Whistling Death!

Tactical Air Combat in the Pacific

Fighting Wings – Volume III

A Clash of Arms Game

This is a free down-load mini-sample rules set of the 2d edition Fighting Wings air combat game rules and some of its aircraft. It is designed to show some of the basic features of the game and how it plays in air-to-air combat. You are invited to make or download as many copies of this .PDF format file as you want and pass it to your friends.

Whistling Death is currently on a P300 pre-order system. About 200 copies of the game have been ordered so far. When 300 orders are reached the game will be published by Clash of Arms. You can help by putting in a pre-order at the Clash of Arms website and save at least $16 on the publication price.

Go to http://www.clashofarms.com and click the "new projects" button under the front page featured game. From the new project menu select "Whistling Death" for a detailed description of the game and its components. If interested, click the "Order Now" button and fill in the on line form.

Thank you,

J.D. Webster
Designer – Fighting Wings Series

Fighting Wings - Volume III - Advertisement

Whistling Death is the third game in J D Webster's WWII Fighting Wings series. Containing 110 scenarios (that's one hundred ten, folks) ranging from flight training (3), introductory air combat (5), air-to air combat (58), air-to-ground (4), air-naval (32), and mission level (8), it features 40 distinctive aircraft and numerous ship types.

The game comes with the following components:
420 aircraft counters (1/2 inch square)
140 ship counters (1/2 x 1 inch)
60 ship counters (3/4 x 2 inch) which must be cut-out by the player
1 map, 10 sided die
Revised 2d Edition Rule Book, Scenario Book
Aircraft/ship data cards, Player aids

Aircraft covered are:

Japan: A6M2, A6M3, and A6M5 Zero; A6M2-N Rufe; J2M3 Jack; N1K2-J George; Ki.43-lla Oscar; Ki.61-lb Tony; Ki.84-la Frank; F1M2 Pete; D3A2 Val; B5N2 Kate; D4Y2, D4Y3 Judy; B6N2 Jill; MXY7 Ohka; G4M1, G4M2 Betty; H8K2 Emily; and P1Y1 Frances.

USA: F2A-3 Buffalo; F4F-3 and F4F-4 Wildcat; FM-2 Wildcat; F6F-3 and F6F-5 Hellcat; F4U-1D and F4U-4 Corsair; P-39D Aircobra; P40E Warhawk; P-38G-10 Lightning; PBY-5A Catalina; TBD-1 Devastator; OS2U-3 Kingfisher; SBD-3 and SBD-5 Dauntless; TBF-1C and TBF 3 Avenger; SB2C -1C and SB2C-3 Helldiver.

Ships depicted, by class, are:

Japan: Yamato (BB), Kongo (BB), Kaga (CV), Shokaku (CV), Shoho (CVE), Myoko/Takao (CA), Nagara/Naka (CL), Kagaro/Yugumo (DE), Akazuki (DDAA), Matsu (DE), Ch13 (subchaser), Large, Medium and small merchant, Large, Medium and Small Landing Craft.

USA: Lexington (CV), Yorktown (CV), Essex (CV), Casablanca (CVE), Pennsylvania (BB), South Dakota (BB), Brooklyn (CL), Atlanta/Oakland (CL), Sims (DD), Sumner (DD), Cimarron (Oiler), Ashland (LSD),PT boat (80' Elco),
Landing Craft (SCI and SCS), Landing Ship (LSM and LSM-R).

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*** *Fighting Wings* ***
Introductory "Quick-Start" Rules

These rules allow players to sample the ***Fighting Wings*** game system with minimal effort and they can be used as a stepping stone to learning the rich details of the full game system.

Scale: One turn is 4 seconds of time. One map hex is 100 yards. Each aircraft (A/C) counter is one airplane. Each A/C flight point (FP) is 50 mph of speed, each half flight point is 25 mph of speed.

Sequence of Play: Each game turn is divided into three phases; ***Initiative***, ***Movement*** & ***Combat***. All desired activities allowed in one phase must be completed before starting the next phase. All phases must be completed before starting the next game turn.

Key Concepts: The game is played in three dimensions. A/C have a specific location and orientation which is defined by their ***map position***, ***altitude***, ***facing*** and ***flight attitude***. A/C may be in level, climbing or diving flight. Some may be at higher or lower altitudes than others. Being able to visualize the relationship between one A/C to another with regards to relative altitude and orientation is the key to maneuvering and firing at enemy A/C and, thus, to playing and enjoying ***Fighting Wings***.

A/C Data Cards (ADCs): The information need to fly an A/C is found on its data card. The key sections to be familiar with for these rules are the ***A/C Performance Chart*** which lists the A/C's speed limits, the ***Power versus Speed Chart*** which lists power available, banking and side slip requirements, and the ***Fire Power Chart*** which details each A/C's weapons. The use of each section of an ADC is explained in the rules sections below that are pertinent to that portion of the ADC. Items on an ADC not mentioned in these rules may be ignored.

Map Position: The hexgrid is used to position A/C counters. Counters can be in the center of a hex or placed on one of the six hexside lines that define the hex (but only if faced parallel to the line).

Altitude: Altitude is divided into 1,000 foot "levels", 100 foot "increments" and coded "bands" each about six levels thick. Performance numbers, as depicted on A/C data cards (ADCs), vary by altitude band. Altitude bands are identified by two-letter codes as follows:

UH+	=	Ultra-high	EH	=	Extremely high
VH	=	Very high	HI	=	High
MH	=	Medium high	ML	=	Medium low
LO	=	Low	VL	=	Very low

Altitude is always recorded as follows: "Thousands dot hundreds" (i.e., "2.1" = 2,100 feet, or two levels and one increment.

Facing: The nose of the A/C top view on a counter denotes the direction an A/C is facing. A/C must always face a hexside or one of the six junctures between two hexsides. This results in 12 allowed facings, each 30° apart from the next & labled with a compass heading (see compass rose in flight example diagram on page 3. (N = North, NNE = North by Northeast, NE = Northeast, E = East, etc.).

Flying: An A/C's start hex, facing, altitude, speed, angle of bank and flight attitude is recorded on an "A/C Logsheet" each game turn. One logsheet is kept for each A/C in play. The scenarios provide the initial data for the first game turn, and each player records changes resulting from movement each turn thereafter on the logsheet.

Speed & Flight Points: How fast an A/C can fly at different altitudes is shown on its ADC. Take any ADC and find the ***A/C Performance Chart***. At the far left is an altitude column listing the different bands. To the right are three columns labeled minimum, maximum and maximum dive speed. The nos. in each column are in terms of flight points. An A/C's start speed equals the flight points (FPs) it has for moving in a game turn. FPs can be expended as horizontal FPs (HFPs) or vertical FPs (VFPs). Each HFP expended moves the A/C one hex or hexside on the map in the direction it is facing. Each VFP expended changes altitude 300 feet up or down depending on the A/C's flight attitude (climbing or diving) but does not move it on the map. All full FPs must be expended each turn.

Half FPs: The smallest speed increment tracked is 0.5 (a half FP). Half FPs cannot be expended so they are carried forward until their A/C's start speed includes a 0.5, upon which, the two are added together to form an extra full FP. The extra FP must be an HFP if the A/C's start attitude is level or shallow, or a VFP if steep or vertical.

Bank Angles: There are six allowed bank angles; Wings Level (LVL), Left Bank (LB), Right Bank (RB), Inverted Left Bank (ILB), Inverted Right Bank (IRB) and Inverted (INV). Changing bank angles from an existing one to an adjacent one requires the A/C to be rolling left or right for a period of time expressed in the form of FPs expended. This is shown on the "Banking FPs" line of the ***Power vs. Speed Chart*** of the ADC. Cross reference the line with the speed range columns. If the number were 2, the A/C could roll to the next bank angle after every two FPs expended. A/C in LB, ILB, RB or IRB banks may turn in the direction of the bank. Banking between LB & ILB, or RB & IRB is allowed while turning, in all other cases banking and turning may not be mixed. The bank angle used by an A/C also helps define its nose attitude as upright or inverted.

Turning: If banked left or right, A/C may change facing as explained below. Depending on an A/C's speed and the turn rate selected, more than one facing change may be possible in a single game turn. There are five turn rates allowed: EZ (easy turn); TT (tight turn); HT (hard turn); BT (break turn) and ET (emergency turn), each representing increasing levels of G. A particular turn rate may only be used if the A/C has sufficient speed for it. EZ turns are allowed at any speed ≥ the A/C's minimum level speed. Higher turn rates require a minimum speed as listed on the ***A/C Performance Chart*** in the columns labled TT through ET. Cross index the A/C's altitude band with the desired turn rate to find the minimum speed required. If the A/C does not have that speed, it cannot use that rate.

The Turn Chart: Turning requires an A/C to expend, in movement, contiguous FPs equal to, or greater than the no. listed in the ***A/C Turn Chart*** at the intersection of the selected turn rate with the A/C's speed. Once sufficient FPs have been expended, over one or more game turns, the A/C's facing may be changed from its current heading to the adjacent one in the direction toward which the A/C is banked. If on a hexside when changing facing, shift the A/C to the hex adjacent to that hexside in the direction of the bank before changing facing (see example below). Changing facing ends a turn in progress and a new turn must be started to face again. On the ***A/C Turn Chart***, an entry of "60" or "90" allows 2 or 3 facing changes, respectively, for each FP expended.

Flight Attitudes: An A/C's flight attitude indicates the direction its nose is pointed in which determines how many FPs can be spent as HFPs or VFPs. There are seven basic flight attitudes: ***level flight*** and ***shallow, steep*** or ***vertical*** climbs and dives. With inverted bank attitudes included, 14 nose attitudes are possible. The ***Flight Attitude Diagram*** shows 12 positions but vertical attitudes can be upright or inverted and one way or the other must be declared the instant an A/C ends its move in a vertical attitude. This also determines when and if reversals occur (see below).

Flight Attitude Codes: Each attitude is given a logsheet code as follows; LVL = upright level, INV = inverted level, C or D indicates a climb or dive, SH = shallow, ST = steep and V = vertical. Attitude codes on the ***Flight Attitude Diagram*** in parenthisis are inverted attitudes. Flight direction reversals occur whenever A/C switch from upright or inverted bank attitudes to the opposite as a result of a nose attitude transition.

Flight Proportions Table: A/C in climbs or dives have a mandatory altitude change (MC) in altitude increments forced on them at the start of their move. An optional altitude change (OC) in altitude increments is always allowed at the end of an A/C's move. MC and OC are in addition to altitude changes caused by VFPs expended. The ***Flight Proportions Table*** defines how much MC and OC A/C must or may have and how many VFPs A/C can use during their move. To use this table, find the appropriate flight attitude and read across to the desired column (MC, VFPs, OC). All entries are presented as fractions. For MC, cross index that fraction with the A/C's speed on the ***Fractional Values Table*** to find the number of altitude increments the A/C is forced to climb or dive based on its ***STARTING*** attitude. The entry for VFPs lists the portion of the A/C's speed that may be VFPs based on its ***AVERAGE*** flight attitude (each VFP changes altitude by 3 increments). The OC allowed, calculated as for MC, indicates the maximum altitude change, in increments, the A/C may climb or dive based on its ***ENDING*** flight attitude.

Flight Attitude Transitions: At the start of each move, a player must choose whether his A/C will remain in its current attitude, or will change attitudes. If remaining in the current attitude, refer directly to the ***Flight Proportions Table*** to find the A/C's VFP allowance and MC or OC limits. Starting, average, and ending flight attitude always equal the current attitude in this case.

Transition Procedure: When changing flight attitudes, the ***Flight Attitudes Diagram*** is used. This is composed of two circles, each depicting the 14 nose angles. When pulling the nose up and around, the outer-circle is used. When pushing the nose forward and down, the inner circle is used. The procedure for changing flight attitudes is as follows:

1. Refer to the ***Flight Proportions Table*** and record any MC required by the A/C's start attitude.

2. Decide whether a pull or push transition will be used and refer to the appropriate circle of the ***Flight Attitudes Diagram***.

3. Select a turn rate allowed by the A/C's speed to be used for the transition and note the number of attitude changes allowed by that turn rate. Count around the circle, in the direction the A/C side view is pointed, a number of attitudes equal to the number allowed starting from the A/C's original flight attitude.

4. Use the average flight attitude of a transitioning A/C for purposes of determining HFP and VFPs allowed per the ***Flight Proportions Table***.

5. Decide whether any OC will be taken based on the end attitude reached during the transition - which is also next turn's start attitude.

Average Flight Attitude: When a transition is done, the flight attitude half way round the circle between an A/C's starting attitude and its ending attitude (rounded up) is its average flight attitude. The A/C may only expend VFPs as allowed by the average attitude to more accurately reflect its flight path during a transition.

Speed Changes: Engine thrust and diving cause an A/C to speed up. Turning, slipping, climbing and being too fast cause an A/C to slow down. This is measured by the accumulation of acceleration points (accel) and deceleration points (decel). At the end of each turn all decel points earned are subtracted from all accel points earned. If the remainder is positive, speed is gained; if negative, speed is lost. for every 5 points of difference, increase or decrease A/C speed by 0.5 FPs as required. The new speed is next turn's start speed. If, after making all possible speed adjustments, less than 5 accel or decel points remain, note this in the "accel carry" or "decel carry" space of the A/C log sheet for the following game turn. These points will be added to any accel or decel earned in the new turn. A list of the different accel and decel points are given below.

Accel & Decel Points:

Climbs and Dives - For each altitude increment (100') dived or climbed in a game turn, gain 1 accel or decel respectively.

Engine Power - Accel available from engine power is found by cross indexing the A/C's start altitude with the appropriate speed column of the ***Power Versus Speed Chart*** of its ADC. There may be one number, or two separated by a slash. Any amount of accel up to the highest number shown may be taken each game turn.

Turns and Transitions - For each 30° of facing change started, or each 30° of flight attitude change performed, add the listed decel number found in parenthesis next to the turn rate column header on the ADC. Note that EZ turn rates are not listed, but always incur half the listed TT turn rate decel (keep fractions).

Overspeed Decel - Anytime the A/C has a start speed greater than its maximum listed level speed, decel is incurred in an amount = 2 x (Current speed – maximum listed speed). Example: If max speed = 7.0 and current speed is 8.5, overspeed decel = 2x(8.5-7.0) = 2x1.5 = 3.0 decel.

Side Slip Decel - Each time a sideslip is started decel = to that for doing an "HT" turn is incurred.

Special Moves: A/C can do flight direction reversals & side slips.

Reversals: These are mandatory anytime an A/C does a transition which passes through a vertical flight attitude which changes its nose attitude from an upright or inverted one to the opposite kind, or if an A/C ends a game turn in a vertical flight attitude and chooses to flip from the upright or inverted attitude it started with to the opposite. A flight direction reversal is executed at the end of the move, by flipping the A/C's current bank angle between upright and inverted (i.e., LB to ILB) and changing its facing by 150 to 180 degrees in either direction resulting in a new heading 5 or 6 headings around the compass from the original.

Side Slips: In a ***Slip***, A/C may displace from their current hex or hexside, to the hex or hexside forward and to either side of their flight path respectively. The side slip FP time requirement is listed underneath the banking requirement. Once the time requirement is met in terms of FPs of movement, an A/C may be shifted as shown on the diagram on page 3 on the expenditure of the next HFP. Slip FPs may not be used to count toward banking or turning. Starting a slip incurs HT turn decel.

Stalling: If an A/C's start speed ends up below its listed minimum speed it stalls. When an A/C stalls, it has "0" FPs and cannot turn, roll or do anything. Its nose attitude immediately changes to steep dive. It will lose altitude increments by an amount = to its listed minimum speed + the game turns it has been stalled. It gains accel normally from diving and power. When its start speed is above its minimum speed it can fly and move normally again and has a start attitude of steep dive.

Dangerous Dives: If an A/C's start speed is above its maximum dive speed, roll a D10. On a 9 or 10 it is destroyed.

This Ends the Flying Rules

Gun Combat: The introductory rules only discuss fighter combat with fixed guns (**N** (nose) or **W** (wing) coded weapons on the ***Fire Power Chart*** of the ADC). A target must be in both the shooter's horizontal and vertical fields-of-fire, and within the range of the guns being fired to be attacked. The horizontal field-of-fire is shown in the diagram below for A/C facing hexes, hex junctures and on hexsides. Climbing A/C may not fire on lower targets, diving A/C may not fire on higher targets. The vertical field-of-fire is further limited as follows:

1. Shooter in level flight - target not more than 100 feet higher or lower per two hexes or less of range. Same altitude for range 0 shots.

2. Shooter in shallow flight - target at least 100 feet away per 3 hexes or less of range & not more than 200 feet away per hex of range.

3. Shooter in steep flight - target at least 100 but not more than 600 feet away per hex of range (not more than 300 feet away at range 0).

4. Shooter in vertical flight - target any distance away in altitude if target in same hex (shooter facing unimportant) or, if in adjacent hex, at least 600 feet or more away and in horiz. field-of-fire as defined by facing.

Gun Ranges and Firepower: The ***Firepower Chart*** on the ADC lists the attack strength of each group of guns an A/C has. All or some of the guns may be used in an attack. To determine range to a target, count the horizontal hexes away the target is and add one for every 300 feet of altitude difference between the shooter and the target.

Resolving Gun Attacks: Follow the procedure on page six to calculate the combat odds and then roll percentile dice (01 to 100 using two 10 sided dice, one representing single digits and the other representing 10s). Apply any appropriate modifiers for highest turn rate used that turn, wing gun harmony effects, etc.

Damaging A/C: Cross index the modified percentile roll result with the combat odds to find the number of hits inflicted. An A/C has two damage factors. When an A/C suffers cumulative hits exceed its lowest listed damage factor, it is severely damaged and suffers the following effects:

Severe Damage Effects:

- Add 0.5 to all minimum level and turn speeds.
- Reduce all maximum speeds by 1.0.
- Add 1 to all bank and slip requirements.
- ET turns destroy the A/C & add 2 to dangerous dive rolls.
- Add a +30 shot modifiers.

When hits exceed the higher damage factor, the A/C is destroyed.

Critical Hits: Compare the number of hits inflicted in a single attack with the lowest critical hit rating of any of the guns fired. For each multiple of that rating inflicted in hits, roll once to determine where the critical hit occured and again to determine what the results of that type of critical hit was. Immediately apply the results to the target.

This Ends the Combat Rules

Optional Rules: The following rules may be added in if all players agree to them.

Pilot Quality: There are four levels of pilot Quality; Recruit, Green, Regular and Veteran. In addition some pilots may be aces or crack shots. Pilot quality provides modifiers to the shot die rolls and to initiative rolls.

A/C Protection: Some A/C have engine, fuel tank or cockpit protection die roll modifiers listed on their ADC representing the presence of armor plate or self sealing tanks. If so, their modifiers are added to any critical hit result die rolls in those areas of the aircraft.

PLAYING THE GAME

Set Up: Place A/C counters on the map according to the selected game scenario. Begin play following the sequence given below.

Initiative Phase: In this phase players determine in what order A/C will be moved. Each player rolls a ten sided die for each A/C in his control. The lowest roller moves first and so on. Players with ties must reroll until the tie is broken. Pilot quality modifiers do not apply to tie-breaker rolls.

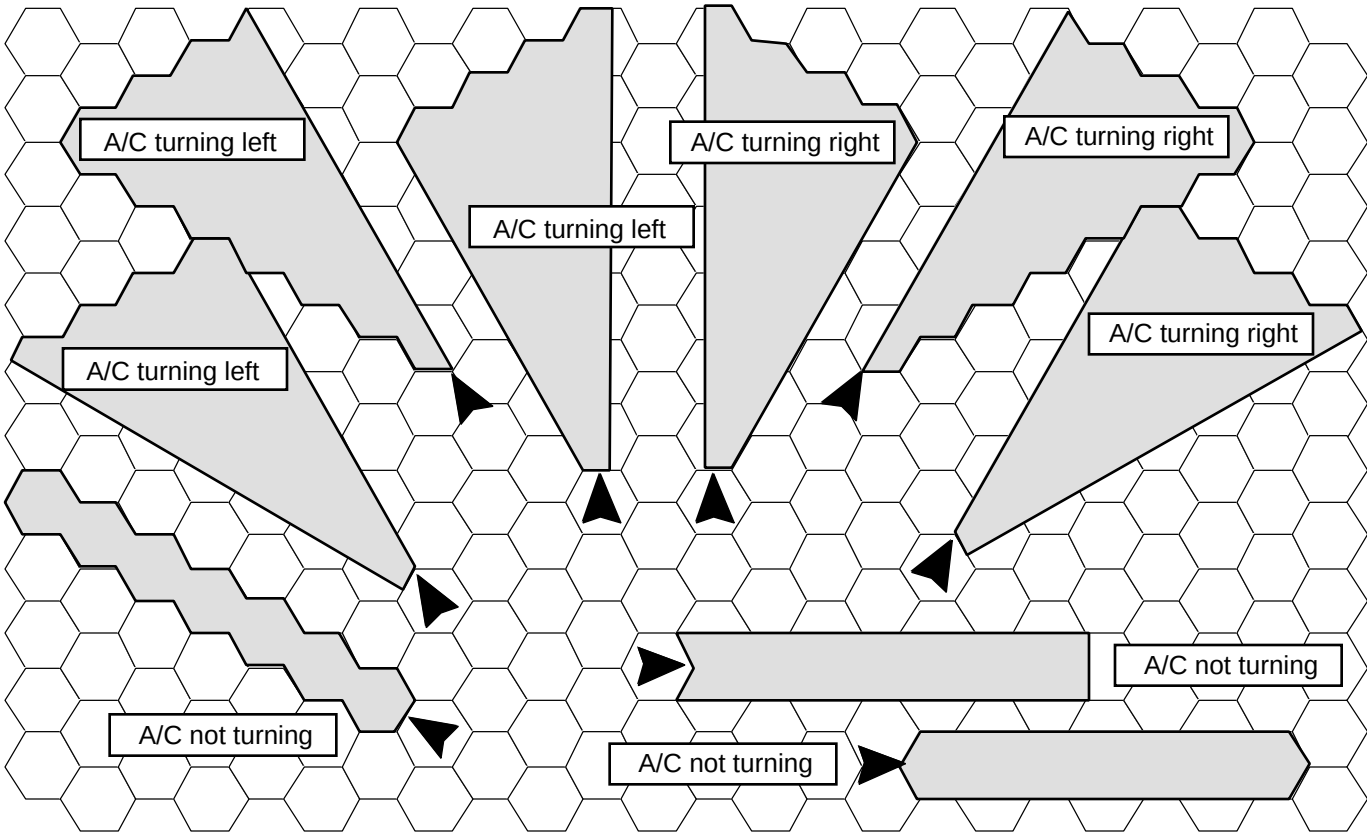
Tailing Exception to Initiative: If an A/C has an enemy A/C within a horizontal wedge equal to both its left and right turning field-of-fire arcs combined, whether the A/C is actually turning or not, and if the enemy is within 8 hexes of range (counted as for gun shots) at the start of a turn, it may tail the enemy, adopting its initiative no. and moving immediately after it moves.

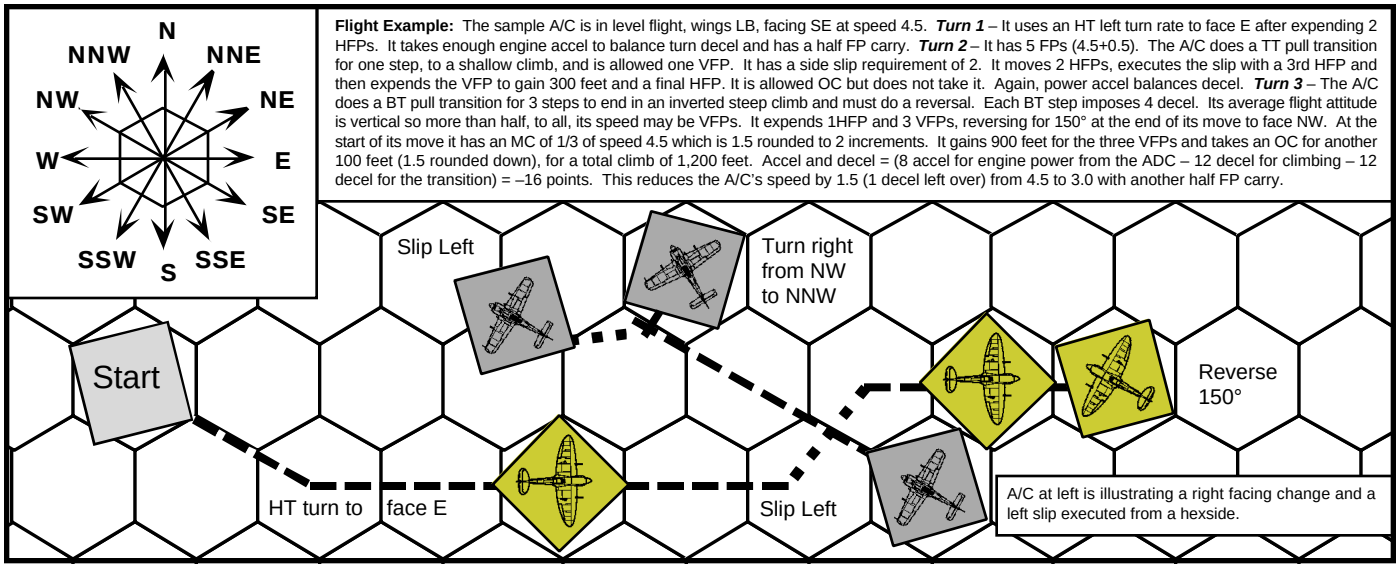
Movement Phase: In this phase players move their A/C about the map as allowed by the flight rules in the order established by initiative.

Combat Phase: After all movement is complete, players may conduct fixed gun attacks against any one eligible enemy A/C in their A/C's field-of-fire. Each attack expends one point of ammo. When guns use up all their ammo, they may not fire any more. Damage results from attacks are not applied until after all A/C have fired.

Victory Points (V.P.s): Each A/C has two V.P. numbers. The lower number is awarded to the enemy side if the A/C is severely damaged by the end of play. The higher number is awarded if the A/C is shot down by the end of play. If both occur, only the higher number applies. The side with the most points at the end of play is the winner.

Horizontal Field-of-Fire Diagram





Flight Example: The sample A/C is in level flight, wings LB, facing SE at speed 4.5. ***Turn 1*** – It uses an HT left turn rate to face E after expending 2 HFPs. It takes enough engine accel to balance turn decel and has a half FP carry. ***Turn 2*** – It has 5 FPs (4.5+0.5). The A/C does a TT pull transition for one step, to a shallow climb, and is allowed one VFP. It has a side slip requirement of 2. It moves 2 HFPs, executes the slip with a 3rd HFP and then expends the VFP to gain 300 feet and a final HFP. It is allowed OC but does not take it. Again, power accel balances decel. ***Turn 3*** – The A/C does a BT pull transition for 3 steps to end in an inverted steep climb and must do a reversal. Each BT step imposes 4 decel. Its average flight attitude is vertical so more than half, to all, its speed may be VFPs. It expends 1HFP and 3 VFPs, reversing for 150° at the end of its move to face NW. At the start of its move it has an MC of 1/3 of speed 4.5 which is 1.5 rounded to 2 increments. It gains 900 feet for the three VFPs and takes an OC for another 100 feet (1.5 rounded down), for a total climb of 1,200 feet. Accel and decel = (8 accel for engine power from the ADC – 12 decel for climbing – 12 decel for the transition) = –16 points. This reduces the A/C's speed by 1.5 (1 decel left over) from 4.5 to 3.0 with another half FP carry.

AIRCRAFT:

FW – A/C FLIGHT LOG SHEET

GAME TURN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Next Log
INITIATIVE ROLL																
START HEX																
START FACING																
START ALTITUDE																
START SPEED																
0.5 FP CARRY																
ANGLE-OF-BANK																
TURN / MNVR. CARRY																
START FLT. ATT.																
TRANS. RATE - STEPS																
HFP / VFP SPLIT	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
MAND. ALT. CHANGE																
VFP ALT. CHANGE																
OPT. ALT. CHANGE																
NET ALTITUDE CHANGE																
THROTTLE																
ACCEL CARRY																
POWER ACCEL																
DIVE & DV. ATT. ACCEL																
TOTAL ACCEL																
DECEL CARRY																
TRANSITION DECEL																
CLIMB & CL. ATT. DECEL																
INVERTED & MISC. DEC.																
TURN RATE DECEL																
MANEUVER DECEL																
OVERSPEED DECEL																
TOTAL DECEL																
ACCEL – DECEL =																
NET SPEED CHANGE																

Pilot:

Initiative Mod:	Veteran +1 Regular +0 Green –2 Recruit –4
Keen eyes:	+02 to Tac-scale first sight rolls if a flight lead
Ace / Hero:	–05 to attack LH rolls for each
Crack shot:	+ or –1 to critical hit area roll if range 2 or less
Gifted Flyer:	HT+ turns or transitions at .05 speed less

Station:	**Item**	**Load**	**Weight**

Hits Taken:

Damage Notes:

Wpn. Group	**Ammo**	**Shots Fired**
____	____	
____	____	
____	____	
____	____	
____	____	
____	____	

Endurance Available:

Endurance Used/Lost:

A/C TURN CHART (Banking - A/C must be in LB or ILB to turn left, RB or IRB to turn right)

A/C SPEED in FPs	EASY "EZ"	TIGHT "TT"	HARD "HT"	BREAK "BT"	EMERG. "ET"	SCALE MPH
1.0 - 1.5	1	60	90	NA	NA	50 - 75
2.0 - 2.5	2	1	60	90	NA	100 - 125
3.0 - 3.5	3	2	1	60	90	150 - 175
4.0 - 4.5	4	3	2	1	60	200 - 225
5.0 - 5.5	6	4	3–2	2–1	1	250 - 275
6.0 - 6.5	8	6	3	2	2–1	300 - 325
7.0 - 7.5	10	7	4	3–2	2	350 - 375
8.0 - 8.5	12	8	5	3	3–2	400 - 425
9.0 - 9.5	15	9	6	4	3	450 - 475
10.0 - 10.5	18	10	8	5	3	500 - 525
11.0 - 11.5	22	12	9	6	4	550 - 575
12.0 - 12.5	26	14	11	7	5	600 - 625

1. **Procedure** - Cross index speed with turn rate to find the minimum turning FPs required per 30° of facing change. Turn Rate decel is incurred per 30° of facing change.
2. **"90" or "60" entries** indicate a maximum allowed facing change in degrees for one FP.
4. **"3-2" or "2-1" entries** indicate a split turning FP requirement; the left no. for the first facing change and the right no. is for the next facing change. The cycle repeats for a continuous turn at that rate.

FRACTIONAL VALUES

No.	1/4	1/3	1/2	2/3
0.5	0.0	0.0	0.0	0.5
1.0	0.0	0.5	0.5	0.5
1.5	0.5	0.5	0.5	1.0
2.0	0.5	0.5	1.0	1.0
2.5	0.5	1.0	1.0	1.5
3.0	0.5	1.0	1.5	2.0
3.5	1.0	1.0	1.5	2.5
4.0	1.0	1.5	2.0	2.5
4.5	1.0	1.5	2.0	3.0
5.0	1.0	1.5	2.5	3.5
5.5	1.5	2.0	2.5	3.5
6.0	1.5	2.0	3.0	4.0
6.5	1.5	2.0	3.0	4.5
7.0	1.5	2.5	3.5	4.5
7.5	2.0	2.5	3.5	5.0
8.0	2.0	2.5	4.0	5.5
8.5	2.0	3.0	4.0	5.5
9.0	2.0	3.0	4.5	6.0
9.5	2.5	3.0	4.5	6.5
10.0	2.5	3.5	5.0	6.5
10.5	2.5	3.5	5.0	7.0
11.0	2.5	3.5	5.5	7.5
11.5	3.0	4.0	5.5	7.5
12.0	3.0	4.0	6.0	8.0

FLIGHT PROCEDURES SUMMARY

A. Use throttle: Take from 0 to highest number shown on ***Power versus Speed Chart*** for A/C's speed range and altitude.

B. If Stalled: A/C has zero FPs, and will lose altitude in increments = to listed minimum speed plus number of game turns stalled. Flight Att. = STD. Dive and engine accel are added normally. When start speed > minimum speed, A/C may fly again. If A/C hits altitude 0.0 it crashes.

C. Choose Flight Attitude: Remain in same attitude, or transition to new attitude. If transition desired, find A/C's start attitude, select turn rate used for pull or push transition and count around ***Flight Attitude Diagram*** a number of attitudes allowed by turn rate to find ending flight attitude. Use average flight path for determining VFPs allowed.

D. Execute A/C Move: Proceed as follows:
- Apply any mandatory altitude change (MC) immediately.
- Expend FPs in compliance with ***Flight Proportion*** restrictions of average attitude. (HFPs & VFPs may be mixed in any order)
- Take optional altitude change (OC) at end of move if desired.
- Each VFP expended changes altitude by 300 feet.
- If A/C transitions through a vertical attitude, or ends in a vertical att. and reverses bank angle, perform a flight direction reversal at end of its move.

E. Determine Speed Change: Record accel & decel points incurred. Subtract decel from accel. A/C gains or loses 0.5 speed per 5 accel or decel left. Record on flight log - A/C's new attitude, altitude, speed, bank angle and any 0.5 FP, accel or decel carried forward.

FLIGHT PROPORTIONS TABLE

Flight Attitude	Mandatory Changes	VFPs Allowed (Rest are HFPs)	Optional Changes
Level	None	None	± up to 1/4 +
Shallow	1/3 +	0 or 1 FP as VFP	up to 1/3 –
Steep	1/2 +	1 to ≤ 1/2 of speed	up to 1/2 –
Vertical	1/3 +	> 1/2 to All of speed	up to 1/3 –

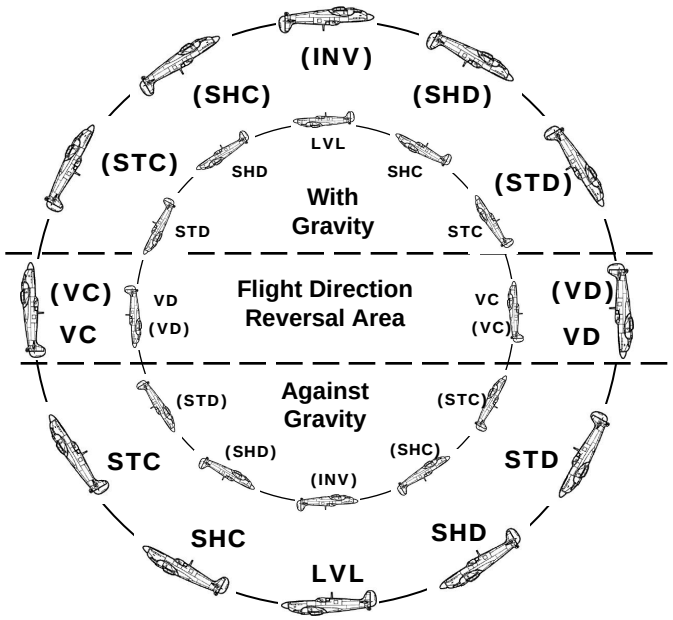
Notes:
1. Fractions indicate change in alt. increments = to that portion of A/C's speed ("+" = round up fraction, "–" = round down).
2. Mandatory changes (MC) are based on starting flight attitude.
3. VFPs allowed are based on average flight attitude.
4. Optional changes (OC) are based on ending flight attitude.
5. ***Fractional values Table procedure*** - If start attitude is:
   - Level or shallow, round VFP portion down, HFP portion up.
   - Steep or vertical, round VFP portion up, HFP portion down.

Flight Attitudes Diagram

Transition Turn Rate = Flight Attitude Changes

None = 0 EZ = 1 TT = 1 HT = 2 BT = 3 ET = 4

- If pulling or pushing with gravity at start, +1 change allowed.
- Pushing more than two steps invokes Neg. G shot modifiers.
- Outer circle shows flight att. changes when pulling nose up.
- Inner circle shows flight att. changes when pushing nose down.
- For TT or higher transitions, Average flight path (AFP) = flight attitude half way between original and new attitude (rounded up).
- If using EZ transition, AFP is same as start flight attitude.
- Decel for transitioning = decel for turn rate used x no. of changes.



HALF FPs RULE

When 0.5 FP carry mates with half speed to create a bonus FP:

- If start attitude is level or shallow, bonus FP must be HFP.
- If start attitude is steep or vertical, bonus FP must be VFP.

Quick Start - Fighting Wings Combat Tables

AIR-TO-AIR COMBAT PROCEDURE

1. Determine Range of attack = Hexes + each 300 feet. Add up firepower of all weapons fired at that range.
2. Determine deflection angle.
   a. Get defense multiplier from heading difference
   b. +1 to mult. if target or shooter in level & other not.
   c. +2 if target or shooter is diving and other climbing.
3. Multiply target defense strength by multiplier. Get combat odds by dividing firepower by final defense str.
4. Roll percentile dice on odds table to determine no. of hits acheived. For each multiple of hits equal to gun groups critical rating, inflict one critical hit.
5. Roll d10 to determine where critical hits occur on table below, roll d10 for critical effect in each area. Apply any modifiers for A/C protection to effect rolls.

A/C CRITICAL AREA HIT TABLE (D10)

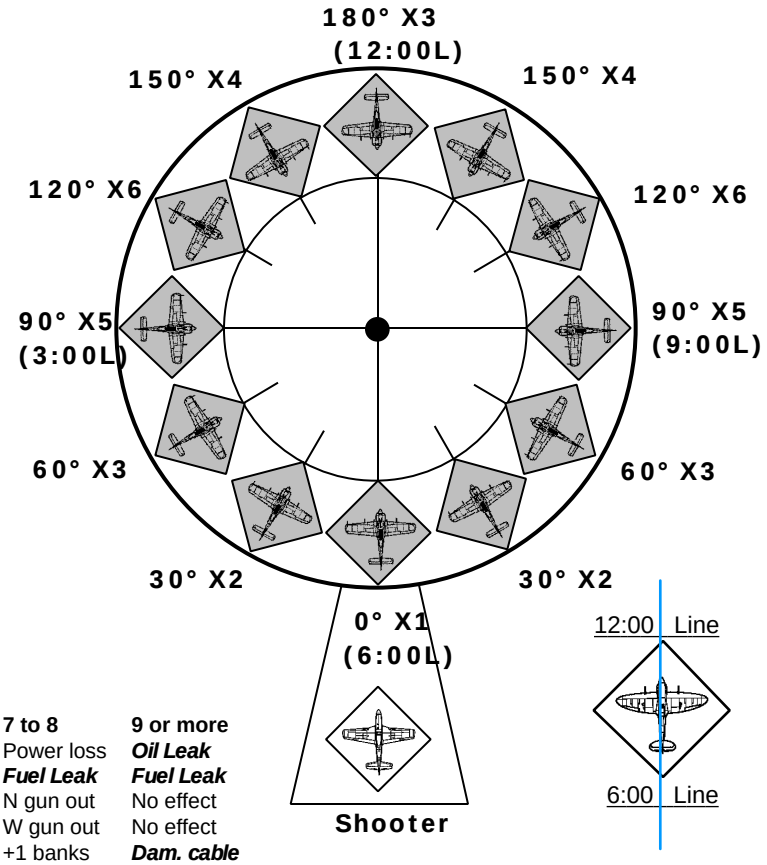
D10	Area Hit	D10	Area Hit
≤ **2**	Engine (random which)	**6**	Cockpit
3, 4	Fuel tanks	**7, 8**	Wings
5	Hollow space (no effect)	≥ **9**	Controls

Modifiers: –1 if final deflection to target = 150 or 180.
+1 if final deflection to target = 30 or 00. –1 if multi-engine A/C.
–1 if hit from 12:00 line. Crack shots may adjust ±1 if range ≤ 2.

CRITICAL HIT EFFECTS TABLE (D10)

Area Hit	1 or less	2 to 3	4 to 6	7 to 8	9 or more
Engine:	Eng. seizes	Fire!	Power loss	Power loss	***Oil Leak***
Fuel Tanks:	A/C blows up*	Fire!	***Fuel Leak***	***Fuel Leak***	***Fuel Leak***
Cockpit:	1 crew killed*	1 crew Killed*	1 crew wnd.	N gun out	No effect
Wings:	Wing breaks off*	Wing spar**	+1 banks / slips	W gun out	No effect
Controls	Cables severed*	Tail structure**	+1 banks / slips	+1 banks	***Dam. cable***

- (*) If all engines seized, or an asterix result occurs, A/C is destroyed.
- (**) 3 wing spar or tail str. hits destroy an A/C. If wounded twice, crewman is killed.
- Oil & fuel leaks and damaged cables provide -1 mod.s to subsequent rolls in that area.
- Power loss reduces max accel on eng. hit by a fraction (to 2/3, 1/2, 1/3, 1/4, then eng. out).
- For each fire, roll D10 end of each turn, (1= A/C blows up, 9 or 10= fire out). -1 if fuel fire.



Deflection Multiplier Play Aid

Gun Attack Percent - Die Roll Modifiers

Special Damage Rule: If cumulative modifiers will cause a percentile roll 01 to miss, a roll of 01 will still inflict 4 hits regardless of odds.

Recruit or Green pilot / crew	= +30, +15	Firer used TT turn*	= +00 / +10*	Target size modifier	= –05 x ADC modifier
Veteran or hero pilot / crew	= –05 each	Firer used HT turn*	= +10 / +20*	Deflection modifiers	= Var. Defense. Str.
Ace or crack shot pilot	= –10 each	Firer used BT turn*	= +20 / +30*	*Turn rate mods. for F&L / M&H class resp.	

Firer or aimer wounded (Wnd)	= +20	Gun harmony, if range 2, 3 and if ≥ half actual guns used are wing guns	= –15, –10
Firing A/C severely damaged	= +30	Each hex past gun harmony if ≥ half actual guns used are wing guns	= +10
Firing A/C inverted or neg.-G	= +30	If shooter's 12:00 line superimposes target's 6:00 line with 180, 0 deflection	= –10, –20

DAMAGE (Hits Achieved) TABLE

Percent Die Roll	*COMBAT ODDS* 1–6	1–4	1–2	1–1	1.5–1	2–1	3–1	4–1	5–1	6–1	8–1	10–1	12–1
≤ 01*	4	4	5	6	7	8	9	10	12	14	16	18	20
02 to 05	2	3	4	5	6	7	8	9	10	12	14	16	18
06 to 11	1	2	3	4	5	6	7	8	9	10	12	14	16
12 to 22	–	1	2	3	4	5	6	7	8	9	10	12	14
23 to 39	–	–	1	2	3	4	5	6	7	8	9	10	12
40 to 59	–	–	–	1	2	3	4	5	6	7	8	9	10
60 to 76	–	–	–	–	1	2	3	5	5	6	7	8	9
77 to 87	–	–	–	–	–	1	3	4	5	5	6	7	8
88 to 93	–	–	–	–	–	–	2	3	4	5	5	6	7
94 to 96	–	–	–	–	–	–	–	2	3	4	4	5	6
97 to 98	–	–	–	–	–	–	–	–	–	–	2	4	5
≥ 99	–	–	–	–	–	–	–	–	–	–	–	–	–

F4F-4 "Wildcat"

A/C Type: Grumman Carrier Based Fighter
Engine(s): One Pratt & Whitney R-1830-86
Eng. Pwr: 1000 - 1200 HP, Radial Air Cooled
A/C Crew: Pilot

Max Speed: 320 MPH at 18,800 Feet
Max Ceiling: 34,000 / 27,900 / 20,100 Feet

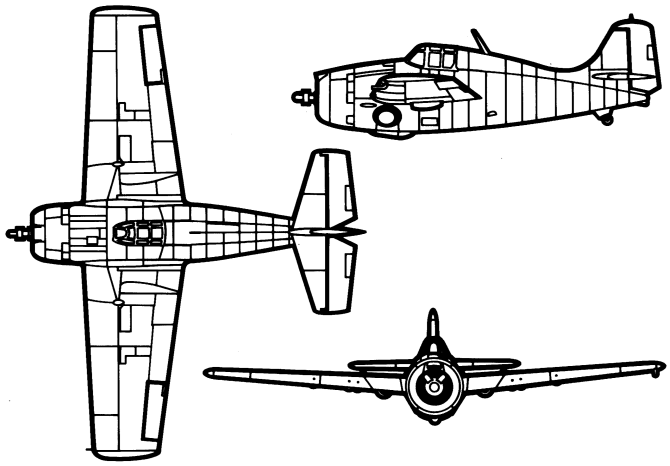
Defense Factor: 5 Size Modifier: + 0
Damage Factor: 9 / 13 Endurance: 200
Cockpit View: Fair Blind Area: Rear

Protection: Cockpit +2 Fuel +2 Engine +0

Climb Decel / Dive Accel: 3.0 / 1.0
Weight and Load Limit: 1,070 / 2 - 5

Wpn. Stations	Weight	Allowed Loads
1, 5	110	Bomb
2, 4	425	Fuel Tank
3	300	Fuel Tank

Country: U.S.A. Service Entry Date: December 1941



Class: F Victory Points: 5 - 9

AIRCRAFT PERFORMANCE CHART

Altitude Levels	Band	Minimum Speed	Maximum Speed	Maximum Dive Spd.	Min. TT (2)	Min. HT (3)	Min. BT (4)	Min. ET (5)	Altitude Band	Altitude Levels	Average Rate Of Climb
43+	UH	——	——	——	—	—	—	—	UH	43+	——
37 - 42	EH	——	——	——	—	—	—	—	EH	37 - 42	——
31 - 36	VH	3.0	5.5	9.5	4.0	5.5	7.0	8.0	VH	31 - 36	300
25 - 30	HI	2.5	5.5	10.0	3.5	5.0	6.0	7.0	HI	25 - 30	700
19 - 24	MH	2.5	6.0	10.0	3.0	4.5	5.5	6.5	MH	19 - 24	1,400
13 - 18	ML	2.0	6.0	10.0	3.0	4.0	5.0	6.0	ML	13 - 18	1,700
7 - 12	LO	2.0	6.0	9.5	2.5	4.0	4.5	5.5	LO	7 - 12	1,800
1 - 6	VL	1.5	5.5	9.0	2.5	3.5	4.0	5.0	VL	1 - 6	1,900

FIRE POWER CHART

Guns	Type Weapons	Ammo	Criticals
W1	One .50 Calibre M2	9	3
W2	Two .50 Calibre M2	9	3
W3	Two .50 Calibre M2	9	3
W4	One .50 Calibre M2	9	3

GUN ATTACK FACTORS

Range	W1	W2	W3	W4	Total
0	9	18	18	9	54 / 36
1	7	14	14	7	42 / 28
2	4.5	9	9	4.5	27 / 18
3	3	6	6	3	18 / 12
4	2	4	4	2	12 / 8
5	1.5	3	3	1.5	9 / 6
6	1	2	2	1	6 / 4
7	—	—	—	—	— / —

WEAPON STATIONS

POWER VERSUS SPEED CHART

Levels	Band	1.0 - 4.5	5.0 - 7.5	8.0 - 9.5	10.0 +	Band
43+	UH	——	——	——	——	UH
37 - 42	EH	——	——	——	——	EH
31 - 36	VH	3.0	1.0	——	——	VH
25 - 30	HI	5.0	2.0	——	——	HI
19 - 24	MH	6.0	3.0	——	——	MH
13 - 18	ML	7.0	4.0	——	——	ML
7 - 12	LO	7.0	4.0	——	——	LO
1 - 6	VL	7.0	4.0	——	——	VL
Banking FPs:		2	2	3	5	
Side Slip FPs:		2	3	5	6	

NOTES & VARIANTS

F4F-4s: Station 3 for the drop tank was a field modification done in Pearl Harbor and used from July 1942 on. Stations 2 and 4 for drop tanks were incorporated into production A/C delivered from October 1942 on. A/C with stations 2 and 4 did not have station 3. Flaps can only be used at speeds ≤ min. +1.0. Above that they retract automatically due to air pressure. They cannot be damaged by over-speed.

FM-1: December 1942 General Motors 4-gun model. As F4F-4 except W2 & W3= One .50 Calibre M2. Data as for W1 & W4, ammo= 16 for all guns. Delete stations 2, 3, 4. (900 built). Use Firepower Totals after slash.

Martlet V: Export version of the FM-1. 312 were supplied to the British ***Fleet Air Arm*** starting February 1943. Exactly as FM-1. Used in the Atlantic and Mediterranean theaters from escort carriers.

Mitsubishi A6M2 "Zero"

A/C Type: Model 21 Type 0 Carrier Fighter
Engine(s): One Nakajima Sakae 12, No F.I.
Eng. Pwr: 820 - 950 HP, Radial Air Cooled
A/C Crew: Pilot

Max Speed: 331 MPH at 14,900 Feet
Max Ceiling: 33,800 / 27,700 / 20,000 Feet

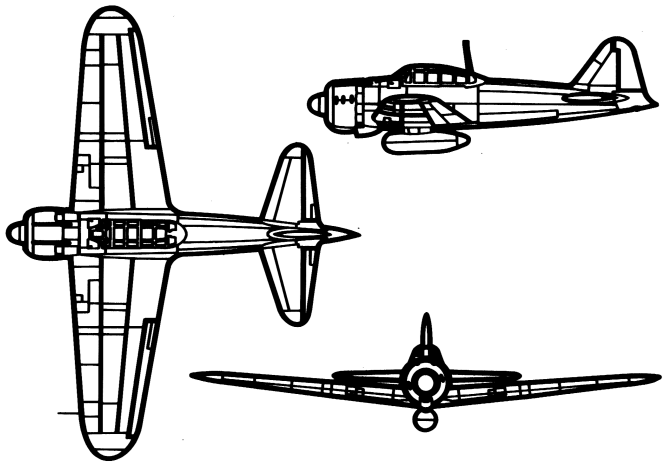
Defense Factor: 5 Size Modifier: +0
Damage Factor: 6 / 10 Endurance: 250
Cockpit View: Good Blind Area: Rear low

Protection: Cockpit +0 Fuel +0 Engine +0

Climb Decel / Dive Accel: 3.0 / 1.0
Weight and Load Limit: 870 / 2 - 5

Wpn. Stations	Weight	Allowed Loads
1, 3	135	Bomb
2	600	Fuel Tank

Country: Japan Service Entry Date: December 1940



Class: F Victory Points: 4 - 8

AIRCRAFT PERFORMANCE CHART

Altitude Levels	Band	Minimum Speed	Maximum Speed	Maximum Dive Spd.	Min. TT (2)	Min. HT (3)	Min. BT (3)	Min. ET (4)	Altitude Band	Altitude Levels	Average Rate Of Climb
43+	UH	——	——	——	—	—	—	—	UH	43+	——
37 - 42	EH	——	——	——	—	—	—	—	EH	37 - 42	——
31 - 36	VH	2.5	5.5	9.5	3.5	5.0	6.0	7.0	VH	31 - 36	600
25 - 30	HI	2.0	6.0	10.0	3.0	4.5	5.5	6.5	HI	25 - 30	1,400
19 - 24	MH	2.0	6.0	10.0	3.0	4.0	5.0	5.5	MH	19 - 24	2,000
13 - 18	ML	2.0	6.5	9.5	2.5	3.5	4.5	5.0	ML	13 - 18	2,400
7 - 12	LO	1.5	6.0	9.0	2.5	3.5	4.0	4.5	LO	7 - 12	3,100
1 - 6	VL	1.5	5.5	8.0	2.0	3.0	3.5	4.5	VL	1 - 6	3,300

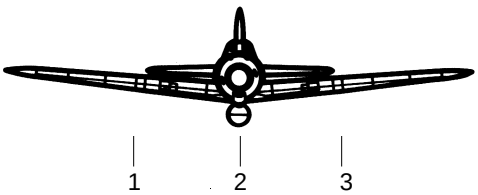
FIRE POWER CHART

Guns	Type Weapons	Ammo	Criticals
N1	One 7.7mm Type 97	16	4
N2	One 7.7mm Type 97	16	4
W1	One 20mm Type 99m1	3.5 (6)	2
W2	One 20mm Type 99m1	3.5 (6)	2

GUN ATTACK FACTORS

Range	**N1**	**N2**	W1	W2	Total
0	5	5	13	13	36
1	4	4	10	10	28
2	3	3	7	7	20
3	2	2	5	5	14
4	1	1	3	3	8
5	1	1	2	2	6
6	—	—	—	—	—
7	—	—	—	–-	—

WEAPON STATIONS



POWER VERSUS SPEED CHART

Levels	Band	1.0 - 4.5	5.0 - 7.5	8.0 - 9.5	10.0 +	Band
43+	UH	——	——	——	——	UH
37 - 42	EH	——	——	——	——	EH
31 - 36	VH	1 / 2	1 / –	——	——	VH
25 - 30	HI	3 / 4	1 / 2	——	——	HI
19 - 24	MH	5 / 6	2 / 3	——	——	MH
13 - 18	ML	6 / 7	3 / 4	——	——	ML
7 - 12	LO	7 / 8	4 / 5	——	——	LO
1 - 6	VL	7 / 8	4 / 5	——	——	VL
Banking FPs:		2 / 2	3 / 4	6 / 7	8 / 9	
Side Slip FPs:		3	4	6	8	

NOTES & VARIANTS

A6M2 Model 21: Built from December 1940 to February 1944. Comprised almost 50% of all Zeros built in this period (even after improved A6M3 and A6M5 Zeros appeared). After July 1942, cannon ammo = 6 shots. Ring & bead backup sight. Stations 1 & 3 may carry one bomb of up to 132lbs. Station 2 is for 87g drop tank.

Banking: Zero rolled better to left than right. Numbers for left / right roll resp. Spring tabs added to ailerons from May 1943, new Bank FPs = 2/2, 2/3, 5/6, 7/8.

A6M2 Model 11: First 64 Zeros delivered from July to November 1940. Used only in China from August 1940 on. Initial engine problems (–2 to any enroute event caused engine critical hit rolls). Thinner wing skin - Reduce all max safe dive speeds by 0.5 and damage = 6 / 9. Not usable on aircraft carriers due to absence of folding wingtips which appeared with Model 21. All else as Model 21.