

# AIR WARS



**Simple Air To Air Combat in the Late 20<sup>th</sup> Century**

by Jim Wallman

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ANNEX A - Example Order/Record Sheet

ANNEX B - Summary of aircraft statistics



## 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 is the skill of the player, rather than the technology that I have tried to emphasize 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 been 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 handling 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



McDonnell Douglas F-4 Phantom

Knut Uppstad -08

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

## INTRODUCTION TO 2008 EDITION

Much has changed in weapons technology since 1989, and the nature of warfare itself has probably altered. Air to Air combat has, in the early 21<sup>st</sup> century asymmetrical wars become almost unknown.

That rather places a limit on these rules – dealing as they do with the late 20<sup>th</sup> century from about 1960 to about 1980. Rather than try to update the rules to take account of post 1990 aircraft and technologies, I felt that the period stands alone, so I have kept it there. These rules are primarily aimed at Vietnam, the Arab-Israeli and Indo-Pakistan wars and fantasy NATO-Warsaw Pact combats set in the 1980's. If you're looking for a set of rules for air war in the skies of Iraq, I'm afraid these won't help.

Jim Wallman  
Streatham 2008

## 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.
- A sheet marked off in horizontal lines to show height profiles (Optional)
- A counter for each aircraft to put on the profile sheet. (Optional)

## SEQUENCE OF ACTION

1. Each player writes orders for move on the order sheet.
2. Cross off combat fuel used
3. Display orders.
4. Place any medium range missile launched in the launching aircraft's hex.
4. Move aircraft models.
5. Move all MR missile counters.
6. Assess the results of cannon/heat seeker firing
7. Assess results of missile hits

## 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') immediately, then 2 levels per move thereafter. Roll 1d6 - score 4, 5 or 6 to recover after the first move of spinning, 6 or more after the second 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

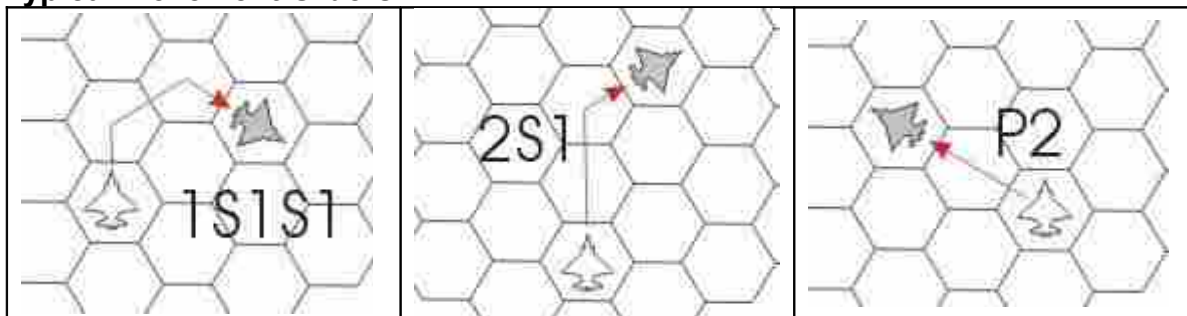
Orders describing the intended movement must be written at the start of each move for each aircraft, using the following standard code letters:

- 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.
- Flare Launch Flares (to confuse incoming heat seekers).
- Chaff Launch Chaff (to confuse targeting radar).

### Optional Movement Orders (if using height bands)

- D Dive one height band. (no extra fuel use)
- DD Dive two height bands. (use one extra fuel unit regardless of number of D)
- Cx Climb x height bands. (use one extra fuel unit no matter how far you climb)
- Level Level out from nose-up or nose-down.

### 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 Rules]

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.

If you are using the height rules then it is important to know whether an aircraft is 'nose up' or 'nose down' – this is indicated on the profile board.

Obviously - after a climb an aircraft is 'nose up' and after a dive it is nose down.

## 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.

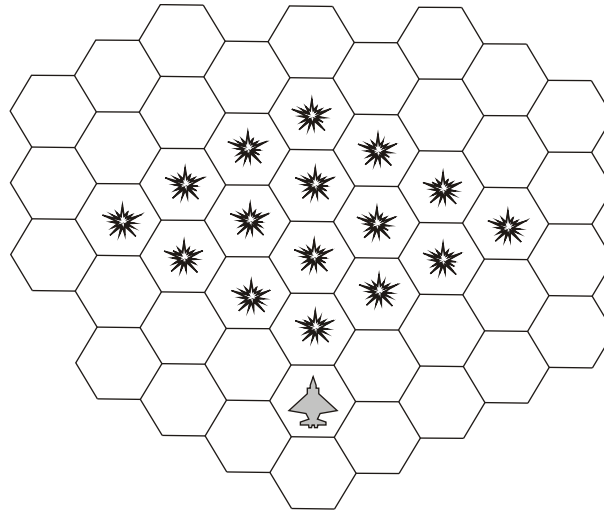
Like cannon, they do not have to be ordered in advance to fire, and may be fired singly or in pairs at any single target. They have a range of four hexes on a forward 120° arc of the firing aircraft. In addition the target aircraft must have its rear 120° pointing at the firer (the 'target window'). 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:

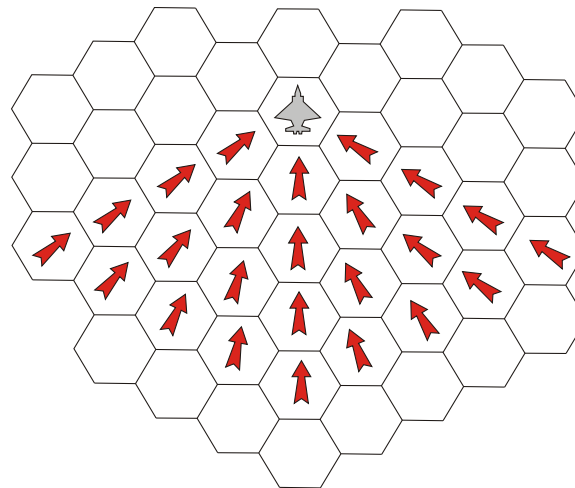
Each Missile score 3+ to hit

If the target launches flares to confuse the missiles -2 from the die roll.

Firing Aircraft Parameters - Heat Seekers:



Target Aircraft Parameters:





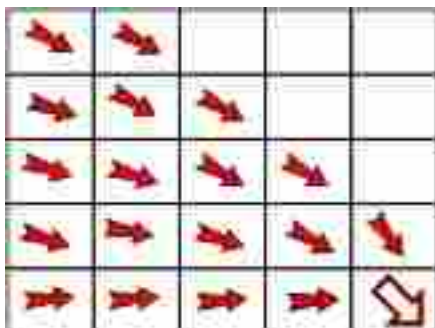
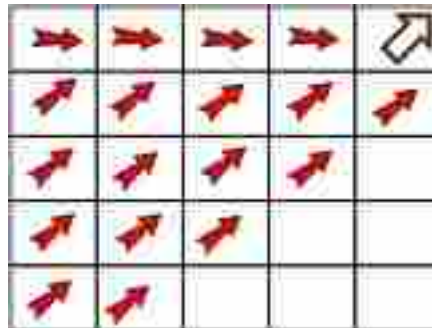
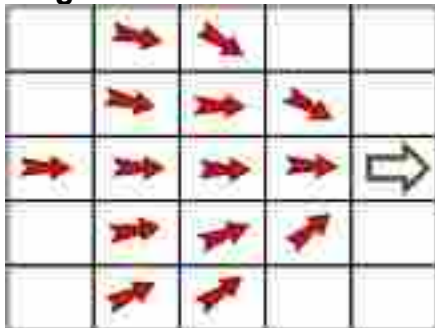
**OPTIONAL RULE – HEIGHT BANDS**

If engaging targets on a different height band the firing aircraft must be pointing either up or down as appropriate. The vertical parameters look like this:

**Firing Parameters**



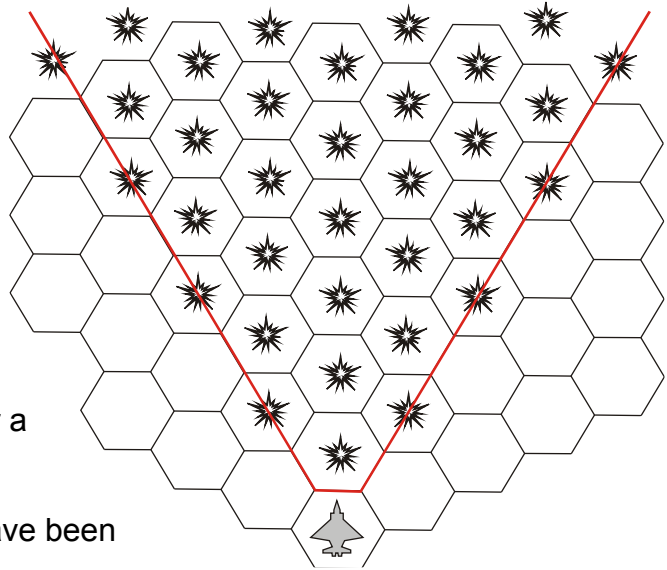
**Target Parameters**



**Medium Range Missiles (RADAR Homing)**

These include Sparrow and Alkali Air to Air missiles, and most heavy SAM. 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 60° 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.



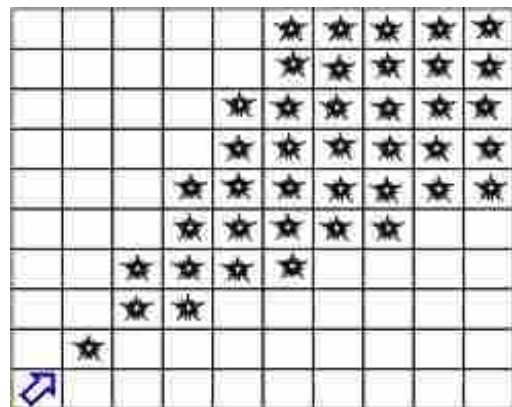
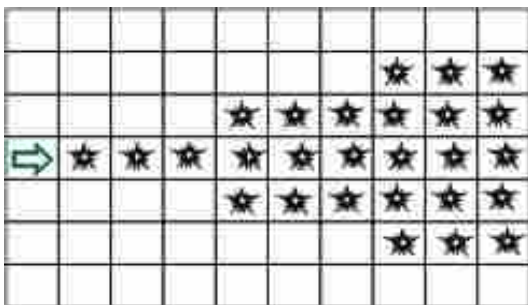
If the missile successfully intercepts the aircraft in that time then roll 2 or more for a successful hit. Roll again for damage

Missiles are moved AFTER all aircraft have been moved.

(There are small differences in the characteristics of different types of missile – see the Missile Data table at the end of the rules if you'd like to reflect these differences in your game)

**OPTIONAL RULE – HEIGHT BANDS**

The vertical parameters for Radar missiles look like this:



## Bombs

'Dumb Bombs' can be released at any time. All bombs are released at once. They move straight forward for one move at the horizontal speed of the dropping aircraft, and drop 15 levels 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 60° 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.

## OPTIONAL HEIGHT RULE

Bombs drop at 15 levels per move.



## DAMAGE

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

The 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 is 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 SAM 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.

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

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

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

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

The operation of SAM 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 ARTILLERY

AAA is an area weapon. The AAA zone will be defined by the location on the ground of AAA sites. Any aircraft entering the zone is a potential target. Roll for each aircraft each move it is in the zone.

AAA has a maximum height range of 2 levels, horizontal range of 4 hexes.

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

If the AAA 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:                        |                               |                               |                               |                               | Cruise                        |                               |                               |                               |                               | Accel:                        |                               |                               |  |  | Cruise          |  |  |  |  | Accel: |  |  |  |  |
|                       | Max                           |                               |                               |                               |                               | Decel:                        |                               |                               |                               |                               | Max                           |                               |                               |                               |                               | Decel:                        |                               |                               |  |  | Max             |  |  |  |  | Decel: |  |  |  |  |
|                       | Turns                         |                               |                               |                               |                               |                               |                               |                               |                               |                               | Turns                         |                               |                               |                               |                               |                               |                               |                               |  |  | 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              | ① ② ③ ④ ⑤ ⑥ ⑦ ⑧               |                               |                               |                               |                               |                               | ① ② ③ ④ ⑤ ⑥ ⑦ ⑧               |                               |                               |                               |                               |                               | ① ② ③ ④ ⑤ ⑥ ⑦ ⑧               |                               |                               |                               |                               |                               |  |  |                 |  |  |  |  |        |  |  |  |  |
| 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: Turn = No. of 60° turns      ECM = ECM score      ROC = Rate of climb (levels per move)  
 Lo Max = max speed under 25 levels      Hi Max = max speed 26 levels or more

| Description           | Crew | Engine | SPEEDS |        | No. of Cannon | Hard Points | ROC | Ceiling | Turn | Fuel points | Airframe Damages | ECM | Weapons |                    |
|-----------------------|------|--------|--------|--------|---------------|-------------|-----|---------|------|-------------|------------------|-----|---------|--------------------|
|                       |      |        | Cruise | Hi Max |               |             |     |         |      |             |                  |     |         | Lo Max             |
| <b>USA</b>            |      |        |        |        |               |             |     |         |      |             |                  |     |         |                    |
| 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+      |                    |
|                       |      |        |        |        |               |             |     |         |      |             |                  |     |         |                    |
| <b>USSR / Russian</b> |      |        |        |        |               |             |     |         |      |             |                  |     |         |                    |
| 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       |                    |
| Su19 Fencer A         | 2    | 2      | 1      | 5      | 3             | -           | 4   | 3       | 60   | 1           | 15               | 6   | 6       |                    |



| Description                | Crew | Engine | SPEEDS |        | No. of Cannon | Hard Points | ROC | Ceiling | Turn | Fuel points | Airframe Damages | ECM | Weapons |                                    |
|----------------------------|------|--------|--------|--------|---------------|-------------|-----|---------|------|-------------|------------------|-----|---------|------------------------------------|
|                            |      |        | Cruise | Hi Max |               |             |     |         |      |             |                  |     |         | Lo Max                             |
| 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       |                                    |
| <b>France</b>              |      |        |        |        |               |             |     |         |      |             |                  |     |         |                                    |
| 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                                |
| <b>Israel</b>              |      |        |        |        |               |             |     |         |      |             |                  |     |         |                                    |
| Kfir                       | 1    | 1      | 1      | 5      | 3             | 2           | 1   | 2       |      | 1           |                  | 5   | 5+      | ECM                                |
| <b>Generic Helicopters</b> |      |        |        |        |               |             |     |         |      |             |                  |     |         |                                    |
| 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 / 4000m per minute = 1 level per move.  
 Speeds : 300 mph / 500 kph = 1 hex per move  
 Scales : 1 hex ~ 1000 metres  
 1 move ~ 5 or 6 seconds  
 Range/Fuel : 50 miles (80km) 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     |
|--------------------|-------|----------------|----------------|----------------|
| <b>USSR</b>        |       |                |                |                |
| Anab (AA3)         | Radar | 16             | 8              | USSR & Clients |
| Ash (AA5)          | Radar | 30             | 10             |                |
| Atoll (AA2)        | IR    | 4              | Heat seeker    | Mig21          |
| Acrid (AA6)        | Radar | 30             | 10             | MiG-25         |
| Apex (AA7)         | Radar | 35             | 10             | MiG-23, MiG-25 |
| Apex (AA7)         | IR    | 4              | Heat seeker    | MiG-23, MiG-25 |
| Aphid (AA8)        | IR    | 5              | Heat seeker    | Mig-23, MiG-21 |
| <b>USA</b>         |       |                |                |                |
| Falcon (AIM-4D)    | IR    | 5              | Heat seeker    |                |
| Falcon (AIM-4E/F)  | Radar | 24             | 10             |                |
| Sidewinder (AIM9B) | IR    | 3              | Heat seeker    |                |
| Sidewinder (AIM9C) | Radar | 18             | 5              |                |
| Sidewinder (AIM9D) | IR    | 4              | Heat seeker    |                |
| Sparrow (AIM7E/F)  | Radar | 25             | 8              |                |

All Radar missiles turn once for each hex moved forward.