

Air War-Vietnam



**Miniatures Rules for Jet Combat
Over Vietnam 1965-1972**



David Child-Dennis



Air War-Vietnam

From Thuds to Phantoms

The air war that raged over Vietnam from 1965-1972 saw the introduction of several new aircraft, SAMs, air to air missiles, and large scale air combat operations.

From the first air strikes with F-105 Thunderchiefs going up against Mig-17s to later in the war when F-4s fought Mig-21s, there was no shortage of air operations. B-52 strikes, close air support by Skyraiders, CSAR missions, carrier strikes, etc., were all features of this war. The Vietnam war also saw the large scale introduction of SAMs, electronic warfare, TV guided weapons, and resulted in the crea-

tion of the Top Gun program to hone the dog-fighting skills of U.S. pilots.

For the wargamer, the Vietnam air war offers ample opportunities for designing scenarios. From MIGCAP missions over Hanoi to taking out SAM systems with Wild Weasel aircraft on Iron Hand missions, there is a massive environment to create your own missions.

Air War-Vietnam is the second game in an air combat series (the first was Air Combat-Korea) designed for wargamers who wish to fight these famous air campaigns. The rules are set at an introductory level and are ideal for large groups or those gamers who don't wish to read an aircraft operating manual to learn how to fly jets for a few fun-filled hours.



Getting Started

Air War-Vietnam is designed for 1/600th or 1/300th miniatures, although 1/144th can be used by doubling all measurements.

Print and cut out all of the templates needed to play the game, plus you

will need some six sided dice for various rolls during the game. It is a good idea to laminate the templates or print them on cardstock as they will be used quite often during the game. It is also a good idea to

produce multiple copies for a number of players to help speed things up during play.

You will need a large mat or surface that will enable the players to maneuver multiple jets on the play area.

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Design Credits

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Sequence of Play

Air War-Vietnam has a strict sequence of play which must be followed by all players each turn. Go through the steps listed below in order, with each player performing the steps where applicable for all aircraft.

Air War-Vietnam Sequence of Play

1. Place altitude, maneuver and airspeed markers beside the aircraft model stand, **face down**.
2. Reveal markers.
3. Check Initiative – The fastest aircraft moving first, whether following or not, and then following aircraft moving last if their movement rate does not exceed the aircraft they are attempting to follow.
4. Move all aircraft in order of initiative.
5. Check target acquisition.
6. Engage in air-to-air firing.
7. Engage in anti-aircraft fire against ground attack aircraft
8. Aircraft attacking ground targets conduct their attack (s). If the game has not ended, start a new turn with Step #1.

Movement

Every aircraft model **MUST** move each game turn, unless shot down or in an unrecovered stall.

Aircraft following another, within gun range (12cm), and within the front arc of the following aircraft always have the initiative. The front arc of an aircraft is defined as the arc from wing-tip to wing tip across the nose.

Maximum combat movement rate on the table is 50cm for 1:300 or 1:600 scale models. If players wish to use 1:144 scale, then double all ranges. If players are combining piston-engine aircraft (Skyraider etc) with the jets, then reduce the piston engine aircraft movement rates by half that indicated for jets.

Players may attempt to leave the battle area at any point during the game (battle damage, outnumbered, out of ammo, etc.). The player waits until the movement section of the game turn and then declares that they are disengaging and egressing the battle

area, then checks to see if it is successful. An aircraft must start the turn outside of an enemy aircraft's 90 degree frontal arc to disengage successfully. If there is no pursuit, weapons that cannot engage the player's aircraft, or the enemy aircraft lose visibility, the aircraft has successfully disengaged.

Maneuver Restrictions

Fully loaded ground attack machines are notoriously difficult to manoeuvre, thus if attacked by enemy aircraft, they should immediately dump their ordnance and attempt to defend themselves or exit the area as quickly as possible. While carrying ordnance, ground attack aircraft may only turn within the first manoeuvre segment of the turning circle. Aircraft carrying ordnance **MAY NOT** loop.

Changing altitude

Fighter aircraft may change altitude by one level per game turn. Ground

attack aircraft must remain at their inbound altitude, until they reach the target, at which time they may dive to Very Low to attack it. Air combat may only take place between aircraft on the same altitude level. Altitude bands are relatively broad, being approximately 10,000 feet at middle levels.

Altitude bands are 'H' (High), 'M' (Medium) 'L' (Low) and 'VL' (In the weeds)

Changing speed

F4 Phantom and MiG21 aircraft may **increase** their speed by **TWO** increments or **slow** by **THREE** per game turn.

All other jet aircraft may **increase** or **slow** their speed by **TWO** increments per game turn.

Piston engined aircraft may **increase** or **slow** their speed by **ONE** increment per game turn

Movement (cont.)

Turning

The aircraft model is always aligned with top heading of the turn indicator, **BEFORE** any turn movement is calculated. This is their 'course heading' at the beginning of the game turn. The turn indicator speed-setting counter beside the model should show their previous speed.



in the opposite direction, they can only do so in the next game turn.

If the aircraft continues the same amount

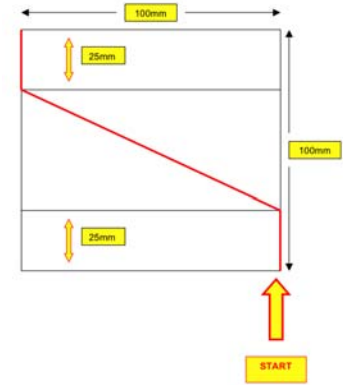
of turn from the previous move, there is no further speed penalty. Whatever the turn and bank sector speed shows for that degree of turn, sets the maximum speed for the current turn. This is why it is important to begin all turn calculations with the model aircraft aligned along the heading arrow of the turn indicator. As the aircraft ceases turning, the pilot selects a new speed setting according to the 'changing speed rules' Players cannot increase their aircraft speed beyond that which is indicated on the turning and banking circle. If players voluntarily decrease speed below the maximum shown on the turning and banking circle, they must use the 'changing speed' rules to do so. Remember, aircraft may only attempt a turn once they have reduced their speed to the maximum permitted as

shown on the turn template into.

shown on the turn template into.

As can be seen from the turn and bank indicator circle, aircraft movement is reduced by the amount of turn attempted. The tighter the turn the greater the loss of speed. Players must determine the amount of turn required, and at the beginning of the game turn, place a speed marker next to the model that indicates the speed the aircraft will finish at when the movement step of the game turn is completed.

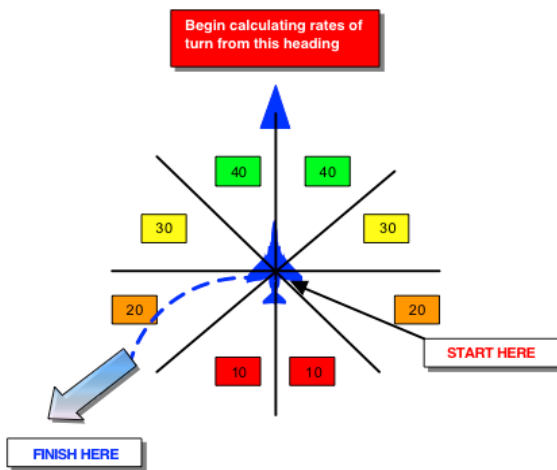
Players may turn through three sectors per movement phase of the game turn, but they must continue in the same direction from which they started the turn, except when side-slipping (see template for details). If they wish to turn



Once an aircraft reaches the 10cm speed limit, aircraft must take a test to see if they recover. Experienced pilots require anything but a '1' while inexperienced pilots require a '3' or better on a 1D6 roll to recover. If the stall cannot be recovered, the pilot automatically ejects. Given the reliability of the US and Russian ejection systems, there is no requirement for a test for a successful bail out. Once recovery has been achieved, the aircraft begins the next game turn at '10cm' airspeed and the player must then decide what airspeed they will advance to. The falling aircraft will lose one altitude level in the recovery phase.



Note: Markers are included at the end of the rules for speed, turning, and altitude. Each player should have a set of markers to use for their aircraft during the game and each aircraft should be clearly marked for all players to see during each game turn.



Stalling

This represents the greatest peril in air combat. While most experienced pilots coped with a stall with little difficulty, there was a real danger of losing all power and being unable to restart the jet engine.

Visibility

Visibility

Radar detection range is unlimited and automatic, unless an ECM jammer is present, in which case visual rules apply to target acquisition. Visual detection is limited to 24 inches in clear weather conditions. Some aircraft canopy designs severely limit the pilot's rear view. The MiG21 is an example. A target must be detected before it can be engaged. As the range between the observer and target decreases so does the score to detect the target. Aircraft

with GCI or AWACs support ADD +1 to their detection dice roll. The player attempting to acquire the target places the firing template across the front arc of his aircraft, in the same position as if he were attempting to engage a target. The calculation to acquire the target is made AFTER all movement has been completed. The observer takes into account the same penalty applied to gunnery accuracy and subtracts it from their dice roll. Once acquisition has been successful it remains so until the



aircraft separate by more than 24 inches.

Visual Target Sighting (roll one six sided dice for each crew member)

Subtract any penalties as they apply from the dice roll. The minimum adjusted score is:

Up to 24inches = 5+

Heavy Monsoon cloud -1

Up to 18 inches = 4+

AWAC or GCI +1

Up to 12 inches = 3+

At High Altitude [H] +2

Up to 6 inches = 2+

Rolling a '1' indicates the player failed to see the enemy aircraft.

Air to Air Combat: Gunnery

All gun systems are considered to be of similar effective range and performance; therefore no specific gun is listed for any individual aircraft. The early F4 Phantom carried no gun, until gun packs and finally internal M61 rotary cannons were retro-fitted from the 'F4E' model.

Maximum gunnery range is 12cm and the target must be in a direct line with the blue arrow on the gunnery template, after all movement is completed. It does not matter where the gunnery line crosses the target, just as long it makes contact with some part of the target model. Ensure the gunnery template penalties are subtracted from the firer's

dice roll. Guns may be used at any time a target is within range. If however a gun is chosen and found to be out of range or arc, a missile may only be selected in the next game turn.

Range and Dice Rolls to hit the target with gunfire (1D6 dice roll per aircraft per game turn)

NOTE: Gunnery range is measured from the center to center of aircraft stands

At 12cm it requires a '6' to hit the target. For each centimetre less than 12cm, reduce the dice roll by '1' to obtain a hit. Therefore at 6cm an automatic hit will be scored against the target, provided there are no other gunnery factors involved. If the final gunnery calculation exceeds '6', then no shot is possible.

Calculating Gun Damage

Note that the attacker is only permitted ONE damage dice roll per target per game turn.

If the firer hits the target, both target and firer immediately roll one six-sided dice each and compare the score. If the firer's dice roll is twice that of the target, the target is instantly destroyed. The pilot and crew have no chance of surviving. If the firer's score is greater, but not twice that of the target, subtract the lower from the higher and this is the minimum score required for the pilot and crew to bail out. If the firer's dice roll is less than the target, there is no damage.

Air to Air Combat: Missiles

Each player's aircraft may conduct one round of missile fire, at one target aircraft, per game turn. Both the firer and target roll one dice, the highest adjusted dice roll wins. If the firer wins, they have scored a hit. If the target wins, the missile misses. If the firer scores a hit against the target, the aircraft is shot down. If the firer's dice roll is double that of the target's, the aircraft is lost in a ball of fire, no survivors. If not, subtract the lower dice roll from the higher to determine the minimum dice roll required for the crew to survive and eject to safety. **All missile damage dice rolls are increased by +1.**

Infra-red missiles (IR)

Infra-red (IR) missiles require an almost direct line of sight to effectively engage a target from behind. All IR missiles can be fired from between 12cm to 30cm range on the table provided they remain within the 'zero' sector of the gunnery template, during the



entire movement step of the game turn. Any target aircraft that manages to move out of the 'zero' arc of the firing aircraft automatically breaks missile lock and the missile misses.

Radar Missiles (R)

Radar missiles may be launched at the target from any angle of approach provided they are at the same altitude level as the target and within the -1 sector of the gunnery template during the entire movement step of the game turn. Radar missiles can be launched from between 30cm to 100cm from the target, but may not be launched at VL altitude. To make a missile shot, ensure the target aircraft begins its movement within range and the -1 sector of the gunnery template.

A player intending to fire a radar guided missile must declare their intention to do so at the beginning of the movement section of the game turn **BEFORE** they move

to engage the target. This has the effect of a radar warning receiver (RWR) alerting the target they are under attack. The player with the target aircraft may immediately change their manoeuvre and speed counters **BUT NOT** altitude in an attempt to avoid the incoming missile. The attacker may not revise their movement or altitude in that movement phase.



SA2 – Guideline Heavy AA missiles

To check for a hit, both players roll one dice with the highest dice roll being the winner. If the target is a Wild Weasel or B52, the aircraft target adds +2 to their dice roll. If the SA-2 hits, **ADD +2** to the SA-2 dice roll when assessing damage.

Ground Attack

All ground attacks with unguided weapons must take place at VL altitude and the attacker must pass across the target during the attack. All AAA and AA missile fire



takes place before the attacking aircraft drop their weapons.

Anti-Aircraft Fire

Each attacking aircraft must pass over the target at VL altitude to complete the at-

tack and is subject to the defender's AAA and short-range missile fire – if available, **BEFORE** they drop their weapons. Each attacking aircraft will be subjected to a single six-sided dice roll from the defender's AAA, plus one short range AA missile (SA-7) if available. They will be treated as two separate firing events.

Ground Attack (cont.)

Each attacking aircraft and defender will roll one six sided dice, per firing event, and compare the result.

If the defender's dice roll is double that of the attacker's, the aircraft instantly disappears in a ball of fire! It cannot release weapons or make a crew bailout check. If the result is a draw, the aircraft does not complete the mission but immediately withdraws damaged.

For any other result, the aircraft is considered lost to enemy AA fire. The difference between the two dice rolls determines the MINIMUM dice roll required for the crew to bail out. If the defender's dice roll fails to equal or beat the attackers', the attack proceeds as planned.

Examples:

AAA fire (without missiles in support) against an attacking aircraft.

If the defender rolls a '6' and the attacker a '5', the attacker will automatically bail out, it being impossible not to roll a '1'. If the defender rolls a '6' and the attacker a '4', then it requires a dice roll of anything but a '1' by the attacker to successfully bail out

Bomb Damage Assessment.

Each aircraft passing across



the target at VL makes an attack check. Both attacker and defender roll one dice each with the highest dice roll winning. If the defender wins the dice roll, the attacking

aircraft misses the target. This competing dice roll off is to simulate the problem of accurate targeting under intense AAA and AA missile fire. For each aircraft that obtains a hit against the target subtract the lower number from the higher and for each number difference between the two dice rolls, this represents 10% per number. Therefore a difference of '3' would cause 30% damage to the target. If the defender's dice roll is higher, there is no damage to the target.

Players should attempt to alter the amount of damage a target can absorb by incorporating a penalty for large or dispersed targets. Rail yards are more difficult to damage than a warehouse complex. Bridges are difficult to hit, but are more easily damaged, so should attract a penalty to hit them, but a bonus to damage them.



Precision Guided Munitions 's and Laser Guided Bombs

Aircraft launching LGB or PGM, add +2 to their accuracy dice rolls, but they MUST attack only a tactical or strategic target such as a bridge or radar site. Defending AAA and AA missiles reduce their dice rolls by -2. This takes into account the longer range from which attacks may be delivered against ground targets, thus reducing the effectiveness of defensive fire.

Area Bombing with the B52

The nature of area bombing, removes the necessity for a dice roll to hit the target. The only matter to be determined is the amount of damage to the target. No itemised BDA has been released for the targets attacked in and around Hanoi and Hai Phong. Only general statements of percentage damage have been published.

B52 raids consist of 3 models in 'V' formation to represent 3-cells of nine aircraft. Each raid rolls 1 six-sided dice to represent between 10% - 60% damage to the target. In *Linebacker II* the B52's were equipped with 1000lb LGB to attack difficult targets; probably fuel depots and rail yards, all located within high-density population centres. How many were carried by each aircraft is unknown, but we will assume that LGB's were carried by individual B52 specifically equipped with laser designators for the purpose. If the B52 cell carries LGB, then the bomb damage dice roll is increased by +1.

Vietnam Air War: A Historical Overview

Initially, the USAF believed the North Vietnamese airforce to be a technological joke. With the bulk of its aircraft, aging Russian supplied MiG-17's, it was a low technology, gun armed, airforce that the Americans believed was so hopelessly outmatched it would soon be overwhelmed. What the Americans didn't appreciate was the Soviet commitment to turn Hanoi into the most heavily defended city of all time. Here was an opportunity to demonstrate the superiority of Soviet arms, in the hands of a small and unsophisticated nation, against the largest military power on the planet. It was also a chance to avenge the humiliation of the 1964 Cuban missile crisis. And what's more, they almost succeeded.

Political Considerations override sound Military Judgment

If nothing else, the airwar in Vietnam demonstrates that political interference at the operational level of war generally leads to costly mistakes. Clearly, no one in the Pentagon had bothered to read Hitler or Stalin's war directives to their generals and ponder the consequences. From the very beginning of the air campaign, the airforce was asked to achieve the near impossible. It was tasked with ground attack missions for which it was not equipped. Only the Navy and Marines possessed suitable aircraft in the A-4, A-6 and F-8, but had too few for the task. They were also tasked with strategic attacks, which they attempted with the F-4



Phantom and F-102 designed to intercept high-flying Tu-95 'Bears' and Tu-16 'Badgers' inbound over Alaska. Suddenly, the Air Force, Navy and Marines were pitched into frantically reconfiguring an unsuitable aircraft to complete their impossible missions. It is a great testimony to American ingenuity and engineering skill that they managed to redesign the F-4 so that it became an extremely efficient multi-role aircraft. But it took the one thing war never gives without cost...time!

The political direction of the air war demanded that aircraft attacking the north must use a specified set of approach corridors. They were referred to as 'route packages' and numbered 1 through 6. Route Pack 6 went all the



way from Udorn in Thailand to Hanoi and was one of the longest routes flown. The problem was the refuelling tankers, so necessary for the returning airforce F-4's, and F-105's remained over Laos in supposedly 'neutral' territory. It was a long haul to make these tankers. The Navy and Marine F-4's, A-6's and A-4's had much shorter distances to fly back to their carriers located in the Gulf of Tonkin, relatively safe from enemy attack. The airforce F-4's were usually tasked to protect the F-105 'Thuds' attacking enemy airfields and defence infrastructure. In order to ensure the survival of this criti-

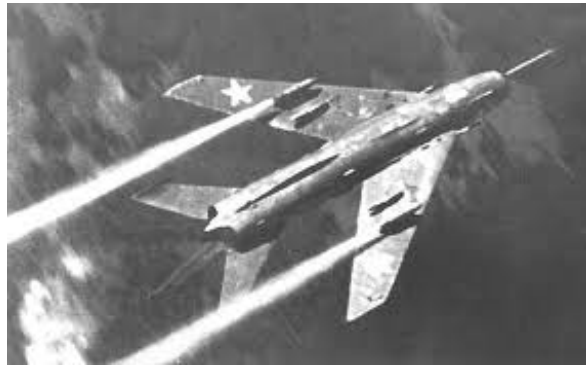


cal infrastructure, the North placed them beside hospitals and within public facilities they had been assured would not be attacked. But again, American ingenuity came to the forefront. Following the Luftwaffe lead in 1943, the USAF developed 'Bullpup B', a radio guided bomb, in 1959, and successfully used it against difficult, high value targets, but due to its small warhead proved unsuccessful against large bridges. The Paul Doumer Bridge in Hanoi was a notable success for guided weapons, when it was badly damaged by two Laser Guided 2000-lb bombs using only 14 strike aircraft – probably F-105's. This was a major reversal for

Vietnam Air War: A Historical Overview (cont.)

the North. The first raid against the bridge, using thirty-one F-105 'Thuds' requiring a large covering force to suppress the defences for the strike to close on the target, dropped 118 conventional 2000lb bombs, and achieved few hits, without destroying the bridge. The Bullpup B, and later Walleye with a 7-mile range, removed the necessity to expose the attackers to the AAA fire. At this point the North Vietnamese must have seen the writing on the wall!

The NVA quickly observed the US was being channelled along specific attack routes and concentrated AAA and missiles, including shoulder launched Soviet SA-7's, into these routes. They also realised that AAA had little chance of hitting a fast moving jet aircraft when firing as individually aimed weapons. To this end they developed what has become known as 'box barrages', whereby a battery of AAA is aimed at a specific area of the sky through which an enemy aircraft is expected to fly. As soon as the aircraft enters the box, the AAA fire at a pre-defined point in the hope of filling the air with enough flak to damage the attacking aircraft. The USAF responded by producing AGM-45 'Shrike', an anti-radiation missile tailored to attack transmitting radars and other high value



command systems. Although early results in Vietnam were disappointing, the North soon learned to switch off radars immediately a Shrike missile launch was detected. This helped suppress SA-2 AA missile launches against B-52 raids over Hanoi in particular during *Linebacker II*.

Linebacker II - The USAF is finally let off the chain...

By Christmas 1972 it was becoming abundantly clear the North Vietnamese were using ceasefire periods to rebuild damaged infrastructure and defence networks. The North had clearly adopted the strategy of attempting to outlast American political will, which they knew was at a crisis point with the prospect for the continuation of a very unpopular war. Finally, in desperation, President Nixon ordered the resumption of the bombing on 18th December 1972. More importantly, target selection was left to the air headquarters responsible for the Vietnam theater of operations. In just 11 days, the infrastructure surrounding

Hanoi and the port of Hai Phong, had all but ceased to exist. The air defence networks that had proven so troublesome had almost been eliminated to the extent that few SA-2 missiles were encountered in the last days of the operation. USAF planners estimated that NVA resupply capacity had fallen from 160,000 tons per month to less than 30,000 tons per month. The North's railways had all but been eliminated and over 80 % of the electrical generation capacity of the North had been destroyed. Even though such a massive bombing effort had been undertaken against a large urban area, the North Vietnamese conceded that just 1,624



civilians had been killed in the attacks. Compared to the bombing of Dresden or Tokyo in 1945, that left over 80,000 dead in just one night, this was a remarkable achievement in precision bombing. This quickly brought the North back to the peace talks which concluded the war at that point and the United States began to withdraw its forces.



WASATCH FRONT HISTORICAL GAMING SOCIETY

We meet every other Friday night in the Salt Lake City, Utah area. We currently game Age of Reason, Age of Discovery, Age of Eagles, The Sword and the Flame, Battles for Empire, Wild West, Blitzkrieg Commander, Sharp Practice, and many, many more periods and games.

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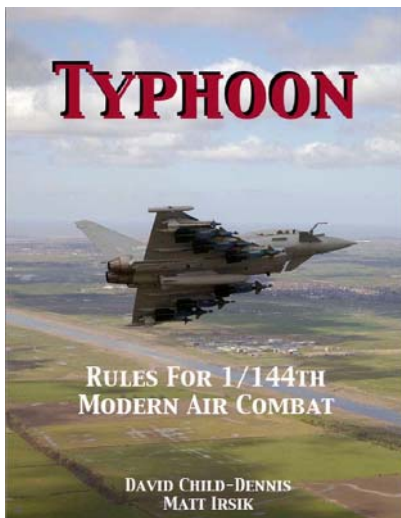
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This is the second in a series of introductory level air combat games that can be used with almost any scale of miniatures. The rules are designed so that gamers can quickly go through them, grasp the basic concepts, then begin play quickly. The rules are suitable for large groups and/or gamers who enjoy air combat, but don't want to take the time to work through more complex systems such as Birds of Prey or The Speed of Heat. The rules are similar to Air War-Korea, but add in missile combat, so if you've already played AW-Korea then you should quickly be able to get started with Air War-Vietnam. The rules also have a "toolkit" approach, so if you or your gaming group wishes to add additional complexity to the game such as jamming, Wild Weasels, pilot experience, etc., then a few simple rules can be added on. If you enjoy Air War-Vietnam, then hopefully you will try some of the rules featured below or move on to Phantoms or Intruders which can also be found at the site below.

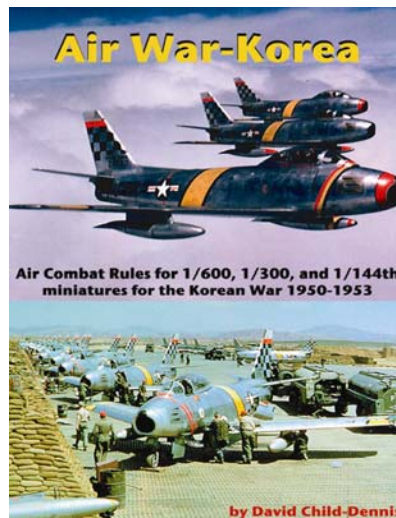


Other Air Combat Miniatures Rules

If you've enjoyed Air War-Vietnam there are several other sets of air combat rules that can be downloaded for free. Go to the Downloads section at www.wfhgs.com to learn more.



Quick play rules for modern air combat using 1/144th scale aircraft.



Using the same system as Air War-Vietnam, but for the Korean air war. Another in the series of introductory level air combat rules that give a quick game and is suitable for almost any scale of miniatures.



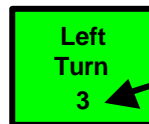
Operational level game simulating one day in the Battle of Britain for use with miniatures. Suitable for beginners and large groups.

Air War- Vietnam

Speed and altitude markers

H	H	H	H	H	H	H	H
M	M	M	M	M	M	M	M
L	L	L	L	L	L	L	L
VL	VL	VL	VL	VL	VL	VL	VL
50	50	50	50	50	50	50	50
40	40	40	40	40	40	40	40
30	30	30	30	30	30	30	30
20	20	20	20	20	20	20	20
10	10	10	10	10	10	10	10
stall	stall	stall	stall	stall	stall	stall	stall
25	25	25	25				
15	15	15	15				

Air War - Vietnam Turn Markers

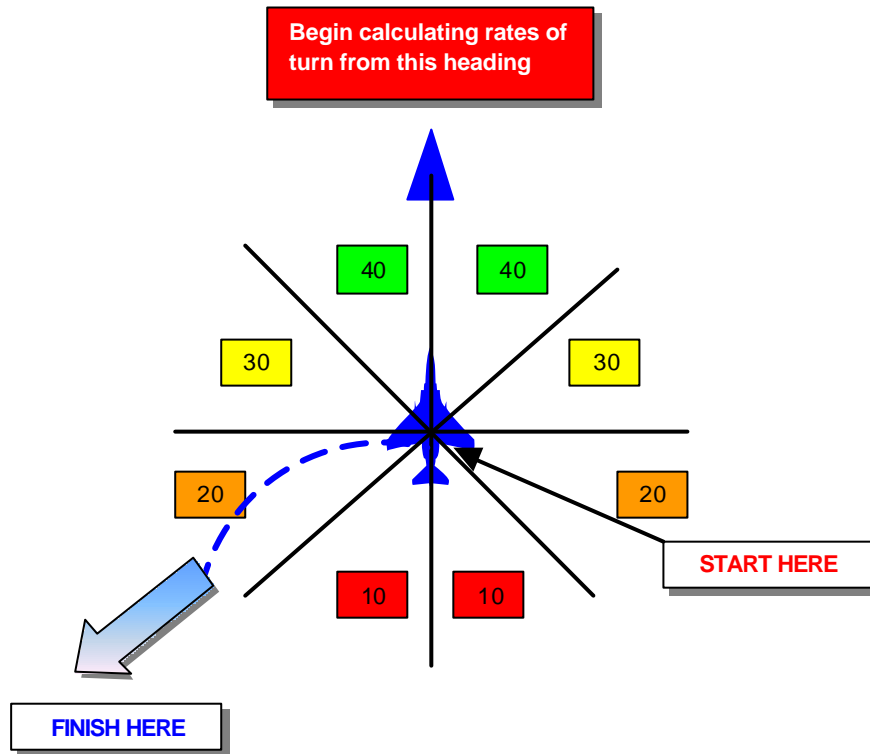


Note: The number shown on the turn marker is the number of sectors a player wishes to turn his aircraft through when making a manoeuvre.

Air War - Vietnam

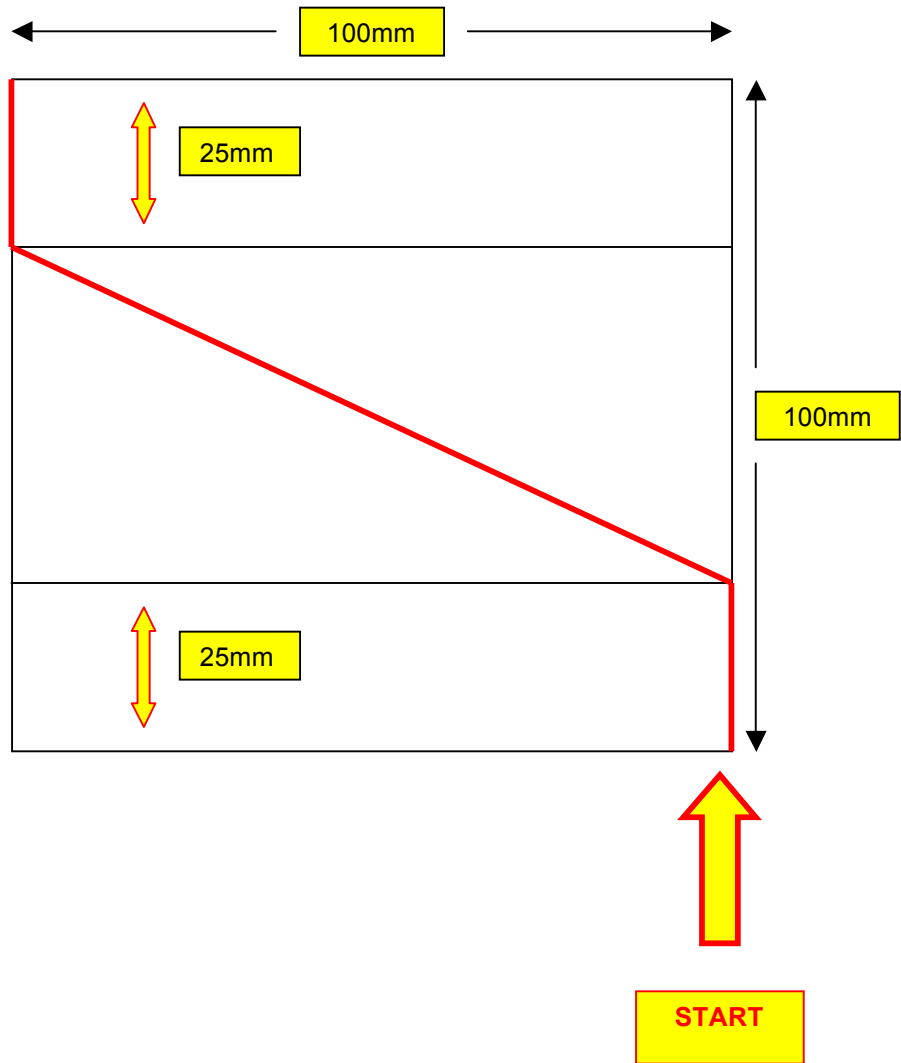
Turn and Movement indicator

All movement is in centimetres

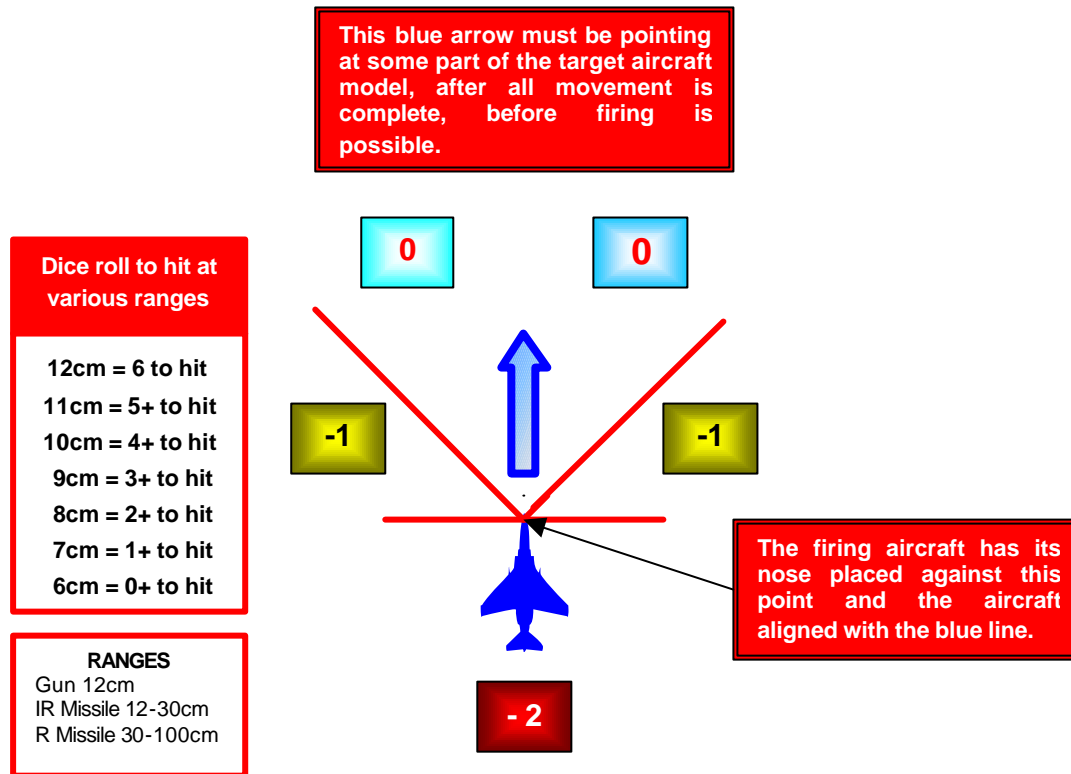


Each sector of the Turn and Movement Indicator shows the maximum speed permitted after turning from straight ahead onto that heading. Place the aircraft model to align with the 'start here' box and then calculate the rate of turn from that point. The maximum speed at which the model will move is listed within the sector selected. It does not matter how fast the aircraft is moving at the beginning of the turn, the speed number shown in the sector is the speed it will use when moving in the current game turn. Aircraft wishing to make a turn **MUST** slow to the maximum permitted movement shown in the various turn sectors before making the turn. Note that the pivot point for any turn should be the centre of the model's stand.

Template measurements for sideslip - 1:144th scale models
Halve measurements for 1:350 – 1:300 scales



Air War – Vietnam Gunnery Template

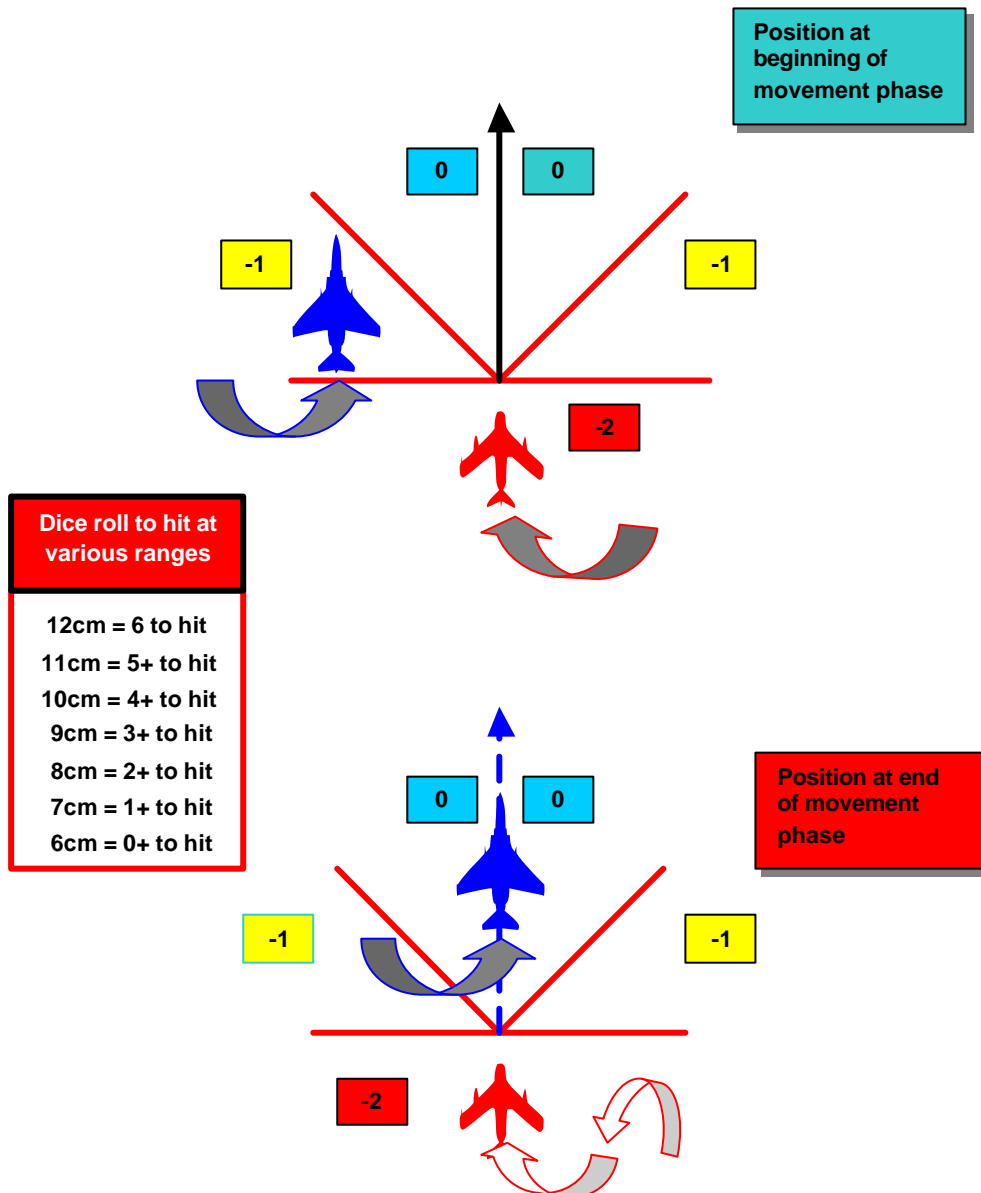


The gunnery calculator is designed to calculate the relative motion penalties of the target in relation to the firer.

As can be seen from the negative numbers in the various boxes, the further from the line of fire the relative movement of both firer and target commences, the greater the penalty. Note that penalties are not cumulative. Only the highest penalty is used. Therefore, if the target moves from behind the firer – say overshoots due to speed difference - the penalty is -2.

The blue arrow is the direction of travel of the firer. The nose of the firing aircraft, or gun turret, is placed at the base of the blue arrow. It is important to note the position the target aircraft was originally in BEFORE the firer moved into position to engage the target aircraft.

Air War – Vietnam Gunnery example



How the Gunnery Template works

At the beginning of the movement phase, the players note the position of their respective aircraft. The F4 Phantom is in the [-1] position of the MiG17 and the MiG17 is in the [-2] position of the F4 Phantom.

The MiG17 player decides to make a 'side slip' to the left in the hope of bringing the F4 into his line of cannon fire. The F4 player opts to continue his left turn and slow in the hope the MiG17 will overshoot allowing him to fire an IR missile at short range.

The MiG manages to end up behind the F4. The F4's position in relation to the MiG17 was a [-1] gunnery penalty at the beginning of the movement phase. The MiG17 is only 8 centimetres behind the F4 and has a line of fire to it. Therefore, reducing the 'to hit' dice roll to '2' (**12cm - 8cm = 4 from 6 = 2 to roll**). Therefore the MiG17 requires a '2' to hit the F4, but there is an additional penalty of [-1 from the attacker's dice roll] for relative position at the beginning of the movement phase, which brings the MiG17 gunnery dice roll to '3' or better to hit the F4 [6-4=2+1=3]