AIR SUPERIORITY

MODERN JET AIR COMBAT



Game Designers' Workshop

AIR SUPERIORITY

J.D. Webster

Game Rules
Game Scenarios
Aircraft Briefings

Game Designers' Workshop

CC-0430/R4

AIR SUPERIORITY

CONTENTS

Game Rules
Introduction....3
Rule 1: Game Components....3
Rule 2: Sequence of Play....3
Rule 3: Positioning Aircraft....3
Rule 4: Configuration and Load....4
Rule 5: Flight Points....4
Rule 6: Changing Speed....5
Rule 7: Turning....5
Rule 8: Changing Altitude....6
Rule 9: Air-to-Air Gun Combat....7
Rule 10: Aircraft Damage....9
Rule 11: Stalling....9
Rule 12: Transonic and Supersonic....10
Rule 13: Order of Flight....10
Rule 14: Special Maneuvers....10
Rule 15: Air-to-Air Missiles....12
Rule 16: Engaging Missiles....13
Rule 17: Heat Seeking Missiles....13
Rule 18: Air-to-Air Radar....14
Rule 19: Radar Guided Missiles....15
Rule 20: Visual Sighting....16
Rule 21: Electronic Warfare Gear....17
Rule 22: Limited Intelligence (Optional)17
Rule 23: Weather (Optional)....18
Rule 24: Fuel (Optional)....18
Expanded Sequence of Play....19

Briefings
Briefing Guide: Aircraft and Missiles..20
Aircraft Availability....24
Missile Availability....25
Typical Medium-Range Air Sup. Loads 26
Tactics and Strategies....27
Designer's Notes....29

Scenarios
Introduction....31
Victory....31
Training Scenarios....32
Solitaire Scenarios....32
Random Aircraft Movement....33
General Scenarios....33
Special Stores Availability Table....37
Historical/Hypothetical Scenarios....37
Scenario Fuel Statistics....45

Reference
Photocopy Note....46
Master Aircraft Log....47
Expanded Sequence of Play....48

Dedication

To my wife, Paula, and my daughter, Nicole; to all my friends who helped and their families; and to fellow military aviators the world over who share my passion for adventure and my love of flying.

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INTRODUCTION

Air Superiority is a multiplayer simulation of jet combat in the 1980s and 1990s. Players control one or more jets in tactical scenarios portraying air battles and situations modern fighter pilots have recently faced or are trained to meet.

This is the first in a series of games and supplements which will provide rules for all aspects of modern tactical air-to-air and air-to-ground combat. Some information included with *Air Superiority* is for use with the second game in the series, *Air Strike,* and is so noted.

To help players learn the game, the rules are arranged so that certain scenarios may be played after reading only a few rules. These points are noted in the rules text. For instance, the first training scenario may be played after reading Rules 1 through 7. Furthermore, many of the rules sections include rules at the end of the section under the heading Advanced Rules. Skip over these at first. Once you have played some scenarios and are comfortable with the game, go back and learn any or all of the advanced rules to increase the detail of the simulation. Additionally, when first learning the game, give Rule 2: Sequence of Play, and Rule 4: Configuration and Load only a cursory reading until these concepts are more fully required in later scenarios.

RULE 1: GAME COMPONENTS

Air Superiority contains the following components:

A. Maps: Four game maps. The four maps are identical but may be referred to as A, B, C and D in order to differentiate them. A hexagonal grid is superimposed on the maps to regulate positioning and movement of game counters. The distance across a hexagon (hex) represents 1760 feet, or 1/3 mile. An outline of megahexes is also superimposed; each megahex is five hexes across. The map edges are designed to match so that maps not presently in use may be shifted where necessary to extend the playing field.

B. Counters: One counter sheet with 240 counters representing aircraft, missiles, and information markers.

C. Rules: This rules booklet, including the rules of Air Superiority, an aircraft briefing, availability tables, game tactics and designer's notes, and a set of scenarios.

D. Data Cards: Thirty data cards, each representing a different aircraft type. The data cards use four special symbols, which stand for the following: $<$: less than, $\leq$: less than or equal to, $>$: greater than, $\geq$: greater than or equal to.

E. Charts: A complete set of charts.

H. One Die: One 10-sided die used to generate random numbers between 1 and 10. Treat a roll of 0 as a roll of 10.

RULE 2: SEQUENCE OF PLAY

Each game-turn represents 12 to 15 seconds of real time. A game-turn is divided into the following sequence.

Stalled Aircraft Phase: Check for stalled aircraft (Rule 11). For those that are stalled, determine if they go into departed (out of control) flight.

Electronic Warfare Interaction Phase: Aircraft may attempt to break radar lock-ons with decoys and/or deceptive jammers (Rule 21).

Visual Sighting Phase: Conduct new sighting attempts (Rule 20) and determine if any previously spotted aircraft or missiles become unspotted.

Engaged/Free Aircraft Determination Phase: Aircraft pursued by missiles declare themselves engaged (defending against the missile) or free (Rule 16). Other aircraft, except stalled and departed ones, are considered free aircraft.

Order of Flight Determination Phase: Determine the order in which free aircraft will fly based on positions of advantage and initiative (Rule 13).

Flight Phase: Aircraft and missiles now fly one by one in the order previously determined. Air-to-air cannon attacks (Rule 9) may be made by free aircraft.

Air-to-Air Missile Launch Phase: Free aircraft may launch air-to-air missiles (Rule 15).

Air Radar Search and Lock-on Phase: Free aircraft may conduct radar searches and attempt lock-ons (Rule 18).

Log Update Phase: A log is kept for each aircraft in play and is updated at this time. Figure each aircraft's starting altitude and speed for the next game-turn. Attempt recovery of departed aircraft (Rule 11).

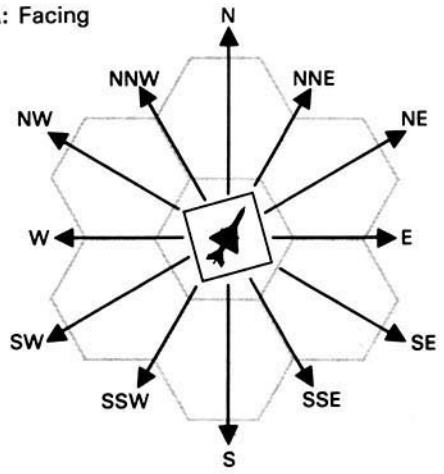
A master log sheet is included in the game for photocopying. Permission is here granted to photocopy the log sheet.

RULE 3: POSITIONING AIRCRAFT

An aircraft's position is a combination of its facing, map location, and altitude.

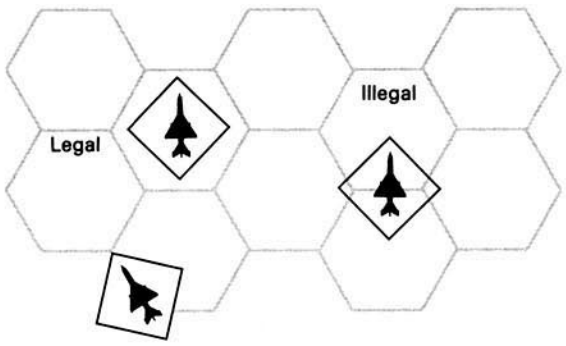
A. Facing: The horizontal direction an aircraft is flying in is its facing. Use the silhouette on the game counter to show facing by pointing the nose of the aircraft in one of twelve directions. (See Diagram A.) Each direction differs by 30 degrees.

Diagram A: Facing



B. Location: The hexgrid is used to define an aircraft's map location. Aircraft may be located on hexes or **hexsides.** When located on a hexside, the silhouette must face parallel to the hexside it is on. (See Diagram B.)

Diagram B: Location



C.Altitude: Altitude is expressed in terms of altitude levels; each level represents 1000 feet. The aircraft's altitude level is kept track of on the log. For Altitude Bands see Rule 8.B

Altitude

Altitude Band	*Altitude Level*
Low Band (LO)	levels 1 through 7
Medium Low Band (ML)	levels 8 through 16
Medium High Band (MH)	levels 17 through 25
High Band (HI)	levels 26 through 35
Very High Band (VH)	levels 36 through 45
Extremely High Band (EH)	levels 46 and above

D. Stacking: Aircraft may freely fly through hexes or hexsides containing other aircraft, and may end their flight stacked on the same hex/hexside with other aircraft.

Advanced Rule

E. Collisions: At the end of the flight phase, if an aircraft is stacked at the same altitude level with 1) an enemy aircraft, or 2) more than one friendly aircraft, roll for possible collision. On a roll of 1, the aircraft which entered the position last collides with one of the others chosen at random. Both aircraft immediately roll on the 10 column of the Damage Table.

Rule 4: CONFIGURATION AND LOAD

The configuration of an aircraft is a measure of how much external load (missiles, gun pods, ECM pods, and drop-tanks) it is carrying. Configuration affects an aircraft's performance.

A. Load Points: An aircraft may be in one of three possible configurations:

CL: clean
1/2: half dirty
DT: dirty

Configuration is determined by the number of load points being carried. Each missile, gun pod, ECM pod, and drop-tank has a load point rating based on its size and weight (the Missile Data Sheet and External Stores Tables list these). Add the total load carried, round fractions up, and note this on the upper right-hand corner of the log. Compare this total to the configuration limits listed on the back of the aircraft's data card to determine the aircraft's configuration.

When missiles are fired or pods or drop-tanks are jettisoned note the load points lost on the load dropped row of the log. Pods and drop-tanks may be jettisoned at any point during flight provided the aircraft is not in a turn (Rule 7) or performing a maneuver (Rule 14). Missiles may be jettisoned also (as opposed to fired). Dropping a load may change an aircraft's configuration; note this on the appropriate row of the log. Any change in configuration takes effect immediately (this may affect turn drag, for instance).

B. Weapon Stations: The Weapon Stations Diagram on the data card indicates the locations and reference numbers of an aircraft's weapon stations. The Allowed Station Loads section indicates in code what weapons may be loaded on a station:

IRM: heat seeking (IR) missile
RHM: radar homing missile
AHM: active homing missile
GP: gun pod
EP: ECM pod
FT: fuel tank (drop-tank)

Codes not defined here are for use with *Air Strike.*

Note: External fuel tanks placed on wing stations must be used in pairs, one on each wing.

C. Load and Station Limits: The load limit of an aircraft expresses its total weight carrying ability in terms of pounds. No aircraft may carry more weight in external load than its load limit. The weights of missiles and external stores are given on the appropriate tables.

The Station Limits section of the data card lists the maximum weight that may be carried on any given station.

Advanced Rule

D. External Stores Availability: In the G (general) scenarios, ECM and gun pods are not automatically available. Instead, each side makes up to three requests for each type of pod (i.e., gun, DDS, and DJM) per aircraft on that side. Each request is made by specific item (e.g., NATO 30mm Aden gun pod), and the item must be available to that air force. Roll the die once for each request. If the roll is less than or equal to the availability number listed on the Special Stores Availability Table, the item is received and no more requests for that type pod may be made by that aircraft. If the roll fails, a second and if necessary a third request may be made but for a different item of that type. No aircraft may request a specific item more than once. (Exception: If an air force does not have three different items of one type, the final request is made for the least available gun pod or least capable ECM pod.) If all three rolls fail, the request for that type pod has been unsuccessful. After all requests by a side are made, any pods received may be redistributed among the aircraft as desired.

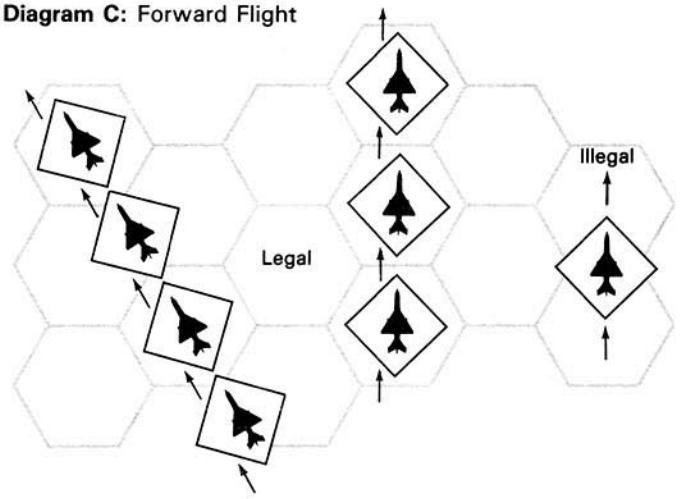
RULE 5: FLIGHT POINTS

The speed of an aircraft is expressed by flight points (FPs). Each FP represents one hundred miles per hour of speed, thus an aircraft with 6.5 FPs is flying at 650 mph.

A. General Rule: Flight points are used to fly an aircraft across the map or to change its altitude. FPs used to fly across the map are horizontal flight points (HFPs); FPs used to change altitude are vertical flight points (VFPs). An aircraft must use all of the FPs available to it in a game-turn except that any remaining .5 FP not used is ignored.

Each HFP allows an aircraft to fly forward one hex or hexside. It may fly onto a hexside only if it faces parallel to that hexside. (See Diagram C.)

Diagram C: Forward Flight



Each VFP allows an aircraft to change its altitude by a certain number of levels as explained in Rule 8.

B. Types of Flight: At the start of an aircraft's move, choose one of three types of flight: level, climbing, or diving. Mark this on the flight row of the log. If level flight is chosen, all of an aircraft's FPs will be HFPs. The climbing and diving rules explain what amount of an aircraft's FPs will be HFPs and what amount will be VFPs if one of those types of flight is chosen.

Advanced Rules

C. Half FPs: Carry forward any unused .5 FP to the next game-turn. Mark this on the log below the start speed of the next game-turn. Such a half FP does not change the aircraft's start speed for the next game-turn, rather it increases by .5 the number of starting FPs which the aircraft has available in that next game-turn. For example, on the first game-turn an aircraft with a start speed of 6.5 uses only 6 of its FPs. The remaining .5 FP is carried forward. On the second game-turn the aircraft's start speed is unchanged at 6.5, but the unused .5 FP of the previous game-turn is added to this to make 7 starting FPs for the aircraft to use. On the third game-turn the aircraft's start speed is still 6.5.

D. Speedbrakes: FPs may also be used by applying speedbrakes. An aircraft may apply speedbrakes once per game-turn at any point in its flight. When applied, expend FPs up to the amount listed on the speedbrake (Spbr) row of the Power Chart without changing location or altitude. One deceleration (decel) point is incurred for each .5 FP so expended. Note: Speedbrakes help use up FPs, they do not change current speed.

RULE 6: CHANGING SPEED

An aircraft's speed will change according to what actions the player takes. Usually the actions taken in one game-turn determine the aircraft's speed for the next.

A. Accel and Decel Points: Some actions will cause an aircraft to accelerate, others will cause it to decelerate. Acceleration is expressed in terms of accel points. Accel points are gained by choosing a high power setting (Rule 6.C) or by diving (Rule 8.D). Mark on the accel points row of the log the accel points gained as each action is performed. Deceleration is expressed in terms of decel points. Decel points are incurred when an aircraft performs certain actions such as turning (Rule 7), climbing (Rule 8), or special maneuvers (Rule 14). Mark on the decel points row of the log the decel points incurred as each action is performed.

B. Procedure: During the log update phase of the game-turn, subtract accumulated decel points from accel points. If the difference is positive, increase speed by .5 for each +3 difference. Mark this on the speed change row of the log (e.g., +.5 FP), and figure the next game-turn's start speed. Also, carry forward any positive difference less than +3 to the next game-turn by marking it as accel points in the next game-turn's column. If the difference is negative, reduce speed by .5 for each −2 difference or fraction thereof, and mark this new speed as the next game-turn's start speed. Exception: If the difference is only −.5 decel point ignore it.

Example One: An aircraft accumulated 4 accel and 2 decel points. The difference is +2. Speed does not change, but the 2 is carried forward and marked as accel points in the next game-turn's column. Example Two: An aircraft accumulated 1 accel and 3.5 decel points. The difference is −2.5, so the speed change is −1 FP and the next game-turn's start speed is 1 FP less.

C. Power Settings: An aircraft has four possible power settings. Choose any setting desired at the start of the aircraft's flight and mark this on the power row of the log. Consult the Power Chart on the aircraft's data card and cross-index the appropriate power column with the aircraft's configuration. Mark the result on the log as appropriate.

1. Afterburner (A/B): A/B power provides extra thrust by dumping fuel directly into the jet engine's exhaust. A/B power gains accel points but at great cost in fuel (Optional Rule 24).

2. Military: Military power is the maximum power a jet engine can produce without using A/B. Military power gains accel points at a less drastic cost in fuel than A/B.

3. Normal: Normal power is an economical setting used to conserve fuel and increase an aircraft's range. Normal power does not gain accel points, and it will only maintain an aircraft's cruising speed or less. One decel point is incurred if normal power is chosen when the start speed exceeds the cruise speed listed on the data card. This applies for all configurations.

4. Idle: Idle power is the minimum setting that will keep a jet engine functioning. It does not provide thrust, however. **Immediately** reduce the start speed by the FP number shown on the Power Chart. This is the only action that changes an aircraft's speed within a game-turn.

D. Maximum Speed: The Velocity Chart on the aircraft's data card gives the maximum speeds for diving flight and for level or climbing flight. Only altitude is considered to find the maximum diving speed, but both altitude and configuration are considered to find the maximum speed for level or climbing flight. During the log update phase, use the type of flight the aircraft chose that game-turn and the altitude and configuration it is currently at (i.e., what it will start at next game-turn) to find the maximum allowed speed. When figuring the next game-turn's start speed ignore any increase in speed over this maximum. Any accel point carry-over is also ignored once the aircraft achieves maximum speed.

For example, a clean F-18 flying level at speed 9 gained enough acceleration during the game-turn to change its speed by +.5 FP and carry over 1 accel point. It is in the LO altitude band, however, so its speed may not exceed 9 per the Velocity Chart. Both the speed change and accel carry-over are therefore lost.

If it is determined during the log update phase that an aircraft's speed already exceeds its maximum (due to diving on a previous game-turn, for instance), the next game-turn's start speed is reduced by −1 FP in addition to any other deceleration, and any acceleration is ignored.

Advanced Rules

E. Rapid Accel Aircraft: Aircraft noted as being rapid accel aircraft on the notes section of the data card increase speed by .5 for each +2 difference (Rule 6.B), not +3.

F. Rapid Power Response Aircraft: Only aircraft noted as being rapid power response aircraft on the data card may choose any power setting each game-turn. Other aircraft may not choose A/B if they chose idle the previous game-turn but are otherwise not restricted.

G. High Altitudes: At high altitudes the amount of thrust a jet engine produces is considerably reduced due to the thinner atmosphere. Therefore reduce the number of accel points gained in military and A/B power as follows: aircraft in the high (HI) altitude band gain only 2/3 the number given on the Power Chart; aircraft in the very high (VH) and extremely high (EH) bands gain only 1/3 the given number. Round fractions to the nearest half or whole number, but never to 0.

RULE 7: TURNING

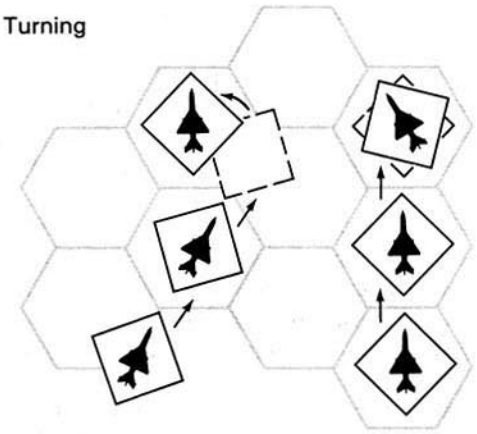
Aircraft may change their facing by turning.

A. Rate of Turn: There are five rates of turn, ranked by the amount of G force they generate.

Easy Turn (EZ)—one to two G.
Tactical Turn (TT)—two to three G.
Hard Turn (HT)—four to five G.
Break Turn (BT)—six to seven G.
Emergency Turn (ET)—eight to nine G.

B. Procedure: An aircraft may begin a turn at any point in its flight. First choose a direction (left or right) and a rate of turn. Next consult the Turning Chart. Cross-index the aircraft's starting altitude and speed with the chosen rate of turn. If the answer is NA, that combination of turn rate and speed is not allowed, and a gentler turn rate must be chosen. If the answer is a number, this is the minimum number of FPs (HFPs and/or VFPs) which the aircraft must now use in flight before it can change facing by 30 degrees. If the answer reads 60 degrees, the aircraft may change facing by 60 or 30 degrees after using one FP. The actual act of changing an aircraft's facing does not expend FPs, rather it is the end result of having begun a turn and used the specified number of FPs or more in turning flight. A turn thus comprises all the FPs used prior to changing the aircraft's facing and the face changing itself. If the aircraft is on a hexside at the time of face changing, shift it to the adjacent hex (left or right as appropriate) before changing its facing. (See Diagram D.)

Diagram D: Turning



An aircraft may abort a turn at any point prior to changing its facing. It may perform consecutive turns, even at different turn rates or in opposite directions. Sometimes a turn will not be completed in one game-turn. Note this on the turn carry row of the log by writing down the direction (L or R), the number of FPs expended for the turn so far, and the rate (EZ, TT, HT, BT, ET).

C. Drag: Turning causes an aircraft to decelerate due to drag. Consult the Turn Drag Chart on the data card at the end of an aircraft's flight if it changed facing during that game-turn. Cross index the aircraft's configuration with the highest turn rate it used in the game-turn. This gives a number of decel points. Mark these on the log sheet for the current game-turn. There is no drag cost for EZ turns. Note: An aircraft might have turned more than once and used different rates, or it might not have completed a turn, but assess decel points for the highest (only) turn rate used.

YOU HAVE READ ENOUGH TO PLAY SCENARIO T-1!

Advanced Rules

D. Sustained Turning: Whenever an aircraft turns more than once in a game-turn, it incurs 1 decel point for each additional completed turn. This reflects the effects of sustained G on an aircraft. Special maneuvers (Rule 14) do not count as turns even when they change an aircraft's facing.

E. Angle of Bank: When an aircraft turns, it banks in the direction of that turn. Should an aircraft first turn one direction and then immediately turn the opposite direction, it must roll out of one bank and into the other. To show the time delay caused by doing this, an aircraft must use one FP after changing its facing (or aborting a turn) before it may start a turn in the opposite direction. The aircraft is considered to be wings level when it uses this one FP, i.e., not banked either way.

F. Turning and Minimum Speed: As G forces on an aircraft increase, so does the aircraft's stalling speed due to increased wing loading. To simulate this, an aircraft may turn at the HT, BT, or ET rate only if its start speed is .5, 1, or 1.5 (respectively) greater than the minimum speed (Rule 11) allowed by its starting altitude and configuration. Otherwise it must choose a gentler rate of turn.

If a HT, BT, or ET turn is carried over to the next game-turn and the new starting speed violates the new minimum speed per above, the aircraft must perform departed flight (Rule 11.B).

RULE 8: CHANGING ALTITUDE

A. General Rule: As an aircraft changes its altitude during flight mark the number of altitude levels gained or lost on the altitude change row of the log. During the log update phase, use this change to determine the next game-turn's starting altitude. An aircraft may not climb higher than its ceiling as given on the Velocity Chart for its configuration.

B. Altitude Bands: Altitude levels are grouped into six altitude bands. Certain rules and charts refer to these bands instead of to levels.

Low Band (LO)—levels 1 through 7.
Medium Low Band (ML)—levels 8 through 16.
Medium High Band (MH)—levels 17 through 25.
High Band (HI)—levels 26 through 35.
Very High Band (VH)—levels 36 through 45.
Extremely High Band (EH)—levels 46 and above.

C. Climbing: When climbing flight is chosen, choose what kind of climb to make.

1. Zoom Climbs: Zoom climbs represent maneuvering climbs in which the aircraft is gaining altitude more from inertia than from wing lift. Decide how many of the starting FPs will be HFPs and the rest will be VFPs. At least one third must be HFPs. (Use the 1/3-2/3 Conversion Chart to determine thirds quickly.) Consult the Climb Chart on the data card and cross-index the aircraft's configuration and power with its starting altitude. If the listed number is 2 or less, each VFP used will gain one altitude level. If it is 2.5 or more, each VFP used will gain one or two levels—the player decides how many each time he uses a VFP. (Note: The numbers on the Climb Chart are more fully used with advanced Rule 8.G.) One decel point is incurred for each altitude level zoom climbed. Aircraft which zoom climb may not make ET turns.

2. Vertical Climbs: Vertical climbs allow an aircraft to gain altitude quickly but inefficiently. To perform a vertical climb, the aircraft must have climbed on the previous game-turn. One third of the aircraft's starting FPs will be HFPs and the rest will be VFPs. (Use the 1/3-2/3 Conversion Chart to determine these amounts.) The aircraft may gain one or two altitude levels (player's choice) for each VFP expended. 2 decel points are incurred for each level climbed. Aircraft which vertically climb may not perform turns or special maneuvers (Rule 14) except verti-

cal rolls. No dives may be performed on the next game-turn.

D. Diving: If diving flight is chosen, choose either a steep or vertical dive.

1. Steep Dives: If a steep dive is chosen, decide how many of the starting FPs will be HFPs and the rest will be VFPs. At least one third must be HFPs. (Use the 1/3-2/3 Conversion Chart here.) Each VFP expended loses one or two altitude levels (player's choice) and .5 accel point is gained for each level lost. The aircraft must dive at least two levels.

2. Vertical Dives: To perform a vertical dive, the aircraft must have dived the previous game-turn. One third of the starting FPs will be HFPs and the rest will be VFPs. (Use the 1/3-2/3 Conversion Chart to determine these amounts.) Lose two or three altitude levels (player's choice) for each VFP expended, and gain 1 accel point per level. Aircraft which vertically dive may not perform turns or special maneuvers (Rule 14) except vertical rolls. No climbs are allowed on the next game-turn, and if the aircraft dove with a start speed of 3.5 or greater, level flight is not allowed either.

E. Gradual Descent: Aircraft in level flight may descend one altitude level per game-turn at any point during their flight. Such gradual descent does not use FPs.

YOU HAVE READ ENOUGH TO PLAY SCENARIO T-2!

Advanced Rules

F. High Pitch Rate Aircraft: Aircraft noted on the data card as being high pitch rate aircraft may enter a vertical climb from level flight on the prior game-turn if their start speed is 3.5 or less. They may also perform a steep dive on the game-turn after a vertical climb. High pitch rate aircraft may enter level flight the game-turn after a vertical dive regardless of the start speed they dove at.

G. Sustained Climbs: A sustained climb represents an aircraft's best climb rate and is the quickest, most efficient way to climb. Unlike other climbs, the aircraft's start speed must be equal to or greater than its climb speed listed at the top of the Climb Chart. Furthermore, the aircraft must select A/B or Mil power.

1. Procedure: The aircraft receives HFPs equal to two thirds its starting FPs (use the 1/3-2/3 Conversion Chart). The remaining one third is ignored but in its place the aircraft receives 1 VFP. Consult the Climb Chart and cross-index the aircraft's configuration and power with its starting altitude. The result is a number of altitude levels, or climb limit. Divide this number by the number of HFPs, and round fractions up. This result is the number of levels the aircraft may gain for each HFP used **after** the VFP is expended. The VFP may be expended at any point during the flight and signals the start of the climb (it in itself does not gain altitude, unlike a normal VFP). The aircraft stops gaining altitude, however, when it reaches its climb limit or any time before. Incur .5 decel point for each altitude level gained. Only EZ turns and slide maneuvers are allowed. Any type of flight may be chosen on the next game-turn, but if climbing is chosen, the sustained climb rate must be used again.

Example: A clean MIG-29 at altitude 15 with 6.5 starting FPs chooses to perform a sustained climb. Its start speed is equal to or greater than its climb speed (5), and Mil power is selected. It now has 1 VFP and 4.5 HFPs. The Climb Chart shows a result of 3. 3 divided by 4.5 equals 2/3 which rounds up to 1 altitude level per HFP. The MIG-29 chooses to start its flight with the VFP. No altitude gain occurs with this, but as the aircraft uses its next three HFPs it elects to gain the one altitude level per HFP allowed it. Since 3 is its climb limit, its fourth HFP does not gain altitude. 1.5 decel points are incurred. The unused .5 HFP is carried over per Rule 5.C.

2. Partial Gains: Some Climb Chart results allow fractional gains in altitude. Note on the climb carry row of the log how far an aircraft has climbed toward the next level. The aircraft is considered to be at the lower level until the next one is fully reached. Climb carry-over is lost if the aircraft does not continue sustained climbing on the next game-turn. Note: Partial gains in sustained climbing is a special case. Half (.5) VFPs may not be used for partial gains, but are themselves carried over per Rule 5.C.

3. Bonus VFPs: Aircraft in a sustained climb may also receive bonus VFPs. Subtract the aircraft's climb speed from its starting FPs and the result, rounded down, is the number of bonus VFPs. Bonus VFPs may only be used at the end of the flight. Each one used gains 1 altitude level; any not used are lost. Incur 2 decel points for each level gained. The climb limit may be exceeded. For instance, in the above example the MIG-29 would receive 1 bonus VFP. After using its fourth HFP it expends this to gain a fourth level even though this exceeds its climb limit of 3. Another 2 decel points are incurred.

RULE 9: AIR-TO-AIR GUN COMBAT

A. General Rule: Free aircraft (Rule 2) may make up to two gun attacks per game-turn at any point in their flight provided at least one HFP or VFP is expended prior to and between each shot. Other free aircraft waiting to perform their flight or already finished may return fire in response to head-on attacks as long as they do not exceed the two shots per game-turn limit. Head-on attacks occur when the firing aircraft is on the target aircraft's 180 degree angle-off line (Rule 9.D) and has just fired at the target aircraft. Treat head-on exchanges and any resultant damage as occuring simultaneously.

B. Range: All aircraft cannon have a range of two. Diagram 1 on the diagram reference sheet shows the aircraft's field of fire. The diamonds depict the possible locations for target aircraft. The dotted line shows the crossover from range one to range two. Additionally, each two full altitude levels difference between firer and target equal one point of range. Point-blank attacks may be made if the attacker is in the target's hex or hexside and at the same altitude level. Return fire to head-on point-blank attacks is permitted.

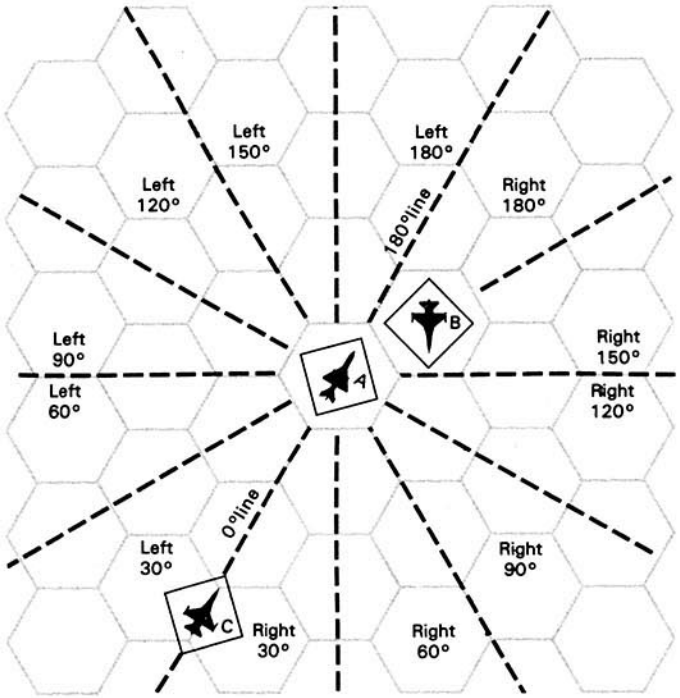
C. Procedure: Consult the internal gun section on the data card. The roll to hit row gives a number for point-blank, one, and two range attacks. Roll one die and modify the roll as appropriate (see below). A hit is achieved if the modified roll is less than or equal to the given number. Damage is determined per Rule 10.

Mark each shot taken on the log. A shot uses up a two-second burst. The shots row of the gun section lists the total number of two-second bursts allowed. Snap shots (one-second bursts) may be taken. These use up only half a shot, but the die roll is modified by +2.

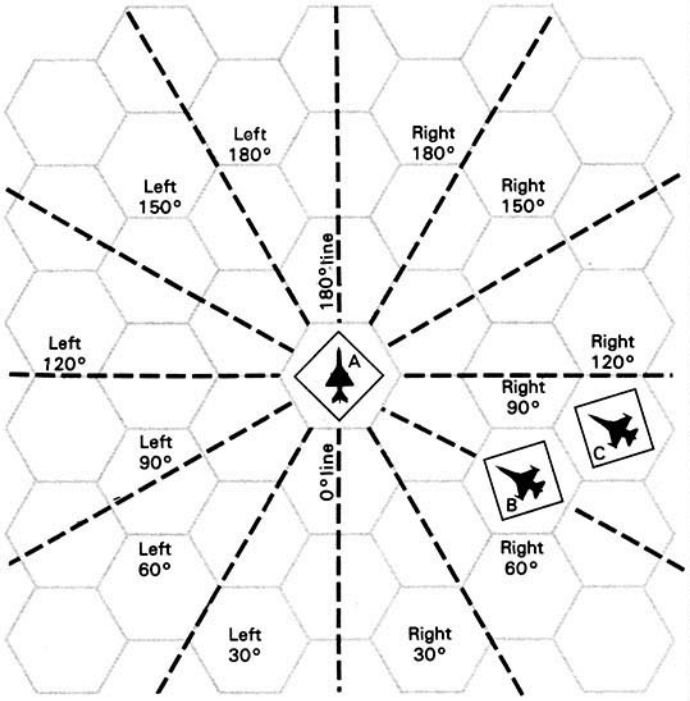
D. Angle-Off Arcs and Deflection: Angle-off arcs are used to measure the deflection of gun attacks. The Gun Combat Modifiers Table lists the deflection modifiers applied to the die roll for being in various angle-off arcs and lines.

Angle-off arcs describe the degree difference in headings between a reference (in this case, target) aircraft and an aircraft pointed at it. For instance, an aircraft on the target aircraft's 90 degree line and pointed at it is facing 90 degrees differently than the target. Diagram E illustrates angle-off arcs. Each arc covers 30 degrees.

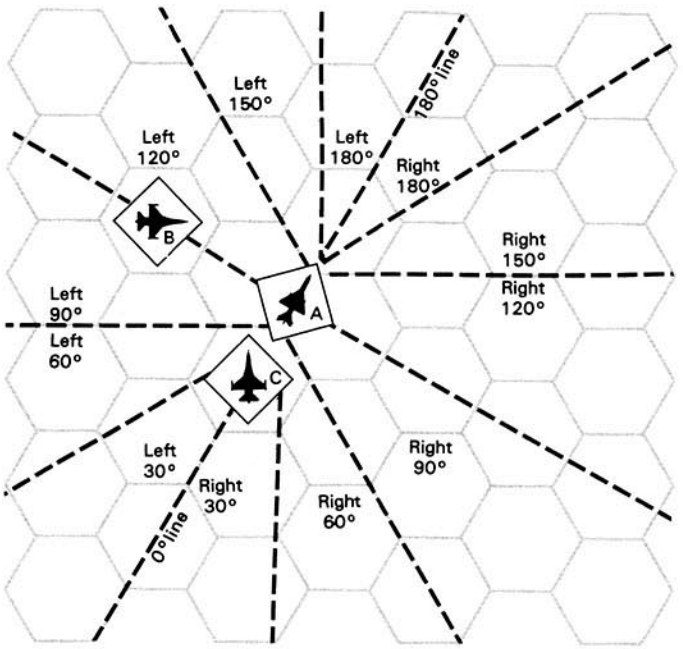
Diagram E: Angle-Off Arcs



A is the reference aircraft.
B is the right 150° arc.
C is on the 0° line.



B is the right 60° arc.
C is the right 90° arc.



B is the left 90° arc.
C is in the right 30° arc (if it was facing **A** it would be on the 0° line).

Determine which arc of the target aircraft the firing aircraft is in and apply this modifier. If the firing aircraft is located directly on an angle-off line, it is considered to be in the arc it would be in if the target aircraft were moved one hex/hexside forward. Aircraft which enter the target's hex/hexside use the modifier for the line they entered on. Attacks from the 180 degree line (not arc) are head-on attacks.

E. Gunsights and G Force: Aircraft in an ET turn or which just changed facing using the ET rate may not fire. Other turn rates which affect gunfire are listed on the gunsight row of the gun section. If the firing aircraft is using or just changed facing using a turn rate listed here, apply the given modifier to the die roll.

F. Restrictions: Climbing aircraft may not fire at lower targets; diving aircraft may not fire at higher targets; aircraft in level flight may not fire at targets more than one level higher or lower.

An aircraft may not fire from a hex/hexside it performed a special maneuver or preparatory move (Rule 14) on or into, unless it was a slide maneuver or a preparatory move for a slide maneuver.

Aircraft may only fire at targets they have spotted (Rule 20).

Advanced Rules

G. Target Size: Gunfire is more likely to hit larger targets. Apply the target aircraft's size modifier given on the data card to the die roll to hit.

H. Steady State Gunsight Tracking (SSGT): Gunsights are optimized for rear quarter attacks. Aircraft attacking from the 60 degree or less angle-off arc may therefore "track" their targets, getting improved probabilities of a hit. To gain an SSGT modifier, the firing aircraft must expend FPs while on a tracking line (see Diagram 3 on the diagram reference sheet). For each two full FPs expended on a tracking line, a −1 is applied to the roll. SSGT may not begin until the attacker is within five hexes of the target aircraft (two altitude levels equals one hex).

I. Radar Ranging: Aircraft with radars that have tracking ability can use radar ranging to get beneficial modifiers to hit. There

are three types of radar ranging: regular (RE), computer assisted (CA), and integrated gun ballistics (IG). The gun section lists which type of radar ranging the aircraft has.

Regular radar ranging requires the attacker to be using SSGT. CA may be used when firing from the 90 degree angle-off arc or less and can be used in conjunction with SSGT. IG may be used when firing from any angle and in conjunction with SSGT if desired. Regular, CA, and IG capabilities are mutually exclusive.

To employ any type of radar ranging, roll the die once. If the result is less than or equal to the radar lock-on number, radar ranging is successful and the appropriate modifier given on the Gun Combat Modifiers Table is applied. Radar contact or tracking of the target (Rule 18) is not a prerequisite for this. However, if a radar lock-on is already in effect and the other requirements are met, radar ranging is automatic and need not be rolled for.

J. Gun Pods: Aircraft may carry gun pods as part of their external load. Information about the various types of gun pods is given on the External Stores Table. An aircraft may carry more than one gun pod but they must be of the same type.

During a cannon attack, state which guns are firing (they do not all have to fire) and roll the die once. Apply this roll (modified as usual) to each firing gun's number to hit. If any hits are achieved, roll separately for each hit on the Damage Table.

RULE 10: AIRCRAFT DAMAGE

A. General Rule: Whan a gun or missile hit is achieved on an aircraft, consult the Damage Table. Roll the die once and modify the roll by the aircraft's vulnerability modifier listed on the data card. Cross-index the modified roll with the gun or missile's attack rating as given on the gun section or missile data sheet. (Use the air-to-air attack rating for guns; air-to-ground is for use with *Air Strike.*) If the aircraft was previously damaged use the next highest attack column. The cross-indexed result gives the type of hit achieved.

—: No effect, i.e., superficial damage only.

L: Light damage. The aircraft may not use BT and ET turn rates, and all gun attacks made by the damaged aircraft suffer a +1 modifier to hit.

2L: Two light hits. The aircraft may not use BT and ET turn rates, and all gun attacks made by the damaged aircraft suffer a +2 modifier to hit.

H: Heavy damage. The aircraft may not use HT, BT, and ET turn rates; no rolling maneuvers allowed; accel points earned for A/B and Mil power are halved (drop quarter fractions to nearest half or whole number); climb chart results are halved (drop fractions less than .25); and all gun attacks by H damaged aircraft suffer a +3 modifier to hit.

C: Crippling damage. Only EZ turns allowed; only slide maneuvers allowed; A/B power not allowed; accel points for Mil power are halved; climb chart results are quartered (drop fractions less than .25); no attacks allowed; and the aircraft must jettison all drop-tanks and gun pods during the flight phase (if it has already flown this game-turn, it must jettison these during the next flight phase). ECM pods and missiles may be jettisoned also if desired.

*: Aircraft shot down—remove it from play. Any missiles en route to that target are also removed from play.

Place the appropriate hit marker(s) on the damaged aircraft to keep track of damage.

B. Cumulative Damage: When an aircraft is repeatedly hit, it will accumulate several hits of one type or of different types. Convert multiple hits into more severe type hits as follows.

Three L hits equal one H hit.

Two H hits equal one C hit.

Two C hits or one C hit and one H hit equal a *.

For example, an aircraft already marked with one L counter and one H counter receives a 2L hit. The aircraft would now be marked with one C counter.

An aircraft suffers the restrictions noted in Rule 10.A above according to its most severe type of hit.

YOU HAVE READ ENOUGH TO PLAY SCENARIO S-1!

Advanced Rule

C. Progressive Damage and Damage Control: An aircraft's damage can worsen or spread (e.g., leaking hydraulic fluid could burst into flame, or a damaged engine could fail). To reflect this, roll once for each damaged aircraft during the log update phase of every game-turn. (Exception: Do not roll for an aircraft on any game-turn it is damaged.) Consult the Progressive Damage Table to determine if the aircraft's damage state increases. If the die roll is less than or equal to the number listed for the highest damage type the aircraft has, raise the aircraft's damage to the next highest type and remove the previous damage marker(s). For example, an aircraft has one H hit and one L hit. Its highest damage type is H, so on a roll of 3 or less remove the H and L markers and replace them with one C marker.

If an aircraft performs damage control it does not roll for progressive damage any more until it suffers further hits. Damage control may be performed on any game-turn the damaged aircraft flies straight and level (i.e., no turns or maneuvers) or at most does a sustained climb (Rule 8.G) at Mil power or a gradual descent (Rule 8.E). Damage control may not be done on a game-turn the aircraft is hit.

RULE 11: STALLING

Aircraft stall if they do not fly at or above their minimum speed.

A. General Rule: At the start of each game-turn, consult the Velocity Chart for each aircraft. Cross index the aircraft's altitude and configuration to arrive at a minimum speed. If the aircraft's start speed is less than the minimum, the aircraft stalls. Roll the die once for each stalled aircraft: 5 or less and the aircraft must perform a departed flight this game-turn; 6 or more and it must perform a stalled flight. Departed and stalled aircraft are busy attempting recovery and may not perform any actions during a game-turn except those given below.

B. Stalled Flight: In stalled flight the aircraft may not change its map location nor facing. It does lose altitude however. On the first game-turn of stalled flight the aircraft loses altitude levels equal to the number of starting FPs plus one (round .5 up). Should stalled flight continue into a second game-turn, the aircraft loses levels equal to its new start speed plus two, and so on for following turns.

Aircraft in stalled flight gain accel points for altitude levels lost as if they were steep diving, i.e., 1 accel point for every two levels. They may also accelerate by choosing A/B or Mil power. Fuel tanks may be jettisoned (Rule 4.A) to improve the aircraft's configuration.

A stall is over at the beginning of a game-turn when the aircraft's start speed is no longer less than the minimum allowed by its starting altitude and configuration. If the start speed is still less, roll as described above to determine if the aircraft performs stalled or departed flight.

C. Departed Flight: Aircraft in departed flight are tumbling out of control. Facing will therefore change. Roll the die at the start of the aircraft's move: odds means it faces left, evens means

it faces right. Roll the die again: this is the number of times it changes facing in that direction. If the departed aircraft is on a hexside and changes facing to an illegal direction, shift it to the left or right hex as appropriate. Departed aircraft do not otherwise change their map location.

Aircraft in departed flight lose altitude at twice the rate of stalled flight, up to a maximum of ten levels per game-turn. The aircraft's speed does not change, however, and accel and decel points are ignored.

To attempt recovery, roll the die once for each departed aircraft during the log update phase: 7 or more and the aircraft continues departed flight in the next game-turn; 6 or less and the aircraft recovers. Set its start speed to its minimum allowed speed or the speed at which it departed, whichever is greater.

RULE 12: TRANSONIC AND SUPERSONIC

Aircraft flying at high speeds are affected by sonic shockwaves.

A. Transonic: Aircraft with a start speed of 6.5 or 7 are flying at transonic speed. Aircraft at speed 6.5 incur 1 decel point. (Exception: aircraft noted on the data card as being supersonic deltas incur none.) Aircraft at speed 7 incur 2 decel points (supersonic deltas incur 1).

B. Supersonic: Aircraft with a start speed of 7.5 or greater are flying at supersonic speed and must comply with the following rules.

(1) Aircraft which select military power incur 1 decel point for each .5 of speed greater than 7. (Exception: Supersonic deltas incur .5 decel point for each .5 of speed greater.) These decel points are received along with the accel points gained per the Power Chart.

(2) Aircraft which select normal power incur the same amount as above plus 1 additional for exceeding their cruise speed (6.C.3).

(3) Aircraft which select idle power lose .5 FP over the amount listed on the Power Chart.

(4) Aircraft which turn (even EZ turns) incur 2 decel points in addition to any others they might receive. Supersonic deltas incur only 1.

(5) Decel points for special maneuvers (Rule 14) other than slides are doubled.

RULE 13: ORDER OF FLIGHT

Aircraft are flown sequentially during the Flight Phase based on their positions of advantage and other factors.

A. Order of Flight Determination: Each game-turn an aircraft will fall into one of the following categories.

Departed: (See Rule 11.)

Stalled: (See Rule 11.)

Engaged: An aircraft which is actively defending against a missile (Rule 16).

Free/Disadvantaged: A spotted aircraft in the 150 or 180 angle-off arc (Rule 9.D) of an enemy aircraft that has an advantage over it.

Free/Nonadvantaged: A spotted aircraft that (1) has an advantage over an enemy aircraft but which is also disadvantaged by the same or different enemy aircraft, or (2) has neither an advantage nor disadvantage.

Free/Advantaged: An aircraft which has a spotted enemy aircraft in its 150 or 180 angle-off arc, within twelve hexes and not more than six altitude levels above or eight altitude levels below.

Free/Unspotted: An aircraft not spotted by any enemy aircraft, or which does not fit into one of the other categories.

Only free aircraft are used to determine positions of advantage and disadvantage. Departed, stalled, and engaged aircraft are not considered free, therefore these may not be considered for advantage or disadvantage. Spotting is covered in Rule 20.

B. Initiative: If aircraft from both sides fall into the same free category, the order of flight within that category is determined by die rolls. Roll once for each aircraft in the category. Consult the Initiative Modifiers Table and modify the rolls as shown. The aircraft with the highest modified result flies last. Roll again on ties.

C. Flight Phase: During the flight phase all aircraft and missiles are flown one at a time in the order determined by their category and initiative as follows:

1. Departed and stalled aircraft in any order.
2. Missiles targeted at departed and stalled aircraft.
3. Engaged aircraft in any order. Missiles targeted at engaged aircraft fly at the same time as their target (Rule 15.B).
4. Free/disadvantaged aircraft. Again, missiles targeted at free aircraft fly at the same time as their target.
5. Free/nonadvantaged aircraft and missiles targeted at them.
6. Free/advantaged aircraft and missiles targeted at them.
7. Free/unspotted aircraft and missiles targeted at them.

YOU HAVE READ ENOUGH TO PLAY SCENARIOS G-1 AND G-2! (Treat all aircraft as being spotted.)

Advanced Rule

D. Tailing: A free aircraft which ends its flight stacked with and at the same altitude level with an enemy aircraft that has already flown may declare it is tailing that enemy if (1) the pursuing aircraft's facing is no more than 60 degrees different, and (2) its start speed for the next game-turn is no more than 1 FP greater. Multiple tailing in a hex/hexside may occur as long as each pursuer meets this criteria.

When tailing, possible collision (Rule 3.E) between the two aircraft is not rolled for. On the next game-turn the pursuer will fly immediately after the pursued does. Order of flight is determined normally for the tailed aircraft. If an engaged aircraft is tailed, any pursuers would have to fly when engaged aircraft do. A free pursued aircraft is considered disadvantaged by the pursuer, but the pursuer cannot disadvantage any other aircraft. Other free aircraft may consider or ignore the pursuer for purposes of determining order of flight depending on what would be advantageous to them.

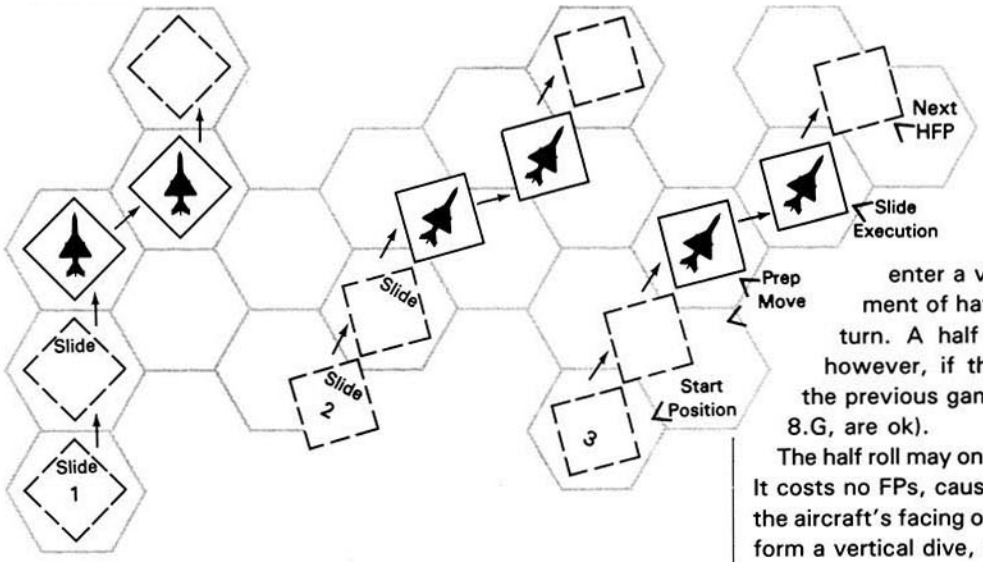
RULE 14: SPECIAL MANEUVERS

A. General Rule: Maneuvers are distinct flight actions. They may not be combined with turning (Rule 8); therefore, a maneuver aborts any turn in progress. Aircraft may perform multiple maneuvers during a game-turn. Maneuvers restrict gun attacks (see Rule 9.F).

B. Slides: A slide allows an aircraft to shift one hex or hexside to the left or right without changing its facing. One slide per game-turn is allowed if the aircraft's start speed is 9 or less; two slides are allowed if the speed is greater.

To perform a slide, expend 2 HFPs in forward flight as a preparatory move. The aircraft may then shift forward and to the left or right as depicted in Diagram F by using another HFP. If two slides are to be done, at least 4 FPs must be expended between the first slide and the preparatory move of the second. Incur 1 decel point for the second slide (none for the first).

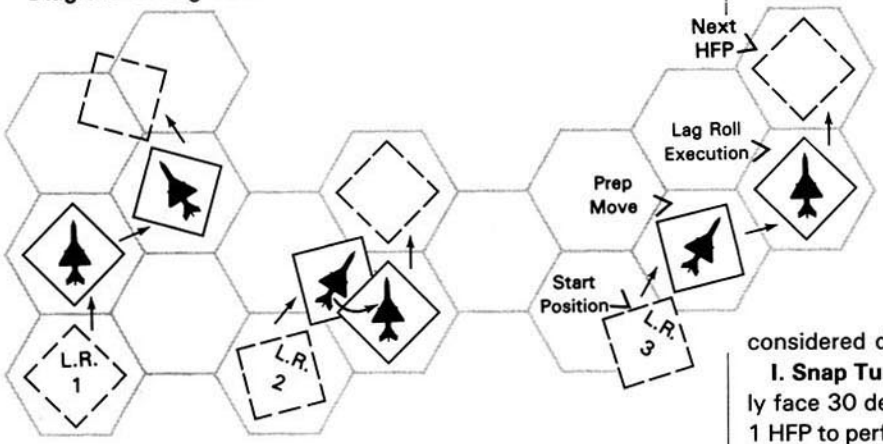
Diagram F: Slides



C. Lag Rolls: A lag roll allows an aircraft to shift left or right as in a slide but also results in a 30 degree change of facing in the direction opposite to the shift.

To perform a lag roll, expend 1 HFP in forward flight as a preparatory move. The aircraft may then shift forward and to the left or right and change its facing as illustrated in Diagram G. The cost in HFPs to execute a lag roll is indicated on the data card. The number of decel points incurred is also listed.

Diagram G: Lag Rolls



D. Displacement Rolls: A displacement roll is identical to a lag roll in every respect except there is no facing change.

E. Barrel Rolls: Barrel rolls are performed in the game as a series of connected lag and/or displacement rolls in the same direction (see Diagram H). (That is, in actual flight the pilot would do one big roll instead of several little rolls.) However, the aircraft incurs .5 decel point for each roll beyond the first in addition to the decel points normally incurred. Multiple lag and/or displacement rolls done such that FPs were expended between the execution of one roll and the preparatory move of the next do not constitute a barrel roll.

F. Vertical Rolls: When flying straight up or down, an aircraft can easily roll about its longitudinal axis. In reality, facing has no meaning going straight up or down, but upon recovery from a vertical climb or dive any amount of roll done would manifest itself as a heading change.

Vertical rolls may only be performed in a hex/hexside where the aircraft expended a VFP while in a vertical climb or dive. There is no FP cost to do a vertical roll, but check the data card to determine any decel cost. When the vertical roll is performed, the aircraft may change its facing to any direction (if it is on a hexside, relocate the aircraft as necessary). This is the only special maneuver allowed for aircraft in vertical climbs or dives.

G. Half Roll With Dive: An aircraft which begins its flight with a half roll maneuver (i.e.,the aircraft inverts) can enter a vertical dive without meeting the requirement of having done a steep dive in the prior game-turn. A half roll maneuver may not be performed, however, if the aircraft did a vertical or zoom climb the previous game-turn (sustained climbs, advanced Rule 8.G, are ok).

The half roll may only be used at the start of an aircraft's flight. It costs no FPs, causes no deceleration, and does not change the aircraft's facing or location. It does allow the aircraft to perform a vertical dive, but the aircraft may not attack or launch missiles. A vertical roll may be performed, but only at the end of the flight (the last FP expended would have to be a VFP per Rule 14.F). On the next game-turn the aircraft must choose diving flight.

H. Unloaded Dives: An unloaded dive is an acceleration maneuver where an aircraft dives to match the fall of gravity. This causes weightlessness, and the loss of induced drag combined with acceleration due to gravity and the engine's thrust allow the aircraft to accelerate faster than normal.

Only aircraft which choose level flight may do this maneuver. All or any portion of the aircraft's HFPs may be used in an unloaded dive. Since turning may not be used with special maneuvers, the aircraft must fly straight forward while unloaded. For each hex/hexside entered, the aircraft loses 1 altitude level and gains 1 accel point. The unloaded dive maneuver must be done in a continuous line of hexes/hexsides and may only be done once each game-turn. An unloaded dive is considered diving flight when determining maximum speed.

I. Snap Turning: A snap turn allows an aircraft to immediately face 30 degrees left or right at the start of its flight. It costs 1 HFP to perform and causes 2 decel points. It may only be done if the aircraft has a start speed of 3 or more and is wings level—meaning it is not banked into a turn that is being carried over, and it did not change facing or use a maneuver at the end of its flight last game-turn.

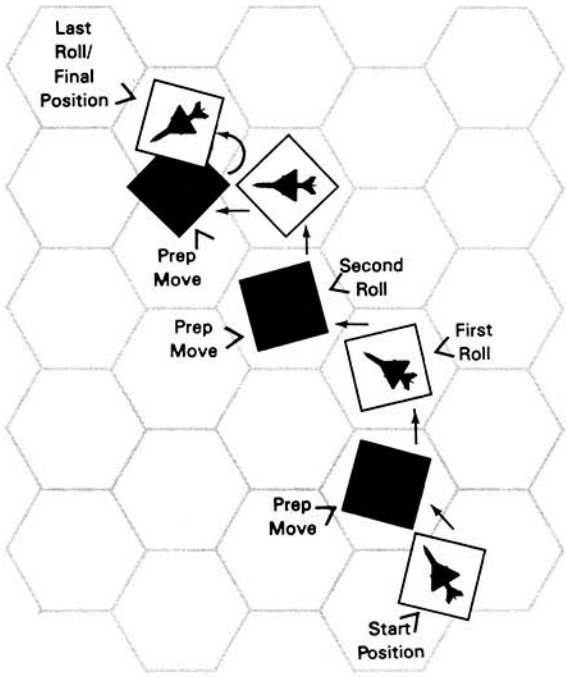
YOU HAVE READ ENOUGH TO REPLAY SCENARIOS G-1 AND G-2 USING SPECIAL MANEUVERS! (Treat all aircraft as being spotted.)

Advanced Rules

J. Altitude Effect on Preparatory Moves: Preparatory moves are required for slides, lag rolls, displacement rolls, and barrel rolls. At HI and VH altitudes 1 additional HFP must be expended in forward flight for the prep move. At EH altitudes 2 additional HFPs must be expended.

K. High Pitch Rate Aircraft and Vertical Rolls: If a high pitch rate aircraft enters a vertical by using its high pitch rate ability (Rule 8.F), it may only do a vertical roll at the end of its flight. To do this the last FP expended would have to be a VFP per Rule 14.F.

Diagram H: Barrel Roll (Done as three consecutive lag rolls).



RULE 15: AIR-TO-AIR MISSILES

Air-to-air missiles come in two forms: heat seeking (Rule 17) and radar guided (Rule 19). The rules given here are applicable to both.

A. Missile Data Sheets: Each missile data sheet is divided into several columns. The first columns list the missiles' types, weights, and load points. Further columns list:

Seeker Head: This is a letter code for the type of seeker head the missile has. I (improved), M (modern), and A (advanced) are heat seekers. RH (radar homing) and AH (active homing) are radar guided heads.

Launch G: This is the maximum turn rate an aircraft may use during flight to launch the missile without penalty. If a higher rate was used, a +2 modifier is applied to the launch roll (see below) for each step of higher rate. Missiles may not be launched if the aircraft used the ET rate.

Launch Roll: This is the number or less that must be rolled on one die to have a successful launch. An unsuccessful roll indicates that the missile malfunctioned, either by not firing or not guiding. Malfunctioned missiles are removed from play.

Turn Ability: Missiles use the Turn Charts just as aircraft do. Their maximum allowed turn rates are listed here. If a divisor is given, that turn rate is better by the divisor's factor. For example, BT/2 indicates that the missile may turn no harder than BT but it need only satisfy 1/2 the FP expenditure listed (round up) for BT turns.

Flight Time: This is the number of game-turns the missile can be in play. If the missile has not attacked its target by the end of its last game-turn, remove it from play.

Visibility: This is the missile's visibility number, which is used just as an aircraft's visibility number (Rule 20).

ECCM (Electronic Counter Countermeasures): This is the missile's resistance rating to jamming and ground clutter. It is used as a die roll modifier in various situations.

Chaff: If the defending aircraft uses chaff as a countermeasure (Rule 21), this is the number or less when rolled on one die which will decoy or prematurely explode the missile (i.e., remove it from play).

Flare: If the defending aircraft uses flares as a countermeasure (Rule 21), this is the number or less when rolled on one die which will decoy or prematurely explode the missile.

Launch Envelope: The minimum and maximum ranges in terms of hexes that a missile may be fired at a target is listed for front, side, and rear shots. Front shots are those fired from within the target's 180 and 150 degree angle-off arcs. Side shots are those taken from the 120 and 90 degree angle-off arcs. Rear shots are those taken from the 60 degree or less angle-off arcs. NA means launching is not allowed. Each two full altitude levels of difference between firer and target counts as one hex of range.

Speed: Use the missile's starting altitude to determine its speed each game-turn. If this is the missile's first game-turn of flight, add the start speed which the launching aircraft had on the game-turn of launch (drop any .5).

Active Homing: This is an AH seeker head's active tracking range in terms of hexes (Rule 19.C).

Home-On-Jam: Missiles with home-on-jam capability (Rule 21) are indicated with a Y (yes).

Roll To Hit: This is the number or less that must be rolled on one die to score a hit when the missile attacks its target. If the roll (after modifications) is less than or equal to the direct number, a direct (or close) hit is scored, meaning that the target is within the warhead's blast radius. If it is less than or equal to the proximity number but greater than the direct number, a proximity hit is scored, meaning that the target may be damaged by shrapnel or warhead fragments but not by the blast.

Attack Rating: The attack rating of the missile is given according to what type of hit was scored. Use the missile's attack rating on the Damage Table per Rule 10.

B. Missile Flight: Missile flight has been simplified for ease of play. Missiles must expend all of their FPs each game-turn, but they do not differentiate between HFPs and VFPs. Use a separate piece of paper to record a missile's flight. Note on this the launching aircraft, target aircraft, missile marker number, missile type, and altitude. Keep track of the missile's altitude during the game-turn as this may change its start speed for the next. All other information is given on the data sheet.

1. Order of Flight: A missile flies at the same time as its target. The missile and target aircraft alternate the expenditure of FPs in proportion to their relative speeds. Proportions are determined by dividing the missile's FPs by the target's FPs, rounding fractions up in favor of the missile. For example, a missile at speed 20 is attacking an aircraft at speed 4.5. The missile would expend 5 FPs for each 1 the aircraft expended.

2. Level Flight: Expend 1 FP to fly forward one hex/hexside. Missiles may always lose 1 altitude level with each FP they expend in level flight if they are higher than their target.

3. Climbing: Expend 1 FP to gain one or two altitude levels. Missiles may not climb if the target is at their level or lower.

4. Diving: Expend 1 FP to lose two or three altitude levels. Missiles may not dive if the target is at their level or higher.

5. Combined: Missiles may fly level, climb, and dive all in the same game-turn as necessary to pursue their target. Any number of FPs may be expended climbing or diving on the same hex/hexside. Missiles may not expend FPs to both climb and dive on a single hex/hexside.

6. Turning: Missiles use the Turn Charts per Rule 15.A above. They also pay 1 FP to actually change facing (instead of deceleration costs). They do not consider angles of bank (Advanced Rule 7.E) and may therefore reverse turns instantly.

7. Maneuvers: Missiles may perform snap turns, slides, lag rolls, and displacement rolls. In addition, anytime a missile expends 2 or more FPs in a hex/hexside climbing or diving, it may perform a vertical roll provided the target aircraft just did one. It costs 1 FP to perform any maneuver except vertical rolls which cost zero. Missiles are limited to one lag or displacement roll per game-turn. All these maneuvers are performed as described for aircraft in Rule 14.

C. Missile Launch: Missiles are launched during the air-to-air missile launch phase. Only free aircraft may launch missiles.

1. Procedure: Declare the target and note the missile load fired on the load dropped row of the log. Roll once per missile for launch success and apply any modifiers per the Missile Launch Modifiers Table. Place a missile counter on the launching aircraft's position if the launch is successful.

An aircraft may launch up to two missiles at a time but they must be of the same type. If both are successfully launched, the second missile will not fly on the following game-turn until the first missile has expended at least 5 FPs. When the second missile starts its flight, deduct the amount of FPs already used by the first missile from the second missile's speed. This simulates the time delay between the two firings which spaces the missiles out.

2. Restrictions: If the launching aircraft climbed during the game-turn of launch, missiles may not be fired at lower targets; if it dove, missiles may not be fired at higher targets; if it flew level, the difference in altitude between it and the target may not be more in levels than the horizontal range is in hexes.

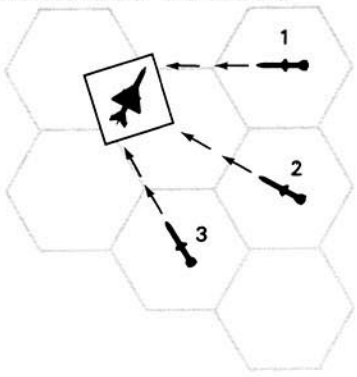
Missiles may not be launched if the aircraft used the ET turn rate, or if it ended its flight with a rolling maneuver.

Missiles may not be launched if the aircraft fired its guns after expending its last FP, i.e., at least 1 FP must have been used since the guns were fired for missiles to be launched.

D. Attack Procedure: A missile attack occurs immediately when both the missile and target aircraft are in the same hex/hexside at the same altitude level. (It does not matter which is flying at the time.) Roll the die once, applying any modifiers as required by the Missile Combat Modifiers Table. Compare the modified result to the missile's to hit numbers to determine if a hit is scored. If a hit is achieved, roll on the Damage Table per Rule 10 using the appropriate attack rating.

Sometimes the target aircraft is on a hexside and the attacking missile cannot enter the hexside due to its aproaching angle. In this case the missile attacks as soon as it flies through or past the aircraft's hexside (at the same altitude!) as illustrated in Diagram I.

Diagram I: Missile Attack. The missiles attack when they enter the hex next to the left of the aircraft.



Advanced Rule

E. Arming: Missiles may not turn, climb, dive, or perform maneuvers until they are armed (a snap turn may be performed immediately after arming but not before). Missiles become armed after they expend 1 FP in forward flight. The following missiles are an exception to this and arm instantly, allowing them to begin maneuvering instantly: Matra 550, AIM-9 Sidewinder, and AA-8 Aphid.

RULE 16: ENGAGING MISSILES

Aircraft under attack by a missile and which either have the missile in sight (Rule 20), or were alerted to it by a friendly aircraft which has both the missile and the defending aircraft in sight, may declare themselves to be engaged during the engaged/free determination phase.

A. Engaged Aircraft Versus Missiles: An engaged aircraft is actively defending itself against the missile(s). As such, it is allowed certain benefits.

An engaged aircraft always flies its proportional segment of FPs first, before the missile flies its proportional segment. An engaged aircraft may dispense chaff and flares during flight to defeat the missile (Rule 21). Additionally, the engaged aircraft may choose idle power to reduce a heat seeking missile's probability of a hit (see the Missile Combat Modifiers Table).

Since engaged aircraft are concentrating on defeating an immediate missile threat, they may not make attacks of any kind or perform radar searches.

B. Free Aircraft Versus Missiles: A free aircraft under attack by a missile has either not spotted it or opted to ignore it and declare itself free. As such, the aircraft is at a disadvantage against the missile.

The missile has the option to fly its proportional segment of FPs before the aircraft flies its proportional segment. (The missile could possibly fly twice in a row if it flies last one game-turn and first the next.) Free aircraft may not employ chaff or flares during flight to defeat the missile. Finally, free aircraft may only select idle power or use the ET turn rate if they roll a 4 or less on one die.

RULE 17: HEAT SEEKING MISSILES

A. Launch: To launch a heat seeking (IR, for infrared) missile, the firing aircraft must be within the range limits given on the missile data sheet for its angle off from the target, and it must not have violated the launch restrictions of Rule 15.C.2. Furthermore, the target aircraft must be spotted (Rule 20) and in the missile seeker head's field of view.

B. Seeker Head Field of View: An IR missile cannot lock on to a target (see below) unless the seeker head can see it. IR seeker heads have a field of view equal to a limited radar arc (see Diagram 4 on the diagram reference sheet). Uncaged IR seeker heads, however, have a field of view equal to the 180 degree angle-off arcs. The technology section of the data card notes if the aircraft can uncage IR seeker heads.

C. Multiple Targets: If only one target is in a field of view, missile lock-on is automatic. If several aircraft, including friendly ones, are in the field of view, seeker heads with limited views automatically lock on to the closest aircraft (thus a closer friendly aircraft will block missile lock-on to an enemy aircraft). If several aircraft, including friendly ones, are within view of an uncaged seeker head, the missile does not have to lock on the closest aircraft, but it is not an automatic lock-on either. Choose which aircraft is to be the target. Roll the die once, and if the selected target is not the closest, add 1 to the die roll for each aircraft closer to or equidistant from the seeker as is the target. A modified roll of 7 or less results in a missile lock-on. For exam-

ple, if the chosen target was second closest (say a friendly air craft was closest), a roll of 6 or less locks on. The firing aircraft may only roll once per game-turn; if the roll fails no missile may be launched.

If the firing aircraft has a radar lock-on to the target (Rule 18.B) and an uncaged M or A type IR missile is being used, the missile automatically locks on regardless of the number of targets in the field of view.

D. IR Missile Tracking Requirements: At the end of each proportional segment of an IR missile's flight and during the engaged/free aircraft determination phase, the target aircraft must be in the missile's 180 degree angle-off arc (even if the missile used a limited arc to lock on with), and the missile must be closer to the target than when it started. If these conditions are not met, the missile loses its target, goes ballistic, and is removed from play.

YOU HAVE READ ENOUGH TO PLAY SCENARIOS S-2, G-3, H-1, AND H-2! (Treat all aircraft and missiles as being spotted.)

Advanced Rule

E. Ground Clutter: Ground clutter interferes with an IR missile's ability to track its target. Add 2 to the launch roll if the firing aircraft is in the LO or ML altitude band and fires IR missiles at a lower target. A lower target in this case is one that is more than one altitude level lower for each hex of horizontal range it is away. For example, a target six hexes away is not a lower target unless it is seven levels or more below the firer.

If an IR missile dives in its proportional segment of flight to attack a target in the LO altitude band, add 2 to the die roll to hit.

RULE 18: AIR-TO-AIR RADAR

Aircraft radars are used for target search, target track, and radar missile guidance.

A. Radar Searches: Free aircraft may conduct radar searches during the air radar search and lock-on phase.

1. Procedure: A potential aircraft target must be within the searching aircraft's radar arc. The radar section of the data card lists the angle-off arcs which make up that aircraft's radar arc. For example, an aircraft with a radar arc listed as 150+ may search its left and right 150 degree and 180 degree angle-off arcs. Some radars are listed as having a limited arc; this arc is illustrated on Diagram 4 of the diagram reference sheet.

The potential target must also be within search range of the radar. The first number on the radar search row of the data card is the maximum search range in terms of hexes. Each two altitude levels of difference between the searcher and the target equal one hex of range. To ease counting, count the intervening megahexes and multiply by five (each megahex is five hexes across).

The second number on the radar search row is the radar search strength. Consult the Radar Modifier Table and find the appropriate radar strength row, then find on this row the range between the searcher and target and note the column it falls in. This column gives the search modifier. Roll the die once, adding the search modifier. If the result is less than or equal to 7 or the target aircraft's visibility number (given on the data card), whichever is greater, then radar contact is established.

For example, a potential target is within the searcher's radar arc and maximum range. Radar strength is given as 15, and range is determined as 20. This gives a modifier of +1 on the Radar Modifier Table, so 1 is added to the search roll.

Each potential target may be searched for in a game-turn. Once found by radar, an aircraft will remain contacted and need not be searched for on later game-turns as long as the aircraft which contacted it remains free, keeps it in its radar arc, and does not violate the limitations given below.

2. Limitations: Multicrew aircraft with backseat radar operators may not search if the aircraft did rolling maneuvers, turned at BT or ET rate, or vertical climbed or dived. Single piloted aircraft may not search if they performed any maneuvers other than a slide, turned at HT rate or greater, vertical climbed or dived, or made an air-to-air gun attack.

Some radars do not have a search function and therefore may not radar search.

B. Target Tracking: Aircraft may attempt to lock on to any one aircraft they have contacted with radar. Lock-on attempts are made immediately after radar searches.

1. Procedure: To attempt lock-on, the target aircraft must be within the maximum tracking range (the first number on the radar track row of the data card). Determine the range and use this with the appropriate radar track strength (second number on the track row) to find the die modifier on the Radar Modifier Table. Roll one die and add this modifier. If the modified result is equal to or less than the radar's lock-on number given on the data card, a lock-on is achieved. Once achieved, it may be maintained from game-turn to game-turn without having to re-roll as long as it is not broken (see below).

Except for aircraft noted under the technology section of the data card as having Track While Scan radars, aircraft lose radar contact with all enemy aircraft other than the one they are locked on to when a lock-on is achieved.

2. Breaking Lock-Ons: Air-to-air radar lock-ons are broken during a game-turn if any of the following happen:

(a) The tracking aircraft stalls or departs.

(b) The target uses chaff and/or deceptive jammers during the electronic warfare interaction phase to break the lock-on (Rule 21).

(c) The tracking aircraft declares itself engaged.

(d) The tracking aircraft uses the ET turn rate.

(e) The tracking aircraft performs a rolling maneuver (lag roll, displacement roll, barrel roll, vertical roll, or half roll).

(f) The tracking aircraft receives a H or C hit.

(g) The tracking aircraft cannot keep the target aircraft illuminated (Rule 19.B) during a radar guided missile attack.

(h) The target is no longer in the tracking aircraft's radar arc at the end of the flight phase.

(i) The tracking aircraft opts to break the lock-on.

C. Radar Information Markers: Radar search/illuminate and radar contact/lock-on markers are provided in the game. When an aircraft uses its radar, place a radar search marker under it. Each search marker is coded with a letter. There are four radar contact markers coded with each letter. Place one of these under each enemy aircraft the searching aircraft contacts. If a lock-on is subsequently achieved, flip the contact marker to its lock-on side. If the searching aircraft chooses to illuminate (Rule 19.B), flip the search marker to its illuminate side. The number of search and contact markers provided in the game is not a limit to the number of searches or contacts which may be made.

Advanced Rules

D. Multitarget Track: Some radars are capable of tracking more than one aircraft at a time. This is noted in the technology section of the data card as Multitarget (NMBR). The number in parenthesis is the number of targets the aircraft may attempt to lock on to or maintain a lock-on within a game-turn.

E. Look-Down: Only aircraft noted as having look-down radar in the technology section may search for low-level targets. Other aircraft may not search for or keep a contact on targets within 4 altitude levels of the ground unless the searching aircraft is at a lower level; nor may they search for or keep a contact on lower aircraft within 10 altitude levels of the ground if the difference in altitude between the ground and the target is less than the difference in altitude between the searcher and the target.

F. Aircraft Nose Attitude: The Radar Vertical Limits Table defines vertical limits to radar arcs to account for the searching/tracking aircraft's nose attitude. Cross-index the radar arc with the type of flight used by the aircraft during the game-turn. This gives an up factor and a down factor. Multiply the horizontal range to the target by the up factor to determine the upper limit. Multiply the range by the down factor to determine the lower limit. The results are the maximum number of altitude levels the target can be above (if positive) or below (if negative) the searching aircraft in order for the target to fall within the radar's vertical limits.

For example, an F-4E zoom climbed during the flight phase, and during the radar search phase it is searching with its 150-180 radar arc for a target four hexes away. The target may be no more than 32 levels higher (4 x 8 = upper limit) and no less than the F-4E's own altitude level (4 x 0 = lower limit) to be searched for.

G. Boresight Mode: Pilots with visual sight of an enemy (Rule 20) may select radar boresight mode. Declare this prior to the aircraft's flight. Radar boresight mode slaves the radar to the aircraft gunsight. Boresighted radars have a limited radar arc regardless of their listed arc. During the radar search and lock-on phase, if a target is in the limited radar arc and within tracking range, it is automatically contacted, even if the searching aircraft violated the limitations of Rule 18.A.2, and a lock-on roll may be made. Aircraft in boresight mode may not conduct normal radar searches. Once the lock-on is achieved, the aircraft may track the target on subsequent game-turns through its listed radar arc. Note: Aircraft with radars having a tracking function but no search function may use boresight mode to achieve a lock-on.

Aircraft without look-down radars can lock on to targets they could not normally have searched for due to altitude restrictions if they use boresight mode. To do this, the tracking aircraft's altitude level must be closer to the target aircraft's level than the target aircraft is to the ground. Add 2 to the lock-on roll in addition to other modifiers.

H. Auto Track Mode: Some aircraft are noted under technology as having auto track ability. Auto track is declared and functions similar to boresight mode, except visual sighting is not required and the radar uses the 180 degree angle-off arcs. During the radar search and lock-on phase, the closest target in the 180 degree angle-off arcs and within tracking range is automatically contacted, even if the searching aircraft violated the limitations of Rule 18.A.2, and a lock-on roll may be made. Optionally, a target which is not the closest may be locked on to if the aircraft has visually spotted it. Aircraft using auto track may not do normal searches and lock-ons.

RULE 19: RADAR GUIDED MISSILES

A. Launch: To launch a radar guided missile the aircraft must have locked on to a target during the previous game-turn and still be locked on to it. The range to the target must be within the launch envelope parameters given on the missile data sheet, and the firing aircraft must not have violated the launch restrictions of Rule 15.C.2. Furthermore, the target aircraft must be within the firing aircraft's 180 or 150 degree angle-off arcs (so the radar missile seeker head can see it).

B. Target Illumination: RH missiles home in on radar waves reflected off the target. Illuminating a target refers to directing high power radar waves at it (also called "painting a target").

To illuminate a target, the firing aircraft must maintain a radar lock-on to it. Declare when an aircraft illuminates a target on the game-turn following the launch, after the free aircraft order of flight has been determined. Target illumination is automatic once declared. Flip the radar search marker to its illuminate side. Only one target may be illuminated at a time, and only the aircraft which fired the missiles can illuminate the target for those missiles.

Although an aircraft may only launch two missiles per game-turn, any number of radar guided missiles may be homing in on an illuminated target. That is, the launching aircraft could fire more missiles on the next game-turn even if the first ones have not reached the target.

An illuminating aircraft has its order of flight modified so that it flies immediately after its target, alternating proportional segments of flight with it. Thus the target aircraft flies its proportional segment, then the illuminating aircraft, and finally the missile (or the missile may fly before a free target per Rule 16.B). If the target flies when engaged aircraft do, the illuminator must fly then also. This will cause the illuminator to fly out of sequence from what it should as a free aircraft but simulates the disadvantage of flying predictably while illuminating a target.

To maintain illumination of a target the tracking aircraft must keep the target in its listed radar arc. This requirement must be met after each of the illuminator's proportional segments of flight.

C. Active Homing Missiles: AH missiles have small built-in radars which illuminate and track the target aircraft without the firing aircraft having to do so. An AH missile's radar takes over (goes active) when the missile flies into its active homing range as listed on the missile data sheet. Before this point the firing aircraft needs to track the target; however, it does not have to illuminate it. If a lock-on is lost prior to the AH missile going active, the missile becomes unguided and is removed from play.

D. Tracking Requirements: At the end of each proportional segment of a radar guided missile's flight and during the engaged/free aircraft determination phase, the following conditions are necessary for the missile to continue tracking its target.

(1) The target must be within the missile's 180 or 150 degree angle-off arc.

(2) The launch aircraft must maintain a radar lock-on to the target. (For AH missiles which go active this is not necessary.)

(3) For RH missiles, the target aircraft must be illuminated by the launch aircraft.

(4) The missile may not end its flight further away from the target than when it started.

If these criteria are not met, the missile loses its target, goes ballistic, and is removed from play.

YOU HAVE READ ENOUGH TO PLAY SCENARIOS S-3, G-4, H-3, H-4, AND H-5! (Treat an enemy aircraft or missile as spotted if it is within twice its visibility number in hexes away from a player's aircraft during the visual sighting phase. Count each two full altitude levels of difference as one hex.)

Advanced Rules

E. Multitarget Track: An aircraft with multitarget track (Rule

18.D) may guide AH missiles at as many targets as it has lock-ons with. It may also launch AH type missiles at different targets in the same game-turn.

F. Ground Clutter: Ground clutter affects radar guided missiles that attack targets close to the ground. If the target aircraft is at altitude level 5 or less, and the illuminating or tracking aircraft which is guiding the missile is higher than the target (or an AH missile which is active dives to attack the target), determine the ground clutter modifier by subtracting the target's level from 6. Add this result to the missile's to hit roll.

The missile's ECCM rating will counteract the ground clutter modifier. Subtract the missile's ECCM rating from the ground clutter modifier. If the result is positive, add this remainder to the to hit roll as the modifier. If it is zero or negative, ignore the ground clutter modifier.

RULE 20: VISUAL SIGHTING

In order to attack a target with guns or IR missiles, the attacker must have visual sight of it. Aircraft make sighting attempts during the visual sighting phase.

A. Procedure: To make sighting attempts, choose any two adjacent angle-off arcs of the sighting aircraft. Roll the die once for each unspotted aircraft and missile within these arcs and within visual range. Each aircraft and missile has a visibility number listed on the data card or missile data sheet. This is the roll or less needed to spot the aircraft or missile. Previously spotted aircraft and missiles within these arcs and still within visual range remain spotted and do not have to be looked for. Visual sight is lost, however, on previously spotted targets in arcs not being visually searched or outside visual range. Visual range is four times the visibility number of the target being looked for. Each two altitude levels difference equals one hex of range.

If an aircraft which launched a missile in the previous game-turn is spotted, the missile is automatically spotted; or if the just-launched missile is spotted, the launching aircraft is spotted.

Keep unspotted aircraft flipped over to show only their facing arrow.

B. Blind and Restricted Arcs: Aircraft may not visually search into their blind arcs; these are listed on the data card. Some aircraft also have restricted visibility when looking into certain arcs; these are listed on the data card as restricted. Add 2 to the search rolls when looking into restricted arcs. Restricted arcs listed with an L are only restricted when looking for targets lower than the searcher.

Aircraft which are carrying over a turn may only look into arcs on the side toward which they are turning, due to the banking of the aircraft. (The 180 and 0 degree angle-off lines may be looked into if their adjacent arc is searched.)

C. Detection: Once an enemy aircraft or missile is spotted by a friendly aircraft it becomes detected by all friendly aircraft (due to radio calls). Being detected means friendly aircraft are now aware of the presence and approximate position of the enemy. Aircraft which subsequently look for a detected target automatically spot it if it is within visual range. An aircraft or missile remains detected for one game-turn after all friendly aircraft lose sight of it.

Detection of an enemy aircraft does not allow a friendly aircraft to attack it with guns or IR missiles; the friendly aircraft must spot it to attack in this way. Undetected aircraft become detected if they make a gun attack, or if a missile they fired is spotted or hits a target. Aircraft become spotted by an enemy if they make a head-on gun attack against that enemy.

Unspotted free aircraft fly last in the order of flight even if detected.

Advanced Rules

D. Range Modifiers: It is easier to see targets silhouetted against the sky. Therefore, when looking for higher targets, treat every four altitude levels difference as one hex of range instead of every two levels.

Since it is more difficult to see distant targets, apply the modifier given on the Visual Range Modifiers Table to the spotting roll. Find the target range on the eyesight row to determine what this modifier is.

E. Paint Schemes: Aircraft paint schemes also affect spotting. The scenarios note which paint schemes are used. The Spotting Modifiers Table lists what modifier to apply to the spotting roll.

F. Multicrew Aircraft: A radar operator may be used to visually search two other adjacent arcs or to assist the pilot in searching the pilot's chosen arcs. If he assists the pilot, subtract 2 from the spotting roll. When radar operators visually search, no radar searches may be conducted and no new lock-ons may be attempted that game-turn; however, previous contacts and lock-ons are maintained. Boresight mode, auto track mode, and illumination are still permitted.

G. Smoking: Some aircraft smoke heavily from their engines when at military power. The smoke trail makes them easier to see. Aircraft that smoke are so noted on the Power Chart. All aircraft with crippling damage are also considered smokers regardless of their power setting. Apply the appropriate modifier to the spotting roll as given on the Spotting Modifiers Table when looking for a smoking aircraft.

Missiles smoke heavily on their first game-turn of flight due to their boosters. On that game-turn only, subtract 3 from the spotting roll. The AIM-9M missile which has a reduced-smoke motor is an exception to this rule.

H. Heads-Up Display Interface: Some aircraft are noted under technology as having HUD Interface. This indicates that when the aircraft's radar locks on to a target in the 180 degree angle-off arcs (only), a box appears on the pilot's heads-up display showing him where to look for that target. Subtract 2 from the spotting roll when looking for such targets. If the aircraft has more than one target locked onto in the 180 degree arcs (due to multitarget track), the spotting modifier is used for the closest one only.

I. Radar Warning Receivers: The ECM section lists what model of RWR an aircraft has. All models alert the pilot when he is locked on to. Model C also alerts the pilot if he is being searched for. RWRs also tell the pilot approximately which arc the radar transmissions are coming from. Consequently he will look harder for the enemy knowing something is there. To reflect this, whenever a pilot visually searches for an aircraft that was indicated by his RWR, apply the spotting modifier given on the Radar Warning Receiver Table.

J. Visual Augmentation Systems: Some U.S. and NATO aircraft are equipped with long-range TV optical systems. Any aircraft so equipped may, upon establishing a radar lock-on, automatically spot one of the locked-on targets in the next spotting phase. The target must be within the searching aircraft's 180 degree angle-off arcs and no more than ten times its visibility number in range away.

V.A.S. may also be used without the radar. In this case, one spotting attempt may be made in the 180 degree angle-off arc out to six times the target's visibility number. All the regular spotting modifiers apply except HUD Interface and multicrew assist.

Also, use the V.A.S. row on the Visual Range Modifier Table instead of the eyesight row.

The V.A.S. Availability Table lists the availability of V.A.S. gear. Roll once for each aircraft in the scenario that can carry V.A.S. and if the number rolled is equal to or less than the number given on the table, the aircraft is so equipped.

When a target is spotted using V.A.S., it is automatically identified (optional Rule 22.A) if within four times its visibility number in range. Beyond this it is identified on a roll of 7 or less.

RULE 21: ELECTRONIC WARFARE GEAR

A. Explanation: The ECM (electronic countermeasures) section of the data card lists the electronic warfare gear an aircraft is equipped with. This may include a decoy dispenser system (DDS), a deceptive jamming system (DJM), and an active jamming system (AJM). The latter is used with *Air Strike*. If an aircraft carries a system it will be coded as model A, B, or C. An A model is an early, first generation system; a B model is an improved system; and a C model is a further improved system.

B. Decoy Dispensers: Decoy dispensers allow an aircraft to carry chaff bundles and flare clusters for use against attacking missiles. Chaff is a synthetic metal fibre dropped in the air to produce confusing radar returns and prematurely detonate missile fuses. Flares are burning magnesium devices designed to decoy heat seeking missiles.

1. Dispenser Loads: Dispenser loads are selected prior to play. The options are:

Model A dispenser: 15 chaff, or 15 flares, or 8 of one and 7 of the other.

Model B dispenser: 15 chaff, or 15 flares, or 10 of one and 5 of the other, or 8 of one and 7 of the other.

As an aircraft uses its decoys, mark on the decoys used row of the log the number and type dispensed.

2. Decoying Missiles: An aircraft may drop decoys during flight each time it expends 1 FP. Simply declare this and place a marker of the appropriate type on the position the aircraft just left. Model A dispensers may drop one or two decoys each time, but not one of each type. Model B dispensers may drop up to two of both types each time (i.e., a maximum of four decoys per position).

A radar guided missile must roll once for each chaff decoy it comes within five hexes of during its flight; an IR missile must roll once for each flare decoy it comes within five hexes of and each chaff decoy it comes within one hex of. Two altitude levels equal one hex, and any hexside of an adjacent hex counts as being within one hex. If the roll is less than or equal to the missile's appropriate decoy number (given on the missile data sheet) the missile is removed from play. Once a missile rolls for a decoy, that decoy is removed from play whether it was effective or not. Only decoys dropped by the target aircraft may be used against a missile. If two or more missiles come within range of the decoys in the same segment of flight, the player who dispensed the decoys must decide which decoys are played against which missiles before any die rolling is done.

During the log update phase remove from play any dispensed decoys that were not played against a missile.

3. Breaking Lock-Ons: Chaff may be dropped during the electronic warfare interaction phase to try to break radar lock-ons. The target aircraft must have a radar warning receiver (RWR, any model) as this warns the pilot that he is locked on to. (The Internal ECM section of the data card notes if the aircraft carries one.) Any number of available chaff may then be dropped. Consult the Chaff Deployment Chart and find the appropriate row for the type of radar that has the lock-on (radars are typed here by their arcs), then find on this row the number of chaff that were dropped (more advanced radars are less susceptible to chaff countermeasures.) This column gives the die roll or less needed to break the lock-on. Roll once for each radar system locked onto the target.

C. Deceptive Jamming: Deceptive jammers are an electronic countermeasure against radar guided missiles and radar lock-ons.

1. Deceiving Missiles: Deceptive jammers affect radar guided missiles by feeding them false radar returns. RH and AH missiles which attack an aircraft with a DJM suffer a +1 to the to hit roll against an A model, +3 against a B model, and +4 against a C model.

The missile's ECCM rating may counteract this. Subtract the ECCM rating from the deceptive jammer's die roll modifier. If the result is positive, add this to the to hit roll as the modifier. If it is zero or negative, ignore the deceptive jammer modifier. Missiles with home-on-jam ability, as noted on the missile data sheet, always cancel the deceptive jamming modifier.

2. Breaking Lock-Ons: Deceptive jammers may break lock-ons during the electronic warfare interaction phase. Roll one die for each lock-on held against the aircraft. Consult the Deceptive Jamming Table and cross-index the jammer's model with the type of radar that has the lock-on (radars are typed here by their arcs). If the roll is less than or equal to the number given here, the lock-on is broken. Resolve chaff attempts to break lock-ons before jamming attempts.

CONGRATULATIONS! YOU MAY NOW PLAY ALL SCENARIOS. HAVE FUN!

Advanced Rule

D. ECM Pods: Aircraft may carry ECM pods as part of their external load. Information about the various types of ECM pods is given on the External Stores Table. Dispenser pods drop decoys at the same rate as model B internal dispensers. However, an aircraft may not drop decoys from both internal gear and external pods at the same time (i.e., on the same position). With deceptive jammers, only the highest rated one is used, thus there is no benefit to carrying more than one deceptive jammer pod or one that is rated less than the internal gear.

RULE 22: LIMITED INTELLIGENCE (OPTIONAL)

A. Aircraft ID: In the G (general) scenarios where players may choose aircraft and some or all start unspotted, it is often fun to not reveal what type of aircraft you are flying until your opponent visually identifies it. Visual identification occurs when the aircraft is spotted and is no further than twice its visibility number in range away. It may be spotted before that but not identified; only when it is identified is the counter flipped over to reveal the aircraft type.

B. Missile ID: To increase tension, do not reveal the type of missile fired until it attacks the target or is countered. Your opponent will not know what type of decoys to use. If the missile misses he should not learn what type it was until the end of the game. All he should know at launch is whether he is locked onto by radar and whether it is illuminating. He must also be told if the missile goes active homing.

C. Target ID: Aircraft noted under Technology as having Target ID are able to use the aircraft's computer to analyze radar return and identify the target aircraft. The target aircraft is identified after it has been locked on to for one game-turn.

D. ID Friend or Foe: The ECM section of the data card lists

if an aircraft has an IFF beacon. This is for use in refereed games and will be covered in a later supplement.

RULE 23: WEATHER (OPTIONAL)

Weather is sometimes an important factor in air combat since it may affect the visual sighting ability of aircraft and IR seeker heads. Radar performance and radar guided missiles are unaffected.

A. Contrailing: Aircraft at high altitudes and high speeds leave contrails in the air. At the start of the game, roll the die once and add 25 to the result. The sum is the lowest altitude level at which aircraft will contrail. Place a contrail marker on all aircraft at and above this level which have a start speed of 5 or greater. Missiles will contrail at any speed when above this level or down to ten levels lower. Aircraft and missiles which are contrailing are automatically spotted at any range by all aircraft which visually search for them.

B. Weather Table: Consult the Weather Table at the start of the game to determine the weather in the battle area.

1. Procedure: Roll the die once to determine the type of weather per the table. Roll again to determine the exact conditions of that weather. If the result includes haze, place the appropriate haze marker on the map. All altitude bands below this level are hazy too. If the result includes one or more stratus layers, randomly pick that number of stratus markers and flip each like a coin. The face-up side indicates the altitude of the stratus. If the result includes one or more dense layers of cloud, randomly pick two ceiling markers for each layer. Use the low ceiling side of the first marker and the high ceiling side of the second. These ceiling levels and all levels in between are full of clouds. Therefore, if a resulting dense layer encompasses a stratus layer or another dense layer, delete the stratus or smaller layer. Should a dense layer overlap another dense layer, combine the two using the lowest low and highest high.

2. Haze: Haze reduces visibility. Visual sighting range is reduced to one times the target's visibility number, not four times. This applies for aircraft looking into or out of haze. Haze also affects the modifiers for aircraft paint schemes as shown on the Spotting Modifiers Table.

3. Stratus Layers: A stratus layer is a thin layer of clouds occupying the altitude level the marker depicts. Aircraft below that level may not see above it, and aircraft above it may not see below it. Either may look for targets which are in the stratus layer, but modify the spotting roll by +3. Aircraft in the stratus may visually search above or below but modify their spotting rolls by +2. Such aircraft may only spot targets in the same layer if they are within one hex. Cannon attacks are possible within these restrictions.

IR missiles may pursue and attack aircraft in a stratus layer provided that the missile enters the stratus no more than one hex away. IR missiles tracking an aircraft which passes through a stratus must fly through the stratus themselves during their proportional segment of flight. If they fail this, remove them from play immediately.

4. Dense Layers: Aircraft within a dense layer may not see or be seen, and aircraft above or below the layer may not see through it. Cannon attacks are not possible, and IR missiles may not track aircraft in a dense layer. Aircraft must roll for collision (Rule 3.E) even if stacked with only one other friendly aircraft.

C. Other Cloud Effects: It is easier to spot an aircraft against a white background, therefore when looking for an aircraft whose altitude level is between the searcher's level and a cloud layer, apply the silhouette modifier given on the Spotting Modifiers Table to the spotting roll.

Bright sunlight reflected off clouds can cause an IR missile to misfire. When firing an IR misssile at a lower target which is above the **highest** layer of clouds, add 3 to the launch roll. A lower target in this case is one that is more than one altitude level lower than the firing aircraft for each hex of horizontal range it is away.

RULE 24: FUEL (OPTIONAL)

Fuel is a critical factor in air warfare, and running low on gas at the wrong moment could be embarrassing. Needless to say, flying around on afterburner power will rapidly consume fuel, so players must be careful.

A. Fuel Points: In the H scenarios, each type of aircraft will be given a starting fuel number and a bingo fuel number (bingo represents the number of fuel points needed to reach home base). A Fuel Generation Table is provided for the G scenarios. At the start of the game, roll the die three times for each aircraft and subtract the sum of the rolls from the starting fuel to obtain the aircraft's actual fuel points at the beginning of play. Do not reveal this number to the enemy until after the game. This way he will not know when your aircraft is low on fuel.

Mark on the fuel used row of the log the number of fuel points used each game-turn according to the power setting chosen. Subtract this amount from the aircraft's remaining fuel and note this on the fuel left row of the log.

The internal fuel capacity of the aircraft is listed on the data card. In scenarios where drop-tanks are given, the extra fuel is already figured into the start fuel. If the start fuel is greater than the internal capacity, then the aircraft begins the game still drawing fuel from the drop-tanks. Should those tanks be jettisoned, the aircraft's fuel drops to its maximum internal amount. In scenarios where the aircraft's external load is optional, fuel points provided by any drop-tanks should be added to the aircraft's supply. The External Stores Table lists the type of drop-tanks and their fuel point capacity.

B. Disengagement and Game End: Instead of ending scenarios on a specific game-turn, the game ends when all aircraft of one side have been destroyed or removed from play by disengagement. An aircraft may disengage from battle if:

(1) The aircraft is not spotted, detected, or contacted by enemy radar and declares that it is disengaging. Declare this during the log update phase and remove the aircraft from play.

(2) The aircraft is spotted but out of enemy cannon range, beyond applicable enemy missile envelopes (consider ranges only), and can outrun its pursuers—that is, its top speed for the altitude band it is in is equal to or higher than any pursuer's speed would be in that same band. Declare disengagement as above.

(3) The aircraft has flown beyond visual spotting range, no missiles are in pursuit or were just launched at it, and no enemy aircraft has a lock-on to it with intent to launch a missile at it on the next game-turn. Declare disengagement as above.

(4) The aircraft stays out of enemy cannon range and out of enemy missile envelopes (or out of IR seeker head fields of view and denies the enemy a radar guided missile shot by breaking any lock-ons) for three consecutive game-turns while opening the distance between itself and the enemy regardless of relative maximum speeds. Declare disengagement as above. This case represents being too tough a target for the attacker, who will then break off.

(5) All players agree to let the aircraft disengage.

C. Bingo: At game end, figure the amount of fuel each aircraft has left as a percentage of its bingo number. Consult the

Bingo Fuel Chart and roll the die once for each aircraft, modifying the roll as shown for the aircraft's worst damage state. Use this modified roll on the appropriate bingo fuel row of the chart to determine the fate of the aircraft. There are three possibilities:

(1) The aircraft returns safely to home field.

(2) The aircraft diverts to an emergency field and is unavailable to the squadron for the next mission. The enemy receives victory points equal to an H hit in addition to victory points for any actual damage.

(3) The aircraft flames out due to fuel starvation and crashes on the way back. The enemy receives victory points for a kill.

U.S. FIGHTERS



F-4 Phantom II: Though rapidly being replaced by newer jets, this twin-engine, two-seat, multi-role fighter whose basic design is already 25 years old continues to be one of the free world's primary combat aircraft. Upgraded and improved throughout its career, the current models of the F-4 will see service well into the 1990s.

F-4E: The USAF uses this model of the Phantom for air superiority and ground attack. It is rapidly being replaced by the F-15 in the air superiority mission, but with its 20mm gatling gun, radar missile capability, slatted wings, and two-man crew, it is still a tough opponent. Its weaknesses stem from having outdated avionics, older radar, and engines which smoke heavily at military power. Its strength is its missile load of four Sparrows and four Sidewinders. The F-4E represented in the game is the latest version with improvements in bombing systems, gunsight, and ECM.

F-4S: This is a rebuild of the 1970s F-4J which had better engines than the early F-4B and improved radar. New modifications include improved gunsights for dogfighting, slatted wings as on the F-4E, better ECM, and reduced-smoke engines. The USMC still operates several squadrons, but the USN has retired all but two reserve squadrons, and these are scheduled to be replaced with F-14s by 1988. The F-4S carries no internal gun.

F-4F: This is an export version of the F-4E used by West Germany since 1971 as their primary air superiority fighter. Oddly enough, the West Germans opted not to include a radar missile capability, a poor decision given the often bad weather in Europe and the large number of enemy aircraft they face. From the lessons learned in recent conflicts, the *Luftwaffe* plans to upgrade their Phantoms, starting in 1988, with enhanced radars, ECM, smokeless engines, and the ability to use Sparrow and AMRAAM missiles. Politics and budget restraints will probably limit the number upgraded.

F-4K/M: This is the British-built version of the Phantom used by the RAF. Its engines are Rolls Royce Spey turbofans which give greater thrust than the American engines but smoke just as badly. The avionics, radar, and ECM suites are basically up to F-4J standards, and for air combat it carries the excellent Skyflash radar missile and the American-built heat-seeking Sidewinder missiles. It does not have an internal gun.



F-14 Tomcat: Widely regarded as the world's best interceptor and a capable dogfighter as well, the Tomcat is the U.S. Navy's primary means of fleet air defense. It is a large, twin-engined, two-seat, swing wing fighter mated with the Hughes AWG-9 radar system which gives it the ability to track over twenty contacts and simultaneously guide Phoenix missiles at six of them. It has successfully engaged target drones over one hundred miles away.

F-14A: Its automatic swing wings and aerodynamically efficient design give the Tomcat good air combat agility. Unfortunately, the F-14A is underpowered compared to most modern fighters and has the disadvantage of being a large target easily seen from far away. Nevertheless, it is a vast improvement technologically over the Phantom and has performed well in combat in the Middle East. It is equipped with a 20mm gatling gun and can carry up to eight missiles, six of which can be the active homing Phoenix. Many Tomcats are also fitted with TV optic visual augmentation systems.

F-14A+: This is an F-14A re-engined with the very powerful F-110 turbofans. Due to political delays in the procurement of the F-14D Super Tomcat, a number of engines intended for the F-14Ds became available, and in 1986 the Navy started using them to upgrade regular Tomcats.

F-14D: Called the Super Tomcat, this version is what the F-14 was always intended to be—powerful and lethal. With an improved radar, new ECM, new avionics, and the big GE engines, the F-14D is a new breed of cat. Its thrust-to-weight ratio in combat will be similar to the F-15's, and its ability to carry improved Phoenix missiles and the AMRAAM assures that it will be able to dominate almost all of its opponents. Unfortunately, funding delays mean it will not become operational in squadron strengths until late 1988 or 1989.



F-15 Eagle: Designed from the beginning as an uncompromised air superiority fighter, the Eagle represents the best in American technology. Its design pioneered the use of the modern heads-up display and the hands-on stick and throttle control interfaces. Designed for speed, high thrust-to-weight ratio, excellent maneuverability, outstanding visibility, long range, and firepower, the Eagle has all the traits needed for a winning fighter. In the Middle East it has achieved 40 to 1 kill ratios. Current and future versions of the F-15 will serve well beyond the year 2000.

F-15A: Thanks to advances in technology, the Eagle pilot can perform all the functions for an all-weather intercept that took a crew of two in earlier planes. The aircraft carries a 20mm gatling gun, eight missiles, smokeless engines, superb radar, and modern ECM. The only real disadvantage is that to achieve all these successful traits, the Eagle has to be big, and like the Tomcat, it is too easily seen. Also, in multi-aircraft battles the Eagle pilot can be caught off guard by unseen foes whereas a two-man crew would not be, thanks to the extra pair of eyes.

F-15C: The C model is an avionics upgrade of the F-15A. It has improved radar and ECM as well as additional internal fuel. It can be fitted with conformal fuel and sensor packs that give it excellent range and endurance without significantly affecting its performance.



F-16 Fighting Falcon: Conceived and designed initially as a low-cost, lightweight dogfighter, the Falcon has been developed into one of the most extraordinarily capable multi-role fighters ever built. It is optimized for close-in air combat and ground attack. Incorporating the latest technologies, it is exceptionally adept at both missions. It has been exported to over a dozen countries and has been combat proven by the Israeli Air Force where it has a kill-to-loss ratio comparable to the F-15's.

F-16A: The Falcon has an excellent radar, heads-up display, and outstanding agility. It is stressed for nine-G maneuvers and is the first modern fighter to employ fly-by-wire technology. It lacks radar missile capability but this disadvantage is offset by the fact that it is small, hard to spot, and carries all-angle Sidewinder missiles as its primary weapons. In addition, it has a 20mm gatling gun. Early in its production cycle, the F-16 was equipped with an excellent air-to-ground weapons computer which turned it into an accurate fighter bomber as well.

F-16C: The C model makes up where the A model is lacking; that is, in all-weather intercept ability. This model gives the Falcon an improved radar, improved ECM, and the ability to carry the AMRAAM missile. The C model also has beefed-up wing pylons, eliminating G limitations the A model faced when loaded with ordnance.



FA-18 Hornet: Having survived controversy, cost overruns, and doubts about its capabilities, the Hornet has emerged as a superb multi-role fighter, better than originally planned, in all respects but one—range. In-

tentionally designed as a dual role fighter/attack plane, the FA-18 is replacing the F-4 in the air superiority mission and the A-7 in the attack mission. The Hornet, like the F-16, incorporates the latest technology. It is a fly-by-wire aircraft and has computerized variable camber wing which gives it unmatched maneuverability for dogfighting. Its advanced radar system and radar missile capability make it an effective all-weather fighter as well. It is used by the U.S. Navy and Marine Corps and exported to Spain, Canada, and Australia.



F-19 Stealth Fighter: As reported in *Jane's All The World's Aircraft 1985-1986,* the F-19 is a product of the famous Lockheed "skunk works" which produced the SR-71 spy plane. It is to be a highly survivable fighter/recon aircraft utilizing stealth technology. It reportedly has twin engines mounted atop the fuselage shrouded by the vertical fins and uses two-dimensional ducted nozzles to reduce its IR signature. With a flat bottom, blended wings, advanced ECM, and possibly radar absorbant structural materials, the F-19 will be near impossible to detect by long-range radar. It is also rumored to be small enough to be carried in C-5 galaxy transports for secret deployments between airbases. The weapons and avionics given to it in the game are purely this author's speculation as no details have ever been released.



F-20A Tigershark: This is the ultimate development of the highly successful F-5 freedom fighter series of jets. Thanks to a powerful F-404 engine and automatic maneuvering flaps, the Tigershark is exceedingly agile in dogfights. It has a self-contained start system and a laser ring gyro inertial platform which readies the jet for flight within seconds of applying power. These two features combine to make this the fastest scrambling point defense interceptor in the world. It is equipped with the latest air-to-ground attack computer, making it a good but short-range multi-role fighter. The design resulted from a private venture by Northrop Aviation to produce a modern technology export fighter in the same class as an F-16. Unfortunately, no sales have yet been made to foreign countries, many of which prefer the slightly more capable F-16. There is some pressure to acquire the fighter for the Air Force Reserve or possibly the Air National Guard, but nothing has been decided yet. The Tigershark is included in the game as a "what if" item.

EUROPEAN AIRCRAFT



BAC Lightning F.6: The Lightning is a British fighter which slightly predates the U.S. Phantom. In service for over a quarter of a century, these outdated interceptors now remain operational with only two RAF squadrons in Britain and in the Saudi Arabian and Kuwaiti Air Forces. A unique design which has two engines, one stacked upon the other in a narrow fuselage, its performance is comparable to that of the F-104 Starfighter. Intended strictly as a point defense fighter, it has a high rate of climb and carries two 30mm cannon and two Red Top all-angle heat-seeking missiles. Though excellent in its day, the Lightning suffers from poor avionics, old radar, miniscule ECM, and a weapons load of only two missiles. The Red Top missiles are all-angle capable but vulnerable to countermeasures and not very maneuverable. The Lightnings will be replaced in the next few years by Tornado jets.



Panavia Tornado F.2/F.3: This is the British air defense variant of the very capable multinational Tornado strike aircraft. It is a twin-engined, swing wing interceptor equipped with an advanced radar system which rivals that carried on the F-14. A heavy aircraft with a two-man crew, it has a high wing loading and a poor thrust-to-weight ratio by today's high-powered standards. It is not a close-in dogfighter and was never intended to be. The Tornado's primary mission is national air defense of Britain and its operating area will mostly be over the high seas where Soviet fighters will not be encountered often. With multitarget engagement capability, an armament of four Skyflash and two Sidewinder missiles, and a 27mm cannon, the Tornado will be highly effective in air combat if need be.



Mirage-IIIE: This is the multi-role version of France's classic delta wing Mirage fighter. A contemporary of the British Lightning, the Mirage-III has aged better due to continuous update programs. The E series is primarily used for ground attack and recon missions although it is still a capable air combat fighter. Made famous by the Israelis in the '60s, the Mirage suffers from old avionics and radar systems. It carries two 30mm cannon and usually two Matra 550 or Sidewinder heat-seeking missiles for air combat. It can also carry the Matra 530 missile on the centerline weapons station.



Mirage F-1C: The F-1 has the distinction of being the only Mirage fighter not having a delta wing. By using a high swept wing and tail configuration, the F-1 was given greater range, speed, and better sustained turning ability than the earlier Mirages. Used primarily as an all-weather interceptor, it has an excellent radar and can carry more missiles than its delta winged predecessors. It is equipped with two 30mm cannon and can carry up to five missiles which can be of the Matra 550 or 530 series, Sidewinders, or the advanced Super-Matra 530D.



Mirage 2000: Returning to the delta wing design, this newest Mirage fighter incorporates the latest technological developments. It is a fly-by-wire aircraft with state of the art radar, avionics, and ECM systems. It has a very powerful engine and superb agility. Like the other Mirages, it carries two 30mm cannon and up to five missiles. It also has a respectable ground attack ability, but this will not be its primary mission.



Saab F-35 Draken: A contemporary of the F-4 Phantom, this Swedish-built, single-seat, single-engine fighter has been progressively refined to retain its combat effectiveness. The Draken's unique double delta wing gives both high maneuverability and good external load carrying ability. Currently in use in the Swedish, Finnish, Danish, and Austrian air forces, the Draken, though dated, is still a capable air combat and ground attack aircraft.

J-35F: This model of the Draken is used as a dedicated air defense interceptor. In this role it can carry up to four missiles; usually Swedish-built versions of the U.S. Sidewinder and Falcon missiles. The J-35F is equipped with only one 30mm cannon, the other being deleted to provide room for the avionics needed to use the radar guided Falcons.

F-35: This is the multi-role export version of the Draken. It carries two 30mm cannons and cannot use radar guided missiles. It also has more weapons stations for air-to-ground ordnance than the J-35F model. Unfortunately, outdated avionics deny it the capability to use advanced smart air-to-ground ordnance. Its older radar and ability to carry only a few heat-seeking missiles make it vulnerable to high technology opponents in air combat.



Saab JA-37 Viggen: Designed in the mid-1970s, the Viggen represents Sweden's first advanced technology fighter. It introduced carnard fore-planes, pulsed doppler look-down radar, and shortfield

takeoff and landing ability. The Viggen is the only European aircraft other than the British Harrier deliberately designed with features to allow it to operate from crude dispersed or makeshift airfields. It is built in several variants and only equips the Swedish Air Force at this time. Constantly being updated with the latest trends in technology, the Viggen promises to be an excellent combat aircraft well into the late 1990s.

JA-37: This is the dedicated interceptor version of the Viggen. It has an excellent radar and can carry the Falcon, Skyflash, and Sidewinder missiles. Its only weak spot is poor rearward visibility, but this is mitigated by the fact that it will operate in an excellent GCI/air defense network.



F-104S Starfighter: This is the Italian-built version of the Lockheed F-104 still in production in the world. The F-104S represents a vast improvement over early versions of the Starfighter. It has improved radar, modern avionics, all-weather intercept capability, and radar guided missiles. Its aerodynamically clean design confers high speed, rapid acceleration, and an impressive climb rate. Of course, its small wings still do not allow any real ability to dogfight, even with the addition of maneuvering flaps. It carries a 20mm gatling gun which can be removed and replaced with an extra fuel tank. It may carry up to six missiles, two of which may be radar guided Aspides. Originally a 1950s design, it is still a viable interceptor today. It has been exported to Turkey.

SOVIET AIRCRAFT



Sukhoi SU-15 Flagon F: This is the latest variant of the 1960s Flagon interceptor. It has twin engines and long range, but even with improvements only a mediocre radar and poor weapons load. It is best suited for use in the GCI controlled intercept. The Flagon is abundant in the Soviet air defense forces but is slowly being replaced by newer and more potent interceptors. It can carry the big outdated AA-3 missiles and/or the smaller short-ranged AA-2 and AA-8 heat seekers. It carries no internal gun.



Sukhoi SU-17/22 Fitter H/J: This is one of the Soviets' primary ground attack aircraft. Big, heavy, and equipped with manually swept variable geometry wings, the Fitter makes a very poor air-to-air fighter. The SU-17H and the equivalent SU-22J export model represent the latest developments of this line of aircraft. They have very powerful engines and a large fuel capacity as well as rudimentary ECM and improved ground attack avionics. They have a reasonable air-to-ground weapons load too. The Fitters can carry AA-2 and AA-8 heat-seeking missiles and have been used by some Arab countries as a supplemental interceptor. The lack of air-to-air radar and clumsy maneuverability make this a poor aircraft for that mission.



Sukhoi SU-27 Flanker: The SU-27 is the larger of two new Soviet multi-role fighters which represent the Soviets' first attempts to build high performance, high technology fighter aircraft. The Flanker bears many features similar to the MIG-29 but has a longer-ranged radar and can carry a larger payload. It is comparable in size and performance to the F-15. It will serve as an interceptor with the Soviet air defense forces and as a long-range fighter in Frontal Aviation. It is armed with an integral cannon and can carry up to eight missiles of the AA-2, AA-8, and AA-10 variety.



MIG-21 Fishbed: Designed in the 1950s as a simple, Mach-2 capable, point defense interceptor, the MIG-21 has evolved over time into a highly capable fighter. In its early forms it had serious deficiencies in weapons load, endurance, and visibility. However, the latest models bear little resemblance to their predecessors. Improvements to the MIG-21 series include newer, more powerful engines, improved radar, increased internal fuel, improved ECM, and a doubling of weapons payload. The MIG-21 has been built in the thousands and is widely exported, but like its contemporaries—the F-4, Mirage-III, Lightning, and F-104—the Fishbed has been surpassed by technology and is being slowly replaced in Soviet front line service by newer types.

MIG-21MF: The tailed delta design, good thrust-to-weight ratio, and small size of the Fishbed along with its smokeless engines make it a dangerous opponent. The J model was the first production model to standardize having the GSh-23mm gun system, four wing pylons, and an improved radar. It still suffers from poor visibility and the inability to absorb battle damage—weaknesses that pervade this entire series.

MIG-21bis: The Fishbed L/N series represents the final generation of the MIG-21 design. They carry more internal fuel and have improved engines and ECM and some minor improvements in avionics. These improvements make for a heavier aircraft, so these late model MIG-21s are not as agile as the versions used in the '60s and '70s.



MIG-23MF Flogger G: Designed in the early '70s, the Flogger was the Soviets' answer to their need for a good all-weather interceptor. It is the technological equivalent of the early F-4 Phantom and incorporates swing wings to aid in performance and endurance. Mated with the AA-7 Apex missile, the Flogger has a significant beyond-visual range engagement capability. It represents a vast improvement in intercept capability over the MIG-21 series but suffers in other respects. It was not designed for dogfighting, and its wings must be manually positioned which requires the pilot to ease off from maneuvering while this is accomplished. It has very poor visibility from the cockpit and is vulnerable to battle damage. With the wings full aft the aircraft cannot pull high G forces due to aerodynamic limitations, but it can accelerate swiftly in this configuration since all parts of the aircraft are inside the supersonic shock wave produced by the nose.



MIG-29 Fulcrum A: As the successor to the MIG-21 and MIG-23 series, the Fulcrum represents a quantum leap in Soviet fighter technology. It is a highly maneuverable, high performance, multi-role fighter in the F-16 class. It features an advanced look-down radar, powerful engines, two high velocity 30mm guns, and modern avionics and ECM. In Soviet service it will carry advanced AA-10 and AA-8 missiles. MIG-29s reached active service in 1984 and are slowly replacing MIG-21s as the Soviets' primary air superiority fighter.



MIG-31 Foxhound A: This large twin-engined, two-seat interceptor is an advanced derivative of the earlier MIG-25 Foxbat. Exploiting technology gained from the Iranians who gave them an F-14 to inspect in return for war supplies, the Soviets have developed a long-range, look-down, very powerful, multitarget tracking radar and long-range active homing AA-9 missiles for the Foxhound. The MIG-31 is also structurally beefed up to improve its low altitude maneuverability. It is credited as having an internal cannon. Too big and clumsy to be a good dogfighter, the MIG-31 is certainly a first-class long-range interceptor and is best employed in that role against bombers and cruise missiles. Against fighters it is best used in the standoff role firing its active homing missiles.

U.S. AIR-TO-AIR MISSILES

AIM-9 Sidewinder: Originally developed as a cheap, reliable, limited technology heat-seeking missile. Early versions of the missile were rear-aspect capable only. Technological advances have made it a very lethal all-aspect weapon.

The AIM-9P is a rebuild of the earlier AIM-9J rear-aspect Sidewinder incorporating an improved warhead, fusing, and a longer-ranged motor.

The AIM-9L is the first model to incorporate an all-aspect seeker head. It has an improved warhead and fuse for all-angle attacks.

The AIM-9M is an improved L model featuring countermeasures rejection logic and a near smokeless motor.

AIM-7 Sparrow III: A semi-active radar homing missile derived from the 1950s Sparrow I beam rider. Being a semi-active missile it requires the target to be illuminated by the firing aircraft's radar.

The AIM-7F is an improved version of the basic Sparrow, incorporating solid-state electronics which allows more room for a bigger motor and larger warhead, giving it greater speed, range, and lethality. Some counter-countermeasures logic is also provided.

The AIM-7M is a refinement of the F model providing it with an improved seeker head and better counter-countermeasures logic.

AIM-54 Phoenix: America's first active homing missile. The Phoenix is a large, long-range, dual guidance missile. It has a small terminal active radar guidance system for its final attack phase and uses track-via-missile updates for mid-course guidance corrections on long-range shots. Designed as a bomber killer, the big Phoenix is not as effective against fighters.

The AIM-54C is intended for use with the AWG-9 radar weapons system and can only be used by the F-14 Tomcat. The C model is an upgrade of the earlier A model featuring new all-digital electronics for improved accuracy and counter-countermeasures logic.

AIM-120 AMRAAM: The advanced medium-range air-to-air missile has its roots in the 1950s when there was a failed attempt to produce a missile with its own terminal radar guidance system. This was the Sparrow II, but the vacuum tube technology of that era could not be made small enough to work, and the project was dropped. In the '70s, it was revived and became practical due to the miniaturization of solid-state electronics. The AMRAAM is a Sparrow-sized missile fitted with an active seeker head incorporating the lessons learned from the development of the Phoenix system.

EUROPEAN AIR-TO-AIR MISSILES

AIM-4C Falcon: An early U.S. designed, rear-aspect, heat-seeking missile similar in function to the Sidewinder. It was produced in Sweden as the RB-28 missile.

AIM-26B Falcon: A much larger semi-active radar homing version of the basic Falcon. It was produced in Sweden as the RB-27 missile. The AIM-26 predates the Sparrow II and is not quite as capable.

Red Top: A British-built heat-seeking missile designed in the 1960s. It functions similarly to a Sidewinder but is much larger, carrying a bigger warhead and using a more sensitive seeker head, giving it an all-aspect capability under favorable conditions.

Skyflash: A British-built copy of the AIM-7E Sparrow III incorporating a better seeker head and a more powerful but shorter-ranged motor.

Aspide: An Italian-built semi-active radar homing missile derived from the Sparrow. It is faster than the AIM-7, and its seeker head has better counter-countermeasures features.

Matra R.530: An early French-built medium-range missile with two versions: semi-active radar homing and heat-seeking. Outdated by today's standards and not nearly as capable as the Sparrow series.

The Matra R.530A is the radar homing version. It is a contemporary of the AIM-26 but with poor range and susceptible to countermeasures.

The Matra R.530B is the heat-seeking version. Though credited by the French as being all-angle capable, it is very poor in this regard and is not rated as such in the game.

Matra R.550 Magic: A French, heat-seeking, dogfight missile similar in size and function to the Sidewinder but incorporating different control surfaces which give it excellent maneuverability and more tolerant launch parameters.

The Matra R.550 Magic II is a logical development of the original Magic, giving it an advanced all-aspect seeker and countermeasures rejection logic.

Super Matra R.530D: Bearing little resemblance to the original R.530 series, this missile is a whole new design. Representing a tremendous leap in capability, it has excellent maneuverability, twice the range of the older missiles, a larger warhead, full counter-countermeasures logic, and more speed as well as increased lethality.

SOVIET AIR-TO-AIR MISSILES

AA-2 Atoll: A Soviet copy of the AIM-9 Sidewinder, it is virtually identical in size, function, and performance.

The basic AA-2 is a copy of the early limited capability AIM-9B. The AA-2B version incorporates improvements in maneuverability and the launch envelope which make it comparable to the AIM-9J.

The AA-2C is a lengthened version incorporating a semi-active radar homing seeker head. It resulted from a requirement to provide the MIG-21 with an all-aspect radar missile. Its design was only a partial success due to its limited usable envelope.

AA-3 Anab: This is an early Soviet design for a medium-range missile. Similar in performance to the Matra R.530 but much larger and slower, using vacuum tube technology. A good bomber killer, but not maneuverable enough to be very effective against agile fighters. It comes in two versions: the AA-3A, a heat-seeking version; and the AA-3B, a semi-active radar homing version.

AA-7 Apex: This is an improved medium-range missile meant to provide the MIG-23 with a Sparrow quality missile. The AA-7 is larger than the Sparrow but has less range, less maneuverability, and is susceptible to countermeasures. Like the AA-3, it comes in both heat-seeking (AA-7A) and radar homing (AA-7B) versions.

AA-8 Aphid: This is a purposely designed short-range dogfight missile. Incorporating solid-state electronics, it is small, fast, and extremly maneuverable. Due to its small size, two can usually be carried where a single missile of other types would fit. This certainly increases the short-range firepower of Soviet fighters. The Aphid is rapidly becoming the Soviets' standard dogfight missile, replacing the earlier, less capable AA-2.

The AA-8A is a short-range heat-seeking dogfight missile using carnard foreplanes for increased agility and a seeker head probably copied from the French Matra Magic missile.

The AA-8B, not proven to exist yet, is an expected development of the AA-8A to incorporate an all-angle seeker head and

fusing.

AA-9 Amos: A long-range, active homing missile copied from the U.S. Phoenix missile. Though similar in size and planform, it is probably not as capable due to the less advanced Soviet missile motors and electronic circuitry.

AA-10 Alamo: A newly advanced medium-range missile demonstrating improved and refined Soviet missile technology. It is rumored to be in the Sparrow class in size and performance and also credited by some sources as being an active homing missile. Both versions are accounted for in the game.

The AA-10A is the basic semi-active radar homing version.

The AA-10B is the rumored active homing version similar in class to the AMRAAM and possibly using stolen AMRAAM technology.

AIRCRAFT AVAILABILITY by Rob Pruden

NORTH AMERICA

USA (NATO):

USAF: F-4E (1972), F-15A (1976), F-15C (1979), F-16A (1980), F-16C (1984), F-19 (1985)

USN: F-14A (1972), F-4S (1977-1988), FA-18 (1984), F-14A+ (1987), F-14D (1989)

USMC: F-4S (1979-1990), FA-18(1983)

Canada (NATO): FA-18 (1984)

WESTERN EUROPE

Austria: F-35 Draken (1986)

Belgium (NATO): F-16A (1981), F-16C (1987)

Denmark (NATO): F-35 Draken (1969), F-16A (1981), F-16C (1987)

Finland: F-35 Draken (1972), MIG-21bis/N (1979), J-35F Draken (1986)

France (NATO): Mirage IIIE (1965), Mirage F-1C (1974), "Export" Mirage 2000 (1984), Mirage 2000 (1986)

Greece (NATO): "Export" F-4E (1975), Mirage F-1C (1976), "Export" Mirage 2000 (1987), F-16C (1988)

Italy (NATO): F-104S (1969)

Netherlands (NATO): F-16A (1981), F-16C (1988)

Norway (NATO): F-16A (1981), F-16C (1988)

Spain (NATO): Mirage IIIE (1970-1987), Mirage F-1C (1976), FA-18 (1987)

Sweden: J-35F Draken (1966-1992), JA-37 Viggen (1979)

Switzerland: Mirage IIIE (1966)

Turkey (NATO): F-104S (1972), "Export" F-4E (1974), F-16C (1987)

United Kingdom (NATO): Lightning F.6 (1964-1987), F-4K/M (1967-1992), Tornado F.3 (1986)

West Germany (NATO): F-4F (1974), F-4F Upgrade (1989)

EASTERN EUROPE

East Germany (Warsaw Pact): MIG-21MF (1972), MIG-21bis/L (1976), MIG-23MF/G (1982), MIG-29 (1987), SU-22J (1987)

Poland (Warsaw Pact): MIG-21MF (1972), MIG-21bis/L (1977), SU-22J (1985), MIG-23MF/G (1987), MIG-29 (1989)

USSR (Warsaw Pact): MIG-21MF (1970), SU-15F (1975), MIG-21bis/L (1975), SU-17H (1978), MIG-21bis/N (1978), MIG-23MF/G (1978), MIG-31 (1983), MIG-29 (1985), SU-27 (1987)

Other Warsaw Pact: MIG-21MF (1974), MIG-21bis/L (1978), MIG-23MF/G (1988), SU-22J (1988)

MIDDLE EAST AND NORTH AFRICA

Algeria: "Export" MIG-21MF (1974), MIG-21bis/L (1982), SU-22J (1986), MIG-23MF/G (1989)

Egypt: "Export" MIG-21MF (1970), "Export" F-4E (1980), F-16A (1982), "Export" Mirage 2000 (1986), F-16C (1988)

Iran: "Export" F-4E (1973), F-14A (1977); Note: Very few of either type remain operational.

Iraq: "Export" MIG-21MF (1973), Mirage F-1C (1981), SU-22J (1987), MIG-23MF/G (1987), MIG-31 (1988)

Israel: "Export" F-4E (1973), F-15A (1977), F-16A (1981), F-15C (1982), F-16C (1987)

Jordan: Mirage F-1C (1981), F-20A (1988) or "Export" Mirage 200 or Tornado F.3 or MIG-29

Kuwait: Lightning F.53 (1969-1980), Mirage F-1C (1977)

Lebanon: Mirage IIIE (1969); Note: May not be operational

Libya: Mirage F-1C (1977), MIG-21bis/L (1979), SU-22J (1980), MIG-23MF/G (1987), MIG-31 (1988), MIG-29 (1989)

Morocco: Mirage F-1C (1977)

Oman: Tornado F.3 (1987)

Qatar: Mirage F-1C (1984)

Saudi Arabia: Lightning F.53 (1968-1984), F-15C (1983), Tornado F.3 (1987)

Syria: "Export" MIG-21MF (1972), MIG-21MF (1974), MIG-21bis/L (1978), SU-22J (1983), MIG-23MF/G (1984), MIG-31 (1987), MIG-29 (1987)

United Arab Emirates: "Export" Mirage 2000 (1986), Mirage IIIE (1968-1987)

AFRICA

Angola: "Export" MIG-21MF (1975), MIG-21bis/L (1980)

Ethiopia: "Export" MIG-21MF (1978), MIG-23MF/G (1987), SU-22J (1988)

Mozambique: "Export" MIG-21MF (1978)

Nigeria: "Export" MIG-21MF (1976)

South Africa: Mirage IIIE (1966), Mirage F-1C (1975)

Uganda: "Export" MIG-21MF (1976)

Zambia: "Export" MIG-21MF (1982)

ASIA AND THE FAR EAST

Afghanistan: "Export" MIG-21MF (1980), MIG-21bis/N (1986)

Australia: Mirage IIIE (1966-1988), FA-18 (1986)

India: MIG-21MF (1972), MIG-21bis/N (1979), "Export" Mirage 2000 (1985), MIG-29 (1987), MIG-31 (1989)

Japan: "Export" F-4E (1973), F-15C (1983)

North Korea: "Export" MIG-21MF (1980), MIG-23MF/G (1988), SU-22J (1987), MIG-29 (1990)

South Korea: "Export" F-4E (1977), F-16C (1986)

Pakistan: Mirage IIIE (1969), F-16A (1984)

Singapore: F-16A (1989)

Thailand: F-16A (1988)

Vietnam: MIG-21bis/L (1980), MIG-23MF/G (1988), MIG-29 (1990)

CENTRAL AND SOUTH AMERICA

Argentina: Mirage IIIE (1973)

Brazil: Mirage IIIE (1973)

Cuba: "Export" MIG-21MF (1973), MIG-21bis/L (1980), MIG-23MF/G (1988), MIG-29 (1990)

Venezuela: Mirage IIIE (1974), F-16A (1984)

Peru: "Export" Mirage 2000 (1986)

Ecuador: Mirage F-1C (1982)

MISSILE AVAILABILITY by Rob Pruden

NORTH AMERICA

USA (NATO): AIM-7F (1977), AIM-9L (1977), AIM-9P (1980), AIM-54C (1982), AIM-7M (1983), AIM-9M (1984), AIM-120 (1988)

Canada (NATO): AIM-9P (1980), AIM-9L (1984), AIM-7M (1984), AIM-9M (1986), AIM-120 (1989)

WESTERN EUROPE

Austria: AIM-9P (1986), AIM-9L (1988)

Belgium (NATO): AIM-9P (1981), AIM-9L (1982), AIM-9M (1987), AIM-120 (1989)

Denmark (NATO): AIM-9P (1981), AIM-9L (1982), AIM-9M (1987), AIM-120 (1989)

Finland: AA-2B (1974), AA-2C (1979), AA-8A (1983), AIM-9P (1985), AIM-26B (1986), AIM-9L (1988)

France (NATO): Matra R.530 (1960), Matra R.550 Magic I (1975), Super Matra R.530D (1980), Matra R.550 Magic II (1985)

Greece (NATO): Matra R.550 Magic I (1976), AIM-9P (1982), AIM-7F (1982), AIM-9L (1984), Matra R.550 Magic II (1987), Super Matra R.530D (1988), AIM-7M (1988)

Italy (NATO): AIM-7F (1980), AIM-9P (1981), AIM-9L (1982), Aspide (1985), AIM-9M (1988)

Netherlands (NATO): AIM-9P (1981), AIM-9L (1982), AIM-9M (1987), AIM-120 (1989)

Norway (NATO): AIM-9P (1981), AIM-9L (1982), AIM-9M (1987), AIM-120 (1989)

Spain (NATO): Matra R.530 (1970), Matra R.550 Magic I (1976), AIM-9P (1982), AIM-7F (1984), AIM-9L (1984), AIM-7M (1987), AIM-9M (1988), AIM-120 (1989)

Sweden: AIM-4C (1966-1982), AIM-26B (1966), Skyflash (1979), AIM-9P (1982), AIM-9L (1983), AIM-9M (1988)

Switzerland: AIM-26B (1968), AIM-9P (1982), AIM-9L (1985)

Turkey (NATO): AIM-7F (1981), AIM-9P (1981), AIM-9L (1983), Aspide (1986), AIM-9M (1987), AIM-120 (1990), AIM-7M (1988)

United Kingdom (NATO): Red Top (1964-1987), Skyflash (1978), AIM-9P (1980), AIM-9L (1981), AIM-9M (1985), AIM-120 (1989)

West Germany (NATO): AIM-9L (1981), AIM-9M (1985), AIM-120 (1989)

EASTERN EUROPE

East Germany (Warsaw Pact): AA-2B (1970), AA-2C (1972), AA-8A (1978), AA-7A and B (1980), AA-8B (1986), AA-10A (1988), AA-10B (1990)

Poland (Warsaw Pact): AA-2B (1972), AA-2C (1974), AA-8A (1980), AA-7A and B (1982), AA-8B (1988), AA-10A (1989)

USSR (Warsaw Pact): AA-2B (1968), AA-2C (1970), AA-7A and B (1974), AA-3A and B (1975), AA-8A (1976), AA-9 (1983), AA-8B (1984), AA-10A (1985), AA-10B (1987)

Other Warsaw Pact: AA-2B (1974), AA-2C (1974), AA-8A (1980), AA-7A and B (1983), AA-8B (1988), AA-10A (1988)

MIDDLE EAST AND NORTH AFRICA

Algeria: AA-2B (1974), AA-2C (1982), AA-8A (1986), AA-7A and B (1989), AA-8B (1990), AIM-7M (1987)

Egypt: AA-2B (1973), Matra R.550 Magic I (1980), AIM-9P (1982), AIM-9L (1985), Super Matra R.530 (1986), Matra R.550 Magic II (1986), AIM-9M (1988)

Iran: AIM-9P (1977) (Actually AIM-9J), AIM-7F (1978)

Iraq: AA-2B (1973), Matra R.550 Magic I (1980), Matra R.530A and B (1981), AA-8A (1982), Super Matra R.530 (1984), Matra R.550 Magic II (1986), AA-7A and B (1987), AA-8B (1988), AA-9 (1988), AA-10A (1988)

Israel: Matra R.530A and B (1961), AIM-7F (1977), AIM-9P (1981), AIM-9L (1981), AIM-7M (1984), AIM-9M (1986), AIM-120 (1989)

Jordan: Matra R.530A and B (1980), Matra R.550 Magic I (1981), AIM-9P (1982), Super Matra R.530 (1984), Matra R.550 Magic II (1986), AIM-9L (1988), AIM-7M (1988) or Skyflash (1988) or AA-7A and B (1988) and AA-8B (1988) depending on which new fighter chosen.

Kuwait: Redtop (1969-1980), Matra R.550 Magic I (1977), Super Matra R.530 (1983), Matra R.550 Magic II (1986)

Lebanon: Matra R.530A and B (1969)

Libya: Matra R.550 Magic I (1977), AA-2B (1979), AA-2C (1979), Super Matra R.530 (1983), AA-8A (1983), Matra R.550 Magic II (1986), AA-7A and B (1987), AA-8B (1987), AA-9 (1988), AA-10A (1989)

Morocco: Matra R.550 Magic I (1977), AIM-9P (1982), Super Matra R.530 (1985), Matra R.550 Magic II (1987)

Oman: Matra R.550 Magic I (1978), Skyflash (1987), Matra R.550 Magic II (1987)

Qatar: Matra R.550 Magic I (1984), Super Matra R.530 (1986), Matra R.550 Magic II (1988)

Saudi Arabia: Red Top (1968-1984), AIM-9P (1983), AIM-7F (1983), AIM-9L (1986), Skyflash (1987), AIM-7M (1988), AIM-9M (1989), AIM-120 (1990)

Syria: AA-2B (1972), AA-2C (1974), AA-8A (1978), AA-7A and B (1984), AA-9 (1987), AA-8B(1987), AA-10A (1988), AA-10B (1990)

United Arab Emirates: Matra R.530A and B (1968-1987), Matra R.550 Magic I (1978), Super Matra R.530 (1986), Matra R.550 Magic II (1986)

AFRICA

Angola: AA-2B (1975), AA-2C (1980), AA-8A (1985)

Ethiopia: AA-2B (1978), AA-2C (1987), AA-8A (1987), AA-7A and B (1988), AA-8B (1989)

Mozambique: AA-2B (1978), AA-8A (1987), AA-2C (1987)

Nigeria: AA-2B (1976), AA-8A (1987), AA-2C (1987)

South Africa: Matra R.530A and B (1966), Matra R.550 Magic I (1976)

Uganda: AA-2B (1976), AA-2C (1988)

Zambia: AA-2B (1982)

ASIA AND THE FAR EAST

Afghanistan: AA-2B (1980), AA-2C (1985), AA-8A (1986), AA-8B (1990)

Australia: Matra R.530A and B (1966-1988), AIM-9P (1981), AIM-9L (1986), AIM-7M (1986), AIM-9M (1988), AIM-120 (1990)

India: AA-2B (1970), AA-2C (1972), Matra R.550 Magic I (1978), AA-8A (1978), AA-7A and B (1983), Super Matra R.530 (1985), Matra R.550 Magic II (1985), AA-8B (1987), AA-10A (1988), AA-9 (1989)

Japan: AIM-7F (1980), AIM-9P (1981), AIM-9L (1983), AIM-7M (1985), AIM-9M (1986), AIM-120 (1990)

North Korea: AA-2B (1980), AA-2C (1982), AA-8A (1985), AA-7A and B (1988), AA-8B (1990)

South Korea: AIM-9P (1981), AIM-7F (1982), AIM-9L (1986), AIM-9M (1990), AIM-7M (1988)

Pakistan: Matra R.530A and B (1969), Matra R.550 Magic I (1980), AIM-9P (1982), AIM-9L (1984), AIM-9M (1987)

Singapore: AIM-9P (1982), AIM-9L (1987), AIM-9M (1990)
Thailand: AIM-9P (1982), AIM-9L (1986), AIM-9M (1990)
Vietnam: AA-2B (1972), AA-2C (1980), AA-8A (1982), AA-7A and B (1988), AA-8B (1990)

CENTRAL AND SOUTH AMERICA
Argentina: Matra R.530A and B (1973), Matra R.550 Magic I (1980)
Brazil: Matra R.530A and B (1973), AIM-9P (1983)
Cuba: AA-2B (1973), AA-2C (1977), AA-8A (1980), AA-7A and B (1988), AA-8B (1990), AA-10A (1990)
Venezuela: Matra R.530A and B (1974), AIM-9P (1984), AIM-9L (1987)
Peru: AA-2B (1978), Matra R.550 Magic I (1976), Matra R.550 Magic II (1986), Super Matra R.530 (1987)
Ecuador: Magic I (1982), Magic II (1987)

TYPICAL MEDIUM-RANGE AIR SUPERIORITY LOADS

The following loads represent typical aircraft loads for medium-range air-to-air missions. For shorter- or longer-range missions, delete or add drop-tanks and missiles as desired.

While it is up to the players to design their own loads, these examples should provide a good starting point. Tailor aircraft loads to the mission. If you plan an air superiority mission, for example, you may want to carry more short-range infrared dogfight missiles and less radar guided ones. On an intercept mission, radar guided missiles would be better. If your opponent does not have radar missiles, your ECM pod may be dead weight. Think about it, plan well, and have fun.

Abbreviations: Conf: Configuration; Wt: Weight; Pts: Points.

Station	Load	Load Wt	Load Pts
F-4E Phantom II; Start Conf: DT; Load Totals: Wt: 7,850, Pts: 18			
1,5	one 1200l drop-tank each	4,400	8
2,4	two AIM-9 missiles each	800	4
2 or 4	one DJM pod (type C)	650	2
3	empty	0	0
6,7,8,9	one AIM-7 missile each	2,000	4
F-4S Phantom II; Start Conf: DT; Load Totals: Wt: 8,900, Pts: 20			
1,5	one 1200l drop-tank each	4,400	8
2,4	two AIM-9 missiles each	800	4
3	SUU-23 Vulcan gun pod	1,700	4
6,7,8,9	one AIM-7 missile each	2,000	4
F-4K Phantom II; Start Conf: DT; Load Totals: Wt: 8,950, Pts: 22			
1,5	one 1200l drop-tank each	4,400	8
2,4	two AIM-9 missiles each	800	4
2 or 4	one DJM pod (type B)	450	2
3	SUU-23 Vulcan gun pod	1,700	4
6,7,8,9	one Skyflash missile each	1,600	4
F-4F Phantom II; Start Conf: 1/2; Load Totals: Wt: 5,600, Pts: 13.5			
1,5	one 1200l drop-tank each	4,400	8
2,4	two AIM-9 missiles each	800	4
3	empty	0	0
6 or 7	one DJM pod (type A)	400	1.5
F-4F+ Phantom II; Start Conf: DT; Load Totals: Wt: 7,000, Pts: 16			
1,5	one 1200l drop-tank each	4,400	8
2,4	one AIM-9 & one AIM-120 each	1,100	4
3	empty	0	0
6,7,8,9	one AIM-120 missile each	1,500	4
F-14A/A+ Tomcat; Start Conf: DT; Load Totals 8,300, Pts: 17			
1,5	one AIM-9 and one AIM-7 each	1,400	4
2,4	one 1200l drop-tank each	4,400	8
3	empty	0	0
6,7	one AIM-54 missile each	2,000	4
8,9,10	empty	0	0
11	one AIM-7 missile	500	1
F-14D Super Tomcat; Start Conf: DT; Load Totals: Wt: 7,850, Pts: 17			
1,5	one AIM-9 & one AIM-120 each	1,100	4
2,4	one 1200l drop-tank each	4,400	8
3	empty	0	0
6,7	one AIM-54 missile each	2,000	4
8,9,10	empty	0	0
11	one AIM-120	350	1
F-15A Eagle; Start Conf: DT; Load Totals: Wt: 6,800, Pts: 16			
1,5	empty	0	0
2,4	two AIM-9 missiles each	800	4
3	one 2200l drop-tank	4,000	8
6,7,8,9	one AIM-7 missile each	2,000	4
F-15C Eagle; Start Conf: CL; Load Totals: Wt: 2,800, Pts: 8			
1,2,4,5	one AIM-120 each	1,400	4
6,7,8,9	one AIM-120 each	1,400	4
3	empty	0	0
F-16A Falcon; Start Conf: 1/2; Load Totals: Wt: 5,850, Pts: 14			
1,2,8,9	one AIM-9 missile each	800	4
4,6	one 1200l drop-tank each	4,400	8
5	one DJM pod (type C)	650	2
3,7	empty	0	0
F-16C Falcon; Start Conf: 1/2, Load Totals: Wt:6,200, Pts: 14			
1,9	one AIM-9	400	2
2,3,7,8	one AIM-120 missile each	1,400	4
4,6	one 1200l drop-tank each	4,400	8
5	empty	0	0
FA-18A Hornet; Start Conf: 1/2; Load Totals: Wt: 5,800, Pts: 12			
1,9	one AIM-9 missile each	400	2
3,7	one 1200l drop-tank each	4,400	8
4,6	one AIM-7 missile each	1,000	2
2,5,8	empty	0	0
F-19 Stealth Fighter; Start Conf: CL; Load Totals: Wt: 1,400 Pts: 4			
1,2,3,4	one AIM-120 each	1,400	4
5,6	30 points of fuel each	0	0
F-20A Tigershark; Start Conf: 1/2; Load Totals: Wt: 3,950, Pts: 10			
1,7	one AIM-9 each	400	2

Station	Load	Load Wt	Load Pts
2 or 6	one DJM pod (type C)	650	2
3,5	one AIM-120 each	700	2
4	one 1200l drop-tank	2,200	4
BAC Lightning F.6; Start Conf: Dt; Load Totals: Wt: 2,800, Pts: 8			
1,2	one Red Top missile each	600	2
3,4	one 600l drop-tank each	2,200	6
Tornado F.2; Start Conf: DT; Load Totals: Wt: 6,400, Pts: 14			
1,4	empty	0	0
2,3	one AIM-9 and one 1200l drop-tank each	4,800	10
5,6,7,8	one Skyflash	1,600	4
Mirage IIIE; Start Conf: DT; Load Totals: Wt: 3,050, Pts: 9.5			
1,5	one Matra R.550 missile each	400	2
2,4	one 600l drop-tank each	2,200	6
3	one Matra R.530 missile or one DJM pod (type B)	450	1.5
Mirage F-1C; Start Conf: DT; Load Totals: Wt: 5,600, Pts: 14			
1,7	one Matra R.550 missile each	400	2
3,5	one super Matra R.530D missile each	1,100	3
6	one DJM pod (EUR. Type C)	600	2
2	one DDS pod (EUR. no.1)	500	2
4	one 1700l drop-tank	3,000	5
Mirage 2000; Start Conf: 1/2; Load Totals: Wt: 4,500, Pts: 10			
1,9	one Matra R.550 missile each	400	2
2,8	one Super Matra missile each	1,100	3
5	one 1700l drop-tank	3,000	5
F-104S Starfighter; Start Conf: DT; Load Totals: Wt: 4,950, Pts: 14			
1,9	one AIM-9 missile each	400	2
2,8	one Aspide missile each	1,000	2
3	one DJM pod (type B)	450	2
7	one DDS pod (type no. 1)	500	2
5	one 1200l drop-tank	2,200	4
4,6	one AIM-9 missile each	400	2
F-35 Draken; Start Conf: 1/2; Load Totals: Wt: 2,600, Pts: 8			
1,2,8,9	empty	0	0
3,7	one AIM-9	400	2
4,6	one 600l drop-tank each	2,200	6
5	empty	0	0
J-35F Draken; Start Conf: 1/2; Load Totals: Wt: 1,920, Pts: 7			
1,2,8,9	empty	0	0
3,7	one AIM-26 missile each	520	2
4,6	one AIM-4	300	2
5	one 600l drop-tank	1,100	3
JA-37 Viggen; Start Conf: DT; Load Totals: Wt: 4,850, Pts: 12			
1	one DJM pod (type C)	600	2
7	one DDS pod (EUR. no.2)	350	1.5
2,6	one Skyflash missile each	800	2
3,5	one AIM-9 missile each	400	2
4	one 1500l drop-tank	2,700	4.5
SU-15 Flagon; Start Conf: DT; Load Totals: Wt: 4,000, Pts: 13			
1	one AA-3A missile	600	1.5
6	one AA-3B missile	600	1.5
2,5	two AA-8 missiles each	600	4
3,4	one 600l drop-tank each	2,200	6
SU-17/22 Fitter; Start Conf: 1/2; Load Totals: Wt: 5,200, Pts: 12			
1,6	1200l drop-tank each	4,400	8
3,4,7,8	one AA-2B Atoll missile each	800	4
2,5,9,10	empty	0	0
SU-27 Flanker; Start Conf: 1/2; Load Totals: Wt: 6,700, Pts: 16			
1,8	one AA-8 missile each	300	2
2,3,6,7	one AA-10 missile each	2,000	6
4,5	one 1200l drop-tank	4,400	8
MIG-21MF Fishbed; Start Conf: DT; Load Totals: Wt: 1,900, Pts: 7			
1,5	one AA-2C missile each	400	2
2,4	one AA-2B missile each	400	2
3	one 600l drop-tank	1,100	3
MIG-21bis Fishbed; Start Conf: DT; Load Totals: Wt: 2,100, Pts: 8			
1,5	one AA-2C missile each	400	2
2,4	two AA-8 missiles each	600	4
3	one 600l drop-tank	1,100	3
MIG-23MF Flogger; Start Conf: DT; Load Totals: Wt: 3,100, Pts: 10			
1	one AA-7A missile	700	1.5
5	one AA-7B missile	700	1.5
2,4	two AA-8 missiles each	600	4
3	one 600l drop-tank	1,100	3
MIG-29 Fulcrum; Start Conf: DT; Load Totals: Wt: 6,000, Pts: 15			
1,6	two AA-8 missiles each	600	4
2,5	one AA-10 missile each	1,000	3
3,4	one 1200l drop-tank each	4,400	8
MIG-31 Foxhound; Start Conf: DT; Load Totals: Wt: 6,800, Pts: 18			
2,3	one 600l drop-tank each	2,200	6
1,4	two AA-8 missiles each	600	4
5,6,7,8	one AA-9 missile each	4,000	8

TACTICS AND STRATEGIES

Players of *Air Superiority* should be aware that this is a game of fighter tactics and not a game of fighter hardware. Of course, the hardware is realistically detailed in the game and the various performance characteristics, strengths, and weaknesses of individual aircraft types and their missiles is noticeable. But it is the decisions you make in play that determine the success or failure of your aircraft in battle. As in real life, advanced jets like the F-15 are not invincible and blow up just as well as older jets when hit by missiles. The superior performance of the F-15 gives it the potential to defeat most adversaries, but I emphasize the word potential—a poorly flown F-15 is as easy to shoot down as a poorly flown MIG. Always bear that in mind and you will enjoy the game. And, by the way, if you are flying an F-15 or other highly advanced free world fighter and some lowly MIG or Sukhoi does shoot you down, it was your own fault and not that of my game design.

The general scenarios allow you to make your own history by starting you in the early detection phase of air battles. The historical and postulated future history scenarios start you in the maneuver phase of a real or postulated fight where you must make life and death decisions from game-turn one and on. This is deliberate and challenging. It is my sincere hope that by playing the game, you will not only have fun, but learn about and appreciate the deadliness of high technology jet air combat. Now let's talk tactics.

The Offensive: On the attack, the most important thing is aggressiveness. When you commit to the battle, go all out to destroy your foe as quickly as possible. Push him around the sky and force him onto the defensive. Take any reasonable shot you can get—after all, the battle is just as much over if you got him with a lucky shot than if you spent twenty game-turns maneuvering for the perfect shot. Besides, in multi-aircraft battles you won't be able to spend much time maneuvering against a single foe, and learning to go for the quick kill is very important.

Aggressiveness is translated into the following principles:

(1) Point your nose at the enemy! When you maneuver, use your best turn rate or pitch up and vertical roll back into your foe if that allows you to get your nose on him faster. In an all-angle missile fight, don't worry about conserving energy; do whatever it takes to get your nose on him first. If you have all-angle heat seekers or radar missiles, you are a threat and he will become defensive. Even if you don't, it makes you feel good to have him in your sights, and the sequence of play has him moving first, giving you the initiative. Once you get your nose on him, then you can worry about energy conservation.

(2) Shoot first! Get your foe off balance! A missile in the air seems to have the wonderful effect of making your opponent become defensive. While he is busy dodging that first missile, you are busy maneuvering for an even better shot. Employ all weapons at your disposal as he enters each weapon's envelope. Never forego a radar missile shot in the face at long range even if you know it will be defeated by sophisticated ECM. It still makes your foe defensive.

(3) Take every shot you can get! Don't spend a lot of time trying to get better parameters for your missile. Get one in the air and then sweeten up the parameters for your next shot as your opponent scrambles to dodge the first one. Fire missiles in pairs if you have enough and fly them to bracket the target so that if he dodges one it will put him in position to be hit by the other. Rake him with gun fire any chance you get, even at bad angles. Even a chance hit for light damage will make your job easier.

(4) Fire your best weapon first. Don't save your silver bullets for a chance that may never come. If a heat seeker has a better hit probability than a radar missile in a situation, use it! If you must make a choice of going for a gunshot or positioning for a missile shot at the end of the game-turn, go for the gun shot only if the probability of a hit is high. After all, if you just fired a missile at close range, you will probably still have the option for a gun attack on the next game-turn.

(5) Fight with your airplane's best characteristics. If you can be out turned, don't go slow and start turning after a head-on pass; instead, pass your opponent at high speed then reverse using the vertical. Technology-wise, take advantage of your aircraft's special characteristics. IR uncage allows you to shoot with angles. Auto tracks gets you the quick lock-on and doesn't inhibit your maneuvering.

(6) Divide and conquer! In multi-aircraft battles this is easily done by shooting first. Missiles are good at dividing up enemy formations. When the enemy is scattered dodging missiles, gang up on single aircraft and kill them quickly. The balance of power in the game can change swiftly after one or two shootdowns. When the enemy splits up, go after the easiest target first. If some go high and others low, pursue the high targets. The high ones will have lower energy states and the low ones will have a tough time getting back into the fight.

(7) Be aggressive but not foolhardy! Always try to stay on the offensive and never get defensive. If forced to choose between pursuing a damaged or defensive target and breaking off to face a new threat, break off and turn into your new attacker. Meet him neutral if you have to, but never wait until he gets an advantage on you. Many a greedy pilot has been shot down for pushing his luck.

The Defensive: The missile age has not ended the dogfight; it has just made it more dangerous! If you are on the defensive, you are probably in deep trouble. Your immediate priority is survival and that is accomplished by getting out of your opponent's weapons parameters as quickly as possible. Your first goal is to maneuver yourself into a position of neutrality by getting your opponent's nose off of your airplane. Once you are safe you must continue to maneuver to keep his nose off of you until he commits an error and allows you to reverse and become offensive or to escape. On the defensive, it is extremely important to capitalize on your aircraft's superiorities. If you are going to be shot at, give your opponent the worst possible angles. If a missile is approaching, use every defensive countermeasure at your disposal. Never conserve decoys. Put as many out in front of the missile as you can. You may not get a chance to use the decoys you saved for later, if you know what I mean.

Defensive strategies embody the following principles:

(1) First, never give up! Your opponent could always have a bad day rolling dice. Luck can often affect the outcome of the game.

(2) Be aggressive defensively. Maneuver violently. You are better off trying to turn around to get at a foe behind you than to try outrunning a missile, primarily because you can't outrun them anyway. Make your opponent work to kill you. If it takes too long, he will have to break off when your wingman arrives to help. If your opponent is so superior you can't shake him off, attack one of his wingmen instead. You just might get a missile off before you get hit or at least free up some of your other aircraft to help or avenge you.

(3) Maintain mutual support! Never forget your wingmen. If one is in trouble, break off your current attack and help him out. Don't break up into individual duels with enemy aircraft. Gang up on them instead.

(4) If multiple aircraft are attacked by a single, split up and then reverse back to sandwich him. A high low split works well if you have high pitch rate aircraft; otherwise, do horizontal splits.

(5) Under gun attack, give your opponent the worst possible shot angle, even if it will cost you excessive speed. Be leery of running from a gun attack even if you are faster. He may still have a missile left and then you would be in worse trouble.

(6) Under missile attack, turn hard into the missile until it is in your 120 to 150 degree arc. Try to keep it there until it is about 12 hexes away, then break right across it blowing out as many decoys as possible when it is close enough. If you can, get it turning one way then break across its path to the other side. It may not be able to reverse back in time. Use the vertical to change your flight path quickly if you can. But beware of getting slow. With a missile, speed is life.

(7) Strive to neutralize the situation. As long as your opponent

is behind you, you will have to move first, giving him the initiative. If you can end out of his 150 degree arc, you have a chance with the initiative rules of getting him to move first. When that happens you should maneuver to gain the initiative or at least to stay neutral. In any case, you are better off!

Maneuvering Strategies: When you engage in fighter combat, your goal is the destruction of the enemy and nothing else. It is kill or be killed. To win, you must be able to maneuver your aircraft into weapons firing parameters quickly while staying out of or neutralizing your enemies' weapon parameters. For maneuvering strategies, we will discuss tactics as if we were in a multi-aircraft battle and that both sides have guns and all-angle missiles, including fire-and-forget active homing missiles.

(1) Opening Moves: When determining your fighting strategy, you must consider your aircraft's maneuverability and the weapons it is carrying. Most battles begin from a head-on approach. The best thing as mentioned earlier is to shoot first. The best weapon is an all-angle heat seeker or active homing missile. If you must use a radar homing missile, you will be vulnerable while illuminating the target. Prior to shooting, try to maneuver out to the side of your approaching enemy and swing back in to fire from his 150 or 120 degree arc so that when he detects you he cannot fire a last second self-guided missile at you. If you have time, split your forces to hit the incoming enemy from both sides in a sandwich. A high and low offensive split can also work, but take care as the high jets may be vulnerable should the enemy detect you before you fire and swarm up against them. When you split, everybody must arrive in position to attack at the same time; otherwise, the enemy can maneuver to counter one force then reverse to meet the second threat.

To counter a split, turn to face the enemy and move so as not to get caught in the middle. Maneuver to attack and overwhelm one force of the split first while putting the other force out of position. If you can't do that, you will have to split up. This is not good as your split forces are facing away from each other and moving farther apart while his are facing each other and getting closer together where they have mutual support.

(2) Engaged Moves: Half the battle is won if you engage the enemy from his side or rear quarters. A good opponent will prevent that and you will meet head on. Your options when you pass an enemy jet are two-fold: You may commence reversing or you may extend away. Depending on the situation, there are advantages to both. If you have an angles advantage or if you can turn better, go for the reversal. If you are fast, zoom climb as you turn to reduce speed and turn radius. If you aren't, turn hard and if necessary, dive to maintain speed and energy. If your opponent does the same, the fight will be close-in and guns and IR missiles will be the primary weapons. Shoot first! Beware of special maneuvers which sound good. The half roll and dive will allow you to pass your enemy and then turn to face him but you will be much lower and you won't be able to attack, and, depending on your speed, you may be forced into doing a steep dive on the next turn. A smart opponent will use that against you by staying higher or just letting you go and taking his now free aircraft somewhere else in the fight, perhaps ganging up on one of your other aircraft.

If you cannot turn well, a turning fight will deplete you of energy quickly and you may be in trouble. Only turn if you will be able to get a shot off. Otherwise, extend away from your opponent. If you are fast, do a shallow zoom climb as you pass and start an easy turn just to keep your opponent out of your blind spot. Do not worry if he is turning hard after your tail as your next move should be to vertical climb and roll back into him if you have enough speed or to half roll and dive back into him if you don't. Try to get an angles advantage on him on the next pass or at least meet him head on again. If you are slow at the pass, you will probably want energy. Do an afterburner power unload and dive maneuver. Remember to plan it so that you can turn at least once to keep the enemy in sight (it is very important to try and turn in the opposite direction as your enemy did to buy time). On your next move, start a break turn and zoom climb back up into your foe. This way you have the option to vertical climb and roll or continue turning depending on how quick the enemy is reversing. Keep your climbs shallow to save energy and strive to use your missiles. A close-in maneuvering gunfight in a poor turning aircraft is not healthy.

Don't forget to look at the overall situation. When you pass an opponent, it will take him two to three game-turns to get back around and shoot at you. It may well be better to ignore him and turn to take a quick shot at some other foe across the battle area. Perhaps your wingmen will be in similar positions and can turn on the one that just passed you.

As a final note, high pitch rate aircraft are very dangerous to be near when they get slow enough to use their pitch up and vertical roll maneuvers. Shoot them from far off or try to pass one at very high speeds. If they pitch and roll onto your tail, half roll and dive back underneath them. Get help! Gang up on them or keep the fight fast so they cannot employ their excellent maneuverability. If you are flying such an aircraft, be wary of slowing down to use that ability as you may well find yourself at stalling speed, where a faster, less maneuverable aircraft can out zoom climb you and vertical roll or half roll back into you. Also, some guy you weren't paying attention to on the other side of the battle may hose a missile at you and then you won't have any speed or energy on hand to dodge it.

(3) Disengagement Moves: In World War II and Korea, it was easy to disengage: just get out of gun range and run. Modern fighter pilots have the distinct problem of having to face a weapon which can seek them down and is three to four times as fast as they are: the guided missile. The fact is, you cannot outrun them. The problem is, there will always be a fight or a time when you will need to, such as when you are low on gas.

Disengaging in the missile age of air warfare is difficult. The best way to disengage is to kill off all of your opponents. This is not always possible. Given that there is at least one missile-armed enemy left, you need the following to successfully disengage—TIME and SPEED! Decide to disengage when it is prudent and not when you are in trouble. Plan your moves to gain a speed advantage over the enemy and then when he is out of position and you have time—such as when you have just passed head on—plug in afterburner, unload, and go! Dive for the deck to get into ground clutter and only turn enough to keep him in sight so you can use your ECM if he does get a shot at you. If he counters that by half rolling and diving onto your tail before you get good separation, you may want to pitch up and vertical reverse back into him or half roll and dive to pass underneath him. Do whatever it takes to meet him each time with more speed and in the opposite direction. The faster he gets in pursuit, the longer it will take him to reverse. Good luck!

DESIGNER'S NOTES

I have always felt that a good air combat game should play swiftly and be fluid; that the game mechanics should work naturally so the gamer can concentrate on the tactics of air fighting rather than the intricacies of moving counters. As in real life, combat in a modern jet game should be swift and decisive.

Tactical decisions should be critical to your success or failure. Unfortunately, modern jet air combat has never been addressed to my satisfaction in our hobby.

I am not a professional game designer by trade, but I am a veteran wargamer (15 years) and a U.S. Navy jet pilot (7 years). This put me in the unique position of knowing what a gamer wants in a game as well as having in-depth knowledge of the subject. This gave me insights into what aspects of modern jet combat should be modeled in a game. After many years of patiently waiting for a good air combat game design to appear, I decided to do one myself.

I probably own a copy of every game in our hobby that deals with airplanes. So after careful thought, I took stock of what made the various airplane games good or bad and resolved not to repeat the errors of previous designs and to incorporate some of their good points. As a military jet pilot (A-7E Corsair being my trusty mount), I feel a common misconception is that air combat games should be designed to the split second level of decision making. Not true! Having been in many practice dogfights and air battles, I can tell you that a pilot, when engaged, must immediately analyze the situation, create a plan, then move the controls to execute the plan. He must then wait for the aircraft to make a meaningful change in flightpath and see how that has caused everyone else to react. Upon seeing the reactions, he must reanalyze and change his own plans and moves accordingly. This can take from 5 to 15 seconds at a time. The really good fighter pilots can do this process quickly and take advantage of it by making moves that force opponents into predictable countermoves. Properly anticipating an opponent's move allows you to be mentally a step ahead of the enemy and maneuvering to counter his countermoves as they occur. The pilot who is not quick and who does not plan his moves will be forced into simple reactive actions and can be manipulated into defeat. Believe me, when I was a young nugget pilot the veterans did this to me all the time. Modern jet combat can be likened to a wrestling match of moves and countermoves, and the pilot who makes the first mistake will usually lose.

Ideally, a 10 to 15 second game-turn is good for modern jet combat. Anything smaller does not allow for a meaningful amount of maneuver to occur during a game-turn. As games should be tailored to what they wish to show, I picked a scale for *Air Superiority* which allowed players to move into and out of air-to-air missile and cannon fire parameters and where pre-engagement moves and countermoves would be as important as the violent twisting maneuvers of a close-in dogfight. I found that the scale of 12 to 15 seconds per game-turn and 1/3 of a mile per hex worked well. Also, at this scale each 100 mph equated to one hex of movement.

Modern jets have tremendous amounts of energy available to them and can dive or zoom thousands of feet per game-turn. Therefore, I chose to use 1000 feet as the basic altitude increment. The time scale made further refinements unnecessary. Another benefit of the scale was that some aspects of aircraft flight could be ignored; mainly, rate of roll and, to a lesser degree, nose attitude. As most jets can roll at 180 degrees per second or more, why worry about tracking angle of bank? In aircraft games small heading changes should be depictable. Squares and hexes are less than ideal for this so I created a modified version of the 12 point facing system which allows for heading changes in increments of 30 degrees and is workable. The real breakthrough in the design was the use of the integrated turn charts. With these, I factored in the effects of varying altitude, airspeed, and G loading in just one chart (no pesky turn points to be tracked here!).

Now I'm sure someone will pipe up and say, "Wait, this chart doesn't account for one aircraft's ability to out turn another." This is another misconception about air combat. Aircraft do not really out turn each other; they "out conserve energy" each other. Regardless of an aircraft's weight or wing loading, any two airplanes at the same speed and G factor will have identical turning circles. What's really important is each aircraft's sustained turn performance. Aircraft with higher wing loadings will generate more drag (energy loss) at a given G force than will lower wing loaded aircraft. Heavier aircraft must overcome more inertia to pull at a given G level, hence, they require more lift which equates to more drag than lighter aircraft. Thrust-to-weight ratios are also a factor: in flight, thrust counters drag. The aircraft with the higher thrust-to-weight ratio in otherwise comparable aircraft (weights, wing loadings, and drag characteristics) will lose speed (energy) slower. All of this can be sort of reduced to a thrust versus drag equation in a turning fight. The pilot in the aircraft having the poorer thrust-to-drag ratio will lose air speed quicker. At some point his air speed will be reduced to a point where he cannot maintain a given G level, and he will have to either ease off to a lesser G level or dive to gain energy that the engine thrust cannot provide. The opponent, who is sustaining a higher G level longer, thus begins to out turn his enemy or gain an altitude advantage which can be exploited for victory. In general, lower wing loaded, lighter aircraft given adequate thrust-to-weight ratios will outperform heavier aircraft in turning fights. In this manner, the lightweight Zeros of WW II out turned the heavier American fighters, just as the lightweight MIG-17s of the Vietnam and Middle East wars out turned the heavy F-4 Phantom jets.

Of course, high thrust-to-weight ratios can compensate for high drag, and heavier aircraft usually have better zoom climb performance and acceleration due to gravity and inertia effects. What makes the huge, heavy F-15 Eagle such a tremendous fighter is its tremendous power and its clean design which limits the drag that is produced in turns. It also has a large wing, giving it a lower wing loading than other contemporary fighters.

These energy considerations and factors are portrayed in the game through the use of accel and decel points and the power and drag charts of the aircraft data cards.

The key points of the design, however, remain that the mechanics of movement are simple and fairly accurate, the sequence of play allows continuous interaction of the players, and play is relatively swift and fluid. Most important is that a typical game will model a real life jet air battle, allowing the players to cycle through the five phases of air combat which are as follows: (1) Detection and acquisition of the enemy; (2) Maneuver for advantage prior to attack; (3) Commitment to the attack: initial pass and engagement; (4) Subsequent maneuver into firing solutions and weapons employment; (5) Disengagement.

Extensive playtesting has shown that this game is lots of fun, and that real life tactics can be employed and do work.

I hope you will enjoy playing this game as much as the playtesters did and as much as I enjoyed creating it. The design you are getting went through three years of adjustments, four rewrites, and one massive final cleanup. There are a lot of rules, but they embody simple, easy to learn concepts and mechanics. Have fun and look for expansions to this system in the near future.

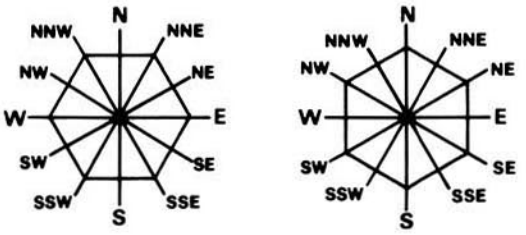
—J.D. Webster

INTRODUCTION TO THE SCENARIOS

The thirty scenarios are organized into Training (T), Solitaire (S), General (G), and Historical/Hypothetical (H) scenarios. The rules booklet notes when a given scenario may be played. Players are encouraged to follow the sequence of the scenarios since later ones become more complex.

When setting up a scenario, each aircraft is given a starting position. This is always a hex; aircraft never set up initially on hexsides. A facing direction, relative to north, is also given for each aircraft. The scenario will define which direction is north on the hex grid. Consult the diagram below as necessary to determine the other directions.

Unless specified otherwise in the scenario, players may add or adjust maps to expand the playing area if aircraft approach close to an edge.



VICTORY

A. Victory Points: Victory is determined by the number of victory points each side accumulates (unless specified otherwise in the scenario).

1. Aircraft Damage: Each side receives victory points for damaging or destroying enemy aircraft. The Victory Point Table lists the number of victory points received according to the aircraft's type and highest damage state.

2. Missiles: Each side receives victory points for enemy missiles that are fired which fail to hit, that are jettisoned, and that are lost aboard a destroyed aircraft. One victory point is earned for each I or M missile, 2 victory points are earned for each A or RH missile, and 3 victory points are earned for each AH missile. Points are not received for enemy missiles that do hit, even if it is only a superficial hit.

3. ECM and Gun Pods: Each side receives 3 victory points for every enemy ECM and gun pod that is jettisoned or lost aboard a destroyed aircraft.

4. Drop-Tanks: Each side receives 2 victory points for every drop-tank they do not drop (they are reusable items).

5. Other Conditions: The scenarios note if victory points can be earned for other conditions.

B. Value. The value of a side is the total of the killed victory point values of each aircraft of the side plus the victory point value of each missile, ECM pod, and gun pod carried on the side's aircraft.

C. Level of Victory: To win, one side must accumulate more victory points than the other. Level of victory is then determined as follows:

1. Draw: Both sides scored points but the higher score is less than 5% greater than the lower.

2. Marginal Victory: Both sides scored points and the winner's score is 5% to 20% greater.

3. Substantial Victory:

a. Both sides scored points and the winner's score is more than 20% greater up to 50% greater.

b. Both sides scored points and the winner's score is more than 50% greater but is less than one-third the value of the opponent's starting force.

c. Only the winner scored points but the total score is less than one-third the value of the opponent's starting force.

4. Decisive Victory:

a. Both sides scored points and the winner's score is more than 50% greater and is at least one-third the value of the opponent's starting force.

b. Only the winner scored points and the total score is at least one-third the value of the opponent's starting force.

VICTORY POINT TABLE

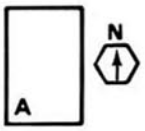
	Damage Level				
Aircraft	*Killed*	*Crippled*	*Heavy*	*Light*	*VP Modifier*
F-4E USAF	30	20	10	5	0.70
F-4E Export	29	19	9	5	0.65
F-4E Recon	32	21	10	5	0.70
F-4S	27	18	9	4	0.60
F-4K	27	18	9	4	0.60
F-4F	24	16	8	4	0.55
F-4F+	33	22	11	6	0.75
F-14A	36	24	12	6	0.80
F-14A+	38	25	12	6	0.85
F-14D	42	28	14	7	0.95
F-15A	42	28	14	7	0.95
F-15 Export	42	28	14	7	0.95
F-15C	45	30	15	8	1.00
F-16A	36	24	12	6	0.80
F-16 Export	36	24	12	6	0.80
F-16C	40	27	13	7	0.90
FA-18A	36	24	12	6	0.80
F-19A	45	30	15	8	1.00
F-20A	36	24	12	6	0.80
Lightning F.6	20	13	6	3	0.45
Lightning F.53	21	14	7	3	0.45
Tornado F.3	33	22	11	6	0.75
F-104S	22	15	7	4	0.50
Mirage IIIE	20	13	6	3	0.45
Mirage III Recon	25	16	8	4	0.55
Mirage F-1C	27	18	9	4	0.60
Mirage 2000	38	25	12	6	0.85
Mirage 2000 Export	36	24	12	6	0.80
Saab F-35	22	15	7	4	0.50
Saab J-35F	24	16	8	4	0.55
Saab JA-37	31	21	10	5	0.70
MIG-21MF	24	16	8	4	0.55
MIG-21MF Export	22	15	7	4	0.50
MIG-21bis N	27	18	9	4	0.60
MIG-21bis L	26	17	9	4	0.60
MIG-23MF	24	16	8	4	0.55
MIG-29	38	25	12	6	0.85
MIG-31	34	23	11	6	0.75
SU-15F	24	16	8	4	0.55
SU-17/22	18	12	6	3	0.40
SU-27	40	27	13	7	0.90

TRAINING SCENARIOS

T-1: Recon Run

Background: The political situation is degenerating and NATO forces have been put on the highest level of alert yet. An American F-19 Stealth Fighter is ordered to penetrate East German defenses to photograph a deployment of Soviet SS-20 surface-to-surface missiles. The target is heavily defended requiring a low-level approach where the F-19 must weave through several hills on the way in and out.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-19A	A	1223	N	1	6	CL	0
blank	A	1016					
blank	A	1120					
blank	A	1212					
blank	A	1509					

(The blank counters represent hilltops.)

Victory Conditions: The F-19 must be flown so it passes alternately to the right and left of each hill as shown, returning to hex 1223. If the F-19 reaches hex 1223 by the end of game-turn 7 it escapes. If it takes to game-turn 8, enemy interceptors will destroy it on a die roll of 5 or less. If it takes longer the F-19 is automatically shot down.

Notes: The F-19 may fly on a hexside of a hill but not through the center of the hex. If it does so, it hits the ground and is destroyed. If the F-19 skips a hill, antiaircraft defenses will destroy it on a roll of 7 or less.

T-2: Check Ride

Background: Lt. Dimitri Tumansky, a Soviet frontal aviation pilot stationed in East Germany, is about to qualify as an unrestricted all-weather combat pilot. To pass his check ride in the MIG-29 he must demonstrate various air combat maneuvers (steep climbs, dives, and turns) to tough veteran check pilot Major Igor Romonov.

Map: Same as scenario T-1.

Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
MIG-29	A	1021	N	15	6	CL	0
blank	A	1017	—	22			
blank	A	1517	—	10			
blank	A	1715	—	16			
blank	A	1313	—	8			
blank	A	1409	—	15			

(The blank counters represent check points.)

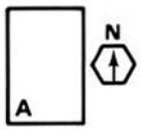
Victory Conditions: The MIG-29 must be flown through each check point, in order, within 8 game-turns to pass! If it takes 9 game-turns, Dimitri will lose his promotion and be failed, requiring attendance of more political motivation lectures and extra study. If it takes 10 game-turns, Dimitri will also have his marriage request denied and get an extra guard duty. If any check point is missed or if it takes more than 10 game-turns, Dimitri's apartment will be given to Major Romonov's brother-in-law, and Dimitri will be posted to the dreaded job of maintenance clerk, pushing papers for a year!

SOLITAIRE SCENARIOS

S-1: Border Clash

Background: Provoked by numerous F-19 reconnaissance flights that have violated their border and have not been intercepted, the East German Air Force resolves to strike back. Four MIG-21s pounce two West German Luftwaffe F-4Fs on a border patrol, and a short, bloodless melee ensues. After a few moments both sides break off, but one MIG pilot gets disoriented and strays deeper into West Germany. One of the F-4Fs sneaks in from behind and attacks with his cannon.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
MIG-21MF	A	1016	N	10	5	CL	0
F-4F	A	1020	N	12	6	CL	0

Victory Conditions: Destroy the MIG by the end of game-turn 6. By game-turn 7 it will cross back into East Germany and the Communists will claim they were attacked over their border (a propaganda victory).

Note: The MIG flies first in each game-turn. Use the Evasive Aircraft Movement Table to determine its flight.

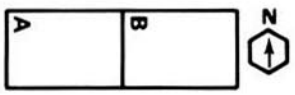
Variations:

1. A second player may control the MIG in a two-player game. To win he must score more points or survive 10 game-turns.
2. Use different types of attacking aircraft.

S-2: Prelude to War

Background: Ever adamant about protecting Sweden's neutrality, the Swedish Navy detects and damages a Soviet submarine. As they attempt to force it up, a group of Soviet missile boats move in to intervene. When they are turned back by Viggen jets, the Soviets respond by sending Sukhoi fighter-bombers to hit the Swedish naval vessels. These are met by more Viggens which attack in a short bloody skirmish.

Map: Play is restricted to these maps.



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
JA-37	A	0901	E	10	6	CL	4
Swedish pilot							
JA-37	A	1101	E	10	6	CL	4
Swedish pilot							
SU-17	B	0904	W	6	6	DT	—
Soviet pilot							
SU-17	B	0702	W	7	6	DT	—
Soviet pilot							
SU-17	B	1103	W	10	6	DT	—
Soviet pilot							
SU-17	B	1301	W	12	6	DT	—
Soviet pilot							

Game Length: Until all SU-17s are destroyed or exit the map.

Notes:

1. The Viggens have two AIM-9P and two AIM-9L missiles each.

2. The SU-17s begin in a non-evasive state (use the Random Aircraft Movement Tables). They individually become evasive (and remain so) if a missile is fired at them or if they are within 14 hexes of a Viggen during the visual sighting phase (count each two full altitude levels of difference as one hex).

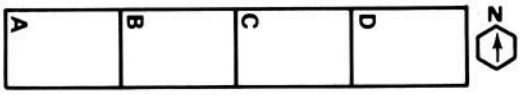
3. The SU-17s may fire back against head-on cannon attacks.

4. The SU-17s receive victory points for exiting the map: 18 if undamaged, 15 if lightly damaged, 12 if heavily damaged, 6 if crippled. Triple these amounts if the aircraft exits the west edge of map A.

S-3: The Wrath of Islam!

Background: The on again/off again Iran-Iraq war continues but with a deadly twist: Iran has developed or acquired a nuclear warhead and attempts to use it against Iraq. They launch four F-4E fighters, one of which carries the bomb—the other three are decoys. All of them are headed for Baghdad on a suicide mission. An Iraqi Air Force crew in a newly acquired Soviet MIG-31 interceptor stands between the Iranians and a Middle East Armageddon!

Map: Play is restricted to these maps.



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-4E	D	0909	W	1	8	CL	?
3rd World pilot							
F-4E	D	0603	W	15	9	CL	?
3rd World pilot							
F-4E	D	1506	W	8	9	CL	?
3rd World pilot							
F-4E	D	1202	W	28	11	CL	?
3rd World pilot							
MIG-31	A	1025	E	10	6	DT	15
Arab pilot							

Victory Conditions: Destroy all four Phantoms prior to any one of them exiting the west edge of map A.

Notes:

1. The F-4Es fly as n on-evasive aircraft.

2. The MIG-31 is loaded with two AA-8B each on stations 1 and 8, one Aa-10A on stations 2 and 7, and one AA-9 on stations 3,4, 5, and 6.

3. If Rule 24 is used, bingo for the MIG-31 is not required—the crew may run themselves out of fuel and become holy martyrs.

RANDOM AIRCRAFT MOVEMENT

The following tables provide a maneuvering target for the solitaire scenarios. Target aircraft will fly evasively or non-evasively; a different table exists for each state. The tables reflect typical abilities of MIG-21/F-4 type aircraft. Keep track of a target's speed and altitude but ignore power settings and accel/decel points.

Non-Evasive Movement Table

Die	*Flight*
1-4	Straight ahead
5-6	Straight ahead, descend 1 level
7-8	Straight ahead 2/3, zoom climb
9-10	Straight ahead 2/3, steep dive

In a zoom climb or steep dive use one-third of the aircraft's speed as VFPs and climb or dive the maximum amount possible (do not dive it into the ground, however!). If an aircraft's speed exceeds the maximum allowed for its altitude, reduce speed per Rule 6.D.

Evasive Movement Table

	Attacker in Target's		
Die	*30° Arc*	*60°-90° Arc*	*120°-180° Arc*
1-2	R,HR,HR,H,HR,H	H,H,HL,H,HL,H	H,H,H,HL,H,H
3-4	L,HL,HL,H,HL,HD	H,HR,H,HR,H,H	H,HR,H,H,H,H
5-6	R,C2,HR,H,C2R,H (−1FP)	H,H,C,HL,C,CL	H,H,HD,HD,HD,HD (+1FP)
7-8	H,HL,C2L,H,HL,H (−1FP)	R,H,D,H,DR,H	H,H,HR,H,H,HR
9	R,H,HL,H,D2L,H	H,H,D2L,H,D,H	H,H,HL,H,H,HL
10	HD,HD,HDR,H,HR,H	L,H,H,D2L,H,H	R,H,CR,H,CR,H (−1FP)

R: Face right 30 degrees
L: Face left 30 degrees
H: Fly forward one hex/hexside
C: Climb 1 altitude level
C2: Climb 2 altitude levels
D: Dive 1 altitude level
D2: Dive 2 altitude levels
(−1FP): Reduce speed by 1 FP but never below minimum allowed speed
(+1FP): Increase speed by 1 FP but never above 6

Each action is separated by a comma and equals 1 FP. Thus an aircraft at speed 5 would perform the first five actions. Always perform the parenthetical speed change, however. Do not dive an aircraft into the ground.

Damage Effects: A target aircraft which suffers heavy damage has its speed reduced by 1 FP. A target which suffers crippling damage has its speed reduced by 2 FPs (i.e., 1 more than when heavily damaged). Furthermore, if the crippled target is using the Evasive Movement Table, change all C and C2 actions to H. Damaged targets using the Non-Evasive Table have their climb abilities affected per Rule 10.A.

GENERAL SCENARIOS

Game Balance: When creating forces for G scenarios, keep the values of each side within 10% of each other and/or limit each side to a given number of points (100 to 200 is suggested).

If the values of the opposing forces are not within 10% of each other, award the smaller force victory points as follows:

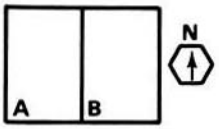
0.05 x the larger force's value if it is 11% to 20% greater
0.1 x the larger force's value if it is 21% to 50% greater
0.2 x the larger force's value if it is more than 50% greater

G-1: Defense and Attack—One-On-One

Background: Close-in combat maneuvering, both offensively and defensively, is a vital skill for the modern fighter pilot. This

scenario challenges both the defender and attacker: the defender must survive long enough for help to arrive; the attacker must prevent this. Violent maneuvering is required, and an overshoot or misjudgment by the attacker could be disastrous.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
Guns only:							
Defender	B	0513	W	10	5.5	CL	0
Attacker	B	0713	W	12	7	CL	0
Heat seeking missiles:							
Defender	A	1913	W	15	5		
Attacker	B	0513	W	15	6.5		
Radar guided missiles:							
Defender	A	1915	NW	15	6		
Attacker	B	0513	NW	15	7		

Game Length: 10 game-turns.

Notes:

1. Choose any aircraft, one NATO and one Warsaw Pact.

2. Additional victory points are scored as follows: the defender earns 2 points per game-turn of survival multiplied by the attacking aircraft's victory point modifier; the attacker earns 2 points per gun and missile shot taken against the defender multiplied by the defending aircraft's victory point modifier.

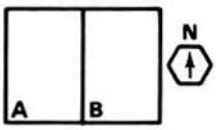
3. In the second setup, each aircraft may carry up to four I or M type missiles allowed to that aircraft.

4. In the third setup, each aircraft may carry up to four missiles of any type allowed to that aircraft.

G-2: Air Battles From Neutral Starts—One-On-One

Background: Many times in a confused air battle, individual opponents spot each other and turn to fight commencing from relatively equal positions. In these cases a pilot's ability to use his aircraft's superior points against his opponent's weak points determines who wins.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*
At the pass:					
1	A	1913	N	15	6
2	A	1913	S	15	6
Offset:					
1	B	0111	W	15	6
2	B	0115	E	15	6
Abeam:					
1	B	0208	W	15	6
2	B	0217	W	15	6

Game Length: 15 game-turns.

Notes:

1. Choose any aircraft, one NATO and one Warsaw Pact.

2. For battles with guns only, configuration is CL and load is 0. For missile battles, each aircraft may carry up to four missiles of any type allowed to that aircraft.

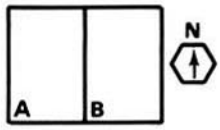
3. Gun and ECM pods may be carried (Advanced Rules 4.D, 9.J, and 21.D).

4. Additional victory points are scored as follows: 2 points per game-turn of survival multiplied by the enemy aircraft's victory point modifier; 1 point for each gunshot taken against the enemy and for each missile successfully launched against the enemy.

G-3: Section Tactics—Two-On-One

Background: The basic fighting unit in air combat is a pair of fighters, generally called a section. One fighter is the leader and the other is the wingman. In combat the section works as a team with either fighter attacking while the other one protects the attacker. The protector must also maneuver to be ready to assume the attack should the original attacker be outmaneuvered or forced out of position. On the defense, the aircraft under attack defends itself to the utmost while the other fighter maneuvers to drive off or kill the attacker. Mastery of these principles and good teamwork makes a section two or three times as effective as two individual fighters.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*
Section attacking:					
Attacker	B	0416	N	20	6
Attacker	B	0717	N	21	6
Defender	B	0409	W	24	6
Section defending:					
Defender	B	0313	W	18	6
Defender	B	0410	W	18	6
Attacker	B	0616	NNW	22	6.5
Neutral setup:					
Leader	B	0214	NNW	16	6
Wingman	B	0513	NNW	18	6
Single	B	0315	SE	16	6

Game Length: 15 game-turns.

Notes:

1. Use Notes 1, 2, and 3 of Scenario G-2 for determining aircraft loads.

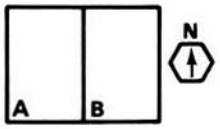
2. Additional victory points are scored as follows: the section earns 1 point per game-turn both aircraft are in play multiplied by the enemy aircraft's victory point modifier; the single earns 2 points per game-turn of survival multiplied by the enemy's victory point modifier (use the highest modifier if the section has two different types of aircraft).

G-4: Section Tactics—Two-On-Two

Background: Whereas it is not hard for two fighters working

as a team to defeat a single enemy—even a superior one—it gets a lot tougher when the odds are even. Against two foes, the section must coordinate its actions, timing its attacks and breaking off if necessary to keep the second foe from gaining an advantage. Teamwork can make the difference when two inferior fighters are battling superior ones by keeping the superior aircraft off balance. If the battle degenerates into two single combats, the inferior aircraft almost always lose.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*
Sandwich:					
Defender	A	1907	S	15	5
Defender	B	0307	S	17	5
Attacker	A	1011	NE	15	7
Attacker	B	1211	NW	15	7
Trail:					
Defender	A	1913	W	10	6
Defender	B	0513	W	5	6
Attacker	A	1719	NNE	12	7
Attacker	A	1820	NNE	13	7
Neutral:					
Friendly	A	0211	E	20	5
Friendly	A	0214	E	20	5
Opponent	B	1811	W	20	5
Opponent	B	1814	W	20	5

Game Length: 15 game-turns.

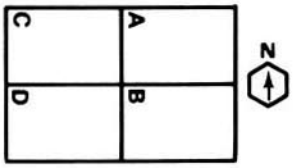
Notes:

1. Choose any aircraft, two NATO and two Warsaw Pact.
2. Aircraft may be loaded as desired with as many missiles as allowed for that aircraft type.
3. Additional victory points are scored as follows: 1 point for each game-turn both aircraft of a side are in play multiplied by the enemy's highest victory point modifier; 1 point for each gunshot taken against the enemy and for each missile successfully launched against the enemy.

G-5: Division Tactics

Background: A division is usually two sections working together, although sometimes by plan or attrition the number is reduced to three aircraft (a section and a single).

Map:



Setup: Choose sides, NATO and Warsaw Pact. Each side then rolls one die and the lower roller sets up first. Choose 2 to 4 aircraft and place them in secret anywhere east of hexrow 0005 on maps A and B. The aircraft must all face W, have a starting speed within 1 FP of their cruising speed, and start in the same altitude band (not necessarily the same level). This side then reveals the altitude band of their setup. The other side now chooses 2 to 4 aircraft and places them west of the 0020 hexrow on maps C and D. These aircraft must all face E, have a starting speed within 1 FP of their cruising speed, and start in the same altitude band (it may be different than the enemy's).

Game Length: 15 game-turns.

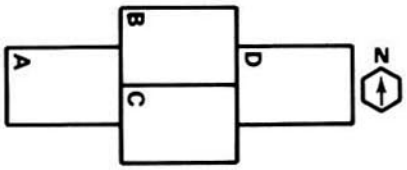
Notes:

1. Aircraft may be loaded as desired.
2. All aircraft begin unspotted and not in radar contact.
3. Additional victory points are scored as follows: 1 point for each game-turn that all aircraft of a side are in play; 1 point for each gunshot taken against the enemy and for each missile successfully launched against the enemy.

G-6: Hassling

Background: Even in peacetime opposing fighters often play a tense game of nerves when an intruding force probes a defense by approaching or crossing a border or a base's or carrier's defense zone. Fighters which pass will try to maneuver to threaten their opponents by getting behind them with weapon lock-ons so they will abort their missions. Such aggressive hassling has the potential to erupt into combat.

Map:



Setup: One player is the intruder; the other is the defender. Both sides set up in secret. The intruder chooses 2 to 4 aircraft and places them anywhere east of the 0018 hexrow of map D. The intruder reveals his aircraft's starting altitude band prior to the defender setting up. The defender chooses 2 to 4 aircraft and places them anywhere west of hexrow 0008 of map A. Aircraft may start at any speed, facing, and altitude.

Game Length: 30 game-turns.

Notes:

1. Aircraft may be loaded as desired.
2. Intruders must fly straight and level until they detect a defender by any means. Defenders are free to maneuver.
3. Neither side may fire weapons until cleared to fire by higher authority. Each side checks for clearance at the start of each flight phase by rolling the die once. Both sides are given a hostility rating. If the die roll is less than or equal to that side's hostility rating, its aircraft may fire anytime thereafter. When they do fire or launch a missile, a hot war situation exists and both sides are cleared to fire until the end of the game. Clearance rolls are not secret. The rolls are:

   U.S./NATO: Intruder: 1; Defender: 0.
   Soviet/Warsaw Pact: Intruder: 2; Defender: 1.
   All Others: Intruder: 3; Defender: 2.

   Clearance Roll Modifiers (defender only):
   −1 if intruder within 10 hexes of map A.
   −2 if intruder on map A.

4. An intruding aircraft may be aborted by a defender if the defender ends two consecutive game-turns meeting the following conditions:

   a. The defender is in the intruder's 30 degree arc (or on the 0 degree line).
   b. The intruder is in the defender's 180 degree arc.
   c. The defender is within 6 hexes and 2 altitude levels of the intruder.

d. A hot war has not started. Aborted intruders are removed from play as they are considered to be diving for home.

5. Additional victory points are scored as follows:

a. The intruder earns 20 points for each aircraft which penetrates west of hexrow 0013 on map A multiplied by the defender's highest victory point modifier.

b. The defender earns 10 points per intruder aborted multiplied by the intruder's highest victory point modifier.

c. Twenty points to the side which does not fire first. If both fire on the same game-turn neither receives points.

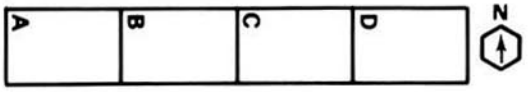
d. The side with the fewest aircraft at start receives 15 points per aircraft it is outnumbered by, multiplied by the enemy's highest victory point modifier.

e. If the intruder enters the cloud layer, the defender must achieve a radar lock-on.

G-7: Interceptor!

Background: The interceptor's mission is to locate, identify, and, if necessary, destroy an intruding aircraft. Interceptors may be "alert" aircraft scrambling from a runway or carrier, or fighters "on station" (patrol). Interceptors have ground radar or airborne radar warning aircraft to help guide them.

Map:



Setup: Both sides set up in secret. The intruder chooses 2 to 4 aircraft and places them anywhere east of hexrow 0013 on map D. They must be at cruise speed, at altitude level 50 or less, and facing W. The interceptor chooses 2 aircraft and places them anywhere west of hexrow 0013 on map A. They must face E but may be at any speed. Roll one die: 1-5, place them at altitude level 1 (on point defense); 6-10, place them at any level between 20 and 30 inclusive (on patrol).

Game Length: Until all intruding aircraft exit the west edge of map A, retreat off the east edge of map D, or are destroyed.

Notes:

1. Aircraft may be loaded as desired.

2. Intruders must fly straight and level until interceptors are detected by any means. Interceptors are free to maneuver.

3. Interceptors may not fire until the target aircraft is identified (Rules 22.A and C, and 20.J) or the unidentified aircraft fires first.

4. Additional victory points are scored as follows:

a. The intruders earn 20 points for each aircraft that exits map A multiplied by the interceptor's highest victory point modifier. Intruders earn only half the normal points, however, for damaging interceptors.

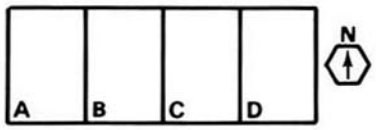
b. The interceptors earn 10 points for each intruder that does not exit map A multiplied by the intruder's highest victory point modifier. (They earn normal points for damaging intruders.)

c. The side with the fewest aircraft at start receives 10 points per aircraft it is outnumbered by, multiplied by the enemy's highest victory point modifier.

G-8: Escort Mission!

Background: Bomb-laden aircraft are vulnerable to enemy fighters and interceptors. It is often necessary to escort them through hostile defense zones to prevent heavy losses. The same applies to photoreconnaissance aircraft which collect valuable targeting information.

Map:



Setup: Both sides set up in secret. The defender chooses 2 to 4 aircraft and places them anywhere on map D, facing W, at any altitude, and at cruise speed. The escort side rolls one die: 1-5 = strike, 6-8 = low recon, 9-10 = high recon. On a strike mission choose 2 escorts and 2 to 4 bomb-laden strike aircraft. On a recon mission choose 2 to 4 escorts and one recon aircraft. In all cases escorting fighters set up anywhere on map A, facing E, at any altitude, and at speed 6. The strike or recon aircraft may set up anywhere west of hexcolumn 0300 on map A at speed 6. Strike aircraft must be below altitude level 26, low recon aircraft below level 11, and high recon above level 15.

Game Length: 30 game-turns.

Notes:

1. Escorts and defenders may be loaded as desired. Strike and recon aircraft are limited to 2 missiles apiece. Assign strike aircraft bomb loads of 5 to 8 points to each of any available stations.

2. The escort side's aircraft must fly straight and level until they detect an enemy aircraft or missile by any means. The defenders are free to maneuver.

3. Additional victory points are scored as follows:

a. The escort side receives 30 points multiplied by the defender's highest victory point modifier for each recon aircraft that exits the east edge of map D.

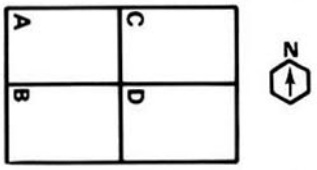
b. The escort side receives points equal to the bomb load of each strike aircraft that exits the east edge of map D multiplied by the defender's highest victory point modifier.

c. The side with the fewest aircraft at start receives 15 points per aircraft it is outnumbered by, multiplied by the enemy's highest victory point modifier.

G-9: Patrol Encounters

Background: Many times air forces must operate without ground or airborne radar support. In these cases aircraft patrol assigned sectors independently. When two patrols meet, the side spotting the other first will have the advantage of being able to maneuver into a favorable position before attacking.

Map: Play is restricted to these maps.



Setup: Each side secretly chooses 2 to 6 aircraft. One side enters on the west edge of the playing field, the other on the east. All aircraft of a side enter in a group, within 5 altitude levels and 6 hexes of each other. Enter at any altitude and at cruise speed. No more than two types of aircraft allowed per side.

Game Length: 30 game-turns.

Notes:

1. Aircraft may be loaded as desired.

2. Both groups must initially follow routes that are plotted beforehand. Use one of the aircraft in the group as the reference aircraft (the patrol leader). The route for the reference aircraft must be plotted so it flies through or adjacent to every full-sized

megahex on the playing field, generally going from the entry edge to the far edge and back again. Plot the route in this manner: entry hex and altitude; direction; hex where the aircraft will turn (30 degrees only); new direction; turn hex; new direction; etc.

3. A group must follow its plotted route until an enemy aircraft or missile is detected by any means. Aircraft may not fire, however, until the target aircraft is identified (Rules 22.A and C, and 20.J) or the unidentified aircraft fires first.

4. Additional victory points are scored as follows:

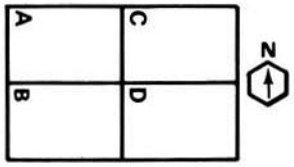
a. The side with the fewest aircraft at start receives 15 points per aircraft it is outnumbered by, multiplied by the enemy's highest victory point modifier.

b. The side which sweeps the other off the map earns 20 points multiplied by the enemy's highest victory point modifier.

G-10: Air Superiority

Background: Air superiority means one thing: total control of a sector of sky for a specified period of time. In the next war, vulnerable bomb-laden ground attack aircraft can only operate if friendly fighters attain local air superiority. The fighters' job is to attack and destroy all enemy aircraft in their sector.

Map: Play is restricted to these maps.



Setup: Each side secretly chooses up to 12 fighters but no more than two different types. Organize them into flights of 2 to 4 aircraft. One side enters on the west edge of the playing field, the other on the east. Aircraft in each flight must enter within 2 altitude levels and 5 hexes of each other, but otherwise may enter at any speed and altitude. Each side chooses one flight which enters automatically on game-turn 1. Roll the die secretly for the other flights; the number rolled is the game-turn that flight will enter play.

Game Length: 30 game-turns.

Notes:

1. Aircraft may be loaded as desired.

2. Aircraft in a flight must fly straight and level until an enemy aircraft or missile is detected by any means or they cross the middle of the playing field.

3. Aircraft which exit the playing field may not return.

4. Additional victory points are scored as follows:

a. Twenty points for being the last one on the field.

b. The side with the fewest number of aircraft receives 15 points per aircraft it is outnumbered by, multiplied by the enemy's highest victory point modifier.

SPECIAL STORES AVAILABILITY TABLE (Advanced Rule 4.D)

Item	*Air Force* U.S.	NATO Europe	War. Pact	3rd World	
Gun Pods:					
SUU-23 Vulcan	6	4	2	—	—
NATO Aden	2	6	3	—	3
French 30mm Defa	—	5	6	—	5
Swedish 30mm KCA	—	4	4 (8*)	—	2
Soviet 30mm	—	—	—	5	4
Soviet 23mm	—	—	—	7	4
ECM Pods:					
European Chaff	—	8	7	2	4
European DDS No.1	—	7	6	—	4
European DDS No.2	—	6	4	—	3
European DDS No.3	—	3	3	—	2
European DJM No.1	—	7	6	2	5
European DJM No.2	—	5	4	—	3
European DJM No.3	—	3	3	—	1
French DJM	—	4	4(6**)	—	2
U.S. DJM No.1	7	6	2	—	2
U.S. DJM No.2	5	2	—	—	—
Soviet DJM	—	—	—	6	5

V.A.S. Availability:

Tornado F.3: 3
F-4E USAF: 7
F-4E Other: 4
F-14A, F-14A+: 5
F-14D: 6
F-19A: Always

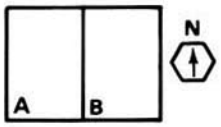
*for Swedes
**for French

HISTORICAL/HYPOTHETICAL SCENARIOS

H-1: Gulf of Sidra, August 1981

Background: The U.S. Sixth Fleet was conducting exercises in the disputed waters of the Gulf of Sidra when two Libyan SU-22 Fitter J jets ventured out. Two U.S. F-14A Tomcat jets intercepted. A skirmish began when the lead Fitter fired a missile at the lead Tomcat. The missile, a rear quarter heat seeker, was fired head on at minimum range with no chance of guidance. The F-14s quickly reversed on the Fitters, which split up in different directions, and shot both down.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-14A	B	0215	S	21	6	1/2	10
U.S. pilot							
F-14A	A	1714	S	22	6	1/2	10
U.S. pilot							
SU-22	B	0215	NNE	20	6	1/2	7
Arab pilot							
SU-22	B	0215	NNE	20	6	1/2	8
Arab pilot							

Game Length: 10 game-turns.

Notes:

1. The F-14s are loaded with one AIM-9L on stations 1 and 5, and one 1200-liter FT on stations 2 and 4.

2. The SU-22s are loaded with one 600-liter FT on stations 1 and 6, and one AA-2B on stations 3 and 4 except the first SU-22 has already expended one missile.

3. Each SU-22 earns 1 victory point per game-turn it survives.

4. If using Rule 21, the F-14s may dispense 8 flares and 7 chaff. The SU-22s are not fitted with DDS.

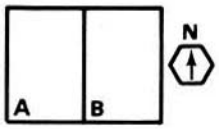
5. If using Rule 20.E, the F-14s are uncamouflaged, and the SU-22s are camouflaged.

Variation: Add one AIM-7F on stations 6 and 7 of each F-14, and give each SU-22 two victory points per game-turn of survival starting on game-turn 5.

H-2: Syrian Hot Dogs, June 1982

Background: Most of the air battles in the Bekaa Valley during 1982 consisted of F-15s and F-16s slaughtering hapless, inexperienced, and fleeing MIG pilots. On a few occasions, however, F-16s tangled with very aggressively flown MIG-21s that stayed to fight. Several F-16s had close calls from missiles which were evaded only by the F-16's excellent turning ability. These veteran "hot dog" Syrian pilots provided the only bright spot in an otherwise dismal period for the Syrian Air Force.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-16A	A	1112	E	20	7	CL	2
Israeli pilot							
F-16A	A	1115	E	22	7	CL	2
Israeli pilot							
MIG-21MF	B	1513	W	20	6	CL	4
Arab pilot							
MIG-21MF	B	1611	W	20	6	CL	4
Arab pilot							
MIG-21MF	B	1714	W	25	6	CL	4
Arab pilot							
MIG-21MF	B	1815	W	25	6	CL	4
Arab pilot							

Game Length: 20 game-turns.

Notes:

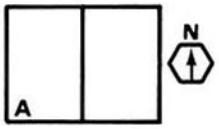
1. The MIGs must fly straight and level on game-turn 1.
2. The F-16s are loaded with one AIM-9L on stations 1 and 9.
3. The MIGs are loaded with one AA-2B on stations 2 and 4, and one AA-8A on stations 1 and 5. Use the MIG-21MF export model.
4. If using Rule 21, the F-16s may dispense 8 flares and 7 chaff.

Variation: Start the MIGs in hexes B 1713, 1811, 1914, and 2015. Both sides begin unspotted, and the MIGs must fly straight and level until they detect an enemy aircraft or missile by any means. The F-16s are free to maneuver. All aircraft are camouflaged.

H-3: Arabian Eagles, 1984

Background: Frustrated in their attempts to defeat each other, Iran and Iraq began to attack neutral oil tankers in the Persian Gulf in order to cut off each other's oil revenues. In response the U.S. provided Saudi Arabia with AWACS aircraft. The Saudi Arabians for their part promised to protect neutral shipping in their waters. In 1984 they made good on this promise when two of their F-15 Eagles intercepted two Iranian F-4Es and shot one down.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-4E	B	1804	SW	4	7	DT	28
3rd World pilot							
F-4E	B	1905	SW	4	7	DT	28
3rd World pilot							
F-15A	A	0208	E	10	6	DT	16
Arab pilot							
F-15A	A	0210	E	10	6	DT	16
Arab pilot							
blank	A	1118					

(The blank counter represents a neutral oil tanker.)

Game Length: 15 game-turns.

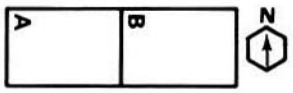
Notes:

1. The F-4Es are loaded with one 1200-liter FT on stations 1 and 5, one AIM-9P and eight bomb points each on stations 2 and 4, and one AIM-7F on stations 8 and 9.
2. The F-15As are loaded with two AIM-9P each on stations 2 and 4, one 2200-liter FT on station 5, and one AIM-7F on stations 6, 7, 8, and 9.
3. The Iranians must fly straight and level until they detect an enemy aircraft or missile by any means, or until they approach within 10 hexes of the tanker. The Saudis are free to maneuver.
4. The Iranians score additional victory points equal to the bomb load of each F-4 that flies over the tanker hex at altitude level 5 or less. The bombs are considered dropped at that point (they may be jettisoned before this but earn no victory points).
5. If using Rule 20.E, the F-15s are painted air superiority grey, and the F-4s are camouflaged.
6. If using Rule 21, each aircraft may dispense 8 flares and 7 chaff.

H-4: The Fall of Kuwait (1980)

Background (Hypothetical): The Iran-Iraq war might not have occurred; instead, the Iraqis might have struck south for a surprise invasion of Kuwait. Fast scrambling Kuwaiti Lightnings give a good account of themselves before Iraqi tanks overrun their airfields. Even the arrival of a U.S. carrier battle group is too late to prevent the collapse of Kuwait's defense forces.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
Iraqi:							
Mirage F-1E	B	1102	S	20	5.5	DT	11.5
Arab pilot							
Mirage F-1E	B	0901	S	20	5.5	DT	11.5
Arab pilot							
MIG-23MF	B	1005	S	10	5.5	DT	20
Arab pilot							
MIG-23MF	B	1104	S	10	5.5	DT	20
Arab pilot							

Kuwaiti:							
Light. F.53	A	1022	N	4	6.5	CL	2
Arab pilot							
Light. F.53	A	0923	N	4	6.5	CL	2
Arab pilot							
Light. F.53	A	1124	N	4	6.5	CL	2
British pilot							
Light. F.53	A	1224	N	4	6.5	CL	2
British pilot							

(The British pilots are mercenaries.)

Game Length: 20 game-turns.

Notes:

1. The F.53s are loaded with one Red Top on stations 1 and 2.

2. The Mirage F-1Es are loaded with one R.550 Magic I on stations 1 and 7, one 1200-liter FT on stations 3 and 5, and one Matra R.530A on station 4.

3. The MIGs are loaded with one AA-2B on stations 2 and 4, one 600-liter FT on stations 1 and 5, and ten load points of air-to-ground ordnance on station 3. These are export model MIG-23s and carry no DDS.

4. All Iraqi aircraft must fly straight and level until they detect an enemy aircraft or missile by any means. The Lightnings are free to maneuver.

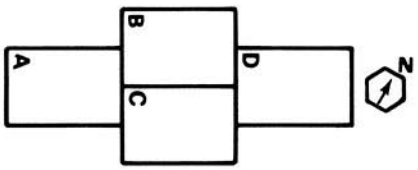
5. If using Rule 20.E, all aircraft are camouflaged.

6. The Iraqis score additional victory points for exiting MIG-23s off the south edge of map A. Points are earned equal to the air-to-ground ordnance load being carried.

H-5: Skirmish with the Infidels

Background (Hypothetical): Observing a buildup of the Soviet Army on the Iranian border, the U.S. asks its NATO ally Turkey to probe the air defenses of the Soviets in that area. The Turks launch two well-armed Starfighters. As they near the border, the Soviets meet them with a flight of Flagon interceptors. Neither side takes any chances as both maneuver for quick shots.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-104S	A	1022	NE	30	6	DT	12
NATO pilot							
F-104S	A	1123	NE	30	6	DT	12
NATO pilot							
SU-15F	D	1009	SW	20	5	DT	13
Soviet pilot							
SU-15F	D	1207	SW	20	5	DT	13
Soviet pilot							
SU-15F	D	1101	SW	10	5	DT	12
Soviet pilot							

Game Length: 15 game-turns.

Notes:

1. The Starfighters are loaded with one 600-liter FT on stations 1 and 9, one Aspide on stations 2 and 8, and one AIM-9P on stations 3, 4, 6, and 7.

2. The first two Flagons are loaded with one 600-liter FT on stations 3 and 4, two AA-8A each on stations 2 and 5, one AA-3A on station 1, and one AA-3B on station 6. The last Flagon is loaded with one 600-liter FT on stations 3 and 4, one AA-3A on stations 1 and 6, and one AA-3B on stations 2 and 5.

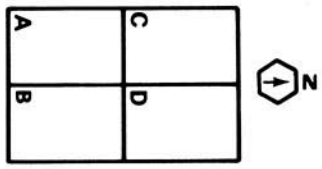
3. Both sides are free to maneuver at start due to GCI radar.

4. If using Rule 20.E, Soviet aircraft are painted silver, and Turkish aircraft are camouflaged.

H-6: Danger Zone, 1986

Background (Hypothetical): Two F-14 Tomcats are sent to cover a stranded American ship in the Indian Ocean. A group of hostile MIGs come out to interfere. Realizing they're outnumbered, the Tomcats call for help, and an ace F-14 launches to help. Before the reinforcement can arrive, one Tomcat is shot down and the other is forced to fight off six of the MIGs alone. The ace arrives in the proverbial nick of time, joining the battle to shoot down three of the MIGs and helping the other Tomcat shoot down a fourth. The last two MIGs flee.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
U.S. Initial:							
F-14A	A	1916	N	15	5	CL	4
U.S. pilot							
F-14A	B	0218	N	15	5	CL	4
U.S. pilot							
U.S. Reinforcement:							
F-14A	—	—	—	—	—	CL	4
U.S. pilot							
MIGs:							
MIG-21N	B	0105	S	15	7	CL	2
3rd World pilot							
MIG-21N	B	0103	S	15	7	CL	2
3rd World pilot							
MIG-21N	A	1902	S	16	7	CL	2
3rd World pilot							
MIG-21N	A	1801	S	17	7	CL	2
3rd World pilot							
MIG-21N	A	1910	S	12	7	CL	4
Soviet pilot							
MIG-21N	B	0824	NNW	20	6	CL	4
Soviet pilot							

The Soviet pilots are advisors.

Maverick enters play from the south edge of map C or D on game-turn 8, at any facing, altitude, and speed.

Game Length: 30 game-turns.

Notes:

1. The F-14s are loaded with one AIM-9L and one AIM-7F each on stations 1 and 5. DDS load is 8 flares and 7 chaff.

2. The MIGs are loaded with one AA-8A on stations 2 and 4. The Soviet piloted MIGs are also carrying one AA-2C on stations 1 and 5. All may dispense 8 flares and 7 chaff.

3. Both F-14s have radar contact with the five MIGs in front of them. The sixth MIG has spotted both F-14s. No one else has visual contact at start. The F-14s are painted air superiority grey;

the MIGs are camouflaged.

4. The F-14s must fly straight and level on game-turn 1.

5. It is a cold war situation. The MIGs have the option to fire and make it a hot war situation; the F-14s may not fire until any one of the MIGs does. Once hot, the situation remains hot.

6. The F-14s may "tag" MIGs. A tag occurs if an F-14 ends two consecutive game-turns meeting the following conditions:

a. The F-14 is in the MIG's 30 degree arc (or on the 0 degree line).

b. The MIG is in the F-14's 180 degree arc.

c. The F-14 is within 6 hexes and 2 altitude levels of the MIG.

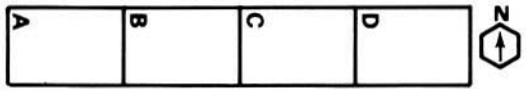
d. A hot war situation has not started. Tagged MIGs are removed from play as they are considered to be diving for home. Exception: a MIG piloted by a Soviet advisor that is tagged will bug out only on a die roll of 4 or less.

7. The F-14s earn 10 victory points for each MIG that is removed from play while in a cold war situation.

H-7: Mideast Scramble

Background (Hypothetical): Iran has launched a massive offensive in the Iran-Iraq War, and Iraq is collapsing. Indian forces and Soviet forces in Afghanistan have invaded Pakistan. Israel and Syria are at war. The entire Middle East is in an upheaval and Jordan is in the middle of it. The Jordanian Air Force with its newly acquired F-20 Tigersharks is simply trying to keep the country alive. Nothing must be allowed to cross the border, so the Jordanians intercept to kill all intruders—in this case, Syrians trying to outflank Israelis.

Map: Play is restricted to these maps.



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-20A *Arab pilot*	A	0901	E	1	4.5	1/2	6
F-20A *Arab pilot*	A	1101	E	1	4.5	1/2	6
MIG-29 *Arab pilot*	—	—	W	—	6	DT	15
MIG-29 *Arab pilot*	—	—	W	—	6	DT	15
MIG-29 *Arab pilot*	—	—	W	—	6	DT	15
MIG-29 *Arab pilot*	—	—	W	—	6	DT	15

All MIGs set up anywhere on the east half of map D at altitude 50 or less. They must be within 4 hexes and 5 altitude levels of the first MIG.

Game Length: Until all MIGs exit the west edge of map A, retreat off the east edge of map D, or are destroyed.

Notes:

1. The MIGs are loaded with one AA-10A on stations 2 and 5, two AA-8A each on stations 1 and 6, and one 1200-liter FT on stations 3 and 4.

2. The F-20s are loaded with one AIM-7M on stations 3 and 5, and one AIM-9L on stations 1, 2, 6, and 7.

3. All aircraft may dispense 8 flares and 7 chaff.

4. The MIGs must fly straight and level until they detect an enemy aircraft or missile by any means. The F-20s are free to maneuver. All aircraft are camouflaged.

5. Additional victory points are scored as follows:

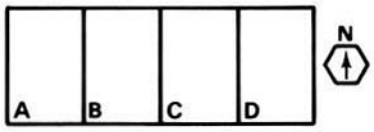
a. The Syrians earn 20 points per undamaged aircraft that exits off the west edge of map A, and 10 points per lightly damaged one. H and C damaged MIGs must retreat off the east edge of map D. The Syrians earn only half the normal points, however, for damaging F-20s.

b. After game-turn 15, the Jordanians earn 1 point per game-turn for each MIG still on the map.

H-8: The Fire Spreads West

Background (Hypothetical): Syrian forces crumble before a massive Israeli assault. Soviet ground forces cross into Iran and Turkey, driving south to aid the Syrians. America responds by sending Marine ground and air task forces into Turkey to prevent a westerly move by the Soviets. Two Soviet divisions collide with a Turkish infantry brigade, swiftly overrunning it. In their path are U.S. Marines in battalion strength. Air support is called for, and before either side can stop the situation, superpower forces come into conflict. In this instance Marine F-18s escorting bomb-laden F-4 Phantoms encounter long-range Soviet SU-27 fighters.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-4S *U.S. pilot*	A	0611	E	10	5	DT	34
F-4S *U.S. pilot*	A	0511	E	10	5	DT	34
F-4S *U.S. pilot*	A	0714	E	10	5	DT	34
F-4S *U.S. pilot*	A	0614	E	10	5	DT	34
FA-18 *U.S. pilot*	A	0312	E	15	5	DT	11
FA-18 *U. S. pilot*	A	0314	E	15	5	DT	11
SU-27 *Soviet pilot*	D	1610	W	15	6	1/2	16
SU-27 *Soviet pilot*	D	1809	W	18	6	1/2	16
SU-27 *Soviet pilot*	D	1615	W	21	6	1/2	16
SU-27 *Soviet pilot*	D	1816	W	24	6	1/2	16

Game Length: 30 game-turns.

Notes:

1. Both sides must fly straight and level until an enemy aircraft or missile is detected. A side is free to maneuver once the enemy is detected. All aircraft are painted air superiority grey.

2. The FA-18s are loaded with one AIM-9L on stations 1 and 9, one 1700-liter FT on station 5, and one AIM-7M on stations 2, 4, 6, and 8.

3. The F-4s are loaded with one AIM-7M on stations 8 and 9, one 1200-liter FT on stations 1 and 5, and eight points of bombs each on stations 2, 3, and 4.

4. The SU-27s are loaded with one AA-8B on stations 1 and 8, one AA-10B on stations 2 and 3, one AA-10A on stations

6 and 7, and one 1200-liter FT on stations 4 and 5.

5. DDS may be loaded as desired per Rule 21.B.1.

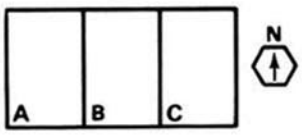
6. The U.S. side scores additional victory points for exiting F-4s off the east edge of map D. Points are earned equal to the bomb load being carried at the time (24 maximum per F-4).

7. The F-4s may jettison bombs (to gain maneuverability, for instance) but when doing so they must jettison all eight bombs on a station. Not all stations with bombs need be jettisoned unless damage dictates otherwise.

H-9: The Hills Are Alive

Background (Hypothetical): Warsaw Pact armies stage a major exercise on the Austrian border. Some units actually cross the border and Austrian defense units fire on them. Provoked, the Warsaw Pact strikes with raids of aircraft, and the tiny Austrian Air Force bravely faces the larger foe. NATO sounds the alert as Soviet and Warsaw Pact army units begin staging on the German border.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-35	B	0503	E	30	7	CL	4
NATO pilot							
F-35	B	0302	E	30	7	CL	4
NATO pilot							
F-35	B	0325	NE	10	7	CL	4
NATO pilot							
F-35	B	0124	NE	10	7	CL	4
NATO pilot							
MIG-23MF	C	0811	W	20	6	1/2	7
Warsaw Pact pilot							
MIG-23MF	C	1010	W	20	6	1/2	7
Warsaw Pact pilot							
MIG-23MF	C	0814	W	20	6	1/2	7
Warsaw Pact pilot							
MIG-23MF	C	1015	W	20	6	1/2	7
Warsaw Pact pilot							
MIG-23MF	C	1813	W	30	6	1/2	7
Warsaw Pact pilot							
MIG-23MF	C	1913	W	30	6	1/2	7
Warsaw Pact pilot							

Game Length: 20 game-turns.

Notes:

1. The F-35s are loaded with one AIM-9L on stations 3, 4, 6, and 7.

2. The MIGs are each carrying four AA-8A, one AA-7A, and one AA-7B (stations 1, 2, 4, and 5). DDS load is 10 flares and 5 chaff.

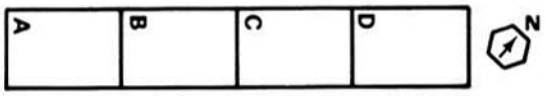
3. All aircraft begin unspotted, but both sides are under GCI control so aircraft are free to maneuver. All aircraft are camouflaged.

4. The Austrians are given 20 victory points at start (propaganda points for foreign incursion).

H-10: AWACS Defense, North Sea

Background (Hypothetical): New Year's Day. For two days world leaders have tried to stave off the headlong rush into war. Suddenly, but not unexpectedly, the German front erupts. World War III has begun and both sides bid for air superiority by trying to down each other's early warning aircraft in the opening assaults.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
AWACS	A	1005	SW	30	6	—	—
British pilot							
Tornado	B	0523	NE	40	6	DT	14
British pilot							
Tornado	B	1523	NE	40	6	DT	14
British pilot							
F-4K	A	0905	SW	35	6	DT	16
British pilot							
F-4K	A	0905	SW	35	6	DT	16
British pilot							
MIG-31	D	1001	SW	55	10	DT	19
Soviet pilot							
MIG-31	D	0901	SW	55	10	DT	19
Soviet pilot							
SU-15F	D	1010	SW	50	10	DT	13
Soviet pilot							
SU-15F	D	1010	SW	50	10	DT	13
Soviet pilot							

Game Length: 30 game-turns.

Notes:

1. The Tornados are loaded with one 1200-liter FT and one AIM-9L each on stations 2 and 3, and one Skyflash on stations 5, 6, 7, and 8. They may dispense 10 chaff and 5 flares.

2. The F-4s are loaded with one 1200-liter FT on stations 1 and 5, two AIM-9L each on stations 2 and 4, and one Skyflash on stations 6, 7, 8, and 9. DDS load is 10 chaff and 5 flares.

3. The MIG-31s are loaded with one 850-liter FT on stations 2 and 7, two AA-8B each on stations 1 and 8, and one AA-9 on stations 3, 4, 5, and 6. They may dispense 15 chaff.

4. The SU-15Fs are loaded with one AA-3A on station 1, one AA-3B on station 6, two AA-8B each on stations 2 and 5, and one 600-liter FT on stations 3 and 4.

5. The Soviet aircraft must fly straight and level until an enemy aircraft or missile is detected by any means. The British aircraft know the exact position and speed of the enemy (due to the AWACS) and are free to maneuver.

6. All Soviet aircraft are painted silver, the AWACS is uncamouflaged, the F-4s are camouflaged, and the Tornados are painted air superiority grey.

7. There is no data card for the AWACS aircraft. Use the following characteristics instead:

a. Speed is 6 FP. If heavily damaged reduce speed to 5; if crippled reduce speed to 4.

b. Only EZ turns and slide maneuvers are allowed.

c. It may use 1 VFP per game-turn either to climb 0.5 altitude level or dive 1 or 2 levels.

d. Visibility rating is 10 and size modifier is -3.

e. Vulnerability rating is 0, but reduce the attack rating of all weapons hitting the AWACS by 1, i.e., shift one column to the left on the Damage Table.

f. It has a RWR model B, two DDS model A, and a DJM

model C. It carries 15 chaff and 15 flares.

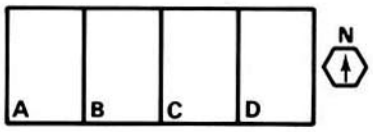
g. The AWACS may not declare itself engaged but may freely use ECM gear to defend itself.

h. The Soviets earn 50 victory points if the AWACS is destroyed, 33 if it is crippled, 17 if heavily damaged, and 8 if lightly damaged.

H-11: Ambush of the U.S.S. Kittyhawk!

Background (Hypothetical): On the same day Warsaw Pact troops poured across the German border, units of the Sixth Fleet in the Mediterranean were heavily attacked. The U.S.S. Kittyhawk off the coast of Libya caught the full brunt of a Libyan mass raid. Over 100 aircraft attacked, overwhelming the defending fighters. The Kittyhawk was put out of action by multiple hits.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-14D	A	1010	E	40	6	DT	20
U.S. pilot							
F-14D	A	1015	E	40	6	DT	20
U.S. pilot							
FA-18	A	1512	E	35	5	DT	13
U.S. pilot							
FA-18	A	1514	E	35	5	DT	13
U.S. pilot							
Mirage F-1E	D	0508	W	20	6	DT	13
3rd World pilot							
Mirage F-1E	D	0518	W	20	6	DT	13
3rd World pilot							
MIG-23	D	0612	W	10	6	DT	10
Arab pilot							
MIG-23	D	0712	W	10	6	DT	10
Arab pilot							
MIG-23	D	0714	W	10	6	DT	10
Arab pilot							
MIG-23	D	0814	W	10	6	DT	10
Arab pilot							
SU-22	D	1810	W	1	6	—	20
Arab pilot							
SU-22	D	1910	W	1	6	—	20
Arab pilot							
SU-22	D	1911	W	1	6	—	20
Arab pilot							
SU-22	D	1815	W	1	6	—	20
Arab pilot							
SU-22	D	1915	W	1	6	—	20
Arab pilot							
SU-22	D	1916	W	1	6	—	20
Arab pilot							

Game Length: Until all SU-22s exit the map or are destroyed.

Notes:

1. The F-14Ds are loaded with one 1200-liter FT on stations 2 and 4, one AIM-9M and one AIM-120 each on stations 1 and 5, and one AIM-54C on stations 6, 7, 8, and 9. They may dispense 8 flares and 7 chaff.

2. The FA-18s are loaded with one 850-liter FT on stations 3 and 7, one AIM-9M on stations 1 and 9, and one AIM-7M on stations 2, 4, 6, and 8. They may dispense 8 flares and 7 chaff.

3. The Mirage F-1Es are loaded with one Matra Magic 550 II on stations 1 and 7, one Super Matra 530D on stations 3 and 5, one 1700-liter FT on station 4, one French DJM-C pod on station 2, and one European DDS pod No. 2 (loaded as desired) on station 3.

4. The MIG-23s are loaded with two AA-8B each on stations 2 and 4, one AA-7A on station 1, one AA-7B on station 5, and one 600-liter FT on station 3.

5. The SU-22s are loaded with five load points of rockets and bombs each on stations 1, 3, 4, and 6 (ordnance destined for the U.S.S. Kittyhawk!).

6. All U.S. aircraft are painted air superiority grey; all Libyan aircraft are camouflaged.

7. The SU-22s must fly straight, 6 hexes each game-turn, until they are shot down or exit the play area. They do not defend themselves with ECM or maneuvers in any way. If crippled, they must jettison all ordnance and turn at the highest possible rate to head south off the map at the highest possible speed. (Heavily and lightly damaged SU-22s continue on.)

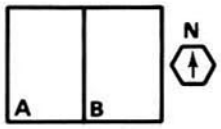
8. Additional victory points are scored as follows: the Libyans earn points equal to the number of load points carried off the west edge of map A by SU-22s; the U.S. earns points equal to the number of load points on crippled or destroyed SU-22s (i.e., those not exited off the west edge).

H-12: Cutthroat!—The Baltic Front

(For 3 or more players.)

Background (Hypothetical): A Soviet air army descends upon Denmark. The Swedes are forced to react as the Soviet fleet tries to break out through the Baltic. In the heat of battle and the confusion of the moment, Danish, Soviet, and Swedish aircraft meet over the straits near Copenhagen, all intent upon shooting each other down and unwilling to take the time to identify targets.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-104G	A	1017	E	18	6	DT	12
NATO pilot							
F-104G	A	0818	E	20	6	DT	12
NATO pilot							
F-16A	B	1916	W	15	6	1/2	12
NATO pilot							
MIG-21L	A	1905	SE	20	6	DT	9
Soviet pilot							
MIG-21L	A	1705	SE	20	6	DT	9
Soviet pilot							
MIG-21L	A	1303	SE	15	6	DT	9
Soviet pilot							
JA-37	B	0924	N	25	6	DT	12
Swedish pilot							
JA-37	B	1124	N	25	6	DT	12
Swedish pilot							
J-35F	B	1508	W	12	6	1/2	8
Swedish pilot							

Game Length: 20 game-turns.

Notes:

1. Use the F-104S data card but delete the 20mm cannon and add the extra fuel as noted on the data card.

2. Each side's aircraft must fly straight and level until they detect another side's aircraft or missile by any means. All aircraft are camouflaged.

3. The F-104s are loaded with one 600-liter FT on stations 1 and 9, one European DDS pod No. 1 on station 5, and one AIM-9P on stations 3, 4, 6, and 7.

4. The F-16 is loaded with one AIM-9L on stations 1 and 9, one AIM-9P on stations 2 and 8, and one 1200-liter FT on stations 4 and 6.

5. The MIGs are loaded with one AA-2C on stations 1 and 5, two AA-8A each on stations 2 and 4, and one 600-liter FT on station 3.

6. The JA-37s are loaded with one AIM-9P on stations 1 and 7, one Skyflash on stations 2 and 6, one 1200-liter FT on station 4, one European DDS pod No. 1 on station 3, and one European DJM pod No. 2 on station 5.

7. The J-35F is loaded with one AIM-4C on stations 4 and 6, one AIM-26 on stations 3 and 7, and one European DDS pod No. 1 on station 5.

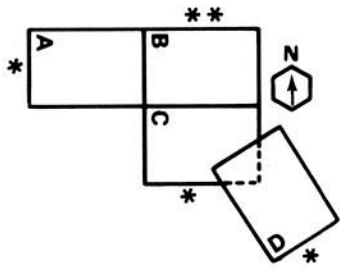
8. Dispenser pods and internal DDS may be loaded as desired.

9. If two sides damage the same aircraft, the last side to damage it receives the victory points at game end.

H-13: Eating Dirt

Background (Hypothetical): The opposing armies on the West German front will be well-equipped with hundreds of surface-to-air missile systems. Aircraft operating in or near the FEBA (Forward Edge of Battle Area) will have to do so at low altitude to avoid attacks from those missile systems. An air battle in such a restrictive environment requires different tactics and techniques. This scenario illustrates such a situation, where Luftwaffe Phantoms try to protect a group of ground attack Tornados on their way through the FEBA.

Map: Play is restricted to these maps. Place partial hex D 1000 on top of C 1005. *: NATO safe edge. **: Soviet safe edge.



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
SU-27	B	0604	SSW	1	5	DT	16
Soviet pilot							
SU-27	B	0703	SSW	1	5	DT	16
Soviet pilot							
SU-27	B	1015	S	1	5	DT	16
Soviet pilot							
SU-27	B	1017	S	1	5	DT	16
Soviet pilot							
F-4F	C	1502	NNW	1	4.5	1/2	13.5
NATO pilot							
F-4F	C	1603	NNW	1	4.5	1/2	13.5
NATO pilot							
F-4F+	—	—	—	1	6	DT	16
NATO pilot							
F-4F+	—	—	—	1	6	DT	16
NATO pilot							
Tornado	—	—	—	1	6	DT	23
NATO pilot							
Tornado	—	—	—	1	6	DT	23
NATO pilot							
Tornado	—	—	—	1	6	DT	23
NATO pilot							
Tornado	—	—	—	1	6	DT	23
NATO pilot							

The upgraded F-4Fs enter play on game-turn 3 from the west edge of map A. The first two Tornados enter likewise on game-turn 5, and the last two on game-turn 6.

Game Length: 20 game-turns.

Notes:

1. The F-4Fs are loaded with one 1200-liter FT on stations 1 and 5, two AIM-9L each on stations 2 and 4, and one European DJM pod No. 1 on station 6.

2. The Upgraded F-4Fs are loaded with one 1200-liter FT on stations 1 and 5, two AIM-9L each on stations 2 and 4, and one AIM-120 on stations 6, 7, 8, and 9.

3. The Tornados are loaded with one AIM-9L on station 1, one European DJM pod No. 2 on station 4, one 1200-liter FT on stations 2 and 3, and twelve load points of air-to-ground ordnance on the belly.

4. The SU-27s are loaded with one AA-8B on stations 1 and 8, one 1200-liter FT on stations 4 and 5, and one AA-10B on stations 2, 3, 5, and 7.

5. All German aircraft may dispense 8 flares and 7 chaff. The SU-27 dispensers are loaded as desired per Rule 21.B.1.

6. The Phantoms are painted air superiority grey, and the Tornados and SU-27s are camouflaged.

7. The Soviets may safely exit the play area from the north edge of map B. The Germans may safely exit from the west edge of map A, the SSE edge of map D, and that part of the south edge of map C not overlaid by map D. Aircraft may exit from other edges but roll the die once for each such aircraft: 5-10 it safely disengages; 1-4 the aircraft is hit by antiaircraft weapons with an attack rating of 7. If the aircraft survives this it disengages.

8. Any aircraft above altitude level 1 risks attack by SAMs. Roll the die once for each aircraft that ends the flight phase above level 1. If the roll is less than or equal to two times the aircraft's altitude, a SAM unit from the opposing side achieves a lock-on and fires. A missile will enter next game-turn unspotted from any of the owning side's safe edges. Use the AIM-7F for NATO SAMs, and the AA-7A for Soviet SAMs. If the targeted aircraft returns to altitude 1 the SAM radar loses the lock-on. When attempting to break SAM lock-ons, SAM radars have an arc type of 150+.

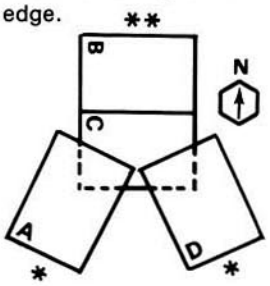
9. Additional victory points are scored as follows: the Germans earn points for each Tornado which exits the SSE edge of map D equal to the air-to-ground load points carried; the Soviets earn points equal to two times the air-to-ground load not exited off the SSE edge of map D.

H-14: Enter the French

Background (Hypothetical): The West German forces are buckling under Soviet pressure. French army units move forward to help stabilize the front. Intelligence must be gathered so a

pair of heavily escorted Mirage IIIs attempt a reconnaissance run along the front using side-looking recon pods. Soviet and Warsaw Pact MIGs attempt to interfere and down the reconnaissance aircraft.

Map: Play is restricted to these maps. Place partial hex D 1000 on top of C 1005, and A 1000 on top of C 1020. *: NATO safe edge. **: Pact safe edge.



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
Mirage IIIE	A	1020	NNE	4	7	1/2	8
French pilot							
Mirage IIIE	A	1024	NNE	4	7	1/2	8
French pilot							
Mirage 2000	A	1518	NNE	8	7	1/2	10
French pilot							
Mirage 2000	A	1719	NNE	10	7	1/2	10
French pilot							
Mirage 2000	A	0518	NNE	8	7	1/2	10
French pilot							
Mirage 2000	A	0319	NNE	10	7	1/2	10
French pilot							
MIG-21N	C	1005	NNW	20	5	DT	9
Warsaw Pact pilot							
MIG-21N	C	1106	NNW	20	5	DT	9
Warsaw Pact pilot							
MIG-29	—	—	S	—	6	DT	15
Soviet pilot							
MIG-29	—	—	S	—	6	DT	15
Soviet pilot							
MIG-29	—	—	S	—	6	DT	15
Soviet pilot							
MIG-29	—	—	S	—	6	DT	15
Soviet pilot							

The MIG-29s enter on game-turn 3 from the north edge of map B at any altitude between levels 10 and 20.

Game Length: 30 game-turns.

Notes:

1. The Mirage IIIs are loaded with one 600-liter FT on stations 2 and 4, and one European DDS pod No. 1 on station 3. They are unarmed recon aircraft and carry no cannon.

2. The Mirage 2000s are loaded with one 1700-liter FT on station 5, one Matra Magic II on stations 1 and 9, and one Super Matra 530D on stations 2 and 8.

3. The MIG-21Ns are loaded with one AA-2C on stations 1 and 5, two AA-8B each on stations 2 and 4, and one 600-liter FT on station 5.

4. The MIG-29s are loaded with two AA-8B each on stations 1 and 6, one AA-10A on stations 2 and 5, and one 1200-liter FT on stations 3 and 4.

5. Dispenser pods and internal DDS may be loaded as desired.

6. All aircraft are camouflaged.

7. Soviet and Warsaw Pact aircraft may safely exit the play area from the north edge of map B. French aircraft may safely exit from the SSW edge of map A and the SSE edge of map D. Aircraft may exit from other edges but are subject to antiaircraft fire per note 7 of scenario H-13.

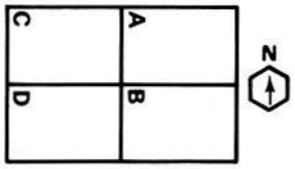
8. To perform their reconnaissance, the recon aircraft must fly through photo target hexes C 1020 to 1005 (16 hexes total). They must fly through west to east at any altitude between levels 4 and 10 but they may not vary their altitude during the run.

9. The French earn 2 victory points per photo target hex flown through by each Mirage III that also exits off the SSE edge of map D.

H-15: Towering Inferno

Background (Hypothetical): High technology battles between the most advanced air combat fighters in the world promise to be deadly, violent exchanges of missile fire. When a fighter is capable of killing several enemy aircraft at once, the outcome of any fight will not be determined until the last enemy goes down in flames. Victory in the next war will reside with the side that most often achieves air superiority over the battle zones of the land forces. This battle of the best against the best might be typical of such efforts.

Map:



Aircraft	*Map*	*Hex*	*Fac.*	*Alt.*	*Speed*	*Conf.*	*Load*
F-19A	C	1518	SSE	35	4	CL	4
U.S. pilot							
F-19A	C	1020	SSE	40	4	CL	4
U.S. pilot							
F-15C	C	1905	SE	12	6	1/2	10
U.S. pilot							
F-15C	D	0205	E	8	7	1/2	10
U.S. pilot							
F-15C	D	1513	NNE	20	7	1/2	10
U.S. pilot							
F-15C	D	1710	NNE	20	7	1/2	10
U.S. pilot							
F-16C	A	1921	S	12	4.5	1/2	14
U.S. pilot							
F-16C	A	1819	SE	15	4.5	1/2	14
U.S. pilot							
MIG-31	B	0901	W	50	6	DT	16
Soviet pilot							
MIG-31	B	1301	W	55	6	DT	16
Soviet pilot							
MIG-29	C	1703	NNW	18	5	DT	15
Soviet pilot							
MIG-29	C	1508	W	15	6	DT	15
Soviet pilot							
MIG-29	B	0324	W	10	7	DT	15
Soviet pilot							
MIG-29	B	0622	NNW	16	7	DT	15
Soviet pilot							
SU-27	A	1010	SSW	10	7	DT	16
Soviet pilot							
SU-27	A	0810	SSW	10	7	DT	16
Soviet pilot							

Game Length: 30 game-turns.

Notes:

1. The F-19s are loaded with one 1200-liter FT on stations 1 and 6; one AIM-120 on stations 1, 2, 3 and 4; and 30 points of fuel in stations 5 and 6.

2. The F-15Cs are loaded with two AIM-9M each on stations 2 and 4, and one AIM-120 on stations 1, 5, 6, 7, 8, and 9.

3. The F-16Cs are loaded with one AIM-120 on stations 3 and 7, one 1200-liter FT on stations 4 and 6, and one AIM-9M on stations 1, 2, 8, and 9.

4. The MIG-31s are loaded with two AA-8B each on stations 1 and 8, and one AA-9 on stations 2, 3, 4, 5, 6, and 7.

5. The MIG-29s are loaded with two AA-8B each on stations 1 and 6, one AA-10B on stations 2 and 5, and one 1200-liter FT on stations 3 and 4.

6. The SU-27s are loaded with one AA-8B on stations 1 and 8, one 1200-liter FT on stations 3 and 4, and one AA-10B on stations 2, 3, 6, and 7.

7. Internal DDS may be loaded as desired.

8. All U.S. aircraft and the MIG-31s are painted air superiority grey; the other Soviet aircraft are camouflaged.

9. The side which sweeps the enemy off the map earns 50 additional victory points.

Variation: Allow both sides reinforcements as follows:

Game-turn 3: Four MIG-29s loaded as above enter from the east edge of the map at any speed and any altitude below 20. All aircraft must enter within 6 hexes and 5 altitude levels of each other.

Game-turn 4: Six F-16Cs loaded as above enter as described for the MIG-29s but from the west edge of the map.

Game-turn 5: Two SU-27s enter from the north edge of map A or the south edge of map B or one from each at any speed and any altitude below 30.

SCENARIO FUEL STATISTICS

Solitaire and Historical/Hypothetical Scenarios

Note: Drop-tank fuel included. If start fuel level is less than internal capacity and drop-tanks are given, the drop-tanks are empty at start.

Scenario	*Aircraft*	**Start/Bingo*	*Aircraft*	**Start/Bingo*
S-1	F-4F	300/120	MIG-21MF	140/56
S-2	JA-37	183/61	SU-17	NA
S-3	MIG-31	450/(240)	F-4Es	NA
H-1	F-14s	650/150	SU-22s	365/235
H-2	F-16s	224/104	MIG-21s	210/84
H-3	F-4Es	440/180	F-15s	470/145
H-4	Mirage F-1s	348/148	Lightnings	400/50
	MIG-23s	194/150		
H-5	F-104s	245/87	SU-15s	460/120
H-6	F-14s (initial)	480/150	MIG-21s	180/120
	F-14 (reinf.)	300/150		
H-7	F-20s	200/25	MIG-29s	400/175
H-8	F-4Ss	350/244	SU-27s	486/214
	F-18s	329/216		
H-9	Drakens	187/119	MIG-23s	225/119
H-10	Tornados	603/124	MIG-31s	630/480
	F-4Ks	535/122	SU-15s	340/240
H-11	F-14s	582/212	Mirage F-1s	362/111
	F-18s	393/135	MIG-23s	256/112
H-12	F-104s	187/87	MIG-21s	170/7
	F-16	320/104	JA-37s	222/76
			J-35	153/85
H-13	F-4Fs	380/210	F-4F+s	320/210
	Tornados	324/217	SU-27s	414/250
H-14	Mirage IIIs	186/85	MIG-21s	200/90
	Mirage 2000s	270/97	MIG-29s	275/150
H-15	F-19s	312/180	MIG-29s	415/175
	F-15s	647/268	SU-27s	450/250
	F-16s	320/138	MIG-31s	660/420

*Fuel

General Scenarios

Determine the modified start and bingo base factors for each aircraft of each side by using the table. Multiply these factors by the aircraft's internal fuel points. If necessary or desired, add drop-tanks with their fuel points and/or adjust configurations and loads to begin play at least 5% over bingo fuel.

Start and Bingo Fuel Generation Table

Scenario	*Side*	*Start Base*	*Bingo Base*
G-1, G-2	Both	.5	.2
G-3	Section	Variable	.3
	Single	Variable	.2
* G-4, G-5	Both	.6	.2
* G-6	Intruder	.6	.4
	Defender	Variable	.2
* G-7	Intruder	.6	.3
	Patrol	Variable	.2
	Point Interceptor	.8**	.1
* G-8	Fighter Escort	.7	.3
	Strike Aircraft	.6	.3
	Defender	.6	.2
* G-9, G-10	Both	Variable	.3

*Apply mission range modifier.

**Do not apply altitude band modifier.

Modifiers to Start Base Factor:

Variable Start (roll one die): 1-3 = .7; 4-7 = .6; 8-10 = .5

Mission Range (roll one die): 1-3 = Short (0); 4-7 = Medium (−.1); 8-10 = Long (−.2)

Configuration at Start: CL = +.05; DT = −.1

Altitude Band at Start: LO = −.1; ML = −.05; MH = 0; HI = +.05; VH = +.05; EH = +.1

Modifiers to Bingo Base Factor:

Mission Range: Short = 0; Medium = +.05; Long = +.1

This copy of the Air Superiority Aircraft Log is *not* intended for direct use. Always use a copy of this form, saving it unmarked as a master for later photocopies. In addition, four pages of this form are included for direct use in the Charts Booklet.

Air Superiority Aircraft Log

AIRCRAFT:			Pilot:				Start Fuel:			Bingo:			Load:		
Game Turn:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Start Altitude															
Start Speed															
0.5 FP Carry															
Power Setting															
Flight Type															
Accel Points															
Decel Points															
Speed Change															
Altitude Change															
Turn Carry															
Climb Carry															
Shots Fired															
Decoys Used															
Load Dropped															
Configuration															
Fuel Used															
Fuel Left															

AIRCRAFT:			Pilot:				Start Fuel:			Bingo:			Load:		
Game Turn:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Start Altitude															
Start Speed															
0.5 FP Carry															
Power Setting															
Flight Type															
Accel Points															
Decel Points															
Speed Change															
Altitude Change															
Turn Carry															
Climb Carry															
Shots Fired															
Decoys Used															
Load Dropped															
Configuration															
Fuel Used															
Fuel Left															

EXPANDED SEQUENCE OF PLAY

Note: The relevant rule numbers are given in parentheses.

Stalled Aircraft Phase(11.A)

1. Check each aircraft's start speed against its minimum allowed speed.
2. Determine if stalled aircraft perform departed or stalled flight.

Electronic Warfare Interaction Phase

1. Attempt to break radar lock-ons with chaff (21.B.3).
2. Attempt to break radar lock-ons with deceptive jammers (21.C.2).

Visual Sighting Phase

1. Make new sighting attempts (20) and identify spotted aircraft (22.A).
2. Flip target counters which were spotted last game-turn but not this game-turn to show their back side.

Engaged/Free Aircraft Determination Phase (16)

Aircraft that are pursued by missiles and not stalled or departed may declare themselves engaged or free. Other aircraft are considered free.

Order of Flight Determination Phase

1. Determine the order of flight for free aircraft (13).
2. Declare target illumination (19.B). Flip appropriate search markers to illuminate side.

Flight Phase

Sequence:

1. Move stalled and departed aircraft (11.B, 11.C). Note their altitude loss.
2. Move missiles targeted at stalled and departed aircraft.
3. Move engaged aircraft and missiles targeted at them (16.A).
4. Move free/disadvantaged aircraft and missiles targeted at them.
5. Move free/nonadvantaged aircraft and missiles targeted at them.
6. Move free/advantaged aircraft and missiles targeted at them.
7. Move free/unspotted aircraft and missiles targeted at them.
8. Check for collisions (3.E).

Aircraft Flight Outline:

1. Choose a power setting (6.C). Note fuel consumed (24.A).
2. Choose type of flight: level, climbing (8.C, 8.G), or diving (8.D). Determine number of HFPs and VFPs.
3. Declare radar boresight or auto track mode (18.G, 18.H).
4. Expend all FPs in flight. Alternate expenditure with pursuing missiles (15.B) and illuminators (19.B) as necessary. The aircraft may jettison external load (4.A), apply speedbrakes (5.D), turn (7), execute gun attacks (9), perform special maneuvers (14), and drop decoys against missiles (21.B.2). If missiles attack, roll for possible hit and damage (15.D, 10). Note any half FP carry-over (5.C), accel and decel points earned, altitude change (8), turn carry-over (7.B), and climb carry-over (8.G.2).
5. Declare if the aircraft is tailing (13.D).

Air-To-Air Missile Launch Phase

1. Attempt missile launch (15.C, 17.A, 19.A). Note load fired (4.A).
2. Place successfully launched missiles on the map.

Air Radar Search and Lock-On Phase (18)

1. Conduct radar searches. Place search and contact markers on appropriate aircraft where successful.
2. Attempt lock-ons to contacted targets. Flip contact marker to lock-on side if successful.
3. Identify enemy aircraft by radar return (22.C).

Log Update Phase

1. Remove unused decoys (21.B.2).
2. Remove missiles whose flight time is exhausted (15.A).
3. Complete damage control (10.C).
4. Roll for progressive damage (10.C).
5. Roll for recovery of departed aircraft (11.C).
6. Figure the starting altitude and speed of each aircraft and missile for the next game-turn.
7. Declare disengagement (24.B) and remove appropriate aircraft from play.

AIR SUPERIORITY

J.D. Webster

Data Cards

This booklet contains the following:

F-104S	F-16A	F-35 Draken
F-4E	F-16C	JA-37 Viggen
F-4F	FA-18A	MIG-21MF
F-4F+	F-19A	MIG-21bis
F-4K/M	F-20A	MIG-23MF
F-4S	Tornado F.3	MIG-29
F-14A	Lightening F.6	MIG-31
F-14D	Mirage IIIE	SU-15
F-15A	Mirage F-1C	SU-17/22
F-15C	Mirage 2000	SU-27

To use the thirty Data Cards in this booklet, carefully separate them along the perforations.

Game Designers' Workshop

CC-0430/T8

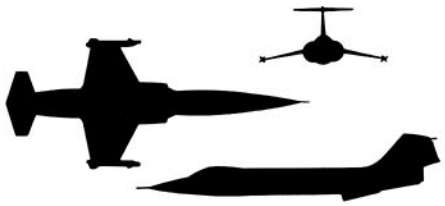
F-104S Starfighter

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	3.0	2.5	6
Military	1.5	1.5	1.0	2
Normal	0	0	0	1
Idle	0.5	0.5	0.5	0
Spbr	0.5	0.5	1.0	—

Smoker at military power



Cruise Speed: 6.0
Visibility: 6
Size: 0
Vulnerability: 0

Restricted Arc: —
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 290

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1.5/1.5
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	2	2	3
HT	4,3	4,3	5,4
BT	5,4	5,4	6,5
ET	NA	NA	NA

Maneuvering flaps; if speed ≤3.5 use lower drag

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	58	52	46	
EH 46+	4.5-15	5-12	5-10.5	16
VH 36-45	4-15	4.5-11	4.5-10.5	16
HI 26-35	3.5-13	4-10.5	4.5-10	14
MH 17-25	3-11	3.5-10	3.5-9	13
ML 8-16	2.5-10	3-9	3-8.5	12
LO 1-7	2.5-9	2.5-8	2.5-7	11

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	.5	1	.5	1	.5
VH 36-45	3	1	2	.5	1	.5
HI 26-35	5	1	3	1	2	.5
MH 17-25	6	2	4	1	2	1
ML 8-16	6	2	4	1	2	1
LO 1-7	7	3	5	2	2	1

F-4E Phantom II

Crew: Pilot, Radar Officer

Power Chart ••

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	2.5	2.0	14
Military	1.5	1.0	1.0	4
Normal	0	0	0	2
Idle	0.5	1.0	1.0	0
Spbr	0.5	1.0	1.0	—

Smoker at military power



Cruise Speed: 5.5
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: 60
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 600

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	2	2
HT	2	3	4
BT	4,3	5,4	6,5
ET	5,4	NA	NA

Slatted wings; if speed <6.0 use lower drag

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	48	40	
EH 46+	4-14	4.5-12	—	15
VH 36-45	3-12.5	4-11	4.5-9	14
HI 26-35	3-11.5	3-10	3.5-8	13
MH 17-25	2-10	2.5-9	3-7.5	12
ML 8-16	2-9	2-8	2.5-7	11
LO 1-7	1.5-8.5	2-7.5	2.5-6.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	.5	0	0
VH 36-45	2	1	1	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	4	1.5	3	1	1	.5
ML 8-16	5	2	3	1	2	1
LO 1-7	6	2	4	1	2	1

F-104S

Radar Data
Type: R-21G
Arcs: 180+
Search: 80/15
Track: 60/12
Lock-On: 7

ECM Data
IFF: Yes
RWR: A
DDS: —
DJM: —
AJM: —

Technology Listing
Auto Track

Weapon Stations Diagram



Internal Gun Data
Type: None
Air to Air: — *Air to Ground:* —
Roll to Hit: —
Gunsight: HT+2, BT+3
Shots: — *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-4, 1/2=5-8, DT=9+
Load Limit: 6,500

Station Limits: 1,3,7,9=1100;
4,6=250; 2,8=500;
5=2200

Notes and Variants

1. Rapid acceleration aircraft.
2. 20mm gun may be deleted and internal fuel increased by 40 points.
3. May use AIM-9, AIM-7, and Aspide type missiles.
4. If station 5 loaded, then stations 4 and 6 not usable.

F-4S Grand Attack Variant: No RHM; No FT. *Gun Data: Type:*20mm Vulcan; *Air to Air:* 6; *Air to Ground:* 8*; *Roll to Hit:* 0=7, 1=6, 2=4; *Shots:* 3.5.

Allowed Station Loads
1,9=IRM, FT
2,8=BB, BG, RP, RHM, EP
3,7=BB, BG, RP, IRM, EP, FT, GP, WR
5=BB, BG, RP, WR, EP, PP
4,6=IRM

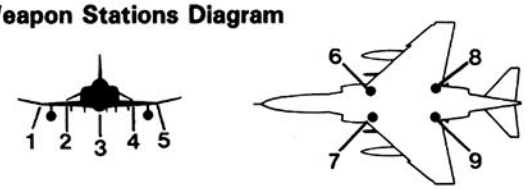
F-4E

Radar Data
Type: APQ-120
Arcs: 180+
Search: 100/20
Track: 80/20
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: B
DJM: —
AJM: —

Technology Listing
HUD Interface
IR Uncage
V.A.S.

Weapon Stations Diagram



Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+2
Shots: 3 *Radar Ranging:* R

Bomb System
Computed −2

Configuration Points Limits:
CL=0-8, 1/2=9-14, DT=15+
Load Limit: 16,000

Station Limits: 1,5=2200;
2,4=3000; 3=4500;
6,7,8,9=500

Notes and Variants

1. Weapon stations 2 and 4 can each carry two AIM-9 missiles in addition to other non-missile stores.
2. May use AIM-9, AIM-7 type missiles.

Export Variant: Bomb System: Ballistic −1; RWR: A; DDS: A.

Recon Variant: No radar; no gun; no RHM on any stations; DJM: A; Technology: none.

Allowed Station Loads
1,5=BB, BG, RP, WR, EP, DP, FT
2,4=BB, BG, BS, RP, RG, RS, WR, RHM, IRM[1], GP, EP, DP,
3=BB, BG, BS, RP, GP, WR, FT, LP
6,7=RHM, EP, LP
8,9=RHM

F-4F Phantom II

Crew: Pilot, Radar Officer



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.5	2.5	2.0	14
Military	2.0	1.5	1.0	4
Normal	0	0	0	2
Idle	0.5	1.0	1.0	0
Spbr	0.5	1.0	1.0	—

Smoker at military power

Cruise Speed: 5.5
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: 60
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 600

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	2
HT	2	3	4
BT	4,3	4,3	6,5
ET	5,4	NA	NA

Slatted wings; if speed <6.0 use lower drag

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	62	50	42	
EH 46+	4-14	4.5-12	—	15
VH 36-45	3-12.5	4-11	4.5-9	14
HI 26-35	3-11.5	3-10	3.5-8	13
MH 17-25	2-10	2.5-9	3-7.5	12
ML 8-16	2-9	2-8	2.5-7	11
LO 1-7	1.5-8.5	2-7.5	2.5-6.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	.5	0	0
VH 36-45	2	1	1	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	5	2	3	1	2	1
ML 8-16	6	2	4	1	2	1
LO 1-7	6	3	4	2	2	1

F-4F+ I.C.E. Phantom II

Crew: Pilot, Radar Officer



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.5	2.5	2.0	14
Military	2.0	1.5	1.0	4
Normal	0	0	0	2
Idle	0.5	1.0	1.0	0
Spbr	0.5	1.0	1.0	—

Cruise Speed: 5.5
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: —
Blind Arc: 30
Radar Arc: 150+
Internal Fuel: 600

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	2
HT	2	3	4
BT	4,3	4,3	6,5
ET	5,4	NA	NA

Slatted wings; if speed <6.0 use lower drag

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	62	50	42	
EH 46+	4-14	4.5-12	—	15
VH 36-45	3-12.5	4-11	4.5-9	14
HI 26-35	3-11.5	3-10	3.5-8	13
MH 17-25	2-10	2.5-9	3-7.5	12
ML 8-16	2-9	2-8	2.5-7	11
LO 1-7	1.5-8.5	2-7.5	2.5-6.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	.5	0	0
VH 36-45	2	1	1	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	5	2	3	1	2	1
ML 8-16	6	2	4	1	2	1
LO 1-7	6	3	4	2	2	1

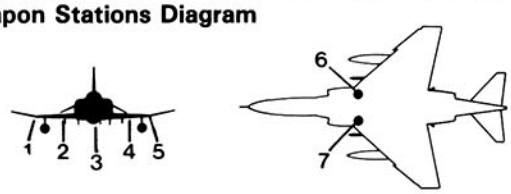
F-4F

Radar Data
Type: APQ-120
Arcs: 180+
Search: 100/20
Track: 80/20
Lock-On: 7

ECM Data
IFF: Yes
RWR: A
DDS: B
DJM: —
AJM: —

Technology Listing
IR Uncage
HUD Interface

Weapon Stations Diagram



Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+2
Shots: 3 *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-6, 1/2=7-12, DT=13+
Load Limit: 15,900

Station Limits: 1,5=2200;
2,4=3000; 3=4500;
6,7=500

Notes and Variants
1. Weapon stations 2 and 4 may each carry two AIM-9 missiles in addition to other non-missile stores.
2. May use AIM-9, AIM-4 type missiles.

Allowed Station Loads
1,5=BB, BG, RP, RG, WR, EP, FT
2,4=BB, BG, BS, RP, RG, RS, GP, WR, IRM, DP, EP, OP
3=PP, BB, BG, BS, RP, GP, WR, FT
6,7=EP, LP, DP

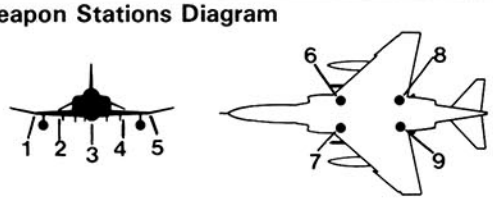
F-4F+

Radar Data
Type: APG-65
Arcs: 150+
Search: 180/40
Track: 120/40
Lock-On: 8

ECM Data
IFF: Yes
RWR: C
DDS: B
DJM: C
AJM: —

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar
Track while Scan
Target ID

Weapon Stations Diagram



Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+1
Shots: 3 *Radar Ranging:* CA

Bomb System
Computed −2

Configuration Points Limits:
CL=0-8, 1/2=9-14, DT=15+
Load Limit: 16,000

Station Limits: 1,5=2200;
2,4=3000; 3=4500;
6,7,8,9=500

Notes and Variants
1. Weapon stations 2 and 4 may each carry two AIM-9 missiles in addition to other non-missile stores.
2. May use AIM-9, AIM-7, AIM-120 type missiles.
3. I.C.E.: Improved Combat Efficiency.

Allowed Station Loads
1,5= BB, BG, RP, RG, WR, EP, FT
2,4=BB, BG, BS, RP, RG, RS, GP, WR, IRM, RHM, AHM, DP, EP, OP
3=BB, BG, BS, RP, GP, WR, PP, WP, FT
6,7=RHM, AHM, EP, LP, DP
8,9=RHM, AHM

F-4K/M Phantom II

Crew: Pilot, Radar Officer



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.5	3.0	2.5	15
Military	2.0	1.5	1.0	4
Normal	0	0	0	2
Idle	0.5	1.0	1.0	0
Spbr	0.5	1.0	1.0	—

Smoker at military power

Cruise Speed: 6.0
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: 60
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 610

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	2	2
HT	2	3	4
BT	4	5	6
ET	5	NA	NA

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	50	40	
EH 46+	4.5-13	4.5-11	—	14
VH 36-45	3.5-12	4-11	4.5-9	13
HI 26-35	3-11	3-10	3.5-8.5	12
MH 17-25	2.5-10	3-9	3.5-8	11
ML 8-16	2-9	2.5-8	3-7.5	10.5
LO 1-7	2-8.5	2-7.5	2.5-6.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	.5	0	0
VH 36-45	2	1	1	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	5	2	3	1	2	1
ML 8-16	6	2	4	1	2	1
LO 1-7	7	3	5	2	2	1

F-4S Phantom II

Crew: Pilot, Radar Officer



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	2.5	2.0	14
Military	1.5	1.0	1.0	4
Normal	0	0	0	2
Idle	0.5	1.0	1.0	0
Spbr	0.5	1.0	1.0	—

Cruise Speed: 5.5
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: 60
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 610

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	2	2
HT	2	3	4
BT	4,3	5,4	6,5
ET	5,4	NA	NA

Slatted wings; if speed <6.0 use lower drag

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	62	50	40	
EH 46+	4-14	4.5-12	—	15
VH 36-45	3-12.5	4-11	4.5-9	14
HI 26-35	3-11.5	3-10	3.5-8	13
MH 17-25	2-10	2.5-9	3-7	12
ML 8-16	2-9.5	2-8	2.5-6.5	11
LO 1-7	1.5-9	2-7.5	2.5-6.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	.5	0	0
VH 36-45	2	1	1	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	4	1.5	3	1	1	.5
ML 8-16	5	2	3	1	2	1
LO 1-7	6	2	4	1	2	1

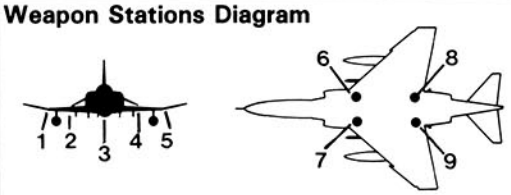
F-4K/M

Radar Data
Type: AWG-12
Arcs: 180+
Search: 100/20
Track: 80/20
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: B
DJM: —
AJM: —

Technology Listing
HUD Interface
IR Uncage

Weapon Stations Diagram



Internal Gun Data
Type: None
Air to Air: — *Air to Ground:* —
Roll to Hit: —
Gunsight: BT+2
Shots: — *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-8, 1/2=9-14, DT=15+
Load Limit: 16,000

Station Limits: 1,5=2200;
2,4=3000; 3=4500;
6,7,8,9=500

Notes and Variants
1. Weapon stations 2 and 4 may each carry two AIM-9 missiles in addition to other non-missile stores.
2. May use AIM-9 and Skyflash type missiles.

Allowed Station Loads
1,5=BB, BG, RP, WR, EP, DP, FT
2,4=BB, BG, BS, RP, WR, GP, OP, EP, DP, IRM[1], RHM
3=BB, BG, BS, RP, GP, WR, FT
6,7=RHM, EP, LP
8,9=RHM

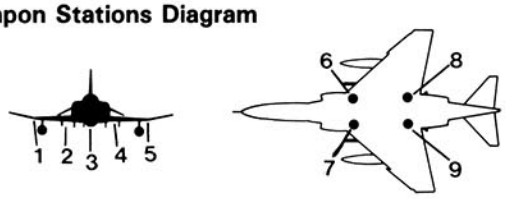
F-4S

Radar Data
Type: AWG-10A
Arcs: 180+
Search: 100/20
Track: 80/20
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: B
DJM: A
AJM: —

Technology Listing
HUD Interface
IR Uncage

Weapon Stations Diagram



Internal Gun Data
Type: None
Air to Air: — *Air to Ground:* —
Roll to Hit: —
Gunsight: BT+2
Shots: — *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-8, 1/2=9-14, DT=15+
Load Limit: 16,000

Station Limits: 1,5=2000;
2,4=3000; 3=4500;
6,7,8,9=500

Notes and Variants
1. Weapon stations 2 and 4 may each carry two IRMs in addition to other non-missile stores.
2. May use AIM-9, AIM-7 type missiles.

Allowed Station Loads
1,5=BB, BG, RP, WR, EP, DP, FT
2,4=BB, BG, RP, RG, WR, GP, EP, DP, OP, IRM,[1], RHM
3=BB, BG, RP, GP, WR, FT
6,7=RHM, EP
8,9=RHM

F-14A Tomcat

Crew: Pilot, Radar Officer



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	2.5	2.0	16
Military	1.0	1.0	1.0	5
Normal	0	0	0	2
Idle	0.5	0.5	1.0	0
Spbr	0.5	0.5	1.0	—

Cruise Speed: 5.5
Visibility: 8
Size: −1
Vulnerability: +1

Restricted Arc: —
Blind Arc: 30L
Radar Arc: 120+
Internal Fuel: 750

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1.5/1.5
Vertical Roll: 0/.5

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1,1,2	1,1,2	1,1,3
HT	2,2,4	2,2,4	2,2,4
BT	3,4,5	3,4,5	3,4,6
ET	4,4,6	NA	NA

Auto swing wing; drag for low, medium, high speeds

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	55	50	
EH 46+	3-15	4-13	4-11	15
VH 36-45	3-13	3.5-12	3.5-10	15
HI 26-35	2.5-12	2.5-11	3-9	14
MH 17-25	2-11	2-10	2.5-8.5	14
ML 8-16	1.5-10	1.5-9.5	2-8	12
LO 1-7	1.5-9	1.5-8	2-7.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	1	.5
VH 36-45	3	1	2	1	1	.5
HI 26-35	5	2	3	1	2	1
MH 17-25	6	2	4	1	2	1
ML 8-16	6	3	4	2	2	1
LO 1-7	8	3	5	2	3	1

F-14D Super Tomcat

Crew: Pilot, Radar Officer



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	4.5	4.0	3.5	20
Military	1.5	1.5	1.0	5
Normal	0	0	0	2
Idle	0.5	0.5	1.0	0
Spbr	0.5	0.5	1.0	—

Cruise Speed: 6.0
Visibility: 8
Size: −1
Vulnerability: +1

Restricted Arc: —
Blind Arc: 30L
Radar Arc: 120+
Internal Fuel: 850

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1.5/1.5
Vertical Roll: 0/.5

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1,1,2	1,1,2	1,1,3
HT	2,2,4	2,2,4	2,2,4
BT	3,4,5	3,4,5	3,4,6
ET	4,4,6	4,4,6	NA

Auto swing wing; drag for low, medium, high speeds

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	65	60	55	
EH 46+	3-15	4-14	4-12	16
VH 36-45	3-15	3.5-13	3.5-11	15
HI 26-35	2.5-14	2.5-12	3-10	15
MH 17-25	2-12	2-10	2.5-9.5	14
ML 8-16	1.5-10	1.5-9.5	2-9	12
LO 1-7	1.5-9	1.5-8.5	2-8	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 5.0	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	1	.5
VH 36-45	3	2	2	1	1	.5
HI 26-35	5	2	3	1	2	1
MH 17-25	6	3	4	2	2	1
ML 8-16	7	3	5	2	2	1
LO 1-7	8	4	5	3	3	1

F-14A

Radar Data
Type: AWG-9
Arcs: 120+
Search: 500/60
Track: 360/60
Lock-On: 7

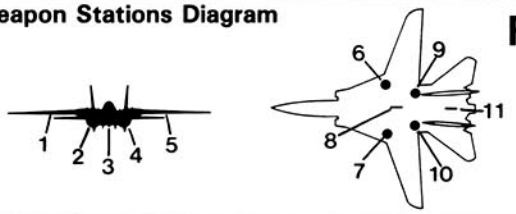
ECM Data
IFF: Yes
RWR: B
DDS: B
DJM: A
AJM: —

Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+2
Shots: 3.5 *Radar Ranging:* R

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar
Track while Scan
Multi-target (6)
V.A.S.
0

Bomb System
Not Allowed

Weapon Stations Diagram



Configuration Points Limits:
CL=0-8, 1/2=9-12, DT=13+
Load Limit: 10,800

Station Limits: 1,5=3000;
2,4=2200; 3=2000;
6,7,9,10=1000; 8,11=500

Notes and Variants
1. Supersonic Delta.
2. Rapid Pitch Rate.
3. Computerized swing wing; use first turn drag number for speed ≤3.5, second for speed ≤7.0, third for speed ≥7.5.
4. Weapon stations 1 and 5 may carry one IRM in addition to other stores.
5. May use AIM-9, AIM-7, AIM-54 type missiles.

F-14A+ Variant: Up-engined F-14A; use F-14D power chart and fuel usage. (All else remains the same.)

F-14A Iran Export Variant: No DJM

Allowed Station Loads
1,5=IRM, RHM, EP
2,4=FT only
3=PP, EP
6,7=RHM, AHM
9,10=AHM only
8,11=RHM only
Restrictions: a) If station 3 loaded, then stations 8,9,10,11 not usable. b) If stations 9,10 loaded, then stations 8,11 not usable. c) If stations 6,7 loaded with AIM-54, then station 8 not usable.

F-14D

Radar Data
Type: APG-71
Arcs: 120+
Search: 500/80
Track: 360/80
Lock-On: 8

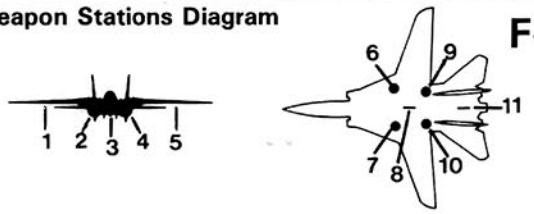
ECM Data
IFF: Yes
RWR: C
DDS: B
DJM: C
AJM: —

Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+1
Shots: 3.5 *Radar Ranging:* CA

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar
Track while Scan
Multi-target (6)
Target ID
V.A.S.

Bomb System
Not Allowed

Weapon Stations Diagram



Configuration Points Limits:
CL=0-8, 1/2=9-14, DT=15+
Load Limit: 10,800

Station Limits: 1,5=3000;
2,4=2200; 3=2000;
6,7,9,10=1000; 8,11=500

Notes and Variants
1. Supersonic delta.
2. Rapid pitch rate.
3. Rapid power response.
4. Computerized swing wing; use first turn drag number for speed ≤3.5, second for speed ≤7.0, third for speed ≥7.5. - high bleed
5. Weapon stations 1 and 5 may carry one IRM in addition to other stores.
6. May use AIM-9, AIM-7, AIM-54, AIM-120 type missiles.

Allowed Station Loads
1,5=IRM, RHM, AHM, EP
2,4=FT only
3=PP, EP
6,7=RHM, AHM
9,10=AIM-54 only
8,11=RHM, AHM
Restrictions: a) If station 3 loaded, then stations 8,9,10,11 not usable. b) If stations 9,10 loaded then station 8,11 not usable. c) If stations 6,7 loaded with AIM-54, then station 8 not usable.

F-15A Eagle

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	5.5	4.5	3.5	20
Military	3.0	2.5	2.0	4
Normal	0	0	0	2
Idle	0.5	0.5	1.0	0
Spbr	1.0	1.0	1.0	—



Cruise Speed: 6.0
Visibility: 8
Size: −1
Vulnerability: +1

Restricted Arc: —
Blind Arc: 30L
Radar Arc: 150+
Internal Fuel: 580

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/.5

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	1
HT	2	2	2
BT	3	4	4
ET	4	4	5

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	65	55	48	
EH 46+	4-15	4.5-13	4.5-11	16
VH 36-45	3.5-14	3.5-12	4-10.5	15
HI 26-35	2.5-13	3-11	3.5-10	15
MH 17-25	2-12	2.5-10	3-9	14
ML 8-16	2-10	2.5-9	2.5-8	12
LO 1-7	2-9	2-8.5	2-7.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	1	.5
VH 36-45	4	1	3	1	1	.5
HI 26-35	6	1.5	4	1	2	.5
MH 17-25	6	2	4	1	2	1
ML 8-16	8	2	5	1	3	1
LO 1-7	8	3	5	2	3	1

F-15C Eagle

Crew: Pilot only

Power Chart ••

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	5.5	4.5	3.5	20
Military	3.0	2.5	2.0	4
Normal	0	0	0	2
Idle	0.5	0.5	1.0	0
Spbr	1.0	1.0	1.0	—

See notes for FAST packs



Cruise Speed: 6.0
Visibility: 8
Size: −1
Vulnerability: +1

Restricted Arc: —
Blind Arc: 30L
Radar Arc: 150+
Internal Fuel: 670

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/.5

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	1,2
HT	2	2	2,3
BT	3,4	4	4,5
ET	4	4,5	5,6

See notes for FAST packs

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	65,62	55,52	48,42	
EH 46+	4-15	4.5-13	4.5-11	16
VH 36-45	3.5-14	4-12	4.5-10.5	15
HI 26-35	2.5-13	3-11	4-10	15
MH 17-25	2.5-12	3-10	3-9	14
ML 8-16	2-10	2.5-9	2.5-8	12
LO 1-7	2-9	2-8.5	2.5-7.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	1,0	.5,0
VH 36-45	4	1	3	1	1	.5
HI 26-35	6,5	1.5	4,3	1	2	.5
MH 17-25	6,5	2	4,3	1	2	1
ML 8-16	8,6	2	5,4	1	3,2	1
LO 1-7	8,7	3,2	5	2,1	3,2	1

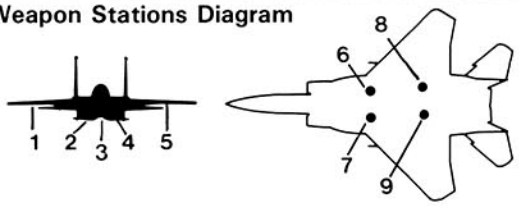
F-15A

Radar Data
Type: APG-63
Arcs: 150+
Search: 280/50
Track: 250/50
Lock-On: 8

ECM Data
IFF: Yes
RWR: B
DDS: B
DJM: B
AJM: —

Technology Listing
Auto Track
HUD Interface
Look-down Radar
IR Uncage

Weapon Stations Diagram



Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+1
Shots: 5 *Radar Ranging:* CA

Bomb System
Computed −2

Configuration Points Limits:
CL=0-8, 1/2=9-14, DT=15+
Load Limit: 16,000

Station Limits: 1,5=1000;
2,4=5100; 3=4500;
6,7,8,9=500

Notes and Variants
1. Rapid power response.
2. Weapon stations 2 and 4 may carry two IRMs in addition to other non-missile stores.
3. May use AIM-9, AIM-7, AIM-120 type missiles.

F-15 Mideast Export Model: DDS=A; DJM=A; no AIM-120 type missiles.

Allowed Station Loads
1,5=BB, BG, RP, DR, TR, EP, DP
2,4=BB, BG, BS, RP, RG, RS, WR, GP, EP, DP, FT, IRM
3=BB, BG, BS, RP, RG, RS, WR, GP, PP, EP, FT
6,7,8,9=RHM, AHM

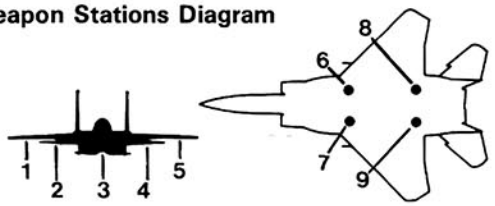
F-15C

Radar Data
Type: APG-63+
Arcs: 150+
Search: 300/50
Track: 250/50
Lock-On: 8

ECM Data
IFF: Yes
RWR: C
DDS: B
DJM: C
AJM: —

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar
Track while Scan

Weapon Stations Diagram



Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+1
Shots: 5 *Radar Ranging:* CA

Bomb System
Computed −2

Configuration Points Limits:
CL=0-8, 1/2=9-14, DT=15+
Load Limit: 16,000

Station Limits: 1,5=1000;
2,4=5100; 3=4500;
6,7,8,9=500

Notes and Variants
1. Rapid power response.
2. Weapon stations 2 and 4 may carry two IRMs or AHMs in addition to other non-missile stores.
3. May use AIM-9, AIM-7, AIM-120 type missiles.

Long Range Variant with FAST Packs Installed: Internal Fuel: 1150; use the second number (if any) for drag (turn drag chart), ceiling (velocity chart), and climb values (climb capability chart); for CL, 1/2, DT configurations A/B power=5.0, 4.0, 3.5 and military power=2.0, 2.0, 1.5.

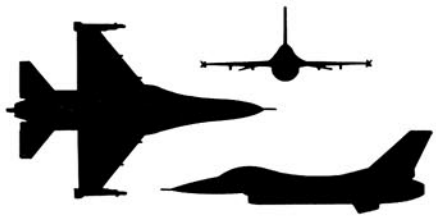
Allowed Station Loads
1,5=BB, BG, RP, DR, TR, EP, DP, AHM
2,4=BB, BG, BS, RP, RG, RS, WR, GP, EP, DP, FT, IRM, RHM, AHM, ASM
3=BB, BG, BS, RP, RS, RG, WR, GP, PP, EP, FT
6,7,8,9=RHM, AHM
Restriction: If stations 2 or 4 carries an RHM, then note 2 not allowed.

F-16A Fighting Falcon

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	4.5	3.5	2.5	10
Military	2.5	2.0	1.0	2
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—



Cruise Speed: 6.0
Visibility: 6
Size: 0
Vulnerability: +1

Restricted Arc: —
Blind Arc: 30L
Radar Arc: 150+
Internal Fuel: 345

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	2
HT	2,1	2,1	3,2
BT	3,2	4,3	5,4
ET	4,3	5,4	6,5

Maneuvering flaps; if speed <5.0 use lower drag

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	55	45	
EH 46+	3.5-14	4-12	—	15
VH 36-45	3-14	3.5-11.5	3.5-10	15
HI 26-35	2.5-13	2.5-11	3-9	15
MH 17-25	2-12	2-10	2.5-8.5	14
ML 8-16	1.5-10	2-8.5	2-8	12
LO 1-7	1.5-9	1.5-8	2-7.5	10

Climb Capability Chart

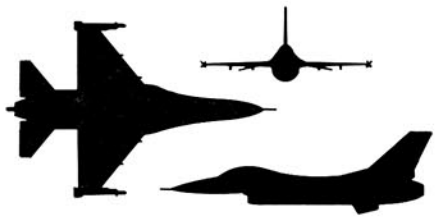
Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	0	0
VH 36-45	4	1	3	1	1	.5
HI 26-35	5	1.5	3	1	2	.5
MH 17-25	6	2	4	1	2	1
ML 8-16	7	2	5	1	2	1
LO 1-7	8	3	5	2	3	1

F-16C Fighting Falcon

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	4.5	3.5	2.5	10
Military	2.5	2.0	1.0	2
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—



Cruise Speed: 6.0
Visibility: 6
Size: 0
Vulnerability: +1

Restricted Arc: —
Blind Arc: 30L
Radar Arc: 150+
Internal Fuel: 345

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	2
HT	2,1	2,1	3,2
BT	3,2	4,3	5,4
ET	4,3	5,4	6,5

Maneuvering flaps; if speed <5.0 use lower drag

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	55	45	
EH 46+	3.5-14	4-12	—	15
VH 36-45	3-14	3.5-11.5	3.5-10	15
HI 26-35	2.5-13	2.5-11	3-9	15
MH 17-25	2-12	2-10	2.5-8.5	14
ML 8-16	1.5-10	2-8.5	2-8	12
LO 1-7	1.5-9	1.5-8	2-7.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	0	0
VH 36-45	4	1	3	1	1	.5
HI 26-35	5	1.5	3	1	2	.5
MH 17-25	6	2	4	1	2	1
ML 8-16	7	2	5	1	2	1
LO 1-7	8	3	5	2	3	1

F-16A

Radar Data
Type: APG-66
Arcs: 150+
Search: 120/40
Track: 120/30
Lock-On: 8

ECM Data
IFF: Yes
RWR: B
DDS: B
DJM: —
AJM: —

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar

Weapon Stations Diagram



Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+1
Shots: 2.5 *Radar Ranging:* CA

Bomb System
Computed −2

Configuration Points Limits:
CL=0-6, 1/2=7-14, DT=15+
Load Limit: 20,000 (see notes)

Station Limits: (for ET, BT rates/for ≤HT rates)
1,9=200/200; 2,8=500/700; 3,7=2000/3500; 4,6=2500/4500; 5=1200/2200

Notes and Variants
1. May use AIM-9 type IRMs only.
2. F-16A is stressed for ET turns but its pylons are not. The listed load limit is for turn rates ≤HT. For rates ≤BT use 16,000 maximum; for rates ≤ET use 12,000 maximum. May not use turn rate greater than load or station limits allow.
3. High pitch rate.
4. Rapid power response.

Export Model: RWR: A; DDS: A.

Allowed Station Loads
1,9=DP, IRM
2,8=BB, IRM
3,7=BB, BG, BS, RP, RG, RS, GP, WR, ASM, EP, DP, LP
4,6=BB, BG, BS, RP, RG, RS, GP, WR, ASM, EP, DP, LP, FT
5=BB, BG, BS, WR, EP, DP, WP, LP, PP, FT

F-16C

Radar Data
Type: APG-68
Arcs: 150+
Search: 160/40
Track: 120/40
Lock-On: 8

ECM Data
IFF: Yes
RWR: C
DDS: B
DJM: C
AJM: —

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar
Track while Scan

Weapon Stations Diagram



Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+1
Shots: 2.5 *Radar Ranging:* CA

Bomb System
Advanced −3

Configuration Points Limits:
CL=0-6, 1/2=7-14, DT=15+
Load Limit: 20,000 (see notes)

Station Limits: (for ≤ET rate/for ≤BT rate)
1,9=200/200; 2,8=500/700; 3,7=2000/3500; 4,6=2500/4500; 10,11=special; 5=1200/2200

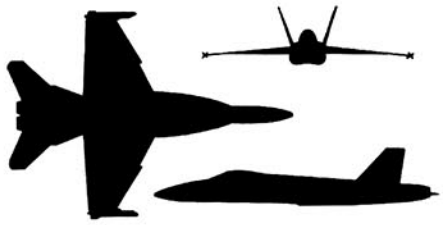
Notes and Variants
1. May use AIM-9, AIM-7, AIM-120 type missiles.
2. F-16C is stressed for ET turns but its pylons are not. The listed load limit is for turn rates ≤BT. For ET rates use 12,000 as maximum. May not use ET rate unless load and station limits allow.
3. High pitch rate.
4. Rapid power response.

Wild Weasel Variant: RWR: D; allow ARM on stations 2,3,7,8.

Allowed Station Loads
1,9=IRM, DP, AHM
2,8=IRM, RHM, AHM, BB
3,7=BB, BG, BS, RP, RG, RS, GP, WR, RHM, AHM, ASM, EP, DP, LP
4,6=BB, BG, BS, RP, RG, RS, GP, WR, ASM, EP, DP, LP, FT
5=BB, BG, BS, WR, EP, DP, WP, LP, PP, FT
10,11=OP, LP only

FA-18A Hornet

Crew: Pilot only



Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1

Vertical Roll: 0/0

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	4.0	3.0	2.5	12
Military	2.0	1.5	1.0	4
Normal	0	0	0	2
Idle	0.5	0.5	1.0	0
Spbr	1.0	1.0	1.0	—

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	2	2
HT	3,2	3,2	4,3
BT	4,3	5,4	6,5
ET	5,4	6,5	NA

Maneuvering flaps; if speed <6.0 use lower drag

Cruise Speed: 5.5 *Restricted Arc:* —
Visibility: 6 *Blind Arc:* 30L
Size: 0 *Radar Arc:* 150+
Vulnerability: +1 *Internal Fuel:* 540

Minimum-Maximum Velocity Chart

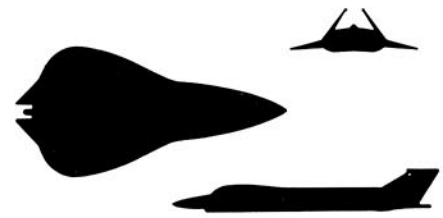
Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	56	49	
EH 46+	3-12	3,5-11	4-9.5	14
VH 36-45	2.5-12	3-11	3.5-9	14
HI 26-35	2-12	2.5-10.5	3-9	13
MH 17-25	1.5-11	2-10	2.5-8	12
ML 8-16	1.5-10	1.5-9	2-8	12
LO 1-7	1-9	1.5-8	2-7	11

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	1	0
VH 36-45	3	1	2	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	6	2	4	1	2	1
ML 8-16	6	2	4	1	2	1
LO 1-7	8	3	5	2	3	1

F-19A Stealth Fighter

Crew: Pilot only



Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1

Vertical Roll: 0/0

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	5.0	4.0	3.5	12
Military	2.5	2.0	2.0	4
Normal	0	0	0	2
Idle	0.5	0.5	0.5	0
Spbr	1.0	1.0	1.0	—

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	1
HT	2	2	2
BT	3	3	4
ET	4	NA	NA

Cruise Speed: 6.0 *Restricted Arc:* 60L
Visibility: 5 *Blind Arc:* 30
Size: 0 *Radar Arc:* 150+
Vulnerability: 0 *Internal Fuel:* 400

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	55	50	
EH 46+	3.5-11	4-10.5	4-10	12
VH 36-45	3-10.5	3.5-10	3.5-10	12
HI 26-35	3-10	3-9.5	3.5-9	12
MH 17-25	2.5-9	2.5-8.5	3-8	11
ML 8-16	2.5-8.5	2.5-8	2.5-7.5	10
LO 1-7	2-8	2-7.5	2-7	9

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 5.0	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	1	.5
VH 36-45	4	1	3	1	1	.5
HI 26-35	5	2	3	1	2	1
MH 17-25	6	2	4	1	2	1
ML 8-16	7	3	5	2	2	1
LO 1-7	8	3	5	2	3	1

FA-18A

Radar Data	ECM Data	Technology Listing
Type: APG-65	*IFF:* Yes	Auto Track
Arcs: 150+	*RWR:* C	HUD Interface
Search: 180/40	*DDS:* B	IR Uncage
Track: 120/40	*DJM:* C	Look-down Radar
Lock-On: 8	*AJM:* —	Track while Scan
		Target ID

Weapon Stations Diagram



Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+1
Shots: 3 *Radar Ranging:* IG

Bomb System
Advanced −3

Configuration Points Limits:
CL=0-6, 1/2=7-12, DT=13+
Load Limit: 13,400

Station Limits: 1,9=250;
2,8=2500; 3,7=3000;
4,6=500; 5=3000

Notes and Variants
1. Rapid power response.
2. High pitch rate.
3. May use AIM-9, AIM-7, AIM-120 type missiles.

Allowed Station Loads
1,9 = IRM
2,8=BB, BG, BS, RP, RG, RS, FT, WR, ARM, ASM, IRM, RHM, AHM, EP, DP, LP
3,7=BB, BG, BS, RP, RG, RS, GP, FT, WR, ARM, ASM, EP, DP, LP
4,6=RHM, AHM, OP, LP
5=BB, BG, BS, DR, TR, GP, PP, WP, FT

F-19A

Radar Data	ECM Data	Technology Listing
Type: APG-68+	*IFF:* Yes	Auto Track
Arcs: 150+	*RWR:* C	HUD Interface
Search: 200/40	*DDS:* B	IR Uncage
Track: 160/40	*DJM:* C	Look-down Radar
Lock-On: 8	*AJM:* —	Track while Scan
		Target ID
		V.A.S.

Weapon Stations Diagram



Internal Gun Data
Type: 20mm Vulcan
Air to Air: 6 *Air to Ground:* 8*
Roll to Hit: 0=7, 1=6, 2=4
Gunsight: BT+1
Shots: 3 *Radar Ranging:* IG

Bomb System
Advanced −3

Configuration Points Limits:
CL=0-4, 1/2=5-8, DT=9+
Load Limit: 6,500

Station Limits: 1,4=1500;
2,3=750;
5,6=1000

Notes and Variants
1. F-19A called "Ghostrider" in novel *Red Storm Rising.*
2. Supersonic delta.
3. Rapid power response.
4. Stealth technology effects: a) Add 4 to radar detection attempts on F-19. b) Add 4 to lock-on attempts on F-19. c) Auto track not allowed against F-19. d) All missiles add 2 when attacking F-19.
5. May use AIM-9, AIM-7, AIM-120 type missiles.
6. Rapid acceleration aircraft if configuration=CL.
7. Weapons in internal bays=half listed load points (drop fractions).

Allowed Station Loads
1,4=BB, BG, BS, RP, RG, RS, FT, WR, ARM, IRM, RHM, AHM
2,3=BB, BG, BS, RP, RG, RS, ARM, IRM, RHM, AHM, EP, DP, LP, PP, OP
5,6=(internal weapons bay) BB, BG, BS, RG, RS, or fuel
Notes: Stations 5 and 6 limited to one weapon each. Station 5 may carry OP or LP. Instead of weapons, stations 5 and 6 may each carry 30 points of fuel.

F-20A Tigershark

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	4.0	3.5	2.5	6
Military	2.5	1.5	1.0	2
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—



Cruise Speed: 5.0
Visibility: 5
Size: 0
Vulnerability: 0

Restricted Arc: 60L
Blind Arc: 30
Radar Arc: 150+
Internal Fuel: 250

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	2	2
HT	2,1	3,2	4,3
BT	4,3	5,4	6,4
ET	5,4	6,5	8,6

Maneuvering flaps; if speed <5.0 use lower drag

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	56	52	42	
EH 46+	4-13.5	4.5-12	—	14
VH 36-45	3.5-13	4-11	4-9.5	14
HI 26-35	2.5-12	3.5-10	3.5-9	14
MH 17-25	2-11	3-9.5	3-8.5	13
ML 8-16	1.5-10	2.5-9	2.5-8	12
LO 1-7	1.5-9	2-8	2.5-7	11

Climb Capability Chart

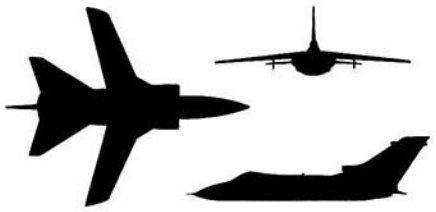
Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	0	0
VH 36-45	3	1	2	.5	1	.5
HI 26-35	4	2	3	1	1	.5
MH 17-25	6	2	4	1	2	1
ML 8-16	7	3	5	2	2	1
LO 1-7	8	3	5	2	3	1

MRCA Tornado F.3

Crew: Pilot, Radar Officer

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.5	2.5	2.0	12
Military	1.5	1.0	1.0	3
Normal	0	0	0	1
Idle	0.5	0.5	0.5	0
Spbr	0.5	1.0	1.0	—



Cruise Speed: 6.0
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: 60L
Blind Arc: 30
Radar Arc: 120+
Internal Fuel: 620

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/.5

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	2,2,2	2,2,2	2,2,2
HT	3,4,4	3,4,4	4,4,4
BT	4,5,6	4,5,6	5,6,7
ET	5,6,8	NA	NA

Auto swing wing; drag for low, medium, high speeds

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	65	58	52	
EH 46+	4-15	4-13	4.5-11	16
VH 36-45	3-15	3.5-12.5	4-10.5	16
HI 26-35	2.5-14	3-12	3.5-10	15
MH 17-25	2.5-12	2.5-10	3-9	15
ML 8-16	2-10	2-9.5	2.5-8.5	12
LO 1-7	1.5-9	1.5-9	2-8	11

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	.5	1	.5	1	.5
VH 36-45	2	.5	1	.5	1	.5
HI 26-35	3	1	2	1	1	.5
MH 17-25	4	1.5	3	1	1	.5
ML 8-16	5	2	3	1	2	1
LO 1-7	6	2	4	1	2	1

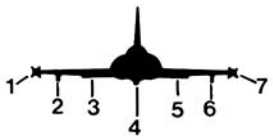
F-20A

Radar Data
Type: APG-67
Arcs: 150+
Search: 200/40
Track: 100/30
Lock-On: 8

ECM Data
IFF: Yes
RWR: C
DDS: B
DJM: —
AJM: —

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar
Track while Scan
Target ID

Weapon Stations Diagram



Internal Gun Data
Type: two 20mm
Air to Air: 4 *Air to Ground:* 6*
Roll to Hit: 0=5, 1=3, 2=1
Gunsight: BT+1
Shots: 5.5 *Radar Ranging:* CA

Bomb System
Advanced −3

Configuration Points Limits:
CL=0-6, 1/2=7-10, DT=11+
Load Limit: 9,200

Station Limits: 1,7=200;
2,6=1100;
3,4,5=2200

Notes and Variants
1. Rapid power response.
2. Rapid pitch rate.
3. May use AIM-9, AIM-7, AIM-120 type missiles.

Allowed Station Loads
1,7=IRM
2,6=IRM, RHM, AHM, BB, BG, SB, WR, ARM, EP, RP, RG, RS
3,5=RHM, AHM, ARM, ASM, BB, BG, BS, RP, RG, RS, GP, FT, WR, EP, DP, LP
4=FT, BB, BG, BS, RP, RG, RS, WR, GP, EP, PP, OP, LP, DP

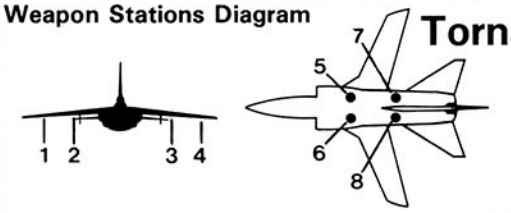
Tornado F.3

Radar Data
Type: Fox Hunter
Arcs: 120+
Search: 300/40
Track: 300/30
Lock-On: 7

ECM Data
IFF: Yes
RWR: C
DDS: B
DJM: —
AJM: —

Technology Listing
HUD Interface
IR Uncage
Look-down Radar
Multi-target (4)
Track while Scan
V.A.S.

Weapon Stations Diagram



Internal Gun Data
Type: one 27mm Mauser
Air to Air: 5 *Air to Ground:* 2
Roll to Hit: 0=6, 1=3, 2=1
Gunsight: BT+1
Shots: 4 *Radar Ranging:* CA

Bomb System
Computed −2

Configuration Points Limits:
CL=0-6, 1/2=7-12, DT=13+
Load Limit: 10,200

Station Limits: 1,4=1100;
2,3=3000;
5,6,7,8=500

Notes and Variants
1. Supersonic delta.
2. Rapid power response.
3. Computerized swing wing for maximum aerodynamic performance; use first drag number if speed ≤3.5, second if speed ≤7.0, third if speed ≥7.5.
4. Weapon stations 2 and 3 may each carry two IRMs in addition to other stores.
5. May use AIM-9, Skyflash, and AIM-120 type missiles.
6. Stations 2 and 3 may be overloaded to carry one 2200-liter drop-tank (weight 4000), but maximum turn rate reduced to HT until tanks are jettisoned.

Early Production Tornado F.2 Variant: For CL configuration, A/B power=3.0 and military power=1.0 (less efficient engines).

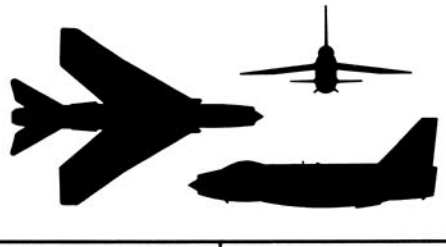
Allowed Station Loads
1,4=BB, BG, RP, DR, EP, FT, IRM
2,3=BB, BG, BS, RP, RG, RS, WR, EP, DP, LP, FT
5,6,7,8=RHM, AHM

BAC Lightning F.6

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	3.0	2.5	12
Military	1.5	1.5	1.5	4
Normal	0	0	0	2
Idle	0.5	0.5	0.5	0
Spbr	0.5	1.0	1.0	—



Cruise Speed: 6.0
Visibility: 6
Size: 0
Vulnerability: −1

Restricted Arc: 60
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 475

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	2	2	2
HT	2	3	3
BT	4	4	4
ET	NA	NA	NA

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	58	52	48	
EH 46+	4.5-13.5	5-12	5-11	14
VH 36-45	4-13	4.5-11	4.5-10	14
HI 26-35	3.5-11	3.5-10	4-9	12
MH 17-25	3-10	3-9	3.5-8.5	12
ML 8-16	2.5-9	2.5-8.5	2.5-8	11
LO 1-7	2-8	2-8	2-7.5	10

Climb Capability Chart

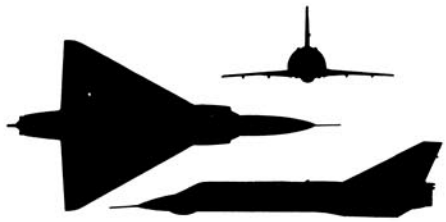
Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	.5	1	.5	1	0
VH 36-45	3	1	2	.5	1	.5
HI 26-35	5	1	3	1	2	.5
MH 17-25	6	2	4	1	2	1
ML 8-16	7	2	5	1	2	1
LO 1-7	7	3	5	2	2	1

Mirage IIIE

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	2.5	2.0	1.5	5
Military	1.5	1.0	1.0	2
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—



Cruise Speed: 6.0
Visibility: 6
Size: 0
Vulnerability: 0

Restricted Arc: —
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 285

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	2	2
HT	2	3	4
BT	3	4	5
ET	4	NA	NA

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	54	45	35	
EH 46+	4.5-14	—	—	15
VH 36-45	3.5-13	4-10.5	4.5-8.5	14
HI 26-35	3-11	3.5-10	4-8	13
MH 17-25	2.5-10	3-9	3.5-7.5	12
ML 8-16	2-9	2.5-8	2.5-6.5	11
LO 1-7	2-8.5	2-7.5	2.5-6	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	.5	0	0	0	0	0
VH 36-45	1	.5	1	0	.5	0
HI 26-35	2	1	1	.5	1	.5
MH 17-25	2	1	1	.5	1	.5
ML 8-16	4	2	3	1	2	1
LO 1-7	4	2	3	1	2	1

Lightning F.6

Radar Data
Type: Ferr. Air Pass
Arcs: 180+
Search: 80/12
Track: 60/10
Lock-On: 6

ECM Data
IFF: Yes
RWR: A
DDS: —
DJM: —
AJM: —

Technology Listing
None

Weapon Stations Diagram



Internal Gun Data
Type: two 30mm Aden
Air to Air: 6 *Air to Ground:* 6
Roll to Hit: 0=6, 1=3, 2=2
Gunsight: HT+1, BT+2
Shots: 3 *Radar Ranging:* R

Bomb System
Manual −0

Configuration Points Limits:
CL=0-2, 1/2=3-6, DT=7+
Load Limit: F.6=2,600; F.53=6,600

Station Limits: 1,4=2000;
2,3=300;
5,6=1100

Notes and Variants
1. May use Redtop missiles only.
2. Stations 5 and 6 are overwing pylons.

Export F.53 Variant: IFF only, no RWR; A/B power=3.0, 2.5, 2.0 for CL, 1/2, DT configurations respectively.

Allowed Station Loads
F.6:
1,4=not used
2,3=IRM
5,6=FT, RP
F.53:
1,4=BB, RP, DR
2,3=IRM 5,6=FT, RP, DR

Mirage IIIE

Radar Data
Type: Cyrano II
Arcs: 180+
Search: 90/15
Track: 60/12
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: —
DJM: —
AJM: —

Technology Listing
HUD Interface

Weapon Stations Diagram



Internal Gun Data
Type: two 30mm Defa
Air to Air: 6 *Air to Ground:* 6
Roll to Hit: 0=6, 1=3, 2=2
Gunsight: BT+2
Shots: 3 *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-4, 1/2=5-8, DT=9+
Load Limit: 4,800

Station Limits: 1,5=550;
2,4=2200;
3=2200

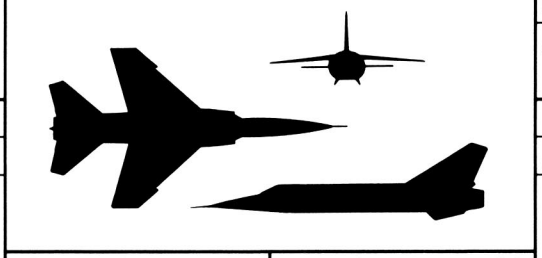
Notes and Variants
1. Supersonic delta.
2. May use AIM-9, Matra 550 IRM class missiles on stations 1,5 only.
3. May use Matra 530 missiles on station 3. (Swiss version may use AIM- 26.)

Mirage IIIR Recon Variant: No radar; no guns; DDS: A.

Allowed Station Loads
1,5=BB, RP, RK, IRM, EP
2,4=BB, BG, RP, RG, RS, RK, GP, ARM, ASM, DR, FT, RPT
3=IRM, RHM, BB, BG, RS, RG, RP, RK, GP, ARM, ASM, PP, EP, WR, WP, FT
Note: Station 3 may carry two BB type weapons without using WRs.

Mirage F-1C

Crew: Pilot only



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	2.5	2.0	1.5	6
Military	1.5	1.0	1.0	2
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	0.5	1.0	—

Cruise Speed: 5.5
Visibility: 6
Size: 0
Vulnerability: 0

Restricted Arc: 60
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 370

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	2	2	2
HT	3,2	3,2	4,3
BT	4,3	4,3	5,4
ET	5,4	NA	NA

Maneuvering flaps; if speed <4.5 use lower drag

Minimum-Maximum Velocity Chart

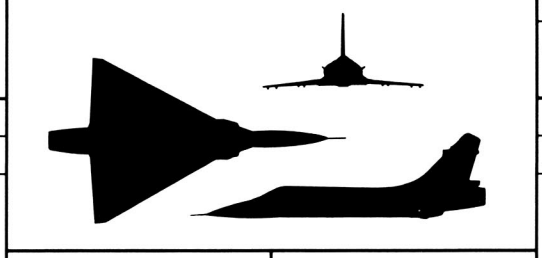
Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	65	58	48	
EH 46+	3.5-14	4-12	4.5-10	15
VH 36-45	3-14	3.5-11	4-9.5	14
HI 26-35	2.5-12	3-10	3.5-9	14
MH 17-25	2.5-11	2.5-9.5	3-8.5	13
ML 8-16	2-10	2-9	2.5-8	12
LO 1-7	1.5-9	1.5-8	2-7.5	11

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 5.0	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	.5	.5	0
VH 36-45	2	1	1	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	5	2	3	1	2	1
ML 8-16	6	2	4	1	2	1
LO 1-7	6	3	4	2	2	1

Mirage 2000

Crew: Pilot only



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	4.0	3.0	2.0	9
Military	2.0	1.5	1.0	3
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—

Cruise Speed: 6.0
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: —
Blind Arc: 30
Radar Arc: 150+
Internal Fuel: 325

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	2	2
HT	2	3	4
BT	3,2	4,3	5,4
ET	4,3	5,4	6,5

Slatted wings; if speed <6.0 use lower drag

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	56	48	
EH 46+	3.5-15	4-13	4.5-10	15
VH 36-45	3-14	3.5-12	4-9	15
HI 26-35	2.5-13	3-11	3.5-8.5	14
MH 17-25	2-12	2.5-10	2.5-8	12
ML 8-16	1.5-10	2-9	2-7.5	11
LO 1-7	1.5-9	1.5-8.5	1.5-7	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	.5	1	.5	1	0
VH 36-45	3	1	2	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	5	2	3	1	2	1
ML 8-16	6	3	4	2	2	1
LO 1-7	8	3	5	2	3	1

Mirage F-1C

Radar Data
Type: Cyrano IVM
Arcs: 180+
Search: 120/30
Track: 90/20
Lock-On: 8

ECM Data
IFF: Yes
RWR: B
DDS: A
DJM: —
AJM: —

Technology Listing
Auto Track
HUD Interface
Look-down Radar
IR Uncage

Weapon Stations Diagram



Internal Gun Data
Type: two 30mm Defa
Air to Air: 6 *Air to Ground:* 6
Roll to Hit: 0=6, 1=3, 2=2
Gunsight: BT+2
Shots: 3.5 *Radar Ranging:* R

Bomb System
Manual −0

Configuration Points Limits:
CL=0-5, 1/2=6-8, DT=9+
Load Limit: 8,800

Station Limits: 1,7=250;
2,6=1100; 3,5=2800;
4=4500

Notes and Variants

1. May use AIM-9, Matra 550, Matra 530, Super Matra 530 type missiles.
2. Station 4 can be fitted to carry two BB class weapons or two dual racks with four BB class weapons.

Mirage F-1E Export Model: No DDS; No auto track; No look-down radar; Bomb System: Ballistic −1.

Allowed Station Loads

1,7=IRM
2,6=BB, BG, BS, RK, RP, RG, RS, DR, EP, IRM
3,5=BB, BG, BS, RK, RP, RG, RS, RPT, GP, DR, IRM, RHM, FT, EP, DP, LP
4=BB, BG, BS, RP, RG, RS, GP, DR, ARM, RHM, ASM, FT

Mirage 2000

Radar Data
Type: RDI
Arcs: 150+
Search: 180/40
Track: 120/30
Lock-On: 8

ECM Data
IFF: Yes
RWR: C
DDS: B
DJM: C
AJM: —

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar
Track while Scan

Weapon Stations Diagram



Internal Gun Data
Type: two 30mm Defa
Air to Air: 6 *Air to Ground:* 6
Roll to Hit: 0=6, 1=3, 2=2
Gunsight: BT+2
Shots: 3 *Radar Ranging:* CA

Bomb System
Computed −2

Configuration Points Limits:
CL=0-5, 1/2=6-10, DT=11
Load Limit: 13,200

Station Limits: 1,9=660;
2,5,8=4000;
3,4,6,7=880

Notes and Variants

1. Supersonic delta.
2. Rapid power response.
3. High pitch rate.
4. May use AIM-9, Matra 550, Matra 530, Super Matra 530 type missiles.

Export Model: Radar: RDM; Arc: 150+; Search: 120/40; Track: 100/25; Lock-On: 8; No track while scan; no DJM; RWR: B.

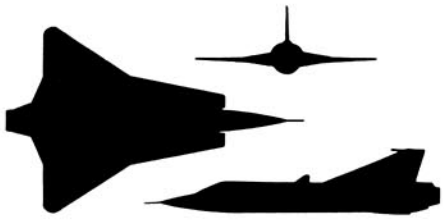
Allowed Station Loads

1,9=BB, BG, RP, EP, DP, IRM
2,8=BB, BG, BS, RP, RG, RS, ASM, GP, WR, IRM, RHM, FT, RPT
3,6,7=BB
4=BB, LP
5=BB, BG, BS, RP, RG, RS, ASM, GP, WP, WR, EP, PP, FT, RPT

Note: Stations 2,5,8 may each carry two DRs with four bombs attached.

Saab F-35 Draken

Crew: Pilot only



Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1

Vertical Roll: 0/0

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	2.5	2.0	1.5	6
Military	1.5	1.0	1.0	2
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	0	1	1
HT	1	2	2
BT	3	4	4
ET	NA	NA	NA

Cruise Speed: 6.0 *Restricted Arc:* 60L

Visibility: 7 *Blind Arc:* 30

Size: 0 *Radar Arc:* 180+

Vulnerability: 0 *Internal Fuel:* 340

Minimum-Maximum Velocity Chart

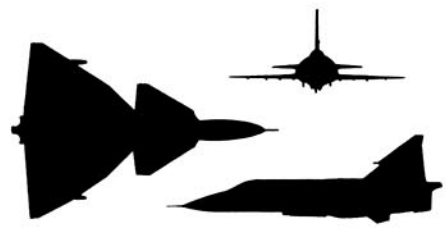
Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	65	58	45	
EH 46+	3.5-13	3.5-11	—	13
VH 36-45	3-12	3.5-11	3.5-9.5	13
HI 26-35	2.5-11	3-10	3.5-9	13
MH 17-25	2-10	2.5-9	3-8	12
ML 8-16	1.5-9	2-8	2.5-7	11
LO 1-7	1.5-7.5	1.5-7	2-6.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	.5	0	0	0
VH 36-45	1	.5	1	.5	.5	0
HI 26-35	2	1	1	.5	1	.5
MH 17-25	3	1	2	.5	1	.5
ML 8-16	4	1.5	3	1	1	.5
LO 1-7	5	2	3	1	2	1

Saab JA-37 Viggen

Crew: Pilot only



Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1

Vertical Roll: 0/0

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	2.5	2.0	11
Military	1.0	1.0	1.0	3
Normal	0	0	0	1
Idle	0.5	1.0	1.0	0
Spbr	0.5	1.0	1.0	—

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	1
HT	2	2	3
BT	3	4	4
ET	4	NA	NA

Cruise Speed: 5.0 *Restricted Arc:* 60

Visibility: 7 *Blind Arc:* 30

Size: 0 *Radar Arc:* 150+

Vulnerability: 0 *Internal Fuel:* 305

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	54	45	
EH 46+	3.5-13	4-12	—	14
VH 36-45	3.5-13	3.5-11	4-9	14
HI 26-35	3-12	3-10	3.5-8.5	13
MH 17-25	2.5-10	2.5-9	3-8	13
ML 8-16	2-9	2-8	2.5-7	12
LO 1-7	1.5-8	1.5-7.5	2-6.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	.5	0	0
VH 36-45	2	1	1	.5	1	.5
HI 26-35	4	2	3	1	1	.5
MH 17-25	5	2	3	1	2	1
ML 8-16	6	2	4	1	2	1
LO 1-7	6	3	4	2	2	1

F-35

Radar Data
Type: Erickson
Arcs: 180+
Search: 60/12
Track: 35/8
Lock-On: 7

ECM Data
IFF: Yes
RWR: A
DDS: —
DJM: —
AJM: —

Technology Listing
None

Weapon Stations Diagram



Internal Gun Data
Type: two 30mm Aden
Air to Air: 6 *Air to Ground:* 6
Roll to Hit: 0=6, 1=3, 2=2
Gunsight: HT+1, BT+2
Shots: 2.5 *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-4, 1/2=5-8, DT=9+
Load Limit: 9,000

Station Limits:
All=1100

Notes and Variants
1. F-35 is export model.
2. Supersonic delta.
3. May use AIM-9, AIM-4 type IRMs only.

Swedish J-35F Interceptor: Radar: PS-01; Arcs: 180+; Search: 100/15; Track: 60/10; Lock-On:7; Gun: one 30mm cannon; Air to air: 4; Air to ground: 2; Roll to hit: 0=4, 1=2, 2=1; Shots: 2.5; May use AIM-9, AIM-4, AIM-26 type missiles.

Allowed Station Loads
1,2,8,9=BB, RP, RK, EP
3,7=BB, RP, RK, IRM, RHM, FT
4,6=BB, RP, RK, IRM, FT
5=BB, RP, RK, EP, PP, FT

JA-37

Radar Data
Type: PS-46A
Arcs: 150+
Search: 150/30
Track: 120/30
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: —
DJM: —
AJM: —

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar
Track while Scan

Weapon Stations Diagram



Internal Gun Data
Type: one 30mm KCA
Air to Air: 5 *Air to Ground:* 3
Roll to Hit: 0=5, 1=3, 2=2
Gunsight: BT+2
Shots: 4 *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-6, 1/2=7-10, DT=11+
Load Limit: 13,200

Station Limits: 1,3,5,7=1100;
2,6=2200;
4=4400

Notes and Variants
1. Supersonic delta.
2. May use AIM-9, AIM-4, AIM-26, and Skyflash type missiles.

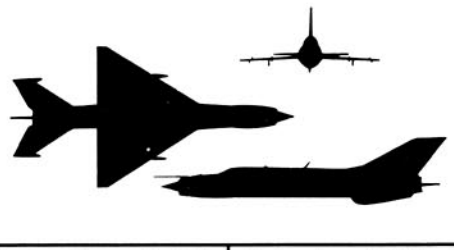
Allowed Station Loads
1,7=BB, BG, RP, RK, EP, IRM, DR, FT
2,6=BB, BG, RP, RK, WR, GP, IRM, RHM
3,5=BB, BG, RP, RK, IRM, FT, EP
4=BB, BG, RP, GP, PP, DR, FT

MIG-21MF Fishbed J

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.5	2.5	2.5	6
Military	1.5	1.0	1.0	2
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—



Cruise Speed: 6.0
Visibility: 5
Size: 0
Vulnerability: −2

Rstr. Arc: 180L, 60
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 280

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	1
HT	2	2	3
BT	4	4	4
ET	4	5	NA

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	56	50	44	
EH 46+	4-13	4.5-11	—	13
VH 36-45	3.5-12	4-10	5-8	13
HI 26-35	3-10.5	3.5-9	4-7.5	12
MH 17-25	2.5-9	3-8	3-7	12
ML 8-16	2-8	2.5-7	2.5-6.5	10
LO 1-7	2-7.5	2-6.5	2.5-6	9

Climb Capability Chart

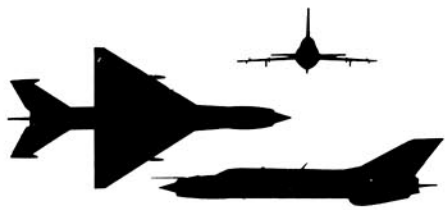
Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	0	1	0	0	0
VH 36-45	1	.5	1	.5	.5	0
HI 26-35	2	.5	1	.5	1	.5
MH 17-25	3	1	2	1	1	.5
ML 8-16	4	1	3	1	1	.5
LO 1-7	4	2	3	1	2	1

MIG-21bis Fishbed N

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.5	3.5	3.0	7
Military	1.5	1.5	1.0	2
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—



Cruise Speed: 6.0
Visibility: 5
Size: 0
Vulnerability: −2

Restricted Arc: 180L
Blind Arc: 60
Radar Arc: 180+
Internal Fuel: 300

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	1
HT	2	2	3
BT	4	4	4
ET	4	NA	NA

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	55	50	45	
EH 46+	4-13	4.5-11	—	13
VH 36-45	3.5-12	4-10	5-8	13
HI 26-35	3-10.5	3.5-9	4-7.5	12
MH 17-25	2.5-9	3-8	3-7	12
ML 8-16	2-8	2.5-7.5	2.5-6.5	10
LO 1-7	2-7.5	2-7	2.5-6.5	9

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	0	0	0
VH 36-45	1	.5	1	.5	.5	0
HI 26-35	2	1	1	.5	1	.5
MH 17-25	3	1	2	1	1	.5
ML 8-16	4	1.5	3	1	1	.5
LO 1-7	5	2	3	1	2	1

MIG-21MF

Radar Data
Type: Jaybird
Arcs: 180+
Search: 48/12
Track: 30/8
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: A
DJM: —
AJM: —

Technology Listing
None

Weapon Stations Diagram



Internal Gun Data
Type: GSh twin 23mm
Air to Air: 5 *Air to Ground:* 5
Roll to Hit: 0=7, 1=4, 2=2
Gunsight: HT+2, BT+3
Shots: 2 *Radar Ranging:* R

Bomb System
Manual −0

Configuration Points Limits:
CL=0-4, 1/2=5-6, DT=7+
Load Limit: 4,400

Station Limits:
1,5=550;
2,3,4=1100

Notes and Variants
1. Pre-1985 ECM: No DDS.
2. Aircraft has thick front windscreen; add 1 to all spotting rolls in 180 arc.
3. May use AA-2, AA-8 type IRMs.
4. AA-2C is only RHM type allowed.

Export Model: Radar: Spinscan B; Arc: 150+; Search: 35/8; Track: 24/8; Lock-On:7; IFF: Yes; RWR:A.

Allowed Station Loads
1,5=BB, RK, RP, IRM, RHM[4], EP, FT
2,4=BB, RK, RP, IRM, DR, FT
3=BB, FT, EP, DR, GP

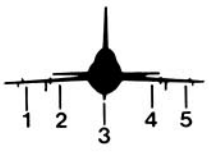
MIG-21bis

Radar Data
Type: Jaybird
Arcs: 180+
Search: 48/12
Track: 30/8
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: A
DJM: —
AJM: —

Technology Listing
None

Weapon Stations Diagram



Internal Gun Data
Type: GSh twin 23mm
Air to Air: 5 *Air to Ground:* 5
Roll to Hit: 0=7, 1=4, 2=2
Gunsight: HT+1, BT+2
Shots: 2 *Radar Ranging:* R

Bomb System
Manual −0

Configuration Points Limits:
CL=0-4, 1/2=5-6, DT=7+
Load Limit: 4,900

Station Limits: 1,5=800;
2,4=1100;
3=1100

Notes and Variants
1. Aircraft has thick front windscreen; add 1 to all spotting rolls in 180 arc.
2. May use AA-2, AA-8 type IRMs.
3. AA-2C only RHM type allowed.

MIG-21bis Fishbed L: A/B power: 3.5, 3.0, 2.5 for CL, 1/2, DT configurations respectively (less powerful engine).

Allowed Station Loads
1,5=BB, RK, RP, IRM, RHM[3], EP, FT
2,4=BB, RK, RP, IRM, DR, FT, RHM[3]
3=BB, FT, EP, DR, GP
Note: Stations 2,4 may be fitted to carry two AA-8s each.

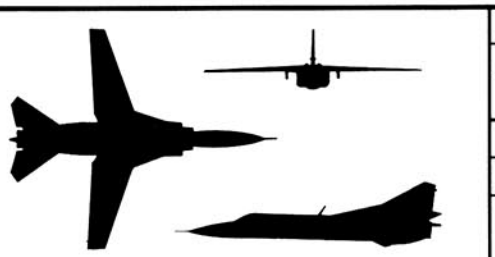
MIG-23MF Flogger G

Crew: Pilot only

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	2.5	2.5	11
Military	1.5	1.5	1.0	3
Normal	0	0	0	1
Idle	0.5	0.5	0.5	0
Spbr	0.5	0.5	1.0	—

Speed restrictions; see notes



Cruise Speed: 6.0
Visibility: 6
Size: 0
Vulnerability: −1

Restricted Arc: —
Blind Arc: 60
Radar Arc: 150+
Internal Fuel: 375

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1.5/1.5
Vertical Roll: 0/.5

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1,1,2	1,1,2	1,2,2
HT	2,2,2	2,2,3	2,3,3
BT	3,4,NA	3,4,NA	3,4,NA
ET	NA	NA	NA

3-position wing; drag for fore, mid, aft sweep

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	54	45	
EH 46+	4.5-15	4.5-12	—	16
VH 36-45	4-14	4.5-11	4.5-10	15
HI 26-35	3.5-12	4-10	4.5-9.5	14
MH 17-25	3-10	3.5-9.5	3.5-9	12
ML 8-16	2.5-9	3-9	3-8	11
LO 1-7	2-8.5	2.5-8	2.5-7.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	.5	0	0
VH 36-45	2	.5	1	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	4	1	3	1	1	.5
ML 8-16	5	2	3	1	2	1
LO 1-7	7	2	5	1	2	1

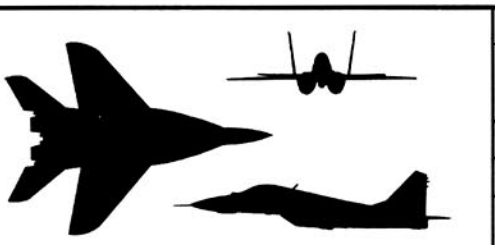
MIG-29 Fulcrum A

Crew: Pilot only

Power Chart ●●

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	5.5	4.5	4.0	14
Military	3.0	2.5	2.0	4
Normal	0	0	0	2
Idle	0.5	0.5	1.0	0
Spbr	1.0	1.0	1.0	—

Smoker at military power



Cruise Speed: 6.0
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: —
Blind Arc: 30
Radar Arc: 150+
Internal Fuel: 400

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/0

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	1	1
HT	2	2	3
BT	4	4	4
ET	4	5	5

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	68	58	50	
EH 46+	3.5-15	4-13	4.5-10.5	15
VH 36-45	3-14	3.5-12	4-10	14
HI 26-35	3-13	3-11	3.5-9.5	14
MH 17-25	2.5-12	2.5-10	3-9	12
ML 8-16	2-10	2.5-9	2.5-8.5	10
LO 1-7	2-9	2-8.5	2.5-8	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 5.0	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	1	.5
VH 36-45	4	1	3	1	1	.5
HI 26-35	6	2	4	1	2	1
MH 17-25	7	2	5	1	2	1
ML 8-16	8	3	5	2	3	1
LO 1-7	8	3	5	2	3	1

MIG-23MF

Radar Data
Type: High-Lark B
Arcs: 150+
Search: 120/20
Track: 90/15
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: A
DJM: —
AJM: —

Technology Listing
Auto Track
Look-down Radar
HUD Interface

Weapon Stations Diagram



Internal Gun Data
Type: GSh twin 23mm
Air to Air: 5 *Air to Ground:* 5
Roll to Hit: 0=7, 1=4, 2=2
Gunsight: HT+1, BT+2
Shots: 2 *Radar Ranging:* R

Bomb System
Manual −0

Configuration Points Limits:
CL=0-5, 1/2=6-8, DT=9+
Load Limit: 6,600

Station Limits:
1,2,4,5=1100;
3=2200

Notes and Variants

1. If wings forward, max speed=6.0 and reduce listed minimum speeds by 0.5.
2. If wings midswept, max speed=8.0.
3. If wings aft, aircraft is rapid acceleration capable but may not use BT turn rate.
4. Aircraft has 3-position swing wing (fore, mid, aft). Wing position may be changed one step either way in log update phase of turn if aircraft used TT or less turn rate, flew level, descended, or made a sustain climb that turn.
5. Weapon stations 2 and 4 may each be fitted to carry two AA-8 missiles.
6. May use AA-8, AA-7, AA-2 type missiles.

Allowed Station Loads
1,5=BB, BG, RK, RP, RG, DR, IRM, RHM, EP, FT
2,4=BB, BG, RK, RP, IRM [5]
3=BB, BG, RP, DR, TR, FT, EP

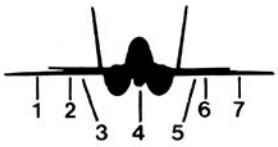
MIG-29

Radar Data
Type: MIG-29
Arcs: 150+
Search: 150/30
Track: 120/30
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: B
DJM: A
AJM: —

Technology Listing
Auto Track
HUD Interface
IR Uncage
Look-down Radar
Track while Scan

Weapon Stations Diagram



Internal Gun Data
Type: two 30mm
Air to Air: 5 *Air to Ground:* 5
Roll to Hit: 0=6, 1=4, 2=2
Gunsight: BT+2
Shots: 4 *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-8, 1/2=9-12, DT=13+
Load Limit: 13,200

Station Limits:
1,7=1100;
2,3,4,5,6=2200

Notes and Variants

1. May use AA-8, AA-2 IRMs.
2. May use AA-10, AA-7 type missiles.
3. Stations 1,2,6,7 may each be fitted to carry two AA-8 missiles.
4. Station 4 may be overloaded with a 2200-liter drop-tank (weight 4000), but maximum turn rate is limited to HT until tank is jettisoned.

Allowed Station Loads
1,7=BB, BG, RK, RP, DR, TR, IRM, RHM, AHM
2,3,5,6=BB, BG, RK, RP, RG, EP, GP, WR, ARM, ASM, IRM, RHM, AHM
2,6=FT
4=BB, BG, RP, RG, EP, PP, FT

MIG-31 Foxhound A

Crew: Pilot, Radar Officer



Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1

Vertical Roll: 0/1

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.5	3.0	2.5	24
Military	2.0	1.5	1.5	8
Normal	0	0	0	3
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	2	2	2
HT	3	3	3
BT	4	4	5
ET	NA	NA	NA

Cruise Speed: 6.0
Visibility: 8
Size: −1
Vulnerability: −1

Restricted Arc: —
Blind Arc: 60
Radar Arc: 120+
Internal Fuel: 1200

Minimum-Maximum Velocity Chart

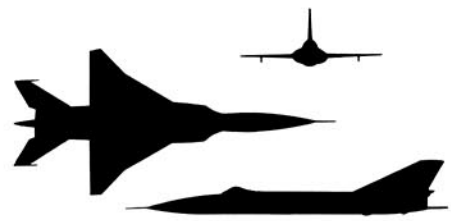
Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	70	65	55	
EH 46+	4.5-16	5-13	5-12	15
VH 36-45	4-14	4.5-12	4.5-11	14
HI 26-35	3.5-12	3.5-11	4-10	14
MH 17-25	3-10	3-10	3.5-9	12
ML 8-16	2.5-9	2.5-9	3-8.5	10
LO 1-7	2-8	2.5-7	2.5-7	9

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 5.0	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	.5	1	.5	1	.5
VH 36-45	3	1	2	.5	1	.5
HI 26-35	4	1	3	1	1	.5
MH 17-25	5	2	3	1	2	1
ML 8-16	6	2	4	1	2	1
LO 1-7	7	2	5	1	2	1

SU-15 Flagon F

Crew: Pilot only



Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1

Vertical Roll: 0/0

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	2.5	2.5	12
Military	1.5	1.0	1.0	4
Normal	0	0	0	2
Idle	0.5	0.5	1.0	0
Spbr	0.5	0.5	0.5	—

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	2	2
HT	3	3	4
BT	4	5	6
ET	NA	NA	NA

Cruise Speed: 6.0
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: 60
Blind Arc: 30
Radar Arc: 180+
Internal Fuel: 600

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	65	60	55	
EH 46+	4.5-15	5-13	5-11	16
VH 36-45	4-13.5	4-12	4.5-10	15
HI 26-35	3-12	3.5-11	4-9	14
MH 17-25	2.5-10	3-9	3.5-8.5	12
ML 8-16	2.5-8.5	2.5-8	3-7.5	10
LO 1-7	2-7	2.5-6.5	2.5-6.5	8

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 5.0	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	0	.5	0
VH 36-45	2	.5	1	.5	1	0
HI 26-35	2	1	1	.5	1	.5
MH 17-25	3	1.5	2	1	1	.5
ML 8-16	4	2	3	1	2	1
LO 1-7	5	2	3	1	2	1

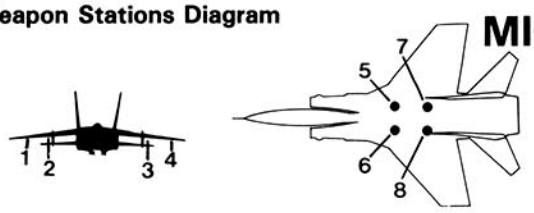
MIG-31

Radar Data
Type: MIG-31
Arcs: 120+
Search: 300/50
Track: 250/50
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: A
DJM: —
AJM: —

Technology Listing
Look-down Radar
HUD Interface
Multi-target (4)
Track while Scan

Weapon Stations Diagram



Internal Gun Data
Type: GSh twin 23mm
Air to Air: 5 *Air to Ground:* 5
Roll to Hit: 0=7, 1=4, 2=2
Gunsight: HT+1, BT+2
Shots: 2 *Radar Ranging:* R

Bomb System
Not Allowed

Configuration Points Limits:
CL=0-4, 1/2=5-8, DT=9+
Load Limit: 9,000

Station Limits:
1,2,3,4=1650;
5,6,7,8=1100

Notes and Variants
1. May use AA-8, AA-2 type IRMs.
2. May use AA-6, AA-7, AA-9, AA-10 type missiles. (*Note:* AA-6 not included in *Air Superiority.*)
3. Stations 1,2,3,4 may each be fitted to carry two AA-8 missiles.

Allowed Station Loads
1,2,3,4=IRM, RHM, AHM, FT, EP
5,6,7,8=IRM, RHM, AHM
Restrictions: If any missile type other than AA-9 is used on station 5 or 6, then stations 7 and 8 not usable.

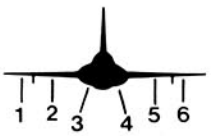
SU-15

Radar Data
Type: Skip Spin
Arcs: 180+
Search: 100/20
Track: 90/15
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: —
DJM: —
AJM: —

Technology Listing
None

Weapon Stations Diagram



Internal Gun Data
Type: None
Air to Air: — *Air to Ground:* —
Roll to Hit: —
Gunsight: HT+2, BT+3
Shots: — *Radar Ranging:* R

Bomb System
Not Allowed

Configuration Points Limits:
CL=0-4, 1/2=5-6, DT=7+
Load Limit: 4,600

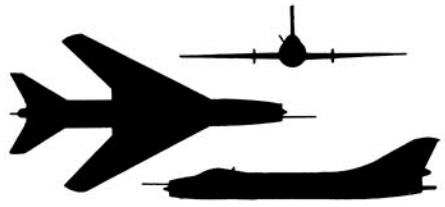
Station Limits:
1,2,5,6=600;
3,4=1100

Notes and Variants
1. May use AA-3 missiles IR or RH.
2. May use AA-2, AA-8 IRMs.
3. Stations 1,2,5,6 may each be fitted to carry two AA-8 missiles.

Allowed Station Loads
1,6=IRM, RHM, EP
2,5=IRM, RHM
3,4=FT, GP

SU-17/22 Fitter H/J

Crew: Pilot only



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	2.5	2.0	10
Military	1.5	1.0	1.0	3
Normal	0	0	0	1
Idle	0.5	0.5	1.0	0
Spbr	0.5	1.0	1.0	—

Speed restriction; see notes

Cruise Speed: 5.0
Visibility: 7
Size: 0
Vulnerability: 0

Restricted Arc: —
Blind Arc: 60
Radar Arc: Lim.
Internal Fuel: 530

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1.5/1.5
Vertical Roll: 0/.5

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1,2	1,2	2,2
HT	2,2	2,3	3,4
BT	4,4	4,4	4,5
ET	NA	NA	NA

2-position swing wing; drag for fore, aft positions

Minimum-Maximum Velocity Chart

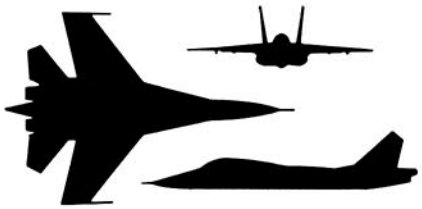
Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	58	48	40	
EH 46+	4.5-13.5	4.5-10.5	—	14
VH 36-45	3.5-12	4-10	4.5-8	13
HI 26-35	3-11	3.5-9	4-7.5	13
MH 17-25	2.5-10	3-8	3.5-7	12
ML 8-16	2.5-8.5	2.5-7.5	3-6.5	10
LO 1-7	2-8	2.5-7	2.5-6.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	1	.5	1	.5	0	0
VH 36-45	2	.5	1	.5	.5	0
HI 26-35	3	1	2	1	1	.5
MH 17-25	4	1	3	1	1	.5
ML 8-16	6	2	4	1	2	1
LO 1-7	6	2	4	1	2	1

SU-27 Flanker A

Crew: Pilot only



Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	5.0	4.5	3.0	24
Military	3.0	2.5	2.0	7
Normal	0	0	0	3
Idle	0.5	0.5	1.0	0
Spbr	1.0	1.0	1.0	—

Cruise Speed: 6.0
Visibility: 8
Size: −1
Vulnerability: 0

Restricted Arc: —
Blind Arc: 30L
Radar Arc: 150+
Internal Fuel: 715

Maneuver Costs: HFP/Decel

Lag/Displacement Roll: 1/1
Vertical Roll: 0/.5

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1	2	2
HT	2	2	3
BT	3	4	4
ET	4	4	NA

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	68	55	46	
EH 46+	4-15	4.5-12	4.5-10	15
VH 36-45	4-13	4-11	4.5-9.5	15
HI 26-35	3.5-12	3.5-10.5	4-9	14
MH 17-25	3-11	3.5-10	3.5-8.5	13
ML 8-16	2.5-9	3-8.5	3.5-8	11
LO 1-7	2-8.5	2.5-8	3-7	9

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 5.0	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	1	.5
VH 36-45	4	1	3	1	1	.5
HI 26-35	5	2	3	1	2	1
MH 17-25	6	2	4	1	2	1
ML 8-16	6	3	4	2	2	1
LO 1-7	7	3	5	2	2	1

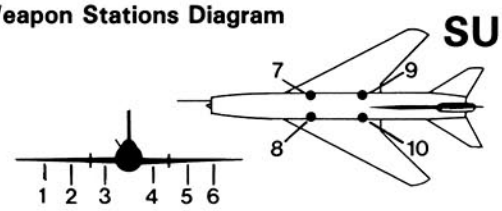
SU-17/22

Radar Data
Type: High Fix
Arcs: Limited
Search: Not Allowed
Track: 10/6
Lock-On: 5

ECM Data
IFF: Yes
RWR: B
DDS: A
DJM: —
AJM: —

Technology Listing
None

Weapon Stations Diagram



Internal Gun Data
Type: two 30mm cannon
Air to Air: 5 *Air to Ground:* 4
Roll to Hit: 0=4, 1=2, 2=1
Gunsight: HT+1, BT+2
Shots: 2 *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-6, 1/2=7-14, DT=15+
Load Limit: 11,000

Station Limits: 1,6=2200;
2,5=1100; 3,4=2200;
7,8,9,10=1100

Notes and Variants
1. If wings swept forward, LO and ML stall speed are 0.5 less but max speed at any altitude is 6.0.
2. Aircraft has 2-position swing wing (fore/aft). Wing position may be changed to other position in log update phase of turn if aircraft used TT or less turn rate, flew level, descended, or made a sustained climb that turn.
3. May use AA-2, AA-8 type IRMs.

Allowed Station Loads
1,6=BB, BG, RP, RG, RK, DR, FT
3,4=BB, BG, RP, RG, RK, GP, IRM
2,5=BB, BG, RP, RK, EP
7,8=BB, BG, RP, FT, IRM
9,10=BB
Note: If FT loaded on stations 7 and/or 8 then stations 9 and 10 not usable.

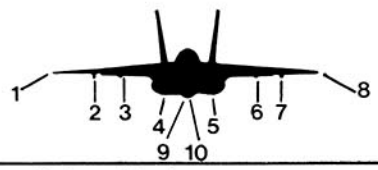
SU-27

Radar Data
Type: SU-27
Arcs: 150+
Search: 200/40
Track: 180/30
Lock-On: 7

ECM Data
IFF: Yes
RWR: B
DDS: B
DJM: A
AJM: —

Technology Listing
Auto Track
HUD Interface
Look-down Radar
IR Uncage
Track while Scan

Weapon Stations Diagram



Internal Gun Data
Type: two 30mm
Air to Air: 5 *Air to Ground:* 5
Roll to Hit: 0=6, 1=4, 2=2
Gunsight: BT+2
Shots: 4 *Radar Ranging:* R

Bomb System
Ballistic −1

Configuration Points Limits:
CL=0-9, 1/2=10-15, DT=16+
Load Limit: 15,200

Station Limits: 1,8=200;
2,3,6,7=2200;
4,5=3000; 9,10=1100

Notes and Variants
1. May use AA-2, AA-8 type IRMs.
2. May use AA-7, AA-10 type RHM and AHM missiles.
3. Stations 2,3,6,7 may each be fitted to carry two AA-8 missiles.

Allowed Station Loads
1,8=IRM, EP
2,7=BB, BG, RK, RP, RG, WR, IRM, RHM, AHM, ARM, EP
3,4,5,6=BB, BG, RP, RG, GP, WR, IRM, RHM, AHM, ARM, ASM, EP, LP, FT
9,10=RHM, AHM, BB, WR, EP

AIR SUPERIORITY

J.D. Webster

Game Charts

Game Designers' Workshop

CC-0430/T7

TURN CHARTS

LO ALTITUDE BAND (1-7)

Turn Rate	Start Speed 2	3	4	5	6	7	9	11	14	17	20	24+
EZ	1	2	3	4	5	6	8	10	12	15	18	22
TT	1	1	2	3	4	4	6	8	10	12	15	18
HT	60	1	2	2	3	3	4	6	8	10	12	15
BT	NA	60	1	1	2	2	3	4	6	8	10	12
ET	NA	NA	60	60	1	1	2	3	4	6	8	10

ML ALTITUDE BAND (8-16)

Turn Rate	Start Speed 2	3	4	5	6	7	8	10	13	16	19	23
EZ	2	3	4	5	6	7	8	10	13	16	19	23
TT	1	2	3	4	4	5	6	8	10	12	15	18
HT	60	1	2	3	3	4	5	6	8	10	12	16
BT	NA	60	1	2	2	3	4	5	6	8	10	12
ET	NA	NA	60	1	1	2	3	4	5	6	8	10

MH ALTITUDE BAND (17-25)

Turn Rate	Start Speed 2	3	4	5	6	7	9	11	14	17	20	24+
EZ	2	3	4	5	6	7	9	11	14	17	20	24
TT	1	2	3	4	5	6	7	9	11	14	17	20
HT	60	1	2	3	4	4	5	7	9	11	14	17
BT	NA	60	1	2	3	3	4	5	8	9	11	14
ET	NA	NA	60	1	2	2	3	4	6	8	9	11

HI ALTITUDE BAND (26-35)

Turn Rate	Start Speed 2	3	4	5	6	7	8	10	12	15	18	22	26
EZ	3	4	5	6	7	8	10	12	15	18	22	26
TT	2	3	4	5	6	7	8	10	12	15	18	22
HT	1	2	3	4	5	6	7	8	10	12	15	19
BT	NA	NA	2	3	4	4	5	6	8	9	12	16
ET	NA	NA	NA	2	3	3	4	5	6	8	10	13

VH ALTITUDE BAND (36-45)

Turn Rate	Start Speed 2	3	4	5	6	7	9	11	14	17	20	24+
EZ	4	5	6	7	8	9	11	14	18	22	26	30
TT	3	4	5	6	7	8	9	11	14	18	22	26
HT	NA	3	4	5	6	7	8	9	11	14	18	22
BT	NA	NA	3	4	4	5	6	8	9	11	14	18
ET	NA	NA	NA	3	3	4	5	6	7	9	11	13

EH ALTITUDE BAND (46+)

Turn Rate	Start Speed 2	3	4	5	6	7	9	11	14	17	20	24+
EZ	5	6	8	10	12	14	16	18	22	26	30	35
TT	4	5	6	7	8	10	12	15	18	22	26	30
HT	NA	4	5	6	7	8	10	12	15	18	22	26
BT	NA	NA	4	5	6	7	8	10	12	15	18	21
ET	NA	NA	NA	4	5	6	7	8	9	10	12	14

NOTES

NA = Not Allowed.
60 = 60° turn allowed for each FP.
Aircraft with a start speed of 2.5 or less use the *2* column; aircraft with a start speed of over 24 use the *24+* column. Aircraft and missiles with a start speed falling between two listed speeds use the lower speed column.

INITIATIVE MODIFIERS (Rule 12.B)

+1 U.S.A., British, and Israeli pilots
0 French, NATO, and Swedish pilots
−1 Soviet and Warsaw Pact pilots
−2 Arab and Third World pilots
+2 If aircraft belongs to side gaining the first kill
+2 If aircraft belongs to side with the most kills
Note: Modifiers are cumulative.

⅓—⅔ CONVERSION CHART (Rule 8)

FPS	⅓	⅔	FPS	⅓	⅔	FPS	⅓	⅔
.5	0	.5	7	2	5	13.5	4.5	9
1	0	1	7.5	2.5	5	14	5	9
1.5	.5	1	8	3	5	14.5	5	9.5
2	1	1	8.5	3	5.5	15	5	10
2.5	1	1.5	9	3	6	15.5	5	10.5
3	1	2	9.5	3	6.5	16	5	11
3.5	1	2.5	10	3	7	16.5	5.5	11
4	1	3	10.5	3.5	7	17	6	11
4.5	1.5	3	11	4	7	17.5	6	11.5
5	2	3	11.5	4	7.5	18	6	12
5.5	2	3.5	12	4	8	18.5	6	12.5
6	2	4	12.5	4	8.5			
6.5	2	4.5	13	4	9			

BINGO FUEL CHART (24.C)

% of Bingo Fuel Left at Disengagement	Safe Return to Base	Divert to Emergency Base	Run Out of Fuel & Crash
100% or more	1-10	11+	—
90-99%	1-9	10-12	13+
80-89%	1-6	7-9	10+
75-79%	1	2-4	5+
74% or less	—	1-2	3+

Die roll modifier (for severe damage state):
+1 for L or 2L
+3 for H
+5 for C

Visual Sighting (Rule 20)

Pilot may visually search two adjacent arcs.

Maximum sighting range is 4× visibility # of target (2 alt. levels = 1 hex of range).

Roll visibility # or less to spot target.

+2 die roll modifier for restricted arcs (20.B).

Detected targets are automatically spotted (20.C).

Advanced Rules

When looking for higher targets, 4 alt. levels = 1 hex of range (20D).

Radar operator may visually search two adjacent arcs (20.F). Maximum V.A.S. sighting range is 6x target visibility #, or 10× with lock-on (20J).

Optional Rules

Target aircaft identified at range of 2× visibility # or less (22.A).

Contrailing aircraft and missiles automatically spotted (23A).

Maximum sighting range in or out of haze is 1× visibility # of target (20.J).

VISUAL RANGE MODIFIERS TABLE (20.D, 20.J)

	Range to Target										
Eyesight	*0-9*	*10-12*	*13-15*	*16-18*	*19-21*	*22-24*	*25-27*	*28-30*	*31-33*	*34-36*	*37-40*
V.A.S.	*0-20*	*21-30*	*31-40*	*41-50*	*51-60*	*61-70*	*71-80*	*81-90*	*91-100*		
	0	*+1*	*+2*	*+3*	*+4*	*+5*	*+6*	*+7*	*+8*	*+9*	*+10*
	Die Roll Modifier										

SPOTTING MODIFIERS TABLE (20.E, 20.G, 23.B, 23.C)

	Target is:						
Target Aircraft Paint Scheme	*At Lower Level*	*At Same or Higher Level*	*Smoking At Lower Level*	*Smoking At Same or Higher Level*	*In Haze*	*In Stratus Layer*	*Silhouetted Against Cloud Layer*
Silver	−2	0	−1	−2	*	+3	−1
Uncamouflaged	−1	0	−1	−2	*	+3	−1
Camouflaged	+1	0	−1	−2	0	+3	−2
Low Visibility Grey	+1	+1	−1	−2	+1	+3	−1

*Ignore lower level modifier if target also in haze.

Other Die Roll Modifiers

−2 for multicrew assist (20.F).

−2 for HUD interface (20.H).

−3 when looking for just-launched missiles except the AIM-9M (20.G).

+2 when looking out of stratus layer (23.B.3).

Note: Modifiers are cumulative.

RWR TABLE (20.I)

Type	*Detect Search*	*Detect Lock-on*	*Spotting Modifier*
RWR-A	no	yes	−1
RWR-B	no	yes	−2
RWR-C	yes	yes	−2

Battle Area Weather (23.B)

Die Roll	*Result*
1-5	Clear
6-8	Broken
9-10	Overcast

Contrail Altitude (23.A)

Aircraft: die roll +25

Missiles: same die roll +15

WEATHER TABLE

Die Roll	*Clear*	*Broken*	*Overcast*
1	LO Haze	LO Haze, 3 Stratus	LO Haze, 3 Stratus, 1 Dense
2	ML Haze	ML Haze, 1 Dense	LO Haze, 3 Stratus, 1 Dense
3	LO Haze, 1 Stratus	MH Haze, 1 Dense	LO Haze, 3 Stratus, 1 Dense
4	1 Stratus	1 Stratus, 1 Dense	1 Stratus, 3 Dense
5	2 Stratus	2 Stratus, 1 Dense	1 Stratus, 2 Dense
6	none	3 Stratus	ML Haze, 1 Dense
7	none	4 Stratus	ML Haze, 2 Dense
8	none	HI Haze, 1 Stratus	LO Haze, 1 Stratus, 2 Dense
9	none	LO Haze, 1 Dense	2 Stratus, 2 Dense
10	none	2 Stratus	2 Stratus, 3 Dense

Air-to-Air Radar (Rule 18)

Single piloted aircraft may not search if they turn at HT rate or greater, vertical climb or dive, make a gun attack, or perform a maneuver other than a slide.

Multicrew aircraft may not radar search if they turn at BT or ET rate, vertical climb or dive, do a rolling maneuver, or if the radar operator visually searches (Advanced Rule 20.F).

A lock-on is broken (18.B.2) if the tracking aircraft stalls or departs, engages against a missile, turns at ET rate, performs a rolling maneuver, receives an H or a C hit, does not keep target in radar arc, does not maintain illumination, opts to break the lock-on or if chaff or jammers break it (Rule 21).

RADAR MODIFIERS TABLE (18.A.1)

Radar Strength	*Range to Target*								
6	0-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-54
8	0-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	65-72
10	0-10	11-20	21-30	21-40	41-50	51-60	61-70	71-80	81-90
12	0-12	13-24	25-36	37-48	49-60	61-72	73-84	85-96	97-108
15	0-15	16-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135
20	0-20	21-40	41-60	61-80	81-100	101-120	121-140	141-160	161-180
25	0-25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	201-225
30	0-30	31-60	61-90	91-120	121-150	151-180	181-210	211-240	241-270
40	0-40	41-80	81-120	121-160	161-200	201-240	241-280	281-320	321-360
50	0-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450
60	0-60	61-120	121-180	181-240	241-300	301-360	361-420	421-480	481-540
	0	*+1*	*+2*	*+3*	*+4*	*+5*	*+6*	*+7*	*+8*

Die Roll Modifier

Advanced Rules

Multitarget track allows lock-ons to several targets (18.D).

Look-down radar required to contact lower targets at level 4 or less (18.E).

Look-down radar required to contact lower targets at level 5 to 10 or else the searcher must be closer in altitude to target than target is to ground (18.E).

Radar contact may alternatively be made with boresight or auto track modes (18.G, 18.H).

RADAR VERTICAL LIMITS TABLE (18.F)

Radar Arc	*Searcher's Flight Profile*											
	*Vertical Dive**		*Steep Dive*		*Level*		*Sustained Climb*		*Zoom Climb*		*Vertical Climb**	
	Up	*Down*	*Up*	*Down*	*Up*	*Down*	*Up*	*Down*	*Up*	*Down*	*Up*	*Down*
Limited	−2×	−9×	−½×	−2×	½×	−½×	1×	0×	3×	1×	9×	2×
180°	−1×	−∞×	0×	−5×	1×	−1×	2×	−½×	5×	0×	∞×	1×
150°+	−1×	−∞×	0×	−8×	2×	−2×	4×	−1×	8×	0×	∞×	1×
120°+	0×	−∞×	1×	-10×	4×	−4×	6×	−2×	10×	−1×	∞×	0×

* The up/down limits apply for boresight mode, auto track mode, and maintaining previous lock-ons. Radar search is not otherwise allowed in vertical dives or climbs. ∞ = infinity.

CHAFF DEPLOYMENT CHART (21.B.3)

Radar Type Having Lock-on	*Number of Chaff Dropped*					
Limited	—	1	2-3	4-5	6-7	8+
180°	—	1-2	3-5	6-9	10+	—
150°+	1-3	4-7	8+	—	—	—
120°+	4-7	8+	—	—	—	—
	1	2	3	4	5	6

Die roll or less needed to break radar lock-on.

DECEPTIVE JAMMING TABLE (21.C.2)

Radar Type Having Lock-on	*Jammer Type*		
	DJM-A	*DJM-B*	*DJM-C*
Limited	3	6	9
180°	1	3	4
150°+	—	1	3
120°+	—	—	2

Result is die roll or less needed to break radar lock-on.

DAMAGE TABLE (10.A)

Attack Rating

Die Roll	1	2	3	4	5	6	7	8	9	10+
0–	*	*	*	*	*	*	*	*	*	*
1	C	C	*	*	*	*	*	*	*	*
2	H	H	C	*	*	*	*	*	*	*
3	L	H	H	C	*	*	*	*	*	*
4	L	L	H	H	C	C	*	*	*	*
5	L	L	2L	H	C	C	C	*	*	*
6	L	L	L	H	H	C	C	C	*	*
7	–	L	L	L	H	H	C	C	C	*
8	–	–	L	L	H	H	H	H	C	C
9	–	–	–	L	L	2L	H	H	C	C
10+	–	–	–	–	L	L	2L	H	H	C

Notes: Apply aircraft's vulnerability rating as a die roll modifier. Shift one column to right if aircraft previously damaged. Subtract two if rolling for damage from a missile hit.

Damage Effects

–: No effect

L, 2L,: No BT and ET turns; gun attacks affected.

H: No HT or greater turns; no rolling maneuvers; accel points for A/B and Mil power halved; Climb Chart results halved; +3 for gun attacks

C: EZ turns only; slide maneuvers only; no A/B power; accel points for Mil power halved, Climb Chart results quartered; no attacks; jettison drop-tanks and gun pods.

*: Aircraft shot down.

Cumulative Hits

Three L = H
Two H = C
Two C = *
One C + one H = *

PROGRESSIVE DAMAGE (Advanced Rule 10.C)

Current Damage	*Die Roll or Less*	*Increased Damage*
L, 2L	2	H
H	3	C
C	4	*

GUN COMBAT MODIFIERS (Rule 9)

Note: All modifiers are cumulative.

+2 for snap shooting (half burst).

Variable modifier for gunsight/turn rate (9.E).

+1 if the firing aircraft has an L hit (10.A).

+2 if the firing aircraft has a 2L hit.

+3 if the firing aircraft has an H hit.

Advanced Rules

Variable modifier for target size (9.G).

–1 for each 2 FPs flown on SSGT line (9.H).

–1 for RE radar ranging if lock-on achieved (9.I).

–2 for CA radar ranging if lock-on achieved (9.I).

–3 for IG radar ranging if lock-on achieved (9.I).

Angle-Off (9.D)

0° line: –2
30° arc: 0
60° arc: +2
90° arc: +4
120° arc: +4
150° arc: +4
180° arc: +3
180° line: +2

MISSILE COMBAT MODIFIERS

MISSILES ANGLE-OFF TABLE

	Seeker Head Type				
Angle-off at Attack	*I*	*M*	*A*	*RH*	*AH*
0° line	–1	–1	–2	–1	–2
30° arc	0	0	0	0	0
60° arc	0	0	0	0	0
90° arc	+2	+1	0	+1	0
120-150° arc	+3	+2	+1	+1	+1
180° arc/line	+4	+3	0	0	0

Note: Modifiers are cumulative.

For Heat Seeking Missiles

–3 if target is in A/B power.

–1 if target is in Mil power.

+1 if target is on Idle Power.

+2 for ground clutter if missile dives to attack target in LO band (Advanced Rule 17.E).

MISSILE LAUNCH MODIFIERS

+2 for each higher rate of turn over missile's Launch G (15.A).

+2 for IR missiles fired from LO or ML band at "lower" target (Advanced Rule 17.E).

+3 for IR missiles fired at "lower" targets above highest clouds (Optional Rule 23.C).

For Radar Guided Missiles

1 – ECCM if target has DJM A. Modifier may not be negative (21.C.1).

3 – ECCM if target has DJM B. Modifier may not be negative (21.C.1).

4 – ECCM if target has DJM C. Modifier may not be negative (21.C.1).

6 – alt. level-ECCM for ground clutter. Modifier may not be negative (Advanced Rule 19.F).

Note: Ignore target's DJM if missile has home-on-jam ability.

Air Superiority Aircraft Log

AIRCRAFT:			Pilot:				Start Fuel:			Bingo:			Load:		
Game Turn:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Start Altitude															
Start Speed															
0.5 FP Carry															
Power Setting															
Flight Type															
Accel Points															
Decel Points															
Speed Change															
Altitude Change															
Turn Carry															
Climb Carry															
Shots Fired															
Decoys Used															
Load Dropped															
Configuration															
Fuel Used															
Fuel Left															

AIRCRAFT:			Pilot:				Start Fuel:			Bingo:			Load:		
Game Turn:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Start Altitude															
Start Speed															
0.5 FP Carry															
Power Setting															
Flight Type															
Accel Points															
Decel Points															
Speed Change															
Altitude Change															
Turn Carry															
Climb Carry															
Shots Fired															
Decoys Used															
Load Dropped															
Configuration															
Fuel Used															
Fuel Left															

Air Superiority Aircraft Log

AIRCRAFT:			Pilot:				Start Fuel:			Bingo:			Load:		
Game Turn:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Start Altitude															
Start Speed															
0.5 FP Carry															
Power Setting															
Flight Type															
Accel Points															
Decel Points															
Speed Change															
Altitude Change															
Turn Carry															
Climb Carry															
Shots Fired															
Decoys Used															
Load Dropped															
Configuration															
Fuel Used															
Fuel Left															

AIRCRAFT:			Pilot:				Start Fuel:			Bingo:			Load:		
Game Turn:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Start Altitude															
Start Speed															
0.5 FP Carry															
Power Setting															
Flight Type															
Accel Points															
Decel Points															
Speed Change															
Altitude Change															
Turn Carry															
Climb Carry															
Shots Fired															
Decoys Used															
Load Dropped															
Configuration															
Fuel Used															
Fuel Left															

Missile Data

U.S., NATO, & Allied Missiles	Weight	Load Points	Seeker Head	Launch G	Launch Roll	Turn Ability	Flight Time	Visibility	ECCM	Chaff	Flare	Launch Envelope 150-180° max-min	Launch Envelope 90-120° max-min	Launch Envelope 30-60° max-min	Speed LO	Speed ML	Speed MH	Speed HI	Speed VH	Speed EH	Active Homing	Home on Jam	Roll to Hit	Attack Rating	Direct	Proximity
Falcon AIM-4C	150	1	I	TT	7	BT/2	2	7	—	2	5	NA	NA	18-1	14	16	18	18	20	22	—	—	4	7	5	3
Falcon AIM-26B	260	1	RH	TT	7	BT/2	2	8	—	4	0	24-9	18-9	18-6	10	12	14	14	16	16	—	—	4	8	6	4
Sidewinder AIM-9P*	200	1	I	HT	8	ET/2	4	7	—	2	5	NA	NA	18-1	12	14	16	16	18	18	—	—	5	8	5	3
Sidewinder AIM-9L*	200	1	A	BT	9	ET/3	4	7	—	2	5	12-3	16-2	18-1	10	12	14	14	16	16	—	—	7	9	7	4
Sidewinder AIM-9M*	200	1	A	BT	9	ET/3	4	3	—	1	2	12-3	16-2	18-1	10	12	14	14	16	16	—	—	7	9	7	4
Sparrow AIM-7F	500	1	RH	HT	8	ET/2	5	9	1	4	0	120-6	90-6	100-3	20	22	22	24	24	24	—	—	5	8	9	5
Sparrow AIM-7M	500	1	RH	HT	8	ET/2	5	9	2	3	0	120-6	90-6	100-3	20	22	22	24	24	24	—	—	7	9	9	5
Skyflash	400	1	RH	HT	8	ET/2	4	9	3	4	0	90-9	70-8	80-4	24	24	26	26	28	28	—	—	5	9	8	4
ASPIDE	500	1	RH	HT	8	ET/2	4	9	3	4	0	100-9	80-8	90-4	24	24	26	26	28	28	—	—	6	8	8	4
ANRAAM AIM-120	350	1	AH	BT	8	ET/3	4	4	4	2	0	90-3	60-3	90-1	22	24	24	26	26	28	24	Y	6	8	7	4
Phoenix AIM-54C	1000	2	AH	TT	8	BT/2	8	10	5	2	0	300-10	220-8	250-4	24	26	26	28	32	36	45	Y	6	9	10	6
Matra 550 Magic I*	200	1	M	BT	8	ET/3	2	6	—	2	5	NA	12-2†	15-1	14	16	16	18	18	20	—	—	5	8	6	3
Matra 550 Magic II*	200	1	A	BT	8	ET/3	2	6	—	2	3	9-3	12-2	15-1	14	16	16	18	18	20	—	—	6	9	6	3
Matra 530A	450	1.5	RH	HT	8	BT/2	3	8	—	5	0	50-16	24-9	30-6	12	14	16	18	18	20	—	—	4	8	9	4
Matra 530B	450	1.5	M	HT	8	BT/2	3	8	—	3	5	NA	12-6†	18-4	12	14	16	18	18	20	—	—	4	8	9	4
Super Matra 530D	550	1.5	RH	HT	8	ET/2	4	10	3	2	0	75-12	50-9	60-5	24	26	26	28	28	30	—	Y	5	9	8	4
RED TOP	300	1	A	TT	7	BT/2	2	9	—	2	5	10-6	12-4	18-2	12	14	16	16	18	18	—	—	3	8	7	3
Warsaw Pact Missiles																										
Atoll AA-2B	200	1	I	HT	7	ET/2	2	7	—	2	5	NA	NA	12-2	12	14	16	16	16	18	—	—	4	8	5	3
Atoll AA-2C	200	1	RH	TT	7	BT	2	7	—	4	0	20-6	10-5	15-4	12	12	14	14	16	16	—	—	2	7	5	3
Anab AA-3A	600	1.5	RH	TT	7	BT/2	3	9	—	5	0	40-16	20-10	30-9	10	12	14	16	16	18	—	—	2	7	9	4
Anab AA-3B	600	1.5	I	TT	7	BT/2	3	9	—	3	5	NA	NA	15-4	10	12	14	16	16	18	—	—	2	7	9	4
Apex AA-7A	700	1.5	RH	HT	7	BT/2	4	9	—	4	0	60-12	40-9	50-6	14	16	16	18	18	18	—	—	2	8	9	4
Apex AA-7B	700	1.5	I	HT	7	BT/2	4	9	—	3	5	NA	NA	24-6	14	16	16	18	18	18	—	—	2	8	9	4
Aphid AA-8*	150	1	M	BT	8	ET/3	1	6	—	2	5	NA	9-2†	12-1	12	14	16	18	18	20	—	—	5	9	5	3
Aphid AA-8B*	150	1	A	BT	8	ET/3	1	6	—	2	5	9-3	12-2	15-1	12	14	16	18	18	20	—	—	6	9	5	3
AA-9	1000	2	AH	TT	7	BT/2	6	10	3	4	0	180-20	120-15	150-10	16	18	20	22	22	24	30	Y	4	8	10	6
AA-10B	500	1.5	AH	HT	8	BT/2	4	9	2	4	0	60-6	40-6	50-3	20	22	24	24	26	26	12	Y	5	8	7	4
AA-10A	500	1.5	RH	HT	8	BT/2	4	9	2	4	0	60-6	40-6	50-3	20	22	24	24	26	26	—	—	4	8	7	4

*Instant arming missile
†90° arc only, 120° arc is NA

EXTERNAL STORES TABLES

GUN PODS

Type	*Weight*	*Load*	*Shots*	*Roll to Hit*	*ATA/ATG Rating*
USA SUU-23 Vulcan 20mm Pod	1700	4	6	6-4-3	6/6
NATO 30mm ADEN Pod	800	2.5	4	4-2-1	3/3
French 30mm DEEA Pod	1500	3.5	10	4-2-1	3/3
Swedish 30mm KCA Pod	1000	3	2	5-3-2	4/4
Soviet 30mm Pod	800	2.5	4	3-2-1	3/3
Soviet 23mm Pod	1100	3	3	5-3-2	4/3

DROP TANKS

*Size**	*Weight*	*Load*	*Fuel Points*	*Primary Users***
450 to 500 liters	800	2.5	35	UK SU
600 liters	1100	3.0	50	UK SU NATO FR
800 to 850 liters	1500	3.5	75	US UK SU
1200 liters	2200	4.0	100	All
1500 liters	2700	4.5	120	UK NATO
1700 liters	3000	5.0	140	US UK FR
1900 liters	3500	6.0	160	US
2200 liters	4000	8.0	180	US

* *Size Conversions:* 3.78 liters = 1 US gallon, 1.2 US gallon = 1 imperial gallon,

** Abbreviations: US = United States, UK = United Kingdom (Britain), FR = France, SU = Soviet Union, NATO = NATO countries and European neutrals, All = all countries.

ELECTRONIC WARFARE PODS

Type		*Weight*	*Load*	*Ability/Decoy Load*
European	Chaff Pod	250	1	20 CH
European	Dispenser Pod #1	500	2	20 FL, 38 CH, or 10 FL + 18 CH
European	Dispenser Pod #2	350	1.5	8 FL + 10 CH
European	Deceptive Jammer #1	400	1.5	DJM-A
European	Deceptive Jammer #2	450	2	DJM-B
French	Deceptive Jammer	400	1.5	DJM-C
European	Deceptive Jammer #3	600	2	DJM-C
European	Dispenser Pod #3	700	2	20 FL + 60 CH
US	Deceptive Jammer #1	600	2	DJM-B
US	Deceptive Jammer #2	650	2	DJM-C
Soviet	Deceptive Jammer	500	2	DJM-A

V.A.S AVAILABILITY TABLE

Aircraft	*Availability*
Tornado F.2, F.3	= 3
USAF F4E	= 7
Other F4E	= 4
F-14A, A+	= 5
F-14D	= 6
F-19A	= Always

EXPANDED SEQUENCE OF PLAY

Note: The relevant rule numbers are given in parentheses.

Stalled Aircraft Phase(11.A)

1. Check each aircraft's start speed against its minimum allowed speed.
2. Determine if stalled aircraft perform departed or stalled flight.

Electronic Warfare Interaction Phase

1. Attempt to break radar lock-ons with chaff (21.B.3).
2. Attempt to break radar lock-ons with deceptive jammers (21.C.2).

Visual Sighting Phase

1. Make new sighting attempts (20) and identify spotted aircraft (22.A).
2. Flip target counters which were spotted last game-turn but not this game-turn to show their back side.

Engaged/Free Aircraft Determination Phase (16)

Aircraft that are pursued by missiles and not stalled or departed may declare themselves engaged or free. Other aircraft are considered free.

Order of Flight Determination Phase

1. Determine the order of flight for free aircraft (13).
2. Declare target illumination (19.B). Flip appropriate search markers to illuminate side.

Flight Phase

Sequence:

1. Move stalled and departed aircraft (11.B, 11.C). Note their altitude loss.
2. Move missiles targeted at stalled and departed aircraft.
3. Move engaged aircraft and missiles targeted at them (16.A).
4. Move free/disadvantaged aircraft and missiles targeted at them.
5. Move free/nonadvantaged aircraft and missiles targeted at them.
6. Move free/advantaged aircraft and missiles targeted at them.
7. Move free/unspotted aircraft and missiles targeted at them.
8. Check for collisions (3.E).

Aircraft Flight Outline:

1. Choose a power setting (6.C). Note fuel consumed (24.A).
2. Choose type of flight: level, climbing (8.C, 8.G), or diving (8.D). Determine number of HFPs and VFPs.
3. Declare radar boresight or auto track mode (18.G, 18.H).
4. Expend all FPs in flight. Alternate expenditure with pursuing missiles (15.B) and illuminators (19.B) as necessary. The aircraft may jettison external load (4.A), apply speedbrakes (5.D), turn (7), execute gun attacks (9), perform special maneuvers (14), and drop decoys against missiles (21.B.2). If missiles attack, roll for possible hit and damage (15.D, 10). Note any half FP carry-over (5.C), accel and decel points earned, altitude change (8), turn carry-over (7.B), and climb carry-over (8.G.2).
5. Declare if the aircraft is tailing (13.D).

Air-To-Air Missile Launch Phase

1. Attempt missile launch (15.C, 17.A, 19.A). Note load fired (4.A).
2. Place successfully launched missiles on the map.

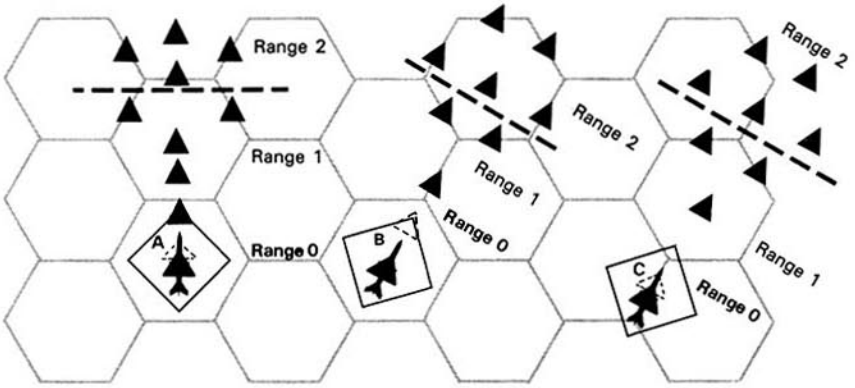
Air Radar Search and Lock-On Phase (18)

1. Conduct radar searches. Place search and contact markers on appropriate aircraft where successful.
2. Attempt lock-ons to contacted targets. Flip contact marker to lock-on side if successful.
3. Identify enemy aircraft by radar return (22.C).

Log Update Phase

1. Remove unused decoys (21.B.2).
2. Remove missiles whose flight time is exhausted (15.A).
3. Complete damage control (10.C).
4. Roll for progressive damage (10.C).
5. Roll for recovery of departed aircraft (11.C).
6. Figure the starting altitude and speed of each aircraft and missile for the next game-turn.
7. Declare disengagement (24.B) and remove appropriate aircraft from play.

Diagram 1: Legal Target Positions for Gun Attack



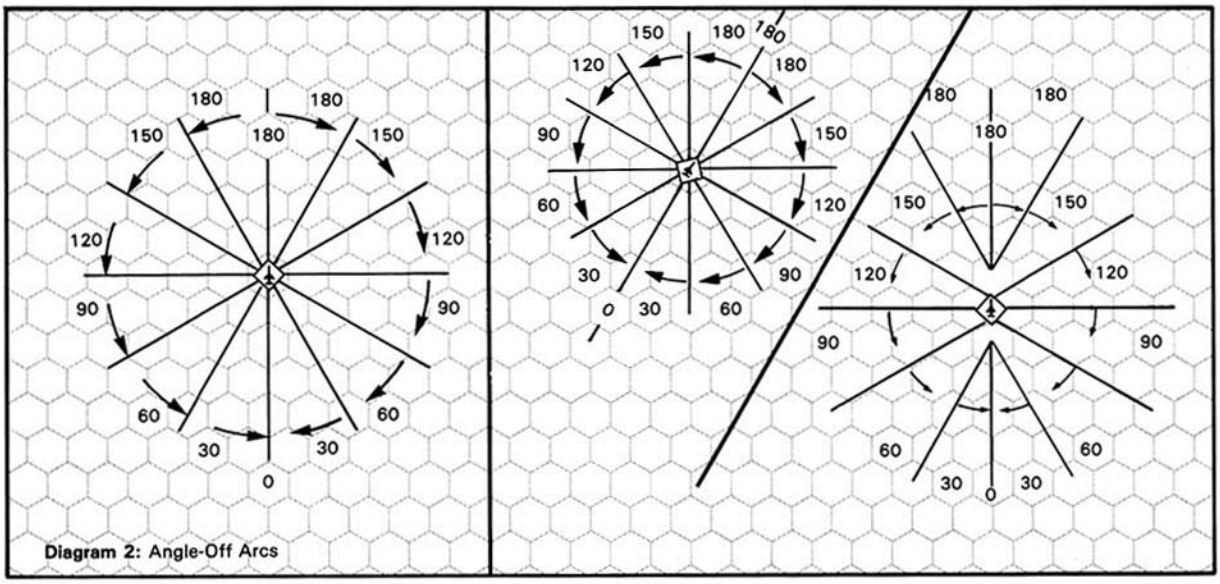


Diagram 2: Angle-Off Arcs

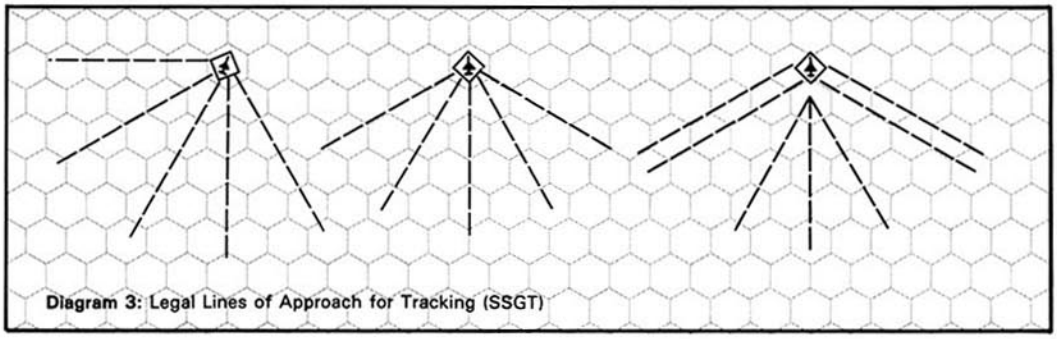


Diagram 3: Legal Lines of Approach for Tracking (SSGT)

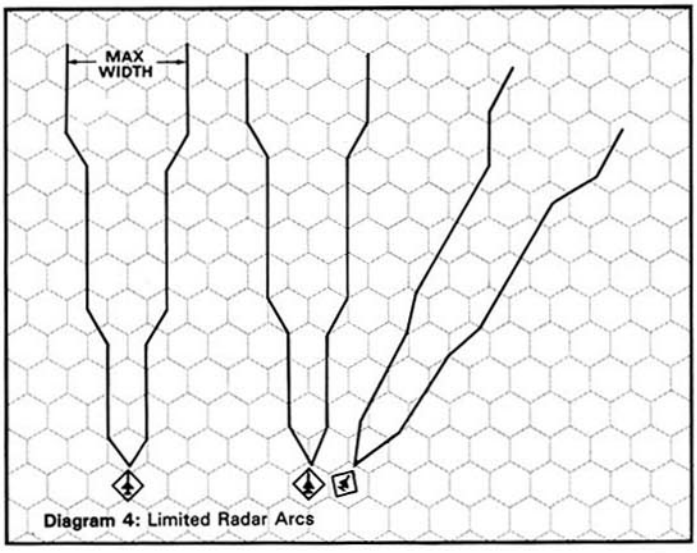


Diagram 4: Limited Radar Arcs

REFERENCE SHEET

FLIGHT RULES

Level Flight:

All FPs are HFPs.

Aircraft may descend 1 altitude level per game-turn (Rule 8.E).

Zoom Climb (Rule 8.C.1):

At least one third of FPs must be HFPs.

If climb rate is 2 or less, each VFP gains 1 altitude level.

If climb rate is 2.4 or more, each VFP gains 1 or 2 levels.

Decel cost is 1 point per level climbed.

No ET turns allowed.

Vertical Climb (Rule 8.C.2):

Climb required on previous game-turn.

One third of FPs are HFPs.

Each VFP gains 1 or 2 altitude levels.

Decel cost is 2 points per level climbed.

No turns or maneuvers allowed except vertical roll.

No dives allowed on next game-turn.

Sustained Climb (Advanced Rule 8.G):

A/B or military power required.

Start speed must equal or exceed climb speed.

Two thirds of FPs are HFPs.

Climb limit/HFPs: altitude levels gained per HFP.

1 VFP. The VFP starts the climb.

Decel cost is .5 point per level climbed

1 bonus VFP per starting FP over climb speed.

Each bonus VFP gains 1 altitude level at 2 decel point cost.

Only EZ turns and slide maneuvers allowed.

Aircraft may not do zoom or vertical climb next game-turn.

Steep Dive (Rule 8.D.1):

At least one third FPs must be HFPs.

Dive 1 or 2 altitude levels per VFP.

Accel gain is .5 per level dove.

Must dive at least 2 levels.

Vertical Dive (Rule 8.D.2):

Dive required on previous game-turn.

One third of FPs must be HFPs.

Dive 2 or 3 altitude levels per VFP.

Accel gain is 1 point per level dove.

Must dive at least 2 levels.

Turning (Rule 7):

No gun attacks or missile launch allowed if ET rate used.

Consult Turn Drag Chart for decel cost.

Additional decel cost for sustained turning (Advanced Rule 7.D).

Missile Flight (Rule 15.B):

Use 1 FP to:

Fly forward 1 hex/hexside (may descend 1 altitude level each hex/hexside).

Climb 1 or 2 altitude levels.

Dive 2 or 3 altitude levels.

Turn (expend the FP when missile changes facing).

Slide.

Snap turn.

MANEUVERS

Maneuvers may not be combined with turning, and gun attacks are not allowed during a maneuver except during a slide.

Slide (Rule 14.B):

Expend 2 HFPs in prep move.

Expend 1 HFP to shift left or right 1 hex.

1 slide allowed per game-turn if start speed is 9.0 or less.

2 slides allowed per game-turn if start speed is 9.5 or more; expend 4 HFPs between 1st slide and prep move for second.

Decel cost is 0 for 1 slide in a game-turn, 1 point for 2 slides in a game-turn.

Lag Roll (Rule 14.C):

Expend 1 HFP in prep move.

Shift left or right one hex and change facing.

FP and decel costs vary.

Displacement Roll (Rule 14.D):

Identical to the lag roll but no facing change.

Barrel Roll (Rule 14.E):

Consecutive lag and/or displacement rolls.

Incur .5 decel points for each roll beyond the first in addition to normal decel costs.

Vertical Roll (Rule 14.F):

Must be in vertical climb or dive.

May change facing to any direction after using a VFP.

Decel cost varies.

Half Roll with Dive (Rule 14.G):

Declare at start of move.

Enter a vertical dive from level flight or sustained climb on previous game-turn.

No gun attacks or missile launch.

May vertical roll at end of flight only.

Must dive on next game-turn.

Unloaded Dive (Rule 14.H):

Must be in level flight.

Descend 1 altitude level per HFP.

AIR SUPERIORITY

Perform once per game-turn in a continuous line.

Accel gain is 1 point per level descended.

Snap Turn (Rule 14.I):

Start speed of 3 or more required.

Must be wings level.

Change aircraft's facing 30 degrees at start of flight.

Costs 1 HFP and 2 decel points.

ACCELERATION POINTS

Variable amount for choosing A/B or military power.

.5 per altitude level lost in steep dive.

1 per altitude level lost in vertical dive.

1 per altitude level lost in unloaded maneuver.

DECELERATION POINTS

1 if start speed is 6.5 (0 for supersonic deltas).

2 if start speed is 7 (1 for supersonic deltas).

1 per .5 FP of start speed over 7 if military or normal power selected (.5 per .5 FP for supersonic deltas).

1 if normal power selected when start speed exceeds cruise speed.

1 per altitude level gained in zoom climb.

2 per altitude level gained in vertical climb.

.5 per altitude level gained normally in sustained climb (Advanced Rule 8.G).

2 per altitude level gained using bonus VFPs in sustained climb (Advanced Rule 8.G).

1 for performing 2 slides in a game-turn.

Variable amount for rolling maneuvers (double cost if at supersonic speed).

2 for snap turn (4 at supersonic speed).

Variable amount for turn drag.

2 if turn at supersonic speed (1 for supersonic deltas).

1 for each additional turn over the first (Advanced Rule 7.D).

1 per .5 FP used by speedbraking (Advanced Rule 5.D).

AIRCRAFT DATA CARDS

F-14A: Stations 1 and 5 may carry AIM-54 type AHMs.

F-14D: CL afterburner power should be 4.5 not 4.0.

MiG-23MF Flogger G: CL afterburner power should be 3.5 not 3.0. Add to "Notes and Variants": "7. If wings forward, reduce listed minimum speed by 0.5."

Mirage-V: Allowed loads for stations 6 and 7 = BB only.

F-104S: It comes in two versions, intercept and ground attack. The interceptor has no internal gun but may use RHM missiles and carries 40 extra points of fuel. The attack version may not use RHM missiles but does have a 20mm cannon which, if desired, may be deleted and replaced by 40 points of extra fuel.

The variant should read: "F-104S Ground Attack Variant: No RHM; Internal Gun Type = 20mm Vulcan; Air-to-Air: 6; Air-to-Ground: 8*; Roll to Hit: 0 = 7, 1 = 6, 2 = 4; Shots = 3.5. Note 2 applies to the attack variant."

F-4S, F-4F, F-4F+ I.C.E, F-4K/M, F-4E: Delete OP from allowed loads on stations 2 and 4 for all these Phantoms.

F-4E, F-4D: Add LP to allowed loads on station 3 (may use PAVE TACK pods there).

SU-17/22, SU-27, SU-24, MiG-29, JA-37, KCA gun pod and Soviet 30mm gun pod: All these should all have their air-to-ground cannon attack strength underlined.

SOKO IAR-93B ORAO-2: The "2" at the end of the gun type and shots section of the internal gun data should be a "1" to refer to note 1.

AIR SUPERIORITY ERRATA

Aircraft Briefings

Missile Names: AA-9 = AMOS, AA-10 = ALAMO.

Missile Availability: Delete AIM-7M (1987) from Algeria and add it to Egypt.

Game Charts

Missile Data Table: The last four columns are mislabeled; the first two of those columns are the Roll to Hit number for Direct and Proximity Attacks; the last two columns are the Attack Ratings of Direct and Proximity Hits, respectively.

Missile Combat Modifiers: For Radar Guided Missiles add: "4 – EECM if target has DJM D. Modifier may not be negative. (21.C.1)."

Deceptive Jamming Table (21.C.2): Add column for DJM-D; 9, 6, 4, 3 are the results needed to break radar lock-ons.

Diagram 1: One of the triangles should be on the hexside immediately in front of aircraft A, and there should only be one in the center of the hex in front of aircraft A.

AIR STRIKE ERRATA

Counter Mix

The six AAA/SAM site counters that read "Live AAA Site" on the back in black should read "Live SAM Site."

The correct Roll to Hit numbers for the S-60 57mm counters is 2-2-1.

The correct Roll to Hit numbers for the KS-19 100mm counters is 1-1-0.

The correct defense strength for the Patriot SAM site counters is "6."

Game Charts

Antiradiation Missiles (ARM): Add these notes:

7. ARM missiles always attack land-based radar sites with their Soft Attack Strength whether the target is hard or not. The listed Hard Attack Strengths are for use against ships in a future module.

8. If the modified die roll result for an ARM attack on a radar-equipped SAM unit is an even number, and the attack did "D" level damage or more, the radar in the unit is permanently knocked out.

Weapons Racks: The correct code for multiple rack is "MR." Add to "Notes": "3. An MRT is restricted to carrying BB, BG class weapons only; DRs and TRs may carry any BB, BG, RP, RK, Maverick type, RG and RS weapons; MRs may carry BB or RP class weapons but are limited to a max of three RPs."

Man-Portable IR SAMs: The asterisk indicates IFF interrogator (opt. rule 22D). All man-portable SAMs have a visual lock-on number of 7.

Mobile IR SAM Vehicles: The seeker head on the MIM-72C Chaparral should be an "A," not "M."

SAM Attack Modifiers Table: Delete the "Radar-Guided SAMs" modifier for ground clutter. Ground clutter only affects air-to-air missiles and does not apply to SAMs. Add "4 – SAM's ECCM vs. DJM D" to "Deceptive Jamming" modifier.

RWR Detection Capabilities (20.I, 38.A): The column heading "Air Radar Search" should read "Air Radar Search, Track." Add an "X" to RWR-C under "Search" below what is now Air Radar Search, Track for air radars of Lim., 180+, and 150+, and under the AH Active column.

Area Weapon Dispenser Pods (WP): Note 3 should read: "3. **Available to British Tornado Aircraft only. They may carry up to four, one each on stations 6, 7, 8 and 9."

External Stores Table—Non-EW Pods: Note that the IP pod may be carried on any station an EP or DP pod can be carried on.

Additional Electronic Warfare Pods (EP): Add a note: "1. Conformal dispensers may not be added to aircraft that already have internal dispensers."

Victory Point Table: The first "Inf. SAM SA-7B" should be "Inf. SA-7A."

Terrain Effects Chart: The defense strength of "Dam," "Pier/Dock," "Runway" and "Bridge" should be underlined, as they are hard targets.

Maps

Map Terrain: The terrain feature on map F between F1621 and F1820 (inclusive) is a tunnel. Ground units may move through these hexes while on the road, and such units cannot be spotted while in the tunnel. The entrance hexes (F1621 and F1820) can be attacked and, if damaged or killed, will prevent movement through the tunnel. Tunnel entrances are hard targets with a defense strength of 12.

Unit Identification Chart: The A/C Shelter and Hangar diagrams are labeled in reverse. The shelters are the black-roofed ones.

Game Rules

Rule 10: Aircraft Damage, para. A, General Rule: Crippled aircraft must jettison all air-to-ground weapons (including rocket pods and weapons pods), weapons rack, and any pods not associated with aircraft defense.

Rule 25, para. A, Terrain Altitude: The third sentence should read: "Ridgelines are less than 1000 feet higher...etc."

Rule 27, para. D, Camouflage (addition): Camouflaged targets may be attacked normally when sighted. Camouflaged AAA or

SAM units which fired or launched a missile the turn prior may be sighted at out to normal range if the searching aircraft rolls a 5 or less. Camouflaged SAM units whose basic missile visibility is 7 or more are sighted automatically at any range if the searching aircraft spots a just-launched missile. Camouflaged targets which were sighted revert to being unsighted if no enemy aircraft searches for them during a game-turn.

If camouflaged targets are not sighted they may be attacked if "detected." Camouflaged targets are detected if:

(a) They were previously or are currently marked by a smoke or laser spot.

(b) They have been previously sighted by friendly aircraft or a ground FAC has a line of sight to them.

(c) They are a AAA or SAM unit which has fired or launched a missile in the game.

Attacks on detected but unmarked (by smoke or laser spot) targets figure the FAS of weapons as if they were attacking a secondary target. Bombsight and tracking time modifiers are disallowed (aiming is still required). Smart weapons may not attack detected but unsighted targets.

Rule 28, para A, Aiming (addition): Aiming must be done with wings level. FPs expended while aiming cannot count toward turning or prep moves.

Scenario S-4: Scenario S-4 should be played after reading through Rule 30, para. C.

Rule 30, para. H, Fire Control Radars (addition): FCRs used with units doing plotted fire are considered operating from the AAA planning phase to the AAA plotted fire resolution phase and may not shut down for ARM attacks. FCRs that are actively jammed provide no die roll modifiers, (AAA units with integral FCRs use the shut down modifier) though they are still operational in regard to potential ARM attacks.

Rule 31, para. C, Speed Restrictions (addition): These speeds are for safe carriage of weapons and safe bombing. If the maximum safe speed of carriage is exceeded, the weapon fusing mechanisms become damaged and unreliable; all attacks by single weapons will "dud" if the unmodified attack die roll was an odd number. All attacks by multiple weapons have the final attack strength reduced by 1/2 (drop fractions).

If bombs are released at speeds higher than 7.0, sonic shock waves affect their flight path. Single weapons automatically miss. Multiple weapons have the final attack strength reduced by 1/2 (drop fractions) and miss if the unmodified attack die roll was an odd number. Additionally, whenever bombs are released at speeds higher than 7.0, some will pitch up and bounce off the aircraft. Roll for damage as if a hit by an Attack Rating of "1" had occurred.

Rule 32, para. C, Speed Restrictions (addition): RPs are affected in a manner similar to bombs. Any RP which is carried at over its safe speed becomes unreliable; subsequent attacks have the final attack strength reduced by 1/2, and if RPs are fired from an aircraft exceeding the safe speed, the final attack strength is reduced by 1/2 again.

Rule 33, para. F, SAM Unit Damage Effects (new paragraph): SAM units printed in white are destroyed by any "D" or greater result. SAM units printed in black may lose radars when damaged by ARMs and lose 1/2 of any remaining missiles (drop fractions) for each "D" level of damage.

Rule 35, para. F (new paragraph): Aircraft in T-level flight may not conduct damage control. Note: The +1 modifier for IR missiles attacking a T-level aircraft (para. E) is cumulative with the +2 modifier for ground clutter which is used if the missile dives from higher than altitude level 1 to hit the target. Air-to-air missiles do not fly at T-level; they attack from altitude level 1. SAMs with T-level minimum altitude capability may fly at T-level and do not have to pay a point on launch to reach T-level.

Rule 35 (clarification): Aircraft intending to enter terrain-following flight must be in level flight during the game-turn they enter terrain-following flight. Furthermore, an aircraft may not perform an unload maneuver during the turn it intends to enter terrain-following flight.

Rule 36, para. A, Detection (clarification): EWRs function throughout a game-turn and may detect aircraft as they move in and out of terrain masking; however, line of sight is checked and pass-down possibilities are determined only in the SAM interaction phase.

Rule 37, para. D, Guidance Requirements (clarification): If the lock-on to a target aircraft is lost for any reason, any missiles in flight being guided by the unit which lost the lock-on are removed from play (they self-destruct) except in the case where optical guidance capability exists and a visual lock-on is already in effect. In this case, one of the missiles may instantly convert to optical guidance.

It is allowable for a SAM fire unit with dual-guidance capability to simultaneously have radar and visual lock-ons, but they must be against the same target. In this case, missiles are launched under radar guidance first and may, if necessary, revert to optical guidance. Any missile switched to, or launched under, optical guidance must remain so until the end of its flight. A SAM unit may not use both radar and visual guidance modes simultaneously.

Rule 38, para. B, Active Jammers (AJMs) (clarification): A line of sight to the target radar is required for jamming. Radar becomes unjammed every log update phase.

Rule 43, para. B, Launching (addition): Glide bombs whose speed restrictions are exceeded will "dud" or damage the launching aircraft as in rule 31, para. C.

Rule 44, para. H, Radar Bombing, case 5: The reference to red triangle should read black triangle.

Aircraft Briefings

The following were omitted from various sections:

Aircraft

A-4M Skyhawk: The A-4M is the final version of a very successful Vietnam-era light attack aircraft. While retaining the small size and simple design of earlier models, the A-4M has a more powerful engine and advanced avionics. It improves upon the bombing accuracy of previous types while maintaining a higher flight performance. It is currently operated by the USMC and by Kuwait.

F-15E Strike Eagle: The Strike Eagle is a two-seat, dual-role version of the F-15 fighter, capable of long-range all-weather strike missions as well as air superiority missions. The new radar incorporates terrain-following ability, target identification, high resolution ground attack modes and operates with LANTIRN pods for night missions. The ordnance payload is increased over the basic F-15 and is carried mainly on conformal fuel tanks similar to FAST packs. Three hundred ninety-two F-15Es are desired by the USAF to replace F-4s and supplement F-111s in deep strike roles.

F-16F Super Scamp: This aircraft is an advanced derivative of the versatile F-16 series. It is distinguished by its large, cranked delta wing with drag-reducing semi-recessed weapons'

racks. These features enable the Scamp to carry a much larger payload for longer distances on the same fuel load of regular F-16s. The Super Scamp was a contender for the USAF dual-role fighter but lost to the F-15E. It is included as a "what if" aircraft as there are no plans to produce it.

Mirage 2000N: This is a two-seat strike variant of the Mirage 2000, sharing the same airframe but incorporating avionics dedicated to low-altitude navigation and attack. The 2000N fills the deep strike mission requirements of the French air force and is intended to be a tactical nuclear strike aircraft when mated with the ASMP air-to-ground cruise missile currently under development. It can also employ a wide array of conventional weapons, and the French will benefit from reduced maintenance requirements by having common aircraft types.

European-Built SAM Fire Units

Blowpipe: The British solution to providing infantry with an all-aspect-capable shoulder-launched SAM is to use optical command guidance (joystick control). The system is simple but highly dependent on operator skill which is subject to battlefield distractions. A Blowpipe unit represents a three-man team with a single launcher, one ready missile, and two reloads.

Javelin: The Javelin missile is almost identical to the Blowpipe, but the system utilizes automatic-command, line of sight guidance, and the missile has an improved warhead. A three-missile launcher is mounted on a stand or trailer which also houses the optical sighting system. A single man operates it, and three reloads (one per launcher) are available.

RBS-70: A large, infantry-fired, short-range SAM mounted on a pedestal containing the launch tube with one missile, optical sights, laser guidance beam and a seat for the operator. Two reloads are kept nearby, and the entire system can be vehicle-mounted if desired.

SATCP Mistral: A new, French, IR, short-range SAM in the Stinger class but slightly larger. It is pedestal-mounted with a seat for the operator and is visually aimed like the shoulder-fired SAMs. The single launch tube has one ready missile, and two reloads are kept nearby.

Rapier 90: An improved version of the basic, trailer-mounted Rapier. It incorporates a six-rail launcher with a built-in millimeter wave TTR. The operator has a TV optics sighting and tracking unit using command guidance, which allows the missiles to be optically or radar guided. Two separate launchers and guidance units comprise a Rapier 90 counter, which allows it to attack two separate targets.

Tracked Rapier: This system consists of a lightly armored, tracked vehicle mounting a turreted, eight-round launcher with integral radar and optics guidance capabilities. Eight standard Rapier missiles are ready to fire.

Crotale: This mobile, French, mid-range, radar-guided missile system is carried on a large, four-wheeled, armored vehicle. Mounted on top is the missile launcher with four ready-to-fire Crotale missiles and an integral TTR with communications link. A command and control vehicle with built-in EWR and three of these Crotale fire units comprise a complete battery.

Roland I/II: The Roland I system comprises a launch turret with two missile launch tubes and a TV optics guidance system. Roland II adds an integrated EWR/TTR radar to the turret. The system can be mounted on a towed van, tracked vehicle, or wheeled transport. Besides the two ready missiles, Roland has eight more housed in two four-round magazines that allow for automatic reloading. The game counter depicts the tracked vehicle version (the van or transport system would be a soft target with a defense strength of 2).

ADATS: A Swiss-built Air Defense Anti-Tank System (ADATS) adopted by Canada and recently selected by the US Army and other NATO services as the replacement for the defunct Sgt. York divisional air defense system. It consists of a turret with eight launch tubes and integrated optical and laser guidance systems including night IR vision devices. An EWR is mounted on top of the turret, which is itself carried on a modified M-113 APC. As its name implies, the missiles can be used against tanks.

SPADA: This is an Italian-built, nonmobile, static, medium-range SAM system. It uses a ground-launched version of the ASPIDE missile. A SPADA fire unit consists of a control van, a CW search-and-track radar and two pedestal-mounted launchers each housing six ready-to-fire missiles.

Soviet-Built SAM Fire Units

SA-7A/B Grail: A short-range, shoulder-fired, IR SAM nearly identical in design and function to the Redeye. The "B" model incorporates a better rocket motor and seeker head, giving it more speed, range and maneuverability. Each fire unit represents an infantry fire team with one loaded launch tube and four reload missiles.

SA-14 Gremlin: The Soviet equivalent of the US's shoulder-fired Stinger, having all-aspect capability but lacking the flare rejection logic of the US missile. It is deployed like the Grail and replaces it in most frontline units.

SA-4 Ganef: This is an older, long-range, high-altitude, mobile SAM system employing CW guidance. The fire unit represents a four-vehicle battery. One tracked vehicle mounts the PAT HAND TTR, and the other three each carry two of the large ramjet-powered Ganef missiles, giving the battery six ready-to-fire missiles.

SA-6B Gainful: This is a medium-range, highly capable, mobile SAM system mounted on tracked vehicles. Like the Ganef, a fire unit represents an entire battery which consists of five vehicles. One carries the large STRAIGHT FLUSH radar system (a combined EWR/TTR using CW guidance). The other four vehicles each carry a triple-rail launcher with three ready missiles. The "B" model has better ECCM, incorporates optical guidance ability, and is more accurate than earlier versions.

SA-8B Gecko: This is a mid-range SAM system mounted on a single lightly armored, wheeled transporter. A six-rail missile launcher is housed on top along with an integrated LAND ROLL combined EWR/TTR-type radar. Eight reload missiles are stored inside, and the vehicle is amphibious. An SA-8 battery would consist of four to five SA-8 vehicles and a BTR-60 mobile CCU. With each vehicle having its own radars, an SA-8 Battery can engage four to five times as many enemy aircraft as could the earlier SA-4 and SA-6 systems.

SA-11 Gadfly: An SA-11 fire unit represents a single tracked vehicle having a four-rail missile launcher on a boxed mount that also houses an integral CW-type TTR radar. The SA-11 is normally employed in batteries of five vehicles, four of which are SA-11 launch vehicles and one of which is a mobile CCU. Sometimes SA-11s are attached as single vehicles to existing SA-6 batteries to beef up their firepower. It is believed that the SA-11 radar can be used with SA-6 missiles and vice versa.

SA-9 Gaskin: This is simple, mobile, short-range, IR SAM system. It consists of a one-man-operated, unpowered turret with four boxed, ready-to-fire missiles and visual sighting gear

mounted on a BRDM wheeled vehicle. It is employed in a four-vehicle platoon (four fire unit counters) as part of a regimental air defense company which would normally include a mobile CCU and a platoon of ZSU-23-4 mobile AAA vehicles (two counters).

SA-13 Gopher: This is the replacement for the SA-9 and is now entering service. It is a tracked vehicle with a one-man turret having four boxes of ready-to-fire missiles. The SA-13 missile is a more powerful and longer-ranged than the SA-9. It is equipped with integral IFF and has a ranging radar to aid the gunner in determining if the target is in range. The SA-13 is employed like the SA-9.

Game Scenarios

On the random AAA diagrams on page 30, the third diagram has a "2" where a "4" should be.

S-5: The setup hex for the fourth hangar is G-1014. There should be three ZPU-2 14.5mm light AAA units, not one.

S-6: The correct total load for the Mirage Vs in note 1 is 18, not 24, points.

S-7: Add this to note 6 (JAS-39 loads): "Station 6 = one European Decoy dispenser pod 2."

S-8: Note 4 should read: "Enemy aircraft receive points for damaging ground units and overflying hexes as in scenario S-5...."

S-9: Note 5 should read: "Any recon aircraft exiting the play area from any edge except the western one is destroyed. Any aircraft except the F-19 climbing above...etc."

S-11: The correct weight and loads in note 7 are: total weight = 1700; total load = 5. An AA-7B is on station 5.

S-12: There are three ZPU-4 14.5mm AAA units in the force mix. The correct weight and loads in note 2 are: total weight = 7120; total load = 16. The correct stations for the 2000lb laser-guided HE bombs in note 3 are 1, 2, 4, and 5.

S-13: Result 9 on the Critical Loss Table should read: "Dead in the water, −2 on all attacks, no +1 for evasive maneuvers."

S-14: The setup hex for the third M-38 37mm AAA gun is E-0721. There are three S-60 57mm guns in the force mix.

H-17: The map in the setup diagram should be rotated 180° so that the "I" appears in the lower left corner.

H-19: The reference to "dotted contours" in note 1 should be to "ridgelines."

H-22: Maps H and F in the setup diagram should each be rotated 180 degrees so that the letters appear in the upper right corners. The Tornadoes in note 2 are carrying a European DDS type 3 on station 5.

Add this note: "10. The SA-4 and EWR on map F are an IAD system. The EWR on map J is a GCI site which controls the SU-27s when they come into play. If the GCI radar is destroyed prior to the Flankers entering play, their entry is delayed until turn 15."

H-23: The map setup note should read: "and maps H and I are shifted down one megahex. The road at F-2010 should now join the road at I-0105."

The north arrow is wrong. It should be pointing directly toward the left edge of map H (i.e., if the top of the page were north, the arrow would point due west).

In "Tank Column," setup hex J-0818 should be J-0810.

Note 2 concerning drop-tanks for CAP, OA-4M and F-18 aircraft should read: "with a fuel capacity equal to or greater than 15 percent" and "with a fuel capacity equal to or greater than 20 percent...."

The entry edges for aircraft in note 7 should be: Raid aircraft: south edge of map I or east edge of maps I and F. CAP aircraft: north edge of map H.

H-25: Under "Soviet Air Defenses," the ZSU-30-6s should be ZSU-23-4s. Note 6 should read: "...are attacked on the "5" column on the Aircraft Damage Table."

G-11: Note 5 should read: "...reduced, as to point value, to within 20 percent of the air support player's surviving infantry and armor."

G-12: "High Threat" defense should read: "Same as medium threat but add AHM capable CAP, long-range SAMs...etc." Under the Target Table labeled "Primary Map is F," result "1, 2" should read: "Bridges in hexes 1105 and 0722."

CALIBER REFERENCE GUIDE FOR AAA WEAPONS

NATO Light AAA

.50 cal = .50 caliber (12.7mm).
Rh 202 = Single- or twin-mounted 20mm.
M-167 = 20mm Vulcan Gatling.
M-163 = 20mm Vulcan Gatling.
PH-M3 = Twin 20mm.
GEMAG = 25mm Gatling.
Blazer = 25mm Gatling.

NATO Medium AAA

OLK-35 = Twin 35mm (erroneously listed as 25mm in briefing guide).
GEPARD = Twin 35mm.
BOFORS = 40mm.
BOFI = 40mm.

Warsaw Pact Light AAA

DShK-38 = 12.7mm.
ZPU-2 = Twin 14.5mm.
ZPU-4 = Quadruple 14.5mm.
ZU-23 = Twin 23mm.
ZSU-23-4 = Quadruple 23mm.
CZ-M53 = Twin 30mm.
ZSU-30 = Twin or Gatling 30mm.

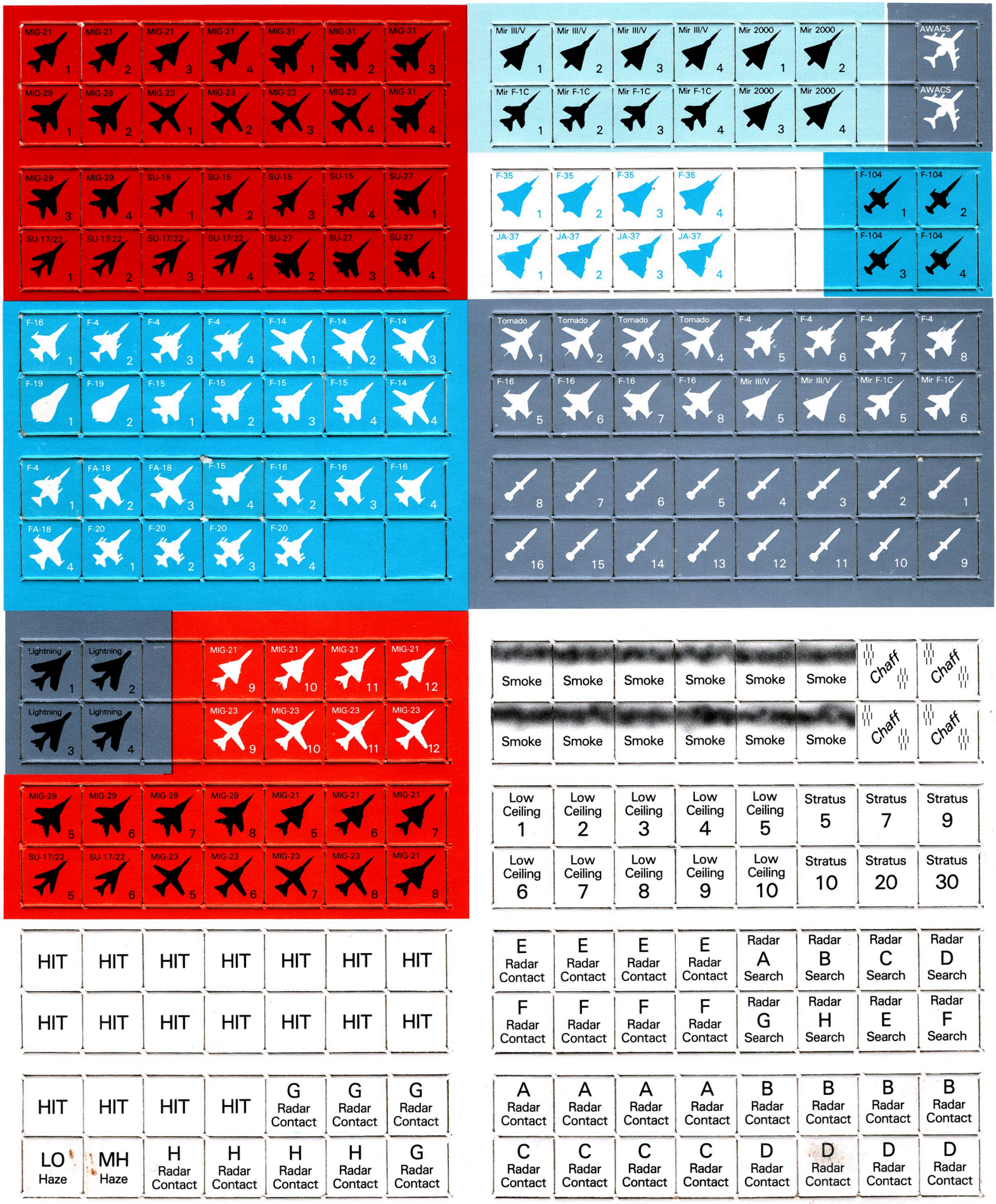
Warsaw Pact Medium AAA

M-38 = 37mm.
S-60 = 57mm.

Warsaw Pact Heavy AAA

KS-12 = 85mm.
KS-19 = 100mm.

Air Superiority



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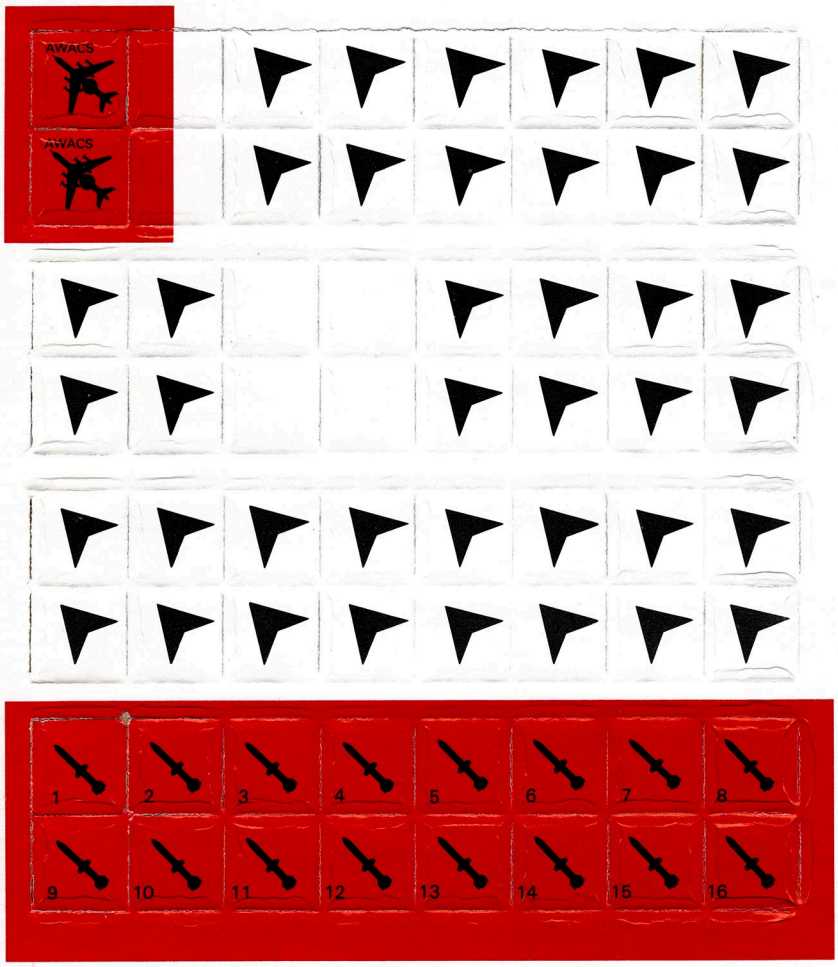
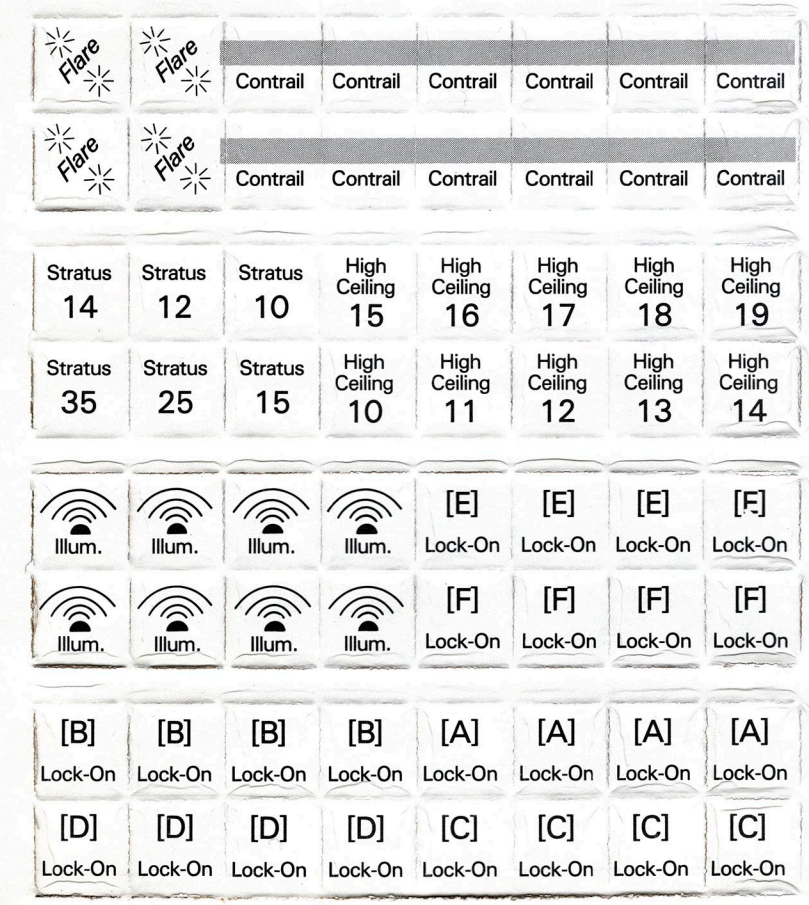
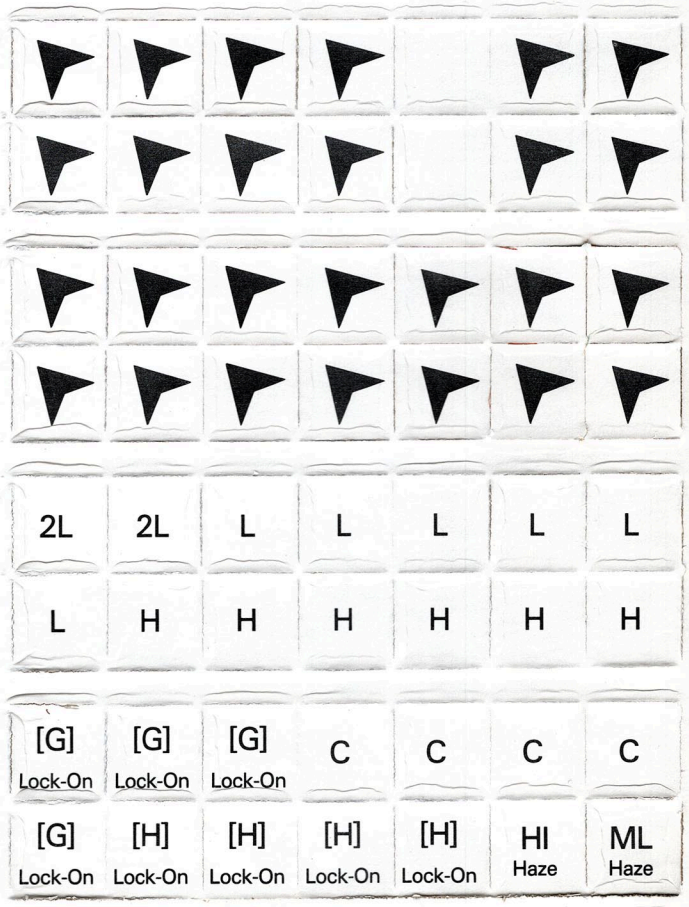
Air Superiority





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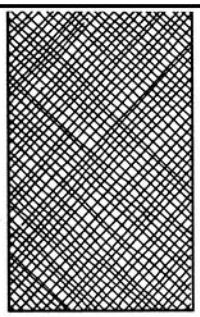

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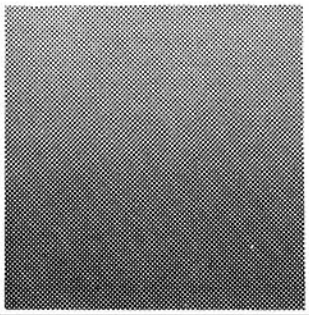

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AIR SUPERIORITY

MODERN JET AIR COMBAT

Sample chart reduced from actual size.

F-14A Tomcat
Crew: Pilot, Radar Officer

Power Chart

Power	*CL*	*1/2*	*DT*	*Fuel*
A/B	3.0	2.5	2.0	16
Military	1.0	1.0	1.0	5
Normal	0	0	0	2
Idle	0.5	0.5	1.0	0
Spbr	0.5	0.5	1.0	–



Cruise Speed: 5.5
Visibility: 8
Size: –1
Vulnerability: +1
Restricted Arc: –
Blind Arc: 30L
Radar Arc: 120+
Internal Fuel: 750

Maneuver Costs: HFP/Decel
Lag/Displacement Roll: 1.5/1.5
Vertical Roll: 0/.5

Turn Drag Chart

Rate	*CL*	*1/2*	*DT*
TT	1,1,2	1,1,2	1,1,3
HT	2,2,4	2,2,4	2,2,4
BT	3,4,5	3,4,5	3,4,6
ET	4,4,6	NA	NA

Auto swing wing; drag for low, medium, high speeds

Minimum-Maximum Velocity Chart

Configuration:	*CL*	*1/2*	*DT*	*Dive Speed*
Ceiling:	60	55	50	
EH 46+	3-15	4-13	4-11	15
VH 36-45	3-13	3.5-12	3.5-10	15
HI 26-35	2.5-12	2.5-11	3-9	14
MH 17-25	2-11	2-10	2.5-8.5	14
ML 8-16	1.5-10	1.5-9.5	2-8	12
LO 1-7	1.5-9	1.5-8	2-7.5	10

Climb Capability Chart

Configuration:	*CL*		*1/2*		*DT*	
Climb Speed: 4.5	*A/B*	*Other*	*A/B*	*Other*	*A/B*	*Other*
EH 46+	2	1	1	.5	1	.5
VH 36-45	3	1	2	1	1	.5
HI 26-35	5	2	3	1	2	1
MH 17-25	6	2	4	1	2	1
ML 8-16	6	3	4	2	2	1
LO 1-7	8	3	5	2	3	1

Air Superiority: The Game

Air power—the projection military force anywhere in the world by aircraft—is one of the dominant themes of modern history. Air superiority—control of the skies—is vital for air power. Since the appearance of jets in World War II, jet fighters have been designed, and their pilots trained, to achieve this overriding goal: air superiority.

- *Air Superiority* is a realistic and playable game of jet fighter combat in the 1980s and 1990s. The rules cover the many aspects of modern air-to-air combat: the basics of flight, gun combat, air-to-air missiles, radar, and electronic warfare. Options allow for fuel considerations and the effects of weather. The rules are organized in easy-to-learn sections, with scenarios that may be played after each section. Players may master the rules without having to learn them all before being able to play.
- *Air Superiority* includes thirty aircraft, each with its characteristics detailed on a separate aircraft card. The majority of the aircraft are U.S., European, and Soviet fighters currently operational in Europe, but two aircraft not yet operational are also included: the F-19 Stealth Fighter (rated based on speculation of its abilities) and the F-20 Tigershark. Included in the scenario booklet are 30 scenarios (2 training, 3 solitaire, 10 general, and 15 historical/hypothetical) of air superiority missions in Europe and elsewhere in the world.
- *Air Superiority* is suitable for two-player, multi-player, and solitaire play. The three solitaire scenarios allow a single player to fly and fight his aircraft against aircraft flown according to the scenario instructions. All the other scenarios may be played by two players; scenarios with more than one fighter on a side may be played with teams of players, each player flying one aircraft.
- *Air Superiority's* briefing booklet covers the aircraft and missiles represented in the game, including their worldwide availability. The section on tactics and strategies briefs the players on important elements of operating their aircraft.

Air Superiority: The Series

Air Superiority is the first game in the *Air Superiority* series. The series covers both air-to-air and air-to-ground combat, and includes the jet aircraft and missiles of the world's nations. *Air Strike*, the second title in the series, will cover air-to-ground interaction: air strikes and air defense. Other titles will cover the aircraft and situations of other regions and other periods, such as the Middle East, Asia, the Korean and Vietnam wars, and the Arab-Israeli conflicts.

Game Components
- Four 10 ½" x 15 ½" maps
- One rules booklet with aircraft briefings and game scenarios
- One game charts booklet
- One aircraft data card booklet
- One 10-sided die
- 240 die-cut counters

Playing Time
1-4 hours, depending upon scenario

Number of Players
2 or more, plus 3 solitaire scenarios

Time Scale
12-15 seconds per turn

Map Scale
⅓ mile per hex

Unit Scale
Individual aircraft

Complexity Rating
- Master
- Advanced
- Intermediate
- Basic
- Introductory

Game Credits

Design: J.D. Webster
Development: Ben Knight
Art Director: Barbie Pratt
Cover Painting: Steve Venters

The following is a selection of aircraft from the game.



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