AIR WARS

Simple Air To Air Combat in the Jet Age

CONTENTS

INTRODUCTION

These rules are intended to provide a very simple and fast-moving wargame using any scale of modern aircraft models available at present, in conjunction with a hexagon grid. The size of grid will obviously depend upon the scale of models used.

To keep the game simple, much of the fine detail of air combat technology has been left out. Modern air combat is highly technical, but there is insufficient hard evidence to suggest the precise relative position of technology and pilot skill. Most writers on the subject are at pains to point out that the pilot's skill is still a significant factor, and it the skill of the player, rather than the technology that I have tried to emphasis here. Obviously, technology cannot be ignored, and in most cases I have tried to reflect the main differences in generic types of weapons and aircraft. Feel free to tinker if such detail that is available is insufficient for you.

The rules have designed with the wars of the 1960s and 1970s specifically in mind. They therefore exclude some of the more spectacular weapons developments of recent years.

The game is mainly 2-dimensional, although there is a simplified height- band system to represent general operating heights. A fully implemented 3- D system would be much more complex to operate, and a lot slower in play, and for that reason has not been provided here.

The game is intended to accommodate medium numbers of aircraft, and a single player should have no difficulty in handing 3-5 aircraft at once using the basic rules. The campaign rules are a different matter, however, and there is a separate section on those.

I have drawn a distinction between the science-fiction type claims made by the aircraft industries and defence establishment, and instead tried to concentrate on the general experience of air to air combat. Most dogfights seem to have lasted between 30 seconds and 3 minutes. For most of that time the combatants seem to be desperately trying to see each other. It is interesting to note that despite all the sophisticated radar hardware present on modern fighter aircraft, pilots and aircrew still rely on the Mark 1 Eyeball for most targeting.

Combat manoeuvring with jets is very quick and confusing. Unlike earlier periods, concepts such as 'tailing' have less validity since once the target is aware of a hostile aircraft it is capable of such sudden and violent manoeuvring that it becomes virtually impossible to follow.

Jim Wallman
Streatham 1989

EQUIPMENT REQUIRED

A very large hexagon sheet is required. A minimum of 35 hexes square, preferably much larger. The hexagons need to be large enough to comfortably accommodate a single aircraft model of the scale you are using.

Aircraft Models or counters.
Plastic-covered order/record sheets (example at annex A).
Chinagraph pencils or soluble map pens
Normal Dice (d6).
A set of damage cards.

SEQUENCE OF ACTION

1. Each player writes orders for move.
2. Cross off combat fuel used
3. Display orders.
4. Move aircraft models
5. Move all missile counters.
6. Assess the results of cannon/heat seeker firing (if any)
7. Assess results of missile hits (if any)

MOVEMENT

Speeds

Movement is from hex to hex through the sides of the hex. In the aircraft data table (Annex B) there are two speed bands for each aircraft type; one is the cruising speed, the other is maximum speed (which can vary with operational height).
The only aircraft that can remain 'stationary' are helicopters and VIFF- capable aircraft.

Acceleration

Most aircraft may only accelerate by two hexes per move. The only exceptions are twin-engined fighters which can accelerate by three hexes.

Fuel

Each aircraft has an allocation of combat fuel units to start the game. Each aircraft will have a slightly different allocation as detailed in the data tables. This represents combat fuel only, and when it is exhausted the aircraft is removed from play - signifying that it has broken off combat

Every move the aircraft makes at cruising speed uses one fuel unit. Every move the aircraft makes that is faster than cruising speed uses two fuel units. Helicopters remaining stationary use one fuel unit per move. Harriers remaining stationary use two fuel units per move.

Turning
Aircraft have different manoeuvre characteristics. In the data table (Annex B) each aircraft is given a manoeuvre number. This is the number of 60° turns it may make in one move at cruising speed. At faster than cruising speed, they may make one fewer turns - but may always make one 60° turn per move.

This is also subject to the limitation that no more than one turn may be taken before least one hex must be moved forward. The only exceptions are:

a. helicopters which may make their turns in any sequence, and;

b. Harriers which may make turns in any sequence if moving at cruising speed or less.

Aircraft may make emergency turns (to evade missiles or other aircraft). They may add one turn. Roll 1d6 - score 1 and the pilot loses control of the aircraft and it spins, dropping two levels (2000') per move. Roll 1d6 - score 4, 5 or 6 to recover after the first move of spinning. Spins may be entered voluntarily.

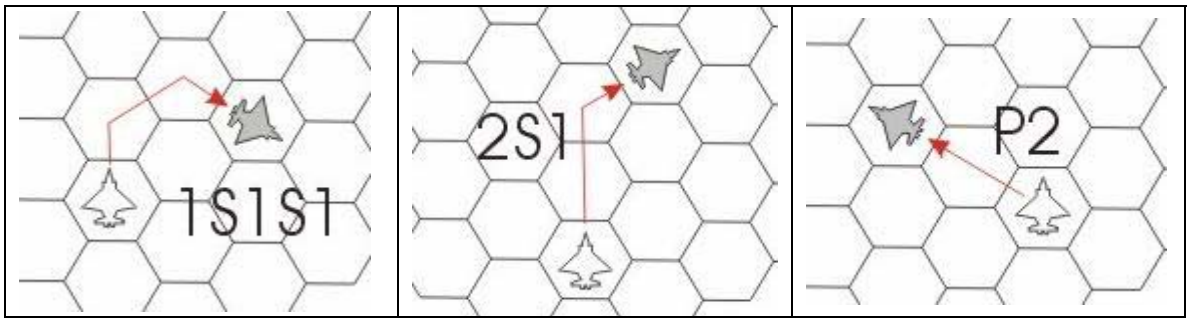
[If you are not using the altitude rules, the aircraft remains in the hex for one move, then drops out of combat].

Movement Orders
Orders describing the intended movement must be written at the start of each move for each aircraft, using the following standard code letters:

L	60° turn to left
R	60° turn to right
1	one hex forward
2	two hexes forward (etc)
FM	fire medium range missile at designated target (see later)
LO	'Lock On' medium range missile system to potential target.
LF	Launch Flares (to confuse incoming heat seekers).
D	Dive one height band. (no extra fuel use)
DD	Dive two height bands. (use one extra fuel unit) (and so on...)
Cx	Climb x height bands. (use one extra fuel unit)

Overleaf are some diagrams showing typical orders, and how they affect the aircraft.

Typical Movement Orders:



Engine Damage
Aircraft with two engines which take an engine hit may remain in the air, but their maximum speed is reduced to 1 hex. Aircraft with one engine taking an engine hit are shot down.

Collisions
If two aircraft finish their move in the same hex at the same height, there is a possibility of collision. Each aircraft draws on damage card (ignore what is written on it) if the cards are the same (ie they have the same number) they have collided. Each aircraft rolls for collision damage as follows:

Score 1	Aircraft thrown out of control and crashes.
2-3	Aircraft takes three airframe damages
4-6	Aircraft takes four airframe damages

Height [Optional Rule]
Height is represented by a series of 1000' height bands, displayed on a separate 'profile board'. A counter indicates the aircraft's height.

Aircraft may climb at their climb rate (as shown in the 'ROC' column in annex B), at a cost of one fuel unit.
They may dive up to double their rate of climb.

WEAPONS

Cannon
Most aircraft types have cannon, with broadly similar properties. They may fire on any targets within two hexes directly ahead of the aircraft at the end of the move. The chance of hitting depends upon the speed of the target and the height of the combat:
Roll 1d6 to hit:

Height:	Up to 30,000 feet		Over 30,000 feet	
Range:	1	2	1	2
Score to hit:	3+	5+	4+	6+

Factors:

-1 if target moving 3 hexes or more.
-1 for each pilot wound.
+1 if Ace pilot
-1 if Raw Pilot

If a hit is scored take a damage card (see below).
Cannon can only be used on targets in the same height band.

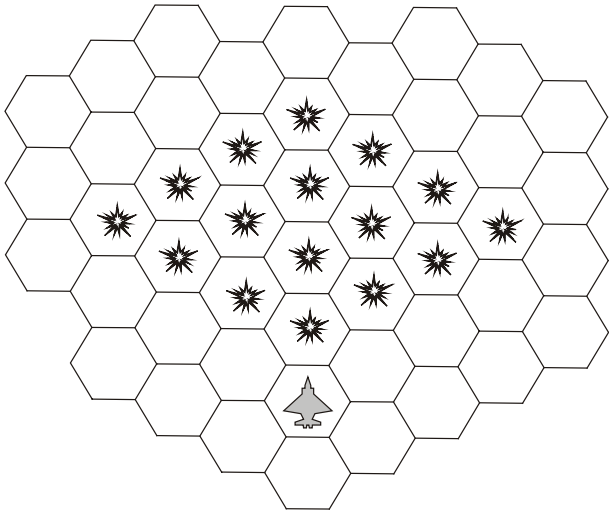
Infra-Red Missiles (Heat Seekers)
These are carried by some aircraft for particular missions, and include such types as Sidewinder, Shafrir and Atoll. They can only engage targets in the same height band.

Like cannon, they do not have to be ordered in advance to fire, and may be fired singly or in pairs at any single target. They have a range of four hexes on a forward 120ø arc of the firing aircraft. In addition the target aircraft must have its rear 120ø pointing at the firer (the 'target window'). This is because the heat seekers must be able to 'see' the target's hot exhaust pipe.

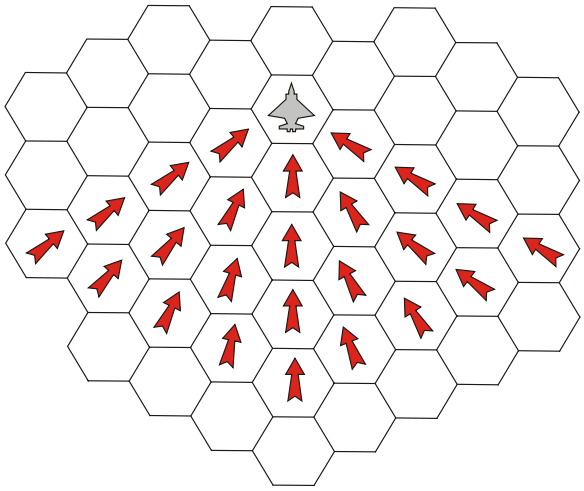
Heat seekers can be fired singly or in pairs. Roll 1d6 per missile:

Each Missile score 3+ to hit
If the target launches flares to confuse the missiles -2 from the die roll.

Firing Aircraft Parameters - Heat Seekers:

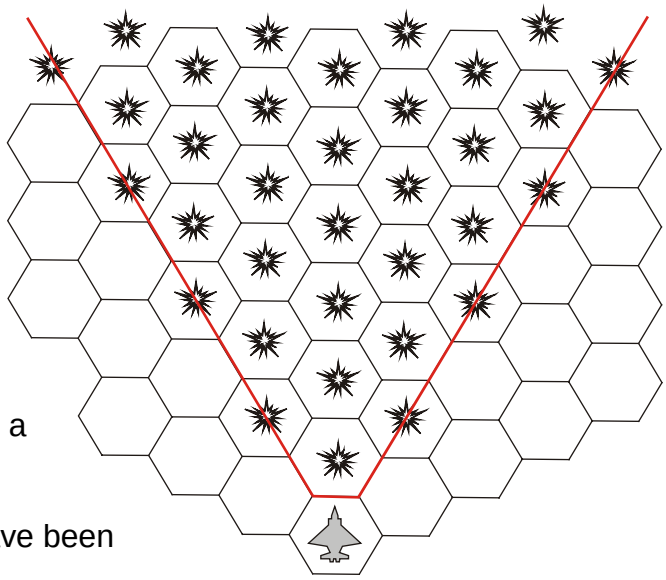


Target Aircraft Parameters:



Medium Range Missiles (RADAR Homing)
These include Sparrow and Alkali Air to Air missiles, and most heavy SAMs. The firing procedure is a bit more complicated than that for Heat seekers or cannon. It must follow this sequence:

a. 'Lock On' to a target aircraft with the missile's homing Radar. Player must write 'LO' and identify a specific target aircraft. If in that turn the designated target finishes its move anywhere within the firer's forward 60ø arc it has been Locked.
b. The target must remain in that forward arc for the next turn before the missile can be fired.



c. On the third move the missile is launched. It moves at 10 hexes per move and homes in on the designated target for three moves, after which it is removed (if it has not hit by then). In the Air to Air role they can alter height by one band per move.

If the missile successfully intercepts the aircraft in that time then roll 2 or more for a successful hit. Roll again for damage

Missiles are moved AFTER all aircraft have been moved.

Bombs
'Dumb Bombs' can be released at any time. All bombs are released at once. They move forward for one move at the speed of the dropping aircraft, and drop 1 level per move.

Their accuracy depends upon the height, type and speed of the dropping aircraft.

Height	Speed 1	over 1
1-10	2+	4+
11-20	3+	5+
21-30	4+	6+
31+	5+	7+

Type Effects: Large target (ie town/village)+1

Small Target (ie bridge)	-1
Fighter Bomber below ht 10	+1
Medium Bomber over ht 30	+1

Loads: Fighter Aircraft may have single light bombs without affecting their performance. Fully laden with bombs they may only move at cruising speed and with only one 60ø turn per move.

Fully laden bombers may not exceed cruising speed.

'Smart Bombs' are treated as Medium range Missiles (see above), except that they must lock on for an extra turn before firing - and are only used against SAM or AA sites (since they are Radar Homing).

LASER Guided Bombs. These must have their target illuminated by another aircraft. The illumination has a range of 10 hexes and 5 levels.

DAMAGE
Each aircraft can take a number of Airframe Damages before being shot down - typically five.

Damage cards set is attached to these rules, photocopy the pages first, so that you can make multiple sets of cards. Stick each sheet onto thin card, and cut them out. This pack of damage cards is used instead of dice to determine the result of weapon hits.

For each hit take one card. Each card has multiple results on it, depending upon the type of weapon firing. The cards are in sets of 40 cards. If possible, use more than one set, and at least one set per player. The following table is a summary of the contents of each card.

Card No	Single Cannon	Multi-Cannon	Heat Seeker	Medium Missile
1	PK	PK	PK	PK
2-3	EH	PK	EH	PK
4-5	FL	EH	EH	PK
6	FL	FL	EH	PK
7	FL	FL	EH	EH
8-9	PW	FL	EH	EH
10	PW	PW	EH	EH
11	PW	PW	EH	FL
12	PW	PW	FL	FL
13-14	D	D	FL	FL
15	D	D	PW	PW
16-17	D	D	D	PW
18-19	D	D	D	D
20	D	D	D	DD
21-24	D	DD	D	DD
25	D	DD	DD	DD
26	D	DD	DD	DDD
27-29	DD	DD	DD	DDD
30	DD	DDD	DD	DDD
31	DD	DDD	DDD	DDD
32-33	DD	DDD	DDD	DDD
34-36	DDD	DDD	DDD	DDD
37	MO	MO	MO	MO
38	Cm	Cm	Cm	Cm
39	R	R	R	R
40	X	X	X	X

Key to Results

PK Pilot Killed
EH Engine Hit + 1 Airframe Damage
FL Fuel Line Hit + 1 Airframe Damage (use 1 extra fuel per turn)
PW Pilot Wounded + 1 Airframe Damage (3 wounds = killed)
D 1 Airframe Damage
DD 2 Airframe Damages
DDD 3 Airframe Damages
MO Missile Targeting Systems Out + 1 Airframe Damage (No missile firing)
Cm Radio damaged. No communication with either base or other aircraft. + 1 airframe damage.
R Radar damaged. No early warning radar use + 1 airframe damage.
X Fuel tank hit. Aircraft explodes - no chance to eject.

ELECTRONIC COUNTER MEASURES
It is assumed that 'SAM-song' missile detectors are fitted to all aircraft, so that whenever an aircraft if subject to an attempted 'lock-on' the player in control of that aircraft must be told.

In the aircraft data tables is an integral ECM score. This is the die roll necessary to throw off a 'lock on'.

ECM Pods may be added to the aircraft in place of some weapons. These jam targeting weapons and must be set in advance to one of the following frequencies:

a. SAM Radar Frequency.
b. Medium Range Missile Frequencies.
c. AA Gun Radar Frequency.

Against each type an ECM pod allows the aircraft to +2 to its resistance die roll.

BALING OUT
Each crew member may roll to successfully eject, scoring 2+ to succeed. -1 from dice per wound. Ejector seats place the crew member in the hex behind the aircraft. Parachutes descend at 1 level every 10 moves.

SURFACE TO AIR MISSILES
Heavy SAMS represent an area weapon. There are two ways of reflecting this. Either mark a part of the playing area as a SAM-zone OR mark the location of individual SAM Sites on the ground and reflect the ranges etc of each site. Any aircraft entering the SAM zone is a potential target. Roll for each aircraft each move it is in the zone.

SAMs have a minimum height range of 2 levels, a maximum of 25. They have a range of 50 hexes.

If the SAMs are on the same side as the aircraft, roll 1 for the SAM to 'Lock On'.

If the SAMs are hostile to the aircraft, roll 1, 2 or 3 for the SAM to 'Lock On'.

If the SAMs do lock on then treat then as if they were Medium Range Missiles.

The operation of SAMs is automatic and out of the control of the players.

SAMS take one complete move to launch, once locked on. Aircraft crews might sight the launch, depending on their altitude and facing.

ANTI-AIRCRAFT GUNS
AA Guns are an area weapon. The AA zone will be defined by the location on

the ground of AA sites. Any aircraft entering the zone is a potential target. Roll for each aircraft each move it is in the zone.

AA Guns have a maximum height range of 2 levels, horizontal range of 4 hexes.

If the AA Guns are on the same side as the aircraft, roll 1, 2 or 3 for the AA Gun to open fire.

If the AA guns are hostile to the aircraft, they open fire automatically.

Roll to hit:

Height:	**Level One**		**Level Two**	
Range:	1-2	3-4	1-2	3-4
Score to hit:	3+	5+	4+	6+

-1 from die if target moving 3 hexes or more.
+1 to die if Veteran Crew
-1 from die if Green Crew

If a hit is scored take a damage card (see above).
The operation of AA guns is automatic and out of the control of the players.

Aircraft Record Sheet

Vessel ID			
STATS	Cruise Accel: Max Decel: Turns	Cruise Accel: Max Decel: Turns	Cruise Accel: Max Decel: Turns
Damage	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
Fuel	01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60	01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60	01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
Missiles	①②③④⑤⑥⑦⑧	①②③④⑤⑥⑦⑧	①②③④⑤⑥⑦⑧
Crew	-1 -2 -3 Dead	-1 -2 -3 Dead	-1 -2 -3 Dead
Specials			
Move	Movement Orders	Movement Orders	Movement Orders
1			
2			
3			
4			
5			
6			
7			
8			
9			

AIRCRAFT DATA

ANNEX A

Codes: Eng = Engines
Cei = Ceiling
ECM = ECM score
Cru = Cruising speed
Turn = No. of 60° turns
ROC = Rate of climb (levels per move)
Can = No. of Cannon
Fuel =fuel pts
HP = Hard Points
Dam = Airframe damages

Description	Crew	Eng	SPEEDS Cru	Hi Max	Lo Max	Can	HP	ROC	Cei	Turn	Fuel	Dam	ECM	Weapons
USA														
A1 Skyraider	1	1	1	1	1	4	5	1	32	1	20	3	6	Bombs
F16	1	1	1	4	2	1	9	3	60	2	26	4	5+	4IR 4MR
F111E	2	2	2	5	2	2	8	1	60	1	60	6	4+	Bombs
F105D	1	1	1	4	2	1	5	3	52	1	48	6	4+	Bombs/ Wild Weasel
A6E Intruder	2	2	1	2	2	-	5	1	44	1	20	5	5+	
F14 Tomcat	2	2	1	4	2	Gat	6	3	56	1	40	5	5+	
C130 Hercules	2	4	1	1	1	-	-	3	33	1	50	8	4+	
F4E Phantom	2	2	2	5	3	Gat	5	2	60	1	30	5	4+	4MR 4IR ECM
A4E Skyhawk	1	1	1	-	2	2	9	1	49	2	22	5	5+	Bombs
F8J Crusader	1	1	1	4	3	4	5	2	42	1	30	5	4+	4IR Rockets
F15 Eagle	1	2	2	5	3	2	5	4	70	2	25	5	4+	
F18	1	2	2	4	3	2	7	3	60	1	15	5	5+	
F5	1	2	1	2	2	2	5	2	32	1	40	4	6	2IR
F101 Voodoo	1	2	1	4	2	3	6	1	52	1	30	5	6	3IR
A7E Corsair	1	1	1	2	2	Gat	8	1	30	1	80	5	5+	
C5A Galaxy	6	4	1	1	1	-	-	1	34	1	70	8	5+	
USSR / Russian														
Tu16 Badger	2	2	1	-	-	7	-	1	43	1	∞	8	5+	Bombs only
Tu26 Backfire	2	2	1	5	3	-	-	1	60	1	40	7	5+	
Su7B Fitter A	1	1	1	3	2	2	4	2	50	1	29	6	6+	Bombs
Su11 Fishpot C	1	1	1	4	2	-4	2	5	61	1	15	5	6	
Su15 Flagon A	1	2	1	5	2	2	4	3	65	1	15	5	6	1IR 1MR
Su17 Fitter C	1	1	1	3	2	2	6	4	59	1	80	6	6	

Description	Crew	Eng	SPEEDS Cru	Hi Max	Lo Max	Can	HP	ROC	Cei	Turn	Fuel	Dam	ECM	Weapons
Su19 Fencer A	2	2	1	5	3	-	4	3	60	1	15	6	6	
MiG17 Fresco	1	1	1	2	2	3	4	1	54	1	28	5	6	Can replace cannon with 4IR or 4MR
MiG19 Farmer	1	2	1	3	2	3	4	2	58	2	25	5	6	2IR
MiG21 Fishbed	1	1	1	4	2	2	4	3	59	2	22	5	6	1IR (later 4IR)
MiG23 Flogger B	1	1	1	5	3	2	5	2	55	1	15	5	6	
MiG25 Foxbat	1	2	1	6	4	-	4	4	73	1	15	5	6	
MiG27 Flogger D	1	1	1	4	2	2	7	2	50	1	18	6	6	
Yak36 Forger A	1	1	1	3	2	2	4	1	50	1	10	5	6	
France														
Super Entendard	1	1	1	2	1	2	2	2	50	1	25	5	5+	
Mirage IIIE	1	1	1	5	3	2	5	1	56	1	24	5	4+	4IR +ECM or 2IR+1MR
Mirage F1C	1	1	1	5	3	2	5	3	65	1	15	5	5+	
Super Mystere	1	1	1	2	2	2	2	1	55	1	18	5	5+	2IR
Israel														
Kfir	1	1	1	5	3	2	1	2		1		5	5+	ECM
Generic Helicopters														
Light	2	1	0	-	1	-	-	1	8	2	30	3	6	
Attack	2	1	1	1	1	2	2	1	10	2	10	5	5+	
Transport	2	2	1	1	1	1	-	1	15	1	10	6	6	

Assumptions Used In Setting Aircraft Data:

Rate of Climb :	12000 feet per minute = 1 level per move.
Speeds :	300 mph = 1 hex per move
Scales :	1 hex -~ 1000 yards 1 move -~ 5 or 6 seconds
Range/Fuel :	50 miles operational range = 1 fuel unit, subject to a minimum of 15. Use combat radius rather than ferry ranges.
ECM :	Where no better information, assume Modern aircraft have 4 or 5, old aircraft 6. Bombers are usually one better than fighters because they carry more built-in ECM.
Damage :	Prop/WWII Fighters = 4, most modern fighters = 5, bombers (usually armoured) = 6, large aircraft = 7 or 8. Very large bombers = 10.

MISSILE DATA

Designation	Type	Range in hexes	Speed in hexes	Deployment Notes
USSR				
Anab (AA3)	Radar	16	8	USSR & Clients
Ash (AA5)	Radar	30	10	
Atoll (AA2)	IR	4	n.a.	
Acrid (AA6)	Radar	30	10	MiG-25
Apex (AA7)	Radar	35	10	MiG-23, MiG-25
	IR	4	n.a.	ditto.
Aphid (AA8)	IR	5	n.a.	Mig-23, MiG-21
USA				
Falcon (AIM-4D)	IR	5	n.a.	
Falcon (AIM-4E/F)	Radar	24	10	
Sidewinder (AIM9B)	IR	3	n.a.	
Sidewinder (AIM9C)	Radar	18	5	
Sidewinder (AIM9D)	IR	4	n.a.	
Sparrow (AIM7E/F)	Radar	25	8	

Note that Radar missiles can turn once for each hex moved forward.

