will notive a significant drop-off in accuracy, which increases over distance also. In fact, firing on the move is not likely to hit any specific target, but it can still suppress the enemy, especially when massed on a specific location.

Concealment

Units which haven't moved from their initial setup positions, even those not in foxholes or trenches, are assumed by CMAK to be camouflaged, and are more difficult to spot than units which have moved in subsequent turns. You won't notice the difference when you place an anti-tank gun in open ground, especially when not in a foxhole or trench, but woods, rough and other terrain obscuring line of sight will make your units as good as unspottable until they open fire.

Cover

The "exposure" and "hit chance" indicators are just a snapshot of the moment. Keep in mind that during the 60 seconds of an action phase, units move, angles and lines of sight change, and what was a sure shot at the beginning of a phase might become impossible a few seconds later. An infantry squad, running across open ground, might be shown with a high exposure at the beginning of a turn, but after a few seconds it could go prone in brush or rough terrain, and that exposure value drops significantly. A tank, in open view of your

forces, could move into a hull-down position or behind a patch of scattered trees, and become a lot harder to hit.

All of the above are difficult to quantify and show in the interface for any given moment, as the whole battlefield in CMAK is "in motion" when the clock is ticking. Keep in mind that when something is not shown, it doesn't mean it has no effect, and instead of trying to play by numbers (something often found among veteran boardgamers), playing with an open mind and a focus on what could work in the real world is usually the better choice.

Hide

Sometimes the safest thing to do when faced with a powerful enemy unit is hide from it, especially if you haven't yet been spotted. Often, skillful use of hiding, especially as the defender, will allow you to remain invisible to your opponent until you feel the time is right to engage in direct combat.

The Hide order instructs a unit to remain hidden and quiet, but reduces its spotting ability somewhat. Be advised that hidden units occasionally will open fire of their own accord, usually on enemies that approach to a dangerously close range.

Hiding, if done right, keeps your units unspotted until the enemy virtually steps on them. "If done right" are the key words here. Trying to hide in the middle of open ground, on top of a bare hill, or behind a stone wall when the enemy is coming across a high hill are not a good ideas. Hiding in buildings, woods, or rubble (to name a few examples) works much better and usually allows you to remain unspotted until you choose to engage the enemy.

Note: hiding units spot somewhat worse than non-hiding units, simulating the fact that their main concern is not being seen, and that only a limited number of soldiers (in a squad for example) are able to spot for targets, while the others remain out of sight.

If you issue a TARGET order to hiding troops, they automatically unhide, ready to open fire immediately at the beginning of the next Action Phase. You can, however, order them to hide again. This keeps the TARGET order active, but your troops try and remain hidden until the chosen target comes well within their lethal zone. Of course they might still engage another target if it becomes a serious threat. Generally however, an ambush is best set using the Cover Arc command (see below).

Cover Arc

Units can be ordered to cover a specific firing arc. This is done by selecting the COVER ARC order from a unit's order menu, and then placing the two limiting edges of the arc to be covered on the map. The roughly triangle-shaped wedge formed by those two edges and anchored at the unit becomes the arc the unit will focus on. This way it is possible to assign fire zones to individual units, and prevent them from targeting enemies outside those zones. How well your units stick to the assigned zones depends on their experience, whether they are in command, and their commander's steath skill.

By holding the Shift button after selecting the COVER ARC command, the arc width will automatically be set to a maximum 180°, and only one left-click is required to determine the "range" and orientation of the arc. This is a quick way to instruct units to hold fire until enemy has advanced to within a certain distance of your positions.

By holding the Control button after selecting the COVER ARC command, the arc width will be automatically set to 180° AND the arc will automatically extend across the full length of the map. Left-clicking is only required to set the orientation of the arc. This is a quick way to instruct your units to disregard enemy in the rear and open fire on any visible units in a certain direction without limiting range.

A unit with a covered arc command assigned to it will automatically rotate to face the middle of the covered area, in order to minimize time to engage enemy units across the full arc. It will of course rotate towards an enemy unit once it enters the arc, but the initially chosen arc remains in effect. When no enemy units are visible, the unit will rotate back to facing the middle of the arc after a few seconds.

Each arc can be a minimum of 20 meters long and 10° in width.

Anti-Tank weapons can also be assigned a COVER ARMOR firing arc, instructing them to limit their fire to enemy armored units only. This is a good way to have your anti-armor weapons hold their fire even when in sight of enemy infantry, thereby not giving away their position until enemy tanks appear.

Note: keep in mind that trucks and jeeps and very light armored cars, just to name a few examples, are NOT considered "armored vehicles" for the purposes of covered arcs, and are not regarded as valid targets for a unit with an active Cover Armor command.

Hidden units assigned covered arcs will immediately stop hiding when they notice an enemy unit enter the covered arc. This does not mean they will *automatically* open fire on that unit, though they usually will if they have a good shot. This is a useful way to coordinate an ambush because your hidden troops will be difficult for the enemy to spot, but once the enemy enters your covered arcs, your hidden troops will stop hiding and begin to target enemies (within the covered arcs) normally, usually meaning that they'll open fire on good targets.

Note: A Cover Arc command puts the unit into a mode where it is more likely to engage targets (within its Arc, of course) than witout the command. This depends on how likely the unit can cause the target harm. For example, if you had two unassigned HMGs next to each other, and a dug in enemy unit in good cover is spotted hundreds of meters away, a HMG with a Cover Arc command is more likely to fire than one without. However, if the enemy unit is moving around in the open several hundred meters away, both are likely to open fire regardless of if it has a Cover Arc command or not. The downside is that a Cover Arc unit might use a lot of valuable ammo without much noticable results. Units are not likely to, on their own, use up ammo and expose themselves to retaliation unless they feel there is a good reason to be shooting. The lower the Exposure and Firepower numbers both are, the less likely the unit will fire on its own. The player can override this behavior by issuing a Target order or in some cases using a Cover Arc command.

Special

There are several special orders in CM, which do not fall into any of the previous categories. Some are available for all units, others only for specific types.

Line of Sight (LOS)

Shortkey: L
This order is unlike any other because it doesn't actually instruct the selected unit to do anything. Instead, it's an "LOS tool" which can be used to check exactly what the unit can see and what it can't. After selecting the order, a line extends from the unit towards the mouse cursor as with other movement or targeting orders. But this

line does not tell the unit to go anywhere or rotate. Instead it gives information about its field of view. Left-clicking with the LOS order active simply deselects the LOS tool.

The line of sight (LOS) line is color coded. There are basically three colors (blue, red and black), which indicate:

Blue

The area or unit at which the cursor is pointing is within line of sight and therefore can be seen (and probably fired on if necessary) by the selected unit. Depending on the "quality" of the LOS the color can be light blue (excellent visibility), dark blue (bad visibility), or any shade in between. As you move your line of sight from an open field to woods, you can see that the line's color gets darker and darker, showing that more and more foliage and trees obstruct the unit's vision.

Red/Black

The area or unit at which the cursor is pointing is not within line of sight and therefore cannot be seen (and only fired at using indirect-fire weapons like artillery under certain circumstances). The line has two colors in such a case - red towards the first obstacle on the path blocking the line of sight, and black from there on. This is useful because it hints at what exactly is in the way between your unit and the area/unit to be seen. In woods, for example, you are able to judge how far forward you have to move in order to peek outside of the forest while remaining in maximum cover and concealment. However, the point between the red and black color shows only the FIRST possible obstacle within the line of sight. There may be additional ones behind it, but you are not able to see them yet.

Keep in mind that because Combat Mission: Afrika Korps employs a three-dimensional battlefield, lines of sight can be found in all three dimensions. A unit on a hill may be able to see behind a house or even a group of tall trees, if it is sufficiently higher than the obstacle. Also don't be surprised if you are able to see the second story of a house, but not the first one, if, for example, a patch of trees is blocking the lower levels.

When you move the LOS line above an enemy unit, some additional information is displayed (see "FIRING ORDERS" section).

Button Up / Open Up

Shortkey: Z

Many armored vehicles are built to provide all-around protection for their crews. Once they close their hatches or steel doors, they are more or less protected at least from small arms fire. "Button up" orders hatches closed, while "Unbutton" has the reverse effect.

Even open-top vehicles can "button up" in a sense, by having the crew duck down to take cover within the armored hull. Even if buttoned up, such open-top vehicles of course can still be hurt from above by grenades or small arms fire at higher elevations.

In any case, buttoned-up vehicles may not use any weapons which are mounted on the outside (e.g. antiaircraft machineguns on tanks and halftracks), with the exception of remotely-operated machineguns (mounted on some late-war German assault guns), since these can be triggered from the inside of the crew compartment, and the MG42 mounted on the front of the German Schützenpanzerwagen (SPW), because it has a full-size armored shield to protect the shooter (from the front at least).

Usually, you don't need to order your vehicles to button up as they will do so automatically when they receive enemy fire or shrapnel from nearby exploding artillery rounds. However, sometimes this might be too late, and if you know that your vehicle is going to enter some lines of fire, it might be a good decision to order it to button up before the bullets start pinging against the armor. Unfortunately, buttoned vehicles are virtually "blind", as visibility is reduced to small vision slits or periscopes, and buttoning up too early might cause your vehicle to stumble into a nasty ambush.

Your units will chose to button up or unbutton deliberately, depending on their morale and suppression status. Also, some tanks have to button up in order to be able to fire their main guns (because the tank commander is also the gunner), and they will do so and unbutton after firing to spot for new targets without having to be ordered to do so.

While unbuttoned, your crew runs the risk of being killed or injured by all the hot lead flying around on a battlefield. Tank commanders during World War Two suffered significant casualty rates for this reason. Once a crew member is injured or killed, the

rest of the crew usually will be SHOCKED for some time and not able to execute any orders for as long as it remains shocked. Moreover, the remaining crew will have to rearrange positions within the vehicle and/or show a natural reluctance to expose themselves to enemy fire for the remainder of the scenario. Such vehicles will often remain buttoned for the remainder of the battle.

Split Squad

Shortkey: None

While squads usually are the smallest maneuverable unit on CM's battlefield, under certain circumstances the player might want to split one or more of is squads, e.g. in order to set up outposts in front of his main positions or to assault tanks (and avoid risking a whole squad for this task). The SPLIT SQUAD order allows this, but not without certain drawbacks.

One drawback is that half-squads have generally less combat power than they do when they are one coherent and well-coordinated squad. By splitting squads, the player sacrifices a portion of a squad's concentrated firepower in exchange for higher maneuverability of the two units. The other drawback, maybe even more serious, is that half-squads are more "brittle" than full squads, tending to panic more quickly. For these reasons, half-squads should usually be used only in an observation role (as outposts or scouts).

When squads are split, the resulting half-squads are separated into an assault element (retaining most of the explosives, anti-tank weapons and submachineguns) and a support element (retaining machineguns and rifles, able to provide covering and suppression fire at longer distances).

Only half-squads originating from the same full squad can be re-joined. This happens automatically by moving them close together (10m or closer) at the end of a turn. Should one half of the squad be eliminated, the other half still cannot join with any other half-squad for the remainder of the game. It is not possible to split teams or any other units.

"Able Fox Five to Able Fox. I got a target but ya gotta be patient."

The Men and Machines

Units in Combat Mission: Afrika Korps represent squads and teams of soldiers as well as individual vehicles and guns with crew. These are (with a few exceptions) the smallest tactical elements that can receive orders – in other words, in Combat Mission you are not telling every individual soldier what to do, but issue orders from the position of a squad or team leader to the whole group.

This is obvious from looking at your units – although you will see individual figures standing on the map, these do not represent single men, but rather a group. In the case of squads, usually three figures (two if you use the "reduced figures" option) represent anywhere from 7-14 men. Teams (including HQs and gun crews) are usually shown as one figure regardless of the actual team size – a design decision to keep squads and teams easily recognizable.

Designer's note: We would have loved to show every single man on the battlefield, but have decided not to because of restrictions of current computer hardware to display and animate thousands of soldiers on the map, and in order to keep the interface from getting

clogged. Individual soldiers and their positions on the battlefield ARE tracked with regard to casualties, however, albeit somewhat abstractly.

Combat Mission: Afrika Korps features a tremendous number of units for each of the nations, including infantry formations, guns and vehicles and other heavy weapons. Listing them all even with a brief overview would be totally beyond the scope of this manual. However, each unit's detailed information can be accessed from within the game and in the editor, by clicking on a unit and hitting the ENTER key. This opens the Detailed Unit Information window in the upper left corner. Detailed stats for each unit, its weapons, and capabilities are displayed here. On the following pages you will find a short explanation of what is shown and tracked by CMAK.

Men

Nationality, Division and Type of Unit

This shows the nationality of the unit, its parent division type, and the unit type, similar to what is shown in the unit information panel described earlier.

Speed Class

The speed class determines the speed at which the infantry unit is able to move. The speed class a unit belongs to depends
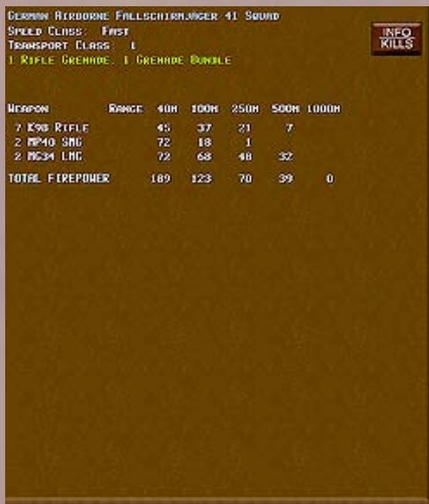
essentially on how much heavy equipment it is carrying. There are three speed classes for infantry units (there are some more for other units, explained later in this chapter):

Slow - most heavy equipment (e.g. the MG42 heavy machinegun) but also units carrying a lot of extra equipment like artillery spotting teams without radio sets

Medium - light machineguns, light mortars (e.g. the 60mm mortar), and spotters with radios

Fast - squads, sharpshooters, and other small and mobile infantry teams

Slow and medium speed units CAN use RUN movement orders, but will tire a lot faster than FAST units; if you do not want to exhaust your troops too quickly, RUN orders should be given to slow and medium units to cover short stretches in emergencies only.

Transport Class

Ranges from 1 to 9, with 9 representing the largest heavy equipment in the game. Units can only mount vehicles which offer at least the same or higher transport class.

Leadership Abilities

If the selected unit is an HQ unit, its leadership abilities (if any) are displayed as, for example, "Morale +1" or "Command +2".

Special Equipment

If a unit is carrying special equipment (e.g. Panzerfaust, rifle grenades, demolition charges, Molotov cocktails, magnetic mines etc.), the type and quantity is mentioned here. Hand grenades are NOT mentioned here seperately. Also, if the unit has binoculars (greatly enhancing its long range spotting and identifying abilities), this will be noted here as - you guessed it - "has binoculars".

Weapons & Firepower

A list of available small arms for the selected unit is displayed. Which weapons are available depends on the nationality and type of the unit. Note that some captured weapons can be assigned to units from game start, depending on their documented historical use.

As the unit takes casualties, individual weapons disappear from the list, showing that the soldier carrying that particular weapon has

been put out of action. Sometimes, however, soldiers can exchange weapons. For example, if the soldier carrying a squad's machinegun is hit, another soldier of that squad might drop his own weapon and pick it up.

Beside the weapons listing, a firepower table shows the firepower of each weapon according to the range to a target. The firepower (FP) is shown for all weapons of the same type, e.g. a German Rilfe 44 squad has 6 K98 rifles. That means 6 x fp 3 at 250m = 18 fp. However, the firepower as shown in increments of 40m, 100m, 250m, 500m, and 1000m is a reference for the player only - the game engine uses a more precise system measuring down to the meter.

Eligible for exit

If a unit is eligible for map exit (as part of a scenario's victory objectives), this will be noted in the right upper corner of the detailed unit info screen.

Info/Kills

By clicking on the white Info/Kills box in the upper right corner of the info screen, you can toggle the display between unit stats and a summary of how the unit fared in the particular battle so far. To preserve the "fog of war", only verified kills are shown - so if your mortar team takes out a squad hiding in woods and nobody sees it, the "kill" will not be shown here until the battle is completely over.

Machines

Nationality, Division and Type of Unit

This shows the nationality of the unit, its parent division type, and the unit type, similar to what is shown in the unit information panel described earlier.

Maximum Speed

This states (in miles per hour and meters per second) the maximum speed the vehicle can go on a paved road. Cross-country movement is generally much slower.

Weight

Measured in tons (U.S. and metric).

Engine

The horsepower is used for speed and acceleration calculations. Diesel-powered engines are slightly less likely to catch fire when hit.

Ground Pressure

Measurement of the vehicle weight and the surface-contact area of its tracks. Higher ground pressure increases the chance of bogging down.

Silhouette

A numerical value representing the size of the vehicle, modified especially by its height, that affects gunnery accuracy and spotting against it. A value of 100 is "medium size".

Transport Class

A vehicle can only transport (tow) other units with the same or lower transport class.

Passenger Capacity

Can be squad, team or none. Units may ride on the deck of a tank for example, or within a passenger compartment on transport vehicles like some halftracks and trucks.

Armor

The armor table gives the thickness and slope of armor for various tank parts (usually turret, upper hull, lower hull, and top) for the front, sides and rear. Other information may include armor quality (values lower than 100% represent manufacturing and metallurgical flaws, common in early Allied vehicles and some late-war German vehicles). Special features like armor skirts (Schürzen) or partly-open vehicles (open top and/or sides) are also noted here, along with "curved" mantlets such as the famous "Saukopfblende" of the German StuGIII, which can provide an effective armor protection substantially higher than the base thickness and slope indicate (depending on which part of the curved armor is hit, thickness and slope can vary to a large degree within a fairly small hit area). When you see a value like "50+20", then the 50 represents the tank's base armor, and the 20 additional bolted-on armor, either as field modification or done by the factory. This increases armor protection somewhat, but bolted-on armor is usually a somewhat less effective than the armor of the same thickness made from a single piece of metal.

Special Equipment

Smoke Dischargers - small chemical packets mounted on the outside of a tank that can create a smoke cloud.

Nahverteidigungswaffe - close defense weapon - hurls an HE or smoke grenade from the inside of the tank against any enemy infantry approaching the tank.

Alternate Rear-facing Driver - some German armored cars were equipped with a second driver seat in the rear of the vehicle, allowing them to reverse quickly out of enemy view.

Cupola - some tanks feature a tank commander's hatch with cupola allowing the tank commander a 360° view around the tank even with the hatch closed. It enhances a tank's close range observation against infantry assaults, even from from the rear.

1 man turret - some early war tank models with a crew of 2 have only one man in the turret - meaning that the tank commander is usually also the gunner and loader, and therefore cannot remain unbuttoned and fire the tank's main armament at the same time. This greatly diminishes a tank's spotting abilities while firing and affects rate of fire and accuracy also, as the tank commander has to reload by himself and therefore is forced to take his eye off the sight for each shot.

2 man turret - many earlier tank models have only two men in the turret - usually a loader and the tank commander/gunner. This greatly diminishes a tank's spotting abilities while firing, rate of fire and accuracy - albeit not as much as a 1 man turret layout. The tank must button up to fire its main armament.

Radio - many early war tanks were not equipped with radios, making inter-platoon communication for armored formations very difficult, having to use hand signs, flares and even whistles to communicate. Tanks without radio have to stay a lot closer to the formation's parent HQ to remain in command, and also lose any command bonus when either the HQ or subordinate unit (or both) are buttoned up.

Gyrostabilizer - some tanks (Shermans, Stuarts) are equipped with a gyrostabilizing system, which keeps the gun barrel level even while the vehicle is moving. THis enables the tank to fire more accurately on the move.

Optics

All vehicles in game are rated for their optics (described in more detail later in this chapter). When a vehicle or tank has optics better than STANDARD, this is listed here.

Special Features

Burns Easily - some vehicles stow ammunition and/or fuel in such a way that internal damage regularly causes the entire vehicle to catch fire.

Shot Trap - certain vehicles (like the early Panther model A) have a design flaw in their external shape, which creates a "shot trap" - a curved surface on the underside of the turret front which deflects incoming projectiles downward into the turret ring, or the weakly-armored hull top, where it often penetrates easily.

Slow ROF - certain vehicles are known for their slow "rate of fire", i.e. long reloading times for their main gun. This can be due to design flaws (e.g. a cramped crew compartment) or especially bulky ammunition or cumbersome loading mechanisms.

Turret Speed

Turreted vehicles (mostly tanks but also some armored cars) are rated for their ability to rotate the turret. Five different speeds are possible: Very fast turret, fast turret, medium turret, slow turret, very slow turret.

Machine Gun

Most vehicles have one or more machineguns mounted in various places. Most common are bow and co-axial MGs, with the first able to fire only within the vehicle hull's front arc, while the latter can be directed wherever the main gun can point. "Flexible" machineguns, usually top-mounted and meant for antiaircraft purposes, have a full 360º traverse but can normally only be operated when the vehicle is unbuttoned, though some German vehicles have remote-control capability for these weapons (which, if applicable, is also listed here). Some tanks feature an MG mounted on the rear of the turret, but this usually cannot be fired at the same time as the main gun, as there is no extra crew to man this MG at all times. Machinegun ammo is listed in brackets.

Flame

Vehicles equipped with a flamethrower have this entry, together with the available "ammo", i.e. flamebursts. Note that flames fired at longer ranges can use more than one "ammo point" per shot.

Main Weapon

Gives the caliber, muzzle velocity and blast strength of the main gun, as well as any other special info, e.g. "rear-facing" for vehicles with guns (or mortars) only capable of firing towards the rear of the vehicle. The blast strength is a rough measure that represents, in a single number, the values tracked by the game engine, which are the explosive power and the shrapnel generation of the gun's shells.

Armor Penetration

The penetration table states how many millimeters of armor the shell can penetrate at four ranges (100m, 500m, 1000m, and 2000m), for three different armor slopes (0°, 30° and 60°) and the various anti-armor ammunition types that the gun can fire. These values, however, can vary a lot in the heat of battle, and are supposed to give a rough idea only. Also, although only four ranges are shown, the game engine uses much more precise algorithms (down to a fraction of a meter). The table is color coded to correspond to the colors shown for the various armor parts in the unit interface. For each ammo type, also additional information is listed, like the muzzle velocity and type of ammo (explained later in this chapter). For multi-gun vehicles, a listing like "a7" or "h7" indicates to which of the guns it applies; if e.g. a multi-gun tank has

a 37mm and a 75mm gun, "a7" would indicate that the penetration information applies to the 75mm gun.

Guns

The details screen for guns is a mix of the entries available for infantry units and tanks. Most entries are the same as for infantry units. Additional to that, the MAIN WEAPON is shown, including caliber (e.g. 57mm), muzzle velocity (e.g. 823 m/sec) and a blast value. The latter indicates roughly how lethal the weapon is within a certain range from the impact point.

For guns, the optics (explained in detail further below) are listed here as well, if they are classified as better than STANDARD.

Below that is an armor penetration table, which is intended to give a rough idea of the potential of the gun. It's a rough idea only because a lot of factors influence the actual chance of armor penetration in the heat of battle.

The penetration table states how many millimeters of armor the shell can penetrate at four ranges (100m, 500m, 1000m, and 2000m), for three different armor slopes and the best anti-armor ammunition types that the gun can fire.

Two additional speed levels are available for guns:

Immobile - the unit cannot move on its own and has to be towed (usually only heavy guns, e.g. the 88mm Flak). Additionally, guns which took an exceptionally long time to be prepared for towing after having been setup for firing, will be noted as "cannot embark during battle". Such units can enter the game map towed and move into position, but cannot embark once they disembark. Keep in mind that vehicles can only tow guns with the same or a lower transport class.

Very Slow - usually used for heavier guns which can be pushed by their crews, albeit slowly (e.g. the 75mm AT Gun)

Weapons

Small arms

"Small arms" is a military term describing rifles, pistols, machineguns, and other small-caliber bullet-firing weapons wielded by the individual soldier. Although Combat Mission: Afrika Korps simulates squads and teams rather than individual soldiers, it does treat all weapons of an infantry unit individually.

Small arms and MGs use abstracted "ammo points". When a squad or team fires it expends one ammo point. Infantry units never run completely out of ammunition to simulate the scrounging of ammo found on the battlefield or taken from fallen comrades. Instead, when the last ammo point has been used, ammo is considered to be "low" and the unit tries to conserve its last ammo. Such units fire their weapons rarely and even then primarily in self-defense.

Machineguns on vehicles are treated like other Small Arms. Unlike these, however, ammo counts for MGs are displayed in the unit's Detailed Unit Information window, and the vehicle MGs CAN run out of ammo. Vehicle-mounted flamethrowers sometimes consume even more than one "ammo point" per shot when the target is near the maximum flamethrower range.

Long Distance Targeting

In the case of infantry squads, all weapons of a squad which are effective at the particular range to the target are fired automatically. This means that usually past 400 meters, only the squad's light

automatic weapon will fire. As the target comes closer first rifles, and then submachineguns, join in.

Ammo Loss Due to Casualties

Ammo points are reduced whenever a moving team-served weapon (not squad!) suffers casualties. This simulates the "lost" ammo carried by the now-incapacitated men. Take a bazooka team for example. It consists of two men; a gunner and an ammo bearer. If one of them is hit, expect to see the ammo available for the unit cut significantly. The same is true for machinegun teams, although these usually have more than one ammo bearer which means the ammo loss is not as dramatic.

Extra and Reduced Ammo Levels

During prepared defense situations, units often are awarded (by the scenario designer) extra ammo to "stockpile" within their fortified positions. Even if a unit suffers no casualties, the extra ammo is lost once the team decides to leave its defensive position, because there's no one to carry it!

Units can also start out with less ammo than they normally can carry. This would be done to simulate units that are under-supplied or have recently had intense combat and have not yet had the chance to acquire replacement ammo fully.

Effects of Small-arms Fire

When a unit fires, the firepower rating is used to determine the chance of causing damage. Many factors are used in the calculations, like exposure of the enemy unit, the terrain it is in, the activity and suppression of both firer and target (running, crawling, hiding), the marksmanship (experience) of the firing unit - just to name a few.

Generally, the higher the outgoing firepower and the higher the exposure of the target, the more casualties can be expected with each "shot". A random factor is built in, however, as "lady luck" always takes part in any combat situation.

Suppression

Even when no casualties are caused, incoming fire always has a chance to suppress the target and other units nearby. The higher the effective firepower, the higher the chance of suppressing the enemy.

But suppression does not always mean that the enemy goes prone or runs away. Sometimes incoming fire will "only" change the enemy unit's status from OK to Alerted or Cautious, which might be enough to cause it to re-evaluate its orders or return fire less effectively.

Small arms fire from a unit (simulating sometimes the firing of a dozen rifles and machineguns at a time) is NOT directed at one pinpoint area only. Instead, each "shot" affects an area around the target unit or zone, in which it can cause casualties or suppression. This area is bigger for the "area fire" command.

Infantry Casualties

Casualties for infantry squads and teams are tracked on a man-by-man basis instead of an arbitrary "unit strength" rating. When a squad is fired at, the game determines how many and which of its members are hit. When a man (or men) of your unit has been hit, you can see this immediately in the detailed info window, because the weapon carried by that particular soldier is removed from the list, and the firepower ratings adjusted accordingly.

Example: a German Rifle 1944 squad consists of 6 soldiers armed with the K98 bolt action rifle, two MP40 submachineguns and one MG42 light machinegun. If the squad is hit and suffers one casualty, one of these weapons (and the soldier carrying it) is removed. You might lose a rifle, the submachinegun or - if you're unlucky - the MG42 gunner.

However, important squad weapons - like machineguns (e.g. MG42s) as well as light anti-tank weapons - might be picked up by another squad member even if the man initially carrying the weapon is hit. In such a case, one of the squad members drops his own weapon and acquires the more important one.

Casualties do not necessarily represent dead soldiers. In fact, most of the soldiers regarded as casualties are not dead, just (more or less) seriously wounded. But the end result is the same since the soldier is not capable of fighting any more and is removed from the squad as a casualty. Only at the end of the battle is the actual

distribution of wounded vs. killed determined (randomly). A portion of the casualties sustained might be wounded just lightly and return for subsequent battles (during operations).

Casualties for infantry units have several effects during the course of a game. Besides an adverse effect on a unit's morale, there is a loss of firepower as individual weapons are removed. Additionally, if a heavy infantry weapon (e.g. most mortars and heavy machineguns) loses most of its crew, not only is ammunition lost if the unit attempts to move, but when only one man remains the weapon becomes entirely immobilized because a single man simply cannot effectively carry the weapon, ammo, and personal equipment by himself.

Hand-To-Hand Combat

Up close and personal, this kind of combat usually does not last very long, as one or the other side (and often both) are decimated quickly and either surrender or are completely annihilated. Close combat starts when two infantry units are within approximately 20 meters or so from each other. You can recognize hand-to-hand combat by the sounds of shouts and rifle butts knocking on helmets, as well as liberal use of grenades by both sides. The victor usually is the one that had some combination of superior numbers, close-range firepower (e.g. SMGs), better experience, and suppressing fire from other friendly units.

Normally, small arms like rifles and machineguns are too weak to cause serious damage to armored vehicles. The exception is lightly-armored vehicles like halftracks and armored cars, or "soft" vehicles without any armor (e.g. jeeps, trucks, and assault boats). These can indeed be penetrated and even destroyed by small arms fire. The penetration chances decrease with distance, but the HMG42 can destroy lightly armored halftracks or armored cars out to as much as 200 or 300 meters depending on angle.

But even if no penetration is achieved, small arms fire can still be effective against armored targets. It can cause crew casualties if the target vehicle is "unbuttoned", or force it to button up. Open top vehicles, like the Hummel assault howitzer, are also vulnerable to small arms fire. Firing rifles from a higher elevation right into the top of such a vehicle usually achieves good results in Combat Mission: Afrika Korps, as it would in real life.

The closer the armored target, the more options are available to destroy it. Many units have specialized antitank weapons available later in the war (see SPECIAL EQUIPMENT section), but all infantry squads and HQs have hand grenades, which can be used for a close assault against a tank. Hand grenades work best against open-top vehicles, but can also be used - albeit less effectively - against buttoned up tanks. This simulates the occasional hero climbing on, or right up to, an enemy tank and placing the grenade in a vulnerable spot. Demolition charges and grenade bundles are very useful anti-tank weapons at very close ranges by providing extra "punch", as are rifle grenades (used by the Germans), which can take out light armored vehicles at medium distances. By the far the best close distance anti-armor weapon are magnetic mines, which are placed or sometimes thrown on enemy tanks and stick to the metallic surface of its armor; Molotov cocktails can also be used effectively against open-top vehicles and - to a limited degree - against armored targets.

The main problem with using these weapons is that the infantry unit often needs to get within throwing distance to an enemy tank, and often expose itself to the tank or - much worse - other enemy units covering the tank. There is a good reason why most nations awarded medals for individuals close-assaulting enemy armor, and why a good number of those individuals didn't survive the war...

Special Equipment

Panzerfausts, demolition charges, rifle grenades and other special infantry squad weapons are handled automatically by the TacAI. The player does not give direct orders for the use of these weapons; their actual use is determined instead by the TacAI, but by manually targeting a close-by enemy tank, the TacAI is "encouraged" to use special equipment against that target – if in range.

Panzerfaust

A short-range, one-shot antitank rocket launcher commonly used by late-war German infantry squads. They come in four different types and three ranges (two types are 30m, one each is 60m and 100m) depending on the scenario date.

If an enemy armored vehicle comes within range, your squad tries to fire its Panzerfaust. However, suppression can reduce the likelihood of this significantly, and additionally your troops will be reluctant to fire at distances close to the weapon's maximum

effective range as the chance for a miss is high. Sometimes your troops might even fire a Panzerfausts at enemy infantry if the enemy is heavily dug in and/or your unit is carrying several Panzerfausts and feels it can spare one for antipersonnel use.

Demolition Charges

Usually carried only by engineers, these bags of explosives are automatically used to clear minefields, destroy enemy units in close combat, or knock out fixed fortifications. This weapon packs a lot of punch and will usually be enough to at least immobilize a tank!

Rifle Grenades

German squads might be armed with special grenades which can be fired using a modified rifle. They provide a light anti-tank capability at greater ranges than hand grenades or demolition charges.

Grenade bundles

A bundle of six or more grenades to provide extra "punch" - used often against lightly armored targets, which would normally withstand the impact of one hand grenade alone. An improvised anti-tank weapon. It can take out a tank or most often at least immobilize it, but don't count on it.

Magnetic mines

Anti-tank charges designed to stick to the metal surface of tank and vehicle armor. Usually placed on a vulnerable spot on a tank, like top armor, engine compartment cover, the tracks or hatches to maximize damage. During the war, Germany developed a special anti-magnetic paste called "Zimmerit" to prevent magnetic mines from sticking to the tanks. Ironically, Germany's opponents never used magnetic mines.

Panzerwurfmine

These are hand-held shaped-charge grenades with fabric "wings" or a directional strip that help the charge arrive "head on" when contacting armor after being thrown through the air.

Molotov cocktails

Essentially, a bottle filled with a flammable liquid, designed to burst into a ball of flame upon impact. There are various designs of

Molotov cocktails, ranging from rude (a bottle of gasoline with a piece of cloth, which is ignited before throwing) to sophisticated (specially manufactured glass containers with a mix of gasoline and other chemicals and a more effective ignition mechanism). The end result is usually the same - the target is engulfed in a ball of flame which continues to burn for some time. It's meant for use against armor, though its effects are limited, unless a critical hit against the engine compartment can be achieved, or the armored vehicle is open topped or unbuttoned.

Anti-tank

Ammo Types for Guns/Mortars

Ammunition is tracked individually for heavy guns (tanks, ordnance, infantry anti-tank weapons, and mortars). The five types of ammo are:

"he" - High Explosive (HE)

Rounds of this type carry a significant explosive charge and are intended to generate on impact as many shell fragments (shrapnel) as possible, thereby increasing the lethal radius against soft targets (infantry, lightly armored or open-top vehicles) but sacrificing penetrating power against more heavily-armored targets.

"ap" - Armor Piercing (AP)

This type of shell (or shot) uses kinetic energy to punch through armor plate and has little or no explosive charge. This makes it ideal for use against armored vehicles but generally ineffective against soft targets.

"hc" - Hollow Charge (HC)

Also referred to as HEAT ammunition, this projectile uses a "hollow" (or "shaped") explosive to focus a thin jet of hot gas against armor plate, literally melting a hole through it instead of smashing through with brute force (like AP ammunition does). Because it does not rely on kinetic energy, a HEAT round's penetrative capability does not decrease over long range.

"c" - Canister (C)

Canister ammunition is not unlike a shotgun cartridge - a lightweight shell breaks apart (intentionally) and releases several hundred steel balls that spread out laterally. It's deadly against soft targets at short range (within about 200m) but ineffective against hard targets or at long range.

Germans use it in their 75mm "short" gun, like on the early StuG III.

"t" - Tungsten Core (T)

Known by the Germans as PzGr40 (Panzergranate 40). This type of projectile is lighter than a standard AP round and can be fired at a higher muzzle velocity. It has a high-density shatter-resistant metal core (usually made of tungsten) with greatly improved penetrative power against armor. The drawback to tungsten ammo is that its smaller (core) caliber and lighter shell mass mean that kinetic energy is lost more rapidly over long distances, and the shell has a tendency to ricochet off steeply sloped armor. But the increase in velocity and shell strength almost always make up for these drawbacks. Tungsten is a relatively expensive material meaning these shells are generally rare. By 1944 Germany suffered from a severe shortage of tungsten and other metals, and so had virtually no PzGr40 available.

"s" - Smoke (S)

These projectiles are designed to generate a thick smoke screen as cover for other friendly forces. Smoke ammo causes no damage if fired against enemy infantry or armor, but generally blocks LOS through it for a short time.

Designer's Note: understand the above five ammo types as basic categories, used to describe the countless types and models of projectiles used during the war. Internally, Combat Mission: Afrika Korps tracks the weight, muzzle velocity, ballistic coefficient and size of explosive charge of all the different shell types from all the different guns in the game individually. The HE shell fired by a Panzer IV tank's 75mm gun (weight 12.79 pounds, velocity 548 m/sec, explosive is 11% of total mass) is NOT the same as that used by the 75mm gun on a Sherman (weight 14.7 pounds, velocity 463 m/sec, explosive is 10% of total mass).

Selecting Ammo Type

Your units decide, based on your orders and the type of target they are about to fire at, which ammo type to use. You cannot order a tank specifically to fire tungsten ammo, for example. The tank commander (read: TacAI) is responsible for the choice of ammo and usually tries to first fire some regular rounds to "bracket" the target. The tank commander uses special ammo once a hit is likely to be achieved, but only when the standard type proves ineffective.

Anti-tank gunnery

The phenomenon of armor penetration by projectiles is a complex matter. Unlike many other wargames, Combat Mission: Afrika Korps simulates the process by modeling real-world physics instead of abstract CRTs (Combat Resolution Tables).

Hit Chance

First of all, an anti-tank round - regardless if fired from an anti-tank gun, a light infantry anti-tank weapon like a panzerschreck or another tank - has to hit its target. As a guideline, a Hit Chance is shown whenever you order a unit to fire at an enemy armored vehicle. The hit chance is calculated based on many different dynamic factors, which also change constantly during the course of an Action Phase - but it does give the player a rough idea about the capabilities of the firing weapon.

Some factors taken into account when calculating hit chances are

- size of the target (the silhouette rating)
- facing of the target (vehicle sides are usually bigger - longer - than the front)
- distance between firing unit and target
- exposure of the target (it's much more difficult to hit something which is obstructed from view by trees, a stone wall, a house or a slope - see HULL DOWN)

- the accuracy of the firing weapon, which is often directly proportional to its muzzle velocity, i.e. a faster shot means a flatter trajectory and easier aiming
- the experience rating of the firing crew
- number of previous rounds already fired at this target, which allow the gunner to "bracket"

• ammunition type, caliber, and weight
• the optics of the firing unit
• if the firing unit and/or target are moving. The hit chance is dramatically reduced when the firing unit is on the move.

Hull Down

One of the best tactics to enhance the survivability of your armor is to occupy hull down positions. "Hull down" means that only the turret or superstructure is visible to (and hittable by) the enemy, thereby minimizing the target area tremendously (the silhouette of a vehicle is reduced) without sacrificing one's own ability to fire. Hull-down vehicles are also harder to spot in the first place.

Hull-down positions are not as easy to find as one might think, though. What makes it so difficult is that a hull-down position is always relative between the firing unit and the target. It is entirely possible to be hull-down against one tank, while being in full view of another one. Only rarely will you find a natural dip in the terrain large enough to fit a tank which also provides hull-down status in multiple directions. (Note: in some scenarios you might be allowed to dig in your tanks, however, which achieves exactly this result).

Experience is what it takes to spot good hull-down positions. Hull-down positions can be found anywhere, all the time, and not only in "holes" but even on top of a hill. If your tank is far enough off the ridge, only its turret/superstructure will be visible to targets on the opposite side.

The "seek hull down" order in Combat Mission: Afrika Korps is intended to make finding hull-down spots relative to ONE specific spot on the map easier for the average player, but it is a command best used while out of contact with the enemy and represents the ability of pretty much any tank crew to find a hull-down spot given enough time and preparation. For getting hull-down during the heat of combat, you might be better off scout the map yourself and use your best judgement. Here, the LOS or TARGET tool will aid you, as the words "hull down" will appear over the targetted area or unit as soon as your unit has reach a hull-down position.

Misses

If a shot misses, it does not magically disappear. Instead, the round is tracked to its impact point. Since the trajectory of gun rounds is modelled realistically (i.e. rounds drop by gravity as they

travel), this might mean that a missed projectile ends up somewhere behind the missed target in the ground or, if fired too short, in front of it. But elevations can change this dramatically, and when a target on a hill is missed, the round can easily travel hundreds or thousands of meters further.

Wherever the impact point lies, damage is caused. If a round which missed the intended target sails further and lands near another unit, damage is assessed just as if the unlucky target was the intended one. It won't happen often, but it can.

Armor Penetrations

When a gun round hits an armored target, it does not mean an automatic kill. Far from it - both Axis and Allies had tanks in service which could shrug off direct hits, especially if the shell came from long range and at an oblique angle.

Some factors taken into account when determining whether a round penetrates armor are:

• armor thickness for front/side/rear as well as top/turret/upper hull/lower hull
• armor slope for all of the above
• Side angle (i.e. obliquity)
• Striking velocity (reduced by air resistance as the shell travels)
• Armor quality (i.e. metallurgical flaws)
• Face hardened or homogeneous armor plate
• Brinnell Hardness Number (BHN)
• Shot-to-plate diameter ratio
• Shell "cap" type and strength
• Special ammo (like tungsten rounds)
• Shot shatter
• Shot traps (a design flaw in the vehicle shape which tends to "catch" shells rather than let them ricochet away)
• Armor skirts ("Schürzen")

Note: Combat Mission: Afrika Korps does not use a generic armor "strength", but real-life values taken directly from historical sources: armor thicknesses in millimeters and slopes measured in degrees.

A successful anti-armor round penetrates the armor, sending molten metal fragments and spray into the crew compartment, and - if the shell also contains an explosive charge - exploding inside the vehicle. In many (but not all) cases this means that the penetrated

vehicle is either physically damaged in some fundamental way, members of the crew are incapacitated or panicked, or both. A vehicle so damaged is called "knocked out", and surviving crew members hastily "bail out" of their wrecked vehicle before the next shell arrives. Sometimes the results are even more horrific. If the penetration contacts live ammunition inside the vehicle, or a tank of gasoline, the whole vehicle can burst into flames, otherwise known as a "brew up". Sometimes no one escapes these deadly infernos.

The lethality of a penetration takes into account the mass of armor sent into the interior, the likelihood of the armor to fragment, and the size of the bursting charge of AP ammo, if any (and the chance it might not function properly on penetrations which don't make it cleanly through). You'll find that AP "shot" (which has no explosive capacity) tends to to a better job penetrating armor, but less damage once inside compared to AP "shells" which have an explosive charge. With small guns - especially antitank rifles - it often takes multiple hits to knock out tanks, and often this will be from injuring or killing the crew rather than significant physical damage to the tank itself.

Armor penetrations that penetrate less than 15% "beyond" the armor resistance will be displayed as "partial penetration" and often are less dangerous to the crew of the tank which was hit. (Note: the reduced lethality is not a hard cutoff at 15%, that's just the cutoff to show the 'partial' message).

Non-Penetrating Hits

An armored vehicle can still be damaged even by a hit which does not penetrate the armor. External equipment such as the gun or its optics can be damaged, as well as the vehicle becoming immobilized by a hit to the tracks or a vital engine component. A non-penetrating hit can even injure or kill crewmembers by causing internal armor flaking or "spalling". This happens when the impact force on the outside rips small fragments off the inside of the armor and hurls them around the crew compartment, potentially injuring or killing the crew.

A round can also bounce off and ricochet. This happens mostly when the armor slope and angle of impact (called side angle or obliquity) prevents the round from striking the target plate head-on. If the round lacks the power to penetrate the armor it literally bounces off or even shatters. Ricochets can sometimes cause armor flaking, but are usually harmless and good news for the tank crews.

Ricochets sometimes are "prevented" by the target itself. Pockets in a vehicle's shape that tend to "catch" shells are known as Shot Traps. Look at the underside of a Panther model A mantlet. You can see how a hit would be deflected downward, right into the thin roof of the hull. This was fixed with the later Model G's additional "chin".

Rounds can also shatter upon impact. German shells were made stronger than Allied shells, and the metal could withstand greater stress without breaking apart. Shot shatter happens when an improperly tempered (i.e. heat-treated) shell hits very thick armor and breaks upon contact. Allied shells often were not tempered properly.

The shot diameter-to-plate thickness ratio can have a significant impact on the chance a shell might penetrate its target. The shot-to-plate ratio compares the caliber of the round with the thickness of the armor. A general rule of thumb is that if the ratio is <1 (the plate is thicker than the caliber of the shell), the round is "underpowered" and has a lesser chance of achieving a penetration. If the ratio is >1 (the shell is bigger than the thickness of the armor), the shot is "overpowered" and the chances for a penetration are higher.

Multi-gun vehicles

Multi-gun combat vehicles, i.e. vehicles with more than one type of main gun (like the Grant tank), are a new addition to the CM engine. Don't expect miracles from them, however - the fact that there are two guns doesn't suddenly double your rate of fire ("ROF"). There is still only one commander in the tank, and the two guns just can't fire simultaneously at full ROF as if they're unrelated. Moreover, the tank will only fire one of both of its guns when there is at least a slight hope of achieving a result: for example, don't expect a Churchill to open fire at an AT Gun with its 2 pounder turret mounted gun - it will usually rotate first to use it's hull gun for this task.

Note: For multi-gun tanks, usually the player must manually rotate the tank! This lets the PLAYER have more control. You can rotate if you want (in which case the hull gun will likely be used) or you don't have to rotate (in which case the turret gun will be used).

Armor Types

Different qualities of steel and different types of manufacturing have a big impact on the effective resistance of armor. Obsolete or poor manufacturing techniques can cause armor to resist with less capability than one would expect for a given thickness. For example, check out the Model 1943 T-34 tank. Its armor quality is rated at only 90%.

A separate but related concept is the Brinnell Hardness Number (BHN) which is a measure of the metallurgical "hardness" of the armor. Tank armor is generally considered to be "ideal" at approximately 240 BHN. BHN numbers are not displayed in CMAK, but the engine simulates them. Generally speaking, early-war armor tended to be overly hard and brittle, which meant that it could crack apart when struck hard enough. And even a lesser nonpenetrating hit was likely to cause flaking/spalling of the armor into the crew compartment. The same was true for late-war German armor when German industry ran short of proper alloys.

There are also different types of armor: face-hardened and homogenous. Homogenous plate is a largely uniform block. Face-hardened armor has been treated to arrive at a higher "hardness" (measured in the BHN) just on the front, or "face", thus increasing the chance that a shell will ricochet or shatter. Face-hardened armor does have a weakness, though. Because it is more brittle than uniform block, it can catastrophically break apart upon impact.

Generally speaking, "capped" armor piercing shells penetrate more face-hardened armor than homogenous armor, while the reverse is true for basic uncapped AP.

Reinforced Turret Front Armor

Applies to the Tiger only. Some parts of the turret mantlet are thicker than the stated value.

Armor Skirts (Schürzen)

Schürzen is the name for the relatively thin (about 5mm) soft steel plates mounted a short distance (usually a couple of feet) from the primary flank armor of a tank. Originally designed by the Germans to help protect vehicles from the Soviet 14.5mm Anti-Tank Rifles, they also proved useful against shaped charges used by many types of light anti-tank weapons like bazookas (on the Western Front).

Gunnery Optics

CMAK is the first wargame seriously tackling the issue of optics, and, based on months of research, tries to accurately simulate its effects on tank duels.

There are seven types of optics in the game. Note that nations other than Germany exclusively use "standard" optics. All six other types are German-only.

Note: despite months of research, the data we were able to turn up for Allied optics used throughout the war is extremely sparse. In order to not put the Allies at a disadvantage without justification other than "rumors" that Allied optics were generally worse than German optics, we have decided to set all Allied gun optics to standard values.

Standard: Mediocre quality and magnification, normal field of view. Not listed in the data window.

Good: Typical good-quality general-purpose German optics, mostly used by tanks. Crew must be green or better to use without penalties.

Binocular: Same as "Good" but allows use of two eyes for better depth perception. Used by early Tigers and Panthers. Crew must be green or better to use without penalties.

Long-range: High-magnification German optics, with limited field of view, used by assault guns and tank destroyers. Crew must be regular or better to use without penalties.

Very long-range: Extreme magnification power. Used only by late-model Jagdpanther. Crew must be veteran or better to use without penalties

Dual-Magnification: Can switch between two different magnification levels, to optimize both spotting and tracking. Used by late-model Panthers. Crew must be veteran or better to use without penalties.

Narrow: Cheaper (by German standards) optics of generally good quality but limited field of view. Often used by lightly-armored self-propelled guns. Crew must be regular or better to use without penalties.

Effects of Optics

Good magnification allows for better spotting and gunfire accuracy at long range, except in low-light conditions where the greater need for light of high-magnification optics becomes a hindrance, reducing their effectiveness relative to lower-power lens.

Wider field of view allows for quicker target acquisition and tracking, which allows the gun to be aimed (and fired) faster.

Limited field of view can cause difficulty tracking moving targets at close range.

Hot temperature reduces optical performance, especially for German equipment. The reduction is lesser for more experienced crews.

Extremely cold temperature reduces performance of 'standard' optics, especially for inexperienced crews.

Extremely cold temperature increases performance of German optics, especially for experienced crews.

Artillery

There are two forms of artillery in Combat Mission: Afrika Korps: on-map and off-map. For the sake of this discussion, "artillery" stands for any form of weapon designed to hurl an explosive charge at a designated target. This includes howitzers, mortars, rockets, and naval guns unless otherwise noted.

Blast Strength

Often much deadlier than small arms are the high explosive rounds from mortars, howitzers and tank guns. The firepower of these weapons is represented by a BLAST VALUE, which is a rough measure of both the size of the shell and the amount of explosive charge it carries.

The blast value helps give a general guide to the strength of an explosion, which increases the closer you are to its center. It also helps combine blast radius and blast strength into one easy-to-use number, though the game engine tracks both phenomena separately. For example, the U.S. 75mm and 76mm HE shells used by lend-lease Sherman tanks are roughly the same size, but have different blast radii. The 76mm has a lesser amount of explosive (TNT), so its blast radius is smaller. If it's an accurate shot then the shrapnel from the 76mm is (nearly) as deadly as that from the 75mm, because there's about the same amount of it (the shells are roughly the same size). But if it's not an accurate shot the shrapnel must

therefore travel farther to hit a target. Thus the smaller TNT charge of the 76mm causes less damage since it has less ability to project shrapnel over distance compared to the 75mm round.

The blast value is measured in the same game units as small-arms firepower.

On-Map Artillery

On-map artillery is represented by actual artillery guns on the map, while off-map artillery is represented by artillery spotter teams. Except for small-caliber mortars (60mm and 81mm for example) it is rather unusual to have an artillery gun on the battle map, since most of the time artillery batteries were positioned well behind the front lines. They are included in the game, however, to simulate rear guard actions and exceptional circumstances.

While on-map, artillery units behave just like any other units and have their own set of available orders. Some big artillery guns cannot move (they're simply too big and it can take hours to relocate them), but many can be either towed or manhandled (slowly). After moving, however, a gun has to be set up and prepared for firing (the process is automatic - the time it takes to setup a firing position is displayed in the units info screen). Depending on the type of the gun, this can take anywhere between one and several minutes. A timer indicates the time required for this.

Another form of on-map artillery are mortars and howitzers mounted on vehicles, and besides their better mobility, they work just the same as infantry mortars and howitzers in the game. Vehicle-mounted mortars and howitzers cannot disembark from vehicles. Note also that in order to fire some mortars, the vehicle needs to rotate its rear towards the target!

On-map artillery units (both infantry and vehicle based) usually are only able to fire on targets they can see, although an HQ unit can also "spot" for on-map artillery units (see below).

Using HQs for Indirect Fire

When the firing artillery piece is actually on-map a direct LOS to the target is required in order to fire. The exceptions to this are on-map mortars, both infantry and vehicle-mounted which, due to their high trajectory, can perform indirect fire at close range. Usually, mortars require a LOS to be able to fire. However, if a mortar unit is within command radius of an HQ unit, the HQ unit can serve as

spotter and the mortar is able to AREA FIRE at locations which are out of its own LOS but within LOS of the HQ unit. However, the HQ unit is not allowed to be HIDING to be able to spot! Additionally, mortars are allowed to fire at Target Reference Points (TRP), even if out of LOS, but only provided they have not moved from their initial setup positions. It took a lot of time to set up and register mortars to do this sort of shooting, so if you move you lose!

To fire indirectly simply set up everything as described above, and target the mortar as you normally would. The LOS line, if pointing to an area not visible to the mortar team, will still appear to be BLACK. Click where you would like the target to be and, if the HQ commanding the mortar can see it, the targeting line will "stick" showing that an Area Fire order was successfully plotted. If the line does not "stick" it means the HQ does not have LOS to that exact spot. Double check with the HQ unit's LOS to choose a legitimate spot to target. Make sure, however, that the target line from the mortar unit is orange - if it's red, then you're targetting an enemy unit (not an area), and you're ordering the mortar to focus on that target when it moves into LOS; the mortar will hold its fire until this happens.

Off-Map Artillery

Most of the time, an artillery battery is represented on the map by an artillery spotter team. This team is equipped with binoculars, detailed terrain map with overlay grid, and a radio or field telephone. Its job is to spot targets for a particular artillery battery by reporting the location of incoming rounds and adjusting the aim. Spotter teams equipped with a radio are able to move around quicker (as seen by their higher speed class) than those with telephones, since the latter required a wire line to be laid out to their new position while moving.

Plotting Artillery Missions

To call in an artillery strike, simply issue a TARGET or TARGET WIDE order to the artillery spotter team. Target is the normal choice, delivering fairly concentrated fire on a specifc area, while Target Wide is useful for larger and dispersed formations of enemy units. When the spotter can actually see the target area, the speed and accuracy of the barrage are greatly enhanced, but it is not required. In other words, you CAN call in off-map artillery anywhere on the map without having to trace an LOS.

Artillery Ammunition

Artillery spotter teams have AMMO displayed in their unit info window just like any other unit. On-map artillery units have a limited number of specific types of shells (HE and usually Smoke). But in the case of a spotter, ammo represents the number of shells (of any type) that the attached battery is allowed to fire. Some types of batteries can fire SMOKE as well as normal high-explosive shells; this is noted in the unit's detailed info screen as well as purchase screen in the editor and for Quick Battles. In this case, each ammo point can be used as either smoke or high-explosive. Rounds used for "spotting" DO count against the battery's total. Note also that a "battery" can consist of anything between two and more than 200 (!) tubes, and EACH shell is counted against the ammo total. An 18 tube battery would therefore use up 36 ammo "points" in two volleys, wheras a 4 tube battery could fire 9 volleys before running out of the 36 ammo points.

Delays

There is a delay between issuing a target order and the arrival of the first rounds, ranging anywhere from about 30 seconds up to 10-15 minutes and sometimes even more. The delay depends primarily on the formation to which the firing guns are attached - Corps and Army artillery take longest to arrive, because they are higher up the chain of command and receiving fire requests from more than just your formation, while Regimental and Battalion assets are usually a lot quicker, since their primary task is local support. Divisional artillery is in between. Delays are further modified by the experience of the observer team as well as nationality, since different nations used different procedures for calling in artillery. Another important factor for delays is if the target area is in LOS of the spotting team or not. If not, fire delays can be a lot longer for an artillery strike, and the chance for missing the target area altogether rises dramatically.

The ESTIMATED time delay before the strike commences is shown in the artillery spotter's unit info window. Keep in mind that this is only the estimated time and it can take a little less or much longer before the first rounds fall.

Also, during an ongoing barrage, the time between two volleys is indicated here as well, as the guns are re-loaded and/or realigned.

Usually about 30-60 seconds before the full strike, a few "spotting rounds" fall on or near the target. These are needed for the spotter team to adjust the fire properly (an automatic procedure - no input from the player is required). Accuracy for the main strike is considerably better if the spotter has a line of sight to the target – see below: "Accuracy". The artillery strike will continue over several turns until either the ammo is used up, or until the spotter's targeting order is cancelled (or he dies).

A spotting team cannot call for an artillery strike while hidden - it must unhide before the target command becomes available in its order menu, and cannot hide for the duration of the barrage.

Pre-planned bombardments

During the orders phase for turn 1 of a battle (and ONLY then), each FO is able to call in for a pre-planned artillery bombardment which will commence without any delay at a specific point in time during the battle, to simulate a pre-planned bombardment on known or suspected enemy positions – or part of an established fire plan. The default is for the bombardment to begin immediately, but a player can specify a later turn for this preplanned bombardment to begin by using the Q key. Each time you press the key, 1 turn is added to the delay. This pre-planned fire starts at the first second of the turn specified (including turn 1), and is always accurate - see below: "Accuracy".

This pre-planned bombardment order cannot be changed or cancelled and will remain in effect until all ammo allocated for the battery has been used up, even when the spotter has been subsequently eliminated or has left the map! Keep in mind: this is true also for smoke fire missions ordered during the setup phase!

Note also that while the bombardment commences without delay, the delay time between volleys (for reloading and adjusting) remains in effect.

Accuracy

Artillery fire is not always on target. Depending on the experience of the spotting team, the type of artillery being fired, and whether the target area is in sight of the spotter (which is the most important factor), artillery can miss its mark widely, sometimes resulting in nasty "friendly fire" incidents.

There are two exceptions to this - pre-planned bombardments are always on target (since it is assumed that the necessary calculations have been made ahead of time and the guns have been registered on target), as well as fire (even if out of LOS) on Target-Reference Points (TRPs), which have been likewise pre-registered in a fireplan.

The player receives no feedback if an artillery strike is accurate or not - it is important to watch the battlefield and see where the artillery actually falls. Look for that spotting round - if it's widely off target, chances are that the full barrage is going to be off the mark, too.

Adjusting Fire

When you find your artillery strike to be off the mark, or if you simply want to adjust or "walk" the aiming point a short distance (even after the strike has begun), you will need to adjust your fire. Simply select the spotting team whose fire you want to adjust, and plot a new target point not too far away from the original mark. If the targeting line is light green, you are within the acceptable "quick adjustment" radius of the original aiming point. If the line is blue, you are too far away and the time delay will be the same as if a completely new order had been issued, since the guns have to recalibrate. Note that the targetting line will not turn green when the target area is out of sight of the FO – hence you cannot adjust your fire and gain the benefit of a shorter command delay if the new target is out of LOS!

Press SPACE to cancel a retargeting order in progress without disturbing the current targeting order if you realize you can't get a "green line" where you want it.

Alternatively, and even more convenient, is the "Reset Target" order (hotkey R) which resets the target point (and delay) to what it was at the beginning of the order phase, regardless if you moved the target point or even cancelled the target order altogether. This is especially useful when you "mis-clicked" on a location or simply changed your mind, and allows you to avoid exceedingly long target delays for some of the larger caliber guns otherwise enforced by mistake.

Adjusted fire can STILL be inaccurate, though it is a lot more probable that it will fall on target than the first strike. So you still need to watch the landing of the actual barrage to be able to re-adjust again if needed.

Target Reference Points

Target Reference Points (TRP) are locations which have been carefully pre-registered on the maps - i.e. all heavy weapons have recorded the coordinates and necessary firing adjustments before the battle, in order to be able to bring fire on such an area with the highest accuracy and in the shortest possible time. This is true for artillery, but also any other heavy infantry weapons on the map!

Usually players put TRPs, which look like red-colored bullseye markers, onto important locations like enemy staging areas, likely defensive strongpoints, road junctions, or probable avenues of attack. In fact, often the first thing to do for a combat unit, sometimes even before digging foxholes, is pre-registering targets for the artillery.

In the game, TRPs are available whenever a side is allowed to purchase fortifications (meaning it had enough time to dig-in and pre-register targets), and the scenario designer decides to include them (or not) for each side (and they can also be purchased for quick battles like any other fortifications). During the Setup Phase (and only during the Setup Phase), they can be moved freely across the map (unless padlocked) and are not bound by setup zones.

In Operations, TRPs are valid for one battle only, and disappear in subsequent battles.

If a TRP is targeted by an artillery spotter, the time it takes for the artillery strike to arrive is cut drastically. It can take as little as ten seconds for the first rounds to arrive, and never takes more than 1 minute, even for guns with usually much longer firing delays! CMAK simulates that these TRPs are not only registered targets, but also part of a defensive or offensive fire plan, and therefore such fire can be called for by a simple codeword. LOS (or lack thereof) doesn't influence fire delay times or accuracy.

TRPs can also be targeted by on-map mortars even if out of LOS, but ONLY if the mortar team did not move from its original setup position. The reason for this limitation is that the calculations for hitting a particular target point when not in direct line of sight require skill and preparation and the exact knowledge of one's own position relative to the target - this cannot be adjusted on the fly during the span of a battle.

Other on-map ordnance, like antitank guns for example, can use TRPs to their advantage as well, as long as they remain in their original setup positions. When firing at enemy units on or very near a TRP, they gain a considerable accuracy bonus because they are considered to have "boresighted" or "ranged" their weapons to the TRP before the battle.

Designer's Note: You will notice some very large artillery calibers in the game. We included these enormous weapons for the sake of completeness, because they did have a (rare) presence on the CMAK-scale battlefield. However, if you begin to design scenarios for people other than yourself, we implore you to add heavy artillery (200mm and up) very sparingly if at all to your scenarios. Huge guns just weren't commonly used at the small tactical level and can unbalance a game tremendously. The purchase ratios for Quick Battles, where only a certain percentage of points is allowed to be spent on artillery for each side, is a good indication of what gun calibres are "within limits" for a given battle size.

Air support

Both sides can receive or purchase close air support (CAS) for a battle. However, the player does NOT control the actions of his planes. They roam above the battlefield, spot and engage targets at their own discretion.

Combat Mission: Afrika Korps does NOT simulate carpet-bombings or large scale raids. These are outside of the game's scope. Instead, the fighting on the ground is intended to take place AFTER such bombings, and close air support in Combat Mission: Afrika Korps means the appearance of small formations of fighter-bombers (maybe just a single plane), over which company and battalion commanders have no immediate control.

There are various plane models available for purchase to both Axis and Allies in CMAK, and dependin on the models chosen, have different armament layouts, and therefore engagement capabilities. Some planes might be better suited for anti-armor attacks, while others will be better against infantry and other "soft" targets. In order to allow for air cover in smaller battles also, some planes can also be purchased with full armament loadout (expensive) or for simple "strafing" (much less expensive), with the latter usually meaning that a limited number of strafing runs with MGs will be allowed, although the plane could theoretically carry more ammunition/armament.

When you click on an anti-aircraft weapon targeting a plane, you will be able to see the plane model displayed as a tag on the targeting line. Otherwise, planes are not visible in CMAK other than as a shadow on the ground.

How often a plane attacks and conducts strafing and/or bombing runs depends largely on how much anti-aircraft fire it encounters (i.e. how many AA assets the opposition has on the map). Heavy AA fire can make a plane break off its attack prematurely and even become damaged or shot down (this will be indicated as an explosion in the sky, and later displayed in the After Action Report (see the section about AAR).

Besides dedicated AA (Flak) guns, vehicles equipped with AA machineguns will engage airplanes unless they are busy firing at ground targets, or are buttoned up and unable to access the MG. Infantry will rarely if ever fire at planes, choosing instead to save ammunition.

Since airplanes have to spot targets just like ground units do, it does improve survivability for the player under air attack to hide units in trees or other cover. A tank sitting out in an open field is an easy target. The TacAI will try to move your units into cover when they are subject to an air attack, but often by that time it's too late.

Fighter pilots can misidentify targets and attack friendly units by mistake. Do not be too surprised when, especially while locked in close combat with an enemy, a couple of "friendly" bombs take out YOUR last tank!

Fighter-Bombers appear only in clear weather (and cannot be purchased in other weather conditions in the editor or Quick Battle purchase screen). No fighter-bomber activity is allowed during the night.

"Beautiful view! Is there one for the enlisted men?"

The Command

Like any commander in the field, the ability to control your troops' actions depends on how well you communicate orders to them, how well you're able to motivate them and keep them rallied. Combat Mission: Afrika Korps simulates this (commonly called "Command & Control") through a variety of different means.

Command Delay

Every unit has an inherent command delay before it can execute any new movement orders, though it can still use its weapons and react during this time. This simulates the time it takes for your orders to reach that unit, which in real life would be through hand and light signals, radio, whistles or simply shouting, and for the unit to understand and respond.

The length of the delay depends on the nationality, the experience of the unit and whether it is within command range of a "parent" Headquarters (HQ) unit. Additionally, the number of orders and waypoints you instruct a unit to follow increases the command delay to simulate the extra time it takes to communicate and understand more sophisticated battle plans.

Note: Independent vehicles and HQ units themselves are always considered "in command".

Command Range

An infantry HQ unit can keep any number of infantry units within its command range rallied and grant them the benefits of a shorter delay time and leadership bonuses. The command range of a HQ unit depends on its experience, its COMMAND leadership ability, and whether there is a line of sight between the HQ unit and its subordinate unit. Vehicles receive no benefit from Infantry HQs, but a bailed out crew is treated like any other infantry team. (Exception: any infantry HQ can spot for vehicle-mounted mortar teams - see below).

Platoon HQs can keep any unit from its own platoon under command, as well as any teams within its command range - even teams originally attached to a different company or formation.

Company HQs and Battalion HQs can keep any non-vehicle unit (regardless to which platoon they belong) under command. If a Platoon HQ is eliminated, its subordinate squads are out of command for the remainder of the game, unless a Company HQ or Battalion HQ unit is close enough to keep them in command.

In CMAK, vehicle platoons also have a platoon leader assigned to them. That vehicle HQ can keep all subordinate vehicles under control, but has no influence on independent vehicles or vehicles from another platoon (even if their platoon leader has been eliminated). Vehicle HQs follow the same rules for command as infantry HQs, with the exception that if both the HQ and subordinate vehicles are equipped with radios, the command range does not depend on line of sight (but is still limited to about 400 meters, since the HQ will not be able to give useful orders to its platoon if it is not in the general combat area anymore). On the other hand, vehicles without radio are not only dependent on a direct line of sight, but also on BOTH the HQ and the subordinate tank commanders remaining unbuttoned. As soon as one of them closes his hatches,

the subordinate tank will be considered out of command, regardless of distance, lines of sight or experience. Vehicle HQs exert no command & control over infantry units (as there are very limited means of communication).

By left-clicking on an HQ unit, a number of brown lines extend from the HQ to all subordinate units currently under its command. By clicking on a subordinate unit, a brown line extends to the HQ unit under which control the unit currently is. If the line is black, then the unit is out of command range and suffers an increased delay penalty. If a Platoon HQ is eliminated, NO lines are displayed unless the unit is in command of a higher-level HQ (applicable to infantry HQs only), in which case brown lines appear.

The small command icon in the unit interface (visible after clicking on a unit) tells you if a unit is in command or not. If the command icon is crossed RED, the unit is out of command.

IN COMMAND   OUT OF COMMAND

Leadership

Besides shorter command delay times, a unit in command also benefits from the leadership abilities of the HQ that is keeping it "in command". These are:

Command (icon: star)

Increases the command radius of the HQ unit. This doesn't magically make the HQ shout louder or see further, but instead enables it to formulate orders more clearly and in a shorter period of time.

Combat (icon: lightning bolt)

Increases the fighting abilities of units under its command (i.e. to-hit chance, firepower), by being able to give quick precise commands to target enemy units, which ammunition to employ, etc. This leadership ability is not available for vehicle HQs.

♥ *Morale (icon: heart)*

Lowers the chance of a unit panicking or routing under its command. Panicked units also rally faster when in command of such an HQ unit.

❓ *Stealth (icon: question mark)*

Increases the chance of remaining unspotted by the enemy, and for successful navigation through sewer systems. This leadership ability is not available for vehicle HQs.

Possible ratings for HQ units are 0 (normal), +1 (good) and +2 (excellent). Platoon HQs tend to have better combat related skills, while Company and Battalion HQs more likely excel in command. Each additional level (+1, +2) has the same effect as if the unit in command were 1 or 2 experience levels higher, respectively.

Take a careful look at your HQ units. Learning to ambush with the platoon that has the highest Stealth ability while charging into close assault with the one that has good ratings in Combat and Morale can make the difference between victory and defeat.

Morale

Combat Mission: Afrika Korps is designed to simulate human behavior on the battlefield as realistically as possible, while still allowing for the game to be... a game.

The typical World War Two battlefield is a horrid place to be in. Your life is at risk almost all the time, friends are being killed and mutilated and you are forced to kill for your own survival. Needless to say, even the boldest man can and will break eventually under such conditions and perhaps panic, run away, hide or simply become insane.

The soldiers in CM are no different and value their own virtual lives highly. If you expose them to enemy fire or if they have to fight an overwhelming enemy, chances are that at some point they will start disobeying your orders and act toward their own self-preservation. The morale status, as displayed in the unit's info screen, indicates what the unit thinks about its current situation. In CMAK, both infantry and vehicles follow the morale rules explained below.

The Eight Levels of Morale

OK

Not suppressed to any significant degree.

Alerted

The unit has noticed incoming enemy fire or danger of some sort, but is not yet adversely affected by it.

Cautious

The unit has encountered direct opposition and will think twice before doing something risky. Cautious units tend to take cover when fired upon and are somewhat reluctant to leave their current positions (as indicated by slightly longer command delays imposed on such units) and might replot waypoints on their own if they feel that their commander (the player) is nuts to have them walk across that open field. For vehicles, units might tend to use their smoke dischargers or smoke ammunition (if available) for protection.

Shaken

Danger is mounting. The unit's morale is still holding together, but the soldiers are on edge, and will disobey orders if they feel it's a matter of survival. Usually shaken squads try to look for cover and not expose themselves to enemy fire, might simply disobey orders and instead choose to remain where they are. They might even go looking for better cover. For vehicles, the crew might decide to retreat out of danger soon.

Pinned

These guys are not going anywhere. They simply keep their heads down and stay in cover. Pinned units often try to finish a movement order when they become pinned while moving and near available cover, but most likely ignore their orders and stay put.

Panicked

The player loses control over the unit as self-preservation becomes first priority. Panicked units usually try to run away from danger, and panicked vehicles will withdraw immediately, searching for nearest cover out of sight of enemy armor.

Broken

The unit's morale and cohesion is shattered. This state takes much longer to recover from than panicked, and the unit usually runs farther away. Broken units are also permanently rattled, indicated by a red light beside the tag (see below).

Routed

This unit has had enough and wants to get as far away as it can as quickly as possible. Routed units take a long time to recover and return to player control. Routed units also remain seriously rattled for the duration of the battle. Routed vehicles might retreat off-map, never to be seen again for the duration of the battle.

Rattled

Occasionally, a small circular red light appears to the right of the Suppression status. This indicates that although the unit might have recovered from an earlier Broken or Routed condition, it has been RATTLED by what it went through, and is more likely to panic, surrender, or rout when it comes into contact with enemy units again. Such brittle units are less combat effective for the rest of the game and should be used for "safer" duties.

How quickly a unit moves from OK to Routed depends on:
• the amount of incoming fire and resulting casualties
• if the unit is in command or not. Platoon, company, battalion and vehicle commanders sometimes have the ability to keep their men rallied under even the most intense enemy fire
• the experience of the unit. Green units might cower at the first shot fired at them, while elite units might withstand even the heaviest artillery barrage
• the Global Morale level

Designer's Note: Crews that have their vehicle or gun knocked out will automatically become rattled after bailing out, regardless of their suppression status. This is not only realistic, but meant as an additional discouragement to use such crews in an unrealistic (offensive) way. Simply put, they won't be very effective so get them back to the rear.

Fanatic Troops

It is possible to encounter fanatic troops in Combat Mission: Afrika Korps. There are many historical examples for such troops -

the indoctrinated Hitlerjugend formations fit this description for example.

Fanatic troops will not panic, break, or rout even when suffering heavy losses and rarely surrender. However, the player does not know which of his troops will turn out to be fanatic. In fact, there is no indication of this state of being at all, at any point in the game. This prevents easy abuse and misuse of Fanatic units in unrealistic ways. The result is that you can only guess which units are going beyond the call of duty due to being fanatic.

Note: There is one exception to fanatic units' immunity from panicking - being the victim of a flamethrower attack. Even the most hardcore units pack it in when they are on fire!

The scenario designer determines, for each side independently, whether fanatic troops can appear in a given scenario. He cannot, however, designate a specific unit to be fanatic. This is determined randomly for each unit based on a percentage chance set by the designer in the scenario parameters (see EDITOR).

Fatigue

All infantry units in CMAK are rated for their physical fitness. That way it is possible to simulate experienced troops (e.g. veterans) which have been on front line duty for too long, and therefore have become exhausted - or fresh and physically fit but otherwise badly-trained conscript formations. There are three levels of fitness troops can be assigned: fit, weakened, unfit. Weakened and unfit units tire a lot faster and require more time to recover from being tired or exhausted, and as such are less useful for offensive tasks. Tired units also tend to panic faster than rested soldiers.

If a unit is ordered to run for longer stretches without break (depending on the weight of the equipment it's carrying and the ground conditions), its physical fatigue will rise - in other words, the men become tired. Units generally start out "rested", then can become "ready" (not yet tired but no longer fresh), "tiring", "tired", then finally "exhausted" after running for too long. Other forms of movement can cause fatigue, too, albeit more slowly than running. Sneaking, advancing and assaulting, on the other hand, tire troops quickly even though overall movement speed is modest, so these orders should be restricted to the final push into the trenches and for emergencies.

Tired and exhausted troops are not allowed to RUN or ASSAULT and their hand-to-hand combat as well as firing capabilities (to-hit chance) are reduced.

In order to reduce the fatigue of your men, you have to let them "rest" (just stop moving). It takes less than a minute to go back from ready to rested, but might take a lot longer to get from tired to ready - especially for unfit units. Exhausted units can take 10 minutes and more before being able to move out again.

Note: Keep an eye out for ground conditions. Deep snow or mud, for example, will tire your troops much more quickly than dry open ground. Keep this in mind before ordering an assault charge across those 200 meters of open snow…

Experience

The morale of inexperienced soldiers, not yet used to the sights and sounds of war, tends to deteriorate more quickly under fire than that of seasoned veterans. This does not mean, however, that as experience grows, soldiers turn into emotionless robots. Instead, they simply learned how to deal with certain situations and, even more importantly, how to improve their chances of survival.

Artillery barrages are a good example. While heavy artillery fire is most likely enough to pin and/or panic an inexperienced squad in the middle of an open field (which will result in heavy casualties more often than not), a veteran squad might push forward across the field and out of the killing zone despite heavy initial casualties, and so - in the end - ensure the survival of more of its members.

But better morale is only one advantage of troops with experience. They usually are able to react faster to new orders and/or situations even when not currently "in command", which is reflected in a much better (shorter) command delay. Units also tire slightly more quickly the less experience they have, so an elite paratrooper unit, despite being rated "unfit" would still tire less quickly than an "unfit" conscript squad.

Lastly, the experience rating of a unit also has an impact on its offensive capabilities, i.e. firepower. This reflects, among other factors, better marksmanship, better use of ammunition, and proper handling of weapons - in short, the ability to bring firepower onto a given target quickly and effectively.

There are six experience ratings in Combat Mission: Afrika Korps:

Conscript

"Third line" troops who received little or no training, and have probably never been in battle. The Volkssturm formations of late war Germany are the primary examples. Very likely to panic or surrender when under enemy fire. Certain combat arms, like airborne troops and Gebirgsjäger - mountain troops - which always required a certain amount of training and physical fitness to be accepted within their ranks, cannot be conscripts.

Green

"Second line" troops. Received basic training but have little if any combat experience. Can also simulate troops used outside of their usual role, e.g. Luftwaffe crews used as foot soldiers.

Regular

Properly trained, and most likely have some combat experience, though not extensive. Some units are a mix of seasoned veterans and fresh replacements (the typical way the Germans refitted units in Europe) and can also be considered regular. The majority of troops should be in this category.

Veteran

These are first line troops who received first-class training and/or have proven themselves in combat. Able to fight independently and overcome superior forces. Many airborne and SS troops, along with regular infantry units with long combat histories, are considered veterans.

Crack

The best veteran soldiers achieve this level. Able to withstand even fierce close combat without breaking. You should encounter troops of this caliber only rarely.

Elite

The best of the best. Only a handful of personalities/squads in all of World War Two qualify as elite soldiers. Extensive combat experience AND first-class training are required for elite status.

Soldiers of this caliber are exceedingly rare, even among first-rate forces like the airborne. The famous German tank ace Michael Wittmann is a good example of an "elite" tank commander.

Unlike some other games, units do not rise from one experience level to another during battles or even operations. It takes much more than a few hours' worth of battle to become a true veteran in real life, and can take years before reaching elite status - all of which is far beyond the scope of Combat Mission: Afrika Korps.

The Editor

The Scenario Editor in CMAK is a powerful tool, enabling you to create, from scratch, pretty much any combat action in North and East Africa, Italy and Crete. It is the same Editor we used to create the scenarios and operations included on the CMAK CD, and includes all the features needed to (re)create nearly any historical or fictional battle in the Mediterranean Theater of Operations.

When entering the Scenario Editor, you will see the Editor Main Screen, showing you 10 buttons to access the various elements of the editor, as well as listing the Scenario Name (when entering for the first time this is Untitled) and the Scenario Type (the default is Battle).

NEW BATTLE – creates a new battle scenario. By clicking on this button, all settings in the editor will be reset and the Parameters screen will automatically be called up. If you have been working in the editor before, you will be asked if you want to save your current scenario first, before all settings are reset.

NEW OPERATION – same as above, though the Scenario Type will be changed to Operation, and you will be able to start designing an Operation Scenario. The Parameters screen opens automatically. Again, you will be prompted to save what you have done previously if you have made any changes to the editor settings before clicking on this button.

LOAD – lets you load an existing scenario file to edit. Depending on which scenario you decide to load, the Scenario Type will be changed accordingly. You will be prompted to save your current work before loading another scenario.

SAVE – lets you save your scenario. You will be asked to specify a file name and a location to save to. The default location is the "Scenarios" folder in the CMAK directory. Even though you can change this, only scenarios contained in this folder will show up on the playable scenario list in the game main screen. If you want to make a map which can be imported into Quick Battles, change the directory to the "Quick Battles" folder in the CMAK directory. The name you specify for your file before saving will be adopted as the Scenario Name automatically.

TOURNAMENT SAVE – this is a special form of saving your scenario, and should be done only after you are finished with it. Tournament saving a scenario means that nobody – not even you – will be able to open and edit the scenario at a later stage! As the name implies this is a great feature for tournaments as it prevents cheating, but it can be a pain when you realize later on that you would like to edit something – because you can't. It is recommended to save a backup copy using the regular SAVE feature just in case.

PARAMETERS –opens the parameters screen for the current battle or operation.

UNIT EDITOR –lets you purchase units for both sides

MAP EDITOR – lets you create a map for the battle or operation, as well as preview the map in 3D and place units and victory locations accordingly

LOAD BRIEFINGS – Allows you to load in three text files which will be displayed as briefings to the player(s). Create three different text files in any word processor, each one to do the following:

Text file 1 – General Briefing, will be displayed to both players before starting the game and choosing sides

Text file 2 – Axis Briefing, will be displayed to Axis player before setup

Text file 3 – Allied Briefing, will be displayed to Allied player before setup

These files MUST be in text format (extension *.txt for PC) for CM to understand them. The names of the files are not important.

The Load Briefings dialog will ask you to locate these files, one after the other. Pay attention to the sequence of the briefings, which always is: General, Axis, Allies. After finishing, the text of the briefings will be incorporated and saved with the scenario file (do not forget to save your scenario before exiting!) You can click "Cancel" anytime during the process, which will abort it. Any briefings loaded will be incorporated into the scenario, however.

If you want to make changes to your briefing texts at a later time, simply edit them in your preferred text editor. You will then have to go through this menu again to update them for the scenario.

Note: There is a "hidden" feature that allows you to output the text from an already compiled scenario. This is great if you lost your originals or wish to use someone else's text as a template for your own. To do this, simply hold down the SHIFT and CONTROL keys when you click on the "Load Briefings" button. You will go through the same sequence as when loading briefings, except that you will be asked to specify where to SAVE the briefings TO in plain text format.

EXIT – exits the Scenario Editor. You will be prompted to save your work before doing so.

Parameters

Each battle's and operation's parameters consist of two parts – the "overall parameters" (which set some global settings for each battle or operation; the "overall parameters" screen is the same for both battles and operations) and the battle or operation specific parameters, which are different from each other.

Overall parameters

The "Overall Parameters" are very important and should be adjusted before anything else is done in the editor, since they

determine which unit types are available and what they cost (with Rarity on) and what the the weather (and ground) conditions will be. Therefore, whenever you click on the NEW BATTLE or NEW OPERATION buttons, the parameters window opens automatically.

Note: If you should ever wonder why you can't find a particular unit in the Purchase screen, make sure you double-check the Date and Region settings. Units that were not historically available before/after the current Date or in the particular region are not displayed.

Date - Select the month and year. Some choices are greyed out depending on the region you have set.

Region – possible options are North Africa, East Africa, Italy, Crete and All Combined. The latter allows you to mix and match various nations and unit types without historical geographical restrictions.

Ground Condition - Very dry, dry, damp, wet, mud, deep mud, light snow, snow, heavy snow. For Operations, this is the ground condition encountered for the first battle – subsequent battles will have the ground condition modified depending on actual weather, ie. after several battles of rain, ground conditions will deteriorate to damp, wet, mud, deep mud and so on.

Temperature – ranges from Hot to Extreme Cold. Temperature affects troop fatigue and weapons reliability.

Ground Type – Dirt, Arid Rocks or Sand.

Defender is – "not dug in", "dug in", "dug in with fallbacks", or "dug in with vehicles". This sets the entrenchment options for the defender. "Not dug in" means that defending infantry will not have the benefit of foxholes. "Dug in" means that defending infantry will start with foxholes on map. "Dug in with fallback" means that defending infantry will start with foxholes on map, and additionally the player will be able to place a number of foxholes as secondary positions. "Dug in with vehicles" means that fallback positions are allowed, and additionally, any vehicle on the map may be dug in for the duration of the battle.

Map Contours - Can be 1.25m, 2.5m, 5m or 8m per elevation change. Since there are up to 20 height levels in CMAK, this allows for height differences of up to 160m.

Fanaticism - Same choices available for Axis and/or Allies – "normal" means that the usual morale rules apply. The other settings determine the percentage chance that a squad/unit of the selected type of troops (regular or better, or all troops) will be fanatic, i.e. never panic (except when attacked by flamethrowers) and rarely surrender. Neither player knows beforehand which of their troops will be fanatic.

Brief Description - Enter a brief description about the scenario you're creating. This is displayed in the Load Game Window as a quick reference for players.

Battle Parameters

This screen sets the parameters specific to a battle.

Time – Mid-Day, Dusk, Dawn, Night.

Weather - Clear, Overcast, Rain, Fog, Rain & Fog, Thick fog, Snow, Blizzard.

Wind – sets the wind strength and direction.

Game Length - 2-120 turns are possible. Additionally, the game length can be "fixed" (ie. the battle will end automatically after the final turn as set here) or "variable", ie. the battle will end after a variable number of additional turns played after the max. number set here (the number of extra turns depends on how much combat action takes place).

Type – Assault, Attack, Probe or Meeting Engagement. This option is important for the "Force Readiness" feature (see THE MISSION) and therefore possibly affects end game calculations.

Map Edges Friendly To - All four directions can be toggled to Axis, Allied, or Neutral. At least one map edge has to be friendly to a side.

Map Edge for Exit Points - If the goal for one side is to fight through and exit the map, the map edge eligible for exit is set here.

Flag Type - There are several flag types – static large flags, static small flags and dynamic flags. These are explained in detail in The Mission. Note that in Meeting Engagements all flags MUST be static. For dynamic flags, the option is available that the one valid flag can be selected by the attacker at game start, or that it will be randomly assigned by the computer.

Axis Bonus - Can be positive or negative. Used mainly for unbalanced historical battles where one side is superior to the other. The inferior side is awarded this many points to allow it to "win" when it achieves greater success than expected, given the situation.

Operation Parameters

This screen sets the parameters specific to an operation.

Operation Type - This is the most important setting for an Operation. It defines, in no small way, how the Operation will play out. It might take a few tries to understand the subtleties of these
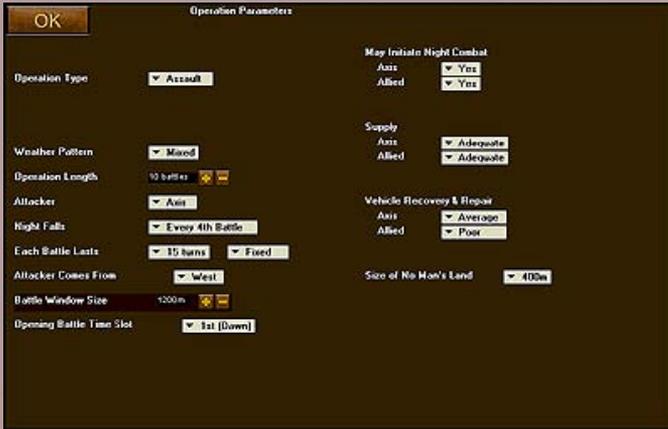
options, but the more you think about historical examples the better your Operations will be.

Advance – the Battle map is a portion of the entire operational map, and "slides" forward (or backward) between battles. The attacker wins by reaching the end of the operational map before the time limit is over (this may take several battles) As soon as the attacker reaches the end of the map the game automatically ends, and the victory level of the attacker is determined by how quickly he achieved his goal. If the operation ends before the attacker reaches the end of the map, the victory level for the DEFENDER will depend on how far the attacker came. Units which end the last battle in no man's land are automatically shifted back to their own front lines. This type of operation is great for fluid fire & maneuver battles.

Assault – similar to above with regard to map movement and victory conditions (ie. the attacker wins by reaching the end of the operational map). However - units are NOT shifted between battles. Some may be cut off when too far forward in no man's land and will be 'padlocked' during the next battle's setup phase, and will not be resupplied. This type of operation is great for assaults on fortified positions, urban or forest battles and firefights "until the last man".

Static – The battle map covers the entire operational map, ie. it does NOT "slide". Victory is judged by causing casualties to the enemy and holding victory FLAGS. Units are NOT shifted between battles. Some may be cut off and will be 'padlocked' during the next battle's setup phase, and will not be resupplied. Static operations are essentially a series of connected battles on the same map.

Attacker Casualty Point Factor – (Static operations ony) the "Attacker Casualty Point Factor" determines how many victory points are awarded to the defender for destroying attacking units. 100% is the standard setting. If set high, the attacker has to be very careful about losing men, as the defender will gain more than the usual amount of victory points. Set it low, and taking ground (flags) is paramount, and losing casualties is not a big deal. It's therefore a measure of how "expendable" the attacking units are, and how aggressively the attacker can afford (or has) to be.

Weather Pattern - Good, Mixed or Bad. Combat Mission: Afrika Korps semi-randomly assigns the weather conditions for each battle based on this setting.

Operation Length - 1-20 battles. 10 battles is generally an appropriate length.

Attacker - Allied or Axis

Night Falls – "No night", or "every other" to "every tenth" battle. Example: a ten battle operation with night on every fifth battle would simulate two days of combat. A ten battle operation with "no night" would simulate fighting ten engagements on the same day.

Each Battle Lasts - 10 to 60 turns (minutes). The battle end can be "fixed" (battle ends after the last turn as specified here), or variable (the battle can go on for a variable number of turns after the last turn specified here).

Attacker Comes From - North, south, east, or west. This defines the direction in which the operation map moves.

Battle Window Size – (only applicable to Advance and Assault operations) the minimum is 1200m, the maximum depends on the overall length of the operation map. Determines how large the map is for each battle.

Opening Battle Time Slot - Can be anything between 1st to 10th. 1st is the default setting and means that the operation will open with the first battle conducted during dawn. If you choose a subsequent setting, the battle will open at the time of day specified for that slot. For example, if an operation is set to Night on every fifth battle, and the opening battle time slot is set to five, the operation will start with the first engagement played during the night.

May Initiate Night Combat - Axis/Allies, yes or no. If one or both sides are not able to initiate night combat, they will still be able to reposition their forces during that battle's setup phase.

Supply - Ample, Full, Adequate, Limited, Scarce, Severe - determines the amount of ammo replenished between battles.

Vehicle Recovery & Repair - Excellent, Good, Average, Poor, None. Determines the chance that an abandoned vehicle can be recovered, repaired, and returned to the game after a few battles.

Size of No Man's Land – "0m" to "800m" in 80m increments.

Note: The Size of No Man's Land should reflect the type of map played on. For open desert maps, it makes sense to set this to (nearly) the maximum, while for urban maps with short lines of sight, it should probably be 80m or 160m. Setting this option to 0 is generally not advised, since it can lead to the unrealistic event of units within hand grenade range of the enemy being able to relocate to a totally different part of the map in between battles.

Maps

The random map generator lets you quickly make a map for your battle, operation or QuickBattle. By setting a number of variables (and according to the region you have pre-set in the overall parameters or for your QuickBattle, you are able to determine what type of map and topography you will have to face.

Map Type

Rural – most of the Med outside of the bigger settlements classifies as rural. Rural maps have virtually no settlements, except only the occasional peasant shack and few roads, if any. Rural maps can be heavily forested areas or simply open desert, mountains or flat valleys, depending on the other settings.

Farm Land – you will encounter wheat fields here (in Italy) and some tiny settlements of usually just a few farmhouses scattered across the map. You might see a dirt road or two run through the map. Farm Land can also simulate desert maps with some settlements.

Village – the main feature of such maps will be a small settlement and an occasional church or mosque, as well as usually at least one dirt road, and in Italy often wheat fields or vineyards as well.

Town – towns are bigger settlements, and will see some two-story buildings, sometimes more than one church and a few roads.

Large Town – large towns feature paved roads and blockhouses and usually include parts of the suburban area around it as well.

Tree Coverage – Can be set to heavy, moderate, light or open. This directly determines the amount of forest you will see on the map, modified by the other settings. Heavy tree coverage will still yield fewer trees in North Africa than in Italy.

Hilliness – Large Hills, Modest Hills, Small Hills, Gentle slopes and flat are the options here. This determines how many height differences the computer will assign to the map. The actual height of the hills depends on the "height difference per level" settings made in the Parameters.

Damage – can be None, Light, Medium, Heavy, Massive. Determines the number of craters seen on the map, as well as damage to any structures done prior to battle. Urban maps with massive damage will be little more than smoldering ruins. Note that maps with massive damage can put quite a strain on your hardware.

Editing maps

Of course you can also make your own maps from scratch in the Map Editor. These can be used for operations or battles, and can even be saved and later imported for Quick Battles!

Basic interface

Done – moves you back to the Editor main screen

Preview – lets you preview the map in 3D mode. This is where you place units, fortifications and victory flags on the battlefield, or simply double-check your map. Double checking is important because the 2D editor map does not give any indication of lines of sight, which is an important part of designing a map. Also, you can

evaluate the visual appeal of your map and check for any imperfections, as these are quickly visible in 3D view mode.

Note: when you save your scenario to disk, the last camera position you used is saved as well, and becomes the "opening shot" of the 3D battlefield for players. This is true for both sides – use the "\" hotkey to switch between Allied and Axis view. Both views are saved independently. This way you can determine what the Allied and Axis players will see when they first enter a battle or operation.

Height is ON/OFF – Shows or hides the height information on every terrain "tile". The default elevation level is 7 and no number is shown on the map tiles for that value. Possible elevations range from 0 to 19. Each elevation represents a height difference of 1.25, 2.5, 5 or 8 meters, depending on the parameters set for that map.

Place Terrain – Lets you place terrain "tiles". Each "tile" represents an aread of 20 by 20 meters. Click on a terrain tile on the left hand palette to select it, then click anywhere on the map grid to place it. You can also Shift-left click to place a "square" of 5 by 5 tiles – good for filling large areas quickly.

By keeping the left mouse button pressed, you can simply "paint" a map with the currently selected terrain feature. The currently selected terrain is highlighted, and a short description is shown above the terrain "palette".

In order to place "landmarks" (a short text label describing terrain features, objectives, and historical areas, visible on the 3D map for both players), you have to use the CTRL-left click combination. This will open a new window in which you can enter the name of the landmark. You can notice landmarks by a small yellow triangle within the tiles they have been placed into. You can erase landmarks by CTRL-clicking on a tile with a yellow triangle and erasing the entered text description.

Change Height – Allows you to adjust the elevation of each tile. Use the + and – keys to adjust the "current" elevation that each subsequent click on the map will set. Again, shift-left click allows you to fill an area of 5 by 5 tiles. You can also "paint" elevations just like terrain tiles.

Setup zones – Allows you to define setup zones for both sides. Each side has three (color-coded) setup zones. There are no restrictions on how many tiles a setup zone has to consist of, nor do

the setup zone tiles have to adjacent to each other. Shift-left click and "painting" works for setup zones as well.

Width, Height – sets the size of the map. Maximum area for a Battle map is 20 square kilometres (roughly 4km by 5km), though neither dimension may exceed 5 km. An operation map may be 8000m along the axis of advance (set in the parameters under "Attacker comes from…"), and 4000m across for a total of 32 square kilometres! Smaller maps are recommended, though.

You can adjust the size of your map at any time – and from all four directions. In order to extend/cut the map from the north/east, simply click on the appropriate Height/Width buttons. If you hold SHIFT and click, the map will be cut/extended from west/south respectively.

Compass – "Scrolls" the map grid up, down, left of right if less than the whole map grid fills your screen.

Down Arrow, Up Arrow – lets you access the remaining parts of the terrain tiles "palette", if not the whole palette is visible on your screen.

Saving Maps for Quick Battles

When you intend to make maps which can be later imported into a Quick Battle, make sure that you click on NEW BATTLE before starting on your map. Operation maps cannot be imported! Also, CM provides a special directory for maps designed for Quick Battles called "Quick Battle maps", which is the default directory opened when importing maps, so make sure you save your map into that directory to be able to quickly find it later on.

When making maps for Quick Battles, you can but don't have to purchase units and/or assign setup zones. The former CAN be imported into Quick Battles (but don't have to), and the latter will be imported automatically.

Other battle settings, e.g. ground conditions, weather, dates and regions are meaningless when you intend to make maps for Quick Battles, as these will be assigned by the parameters of the Quick Battle played, overriding any settings previously set. Victory flags remain, however, as they were placed by the map designer.

Useful hints for map design

Keep in mind that maps in CM are 3D. Use this feature to create visually appealing maps resembling the real world, and the players will thank you for it. Get lazy, for example by making completely flat maps or not paying attention to how a river flows or that hills in real life really aren't small lumps of dirt piled up on an area of 40x40 meters, and you will find your scenarios not played all too often. Think about the real world – rarely will you find completely flat areas, and gentle slopes, small ditches, elevated roads are everywhere. Paying attention to detail when making maps pays – in more visual appeal and more tactical options!

Light and medium bridges in CMAK span two elevation levels above the ground below, while heavy bridges span four elevation levels above. Keep this in mind when planning to add bridges to your map, it might save you a lot of re-working later on.

Note: There is a hidden feature which allows you to place destroyed bridges and other buildings on the map, including factories and churches (which do not have their own terrain palette). Here's how it works: place a rubble tile on the desired spot (DON'T use "flat rubble"). Preview the map (important!). The "destroyed" tag is now fixed for that particular tile. Now go back to the map editor and place a bridge or building on top of the tile. Go into preview again – the bridge or building will now be shown as "destroyed".

If you want to undo this, place an "open ground" tile on the spot, preview map, and the "damaged" tag will disappear.

It's a good idea to have rivers/ponds/lakes on lower elevations than surrounding terrain, as it looks more real and gives the map a certain visual depth. Since rivers can't flow up and down again,CM will assign the lowest elevation to all river tiles automatically.

Roads are just that – roads. Do not use roads terrain to simulate dirt paths or muddy tracks or driveways towards a house unless it is really wide enough to be considered a road. Open ground serves well to simulate these small paths, and a row of scattered trees within a forest can be used to simulate tracks which can be used by vehicles – albeit at some chance of bogging.

Paved roads are extremely rare in the Med in the mid-40s. In fact, in the countryside you will often only find dirt tracks which would even be better simulated by "open ground" than a "dirt road" in CMAK. Use paved roads for major highways only, as well as in

cities. Of course there's always the exception to the rule, but generally paved roads were a luxury, even within medium-sized towns.

Typical villages in the Med are often built along a single road, one house deep. You often see wooden fences around such houses, and, for the more wealthy, a stone wall sometimes.

Ditches on the side of a road are often very shallow. Since such ditches usually do not provide enough cover for a whole infantry squad, there is nothing wrong with simply leaving them out and using flat open ground. Alternatively, scattered trees and brush can simulate the cover gained by such ditches. Use lower elevations only when deep ditches providing complete concealment, even for vehicles, are what you want. Keep in mind that since elevation information is tied to a complete tile, such ditches will be a minimum of 20m wide.

With a bit of practice you will soon be able to admire your own CM landscape – and then destroy it!

Units

The unit purchase screen allows you to select which forces will be fighting in your scenario. The same screen is also used to purchase units for Quick Battles (see THE CHALLENGE), though when making custom scenarios the restrictions usually applicable to Quick Battles are not in effect.

On top you see the Options bar. Here you can select:

Army – Axis or Allies
Nation – only those nations available during the timeframe and in the region you have selected in the parameters will be shown, other options are greyed out
Division – only those Division types available to a given nation are displayed here
Experience – sets the experience of the units or formations you want to purchase
Fitness – sets the fitness of the units or formations you want to purchase (not available for vehicles)
Headcount – by setting the headcount to anything else but "full" reduces the cost for a given unit or formation, but at the same time reduces the headcount of that unit by to the percentage set,

representing casualties suffered in previous battles (not available for vehicles)

Location – Units can start "on map" or be set to enter as reinforcements. There are 30 reinforcement slots available. Each slot can be assigned different rules for activation. See REINFORCEMENTS below.

Below the options bar, you will see buttons with various unit categories: Infantry, Support, Vehicles, Armor, Artillery/Air, Fortifications. As you purchase units, the point totals corresponding with the types of troops you purchase will be updated here. On the right hand side, the total number of points you have spent is shown. These point numbers can work as an indication for the scenario designer if the battle or operation is balanced, but there are no limits on how many points you can spend in the Editor.

The two columns in the purchase screen show – on the left – the available units, based on the selections made in the option screen, and – on the right – the already purchased units. When you move your mouse cursor over a unit in either column, some of its details are summarized at the left bottom of the screen. These details usually include headcount, main armament, a general classification for vehicles types based on their normal use (e.g. Assault Gun, Medium Tank), Armor thickness, Speed, Transport Class and so on. For formations, the composition of the formation is indicated, e.g. for a typical rifle platoon, this could be: 1x Platoon Headquarters, 3x Rifle Squad.

You can also delete and edit any units in the right hand column (already purchased) using the respective buttons at the bottom of the column (you can also edit a unit by double-clicking on it instead). Deleting the parent HQ of a formation will delete the entire formation. For editing units, see EDITING UNITS below.

Which units are available for purchase depends on the Parameter settings you have chosen, mainly the nations, the date, and the region.

Reinforcements

Units can start a game on map, or can be assigned to any of the 30 available reinforcement slots. When purchasing units, simply change the setting in the options bar under "Location". You don't have to use the reinforcement slots in numerical order, though it's easier to relocate what you created later on.

Each reinforcement slot can be assigned a set of rules for its activation. If the activation is triggered, all units in that reinforcement slot will be placed on the map. For both operations and battles, there is an option which specifies the "first possible arrival" of such reinforcements.

First possible arrival

For Battles, this number represents the first turn in which the units from that reinforcement slot can appear. For operations, the number represents the first BATTLE in which the units can enter, and they will do so during the setup phase.

Chance

This percentage gives the chance that the units will indeed enter on a given turn (or battle). The lowest possible setting is 1%. If set to 100%, the units will always arrive on the turn of first possible arrival.

The chance remains the same for each subsequent turn. Example: a unit is set for a "first possible arrival" at turn 4 of a battle, with a chance of 30%. This means that it will NEVER arrive on turns 1-3. It has a 30% chance to arrive on turn 4. If it does not arrive on turn 4, it then has a 30% chance to arrive on turn 5, and so on.

Reserves (operations only)

For operations, reinforcements slots can also be assigned reserve status. Instead of scheduling a first possible arrival and a chance, you can simply assign the reinforcement slot to one of three reserve pools – Battalion, Regimental and Divisional reserves. When things start to go wrong and casualties mount, the Computer will release reserves to the player, starting with Battalion reserves (after light casualties), then Regimental reserves (after heavy casualties), then Divisional reserves (after very heavy casualties). Only one reinforcement slot will be released per battle. If more than one slot has been assigned to the same reserve pool (e.g. when you have two slots assigned to Battalion reserve), they will be released in subsequent battles in numerical order (first reinforcement slot 1, then 2 and so on).

You can also skip reserve pools, for example by assigning a divisional reserve only, but no battalion or regimental reserves. This means that the player will have to receive more casualties before first reinforcements appear, as divisional reserves are usually only released when things go terribly wrong.

Link to map (advance and assault operations only)

For advance and assault operations, there is also a third option for reinforcements – linked to map. When a reinforcement slot is assigned this status, a reinforcement flag will appear on the 3D map. It can be moved and placed just like victory flags in operations by left-clicking on it and issuing a PLACE order. When the battle map advances so that the reinforcement flag would appear on the map, the reinforcements are triggered and placed on map in the setup area of the player receiving them (they are NOT placed around the flag location). This is a great way to simulate defenses in depth, for example, as the reinforcements for the defender will appear based on the attacker's speed of advance and not a rigid schedule.

Fortifications as reinforcements

In CMAK, it is possible to purchase fortifications like bunkers and minefields as reinforcements in both battles and operations. This is necessary to simulate deep fortified defense systems, which stretched for miles into the rear. But use your discretion when assigning fortifications to reinforcement slots, as there are no security features built in to prevent "magical" appearance of a bunker close to the frontlines which wasn't there in previous battles or turns. The best way to use this feature is to link fortifications to the map during advance and assault type operations, and rarely, if

ever, allow fortifications to enter the map as scheduled reinforcements or reserves.

Editing units

Although certainly not mandatory, CMAK allows each individual unit to be customized to some extent. None of the changes allowed make fundamental changes to the unit's inherent qualities (for example, you can't give a Panther an 88mm gun, or a squad all light machineguns). But you can change various other unit abilities.

Select a unit from the right hand column of the purchase screen, and double click on it or click on the EDIT button at the bottom. This will open that unit's editing screen. In all screens, CANCEL negates any changes made and brings you back to the purchase screen, and OK accepts any changes and closes the window. Don't forget to save the scenario before exiting the Editor, though, for the changes to have any effect.

Depending on which unit type you want to edit, the editing screen might differ slightly. Three of the main examples are explained below.

Infantry units

Unit type - The type of unit you are editing is always shown on the upper left.
Ammunition - Below the unit's name, you are able to edit the small arms ammunition available to that unit. Note that every unit has a maximum capacity for carrying ammo, which is also listed. Units rarely start off with their maximum capacity by default.

Note: holding the SHIFT key adjusts values in groups of 10

Experience – you can adjust the unit's experience rating. This is a great way to add individual elite and crack units to an otherwise regular formation.
Fitness – changes the fitness level for the unit.
Standard Name/Special name – the Standard Name for each unit is randomly assigned when you enter a battle. For historical scenarios, you might want to change this name to reflect a certain historical personality (in the case of a Rifle Squad, for example, a known squad leader). By clicking on the button, you will be able to enter a special name for the unit, which will be displayed every time the scenario is played.

Suppression – units usually start off without suppression, but can also enter the map panicked or even routed, to simulate pre-battle fatigue. Suppression pre-set here is subject to the normal rally rules.

Fatigue – similarily, units can enter a map tired or even exhausted, for example after a long forced march. Again, fatigue set here is subject to the normal recovery rules once in the game.

Nr. Explosives – infantry units can carry up to three explosive bundles. These are usually demolition charges for pioneer and engineer units, and "grenade bundles" for other units. They pack a lot more punch than regular hand grenades and can be used to destroy minefields, or buildings, or to assault tanks.

Nr. Antitank Weapons – up to 4 anti-tank weapons can be assigned to an infantry unit. These will all be of the same type as set below.

Type – here you can determine which type of anti-tank weapon is being carried by the infantry unit. Only those options available for the timeframe of the scenario, the unit type and the nationality chosen are highlighted. Options include Rifle Grenades, various types of Panzerfaust, Panzerwurfmine, Magnetic Mines, and so on. These are explained in THE COMBAT.

Infantry HQ units

Infantry HQ units can be edited pretty much like any infantry unit with two exceptions: Infantry HQ units (be it Platoon, Company or Battalion HQs) never carry explosives, and each HQ has a set of Leadership Abilities which can be edited here.

Leadership abilities – there are four, Command, Combat, Morale, and Stealth (explained in THE COMMAND), and possible values are 0, +1, and +2. You can add or subtract to each ability by clicking on the + and – buttons respectively.

Each HQ is assigned a random set of abilities when the unit is purchased. Usually, Platoon HQs get higher values for Stealth and Combat, while Battalion HQs get better Morale and Command. Company HQs are in the middle.

Armored and support units

The editing screen for armoured and support units differs somewhat from the infantry editing screen. Below is shown the editing screen for a German Platoon leaders' Tiger tank. For support units like Anti-tank Guns and mortars, the screen is similar, except

that suppression and fatigue are additional editable options (and no leadership values are displayed.)

The main difference to the infantry edit screen is that ammunition values are split into the various available shell types for the given gun. In the case of the Tiger example below, the available ammunition is split into High Explosive Rounds, Armor Piercing Rounds and Smoke Rounds. The total for ALL shell types combined cannot be higher than the "max" number stated.

Also note that armoured HQs only have two Leadership values instead of the four associated with infantry HQs.

Tables of Organization and Equipment (TO&E)

CMAK lets you purchase individual guns, vehicles and support units, as well as whole formations of infantry and armor. Armor can be purchased in platoons, which normally range from 2 to 5 vehicles, with one vehicle assigned as Platoon HQ. Infantry units can be purchased in Platoons, Companies and Battalions, all with their respective HQ units. The availability of the various formations and what they consist of has been painstakingly researched and includes a plethora of historical options.

Combat Mission is about as consistent as it can be with TO&E. Unfortunately, the number of nations, formations, length of the conflict, and the constant changes made to formations make it difficult to get things perfectly organized. To keep things as consistent to the user as possible, the following conventions were used to organize the TO&E:

1. The formation name is designed to give the player a lot of information very quickly and easily. Each title contains some or all of the following pieces of information in addition to its basic name (ex: Rifle Battalion, Infantry Company, etc.):

Level - Battalions are assumed to be attached to Regiments if they are standard fighting formations, Divisions if they are specialists such as Recon and Pioneers. Formations which are not Battalion size, or are not attached like this, have the appropriate notation made at the beginning (ex: Divisional Pioneer Company, Regimental Recon Platoon, etc.)

Divisional Type - In some circumstances standard formations were slightly different in one type of division than another within the same force type (i.e. Infantry, Mechanized, Cavalry, etc.) To reduce confusion, formations which appear in the same force type which are different for two or more division types are noted in " ( )". For example, (Pz) means only available for Panzer Divisions, (PzG) for Panzergrenadier Divisions, (Pz/PzG) for both types, etc.

Introduction Year - The year the formation was introduced is noted as '41, '42, '43, '44, or '45. If there were more than one formation during this time period, then a letter is used right after to differentiate between them (ex: '41A, '41B, '41C, etc.). Depending on circumstances these duplicate formations might be available at the same time or not. If there is no date at all that means the formation was the only one of that type in use for 3 or more years in a row.

Incomplete/Complete - Some formations, particularly Recon units, had great numbers of vehicles assigned to them. This is not something that Combat Mission is set up to handle, especially because these units often fought separate from each other by design.
If such units were left out there is a "-" at the very end denoting that some assigned units were purposefully not included.
If you see the "-" you can safely assume that some type of light wheeled or tracked armor would likely accompany this formation. Note that armored Halftracks and sometimes Armored Cars are included for the most part. Generally only company sized armored vehicle formations were left out.

In addition, some German Panzer Divisions were supposed to have a fully armored Battalion per Regiment. In reality generally only the "Elite" Panzer Divisions managed to acquire the assigned

number of vehicles. The typical Battalions have a "-" mark denoting that only one Company out of three have halftracks. A "+" notes a Battalion fully outfitted with all its halftracks according to its TO&E.

2. In addition to the above conventions, Company-sized formations sometimes have their mode of transportation noted. In general it should be assumed that all formations move either by foot, horse, or with the assistance of minimal numbers of unarmored motor vehicles. Heavy Weapons Companies are assumed to be transpoted by motorized or armored transportation in Mechanized formations, horse and some vehicles for all others.

Company-sized formations which used armored vehicles for transport or support, usually halftracks, are noted as " (Armored)". Those companies which primarily used non armored vehicles for transportation are noted as " (Motorized)". Some formations used light 4x4s " (VW)" or motorcycles " (MC)" to move from battle to battle. In general these designations are in place to help avoid confusion because their TO&Es are generally different from each other.

NOTE: Only armored support vehicles are included in the TO&E because non-armored transport were not intended to take part in combat. Also, Combat Mission purposefully does not include motorcycles to avoid players using swarms of them in a historically incorrect manner.

3. Forces are grouped according to their basic classification. From top to bottom the TO&E covers Infantry, Recon, Pioneers, Misc.

4. Within each grouping units are organized with the most common units listed first. For example, standard Infantry Battalions appear over variations, like Light Infantry Battalions and Regimental Pioneer units appear before Divisional ones.

The Challenge

Combat Mission features one of the most advanced artificial intelligences found in wargames today. It's capable of handling any map, situation and task you ask from it, some better, some worse, but under almost all circumstances it will be a worthy opponent. With one difference, the AI doesn't learn – but you do. So over time we strongly encourage you to try out a game against another opponent, be it by email or the Internet. You will discover completely new sides to the tension and excitement of leading your troops into combat. Matching your tactical knowledge against another human is an incredibly rewarding and thrilling experience, and with the "Turn Timer" option for Internet-based games – adding time pressure to make snap decisions – your combat experience will be complete!

This chapter describes the various challenges the game can offer you, when playing alone or against another person.

Artificial Intelligence

Combat Mission features essentially two levels of computer-player Artificial Intelligence, which we call – very loosely – Strategic AI (StratAI) and Operational AI (OpsAI). The former develops the battle plan against your forces when you play the computer in a single player game. It analyzes its own force and key locations on the map, places units for defense and decides the best approach to the objectives in the attack. The StratAI is not scripted, meaning that it can tackle any map layout and set of objectives. It is, of course, by no means perfect – even though it's probably the best out there – and will generally be at a disadvantage against an experienced human player, but almost always puts up a good fight.

The OpsAI, on the other hand, makes sure that the "orders" developed by the StratAI are executed properly. It adjusts waypoints and reacts to enemy threats, "reports" to the StratAI if an order is impossible to execute due to (for example) strong enemy resistance and so on. The interaction of these two levels of AI, mixed with a

heavy dose of "fuzzy logic" decision making, ensures variety of play and even – to some extent – a human component even in single-player mode.

In addition, there is a third AI in the game, which not only leads computer controlled forces, but your own as well! When issuing orders, you have to keep in mind that your units are not robots. Being trained soldiers, they try their best to do what you tell them, but there are limitations. On certain occasions a unit might change your order a little or completely disregard it. The "Tactical Artificial Intelligence" (TacAI), which is responsible for this behavior, simulates the individual on the battlefield and takes into consideration what he thinks, sees and hears. It is, however, never proactive and acts only in self-preservation and self-defense!

Imagine a situation in which you order one of your units to fire at an enemy hidden in woods several hundred meters away, and all of a sudden another platoon appears on your flank, from behind a dip or a house merely 40 meters away. If your men dutifully carry out your orders for the full 60-second Action Phase, the enemy will probably overrun your position before you - the player - get a chance to change your orders accordingly. Instead, the TacAI usually intercedes to simulate your soldiers taking it upon their own initiative to switch fire toward the suddenly far more threatening enemy unit. Imagine another situation where your lead tank runs into a mine! Would you want to see your other units, which were plotted to follow the lead vehicle, simply rumble forward into the same minefield? If your answer is no then you'll be happy, because the TacAI will change their orders and have them try to drive around the obstacle.

Not only does the employment of the TacAI result in a more rewarding and realistic gaming experience, it also serves to simulate the behavior of human beings on a lethal World War Two battlefield. The uncertainties of human behavior (stress, morale, panic, will to survive) are taken into account and simulated in the game.

The TacAI also uses "fuzzy logic" principles when determining the likely reactions of your units. This leads to a rich and varied set of possible unit behavior in different situations, and makes the units appear human in their actions. Some might run away when facing a new enemy close by, some might stand and fight or even charge. Although you might not always like the results, keep in mind that real world commanders often feel the same way! In other words, the TacAI is not programmed to be "perfect" since there is no such thing as perfection in war.

Only after the 60-second Action Phase has elapsed can you issue new orders to your units and redirect their actions, simulating tactical input from a squad or platoon commander to the individual soldiers.

Quick Battles

Quick Battle Scenarios are randomly generated battles following parameters set by the player. As the name Quick Battle implies, this is a great way to quickly generate battles in nearly endless variations and to get into the thick of things. Another advantage for 2 player matches is that these battles are not known to either player beforehand and can be quickly balanced to match the skills of the players.

Many options are available, which are discussed in detail below.

In order to start a Quick Battle, you need to choose "Quick Battle" from the list of available scenarios/battles. This option is always on top of the list.

Date and Region – the first screen lets you select the month and year of the battle, as well as the geographical region. These selections are important, as they determine the equipment and formations and terrain available to you. All three settings can be set to "random". You also have the option of choosing "All combined" for the region – this will allow you to select any troops from all the geographical regions.

Battle parameters

The next screen allows you to set the main battle parameters, like the forces that will be fighting each other, but also victory conditions and more.

Force Mix – Six options are available. These determine the equipment that will be available to you. The options are:

Combined Arms – a balanced mix of infantry, mechanized and armored units, much like a typical Combat Group would look like during WWII.

Infantry Only – armoured vehicles are ruled out in this option

Mechanized – a mix of infantry and light vehicles, with a limited number of armored vehicles

Armor – all unit types are allowed, and you will be able to spend most of your purchase points on tanks and armored vehicles if you wish

Unrestricted – you can buy units in any mix you prefer

Random – the computer will randomly assign one of the above Force Mixes

Nationality – here you are able to chose which nations will be pitted against one another. The choices available depend on your settings of date and region.

Division Type – most forces in WWII were not mixed together willy-nilly, but usually belonged to a certain type of superior organization, like an Infantry Division, or an Armored Corps. By setting the Division Type, you determine what kind of equipment will be available to purchase, and in what quantities. A mechanized Division will be allowed to spend more points on purchasing tanks than an Infantry Division, for example.

You can also set this option to random, in which case the Division type will be selected by the computer.

Quality - Low, Medium, High, Unrestricted or Random. Sets the available troop experience ratings. Low quality means that only conscripts or green units can be used. At medium, only green or regular units can be bought. At high, only veteran or crack units can be bought. Unrestricted means that you can purchase units of all experience ratings. Random randomly chooses one of the above.

Note: Elite is not available for QBs at all, not even under the "unrestricted" option! Troops of this calibre were extremely rare, and in order to prevent unrealistic overuse of elite troops, their selection has been excluded.

Purchase Units - Automatic or Allow Human. Automatic has the computer select the combat units for that side while Allow Human allows the player to choose them.

Fitness – choices are Fit, Weakened, Unfit or Random.

Casualties – you can set a percentage from 0%-50%, or have the computer randomly assign a pre-battle casualty rate. Your units will be depleted randomly by the computer according to the percentage set here. This includes reducing headcount for squads and teams, but also eliminating certain equipment AFTER you purchase it. For example: if you have chosen a 50% casualty rating

for your side, and purchase a platoon of 4 Panther tanks, chances are that only 2 will be available to you for the game. See also – Force Size below.

Ammunition – allows you to set how much ammunition your side has available. Options are 10% - 100%. Please note that setting your ammo too low can have a strong impact on play balance. That's why there is no random setting available here.

Battle Type - Assault, Attack, Probe, or Meeting Engagement. This determines the force balancing (how many points the attacker gets relative to the defender), the map size, whether the defender may have fortifications, as well as victory flag placement. See The Mission for more details.

Force Size - 300-5000 points. These are the points given to the DEFENDER to purchase combat units. The attacker's points are calculated relative to this number according to the Battle Type selected above. For Meeting Engagements, both sides' points are equal.
Also, depending on the casualty settings for each side, this point total will be increased in proportion to the casualty percentage set (eg. if you play with 50% casualties, your point total will double. After you purchase your units, half of them will be deleted randomly, thereby reducing your points available for the battle to the number set in this option).

Map Size - Small, Medium, Large, or Huge. This is a relative setting. The actual map size (in meters) depends on the selected force size.

Handicap - This determines how many extra buying points (if any) are added to or subtracted from the attacking force, based on the Force Size selected above. It's great for balancing play between opponents of unequal skill levels.

Rarity – can be fixed, variable or turned off. All unit costs in the editor are rated for their performance, but also for how rare they were on the actual WWII battlefield. Fixed Rarity will always apply these rarity modifiers in the unit purchase screen. Variable rarity introduces a random element, by which a rare unit can occasionally become much more common, and therefore cheaper to purchase. Turning rarity off means that unit costs are not adjusted by their rarity at all and units are rated for performance only.

Time – Mid-Day, Dawn, Dusk, Night, or Random.

Weather - Clear, Overcast, Rain, fog, Rain&Fog, Thick Fog, Snow, Blizzard, Random

Game Length - 20-60 turns.

After setting the general preferences, the random map generator screen appears. It works exactly the same as the auto-generate map function in the scenario editor (see THE EDITOR/Maps), with one addition – for Quick Battles, it is possible to import custom-made maps.

Importing Maps

A new feature in CMAK allows you to import any user-generated maps into Quick Battles. When prompted to determine which map you want to play on, you will see the usual map generator window as explained in THE EDITOR, but in addition a button appears on the right labeled "load from file". Clicking on that button opens a new window listing all available maps. The default directory opened is called "Quick Battle Maps", but you can browse your harddrive for any maps available, including those from other battles and even saved games! Maps from Operations cannot be imported, however.

Note: you can, for example, import the "autosave" from a previously finished battle. All terrain features, including terrain damage like craters and destroyed buildings as well as foxholes will be imported, allowing you to essentially play a series of Quick Battles on the same map! Make sure you don't forget to set date, year and region (and possibly force types) accordingly, or you might find that the desert map from 1941 you just fought on suddenly was teleported to Italy into the year 1945…

After selecting the map, scenario or saved game you want, you will be asked if you want to import troops, also. This applies to any pre-made scenarios and (auto)save game files from FINISHED battles (i.e. games that were saved while looking at the AAR screen). These troops will be added to your force in addition to those you purchased for the Quick Battle, and they DO NOT count against your point total. When you import the forces from a saved game, troops will be imported in the state they were in when the game was finished. Note that these troops do NOT get resupplied, and a squad with LOW ammo will enter the new battle in exactly the same condition.

One word of caution, however – there are no safety features built in for importing maps. Make sure that the map you're importing fits the size of the Quick Battle you are generating. Importing a 400x400m map for a 6000 points Assault is not a wise thing to do. Likewise, importing troops from a 6000 points assault scenario to play a meeting engagement with 500 additional points purchased can seriously unbalance the game. Note also that setup zones and victory flags remain in their default position as placed by the map designer, and may not fit the type of battle you want to play. The troop orientation in Quick Battles is ALWAYS east/west with the Allies starting at the east map edge and the Axis on the west. Use your own discretion!

Choose type of game

Finally, choose which side you want to play and if you want to start a single player game, a PBEM game, a hotseat game or a game over the Internet via TCP/IP (all explained in The Challenge).

When you have chosen to have the computer automatically purchase forces for you, you will find yourself immediately in the setup phase of the battle. Otherwise, you will enter the UNIT PURCHASE screen.

Purchasing units in Quick Battles

The unit purchase screen for Quick Battles is the same one used to make custom-made scenarios in THE EDITOR, but there are some differences, explained below. For a more detailed description of how the screen works overall, see THE EDITOR.

Depending on the parameters you have set for the Quick Battle, some options in the unit purchase screen will be greyed out. For example, when you set Fitness to "Fit" in the Parameters, only this option will be available in the unit purchase screen. When you have used random settings in the parameters, for example for force mix or nationalities, make sure you check out all your available options in the purchase screen. The "Location" option is always set to "On Map", as no reinforcements can be purchased for Quick Battles.

Under the options bar, you will notice how many points you are able to spend for the Quick Battle. On the right hand side, the total number of points you can use to purchase your troops is displayed. This can be different from the number you set in the parameters, depending on the chosen casualty level and battle type.

Note: when casualties have been set to 50%, you are allowed to spend twice as many points as will enter the battlefield, because half of your force will be randomly "eliminated" before the setup phase. See the previous section about Battle Parameters.

Also, depending on the battle type, each side will often be able to spend a different point total - except for meeting engagements, where both opponents normally get the same number of points - the attacker in a Quick Battle usually gets more points than the defender. A Probe yields the least point advantage, an Assault the most. Of course this is modified by any "Handicap" settings.

The total is broken down into various categories of unit types which you are allowed to purchase – Infantry, Support, Vehicles, Armor, Artillery/Air and Fortifications. How many points are available for each category depends, again, on the parameter settings for your Quick Battle, including force mix, division type, region and battle type.

By clicking on each category, the available unit list appears in the purchase screen. The cost for each unit or formation is listed, as well as the "rarity adjustment" (if applicable).

Note: many formations listed under "Infantry" actually consist of a mix of infantry and support units (and sometimes vehicles), so the cost listed is not always directly deductible from the Infantry point allowance. Example: A Grenadier Battalion '43 might cost approx. 1150 points combined, but it consists of about 740 points of infantry units, about 270 points of support units (Heavy Machineguns mostly) and about 140 points of artillery units (forward observers).

Before purchasing any units, make sure you adjust the options in the top options bar. For example, often you will be able to choose from units with different experience, e.g. green or regular troops, and you should set the option to reflect which ones you want to buy before actually selecting that formation.

Purchased units appear in the righthand column of the purchase screen. You can delete any units from this area if you change your mind. When you spend more points than you are allowed for a category or overall, the corresponding point value will turn red and you will be reminded that you exceeded your point total when you try to exit the purchase screen. How many points you spent is shown in the "Spent" line directly below the options bar.

Note: it is possible that even though you are allowed to spend points for a certain category (for example armor or vehicles), no units will actually be listed in the purchase screen. This is not a bug, but indicates that the particular force mix, nationality and division type for the set date and region excludes the use of that category of units for this battle. This is often the case for Partisans and minor nations like Hungarians and Romanians, which often did not have armor or vehicle support.

PBEM

Playing by Email (PBEM) can be an extraordinary gaming experience. Matching your tactical skills directly against those of another human opponent, regardless of where he is in the world, will bring your enjoyment of Combat Mission to new heights.

But in order to start and complete a PBEM game successfully, a little bit of organization can help. Without it, PBEM-ing can quickly become frustrating: whose turn is it? Where is the last file? Did I plot my last turn already? Did the last PBEM file get overwritten?

PBEM games play just like single player games against the AI, except that each time you finish a game turn, you will need to send this information to your opponent.

After you click GO!, Combat Mission generates a text file, which contains the encrypted turn data that needs to be emailed to your opponent. You will be asked to name the file, which then will be saved into the PBEM directory within the CM folder. The default name is "PBEM", but you can change it to anything you like.

When renaming PBEM files, it makes sense to use a short description of what that file is, as it will allow you to track down quickly what game and which turn it is. The moment you start playing more than one PBEM game at once (don't worry, it WILL happen!), you'll learn to appreciate the correct naming of your files. There are many ways to do this. You can simply number the files in sequence, starting with "Anzio 1" – this is the easiest way to find a file. If you also want to know exactly what the file contains, you could also label it "Anzio Turn 15 US", or "Steve Setup Germans". Use whichever file names work best for you. Remember that files with the same name will be overwritten – that's why it makes sense to name them after the scenario name or even your opponent's name. It is also good if you agree beforehand with your opponent on which numbering system you want to use.

Additional to the above "manual" way to organize things, there is a number of "PBEM organizing" programs out there, which – though not officially supported by Battlefront – do work with Combat Mission and make the re-labeling and organization work easy for you. Check our forums at www.battlefront.com and certainly someone will be able to help you out in finding such software.

Compatibility

It is very important that both players use the same, compatible method for sending PBEM files to each other. If one player can't load a file it is most likely because of a transmission error due to an incompatible email format. Macintosh users playing against Windows users should pay close attention to that! Generally it is best if "uuEncoding" is used without any form of compression. If you should use compression, make absolutely sure that it can be decoded on the other end.

PBEM Turn Sequence

The turn sequence in PBEM games is designed to allow for a reasonably fast game, but at the same time provide security and prevent cheating. One of the weakest points in the PBEM chain of some games is that a player can open the file sent to him by his opponent as often as he likes, plotting new orders for his units until he achieves the results he wants. This is not possible with CMAK, since the PBEM turn sequence prevents the player from watching the results of his orders before sending the file to his opponent.

The PBEM sequence goes like this:

1.   Player A starts a scenario and chooses the side he wants to play. He chooses a password and enters the game during the Setup Phase and positions his units. After hitting GO!, the PBEM file is generated. He emails this file to Player B.

2.   Player B opens the file, chooses a password for himself, and enters the game during the Setup Phase. After positioning his units and hitting GO!, the PBEM file is generated, which he sends to Player A.

3.   Player A opens the file, plots his turn one orders and hits GO!. He sends the file to Player B.

4.   Player B opens the file and plots his orders for turn one. He does not watch the Action Phase yet – he has to email the file to Player A first.

5.   Player A watches the Action Phase, and sends a file back to Player B.

6.   Player B watches the Action Phase, after that he plots his turn 2 orders.

7.   Player A plots his turn 2 orders.

8.   Player B watches turn 2 Action Phase.

9.   Player A watches turn 2 Action Phase and plots turn 3 orders.

10. Player B plots turn 3 orders.

11. Player A watches turn 3 Action Phase.

12. Player B watches turn 3 Action Phase and plots turn 4 orders.

Steps 7-12 repeat until the game ends.

TCP/IP

Minimum TCP/IP Requirements

To play using a the Internet or a LAN you need two players both using the same version of Combat Mission Afrika Korps, on either a Mac or Windows based machine. An active connection to the Internet or a TCP/IP based LAN is also a requirement. You might need special networking software for LAN games played between Macintosh and Windows based systems.

Basic Concepts

One player is designated as the Host and the other as the Guest. The Host is responsible for picking the Scenario or Operation and selecting any applicable parameters for a Quick Battle. Combat Mission picks the faster computer to process turns on, so the Host need not be the person with the best machine for optimal game performance.

Starting a Game

The Host starts up an Operation, Battle, or Quick Battle in the normal way (see Getting Started section). Once the game is loaded the Host selects the side to play, and then is presented with the connection choice screen (see previous page). Click on the TCP/IP option and select a turn time limit if desired. After this is done, click on OK, enter a password, and click OK again.

Note: The optional turn time limit governs both Action and Orders Phases combined, however the Setup time is twice the amount of the timer setting. Keep in mind how big the battle is and the amount of time pressure the players both want to have. Quick turn times for large battles are probably not a good idea.

The next screen you see is the Host Connection Page. This lists all of the Host's Current IP addresses, one of which the Guest needs in order to connect to the game (see IP Address Tips later in this section). The Host must wait until the Guest connects, at which point the game proceeds almost like a single player game in terms of the game mechanics.

Important: do not minimize the game while waiting for the guest to connect. The guest needs to load in the 3D graphics during his attempt to connect, and this cannot be done properly when CM is minimized in the backhround.

Joining a Game

All the Guest needs to do is start up Combat Mission, click on the Join Multiplayer button, then select Join Network Game. At this point a screen appears asking for the Host's IP address. This number must come from the Host at the time the game is set up. Once the IP address is entered a connection with the Host should be established almost immediately and the game will start downloading the scenario data so that the game can begin.

Note: Unlike many multi-player games, a scenario file only needs to be present on the Host's system for a game to play correctly.

Turn Timer

One of the unique features of TCP/IP play is the optional Turn Timer, which is set by the Host before the Guest joins the game. Each player has twice as much time as the Turn Timer's setting in order to set up units in the Setup Phase. For example, a setting of 2 minutes allows 4 minutes for setup. Once the game begins the selected time is shared between the Action Playback Phase and the Orders Phase. This means you have only one block of time to view the action from last turn and issue orders for next turn.

Each player has one "free" viewing of the Action Playback (i.e. 60 seconds). After this "free" 60 seconds the timer automatically starts counting down. Multiple reviews of a movie quickly eat into the total amount of time you have to give orders. The timer switches to a warning color (red) as it gets close to zero.

Note: If the player clicks on "Done" right away, and stops viewing the playback, the timer starts counting down. In other words, the "free" 60 seconds can only be used for watching the playback, not for issuing orders.

The timer continues regardless of what the player is doing, like switching Combat Mission to the background to check email. If a player needs to take a break for any reason a Pause request can be made. This is accomplished by pressing the Alt (or Command on the Macintosh) and P keys at the same time. This flashes a message on both player's screens requesting the Timer be temporarily disabled. The other player now has the option of accepting by requesting a Pause also, or denying this request by doing nothing. When both players request a Pause a message pops up indicating that the Timer is disabled for the rest of that turn. Both players can now take

as long as needed to complete the turn. When both players have clicked on the "OK!" button (or "Done!" if in the Action Playback Phase) the game proceeds with the time re-enabled. If a Pause is issued during an Action Playback Phase the timer remains disabled until the next full turn.

Multiplayer Chat

Each player can send a text "chat" message to the other. To activate the Chat feature, press the "`" (tilde) key or the number "0" (zero) key. Users with non-US standard keyboards most likely can only use the "0" key. You can now type in your message and press the "Enter" key to send it. If a message is no longer necessary, but the entry box is already presented, simply press the "Enter" key with no text typed in. Messages are displayed in the upper right corner of the screen and new ones are announced by an audio "squawking" sound on the receiving player's system.

Note: As soon as a Guest join a game the players can begin chatting. At this point it is a good idea for the Guest to send a brief message to indicate to the Host that the connection is indeed established.

Chat messages can not be viewed when in the 2D part of the game. This means while you are in a Briefing screen you can not read or responded to messages. However, the audio "squawking" sound can be heard to indicate the other player is trying to make contact.

At the end of a game, when the After Action Report is displayed with the scores and indication of the winning player, should you wish to chat further with your opponent, just click the "Look at Map" button which will return you to the 3D battlefield. From there you can use the chat feature as before to continue your conversation, and perhaps gloat about your glorious victory.

Special Note for Operations

Operations proceed just like normal single battle except that at the completion of one battle you are shown the current Operation Debrief Screen. Remember that you cannot chat when viewing this screen. As soon as both players click OK the next battle will commence to load and the setup phase will begin.

IP Address Tips

When a player Hosts a game, Combat Mission lists ALL the IP addresses assigned to a system. If you have multiple modems or network cards it will list all IP addresses associated with those devices. What it can't do is tell you which one is the correct IP address as it depends on how your system is configured. Users of AOL, for instance, may have up to three addresses listed. You will need to have your opponent try to use each IP address in order until they find the one that allows connections. Once you have found the correct IP address, make note of its place in the list since it should always be the same one. For example, let's say when you host a game Combat Mission shows three separate IP addresses. You give the first one to your opponent and it doesn't work but the second one makes a connection. In the future, the correct IP address should always be the second one in the list even though the address itself may change.

If you need more help with IP addresses, please see Appendix C - Troubleshooting.

Lost Connections

If at some point during play the connection is lost (not uncommon for even "stable" Internet connections) both players receive messages indicating that the connection is now broken and the game must be restarted by loading the autosave. The autosave file is created on each players' system when the game detects the players are no longer connected. It does not matter which player reloads the autosave, and thereby acts as Host, but depending on the timing of the disconnect some orders may need to be reissued. Autosaves created due to a broken connection during the Action Playback do not allow either player to issue any orders. This is done to prevent one player from purposefully breaking a connection during a turn that is going badly in order to "redo" orders.

Internet Connection Sharing

If you are using Internet Connection Sharing, and your machine is not the one that connects to the net, then you can't be the host. eg. if you are on a local area network (LAN) and you connect to the Internet over the LAN via a server, then you can only Join - though your server could Host an Internet game. If you don't know what Internet Connection Sharing is, then you probably don't have to worry about this.

Firewalls and Proxies

In order to play a network game, Combat Mission requires that TCP port 7023 be open for all outgoing and incoming transmissions. Please check the documentation for your firewall or proxy software on the correct procedure to activate access to that port.

Cable/DSL Router Configuration

If you use a home broadband router (eg. LinkSys Cable/DSL 4 port Router) and wish to host a network game you will need to add TCP port 7023 to the routers forwarding table. You then need to match port 7023 to the internal IP address of the computer that you wish to host the network game. You can then use the router control panel (usually accessed via your web browser) to get the external IP address given out by your ISP. Give this external IP address to your opponent and they should be able to connect with you hosting. Consult your routers documentation for more information on proper port forwarding procedures.

The Beginner's Tutorial

This is a Combat Mission Afrika Korps tutorial designed to help the beginning player understand the use of the basic commands in the game. This basic tutorial is for beginning players that are unfamiliar with the Combat Mission series of games.

Getting Started:

After starting the game, the first thing you should see is the main title screen. The main title screen contains four main buttons. For our purposes, you should click on the button labeled "PLAY GAME". This should bring up the "LOAD GAME" screen, which provides you with a list of scenario titles to choose from.

Select the "Tutorial" scenario and click on the "CONTINUE" button. This will bring up the General Briefing, which is available to both sides in a game. Read over the briefing carefully in order to familiarize yourself with the situation. When finished reading, click "CONTINUE".

You can now select the side you wish to play; for our purposes you will select "ALLIES". Once this is selected the next screen comes up and you will select "1 PLAYER" and then click "OK". You will now see the detailed briefing for the Allied side. Read carefully- it will tell you what your mission is, what forces you have to accomplish it, if you can expect any reinforcements and any intelligence on the enemy dispositions. Keep in mind that all of the information might not be true; the scenario designer might choose to tell you a half-truth or an outright lie. There is no need to take notes

on the briefings- they can be accessed by the ALT-B hotkey or simply pressing the BRIEFING button on the main interface during the game.

This tutorial scenario is an Allied Probe, meaning you as the Allied player will be in an offensive posture, and the Axis forces will be in a defensive posture. When you finish reading, click on the "CONTINUE" button.

Discovering the 3D Battlefield:

Congratulations, you made it onto the 3D battlefield of Combat Mission! On this rendered terrain, battles will be won and lost, sacrifices made and heroics performed. Note that you can generate any real or imagined field you would like using the powerful SCENARIO EDITOR, but for now lets just concentrate on this predesigned piece of virtual reality.

The game begins in the SETUP PHASE, where you can scout the map, make your plan and deploy your forces in an effort to crush your opponent.

Take a look at the overall screen layout, which is divided into two main sections. The upper three-quarters are occupied by the 3d battlefield window, while the bottom quarter is covered with the game's interface. Throughout the game, this interface will feed you vital information about the status of the battle, your forces and the virtual world you are fighting in. Lets take a walk through it to see what's what.

To begin our tour of the interface, please left-click on an open area of the 3d map. This will deselect any units and give you the general interface bar, below. As you look at the general interface bar, in the top left corner you will see a British flag with an arrow pointing at an Italian flag with a small square. This graphic means that this scenario is a British attack. Below that you will see several percentage values, these are the Morale Indicator and Victory Level Indicator. Beware, the Victory Level displayed is merely an estimate, based upon what you know as the commander about flags held and losses inflicted. You will only discover the true value after the battle is over. The Morale Indicator is a function of the casualties you have taken and directly influences the willingness of your troops to fight rather than run away. Also beware that, should it get too low your side may automatically offer a cease-fire or even surrender.

Moving to the right, you will next see a landscape thumbnail. This serves to indicate the weather and ground conditions affecting this battle. Holding the mouse over the little picture will switch the graphic to text indicating the specific conditions. Vehicles and men move better, faster (with lower chances of bogging) and accrue less fatigue in dry ground conditions. Strong winds will whip flames into raging infernos quickly, and fires tend to spread with the wind direction. Next to this you will see dialog boxes—indicating the date, time of day and current turn. Below it you will see the scenario title.

To the right of this display rest a series of buttons. Most of them are quite self-explanatory, but do note that if you choose to Prepare For a Ceasefire, that button will stay depressed. Possibly the most important button on this interface is the one labeled HOTKEYS. Left-click on it, and you will see a list of all the hotkeys available within the game interface. This list is also available at the end of this manual, complete with descriptions of the in-game effects of these commands. For now, let us explore a few of the key effects. You might have noticed your men seem a bit large; hitting SHIFT-C will cycle through the graphical scale, ranging from realistic to +4. Note that changing the scale has no effect on in-game physics, it just serves to make things easier to see. SHIFT-T will cycle through the tree display density settings. You might find NONE useful for issuing orders to units in forests, while you might like EXTREME for movie watching. If you are running on a slower machine, lowering the tree display density or the terrain effects density (SHIFT-N) will help to smooth out the game's animation

On the right hand side of the interface you will find the viewpoint navigation buttons, which move the viewpoint around the map. You will note that your battlefield map of Combat Mission is three-dimensional, and you can move your viewpoint (the "camera") in any direction, even up and down. There are several ways to navigate on the battlefield, but one of the easiest is by using the arrow buttons on the main game interface. Another very valid way of moving and rotating the camera is to push the mouse cursor off of the screen edge. Pushing it all the way to the top, for example, will move the viewpoint forward. To the sides, pushing it off the upper parts of the battle window rotate the view point, while the lower parts will scroll the view sideways. For other viewpoint navigation methods (like how to zoom or adjust the camera angle up and down) read the BASICS section of the game manual.

Try moving around the map now. Make sure to try out the different view levels, from the strategic view (level 9) all the way

down to the trench cam at ground level (level 1). You can use the UP and DOWN buttons on the main game interface, the 1 through 9 keys on your keyboard or the + and - keys on your keypad. While the higher view levels are good to get an overview of the map and a feel for the battle in progress, the lower views are excellent for close-up action playbacks and fine plotting of moves, lines of sight etc. Note that, at this point, you cannot see any enemy units. This is because of the "Fog of War". You will not see the enemy units until your fighting forces actually "see" them.

Identifying Your Mission

In order to orient yourself on the battlefield, rotate the camera until you spot a black windrose with a big N above it slightly beyond the edge of the map. This will help orient you to both the wind and cardinal directions quickly and easily. Obviously, the "N" means North is in the specified direction.

Let's take a real look at this map. Your forces, a group of infantry-carrying scout cars and tracked universal carriers, is approaching a small hill that stands between your men and the enemy radio relay station. Since the enemy station is almost certainly defended, it would be foolish to simply drive over the crest of the hill without some sort of plan.

In most other tactical wargames one gained (and maintained) control of victory locations by placing a unit directly on top of it, but this does not apply to Combat Mission. Due to the realistic 3d nature of the game, Combat Mission requires the player to gain control of the area surrounding the flag. Furthermore, in order to maintain control of that flag you must keep units nearby—when your troops leave the area, who knows what else could walk in? When your troops no longer securely hold an objective area, the victory flag will turn gray and have large '?' on it. Keep in mind that on unscouted parts of the map you might well see neutral flags even though they are under the control of unspotted enemies. In addition, remember that due to fog of war what you see is not necessarily what you get; i.e.-hidden enemy units might be exerting control over flags you believed to be yours alone. A critical item to remember is that you only gain victory points for the victory flags under your control at the end of the game.

Lets look at your forces. Notice the red dashed-line border surrounding your forces? This is your Setup Zone. Setup Zones define the area in which you may freely move troops that are located

within them during the setup turn. This allows you to configure your units in such a way that they may best be able to execute your orders.

Although there are none in this scenario, you may occasionally find some of your units that are located outside of the defined setup zones. These units are recognizable by an orange base color and are termed "padlocked" units, meaning that you cannot move them around or place them in different locations during your setup turn. Other units can also be set up outside of such zones in the "neutral" area (to simulate advance elements for example). Such units have a grey zone color and can be left as is or placed in any of the setup zones. When you get used to the color coding of the unit bases in this game you will be able to determine at a glance which units are capable of being moved around in the setup turn.

Becoming Familiar with Your Units

When you left-click on one of your units, a yellow frame will surround it on the 3d Battlefield. At the same time, the game interface in the bottom portion of the screen will transform into a unit status window. In that status window, you can see the name and type of the unit, weapons, armor, manpower and experience. Once the game is underway, casualties, morale, current activity and suppression status will also be displayed here. For more details on this window, please see MEN AND MACHINES.

Pressing the ENTER key will cause a more detailed unit status display to appear. In this pop-up, you can see all manner of technical information about the unit including characteristics such as armor penetration, horsepower and firepower. See MEN AND MACHINES for details.

Issuing Orders

Find the Jeep sitting in your formation of vehicles and select it by left clicking on it. With a unit selected you can now access its orders menu. Hit the SPACE BAR, or just right-click on a unit to bring up the orders menu. You will also note upon closer inspection of the jeep that it is carrying a passenger – in this case the platoon HQ of your infantry. Let's look at the orders bar you just called up.

Since you are still in the Setup Phase, the order menu contains only a few orders, used mainly to redeploy your units within their setup zones. When the game starts, additional orders for targeting,

different modes of moving, etc., will become available. Beside each order, you will notice a letter. This is the hotkey command, which you can use to issue an order without having to call up the order menu.

All right, let's move around a few of the units. Select the PLACE order for the Jeep you have chosen by right-clicking on the unit in order to bring up the order menu and selecting the PLACE command, or alternatively by pressing the P key. You will notice a line extending from the selected unit towards the mouse cursor. This line will follow your cursor wherever you move it. Point the cursor anywhere within the setup zone and left-click. The Jeep will jump to the new location. Now hit P again and move it back to where you found it.

There are restrictions as to where you are allowed to place your units. Tanks, for example, cannot enter woods or buildings or even steep slopes (CM is 3-dimensional after all). As previously stated, you are also not allowed to move your units out of their setup zones. Try it - select the Jeep and, press P and move the cursor out of the setup zone, then left-click. Nothing will happen - the Jeep cannot leave its own setup zone. You can also change the facing of your units (your units will spot an enemy best in the direction they face!). This is done with the ROTATE command. Bring up the orders menu or hit O, move the cursor to the direction you want your unit to face and left-click.

Notice also that the line color is different for each command you choose. An in-depth description of available commands, line colors and their effect in the game can be found in THE COMBAT.

The All Important Line Of Sight (LOS)

Another command available during the Setup Phase (and also thereafter) is LINE OF SIGHT. This is a very useful tool to check exactly what your units are able to see from their current positions. Try it - select a unit, hit L (or right-click on a unit to call up the orders menu and left-click on LINE OF SIGHT). Now move the cursor around the map - you will notice that the color of the line changes, depending on what you point at. You don't need to click, just pointing the cursor does the job (in fact, when you click you exit the LOS tool). Notice also that some text appears above your cursor describing the type of terrain you're pointing at right now.

The brighter the blue line color, the better the line of sight, i.e. the less obstructed the view to that particular location. Notice that line of sight deteriorates with distance, even across open terrain. Additionally, some objects, like houses, completely block the LOS, while others, like woods, simply make it deteriorate faster. At some point, the LOS becomes blocked. Your unit is not able to see any further - immediately, the LOS line color changes to red/black. The red part of the line shows what is still visible, the black part starts from the point where the LOS is cut, and nothing beyond that can be seen.

Lines of sight are extremely important in tactical combat - you need to see the enemy before you can fire at him. At the same time, you are trying to deny him lines of sight to your own troops, thereby effectively keeping him from firing at you. Mastering the concept of line of sight in this game is essential to your success as a battlefield commander. You won't always have to use the LOS tool. Being 3D in nature, and with the free camera movement, most often you can "eyeball" what your units can see. One of the best is to simply select "ground view" (level 1) and position the camera on top of the spotting unit. Keep in mind, however, that with the option to scale unit sizes and the generalization of individual trees and soldiers, "eyeballing" will never be as exact as the LOS tool. If in doubt, hit the L key - keep this in mind, it can save you from some frustrating defeats later.

Getting Your Units Ready for Battle

Now it's time to apply all of the above and concentrate on the mission at hand. First of all, lets use a couple of the hotkeys to arrange our battlefield better. Press the SHIFT and C buttons simultaneously. You will note that you just changed the graphic scale of the units. Lets adjust the scale until the units are as small as they will go, and the label at the top of the screen reads "Realistic". Press the SHIFT-C keys repeatedly until you reach the desired size combination. Next, press the SHIFT and B keys simultaneously. Watch for a message on the top of the 3d screen that tells you that "Unit Bases are ON". This will put a colored base on all units in the game, allowing you to quickly find the friendly and enemy units in the heat of the battle. Finally, hit the SHIFT and P keys together until you see a message on the top of the 3d screen that says "Show all Paths/Targets". Now we are ready to go!

You have a small force of men and vehicles and a mission to accomplish, and your forces are already deployed to begin the

mission. Since everything is in place already, we are going to just hit the GO button at the right side of the game interface.

The Orders Phase, First Turn

After hitting GO, the computer player will take a few seconds to position its own units and then the order phase for the first turn begins. You'll notice that the setup zones disappear (they have no further meaning for the game) and your units are awaiting your orders for the first minute of action. Methodically, we're going to issue the first round of orders to your units, based on the previous tactical considerations. Without any unit yet selected, press the "+" key. This will bring up the first unit in order; in this case your 3 inch Mortar Team. This is important, so note the location of the vehicle that your 3 inch Mortar Team is riding in.

Now left click on the jeep and select it, and hit the "SPACE" bar to bring up the orders menu (or right click on the jeep). Click on the "MOVE" button in the orders menu, and plot a course for the jeep that runs slightly to the left of the soft ground about 75 meters in front of the jeep (you don't want to try to drive through soft ground because your vehicles may get stuck in there!). As you move your mouse, the movement line will stretch from the jeep to wherever your mouse is pointing. Click a destination point to the left of the soft ground. Now, use the move command again to add another movement order, this time taking the jeep up to (but not over) the crest of the hill between your forces and the Radio Relay building. Angle off slightly to the left as you do so, and try to make the entire trip in just 2 legs of movement, one taking the jeep to the left of the soft ground and the other taking the jeep to just below the crest of the hill. Make SURE that you stay below the crest of the hill as your unarmored jeep would surely draw a lot of fire if it crested the hill and were spotted by the enemy forces defending the Radio Relay building. After you have plotted the course for the jeep, keep the jeep selected and take just a moment to look at the interface bar at the bottom of the screen. You can see that it tells you the jeep will "pause 19 seconds". This means that it will be 19 seconds before the jeep starts to move to follow your orders. Some vehicles will be able to follow orders faster than others, as you will see while you plot your movements. It is important to keep this in mind to avoid faster vehicles running into slower moving vehicles and creating a traffic jam, which at best is annoying and at worst can cost you the lives of your men if it happens while under fire. When you plot orders, if need be you can use the "p" unit order command to have a unit wait

an extra 10 seconds before implementing the orders. Each time you press "p" in the unit order menu will delay the unit's movement an additional 10 seconds.

Now that you have moved the jeep, go back to the universal carrier that is carrying your 3 inch Mortar Team and select the vehicle (not the team, for while they are passengers they go where the vehicle goes). Plot a course to bring the universal carrier up next to the Jeep's ending point (below the crest of the hill). This time, use the MOVE command, but right click as you reach the ending point of each leg. You will note that when you right click while giving a movement order you place a waypoint and can continue plotting the move. If you make any mistakes during plotting, simply hit the BACKSPACE key and your last movement order will be deleted.

Now turn your attention to your other vehicles, a group of scout cars and universal carriers that are carrying infantry, plus a machine gun armed universal carrier. Using your newfound plotting skills, plot courses for these units that bring them up to (but NOT over) the hill ahead. This time, line them up just on your side of the hill, but try to stay to the right side of the soft ground that your jeep skirted earlier.

Once all units are plotted and ready to begin their journeys, grab the popcorn and press the GO button. You will now be treated to a 60 second movie as your troops follow your orders.

The Movie Interface Screen

After a few second of calculation, the movie will begin. Once you hit go, you have no control over what happens next, the orders you gave and those of your opponent (in this case your computer) determine what happens in the upcoming movie. Your men might not do exactly what you want at times, especially when under fire.

You will see that on the right hand side of the control interface some VCR-type controls have appeared. You can use these controls to start, stop, fast forward or rewind your 60 second turn movie, and you can move the camera to watch the movie from any angle. Do not press DONE yet! Feel free to watch the action as many times and from as many angles as you would like. When you are satisfied, click on the DONE button below the playback controls to continue to turn 2. Be sure—once you click on it you cannot go back and review the movie.

Moving Through Turn 2 and Beyond

Your forces should not complete their movement orders until turn 4 or 5, so keep pressing GO and watching the movies until your forces have completed their trips.

Now you should have your scout cars and universal carriers arrayed and ready for their assault on your side of the hill crest. On the left, you should have your jeep and the universal carrier that is carrying the 3 inch Mortar Team. What we want to do now is dismount the mortar team and move it closer to the top of the hill. Select the 3 inch Mortar Team that is riding in the universal carrier and use the move order command to bring the team up close to the top of the hill (but make sure they do not actually crest the hill so that they can be seen on the other side).

Now dismount the Platoon HQ and move him so that he ends just over the crest of the hill, which will allow him to see on the other side of the hill. You will notice when the Platoon HQ is selected a series of lines will radiate from him to the other members of his platoon. All of these lines should be black with the exception of one single red line leading to the 3 inch Mortar Team. This means that the mortar team is "In Command" and can receive bonuses from the HQ. With an indirect fire type of unit like the 3 inch Mortar Team, it also means that the mortar team can remain hidden behind the crest of the hill and the Platoon HQ can act as the spotter for the mortar team.

OK, now that you have plotted the movement orders for the mortar team and the Platoon HQ, finish the platoon HQ's movement order by pressing "H". This will tell the Platoon HQ to HIDE once he finishes his movement, and will give the 3 inch Mortar Team time to setup. All crew served weapons in the CM series of games have a setup time after movement.

Commence Firing!

It may well take you two turns to get the 3 inch Mortar Team setup and ready to fire. Use that time to position the rest of your vehicles carefully on your side of the ridge. The basic plan here is simple. We can see that there are several sandbag protected enemy gun positions. Some of these are machine gun positions and are not as dangerous to our lightly armored scout cars and universal carriers. However, there is at least one anti aircraft gun position.

These weapons can be VERY effective against lightly armored vehicles and troops. We will therefore concentrate on killing the enemy anti aircraft gun position with our own on board 3 inch Mortar Team before we initiate the general attack with the rest of our forces.

The first thing we must now do is UNHIDE our Platoon HQ using the unit orders menu. This will allow him to spot for the 3 inch Mortar Team. If you have properly positioned him just over the top of the hill, you should be able to use the LOS tool in the unit orders menu to check that he can clearly see the sandbagged gun positions marked as containing the enemy mortar and anti aircraft gun. Once you have ensured that the Platoon HQ can see the target, select the 3 inch Mortar Team and choose TARGET from the unit orders menu (you can also just press "T"). Move over on the map and place the mouse pointer directly over the center of the sandbagged gun position. Once you click the mouse, note that there will be an orange target line extending from the 3 inch Mortar Team to the intended target location. When you are satisfied with the aiming point for the mortar press GO and maneuver the camera so that you can watch the impact of the rounds during the movie.

First Blood

It will take a few seconds for the 3 inch Mortar Team to orient the weapon toward the target, but before long the rounds should begin falling. Some of the mortar rounds will not hit the target, but after a turn of sustained firing you should have seen at least 2-3 rounds landing within the sandbagged area. The 3 inch mortar is a very powerful weapon and 2-3 rounds landing near the center of a sandbagged position should have taken out whatever was in there. Use your best judgment; if necessary you may want to continue the targeting for another turn to be on the safe side.

Once you are reasonably confident you have destroyed whatever weapon was in that gun position, switch your targeting on the 3 inch Mortar to the other gun/mortar position that sits right next to the first one. Wash, rinse, repeat. Within 4 turns at the very latest you should be pretty confident that you have destroyed whatever guns were in those positions. Now you can turn your attention to any other likely looking targets for the 3 inch mortar, starting with any other sandbagged machine gun positions that the Platoon HQ can see. You probably don't want to target the Radio Relay building since you will now begin your assault.

After you change your targeting and the enemy AA gun is probably destroyed, it is time to begin the assault with the rest of your forces. Plot FAST MOVE for each of your lined up vehicles and, trying to stay out of each other's way, have their routes of advance end right in front of the building. When satisfied with your movement plotting, press GO!

The Charge of the Light Brigade

This will probably be an exciting turn. Your speeding scout cars each carry multiple heavy machine guns and they will automatically begin firing at anything they see that appears to be a worthwhile target. Barring any terribly unfortunate circumstances, most of your vehicles should make it to the building. Using the unit orders menu you can have the machine gun armed scout cars target any specific targets you want them to. You might also want to get your infantry out of the backs of these vehicles and let them get in on some of the fighting. Since there will probably be lots of shooting and bullets all around, try using the ADVANCE command.

Click on each of your infantry units and bring up their unit orders menu. Use the ADVANCE or ASSAULT commands to plot movement into the building. Woe be unto any Italian forces still occupying the Radio Relay building when they go in there!

Mopping up

Well, it should be almost all over but for the crying on the part of the Italians. Use your scout cars to move around the map, taking down any enemy strongpoints that still exist. Check your manual for detailed information about other commands you can use that might be fun to try.

Good luck and have fun!

Appendix A – Hotkeys

Note: Defaults when you first start the game are shown in brackets.

Shift-C – Unit (visual) scale

Options: 0, +1, (+2), +3, +4
Enlarges visual display of all units on map. Units further away from the camera are enlarged more than units closer to the camera.

Shift-I – Smoke Graphics

Options: None, Fast and Compatible, (High Quality)
Toggles display of smoke on map

Shift-O – Occupied buildings transparent

Options: (On), Off
Buildings will be shown with transparent walls or without walls.

Shift-T – Tree coverage

Options: None, Sparse, (Moderate), Full, Extreme
Toggles visual density of trees on map.

Shift-N – Terrain Elements

Options: None, Sparse, (Moderate), Full, Extreme
Toggles visual density of terrain elements on map

Shift-H – Horizon Range

Options: (Unlimited), 1000m, 1500m, 2000m, 2500m
Displays map only to the specified distance to increase game performance on slower computers

Shift-P – Show all Moves/Targets

Options: (Off), All Movement Paths, All Target Lines, Show all Paths/Targets
Toggles display of movement and/or target lines on the map. When set to off, movement and target lines are only visible for a currently selected unit

Shift-V – Show vehicles

Options: (On), Off
Toggles display of vehicles and bunkers. Great to find passengers riding in transport vehicles quickly.

Shift-F – Objective Flags

Options: (On), Off
Toggles display of Objective Flags. Default resets to On everytime you start a new game.

Shift-A – Viewpoint up

Options: (0), 10, 20 (at 1x zoom)
Raises the camera viewpoint the specified amount of degrees. Default resets everytime you change view levels.

Shift-Z – Viewpoint down

Options: (0), -10, -20, -30, -40, -50, -60, -70, -80, -90, -100 (at 1x zoom)
Lowers the camera viewpoint the specified amount of degrees. Default resets everytime you change view levels.

Shift-S – Sound

Options: On, Off, (On+Ambient)
Toggles sound display.

Shift-R – Show Building Roofs

Options: (On), Off
Toggles display of building roofs to quickly find units on urban map

Shift-E – Show Exit Zone (if any)

Options: (On), Off
Shows Own or Enemy Exit Zone, if available.

Shift-B – Unit Bases

Options: (On), Off
Toggles display of bright colored bases beneath each unit

Shift-M – Show 3 men per squad

Options: (Third Squad Member On), Off
Toggles display of a maximum of 3 or 2 soldiers for Infantry Squads. Display or other units like teams and vehicles is not altered.

Shift-K – Camera shake

Options: (On), Off, On+Extra for Unit Lock
Toggles camera shake options due to nearby explosions. On+Extra for Unit Lock means that the camera will shake when locked (TAB) to a moving unit.

Shift-W – weather/fog

Options: None, Partial, (Full), Extreme
Toggles display of in-game weather effects, like density of snow and tree drops.

Shift-G – Labels

Options: On, (Off)
Toggles display of small text lines describing the status of units on the map, like panicked, low ammo etc.

Shift-D – Detailed Armor Hits

Options: (On), Off
Toggles display of detailed descriptions of hits against armored vehicles, like the hit location, observed effect and so on

Shift-L – Landmarks

Options: (On), Off
Toggles display of Landmarks explaining terrain features and objective areas

Shift-J – View rotates on point

Options: On, (Off)
Toggles the type of camera rotation used in-game

Shift-X – Show covered arcs

Options: All, (Selected Unit)
Toggles display of covered arcs and covered armor orders. When set to "all", all active arc commands will be displayed on the map (which can be quite crowded when there is more than one or

two on the map). "Selected Unit" only displays the active arc command for the currently selected unit.

Shift-U – Show building shadows

Options: (On), Off
Shows shadows around buildings or not

Shift-Q – Show play aids

Options: On, (Off)
Shows or hides all play aid graphics. Great for taking screenshots.

Shift-Y – Show frame rate

Options: On, (Off)
Shows the current display framerate

Other hotkeys

Alt-B – Scenario Briefing

Brings up Scenario Briefings

Alt-S – Save Game

Saves the Game

Alt-C – Cease fire request

Secretly request a ceasefire. When the opponent does the same, game ends. You will be prompted to confirm. Once selected, this request "sticks" and by selecting it again and choosing NO when asked for confirmation you withdraw the request.

Alt-U – Surrender

Surrender immediately to the opponent to end the game. All units on map are captured. You will be prompted to confirm.

Alt-A – Abort Scenario

Immediately finish playing the current scenario. An "autosave" file is created when you exit a Scenario. You will be prompted to confirm.

Alt-Q – Quit Combat Mission

Quit the game immediately. You will be prompted to confirm.

Alt-P – Request TCP/IP Pause

Freezes game and timer during TCP/IP games when the opponent selects this, too.

Alt-F – Place/Remove foxhole

When fallback foxholes are available for a side, placement mode can be toggled on and off with this hotkey

Alt-1..5 – Editor Crater Mode

In the Scenario Editor, this allows the scenario designer to place craters of varying size (1 – smallest, 5 – largest) on the map.

Alt-G – Adjust Brightness (Gamma)

Adjusts in-game gamma brightness

Appendix B - Orders

Movement – Infantry

Move to Contact –

orders the unit to advance cautiously and keep eyes open for enemy contacts. Will stop as soon as enemy comes into LOS or unit is fired upon. Units moving to contact that have a "cover arc" active will only stop when enemy units appear within that arc. Units ordered to Move to Contact AND Hide will hide at the end of their movement, even if the movement stops prematurely due to enemy contact.

Order not available to: immobile units.
Hotkey: E

Move –

walking speed. Units won't stop when enemy is spotted, but will break off movement (and usually look for cover) when under heavy fire or an enemy unit is suddenly spotted very close by.

Order not available to: immobile units.
Hotkey: M

Run –

orders the unit to move as fast as possible. Will not stop to engage targets and suffers from heavily reduced spotting ability as well as greatly increased exposure.

Order not available to: immobile units, heavy weapons like towed anti-tank guns, tired units
Hotkey: F

Advance –

tactical move when advancing under fire in view of the enemy. This assumes dashing from cover to cover, using covering and suppressive fire and movement by bounds.

Order not available to: immobile units, heavy weapons and support weapons like mortars or anti-tank rifles, all conscripts, out-of-command green units, exhausted units
Hotkey: A

Assault –

similar to Advance, but especially useful for covering those last 10 or 20 meters into an enemy position. Increases morale slightly while allowing units to return suppressive fire, but too tiring to be used over longer stretches.

Order not available to: immobile units, heavy weapons and support weapons, all conscripts, out-of-command green units, tired units, units which have previously panicked (i.e. "rattled")

Hotkey: U

Sneak –

Tells a unit to hug the ground and crawl and use stealth. Will open fire in self-defense only. (This command combines the "crawl" and "sneak" commands of CMBO).

Order not available to: immobile units and heavy weapons

Hotkey: S

Rotate –

changes the facing of a unit. How fast a unit is able to rotate depends on the type of vehicle or gun. For the latter, rotation speed drops after casualties are taken.

Order not available to: immobile vehicles (note that turretless Assault Guns have to rotate the whole vehicle to rotate their guns more than a few degrees). Other immobile units (e.g. super-heavy anti-tank guns like the German 88 Pak) can rotate their guns, even though they can't move.

Hotkey: O

Withdraw –

emergency order, tells infantry units to "get the heck out of there". This order has NO command delay, but it substantially increases the chance that the unit will panic while retreating.

Order not available to: immobile units and heavy weapons, tired units

Hotkey: W

Pause –

increases the command delay for a unit at the beginning of a turn (and only at the beginning of a turn) in increments of 10 seconds. Works up to 60 seconds, then resets back to 0 additional

delay. Allows players to somewhat time movements of units within a turn.

Order not available to: immobile units.

Hotkey: P

Halt –

cancels any current movement order and all waypoints for a unit.

Hotkey: None (The Backspace Hotkey cancels the last waypoint only, whereas this order cancels the entire movement path including ALL waypoints)

Movement - Vehicles

Move –

unit drives at walking speed, ie. at the speed of moving infantry. Usually will not stop when an enemy is spotted.

Hotkey: M

Move to Contact –

works like the infantry command (above). Vehicle will stop upon spotting any kind of enemy target Units ordered to Move to Contact AND Hide will hide at the end of their movement, even if the movement stops prematurely due to enemy contact."

Hotkey: E

Fast –

orders the unit to drive at maximum speed. Will not stop to engage targets and suffers from heavily reduced spotting capability. For vehicles, moving fast additionally increases the chance of bogging, especially on muddy ground or snow, but it does throw off the aim of the enemy and decreases the chance of being hit.

Hotkey: F

Reverse –

similar to the Move command, but the vehicle moves in the direction opposite to its facing

Hotkey: R

Hunt –

available to armoured fighting vehicles (AFV) only. Tells the vehicle to advance at medium speed and look for armoured targets and antitank guns. When armoured enemythese targets come into line of sight, the vehicle will stop and engage if it has a decent chance of causing damage to them, resuming on its movement path after all valid targets have been killed or moved out of sight.
Hotkey: U

Shoot & Scoot –

available only to AFVs. This is a two-leg order requiring placement of two waypoints. The first waypoint (Shoot) tell the unit to advance to that position and scout for targets. After several seconds, the unit is supposed to withdraw in reverse (Scoot) to the second waypoint (which – usually – is somewhere out of sight of the enemy).
Hotkey: Q

Seek Hull-down –

orders unit to move forward toward the waypoint and, on that path, stop as soon as a position is found which will result in the vehicle being hull-down relative to a possible enemy in the waypoint's location. If no such position is found, the vehicle will move all the way to the waypoint.
Hotkey: D

Rotate –

changes the unit's facing.
Hotkey: O

Pause –

same as for infantry.
Hotkey: P

Fire Orders

Target

Hotkey: T
General purpose "shoot at this unit" order. If you click on a piece of terrain, the order automatically changes into an "Area Fire" order. The difference between "target" and "area fire" is that one targets a

specific unit while the other targets any unit in that general area. The area covered by "area fire" is also larger than the one covered by the "target" order, and "area fire" is also more likely to cause suppression to adjacent troops.

Next Target

Hotkey: N (only available for direct firing units)
Automatically targets the "next" enemy unit in sight. This is a great way to scan quickly through all available targets for the selected unit, and also allows a quick check of which enemy units are actually visible. It will not work if the firing unit is not capable of firing, though, or if a unit is within line of sight, but outside of the maximum range of that unit's weapons.

Cancel Target

Hotkey: X
Cancels the currently selected target.

Smoke

Hotkey: K
Some units (guns and armoured fighting vehicles as well as some artillery) are capable of firing a special type of ammunition which, within a few seconds of impact, creates a smoke screen for a limited amount of time. Firing smoke ammunition can be ordered using this command. Infantry squads are not capable of placing smoke in CMAK.

Target Wide

Hotkey: I (for Artillery spotters only)
Artillery spotters can instruct the firing battery to spread out its shells rather than aim at a pinpoint target. This is a good way to suppress large, dispersed formations of enemy troops.

Add Time

Hotkey: Q (for Artillery spotters only)
Adds a delay to a prep-bombardment in increments of 1 minute. Only available during the first order phase of a battle.

Reset Target

Hotkey: R (for Artillery spotters only)

Resets the fire order for an artillery spotter to what it was at the end of the last action phase. Useful since altering an artillery spotter's orders usually results in large time delays, and this order allows you to reset any changes you have made without adding extra time delays.

Cover arc

Hotkey: C
By placing to points on the map, the player designates a firing zone for that unit. Unit will only engage enemy units that enter this area when it has a „good shot"

Cover armor

Hotkey: V (for anti-tank units only)
Similar to the above, but unit will only engage armored targets.

Special orders

Line of Sight (LOS)

Hotkey: L
This order is unlike any other because it doesn't actually instruct the selected unit to do anything. Instead, it's an "LOS tool" which can be used to check exactly what the unit can see and what it can't. After selecting the order, a line extends from the unit towards the mouse cursor as with other movement or targeting orders. But this line does not tell the unit to go anywhere or rotate. Instead it gives information about its field of view. Left-clicking with the LOS order active simply deselects the LOS tool.

Hide/Unhide

Hotkey: H
Tells unit to keep its head down or engine idle and try to remain unspotted. Issuing the order again tells the unit to unhide. Obviously, trying to hide is more or less successful depending on several factors, but being in suitable terrain is one of them. Trying to hide a Tiger Tank in an open field is not a good idea.

Button Up / Open Up

Hotkey: Z
Many armored vehicles are built to provide all-around protection for their crews. Once they close their hatches or steel doors, they

are more or less protected at least from small arms fire. "Button up" orders hatches closed, while "Unbutton" has the reverse effect.

Split Squad

Hotkey: None

While squads usually are the smallest maneuverable unit on CM's battlefield, under certain circumstances the player might want to split one or more of his squads, e.g. in order to set up outposts in front of his main positions or to assault tanks (and avoid risking a whole squad for this task). The SPLIT SQUAD order allows this, but not without certain drawbacks.

Orders only during Setup Phase

Dig In -

Units (including vehicles if allowed by scenario designer) can start a game "dug-in" (ie. in foxholes) or not. See also "Fallback positions and digging in" above.

Activate Flag -

Available only for the attacker when playing on a map with dynamic non-random flags. After choosing this order (available only to the highest HQ on the map!), you will be prompted to click near one of the dynamic flags. This will activate the flag as "real", while the other flags will be shown as "bogus". Your opponent will not know which flag is real and which not - this is visible only to the attacking side.

Appendix C - Troubleshooting

We have taken great care to deliver a bug-free, compatible and playable game to you. However, the vast myriad of different hardware and software configurations available today makes it impossible to provide solutions for 100% of them. Below you will find answers to a few known issues as well as a guideline to any problems you might encounter with the game.

The first time you run CM, it checks your graphics hardware by asking you "Can you see this?" It also displays the name of the graphics card it has detected, and a monitor resolution and refresh rate. If these are acceptable, you should click the button (if not - or you want a different setting, just wait a few seconds and alternate choices will be shown, one at a time). Once you click the button to accept, the program then saves this as your default video setting. If you ever want to change it (e.g. you buy a new graphics card or monitor, or are troubleshooting to find a configuration that works) just delete the CM "preferences" file (called "Combat Mission AK Prefs") and the process of checking your graphics hardware will be reset and begin anew the next time you run CMAK.

Common Issues:

CUSTOM THEMES/CURSORS: Do not use custom Windows "themes" or custom mouse pointers! If you get mouse pointer "flicker", or notice any unexplainable problems (even those which seemingly have nothing to do with cursors or the mouse) try changing the "Windows Theme" and mouse pointer to the Windows Default.

MICROSOFT INTELLIMOUSE: has been linked to various problems including crashes and graphical corruption. Obtain and install the latest drivers from Microsoft. If this does not solve the problem, disable the Intellimouse software (there should be an icon you can click in the lower-right portion of your screen, in the task bar).

LOGITECH MOUSE/TRACKBALL: Problems have been linked to obsolete drivers for these products. Obtain and install the latest drivers.

OVERCLOCKED GRAPHICS: If your video card has an over-clocking feature, this may cause very strange graphical problems. Drop the clock speed back to normal, using its control panel.

Mac Issues:

Problem: I have OS-X installed and CMBB won't run.
Cause/Solution: CMBB does not support OS-X in either native or classic mode. In order to play you will need to setup your Mac to dual boot with a dedicated 9.x bootable partition and play the game from there.

Problem: I have a dual processor G4 with a Radeon Pro 9000 card installed and I am getting what looks like psychedelic graphics displayed when playing the game.
Cause/Solution: The problem lies with the current drivers for the Radeon Pro 9000 card and we are not able to fix it on our end. Both ATI and Apple have been contacted but there has to date been no progress on this issue.

Problem: Mac system has a Geforce 2/3 video card and the sky graphic textures in-game are all black.
Causes/Solution: Appears to be a conflict at some level with the Nvidia video extensions and Mac OS. Check for updated extensions from Apple or Nvidia.

Install Issues:

Problem: Setup halts part way through the install process. May indicate a problem reading a specific file or resource.
Cause/Solution #1: Could be a dirty or scratched CD. Use some rubbing alcohol and dilute it with water (about a capful total) Dip a cotton swab or Q-tip into the solution and then gently rub the soaked swab across the shiny surface of the CD. Be sure to work any area that show smudges or scratches. Let the CD air dry. Reinsert the CD and try to reinstall. You can also use any aftermarket CD Cleaning kit or cleaning system to do the above.
Cause/Solution #2: Some DVD and CD drives can have a problem reading a CD that is as full as the CMAK one (almost 100% full). Try copying the entire "CMAK Installer.exe" file from the CD to your hard drive first and then running the install from the hard drive.

Cause/Solution #3: Try and put the CMAK disc in a different CD drive if your system has more than one and then launch the installer.

General Issues:

Problem: Game reports that CD needs to be inserted in order to load the game.
Cause/Solution 1: The CD does have to be inserted into the CD Drive in order to launch the game. Once the game has loaded the CD can be removed.

Problem: Game reports that CD needs to be inserted in order to load the game but CD is in the CD drive. I have Windows XP/2000.
Cause/Solution: Windows may have enabled "Compatibility Mode" for CMAK. This can occur if you upgrade to XP/2000 from an earlier OS of if you turned it on manually. To check this, please right click on the shortcut that points to CMAK. Select Properties and on the next page select the Compatibility tab. Now make sure none of the boxes are checked on that page. Click Apply or OK to close the window and then re-launch the game.

Problem: Sound in game used to work but is now silent.
Cause/Solution: The sound in the game can be toggled between ON, ON+Ambient and OFF. These settings are toggled via the Shift-S keystroke.

Video Issues:

Problem: Game seems to lock up or display a black screen immediately after game is loaded, you may hear the intro music or sound still. Video card is a Nvidia (GeForce GeForce 2,3 or 4 card) and you have newer drivers (41.09 or higher) installed for it. If video card is a Radeon see next Problem entry.
Cause/Solution #1: The problem is with the video drivers. They have a problem properly initializing the screen graphics when Anti-Aliasing is enabled. Turn off Full Screen Anti-aliasing for your video card. This can be done via the video cards display properties panel.
Cause/Solution #2: Minimize CMAK by pressing Alt-Tab and then re-maximize it by clicking on its icon on the Taskbar. The display should properly refresh and everything should be visible again.
Cause/Solution #3: Since those drivers will not correctly work when Anti-Aliasing is enabled you maybe able to install older video drivers which will work fine and allow you to use Anti-Aliasing.

Problem: Game seems to lock up or display a black screen immediately after game is loaded, you may hear the intro music or sound still. Video card is a Radeon card.

Cause/Solution #1: The problem is with the video drivers. They have a problem properly initializing the screen graphics when Anti-Aliasing is enabled. Turn off Full Screen Anti-aliasing for your video card. This can be done via the video cards display properties panel.

Cause/Solution #2: Minimize CMAK by pressing Alt-Tab and then re-maximize it by clicking on its icon on the Taskbar. The display should properly refresh and everything should be visible again.

Problem: My game is playing very slow and I have a Nvidia card (GeForce, GeForce 2,3,4 or FX) in my computer.

Cause/Solution: This seems to be a bug introduced in some Nvidia drivers released after version 41.09. Nvidia has recently released a new driver version (45.23) which fixes the slowdown issue.

Download the new 45.23 drivers from Nvidia's webpage located at www.nvidia.com

Problem: In game text is corrupt or colored improperly. I have a GeForce FX5200 video card.

Cause/Solution: This seems to be isolated to the FX5200 series cards and is a bug in the Nvidia drivers. You can use Alt-Tab to minimize and then maximize the game to get the text to appear normally but you can only use the Alt-Tab solution once per game session. If you Alt-Tab out and back in a second time the problem will reoccur and will persist until you reboot. UPDATE: Recent Nvidia drivers seem to have fixed this issue.

Problem: In game textures/graphics seem to have a black or miscolored border around them. Video card is a Nvidia FX series (5200, 5600, 5800, 5900).

Cause/Solution: This seems to be a bug in the recent Nvidia drivers and occurs with the Nvidia FX series video cards. You can use Alt-Tab to minimize and then maximize the game to get the graphics to appear correct.

Problem: I have a Radeon 9000 video card and while editing map elevations in the scenario editor changed elevation numbers do not display.

Cause/Solution: Alt-Tab out and back in to the game. The proper elevation numbers should now be displayed.

Problem: When game is launched it reports that a resolution of at least 800x600 is required in order to run but my desktop is set to 800x600 (or higher) already.

Cause/Solution #1: Whatever video card you have is not properly identifying itself and as such the game does not know what video resolutions it can support. You should reinstall the latest video drivers available for your video card (see notes about Nvidia drivers 41.09 and higher) and also reinstall/upgrade your version of DirectX.

You can download the newest version of DirectX (currently 9.0b) directly from Microsoft here:

http://www.microsoft.com/downloads/
search.aspx?displaylang=en&categoryid=2

Problem: When game is launched an Unhandled Exception: c0000005 at address: 0053d978 & 005419e5 (can also be some other addresses but they always start with c0000005) error occurs.

Cause/Solution: At some point a DirectX component file has become corrupted or is no longer correctly functioning. In order to resolve this issue you should re-install DirectX. Recommend the latest version, which is now DirectX 9.0b and can be obtained directly from Microsoft at the following URL:

http://www.microsoft.com/downloads/
search.aspx?displaylang=en&categoryid=2

Problem: When game launches the monitor goes black and reports a error message that says "scan frequency out of range" or similar message.

Cause/Solution #1: The game will launch in the same resolution and refresh rate that your desktop is set to but Windows can sometimes report those settings incorrectly. Check in Windows Hardware/Device Manager that your monitor is not listed as "Default Monitor". If it is, check with your monitor manufacturer for specific drivers.

Cause/Solution #2: If you have a GeForce video card download and install the NVRefreshTool utility which will allow you to customize the refresh rate for any resolution and bit depth (Note:CMAK always runs in 16 bit color mode). Try setting your desktop resolution to 60Hz and then launch the game. You can experiment with raising the refresh rate higher until you reach the limit of your monitor. In general, the higher the refresh rate the less the screen will appear to "flicker". Check with your monitor manufactures to locate the monitors highest support refresh rate by resolution.

You can download the NVRefreshTool utility from this webpage:
http://www.guru3d.com

Problem: Video Card uses the Kyro or Kyro II Chipset (ex: Hercules Prophet 4500) and text and graphics in-game are blurry or corrupted.

Cause/Solution: You will need to add a entry to the registry to clear up the corruption. Launch the Regedit program and locate the following key:

HKEY_LOCAL_MACHINE\SOFTWARE\PowerVR\KYRO\Game Settings\D3D

You will need to add the following entry to that key.

[HKEY_LOCAL_MACHINE\Software\PowerVR\KYRO\Game Settings\D3D\Afrika Korps.exe] "DisableCopyBlt3D"="1"

NOTE: You must make sure that you enter that entry with the EXACT name of the game executable. If you for some reason have renamed your game .exe to be "CMAK.exe" for example that registry entry should look like this:

[HKEY_LOCAL_MACHINE\Software\PowerVR\KYRO\Game Settings\D3D\CMAK.exe] "DisableCopyBlt3D"="1"

Battlefront.com takes no responsibility for any damage that may occur due to editing your registry.

Problem: Video Card uses the Kyro or Kyro II Chipset and some solid objects appear transparent when viewed in front of other transparent objects.

Cause/Solution: You can do the following at the expense of some performance loss. Go to Control Panel then click Display Control Panel and then the Settings tab. Click the Advanced button then click the 3D Optimization tab then click the Direct3D tab (default). Under the Control Full-Scene Anti-Aliasing make sure the setting 'Application specified anti-aliasing' is selected. Check mark the 'Enable External Depth/Stencil Buffer' and under that check the 'Enable External Depth/Stencil Buffer Storing'.

You may also need to disable Full Screen Anti-Aliasing if graphic corruption persists. You might want to view this thread from the Tech Support forum for a discussion on this issue:

http://www.battlefront.com/cgi-bin/bbs/ ultimatebb.cgi?ubb=get_topic;f=8;t=003746

Problem: When mouse is moved across the screen it leaves a trail of corrupted graphics. Cursor itself may also appear as a white block.

Cause/Solution: That is usually caused by running with Custom Mouse cursors or having a Windows Theme Packs installed. Make sure that you are only using the Standard Windows Default Mouse

cursor and disable or uninstall any custom mouse animations and effects that may have been loaded with a Theme pack. You may also want to upgrade your mouse drivers as applicable. Check with the manufacturers website for updated mouse drivers.

Problem: I have a ATI Radeon card but I can not see any fog graphics on my PC with Windows installed.

Cause/Solution: This is a problem with the drivers that ATI makes for Windows based systems. For some reason they have decided to not support "fog table emulation" which is needed to show the fog graphics in CMAK.

Specific Video Issues

NVIDIA DRIVERS (40.72 and newer) AND FULL SCREEN ANTI-ALIASING (FSAA)

With all Nvidia drivers released after version 40.72 there has been a persistent bug which has caused issues in the game when Anti-Aliasing was enabled. The most common problem reported is invisible text in all 2D portions of the game interface including all game menu's.

There are several current workarounds for this problem.

A). If you wish to use these new drivers AND also have FSAA enabled you can minimize (alt-Tab) and then maximize the game. That should make the hidden text reappear.

B). If you disable FSAA with these drivers you should not have any problems with in-game text.

C). The older driver releases (30.82 and 30.87) were both stable, high performing and did not have this FSAA bug. Those drivers can be found below.

You should be able to find those drivers listed above either at Nvidia's website at http://www.nvidia.com or at Guru3d which is located here: http://www.guru3d.com

RADEON VIDEO CARDS AND SLUGGISH GAME PERFORMANCE

If you have a Radeon video card and are noticing sluggish or stuttering game performance you may want to try and disable the Z-Mask setting on your card. Many people have reported substantial performance improvements when they disabled the Z-Mask. This is a setting that is accessible using a Radeon Tweak Program which you can find here:

http://www.rage3d.com/r3dtweak/

SiS VIDEO CARDS AND CMAK INCOMPATIBILITY

If your computer has the integrated SiS 650 chipset on the motherboard you will not be able to run CMAK.

Certain models of Sony Vaio's use this chipset as do some Pentium 4 motherboards. Please check with the manufacturer to see if you have the SiS 650 chipset in your computer.

This issue appears to be a bug in the current SiS 650 video drivers but, to date, it has not been fixed by either Sony or SiS and we have no indication if or when a updated driver release will address the problem.

TCP/IP Troubleshooting

Firewalls and Proxies - If either player is behind a firewall (hacker protection) or is using a proxy system, you might need to reconfigure your system. In order to play a network game, Combat Mission requires that TCP port 7023 be open for all outgoing and incoming transmissions. Please configure your firewall and proxies accordingly. Users of the software packages Black Ice Defender and Zone Alarm may have to disable the software completely before a successful connection can be made. It is possible that some users of Black Ice Defender might have to do a full uninstall of the package in order for CM to be able to work correctly for TCP/IP play

Cable/DSL Router Configuration - If you use a home broadband router like the LinkSys Cable/DSL 4 port Router and wish to host games you will need to add TCP port 7023 to the routers forwarding table. You then need to match port 7023 to the internal IP address of the computer that you want to host the game with, then use the routers control panel (usually accessed via your browser) to get the external IP address given out by your ISP. Give this external IP address to your opponent and connection should work with you as Host.

Internet Connection Sharing - Many people use ICS on their home LANs to access a broadband or modem connection to the Internet across multiple computer systems. Currently a computer that is connected to the Internet via an ICS connection can not Host a Combat Mission game out to the Internet. They can however host locally to systems that are connected on the same home LAN. They can also still attach to a hosted game normally on the Internet or the home LAN. This limitation on hosting affects systems that gain their access to the Internet SOLELY through an ICS connection.

Problem: I am on Windows XP and I can't seem to host a game. I can connect to game though.

Solution 1: Windows XP comes with its own built in Firewall which may need to be modified or disabled in order to host games. First check your network properties by going into the Control Panel>Network Connections. Find the network adaptor that is used to establish your connection to the internet. Right click on the Network Adaptor and select "Properties". Click the "Advanced" tab. If there is a checkmark in the box labeled "Protect my computer and network by limiting or preventing access to this computer from the Internet", you have XP's built in Firewall and will need to configure it to allow you to host CMAK games. If it is not checked, then see Solution 2 below. In order to enable the firewall to allow you to host a CMAK game you will need to click the "Settings" button from the "Properties>Advanced" screen. Once you click the "Settings" button you will see a list of Services and three buttons at the bottom of the screen. Click the "Add" button. You will be presented with another screen with several blank fields. The first field is for you to describe the service you are adding. Just type something like "CMAK Network Games" in that field. The second field is for the name or IP address of the computer which needs to host this service. You can type 192.168.0.0 (default IP of your system) or type in the computers "name". If your computer is part of a home network where each system has its own configured IP address then type in whatever IP is assigned to your computer or alternatively you can use the computers "name". In the third field "External port number for this service" type in the number "7023" (without the quotes). In the fourth field, "Internal port number for this service" type in the number "7023" (without the quotes). Make sure the button "TCP" is selected. Click the OK button 3 times to save the changes and exit. You should now be able to host games.

Solution 2: If your Windows XP is connected to the internet through a computer running Internet Connection Sharing you can not host a game but you can still join a game hosted by someone else.

Loading a PBEM file does not work

If one player can't load a file it is most likely because of a transmission error due to an incompatible email format. It is very important that both players use the same, compatible method for sending PBEM files to each other. Macintosh users playing against Windows users should pay close attention to this! Generally it is best if "uuEncoding" is used without any form of compression. Since the files are text, software compression generally doesn't reduce transmission times that dramatically. If you should use compression

make absolutely sure that it can be decoded by the player on the other end.

Reporting bugs

The armor slope of that Panther is off by 0.5 degrees! My life is ruined!

If you spot any inaccuracies, problems, bugs or simply any weird stuff in the game, please feel free to post it on the Combat Mission message board at www.battlefront.com. We've taken great care to bring you a bug-free, historically accurate game, but since we're realists we are more than happy to "tweak" the game if there are demonstrable inaccuracies. These tweaks will then be released in official patches, available for download from Battlefront.com.

What do I do if I have a defective CD-ROM?

Please do NOT send the CD back before you contact sales@battlefront.com. They will tell you how to proceed. Battlefront.com does not accept any returns without prior authorization through the above email address.

I need Tech Support

If none of the above resolves your problem or if your specific issue it is not covered then please login to the Tech Support forum and search through the extensive list of posts as you may very well find info on it there. If you wish to post a message seeking assistance to the Tech Support forum please be sure to include as much information about the problem AND you system as you can so we can assist you quickly and efficiently.

If this still doesn't work, you can also email **support@battlefront.com** with your question. Please include a detailed description of the problem as well as your hardware configuration in your email.

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