GAME MANUAL

CONTENTS

1. WELCOME 5
1.1. Installation 5
1.2. Product Updates 5
1.3. Game Forums 6
1.4. Technical Support 6

2. INTRODUCTION 7

3. STARTING THE GAME 8
3.1. Play New Game 8
3.2. Resume Saved Game 9
3.3. Set Game Options 10
3.4. Edit Scenario 19

4. STANDARD RULES 20

5. ADVANCED RULES 20

6. INTERFACE CONVENTIONS 21
6.1. General Usage 21

7. GAME DISPLAYS 27
7.1. The Menu 27
7.2. The Game's File Menu 27
7.3. The Editor's File Menu 27
7.4. The Play Menu 27
7.5. The Game's View Menu 28
7.6. The Editor's View Menu 28
7.7. The Options Menu 29
7.8. The Help Menu 30
7.9. The Sound Menu 30
7.10. The Mouse Cursor 30
7.11. Unit Health Indicators 31
7.12. Standard Unit Icons 31
7.13. Unit Icon Display (Advanced Rules) 32
7.14. Displayed Bombardment Range (DBR) 33

8. PLAYING THE GAME 34
8.1. Game Definitions 34
8.2. Unit Characteristics and Their Effects 35
8.3. Unit Special Capabilities 39
8.4. Equipment 40
8.5. Force 42
8.6. Formation 47

9. WHAT HAPPENS DURING A GAME TURN 49
9.1. Automatic Book keeping 50

10. YOU ISSUE ORDERS TO YOUR FORCES 63
10.1. Variable Initiative 63
10.2. Using the Game Control Panel 64
10.3. Selecting Theater Options (Advanced Rules) 66
10.4. Giving Orders to Your Units 66
10.5. Attack Menus and Attack Planning (Advanced Rules) 69

11. MOVEMENT 72
11.1. Naval Movement 72
11.2. Air Movement 72
11.3. Railroad Movement 72
11.4. Seaborne Movement 73
11.5. Airborne Movement 73

11.6. Airmobile Movement 73
11.7. Embarked Status 74
11.8. Movement Costs and Allowances 75
11.9. Land Unit Movement Costs 75
11.10. Skipping the Unit Movement Popup 77
11.11. PO Assist 77

12. ENGINEERING 79
12.1. Demolition / Bridge repair (Advanced Rules) 79
12.2. Ferry Support 79
12.3. Major Ferry Support 79
12.4. Fortification (Advanced Rules) 79
12.5. Railroad Repair (Advanced Rules) 80

13. ALL BATTLES ARE RESOLVED 80
13.1. Airbase Defense 82
13.2. Air and Naval Units in Land Combat 82
13.3. Naval Combat 83
13.4. Naval Targeting 84
13.5. Port Attacks 85
13.6. Nuclear Attacks 85
13.7. Airfield Attacks 85
13.8. Bridge Attacks 85
13.9. Battlefield Reconnaissance 85
13.10. Target Density (Advanced Rules) 86
13.11. Long-Range Supporting Fire 86
13.12. Environmental Effects on Combat (Advanced Rules) 87
13.13. Flanks and Rear Areas 89
13.14. Retreats 89
13.15. Attack Complexity (Defined) 89
13.16. Amphibious Attacks 90
13.17. Airborne Attacks 90
13.18. Airmobile Attacks 90
13.19. Effects of Entraining Units 90
13.20. Assault Ratio Rules 90

14. YOUR ENTIRE FORCE MOVEMENT ALLOWANCES ARE ADJUSTED 92
14.1. Battlefield Time Stamps 92
14.2. Turn Over 93
14.3. The Turn Ends 94

15. VICTORY 94

16. INFORMATION AND PLAYER AIDS 95
16.1. The Unit Report (Advanced Rules) 95
16.2. The Formation Report (Advanced Rules) 97
16.3. The Air Unit Report 98
16.4. The Attack Planning Window (Advanced Rules) 98
16.5. Planned Combats 100
16.6. The Situation Briefing 101
16.7. The Scenario Briefing 102
16.8. The Air Briefing 103
16.9. The Weather Briefing (Advanced Rules) 103
16.10. The Expected Reinforcements Briefing 103
16.11. The Recent Reinforcements Briefing 104
16.12. Inventory and Replacements Briefing 104
16.13. Recent News 105
16.14. Group Composition 105
16.15. Order of Battle: Units Report 105

16.16. Order of Battle: Formations Report 106
16.17. Theater Options Report 106
16.18. Equipment Report 106
16.19. Detailed Combat Report 107
16.20. Loss Report 108
16.21. Combat Chart 108
16.22. Combat Chart Legend 110
16.23. Combat Review 110
16.24. The Editor's Edit Menu 111

17. CREATING SCENARIOS WITH THE SCENARIO EDITOR 117
17.1. The Scenario 117
17.2. The Map Editor 118
17.3. The Force Editor 122
17.4. Advanced Force Editor Functions 129
17.5. The Equipment Editor 129
17.6. The Environment Editor 131
17.7. Weather Zones 132
17.8. The Calendar Editor 132
17.9. The Event Editor 133
17.10. The Replacement Editor 139
17.11. The Deployment Editor 141
17.12. Game Options Preferences Preset 149

18. GENERAL NOTES ON SCENARIO CREATION 150
18.1. Use the Scenario Dump Feature 150
18.2. Talk to Other Scenario Designers 150
18.3. Study Dumps of the Existing Scenarios 151
18.4. The Event Engine 151
18.5. Make it Fit 151
18.6. Maps 152
18.7. Unit Deployments and Air Unit Missions 152
18.8. Forces 152
18.9. Formations 152
18.10. Units 154
18.11. Supply 157

19. APPENDICES 158
19.1. Calculations 158
19.2. Notes On Combat Resolution 159
19.3. Seeing the Elephant 161
19.4. Naval Combat Procedure 161
19.5. Naval Repair Procedure 164
19.6. Sea Interdiction Procedure 164
19.7. Naval Spotting Procedure 165
19.8. Splitting TO&E Lines 166
19.9. The Equipment.nqp File 168
19.10. Opart4.ini File 169
19.11. Opart4 Fonts.ini File 172

20. GAME HINTS 173
20.1. Using Air Units 173
20.2. Combat Planning Considerations 173
20.3. Nuclear Weapons 174
20.4. Keeping Your Units Supplied 174

21. CREDITS 175

1. WELCOME

Thank you for purchasing **The Operational Art of War IV** (hereafter referred to as **TOAW IV**). This all new, enhanced version of the classic Operational Art of War system includes all the Scenarios from the original versions of the game, along with all-new Scenarios for your wargaming pleasure. In addition, a powerful Scenario Editor is included, allowing you to generate any campaign you wish that spans the twentieth century!

1.1. INSTALLATION

Please ensure your system meets the minimum requirements listed below. To install the game, insert **The Operational Art of War** CD into your CD-ROM drive. If you have disabled the Autorun function on your CD-ROM or if you are installing from a digital download, double-click on the installation archive file, then double click on the file that is shown inside the archive. Follow all on-screen prompts to complete installation.

One important new directory is your Documents or My Documents folder. Most user editable content including the scenarios are now located under the Documents/My Games/The Operational Art of War IV directory.

The installation installs **TOAW IV** Graphics. Earlier graphics packages from **TOAW III** and before are no longer supported.

But those are just the officially supported graphics. TOAW employs "folder hierarchy" to locate graphical files. The Graphics Override folder is higher in the hierarchy than the Graphics folder and scenario-specific sub-folders within the Graphics folder are higher still. Other, user-designed graphics packages will eventually be available online that could be placed in the Graphics Override folder. Also, scenarios can have scenario-specific graphics provided by the designer.

The exact folder hierarchy is as follows (highest to lowest priority):

Graphics Override\Scenario Name
Graphics\Scenario Name
Graphics Override\Year the scenario occurs (actually, it looks backwards for the first one with that year, just like sounds)
Graphics\Year the scenario occurs
Graphics Override
Graphics

Other file types besides graphics (such as eqp files) can be given priority in scenario-specific folders as well.

1.1.1. MINIMUM SYSTEM REQUIREMENTS

OS: Windows 7 or better.
Processor: Pentium 4 or better
RAM: 512mb
Sound Card: Any Windows compatible
CD-ROM: Only for physical version
Hard Drive: 450MB (600 MB recommended) of free, uncompressed disk space
Microsoft .Net 4.0
The Game Window is limited to a minimum size of 1024x768.

1.1.2. UNINSTALLING THE GAME

Please use the Add/Remove Programs option from the Windows Control Panel to uninstall the game.

1.2. PRODUCT UPDATES

In order to maintain our product excellence, Matrix Games releases updates containing new features, enhancements, and corrections to any known

issues. Keeping up with these updates is made easy and is free by signing up for a Matrix Games Member account. When you're signed up, you can then register your Matrix Games products in order to receive access to these important game-related materials. Doing so is a simple two step process:

- Sign Up for a Matrix Games Member account – THIS IS A ONE TIME PROCEDURE; once you have signed up for a Matrix account, you are in the system and will not need to sign up again. Go to **www.matrixgames.com** and click the Members hyperlink at the top. In the new window, select Register NOW and follow the on-screen instructions. When you're finished, click the Please Create My New Account button, and a confirmation email will be sent to your specified email account.
- Register a New Game Purchase – Once you have signed up for a Matrix Games Member account, you can then register any Matrix Games title you own in your new account. To do so, log into your account on the Matrix Games website (**www.matrixgames.com**). Click Register Game near the top to register your new Matrix Games purchase.

Once you've registered your game, when you log in to the Members section you can view your list of registered titles by clicking My Games. Each game title is a hyperlink that will take you to an information page on the game (including all the latest news on that title). Also on this list is a Downloads hyperlink that takes you to a page that has all the latest downloads, including patches, for that particular title.

Remember, once you have signed up for a Matrix Games Member account, you do not have to sign up again – at that point you are free to register for any Matrix Games product you purchase. Thank you and enjoy your game!

1.3. GAME FORUMS

Our forums are one of the best things about Matrix Games. Every game has its own forum with our designers, developers and the gamers playing the game. If you are experiencing a problem, have a question or just an idea on how to make the game better, post a message there. Go to **http://www.matrixgames.com** and click on the Forums hyperlink.

1.4. TECHNICAL SUPPORT

Should you have a technical problem with the game, the best way to get help is to post a note in the Technical Support sub-forum within the **TOAW IV** forum at **http://www.matrixgames.com**. You'll then hear back from either Matrix or **TOAW IV** personnel, or from one of the many helpful players of the game. This is usually the fastest way to get help. Alternatively, you can email your problem to **support@matrixgames.com.**

2. INTRODUCTION

TOAW IV is a combined simulation and Scenario editor covering military campaigns over the past century. Our goal is to model these campaigns as games, with a serious effort to represent some of the real problems faced by commanders in the field. Many things that are represented abstractly in other games are treated here in a relatively concrete way. Your forces are not just a collection of icons on a map, differing primarily in graphic representation or a shallow set of numerical strengths. While you can play this game at that level, your armies are actually very complex organizations made up of individual vehicles, weapons, or squads.

The troops who man your weapons may range from elite veterans to green conscript recruits who can improve their performance with experience. They need food and fuel and ammunition, and they get tired if you push them too hard. They will not usually fight to the last drop of binary blood, and they generally do not perform to their best potential if they have to coordinate with unfamiliar forces. If you ask them to do something complicated, they might not do it in quite the way you expect. In short, they act just a little bit like real troops.

The title "Operational Art of War" is based on a Soviet era military term meaning, essentially, "the theory and practice of army level combat". There isn't really a hard definition of "operational level" scale. The term is generally used to describe anything in the gray area between strategy (overall conduct of a war, including non-combat factors such as industrial production) and tactics (the details of the actions of small units). If your primary focus is the battlefield, it isn't strategy. If you can't smell the smoke, you aren't really dealing with tactics. Think of the operational level as a view of the battlefield on a scale just exceeding that at which differing ranges of various direct fire weapons are significant.

The Operational Art of War is flexible enough to represent units ranging in size and organizational complexity from a few vehicles to an entire corps. Map and time scales are flexible, with maps ranging from 2.5km to 50km per map location (arranged in an invisible hexagonal grid) and Game Turns ranging from six hours to a full week. Air, land, and sea action are modeled, but the emphasis is on land and sea campaigns so air forces are not treated quite as concretely as land forces.

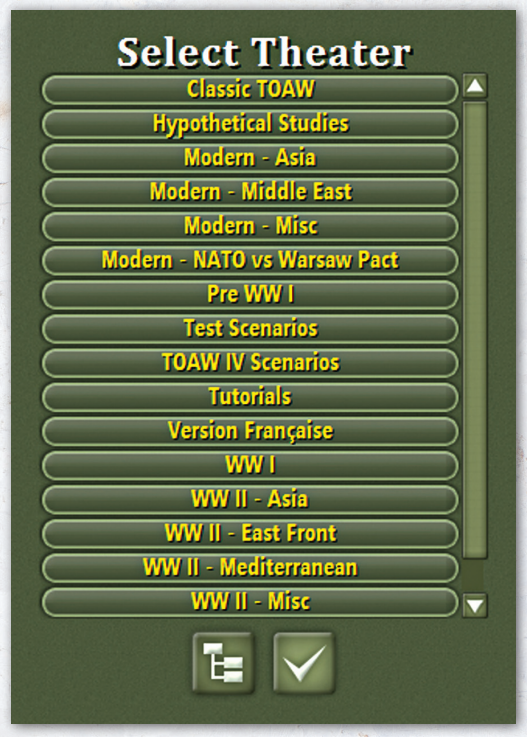
Different game situations are called Scenarios; these can be created using the Scenario Editor. In document processing terms a Scenario is essentially just a complex document, and the Scenario Editor a document processor. Individual Scenarios can cover anything from short operations to complete campaigns, including significant events occurring outside the Scenario's theater. The editor includes a large equipment database, full map drawing capability, and programmed opponent (PO) operational planning. It is the same tool used to create the Scenarios included with the game. If you feel the urge to do a bit of historical research, the Scenarios you create can be as rich and interesting as ours are. In fact, our experience suggests that amateur designers will eventually create many of the best Scenarios for the game.

3. STARTING THE GAME

The installation will have placed a Window's icon on your desktop (you may also want to create a direct shortcut to the Opart4.exe file on your desktop). Double-click on that icon to bring up the **TOAW IV** Game Menu. Depending upon your system, click on the appropriate "Play" option.

The first time you run the game you will be prompted to select a language. The options are English, Chinese, Deutsch (German), Espanol (Spanish), Francais (French), Italiana (Italian), and Polski (Polish). After that, the language can be changed from the File pulldown in the opening screen. Select "Choose Language".

The first control screen you see after the introduction has five buttons: Play New Game, Resume Saved Game, Play Online, Edit Scenario and Quit.



3.1. PLAY NEW GAME

Play a new game.

Clicking on the Play New Game button brings up the Select New Game Dialog. The first time you play, the tutorial directory will be selected. You can select the Default Directory button to bring up the Select Theater dialog which lists all directories under the Documents/My Games/The Operational Art of War IV/Scenarios directory. Clicking on the Default Directory button again will bring up the browse for folder dialog for Windows.

Expand the Scenarios folder to view all of the included Scenarios within the game; **TOAW IV** has broken them up according to timeframe and region (NATO Warsaw Pact, Middle East, etc.) as well as a Classic TOAW folder that includes all of the classic Scenarios from previous versions of the game.

Find a folder/timeframe that interests you, highlight it, and click OK.

A Select New Game window will be displayed. If either pane has more information than space to display it, that pane will have a scrollbar on the side

of it. The Available Scenarios within the folder you selected are listed at left; highlighted Scenarios will have information regarding them in the pane at right. Select a Scenario you wish to play. Below these two panes are buttons, as follows:

Default Directory – Click to change the default directory of your current Scenarios. This will allow you to select a different folder from which to load Scenarios from other eras.

The button to the right of the Default Directory indicates the types of players that will be involved in the game:

Two Player (Hotseat) Game

Play by EMail (PBEM) Game

Computer vs. Human Player Game. Each Scenario has a "Player 1" and "Player 2," set by the game. In this mode, the player selects to have the computer represent Player 1 and the player to represent Player 2. For example, in the "Red Thunder 1988" Scenario, Player 1 is set to be NATO while Player 2 is set to be the Warsaw Pact. Having this button displayed will set NATO as the computer player and the Warsaw Pact as the human player.

Human vs. Computer Player Game. Having this button displayed will set Player 1 as human and Player 2 as computer. For example, in the "Red Thunder 1988" Scenario, Player 1 (NATO) will be human while Player 2 (Warsaw Pact) will be run by the computer.

Computer vs. Computer Game

Set Game Options – Brings up the Game Options Dialog.

Cancel / Exit – Exits to the Main Menu.

Play / Exit – Starts the currently selected Scenario.

Scenario Documents – Will launch the appropriate reader program for any scenario documents that accompany the selected scenario. Documents can use any of the following file extensions (.htm, .pdf, .doc, .txt, .xls) and the file must be named exactly the same as the name appears in the **TOAW IV** Scenario Editor. This button will appear blank if there is no associated document, and as a printed page if there are any associated documents.

3.2. RESUME SAVED GAME

Resume a saved game.

Clicking on the Resume Saved Game button brings up a standard Load window. Select your saved game and click "Open" to play.

Clicking on the Resume Saved Game button can also be used for older (legacy) PBEM games. Select your saved game and click "Open" to play.

While we recommend the new PBEM++ system, we still support the older system for people with unstable internet connections. Note that only legacy PBEM can use the "Trusted PBEM" option.

TOAW IV can optionally create/overwrite an Autosave.SAL file every five minutes in the Saves folder of the Documents/My Games/The Operational Art of War IV directory.

If you choose to play by legacy by email, the game will automatically prompt you to create PBEM game files for your opponent at the appropriate times. These files are similar to saved game files, but they include some additional information and have a "PBL" file extension. Send the PBEM file to your opponent when your Turn is finished. You may continue your Turn using the PBEM file he sends

back in response. Another save file is simultaneously created when the PBL file is written; this file will have the same file name that you gave the PBL file, but will have a "SAL" file extension instead. DO NOT send this SAL file to your opponent, unless you want to give him some free intelligence. This file is for your use only, should you wish to view the status of the battlefield at the conclusion of your Turn. You may load this file at any time by selecting Resume Saved Game from the first control screen displayed when **TOAW IV** is started.

When you begin the game you will be asked for a password. You will need this password to continue the game from the PBEM file returned by your opponent. Keep your password secret from your opponent to prevent him from viewing information that should not be available to him. You will be given an opportunity to view a playback of your opponent's Turn when you load a PBEM game.

There are certain restrictions on PBEM games. Variable Initiative (see section 10.1) is locked out, so the order of play will never change during a Scenario. You will need your opponent's password if you decide to end the Scenario early, so it is only possible to end a Scenario if both players agree. Finally, while the undo function is functional during PBEM games it does leave a record in the playback. If you undo an action in a PBEM game you should be prepared to explain your reasons to your opponent!

3.3. SET GAME OPTIONS

Clicking on the Set Game Options button on the Start New Game dialog brings up the Set Advanced Game Options dialogs in sequence. There are two dialogs. The first dialog sets the Game Parameters, which apply to both players (Game Parameters may not be changed during PBEM games). The second dialog sets the Player Options, which apply only to you (and may be changed at any time, even during PBEM games). The Player Options dialog has two pages. The Player Options dialog also includes the Programmed Opponent Options.

3.3.1. GAME PARAMETERS

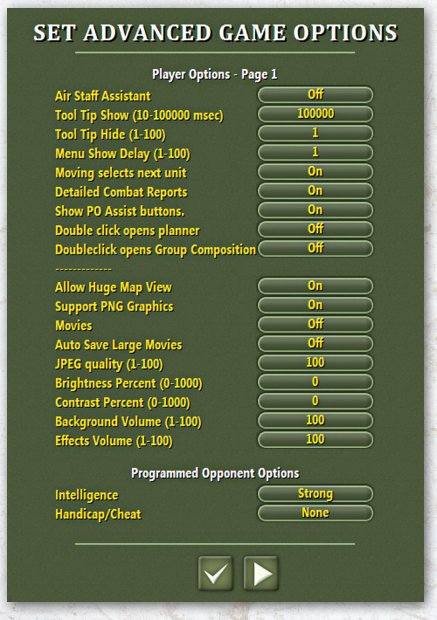
- Command and Control: Turning this off will cause your Formations and units to never "reorganize." They will always be available for Move and Attack orders.
- Scenario Variability: Turning this off will cause Scenarios to always end exactly on the historical ending Turn. Any events with a 50% or greater possibility will always occur, and any events with less than 50% probability will never occur.
- Fog of War: Turning this off will always give you full information on the locations of all enemy units.
- Environment: Turning this off will cause Weather and Time of Day to have no effect. This includes Mud and Snow effects as well.

- Active Disengagement: Turning this off allows all units to disengage from enemy units (see 10.4.10, Disengagement) automatically. In effect, Disengagement Attacks are not allowed.
- No Borders: You can only see borders and supply rates for hexes that your forces are adjacent to, or have occupied this Turn. This is an additional means of increasing Fog of War.
- High Supply: This gives a boost of 50% to the resupply rate. Scenarios designed with earlier versions of TOAW often had drastically undersupplied forces due to a misunderstanding of the total amount of supply that would be received by on-map units. Use this to counterbalance that effect and for games between very aggressive players.
- New Flanking Rules: If on, when the defender has two non-adjacent hexes that he can't be attacked from (for example, one sea hex to the NW and one friendly unit to the NE), then attackers 120 degrees apart no longer cause a flanking attack. Against such a defender, it is only considered a flanking attack if the attacker has units that are 180 degrees apart. Previously, if you had a horizontal front on the map, it would have multiple flanks exposed because of the zigzag of the hexes on that axis. This option is intended to make sure that even though the line zigzags, it won't introduce cases where units are subject to flanking, when they probably shouldn't be. Possible consequences include making it easier to defend, and making map edges and impassable terrain features more important.
- Advanced Rules: If on, Advanced Rules are applied (see section 5). If off, Standard Rules are applied (see section 4).
- New Turn Order Rules: If on, this option will better equalize the two player-turns. The details are listed in section 9.0.2.
- New Supply Rules: If on, this option offers a more realistic supply model. The details are listed in section 9.1.7.3.
- Trusted PBEM: If on, legacy PBEM games can export an XML file for loading into the editor. Also, Elmer Assist may be used by players.
- New Bridge Rules: If on, bridges will only exist, and be subject to destruction, in locations where the road terrain graphically crosses the river/canal terrain. This will affect both bridge-blowing by units and bridge-attacks by aircraft.

Note that Game Options may be preset by the scenario designer. See section 17.12.

Note that Game Options settings cannot be changed once set although different games may have different rules set..

3.3.2. PLAYER OPTIONS – PAGE 1



- Air Staff Assistant: The Air Staff Assistant can handle all of your Air unit orders for you. The Air Staff Assistant will place all Air units under computer control. As in the Standard Rules of the game, you may override specific Air unit orders for any given Turn; just select any unit and Mission as you would normally. The Air Staff Assistant can be toggled from the Advanced Game Options window as well as from the Air Unit Management window. If you turn the Assistant on from the Air Unit Management window, all Air units will immediately be assigned Air Missions by the assistant.
- Tool Tip Show (10 – 100000 msec): This sets how long the cursor must remain stationary over one spot before the Tool Tip appears.
- Tool Tip Hide (1-100): This sets how long the Tool Tip remains shown, in seconds, before it is hidden.
- Menu Show Delay: This sets how long the right mouse button must be held down before the Movement Popup appears. If set to 1, the Movement Popup automatically appears without delay.
- Moving Selects Next Unit: If on, the next unit becomes the active unit after the current unit completes its move. This has no effect if the Menu Show Delay is set to 1 (the current unit remains the active unit, regardless).
- Note that default is to set the above two options to 1 and 0. if the above two are set to 5 and 1 then you can make simple moves and attacks without popping up the menu that includes the full options unless you hold down on the right mouse button. This can help beginning players, people looking for a simpler experience and people on touch enabled tablets. You can still access the full menu by holding down on the right mouse button.
- Detailed Combat Reports: Turning this off means the details of a battle normally displayed after each combat will not appear. Disaster notifications will also not be displayed. You can still access the combat reports using the combat summary that will appear at the end of the turn instead. This option can be toggled during play via the Play menu.
- Show PO Assist Buttons: If on, the four PO Assist Buttons are shown at the bottom of the Control Panel. This only applies if you are in the classic view.
- Double click opens planner: If on, a double click on a target hex will open the Combat Planner for that hex. Note that, if enabled, this is a method to avoid causing the defender to Retreat Before Combat, if that is desired. You can also hover over the hex and hit the P key to open the combat planner.
- Double-click opens group composition dialog. If on, a double click on a target hex will open the group composition dialog for that hex.
- Allow Huge Map View: If on, the Huge Map View is available for viewing. (Turning this off can avoid frequent accidental map resizing if your mouse is acting up.)
- Support PNG Graphics: This parameter is now obsolete. The **TOAW IV** graphics package is always used. Only by physically replacing it or overriding it in a higher priority folder can another package be accessed.
- Movies: This option creates two BMP files in the Saves directory at the end of each player's Turn. One is of the entire map at the microview scale; the other is of the entire map zoomed out (small 2D mode) scale. This can be used

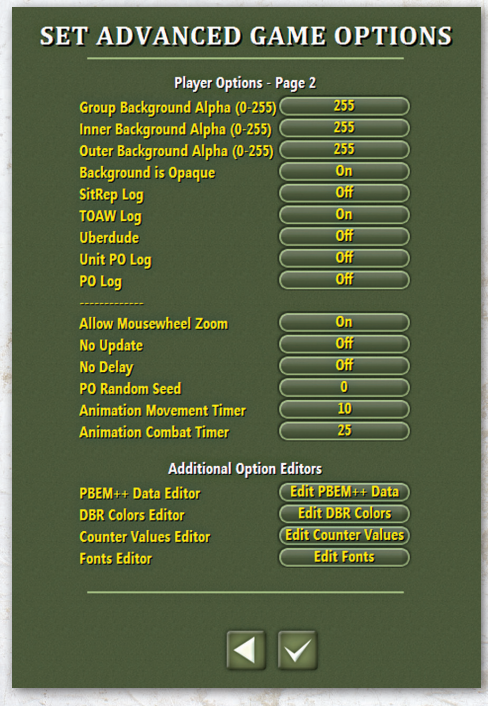
for creating AARs and to keep track of your general campaign progress. You can link these images together using second-party graphics software and view your progress towards victory (or defeat) as a snapshot movie. Keep in mind two things when using this option. First, the time that it takes to write this file depends on the speed of your machine and the size of the map. You will see the hourglass cursor to let you know the game is working on writing the image to a file. This may take a few minutes on slower machines, especially when writing large maps. Second, BMP files can be very large in terms of file size. As with the SitRep logs, you should clean out those you won't be using for movies on a regular basis. You can also use your favorite graphics software to convert these files to JPG format in order to save disk space.

- Auto Save Large Movies: In the above feature, the save of the main map can be very time consuming for large scenarios. This allows that part of the above feature to be skipped. If off, only the micromap part is saved.
- JPEG quality (1-100): This determines the quality of the above saves. Lowering it can save file size at the expense of quality.
- Brightness Percent (0-1000): Users can vary the brightness to their preference with this option. Most users will leave it at 0.
- Contrast Percent (0-1000): Users can vary the contrast to their preference with this option. Most users will leave it at 0.
- Background Volume (1-100): Users can vary the background volume to their preference with this option. Most users will leave it at 100.
- Effects Volume (1-100): Users can vary the effects volume to their preference with this option. Most users will leave it at 100.

3.3.3. PROGRAMMED OPPONENT (PO) OPTIONS

- Intelligence: This sets the level of optimization in the programmed opponent. In most cases, the programmed opponent will search larger areas, make multiple passes at problem solutions, and optimize the order in which it does things more heavily at higher levels. This results in more intelligent play at some cost in execution time.
- Handicap/Cheat: This sets the level of advantage for the human or programmed opponent in human vs. computer games. There is no advantage if "None" is selected. Selecting Human +1 or Human +2 gives increasing advantages (supplies, rest, strength modifiers, etc.) to a human player; selecting Computer +1 or Computer +2 gives the same increasing advantages to the programmed opponent.

3.3.4. PLAYER OPTIONS – PAGE 2



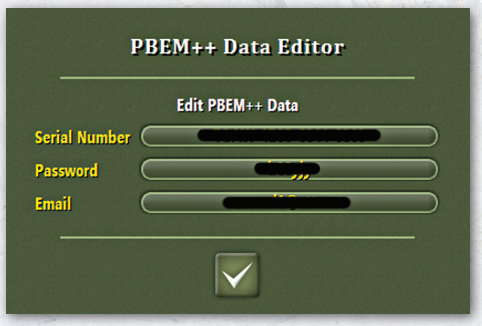
- Group Background Alpha: Dialog Groups Elements Alpha Channel setting
- Inner Background Alpha: Dialog Around Elements Alpha Channel setting
- Outer Background Alpha: Dialog Outside Edge Alpha Channel setting
- Background is Opaque Indicates: whether the background is opaque
- SitRep Log: This creates a text file in the Saves directory that contains news and detailed combat reports. If playing a PBEM Turn, then the news and only the last two lines of the combat reports and their locations are displayed. When using this option, players should make a habit of deleting their old logs on a regular basis to save hard drive space. This can be helpful for reviewing large maps. In a PBEM game the log is less detailed.
- TOAWLog: Generates a detailed log intended for Scenario design and bug reporting.
- Uberdude: Generates messages intended for debugging and scenario design. It will show things like whether or not an event was fired.
- Unit PO log: Detailed log intended for debugging the PO.
- PO log: Log intended to help optimize the PO for a scenario.
- Allow mouse wheel zoom – can be turned off if you have an over-sensitive mouse wheel.
- No Update: Meant for computer vs computer play when trying to tune the PO. This should only be set to that for that purpose, it can lead to units not moving on the map and other issues.
- No Delay: This removes the animation delay, the Shift and Caps Lock key do the same thing during play.
- PO Random Seed: Random numbers in the computer aren't truly random, they are generated from an algorithm. a seed of 103458 will always generate the same sequence of numbers. This means that if you make the same attacks and moves in the same order, you can get repeatable results which is great for bug reports. -1 means use the seed from the save file, 0 means generate a new one, any positive number means use that as the seed.
- Movement Animation TImer: How many milliseconds between frames during movement.
- Combat Animation TImer: How many milliseconds between frames during combat.

Additional Option Editors.

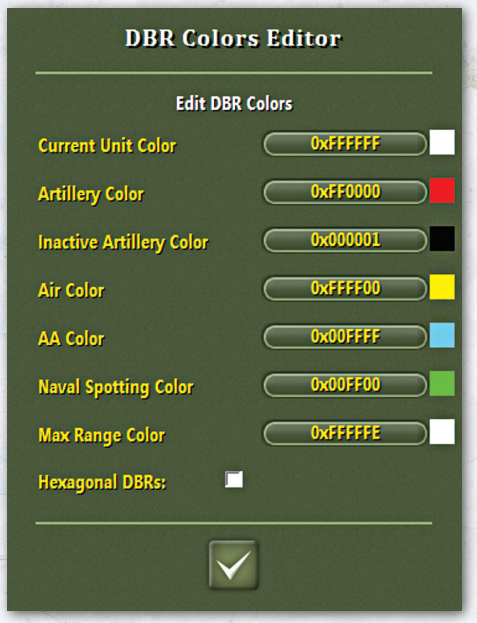
- PBEM++ Data Editor: Lets you edit the serial number, email and password for PBEM++ games.
- DBR Color Editor: Edit the colors shown on the map and allows you change the displayed colors that show the various ranges and also allows you to switch between a hexagonal and a circular DBR display.
- Counter Display Editor: Allows you to edit what values are shown on the unit counter, This can include not only the ones you'd expect but also a summary of the values for the stack and things like engineering and AA values.
- Fonts Editor: Allows you to edit the fonts used in the game. Most dialogs should expand or contract to best fit the fonts you want to use. There are a few dialogs which may not change size and the tooltip font must be a TrueType™ to display properly.

3.3.4.1. PBEM++ DATA EDITOR

The three text input prompts are each 19 characters max.



3.3.4.2. DBR COLOR EDITOR



The seven DBR categories each have a hexadecimal value input prompt. Each color is illustrated via a color swatch.

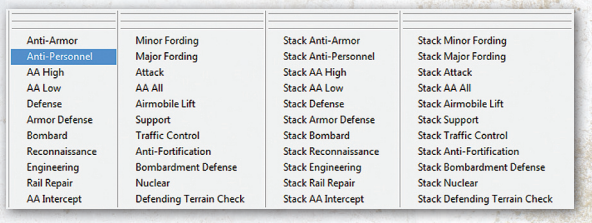
The check box selects whether the DBRs are displayed in-game as hexagonal or circular.

3.3.4.3. COUNTER DISPLAY EDITOR

A maximum of six options can be programmed (the Unit Icon Display button on the Control Panel cycles through the programmed options in-game). Each row on the dialog programs an option. Four are strength options, and two are movement

options. The first strength option and the first movement option are each always active.

The check boxes toggle whether each additional option is active or inactive. Each strength option has two values displayed on the counter. Each movement option only shows one value on the counter. Left clicking on a strength option increments it to the next Strength Category in sequence. Right-clicking on a strength option pops up the Strength Category Menu. There are 22 Strength Categories. Each has both a normal and a Stacked version, for a total of 44 options in the menu. The Stacked version is that strength summed for all units in a stack.



The 22 Strength Categories are described in section 7.13.2.

The movement options are simple: The Remaining Movement Allowance is always active,

and the Unit Time Stamp is the only option. It can be toggled on or off.

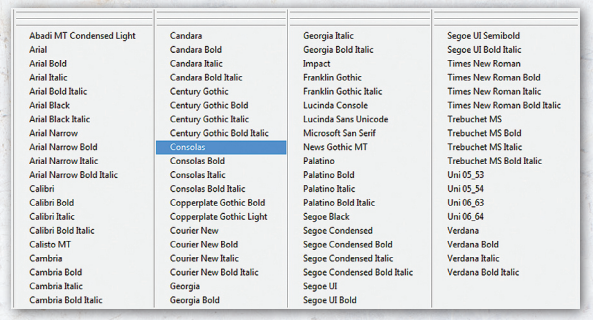
There are two buttons at the bottom that will set either Basic or Advanced Defaults. Basic Defaults sets the same two options as under **TOAW III** and before. Advanced Defaults presets a full set of six options.

3.3.4.4. FONTS EDITOR

There are 39 different fonts programmed in **TOAW IV**. They are arranged in a menu of 13 rows x 3 columns in this editor. How each one is used is shown in the Info Panel when the mouse is over each font button in this editor. Clicking on any of the 39 buttons launches the corresponding individual Font Editor.

3.3.4.5. FONT EDITOR

There are two columns of ten buttons and one check box each. The first button on the first column is unique in that a left-click allows entering the font name while a right-click calls up the Font Menu.



The font names listed in the Font Menu are the font names that are provided by Windows plus the font names provided by **TOAW IV** (in the My Fonts folder). But you may have more font names available on your computer, especially if you have MS Office installed. Such font names would have to be hand entered via the left-click option above.

There are five more buttons on each column that allow setting of various numerical font parameters. There is one spare button that does nothing (included just to keep the rows aligned).

Finally, there are two check boxes. The first sets whether Windows fonts are used instead of the old **TOAW III** bitmapped fonts. If the bitmapped fonts are selected, all other parameters are blanked out to avoid confusion, since they then have no effect. The other checkbox sets whether the font has a background or not. If it is not checked, the Background Color is disabled (since there then is no background).

Once all individual fonts desired have been edited and the Fonts Editor is exited, the font changes are saved to disk in the Opart4 Fonts.ini file.

Note that the Player Options settings are stored in an external file called Opart4.ini. This file also includes a suite of other player parameters that

aren't available on the Player Options dialog. The file can be edited in a text editor if those parameters need to be changed. See Appendix 19.10 for details on this file.

There is another external file called Opart4 Fonts.ini that stores the font choices. See Appendix 19.11 for details on this file.

3.3.5. DEFAULT OPTIONS

Note that the settings for "Tool Tip Show" and "Tool Tip Hide" can turn Tool Tips on and off (see 3.4.2 above). And "Menu Show Delay" can turn the movement popup window on and off (see 3.4.2 above). While players should not find effecting their choices difficult, there is, nevertheless, an aide to assist with it. On the "Play" pulldown in the game, note that there is an option of "Default Options". Selecting that calls up this dialog:

Selecting "Updated Defaults" will set those three values to use Tool Tips and skip the movement popup (TOAW will employ these two new features). Selecting "Classic Defaults" will set those three values such to turn both features off (TOAW will function like older versions did).

3.3.6. CHEAT PREVENTION

There is now a PORandomSeed parameter in the Opart4.ini file. If set to 0 (default) it will always use the next random number. If set to -1, it will always use the random number stored in the save file. If set to a number it will use that number. PBEM games are always treated as -1. This means that unedited reloads of a .PBL PBEM or PBEM++ game will always produce the same results. This also means that Matrix will be able to reproduce bug reports.

Note that this guarantees that reloading can't tamper with PBEM interturn calculation results via the reloading cheat. It will also make it more difficult to change PBEM combat results via the reloading cheat (but not render it impossible, of course).

A read-only PBEM End of Turn file is generated that allows their reviewing the state of your units.

3.3.7. PBEM++ (ONLINE PLAY)

TOAW IV fully supports Matrix's online PBEM system, PBEM++. Use of this system not only makes it easy to obtain opponents, it comes with built-in cheat prevention that detects all reload cheating.

PBEM++ is a monitored, secure play against an opponent. You create and respond to Challenges (New games) and download your turns, upload them and can save them at any time to continue later. It is provided free of charge by Matrix.

The PBEM++ system is entered via the PBEM++ button on the startup screen.

When you first enter the PBEM++ system, it will prompt you for your username and password. These should match the Matrix Games user account you used to register **TOAW IV**.

There is an input box for your username and an input box for your password. There is a checkbox to save the password you enter.

On the Control Panel, there is a button to Exit (this will proceed to the PBEM++ page) and a

button to return to the start screen. Click the Exit button.

The PBEM++ screen has five tabs. Upon opening, it is in the Load Turn screen, but you can switch between screens by clicking on the desired tab:

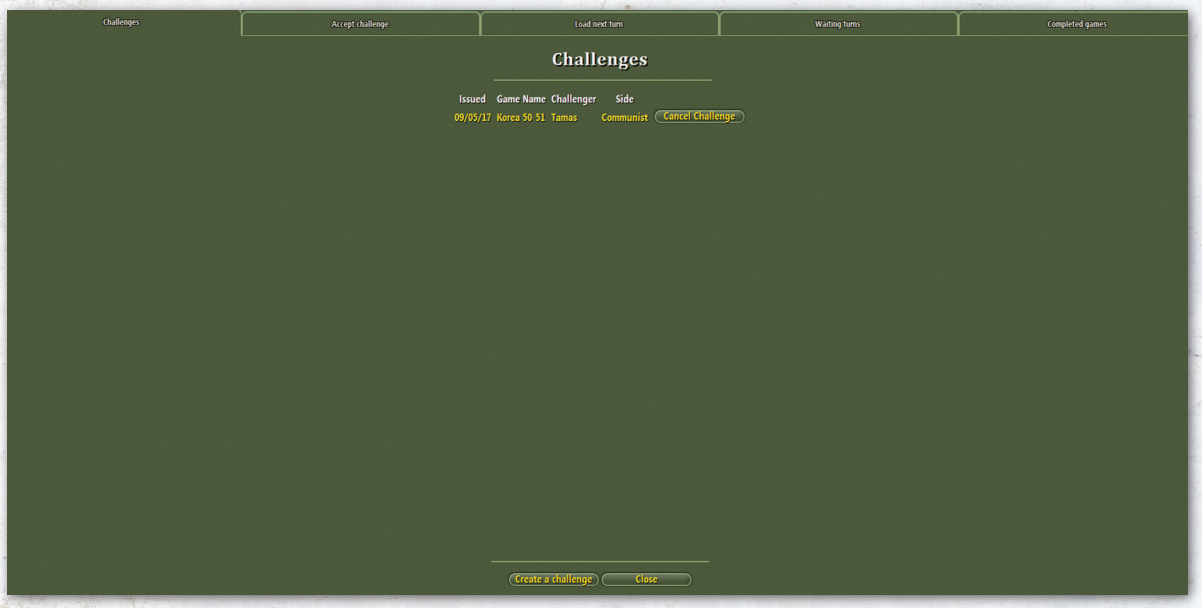
Challenges screen – This is where you can challenge other players and view the challenges you have out there. The first step is to create a challenge which will take you to the New Game screen. You can also cancel your challenge at this screen.

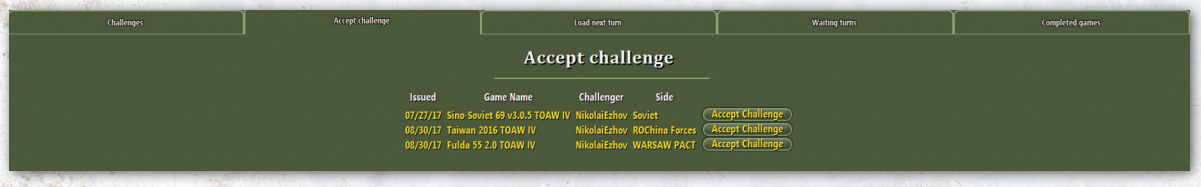
The Control Bar has two buttons:

"Create a Challenge" Button – Create the challenge (this opens the Select New Game dialog, where the challenge is created upon starting the desired scenario).

"Close" Button – Exit the PBEM++ screen.

Accept screen – This is where you will accept a challenge. Note that accepting a challenge may or may not start your turn depending on which player the scenario designer has specified as player 1.





There are four headings:

Issued – date the challenge was issued.

Game Name – scenario to be played.

Challenger – who issued the challenge.

Side – the side that will be played by the Challenger.

There are four headings:

Issued – date the challenge was issued.

Game Name – scenario to be played.

Challenger – who issued the challenge.

Side – the side that will be played by the acceptor.

Finally, there is an "Accept Challenge" button on

the right of each challenge. Click to accept a challenge.
The Control Bar has one button:

Close Button – Exit the PBEM++ screen.

Load Turn screen – This is where you will load your current turn and proceed to play through it.You can also resign a game from this screen.

Updated – last date a turn was uploaded.

Game Name – the scenario being played.

Turn – the current game turn.

Your Side – the side you are playing.

Opponent – who you are playing.

The Control Bar has one button:

There are six headings:

Instance – a PBEM++ code that IDs the game in progress.

Updated – last date a turn was uploaded.

Game Name – the scenario being played.

Turn – the current game turn.

Side – the side you are playing.

Opponent – who you are playing.

There are then two buttons with each line:

"Start Turn" Button – click to enter a turn.

"Resign Game" Button – click to resign a game.

The Control Bar has one button:

Close Button – Exit the PBEM++ screen.

Close Button – Exit the PBEM++ screen.

Completed screen – Here you can gloat over the games you have won.

There are six headings:

Instance – a PBEM++ code that IDs the game that was played.

Updated – last date a turn was uploaded.

Game Name – the scenario that was played.

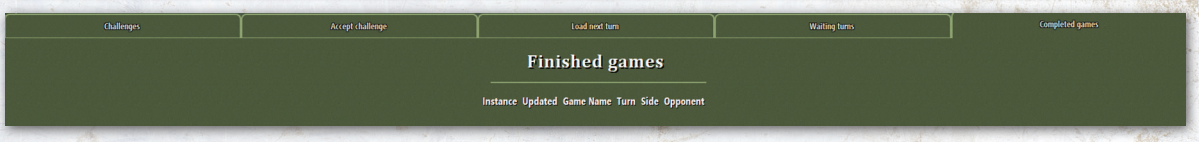
Turn – the last game turn played.

Your Side – the side you played.

Opponent – who you played.

The Control Bar has one button:

Close Button – Exit the PBEM++ screen.



Waiting screen – This is where you can see the list of games that are waiting for your opponent to play.

There are six headings:

Instance – a PBEM++ code that IDs the game in progress.

3.4. EDIT SCENARIO

Edit a scenario.

Clicking on the Edit Scenario button will send you to the Scenario Map Editor.

4. STANDARD RULES

- Under Standard Rules, any sections described in this manual as Advanced Rules will not apply to your game. Under Standard Rules:
- All right mouse button popup game menus are eliminated.
- Movement is always made by units individually and combat is always executed as a group. The embarking and disembarking of units is done using the small brass buttons in the Unit Panel.
- The Unit Report window is unavailable.
- Unit Orders and Loss Tolerance settings are inaccessible. Graphics representing Loss Tolerance, Orders, and Unit Health are not shown on 2D unit icons.
- All environmental effects (Weather and Time of Day) are treated as daytime / moderate temperatures / fair weather.
- Target Density and Traffic Density rules are considered to be off. Map graphics associated with these two rules are not displayed.
- All units are considered fully supplied.
- All locations are considered "seen".
- All friendly units are fully "cooperative".
- All air unit missions are assigned by the computer. You can override computer-assigned missions by using your air units to bomb enemy targets if you wish. (Scenario designers should understand that missions are assigned at the end of the Turn, so the missions assigned in the Editor will be the missions executed on the first Turn.)
- Bridge Blowing, Bridge Repair, and Bridge Attacks are not available.
- Automatic damage to rail lines by units inside enemy territory will not occur.
- Unit division occurs only as a result of combat.

Theater options are not available (Scenario designers should keep this in mind and assign secondary activations for Theater Option events if they are necessary for the Scenario). Certain Menu options are meaningless and are grayed out.

5. ADVANCED RULES

All rules described in this manual are in effect unless you turn them off in the Advanced Game option window. If you turn any options off, the game will be simplified by removing them. Among other things, you can set a programmed (computer) opponent's intelligence level and the handicap (a strength cheat), and whether or not to play with Fog of War. Some of these options can also be set using the View / Game Options menu within the game or Editor.

To help you identify Advanced Rules quickly, each section that applies will have a Five-Star General insignia displayed next to it.

6. INTERFACE CONVENTIONS

6.1. GENERAL USAGE

6.1.1. USING THE MOUSE

For the most part, the interface conforms to Windows™ guidelines for windowed applications. Menus, file dialogs, and window controls work as you would expect. Left mouse clicks are used to make selections, while right mouse clicks are used to issue orders or call up menus.

The primary departure from Windows™ guidelines is in scrolling of lists or documents, these act more like scrollbars on mobile devices, clicking will attempt to go to that portion of the items. In most cases a left click on a scroll control button will scroll the list by one item while a right mouse button click on a scroll control button will scroll the list by an entire displayed page. Right-clicking on a scroll arrow can thus be used to quickly scroll through large lists.

6.1.2. USING THE KEYBOARD

The game supports a number of hotkeys, which are not case sensitive. There is a text file, called "KeyCommands.txt", in the manuals folder that details all hot keys available.

- When referring to a unit that can act, we mean the next land unit in the owning player's Order of Battle (OOB) that is neither selected for combat, Dug In, Entrenched, Fortified, in either Local or Tactical Reserve, or out of Movement Points.
- Message window style dialogs now accept input from the number keys (either on the keypad or the main row at the top of the keyboard) to select from available options. The options buttons in these dialogs are always arranged vertically. The "1" key selects the top button, "2" selects the next button, etc.
- The <Esc> and <Enter> keys can be used to exit any standard game dialog. <Enter> accepts the dialog and <Esc> cancels it, they will also exit from the small "message box" style dialogs if there is only one possible choice.
- F1 brings up the help file.
- F2 Opens the Group Composition Dialog (same as C below).
- F3 Saves Map.
- <Shift> and <Ctrl> and F4 Saves current player's OOB.
- F9 does a quick save.
- The numerical keypad number keys can be used to scroll the map or center on the current unit.
  1 – Southwest
  2 – South
  3 – Southeast
  4 – West
  5 – Center on current unit
  6 – East
  7 – Northwest
  8 – North
  9 – Northeast
- The Arrow keys can be used to scroll the map. Use the <Shift> key along with an arrow key to scroll the microview map's locator pane. Use the <Ctrl> key along with an arrow key to scroll the microview map.
- Period < . > – Disembarks the selected unit, if possible. If not, this will advance to the next unit that can disembark.
- Comma < , > – Recombines or splits units.

- F12 or Backslash < \ > – Toggles PO Assist Mode.
- Slash < / > – Show the current formation path.
- Questionmark < ? > – Show all formation paths.
- <Shift> and F12 or Vertical Bar < | > – The PO moves your units that are under PO Assist Control.
- Space < > – Hides units while held down. Also hides some dialogs.
- <Shift> or <Caps Lock> speeds up individual battles and PO moves.
- A – Bring up the air unit report.
- <Shift> and A – Brings up the Air Briefing.
- B – Find place
- <Ctrl> and B – Find next place.
- C – Group Composition: The Group in the map location currently under the mouse cursor is displayed in a small window similar to one of the location panes in the Attack Planning window. If the cursor is not over an occupied location, the Group in the current unit's location will be displayed. This can be used to examine friendly or enemy occupied locations. If you click on a friendly unit in the window, it becomes the new current unit. The Group Composition window is also available in the map panel right mouse button popup menu as "Show Group Composition".
- D – Orders the unit to Dig In and advances to the next unit that can act.
- E – Resolves all combats or ends the Turn.
- F – Brings up the Formation Report (see 16.2).
- G – Gets the next unit stacked with the current unit, brings it to the top of the group stack, and makes it the current unit.
- H – Moves HQs to the top of stacks.
- I – Toggles through the range circles options, including unit visibility.
- L – Cycles through the Loss Tolerance settings for the selected unit.
- <Shift> and L – Cycles through the Loss Tolerance settings for the selected stack.
- M – Toggles the standard unit icon display mode between Movement and Strengths.
- N – Selects the next unit that can act.
- O – Bring up the Order of Battle Report (in-game only, not in the Editor).
- P – If the current unit is able to attack the location the cursor is over, this brings up the Attack Planning window (see 10.5). Note that this is a method to avoid causing the defender to Retreat Before Combat, if that is desired.
- R – Refreshes the display of the current unit.
- T – Sets the selected unit to Tactical Reserve and advances to the next unit that can act.
- <Shift> and T – Brings up the list of available Theater Options (see 10.3).
- U – Brings up the Unit Report (see 16.1).
- W – Toggles the map pane weather view on or off.
- X – Saves a "*scenario name*.AI" file and Saves a "scenario name.col file.
- Y – Graphically zooms in.
- <Shift> and Y – Graphically zooms out.
- Z – Undo the last action.
- Plus sign < + > – Selects the next unit.
- <Shift> and < + > – Selects the next unit that can act. This is the same as N, above.
- Minus key < – > – Select the previous unit.
- <Shift> and < – > – Selects the previous unit that can act. This is similar to N, above.

6.1.3. FORCE EDITOR HOTKEYS

- You can copy a unit's equipment into a buffer (using the G [Get] key in the Force Editor)

and use it to replace the equipment in another unit (using the A [Assign] key in the Force Editor).

- F4 – Saves the current Order of Battle as a specially formatted text file.
- F5 – Loads a specially-formatted text file as an order of battle.

6.1.4. SCENARIO EDITOR HOTKEYS

- F6 – Saves the current Scenario's Event List as a specially formatted text file.
- F7 – Loads a specially-formatted text file as the Event List of the current Scenario.
- F8 – Saves the scenario in **TOAW III** version 3.4 format.
- <Shift> and F8 – Saves the scenario in **TOAW III** version 3.2 format.
- F11 – Regenerates the .eqp and .nqp files.

The effects of right or left mouse clicks are usually different and are always described in the Information Panel at the bottom of the screen or window. When you first start the game, you may find it helpful to slowly pass the mouse cursor over the entire Game Window while keeping an eye on the Information Panel near the bottom of the display. As you play, keep an eye on the Information Panel for prompts and information.

6.1.5. COMMON SCREEN ELEMENTS

Regardless of whether you are playing a Scenario or are working within the Scenario Editor, there are several items that are common to all screens.

6.1.6. THE WINDOW FRAME

The Window Frame is a standard Windows™ style window frame and menu. It can be sized, moved, maximized, minimized, etc.

6.1.7. THE MAP PANEL

This area displays a portion of the current Scenario map. Click within this panel to issue orders or make selections from the map. Move your mouse cursor to the edge of the Map Panel to scroll the

display to other areas of the map. The map may also be repositioned via Map Drag: Place the cursor over an unoccupied hex, hold down the left mouse button, and drag the mouse to a new location. Release the left button and the map will be moved to the new location

There are a total of five 2D zoom levels for this display (and two 3D zoom levels). Place names scale with the zoom level, too, if Windows fonts are used for the place name fonts.

Within each zoom level, the Y hotkey zooms further in, while the <Shift>Y Hotkey zooms further out. These zooms do not switch to a different tile and counter set like the original zooms. Instead, the set in use is graphically scaled. This is meant for people who want screenshots to illustrate a certain point.

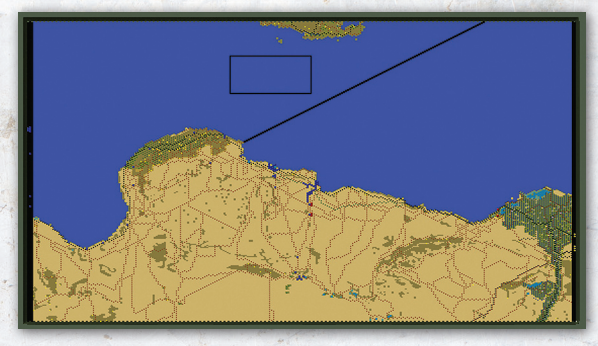
6.1.8. THE INFORMATION PANEL

This area is shown along the bottom of the display. Prompts, help, and general text feedback appear here. Be sure to look here for prompts and information as you move your mouse cursor around and click within the game display.

6.1.9. THE MICROVIEW PANEL

This area in the lower left corner of the game display shows most or all of the current map using very small-scale graphics. In some Scenarios, the map is large enough that it won't fit entirely within the Microview Panel. To scroll the microview map to another area of a large Scenario map, move your mouse cursor to the edge of the microview panel. Left (or right) click in the Microview Panel to recenter the map panel on that portion of the Scenario map. The micromap may also be repositioned via Map Drag like the main map.

Double-clicking on the Microview will open up the 'jump map,' a full screen map with the same



scale as the Microview. Clicking on the jump map anywhere will center the main map on the place you click. Obviously, this is only of value for maps large enough to exceed the micromap limits.

6.1.10. AIR WAR PANEL

By default, this is below the Unit Panel.

Side – Ours or Theirs

AS – A number indicating the Air Superiority level.

INT – The percent chance of an aircraft being intercepted.

LOST – Aircraft that have been lost.

Also known as the "bolted plate". This area's display is dependent upon the screen resolution used. At larger screen resolutions (at least 1024 x 768), a circlet of gold stars surrounds the **TOAW IV** logo. This circlet provides a graphical approximation of the portion of the Turn that a player has used. This feature is only present on the Legacy Control Panel (see below).

6.1.11. THE LEGACY CONTROL PANEL

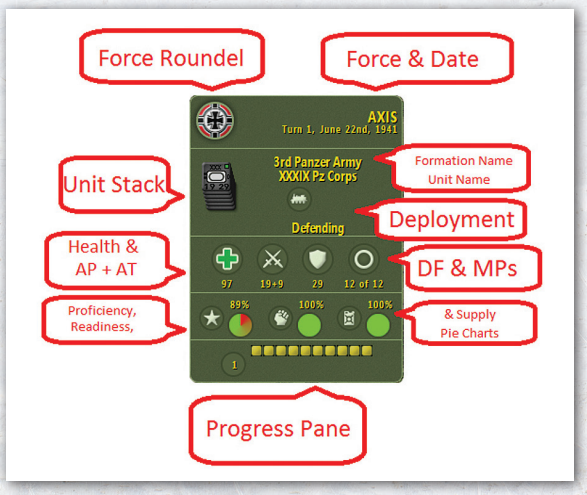
This is an obsolete feature that is accessed via the Panels Control Panel (see below at 6.1.14). This area is shown along the right hand side of the game display. The appearance and functions of the Control Panel vary depending on whether you are playing the game or using the Editor.

6.1.12. LEGACY TURN INFORMATION PANEL

This is part of the obsolete Legacy Control Panel. This area will show information on the current Turn, when the mouse cursor is anywhere other than the Map Panel. Note that **TOAW IV** uses the MM/DD/YYYY format for dates when using English and other formats for other languages, this is set in the current Language.xml file. If the mouse cursor is over a friendly unit, it shows the proficiency, readiness, and supply of that unit. If it is over any blank space in the map panel, it shows the proficiency, readiness, and supply of the currently selected unit.

6.1.13. THE NEW UNIT PANEL

This area is visible only in the game. There is a legacy Unit Panel that is visible when the Legacy Control Panel is used and in the Deployment Editor. That is discussed in section 17.11.1. Left clicking on the Unit Panel centers the screen on the unit. Right clicking on the Unit Stack (when the Panel is that mode) brings up the Unit Report window for the top unit shown in the panel. Right clicking elsewhere in the panel toggles the view mode between Stack and Group Composition.



The Unit Panel consists of five sections. The first section shows the date, the unit's Force Roundel, and the unit's Owning Force. The second section shows the Unit Stack or Group Composition, depending upon mode. If in Stack mode, it also shows the unit's Parent Formation, Unit Name, and Deployment or Mission. The third section (only visible in stack mode) shows the unit's Health, Attack Strength, Defense Strength, and Original and Remaining Movement Allowance. The fourth section shows the unit's Proficiency, Readiness, and Supply level both numerically and via a health pie chart. The fifth section shows the current round, and the progress pane – showing the rounds expended so far and to be expended by planned combats.

A "stack" of unit icons appears in the second section of the Unit Panel (if the panel is in Stack mode). If you move your mouse cursor slowly along the edge of the stack in the Unit Panel, you can examine each unit grouped in the same location. Left click on any one of the stacked unit icons to make the indicated unit the new "current unit" (thus bringing it to the top of the stack). When in Group Composition mode, mousing over the group allows similar examination of each unit. Note that, when in Group Composition mode, mousing over stacks on the map reveals the compositions of those stacks – making it easy to view the contents of stacks around the map.

Several icons can be displayed along the center of section 2 of the Unit Panel to show that the unit can board or debark from ships, planes, or trains. These icons also act as buttons. Clicking on them will order the unit to attempt the indicated action:

- Board Helicopter
- Board Train
- Board Ship
- Board Plane
- Debark

Various icons and numbers below the counters of the Unit Panel indicate the general state of the unit and the presence of other units also present in its location. From left to right, at bottom:

- The Health Icon shows a color from green (very good Unit Supply, Readiness, and Equipment levels) to red (very poor Supply, Readiness, and Equipment levels).
- Numbers below the Attack Strength icon indicate the unit's Attack Strength. If the unit can fire long distances at enemy units, the range is shown next to the Attack Number, otherwise the unit's Anti-Personnel and Anti-Armor Strengths are shown.
- A number below to the Defense Strength icon indicates the unit's Defense Strength.
- Finally, two numbers below the Movement Allowance icon indicates the unit's Current and Original Movement Allowances. For example, "10 of 20" would mean the unit's Current Movement Allowance is 10 and the Original Movement Allowance is 20.
- Below that in a row are the Proficiency, Readiness and Supply, indicated by heath pie icons which can range in color from red to green.

6.1.14. THE PANELS CONTROL PANEL

On the top left of the Map Panel is the Panels Control Panel. This is a panel of buttons that toggle the various Control Panel panels visible/invisible. The first part of this panel even toggles the display of the rest of the panel. (So, once you've made your choices as to which Control Panels to show, you can even make most of this panel invisible).

The first part of the panel shows two buttons:

The first button sequences through Normal View , Review Battles , and PO Mode . The second button toggles between showing /not showing the rest of the panel.

The rest of the panel has six buttons that toggle the showing of the parts of the Control Panel on and off:

- Info Line Panel shown/not shown.
- Buttons Panel shown/not shown.
- Microview Panel shown/not shown.
- Air War Panel shown/not shown.
- Unit View Panel shown/not shown.
- Old Control Panel shown/not shown.

6.1.15. BUTTON PANEL

This panel is discussed in section 10.2.

6.1.16. TOOL TIPS

Includes an enlarged picture of the terrain.

The top line may include the unit name if the unit is visible.

The Second line includes the various effects that terrain has on the hex, including Anti-Tank, Anti-Personnel, Fortification Level and Supply.

The Third line includes the Formation PO Orders

The Fourth line includes the location and terrain description.

The fifth line includes the prompt line which describes some options available if you click in the hex.

Note that setting the ToolTipShow very high and the ToolTipHide very short (see the "Page Two" display above) effectively turns ToolTips off.

7. GAME DISPLAYS

7.1. THE MENU

Menu functions work according to Windows™ conventions. Many game and Editor functions are only available through the Menu.

Not all of these menu items are available at any given time.

7.2. THE GAME'S FILE MENU

- **Begin New Game** – Load a new Scenario and start a new game.
- **Resume Saved Game** – Load an existing saved game file and resume that game.
- **Save Game As…** – Save the current game.
- **Go to Editor** – Exit the game and go to the Scenario Editor.
- **Create Map Image (JPG)** – Create an image of the current map.
- **Create Map Image (AVI)** – Create an image of the current map.
- **Close** – Close the application.

7.3. THE EDITOR'S FILE MENU

- **New Scenario** – Initialize a new Scenario and go to the Map Editor.
- **Open Scenario** – Open an existing Scenario file.
- **Close** – Close the application
- **Save Scenario As** – Save the current Scenario.
- **Dump Scenario As** – Create a text file that completely describes the current Scenario. This text file is commonly referred to as a "Scenario Dump".
- **Open Map** – Open an existing Map file.
- **Save Map As** – Save the current Map.
- Create Map Image (BMP) – Save the Map as a single (usually very large – several MB) JPEG file. You will need a good graphics program to display or manipulate the JPEG file.
- **Open Map (XML)** – Loads a map that has been saved as an XML format text file.
- **Save Map (XML)** – Saves the map as an XML format text file.
- **Open Game (XML)** – Loads and entire scenario that has been saved as an XML format file.
- **Save Game (XML)** – Saves the entire scenario as an XML format text file.
- **Save Equipment (XML) as...** – Saves the Equipment.eqp file as an XML format text file. (This is necessary for the Equipment Editor).
- **Go to Game** – Exit the Editor and play the game.

7.4. THE PLAY MENU

- **End Scenario** – Ends the current Scenario. Victory is determined normally, but may not be historically valid.
- **End Turn** – Resolve any planned Attacks, and possibly hand control over to the other player. This has exactly the same effect as the Resolve Battles / End Turn button in the Control Panel.
- **Computer Player** – Change the computer player selection.
- **Undo** – Undo the previous action. This is the same as clicking on the Undo button in the control panel.

- **Game Options** – This brings up the first page of the Set Advanced Game Options dialogs. These options affect both players and cannot be changed once a PBEM game begins. See 3.3.1.
- **Player Options** – This brings up the second page of the Set Advanced Game Options dialogs. These options only affect the the computer in use and can be changed at any time. See 3.3.2 & 3.3.3.
- **Default Options** – This brings up the Game Rules dialog. It allows you to choose between Updated Defaults (that use Tool Tips and allow skipping the Movement Popup) or Classic Defaults (that turn both those features off).
- **Plan Moves (\)** – This turns on PO Assist Mode.
- **Execute Moves (|)** – This moves all your units that are under PO Assist control.
- **Move One Formation** – This moves only the current formation if under PO Assist control.
- **Objective Tracks** – This expands to show Track 1 through Track 5 to allow the player to choose which track to display on the map.

7.5. THE GAME'S VIEW MENU

- **Scenario Briefing** – Show the Scenario's historical and special information article.
- **Situation Briefing** – Show the report detailing the current game situation.
- **Weather Briefing** – Show a current Weather Briefing (see 16.9) with a forecast for the next Turn.
- **Theater Options** – Show the Theater Options window (see 10.3).
- **Air Briefing** – Show a report giving aircraft losses for the current Turn, as well as Theater Air Superiority and Theater Interdiction Levels.
- **Air Units** – Show a list of all Air units, their locations, and current Missions.
- **Order of Battle** – Show a list of all units currently in-Theater (on the map).
- **Recent News** – Show a Report listing significant events that have occurred both in and out of Theater.
- **Expected Reinforcements** – Show a list of all expected Reinforcements and Withdrawals.
- **Recent Reinforcements** – Show a list of any units received as Reinforcements or withdrawn from the Theater this Turn.
- **Inventory and Replacements** – Show a list of all equipment assigned or available as Replacements.
- **Formation Path (/)** – Shows the current formation's objective path via graphic lines between objectives.
- **All Formation Paths (?)** – Shows all formations' objective paths via graphic lines between objectives.

7.6. THE EDITOR'S VIEW MENU

- **Properties** – Show the completion status of the current Scenario.
- **Order of Battle** – Show a list of all units of the current side.
- **Place Names: Visible** – Place names are shown on the Map, below any visible unit icons.
- **Place Names: Floating** – Place names are shown on the Map, above any visible unit icons.
- **Place Names: Invisible** – Place names are not shown on the Map.
- **Location Grid: Visible** – Use this to display a hexagonal grid overlay on your map.
- **Location Grid: Invisible** – Use this to remove the hexagonal grid overlay from the map.

- **Unit Visibility: Visible** – Units are shown on the Map.
- **Unit Visibility: Invisible** – No units are shown on the Map.
- **Units: Icons – Strength** – Traditional, standard NATO unit icons are shown on the Map, with unit Strengths displayed at the bottom of the icon.
- **Units: Icons – Movement** – Traditional, standard NATO unit icons are shown on the Map, with remaining unit Movement displayed at the bottom of the icon.
- **Unit 3D Bases: 3D Figures Bases** – 3D figures are shown with bases.
- **Unit 3D Bases: 3D Figures No Bases** – 3D figures are shown without bases.
- **Text Contrast: Standard**
- **Text Contrast: Highlight** – Show most game text against a shadowed background.
- **Text Contrast: Maximum** – Show most game text against a dark gray background.
- **Intro Cinematic: Do Not Play** – Do not play the introductory movie when the game starts.
- **Intro Cinematic: Play At Startup** – Play the introductory movie when the game starts.

7.7. THE OPTIONS MENU

- **Options Pulldown** – Most of these items are grouped as "radio buttons", and only one option is active within a group at any given time. Some of these options are not available unless you are playing under Advanced Rules.
- **Location Grid: Visible** – Use this to display a hexagonal grid overlay on your map.
- **Location Grid: Invisible** – Use this to remove the hexagonal grid overlay from the map.
- **Movement Paths: Visible** – Show projected Movement Paths.
- **Movement Paths: Invisible** – Do not show projected Movement Paths.
- **Movement Paths: Floating** – Show projected Movement Paths above unit icons.
- **Formation Highlight: Visible** – A "steel-colored" highlight is placed in all locations where a unit of the current Formation is present.
- **Formation Highlight: Invisible** – The "steel-colored" highlight is not shown around other units belonging to the same Formation as the selected unit.
- **Place Names: Visible** – Place names are shown on the Map, below any visible unit icons.
- **Place Names: Floating** – Place names are shown on the Map, above any visible unit icons.
- **Place Names: Invisible** – Place names are not shown on the Map.
- **Possession: Flags** – Territorial ownership is indicated on the Map by national flags.
- **Possession: Borders** – Territorial ownership is indicated on the Map by colored borders along the boundaries between the two Forces.
- **Possession: Invisible** – Possession of terrain is not indicated on the Map.
- **Unit Visibility: Visible** – Units are shown on the Map.
- **Unit Visibility: Invisible** – No units are shown on the Map.
- **Units: Icons – Strength** – Traditional, standard NATO unit icons are shown on the Map, with unit Strengths displayed at the bottom of the icon.
- **Units: Icons – Movement** – Traditional, standard NATO unit icons are shown on

the Map, with remaining unit Movement displayed at the bottom of the icon.

- **Unit 3D Bases: 3D Figures Bases** – 3D figures are shown with bases.
- **Unit 3D Bases: 3D Figures No Bases** – 3D figures are shown without bases.
- **Map View: 2D Huge** – Set the Map view to the huge 2D mode.
- **Map View: 2D Large** – Set the Map view to the large 2D mode.
- **Map View: 2D Small** – Set the Map view to the small 2D mode.
- **Map View: 2D Tiny** – Set the Map view to the tiny 2D mode.
- **Map View: 2D Ultra Tiny** – Set the Map view to the ultra tiny 2D mode.
- **Map View: 3D Large** – Set the Map view to the large 3D mode.
- **Map View: 3D Small** – Set the Map view to the small 3D mode.
- **Supply: Sources** – Show Supply Sources in the Map panel.
- **Supply: Invisible** – Do not show Supply Sources or levels in the Map Panel.
- **Supply: Visible** – Show the Supply Location Values for all locations in the Map Panel.
- **Weather: Visible** – Show weather in the Map and Microview Panels.
- **Weather: Invisible** – Do not show weather in the Map or Microview Panels.
- **Text Contrast** – Standard
- **Text Contrast: Highlight** – Show most game text against a shadowed background.
- **Text Contrast: Maximum** – Show most game text against a dark gray background.
- **Intro Cinematic: Do Not Play** – Do not play the introductory movie when the game starts.
- **Intro Cinematic: Play At Startup** – Play the introductory movie when the game starts.

7.8. THE HELP MENU

- **Help Topics** – Calls up a standard Windows help file.
- **About The Operational Art of War** – This shows credit and version info for the game.

7.9. THE SOUND MENU

7.9.1. BACKGROUND

- **Music** – Turns the background music on and the background battle sounds off.
- **Battle Sounds** – Turns the background battle sounds on and the music off.
- **Music & Battle Sounds** – Turns background music and battle sounds on.
- **No Background Sounds** – Turns off all background sounds.

7.9.2. SOUND EFFECTS

- **Sound Effects On** – Turns the foreground sound effects on.
- **Sound Effects Off** – Turns the foreground sound effects off.

7.10. THE MOUSE CURSOR

The mouse cursor shape is significant. In addition to the standard Windows cursor shapes used to manage the Game Window, there are several game-defined shapes:

The colored pointing finger shape generally indicates a button or control that can be pushed (clicked on) to cause some action.

The black & white pointing finger shape is used where mouse clicks will have no effect.

The up-pointing finger shape is used to indicate that a unit can move to a given map location.

The crosshair is used to indicate a target for an attack or bombardment. In the map editor it is used to indicate a target for a map editing operation.

The open box cursor is used to indicate the area to be centered if you click within the Microview Panel.

Various arrow cursors indicate scrolling directions for the Map and Microview.

Custom animated cursors are available. There is one for ground assault, one for artillery bombard, and one for air bombard. They can't be turned off, but players can just move their files from the Graphics folder to a graphically inaccessible folder if they don't desire to use them.

7.11. UNIT HEALTH INDICATORS

7.11.1. STANDARD RULES

If for some reason you can't move a unit, a red band will be shown across the bottom of its 2D unit icon. This might occur as a result of a combat or because the unit is prevented from moving by special Scenario rules. If the unit is scheduled to participate in an Attack, a triangular red-colored Attack Indicator will appear along the edge of the icon, pointing in the direction of the Attack Objective.

7.11.2. ADVANCED RULES

Unit Health is an average of the unit's Supply, Readiness, and a fraction of assigned vs. authorized equipment. It is not actually used in any game calculations, but it can be useful in keeping track of how your units are doing. Health is shown as a colored light in the Health Indicator of the Unit Panel and on the standard unit icons. The colors stand for the following ranges:

100% –	86%	Green
85% –	71%	Yellow-Green
70% –	56%	Yellow
55% –	41%	Orange
40% –	0%	Red

Note: If the unit is marked as Unsupplied, the Health Indicator is Black, for easier identification of Unsupplied units.

7.12. STANDARD UNIT ICONS

Regardless of the Map and unit display mode you are using to play the game, the standard 2D unit icons are used in the Unit Panel and Combat Planning Dialog. If you are playing in 2D mode, they are also used on the map. There is a lot of information packed into these icons.

The colors of the icons are a general guide to how well your units can cooperate. Units of different Formations will tend to cooperate better in attacks if they have similar colors. Generally speaking, units will cooperate best if their 2D counter colors are identical.

A unit Health Indicator light appears in the upper right corner of the icon.

A symbol in the center of the icon shows the unit Type.

A unit Size symbol appears above the Type symbol. Ground units only – not on air or naval units.

If the unit is scheduled to participate in an Attack, a triangular brass attack indicator will appear along the edge of the icon, pointing in the direction of the Attack Objective.

Unit Attack and Defense Strengths or Movement Allowance appears below the unit Type symbol.

7.13. UNIT ICON DISPLAY (ADVANCED RULES)

The colors of icons are a general guide to how well your units can cooperate. Units of different Formations will tend to cooperate better in attacks if they have similar colors. They will cooperate best if the colors are identical.

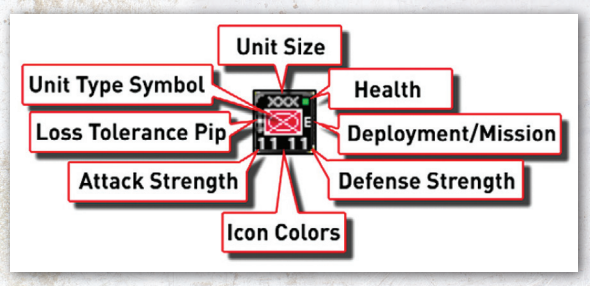
Loss Tolerance pips appear to the left of the Type symbol. One pip if the unit is to Minimize Losses, two indicates Limit Losses, and three if the unit is to Ignore Losses.

Deployment / Mission letters appear to the right of the Type symbol. For most units, this represents the unit's Deployment. For Air units, it represents the unit's Mission.

If the unit is not fully available for Orders, the numbers are shown in a colored band as follows:

- **Yellow:** The units are in Garrison mode, which is the result of a special Scenario rule.
- **Orange:** The unit or its parent Formation is reorganizing. Otherwise, they are in Reserve as a result of a special Scenario rule.
- **Red:** The unit is Routed.

If the unit is scheduled to participate in an Attack, a triangular red-colored attack indicator will appear along the edge of the icon, pointing in the direction of the Attack Objective.



7.13.1. UNIT SIZES

Squad	Battalion	Division	Army Group
••	II	XX	XXXXX

Platoon	Regiment	Corps	Theater
•••	III	XXX	XXXXXX
Company	Brigade	Army	Supreme Command
I	X	XXXX	XXXXXXX

7.13.2. ADDITIONAL UNIT NUMBERS OPTIONS

There are additional display options for the unit numbers beside just Attack and Defense. These are saved in the Opart 4.ini file and can be set using the Unit Icon editor in the Player Options. Entering the M Key or pressing the Unit Icon Display button cycles through the options selected in that file. There can be up to six options to cycle through (four strength and two movement). One of the options is always the MP display. The other had always been the AP & DF display. Now, there are the following parameters to set in the Opart 4.ini file:

The strength options are as follows:

- Anti-Armor
- Anti-Personnel
- Anti-Air High
- Anti-Air Low
- Defense – Total Defense (of soft and armored equipment)
- Armor Defense – armored equipment only
- Bombard
- Recon
- Engineering
- Rail Repair
- Anti-Air Intercept
- Minor Fording
- Major Fording
- Attack
- Anti-Air All
- Airmobile Lift
- Support
- Police

- Anti-Fortification
- Bombardment Defense
- Nuclear Bombard
- Defending Terrain Check – Defense strength modified by terrain

There is one movement display option:

- Time Stamp – Fraction of unit's movement allowance expended, in tenths. (0 = not moved; 10 = no movement left). Note how useful this display can be for determining the impact adding such a unit to a combat will have on that combat's start round.

7.14. DISPLAYED BOMBARDMENT RANGE (DBR)

This feature will allow the "I" key, or Unit Visibility button in the Control Panel, to display the bombardment ranges of your support units. This command now toggles between showing no units, units but no DBR, the current unit's DBR, and all units DBR's. Only the DBR's for friendly units will be shown. On the main map, all non-air, ranged units should display the radius of their maximum range in one of three colors. In order of visibility, they are:

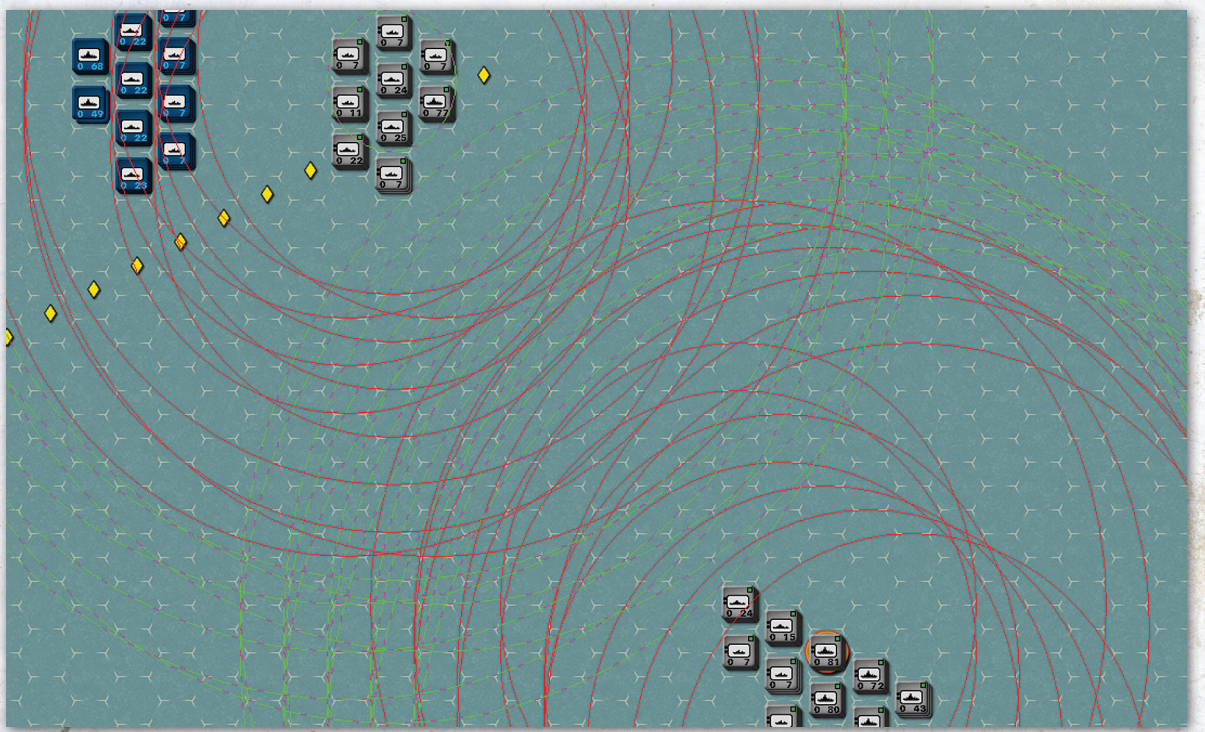
White = Unit currently selected.

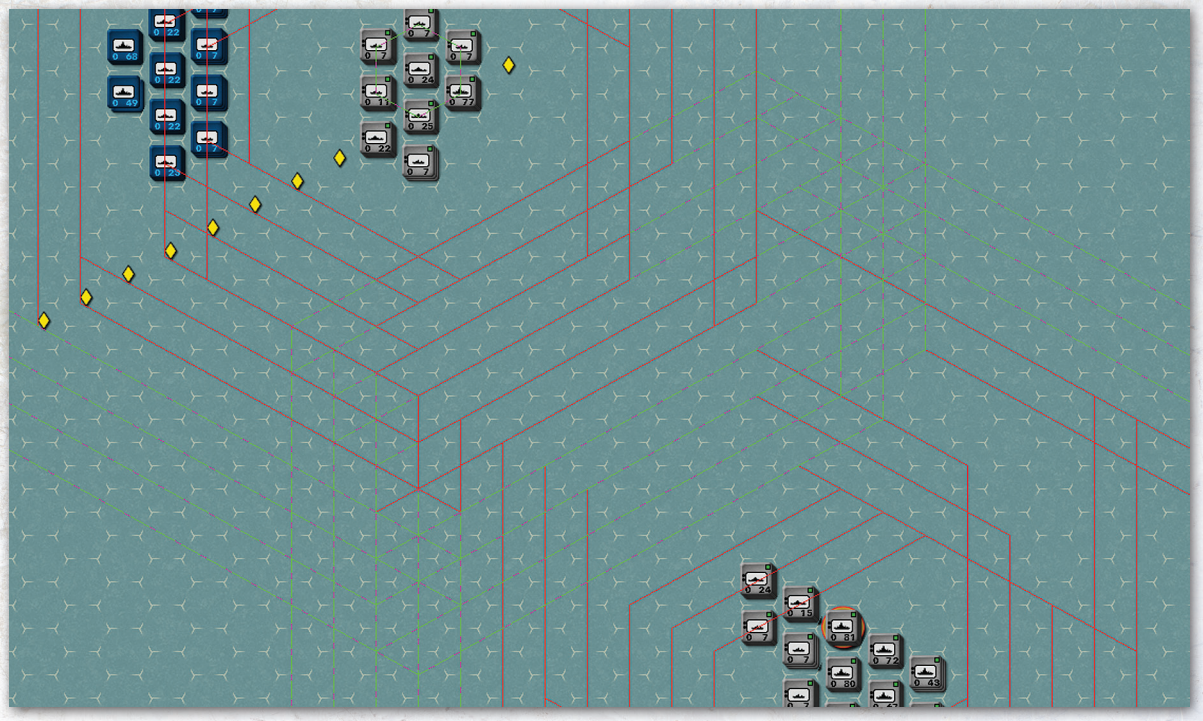
Black = A unit that is set to attack/bombard, or is in any support deployment mode (D, E, F, L, or T), or has no remaining Movement Points (MP's).

Red = A unit that has MP's remaining, is not set to attack, and is not in any support deployment mode.

The DBR of air units is shown on the micro map, along with the effective radii of AA units. These are both displayed in blue.

The above colors can be edited via the DBR Editor. (See section 3.4.4.2).





Note that there is an option on the DBR Editor to choose whether DBRs are circular or hexagonal.

8. PLAYING THE GAME

8.1. GAME DEFINITIONS

8.1.1. THE MAP

The Map Edge

The map edge includes all locations adjacent to either an off-map or non-playable location.

The Theater

This is everything contained in the entire playable map area. You have complete control in the Theater. In some Scenarios, events can occur outside of the Theater. These events can have significant impact in the Theater, and their potential effects may strongly influence your in-Theater decisions.

Non Playable Areas

Some maps are partially obscured by black areas; these areas are permanently non playable. Units using Air and Airborne Movement may move through Non Playable Areas, but they may not stop there. No other unit may enter a Non Playable Area. Air Strikes may be launched across Non Playable Areas. Supply cannot be traced across Non Playable Areas.

Exclusion Zones

In some Scenarios, part of the map may be partially obscured by an overlay of diagonal lines. These are Exclusion Zones, which are essentially non-playable areas. There may be as many as two Exclusion Zones in any given Scenario.

Friendly units within an Exclusion Zone may be examined. You can issue most kinds of orders to them and they are considered normally supplied. No unit may enter any location in an Exclusion Zone, although Air strikes may be launched into Excluded locations. Supply may not be traced through Exclusion Zones. Units in Exclusion Zones will not interfere with the movement of enemy units outside the Zone, and will not "patrol" outside of the Exclusion Zone. Units outside of Exclusion Zones will not patrol locations inside of Exclusion Zones. Guerrilla activity has no effect within an Exclusion Zone.

Unlike Non-Playable Areas, Exclusion Zones may be removed during the course of a Scenario.

Unit

A unit is the smallest organization of military force that can appear on a map. It is defined by the equipment (see below) assigned and authorized, its Proficiency, Readiness, Supply, Icon Colors, Icon Type, and Size symbol.

8.2. UNIT CHARACTERISTICS AND THEIR EFFECTS

8.2.1. UNIT STRENGTHS AND CAPABILITIES

A unit's Strengths and Capabilities are based on the equipment assigned, Proficiency, Readiness, and Supply Level. Various assigned equipment strengths are scaled and combined into generic Attack and Defense numbers for quick reference purposes. The quick reference numbers are a reasonably good indicator of a unit's expected performance, but they only tell part of the story.

If you examine a Full Unit Report (see 16.1), you will see the Strengths broken down by category:

- **Airmobile Transport** – This is the unit's ability to provide Airmobile Transport to Airmobile Units within 200 kilometers
- **Anti-Armor** – This is the unit's strength against enemy armored equipment. Anti-Armor strength is only used against enemy armored equipment.
- **Anti-Personnel** – This is the unit's strength against enemy non-armored equipment.
- **Anti-Air (high)** – This is the unit's strength against aircraft operating at high altitude. This generally applies to Medium and Heavy Bombers, or aircraft performing Interdiction Missions in the area.
- **Anti-Air (low)** – This is the unit's strength against aircraft operating at low altitude. This generally applies to smaller aircraft performing Bombardment or Combat Support Missions, or launching Interdiction Attacks against moving units.
- **Defense** – This is the unit's general ability to defend itself.
- **Reconnaissance** – This is the unit's chance to perform exceptional feats of reconnaissance. It also influences a unit's Strength at the beginning of an attack and its ability to move near enemy forces.
- **Engineering** – This is the unit's chance to rebuild bridges and aid other units in certain combat engineering tasks.
- Minor Ferry – This is the unit's ability to reduce movement penalties for itself or others entering River or Canal terrain in the unit's location.

- **Major Ferry** – This is the unit's ability to allow other units to enter "Super River" or "Suez Canal" terrain.
- **Rail Repair** – This is the unit's chance to rebuild damaged Rail Lines.
- **Artillery** – This is the unit's Bombardment Strength. It includes that portion of the Anti-Personnel Strength that the unit can use in Bombardment Missions or in Combat Support. Typically, only Headquarters, Naval, Air, and Artillery units will have a non-zero Artillery Strength, regardless of equipment assigned.

These Strengths are simply the sums of the total Strengths in each category for all equipment assigned to the unit, multiplied by the unit's Morale (see below), scaled to fit the game displays. The unit's actual internal Strengths, used for all game calculations but not displayed, are much larger numbers. At the low end (displayed unit strengths less than three), there can be quite a bit of real difference between units that show similar displayed Strengths.

Some units have anti-aircraft fire ranges of up to 50 kilometers against Air units participating in Combat Support or Bombardment Missions in the area.

8.2.2. UNIT EXPERIENCE AND PROFICIENCY

The Proficiency of a Veteran unit (one that has previously participated in a combat) is a known quantity. This is not true of Untried units (those with no combat experience). A unit's actual Proficiency is determined when it first participates in combat, and can vary by as much as 33% (relative) from the originally projected Proficiency.

If a Veteran unit receives large quantities of replacement equipment, there is a chance that the unit will lose its Veteran status.

Every time a unit engages in combat, there is a chance that its Proficiency will increase. Less proficient units will increase more rapidly than more proficient units.

8.2.3. UNIT READINESS

This represents the effects of wear and tear on equipment and troop fatigue. A fully-rested unit has a Readiness of 100%, and a completely exhausted unit has a Readiness of 33%.

8.2.4. UNIT MORALE

This is a weighted average of a unit's Proficiency, Supply Level, and Readiness. Regardless of actual Proficiency, Supply Level or Readiness, Morale can be no lower than 10% and no higher than 100%. This value is multiplied by the raw equipment Strengths to calculate the actual effective Strengths of the unit.

8.2.5. UNIT QUALITY

This is a weighted average of a unit's Proficiency and Readiness, expressed as a percentage. Regardless of actual Proficiency and Readiness, Unit Quality can be no lower than 10% and no higher than 100%. This is the chance that the unit will pass a Quality Check. Quality Checks are made at numerous points in the game to determine things like the unit's ability to sustain an attack or hold ground in the face of a strong enemy attack.

8.2.6. AIR UNIT COMBAT SUPPORT AND AIR SUPERIORITY REACTIONS (ADVANCED RULES)

In order to provide combat support or intercept enemy Air units, air units must pass both a Quality Check (see 9.1.10) and a Range Check. The chance of passing a Range Check decreases with range to target as a proportion of the unit's Combat Range.

8.2.7. UNIT WEIGHT

This is the sum of the weight of all assigned equipment, expressed in tons. This figure is used when determining whether the unit is eligible for transport by Aircraft, Helicopters, Ships, or Trains.

8.2.8. UNIT DEPLOYMENT ORDERS (ADVANCED RULES)

Units may be deployed in various ways within their location. This Deployment status reflects an internal optimization for specific roles or missions:

- **Defending** – The unit is deployed to defend the location. There are defensive and supply advantages for this deployment.
- **Entrenched** – This is an enhanced version of the Defending Deployment, with greater defensive advantages.
- **Fortified** – This is the strongest possible defensive deployment, with very great advantages.
- **Tactical Reserve** – The unit will attempt to react to enemy attacks into adjacent locations. Headquarters and artillery units assigned to Tactical Reserve will not react (but will still support). This makes this a good deployment for retaining both artillery mobility and supportability.
- **Local Reserve** – The unit will attempt to react to enemy attacks into locations within a movement radius defined by the unit's remaining Movement Allowance. Regardless of the radius, the reaction movement is only one hex per combat.
- **Mobile** – The unit is ready for movement. Artillery units in this Deployment will not provide long range supporting fire. This is also the Deployment status of a unit that moved in the previous Turn.
- **Moving** – This is the same as a Mobile deployment, except that the unit has already moved this Turn. Units automatically deploy to Moving Deployment if they move.
- **Attack** – The unit is scheduled to launch an attack later in the Turn. A unit enters Attack Deployment as soon as it is ordered to attack an enemy location.
- **Limited Attack** – The unit is scheduled to launch a limited attack later in the Turn. A unit enters Limited Attack Deployment as soon as it is ordered to conduct a Limited Attack on an enemy location.
- **Retreated** – This is similar to a Mobile Deployment, except that the unit has recently retreated.
- **Routed** – This is similar to a Mobile Deployment, except that the unit has recently routed. The unit may not move or attack.
- **Reorganizing** – The unit is attempting to recover from recent combat, and may not move or attack.
- **Embarked** – The unit is boarded on strategic transports – Trains, Ships, or Aircraft. When the unit disembarks, it will automatically redeploy to Moving status.
- **Interdiction Mission (Air & Helicopter units only)** – The unit will perform Interdiction Missions.
- **Air Superiority Mission (Air units only)** – The unit will perform Air Superiority Missions and will do Sea Reconnaissance.
- **Combat Support Mission (Air & Helicopter units only)** – The unit will support friendly ground units during attacks.
- **Rest Mission (Air & Helicopter units only)** – The unit will perform no Missions. This accelerates the unit's ability to recover Readiness.
- **Sea Interdiction Mission (Air & Helicopter units only)** – The unit will perform Sea Interdiction Missions and will do Sea Reconnaissance.

8.2.9. CHANGING DEPLOYMENT STATUS (ADVANCED RULES)

There are restrictions on your ability to change a unit's Deployment:

- A unit may only change to the Defending deployment from Tactical Reserve, Local Reserve, or Mobile Deployments.
- A unit may change from Retreated Deployment to Mobile Deployment, if it has sufficient Movement Points remaining to position itself for an Attack or Bombardment against an enemy unit. No such Attack needs to actually be executed, though; the unit may cancel the Attack order after its confirmation of attack eligibility.
- A unit may only change to Entrenched Deployment from the Mobile, Tactical Reserve, Local Reserve, or Defending Deployments. The unit must either pass a Quality Check or a Local Engineering Check (a measurement against the unit's Engineering Capability). Regardless of whether the unit passes either of these Checks, the unit expends its entire Movement Allowance in the effort.
- A unit may only change to Fortified Deployment from the Defending or Entrenched Deployments. The unit must either pass a Quality Check or a Local Engineering Check. Regardless of whether the unit passes either of these Checks, the unit expends its entire Movement Allowance in the effort.
- A unit may deploy to Mobile, Tactical Reserve, or Local Reserve Deployments from Defending, Entrenched, Fortified, Tactical Reserve, Local Reserve, or Mobile Deployments.

8.2.10. UNIT LOSS TOLERANCE ORDERS (ADVANCED RULES)

Unit combat actions depend on the unit's Orders Emphasis, which is a relative gauge of casualty tolerance:

- **Ignore Losses** – Units will attempt to either seize or defend locations in combat, regardless of losses.
- **Limit Losses** – Units take losses into consideration in combat; they will either break off attacks or retreat from a defense, if necessary, to preserve themselves.
- **Minimize Losses** – Units will make only the most superficial of efforts in combat. If the enemy is very weak, they will press their attack or defense. If the enemy is strong enough to inflict significant losses, the unit will break off or retreat.

8.2.11. DIVISION INTO SUB-UNITS (ADVANCED RULES)

Units may divide and recombine. This is done using the Divide / Recombine button in the Unit Report window (see 16.1), or from the popup menu you get by right clicking on the unit icon in the Map Panel. When you choose to divide a unit, it can be divided into either two or three subunits at your discretion. In order to recombine into the original unit, all sub-units must be present. If any subunit is lost, the unit may not recombine until the subunit reappears as a reinforcement.

Sub-units will have only about 80% of the parent unit's proficiency. If you recombine your units, the newly recombined parent unit will have 125% of the average sub-unit's proficiency. This means that the act of dividing a unit and recombining it will result in no permanent loss of the unit's Proficiency.

During the game, units are frequently subdivided

automatically due to adverse combat results.

Also, an Airborne unit might be sub-divided during an Airborne Landing operation. To determine if a unit has been subdivided, consult the Formation Report.

Air, Naval, Coastal Artillery, Fixed Artillery, Supply, and Headquarters units may not be divided.

Formations with a large number of divided units are more likely to be forced into Reorganization as a result of combat losses.

8.3. UNIT SPECIAL CAPABILITIES

Many units have special capabilities, based either on the equipment assigned or the Unit Icon symbol. The special capabilities of a unit (if any) are listed in the Special Abilities section of the Unit Report for that unit (see 16.1), as well as from the unit's 2D icon. See the Unit Type Symbol Key (see 16.1) for information on unit 2D icon symbols.

- **Air Units** – These units may only be based on airfields. Movement is a transfer from one airfield to another, while combat is normally handled as Bombardment or Combat Support and does not actually require movement.
- **Airborne Units** – These units are eligible for Air Transport and Airdrops.
- **Airmobile Units** – These units are eligible for Airmobile Movement.
- **Amphibious Units** – These units are capable of independent Amphibious Movement.
- **Artillery and Headquarters Units** – These units automatically support Cooperative friendly units within their Bombardment range. They are also better at disengaging from the enemy than most other units.
- **Attack Helicopter Units** – These units act much like Air units, except that they may be based in any friendly location.
- **Bicycle Units** – These units have enhanced movement capabilities along Roads.
- **Guerrilla Units** – These units have special Movement and Attack capabilities.
- **Headquarters Units** – These units aid in distribution of supplies to nearby Cooperative units. In some Scenarios, they also provide command functions.
- **Helicopter Transport Units** – These units can provide Airmobile Transport capacity for Airmobile units within 200 kilometers.
- **Mountain Units** – These units have enhanced movement and combat capabilities in hills, mountains, and across major or minor escarpments.
- **Naval Air Units** – These are Air units with the additional capability to be based on Aircraft Carriers.
- **Naval Units** – These units are only capable of movement through Anchorage or Deep Water locations.
- **Ski Units** – These units have enhanced movement capability in Snowy locations.
- **Special Forces** – These units have large Reconnaissance capabilities and a special capability to easily move near enemy units. They also have all of the capabilities of Airborne, Airmobile, and Mountain units.
- **Supply Units** – Increases the Supply Level in each supplied location that can trace a path no longer than the Supply Radius to the Supply unit. Additionally, Supply units multiply supply distribution to adjacent Cooperative units by 1.5. There is no effect on Unsupplied locations.

Units with various types of engineering equipment assigned can have an Engineering capability. Such units may be able to rebuild destroyed bridges, aid in Fortification efforts, or conduct Ferry operations (Land units crossing rivers). See Engineering (section 12) for details.

8.4. EQUIPMENT

This is the generic term for all of the useful weapons, transport vehicles, and other hardware that can be assigned to units. The equipment in the game is rated for a Weapon Range and Anti-Armor, Anti-Personnel, Anti-Air High, Anti-Air Low, and Defense strengths. Each piece can also have one or more of the following characteristics:

8.4.1. EQUIPMENT CHARACTERISTICS AND THEIR EFFECTS

8.4.1.1. MOVEMENT RELATED CHARACTERISTICS

A unit's Movement Allowance and cost to enter certain terrain types are both based on the movement characteristics of the equipment assigned to the unit.

- **Riverine Equipment:** This equipment uses the Riverine Movement rate (2400 kilometers per week), and can only move along Rivers and through Shallow Water and Flooded Marsh terrain.
- **Motor Equipment:** The equipment uses the Motorized Movement rate (560 kilometers per week).
- **Slow Motor Equipment:** The equipment uses the Slow Motorized Movement rate (350 kilometers per week).
- **Fast Motor Equipment:** The equipment uses the Fast Motorized Movement rate (660 kilometers per week).
- **Horse Equipment:** The equipment uses the Horse (with wagons and other transports) Movement Rate (340 kilometers per week).
- **Fast Horse Equipment:** The equipment uses the Fast Horse (Cavalry) Movement rate (400 kilometers per week).
- **Rail Move Equipment:** The equipment always moves by Rail Movement (4200 kilometers per week). It does this without using Rail Transport capacity, and can only move by rail.
- **Slow Equipment:** The equipment uses the Foot Movement rate (280 kilometers per week).
- **Static Equipment:** The equipment cannot move without transport.
- **Fixed Equipment:** The equipment cannot move.
- **Helicopter Movement:** The equipment moves at the helicopter rate.
- **Agile:** The equipment has a horsepower to weight ratio greater than 20 horsepower per ton. This equipment is capable of moving off-road and is slightly more difficult to hit on the battlefield.
- **Roadbound:** The equipment moves poorly off of Roads.
- **Amphibious Equipment:** The equipment has an intrinsic Amphibious Movement capability.

8.4.1.2. COMBAT RELATED CHARACTERISTICS

Targeting

- **Targeting+:** The equipment has enhanced targeting capabilities. See the Appendix (19.0) for details.
- **Targeting++:** The equipment has enhanced targeting capabilities. See the Appendix (19.0) for details.
- **Targeting+++:** The equipment has enhanced targeting capabilities. See the Appendix (19.0) for details.
- **Targeting++++:** The equipment has enhanced targeting capabilities. See the Appendix (19.0) for details.
- **All Weather Equipment:** The equipment has a Night / All Weather capability. This is primarily used by aircraft. Naval equipment assigned this

ability function as if they are equipped with radar for naval spotting purposes.

- **High Altitude AA Equipment:** The equipment has an Anti-Aircraft capability designed primarily for use against high-altitude aircraft.
- **High/Low Altitude AA Equipment:** The equipment has an Anti-Aircraft capability designed for use against both high-altitude and low-altitude aircraft.
- **Long Range Equipment:** The equipment has a Ranged fire capability.
- **Extended Bombardment Range:** The equipment can fire to 1.5 times its normal Bombardment Range, at half strength.
- **Shock Cavalry:** The equipment is shock cavalry.
- **Standoff Weapons:** The equipment fights at a distance.
- **Infantry:** The equipment is infantry.
- **Torpedo Bomber:** The equipment is a torpedo bomber – very effective against naval targets.
- **Dual Purpose Missiles:** The equipment is a missile that can be used against land or sea targets.
- **Poor Geometry:** The equipment is very boxy – slope ratings are reduced significantly.
- **Fair Geometry:** The equipment is somewhat boxy – slope ratings are somewhat reduced.

Exotic Armor

These types of armor provide improved resistance to HEAT anti-armor weapons.

- **Composite Armor:** The equipment has Composite Armor.
- **Laminate Armor:** The equipment has Laminate Armor (for example, Chobham armor).
- **Reactive Armor:** The equipment has Reactive Armor.

Defensive Capabilities

- **Armor Equipment:** The equipment is armored.
- **Active Defender Equipment:** The equipment actively contributes to a location's defense and is directly exposed to enemy action during any combat.
- **NBC (Nuclear, Biological, and Chemical) Equipment:** The equipment is resistant to Nuclear and Chemical attacks.

Anti-Armor

- **Kinetic Weapons:** The equipment is considered to be using kinetic weapons in Anti-Armor combat.
- **HEAT Weapons:** The equipment is considered to be using some variation of High Explosive Anti-Tank (HEAT) weapons in anti-armor combat. HEAT weapons have relatively poor performance against some kinds of armor.

Special Weapons

- **Anti-Shipping Equipment:** The equipment has a strong anti-shipping capability.
- **Anti-Shipping Only Equipment:** The equipment can only be used against naval or embarked targets (coastal guns).
- **Precision Guided Weapons:** The equipment's Attack strengths increase if the owning force has Precision Guided Weapons. Systems that always use Precision Guided Weapons do not have this characteristic.
- **Smoke:** The equipment fires only smoke.
- **Atomic Armed Equipment:** The equipment can make Atomic attacks if Atomic Weapons are available.

Transport Related Characteristics

- **Transport Equipment:** The equipment can transport other equipment.

- **Light Transport Helicopter:** The equipment can provide one ton of Airmobile transport.
- **Medium Transport Helicopter:** The equipment can provide three tons of Airmobile transport.
- **Heavy Transport Helicopter:** The equipment can provide eight tons of Airmobile transport.
- **Lightweight:** The equipment does not add to the weight of a unit.
- **Airborne:** The equipment can be transported by air.

Aircraft

- **Naval Air Equipment:** The equipment is a Naval Aircraft.
- **High Air Equipment:** The equipment is an aircraft that attacks at high altitude.
- **Low Air Equipment:** The equipment is an aircraft that attacks at low altitude.
- **In-Flight-Refueling Equipment:** The equipment is an aircraft that can extend its range via in-flight-refueling.

Ships

- **Heavy Naval Equipment:** The equipment is a heavy naval vessel.
- **Medium Naval Equipment:** The equipment is a medium naval vessel.
- **Light Naval Equipment:** The equipment is a light naval vessel.
- **Carrier Naval Equipment:** The equipment can base naval aircraft units.

Engineering

- **Engineer Equipment:** The equipment has an Engineering capability.
- **Major Ferry Equipment:** The equipment can enter Super River or Suez Canal locations and can assist other units in entering this terrain.
- **Rail Repair Equipment:** The equipment can repair damaged Rails.

Special Capabilities

- **Recon Equipment:** The equipment has a Reconnaissance capability.
- **Support:** The equipment provides Supply functions for a Formation.
- **Command:** The equipment provides Command functions for a Formation.
- **Police:** The equipment reduces traffic congestion penalties at its location.

Most unit Strengths and Capabilities are based on the total Strengths and Capabilities of all equipment assigned to the unit.

8.4.2. AUTHORIZED EQUIPMENT

A military unit is essentially an organization of troops and equipment. Real-world military units usually have an "official" Table of Organization and Equipment (TO&E). This is the equipment that the unit is authorized to control. In most cases, real units do not exactly match their authorized strength. If the assigned strength is less than the authorized strength, the unit is considered "under strength" and will be eligible for replacements.

8.4.3. ASSIGNED EQUIPMENT

The equipment actually under the control of a unit at any given time is considered "assigned". Generally, but not always, the amount of equipment assigned to a unit is less than the amount authorized. The Strengths and Capabilities of a unit are largely determined by the equipment actually assigned.

8.5. FORCE

A Force is a complete list of all units and Formations assigned to one player's side in a Scenario. It also

includes a number of characteristics that affect just about everything you do with units of that Force. These characteristics are transparent; in other words, they show up in your unit Strengths, etc., but you don't need to know about them. Scenario designers set them to achieve specific historical effects.

8.5.1. FORCE CHARACTERISTICS AND THEIR EFFECTS

These values reflect various Force-wide capabilities. Some are only directly visible in the Editor, but all have strong effects on your Force's ability to fight.

Force Supply Stockpile
(1-100%) – This represents Supply stockpiles available to the entire Force. See Force Supply Stockpile (16.13.1) for more information.

Force Proficiency
(1-100%) – This represents the overall Proficiency of the Force. This characteristic is used to determine the length of your Turn. Reconstituted unit Proficiencies are averaged with this value.
Force Air Refueling Range Multiplier
This value can range from one to ten. Aircraft with inflight refueling capability will have their ranges multiplied by this amount. Any Extended Ranges are shown in the game, but the characteristic itself is only visible in the Editor or the Expanded Situation Report.

(0-100%) Force NBC Proficiency
Losses to chemical and atomic attacks are reduced if this value is greater than zero. At the maximum level of 100%, losses for all equipment are reduced as though they had an inherent NBC defense capability (see 8.4, Equipment). This characteristic is only directly visible in the Editor or the Expanded Situation Report.

(1-100%) Force Night Combat Proficiency
Unit Proficiencies are averaged with this value when determining Anti-Armor, Anti-Personnel, and Defense Strengths at night. This characteristic is only visible in the Editor or the Expanded Situation Report.

(1-100%) Force Electronic Support Level
This represents the general electronic capability of the force: Radar, Electronic Countermeasures, Signal Intelligence, etc. This characteristic is only visible in the Editor or the Expanded Situation Report.

Electronic Support Checks
An electronic support check passes if a random number from zero to the friendly Force Electronic Support Level is higher than a random number from zero to the enemy Force Electronic Support Level. Default value of 33% is treated as a value of zero for this purpose. Only if the values are changed from the default level does the above take place. (The feature was non-functional for years. Once fixed, this qualification had to be made to avoid breaking existing scenarios).

Electronic Support Effects
Locations with HQ units, Air units, and units that move or fire are "noticed" at the beginning of the following Turn if the enemy player makes an Electronic Support Check for the location.

Combats involving large numbers of units are affected by relative Electronic Support levels.

Artillery, HQ, and Air units can only support combats if they pass a Communication Check. Attacks with a large fraction of units failing Communication Checks will take longer to resolve.

Individual units and entire Formations may be unavailable for orders (reorganizing) at the

beginning of a Turn due to enemy Electronic Warfare. Individual units may be unavailable if they fail Communication Checks, and Formations are more likely to be unavailable if a significant proportion of attached units fail Communication Checks.

Communications Checks
The chance for a unit to pass a Communication Check is equal to the Force Communication Level. It increases if the friendly Electronic Support Level is higher than the enemy Electronic Support Level, and decreases if the friendly Electronic Support Level is lower than the Enemy Electronic Support Level. Unless the enemy Force has a much higher Electronic Support Level, or the Force has a very low Communication Level, a unit can usually pass a Communication Check. Units that have not moved this Turn have a higher chance of passing a Communication Check.

Long range Anti-Aircraft units must pass a Communication Check to fire on aircraft at ranges of 1 hex or more.

Force Communications Level
(25-100%) – This value is checked against a random number from 0 to 100 whenever:

- Unit and Formation statuses are determined,
- SAM units fire at long range, and/or
- Anti-Aircraft support or Artillery fires in support of Attacks and Defenses.

Failure prevents the unit from participating in combat or increases the chance that the unit or its parent Formation will be reorganizing at the beginning of a Turn. The default value is 100%. The 100% value should be retained for most World War II and later Scenarios. During the World War I period, a value of 75% is recommended for Scenarios. Prior to 1900, values of 50% or lower are appropriate. This characteristic is only visible in the Editor or the Expanded Situation Report.

Force Precision Guided Weapons Level
(1-999%) – Systems with precision guided weapons capabilities (set in the equipment list – mostly aircraft) have their Anti-Air, Anti-Armor, and Bombardment Strengths multiplied by the following:

100% + Force Guided Weapons Level %

If you set this value to the maximum value of 999%, these systems will have their strengths multiplied by almost 11 times. This characteristic is visible only in the Editor or the Expanded Situation Report.

Force Loss Intolerance
(10-999%) – This value is used only for Victory determination and does not affect the performance of your Force in any way. It is a direct multiplier to the Victory Point penalty you play for losses. This characteristic is only visible in the Editor or the Expanded Situation Report.

Force Pestilence
(0-50%) – This value sets a percentage of equipment lost to disease by every unit in the Force on every Turn. Infantry, Horse Transport, and Cavalry equipment is lost at this rate, while all other types of equipment are lost at half this rate. Within each individual location, the losses are multiplied by:

- Frozen, Not Snowy: 1.1
- Frozen, Snowy: 1.25
- Hot, not Mud or Marsh: 1.1
- Hot, Mud, or Marsh: 1.25
- Unsupplied: 1.25
- Seaborne Land Unit: 1.25

These multipliers are cumulative. The worst cases are Unsupplied Frozen, Snowy, or Unsupplied Hot Muddy locations, which would make the

multiplier 1.5625. If the overall Force Pestilence value were set at 3%, losses in the worst-case situations would actually be 4.69% for Infantry, Cavalry, and Horse Transport equipment, and 2.34% for all other types of equipment. Half of Infantry, Cavalry, and Horse Transport equipment lost by units in Supplied locations are sent to the Replacement Pool. All non-Infantry, non-Cavalry, non-Horse Transport equipment lost by units in Supplied locations is sent to the Replacement Pool as well. All other Pestilence losses are permanent. This value should rarely be set above 5%, and in most cases should be lower. The default is 0%. This value may be set from the OOB Editor (Edit > Modify Current Force menu), or by use of the Force Pestilence (Pestilence 1 or Pestilence 2) Event effects.

Force Movement Bias
(14-455%) – This is a multiplier for Movement Rates for all units of the Force.

Force ZOC Cost
(0-1000%) – Default of 100 applies the normal 25% cost. A value of 50 halves the cost. A value of 200 doubles it, etc. This does not affect chances of triggering disengagement attacks. This is the cost of moving away from an adjacent unfriendly unit.

Force Overextended Supply Threshold
(0-100) – A default value of 0 will not use the Overextended feature. This is the location supply level below which a location is overextended instead of supplied.

Force Naval Critical Hit Scalar
(0-100) – A default value of 10 will make critical hits occur about 5% of the times that a ship's armor is penetrated.

Force RFC Scalar
(0-100) – A default value of 10 can be lowered (making Retreat From Combats (Overruns) harder to obtain), or increased (to make them easier to obtain).

8.5.2. FORCE / DEPLOYMENT EDITOR SETTINGS THAT AFFECT BOTH PLAYERS

(1-1000) The Attrition Divider
It is possible to set the Attrition Divider value for a Scenario by using the Edit > Set Attrition Divider item in the Force and Deployment Editor menus.

This value directly affects the lethality of most combat. Within the combat code, the effective losses for any item of equipment are divided by this number before being applied to the unit. The default value is 10. Minimum is 1 and maximum is 100. The effect of setting this value is:

Divider	Losses
1	10x
2	5x
5	2x
10	1x (default)
20	0.5x
50	0.2x
100	0.1x

Other values' effects are between those listed.

Scenario designers who change this from the default should indicate the value used in their Scenario Briefing.

(1-99) Max Rounds Per Battle
It is possible to set Max Rounds Per Battle (MRPB) value for a Scenario by using the Edit > Set Max Rounds Per Battle item in the Force and Deployment Editor menus.

This value sets the maximum number of rounds that the attacking forces will execute, for all battles, in each series of combats. The default value is 99. The minimum value is 1 and the maximum is 99.

This value can have a wide variety of different effects, particularly when coupled with Shock events. Low MRPB values can minimize "Turn burn," but at the cost of attacks not having enough tactical rounds to retreat defenders. Low MRPB values can also yield better results from using Tactical and Local Reserve Deployments. You can more safely use progressively higher Loss Tolerance settings for Attacks, with low MRPB values, since the number of tactical rounds that stubborn units continue attacks and defenses will be attenuated.

While some Scenarios will benefit from very low MRPB values, it is generally not recommended to set it lower than 3, as this also attenuates the number of rounds that Artillery, Naval, and Air units will bombard for, at their higher Loss Tolerance settings, and may also adversely affect the net bonuses that positive shock values have in reducing the number of tactical rounds expended during combat. It is recommended that Scenario designers using Shock events generally set this value to be no less than the following:

(Highest Value Shock – 70) / 10

Your mileage may vary; playtest for overall effect throughout the campaign.

Another effect to keep in mind when setting this value is that the chance for ending the Turn by a "Proficiency Check" is not affected. Thus, while players may realize more sets of Attacks throughout their Turn, with low MRPB values, they will conversely be more likely to have the Turn ended (eventually) by a failed Proficiency Check, since one is made at the end of each series of Attacks. See Turn Over (14.1) for details.

Scenario designers who change this from the default should indicate the value used in their Scenario Briefing.

AAA Lethality Level.
(0-999) – Default is 100, which leaves the lethality as it is now. For example, a value of 50 would halve AAA lethality, while a value of 200 would double it. A value of 0 would eliminate all AAA lethality.

Engineering Build Rates.
(0-999) – Default is 100, where 100 engineer squads have the engineering of 100 squads now. A value of 50 would mean that 100 engineer squads would have the engineering of 50 squads now, and a value of 200 would mean that 100 engineer squads would have the engineering of 200 squads now, etc. A value of 0 would eliminate engineering effects. Note that this also scales Rail Repair rates and Major/Minor Fording rates.

Enemy-Hex Conversion-Costs.
(0-999) – Default is 100, where each enemy hex converted costs the moving friendly unit the original 10% of its movement allowance (reducible by high recon levels, though). A value of 50 would mean each hex costs 5% of the unit's movement allowance (same effect of recon as above), and a value of 200 would mean that each hex converted would cost 20% of the unit's movement allowance. A value of 0 would mean that there wouldn't be any cost of hex conversion, no matter what the unit's movement allowance or recon level was. Actual cost to the unit is still rounded down. And there is still a minimum cost of one, with the single exception for the setting of 0.

Entrenchment Rates.
(0-999) – Default is 100, under which units dig in at the same rate as now. A value of 50 halves the rate, and a value of 200 doubles the rate, etc. A value of 0 prevents any digging in at all, and (under that special case) digging in attempts don't zero remaining MPs.

Density Combat Penalty Rates.
(0-999) – (Density movement penalties due to traffic jams are not affected.). Default is 100, which leaves density penalties as they are now. A value of 50 would halve density penalties, a value of 200 would double them, and a value of 0 would eliminate them all together.

Supply Costs of Movement Rate.
(0-999) – Default is 100, which works like now. A value of 50 would halve supply costs of movement (half a point for each MP expended, etc.). A value of 200 would double costs (2 points for each MP expended, etc.). A value of 0 would mean there was no cost for movement (like naval movement). Fractional values are effected via random functions.

Readiness Costs of Movement Rate.
(0-999) – Default is 100, which works like now. A value of 50 would halve readiness costs of movement (half a point for each hex entered, etc.). A value of 200 would double costs (2 points for each hex entered, etc.). A value of 0 would mean there was no cost for movement (like naval movement). Fractional values are effected via random functions.
Divisor of Improved-Road Motorized-Movement
(1-10) – A default value of 1 will leave things like in TOAW version 3.4 and before. A setting of 2 will make movement on improved roads by motorized units cost ½ movement point. A setting of 3 will make movement on improved roads by motorized units cost 1/3 movement point, etc. Maximum value is 10.

Naval Attrition Divider
(1-1000) – This is the same as the normal Attrition Divider, but applies to naval combat only. The normal Attrition Divider does not affect naval combat. A setting of 10 is neutral. A setting of 5 doubles shots. A setting of 20 halves shots, etc. Note that it also scales naval combat supply costs.

8.6. FORMATION

A Formation is an organization of units with a common Headquarters. Units belonging to the same Formation are shown on the map by a steel-colored highlight ring around the appropriate units. See Formation Reports (16.2) for more information.

8.6.1. FORMATION CHARACTERISTICS AND EFFECTS

Formation Support Scope Effects (Advanced Rules)
There are limits on the cooperation possible between units in your Force. In most cases, your units will only work well with others belonging to the same Formation, but there are special cases where some cooperation with units of other Formations is possible, as follows.

Formation Support Scope

- **Internal Support:** Units assigned to the Formation may only freely cooperate with others in the same Formation. Limited cooperation is possible with units using the same icon color scheme; no cooperation is possible with units using a different icon color scheme.
- **Army Support:** Units assigned to the Formation may only freely cooperate with others in the same Formation, or those using the same icon color scheme (icon and symbol color). Limited cooperation is possible with units using the same icon background color; no cooperation is possible with units using a different basic icon color.

- **Force Support:** Units assigned to the Formation may only freely cooperate with others in the same Formation or others using the same basic icon color. Limited cooperation is capable with all other units.
- **Free Support:** Units assigned to the Formation may freely cooperate with any other units.

Unit Cooperation

- **Free Cooperation:** Units will coordinate Attacks and Defenses. Reserve and combat support units will attempt to respond to all Attacks within range. Nearby Headquarters units will increase the likelihood of Resupply. This is shown with a gold-colored Flag icon in the Combat Planning window.
- **Limited Cooperation:** Units will coordinate Attacks and Defenses, but with penalties. Reserve units will respond to all Attacks within range. Combat Support units will not respond to Attacks. This is shown with a steel-colored Flag icon in the Combat Planning window. This scales combat strengths by 83%.
- **No Cooperation:** Units will not coordinate Attacks. Defense is coordinated, but with penalties. Reserve and Combat Support units will not respond to Attacks. This is shown with a black Flag icon in the Combat Planning window. This scales combat strengths by 67%.

The scaling due to Limited or No Cooperation applies to both attackers and defenders. The scaling is applied to the entire attack or defense regardless of how few or how inconsequential the uncooperative units in the combat are, or whether they are ground-assaulters or ranged-supporters. Note that players can determine the cooperation level of an attack by viewing the Attack Planner Flags. But the Attack Planner does not show the reduced combat strengths – players have to figure that themselves.

Cooperative Units

Any units capable of free cooperation are considered cooperative. All other units are considered non-cooperative. Non-cooperative Support units will not automatically support Attacks or Defenses. Movement penalties may apply when moving units through locations occupied by non-cooperative units. Supply may be more difficult in locations containing non-cooperative units. The proximity of cooperative Headquarters units can make it easier for units to receive Supplies.

See the Support & Cooperation Levels Chart (18.9.2) for a matrix comparing the assigned Formation Support type and allowed Cooperation Levels.

The Current Unit

At any given time, the information for one unit is displayed in the Unit Panel. This is the current unit. Any unit-related changes (a new icon, equipment assignments, etc.) apply only to this unit.

The Current Force

At any given time, only one Force (of the two possible) is displayed. Any selections you make will affect only this Force.

The Current Formation

At any given time, only one Formation can be displayed. Any changes you make will affect only this Formation.

Order of Battle

This is a complete list of all units and Formations comprising both forces in a Scenario.

Local Force Limits ("Grouping")

Up to nine units of all types may occupy any particular location. In most cases, it is best to limit the number

of units in a location to a smaller number. The precise limit depends upon the equipment assigned to the units involved, but a good rule of thumb might be to limit stacking to no more than three units of each type (Land/Sea/Air) per location.

Orders Scope (Advanced Rules)
When you give orders to your Forces, the effects can apply to either a single unit, a group of units in a single location, or all units that can possibly participate in a given action:

- Single Unit Orders Scope: Your orders apply only to the current unit.
- Single Group Orders Scope: Your orders apply to all units occupying the current unit's location.
- All Units Orders Scope: Your orders apply to all units that can participate in a particular action – typically an attack on an enemy position. Note that this will add units regardless of their Formation, and may trigger non-cooperative unit penalties.

9. WHAT HAPPENS DURING A GAME TURN

Each game is divided into a number of Turns, so things happen in a specific order during each Turn. First, the game performs automatic bookkeeping, then you and your opponent issue your orders, and the program determines the results. When both players' orders have been resolved, the Turn ends.

9.0.1 PBEM PLAYBACK

If you start a PBEM++ turn, you will be shown the PBEM Playback screen. This will give you the opportunity to view the moves and battles that your opponent made during his previous player-turn.

The Info Panel will show the number of moves contained in the playback. There are five buttons on the Control Panel: Rewind, Stop, Step, Play, and Exit. The Step button advances one move if left-clicked. If right-clicked it will backup one step. Once the Exit button is selected the game will exit the playback and begin the Automatic Bookkeeping phase. Once that starts, you will not have another opportunity to view the playback – without reloading the turn (which can trigger an indication that you reloaded the turn.) Furthermore, a bell will ring during your playback when your opponent used the "undo" button.

Note: The system monitors how many times you've reloaded without saving. You can always reload a file you've saved since the last time you opened it without generating such a message.

9.0.2 PLAYER-TURN EQUALIZATION (AKA "NEW TURN ORDER RULES") (OPTIONAL)

There is now an Advanced Rules Option to use equalized player-turns. The old pre-turn calculation method used to do all the calculations for supply, recovery, and other items at the start of the first player turn. This was a bit unfair (usually to the second player). The new turn order splits that processing into three parts. Air-Combat, Events, and Weather effects still happen at the beginning of the game turn. But everything else now happens at the beginning of each respective player-turn instead. Clouds even move between player-turns – just without weather effects.

Note that equalization will mean that enemy units cut off from communications in the friendly player-turn will be unsupplied in the immediately following enemy player-turn regardless of side (previously an unfair advantage for side-two). Also, note that movement recovery is done twice for each side (start of each player-turn). This will clear the "Retreated" condition for both sides during their own player-turn (previously an unfair advantage for side-one). It may even make use of reserve deployments more palatable to players.

Furthermore, neither side is assumed to have 100% visibility into their own territories during the enemy movement phase (previously an unfair advantage for side-two). Rather, detection of enemy moves into friendly territory will now depend upon the friendly Theater Recon Level or friendly units. Therefore, enemy units will now be better able to slip around either player without notice.

9.1. AUTOMATIC BOOK KEEPING

- An End of Scenario check is made and the calendar is adjusted.
- Out of Theater events occur (including unit withdrawals).
- Weather is determined.
- Theater Air Superiority and Interdiction strengths are determined.

Under New Turn Order Rules, the following steps are split so that each side does them at the start of their respective player-turns:

- Intelligence is gathered.
- Units and Security Forces conduct local patrols.
- Your forces are resupplied, receive replacements, and prepare for the new Turn.
- Reinforcements appear.
- Unit Command and Control levels are set.

9.1.1. END OF SCENARIO CHECK

There are two ways for a Scenario to end automatically (at the discretion of the program):

- A Scenario will end when it reaches its nominal final Turn. This nominal final Turn can change during a Scenario, so keep an eye on it to avoid surprises.
- A Scenario will end if there are no Land units of one Force on the map.

9.1.2. OUT OF THEATER EVENTS

Some Scenarios are heavily influenced by Out of Theater Events. These Events may be triggered by your actions in the Theater. The most significant potential Events should be detailed in the Scenario Description. Military decisions can have political consequences; if an opportunity in the game looks too good to be true, check the Scenario Description to make sure you won't bring the sky crashing down around your ears by taking advantage of it.

The variety of potential Events is too great to be fully described here. If you are curious about the kinds of things Scenario designers might throw at you, check out the Event Editor (17.9).

9.1.3. CLIMATE AND WEATHER (ADVANCED RULES)

Weather is determined on a location-by-location basis, from Turn to Turn. Mountains are cooler. Locations adjacent to Shallow or Deep Water are moderate. Cold and Warm weather fronts may move across the Theater. Rain or Snow may result in some locations becoming Snowy or Muddy, with significant effects on Movement.

While any location with sub-freezing temperatures is labeled as Very Cold, there are actually three different levels of sub-freezing temperatures. The average temperature of any Weather Zone is listed in the Weather Briefing. Water features (Rivers, Canals, Shallow Water, etc.) in Very Cold locations may or may not be Frozen. Rivers and Canals freeze at the Frozen 2 Level. Super Rivers and Shallow Water freeze at the Frozen 3 Level.

Weather Effects on Bicycle and Ski Units

Bicycle and Ski unit icons are displayed only if local conditions are appropriate. Ski units are displayed as Infantry when in non-Snowy locations. Bicycle units are displayed using Infantry icons when in Very Cold locations.

Weather Effects on Chemical Weapons

Chemicals are most lethal in Cool or Moderate temperatures, with no Rain, and with Overcast conditions. They are least effective in Hot temperatures and Heavy Rain or bright sunlight. High temperatures, wind, and sunlight degrade chemical agents. Rain washes them away and impedes distribution. Chemicals can increase Readiness losses in combat for both sides. They are most tiring (3x) at higher temperatures, and have little Readiness effect at low temperatures. (Actually, it's not the chemicals. It's the damned protective suits that do the damage. You have to wear one of these things to believe how uncomfortable they are.)

Weather Effects on Nuclear Weapons

Nukes are most lethal in Hot temperatures, with no Rain, and Fair conditions. They are least effective in Cold temperatures, Heavy Rain, and Overcast conditions. This is due to a combination of exposure and atmospheric transparency.

9.1.4. AIR SUPERIORITY AND INTERDICTION

All of your air units perform Missions based on their Deployment status. See Unit Deployment Orders (8.2.8) for more information.

Air Superiority
Units assigned Air Superiority Missions attempt to destroy enemy aircraft flying Missions and to protect friendly aircraft and locations. They will engage your opponent's Air units only if those enemy Air units attempt to fly Missions. All Missions performed by Air units are affected by the local Air Superiority Strengths of each Force.

Local Air Superiority
Air units with Air Superiority Missions may or may not participate in any particular local Air Superiority combat. The chance that a unit will participate is based on the range to the unit's base, its Force Electronic Support Level, and the unit's Quality. High Quality units and those nearby are more likely to participate than lower Quality units further from the location. A Force's Local Air Superiority Strength is the sum of Anti-Air Strengths of all participating friendly Air units with Air Superiority Missions.

Even if no other Missions are flown, opposing units with Air Superiority Missions may fight at the beginning of each Turn when the game sparks a number of Air Superiority battles at random locations on the map.

Theater Air Superiority
The program keeps track of Air Superiority units and calculates a Theater Air Superiority Level for each Force. Theater Air Superiority is a general indicator of Air Superiority in the theater. It is presented solely for your information, and isn't used by the game.

Interdiction
Units assigned Interdiction Missions will attempt to intercept enemy Land units when those Land units move and also impair your opponent's ability to supply his Force. Units performing Interdiction Missions are subject to Interdiction by enemy Air units with Air Superiority missions and are protected by friendly units with Air Superiority missions.

Interdiction is less effective in poor weather and on night Turns.

9.1.4.1. SEA INTERDICTION

Naval and embarked units moving in deep water hexes are now subject to interdiction attacks as follows:

- Air units that have an Anti-Naval strength can be set to a new deployment mode: "Sea Interdiction". Such units will perform interdiction of detected moving naval and embarked units, just as air units set to "Interdiction" interdict detected moving land units. Such units have the "T" deployment mode letter on them. They do not interdict land unit movement, and have no impact on enemy Force Supply Levels. Only all-weather air units conduct sea interdict at night.
- Surface ships and coastal guns also perform "Sea Interdiction" within their respective gunnery ranges. This is automatic, and no deployment setting is necessary.
- Ship units and embarked units moving by "Group Movement" defend as a group if interdicted by the above. Group Movement thus forms a "de facto" Task Force.
- Ship units interdicted or bombarded by other ships or coastal guns will fire counterbattery back at them, if in range.
- Carrier ship units interdicted or bombarded by aircraft from enemy carriers will launch counterstrikes against them, if in range and the attacking carriers have been detected.
- Moving groups that are interdicted stop their movement to allow plan changes.

- Planes performing Sea Interdiction are, of course, provided air cover by friendly in-range planes set to Air Superiority.

9.1.5. INTELLIGENCE GATHERING (ADVANCED RULES)

You will never have complete information on the location of enemy Forces during a game. The amount of information you do have is based on the type and location of your Reconnaissance assets and local environmental conditions.

Levels of Information

Your knowledge of any particular map location may be:

- **Unknown** – You have no information regarding the presence of enemy units.
- **Observed** – You know whether or not enemy units are present, but their identity and strengths are not evaluated.
- **Spotted** – You know of any enemy units that are present, as well as their identity and strengths.

Reconnaissance Assets

- **Units** – All of your units have the ability to detect, and in some cases evaluate, the strengths of enemy units in nearby locations.
- **Internal Security** – All of the terrain you own is considered either Observed or Spotted. Areas near dense Urban locations are more likely to be Spotted.
- **Theater Reconnaissance** – This represents everything from spies on the ground to Reconnaissance aircraft. The quality of Theater Reconnaissance depends heavily on environmental conditions. Theater Reconnaissance is capable of observing locations, but cannot spot them.

Intelligence Updates

Intelligence information is updated at the beginning of every Turn. Each of your units gathers information on nearby locations. Then your Internal Security assets gather information your rear areas and your Theater Reconnaissance assets gather information on enemy-held areas.

Generally, units and Internal Security assets can only observe adjacent locations. If, however, the unit or Internal Security asset is observing from a location with a mountain peak, observation visibility can be as far as 40 kilometers. This mountain view advantage deteriorates with decreasing visibility and during night turns. Note that the mountain peak reconnaissance is received dynamically: If the peak is entered during a player-turn, the reconnaissance occurs immediately. You don't have to wait for the inter-turn calculations.

Likewise, if an adjacent location is viewed through an escarpment, the location is more likely to be spotted by units "looking down" and less likely to be spotted by units "looking up". Note that the hex that *contains* the escarpment hexside is on the high side of it. The hex on the other side of it is on the low side.

Theater Reconnaissance is more likely to observe locations with Roads, Anchorage locations, Airbases, or large concentrations of Motorized equipment. Airfields with Air units will almost certainly be observed. Theater Reconnaissance is less likely to observe locations with Hills, Badlands, Mountains, Dense Urban, Light Woods, Jungle, or Forest terrain, as well as locations with hazy or (especially) overcast visibility conditions. Theater Reconnaissance is also less effective during night Turns.

Previously spotted locations will remain spotted as long as they remain under observation by any of your Reconnaissance assets. Previously observed locations may become spotted if they remain under

observation. Locations no longer under observation become unknown.

The level of Intelligence Information available for any particular location is displayed with the location description in the Information Panel.

9.1.5.1. SEA SPOTTING

In addition to normal recon methods, ships at sea are revealed by spotters on ships or the coastline, and scout planes as follows:

- Surface spotting is done by any naval unit (not embarked unit) at sea and any land unit on a coastal hex. It extends 25 kms out on a day turn and 10 kms out on a night turn. However, naval equipment with the "All Weather" flag set sees 50km, day or night (modeling radar). And if a force has any aircraft with the "All Weather" flag set, then all naval vessels are assumed to have radar and see 50km, day or night.
- Carrier planes and land-based planes set to "Sea Interdiction" or "Air Superiority" Sea-Spot out to a range limited by their max ranges and the number of effective planes available. This is not done during night turns, except by all-weather aircraft.
- Spotting is dynamically updated as such units move – like a land unit entering a Peak hex. The exceptions are the land-based planes set to "Sea Interdiction" or "Air Superiority" – they only spot during the interturn periods.
- Clouds over the surface spotter block its spotting.
- Sea Spotting does not spot units on land in any fashion.
- Ship/embarked units skirting the coastline no longer reveal units along that coast. (Of course, coastal gun units that fire at them are revealed).
- Note: If this means that a target anchorage hex remains "Unknown", then the embarked units assigned to it will have to set up an assault on that hex. If the target hex turns out to be empty, then the assaulters will just move into it upon combat execution – without any combat occurring.
- Note that naval units themselves can not enter enemy owned anchorage hexes. Such locations must first be captured by friendly ground forces before naval units can enter them.

9.1.6. LOCAL PATROLS AND GUERRILLA EFFECTS

When a unit occupies a location, that location becomes "owned" by the unit's Force. Unoccupied locations tend to remain owned by the last Force to occupy them. There are, however, times when a location can change ownership without being occupied by a unit.

Guerrillas can cause a location's ownership to change. Guerrillas operate more effectively in Hills, Badlands, Mountains, Light Woods, Jungle, and Forest locations. Guerrillas operate less effectively in Anchorage or Road locations, and will not operate in Airbase or Urban locations. Guerrillas are only present if the Scenario calls for them.

Patrols also act as a "projection of force," in that they can affect the ownership of surrounding locations:

- A location adjacent to a Dense Urban location becomes owned by the Force owning that urban location.
- A location adjacent to a unit of only one Force becomes owned by the Force controlling that unit.

Scenario designers should keep these effects in mind when setting objective victory values.

9.1.7. SUPPLY (ADVANCED RULES)

Supply is a critical factor in **The Operational Art of War IV**. Individual units need supplies to operate effectively. As units move and fight they expend their internal supply stockpiles. In order to maintain your units' effectivenesses, the expended supplies must be replaced. Replacement supplies flow through lines of communication from the force stockpile, through Formations, to individual units.

Lines of Communication

A Line of Communication is a path from one location to another. Lines of Communication are blocked by enemy units, locations adjacent to enemies and not occupied by friendly units, non-Road Badlands terrain, non-Road Dunes terrain, or terrain that cannot be entered by a normal Land unit. A unit without a line of communication is marked as Unsupplied.

9.1.7.1. OVEREXTENDED SUPPLY STATE

There is now a new supply state that falls between "Supplied" and "Unsupplied". It's called "Overextended". If used, it will allow a designer to realistically impede units from continuing to press on indefinitely at red unit-supply conditions. Units in this state will have to slow down enough to keep their unit supply levels above their desertion levels – or wither away.

- A unit is "Overextended" if it has a line-of-communications to a supply point but is far enough from any supply source to be in a hex with lower location supply level than the designer-set "Overextended Supply Threshold". For example, if that threshold were 6, then any hex with a supply level of 5 or lower would be "Overextended".
- The default setting for the threshold is 0 – making it impossible for any hex to qualify for the new state. Therefore, only scenarios specifically edited for it will employ this feature.
- "Overextended" units receive supply normally.
- However, they also suffer desertion losses (see below) during the interturn calculations the same as if they were "Unsupplied" – except that those losses go to the "On Hand" pool, not the dead pile. To review, such losses start when the unit supply-level drops below (100 – unit proficiency). The percent loss per turn is scaled by turn intervals per week and by how far below the threshold they are.
- "Overextended" units only receive replacements if they are not suffering desertions (their unit-supply level is above (100 – unit proficiency)).
- "Overextended" hexes have a different supply font color from the normal supply font color in the location supply display, for information purposes.

Unit Supply

Each unit has its own Supply Level, which is a percentage value reflecting the unit's own internal Supply stockpile (food, bullets, gasoline, etc.). These supplies are actually in the hands of the troops, available for immediate use. A unit's Supply Level strongly affects its Capabilities.

Each unit expends Supplies as it acts to follow your orders. When necessary, units draw new Supplies from their Force Supply stockpile, through their Formation supply system. Units may begin a Scenario with a level greater than 150%, but Supply Levels may not be increased above 150% during the course of a Scenario. Any oversupplied unit (with a Supply Level greater than 100%) will lose its excess supplies if it moves. (For this purpose, participation in combat is not considered movement.)

Unit readiness is limited to no more than the unit's Supply Level or the minimum Readiness (33%), whichever is higher.

Desertions

Unsupplied units with very low Supply and Readiness Levels are subject to Desertion effects. Deserting troops and equipment are lost permanently and are not placed in the Replacement Pool. The number of deserters increases as Supply and Readiness levels decrease, and decreases with higher unit Proficiencies. Desertions tend to start slowly (particularly in high Proficiency units) but will accelerate over time. Desertion starts when the unit supply-level drops below (100 – unit proficiency). Desertion amounts are scaled proportional to the turn interval and to how far below the above threshold the unit supply-level is.

Formation Supply Distribution Efficiency

Each Formation has a Supply Distribution Efficiency, which is a percentage value reflecting the Formation's ability to distribute supplies from the Force Stockpile to units in the Formation. This value is set for each Formation in a Scenario, and actually means different things for different types of Formations. It takes into account everything from dedicated organic transport capability to the mindset of the troops responsible for getting the goodies to the troops.

Force Supply Stockpile

Each Force has a Supply Stockpile Level. This Level generally remains constant, but can vary in some Scenarios. It represents supplies available for distribution to units through Formation Supply systems.

Transport Asset Sharing

Units that do not move and are not assigned a Local or Tactical Reserve status will temporarily lend a portion of their transport assets (equipment with a transport capability, such as trucks, horse teams, etc.) to their parent Formation (and possibly to others depending upon the Formation Support Level) to aid in distributing Supply to other units. Any unused Rail, Air, or Sea Transport Capacity also contributes to resupply efforts. This results in a boost to the Formation's capacity to distribute supplies. Transport asset sharing has no negative effects.

Interdiction Effects

Enemy Air units flying Interdiction Missions impair Supply distribution. This is determined on a location-by-location basis (Local Interdiction), but the average value over the entire Theater (Theater Interdiction) is calculated for your planning use. The Theater Interdiction Level is not used by the game.

HQ Bias Effects

The level of resupply possible for a unit increases by 50% if a cooperative Headquarters unit is located with or adjacent to a unit. See Cooperative Units (8.6.1).

If a Headquarters unit assigned to a Formation is destroyed, or if any assigned Support squads have been eliminated, the Formation's Supply Distribution Efficiency is reduced. You should protect your Headquarters units to avoid these serious disruptions to unit resupply.

Supply Lines

As a general case, in order to receive resupply, units must be able to trace a Line of Communication back to a friendly Supply Source. If the unit cannot trace this Line, its Supply Level will drop by an amount equal to the number of half days in a Turn. Such units, again, are marked as Unsupplied. They will also be subject to isolation effects in combat.

The distribution of supply across the map created by your supply lines can be viewed via the "Supply View". This view is accessible via the Supply Button on the Control Panel and via the View pull-down. Under this view each supplied location will have a supply marker with a number on it (as shown below). The colors of the markers tell which side can trace to the location: Red markers mean only the Red Side can trace; Blue markers mean only the Blue Side can trace; And Gold markers mean both sides can trace. The number in the marker is the location supply for that hex for the current side. That number is the base value all units in that hex will use to calculate the supply they will receive in their next supply replenishment phase.

Supply lines are modeled via two different methods: Old Supply Rules and New Supply Rules.

9.1.7.2. OLD SUPPLY RULES

In the old method, there are only four possible hex-location supply-levels (100%, 75%, 50%, and 25% of the Force Supply Level), and off-road locations are penalized regardless of how far they are from a supply source.

Full Supply (100%)

Supply is first traced from friendly controlled supply points through friendly controlled, undamaged,

Note the different font color used in the display for locations that are "Overextended" (less than 4 in this shot). Also note that the above view was created with "No Borders" set to OFF. Had it been ON, then only locations adjacent to friendly units would have shown markers in them.

Railroad hexes. Then, it must progress from each supplied, friendly controlled, undamaged Railroad hex to a distance equal to the Force Supply Radius (set in the Editor) through friendly controlled, improved Road, Unmuddied Road, Urban, Airfield, and Anchorage locations. All locations with an

unbroken Line of Communication through these types of terrain to a friendly Supply Point are fully supplied and will provide the maximum possible amount of resupply for units. This is called the Fully Supplied Net.

Normal Supply (75%)
Supply is then traced from the Fully Supplied Net through friendly cropland and open locations. Any location with an unbroken Line of Communication through these types of terrain to a friendly Supply Point is normally supplied and will provide 75% of the maximum possible amount of resupply for units.

Limited Supply (50%)
Locations not Fully or Normally Supplied, but able to trace a Line of Communication no longer then the Force Supply Radius to any normally or fully supplied location, are considered to have Limited Supply. Units in these locations receive 50% of the maximum possible resupply.

Minimal Supply (25%)
Locations not otherwise supplied, but able to trace a Line of Communication of any length to any friendly Supply Point are considered to have Minimal Supply. Units in these locations receive 25% of the maximum possible resupply.

Force Supply Radius
The default Force Supply Radius is four hexes, but can vary from zero to 100, depending on Scenario design.

Local Terrain Effects
Some terrain types influence Resupply levels. Resupply levels for units in Marsh, Flooded Marsh, and Mountain terrain are reduced by 33%.

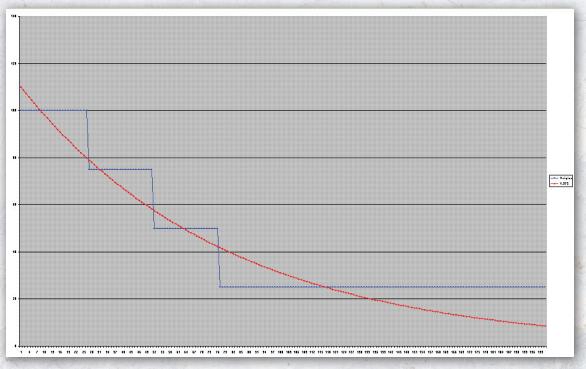
9.1.7.3. NEW SUPPLY RULES (OPTIONAL)

In this new method (selected via an Advanced Rule), to calculate location supply values we use a formula based on the movement points that would be expended by a virtual "Supply Unit" (which has motorized movement and a 50% unit density) to get to the location.

Note that this will mean that very dense locations will likely suffer some supply reduction due to added movement costs of that density condition (stacking limits, however, will not block supply). Supply beyond major rivers will depend upon bridge status or major ferry ability. Major Escarpments now block supply. Contiguous, unbroken Rail lines that connect back to a supply source are still treated as if every hex on the line was that supply point. If the line connects to multiple supply points of variable values (see below) then the strongest one is broadcast over the line. Friendly units in flooded marsh, badlands, dunes, etc. locations that are unreachable by the virtual supply unit but that are nevertheless adjacent to a normally supplied location receive one-quarter the supply that was in that adjacent location. And there's a lot more complexity behind the scenes (beyond those factors) to get it all to come out right.

Note that Naval, Air, and Helicopter units are still supplied as they were under the Old Supply Rules.

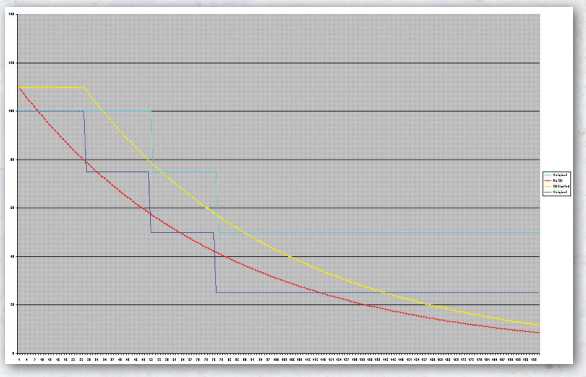
The exact formula is: **1.10 / (1.375 ^ (Supply Distance / Supply Radius))**. This is illustrated here:



Y-Axis is percent of Force Supply. X-Axis is distance from the Supply Point in movement points (MPs). The blue curve is the old way; the red curve is the new way. Note that the example supply radius was 25. This was what we considered the "best fit" curve. Note that one consequence is that the supply rises to 110%-of-full right on the supply-point. That may seem strange at first, but it's part of the curve fitting process. Just think of it as a bonus for being right on the supply point. Also, note that under this formula, the supply level will continue to attenuate – perhaps all the way to zero at some point. It will still be "Supplied" at that level, though – but there can now be future effects added that may further exploit this.

Supply Units still have their enhanced effect: they effectively treat a location as if it were one supply radius closer to the supply point, provided that the location was within a supply radius of the supply unit.

Again, this is illustrated here:



The blue and red curves are as in the previous plot – the old and new ways without supply units. The cyan curve is the old way with supply units. The yellow curve is the new way with supply units. Note that the yellow curve is clipped to no more than 110%-of-full. Again, the example supply radius was 25. Note that at very long distances, the impact of the new method is very pronounced.

For example, take the case of the supply radius being five MPs, and the supply unit being ten MPs away from the supply point and the unit being four MPs further away from the supply point (therefore four MPs from the supply unit). Because the unit is less than five MPs (the supply radius) away from the supply unit, we enhance its supply by treating it as if it were five MPs closer to the supply source (in other words, nine MPs away instead of fourteen MPs away).

The Improved-Road Motorized-Movement divisor (see 8.5.2) also affects the supply trace when New Supply is in use. Supply traced over other than improved road hexes will pay costs x divisor. So with a setting of 2, for example, inland supply in the desert will attenuate at twice the rate it previously did – making inland desert operations more realistically difficult. The default value is 1, which gives no motorized benefit on improved roads – or supply effect (i.e. just like under 3.4 and before).

9.1.7.4. VARIABLE SUPPLY POINTS

Under these New Supply Rules, designers can also set supply levels for supply points (either initially or through events) to values between 1-250%-of-full. Default is 100%, of course. This is somewhat similar to the previous "kluge" of putting a supply point in a distance hex – but without the impact to ranges of the distance hex. When there are multiple points of different values, locations trace back to the point that will give each location the best supply value – even if further away.

Airborne Resupply

If a unit cannot trace a Line of Communication back to a friendly Supply Source, it may still be able to receive resupply. The level of resupply available to any particular hex is based on the amount of

Air Transport Capacity left unused at the end of the previous Turn and the total size of the units in it requiring Airborne Resupply. Local Airborne Resupply levels are reduced by 33% if visibility in the location is Hazy, or 50% if the visibility in the location is Overcast. Note that such units will still be considered to be Unsupplied for desertion and isolation purposes.

Night Resupply

Resupply levels are reduced by 33% during night Turns.

Other Supply Considerations

If a unit moved (from one location to another) in the previous Turn, its Resupply Level is reduced by 33%. On the first Turn of a Scenario, units do not draw resupply, but are still checked to determine whether they are Supplied or not. There is a "global handicap" or reduction of 33% for the net resupply available to units after all modifications take effect during the automatic bookkeeping phase. This can be offset, by using the High Supply option, in the Advanced Game options. In older versions of TOAW units could not increase their supply level by more than 50% per turn. In **TOAW IV** that restriction has been removed. A fully depleted unit can recover all the way to 150% in a single turn, if its location is lush enough.

9.1.7.5. SUPPLY CONSUMPTION COSTS

Land Movement consumes 1 supply point per movement point expended (this is modified by the Supply Costs of Movement Rate parameter (see 8.5.2)). However, Naval, Embarked, and Air Units do not expend supply when moving.

Attacking consumes 10 supply points per combat round. Defending consumes 10 supply points per combat round. Ranged units directly assigned to combat consume 10 supply points per combat round. Ranged units that cooperatively support at half strength consume 5 supply points per combat round. Note that if the attacker fails any of the Assault Ratio checks (see 13.20) then defender supply costs can drop significantly. Also, the Naval Attrition Divider scales naval combat supply costs. Air units set to Air Superiority or Interdiction missions pay no supply for combat.

9.1.7.6. THE UNIT SUPPLY MODEL

Note that no unit will drop below 1% Unit Supply level, regardless of what the movement or combat cost would be otherwise. Yet they still continue to conduct operations – albeit at reduced strengths and speeds. This may seem non-intuitive, but that's because the Unit Supply value is not actually a direct measure of the unit's supply stockpile, as many players assume.

If that were the case, the unit's strengths and mobility would be independent of its supply level until that level reached zero – at which point their strengths and movement allowances would plummet to zero themselves (a ridiculously unrealistic effect – real units are far more resilient than that). Instead, they drop non-linearly with the drop in supply level. In other words, the unit becomes more and more frugal with supply the lower supply becomes. A flush unit may be profligate with supply, while a depleted one would make every bullet and drop of gas count. However, the increase in strengths at flush supply is not proportionate to the increase in Unit Supply Level. This models the diminishing returns for more and more supply expenditure. So a fully depleted unit retains a significant fraction of its flush strength.

And note that more of flush strength level is retained at depleted levels in high proficiency units than in low proficiency units. That is true in the

real world as well – it's called "fire discipline". The better the unit the more fire discipline it has. So, TOAW's supply system cleverly models how real world units perform. They don't blow off all their supply oblivious of how much is left.

So a 1% unit supply state effectively represents the state at which the unit has reached maximum supply conservation. In other words, the unit would only be expending as much supply as it was continuously receiving via its supply line, and not further depleting its reserves. In fact, the Unit Supply Level value in general is more a measure of the rate at which the unit is expending supply than a direct measure of its stockpile.

Of course, there is a point of supply delivery, below which, that assumption falls apart. That's why the system has the new "Overextended Supply Threshold" feature. It allows the designer to set a point at which red-lined units just have to stop and wait for supplies to catch up to them.

Can units actually run all the way out of supply in TOAW? Yes – via desertions. Desertions can represent troops abandoning the unit due to lack of food and morale. But they can also represent guns and vehicles running out of fuel and ammo and being abandoned. So, a unit that has lost all its equipment from desertions has, effectively, run completely out of supply. (And its strength would finally be reduced to zero). Note that desertions only occur at Unsupplied or Overextended conditions.

9.1.8. REPLACEMENTS

Equipment losses are a fact of life on the battlefield. If these losses are not replaced, your units will become less useful over time. Your units are eligible to automatically receive Replacements from your Force Equipment Stockpiles if they are under strength, in Supply, and not Embarked on Ships or Trains. In most Scenarios, your Force Replacement Stockpiles will be replenished on a regular basis. In some Scenarios, units may have different priorities for receiving Replacements. This will usually be mentioned in the Scenario Briefing.

If your Force is at full strength, Replacements will automatically appear in the form of reconstituted, previously-destroyed units built up from replacement equipment. Reconstituted units will appear "Untried" in an Urban location distant from enemy units.

When units are Reconstituted, there is a one to four week delay in their appearance. Reconstituted Air units appear at Airfields. Other Reconstituted units will appear at a Scenario-specific point (which should be mentioned in the Scenario Briefing) or near friendly Supply sources in Urban or Road locations. If no friendly Supply sources are located in Urban or Road locations, or if the Scenario-specific Reentry Point is not friendly-controlled, Land units will not be Reconstituted. Special Forces, Coastal Artillery, and Fixed Artillery units are never Reconstituted. Reconstituted Airborne and Glider units will keep their special icons, but are no longer eligible for Airborne Movement. Reconstituted units are listed as such in the Expected Reinforcements Briefing (16.9).

Readiness Recovery (Advanced Rules)

Your units' Readiness levels decline during movement and combat. Unit readiness recovers at the beginning of every Turn except the first. The amount recovered is based on the Scenario's time and distance scales, but will generally be approximately the amount needed to fully recover from a maximum movement. Units recover Readiness more slowly if they have moved in the previous Turn, occupy a contaminated location, or if they are Unsupplied.

Due to the highly technical nature of Air and Helicopter units, these units' Readiness Recovery

is also strongly affected by unit Proficiency. Low Proficiency Air and Helicopter units will recover Readiness very slowly.

9.1.9. REINFORCEMENTS AND WITHDRAWALS

From time to time, new units may appear on the map as Reinforcements. They generally appear at a specific time and place, but there are differences in the restrictions between different types of units and different locations. Reinforcements may appear either on a specific Turn, or, if the Scenario calls for it, as the result of some Event. You can check your Expected Reinforcements Report for predictions of when a given unit will arrive, but units may arrive either sooner or later than the predicted Turn. Reinforcements always enter at or near the location listed in the Report if that location is available. Generally, a location is available if the unit could move into it normally. In some cases there are additional restrictions. You can check the Recent Reinforcements window (available from the View menu) for information on Reinforcements received this Turn.

See 16.9 and 16.10 for more information on the various Reinforcement windows available.

Land Units

Most Land units will always appear at the location given in the Formation Report, if that location is available. A location is only considered to be available if it is either friendly-controlled and not at the stacking limit or located on a map edge. If for some reason the location is not available, units scheduled to appear on a map edge will instead appear at some other available location along the same map edge, within two hexes. Units scheduled to appear away from a map edge will only enter when the location becomes friendly-controlled and not at the stacking limit.

Guerrilla Unit Reinforcements

Guerrilla units scheduled to appear as Reinforcements may appear at any playable location within three hexes of their scheduled Reinforcement location, if that location is enemy-occupied.

Unlike other units, Guerrilla units may appear in enemy-owned locations, converting the location to friendly ownership upon entry.

Naval Unit Reinforcements

Naval units will appear in the nearest available Deep Water map edge location.

Air Unit Reinforcements

Air units will appear at the nearest available Airbase appropriate to the units' equipment. Naval Air units appear on available Aircraft Carriers or Airbases. Other (non-Naval) Air units appear on Airbases.

Withdrawals

In some Scenarios, some units may be scheduled to withdraw. The game will automatically withdraw the unit in the most appropriate manner. Be sure to check your Reinforcement Report for withdrawals when playing a Scenario, since it can be a rude surprise if your entire plan depends upon a unit that is scheduled to be withdrawn. If a unit is withdrawn, it will be listed in the Recent Reinforcements window on the Turn of withdrawal.

9.1.10. COMMAND AND CONTROL (ADVANCED RULES)

You can usually, but not always, issue Movement or Attack orders to any unit on the map of the Force you control. The exceptions are:

Unit Reorganization

Units failing multiple Quality Checks during combat, usually as the result of significant combat

losses, can become so disorganized that they will no longer respond to your orders. When this happens, the unit is said to be "Reorganizing". At the beginning of each Turn, all Reorganizing units are checked to see if they have finished their reorganization. Units must pass a modified Quality Check in order to complete Reorganization. This is more likely if they are Supplied, have not moved in the previous Turn, and are located with or adjacent to a cooperative Headquarters unit.

A Reorganizing unit (or any other unit that is not allowed to move during the current Turn; e.g., Reserves) has an orange "bar" printed behind its combat (Attack – Defense) or Movement numbers on its 2D icon.

Formation Attack Restrictions

Units of Formations failing a Formation Quality Check at the beginning of a Turn are considered to be Reorganizing and will only be available for non-combat orders. They will accept all other orders, and they will Defend normally, but are not available for launching Attacks or Bombardments.

Formation Quality is the average of the Formation's Proficiency and average assigned unit Quality. Formation Quality is reduced if many units are divided. The Formation passes the Quality Check if this value is greater than a random number from 1 to 100, or if the number of units that experienced severe combat results in the previous Turn is smaller than a random number from 1 to the number of units in the Formation. This means that Formations are subject to Reorganization on Turns following heavy combat.

Formation Proficiency is reduced by 50% if any assigned Headquarters unit is eliminated, or if all assigned Command Groups in the Headquarters have been eliminated. You should attempt to protect your Headquarters units to avoid this drop in Proficiency.

10. YOU ISSUE ORDERS TO YOUR FORCES

A new Turn will start if the Scenario doesn't end during the Bookkeeping checks (section 8.0). During each Turn, you and your opponent will both be given an opportunity to issue Orders to your forces.

10.1. VARIABLE INITIATIVE

The Force defined in the Scenario as "the first player" (usually the Attacking Force) will always move first on the first Turn of a Scenario. After that, the first player is determined by an Initiative Check. This means the order of players can change from Turn to Turn.

The Initiative Level of a Force is partly randomized, but is strongly influenced by the average Movement Allowance of all friendly Land units on the map not assigned to Formations with a Reserve status.

PBEM and Hotseat Exceptions: In PBEM and Hotseat games, the Initiative remains fixed in the order established on the first Turn of the game.

10.2. USING THE GAME CONTROL PANEL

10.2.1. BUTTON PANEL

The Button Panel shows sixteen buttons at a time in four rows of four buttons each. There are three tabs that toggle the display of three sets of sixteen buttons.

The three tabs are Units, Map, and Reports. The functions of these buttons are described by prompts in the Information Panel at the bottom of the window.

Under the Units tab:

Row 1:

- Previous Unit – Focuses the game's attention on the previous unit in the force by making it the current unit.
- Next Unit – Focuses the game's attention on the next unit in the force by making it the current unit.
- Current Unit – Calls up the Unit Report for the current unit.
- Resolve Combats / End Turn – If you have any combats planned, this will resolve them. Depending upon the state of your forces after the combat your Turn may end or continue. If no combats are planned, this simply ends your Turn. This button switches to crossed swords if combats are planned. Note that it is gold color, which indicates that it causes an action on the map – it isn't just informational.

Row 2:

- Previous Formation – Focuses the game's attention on the previous Formation, making its first unit the current unit.
- Next Formation – Focuses the game's attention on the next Formation, making its first unit the current unit.
- Current Formation – Brings up the Current Formation Dialog, from which you can examine the entire Formation and issue non-movement orders to units belonging to the Formation.
- Undo – Undo the previous order. Again, the gold color indicates that this button causes an action on the map – it is not just informational.

Row 3:

- Unit OOB – Brings up the Unit OOB report. This is a list of all friendly units on the map.
- Formation OOB – Brings up the Formation OOB report. This is a list of all friendly formations that have units on the map.
- Air OOB – Brings up the Air OOB report. This is a list of all the air units on the map.
- Unit Icon Display – Changes the unit icon display preferences. In 2D mode, this selects between showing unit Strengths or Movement Allowances.

Row 4:

- Planned Combats – Brings up the Planned Combat Report. This shows all planned combats.
- Combat Review – Brings up the Combat Review Report. This shows all recent combats.
- Unit Visibility – Toggles between invisible, visible, visible & current DBR, and visible & all DBR. Left-click advances forward through those; right-click advances backward through them.

- Help Topics – Brings up the Help Dialog.

Under the Map Tab:

Row 1:

- Supply – Toggles between sources, invisible, and visible.
- Weather – toggles between invisible and visible.
- Objectives – toggles between visible, floating, and invisible.
- Resolve Combats / End Turn – Repeated from this position on the Units Tab.

Row 2:

- Airfields – toggles between airfields floating above units and below units.
- Anchorages – toggles between anchorages floating above units and below units.
- Headquarters – first click brings headquarters to the top of the stack. Second click brings artillery to the top of the stack.
- Undo – Repeated from this position on the Units Tab.

Row 3:

- Location Grid – toggles between visible and invisible.
- Place Names – toggles between visible, floating, and invisible.
- Possession – toggles between flags, borders, and invisible.
- Battle Visibility – toggles on-map crossed swords for Planned Combats, Combat Review, and Battlefield Timestamps visible/invisible. The sequence is: none visible, Planned Combats visible (gold), Combat Review visible (silver), Battlefield Timestamps visible (bronze), and all three visible.

Row 4:

- Decrease Y-Zoom – Decreases the Y-Zoom. (Ten scaled steps between the Map View sizes)
- Increase Y-Zoom – Increase the Y-Zoom. (Ten scaled steps between the Map View sizes)
- Decrease Map View – Decreases the Map View size. (Five view sizes from Ultra Tiny to Huge)
- Increase Map View – Increase the Map View size. (Five view sizes from Ultra Tiny to Huge)

Under the Reports Tab:

Row 1:

- Situation Report – shows the Situation Report.
- Scenario Description – shows the Scenario Description.
- Weather Report – shows the Weather Report.
- Resolve Combats / End Turn – Repeated from this position on the Units Tab.

Row 2:

- Air Briefing – shows the Air Briefing.
- Recent News Report – shows the Recent News Report.
- Inventory and Replacements Report – shows the Inventory and Replacements Report.
- Undo – Repeated from this position on the Units Tab.

Row 3:

- Expected Reinforcements Report – shows the Expected Reinforcements Report.

- Recent Reinforcements Report – shows the Recent Reinforcements Report.
- Theater Options Report – shows the Theater Options available.
- Unit Panel Display Mode – Toggles the Unit Panel Display between Stack view and Group Composition view.

Row 4:

- Formation PO Track – toggles showing the PO Track for the current formation.
- All PO Tracks – toggles showing all PO Tracks.
- PO Mode – toggles PO Mode on/off.
- Move PO – When gold, in "hot" mode and starts the PO move. When not gold, in "safe" mode and won't start the PO move. PO Mode button toggles it between hot and safe modes. Again, gold color indicates it will cause an action on the map.

10.3. SELECTING THEATER OPTIONS (ADVANCED RULES)

In some Scenarios, you may have options to request Out of Theater actions that can affect the situation on the map. At the start of your Turn, you will be notified if you have any available Theater Options. Use the View / Theater Options menu item to check your Theater Options. Click on an Option button in the window to select it. Its button will turn silver. Your selection will become effective at the end of the Turn.

10.4. GIVING ORDERS TO YOUR UNITS

You order normal Movement or combat by right-clicking on a map location. Select units by left-clicking on them.

10.4.1. ADVANCED UNIT ORDERS RULES (ADVANCED RULES)

In most cases, you will be able to choose how many units you wish to affect by an order. Depending on your orders, one or more units will attempt to Attack or Move toward the selected location by the most effective route. If you right-click on your current unit, you can issue General Orders to it from the popup menu. Depending upon your Advanced Rule setting for the Menu Show Delay (see 3.4.2) you may have to hold the right button down for a short while to get the popup. Otherwise, the unit will skip the popup and automatically do the most obvious action.

10.4.2. GENERAL UNIT ORDERS POPUP MENUS (ADVANCED RULES)

You can use this menu to issue General Orders to your units. Most of these Orders can also be issued from other windows, displays, etc., but this is the most convenient place to see exactly what options you have for your units at any given time. General Orders are as follows:

Note that only General Orders that are available will be displayed.

- **Disband Unit** – Disbanded units are removed from the map and return their equipment to your Supply Pool. It is not possible to disband units that are Routed, Reorganizing, Unsupplied, or "In Garrison."

- **Divide Unit** – Divide the unit into two or three smaller units.
- **Recombine Unit** – Recombine a number of smaller units into a single larger unit.
- **Board Train** – Board a Train to use Rail Movement.
- **Board Aircraft** – Board an Aircraft to use Air Movement or Airborne Movement.
- **Board Helicopters** – Board Helicopters to use Airmobile Movement.
- **Board Ship** – Board a Ship to use Seaborne Movement.
- **Disembark** – Disembark from Trains, Aircraft, Helicopters, or Ships.
- **Repair Railroad** – Attempt to repair damaged Railroads in the current location.
- **Destroy Bridges** – Destroy bridges in the current location.
- **Repair Bridges** – Attempt to repair bridges in the current location.
- **Deploy: Dig In** – Assume or increase Defensive Deployment, to Defending, Entrenched, or Fortified.
- **Deploy: Tactical Reserve** – Unit assumes a Tactical Reserve Order.
- **Deploy: Local Reserve** – Assume a Local Reserve Order.
- **Deploy: Mobile** – Assume a Mobile Deployment.
- **Mission: Air Superiority** – For Air units only; the unit will assume an Air Superiority Mission.
- **Mission: Interdiction** – For Air and Helicopter units only; the unit will assume an Interdiction Mission.
- **Mission: Combat Support** – For Air and Helicopter units only; the unit will assume a Combat Support Mission.
- **Mission: Sea Interdiction** – For Air and Helicopter units only; the unit will assume a Sea Interdiction Mission.
- **Mission: Rest** – For Air and Helicopter units only; the unit will assume a Rest Mission.
- **Orders: Minimize Losses** – Set Loss Tolerance to minimize losses.
- **Orders: Limit Losses** – Set Loss Tolerance to limit losses.
- **Orders: Ignore Losses** – Set Loss Tolerance to ignore losses.
- **Show Unit Report** – Show the Unit Report window (16.1).
- **Show Formation Report** – Show the Formation Report window (16.2).
- **Show Group Composition** – Show the Group Composition window (see 6.1.2 for details).

10.4.3. BOMBARDMENT OF OR FROM DISTANT LOCATIONS

In some Scenarios, some locations may be "Distant." These locations are usually used to represent off-map Anchorages and/or Airfields and are frequently surrounded by Non-Playable or Deep Water locations. The distance of a Distant location is included when determining attack ranges. Distant hex values have no effect on movement, however.

10.4.4. LAND MOVEMENT

This is the normal movement of Land units through certain allowed types of terrain.

10.4.5. CHANGE OF OWNERSHIP

When a non-Guerrilla Land unit enters an enemy-controlled location, that location becomes friendly-controlled. Entering an enemy-controlled location incurs additional Movement Point penalties; see Enemy-Controlled Terrain (11.9.3) for details.

Guerrilla units have a special ability to choose between two different methods of Movement. By default, these units will not change the ownership of hexes that they pass through. After Movement is concluded for the unit, and another unit is selected, then the hex that the Guerrilla unit occupies becomes friendly-controlled. This mode plays to their combat advantages (see 16.1.2) in attacking from hexes that were previously enemy-controlled during the Turn, by retaining more enemy-controlled terrain from which to gain the bonus on subsequent Turns. Guerrilla units may also operate more openly by choosing to convert hexes that they move through. This will make their Movement paths more visible after playback and reduce the number of hexes that they can operate with a combat advantage from on subsequent Turns. To convert a hex during Movement, stop the Guerrilla unit in the hex to be converted and select another unit. This will convert the hex that the Guerrilla unit stopped in. Then, you may continue moving, repeating this procedure as necessary, to convert any other hexes.

10.4.6. RAILROAD DAMAGE

Any Railroads in an enemy-controlled location may be damaged when a friendly unit enters the location. The chance that this will happen is dependent on the Scenario. Damaged (broken) Railroads may not be used for Railroad Movement.

10.4.7. TRANSIT ATTRITION

Even in the best of cases your units will suffer minor equipment losses during Movement. Most of these losses represent simple straggling or small details left behind for route security duties and are not permanent. The "lost" equipment is assigned to your Replacement Pool for later redistribution, provided that the moving unit is not marked as Unsupplied. If a unit is marked Unsupplied, its Transit Attrition losses are permanently lost.

10.4.8. INTERDICTION MISSIONS

If your opponent has any Air units flying Interdiction Missions, it is possible that your unit may come under Air Attack during Movement. The chance for this is proportional to your opponent's Local Interdiction Level. Units on Roads or using Rail Movement are particularly vulnerable to Interdiction Missions. Enemy Air units striking your units might be intercepted by your Local Air Superiority effort, which in Turn are subject to attack by your opponent's Local Air Superiority.

Reminder: Interdiction only affects over-land movement of ground units. Similarly, Sea Interdiction (see 9.1.4.1) only affects sea movement of naval and embarked units.

10.4.9. SUPPLY CONSUMPTION

Your units will consume part of their internal supplies and will suffer a reduced Readiness with every Movement Point expended.

10.4.10. DISENGAGEMENT (ADVANCED RULES)

In the real world, it can be quite difficult to break contact with enemy units. When you order a unit to move out of a location adjacent to an enemy unit, that unit will attempt to disengage. Successful disengagement results in a normal ordered Movement. Disengagement is automatic if:

- Your unit is a Commando unit,
- Your unit is either a Headquarters or Artillery

unit, and the destination location is occupied by a friendly unit, and/or

- Your unit is moving to a destination not adjacent to an enemy unit, and there is a friendly unit in the location being vacated.
- Your Disengagement chance is improved if:
- Your unit has a large Reconnaissance capability,
- Your unit began the Turn with a very high Movement Allowance relative to the enemy units it is adjacent to, and/or
- Your unit is heavily equipped with armored equipment.
- Your Disengagement chance is reduced if:
- The enemy units have a large Reconnaissance capability,
- Your unit began the Turn with a low Movement Allowance relative to the enemy units.
- Terrain modifies the Disengaging unit's Reconnaissance Capability:
- Badlands, Forests, Super Rivers, and Suez Canal locations offer the best cover for Disengagement (3x Recon).
- Bocage, Dense Urban, River, Canal, and Fortified Line locations (2.5x Recon).
- Mountains, Urban (2x Recon).
- Cropland, Hills (1.5x Recon).

Terrain modifications for disengagement regarding Reconnaissance Strength are not cumulative. Only the best (highest value) terrain type is considered. For disengagement purposes, unit Reconnaissance Capabilities are multiplied by an additional 0.5 on night Turns or if there is Heavy Rain or Snow in the location (which is cumulative).

Should your unit fail to disengage from the enemy, it will be subject to a Disengagement Attack. This is a short, one-sided shot at your unit as it attempts to move. The attack is based on the attack strengths of all enemy units involved, and the defense strength of your moving unit plus any supporting fire from eligible air and artillery units. Only the moving unit will take losses, which may force it to retreat, divide into sub units, or (in the worst case) disband.

If the units attempting to disengage are much weaker than adjacent enemy units there is an additional movement cost – up to 3x the normal cost to move out of the location. Relatively strong units will see no additional movement costs.

If you wish to avoid the effects of disengagement in your games, you can turn "active disengagement" off using the game options dialog.

10.5. ATTACK MENUS AND ATTACK PLANNING (ADVANCED RULES)

When you order your units to move into an enemy-occupied location, you are actually creating a plan for an attack on that position at some later point in the Turn. In rare cases, the would-be defenders may decide to retreat rather than weather your Attack (see section 10.5.2, Retreat Before Combat, below). If this happens, your units may advance into the vacant location. If the defender does not retreat before combat, a popup menu will allow you to set up an Attack. You can quickly select the number of units to attack with and set their Loss Tolerance directly from the popup menu. If you wish to plan the battle in detail, you can choose the Attack Planning window.

10.5.1. ATTACK DEPLOYMENT (ADVANCED RULES)

You may set up as many Attacks as you wish. The Orders emphasis you select determines how hard your units will fight for their objectives. If more than one unit is scheduled to Attack any particular

location, all involved units are combined into a single Attack. Units may be ordered to Attack, conduct a Limited Attack, or (if at a distance) Bombard the defender. When setting Attack Deployments for units participating in an Attack, each unit can be given individual Attack Deployments orders; i.e., one unit can be ordered to "Ignore Losses", one can be told to conduct a "Limited Attack", while still another can be given orders to "Minimize Losses".

Attacking units participate fully, and may advance into the location if the enemy retreats. Units conducting a Limited Attack add half their Strength to the Attack, suffer only half the losses they would in a normal Attack, and will not advance into the location after combat.

Bombardment Attacks may be set up against enemy units within range of your Air and Long Range Artillery units by clicking on any non-adjacent enemy target location within range. Adjacent ranged units may also bombard if they have more that 50% of their combat strength coming from ranged equipment or if their range has been changed from nominal. Players can tell if an adjacent unit is going to bombard instead of assault by the resulting movement path over the target hex. If it is the "arrow" path it will assault. If it is the "crosshair" path it will bombard.

Bombarding units and units conducting a Limited Attack will not advance after combat. Attacks take precedence over Bombardments. If any Attacks are plotted against a location scheduled to be bombarded, any Bombarding units are added to the Attack. Bombardments are generally much less effective than Attacks, but they can be useful for damaging enemy units out of reach of a normal Attack. Bombardments are subject to counterbattery fire if the target hex contains in-range ranged units. Counterbattery occurs after the bombardment that triggers it (instead of before, as in older versions of TOAW). Artillery that supports a ground assault is not subject to counterbattery – regardless of the presence of ranged defenders in the target hex.

10.5.2. RETREAT BEFORE COMBAT (RBC)

The first time you order a unit to Attack any particular enemy location in any given Turn, there is a chance that the defenders will retreat before combat. If there is a large difference between the combined Attack Strengths of your current unit when the Attack is ordered and the combined Defense Strengths of the enemy units in the defending location, the computer will check to see if the defending units immediately retreat rather than face your assault.

When checking for retreats before combat, a Flanking Check is made, which is based on the quantity of "active defender" equipment in the defending and attacking units relative the Scenario Map scale. If the defender has less than the amount of equipment necessary to fully cover his frontage in the Scenario Scale, the Attacker has more equipment, and the Attacker passes a Unit Quality Check, the chance for a retreat before combat is increased by a random fraction between one and:

Attacker Equipment Density / Defender Equipment Density

This makes is much more likely that "small" units will retreat before combat with "large" units because the large unit has succeeded in turning the flank of the smaller unit.

There are two types of retreat before combat. If the defending units fail a Quality Check, they will simply retreat. They are subject to the same types of losses and penalties as in normal after-combat retreats. Depending upon their Loss Tolerance Orders, units passing their Quality Check may still retreat before combat in order to avoid likely destruction during your assault. This is more likely if you have given the unit orders to Minimize Losses. Units retreating after a passed Quality Check are treated more favorably than those retreating after a failed Quality Check.

In many cases, retreats before combat will result in the destruction of the defending units during your Movement, leaving their location open for occupation by your units. Headquarters and Artillery units, as well as units with Minimize Losses Orders, are more likely to retreat before combat. A unit with Ignore Losses orders is less likely to retreat.

Units advancing into locations vacated by enemy units retreating before combat pay the additional cost of entering enemy terrain, although they are exempt from the costs of moving adjacent to enemy units.

Note that the P hot-key and the "Double click opens planner" option provide methods to avoid causing a Retreat Before Combat, if desired.

RBC chances are adjusted for faster units (proportionate to their speed advantage) to a max of a 2:1 additional advantage. This doesn't apply to fixed defenders, though.

RBC stands flag will be cleared when a combat phase inflicts over 50% losses to the defenders – allowing such defenders to then be subject to more RBC attempts in that same turn.

RBC at greater than 8:1 odds now proportionately decrease the chance of the unit standing. So, if the odds are, say, 100:1, then the defender will be very likely to be RBC'd. But, note that those odds still incorporate the defender's deployment / terrain multiples.

RBC code allows only one RBC attempt against a combined stack – if successful, the entire stack retreats.

RBC code requires the defender to have 15% of the density penalty threshold to avoid the flanked penalty during any RBC attempt.

10.5.3. ATTACK OPTIONS (ADVANCED RULES)

If the defending force does not retreat before combat, you will be asked for your General Attack Orders. Depending on circumstances, you may be given the following options:

- **Single Unit Attack:** The current unit will attack the enemy position.
- **Single Unit Limited Attack:** The current unit will conduct a Limited Attack on the enemy position.
- **Single Group Attack:** All units grouped with the current unit will attack the enemy position.
- **Single Group Limited Attack:** All units grouped with the current unit will conduct a Limited Attack on the enemy position.
- **Atomic Attack:** The unit will launch an Atomic Attack. The strength of the attack is shown on the menu.
- **Bridge Attack:** The unit will attack bridges in the location. The chance of success is shown on the menu.
- **All Units Attack:** All units (regardless of Formation; Non-Cooperative Attack penalty may apply; see 8.6.1) that can possibly participate will attack the enemy position.
- **All Units Limited Attack:** All units (regardless of Formation; Non-Cooperative Attack penalty may apply; see 8.6.1) that can possibly participate will conduct a Limited Attack on the enemy position.

- Minimize Losses: If determined enemy opposition is encountered, the attack will not be pressed, so that losses are minimized as much as possible.
- Limit Losses: The attack will be pressed, even in the face of significant casualties. This is the usual Attack Order emphasis.
- Ignore Losses: The attack will be pressed regardless of casualties. Due to excessive casualties, this type of attack should be used rarely and with caution.

10.5.4. RECONNAISSANCE (ADVANCED RULES)

As your units approach or enter enemy territory, they will discover previously unknown enemy units in or adjacent to their path. Normally, only the number and type of enemy units will be uncovered during movement. If your moving unit has a large Reconnaissance Capability, you may also discover enemy strength information. Units using Air or Airborne Movement have a greatly reduced chance of gaining information on enemy units. These units can actually fly over enemy units without spotting them.

10.5.5. DEPLOYMENT RECOVERY

Ranged units (artillery, aircraft, etc.) now retain their deployment states after combat. Furthermore, even assaulting units can recover their previous deployment states if the attack is canceled before execution. This means that it is now safe to directly assign bombarding units to attacks even if it is likely that the turn will end before another movement round – they will still be in a support deployment if they had been in one prior to the assignment to the attack. Also, you can assign dug-in units to an attack, cancel the attack, and find them still dug-in. This especially helps the PO, since it previously disentrenched most of its force just testing whether attacks with them were plausible.

11. MOVEMENT

11.1. NAVAL MOVEMENT

This is the movement of Naval units through Deep Water or Anchorage locations. Units conducting naval movement are subject to interdiction attacks by in-range air units set to Sea Interdiction missions and by naval/coastal gun units within gunnery range of the movement.

11.2. AIR MOVEMENT

This is the movement of Air units from one Airbase to another. While Air units may attack any enemy with their range, their movement destinations are strictly limited to friendly Airbases.

11.3. RAILROAD MOVEMENT

This is the movement of Land units by train, along Rail lines. In order to use Railroad Movement, a unit must begin its Turn in a Railroad location, sufficient Rail Transport Capacity to lift the unit must be available, and the unit must be Entrained. A Train icon in the Unit Panel shows eligibility for Rail Movement. Right-click on the icon to bring

up the Unit Report and load the unit. See also 11.7, Embarked Status.

Units may move very large distances by Rail with no Movement Attrition or loss of Supplies and Readiness; however, they are very vulnerable to enemy attacks.

11.4. SEABORNE MOVEMENT

This is the movement of Land units through Deep Water or Anchorage locations. In most cases, Land units must be Embarked on Ships to move by sea. In order to use Seaborne Movement, your unit must begin its Turn in an Anchorage location and you must have sufficient Sealift Capacity to lift the unit. A Ship icon in the Unit Panel shows eligibility for Seaborne Movement. Click on the icon to bring up the Unit Report and load the unit on Ships.

In some Scenarios, some units may have an independent Amphibious Capability and can always move using Seaborne Movement.

Units conducting seaborne movement are subject to interdiction attacks by in-range air units set to Sea Interdiction missions and by naval/coastal gun units within gunnery range of the movement.

11.5. AIRBORNE MOVEMENT

This is the movement of Airborne-capable Land units while Embarked on Air Transports. In order to use Airborne Movement, your unit must begin its Turn in an Airbase location and you must have sufficient Airlift Capacity to lift the unit. Units may only board Aircraft if there is another unit present at the location, or if there are no enemy units in adjacent locations. An Air Transport icon in the Unit Panel shows eligibility for Airborne Movement. Click on the icon to load the unit on an Aircraft.

An Airborne unit may disembark without ill effects on any friendly-controlled Airbase, or it may conduct an Airdrop on any other location that it could normally enter or attack. Often, the contents of the location will be unknown. If enemy units are discovered to be present at the time of the drop, your Airdropped unit will be destroyed unless the enemy units opt to retreat before combat.

Some equipment is too heavy to be moved by Transport Aircraft during the time period covered by the game. All non-Airborne-capable armored vehicles and Transport in excess of the bare minimum required by the unit for normal Land movement will be stripped from the unit and added to your Replacement Pool for later redistribution.

Headquarters units may Airdrop only into friendly-controlled territory.

Airborne units are subject to equipment losses and possible arbitrary division into sub-units during Airdrops, and may be scattered outside their intended destination location in smaller (five to ten kilometers) scale Scenarios. Poor terrain (Forests, Jungle, Badlands, Mountains, Urban, etc.) and environmental factors (bad weather, night) can have a strong negative effect on Airdropped units.

If the enemy has Air units with Air Superiority missions, your units may also suffer Attrition from enemy Interception. It is usually best to avoid Airdrops in the face of significant enemy air opposition.

11.6. AIRMOBILE MOVEMENT

This is the movement of Helicopter and Airmobile-capable Land units while embarked on Helicopters. In order to use Airmobile Movement, your unit must either be a Helicopter unit itself or it must begin its Turn within 200 kilometers of Helicopter Transport units with enough combined

Airmobile Transport Capacity to lift the entire unit. It is not necessary to be in the same location as a Helicopter Transport unit. An Airmobile Transport icon in the Unit Panel shows eligibility for Airmobile Movement. Click on the icon to load the unit on the Helicopter unit. Any Helicopter units providing Airmobile Transport for a unit have their Movement Allowances reduced to zero for the Turn. A unit may not provide Airmobile Transport if it has moved.

It is important to note that assigning Transport HH equipment to a unit will grant it the ability to lend its Airlift Capacity to any friendly units using Airmobile Movement. This can have unintended consequences if other units use Airmobile Movement nearby, as this will immobilize the unit which provided the Airlift Capacity. It is generally best to only assign Transport HH equipment to units with the Transport Helicopter unit icon, or to Headquarters that are expected to remain relatively stationary.

Helicopter units may only move to friendly-controlled locations. This restriction does not apply to Airmobile units using Airmobile Movement, which can even enter and pass through enemy-occupied locations.

Units using Airmobile Movement are subject to Interception by enemy aircraft flying Air Superiority missions, and to anti-aircraft fire from enemy units that they fly over.

An Airmobile unit may disembark without any ill effects in any playable location not occupied by enemy units. If it disembarks onto an enemy unit, an Airmobile assault is immediately conducted. Unlike Airborne units, Airmobile units are not subject to Scattering or Drop Attrition when disembarking in enemy territory. Units using Airmobile Movement automatically disembark when they reach the end of their Movement Allowance, if you end your Turn, or if you select another unit. Disembarked Airmobile units have ½ their original Movement Allowance.

If an Airmobile Assault goes badly, or if for some other reason the unit has to end its movement without disembarking, the unit will be returned to its original location. Depending upon the reason for the failure, the unit may suffer substantial losses – particularly to heavier weapons. In some cases, it may be possible to pick the unit up and immediately launch another Airmobile Movement and Assault, but this is usually not a good idea.

Helicopters and Equipment transported by helicopters now take less damage. You need an air superiority ratio (including local AA) of 4:1 to be safe. With lesser ratios, the casualties will mount quickly. Previous safe level was 10:1.

Helicopters are treated differently from regular traffic. They are very durable, but prone to damage. Damaged helicopters, and equipment transported by them, will go into the replacement pool instead of being destroyed. Damage is based on Enemy versus Friendly Air Superiority, and has enemy AA added if AA spotted them. Friendly and Enemy AA units don't have a direct affect on casualties, only on whether damage occurs.

Whether an attack occurs depends on whether the Enemy has noticed the hex, an electronic support check, how much Low AA Fire they might be subject to, and the unit density in the hex. This means that you should fly over jungles and wilderness, not the enemy concentrations!

11.7. EMBARKED STATUS

An embarked unit (regardless of transport mode; e.g., Train, Ship, or Plane) displays an embarked "stairstep" button icon in the Unit Panel. In most cases, you can disembark by clicking in the embarked button, or from the General Unit Orders

popup menu. Additionally, a special "embarked" 2D icon replaces the unit's normal 2D unit symbol icon in the Unit Panel (the actual icon displayed depends on the Transport mode; see the 2D icon symbol chart later in this manual).

Once a unit has expended Movement Points using an embarked type of Transport Mode, it is usually restricted in its ability to move by normal Land movement on the Turn that it disembarks. See 11.4 (Seaborne Movement), 11.6 (Airmobile Movement), and 13.16 (Amphibious Attacks) for more information on attacking, and attacks by, Embarked units.

11.8. MOVEMENT COSTS AND ALLOWANCES

In order for a unit to enter a location, it must have sufficient remaining Movement Allowance. If a unit has not moved or attacked previously in the Turn, it can always move at least once into any allowed location regardless of cost. Unit Movement Allowances are based on the Supply levels and equipment assigned, and the Scenario physical and time scales.

11.9. LAND UNIT MOVEMENT COSTS

11.9.1. ROAD

Movement costs along roads vary from 1 to 3, depending upon the number of Vehicles and Horse Teams already in the location. Mud increases movement costs along unimproved roads by 1.

11.9.2. OFF-ROAD

The minimum standard cost for a Land unit to enter most allowed locations is based on the unit's movement category, as follows:

- Minimum Standard Cost (foot or mixed movement): 1
- Minimum Standard Cost (motorized movement): 2

(Advanced Rules) Even the presence of friendly units in a location can increase the standard cost for entering that location. The exact amount of the cost increase is dependent on the number of Vehicles and Horse Teams already there, and affects Motorized units more strongly than other types. Units with Military Police can reduce these movement cost increases. If there are already nine units in the location, or if there are any enemy units there, the movement is not allowed. If there are fewer than nine friendly units in the location, the maximum standard cost for entry is based on the unit's movement category:

- (Advanced Rules) Maximum Standard Cost (foot or mixed movement): 3
- (Advanced Rules) Maximum Standard Cost (motorized movement): 6

11.9.3. ADDITIONAL LAND MOVEMENT COSTS

Some terrain types prohibit movement or impose additional costs for entry, as follows:

- **Alpine:** Not allowed, except along a Road or Improved Road
- **Any Forest:** +2
- **Arid:** No effect
- **Badlands:** Mixed or Motorized movement not allowed; Mountain units +2, all others x3
- **Bocage/Hedgerow:** +2
- **Broken Railroad:** No effect; may not be used for Rail Movement
- **Contaminated Terrain:** Adds 50% to the total Movement Point cost of moving into

the hex. This will prevent the unit from moving through more than one contaminated hex per Turn.

- **Cropland:** +1
- **Dunes:** Mixed or Motorized movement not allowed; Mountain units +2, all others x3
- **Across Escarpment:** Mountain units +1, all others +2
- **Across Major Escarpment:** Mountain units +2, all others not allowed
- **Deep Water:** Not allowed, except along a Road or Improved Road
- **Dense Urban/Ruined Dense Urban:** +1
- **Enemy Adjacent:** 12.5% to 25% of the original Movement Allowance. This depends on the unit's Reconnaissance Capability. This penalty is doubled if the unit is moving from one such location to another. The cost is assessed upon leaving a hex adjacent to the enemy, not upon entering it. This amount is scaled by the Force ZOC scalar in the Editor.
- **Enemy-Controlled Terrain:** Up to 10% of original Movement Allowance. This depends on the unit's Reconnaissance Capability. This cost also applies throughout the entire Turn in which a location first becomes friendly-controlled. This amount is scaled by the Enemy Hex Conversion Costs scalar in the Editor.
- **Flooded Marsh:** Amphibious units +2, all others not allowed

(Advanced Rules) Frozen River, Super River, Canal, or Shallow Water: No effect. Land units may move into Frozen Shallow Water locations. Supply may be traced through Frozen Shallow Water locations as if they were Open terrain. If a unit is on a Frozen Shallow Water or a Super River location when the location thaws, the unit will automatically move to an adjacent location if possible. If there is no adjacent location to which the unit could be moved, it will instead evaporate – and all equipment assigned to the unit is lost.

You need to keep an eye on your Weather Report as Spring approaches to avoid losing units deployed on Frozen Shallow Water or frozen Super River locations.

- **Hills:** Mountain units no effect, Mixed and Motorized movement +2, all others +1
- **Jungle:** +3
- **Light Woods:** +1
- **Marsh:** +2
- **Mountain:** Mountain units +1, all others +2
- **Mud:** Foot movement + 2, all others +3
- **Non-Playable:** Not allowed [exception: Air units]
- **Railroad:** No effect, unless using Rail Movement
- **Rocky:** Foot movement + 1, all others +2
- **Sand:** +1
- **Snow:** Motorized Movement+3, ski no effect, all others +2
- **Unfrozen River or Canal:** Amphibious units, no effect. All others +2 (usually; see section 11.9.4, River Movement Costs)
- **Unfrozen Shallow Water:** Not allowed
- **Unfrozen Super River or Suez Canal:** Amphibious units cost is 2, all others not allowed
- **Urban:** No effect
- **Wadi:** Mountain units no effect, Motorized and Mixed movement +2, all others +1

11.9.4. RIVER MOVEMENT COSTS

Rivers and Canals (as opposed to super rivers or Suez Canal) normally add 2 to the cost of entering a location. There are exceptions, as follows:

- Amphibious units are exempt from River Movement costs
- If the total minor ferry capability in the location (including that of the moving unit) is greater than 20%, the moving unit is exempt from River Movement costs.
- If the total minor ferry capability in the location (including that of the moving unit) is greater than 10%, the River adds only one point to the Movement Cost. Total Ferry Strengths less than 10% have no effect on River Movement.

11.9.5. NAVAL UNIT MOVEMENT COSTS

Naval units, and Land units using Sea Transport, may enter any Anchorage or Deep Water location at a cost of 1. No other locations are allowed.

11.9.6. AIRBORNE MOVEMENT COSTS

Units using Air Transport may enter any location at a cost of 1.

11.9.7. RAILROAD MOVEMENT COSTS

Units using Rail Transport may enter any friendly-owned connected Rail Location at a cost of 1.

11.9.8. AIRMOBILE MOVEMENT COSTS

Units using Airmobile Transport may enter any location not occupied by enemy units at a cost of 1. Locations occupied by enemy units cost 3.

11.10. SKIPPING THE UNIT MOVEMENT POPUP

The "Menu Show Delay" (see "Page Two" display above) allow players to skip the popup when they move units. If it is set to a value greater than one, the most likely task will be executed automatically – skipping the popup. If the player wants to use the popup instead, he can hold the right button down until the delay expires, then make his selection. Note that setting the delay to one turns the feature off – the popup will always appear. Note that to expedite this feature, formerly "grayed out" items on the popup have now been removed instead.

Typically, this means that clicking the right mouse button will move the unit to the location or set it to attack, if there is an adjacent enemy unit in the target location. To move a group, entrain, plan the attack, etc., just hold the right mouse button down until the delay expires.

After completing the move, the active unit is automatically advanced to the next unit in the stack – unless the Page Two "Moving Selects Next Unit" option has been turned off. This option has no effect if the "Menu Show Delay" feature is turned off (the moved unit always remains the active unit, like in older versions of TOAW).

If the Page Two "Menu Show Delay" option is set to one, this feature is turned off.

11.11. PO ASSIST

This feature allows the PO to take control of as many friendly formations as the player desires. Formations that he wants to control himself can be set to "Manual" orders (the old "Fixed" orders renamed).

Note the four new Control Panel Buttons above. These are shown on the bottom row of the Reports Tab of the Button Panel. If the legacy Control Panel is active, they are only shown if the eighth option on Page 2 of the Advanced Rules Options (see above) is "On".

The first is the "Formation PO Tracks" Button. It will show the PO Tracks for the current formation. Note: this is a graphical display of the track.

The second is the "all PO Tracks" Button. It will show the PO Tracks for all formations. Again, note that this is a graphical display of the tracks.

The third is the "PO Mode" Button. It will switch the program to place objectives mode. This will show the current formation's objectives as x, y points. Objectives can be changed in this mode.

The fourth is the "move PO" Button. It will cause the PO to move units.

Pressing F12 or clicking on the 'start circle' or Pressing \ or clicking the "PO Mode" Button also causes the program to switch to the deployment place objectives mode.

Pressing F in this mode brings up the formation dialog allowing you to set the states, including letting the human have control of a formation.

<shift>-F12 or Pressing | or clicking the "move PO" Button causes the PO to move and set up attacks, but not execute them.

A typical sequence would be:

Press \, press F12, click on the circle, or click the "PO Mode" button to switch to the objectives mode.

Press / or the "Formation PO Tracks" button (alternate: ? or the "all PO Tracks" button) to see the current objectives graphically.

Select various formations and Change or Update the objectives as desired.

Press F to change the formation orders. Set formations you want to control yourself to "Manual".

Press \, click on the circle or the "PO Mode" button to switch out of objectives mode.

Press | or the "move PO" button to have Elmer move.

Move the units you want to move.

Hit E followed by 1 to execute the attacks/end the turn.

Note that there is an "Elmer Assist Primer" document available in the Manuals folder that gives more detail on using this feature.

With **TOAW IV**, several additional features have been added to further help with the use of this feature:

The Formation OOB dialog lists all friendly formations and how they are programmed. There are checkboxes to easily toggle whether each formation is PO controlled or not.

When PO Mode is active, units of PO controlled formations have a purple band on them – to easily identify which units will be PO controlled.

While PO Mode is active, double clicking on any unit will toggle that unit's formation in and out of PO control.

While in PO Mode, PO Objectives can be repositioned by dragging.

11.11.1. AI FILE

The X hotkey saves a "*scenario name*.AI" file. Note that use of the PO Assist feature can enable the player to optimize the formation objectives (in a sort of "survival of the fittest" fashion). This optimization could be useful to the scenario design itself. This file contains the AI objective paths, thereby enabling their import into the scenario in the Editor. If saved to any folder in the graphical hierarchy for the scenario, it will be reloaded whenever the scenario is run or loaded into the editor (be careful about this, designers). It also contains three settings for PO attack-odds limits as follows:

- Threshold1: This is the odds (x10) required for the PO to prosecute an attack with at least 7 rounds completed or if the Max Rounds per Battle is set. The default is 10 (1:1)
- Threshold2: This is the odds (x10) required for Elmer to prosecute an attack with at least 5 rounds completed. The default is 20 (2:1)

- Threshold3: This is the odds (x10) required for Elmer to prosecute an attack with at least 0 rounds completed. The default is 30 (3:1)

There is also a separate set of thresholds for the Berserk Strategic Bias. These settings would allow players or designers to fine-tune the PO in their scenario a bit more. But the file has to be edited in an XML editor (like XmlPad). See the "Red Thunder 1988" folder for an example of an .AI file.

12. ENGINEERING

12.1. DEMOLITION / BRIDGE REPAIR (ADVANCED RULES)

Any unit can blow bridges. This can be done at any time and at no cost.

If the "New Bridge Rules" Advanced Rule option is ON then bridges may only be blown on locations that have a road/railroad that graphically crosses a river/canal. Otherwise, any location with both a road//railroad and a river/canal, even if they don't graphically cross, is eligible to be blown.

Only units with an Engineering Capability can build bridges, however. The attempt will consume the unit's entire Movement Allowance for a Turn. The chance of success is equal to the unit's Engineering Capability.

12.2. FERRY SUPPORT

All Land units can cross Canals and Rivers at an additional Movement Cost. The presence of units with an Engineering Capability can reduce this cost, based on their corresponding Minor Ferry Capacity. See 11.9.4, River Movement Costs, for more information.

12.3. MAJOR FERRY SUPPORT

Land units cannot usually enter Super River or Suez Canal locations. Units that have a Major Ferry Capacity of greater than 10% have the ability to enter these locations and create temporary crossing points for other units. If the hex contains a blown bridge, a unit with engineering equipment can move into, or through, the hex and even attempt to make repairs. If a Scenario designer has placed an Anchorage (port) in the hex, this will allow Land (and Naval) Movement into and out of the hex as well.

12.4. FORTIFICATION (ADVANCED RULES)

All Land units may deploy into defensive positions. The presence of units with an Engineering Capability increases the chance of successfully Entrenching or Fortifying. Even if a unit fails to Entrench or Fortify, it will increase the local Entrenchment Level, making it easier for that unit and others to Entrench or Fortify in the future. Once created, Field Fortifications are permanent. As the Entrenchment Level of a location increases, units in the location will

find it easier to enter Entrenched or Fortified Deployments. When a location changes hands, the Entrenchment Level is automatically reduced by 25%. Once ordered to dig in, units will continue to dig until their location is Fortified or you give them other orders.

The current Fortification Level of a hex can be checked by positioning the mouse cursor over the location and observing the Fortification Level reported in the Information Panel. A Fortification Level of 33% or less will only be reported in the Information Panel. Once the Fortification Level exceeds 33% a graphic is shown in the hex to indicate the presence of significant fortifications. Once the Fortification Level exceeds 66% the symbol is slightly thickened.

Fortified Line terrain is a special case. The Entrenchment Level of a Fortified Line location is always set to 100% at the start of a Scenario.

12.5. RAILROAD REPAIR (ADVANCED RULES)

Units with a Rail Repair Capability can repair broken railroads. The attempt will consume the unit's entire movement allowance. The chance of success is equal to the unit's rail repair capability. Units with a Rail Repair Capability will automatically attempt to repair damaged Railroads in their location at the end of their Turn, if they have not been given orders to do anything else.

Automatic Railroad Repair: In most Scenarios, both forces have an Automatic Railroad Repair Capability. The default value is 1 location per Turn, which is repaired when the game performs Automatic Bookkeeping. This is in addition to the Railroad Repair Capability of any units on the map. The Automatic Rail Repair function is reasonably intelligent; it attempts to recreate destroyed supply nets from supply sources, and will tend to occur near Supply Points and deployed Railroad Repair units.

13. ALL BATTLES ARE RESOLVED

Whenever you wish during your Turn, you may request that attacks and bombardments planned during your movement be resolved. Click on the Switch Sides / Combat Resolution button to make the request. The battles are resolved before control of the game is returned either to you or your opponent.

The battle for each location is fought separately. Computer-controlled units scheduled to Attack any given location are combined into a single Attack, and all available Support units on both sides are automatically added to the battle. Support units may participate in more than one battle (if so, they attack using half their Attack Factors). If a Support unit instead is assigned to exclusively support one battle (by left-clicking on it), it attacks at full strength, but cannot be used in other battles during this round of combat; see sections 13.16 (Amphibious Attacks), 13.17 (Airborne Attacks), and 13.18 (Airmobile Attacks) for details.

Attacks are resolved in order of complexity, with simpler Attacks occurring before more complex Attacks. See 13.15, Attack Complexity, for more details.

Individual battles are resolved in a series of Tactical Rounds. Each player Turn is divided into ten Tactical Rounds, and individual battles begin on the Round that most closely corresponds to the proportion of the attacking units' Movement Allowance expended before the combat.

Example: A unit with a remaining Movement Allowance of 12 and an initial Movement Allowance of 18 begins its Attack on Round 3. These rounds are used only for combat purposes and have no direct effect on your game play.

On each Tactical Round, combat is resolved in the order of Local Bombardment, then Anti-Armor combat, and then Anti-Personnel combat. During Local Bombardment, all supporting units fire their Bombardment Strengths at the enemy. Air units are subject to Interception and Anti-Aircraft fire. Then, enemy armored equipment is fired on by the combined friendly Anti-Armor strength and all enemy equipment is fired on by the combined friendly Anti-Personnel strength. Generally, only actively defending equipment is subject to losses during Anti-Armor and Anti-Personnel fire.

Much of the equipment "lost" during combat is not actually destroyed. Instead, it is considered damaged or temporarily unserviceable. This damaged equipment goes to the Replacement Pool unless the owning unit is Out of Supply. In the case of Air equipment, the fraction of damaged equipment going to the Replacement Pool is proportional to the owning unit's Proficiency. Naval equipment never goes to the Replacement Pool.

After each Round, all involved units check for "break off". The chance that a unit will break off depends on losses, Orders emphasis, coordination difficulty, and the duration of the individual Attack. Attacking units that break off simply cease their participation in the Attack. Defending units that break off attempt to disengage and retreat. Unit Supply and Readiness Levels are reduced in each round of combat. Readiness Losses are increased if chemicals are in use. Air units involved in combat are subject to more Quality Checks than other units. Air units failing these additional Quality Checks attack with lower Strengths.

Retreat From Combat Determination

- At the end of each combat round, units that have not dropped out of the attack or retreated from the defense will be used to determine the current Assault Strength Ratio. This ratio is then further modified by terrain and deployment scalars of the defender's position appropriate to the equipment types in that defense.
- This final ratio then scales the quality of each defender for purposes of Retreat from Combat (RFC). So, the higher the ratio, the greater the chance of RFC, and vice-versa. Units set to Minimize or Limit Losses must face further tests due to any losses they suffered. This scaling is split between a check for whether the net adjusted odds are > 1 (favors the attacker) or < 1 (favors the defender). In the first case, the defender's quality is directly scaled down by the adjustment. In the second case, the defender's headroom over his quality is scaled down by it. In other words:
- IF (Adjusted Odds > 1) THEN
- Defender Quality = Defender Quality / Adjusted Odds
- ELSE (Adjusted Odds < 1) THEN
- Defender Quality = 100 – (100 – Defender Quality) * Adjusted Odds
- A ratio of 3 invokes the unmodified quality of the defenders for the quality check (Adjusted Odds = 1). So a ratio of 6 would halve the quality while a ratio of 1.5 would halve its

headroom, etc. For example, if the defender had a quality of 70 (headroom of 30) and the radio was 1.5, the check would use an adjusted quality of 100 – 30 * 0.5 = 85. If the ratio was 6 it would use an adjusted quality of 70 / 2 = 35.

- Note that there is a Game Parameter (Force RFC Scalar) (see 8.5.1) that scales the ratio needed for the quality to be unmodified. 3 is the default value. So the scenario designer can adjust how easy or hard it is to gain ground.
- Remember that the ratio takes into consideration to what extent the defenders are armored or not and the assaulter's AP vs. AT strengths. The net effect is that terrain effects and combat odds scale the Quality check. This means that terrain affects RFC odds yet even fortified locations can be overcome via employment of heavy combat odds.

After the "break off" check, any defending Reserve units that can respond will move toward or into the location of the attack. It is possible for these units to arrive as other defenders are retreating.

Battles continue until all units of one side have broken off, but not beyond Tactical Round 10. Individual attacks will tend to last longer and cause greater losses if both sides are evenly matched or have aggressive (Ignore Losses) Orders emphasis.

You can determine how much of your Turn currently remains and when the last planned attacks will begin by looking in the Information Panel at the bottom of the screen while your mouse cursor is on the Progress Pane at the bottom of the Unit Panel.

Turn Used refers to the amount of the Turn that was already used, while Planned Combats refers to the Turn Used percentage at the commencement of the current series of planned attacks. For example, Turn Used (20%) and Planned Combats (40%) means that your previous series of combats left you with 20% of your Turn remaining, and at least one combat that you have currently planned will begin on Tactical Round 4. The Combat Planner's "Time Expended" pane can show which of your combats may be starting late. This can also be easily seen on the Planned Combats dialog.

When using larger screen resolutions (at least 1152 x 864), there is also a graphical approximation shown in the proportion of gold and silver stars remaining displayed in the circlet around the **TOAW IV** logo in the bolted plate. Gold stars represent the proportion of the Turn left at the commencement of the current series of battles, while Gold plus Silver stars represent the proportion of the Turn left from the end of the previous series of battles. The above only applies if the Legacy Control Panel is in use. If not, the Progress Pane at the bottom of the new Unit Panel shows the same via gold and gray cells (shown above).

13.1. AIRBASE DEFENSE

Air units with a High Altitude Anti-Air capability will automatically join in local Air Superiority combat regardless of Mission if their base is attacked by enemy Air units. They will also rise to intercept airborne units launching assaults on their airbase.

13.2. AIR AND NAVAL UNITS IN LAND COMBAT

Air and Naval units can only participate in Land combat in their role as long-range Artillery supporting Attacks or Defenses. They do not contribute to the defense of their own location when attacked by

Land units. If an Air or Naval unit is the only occupant of a location under attack by enemy land units, it will immediately attempt to retreat (air units will relocate to a friendly airbase). If no retreat is possible, the unit is immediately destroyed.

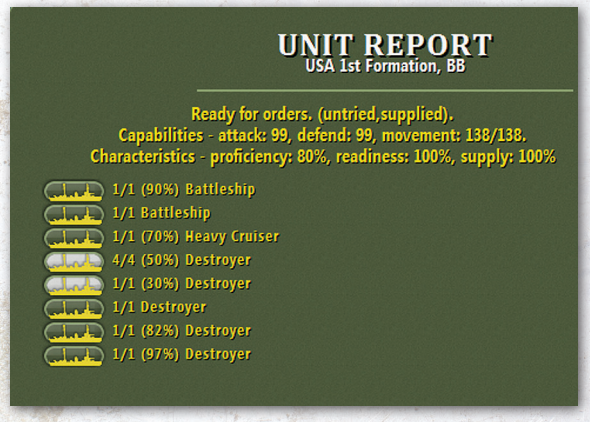
13.3. NAVAL COMBAT

Naval combat in older versions of TOAW had been very crudely modeled. Ships were literally treated as if they were a single piece of equipment – like a single squad. Any AP hit killed them. Their defense strengths weren't used in that determination, by the way. This meant that it was as easy to sink a Battleship as it was to sink a Destroyer. AP strengths were combined for hit determination – making a bunch of DDs as powerful as BBs. Whether hit ships were permanently destroyed or just sent to the "On Hand" pool bizarrely depended upon a check against their proficiency. Fleet units could "evaporate" like a land unit that had lost cohesion. Embarked units employed their various strengths when attacked. The whole thing had to be overhauled if there was to be any hope of realistic naval warfare. It has been. The **TOAW IV** combat model has the following features:

- Ships now have damage levels, and take damage in combat, if hit by the attacking ordinance. Those levels are displayed in the unit report (see below).
- Attacking equipment Anti-ship factors are evaluated as individual shots/planes so that each warhead can be evaluated for armor penetration.
- Hit chances depend on a number of checks made involving various factors such as the visibility, attacker proficiency, target agility, aircraft anti-naval strength, gunnery range, and shock levels.
- The amount of damage a hit inflicts on a target ship depends upon shell weights of the ordinance hitting them, their armor thickness, and their durability.
- Ship armor and durability are derived from the ship's defense strength, unless the designer has explicitly specified them using the new naval equipment add-on to the scenario's equipment file. That file also allows ship agility, accuracy, and speed to be explicitly specified.
- Embarked units' armor, durability, agility, and AAA are fixed at 0, 25, 18, and 0, respectively. This means that the strengths of the embarked equipment are no longer used to resolve attacks on embarked units.
- Ships that accumulate 100 or more damage points are eliminated – sent to the dead pile.
- Ship damage levels less than 100 are saved in the unit on each TO&E line. Those levels debilitate the ship's AP, AAA, Speed, Nuclear Strength, and Agility accordingly. They do not affect Defense Strength, Armor, or Durability levels. Damage levels of 50 or more turn the ship's TO&E button red (for a bit of chrome).
- If a TO&E line contains more than one ship all damage on that line is applied to only a single ship until the damage totals 100 – at which point one ship is sunk and the damage level of the TO&E line drops back to zero. Call it the "lead" ship in that line. Other ships in that TO&E line remain undamaged (and invulnerable) – until they become the "lead" ship due to the sinking of the previous one. Note that there is a technique available to designers to split such multiple-ship lines up into single ship lines, if desired. (See section 19.8)

- Naval units cannot be disbanded by players or evaporated by combat short of all ships in the unit being sunk. Combat never sends ships to the "On Hand" pool.
- Aircraft Carriers with more than 66 damage points cease to function as aircraft carriers. If that means that there are then fewer aircraft carrier bases than air units in the hex, one air unit will be eliminated.
- Carrier-based air units are exempt from combat reorganization.
- Damage points incurred by embarked units destroy a weight of equipment equal to those damage points.
- There is limited ability to repair some damage while at sea, and significantly more while at port.

This new combat procedure only affects combat where the target is a *ship* or embarked. Bombardment of *land* units by naval forces is still resolved just as it has always been resolved. There is a detailed discussion of these factors for the benefit of players and designers in the appendices at the end of this document.



This illustrates how damage is displayed in the Unit Report. Note that one BB has 10% damage, while one is undamaged. The CA has 30% damage. The lead DD on the fourth TO&E line has 50% damage (the other three are undamaged). Finally, the first individual DD has 70% damage, the second is undamaged, the third has 18% damage, and the last has 3% damage. So the values are actually displayed as (100 – damage). The two lines with 50% and 70% damage have red buttons. Note that the two BBs have been split into two separate lines in the TO&E, as have the second set of four DDs. Clearly, the second set of four DDs can have their combat better modeled than the first set.

13.4. NAVAL TARGETING

Previously, ships in a target hex had the same priority as a single squad. This allowed players to unrealistically protect the ships with embarked land units – whose huge equipment counts swamped the enemy shots. Now, target priorities are based realistically on the true values of the units. Priorities are by unit and based upon the unit icon as follows:

- Carrier Naval: 1500
- Heavy Naval or Task Force Naval: 150
- Medium Naval: 50
- Light Naval or Riverine Naval: 10
- 100 weight of embarked: 40

So, for example, if a group contained a CV, a BB, a CA, a CL, some DDs in a TF unit, and 250 weight of embarked, the total value in the hex would be 2000. Then the CV unit would have 75% priority, and the BB, CA, CL, DDs, and embarked units would have 7.5%, 2.5%, 2.5%, 7.5%, and 5%, respectively. That will mean that 75% of all planes and shots will target the CV unit.

If any target unit has multiple ships in it, then there is further targeting priority within the unit using the same weights but based upon the naval equipment flags.

13.5. PORT ATTACKS

This allows players to target only the naval units in an anchorage hex – like an "Airfield Attack" targets only the planes in a hex. This can be done even if the hex is "unknown". Again, this counters attempts by players to divert the targeting of their ships in port with land units. But note that any normal (non-"port") attack on an anchorage hex now targets everything in it except the naval units, for when that is desired. So, if ships are in an anchorage hex, the player must select "Port Attack" to target them, even if there is nothing else in the hex.

13.6. NUCLEAR ATTACKS

Nuclear Attack Strengths range from 0.01kT (kilotons of TNT) to 4mT (megatons of TNT), and their lethality is based on the physical scale of the Scenario. Effects may not be limited to the target location. The estimated Effective Strength of the attack is shown on the popup menu. This weather-dependent Strength may vary from what you would expect by examination of the unit's equipment. If a radius is given, the Attack effect will extend outside of the target location. The Attack Strength drops off rapidly outside of the target, but can in some cases still be quite deadly even several hexes away. Unless you are really desperate, it is best to avoid launching Nuclear Attacks if friendly units are within the Attack Radius.

Armored equipment is much more resistant to Nuclear Attacks than Non-Armored equipment. You generally won't take out many tanks with a Nuclear Attack unless the cumulative Attack Total is several hundred kT or more.

After a Nuclear Attack, the target and nearby locations may become Contaminated (11.9.3). The path of contamination outside the target is somewhat randomized, but can extend up to three times the attack radius from the actual attack location – generally to the east. Once contaminated, locations remain contaminated until the radioactivity decays. Units in Contaminated locations will suffer reductions in Readiness each Turn.

Nuclear attacks now receive the flanking bonus, causing more collateral damage.

13.7. AIRFIELD ATTACKS

Artillery and Aircraft units ordered to attack Airfields will concentrate their attacks on Air units in the attacked location, ignoring the presence of enemy Land units.

13.8. BRIDGE ATTACKS

Unlike all other kinds of Attacks, Bridge Attacks can be ordered on locations with no known enemy units. Only enemy owned bridges may be attacked. The chance of success for a single unit launching a Bridge Attack is shown on the popup menu. If more than one unit participates, all Attack Strengths are added and the Bridge Attack is conducted as a single Bombardment (so the chances become cumulative).

If the "New Bridge Rules" Advanced Rule option is ON then bridge attacks may only be made on locations that have a road/railroad that graphically crosses a river/canal. Otherwise, any location with both a road//railroad and a river/canal, even if they don't graphically cross, is eligible for a bridge attack.

13.9. BATTLEFIELD RECONNAISSANCE

All unit Strengths are increased by the unit's Reconnaissance Capability on the first round of

combat. Reconnaissance Capability has no effect on subsequent Rounds.

Example: If a unit has an Anti-Personnel Strength of 15 and a Reconnaissance Capability of 30%, its effective Anti-Personnel Strength on the first round of combat would be 19.

13.10. TARGET DENSITY (ADVANCED RULES)

Normal Combat Loss calculations assume target densities below a certain value based on the physical scale of the Scenario. In many cases you can exceed this target density by piling units into a location. This may be the only way to effectively concentrate for an attack in some Scenarios, but there is a cost. If you present the other Force with a dense concentration of equipment, so that he can't help but hit something with every shot, you may take excessive losses. Locations with excessive target densities are indicated on the map by a small colored light in the west corner of the location. These indicator lights range from yellow-green to red.

- As a rule of thumb, you should avoid piling units into a location if you see a colored light, as follows:
- No indicator means the target density is at or below the limit for the Scenario.
- A yellow-green indicator is a caution; the target density limits have been exceeded, and combat losses are multiplied by 1.0 to 1.4.
- A yellow indicator is a warning; the excessive target density will result in combat losses being multiplied by 1.4 to 1.7.
- An orange indicator is a strong warning; the excessive target density will result in combat losses being multiplied by 1.7 to 2.0.
- A red indicator is a very strong warning; the excessive target density will result in a combat losses being multiplied by at least 2.0.

13.11. LONG-RANGE SUPPORTING FIRE

All cooperative Air units with Combat Support orders, Artillery, and Naval units may automatically add one-half of their Bombardment Strengths to each Attack within range. Artillery units will not support combats if they have Mobile, Retreated, or Routed deployments. Units must pass a Communication Check (8.5.1) in order to provide Combat Support. Air units may fail to react if the range is long compared to their combat radius.

There is no supporting fire for Bombardments. Air units may suffer losses to Anti-Aircraft fire and Interception by enemy Air units with Air Superiority missions.

Air units with multiple range air equipment in them assigned to attack a target will only take losses on the equipment with the range to actually reach the target.

Note that both air equipment and anti-air equipment are rated as either high or low (some anti-air is high/low). Low air is affected by both high and low anti-air. High air is affected by high anti-air and, only a small proportion of low air. Just because the plane is rated high-altitude doesn't mean that it necessarily carries out its mission at high altitude – especially combat support.

Air units with 0 AP strength but with non-zero AT or Anti-Naval strengths can now be assigned Combat Support or Sea Interdiction missions respectively.

Entrained, embarked, and retreated artillery no longer provide support.

13.12. ENVIRONMENTAL EFFECTS ON COMBAT (ADVANCED RULES)

Terrain and environmental conditions have a strong effect on combat. Terrain primarily benefits defending Land units and sometimes penalizes attacking Land units. Visibility and time of day affect Air unit Strengths.

Some rules only pertain when Advanced Rules are being utilized; these are noted below.

13.12.1. DEFENSIVE ANTI-ARMOR STRENGTHS

Defending units benefit from increased Anti-Armor Strengths in some terrain or Deployments. Defense Multipliers combine as detailed in 13.12.6. Otherwise effects are not cumulative. Only the strongest modifier is in effect:

- In a Fortified Line hex (any Deployment), or Fortified Deployment (any terrain): x5
- Dense Urban, Dense Urban Ruin, or Mountains (any Deployment), or Entrenched Deployment (any terrain): x3.5
- Urban, Urban Ruin, Bocage, or Marsh (any Deployment), or Defending Deployment (any terrain): x2

13.12.2. DEFENSIVE ANTI-PERSONNEL STRENGTHS

Defending units benefit from increased Anti-Personnel Attack Strengths in some terrain or Deployments. Defense Multipliers combine as detailed in 13.12.6. Otherwise effects are not cumulative. Only the strongest modifier is in effect:

- In a Fortified Line hex (any Deployment), or Fortified Deployment (any terrain): x4.5
- Bocage (any Deployment) or Entrenched Deployment (any terrain): x3
- Mountains (any Deployment), or Defending Deployment: x1.5

13.12.3. DEFENSIVE STRENGTHS OF VEHICLES

Vehicles in defending units benefit from increased Defensive Strengths in some terrain and Deployments. Defense Multipliers combine as detailed in 13.12.6. Otherwise effects are not cumulative. Only the strongest modifier is in effect:

- In a Fortified Line hex (any Deployment) or Fortified Deployment (any terrain): x3
- Dense Urban or Dense Urban Ruin (any Deployment) or Entrenched Deployment (any terrain): x1.5

13.12.4. DEFENSIVE STRENGTHS OF INFANTRY

Infantry and non-static weapons in defending units benefit from increased Defensive Strengths in some terrain or Deployments. Defense Multipliers combine as detailed in 13.12.6. Otherwise effects are not cumulative. Only the strongest modifier is in effect:

- In a Fortified Line hex (any Deployment) or Fortified Deployment (any terrain): x8
- Dense Urban, Dense Urban Ruin, or Badlands (any Deployment): x4
- Urban, Urban Ruin, Bocage, Dunes, or Mountain (any Deployment): or Entrenched Deployment (any terrain): x3
- Forest, Jungle, Hills, or Wadi (any Deployment), or Defending Deployment (any terrain): x2.0

13.12.5. DEFENSIVE STRENGTHS OF STATIC EQUIPMENT

Static equipment (equipment that requires Transport in order to move) benefits from increased Defensive Strengths in some terrain or Deployments. Defense

Multipliers combine as detailed in 13.12.6. Otherwise effects are not cumulative. Only the strongest modifier is in effect:

- In a Fortified Line hex (any deployment), or Fortified Deployment (any terrain): x6
- Badlands (any Deployment): x3
- Dense Urban, Dense Urban Ruin, Dunes, or Mountains (any Deployment), or Entrenched Deployment (any terrain): x2.0
- Urban, Urban Ruin, Forest, Jungle, Hills, Bocage, or Wadi (any Deployment), or Defending Deployment (any terrain): x1.5

13.12.6. COMBINATION OF TERRAIN AND DEPLOYMENT DEFENSE MODIFIERS

Terrain Defense Multipliers combine with Deployment Defense Multipliers as the square root of the sum of the squares. However, no multiplier can be greater than the fortified benefit. This is shown here:

		Mobile	Defend	Entrench	Fortify
Infantry Defense Multiplier		-	2.00	3.00	8.00
Fortified Line	8.00	8.00	8.00	8.00	8.00
Dense Urban, Badlands	4.00	4.00	4.47	5.00	8.00
Mountain, Dunes, Urban, Bocage	3.00	3.00	3.61	4.24	8.00
Forest, Jungle, Hills, Wadi	2.00	2.00	2.83	3.61	8.00
All others	-	-	2.00	3.00	8.00
		Mobile	Defend	Entrench	Fortify
Vehicle Defense Multiplier		-	-	1.50	3.00
Fortified Line	3.00	3.00	3.00	3.00	3.00
Dense Urban	1.50	1.50	1.50	2.12	3.00
All others	-	-	-	1.50	3.00

13.12.7. UNIT STRENGTHS IN WATER ASSAULTS

Non-Marine Land units attacking from River, Super River, Canal, Suez Canal, or Deep Water (Amphibious Assaults) have all Strengths multiplied by 0.7.

13.12.8. ESCARPMENTS

Since only Mountain units can move across Major Escarpments, they are the only units that can attack across them (exception: any unit can attack across a major escarpment via a road). Their losses will be three times the normal for the attack. Combat across Minor Escarpments results in twice the losses for the Attacker. Artillery and Headquarters are not as affected; Artillery attacks at 150% Strength if it is "looking down" on the target across a Major Escarpment. This is defined as an artillery unit, in the hex that contains the escarpment terrain feature, firing across that hexside feature at an adjacent unit.

13.12.9. VISIBILITY (ADVANCED RULES)

Visibility affects Air unit Attack and Defense Strengths, as follows:

- Fair: 100% – Fair locations are locations that have no clouds in them.
- Hazy: 100% for all weather equipment, 66% otherwise – Hazy locations are locations that have flat clouds in them (regardless of precipitation).
- Overcast: 66% for all weather equipment, 33% otherwise – Overcast locations are locations that have puffy clouds in them (regardless of precipitation).

13.12.10. NIGHT AND DAY (ADVANCED RULES)

In six hour and half-day Turn Scenarios, time of day affects Air unit Attack and Defense Strengths, as follows:

- AM Turn: 100%
- PM Turn: 66% for all weather equipment, 33% otherwise.

13.12.11. NIGHT ATTENUATION

If Turns are Full Days or longer, Air unit Attack and Defense Strengths are multiplied by 83% for All Weather equipment, 66% otherwise.

13.13. FLANKS AND REAR AREAS

Most units are assigned a mix of actively-defending equipment (such as Infantry or Tanks) and passively-defending equipment (such as Artillery). Usually, passively-defending equipment is significantly shielded from losses in combat. The theory is that units like Artillery are deployed in rear areas and generally are out of harm's way. Unfortunately, this isn't always the case.

In units attacked from any two, or more, non-adjacent hexes in the same Turn, passively-defending equipment (such as Artillery) will be forced to participate directly in combat. The attacks need not be combined. One unit can "pin" from one direction, while another executes the "Flanking" Attack. If a unit that attacked earlier in the Turn is itself later attacked, the original Attack is considered a "defense" for this purpose. This means that if a unit attacks to the south, but is itself later attacked from the north, it will suffer the Flank Attack penalty. Likewise, a unit that attacks into two, or more, non-adjacent hexes will suffer a Flank Attack from the defensive fire of the defending units. Units that split into sub-units and attack into two or more non-adjacent hexes will cause the parent unit (and any subsequently re-split sub-units) to be subject to Flank Attacks if the sub-units recombine afterwards on the same Turn that the sub-unit Attacks are made. Once a unit has its flank "turned," all further attacks in that Turn against it, or by it (in the case of Defensive Fire against Attacking units), will be a Flank Attack until it retreats (defenders) or advances (attackers). Units are not subject to the Flank Attack penalty immediately after any movement out of the hex from which they were attacked, or attacked out of.

The facing of the 3D unit icon graphics on the map is not significant for this purpose.

Note that, if optioned, "New Flanking Rules" revises this somewhat. See 3.3.1.

13.14. RETREATS

If a defending unit attempts to break off, it will look for a safe location in the direction of the nearest friendly cooperative Headquarters or Supply Source. The unit will attempt to disengage and retreat into that safe location. If such a location is not available, the unit will instead have its Readiness reduced to 33% and it will refuse further orders until it Reorganizes. In practical terms, this reduces the unit to a milling mob of uncoordinated troops, which will offer little resistance if attacked again. Entrained units forced to retreat will be dis-entrained and lose their entrained movement allowance.

13.14.1. RBC ESCAPE FROM BLOCKED RETREAT PATH

Surrounded defending units that are forced to retreat from combat and have no other path of retreat will get to attempt to breakout via RBCing any of the surrounding enemy units. All qualifying defenders get to attempt the RBCs until a path is cleared or all have failed against all blockers. Note that this will require the use of substantial forces in all possible paths around the defender if that defender is to be denied a retreat path. "Ants" won't work.

13.15. ATTACK COMPLEXITY (DEFINED)

Attack Complexity increases with the number of attacking units, the distance those units move before launching their Attack, the Cooperation Level

necessary for coordination between units of differing Formations, and inclement weather or difficult terrain in and around the location of the Attack.

13.16. AMPHIBIOUS ATTACKS

Any Attack launched from a Deep Water location is considered an Amphibious Attack. Such an Attack is resolved normally, except that if the Attacker is unsuccessful his units will re-embark on their Transports. Note that a non-Marine unit attacking from a Deep Water location has its Attack Strength multiplied by 0.7 (see section 13.12.7, Unit Strengths in Water Assaults).

13.17. AIRBORNE ATTACKS

Airborne Attacks are resolved during Movement. See 11.9.6, Airborne Movement.

13.18. AIRMOBILE ATTACKS

Airmobile Attacks are resolved during Movement. See 11.9.8, Airmobile Movement.

13.19. EFFECTS OF ENTRAINING UNITS

Units on board Trains have their Attack and Defense strengths reduced to 25% of normal. They may defend, but may not launch Attacks.

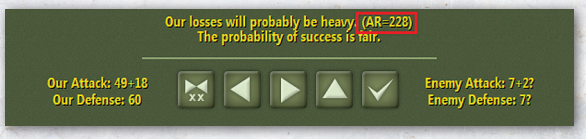
13.20. ASSAULT RATIO RULES

This feature is intended to render the gamey "Supply Sucking" and "Bombard to Victory" tactics so common in older versions of TOAW obsolete. Now, to "suck" supply from a defending stack, the attacker will have to commit comparable frontline forces. And bombardment will no longer benefit from inclusion of a "throwaway" ground attacker (an "ant" unit).

The benefits to the attacker artillery strength, the defender supply cost per round, and the prevention of counterbattery fire from a ranged defender are no longer guaranteed just because there is any ground-attacking unit, regardless of the size or composition of that unit. Rather, receipt of these benefits is now dependent upon a new attack parameter called the "Assault Ratio" (AR for short).

The AR is 100 times the ratio between the Attacker Assault Strength to the Defender Defense Strength. The Defender Defense Strength is determined just as it always has been – total defense strength of all defenders in the target hex (but without support). But the Attacker Assault Strength is new, and sort of complicated to explain. First, it only includes direct ground attackers – no support. Second, it only includes the active equipment of those attackers. Finally, of that equipment, it totals the AP and AT strengths in proportion to the contribution of armored and soft equipment to the Defender Defense Strength. So, if the defender is all armored equipment, only the attacker's AT strengths would be totaled. If the defender is all soft equipment, only the attacker's AP strengths would be totaled. If half the defender's defense strength is from soft equipment and half armored, then half the attacker's AP would be totaled with half his AT, etc.

Once determined, the AR of the attack is displayed in the Attack Planning Dialog (subject to Fog-of-War) as shown below:



Then, the AR is used to determine the level of benefit to those three assault factors above. If the AR is 100 or greater (Attacker Assault Strength is at least equal to Defender Defense Strength) then all the benefits are automatically received – just like for all attacks before. But, if it is less, the chances increase proportionately that the benefit level will decrease from Full to Partial. (For example, at an AR of 50, there is a 50% chance of that). At less than 10, the chances increase proportionately that the attack could even be treated the way a pure bombardment was effected before (provided it has any directly-assigned support). (For example, at an AR of 5, there is a 50% chance of that). At 0, it is guaranteed to be treated like a bombardment – again, if it has directly-assigned support.

The three benefit levels are shown here:

Benefit Level / Factor	Full	Partial	None	
			With Spt	Without Spt
Defender Supply Cost/Round	10	1	0	0
Defender Artillery Cost/Round	5	0.5	0	0
Defender CtrBtry Cost/Round	n/a	n/a	10	n/a
Attacker Artillery Bonus	X10	none (X1)	none (X1)	n/a
Indirect Artillery Support	Yes, X10	Yes, X1	No	Yes, X1
Counterbattery Possible?	No	No	Yes	No
Ground Assault Takes Place?	Yes	Yes	No	Yes
Check1: AR >= Rand (1-100)	Pass	Fail	Fail	Fail
Check2: AR >= Rand (1-10)	n/a	Pass	Fail	Fail
Combat Report Label:	Attack	Weakly Attack	Bombard	Very Weakly Attack

Red items are where this feature differs from the old way. "Artillery" applies to any supporting ranged unit (including air units). Note that the Full column is identical to the way assaults were always resolved before. The None/With Spt column is the same as the way bombardments were always resolved before. The Partial column is sort of in-between. Note that there are two random checks made against the AR that determine which benefit level is received. Finally, note that the 0.5 supply cost is effected via a random check (randomly 0 or 1 @ 50% each).

The benefit level received is displayed in the Combat Report as shown below:

If the message says "attack", then full benefits were received:

Full Report AXIS attack location 4,36.

If it says "weakly attack" then partial benefits were received:

Full Report Axis weakly attack location 144,84.

If it says "bombard" then no benefits were received (or the attack actually was a bombardment):

Full Report Axis bombard location 143,85.

Finally, if the message says "very weakly attack", then no benefits were received and the attack had no directly assigned artillery support:

Full Report Axis very weakly attack location 144,83.

While this probably sounds very confusing, (and there is a great deal of complexity behind the scenes that has been omitted from this description) all players need to understand is that to ensure full benefits, **keep the effective strengths of the forces actually assigned to ground-assault the defenders at least equal to the size of the defenders' defense strengths.** (That means keeping the AR equal to 100 or above). The farther below 100 the AR is, the more risk that less and less of the above benefits will be received. Note that defender terrain and deployment enhancements are ignored for purposes of this effect (we're just sort of comparing relative effective unit sizes). But entrainment/embarkment, etc. are not ignored. Be aware that support Loss Tolerances will now determine the number of rounds expended if the assault becomes a bombardment (like in a normal bombardment).

Note that, other than determining the above effects, the AR and Attacker Assault Strength

values are not used in the resolution of the actual combat. Passive equipment still participates as before, provided the AR is otherwise not rendered small enough to convert the attack into a bombardment. But that will be the case if the assault is pure passive (AR will equal 0). Note that if there is a situation where players want a pure passive or otherwise very tiny attack to actually assault, then they should not provide it any directly assigned support, and then it will do so.

14. YOUR ENTIRE FORCE MOVEMENT ALLOWANCES ARE ADJUSTED

After combat, all of your units will have their remaining Movement Allowances adjusted to reflect the Median Tactical Round needed to resolve all Normal Attacks. Note that this omits bombardments, unless the round only included bombardments – then the round advances to the median-length bombardment.

Example: If the Median Tactical Round was Round 7, all of your units will have their Movement Allowances limited to no more than 30% [(10-7)*10%] of their full Movement Allowance.

14.1. BATTLEFIELD TIME STAMPS

Note that the above is a change from older versions of TOAW. In those versions, after all combats were resolved, the player-turn advanced to the combat round of the longest lasting combat. So, a single long-lasting combat could burn up most or all of the player-turn. This factor (often referred to as "turn burn") made very large scenarios especially vulnerable since the more combats a phase resolved, the more likely one of them would suffer from being very long-lasting. This was somewhat addressed by the MRPB feature, but even that only addressed the battle length of the combat itself, not the delaying effect of late units – and only for scenarios that had seen designer attention regarding it. Beginners, especially, still watched helplessly as their turns ended far too early – souring them on the game.

This is a new feature that (hopefully) will finally resolve the issue to the enjoyment of everyone. Under **TOAW IV**, after all combats are resolved, the player-turn will advance to the combat round of the MEDIAN length combat. In other words, if there were seven combats that lasted 1, 1, 2, **2**, 3, 3, & 6 rounds respectively then the player turn would advance only two rounds, instead of the six rounds of before. Note that this means that three combats lasted longer than the round of the new combat phase. This will be accounted for by placing a TIME STAMP in those three hexes that will equal their actual ending round.

TIME STAMP definition: The fraction of the player-turn, in tenths, that has been expended. This applies to the Player-Turn itself, to Units (the fraction of their MPs that they have expended), and now to battlefield hexes.

Movement effects of Battlefield Time Stamps: Any unit that enters a hex with a Battlefield Time

Stamp will have its movement points reduced until its unit time stamp is at least equal to that of the hex.

Combat effects of Battlefield Time Stamps: Combats planned for a hex with a Battlefield Time Stamp will start on a combat round as if the player-turn is the same as the hex's time stamp. All units that participate in a combat that results in a Battlefield Time Stamp have their time stamps increased to the resulting time stamp of the battlefield.

Combat creation of Battlefield Time Stamps: If a combat lasts longer than one round, it creates a Battlefield Time Stamp equal to the last round that combat expended.

In addition, if a defender was prevented from retreating from a combat by non-participating adjacent enemy units then the combat's Battlefield Time Stamp is the greater of the time stamps of the blocking units and the time stamp of the last round of the combat. So, if the combat ended on round five, but there was a blocking unit that prevented the defenders from retreating and it had a time stamp of seven, then the Battlefield Time Stamp would be set to seven (and all participating units would have their time stamps increased to seven). Note that this ends the time-machine effect of blocking units that the game had endured up to this point.

RBC creation of Battlefield Time Stamps: Whenever a defender is forced to retreat-before-combat (RBC, also referred to as Overrun) by a unit with a Time Stamp greater than the Player-Turn's Time Stamp, there is a Battlefield Time Stamp created in the hex equal to the time stamp of the overrunning unit. Note that this ends the time-machine effect of overrunning units.

Battlefield Time Stamps are shown on the map by a dedicated graphic (see below) and their effect on movement is incorporated into the path feature and shown in the unit panel. Note below that there is now an option to display the unit's time stamp on its counter.

After all combats are resolved and the combat phase has been advanced, all Battlefield Time Stamps on the map that are either less than or equal to the new time stamp of the player-turn are erased. So all Battlefield Time Stamps are erased by the end of the player-turn.

Note that by advancing to the MEDIAN instead of the MINIMUM combat length the game retains a requirement for a level of skill in marshalling the player's combats. Players still need to try to minimize the number of combats that last multiple rounds to get the best amount of combat exploitation. But now a single slip-up or bad break won't ruin an entire player-turn.

14.2. TURN OVER

Your Turn will end if any of the following conditions apply:

- You have launched no Attacks.
- The mean remaining Movement Allowance of your entire Force is too small to allow for successful exploitation of your Attacks; i.e., an average of less than 20% of the Movement Points remaining among the units involved

in the last series of Attacks. Effectively, this means that the player-turn ends if you have no more than one unexpended combat round left.

- Your Force fails a Proficiency Check. This is the primary use of the Force Proficiency value, though it should be noted that the Force Proficiency value is not the exact probability that the Turn will continue after each series of Attacks. To fail the check, a random check against the Force Proficiency value must fail, AND a random check against the number of rounds remaining must also fail. So the chance of failing the check increases as more and more of the turn is expended.

If your turn ends after your combats have been executed, there will be a message dialog telling whether it ended because of a Force Proficiency Check failure or because there is too little of your turn left. So, if you get an early turn ending you should be able to determine whether it was due to bad luck or mismanagement. Hopefully, this will enable beginners to improve their gameplay from such knowledge. If you end the turn manually, with no combats planned, there is no such message.

14.3. THE TURN ENDS

When both players have had an opportunity to issue Orders to their Forces and all combats are resolved, the Turn ends. A new Turn begins with Automatic Bookkeeping. This process then continues until the end of the Scenario.

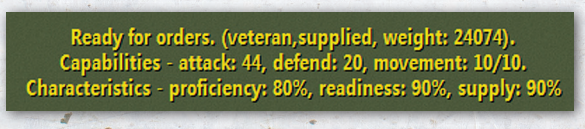
15. VICTORY

Victory in the game is based on control of Objectives, Victory Point awards by event, and penalties for combat losses. If you control more Objective Points while taking fewer losses, and/or more VP awards, than your opponent, you win. Otherwise, you lose. To some extent, losses and awards offset Objective Values. It is entirely possible that your losses and awards can completely negate any advantage for holding a particular chunk of real estate. Values for Objectives controlled, VP awards, and penalties for losses taken are tracked in the Victory pane of the Situation Briefing. This briefing pops up at the beginning of every Turn, so keep an eye on it.

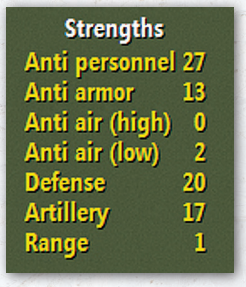
16. INFORMATION AND PLAYER AIDS

16.1. THE UNIT REPORT (ADVANCED RULES)

You can bring up a detailed Unit Report by clicking the Unit Report button on the Button Panel, right clicking on the Stack in the Unit Panel (see 6.1.13), or by right-clicking on a unit in the Map Panel and selecting the Show Unit Report option from the resulting popup menu. The Unit Report window shows all available information for the current unit.



The data pane at the top of the window shows the unit's current Status, Capabilities, Transport Weight in tons, and other characteristics.



The Strength pane shows the unit's various Strengths, including anti-armor, anti-air, and other factors.

The Special Abilities pane lists any special abilities the unit has, such as Engineering, Ferry Support, or Reconnaissance.

The Transport Options pane lists any transport lift options available to the unit, such as Board Train, Board Ship, Board Aircraft, and Board Helicopter. Any such available will be shown on a button. Clicking the button will cause the unit to be embarked on that transport.

The Range Limit pane shows the unit's Range, if it is a ranged unit. The button allows the player to change the range value. Non-ranged units have no such pane.

Range Limits

All ranged units now can have their nominal ranges player-limited. The choice is made within the Unit Report. A setting of -1 restores the value to the nominal value. A setting of 0 makes the unit non-ranged – this can allow the unit to assault when adjacent. A setting of any positive range allows the unit to bombard when adjacent. The -1 setting still

applies the 50% test when adjacent. These settings can be preselected by the designer in the editor (default is -1). Note that the intent of this feature is to allow players to tailor their bomber ranges so as to stay within air cover of their fighters – but note that it applies to ships and artillery, too. It can also benefit units with multiple equipment types in their TO&E to operate with the range of the shortest-ranged equipment type. The DBR display ("Crop-circles"), will reflect the modified range.

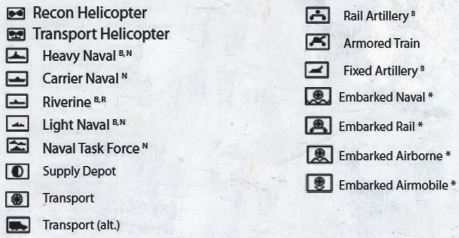
The Unit Icon pane in the right top corner shows the unit's icon. If the unit has a secondary icon, that will be shown below the primary icon. (See 17.3.1)

The Equipment Pane shows a complete list of all equipment assigned/authorized for the unit. You can click on the Equipment buttons for additional information on any piece of equipment authorized for the unit.

The Control Bar Buttons allow you to change the unit's Deployment and Loss Tolerance, switch to view the next or previous unit in your Force, cycle through the units grouped in the same location, exit the window, view the unit's parent Formation, view the OOB, or subdivide/recombine the unit. If a scrollbar appears, it can be used to scroll through the equipment pane.

There is additional information available in the Scenario Editor. The unit's Transport requirement is available in the Unit Data pane, and a Veteran/Untried toggle button is available in the Control bar.

- Headquarters [BH]
- Headquarters (alternate) [BH]
- Battle Group
- Kampfgruppe
- Task Force (land)
- Combat Command A
- Combat Command B
- Combat Command C
- Combat Cmd. R(eserve)
- Tank
- Heavy Tank
- Armored Infantry
- Armored Recon
- Armored Engineer
- Armored Cavalry
- Assault Gun
- Armored SP Artillery [B]
- Armored Hvy Artillery [B]
- Armored SP Antitank
- Heavy SP Antitank
- Infantry
- Infantry Hvy Wpns
- Machine Gun
- Engineer
- Cavalry
- Special Forces [S]
- Marines
- Ski (infantry)
- Bicycle (infantry)
- Motorcycle (infantry)
- Reserve (infantry)
- Military Police
- Border (guards)
- Garrison
- Irregular Infantry
- Guerrilla [G]
- Civilians
- Antitank
- Antitank (alternate)
- Mortar [B]
- Heavy Mortar [B]
- Artillery [B]
- Heavy Artillery [B]
- Horse Artillery [B]
- Infantry Artillery [B]
- Rocket Artillery [B]
- Surface-to-Surface Msl. [B]
- Anti Aircraft
- Motorized Infantry
- Mot Inf Hvy Wpns
- Motor Machinegun
- Motorized Engineer
- Motorized Cavalry
- Motorized Antitank
- Motorized Antitank (alt.)
- Motorized Artillery [B]
- Motorized Rocket Art. [B]
- Motorized Anti Air
- Mountain Infantry [M]
- Mountain Hvy Wpns [M]
- Mountain Cavalry [M]
- Mtn Cav Hvy Wpns [M]
- Airborne [A]
- Parachute Infantry [A]
- Parachute Hvy Wpns [A]
- Airborne Engineer [A]
- Airborne Recon [A]
- Parachute Artillery [AB]
- Airborne Antitank [A]
- Airborne Anti Aircraft [A]
- Glider Tank [A]
- Glider Infantry [A]
- Glider Hvy Wpns [A]
- Glider Artillery [AB]
- Glider Recon [A]
- Glider Antitank [A]
- Airmobile [L]
- Airmobile Antitank [L]
- Airmobile Infantry [L]
- Airmobile Inf Hvy Wpn [L]
- Airmobile Cavalry [L]
- Airmobile Artillery [LB]
- Airmobile Engineer [L]
- Airmobile Anti Aircraft [L]
- Ferry/Bridge Engineer
- Railroad Repair
- Amphibious [P]
- Amphibious Tank [P]
- Armored Amphibious Transport [P]
- Chemical Artillery [B]
- Coastal Artillery [BC]
- Coastal Artillery (alt.) [BC]
- Air [X]
- Fighter [X]
- Fighter Bomber [X]
- Light Bomber [X]
- Medium Bomber [X]
- Heavy Bomber [X]
- Fighter [X]
- Fighter Bomber [X]
- Bomber [X]
- Heavy Bomber [X]
- Jet Fighter [X]
- Jet Bomber [X]
- Jet Heavy Bomber [X]
- Naval Fighter [X]
- Naval Attack [X]
- Naval Bomber [X]
- Attack Helicopter [B]



16.1.1. UNIT NOTES

A Airborne Capability: These units can move by air if sufficient Air Transport Capacity is available. See 16.1.4 for more notes on Airborne units..

B Artillery Capability: These units are capable of supporting attacks with long-range fire.

C Coast Defense Capability: These units may only fire on enemy units in Deep Water and Anchorage locations.

G Guerrilla Capability: See section 16.1.2, Guerrilla Unit Notes.

H Headquarters Capability: These units provide Headquarters benefits to other units in their Formation.

L Airmobile Capability: See 16.1.3, below.

M Mountain Capability: These units have reduced Movement Costs in certain types of terrain.

N Naval Movement Capability: These units can only enter Deep Water and Anchorage Locations.

P Amphibious Capability: These units are capable of limited Amphibious Movement.

R Riverine Movement Capability: These units can only enter Rivers, Canals, Shallow Water, and Flooded Marsh locations.

S Special Forces Capability: These units have Disengagement advantages.

U Supply Unit Capability: These units extend supply by a supply radius.

X Air Movement Capability: These units are capable of long-range Airbase-to-Airbase transfers.

* Embarked unit: These symbols are used to mark units currently Embarked (not available in the Editor).

16.1.2. GUERRILLA UNIT NOTES

- Guerrilla units always Disengage without cost, as Special Forces units do.
- Guerrilla units are very difficult to spot, particularly by Air or Helicopter units.
- Guerrilla units will not change the ownership of locations while moving. Only after Movement will Guerrilla units change the ownership of the location they occupy.
- Guerrilla unit Attack and Defense strengths are doubled when attacking from locations that were enemy-owned at the beginning of the Turn. Guerrilla units always draw at least "normal" supply, regardless of whether their location is friendly-supplied or not. If a higher level of Supply is available, the unit benefits normally.

16.1.3. AIRMOBILE UNIT NOTES

These units are capable of Airmobile Movement if sufficient Airmobile Transport Capacity (provided by Helicopter Transport units) is available within 200 kilometers of their location.

16.1.4. AIRBORNE UNIT NOTES

These units are capable of Airborne Movement if sufficient Air Transport Capacity is available. They are also capable of Airmobile Movement.

16.2. THE FORMATION REPORT (ADVANCED RULES)

This window shows all available information for one Formation. You can access this Report by clicking the Formation Button on the Button

Panel, via the Unit or OOB reports, or by right-clicking on a unit in the Map Panel and selecting Show Formation Report.

The data pane at the top of the window shows the Formation's current Status, Support Scope (how well its units cooperate with units of other Formations), Proficiency, and Supply Distribution Efficiency.

The Unit List pane below shows all units assigned to the Formation, their locations, and other essential information. Clicking on a Unit Name button will center the Map display on that unit. You can change a unit's Deployment or Mission by clicking on its Deployment button.

The Move PO button will move the current formation under PO control if it is displayed in "Hot" (gold) mode (PO Mode must be ON). If in "Safe" (white) mode it does nothing. The Next and Previous Formation buttons in the control bar are used to view your other Formations, and the Exit button exits the window. If a scrollbar appears, it can be used to scroll through additional units assigned to the Formation. The Force button will open the Unit OOB report. The Formation OOB button will open the Formation OOB report.

16.3. THE AIR UNIT REPORT

To access this Report, click View and select Air Units.

The Air Unit Report shows all of your Air units, their Missions, locations, and essential information. It effectively gathers all of your Air units into a virtual Formation so you don't have to hunt for them all over the Map (Theater). If you click on a unit name button, the map will center on that unit. You can use the Mission button to change the unit's Mission. The scrollbar is used to scroll through your Air units if there are more than will fit in the display area and the Exit button closes the window. The Air Staff Assistant button can be used to turn the Air Staff Assistant on or off.

At the top are the list headings (Unit, Mission, Location, and Unit Info). Clicking on each will sort the list by that column. To un-sort the list, the dialog must be exited and then re-entered.

16.4. THE ATTACK PLANNING WINDOW (ADVANCED RULES)

The Attack Planning Dialog gives all the information necessary to plan an Attack in detail.

In most cases, it is not necessary to use this feature to plan your attacks, but it can be helpful if you want to fine tune an Attack and is useful for learning how to play the game. To access, move units to attack an enemy unit or units, hover the mouse cursor over the enemy units until the cursor changes to a crosshairs symbol, and right click and select Plan an Attack.

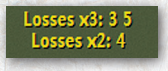
The Objective pane in the center of the window shows the Objective of the Attack, and all information available regarding enemy units in the Objective. The six surrounding panes show all terrain and units in the locations surrounding the Objective. Left-clicking on a friendly unit in the surrounding panes commits or un-commits that unit to the Attack with its current Loss-Tolerance setting. Right-clicking on a friendly unit in the Plan An Attack window brings up a list of options for changing the Attack Plan, including settings for Loss Tolerances. Individual unit flags show the cooperation that unit has with the other participating units. (See the Cooperation pane, below, for the meaning of the flag colors).

The Support pane, at right in this window, displays all long-range units available to support the

Attack. Such a unit automatically supports that combat if you make no selections; i.e., you do not left-click on it to place a brass-colored triangular symbol on it. When such a unit automatically supports an attack, it attacks with half of its attack strength, and supports all attacks within its range. If, however, you wish to exclusively assign a Support unit to a specific Attack, it will support that Attack (only) with its full Attack Factor, but that unit cannot then be used to support any other Attacks during that Round of combat. Support units that are in range to support but are not in a support deployment will still be shown, but with a red "X" through them. They can be added to the attack manually while in that condition. The same red "X" shows on ground units that lack the MPs to join the attack.

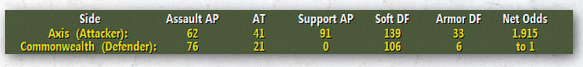
The Cooperation pane, at top left, shows the overall cooperation level the attack will experience. Below the flag for this level is a numerical value showing the amount the attackers will be scaled by this cooperation level. Note that a gold flag is full cooperation (x1 factor), a silver flag is limited cooperation (x0.87 factor), and a black flag is no cooperation (x 0.67 factor).

The Time Expended pane, at top right, shows how much of your Turn will be used after the Attack is executed, assuming all goes well. If the Attack is not overwhelming and one or both sides in the Attack have high Loss Tolerances, much more time may be expended. Grey tinted rounds have already been expended in previous combat phases or will be in other combats already set up for this phase. Gold tinted rounds are going to be expended by the combat shown in the planner.



The Loss Multiple pane, at bottom left, shows the effects of escarpments, if any are across any of the possible lines of attack. The top line shows where major escarpments (x3) are, and the bottom line shows where any minor escarpments (x2) are. Hexsides are identified by number as follows: 0 = top, 1 = upper right, 2 = lower right, 3 = bottom, 4 = lower left, and 5 = upper left.

The Defender Support pane, at bottom right, allows the player to enter his estimate of expected defender support. This estimate is then incorporated into the Odds pane, below. Note that the game could provide the exact support that the defender will receive, but that would be a serious breach of fog-of-war. The friendly player cannot know the cooperation and ranges of nearby enemy support, or what support might be hidden in unknown hexes. But he can have an idea, from experience, of what support the defense can expect, especially if the target hex has been recently attacked (via the Combat Report).



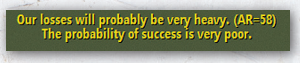
Side	Assault AP	AT	Support AP	Soft DF	Armor DF	Net Odds
Axis (Attacker):	62	41	91	139	33	1.915
Commonwealth (Defender):	76	21	0	106	6	to 1

The Odds pane, below the Objective pane, calculates the odds of the attack. Note that, unlike the strength information flanking the Control Bar, this estimate includes the effect of terrain, making it more useful. It also addresses the defender's soft vs. armored defense: It amalgamates the AP vs. Soft odds proportionately with the AT vs. Armored odds. It also allows the player to include an estimate of defender support as explained above. However, it still does not include the effect of cooperation (defender cooperation is unknown, so including attacker cooperation alone would be misleading).

The amalgamation above is achieved via this formula:

((Attacker AP + Support)/(Defender Soft DF) x (1 – Defender hardFraction) + (Attacker AT)/(Defender Hard DF) x Defender hardFraction +

(Attacker Soft DF)/(Defender AP + Support) x (1 – Attacker hardFraction) + (Attacker Hard DF)/(Defender AT) x Attacker hardFraction) / 2



The Prediction pane, below the Odds pane, shows the predictions for losses and success, as in older versions of TOAW. As in those previous versions, such predictions don't consider terrain or defender support.

The Control Bar buttons are used to switch the unit icon display between Strengths and Movement Allowances, and the Exit button is used to exit the window. The up and down buttons will cycle the planner through all planned combats. If the <Shift> key is held down, those buttons will cycle the planner through all potential combats.

Total Attack and Defense Strength information is available in the Strength panes flanking the Control Bar. These values are as they were under older versions of TOAW – they don't include the impact of terrain.

16.5. PLANNED COMBATS

The Planned Combats dialog lists all the combats planned for the current combat phase.

Use the scrollbar to scroll through the list if necessary. It can be accessed through the Control Panel or from the Attack Planner. There is one button (Exit), the force flag, and a count of battles planned. This is a new dialog intended to assist with combat planning.

At the top are the list headings (Location, Success Prediction, Loss Prediction, AR, Cooperation, and

Time Expended). Clicking on each will sort the list by that column. To un-sort the list, the dialog must be exited and then re-entered. Clicking on any Location button will open the Attack Planner for that planned attack.

16.6. THE SITUATION BRIEFING

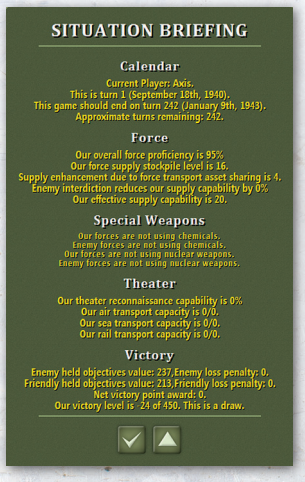
The Situation Briefing gives an overall evaluation of the current game situation. It can be accessed by clicking View and selecting Situation Briefing. This briefing can be displayed in two modes: Condensed and Expanded. In Condensed Mode, the most pertinent parameters are shown on a single page (these are actually the parameters that were shown in previous versions of TOAW). In Expanded Mode, all parameters are shown, but in three pages. The Control Bar has buttons to toggle between modes.

The report is displayed on a single page in Condensed Mode, and displayed on three pages in Expanded Mode.

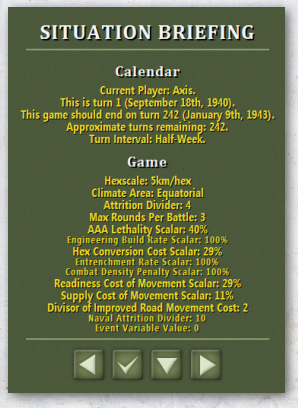
Information is arranged in seven panes, as follows:

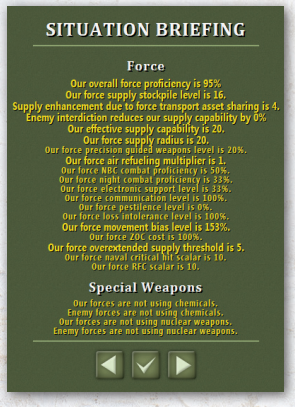
- The Calendar pane shows the current player and date, the most likely end date for the Scenario, the approximate number of Turns remaining, and (Expanded Mode only) the Turn Interval.
- The Game pane (Expanded Mode only) shows the following game parameters: Hexscale, Climate Area, Attrition Divider, Max Rounds Per Battle, AAA Lethality Scalar, Engineering Build Rate Scalar, Hex Conversion Rate Scalar, Entrenchment Rate Scalar, Combat Density Penalty Scalar, Readiness Cost of Movement Scalar, Supply Cost of Movement Scalar, Divisor

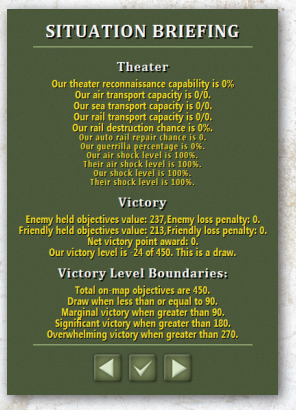
— *Condensed Mode* —



— *Expanded Mode* —







of Improved Road Movement Cost, Naval Attrition Divider, and Event Variable Value.

- The Force pane gives information on the following Force Parameters: Force Proficiency and Supply Stockpile Level (including figuring the effective supply capability), (Expanded Mode only: Force Supply Radius, Force Precision Guided Weapons Level, Force Air Refueling Multiplier, Force NBC Combat Proficiency, Force Night Combat Proficiency, Force Electronic Support Level, Force Communication Level, Force Pestilence Level, Force Loss Intolerance Level, Force Movement Bias Level, Force ZOC Cost, Force Overextended Supply Threshold, Force Naval Critical Hit Scalar, and Force RFC Scalar.)
- The Special Weapons pane shows who is using Chemical or Atomic weapons.
- The Theater pane lists your Force's Reconnaissance and Transport Capacities. It also (Expanded Mode only) lists the following Theater Parameters: Rail Destruction Chance, Auto Rail Repair Chance, Guerrilla Percentage, Friendly Air Shock Level, Enemy Air Shock Level, Friendly Shock Level, and Enemy Shock Level.
- The Victory pane shows who is currently winning the Scenario. This is determined by summing the Friendly Held Objectives value, minus the Enemy Held Objectives value, plus the Enemy Loss Penalty, minus the Friendly Loss Penalty, plus the Net Victory Point Award.
- The Victory Level Boundaries pane (Expanded Mode only) lists the Total On-Map Objectives, the Draw Level, the Marginal Victory Level, the Significant Victory Level, and the Overwhelming Victory Level.

Note that when the listed parameters are set to their default setting then they are shown in a smaller font size than when they are not at the default setting. This makes it somewhat easier to spot parameters that are non-default (and most in need of notice) from the defaults.

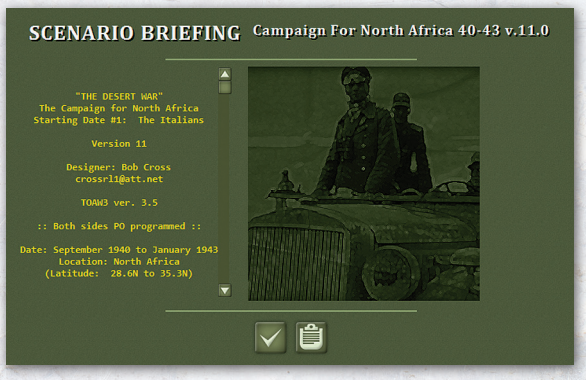
The Control Bar in Condensed Mode consists of:

- The Exit button exits the window.
- The Expand button switches to Expanded Mode.
- The Control Bar in Expanded Mode, Page 1, consists of:
- The Previous Page button opens the Previous Page.
- The Exit button exits the window.
- The Condense button switches to Condensed Mode.
- The Next Page button opens the Next Page.

The Control Bar in Expanded Mode, Pages 2 & 3, consists of the same as Page 1, except there is no Condense button.

16.7. THE SCENARIO BRIEFING

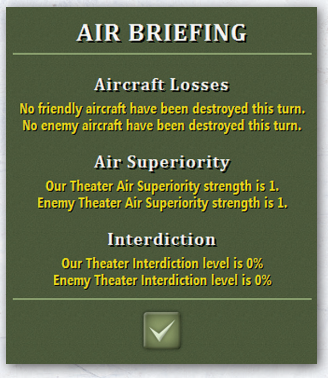
The Scenario Briefing gives a lengthy description of a Scenario, including scale, environmental information, special considerations and a brief history of the battle or campaign portrayed by the Scenario.



This Briefing can be accessed by clicking View and selecting Scenario Briefing. Scroll down the left display pane via the scrollbar to read about the current Scenario. If the scenario has any associated documents, then a document button will be shown. That button will open all the scenario's documents. A blank button will be shown if the scenario has no associated documents.

16.8. THE AIR BRIEFING

The Air Briefing gives a brief rundown of the current situation in the air over the Theater. It can be accessed by clicking View and selecting Air Briefing. Note that the Air War Panel contains this same information.



Current Turn aircraft losses are listed in the Aircraft Losses pane. Only aircraft actually destroyed are listed. You will always know your own losses exactly, but enemy losses are subject to misinformation. Pilots are notorious for inflating and double-reporting enemy planes shot down. Damaged aircraft (those sent to the Replacement Pool) are not included in the Loss Report.

The Air Superiority pane shows the Theater Air Superiority levels, a general indicator of who controls the air over the Theater.

The Interdiction pane shows both Forces' Theater Interdiction Levels, a general gauge of each Force's efforts to impair enemy supply distribution and land unit movement.

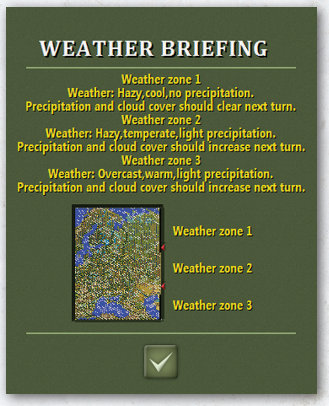
Note that the Enemy Loss value's misinformation factor is fixed at the start of the turn. So, opening this briefing over and over will no longer reveal that factor, as was possible in previous versions of TOAW.

Use the Control Bar Exit button to exit the window.

16.9. THE WEATHER BRIEFING (ADVANCED RULES)

The Weather Briefing shows a microview scale Map of the entire Theater with a visibility and precipitation overlay. It can be accessed by clicking View and selecting Weather Briefing.

Above the Weather Map is a description of current and forecast weather in each Weather Zone. If there is more than one Weather Zone, the breakpoints are indicated at the edge of the Weather Map. Use the Control Bar Exit button to exit the window.



16.10. THE EXPECTED REINFORCEMENTS BRIEFING

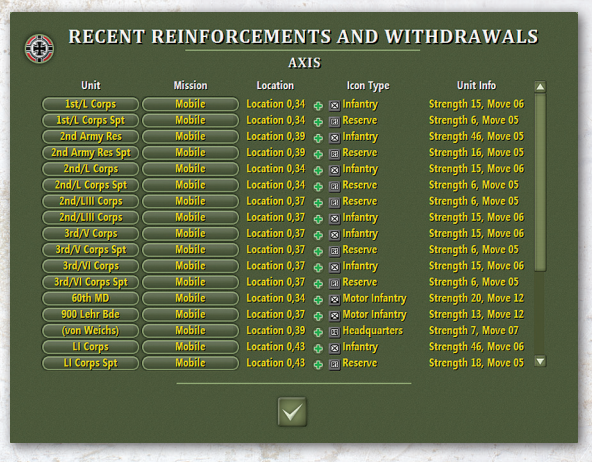
The Expected Reinforcements Briefing lists all expected Reinforcements and Withdrawals, their projected entry or exit Turns and locations, and unit Types. It can be accessed by clicking View and selecting Expected Reinforcements.

At the top are the list headings (Turn, Date, Location, Unit, Formation, Icon Type, and Unit Info). Clicking on each will sort the list by that

column. To un-sort the list, the dialog must be exited and then re-entered. Note that the date is in MM/DD/YYYY format. The unit health and icon are displayed between the Formation and Icon Type columns. The Unit Info is enclosed in brackets if the unit is a future reinforcement (as opposed to a Withdrawal).

Use the scrollbar to scroll through the list if necessary. The Exit button in the Control Bar exits the window.

16.11. THE RECENT REINFORCEMENTS BRIEFING



The Recent Reinforcements Briefing lists all Reinforcements and Withdrawals for this Turn, their locations, and unit Types. It can be accessed by clicking View and selecting Expected Reinforcements.

Use the scrollbar to scroll through the list if necessary. The Exit button in the Control Bar exits the window.

At the top are the list headings (Unit, Mission, Location, Icon Type, and Unit Info). Clicking on each will sort the list by that column. To un-sort the list, the dialog must be exited and then re-entered.

16.12. INVENTORY AND REPLACEMENTS BRIEFING

The Inventory and Replacements Briefing lists all available Replacements, the number of items on hand (available for immediate distribution), rate of appearance, beginning Turn, end Turn, the current total number of items assigned to units in the Theater, and the permanent loss totals. It can be accessed by clicking View and selecting Inventory and Replacements.

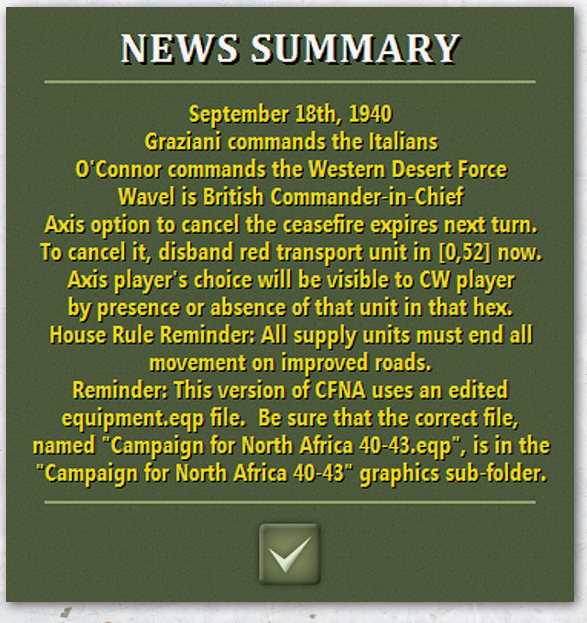
Use the scrollbar to scroll through the list if necessary. The Exit button in the Control Bar exits the window.

The Editor version of this window differs from the game version. Rate of appearance, beginning Turn, and end Turn are all represented by buttons; you use these buttons to change the values. The assigned equipment totals in the Editor include all assigned equipment regardless of whether the units are deployed on the Map (in Theater).

At the top are the list headings (Available Systems, On Hand, Rate, Turns, Assigned, and Lost). Clicking on each will sort the list by that column. To un-sort the list, the dialog must be exited and then re-entered.

16.13. RECENT NEWS

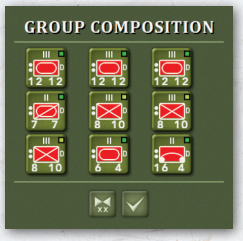
The Recent News Briefing lists significant occurrences since the beginning of the Scenario. It can be accessed by clicking View and selecting Recent News.



Use the scrollbar to scroll through the list if necessary. The Exit button in the Control Bar exits the window.

16.14. GROUP COMPOSITION

The Group Composition displays all the units in the unit stack. Clicking on any unit will move that unit to the top of the stack.



Note that the Unit Panel can be placed in Group Composition mode – with the same display. Then mousing over the map can quickly reveal the contents of any observed hex.

16.15. ORDER OF BATTLE: UNITS REPORT

The Order of Battle (OOB): Units Report lists all of your units, their formations, locations Icon Type, and Unit Info as well as health icon and unit icon. On the Control Panel are the Force Roundel, Exit Button, and Units in Theater pane.

Use the scrollbar to scroll through the list if necessary. It can be accessed through the View Menu.

At the top are the list headings (Unit, Formation, Location, Icon Type, and Unit Info). Clicking on each will sort the list by that column. To un-sort the list, the dialog must be exited and then re-entered.

16.16. ORDER OF BATTLE: FORMATIONS REPORT

The Order of Battle (OOB): Formations Report lists all of your formations, locations, and Formation Info such as Activation Turn, General Orders, and Orders Emphasis. On the Control Panel are the PO Move Button, Exit Button, and Formations in Theater pane. When PO Move is invoked, the units of the current formation will be moved by the PO, provided that button had been in "Hot" mode.

There are also a column of checkboxes that toggle each formation in and out of PO control. Checked formations are under PO control. Unchecked ones are under Manual control.

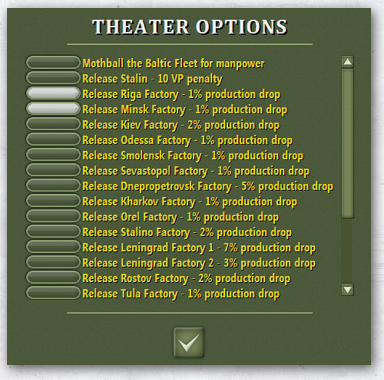
Use the scrollbar to scroll through the list if necessary. It can be accessed through the Control Panel.

At the top are the list headings (Formation, Location, Activation Turn, PO?, General Orders, and Orders Emphasis). Clicking on each will sort the list by that column. To un-sort the list, the dialog must be exited and then re-entered.

This is a new dialog intended to make PO Mode operations easier. Note that right-clicking on the General Orders button will change it to "Manual" – making that option easier to invoke. (Toggling the checkbox to "checked" has the same effect).

16.17. THEATER OPTIONS REPORT

The Theater Options Report lists any theater options you may have. To option a theater option, click on its button. The button will turn silver. That means that it will execute in the next inter-turn phase. To cancel that, click the button again and it will turn back to normal.



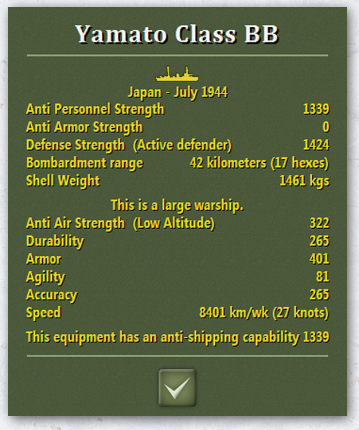
Use the scrollbar to scroll through the list if necessary. It can be accessed through the View Menu.

16.18. EQUIPMENT REPORT

The Equipment Report details the parameters of an equipment item. The equipment's strengths (AT, AP, DF, AA (High and Low), and Anti-

Shipping) and range (in km and hexes) are specified. If it is naval equipment, its Durability, Armor, Agility, Accuracy, and Speed (in km/wk and knots) are also specified. Any special abilities of the equipment are listed.

This report is accessed by clicking on any equipment button (present in the Unit Report, Inventory Report, Force Editor and Loss Report).



Note that if the Report is accessed from the Equipment Panel of the Force Editor, there is an extra button next to the Exit button: A button to enter the Equipment Editor.

16.19. DETAILED COMBAT REPORT

If the Detailed Combat Reports Advanced Rules Option is turned ON then a Detailed Combat Report will be delivered after each combat resolution. The report is divided into two panes. The top pane reports the results of the combat, who won the contested hex, what the percent losses were, what rounds were expended, and what caused the combat to end. The second pane details what units of both sides participated, on which round they broke off the attack, and which units retreat or evaporate

There are also coded info inclosed in brackets in the report details. This info is included to be used by the new Combat Chart, but can be deciphered by players themselves, if desired (note that it is not necessary to do so to understand the report, however). For the record, the first line is followed by such a code that has info on the overall combat: Contained in the brackets are the combat timestamp, attacker color, attacker cooperation, and defender cooperation. Cooperation codes are FC = full cooperation, LC = limited cooperation, and NC = no cooperation. There are then code info on each unit's line in the report: Each attacker has its cooperation and timestamp. Each defender has its cooperation.

Also for the benefit of the Combat Chart, a number of unit purposes have been refined: Ranged support directly assigned to an assault is listed as "Bombardment Attacks" to distinguish them from ground attackers and cooperative support. Ground attackers ordered to Limited Attack are now so identified in the report to distinguish them from cooperative support. Air units that intercept bombers are now listed as" intercept supports". Air units that defend bombers from such interception are now listed as "escort supports".

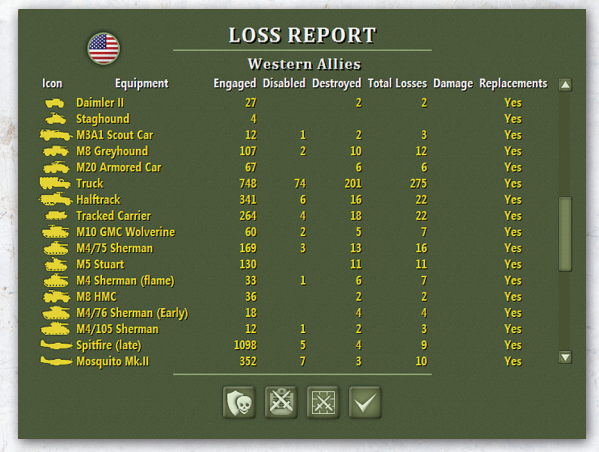
The report's Control Panel has four buttons: Defender Loss Report, Attacker Loss Report, Combat Chart, and Exit. Use the scrollbars to scroll through the panes if necessary.

Like many dialogs, pressing the spacebar will make this report invisible. But this dialog is also made invisible by clicking anywhere on the report or by holding the left mouse button down. If the combat is off-screen, then when either of these actions is taken, the map re-centers on the combat hex. While the report is up, the combat location hex is indicated by a white circle.

16.20. LOSS REPORT

Each Detailed Combat Report includes two Loss Reports: One for the Defender and one for the Attacker. The title of the report includes the Force Name, while the Control Panel includes the Force Flag Roundel. The Control Panel also contains three buttons: The button for the other Loss Report, the button for the Combat Report, the button for the Combat Chart, and the Exit button. The info panel of the report lists the equipment employed and figures for each equipment item about how many were Engaged, Disabled, Destroyed and Total Losses (Disabled means they are returned to the On Hand pools, Destroyed means they are permanently lost, and Total Losses is the sum of those two). There is also a Damage column to report damage incurred by naval equipment. This is the cumulative damage inflicted on the class of naval equipment on each row (if any) during the combat. Note that the totals include the damage inflicted on ships that sank in the combat in addition to that on ships that are just damaged. Finally, it reports whether replacements are available for the equipment.

At the top are the list headings (Icon, Equipment, Engaged, Disabled, Destroyed, Total Losses, Damage, and Replacements). Clicking on each will sort the list by that column. To un-sort the list, the dialog must be exited and then re-entered.



There are a number of files (Sitrep Log, .csv file, TOAW Log) that store combat result information. There is a user-made program available that processes the .csv information.

16.21. COMBAT CHART

The Combat Chart is accessed from the Detailed Combat Report. This new chart has the intention of making combat results easier to understand, by translating the bewildering mass of text generated by the Combat Report into a graphical representation that can be quickly understood.

Over the chart is the Attack Location line, listing the attacking side, the location, and the type of combat that took place. Below that is the chart. Below the chart is a line detailing the attack duration, a line reporting which side (if any) won, and two lines detailing both sides' loss percentages.

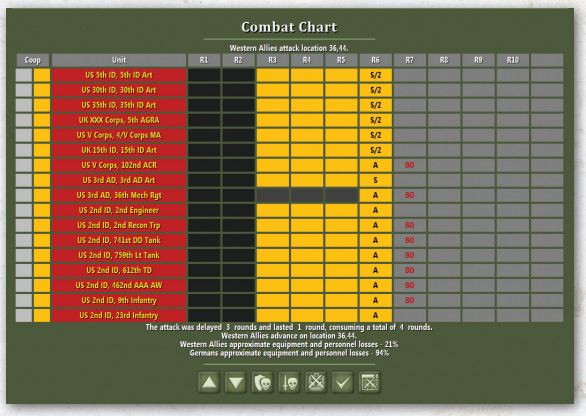
Back to the Chart: The chart is in the form of a table with columns and rows. The top row is the headings row, listing Coop (cooperation), Unit, and R1 through R10, with one extra column.

The Coop title covers two columns. The first is the overall cooperation. The second is each individual unit's cooperation. The cooperation is shown by cell color: Gold = Full, Silver = Limited, and Black = None.

The Unit column lists the formation and unit names of all units involved in the combat. Cell colors match each side's microview color (blue or red).

Finally, there are ten columns for the ten combat rounds that make up a player-turn. Coded info is printed in those columns, along with the cell colors, to detail what happened during the combat. Those codes (both for the text and for the cell colors) are detailed in the Legend dialog, In effect, these cells should show clearly when and how each unit participated in the combat. Units that assaulted or defended are identified. Units that supported in various ways are so identified. When units broke off, retreated, or advanced is noted. Units that were late or joined by reserve movement are identified. Units that subdivided during the combat are identified along with their subunits.

The example above is derived from the battle described in the Combat Report display in section 16.19. That report contained nine pages of text (this battle involved 146 attackers and 20 defenders). Trying to decipher what happened in that battle from that report is a real challenge. The Combat Chart from that battle is in ten pages, with the first page shown above. It is immediately clear that the battle started on round three (two rounds had been expended in previous combat phases and are shown in very dark gray). It was delayed three rounds due to a late unit. And it consumed one round of actual battle. The attackers had limited cooperation. There are up and down buttons to view the other pages of the chart.



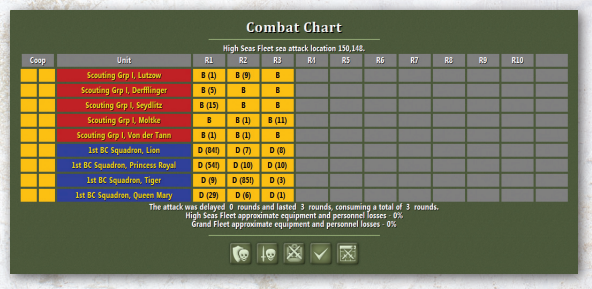
Paging down to page seven reveals the unit that caused the delay. The dark gray cells show that the 36th Mech Rgt was three rounds late, delaying the battle. This also shows a number of attackers that broke off after one round of combat.

Paging down one more page reveals the units that caused the limited cooperation. Four UK

units were added to the battle – they weren't fully cooperative. This shot also shows more attackers that broke off, but also several that advanced. (Breaking off is in red, while advancing is in green text).

Finally we get to the defenders. Note that the defense had full cooperation, but all defenders that were actually in the target hex (not supporting in some fashion) either retreated or were eliminated. Retreating and Elimination are shown in red (holding would be shown in green). It should be clear that the final four rounds – shown in gray – were not used in this combat.

So it should be clear that rounds that had already been expended, rounds that were skipped due to late units, rounds that were expended in combat during this specific attack, and rounds that were not reached in this specific attack are identified by cell color.



Naval Damage incurred during the combat is also detailed in the chart. (This chart was created from a different battle from a different scenario.)

The Control Bar has seven buttons: Line/Page Up, Line/Page Down, Defender Losses, Attacker Losses, Combat Report, Exit, and Combat Chart Legend. The first two buttons are only shown if the total lines in the report exceed 17.

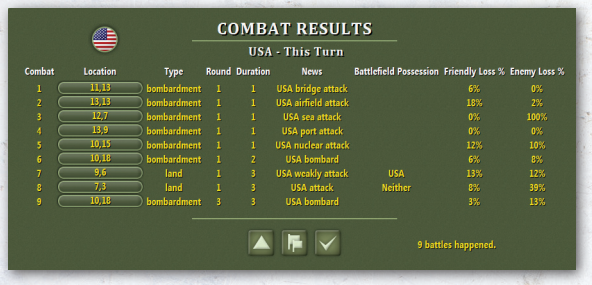
16.22. COMBAT CHART LEGEND

The Combat Chart Legend is accessed via the Combat Chart. It explains what the text and cell colors in the Combat Chart mean. The only button is the Exit button.

16.23. COMBAT REVIEW

Detailed combat results are now stored in the .sav and .pbl files. This allows for review of those

combat details throughout the player-turn AND by the opposing player in his player-turn. They are accessed via this dialog. The most recent two turns of combats are retained.



The report's Control Panel has three buttons: Switch Turn, Switch Sides, and Exit. Use the scrollbars to scroll through the list of combats if necessary. There is also the force flag and a count of battles stored.

At the top are the list headings (Combat, Location, Type, Round, News, Battlefield Possession, Friendly Loss %, Enemy Loss %). Clicking on each will sort the list by that column. Clicking on the Combat column restores the original sort sequence. Clicking on the Location button opens the Combat Report for that battle.

16.24. THE EDITOR'S EDIT MENU

The Edit Menu is only available in the Editor. You may ignore this section if you do not intend to design Scenarios.

- **Undo** – Undo the previous action. This is the same as clicking on the Undo button in the Control Bar.
- **Environment** – Set the Scenario's environmental conditions.
- **Calendar** – Set the Scenario Calendar.
- **Events** – Set the Scenario's events.
- **Forces** – Create an organized list of units for use in the Scenario. While the Force Editor panel is open, selecting the Edit Menu will open several nested sub-menus to adjust settings for the Forces. See 16.13.1, Force Editor Sub-Menus, starting with "Copy Current Formation."
- **Replacements** – Set up the Replacement Rates for all equipment types available in the Scenario.
  - **Replacements Editor** – Start the Replacement Editor window to fine tune Replacements for a Scenario.
  - **Default 1% Replacements** – Set the Replacement Rate for all equipment in the current Scenario to 1% of the total assigned equipment base on each Turn.
  - **Default 2% Replacements** – Set the Replacement Rate for all equipment in the current Scenario to 2% of the total assigned equipment base on each Turn.
  - **Unit Replacements Priorities** – Set Replacement priorities and eligibility for reconstitution for specific units.
- **Deployment** – Deploy the units in the OOB and assign Formation objectives

Upon selecting Deployment Mode the following are added to the Edit Menu:

- **Set Microview Icons** – Units are shown as either blue or red icons in the Microview display. You use this option to set which Forces the colors should be assigned to. This is available in the Force Editor, as well.
- **Set 3D Icon Tint** – Equipment graphics are shown in the 3D map display using one of four possible "tints". You use this option to set which tint is to be used by each Force. This is available in the Force Editor, as well.

- **Remove All Units** – Remove all Deployed units from the map.
- **Automatic Ownership** – Calculate, from the positions of Deployed units, the ownership of each location on the Scenario Map.
- Objective Tracks
  - Track 1: Select to edit Track 1 Formation Objectives (default).
  - Track 2: Select to edit Track 2 Formation Objectives.
  - Track 3: Select to edit Track 3 Formation Objectives.
  - Track 4: Select to edit Track 4 Formation Objectives.
  - Track 5: Select to edit Track 5 Formation Objectives.
  - Copy Track 1 to Track 2: Copy all Track 1 Formation Objectives to Track 2.
  - Copy Track 1 to Track 3: Copy all Track 1 Formation Objectives to Track 3.
  - Copy Track 1 to Track 4: Copy all Track 1 Formation Objectives to Track 4.
  - Copy Track 1 to Track 5: Copy all Track 1 Formation Objectives to Track 5.
  - Clear All Objective Values: Sets all Objective Values to zero.
- **Set Attrition Divider** – Adjusts the amount of casualties taken in combat. This is available in the Force Editor, as well.
- **Set Max Rounds Per Battle** – Adjusts how long combats will last. This is available in the Force Editor, as well.
- **Set AAA Lethality Level** – Adjusts how deadly AAA combat will be. This is available in the Force Editor, as well.
- **Set Engineering Build Rates** – Adjusts the engineering level for a given amount of engineer equipment. This is available in the Force Editor, as well.
- **Set Enemy Hex Conversion Costs** – Adjusts the cost of enemy hex conversion. This is available in the Force Editor, as well.
- **Set Entrenchment Rates** – Adjusts how quickly units can dig in. This is available in the Force Editor, as well.
- **Set Density Combat Penalty Rates** – Adjusts the combat penalty for exceeding density limits. This is available in the Force Editor, as well.
- **Set Supply Costs of Movement Rates** – Adjusts what the cost in supply will be for movement. This is available in the Force Editor, as well.
- **Set Readiness Costs of Movement Rates** – Adjusts what the cost in readiness will be for movement. This is available in the Force Editor, as well.
- **Set Divisor of Improved-Road Motorized-Movement** – Adjusts the cost of motorized movement along improved roads. This is available in the Force Editor, as well.
- **Set Naval Attrition Divider** – Scales the number of shots in naval combat resolution. This is available in the Force Editor, as well.

Map – Create a Map for the Scenario.

Upon selecting Map Mode the following are added to the Edit Menu:

- **Map Boundaries** – Settings for adjusting the size of the Map.
  - **Set Map Boundaries** – Start the Set Boundary window to set the boundaries of the current Scenario Map. A Map must be at least 20 x 20 and no larger than 300 x 300.
  - **Increase Top Margin** – Add cells to the top of the Map.

- **Increase Right Margin** – Add cells to the right side of the Map.
- **Increase Left Margin** – Add cells to the left side of the Map.
- **Increase Bottom Margin** – Add cells to the bottom of the Map.
- **Clip Top Margin** – Remove cells from the top of the Map.
- **Clip Right Margin** – Remove cells from the right side of the Map.
- **Clip Left Margin** – Remove cells from the left side of the Map.
- **Clip Bottom Margin** – Remove cells from the bottom of the Map.

- **Clear Map** – Remove all terrain from the current Map and replace it with open terrain.
- **Auto Contouring** – Settings for contouring the terrain features.
  - **On** – Contours terrain for a more smooth and rounded look inside of hexes.
  - **Off** – Terrain features are fully painted to the hex sides.

Briefings – Enter a text description or Scenario result reports for the current Scenario.

- **Scenario Briefing** – Edit the Scenario Briefing.
- **Force 1 Victory Briefing** – Edit the Briefing that appears after a Victory by the first Force in the Order of Battle.
- **Force 2 Victory Briefing** – Edit the Briefing that appears after a Victory by the second Force in the Order of battle.
- **No Victory (draw) Briefing** – Edit the briefing that appears when a Scenario ends in a draw.

First Force – Set the Force that will move first on the first Turn of the Scenario.

16.24.1. FORCE EDITOR SUB-MENUS

Upon opening the Force Editor the following are added to the Edit Menu:

- **Copy Current Formation** – Make a copy of the current Formation and insert it into the Order of Battle.
- **Cut Current Formation** – Cut the current Formation from the Order of Battle and place it in the clipboard.
- **Paste Formation** – Paste the most recently cut Formation from the clipboard into the Order of Battle.
- **Modify Current Force** – Modify the entire current Force. Suggested values for some of these characteristics are available in the Help File, under the topic of General Organization.
  - **Force Overall Proficiency** – Set the Force Proficiency. (1-100)
  - **Force Supply Stockpile Level** – Set the Force Stockpile Level. (1-100)
  - **Force Precision Guided Weapons Level** – Set the Force Precision Guided Weapons Level. (1-999)
  - **Force Air Refueling Range Multiplier** – Set the Force Air Refueling Multiplier. (1-10)
  - **Force NBC Proficiency** – Set the Force Atomic, Biological, and Chemical Proficiency. (0-100)
  - **Force Night Combat Proficiency** – Set the Force Night Combat Proficiency. (1-100)
  - **Electronic Support Level** – Set the Force Electronic Support Level. (1-100)
  - **Force Communication Level** – Set the Force Communication Level. (25-100)
  - **Force Pestilence Level** – Set the Force Pestilence Level. (0-50)
  - **Force Loss Intolerance** – Set the Force Loss Intolerance. (10-999)

- **Force Movement Bias** – Set the Force Movement Bias. (14-455)
- **Force ZOC Cost** – Set the Force ZOC Cost. (0-1000)
- **Force Overextended Supply Threshold** – Set the Force Overextended Supply Threshold. (0-100)
- **Force Naval Critical Hit Scalar** – Set the Force Naval Critical Hit Scalar. (0-100)
- **Force RFC Scalar** – Set the Force RFC Scalar. (0-100)

- **Unit Assigned Equipment** – Modify assigned equipment levels for all units of the current force.
  - **Add Equipment** – Add a relative percentage to the currently assigned equipment levels of all units of the current Force.
  - **Subtract Equipment** – Subtract a relative percentage to the currently assigned equipment levels of all units of the current Force.
  - **Set Equipment** – Set assigned equipment levels to a fixed percentage of the authorized levels of all units of the current Force.
  - **Randomize Equipment** – Randomize the currently assigned equipment levels of all units of the current force by a relative percentage.
- **Unit Proficiency** – Modify Proficiency Levels for all units of the current Force.
  - **Add Proficiency** – Add to the Proficiency Levels for all units of the current Force.
  - **Subtract Proficiency** – Subtract from the Proficiency Levels for all units of the current Force.
  - **Set Proficiency** – Set the Proficiency Level for all units of the current Force.
  - **Randomize Proficiency** – Randomize the Proficiency Levels for all units of the current Force.
- **Unit Readiness** – Modify Readiness Levels for all units of the current Force.
  - **Add Readiness** – Add to the Readiness Levels for will units of the current Force.
  - **Subtract Readiness** – Subtract from the Readiness Levels for all units of the current Force.
  - **Set Readiness** – Set the Readiness Levels for all units of the current Force.
  - **Randomize Readiness** – Randomize the Readiness Levels for all units of the current Force.
- **Unit Supply** – Modify the Supply Levels for all units of the current Force.
  - **Add Supply** – Add to the Supply Levels for all units of the current Force.
  - **Subtract Supply** – Subtract from the Supply Levels for will units of the current Force.
  - **Set Supply** – Set the Supply Levels for all units of the current Force.
  - **Randomize Supply** – Randomize the Supply Levels for all units of the current Force.
- **Unit Rename** – Search and replace substrings in names of all units of the current Force.
- **Unit Recolor 2D Icons** – Replace the color scheme of the 2D icons for all units of the current Force.
- **Formation Proficiency** – Modify the Proficiency Levels for all Formations of the current Force.
  - **Add Proficiency** – Add to the Proficiency Levels for all Formations of the current Force.

- **Subtract Proficiency** – Subtract from the Proficiency Levels for all Formations of the current Force.
- **Set Proficiency** – Set the Proficiency Levels for all Formations of the current Force.
- **Randomize Proficiency** – Randomize the Proficiency Levels for all Formations of the current Force.

- **Formation Supply** – Modify the Supply Levels for all Formations of the current Force.
  - **Add Supply** – Add to the Supply Levels for all Formations of the current Force.
  - **Subtract Supply** – Subtract from the Supply Levels for all Formations of the current Force.
  - **Set Supply** – Set the Supply Levels for all Formations of the current Force.
  - **Randomize Supply** – Randomize the Supply Levels for all Formations of the current Force.
- **Formation Rename** – Search and replace substrings in names of all Formations of the current Force.
- **Modify Current Formation** – Modify the entire current Formation.
- **Unit Assigned Equipment** – Modify assigned equipment levels for all units of the current Formation.
  - **Add Equipment** – Add a relative percentage to the currently assigned equipment levels of all units of the current Formation.
  - **Subtract Equipment** – Subtract a relative percentage from the currently assigned equipment levels of all units of the current Formation.
  - **Set Equipment** – Set assigned equipment levels to a fixed percentage of the authorized levels of all units of the current Formation.
  - **Randomize Equipment** – Randomize the currently assigned equipment levels of all units of the current Formation by a relative percentage.
- **Unit Proficiency** – Modify Proficiency Levels for all units of the current Formation.
  - **Add Proficiency** – Add to the Proficiency Levels for will units of the current Formation.
  - **Subtract Proficiency** – Subtract from the Proficiency Levels for all units of the current Formation.
  - **Set Proficiency** – Set the Proficiency Level for all units of the current Formation.
  - **Randomize Proficiency** – Randomize the Proficiency Levels for all units of the current Formation.
- **Unit Readiness** – Modify Readiness Levels for all units of the current Formation.
  - **Add Readiness** – Add to the Readiness Levels for all units of the current Formation.
  - **Subtract Readiness** – Subtract from the Readiness Levels for all units of the current Formation.
  - **Set Readiness** – Set the Readiness Levels for all units of the current Formation.
  - **Randomize Readiness** – Randomize the Readiness Levels for all units of the current Force.
- **Unit Supply** – Modify Supply Levels for all units of the current Formation.
  - **Add Supply** – Add to the Supply Levels for all units of the current Formation.
  - **Subtract Supply** – Subtract from the Supply Levels for all units of the current Formation.
  - **Set Supply** – Set the Supply Levels for all units of the current Formation.

- **Randomize Supply** – Randomize the Supply Levels for will units of the current Formation.
- **Unit Rename** – Search and replace sub -strings in names of all units of the current Formation.
- **Unit Recolor 2D Icons** – Replace the color scheme of the 2D icons for all units of the current Formation.
- **Formation Proficiency** – Modify the Proficiency Level of the current Formation.
  - **Set Proficiency** – Set the Proficiency Level of the current Formation.
  - **Randomize Proficiency** – Randomize the Proficiency Level of the current Formation.
  - **Formation Supply** – Modify the Supply Level of the current Formation.
  - **Set Supply** – Set the Supply Level of the current Formation.
  - **Randomize Supply** – Randomize the Supply Level of the current Formation.
- **Formation Rename** – Rename the current Formation.
- **Modify Current Unit** – Modify the current unit only.
- **Unit Assigned Equipment** – Modify assigned equipment for the unit.
  - **Add Equipment** – Add a relative percentage to the currently assigned equipment levels of the current unit.
  - **Subtract Equipment** – Subtract a relative percentage to the currently assigned equipment levels of the current unit.
  - **Set Equipment** – Set assigned equipment levels of the current unit to a fixed percentage of the authorized levels.
  - **Randomize Equipment** – Randomize the currently assigned equipment levels of the current unit by a relative percentage.
- **Unit Proficiency** – Modify the Proficiency of the current unit.
  - **Set Proficiency** – Set the Proficiency Level of the current unit.
  - **Randomize Proficiency** – Randomize the Proficiency Level of the current unit.
- **Unit Readiness** – Modify the Readiness Level of the current unit.
  - **Set Readiness** – Set the Readiness Level of the current unit.
  - **Randomize Readiness** – Randomize the Readiness Level of the current unit.
- **Unit Supply** – Modify the Supply Level of the current unit.
  - **Set Supply** – Set the Supply Level of the current unit.
  - **Randomize Supply** – Randomize the Supply Level of the current unit.
- **Unit Rename** – Rename the current unit.
- **Set Microview Icons** – Units are shown as either blue or red icons in the Microview display. You use this option to set which forces the colors should be assigned to. This is available in the deployment editor, as well.
- **Set 3d Icon Tint** – Equipment graphics are shown in the 3D map display using one of four possible "tints." You use this option to set which tint is to be used by each Force. This is available in the Deployment Editor, as well.
- **Set Attrition Divider** – Adjusts the amount of casualties taken in combat. This is available in the Deployment Editor, as well.
- **Set Max Rounds Per Battle** – Adjusts how long combats will last. This is available in the Deployment Editor, as well.
- **Set AAA Lethality Level** – Adjusts how deadly AAA combat will be. This is available in the Force Editor, as well.

- **Set Engineering Build Rates** – Adjusts the engineering level for a given amount of engineer equipment. This is available in the Force Editor, as well.
- **Set Enemy Hex Conversion Costs** – Adjusts the cost of enemy hex conversion. This is available in the Force Editor, as well.
- **Set Entrenchment Rates** – Adjusts how quickly units can dig in. This is available in the Force Editor, as well.
- **Set Density Combat Penalty Rates** – Adjusts the combat penalty for exceeding density limits. This is available in the Force Editor, as well.
- **Set Supply Costs of Movement Rates** – Adjusts what the cost in supply will be for movement. This is available in the Force Editor, as well.
- **Set Readiness Costs of Movement Rates** – Adjusts what the cost in readiness will be for movement. This is available in the Force Editor, as well.
- **Set Divisor of Improved-Road Motorized-Movement** – Adjusts the cost of motorized movement along improved roads. This is available in the Force Editor, as well.
- **Set Naval Attrition Divider** – Scales the number of shots in naval combat resolution. This is available in the Force Editor, as well.

17. CREATING SCENARIOS WITH THE SCENARIO EDITOR

The standard game Scenarios were all created using the Scenario Editor included with the program. Designing all but the simplest of Scenarios is actually quite a bit of work, but if you have the historical references and inclination, there is no reason why your Scenarios can't be as thorough as ours. All Editor functions are available through the Edit Menu. Only the "large 2D" Map display is supported by the Editor.

17.1. THE SCENARIO

The Scenario is a complete description of a historical battle or campaign, comprising the following elements:

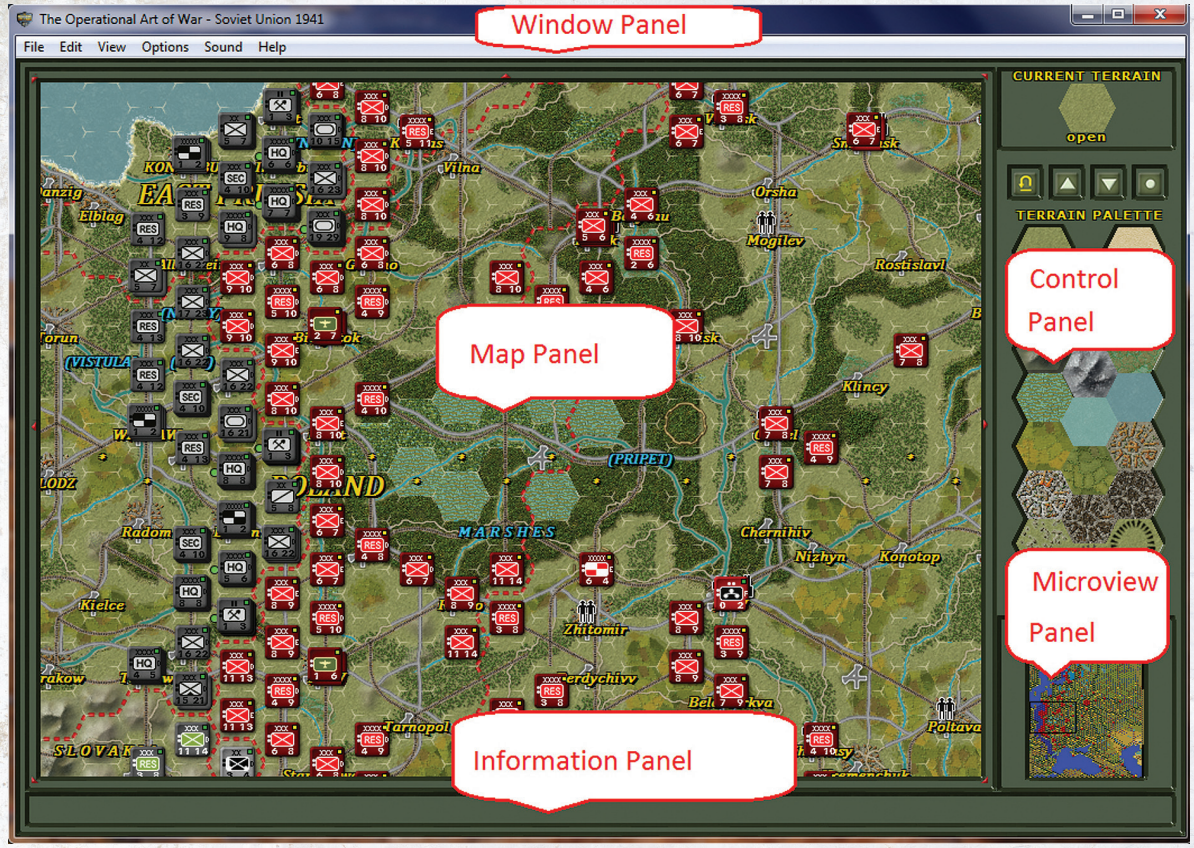
- A Map: This is created using the Map Editor. Maps may be up to 700x700 locations in extent, with up to 4,000 named locations. See 17.2.
- An Order of Battle describing the two opposing Forces: This is created using the Force Editor. Each Force may have up to10,000 units (sub-units count against this total) in 1,000 Formations. See 17.3.
- Deployments of the opposing Forces: These are defined using the Deployment Editor. See 17.11.
- A Calendar: This is defined using the Calendar Editor. See 17.8.
- An Environment: This is defined using the Environment Editor. See 17.6.
- Replacements: Use the Replacement Editor to set equipment stockpiles and Replacement Rates. See 17.10.

- Optionally, a Scenario may also include:
- An Event list: This is created using the Event Editor. See 17.9.
- A Scenario Briefing & Victory Briefings: See 17.11.18.

17.2. THE MAP EDITOR

17.2.1. THE MAP EDITOR CONTROL PANEL

This panel is shown along the right side of the display. It is divided into three areas: the Current Terrain Display, the Control Bar, and the Terrain Palette. The current terrain is shown in the Current Terrain pane. The four buttons in the Control Bar are Undo, Scroll Terrain Palette Back, Scroll Terrain Palette Forward, and Editor Draw Mode Select:



The Map Editor display is divided into several areas: the window pane, scroll panel, Map Panel, Information Panel, and the Control Panel (with the Current Terrain Display, Control Bar, Terrain Palette, etc.). If your window is large enough, there will also be Microview Panel.

The Undo button is used to undo the previous action.

The Terrain Palette Scroll Buttons are used to change the portion of the Terrain Palette available for selection as the current terrain.

The Editor Draw Mode Select is used to specify the action to be performed if you select a location in the Map Panel.

17.2.2. MAP EDITOR DEFINITIONS

The Current Terrain

The current terrain is shown in the upper right corner of the display. It is used to modify selected Map locations according to the Map Editor Draw Mode (see below). You select the current terrain by clicking within the Terrain Palette.

The Map Editor Draw Mode

You select most Editor Draw Modes by clicking on the Draw Mode button in the Control Bar. The Draw Mode determines what actually happens when you left-click in the Map Panel. You can also right-click in the Map Panel to select a one-time draw mode from a popup menu for just that location. The popup menu has options as follows:

Point Draw: Any single location selected in the map will be modified. If the location already contains the current terrain, your click will manually make or break a terrain connection to the nearest location side. If the location does not contain the current terrain, the current terrain will be added and all possible location side connections will automatically be established.

Blob Draw: Any single location and its surrounding six locations will be filled with the current terrain.

Line Draw: A line of locations from the last selected location to the most recently selected location will be filled with the current terrain.

Fill Draw: An area bounded by the current terrain will be filled with the current terrain.

Erase Draw: If the location contains the current terrain, it will be removed.

Place Name: You can enter a name for the selected location.

Draw Border: You can draw a permanent border graphic on the map. It can be helpful to turn the hex grid overlay off when placing borders.

- Distance (available only from popup menu): You can set a Distance Value for the location. Bombardment missions against or from distant hexes adds the distance value to the bombardment range. The maximum distance is 254, and the minimum (and default) is 0.
- Blow/Repair Bridges (available only from popup menu): You can repair or blow bridges in the location.
- Set Entrenchment (available only from popup menu): You can set the Entrenchment Level of the location to a value ranging from 0 to 100.
- Set Exclusion Zone 1 or 2 (available only from popup menu): You can set an Exclusion Zone. The area is effectively non-playable in the game, but may be removed by an Event.

17.2.3. HOW TO EDIT A MAP

Creating a Map is simply a matter of selecting terrain types and clicking within the Map Panel to paint the terrain onto the Map. As you draw, the Map's features are automatically contoured or connected. You can override the automatically-selected contour or connections in Point Draw mode by clicking within the location to make or break new connections.

A Sample Map Editing Session

Maximize the window. Move your mouse cursor over the Map Editor Draw Mode button and make sure it is set to the Point Draw mode.

Click on the Scroll Terrain Palette Forward button in the Control Bar to see all available tiles in the Terrain Palette. Repeated clicks will continue to scroll through the available terrain types.

Select a terrain type from the Terrain Palette. Left-click within the Map Panel. You will see the selected location fill with the current terrain. Now

left-click on an adjacent location; that location will also fill with the current terrain and connections will automatically be established between the two locations. Now, left-click near a hexagonal boundary between two connected locations. The connection will be broken. Left-click again and the connection will be reestablished.

Left-click on an empty location. Now, click the Undo button. The location you filled will be restored to its original condition.

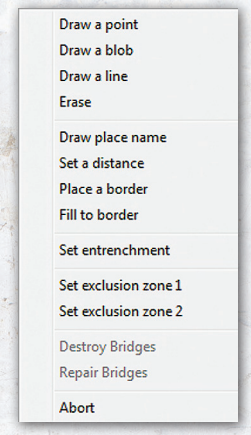
Now, click on the Editor Draw Mode button in the Control Bar; it will change to the Blob Draw mode. Left-click on an empty area of the Map. A seven-location area centered on the location you selected will fill with the current terrain.

Click on the Editor Draw Mode button to select the Line Draw mode. Now, left-click on any location in the Map Panel. A line of locations from the last selected location will be filled with the current terrain. Draw a few more lines until they completely enclose an area of the map.

Click on the Editor Draw Mode button to select the Fill Draw mode. Now, left-click on an empty location within the area you outlined previously. The region will fill with the current terrain [exception: you cannot fill with "Clear" terrain].

The terrain being used to "fill" must be the same terrain type used to create the enclosed area (otherwise the entire map area will be "filled" and you will want to quickly "undo").

Click on the Editor Draw Mode button to change to the Erase Draw mode. Now, left-click on a location containing the current terrain. The terrain will be removed from the location.



You may also right-click on Map locations. The effect is similar to left-clicking, except that you may select a drawing action from a popup menu. This is more flexible than left-clicking, but depending on the kind of editing you are doing at the time, it can require more mouse clicks to do the same job.

You should have a simple Map on screen now. Move your mouse cursor to the Scroll Frame to scroll the map.

Generally, you should "rough in" your Map first, clicking to drop terrain on the Map and allowing the automatic terrain linking function to connect the tiles for the best display. Draw coastlines first, followed by isolated major terrain features. Once you have the basic terrain drawn, you can return to the point draw mode to click within locations (near edges) to manually make and break terrain connections. This will generally be necessary for linear features such as Roads, Rivers, and Railroads.

Once your Map is fully defined, you can use Edit Map Boundaries to fix its size. These Map Boundary functions can also clip margins or insert additional space along edges if you need it.

Be sure to save your work frequently!

17.2.4. ALTERNATE PLACE NAME FONTS AND BITMAPS

"#1"-"#3" in a placename selects the alternate Placename font 1-3. There are three optional placename fonts in addition to the standard placename font. The actual fonts are set in the "Opart 3 fonts.ini" file or in the Fonts Editor Dialog (see 3.3.4.4).

"<1"-"<9" in a placename selects the mapOptional1-9 bitmap. You can select multiple bitmaps. (There are nine placename bitmaps provided in the Graphics folder – designers can make their own if they prefer).

Examples:

"#1Font1" will display "Font1" on the map in the PlacenameFont1 style.

"<1bitmap1" will display mapOptional1.bmp and "bitmap1" on the map in the standard font.

"#2<1<3Manpower Factory" will display mapOptional1.bmp, mapOptional3.bmp, and "Manpower Factory" on the map in PlacenameFont2 style. Here's a shot illustrating the use of these features:

Note that the canned bitmaps are:

1. Factory
2. Refinery
3. Manpower Center
4. Oil Field
5. Mineral site
6. Reforger site
7. Yellow Diamond
8. Red Star
9. Stop Sign

They are situated within the hexes so that some can be combined on the same hex without overlap. Again, designers can create their own bitmaps to substitute for any of the above. Note that, like any other graphical file, they follow the folder hierarchy rules.

The four canned placename fonts vary as follows (all are Cambria Italic with a drop shadow):

1. Standard – 10 size, gold (perhaps for normal cities)
2. Font1 – 20 size, gold (perhaps for big cities)
3. Font2 – Standard size (10) but blue (perhaps for terrain features)
4. Font3 – 7 size, gold (perhaps for tiny cities)

Again, anyone may revise these fonts however they desire within their own "Opart 4 fonts.ini" file to suit their own tastes.

Finally, note that the "Opart 4 fonts.ini" file now has a suite of fonts as follows:

1. Document Font
2. Medium Font
3. Dialog Medium Font
4. Equipment Dialog Medium Font
5. Small Font
6. Objective Font
7. ToolTip Font
8. Supply Font
9. Small Supply Font
10. Huge Supply Font
11. Map Font
12. Small Map Font
13 Huge Map Font
14. Placename Font
15. Placename1 Font
16. Placename2 Font
17. Placename3 Font
18. Small Placename Font
19. Small Placename1 Font
20. Small Placename2 Font

21. Small Placename3 Font
22. Huge Placename Font
23. Huge Placename1 Font
24. Huge Placename2 Font
25. Huge Placename3 Font
26. Button Tab Font
27. Unit Info Small Font
28. Unit Info Medium Font
29. Unit Info Value Font
30. Unit Info Fixed Font
31. Status Bar Font
32. Fixed Status Bar Font
33. Title Screen Font
34. Title Font
35. Subtitle Font
36. Wide Button Font
37. Text Button Font
38. Editor Font
39. Editor Equipment Font

17.2.5. SIMPLE MAP IMPORT/EXPORT (PARTIAL MAPS)

You can edit a map's exported xml file to enable it to export a part of the map – then import that part to a location in a different map. It's recommended to use even steps (2, 4, 6, 8) for the X and Y axes to avoid artifacts. Min and max define the map size of the area to import. There is an article on the Matrix TOAW board that describes how to do partial map export/import here:
http://www.matrixgames.com/forums/tm.asp?m=1797874

17.3. THE FORCE EDITOR

The Force Editor is used to create a complete Order of Battle (an organized list of all units and Formations) for a Scenario and can be reached by clicking Edit and selecting Forces.

The Force Editor display is implemented as a fixed size window. It is divided into four regions: the Window Frame, the Unit Control Panel, the General Control Panel, and the Information Panel. The information and displays within the General Control Panel change depending upon your general editing focus. Many special-purpose global Force modification functions are available in the Edit menu.

This setting affects the General Control Panel display on the right side of the Force Editor.

Be aware that if a force contains any subdivided units its OOB can't be modified. That means you can't insert, cut, paste, copy, move, or delete any units within the OOB. To restore that ability all subdivided units must be recombined. Moral: Don't subdivide any units until you have the OOB finished.

The strength values displayed on the Unit Icons, while based upon the cumulative strengths of the equipment the units are composed of, are relative values. They are scaled relative to the largest strength of any unit of either side in the game. That strength is scaled so that it equals 31 and all other strengths are scaled relative to that. There is an exception in that strengths of naval units are ignored for this purpose. (Fleet units often swamped this scalar in early scenario designs, making all other units in the game have very small displayed strengths). The scaling value is saved in the scenario file and does not vary during the game.

Designers should be aware of this factor. If most of your units appear to have very small displayed strengths then you probably have some disproportionately large unit in one of the forces. To rectify that situation, that unit should be split up in some fashion.

17.3.1. FORCE EDITOR DEFINITIONS

The Force Editor Editing Focus

Available Systems: This shows a list of all available weapon systems in the game's database.

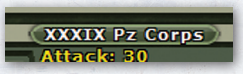
Current Force: This shows a complete list of all units in the current Force.

Current Formation: This shows all information for the current Formation.

You can change the Editing Focus by clicking on the buttons at the bottom of the General Control Panel.

The Unit Control Panel

This is the square area to the left of the Force Editor display. It always shows a description of the current unit.

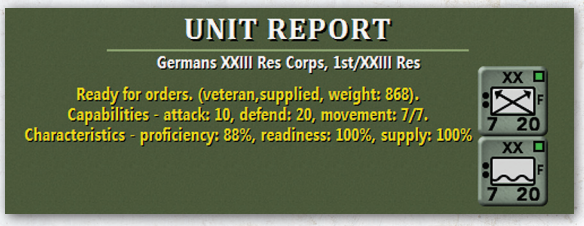


At the top of the Panel you will find the Unit Name button. Click here to change the unit's name.

Just below are the Unit Size Symbol button, the Unit Icon Colors button, and the Unit Icon Type button. All of these buttons control the graphic appearance of the unit icon on the map, and can have an effect on play. The size symbol and icon type buttons are used to set NATO standard military symbols for the unit's map appearance. Some icon types confer specific abilities on the unit. See 16.1 for additional information on unit icons available and their effects. The selection of unit icon colors can also have an effect on play depending on the Support Level (see 18.9.2), as the command and control rules key on the color selections you make for your units . Click on any of these buttons to bring up a self-explanatory selection dialog.

Alternate Icon

A unit can be assigned an alternate icon type, in addition to its primary icon type. The two icons combine their properties. So, for example, designers can create a Marine unit that is heliportable or an airborne mountain unit. Also, if a parachute unit has an alternate icon that is also a parachute icon, it will retain airborne ability after being rebuilt. Click just to the left of the primary icon and the icon dialog will pop up. Select the alternate icon from that dialog. It will be displayed next to the primary icon. To remove the alternate icon, pop up the dialog the same way again and hit <esc>. The primary icon is the one that will be displayed on the map counter in the game. But both are displayed in the Unit Report.



This is a shot of the Unit Report for a unit with an alternate icon. The primary icon is the Special Forces icon. That is displayed on the counter on the map. The alternate icon is the Amphibious icon. So this unit combines the Special Forces and Amphibious abilities.

Within the row of buttons along the top of the panel is a short text description of the current unit. These numbers show the unit's current Strengths and Movement Allowance. Unit-displayed Strengths are scaled on the fly as you make changes to units. This means that you may see fluctuations in the displayed

Strengths of your units as you create the first few units in a Force. This is normal, and will not occur in the game since the scaling constant is fixed when a Scenario is loaded.

In the center of the panel is a list of all equipment currently assigned or authorized for the unit. In some cases, the assigned and authorized numbers may not match. Right-click on the equipment buttons for information about the particular type of equipment. Left-click to change the amount of equipment assigned to the unit. There are slots for a maximum of 24 equipment systems per unit.

At the bottom of the Unit Control Panel is a row of buttons. From left to right, these are:

- Previous unit
- Next unit
- Scroll Equipment List Up and Down
- Current Unit Characteristics: Used to set the unit Proficiency, Readiness, and Supply Levels, and preset the Range to some value other than nominal.
- Copy current unit: Makes a copy of the current unit and makes the copy the new current unit.
- Delete current unit: Removes the current unit from the Force.

17.3.2. THE GENERAL CONTROL PANEL

This is the square area to the right of the Force Editor display. Depending upon the Editor scope, it always shows a list of available systems, current Force, or current Formation.

Available Systems Control Panel

This shows a list of all weapon systems available in the game's database. To aid in rapid location of specific systems, the list is organized into the following categories:

- Infantry & Support Troops
- Guns & Mortars
- Self Propelled Guns & Mortars
- Rockets & Missiles
- Anti-Aircraft Weapons
- Reconnaissance Vehicles
- Transports
- APC's & IFV's
- Anti-Tank Vehicles
- Tanks
- Ships
- Helicopters
- Fixed Wing Aircraft
- New Equipment

Equipment Modification

The list of Available Equipment is contained in the Equipment.eqp file in the Graphics folder. The Equipment Database stored in the Equipment.eqp file can be edited via any of a number of user-made editors (example: BioEd) to customize the Available Systems for specific scenarios. The edited file should be saved in the scenario's sub-folder in the Graphics folder. There is a "How to" document in the Manuals folder that details how to use the BioEd to revise the database.

New to **TOAW IV** is a build-in Equipment Editor. This Equipment Editor is discussed in section 17.5.

The number of Available Equipment items in the existing database is 5000 items. Well over half of those are Spare Equipment and thus ready for editing.

In addition, there is an Equipment.nqp file that stores a suite of new naval parameters for the database as well. This file can also be designer edited and stored in the scenario's sub-folder. How to edit this file is described in Appendix 19.9.

The contents of both of those files are now stored in the scenario file (.sce), the save file (.sal), and the PBEM file (.pbl). This means that the files don't actually have to be provided by the designer to the players. But if anyone desires to edit the scenario, they will need the files. Therefore, the F11 key in the Editor will regenerate both files to the main menu, if they aren't otherwise available.

You can quickly jump to the start of any particular category by clicking anywhere to the right of the system buttons.

Left click on a system to authorize and assign it to the current unit. A window will pop up asking you how many of the systems you wish to authorize for the unit.

When you make this selection you are actually setting the authorized level of equipment for the unit. This represents a normal maximum number of the systems in the unit rather than the current assigned number.

Since in most cases the assigned and authorized quantities will be closely matched during Scenario design, the Editor automatically assigns the authorized quantity of equipment to the unit. A similar button in the Unit Control Panel sets the assigned quantity, which may be more or fewer than the authorized quantity. As in the Unit Control Panel, a right-click on a system button will bring up an information display for the selected equipment type.

Note: To remove an equipment item from the unit's TO&E, you must set the Authorized value to zero from within the Available Systems Panel. Setting the Assigned value to zero within the Unit Control Panel will leave the equipment in the unit, just with zero assigned.

At the bottom of the Available Systems panel is a row of buttons. From left to right, these are:

- Scroll to Previous Weapon
- Scroll to Next Weapon
- Display Current Force: Switch the Editor scope to Current Force.
- Display Current Formation: Switch the editor scope to Current Formation.
- Switch Forces: Change the current Force from one side to the other.
- Exit Force Editor: Return to the Map Editor.

Current Force Control Panel

This shows a list of all units defined for the current force.

At the top of the panel is the Force Name button. Click here to change the name of the current Force.

Below the Force Name button is a list of units in the current Force. The current unit is indicated by white text. To the left of each unit button is an assignment button showing either "unassigned" or the name of the Formation the unit is assigned to.

Left-click on any unit name button to make it the current unit.

Right-click on a unit name button to cut it from the Force for later pasting. To paste the cut unit, move the mouse to where you wish to insert it and right-click again. If you accidentally cut a unit, you can drop it back in its proper place by right-clicking again without moving the mouse.

Left-click on an Assignment button to change a unit's Formation Assignment. The effects will vary. If the unit is currently assigned, it and all following units of the same Formation will become unassigned. If the unit is unassigned, it and all following unassigned units will be either attached to an existing Formation or assigned to a new Formation (your choice).

Right-click on an Assignment button to cut that Formation from the Force. To paste the just-cut Formation back into the Force, move the cursor to where you want to insert it and right-click again.

At the bottom of the Current Force Control Panel is a row of buttons. From left to right, these are:

- Force Characteristics: Looks like a flag. Use it to change the national flag of the Force.
- Scroll to Previous Unit
- Scroll to Next Unit
- Display Weapons: Switch the Editor scope to Available Systems.
- Display Current Formation: Switch the editor scope to Current Formation.
- Switch Forces: Change the current Force from one side to the other.
- Exit Force Editor: Return to the Map Editor.

Current Formation Control Panel

This shows all available information for the current Formation.

At the top of the panel you will find the Formation Name and Support Level buttons. Click on the Formation Name button to change the name of the current Formation. Click on the Formation Support Level button to change the Formation's Support Level (see 18.9.2).

Below the Name and Support buttons is the list of units assigned to the current Formation. Click on any Unit Name button to make that unit the current unit. To the right of each unit name is an abbreviated list of unit Strengths and Movement Allowances. There may be more units than will fit within the display area. If so, you can scroll the unit list using the scroll buttons to the right of the unit list. There is space for a maximum of 32 units per formation. Sub-units count against this total, so if you fill the formation with 32 units, those units will not be able to subdivide. Best to keep far less than 32 units in the formation to allow some room for units to subdivide.

At the bottom of the Current Formation Control Panel is a row of buttons. From left to right, these are:

- Previous Formation
- Next Formation
- Display Current Force: Switch the editor scope to Current Force.
- Display Weapons: Switch the editor scope to Available Systems.
- Formation Proficiency
- Formation Supply Distribution Efficiency
- Exit Force Editor: Return to the map editor.

The Previous and Next Formation buttons are used to flip through your formations one at a time. Use the display weapons button to switch the editor scope to Available Systems. The Display Current Force button will switch the Editor scope to Current Force. Click on the Switch Forces button to change the current force from one side to the other. And select the exit force editor button to return to the map editor.

17.3.3. HOW TO EDIT A FORCE

From the Edit menu, select the Forces menu item to access the Force Editor window.

Let's create a unit. Move your mouse cursor over to the Available Systems Control Panel and click within the panel to the right of the Weapon System buttons.

Select the Tanks button. This will quickly drop to that part of the database.

Now, move your mouse cursor down to the Scroll to Next Weapon System button and right-click to scroll by an entire page. You should be looking at a list of French and German armored equipment. If not, scroll around using the Next / Previous buttons until you see a button labeled PzKpfw 35t. Click on this button.

A "How Many" window will appear. Using your keyboard, enter the number 39. Now, use the same procedure to add 30 PzKpfw IIB, 13 PzKpfw I, and 6 PzKpfw IVd. You have just authorized the equipment for a typical 1940 mixed German Panzer battalion.

When you are done, the Unit Control Panel should like this:

Now, click on the Name button at the top of the Unit Control Panel to change the name of the unit to "1st Panzer".

Click on the Unit Size Symbol button and select the Battalion symbol (II).

Click on the Unit Icon Colors button to select a medium gray icon with light gray interior. If the Icon Type button to the right does not show a NATO standard armor symbol, click on it and select the symbol from the window that appears.

Move your mouse to the rows of buttons at the bottom of the Unit Control Panel and click on the Proficiency, Readiness, or Supply button to set those values for the unit.

That's it! The 1st Panzer Battalion is now fully defined.

If you click on the Copy Unit button at the bottom of the display, copies of the unit will be created. Their name will be appended with a plus sign (+) at the end.

Click on the Display Current Force Button at the bottom of the Available Systems panel. The Force Control Panel will be displayed and you should see three units, as shown below. These are your original "1st Panzer" Battalion, and the copies you made (as mentioned, copies are indicated by a "+" sign).

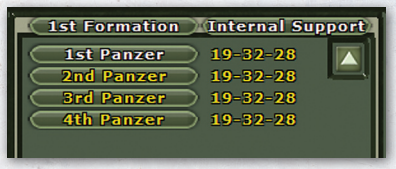
You can select each in turn (click on the name on the Force Panel; a selected unit's name is shown in white; non-selected units' are printed in yellow). This unit will become 'active' in the left-hand Unit Control Panel; from here you can click the Name button and rename your unit. Do this with each copy you created.

Now, click on the top Unassigned button, next to your 1st Panzer unit, in the Force Control Panel. This will automatically assign all Unassigned units directly below that unit to the same Formation. Note that if you click instead on the Unassigned Unit button for the bottom unit in the list, only that unit will be assigned to a Formation. To undo a Formation assignment (to "Unassign" a unit), you can left-click on the button listing the Formation name; to delete the unit, right-click on the same button. If you clicked on the top "Unassigned" button, as instructed, all units should now be listed in the "1st Formation", as shown in the illustration left.

If you wish, you can click on the Flag button at bottom left to assign the appropriate National Flag for the Force.

Click on the Display Current Formation button at the bottom of the display to change to the Formation Control Panel, as shown below.

Click on the Formation Name button to change the name to 1st Panzer Rgt, and then click on the Formation Support Level button just to the right until it shows "Army Support". Units of the Formation will now be free to act in concert with other units using the same icon colors, regardless of their parent Formations. This might be typical of an independent corps-level Panzer Regiment.



You can also use the Formation Proficiency and Supply Distribution Efficiency buttons to enter appropriate values for the Formation as a whole.

Click on the Display Weapons button to change the Editor Scope back to Available Systems.

Then click on the Switch Sides button. You can now define an opposing force (say French, 1940) in the same way.

Once all units for both sides have been fully defined and assigned to Formations, you are ready to deploy your Forces to the Map using the Deployment function.

The preceding example was set up to show how to create a simple Force. If you are creating a larger Force, it is usually most efficient to create several prototype units and make multiple copies of those to create all the units for your Force. For example, you might create one typical Infantry unit, a typical Armor unit, a typical Artillery unit, etc. Then, use the Unit Cut/Paste feature to create enough copies of your prototype units to flesh out your Force. It will ease your task if you arrange the units so that they are ready for organization into Formations. Group the units so that all you want assigned to the first Formation are at the top of the list, units of the second Formation next, etc. Then make any modifications necessary to individual units to customize them as needed for your Scenario – names, variations in equipment and Strengths, etc. Finally, after all your units are created, assign them to Formations. Do one Force at a time.

Be sure to save your work frequently!

17.4. ADVANCED FORCE EDITOR FUNCTIONS

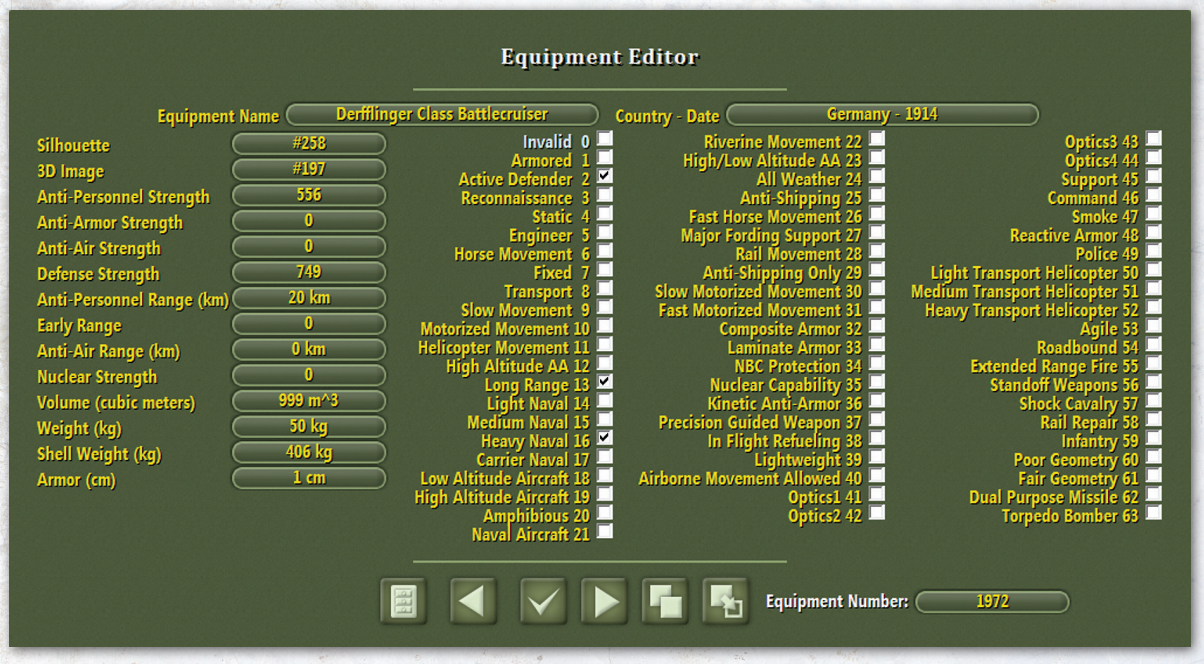
A large number of Advanced Editor features are available from the Edit Modify Current Force, Modify Current Formation, and Modify Current Unit menu items. It is possible to modify all or part of a Force, including global search and replace unit and Formation renaming. Please see the description of the Edit menu for a brief description of these functions.

17.5. THE EQUIPMENT EDITOR

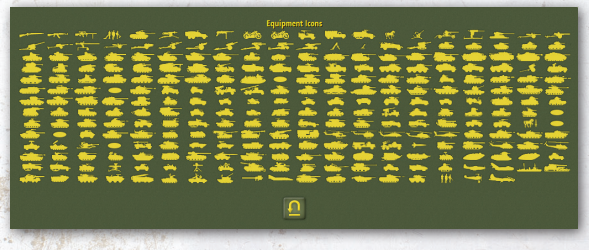
This editor is accessed (only) from the Available Systems Control Panel in the Force Editor. Right-clicking on any Equipment Icon button there will bring up the Equipment Report for that item. At the bottom of that report is a button to launch the Equipment Editor (only present if invoked from that Panel).

Click on that button. The Equipment Editor (with a copy of that equipment item loaded) is launched:

At the top of the Equipment Editor are two buttons that allow the Equipment Name and Country – Date to be edited. Below that there is a column of buttons on the left that allow all the Equipment Parameters to be edited. To the right of that are three columns of checkboxes that allow the 64 Equipment Flags to be toggled. Note that the Invalid flag can't be edited. (The Invalid flag identifies the equipment category titles).



Clicking on the very first parameter button invokes the Silhouette Selection dialog. This shows all the silhouettes. The info panel has a description of each silhouette as the mouse passes over them. Clicking on a silhouette selects it.



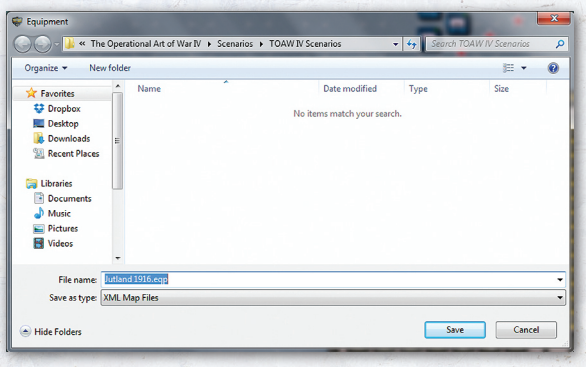
Clicking on the second parameter button invokes the 3D Image Selection dialog. The current 3D Image is displayed. There are buttons to decrement and increment the image number, and a button to enter the image number. Putting the mouse over the image shows its description in the Info Panel. When the desired image is displayed, clicking the exit button selects it.

The Control Bar at the bottom has six standard buttons and one wide text button as follows:

- **Save Button:** This saves the current equipment item to the Equipment List (memory only – saving to disk is further down). Forget this step and the edit is lost once you proceed on to another equipment item.
- **Decrement Button:** Loads a copy of the equipment item one lower in the equipment list than the current item. This will erase the current edit (so save it first if you want to keep it).
- **Exit:** This exits the Equipment Editor. This will erase the current edit (so save it first if you want to keep it). Note that, while there is some ability to move around in the equipment list within the Editor, temporarily returning to the Force Editor may give more control over that.

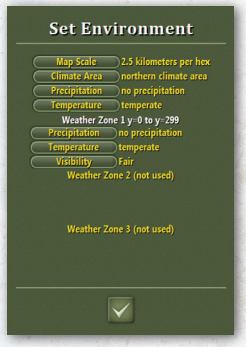
- **Increment Button:** Loads a copy of the equipment item one higher in the equipment list than the current item. This will erase the current edit (so save it first if you want to keep it).
- **Copy Button:** This copies the current equipment to the Paste Buffer. It stays there till the Force Editor is exited or the copy button is clicked again.
- **Paste Button:** This pastes the contents of the Paste Buffer to the current equipment.
- **Equipment Number Button:** This displays the equipment number, and allows it to be edited.

To save the edits to disk, you must first exit the Equipment Editor. Then, on the File pull-down, there is the "Save Equipment(XML) As…" option. Click on that option. The File Save dialog is invoked. Note that the file name is already correct with the scenario name and .eqp suffix. But you will most likely have to change the folder first. That is accomplished within the folder path listing at the top of the dialog.



Once the .eqp file has been saved, it must then be incorporated into the scenario file. That is achieved by putting the .eqp file in the scenario-specific named folder and saving the scenario.

17.6. THE ENVIRONMENT EDITOR



The Environment Editor is accessed from the Edit menu. It is used to set the Scenario Environment, which includes the following elements:

- **Map Scale:** Each Map location can be 2.5, 5, 10, 15, 20, 25, or 50 kilometers across. This affects game movement and the Map Size calculation used to determine the number and location of Weather Zones.
- **Climate Area:** If the Map is large enough, it will be divided into as many as three Weather Zones. Set this value to select the direction from which warm and cold fronts arrive. Unless you wish to include weather systems (cold or warm fronts) in your Scenario, the equatorial setting should be used. Other than specifying weather front directions, this setting is not directly visible within the game, and has no direct bearing on game play.
- **Precipitation:** Precipitation may be Heavy, Moderate, Light, Occasional, or None. This is a global likelihood value, and can be modified by terrain.
- **Temperature:** The temperature in any particular Weather Zone may be Frozen (levels 1 through 3), Cold, Cool, Moderate, Warm, or Hot. If your Map is zonal, this selection will be for the most extreme Zone (North for northern, South for southern, All for equatorial) with less extreme Zones being progressively warmer.

Climate Area is an advanced feature, and need not be used in most cases. It is intended for use

by advanced Scenario designers who wish to model things like cold and warm fronts, seasonal weather changes, etc. Proper use of Zone Polarity requires use of the Event Editor.

17.7. WEATHER ZONES

If the Climate Area is set to Northern or Southern, and the Map is at least 600 kilometers from north to south, the Map will be divided into Weather Zones. The most extreme Zone in a Northern map is the Northern Zone, and the least extreme zone is the Southern Zone. The opposite is true for a Southern Map. To avoid Zonal effects, select an Equatorial Climate area.

On Zonal Maps, weather effects (triggered by Events – see 17.8, Event Editor) will progress from Zone to Zone. Cool fronts progress from the most extreme Zone to the least extreme Zone. Warm fronts progress from the least extreme Zone to the most extreme zone. Depending upon the precipitation likelihood, storms may occur in one or more (possibly not all) zones as fronts pass through.

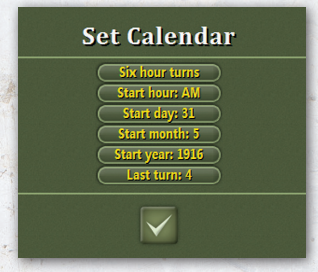
17.7.1. TABLE 1: WEATHER ZONES (NORTHERN OR SOUTHERN CLIMATE AREAS)

North to South	Zones
0-599 km	1
600-1199 km	2
1200+ km	3

17.7.2. WEATHER ZONE PANES

If your Scenario has more than one Weather Zone, you can set separate starting values for precipitation (Rain or Snow), visibility (Cloudiness), and temperatures for each Zone.

17.8. THE CALENDAR EDITOR



The Calendar Editor is accessed from the Edit menu. It is used to set the Scenario Calendar, which includes the following elements:

- **Turn Length:** Turn length can be six hours, half day, full day, half week, or full week. This affects Movement, Weather progression, and the availability of day/night effects.
- **Start Hour:** This value is meaningful only if the Turn length setting is less than "Full Day." AM Turns are daylight Turns for half-day turn intervals. PM Turns are night Turns for half-day turn intervals. For 6-hour turn intervals, the hours are Pre-dawn, Morning, Afternoon, and Night. Note that these descriptions are only shown in the Info Panel. The Predawn and Morning hours both show as AM on the Start Hour button. The Afternoon and Night hours both show as PM on the Start Hour button. Morning and Afternoon hours are Day. Night and Predawn hours are Night.
- **Start Day:** This is the date of the first Turn of the Scenario. You can set any valid day, but if the Turn length is half week or full week subsequent dates will be rounded to appropriate values.
- **Start Month:** This is the first month of the Scenario.
- **Start Year:** This is the first year of the Scenario.
- **Last Turn:** This is the nominal last Turn of the Scenario. Normally, a Scenario will not end before this Turn. It is possible that the Scenario can be longer. This value can be modified during play by the Event Editor.

17.9. THE EVENT EDITOR

Warning: the Event Engine is very complex! It was designed for optional use by advanced Scenario designers. An Event List is essentially a computer program designed to be executed by an interpreter called the Event Engine. You need not use the Event Editor for your Scenarios, and its use is not recommended for first time Scenario Designers.

17.9.1. INTRODUCTION TO THE EVENT ENGINE

The Event Editor is used to define the Event List for a Scenario. Any Scenario may have a maximum of 10,000 events defined in the Event list. The Event Engine is a very powerful feature, allowing the inclusion of scripted historical detail ranging from simple news strings to complex probability controlled branching.

17.9.2. THE STRUCTURE OF AN EVENT

An Event is defined by the following elements: a Trigger, an Effect, a Location, a Value or Radius, a Chance of Occurrence, a Turn Range, a News String, and a Status. Except for one exception, explained below, all events can only be activated one time.

17.9.3. EVENT TRIGGERS

An Event is set into motion by a trigger. Allowed triggers:

- **Force 1 or 2 occupies a location:** Occupation of any location within the given radius will serve as a trigger. This trigger can only be used with certain effects.
- **Timer:** The Event activates on a specified Turn.
- **Player 1 or 2 winning (victory differential):** The Event is activated if the Victory Differential reaches the specified Value. This trigger can only be used with certain effects.
- **Other Event activated:** The Event is activated after another specified Event is activated.
- **Other Event cancelled:** The Event is activated after another specified Event is cancelled. Note that this only applies to cancellation due to Probability check failure (see below). Cancellation by the Cancel Event effect will not cause this to trigger.
- **Player 1 or 2 uses Chemical Weapons:** ... anywhere on the Map.
- **Player 1 or 2 uses Nuclear Weapons:** ... anywhere on the Map.
- **Force 1 Attacks and Force 2 Attacks:** These triggers are similar to the "Force 1 Occupies" and "Force 2 Occupies" triggers. The Event is triggered if there is an Attack by the indicated Force within the Event Check Radius, or if any terrain becomes controlled by the Force within the radius. This means that the "Attack" trigger includes the "Occupied" trigger in addition to Attack detection. This trigger can only be used with certain effects.
- **Variable value:** Event triggers when the Event Engine variable reaches a specific value. This trigger can only be used with certain effects.
- **Unit destroyed:** Event triggers when the specified unit has been destroyed or disbanded (not withdrawn). If the unit has been subdivided, the event triggers upon destruction of all subunits of the unit. This trigger can only be used with certain effects.

Each Event has a chance to have an effect. In most cases, this will be 100%. If an effect does not occur because it fails this check, it is considered "cancelled". If the Event passes the check, it is considered "activated". This can in turn cause other Events to be activated or cancelled. Each Event has a Turn Range. In most cases, this will be one Turn.

If a larger Range is specified, the actual occurrence of the Event can activate (with equal chance) in any Turn from the Turn of triggering to that Turn plus the Turn Range. The check for activation of an Event with less than 100% chance to occur only happens once, regardless of the Turn range. The Activation Check is made first, and the actual Turn of Occurrence is calculated after it is determined that the Event is to occur.

Example: An Event scheduled to be triggered on Turn 5, with a Turn Range of 4 and a chance of activation of 75%. There is a 75% chance (one-time check) that the Event will occur. If it does occur, it will actually be activated on Turn 5, 6, 7, or 8.

17.9.4. EVENT EFFECTS

When an Event is set into motion, it has an effect. Allowed effects are:

- **Force 1 or 2 Increase Victory Level:** The specified value (see below) is added to the Victory Level for the indicated Force.
- **Force 1 or 2 Experiences Refugee Effects:** The indicated Force suffers Refugee Effects within a radius (see below) of the specified location. The activation or cancellation of another Event, typically an Occupation Event, should be the trigger this for type of Event. The effect is one additional movement point when moving via a road. The effect lasts one turn.
- **Storms:** Inclement weather occurs. This affects Air units, Land unit Movement, and some terrain types.
- **Warm Front:** The least extreme Weather Zone (see 17.5, The Environment Editor) warms by one Level. Storms may occur, depending upon the global Precipitation likelihood. On subsequent Turns, the warming trend will affect more extreme Weather Zones. If a Map is too small to be Zonal, or Zone Polarity is equatorial, the entire Map will be affected as a one-time Event.
- **Cool Front:** The most extreme Weather Zone (see The Environment Editor) cools by one Level. Storms may occur, depending upon the Global Precipitation likelihood. On subsequent Turns, the cooling trend will affect less extreme Weather Zones. If a Map is too small to be Zonal, or Zone Polarity is equatorial, the entire Map will be affected as a one-time Event.
- **Force 1 or 2 Wins Instantly:** Unless another Event overrides this one, the indicated Force wins at the end of the Turn.
- **End Scenario with Normal Victory Tally:** Unless another Event overrides this one, the Scenario ends with a normal Victory Tally.
- **News Only:** Other than placing a news string in the News display, this Event has no direct effect. Other events may use this one as a trigger.
- **Withdraw a Unit:** The indicated unit will be withdrawn beginning with the Event activation.
- **Force 1 or 2 Is Granted Chemical Release:** Subsequent Attacks by the Force's Artillery and Aircraft equipment are enhanced by chemicals.
- **Force 1 or 2 Is Granted Nuclear Weapons Release:** The Force may attempt a given number of Nuclear Attacks per Turn with his long-range Air units.
- **Nuclear Attack:** A nuclear attack is performed on the specified hex at the specified strength.
- **Force 1 or 2 Replacement Rates Are Multiplied:** ... by a given percentage (1% to 999%).
- **Force 1 or 2 Force Supply Stockpile Level Is Increased:** ... by a given percentage.

- **Force 1 or 2 Force Supply Stockpile Level Is Decreased:** ... by a given percentage.
- **Activate Event:** Use this to activate another Event. This is most commonly used to use one complex Event to trigger another. This will activate the target event even if it has already been activated. No Enable Event effect is necessary to re-enable the event.
- **Cancel Event:** Use this to cancel another Event. This will not cause Event Canceled triggers to fire.
- **Enable Event:** All other Events can only be activated once. You can use this effect to set a previously activated or triggered Event to be eligible for another occurrence.
- **Force 1 or 2 Theater Reconnaissance Capability:** ... is increased by a positive value or decreased by a negative value. Minimum value is zero.
- **Force 1 or 2 Guerrilla Capability:** ... is set to a certain percentage.
- **Force 1 or 2 Air Transport Capacity:** ... is set to a certain Level.
- **Force 1 or 2 Sealift Capacity:** ... is set to a certain Level.
- **Force 1 or 2 Rail Transport Capacity:** ... is set to a certain Level.
- **Withdraw an Army:** All units with exactly the same icon color scheme (foreground and background) as a selected unit will be withdrawn from the Theater. This includes Reinforcements not yet on the Map.
- **Force 1 or Force 2 Shock Level:** This is typically used to model surprise. Shock levels can range from one to 200, but should in most cases be limited to the 50-150 range. The default is 100. Unit strengths are multiplied by the Shock Level (as a percentage). Movement costs for moving near enemy forces may be decreased if the moving Force has a Shock Level greater than the non-moving Force, and costs may be increased if the moving Force has a Shock Level less than the non-moving Force. Time expended in combat may be reduced if the Attacker has a Shock Level above 100 and may be increased if the Attacker has a handicap level below 100. At levels below 100, Formations may arbitrarily reorganize (becoming unavailable for your orders). At Shock Levels below 70%, Air units will not defend their Airbases if attacked.
- **Force 1 or Force 2 Rail Repair Capacity:** This is the greatest number of Rail locations that will automatically be repaired by the Force in any given Turn. This ability is in addition to any Railroad Repair Engineering units.
- **Force 1 or Force 2 Rail Destruction Chance:** This is the chance that units of the Force will destroy enemy Rail lines when advancing into enemy-controlled territory. The default is 100% (as hard-coded in earlier versions of the game).
- **Force 1 Air Shock Level and Force 2 Air Shock Level:** As with the Force Shock Level, this is used to model surprise or sudden drops of morale for Air units. It is a direct percentage multiplier to Air unit Strengths. If the Shock Level is less than 70%, Air units will not rise to defend their air bases (interception) when under attack. The default is 100%. The effect is permanent, so you need to remember to restore to 100% when you want the Surprise Effect to expire. This also affects Unit Quality Checks, so be careful with it. Air units are no longer directly affected by the (non-air) Force Shock Level.
- **Supply Radius 1 and Supply Radius 2 are used to set the Road Supply Radius of Force**

1 or Force 2: This is the distance to which Roads extend the fully supplied net from Supply Sources or Railroads leading to Supply Sources. The default is 4 hexes. Any value from 0 (Full Supply, only available along Rail lines and at Supply Sources) to 100 (Full Supply, can run from Supply Points along Rail lines and up to 10 hexes along Roads) can be set.

- **Force 1 or 2 ZOC Cost:** Adjusts the scalar for the cost of moving from one enemy ZOC to another.
- **Force 1 or 2 Movement Bias:** Adjusts the Force Movement Bias parameter.
- **Cease Fire and Open Fire:** When a Cease Fire is in effect, units may not enter enemy territory or Attack enemy units, there is no Interdiction or Air Superiority combat, and Air units will not intercept enemy units using Air movement. Once called, a Cease Fire is permanent. To cancel a Cease Fire, issue an Open Fire Event effect.
- **Supply Point 1:** Place or remove a Force 1 Supply Point. This also sets the Variable Supply level. A level of 0 removes the point.
- **Supply Point 2:** Place or remove a Force 2 Supply Point. This also sets the Variable Supply level. A level of 0 removes the point.
- **Form'n Orders:** Set Formation orders and emphasis. Only orders and emphasis can be modified. Objective tracks are unaffected.
- **Remove Zone 1:** Remove Exclusion Zone 1.
- **Remove Zone 2:** Remove Exclusion Zone 2.
- **Strategic Bias 1:** Set P.O. Force 1 Strategic Bias.
- **Strategic Bias 2:** Set P.O. Force 2 Strategic Bias.
- **Force 1 PO Activate:** If Force 1 is PO Controlled, the specified event is activated. Note: If control is ever transferred to Human Control – including starting the scenario under Human Control – all such events are canceled. Resuming PO Control will not revive them.
- **Force 2 PO Activate:** If Force 2 is PO Controlled, the specified event is activated. Note: If control is ever transferred to Human Control – including starting the scenario under Human Control – all such events are canceled. Resuming PO Control will not revive them.
- **Set ownership 1:** Set ownership of a location to Force 1. No effect if location is occupied.
- **Set ownership 2:** Set ownership of a location to Force 2. No effect if location is occupied.
- **Variable +:** Adds a value to the Event Engine variable.
- **Variable –:** Subtracts a value from the Event Engine variable.
- **Theater Option 1:** Places a Theater option in the Force 1 Strategic Option window.
- **Theater Option 2:** Places a Theater option in the Force 2 Strategic Option window.
- **Force 1 Track:** Switch programmed opponent Objective tracks for Force 1.
- **Force 2 Track:** Switch programmed opponent Objective tracks for Force 2.
- **Disband unit:** Similar to Withdraw Unit, but disbands the unit with its equipment entering the Replacement Pool. The unit need not be on the map to be Disbanded. This can be used to dump an equipment bonus into the Replacement Pool. Units disbanded by this method (as opposed to disbanded by the player in-game) are permanently removed from the Force's OOB and never rebuild.
- **An Event Can Have a Value:** Depending upon context, the value can be a trigger (the

Victory Differential necessary to trigger a player-winning triggered Event) or an Effect Value (the Victory Award for an increase Victory Level effect Event).

- **An Event Can Have a Radius:** Depending upon context, the Radius can control either the trigger (as in the case of an occupation-triggered Event) or the Effect (as in the case of a Refugee Effect Event). Radius limit is now 99.
- **Withdraw Unit/Army and Disband Unit Events:** ... require a unit specification.
- **Formation Orders Events:** … require a Force number (1 or 2) and then a formation specification.

17.9.5. THE EVENT ENGINE VARIABLE

The Event Engine variable is used to track some value. You can add to it or subtract from it by Event Effects (see below). The value can't go lower than 0, so if you have any doubt about the Level the variable may have and you want to be sure to set it to zero, just subtract some large value from the variable.

For an example of many valid Event types used in a Scenario, use the "Dump" feature in the Korea 50-51 Scenario and examine the file it creates for an example of a functional Event List.

17.9.6. THEATER OPTIONS

You can use Theater Option Effects to give players control over specific Events. The News string for the option will show up in the Theater Option window next to the Option button, not in the Recent News window. When a player selects an option, it is converted into a Timed Event (timer trigger) for activation in the current Turn. The option is then removed from the player's option list. If you wish to remove an option, place a second option with exactly the same News string and set an "Event to Activate" of 9999 or 10000.

The limit is 64 Theater Options active at any given time. Adding an Option after that limit is reached will have no effect. The added Option will never show up in the list. Of course, a scenario can have more than that overall, but would have to ensure that any excess are used or removed before any more are activated.

17.9.7. USING THE EVENT EDITOR TO CREATE AN EVENT LIST

The Event Editor shows three events at a time, in separate panes. Below the Event panes is a Control Bar with Event List scroll buttons, sorting buttons, and an Exit Event Editor button.

Event Editor Control Buttons

- **Scroll Buttons:** Use this to scroll through the Event list.
- **Sort Buttons:** Use this to sort events by Turn, Trigger, or Effect.
- **Exit Button:** Use this to exit the Event Editor.

Event Panes

Each Event pane has up to nine buttons, as well as a News string entry field immediately below the buttons. Click within the News string entry field to change the string to be displayed in the Recent News report if the Event is activated. You do not have to specify a News string, and in some cases you will want to leave the News string blank. Note that if you precede the News string with "Debug" it will not show in the Recent News when the event is triggered. This, therefore, allows the News string to serve as an Editor comment to remind the designer what the event is about when doing scenario edits at some future date. Many events do not use all nine buttons, and buttons will only appear as needed. Different buttons can have different meanings in different Event types. Watch the context prompt in the Event Editor Information panel for further explanation. From left to right, top to bottom, the buttons are:

- **Trigger:** Sets the trigger type. Left-clicking increments to the next trigger. Right-clicking results in a popup menu from which you can select the trigger. It is usually more efficient to use the popup menu to select the trigger type.
- **Effect:** Selects the effect type. Left-clicking increments to the next effect. Right-clicking results in a popup menu from which you can select the effect type. It is usually more efficient to use the popup menu to select the Event type.
- **Triggering Event:** Allows you to choose the Event to use for a trigger for the current Event. This is only used if you are setting up an Event triggered by another Event.
- **Turn or Delay:** Sets the Turn of occurrence
- **Turn Range:** Sets the range of Turns over which an Event may occur.
- **Chance of Occurrence:** Sets the chance that the Event will occur if the trigger condition is met.
- **Location x:** Sets the x map coordinate of the affected or checked location.
- **Location y:** Sets the y map coordinate of the affected or checked location.
- **Value, Radius, Affected Event, or Unit Name:** Selects the item indicated by the context prompt in the Information panel.

To the right of the Event Pane are two or three buttons:

- **Copy Button:** Copies the associated event pane to the Paste Buffer. After this is done, a third button is added: The Insert Button.
- **Delete Button:** Deletes the associated event pane.
- **Insert Button:** Inserts the contents of the Paste Buffer above the associated event pane. This button is only shown if the Copy operation has been performed.

Note that these buttons are new for **TOAW IV**, and are a huge improvement over the way events were copied in earlier versions of TOAW. Before, clicking anywhere in the event pane that was not directly on a button or within the News String area caused the event to be copied and inserted – often done accidentally without the designer even being aware of it happening. That is no longer the case. Events are only copied and inserted by the Copy and Insert buttons. There is another advantage: Once copied, the paste buffer's contents can be inserted over and over as often as desired.

The Control Bar has five buttons:

- **Insert Button:** Inserts the contents of the Paste Buffer above the current event pane.
- **Sort by Trigger Button:** Sorts the events by trigger value.
- **Sort by Effect Button:** Sorts the events by effect value.

- **Sort by ID Button:** Sorts the events by ID value.
- **Exit Button:** Exits the Event Editor.

Last, there is a "Go to event #" Input Box. Entering a number in the box will go to that event in the event list.

Finally, note that there is now a scrollbar, allowing scrolling to the desired event area.

17.9.8. THE NEW SCENARIO EVENT TEMPLATE

When you first open the Event Editor for a new Scenario, you will find several standard "blank" Events ready to be filled in. The first of these is a Turn 1 News Event. You can fill in the News string to create the first News item you want to appear in the Recent News report when the Scenario begins. Below this are blank Turn 1 Events for setting the Air, Sea, and Rail Transport and Global Reconnaissance levels for each Force. In most cases, you will want to leave the Sea and Air Transport levels at 0, but there should almost always be some Rail Transport or Global Reconnaissance Level for each Force.

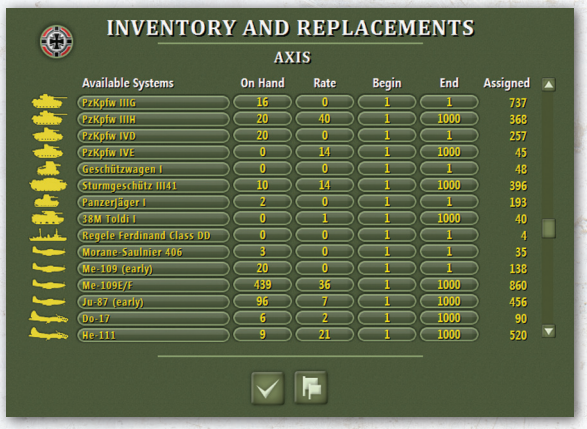
To calculate the amount of Transport needed, determine how many units you wish to be able to move. In a truly historical Scenario, this will be based on the actual maximum levels used by each Force in the original campaign. Add up the transport requirements available in the Deployment Editor Unit Reports.

For example, if your research indicates that a Force apparently had the ability to ship three regiments per Turn by Rail, and the Transport requirement of three typical regiments adds up to 150, set the Force Rail Transport Capacity to 150. Do the same for Air and Sea transport capacities if you want to be able to move units by Air or Sea in your Scenario.

17.9.9. DEFAULT EVENTS

When a named Urban location is taken or successfully defended, the program automatically places a News item in the Recent News report. You do not need to set up separate Events solely to report these occurrences. But note that if the named location is not Urban (or Dense Urban) no such automatic news items are generated for it.

17.10. THE REPLACEMENT EDITOR



You set the Rate of Replacement for each type of equipment in the inventory of each Force using the Replacement Editor.

This window is very similar to the Inventory and Replacements Report available in the game. It lists the complete equipment inventory for a given Force, indicated by the National Flag near the Control Panel.

The Control Bar at the bottom of the dialog has two buttons: Exit, and Switch Sides. The Exit button is used to leave the Replacement Editor and the Switch Sides button is used to toggle from one Force inventory to the other. There is now a scrollbar, which replaces the function of the previous scroll up/down buttons.

Each item in the inventory has several buttons, as follows:

- **Information Button:** Click for equipment information.
- **Name:** This is the name of the equipment type.
- **On Hand Button:** This is the quantity of Replacement equipment currently stockpiled and available for distribution to understrength units.
- **Replacement Rate Button:** This is the rate at which the equipment is added to the "On Hand" stockpile of Replacements. In most cases, this should be woefully short of requirements.
- **Begin Button:** This is the first Turn in which the equipment will be added to the stockpile.
- **End Button:** This is the last Turn in which the equipment will be added to the stockpile.
- **Assigned Equipment Tally:** This is the total quantity of equipment assigned to all units defined in the Force's Order of Battle. The total includes units that may, depending upon Scenario design, never actually enter the Map.

Note that the list is sortable via the header items, just like the in-game Inventory Report.

17.10.1. DEFAULT REPLACEMENTS

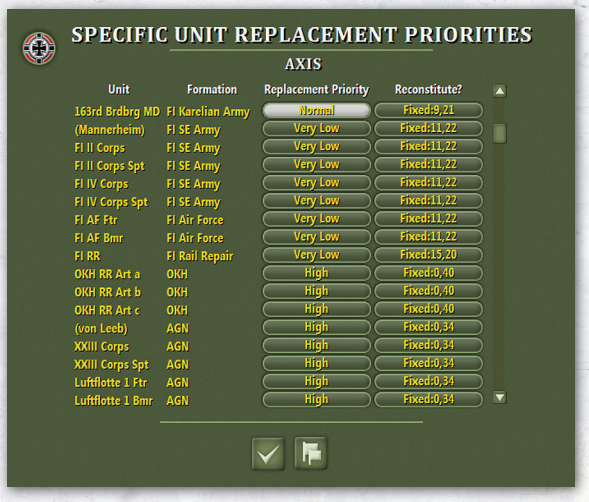
If you choose, you can set 1% or 2% Replacements from the Edit / Set Replacements menu item. If you do this, 1% or 2% of your total starting Force inventory of each item will be replaced each Turn.

17.10.2. EQUIPMENT TRANSITIONS

You can model equipment transitions by using the Begin and End buttons to set the arrival time frames for different types of equipment. For example, in the Korea 50-51 Scenario, the U.N. player initially receives Shermans, then Pershings, and finally Pattons. If you authorize different types of equipment in your units while assigning different starting Levels, you will find that the unit slowly transitions from one type of equipment to another as the types of Replacements available change over time. Since it is possible to authorize equipment without actually assigning it, a unit could conceivably go from being equipped solely with one type of equipment at the beginning of a Scenario, to being equipped solely with another type of equipment by the end of the Scenario. Sudden transitions can be achieved by withdrawing a unit and entering another unit of the same name, but different equipment as a Replacement at a later date.

Be aware that unit reconstitution is only triggered by having sufficient replacement equipment for the top item in the unit's TO&E. So, such transitioned units may not reconstitute well.

17.10.3. UNIT REPLACEMENT PRIORITIES



You can use the Specific Unit Replacement Priorities window to set unit Replacement priorities and eligibility for Reconstitution. The unit list can be scrolled up and down, and the Switch Sides button switches from one Force to the other. All units are

displayed, along with their Formation assignments, Replacement Priority, and Reconstitution Eligibility. Select a Replacement Priority button to change the associated unit's Replacement Priority. Select a Reconstitution button to toggle the unit's eligibility for Reconstitution.

Replacement priorities affect the likelihood and amounts of Replacements for units if there isn't enough replacement equipment to fill all requests.

17.10.4. REPLACEMENT PRIORITY

Very High – 100%
High – 80%
Normal – 60%
Low – 40%
Very Low – 20%
None – 0

Units with a Replacement Priority of none will never receive Replacements during a Scenario. Units ineligible for Reconstitution will not be Reconstituted if destroyed during a Scenario. If you use this window to set unit Replacement Priorities or eligibility for Reconstitution, you should probably mention the fact in your Scenario Briefing, otherwise players may be confused when their units do not receive Replacements or are not Reconstituted.

17.10.5. RECONSTITUTION? FIXED X, Y

This column hides a very powerful feature that, up to this point, has been sadly undocumented. There are two obvious options: No and Yes. If set to No the unit will not reconstitute. If set to Yes it will reconstitute. It will do so to the Reentry Point if that has been set. If it hasn't, it will reconstitute as described in section 9.1.8.

The problem with this is that a force may consist of units needing to reconstitute in very different locations. For example, a WW II Allied force may consist of British, US, French, and Soviet units. You don't want your Soviets to reconstitute in Britain or your British to reconstitute in Russia. But, with only one Re-entry Point all units will reconstitute in the same place – so some must reconstitute in the wrong place. Omitting the Reconstitution Point will cede control of where to reconstitute to the computer – which may put them anywhere, randomly.

Fortunately, this column has a third choice: Fixed x, y. If that is opted for the unit, the unit will reconstitute in the x, y location. That location is set by the first objective of Track One of the unit's formation. So, by controlling where that objective is set, you can control exactly where the units of each formation reconstitute. There can be as many reentry points in the game as there are formations.

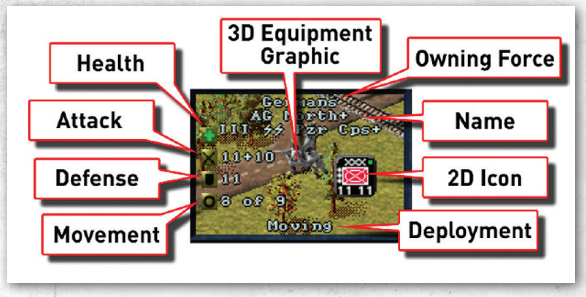
17.11. THE DEPLOYMENT EDITOR

The Deployment Editor is used to deploy Forces on the map; set Supply Points, Reinforcement Entry Sites, and plot programmed opponent Orders and Objectives. The main displays in the Deployment Editor are very similar to those used in the game.

Forces for both sides must be validly defined before the Deployment Editor can be entered. That means that at least one unit, assigned to a formation, must be created for each side.

17.11.1. THE LEGACY UNIT PANEL

This area is visible only in the Editor's Deployment Editor and in the Legacy Control Panel. Left clicking on the Unit Panel centers the screen on the unit. Right clicking on the Unit Panel brings up the Unit Report window for the top unit shown in the panel.



The Unit Panel shows the unit's Owning Force, Parent Formation, Unit Name, and Deployment or Mission. A graphic of the most significant equipment type assigned to the unit is superimposed on a background showing the terrain in the unit's location.

Various icons and numbers along the left side of the Unit Panel indicate the general state of the unit and the presence of other units also present in its location. From top to bottom, at left:

- The Health Icon shows a color from green (very good Unit Supply, Readiness, and Equipment levels) to red (very poor Supply, Readiness, and Equipment levels).
- Numbers to the right of the Attack Strength icon indicate the unit's Attack Strength. If the unit can fire long distances at enemy units, the range is shown next to the Attack Number, otherwise the unit's Anti-Personnel and Anti-Armor Strengths are shown.
- A number next to the Defense Strength icon indicates the unit's Defense Strength.
- Finally, two numbers next to the Movement Allowance icon indicates the unit's Current and Original Movement Allowances. For example, "10 of 20" would mean the unit's Current Movement Allowance is 10 and the Original Movement Allowance is 20.

A "stack" of unit icons appears in the middle of the Unit Panel. If you move your mouse cursor slowly along the edge of the stack in the Unit Panel, you can examine each unit grouped in the same location. Left click on any one of the stacked unit icons to make the indicated unit the new "current unit" (thus bringing it to the top of the stack).

17.11.2. THE DEPLOYMENT EDITOR CONTROL PANEL

The eight buttons in the control panel are, from left to right/top to bottom, as follows:

- **Previous Unit:** Select the previous unit.
- **Next Unit:** Select the next unit.
- **Unit Icon Display:** Changes the unit icon display preferences. This selects between showing unit strengths or movement allowances.
- **Switch Sides:** Switch from one Force to the other.
- **Previous Formation:** Select the previous Formation and its first unit.
- **Next Formation:** Select the next Formation and its first unit.
- **Current Formation Info:** Display a full Report on the current Formation.
- **Undo:** Undo the previous action.

A ninth button is situated under these eight:

Deployment Mode Select: The Deployment mode select is used to specify the action to be performed if you select a location in the Map panel. The different modes available are Place Unit, Remove Unit, Place Supply, Place Objective, Objective Value, Reentry Point, and Toggle Ownership. Left clicking on the button moves through the list forward. Right clicking on it moves through the list backwards.

17.11.3. THE DEPLOYMENT MODES

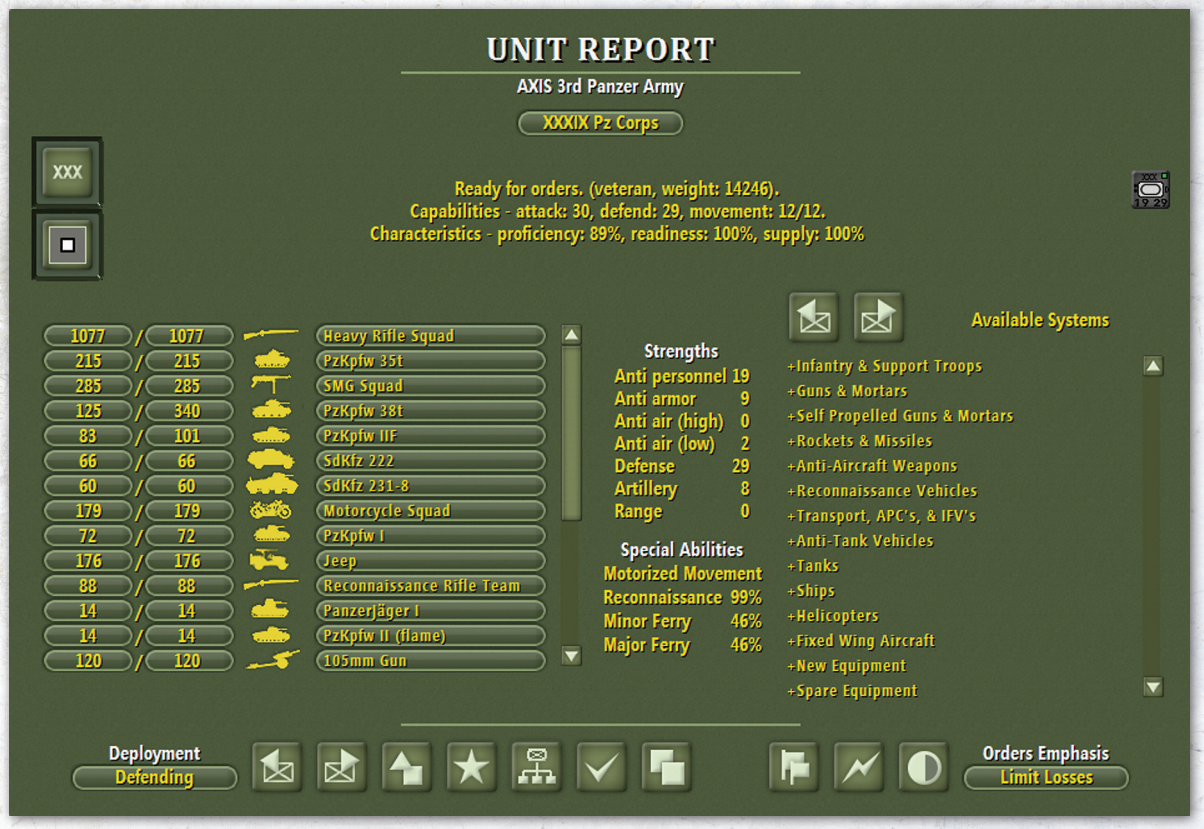
You place units, Supply Points, etc. by right-clicking in the Map panel. The effects of a right-click depend on the Deployment mode. The Deployment mode is selected by clicking on the Deployment Mode button, or by left-clicking on an empty Map location. If you left-click on a Map location containing a unit, that unit will become the current unit.

- **Place Unit:** The current unit, if off map, will be placed in the selected location. If you right-click on the current unit (i.e., the one with the brass-colored highlight around it), a popup menu will give you a choice of actions.
- **Remove Unit:** The top unit (and possibly others) in the selected location will be removed from the Map.
- **Place Supply:** If no Supply Point is in the location, one will be placed. If a Supply Point is already present, it will be removed. There will be a prompt for the Variable Value for the point. If set to zero, the point is removed. There is a limit of 399 Supply Points per side.
- **Place Objective:** If no current Formation Objective is in the location, one will be placed. If there is already a current Formation Objective in the location, it will be removed.
- **Objective Value:** You can set the value for any final Objective in the location.
- **Reentry Point:** You can set a reentry point for Reconstituted Land units. Each side may have one Reentry Point defined. It is not necessary for a Reentry Point to be set for each Force, but if it is set all Reconstituted Land units belonging to the Force will attempt to enter at or near the Reentry Point as long as it is friendly-controlled.
- **Toggle Ownership:** You can change the ownership of an unoccupied location.

17.11.4. THE ORDER OF BATTLE (OOB) REPORT

This report is almost the same as the one used in the game. But note that it has buttons to change the Force Name, Force Flag, Force Proficiency, and Force Supply Stockpile. Those operations are also available when using the Force Editor. They appear on the OOB Report as part of an effort to replace the Force Editor by incorporating its functions onto the OOB, Formation, and Unit Reports. That effort was not fully completed before the Release of **TOAW IV**. It is still planned to be completed in a future update.

17.11.5. UNIT REPORT



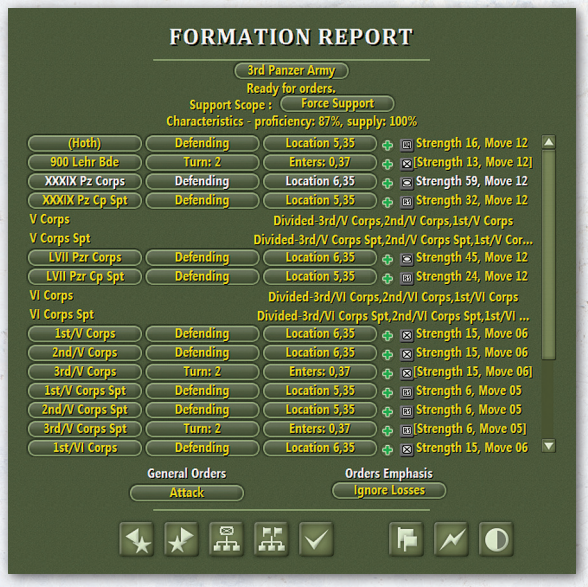
This report has a lot of differences with the one in the game. It has a lot of similarities to the Force Editor, in fact. You can set the Unit Name, Size, Color scheme, Icon, Secondary Icon, Add/Remove Equipment, change the amounts of Assigned/Authorized Equipment, and set the Unit Supply, Readiness, and Proficiency. You also change the Untried/Veteran status here, as you always did.

Note that this report has the Available Systems pane from the Force Editor. It works a little differently than the Force Editor's, however. The two buttons at the top are the "collapse all" and "expand all" buttons. You can, alternately, expand or collapse a single category by clicking on its category. Once expanded, the scrollbar allows quick access to the equipment.

The main Force Editor feature that is missing from these three reports is the ability to create units and formations from scratch or to move units within the OOB. For that you still have to go to the original Force Editor. It's also not as easy to move between the three reports as it is between the three states in the Force Editor. And these reports are not available if the forces are still not fully defined. Finally, the Edit pulldown options when the Force Editor is active are not available with these reports. These are the issues that are planned to be addressed in a future update.

17.11.6. THE FORMATION REPORT

This window is almost identical to the one used in the game. The primary difference is the presence of Formation Orders and Emphasis buttons, used to



define the behavior of the Formation when it is under computer control. You will have to use these buttons to set the Orders and Loss Tolerance for your Formations. But note that it has buttons to change the Formation Name, Formation Proficiency, and Formation Supply Distribution Efficiency. Again, this is part of the Force Editor re-design, yet to be completed.

17.11.7. FORMATION ORDERS

Formation orders are primarily designed for use in fine-tuning the programmed opponent. Except for the Static and Delay orders, they have no effect on a human player.

- **Defend:** The Formation will defend its Objectives, with higher priority given to higher-numbered Objectives. As long as all Objectives are under friendly control, most units will remain in place. If all Objectives are under friendly control, but some are threatened, some units will migrate in a high efficiency, safe, low-speed mode toward the most threatened Objective. Movement will generally be along the line of intermediate Objectives, if any. If any Objective becomes enemy-controlled, the Formation orders automatically switch to Attack orders and follows Attack Order logic. If allowed, units belonging to the Formation will attempt to dig in. Formations with Defend orders will remain more concentrated than Formations with Screen orders.
- **Attack:** The Formation will advance toward the highest-numbered enemy controlled Objective. Once all Formation Objectives are friendly-controlled, the Formation switches to Defend orders and follows Defend Order logic. Formations with Attack Orders will remain more concentrated than Formations with Secure orders.
- **Secure:** This is similar to an Attack Order. The only difference is that a Formation with a Secure Order switches over to a Screen Order (rather than Defend) when all Formation objectives are under friendly control.
- **Screen:** Units belonging to a Formation with a Screen Order will divide, split up, and attempt to bring all nearby territory under friendly control. They will fall back to the highest-numbered Objective if strongly approached by the enemy. If any Formation objective becomes enemy-controlled, the Formation switches to a Secure order.
- **Static:** Units belonging to the Formation are not available for Orders until the Formation is activated. Activation occurs on a specific Turn (set in the Editor) or when the enemy Attacks or moves adjacent to any unit of the Formation. When activated, the Formation assumes a Defend order.
- **Wait:** Affects the programmed opponent as a Delay order. There is no effect on a human player.
- **Hold:** Affects the programmed opponent as a Static order. There is no effect on a human player.

- **Delay:** Units belonging to the Formation are not available for Orders until the Formation is activated. Activation occurs on a specific Turn (set in the Editor) or when the enemy Attacks or moves adjacent to any unit of the Formation. When activated, the Formation assumes an Attack order.
- **Independent:** Units belonging to the Formation will attempt to do what they do best in support of other Formations along the axis running from lowest-numbered Objective to highest-numbered Objective. This is a "catch all" order, intended primarily for very high-level Formations.
- **Manual:** The "Manual" Formation order is identical to the "Hold" Formation Order except for one thing – the Formation can only be activated by either an Event or Turn. Enemy actions will not activate the Formation. This order is intended for Formations in Static or Fortified positions, where the Scenario designer wishes to force the Formation to remain in place, regardless of enemy action. This order has no effect on a human player. Note that this means that such formations are not moved by the PO Assist feature – thus the name.
- **Advance:** This order has no effect on a human player. The PO effect is similar to the Attack Order, except that the Formation will ignore threats to its rear areas. The Formation will only react to rear area threats if all Formation Objectives become enemy-controlled.
- **Garrison:** This order affects both human and computer players. Garrison orders are very similar to Reserve orders, except that units are individually activated if pushed out of their original positions. The Order is converted to a Defend Order when the game is first loaded, and all units of the Formation assume a Garrison status. Units in Garrison are treated much like units in Reserve Formations. Individual units lose their Garrison status when they are retreated or eliminated. Once a unit loses its Garrison status, it may be used normally. Garrison units are shown with a yellow band across the bottom of their 2D unit icon.

17.11.8. FORMATION LOSS TOLERANCE

Formation Loss Tolerances have much the same effect as Unit Loss Tolerances have in the game. Formations ordered minimize losses will behave cautiously under programmed opponent control. Formations ordered to ignore losses will behave very aggressively under programmed opponent control.

17.11.9. FORMATION OBJECTIVES

Each Formation may have up to ninety-nine Objectives. Formations will attempt to advance up the line of Objectives from the lowest numbered Objective to the highest numbered Objective when

on the offensive. They will fall back in the opposite direction when defending. At least one Objective must be set for the Formation in order for units to be assigned as reinforcements. As a Formation is assigned Objectives, the Microview panel displays the numbered Objective for that Formation.

In addition to the numbered tracks, objective tracks can now be displayed graphically on the map panel. In Deployment Mode, the View pull down has two options: Formation Path (/) – displays the current formation's path and Formation Paths (?) – displays all formations' paths. Red arrowed lines indicate the currently selected unit's first objective, while blue arrowed lines show the path from lowest to highest numbered objectives for the formation.

17.11.10. DEPLOYMENT FOR AIRBORNE OPS

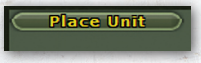
The programmed opponent is much more likely to use Airborne units in Airborne Attacks if you deploy the units in locations with airbases. Remember to give the Force enough Air Transport Capacity to transport all the units you want involved.

17.11.11. DEPLOYMENT FOR AMPHIBIOUS OPS

The programmed opponent is much more likely to use units for Amphibious operations if you deploy the units in a friendly Anchorage, with the lowest-numbered Objective reachable only by Sea Transport. Remember to give the Force enough Sea Transport Capacity to transport all the units you want involved in any invasions.

17.11.12. HOW TO DEPLOY YOUR FORCES

Undeployed units may be deployed by placing them on the map, or by assigning them as Reinforcements. You will only be able to deploy units in allowed locations. It is probably best to set up territorial ownership before deploying your units. The quickest way to do this is to temporarily deploy a few units from each force within the territory to be controlled by the force at the beginning of the Scenario.



Select the Place Unit deployment mode. Move the mouse cursor into the map view and right click to deploy a unit. Place a few more units in the same way to outline the territory owned by that Force.

Now, click on the Switch Sides button and deploy a few units from the second Force. Once the rough outlines of the territories are outlined, select the Edit Automatic Ownership menu item to calculate terrain ownership over the entire Map. It is best to place at least half a dozen units per side since the Ownership Calculation takes more time if units are sparsely placed.

Select the Edit Remove All Units menu item to pick up the temporarily deployed units. Select View Flags: Visible or View Flags: Borders so you can see the boundaries between the Forces.

To fine tune the territorial ownership, select the Toggle Ownership deployment mode and click on the locations you wish to change from ownership by one Force to the other.

Once you have your borders defined, it is time to start placing your Forces on the map. Select the Place Unit deployment mode. Move the mouse cursor back into the map view and begin placing units by right-clicking on map locations. As you place units, the Editor will keep cycling to the next undeployed unit. Once you have placed all the units you wish on the map, the remainder can be set as Reinforcements.

You can divide units in the Deployment Editor. Be cautious about this. Once units are divided,

they cannot be modified in the Force Editor. Try to avoid dividing units in the Deployment Editor until after you are certain that there will be no more significant changes to your Order of Battle.

17.11.13. SETTING REINFORCEMENTS

In order to set Reinforcements, you will have to assign at least one Objective for the units' parent Formation. Select the Place Objective deployment mode and right-click within the Map Panel. The selected location will become the default entry point for all Reinforcements assigned to the Formation.

Click on the Current Formation button in the Control Panel to bring up the Formation Report. Notice that all undeployed units assigned to the Formation are scheduled to appear on the first Turn at the location selected for the first Formation objective. You can change the entry Turn or entry (appearance) location by clicking on the corresponding buttons next to the unit's name.

You can also change the entry hex by temporarily placing the unit on the map in the desired entry location and then removing it. This tends to be safer than entering an x, y, location, since you can see exactly where the unit will enter.

The location buttons are also now available for units that are already on the map. They can be moved via editing the button values without needing to remove them from the map first.

17.11.14. PLACING SUPPLY SOURCES

Once all Reinforcements are set, you need to place Supply Sources. Select the Place Supply deployment mode. Click within the Map view to place Supply Points for the current Force. Switch sides to place the other Force's Supply Points. Upon placement (or upon clicking on an existing Supply Point), the program will prompt for the Supply Point's Variable Value. To remove a placed Supply Point, change the Variable Value to zero.

17.11.15. SET FORMATION ORDERS

Set the Formation Orders and Orders Emphasis for each Formation using the buttons at the bottom of the Formation report.

17.11.16. PLACE FORMATION OBJECTIVES

Select the Place Objective deployment mode. Set Objectives for the current Formation by right-clicking within the Map Panel. If you wish to remove an Objective, right-click again. Objectives for the current Formation are shown as numbers in the Map and Microview Panels. If a location has an Objective for any Formation of either Force, it is shown as a national flag indicating the current owner of the location. Note that only objectives that are given a positive Victory Point value will be visible when you play the game.

If you click on an existing objective while placing objectives in the deployment editor you are offered three choices, as follows:

- **Remove Objective:** Removes the Objective from the map.
- **Insert Objective:** Renumbers all Objectives to allow placement of a new Objective within an existing Objective path.
- **Compress Objectives:** Removes any "holes" in the Formation's Objective path.

17.11.17. SET THE MICROVIEW ICON COLORS AND 3D ICON TINTS

One of the last things you need to do when designing a Scenario is to decide which sides should be represented by which colors in the Microview and in the 3D Map displays. Use the Edit Set

Microview Icons menu item to set Microview Icon colors, and the Edit Set 3D Icon Tint menu item to set 3D icon colors.

17.11.18. CREATE SCENARIO AND VICTORY BRIEFINGS

The Scenario Briefing

This shows up when the Scenario is selected in the Scenario select dialog as well as within the game from the Scenario briefing display. You have 16k of text space. You should try to include the following in your Scenario briefings:

- **Physical Description:** Scale, Climate, Map Size.
- **History:** Date, Location, General Context. Keep this fairly short, or make sure that there is a concise introductory paragraph.
- **Basic Mission Guidelines for Players:** Let them know what they need to try to do to win the game.
- **Formation Support Level Effects:** Be sure to let players know if you have used the Formation support scope feature to impose restrictions on force cooperation.
- **Special Features / Events:** You should point out strong Event features, such as the possibility of Chinese intervention in Vietnam. This really is a critical point. You will confuse the hell out of players with things like guerrilla and theater reconnaissance effects if you don't mention them in the Scenario description.

Victory Briefings

Consequences and Speculation – Players will see one of three results texts at the end of a Scenario, depending upon the outcome. This text should give the player a sense of the consequences of the game result, including a reference to the historical result.

The Briefing Editor

The included Briefing Editor is a simple Windows text editor. It can be used to create briefings, but if you really want to do a professional job (spell checking, etc.) you might wish to create your briefings in a full functioned word processor (e.g. Microsoft WordTM). Once you are satisfied with the briefing, just cut it from your word processor and paste it into the Briefing Editor.

17.12. GAME OPTIONS PREFERENCES PRESET

This is a new option that allows the designer to pre-set his preferences for the Advanced Game Options for his scenario. The first player will have the option to accept or override these preferences. If he overrides them, his opponent will receive an alert message to that effect.

The dialog is invoked via the Edit pull-down. There is a menu item "Advanced Rules Preset" on that pull-down. Click on it. The dialog is launched.

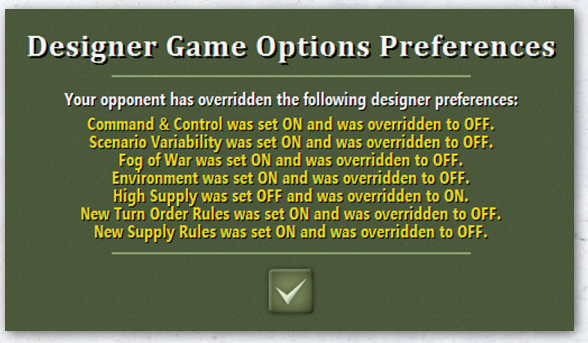
Note that there are 13 rows listing the 13 Advanced Rules Game Options. To the right of each are three columns of checkboxes. There is an ON column, and OFF column, and a DO NOT CARE column.

Initially, all Game Options are set to "DO NOT CARE". The designer can then set as many or as few options as he desires to the ON or OFF preferences. After saving the scenario file, those preferences are stored with that file.

Now, whenever anyone starts the scenario, after the Turn 1 message is exited, he will be alerted to the preferences that the designer set, in the Game Options Preferences Override dialog.

On this dialog, each Advanced Rule Game Option that the designer set a preference for is listed with that preference shown. To the right of each item is an Override checkbox. The first player then has the option to override as many or as few of those preferences as he desires, by toggling the appropriate checkbox. But he is warned that such overriding will be reported to his opponent. After the dialog is exited, the Advanced Rules Game Options are set as the preferences and overrides dictate.

During his first turn, the opposing player receives an alert dialog that shows any overrides that the first player made, if any.



18. GENERAL NOTES ON SCENARIO CREATION

Here are a few things to keep in mind when designing a Scenario.

18.1. USE THE SCENARIO DUMP FEATURE

Scenario Dumps are an invaluable aid in Scenario design. A tremendous amount of information is available in the Scenario Dump. Among other things, the Dump includes the results of the Scenario validation check as a list of Warnings and suggestions. In order to load into the game without Warnings, your Scenario must pass this Scenario Validation Check.

18.2. TALK TO OTHER SCENARIO DESIGNERS

This Editor is only going to become more complex as the game develops. If you don't understand

something, or if you can't figure out how to model some Event, check with other Scenario designers. There are several excellent websites that have links to resources (web sites and email addresses) for Scenario designers, including collections of user-created Scenarios as they are developed.

18.3. STUDY DUMPS OF THE EXISTING SCENARIOS

Load some of the standard Scenarios and use the Scenario Dump feature to create text dumps. Studying these dumps will give some idea of the level of situation detail possible in **TOAW IV**. If you decide to print a Scenario Dump out, you might wish to reformat it in a word processing program. It is not uncommon for Scenario Dumps to run over 150 printed pages with the usual printer defaults. Scenario Dumps are also a critical aid in developing your own Scenarios, particularly if you make heavy use of Reinforcements or the Event engine.

18.4. THE EVENT ENGINE

You can go nuts with this thing, but be cautious. We opted for power over bulletproofing. If you are working on a short, straightforward Scenario, you may not need to worry about the Event List at all. Default News items will be generated when significant battles are fought or named cities are taken or ruined. On the other hand, if your Scenario is longer than a couple of months – particularly if weather is important – expect to get your frontal lobes dirty.

Regardless of whether you wish to be creative with the Event Engine, there are a few standard Events that should be set for most Scenarios. Be sure to set Theater Recon, theater Guerrilla, Rail Transport, Sea Transport, and Air Transport levels for each Force. Set this up as a simple timer trigger for Turn 1. Remember to modify the values with later Events if they should be changed. Theater Recon abstractly represents your long range and "humint" resources. A value of 10% is probably sufficient for most cases, perhaps higher in smaller physical scales. Theater Guerrilla levels represent things like partisan activity. Set this level if you want locations behind friendly lines to have a chance to spontaneously revert to enemy control.

18.5. MAKE IT FIT

Think about the games you have played. Do you remember any that didn't work because the unit scale or density were wrong? We do. This is a subjective judgment, and there are special cases. But try to avoid huge, sparsely-populated Maps. You should also try to avoid Maps clogged with large groups of units unless you want to give players a case of virtual trench foot. Some situations are too large, and some are too small, to fit well with this game system. **TOAW IV** is designed to handle classic military campaigns; it won't do well with things like island-hopping, although it can handle something like Operation Sealion or Operation Chromite.

Naval combat is no longer weakly modeled. However, there are still many facets of naval warfare that have yet to be modeled (transporting/interdicting supply by sea, for example). If you really need to handle Naval Campaigns (i.e. WWII in the Mediterranean or Pacific), resolve them using the Event Engine and a series of dependent Reinforcement or Withdrawal Events.

18.6. MAPS

In some cases, you will have to simplify things like road networks. When you do, try to keep the programmed opponent code in mind. The pathfinding algorithms are pretty good, but they will have an easier time of "looking smart" if you don't go out of your way to design crooked roads or railroads with lots of switchbacks. Blow bridges in the Map Editor if necessary. Note: The above is now obsolete advice. The pathfinding algorithm is close to perfect.

18.7. UNIT DEPLOYMENTS AND AIR UNIT MISSIONS

When you get around to final polish on your Scenarios, be sure to give reasonable starting Missions for Air units. Remember that if Air units are "resting" they will not respond to enemy air action. (Actually, you can use this to model surprise to some extent, although the units will still rise to their own defense if their base is attacked.) No player wants to cycle through 20 Air units putting all the fighters on Air Superiority and all the bombers on Interdiction at the start of every Scenario. Put Land units in defensive positions or Reserve deployments. Set appropriate Loss Tolerances for all units. If air units are deployed to remote "distant" hexes separated from the main theater via impassable terrain, be sure to provide supply points to those locations.

18.8. FORCES

The Force you set as the first Force on Turn 1 is guaranteed to move first on Turn 1 only (except in PBEM and Hotseat games). All bets are off after that, with initiative set according to the relative Strengths and positions of the opposing forces.

18.9. FORMATIONS

18.9.1. GENERAL ORGANIZATION

You have 32 unit slots in each Formation. Please DO NOT use them all. Open slots must exist for units to break down. If you fill up your Formation unit list the units of the Formation will not be able to break down. In most cases, limit the number of line combat units (things like infantry regiments) in a Formation to no more than 12; any more and the programmed opponent code will not use all of the units efficiently in some situations. You may actually want this effect in some situations. Overloaded Formations may tend to use Soviet-style echelon attacks.

18.9.2. SUPPORT LEVELS

This is a critical game feature, so information available elsewhere in this manual bears repeating here. You can set a Formation Support Level to Internal Support, Army Support, Force Support, or Free Support. The degree of cooperation is based on the best possible Cooperation Level between two units.

Internal Support

Units belonging to Formations with Internal Support levels will only cooperate fully with other units of the same Formation. Limited cooperation is possible with units belonging to other Formations, as long as those units use exactly the same 2D icon color scheme. No cooperation is possible with other units.

Army Support

In this context the term "Army" means units with identical 2D icon colors. Units belonging to Formations with Army Support levels will cooperate fully with other units of the same

Formation, as well as those using an identical 2D icon color scheme and belonging to other Formations. Limited cooperation is possible with units of other Formations using the same 2D icon background color and a different foreground (symbol) color. No cooperation is possible with other units.

Force Support

In this context the term "Force" means units with similar 2D icon background colors. Units belonging to Formations with Army Support levels will cooperate fully with other units of the same Formation, as well as those using the same 2D icon background color and belonging to other Formations. Limited cooperation is possible all other units.

Free Support

Units belonging to Formations with Free Support cooperate fully with all friendly units. This should generally be used only for very high-level Formations.

Support & Cooperation Levels Chart

Assigned Support Type	For units "assigned" to same formation*	Same icon background color, same symbol color	Same icon background color, different symbol color	Different icon background color
Internal Support	F	L	X	X
Army Support	F	F	L	X
Force Support	F	F	F	L
Free Support	F	F	F	F

Key: F - Free Cooperation L - Limited Cooperation X - No Cooperation

* **Note:** Units assigned to the same formation always cooperate freely regardless of their icon color schemes.

The penalty for using "non-cooperative" or "limited cooperative" units varies. The strongest effect is in combat. Non-cooperative units are more likely to pull out of attacks early, and increase the chance that combats will take longer to resolve. The same is true to a lesser extent for units with limited cooperation.

The penalty for using Non-Cooperative or Limited Cooperative units varies. The strongest effect is in combat. Non-Cooperative units are more likely to pull out of Attacks early, and increase the chance that combats will take longer to resolve. The same is true to a lesser extent for units with Limited Cooperation.

18.9.3. FORMATION OBJECTIVES

Intermediate Objectives

The programmed opponent will do a pretty good job of finding a path from a Formation's current location to its Objectives. There may be times, however, when you wish to fine tune the likely path that a Formation will take from one point to another.

This is particularly true if the terrain in your Scenario has a strong channelizing effect on movement. You may find that in this case many Formations will jam up at low Movement Cost choke points. If this happens, you might wish to set intermediate Objectives to guide some or all Formations through specific points. It can also be helpful to specify intermediate Objectives at places like bridges if the terrain is difficult. This may simplify the programmed opponent's task in finding "good" paths.

Intermediate Objectives can also be used to set up reserve reaction situations. By setting an Objective to some otherwise unimportant location, you can trigger an Attack by the affected Formation when the enemy Force passes through the "tripwire" Objective. In some cases, this is a matter of timing. You can, for example, set up a likely meeting engagement by setting a zero value tripwire Objective on a Road just before the Objective you actually wish to protect. Your Formation will react, advancing through the actual Objective on its way to the front as soon as the enemy hits the tripwire.

Values and Victory

It is only possible to assign Victory Point values to Objectives assigned to Formations. This should keep you from forgetting to assign someone to guard

or seize an important Victory Point Objective. You should still be careful in assigning Objectives and Victory Values, though. The programmed opponent logic is strongly Formation-based. Within certain limits, the internal movement logic will ignore valued Objectives not specifically assigned to a particular Formation. Be sure to assign sufficient forces to secure valuable Objectives.

Victory in the game is based on the values you assign to your Objectives. Loss penalties are scaled to be equal to total Objective Values. Total loss of both Forces will result in loss penalties exactly equal to the value of all Objectives on the map.

Multiple Objective Tracks

You can set up as many as five different sets of Objectives for each Formation. Only the values assigned to Objectives in Track One have any Victory effect. If you use this feature be sure to set up multiple Objective tracks for all Formations, otherwise the programmed opponent may become confused if you select alternate Objective tracks. Use a Force Track Event to switch tracks during a Scenario.

This is a very advanced feature. It imposes significant additional testing requirements on your Scenario. Do not feel that you must use it. Most of the official Scenarios only use Track One objectives.

18.10. UNITS

18.10.1. AUTHORIZED AND ASSIGNED EQUIPMENT

In many cases, you should consider assigning your units less than their authorized equipment strengths, particularly if your Scenario is not set at the very beginning of a conflict. In some rare cases, units can begin with more than their authorized equipment level.

18.10.2. UNTRIED VS. VETERAN STATUS

You can set your units to Veteran status, fixing their Proficiency, by use of the Veteran / Untried toggle button in the Unit Report. This can have a strong effect on how your Scenario will play. Most units should be Veterans in mid-war Scenarios. Many units should be Untried in Scenarios beginning major campaigns. Newly-raised units arriving as Reinforcements should generally be Untried (the default).

18.10.3. SUPPLY LEVELS

It is common for one or both sides to have very large stockpiles of Supplies available for their units in the opening hours or days of a war. You should consider this if your Scenario is set at the beginning of a war. We do not recommend over-supplying forces in mid-conflict Scenarios. Be aware that an oversupplied unit's Supply Level will immediately drop to 100% or less if it moves.

18.10.4. DEPLOYMENT STATUS

If the situation modeled in your Scenario calls for units in defensive positions, be sure to remember to set the units to Defending, Entrenched, or Fortified deployment status. Remember to set a Local or Tactical Reserve order for any units that historically reacted to enemy movements. This could be critical for some Scenarios where the attacker will move before the defender gets a chance to set his unit deployments.

18.10.5. HEADQUARTERS UNITS

Depending upon the effect you are trying to achieve, Headquarters units can either be simple Formation focal points and holding units for assets typically attached to larger Formations, or they can be carefully modeled providers of command and supply for units in their Formation. Some armies have very informal

decentralized Command and Supply systems. Others are arranged in rigid, formal hierarchies.

You can see this difference in the Middle East 1973 Scenario; the Israelis do not even have Headquarters units and the Arabs have very formal HQ units. This is an advantage for the Israelis, as they are not subject to the negative effects of damage to HQ units.

18.10.6. COMMAND GROUPS

Command Groups provide command functions for a Formation. Headquarters units do not need to have command groups authorized, but if they do, their Formations Are likely to be forced to reorganize if all assigned command groups in the Headquarters are eliminated. In game terms, use of command groups allows a Scenario designer to build a vulnerability into a Force's Formations. We recommend taking advantage of this feature, so go ahead and assign two command groups (this will probably work better than one unless you really want your command structure to be fragile) to each Headquarters unit.

18.10.7. SUPPORT SQUADS

Support Squads provide supply distribution functions for a Formation. Headquarters units do not need to have Support Squads authorized, but if they do, units of the associated Formation will suffer reduced resupply rates should some or all authorized Support Squads be eliminated. In game terms, use of Support Squads allows a Scenario designer to build vulnerability into a Force's Formation Supply distribution efficiency.

Whenever the game checks Formation Supply distribution efficiency (usually when supplying units), it looks to see if the Formation has a Headquarters unit assigned. If no Headquarters unit is assigned, or the assigned Headquarters has not been eliminated and either never had Support Squad equipment authorized or still has its full complement of Support Squads assigned, the usual Formation Supply distribution efficiency is used. If an assigned Headquarters has been destroyed, or if fewer than half of the authorized Support Squads are assigned, the Formation Supply distribution efficiency is 50% of its "best" level (the one you set in the Editor). At Support Squad levels between 50% and 100% of authorized, the Formation Supply distribution efficiency is tied to the fraction of assigned / authorized Support Squads. If you don't want these effects, don't assign Support Squads to your HQ units. We strongly recommend against using Support Squads in Headquarters units below Regimental level.

How many support squads should you put in a Headquarters? The number is tied to the size of the Formation:

HQ Size Symbol	Support Squads for 100% Supply Distribution Efficiency
Section	1
Platoon	1
Company	3
Battalion	5
Regiment	15
Brigade	20
Division	40
Corps	80
Army	120
Army Group	400
Theater	1200
Supreme Command	3600

Now, do you need to remember these numbers? No. Just assign any number of Support Squads to your Headquarters units. When you set the Formation Supply distribution efficiency for the Formation (including use of the global change functions in the Editor), the Editor will automatically recalculate

the proper number of Support Squads for all Headquarters units affected by the change. Note that since the Supply Level is tied to the number of Support Squads assigned, there may be slight rounding errors, particularly in Brigade and lower-level headquarters.

18.10.8. PROTECTING HEADQUARTERS UNITS

With the increased importance of Headquarters units using command groups or Support Squads, you really need to be sure to include things like divisional Anti-Aircraft equipment in your Orders of Battle, otherwise your Formations will be very vulnerable to enemy Air attacks.

18.10.9. SIGNIFICANCE OF UNIT ICONS

Unit Type Symbols

Some, but not all, Unit Icon type symbols carry with them special Capabilities. In some cases, special equipment variants or modifications are implied. Use these symbols carefully. Symbols are listed by name in the Unit Types appendix which follows. Also see the Unit Symbol identification chart in section 16.1 of this manual.

Guerrilla Units

You should use Guerrilla units only in Scenarios where Guerrillas have a historical reputation for special capabilities beyond those of Light Infantry. In many cases, it is more appropriate to use the Irregular unit type to simulate simple armed mobs. It is recommended that the guerrilla Event engine effect be used in conjunction with Guerrilla units in order to maximize enemy player confusion.

Unit Standard Icon Colors

Icon colors are significant. Remember that each degree of separation you select in your icon color schemes will add a degree of separation in unit cooperation. Maximum cooperation is possible between units with identical icon color schemes. Less cooperation is available between icons with similar background colors and different foreground (symbol) colors. Very little cooperation is possible between units with different icon base colors.

18.10.10. REPLACEMENTS

In many cases, you can get away with one of the default Replacement settings, either 1% or 2%. See the Edit / Replacements menu item. The default settings will provide reasonable, if uninspired Replacements beginning on the first Turn and running through the end of the Scenario.

Equipment Transitions

In long Scenarios, you might wish to model equipment transitions. You have 24 slots for equipment in each unit – generally more than enough. Reserve two or three slots for equipment to be received by the unit at different times. For example, some of the armored units in the Korea Scenario start with a number of M-24's or Shermans. If you examine them closely in the Editor, you will see that they have authorizations for Pershings and Pattons, but no assigned equipment in these slots. Check the U.N. Replacements for that Scenario and you will see that Shermans are replaced early, tailing off to be followed by Pershings, and finally by Pattons. Each equipment replacement schedule overlaps, but the result is that U.N. units will slowly transition from Shermans to Pershings to Pattons over the course of the Scenario.

Event Replacement Multiplier Effects

If a major belligerent enters the fray during a Scenario, you should probably use the Event Engine to increase the gaining Force's Replacements at the point of entry.

18.11. SUPPLY

18.11.1. SUPPLY POINTS

A Supply Point should be placed for any location that has the ability to supply a large portion of a Force. In long campaigns, this generally means the point through which supplies arrive in Theater. In shorter Scenarios, Supply Points can represent local stockpiles. If you want Supplies to flow in through an Anchorage, you need to put a Supply Point there. Supply Points are placed for each player. One player's Supply Point will not supply the other player. If you want a single location to be able to supply either player, you should place one Point for each player in the location.

18.11.2. DIFFERING SUPPLY LEVELS: FORCES VS. FORMATIONS VS. UNITS

Remember, units have organic supply levels reflecting actual beans, bullets, etc. These levels should frequently be set high at the beginnings of wars to reflect oversupply conditions common in attacking forces at the beginnings of wars. For mid-conflict campaigns, try not to set them above 100% since oversupply really is intended to reflect the kind of forward stockpiling that is difficult to achieve once the fighting begins. The Formation Supply distribution efficiency is actually a measure of the Formation's ability as an organization to distribute any available Supplies from the Force Stockpile to units in their command. It does not represent a Stockpile.

Finally, the Force Stockpile is intended to represent the global availability of Supplies for one side. It represents actual Stockpiles, Production Capability, outside aid, etc. It is possible to have a very large Force Stockpile while individual units starve because of a poor supply distribution system, reflected by poor Formation Supply distribution efficiencies.

Consider the story of the quartermaster at Isandlwana (1879). As legend has it, the British troops had plenty of ammunition available, but the quartermaster refused to distribute it more rapidly than the official rate of replacement for British troops in the field. Good Force Supply Stockpile. poor Formation Supply Distribution Efficiency. Initially, good Unit Supply levels.

Imperial Japanese forces in the Pacific had to account for every round fired from the very beginning of the Pacific War. Pilots could receive a reprimand if commanders decided they had expended too much ammunition during a mission. Poor Force Supply Stockpile. Moderate Formation Supply Distribution Efficiencies. Initially, moderate Unit Supply levels.

Over the last half-century, an intermittent controversy has flared from time to time over the issue of "tail to teeth" in combat units. Western units have traditionally had very large Support services relative to communist units. In theory (and generally in practice), this has meant that western units could resupply from Force Stockpiles much more rapidly than their opponents. The Soviets, for example, had very large Supply Stockpiles from 1943 on, but their offensives usually stalled after a short advance because they lacked the ability to rapidly distribute Supplies to the troops needing them. This is in fact the primary driving force behind the Soviet practice of attack by echelon. West: Good Force Supply Stockpiles. Good Formation Supply Distribution Efficiencies. Good Unit Supply levels. Communist: Good Force Supply Stockpile levels. Poor Formation Supply Distribution Efficiencies. Situation-dependent Unit Supply levels.

18.11.3. TRANSPORT ASSET SHARING

Don't ignore the "boring" equipment assigned to units. Excess Trucks and Horse Teams may not have

an effect on a unit's Movement capability, but they can have a very strong effect on Supply Distribution. U.S. forces, in particular, are well-known for their practice of temporarily stripping Transport assets from units that don't need them and forming ad-hoc "Redball Express" units to aid in rapid resupply. This is modeled in the game as "Transport Asset Sharing". On the other hand, remember that some Forces (particularly "third world" countries) should be chronically understrength in Transport assets.

18.11.4. EVENT SUPPLY MODIFIER EFFECTS

Even in simple Scenarios, you may wish to modify Force Supply Stockpile levels. Consider the case of Allied forces in France, 1944. Loss of any of the ports bringing in Supplies would have had a severe impact on the overall Supply availability. In Korea, 1950, loss of Pusan would have been devastating to the U.N. Supply Stockpile. You can model this partly by assigning different Supply Points for different ports of entry, then using the Event Engine to set the overall Supply Level depending upon who occupies different locations.

18.11.5. SCENARIO BRIEFING ILLUSTRATION

If you place a bitmap illustration (a standard windows BMP file) with the same name as your Scenario file in the Graphics directory, your bitmap image will show up in the Scenario Briefing screen during game loads and when players examine the Scenario briefing within the game. For example, the bitmap for the "Korea 50-51" Scenario is named "Korea 50-51". There is an included document in the Manuals folder that gives a "how to" explanation of how to properly create a scenario bitmap. Once created, the scenario bitmap should be placed in either the same folder as the scenario file or in the scenario-specific graphics subfolder for the scenario.

19. APPENDICES

19.1. CALCULATIONS

19.1.1. EQUIPMENT DENSITY

Up to nine units may be grouped in any particular location, but in many cases this is a bad idea. Each location has a specific allowed Equipment Density:

50 + 2 x Scenario physical scale2

Scale	Allowed Density
2.5km/hex	68
5km/hex	100
10km/hex	250
15km/hex	500
20km/hex	850
25km/hex	1300
50km/hex	5050

Any location with more than the allowed number of Vehicles or Horse Teams suffers from traffic jams (increased movement costs to enter). Any location with more than the allowed number of "active defender" equipment suffers from increased losses in the Event of combat.

19.1.2. UNIT QUALITY CALCULATION

Quality = (2 x proficiency + readiness) / 3

19.1.3. UNIT COMBAT STRENGTH CALCULATION

Strength = equipment strength x (2 x proficiency + readiness + supply) / 4

19.2. NOTES ON COMBAT RESOLUTION

Combat resolution in TOAW Volume I was based on cumulative mass fire. This is still true of Artillery fire in Century of Warfare, and later versions, but Anti-Tank and Anti-Personnel fire are now handled at the level of individual weapons firing at individual targets. Each item has a maximum of from one to three shots on any given round:

Maximum Rate of Fire, per Round of Combat:

Equipment Characteristics	Attacking	Defending
Motorized, Long Range, Helicopter	3 shots	3 shots
Static, Fixed, or Infantry	1 shots	2 shots
Everything Else	2 shots	3 shots

Individual weapons try to engage appropriate targets. There is some randomization, but the toughest targets will tend to draw fire from the most lethal enemy systems.

Note that this has numerous side effects. Among them: Large towed Anti-Tank weapons are now much less effective on the attack than before. AFV's are relatively more lethal than before. Losses to very large forces attacking very small forces will be smaller than under the original TOAW system. The actual number of shots fired by Engaged units is dependent upon relative overall Engaged Strength in each individual combat, but will not exceed the theoretical maximum sum expected for all weapons based on the table above. All shots actually fired by Anti-Personnel weapons are assumed to be lethal. In most cases, this will give results very similar to those expected in the original version of TOAW.

Anti-Armor fire is quite different. In order to be lethal, any given Anti-Armor shot must first hit the target (see Targeting, below). Each hit must then be able to defeat the armor protection of the target equipment. Each armored target has one Strength vs. HEAT weapons and another vs. Kinetic weapons (also includes Top-Attack weapons), although the two values are identical for almost all early period armored vehicles. See the "Equipment List.doc" file in the "Docs" folder for effective armor values.

Anti-Armor Chance to Hit, per shot:

Equipment Characteristics	Restricted Vision	Normal	Open Vision
Targeting++++	85%	100%	100%
Targeting+++	85%	85%	72%
Targeting++	85%	75%	56%
Targeting+	75%	50%	25%
Everything Else	50%	33%	11%

Note that Restricted Vision locations actually benefit simpler weapon systems while reducing the capability of more advanced systems. On the other hand, Open Vision rewards more advanced systems (nominal chances to hit are squared). Open Vision locations have no precipitation and no terrain other than Open, Arid, Roads, Rivers, Rocky, Escarpments, Canals, or Sandy. Restricted Vision locations have Heavy Precipitation, Heavy Cultivated, Urban, Urban Ruin, or Forest terrain. Very few early-period weapons have enhanced targeting capabilities.

Anti-Armor Chance to Defeat Armor, per hit:

pq = 100xAnti-Armor/Defensive Armor	Chance to Kill
100+	100%
99...25	((pq^2)/100)%
24-	0%

This means there is no chance to kill armor unless the firing weapon has at least 25% of the nominal penetration necessary to defeat the target's armor. Because of the square involved, the chance to kill declines rapidly with decreasing pq (penetration quotient). Defensive armor values are divided by three during penetration checks when attacked by aircraft.

Examples: Chances to Kill

pq	Chance
99	98%
90	81%
80	64%
70	49%
50	25%
40	16%
30	9%
25	6%

19.2.1. EXAMPLE CALCULATION

T-34/76 (late) Anti-Armor 7 (kinetic), fires on PzKpfw V Panther armor 13 under normal conditions:
Chance to hit = 33%
pq = 100 x 7 / 13 = 54.
Chance to kill if hit = ((54 ^ 2) / 100)% = 29%
Overall chance to kill = 33% x 29% = 10%.

19.2.2. ARTILLERY VS. ENTRENCHMENTS

Artillery can lower the effectiveness of prepared defensive positions during combat. The effect is intended to model the earth-churning tendencies of heavy Artillery and is tied to the weight of individual shells. Heavier pieces are much more effective than lighter pieces. MRL's (Multiple Rocket Launchers) generally do not receive this advantage. While the Anti-Personnel strengths of heavy Artillery may seem weak (due to very low rates of fire), weapons of 150mm or larger can be very effective against entrenched enemies.

19.2.3. ARMORED TROOP TRANSPORTS

The contribution of Armored Troop Transports (APC, MICV, etc.) to unit strength is based upon unit Loss Tolerance.

At higher Loss Tolerances, more of these vehicles are assumed to be directly involved in combat. They contribute directly to unit Strengths. Infantry assigned to the unit receives less protection from enemy Artillery fire and has a tendency to be lost when Troop Transports are hit by Anti-Armor fire. At lower Loss Tolerances, fewer of these Vehicles are on the front lines. They do not contribute directly to unit Strengths, but they do provide more protection to Infantry during Artillery fire. Infantry is generally assumed to be dismounted if the Transport is hit by Anti-Armor fire and will not be affected by Transport losses.

When an APC class item of equipment is destroyed in combat, there is a chance (based on loss tolerance and the proportion of Infantry and Transports in the unit) that an Infantry squad of some kind belonging to the same unit will also be destroyed.

19.2.4. NUCLEAR WEAPON YIELDS

Atomic-capable systems are individually rated for a Nuclear Attack Strength. The following values are defined for various equipment. These values are added to a unit's conventional Attack Strength. At sub-kiloton levels, the addition may not be particularly significant.

Conventional Yield	Equivalent
0.1kT	25
0.2kT	50
0.5kT	125
1kT	250
2kT	500
5kT	1250
10kT	2500
20kT	5000
25kT	6250
40kT	10000
50kT	12500
60kT	15000
100kT	25000
200kT	50000
300kT	75000
500kT	125000
1mT	250000
4mT	1000000

19.3. SEEING THE ELEPHANT

When a unit's actual Proficiency is determined upon conversion from Untried to Veteran status, its Proficiency can vary by ± 33% the original value. Veteran values will tend to fall near the expected Proficiency.

19.4. NAVAL COMBAT PROCEDURE

19.4.1. STEP 1: DETERMINE THE TARGET SHIP'S DURABILITY, ARMOR, AND AGILITY FACTORS

Use the **equipment's** (not unit icon) naval flag as follows:

For Carrier Naval:

Durability = 0.2251 x DF
Armor = 0.203395 x DF
Agility = 93 x (1-damage%)

For Heavy Naval:

Durability = 0.159445 x DF
Armor = 0.334704 x DF
Agility = 75 x (1-damage%))

For Medium Naval:

Durability = 0.114241 x DF
Armor = 0.248594 x DF
Agility = 160 x (1-damage%))

For Light or Riverine Naval:

Durability = 0.082939 x DF
Armor = 0.051987x DF
Agility = 210 x (1-damage%))

For Embarked Units:

Durability = 25
Armor = 0
Agility = 18

However, these values are superseded by any explicit values the designer may have coded for the ship class in the scenario's **Equipment.nqp** file.

If the ship is in port, divide Agility by 2.

Note that if the attacker is a ship, then its durability will have to be determined too, for the second hit check, below.

19.4.2. STEP 2: DETERMINE THE NUMBER OF SHOTS/ATTACKING PLANES

Note that this is where the Naval Attrition Divider is applied – scaling the number of shots.

Number of attacking planes = Assigned x (2 x Proficiency + Readiness + Supply) / 4 / (Naval Attrition Divider/10)

Fractions from this are evaluated as the percent chance of one more plane. Each resulting plane attacks individually and is evaluated for hit/miss, penetration/damage individually. This is done for each type of plane in the unit.

Number of shots per attacking coastal battery = (102.922 x Gun's Anti-Naval Value x Assigned x ((2 x Proficiency + Readiness + Supply) / 4)/ Shell Weight) / (Naval Attrition Divider/10)

Fractions from this are evaluated as the percent chance of one more shot. Each resulting individual shot is evaluated for hit/miss, penetration/damage individually. This is done for each type of gun in the unit.

Number of shots from each attacking ship TO&E line = ((#Ships-Damage%) x 102.922 x Ship's Anti-Naval Value x ((2 x Proficiency + Readiness + Supply) / 4) / Shell Weight) / (Naval Attrition Divider/10)

Fractions from this are evaluated as the percent chance of one more shot. Each individual shot resulting is evaluated for hit/miss, penetration/damage individually. Note that the formula evaluates as 10 salvos.

19.4.3. STEP 3: FOR EACH INDIVIDUAL ATTACKING AIRPLANE OR EACH SHOT FROM EACH GUN OF EACH SHIP/ COASTAL BATTERY, DETERMINE IF A HIT OCCURS

There are two checks:
First hit check passes if:

Attacking Unit Proficiency x Attacker Shock Level > Random (Target Ship Agility Rating) x Defender Shock Level

Note that this is where shock, for both sides, is applied.
Second hit check for airplanes passes if:

Attacking plane's Anti-Naval Value x Visibility > Random (Target Ship Agility Rating) x Defender Shock Level

There is an exception for torpedo bombers (any plane with the Torpedo flag), where the Anti-Naval Value is divided by 4 first.

Visibility is a value based upon the combination of weather x lighting: clear/hazy/overcast x day/mixed/night. Clear is 1, hazy is .66, and overcast is .33. Day is 1, mixed is .66, and night is .33. Note that the square root of this product is used for surface naval combat. Weather value is the average of the target hex and attacker hex values.

Second hit check for guns (including surface ships) passes if:

100 x SQRT(Visibility) / ((1 + (0.002 + .13 / Attacking Ship's Durability) x Range x Range) > Random (100)

Here is where the Attacking Ship's Durability will be needed. For Coastal Guns, a value of 100,000 is used for durability. Note that the actual parameter used is the Accuracy – but this is identical to the Durability though, unless the designer has specified a different value in the .nqp file. See the curve below for how this equation plots out.

Note that Range is the number of hexes between the attacker and defender – not including their hexes – times the hex scale in kms. So adjacent

combat would be point-blank range (=0). However, in that adjacent case, there is a random check as follows:

Range = random (minimum (max range of all units involved, hexscale/2)

This is only determined once per naval unit per combat round.

Both checks must pass for a hit to occur.

19.4.4. STEP 4: DETERMINE THE DAMAGE ANY HIT MAY HAVE CAUSED

If a hit occurred, it causes 1 damage point if:

(Attacking Weapon's Shell Weight > Random (Defending Ship's Durability / 10)) AND (Target ship's damage < 20)

(This is intended to be automatic unless the shell weight is trivially small. But note that there is a limit to the damage that can be inflicted by such superficial hits: 5 max for Heavy Naval, 10 max for Medium Naval, 15 max for Carrier Naval, and 20 max for all others.)

Then, it must be determined if the hit penetrated the ship's armor and what additional damage it may have caused:
Penetration occurs if:

Random (Attacking Weapon's Shell Weight /2) > Random (Defending Ship's Armor Value)

If this check passes:

Additional damage points = Random (Attacking Weapon's Shell Weight / 10) x Random (50) / Defending Ship's Durability Value

There is an exception for torpedo Bombers, whose Shell Weight is quadrupled for the above checks. (So, there is a /4 effect for the hit check, followed by a x4 effect for the damage – harder to hit with a torpedo, but if you do…the damage is underwater, making it much more severe).

There is then a chance that the additional damage is a critical hit:

*5% x (Attacker Shell Weight / (Defender Durability * 6.25)) * (Defender Force Critical Hit Scalar / 10)*

Note that there is a new Force parameter for scaling the chance of critical hits as the designer desires. Also note that if the shell weight is the same as the weighted durability and the scalar is left at the default value of 10, then the equation reduces to a 5% chance.

If a critical hit occurs, additional damage is incurred due to the target ship's magazine detonating. This additional damage is:

The result of a normal distribution centered at 50 with a standard deviation of about 13.5.

So, it will average about 50 additional damage, +/- a little.

19.4.5. STEP 5: FINALLY, DETERMINE WHAT DEFENDING EQUIPMENT HAS BEEN DESTROYED

A ship that accumulates 100 or more damage points sinks (goes to the dead pile). If the ship has accumulated less than 100 damage points, that value is stored in the ship's TO&E line, and affects a number of ship abilities. If that line has more than one ship in it, only the "lead" ship has accumulated that damage and is affected by it.

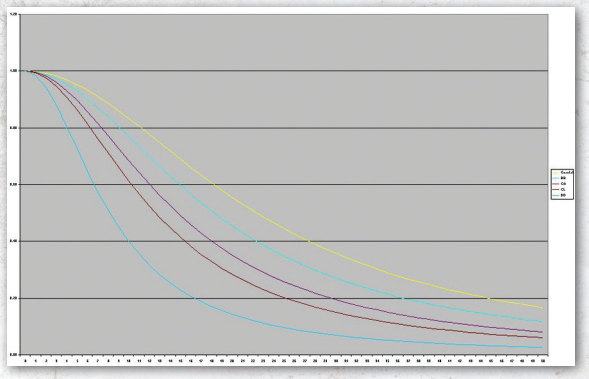
If an embarked unit suffers damage points, a randomly selected weight of equipment equal to those points is destroyed as follows. Each TO&E item in the embarked unit loses:

Assigned x damage accumulated / Unit Weight

Fractions of this are evaluated as the chance of one more kill.

If an aircraft carrier suffers more than 66 damage points it ceases to function as an aircraft carrier. This will cause an air unit to be eliminated if there are then more air units in the hex than aircraft carrier bases. The air unit to be eliminated is selected randomly. Otherwise, the planes on the carrier are not targeted or included in target calculations. (But they do engage in AS combat).

The following curve shot shows how the gunnery range equation plots out for various Durability values:



The top curve is for a coastal gun. The next is for a 130-Durability BB. The next is for a 50-Durability CA. Then next is for a 30-Durability CL. And the last is for a 10-Durability DD. Vertical lines are every 20%; Horizontal range is out to 50 kms.

For example, at 30km, a coastal gun has a 36% hit chance, a BB has a 27% chance, a CA has a 19% chance, a CL has a 15% chance, and a DD has a 7% chance.

Note that these values assume a stationary target, a perfect crew, and perfect visibility. The agility of the target vs. the proficiency of the crew is tested in the first hit check, and the visibility factor scales these values.

Note that the square root of the visibility factor is used for gunnery. This is to account for the fact that gunnery enjoys better optics, radar, starshells, searchlights, etc. that planes normally don't have.

19.5. NAVAL REPAIR PROCEDURE

During the interturn calculation period, all damaged ships get the following checks for damage repair:
IF the ship's unit is in a supplied anchorage hex AND it did not move in the previous turn THEN

# of damage points repaired = 1500 / ((Durability + Armor + AP + AAA) x # of turns per week).
Fractions of this are evaluated as the chance of one more point repaired.

ELSE

# of damage points repaired = 150 / ((Durability + Armor + AP + AAA) x # of turns per week).
Fractions of this are evaluated as the chance of one more point repaired

AP and AAA values are the ship class's intrinsic values. They are not the damage-adjusted values.

Note that repair is 10x faster in port than at sea.

These figures will typically allow about the following weekly rates of repair in port:

Carrier – 5 points.
Battleship – 1 point.
Heavy Cruiser – 3 points.
Light Cruiser – 5 points.
Destroyer – 14 points.

Note that a true port repair simulation would require modeling port and shipyard capacities. But adding such features will have to wait. The simplistic version above will have to do for now.

19.6. SEA INTERDICTION PROCEDURE

Chance of surface interdiction per in-range surface interdictor:

Target Value of Moving Unit or Stack / Target Value of all detected in-range Units.

Note that if the moving stack is the only one detected, then the chance of interdiction is 100%. Also, if there are 100 friendly ships and 100 enemy ships in spotting range, the chance of interdiction will be 1% per ship, averaging 1 interdiction per moving enemy ship – it pairs off both side's ships (on average).

Chance of air interdiction per in-range air interdictor:

*Target Value of moving Unit or Stack * (Naval Attrition Divider / 10) / Target Value of all detected in-range Units / (interdictor's spotting range / 2).*

This will tend to limit air interdiction to no more than once or twice as the fleet passes through its scouting range. The point is to limit planes to realistic mission rates. There is an exception for carrier movement, though. If the moving carrier hasn't been attacked in the turn, it is automatically interdicted in the first detected in-range hex it enters. (Who gets the first shot really matters in carrier-vs.-carrier combat.)

Both of these formulae pose a tactic for the phasing player: bring the entire fleet to be moved through the interdictor's range into its detection before moving through. The more in-range targets detected the less interdiction there will be per individual move.

19.7. NAVAL SPOTTING PROCEDURE

First, understand the necessity for this feature: Naval units, unlike ground units, can't hide – due to their great size – and operate in a terrain that has no cover. They have to be handled separately from ground units for recon purposes. Within the limit of the horizon, subject to visibility, they should be detected.

19.7.1. SURFACE RECON

This models the observation of the seas from the coastline or from the conning towers of ships.

The daytime observation range is 25km and the nighttime observation range is 10km. Whenever a land unit moves into a coastal hex, it reveals Deep-Water hexes out to the appropriate range – just as if it had entered a peak hex. And note that, like for peak hexes, if the observer is under a cloud, it can't observe. As a naval unit moves, it reveals Deep-Water hexes around it out to the appropriate range – just as if it had entered a peak hex (same comment about clouds).

The range of hexes revealed at the various hex scales is, therefore, as follows:

Hexscale	Day	Night
2.5km	11	5
5km	6	3
10km	2	2
15km	2	1
20km	2	1
25km	2	1
50km	1	1

A range of 1 means only adjacent hexes are revealed.

Note that the range to the target doesn't include the firing or target hexes. That's why there may seem to be an extra hex included in some of the above. For example, eleven 2.5km hexes out from an observing naval unit would be a target naval unit that was ten 2.5km hexes (25km) from that observing naval unit.

Note that radar is modeled as well: Any ship with the "All Weather" flag set will see out to 50km, day or night. Furthermore, if a force has any aircraft on map with the "All Weather" flag set, then all ships are assumed to have radar and see accordingly. (This is needed for existing modern scenarios that won't see futher designer attention).

19.7.2. AIR RECON

This models the observation of the seas by air units committed to sea operations. That includes

ground-based air units assigned to Sea Interdiction or Air Superiority and Carrier-based air units assigned to Sea Interdiction or Air Superiority.

The range that can be fully searched for a given number of planes =

Minimum (50Km x Square Root (# planes available for search), max range of planes)

Fractions of this are evaluated as the chance of one more hex in the range.

So, for example, if the total ready planes/2 assigned to Sea Interdiction/Air Superiority in a hex total 9, then the max range that can be searched will be 150km. If the planes had an assigned range of 200, then the range of 150 will be substituted for it for search purposes. If the planes had an assigned range of 100, then 100 will, of course, still be used instead. Note that the "max range of planes" is the average max range of all the planes in the hex.

So, for 2.5km hexes, that 150km range would be 60 hexes. For 5km, 30 hexes. For 10km, 15 hexes, for 15km, 10 hexes. For 20km, 8 hexes. For 25km, 6 hexes. For 50km, 3 hexes. Within these ranges, all enemy Deep-Water hexes would be spotted.

Note that the number of planes available for search = Assigned x readiness / 2. So, if the hex had 75% readiness they would have needed 24 planes in it to have 9 planes available to search. Also note that only all-weather aircraft can search at night.

Note that there is now a crop circle designed to show naval spotting range (since this can be less than the nominal range of the aircraft onboard the carrier). It is distinguished by a dashed line as shown here:

Note that in the above case, the carrier spots out to three hexes (150km). But the planes on the carrier have ranges of 12 (600km). So the dashed line is critical for players to know how far their carriers can see.

Note that if the range was extended one hex by chance evaluation of any fractional value, that extra hex is not reflected in the circle. So, players will not know if they got the extra hex or not – adding a little risk to carrier recon. This is true for non-phasing and phasing unit's ranges. The phasing unit's range varies randomly with each hex entered.

Note that hazy and overcast locations affect the chances of spotting. If the weather is in the phasing unit's hex, it affects all the unknown hexes in range of the unit. If in the target unit's hex, it only affects the chances of detecting that specific hex. Hazy locations reduce spotting chances by 15%. Overcast locations reduce it by 30%.

19.8. SPLITTING TO&E LINES

Here's a shot of the Baltic Fleet from "Soviet Union 1941". Note the 40 DDs on one TO&E line and the 2 BBs on one other TO&E line. Since there is only one damage value stored per TO&E line, only one ship per line can incur and store damage as this unit is configured. Clearly, it would be better to have an individual line for each ship in the unit, if possible. But the TOAW Editor does not support that. There is no way to split up the 40 DDs or the 2 BBs within the TOAW Editor. However, you can do it from within an XML editor.

The first step is to dump the OOB as an XML file. With the Force Editor Dialog open, hit F4. Save the OOB file.

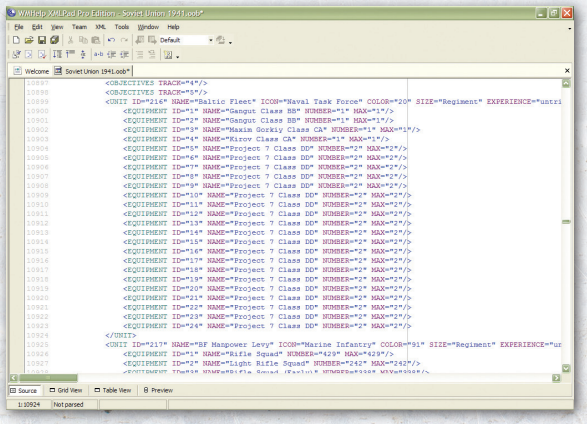
The second step is to open that OOB file in an XML editor (for example: XMLPad).

Then, find the fleet unit in the file.

Then, edit each equipment line – editing, copying and pasting as needed – until the equipment lines have been split up as desired.

Save the edited OOB file.

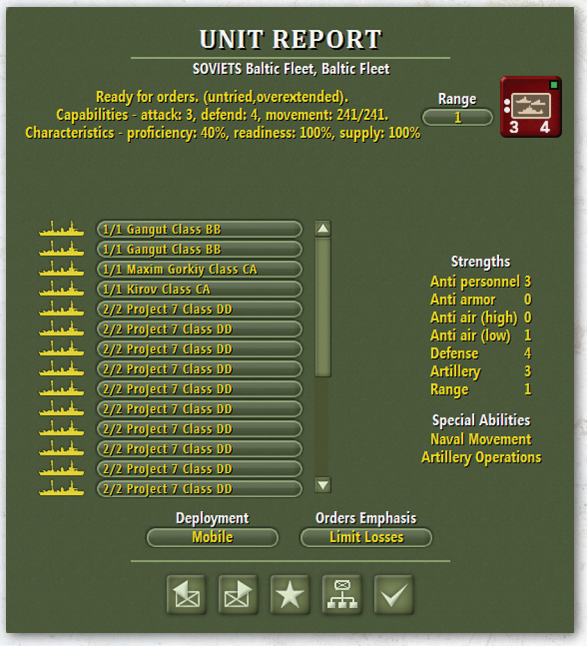
The following shot shows a possible such edit of the fleet shown above:

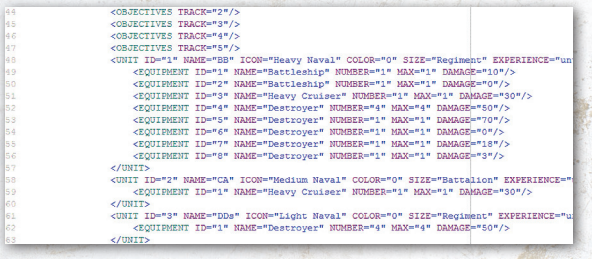


Note that there are now two lines for the BBs (one in each), and 20 lines for the DDs (two in each). Note that there is still a limit of 24 equipment slots per unit.

Now, again with the Force Editor Dialog open, hit F5 and upload the edited OOB file.

The following shot shows the resulting unit:





Designers may also want to "pre-set" damage on some ships. Again, this is not supported within the TOAW Editor, but can be done via an XML editor. The above shot shows how to add damage values to ship TO&E lines. The key word DAMAGE is added to the line and the damage value is put in quotes.

19.9. THE EQUIPMENT.NQP FILE

The Equipment.nqp file allows designers to edit the naval scale factors of the base naval equipment flag classes. It also allows designers to explicitly specify the naval parameters for individual ship classes. Here's how:

```
<ACOW_EXE>
<NAVAL>
<RIVERINE DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=4200 />
<LIGHT DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=4200 />
<MEDIUM DURABILITY=114241 ARMOR=248594 AGILITY=160 ACCURACY=114241 SPEED=4200 />
<HEAVY DURABILITY=159445 ARMOR=334704 AGILITY=75 ACCURACY=159445 SPEED=4200 />
<CARRIER DURABILITY=225100 ARMOR=203395 AGILITY=93 ACCURACY=225100 SPEED=4200 />
<EMBARKED DURABILITY=20000000 ARMOR=0 AGILITY=18 ACCURACY=20000000 SPEED=4200 />
<Equipment6 DURABILITY=0 ARMOR=0 AGILITY=0 ACCURACY=0 SPEED=0 />
</NAVAL>
</ACOW_EXE>
```

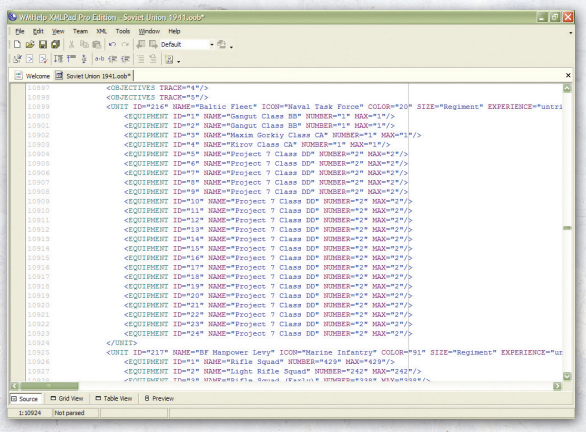
The vanilla version of the Equipment.nqp file is shown above – displayed in XMLPad. It can be found in the Graphics Override sub-folder. Note that there are seven lines of data. The first six lines specify the scale factors used for the various naval equipment flags, and embarked units. These values are used if the designer has not specified explicit values for these in a scenario specific version of this file (this will be discussed further down). Durability, Armor, and Accuracy factors are scaled by a factor of 1,000,000. (These numbers are the same as the ones in the first step of Appendix One.)

Note that all speed values for these six lines are the same as the original nominal MPs for naval and embarked units (4200km/week). This speed is equivalent to about 13.5 knots. That's fine for the ships used to embark land units, but naval units will usually be faster. An alternate version of the file is also available in the Graphics Override sub-folder. It is shown here:

```
<ACOW_EXE>
<NAVAL>
<RIVERINE DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=4200 />
<LIGHT DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=10890 />
<MEDIUM DURABILITY=114241 ARMOR=248594 AGILITY=160 ACCURACY=114241 SPEED=9956 />
<HEAVY DURABILITY=159445 ARMOR=334704 AGILITY=75 ACCURACY=159445 SPEED=7778 />
<CARRIER DURABILITY=225100 ARMOR=203395 AGILITY=93 ACCURACY=225100 SPEED=9334 />
<EMBARKED DURABILITY=20000000 ARMOR=0 AGILITY=18 ACCURACY=20000000 SPEED=4200 />
<Equipment6 DURABILITY=0 ARMOR=0 AGILITY=0 ACCURACY=0 SPEED=0 />
</NAVAL>
</ACOW_EXE>
```

Now Light Naval has a speed equivalent to 35 knots, Medium Naval has a speed equivalent to 32 knots, Heavy Naval has a speed equivalent to 25 knots, and Carrier Naval has a speed equivalent to 30 knots. If this .nqp file is opened in the Graphics Override sub-folder, these speeds will be applied to these naval classes in scenarios that have not been designer edited. Players can decide for themselves which of the two .nqp file choices they wish to have open in that folder. Copies of each are in their own zip files within that folder.

However, designers can make a scenario-specific version of the .nqp file for their individual scenarios. Note the seventh line ("Equipment6") in the above shots. While not used in the above versions, that line (and up to 100 copies of it) can be used to explicitly specify the values for an individual naval equipment item (the item must have a naval flag set). The file just needs to be in the scenario-specific graphics folder, like the scenario's scenario-specific Equipment.eqp file. It follows folder hierarchy rules just like that earlier file. The following section will illustrate the format for such a scenario-specific .nqp file.

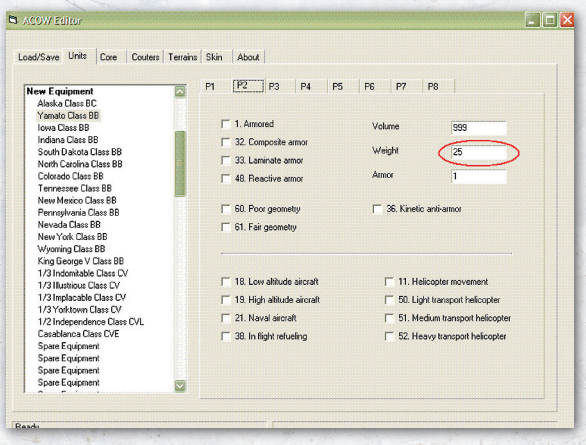


Shown above is part of the Okinawa 1945 v.3.0.nqp file. Note that the "Equipment6" line has been replaced by a suite of lines explicitly specifying

the various values for individual ship classes. The first six lines are unchanged. Note the format of the new lines: There is a name – for information purposes only (it is not required to resemble the ship class it relates to, but it helps the designer keep things straight). Next, the Durability, Armor, Agility, Accuracy, and Speed values (not scale factors like in the first six lines) are explicitly specified.

So, the Yamato has a durability of 265, armor of 401, Agility of 81, Accuracy of 265, and Speed of 8401 km/week (27 knots). Note that the Accuracy is the same as the Durability. This is typical. Note that the larger the Durability value the more accurate the ship is. The theory is that the bigger and heavier a ship the better a gun platform it is. The only case shown where Durability is different from Accuracy is for the Essex. To allow three air groups on it, that Fleet Carrier has been split into three parts. So, each part has 1/3 the durability of the whole, but the Accuracy is based upon the whole, so is three times the size of the Durability. So, the main purpose of the Accuracy parameter is to facilitate component ship modeling.

But, how do you link the new lines with the equipment items in the original Equipment.eqp file? Answer: you use the "Weight" parameter. Since that had never been used by naval equipment, the .nqp file now uses it to index the equipment to its proper line in the .nqp file. For example, the Yamato's data is on line 25 of the .nqp file, so its "Weight" parameter must be set to 25. This can be done using the BioEd as shown:



Note that the new lines start numbering from 6 (the first six lines are 0 through 5) and increment from there. If the Weight is left at 0, then the values are calculated from the ship's Defense Strength using the scale factors in the first six lines of the .nqp file.

The data used for the explicit values came, in this case, from War in the Pacific. Designers can use their own sources, of course – including the web. This subject has been extensively discussed on the TOAW board. Designers needing help can seek it there if they wish.

Note that the first six lines will still affect any ship class that has its weight value left at zero. Designers may want to customize those values for that reason. In particular, designers can customize the parameters for embarked units via the sixth line.

Note that the agility factors used were based upon Pacific War evasion ratings. Those ratings used the following formulae:

For Carrier or Battleship: 3 x speed.

For Cruiser: 5 x speed.

For Destroyer: 6 x speed.

For Transport: 1 x speed.

19.10. OPART4.INI FILE

This file stores the Player Parameters. Those parameters are as follows:

GroupBackgroundAlpha=180	Dialog Groups Elements Alpha Channel setting
InnerBackgroundAlpha=180	Dialog Around Elements Alpha Channel setting
OuterBackgroundAlpha=180	Dialog Outside Edge Alpha Channel setting
ComplexBlowsBridges=Y	Advanced Rule Parameter
BackgroundIsOpaque=Y	N=Transparent Dialogs
email=	PBEM++ Parameter
password=	PBEM++ Parameter
serialNumber=	PBEM++ Parameter
AllFormationLines=N	Graphical Objective lines
oneGame=N	For Automated Scenario Testing
oneTurn=N	For Automated Scenario Testing
oneRound=N	For Automated Scenario Testing
p3=N	Both sides PO Controlled
userIcon5=Y	Alternate Strength Display Parameter
userIcon42=9	Alternate Strength Display Parameter
userIcon41=8	Alternate Strength Display Parameter
userIcon32=4	Alternate Strength Display Parameter
userIcon31=1	Alternate Strength Display Parameter
userIcon22=4	Alternate Strength Display Parameter
userIcon21=1	Alternate Strength Display Parameter
userIcon12=4	Alternate Strength Display Parameter
userIcon11=1	Alternate Strength Display Parameter
circleColorMaxRange=0xFFFFFE	DBR Color
circleColorNavalSpotting=0x00FF00	DBR Color
circleColorAA=0x00FFFF	DBR Color
circleColorAir=0xFFFF00	DBR Color
circleColorInactiveArtillery=0x000001	DBR Color
circleColorArtillery=0xFF0000	DBR Color
circleColorCurrentUnit=0xFFFFFF	DBR Color
animationMovementTimer=10	Animated Cursor Parameter
animationCombatTimer=25	Animated Cursor Parameter
toolTipPosition=-1	Specifies a corner for the ToolTip instead of by Mouse
nextUsesOOBOrder=N	Y = by OOB; N = by left to right, top to bottom.
autosave=N	Autosaves game every 5 minutes.
MaxScreenY=0	Sets maximum screen height
MaxScreenX=0	Sets maximum screen width
ElmerHandicap=2	Advanced Rule Parameter
ElmerIntelligence=2	Advanced Rule Parameter
AllFormationLiness=N	Graphical Objective lines

OneFormationLine=N	Graphical Objective lines
AllCropCircles=N	DBR Display
OneCropCircle=N	DBR Display
p4=N	PBEM
p2=N	Player 2 PO Controlled
p1=N	Player 1 PO Controlled
p0=N	No PO Controlled Player
ChangeScreenResolution=N	Y=Alternate Screen Resolution
ScreenY=768	Alternate Screen Resolution Parameter
ScreenX=1024	Alternate Screen Resolution Parameter
visibleAI=N	If Y, then <CTRL> key shows additional AI info
experimentalAIP2=Y	For Ralph to do AI testing
experimentalAIP1=Y	For Ralph to do AI testing
uberdude=N	Y=uberdude feature active
nointro=Y	Y=Intro Cinematic doesn't play upon start
stringdump=N	Probably obsolete
toawlog=Y	Y=TOAW Log recorded
unitpolog=N	Y=Unit PO Log recorded
polog=N	Y=PO Log recorded
PORandomSeed=0	0=Use next random number (reloading will vary results). -1=Use random number stored in .sal file (cheat prevention). PBEM always uses -1. Reloading gets the same results.
allowMouseWheelZoom=Y	N=no mousewheel zoom (useful for some mousewheels).
nosound=N	Used to debug the sound system
multicpu=N	Used to debug the sound system
oldsound=N	Used to debug the sound system
noupdate=N	Y=Map doesn't reposition with each combat report.
slowAnimation=N	Slows movement and combat animations
nodelay=N	Y=Skips the movement animation.
doubleClickComposition=N	Y=Doubleclick opens Unit Composition dialog
doubleclickplanner=N	Advanced Rule Parameter
contrast=0	Advanced Rule Parameter
brightness=0	Advanced Rule Parameter
menuDelay=1	Advanced Rule Parameter
toolTipHideDelay=1	Advanced Rule Parameter
toolTipShowDelay=100000	Advanced Rule Parameter
effectsVolume=100	Advanced Rule Parameter
backgroundVolume=100	Advanced Rule Parameter
JPegQuality=100	Advanced Rule Parameter

movingSelectsNextUnit=Y	Advanced Rule Parameter
showPOOptions=Y	Advanced Rule Parameter
PNGSupport=N	Advanced Rule Parameter
hugeMapEnabled=Y	Advanced Rule Parameter
autoSaveLargeMovies=N	Advanced Rule Parameter
movies=N	Advanced Rule Parameter
sitrepLogs=N	Advanced Rule Parameter
airAssistant=N	Advanced Rule Parameter
combatReporting=Y	Advanced Rule Parameter
hexagonalCropCircles=N	Sets whether crop circles are circular or hexagonal
condensedSituationReport=N	Sets Situation Report to 1 or 3 pages.
basicDefaults=N	
MacroTerrain=N	

19.11. OPART4 FONTS.INI FILE

This file stores the Font choices.

Note that there are 39 fonts in the game as follows:

- DocumentFont
- MediumFont
- DialogMediumFont
- EquipmentDialogMediumFont
- SmallFont
- ObjectiveFont
- ToolTipFont
- SupplyFont
- SmallSupplyFont
- HugeSupplyFont
- MapFont
- SmallMapFont
- HugeMapFont
- PlaceNameFont
- PlaceNameFont1
- PlaceNameFont2
- PlaceNameFont3
- SmallPlaceNameFont
- SmallPlaceNameFont1
- SmallPlaceNameFont2
- SmallPlaceNameFont3
- HugePlaceNameFont
- HugePlaceNameFont1
- HugePlaceNameFont2
- HugPlaceNameFont3
- UnitInfoSmallFont
- UnitInfoMediumFont
- UnitInfoValueFont
- UnitInfoFixedFont
- StatusBarFont
- FixedStatusBarFont
- TitleScreenFont
- TitleFont
- SubtitleFont
- WideButtonFont
- TextButtonFont
- EditorFont
- EditorEquipmentFont

There's also a Unicode font that is used for Arabic, Chinese, Japanese, Korean, etc. characters.

Font parameters are (not all fonts have all):

Selection	**Name of the font**
Size	Font size
Weight	Font thickness

Spacing	Space between characters
Line Spacing	Space between lines
Drop Shadow Size	Size of the Drop Shadow
Red Color	Red
Silver Color	Silver
Gold Color	Gold
Drop Shadow Color	Color of the Drop Shadow
offsetYOverride	Fine tune fonts Y position
offsetXOverride	Fine tune fonts X position
WidthOverride	Fine tune fonts width
HeightOverride	Fine tune fonts height
Outline Width	Outline the text in the outline color
TextColor	Text color
AlternateTextColor	Not used on all fonts. Supply font alternate is for Overextended hexes.
BackColor	Text background color
OutlineColor	Text outline color
windowsFont	Y = Use the windows font; N = Use the bitmapped font.*
Background	Y = Text has a background of the background color

*Note that if the bitmapped font is used instead of the windows font, all other parameters are irrelevant and ignored.

20. GAME HINTS

20.1. USING AIR UNITS

The long-term effectiveness of your air units is inversely proportional to their apparent visibility over the battlefield. Sad perhaps, but true. While it may be fun to launch an Air Strike on a particular location, this is the least effective way to use your Air units. Sometimes, however, you really need the immediate firepower. If so, go for it. Remember that there is a cost though. Combat Support Missions are moderately efficient, and again, sometimes you can't do without them. Unfortunately, they also grind your Air units down more quickly than any other Mission.

They are also a dandy way to draw enemy fighters into the fray, which may or may not be a good thing depending on the local Air Superiority equation. If you have Air Supremacy (the enemy can't effectively contest your Air Superiority Strength), your units will be most effective on Interdiction missions. Few things wear the bad guys down as quickly as empty fuel tanks, magazines, and mess kits, and the inability to move near Roads and Railroads can be a real nuisance. If the enemy air force is much stronger than yours, keep your air units on Air Superiority Missions and hope for the best. Consider keeping your best ground attack units out of the action. They may be more effective as a threat, forcing your opponent to maintain a strong Air Superiority effort at the expense of his Interdiction and Combat Support efforts.

20.2. COMBAT PLANNING CONSIDERATIONS

All units will have their Movement Allowances reduced to reflect the amount of time necessary to

resolve all attacks. This means you should move most of your units before resolving any attacks. If you believe all attacks will be resolved quickly, you should hold back a few high Movement Allowance units for use as an exploitation reserve. If you wish to exploit any breakthroughs before your opponent can react, consider holding off on the kinds of Attacks that are likely to take a long time to resolve – those involving units that have expended most of their Movement Allowance and fixed Attacks on defensive positions with probable Ignore Losses orders emphasis.

20.3. NUCLEAR WEAPONS

If you find that you have the option to use Nuclear Weapons, be sure to check the Scenario briefing. In almost all cases, there are significant potential costs associated with these weapons.

20.4. KEEPING YOUR UNITS SUPPLIED

There are a few things you can do to maximize the amount of supplies flowing to your units:

- Make sure to keep your Lines of Communication open. Don't let the bad guys cut in behind you.
- Don't move your units unless necessary.
- Keep your units near a cooperative headquarters unit.
- Avoid "boondocks" deployments. Try to keep your units in urban locations, on Roads, Anchorage locations, or Airbases.
- If your opponent has a strong Interdiction capability (lots of Air units capable of performing Interdiction Missions), keep some of your air units on Air Superiority duty.

21. CREDITS

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