FIRE ON THE WATERS

1. INTRODUCTION

1.1. "Fire on the Waters" is a naval warfare simulation portraying naval surface warfare in World War II. The simulation presents aspects of this warfare through a series of scenario sets.
1.2. Each scenario set also includes a scenario generator to create scenarios typical for the time and place that the set covers.
1.3. The game presents these battles on a tactical, ship-to-ship level. The game is for two sides: one controlling the Allied ships and one controlling the Axis ships. Ships are represented by cardboard counters or 1/6000 scale miniatures, with any 4' by 6' level surface serving as a playing area. Movement and combat are conducted in accordance with these rules of play.

2. GAME EQUIPMENT

2.1. <u>The Playing Area</u>. A level surface with dimensions of about four feet by six feet should be selected as a playing area. Players may wish to cover the area with a sheet of blue felt. This adds atmosphere and, more practically, keeps the playing counters or miniatures from shifting around. One inch on the playing surface equals 1,000 yards.
2.2. <u>Charts and Tables</u>. Various charts and tables are provided on separate sheets. Generally, these charts and tables are used in conjunction with dice to determine the results of actions taken by the players and the ships that they control.
2.3. <u>Playing Pieces</u>. The cardboard playing pieces (called "counters") should be punched out of the counter sheet and sorted by color and type. There are several types of counters:
    2.3.1. 1/2 by 3/4 inch ship counters, which have ship plan views on one side and triangles indicating direction of movement on the other;
    2.3.2. 3/4 inch by 2 inch force markers, used to mark the position of unseen ships;
    2.3.3. 1/2 by 3/4 inch torpedo markers showing the location from which torpedoes were launched and their direction;
    2.3.4. illumination counters of various types, showing illumination by searchlight, starshell and fire;
    2.3.5. counters showing potential torpedo hits,
    2.3.6. counters showing sinking ships;
    2.3.7. contact counters showing contact by radar or visual sighting; and
    2.3.8. smoke counters.
2.4. <u>Miniatures</u>. Alternatively, the game can be played with 1/6000 scale miniature ships. These should be placed on 1 inch bases for destroyers and smaller ships, 1.5 inch bases for cruisers and 1.8 inch or 2 inch bases for battlecruisers and battleships.
2.5. <u>Dice</u>. Five six-sided dice and two ten-sided dice are provided with the game. Six-sided dice are described in these rules as D6 (or as D36 if two are rolled and read as a two-digit number ranging from 11 through 66). Similarly, ten-sided dice are referred to as D10 or as D100 when rolled as percentile dice.
2.6. <u>Templates</u>. Five templates to be used to determine the arcs of weapons and the turning radii of ships.
2.7. <u>Other Equipment</u>. The players should also have a ruler and a tape measure graduated in inches. These will be used to measure ranges and to regulate movement. A protractor may also be helpful to measure angles.

3. SEQUENCE OF PLAY

3.1. <u>Setting up the Game</u>. The players should select or generate a scenario, allocate ship counters and place the counters on the playing surface as the scenario set-up instructions direct. Once placement is complete, play may begin.
3.2. <u>The Game-Turn</u>. The game is played in a series of sequential game-turns, each composed of sequential segments. Segments are always conducted in the order set out below. One game-turn equals four minutes of elapsed time.
3.3. <u>Game-Turn Segments</u>.
    3.3.1. Movement Plotting Segment -- For scenarios with a variable sighting base, the sighting base for the turn is rolled. Each player plots movement for his ships, designating any ships that will make smoke. Each player plots torpedo launches.
    3.3.2. Movement Segment -- Each player places new torpedo launch markers on the playing surface, moves his ships as plotted, , and considers whether torpedoes have intercepted their targets.
    3.3.3. Visual Search Segment -- Visual sighting distances for each side are determined and visual searches are conducted for each ship.
    3.3.4. Radar Search Segment -- radar searches are conducted for each ship with centimetric search radar.
    3.3.5. Illumination Segment -- ships illuminate sighted ships with searchlights or starshells.
    3.3.6. Gunfire Segment -- Players determine which of their ships will fire guns, and designate their targets. Players alternate doing this target ship by target ship, with the player with the most ships starting the process. The process continues until all ships firing have fired. *(Optionally, if the optional gunfire modifiers are used, players*

designate firing ships alternatively, then fire them once all targets are designated.)

3.3.7. Torpedo Segment -- Where torpedoes have intercepted their targets, players determine whether hits have resulted.

3.3.8. Damage Control Segment -- Each player secretly and simultaneously resolves attempts to repair damage to his ships.

3.3.9. Damage Segment -- Each player secretly and simultaneously determines damage caused by gunfire and torpedo hits on his ships during the turn.

3.4. *Half Turns. (Optional) Whenever opposing ships are at 5 inches range or closer, and at least one of the ships has sighted an opponent at that range, either player may declare that play will be resolved by half-moves. Each half move represents 2 minutes of elapsed time. The following rules apply to these half moves.*

3.4.1. *Half moves are numbered by decimals – either .0, to correspond to a move beginning at the same time as a whole move, or .5, to correspond to a move halfway through a whole move. For example, half move 12.0 is a half move corresponding to the start of whole move 12.*

3.4.2. *Ships and torpedoes move half of their movement allowance during a half move.*

3.4.3. *For ships with no opposing ships within 5 inches, the only .5 half move phases are movement phases.*

3.4.4. *Ships with opposing ships within 5 inches may also plot torpedo attacks, spot, illuminate, fire guns and take damage during any half move.*

3.4.5. *Ships firing guns in a half move when within 5 inches of an enemy ship have their gunfire subject to a –3 modifier.*

3.4.6. *Gunfire modifications for turning firers and targets are doubled during a half move. This doubling is accomplished by halving the degrees turned for the modifiers to apply.*

3.5. Range and Bearing Conventions.

3.5.1. If counters are used, ranges are measured from any part of one counter to any part of the other. Weapon bearings are measured from the center of the counter side.

3.5.2. If miniatures are used, ranges are measured from forward funnel to forward funnel but weapon bearings are checked from the forward stack of the firer (or center dot of a torpedo marker) to any part of the target ship.

4. MOVEMENT.

4.1. Divisions. Ships generally move in groups called "divisions." For historical scenarios, the composition of these divisions is set by scenario rule. For generated scenarios, players use the following rules to form divisions themselves.

4.1.1. For Japanese forces, all destroyers and light cruisers are divided into divisions of three or more ships. No division may have more than one light cruiser. All larger ship are organized into divisions of two to four ships.

4.1.2. The organization of all other forces depends upon the number of ships present and whether ships larger than destroyers are present. If larger ships are present and more than five ships are present in total, all cruisers are placed in one division and all battleships and battlecruisers in another. The destroyers are divided as equally as possible into two divisions. If only destroyers are present, they are divided into divisions of three or more ships.

4.1.3. Merchant ships usually move in a single unit called a convoy. It is a series of parallel columns of ships. A convoy may execute ship turns only.

4.1.4. Each division has a flagship. The flagship does not have to be the first ship in its division.

4.2. Movement Allowances. Each ship has a movement allowance expressed in the number of inches that the ship can move across the playing surface in 1 turn.

4.3. Acceleration Limits. Ships need not always move at their maximum speeds. However, they may be limited in their ability to increase their speeds in any 1 game-turn.

4.3.1. All destroyers may increase their speeds by 2 inches in any 1 game-turn.

4.3.2. All other ships may increase their speeds by 1 inch in any 1 game-turn.

4.4. Turn Radii. Various sizes of ships have differing turning radii, as noted on the turn guides provided with the game. A ship entitled to use a smaller radius may always elect to use a larger radius. In some cases, damage may force a ship to use a larger radius than usual.

4.5. Movement Plotting. All ship movement is plotted in the Plotting Segment. Movement plotting is usually done by divisions. Various maneuvers may be plotted.

4.5.1. Divisions may move straight ahead. A player plots straight-ahead movement simply by noting the number of inches moved.

4.5.2. All ships of a division may turn simultaneously in the same direction. This is called a "ships turn." A player may plot a ships turn by writing a letter indicating the direction of the turn and the degrees turned. A "SR" (ships right) indicates a right turn, a "SL" (ships left) a left one. Degrees must be stated in numbers divisible by 30. Ship turns can be plotted to occur at any point during a game-turn's movement.

4.5.3. Each ship in a division may turn at a single specified point, following its predecessor. This is called a "column turn."

Column turns are plotted like ships turns, but with "C" rather than an "S".

4.5.4. Movement plotting example: "1"-CL60-1"-SR30" indicates a move straight ahead of one inch, a 60 degree left column turn, two inches straight ahead, a 30 degree ships turn to the right and the balance of the move straight ahead.

4.6. Divisional Formation. Usually, movement is plotted by divisions. Ships may be considered part of a division if all of the following conditions are met:

4.6.1. They were organized as a division at the start of the scenario.

4.6.2. They are part of a chain of ships separated by no more than one inch (or, for convoys, in a convoy formation).

4.6.3. They are moving at least as fast as the division flagship.

4.6.4. *Optional: they did not move to evade torpedoes in the previous turn.*

4.7. Divisional Movement. With the obvious exception of ships turns, all ships in a division follow the movements of the lead ship.

4.7.1. Each division has a designated flagship. A player may change the flagship designated for a division at any time, but the division must move straight ahead during the turn in which the substitution is made.

4.7.2. A ship that is not part of a division has its movement plotted separately. However, unless the ship is moving directly off the playing surface via a friendly edge, the independent movement table is used to determine whether it moves as plotted.

4.7.3. Players may always plot independent movement for a ship even if it is in a formation, subject to the use of the independent movement table.

4.8. Reforming or Rejoining Divisions. If a ship leaves a division or a division formation becomes disrupted, the ships originally in the division may rejoin or reform the division by moving independently to fulfill the conditions for being in the division.

4.9. Stacking. Stacking during movement is unlimited (subject to the possibility of collisions), but is not permitted at the end of movement.

4.10. Collisions. When two counters or ship miniatures occupy the same space, there is a chance that they may collide. A collision takes place if a "1" is rolled on 1D6. Collisions are rolled for, and their results determined, at the instant that the two potentially colliding ship counters overlap. Collision damage is the equivalent of torpedo damage, with destroyers and smaller ships inflicting damage like 21" torpedoes and cruisers and larger ships inflicting damage like 24" torpedoes. For bow-to-stern collisions, the involved ships take damage as if torpedoed in their extreme bows or sterns. For bow-to-side collisions, trace the movement of the ships to determine which ship struck bow-on and

which ship was struck in the side(or determine this randomly); then roll to find the damage location on the struck ship as for a torpedo hit. The ship striking bow-on takes damage starting at its extreme bow. When a division risks a collision with a stationary ship, only the first ship in the division to meet the stationary ship risks collision.

4.11. Land. If a ship's pre-plotted movement (under 4.12) or random independent movement brings it into contact with land, it may alter course sufficiently to avoid the land. If a ship's regular plotted movement brings into contact with land, it takes damage as if it rammed another ship bow-on. If it is traveling at a speed of less than 2 inches, it takes damage as if it was struck at its extreme bow with an 18" torpedo, at a speed of 2 inches through 4 inches, a 21" torpedo, and at a speed of more than 4 inches a 24" torpedo.

4.12. Pre Contact Movement. At the beginning of play, each player plots 10 turns of movement for his or her ships. Ships may not deviate by more than 30 degrees from their starting courses. They may move at any speed from 1 inch per turn to their maximum speed. A player's ships must follow their plotted movement until at least 1 of the ships spots an enemy ship visually or by radar. If after 10 turns the ships of a player have not made contact with an enemy ship, they continue to follow their movement orders for the 10th turn.

4.13. Quick Starts. Most scenarios begin with opposing ships on courses that will result in contact. To start a scenario quickly, players may simply designate starting speeds for their divisions and extend their initial courses until contact occurs.

5. SIGHTING

5.1. General. A ship may only fire guns or torpedoes at ships that it has currently sighted. Also, ships may not move freely until at least one enemy ship is sighted.

5.2. Sighting Attempts. Radar sighting is determined only in the radar sighting segment. Visual sighting is determined in the visual sighting segment, the illumination segment, and the damage segment. In the illumination segment, illumination of an enemy ship may result in more friendly ships spotting it. In the damage segment, fires may increase the range at which a ship is spotted.

5.3. Maximum Sighting Range. The maximum sighting range is based upon a base range determined at the start of the visual sighting segment. The maximum radar range is determined from the radar sighting table.

5.4. Visual Sighting. Each side's visual sighting range is determined each game-turn as described in the visual sighting table. Enemy ships within a ship's sighting range, as modified, are automatically sighted. The counters of

sighted ships are flipped face-up when they are sighted.

5.5. Visual Sighting Duration. A ship remains visually sighted until it cannot be seen by any enemy ship.

5.6. Illumination. Illumination attempts may be made in the illumination segment. Any ship which has sighted an enemy ship (whether visually or by radar) may illuminate it in one of two ways:

5.6.1. A ship may illuminate one enemy ship each turn with its searchlights. Japanese searchlights have a range of 8 inches for destroyers and 11 inches for cruisers and battleships. All other searchlights have a range of 5 inches for destroyers and 7 inches for cruisers and battleships.

5.6.2. A ship may illuminate one enemy ship each turn by firing starshell from one of its gun mounts.

5.6.3. Starshell is effective to a range of 15 inches for guns of 5.25 inches caliber or less and 20 inches for guns of 5.5 inches or more.

5.6.4. A mount firing starshell in a turn may not engage in gunfire in the same turn.

5.6.5. Mounts firing starshell must be able to bear on their targets.

5.6.6. A single battery can engage no more than 1 target with starshell. Other mounts in the battery may not fire at any targets other than the target illuminated by starshell.

5.7. Radar. Radar sighting is described in the radar sighting table. It is automatic at the ranges indicated. The counters of ships sighted by radar are not flipped face-up.

5.8. Smokescreens. Smokescreens block visual (but not radar) line of sight. Making smoke is plotted in the Movement Plotting Segment. Smoke is represented by blank counters or cotton wool placed behind the smoke-producing ship as it moves. Smoke persists for 2 turns in calm weather or 1 turn in moderate wind and is then removed. Smoke is ineffective in high winds. Ships obscured from view by smokescreens become eligible for the "two dummy" rule just like ships that have passed beyond visual and radar range.

5.9. Land. Ships cannot be sighted visually or by radar through land.

6. GUN COMBAT

6.1. General. All ships carry guns which may be fired at enemy ships in the Gunfire Segment. Each ship may fire its guns once each turn. Guns can only be fired at targets within their range. At night, guns cannot be fired at targets unless the targets are illuminated or on fire. *Optional: Guns may also be fired if they are fired at targets that fired guns in the preceding turn or are pointed by a fire control radar capable of blind fire. The type, number and range of guns carried by a ship are listed in the data chart for ships of that class.*

6.2. Batteries. All of a ship's guns are divided into "batteries." A battery is a group of guns controlled by one gun director. Guns are fired by batteries, and a battery of guns may be fired at one target each game-turn.

6.2.1. Primary (or main) directors control a ship's largest guns. If a ship has more than 1 size of guns, the smaller guns are controlled by the secondary directors.

6.2.2. A director may control all guns (of the appropriate size) that can fire into an arc that that director covers.

6.3. Sighting. Guns may only be fired at targets which have been sighted. At night, the targets must also be illuminated or on fire. *Optional: guns may also be fired if they are fired at targets that fired guns in the preceding turn or are pointed by a fire control radar capable of blind fire.*

6.4. Radar Firing. If guns are fired with a modifier for fire control radar, they must be fired at the closest target detected by radar. If more than one such target is at the same range, the firing player must use a die roll to randomly determine the target to be fired upon.

6.5. Bearing. Key to gun combat is the concept of "bearing." Gun mounts and some directors have limited arcs in which they may be pointed. These are referred to as the areas into which mounts and directors "bear." Information on the bearing of mounts and directors is contained in the explanation to the ship data charts.

6.6. Gun Combat Resolution. Gun combat is resolved by a D10 die roll and a percentile die roll, as further described in the charts section on gunfire combat. As gunfire is resolved, players record the hits scored on their ships by number and caliber.

6.7. Secondary Batteries. As a general rule, cruiser secondary batteries were not very effective in surface actions. If a ship smaller than a battlecruiser is using its main battery in a turn, it does not compute hits for its secondary battery. It may use its secondary batteries to fire starshell and to put other ships under fire for accuracy modifier purposes. *(Optionally, hits may be computed, but with the battery interference modifiers used).*

7. TORPEDO COMBAT

7.1. General. Many ships carried torpedoes in rotatable mounts of multiple torpedo tubes. Torpedoes were deadly weapons, but required skilled use to be most effective. The Japanese excelled at torpedo tactics, while the Americans developed an effective set of torpedo tactics during the period covered by this game. The Royal Navy used torpedoes effectively in surprise nighttime attacks, while the Italians were competent torpedomen.

7.2. Mounts. All torpedoes in a mount must be fired at the same time at the same target. Details of the configuration of a ship's torpedo mounts may be found on that ship's data chart. As with gun mounts and directors, torpedo mounts have restricted firing arcs. These are described in the key to the ship data charts, but are generally 120 degrees to one or both sides of the ship.

7.3. Sighting. Torpedoes may only be launched at targets which the launching ship has sighted visually or with radar. Illumination is never required to fire torpedoes.

7.4. Plotting. Torpedo launches are plotted in the Movement Plotting Segment, and are marked by counters placed on the playing surface adjacent to their launching ships at the start of the following Movement Segment. Record on the launching ship's record the turn of the launch, the mounts launching torpedoes, the torpedo counter representing the attack, the speed of the torpedoes, the 30º angle into which the torpedoes are being launched and the target ship. Example: "T4/aT,bT/Q/F/A3/FLETCHER" means mounts a and b launched at Fletcher on turn 4. The torpedoes will run at fast speed in 30º angle 3 (90º to 120º off the firing ship's course). They are represented on the playing surface by counter Q.

    7.4.1. Arcs are A1 – the arc from 30º to 60º to the left or right of the firing ship's course, A2 – 60º to 90º, A3 – 90º to 120º, A4 – 120º to 150º.

    7.4.2. Rather than the firing ship's record sheet, players may use the Torpedo Log form to record torpedo launches.

7.5. Resolution. During the Movement Segment, torpedoes move down the designated for them. If they intercept their targets during the course of their movement (which may extend over several turns) torpedo hits are resolved. Torpedoes and their targets are considered to move simultaneously and proportionately, although potential hits are resolved at the end of the target ship's movement. Attacks are resolved if the torpedoes intersect the target ship's course and come within 1 inch of the target ship. Hits are recorded (together with the side of the ship hit -- for cruisers and larger ships) for resolution in the Damage Segment. Other ships on the same line of bearing as the potential target (as measured from the dot of the attack counter at the end if the turn) are attacked by the torpedoes at half the normal hit number. Any successful attack results in the attack counter being removed.

    7.5.1. Although torpedo launches are recorded by mounts, torpedo attacks are resolved for each torpedo in the spread.

    7.5.2. Unlike guns, torpedoes have no basic to hit value. Consult the Torpedo Tables to determine the to hit value of torpedoes in a spread. Torpedoes have maximum to hit values that they cannot exceed. These values are shown on the ship data sheets and the torpedo tables.

    7.5.3. Players may use torpedo hit counters to track possible torpedo hits.

    7.5.4. While torpedo hits are resolved at the end of a target ship's move, target angle and range are determined at the point in the ship's movement that the potential attack occurred.

7.6. Reloads. Certain Japanese ships carry extra torpedoes that can be reloaded into their torpedo tubes in the course of a scenario. Mounts are reloaded if a one is rolled on 1D6 at the start of the Movement Plotting Segment. No rolls are permitted until three turns after the mount being reloaded was launched, and no rolls are permitted in turns when the ship trying to reload is under fire, on fire, or visually sighted.

7.7. Dummy Attacks. A player can always place a dummy torpedo attack counter for any ship carrying torpedoes. The marker is revealed as a dummy when its "torpedoes" outrun all possible targets or come to the end of their runs.

8. DAMAGE

8.1. General. In the Damage Segment, players determine the effects of gunfire and torpedo hits on their ships. Damage is determined secretly and simultaneously.

8.2. Gunfire Damage. A series of die rolls are made to resolve gunfire hits. Roll D36 to determine the hit location. Roll 1D6 to determine whether the hit is high, low or both, and 1D6 to see if the hit results in an explosion, fire or flooding. Roll 1D6 and compare it to the shell's adjusted power rating to see if the hit is effective. See the Tables for more details.

8.3. Torpedo Damage. Torpedoes inflict damage to ships' internal compartments. In addition, they inflict damage through the Shock Effect table.

    8.3.1. Ship internal diagrams are divided into compartments. Compartments may be of 9 types: engine rooms, boiler rooms, boiler operating stations, gearing rooms, magazines, fuel oil tankage, aviation fuel tankage, plot and CIC rooms and void spaces.

    8.3.2. Torpedoes are rated by their ability to flood compartments within a specified distance of their impact point. The impact point is determined by rolling D36; the distance the damage spreads is determined by the size of the torpedo and the ship being hit. The target ship's data sheet indicates the number of D36 locations that are affected on either side of a torpedo's point of impact. If the value is a percent, this is the percentage chance of the hit being effective at the point of impact.

    8.3.3. Bulges. Some ships had spaces built into the sides of their hulls that were effective at reducing the effect of a torpedo

hit. These are noted on the ship data sheets, with a –1 rating given for the bulge. The rating indicate the decrease in the number of locations affected by a hit on the bulge. If the torpedo would usually affect ±0 spaces but hits a –1 bulge, treat it as having a 50% chance of being effective. If the torpedo would usually have to roll for effect, halve the chance. Example: a 24" torpedo hits a ship on a –1 rated bulge. The torpedo would usually do damage at ±2 locations. Because of the bulge, it does damage at ±1 locations.

8.3.4. Destroyed spaces next to flooded spaces also flood.

8.3.5. In addition to flooding, a torpedo hit will cause a number of shock effect hits based on the size of torpedo and the size of the ship being hit.

8.3.6. Torpedo hits on a destroyer or smaller ship in hit locations 11-16 reduces the ship's speed to 1 inch (lost bows); hits in hit locations 61-66 reduce it to a DIW state. All other hits on such ships by 20.5" or larger torpedoes sink them.

8.3.7. Torpedo hits on cruisers forward of the forward magazines reduce speed to 1.25" (lost bows), and hits aft in propshaft locations and steering areas always result in the destruction of the props or rudders.

8.4. Collateral Damage. Some damage may cause additional collateral damage to the ship suffering them. These are generally covered on the ship data charts.

8.4.1. Magazine hits. A hit on an unflooded magazine may cause a fire or an explosion sinking the ship.

8.4.2. Gun mount hits. A hit on a gun mount or turret may cause a fire or an explosion sinking the ship.

8.4.3. Torpedo mount and reload hits. A hit on a torpedo mount or reload may cause a fire or an explosion sinking the ship.

8.4.4. Fuel oil, AAMG, aviation gas and aircraft hits. Any of these may cause a fire.

8.4.5. As noted above, hits to compartments adjacent to flooded compartments automatically flood those adjacent compartments.

8.4.6. If a hit affects more than 1 location, check each location to see if a fire starts.

8.5. Fires. Fire have a number of effects.

8.5.1. If a ship has 3 or more fires burning, it may use no weapons and must reduce its speed to no more than 2.00".

8.5.2. If a ship has 6 or more fires burning, the fires go out of control and the ship is abandoned and so is considered sunk.

8.5.3. In the Damage Control phase of each turn, roll 1D10 for each fire. On a 10, another fire starts. One of these die rolls (declared in advance) also counts as the damage control roll for fighting a fire.

8.5.4. At the end of a scenario, roll on the fire continuation table to see if any fires burning at scenario's end go out of control.

8.6. Fires, Explosions and Flooding. A space may be subject to flooding and to fires and explosions. If both flooding results and fire and explosion results could both apply to an unflooded space, the following rules apply.

8.6.1. Always check for explosions.

8.6.2. In the absence of an explosion, only fuel oil and aviation gas spaces are subject to flooding and fires simultaneously.

8.6.3. In all other cases, the flooding is assumed to extinguish the fire.

8.7. Fires (Optional). These are alternate (and more detailed) fire rules. If a hit starts a fire, the following effects result.

8.7.1. The fire occupies the numbered hit locations containing the equipment or compartment that is burning. The player owning the ship should note this on the ship's damage sheet. The equipment in these locations is destroyed.

8.7.2. Ships must attempt to fight fires in the damage control phase by rolling their damage control number or less on 1D10. A successful roll reduces the extent of 1 fire by 2 hit locations, chosen by the owning player from one boundary of the fire or the other. A successful damage control roll against a fire in a turn will also prevent that fire from spreading.

8.7.3. Every turn in the damage control phase, players must check to see if fires on their ships spread. Roll 1D10 for each fire -- the fire spreads on a roll of 10. For this roll, a "fire" is a continuous area of burning hit locations. The fire spreads to the hit locations on both sides of the locations marking the extent of the fire. If a fire begins on one level, it spreads to the other the first time that a 10 is rolled for it. Thereafter, it spreads (or is reduced) on both levels at the same time.

8.7.4. A ship is abandoned whenever 18 or more of its hit locations are on fire. When 12 or more locations are on fire, the ship cannot fire weapons and must reduce speed to 2.00".

8.7.5. *When a fire reaches an unflooded location capable of explosion, check for explosion as if the location received a gun hit. Locations threatened by fire can be voluntarily flooded before the fire spreading role is made.*

8.8. Damage Effects. Hits result in the following damage effects.

8.8.1. Generally, a hit on a mount or director disables the mount or director.

8.8.2. A hit on a hull space damages the hull space. A damaged magazine disables the guns it serves. A damaged engine room or fire room space results in a speed loss, as

shown in the Compartment Speed Loss Table.

8.8.3. A flooded hull space will slow a ship by the amount calculated as provided in the damage charts.

8.9. Propulsion Hits. Optional: Often, any hit in a ship's propulsion spaces -- boiler rooms and engine rooms -- could bring the ship to a temporary halt. For a hit on these spaces, consult the Propulsion Hit Table to see if the ship stops for a turn.

8.10. Damage Control. A player may attempt to remove the effects of one hit or fire from each of his ships in the Damage Control Segment. Fires must always be put out before any other damage suffered by a ship is repaired.

8.10.1. A USN ship may remove the effects of one hit or put out one fire on a die roll of 3 or less on 1D10.

8.10.2. An Allied (other than USN), Japanese, or German ship may remove the effects of one hit or put out one fire on a 1D10 roll of 2 or less.

8.10.3. An Italian ship may remove the effects of one hit or put out one fire on a 1D10 of 1.

8.10.4. A merchant ship may remove the effects of one hit or put out one fire on a 1D10 roll of 1.

8.10.5. A roll of 9 or 10 on a damage control attempt means that the item being worked on is unrepairable.

8.10.6. A flooded space may not be repaired by damage control.

8.10.7. Optional: Increase damage control number by 1 if all of the following conditions are met:

8.10.7.1. The ship did not using any of its weapons in that turn.

8.10.7.2. The ship was not fired upon by 4 or more guns.

8.10.7.3. If a compartment hit is being repaired or a fire is being fought, the ship's speed is 2.00" or less.

8.10.8. Optional: Increase the damage control number by 1 or use the damage control number of the assisting ship (at the owning player's option) if another ship assists in fire-fighting efforts. The assisting ship must be beside the burning ship, within 1 inch, at the burning ship's speed and paralleling its course. The assisting ship may not use its weapons and cannot assist if it is fired upon in the turn. Only warships may assist in firefighting efforts.

8.10.9. At the end of a scenario, use the Fire Continuation Chart to determine if any ships on fire at the scenario's end burn out of control.

8.11. Sinking Ships. A sinking ship does not sink during the scenario unless it is the victim of an explosion. It remains stationary on the playing surface, a hazard to navigation. It is considered sunk for scenario purposes, however, if 2/3 of its FPs are flooded or it succumbs to fire during the scenario or after it is over.

9. HISTORICAL SCENARIOS.

9.1. General. Historical scenarios are described in detail in the accompanying materials.

9.2. Special Rules. Scenarios have special rules. These override any game rules which they contradict.

9.3. Duration. Historical scenarios continue for 24 turns, or until one side has exited all of its ships capable of movement from its friendly mapside.

10. GENERATED SCENARIOS.

10.1. General. Generated scenarios may be produced in the following way.

10.1.1. Determine the base visibility by the die rolls specified in the scenario set. Gunnery visibility modifiers are determined based on the base visibility and other factors. The following modifiers apply to the following base ranges: -1 to 21 inches, -2 to 19-20 inches, -3 to 13-18 inches, -4 to 7-12 inches, -5 to 3-6 inches, -7 to 2 or fewer inches. Due to inferior fire control equipment, Italians use a -10 modifier in night scenarios and a -7 modifier in day scenarios if the base is 16 inches or less.

10.1.2. Each player secretly and simultaneously determines the composition of his forces using the Ship Type and Ship Class Tables.

10.1.3. Each player secretly and simultaneously decides his or her forces' distance and bearing from the center of the playing surface.

10.2. Set-up. Players place the divisions on the playing surface, representing each division with a force marker.

10.2.1. One division or dummy force must be placed at the start location determined for that side under 10.1.3.

10.2.2. All other divisions and dummy forces of the same side must begin with one of their ships within three inches of this division.

10.3. Initial Movement. Each side's initial course is towards the center of the playing area. Each side moves until it sights an enemy ship visually or with radar.

10.4. Length. All generated scenarios last 24 turns, starting on the first turn in which a side need not use pre-plotted movement.

10.5. Victory Conditions. Generated scenarios are won on points.

10.5.1. Score one point for each enemy destroyer incapable of movement or sunk at the scenario's end.

10.5.2. Score two points for each enemy light cruiser incapable of movement at the scenario's end.

10.5.3. Score three points for each enemy light cruiser sunk or heavy cruiser incapable of movement at the scenario's end.

10.5.4. Score four points for each enemy heavy cruiser sunk at the scenario's end.

10.5.5. Score six points for each enemy battlecruiser or battleship incapable of movement at the scenario's end.

10.5.6. Score eight points for each enemy battleship or battlecruiser sunk at the scenario's end.

10.5.7. Total the points which each side would receive for sinking all of the other side's ships. Subtract the smaller side's total from the larger, and add the difference to the smaller side's point score.

10.5.8. For victory point purposes, a ship is "incapable of movement" if any combination of flooded spaces and permanent damage has reduced its speed to zero.

Interpreting the Ship Charts

The abbreviations on the ship charts have the following meanings:

A, B or C - for guns and directors, bearing into the 300 degree arc centered on the bow of the ship.

M - bearing into the 120 degree arcs centered on each side of the ship.

X or Y - bearing into the 300 degree arc centered on the stern of the ship.

1, 3, 5, 7, S - bearing into the 120 degree arc centered on the right side of the ship (or both sides, for centerline mounts).

2, 4, 6, 8, P - bearing into the 120 degree arc centered on the left side of the ship (or both sides, for centerline mounts).

E – engine
B – boiler
M – magazine
BM – bomb magazine
BR -boiler room
ER - engine room
V – void space (containing non-vital equipment, crew accommodations or stowage)
FO – fuel oil space
AV – aviation fuel space
ST – steering space

Engineering arrangement assumptions:

Use these assumptions for damages to engineering spaces. Any BR space can serve any ER space. For ships with 2 ER spaces and 2 propshafts, the forward space turns Propshaft 1 and the aft space turns Propshaft 2. For ships with 2 ER spaces and 4 propshafts, the forward space turns Propshafts 1 and 3 and the aft space turns Propshafts 2 and 4.

Flooded internal spaces cause a loss of speed as noted in the damage tables. Hit F and E spaces also result in speed loss, as shown on the relevant chart. Guns served by damaged or destroyed magazine spaces may not fire. Assume that a ship's "M" guns are served by its aft magazines unless the ship has an "M" magazine.

If a location has more than two installations, the shell hits all of them unless they are paired left and right. When paired installations are the only targets, roll 1-4 to hit on the engaged side, 5-6 for the unengaged side -- unless the range is beyond 20 inches, in which case the chances to hit either are equal.

Designer's Notes

General Concept. Fire on the Waters is my attempt to design a fast-playing but accurate simulation of World War II naval surface combat. While additional developments of the game may encompass naval aviation and submarines, the emphasis here is on gun and torpedo combat. In keeping with the tactical nature of the game, the scale is relatively small: 4 minutes to the turn and 1000 yards to the inch. This yields gun ranges of 15 to 40 inches and movement allowances of 3 to 5 inches.

I designed the game to played on a table top or floor rather than a hex map. This eliminates the artificial facing constraints that a hex grid imposes. It also facilitates range taking (by the use of a tape measure) and the use of historical formations. The game requires no more than a 4 by 6 foot surface.

Movement. In my experience, most naval games permit too much free movement by individual ships. While ships did move independently in some engagements, maneuver outside of the confines of a fixed formation always risked a loss of control by the force commander. In most engagements, ships tried to maneuvered in pre-arranged formations and only went to independent movement when the formations fell apart under the pressure of losses, damage or confusion.

FOTW takes this into account by providing for ship movement in fixed formations. Movement outside the confines of a formation creates a risk of random movement, and random movement can land a ship in serious trouble. The potential penalties associated with independent movement encourage players to maneuver their ships realistically. Formation movement encourages the players to use the tactics used by their historical counterparts.

Formation movement has the added virtue of enhancing playability. Because players plot their move by formation rather than by ship, plotting takes less time.

Gun Combat. Given the task that it was trying to accomplish, World War II naval gunfire was extremely accurate. It relied on a complex system of sophisticated optics, stabilized mounts and directors, and an integrated system of spotters to spot the fall of shot. As the war progressed, fire control radars supplemented these elements to make naval gunfire still more effective. Subjectively, naval gunfire seems inaccurate, given the large number of shells fired for relatively few effective hits. In actual engagements, hit rates varied from one of nine shells fired to one of a thousand.

The mechanics of naval gunfire are not difficult to explain in summary form. Using powerful optical instruments, a ship's crew would estimate the range, course and speed of a target ship. This data would be combined with the speed and course of the firing ship and then converted into data used to point the ship's guns at a point where their projectiles would intercept their target. Once the guns were fired (typically in unison -- this was called a "salvo") the water splashes from the misses would be observed. Based on the relative position of the splashes and the target, the point of aim for the

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guns would be corrected. Once the splashes were all around the target (a "straddle"), the guns would go to rapid fire. Until then, the guns would usually fire salvo by salvo at a controlled rate, gradually correcting their fire. Refinements like fire control radar and spotter planes improved accuracy incrementally by permitting more accurate spotting of splashes and better estimation of ranges, target course and target speed.

Simulating this process and the large range of probabilities that it could produce requires a game system that can take into account a wide range of hit probabilities. FOTW's system does this by focusing on three different basic factors that determined the probability of a hit being effective: gun type, target size and environmental modifiers. In essence, the system develops a number value for each factor, and then multiplies the factors to get a percentage chance of an effective hit.

Gun type had some subtle and not-so-subtle effects on accuracy. In general, larger caliber guns were more intrinsically accurate, were mounted on more stable gun platforms, and were directed by better fire control equipment. Countering this, smaller guns could develop higher rates of fire. This is not as great an advantage as it might seem, as other factors tended to limit rate of fire and small gun effectiveness as ranges increased. These included difficulties in loading guns elevated to fire at longer ranges, holding fire until the previous salvo of shots landed (thus facilitating correction of fire), and difficulties in spotting smaller shell splashes as ranges increased.

The system divides guns into four main types based primarily on their bore sizes. It then supplies gun type modifiers based on gun bore and range. Smaller guns have higher factors at close range (where their higher rates of fire result in more hits), while larger guns are more effective at longer ranges (for all of the reasons stated above). The resulting factor is a proxy for the accuracy of the gunmount under ideal conditions.

The environmental factor is really a hodgepodge of various factors that affected gunnery. It assumes that average (as opposed to ideal) visibility conditions reduce hits by about 40%. The factor is adjusted based on actual visibility, changes in course by the firer and the target, target speed and a few miscellaneous factors.

Target size is self-explanatory, but does factor in the idea that near misses were potentially more damaging to smaller, less sturdy targets.

The game's gunfire tables express all of these factors as logarithms, so as to avoid the need for multiplication. The factors are added to produce a final factor that is then converted into an analog and used as the chance of a mount scoring an effective hit on its target. In some cases, hits occur automatically, and the player rolls for possible additional hits.

The armor system takes into account the ability of a shell hit to do meaningful damage to a target. This a function of armor, but also involves more than armor. Armor was never a be-all and end-all for damage; luck also counted. Even a non-penetrating heavy shell could jam a turret in train if it hit it. Even a light shell could put the turret out

of commission if it hit on a turret aperture (as actually happened at the Battle of the Komondorski Islands). The armor factor takes this into account by taking a probabilistic approach to gun size and damage rather than presenting armor penetration as an all-or-nothing proposition.

Torpedoes. Torpedoes were a fluky weapon, but could be devastating if they hit. FOTW's torpedo system used a series of factors similar (but not identical) to the gunfire system to calculate the percentage chance of each torpedo hitting. This reflects the parallels between torpedo and gun fire control techniques. In both, the firer tried to estimate the course, speed and range of the target. As with shells, most W.W.II torpedoes ran in a straight line once they were launched. If that line didn't intersect an enemy ship, the attack failed. Because ships carried limited numbers of torpedoes, torpedo attacks tended to be made at close range and with the advantage of surprise. This minimized the ability of the target to steer out of harm's way.

Because a principal element of torpedo warfare was surprise, players are permitted to place dummy torpedo counters on the playing surface. This mechanism keeps players guessing as to whether they should take evasive action to avoid torpedoes or steam bravely on to maximize their gun power.

The system's negative modifier to USN torpedoes before August 1943 reflects the dismal reliability of those torpedoes. Similar problems plagued early war German torpedoes, so these also receive a negative modifier. The positive modifier for the Japanese reflects both their superior torpedo technology and the relatively sophisticated fire control systems needed to take full advantage of it.

One factor that is not fully modeled in the system is the American ignorance of the capabilities of the Japanese "Long Lance" torpedo. At least until the latter part of 1943, the Americans vastly underestimated the range and speed of these torpedoes, and paid for it with a series of sunk and damaged ships. Players wishing to model the American's ignorance more accurately may use the optional modifiers in the torpedo tables.

Damage. Many naval warfare games use a incremental approach to ship damage, in which hits gradually wear away at a ship's capabilities like wind eroding sandstone. Some pay lip service to the idea of the varying effect of hits by making some hits "critical hits." FOTW rejects this approach, using instead a system in which each effective hit does discrete damage to some item of the ship's equipment. This approach is kept playable by the use of damage diagrams for each ship class used in the game.

FOTW's system more closely approximates the reality of ship damage, where a one hit could raise havoc, or a great many hits could do relatively little harm. The damage routines take into account gunfire hit location, special damage, fires and flooding, all in the roll of four to six dice.

Torpedo hits are played out by rolling dice to determine where the torpedo hit its target. Wherever I could, I derived the hit location values from actual internal diagrams of the ships in question. Where this information was unavailable, I estimated the internal arrangements of the ship from its silhouette. Where appropriate, I modified these values and (and the values of torpedo hits generally) to account for the presence of anti-torpedo bulges. These were spaces fitted along the sides of cruisers and larger ships; they were designed to absorb some of the force of torpedo hits.