Angels & Bears

Modern Air & Naval Combat
1980-1989

David Child-Dennis

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Introduction

In the 1980's the most powerful air forces and naval fleets in the world prepared for World War Three. Thousands of ships, submarines, and aircraft constantly patrolled the globe, rehearsing what could have turned out to be the most technologically advanced war in the history of the world. In the end, however, the Russians and their allies blinked, ending in the fall of the Berlin Wall and the collapse of the Warsaw Pact.

For gamers, however, this was fertile ground and hundreds of board games, rules, and miniatures emerged to cover these potential conflicts. One of the most fascinating, but hard to simulate/game areas of a potential WW3

conflict was modern naval combat. With missiles, helicopters, aircraft, submarines, and a wide variety of ships, it is easily the most complex part of an air, ground, and naval global war to simulate.

Several board games (i.e., Fast Carriers, Seapower & the State, Victory's Fleet series, etc.) did a good job of modeling modern operational combat, but miniatures rules for this era were few and far between. These ranged from the complex (Harpoon 4) to the very simple that appeared as one or two page articles in gaming magazines. However, gamers love to use their miniatures and want to play a modern naval

game scenario without needing a degree from Annapolis, thus Angels & Bears was born.

A&B is designed to let gamers launch airstrikes, engage in desperate battles with a carrier's CAP, fire large salvos of surface to surface missiles, and get it done in an evening's worth of gaming. So now it's time to turn back the clock to the 1980's when superpowers almost came to blows with the most powerful forces ever seen.

Setting up the Game

Angels & Bears is designed for 1/600th or 1/300th aircraft miniatures, although 1/144th can be used by doubling all measurements. Ship models may be of any size, although 1/2400 or 1/3000th are suggested.

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 and naval vessels on the play area.

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Air Combat Rules: Sequence of Play

Angels & Bears is really two games in one. The first is the air combat portion of the rules and the second deals with naval combat. Each turn has a strict sequence of play and players on both sides need to completely finish each part of the turn before moving on to the next phase. Once the final step is completed, then start a new turn by returning to the first step.

1. Place altitude, manoeuvre and airspeed markers beside the aircraft model stand, **face down**.

2. Turn over markers. Declare radar missile fire at this point and nominate the target.

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)

9. Has the mission been completed? If not, go to 1 above and repeat game steps.

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 their front firing arc, always have the initiative, provided they are not moving at a higher speed. The front arc of an aircraft is defined as the arc from wingtip to wing tip across the nose. By having the initiative a player may choose whether they move first or last.

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 models, then double all measurements. If players are combining piston-engine aircraft 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.

Collision

In the event of two models being moved across the same flight path or coming within physical contact during manoeuvre, in the same game turn, there will be a possibility of collision. Both players will roll one dice each and if they roll the same number a collision has occurred. Both aircraft, including crew are immediately lost.

Maneuver Restrictions due to ordinance loads

Fully loaded ground attack machines are notoriously difficult to maneuver, thus if attacked by enemy aircraft, they should immediately dump their ordinance and attempt to defend themselves or exit the area as quickly as possible. While carrying ordinance, ground attack aircraft may

only turn within the first maneuver segment of the turning circle. Aircraft carrying ordinance 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. 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

All supersonic aircraft may **increase** their speed by **THREE** 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

Harrier/AV8 may stop immediately and turn through four turning segments without penalty.

Movement counters are provided in 1-step increments.

Turning

The aircraft model is always aligned with the 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 indictor speed-setting counter beside the model shows their previous speed. Models must be

turned first and then moved the required distance set by the movement counter.

As can be seen from the turn and bank indicator circle, aircraft movement is reduced by the amount of turn being 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. Remember that unless an aircraft can reduce its speed to the movement rate shown on the turn and bank indicator, then it cannot turn until it can be slowed to that speed using the 'changing speed rules'. Thus, a supersonic aircraft moving at 50cm can only reduce its speed to 20cm in the next game turn, and manoeuvre accordingly.

Players may turn through up to 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 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. Players should retain the cur-

rent turn speed counter until the new speed counter is turned over at the beginning of the turn. As the aircraft ceases turning, the pilot selects a new speed setting according to the
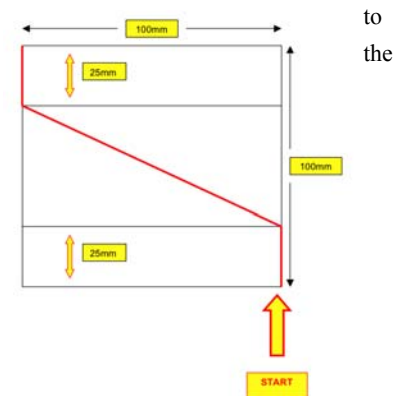
'changing speed rules' Players cannot increase their aircraft speed beyond that which is indicated on the turning and banking circle. If players voluntarily decrease speed below the maximum shown on the turning and banking circle, they must use the **'changing speed'** rules to do so.

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. Once an aircraft falls to 10cm airspeed, it has stalled and must take a stall test to see if it recovers. 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 to 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.

Detection

Radar Detection
All targets are automatically acquired by radar, unless the system is subject to jamming by a dedicated EW aircraft or ground based system, in which case visual detection rules apply. Enemy aircraft can be locked on and engaged with radar guided missiles without being detected visually.

Visual Detection
This visibility system is designed to take into account the relative movement between acquirer and target. It also allows for multiple crew-members, such as those in a B52 or Tu95 etc, to individually locate a target. Soviet IRST systems, fitted to the MiG23ML and MLD series and MiG29, were little better than normal visual ranging at this time.

Visual detection is limited to 24 inches in clear weather conditions. 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. Crew members of bombers may place the template according to their normal facing direction. A tail gunner in a B52 would place the template so that the blue arrow was pointing directly to the rear. A crew may attempt to locate all targets within range, once per game turn.

The calculation to acquire the target is made AFTER all movement has been completed. The observer (s) takes into account the same sector penalty applied to gunnery accuracy and subtracts it from their dice roll. Players must be aware that because of the different position of crew members in the same aircraft, their acquisition dice rolls may be different.

Once acquisition has been successful it remains so until the aircraft separate by more than 24 inches. Pilots in the same formation may hand off targets to other aircraft. Therefore, once a bomber cell locates a hostile aircraft, every other aircraft in that cell automatically does so. Each aircraft in each cell or formation may make a target acquisition check until one is successful. At that point all aircraft in that cell or formation have located the enemy aircraft. If enemy aircraft are in a close forma-

tion, that is, the models are within 12cm of each other, the formation is located once any model within the formation is acquired.

Targets must be visually detected to be engaged in air to air gunnery combat or to

be fired on by an infrared (IR) missile.

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 to locate a target visually is:

Up to 24inches = 5+

Up to 18 inches = 4+

Up to 12 inches = 3+

Up to 6 inches = 2+

Modifiers

Heavy Monsoon cloud = -1

Observers at H altitude +2 to location dice roll.

GCI or AWACS support +1

Target fired a weapon on previous turn+1

Rolling a '1' indicates the player failed to see the enemy aircraft, regardless of any modifiers.

Air to Air Combat

Air-to-Air Gunnery

All gun systems are considered to be of similar effective range and performance; therefore no specific gun is listed for any individual aircraft. 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. An example of how to use the gunnery/missiles system is included with the missile and gunnery template.

This blue arrow must be pointing at some part of the target aircraft model, after all movement is complete, before firing is possible.

Dice roll to hit at various ranges

12cm = 6 to hit
11cm = 5+ to hit
10cm = 4+ to hit
9cm = 3+ to hit
8cm = 2+ to hit
7cm = 1+ to hit
6cm = 0+ to hit

RANGES
Gun 12cm
IR Missile 12-30cm
R Missile 30-100cm

The firing aircraft has its nose placed against this point and the aircraft aligned with the blue line.

0   0
-1   -1
-2

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 centre to centre 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.
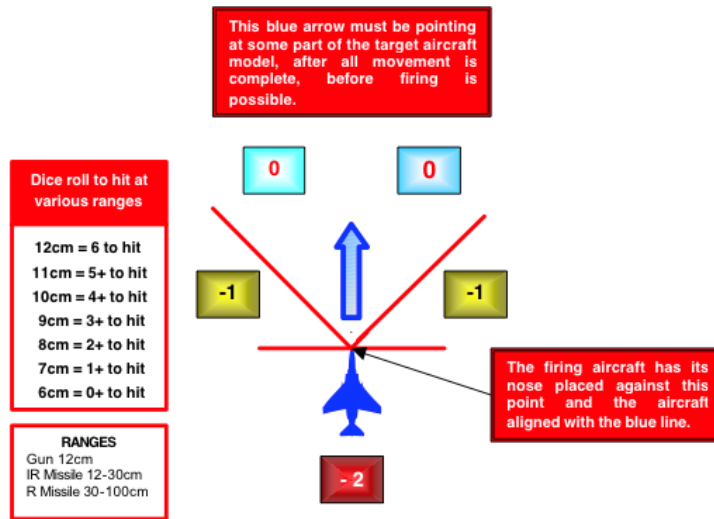
Calculating Gun Damage
Note that the attacker is only permitted ONE damage dice roll per target per game turn.

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 Missile fire

Players may conduct one round of missile fire per game turn, per aircraft. Both the firer and target roll one dice to achieve a hit, 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. Compare the original dice rolls. If the firer's dice roll is double that of the target, the aircraft is lost in a ball of fire, no survivors. If not, subtract the lower dice roll from the higher to determine the <u>minimum</u> dice roll required for the crew to survive and eject to safety.

Missile inter-generation adjustments

Players will note that each missile has a 'Generation' number allocated to it. This is to allow for a 'to hit' dice roll modification where air forces of different generations are involved in combat. Soviet export missiles always have their generation number reduced by -1 to reflect downgraded radar, and missile systems.

The player with the higher generation number ADDS the difference between generation numbers to his dice roll. Therefore a 3rd generation missile carrier adds +2 to their dice roll when engaging or defending against a 1st generation missile carrier. This dice roll modification is to reflect not only the difference between the individual missiles, but also the difference in the ESM and ECCM associated with the more advanced aircraft system carrying the more advanced missile. To determine missile damage use the gunnery damage calculation system, but the attacker's dice

Air to Air Combat (cont.)

rolls have +1 added to reflect their higher lethality in comparison to gunfire. By 1982, it was possible to engage a target with generation 3 and 4 missiles, at a different altitude to the firer. Players may engage a target with missiles one altitude level above or below their current position.

Infra-red missiles (IR)

All IR missiles can be fired from between 12cm to 30cm range on the table provided they are within the firing envelope of the missile.

> **Generation - 1** IR missiles require an almost direct line of sight to effectively *engage* a target <u>from behind, and must be at the same altitude</u>. The target must be within the **[0]** firing sector of the gunnery template AFTER all movement is completed.
>
> **Generation - 2** IR missiles were better but the target must be *engaged* within the **[-1]** sector of the gunnery template <u>from behind and at the same altitude as the target</u>, after all movement is complete.
>
> **Generation - 3 and 4** IR missiles may be launched from any angle of approach to the target, provided it remains within the front arc of the firing aircraft. Generation 3 and 4 missiles may be launched one altitude level above or below the target, <u>BUT maximum engagement ranges will be halved. Minimum engagement ranges will still apply.</u>

Any target aircraft that manages to move out of firing arc automatically breaks missile lock and no shot is possible. Targets changing altitude as part of an evasion manoeuvre don't break missile lock unless they manage to move out of firing arc or range.

Radar Missiles (R)

Radar missiles may be launched at the target from any angle of approach, between 30cm to 100cm from the target. Only Generation 3 and 4 missiles may 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. The target does not need to finish its movement in that sector, but must remain in the first arc of the firing aircraft. In order to score a hit, both players roll one dice, and after applying any generation modifiers, the highest dice roll wins.

RWR (Radar Warning Receiver)

A player intending to fire a radar guided missile must declare their intention to do so immediately the movement order counters are revealed. This has the effect of a radar-warning receiver (RWR) alerting the target they are under attack. Once the missile firer reveals their order counters, all play stops until the player with the target aircraft makes a decision to either immediately change their maneuver, altitude and speed counters, in an attempt to avoid the incoming missile, or continue with his originally placed order markers. This missile avoidance move has priority over all other movement, unless the player chooses to continue with the orders they have already placed, in which case the normal priority rule applies.

Top Gun (Optional Rule)

To reflect the advanced training and tactics that USN pilots received, players may determine that designated aircraft may make an extra move should an enemy aircraft gain an automatic 'following' position, behind them at gun range. The Top Gun aircraft moves first, as per the initiative rule, followed by the attacker. The Top Gun aircraft may then make a second move that is half the original move distance indicated by the Top Gun aircraft's original movement counters. They may also turn through one additional segment of the turn indicator, adjusting their speed accordingly. This does not cause their aircraft to stall. All other rules apply.
In the reverse position, where a Top Gun aircraft manages to gain a 'following' position behind a Soviet or Soviet client aircraft, the Top Gun aircraft may make an extra move, using the same restrictions as those above, after the player has made his move. Players should randomly determine which aircraft have this capability.

Air to Surface Combat

Anti-Aircraft Fire – Against tactical and ground support strikes with un-guided weapons

Each attacking aircraft must pass over the target to complete the attack 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 a second if short-range AA missiles (SA-7, Redeye, Blowpipe, Roland etc) are available. They will be treated as two separate firing events.

Each attacking aircraft and defender will roll one six sided dice, per aircraft attack, 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.

If the defender's dice roll beats the attacker's 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. The attacking aircraft may have received some damage but it is not sufficient to shoot it down.

Ground Attack using short-range 'stand off' weapons.

Attackers using short range guided weapons such as the Russian AS-7 'Kerry', the French AS-30, or US Bullpup, etc can be launched by the attacker, nominating the target and placing the aircraft model within 20cm of the target, at Medium or High altitude, before attempting the attack. Only dedicated attack aircraft, known to have carried such weapons may be used. All defensive AAA fire dice rolls against such attack aircraft will be reduced by –2. AA missile fire dice rolls are not reduced, unless subjected to ECM. Players can assume that aircraft such as the Buccaneer, Jaguar, Tornado, F15, A4, A6, MiG23BM and 27, Su7, 17, 20 and 22 are all standoff weapon capable. It is not essential that players nominate the exact weapon fitted to their aircraft, this class of weapon being assumed to have similar operating parameters and capabilities. However, the attacker must be represented by one of the aircraft included in this list or one that a player can show historically carried such a weapon.

Examples:

AAA fire (without missiles in support) against an attacking aircraft with 'dumb bombs'

If the defending AAA rolls a '6' and the attacking aircraft a '5', the attacker has received only minor damage, (there is '1' difference between the dice rolls) but enough to be shot down. The pilot will automatically bail out, it being impossible not to roll a '1'.

If the defending AAA rolls a '6' and the

attacking aircraft a '1', the defender's dice roll is twice that of the attacker's. Instant destruction of the attacking aircraft. The model is immediately removed from the table.

Electronic warfare - 'the Dark Art' of Wild Weasels, Prowlers, Ravens and Bears

Specialised EW aircraft began to appear at the end of the Vietnam War and continued to be developed as the 'Cold War' deepened. Various approaches to EW were adopted as the threat environment changed.

- One specialised EW aircraft can be assigned as a specialist ECM aircraft to an attack formation. The effect of the EW aircraft is to reduce defensive AAA fire by -2 when engaging attacking aircraft. This allows for the attacker firing ARM missiles at defending radar sites, dumping 'chaff' and IR flares.

- Ground based defensive AA missile fire has its 'to hit' dice roll reduced by –2

- All Soviet Tu95E, USAF B52 and B1 have a substantial integral ESM/ECM suite which will reduce missile fire 'to hit' dice rolls by –1.

- Ground based ESM/ECM systems reduce accuracy by -2 on all 'to hit' dice rolls.

Air to Surface Combat (cont.)

Bomb Damage Assessment.

Each attacking aircraft passing across the target 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 fails to damage 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. A draw (both numbers rolled are the same) represents no damage.

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. Aircraft launching LGB or PGM, add +2 to their accuracy dice rolls, but they may only be used to attack a single tactical or strategic target such as a bridge, communications centre or radar site etc.

Area Bombing with the B52 or B1
B52 and B1 raids consist of 3 models in 'V' formation to represent nine aircraft in three cells bombing from high altitude. 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. Each raid and the defender, roll one dice each to

determine the amount of damage to the target. LGB's and cruise missiles may be carried by individual B52 and B1 specifically equipped with laser designators and satellite targeting systems for the purpose. If the bomber cell carries LGB, then the bomb damage dice roll is increased by +1.

Cruise Missiles are treated as BOL missile fire. Because cruise missiles are very small targets, defenders subtract –1 from ALL AA dice rolls to hit them, but add +1 to their damage dice roll to shoot them down. Due to the cruise missile's high accuracy, the firer adds +2, to their 'to hit' dice roll. No nuclear release authority has been given to theater commanders. Damage is calculated using the Bomb Damage Assessment rule.

Part 2 – Attacking Naval Targets

Air attack against naval targets

Scales and Movement:

These rules are intended for use with ship models in 3000th or 6000th scales. All dice are D6.

Combat occurs in three distinct zones. (1) Within the horizon. (2) Over the horizon and (3) Underwater. The horizon has a

nominal range of up to 24 inches, while beyond the horizon is limited to 48 inches or the average width of a gaming table. Most torpedo attack ranges are limited to 12 inches, although some torpedoes can operate beyond the horizon. Because air attacks last only minutes, the rate of movement for ships is largely irrelevant. Ship models (or markers) are placed in the desired formation to receive an attack and not moved until the attack is finished. Aircraft move at the rate shown in the rules. This gives a reasonable appearance of movement for the aircraft in relation to 1:3000th scale ships, given that even a lowly Skyhawk attacking at 300 knots, would clear the horizon in under a minute.

Ranges:

To establish unaided visibility within the horizon - roll 4 dice and add their total together to give between 4 – 24 inches.

Radar range – surface to surface at sea level – 24 inches. Airborne search radar range is unlimited.

ESM range – up to 36 inches. This allows for the detection of electronic emissions just over the horizon.

Air attacks against Naval units :

Attack Turn Sequence

- The player commanding the naval force places all ships. Ship models do not move after deployment.

- The player commanding the attacking air units responds by moving all attacking aircraft or missiles.

- The naval force conducts all AA (including fighter interception of enemy attack aircraft) and ASW fire.

Air to Surface Combat (cont.)

- The remaining aircraft attack their nominated targets.

- All damages are recorded against their targets and ships tested for sinking.

- The Naval force commander attempts to repair damage.

- Morale is tested for damaged ships.

The radar horizon (at sea level) is 24 inches (600mm) from the observer. Therefore, players may deploy markers for those units outside visual range and beyond 24". The marker should state the type, (large, medium or small target) but not the identity of the ship. Helicopters and aircraft are placed as they are.

Gun Range = 12" (300mm)

Torpedo Range = 12" (300mm) unless capable of very long-range.

Missile Range = 24" (610mm) within the horizon

Missile Range – Over the Horizon (OTH) or Beyond Visual Range (BVR) = 48" (1220mm)

All targets within the horizon are automatically detected, while those over the horizon are automatically detected by aircraft or helicopters once they are within the observers horizon or are assumed to reach sufficient altitude to gain a direct line of sight to the target. Satellites give targeting information but not in 'real time', therefore satellite targeting should always be treated as a 'bearing only launch'. Only specialised naval attack aircraft (listed in the attached data tables) may launch air to surface missiles at the maximum 'Beyond Visual Range' 48inch range.

Most defensive systems are 'layered' in that they are capable of engaging incoming attacks at long range (over the horizon or at very high altitude) within the horizon, (about 15 miles) and very close to the vessel itself. Missiles form the long (OTH or BVR) and medium (Within the horizon) range defence while point defense weapons deal with threats under 1500m. Many of these systems are fully automated and do not require operator intervention to engage a target. This is especially true of 'CIWS' systems that are a final defence against incoming missiles. In addition, a large array of sophisticated electronic support measures (ESM and ECM) attempt to mislead or jam enemy radar and missile control signals.

The combat system is based on opposing dice rolls. This is designed to reflect both the manoeuvre and electronic counter measures (ECM, ECCM and decoys including 'chaff') of the defender and attacker. It works very simply. The attacking aircraft rolls the number of dice listed in their data tables. The defending ships rolls an equal number of dice and the highest dice roll(s) win. If there are other ships within 12 inches of the target ship they may add their AA fire in support of the target ship. They do this by adding one extra dice per ship to the defender's AA dice rolls. Ships must always fire in their own defence first before offering additional AA fire support to other ships.

When comparing each group of dice to determine the winner, players should read them in the following manner. Remove all matched dice; i.e. those with the same number rolled, continuing until you are left only with those dice that cannot be matched. The remaining dice are paired off, highest against highest. If the defender's dice roll is the highest, the attacking missiles are destroyed by AA fire. If the attacker's dice roll wins, they have scored a hit and must then calculate the number of damages caused to the target ship.

For each dice pair that is a 'hit', subtract the lower dice roll number from the higher, and this becomes the number of 'damages' the target sustains. Place a counter for each **damage** beside the target ship (with the damage counters provided). Roll 2D6 for each new **hit** (not new **damages** or those already recorded) and any doubles rolled result in the immediate destruction of the target.

Each unrepaired or retained damage is assumed to degrade the efficiency of the ship by reducing its firing capacity and manoeuvre. Ships firing in their defence while retaining unrepaired damages re-

Air to Surface Combat (cont.)

duce their dice roll(s) by that number. Therefore, a ship with six retained damages would reduce each defence or attack dice roll by '6'. The ship has no capacity to fight or defend itself.

Damage is repaired by rolling 1D6 and removing the appropriate number of damages from each damaged ship, in the damage repair phase of the game turn. This reflects damage control parties repairing or bypassing damage. However, once a ship retains a certain number of unrepaired damages, it sinks. This reflects out of control flooding or fire that ultimately causes the loss of the ship. The smaller the ship the smaller the number of unrepaired damages leading to its loss.

Air Defense Rates of Fire - OTH

Some warships have a 'layered' AA defence that allows them to engage targets from OTH. Ships shown in the "ship stats" as having an OTH capability, may roll an extra dice in their AA defence to simulate their ability to engage a target at a longer range than those that don't. This only applies to defence against air attack from OTH.

Air to Surface Attacks – within the horizon

Aircraft are placed next to their intended targets. Before any air attack commences, each ship, within 12-inches, or a combat air patrol within 24" of the attackers may attempt to engage the incoming aircraft. If a fighter combat air patrol intercepts an incoming air attack, this combat will need to be fought as an air action before the

air attack against the naval units commences.

Air to Surface Attacks – over the horizon (OTH) or Beyond Visual Range (BVR)

Only those listed as specialized maritime attack aircraft may attempt OTH or BVR attacks against shipping. The attacking aircraft are deemed to have either satellite or long-range radar tracking of the intended target, therefore their attack dice numbers are not reduced, as would be the case in a BOL attack. These aircraft are placed between 24 and 36 inches (if OTH) or between 36 and 48 inches (if BVR) from the target ship(s) at the beginning of the attack. The attacker must clearly nominate each target before the attack is made. Only one attack may be made by each aircraft against any one ship. However, more than one aircraft may attack a single ship.

If the attack succeeds, the number of damages are recorded against the ship and then the attacker attempts to roll a 'double' for each hit (not damages) to see

if the target is sunk or damaged. Once the air attack is complete, the aircraft group withdraws from the table. Remember, it is the missile(s) the aircraft are launching that is the focus of the AA fire from the ships and not the launching aircraft.

Because of the time required to mount such an attack, only one OTH or BVR attack may be made per aircraft in each game. This means that the actual game time to mount an air attack against ships is relatively short. Players should be capable of a number of air attack scenarios in the space of a couple of hours gaming.

Bearing Only Launch (BOL) attacks

This form of attack is used where the attacker has only a general idea where the target is at the moment of launch. This is used by submarine cruise missile fire against moving ship targets, where targeting data is not 'real time'. Hence the importance the Soviets placed on their Tu95 D and H aircraft being able to track and engage targets at extreme range. The missile is lunched at the last known position of the target and the onboard missile sensors (ITARH etc) are left to detect the target. The accuracy of such attacks is not as high as fully controlled and observed attacks, therefore the defender has two dice rolls to the attacker's one.

Naval Combat Operations

Maneuver Rate

When a surface action commences, normal table movement of the various ships occurs. All ships deployed in combat formation may manoeuvre at up to 8 inches, with a maximum turning rate of 45^0 per game turn. Independent ships, outside the combat formation may move at up to 8 inches per game turn but have a maximum turning rate of 90^0 per game turn.

Surface Attack – Missiles and Guns (rate of fire) within the horizon

When an enemy warship engages a target (the defender), with missiles, guns, or both, the attacker rolls the number of D6 dice listed for that ship under **Rate of Fire – Surface** in the **ship data tables**. Add +1D6 to each gun armed ship once range closes to within 12". Vessels classified as '**stealth ships**' have –1 from all dice rolls for missile fire against them. The defender rolls the same number of dice to defend against the attack. If the target ship has any retained damage points, the number of retained damage

points is removed from each of their defending dice roll(s). Damage sustained in the current game turn is not counted until the next game turn.

The dice are then matched off and the highest individual dice rolls win. Each time an attacker wins a dice roll, it inflicts one **hit** against the defender that inflicts the difference between the winning and losing dice rolls as the number of **damages**. Make a sink test for each **HIT**, by rolling a double with two dice. This 'sink test' represents the possibility of a catastrophic explosion causing the immediate loss of the ship.

Surface attack – Missiles Fired Over The Horizon (OTH) or Bearing Only Launch (BOL)

Attackers firing missiles **Over The Horizon** (between 24 and 36 inches range) must have an OTH capability in their ship listing, or fire on a 'Bearing Only Launch'. The firer rolls the number of dice listed in the Surface Warfare - OTH column, and the target must equal or beat the number rolled to avoid being hit.

Attackers using **Bearing Only Launches** (up to 48 inches range) have no mid course correction capability. The firer rolls 1D6, but the target rolls 2D6, the highest dice roll winning. This reflects the inaccuracy of such a targeting method. Submarines firing cruise missiles from OTH must use BOL firing rules.

Submarine Operations and Attacks

These are different to all other attacks. Submarines are placed within 12" of their intended target during the movement phase of the game turn. They are not required to move across the table to get to the attacking position. Any defending warship or aircraft with ASW capability, then attempts to drive off or destroy the submarine BEFORE the submarine attacks – using ASW warfare. The defender(s) may attack the submarine using a 1D6 dice roll for every ASW capable warship (not freighter, aircraft carrier or assault ship) within 12" of the submarine. The Submarine defends against these attacks by throwing the same number of dice as the attacker(s). The highest dice rolls win. If the ASW defence wins, the submarine suffers the number of damages equal to the difference between the defender and attacker's highest dice roll(s). For each damage suffered by the submarine, the ASW force makes a 'sink test' against the submarine. If they succeed they immediately destroy the submarine. If not, the submarine withdraws – being immediately removed from the game. A damaged submarine may not be redeployed in the same game.

Naval Combat Operations (cont.)

If the submarine player succeeds in beating the ASW dice rolls, they may then attack their nominated target with 4 dice. The target ship counters with 4 dice, the highest dice rolls winning. Each successful hit causes the number of damages, as described in 'the combat system'. Each successful hit also allows the attacker to attempt to roll a double, with two dice, which if successful, sinks the target immediately.

Once the submarine attack is concluded, the submarine is removed from the table until it is required for another attack, either in the next or future game turns. Submarines may only attack one target per game turn. Surface ASW ships and aircraft may only attack one submarine per game turn. They may not attack any other target while doing so, but may defend themselves if attacked.

Submarine versus Submarine.

At the beginning of the game, players may allocate one of their submarines to a dedicated ASW role. U.S and NATO Carrier Battle Groups have a submarine attached for this purpose. This allows the defending player to immediately placing a dedicated ASW submarine within 6" of the enemy submarine that has declared an attack on a friendly surface warship. Both roll 4 dice. The attacking enemy submarine must attempt to avoid the attack by equalling or beating the defending ASW submarine dice rolls and then must elect to either return fire against the ASW sub-

marine or continue against the original surface target. All damage and sinking is assessed using the above ship damage rules.

ASW aircraft versus submarine

Players using independent submarine forces to attack naval units are subject to ASW operations by long-range ASW aircraft, either naval or land based. The player with the submarine force declares they are preparing to close to attack range with the enemy naval target(s). No models need be placed on the table for this part of the game. The defending naval player allocates air and naval resources to detect and engage the enemy submarine (s).

Once allocated, these forces may only conduct ASW operations until the end of the scenario. For each submarine, the defender allocates an ASW aircraft or ASW ship that will attempt to detect the submarine. Only specialist ASW aircraft and ships may be tasked with ASW operations. The defender may allocate as many ASW assets against a submarine as they have availble, however a carrier battle group is limited to four ASW aircraft (S3 Viking, ASW helicopters etc) and two land based

ASW aircraft (Nimrod, P3 Orion etc) available for the scenario.

Only one mission per aircraft, against one target submarine is permitted. Detection is attempted by each aircraft making a single location attempt against a single submarine target. Both players roll one dice with the highest player winning. If the ASW aircraft win the roll off, they immediately attack the submarine using the ASW rules for ships engaging submarines. Early Russian nuclear submarines (including Alfas) were noisy therefore the NATO ASW forces will get a +1 on all detection dice roll attempts against such targets. Russian diesel electric boats suffer no extra penalty. If the submarine evades the ASW force, it may then proceed to engage the target it was assigned. Players will need to construct some form of time frame for the commencement of this attack, depending on the distance the submarine is from its intended target.

Submarines firing cruise missiles

Submarines firing cruise missiles do so from OTH, and therefore are not required to be placed on the table. The player firing the cruise missiles rolls one dice us-

ing the BOL rules for missiles. The target rolls two dice in defence. The highest dice roll (s) win. Damage is assessed according to the ship damage rules.

Damage and Repair

Each successful hit causes a number of damages to the target. The counters attached to the rules should be placed beside damaged ships to allow players to know the state of ships as they become progressively damaged. Battle damage degrades all ship systems through the loss of personnel, systems and machinery. Damaged ships may attempt repairs at the end of the game turn. Damage is removed by rolling 1D6 dice and reducing the number of damages by the number rolled. Any damage not repaired, remains with the ship as 'retained damages'. It may take several dice throws to remove all damage, but until all damage is removed the ship may only manoeuvre and fire at a reduced rate. Damaged ships also have all types of fire is reduced by 1 point, for every retained damage, on each dice rolled in attack or defence. CV with 4 or more retained damage points cannot operate aircraft. Each retained damage point

reduces the ship movement by 1 inch.

Sinking ships

All ship targets (except aircraft carriers) are immediately destroyed by rolling any double, (with two dice), for each successful hit (not damage), scored against that target. Aircraft carriers (including the Soviet Helicopter carriers and the Kirov class battle cruiser) require two catastrophic hits to immediately sink. However, if they suffer one catastrophic hit, they are unable to continue operating aircraft and must immediately withdraw from the battle. Destroyed ships are immediately removed from the game. Once ships reach their maximum number of damage points as retained damages, they sink and are immediately removed from the game.

Ship Morale

Ships that have remaining 'retained damages' at the beginning of the player's game turn, must roll 1D6 and equal or exceed the number of retained damages to remain in the battle. If they fail the morale test, the ship must immediately

withdraw at 'best speed' from the table. It may continue to roll to remove retained damages, but must still leave the table.

Specialized Naval Attack Aircraft – Rate of Fire

The rates of fire given for these specialise naval attack aircraft reflect not only the number and type of weapon carried, but the sophistication of those weapons and their supporting EW systems.

FSU and Allies	Rate of Fire
Tu95 Bear D	2
Tu95 Bear G	3
Tu26M Backfire	4
Su24 Fencer	2
Su25T	1
Su27K	3

United States & NATO Allies	
Orion P3	3
F14 Tomcat	3
FA18 Hornet	2
A6	2

NATO	
Bruget Atlantique	3
Tornado	2
Euro Fighter/Mirage 2000	2
Etendard	2

NOTE: These specialized naval attack aircraft DO NOT reduce their number of attacks when launching missiles from OTH or BVR.

Ship Data

Vessel	Surface Warfare To Horizon	OTH	OTHAA	ASW	Damage Points	Carrier Attack	Air Fighter	Groups Recon
Soviet Union Rate of Fire								
Kuznetsov CV	2	2	Y	Y	12	1	1	1
Kiev CVH	2	N	Y	Y	10			
Moskva CVH	1	N	Y	Y	10			
Kynda CG	3	1	Y	Y	7			
Kresta I CG	1	1	N	Y	7			
Kresta II CG	1	1	Y	Y	7			
Kara CG	3	1	Y	Y	7			
Kirov BCGN	3	2	Y	Y	8			
Sovremenny CG	3	2	Y	Y	7			
Udaloy CG	1	1	Y	Y	7			
Neustrashimy FFG	1	1	Y	Y	5			
Slava CG	4	2	Y	Y	7			
Kashin Mod DDG	2	1	Y	Y	5			
Krivak II FFG	1	N	Y	Y	5			
Krivak III FFG	1	1	Y	Y	5			
United States								
Kennedy Class CV	2AA	N	N	N	15	2	2	1
Nimitz Class CVN	2AA	N	N	N	15	2	2	1
Enterprise CVN	2AA	N	N	N	15	2	2	1
Arleigh Burke DDG 3	3	2	Y	Y	6			
Arleight Burke DDG 1-2	2	1	Y	Y	6			
Ticonderoga CG	3	2	Y	Y	7			
Virginia CGN	3	1	Y	Y	7			
California CGN	2	1	Y	Y	7			
Kidd DDG	2	1	Y	Y	6			
Spruance DDG	2	1	Y	Y	6			
O.H.Perry FFG	2	1	Y	Y	5			
Knox FF	2	N	Y	Y	5			
United Kingdom								
Invincible CVH	2AA	N	N	N	10	1	1	1
Type 82 DDG Bristol	2	1	Y	Y	6			
Type 42 DDG	2	N	N	Y	6			
Type 22 FFG Batch 1 & 2	2	N	N	Y	5			
Type 22 FFG Batch 3	3	N	N	Y	6			
Type 23 FFG York Class	3	2	N	Y	5			
Leander Type 2TA	2	N	N	Y	5			
Leander 2B	1	N	N	Y	5			

OTH - Over the Horizon

OTHAA - Over the Horizon Anti-aircraft

ECM Range to 36 inches

Missile Data

Aircraft Missiles

The tables list missiles by type – Infra-red or Radar, (IR or R) and the generation of the missile. When firing a missile against another aircraft, compare the target aircraft's missile generation with that of the firer. If there is a difference, add or subtract that from the dice roll of the attacker. This simulates the better guidance, ECM or ECCM capability of a later or more advanced system. Ground based AA missiles, listed as 'short range' are 'point defence' missiles that only allow fire against aircraft as they attack the target or, listed as 'medium' and 'long range', allow them to engage attacking aircraft immediately they are placed on the table, before they begin any attack. Specialist attached EAW aircraft can be used to reduce missile fire effect against targets.

Note on missiles generation numbers.

Missile generation numbers reflect NATO, US and Soviet military standards. They don't reflect Soviet export model capabilities. In the case of Soviet export clients (most of the Arab world) the missile generation should be 1 less than that listed.

Missile Range scales:

Infra-Red (IR) missile range is between **12cm and 30cm**

Radar (R) missile range is between **30cm and 100cm**

Air to Air Missiles

Missile	Type	Generation	Aircraft to which it is fitted
Russia and Client States			
AA6 'Acrid' (R40)	R	1/3	MiG25 B and MiG31M
AA7 'Apex' R23T	IR	2	MiG23 MF-D from 1980
AA7 'Apex' R24R	R	2	MiG23 MF-D from 1980
AA8 'Aphid' R60	IR	3	MiG23MF, MiG29, Su27
AA9 'Amos'	R	3	MiG31 only
AA10a "Alamo" R27A	R	2	MiG21MF, MiG23MFD, MiG25B
AA10b 'Alamo' R27B	IR	2	As above
AA10c 'Alamo' R27C	R	3	As above
AA10d 'Alamo' R27D	IR	3	As above
AA10e 'Alamo' R27E	R	3	As above
AA11 'Archer' R73	IR	4	MiG29, 31, Su27, MiG23 MLA
AA12 ' Adder' R77	R	4	Similar to AMRAAM, MiG29, Su27 series
NATO and US			
AIM-9L Sidewinder	IR	3	Fitted to most NATO and US fighters
AIM-7F Sparrow	R	3	Fitted to most NATO and US fighters
MATRA 550 Magic 2	IR	3	Mirage 2000, Rafael
MATRA Super 530	R	3	Mirage 2000, Rafael
AMRAAM	R	4	Most NATO, US fighters
ASRAAM	IR	4	Typhoon, Tornado F3, Harrier GR7

Anti-Aircraft Missiles-Ground or Ship Mounted

| Type	Name	Homing	Altitude	Range	Type	Generation
SA-2	Guideline	R	med to high	48"	R	2
SA-3	Goa	R	med	48"	R	2
SA-4	Ganef	R	med to high	48"	R	2
SA-5	Gammon	R	med to high	48"	R	2
SA-6	Gainful	R	low	36"	R	2
SA-7	Grail	IR	low	24"	IR	1
SA-8	Gecko	R	low	24"	R	2
SA-9	Gaskin	IR	low	24"	IR	1
SA-10	Grumble	R	low to high	48"	R	2
SA-11	Gadfly	R	low	36"	R	2
SA-12	Gladiator	R	low to high	24"	R	2
SA-13	Gopher	IR	low	24"	IR	3
SA-15	Gauntlet	R	low to med	24"	R	3
	Hawk	R	low to med	36"	R	2
	Chaparral	IR	low	24"	IR	2
	Rapier	R	low	24"	R	2
	Roland	R	low	24"	R	2
	Stinger	IR	low	24"	IR	2
	Patriot	R	low to high	48"		3
	Crotale	R	low	24"	R	2
	Javelin	IR	low	24"	IR	3
	Mistral	IR	low	24"	IR	2
	Sky guard	R	Low-High	36"	R	3

Modern naval and air combat is a very complex subject and has been presenting difficulties to gamers for a long, long time. Taken separately, they are subjects with a lot of depth unto themselves, but when combined they can become almost unplayable. Harpoon 4 does perhaps the best job of integrating air and surface combat, detection, ASW, anti-air warfare, and more, but there is a steep learning curve and the person preparing the scenario must do an incredible amount of work to prepare for the game. Angels & Bears attempts to use an established air combat system for miniatures (as used in Air War-Korea and Air War-Vietnam) and mated a surface combat system to it. The result is hopefully a fast playing modern combat simulation that will attract gamers who have to this point been put off by the complexity of trying to game this type of warfare. Angels & Bears will not be the last word on this subject, but hopefully it will get people to try this period out and have some fun with it.

Other Air Combat Miniatures Rules

If you've enjoyed Angels & Bears 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.
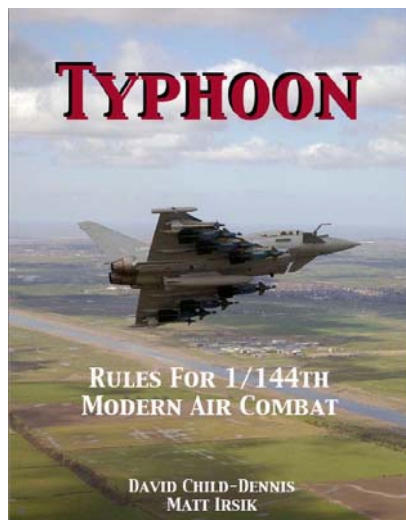
Quick play rules for modern air combat using 1/144th scale aircraft.
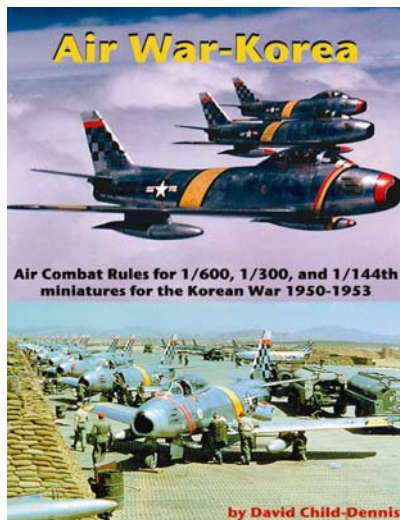
Using the same system as Air War-Vietnam, but for the Korean air war. Another in the series of introductory level air combat rules that give a quick game and is suitable for almost any scale of miniatures.

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

Air Combat Markers

IrAF Su7B

F15 Eagle

MiG 29

Counters & markers for modern air combat wargames. Includes NATO, Warsaw Pact/Russian, & Middle Eastern aircraft

Angels & Bears
NATO and USAF aircraft

Canberra PR7	Nimrod	E3 Sentry	E2C Hawkeye
P3 Orion	E6 Intruder	EA6B Prowler	B2 Spirit

Jaguar	F104	F5	Buccaneer	Canberra	F111
F15 Eagle	F4 Phantom	F16	F117	AV8 Harrier	Mirage F1
F104	G91	Mirage III	A4	F/A 18	Etendard

Tornado	B52 G/H	A10 Warthog	Mirage 2000
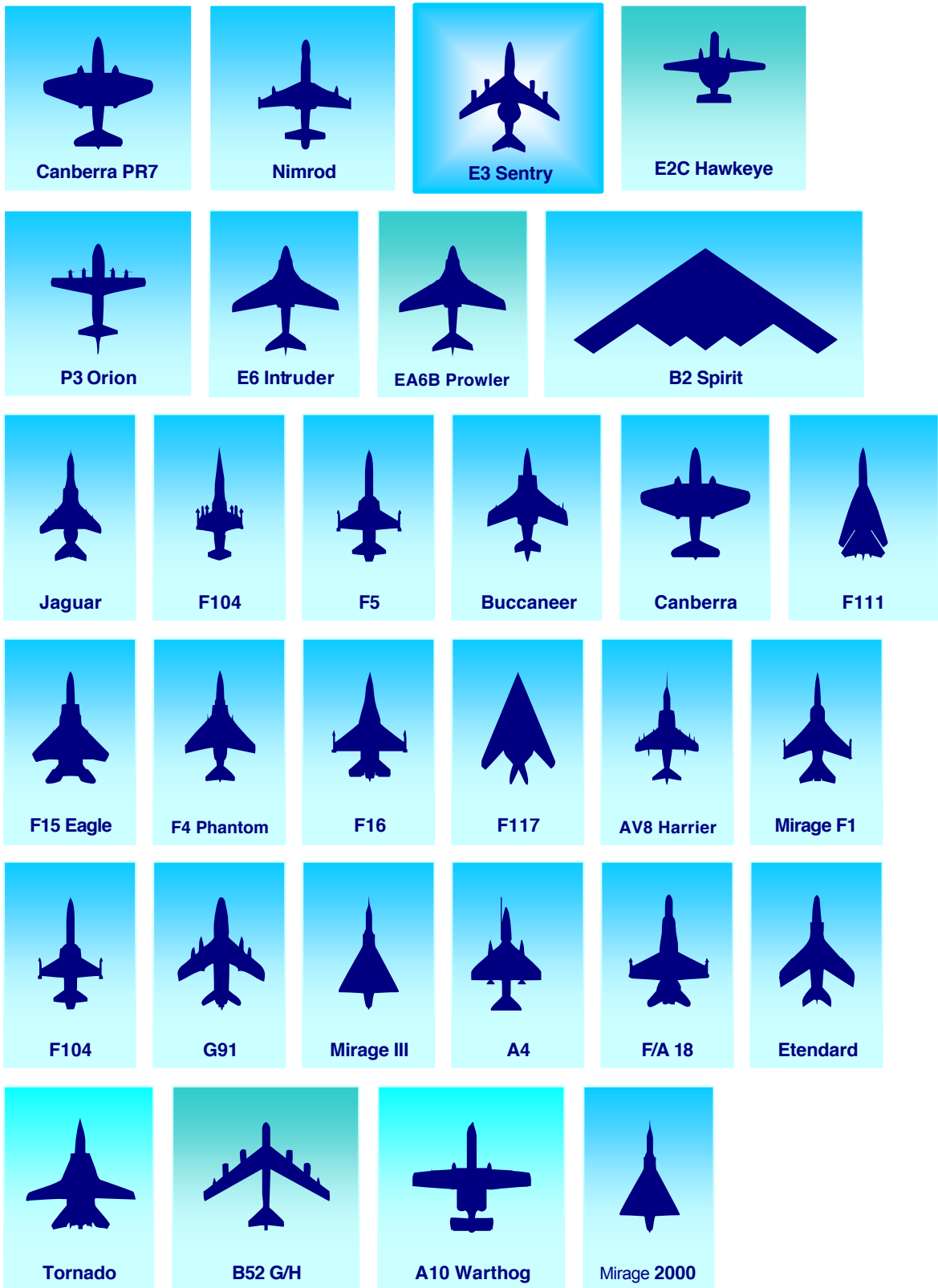
Saturday, 7 August 2010

Angels & Bears
Soviet Aircraft Markers

MiG 25	Su 27	MiG 29	Tu26M	MiG 21	MiG 27
Yak 36	MiG 23	Su24 B	Su 7B	MiG 19	Su 17/20/22
Su25	MiG 17	Tu22 Blinder	MiG 31	EW Yak 28	
Tu 160	Tu95E [ELINT]	Tu16 Badger	IL76 AWACS		
IL38 May - ASW	Tu95 D [Bear D]				
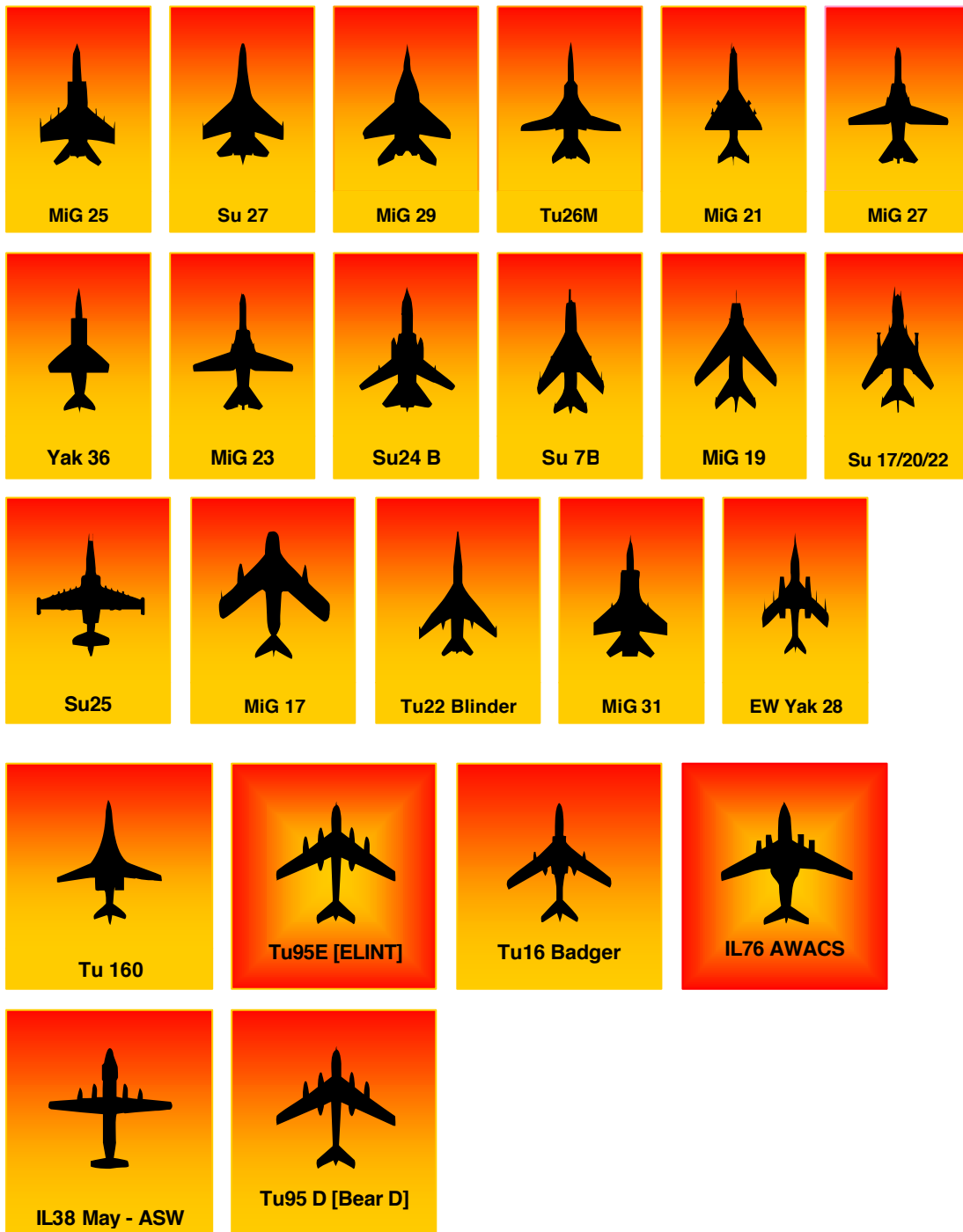
Sunday, 8 August 2010

Angels & Bears

Israel, Iran, Iraq aircraft markers

ISRAEL

IAI Kfir	A4 Skyhawk
F4	Mirage III
F15	F16

IRAQ

IrAF F1EQ	IrAF MiG21	IrAF MiG23
IrAF MiG29	IrAF MiG25	IrAF Su7B

IRAN

IRIAF- F4	IRIAF- F5	IRIAF - F14A

SWEDEN

Draken

Wednesday, 18 August 2010

Angels & Bears
Contact Markers

Small Radar Target	Small Radar Target	Small Radar Target	Small Radar Target	Small Radar Target	Small Radar Target	Small Radar Target	Small Radar Target

Medium Radar Target	Medium Radar Target	Medium Radar Target	Medium Radar Target	Medium Radar Target	Medium Radar Target	Medium Radar Target

Large Radar Target	Large Radar Target	Large Radar Target	Large Radar Target	Large Radar Target	Large Radar Target	Large Radar Target

ASW Contact	ASW Contact	ASW Contact	ASW Contact	ASW Contact	ASW Contact	ASW Contact

Ka 25	Ka 25	Ka 25	Ka 25	Ka 25	Ka 25
ASW	ASW	ASW	ASW	ASW	ASW

Sunday, 8 August 2010

Angels & Bears
Radar Plots and ASW Markers

Small Radar Target	Small Radar Target	Small Radar Target	Small Radar Target	Radar Small Target	Small Radar Target
Medium Radar Target	Medium Radar Target	Medium Radar Target	Medium Radar Target	Medium Radar Target	Medium Radar Target
Large Radar Target	Large Radar Target	Large Radar Target	Large Radar Target	Large Radar Target	Large Radar Target
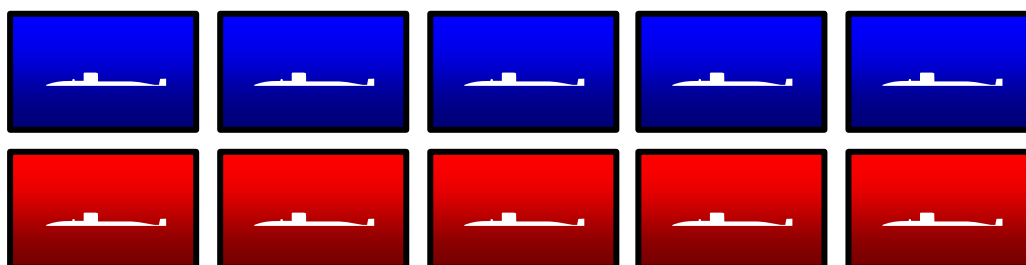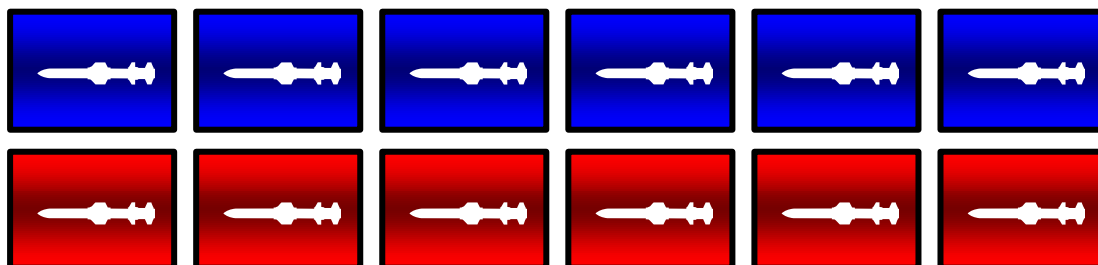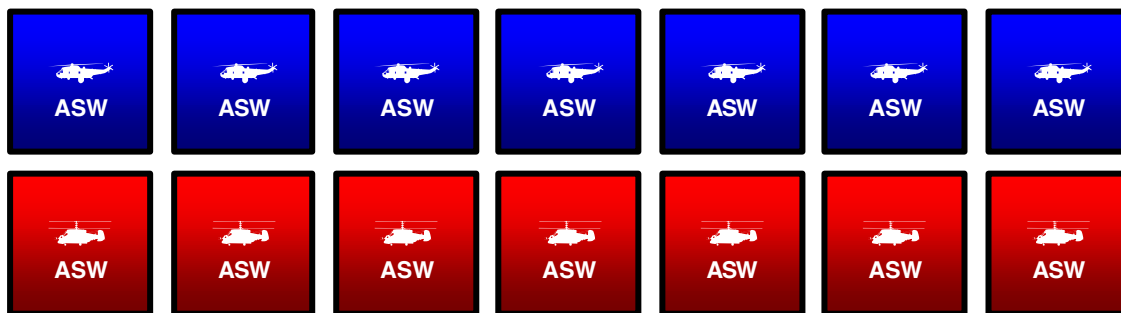
Angels and Bears

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

Saturday, 10 July 2010

Angels and Bears
Turn Markers

|						
Left Turn 1	Left Turn 1	Left Turn 1	Left Turn 1	Left Turn 1	Left Turn 1	Left Turn 1
Left Turn 2	Left Turn 2	Left Turn 2	Left Turn 2	Left Turn 2	Left Turn 2	Left Turn 2
Left Turn 3	Left Turn 3	Left Turn 3	Left Turn 3	Left Turn 3	Left Turn 3	Left Turn 3
Right Turn 1	Right Turn 1	Right Turn 1	Right Turn 1	Right Turn 1	Right Turn 1	Right Turn 1
Right Turn 2	Right Turn 2	Right Turn 2	Right Turn 2	Right Turn 2	Right Turn 2	Right Turn 2
Right Turn 3	Right Turn 3	Right Turn 3	Right Turn 3	Right Turn 3	Right Turn 3	Right Turn 3
NO TURN	NO TURN	NO TURN	NO TURN	NO TURN	NO TURN	NO TURN
Side Slip Left	Side Slip Left	Side Slip Left	Side Slip Left	Side Slip Left	Side Slip Left	Side Slip Left
Side Slip Right	Side Slip Right	Side Slip Right	Side Slip Right	Side Slip Right	Side Slip Right	Side Slip Right

Left Turn 3
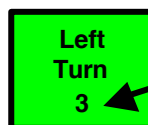
Note: The number shown on the turn marker is the number of sectors a player wishes to turn his aircraft through when making a manoeuvre.

Angels and Bears
Turn and Movement indicator

All movement is in centimetres

Begin calculating rates of turn from this heading

START HERE

40   40

30   30

20   20

10   10
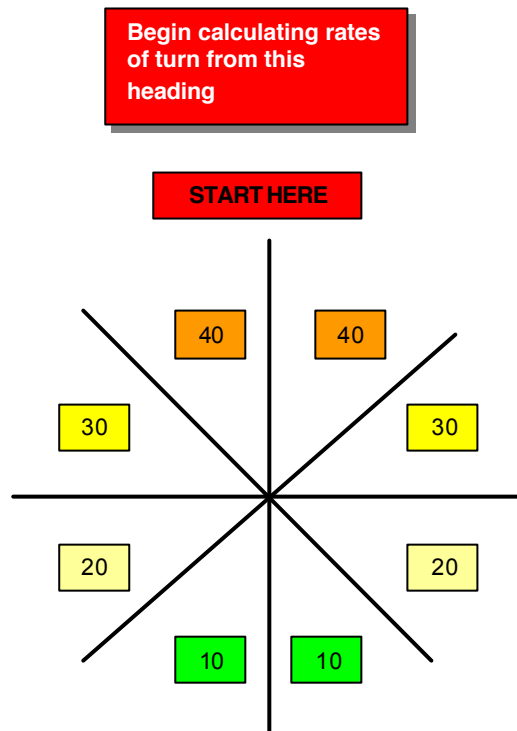
Each sector of the Turn and Movement Indicator shows the maximum speed permitted after turning from straight ahead onto that heading. Place the aircraft model to align with the 'start here' box and then calculate the rate of turn from that point. The speed at which the model will move is listed within 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.

Note: The maximum combat speed is 50cm. Should an aircraft elect to leave the battle it may increase speed to supersonic, in one game turn, and move in a straight line towards its original entry point on the table. It will move at 100cm per game turn until it crosses the table edge. It may not fire guns or missiles while doing so.

Angles and Bears
Turning and movement indicator

Start with aircraft heading at this point

No turn

40 40

30 30

20

NOTE
45⁰ arc

10 10
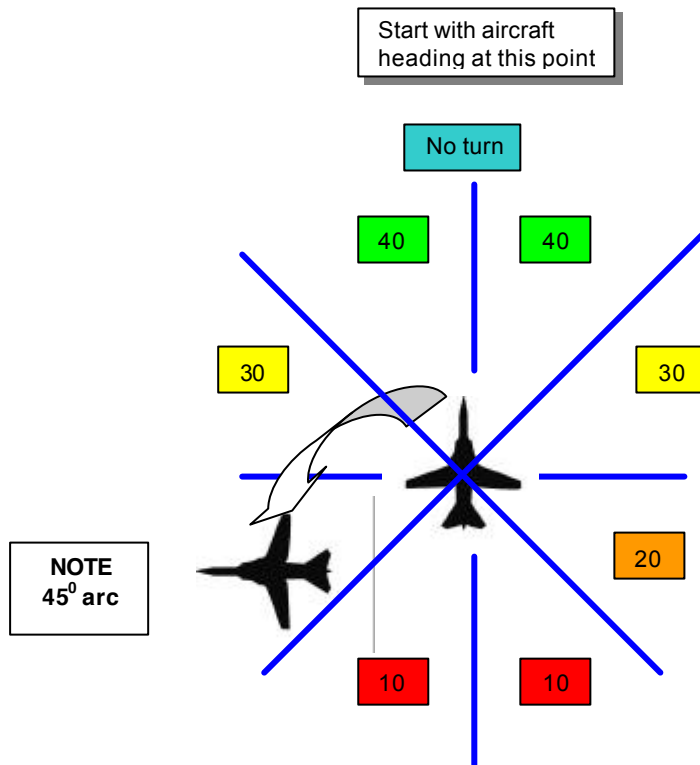
The model is turned to its new heading before it moves.
The MiG has turned through 3 sectors of the turning circle [40,30,20] from straight ahead. Once facing the new heading it is then moved.

Being supersonic, it may slow from 50cm to 20cm (three increments). The player turns the model and then moves it 20cm within the 20cm movement sector. Note there is a 45° arc within which the player may choose to turn the aircraft.
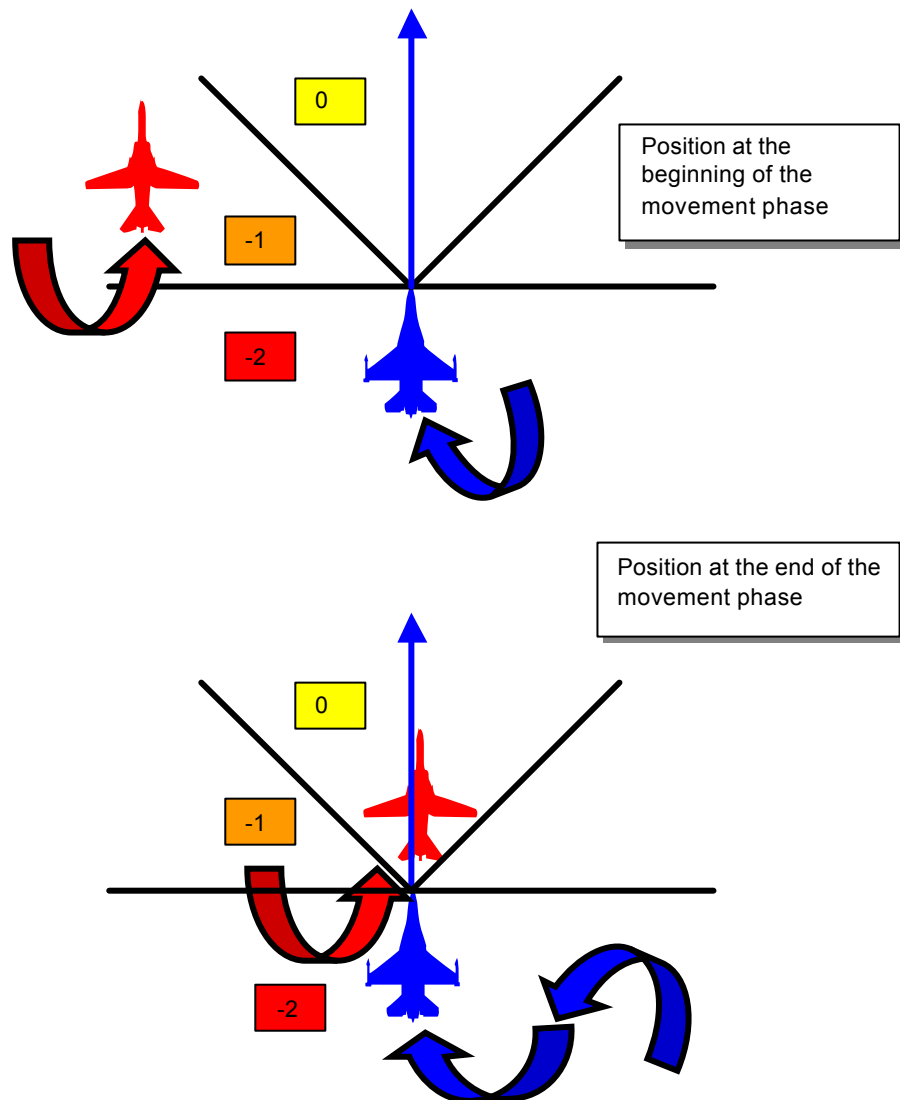
Monday, 1 November 2010

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

100mm

25mm

100mm

25mm

START
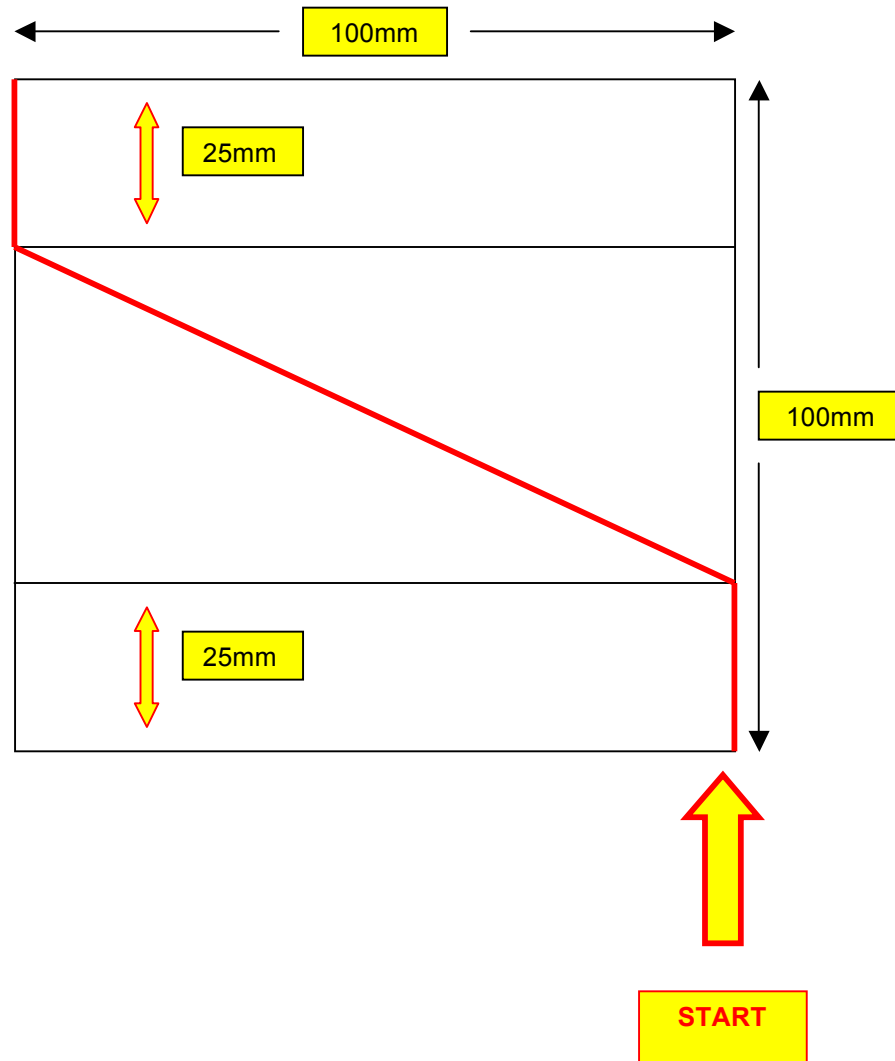
Angels and Bears
Gunnery example

Dice roll to hit target at listed ranges

12cm = 6 to hit
11cm = 5+ to hit
10cm = 4+ to hit
9cm = 3+ to hit
8cm = 2+ to hit
7cm = 1+ to hit
6cm = 0+ to hit

Ranges
Gun 12cm
IR Missile 12-30 cm
R Missile 30-100cm

0

-1

-2

Position at the beginning of the movement phase

0
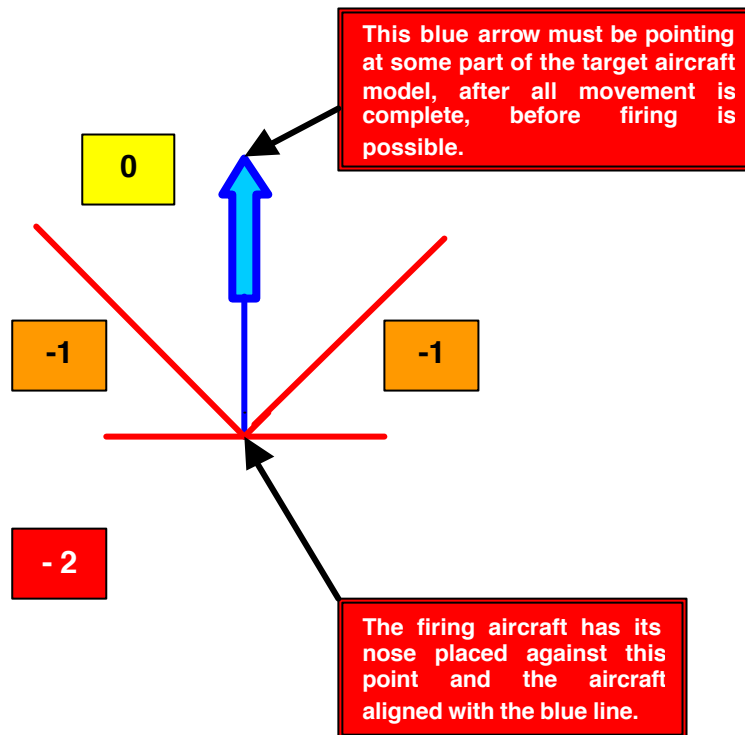
-1

-2

Position at the end of the movement phase

At the beginning of the movement phase, the players note the position of their respective aircraft. The MiG23 is in the [-1] position of the F16, and the F16 is in the [-2] position of the MiG23. The F16 player decides to make a 'side-slip' to the left in the hope of bringing the MiG23 into his line of cannon fire. The MiG23 player opts to continue his left turn and slow in the hope that F16 will overshoot, allowing him to fire an IR missile at short range.

The F16 manages to end up behind the MiG23. The MiG's position in relation to the F16 was [-1] at the beginning of the movement phase. The F16 is only 8 cm behind the Mi G, and has a line of fire to it, reducing the 'to hit' dice score to 2+ to hit the MiG. But there is an additional [-1] penalty from the F16 player's dice roll to allow for their relative positions at the beginning of the movement phase. This brings the final dice roll calculation for the F16 player to 3+

Monday, 1 November 2010

Angles and Bears
Gunnery Template

0

This blue arrow must be pointing at some part of the target aircraft model, after all movement is complete, before firing is possible.

-1   **-1**

- 2

The firing aircraft has its nose placed against this point and the aircraft aligned with the blue line.

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.

David Child-Dennis and Matt Irsik 2010

Angles and Bears
Ship Damage Counters

1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6