X-Plane
Grumman F-14D Tomcat

Pilot's Operating Manual

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Background: The Grumman F-14 Tomcat

The Grumman F-14 Tomcat is an American fighter aircraft that was in service with the United States military from 1974 to 2006. The aircraft was initially equipped with two Pratt & Whitney TF30-P-412A turbofan engines, and later with General Electric F110s. The supersonic F-14 was designed primarily to operate from carriers and features a variable-geometry wing for efficiency in both low and high-speed flight. A twin-tail configuration was also adopted to assist with maneuvers at high angles of attack, while also reducing the height of the aircraft to fit within the limited roof clearance of an aircraft carrier hangar.

The F-14 was developed as a successor to the F-4 Phantom II, after the cancellation of the F-111B project which suffered development issues and was not ordered into production. The brief for the F-14 was to create an aircraft with the aerodynamic and electronic capabilities needed to successfully defend U.S. aircraft-carrier operations at long range against Soviet aircraft and missiles.

The first flight of the F-14 took place on 21 December 1970, and the aircraft were initially deployed in 1974 aboard the U.S. Navy carrier USS Enterprise (CVN-65).

F-14A:

The initial all-weather interceptor fighter variant was designated F-14A. The first 12 aircraft from the production-line were prototype versions, designated YF-14As. Subsequently, the U.S. Navy ordered 478 F-14As, and an additional 79 were ordered by Iran. These aircraft were initially fitted with Pratt & Whitney TF30-P-412A turbofans, but the final 102 produced were upgraded with TF30-P-414As.

F-14B:

The F-14B model was the first major upgrade to the aircraft, starting in March 1987. The TF30 engines were replaced with General Electric F110-GE-400s. The aircraft was also fitted with the ALR-67 Radar Homing and Warning (RHAW) system. although many of the avionics systems were retained. A total of 38 new aircraft were produced, with another 43 F-14A models being upgraded to B variants.

F-14D:

The F-14D Super Tomcat became the last variant and was first delivered in 1991. This aircraft was fitted with a glass cockpit and the AN/APG-71 radar. Also featured was an Airborne Self Protection Jammer (ASPJ), Joint Tactical Information Distribution System (JTIDS), SJU-17(V) Naval Aircrew Common Ejection Seats (NACES), and Infrared search and track (IRST). A total of 37 F-14D models were produced.

The Boeing F/A-18E/F Super Hornet replaced the F-14 Tomcat, which was retired by the U.S. Navy in 2006. A total of 712 aircraft were produced across all model-types. Some aircraft are still flying with the Iranian Air Force, although the numbers are not published.

F-14D Specifications

Engines:		
Model	----------	2 x General Electric F110 turbofans
Power	----------	2 x 28,200 lb. thrust
Fuel:		
Capacity	----------	16,000 lbs. / 7,257 kg.
Fuel	----------	Jet A
Fuel Burn (average)	----------	4,000 lbs. per hour
Weights and Capacities:		
Max. Takeoff Weight	----------	74,000 lbs. / 33,566 kg.
Max. Landing Weight	----------	54,000 lbs. / 24,494 kg.
Empty Operating Weight	----------	43,735 lbs. / 19,838 kg.
Maximum Payload	----------	14,265 lbs. / 52,000 kg.
Crew	----------	2
Performance:		
Super-cruise Speed	----------	Mach 1.3
Max Operating Speed	----------	Mach 2.34
Final Approach Speed		120 - 130 KIAS (full flap/gear down)
Takeoff Distance	----------	2,500 ft. / 760 m.
Landing Distance	----------	2,400 ft. / 730 m
Range	----------	1,600 nm (500 nm combat)
Service Ceiling	----------	53,000 ft. / 16,000 m.

The X-Plane F-14D

Unlike other flight simulators, X-Plane employs a technique called “blade element theory. This utilizes the actual shape of the aircraft (as modeled in the simulator) and breaks down the forces on each part separately. The force of the “air” acting on each component of the model is individually calculated, and combined, to produce extremely realistic flight.

When you “fly” an airplane in X-Plane, your control inputs move the control surfaces of the aircraft, and these interact with the virtual flow of air around it. As such, you may consider that you are really flying the aircraft.

Due to the use of ‘Blade Element Theory’ in X-Plane, an aircraft must be modeled with great accuracy, in order that it behave like its real-life counterpart. This means the fuselage, wings and tail surfaces must be the right size and shape, the center of lift and center of gravity must be in the right places, and the engine(s) must develop the right amount of power. In fact, there are a great many properties that must be modeled correctly to achieve a high-fidelity flight model.

The F-14D featured in X-Plane has been modeled by our design team with a degree of accuracy that ensures its flight characteristics are like the real aircraft. However, despite this, some differences will be apparent, because even the smallest factor plays into the ultimate behavior of the aircraft, both in real life, and in X-Plane. The systems modeling of this aircraft involves some compromise too, because of the degree of complexity present in the real aircraft. However, in most cases, the actual F-14D procedures could be followed when operating the X-Plane version. Checklists are presented later in this document (with modifications to suit this specific simulation platform and model). It is recommended that X-Plane pilots follow those procedures to extract the maximum capability and enjoyment from this aircraft.

Views and Controls

The X-Plane F-14D features a detailed 3-D cockpit with a great many of the primary controls and systems modeled, including: Flight controls (flight-stick, rudder pedals, thrust levers), electrical systems, pneumatic systems, navigation aids, radios, autopilot, interior and exterior lighting, combat and weapons systems and fuel systems.

Creating “Quick Look” views

Before discussing the controls, we suggest that the pilot establish a series of “Quick Look” views that will be helpful later when interacting with this particular aircraft. If you are not familiar with this technique, more information is available in the X-Plane Desktop Manual.

The following “Quick Look” views are recommended for the F-14D, in a situation where the pilot is not using a Virtual Reality (VR) headset, or a head tracking device. To some degree, these correspond (on the keyboard Number Pad) with their physical location in the cockpit and are therefore logical and easy to recall later.

Throttle Quadrant / Radio Panel

Landing Gear Control Panel

Engine / Armament Control Indicators.

Electrical Panel

Pilot's EFIS (Electronic Flight Instrument System) Control Panel / Autopilot

Multi-Function Displays

Fuel Quantity / Display Control Panel

Pilot's Left Glance View

Pilot's Forward View

Pilot's Right
Glance View

Operating the controls

This section covers the basics techniques for the operation of the controls that you will encounter in the cockpit of an X-Plane aircraft. Control manipulators are consistent across all X-Plane aircraft. However, the specific **ILLUSTRATIONS** in THIS chapter may differ from YOUR aircraft.

Toggle and Rocker switches are operated with a single click of the mouse. Place the mouse pointer slightly above, or below, the center point of the switch, depending on the direction you intend to move it. A small white arrow is displayed to confirm the intended direction. Click the mouse button to complete the operation.

Levers are operated by assigning a peripheral device to the necessary axes in X-Plane (throttle, prop, mixture etc.). More information is available in the X-Plane Desktop Manual.

Levers may also be operated by clicking and dragging the mouse pointer.

Radio and Navigation frequency rotary dials are grouped together as “twin concentric knobs”. Here, the larger rotary is used to tune the integer portion of the frequency, and the smaller rotary is used to tune the decimal portion. Each works independently, using the same technique as described above.

Some rotary dials are operated by positioning the mouse pointer on top of the control, and then a click and drag to the right, or to the left. The same can be accomplished using the mouse wheel - if one is present on your device.

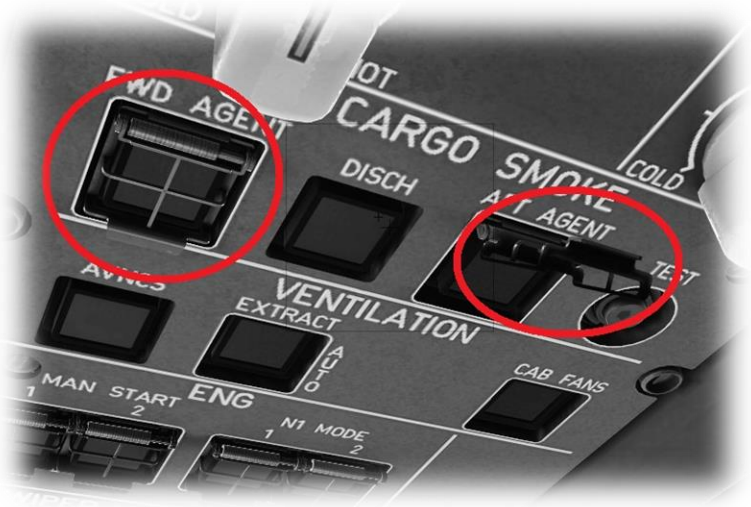
Other rotary controls require finer precision. When the mouse pointer is positioned slightly to the left of such control, a counterclockwise arrow appears. This indicates that you are ready to rotate the control counterclockwise. Correspondingly, a clockwise arrow indicates that you are ready to rotate the control clockwise. After positioning the mouse pointer, changing the frequency in the desired direction is accomplished in two ways:

i) By rolling the mouse wheel forwards, or backwards.

ii) By clicking (dragging is not supported here)

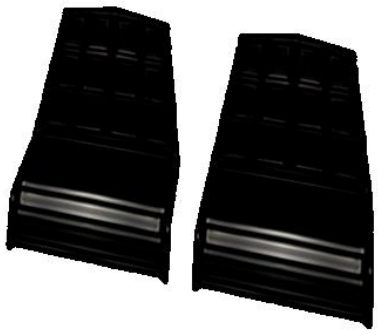
Push buttons are operated by a mouse point and click.

These are usually toggle operations.



Guarded switches are used in situations where accidental activation of the switch must be prevented. To operate a guarded switch, the guard must first be opened. Do this by positioning the mouse pointer over the switch until the two vertical white arrows are displayed. Click once. If the switch is currently closed, it will open, and vice versa. After the guard has been opened, the switch may be operated like a toggle and rocker switch (see above).

The Yoke / Stick / Joystick is operated by assigning a peripheral device to the “roll” and “pitch” axes in X-Plane. This is discussed in greater detail later in the guide.



The Rudder Pedals are operated by assigning a peripheral device to the “yaw” axis in X-Plane. If your rudders also support toe braking, create additional assignments to the “left toe brake” and “right toe brake” axes in X-Plane. This is discussed in greater detail later in the guide.

Note that you may also assign keys on your keyboard, or buttons on your external peripheral to move the rudder to the left or right, or to center the rudder.

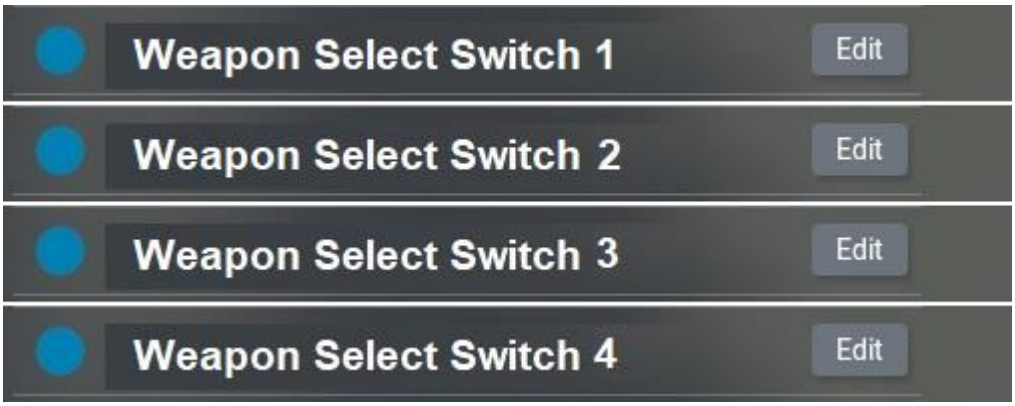
Assigning peripheral devices

This section of the manual deals with an “ideal” scenario, in terms of the assignment of external computer peripherals to operate the X-Plane F-14D with the highest degree of realism. If you are missing some of these external peripherals, you may elect to choose a different configuration that better suits your hardware.

This aircraft is equipped with a center stick, for roll and pitch control.

To simulate this, assign the lateral axis of your yoke (or joystick) to the “Roll” command in X-Plane, and the vertical axis to the “Pitch” command.

More information is available in the X-Plane Desktop Manual.



Bind a joystick four-axis hat switch to “Weapon Select Switch 1” through “Weapon Select Switch 4”. This will enable you to quickly select your weapon of choice in a combat scenario.

Weapon selection may also be made in the virtual cockpit using the four-axis hat-switch on the left-side of the flight stick.

Bind a joystick button to “Fire armed missiles or bombs”.

This will enable you to quickly fire the currently selected weapon in a combat scenario.

Bind a joystick button to “Drop all drop tanks”.

This facilitates dropping the external fuel tanks when exhausted, or in the event of an emergency.

This aircraft is equipped with dual thrust levers – which control the thrust generated by the left and right engines respectively.

To simulate this, assign two levers on your quadrant to the “Throttle 1” and “Throttle 2” property in X-Plane.

This aircraft is equipped with a Flap lever, which controls the deployment of the flaps for takeoff and landing.

To simulate this, assign a peripheral lever to the “Flaps” property in X-Plane.
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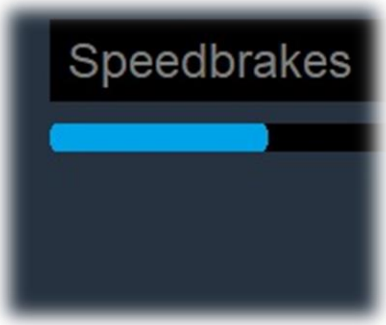

This aircraft is equipped with speed brakes that deploy above the wings. These reduce lift and slow the aircraft, for situations that require a rapid descent without a corresponding increase in speed.

The Speedbrakes may be controlled using a toggle lever on the right side of the throttle quadrant.

However, to most easily simulate this, assign a hat-switch or other similar peripheral device to the “Speedbrakes” property in X-Plane.

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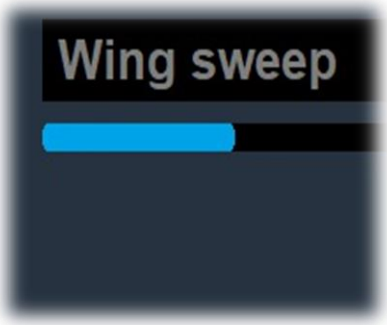

This aircraft is equipped with a Wing Sweep lever, which controls the profile of the wings (forward for low-speed flight and rearward for high-speed flight).

To simulate this, assign a peripheral lever to the “Wing sweep” property in X-Plane.

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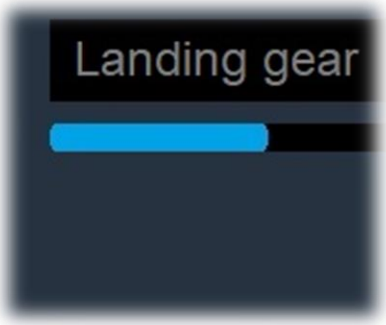

This aircraft is equipped with a Landing Gear lever.

To simulate this, assign a peripheral lever to the “Landing gear” property in X-Plane.

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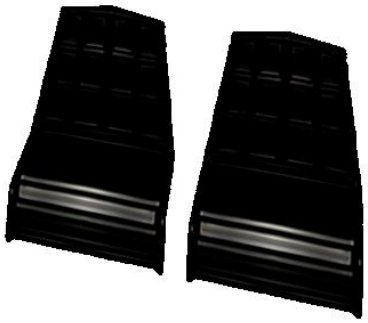
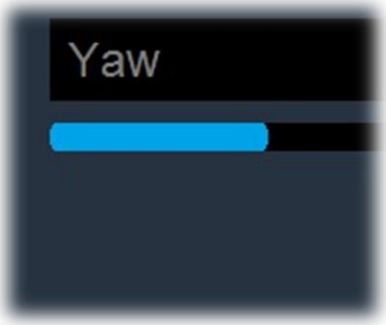


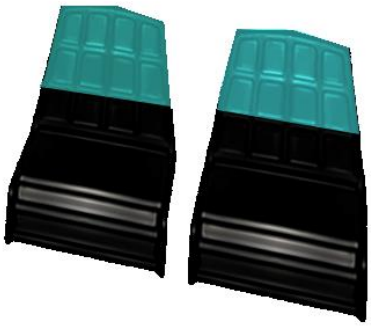


This aircraft has rudder control pedals, that actuate the rudder (integrated into the tail assembly).

The rudder “yaws” the aircraft to the left or right. This mostly applies to the takeoff, approach, and landing phases, to maintain the desired course without applying roll.

In a conventional aircraft, the rudder is also used to make coordinated turns, but this is automated by the Airbus fly-by-wire system.

To simulate this, assign the yaw axis of your pedals peripheral device (or a joystick axis) to the “yaw” property in X-Plane.



This aircraft has rudder toe-braking, actuated by the tip of the rudder pedals.

To simulate this, assign the brake “toe-tipping” motion of each individual pedal (or a joystick axis) to the “left toe brake” and “right toe brake” property in X-Plane.

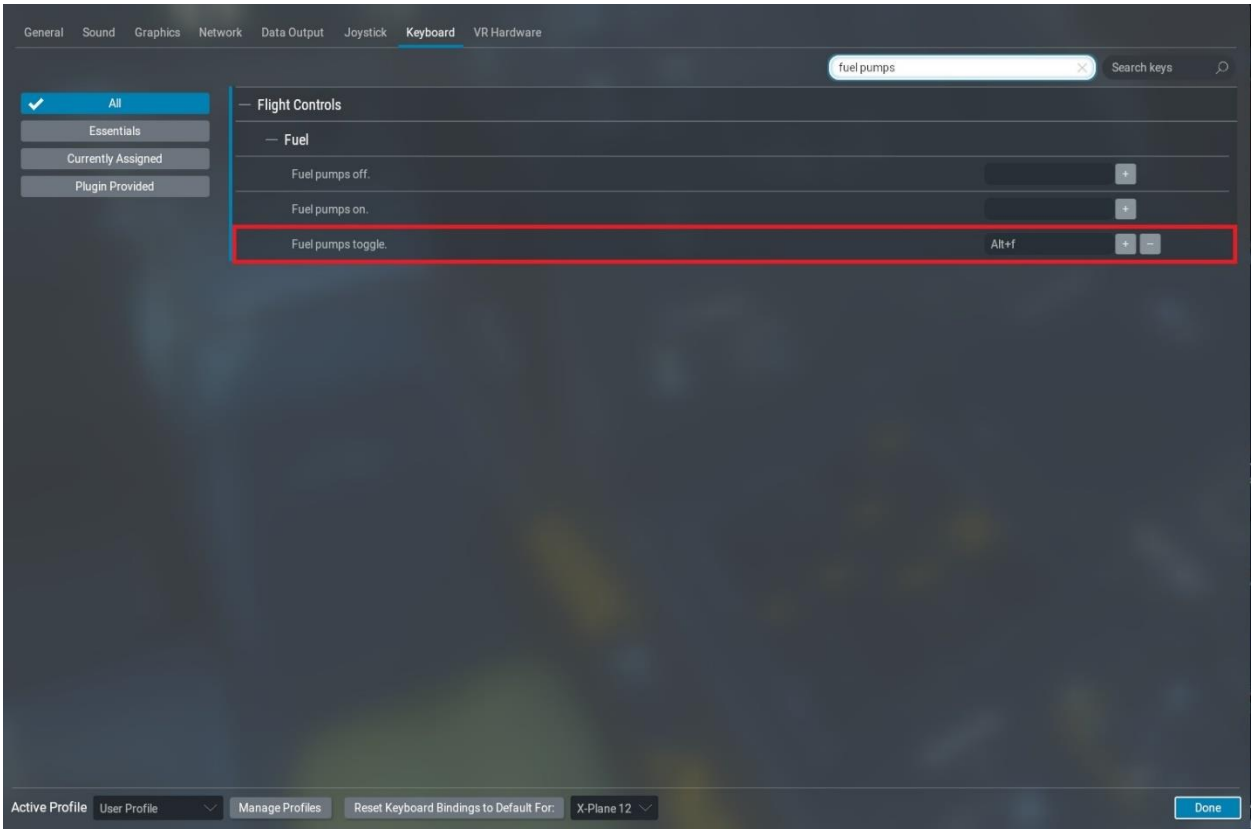
Key Binds

The following key binds are required to emulate actions not supported by controls available, or readily accessible in the 3D cockpit.

‘GPU toggle’ and ‘Bleed air toggle GPU’ functions:

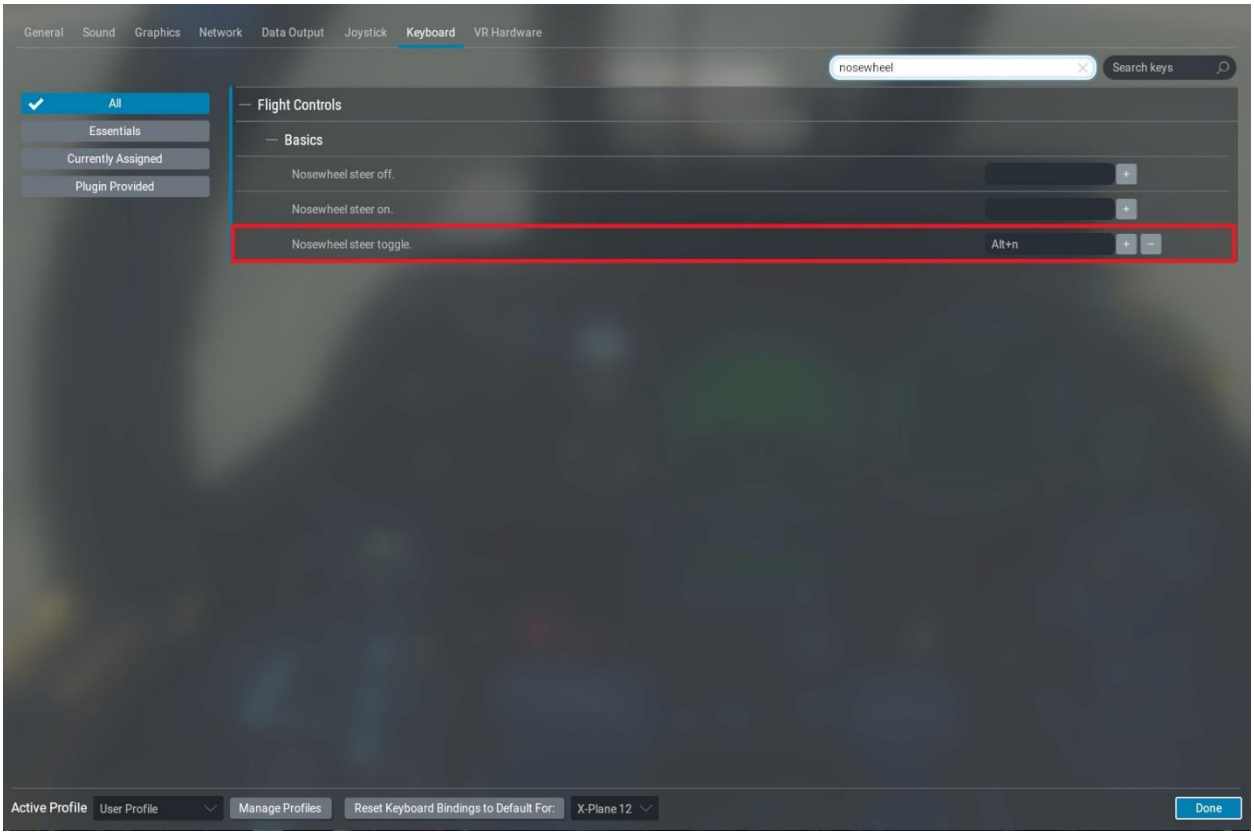
In the example above, the chosen keystrokes are Alt+g and Alt+a respectively, but you may bind a key combination of your choice, provided it does not conflict with any other essential functions.

‘Fuel pumps toggle’ function:



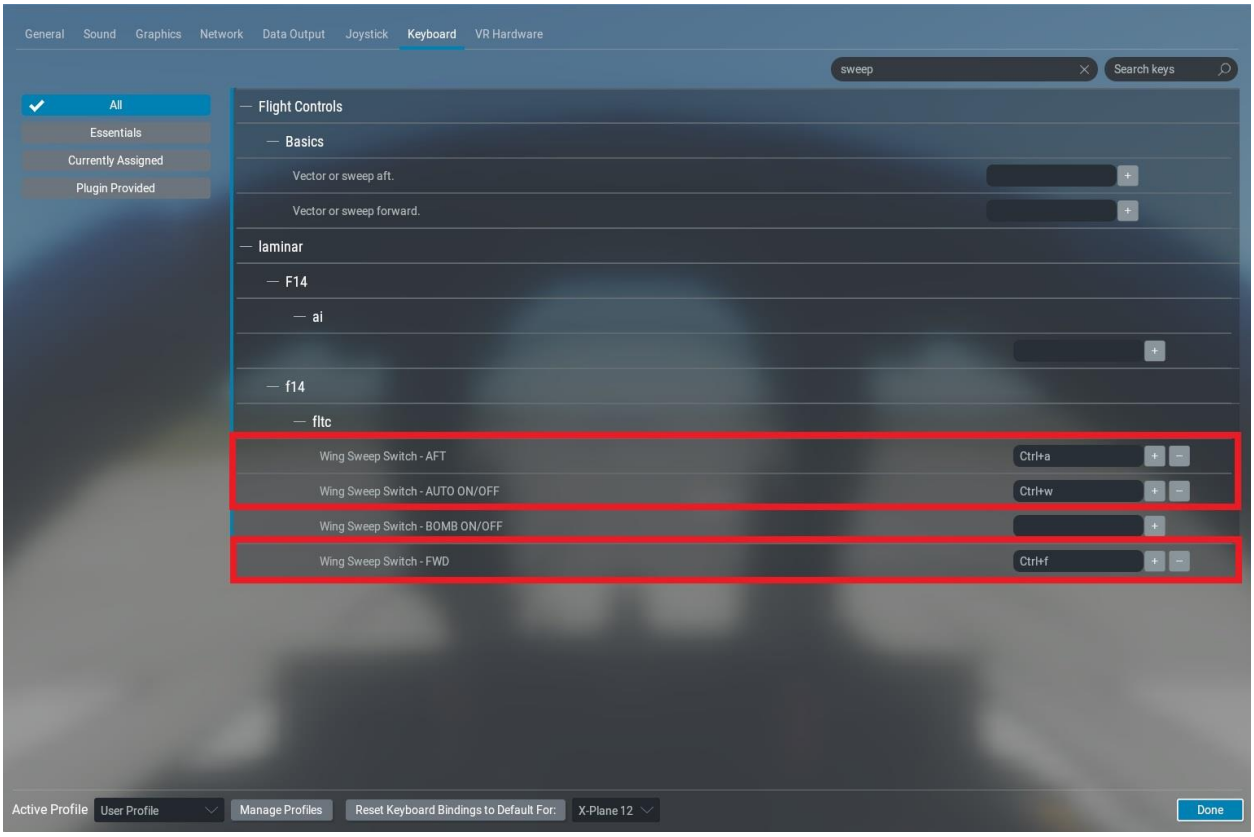
In the example above, the chosen keystrokes are Alt+f, but you may bind a key combination of your choice, provided it does not conflict with any other essential functions.

‘Nosewheel steer toggle’ function:



In the example above, the chosen keystrokes are Alt+n, but you may bind a key combination of your choice, provided it does not conflict with any other essential functions.

Wing sweep functions:



In the example above, the chosen keystrokes are Ctrl+a, Ctrl+w and Ctrl+f, but you may bind a key combination of your choice, provided it does not conflict with any other essential functions.

Setting up for the mission

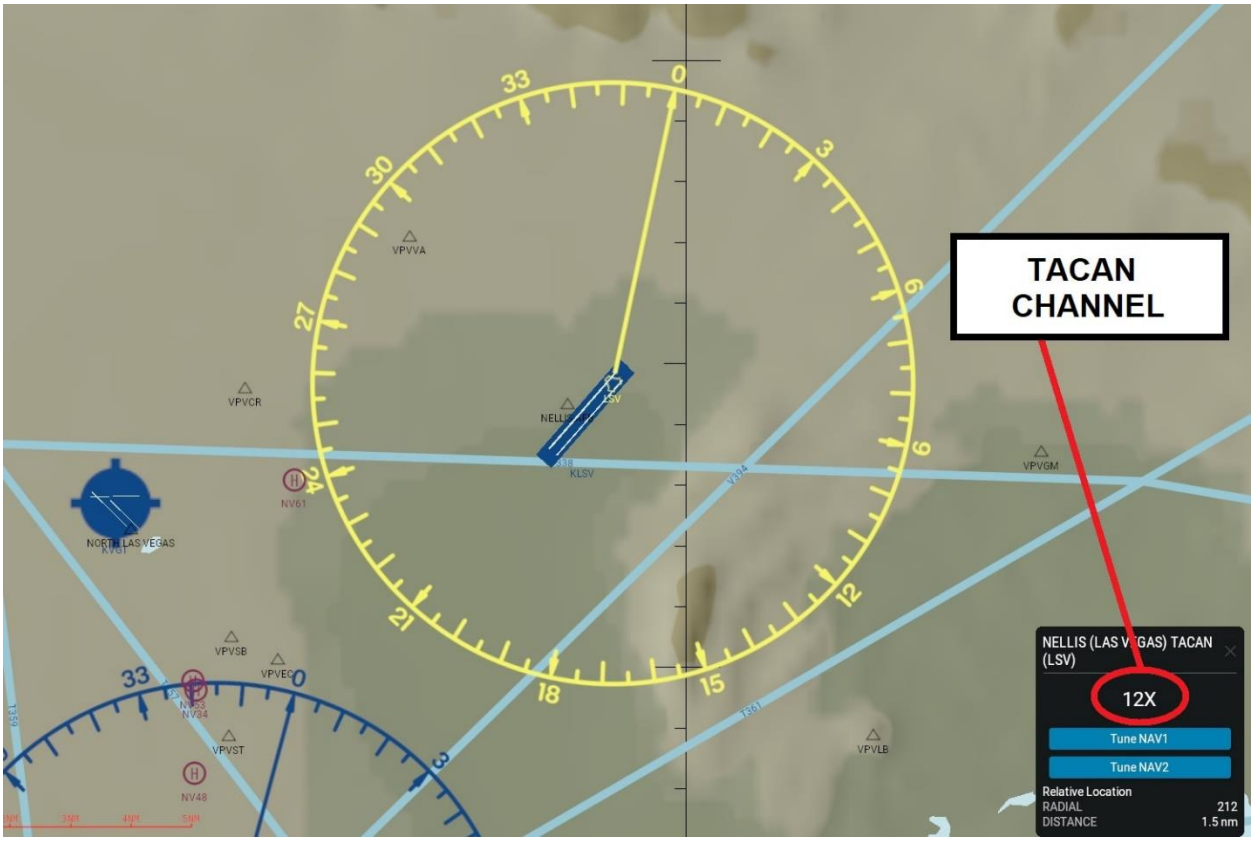
The F-14 is a ‘mission centric’ aircraft, meaning that it is configured prior to the flight with only the needs of that mission in mind. This includes:

- ✓ Flight Plan
- ✓ Weapons Load
- ✓ Nav Frequencies

Flight Plan

In the real world the F14-D used a bespoke computer that is loaded with a flight plan by ground crew prior to the mission. The bespoke computer is not modeled for X-Plane because it has no utility beyond this specific aircraft. However, X-Plane pilots may accomplish something similar - by navigating using Tactical Air Navigation (TACAN) stations. TACAN stations are similar to VOR transmitters and operated by the military. These stations normally have a range of up to 300 nautical miles, depending on altitude.

X-Plane map – TACAN station



Navigating to a TACAN station involves noting the TACAN channel identifier (‘12X’ in the example above) and selecting this using the TACAN Radio Panel (see: TACAN Radio). Multiple TACAN stations can be used to achieve a ‘pseudo’ flight plan, by noting each channel identifier in advance of the flight and selecting the appropriate channel forming the next waypoint as the flight progresses.

Weapons Load

Prior to the flight, the X-Plane F-14D pilot may select a full, or partial weapons load by clicking the ‘Weapons’ button . The position of each load item (weapon or fuel tank) is fixed, because these rely on specific mounting-point types on the aircraft. For example, you may only place a Sparrow missile at Hard Point 1 or 2. Use the following examples as a guide:

Weapons Load (Full)

Weapons Load (Partial)

Navigation station frequencies

In the real world, the F-14D did not have a NAV radio for the crew to tune navigation station frequencies. As such, there was never a consideration that the pilot would “select” a frequency outside of the stations expected to be in proximity during the mission.

Once the mission was determined, the aircraft computer was pre-loaded with the appropriate navigation station frequencies, which can be selected later using the ARA-63 nav radio (see: ARA-63 Panel). Because the mission did not consider flying into an unknown area, the ARA-63 was only loaded with up to 20 potential navigation aid frequencies that might be needed based on the area in which the mission was to be flown.

Pre-loading the expected navigation station frequencies

To emulate the pre-loading of up to 20 navigation station frequencies, the X-Plane F-14D pilot must edit the following text file:

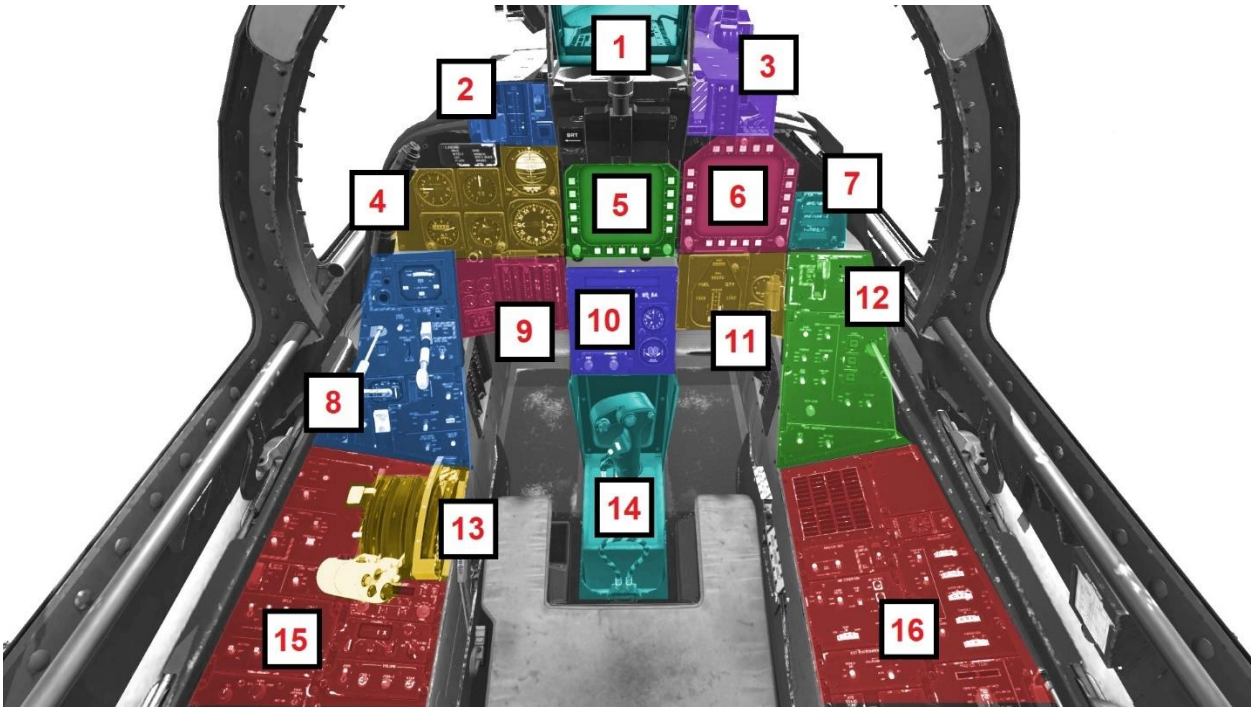
- ✓ Aircraft / Laminar Research / Grumman F-14 Tomcat / data / ara63.txt

Each line in the file represents a channel – from 1 to 20. The frequency for a given channel is in the format 99999, where the first three digits represent the unit portion of the frequency, and the last two digits represent the decimal portion of the frequency. For example, 10810 represents a frequency of 108.10 MHz.

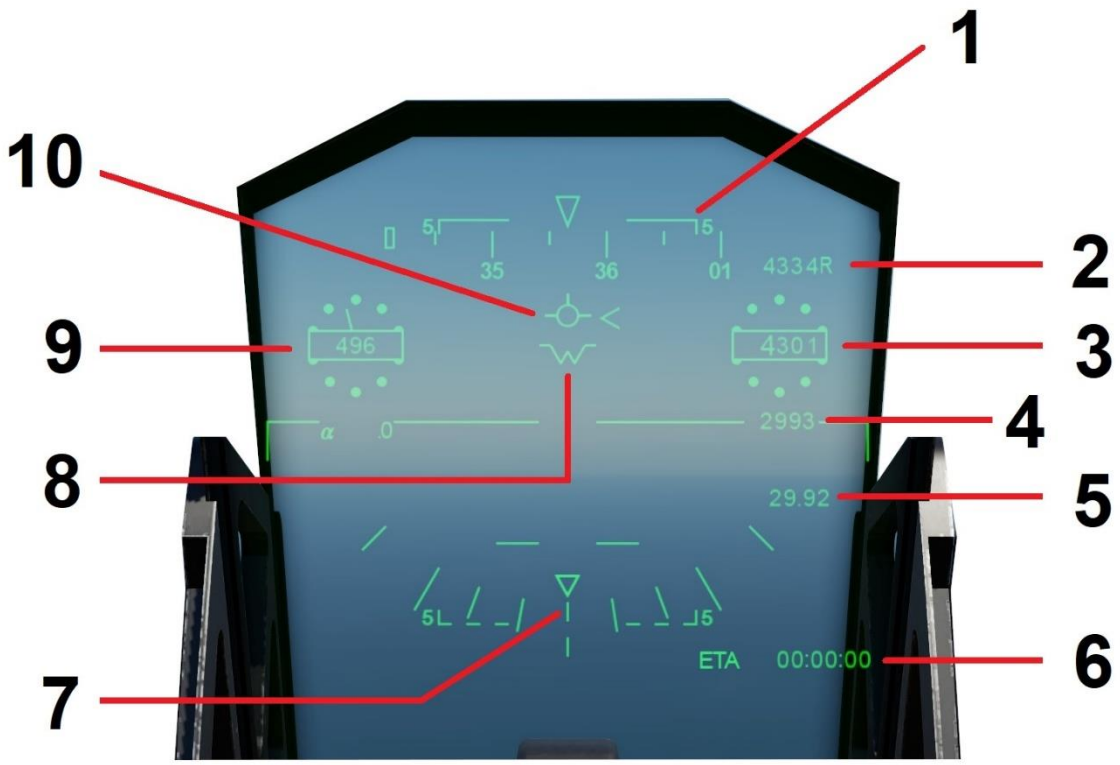
A Tour of the Cockpit

In this section of the manual, the cockpit will be broken down into distinct functional areas, and the controls that are featured in those areas will be identified and described. This will assist in locating the necessary instruments and controls later, when working through the aircraft check lists, and flying the aircraft.

Note: Not all of the functions contained within these panels are fully simulated in the X-Plane F14-D model.



1 Head Up Display



1	Pitch Scale	Indicates the current pitch-up or pitch-down angle relative to the horizon.
2	Radar Altitude	Altitude relative to the ground immediately below the aircraft (using reflected radar) This system operates only up to 5000 feet above ground level.
3	Altitude	Altitude MSL (above sea level).
4	Rate of Climb / Descent	Rate of climb / descent in feet per minute.
5	Barometric Pressure	Current altimeter barometric pressure setting.

6	**Waypoint ETA**	ETA represents NAV1 DME estimated time of arrival. When tracking a TACAN, this will display the time to the navaid.
7	**Angle of Bank Scale**	
8	**Aircraft Datum**	Represents where the aircraft is pointing (as opposed to the flight path the aircraft is actually taking, which can be different).
9	**Airspeed**	Airspeed in Knots Indicated.
10	**Flight Path Marker**	Represents the flight path the aircraft is actually taking (as opposed to where the aircraft is pointed, which can be different).

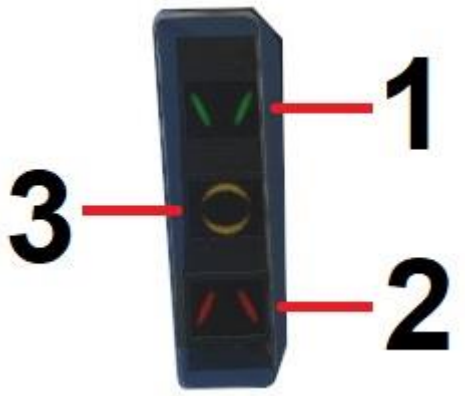
2 Angle of Attack Indicator & Master Weapons Arm Switch

The AOA indicator displays the wing angle of attack relative to the oncoming airstream. A stall reference marker is also provided.

The AOA scale from 0 to 30 units is equivalent to a range of -10 degrees to +40 degrees.

An approach reference indicator at 15 units is provided for the ideal AOA during on-speed approaches for a carrier landing.

The MASTER ARM guarded switch is used to arm the weapon systems prior to a combat scenario.



The AOA indexer operates only when the landing gear is down and provides three annunciators for rapid angle of attack guidance.

1. AOA is too high (push forward)
2. AOA is too low (pull back)
3. AOA is within desired limits

3 Wing Sweep Indicator & ACM Switch

Wing Sweep Indicator

This scale displays the angle of the variable-geometry wings relative to the oncoming airstream.

The wings are in a forward position (20°) for low-speed flight and optimum lift, and in a rearward position (68°) for high-speed flight and minimum drag.

See: Throttle Quadrant

See: Wing sweep functions:

Auxiliary Instrumentation

These instruments provide redundancy in the event the Horizontal Situation Display fails:

Vertical Speed Indicator

This instrument informs the pilot of the rate of climb, or the rate of descent, in hundreds of feet per minute.

Airspeed Indicator

This instrument displays the speed of the aircraft (in knots x 100) relative to the oncoming airstream.

Attitude Indicator

This instrument displays the attitude of the aircraft relative to the horizon. This informs the pilot whether the aircraft is flying straight, or turning, and whether the aircraft is climbing, or descending. This information is crucial in “instrument conditions” - when the outside horizon is not visible.

Altimeter

The altimeter displays the altitude above sea level. This model uses an analog representation for hundreds of feet and a digital representation for thousands of feet.

Altimeters use barometric pressure to determine altitude. As such, they must be calibrated at the start of the flight, and periodically re-calibrated during the flight, to account for the current local conditions. To calibrate this instrument, the pilot must set the published barometric pressure at his current location. This setting is also displayed here, in inches of mercury.

Radar Altimeter

This instrument displays altitude relative to the ground immediately below the aircraft (using reflected radar). The scale is non-linear, and altitude is displayed only up to 5000 feet above ground level.

When radar-altitude is not available, the ‘OFF” flag appears.

The rotary at the lower-right sets the ‘minimum altitude’ bug. When set, the pilot is reminded not to descend below this point.

Bearing Distance Heading Indicator

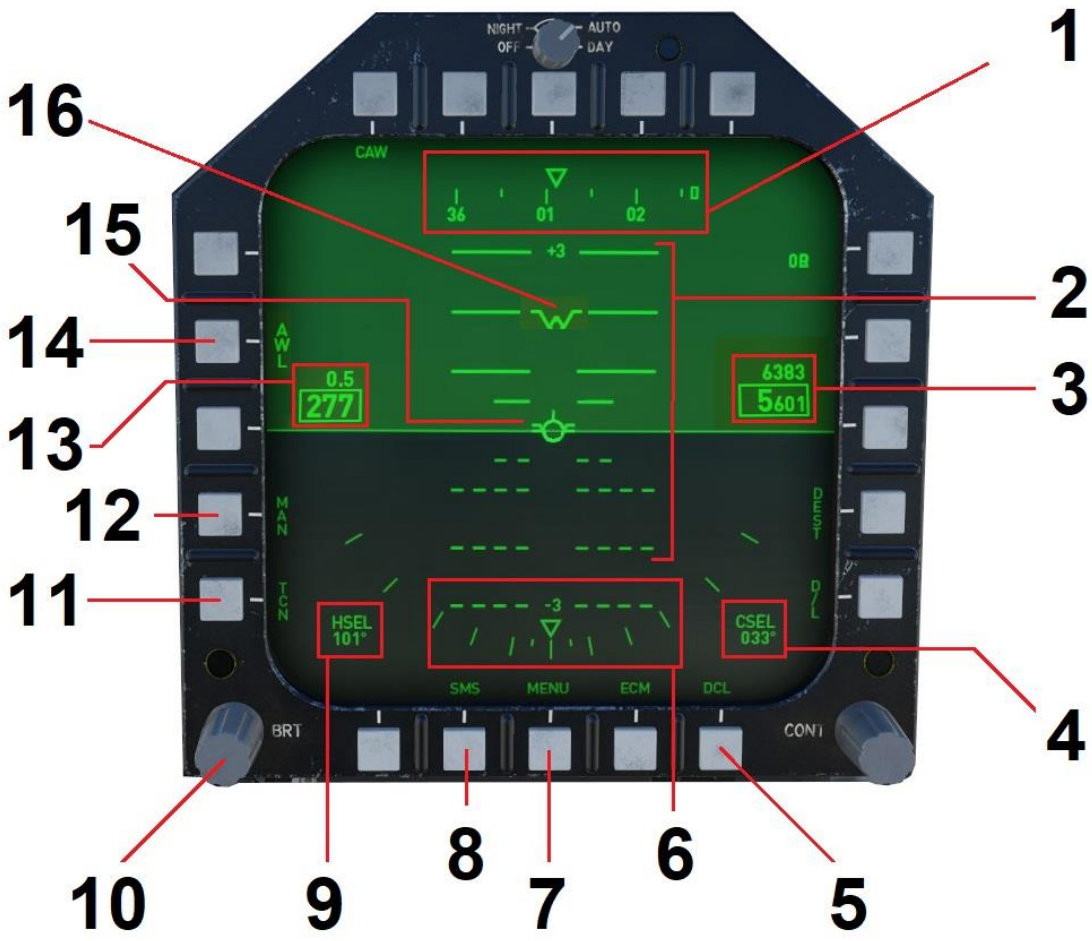
The numerical dial indicates heading. Additionally, there are two pointers, which show bearing to and from a TACAN navigational aid (when tuned).

5 Primary Multi-Function Display (MFD)

5.1 Vertical Display Indicator (VDI) Mode

VDI mode displays the attitude of the aircraft relative to the horizon. This informs the pilot whether the aircraft is flying straight, or turning, and whether the aircraft is climbing, or descending. VDI mode also displays altitude and airspeed information, and navigation aid deviation references.

To place the MFD in 'VDI' mode, select MENU / MENU2 / VDI



1	Heading Scale	
2	Pitch Scale	
3	Altitude / Rate of Climb	Pressure Altitude (feet MSL) and Rate of Climb / Descent in feet per minute.
4	Course Selection	Course selected using the CRS Rotary located on Panel 10. Also, the bearing to the navigation station currently tuned by the NAV2 radio.
5	Declutter Pushbutton	Used as a toggle to incrementally remove clutter from the currently active display mode.
6	Angle of Bank Scale	
7	Menu Pushbutton	Cycles through the available menus.
8	SMS Pushbutton	Invokes the Stores Management System which displays the remaining weapons onboard the aircraft. See: 5.3 Stores Management System (SMS) Mode
9	Heading Selection	Heading selected using the HDG Rotary located on Panel 10. Also used in conjunction with autopilot in HEADING mode. See: autopilot.
10	Display Brightness Rotary	
11	TCN Pushbutton	Displays the bearing to the TACAN or VOR station currently tuned by the NAV1 radio.
12	Manual Steering Mode Pushbutton	When in this mode, use the CRS rotary to select the desired course. The system will display a small diamond under the magnetic heading, indicating the direction to steer.
13	Airspeed	Airspeed in Knots Indicated and (above) Mach Number.
14	All Weather Landing Pushbutton	Cycles through Tactical Navigation (TACAN), ILS (instrument landing system) and ACL (automated carrier landing) modes for both the HUD and MFD. These modes present course and altitude deviation from the selected navaid station. ACL mode is selected when landing on a suitably equipped carrier (including the one featured in X-Plane). ILS mode is selected when using a standard ILS system featured on land. AWL mode provides both when available.

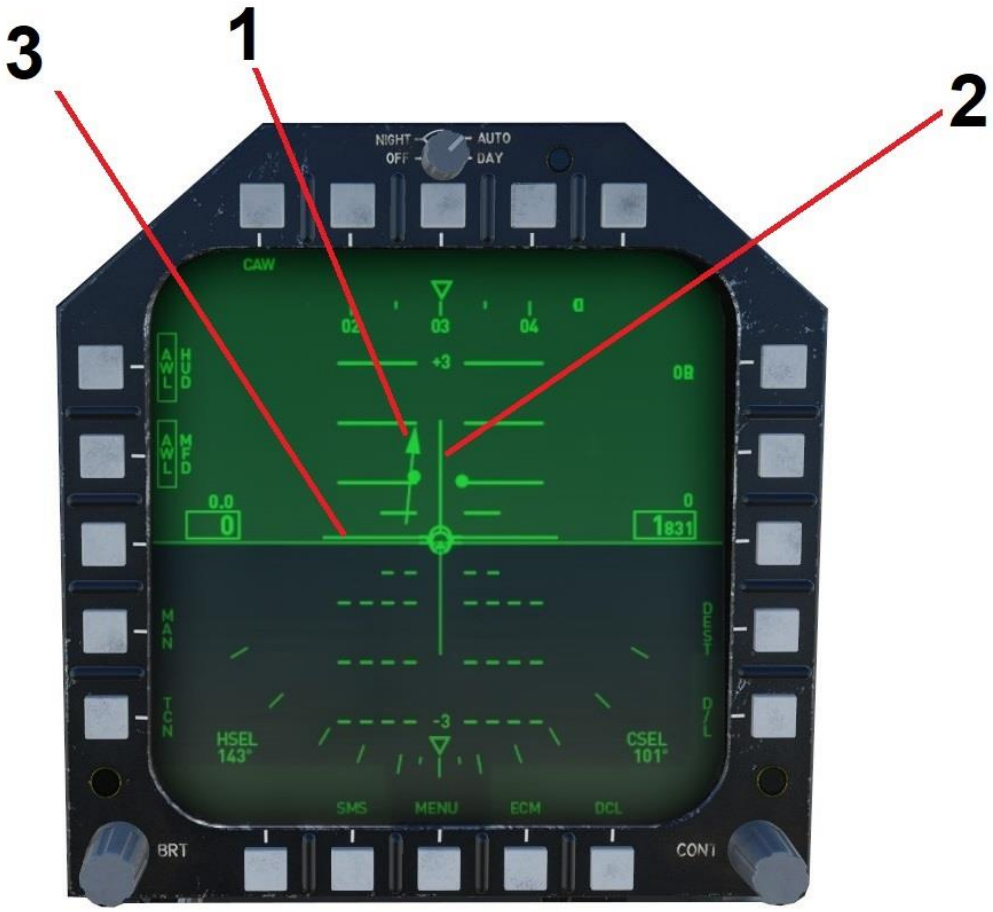
15	**Flight Path Marker**	Represents the flight path the aircraft is actually taking (as opposed to where the aircraft is pointed, which can be different).
16	**Aircraft Datum**	Represents where the aircraft is pointing (as opposed to the flight path the aircraft is actually taking, which can be different).

5.2 All Weather Landing Mode

AWL mode permits the display of TACAN navigation guidance, or localizer and glideslope indicators using either an ACL (Automated Carrier Landing) radio navaid, ILS (Instrument Landing System) or both (in AWL mode). TACAN stations are tuned using the TACAN Radio Panel (see: TACAN Radio). ACL/ILS stations are selected by dialing the appropriate channel (that corresponds to a frequency in the ara63.txt file) using the rotary on the ARA-63 nav radio (see: ARA-63 Panel).

To access this mode on the MFD, select MENU / VDI and toggle the (lower) AWL / ACL / ILS button.

To access this mode on the HUD (Head Up Display), select MENU / VDI and toggle the (upper) AWL / ACL / ILS button.

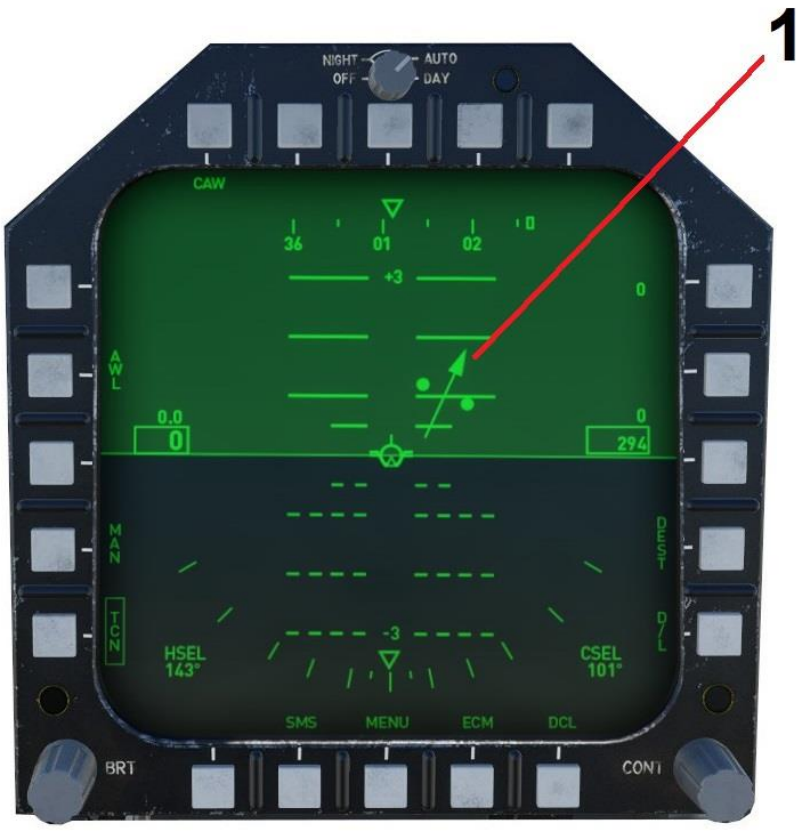


1	**TACAN Course Indicator**	Shows relative position and alignment for intercept. When the arrow is centered and pointing upwards, you are on course.
2	**ILS or ACL Localizer**	Represents horizontal deviation from approach path.
3	**ILS or ACL Glideslope**	Represents vertical deviation from approach path.

5.3 TACAN Mode

TACAN mode permits the display of TACAN navigation guidance. TACAN stations are tuned using the TACAN Radio Panel (see: TACAN Radio).

To place the MFD in 'TCN' mode, select MENU / MENU2 / VDI / TCN

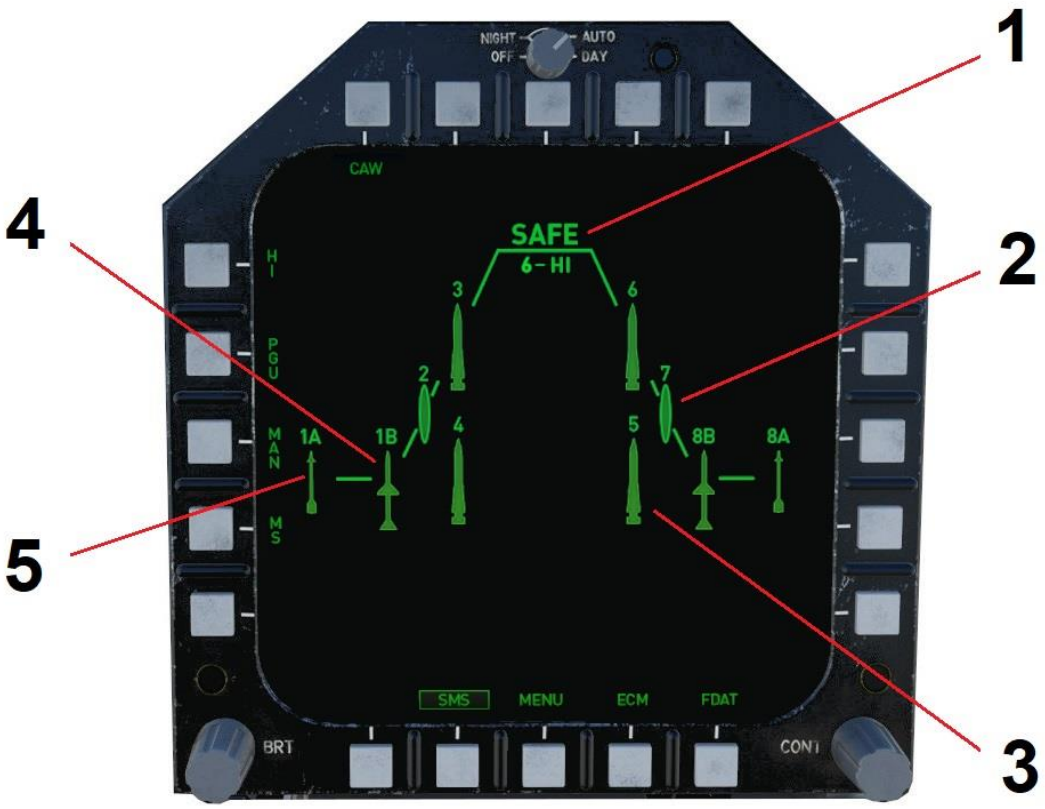


1	**TACAN Course Indicator**	Shows relative position and alignment for intercept. When the arrow is centered and pointing upwards, you are on course.

5.4 Stores Management System (SMS) Mode

SMS mode permits the crewmember to check the weapon status. This informs the pilot if the weapons are in SAFE mode, or ARMED mode, and which weapons are still present (not yet fired) in the arsenal. See: Weapons Load

To place the MFD in 'SMS' mode, select MENU / SMS



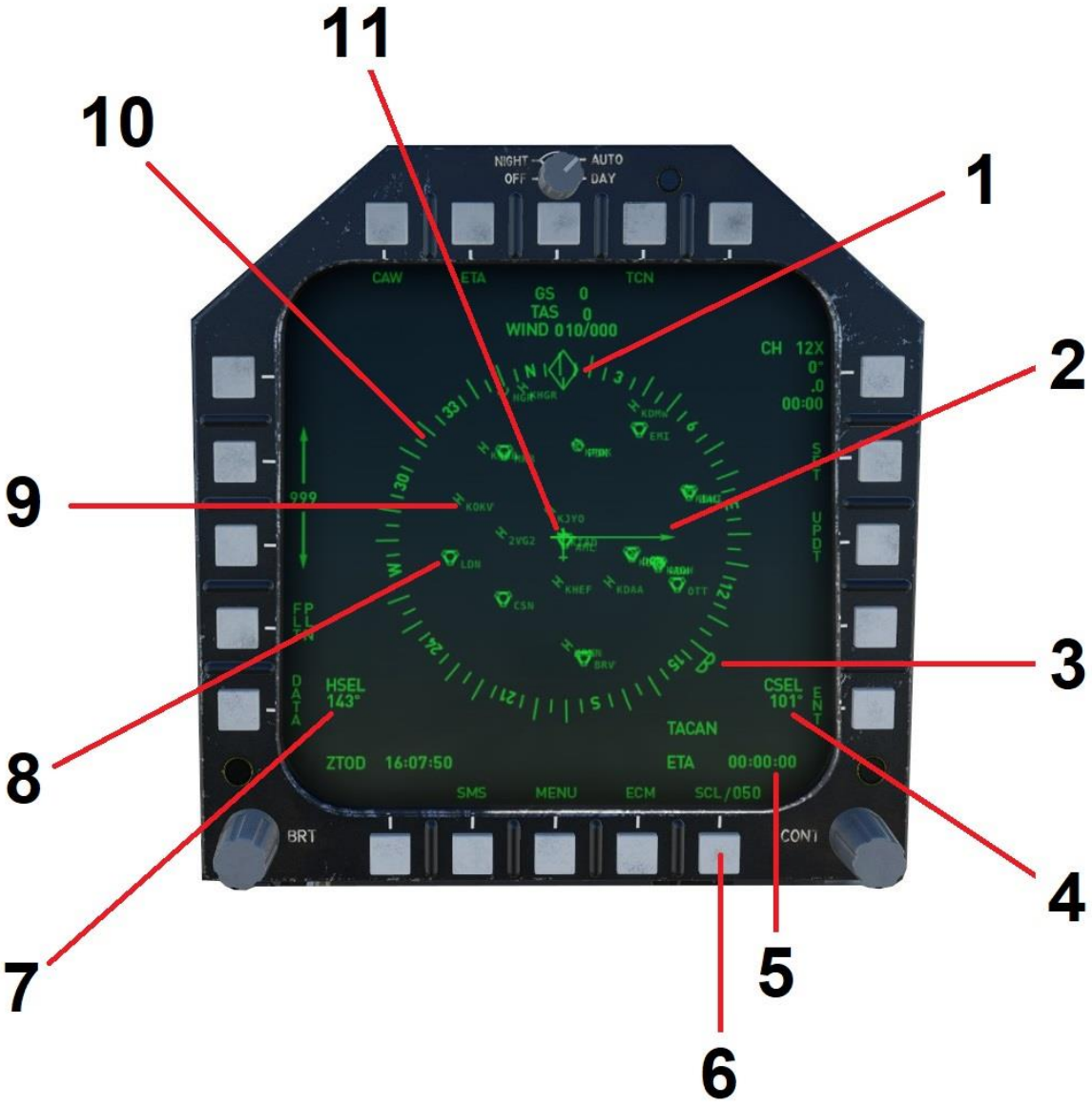
1	**Weapons Mode**	SAFE or ARMED. Weapons must be armed before they can be fired. This is controlled with a guarded switch. See: Angle of Attack Indicator & Master Weapons Arm Switch
2	**Drop (Fuel) Tank**	External (droppable) fuel tank. Each tank provides an additional 1,440 lbs. of fuel capacity.

3	**AIM 54 Phoenix Missile**	*The AIM-54 Phoenix Air Intercept Missile is an American active radar-guided, beyond-visual-range air-to-air missile. Source: Wikipedia* Use this missile for long range air-to-air combat scenarios (up to 100 miles).
4	**AIM 7M Sparrow Missile**	*The AIM-7 Sparrow Air Intercept Missile is an American medium-range semi-active radar homing air-to-air missile. Source: Wikipedia* Use this missile for medium range air-to-air combat scenarios (up to 30 miles).
5	**AIM 9M Sidewinder Missile**	*The AIM-9 Sidewinder Air Intercept Missile is a short-range air-to-air missile. Source Wikipedia* Use this missile for short range air-to-air combat scenarios (up to 2 miles).

5.5 Horizontal Situation Display (HSD) Mode

The Horizontal Situation Display presents the aircraft's position & (magnetic) heading in a plan view, as if looking down at the aircraft from directly above.

To place the MFD in 'HSD' mode, select MENU / MENU2 / HSD



1	**Current Heading**	
2	**Selected Course (Visual)**	
3	**Heading Bug**	Visual representation of the heading selection.
4	**Course Selection**	Course selected using the CRS Rotary located on Panel 10. Also, the bearing to the navigation station currently tuned by the NAV2 radio.
5	**TACAN ETA**	ETA to TACAN station (if tuned). See: ARA-63 Panel
6	**Scale (SCL) Button**	Toggles the display range (10 NM thru 100 NM)
7	**Heading Selection**	Heading selected using the HDG Rotary located on Panel 10. Also used in conjunction with autopilot in HEADING mode. See: Autopilot
8	**TACAN or VOR station**	
9	**Airport**	
10	**Compass Rose**	
11	**Current Position**	

Secondary Multi-Function Display (MFD)

Identical in function to Primary MFD. Provides parallel capability and redundancy. See: Multi-Function Displays (MFD)

7 VHF / UHF Indicator Panel

This panel provides reference information only.

The first frequency displayed is that currently selected using the VHF Radio

The remaining frequencies displayed are just for aesthetic purposes and have no function.

Left Vertical Panel

Landing Gear & Flap Indicator

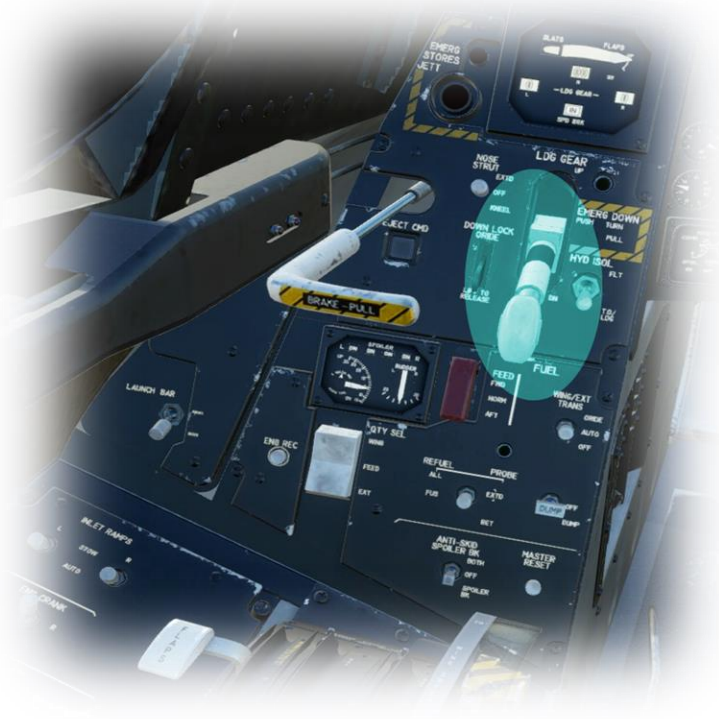
Flaps deployed / Gear down:

Flaps retracted / Gear up:

Parking Brake Lever

Use this level to engage / disengage the parking brakes. The braking force is proportional to the level position.

Place the lever full rearward for maximum parking brake application. Place the lever full forward to disengage the parking brakes.



Landing Gear Lever

Use this level to retract and deploy the landing gear.

Place the lever in the up position to retract the gear.

Place the lever in the down position to deploy the gear.

See: Landing Gear & Flap Indicator

Spoiler, Flap and Pitch Trim Indicator

Spoilers partially deployed / Pitch trim neutral, Rudder trim neutral:

Spoilers fully deployed / Pitch trim up 10 degrees, Rudder trim left 10 degrees:

Fuel Feed (Guarded) Switch

This switch controls from which tank(s) the fuel is sourced.

NORM:

Fuel is sourced from both the forward and aft tanks.

FWD:

Fuel is sourced from the forward tank only.

AFT

Fuel is sourced from the aft tank only.

Refueling Probe Activation Switch

This switch deploys the receptor probe for in-flight refueling.

RET:

Retracts probe.

FUS EXTD:

Extends probe. Fuel is transferred to fuselage tanks only.

ALL EXTD:

Extends probe. Fuel is transferred to all tanks.

Fuel Dump Switch

Place switch in DUMP position to initiate dumping of all INTERNAL fuel tanks in the event of an emergency.

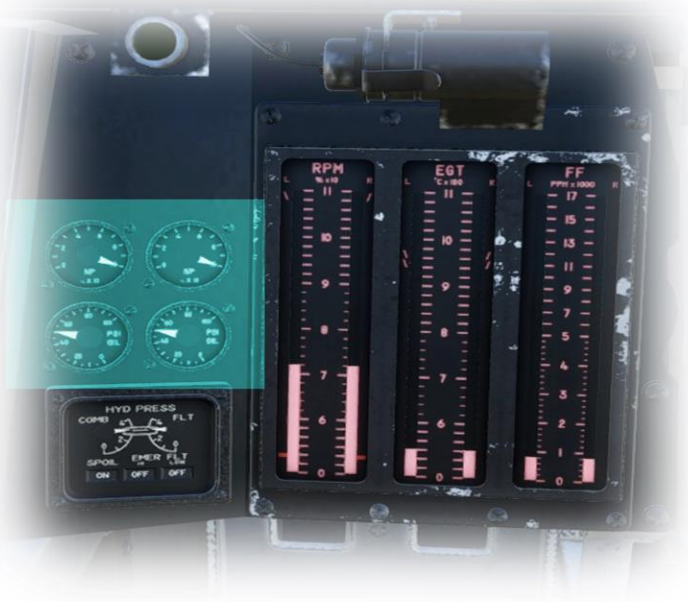
Note: Fuel dumping does not include the external tanks, which can be dropped if required. Bind a joystick button to “Drop all drop tanks” to facilitate this.

Anti-Skid / Spoilers

Place switch in the BOTH position to activate anti-skid braking and arm the spoilers (speed brakes) which will deploy on touchdown.

Place switch in the SPOILER position to just arm the spoilers.

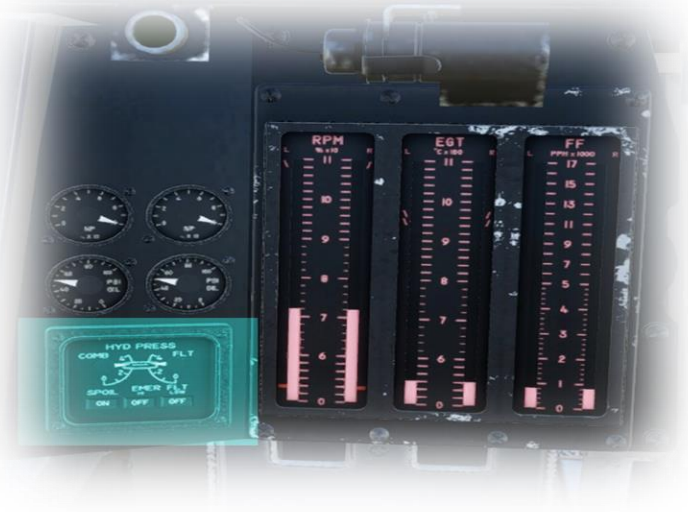
Engine Indicators Panel



Exhaust Nozzle & Oil Pressure Gauges

The gauges designated ‘NP’ indicate the position of the exhaust nozzles that channel the thrust exiting the engines. The shape of the nozzles is controlled automatically from 0% (most closed position) to 100% (most open position).

The gauges designated ‘PSI’ indicate the oil pressure in the left and right engines respectively, in PSI (Pounds per square inch). Normal range is 25 PSI to 65 PSI.



Hydraulic Pressure Gauges

These gauges show the combined hydraulic pressure and flight-system (only) hydraulic pressure. The scales range from 0 to 4,000 PSI. Normal range is 3,000 PSI.

The flags below indicate if hydraulic pressure is available to the spoilers, and whether the emergency flight-system hydraulic pump is operating (in either High or Low power mode).

Engine RPM Indicators

Displays the Revolutions Per Minute (RPM) for the left and right engines respectively.

Engine Exhaust Gas Temperature Indicators

Displays the Exhaust Gas Temperature (degrees Celsius x 100) for the left and right engines respectively.

Engine Fuel Flow Indicators

Displays the rate that fuel is flowing (lbs. per hour x 1000) into the left and right engines respectively.

10 Weapons Inventory Panel

Missile Inventory

Displays the missiles currently on-board the aircraft:

SW	-	Sidewinder
SP	-	Sparrow
PH	-	Phoenix

Heading and Course Selection Rotaries

HDG:

Controls the heading bug when the MFD is in ‘HSD’ mode.

CRS:

Controls the selected course displayed on the MFD when in ‘HSD’ mode.

Brake Pressure Gauge

PARK:

Available brake pressure in the parking brake accumulator.

AUX:

Available brake pressure in the wheel brake accumulator.

11 Fuel Indicator Panel

BINGO Fuel:

Use the adjacent rotary to set the BINGO fuel amount. This is the minimum fuel that must remain onboard to return from the mission safely.

When the total fuel remaining drops below this value, the BINGO annunciator will illuminate.

TOTAL Fuel:

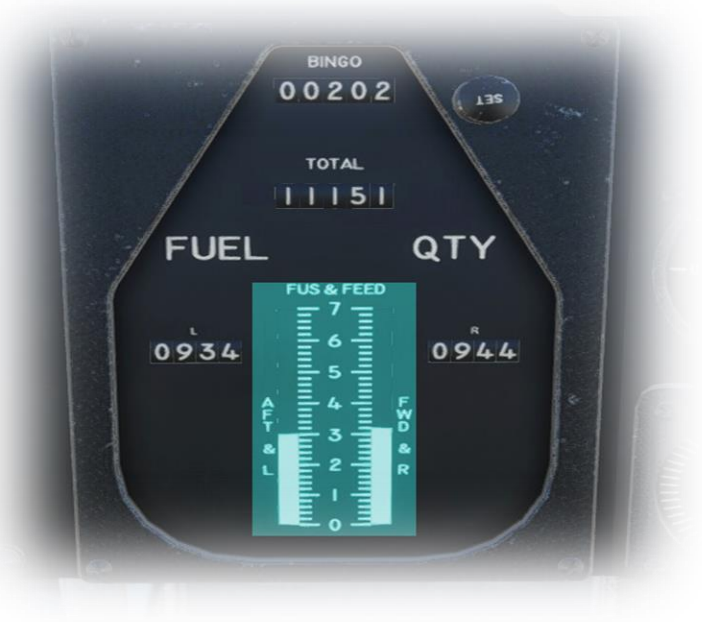
Indicates the total fuel on board in lbs. This is all internal and external tanks combined.

LEFT-SIDE Fuel:

Indicates the combined fuel in Box Beam L and Cell 3.

RIGHT-SIDE Fuel:

Indicates the combined fuel in Box Beam R and Cell 4.



FUS & FEED:

The left tape indicates the sum of the following tanks…

Box Beam Left;
Cells 3,5,6,7,8;

The right tape indicates the sum of the following tanks…

Box Beam Right;
Cells 1,2,4;

12

Display Control Panel

Tow Hook Lever:

Use this lever to deploy and retract the rear-mounted arrestor-hook. This is used in conjunction with the arresting cables on aircraft carrier decks to prevent the aircraft from overshooting the deck on landing.

HUD Format Switch:

ANLG:

Selects analog display format for airspeed and altitude.

DGTL:

Selects digital display format for airspeed and altitude.

BOTH:

Both formats are displayed.

HUD Declutter Switch:

NORM:

All information is displayed in the HUD.

LVL1 and LVL2:

Control the level of HUD declutter in effect.

HUD Power Switch:

ON:

HUD is displayed.

OFF:

HUD is not displayed.

HUD and MFD Display Mode Pushbuttons:

A/A:

Places the HUD and MFD in ‘Air to Air’ mode for optimal presentation of information during aerial combat.

A/G:

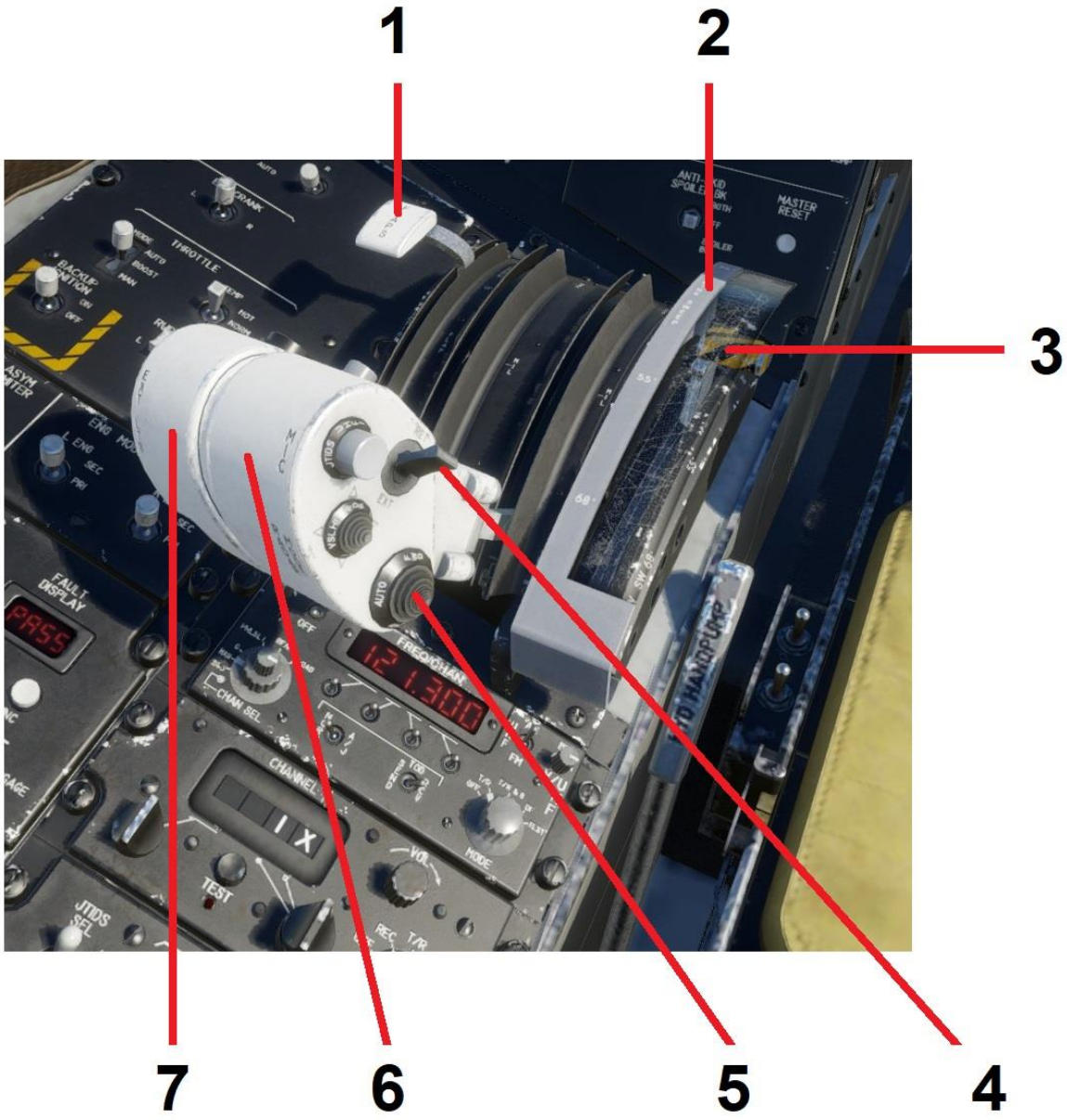
Places the HUD and MFD in ‘Air to Ground’ mode for optimal presentation of information during ground targeting scenarios.

TLN:

Places the HUD and MFD in ‘Air to Air’ mode for optimal presentation of information for take-off, landing and navigation.

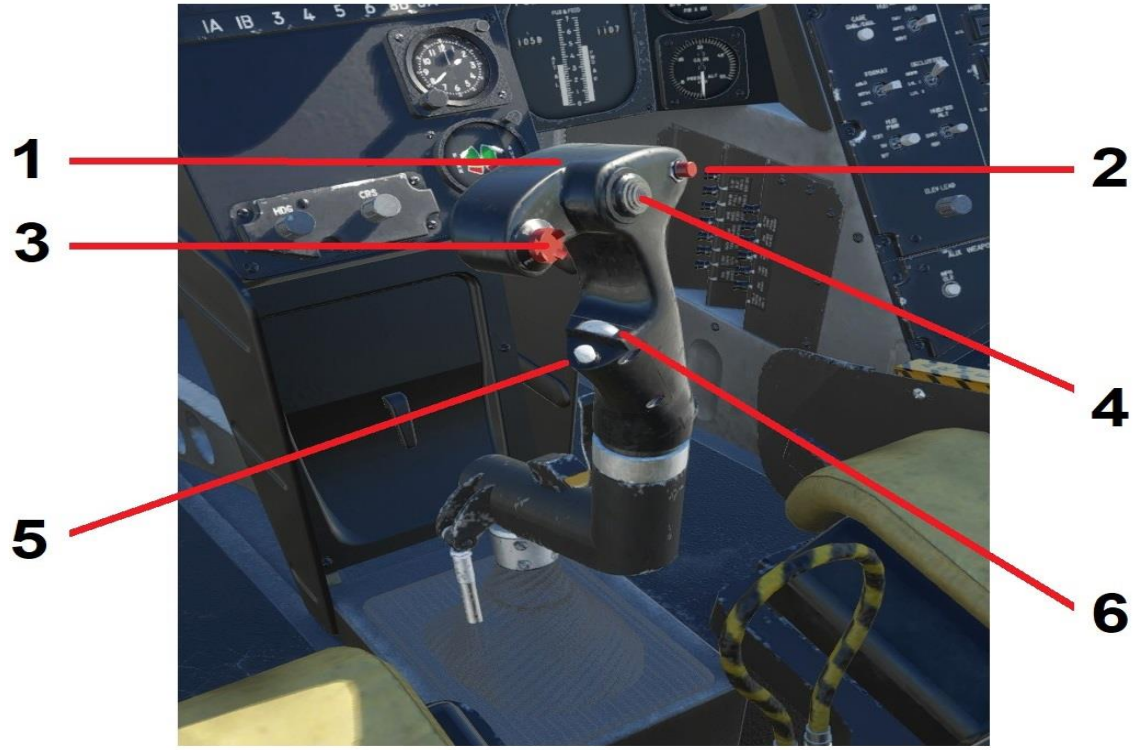
13

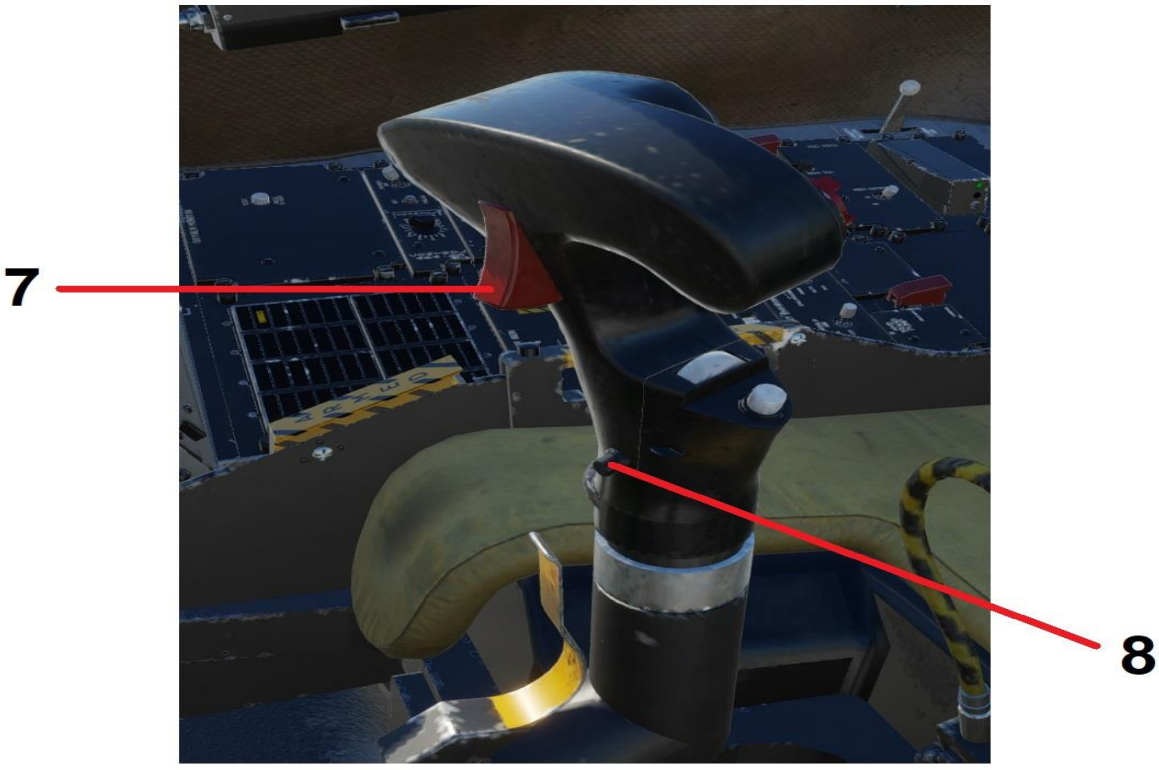
Throttle Quadrant



1	**Flap Lever**	Deploys or retracts the flaps. Maximum flap angle is 35 degrees. Flap position is proportional to lever position. There are no preset detents. Move lever forward to retract flaps. Move lever rearward to deploy flaps.
2	**Wing Sweep Lever Guard**	Guards the wing sweep lever. Lift to gain access to the wing-sweep lever, for emergency manual operation.
3	**Wing Sweep Lever**	Normal wing sweep operation is automatic, or manually set by the pilot using the wing sweep mode switch on the right-throttle (see 5). Forced manual operation of the wing sweep may be achieved by lifting this guard and moving the lever manually.
4	**Speed brake switch**	Deploys or retracts (wing-mounted) speed brakes. Press and hold in the EXT position to extend the speed brakes gradually until desired (or full) deployment is achieved. Place in RET position to fully retract speed brakes.
5	**Wing Sweep Mode switch**	This four-way switch is used to place the wing-sweep system into the following modes: AUTO – normal operation BOMB – set to 55 degrees for optimal stability during bomb operations FWD – Press and hold to move wing-sweep forward until desired position is achieved. See: Wing Sweep Indicator & ACM Switch AFT – Press and hold to move wing-sweep rearward until desired position is achieved. See: Wing Sweep Indicator & ACM Switch
6	**Right Engine Throttle**	
7	**Left Engine Throttle**	

14 Flight Stick





1	**Flight Stick**	Roll and pitch.
2	**Bomb Release Button**	Bombs not currently supported.
3	**Weapon Select Switch**	Four-way switch used to select active weapon: SW - Sidewinder SP - Sparrow PH - Phoenix GUN - 20mm Cannon See: 5.4 Stores Management System (SMS) Mode
4	**Pitch & Roll Trim**	Four-way switch: UP - Pitch Trim Down DOWN - Pitch Trim Up LEFT - Roll Trim Left RIGHT - Roll Trim Right
5	**Deploy Flare Button**	Deploys flare to decoy enemy heat-seeking missiles.
6	**Flap Command Wheel**	Not modeled.
7	**Forward Weapon Firing Trigger**	Fires currently active weapon. See: (3)
8	**Nosewheel Steering Toggle Button**	

Left Lower Panel

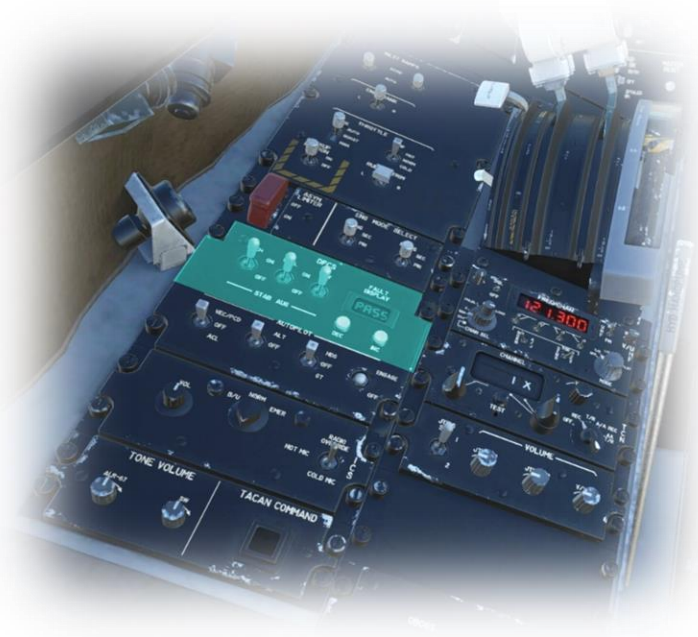
ENG Crank Switch

Routes pressurized air from an outside source to the selected engine for startup.

See: Cold and Dark to Engine Start

Rudder Trim Switch

Click left or right to adjust the rudder trim in corresponding direction. Click and hold for large trim adjustments.



Digital Flight Control System

The Digital Flight Control System was retro-fitted to F-14D aircraft to protect against unrecoverable flat spins and carrier landing mishaps.

This system applies augmented inputs to the flight control surfaces to improve stability in each of the selected axes. (pitch, roll and yaw).

Autopilot

See: Autopilot

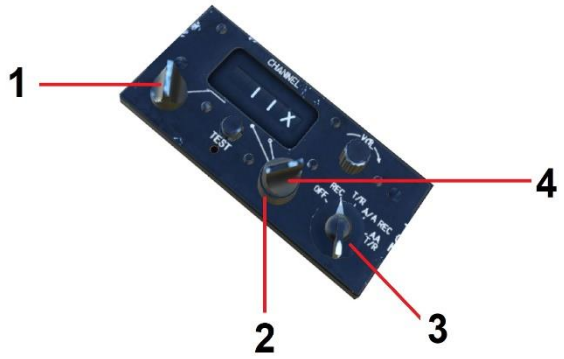
VHF Radio

Used to transmit and receive on VHF frequencies, including ATC and ATIS.

1: Volume control rotary. Adjusts the loudness of VHF radio reception.

2: Frequency Select Switches. Used to tune the radio to the desired frequency. Move the switch up or down to increment/decrement the portion of the digital frequency marked above that switch.

3: Mode rotary. Only two modes are supported – OFF and T/R (Transmit and Receive).



TACAN Radio

TACAN (Tactical Air Navigation System) is a navigation system originally designed for naval aircraft to acquire moving landing platforms, and later expanded for other military applications. TACAN provides the user with bearing and distance (slant-range or hypotenuse) to a ground or ship-borne station. Source: Wikipedia

1: Channel selection rotary (left digit).
2: Channel selection rotary ('X' or 'Y').
3: Mode Rotary ('OFF' or 'REC' [Receive]).
4: Channel selection rotary (right digit).

Note: In X-Plane, the carrier and frigate broadcast on TACAN channels 88X and 90X respectively.

Lower Right Panel

Generators Control Panel

The F-14D features two generators that convert rotational momentum in the engines into a/c electrical power for the aircraft batteries and systems.

These switches activate the generators.

In normal operation, both generators would be used, unless the L GEN or R GEN annunciator is lit, in which case the pilot would turn off the affected generator.

Environmental Panel

This panel features the environmental control and cabin pressurization dump switches.

CABIN PRESS:

Set to ‘NORM’ to maintain a cabin pressure of 8,000 feet. Set to ‘DUMP’ in the event there is a need to depressurize the cockpit.

AIR SOURCE:

These buttons control the source of engine surplus (bleed) air pressure that will power the environmental control system. Use the ‘BOTH ENG’ option by default. Select another option in the event one or both engines are malfunctioning.

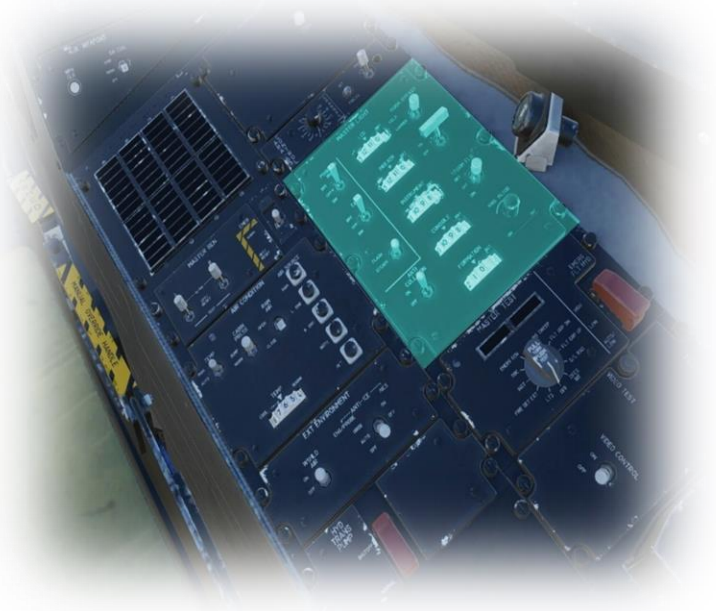
ARA-63 Panel

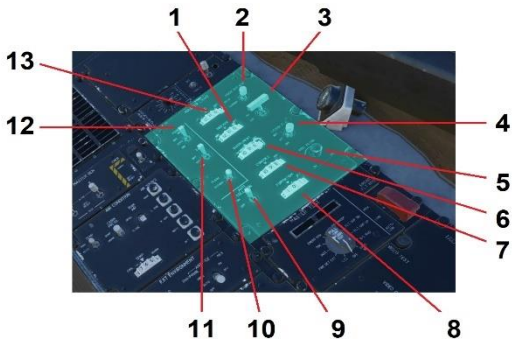
See: Navigation station frequencies

The ARA-63 is a microwave landing system that provides precise guidance information necessary for precision aircraft carrier landings.

To use this system for a carrier approach in X-Plane, place the power switch in the ON position, and select channel 1X using the adjacent rotary.

Localizer and glideslope deviation will be displayed on the MFD when in All Weather Landing Mode





9: External anti-collision light switch. These are the rotating red bacons on the tail assembly.

10 / 11: Not modeled.

12: External position lights switch. These are the red, green and white lights on the wingtips and tail assembly respectively.

13: Brightness of the missile inventory display. See: Missile Inventory

1: Brightness of angle of attack display rotary.

2: Set to CARRIER for arrested landings. If the arrester hook is not deployed, the (external) nosewheel approach lights and (cockpit) angle of attack indicator will flash as a warning.

3: (Nosewheel) taxi lights switch.

4: (Cockpit) white flood lighting switch.

5: (Cockpit) night vision flood lighting intensity rotary.

6: Brightness of instrument backlighting rotary.

7: Brightness of (external) green formation lights rotary. These lights assist with close proximity formation flying.

8. Brightness of lower-left / lower-right panel back lighting.

External Environmental Panel

This panel features controls for managing external ice on the windshield and pitot probe.

WSHILD AIR:

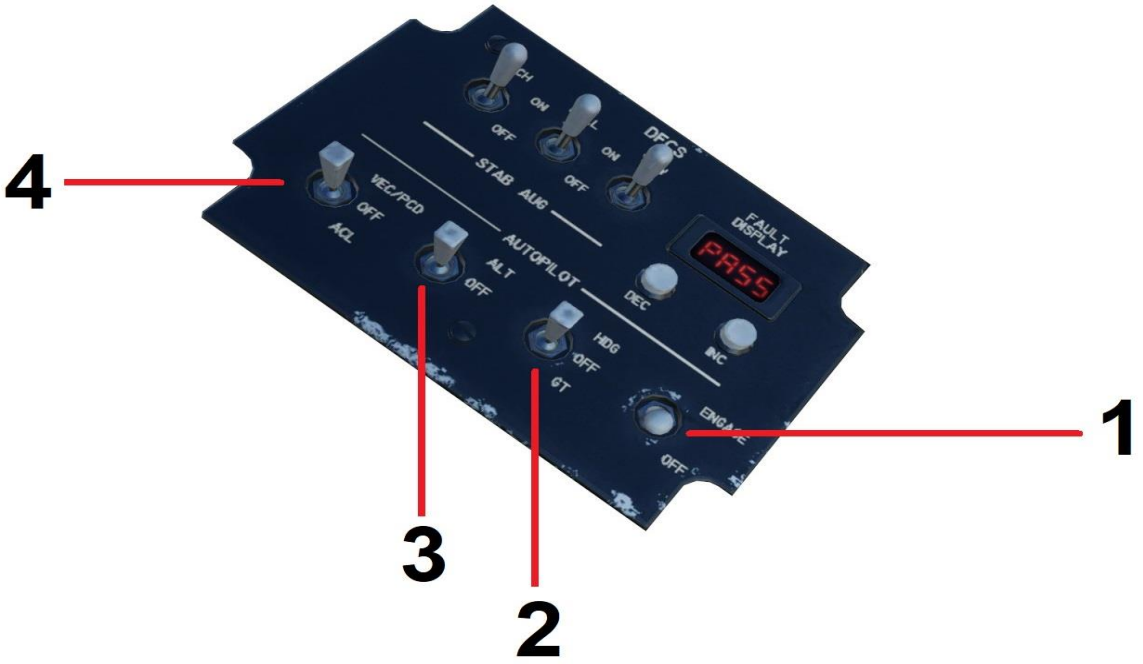
Set to ‘ON’ to direct compressor bleed air to the external face of the windshield for de-icing.

ANTI-ICE:

Set to ‘AUTO’ to activate pitot-static probe only when there is no weight on the wheels.

Set to ‘ON’ to activate pitot-static probe anti-icing independent of weight on wheels.

Autopilot



1	**Engage Switch**	Activates autopilot. Current attitude must be within 30 degrees of pitch up or down. And 60 degrees roll left or right. For the autopilot to function. all three stability augmentation axes (circled) must be set to ON.
2	**Heading Hold**	Steps: • A/P Switch to “ENGAGE”. • HDG-OFF-GT Switch to HDG. • Use the control stick to maneuver to the desired heading. • Release the control stick when the aircraft bank angle is less than ±5 degrees. To change, roll the aircraft to the new desired heading using a bank angle of greater than ±5 degrees, then release the control stick when the aircraft bank angle is less than ±5 degrees.

3	**Altitude Hold**	Steps: • A/P Switch to “ENGAGE”. • ALT-OFF Switch to ALT • Maneuver to the desired altitude. • When the A/P REF message appears on the MFD (upper left), press the nose wheel steering push button on the control stick, or use ‘toggle nosewheel’ key bind • Altitude Hold mode should engage and the A/P REF message will turn off. To change altitude at this point simply use the control stick to maneuver up or down … The A/P REF message will re-appear. Press the nose wheel steering push button on the control stick when at the desired altitude. The A/P REF message turns off and Altitude Hold Mode is engaged.
4	**VEC PCD / ACL**	**Automatic Carrier Landing (ACL)** (on final approach to carrier) Steps: • A/P Switch to “ENGAGE”. • Select ACL • When the A/P REF message appears on the MFD (upper left), press the nose wheel steering push button on the control stick, or use ‘toggle nosewheel’ key bind • Follow ATC instructions to correct for power as needed

Checklists

Disclaimer:

The following check lists are designed with the convenience of the simulation pilot in mind and customized to the X-Plane F14 aircraft. These may differ from those of the real aircraft.

Cold and Dark to Engine Start

REQUEST GROUND SERVICE

GPU – TOGGLE ON

(Use key bind)

BLEED AIR – TOGGLE ON

(Use key bind)

MFD1 – POWER ON

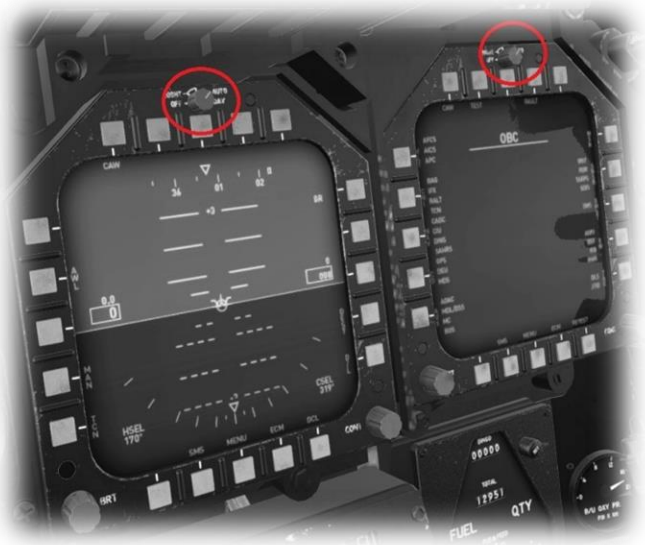
MFD1

- MENU
- VDI

MFD2 – POWER ON

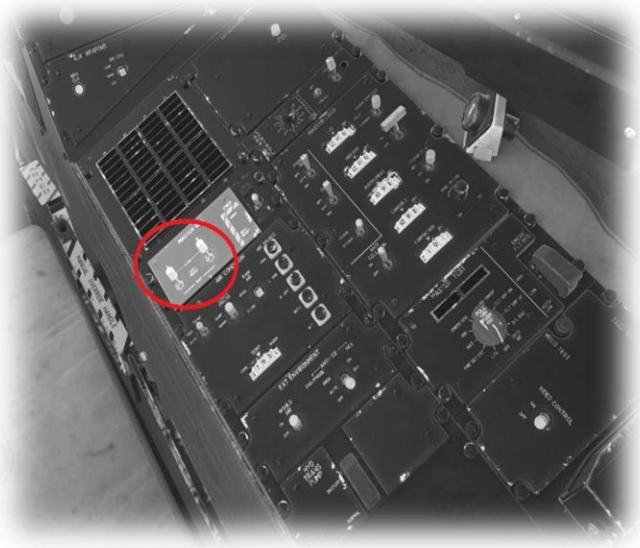
FUEL PUMPS – TOGGLE ON

(Use key bind)



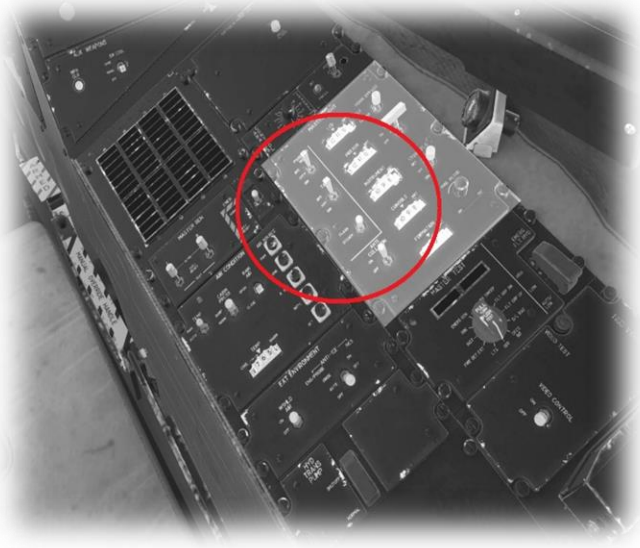
LEFT GENERATOR – ON

RIGHT GENERATOR – ON



EXTERNAL LIGHTS

– AS REQUIRED



THROTTLES

– ADVANCE TO IDLE

(away from OFF position)

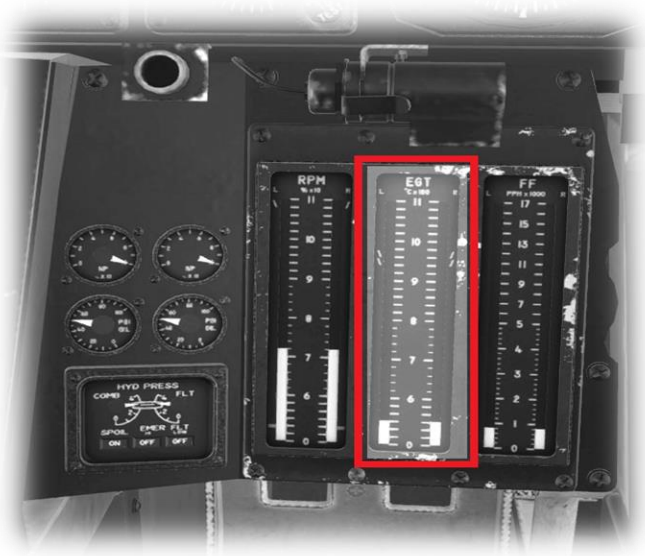
LEFT ENGINE - CRANK

EXHAUST GAS TEMPERATURE

- MONITOR LEFT ENGINE

CRANK SWITCH

- WAIT FOR AUTO RETURN TO NEUTRAL POSITION



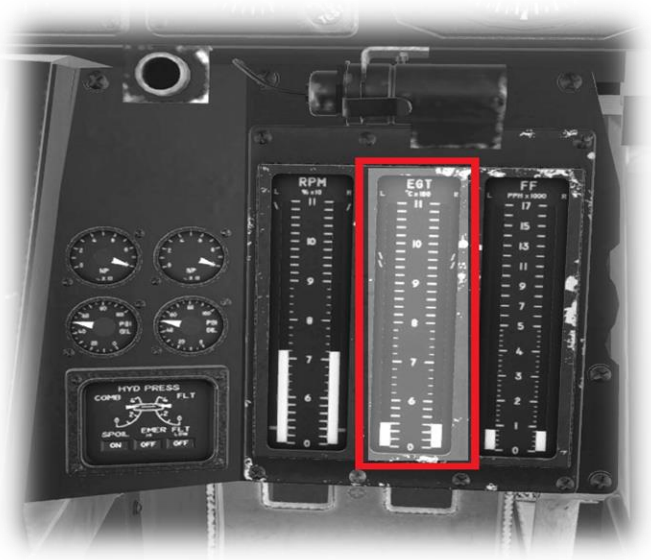
RIGHT ENGINE - CRANK

EXHAUST GAS TEMPERATURE

- MONITOR RIGHT ENGINE

CRANK SWITCH

- WAIT FOR AUTO RETURN TO NEUTRAL POSITION

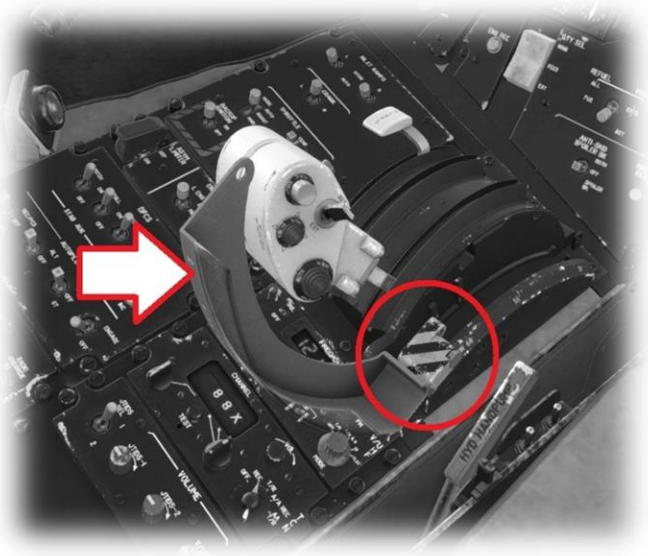


Before Taxi

WING SWEEP GUARD – UP

WING SWEEP LEVER – OV

(full rearward position)



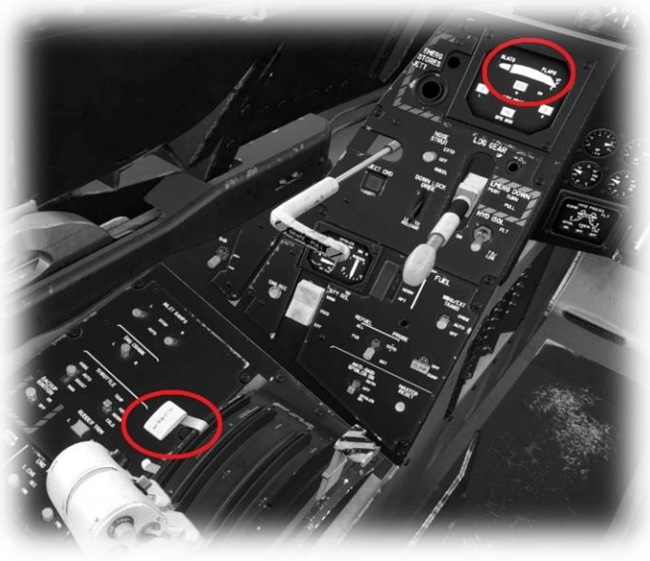
ANTI-SKID – OFF

NOSEWHEEL STEERING

- TOGGLE ON

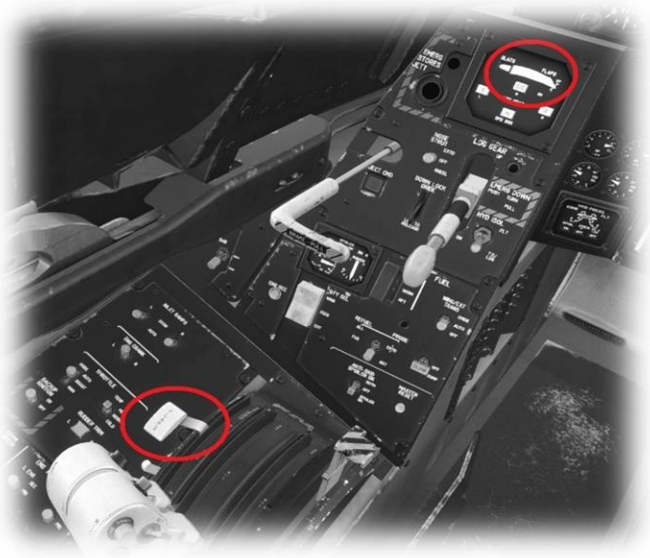
(Use key bind)

FLAPS – 50 PERCENT



PARKING BRAKE

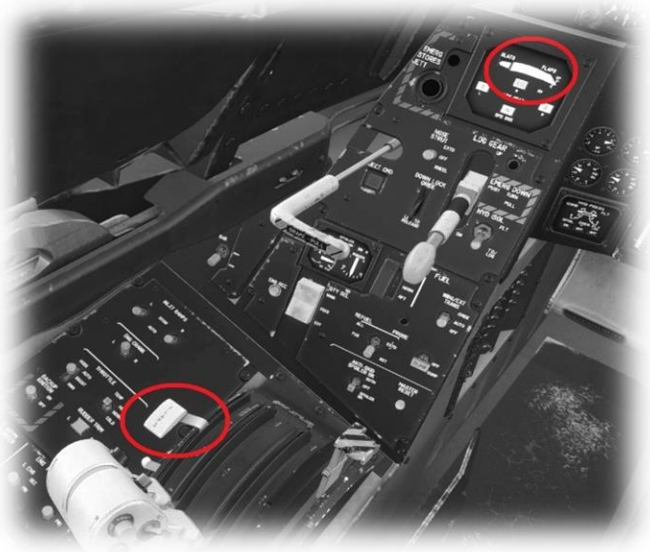
- OFF



Before Takeoff

PARKING BRAKE

- ON



WING SWEEP GUARD

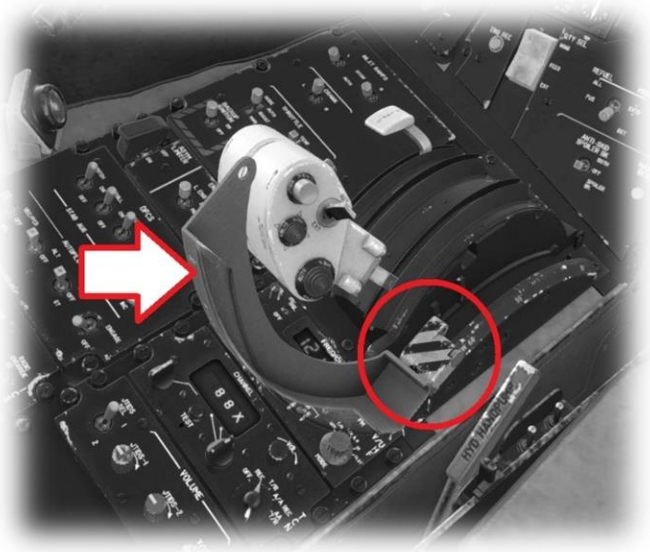
- UP

WING SWEEP LEVER – 20°

(full forward position)

WING SWEEP GUARD

- DOWN

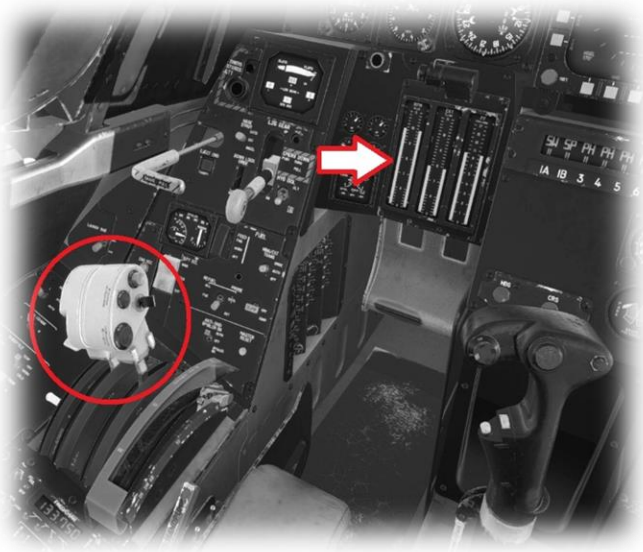


ANTI-SKID – BOTH

PITCH TRIM – 2° POSITIVE

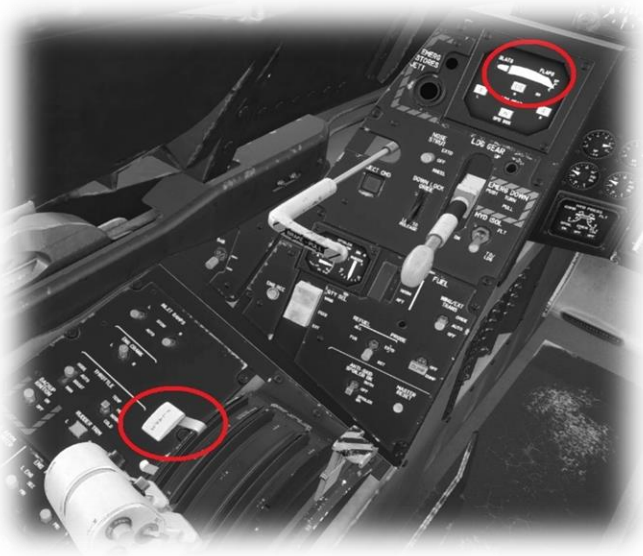
THROTTLES

– ADVANCE UNTIL RPM REACHES 95 %



PARKING BRAKE

- OFF



AT 100 KIAS

NOSEWHEEL STEERING

- TOGGLE OFF

(Use key bind)

AT 150 KIAS

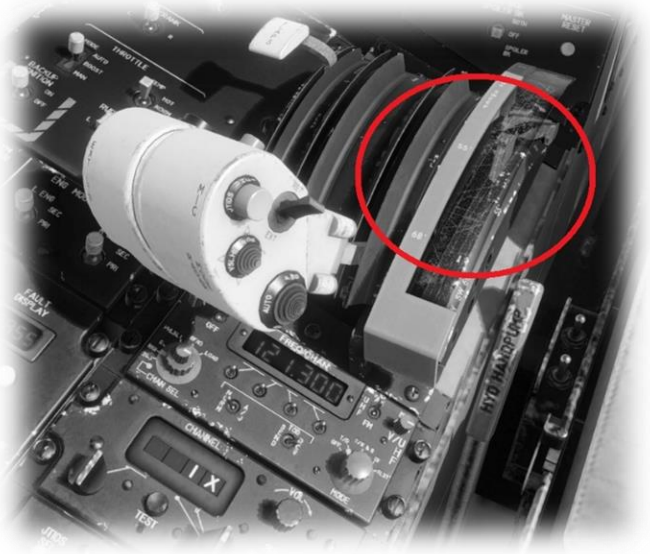
- ROTATE

After Takeoff

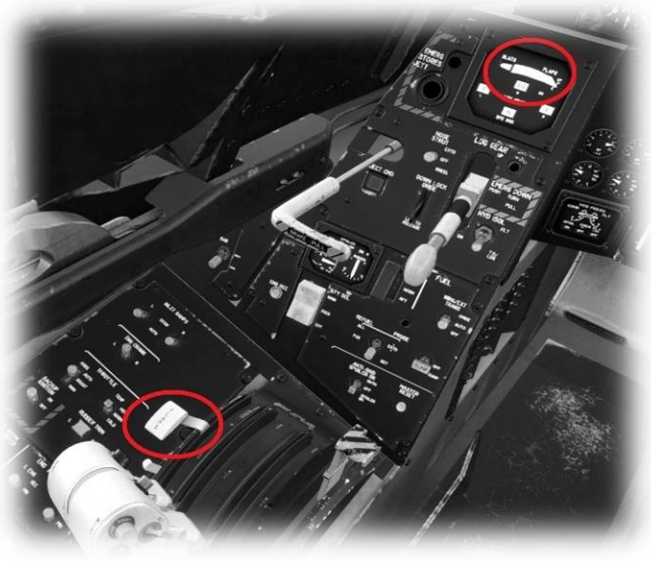
LANDING GEAR - UP

WING SWEEP – AUTO ON

(Use key bind)



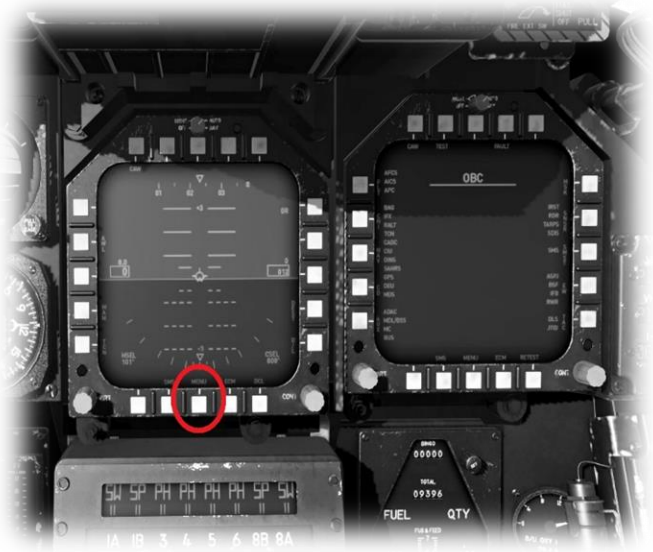
FLAPS – RETRACT



Before Landing

MFD1

- MENU
- VDI

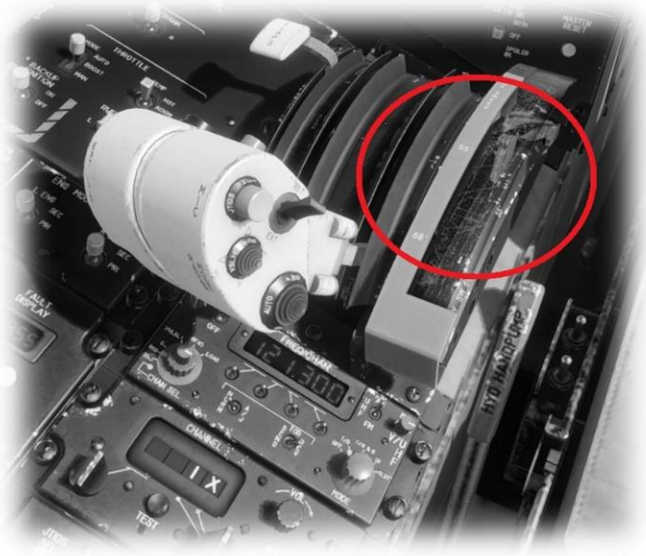


SPEEDBRAKES

- ARM

WING SWEEP - AUTO

(Use key bind)

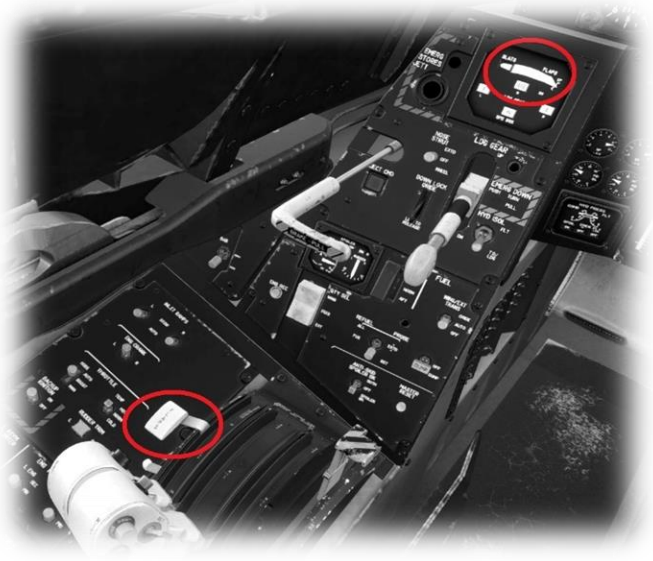


AT 250 KIAS

LANDING GEAR - DOWN

AT 220 KIAS

FLAPS – EXTEND FULL



After Landing

AT 100 KIAS

NOSEWHEEL STEERING

- TOGGLE ON

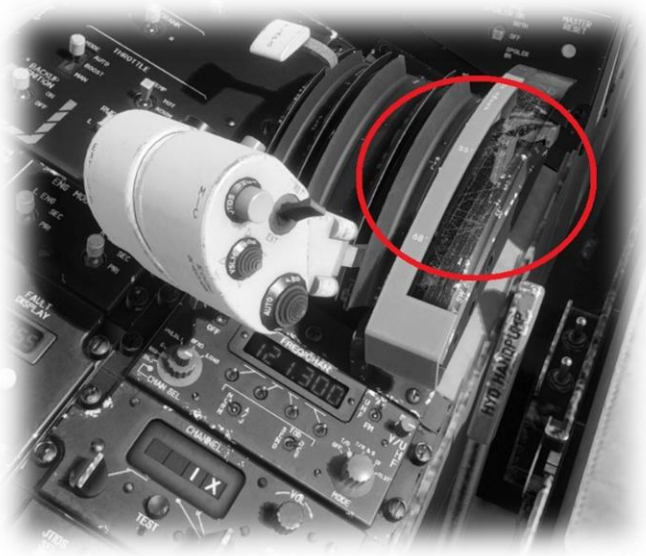
(Use key bind)

BRAKES

- AS REQUIRED

WING SWEEP – AUTO OFF

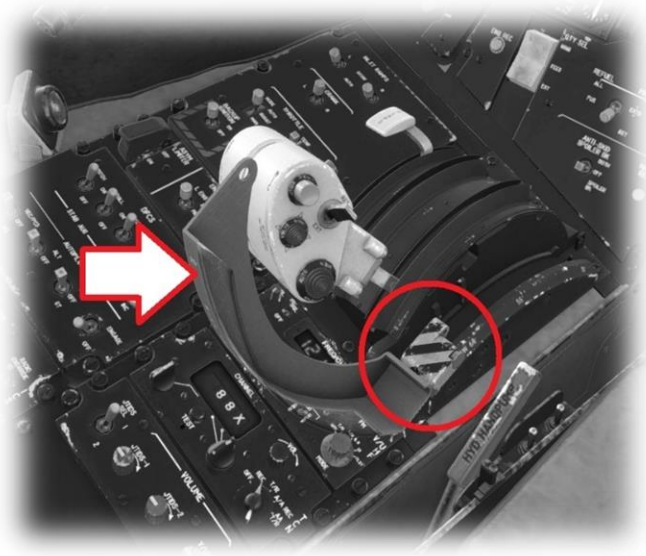
(Use key bind)



WING SWEEP GUARD – UP

WING SWEEP LEVER – OV

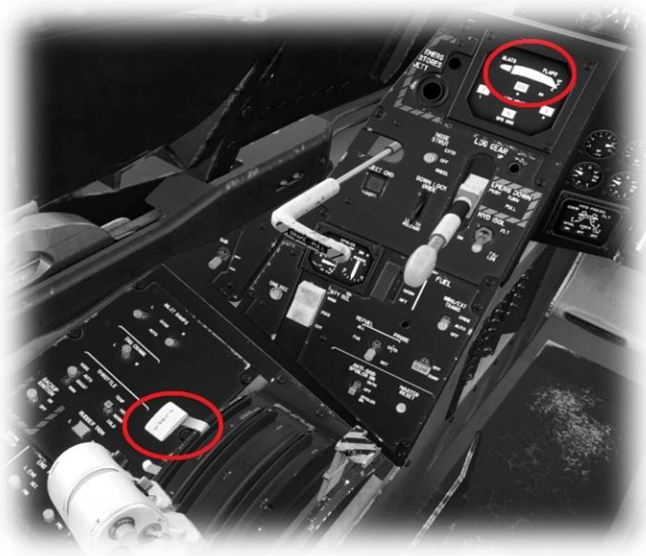
(full rearward position)



SPEEDBRAKES

- OFF

FLAPS – RETRACT



Shut Down

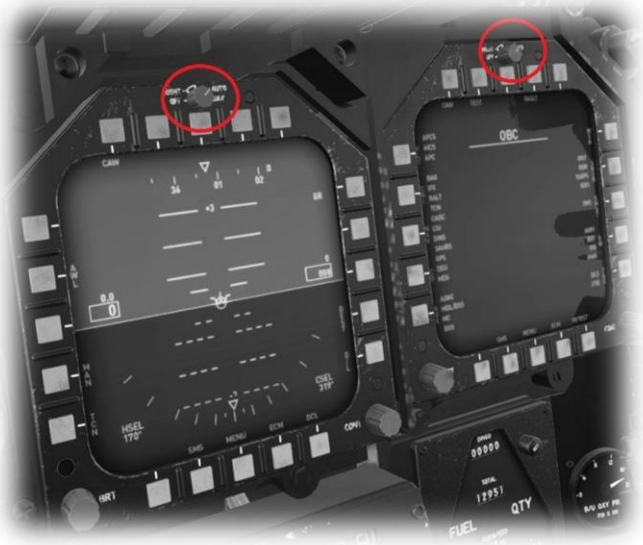
FUEL PUMPS

- TOGGLE OFF

(Use key bind)

MFD1 – POWER OFF

MFD2 – POWER OFF



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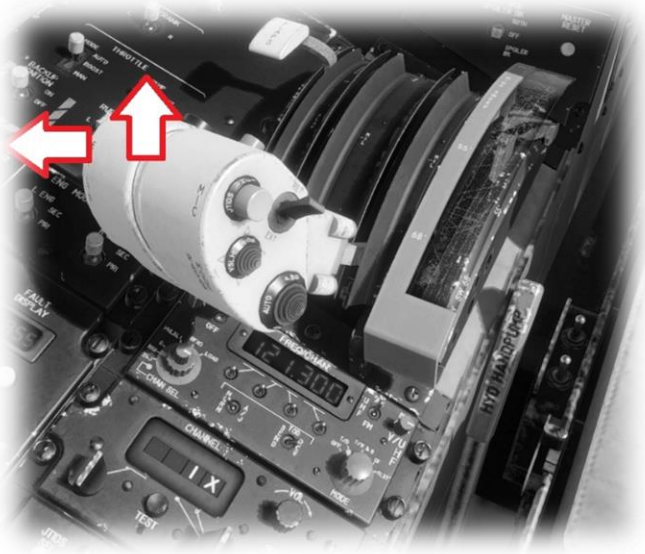
THROTTLES

- LIFT TOGETHER AND MOVE REWARD TO ‘OFF’

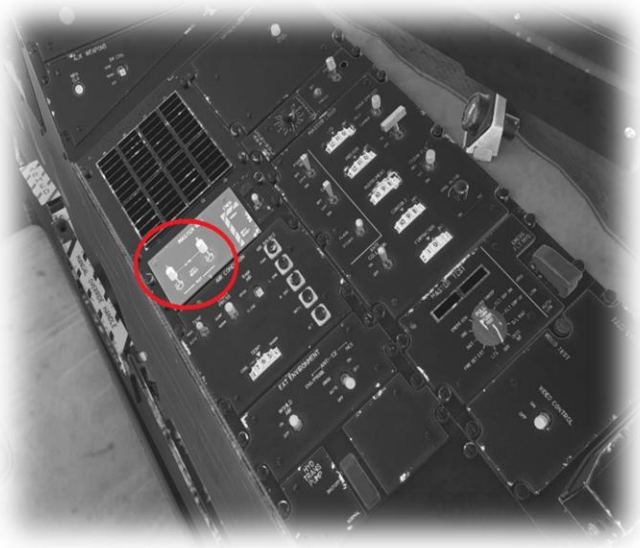
(mouse operation)

- HOLD UNTIL RPMS DROP TO ZERO



LEFT GENERATOR – OFF

RIGHT GENERATOR – OFF



EXTERNAL LIGHTS

– OFF