Thoughts for the Airwar Gamer

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There is an ideal way to play any wargame, and AirWar is no exception. The only problem is that in this particular case the ideal setup consists of several controllers, preferably computer aided, a game set for each (isolated) player, and a lot of that elusive phenomenon, time. Perhaps one day some enterprising person will arrange it, but until such time we will have to be content with one game, 'n' participants, a calculator and lots of paper; the latter two are not necessary, but in some scenarios very, very helpful.

It is with this in mind that I have compiled these 'thoughts'; it is all too easy when dreaming up 'improvements' to such a complex tactical game to let your imagination run wild with the result that 'realism' is increased except in one case – 2½ seconds real time tends to stretch towards 2½ weeks. Not a very satisfactory state of affairs!! I think that I have avoided this trap, and that none of the following suggestions will be much of a bind timewise; anyway, I'll let you be the judge.

So what, then, do these 'thoughts' consist of? They can be summarised as varying from identification to bombing, from 'new' aircraft variants to tracking cone errors, but your best answer is probably to carry on reading .....

'He who sees Wins' is a motto very well suited to aerial combat, and opposing pilots' eyesight (and luck) can act as a great leveller between all-singing, all-dancing aircraft of the F15 ilk and their more modest cousins. No air combat game could claim to be anything approaching reality without some sort of spotting rules and, quite rightly, AirWar gives us the opportunity of conducting Visual, Radar, and IR searches. These are all fairly straightforward to conduct (if a little tedious), and the results are easy – yer sees 'im or yer doesn't. This is fine for the casual face-to-face gamer (I mean, dogfighting is what it's all about, isn't it?!), but can be improved upon if you can spare a little extra time.

The game designer suggests (again correctly in my view) that the maximum distance at which a pilot will see another 'plane is 60 hexes – about 6 miles. What is neglected, probably in the interests of shortening the search phase, is that though you may see your target it is not always so easy to identify it. Put yourself in the place of your pilot: your flight leader is swearing at you for getting out of formation, you've the sun in your eyes, and a million other worries, not least of which is whether you are about to get a large and unfriendly missile up your exhaust pipe. And you see a speck at 4 o'clock. Is it a Mirage III or Mig 21!?? They both look suspiciously similar even as close as 1½ miles, as an unfortunate Israeli found out in 1973 ....

You may see your target from miles away, but unless you are willing to risk your superiors' wrath, or have confirmation from ground control, I think you'll want to investigate further before loosing off those missiles! To aid you I have tabulated the following guidelines as to what you'll see and at what distance.

30 hexes (plus)	Aircraft position (including altitude), heading and speed (number of hexes moved each game turn, *not* movement allowance).
30 hexes and less	As above, and also identify all aircraft of visual size 7 (see "Aircraft" note [a]).
25 hexes and less	Identify all size 6 aircraft and also angle of bank and dive/climb type.
20 hexes and less	Identify all other aircraft.
10 hexes and less	Confirm external store presence, but *not* numbers or type.

The following are never known:

Acceleration, throttle, and movement allowance settings; weapons types and numbers, pilot capability, and non fatal damage, including that caused by your own shooting.

Visual methods are still far and away the best for identification purposes, indeed, it is not possible to identify an aircraft positively from its radar blip alone. Most modern airforces carry radar identification devices, but their usefulness in battle conditions is dubious. I therefore think that radar (and IR) searches will give positions at the time of each search phase, and aircraft radar size ONLY. Heading and speed can be deduced from successive positions, but all other information must be gleaned visually.

The second edition of the game includes the effect of vapour trails (contrails) in increasing a 'plane's size for visual searches, but I do not think it goes far enough. Vapour trails are visually very obtrusive!! To reflect their effects more truly I think that in addition to the size increase already mentioned in the game all distances in the Visual Search Base Probability table should be trebled. Contrails will not change the ease of identification to any great extent and so all identification distances are unchanged.

While still on the subject, a coat of paint can greatly affect the chances of your being seen. For instance, an F15 Eagle sporting the new Lizard scheme will be practically invisible near the ground, but will stand out against a clear sky in a way that its brothers in air superiority blue wouldn't. There is tremendous variation between times, types, and nationalities using camouflage, and I think that thrashing out the 'who's 'when's and 'where's is best left to the gamers concerned. The results of camouflage are easier to determine, and I suggest the following:

Camouflage	A	B	C	D
1) None	+25%	+50%	*	*
2) Light grey/blue etc.	+25%	+25%	-25%	-50%
3) Land	-50%	-25%	NA	+25%
4) Sea	-50%	-25%	NA	NA
5) '½ – ½'	——— see text ———			

\# – alteration to final visual search probability
NA – no effect
* – no effect, but roll two dice for sun's reflection. A 2 or 3 increases the base probability by 50%.

A: Target is ¼ spotter's height (or less) or 20 levels above the ground terrain, whichever is greater.

B: Target is ¼ – ½ spotter's height, or 40 levels above the ground terrain, whichever is greater.

C: Target is below the spotter, but greater than half its height above the ground.

D: Target is level with the spotter or higher.

The order of priority is D over A over B over C.

Notes:

a) If category 2 aircraft fly over a cloudbank A and B values become -25%.

b) For category 3 aircraft flying over sea and category 4 aircraft flying over land the values in columns in A and B become NA.

c) '½ - ½'. Upper surfaces are one scheme, lower surfaces are another. Decide which surface the spotting aircraft would see and use the appropriate row.

Before I leave the subject I would briefly like to mention the effects of Night, Fog and Rain on Identification. Each reduces the relevant distance by 50%. for example, to identify a size 5 aircraft in Night and Rain you would have to be 20 x 50% x 50% = 5 hexes, or less, away from it.

In most standard games the distances covered are so small that radar searches and radar missile launches are often redundant, and it helps enormously if one can expand the size limits short of buying many new map sections. I have got around the difficulty by drawing an 18mm by 16mm grid on a standard A4 graph paper. Numbering each full size map section and representing their position on the graph-map with suitably numbered pieces of 18 x 16mm paper an area of 270 by 170 hexes can be easily covered, even if the aircraft are in several far-removed groups.

If the graph paper shows millimetre squares each individual hex may be represented, and you can design whole landscapes readily translatable onto the full size map as and when required. Let your imagination run wild! You can have ports, cities, permanent SAM sites at your fingertips. I have, amongst other things, an airport, which brings me neatly, if somewhat contrivedly to my next topic for discussion: namely acceleration by power while climbing .....

It is ridiculous to say that aircraft cannot increase their throttle settings while they are climbing; most airliners reach cruising speed while climbing from takeoff to their cruising altitude. On the other hand, it *is* true that such acceleration will be slower than while flying level, and these two points have led me to ammending the acceleration-by-power rules:

a) All aircraft may accelerate by power while climbing until their throttle setting is equal to their cruise speed for the altitude in question (F15's and others listed in their data sheets as being able to accelerate while climbing are not limited to this restriction). *ANY* 'plane that is accelerating by power when climbing does so with its acceleration mode rounded down by 50%. Modes of ½ remain at this value, though.

b) All aircraft that may accelerate can do so when diving with a mode increased by 50%, rounding fractions down to the nearest half integer.

You will probably find that this changes dogfighting capabilities somewhat, as will my following suggestion. If all acceleration/deceleration by power and opening/closing of Airbrakes is performed in secret before *any* movement takes place this will turn the close-range dogfight into the tactical battle of wits and guessing that it is in real life.

The size of a target can be a major factor in whether or not you hit it, on purely random principles a B52 is easier to hit than a Mig 15 – it takes up more airspace! This is not reflected in the hit probability table, but it is a simple matter to take size into account. Assume that the hit probability table is for size 5 aircraft, and for all aerial guns add (or subtract) the following figures per size point away from this:

Range	1-2	3-4	5-6
Modifier	±4	±3	±2

NB. "Size" is unmodified visual size

All the topics dealt with so far are fairly minor – you can take or leave them as you please. There is, however, one major problem in the rules, one that cannot be accepted or glossed over, and this occurs with the limited tracking cones: if you have a 14° cone but can only turn it through increments of 30° you're in big trouble; aircraft can fly out of them and there's nothing you can do. (I suspect that anyone using radar homing missiles has come across this one and so I won't describe it further.) In fact my solution to the problem (which I'm afraid is slightly time consuming) revolves around another mistake in the rules, the sideslipping table.

"Oh no!" you cry, "what's wrong with it?!" Nothing, providing you recognise it for what it is – an angular correction chart, not a side-slipping one. To explain what I'm getting at refer to figure 1.

A plane leaves hex R turned 20° east of North. In real life its ninth hex of movement should be Q but you will find in the game you move through P. If you "sideslip" as defined in the game rules you will find you pass through Q, Trying out the other angles you will see that the table is correct for 5°, 10°, 15° and 20°. (For 25°replace "2" by 2 then 3 then 2 ....)

The upshot of all this is that your table can be used for positional correction *and* for tracking cone correction. The format is rather tedious in practice, but I will include it for completeness:

For each hex entered while turned left or right between 5° and 25° inclusive add a fraction – see below – to a running total.

Turned at:	5°	10°	15°	20°	25°
	1/12	2/12	3/12	4/12	5/12 fraction added per hex entered

When the total reaches 1 left or right, Sideslip 1 left or right. Simple!?

Returning to the tracking cones: consider a 'plane facing North in hex A (figure 2), a 'plane which is banked 20° right and has a limited radar tracking cone. Does hex X lie within this cone or not?

To find out, draw an imaginary line from X through the arrow indicating the 'planes facing (M) so that it cuts it at right angles as shown. This will define one hex (only) – Y. Count how many hexes Y is away from A (in this case 9) and consult the so-called sideslip table: 20° yields a value of 3. This means that to move at 20° to the right you must 'sideslip' once every three hexes you moved forward (figure 2[a]).

Since Y is 9 hexes forward of A this means that to get to the 'real' Y you should "sideslip" 9/3 = 3 times to the right (with fraction round to the nearest whole number). Next determine the tracking cone boundary hexes which lie on XY – S & T (sorry!) on the diagram. Move these three hexes to the right as shown – they now define the true tracking cone which, as you can see, includes hex X.

Notes:

a) If there are two possible hexes for Y, (S and T) – the line from X runs along a hex boundary, use the nearer.

b) For easy reference (i.e. to see if X is within the cone or not, but without determining the actual cone position) divide the number of hexes between A and Y by the relevant number in the table. Determine hexes S and T, and if X is less than this number of hexes from T but more than this number from S then it lies within the cone.

What about the real sideslipping? Aircraft may sideslip *once* per game turn, regardless of velocity provided that they are banked at 45 . The direction of slip is that of the lower wing.

Enough of this babble, and onto the really important stuff .....

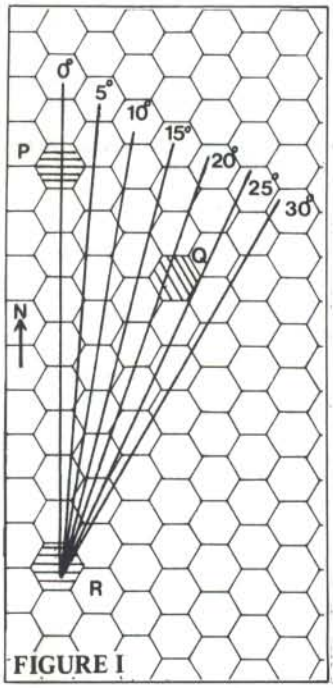


FIGURE I

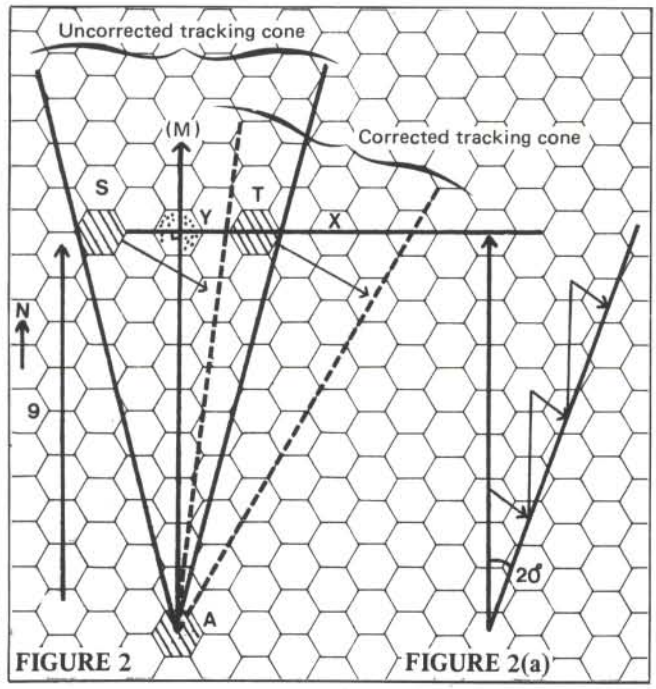


FIGURE 2 FIGURE 2(a)

Missiles:

Red Top:
This is an all angle heat seeking missile; when in its target's frontal sectors it has a limited cone.

Sky Flash:
"Look down Shoot down" version of a late Sparrow. In use with RAF and Sweden C. 1981.

RH-AA1 Alkali:
Beam Riding RH missile.

Firestreak:
Heat seeking missile
1958 – 1962 limited tracking cone
1962 – 1970 normal tracking cone

Turns of flight: 4
Tracking Range: 35
Max. Energy add: 2
Probability of malfunction: 10
Minimum Launch Range: 3
Counter Measures: As Aim 9-B

Maximum MA	15	14	13	11
1st game turn add	4	3	3	2
Turn mode	7	7	7	8
Energy maximum	7	8	9	10
	LO	ML	MH	HI

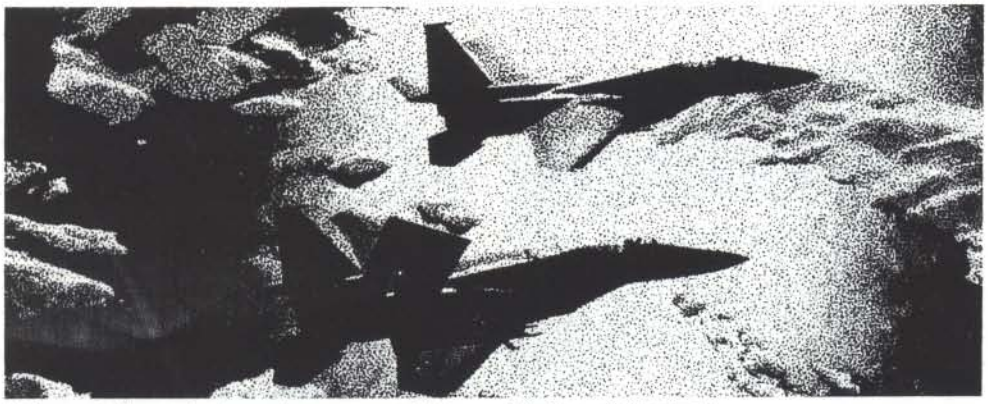
Dive	Levels Dived	MA
I	3	0
	6	+1
	8	+2
II	10	+1
	12	0
	16	-1
III	19	-2
	23	-3
after 1962	(26	-4)

Climb	Levels Climbed	MA
I	3	-1
	6	-2
II	7	-3
	8	-4
	9	-5
III	10	-6
after 1962	(11	-7)

Aircraft:

Notes:
a) Sizes. Where quoted '(n)' refers to radar and 'm' to visual/actual size. 'm' may vary due to smoke, contrails etc, for visual, but not 'actual' purposes.

b) Missile Numbers: Where these differ from those already quoted in the game the smaller number is the usual complement, the larger the maximum usually carried: the aircraft is not loaded but may carry no external stores without becoming loaded.



c) Since missiles and other ordnance are carried on the same pylons, carrying the one may exclude the other — gamers should research this themselves since such data are too plentiful for an article of this size!

F4 Phantom:
Cannon shots. Note that only E and F carry an internal gun; the F4D carries a belly pod. This may be carried on all subsequent Marks, but is not an internal gun and reduces external ordnance (bar Air to Air Missiles) that may be carried by 1/3. An aircraft carrying this pod is not loaded unless it carries other stores (excluding Air to Air Missiles).

Any aircraft carrying 6 RH or any HS missiles has its maximum ordnance load reduced by 1/3.

1000 lb. bomb and bomblet capacity is 16, not 11.

F4 K/M:
These have a maximum speed of 11.

F 111:
The outer wing pylons are non-movable and when used the wings can only be held unswept. If any aircraft are used with more than 75% maximum ordnance (even if the excess is subsequently launched/dropped) its movement allowance may never exceed 5.

A10 Thunderbolt II:
Radar size (7); visual size 7.

F16 Fighting Falcon:
RH missiles: carried 1983 onwards.
HS missiles: usually 2 aim — 9L carried.

F 15 A:
7; The Eagle carries an 'Eagle Eye' visual augmentation device from 1980 onwards. This has a limited tracking cone in which targets may be sighted, and may only be used on aircraft onto which the Eagle has a lock-on. Its effect is to increase the identification range five-fold. The Eagle may not use any other type of search during the gameturn in which the 'Eagle Eye' is used.

Meteor:
(5); 5.

Draken:
A: G cannon (3 shots).
2 or 4 sidewinder; maximum velocity 10.
No other ordnance carried.
Radar: 2 C 125 2 L B

D: As F, but G cannon and missiles are 4 sidewinders.

F: Missiles; may also carry 4 sidewinders as well as Falcons.

Danish version: This has 9 1000 lb. hardpoints plus rails for 4 sidewinder.

Availability: A 1957 — 1963
D 1962 — present
F 1966 — present

Viggen:
(6); 6. RH missiles are Skyflash.
HS: may carry up to 4 regardless of RH.

Lightning F1:
(6); 6.
Use: 1961-1964 Radar 3 D O O O B
Cannon type G, 3 shots
Missiles: 2 Firestreak
Stores: None
Throttle: LO: 7; ML: 8; MH: 9; Hi: 10.
Climb: Reduce MA by 1 for all Type II and III
Reduce MA by 1 for all Type I except where it is already 1.

Throttle:	0	1	2	3	4	5	6	7	8	9
LO	3	3	3	3	2	2	1	-	-	-
ML	3	3	2	2	2	1	1	½	-	-
MH	2	2	2	1	1	1	1	½	½	-
HI	2	1	1	1	1	1	½	½	½	½

The F1 is identical to the F6 in all other respects.
Use: 1961-1964.

Lightning F2:
(6); 6.
Identical to the F6 except that it carries Finestreak missiles and has G cannon (3 shots).
Use 1963-1970.

Lightning F6:
(6); 6.
Use: 1966-

Hunter F1:
Use 1954-1958 (RAF)
Cannon: P 3 shots

MA/ Throttle	Climb LO	ML	MH	HI
5	3 2	3 1	2 -	2 -
4	2 1	2 1	2 -	2 -
3	2 1	2 -	1 -	1 -
2	1 1	1 -	1 -	1 -
1	1 -	- -	- -	- -

MA	Turn LO	ML	MH	HI
1	2	2	2	3
2	2	2	2	3
3	2	2	2	4
4	2	2	2	4
5	2	2	3	4
6	3	3	3	5

Flight Parameters:
Add 1 to Wingover, pull through and Immelmann at MH and HI; change "type II" to "type I" for MH and HI in these manoeuvres.

F 104 Starfighter:
Turn modes — LO (9) is 10
ML (10) is 14/15
'S' version may carry up to 6 HS *and* 2 RH though usual maximum is 4 + 2.
C-104 carries 4 1000 lb. bombs!

F8E Crusader:
Turn modes — LO (7) is 4; (8) is 6
ML (8) is 6; (9) is 8
MH (9) is 9
HI (9) is 10

Mig 19D:
All Alkali armed Migs carry 4 RH and NO GUNS.
Radar-less Migs carry 4 HS *and* guns

F18 Hornet: F18L Cobra
Only 2 HS (AIM-9L) usually carried (along with 2 Sparrow). Maximum speed is 1190 kt = a maximum MA of 10.

Mig 17 D/E:
See Mig 19D

Mig 17 A:
This has cannon F, but increase all hit probabilities by 5. Shots: 2.

Su 7:
Carries 4 bomblets (not 24).

Mig 23:
5, (5).

AAF-L:
Aircraft Munitions and Radar Charts are unchanged from the 1st edition, and so use the Mig 29 rows (for 24 read 2). Ceiling 276.

Foxbat E ('New' Mig 29):
Radar characteristics: 8 B 500 7 N B
Munitions: As Mig 25

Tornado F2 (ADV)
Radar: 10 B 700 9 N E
Cannon: R; 3 shots

Tornado generally:
(6); 6.

Strafing destruction probability table: for P read R and vice versa.

My final comment concerns bombing, a field greatly improved in the second edition, though I still haven't found the munitions scatter table!!

From what I can make out hit probabilities represent the chance of hitting a particular hex (for unguided munitions), while destruction probability takes into account direct hits and indirect blast damage. Guided munitions are different in that if they hit, they hit a specific target (tank, bridge, or whatever), rather than a specific hex. Since direct hits have a far greater chance of destruction than indirect ones, I think target destruction probabilities should be correspondingly greater. Thus:

a) Players should state the targets of all p.g.m. on launch.

b) If hits are achieved alter the destruction probabilities according to the following schedule:

Destruction probability	Modifier
1 → 10	+ 10
10 → 20+	+ 15

All other targets in the hex are affected by the blast as normal.

As the rules stand the more junk you fling at a hex, the greater the chance of hitting it. Since not all munitions will fall in exactly the same spot in the hex the chances of a direct hit on, and thus destruction of, a target will increase. I suggest that for the 'n'th bomb (1000 lb. or 750 lb) increase target destruction probability by n (e.g. the 5th 750 lb. bomb falling on a bridge hex will have its destruction probability raised to 7; 2 + 5).

I hope that these thoughts have been of use and/or interest, and it only remains for me to say two things:

Firstly — Happy Hunting.

Secondly — Please Mr. Isby, Sir, can we have some more? And can you throw in a few bombers as well?!

The second edition omitted cannon type J; below is a table copied from the first edition:

Die Roll	1	2	3	4	5	6
1	E	1	1	1	1	1
2	1	Ef	1	2f	2	2f
3	2	2	E	2	2	2
4	3	3f	3	Ef	3	3f
5	3	3	3	4	E	4
6	4	4f	4	4f	4	Ef