



## The Operational Art of War IV™

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### Welcome.

Thank you for playing The Operational Art of War IV™! We are always looking for ways to improve your gaming experience. For the latest information on the game, please go to the Matrix Games web site at [www.matrixgames.com](http://www.matrixgames.com).

Below you will find the latest and greatest information on The Operational Art of War. Information in this document supersedes that in the official game manual.

The first time that you start a game in TOAW IV, you will be presented with an opened directory tree, showing the expanded Scenarios directory. You are asked at this time to select a scenario directory. First time players may wish to select the Tutorials directory as their default directory, so that they can play along with one of the guided tutorials in this directory. It is a good idea to open the reader for the scenario document that accompanies each tutorial and either print it, or alt-tab between it and the game as you first play. This is done by clicking on the button circled in red, in the screenshot below, when you have selected, or highlighted, a scenario to play. All scenarios with special documentation will have the button appear with text lines in it, when highlighted. Scenarios without special documents will only display a “blank” button, when highlighted. For new players, the recommended order of playing is the following: Tutorial, Anonymous Heroics, Tannenberg 1914, Kasserine 43. All but Anonymous Heroics were based on earlier versions of the game, so there may be slight differences in the described, or illustrated GUI (Graphical User Interface). However, all the basic concepts of earlier versions of TOAW apply to TOAW IV, as well. Note: If you do not have Microsoft Word installed, you may have difficulty with some of the .doc format documents. In this case, please take advantage of the fact that Microsoft offers a free file viewer for its MS Word files. You can get it by clicking on this link, or copying and pasting it into your web browser. <http://www.microsoft.com/downloads/details.aspx?familyid=95E24C87-8732-48D5-8689-AB826E7B8FDF&displaylang=en>



After cutting your teeth on the tutorials, feel free to be adventurous and try selecting scenarios from any represented period that interests you. When selecting a scenario, before deciding to play it against the computer, make sure that it is PO enabled, for at least one of the sides. If not, then you can always play solo, in hot seat mode. Best however, is playing against another human player. There are several active communities on the Internet, where players from all over the world get together, to play against each other in competitive ladder play, as well as just for fun. We hope that you too, will get involved with PBEM play and enjoy the camaraderie and challenge that human-to-human play will bring.

Grogards who prefer the Classic TOAW look, rather than the new style terrain graphics can easily switch back to them by choosing the Windows Start Menu item “The Operational Art of War III > Extras > Install Classic TOAW Graphics”. To switch back to the new terrain, simply select “The Operational Art of War III > Extras > Revert to TOAW III Graphics”. These options can be chosen repeatedly.

### Troubleshooting:

Ensure that your system meets the minimum system requirements. These are found on page 7 of the manual. **Note that there is also a Windows XP version (the “Slow” version) of 4.0 intended for pre-2004 machines – slower operation. Users can try either and use the one that works best on their machine.** Also, ensure that you have the latest video and sound drivers available for your system and that you have upgraded to the latest version of DirectX from Microsoft. The vast majority of reported problems are resolved by upgrading all drivers and DirectX to the latest versions.

If you are still experiencing problems with the game, please contact [support@matrixgames.com](mailto:support@matrixgames.com) or post in the Operational Art of War Support Forum at [www.matrixgames.com](http://www.matrixgames.com). Please provide as much detail on your issue as soon as possible.

**To obtain optimum game performance, close all other applications before beginning a game.**

### **Online Resources:**

English Forums:

Official Forum

<http://www.matrixgames.com/forums/tt.asp?forumid=225>

Gamesquad

<http://forums.gamesquad.com/forumdisplay.php?f=10>

Blitzkrieg Wargaming Club

[http://www.theblitz.org/message\\_boards/forumdisplay.php?fid=15](http://www.theblitz.org/message_boards/forumdisplay.php?fid=15)

TDG

<http://www.savemstateathletics.com/tdg/index.php>

Developer's Blog

<http://www.operationalwarfare.com/>

Chinese Forum

<http://www.toaw.org/bbs/forumdisplay.php?fid=19>

German Forum

<http://www.si-games.com/forums/forumdisplay.php?f=167>

Italian Forum

<http://www.netwargamingitalia.net/forum/forumdisplay.php?f=38>

Polish Forum

<http://www.csto.pl/viewforum.php?f=79>

### **Change History:**

v.4.1 10/15/2018

#### **I. STEAM ACCESS:**

TOAW IV now is available on Steam and supports Steam operations. Even if purchased on the Matrix site, Steam keys are available.

Preliminary documentation for Steam integration:

[https://docs.google.com/document/d/1LuWUQDp2yXWuRymLIriOk64qBrLeedxI2\\_ikJutAPM8/edit?usp=sharing](https://docs.google.com/document/d/1LuWUQDp2yXWuRymLIriOk64qBrLeedxI2_ikJutAPM8/edit?usp=sharing)

[https://docs.google.com/document/d/1W\\_rPO9AzwC94s9fH2yzKiUp1ykV-S8a-XXtK0TiKmtE/edit?usp=sharing](https://docs.google.com/document/d/1W_rPO9AzwC94s9fH2yzKiUp1ykV-S8a-XXtK0TiKmtE/edit?usp=sharing)

<https://docs.google.com/document/d/1t1AAeqZg01YyopfBxNqwVV7Y6VcryPEpHtuvUdXjdLE/edit?usp=sharing>

There is a new dll: steam\_api.dll

#### **II. GAME FEATURES:**

##### **1. Dismount Feature:**

This new feature is intended to allow motorized infantry to shed motorized transport and thus become foot infantry – allowing it to enter and conduct combat into locations barred to motorized units by certain terrain (dunes, badlands, etc.).

The feature is accessed via the Unit Report. After the "Transport" pane, there is a check box to effect the dismount IF the unit contains any motorized transport:

### UNIT REPORT

**Commonwealth 70th Inf Div, 1st Buffs**

Ready for orders. (veteran, supplied, weight: 336).

Capabilities - attack: 13, defend: 20, **movement: 66/66.**

Characteristics - proficiency: 70%, readiness: 100%, supply: 100%

**8 20**

Icon	Unit Name	Count
	Recon Rifle Squad	45/45
	Recon SMG Squad	6/6
	Heavy MG	8/8
	3 inch Mortar	5/5
	Tracked Carrier	12/12
	50mm Mortar	8/8
	Medium MG	4/4
	Truck	76/80
	2 Pounder AT Gun	0/4

#### Strengths

Anti personnel	8
Anti armor	3
Anti air (high)	0
Anti air (low)	2
Defense	20
Artillery	1
Range	0

#### Special Abilities

**Motorized Movement**

Reconnaissance 99%

**Dismount:**

**Deployment:** **Mobile**

**Orders Emphasis:** **Limit Losses**

Navigation icons: Home, Back, Forward, Star, Hierarchy, Checkmark, Refresh

Upon clicking, the motorized transport is removed from the unit (sent to the “On Hand” pools):

**UNIT REPORT**

**Commonwealth 70th Inf Div, 1st Buffs**

Ready for orders. (veteran, supplied. weight: 72).

Capabilities - attack: 11, defend: 16, movement: 28/28.

Characteristics - proficiency: 70%, readiness: 100%, supply: 100%

**Equipment:**

- 45/45 Recon Rifle Squad
- 6/6 Recon SMG Squad
- 8/8 Heavy MG
- 5/5 3 inch Mortar
- 0/12 Tracked Carrier
- 8/8 50mm Mortar
- 4/4 Medium MG
- 0/80 Truck
- 0/4 2 Pounder AT Gun

**Strengths:**

- Anti personnel 7
- Anti armor 3
- Anti air (high) 0
- Anti air (low) 1
- Defense 16
- Artillery 1
- Range 0

**Special Abilities:**

- Foot Movement
- Reconnaissance 77%
- Dismount:

**Deployment:** Mobile

**Orders Emphasis:** Limit Losses

Note that the Trucks and Tracked Carriers are zeroed and the unit now has “Foot Movement”. The unit is now tagged as “Dismounted” and has only 28 MPs. But, as a foot unit, it can now operate in dunes and etc.

Here is a shot of the inventory before dismantling:



### INVENTORY AND REPLACEMENTS

Commonwealth

Available Systems	On Hand	Rate	Turns	Assigned	Lost
 Scout Carrier	84	6	1-218	120	0
 Marmon-Herrington (early)	0	1	49-138	20	0
 Humber III	0	1	9-98	20	0
 Humber Scout	0	1	89-178	5	0
 Daimler II	0	1	129-218	0	0
 Truck	1852	98	1-218	7060	0
 Tracked tractor	0	1	191-218	0	0
 Tracked Carrier	133	7	1-218	390	0
 Deacon 6-pdr SPAT	0	0	--	0	0
 Mk-VI Light Tank	12	2	1-33	160	0
 A-9 Cruiser	2	1	1-34	55	0
 A-13 Cruiser	0	1	3-42	50	0
 A-10 Cruiser	1	1	1-44	46	0
 Matilda II	0	1	3-128	50	0
 Churchill	0	5	179	0	0

✓

Now, here's the inventory after dismounting. Note that the Trucks and Tracked Carrier numbers have been increased by the amount released from the unit:



### INVENTORY AND REPLACEMENTS

Commonwealth

Available Systems	On Hand	Rate	Turns	Assigned	Lost
Scout Carrier	84	6	1-218	120	0
Marmon-Herrington (early)	0	1	49-138	20	0
Humber III	0	1	9-98	20	0
Humber Scout	0	1	89-178	5	0
Daimler II	0	1	129-218	0	0
Truck	1928	98	1-218	6984	0
Tracked tractor	0	1	191-218	0	0
Tracked Carrier	145	7	1-218	378	0
Deacon 6-pdr SPAT	0	0	--	0	0
Mk-VI Light Tank	12	2	1-33	160	0
A-9 Cruiser	2	1	1-34	55	0
A-13 Cruiser	0	1	3-42	50	0
A-10 Cruiser	1	1	1-44	46	0
Matilda II	0	1	3-128	50	0
Churchill	0	5	179	0	0

The option to dismount remains available even if the unit is unsupplied:

## UNIT REPORT

**Axis Gruppo Maletti, I LMR HQ**

Ready for orders. (unried, **unsupplied**, weight: 58).  
Capabilities - attack: 1, derend: 1, movement: 55/55.  
Characteristics - proficiency: 40%, readiness: 75%, supply: 61%



**10/10 Recon Light Rifle...**  
**6/6 Medium MG**  
**16/16 Truck**

**Strengths**  
Anti personnel 1  
Anti armor 1  
Anti air (high) 0  
Anti air (low) 1  
Defense 1  
Artillery 0

**Special Abilities**  
Motorized Movement  
Reconnaissance 3%

Dismount:

**Deployment**  
Defending

**Orders Emphasis**  
Limit Losses



But, if you effect that option, you will first be given a warning:

**UNIT REPORT**

**Axis Gruppo Maletti, I LMR HQ**

Ready for orders. (untried,unsupplied, weight: 58).  
Capabilities - attack: 1, defend: 1, movement: 55/55.  
Characteristics - proficiency: 40%, readiness: 75%, supply: 61%

**Unsupplied Dismount!**

This unit is unsupplied.  
If you dismount it, all its motorized transport will be permanently lost.  
Continue?

Yes  
No

Light Rifle...  
MG

**Strengths**

- Anti personnel 1
- Anti armor 1
- Anti air (high) 0
- Anti air (low) 1
- Defense 1
- Artillery 0

**Special Abilities**

- Motorized Movement
- Reconnaissance 3%

Dismount:

Deployment: Defending  
Orders Emphasis: Limit Losses

Navigation icons: back, forward, up, star, hierarchy, confirm

But, if you go ahead and effect the dismount, the motorized transport is not sent to the "On Hand" pools. Rather, it is sent to the dead pile:



## INVENTORY AND REPLACEMENTS

Axis

Available Systems	On Hand	Rate	Turns	Assigned	Lost
 88mm Dual Purpose Gun	0	1	132-169	0	0
 Jeep	0	1	145-192	5	0
 SdKfz 221	0	1	87-158	0	0
 SdKfz 231-8	0	1	87-134	0	0
 Carro Veloce L3/35	0	9	14-49	313	0
 Autoblindata 41	10	1	49-168	5	0
 Carro Veloce L6/40	0	2	129-190	0	0
 Truck	1326	78	1-216	3079	16
 SdKfz 251/1	0	1	39-214	0	0
 PzKpfw I	0	0	--	0	0
 PzKpfw IIF	0	2	71-82	0	0
 PzKpfw IIIE	0	6	97-126	0	0
 PzKpfw IIIH	0	6	97-121	0	0
 PzKpfw IIIJ	0	5	149-164	0	0
 PzKpfw IVD	0	3	111-155	0	0



In order to resume motorized movement, the unit must first be restored to “mounted” status. To do so, click the Dismount check box back to off. Then, the unit will start to receive motorized transport as replacements in subsequent inter-turn phases. If the box is left in “dismounted” status, no such replacements will be received (leaving the unit in foot mode). But, once unchecked, it will receive them:

## UNIT REPORT



**Commonwealth 70th Inf Div+, 2nd Scots Gds**

Ready for orders. (veteran, supplied, weight: 240).

Capabilities - attack: 12, defend: 19, movement: 66/66.

Characteristics - proficiency: 70%, readiness: 100%, supply: 106%



	45/45 Recon Rifle Squad	<p><b>Strengths</b></p> <p>Anti personnel 8</p> <p>Anti armor 3</p> <p>Anti air (high) 0</p> <p>Anti air (low) 2</p> <p>Defense 19</p> <p>Artillery 1</p> <p>Range 0</p> <p><b>Special Abilities</b></p> <p>Motorized Movement</p> <p>Reconnaissance 99%</p> <p>Dismount: <input type="checkbox"/></p>
	6/6 Recon SMG Squad	
	8/8 Heavy MG	
	5/5 3 inch Mortar	
	7/12 Tracked Carrier	
	8/8 50mm Mortar	
	4/4 Medium MG	
	49/80 Truck	
	0/4 2 Pounder AT Gun	

**Deployment**

Mobile

**Orders Emphasis**

Limit Losses



If the unit contains Static equipment (towed artillery mostly), then if the transport in the unit had been removed while the artillery remained, the unit would have been switched to a MP of 1 – not what was intended. So, this feature also removes any Static equipment as well. Here's an example of that:

**UNIT REPORT**

**Commonwealth 7th Armored Div, 4th RH Art**

Ready for orders. (veteran, supplied, weight: 25).  
Capabilities - attack: 6, defend: 8, movement: 28/28.  
Characteristics - proficiency: 80%, readiness: 100%, supply: 100%

Range: 1

III  
4 8

0/24 25 Pounder ER Gun  
0/12 18 Pounder ER Gun  
20/20 Recon Rifle Squad  
2/2 Recon SMG Squad  
12/12 Medium MG  
3/3 Heavy MG  
0/61 Truck

**Strengths**  
Anti personnel 4  
Anti armor 2  
Anti air (high) 0  
Anti air (low) 1  
Defense 8  
Artillery 0

**Special Abilities**  
Foot Movement  
Reconnaissance 35%  
Artillery Operations  
Dismount:

Deployment: Tactical Reserve  
Orders Emphasis: Limit Losses

Navigation icons: back, forward, up, star, network, checkmark

Note that the artillery has been sent to the pools along with the trucks.

To enable players to keep track of which units have been dismantled or can be dismantled, the “OOB – Units” Report now has a column to reflect that:

Unit	Formation	Location	Icon Type	Unit Info	Dismount
4th RH Art	7th Armored Div	Location 157,88	Artillery	Strength 14, Move 28	Dismounted
11th Hussars	7th Armored Div	Location 157,90	Armored Cavalry	Strength 44, Move 66	Mounted
16th Inf Bde HQ	70th Inf Div	Location 157,85	Inf Artillery	Strength 14, Move 66	Mounted
2nd Queens	70th Inf Div	Location 157,85	Motor Infantry	Strength 36, Move 66	Mounted
2nd Leicesters	70th Inf Div	Location 157,85	Motor Infantry	Strength 36, Move 66	Mounted
1st A & S	70th Inf Div	Location 157,85	Motor Infantry	Strength 36, Move 66	Mounted
1st Essex	70th Inf Div	Location 166,90	Motor Infantry	Strength 36, Move 66	Mounted
1st Buffs	70th Inf Div	Location 166,90	Motor Infantry	Strength 27, Move 28	Dismounted
1st Hampshire	70th Inf Div	Location 166,90	Motor Infantry	Strength 33, Move 66	Mounted
2nd KORR	70th Inf Div	Location 166,90	Motor Infantry	Strength 36, Move 66	Mounted
2nd Scots Gds	70th Inf Div+	Location 160,91	Motor Infantry	Strength 33, Move 66	Mounted
11th Czech+	70th Inf Div+	Location 160,91	Infantry	Strength 23, Move 28	-
107th RHA	70th Inf Div+	Location 157,88	Artillery	Strength 34, Move 66	Mounted
13th LAA	70th Inf Div+	Location 160,91	Anti Aircraft	Strength 18, Move 66	Mounted
Selby Force HQ	22nd Guards Bde	Location 164,84	Headquarters	Strength 10, Move 66	Mounted
3rd Coldstrm Gds	22nd Guards Bde	Location 162,84	Motor Infantry	Strength 33, Move 66	Mounted
1st S Stfshre	22nd Guards Bde	Location 163,84	Motor Infantry	Strength 33, Move 66	Mounted

138 units are in theater.

Units listed as “Mounted” can be dismantled. Units with the “-“ cannot be dismantled.

Note that there can be instances where a unit consists entirely of motorized transport and/or Static equipment. In that case, dismantling the unit will have the same effect as disbanding it.

If sub-units have been dismantled then recombination will only result in a dismantled parent if all sub-units were dismantled.

While the primary purpose of the feature is to allow motorized infantry to temporarily operate as foot infantry, other uses can be imagined. For example, it might be used to protect trucks from unnecessary losses in combat by dismantling just prior to combat execution.

It could also be used by designers to model a mostly foot army with some, short term, trucking ability. All infantry could have trucks in their TO&E, but then all be dismantled. Then, if there was only a small amount of trucks available in the pools, an occasional unit could mount-up for a swift transfer to another area, then return the trucks back to the pools by dismantling.

2. **Density effects for unstacked locations.**

Previously, only locations with two or more units suffered combat density penalties. Now, any location can be so penalized, if the advanced rule is optioned (see below). Clearly, this is an improvement in reality. Here's a shot from my "Kaiserschlacht 1918 (mini)" scenario. Note that this scenario has 5km hexes while the units are division sized. Most single units exceed density penalties:



Note all the single units that now have even red density penalties.

**3. Variable Initiative Advanced Rule Option.**

This is a new Advanced Rule Option that allows players to choose whether they want Variable Initiative to be possible in either PO vs. Human or Hot Seat games. It is still not available for PBEM or PO vs. PO games.

**4. New Density Rules Advanced Rule Option.**

This toggles the above density effects for unstacked locations.

These options appear on the Game Options page:

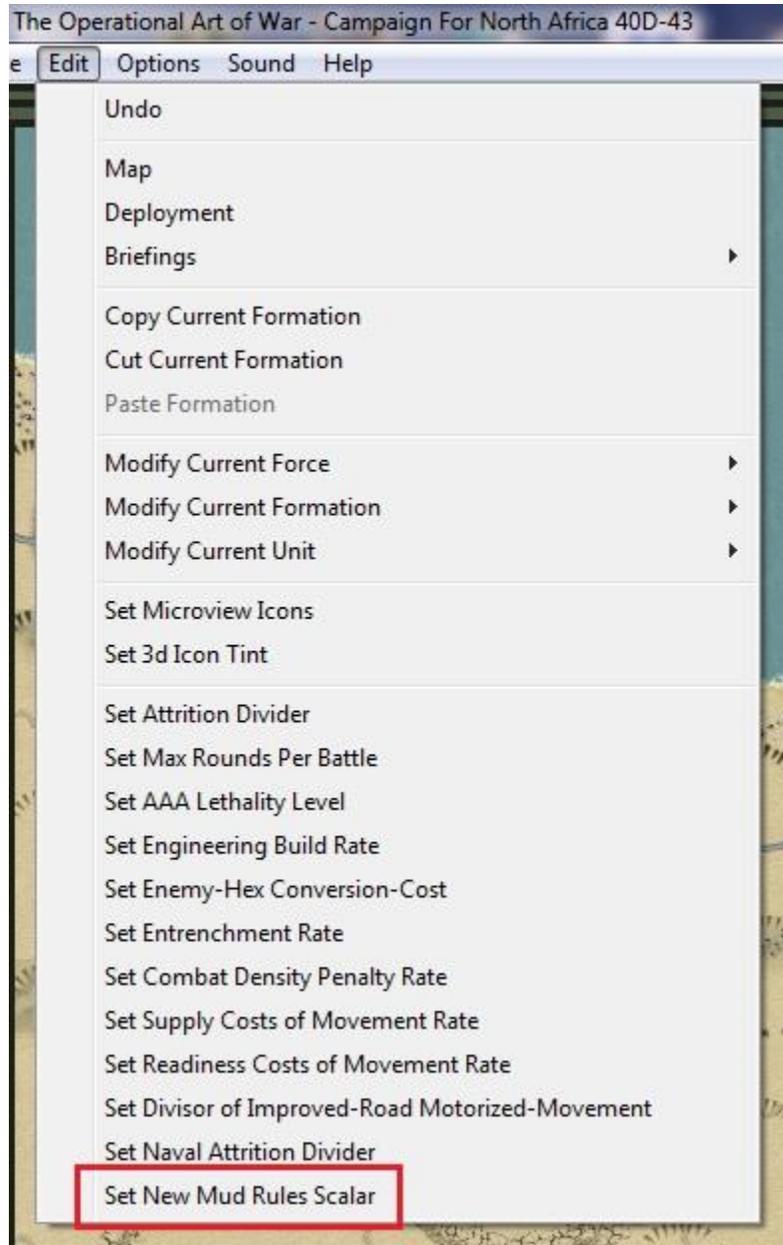


These options are also added to the Designer Advanced Rules Preferences dialog – allowing designer presetting of these parameters.

### III. EDITOR FEATURES:

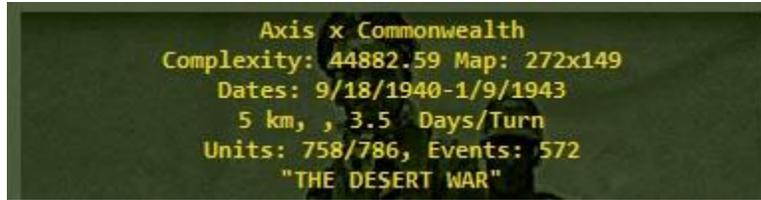
#### 1. New Mud Rules Scalar.

This is a new Editor Game Parameter that scales the mud drying rate if the New Mud Rules are in use. This allows the Designer to fine-tune this factor for his scenario. The default value of 100 is neutral. A minimum value of 1 divides the default drying by 100. A maximum value of 10000 multiplies the default drying by 100. Values in between those extremes fine tune the feature.



**2. Auto Prefix in the Scenario Briefing.**

The Editor will now add an auto prefix to any scenario that undergoes a save operation as follows:



Line 1 contains the names of the two sides.

Line 2 contains a complexity estimate and the map dimensions.

Line 3 contains the date range.

Line 4 contains the map scale and the turn interval.

Line 5 contains the unit totals and the event totals.

Complexity is calculated from a scaled product of the Total Units, Total Turns, Total Events, and Total Map Boundaries.

This addition consumes text space in the briefing (so, if your briefing is full, some of it will be deducted from the end).

Only scenarios edited post this feature's launch will exhibit this prefix, but all scenarios that ship with the game have been so saved.

**IV. USER INTERFACE FEATURES:**

**1. Player choice for first page of Detailed Combat Report.**

Players can now choose which page of the Detailed Combat Report they wish to appear first. This choice is made on page one of the Player Options Dialog:



Here, the Combat Report will appear first. Click on that button, however and:



...Attacker Losses will appear first. Click again and:



...Defender Losses will appear first. Click again and:



...The Combat Chart will appear first. Finally, one more click and Detailed Combat Reporting is turned off. The cycle then repeats. This feature is especially intended to allow the Combat Chart to be the first page shown. Note that, once displayed, any other page can then be launched from any of the other pages.

**2. Player Assist objectives are now “Drag and Drop”.**

Left-click and drag moves the waypoint. Right-clicking on an empty spot creates a new waypoint between the two nearest ones. Right-clicking on a waypoint and doing an insert inserts a new waypoint half-way to the next one. Right-click on a waypoint and delete deletes a waypoint.

NOTE: While playing, you can't change Waypoint 0 since that controls where reinforcements come in. You can still move it with this version.



With the mouse over Objective 6, I hold down the left mouse button and move the mouse to Reims (“drag”). After releasing the mouse button (“drop”):



Objective 6 has now been dragged to Reims!

## V. BUG FIXES:

1. The Equipment Editor DF parameter now correctly switches to Vehicle Weight when the equipment is armored.
2. Subdivided units' subunits no longer end up in different formations.
3. Unsupplied subunits no longer regain Supplied status from their parent unit upon recombination.
4. Expected Reinforcements Dialog now shows all expected withdrawals.
5. Sea movement now converts deep water hexes again.
6. No more End-of-Turn air interdiction during Cease Fire turns.
7. Formation Report no longer can display an extra slot showing an enemy unit (allowing side changes).
8. Variable Initiative fixed (superseded by the Variable Initiative Advanced Rule above).
9. Distance Hexes now function properly again.
10. TOA.CFG file read/write restored.
11. Fixed the supply drop for unsupplied units – especially for the 3-hour and 1-hour intervals (which are fractional values of  $\frac{1}{2}$  and  $\frac{1}{6}$  point respectively, effected via chance).
12. Fixed the date incrementing for the Monthly and Seasonal turn intervals.
13. Fixed an issue with the PO waiting for mouse movement.
14. Fixed the info for the Unit Counter Values Options.
15. Fixed crashes caused by strings being too long in language files.

16. The mixed stack bug will now cause one unit's side to be disintegrated (going back to reinforcements.)
17. Lengthened allowed text in several buttons for Chinese support.

## VI. NEW SCENARIOS:

<b>Scenario</b>	<b>Designer</b>
1. Shiloh 1862 (Van Dorn Variant)	Bob Cross

## VII. UPDATED SCENARIOS:

<b>Scenario</b>	<b>Designer</b>
1. Shiloh 1862	Bob Cross
2. Leipzig 1813	Bob Cross
3. Waterloo 1815	Bob Cross
4. Killer Angels 1863	Bob Cross
5. Killer Angels 1863 (Jackson Variant)	Bob Cross
6. Germany 1945 (Race to Berlin)	Bob Cross
7. Germany 1945 (Last Stand)	Bob Cross
8. Campaign for North Africa 40-43	Bob Cross
9. Campaign for North Africa 40D-43	Bob Cross
10. Campaign for North Africa 41-43	Bob Cross
11. Campaign for North Africa 41N-43	Bob Cross
12. Campaign for North Africa 42-43	Bob Cross
13. Campaign for North Africa 42O-43	Bob Cross
14. France 1944 D-Day	Bob Cross
15. France 1944 Cobra	Bob Cross
16. Denmark Strait 1941	Bob Cross
17. Soviet Union 1941	Bob Cross
18. Soviet Union 1941 Mobile Variant	Bob Cross
19. Soviet Union 1941 Early Variant	Bob Cross
20. Soviet Union 1941 Early and Mobile Variant	Bob Cross
21. Kaiserschlacht 1918	Bob Cross
22. Kaiserschlacht 1918 (mini)	Bob Cross
23. Cambrai 1917	Bob Cross
24. Jutland 1916	Bob Cross
25. Okinawa 1945	Bob Cross
26. Midway 1942	Bob Cross
27. Pearl Harbor 1941	Bob Cross
28. Savo Island 1942	Bob Cross
29. Cape Esperance 1942	Bob Cross
30. The Next War 1979	Bob Cross
31. Project Kuo-Kuang 1962	Rui Wong
32. Taiwan 2016	Rui Wong
33. Fire in the East 2	Kristian Kristensen
34. Directive 21 1941-1945	Rick Kesler
35. La Grande Armee 1805	Rob Kunz
36. The Guns of August 1914	Rob Kunz

## **VIII. UPDATES TO CLASSIC SCENARIOS (Updates made by Steve Sill):**

1. Attu Island 43
2. Bulge 44
3. Bulge 2000
4. Burma 43-43
5. Desert Storm 91
6. Dragoon 44
7. Fulda 76
8. Germany 84
9. Kiska Island 43
10. Korea 50-51
11. Korea 99
12. Libya-Egypt 2000
13. Middle East 67
14. Middle East 73
15. Nato-Warsaw Pact 62
16. NATO-Warsaw Pact 78
17. Normandy 44
18. NormandyRommel 44
19. Olympic 45
20. Overlord 44
21. Seoul 2000
22. Sicily 43
23. Singapore 42
24. St. Lo 44
25. Tannenberg 14
26. Tet Offensive 68

Most changes involved fixing the issues created by the revision in how recon level increments were effected (ancient TOAW issue). But there were a few cases of supply points added to distant airfields and coastal batteries disabled.

**I. USER INTERFACE FEATURES:**

1. F1 now opens the manual.
2. Added a Graphics Scaling parameter to the "Opart 4 Fonts.ini" file. This up scales many of the graphics. Values greater than one make things bigger. Values less than one make things smaller. This is intended to address issues created by 4K screens.
3. Added a parameter to the "Opart 4 Fonts.ini" file called HugeIcon. It will show up once you launch the new version and close it. It changes the icon on the unit panel to be a huge 2D view.

**II. BUG FIXES:**

1. Found and fixed the bug that causes the formation lines to show up.
2. Fixed issue with the AI not moving Ships. It may have prevented some land units from moving as well.
3. Fixed crash in Air and Fleet Interdiction.
4. Fixed issue with Chinese in diplomacy pouch.
5. Fixed issue with zoom in classic view leaving classic view.
6. Fixed issue with loading/saving non-game object like units.
7. Added titles over buttons in the new game dialog.
8. Fixed Net Awards.
9. Made scrolling easier.
10. Increased the scrolling area around the main map to 32 pixels.
11. Modified the dialog boxes so that the mouse capture no longer extends beyond the visible area.
12. Modified the dialog boxes so that the drag area is 15 pixels around the visible area.
13. Hid the warfare panel on screens equal to or smaller than 1024x768.
14. Diplomacy Pouch now word wraps.
15. Minor changes to the diplomacy panel and progress bar. The prophecies at the bottom were not aligned.
16. Combat Planner now respects the Scaling factor in the "opart 4 fonts.ini" file. If you go above about 1.5 there will be overlap. To help isolate and/or fix the problems some people are having with Chinese logins, if you add a file called DefaultFolder.txt file and put the path to the folder inside, it will use that instead of trying to find the my documents folder. To use this, you might create a folder called C:/TOAW and put contents of Documents/My Games/The Operational Art of War IV and all its subfolders into it. Then launch TOAW as an administrator and it should work.
17. Game Select dialog now has labels for the buttons. This should help new players.
18. PBEM Errors should no longer leave you on a blank screen.
19. Removed the extra sound from the combat planner.
20. Modified startup code to give better errors on startup issues.
21. Shifted units slightly in the smaller map views to look better.
22. Button Panel is now draggable.
23. Tweaked the position of the counters on the map.
24. Fixed the issue with right scroll not working after changing from large to small map view.
25. Fixed the bug that was causing PBEM crashes.
26. Fixed DefaultFolder.txt file.
27. Fixed crash bug caused by using new scales.
28. Fixed issue with the game not registering that the mouse was moved to the default button.
29. Made a change that may help with the black boxes.
30. Fixed loading a unit into the editor.
31. Tooltips should now remain onscreen.
32. The editor will no longer crash with a bad OOB, instead it will try to clean it up and give warnings.

33. Did some more rewriting to make the scenario loading code even more bulletproof.
34. The mouse now works when clicking on more of the tabs on the button panel instead of the right half.
35. Hints no longer happen when a popup menu is open.
36. Supply over railroads when there is a Road Cost other than the default now works correctly.
37. Modified the Airborne cost when there is a Road Cost other than the default but haven't had a chance to test it.
38. Made a change that might help with the issue of the combat report dialog crashing.
39. The close dialog on the New Scenario Dialog now returns to the start screen.
40. Fixed saving JPGs.
41. To help diagnose an issue some people are having with pauses, if you open the Opart 4.ini file in Documents/My Games/The Operational Art of War IV and add a line labeled smallram=Y it may help.
42. Added in some updates to the expanded time and distance rules.

### III. SCENARIOS:

1. Updated a number of scenarios to match their updates posted on the forum.
2. Added Directive 41 scenario.

v.4.0.0.0 10/31/2017

### I. NAVAL WARFARE:

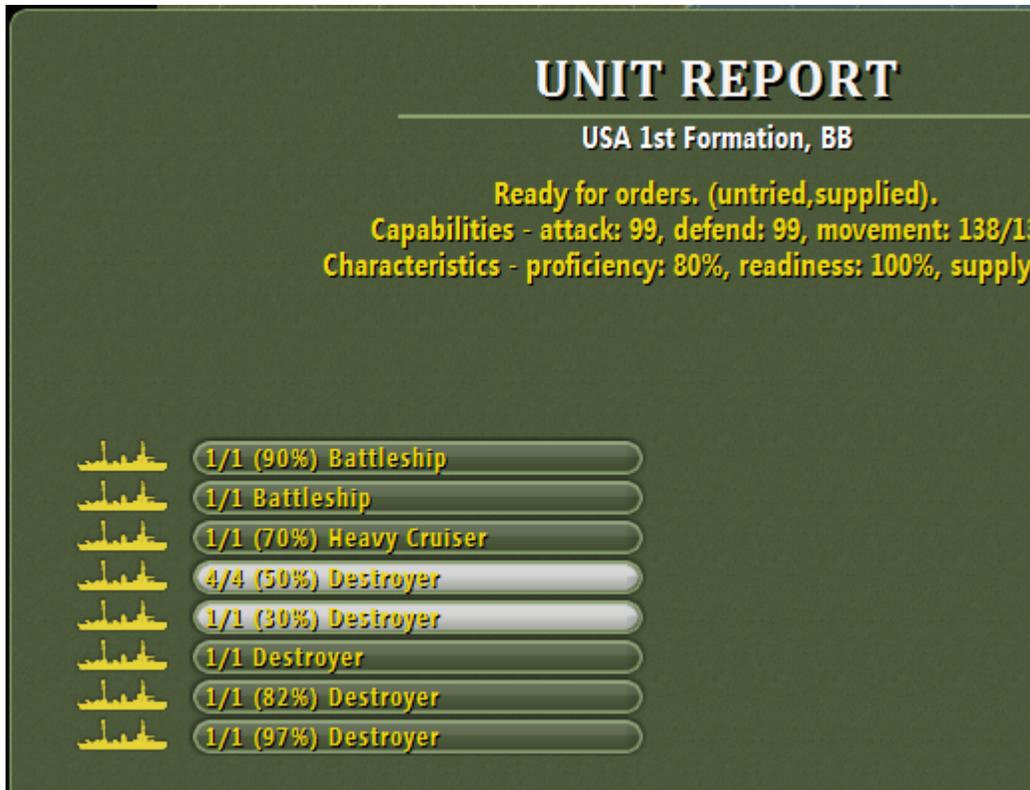
This version includes a suite of new naval features that should prove to be a good first step towards a full naval warfare model.

1. **Naval Combat:** To recap, naval combat in 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 surprising discovery 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 new naval 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 silver (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.
- 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 silver 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.

2. **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.
  - 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.
  
3. **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. Then the targets will be observed - but the assaulters will lose their embarked status - forcing them to assault.
  
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.

A related feature is the “Port Attack” option. 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.

## II. SUPPLY ENHANCEMENTS:

1. **Motorized Movement on Improved Roads:** There is now a designer option to divide the MP cost of motorized units on improved roads by a divisor that can range from 1 to 10. A setting of 2 makes the MP cost  $\frac{1}{2}$  MP, for example. This also affects the supply trace when New Supply is in use. Supply traced over other than improved road hexes will pay costs  $\times$  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).
2. **Limit removed on Unit Supply Recovery per Turn:** Increased from 50 to 150. So, if the location is lush enough, a fully depleted unit can recover full supply in a single turn.
3. **Intermediate 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 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.
  - “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 from the normal supply font in the supply display, for information purposes.
  - Note that, since this effect was scaled by turn-interval, the attrition due to being unsupplied was also given that factor as well, for consistency. So, unsupplied units will now melt away faster in full-week turns than in 6-hour turns, etc.

### III. RANGE LIMITS:

All ranged units now can have their nominal ranges player-limited. The choice is made within the Unit Report (see illustration). A setting of -1 restores the value to the nominal value. A setting of 0 makes the unit non-ranged – this can allow the unit to assault when adjacent. A setting of any positive range allows the unit to bombard when adjacent. The -1 setting still applies the 50% test when adjacent – as in 3.4 section IV. 2, below. These settings can be pre-selected by the designer in the editor (default is -1). Note that the intent of this feature is to allow players to tailor their bomber ranges so as to stay within air cover of their fighters – but note that it applies to ships and artillery, too. It can also benefit units with multiple equipment types in their TO&E to operate with the range of the shortest-ranged equipment type. The DBR display (“Crop-circles”), will reflect the modified range.



### IV. 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 disentranced most of its force just testing whether attacks with them were plausible.

## V. BATTLEFIELD TIME STAMPS:

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

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

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

**Movement effects of Battlefield Time Stamps:** Any unit that enters a hex with a Battlefield Time Stamp will have its movement points reduced until its unit time stamp is at least equal to that of the hex.

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

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

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

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

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



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

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

#### **VI. NEW BRIDGE DESTRUCTION RULES:**

There is now an Advanced Rule player-option to use the New Bridge Destruction Rules. If optioned, bridges will only exist, and be subject to destruction, in locations where the road terrain graphically crosses the river/canal terrain. This will affect both bridge-blowing by units and bridge-attacks by aircraft.

#### **VII. NEW MUD AND SNOW RULES:**

If this advanced rule is optioned, when snow melts, it is converted to mud. Furthermore, mud dries out proportionate to temperature. (Cold: very little; Hot: very fast). This will facilitate the creation of mud seas. (This is not in the manual).

#### **VIII. EDITOR ENHANCEMENTS:**

##### **1. Parameter Expansions:** Various limits were increased as follows:

- Number of Event Slots increased from 999 to 10,000.
- Number of Units per Side increased from 2,000 to 10,000.
- Number of Formations per Side increased from 400 to 1,000.
- Map Boundaries increased from 300x300 to 700x700.
- Number of Placenames increased from 800 to 4,000.
- Number of Supply Points per side increased from 99 to 399.
- Number of Objectives per track increased from 39 to 99.
- Distance hex limit increased from 199 to 254.
- Supply Radius limit increased from 25 to 100.
- Refugee radius increased from 20 to 99.
- 1/2 Occupies and 1/2 Attacks radius increased from 20 to 99.
- Helicopters now work with dates earlier than 1955.
- Equipment list limit increased from 2018 to 5000.
- Theater Option limit increased from 16 to 64.
- Turn Intervals increased to include 1 hour, 3 hour, 2 week, monthly, seasonal, and annual. (Not in the manual).
- Hex Scales increased to include 0.25 km, 0.5 km, 1 km, 100 km, and 200 km. (Not in the manual).

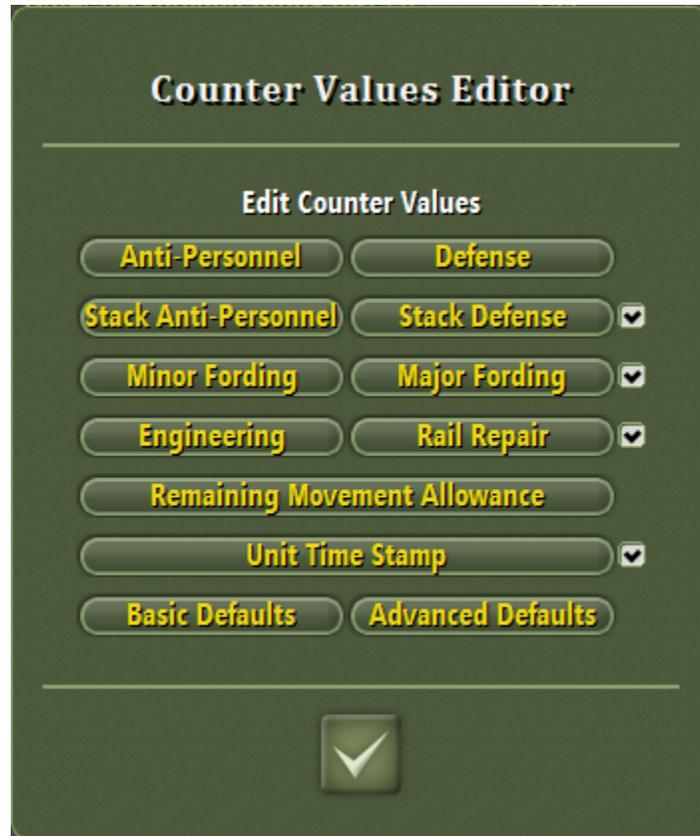
- Year limits are now 3000BC to 3000AD. Negative years have “BC” appended. Positive years less than 1000 have “AD” appended. (Again, not in the manual).
2. **Alternate Icon:** A unit can be assigned an alternate icon, in addition to its primary icon. The two icons combine their properties. So, for example, designers can create a Marine unit that is heliportable or an airborne mountain unit. Also, if a parachute unit has an alternate icon that is also a parachute icon, it will retain airborne ability after being rebuilt. In the Force Editor, click just to the left of the primary icon and the icon dialog will pop up. Select the alternate icon from that dialog. It will be displayed next to the primary icon. To remove the alternate icon, pop up the dialog the same way again and hit <esc>. The primary icon is the one that will be displayed on the map.
  3. **Equipment.nqp File:** This new file allows designers to explicitly set various naval parameters of naval equipment. This includes the ship’s Durability, Armor, Agility, Accuracy, and Speed. There are two versions in the Altgraphics sub-folder. One leaves all naval units at the original MP speed. The second has new MP settings for naval speeds. Players can choose for themselves which one they prefer, provided the scenario designer hasn’t created a scenario-specific version for the scenario. Like the original Equipment.eqp file, it obeys the graphic folder priority rules. See Appendix Six for more about this file.
  4. **New Game Parameters:**
    - **Divisor of Improved-Road Motorized-Movement:** See section II, item 1. A default value of 1 will leave things like in 3.4 and before. A setting of 2 will make movement on improved roads by motorized units cost ½ movement point. A setting of 3 will make movement on improved roads by motorized units cost 1/3 movement point, etc. Maximum value is 10.
    - **Naval Attrition Divider:** This is the same as the normal Attrition Divider, but applies to naval combat only. The normal Attrition Divider does not affect naval combat. A setting of 10 is neutral. A setting of 5 doubles shots. A setting of 20 halves shots, etc. Note that it also scales naval combat supply costs. See Appendix I.
  5. **New Force Parameters:**
    - **Force Overextended Supply Threshold:** See section II, item 3. A default value of 0 will not use the Overextended feature. This is the location supply level below which a location is overextended instead of supplied.
    - **Force Naval Critical Hit Scalar:** A default value of 10 will make critical hits occur about 5% of the times that a ship’s armor is penetrated. See Appendix I.
    - **Force RFC Scalar:** A default value of 10 can be lowered (making RFCs harder to obtain), or increased (to make them easier to obtain).
  6. **Saving as 3.4 or 3.2 files:** 3.5 files can be quite large, due to the new parameter limits. If your design doesn’t require those new limits or any other 3.5 design features, you may want to save it as a 3.4 or even a 3.2 file. To save as 3.4, use the F8 key. To save as 3.2, use the <shift>F8 key. Such files will still run under 3.5 and use all 3.5 game features.
  7. Scenario-specific Equipment.eqp and Equipment.nqp file values are now incorporated into the .sce, .sal, and .pbm files, eliminating the need for players to match up those files with the scenario. As usual, folder priority determines which such files are selected for inclusion. Note that this means that designers no longer need to provide modified eqp or nqp files for their scenarios. They will play just fine without them. On the other hand, they can’t be modified in the Editor without them. Therefore the F11 key in the Editor will regenerate those files to the main folder in the event that end-users lack them.

8. Designers can “preset” any Advanced Rules Game Parameters for their scenarios. Players will be notified of such presets via button colors on the Game Parameters dialog. Players will still be able to override the designer’s suggestions, though.
9. There is now a Built-in Equipment Editor. It functions about the same as the old BioEd (user created software) used to. Edits are saved in an .eqp file, for later inclusion into the designer’s scenario.

#### **IX. USER INTERFACE ENHANCEMENTS:**

1. Arrow Buttons on Combat Planner Dialog have now restored 3.2 operation. These buttons now again sequence through planned combats only. <Shift> + button will revert to the 3.4 operation – sequence through all potential combats.
2. 3D Supply View has been improved.
3. Advanced Rules - Trusted PBEM: If selected on the Advance Rules Page 1, such PBEM games can export an XML file for loading into the editor and can use PO Assist.
4. You can resume a PBEM game by dragging the .PBL file to the TOAW screen icon.
5. TOAW\_log.txt now includes naval combat checks.
6. Disbanding a unit now causes the next unit in the Formation to become the current unit.
7. Combat dialog now redraws the screen upon exit.
8. Equipment parameters dialog now includes Armor, Durability, Accuracy, Agility, and Speed (in both km/week and knots) for naval equipment and Shell Weight for ranged equipment.
9. The Combat Losses Reports now have a column for naval damage. This is the cumulative damage inflicted on the class of naval equipment on each row (if any) during the combat. Note that the totals include the damage inflicted on ships that have sunk.
10. Unsupplied units now have their health indicator light replaced with a black square for easier identification.
11. Expanding text font size will now expand sizes of dialogs and their components.
12. Dialogs now have scroll bars if necessary.
13. Many dialogs are now sortable. (OOB, Inventory, Expected Reinforcements, Recent Reinforcements, Air Unit Report, Loss Report).
14. Turn ending report on why the turn ended.
15. The Force Editor has been partially redesigned with its features delegated into the OOB, Unit Report, and Formation Report. This will be completed in a subsequent update.
16. New map and interface artwork.
17. Additional zoom levels between the old zoom levels.
18. New organization and buttons for the Control Panel, including buttons for OOB, Air Unit Report, and Theater Options.
19. Option to hide various Control Panel features – showing more of the map.
20. Combat Report review: Combat reports are now saved in the pbm and sal files – making them reviewable during current and enemy player-turns via a new dialog.
21. Option to show the aggregate strength value of a stack.
22. Planned Combats Report added – shows all planned combats and their various parameters, including start round, cooperation level, friendly and enemy strengths.
23. More info on the Situation Report.
24. Better organized Combat Report that clearly shows how units participated and how long the combat lasted.
25. Upper right window can be toggled between Unit Panel and Group Composition.
26. Fonts settable within game rather than via the .ini file.
27. More parameters settable via the Advanced Rules panel rather than via the .ini file.
28. Persistent (always shown) Air Superiority display.
29. Jump Map: Micromap-scale map dialog that shows the entire game map (or as much as will fit on the screen).
30. Option to use the Matrix online PBEM system.
31. The PO Assist feature has been enhanced to be easier to use:

- a. List of Formations similar to the current OOB list (but listing formations instead of units and showing General Orders) to ease players' control choices.
  - b. Map indicator of PO control when in PO Mode – Color bar over numbers via new color added to the Numbers.bmp.
  - c. Simplified the choice between PO and Human control of a formation: If PO controlled, Orders are as per designer's initial settings.
  - d. Double-click on any unit of a formation while in PO Mode toggles between the two control choices. (Not finished yet).
  - e. Objectives made dragable. (finished in 4.0.2.21).
32. Added additional display options for the unit numbers beside just AP and DF. These are set in the Counter Values Dialog (accessed via the Player Options dialog):



The strength options are available via a pop-up menu:

Anti-Armor	Minor Fording	Stack Anti-Armor	Stack Minor Fording
Anti-Personnel	Major Fording	Stack Anti-Personnel	Stack Major Fording
AA High	Attack	Stack AA High	Stack Attack
AA Low	AA All	Stack AA Low	Stack AA All
Defense	Airmobile Lift	Stack Defense	Stack Airmobile Lift
Armor Defense	Support	Stack Armor Defense	Stack Support
Bombard	Traffic Control	Stack Bombard	Stack Traffic Control
Reconnaissance	Anti-Fortification	Stack Reconnaissance	Stack Anti-Fortification
Engineering	Bombardment Defense	Stack Engineering	Stack Bombardment Defense
Rail Repair	Nuclear	Stack Rail Repair	Stack Nuclear
AA Intercept	Defending Terrain Check	Stack AA Intercept	Stack Defending Terrain Check

Items appended by “Stack” are the values for the entire stack in the hex.

#### **X. BUG FIXES:**

1. Small 2D map view unit color display problem fixed.
2. Helicopter units now show strengths during the friendly turn in all hexes.
3. Map Image function no longer clips the top of the map.
4. Nuclear Flag now works on ships.
5. Improved Combat Retreat AI.
6. Improved Naval rebuilt-unit arrival hex logic – speeds up interturn replacement calculations in scenarios with a lot of deep water.
7. Map image now omits placenames from the image if they are turned off on the map when the image is made.
8. A problem with attack value in the Force Editor has been fixed.
9. Riverine reinforcements can now arrive in Major River hexes.
10. Air units set to AS now gain proficiency from combat experience.
11. Carrier units moving through other carrier units no longer steal air units.
12. 0 AP air units can now be assigned to combat missions provided their AT or Anti-Naval is non-zero.

Be sure to check out the six appendices at the end of the document.

## APPENDIX ONE: NAVAL COMBAT PROCEDURE

### I. FIRST, DETERMINE THE TARGET SHIP'S DURABILITY, ARMOR, AND AGILITY FACTORS.

Use the equipment's (not unit icon) naval flag as follows:

#### For Carrier Naval:

$$\text{Durability} = 0.2251 \times DF$$

$$\text{Armor} = 0.203395 \times DF$$

$$\text{Agility} = 93 \times (1 - \text{damage}\%)$$

#### For Heavy Naval:

$$\text{Durability} = 0.159445 \times DF$$

$$\text{Armor} = 0.334704 \times DF$$

$$\text{Agility} = 75 \times (1 - \text{damage}\%)$$

#### For Medium Naval:

$$\text{Durability} = 0.114241 \times DF$$

$$\text{Armor} = 0.248594 \times DF$$

$$\text{Agility} = 160 \times (1 - \text{damage}\%)$$

#### For Light or Riverine Naval:

$$\text{Durability} = 0.082939 \times DF$$

$$\text{Armor} = 0.051987 \times DF$$

$$\text{Agility} = 210 \times (1 - \text{damage}\%)$$

#### For Embarked Units:

$$\text{Durability} = 25$$

$$\text{Armor} = 0$$

$$\text{Agility} = 18$$

However, these values are superceded by any explicit values the designer may have coded for the ship class in the scenario's **Equipment.nqp** file.

If the ship is in port, divide Agility by 2.

Note that if the attacker is a ship, then its durability will have to be determined too, for the second hit check, below.

### II. NEXT, DETERMINE THE NUMBER OF SHOTS/ATTACKING PLANES.

Note that this is where the Naval Attrition Divider is applied – scaling the number of shots.

$$\text{Number of attacking planes} = \text{Assigned} \times (2 \times \text{Proficiency} + \text{Readiness} + \text{Supply}) / 4 / (\text{Naval Attrition Divider}/10)$$

Fractions from this are evaluated as the percent chance of one more plane. Each resulting plane attacks individually and is evaluated for hit/miss, penetration/damage individually. This is done for each type of plane in the unit.

$$\text{Number of shots per attacking coastal battery} = (102.922 \times \text{Gun's Anti-Naval Value} \times \text{Assigned} \times ((2 \times \text{Proficiency} + \text{Readiness} + \text{Supply}) / 4) / \text{Shell Weight}) / (\text{Naval Attrition Divider}/10)$$

Fractions from this are evaluated as the percent chance of one more shot. Each resulting individual shot is

evaluated for hit/miss, penetration/damage individually. This is done for each type of gun in the unit.

*Number of shots from each attacking ship TO&E line = ((#Ships-Damage%) x 102.922 x Ship's Anti-Naval Value x ((2 x Proficiency + Readiness + Supply) / 4) / Shell Weight) / (Naval Attrition Divider/10)*

Fractions from this are evaluated as the percent chance of one more shot. Each individual shot resulting is evaluated for hit/miss, penetration/damage individually. Note that the formula evaluates as 10 salvos.

### **III. NEXT, FOR EACH INDIVIDUAL ATTACKING AIRPLANE OR EACH SHOT FROM EACH GUN OF EACH SHIP/COASTAL BATTERY, DETERMINE IF A HIT OCCURS.**

There are two checks:

First hit check passes if:

*Attacking Unit Proficiency x Attacker Shock Level > Random (Target Ship Agility Rating) x Defender Shock Level*

Note that this is where shock, for both sides, is applied.

Second hit check for airplanes passes if:

*Attacking plane's Anti-Naval Value x Visibility > Random (Target Ship Agility Rating) x Defender Shock Level*

There is an exception for torpedo bombers (any plane with the Torpedo flag), where the Anti-Naval Value is divided by 4 first.

Visibility is a value based upon the combination of weather x lighting: clear/hazy/overcast x day/mixed/night. Clear is 1, hazy is .66, and overcast is .33. Day is 1, mixed is .66, and night is .33. Note that the square root of this product is used for surface naval combat. Weather value is the average of the target hex and attacker hex values.

Second hit check for guns (including surface ships) passes if:

*100 x SQRT(Visibility) / ((1 + (0.002 + .13 / Attacking Ship's Durability) x Range x Range) > Random (100)*

Here is where the Attacking Ship's Durability will be needed. For Coastal Guns, a value of 100,000 is used for durability. Note that the actual parameter used is the Accuracy – but this is identical to the Durability though, unless the designer has specified a different value in the .nqp file. See the curve below for how this equation plots out.

Note that Range is the number of hexes between the attacker and defender – not including their hexes – times the hex scale in kms. So adjacent combat would be point-blank range (=0). However, in that adjacent case, there is a random check as follows:

*Range = random (minimum (max range of all units involved, hexscale/2)*

This is only determined once per naval unit per combat round.

Both checks must pass for a hit to occur.

### **IV. NEXT, DETERMINE THE DAMAGE ANY HIT MAY HAVE CAUSED.**

If a hit occurred, it causes 1 damage point if:

*(Attacking Weapon's Shell Weight > Random (Defending Ship's Durability / 10)) AND (Target ship's damage < 20)*

(This is intended to be automatic unless the shell weight is trivially small. But note that there is a limit to the damage that can be inflicted by such superficial hits: 5 max for Heavy Naval, 10 max for Medium Naval, 15 max for Carrier Naval, and 20 max for all others.)

Then, it must be determined if the hit penetrated the ship's armor and what additional damage it may have caused:

Penetration occurs if:

*Random (Attacking Weapon's Shell Weight / 2) > Random (Defending Ship's Armor Value)*

If this check passes:

*Additional damage points = Random (Attacking Weapon's Shell Weight / 10) x Random (50) / Defending Ship's Durability Value*

There is an exception for torpedo Bombers, whose Shell Weight is quadrupled for the above checks. (So, there is a /4 effect for the hit check, followed by a x4 effect for the damage – harder to hit with a torpedo, but if you do...the damage is underwater, making it much more severe).

There is then a chance that the additional damage is a critical hit:

*5% x (Attacker Shell Weight / (Defender Durability \* 6.25)) \* (Defender Force Critical Hit Scalar / 10)*

Note that there is a new Force parameter for scaling the chance of critical hits as the designer desires. Also note that if the shell weight is the same as the weighted durability and the scalar is left at the default value of 10, then the equation reduces to a 5% chance.

If a critical hit occurs, additional damage is incurred due to the target ship's magazine detonating. This additional damage is:

*The result of a normal distribution centered at 50 with a standard deviation of about 13.5.*

So, it will average about 50 additional damage, +/- a little.

## **V. FINALLY, DETERMINE WHAT DEFENDING EQUIPMENT HAS BEEN DESTROYED.**

A ship that accumulates 100 or more damage points sinks (goes to the dead pile). If the ship has accumulated less than 100 damage points, that value is stored in the ship's TO&E line, and affects a number of ship abilities. If that line has more than one ship in it, only the "lead" ship has accumulated that damage and is affected by it.

If an embarked unit suffers damage points, a randomly selected weight of equipment equal to those points is destroyed as follows. Each TO&E item in the embarked unit loses:

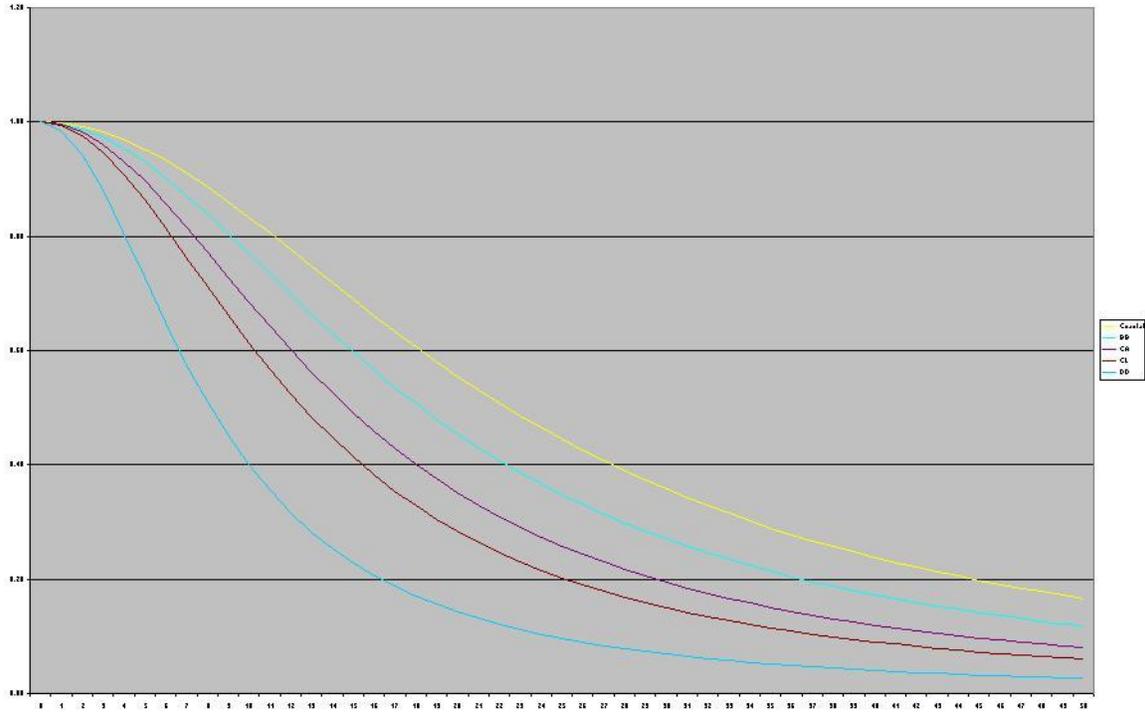
*Assigned x damage accumulated / Unit Weight*

Fractions of this are evaluated as the chance of one more kill.

If an aircraft carrier suffers more than 66 damage points it ceases to function as an aircraft carrier. This will cause an air unit to be eliminated if there are then more air units in the hex than aircraft carrier bases.

The air unit to be eliminated is selected randomly. Otherwise, the planes on the carrier are not targeted or included in target calculations. (But they do engage in AS combat).

The following curve shot shows how the gunnery range equation plots out for various Durability values:



The top curve is for a coastal gun. The next is for a 130-Durability BB. The next is for a 50-Durability CA. Then next is for a 30-Durability CL. And the last is for a 10-Durability DD. Vertical lines are every 20%; Horizontal range is out to 50 kms.

For example, at 30km, a coastal gun has a 36% hit chance, a BB has a 27% chance, a CA has a 19% chance, a CL has a 15% chance, and a DD has a 7% chance.

Note that these values assume a stationary target, a perfect crew, and perfect visibility. The agility of the target vs. the proficiency of the crew is tested in the first hit check, and the visibility factor scales these values.

Note that the square root of the visibility factor is used for gunnery. This is to account for the fact that gunnery enjoys better optics, radar, starshells, searchlights, etc. that planes normally don't have.

Just for the record, hazy/overcast is displayed by cloud type. Puffy clouds are overcast. Thin clouds are hazy. Precipitation doesn't matter.

## APPENDIX TWO: NAVAL REPAIR PROCEDURE

During the interturn calculation period, all damaged ships get the following checks for damage repair:

*IF the ship's unit is in a supplied anchorage hex AND it did not move in the previous turn THEN*

*# of damage points repaired =  $1500 / ((Durability + Armor + AP + AAA) \times \# \text{ of turns per week})$ .*

*Fractions of this are evaluated as the chance of one more point repaired.*

*ELSE*

*# of damage points repaired =  $150 / ((Durability + Armor + AP + AAA) \times \# \text{ of turns per week})$ .*

*Fractions of this are evaluated as the chance of one more point repaired*

AP and AAA values are the ship class's intrinsic values. They are not the damage-adjusted values.

Note that repair is 10x faster in port than at sea.

These figures will typically allow about the following weekly rates of repair in port:

Carrier – 5 points.

Battleship – 1 point.

Heavy Cruiser – 3 points.

Light Cruiser – 5 points.

Destroyer – 14 points.

Note that a true port repair simulation would require modeling port and shipyard capacities. But adding such features was beyond the scope of this update. The simplistic version above will have to do for now.

### APPENDIX THREE: SEA INTERDICTION PROCEDURE

Chance of surface interdiction per in-range surface interdictor:

$$\text{Target Value of Moving Unit or Stack} / \text{Target Value of all detected in-range Units.}$$

Note that if the moving stack is the only one detected, then the chance of interdiction is 100%. Also, if there are 100 friendly ships and 100 enemy ships in spotting range, the chance of interdiction will be 1% per ship, averaging 1 interdiction per moving enemy ship - it pairs off both side's ships (on average).

Chance of air interdiction per in-range air interdictor:

$$\text{Target Value of moving Unit or Stack} * (\text{Naval Attrition Divider} / 10) / \text{Target Value of all detected in-range Units} / (\text{interdictor's spotting range} / 2).$$

This will tend to limit air interdiction to no more than once or twice as the fleet passes through its scouting range. The point is to limit planes to realistic mission rates. There is an exception for carrier movement, though. If the moving carrier hasn't been attacked in the turn, it is automatically interdicted in the first detected in-range hex it enters. (Who gets the first shot really matters in carrier-vs.-carrier combat.)

Both of these formulae pose a tactic for the phasing player: bring the entire fleet to be moved through the interdictor's range into its detection before moving through. The more in-range targets detected the less interdiction there will be per individual move.

## APPENDIX FOUR: NAVAL SPOTTING PROCEDURE

First, understand the necessity for this feature: Naval units, unlike ground units, can't hide – due to their great size – and operate in a terrain that has no cover. They have to be handled separately from ground units for recon purposes. Within the limit of the horizon, subject to visibility, they should be detected.

### I. Surface Recon:

This models the observation of the seas from the coastline or from the conning towers of ships.

The daytime observation range is **25km** and the nighttime observation range is **10km**. Whenever a land unit moves into a coastal hex, it reveals Deep-Water hexes out to the appropriate range – just as if it had entered a peak hex. And note that, like for peak hexes, if the observer is under a cloud, it can't observe. As a naval unit moves, it reveals Deep-Water hexes around it out to the appropriate range – just as if it had entered a peak hex (same comment about clouds).

The range of hexes revealed at the various hex scales is, therefore, as follows:

Hexscale	Day	Night
2.5km	11	5
5km	6	3
10km	3	2
15km	2	1
20km	2	1
25km	2	1
50km	1	1

A range of 1 means only adjacent hexes are revealed.

Note that the range to the target doesn't include the firing or target hexes. That's why there may seem to be an extra hex included in some of the above. For example, eleven 2.5km hexes out from an observing naval unit would be a target naval unit that was ten 2.5km hexes (25km) from that observing naval unit.

Note that radar is modeled as well: Any ship with the "All Weather" flag set will see out to **50km**, day or night. Furthermore, if a force has any aircraft on map with the "All Weather" flag set, then all ships are assumed to have radar and see accordingly.

### II. Air Recon:

This models the observation of the seas by air units committed to sea operations. That includes ground-based air units assigned to Sea Interdiction or Air Superiority and Carrier-based air units assigned to Sea Interdiction or Air Superiority.

The range that can be fully searched for a given number of planes =

*Minimum (50Km x Square Root (# planes available for search), max range of planes)*

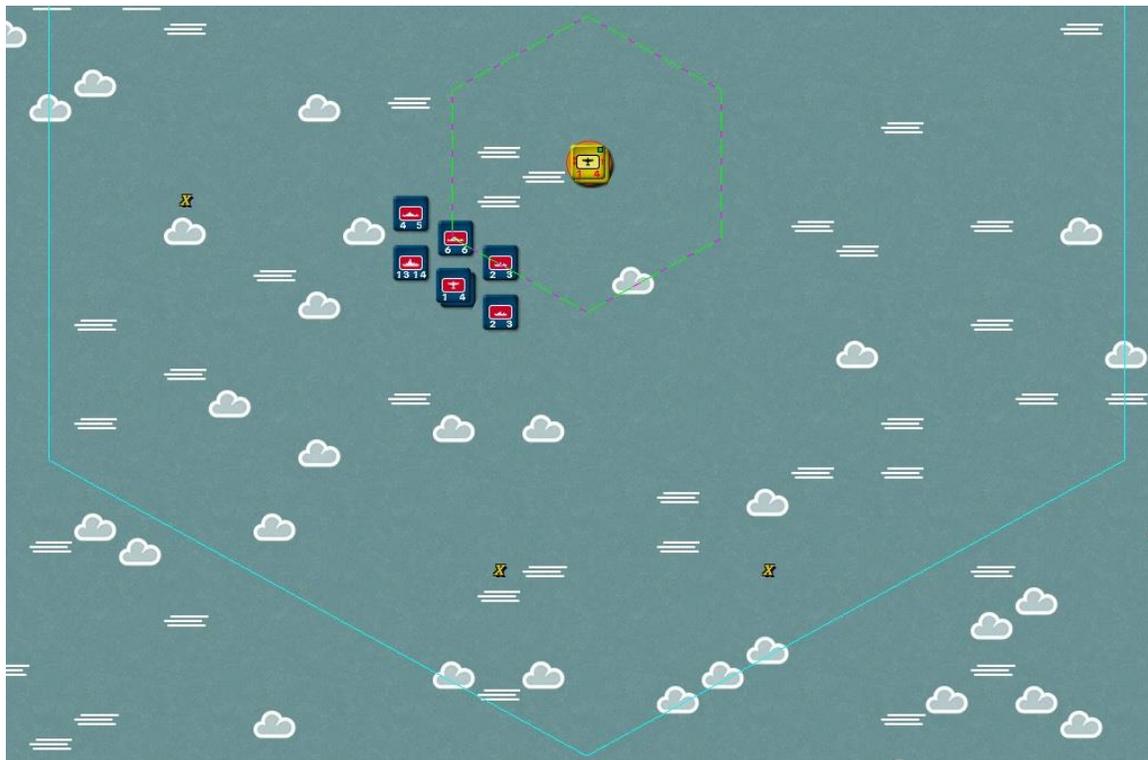
Fractions of this are evaluated as the chance of one more hex in the range.

So, for example, if the total ready planes/2 assigned to Sea Interdiction/Air Superiority in a hex total 9, then the max range that can be searched will be 150km. If the planes had an assigned range of 200, then the range of 150 will be substituted for it for search purposes. If the planes had an assigned range of 100, then 100 will, of course, still be used instead. Note that the "max range of planes" is the average max range of all the planes in the hex.

So, for 2.5km hexes, that 150km range would be 60 hexes. For 5km, 30 hexes. For 10km, 15 hexes, for 15km, 10 hexes. For 20km, 8 hexes. For 25km, 6 hexes. For 50km, 3 hexes. Within these ranges, all enemy Deep-Water hexes would be spotted.

Note that the **number of planes available for search = Assigned x readiness / 2**. So, if the hex had 75% readiness they would have needed 24 planes in it to have 9 planes available to search. Also note that only all-weather aircraft can search at night.

Note that there is now a crop circle designed to show naval spotting range (since this can be less than the nominal range of the aircraft onboard the carrier). It is distinguished by a dashed line as shown here:

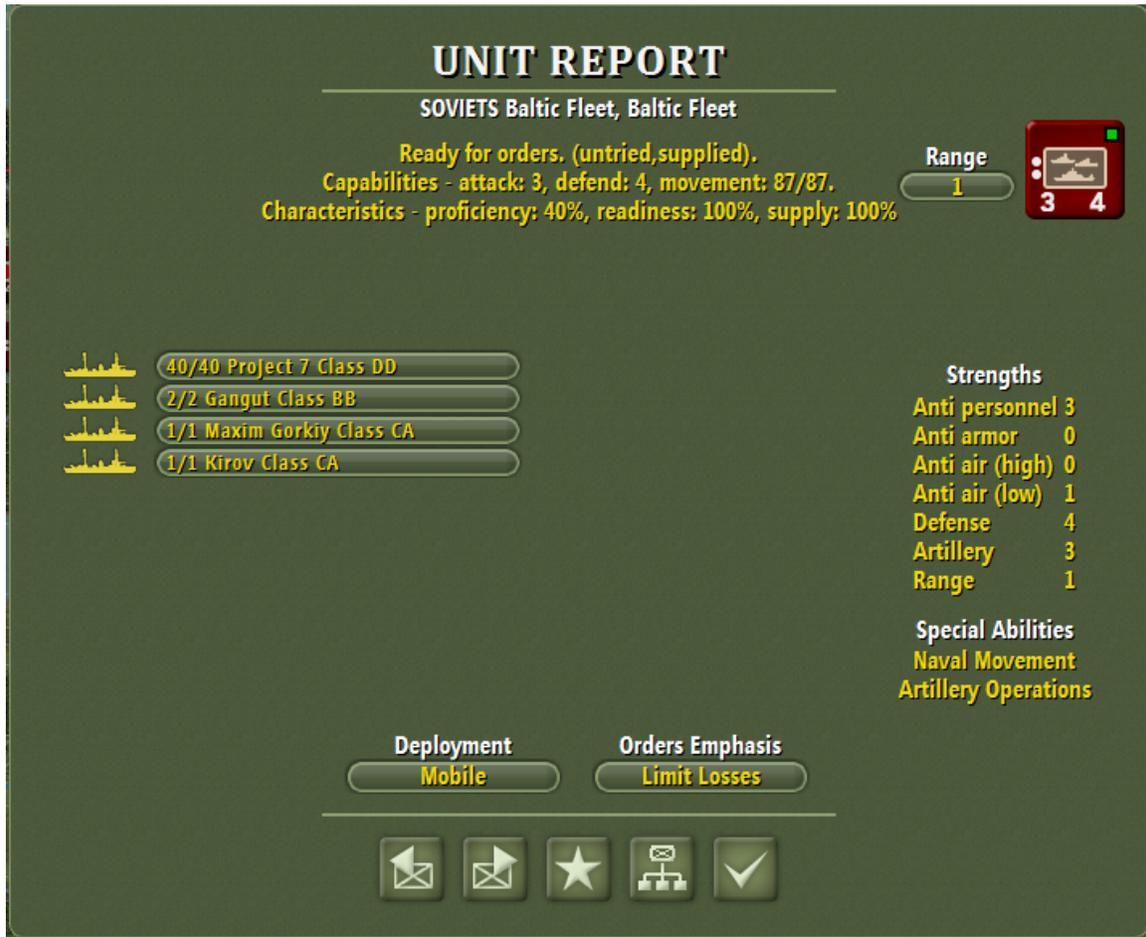


Note that in the above case, the carrier spots out to three hexes (150km). But the planes on the carrier have ranges of 12 (600km). So the dashed line is critical for players to know how far their carriers can see.

Note that if the range was extended one hex by chance evaluation of any fractional value, that extra hex is not reflected in the circle. So, players will not know if they got the extra hex or not – adding a little risk to carrier recon. This is true for non-phasing and phasing unit's ranges. The phasing unit's range varies randomly with each hex entered.

Note that hazy and overcast locations affect the chances of spotting. If the weather is in the phasing unit's hex, it affects all the unknown hexes in range of the unit. If in the target unit's hex, it only affects the chances of detecting that specific hex. Hazy locations reduce spotting chances by 15%. Overcast locations reduce it by 30%.

## APPENDIX FIVE: SPLITTING TO&E LINES



Here's a shot of the Baltic Fleet from "Soviet Union 1941". Note the 40 DDs on one TO&E line and the 2 BBs on one other TO&E line. Since there is only one damage value stored per TO&E line, only one ship per line can incur and store damage as this unit is configured. Clearly, it would be better to have an individual line for each ship in the unit, if possible. But the TOAW Editor does not support that. There is no way to split up the 40 DDs or the 2 BBs within the TOAW Editor. However, you can do it from within an XML editor.

The first step is to dump the OOB as an XML file. With the Force Editor Dialog open, hit F4. Save the OOB file.

The second step is to open that OOB file in an XML editor (for example: XMLPad).

Then, find the fleet unit in the file.

Then, edit each equipment line – editing, copying and pasting as needed – until the equipment lines have been split up as desired.

Save the edited OOB file.

The following shot shows a possible such edit of the fleet shown above:

```
10897 <OBJECTIVES TRACK="4"/>
10898 <OBJECTIVES TRACK="5"/>
10899 <UNIT ID="216" NAME="Baltic Fleet" ICON="Naval Task Force" COLOR="20" SIZE="Regiment" EXPERIENCE="untri
10900 <EQUIPMENT ID="1" NAME="Gangut Class BB" NUMBER="1" MAX="1"/>
10901 <EQUIPMENT ID="2" NAME="Gangut Class BB" NUMBER="1" MAX="1"/>
10902 <EQUIPMENT ID="3" NAME="Maxim Gorkiy Class CA" NUMBER="1" MAX="1"/>
10903 <EQUIPMENT ID="4" NAME="Kirov Class CA" NUMBER="1" MAX="1"/>
10904 <EQUIPMENT ID="5" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10905 <EQUIPMENT ID="6" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10906 <EQUIPMENT ID="7" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10907 <EQUIPMENT ID="8" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10908 <EQUIPMENT ID="9" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10909 <EQUIPMENT ID="10" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10910 <EQUIPMENT ID="11" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10911 <EQUIPMENT ID="12" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10912 <EQUIPMENT ID="13" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10913 <EQUIPMENT ID="14" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10914 <EQUIPMENT ID="15" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10915 <EQUIPMENT ID="16" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10916 <EQUIPMENT ID="17" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10917 <EQUIPMENT ID="18" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10918 <EQUIPMENT ID="19" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10919 <EQUIPMENT ID="20" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10920 <EQUIPMENT ID="21" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10921 <EQUIPMENT ID="22" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10922 <EQUIPMENT ID="23" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10923 <EQUIPMENT ID="24" NAME="Project 7 Class DD" NUMBER="2" MAX="2"/>
10924 </UNIT>
10925 <UNIT ID="217" NAME="BF Manpower Levy" ICON="Marine Infantry" COLOR="91" SIZE="Regiment" EXPERIENCE="ur
10926 <EQUIPMENT ID="1" NAME="Rifle Squad" NUMBER="429" MAX="429"/>
10927 <EQUIPMENT ID="2" NAME="Light Rifle Squad" NUMBER="242" MAX="242"/>
10928 <EQUIPMENT ID="3" NAME="Rifle Squad (Fast)" NUMBER="338" MAX="338"/>
```

Note that there are now two lines for the BBs (one in each), and 20 lines for the DDs (two in each). Note that there is still a limit of 24 equipment slots per unit.

Now, again with the Force Editor Dialog open, hit F5 and upload the edited OOB file.

The following shot shows the resulting unit:

# UNIT REPORT

SOVIETS Baltic Fleet, Baltic Fleet

Ready for orders. (untested, overextended).  
 Capabilities - attack: 3, defend: 4, movement: 241/241.  
 Characteristics - proficiency: 40%, readiness: 100%, supply: 100%

Range

1



-  1/1 Gangut Class BB
-  1/1 Gangut Class BB
-  1/1 Maxim Gorkiy Class CA
-  1/1 Kirov Class CA
-  2/2 Project 7 Class DD
-  2/2 Project 7 Class DD
-  2/2 Project 7 Class DD
-  2/2 Project 7 Class DD
-  2/2 Project 7 Class DD
-  2/2 Project 7 Class DD
-  2/2 Project 7 Class DD
-  2/2 Project 7 Class DD
-  2/2 Project 7 Class DD
-  2/2 Project 7 Class DD

**Strengths**

- Anti personnel 3
- Anti armor 0
- Anti air (high) 0
- Anti air (low) 1
- Defense 4
- Artillery 3
- Range 1

**Special Abilities**

- Naval Movement
- Artillery Operations

Deployment

Mobile

Orders Emphasis

Limit Losses



```

44 <OBJECTIVES TRACK="2"/>
45 <OBJECTIVES TRACK="3"/>
46 <OBJECTIVES TRACK="4"/>
47 <OBJECTIVES TRACK="5"/>
48 <UNIT ID="1" NAME="BB" ICON="Heavy Naval" COLOR="0" SIZE="Regiment" EXPERIENCE="un
49 <EQUIPMENT ID="1" NAME="Battleship" NUMBER="1" MAX="1" DAMAGE="10"/>
50 <EQUIPMENT ID="2" NAME="Battleship" NUMBER="1" MAX="1" DAMAGE="0"/>
51 <EQUIPMENT ID="3" NAME="Heavy Cruiser" NUMBER="1" MAX="1" DAMAGE="30"/>
52 <EQUIPMENT ID="4" NAME="Destroyer" NUMBER="4" MAX="4" DAMAGE="50"/>
53 <EQUIPMENT ID="5" NAME="Destroyer" NUMBER="1" MAX="1" DAMAGE="70"/>
54 <EQUIPMENT ID="6" NAME="Destroyer" NUMBER="1" MAX="1" DAMAGE="0"/>
55 <EQUIPMENT ID="7" NAME="Destroyer" NUMBER="1" MAX="1" DAMAGE="18"/>
56 <EQUIPMENT ID="8" NAME="Destroyer" NUMBER="1" MAX="1" DAMAGE="3"/>
57 </UNIT>
58 <UNIT ID="2" NAME="CA" ICON="Medium Naval" COLOR="0" SIZE="Battalion" EXPERIENCE="
59 <EQUIPMENT ID="1" NAME="Heavy Cruiser" NUMBER="1" MAX="1" DAMAGE="30"/>
60 </UNIT>
61 <UNIT ID="3" NAME="DDs" ICON="Light Naval" COLOR="0" SIZE="Regiment" EXPERIENCE="u
62 <EQUIPMENT ID="1" NAME="Destroyer" NUMBER="4" MAX="4" DAMAGE="50"/>
63 </UNIT>

```

Designers may also want to “pre-set” damage on some ships. Again, this is not supported within the TOAW Editor, but can be done via an XML editor. The above shot shows how to add damage values to ship TO&E lines. The key word DAMAGE is added to the line and the damage value is put in quotes.

## APPENDIX SIX: THE EQUIPMENT.NQP FILE

The Equipment.nqp file allows designers to edit the naval scale factors of the base naval equipment flag classes. It also allows designers to explicitly specify the naval parameters for individual ship classes. Here's how:

```
01 <ACOW_EXE>
02 <NAVAL>
03 <RIVERINE DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=4200 />
04 <LIGHT DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=4200 />
05 <MEDIUM DURABILITY=114241 ARMOR=248594 AGILITY=160 ACCURACY=114241 SPEED=4200 />
06 <HEAVY DURABILITY=159445 ARMOR=334704 AGILITY=75 ACCURACY=159445 SPEED=4200 />
07 <CARRIER DURABILITY=225100 ARMOR=203395 AGILITY=93 ACCURACY=225100 SPEED=4200 />
08 <EMBARKED DURABILITY=20000000 ARMOR=0 AGILITY=18 ACCURACY=20000000 SPEED=4200 />
09 <Equipment6 DURABILITY=0 ARMOR=0 AGILITY=0 ACCURACY=0 SPEED=0 />
10 </NAVAL>
11 </ACOW_EXE>
12
13
```

The vanilla version of the Equipment.nqp file is shown above – displayed in XMLPad. It can be found in the Altgraphics sub-folder. Note that there are seven lines of data. The first six lines specify the scale factors used for the various naval equipment flags, and embarked units. These values are used if the designer has not specified explicit values for these in a scenario specific version of this file (this will be discussed further down). Durability, Armor, and Accuracy factors are scaled by a factor of 1,000,000. (These numbers are the same as the ones in the first step of Appendix One.)

Note that all speed values for these six lines are the same as the original nominal MPs for naval and embarked units (4200km/week). This speed is equivalent to about 13.5 knots. That's fine for the ships used to embark land units, but naval units will usually be faster. An alternate version of the file is also available in the Altgraphics sub-folder. It is shown here:

```
01 <ACOW_EXE>
02 <NAVAL>
03 <RIVERINE DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=4200 />
04 <LIGHT DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=10890 />
05 <MEDIUM DURABILITY=114241 ARMOR=248594 AGILITY=160 ACCURACY=114241 SPEED=9956 />
06 <HEAVY DURABILITY=159445 ARMOR=334704 AGILITY=75 ACCURACY=159445 SPEED=7778 />
07 <CARRIER DURABILITY=225100 ARMOR=203395 AGILITY=93 ACCURACY=225100 SPEED=9334 />
08 <EMBARKED DURABILITY=20000000 ARMOR=0 AGILITY=18 ACCURACY=20000000 SPEED=4200 />
09 <Equipment6 DURABILITY=0 ARMOR=0 AGILITY=0 ACCURACY=0 SPEED=0 />
10 </NAVAL>
11 </ACOW_EXE>
12
13
```

Now Light Naval has a speed equivalent to 35 knots, Medium Naval has a speed equivalent to 32 knots, Heavy Naval has a speed equivalent to 25 knots, and Carrier Naval has a speed equivalent to 30 knots. If this .nqp file is opened in the Altgraphics sub-folder, these speeds will be applied to these naval classes in scenarios that have not been designer edited. Players can decide for themselves which of the two .nqp file choices they wish to have open in that folder. Copies of each are in their own zip files within that folder.

However, designers can make a scenario specific version of the .nqp file for their individual scenarios. Note the seventh line (“Equipment6”) in the above shots. While not used in the above versions, that line (and up to 100 copies of it) can be used to explicitly specify the values for an individual naval equipment item (the item must have a naval flag set). The file just needs to be in the scenario-specific graphics folder,

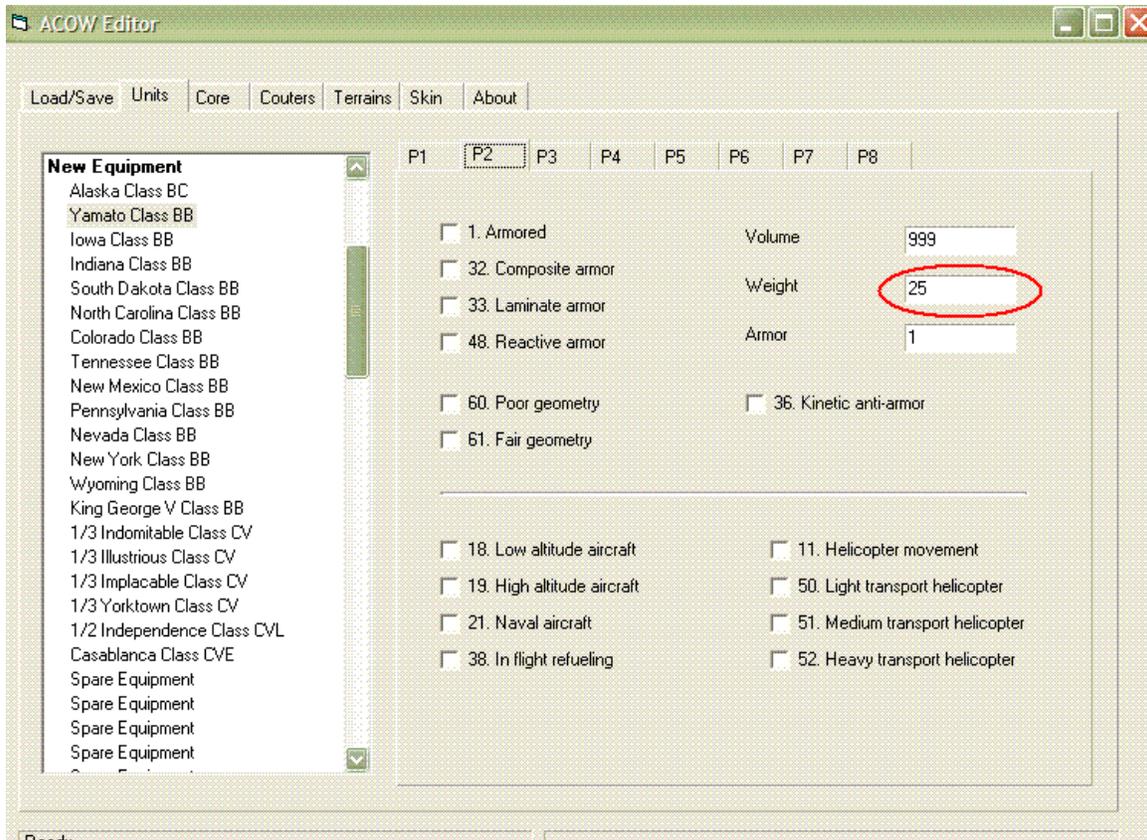
like the scenario's scenario-specific Equipment.eqp file. It follows folder hierarchy rules just like that earlier file. The following section will illustrate the format for such a scenario-specific .nqp file.

```
02 <NAVAL>
03 <RIVERINE DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=4200 />
04 <LIGHT DURABILITY=082939 ARMOR=051987 AGILITY=210 ACCURACY=082939 SPEED=4200 />
05 <MEDIUM DURABILITY=114241 ARMOR=248594 AGILITY=160 ACCURACY=114241 SPEED=4200 />
06 <HEAVY DURABILITY=159445 ARMOR=334704 AGILITY=75 ACCURACY=159445 SPEED=4200 />
07 <CARRIER DURABILITY=225100 ARMOR=203395 AGILITY=93 ACCURACY=225100 SPEED=4200 />
08 <EMBARKED DURABILITY=20000000 ARMOR=0 AGILITY=18 ACCURACY=20000000 SPEED=4200 />
09 <Yugumo DURABILITY=11 ARMOR=4 AGILITY=210 ACCURACY=11 SPEED=10890 />
10 <Fletcher DURABILITY=12 ARMOR=13 AGILITY=228 ACCURACY=12 SPEED=11823 />
11 <S-Class DURABILITY=9 ARMOR=5 AGILITY=210 ACCURACY=9 SPEED=10890 />
12 <Cleveland DURABILITY=45 ARMOR=122 AGILITY=165 ACCURACY=45 SPEED=10267 />
13 <Brooklyn DURABILITY=40 ARMOR=127 AGILITY=165 ACCURACY=40 SPEED=10267 />
14 <Agano DURABILITY=27 ARMOR=45 AGILITY=175 ACCURACY=27 SPEED=10890 />
15 <Portland DURABILITY=40 ARMOR=63 AGILITY=160 ACCURACY=40 SPEED=9956 />
16 <NewOrleans DURABILITY=40 ARMOR=114 AGILITY=160 ACCURACY=40 SPEED=9956 />
17 <Pensacola DURABILITY=35 ARMOR=47 AGILITY=160 ACCURACY=35 SPEED=9956 />
18 <Northampton DURABILITY=35 ARMOR=54 AGILITY=160 ACCURACY=35 SPEED=9956 />
19 <Baltimore DURABILITY=55 ARMOR=136 AGILITY=165 ACCURACY=55 SPEED=10267 />
20 <Essex DURABILITY=36 ARMOR=67 AGILITY=99 ACCURACY=108 SPEED=10267 />
21 <Atlanta DURABILITY=28 ARMOR=68 AGILITY=165 ACCURACY=28 SPEED=10267 />
22 <Oakland DURABILITY=28 ARMOR=68 AGILITY=165 ACCURACY=28 SPEED=10267 />
23 <Dido DURABILITY=22 ARMOR=53 AGILITY=160 ACCURACY=22 SPEED=9956 />
24 <Swiftsure DURABILITY=34 ARMOR=73 AGILITY=160 ACCURACY=34 SPEED=9956 />
25 <Fiji DURABILITY=34 ARMOR=73 AGILITY=160 ACCURACY=34 SPEED=9956 />
26 <Leander DURABILITY=28 ARMOR=66 AGILITY=165 ACCURACY=28 SPEED=10267 />
27 <Alaska DURABILITY=120 ARMOR=213 AGILITY=99 ACCURACY=120 SPEED=10267 />
28 <Yamato DURABILITY=265 ARMOR=401 AGILITY=81 ACCURACY=265 SPEED=8401 />
29 <Iowa DURABILITY=190 ARMOR=317 AGILITY=99 ACCURACY=190 SPEED=10267 />
30 <Indiana DURABILITY=150 ARMOR=307 AGILITY=84 ACCURACY=150 SPEED=8712 />
31 <SouthDakota DURABILITY=150 ARMOR=307 AGILITY=84 ACCURACY=150 SPEED=8712 />
32 <NorthCarolina DURABILITY=140 ARMOR=297 AGILITY=84 ACCURACY=140 SPEED=8712 />
33 <Colorado DURABILITY=135 ARMOR=303 AGILITY=69 ACCURACY=135 SPEED=6534 />
```

Shown above is part of the Okinawa 1945 v.3.0.nqp file. Note that the “Equipment6” line has been replaced by a suite of lines explicitly specifying the various values for individual ship classes. The first six lines are unchanged. Note the format of the new lines: There is a name – for information purposes only (it is not required to resemble the ship class it relates to, but it helps the designer keep things straight). Next, the Durability, Armor, Agility, Accuracy, and Speed values (not scale factors like in the first six lines) are explicitly specified.

So, the Yamato has a durability of 265, armor of 401, Agility of 81, Accuracy of 265, and Speed of 8401 km/week (27 knots). Note that the Accuracy is the same as the Durability. This is typical. Note that the larger the Durability value the more accurate the ship is. The theory is that the bigger and heavier a ship the better a gun platform it is. The only case shown where Durability is different from Accuracy is for the Essex. To allow three air groups on it, that Fleet Carrier has been split into three parts. So, each part has 1/3 the durability of the whole, but the Accuracy is based upon the whole, so is three times the size of the Durability. So, the main purpose of the Accuracy parameter is to facilitate component ship modeling.

But, how do you link the new lines with the equipment items in the original Equipment.eqp file? Answer: you use the “Weight” parameter. Since that had never been used by naval equipment, the .nqp file now uses it to index the equipment to its proper line in the .nqp file. For example, the Yamato's data is on line 25 of the .nqp file, so its “Weight” parameter must be set to 25. This can be done using the BioEd as shown:



Note that the new lines start numbering from 6 (the first six lines are 0 through 5) and increment from there. If the Weight is left at 0, then the values are calculated from the ship's Defense Strength using the scale factors in the first six lines of the .nqp file.

The data used for the explicit values came, in this case, from War in the Pacific. Designers can use their own sources, of course – including the web. This subject has been extensively discussed on the TOAW board. Designers needing help can seek it there if they wish.

Note that the first six lines will still affect any ship class that has its weight value left at zero. Designers may want to customize those values for that reason. In particular, designers can customize the parameters for embarked units via the sixth line.

Note that the agility factors used were based upon Pacific War evasion ratings. Those ratings used the following formulae:

- For Carrier or Battleship: 3 x speed.
- For Cruiser: 5 x speed.
- For Destroyer: 6 x speed.
- For Transport: 1 x speed.

## APPENDIX SEVEN: MANUAL ERRATA

### 2. Introduction: (Fourth paragraph):

The Operational Art of War is flexible enough to represent units ranging in size and organizational complexity from a few vehicles to an entire corps. Map and time scales are flexible, with maps ranging from 0.25km to 200km per map location (arranged in an invisible hexagonal grid) and Game Turns ranging from one hour to a full year. Air, land, and sea action are modeled, but the emphasis is on land and sea campaigns so air forces are not treated quite as concretely as land forces.

### 8.6.1 Formation Characteristics and Effects:

#### Formation Support Scope:

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

In the above, note that “basic icon” color may have been better described as the overall “counter” color, as “counter” may be more familiar to wargamers, and would reduce confusion over the above.

### 17.9.4 Event Effects:

Force 1 or 2 Guerrilla Capability: is set to a certain percentage. Value set is percentage chance per turn for Force 2 or 1 owned hexes to revert to Force 1 or 2 ownership.