



GAME MANUAL



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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.

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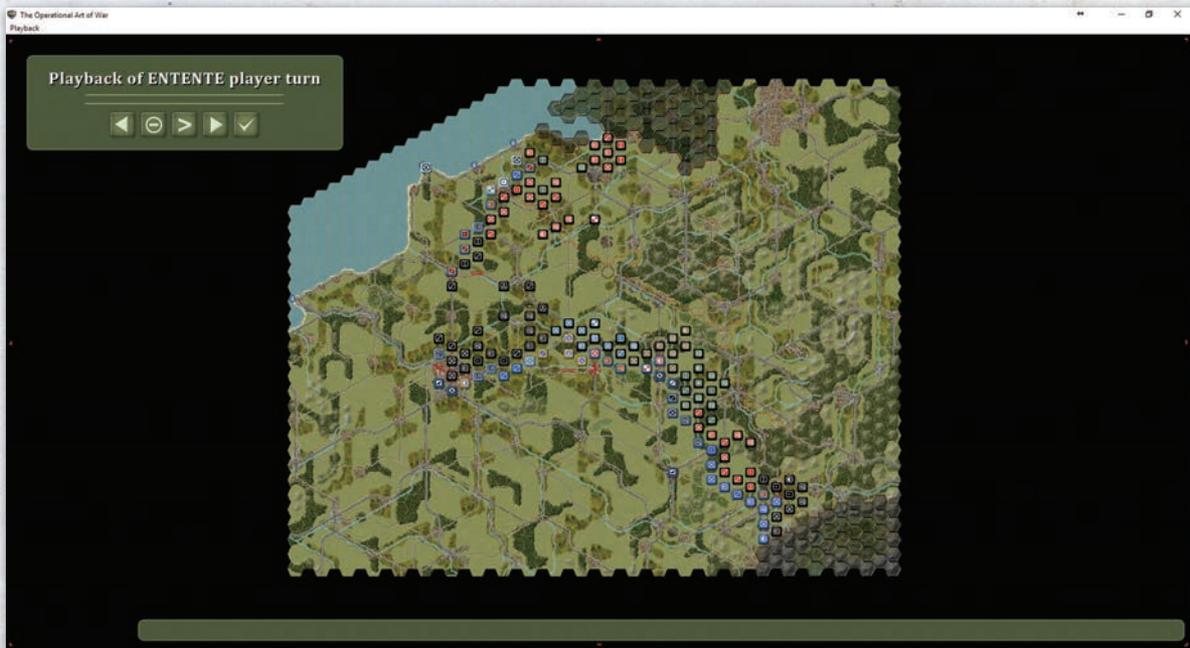
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9. WHAT HAPPENS DURING A GAME TURN

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 than 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%.

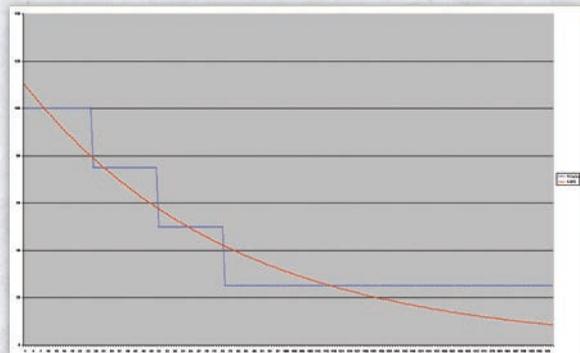
9.1.7.3. NEW SUPPLY RULES (OPTIONAL)

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.

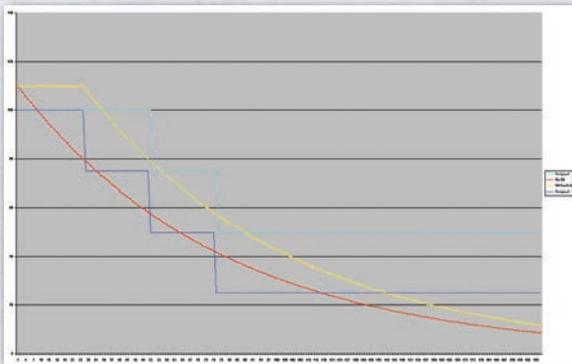
The exact formula is: $1.10 / (1.375 ^ {(\text{Supply Distance} / \text{Supply Radius})})$. This is illustrated here:



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).

9.1.74. 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.

9

10

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:

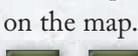
-  Previous Unit – Focuses the game’s attention on the previous unit in the force by making it the current unit.
-  Next Unit – Focuses the game’s attention on the next unit in the force by making it the current unit.
-  Current Unit – Calls up the Unit Report for the current unit.
-  Resolve Combats / 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.
-  Anchorage – 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)

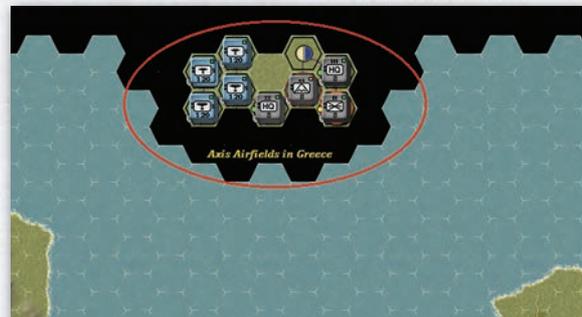
You can use this menu to issue General Orders to your units. Most of these Orders can also be issued from other windows, displays, etc., but this is the most convenient place to see exactly what options you have for your units at any given time. General Orders are as follows:

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 overland 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 than 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 it 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 dis-entrenched 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

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 = $100 - (100 - \text{Defender Quality}) * \text{Adjusted Odds}$
 - 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 ratio 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.

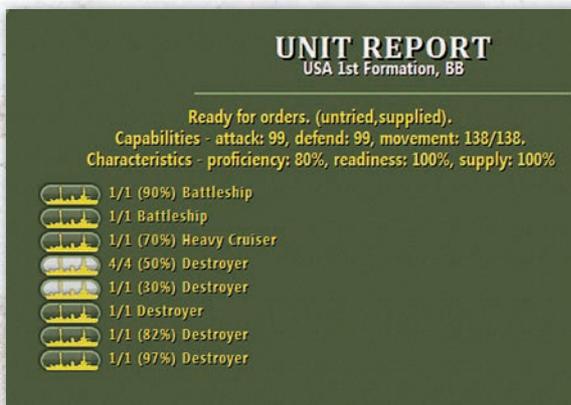
13.3. NAVAL COMBAT

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					
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
Vehicle Defense Multiplier					
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 optional, “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:

