
F/A-18 Hornet Classic™

# Introduction

**F/A-18 Hornet** is a modern jet fighter simulation of the Navy and Marine Corps F-18A built by McDonnell Aircraft Company of St. Louis, MO.

The F-18A is based upon the experimental YF-17 designed and built by Northrop Corporation during the 1970's under contract with the U.S. Air Force. In a tight competition, General Dynamics' F-16 Falcon was ultimately chosen as the Air Force's mainstay fighter. Later, in an effort to salvage their efforts, Northrop teamed up with McDonnell Douglas to produce a new naval air combat fighter known as VFAX (fighter/attack experimental aeroplane). McDonnell Douglas's experience was useful because of their extensive background in carrier-based fighter design. For this reason, McDonnell Douglas became the primary contractor with Northrop being the major subcontractor. The McDonnell Douglas F-18 flew for the first time on November 18th, 1978.

The F-18 is a larger and broader version of the YF-17 adding greatly improved performance. The F-18 is powered by (2) General Electric F404 engines producing 16,000 lbs of thrust each making the airplane's maximum velocity Mach 1.8. It has a fuel capacity of 11,000 lbs internal and 6,800 lbs carried in three external drop tanks. Empty, the F-18A weighs 21,830 lbs and has a maximum takeoff weight of 51,900 lbs.

Graphic Simulations' "F/A-18 Hornet" provides you with the feel of piloting your own F/A-18. "F/A-18 Hornet" creates as much of the realism as is possible in a computer simulation. So, put on your G-suit, strap yourself in and fire those engines up—all of the free world is depending on you!

U.S.A.

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F/A-18 Hornet Classic™

# Game Environment

**Game Overview**

The following is a brief overview of a game play sequence. For detailed instruction, refer to sections following the Overview.

In “F/A-18 Hornet” you create a pilot that acts as your alter-ego. At your direction, he performs all missions, gets all awards, and takes all risks.

Starting up

Open the “F/A-18 Hornet” application file. When the game starts up a new pilot is created.

Dossier/Map/Briefing

The first thing you see is the Pilot’s Dossier displayed on the screen. It contains the pilot’s personal and battle history information. It also contains three pushbuttons, which look like file folder tabs, labeled “Dossier”, “Map” and “Briefing”.

Clicking on the tab labeled “Map” displays a map of the current mission area. It may be shifted or zoomed to view a small region of the theater in detail.

Clicking on the tab labeled “Briefing” displays the name, objective, location and strategic importance of the current mission.

Preferences

Change the preference settings to better suit your computer’s capabilities and your own personal preferences. See the “Preference” section for details on each item.

Flying

Three types of missions are available: “Training”; “Network”; and “Tour of Duty”. Your action in the “Training” and “Tour of Duty” missions can be replayed from “Replay Film”.

Training

Six training missions are available by choosing “Training” from the “Mission” menu. Select a mission, then choose “Fly Training ...” from the “Mission” menu.

Each training mission practices a specific skill needed for successful completion of the “Tour of Duty” missions. The pilot cannot die, no score is accumulated and no mission completion awards are given in these missions.

Tour of Duty

The “combat that counts” occurs in the “Tour of Duty” missions. Each new pilot must complete a series of seven missions, assigned from the pool of the 28 available “Tour” missions. When the pilot is created his first mission is automatically assigned and ready for flight.

The following five steps represent the sequence of actions necessary for executing the “Tour” missions:

(1) Study the mission “Briefing” to determine your objective, navigational information or any other special considerations for your assigned mission.

(2) Next, view the mission “Map” to gain familiarity with the mission area and the proximity of the primary objective and other possible objectives.

(3) Then, choose “Fly Kuwait” from the “Mission” menu to begin the mission. You are given an opportunity to load your airplane with weapons before you jump into the cockpit. After loading armament, click on the “Fly” button and away you go!

(4) After a mission ends (which happens when you return to your base or die) a debriefing session begins. Your mission success is evaluated, your status is updated and your score and awards are presented (if applicable).

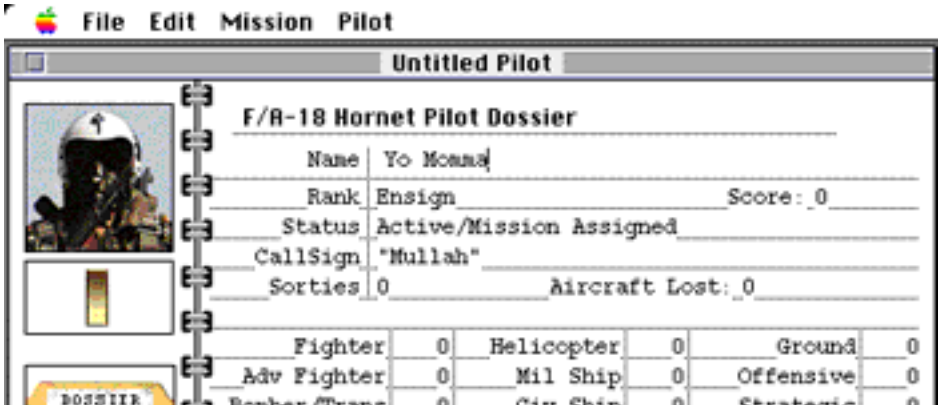
(5) Assuming that you are still alive after a mission, choose “Get Next Mission” from the “Mission” menu to accept the next assignment.

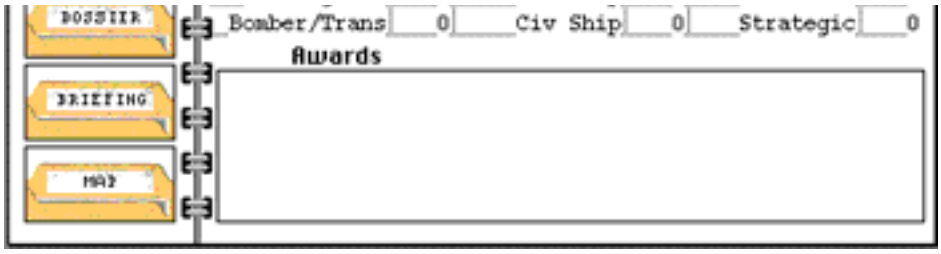
Replay Film
Review your current mission from start to finish with “Replay Film”. Select any view of the action while replaying the film at actual speed or fast forward. Stop the film at any point and change views to get a complete look at the situation. The film is erased each time a new mission is selected.

**Pilot Dossier**
When a new pilot is created a dossier page appears on the screen. It contains all pilot records regarding his personal data, status and battle history.

Personal Biography
The pilot’s name, rank, military status and callsign are displayed at the top of the dossier. At first the pilot’s name is blank. You may provide one in the appropriate space.

Rank and Status change as a result of your pilot’s actions. Targets destroyed and mission objectives met add to the pilot’s score, giving him promotions in rank. Newly created pilots begin with the U.S. Navy rank of Ensign. The rank insignia is displayed on the left of the dossier below the pilot’s picture.






The pilot's callsign is "awarded" by his fellow officers and (like it or not) it sticks for life. Pilots refer to each other by their callsigns.

Status
Status is either Active, Dead, MIA, or Court-martialed.

MIA—stands for "Missing in Action" and is used when the pilot does not return from a mission and his situation is unknown.

Court-martialed—indicates a pilot who has allegedly committed treasonous acts or other acts unbecoming an officer in the United States Navy. Destruction of friendly structures and equipment is the easiest way to gain this status.

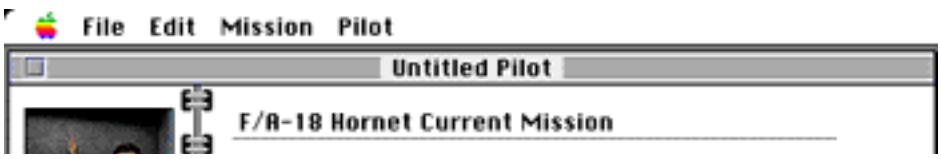
Once a pilot dies, is court-martialed or deemed MIA he can no longer resume "Active Duty". An "Active" status is required in order for the pilot to train or to be given a "Tour of Duty" mission.

Battle History
A pilot's battle successes are also logged in his dossier. The "Score" is a cumulative total of each target kill multiplied by its respective point value. The detail of the pilot's lifetime target kills is shown in the middle of the dossier. Each target type is followed by the quantity of kills for that target type.

The cumulative lifetime total of sorties flown is displayed next to "Sorties". The number of aircraft flown by the pilot, that have crashed, is displayed next to "Aircraft Lost".

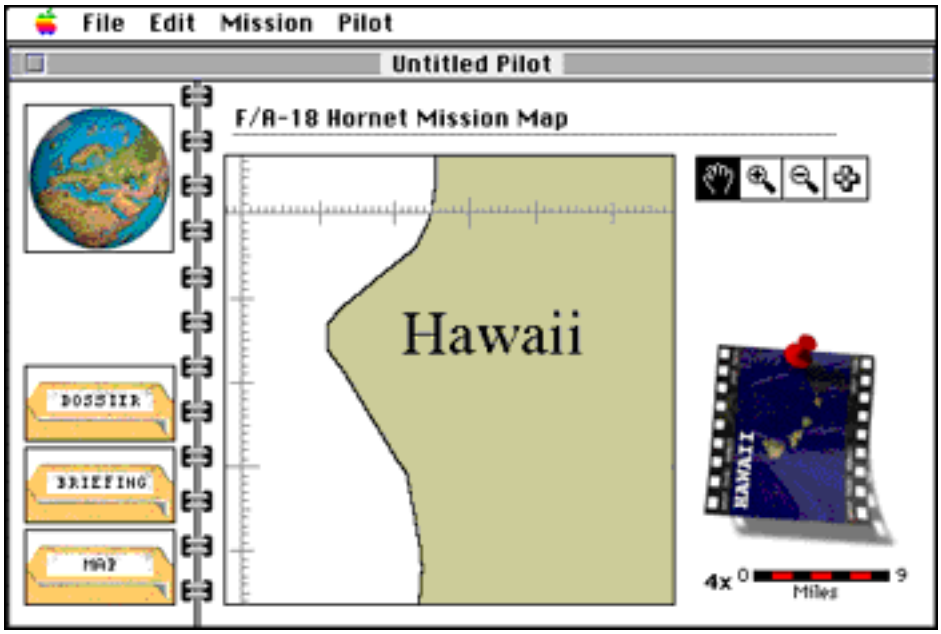
Mission completion awards are displayed in an area below the target killed detail. During mission debriefing, following a successfully completed mission, an award is presented to the pilot. Awards are displayed in the order received.

**Mission Briefing**
Each mission's name, location, objective, and strategic significance is described in the mission briefing. Study the briefing before beginning a mission to determine proper armament and for other necessary instructions and considerations. Choose "Mission Briefing" from the "Mission" menu or select the "Briefing" folder tab from the pilot dossier.




**Mission Map**

The "Map" displays the area of significance for tour of duty missions or training missions. Small "+" signs mark "waypoints" on the map. Waypoints are preset navigational points programmed into your airplane and used for guidance. Usually waypoints are set on primary or secondary targets, friendly bases or any other location of significance. Tools for zooming and shifting the map are located on the top right side of the mission map dialog box. Use the "Hand Tool" to move the map around in the viewing area. The "Zoom-In" tool can be used to take a closer look at your area and the "Zoom-Out" tool can be used to provide an overall view of the mission area. Use the "Distance Tool" by clicking and dragging between any two points on the map to determine the distance between the points.




**The Pilot Document**

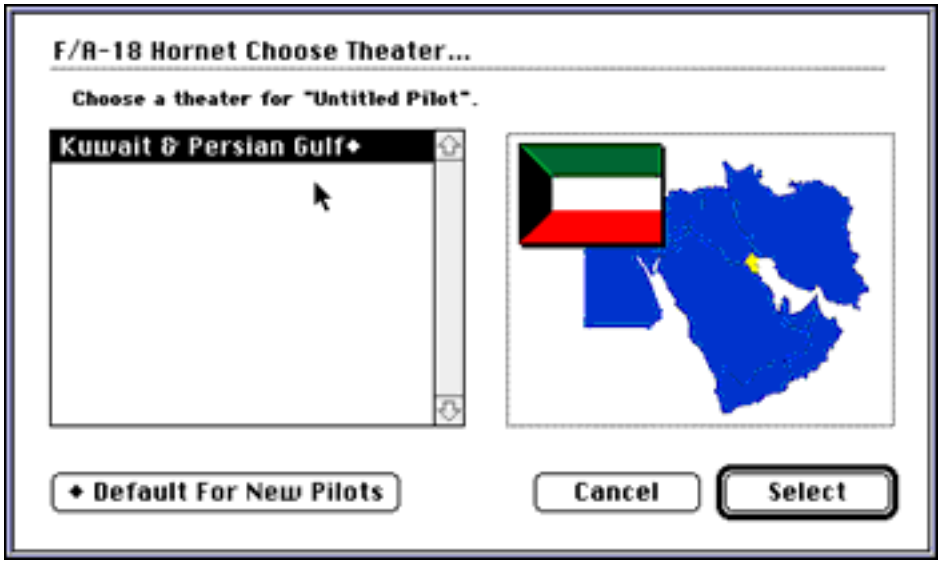
A new pilot is created by choosing “New Pilot” from the “File” menu. Choose “Save” from the “File” menu to keep any changes to a pilot. To open a previously saved pilot document, simply double-click on the icon bearing its name instead of double-clicking on “F/A-18 Hornet”. You may also choose “Open” from the “File” menu.

Each pilot’s personal data, rank, score, awards, and target kills is saved in the pilot document. The pilot document also contains complete information about his current mission. You can quit the game with a mission in progress and, as long as you “Save Changes”, later resume the mission from where you left off. Saving changes also saves the film of the current mission which can be replayed at any time prior to choosing a new mission.

An attempt to quit the game initiates a “Save Changes ...” dialog. Click on “Save” in order to permanently add the awards, kills, etc. earned during that session to the pilot’s permanent record. If a pilot is killed in combat a “Save Changes” is automatically performed to reflect his demise—so be careful out there!

**Theater**

“F/A-18 Hornet” includes the “Kuwait & Persian Gulf” theater which is chosen as the default theater of operation. An “F/A-18 Hornet” theater consists of 28 missions with their objectives confined to a common geographical region. To begin a new theater, select “Choose Theater” from the “File” menu and click once on the preferred theater name.

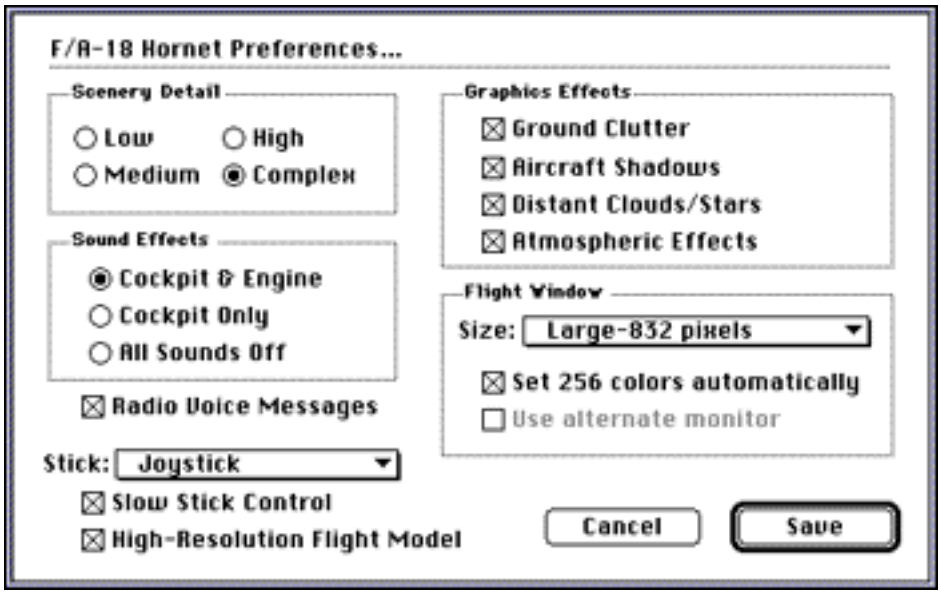



All newly created pilots use the theater noted with the “♦”. To set this default, select a theater by clicking once on its name then select “♦ Default For New Pilots”. A pilot may not change his theater until all missions in the current theater are completed. F/A-18 Hornet Classic™ includes only one theater — “Kuwait & Persion Gulf.”

From time to time Graphic Simulations will release new theater diskettes. Once installed the names of these new theaters appear in the list along with “Kuwait & Persian Gulf”

**Preferences**

All environment settings and options available in “F/A-18 Hornet” are selected in the “Preferences” dialog box. Select “Preferences” from the “Edit” menu to change preference items.




Scenery Detail

The available settings are Low, Medium, High and Complex. The Scenery Detail setting determines the distance at which objects appear from the viewpoint. A lower setting causes a delay in the appearance of objects until they are closer to the airplane. This causes fewer visible objects to appear on the screen at the same time, simplifying the view and creating a smoother, faster simulation on slower Macintosh computers. The Complex setting uses more complex airplanes and other objects during game play.

Sound Effects

The available settings are Cockpit & Engine, Cockpit Only and All Sounds Off. Cockpit & Engine plays all sounds. Cockpit Only plays all sounds except the engine and afterburner sounds.

Graphic Effects

The available settings are Ground Clutter, Aircraft Shadows, Distant Clouds/Stars and Atmospheric Effects.

Ground Clutter—shows randomly placed surface objects appropriate for a particular type of terrain. For example, white caps are displayed on a water surface. Some Ground Clutter objects are not visible from higher altitudes.

Aircraft Shadows—causes all aircraft to cast shadows on the surface.

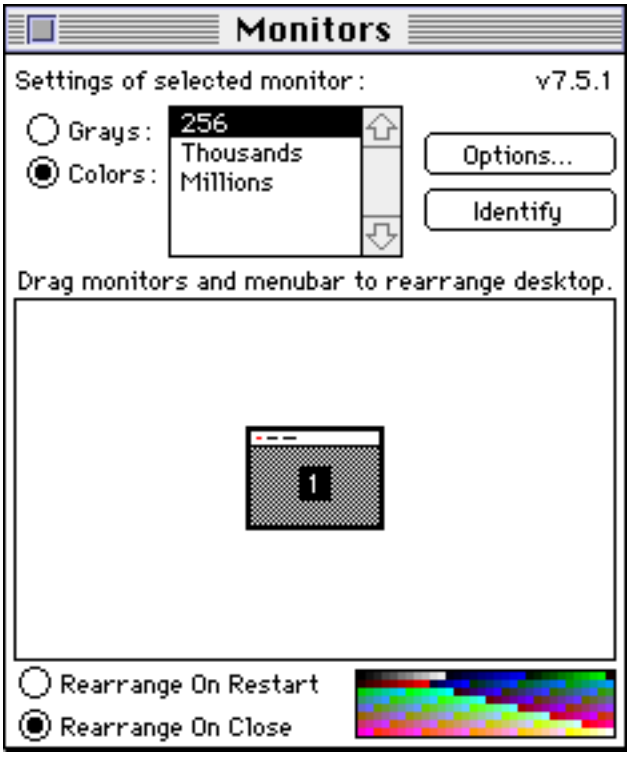
Distant Clouds/Stars—displays puffy, white clouds above the horizon and always in the distance. At night, clouds vanish and stars appear in the sky.

Atmospheric Effects—adds realistic haze effects. Haze bands are visible on the horizon. In some missions additional atmospheric haze or fog is present and this option must be selected in order to see it.

Flight Window

Five flight window size settings are available to accommodate all popular Macintosh monitor sizes. "Small" utilizes a window 512 pixels wide. This size is appropriate for 9" and 12" monitors, including Color Classic and Classic II computers. "Medium" utilizes a 640 pixel wide window and is appropriate for all 13" and 14" monitors as well as all PowerBook computers. "Large" utilizes an 832 pixel wide window which is appropriate for 16" monitors. "Very Large" utilizes a 1024 pixel wide monitor which is a standard size for most 19" monitors. "Huge" utilizes a 1152 pixel wide window which is the standard size for most 21" monitors. Please check your monitor documentation for its screen size support. Choosing a smaller flight window size yields a faster and smoother simulation on slower computers. You may wish to choose a smaller size than the largest that your monitor can support, especially if you have a 19" or 21" monitor.

Panorama (3 monitors)—If you have the available equipment, the flight window can be adjusted to fill three monitors. All three monitors must be set to 256 colors or grays and be configured like the example to the right:




Select any "Flight Window Size" and select "Panorama (3 monitors)". All three monitors use the selected size. If the monitor's resolution is smaller than the chosen size, the displayed area is cropped. For this reason, it is recommended, but not required, that all three monitors be the same physical size.

Using a window size smaller than what your monitor can support creates a smaller window that is centered on your monitor screen.

"Set 256 Colors Automatically"—changes your monitor setting to 256 colors (or grays if applicable) each time flight begins. After flight is suspended, monitor settings are returned to their original states. Select this option unless it causes a problem.

"Use Second Monitor"—allows users with multiple monitor configurations to place the flight window on the second monitor. The second monitor is the monitor labeled "2" in the Monitors Control Panel item. To use the number "3" monitor, press and hold the o key when flight begins. At all times the dossier remains on the original monitor.

Custom Sound Driver

Selection of this option yields a faster and smoother simulation on slower computers. This option should be selected unless sound problems arise.

Slow Stick Control
Selection of this option decreases the sensitivity of the mouse or joystick. This makes the airplane a little easier to fly and not overly responsive. It should be used if you have trouble flying the aircraft with the normal stick settings.

High-Resolution Flight Model
Two flight models are available, Normal and High-Resolution. The Normal flight model draws 10 frames to the screen each second, whereas the High-Resolution flight model draws 20 frames per second. Faster computers can easily support High-Resolution. Slower computers may prefer Normal. Test each because personal preferences will vary.

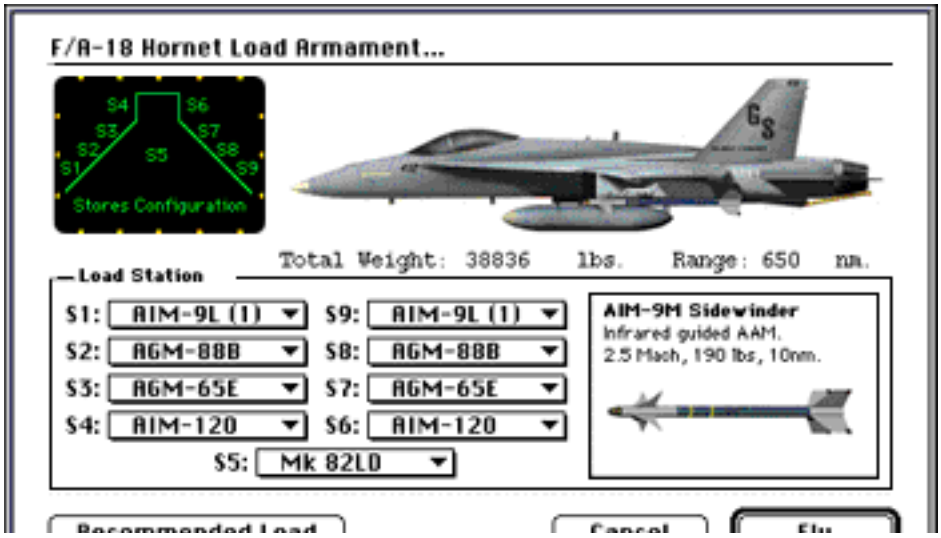
## Missions

The “Mission” menu contains all choices related to flying a mission. There are three types of missions available: “Training”, “Network” and “Tour of Duty”. After choosing the type of mission, choose “Fly ...” to begin. You may suspend flight at any time by pressing c` . Continue the mission by choosing “Continue ...” from the “Mission” menu.

When a mission is continued, the simulation is automatically restored to the situation as it was when flight was suspended. This causes a delay before flight is resumed. For very long missions, this delay could be several seconds.

## Load Armament

After choosing “Fly...”, you are asked to load weapons onto your airplane in the “Load Armament” dialog box. The F/A-18 Hornet has nine stations for loading armament and other equipment. To load a station, click and hold the mouse pointer on the desired station. The possible armament choices are then displayed. Move the mouse pointer to the weapon of choice and release the mouse button. See the “Weapons / Stores / Countermeasures” section for a description of the available load items.




Because of the weight or functional restrictions of some load items, only certain ones can be placed at each location. For example, the FLIR pod can only be mounted on one of the side fuselage mounts (stations 4 and 6) and the external fuel tank can only be mounted on the fuselage centerline (station 5). The smaller sidewinder missiles are limited to the outer wing positions. Because of their weight, free-fall bombs can only be loaded on the stronger wing pylons (stations 2,3,7,8) and the centerline (station 5). To maintain an acceptable load balance, free-fall bombs are dropped in pairs, one from each side of the airplane. So, when you drop a MK84 from station 2, whatever is loaded on station 8 also falls.

Each mission's recommended load is preset, but may be altered according to the pilot's desires. When you are finished loading armament, click on the "Fly" button and strap yourself in!

**Training**

Six training missions are available for practicing essential F/A-18 Hornet operational skills. Each mission builds on the skills learned in the preceding training mission with the last involving live combat action simulation.

Simple flying, landing, carrier operation, navigation, air-to-ground combat and air-to-air combat techniques are covered in these missions. See the "Training" section later in this document for detailed instruction.

**Tour of Duty**

When the training is over it's time to go to work. The "Tour of Duty" missions are live-action missions each with objectives and awards. Score is awarded for enemy kills and, of course, your pilot can be killed too.

A pilot's tour of duty consists of seven "Tour" missions, each likely to be more difficult than the last. Prepare by studying the "Briefing" and also the "Map". When you are ready, choose "Fly Kuwait ..." from the "Mission" menu.

If continuing a mission after a replay, a momentary pause is necessary to reset the mission. If the mission is very long, a delay of several seconds should be expected.

**Scoring**

Target Point Accumulation

Each target type is worth a number of points based on its difficulty to destroy and strategic value to your enemy. Points gained during a mission are awarded in the mission debriefing.

Rank Promotion Values

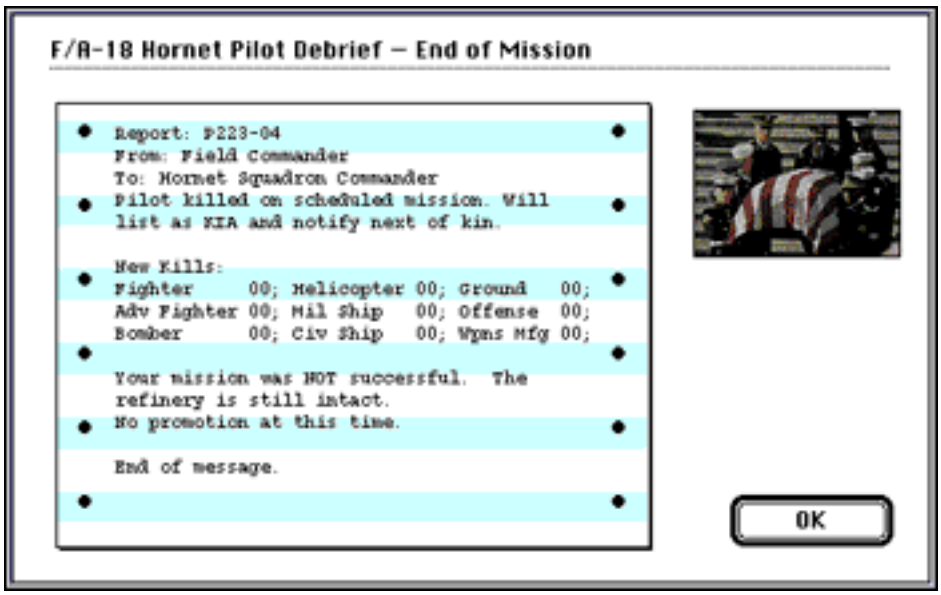
Following are obtainable ranks and the points required to achieve them:

Ensign 0
Lieutenant (Junior Grade) 5000
Lieutenant 12000
Lieutenant Commander 25000

Commander 45000
Captain 75000

**Mission Debriefing**

When the pilot dies, bails out, lands a disabled aircraft, ditches or successfully completes a mission and lands safely at the location specified in the mission briefing, the current mission ends. Afterwards, a window appears with information about the outcome of the mission.

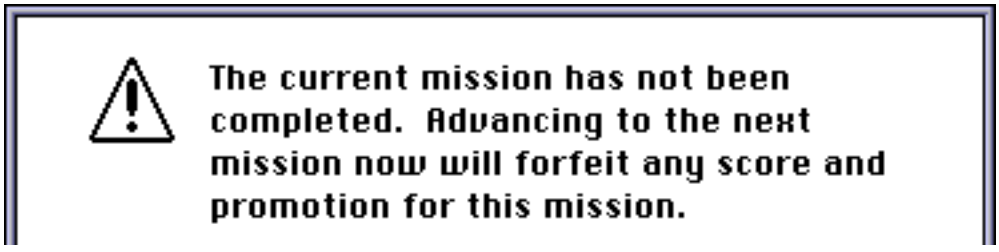



Points for all destroyed targets are awarded at this time. If enough points for a rank promotion are accumlated, then the promotion is awarded and the new insignia is shown on the left.

The pilot's status is updated along with a message stating whether the mission was a success or a failure. If the mission was successfully completed then the pilot's dossier is updated to include a newly earned mission award.

**Get Next Mission**

When created, a pilot is assigned the first of seven missions in his tour of duty. The "tour" missions are randomly selected from the current theater's 28 active combat missions.
To fly the first mission simply choose "Fly ..." from the "Mission" menu. After a mission is completed and you are ready to proceed to the next, choose "Get Next Mission" from the "Mission" menu.




Choosing “Get Next Mission” before the current mission is completed produces the dialog box to the right:

**Replay Film**

A film recording of the most recent “Tour” and training mission is made and kept until a new mission is chosen. During a replay any view may be chosen or changed at will. A heads-up-display can be activated by pressing cH .


Replay begins at the start of the mission with the film in the stopped position. The available options are reset to start, stop, play and double-speed play.

Views can be changed at any time. Camera viewpoints are independent of the view that was used during the mission. See the “Views” section later in this document.

Film can be replayed either during a mission or after its conclusion.

Films can be saved by making a copy of the pilot document. This keeps the replay film of your famous mission for posterity.

**Famous Pilots**

The top ten pilots, ranked by score, are honored in the “Famous Pilots” ledger. The pilot’s name,

current status and total points are shown. These pilots remain until cleared by selecting “Clear Famous Pilots”.

F/A-18 Hornet Classic™

# Training: Flight Controls

This section is designed to give you detailed information on basic operational techniques of the F/A-18 Hornet. You will be instructed what to press, what to move, and where to look to learn effective operation of this complex jet fighter.

**Flight Controls**

To get an F/A-18 Hornet into the air, all you really need is a basic understanding of how to steer it and how to make it go. A “stick” is used for steering and the “throttle” is used to accelerate.

Stick

An airplane’s steering “stick” is situated in front of the pilot, between his legs. It is fixed at its base but can be moved around by gripping it with your hand and tilting any direction. While the airplane is airborne, moving the stick forward dives the airplane, pulling it back toward the pilot causes the airplane to climb, moving it left causes the airplane to roll to the left and moving it right causes a roll to the right.

There are a number of ways to tell the computer which way you want the stick to be moved. Your Macintosh comes equipped with a keyboard and a mouse or a keyboard and a trackball. Either of these configurations can be useful replacements for the stick. Also, several companies produce flight sticks or “joysticks” that plug into your computer and act very much like the airplane’s stick.

If your Macintosh has a numeric keypad, four of its keys can be used to simulate the directional movement of the stick. The 4 , 6 , 5 and 8 keys represent roll left, roll right, climb, and dive, respectively. The use of a joystick or mouse is recommended over the use of the keys on the numeric keypad.

If you choose to use a mouse, use the diagram at right to determine its appropriate directional movements.

If you choose to use a joystick, use the diagram at right to determine its appropriate directional movements.

A popular stick, the Advanced Gravis MouseStick II, has a trigger that fires the currently selected weapon. Any MouseStick II button is configurable to any keyboard command. See your joystick product documentation for more information on the stick and its capabilities.

PowerBook users need to use the trackball to substitute for stick movements. Roll the ball to the left or right for a respective roll of the airplane. Roll the ball forward (toward the screen) to dive the airplane and roll the ball backward (toward you) to climb to a higher altitude.

Taxiing the airplane, which is driving the airplane while on the ground, requires the same control movements as flying. However, climbing and diving are not possible and left and right movements of the stick simply change the direction that the airplane is pointed. No steering is possible unless some forward movement is present. The turn rate of the taxiing airplane depends on its speed.

Use the b as a brake pedal. If the brake is engaged while the airplane is stopped, the brake locks. Locked brakes are released by pressing the b .

Throttle

Speed is necessary not only to taxi an aircraft but also to lift it off of the ground and keep it flying. The F/A-18 Hornet requires a speed of about 120 to 140 knots before it can lift off the runway. The exact liftoff speed is determined by the airplane's weight and atmospheric factors. When the throttle is pushed forward additional thrust is generated which increases speed. The + and - key are used to control the throttle.

F/A-18 Hornet Classic™

# Training: Takeoff & Flight

The purpose of this first mission is for you to get your F/A-18 Hornet into the air and gain enough control skills to perform basic maneuvers. Your starting position is at the beginning of a long runway at a training base in the Hawaiian islands.

To begin this first training mission select “Training” from the “Mission” menu. A dialogue box appears containing six training missions. Click once on the first one titled “Takeoff and Flight”. Then press the “Select” button in the lower right-hand portion of the dialogue box. Next choose “Fly Training ...” from the “Mission” menu. The “Load Armament” dialogue box appears. This mission does not require weapons so simply click on the “Fly” button at the bottom of this dialogue box. Next you see the forward view from the cockpit of your F/A-18 Hornet. Read the following background section before attempting flight.

**Background**

Before attempting flight it is best to become familiar with some of the elements of the cockpit. On top of the instrument panel, notice what appears to be a glass plate with some numbers and graphics on it. This is known as the Head-Up-Display (HUD). A number enclosed in a box appears on the left and right side of the HUD. The one on the left is the air speed indicated in knots. The one on the right is the airplane’s altitude. In the middle of the HUD notice a group of horizontal bars with numbers on each side. This collection of bars is known as the Pitch Ladder. The Pitch Ladder bar in the center of the HUD indicates the degrees above or below the horizon that your airplane is currently pointed. In the center of HUD is a small circle with three tick marks

extending from it. This is the Velocity Vector which indicates the direction that the airplane is currently going. At the very top of the HUD are some numbers with tick marks between them, this is the airplane's Heading Indicator. The number above the "^" represents the airplane's current heading. Fixed in the center of the HUD is the Water Mark. This "W" shaped mark is only visible when the landing gear is extended.

Down on the instrument panel, left of center, notice the four words, Gear, Flap, Hook and Brak (brakes). Currently the gear indicator is lit. This means your landing gear is extended. When any of these are extended or in use, its indicator illuminates. Notice the two display screens at the bottom on the left and right of the instrument panel. The one on the left is known as the Master Monitor Display (MMD) and the one on the right is known as the Multi-Function Display (MFD). The MMD shows information on the F/A-18 Hornet's offensive and defensive stores and engine information. At the bottom of the MMD are two percentages with the word "MIL" between them. These represent the thrust percentage produced by each of the two F404 engines.

To increase thrust, press the + key. If thrust is below 50%, pressing + automatically increases thrust to 50%. Each single press of the + key increases thrust another 2% until 100% is reached.

To decrease thrust press the - key. If thrust is above 50%, each single press of the - key decreases thrust 2% until 50% is reached. If thrust is below 50%, pressing - kills the engines only if the airplane is on the ground.

Press the d key to automatically increase thrust to 100%. If thrust is already at 100%, pressing the d key turns on the first stage of "afterburner" which is essentially 115% thrust. Each subsequent d key press increases thrust to a new stage of afterburner. Six stages of afterburner are available. While afterburners are on, fuel consumption is very high. So be frugal with its use.

**Action**

To begin, grasp whatever control device you are using: mouse, joystick, keyboard, or track ball. For brevity sake, we will hereafter assume that you are using a mouse. Next, press the d key once. You notice an engine sound and in a moment some forward movement. Move your mouse to maintain a straight path down the runway. Once your path is straight, AVOID ANY LEFT OR RIGHT MOVEMENTS OF YOUR MOUSE. Notice that the airspeed indicated on the HUD begins to increase. Once it reaches 100 knots, pull back on your mouse gently until a 10° angle of attack is achieved. Push your mouse forward to stabilize your climb. With this climb angle you should be able to see the horizon on each side of the instrument panel. Make sure your mouse movements are very gentle. Now retract the landing gear by pressing the G key. Notice that your gear light is now extinguished.

At any time during flight you may temporarily pause the game by pressing cP . Then, when you are ready to resume, again press cP .

Once your flight is stable, move your mouse forward until the airplane's climb is 0°. Then, gently move the mouse to the left to begin a left turn. A small movement back to the right is necessary to stabilize the left turn. Stop the turn by moving the mouse to the right until the horizon is straight across your screen. Once you feel comfortable making gentle turns, practice more severe ones. If you crash or have some other difficulty and wish to start over press and

hold the c key and then press the ` key. This ends the mission and gives you the opportunity to start again from the beginning. Redo this mission until smooth flight and turns are easily maintained.

F/A-18 Hornet Classic™

# Training: Airstrip Landing

**Background**

This training mission is designed to instruct you on one of the most difficult tasks of flying any airplane—landing. The Instrument Landing System (ILS) provides the F/A-18 Hornet pilot with helpful guides for a proper landing.

The ILS displays two new bars on the HUD. The horizontal bar is the glide slope deviation or GSD. The vertical bar is the localizer deviation or LD. The glide slope is an imaginary path which, when followed, ensures a proper descent to a safe landing. If you fly your airplane along this line it touches down at the front of the runway. When the GSD is in the center of the HUD, your airplane is following this line. The localizer is an imaginary line that runs along the ground extending through the middle of the runway. If you fly your airplane along this line it passes over the runway from one end to the other. When the LD is in the center of the HUD, your airplane is following this line. The idea is to center both lines, making a "+" in the middle of your HUD.

In actual practice it is a little cumbersome lining up both LD and GSD, so just concentrate on the GSD and your landing point. Use the LD as a secondary guide.

In order to land at a safe speed, look at the Angle of Attack Indexer (AOAI) and adjust your thrust accordingly to achieve an appropriate speed. The AOAI is the small panel attached to the left side of the HUD. It has a ball in the middle and lights above and below the ball. The ball is illuminated when your speed is proper for a safe touch down. If the lights above the ball are lit, your speed is too high for a safe landing. If the lights below the ball are lit, your speed is too slow for a safe landing.

In actual practice you can use a familiar landing approach to assure a proper landing speed and use the AOAI as a secondary guide. For example, begin an approach to landing two miles behind the landing point with the landing gear down, flaps extended, and the thrust at 76%. Following the GSD, you will find that a proper landing speed is always achieved.

**Action**

Choose "Training" from the "Mission" menu. Select "Airstrip Landing" and click on the "Select" button. Next choose "Fly Training" from the "Mission" menu. The "Load Armament" dialogue appears next. No armament is needed for this mission. After you do begin live flight remember that you can pause the game by pressing cP at any time. If things really go badly, press c` and start the mission over again.

Before pressing the "Fly" button it is important to note that the F/A-18 Hornet's initial position

is in the air, aligned with a runway that is two miles ahead.

OK, with that in mind press the “Fly” button. Now, press the G key to extend the landing gear and the F key to extend the flaps. Then, press the L key to turn on the Instrument Landing System (ILS). Next, maneuver the airplane so that the “w” shaped Water Mark on the HUD is placed on the base of the approaching runway. Remain steady until the GSD moves up onto the “w”. Pull back on the mouse to keep the GSD centered in the HUD, on the “w”. Continue until your airplane touches the ground. Push forward on the mouse to keep the airplane from bouncing up off the runway and taking flight. Once on the runway, press and hold the b until the airplane comes to a complete stop. Then, press and hold the - key to kill the engines.

Once you have successfully landed the airplane and feel comfortable with landings move on to the next training mission.

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# Training: Carrier Operations

**Background**

Like the previous training mission, this Carrier Operations mission begins with the F/A-18 Hornet aloft, lined up behind its landing point. This time, however, the landing point is on an aircraft carrier which provides a very small landing area. Again the ILS will be used to assist in the landing. Because of the small landing area, a carrier landing is basically a controlled collision between your airplane and the carrier deck. Once your airplane hits the carrier deck its forward motion is stopped when a hook extending from your airplane grabs one of many arrestor cables that stretch across the deck.

**Action**

Choose training from the “Mission” menu and then select “Carrier Operations”. Click on the “Select” button. Next choose “Fly training ...” from the “Mission” menu. Again, no armaments are needed so leave this dialog box empty.

Press the “Fly” button. When the cockpit view appears immediately press G to extend the landing gear, F to extend the flaps, H to extend the tail hook and L to turn on the ILS. Next, maneuver the airplane so that the “w” shaped Water Mark on the HUD is placed on the carrier deck. Remain steady until the GSD moves up onto the “w”. Pull back on the mouse to keep the GSD centered in the HUD, on the “w”. Continue until your airplane touches the deck. Quickly push forward on the mouse to prevent your airplane from bouncing up off of the carrier deck and loosing the grip of the arrestor cable. If the hook catches a cable all forward motion is quickly

stopped. If not, press d a few times and take off again for another try. If you do come to a complete stop, retract the hook by pressing the H key.

Press cP to pause the game and read through the next paragraph. When you feel comfortable enough to try a catapult launch, press cP to resume action.

If you have survived the landing with no damage to either engine (press D to get a damage report), you can now practice carrier catapult launches. To do this, taxi the airplane onto the large white pad located on the forward right-hand portion of the carrier deck. A careful taxi can be performed at a thrust level of 76%. As soon as motion begins quickly turn to the right. When the airplane drives onto the pad press and hold the b until all forward motion stops. If the brake is engaged when the airplane comes to a complete stop, the brake locks on. Make sure that all motion stops before you release the b .

Don't worry about perfect alignment, your airplane automatically aligns before the launch begins. Next, press the d key and wait until 100% thrust is reached. Then press the d key one more time to ignite the first stage of afterburner. Next, press the b to release the brake. You are quickly catapulted off of the front of the carrier. Pull back on your mouse to begin your climb. The catapulting action instantly increases your air speed from 0 to 150 knots before your airplane reaches the end of the carrier deck. Practice carrier landings and catapult launches until you can routinely perform them without accident.

F/A-18 Hornet Classic™

# Training: Navigation and Radar

**Background**

The purpose of this training mission is to familiarize you with the navigation instrumentation of the F/A-18 Hornet. Aside from the ILS, which was used in the two previous training missions, the Digital Moving Map and the Tactical Air Navigation system (TACAN) are available.

The Digital Moving Map is displayed on the Multi-Purpose Color Display (MPCD). The MPCD is located in the center of the look-down screen (press 2 on the top of the keyboard). Press M to change the MPCD display to the map. Your current position is a small "+" in the center of the map. As your position changes the map scrolls, keeping the "+" centered. The map is always aligned with magnetic north at the top. A "^" shows your current heading. Two more bits of information are shown above the map. The current heading is displayed on the left and the miles across the current view is on the right. The 9 and 0 keys on the top of the keyboard zoom in on the map and zoom out of the map respectively.

The TACAN tracks the airplane's current position and waypoint position information. A waypoint is a fixed navigational point, usually a target location or the location of a known structure. When the autopilot is engaged, the heading changes to intercept the currently selected waypoint. Turn on the TACAN by pressing the T key. Select another waypoint by pressing the W key.

Waypoint information is displayed in three ways. First, a bar is positioned in the heading indicator located on the HUD. The bar shows you which way to steer to fly to the currently

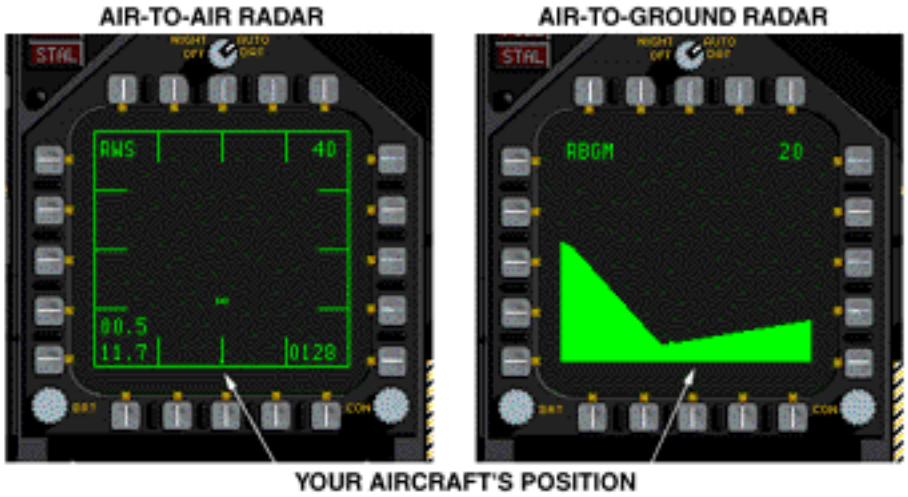
selected waypoint. Turn toward the bar until it centers in the heading indicator.

Second, the MPCD shows the currently selected waypoint, its range, time to reach the waypoint, and the heading to the waypoint. This information is in the lower left quadrant of the MPCD. Press the N key to display this navigational information if the MPCD is in another mode.

Third, the Digital Moving Map displays the location of all stored waypoints. Also, a line from the airplane's current position to the currently selected waypoint is displayed.

**Action**

To fly the mission, select "Training" from the "Mission" menu. Next, select the "Navigation" mission, then click on the "Select" button. Choose "Fly Training ..." from the "Mission" menu. Click on "Fly" from the "Load Armament" dialog box. You are now positioned at the beginning of a runway. It's dark. You're out of cigarettes and you're not wearing sunglasses.




Press the T key and notice "TACN 1" appears in a display in the center of the instrument panel. Also, notice the new bar displayed in the Heading indicator. If you have difficulty locating these two items, press T a couple of times and note the differences. With the TACAN on, press the 2 key located on the top of the keyboard to view the look-down screen. The MPCD shows information about waypoint 1 (D1) in its lower left quadrant. The waypoint number, miles to waypoint, time to waypoint, and heading to waypoint are displayed. Press W several times eventually stopping on waypoint 1. Other information on the MPCD is discussed in the "Navigation" section of the "Reference" chapter.

Next, press the M key to view the map with the waypoints displayed. Note the "^" depicting the current heading and the line between your current position and the selected waypoint. Zoom the map in and out at will by using the 9 and 0 keys. Press 1 from the top of the keyboard to return to the forward cockpit view.

Press d to fire up the engines and take off as normal. Shortly after you become airborne, press G to raise the landing gear and press A to engage the Auto Pilot. Notice that nothing else is required of you to fly to the selected waypoint. The A/P holds an altitude of no less than 1000 feet and steers to the selected waypoint when the TACAN is turned on. When the airplane arrives

at the waypoint it will circle until given new instructions.
Take a few moments to test the various components of the TACAN and A/P systems. When you begin to feel good about your comprehension, take an opportunity to get an advance look at the radar system.

**Preview of Coming Attractions**
Since this training exercise isn't too terribly taxing, it's a good time to preview an instrument system that will become near and dear to you—the AN/APG-65 radar system.

AN/APG-65 Radar System
The MFD (display screen in the right side of the instrument panel) displays radar information and damage reports. Three radar modes are available, air-to-air, air-to-ground and silent.

Initially, the radar is in silent mode. In this mode no radar is emitted, which is good for eluding radar tracking weapons and instruments. Press R to turn the radar on and enter air-to-air mode. The air-to-air radar view is top down with your position being at the bottom center. All other airplanes (targets) visible on this screen are in front of you. In the top right corner is the range. The range is the number of miles between you and objects at the top of the radar screen. Change the range by pressing the t key. A target can be selected by pressing the \ key. Press \ again to select a new target. When a target is selected additional information about it is shown. The selected target's closing speed is displayed in the bottom right corner of the radar. In the lower left corner, his altitude (above) and distance (below) are shown.

Four air-to-air modes are available. They are Velocity Search (VS), Range While Search (RWS), Track While Scan (TWS), and Air Combat Maneuvering (ACM). The currently selected mode is shown in the top left corner of the radar. Change air-to-air mode by pressing the Q key. See the Radar section of the Reference chapter for details on each mode.

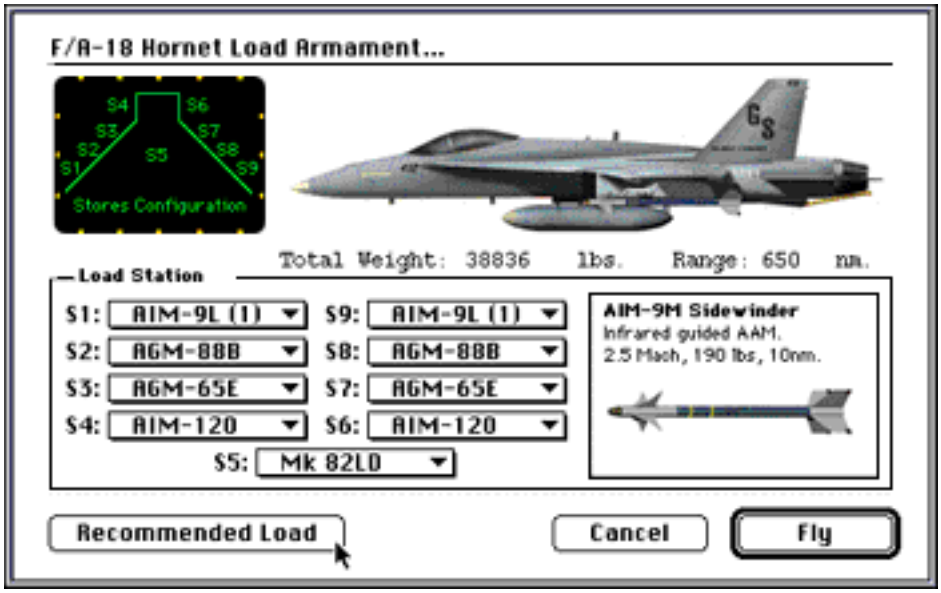
Air-to-ground radar scans the surface below for specific types of targets. To change from air-to-air to air-to-ground, press R . Four air-to-ground modes are available. They are Real Beam Ground Mapping (RBGM), Sea Surface Search (SSS), Ground Moving Target Indication (GMTI), and Anti Radiation (ARAD). See the Radar section of the Reference chapter for details on each mode.

F/A-18 Hornet Classic™

# Training: Air-to-Ground

**Background**

There are four different classes of air-to-ground (A/G) weapons. They are cannons, free-fall bombs, electro-optical missiles, and anti-radar missiles.




In the previous training missions you were instructed to skip the “Load Armament” dialog box. In this mission you learn how to use A/G weapons; loading them is the first step. In missions where weapons are necessary (all of them from now on) a recommended load is pre-selected and mounted on your airplane. You may change or remove these weapons before pressing the “Fly” button. The weapons are placed at nine stations on the wing, wing pylons and fuselage of the airplane. Weapons are placed according to their weight. The very light “Sidewinder” missile is the only weapon that can be placed on the wing tips (stations 1 & 9). The heavier free-fall bombs can only be placed on the structurally re-enforced wing pylons (stations 2,3,7,8) and the fuselage (station 5). Change or remove weapons by clicking and holding the mouse button on the station to be changed. Move the mouse pointer to the new weapon choice and release the mouse button. You may re-install the recommended load weapons by clicking the “Recommended Load” button.

Weapons are selected for firing in the MMD (master monitor display). Press ] to cycle through the A/G weapons. Initially, “safe” is displayed signifying that no weapon is selected. When a weapon is selected “arm” is displayed because weapons are automatically armed. Under “safe/arm” is the name of the weapon and the number of them loaded. A weapon, selected for firing, is fired by pressing the mouse button

, r or e .


A forward looking infra-red (FLIR) camera pod may be loaded and selected like a weapon. It is only used for target acquisition at night.

Cannon

The F/A-18 Hornet is equipped with an M61A Vulcan cannon and 978 rounds of ammunition. Once selected, a "pipper" appears in the HUD. This circular indicator points out the probable impact point with the surface. So place it on a ground based target and fire. To fire, press the mouse button r or e . A stream of tracer fire can be seen amidst the bullets.

**Action**

Begin the A/G training mission. Notice that the recommended load of weapons is already in place. Then, press the "Fly" button. When ready, press the ] key until the "M61A" is selected in the MMD. Next, fly toward waypoint 1, which marks a nearby island covered with a variety of practice targets. A ground patch with small vehicles is located on the near side of the island. Practice "strafing" (shooting a ground target) the small vehicles. They blow-up when hit by your cannon fire.

When you are satisfied with your strafing practice, fly a few miles out over the water and pause play by pressing cP . Read the next section.

**Background -**Free-Fall bombs

A wide variety of free-fall bombs are available for selection. Mostly these are classic, large iron bombs that fall to the ground and explode on impact. See the "Weapons/Store/Countermeasures" section of the "Reference" chapter for details on each of these.


Because of their weight, free-fall bombs are only loaded on wing pylons (stations 2,3,7,8) and the airplane fuselage centerline (station 5). To keep the airplane in balance they are released in pairs, one bomb from each side of the airplane.

A Continuously Calculated Impact Point (CCIP) system is used to designate and target an impact point for free-fall bombs. To use it, simply select a free-fall bomb and notice "CCIP" displays in the HUD. Position the airplane to place the Velocity Vector (small circle with three tick marks) on the desired target and press the mouse button, r or e . A diamond appears to mark the selected target. Extending through the diamond is a line leading down to the release reticle (a large circle with radial marks). Fly the diamond into the release reticle to automatically release the bomb onto the target. Press the mouse button, r or e again to manually release the selected weapon. Press \ to de-select an target. The CCIP is not

flawless, however it should yield better results than manual bomb targeting.

**Action**
Now, press cP to resume flight. Turn back toward the island and choose a building to use for bombing practice. Press ] to select the "MK83LD" bombs in the MMD. Notice that one bomb is highlighted from each side of the airplane. Also, notice that "CCIP" and target selector are now displayed in the HUD. Next, place the target selector on your target choice and press the mouse button, r or e . Notice the diamond and line extending from it. Position the airplane so so that the diamond moves inside of the circular release reticle. A "click" sound is heard when the bomb releases. Fly back over the target to assess the damage.

When you are satisfied with your free-fall bomb practice, fly a few miles out over the water and pause play by pressing cP . Read the next section.

**Background -**Electro-Optical Missiles
The AGM-65E Maverick and AGM-62 Walleye missiles have cameras mounted in their noses. The missile's camera view is displayed in the MPCD. Press E to see a selected electro-optical weapon's camera view. Use the arrow keys to move the camera view a limited distance. Press the 9 and 0 keys to zoom the camera view. Turn on the A/P before attempting the activities associated with deploying an electro-optical missile.

Designate a target by positioning the missile's camera view on a target and pressing the mouse button, r or e . To launch, press the mouse button, r or e a second time.
De-select a target by pressing the \ key.

**Action**
Now, press cP to resume flight. Turn back toward the island and choose a building to use for bombing practice. Press ] to select the "AGM-65E" missile from the MMD. Press A to engage the A/P. Press 2 to view the look down screen. Press E to see the Maverick's camera view in the MPCD. Position a target in the center of this view using the arrow keys and zoom keys. Press the mouse button, r or e to designate the target. If you are not happy with the designated target, press \ to de-select. When "In Rng" flashes in the HUD, press the mouse button, r or e to launch.
When you are satisfied with your Electro-optical missile practice, fly a few miles out over the water and pause play by pressing cP . Read the next section.

**Background -**Anti-Radar Missile
The AGM-88B HARM missile targets a selected radar emitting source. Radar emitting targets are designated using the air-to-ground/ARAD radar mode.

**Action**
Now, press cP to resume flight. Turn back toward the island. Press ] to select the "AGM-88B" missile from the MMD. Press R until the radar is in A/G mode. Press Q until the ARAD mode is selected. ARAD shows only surface objects that emit radar. Press t to change the ARAD view range. Press \ to designate a target on the ARAD display. When "In Rng" flashes in the HUD, press the mouse button, r or e to launch.

When you are satisfied with your anti-radar missile practice, fly a few miles out over the water and pause play by pressing cP . Read the next section.

**Background-** FLIR

The Forward Looking Infer-Red (FLIR) camera pod is available to aid in night target acquisition for either free-fall bombs or electro-optical missiles. Designating a target is the same as with electro-optical missiles. To use the FLIR, simply load it like a weapon from the “Load Armament” dialog and select it by pressing ] , then press E . The FLIR display then appears in the MPCD.

To deploy free-fall bombs using the FLIR for target acquisition, select the target in the FLIR display. This performs the same function as designating a target with the velocity vector of the CCIP. Next, select a free-fall bomb (MK-xx). Then, look in the HUD and center the diamond in release reticle.

**Action**

To deploy an electro-optical missile using the FLIR for target acquisition, select the target in the FLIR display. Next, choose an electro-optical missile and press the mouse button, r or e to launch.

Practice using the FLIR at your will. You may need to start the training mission over to reload your weapons. When you get bored of this exercise, move on to the air-to-air training mission.

F/A-18 Hornet Classic™

# Training: Air-to-Air

**Background**

The F/A-18 Hornet's air-to-air (A/A) combat systems include two types of missiles and the Vulcan cannon for offensive strike capabilities; four A/A radar modes for tracking and designating potential targets; chaff, flares, and ECM for defenses; and an Identify Friend or Foe (IFF) system for better target identification.

The M61A Vulcan cannon is used for very close range encounters. The cannon fires at a rate of 6000 rounds per minute. Your airplane carries a full load of 978 rounds. Tracer rounds are intermittently mixed with bullets so that the stream of fire is visible.

When the gun is selected, a circular targeting "pipper" is displayed in the HUD. The pipper shows the probable impact point of the cannon fire at the designated target's range or the cannon's maximum range if no target is designated.


**Action**

Begin the training mission. Press [ to select M61A Vulcan cannon. Turn the radar on to the Air-to-Air/ACM mode. Launch from the carrier and begin a 360° turn. Soon, two target blips should appear on the radar screen. Because of ACM's auto-acquisition feature the first blip spotted by the radar is acquired. Press I to verify that the target is not a friendly airplane. If a "RPLY" is given, change targets with the \ key.

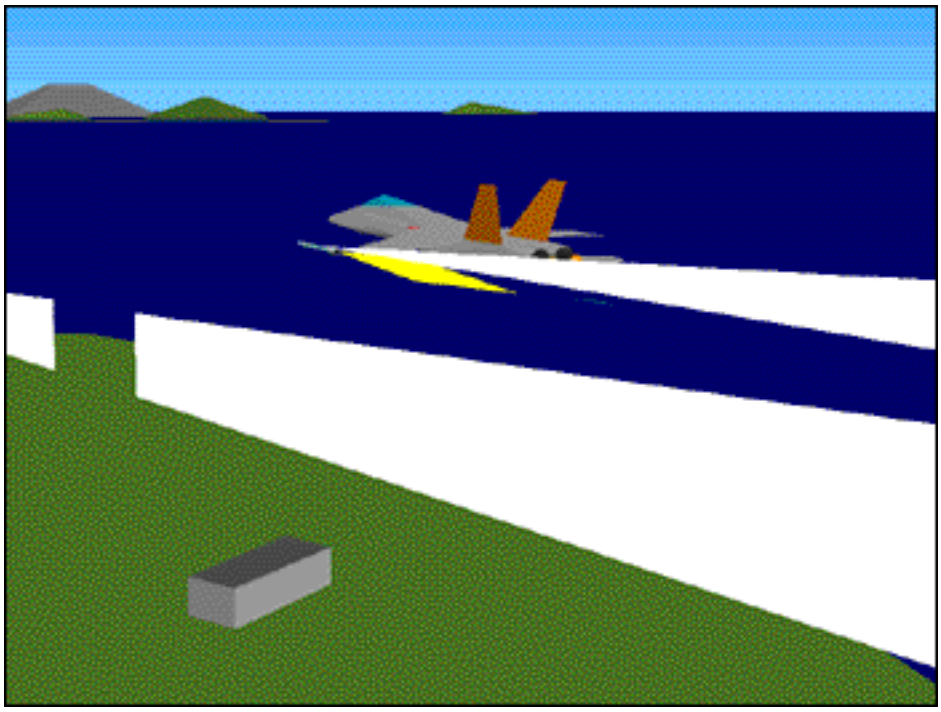
If the target is directly in front of you, you will notice the small box in the HUD. This box indicates the location of the target. If the box moves off of the HUD a line appears extending from the center of the HUD toward the target. When you are in range of the target, "in rng" is displayed on the right side of the HUD. Shoot when the targeting box moves inside the pipper and "in rng" is flashing.

Once the target is destroyed, fly in a 360° circle until a new target is located on the radar display. Again, press I to make sure that the airplane is not a friendly. Now select an AIM-9 missile. Pause play and read the following description of A/A missiles and their targeting systems.

**Background**

The F/A-18 Hornet's A/A missiles rely on the airplane's radar to locate and designate targets. Just as with the cannon, designate a target by pressing the \ key. The radar view shows the target blip with bars on each side when it is designated. Again, detailed information on the

designated target is also shown on the radar screen.



When an A/A missile is selected, a targeting circle is displayed in the HUD. Place the designated target box (small box in the HUD) in the targeting circle. When range and alignment is right for a probable hit, a “shoot” que flashes on the right side of the HUD.

The short range AIM-9 Sidewinder and the medium range AIM-120 AMRAAM are the two A/A missile choices. The Sidewinder is heat seeking and the AMRAAM is radar equipped. Use the Sidewinder when the target is within five miles and use the AMRAAM when the target is within ten miles.

**Action**

Continue play by pressing cP . Fly toward the designated target centering the target box inside the targeting circle. Wait until the “shoot” que appears in the HUD, then fire the missile. If you miss or only slightly damage the target, try again with another missile. After firing, a same type missile is selected if one is available.

Again, press cP to pause play and read about the defensive capabilities of the F/A-18 Hornet.

**Background**

To defend against a missile launch, flares and chaff may be dropped from the airplane to confuse the guidance system of the oncoming missile.

Chaff is composed of hundreds of metal strips. These strips are strewn behind the airpane. A radar equipped missile receives a confused signal causing its guidance system to fail momentarily. Press ; to drop chaff.

Flares confuse heat seeking missiles by providing additional heat sources for it to follow. The confusion is temporary because the flares only burn for five seconds. Press ' to drop flares. Electronic Counter Measures (ECM) is a system built into the F/A-18 Hornet. Its purpose is to confuse incoming radar equipped missiles by sending out jamming signals. The down side is that these signals make your airplane more visible to other radar equipped airplanes. Press C to turn ECM on or off.

A “Threat” warning indicator lights up and a single “beep” sounds when a radar lock is acquired on your airplane by an enemy. A “Launch” warning indicator lights up and four short “beeps” sound when a missile is launched at you.

**Action**

Next, press cP to continue play. Then, turn on your A/P and TACAN. Press W to change your course to waypoint 2. Eventually, an opponent fighter will see you and close to attack. Turn off the A/P to regain control of your airplane. As your opponent closes, use counter measures as needed to defend against missiles. Do not let your opponent get directly behind you. If you do, notice the debris that flies from your airplane.

F/A-18 Hornet Classic™

# Combat Tactics

**Background**

The most difficult aspect of “F/A-18 Hornet” involves bringing down enemy fighters and meeting mission objectives. With the use of good attack and defensive techniques and aided by the F/A-18 Hornet’s variety of specialty weapons, success in these areas is obtainable.

This section assumes an understanding of the airplane’s weapon and radar systems. This knowledge is obtained in the training missions.

**Air-to-air**

A/A weapons include the M61A Vulcan cannon (machine gun), the short range (10 NM) heat seeking AIM-9 Sidewinder, and the medium range (30 NM) radar seeking AIM-120 AMRAAM.

All A/A weapons are fired from a moving airplane at another moving object. Since it takes time for the weapon to reach its mark, it is important to aim at a point where the target and weapon will meet. The diagram to the right illustrates the need to “lead” the target allowing it to fly into the path of the weapon.

The F/A-18 Hornet’s weapon systems attempt to calculate this lead for you. Fortunately all A/A missiles are guided, adjusting their course to reach the target. However, their ability to change course is limited due to their high speed. Therefore, the better your alignment with the target, the greater your chance of hitting it.

Following is a brief description of each A/A weapon and its intended purpose.

Vulcan Cannon

The M61A Vulcan cannon is used for very close range encounters. The cannon fires at a rate of 6000 rounds per minute. Tracer rounds are intermittently mixed with bullets so that the stream of fire is visible.

When the gun is selected, the pipper is displayed in the HUD. Fly the pipper onto the target and press the mouse button, r or e .

Missiles

Sidewinders and AMRAAMs rely on the Hornet’s radar to locate and designate targets. Designate a target by pressing the \ key. The radar view shows the target blip with bars on each side when it is designated. Detailed information on the designated target is also shown on the radar screen.

A designated target is enclosed in a small box display in the HUD. If the target moves out of the HUD view, a line is shown from the center of the HUD extending out in the direction of the target.

When either missile is selected, a targeting circle is displayed in the HUD. For best hunting, place the designated target box in the targeting circle. When range and alignment is right for a probable hit, a “shoot” que flashes on the right side of the HUD.

Sidewinder
The AIM-9 Sidewinder is a heat seeking missile designed to train on an opponent's engines. Its maximum range is 10 nautical miles but its accuracy is far greater at five miles or less, depending on your opponents closure rate.

When the Sidewinder is selected a low pitch growl is heard. When a target is in range the pitch of the growl rises.

AMRAAM
The AIM-120 AMRAAM has an on-board radar and seeks radr reflecting airborne objects. Its maximum range is 30 nautical miles but less than 10 is recommended for greater accuracy.

**Air-to-ground**
Following is a brief description of each A/G weapon and its intended purpose.

Cannon
The Vulcan cannon can also be used as an A/G weapon. Small targets such as vehicles and fuel tanks are easily strafed with the cannon. In A/G mode the cannon's pipper depicts the probable impact point on the surface.

Free-fall bombs
Use the Continuously Calculated Impact Point (CCIP) system to guide the release of all free-fall bombs. The CCIP considers altitude, speed, distance and air drag of the selected weapon for the airplane's guidance and the weapon's automatic release.

To use the CCIP simply select a free-fall bomb, such as an MK-82. "CCIP" is displayed in the HUD. Position the airplane to place the Velocity Vector on the target and press the mouse button, or r . A diamond appears marking the selected target. At this time, a line now appears on the HUD extending from a point above the target down to the impact point. The impact point is where the bomb hits if released now. Fly the impact point onto the diamond. The bombs are automatically released onto the target. Press the mouse button, r or e again to manually release the selected weapon. Press \ to de-select an impact point.

Electro-Optical missiles
The AGM-65E Maverick and AGM-62 Walleye missiles have cameras mounted in their noses. The missile's camera view is displayed in the MPCD. Press E to see a selected electro-optical weapon's camera view. Use the arrow keys to move the camera view a limited distance. Press the 9 and 0 keys to zoom the camera view. Turn on the A/P before attempting the activities associated with deploying an electro-optical missile.

Designate a target by positioning the missile's camera view on a target and pressing the mouse button, r or e . De-select a target by pressing the \ key. To launch, press the mouse button, r or e a second time.

**Anti-Aircraft Defenses**
You will encounter two types of ground-based air defenses. They are Surface-to-Air (SAM) missiles and Anti-aircraft artillery (AAA).

Surface-to-air missiles

A SAM site consists of six missile launching trucks arranged equally distant around a circle approximately 800 ft in diameter. In the middle of the circle is a radar truck which constantly scans the sky for incoming airplanes. When an unidentified airplane is spotted a radar "lock" is fixed and a missile from the closest truck launcher is launched.

The F/A-18 Hornet warns of the radar "lock" and launch just as it does for a similar A/A situation. Use chaff as a countermeasure or simply try to out-maneuver the missile as a defense. Destroy the radar truck in the center of the site to disable the SAM.

Anti-aircraft artillery
AAA is basically a fixed or mobile cannon. Its range is approximately 2000 ft with a firing rate of approximately 100 rounds per second. Since it is easy to fly above AAA's range they are most often placed where an incoming airplane is likely to fly at a low altitude, such as near a strategic structure or base.

AAA is also found near SAM sites. Because the SAM radar cannot see low flying airplanes, a common strategy is to fly below its view. Therefore, AAA is placed such that the area is secured from high flying airplanes with a SAM site and from low flying airplanes with AAA.

**Countermeasures**
To defend against a missile launch, flares and chaff may be dropped from the airplane to confuse the guidance system of the oncoming missile.

Chaff is composed of hundreds of metal strips. These strips are strewn behind the airplane. A radar equipped missile receives a confused signal causing its guidance system to fail momentarily. Press ; to drop chaff.

Flares confuse heat seeking missiles by providing additional heat sources for them to follow. The confusion is temporary because the flares only burn for five seconds. Press ' to drop flares.

Electronic Counter Measures (ECM) is a system built into the F/A-18 Hornet. Its purpose is to confuse incoming radar equipped missiles by sending out jamming signals. The down side is that these signals make your airplane more visible to other radar equipped airplanes. Press C to turn ECM on or off.

**Emergency Procedures**
If your airplane is badly damaged and you are unable to land at a base, two options are possible—land on any flat surface or bail out.

Landing can be performed with either the gear extended or the gear retracted. Land with the gear retracted only if there is no other option. This is the most dangerous way to get to the ground. Explosion is less likely during a gear extended landing. In any event, look out for solid objects.

Bail out of your airplane by pressing sE . You are ejected clear of the airplane and float slowly down to the surface.

F/A-18 Hornet Classic™

# Reference: Flight Controls

**Head-Up Display (HUD)**

The HUD constantly displays vital flight control information. Speed, altitude, G force, heading and angle of attack are all presented in one area directly in the pilot's forward view.

Velocity Vector

The Velocity Vector is the small circle located in the center of the HUD. Three tick marks extend from its sides and top. The Velocity Vector is simply a visual indication of the airplane's flight path.

Pitch Ladder

The pitch ladder is situated in the center of the HUD, and usually shows three lines parallel to the ground in five degree increments. The pitch ladder displays the airplane's angle relative to the surface. If the airplane is in a climb, a line with a positive number, such as 10 or 15, moves to the center of the HUD.

Altimeter

The altimeter is displayed inside a box, located on the right side of the HUD slightly above center. It displays the actual distance to sea level.

Heading

The heading indicator is located across the top of the HUD. The heading is listed in five degree increments with 000° indicating magnetic north. The aircraft heading is determined by the degree bearing above the "^" symbol.

Airspeed

The true airspeed indicator is displayed inside a box, located on the left side of the HUD, slightly above center and across from the altimeter. It provides the pilot with the aircraft's true airspeed in nautical miles per hour.

Vertical Airspeed

The vertical airspeed indicator is located on the right side of the HUD below center. This indicator is only active while the landing gear is extended. It indicates the aircraft's vertical movement in feet per minute.

Calculated Airspeed Indicator

The CAS indicator is located on the left side of the HUD slightly below center. The CASI registers calculated airspeed relative to Mach (speed of sound) at a given altitude.

G-Force Indicator

The G-Force indicator is located on the left side of the HUD, below center, underneath the Calculated Airspeed Indicator. It displays the force acting against the aircraft relative to gravity (1.0g). Although the aircraft is capable of sustained g-loads greater than 9g, the pilot begins to black out after a few seconds of 5+ g's. A blackout occurs when the increased pull drives blood and oxygen from the pilot's brain. Conversely, a red-out occurs when negative g's drive too much blood to the pilot's head causing a dilation of the blood vessels in his eyes. A pilot can only handle a few seconds of negative g's before incurring a red-out situation.

**Engines**

Engine Start, throttle up and throttle down are controlled by the keyboard. The engines are started by pressing the + once which spools them up to 50% power. By pressing and holding the + key again engine power is increased in 2% increments up to 100%.

Press and hold the - to decrease throttle in 2%increments to 50%. If the - is pressed while the engines are at 50% and the plane is on the ground, the engines are shut down.


The afterburners are ignited by pressing d . If the engines are running below 100%, they are spooled up to 100% before the afterburner is ignited. There are six afterburner stages, ranging from 11,000 lbs of thrust per engine to 16,000 lbs of thrust per engine. The afterburner is staged up by pressing d . To return to military power (non-afterburner) press the + or - once. Engine stage information is shown in the bottom center of the MMD as either **MIL** for military power or **AB1** through **AB6** for the individual afterburner stages.

The afterburners consume huge quantities of fuel every minute. It is not recommended that you fly for longer than a few seconds at a time under afterburner power.

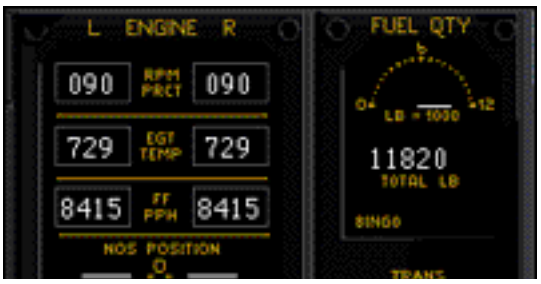
**Engines / Fuel Display**

The Integrated Fuel/Engine Indicator (IFEI) is located in the lower left corner of the look-down screen. This one instrument displays all necessary information on engine condition and fuel consumption.

The left side of the IFEI display shows:

Engine RPMs

Engine Speed is shown in percent of revolutions per second. This ranges from 0% (engine off) to 100% (engine at full military power). Right and left engine RPM is shown separately. This information is duplicated in the lower left and lower right corners of the Master Mode Display (MMD).




Engine Temperature
This indicator displays the temperature of the air as it exits the combustion chamber of the engine. Engine temperature is shown in degrees fahrenheit for the right and left engines separately.

Fuel Flow
Fuel Flow is indicated in Pounds/Hour. This is the actual flow (in pounds) of fuel into the combustion chamber of the engine. Fuel Flow is shown for the right and left engines separately.

Nozzle Position
The engine nozzle position is given in percent open or closed. The engine nozzles are normally constricted (0%) for normal flight and open to approximately twice their normal size (100%) when the afterburner is engaged. Since "F/A-18 Hornet" has six afterburner stages, the nozzles open in approx. 15% increments from AB1 to AB6. Engine nozzle position is shown for the right and left engine separately.

Oil Pressure
Engine oil pressure is shown in pounds/square inch and is shown for the right and left engines separately.

The right side of the IFEI display shows:

Internal Fuel Quantity
This indicator shows total internal fuel in the four fuselage fuel tanks in thousands of pounds. An F/A-18 with full fuel load can carry 11,000 lbs of fuel internally.

Total Fuel Quantity
This indicator shows total fuel being carried by the airplane in pounds. This includes any fuel being carried in the centerline drop tank.

Bingo
This indicator illuminates and an audible reminder is given when Bingo status is reached. Bingo is activated when total fuel drops to 4,000 pounds. This is usually enough fuel to return to a friendly base under military power.

**Flight Controls**

Flaps
When extended, flaps provide an extra amount of lift to the aircraft. This is advantageous when attempting to land at low speeds or turn quickly. Extended flaps also increase the amount of drag on an aircraft which is helpful for lowering airspeed. Flaps are extended and retracted by pressing F . An indicator on the control panel lights when the flaps are extended.

Ailerons
Ailerons create lift and drag forces on the wing surfaces allowing the airplane to roll and thereby turn. This movement is accomplished by lowering the outside wing aileron, providing wing lift, and raising the inner wing aileron, producing drag; the aircraft has a tendency to turn, or roll,

toward the inner wing. Ailerons are controlled by the mouse. Moving the mouse to the left causes the left aileron to raise and the right aileron to lower causing a roll toward the left. Moving the mouse to the right reverses this action and causes the aircraft to roll to the right.

Rudder
Rudders provide left or right yaw without rolling the aircraft. They can be coupled with ailerons to increase turning capability or used separately to yaw the aircraft left or right. To apply left rudder, press , , to apply right rudder press . . To return the rudder to the center position press / . Lights in the upper left corner of the instrument panel light to indicate their position.

Wheel Brake/Speed Brake
Wheel brakes are used to slow the aircraft down on the ground, either while taxiing or just after touchdown. If the airplane is on the ground with no forward velocity, the brake will lock in the "on" position. The speed brake is used to slow the aircraft down during flight by raising a large panel on the tail producing excess drag. Either brake is activated by pressing and holding the b and deactivated by releasing the b . The computer automatically determines which to apply (wheel or speed brake) by determining if you are on the ground or in flight. An indicator on the control panel will light when the brakes (wheel or speed) are applied.

**Recovery Systems**

Landing
Landing is the preferred way to return to earth. The landing gear is essential for all damage-free landings and the arresting hook is a nice addition for dry touchdowns at sea.

Gear
The landing gear is essential for all normal landings. The gear is lowered and raised by pressing G on the keyboard. An indicator on the control panel illuminates when the gear is down and locked. If this light does not come on after pressing G , the gear either did not lower, or for some reason (possibly damage) did not lock. In these cases, a quick external look determines whether the gear is down (or not).

Hook
The arresting hook is used only on carrier landings. It lowers from between the engines and is used to grab one of the arresting cables. Several such cables are stretched across the carrier deck. An aircraft will not be able to stop in time if the hook does not grab one of the cables. The hook is lowered and raised by pressing H . An indicator on the control panel lights when the hook is in the down position and ready to grab one of the cables.

Ejection
When a safe landing is not possible, ejection is the only practical way out of the aircraft. Ejection is completely automatic once the procedure is initiated. The aircraft must be at an altitude of at least 500 feet. To eject from an aircraft you press sE . Remember, ejection should be a last resort.

**Status System**

Threat Warning System
The Threat Warning System consists of complicated electronics that scan the area around the aircraft and warn the pilot of any objects or foreign radar that may pose a threat to the aircraft.

Threat Warning Indicator


The Threat Warning Indicator “THRT”, located in the right indicator panel, lights and an audible “beep” is heard when the radar system has determined that a hostile has a radar lock on your aircraft. Evasive maneuvers are recommended to deprive the enemy of his radar lock.

Launch Indicator

The launch indicator “LNCH” is located on the right indicator p system has detected a missile launch directed at your aircraft. Launch is always preceded by a “THRT” warning. Evasive maneuvers are definitely called for at this point to avoid contact with the missile.

Warning System


The Warning light “WARN” is located on the left indicator panel and illuminates when the mission or data computers have detected a fault in one of the aircraft systems. This indicates anything from low fuel to an engine fire. Specific information can be obtained from the Damage Status menu on the Multi-Function Display (MFD).

Damage Status Menu

This listing is located on the MFD and is activated by pressing D . Pressing D again cycles to the second Damage Status screen. To return to the radar, press R , Q or t .

The first Damage Status screen displays information about the following:


HYDR - Indicates a leak in the hydraulic system.
GEAR - Indicates that the landing gear is somehow damaged and will not move from its current position.
FLAP - Indicates that the flaps are damaged and will not move from their current position.
HOOK - Indicates that the arresting hook mechanism is damaged and will move from its current position.
BRAK - Indicates the the speed brake mechanism is damaged and will not activate.
ENGN - Indicates that there is a problem with one of the two engines. This damage could be fire, loss of oil pressure, or flame-out.
FUEL - Indicates that there is a low fuel condition. This is due to either a leak from damage or normal fuel exhaustion

The following information is displayed by the second screen:


OXYN - Indicates a fault in the On-Board Oxygen Generation System (OBOGS). This usually causes a lack of oxygen to the cockpit and the pilot. To avoid hypoxia (lack of oxygen to the brain) fly at or below 12,000 feet when this fault occurs.
RADR - Indicates damage or a fault in the AN/APG-65 radar. Any damage to the radar usually renders it inoperative.
WPNS - Indicates a general failure in the mission computers or weapons delivery system. This usually renders all armament except the M-61 Vulcan cannon inoperative.
GUN - Indicates a failure in the M-61 Vulcan cannon, rendering it useless. This is caused by a gun jam or damage.
ECM - Indicates a failure in the Electronic Counter Measures. Radar jamming by the ECM fails, making the airplane more vulnerable to incoming missiles.
IFF - Indicates a failure in the Identity Friend/Foe system. Query of other aircraft is disabled.
ILS - Indicates a failure in the Instrument Landing System.

**Backup Flight Instruments**
The Backup Flight Instruments are located in the lower right side of the look-down screen. These provide vital information to the pilot if either the mission computers or HUD fail. They are also useful for flying the airplane while in the look-down view.

Artificial Horizon
This indicator provides the pilot with aircraft attitude information.

Airspeed
This indicator shows true airspeed (in kts.) in the event the HUD fails.

Altimeter
This indicator provides altitude information to the pilot by use of a barometric altimeter calculated on barometric sea level.

Vertical Airspeed
This indicator provides vertical airspeed to the pilot.

F/A-18 Hornet Classic™

# Reference: Views

"The winner is the person who sees his opponent first." This famous adage has remained true through every era of air warfare. Whether you see your target on radar or out of the window, having the first possibility to react is very important. In order to provide the F/A-18 Hornet pilot with the best possible visual awareness, many views are available. The views and associated keys are:

**Cockpit View** 1
This is the default view when flight begins, and is the view most often used while flying. It provides an out-of-the cockpit, over-the-nose view. This view allows the pilot to see the outside world as well as the most important cockpit instrumentation. To return to this view from any other view, press 1 on the keyboard.

**Look Down View** 2
This view allows the pilot to view the rest of his cockpit instrumentation. The MPCD (navigational, electro-optical and moving map displays), back-up flight instruments, fuel stores and engine instruments are visible in this view. If you plan to use this view for more than a brief moment, engage the Auto Pilot by pressing A . This allows you to concentrate on the look-down view displays. Press 2 from the keyboard for this view.

**External View** 3
This provides a chase plane view of the F/A-18 Hornet. The camera angle can be changed by using the arrow keys (discussed later in this chapter). To see the external view, press 3 from the keyboard.

**Wingman View** 4
This view allows the pilot to view his aircraft and his wingman's aircraft in the same view. If the airplanes are a great distance from each other, the wingman's airplane is only a small spec. If there is no wingman, the view is inactive. Press 4 from the keyboard for this view.

**Enemy View** 5
This view allows the pilot to view his aircraft and his nearest enemy's aircraft in the same view. If the airplanes are a great distance from each other, the enemy's airplane is only a small spec. If there is no enemy, the view is inactive. Press 5 from the keyboard for this view.

**Ground View** 6
This view allows the pilot to see his aircraft from the nearest ground viewpoint, whether it is friendly or not. A camera is placed on the ground, near an object of interest and is aimed at the F/A-18 Hornet. Press 6 from the keyboard for this view.

**Chase Weapon View** 7
This view follows a deployed weapon to its point of impact. This view is only active while a weapon is in transit. If several weapons are in transit at one time, this view tracks the last weapon released. Press 7 from the keyboard for this view.

**Weapon-Eye View** 8
This view is from the nose of the weapon as it falls or heads toward its target. This view is only active while a weapon is in transit. If several weapons are in transit at one time, this view tracks the last weapon released. Press 8 from the keyboard for this view.

**View Modification**
The arrow keys can be used in conjunction with the Cockpit, External, and Chase Weapon views to vary the camera angle. The combinations and directions are as follows: ik = 45°, k = 90°, km = 135°, m = 180°, jm = 225°, j = 270°, ij = 315°, with 0° being forward. A 45° head up view out the top of the canopy is available by pressing i .

Press 9 to zoom in or 0 to zoom out while in any of the following views: External, Wingman, Enemy, Ground, Chase Weapon, and Weapon-Eye.

F/A-18 Hornet Classic™

# Reference: Navigation Systems

Navigation is an important part of flying missions. Navigation helps the pilot to find target locations and helps him find his way home.

**Navigation Data Screen**


The Navigation Data Screen provides the pilot with information on navigation, mission time and mission range. This data is displayed on the MultiPurpose Color Display (MPCD) which is in the lower center of the control panel in the look-down view. Engage the look-down view with 2 , then press N to activate the navigation data display.

Fuel Status

Fuel status information is displayed in the upper left c maximum range and maximum flight time given curre

Waypoint Status

Mission Range is presented in the lower left corner of the MPCD. The top line indicates to the pilo with the fuel remaining at the present throttle settings.

Mission Time/Elapsed Time

Mission Time/Elapsed Time information is given in the upper right corner of the MPCD. The top line provides the current time on a 24 hour clock in hours and minutes. The second line shows Elapsed Time displaying the amount of elapsed time since mission start.

**TACAN (TACtical Air Navigation)**

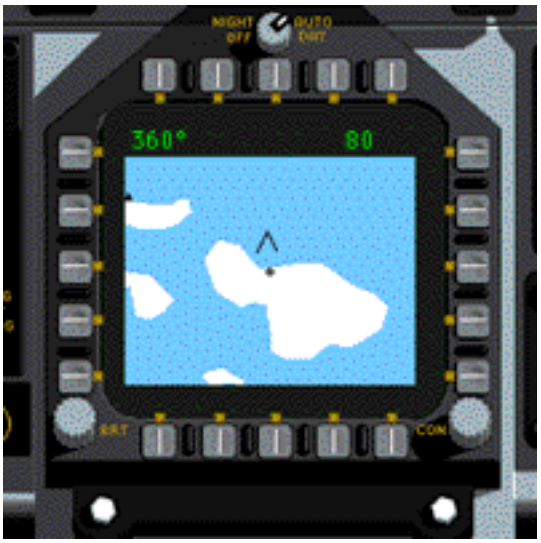

The TACAN provides the pilot with bearing and distance information acquired from a surface station. This information is displayed in the lower right corner of the MPCD in the look-down screen. The presented information consists of the aircraft's current heading, and its longitude and latitude in degrees and minutes. The TACAN also provides the pilot with directional information about the mission waypoints. By pressing T , the TACAN is activated in the up-front display and the waypoint information is displayed in the lower left corner of the MPCD. The pilot is presented with waypoint range in nautical miles, time to waypoint in minutes and seconds and heading information to guide the pilot to the waypoint. The pilot may

cycle through the mission waypoints by pressing W . The currently selected waypoint is displayed above the range and is preceded by the letter “D”.

When the TACAN is activated the letters “TACN” followed by the current waypoints number appear in the upper left screen of the up-front display. A vertical bar is displayed below the heading indicator to mark the selected waypoints heading. Engaging the autopilot with the TACAN on, flies the airplane to the currently selected waypoint.

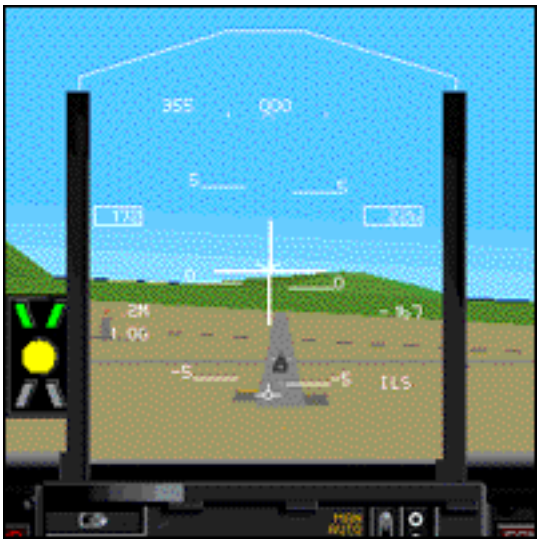
**Digital Moving Map**

The digital moving map provides a navigational map for the pilot. The map is activated from the look-down screen by pressing M . The map is displayed on the MPCD. The crosshairs in the center of the screen show the aircraft’s position relative to the map. a “^” depicts the aircrafts current heading. When the TACAN is activated, additional “+” signs indicate the various waypoints. A line between your position and the selected waypoint position is displayed. The top of the map is always magnetic north or 0°, therefore if the aircraft is traveling south, the map appears to scroll up the screen. Press N to return to the navigation screen or E to return to Electro-Optical weapons or FLIR pod view.




**ILS (Instrument Landing System)**

The ILS is designed to aid pilots in landing the aircraft in low visibility, or just to aid a new pilot in getting the aircraft safely down on the ground. The ILS system is activated by pressing L and consists of two major parts:




GSD and LD Guides

Vertical and Horizontal guides are presented in the HUD when the ILS is active. These guides provide instant directional information to the pilot for landing. The Horizontal bar is altitude information. The pilot should keep this bar in the center of the HUD to guide the plane onto the runway. The vertical bar provides heading information to the pilot. This bar should also be kept in the center of the HUD in order to align the airplane straight down the runway.

AOA Indexer (Angle of Attack)

The AOA indexer is located next to the HUD on the left side. It contains three lights, consisting of a downward pointing arrow, a circle, and an upward pointing arrow. These arrows and circle provide the pilot with information concerning his descent rate. The downward pointing arrow lights to indicate that the aircraft is not descending quickly enough. The pilot should either reduce

thrust or lower the nose. If the upward pointing arrow is lit, the aircraft is descending to quickly. The pilot should raise the nose or increase thrust. If the circle is lit, the aircraft is descending at the correct rate. For a good landing, the plane should have an airspeed of around 150 knots, a nose high attitude of between 8° and 13° and a vertical descent rate of less than 14 feet per minute.

**Other**

There are two other means or methods of navigating the aircraft to its destination. This is accomplished by using the FLIR pod (if loaded) or the RBGM radar mode. Both are useful at night or in low visibility situations.

FLIR (Forward Looking InfraRed) Pod

The FLIR pod is a valuable night-time navigation tool since it works in the infrared range. The pod contains an IR camera which relays its view back to the cockpit and displays it on the MPCD. Since the FLIR Pod is mounted on the plane as a weapon store, it can only be used when a pilot loads it. A complete description on the use and activation of the FLIR Pod is given in the Weapons/Stores/Countermeasures Section.

RBGM (Real Beam Ground Mapping)

The RBGM radar mode is helpful for night or bad weather navigation. The RBGM radar mode displays land and water masses and can be used to follow the coastline or other land/water terrains when surface visibility does not allow visual navigation. A better discussion on the use of RBGM is provided in the Radar section.

F/A-18 Hornet Classic™

# Reference: Radar System

The AN/APG-65 radar system has two main modes of operation; Air-to-Air and Air-to-Ground. Together they provide the pilot with information on surrounding aircraft, land obstacles and ground targets. All radar modes are forward looking, meaning that they only see objects in a cone in front of the aircraft (approx 45° each side from centerline). Objects appearing below the aircraft may not be as visible to the radar because of noise or interference from the ground. Shorter range air-to-air radar modes (TWS and ACM) are better able to deal with this “radar look-down”. The radar is activated by pressing R . The pilot can cycle between air-to-air and air-to-ground radar by pressing R . The radar system may be turned off to avoid detection by pressing S .

**Air-to-Air**

Air-to-air radar modes allow the pilot to see only those targets in the air. This simplifies the amount of information that the radar system must provide the pilot. Air-to-air radar is activated by pressing R and is represented by a Cartesian coordinate map on the right MFD. The selected mode (VS, RWS, TWS, ACM) is shown in the upper left hand corner, with the selected range in the upper right hand corner. To cycle modes press Q , to change range press t . If a target is selected, its altitude is shown in the lower left hand corner in thousands of feet. The distance to target is shown directly under the altitude, also in thousands of feet. The closure rate between the aircraft and the target is shown in knots in the lower right-hand corner.


VS (Velocity Search)

Velocity Search scans for objects with a high closure rate, such as airplanes flying straight toward your aircraft. Other airplanes are not detected. VS has the poorest radar look-down of the four air-to-air radar modes. VS is a long range mode allowing scanning from 80, 40, 20 and 10 miles. Cycle through the ranges by pressing t or st .

RWS (Range While Search)

Range While Search is a close range air-to-air radar mode providing the pilot with information about all airborne targets. RWS has slightly better radar look-down than VS. RWS supports ranges of 40, 20, 10 and 5 miles.

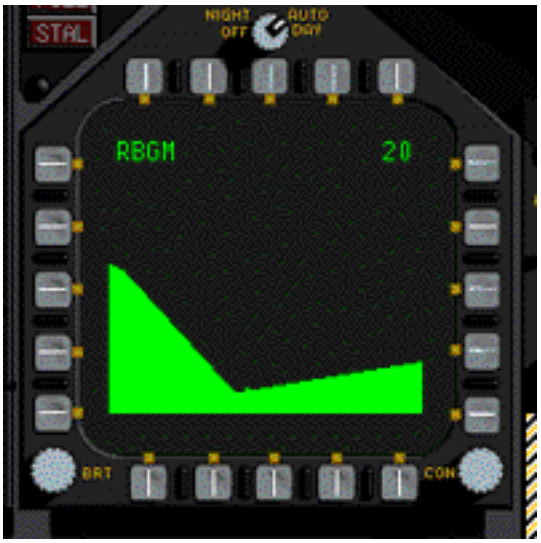
TWS (Track While Scan)

Track While Scan extends the resolution of Range While Scan. It allows the pilot to view only those targets within 10 miles. With the increased resolution, TWS is more capable of determining real targets from false ground images or noise. TWS radar look-down is second only to ACM.

TWS offers ranges at 10, 5, 2.5 and 1.25 miles.

ACM (Air Combat Maneuvering)
Air Combat Maneuvering offers the same range and resolution as TWS, but it locks onto the first potential target automatically. This allows the pilot to concentrate on flying and combat rather than targeting. ACM offers the best radar look-down of all air-to-air radar modes.

**Air-to-Ground**
Several air-to-ground modes are available to the pilot. They are designed to map information on the surface such as moving targets or ships sitting in the water. Air-to-ground radar is represented by a polar coordinate map on the right MFD. Targets may be designated in only two air-to-ground modes (GMTI and ARAD). GMTI target designation is only useful for performing IFF. ARAD target designation can be used by HARM missiles. The selected mode (RBGM, SSS, GMTI, ARAD) is shown in the upper left hand corner, with the selected range in the upper right hand corner. To change modes press Q , to change range press t .




RBGM (Real Beam Ground Mapping)
Real Beam Ground Mapping is a long range ground radar. It is designed to pick up objects and features on the surface, including coastlines. It is best used when trying to navigate along coastlines or waterways, especially at night when visibility is low. RBGM supports ranges of 80, 40, 20 and 10 miles. Cycle through the ranges by pressing t or s t .

SSS (Sea Surface Search)
Sea Surface Search is like RBGM except that it is designed to pick up objects on the water surface, therefore making a perfect mode for hunting ships. SSS has ranges of 80, 40, 20 and 10 miles.

GMTI (Ground Moving Target Indication)
Ground Moving Target Indication tracks moving ground targets of medium size. It is best used for hunting tanks, armored personnel carriers, jeeps and other vehicles. GMTI supports ranges of 40, 20, 10 and 5 miles.

ARAD (Anti RADiation)
Anti Radiation searches for radar emitting sources such as ground based radar and SAM sites. It is useful in tracking radar sources that could hinder a quiet and stealthy approach. ARAD supports ranges of 40, 20 10 and 5 miles.

**Silent Mode**
As with any active radar system, if you can see them, they can probably see you. Therefore the AN/APG-65 has a silent mode which shuts off its active radar system. Silent Mode is activated by pressing S , the radar can be re-activated by pressing R . Use this mode to maintain a stealthy presence.

F/A-18 Hornet Classic™

# Reference: Weapons/Stores

A pilot has to rely on his wits, intelligence and, of course, his weapons to survive. If his weapons fail, he fails or worse – he dies. The F/A-18 Hornet is designed to carry a wide variety of weapons, stores and countermeasures. Weapons include freefall bombs, laser guided bombs, heat-seeking and radar-seeking missiles and electro-optically guided missiles. Even with all of these weapons at the pilots disposal he still needs advanced flying techniques and countermeasures such as flares and chaff to confuse his enemy's missiles and survive to fly again.

**IFF (Identify Friend/Foe)**

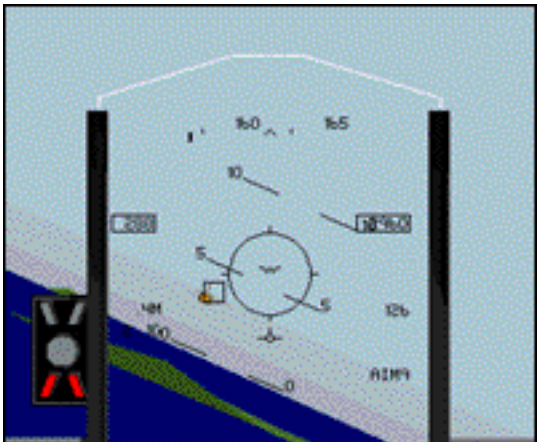
The aircraft's IFF system is designed to give a pilot as much information about air targets as possible. Since much of today's warfare happens beyond visual range, sufficient information is needed about an airborne target - is it "friendly" or not. When an airborne target is selected in the radar, the pilot can determine whether it is friendly or not by pressing I . This causes the IFF to query the target for a response. If the IFF receives the correct response to its query, a tone sounds in the cockpit and a "reply" message displays on the instrument panel, telling the pilot that his locked target is a friend. If no tone is heard, the pilot may assume that this target is a foe. The IFF is not foolproof though; a friendly may not have his IFF transponder turned on - in which case no tone will be heard by the inquirer, or an enemy may have the correct transponder code to return a "friendly" tone.

**Jettison**

Every now and then it is necessary to jettison the aircraft's load. Usually this is due to the need to reduce weight and drag on the aircraft because of a damaged engine or a low fuel status. Anything on the centerline, innerwing pylons, or outerwing pylons can be jettisoned. Weapons loaded on the wingtips or fuselage side pylons CANNOT be jettisoned. Weapons and stores are jettisoned by selecting them with J and then releasing them by pressing r , e or pressing the mouse button. Weapons are not armed when dropped, therefore they will not explode when they hit the ground. To return to an armed weapon status press either [ for Air-to-Air or ] for Air-to-Ground.

**Air-to-Air**

Air-to-Air weaponry is designed to be fired from the air at an airborne target that has been acquired on the radar. By pressing the [ the pilot's Air-to-Air weaponry is activated. Continuing to press the [ cycles through all loaded Air-to-air weapons and the M61 cannon.



Missile Launching

When the desired weapon is selected, the pilot flies the plane to line up his target in the HUD. The target is represented by a square and the aiming reticle appears as a circle. If the square is placed in the circle and the target is in range,

the word “SHOOT” appears on the HUD. The weapon is released at the target by pressing the mouse button, r or e . If the weapon is released at the target without the target box being in the aiming reticle or before the “SHOOT” cue appears, the chances are diminished that the weapon will hit its target.


AIM-9 “Sidewinder”

The AIM-9 Sidewinder has been the mainstay A/A missile of the military for more than 30 years. The Sidewinder uses all-aspect infrared to acquire its targets. Since it homes in on high heat sources (the sun excluded) it is best used while behind the target to give the missile the best possible view of the engine heat. This is a short range weapon with maximum range of 10 miles.

AIM-120 “AMRAAM”

The AMRAAM (Advanced Medium Range Air-to-Air Missile) was untested in actual military action until the Gulf War, when it scored several direct hits against enemy planes. It is guided by an active pulse-doppler radar and can be fired at its intended target beyond visual range once acquired on the aircrafts radar. Its maximum range is 30 miles.

M61 Vulcan Cannon

The M61 is still an effective weapon even in these days of longer range missiles. It is best suited for very close range air-to-air encounters and for strafing ground targets. The M61 is equipped with 978 rounds and fires 6000 rounds per minute.

**Air-to-Ground**

Air-to-Ground weaponry is designed to be dropped or launched from the air at targets located on the ground or on the water. By pressing ] the Air-to-Ground weaponry is activated. Continuing to press ] cycles through all loaded Air-to-Ground weapons and the M61 cannon.

Anti-Radiation

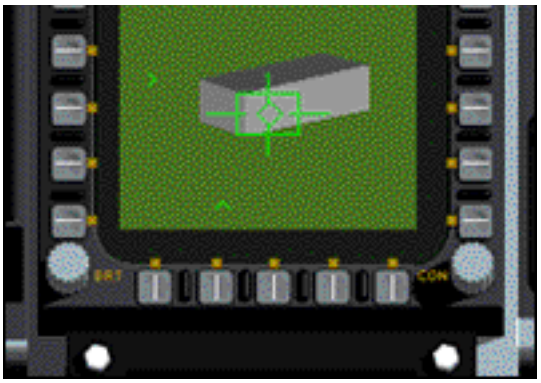
Anti-Radiation missiles are designed to target ground based radar sources such as SAM (Surface-to-Air Missile) sites. The source of the emitting radar is targeted on the aircraft’s radar, and when the target is in range to fire the words “IN RNG” appear on the HUD. The missile is then released by pressing the mouse button, r or e keys. To find radiation emitting targets, place the A/G radar in ARAD mode and select a target by pressing the \ key.

AGM-88A “HARM”

The HARM (Highspeed Anti-Radiation Missile) is designed to acquire and attack its target very quickly, diminishing the chance that the target radar operators can locate the HARM and turn off their emitting radar.

Electro-Optical


Electro-Optical (EO) missiles are designed to acquire their targets by a combination of electronics and optical systems. The pilot uses the camera onboard the missile to visually



acquire the target. The missile then uses its internal electronics to guide itself to the target. To fire an EO equipped missile the pilot must select the weapon from the weapon stores and then engage the EO system by pressing E . The MPCD then displays the image from the missile's camera and identifies the weapon selected in the upper left corner of the display. The pilot must place the cross hairs in the MPCD on the base of the target and press the mouse button, r or e to acquire or lock onto the target. Move the camera view by pressing the arrow keys. The camera can also be zoomed in or out by pressing 9 & 0 . When the target is in range the words "IN RNG" appear in the upper right corner of the MPCD. Launch the missile by pressing the mouse button, r or e .

AGM-65E "Maverick"

The Maverick is a fire and forget ground weapon. The pilot acquires the target through the Maverick's onboard TV camera and fires the weapon. The pilot is then able to move onto other targets or leave the area completely even before the missile hits its target. The onboard camera also has zoom capabilities enabling the pilot to acquire his target from an even greater distance.

AGM-62 "Walleye"

The Walleye is similar to the Maverick but coupled with the AGM-62DL Data Link, has a much greater range of target acquisition.

CCIP (Continuously Calculated Impact Point)


Use the Continuously Calculated Impact Point (CCIP) system to guide the release of all free-fall bombs. The CCIP considers altitude, speed, distance and air drag of the selected weapon for the airplanes guidance and the weapon's automatic release.

To use the CCIP simply select a free-fall bomb, such as an MK-82. "CCIP" is displayed in the HUD. Position the airplane to place the velocity vector on the target and press the mouse button, or r . A diamond appears marking the selected target. At this time, a line appears on the HUD which extends from a point above the target down to the impact point. The impact point is the place that a bomb hits if released now. Fly the impact point onto the diamond. The bombs are automatically released onto the target.

Press \ to de-select an impact point. Press the mouse button, r or e again to manually

release the selected weapon.

CBU-59B "Rockeye"

The Rockeye is a cluster bomb designed to carpet a given target with hundreds of tiny bomblets. The Rockeye has fins to aid in spinning the bomb to create a larger dispersal pattern.

BLU-107B "Durandal"

The French designed Durandal is designed strictly as an anti-runway weapon. It does not detonate upon impact with the runway, it instead is designed to detonate after diving through the runway causing the runway to buckle. This creates a much larger area of damage that is more difficult and time consuming to repair. Because of its effects, one Durandal detonated halfway down a runways length can render the runway unuseable.

B-57

The B-57 is a small tactical thermonuclear device designed to destroy large areas with a nuclear blast. Expect a blast radius of about 2500 feet. What else can you say about a nuclear device, except "Mondo Destruction."

MK-82

The MK-82 is a 500lb general purpose iron bomb designed for destroying small buildings, tanks and other ground forces.

MK-82HD

The MK-82HD is the same as the MK-82 with the addition of high drag capabilities allowing it to impact well behind the aircraft on low level bombing runs.

MK-82LGB

The MK-82LGB is a laser guided version of the MK-82. It follows a laser beam to its intended target. It can be considered a guided bomb.

MK-83

The MK-83 is a 1,000lb general purpose iron bomb effective against medium to small buildings.

MK-83LGB

The MK-83LGB is a laser guided version of the MK-83.

MK-84

The MK-84 is a 2,000lb general purpose iron bomb effective against large buildings, power plants, bridges and bunkers.

MK-84LGB

The MK-84LGB is a laser guided version of the MK-84.

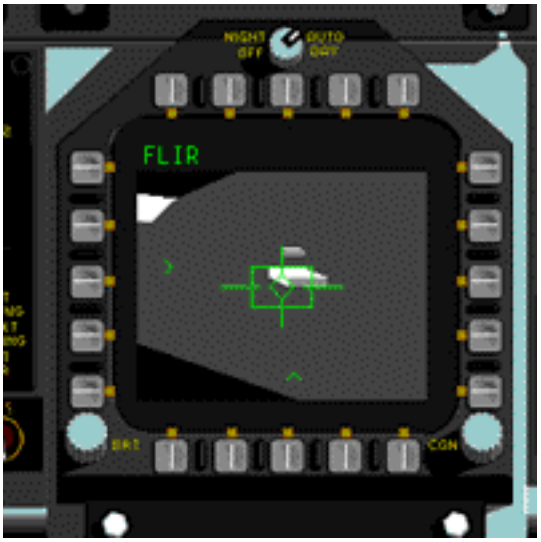
**Other Stores**

Fuel Tank

An external fuel tank carrying an extra 2,270 lbs of fuel can b rack extending the range of the aircraft.

FLIR (Forward Looking Infra-Red)

The FLIR pod is designed to designate and track targets through the use of Infra-red imaging.




This pod can be used for designating targets for EO weapons, or used as a navigation aid at night. To use the FLIR pod, select the pod from the air-to-ground weapons. Select EO mode in the look-down display (press E ). The target can be sighted by using the arrow keys to move the FLIR camera view. Select the target by pressing r , e or pressing the mouse button. Once the target is selected, select the desired air-to-ground weapon for delivery.

**Countermeasures**

Flare

Flares are used to thwart infra-red or heat seeking missiles. When released, they produce a heat source for approximately five seconds. This is often confuses the heat seeking projectile long enough for the aircraft to evade. A count of flares remaining is given in the lower left corner of the MMD. The pilot releases flares by pressing the ' .

Chaff

Chaff is used to thwart radar guided weapons by releasing small metal strips which add noise to the return radar signal. Chaff is usually effective for approx five seconds, giving the pilot long enough to evade the missile. A count of chaff cartridges remaining is given in the lower right corner of the MMD. The pilot releases chaff by pressing the ; .

ECM (Electronic CounterMeasures)

Electronic Countermeasures scrambles an enemy missile's return radar signal. ECM projects false or confusing images on the missile's radar. It is activated by pressing C and remains active until C is pressed again.

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# Reference: Keyboard/Commands (print this chapter)

**Aircraft**

G Gear
F Flaps
H Arrestor Hook
b Wheel/Speed Brake
- Throttle Down
+ Throttle Up
d Afterburner
, Rudder Left
. Rudder Right
/ Rudder Center
D Damage Display
sE Eject

**Miscellaneous**

cC HUD Color
cH HUD Toggle
cA HUD Altitude
cI Instrument Toggle
cP Pause
cF Fast time
c` Exit Mission

**Navigation**

A Auto pilot
T TACN Toggle
L ILS Toggle
I IFF
M Moving Map*
N Navigation Data Display*
W Waypoint Select

**Weapons/Stores**

[ AA Weapon Select
] AG Weapon Select
\ Cycle/Clear Target
r Release Weapon
s[ Weapon System Off
; Chaff
' Flare
E E/O Display*
J Jettison Select
C ECM

**Radar**

R Radar Master (AA/AG)
Q Radar Mode
S Radar Silent
t Radar Range

**Views**

1 Cockpit View
2 Look Down
3 External View
4 Wingman View
5 Target View
6 Ground/Tower View
7 Weapon View
8 Weapon Eye View
9 Zoom In
0 Zoom Out

**View Modifiers**

i Look/Pan Up
j Look/Pan Left
k Look/Pan Right
m Look/Pan Back
ji Left 45°
jm Left 135°
ki Right 45°
km Right 135°
im Straight Up

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# Reference: Theater Map (print this chapter)