

17. Naval Aviation.

In order to recreate dynamic aircraft to ship battles a modification in the turn structure has to be made. Ship movement is broken into two movement phases or impulses. The ships now move only half their allotted movement in each impulse. Aircraft move and attack in the **Aircraft** phases. As such they are given two impulse of movement and two of attack per turn. Aircraft data is listed on several aircraft data tables. The speed impulse listed there is for that of a single impulse.

Air to Sea Turn Sequence.

1. Orders.
2. Communication.
3. Aircraft Phase 1
 - A. Aircraft Movement Impulse 1
 - B. Anti-aircraft fire 1
 - C. Bomb attack 1 .
4. Torpedo Phase 1.
 - A. Torpedo Launching.
 - B. Torpedo Movement Impulse 1.
 - C. Torpedo Attack 1.
5. Ship Movement Impulse 1.
6. Sighting.
7. Combat.
 - A. Shooters that straddled last turn.
 - B. Shooting previous targets not straddled.
 - C. All other Shooting.
8. Aircraft Phase 2
 - A. Aircraft Movement Impulse 2
 - B. Anti-aircraft fire 2
 - C. Bomb attacks 2.
9. Torpedo Phase 2.
 - A. Torpedo Movement Impulse 2.
 - B. Torpedo Attack 2.
10. Ship Movement Impulse 2.
11. Damage Control
12. Damage Check
13. Sighting Phase 2

17.0.1. Aircraft should be organized into small groups of one to three aircraft for movement and attack. To keep track of aircraft small chits or counters can be used for each aircraft. The counters should not be more than $\frac{3}{4}$ " (19mm) across. (War-game counters $\frac{1}{2}$ " are ideal.) The counters should be moved together and not be separated by more than 19mm from counters in the group. Ordinarily counters can be stacked but aircraft making torpedo runs might work better spaced apart a bit to spread their torpedoes. A roster or list should be made for each group listing the type of aircraft in it, their bomb or torpedo load, and any accumulated damage.

17.0.2. Before starting the scenario a general aircraft mission must be written down for each group or

collection of groups (wave). Also, written down is the aircrafts altitude. No written turn to turn orders for aircraft groups are needed. Player controlling aircraft groups can decide from impulse to impulse where the planes may move and when to attack enemy ships. Orders must still be given to ships in the Orders phase as they now apply to both ship movement impulses.

17.1. Aircraft Movement. Air groups must be at one of four altitudes when they move on the table. The altitude levels are; **very low, low, medium** and **high**.

17.1.1. In preparing to play aircraft should assemble off table. If they are detected by enemy ships prior to arriving on the table the enemy may have one or more turns to prepare his ship for any attack. If they are detected off table the enemy is given the altitude that the groups will arrive at. The number of turns before the aircraft arrive on the table is determined by early warning factors and speed of the aircraft. When it is time for the aircraft to arrive in the game place them on the table outside maximum long range AA fire of all enemy ships. This is done in the first impulse of a turn. Placement of aircraft on the table is all that they do during their first movement impulse. They do not move at all their initial phase.

17.1.2. In the subsequent sighting phase of the turn all elements, aircraft and ships attempt to spot and identify each other. Aircraft must make spotting rolls per group to spot and identify ships. If the aircraft do not sight ships they can move in the following movement phase but they cannot attack until they do sight a target.

17.2.1. Aircraft may move up to their full movement impulse in each aircraft phase. This must be in a straight line or they may change direction by moving along the outer edge of one of the turn gauges.

17.2.1.1. Aircraft may turn as well as move straight. All aircraft moving over 100 or more per impulse use the **1 Nautical mile (18.5)** turn gauge as their minimum turn gauge. All heavy bombers (HB) and medium bombers (MB) use the **1 Nautical mile (18.5)** turn gauge no matter what their speed.

17.2.1.2. Aircraft (other than HB and MB) laden with bombs or torpedoes or aircraft moving at over 60 per impulse use the 850m turn gauge.

17.2.1.3. Aircraft (other than HB and MB) not laden with bombs or torpedoes and moving 60 or less may use the 650m turn gauge as their minimum turn diameter.

17.2.1.4. Any turning by a gauge larger than the 18.5 turn gauge is permissible for aircraft as well as ships.

17.2.2. Evasive Movement. Some aircraft moving level or diving to a lower altitude may move 'evasively'. This reduces the chance that the aircraft will be hit by anti-

aircraft fire. It also reduces the chance the aircraft may make a successful attack itself.

17.2.2.1. Aircraft can not move evasively the impulse it makes an attack of any kind.

17.2.2.2. Aircraft laden with bombs or torpedoes may not move evasively.

17.2.2.3. Aircraft that have been hit or any aircraft in the group have been hit then the entire group can not move evasively.

17.2.2.4. Aircraft moving evasively cannot try to sight new targets.

17.2.3. Aircraft flying at any altitude and not changing altitude may not move slower than one half their movement impulse.

17.2.3. Aircraft may decrease their altitude one level per movement turn (two impulses).

17.2.4. Aircraft may decrease their altitude from medium to low in a single impulse by dive bombing.

17.2.5. Aircraft may not engage in attacks while climbing to change altitude. The forward horizontal movement is one half movement impulse speed when climbing.

17.2.5.1. Aircraft may increase their altitude level from very low to low in one impulse.

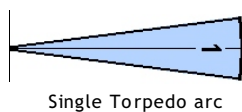
17.2.5.2. Aircraft take one complete turn (2 impulses) to increase altitude from low to medium altitude.

17.2.5.3. Aircraft take 3 complete turns (6 impulses) to increase their altitude from medium to high altitude.

17.3. Aircraft Attack Attacks are conducted by groups. While conducting an attack only one aircraft group is allowed to be in the same airspace in the same impulse. What this means is that only one group may bomb attack per impulse. Only one group is permitted to attack a ship from a particular side per impulse. Since ships have two sides two groups may attack a single ship with torpedoes or by strafing as long as it from different sides of the ship. (Different sides are defined as not within 120° of the same line of attack.) When attacking a ship the attacking group(s) will at some time have to pass through both long range and short range **anti-aircraft (AA)** defenses of all ships within AA range. If aircraft survive the defensive AA they may make their attack.

17.4. Torpedo Attacks.

Torpedo laden aircraft must approach to within 25 of a ship target to launch their torpedoes. For best results the torpedo launch point should be within one torpedo impulse movement of the target ship. Only one torpedo is permitted to be launched per aircraft. The aircraft must move straight



(to within 15 degrees) for at least one quarter a movement impulse prior to the launching of the torpedo.

17.4.1. To launch torpedoes the torpedo aircraft must be at very low altitude. The aircraft may not fly evasively when carrying torpedoes.

17.4.2. When launching torpedo a **torpedo arc template** is placed at the launch/drop point. Arc '1' is used as the running arc. (Or, if running many torpedo-bomber groups it might be useful to cut up an arc template into 15° arc slivers and use them individually.) The center line of the arc should be along the flight path of the aircraft group. If multiple aircraft are in the group more torpedo can be launched in each arc, one for each plane in the group. Or if the torpedo-bombers are spread out then multiple arcs may be placed no more than 1/2" (13mm) from line of flight of the group. But the torpedoes may be launched at different ranges.

17.4.3. Torpedoes are launched during an Aircraft by placing the torpedo arc on the table. The torpedo will not move until the Torpedo Movement impulse following the Aircraft phase. When it comes time to move the torpedo the amount of movement is prorated in quarter moves with that of the launch aircraft's movement. This means if the aircraft moved 3/4 of its movement impulse before it launches then in the first torpedo phase after the launch the torpedo may only move 1/4 of its movement impulse. Likewise if the aircraft moved only 1/4 of its allowed movement impulse before it launched then the torpedo may move 3/4 of its movement.

17.4.3.1. If the aircraft moved more than 3/4 of its movement impulse in the phase before it launches the torpedo, the torpedo may not move at all in the following torpedo impulse.

17.4.3.2. If the torpedo-bomber launches torpedoes at its starting position in the Aircraft impulse the torpedo may move full in its impulse.

17.4.3.3. Prorating only affects the first impulse after launching. The torpedo will move full each torpedo impulse after that first impulse until it reaches the limit of its range.

17.4.3.4. The **minimum range** an aircraft may launch torpedoes at a ship given by the **Minimum Air Launched Torpedo Range** table. This cross-references the crew quality in the aircraft to the minimum launch distance. The better the crew the closer the torpedoes can be launched.

17.4.4. Rules for hitting and moving torpedoes launched from aircraft are basically the same for hitting and damage as for sea launched torpedoes. One exception is that if a launching aircraft has suffered a hit from AA prior to launching the effective range when computing to-hit range is multiplied by 3.

17.4.5. While an aircraft may not move evasively prior to launching its torpedo it may do so once the torpedo is dropped. It may also climb to low altitude the impulse after launching the torpedo.

17.5. Dive Bombing. To dive-bomb an aircraft must have a bomb and must pass directly over the ship model. Aircraft must start the phase at medium altitude to dive-bomb. The aircraft moves straight horizontally $\frac{1}{2}$ impulse movement the phase they dive-bomb before dropping the bomb. After dropping the bomb the aircraft is then at low altitude. A dive bombing is considered to be a low altitude the last 5 of its movement before dropping the bomb and thus subject to short range AA at that point.

17.5.1. Aircraft will drop their bombs as they pass over the ship and must survive any attack from AA to reach their point of bomb release. Should the aircraft pass this test without being shot down by AA fire it may make a dive bomb attack.

17.5.2. Roll once on the Bomb To-Hit table per bomb. Roll a D10 on the Horizontal Locations table per the Ship Type to find the location where the bomb strikes. Then roll to see if the bomb penetrates the armor at this location.

17.5.3. Bombs may be rated as AP, SAP or GP. **GP** or general purpose bombs have a variable penetrate roll as per a **HE** type shell. The other type bombs have variable penetration as similar type shells. Besides the bomb type, bomb weight determines the amount of damage a bomb does when it penetrates. See the appropriate tables that list the penetration and damage particular size bombs do.

17.6.1. Level Bombing - Aircraft with bombs flying without changing altitude may make level bombing attacks. If the flight path takes it over the ship model it may drop its bombs as it passes over. The aircraft must survive any attack from AA to reach its point of bomb release. The aircraft must move straight the last 25 immediately before level bombing from low altitude. For medium and high level bombing the aircraft must move straight 50 immediately before dropping its bombs. Should the aircraft pass this test without being shot down by AA fire it may make a level bomb attack.

17.6.2. Roll once on the Bomb To-Hit table per bomb. Roll a D10 on the Horizontal Locations table to find where the bomb strikes. Then roll to see if the bomb penetrates the armor at these locations. For bombs dropped from medium and high altitudes there is no chance to hit a vertical location on a ship. But, when the bomb(s) are dropped from low altitude there is a 1 in 10 chance (**DAF = 9**) that the bomb can strike a ship at a vertical location.

17.7. Strafing Aircraft with forward facing guns may attempt to strafe enemy ships and boats. Guns are listed as one number multiplying another. The first number is the number of guns, the second number is the damage factor of the guns. (Aircraft gun damage is like AA gun damage where high values are better.)

17.7.1. An aircraft must approach an enemy ship at low or very low altitude to strafe. The line of flight of the aircraft must pass over the ship model. The last 10 of the movement by the aircraft before passing over the ship must be in a straight line.

17.7.2. An aircraft that has not been hit any time prior to its strafe attack hits automatically and does not have to roll to hit with its weapons. An aircraft that has been hit at least once prior to its strafe attack must roll a D10 to hit. A roll of 6 or better is a hit. Otherwise it misses and has no effect.

17.7.3. Roll on die per type forward weapon firing gun for the location hit on the target ship. If the aircraft has many guns but all the same type roll only one location. Hits may be on either vertical or horizontal locations depending on the **DAF** of the attack. For very low level attacks the DAF is 4 and for low level attacks the DAF is 7.

17.7.4. To damage a ship at the specified location the armor must be penetrated. A table lists the average penetration of the aircraft weapons. There is not variable penetration roll required as the penetration is always the listed figure. If the penetration is equal or better than the armor at the location then roll for damage. Roll one D10 for each specified forward gun of that type if it penetrates. If any one of the dice is equal to or less than the damage number the listed damage is inflicted. However, if multiple successes occur only score the damage once.

17.8. Anti-Aircraft A ship's AA defense rests on its AA guns. AA capable guns will have a ':' listed after them as in '(4x2):4' or '8x1:2'. The number following the ':' denotes the AA **damage** factor. The number of guns with the ability to fire AA defense is listed before the ':'. (Multiply the number out as in $4 \times 2 = 8$ to get the total number of guns.)

17.8.1. Anti-aircraft fire does not take place in the normal Combat phase. Instead it takes place during AA segment in each Aircraft phase. Two Anti-aircraft segments per turn. Guns firing in either of these segments may not fire in the normal Ship Combat phase of the same turn. If there is a surface battle going on the player must choose to use his ship's AA and dual purpose guns for either AA or surface combat but not both.

17.8.1.1. The maximum **long range** AA guns reach is 50 from a ship at low and medium ranges. The minimum long range for long range AA guns is 15 for low and very

low altitude, but is 10 for medium and high altitude.

17.8.1.2. The maximum **short range** AA guns can reach is 15 from a ship at low and very low altitude. The minimum range is 1 for these guns.

17.8.1.3. Short range AA fire has no effect on aircraft at high altitude. Long range AA fire is less effective at aircraft at high altitude.

17.8.1.4. Long range guns are high angle rapid fire cannons. Long range AA fire has a range of 15-50 to low to medium altitude targets. For **very low** altitude the maximum long range AA fire is 40. For **high** altitude targets the range is up to 40 and a minimum range of 10.

Example: Secondary or tertiary guns ship listed as 4"/45 (4x2):6 indicates that the ship has 4 twin mounted long range AA cannons (a total of 8). Each of these guns having an AA damage factor of 6.

17.8.1.5. Short range AA fire has a range of 15 and this is to very low, low and medium altitude targets. Short range guns are smaller automatic cannons or machineguns.

17.8.1.6. The AA firing ship can first fire at enemy aircraft groups almost anywhere within the maximum range along their flight path. Different firing arcs of a ship may fire at different points along the path or line of flight. Usually the AA firing player will fire at the first point the aircraft comes into range. Since the chance to hit does not get better the closer the aircraft approaches.

17.8.1.7. AA fire is directed at groups (1-3 aircraft) rather than individual aircraft. AA to-hit rolls are done on the AA To-Hit Table (D100). As this table uses binomials it can result in one or more hits. These hits are distributed to the aircraft in the group as equally as possible. If there are more hits than aircraft then some aircraft will be hit more than once. The hits are allocated by the AA player.

17.8.2. Basic Anti-Aircraft No single gun on a ship may fire at more than one aircraft group per AA fire segment. But a ship's AA guns of the same type may be divided into two totals each one may fire at a different aircraft group in the same segment. Additionally a ship's long range and short range AA gun tallies are not added together, they thus may be targeted to different aircraft groups. Depending on the number of different types of AA guns one half the total of each may be fired on a target per anti-aircraft segment. For each type of gun two different AA groups can be targets provided they are on opposite sides of the ship. A ship with long range AA guns and two different types of short range AA guns could conceivably engage 6 different aircraft groups, 3 on

one side and 3 on the other.

17.8.2.1. Targets on 'opposite sides' are defined as not within 120° of one another. Two targets separated by more than 120° can each be engaged by half the number of guns of a ship. They don't have to be at exactly 180° from one another.

17.8.3. Long Range AA The base to-hit chance to hit an aircraft group with long range AA fire at **very low, low or medium** altitude is 2% per long range gun.

17.8.3.1. The base to-hit chance to hit an aircraft group with long range AA fire at **high** altitude is 1% per long range gun.

17.8.3.2. Ships firing VT-fused long range AA have the AA to-hit chance increased against aircraft at low and medium altitude by an additional 1% per gun.

17.8.3.3. Ships without AA fire control directors have the AA total to-hit chance reduced by one half.

17.8.3.4. Ships with radar controlled AA have the AA to-hit chance increased against aircraft at low, medium and high altitude it is increased by 1% per gun.

17.8.3.5. Ships maneuvering to avoid attack and turning 30° or more in the ship movement impulse just prior to the current Aircraft phase have the AA to-hit chance halved.

17.8.4. Short Range AA The base to-hit chance to hit an aircraft group at **low** and **medium** altitude with short range AA fire is 2% per gun vs. crossing aircraft targets and 4% per gun vs. directly moving (attacking and departing) aircraft groups. (Crossing is where the line of flight does not pass over the ship model.) The distribution of these guns is also divided into two with no more than half the guns able to engage aircraft on one side of the ship and the other half the opposite side. If the aircraft group was to pass over or near enough to the side the other half the AA guns may fire at it.

17.8.4.1. The base to-hit chance to hit an **attacking** aircraft group at **very low** altitude with short range AA is an additional 1% more per gun.

17.8.4.2. The base to-hit chance to hit an air group flying evasively is 1% less per AA gun.

17.8.4.3. Ships without AA fire control directors have the AA total to-hit chance reduced by one half.

17.8.4.4. Ships turning 30° or more in the ship movement impulse prior to the current Aircraft phase have their AA to-hit percent halved.

17.8.5. There is an order in which to fire AA at aircraft. That goes to the closes point of the aircraft group's line of flight during the turn. If the aircraft starts at a distance greater than 15 from the AA firing ship then long range AA fire proceeds first. If the aircraft begins its movement in the phase at 15 or less then short range

AA fire goes first. Remember fire can be anywhere along an aircraft's path in the phase.

17.8.6. AA Hits. If AA from a ship hits an aircraft it does not automatically mean the loss of that aircraft. The ship's player must roll to shoot down the plane. Roll one D10 per hit.

17.8.6.1. Shot Down - If the D10 number is equal or less than the AA damage factor (number after the ':' as in ':2') an aircraft in the group is shot down and is eliminated from the game except if it is a *Kamikaze*. A kamikaze gets a save roll for each 'shot down' to see if it can still attack before it goes down. The kamikaze player rolls a D10 for his shot down plane. If the roll is 6 or better the kamikaze aircraft can still fly up to one impulse move before it crashes and is eliminated. It must attempt to crash into the nearest enemy ship.

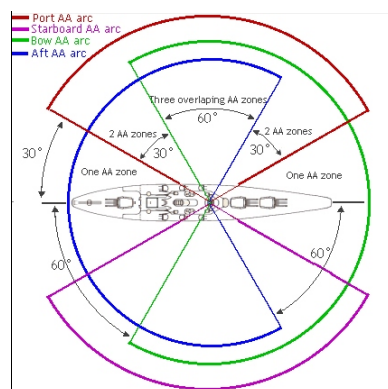
17.8.6.2. Hits - Not shot down - If the aircraft is hit but not shot down a tally of how many times the particular aircraft is hit is kept on the group roster. Each hit reduces the chance that the aircraft can be successful in a bombing or kamikaze attack. These -1 factors are accumulative. For hits on aircraft at or before the point of launch of the torpedo increase the effective range of the torpedo launch by 3 times the range. Hits on aircraft that attempt to make torpedo attacks reduce the chance of a successful hit by increasing the effective range used to compute torpedo hits by a factor of three.

Example In a night raid a three plane swordfish group (level II crew) ends its movement 3 away from the moored Littorio. The Littorio is allowed to fire its short range AA on the group at a range of 15 in order to try to knock down the planes before they launch torpedoes. The Short range AA hits the group once but fails to kill a plane. In the torpedo launch phase the aircraft can launch their torpedoes along their flight path. All three launch at 9 away. (Minimum launch range for level II crews.) In the following Aircraft move impulse the group flies past and over the Littorio to a distance 30 away from the ship. The Littorio may fire its port side AA again at the air group as it is still in the covered arc. Also once the group comes into view of the starboard guns may fire first with short range AA (when the range is under 15) then with long range AA after the swordfish move than 15 away.

Note that when it comes time to try to hit with the torpedoes the one launched by the 'hit' aircraft will be penalized by multiplying its range by three giving it an effective range of 27.

17.9. Advanced AA- Instead of just dividing the AA gun factors of a ship into two the AA gun factors are allocated

more granularly into four sections. Guns are divided by quadrant, with one quarter covering fore, aft, port and starboard. This means AA guns in the forward aspect may fire at targets not only in the forward 90° arc if the ship but a further 30°.



Short range AA is divided into 4 covering zones. Three of which overlap the side, but only 1 covers each end.

(In the diagram this would be the green arc.) The aft AA guns would be able to cover the rear arc as shown in the diagram by the blue arc. The side arcs (red and purple) cover the sides and some of the rear and forward arcs. We can see by the diagram the area directly to the side would be covered by 75% of the AA gun factors while the ends would only be protected by 25%.

Note - The arcs come to a point directly at the very center of the ship (center of arcs) which gets no protection, not 100% as some game lawyers might wish.

17.9.2. Another advanced optional rule that can be added is varying the base percent for long range AA fire by the guns ROF. The base to-hit is set at 2% per gun. But this is for a ROF of 2. Instead if the ROF of the AA gun is used as the base to-hit at low and very low ranges. This does take some math so it isn't recommended for large actions. Multiply all long range AA guns in arc firing by a ratio of $ROF/2 * 2\%$.

Example: 8 German 105mm AA cannons have a ROF of 2.5 thus for the Bismarck the low level long range AA to-hit percent would be $8 \times 2.5/2 \times 2\% = 20\%$.

17.10. Limited visibility - Weather or lighting conditions adversely effect AA to-hit ability.

17.10.1. Darkness limits the long range AA guns fire to 30 for full moonlight. This is reduced still further by the fraction of moon light. Since the minimum range can be less than the sighting range long range AA fire may be ineffective.

17.10.2. Fog or other weather conditions also limits the range at which aircraft can be engaged. The scenario may limit this to less than 15. In that case long range AA may not fire at aircraft.

17.10.3. Radar controlled AA long range fire control can fire blind at aircraft that cannot be seen. It still can fire out to a range of 50. However, if the targets cannot be seen visually the chance to hit is halved. (This combined with the radar bonus of twice the effective hit chance

makes it equal to visual fire.)

17.10.4. Short range AA may also be limited by darkness or weather conditions. However, its range is never 0 so at some range it has a chance to hit. If the sighting range to aircraft is 15 or less then the to-hit number for short range AA is reduced 1% per gun.

17.11. Crew quality - The ability of an aircraft to perform its function varied by the training and experience of the pilot and crew. To reflect this three different crew quality levels are given.

17.11.1. Fresh green crews are at level I.

17.11.2. Veteran or intensely trained fresh crews are level II.

17.11.3. Veteran elite and ace crews are level III.

17.12. Combat Air Patrol (CAP) To protect ships from bombers fighter aircraft groups are placed to intercept any attackers. At the start of the scenario the aircraft allotted to CAP of friendly ships are placed anywhere on the table. The altitude level must be specified for each. Aircraft may change their altitude per 17.2.5.

17.12.1. Order of movement. If there is opposing aircraft on the table then there is an order in which to move them. The aircraft type with the highest maneuver factors move first. If the group is not engaged in combat it may move up to their full movement impulse at their level. Only one group is permitted to engage one other group per impulse.

17.12.2. Air to Air Combat. If an aircraft group moves within 3 or an enemy aircraft group at the same altitude level it may choose to engage in combat with the group. If it engages in combat the movement of both groups stops for the impulse. The enemy combat group may not be engaged in combat with another friendly aircraft group at the same time.

17.12.2.1. No air to air combat takes place until all movement is completed.

17.12.2.2. Aircraft climbing or diving may not choose to engage another aircraft. They can however be engaged with an enemy group if the enemy chooses to attack them.

17.12.2.3. Once all movement is complete and air to air combat groups are paired up air to air combat is resolved.

17.12.3. The Air to Air Attack - Each player rolls one D10 per aircraft in the group. Add this number to the Maneuver factor of the plane. Also add any of the Air Combat factors that apply. The highest total number may has the *combat advantage*. If the total of one plane is 2 or more higher than the other number that plane has a '**tail**' on the other in the next round of combat. The aircraft with the combat advantage may decide to attack or leave the battle. (If both number totals are equal then both must

attack each other simultaneously.) If one with the advantage leaves the battle it is removed from play for the rest of the game. If it decides to attack then...

17.12.3.1. A fraction of the **Attack** factor of the attacking aircraft is subtracted from the defender's Defense factor. Roll one D10 for each attacking aircraft. If the number is higher than the attackers Attack factor only one (1) point of damage is done to the defender. Otherwise the number rolled is the damage factor. Subtract this damage amount from the defender's Defense factor. If the defense factor is reduced to zero or less the defender's aircraft is destroyed.

17.12.3.2. If an aircraft suffers damage in combat this counts as a 'hit' when conducting any air to ship attacks.

17.12.3.3. If an aircraft is being tailed has an Attack tail gun factor (second number of an Attack factor pair) it may fire at a **tailing** enemy aircraft.

17.12.4. Aircraft that have combat advantage may choose to not to have combat. It may instead choose to break-off combat and move instead. If so then it moves before its combat partner in the next impulse.

Notes

Completely redid the torpedo launch rules now. Since I broke the ship movement in two for air attacks things seem a bit smoother, but also more difficult. It is harder to fly the aircraft to the proper launch ranges. But then it was too easy before once you got the steps right. Now turning the ship really does help. I added the minimum launch distance table now after getting real good at launching at 5 or less away. Reading several accounts of torpedo air attack on ships the ranges were generally from 700-2000yds away. Not to complicate things or slow it down by a random distance die roll I just decided to have a hard minimum distance dependent on crew quality.

I also noticed that bombs weren't doing much damage if they didn't penetrate the armored deck. They really cause a bit more destruction than 'nothing' so the horizontal ship damage tables have been changed.

Campaign Ideas

The campaign rules are far down the road from here. First all the air rules must be completed, then the submarine rules. But for a campaign the hits aircraft receive will be important. I can think that each one will reduce the ability to make a safe landing on a carrier by 25% and on land by 15%. Also, there might be some range problems where damaged planes might not be able to fly as far.