

A Quick Start Guide for the DCS: F-15C Eagle



Created by: Godzilla

This guide is a free, personal project for entertainment purposes only.

Title image is the DCS: F-15C loading screen

Forward

This guide would not be possible without Eagle Dynamics and the Digital Combat Simulator community.

I'd like to thank Chuck_Owl for creating the amazing Chuck's Guides series for DCS, one of the inspirations making this guide. Chuck's guides have helped countless times and even after flying so many hours in many modules I still go back to them whenever I forget something or want to make sure I did something right. If anyone needs a guide for any of the full fidelity modules in DCS, do not hesitate to check them all out at <https://www.mudspike.com/chucks-guides-dcs/>.

I'd also like to thank the Hoggit community for creating multiplayer servers that allow for anyone to hop on and fly around in whatever environment they want. If you need help learning a module, want to fly in a new player friendly server, or want to challenge yourself against tough and limiting scenarios then the Hoggit MP servers are a great place to be.

A special shout out to @AMRAAM_Missiles for helping me edit this guide and make sure I didn't go overboard.

Finally, this guide is by no means all-inclusive and all-encompassing. In fact, this guide is not meant to cover everything aside from what is needed to get started (hence the name!). For further reading, I highly suggest giving the Eagle Dynamics F-15C Flight Manual a read, which is located in the DCS install folder at *DCS World\Mods\aircraft\[Flaming Cliffs] or [F-15C]\Doc*. It contains more information than you may think, and while it is almost 150 pages long it is well worth the read if you want to know more.

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The F-15C in DCS World

The F-15C is a powerful, fast and highly capable aircraft in both DCS and the real world. The F-15 was originally worked on as far back as the middle of the 1960s and entered service in the US Air Force in the middle of the 1970s, but it was extremely advanced for its time and upgrades have allowed it to remain in frontline service with several countries even today. Designed as a true air superiority fighter, the F-15 has seen great success in modern combat and has been adapted for multi-role missions with the newer F-15E model being produced in the 1980s.

In technical terms, the F-15 is a high performance, supersonic, all-weather air superiority fighter. It is powered by two Pratt & Whitney F100-PW-220 turbofan engines, which produce just under 15,000 lbs thrust at MIL and almost 24,000 lbs thrust at MAX. The F-15 can reach airspeeds in excess of Mach 2 as well as fly at altitudes above 50,000 feet. It has eight stations for weapons loading along with three available for external fuel tanks of 610 gallons in size. Missile armament consists of the AIM-9 Sidewinder family, the AIM-7 Sparrow family and the AIM-120 AMRAAM family. An internal M61A1 20 mm cannon is located on the left-hand side (right-hand when in cockpit looking forward) with 940 rounds. Internal fuel is around 13,000 lbs (2,000 gal) with up to ~25,000 lbs (3,900 gal) with external tanks. Gross aircraft weight is 38,000 lbs with a maximum takeoff weight of 68,000 lbs.

In DCS World the F-15C is a very powerful aircraft in the air-to-air combat role, wielding the ability to load up to eight AIM-120 AMRAAMs and patrol the skies for hours before needing to refuel. When pushed into a close combat situation, the immense power of the engines combined with a deadly cannon and quick Sidewinder missiles lets the F-15C excel all the same. Even if placed into a historically-based scenario, limited to the weapons that existed when it first rolled off the production line in the 1970s and 80s, the Eagle stands atop the rest as the defining air superiority fighter. Despite being what is known as a "low-fidelity module" (the lack of ability to physically interact with the cockpit and limitations in some systems simulations) it still has a highly detailed flight model and remains a favorite of people who love to fly and sweep the skies.

Controls for the F-15C

The F-15C can be controlled using a variety of method, each having their own advantages and disadvantages. Although it is entirely possible to fly and fight in the F-15 using only a keyboard and mouse, it is generally not seen as a pleasurable and enjoyable experience. However, due to the nature of being a low-fidelity module there is not a lot needed and even a very low-cost flight stick (such as a Logitech Extreme 3D Pro, commonly sold for under \$30 USD) can be used with great success. Below is a list of the minimum recommended (as well as bonus extra) controls/buttons to be bound. If something is not listed, it is possible to be used from the keyboard.

Minimum Recommended

- Pitch/Roll/Yaw Axis Controls
- Thrust Axis Control
- Target Lock
- Return to Search/NDTWS
- Countermeasures Chaff/Flare Dispense
- Weapon Fire (Gun Trigger)
- Weapon Release (Missile Launch)
- Weapon Change
- Trim Controls (Nose Up/Down, Left/Right Wing Down)
- View Controls (if no headtracking is available)
- View Center (if no headtracking is available)

Recommended Controls

(in order of importance)

- TDC Slew Axis Controls / Target Designator Up/Down/Left/Right
- Radar Vertical axis (controls antenna elevation)
- Modes (Navigation/BVR/Close Combat)
- Autopilot modes (Attitude and Altitude Hold)

Axis Controls for the F-15C

The axis controls for the F-15C include several different controls, including the pitch/roll/yaw as well as the throttle and TDC axes. Some people leave their axis controls alone and never bother touching them, while others run highly modified curves and saturations that change how they fly. **Axis tuning is a highly subjective subject, and you should always lean more towards how your own flying feels with modified settings.** I will list my own personal axis settings, but how you set yours should be up to you. Test some out and see how it feels and don't be afraid to change them however you want.

For reference, my control setup is a VKB Gunfighter Mk.III with the Modern Combat Grip PRO (no twist axis), the Virpil MongoosT-50CM3 and the VKB T.Rudder Mk.IV. I also have headtracking.

Pitch

- Deadzone: 2
- Saturation X: 100
- Saturation Y: 100
- Curve: 32

Roll

- Deadzone: 2
- Saturation X: 100
- Saturation Y: 100
- Curve: 32

Yaw

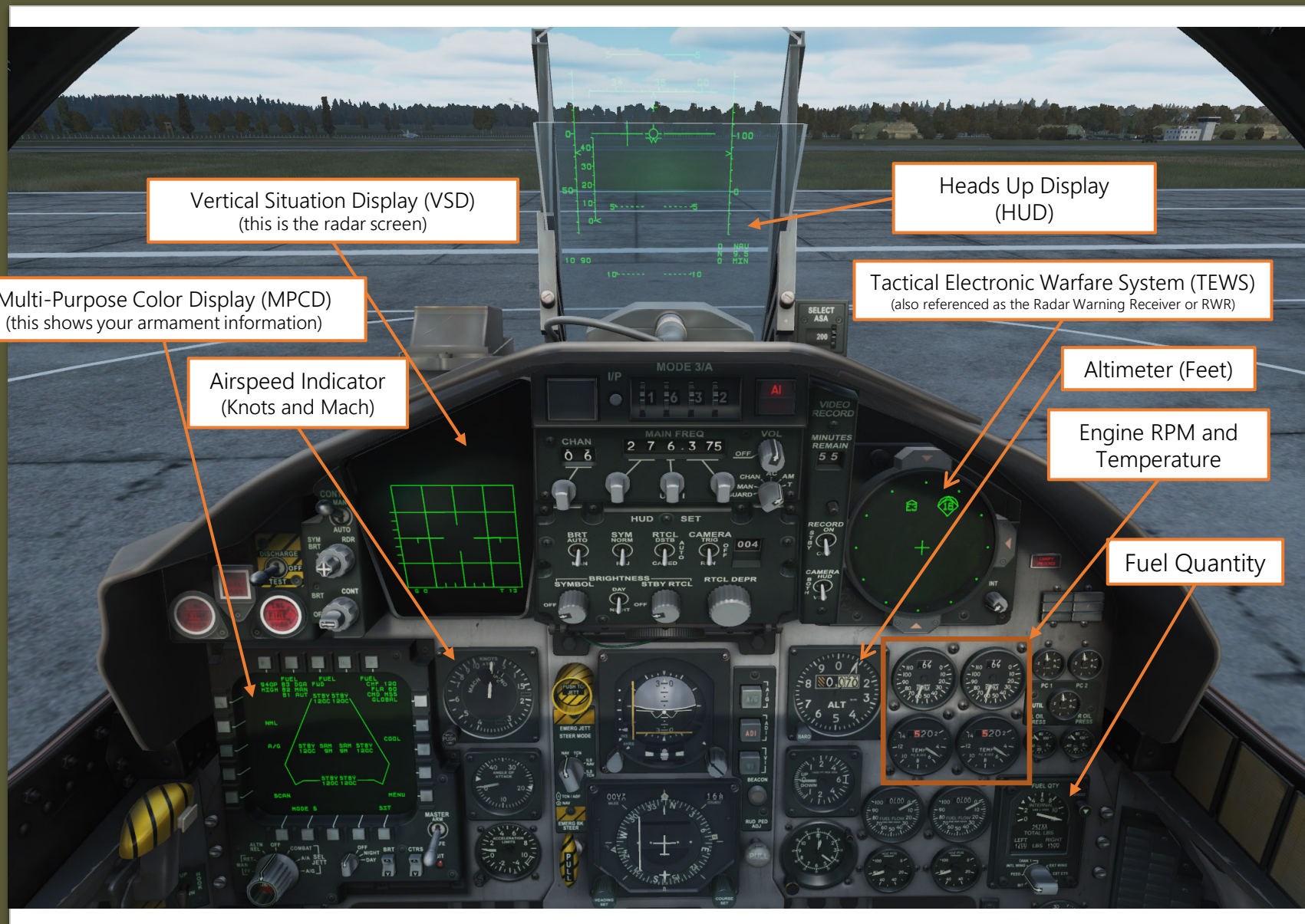
- Deadzone: 0
- Saturation X: 100
- Saturation Y: 100
- Curve: 14

TDC Slew Horizontal

- Deadzone: 0
- Saturation X: 100
- Saturation Y: 60
- Curve: 0

TDC Slew Vertical

- Deadzone: 0
- Saturation X: 100
- Saturation Y: 60
- Curve: 0



Vertical Situation Display (VSD)
(this is the radar screen)

Heads Up Display
(HUD)

Multi-Purpose Color Display (MPCD)
(this shows your armament information)

Tactical Electronic Warfare System (TEWS)
(also referenced as the Radar Warning Receiver or RWR)

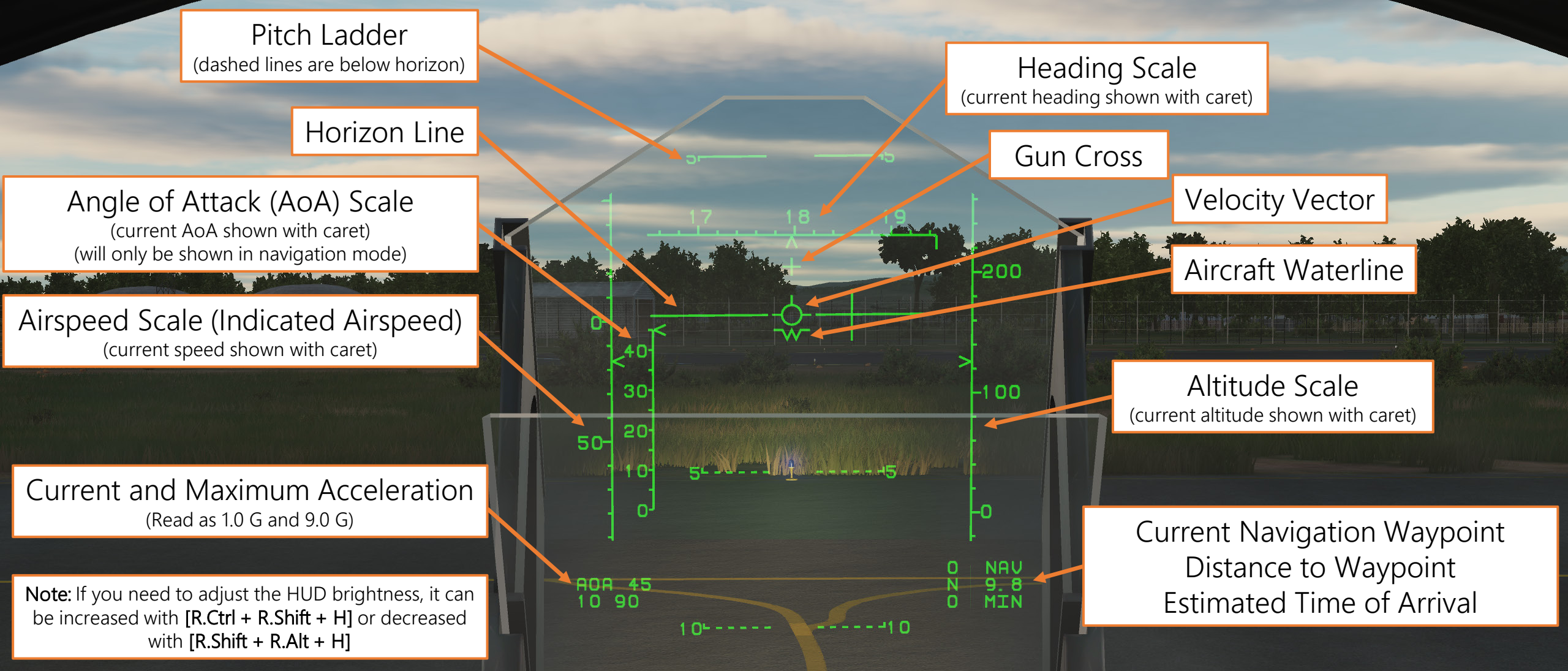
Airspeed Indicator
(Knots and Mach)

Altimeter (Feet)

Engine RPM and
Temperature

Fuel Quantity

Cockpit
Displays and
Gauges for
the F-15C



Heads Up Display (HUD)

ASE Circle

Allowable Steering Error; this circle will be small when far away and grow larger as you close in

Target Designator

Shows you where the target is at
An arrow/diamond underneath the target designator indicates a valid missile shot

Angle Off Line / Tail / Bar

Points to where the target is tracking; down is towards you and up is away

Missile Type and Number

A = AMRAAM
M = Sparrow
S = Sidewinder

A4C = 4x AIM-120C
M3M = 3x AIM-7M
S2L = 2x AIM-9L

Airspeed (Mach)

This will be replaced with AoA if you exceed 18 units

Post-Launch Missile Information

Time to Missile Active (AMRAAM) / Time to Missile Impact

Steering Dot

The steering dot should be kept within the ASE circle and placed as close to the center as possible to get the best missile shot

Range Scale

- Target Range & Closure Rate (knots) shown with caret
- Rmax / Rtr / Rmin indicators shown with thick bars

Target Range (nmi)

Time To Missile Intercept

This is the time it would take the missile to fly to the intercept point and:

- Activate its own radar (AMRAAM)
- Impact the target (Sparrow and Sidewinder)

"M" is shown for AMRAAM / "T" is shown for Sparrow / "S" for Sidewinder

Target Aspect

H = Head On
T = Tail On
R / L = Right or Left

Beyond Visual Range Mode HUD

Gun Ammunition and
Fire Rate

External Fuel Tanks

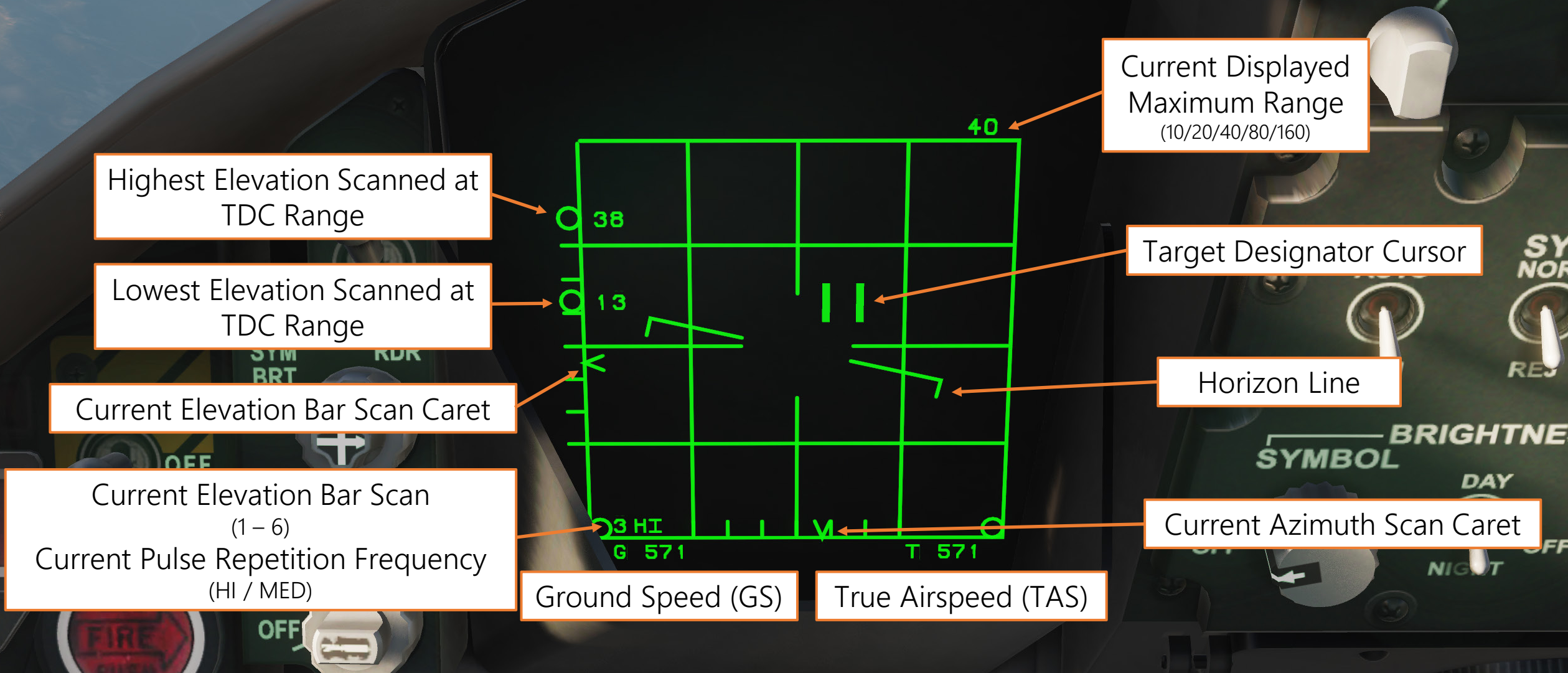
Chaff and Flare
Count



Missile Type and Status

Multi-Purpose Color Display (MPCD)

Fun Fact: The MPCD screen shown in DCS is almost entirely correct for one of the pages in the real F-15C.



Vertical Situation Display (VSD)

The TEWS is a complex system that consists of several sub-systems that all contribute to defining and combatting the current threat from emitting sensors.

Included in the TEWS is the ALQ-135 Electronic Countermeasures Pod (ECM), the ALR-56C Radar Warning Receiver (RWR) and the ALE-45 Countermeasure Dispenser Set (CMD). Combined, these allow the pilot to both detect and spoof potential threats.

A Radar Warning Receiver functions **passively** to detect any radar emitting source, compute what the radar source is, and display it to the pilot. The result is a "threat ID" or "threat code" which is seen on the display. Every emission source has a unique code associated with it and **knowing what those codes mean** may save your life!

As an example, this display on the right shows three emission sources, a "29," a "31" and a "6." Most threat codes are based off the NATO designation of whatever it may be. In this case, the "6" is the SA-6 Kub SAM, the "31" is the MiG-31 Foxhound, and the "29" is the MiG-29S Fulcrum.

But wait! You only know that "29" is a MiG-29S because I said so! In truth, the "29" threat code is applied to both the MiG-29 Fulcrum **and** the Su-27 Flanker family. Be cautious if you do not know the true identity of a threat, the RWR is only one of many ways to figure out what something is.

In some cases, you may see a pair of letters on the RWR such as "BB," "SD," or "CS." These are typically ground search and tracking radars for large SAM sites with multiple units, and the letter pair comes from the NATO designation for the radar. You can read more about what all the threat codes mean on the Hoggit Wiki.

The exact location of the threat code is not directly related to the distance the threat is at, rather it is the radar emission strength. While being closer to a radar source will cause it to be received more strongly, thereby causing it to be closer to the center, it is also possible that a threat indicator is close to the center despite being further away than you might expect. Long range and powerful radars such as the MiG-31 and F-14 can quickly become a primary threat based on their radar power alone. Understanding the position of threats on the display and how that may correlate to range can be the deciding factor on whether you are safe or about to stray too close to a deadly target.

Also be warned that the RWR does not discriminate between friend and enemy, **any radar emission source will appear on the RWR**. It may appear that a "friendly" radar is searching or tracking you, most of the time this is simply how radar works and is *usually* not real threat.

MiG-29 Fulcrum
("hat" over the "29" indicates it is an airborne threat)
Diamond around the threat indicates it is considered the primary threat

If the RWR becomes too cluttered, you can filter out search contacts and only show threats that are locking you by pressing the **RWR/SPO Mode Change [R.Shift + R]** key.

SA-6 Kub Search & Track Radar
"Dome" over the top indicates it is the newest threat to appear

MiG-31 Foxhound
("hat" over the "31" indicates it is an airborne threat)

Ownship Indicator (Cross)
ALQ-135 ECM Status (Diagonal Crosshair)
Empty = ECM is off
Flashing = ECM is powering on
Steady = ECM is operating

Tactical Electronic Warfare System (TEWS)

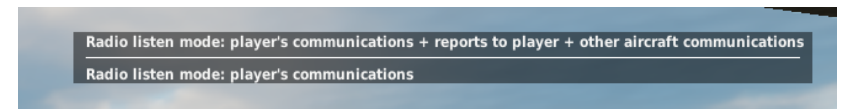
Additional reading on RWR Threat Codes and Symbology:
https://wiki.hoggitworld.com/view/Threat_Database



Getting Started

Starting Up the F-15C

- Press Electrical Power Switch [R.Shift + L] to turn on electrical power. The F-15C does not start using ground external power.
 - If you suddenly begin hearing an endless stream of radio calls from aircraft, press [R.Shift + M] or [R.Shift + \] until you see "Radio Listen Mode: Player's Communications" in the top right
- Press [L.Alt + '] or use the radio menu to open the rearm and refuel window, select a loadout from the drop down or right click underneath the station numbers to select a weapon. Once you are finished, press OK and wait until you hear both "refueling complete" if adjusting fuel load and "rearming complete" before starting the engines.
 - The F-15C is not able to rearm or refuel with the engines running, so make sure to check your fuel and weapons before you start the engines!
- Press Engine Start [R.Shift + Home] to begin the engine startup sequence. The Jet Fuel Starter (JFS) will spin up first (you will hear it) and then engage to start the right engine first, followed by the left engine.
- Once both engines have stabilized at ~67% RPM, the startup sequence is complete. You can press Canopy Open/Close [L.Ctrl + C] to close the canopy.
- Now is the best time to prepare the aircraft for takeoff, which can be done by depressing the T/O Trim button [L.Alt + T]. Press and hold this button until you see the stick stop moving. This will set the aircraft elevator trim to the proper angle to help during the takeoff roll. You will hear a rapid beep which is the departure warning tone.



Taxi Procedures in the F-15C

- After refueling and rearming is completed, close the canopy with [L.Alt + C] before you taxi out.
- Make sure to turn on the **Navigation Lights** [R.Ctrl + L] and **Gear Light** [R.Alt + L] if needed, as these will help you see where you are going as well as make your presence known to others on the ground. The Gear Light will toggle between Far (multiple lights for very bright illumination ahead, commonly used for landing), Near (a single light for narrow illumination, used for taxiing), and Off.
- Slowly increase the throttle until you begin to move, then manage the throttle to maintain a taxi speed that is comfortable, manageable and safe. On the VSD (radar display) you can view your aircraft ground speed (indicated with a G). Best practice is to taxi with a speed below 15-20 knots.
- The F-15C has Nose Wheel Steering (NWS) always on by default. The nose wheel is used to steer by moving the rudder left or right.

Normally the NWS has a range of $\pm 15^\circ$ which allows for smooth turning, but if a tighter turn is needed you can press and hold the **Nose Gear Maneuvering Range** [S] button to increase the nose gear range to $\pm 45^\circ$. Be careful when using this, as you can quickly turn too hard if you are fast, so consider slowing down before making a sharp turn.

If for any reason you need to disable the NWS, you can do so by pressing and holding the **Nose Wheel Steering** [L.Alt + Q] button. If this is held down, the nose wheel is unlocked and free to move.

When taxiing try to make smooth and predictable movements. If you can, stay on the marked taxi lines and obey common courtesy traffic laws if you encounter other people. Keep your taxi speed under control by throttling down or use the brakes if needed.



Taking Off in the F-15C

- Line up the nose wheel with the runway center striped line and roll forward a small amount to make sure that the aircraft is aligned, and the nose wheel is pointed straight ahead.
- Use the **Flaps Landing Position [L.Shift + F]** or **Flaps [F]** button to put the flaps down before takeoff. You can confirm by checking the FLAPS indicator light, the F2 External View mode to see the flaps down, and the information bar along the bottom will show "FLP: 99%."
- Hold the **Wheel Brakes [W]** key and increase the throttle to reach an engine RPM of 80%.
- When you are ready to takeoff, release the brakes and smoothly increase the throttle to MIL (96% RPM). If you intend to takeoff in MAX (full afterburner), push the throttle all the way through. **You will hear several "thumps"** from behind which are the afterburner stages lighting off, followed by the Fuel Flow Indicators spiking very high and a very noticeable increase in acceleration.
- Maintain control of the aircraft by using the rudder and try to stay as close to the center of the runway as possible. As your speed increases, the potential for accidents increases dramatically. Use smooth and small corrections and try not to react too quickly.
- When you reach 120 – 140 knots (depending on weight) begin to pull up slowly to around halfway (**do not attempt to pull straight up!**) and the aircraft will achieve a nose up attitude. As your speed increases past 150-160 knots, pull up slightly further and the aircraft will takeoff.
- Once you see your altitude increasing along with your speed, press the **Gear [G]** key and the gear will retract. Be careful not to lose sight of your forward motion and fall back down to the runway. Use smooth pitch control to maintain a constant angle and keep accelerating.
- As you reach 180-200+ knots, use the **Flaps Up [L.Ctrl + F]** or **Flaps [F]** button to raise the flaps. You may notice a decrease in altitude if you are still slow or have placed your nose back down, so be careful to keep climbing.
- Once you are safely up and away from the runway, you may decrease the throttle back to MIL (speed will no longer be rapidly increasing and the fuel flow will fall sharply) and begin your turn and climb to altitude.

Be careful not to overspeed the landing gear on takeoff! Raise the landing gear once airborne and do not exceed 250-300 knots or else the gear may become permanently stuck.

Landing in the F-15C

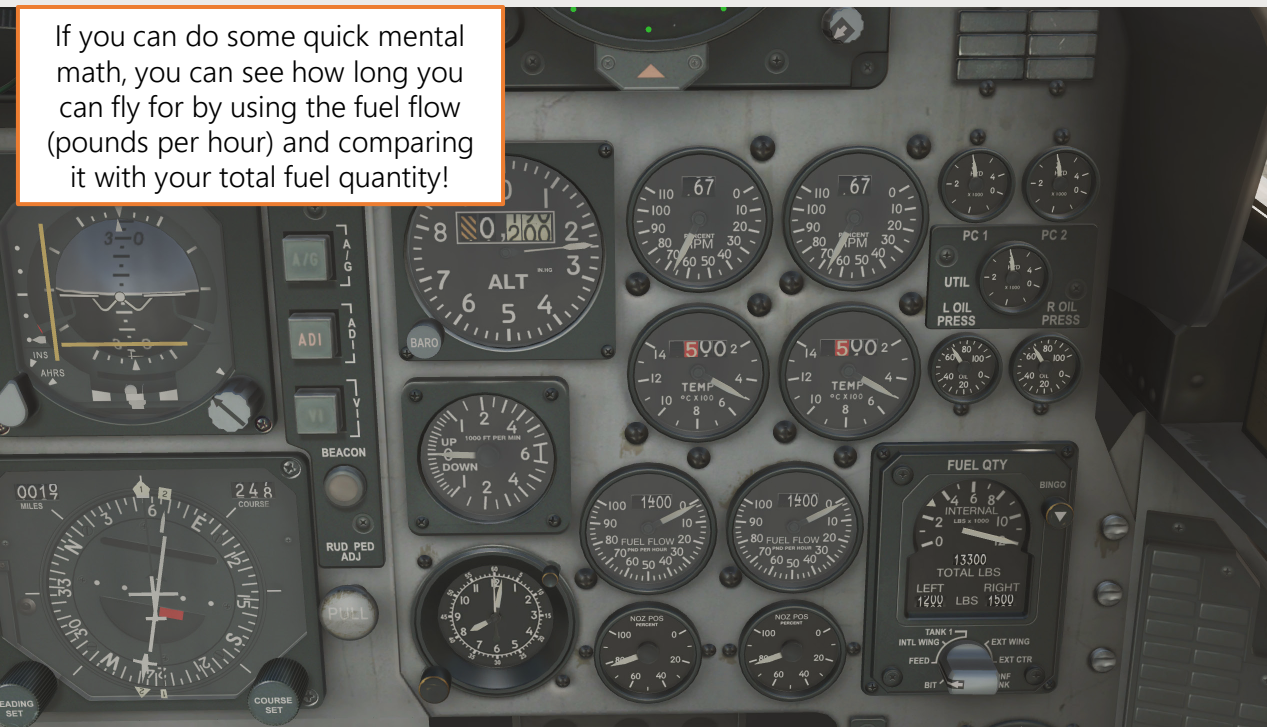
- Standard landing procedure consists of varying parts: the overhead break, the downwind leg, the base leg and the final leg. This is called the "overhead pattern" although other landing patterns exist.
- Enter the pattern by flying perpendicular over the runway you intend to land on at 300-350 knots and a safe altitude. Once you are past the runway, turn in the direction of the runway you intend to land on and fly parallel to it.
- Decrease speed to below 250 knots (use the speed brake if you need to), then deploy the gear by pressing the **Landing Gear Up/Down [G]** key or the **Landing Gear Down [L.Shift + G]**, as well as the flaps with either the **Flaps Landing Position [L.Shift + F]** or the **Flaps [F]** key.
- Once the runway is at around your 4-o'clock or 8-o'clock (positioned around in line with your wing when looking back at it), make the base turn and fly until you can line up with the runway. Then make the base to final turn and line directly along the runway as best as you can.
- Decrease speed further until you arrive to the on-speed AoA, which is around 20-22 units (which is displayed on the HUD). It is not particularly difficult to crush the landing gear if you come down too hard so maintain a steady descent.
- Approach the runway threshold (the part with the white stripes and large arrows/chevrons) and be careful to fully pass over onto the runway proper, then slowly decrease the throttles to IDLE and maintain your AoA as you settle down onto the runway.
- Keep your stick pulled back and let the aircraft act as a large airbrake, which will help to decrease speed very efficiently. Only use light brakes when you are performing an aero-brake. Keep the aircraft waterline below 13° pitch.
- Under 90-100 knots, the aircraft nose will settle down onto the runway and you may begin normal braking. Once you have slowed down enough to maintain smooth control with Nose Wheel Steering, exit the runway at the earliest taxiway exit you can.



Engine and Fuel Management

The F-15C has two Pratt & Whitney F100-PW-220 engines, which gives it very strong acceleration and speed characteristics. The status of these engines can be monitored on the front right side of the cockpit dashboard. Included gauges and displays are engine tachometers (RPM), fan turbine inlet temperature (FTIT), fuel flow indicators, oil pressure indicators and exhaust nozzle position indicators. Each of these can be helpful when determining current engine behavior and diagnosing potential damage and failures. For example, you will see the fuel flow indicators spike rapidly when engaging afterburner and the exhaust nozzles will quickly expand to the fully open position. **Degraded engine performance after taking damage can be noted if the indicators are not synced together between left and right.** It is important to monitor these instruments every so often in order to maintain situational awareness about your own aircraft and to assess the condition of the aircraft before, during and after combat.

If you can do some quick mental math, you can see how long you can fly for by using the fuel flow (pounds per hour) and comparing it with your total fuel quantity!



The fuel system is composed of four fuselage tanks and two wing tanks, along with external fuel tanks that can be mounted under the wings and on the fuselage centerline. The F-15C in DCS is not able to mount conformal fuel tanks (CFTs). Fuel is transferred from the external tanks to the internal tanks under normal conditions, meaning that the external tanks will be drained of fuel first followed by the wing tanks and then the fuselage tanks. All fuel tanks can be refueled both on the ground and in the air. Fuel boost pumps are present which allow the aircraft to sustain negative G and inverted flight while still providing proper fuel flow to the engines. The fuel quantity indicator includes both a mechanical dial and rotary drum to indicate fuel amounts. The pointer/dial gives a reading up to 12,000 lbs, with the top rotary counter providing a total fuel reading and the two lower rotary counters providing a “left” and “right” reading for the currently selected source. The fuel source knob can be switched with **[L.Shift + D]** and the sources available to monitor are:

- FEED: the fuel remaining in the engine feed tanks, this will read a relatively static value until very little fuel remains as the feed tanks are always kept full
- INT WING: the fuel remaining in the internal wing tanks, both left and right
- TANK 1: the fuel remaining in the forward most internal centerline tank
- EXT WING: the fuel remaining the external wing tanks, both left and right; this will read 0000 when the tanks are empty
- EXT CTR: the fuel remaining in the external centerline tank; this will read 0000 when the tank is empty

When the external fuel tanks are empty, they can either be jettisoned to shed excess weight and drag or they can be kept to be refueled later. If you wish to jettison the external tanks you need to press the “Jettison Fuel Tanks” **[L.Alt + R]** keybind and all three external tanks will be jettisoned together. The total fuel quantities are as follows:

- Internal fuel only: 2070 gallons / 13,450 lbs
- Internal fuel plus external centerline tank: 2680 gallons / 17,400 lbs
- Internal fuel plus external wing tanks: 3290 gallons / 21,400 lbs
- Internal fuel plus three external tanks: 3900 gallons / 25,350 lbs

On the fuel quantity indicator is an adjustable BINGO index (an adjustable index is commonly called a “bug”), which can be rotated both clockwise **[L.Alt + D]** and counterclockwise **[L.Ctrl + D]**. When the fuel quantity falls below the set BINGO amount a caution will appear and alert the pilot. There is also an independent FUEL LOW warning that will appear when the feed tanks drop below a certain amount, indicating an emergency (either you really have no fuel left or a fuel transfer pump has failed).

Autopilot

The autopilot in the F-15C can be somewhat confusing to operate, although it can be very helpful when on longer flights or there is a need to maintain a specific attitude. There are two autopilot modes available, the pitch/roll attitude hold and altitude hold modes.

Pitch/Roll Attitude Hold

- Enabled by pressing the **Autopilot – Attitude Hold [A; L.Alt + 1]** button
- Attitude Hold will maintain the aircraft's pitch and roll provided that you are not at extreme attitude (within $\pm 45^\circ$ pitch and $\pm 60^\circ$ roll)
- This will allow you to maintain a specific pitch angle while climbing, or holding a bank angle during an orbit
- With Attitude Hold enabled, moving the stick will activate Control Stick Steering (CSS), which will temporarily disengage autopilot until you release the stick, when Attitude Hold will engage and hold the new pitch and roll angles

Altitude Hold

- Enabled by pressing the **Autopilot – Altitude Hold [H; L.Alt + 2]** button
- **Attitude Hold mode *must be engaged before* using Altitude Hold**
- The altitude you are at when Altitude Hold is engaged is what will be selected, so make sure to be as level as possible before engaging Altitude Hold
- Control Stick Steering will still disengage autopilot, and the new altitude when autopilot re-engages will become the new selected altitude to hold
- Disengaging Attitude Hold will likewise disengage Altitude Hold together



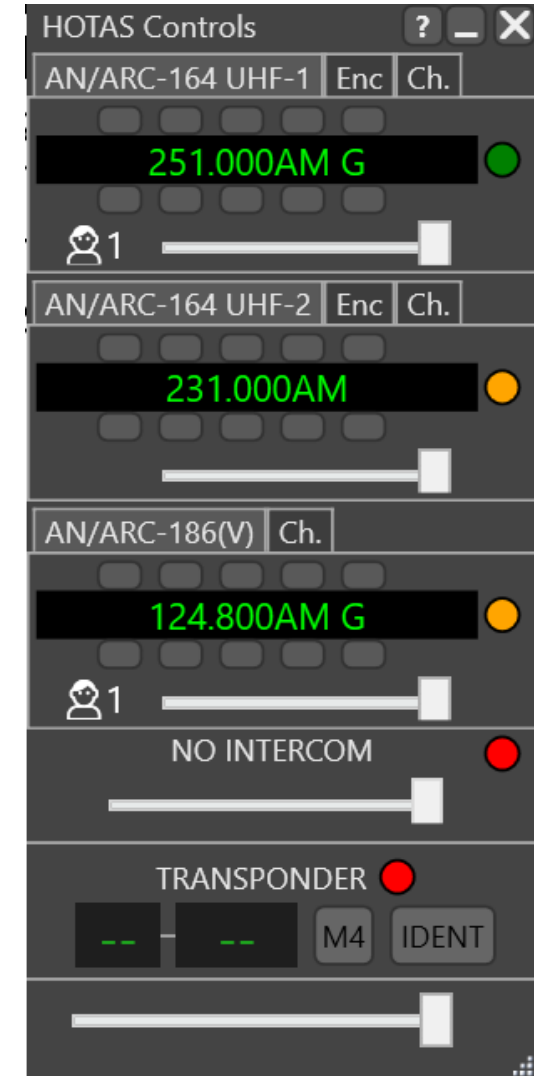
SimpleRadio Standalone Communication

DCS World does not (currently) have a built-in voice chat functionality, which is perfectly fine as we have Ciribob to thank for creating the amazing program that is SimpleRadio Standalone, or SRS. SRS is an external program that plugs into DCS and links it together along with LotATC, a controller software that lets people track the location of all aircraft. SRS provides a way for players in a multiplayer server to communicate with each other over simulated radio channels and frequencies by creating radios that the aircraft would have. In the case of the F-15C it would be the ARC-164 which has two UHF radios paired together. With full fidelity modules you are able to manually tune and program radios through the cockpit, however as it is a low fidelity module the radios are only able to be manipulated by using the radio overlay. This is activated by pressing the "toggle radio overlay" button the SRS panel. With the radio overlay opened you can perform a variety of functions such as:

- Changing the frequencies of all radios
- Selecting which radio is currently selected/active
- Changing radio volume
- Turning on and setting Mode 1 / 3 transponder codes, as well as activating Mode 4 IFF and IDENT function

The individual radios can have their frequencies changed to whatever is allowed by that radio, which for the ARC-164 is the UHF band ranging from 225.00 MHz to 399.98 MHz. This does mean that the F-15C is unable to reach the VHF band, but for gameplay purposes most multiplayer servers enable a setting in SRS that allows for "expanded radios" that will give an extra radio or two to modules that have limited radio access. With the F-15C you are given a magical ARC-186 that is a VHF radio, reaching from 116.00 MHz to 152.00 MHz. For easier access, you can set keybinds for almost any function imaginable for SRS so there is no requirement to always keep the radio overlay open. You could easily open the overlay when first starting up to program the radios how you want and then close it, with the ability to change which radio you are using with any keybind you want.

A note on Mode 3 transponder codes and Mode 4 IFF: SRS transponder codes are only used for LotATC integration so that a human AWACS / GCI is able to see what you are squawking, it has no relation to in-game DCS IFF at all.





F-15C Radar

Using the Radar in the F-15C

The radar of the F-15C was one of the most powerful in the world when it was first fielded, although it has been replaced by newer versions and more advanced technology since. In DCS World, the radar systems interaction is somewhat simplified and not all search and tracking modes are present. The two major radar modes are the Long Range Search (LRS) mode and the Automatic Acquisition (AACQ) modes. In LRS, the radar presents information to the pilot in one of two ways: either in a Range While Search (RWS) mode or Track While Scan (TWS), both of which will be covered later. The radar is displayed on the VSD in a B-scope format, which is azimuth on the horizontal axis and range on the vertical axis.

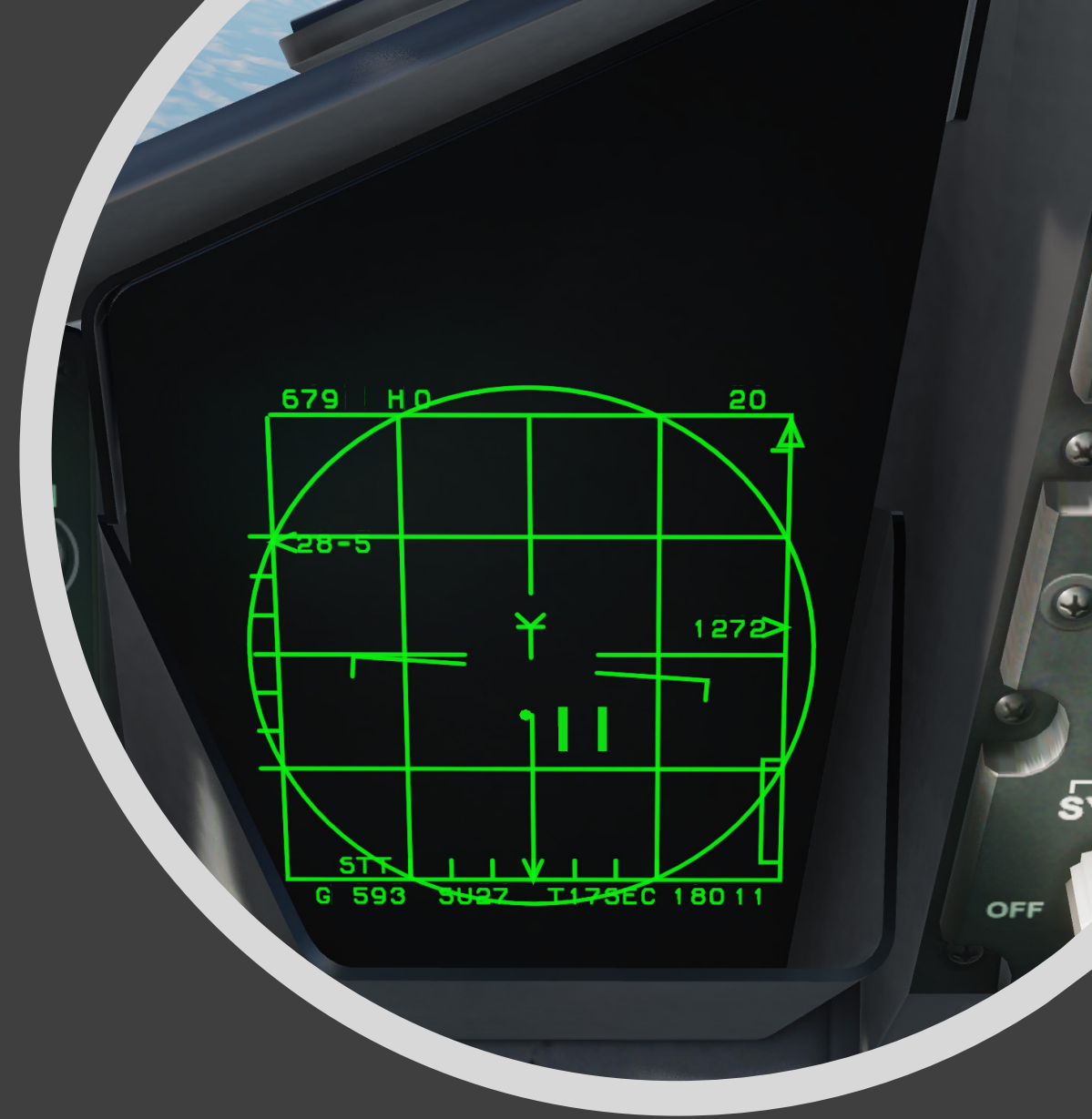
Radar works like a cone reaching out from your plane, meaning that close to you the radar scan “volume” is very small, and it can’t see very up or down, but as the distance from your radar increases the scan volume increases as well. This is a rather complicated topic to explain in text, and so I advise you to explore the amazing tool that is <https://tawdcs.org/radar-f15/>. This tool allows you play around with and see a 3D representation of the F-15C radar in DCS, so play around with it and see how you may need to adjust different parameters such as your range, your own altitude or the radar antenna elevation. The way that radars scan and look for targets can be quite complicated, even without going into some of the more advanced and secretive search techniques that radars can use. The two most common ways to change how a radar works are:

- **Azimuth:** Defines how narrow or wide the radar is searching for a target, usually defined in even multiples such as 20°/40°/60°/80°/140°. The wider the azimuth setting is, the longer the radar takes to perform one “sweep,” or a complete scan from full left to full right. While it might be nice to see everything as wide as possible, it can take a long time to see where targets are.
- **Elevation Bar:** A sort of “stair step” up and down that the radar searches in elevation from top to bottom, with more bars meaning a taller radar search pattern. These are measured in whole even numbers, such as 1 bar / 2 bar / 4 bar / 6 bar etc. More elevation bars means that you can see more above and below you, but this also adds in more time that the radar must scan to return to where it started. After a single radar sweep, the elevation bar is stepped to the next until it reaches the bottom, then restarts again at the top.

The F-15C radar is locked to 140° azimuth and 6 bar scan in Range While Search. This becomes a 60° azimuth and 4 bar scan in Track While Scan.

Long Range Search (LRS) Radar Mode

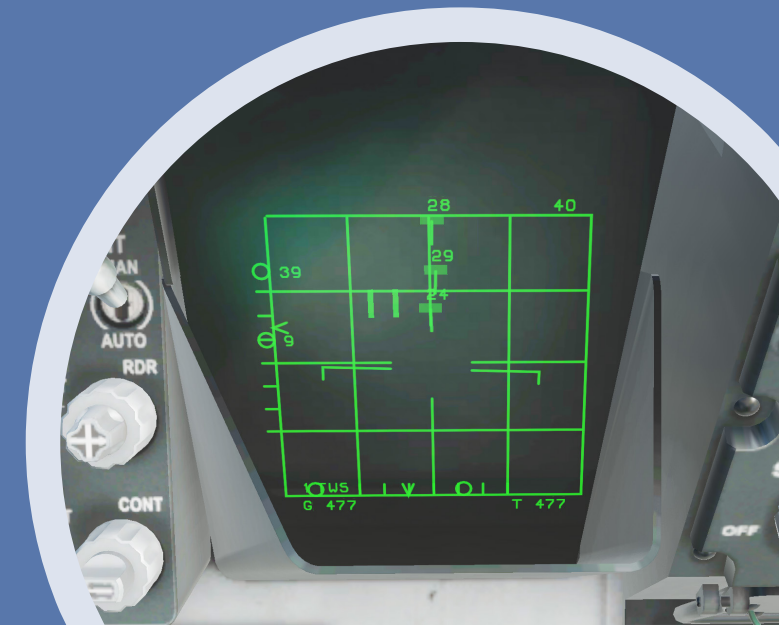
Long Range Search (LRS) mode is the default radar mode that will be seen when the radar is turned on with the Radar On/Off [I] key. This mode can be entered at any time by pressing the Beyond Visual Range Mode [2] key. The HUD will switch to the corresponding display mode and the VSD will be ready to use. The VSD is used to search for and acquire targets, using the **Target Designator** discrete controls or the **TDC Slew** axis controls. The TDC itself will move around on the VSD as you control it, and it works as a "gate" or selector when placed over a contact. If you would like to designate the contact placed between the vertical bars of the TDC you press **Target Lock [Enter]**. Doing so while in RWS (which is the default mode when BVR mode is selected) will immediately take that contact into Single Target Track (STT) mode. In this mode all of your radar power is focused on that one target which allows you to maintain a track on the target. The STT display on the VSD can show highly valuable information such as target range, altitude, speed and even what aircraft it is (through some magical tech you can learn about yourself called NCTR). If you would like to undesignate the contact you now have in STT, you can either press the **Return to Search/NDTWS [Back]** button or simply press **Target Lock [Enter]** somewhere else on the VSD.



Track While Scan (TWS) Radar Mode

Track While Scan (TWS) is a separate radar mode from the RWS mode that is used by default. TWS generates what is called "trackfiles" which are radar and computer calculations about a target's speed, altitude, heading and course. Multiple trackfiles can be stored at one time which is how TWS can be used to prosecute an attack on multiple targets in quick succession. The "hits" or "bricks" visible on the VSD are shown with both an altitude number (in the ten thousands, so 34 is 34,000, 21 is 21,000 etc.) and a course line projected from the brick. In order to keep the track file updated properly the radar must scan each contact approximately every 2 seconds, which means that **the scan volume is limited**.

Attacking targets in TWS functions almost the same as it does in LRS/RWS except that you can designate multiple contacts. The first designated target to be attacked is marked with the same symbol as in STT, with all following targets becoming a hollow brick with an extra number attached to them which is the launch order. After one missile is launched, the designated target will switch to the next following the launch order. If you would like to take one of the targets into STT mode, you can designate the target a second time with the TDC. If there is a contact you designated but no longer wish to target, you may slew the TDC over that contact and press the **Return to Search/NDTWS [Back]** button to undesignate. The radar will be centered on the TDC until you designate a contact, then the radar will remain centered on whatever is the next target to be engaged.



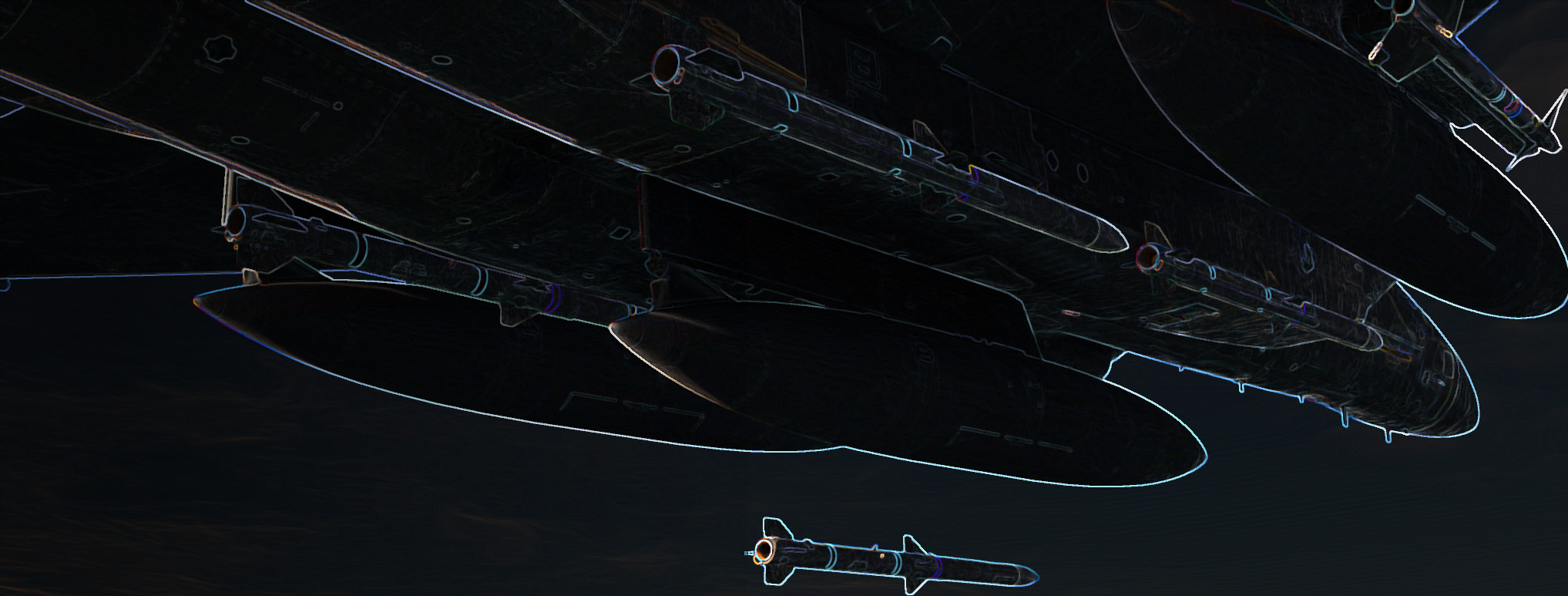
Automatic Acquisition (AACQ) Radar Modes

There will be situations where you are in a dogfight, the target you are going for is too close, or you need to quickly lock onto a target in front of you, and this is where the Automatic Acquisition (AACQ) radar modes are the most helpful. As the name suggests, the AACQ modes will automatically lock onto a target for you which cuts out the entire process of slewing the TDC around on the VSD and designating a contact. The F-15C has two different AACQ modes: vertical scan and boresight.

- **Vertical Scan [3]** presents a general aiming circle along with a vertical line on the HUD, and the first aircraft to cross the vertical line is automatically locked
- **Boresight [4]** presents a smaller aiming circle on the HUD, and the first aircraft to enter the circle will be locked

AACQ is only able to lock a target within 10 nmi range, which firmly keeps it only useful for Within Visual Range (WVR) combat. If you lock a target that you did not intend to, or would like to select a different target, you may reject the currently selected target by using the **Return to Search/NDTWS [Back]** key.





Weapons



M61A1 Gun

The M61A1 is a Gatling type 20 mm cannon which has a selectable rate of fire between LOW (4,000 spm) and HIGH (6,000 spm). In DCS, the F-15C can only use HIGH, although it does carry 940 rounds which gives a large amount of trigger time.

The M61A1 can be called up by pressing the **Cannon [C]** key. The gun is fired with the **Weapon Fire [Spacebar]** key, **which is different from the Weapon Release key**. USAF aircraft have separate gun triggers and weapons release buttons on the stick, **which allows the gun to be fired at any time** (so be careful that you don't accidentally pull the trigger when you don't mean to). If you are in any of the combat modes the trigger is hot!

If the M61A1 is called up and you do not have a radar lock on a contact, two things will take place:

- the Lead Computing Optical Sight (LCOS) appear on the HUD to display a static aiming point for the gun
- the radar will enter the Auto Gun AACQ mode which is a $\pm 30^\circ$ azimuth / 20° vertical scan mode which will acquire the first contact it can find

Without a radar lock on a target the gun must be aimed manually. If a contact is acquired, the gun reticle will switch to the Gun Director Sight (GDS) mode, providing you with a dynamic aim point. A collapsing range clock inside the GDS reticle will appear when within 1.4 nmi. If you place the aim point over the target and you have an accurate shot, then the target designator box will be temporarily removed.

Missile Employment in the F-15C

While the F-15C can certainly hold its own in dogfight with the guns alone, the true power of the Eagle comes from the large number of air-to-air missiles that it can carry. The F-15 was revolutionary for its time with how large, fast and capable it was in the air superiority role, and the ability to carry eight missiles along with its level of flight performance was un-matched. Learning to use the various missiles it can carry is critical to your success in clearing the skies with the Eagle.

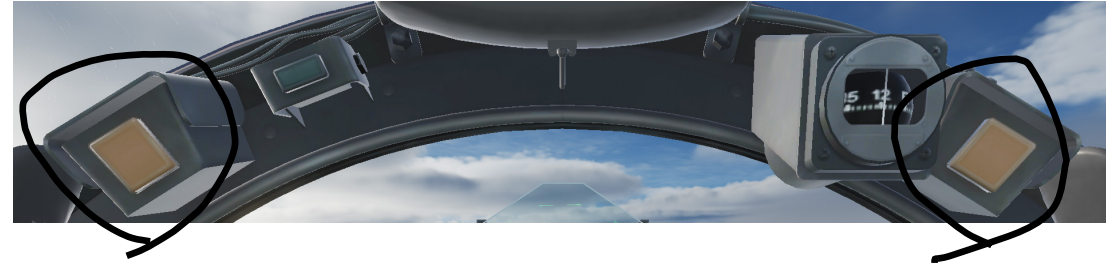
Air-to-air missiles can be used in any of the combat modes, [2] through [6], with or without a radar track on a target. The common range indicators for missiles are:

- Rmax: The missile's maximum aerodynamic launch range, which is against a non-maneuvering target
- Rtr: The missile's maximum maneuvering launch range, which is against a maneuvering and defensive target
- Rmin: The missile's minimum launch range, which it cannot hit the target if fired within this range

While you can launch a missile at any time, some of the big indicators of a valid missile shot are shown below and to the right:

- Yellow lights on the canopy bow light up
- Arrow/diamond underneath the target designator
- "Shoot" audio cue (if "Radio Assists" setting is enabled)

Something to be aware of is that any missiles loaded on the belly stations (3, 4, 6, 7) need to "ejected" or dropped from the aircraft before the motor ignites, meaning that at very low altitudes you may not be able to use them.



AIM-9L/M Sidewinder

The AIM-9 Sidewinder is a short-range heat-seeking (IR) missile. It does not use any on-board guidance after acquiring a target and post-launch, meaning it is a true fire-and-forget missile, as it only needs to keep seeing the target source of heat. The AIM-9L/M can be used in the **Beyond Visual Range [2]** mode by using the **Weapon Change [D]** key, in any of the AACQ radar modes as well as without a radar lock in the **Longitudinal Missile Aiming Mode/FLOOD Mode [6]**. The Sidewinder has a typical range of less than 5 nmi, so it is almost always going to be used within visual range. The AIM-9 is fired with the **Weapons Release [L.Alt + Spacebar]** key.

When using the Sidewinder without a radar lock, the missile seeker is the primary “sensor” that is used to both search and acquire a target. The seeker is caged/un-caged by pressing the **Longitudinal Missile Aiming Mode/FLOOD Mode [6]** key. Note that using the Sidewinder with the radar off will give you *no indication* if a contact is friendly or not, so make sure to visually identify (VID) a target if you are closing in to launch without radar!

When used in the **Beyond Visual Range [2]** mode or any of the AACQ modes, the AIM-9L/M can be slaved to the radar which makes target acquisition much easier and faster. With a radar lock on a contact and the Sidewinder called up the seeker will automatically point at the locked contact and be searching for it. As soon as it is possible the seeker will acquire the target, simplifying the process.

Any time that the Sidewinder is selected, a low “growl” tone will be heard constantly which means that the missile is powered on and searching for a heat source. If a heat source is found the growl will change to a higher pitch tone which means it is tracking a target.





AIM-7M/MH Sparrow

The AIM-7 Sparrow is a medium-range semi-active radar homing (SARH) missile, meaning that it is guided to the target using radar from an "illumination" source (which is you!). The Sparrow is a *much* larger missile than the Sidewinder, and it has a very powerful boost motor that gives it much greater range as well, with the most optimal conditions giving the missile a maximum range of over 30 nmi (although this is very rare and would mean it is unlikely to hit).

The AIM-7M/MH can be called up in the **Beyond Visual Range [2]** mode as well as the **Longitudinal Aiming Mode/FLOOD Mode [6]**. Because the Sparrow is a SARH missile, it is highly desirable to have a clear radar track on a target before firing. With a radar track established, the Sparrow can be launched by pressing and holding the Weapons Release [**L.Alt + Spacebar**] key. **NOTE: The AIM-7MH Sparrow will always loft, while the AIM-7M Sparrow will not loft. This is an artificial limitation.**

If you need to guide a Sparrow without a radar lock, you must switch to the **FLOOD Mode [6]**. This is a less efficient and very unreliable way to guide a Sparrow which only works at closer ranges (within 10 nmi), so it is not recommended unless you are unable to achieve a radar lock. **Be warned that there is almost no way to determine what the missile will guide towards if there are multiple radar returns by the flood antenna, so you may inadvertently hit a friendly if they are in front of you!**



AIM-120B/C AMRAAM

The AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM) is a (surprise!) medium-range active radar homing (ARH) missile, which means that the missile has its own on-board radar seeker that is used to guide the missile to the target. When launched normally the AMRAAM is guided towards the target by being given periodic updates on the target position as it flies, then once it is within range of the target the missile will activate its own radar seeker and guide itself to the target.

The AMRAAM can be used from the **Beyond Visual Range [2]** mode or any of the AACQ radar modes. The AMRAAM is launched by pressing and holding **Weapon Release [L.Alt + Spacebar]** key. With no radar track the AMRAAM is placed into VISUAL mode, which allows the AMRAAM to be launched without a designated target. This is referred to as a “maddog” launch as the AMRAAM radar seeker is active as soon as it launches, which allows for rapid and close target engagement in a situation where acquiring a target is not possible or would be too slow. This can be effective but can also be dangerous, so be careful when launching missiles without a radar track.

The AIM-120 AMRAAM can be a very powerful weapon when used properly and safely, but it is also one of the greatest avenues for friendly fire and near miss incidents in DCS. Learning how and when to use it, ***or not use it***, is vital to succeeding in the multiplayer environment and not ending up teamkilling.

- Once the AMRAAM is launched, **it is not anyone's friend**. Whatever target it finds is the one it will go after, whether you intended it to or not.
- If launched and radar track is lost, an AMRAAM ***will go active*** at 10 nmi from the intended target, using the last information it received
- If there are multiple aircraft in the same area where the intended target is, it is anyone's guess as to which target the missile will go after. See above.
- If you launch an AMRAAM, it is expected that you will accept the responsibility for it and whatever action it takes. See above. (Do you sense a pattern here?)





Countermeasures and Defense



Countermeasure Dispenser Set (CMD)

The F-15C possesses the AN/ALE-45 Countermeasure Dispenser Set (CMD) which provides for chaff and flare expendable countermeasures. Two dispenser sets are installed on each side of the aircraft underbelly, each with two magazines (or banks) of expendables. The standard countermeasure load is 120 chaff (CHF) / 60 flare (FLR). These are used to counter and fool weapons that might otherwise hit you. They are not guaranteed to work but they provide you a fighting chance of surviving in combat, so use them wisely!

- Chaff is a collection of dozens of thin metal strips/shards, which can potentially give multiple false returns to a radar. These would be used to fool either a SARH or ARH missile seeker, which could end up becoming confused by the dispensed chaff and miss your aircraft. **Using chaff alone is usually not enough**, and it is recommended to take defensive and/or evasive action if you suspect or know a radar guided missile is locked onto you.
- Flares are burning pieces of metal (usually magnesium) that burn extremely hot in an attempt to fool an IR/heat seeking missile. If a flare crosses into the path of the missile and your aircraft, there is a chance that the missile might mistake the flare for its original target (you) and go after the flare instead. Be advised that more modern missiles have advanced seekers that can be resistant to flares. **Using flares alone is almost always not enough**, and it is recommended to cut your throttle to IDLE and take evasive action. Use of afterburners will render flares almost entirely useless.

You are able to monitor the number of chaff and flares remaining by viewing the MCPD, and on the upper right corner of the front dashboard is a collection of indicator lights for when chaff or flares are dispensed. Countermeasures can be dispensed in several ways:

- Countermeasures Chaff Dispense [**Insert**]: one (1) chaff bundle will be dispensed for each press
- Countermeasures Flare Dispense [**Delete**]: one (1) flare will be dispensed for each press
- Countermeasures Dispense [**Q**]: one (1) chaff and one (1) flare will be dispensed for each press
- Countermeasures Dispense Continuous [**L.Shift + Q**]: one (1) chaff and one (1) flare will be dispensed every 3 seconds after press, pressing again will turn this off

The chaff and flare load can be adjusted in the rearm and refueling menu [**L.Alt + `**].

Defensive Flying

Defensive maneuvers largely depend on your energy state and range to a threat, but common maneuvers are:

- Turning cold or turning around far enough to be heading away from the threat. At high speed this can be very effective at evading a missile or making an attack difficult as missiles expend far more energy in a chase.
- Beaming, or heading at a perpendicular angle to the threat. This can allow you to still maintain an offensive potential while reducing the danger. You can quickly turn back into the target or escape if needed.
- Erratic maneuvers or flying unpredictably. Turning away and then back in, changing altitude, or snake turns can make a threat confused or hold fire until you close in. This can be dangerous as you expend energy.

Although there are specific “timelines” and dogfighting maneuvers to be used, there is no way to give hard and fast advice on how to fly when in combat. Many actions will be made based on split second decisions with as much information as can be gathered, so the only way to know how to react in combat is to get out and practice. Understanding how your own jet performs is the first step to being able to defeat others, so be sure to test out the limits of F-15C doing evasive maneuvers at different altitudes, speeds, weights etc.



A detailed 3D rendering of an air-to-air refueling operation. A large, multi-colored boom (green, yellow, and red) extends from the upper left towards the center. Below it, a smaller, blue and white boom is visible. The scene is set against a bright blue sky with scattered white clouds. In the foreground, the wing and tail section of a receiving aircraft are visible, with a blue and white boom attached. The ground below is a vast, green landscape with rolling hills and a river. The text "Air to Air Refueling (AAR)" is overlaid on the right side of the image.

Air to Air Refueling (AAR)

Aerial refueling can be one of the most difficult things you may do in DCS, but it is also highly rewarding and very satisfying. The F-15C lends itself to AAR very well due to the large weapons complement it has, which means you can stay up in the air on patrol for extended periods of time. Whether you refuel just after takeoff, during the mission, or on the way back to home base, AAR can be a great way to stay sharp on your piloting skills.

The F-15C uses the boom method of refueling. The tanker aircraft lowers down an adjustable rigid tube that slots into a refueling port on the aircraft and fuel is transferred. As opposed to the probe and drogue method with a flexible hose that is extended from the tanker that connects to a probe on your aircraft, boom refueling is favored by the US Air Force due to the faster rate of fuel flow to support strategic aircraft like large bombers (in DCS, both boom and probe/drogue refuel at the same rate).

To initiate AAR, you must first contact the tanker you wish to rejoin with using the **Communications Menu** [N] and selecting **F6: Tankers**. Make sure to select the correct one, although you will only hear a response from a tanker if you can rejoin with it (if you get no response at all, that is not the correct one). The tanker you would use in the F-15C is the KC-135 (the KC-135 MPRS does have both a boom and two drogues, but DCS does not support both, only drogues). The tanker will respond with directions on where and at what speed to rejoin. Do note that the speed the tanker reports will be slightly off, usually the rejoin speed will be slightly higher (around +6 to +10 knots). At that point, you can use the **Refueling Boom** [L.Ctrl + R] key to open the refueling port. This will also switch your HUD to TACAN mode, giving you range information to the tanker.

Traditionally you should “saddle” with the tanker by coming up alongside and flying in formation off the wing and then move in towards the boom. The F-15C refueling port is over your left shoulder, so forming up on the right wing is optimal. Once you are in position, use the communications menu to proceed. Once you receive clearance you will see the Pilot Director Lights activate on the belly of the tanker (pictured on the right). As you move to connect and receive fuel, paying attention to these two lights is absolutely critical. The left light indicates your vertical position while the right light indicates your horizontal position. Both lights have five stages with the outermost of both being red. Keeping both lights at least green is required for the boom operator to keep the boom connected to your aircraft. If both are in the center position it makes connecting and staying connected that much easier.

Once you have received a full fuel load, you will hear “Transfer complete, disconnect.” (This is currently not working and the only indication is that your fuel total stops ticking up.) In this case, once you have either received a full load of fuel or you would like to stop refueling, simply move away from the tanker and select the **Abort rejoin** option from the radio menu.



Refueling Radio Communications

To request air to air refueling, open the **Communications Menu [N]** and press **Tankers [F6]**. Then select the tanker that you intend to refuel from, then press **Intent to refuel**. You will then hear:

"[Tanker callsign], [Your callsign] request rejoin"

The tanker will respond with:

"[Your callsign], [Tanker callsign] proceed to pre-contact at [altitude], velocity [indicated airspeed]"

Once you are in position just behind and below the boom, select **Ready pre-contact** and hear:

"Ready pre-contact"

If you are not in the proper position (too far away or too far off to one side), you will hear a response of:

"Return pre-contact"

If you *are* in the proper position you will instead hear:

"Cleared contact"

The tanker is now ready for you to connect. Once you have connected you will hear:

"Contact [...] You are taking fuel"

If at any point during the refueling process you disconnect from the boom you will hear

"Return pre-contact"

Once you have received the maximum amount of fuel you can take, you will hear:

"Transfer complete, disconnect"

You are then free to depart from the tanker and close the refueling port.