

Softkey

FALCON AT

.....
F-16 FLIGHT SIMULATOR



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IMPORTANT NOTE

In order to receive technical support and notification of product upgrading and enhancements, please ensure you register this product.

Contents

FALCON A.T.

The F-16 Fighter Simulation

Hardware Requirements

FALCON^{AT} requires:

- An IBM PC/AT (or compatible) computer; OR
An IBM PS/2 Model 30-286, 50, 60, 70, or 80; OR
An IBM PC or XT with an 80286 or 80386 accelerator card.
- 512K RAM minimum.
- A 256K EGA (Enhanced Graphics Adapter) or VGA (Video Graphics Adapter; which runs in 16 color EGA mode) with an EGA or a Multisync monitor capable of displaying 640x200 and 640x350 (16 color) modes.
- One CD-ROM drive.
- DOS 2.0 or higher.

Optional Equipment

- Innovation SSI 2001 sound board.
- A joystick (You'll need a standard IBM-compatible joystick with a 15-pin game port interface card).
- A null-modem cable to connect two machines for dogfighting.

In Case You Have Problems

Beware of using RAM-resident programs while you're running **FALCON^{AT}**. Because of their unpredictable behavior, we cannot guarantee that **FALCON^{AT}** and any particular RAM-resident program will run together in an acceptable fashion.

Your First Flight in the FALCON^{AT}

Loading FALCON^{AT} onto a Hard Drive

Make a Directory on your Hard Drive called **FalconAT** and copy all the files from the CD in this directory.

Using a Joystick or a Mouse

If you're going to use a joystick for controlling your plane's directional movement and weapons firing, make sure it is plugged in before turning your computer on. You will be asked to calibrate the joystick after the armament screen. If you going to use a mouse, make sure it is connected and you have installed a mouse driver before running FALCON^{AT}.

Loading the Program

Turn on your computer and proceed to a DOS prompt. Go to the FalconAT directory on your Hard Drive.

At the DOS prompt, type in:

EFALCON (and press the Enter key).

The program takes a few seconds to load. When the title screen appears, press any key to move on to see the hardware configuration menus.

Hardware Configuration Menus

Use the *Right Arrow* or *Left Arrow* to select menus. Use the Down Arrow and Up Arrow to move among menu items. Press Return to make a selection. The default menu is the **File** Menu, which has two choices: *Play* and *Quit*. You would choose *Play* to continue to the next screen.

Control

Choose between KEYBOARD, JOYSTICK, or MOUSE for controlling your plane's directional movement and weapons firing. The default selection is KEYBOARD, which is indicated by the check mark.

Options

Sound

This menu chooses what sound you will have during the game. ON turns the sound on, OFF turns it off. INNOVATION turns off the IBM sound and turns on the Innovation Sound Board, if you have one.

Number of Players

Leave this choice at the default selection of *1 Player* if you are going to be playing FALCON^{AT} on one machine, as would normally be the case. However, if you wish to hook your machine up to another so you and another player can *dogfight* against each other, select *2 Players*.

If you select *2 Players*, make sure the selection for the BAUD (speed) that your computers will communicate at is correct. Also choose the specific COM PORT that your machine is using for FALCON^{AT} communications.

Select *Play* from the **File** Menu to continue to the Duty Roster.

Duty Roster

After the hardware selections are made, the DUTY ROSTER screen will appear. The DUTY ROSTER maintains a record for up to ten *active* (meaning still alive) players. The last rank achieved and total *merits* (points) attained are displayed along with the pilots' names.

On this first entry, highlight any of the *ROOKIE* names (Up Arrow and Down Arrow key; remember: the program defaults to the topmost name) and type in the name you want to use for yourself at the top. Keep the name within twenty characters. (You can use the Backspace key to correct any errors. Pressing Esc will erase the whole line.)

When you're finished typing your name, press the Enter key. Then select the level of difficulty.

Rank

Select from a listed rank to determine the difficulty level. The order is from First Lieutenant (easiest) all the way to Colonel (highest difficulty). *You select a rank by simply highlighting the desired rank line.*

Leave the selection at 1st LT. (First Lieutenant) for your initial flight.

Missions

This is where you choose from any of twelve different missions involving air-to-air combat, air-to-ground strikes, or a lot of both! There is a ribbon to the left of each mission name, which will be awarded to you if the mission is completed successfully. *Just like rank, you select a mission by highlighting the mission name.* Leave the selection at *Milk Run*, for the initial flight.

Maximum Number of MiGs

You can choose between zero, one, two, or three as the total number of enemy MiG planes possible to be onscreen at any particular time. The *Down Arrow* key increases the number of MiGs. The *Up Arrow* decreases the number.

There are no MiGs on the Milk Run mission

After you're finished making rank and mission selections, press the Enter key to proceed to the armament selection screen.

Armament Selection

Because you're flying at First Lieutenant level for the first flight, you have unlimited armament available. Therefore, you won't make any choices from the Armament selection screen like you would at other ranks.

At other ranks select to outfit your F-16 for a particular mission or exercise. Request the crew chief (*Sarge*) and he will inform you whether the armament requested is available. Sarge will warn you if he thinks you're arming the plane with too much weight. He'll make sure that your load is symmetric (weight equally distributed) and won't allow the placement of more weapons on a station than is structurally possible; but within these guidelines, the total weight is up to you. Carrying too many missiles and bombs will hinder the maneuvering of the plane. You must make your decisions based upon the mission you are embarking on and the armament in stock.

Selection Procedure (All Ranks Except First Lieutenant)

Use the Down Arrow and Up Arrow keys on the numeric keypad to highlight the particular armament lines. When you've highlighted the weapon you're interested in, press **[Plus]** key to request one or more from the Sarge. If he has the item available for you, he'll say so, and the tally number to the right of the weapon will increase accordingly. To decrease the amount carried, use **[Minus]** key. On any mission that you embark upon (except those at First Lieutenant rank), the program defaults to a basic configuration of two AIM-9J Air-to-Air Missiles. Of course, you don't have to accept this basic configuration if you don't want to take these weapons along, and the Sarge has other desired weapons available. (At

First Lieutenant rank, nines (9) will appear beside all weapons to show that armament is unlimited. The ALQ-131 ECM Pod and External Fuel Tanks show a one (1), but they are unlimited as well.)

Once you have completed your selections, press the Enter key to accept the armament configuration. The Sarge will have a few words to say. Get in the habit of reading any messages he has for you, because they may save your life. Then press the Enter key again to proceed to *takeoff ready* position.

Cockpit Orientation

After the Sarge signs off, the next screen has you seated in the F-16A ready for takeoff. Your plane is resting on Runway # 36.

Take some time to get familiar with your F-16. Inside the plane, you are facing the front of the cockpit, which contains the most important displays and controls to be used in the simulation. You don't need to know what every item represents just now, since all the F-16's characteristics aren't activated at First Lieutenant rank.

The most prominent feature of the cockpit is the Head-Up Display, or HUD, which is located in the upper middle of the screen. The HUD is a piece of glass (separate from the canopy) upon which important data is displayed electronically. By having vital information displayed directly in front of your eyes, you don't have to look around the cockpit as much, which helps to maintain your concentration in battle. Although there are several different HUD types, it starts off in *Air-to-Air Mode* and displays essential items such as airspeed, heading, g forces, altitude, and the flight path ladder.

Brief Description of HUD components

Let's examine the main features of the Air-to-Air HUD.

Flight Path Ladder

Represents your plane's angle of climb. When positive numbers (0 through 9) are showing, the plane is in an upward climb. Negative numbers (-0 through -9) signify a dive. Each number represents an increment of ten degrees, from 0° to 90° in either direction. The ladder displayed here shows the F-16 in a 38 degree climb. (Negative numbers are shown by a dotted line.)

Air-to-Air Missile Specifics (Discretes)

Data relating to the specific HUD mode, in this case *Air-to-Air*. The type and status of the weaponry is displayed.

Aiming Reticle

This represents the effective aiming area for missile hits when battling enemy MiGs. Part II will explain its usage.

Airspeed Scale

Displays the plane's true speed (in tens of knots).

G (Gravity) Force Indicator

Shows the amount of centrifugal force acting upon you and your plane at any time due to a number of factors, including turning (banking) rate and airspeed.

Heading Scale

Displays the direction (magnetic scale, and in tens of degrees) that your F-16 is

heading. You should note that the plane starts off on the runway at a 0° heading, which represents due north. East is 90°, south is 180°, and west is 270°.

Altitude Scale

Displays your plane's altitude (in thousands of feet). Note that the current altitude is detailed at the bottom of the HUD, directly below the Altitude Scale.

5-Mile Radar Ranging Scale

Specific to Air-to-Air HUDs, this scale's pointer starts to slide downward when an enemy plane has approached within five miles of your F-16. More on this later.

To glance at the other HUD modes, press the Enter key repeatedly to look at other Air-to-Air Modes (used for dogfighting enemy planes), or press the Backspace key in succession to examine Air-to-Ground Modes (used for ground strike missions). The F7 key brings up a special Landing HUD.

The Rest of the Cockpit

The *AOA Indexer* (left of the HUD) and *AOA Indicator* (beneath the HUD) are used when landing your plane and during battle. They display your *angle of attack*. They aren't necessary at lower ranks, but after your first few landings, become adept at using them because it's a necessary skill for landing the F-16 at higher ranks.

The **JFS** (Jet Fuel Starter) button will light up when you start your engine.

Directly underneath the HUD glass is a combination Radar/Map screen, called the **COMED** (Combined Map/Electronic Display). It will be the second most-

watched item in your cockpit after the HUD. In Radar mode, it monitors details like the horizon and relative position of enemy planes to yours. In Map mode, it shows your current location in the FALCON® world, along with landmarks to guide you during missions. Press the "C" key to toggle between Radar and Map. The default selection is Radar.

The **Military Power/Afterburner** Indicator shows whether you are currently invoking the engine's Afterburner (AB) for extra acceleration, or if you're using standard Military Power (MIL), which is a term for normal engine usage and acceleration. Press the **[A]** key to go immediately to 100% RPM and stage one afterburner. Press **[B]** to increase the afterburner stage up to a maximum of 5. Press **[C]** to decrease the stage or press **[D]** key to go immediately to 100% Military Power. The default setting is MIL.

The **Attitude Director Indicator (ADI)** aids in orienting your plane to the horizon while pitching and rolling. Use it in combination with the "waterline" (your plane's position parallel to the horizon) and visual contact with the real horizon to orient the plane directionally.

The **RPM Gauge** represents the percentage (%) of power that has been applied with the Throttle **[E]** key. (This example shows just over 70% of power being applied.)

The **Wheel Brakes** light is on, signifying that your wheel brakes are set. This keeps the plane from rolling when the engine is started.

Before taking off, take a look out the other views from your cockpit, specifically the Left View (**[F]** key: top row) and Right View (**[G]** key: top row). Note the initial compass heading in the Left View (due north) and how it matches up to the

degree heading in the HUD and your current location on the COMED Map mode. These indicators can help you find your way back.

You also have a variety of out-of-cockpit views that give you an entirely different perspective on the world you are flying in. The Outside View (7) takes you outside the cockpit, to the rear of your F-16A. You can change your horizontal perspective by pressing the [2] key. You can zoom in closer with the [1] key. ([3] zooms out.) The Tower View (8) is the view from your control tower. If you're far away from home, you can use the [4] and [5] keys to zoom in and out. The Tracking View (9) is the view from directly behind your F-16A. Satellite view (U) shows your plane from high above. You can change your perspective in the vertical plane with the [6] key; in the horizontal direction with the [8] key. The Enemy View (0) is what you look like from the MiG cockpit. There's even a view of the world from your missiles (Q).

Important! If you are overwhelmed by the Falcon's cockpit, press the [P] key to pause the game. Press the [P] key again to resume flying.

Directional Control (Flying with the "Stick")

Fighter pilots control the directional movement of their planes with a hand control commonly known as the *stick*. For example *pressing the Down Arrow key on the numeric keypad, or moving the joystick handle backwards*, depending on the input device you're using.

Keyboard

NOTE: Those with standard PC-compatible keyboards (with a separate numeric keypad) have the option of choosing between the I-J-L-M setup or the numeric keypad for stick control. There are other duplicate functions grouped around the numeric keypad that may cause you to prefer that approach if you have a pad.

Under the default setup, when you use the keyboard to control directional movement of your plane, the F-16's stick automatically centers itself after each keystroke. This enables you to easily maintain a constant rate of turn. In other words, if you press the Left Arrow key once, your plane will bank left at a small constant rate, and continue to do so until you make another directional change. If you want to increase the degree of turn (or any other directional change), you need to hold the particular key down for a longer period of time. Also, the longer you hold the particular key down, the faster the rate of change will take place.

As an option to the default keyboard stick control, you can alter the operation so the stick doesn't automatically center itself after each keystroke. Press the Control-S key combination at any time after you're in the cockpit. Now, when you press the Left Arrow key once, your plane will continue to increase its degree of turn even without your holding the key down. *You will need to press the K key (or 5 on the numeric keypad) when you want to center the stick and hold the turn angle constant.* Even though you now don't have to keep pressing the particular directional key to increase the degree of turn, the convention still applies that the longer you hold the particular key down, the faster the rate of change will take place. Press the Control-S key combination again to return to the default mode.

On the Ground

Press the  key (top row) to return to the Front View.

Check the front panel to make sure Wheel Brakes are engaged (the WL BRK light should be on). If not, press the  key to apply them. Now it's time to fire up! Activating the Jet Fuel Starter will start the F-100 engine. To engage the JFS, press the Throttle Increase key  once and the JFS light on the front panel will illuminate. By watching the RPM Gauge, you'll see the engines automatically rev up to 60% RPM.

How to Taxi Your Aircraft

Even though it's not necessary to taxi the aircraft, you may want to in order to get familiar with the Nose Wheel Steering (NWS) System. To the right of the HUD you'll see the NWS System/Landing Gear Status Indicator. The RY (*ready*) light at the top should be lit, indicating that your Landing Gear (which includes the NWS system) is in *down* position and operational.

To taxi, rev your engines (to 65%) by pressing the Throttle Increase key  until RPM reaches 65%.

Release the Wheel Brakes ( key) and your plane should start rolling. *Never exceed 80% RPM with the Wheel Brakes engaged, or your aircraft may be damaged.* Your Nose Wheel Steering light (NS: the one in the middle) will illuminate once the plane is moving. At this point you can use the stick controls to steer your F-16 on the runway.

To turn left, pull the stick to the left. To turn right, pull the stick to the right. The faster your taxi speed, the wider your turns. Keep taxi speed under 50 knots while varying your throttle to control the speed of the aircraft.

Takeoff

If you haven't already done so, release your Wheel Brakes. (The WL BRK light should be off. If not, press .)

Next, hold the Throttle Increase key  down until your engines have reached 100% RPM.

Continue to roll straight down the runway until your airspeed has reached 150 knots (15 on the HUD Airspeed Scale). You'll notice that the NWS System light (NS) will disengage once your speed has exceeded 90 knots. This means that you will no longer be able to steer your aircraft.

For faster takeoffs and to compensate for heavier payloads, light your Afterburner for that extra needed power (at the expense of using more fuel). Afterburner (AB) is engaged by pressing the  (less than) key. The AB1 light on the front panel will turn on. *Non-afterburner takeoffs are called full military power takeoffs.* The MIL indicator light will be on instead of the AB light on military power takeoffs.

When your airspeed reaches the takeoff speed of 150 knots, gently pull back on the stick *until you reach a climb angle of 8 to 12 degrees.* As your plane leaves the ground, the 10 degree step of the Flight Path Ladder on the HUD should cross the HUD center point, indicating a 10 degree climb angle.

Caution: Trying to lift off at speeds less than 150 knots can result in skipping, stalling, or crashing into the runway.

Note that the DC (disconnect) light on the NWS System/LG Status Indicator illuminates once your plane has left the ground. This serves as a signal to raise the landing gear.

After takeoff, you need to retract your landing gear by pressing the **[L]** key. Switch to the Left View (**[4]** key: top row). Look at the Landing Gear (LG) Indicator. All three lights should be off if you've successfully raised the landing gear. Switching back to the Front View (**[3]** key: top row), you'll also notice that all lights in the NWS System/LG Status Indicator turn off once the gear has been raised.

Faster Climb Rate

You should continue on an 8–12 degree climb angle until reaching 400 knots airspeed. At this point you may increase the rate of climb. A climb angle of 30 to 40 degrees is ideal. *Afterburner will also increase your climb rate.*

Don't allow your airspeed to fall under 125 knots. There are four ways to increase your airspeed: increase throttle, light the afterburner, dive, or reduce the rate of climb.

Moving into Position and Finding the Target

Climb to an altitude of 25,000 ft using a 30 degree climb at 450 knots. Your engine should be at 72% RPM Military (MIL) Power. *Level off* the plane by pushing the stick forward until your Flight Path Ladder crosses the center of the HUD at the 0 (zero) degree step.

Use your eyes and try to identify natural and man-made landmarks such as mountain ranges, bridges, lakes, and buildings.

Invoke the Map mode on your Combined Map/Electronic Display (COMED) by pressing the **[M]** key. The Radar mode will be replaced with a 2-D reduced map of the FALCON^{AT} landscape.

Note your current position on the map (flashing black square) in relation to those objects around you. *This will be a very important skill, especially if your navigation system is damaged during combat.*

Since you took off from Runway # 36, your plane should be heading due north. Use your Compass on the Left View panel or check your Heading Scale on the HUD. *The heading should be 0 (zero) degrees.*

Slowly bank your F-16 to the right until the plane is at a 45–50 degree angle. The F-16 should begin a nice easy turn at this bank angle. The steeper the bank, the faster the turn. Speed also affects your rate of turning. *Travelling at 450 knots, the turn radius will be a little over a mile (6288 feet to be exact), but at 900 knots your turn radius is a staggering 5 miles.*

You'll need to fly toward a new heading of 135 degrees (halfway between 13 and 14 on the Heading Scale) to intercept the targets. Ease out of the roll once you've achieved the new heading. Take a look at the map and outside the Front View. You should be heading directly toward the buildings.

Air-to-Ground Missiles

The AGM-65B Missile is designed to be visually locked-on to a ground target. In the front end of each Maverick missile is a TV camera with a zoom lens. The television image is fed to the pilot through the COMED. *This allows you to acquire your target electronically from distances beyond visual range.*

Switch your HUD into Air-to-Ground mode by pressing the Backspace key. Keep pressing Backspace until the M65 HUD mode indicator appears in the bottom left corner of the HUD. Also, make sure your radar is on (**R**), and that the radar screen rather than the area map is showing on the COMED.

To shoot your target, maneuver the F-16 so that the crosshairs in the middle of the HUD (and the crosshairs in the middle of the radar screen) are lined up on the target. Press the Spacebar to *pickle* or target designate the target. The HUD discrete will change from ARM to LOCK, and the target designator (a square) will appear over the target. If the target designator isn't aligned directly over the target, clear the pickle by pressing the Clear A-G Target Lock key (*X*) and try again. Watch for the *in Range* discrete (IN RNG). When it appears, press the Spacebar again, and watch the Maverick head for the target.

Pull back on your stick to execute a climb, so as to clear the debris area and avoid crashing into the ground. It'll take a few seconds for your missile to reach the target and detonate. An *X* will mark the location where your missile hit. If you struck the target, the building image will appear damaged. Otherwise, you'll see a crater in the ground.

Landing

Since the First Lieutenant rank doesn't allow your plane to crash, use this level to practice your landing skills.

Setting up the Landing

Half the process is getting your plane into approach position. You're going to land on Runway #9 approaching from the west. It's important that you give yourself plenty of airspace for the approach.

- If it isn't already on, switch to *Map* mode on the COMED screen (*[C]* key).
- Fly to a position such that the runway is at an *heading of 90 degrees at an altitude of 7,000 ft.*

- Reduce your speed by *throttling down* with the *[M] (Minus)* key to about *300 knots.*

Instrument Landing System (ILS) HUD Mode

- From here you can start a downward approach. Switch on your *Instrument Landing System (ILS) HUD mode* by pressing the *[I]* key.

The ILS is designed to assist a pilot in making a smooth landing. The whole idea behind the ILS is that an imaginary beam is projected from the runway. A pilot must *ride down the beam* to make a perfect approach. *Runways have to be specially equipped to handle ILS landings.* In FALCON, only Runway #9 is set up to handle ILS landings.

The ILS Hud has two principal components: the *Glide Slope Deviation (GSD) Scale* and *Localizer Deviation (LD) Scale*. The *LD Scale* displays angle variance between the correct heading approach angle (90 degrees in this case) and the angle between your current position and the runway. The further you are to the right, the further the *GSD Scale* slides to the left, and vice versa.

The *Glide Slope Deviation Scale* displays the angle offset between the beam and your intercept angle to the runway. The *higher* above the ILS beam you go, the *lower the LD Scale* slides down the HUD, and vice versa.

A perfect approach angle will show the *GSD* and *LD* coming together so that the middle of each scale crosses *at the center point of the HUD* to form a perfect cross.

It's important to understand that your *heading* has nothing to do with where the *GSD* and *LD* are placed on the HUD. The ILS only checks for deviation between the current intercept of the aircraft with required approach angle. *That's why you still need to monitor the heading scale during landing.*

Continue your downward approach, making sure that the *GSD* and *LD* are kept in alignment. Use small movements to make course and altitude correction. *Don't over-compensate*. Once you've fallen below 5,000ft, throttle back to about 68% RPM and reduce your airspeed to 125-150 knots. Use the *Air Brakes* (**B** key) to help you decrease speed. *However, make sure your airspeed doesn't fall below 100 knots. At higher ranks, falling below 100 knots can result in a stall, followed by a funeral.*

At upper ranks, a correct *Angle of Attack (AOA)* is extremely important to the success of your landing. A plane's AOA should lie between 8 and 13 degrees (on the *AOA Indicator*). *Dropping airspeed will increase your AOA*. Take a look at your *AOA Indexer* on the left side of the HUD. If the *top light* is on, then you are coming in *too steep* and *too slow*. If the *bottom light* is on, then your airspeed is *too fast* and AOA is *too shallow*. A *center light* indicates that your airspeed and AOA are perfect.

When you get below 4,000ft, drop your *Landing Gear* by pressing the **G** key. Your *NWS System/Landing Gear Status Indicator RY* (ready) light should be illuminated (just like it was before raising the gear earlier upon takeoff). *Check the Left View to make sure all three wheel lights are lit*. If not, you better prepare for a crash landing (remember, upper ranks only).

At this point, it's important that you monitor your *altitude*, *airspeed*, *GSD*, and *LD*. Use *throttle* and *air brakes* to adjust your speed. *If you're going too slow, turn off your air brakes and increase throttle, or drop your nose a little. (Don't get in the habit of dropping below 8 degrees AOA.)* Use *Trim Control (Scroll Lock key in conjunction with stick control)* to make small adjustments in your climb angle and bank. *Right before touching down (altitude under 100 ft), make*

sure that your climb angle (Flight Path Ladder, remember) is not less than -8 degrees.

As soon as you touch down, *reduce throttle to 60% RPM*, and apply *Air Brakes*, *Flaps* (**F** key), and *Wheel Brakes* until you come to a complete stop. At this point, you may exit to an option menu by pressing the Esc key. Select *Mission Completed* to collect any ribbons and merits that are now yours.

Use the *First Lieutenant* level as a *training simulator* to learn *air combat maneuvers* that can *make or break* your ability to survive dogfights at higher ranks. If your machine has enough memory, you can invoke *Black Box* flight recorder that will replay flight sequences for you to analyze.

Enemy Planes and Missiles

The enemy has two ways to battle against you in *FALCON*. One is with the *MiG* jet fighter; the other is via the Surface-to-Air Missile (SAM).

You can encounter the MiGs in a couple of different ways: *Black Bandit* is a specific MiG mission where you encounter the plane simply by flying north from your airfield. *You will also have the chance of seeing enemy planes at any time after you cross into enemy territory, no matter what the mission is.* Fly at *First Lieutenant* level until you get familiar with how the MiG performs, because you can't be shot down by the MiG at this rank.

SAMs can be fired at you in two ways: from a specific *SAM site* on the ground (that you can identify from the air) or via a *shoulder launcher*. *Note that you have to fly at Captain rank (or above) to have SAMs be active. However, your F-16 doesn't handle much differently at this rank, and although either SAM type can be launched at Captain level, they can't shoot you down.*

Encountering the Enemy

These examples are intended to give you an overview of the process involved in encountering the enemy's arsenal. Try the different HUD modes while you're in the air.

MiGs

If there are any MiGs in the area, you'll usually know fairly quick because a square blip (one per MiG) will show up on your Threat Indicator (if the MiG's radar is turned on). Also, if your COMED screen is in Radar mode and a MiG is in front of you, the data displayed on Radar will give specifics on one *targeted* MiG's position, its airspeed, and whether you are either overtaking it, being left behind, or if it's coming straight at you. When in *bore sight scan mode* (like looking down the barrel of a gun), the position of the MiG is displayed relative to the nose of Falcon. The distance of the target from Falcon is displayed in the upper left corner of the screen. The *targeted* MiG shows up on your Radar screen as a symbol resembling a diamond with vertical bars left and right. Radar always *targets* the first MiG to appear. If any additional MiGs show up on Radar, they will appear as square symbols identical to those on the Threat Indicator.

If there's more than one MiG around, you can alternate between which one is *targeted* by pressing the Air Target Select (*T*) key. The Radar screen displays specific data on whichever MiG is "targeted."

Alternately, you can switch the radar to *search mode* by pressing the F6 key. This gives you an *overhead* view of the targeted MiG, in which the Falcon is located at the lower center of the screen. In this mode, the number in the upper left of the screen represents a distance range: 40, 20, or 10 miles. To switch back to *bore sight scan mode*, press F5.

When a MiG is behind you, you'll have to rely on the Threat Indicator and your own eyes (by looking out the different views) to determine its position. *Radar can't detect anything to the sides or rear of your plane.*

Whenever possible, you want to maneuver your plane into position behind the MiG. It's certainly possible to hit the MiG with a head-on shot using well aimed AIM-9L's or gun bullets, *but the law of averages favors the rear approach.*

When the MiG is in front of your plane but out of visual range, the Target Designator box will map the MiG's position onto the HUD. *Continue to turn and maneuver the F-16 until you're in a favorable position relative to the MiG.*

The enemy may throw either the MiG-21 (code named *Fishbed*) or the MiG-29 (*Fulcrum*). The MiG-29 is capable of firing missiles at you when approaching head on. The MiG-21 won't fire missiles, but may fire on you with its guns when approaching head-on (but it would have to be much closer than the MiG-29 would have to be). MiG-29's can fire missiles from up to 12 miles away. The only way to tell them apart is visually.

Improving Missile Hit Rate

Use the later model AIM-9L *All Aspect* Missile whenever possible. This model has three advantages over the older AIM-9J. *First, the AIM-9L can track an enemy plane regardless of the direction the target is facing. The AIM-9J requires that you fire at the rear of the target to provide an adequate heat source to track on. Second, the AIM-9L is less susceptible to being fooled by enemy flares. Third, the AIM-9L is more lethal.*

Don't fire missiles if you're too close to the target. (In fact, an X—called the *Break X*—appears over the aiming reticle when you're too close for missiles.)

An ideal minimum distance is two-thirds of a mile. Switch to the M-61 Gun when in tight, because anything closer than two-thirds of a mile may result in a miss from the Sidewinders. One cause would be the angular velocity of the plane relative to yours is too great and the missile is unable to turn fast enough. The other cause is that by the time the missile starts tracking, its target is out of position. The best way to track the enemy is to use the Aspect Angle Indicator on the HUD.

Aspect Angle

Use the Aspect Angle Indicator to help you move in on the enemy's six.

Aspect Angle represents the MiG's current heading relative to your current position. To calculate aspect angle, draw an imaginary line from the F-16's current position to the target's current position. (This is called the *position line*.) Then draw another line through the target's longitudinal axis (that is, a line that matches the target's heading). The aspect angle is the intersection of these two lines.

Perhaps an easier way to think about aspect angle is visually. The little caret symbol represents the nose of the target. When you look out the F-16's cockpit, the nose of the actual MiG would be pointed in exactly the same direction as the aspect angle caret in the HUD.

The idea is to keep the aspect angle as close to the target's six (that is, 0°), while you get close enough for your Sidewinder to lock onto the MiG's heat source. When you have a lock and are within a range of about 2 miles, launch the missile and watch it go after the MiG.

Avoiding MiGs

If you don't want to have enemy planes appear at all during the simulation, you can always specify *zero MiGs* during the opening setup. However, you'll probably want to have MiGs involved most of the time. Beyond enemy lines or at any time after an initial enemy plane has appeared, *more will continue to appear (even after you shoot down the first one) if the conditions are especially ripe for them to show up*. The likelihood for MiGs to appear increases dramatically if

- you are flying beyond enemy lines
- your Radar display is turned *on* (default mode is *on*; turn *off* with the *R* key) and they can detect your radar emissions
- you have an ALQ-131 ECM Pod installed and *emitting*
- you are flying at high altitudes. (*In reality, you have to fly below 500 feet to defeat enemy radar!*)

Generally get in the habit of flying low and fast with your radar off to avoid MiGs as well as SA-2 and SA-6 missiles from SAM sites.

SAMs and MiGs will never appear at the same time. The enemy doesn't want to shoot down their own planes!

Surface-to-Air Missiles (SAMs)

If you take a look at the FALCON^{AT} landscape map, you'll notice quite a few locations in enemy territory that are set up for firing Surface-to-Air Missiles (SAMs) at your F-16. SAMs are used primarily for defending ground strongholds from air incursions. They can be fired at you in two ways: from a specific *SAM site* on the ground (that you can identify from the air) or via a shoulder launcher.

SA-2 Guideline Missile

| | | | |
|-----------|----------|------------------|------------|
| Guidance: | Radar | Max Speed: | Mach 3+ |
| Range: | 31 Miles | Service Ceiling: | 70,000+ ft |

SA-2's have limited effectiveness against swift and maneuverable aircraft. The ALQ-131 ECM Jamming Pod will jam the guidance system of the SA-2's, making them virtually useless. Using Chaff is another good way to spoof an SA-2. *These missiles are always launched from SAM sites.*

SA-6 Gainful Missile

| | | | |
|-----------|-------------------------------------|------------------|------------|
| Guidance: | Radar | Max Speed: | Mach 2.8 |
| Range: | 20–37 Miles (depending on altitude) | Service Ceiling: | 50,000+ ft |

The jamming pod usually will do a good job against the SA-6. Chaff is minimally effective, but that's better than nothing. *This missile (like the SA-2) is launched from SAM sites only, and is all too effective against aircraft flying at medium altitudes.*

SA-7 Grail Missile

| | | | |
|-----------|--------------|------------------|----------|
| Guidance: | Heat-Seeking | Max Speed: | Mach 1.5 |
| Range: | 6–7 Miles | Service Ceiling: | 4,921 ft |

The SA-7 is a shoulder launch heat-seeking missile. These missiles were designed to be used against low-flying targets and are lethal to almost half of the aircrafts hit. The best defense against an SA-7 is to fly above 10,000ft. A combination of flares and high speed is also very effective.

Avoiding SAMs

If the ALQ-131 completely jams SA-2 missiles to the point where they don't even launch. The enemy may still launch an SA-6 in an attempt to burn through the jamming.

The only downside of using the ALQ-131 is that it broadcasts to the enemy that you're around. Expect to see some MiGs appear in the near future.

The Threat Warning System will pick up the specific site that launches one and display it as a small blip on the Threat Indicator at its location. Once SAM is launched chaff combined with hard maneuvering can defeat the SAM.

Another way to avoid SA-2's and SA-6's is to fly low and close to the ground.

SA-7

Since these missiles are shoulder-launched, there's no SAM site to identify. Flying fast and launching flares are a secondary defense against the SA-7. The best defense is to fly high (above 10,000 feet), beyond the SA-7's service ceiling.

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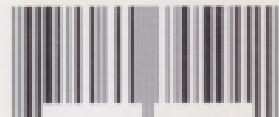
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